

# STANDARD PLANS

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CALIFORNIA STATE TRANSPORTATION AGENCY  
DEPARTMENT OF TRANSPORTATION

## 2015

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## ***PREFACE***

This 2015 edition of the California Department of Transportation Standard Plans is based on U.S. Customary units. This is the Department's third edition Standard Plans since the Department reverted back to U.S. Customary units as its base units. U.S. Customary units ("inch-pound") are defined by the National Institute of Standards and Technology (NIST). The last edition of the Department's Standard Plans published in U.S. Customary units only was the 2010 edition.

This 2015 edition of the Department's Standard Plans is to be used in conjunction with the 2015 edition of the Department's Standard Specifications.



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*Shane N. Tushnet*  
REGISTERED CIVIL ENGINEER

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THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**GENERAL RULES:**

- Words are preferred over abbreviations and acronyms.
- Use words in notes, except where space is limited on the plan sheet.
- Do not use abbreviations or acronyms where the meaning may be in doubt.
- Abbreviations and acronyms may be used in callouts, dimensions, and tables.
- Use upper and lower case letters for abbreviation of a single word. e.g., Misc = miscellaneous and Bit Ctd = bituminous coated
- Use all upper case letters for acronyms. e.g., BCR = begin curb return

**UNITS OF MEASUREMENT:**

- See Tables A, B and C on Standard Plan A3C.
- Units of measurement are not part of abbreviations and acronyms. The above abbreviation and acronym general rules do not apply.

**SYMBOLS:**

- See Table D on Standard Plan A3C.

**SLOPES, FLARES, AND TAPERS:**

- Side slopes:  
X:Y - horizontal:vertical
- Flares and tapers:  
X:Y - longitudinal:lateral

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ABBREVIATIONS  
(SHEET 1 OF 3)**

**A3A**

**E continued**

EII	ELBOW
Emb	EMBANKMENT
EMS	EXTINGUISHABLE MESSAGE SIGN
Encl	ENCLOSURE
Engr	ENGINEER
EOD	EDGE OF DECK
EP	EDGE OF PAVEMENT
Eq	EQUATION
ERS	EARTH RETAINING STRUCTURE
ES	EDGE OF SHOULDER
ESA	ENVIRONMENTALLY SENSITIVE AREA
ESAL	EQUIVALENT SINGLE AXLE LOADS
EST	END STRIP
Estb	ESTABLISHMENT
ETW	EDGE OF TRAVELED WAY
EVC	END VERTICAL CURVE
EVUC	EMERGENCY VEHICLE UNIT CABLE
EVUD	EMERGENCY VEHICLE UNIT DETECTOR
EW	ENDWALL
Exc	EXCAVATION
Exlst	EXISTING
Exp	EXPANSION
Exp Jt	EXPANSION JOINT
Ext	EXTERIOR
Exwy	EXPRESSWAY

**F**

F	FILL,
	FULL CIRCLE
F & C	FRAME AND COVER
F & G	FRAME AND GRATE
FB	FLOOR BEAM,
	FLASHING BEACON
FBCA	FLASHING BEACON CONTROL ASSEMBLY
FBS	FLASHING BEACON WITH SLIP BASE
FCV	FLOW CONTROL VALVE
Fdn	FOUNDATION
FEBT	FACING EASTBOUND TRAFFIC
Fert	FERTILIZER
FES	FLARED END SECTION
FF	FILTER FABRIC
FG	FINISH GRADE
FH	FIRE HYDRANT,
	FLEXIBLE HOSE
Fig	FIGURE
FIPT	FEMALE IRON PIPE THREAD
FIS	FERTILIZER INJECTOR SYSTEM
FL	FLOW LINE
FNBT	FACING NORTHBOUND TRAFFIC
FO	FIBER OPTIC
FOB	FREE ON BOARD
FOC	FACE OF CONCRETE
F/P	FULL/PART CIRCLE
FR	FIBER ROLL
Fr Rd	FRONTAGE ROAD
FS	FAR SIDE,
	FINISHED SURFACE,
	FLOW SENSOR
FSBT	FACING SOUTHBOUND TRAFFIC
FSC	FLOW SENSOR CABLE
Ftg	FOOTING
FV	FUSH VALVE
FWBT	FACING WESTBOUND TRAFFIC
Fwy	FREEWAY

**C continued**

Cr	CREEK
CRCP	CONTINUOUSLY REINFORCED CONCRETE PAVEMENT
CRSP	CONCRETED ROCK SLOPE PROTECTION
CS	COMPOST SOCK
CSP	CORRUGATED STEEL PIPE
CSPA	CORRUGATED STEEL PIPE ARCH
CST	CENTER STRIP
Ct	COURT
CTB	CEMENT TREATED BASE
CTID	CALTRANS IDENTIFICATION
CTPB	CEMENT TREATED PERMEABLE BASE
CTPM	CEMENT TREATED PERMEABLE MATERIAL
Ctrs	CENTERS
Culv	CULVERT
CV	CHECK VALVE

**D**

D	DEPTH,
	DIRECTION (IN PERCENT) OF HEAVIER TRAFFIC FLOW
Dbt	DOUBLE
DD	DOWNDRAIN
Deg	DEGREE
Del	DELINEATOR
Det	DETAIL,
	DETOUR
DF	DOUGLAS FIR
DG	DECOMPOSED GRANITE
DHV	DESIGN HOURLY VOLUME
DI	DRAINAGE INLET,
	DROP INLET
Dia	DIAMETER
Diaph	DIAPHRAGM
DIP	DUCTILE IRON PIPE
Dist	DISTANCE,
	DISTRICT
DIT	DRIP IRRIGATION TUBING
DLC	LOOP DETECTOR LEAD-IN CABLE
DMBB	DOUBLE METAL BEAM BARRIER
DN	DIAMETER NOMINAL
Dr	DRIVE
DTBB	DOUBLE THRIE BEAM BARRIER
DVA	DRIP VALVE ASSEMBLY
Dwy	DRIVEWAY

**E**

E	EAST
Ease	EASEMENT
EB	END OF BRIDGE,
	EASTBOUND
EC	END HORIZONTAL CURVE,
	EROSION CONTROL
ECR	END CURB RETURN
ECTC	EROSION CONTROL TECHNOLOGY COUNCIL
ED	EDGE DRAIN
EDC	EDGE DRAIN CLEANOUT
EDO	EDGE DRAIN OUTLET
EDV	EDGE DRAIN VENT
Elec	ELECTROLIER
Elect	ELECTRIC,
	ELECTRICAL
Elev	ELEVATION

**B continued**

BP	BOOSTER PUMP, BYPASS
BPA	BACKFLOW PREVENTER ASSEMBLY
BPB	BICYCLE PUSH BUTTON
BPE	BACKFLOW PREVENTER ENCLOSURE
B/PI	BRASS/PLASTIC
Br	BRIDGE
Brg	BEARING
BTU	BRITISH THERMAL UNIT
BV	BALL VALVE
BVC	BEGIN VERTICAL CURVE
BW	BARBED WIRE

**C**

C	CONDUIT, CHANNEL (STRUCTURAL STEEL SHAPE)
CAA	CABLE ANCHOR ASSEMBLY
CAP	CORRUGATED ALUMINUM PIPE
CAPA	CORRUGATED ALUMINUM PIPE ARCH
CARV	COMBINATION AIR RELEASE VALVE
CAS	CONSTRUCTION AREA SIGN
CB	CONCRETE BARRIER, CIRCUIT BREAKER, COUPLING BAND, COMPOST BERM
CBW	CONCRETE BLOCK WALL
C-C	CENTER TO CENTER
CCA	CAM COUPLER ASSEMBLY
CCTV	CLOSED CIRCUIT TELEVISION
CCG	CONTROLLER ENCLOSURE CABINET
CEC	CENTER OF GRAVITY
CHDPE	CORRUGATED HIGH DENSITY POLYETHYLENE
Chnl	CHANNEL
Cnl	CAST IRON
CIDH	CAST-IN-DRILLED-HOLE
CIP	CAST-IN-PLACE, CAST IRON PIPE
CIPCP	CAST IN PLACE CONCRETE PIPE
CISS	CAST-IN-STEEL-SHELL
CJP	COMPLETE JOINT PENETRATION
Ckt	CIRCUIT
CL	CHAIN LINK
CL-6	CHAIN LINK FENCE (6 FT)
Cl	CLASS
Clr	CLEAR, CLEARANCE
CM	CENTER MARGIN LIGHT
CMP	CORRUGATED METAL PIPE
CMS	CHANGEABLE MESSAGE SIGN
CNC	CONTROL AND NEUTRAL CONDUCTORS
Cntl	CONTROL
Co	COUNTY
Col	COLUMN
Comm	COMMUNICATION
Conc	CONCRETE
Conn	CONNECTOR
Const	CONSTRUCT, CONSTRUCTION
Cont	CONTINUOUS
Coord	COORDINATE
CP	CANDLEPOWER, COPPER PIPE

**A**

AB	AGGREGATE BASE
ABBC	ASBESTOS BONDED BITUMINOUS COATED
ABM	AIR-BLOWN MORTAR
Abn	ABANDON
ABS	ACRYLONITRILE-BUTADIENE-STYRENE
Abut	ABUTMENT
AC	ASPHALT CONCRETE
AC+	UNGROUND CONDUCTOR
ACB	ASPHALT CONCRETE BASE
ACC	ARMOR-CLAD CONDUCTORS
ACP	ASBESTOS CEMENT PIPE
Adj	ADJUST, ADJUSTABLE, ADJACENT
ADL	ADDED DEAD LOAD
ADT	AVERAGE DAILY TRAFFIC
AFES	ALTERNATIVE FLARED END SECTION
Ahd	AHEAD
AIC	AUXILIARY IRRIGATION CONTROLLER
AIt	ALTERNATE, ALTERNATIVE
AM	TIME FROM MIDNIGHT TO NOON
Amend	AMENDMENT
AP	ALTERNATIVE PIPE
APC	ALTERNATIVE PIPE CULVERT
Approx	APPROXIMATE
APS	ACCESSIBLE PEDESTRIAN SIGNAL
APU	ALTERNATIVE PIPE UNDERDRAIN
ARS	ACCELERATION RESPONSE SPECTRUM
ARV	AIR RELEASE VALVE
AS	AGGREGATE SUBBASE
ASP	ALTERNATIVE SLOTTED PIPE
ASRP	ALUMINUM SPIRAL RIB PIPE
Asy	ASSEMBLY
ATPB	ASPHALT TREATED PERMEABLE BASE
ATPM	ASPHALT TREATED PERMEABLE MATERIAL
Auto	AUTOMATIC
Aux	AUXILIARY
AVB	ATMOSPHERIC VACUUM BREAKER
Ave	AVENUE
Avg	AVERAGE

**B**

B & B	BALLED AND BURLAPPED
BAGR	BRIDGE APPROACH GUARD RAILING
Batt	BATTERY
BB	BEGINNING OF BRIDGE
B/B	BRASS/BRONZE
B/B/PI	BRASS/BRONZE/PLASTIC
B-B	BACK-TO-BACK
BBS	BATTERY BACKUP SYSTEM
BC	BEGIN HORIZONTAL CURVE, BOLT CIRCLE
BCR	BEGIN CURB RETURN
Beg	BEGIN
BFM	BONDED FIBER MATRIX
Bit Ctd	BITUMINOUS COATED
Bk	BACK
Bkf	BACKFILL
Blgd	BUILDING
Blk	BLACK
BLM	BRIDGE-LOG MILE
Blvd	BOULEVARD
BM	BENCH MARK
BMP	BEST MANAGEMENT PRACTICE
Bot	BOTTOM

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*Alfred N. Tushnet*  
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<b>G</b>	
G	GROOVE, EQUIPMENT GROUNDING CONDUCTOR
g	ACCELERATION DUE TO GRAVITY
Ga	GAUGE
Galv	GALVANIZED
GARV	GARDEN VALVE
GARVA	GARDEN VALVE ASSEMBLY
GB	GROUND BUS
QFCI	GROUND FAULT CIRCUIT INTERRUPTER
GM	GRAVEL MULCH
GP	GRADING PLANE
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GUARD RAILING
Grn	GREEN
GSP	GALVANIZED STEEL PIPE
Gtr	GUTTER
GV	GATE VALVE
<b>H</b>	
H	HEIGHT, HALF CIRCLE
HAR	HIGHWAY ADVISORY RADIO
h, hr	HOUR
HD	HORIZONTAL DRAIN
HDPE	HIGH DENSITY POLYETHYLENE
hdw	HEADWALL
Hex	HEXAGONAL
Hex Hd	HEXAGONAL HEAD
HMA	HOT MIX ASPHALT
Horlz	HORIZONTAL
HOV	HIGH OCCUPANCY VEHICLE
HP	HINGE POINT, HORSEPOWER
HPL	HIGH PRESSURE LINE
HPS	HIGH PERFORMANCE STEEL, HIGH PRESSURE SODIUM
HS	HIGH STRENGTH
HSS	HOLLOW STRUCTURAL SECTION
HW	HEADWALL, HIGH WATER
HWM	HIGH WATER MARK
Hwy	HIGHWAY
<b>I</b>	
IB	IMPORTED BORROW
IC	IRRIGATION CONTROLLER
ICC	IRRIGATION CONTROLLER(S) IN CONTROLLER ENCLOSURE CABINET
ID	INSIDE DIAMETER
IF	INSIDE FACE
IFS	IRRIGATION FILTRATION SYSTEM
IISNS	INTERNALLY ILLUMINATED STREET NAME SIGN
Int	INTERIOR
Inv	INVERT
IPS	IRON PIPE SIZE
IPT	IRON PIPE THREAD
Irr	IRRIGATION
ISL	INDUCTION SIGN LIGHTING
<b>J</b>	
Jct	JUNCTION
JP	JOINT POLE
JPCP	JOINTED PLAIN CONCRETE PAVEMENT
JS	JUNCTION STRUCTURE
Jt	JOINT

<b>K</b>	
<b>L</b>	
L	LENGTH, ANGLE (STRUCTURAL STEEL SHAPE)
Lat	LATITUDE
LCB	LEAN CONCRETE BASE
LED	LIGHT EMITTING DIODE
LMA	LUMINAIRE MAST ARM
Ln	LANE
Loc	LOCATION
LOL	LAYOUT LINE
Long	LONGITUDE
Longit	LONGITUDINAL
LPS	LOW PRESSURE SODIUM
LS	LUMP SUM
Lt	LEFT
Ltg	LIGHTING
Lum	LUMINAIRE
<b>M</b>	
M	METERED
Maint	MAINTENANCE
MAS	MAST ARM MOUNTING SIDE ATTACHMENT
MAT	MAST ARM MOUNTING TOP ATTACHMENT
Max	MAXIMUM
MB	METAL BEAM
MBB	METAL BEAM BARRIER
MBGR	METAL BEAM GUARD RAILING
MBPS	MANUAL BYPASS SWITCH
MCV	MANUAL CONTROL VALVE
Med	MEDIAN
MGS	MIDWEST GUARDRAIL SYSTEM
MH	MANHOLE
MIC	MASTER IRRIGATION CONTROLLER
Min	MINIMUM
MIPT	MALE IRON PIPE THREAD
Misc	MISCELLANEOUS
Misc I & S	MISCELLANEOUS IRON AND STEEL
Mkr	MARKER
M/M	MULTIPLE TO MULTIPLE TRANSFORMER
Mod	MODIFIED, MODIFY
Mon	MONUMENT
MP	METAL PLATE
MPGR	METAL PLATE GUARD RAILING
MR	MOVEMENT RATING
MSE	MECHANICALLY STABILIZED EMBANKMENT
Mt	MOUNTAIN, MOUNT
Mtg	MOUNTING
Mtl	MATERIAL
MV	MERCURY VAPOR LIGHTING FIXTURE
MVDS	MICROWAVE VEHICLE DETECTION SYSTEM
MVP	MAINTENANCE VEHICLE PULLOUT
<b>N</b>	
N	NORTH, NEUTRAL (GROUNDED CONDUCTOR)
NB	NORTHBOUND, NEUTRAL BUS
NC	NORMALLY CLOSE

<b>N continued</b>	
NCN	NO COMMON NAME
NL	NOZZLE LINE
NO	NORMALLY OPEN
No.	NUMBER (MUST HAVE PERIOD)
Nos.	NUMBERS (MUST HAVE PERIOD)
NPS	NOMINAL PIPE SIZE
NPT	NATIONAL PIPE THREAD
NS	NEAR SIDE
NTS	NOT TO SCALE
<b>O</b>	
Obir	OBLITERATE
OC	OVERCROSSING
O/C	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OG	ORIGINAL GROUND
OGAC	OPEN GRADED ASPHALT CONCRETE
OGFC	OPEN GRADED FRICTION COURSE
OH	OVERHEAD
OHWM	ORDINARY HIGH WATER MARK
OL	OVERLAP
O-O	OUT TO OUT
Opp	OPPOSITE
OSD	OVERSIDE DRAIN
<b>P</b>	
P	PAGE, PITCH, PART CIRCLE, NUMBER OF POLES FOR A CIRCUIT BREAKER
PAP	PERFORATED ALUMINUM PIPE
PB	PULL BOX
PBA	PUSH BUTTON ASSEMBLY
PC	POINT OF CURVATURE, PRECAST
PCC	POINT OF COMPOUND CURVE, PORTLAND CEMENT CONCRETE
PCMS	PORTABLE CHANGEABLE MESSAGE SIGN
PCP	PERFORATED CONCRETE PIPE, PRESTRESSED CONCRETE PIPE
PCVC	POINT OF COMPOUND VERTICAL CURVE
PE	POLYETHYLENE
PEC	PERMIT TO ENTER AND CONSTRUCT, PHOTOELECTRIC CONTROL
Ped	PEDESTRIAN
Ped OC	PEDESTRIAN OVERCROSSING
Ped UC	PEDESTRIAN UNDERCROSSING
Perm Mtl	PERMEABLE MATERIAL
PEU	PHOTOELECTRIC UNIT
PG	PROFILE GRADE
PJ	POINT OF INTERSECTION
PJP	PARTIAL JOINT PENETRATION
Pkt	PACKET
Pkwy	PARKWAY

<b>P continued</b>	
PL	PLATE
PI	PLASTIC
P/L	PROPERTY LINE
PLS	PURE LIVE SEED
Pit	PLANT,
Pit Est	PLANT ESTABLISHMENT
PM	POST MILE, TIME FROM NOON TO MIDNIGHT
PN	PAVING NOTCH
POC	POINT OF HORIZONTAL CURVE
POT	POINT OF TANGENT
POVC	POINT OF VERTICAL CURVE
PP	PIPE PILE, PLASTIC PIPE, POWER POLE
PPL	PERFORMED PERMEABLE LINER
PPP	PERFORATED PLASTIC PIPE
PR	PRESSURE RATED
PRC	POINT OF REVERSE CURVE
PRF	PAVEMENT REINFORCING FABRIC
PRLV	PRESSURE RELIEF VALVE
PRV	PRESSURE REGULATING VALVE
PRVC	POINT OF REVERSE VERTICAL CURVE
PS&E	PLANS, SPECIFICATIONS AND ESTIMATES
PS	PRESTRESSED
P/S	PRESTRESSED
PSP	PERFORATED STEEL PIPE
PT	POINT OF TANGENCY, CONDUIT WITH PULL TAPE
PTR	POWER TRANSFER RELAY
PVC	POLYVINYL CHLORIDE
Pvmt	PAVEMENT
<b>Q</b>	
Q	QUARTER CIRCLE
QCV	QUICK COUPLING VALVE
Qty	QUANTITY
<b>R</b>	
R	RADIUS
R & D	REMOVE AND DISPOSE
R & S	REMOVE AND SALVAGE
R/C	RATE OF CHANGE
RCA	REINFORCED CONCRETE ARCH
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RCPA	REINFORCED CONCRETE PIPE ARCH
RCV	REMOTE CONTROL VALVE
RCVM	REMOTE CONTROL VALVE (MASTER)
RCVMF	REMOTE CONTROL VALVE (MASTER) W/FLOW SENSOR
RCVP	REMOTE CONTROL VALVE W/PRESSURE REGULATOR
RCW	RECYCLED WATER
Rd	ROAD
Rdwy	ROADWAY
RE	RELOCATED EQUIPMENT
RECP	ROLLED EROSION CONTROL PRODUCT
Reinf	REINFORCED, REINFORCEMENT, REINFORCING

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ABBREVIATIONS  
(SHEET 2 OF 3)**

**A3B**



**R continued**

Rel	RELOCATE
Repl	REPLACEMENT
Req	REQUIRED
Ret	RETAINING
Rev	REVISED, REVISION
RHMA	RUBBERIZED HOT MIX ASPHALT
RICS	REMOTE IRRIGATION CONTROL SYSTEM
Riv	RIVER
RM	ROAD-MIXED, RAMP METERING
RP	RADIUS POINT, REFERENCE POINT
RR	RAILROAD
RSP	ROCK SLOPE PROTECTION, REVISED STANDARD PLAN
Rt	RIGHT
Rte	ROUTE
RW	RETAINMENT, RETAINING WALL
R/W	RIGHT OF WAY
RWIS	ROADSIDE WEATHER INFORMATION SYSTEM
Rwy	RAILWAY

**S**

S	SOUTH, SLIP, SUPPLEMENT
SAE	STRUCTURE APPROACH EMBANKMENT
Salv	SALVAGE
SAPP	STRUCTURAL ALUMINUM PLATE PIPE
SB	SOUTHBOUND, SLIP BASE
SC	SAND CUSHION
S/C	SAW CUT LINE
Sch	SCHEDULE
SCSP	SLOTTED CORRUGATED STEEL PIPE
SD	STORM DRAIN
Sec	SECOND, SECTION
Sep	SEPARATION
SG	SUBGRADE
Shld	SHOULDER
Sht	SHEET
SIC	SIGNAL INTERCONNECT CABLE
Slg	SIGNAL
Slm	SIMILAR
SM	SELECTED MATERIAL
SMA	SIGNAL MAST ARM
SNS	STREET NAME SIGN
SP	STAND PIPE, SERVICE POINT
Spec	SPECIAL, SPECIFICATION(S)
SPP	SLOTTED PLASTIC PIPE

**S continued**

Sq	SQUARE
SS	SLOPE STAKE
SSBM	STRAP AND SADDLE BRACKET METHOD
SSD	STRUCTURAL SECTION DRAIN
SSPA	STRUCTURAL STEEL PLATE ARCH
SSPP	STRUCTURAL STEEL PLATE PIPE
SSPPA	STRUCTURAL STEEL PLATE PIPE ARCH
SSRP	STEEL SPIRAL RIB PIPE
SST	SIDE STRIP
St	STREET
Sta	STATION
STBB	SINGLE THRIE BEAM BARRIER
Std	STANDARD
Str	STRUCTURE
Surf	SURFACING
SW	SIDEWALK, SOUND WALL
Swr	SEWER
Sym	SYMMETRICAL
S4S	SURFACE 4 SIDES

**T**

T	SEMI-TANGENT, THIRD CIRCLE, THREAD, TRUCK TRAFFIC VOLUME (IN PERCENT) OF DESIGN HOURLY VOLUME
Tan	TANGENT
TB	TERMINAL BOARD
TBB	THRIE BEAM BARRIER
Tbr	TIMBER
T&B	TOP AND BOTTOM
TCB	TRAFFIC CONTROL BOX
TCE	TEMPORARY CONSTRUCTION EASEMENT
TDC	TELEPHONE DEMARCATION CABINET
Temp	TEMPORARY, TEMPERATURE, TEMPERED
TG	TOP OF GRADE
TI	TRAFFIC INDEX
TLS	TRUCK LOADING STAND PIPE
TMS	TRAFFIC MONITORING STATION
TOS	TRAFFIC OPERATIONS SYSTEM
ToT	TOTAL
TP	TELEPHONE POLE
TPB	TREATED PERMEABLE BASE
TPM	TREATED PERMEABLE MATERIAL
TQ	THREE-QUARTER CIRCLE
Trans	TRANSITION
TRM	TURF REINFORCEMENT MAT
TS	TRANSVERSE, TRAFFIC SIGNAL, TUBULAR STEEL
TT	TWO-THIRDS CIRCLE
TWSA	TREE WELL SPRINKLER ASSEMBLY
Typ	TYPICAL

**U**

UC	UNDERCROSSING
UD	UNDERDRAIN
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
UP	UNDERPASS
UPS	UNINTERRUPTIBLE POWER SUPPLY
UPSC	UNINTERRUPTIBLE POWER SUPPLY CONTROLLER
UPSM	UPS MODE

**V**

V	VALVE, DESIGN SPEED
Var	VARIABLE, VARIES
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
Veh	VEHICLE
Vert	VERTICAL
Via	VIADUCT
VIVDS	VIDEO IMAGE VEHICLE DETECTION SYSTEM
Vol	VOLUME

**W**

W	WEST, WIDTH
W/	WITH
W/O	WITHOUT
WB	WESTBOUND
WH	WEEP HOLE
Wht	WHITE
WIM	WEIGH-IN-MOTION
WM	WIRE MESH, WATER METER
WS	WATER SURFACE, WYE STRAINER
WSA	WYE STRAINER ASSEMBLY
WSP	WELDED STEEL PIPE
Wt	WEIGHT
WV	WATER VALVE
WW	WINGWALL
WWL	WINGWALL LAYOUT LINE
WWM	WELDED WIRE MESH

**X**

Xfmr	TRANSFORMER
X Sec	CROSS SECTION
Xing	CROSSING

**Y**

Yr	YEAR
Yrs	YEARS

**Z**

**UNITS OF MEASUREMENT:**

Some of the units used in the project plan quantity tables and in the Bid Item List are:

**TABLE A**

UNIT	DEFINITION
ACRE	ACRE
CF	CUBIC FOOT
CY	CUBIC YARD
EA	EACH
GAL	GALLON
LB	POUND
LF	LINEAR FOOT
LNMI	LANE MILE
LS	LUMP SUM
SQFT	SQUARE FOOT
SQYD	SQUARE YARD
STA	100 FEET
TON	2,000 POUNDS

Some of the units used in the plans other than in the project plan quantity tables are:

**TABLE B**

UNIT	DEFINITION
ksi	KIPS PER SQUARE INCH
ksf	KIPS PER SQUARE FOOT
psi	POUNDS PER SQUARE INCH
psf	POUNDS PER SQUARE FOOT
lb/ft <sup>3</sup> , pcf	POUNDS PER CUBIC FOOT
tsf	TONS PER SQUARE FOOT
mph, MPH *	MILES PER HOUR
oz	OUNCE
lb	POUND
kip	1,000 POUNDS
cal	CALORIE
ft	FOOT OR FEET
gal	GALLON

\* For use on a sign panel only

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS								
<i>Alfred N. Tushnet</i> REGISTERED CIVIL ENGINEER													
October 30, 2015 PLANS APPROVAL DATE													
<table border="1"> <tr><td>Grade</td><td>M. Tushnet</td></tr> <tr><td>No.</td><td>C49814</td></tr> <tr><td>Exp.</td><td>9-30-16</td></tr> <tr><td>CIVIL</td><td></td></tr> </table>						Grade	M. Tushnet	No.	C49814	Exp.	9-30-16	CIVIL	
Grade	M. Tushnet												
No.	C49814												
Exp.	9-30-16												
CIVIL													
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Some of the units used in the Electrical plans are:

**TABLE C**

UNIT	DEFINITION
A	AMPERE
bps	BITS PER SECOND
Bps	BYTES PER SECOND
FC	FOOT-CANDLE
Hz	HERTZ
k *	KILO
kV	KILOVOLT
kVA	KILOVOLT-AMPERE
kW	KILOWATT
M *	MEGA
m *	MILLI
mA	MILLIAMPERE
min	MINUTE
p *	PICO
s	SECOND
V	VOLT
VA	VOLT-AMPERE
V(ac)	VOLT (DIRECT CURRENT)
V(ac)	VOLT (ALTERNATING CURRENT)
W	WATT
Ω	OHM
μ *	MICRO

\* Prefix to a unit

**SYMBOLS:**

Commonly used symbols for U.S. customary units

**TABLE D**

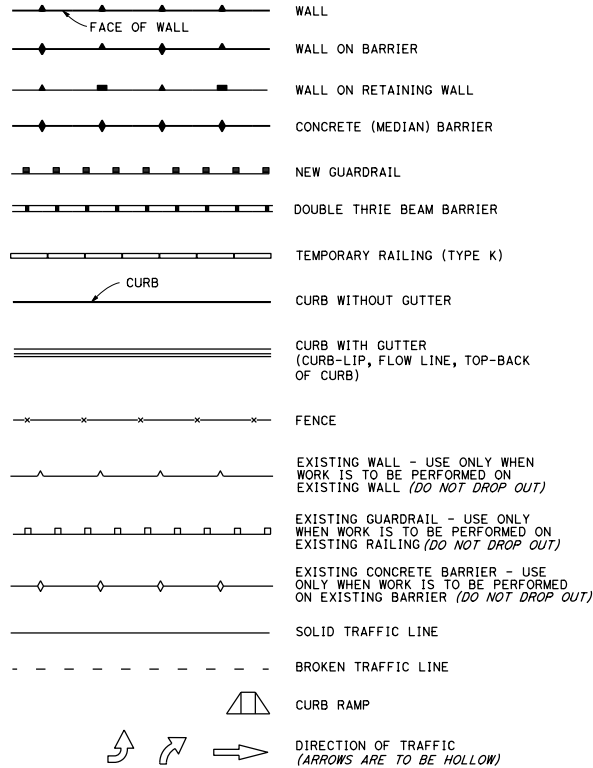
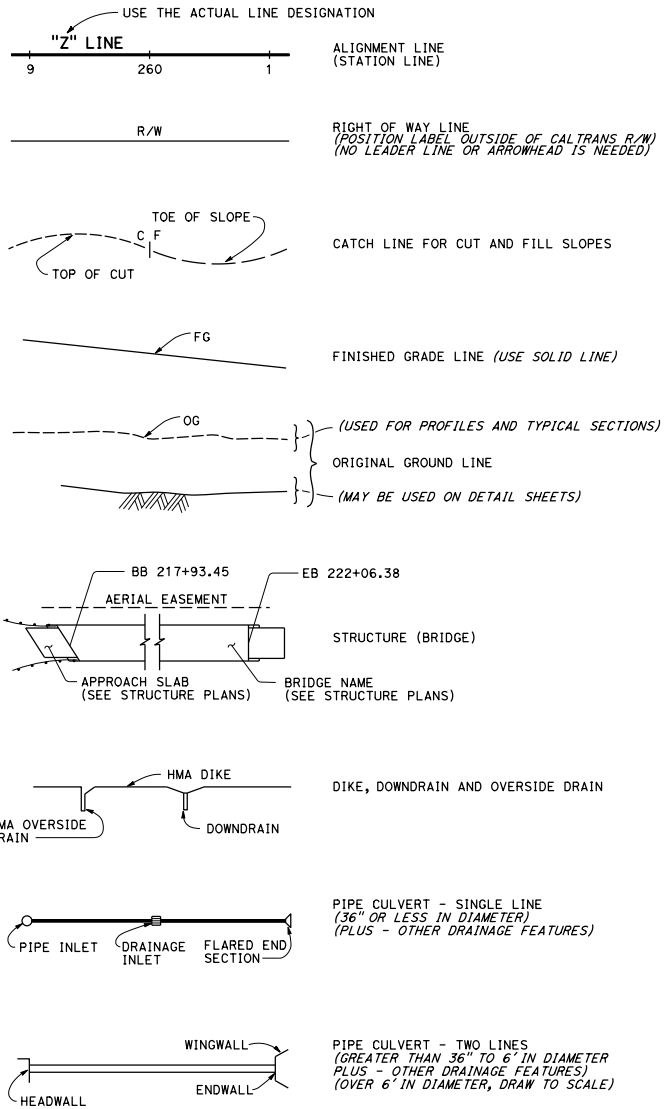
SYMBOL	DEFINITION
⊙	AT
⊖	CENTERLINE
∅	NOMINAL DIAMETER, DIAMETER, PHASE
Ⓟ	PLATE
Ⓢ	STATIONLINE

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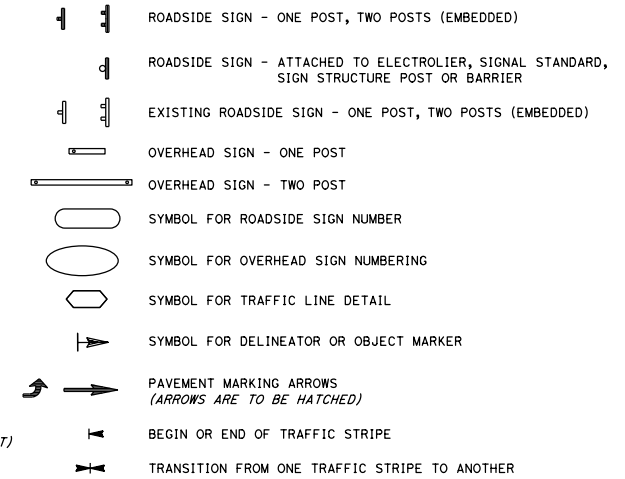
**ABBREVIATIONS  
(SHEET 3 OF 3)**

**A3C**

## SYMBOLY FOR DESIGN FEATURES



## STRIPING AND SIGNING



Dist.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Jeffrey C. Kopley  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
 Jeff C. Kopley  
 No. 53361  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

STATE OF CALIFORNIA  
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**LEGEND**  
**LINES AND SYMBOLS**  
**(SHEET 1 OF 5)**

NO SCALE

**A10A**

2015 STANDARD PLAN A10A

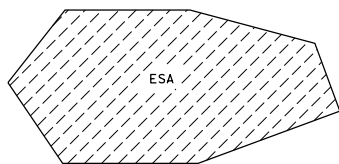


Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
October 30, 2015 PLANS APPROVAL DATE					
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**WATER POLLUTION CONTROL**

- TFESA Temp FENCE (TYPE ESA)
- TSF Temp SILT FENCE
- TRSF Temp Reinf SILT FENCE
- TFR Temp FIBER ROLL
- TGBB Temp GRAVEL BAG BERM
- TSBB Temp STRAW BALE BARRIER
- Temp SLOPE DRAIN FLEX PIPE
- Temp EARTH BERM
- Temp DITCH/SWALE
- WASH Temp CONCRETE WASHOUT
- Temp DRAINAGE INLET PROTECTION
- Temp DRAINAGE OUTLET PROTECTION
- Temp CHECK DAM
- Temp CONSTRUCTION ENTRANCE
- Temp STOCKPILE

**ENVIRONMENTALLY SENSITIVE AREA (ESA)**



**DRAINAGE**

- DIRECTION FLOW OF WATER
- DRAINAGE SYSTEM SYMBOL
- DRAINAGE UNIT SYMBOL
- DRAINAGE INLET
- DITCH FLOW LINE

**DRAFTING**

- TILDE - DESIGNATES AN AREA
- NORTH ARROW
- ADDENDUM SHEET SYMBOL (ADDENDUM NUMBER IS INCLUDED INSIDE THE SYMBOL)
- MATCH LINE
- BREAK LINE

**BOUNDARY LINE**

- STATE OR COUNTRY
- COUNTY OR RESERVATION BOUNDARY
- CITY OR MILITARY BOUNDARY
- FOREST
- SUBDIVISION, SECTION, GRANT
- RANCHO

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**LEGEND**  
**LINES AND SYMBOLS**  
**(SHEET 2 OF 5)**

NO SCALE

**A10B**

2015 STANDARD PLAN A10B

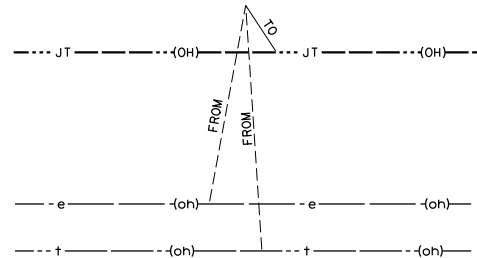
**SUBSURFACE FACILITIES**

- W ——— W ——— W ——— NEW WATER
- w ——— w ——— w ——— Exist WATER
- G ——— G ——— G ——— NEW NATURAL GAS
- g ——— g ——— g ——— Exist NATURAL GAS
- S ——— S ——— S ——— NEW SEWER
- s ——— s ——— s ——— Exist SEWER
- E ——— E ——— E ——— NEW ELECTRICAL
- e ——— e ——— e ——— Exist ELECTRICAL
- T ——— T ——— T ——— NEW TELEPHONE
- t ——— t ——— t ——— Exist TELEPHONE
- GS ——— GS ——— GS ——— NEW GASOLINE
- gs ——— gs ——— gs ——— Exist GASOLINE
- O ——— O ——— O ——— NEW OIL
- o ——— o ——— o ——— Exist OIL
- TV ——— TV ——— TV ——— NEW TELEVISION
- tv ——— tv ——— tv ——— Exist TELEVISION
- ST ——— ST ——— ST ——— NEW STEAM
- st ——— st ——— st ——— Exist STEAM
- TC ——— TC ——— TC ——— NEW TELEMETER CABLE
- tc ——— tc ——— tc ——— Exist TELEMETER CABLE
- SD ——— SD ——— SD ——— NEW STORM DRAIN
- sd ——— sd ——— sd ——— Exist STORM DRAIN
- FO ——— FO ——— FO ——— NEW FIBER OPTIC
- fo ——— fo ——— fo ——— Exist FIBER OPTIC
- JT ——— JT ——— JT ——— NEW JOINT TRENCH
- jt ——— jt ——— jt ——— Exist JOINT TRENCH
- RCW ——— RCW ——— RCW ——— NEW RECYCLED WATER
- rcw ——— rcw ——— rcw ——— Exist RECYCLED WATER
- Irr-c ——— Irr-c ——— Irr-c ——— Exist IRRIGATION CONDUIT
- es-c ——— es-c ——— es-c ——— Exist ELECTRICAL SYSTEMS CONDUIT

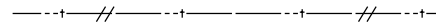
**OVERHEAD FACILITIES**

- E ——— (OH) ——— E ——— NEW ELECTRICAL
- e ——— (oh) ——— e ——— Exist ELECTRICAL
- TC ——— (OH) ——— TC ——— NEW TELEMETER CABLE
- tc ——— (oh) ——— tc ——— Exist TELEMETER CABLE
- T ——— (OH) ——— T ——— NEW TELEPHONE
- t ——— (oh) ——— t ——— Exist TELEPHONE
- TV ——— (OH) ——— TV ——— NEW TELEVISION
- tv ——— (oh) ——— tv ——— Exist TELEVISION
- FO ——— (OH) ——— FO ——— NEW FIBER OPTIC
- fo ——— (oh) ——— fo ——— Exist FIBER OPTIC
- JT ——— (OH) ——— JT ——— NEW JOINT OVERHEAD
- jt ——— (oh) ——— jt ——— Exist JOINT OVERHEAD

**SHOWING THE RELOCATION OF EXISTING FACILITIES TO THE NEW LOCATION**



**ABANDONED FACILITY**



// ABANDON SYMBOL IS THE CELL "ABANDN"

THERE ARE LINE STYLES FOR ABANDONED UNDERGROUND UTILITIES IN THE CALTRANS LINE STYLE RESOURCE FILE (ct1style-SS3.rsc)

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Jeffrey C. Kopley*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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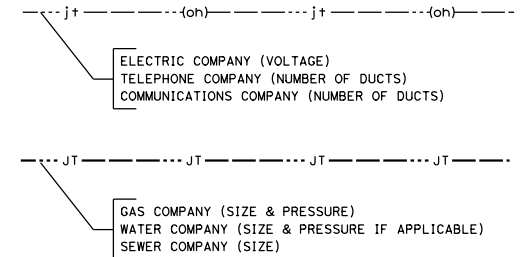
**NOTE:**

IDENTIFY (LABEL) THE OWNER OF EACH FACILITY PLUS THE SIZE, PRESSURE AND VOLTAGE (IF APPLICABLE) FOR ALL FACILITIES (WHETHER PART OF A JOINT OVERHEAD, JOINT TRENCH OR SOLO INSTALLATION).

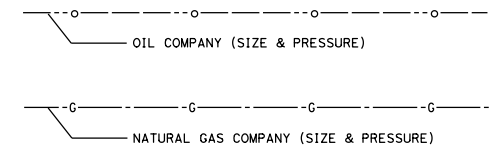
THE TYPE OF FACILITY IS IDENTIFIED BY THE SYMBOLOGY OF THE LINE STYLE CHOSEN (SEE LINE STYLES ON THIS STANDARD PLAN SHEET).

WHEN USING THE JOINT OVERHEAD OR JOINT TRENCH SYMBOLOGY (SEE THE CALTRANS LINE STYLES ON THIS PAGE), USE A BRACKET TO GROUP AND LABEL ALL THE FACILITIES ASSOCIATED WITH THE JOINT OVERHEAD OR TRENCH (SEE THE EXAMPLES BELOW).

**JOINT OVERHEAD/TRENCH**



**SOLO FACILITY**



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**LEGEND**

**LINES AND SYMBOLS**  
(SHEET 3 OF 5)

NO SCALE

**A10C**













2015 STANDARD PLAN A10C


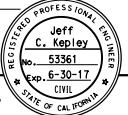
## EXISTING UTILITY POINT FEATURES

THE LEVEL AND COLOR OF AN EXISTING UTILITY POINT FEATURE SYMBOL MATCHES THE UTILITY TYPE LINE STYLE THAT IT IS ASSOCIATED WITH. THE NAME OF THE STANDARD CELLS FOR EACH SYMBOL VARY SLIGHTLY ACCORDING TO THE FACILITY TYPE [e.g., UT-MH-SEWER, UT-MH-GAS]. MULTIPLE VERSIONS OF A PARTICULAR SYMBOL REPRESENTING AN EXISTING UTILITY POINT FEATURE IS USED WHEN EACH IS ASSOCIATED WITH A DIFFERENT FACILITY [e.g., POWER POLE FOR OVERHEAD-ELECTRICAL, TELEPHONE, FIBER OPTIC, JOINT, ETC.]. THIS DIFFERENTIATION FACILITATES ASSET MANAGEMENT OF EXISTING UTILITY FEATURES WITHIN THE CALTRANS RIGHT OF WAY.



## EXISTING UTILITY CELL SYMBOLOGY REPRESENTING UTILITY POINT FEATURES

ATTRIBUTES (METADATA) FOR UTILITY FEATURES WILL BE LOCATED IN UTILITY DATABASE. ONLY AS-BUILT FACILITIES ARE IN THE UTILITY DATABASE. UTILITY DATABASE DOES NOT INCLUDE NEW FACILITIES TO BE CONSTRUCTED.

-  **CABINET:**  
ELECTRICAL, FIBER OPTIC, TELECOMMUNICATION,  
TELEPHONE, TELEVISION
-  **DRAINAGE INLET:**  
SEWER, STORM DRAIN
-  **FIRE HYDRANT:**  
WATER
-  **LAMP POST:**  
ELECTRICAL
-  **METER:**  
ELECTRICAL, NATURAL GAS, WATER
-  **MANHOLE:**  
ELECTRICAL, FIBER OPTIC, GAS, JOINT FACILITY,  
NATURAL GAS, OIL, RECYCLED WATER, SEWER,  
STEAM, STORM DRAIN, TELECOMMUNICATION,  
TELEPHONE, TELEVISION, WATER
-  **PULL BOX:**  
ELECTRICAL, FIBER OPTIC, JOINT FACILITY,  
TELECOMMUNICATION, TELEPHONE, TELEVISION
-  **POWER POLE:**  
ELECTRICAL, FIBER OPTIC, JOINT FACILITY,  
TELECOMMUNICATION, TELEPHONE, TELEVISION
-  **TRANSMISSION TOWER:**  
ELECTRICAL, FIBER OPTIC, JOINT FACILITY,  
TELECOMMUNICATION, TELEPHONE, TELEVISION
-  **VALVE:**  
WATER, NATURAL GAS
-  **VENT:**  
GAS, NATURAL GAS, SEWER, STEAM
-  **VAULT:**  
ELECTRICAL, JOINT FACILITY

DIS#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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## POSITIVE LOCATION

-  POSITIVE LOCATION SYMBOL  
IDENTIFYING THE POTHOLING NUMBER
-  POTHOLING SYMBOL MARKING THE EXACT LOCATION

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LEGEND**  
**LINES AND SYMBOLS**  
**(SHEET 4 OF 5)**  
NO SCALE

**A10D**

2015 STANDARD PLAN A10D

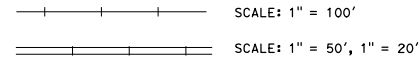
**TOPOGRAPHIC MAPPING LINES AND SYMBOLS**  
**TOPOGRAPHIC MAPPING IS DROPPED OUT ON FINAL CONTRACT PLANS**

---	CURB
- - - -	LANE STRIPE
---	EDGE OF TRAVELED WAY (STATE HIGHWAY)
---	EDGE OF TRAVELED WAY (OTHER)
---	EDGE OF ASPHALT (SHOULDER)
---	CONCRETE
---	GUARDRAIL
---	MEDIAN BARRIER
---	FENCE
---	MASONRY WALL
---	MASONRY WALL AND FENCE
---	RETAINING WALL
---	RETAINING WALL AND FENCE
---	RETAINING WALL AND MASONRY WALL
---	FLOWLINE (NATURAL AND MANMADE)
	EDGE OF BODY OF WATER, SURFACE HATCHED AND SPOT ELEVATION ON SURFACE
	DECK
	BUILDING
	COVERED PORCH OR PARKING
	DIRT PILE, ROCK
	POOL, SPA
	TREES, BRUSH, OR VEGETATION OVER 1/2 CONTOUR INTERVAL IN HEIGHT
	VINEYARD ROW
	CATTLE GUARD
	OVERHEAD SIGN - SINGLE POST
	OVERHEAD SIGN - TWO POST
	TRAIL
	DIRT ROAD

**SYMBOLS ENLARGED FOR CLARITY**

	LEFT TURN LANE ARROW
	HOV LANE (HIGH OCCUPANCY VEHICLE)
	DROP INLET, ROUND DROP INLET
	MANHOLE
	FIRE HYDRANT
	VALVE COVER, STAND PIPE, WELL, UTILITY BOX, RAILROAD CROSSING STANDARD
	UTILITY POLE, POLE AND WIRES, POLE WITH WIRES AND ANCHOR
	TRANSMISSION TOWER
	ELECTROLIER, ELECTROLIER ON POLE
	TRAFFIC SIGNAL, RAILROAD SIGNAL
	CALL BOX
	SIGNS - SINGLE POST, TWO POSTS
	SINGLE TREE, PALM
	MARSH OR SWAMP
	CRASH CUSHION
	TANK
	VOID - OBSTRUCTED AREA, UNABLE TO OBTAIN GROUND INFORMATION PHOTOGRAMMETRICALLY

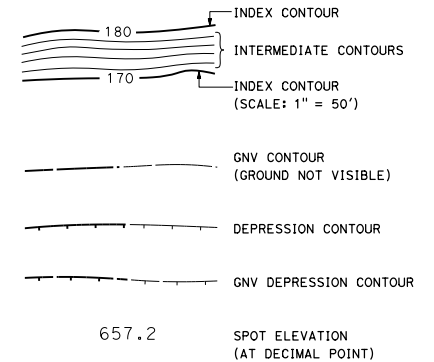
**RAILROAD**



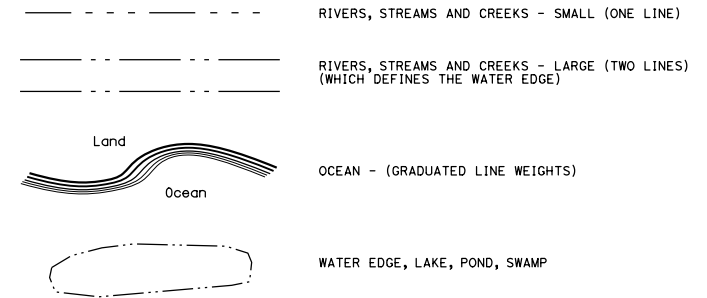
**CONTROL POINTS**

	HORIZONTAL AND VERTICAL CONTROL POINT
	HORIZONTAL CONTROL POINT
	VERTICAL CONTROL POINT

**TOPOGRAPHY**



**WATER WAYS**



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**LEGEND**  
**LINES AND SYMBOLS**  
**(SHEET 5 OF 5)**  
 NO SCALE

**A10E**

2015 STANDARD PLAN A10E

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Jeffrey C. Kopley</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
No. 53361 Exp. 6-30-17 CIVIL					
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REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Chris A. Risdon*  
 CERTIFIED ENGINEERING GEOLOGIST  
 October 30, 2015  
 PLANS APPROVAL DATE

REGISTERED GEOLOGIST  
 CHRIS A. RISDON  
 No. 2541  
 Exp. 12/31/16  
 STATE OF CALIFORNIA

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CEMENTATION	
DESCRIPTION	CRITERIA
WEAK	CRUMBLES OR BREAKS WITH HANDLING OR LITTLE FINGER PRESSURE.
MODERATE	CRUMBLES OR BREAKS WITH CONSIDERABLE FINGER PRESSURE.
STRONG	WILL NOT CRUMBLE OR BREAK WITH FINGER PRESSURE.

**ABBREVIATION:**

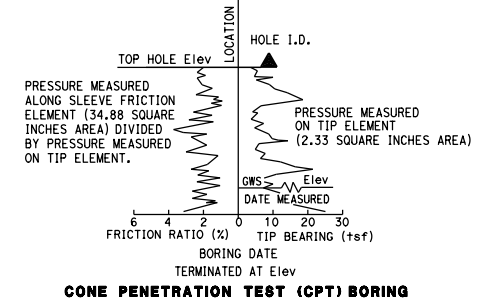
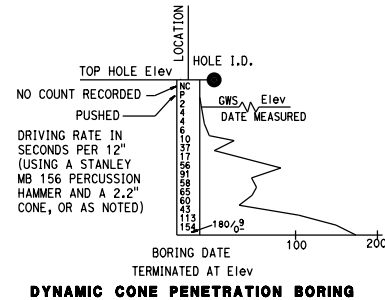
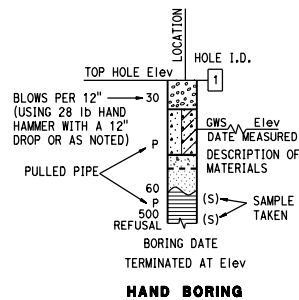
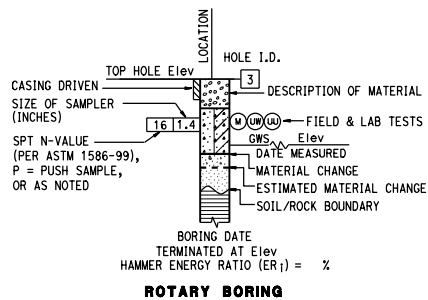
GWS = Ground Water Surface

BOREHOLE IDENTIFICATION		
SYMBOL	HOLE TYPE	DESCRIPTION
	A	AUGER BORING (HOLLOW OR SOLID STEM BUCKET)
	R	ROTARY DRILLED BORING (CONVENTIONAL)
	RW	ROTARY DRILLED WITH SELF-CASING WIRE-LINE
	RC	ROTARY CORE WITH CONTINUOUSLY-SAMPLED, SELF-CASING WIRE-LINE
	P	ROTARY PERCUSSION BORING (AIR)
	R	ROTARY DRILLED DIAMOND CORE
	RC	ROTARY DRILLED DIAMOND CORE, CONTINUOUSLY SAMPLED
	HD	HAND DRIVEN (1-INCH SOIL TUBE)
	HA	HAND AUGER
	D	DYNAMIC CONE PENETRATION BORING
	CPT	CONE PENETRATION TEST (ASTM D 5778)
	O	OTHER (NOTE ON LOTB)

Note: Size in inches.

CONSISTENCY OF COHESIVE SOILS				
DESCRIPTION	SHEAR STRENGTH (tsf)	POCKET PENETROMETER MEASUREMENT, PP, (tsf)	TORVANE MEASUREMENT, TV, (tsf)	VANE SHEAR MEASUREMENT, VS, (tsf)
VERY SOFT	LESS THAN 0.12	LESS THAN 0.25	LESS THAN 0.12	LESS THAN 0.12
SOFT	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
MEDIUM STIFF	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
STIFF	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
VERY STIFF	1 - 2	2 - 4	1 - 2	1 - 2
HARD	GREATER THAN 2	GREATER THAN 4	GREATER THAN 2	GREATER THAN 2

6



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**LEGEND - SOIL**  
 (SHEET 1 OF 2)  
 NO SCALE

**A10F**

2015 STANDARD PLAN A10F

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

GROUP SYMBOLS AND NAMES			
GRAPHIC/SYMBOL	GROUP NAMES	GRAPHIC/SYMBOL	GROUP NAMES
	GW		LEAN CLAY LEAN CLAY WITH SAND LEAN CLAY WITH GRAVEL
	GP		SANDY LEAN CLAY SANDY LEAN CLAY WITH GRAVEL GRAVELLY LEAN CLAY GRAVELLY LEAN CLAY WITH SAND
	GW-GM		SILTY CLAY SILTY CLAY WITH SAND SILTY CLAY WITH GRAVEL
	GW-GC		SANDY SILTY CLAY SANDY SILTY CLAY WITH GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY WITH SAND
	GP-GM		SILT SILT WITH SAND SILT WITH GRAVEL
	GP-GC		SANDY SILT SANDY SILT WITH GRAVEL GRAVELLY SILT GRAVELLY SILT WITH SAND
	GM		ORGANIC LEAN CLAY ORGANIC LEAN CLAY WITH SAND ORGANIC LEAN CLAY WITH GRAVEL
	GC		SANDY ORGANIC LEAN CLAY SANDY ORGANIC LEAN CLAY WITH GRAVEL GRAVELLY ORGANIC LEAN CLAY GRAVELLY ORGANIC LEAN CLAY WITH SAND
	GC-GM		ORGANIC SILT ORGANIC SILT WITH SAND ORGANIC SILT WITH GRAVEL
	SW		SANDY ORGANIC SILT SANDY ORGANIC SILT WITH GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT WITH SAND
	SP		FAT CLAY FAT CLAY WITH SAND FAT CLAY WITH GRAVEL
	SW-SM		SANDY FAT CLAY SANDY FAT CLAY WITH GRAVEL GRAVELLY FAT CLAY GRAVELLY FAT CLAY WITH SAND
	SW-SC		ELASTIC SILT ELASTIC SILT WITH SAND ELASTIC SILT WITH GRAVEL
	SP-SM		SANDY ELASTIC SILT SANDY ELASTIC SILT WITH GRAVEL GRAVELLY ELASTIC SILT GRAVELLY ELASTIC SILT WITH SAND
	SP-SC		ORGANIC FAT CLAY ORGANIC FAT CLAY WITH SAND ORGANIC FAT CLAY WITH GRAVEL
	SM		SANDY ORGANIC FAT CLAY SANDY ORGANIC FAT CLAY WITH GRAVEL GRAVELLY ORGANIC FAT CLAY GRAVELLY ORGANIC FAT CLAY WITH SAND
	SC		ORGANIC ELASTIC SILT ORGANIC ELASTIC SILT WITH SAND ORGANIC ELASTIC SILT WITH GRAVEL
	SC-SM		SANDY ORGANIC ELASTIC SILT SANDY ORGANIC ELASTIC SILT WITH GRAVEL GRAVELLY ORGANIC ELASTIC SILT GRAVELLY ORGANIC ELASTIC SILT WITH SAND
	PT		ORGANIC SOIL ORGANIC SOIL WITH SAND ORGANIC SOIL WITH GRAVEL
	COBBLES COBBLES AND BOULDERS BOULDERS		SANDY ORGANIC SOIL SANDY ORGANIC SOIL WITH GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL WITH SAND

FIELD AND LABORATORY TESTING	
(C)	CONSOLIDATION (ASTM D2435)
(CL)	COLLAPSE POTENTIAL (ASTM D4546)
(CP)	COMPACTION CURVE (CTM 216)
(CR)	CORROSIVITY TESTING (CTM 643, CTM 422, CTM 417)
(CU)	CONSOLIDATED UNDRAINED TRIAXIAL (ASTM D4767)
(DS)	DIRECT SHEAR (ASTM D3080)
(EI)	EXPANSION INDEX (ASTM D4829)
(M)	MOISTURE CONTENT (ASTM D2216)
(OC)	ORGANIC CONTENT-% (ASTM D2974)
(P)	PERMEABILITY (CTM 220)
(PA)	PARTICLE SIZE ANALYSIS (ASTM D422)
(PI)	PLASTICITY INDEX (AASHTO T 90) LIQUID LIMIT (AASHTO T 89)
(PL)	POINT LOAD INDEX (ASTM D5731)
(PM)	PRESSURE METER
(R)	R-VALUE (CTM 301)
(SE)	SAND EQUIVALENT (CTM 217)
(SG)	SPECIFIC GRAVITY (AASHTO T 100)
(SL)	SHRINKAGE LIMIT (ASTM D4943)
(SW)	SWELL POTENTIAL (ASTM D4546)
(UC)	UNCONFINED COMPRESSION-SOIL (ASTM D2166)
(UR)	UNCONFINED COMPRESSION-ROCK (ASTM D7012 - METHOD C)
(UU)	UNCONSOLIDATED UNDRAINED TRIAXIAL (ASTM D2850)
(UW)	UNIT WEIGHT (ASTM D7263 - METHOD B)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

CERTIFIED ENGINEERING GEOLOGIST  
*Chris A. Rosen*  
 October 30, 2015  
 PLANS APPROVAL DATE

REGISTERED GEOLOGIST  
 CHRIS A. ROSEN  
 No. 2541  
 Exp. 12/31/2017  
 STATE OF CALIFORNIA

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APPARENT DENSITY OF COHESIONLESS SOILS	
DESCRIPTION	SPT N <sub>60</sub> (BLOWS / 12 INCHES)
VERY LOOSE	0 - 5
LOOSE	5 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	GREATER THAN 50

MOISTURE	
DESCRIPTION	CRITERIA
DRY	NO DISCERNABLE MOISTURE
MOIST	MOISTURE PRESENT, BUT NO FREE WATER
WET	VISIBLE FREE WATER

PERCENT OR PROPORTION OF SOILS	
DESCRIPTION	CRITERIA
TRACE	PARTICLES ARE PRESENT BUT ESTIMATED TO BE LESS THAN 5%
FEW	5% - 10%
LITTLE	15% - 25%
SOME	30% - 45%
MOSTLY	50% - 100%

PARTICLE SIZE		
DESCRIPTION	SIZE	
BOULDER	GREATER THAN 12"	
COBBLE	3" - 12"	
GRAVEL	COARSE	3/4" - 3"
	FINE	1/5" - 3/4"
SAND	COARSE	1/16" - 1/5"
	MEDIUM	1/64" - 1/16"
	FINE	1/300" - 1/64"
SILT AND CLAY	LESS THAN 1/300"	

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**LEGEND - SOIL**  
**(SHEET 2 OF 2)**  
 NO SCALE

**A10G**

2015 STANDARD PLAN A10G

REFERENCE: CALTRANS SOIL & ROCK LOGGING, CLASSIFICATION, AND PRESENTATION MANUAL (2010)

**PERCENT CORE RECOVERY (REC) & ROCK QUALITY DESIGNATION (RQD)**

$$REC = \frac{\sum \text{LENGTH OF THE RECOVERED CORE PIECES (INCHES)}}{\text{TOTAL LENGTH OF CORE RUN (INCHES)}} \times 100\%$$

$$RQD = \frac{\sum \text{LENGTH OF INTACT CORE PIECES } \geq 4 \text{ INCHES}}{\text{TOTAL LENGTH OF CORE RUN (INCHES)}} \times 100\%$$

RQD\* INDICATES SOUNDNESS CRITERIA NOT MET.

BEDDING SPACING	
DESCRIPTION	THICKNESS / SPACING
MASSIVE	GREATER THAN 10'
VERY THICKLY BEDDED	3' - 10'
THICKLY BEDDED	1' - 3'
MODERATELY BEDDED	4" - 1'
THINLY BEDDED	1" - 4"
VERY THINLY BEDDED	1/4" - 1"
LAMINATED	LESS THAN 1/4"

LEGEND OF ROCK MATERIALS	
	IGNEOUS ROCK
	SEDIMENTARY ROCK
	METAMORPHIC ROCK

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
CERTIFIED ENGINEERING GEOLOGIST PLANS APPROVAL DATE					
October 30, 2015 <small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

ROCK HARDNESS	
DESCRIPTION	CRITERIA
EXTREMELY HARD	CANNOT BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK. CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS.
VERY HARD	CANNOT BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK. BREAKS WITH REPEATED HEAVY HAMMER BLOWS.
HARD	CAN BE SCRATCHED WITH A POCKETKNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE). BREAKS WITH HEAVY HAMMER BLOWS.
MODERATELY HARD	CAN BE SCRATCHED WITH POCKETKNIFE OR SHARP PICK WITH LIGHT OR MODERATE PRESSURE. BREAKS WITH MODERATE HAMMER BLOWS.
MODERATELY SOFT	CAN BE GROOVED 1/16 INCH DEEP WITH A POCKETKNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE. BREAKS WITH LIGHT BLOW OR HEAVY MANUAL PRESSURE.
SOFT	CAN BE GROOVED OR GOUGED EASILY BY A POCKETKNIFE OR SHARP PICK WITH LIGHT PRESSURE. CAN BE SCRATCHED WITH FINGERNAIL. BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE.
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH A POCKETKNIFE. BREAKS WITH LIGHT MANUAL PRESSURE.

FRACTURE DENSITY	
DESCRIPTION	OBSERVED FRACTURE DENSITY
UNFRACTURED	NO FRACTURES.
VERY SLIGHTLY FRACTURED	CORE LENGTHS GREATER THAN 3 ft.
SLIGHTLY FRACTURED	CORE LENGTHS MOSTLY FROM 1 TO 3 ft.
MODERATELY FRACTURED	CORE LENGTHS MOSTLY FROM 4 INCHES TO 1 ft.
INTENSELY FRACTURED	CORE LENGTHS MOSTLY FROM 1 TO 4 INCHES.
VERY INTENSELY FRACTURED	MOSTLY CHIPS AND FRAGMENTS.

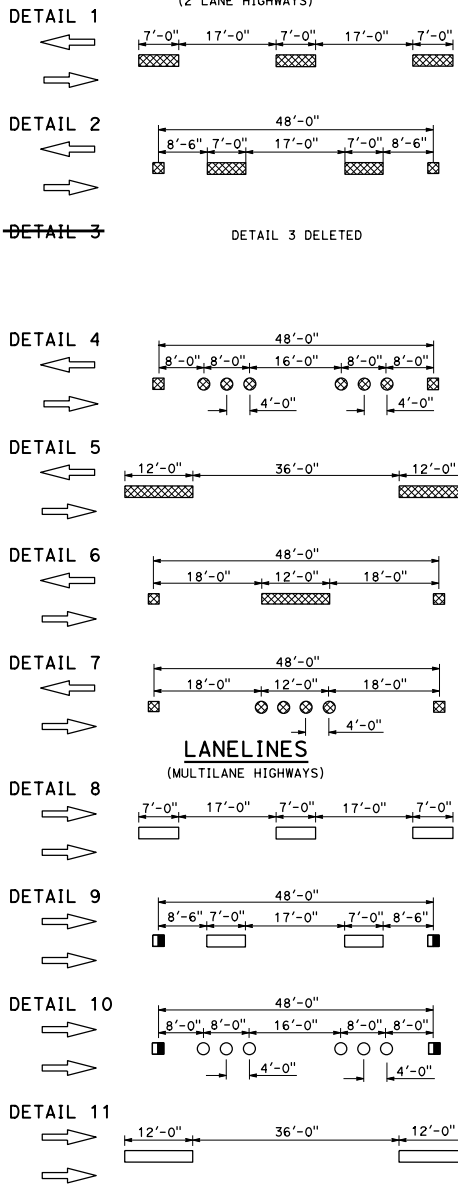
WEATHERING DESCRIPTORS FOR INTACT ROCK						
DESCRIPTION	DIAGNOSTIC FEATURES					GENERAL CHARACTERISTICS
	CHEMICAL WEATHERING-DISCOLORATION AND/OR OXIDATION		MECHANICAL WEATHERING-GRAIN BOUNDARY CONDITIONS (DISAGGREGATION) PRIMARILY FOR GRANITICS AND SOME COARSE-GRAINED SEDIMENTS	TEXTURE AND LEACHING		
	BODY OF ROCK	FRACTURE SURFACES		TEXTURE	LEACHING	
FRESH	NO DISCOLORATION, NOT OXIDIZED.	NO DISCOLORATION OR OXIDATION.	NO SEPARATION, INTACT (TIGHT).	NO CHANGE	NO LEACHING	HAMMER RINGS WHEN CRYSTALLINE ROCKS ARE STRUCK.
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES; SOME FELDSPAR CRYSTALS ARE DULL.	MINOR TO COMPLETE DISCOLORATION OR OXIDATION OF MOST SURFACES.	NO VISIBLE SEPARATION, INTACT (TIGHT).	PRESERVED	MINOR LEACHING OF SOME SOLUBLE MINERALS.	HAMMER RINGS WHEN CRYSTALLINE ROCKS ARE STRUCK. BODY OF ROCK NOT WEAKENED.
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY," FELDSPAR CRYSTALS ARE "CLOUDY."	ALL FRACTURE SURFACES ARE DISCOLORED OR OXIDIZED.	PARTIAL SEPARATION OF BOUNDARIES VISIBLE.	GENERALLY PRESERVED	SOLUBLE MINERALS MAY BE MOSTLY LEACHED.	HAMMER DOES NOT RING WHEN ROCK IS STRUCK. BODY OF ROCK IS SLIGHTLY WEAKENED.
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; ALL FELDSPARS AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT; OR CHEMICAL ALTERATION PRODUCES IN-SITU DISAGGREGATION, SEE GRAIN BOUNDARY CONDITIONS.	ALL FRACTURE SURFACES ARE DISCOLORED OR OXIDIZED, SURFACES FRIABLE.	PARTIAL SEPARATION, ROCK IS FRIABLE; IN SEMIARID CONDITIONS GRANITICS ARE DISAGGREGATED.	TEXTURE ALTERED BY CHEMICAL DISINTEGRATION (HYDRATION, ARGILLATION).	LEACHING OF SOLUBLE MINERALS MAY BE COMPLETE.	DULL SOUND WHEN STRUCK WITH HAMMER, USUALLY CAN BE BROKEN WITH MODERATE TO HEAVY MANUAL PRESSURE OR BY LIGHT HAMMER BLOW WITHOUT REFERENCE TO PLANES OF WEAKNESS SUCH AS INCIPENT OR HAIRLINE FRACTURES, OR VEINLETS. ROCK IS SIGNIFICANTLY WEAKENED.
DECOMPOSED	DISCOLORED OR OXIDIZED THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; ALL FELDSPARS AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY.		COMPLETE SEPARATION OF GRAIN BOUNDARIES (DISAGGREGATED).	RESEMBLES A SOIL, PARTIAL OR COMPLETE REMNANT ROCK STRUCTURE MAY BE PRESERVED; LEACHING OF SOLUBLE MINERALS USUALLY COMPLETE.		CAN BE GRANULATED BY HAND. RESISTANT MINERALS SUCH AS QUARTZ MAY BE PRESENT AS "STRINGERS" OR "DIKES."

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LEGEND - ROCK**  
NO SCALE

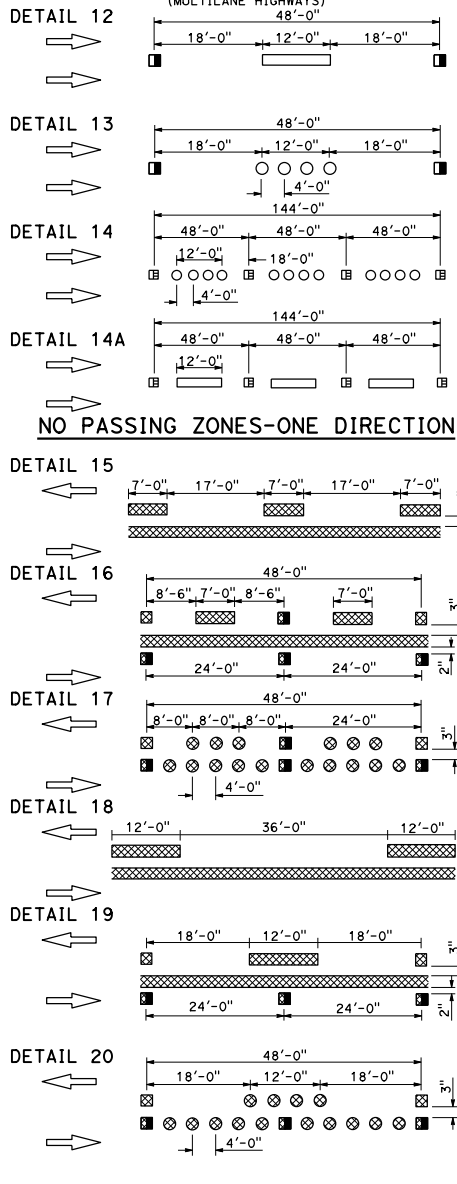
**A10H**

2015 STANDARD PLAN A10H

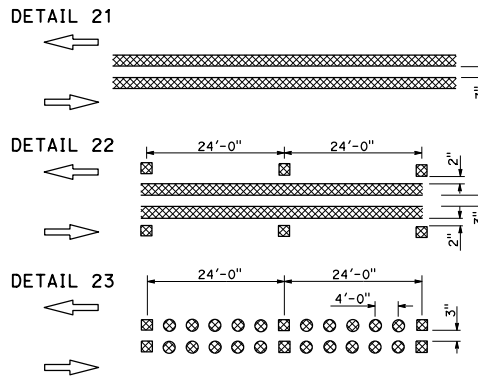
### CENTERLINES (2 LANE HIGHWAYS)



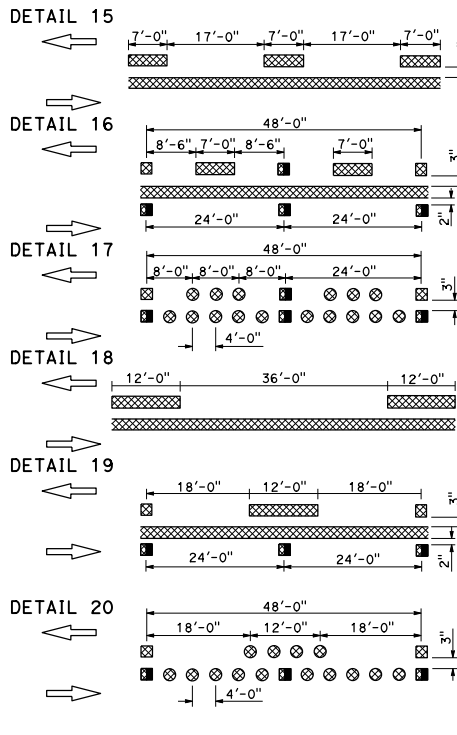
### LANELINES (Cont)



### NO PASSING ZONES-TWO DIRECTION



### NO PASSING ZONES-ONE DIRECTION



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

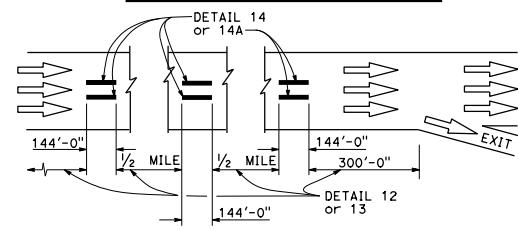
Atifa Ferouz  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Atifa Ferouz  
No. C80402  
Exp. 3-31-17  
CIVIL

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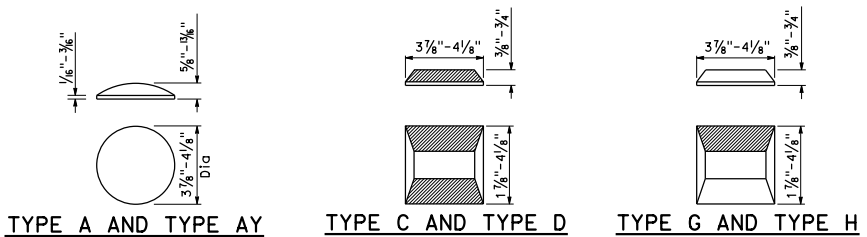
### TYPICAL LANE LINE DELINEATION IN ADVANCE OF EXIT RAMP



- LEGEND**
- MARKERS**
- TYPE A WHITE NON-REFLECTIVE
  - ⊗ TYPE AY YELLOW NON-REFLECTIVE
  - ▣ TYPE C RED-CLEAR RETROREFLECTIVE
  - ⊠ TYPE D TWO-WAY YELLOW RETROREFLECTIVE
  - TYPE G ONE-WAY CLEAR RETROREFLECTIVE
  - ⊞ TYPE H ONE-WAY YELLOW RETROREFLECTIVE
- LINES**
- ▭ 4" WHITE
  - ▨ 4" YELLOW

**NOTE:**  
Detail 14 is to be used in combination with Detail 13. Detail 14A is to be used in combination with Detail 12.

### MARKER DETAILS



TYPE A AND TYPE AY      TYPE C AND TYPE D      TYPE G AND TYPE H

RETROREFLECTIVE FACE

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT MARKERS  
AND TRAFFIC LINES  
TYPICAL DETAILS**

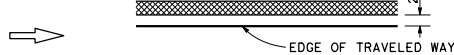
NO SCALE      **A20A**



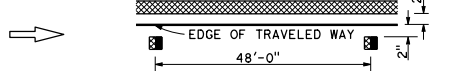
### LEFT EDGELINES

(DIVIDED HIGHWAYS)

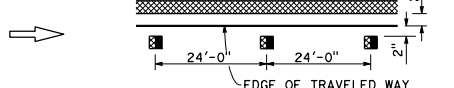
DETAIL 24



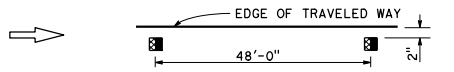
DETAIL 25



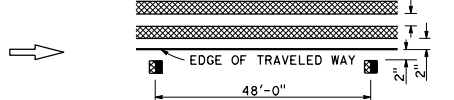
DETAIL 25A



DETAIL 26



DETAIL 27

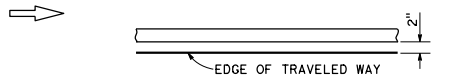


### RIGHT EDGELINES

DETAIL 27A

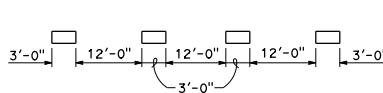
DETAIL 27A DELETED

DETAIL 27B



### RIGHT EDGELINE EXTENSION THROUGH INTERSECTIONS

DETAIL 27C



### MEDIAN ISLANDS

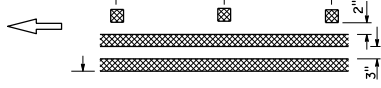
DETAIL 28



DETAIL 29



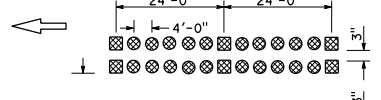
DETAIL 30



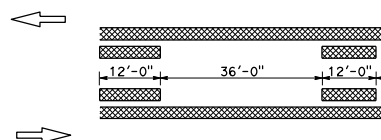
DETAIL 31



DETAIL 32

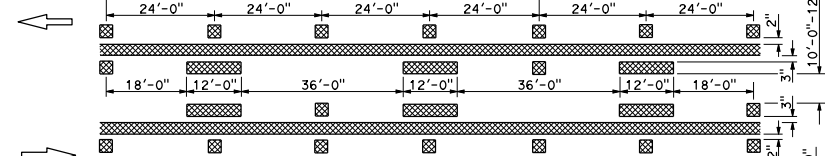


DETAIL 33

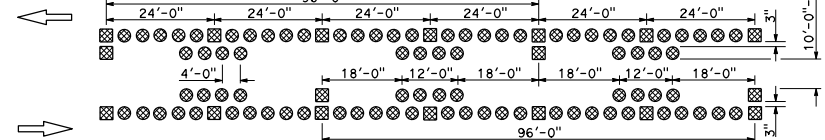


### TWO-WAY LEFT TURN LANES

DETAIL 34



DETAIL 35



### LEGEND

#### MARKERS

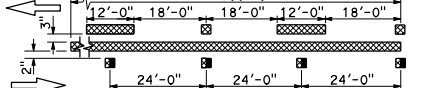
- TYPE AY YELLOW NON-REFLECTIVE
- ◻ TYPE D TWO-WAY YELLOW RETROREFLECTIVE
- ◼ TYPE H ONE-WAY YELLOW RETROREFLECTIVE

### LINES

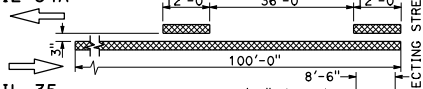
- ▭ 4" WHITE
- ▨ 4" YELLOW

### INTERSECTION TREATMENTS

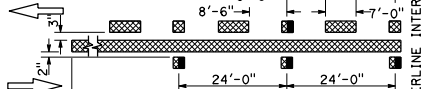
DETAIL 34



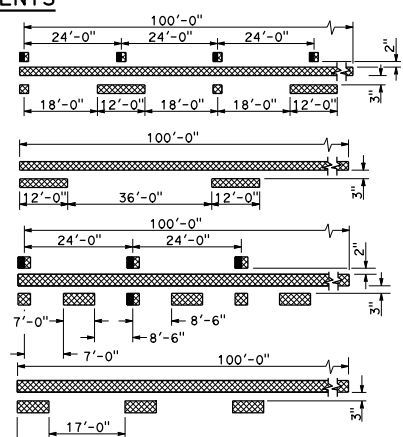
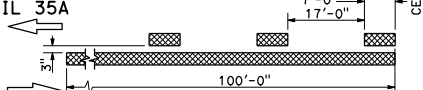
DETAIL 34A



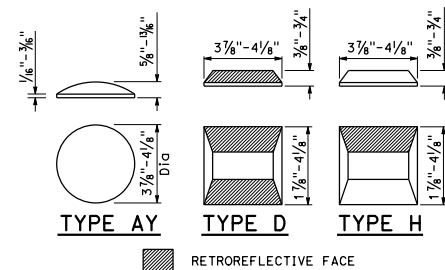
DETAIL 35



DETAIL 35A



### MARKER DETAILS



### PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

A20B

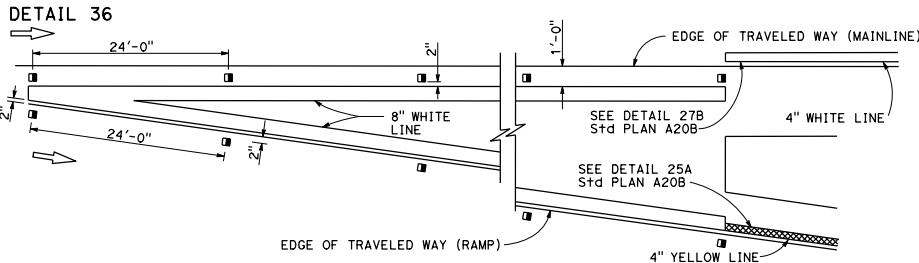
DIS	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Atifa Ferouz  
REGISTERED CIVIL ENGINEER  
No. C80402  
Exp. 3-31-17  
CIVIL

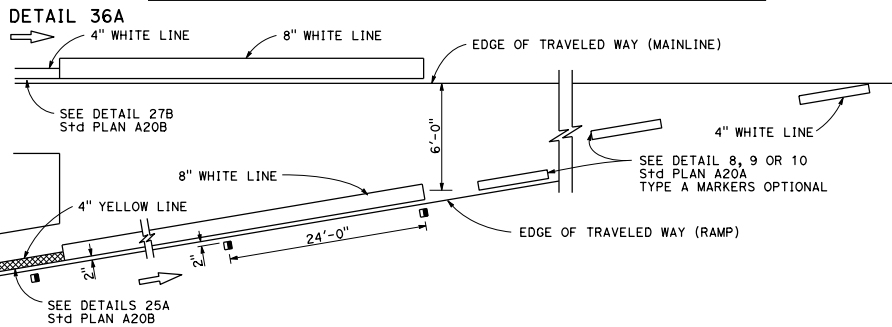
October 30, 2015  
PLANS APPROVAL DATE

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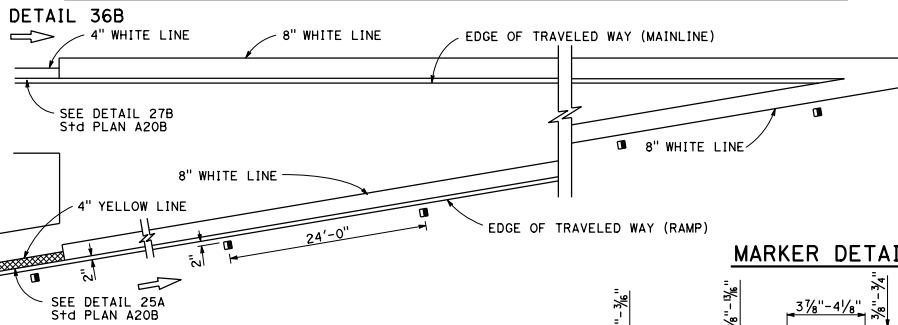
### EXIT RAMP NEUTRAL AREA (GORE) TREATMENT



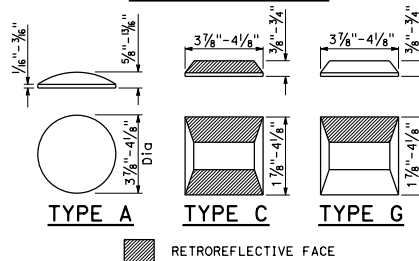
### ENTRANCE RAMP NEUTRAL AREA (MERGE) TREATMENT



### ENTRANCE RAMP NEUTRAL AREA (ACCELERATION LANE) TREATMENT



### MARKER DETAILS



### LEGEND:

#### MARKERS

- TYPE A WHITE NON-REFLECTIVE
- TYPE C RED-CLEAR RETROREFLECTIVE
- TYPE G ONE-WAY CLEAR RETROREFLECTIVE

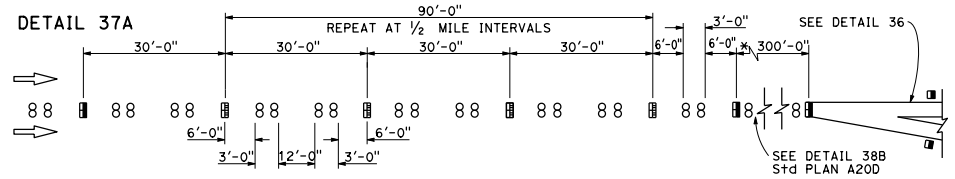
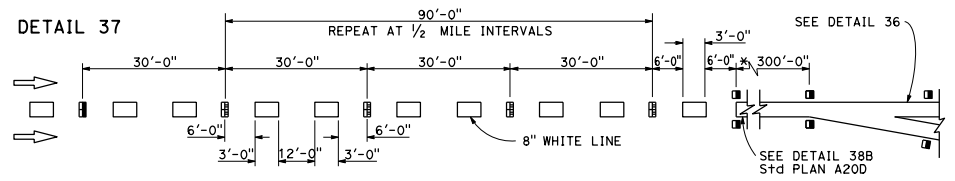
RETROREFLECTIVE FACE

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Atifa Ferouz*  
 REGISTERED CIVIL ENGINEER  
 No. C80402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

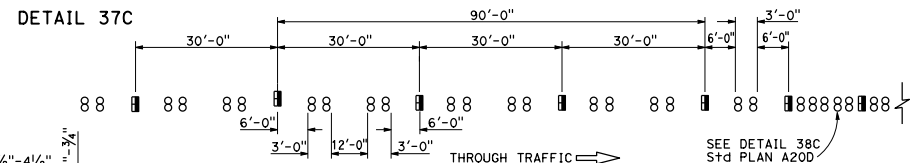
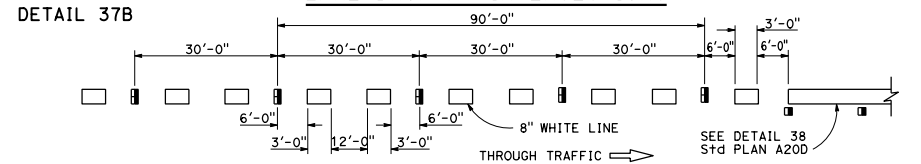
October 30, 2015  
 PLANS APPROVAL DATE  
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### LANE DROP AT EXIT RAMP



\* The solid channelizing line shown may be omitted on short auxiliary lanes where weaving length is critical.

### LANE DROP AT INTERSECTIONS



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

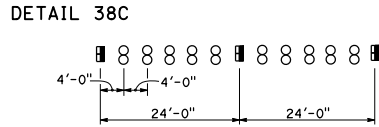
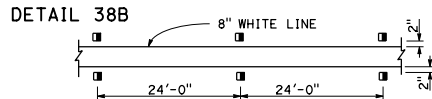
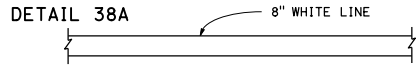
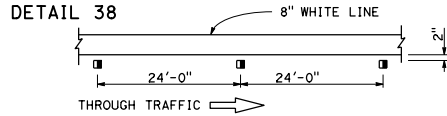
## PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

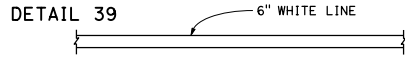
A20C

2015 STANDARD PLAN A20C

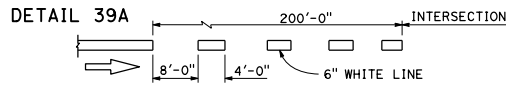
### CHANNELIZING LINE



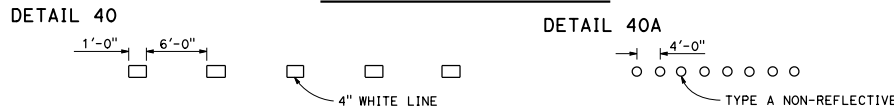
### BIKE LANE LINE



### INTERSECTION LINE BIKE LANE



### LANE LINE EXTENSIONS THROUGH INTERSECTIONS



### CENTER LINE EXTENSIONS THROUGH INTERSECTIONS

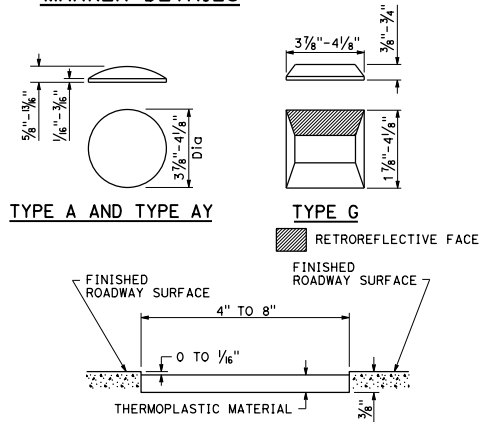


### LEGEND

#### MARKERS

- TYPE A WHITE NON-REFLECTIVE
- ⊗ TYPE AY YELLOW NON-REFLECTIVE
- TYPE G ONE-WAY CLEAR RETROREFLECTIVE
- ▨ 4" YELLOW LINE

### MARKER DETAILS

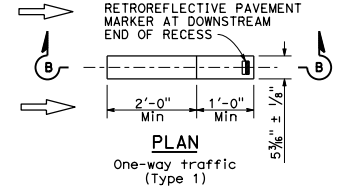
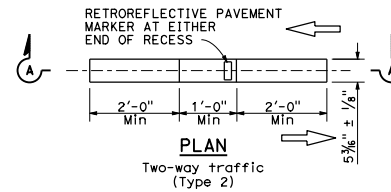
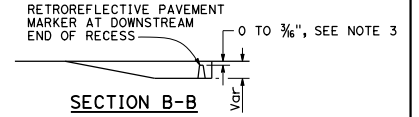
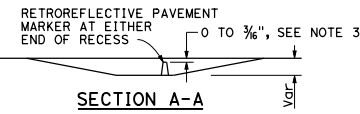


### DETAIL FOR RECESSED THERMOPLASTIC TRAFFIC STRIPE

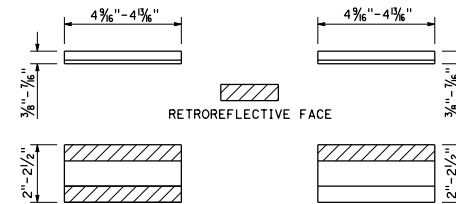
See Notes A and B.

#### RECESSED THERMOPLASTIC NOTES

- A. See typical traffic line details for pavement marking patterns.
- B. The top of the thermoplastic installed in recessed pavement shall be 0 to 1/16" below the pavement surface.



### RECESS DETAIL FOR RETROREFLECTIVE PAVEMENT MARKER



#### RECESSED MARKER NOTES:

1. See typical traffic line details for marker patterns to be used with recessed pavement markers. Detail 14A requires a Type 2 recess.
2. The retroreflective pavement markers shown for recessed installations are not to be used for non-recessed installations.
3. The top of pavement markers installed in recesses shall be 0 to 3/16" below the pavement surface.

#### TYPE C AND TYPE D TYPE G AND TYPE H

See Notes 1 and 2.

### RETROREFLECTIVE PAVEMENT MARKER FOR RECESSED INSTALLATION

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

## PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

NO SCALE

A20D

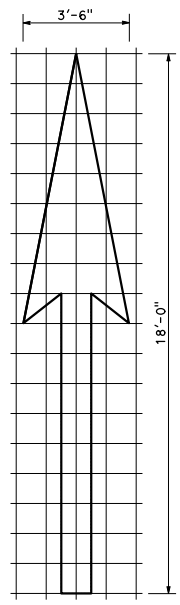
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Atifa Ferouz  
REGISTERED CIVIL ENGINEER

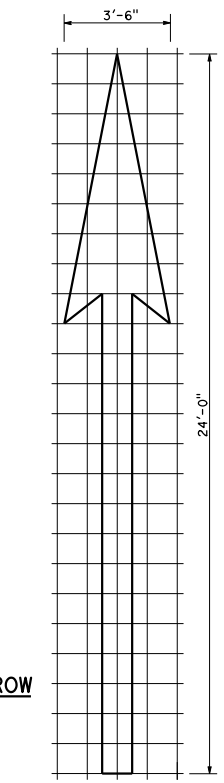
October 30, 2015  
PLANS APPROVAL DATE

Atifa Ferouz  
No. C80402  
Exp. 3-31-17  
CIVIL

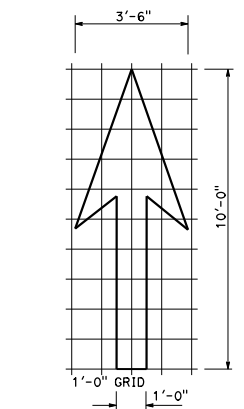
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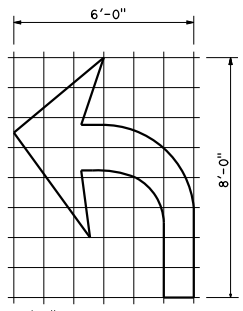
**TYPE I 18'-0" ARROW**  
A=25 ft<sup>2</sup>



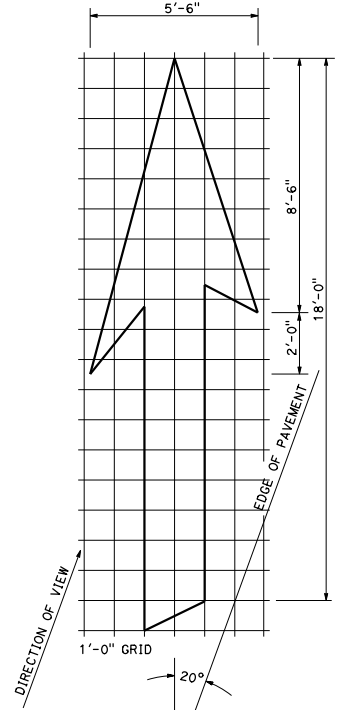
**TYPE I 24'-0" ARROW**  
A=31 ft<sup>2</sup>



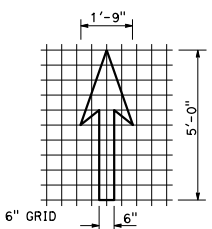
**TYPE I 10'-0" ARROW**  
A=14 ft<sup>2</sup>



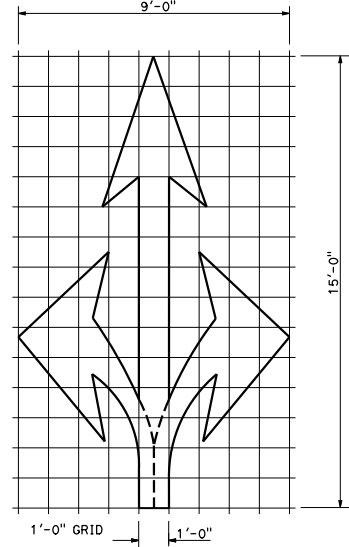
**TYPE IV (L) ARROW**  
A=15 ft<sup>2</sup>  
(For Type IV (R) arrow, use mirror image)



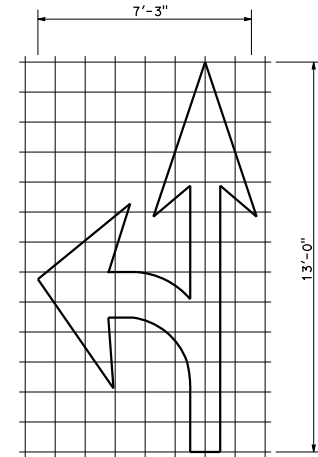
**TYPE VI ARROW**  
A=42 ft<sup>2</sup>  
Right lane drop arrow  
(For left lane, use mirror image)



**BIKE LANE ARROW**  
A=3.5 ft<sup>2</sup>



**TYPE VIII ARROW**  
A=36 ft<sup>2</sup>



**TYPE VII (L) ARROW**  
A=27 ft<sup>2</sup>  
(For Type VII (R) arrow, use mirror image)

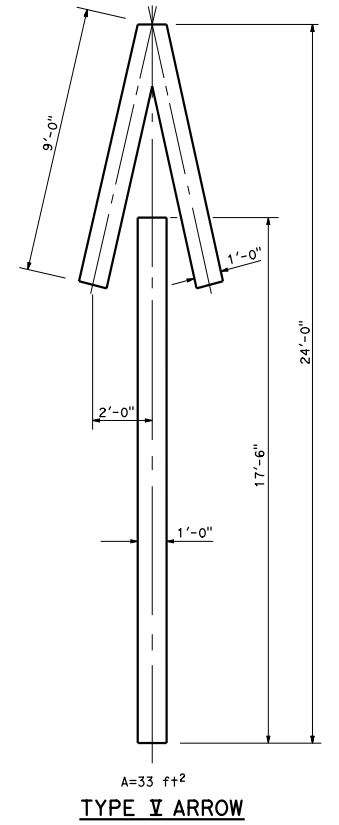
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Atifa Ferouz  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Atifa Ferouz  
No. C80402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

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**TYPE V ARROW**  
A=33 ft<sup>2</sup>

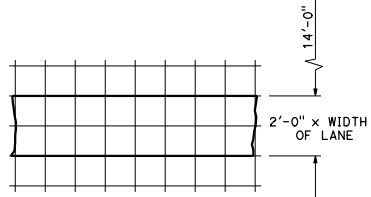
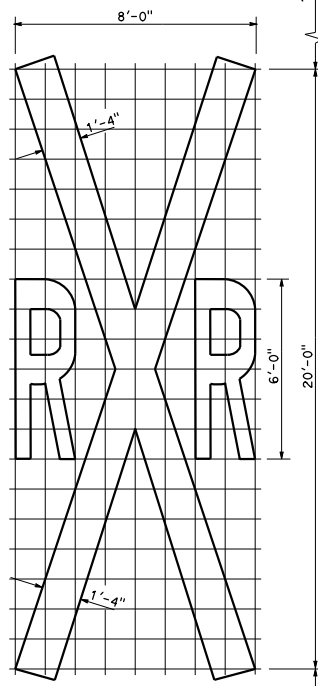
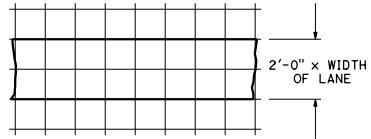
**NOTE:**  
Minor variations in dimensions may be accepted by the Engineer.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT MARKINGS  
ARROWS**

NO SCALE

**A24A**

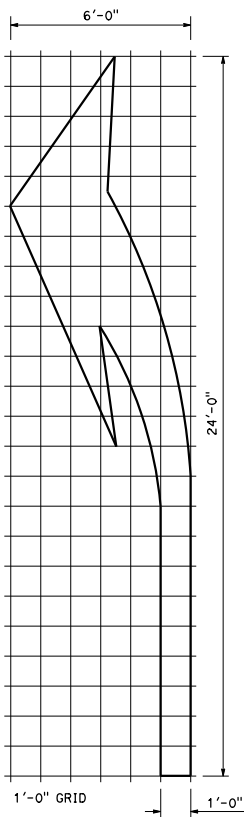
2015 STANDARD PLAN A24A



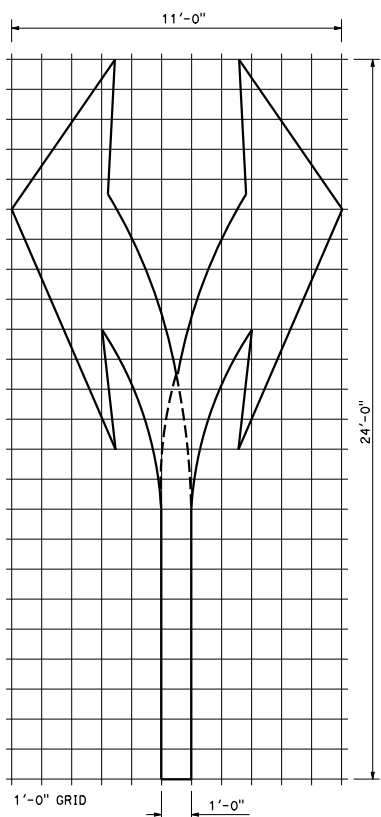
1'-0" GRID  
A=70 ft<sup>2</sup> \*

**RAILROAD CROSSING SYMBOL**

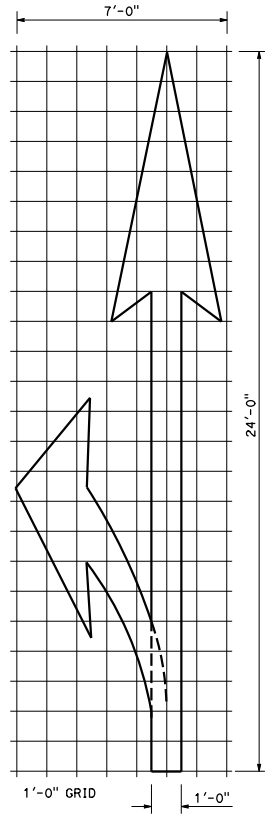
\* 70 ft<sup>2</sup> does not include the 2'-0" x variable width transverse lines.



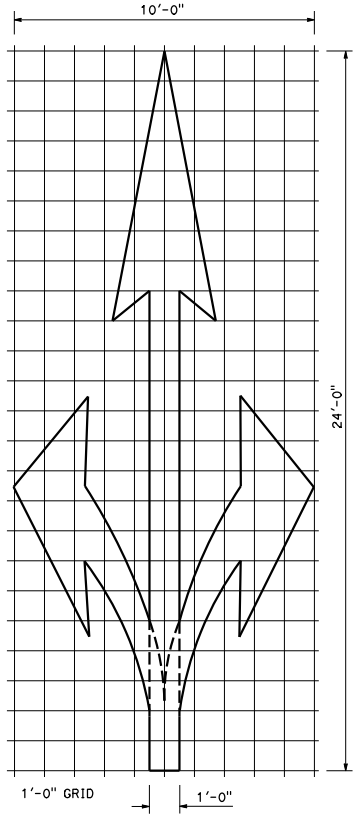
A=42 ft<sup>2</sup>  
**TYPE III (L) ARROW**  
(For Type III (R) use mirror image)



A=73 ft<sup>2</sup>  
**TYPE III (B) ARROW**



A=45 ft<sup>2</sup>  
**TYPE II (L) ARROW**  
(For Type II (R) use mirror image)



A=59 ft<sup>2</sup>  
**TYPE II (B) ARROW**

**NOTE:**  
Minor variations in dimensions may be accepted by the Engineer.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT MARKINGS  
ARROWS AND SYMBOLS**

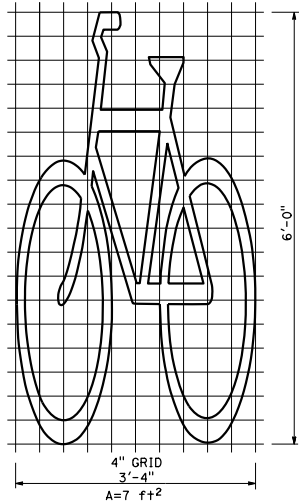
NO SCALE

**A24B**

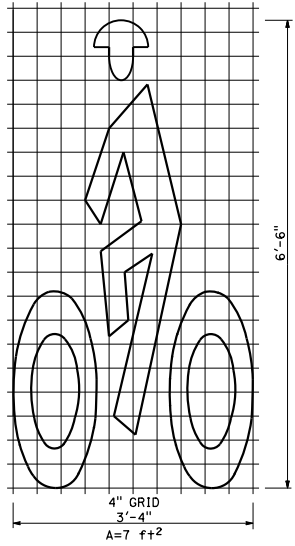
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Atifa Ferouz*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C80402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

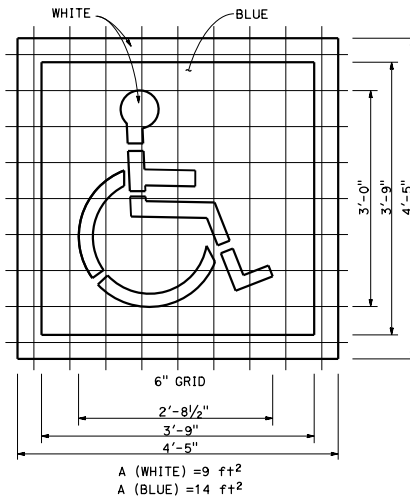
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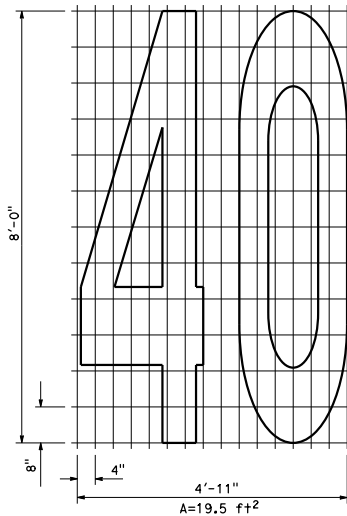
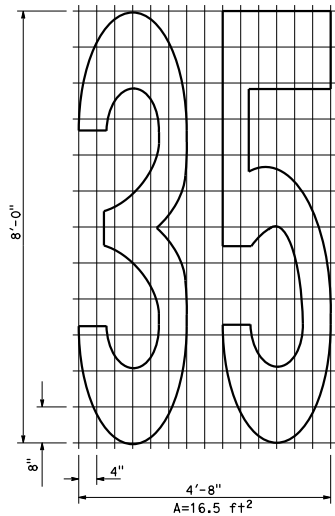
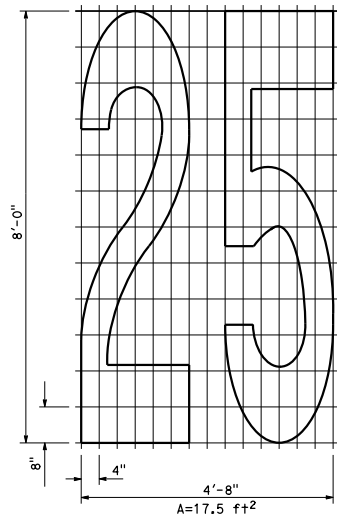
**BIKE LANE SYMBOL  
WITHOUT PERSON**



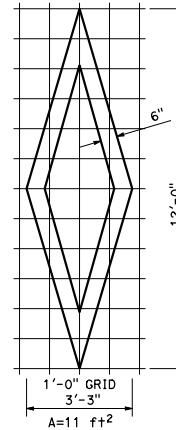
**BIKE LANE SYMBOL  
WITH PERSON**



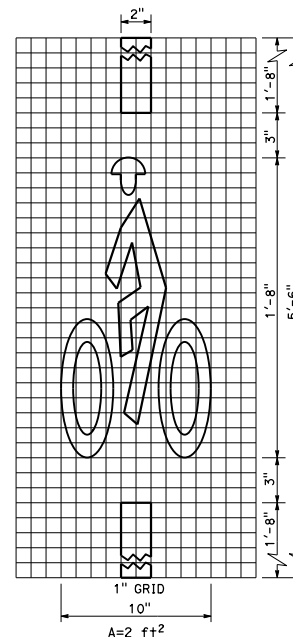
**INTERNATIONAL SYMBOL  
OF ACCESSIBILITY (ISA) MARKING**



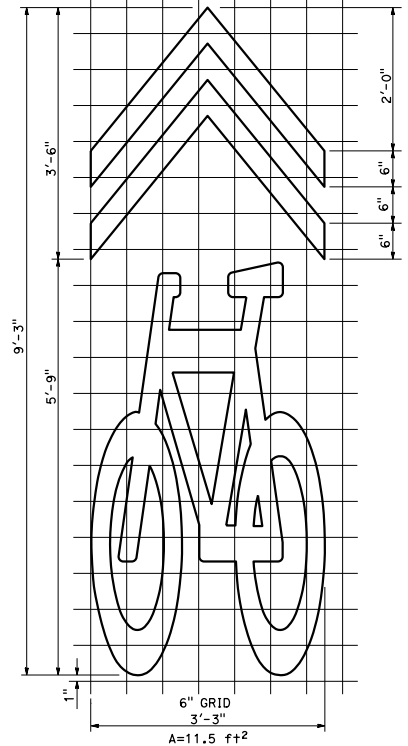
**NUMERALS**



**DIAMOND SYMBOL**



**BIKE LOOP  
DETECTOR SYMBOL**



**SHARED ROADWAY BICYCLE MARKING**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT MARKINGS  
SYMBOLS AND NUMERALS**

NO SCALE

**A24C**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Atifa Ferouz  
REGISTERED CIVIL ENGINEER

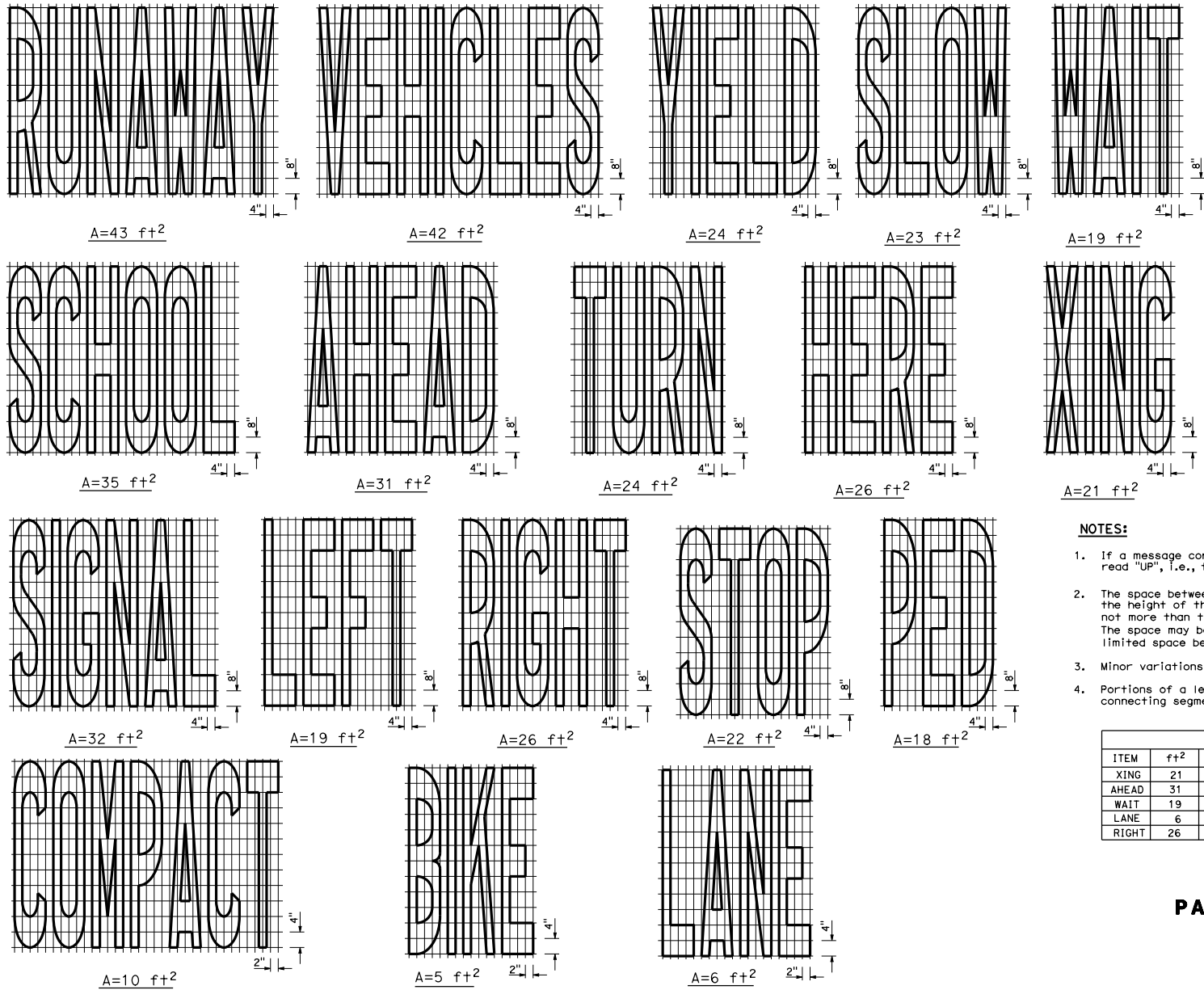
October 30, 2015  
PLANS APPROVAL DATE

Atifa Ferouz  
No. C80402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

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**NOTE:**

Minor variations in dimensions may be accepted by the Engineer.



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Atifa Ferouz*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
 Atifa Ferouz  
 No. C80402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

**NOTES:**

1. If a message consists of more than one word, it must read "UP", i.e., the first word must be nearest the driver.
2. The space between words must be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters. The space may be reduced appropriately where there is limited space because of local conditions.
3. Minor variations in dimensions may be accepted by the Engineer.
4. Portions of a letter, number or symbol may be separated by connecting segments not to exceed 2" in width.

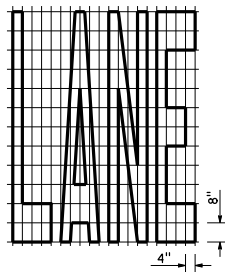
WORD MARKINGS					
ITEM	f+2	ITEM	f+2	ITEM	f+2
XING	21	YIELD	24	BIKE	5
AHEAD	31	SCHOOL	35	SLOW	23
WAIT	19	SIGNAL	32	STOP	22
LANE	6	TURN	24	LEFT	19
RIGHT	26	HERE	26	VEHICLES	42
				PED	18
				COMPACT	10
				RUNAWAY	43

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**PAVEMENT MARKINGS WORDS**  
 NO SCALE

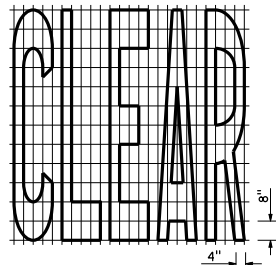
**A24D**

2015 STANDARD PLAN A24D

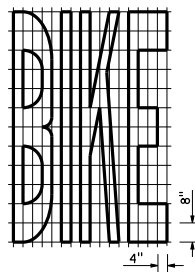




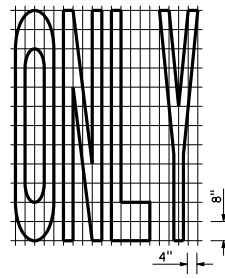
A=24 f+2



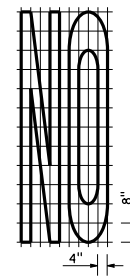
A=27 f+2



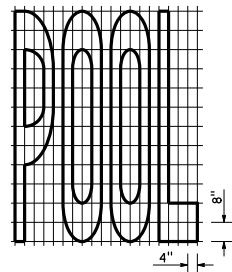
A=21 f+2



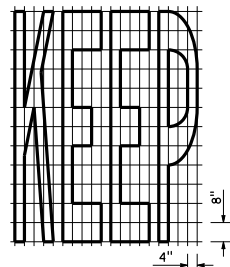
A=22 f+2



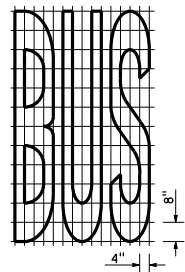
A=14 f+2



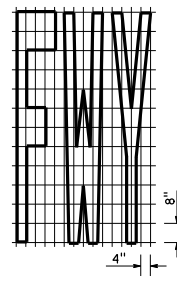
A=23 f+2



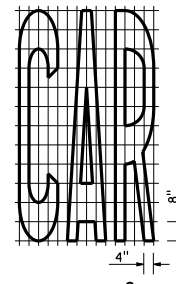
A=24 f+2



A=20 f+2



A=16 f+2



A=17 f+2

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Atifa Ferouz*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

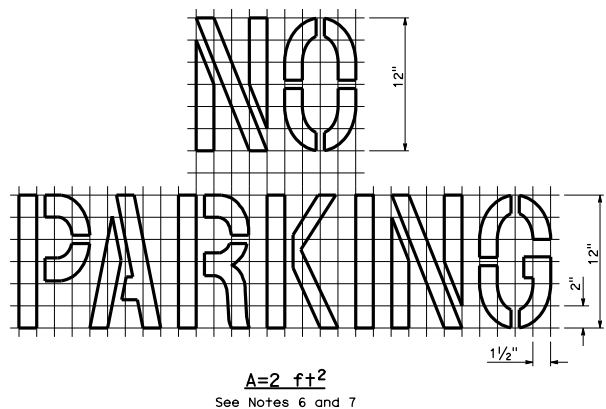
Atifa Ferouz  
No. C80402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

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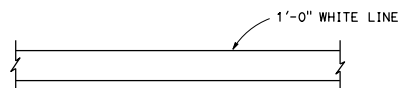
WORD MARKINGS			
ITEM	f+2	ITEM	f+2
LANE	24	NO	14
POOL	23	BIKE	21
CAR	17	BUS	20
CLEAR	27	ONLY	22
KEEP	24	FWY	16

**NOTES:**

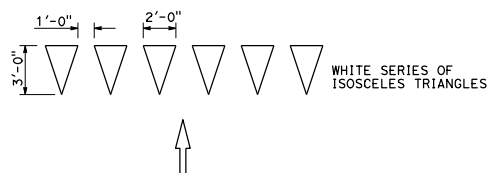
1. If a message consists of more than one word, it must read "UP", i.e., the first word must be nearest the driver.
2. The space between words must be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters. The space may be reduced appropriately where there is limited space because of local conditions.
3. Minor variations in dimensions may be accepted by the Engineer.
4. Portions of a letter, number or symbol may be separated by connecting segments not to exceed 2" in width.
5. The words "NO PARKING" pavement marking is to be used for parking facilities. For typical locations of markings, see Standard Plans A90A and A90B.
6. The words "NO PARKING", shall be painted in white letters no less than 1'-0" high on a contrasting background and located so that it is visible to traffic enforcement officials.



A=2 f+2  
See Notes 6 and 7



**LIMIT LINE (STOP LINE)**

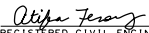
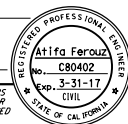


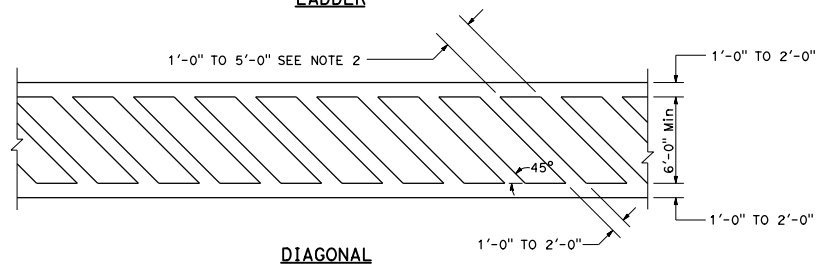
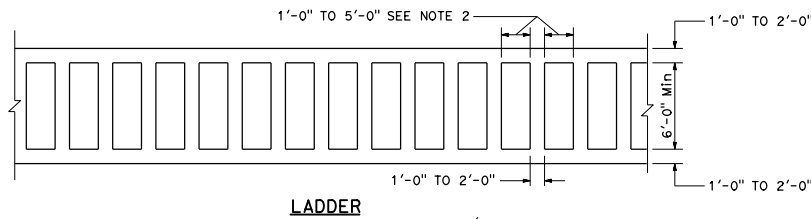
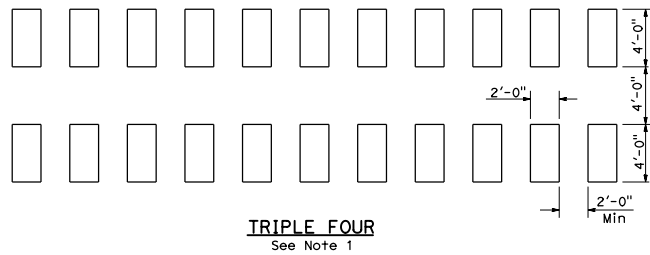
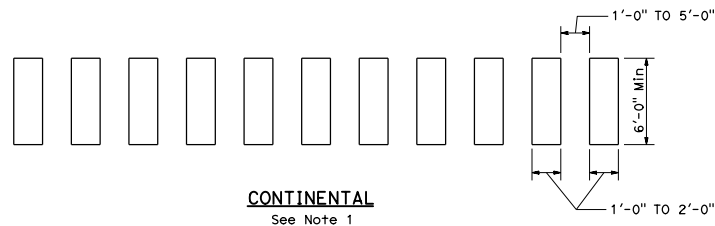
**YIELD LINE**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT MARKINGS**  
**WORDS, LIMIT AND YIELD LINES**

NO SCALE

**A24E**

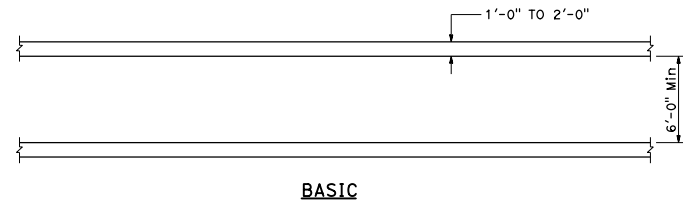
Dist	County	Route	Post Miles Total Project	Sheet No.	Total Sheets
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



**HIGHER VISIBILITY CROSSWALKS**

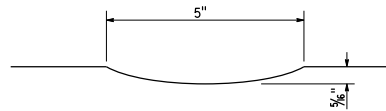
**NOTES:**

1. Spaces between markings must be placed in wheel tracks of each lane.
2. Spacings not to exceed 2.5 times width of longitudinal line.
3. All crosswalk markings must be white except those near schools must be yellow.

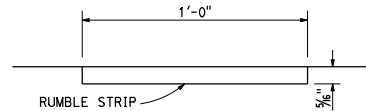


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT MARKINGS  
CROSSWALKS**  
NO SCALE

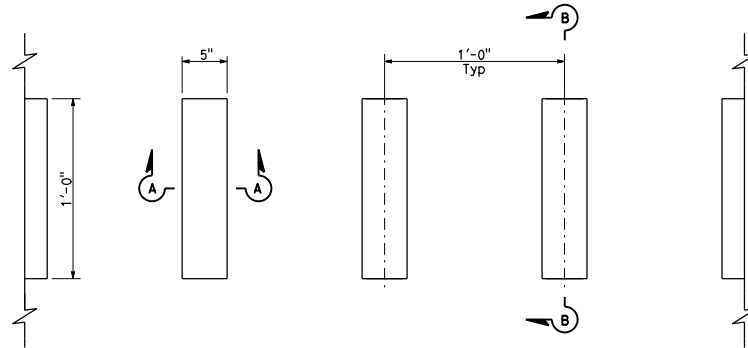
**A24F**



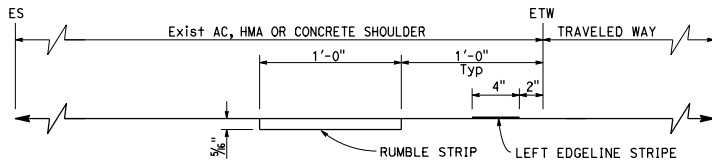
SECTION A-A



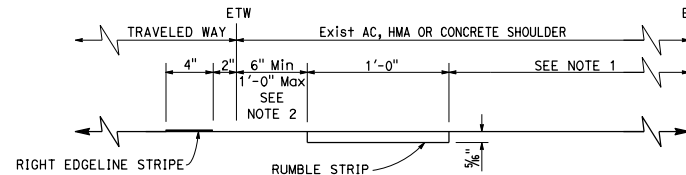
SECTION B-B



PLAN  
GROUND-IN INDENTATIONS



RUMBLE STRIP PLACEMENT  
LEFT OF DIRECTION OF TRAVEL



RUMBLE STRIP PLACEMENT  
RIGHT OF DIRECTION OF TRAVEL

TYPICAL GROUND-IN RUMBLE STRIP  
SHOULDER PLACEMENT

**NOTES:**

1. Where bicycles are permitted, shoulder rumble strips should not be used right of direction of travel unless a minimum of 5'-0" of clear shoulder width for bicycle use is available between the rumble strip and the outer edge of the shoulder. Where bicycles are not permitted, a minimum of 4'-0" of distance is required between the rumble strip and the outer edge of the shoulder.
2. Unless otherwise shown on the plans or specified in the special provisions, the 6" offset from the edge of traveled way to the edge of the rumble strip shall be used for rumble strip placement right of the direction of travel.

Dist	County	Route	Post Miles Total Project	Sheet No.	Total Sheets

Atifa Ferouz  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Atifa Ferouz  
No. C80402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

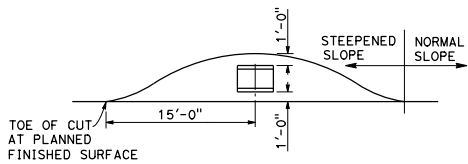
**SHOULDER RUMBLE STRIP  
DETAILS  
GROUND-IN INDENTATIONS**

NO SCALE

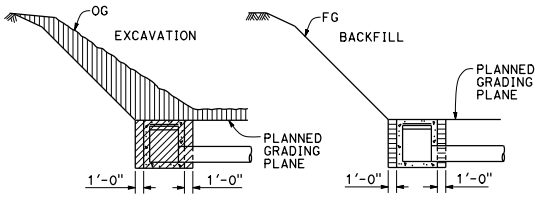
**A 40B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

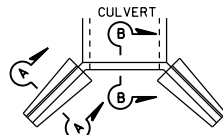
*C. M. Duff*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA



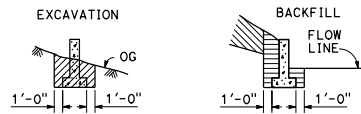
**PLAN**  
See Note 2



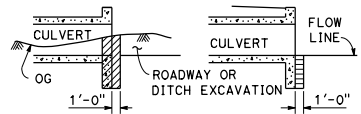
**SECTION**  
**RECESSES AT DRAINAGE INLETS**



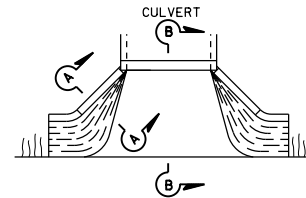
**PLAN OF WING WALL**



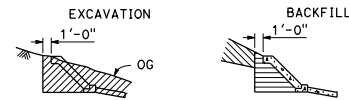
**SECTION A-A**



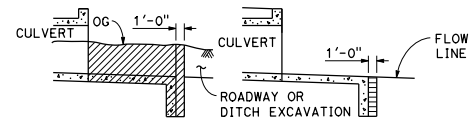
**SECTION B-B**  
**WING WALLS**



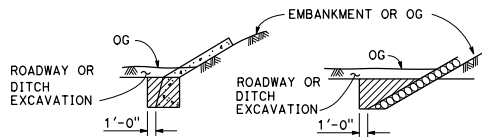
**PLAN OF WARPED WING WALL**



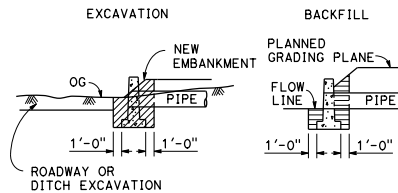
**SECTION A-A**



**SECTION B-B**  
**WARPED WING WALLS**



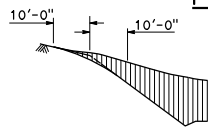
**SLOPE PROTECTION**  
See Note 3



**PIPE HEADWALLS**



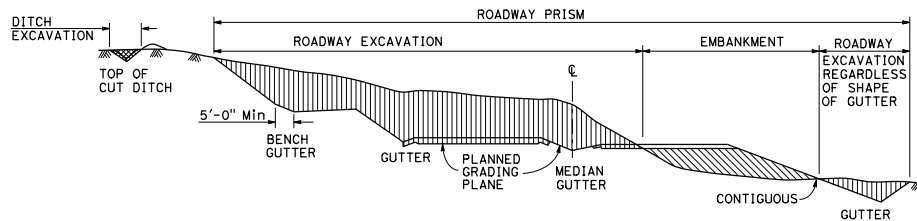
**PAVED OR LINED DITCH**



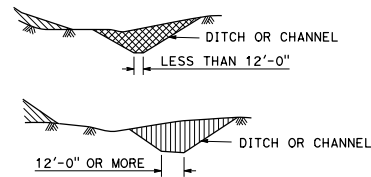
**SLOPE ROUNDING**



**DIKE AND GUTTER**



**ROADWAY EXCAVATION - DITCH EXCAVATION**



**NOTES:**

- This drawing indicates the work to be done and limits of payment for:  
 Roadway Excavation  
 Ditch Excavation  
 Structure Excavation for Slope Protection
- Slopes and dimensions may vary to fit field conditions.
- Top limit of structure excavation is original ground if ditch is not excavated.

**LEGEND**

	STRUCTURE EXCAVATION		ROADWAY EXCAVATION
	STRUCTURE BACKFILL		ROADWAY EMBANKMENT
	DITCH EXCAVATION		
	SLOPE PROTECTION		

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**EXCAVATION AND BACKFILL  
MISCELLANEOUS  
DETAILS**

NO SCALE

**A62A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
------	--------	-------	--------------------------	-----------	--------------

*Gary Wong*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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--	--

**EXCAVATION      BACKFILL**

**CRIB WALL, ON SLOPE**

**SLOPE BEHIND WALL      FLAT BEHIND WALL**

**EXCAVATION      BACKFILL      EXCAVATION      BACKFILL**

**RETAINING WALL IN FILL, ON SLOPE**

**REINFORCED CONCRETE CRIB WALL**

**RETAINING WALL IN FILL**

**RETAINING WALL IN FILL AND CUT**

**RETAINING WALL IN CUT**

**SECTION F-F**

**ELEVATION**

**EXCAVATION**

**BACKFILL**

**PLAN**

**LEGEND**

- STRUCTURE EXCAVATION
- STRUCTURE BACKFILL
- ROADWAY EXCAVATION
- ROADWAY EMBANKMENT
- BRIDGE EMBANKMENT SURCHARGE

**NOTES:**

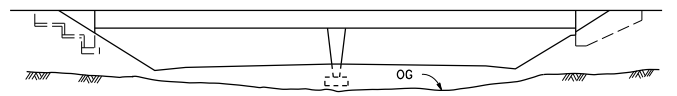
1. Roadway embankment is not delineated on excavation drawings for clarity.
2. Embankment, if any, must be in place before structure excavation is made.
3. If no roadway or ditch excavation or embankment is involved at the wall, structure excavation will be measured from the original ground.
4. No deduction for crib wall member volumes is made from structure backfill quantities.
5. When an embankment settlement period is required, the upper limits of structure excavation are raised to conform to the elevation of the embankment after the settlement period or, when an embankment surcharge is used to the finished surface and grading plane elevations.
6. Embankment slopes to be as steep as material permits. Slope assumed to be 1:1 for purposes of quantity calculations.

**SURCHARGE NOTES:**

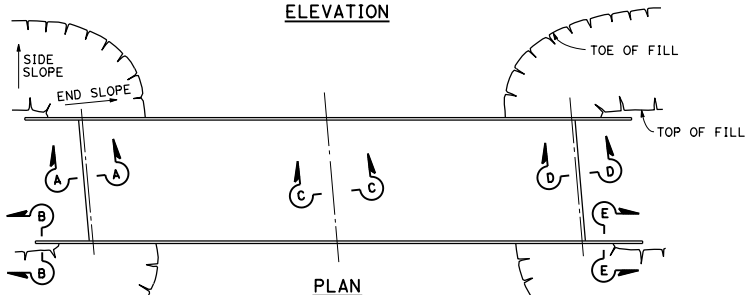
- A. Bridge embankment surcharges to be placed at locations and to the heights listed in the special provisions.
- B. Surcharge slopes to be as steep as stability of material permits.

**LIMITS OF PAYMENT FOR EXCAVATION AND BACKFILL BRIDGE SURCHARGE AND WALL**

NO SCALE



**ELEVATION**

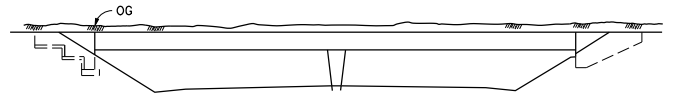


**PLAN**

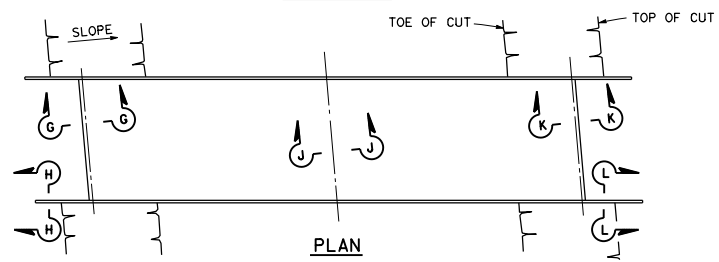
**NOTE:**

Roadway embankment is not delineated on excavation drawings for clarity. Embankment must be in place before structure excavation is made.

**IN FILL**



**ELEVATION**

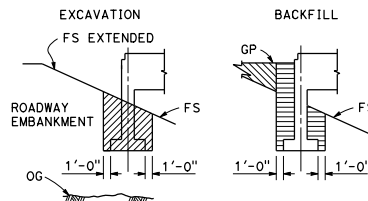


**PLAN**

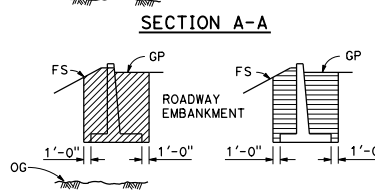
**NOTE:**

If no roadway excavation is involved at bridge, structure excavation is measured from original ground.

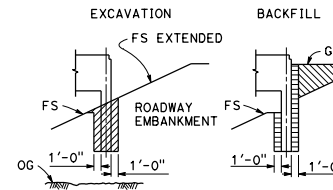
**IN CUT**



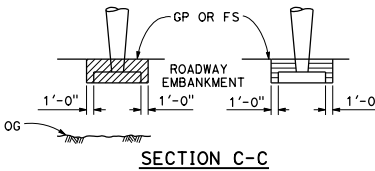
**SECTION A-A**



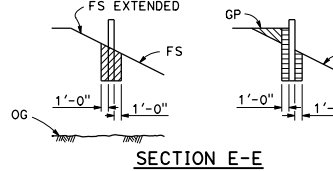
**SECTION B-B**



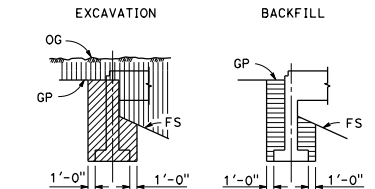
**SECTION D-D**



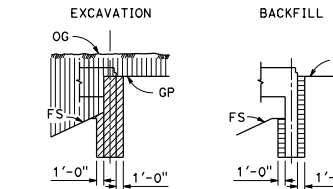
**SECTION C-C**



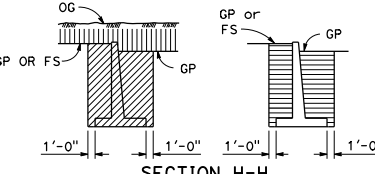
**SECTION E-E**



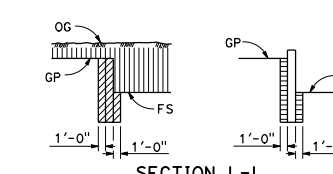
**SECTION G-G**



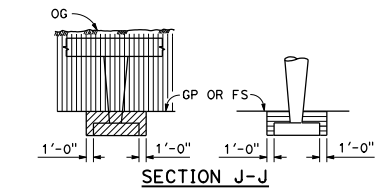
**SECTION K-K**



**SECTION H-H**



**SECTION L-L**



**SECTION J-J**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS





*Gary Wong*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
Gary Wong  
No. C58238  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

**LEGEND**

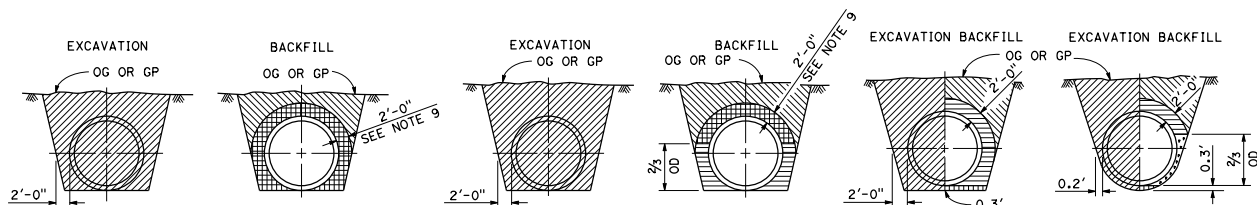
-  STRUCTURE EXCAVATION
-  STRUCTURE BACKFILL
-  ROADWAY EXCAVATION
-  ROADWAY EMBANKMENT

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**LIMITS OF PAYMENT FOR  
EXCAVATION AND BACKFILL  
BRIDGE**

NO SCALE

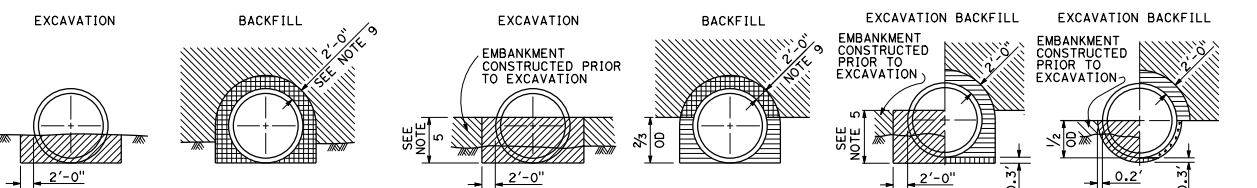
**A62C**



**IN TRENCH**

**IN TRENCH**

**SAND BEDDING SOIL CEMENT BEDDING IN TRENCH**



**IN EMBANKMENT**

**IN EMBANKMENT**

**SAND BEDDING SOIL CEMENT BEDDING IN EMBANKMENT**

MINIMUM ALLOWABLE CLASSES OF RCP FOR METHOD 1

COVER	MINIMUM CLASS AND D-LOAD
5.9'	CLASS II 1000D
6.0' - 7.9'	CLASS III 1350D
8.0' - 9.9'	CLASS III SPECIAL 1700D
10.0' - 11.9'	CLASS IV 2000D
12.0' - 13.9'	CLASS IV SPECIAL 2500D
14.0' - 16.9'	CLASS V 3000D
17.0' - 20.0'	CLASS V SPECIAL 3600D

See Notes 6 and 9

MINIMUM ALLOWABLE CLASSES OF RCP FOR METHOD 2

COVER	MINIMUM CLASS AND D-LOAD
15.9'	CLASS II 1000D
16.0' - 19.9'	CLASS III 1350D
20.0' - 24.9'	CLASS III SPECIAL 1700D
25.0' - 27.9'	CLASS IV 2000D
28.0' - 34.9'	CLASS IV SPECIAL 2500D
35.0' - 41.9'	CLASS V 3000D
42.0' - 50.0'	CLASS V SPECIAL 3600D

See Notes 8 and 9

MINIMUM ALLOWABLE CLASSES OF RCP FOR METHOD 3

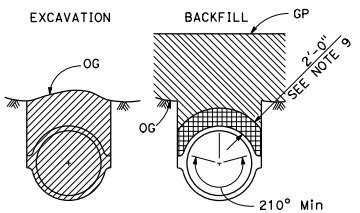
COVER	MINIMUM CLASS AND D-LOAD
25.9'	Class II 1000D
26.0' - 31.9'	Class III 1350D
32.0' - 37.9'	Class III Special 1700D
38.0' - 44.9'	Class IV 2000D
45.0' - 55.9'	Class IV Special 2500D
56.0' - 67.9'	Class V 3000D
68.0' - 80.0'	Class V Special 3600D

**METHOD 1**

**METHOD 2 REINFORCED CONCRETE PIPE**

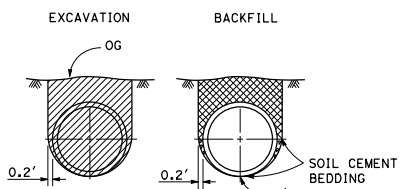
See Notes 1, 2, 7 and 10

**METHOD 3**



**IN TRENCH ONLY CAST-IN-PLACE**

**NON-REINFORCED CONCRETE PIPE**



**IN TRENCH ONLY PRECAST**

See Notes 7 and 11

**LEGEND**

- [Hatched pattern] STRUCTURE EXCAVATION (CULVERT)
- [Hatched pattern] STRUCTURE BACKFILL (CULVERT) 95% RELATIVE COMPACTION
- [Hatched pattern] STRUCTURE BACKFILL (CULVERT) 90% RELATIVE COMPACTION
- [Cross-hatched pattern] LOOSE BACKFILL
- [Vertical lines] SAND BEDDING
- [Dotted pattern] SOIL CEMENT BEDDING
- [Diagonal lines] ROADWAY EMBANKMENT
- OD = OUTSIDE DIAMETER FOR CIRCULAR PIPES AND MAXIMUM VERTICAL DIMENSION FOR OTHER SHAPES
- ID = INSIDE DIAMETER FOR CIRCULAR PIPES AND MINIMUM VERTICAL DIMENSION FOR OTHER SHAPES

**NOTES:**

1. Unless otherwise shown on the plans or specified in the special provisions, the Contractor shall have the option of selecting the class of RCP and the method of backfill to be used, provided the height of cover does not exceed the value shown for the RCP selected.  
Example:  
2'-0" RCP culvert with maximum cover of 19'-0" the options are:  
a) Class V Special or stronger with Method 1.  
b) Class III or stronger with Method 2.  
c) Class II or stronger with Method 3.  
Cover is defined as the maximum vertical distance from top of pipe to finished grade within the length of any given culvert.
2. The class of RCP, method of backfill and bedding selected shall be the same throughout the length of any given culvert.
3. The "length of any culvert" is defined as the culvert between:  
a) Successive drainage structures (inlets, junction boxes, headwalls, etc.).  
b) A drainage structure and the inlet or outlet end of the culvert.  
c) The inlet and outlet end of the culvert when there are no intervening drainage structures.
4. Slope or shore excavation sides as necessary.
5. Embankment height prior to excavation for installation of all classes of RCP under Methods 2 and 3A shall be as follows:  
Pipe sizes 1'-0" to 3'-6", ID = 2'-6"  
Pipe sizes 4'-0" to 7'-0", ID = 7/8 OD  
Pipe sizes larger than 7'-0", ID = 5'-0"
6. The maximum size for all classes of RCP placed under Method 1 is 6'-6" ID.
7. Non-reinforced precast pipe sizes 3'-0" or smaller may also be placed under Methods 1, 2 or 3.
8. Oval or arch shaped RCP shall be placed under Method 2 only.
9. Embankment compaction requirements govern over the 90% relative compaction backfill requirement within 2'-6" of finished grade.
10. Backfill shall be placed full width of excavation except where dimensions are shown for backfill width or thickness. Dimensions shown are minimums.
11. Where the precast non-reinforced concrete pipe is used as a substitute for the cast-in-place pipe, both the wall thickness and the concrete strength shall be at least as great as that specified for the cast-in-place pipe. The fill height allowed shall not exceed that shown for the cast-in-place pipe.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*C.M. Duff*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
Carl M. Duff  
No. C59976  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

**EXCAVATION AND BACKFILL CONCRETE PIPE CULVERTS**

NO SCALE

**A62D**

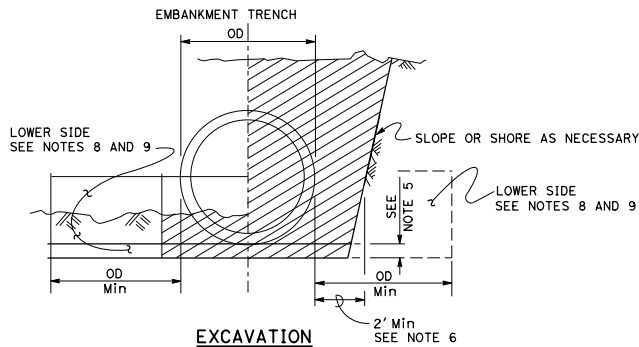
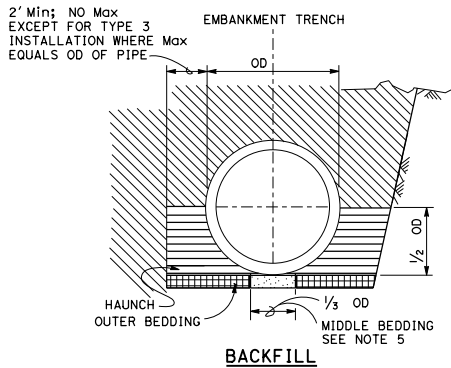
2015 STANDARD PLAN A62D



**DESIGN NOTES:**

Design: AASHTO LRFD Bridge Design Specifications, 4th edition with California Amendments. ACPA DESIGN DATA 1, October 2007. INDIRECT DESIGN METHOD

Soil: w Fe = 162 pcf Installation Type 1  
 w Fe = 168 pcf Installation Types 2 & 3  
 w = Unit weight of soil (pcf)  
 Fe = Soil-structure interaction factor



**INSTALLATION TYPE 1:**

The haunch and outer bedding shall be compacted to a minimum 90 percent relative compaction. In addition, the minimum sand equivalent in these areas shall be 30 and the maximum percentage passing the No. 200 sieve size shall be 12.

**INSTALLATION TYPE 2:**

The haunch and outer bedding shall be compacted to a minimum 90 percent relative compaction. In addition, the minimum sand equivalent in these areas shall be 25.

**INSTALLATION TYPE 3:**

The haunch and outer bedding shall be compacted to a minimum 85 percent relative compaction. 90 percent relative compaction will be required where the fill over the pipe is less than 4'-0" or 1/2 OD. In addition, the minimum sand equivalent in these areas shall be 25 and the material shall not contain rocks, broken concrete, or other solid material exceeding 3" in greatest dimension.

**INSTALLATION TYPE 1**

MINIMUM CLASS AND D-LOAD	COVER	
	60" Dia AND SMALLER	OVER 60" Dia TO 120" Dia Max
CLASS II 1000D	14.9'	12.9'
CLASS III 1350D	15.0' - 21.9'	13.0' - 18.9'
CLASS III SPECIAL 1700D	22.0' - 27.9'	19.0' - 24.9'
CLASS IV 2000D	28.0' - 32.9'	25.0' - 29.9'
CLASS IV SPECIAL 2500D	33.0' - 41.9'	30.0' - 38.9'
CLASS V 3000D	42.0' - 49.9'	39.0' - 46.9'
CLASS V SPECIAL 3600D	50.0' - 60.0'	47.0' - 58.0'

**INSTALLATION TYPE 2**

MINIMUM CLASS AND D-LOAD	COVER	
	60" Dia AND SMALLER	OVER 60" Dia TO 120" Dia Max
CLASS II 1000D	11.9'	9.9'
CLASS III 1350D	12.0' - 15.9'	10.0' - 14.9'
CLASS III SPECIAL 1700D	16.0' - 20.9'	15.0' - 19.9'
CLASS IV 2000D	21.0' - 24.9'	20.0' - 23.9'
CLASS IV SPECIAL 2500D	25.0' - 31.9'	24.0' - 30.9'
CLASS V 3000D	32.0' - 37.9'	31.0' - 37.9'
CLASS V SPECIAL 3600D	38.0' - 46.0'	38.0' - 46.0'

**INSTALLATION TYPE 3**

MINIMUM CLASS AND D-LOAD	COVER	
	60" Dia AND SMALLER	OVER 60" Dia TO 120" Dia Max
CLASS II 1000D	8.9'	5.9'
CLASS III 1350D	9.0' - 11.9'	6.0' - 10.9'
CLASS III SPECIAL 1700D	12.0' - 15.9'	11.0' - 13.9'
CLASS IV 2000D	16.0' - 18.9'	14.0' - 17.9'
CLASS IV SPECIAL 2500D	19.0' - 24.9'	18.0' - 22.9'
CLASS V 3000D	25.0' - 29.9'	23.0' - 28.9'
CLASS V SPECIAL 3600D	30.0' - 36.0'	29.0' - 35.0'

**NOTES:**

- Unless otherwise shown on the plans or specified in the special provisions, the Contractor shall have the option of selecting the class of RCP and the type of installation to be used, provided the height of cover does not exceed the value shown for the RCP selected.  
 Example: 24" RCP culvert with maximum cover of 24'-0" the options are:  
 a) Class III Special or stronger with Installation Type 1.  
 b) Class IV or stronger with Installation Type 2.  
 c) Class V Special or stronger with Installation Type 3.  
 Cover is defined as the maximum vertical distance from top of the pipe to finished grade within the length of any given culvert.
- The class of RCP and Installation Type selected shall be the same throughout the length of any given culvert.
- The "length of any culvert" is defined as the culvert between:  
 a) Successive drainage structure (inlets, junction boxes, headwalls, etc.).  
 b) A drainage structure and the inlet or outlet end of the culvert.  
 c) The inlet and outlet end of the culvert when there are no intervening drainage structures.
- Oval and arch shaped RCP shall not be used.
- Bedding depth: 1/8 OD Min, not less than 3".
- Slurry cement backfill may be substituted for backfill in the outer bedding and haunch areas. If slurry is used, the outer and middle beddings shall be omitted. Prior to installation, the soil under the middle 1/3 of the outside diameter of the pipe shall be softened by scarifying or other means to a minimum depth of 1/8 OD, but not less than 3". Where slurry cement backfill is used, clear distance to trench wall may be reduced as set forth in the Standard Specifications.
- Backfill shall be placed full width of excavation except where dimensions are shown for backfill width or thickness. Dimensions shown are minimum.
- Lower side shall be suitable material as determined by the Engineer. Otherwise it shall be considered unsuitable as set forth in of the Standard Specifications. See Note 9.
- Where the pipe is placed in a trench, if the trench walls are sloped at 5 vertical to 1 horizontal or steeper for at least 90 percent of the trench height or up to not less than 12" from the grading plane, the firmness of the soil in the lower side need not be considered.
- Non-reinforced precast concrete pipe sizes 3'-0" or smaller may be placed under installation Types 1, 2 or 3.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

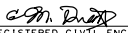
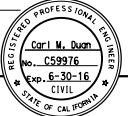
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 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA  
 REGISTERED PROFESSIONAL ENGINEERS

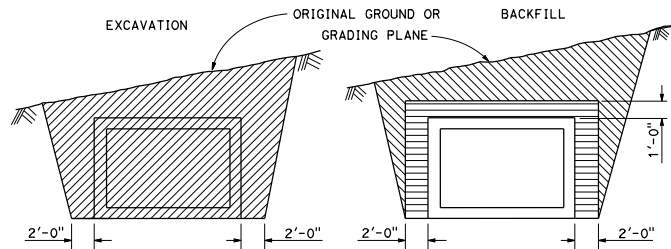
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**EXCAVATION AND BACKFILL  
 CONCRETE PIPE CULVERTS  
 INDIRECT DESIGN METHOD**  
 NO SCALE

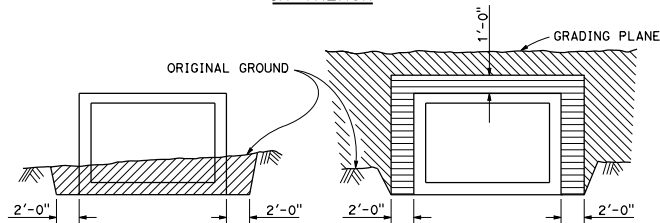
**A62DA**

2015 STANDARD PLAN A62DA

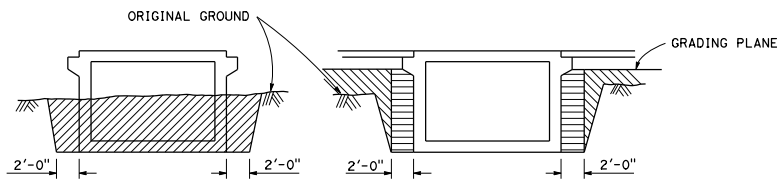
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 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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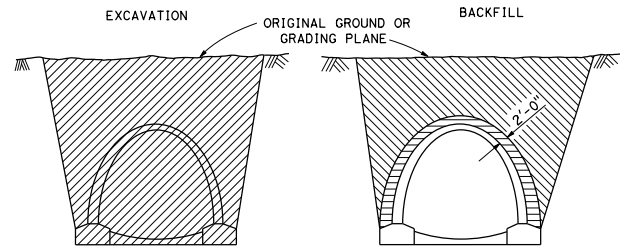
**IN TRENCH**



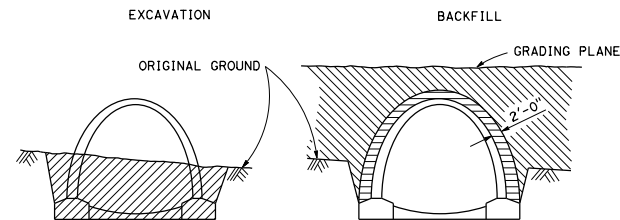
**IN EMBANKMENT**



**EXPOSED TOP  
REINFORCED CONCRETE BOX CULVERT**







**IN TRENCH**



**IN EMBANKMENT  
REINFORCED CONCRETE ARCH CULVERT**

**LEGEND**

-  STRUCTURE EXCAVATION (CULVERT)
-  STRUCTURE BACKFILL (CULVERT)
-  95% RELATIVE COMPACTION
-  ROADWAY EMBANKMENT

**NOTES:**

1. Slope or shore excavation sides as necessary.
2. Dimensions shown are minimum.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**EXCAVATION AND BACKFILL  
CAST-IN-PLACE  
REINFORCED CONCRETE BOX  
AND ARCH CULVERTS**

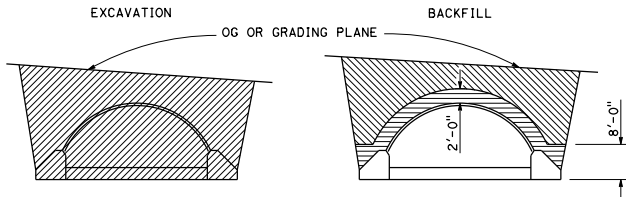
NO SCALE

**A62E**

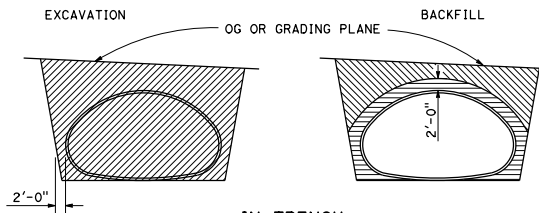
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*C.M. Dunn*  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 PLANS APPROVAL DATE  
 October 30, 2015  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

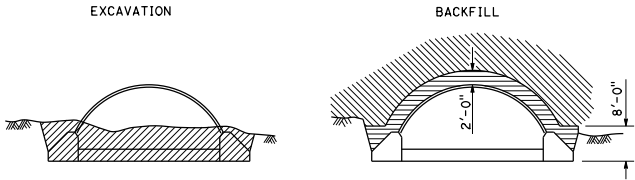
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



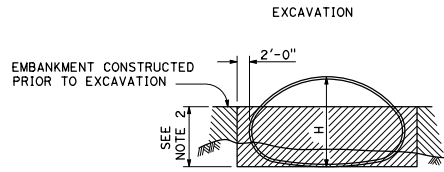
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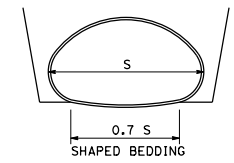
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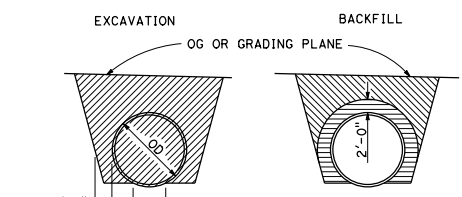
**IN EMBANKMENT  
STRUCTURAL STEEL PLATE ARCHES**



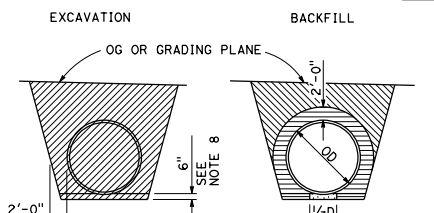
**IN EMBANKMENT  
STRUCTURAL STEEL PLATE PIPE ARCHES  
AND VEHICULAR UNDERCROSSING**



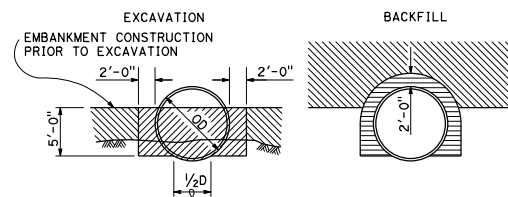
**SHAPED BEDDING**  
S = Larger than 84"



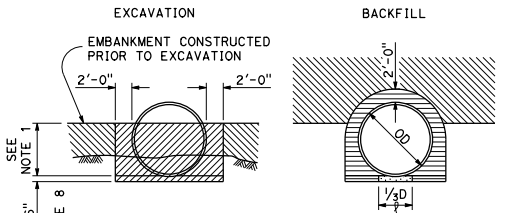
**IN TRENCH**



**IN TRENCH**



**IN EMBANKMENT  
PIPES**  
Larger than 84"



**IN EMBANKMENT  
METAL AND PLASTIC PIPES AND  
CORRUGATED METAL PIPE ARCHES**  
84" or Smaller

**NOTES:**

1. PIPES: 30" minimum for diameters up to and including 42" then 2/3 diameter but no more than 60" required. CORRUGATED METAL PIPE ARCHES: 30" maximum.
2. 2/3 H up to 60" maximum.
3. Slope or shore excavation sides as necessary.
4. Backfill shall be placed full width of excavation except as noted.
5. Diagrams do not apply to overside drains.
6. Dimensions shown are minimum.
7. Construction strutting of structural steel plate pipe, arches and vehicular undercrossing to be used when shown on the project plans. When shown, see Standard Plan D88A for strutting requirements.
8. Excavation below pipe and 80% relative compaction requirements for plastic pipes only.
9. D is the inside diameter (ID) of the pipe.

**LEGEND**

	STRUCTURE EXCAVATION (CULVERT)		ROADWAY EMBANKMENT
	STRUCTURE BACKFILL (CULVERT)		STRUCTURE BACKFILL (CULVERT)
	95% RELATIVE COMPACTION		80% RELATIVE COMPACTION

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**EXCAVATION AND BACKFILL  
METAL AND PLASTIC CULVERTS**

NO SCALE

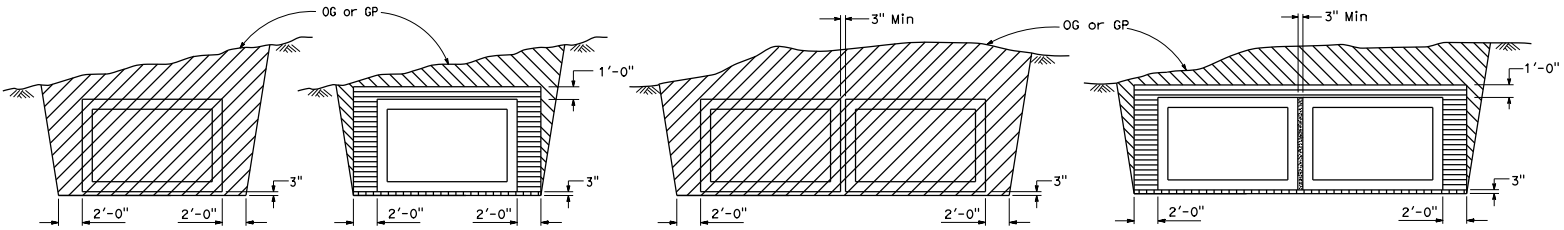
**A62F**

2015 STANDARD PLAN A62F

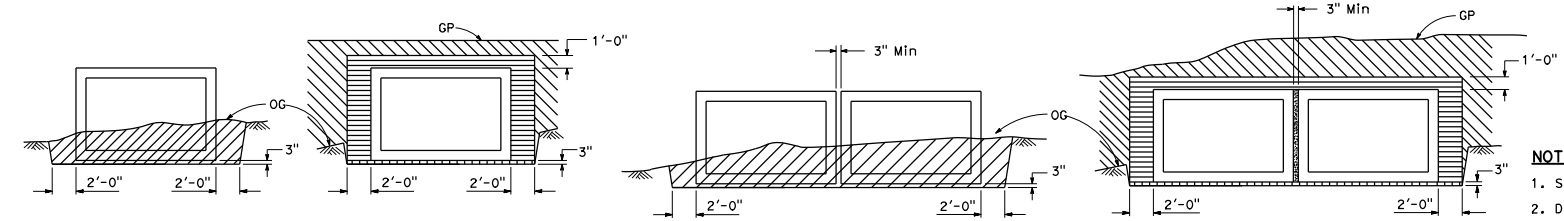
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*C. M. DUNN*  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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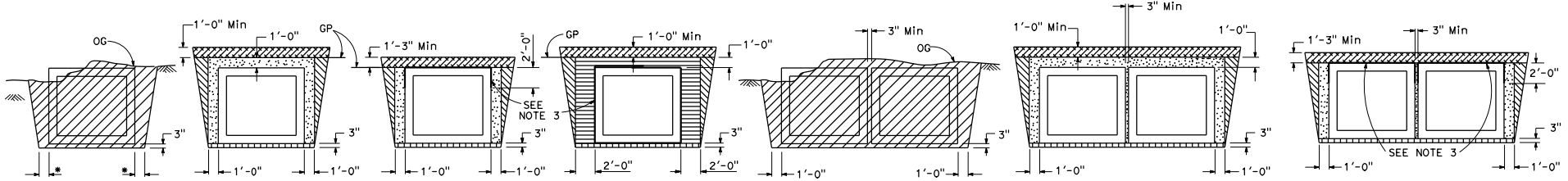


**EXCAVATION IN TRENCH**      **BACKFILL IN TRENCH**



**EXCAVATION IN EMBANKMENT**      **BACKFILL IN EMBANKMENT**

**FILL HEIGHT GREATER THAN 2'-0"**



**EXCAVATION**      **METHOD 1**      **METHOD 2**      **METHOD 3**      **EXCAVATION**      **METHOD 1**      **METHOD 2**

**BACKFILL**

\* 1'-0" Where Method 1 or 2 Backfill is used.  
 2'-0" Where Method 3 Backfill is used.

**FILL HEIGHT 2'-0" OR LESS**

- LEGEND:**
- STRUCTURE EXCAVATION (CULVERT)
  - STRUCTURE BACKFILL (CULVERT) 95% RELATIVE COMPACTION
  - ROADWAY EMBANKMENT
  - SLURRY CEMENT BACKFILL
  - SAND BEDDING (CULVERT)
  - ROADWAY PAVEMENT STRUCTURE

- NOTES:**
1. Slope or shore excavation sides as necessary.
  2. Dimensions shown are minimum.
  3. Method 2 and 3 for single or multiple boxes requires an approved external sealing band. See Standard Plan D83A.
  4. Construction of Roadway Pavement Structure in Method 2 or Method 3 shall not disturb the external sealing band installation.

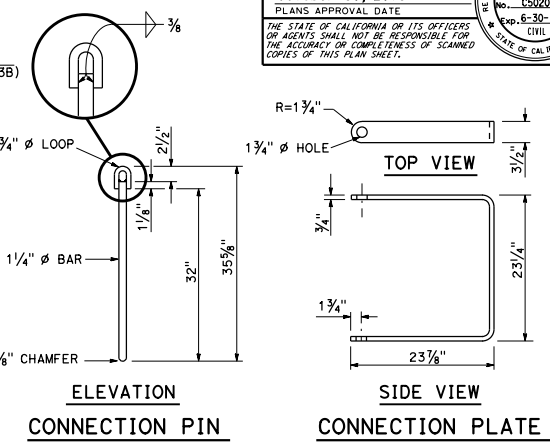
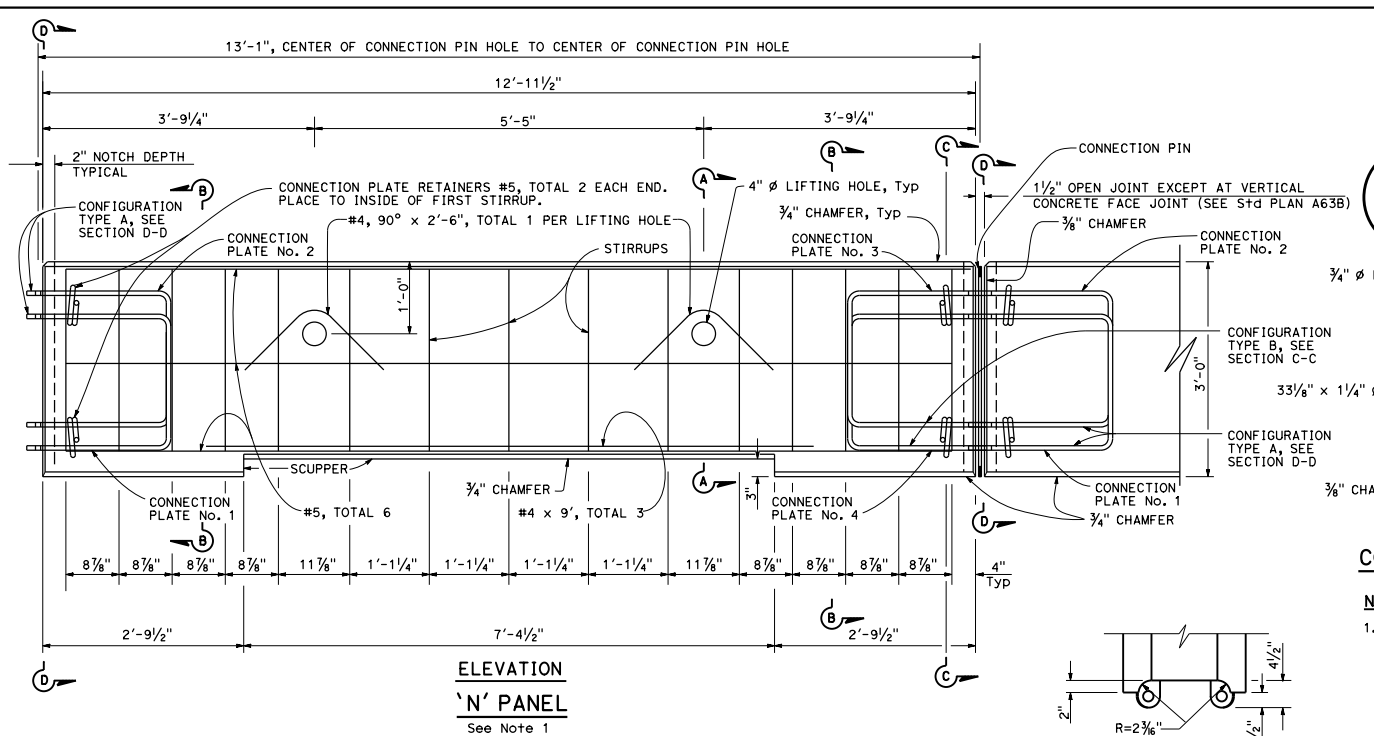
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**EXCAVATION AND BACKFILL PRECAST REINFORCED CONCRETE BOX CULVERT**

NO SCALE

**A62G**

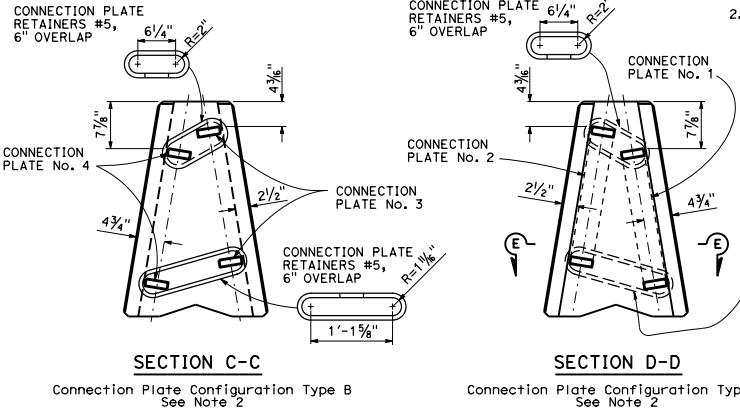
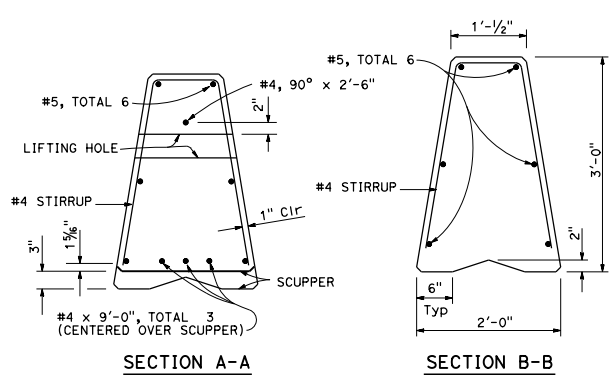
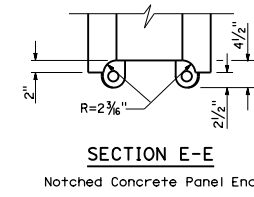
2015 STANDARD PLAN A62G

Dist	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	NO. SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER				
October 30, 2015 PLANS APPROVAL DATE				
No. C50200 Exp. 6-30-17 CIVIL				
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**NOTES:**

- Portable concrete barrier (Type 60K) consists of a layout of interconnected precast panels of the following types:
    - "N" Panels - Notched concrete end at both ends of the panel. Majority of panels used for portable (Type 60K) barrier are "N" Panels.
    - "T" Panels - Notched concrete end at one end of the panel and a vertical concrete face at the other end of the panel. Used to connect "N" Panels to the "R" Panels.
    - "R" Panels - Vertical concrete face at both ends of the panel. Used between "T" Panels. Also connects to vertical concrete end of "T" Panels and vertical concrete end of the connection to permanent concrete barrier.
- For Details of "T" and "R" Panels and Typical layouts of portable concrete barrier (Type 60K), see Standard Plan A63B.



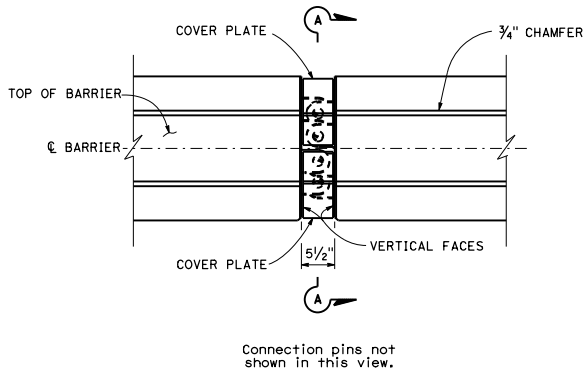
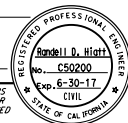
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PORTABLE CONCRETE BARRIER (TYPE 60K)**

NO SCALE

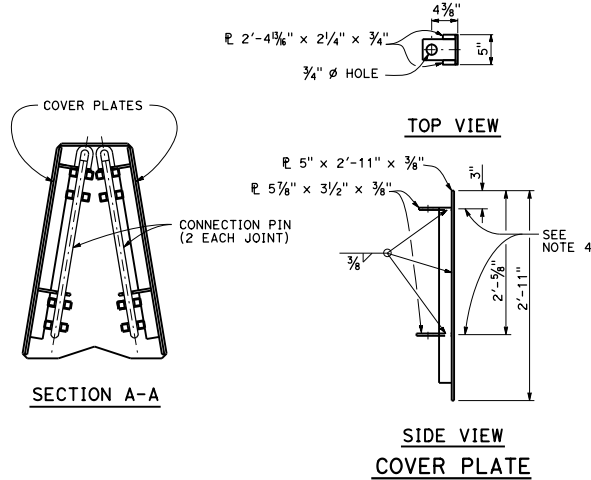
**A63A**

2015 STANDARD PLAN A63A

DIST.	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	NO. SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER				
October 30, 2015 PLANS APPROVAL DATE				
No. C50200 Exp. 6-30-17 CIVIL				
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>				

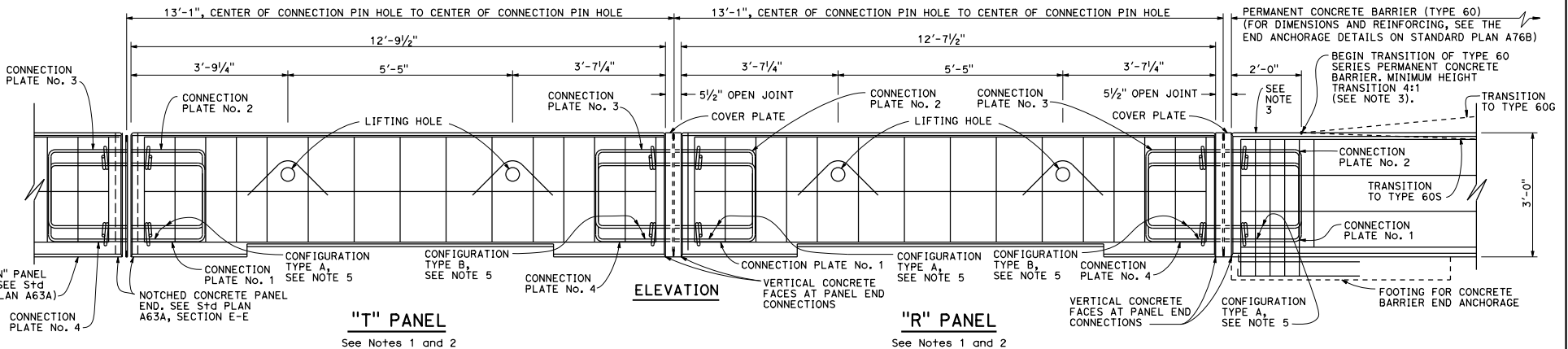


**TOP VIEW**  
**VERTICAL CONCRETE FACE JOINTS**

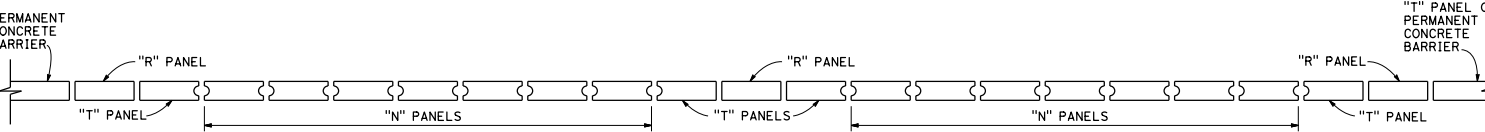


**NOTES:**

- "R" Panels are to be placed at a maximum of 10 panel segment intervals and at connections to permanent concrete barriers. "R" panels provide for quick and easy placement and removal by lateral movement of panel (NO Notched Ends). "N" Panels have concrete notches at each end of the panel. "T" panels have a concrete notch at one end of the panel and a vertical face at the other end of the panel. Notched end connections plus overlapping connection plates require longitudinal movement of the panels during placement or removal. If portable concrete barrier (Type 60K) is to be removed after installation, "R" panels are to be removed first to facilitate removal of the remaining panels.
- Reinforcement and dimensioning details for "R" and "T" Panels are similar to the "N" Panel details shown on Standard Plan A63A.
- Modify end of permanent concrete barrier with the installation of connection plates for connection pins and cover plates. Remove 2' of existing Type 60 permanent concrete barrier to install connection plates for "R" Panel connection. Where the connection to existing barrier requires a height transition, remove existing barrier to end of the height transition.
- Dimension to bottom of the 5 5/8" x 3 1/2" x 3/8" plate.
- For additional details of connection plate configurations, see Sections C-C and D-D of Standard Plan A63A.



**ELEVATION**  
See Notes 1 and 2



**PLAN**  
**TYPICAL PORTABLE CONCRETE BARRIER (TYPE 60K) LAYOUT**  
See Note 1

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PORTABLE CONCRETE BARRIER (TYPE 60K)**  
NO SCALE

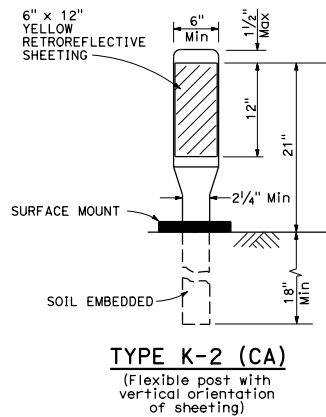
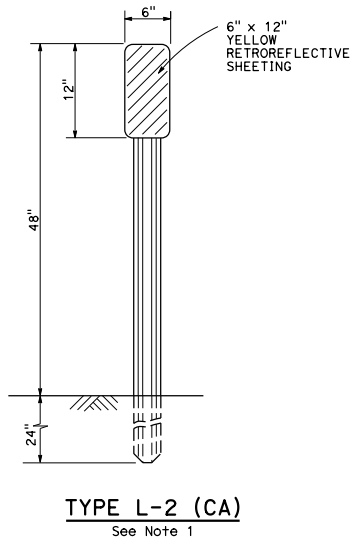
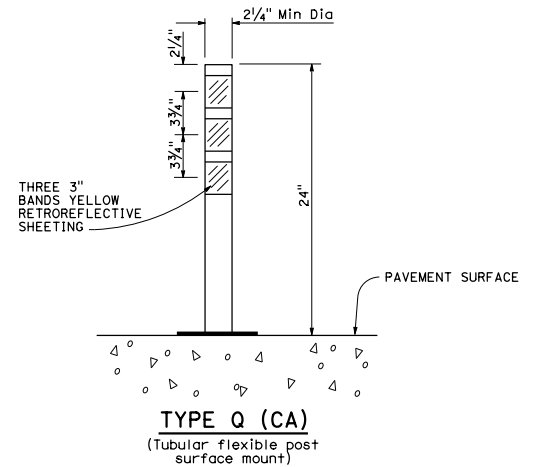
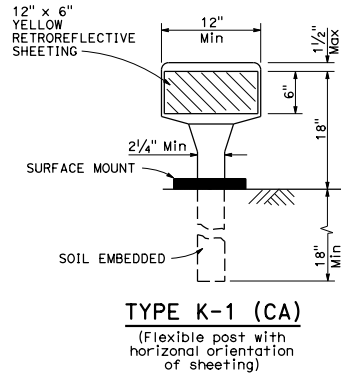
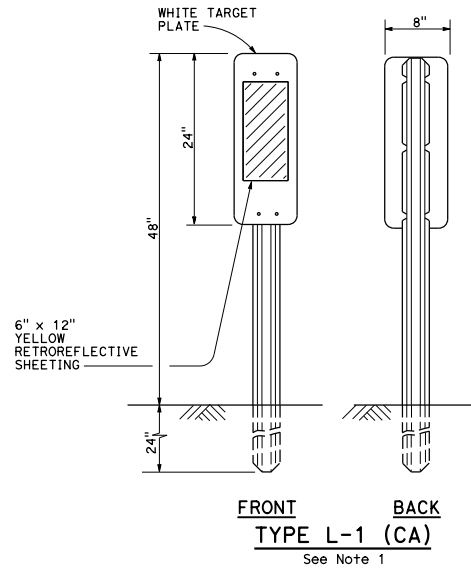
**A63B**

**2015 STANDARD PLAN A63B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C46402  
 Donald E. Howe  
 REGISTERED PROFESSIONAL ENGINEER  
 No. C46402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

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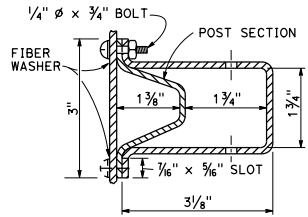
**NOTE:**

1. See Standard Plan A73B for metal post details and additional markers.

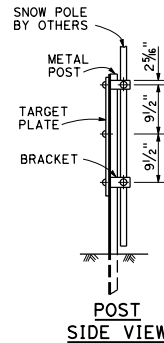
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OBJECT MARKERS**  
 NO SCALE

**A73A**

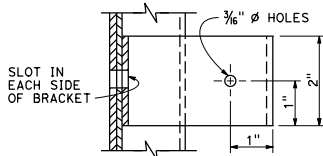




TOP VIEW



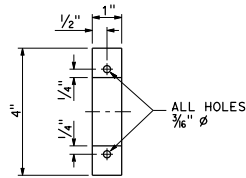
POST SIDE VIEW



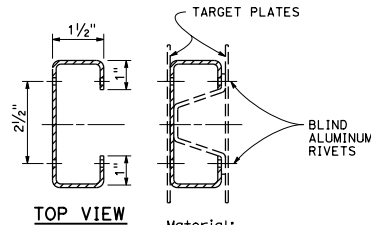
SIDE VIEW

Bracket to be 1/8" x 2" mild steel galvanized after fabrication

SNOW POLE BRACKET



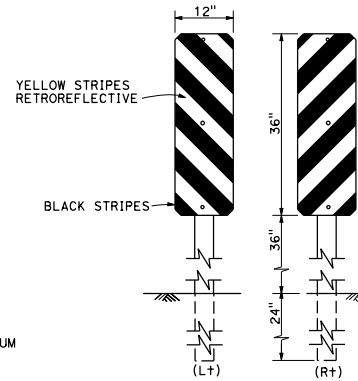
SIDE VIEW



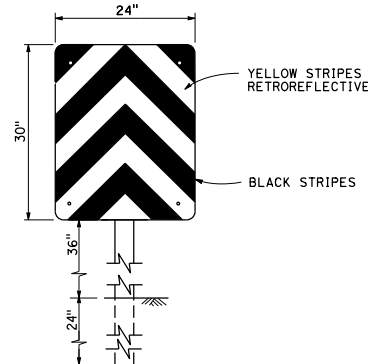
TOP VIEW

Material: Aluminum 0.050" thick (3003-H14 Alloy)

TWO PLATE POST MOUNT



TYPE P (CA)

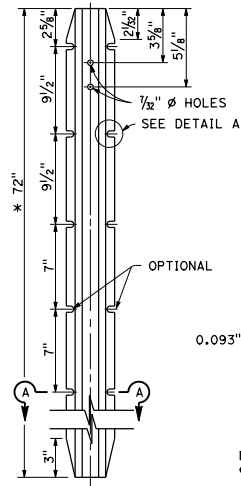


TYPE R (CA)

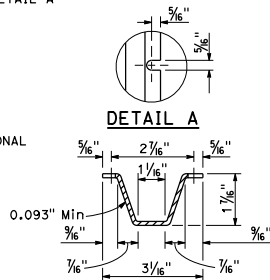
TYPE N-1 (CA), N-2 (CA), N-3 (CA)

N-1(CA). Yellow retroreflective.  
N-2(CA). Red retroreflective.  
N-3(CA). Orange retroreflective.

OBJECT MARKERS



DETAIL A

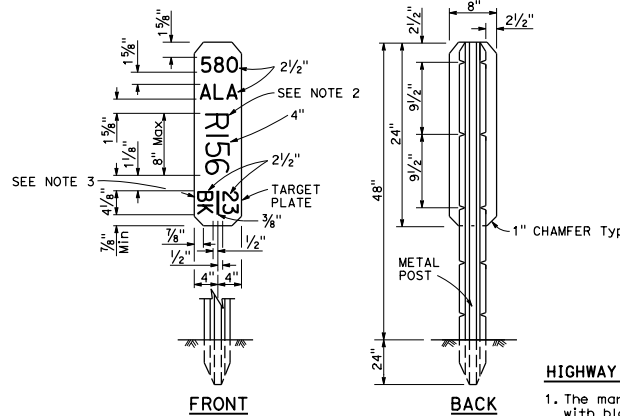


SECTION A-A

Metal post to be as shown except that minor variations in design and dimensions will be permitted to meet manufacturer's standards.

\* 8'-0" for Type P object marker

METAL POST DETAIL



FRONT

BACK

HIGHWAY POST MARKER

HIGHWAY POST MARKER NOTES:

1. The marker shall be white (non-reflective) target plate with black Series D numerals and letters.
2. A post mile prefix, such as "R", shall apply only when directed by the Engineer.
3. "BK"(Back), "AH"(Ahead), or a blank space shall apply as directed by the Engineer.
4. All information shall be in U.S. Customary units (miles).

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
 REGISTERED CIVIL ENGINEER  
 No. C46402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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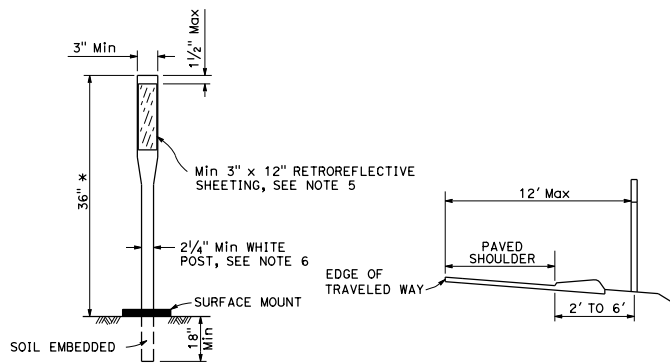
NOTES:

- A. See Std Plan A73A for additional object markers.
- B. Type P(CA) and R(CA) markers shall have orange and white retroreflective stripes in work zones.
- C. Diagonal stripes on Type P(CA) markers shall be sloped down in the direction of travel.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

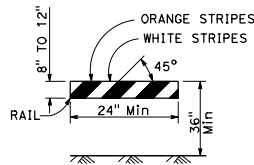
MARKERS

NO SCALE



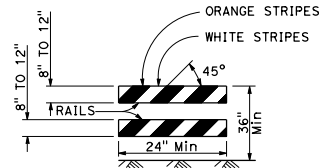
\* 36" Min where speeds are 40 miles/h or less.

**CHANNELIZERS**



**TYPE I BARRICADE**

See Note A



**TYPE II BARRICADE**

**BARRICADES** (See Note 3)

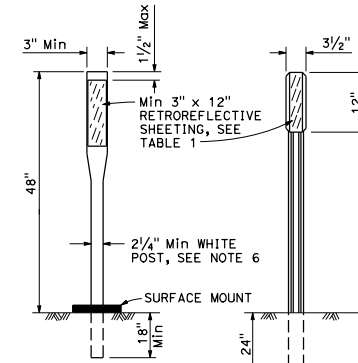
Only face of rails shown. Barricade construction materials and supports as specified in the specifications.

BARRICADE	TYPE I	TYPE II	TYPE III
WIDTH OF RAIL	8" Min - 12" Max *	8" Min - 12" Max *	8" Min - 12" Max *
LENGTH OF RAIL	24" Min	24" Min	48" Min
WIDTH OF STRIPES * *	6"	6"	6"
HEIGHT	36" Min	36" Min	60" Min
NUMBER OF RETROREFLECTIVE RAIL FACES	2 (ONE EACH DIRECTION)	4 (TWO EACH DIRECTION)	3 IF FACING TRAFFIC IN ONE DIRECTION 6 IF FACING TRAFFIC IN TWO DIRECTION

\* For the wooden option dimensions are nominal lumber dimensions.  
\* \* For rails less than 36" long, 4" wide stripes shall be used.

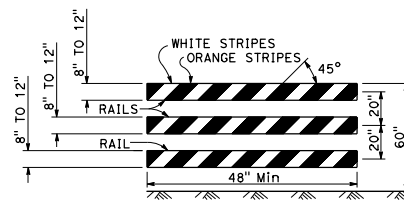
**NOTE A:**

Barricades to have a minimum of 270 square inches of retroreflective area facing traffic when used on freeways, expressways, and other high speed highways.



**CLASS 1 FLEXIBLE POST DELINEATORS**

**CLASS 2 METAL POST**  
See Note 4



**TYPE III BARRICADE**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Atifa Ferouz  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Atifa Ferouz  
No. C80402  
Exp. 3-31-17  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
STATE OF CALIFORNIA

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TYPE	RETROREFLECTIVE SHEETING	
	FRONT	BACK
E	WHITE	WHITE (SEE NOTE 1)
F	WHITE	NONE
G	YELLOW	NONE
J	RED	NONE

**NOTES:**

- The retroreflective sheeting used on the back of delineator shall be a minimum size of 3" x 3".
- The type of delineator to be installed will be designated on the plans.
- All barricade stripes shall be retroreflective and sloped downward in the direction of the opened traffic lane.
- See Standard Plan A73B for Metal Post Details.
- Unless shown otherwise on the plans, or as directed by the Engineer, the color of the retroreflective sheeting for permanent channelizers shall conform to the color of the pavement markings it supplements.
- Except, Class 1 (Flexible Post) temporary delineators and temporary channelizers in work zones shall be orange post with white retroreflective sheeting.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DELINEATORS, CHANNELIZERS AND BARRICADES**

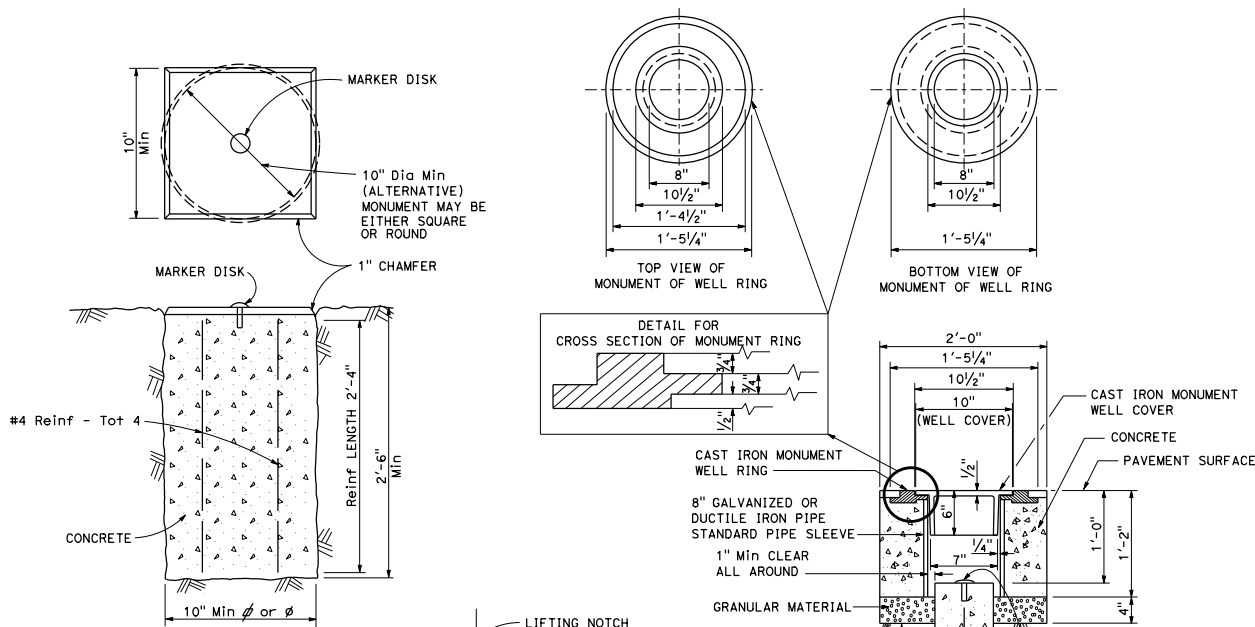
NO SCALE

**A73C**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

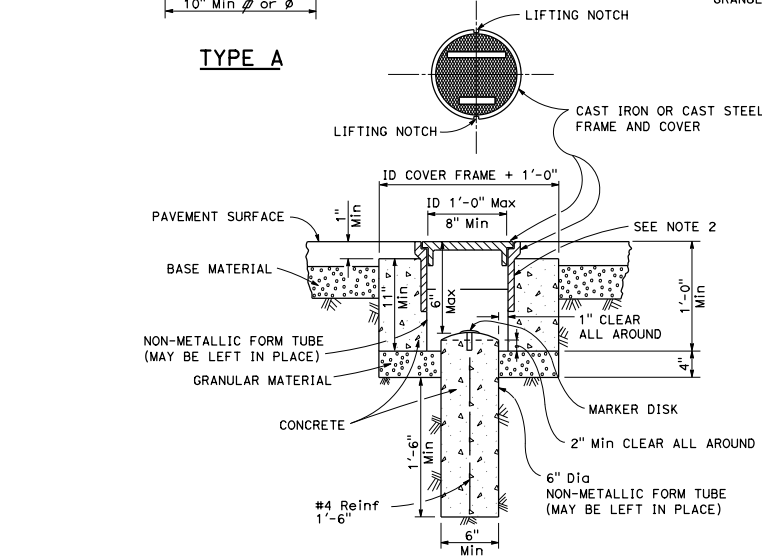
**Mark S. Turner**  
 PROFESSIONAL LAND SURVEYOR  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. 6228  
 Exp. 3-31-16  
 LICENSED LAND SURVEYOR  
 STATE OF CALIFORNIA

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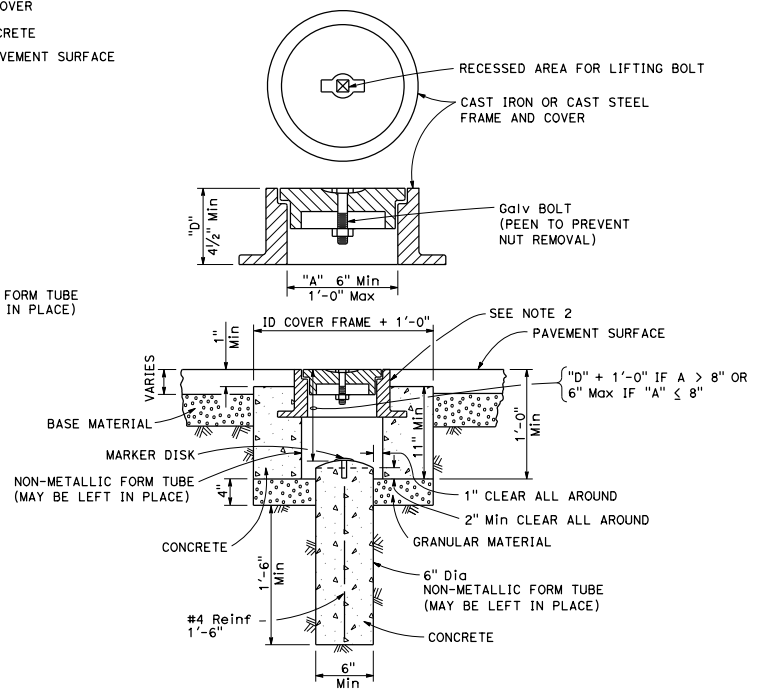


**TYPE A**

**TYPE B**



**TYPE D**  
Alternative No. 1



**TYPE D**  
Alternative No. 2

**NOTES:**

1. The configuration of the cast iron or cast steel frame and cover may vary from that shown.
2. Frame shall be embedded in the concrete a minimum of 3".

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**SURVEY MONUMENTS**

NO SCALE

**A74**

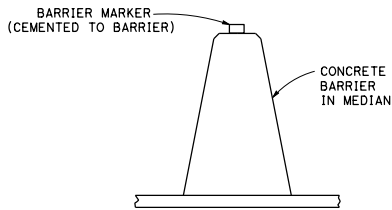
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

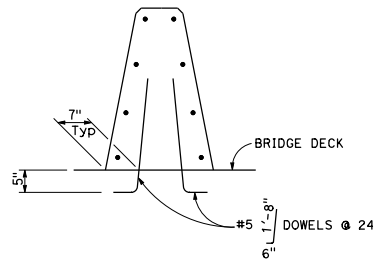
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REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA



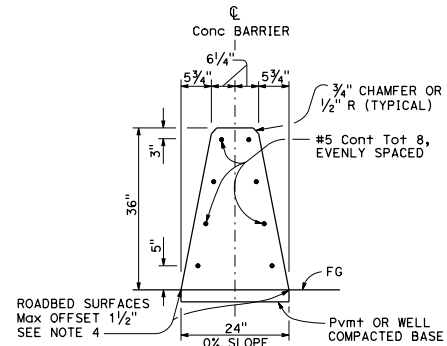
**CONCRETE BARRIER TYPE 60 DELINEATION**

See Note 5



**CONCRETE BARRIER TYPE 60A**

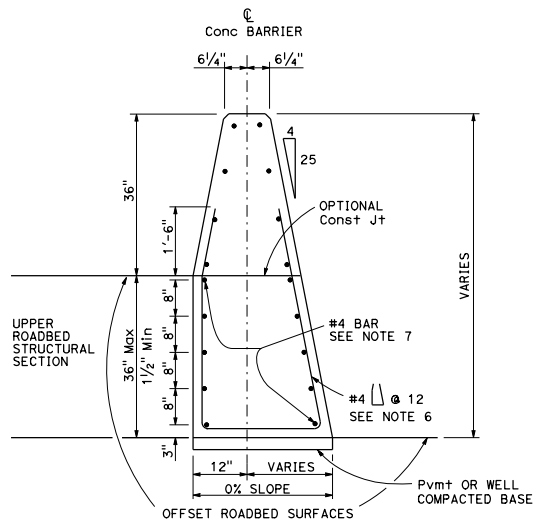
Details similar to Type 60 except as noted.



**CONCRETE BARRIER TYPE 60**

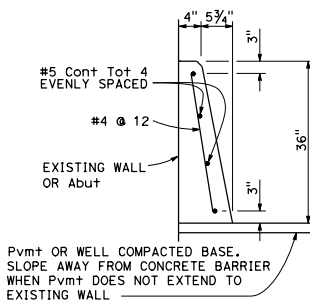
**NOTES:**

- See Standard Plan A76B for details of Concrete Barrier Type 60 end anchors, connection to structures and transitions to Concrete Barrier Type 50 and Concrete Barrier Type 60S.
- See Standard Plan A76C for Concrete Barrier Type 60 transitions at bridge column and sign pedestals.
- Where glare screen is required on Concrete Barrier Type 60, use Concrete Barrier Type 60C.
- Where roadbed offset is greater than 1 1/2", see Concrete Barrier Type 60C.
- See Project Plans for barrier delineation locations.
- Reinforcing stirrup not required for roadbed offsets less than 1'-0".
- For roadbed surfaces offset greater than 1 1/2" and less than or equal to 3", no reinforcement required. For roadbed surfaces offset greater than 3" and less than or equal to 8", use two #4 Reinf at 3" above the lower roadbed surface. For roadbed surfaces offset greater than 8" and less than or equal to 12", use two #4 Reinf at 3" above the lower roadbed surface and two #4 Reinf at 8" above the lower roadbed surface. For roadbed surfaces offset greater than 12" and less than or equal to 36", use two #4 Reinf at 3" above the lower roadbed surface and two #4 Reinf at every 8" increment vertical spacing above the first two #4 Reinf.



**CONCRETE BARRIER TYPE 60C**

Details similar to Type 60 except as noted. Use concrete barrier end anchor when necessary. 36" roadbed surfaces offset shown.



**CONCRETE BARRIER TYPE 60D**

37

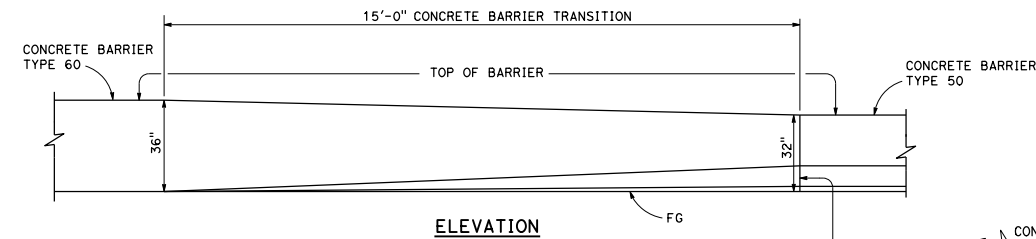
2015 STANDARD PLAN A76A

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

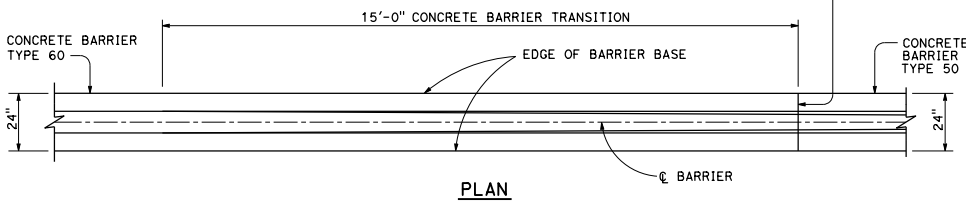
**CONCRETE BARRIER TYPE 60**

NO SCALE

**A76A**

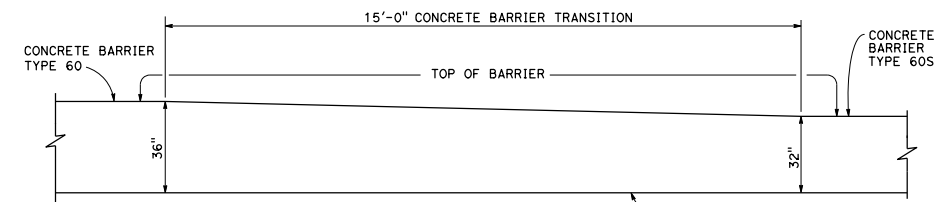


**ELEVATION**



**PLAN**

**TRANSITION CONCRETE BARRIER TYPE 60 TO CONCRETE BARRIER TYPE 50**



**ELEVATION**

**TRANSITION CONCRETE BARRIER TYPE 60 TO CONCRETE BARRIER TYPE 60S**

**NOTES:**

1. See Standard Plan A76A for Concrete Barrier Type 60 and Type 60A.
2. Footing monolithic or doweled with 2-#8 x 8" @ 2'-0". The footing is required at concrete barrier ends and at interruptions in concrete barrier.
3. 10" concrete barrier footing extends 10' back from structure.
4. See Standard Plan A78I for transition to Thrie Beam Barrier.

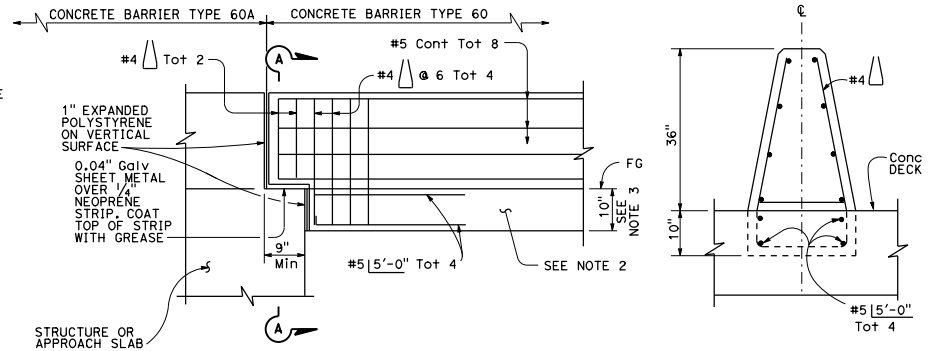
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

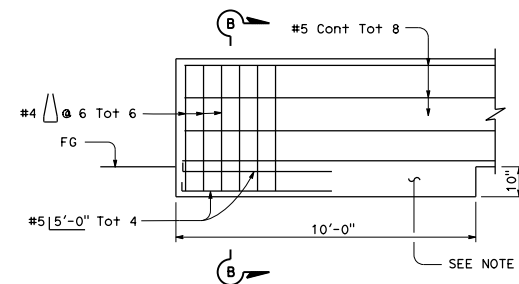
**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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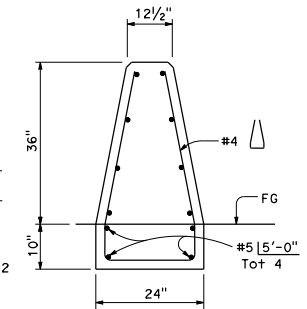


**CONCRETE BARRIER TYPE 60 CONNECTION TO STRUCTURE**

**SECTION A-A**



**CONCRETE BARRIER TYPE 60 END ANCHORAGE**



**SECTION B-B**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER TYPE 60**

NO SCALE

**A76B**

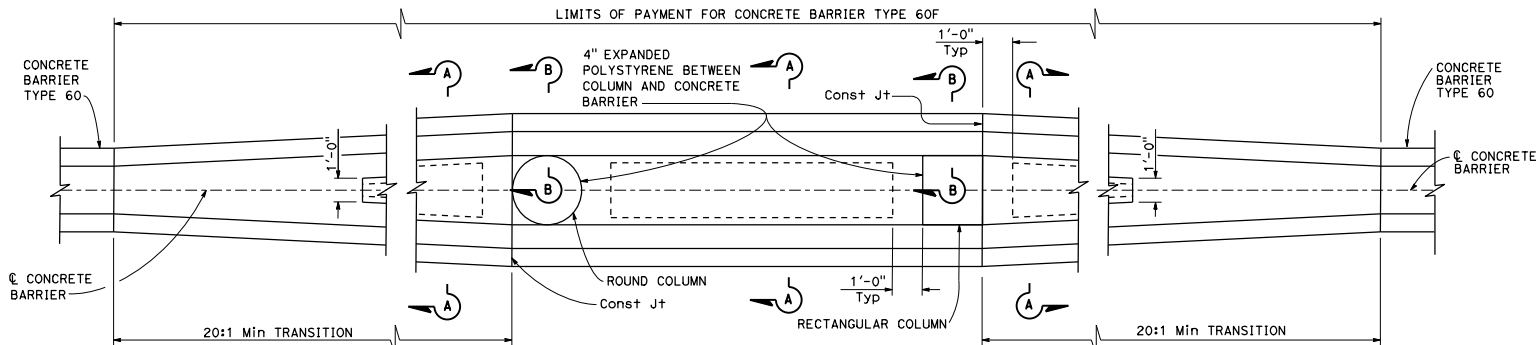
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

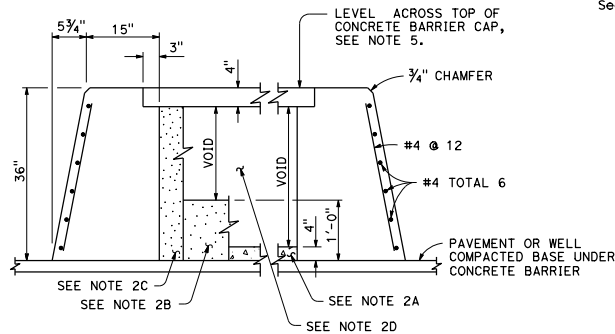
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**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

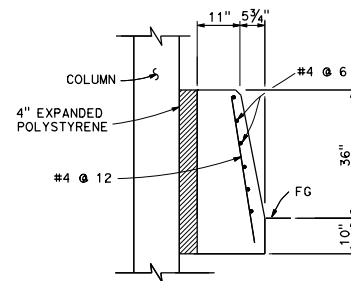


**TRANSITION AT BRIDGE COLUMNS**

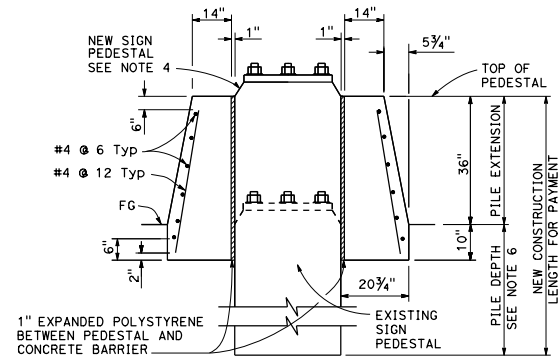
Concrete Barrier Type 60F  
See Note 7



**SECTION A-A**



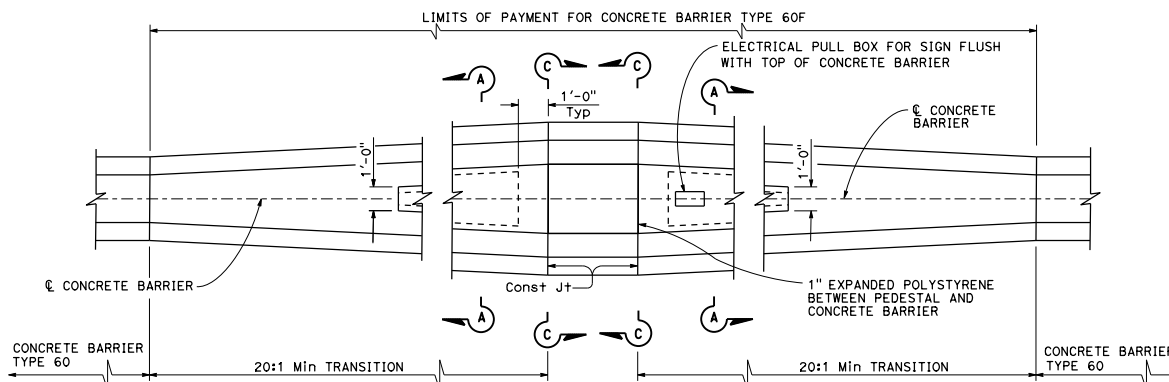
**SECTION B-B**



**SECTION C-C**

**NOTES:**

1. See Standard Plan A76A for Concrete Barrier Type 60.
2. Contractor options for fill between concrete barrier walls:  
A. Place 4" PCC at base between concrete barrier walls.  
B. Place 1'-0" of granular material at base between walls.  
C. Place granular material from base to bottom of 4" cap.  
D. Monolithic concrete with foam blockouts is not permitted.
3. Reinforcing steel shall extend continuous through construction joints.
4. See Overhead Sign plans for sign pedestal elevations on new construction.
5. Adjust height of concrete barrier wall on low side of offset or superelevated roadways to provide level grade across top of concrete barrier cap.
6. See Overhead Signs Standard Plan Pile Foundation Tables.
7. All locations with limited shoulder width available for barrier, see Standard Plan A76F for use of Concrete Barrier Type 60GE.

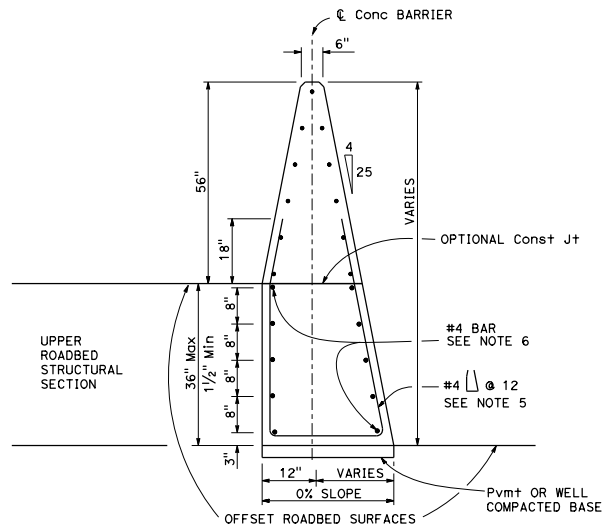


**TRANSITION AT SIGN PEDESTAL**

Concrete Barrier Type 60F  
See Note 7

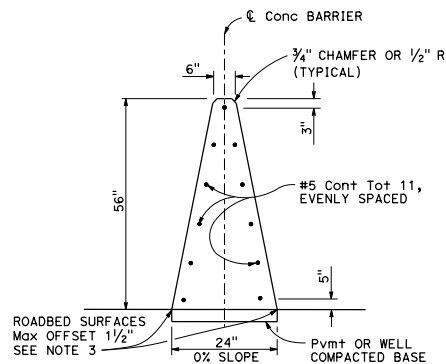
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER TYPE 60F**  
NO SCALE

**A76C**



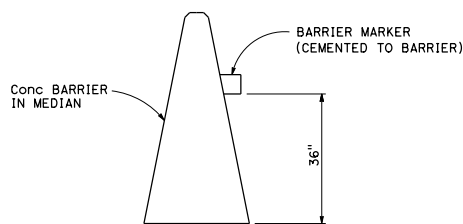
**CONCRETE BARRIER TYPE 60GC**

Details similar to Type 60G except as noted. 36" roadbed surfaces offset shown.



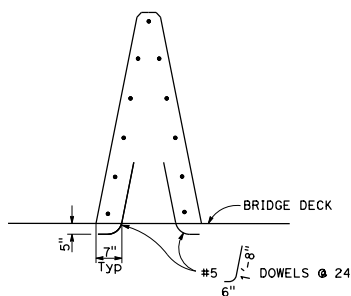
**CONCRETE BARRIER TYPE 60G**

(Monolithic concrete glare screen/barrier)



**CONCRETE BARRIER TYPE 60G DELINEATION**

See Note 4



**CONCRETE BARRIER TYPE 60GA**

Details similar to Type 60G except as noted.

**NOTES:**

1. See Standard Plan A76E for details of Concrete Barrier Type 60G end anchors, connection to structures and transitions to Concrete Barrier Type 60.
2. See Standard Plan A76F for Concrete Barrier Type 60G transitions at bridge column and sign pedestals.
3. Where roadbed offset is greater than 1 1/2", see Concrete Barrier Type 60GC.
4. Barrier delineation to be used when required by the Special Provisions.
5. Reinforcing stirrup not required for offsets less than 1'-0".
6. For roadbed surfaces offset greater than 1 1/2" and less than or equal to 3", no reinforcement required. For roadbed surfaces offset greater than 3" and less than or equal to 8", use two #4 Reinf at 3" above the lower roadbed surface. For roadbed surfaces offset greater than 8" and less than or equal to 12", use two #4 Reinf at 3" above the lower roadbed surface and two #4 Reinf at 8" above the lower roadbed surface. For roadbed surfaces offset greater than 12" and less than or equal to 36", use two #4 Reinf at 3" above the lower roadbed surface and two #4 Reinf at every 8" increment vertical spacing above the first two #4 Reinf.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

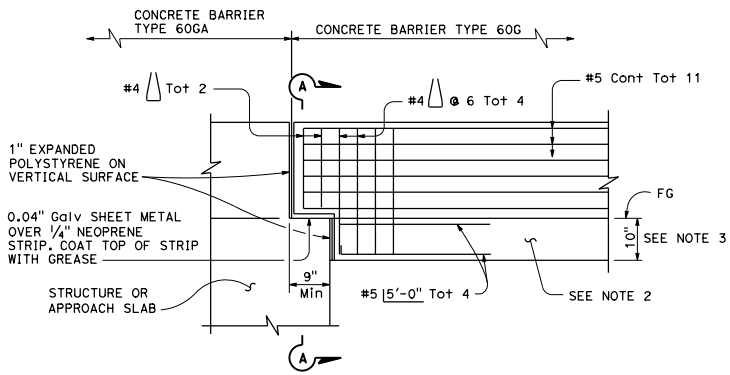
**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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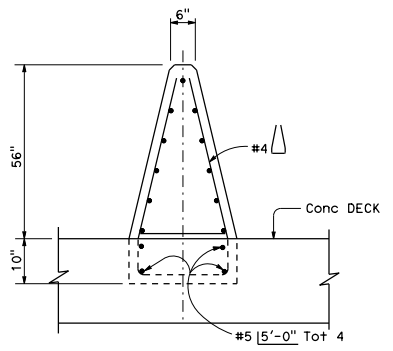
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER TYPE 60G**  
NO SCALE

**A76D**

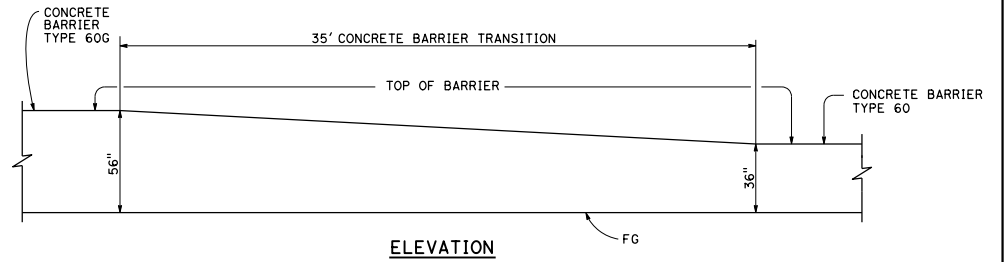




**CONCRETE BARRIER TYPE 60G CONNECTION TO STRUCTURE**

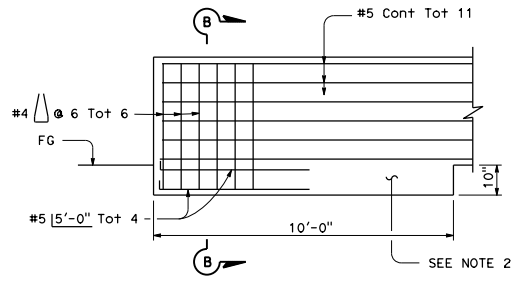


**SECTION A-A**

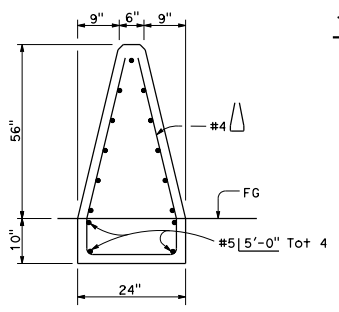


**ELEVATION**

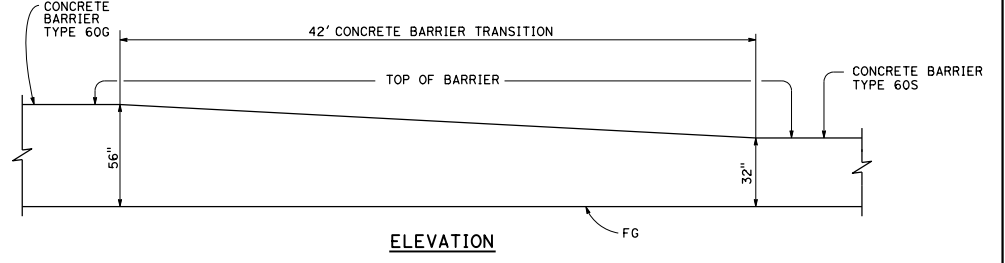
**TRANSITION CONCRETE BARRIER TYPE 60G TO CONCRETE BARRIER TYPE 60**



**CONCRETE BARRIER TYPE 60G END ANCHORAGE**



**SECTION B-B**



**ELEVATION**

**TRANSITION CONCRETE BARRIER TYPE 60G TO CONCRETE BARRIER TYPE 60S**

Dist.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**

1. See Standard Plan A76D for Concrete Barrier Type 60G and Type 60GA.
2. Footing monolithic or doweled with 2-#8 x 8" @ 2'-0". The footing is required at concrete barrier ends and at interruptions in concrete barrier.
3. 10" concrete barrier footing extends 10' back from structure.
4. See Standard Plan A781 for transition to Thrie Beam Barrier.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER TYPE 60G**  
NO SCALE

**A76E**

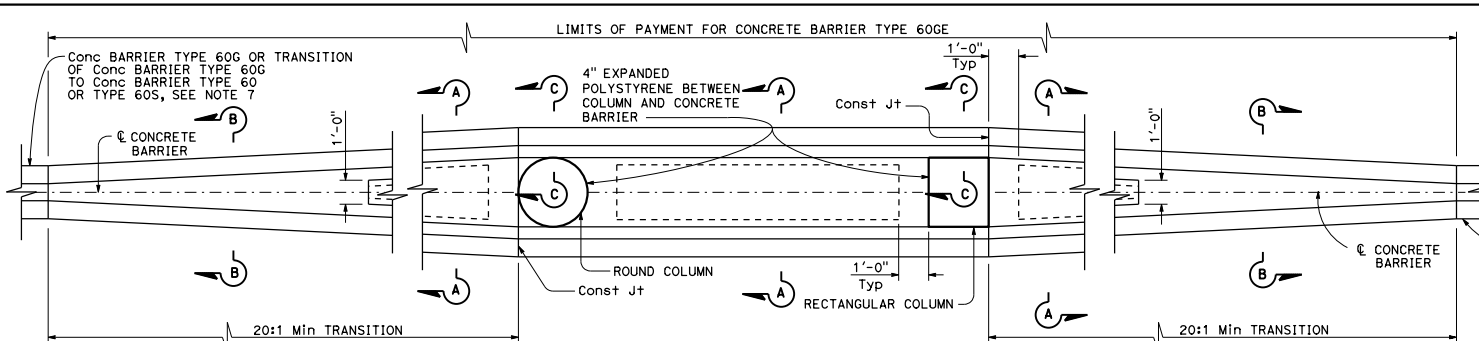
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

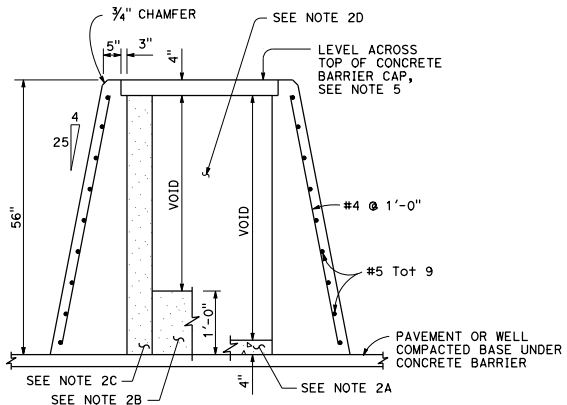
October 30, 2015  
PLANS APPROVAL DATE

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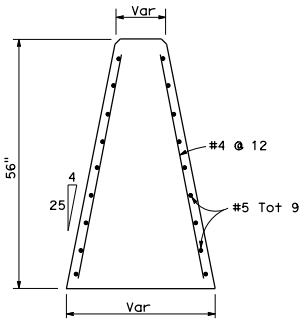
REGISTERED PROFESSIONAL ENGINEER  
Randell D. Hiatt  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA



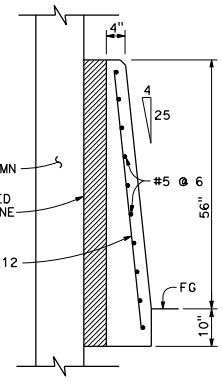
**TRANSITION AT BRIDGE COLUMNS**  
Concrete Barrier Type 60GE



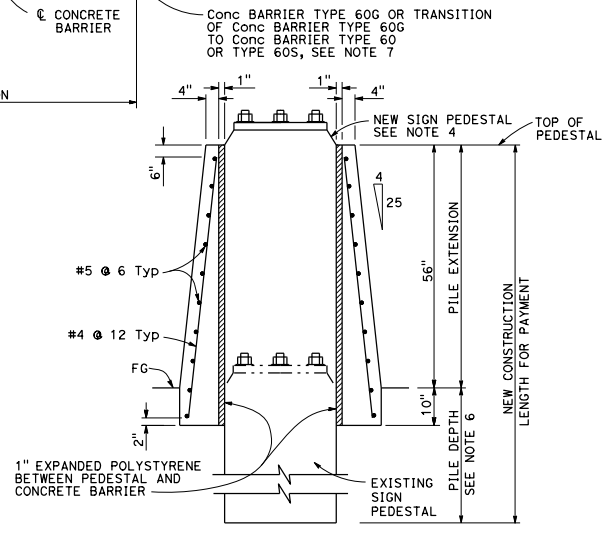
**SECTION A-A**



**SECTION B-B**



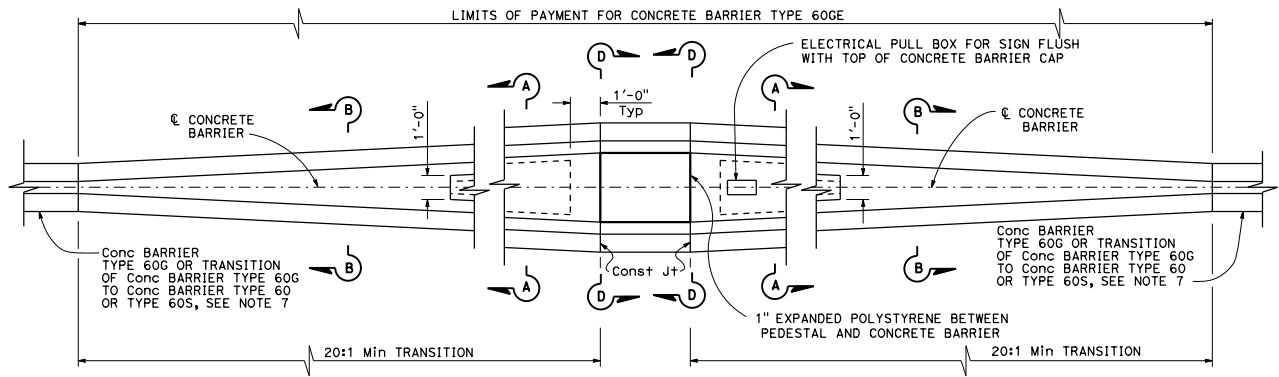
**SECTION C-C**



**SECTION D-D**

**NOTES:**

- See Standard Plan A76D for Concrete Barrier Type 60G.
- Contractor options for fill between concrete barrier walls:
  - A. Place 4" PCC at base between concrete barrier walls.
  - B. Place 1'-0" of granular material at base between walls.
  - C. Place granular material from base to bottom of 4" cap.
  - D. Monolithic concrete with foam blockouts is not permitted.
- Reinforcing steel shall extend continuous through construction joints.
- See Overhead Sign plans for sign pedestal elevations on new construction.
- Adjust height of concrete barrier wall on low side of offset or super-elevated roadways to provide level grade across top of concrete barrier cap.
- See Overhead Signs Standard Plan Pile Foundation Tables.
- See Standard Plan A76E for concrete barrier transitions.



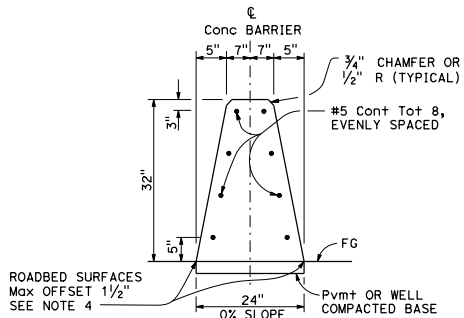
**TRANSITION AT SIGN PEDESTAL**  
Concrete Barrier Type 60GE

**CONCRETE BARRIER TYPE 60GE**

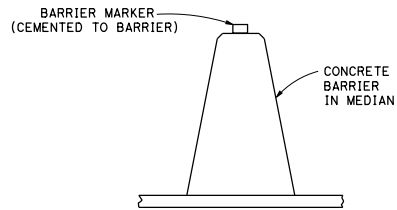
NO SCALE

**A76F**

2015 STANDARD PLAN A76F

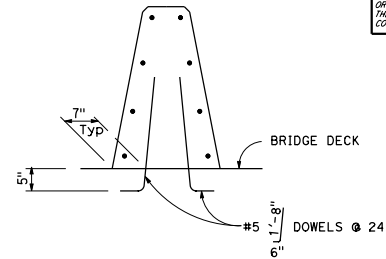


**CONCRETE BARRIER TYPE 60S**



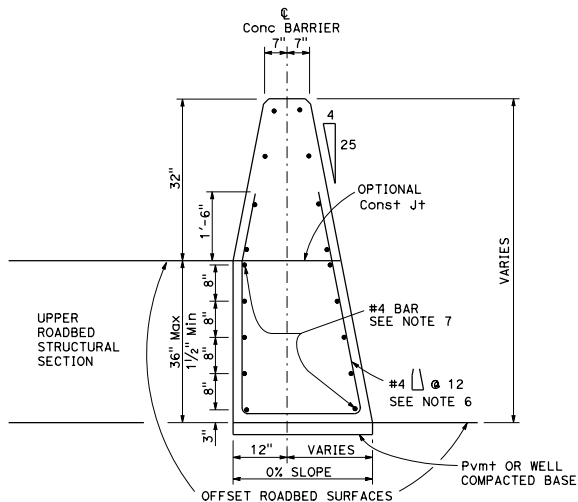
**CONCRETE BARRIER TYPE 60S DELINEATION**

See Note 5



**CONCRETE BARRIER TYPE 60SA**

Details similar to Type 60S except as noted.



**CONCRETE BARRIER TYPE 60SC**

Details similar to Type 60S except as noted. Use concrete barrier end anchor when necessary. 36" roadbed surfaces offset shown.

**NOTES:**

1. See Standard Plan A76H for details of Concrete Barrier Type 60S end anchors, connection to structures and transitions to Concrete Barrier Type 50.
2. See Standard Plan A76I for Concrete Barrier Type 60S transitions at bridge column and sign pedestals.
3. Where glare screen is required on top of concrete barrier, use Concrete Barrier Type 60G.
4. Where roadbed offset is greater than 1 1/2" see Concrete Barrier Type 60SC.
5. Barrier delineation to be used when required by the Special Provisions.
6. Reinforcing stirrup not required for roadbed offsets less than 1'-0".
7. For roadbed surfaces offset greater than 1 1/2" and less than or equal to 3", no reinforcement required. For roadbed surfaces offset greater than 3" and less than or equal to 8", use two #4 Reinf at 3" above the lower roadbed surface. For roadbed surfaces offset greater than 8" and less than or equal to 12", use two #4 Reinf at 3" above the lower roadbed surface and two #4 Reinf at 8" above the lower roadbed surface. For roadbed surfaces offset greater than 12" and less than or equal to 36", use two #4 Reinf at 3" above the lower roadbed surface and two #4 Reinf at every 8" increment vertical spacing above the first two #4 Reinf.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER TYPE 60S**

NO SCALE

**A76G**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Randell D. Hiatt*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Randell D. Hiatt*  
No. C50200  
Exp. 6-30-17  
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STATE OF CALIFORNIA

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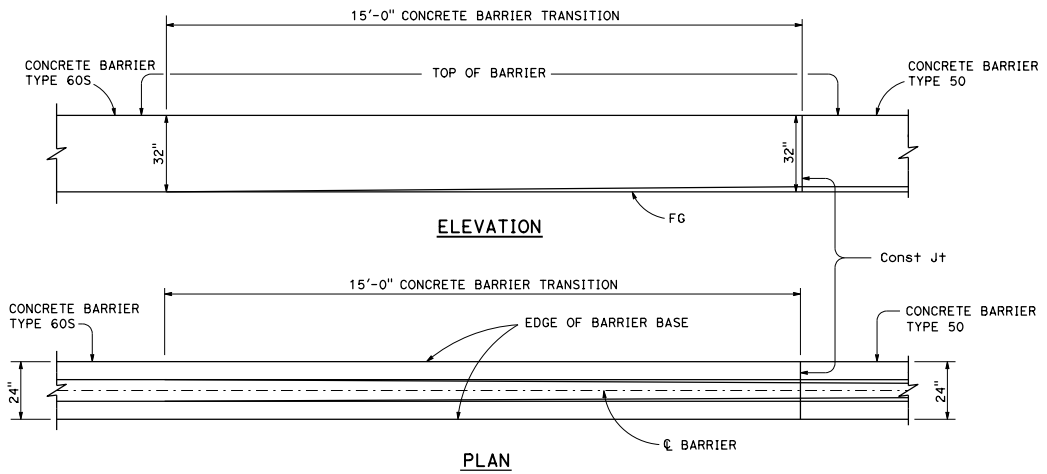
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

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October 30, 2015  
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No. C50200  
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STATE OF CALIFORNIA

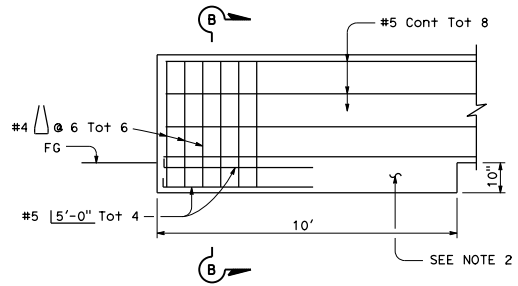
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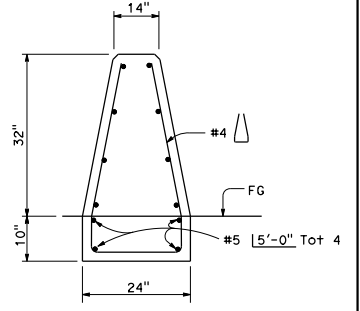
**TRANSITION TYPE 60S CONCRETE BARRIER TO TYPE 50 CONCRETE BARRIER**

**NOTES:**

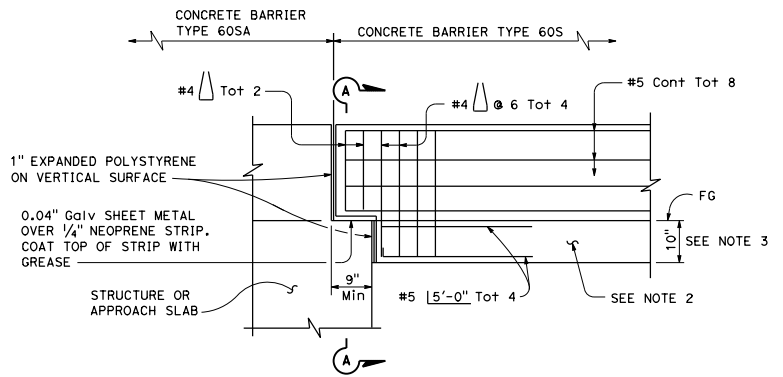
1. See Standard Plan A76G for Concrete Barrier Type 60S and Type 60SA.
2. Footing monolithic or doweled with 2-#8 x 8" @ 2'-0". The footing is required at concrete barrier ends and at interruptions in concrete barrier.
3. 10" concrete barrier footing extends 10'-0" back from structure.
4. See Standard Plan A78I for transition to Thrie Beam Barrier.



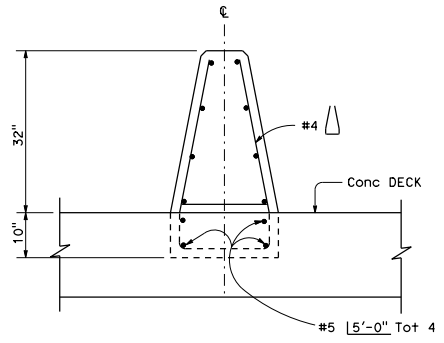
**CONCRETE BARRIER TYPE 60S END ANCHORAGE**



**SECTION B-B**



**CONCRETE BARRIER TYPE 60S CONNECTION TO STRUCTURE**



**SECTION A-A**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER TYPE 60S**

NO SCALE

**A76H**

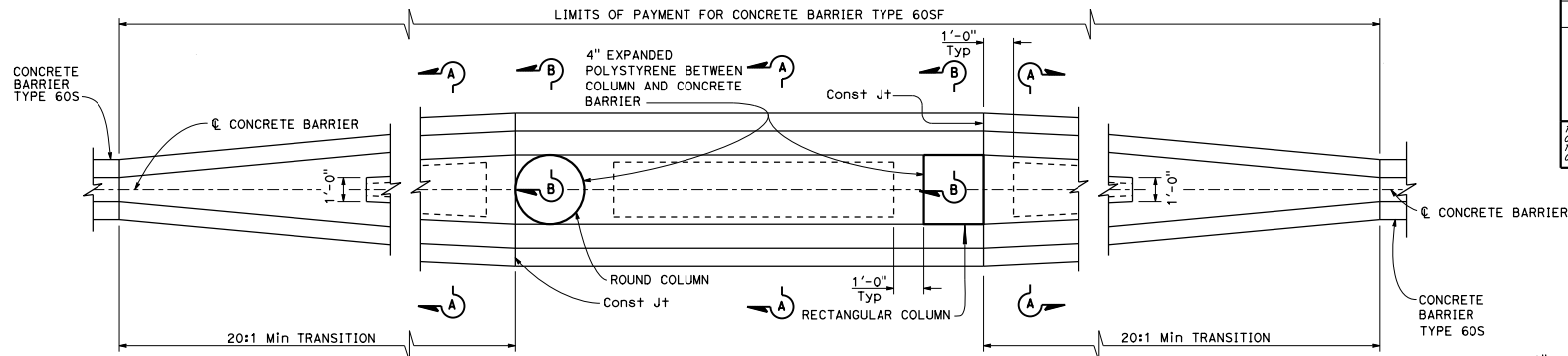
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Randell D. Hiatt**  
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October 30, 2015  
PLANS APPROVAL DATE

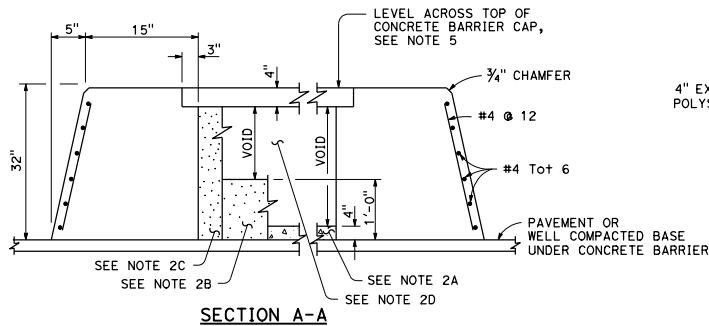
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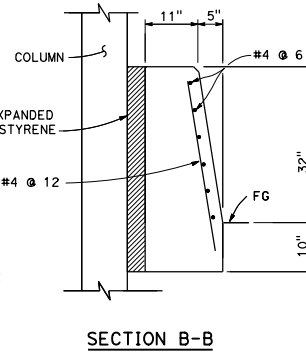


**TRANSITION AT BRIDGE COLUMNS**

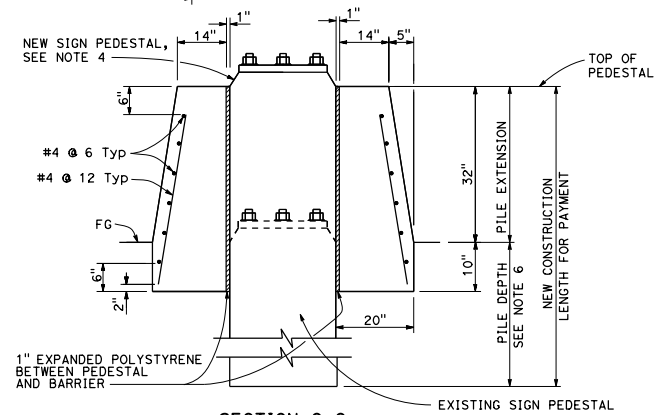
Concrete Barrier Type 60SF  
See Note 7



**SECTION A-A**



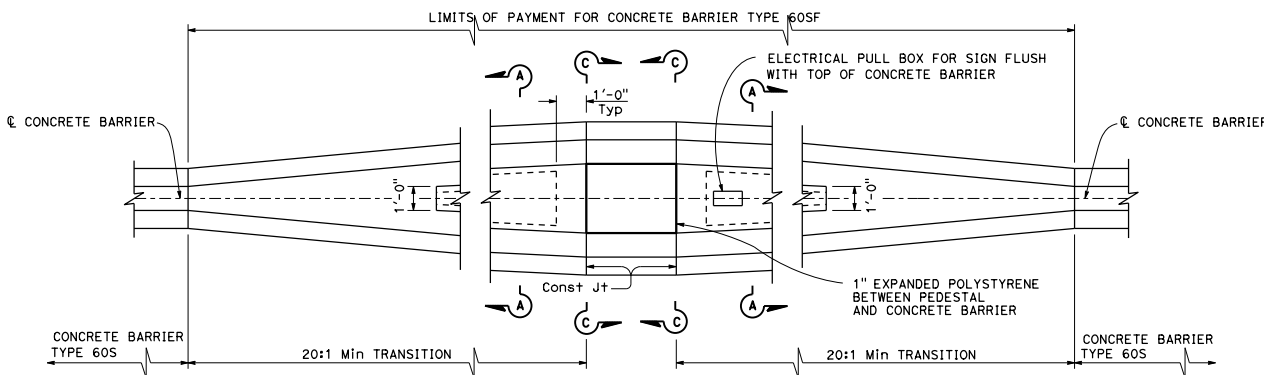
**SECTION B-B**



**SECTION C-C**

**NOTES:**

- See Standard Plan A76G for Concrete Barrier Type 60S.
- Contractor options for fill between concrete barrier walls:
  - Place 4" PCC at base between concrete barrier walls.
  - Place 1'-0" of granular material at base between walls.
  - Place granular material from base to bottom of 4" cap.
  - Monolithic concrete with foam blockouts is not permitted.
- Reinforcing steel shall extend continuous through construction joints.
- See Overhead Sign plans for sign pedestal elevations on new construction.
- Adjust height of concrete barrier wall on low side of offset or superelevated roadways to provide level grade across top of concrete barrier cap.
- See Overhead Signs Standard Plan Pile Foundation Tables.
- All locations with limited shoulder width available for barrier, see Standard Plan A76F for use of Concrete Barrier Type 60GE.



**TRANSITION AT SIGN PEDESTAL**

Concrete Barrier Type 60SF  
See Note 7

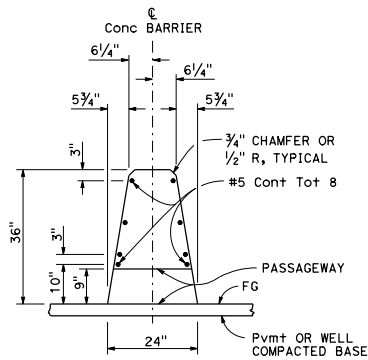
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER TYPE 60SF**

NO SCALE

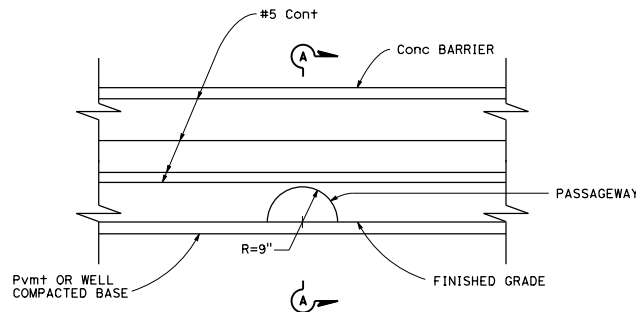
**A76I**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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 STATE OF CALIFORNIA



**SECTION A-A**  
(Concrete Barrier Type 60 shown)



**ELEVATION**  
See Notes 1 and 2

**NOTES:**

1. Type S Passageway typically used for crossing of small size animals.
2. See Standard Plan A76A for typical details of Concrete Barrier Type 60.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER  
WILDLIFE PASSAGEWAY  
(TYPE S)**

NO SCALE

**A76J**

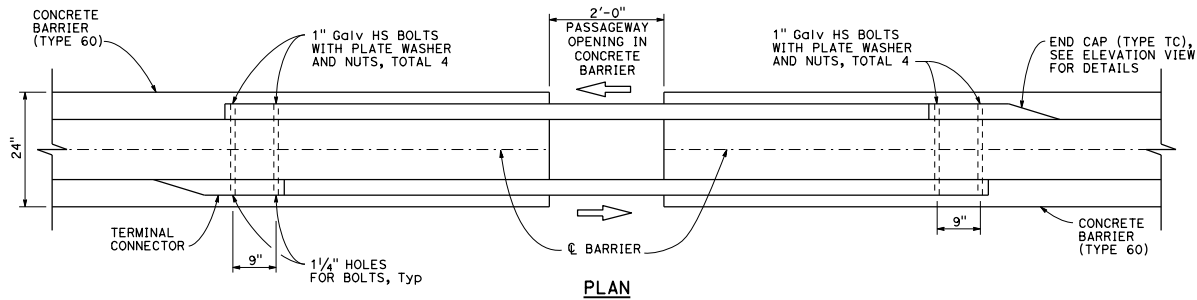
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

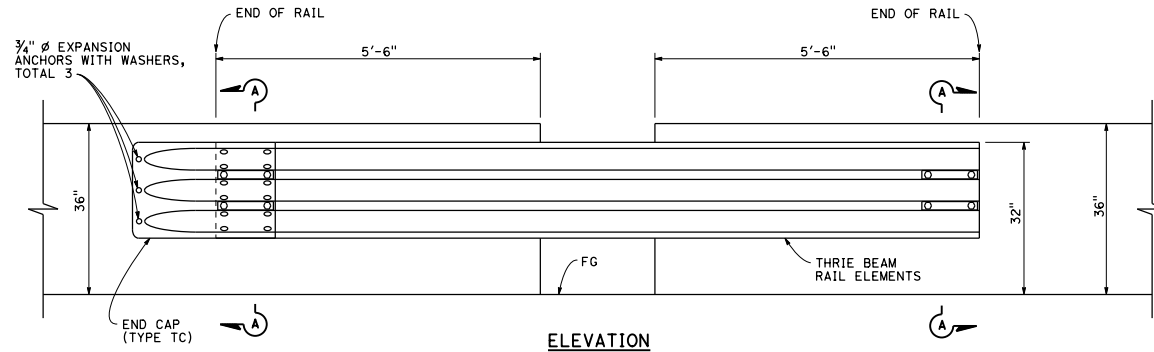
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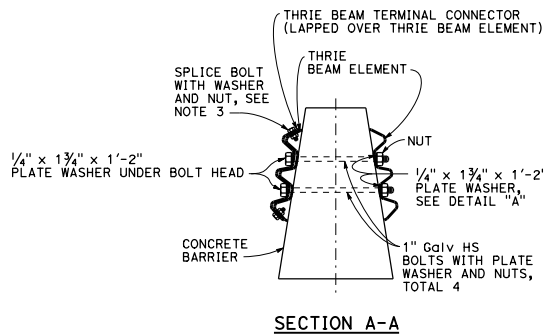
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CIVIL  
STATE OF CALIFORNIA



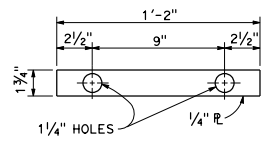
PLAN



ELEVATION



SECTION A-A



DETAIL "A"  
1/4" PLATE WASHER

NOTES:

1. Type M Passageway typically used for crossing of medium size animals.
2. For details of the thrie beam element and hardware, see the A78 series of the Standard Plans. For details of Concrete Barrier Type 60, see the A76 series of the Standard Plans.
3. The end cap, and the thrie beam element, may be spliced together prior to bolting the elements to the concrete barrier. All 8 splice bolts to connect the end cap to the rail element are not required. The 2 top and the 2 bottom splice bolts with washers and nuts shall be used.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER  
WILDLIFE PASSAGEWAY  
(TYPE M)**

NO SCALE

A76K

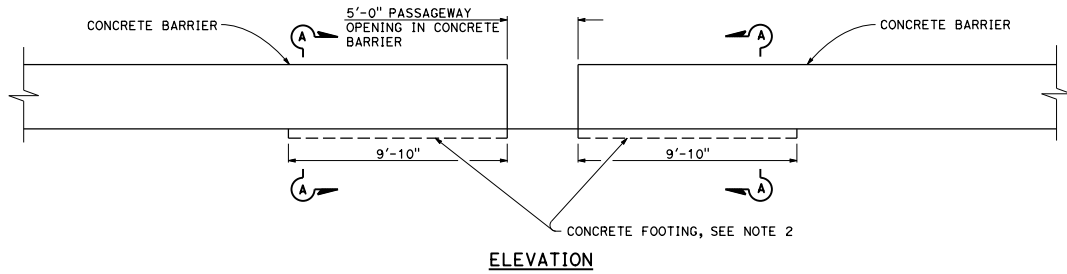
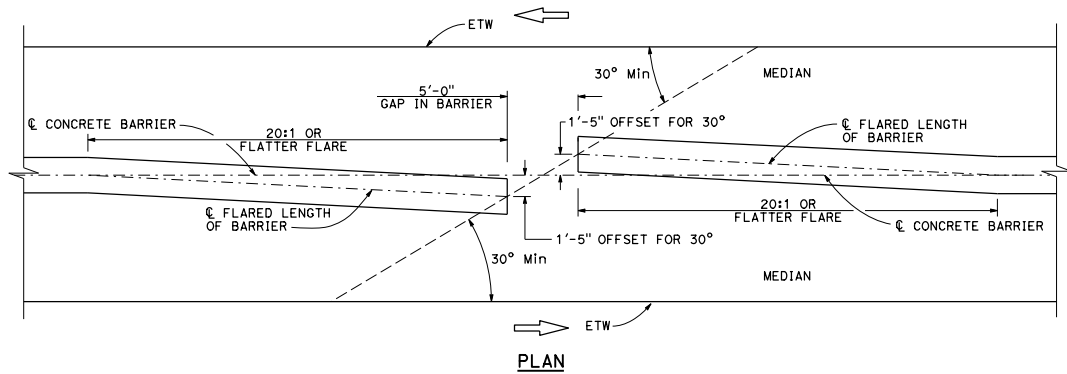
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
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October 30, 2015  
PLANS APPROVAL DATE

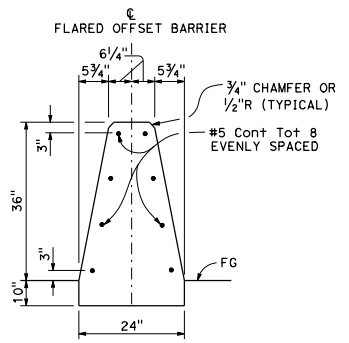
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STATE OF CALIFORNIA

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**NOTES:**

1. Type L Passageway typically used for crossing of large size animals.
2. Barrier end anchorage shall be constructed as shown in Section A-A of this plan or as shown on Standard Plan A76B.



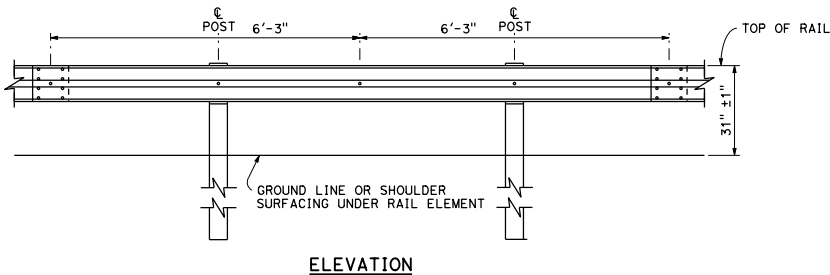
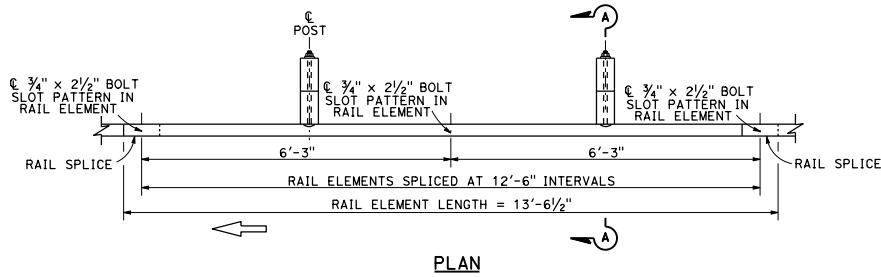
**SECTION A-A**  
See Note 2

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER  
WILDLIFE PASSAGWAY  
(TYPE L)**

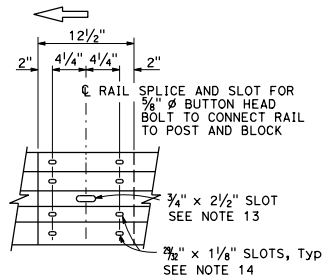
NO SCALE

**A76L**



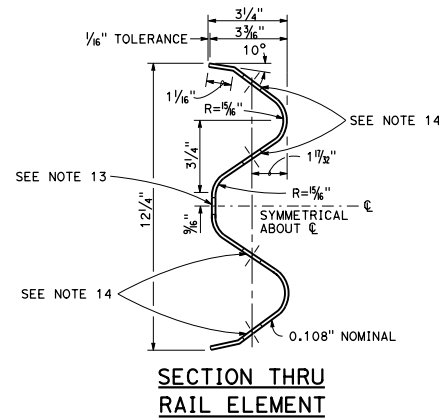


**MIDWEST GUARDRAIL SYSTEM WITH WOOD POST AND BLOCKS**

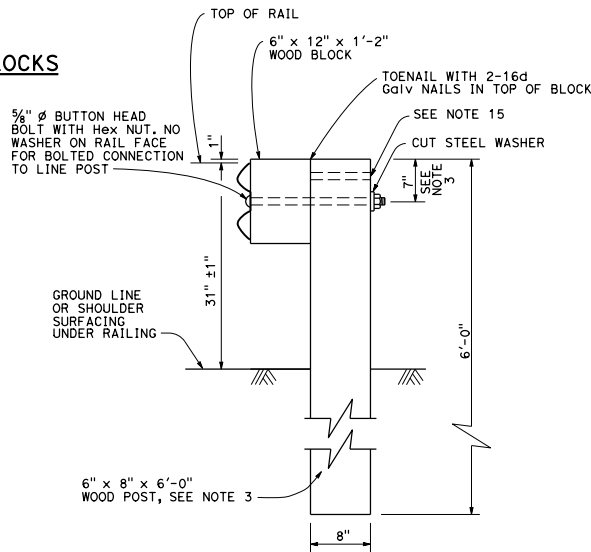


**RAIL ELEMENT SPLICE DETAIL**

- Connect the overlapped end of the rail elements with  $\frac{3}{8}$ "  $\phi$  x  $1\frac{1}{8}$ " button head oval shoulder splice bolts inserted into the  $\frac{3}{8}$ " x  $1\frac{1}{8}$ " slots and bolted together with  $\frac{3}{8}$ "  $\phi$  recessed hex nuts. Recess of hex nut points toward rail element. A total of 8 bolts and nuts are to be used at each rail splice connection.
- The ends of the rail elements are to be overlapped in the direction of traffic (see details).
- Where end cap is to be attached to the end of a rail element, a total of 4 of the above described splice bolts and nuts are to be used.



**SECTION THRU RAIL ELEMENT**



**SECTION A-A TYPICAL WOOD LINE POST INSTALLATION**

See Note 4

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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STATE OF CALIFORNIA

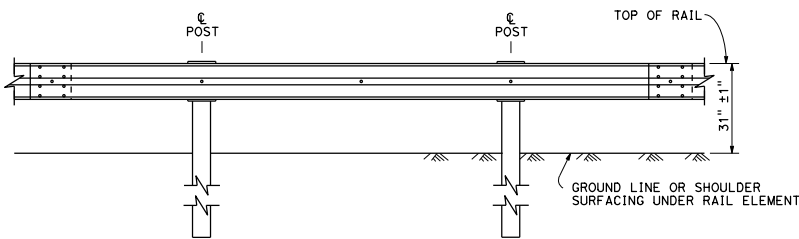
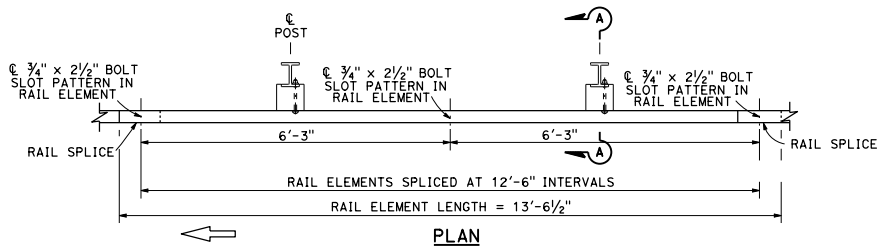
**NOTES:**

- For details of steel post installations, see Standard Plan A77L2.
- For details of standard hardware used to construct MGS, see Standard Plan A77M1.
- For details of wood posts and wood blocks used to construct MGS, see Standard Plan A77N1.
- For additional installation details, see Standard Plan A77N3.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- For MGS typical layouts, see the A77P, A77Q and A77R Series of Standard Plans.
- If railing is connected to terminal system end treatment, use 31" height terminal system end treatment.
- For MGS end anchor details, see Standard Plans A77S1 and A77T2.
- For details of MGS transition to bridge railing, see Standard Plan A77U4.
- For additional details of MGS connection to bridge railing, see Standard Plans A77U1, A77U2 and A77V1.
- For MGS connection details to abutments and walls, see Standard Plan A77U3.
- For typical MGS delineation and dike positioning details, see Standard Plan A77N4.
- Slotted hole for bolted connection of rail element to block and post.
- Slotted holes for splice bolts to overlap ends of rail element.
- Additional hole in uppermost portion of line post is for potential future adjustments of railing height. See Standard Plan A77N1.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
STANDARD RAILING SECTION  
(WOOD POST WITH  
WOOD BLOCK)**

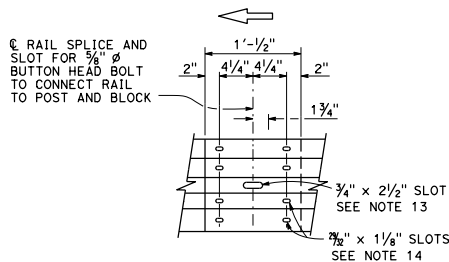
NO SCALE

**A77L1**



ELEVATION

**MIDWEST GUARDRAIL SYSTEM WITH STEEL POSTS AND NOTCHED WOOD OR NOTCHED RECYCLED PLASTIC BLOCKS**

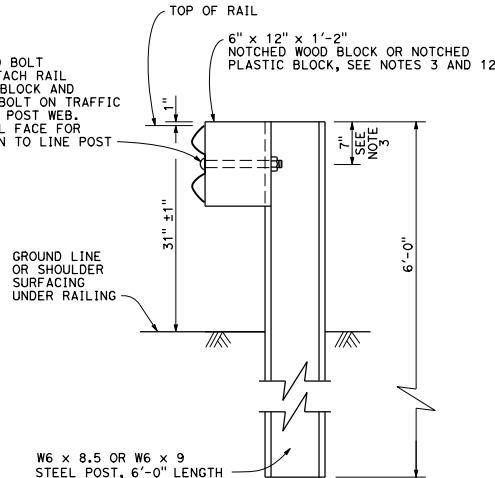


ELEVATION

**RAIL ELEMENT SPLICE DETAIL**

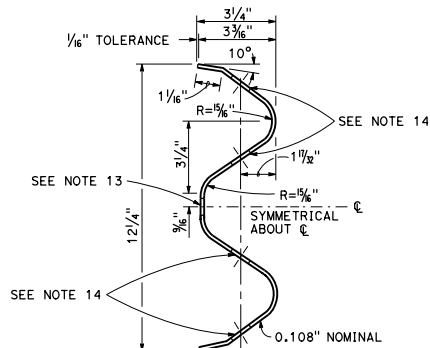
- Connect the overlapped end of the rail elements with  $\frac{3}{8}$ "  $\phi$  x  $1\frac{1}{8}$ " button head oval shoulder splice bolts inserted into the  $\frac{3}{4}$ " x  $1\frac{1}{8}$ " slots and bolted together with  $\frac{3}{8}$ "  $\phi$  recessed hex nuts. Recess of hex nut points toward rail element. A total of 8 bolts and nuts are to be used at each rail splice connection.
- The ends of the rail elements are to be overlapped in the direction of traffic (see details).
- Where end cap is to be attached to the end of a rail element, a total of 4 of the above described splice bolts and nuts are to be used.

$\frac{3}{8}$ "  $\phi$  BUTTON HEAD BOLT WITH HEX NUT. ATTACH RAIL ELEMENT TO WOOD BLOCK AND STEEL POST WITH BOLT ON TRAFFIC APPROACH SIDE OF POST WEB. NO WASHER ON RAIL FACE FOR BOLTED CONNECTION TO LINE POST



SECTION A-A  
TYPICAL STEEL LINE POST INSTALLATION

See Note 4



SECTION THRU RAIL ELEMENT

**NOTES:**

- For details of wood post installations, see Standard Plan A77L1.
- For details of standard hardware used to construct MGS, see Standard Plan A77M1.
- For details of steel posts and notched wood blocks used to construct MGS, see Standard Plan A77N2.
- For additional installation details, see Standard Plan A77N3.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- For MGS typical layouts, see the A77P, A77Q and A77R Series of Standard Plans.
- If railing is connected to terminal system end treatment, use 31" height terminal system end treatment.
- For MGS end anchor details, see Standard Plans A77S1 and A77T2.
- For details of MGS transition to bridge railing, see Standard Plan A77U4.
- For additional details of MGS connection to bridge railings, see Standard Plans A77U1, A77U2 and A77V1.
- For dike positioning and MGS delineation details, see Standard Plan A77N4.
- Notched face of block faces steel post.
- Slotted hole for bolted connection of rail element to block and post.
- Slotted holes for splice bolts to overlap ends of rail element.

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
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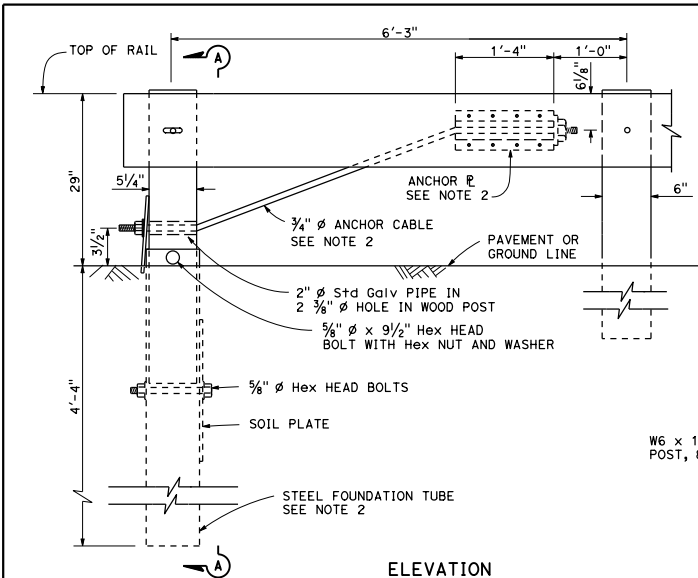
REGISTERED PROFESSIONAL ENGINEER  
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Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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DEPARTMENT OF TRANSPORTATION

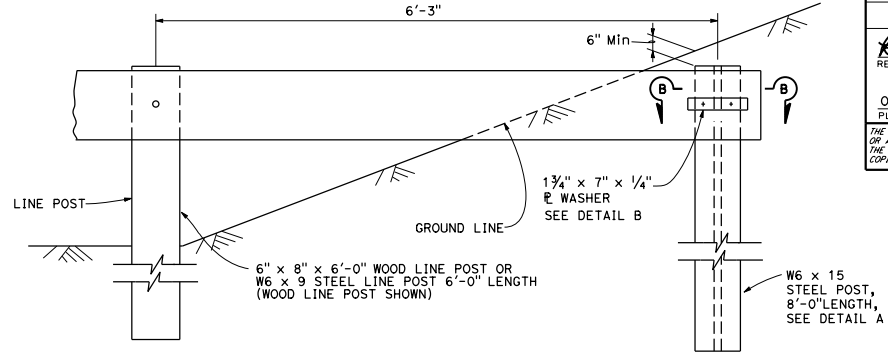
**MIDWEST GUARDRAIL SYSTEM STANDARD RAILING SECTION (STEEL POST WITH NOTCHED WOOD OR NOTCHED RECYCLED PLASTIC BLOCK)**

NO SCALE

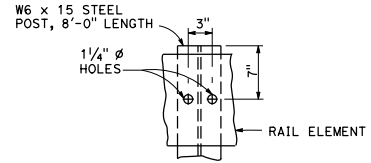
**A77L2**



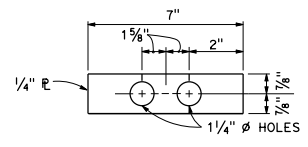
**ELEVATION  
END ANCHOR  
ASSEMBLY (TYPE SFT)**



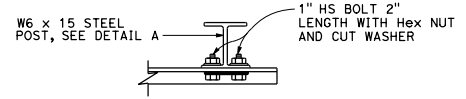
**BURIED POST END ANCHOR**



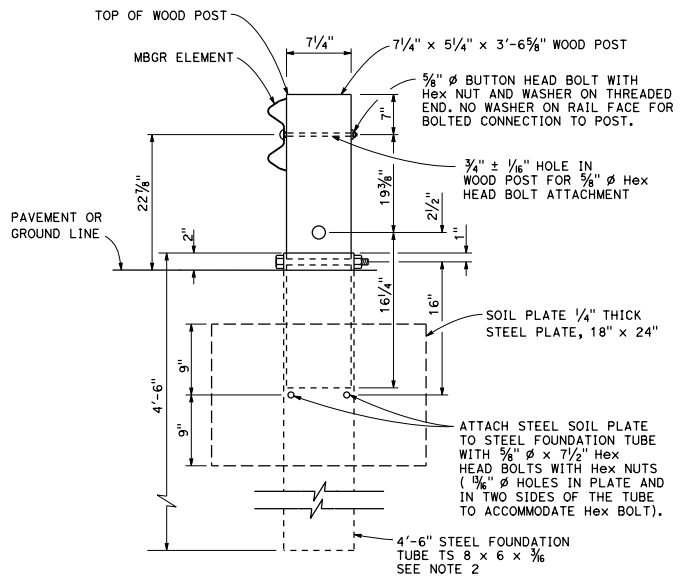
**DETAIL A**



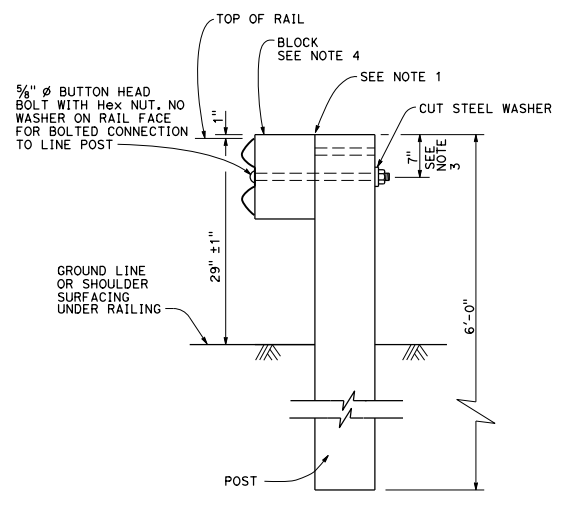
**DETAIL B**



**SECTION B-B**



**SECTION A-A**



**TYPICAL LINE  
POST INSTALLATION**

**NOTES:**

1. For wood post and wood block, toenail with 2-16d Galv nails in top of block. For steel post and notched wood or plastic block, notched face of block faces steel post.
2. A 6'-0" Length steel foundation tube, TS 8 x 6 x 3/8, without a soil plate, may be furnished and installed in place of the 4'-6" length steel foundation tube and soil plate shown. Minimum embedment of the 6'-0" length tube shall be 5'-9". A 3/8" Hex head bolt and nut shall be installed in the hole in the 6'-0" length tube to keep the wood post from dropping into the tube.
3. To connect railing to 27" terminal system end treatment, transition the top of railing height at a ratio of 120:1 to terminal system end treatment height plus one 12'-6" standard railing section at the transitioned height for a horizontal connection to the end treatment.
4. See Standard Plans A77N1 and A77N2 for details.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**METAL BEAM GUARD RAILING  
RECONSTRUCT INSTALLATION**

NO SCALE

**A77L3**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
Randell D. Hiatt  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

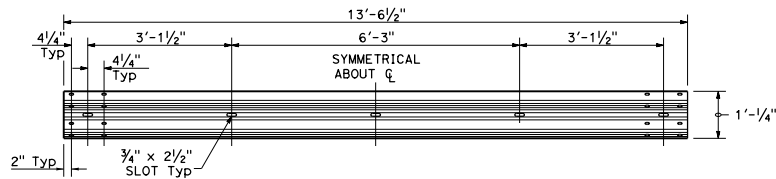
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

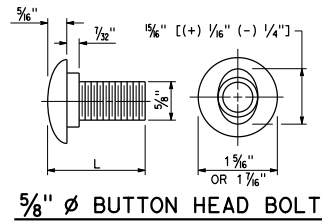
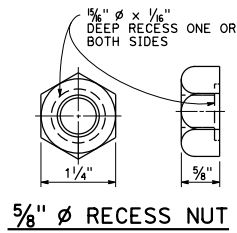
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**TYPICAL RAIL ELEMENT**

**NOTE:**

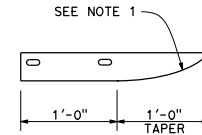
1. Slotted holes for splice bolts to overlap ends of rail element.



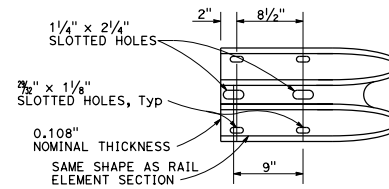
**BUTTON HEAD BOLT**

L	THREAD LENGTH
1 7/8"	FULL THREAD LENGTH
2"	FULL THREAD LENGTH
10"	4" Min THREAD LENGTH
18"	4" Min THREAD LENGTH
20"	4" Min THREAD LENGTH
22"	4" Min THREAD LENGTH
26"	4" Min THREAD LENGTH
36"	4" Min THREAD LENGTH
** 2 3/4"	2" Min THREAD LENGTH
** 19"	4" Min THREAD LENGTH

\*\* For nested rail applications.



**PLAN**



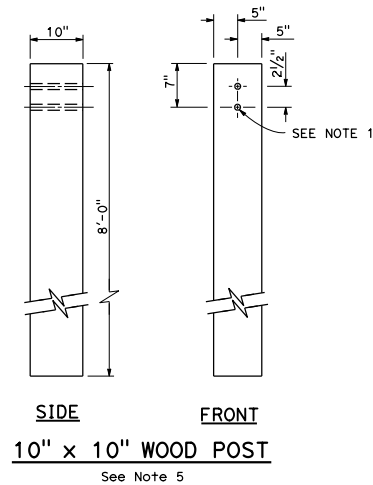
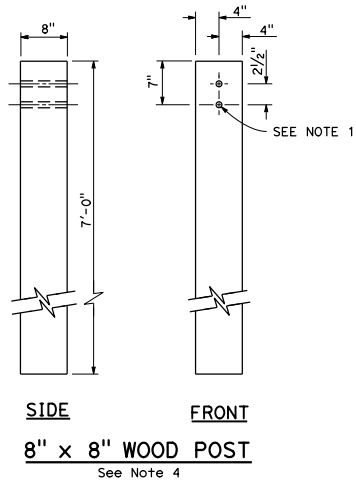
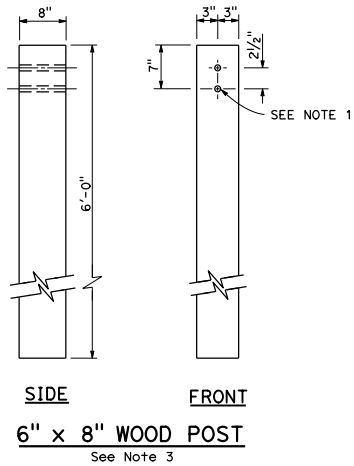
**ELEVATION  
END CAP  
(TYPE A)**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
STANDARD HARDWARE**

NO SCALE

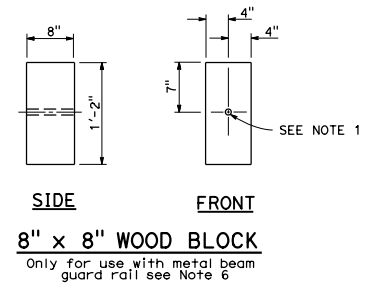
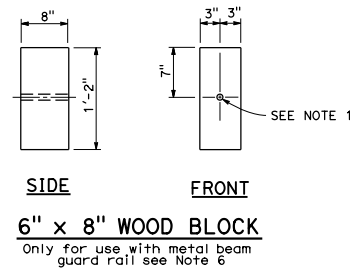
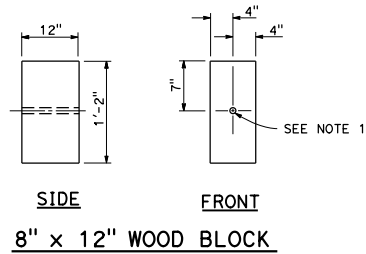
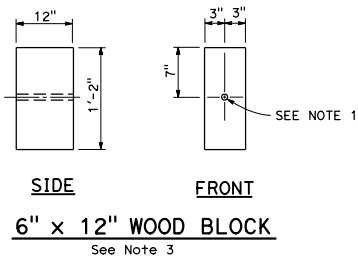
**A77M1**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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**NOTES:**

1. All holes in wood posts and blocks shall be  $\frac{3}{4}$ " Dia  $\pm$   $\frac{1}{16}$ ".
2. Dimensions shown for wood post are nominal.
3. This post and block combination used for standard line post sections of MGS.
4. This post and 8" x 12" block combination used for line post sections of MGS on narrow roadways.
5. This post and 8" x 12" block combination is typically used where strengthened line post sections of MGS are warranted to shield fixed objects.
6. See Standard Plan A77L3 for use of 6" x 8" and 8" x 8" wood blocks.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
WOOD POST AND  
WOOD BLOCK DETAILS**

NO SCALE

**A77N1**

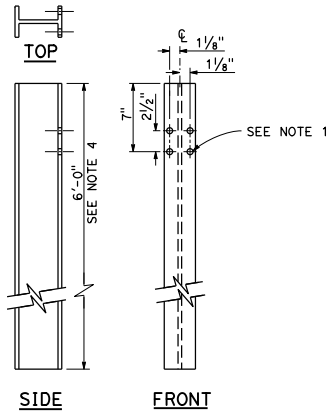
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

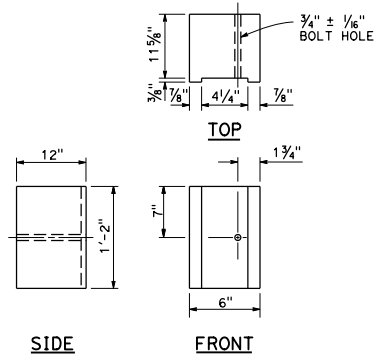
October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

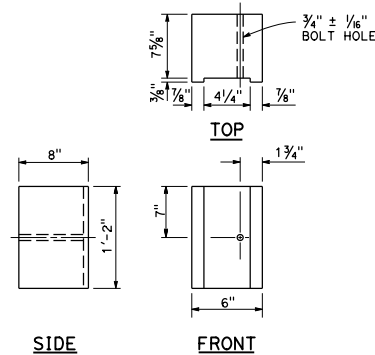
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**W6 x 9 OR W6 x 8.5**  
**STEEL POST**  
See Note 4



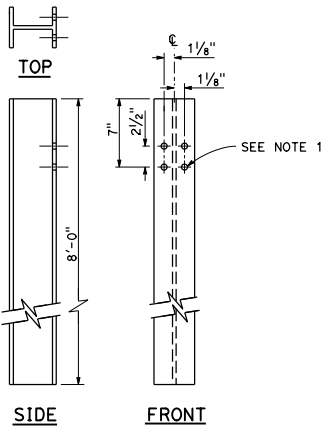
**6" x 12"**  
**NOTCHED WOOD BLOCK**  
See Notes 2 and 3



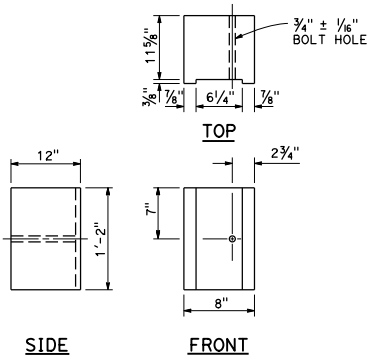
**6" x 8"**  
**NOTCHED WOOD BLOCK**  
Only for use with metal beam guard railing. See Note 5

**NOTES:**

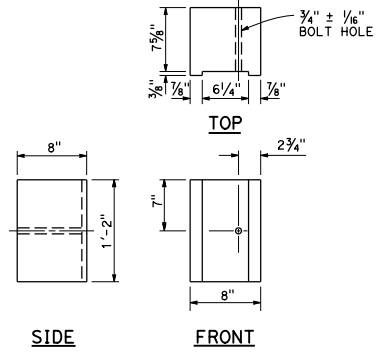
1. All holes in steel post shall be 1/8" Dia maximum.
2. Dimensions shown for wood block are nominal.
3. Notched face of block faces steel post.
4. 6'-0" length posts to be used for typical roadway installation. See Standard Plan A77N3.
5. See Standard Plan A77L3 for use of 6" x 8" and 8" x 8" notched wood blocks.
6. This post and 8" x 12" block combination to be used for line post sections of MGS on narrow roadways and where strengthened line post sections of MGS are warranted to shield fixed objects.



**W6 x 15**  
**STEEL POST**  
See Note 6



**8" x 12"**  
**NOTCHED WOOD BLOCK**  
See Notes 2 and 3



**8" x 8"**  
**NOTCHED WOOD BLOCK**  
Only for use with metal beam guard railing. See Note 5

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM**  
**STEEL POST AND**  
**NOTCHED WOOD BLOCK DETAILS**

NO SCALE

**A77N2**

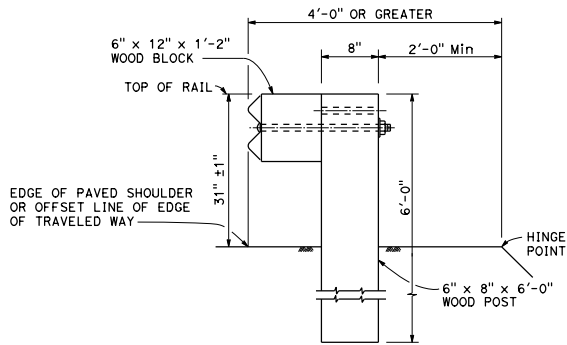
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

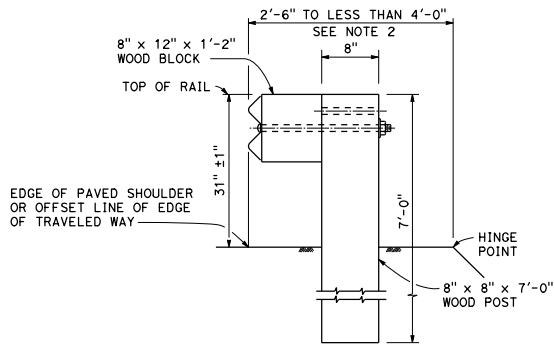
October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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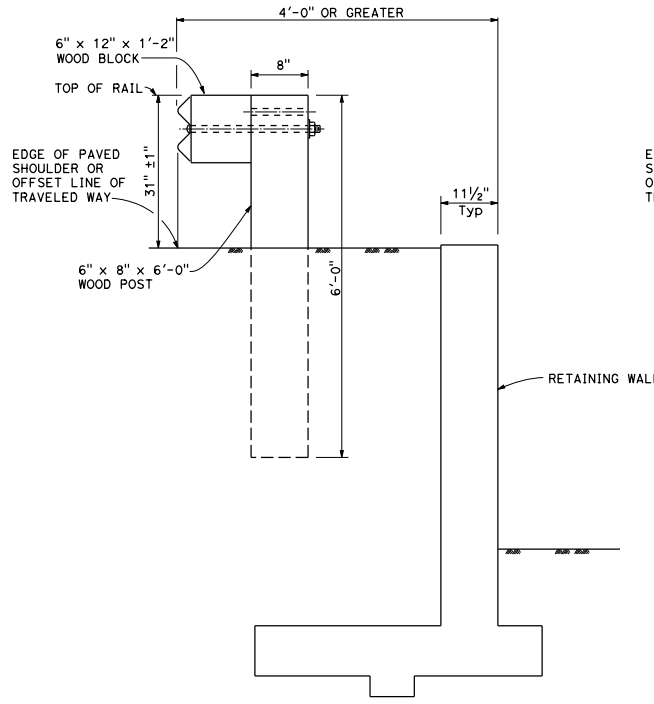


**DETAIL A**  
**TYPICAL ROADWAY**  
**INSTALLATION**  
See Note 1

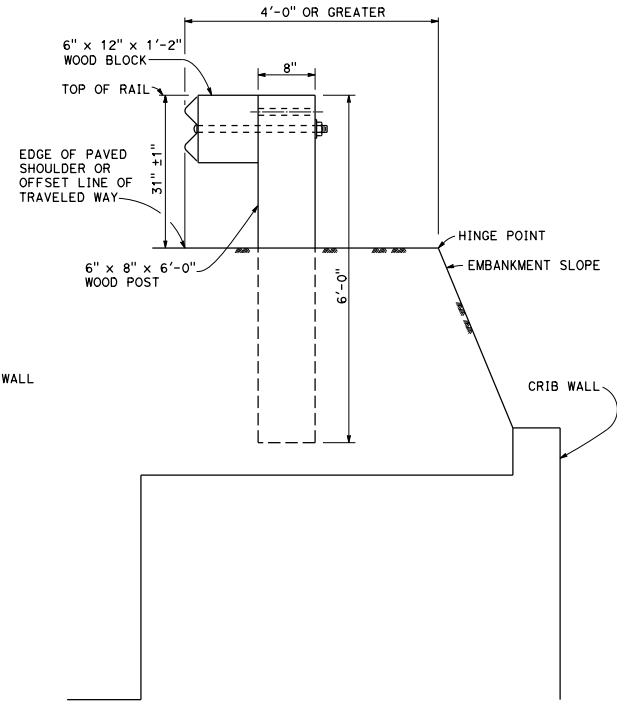


**DETAIL B**  
**NARROW ROADWAY**  
**INSTALLATION**  
See Note 1

**POST EMBEDMENT**



**DETAIL C**



**DETAIL D**

**INSTALLATION AT EARTH RETAINING WALLS**

**NOTES:**

1. These installation details also applicable to steel line post installations. For Detail A, C, and D, where steel line post installations are constructed, W6 x 8.5 or W6 x 9 steel post, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks are to be used in place of the size of wood post and wood block shown. For Detail B, where steel line post installations are constructed, W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks are to be used in place of the size of wood post and wood block shown. For additional installation details, see Standard Plans A77L1 and A77L2.
2. Where the distance between the face of the rail and the hinge point is less than 2'-6", see the Project Plans for special details.
3. For dike positioning with MGS installations, see Standard Plan A77N4.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**MIDWEST GUARDRAIL SYSTEM**  
**TYPICAL LINE POST**  
**EMBEDMENT AND**  
**HINGE POINT OFFSET DETAILS**

NO SCALE

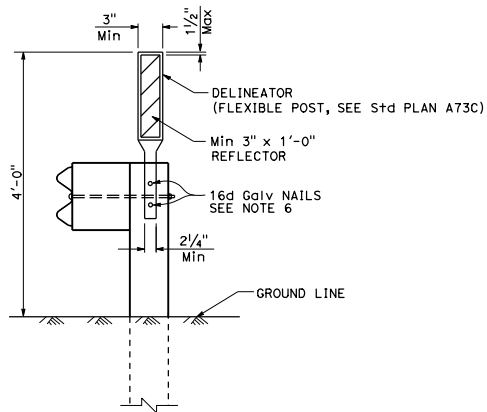
**A77N3**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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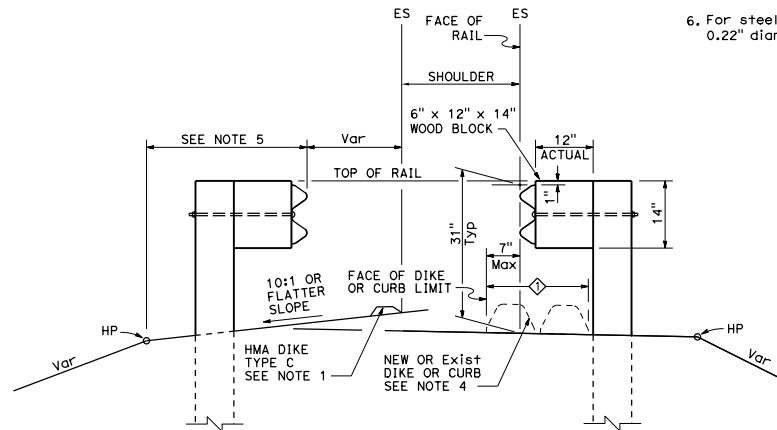
REGISTERED PROFESSIONAL ENGINEER  
 No. C50200  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

**NOTES:**

1. When necessary to place dike more than 7" in front of face of MGS, only Type C dike may be used. For dike details, see Standard Plan A87B.
2. For standard railing post embedment, see Standard Plan A77N3.
3. MGS delineation to be used where shown on the Project Plans.
4. When dike or curb is placed under MGS, the maximum height of the dike or curb shall be 6". Mountable dike should not be used. For dike and curb details, see Standard Plans A87A and A87B.
5. For details of typical distance between the face of rail and hinge point, see Standard Plan A77N3.
6. For steel line posts, use 1/4" - 20 self-tapping screws in 0.22" diameter holes or 1/4" bolts in 3/8" diameter holes.



**MGS DELINEATION**  
See Note 3



**DIKE POSITIONING**  
See Note 1

◇ PERMISSIBLE DIKE OR CURB PLACEMENT AREA

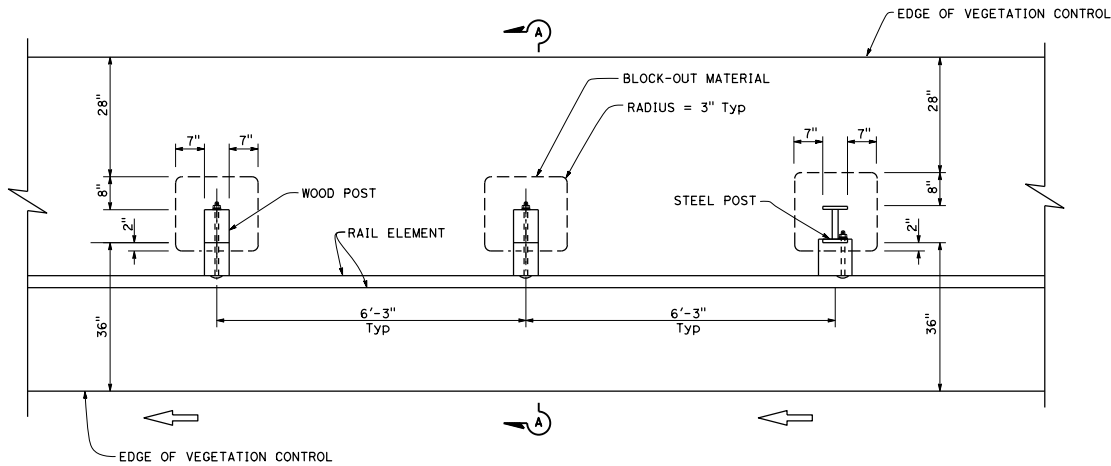
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
TYPICAL RAILING DELINEATION  
AND DIKE POSITIONING DETAILS**

NO SCALE

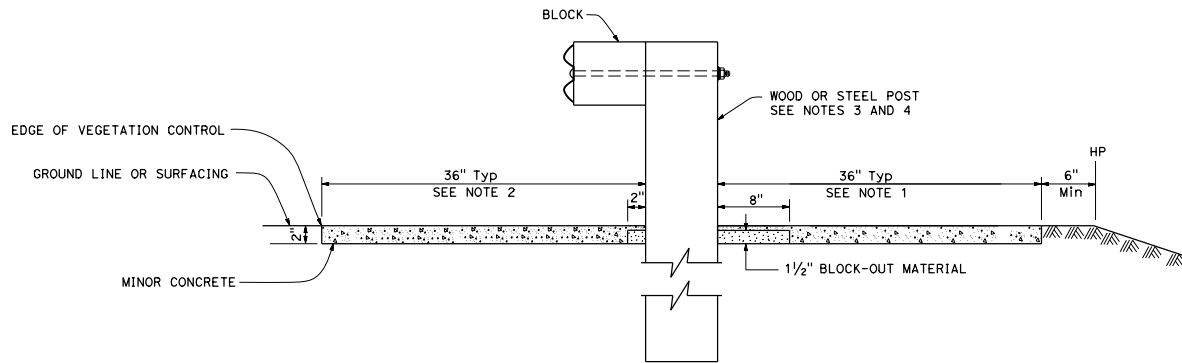
**A77N4**



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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REGISTERED PROFESSIONAL ENGINEER Randell D. Hiatt No. C50200 Exp. 6-30-17 CIVIL STATE OF CALIFORNIA					



**PLAN**



**SECTION A-A**

**NOTES:**

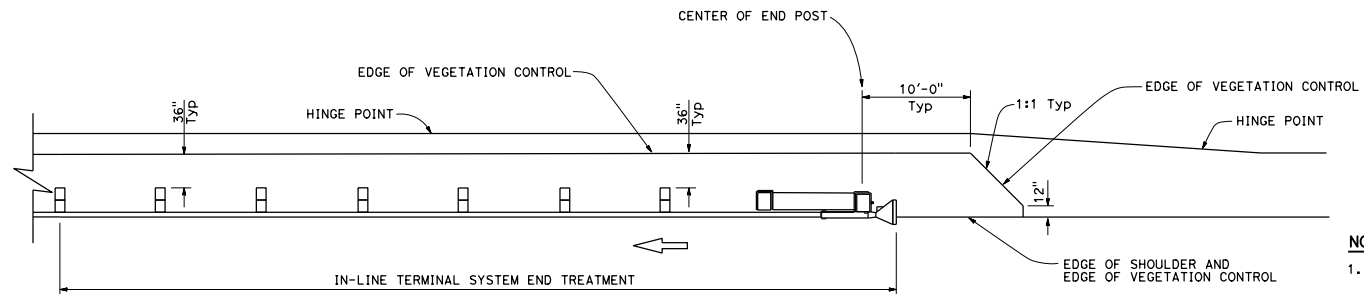
1. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post. If the 8" block-out at back of post can not be maintained, construct vegetation control flush with the back edge of post.
2. Where dike is constructed under railing, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. For wood post sizes, see Standard Plan A77N1.
4. For steel post sizes, see Standard Plan A77N2.
5. For details not shown, see Standard Plans A77L1 and A77L2.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
 TYPICAL VEGETATION CONTROL  
 STANDARD RAILING SECTION**

NO SCALE

**A77N5**

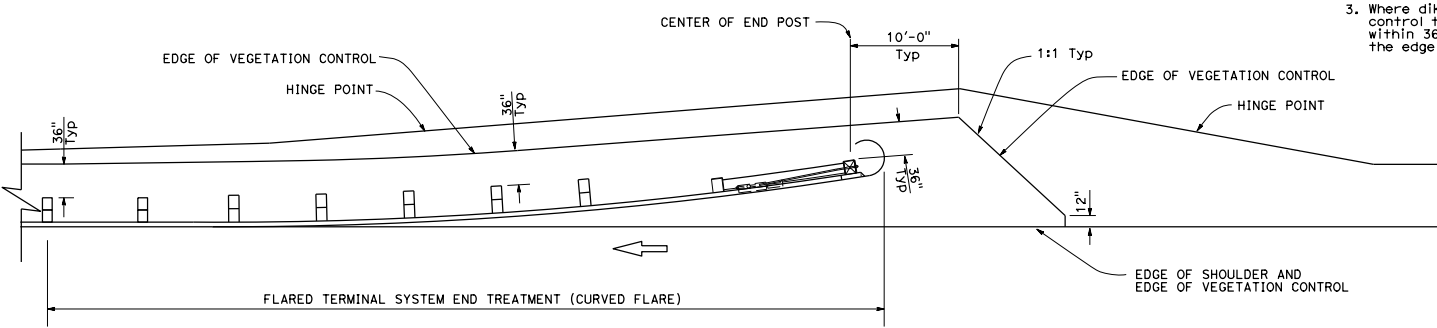
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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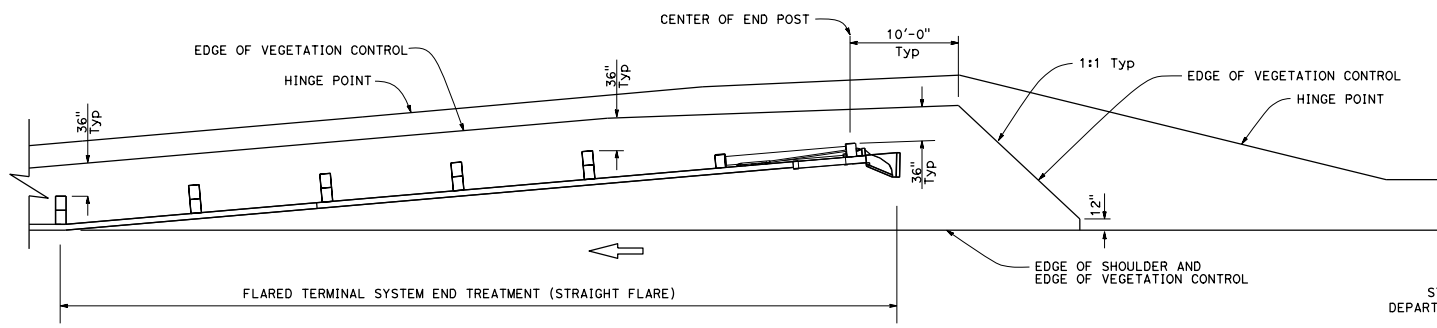
PLAN

**NOTES:**

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post. If the 8" block-out at back of post can not be maintained, construct vegetation control flush with the back edge of post.
3. Where dike is constructed under railing, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.



PLAN



PLAN

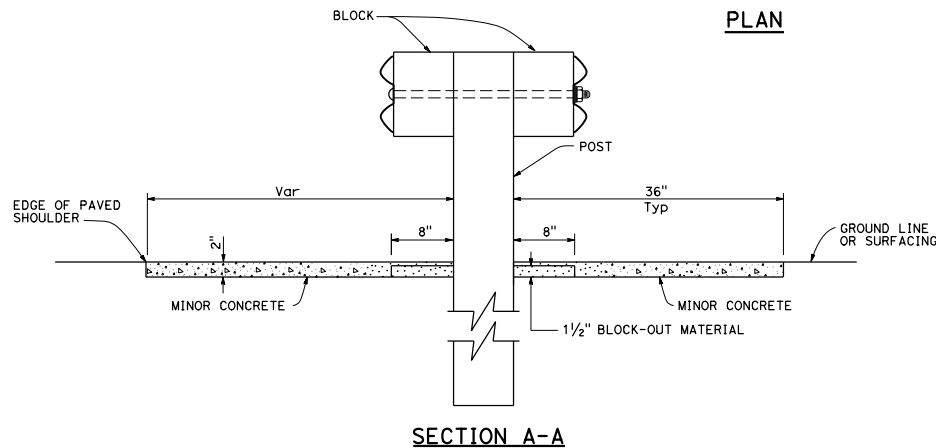
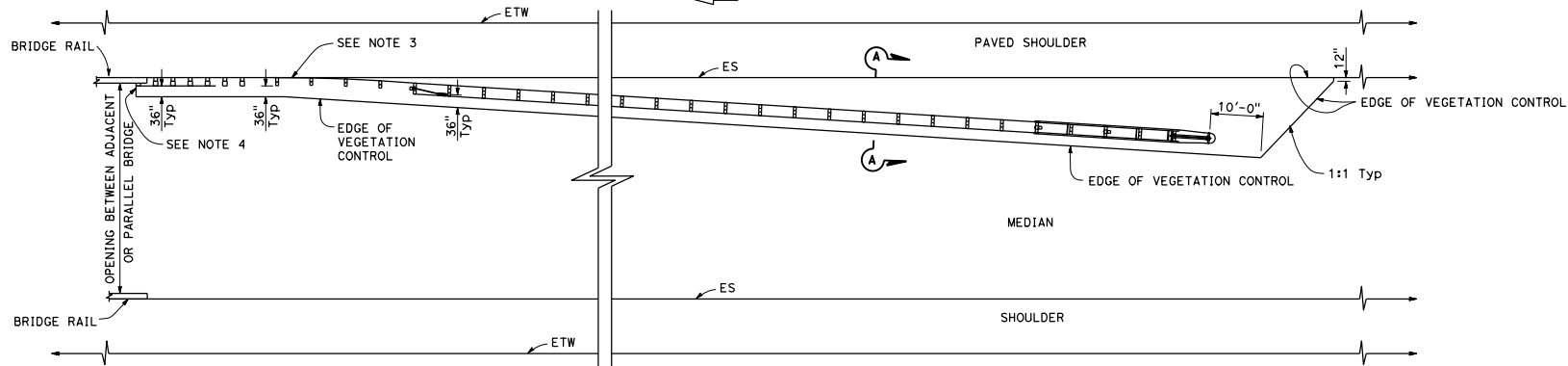
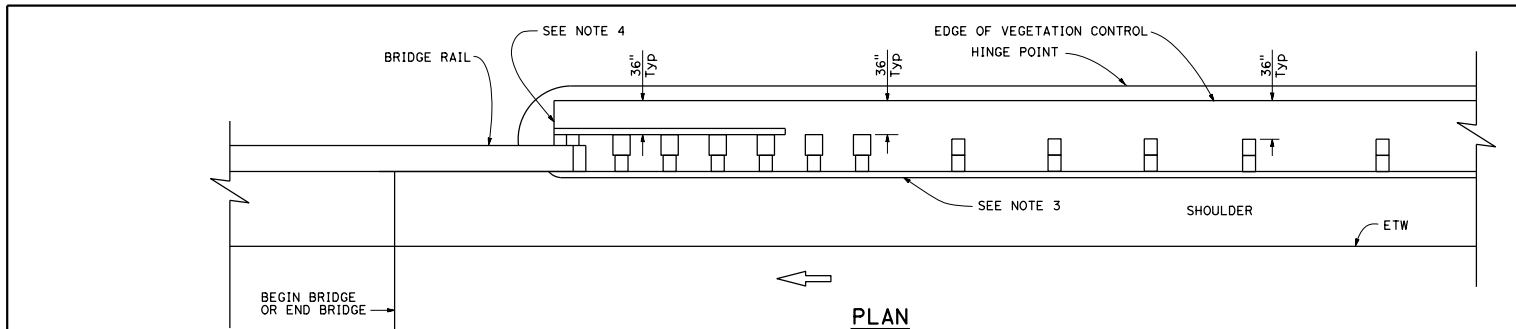
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

## MIDWEST GUARDRAIL SYSTEM TYPICAL VEGETATION CONTROL FOR TERMINAL SYSTEM END TREATMENTS

NO SCALE

**A77N6**

2015 STANDARD PLAN A77N6



**NOTES:**

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post. If the 8" block-out at back of post can not be maintained, construct vegetation control flush with the back edge of post.
3. Where dike is constructed under railing, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
4. End vegetation control at end of backside rail element.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**MIDWEST GUARDRAIL SYSTEM  
TYPICAL VEGETATION CONTROL  
AT STRUCTURE APPROACH**

NO SCALE

**A77N7**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS


*Randell D. Hiatt*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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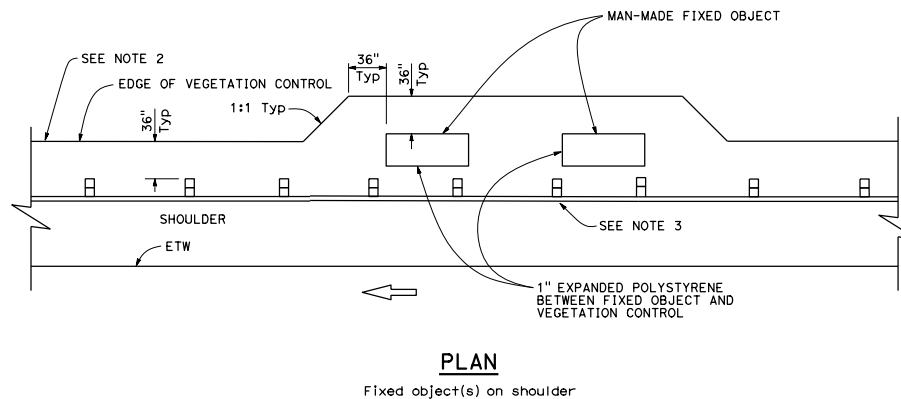
REGISTERED PROFESSIONAL ENGINEER  
*Randell D. Hiatt*  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

60

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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**NOTES:**

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post. If the 8" block-out at back of post can not be maintained, construct vegetation control flush with the back edge of post.
3. Where dike is constructed under railing, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
TYPICAL VEGETATION CONTROL  
AT FIXED OBJECT**

NO SCALE

**A77N8**

2015 STANDARD PLAN A77N8

**NOTES:**

- 1. See Standard Plan A77N5 for additional vegetation control details.
- 2. Where dike is constructed under railing, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

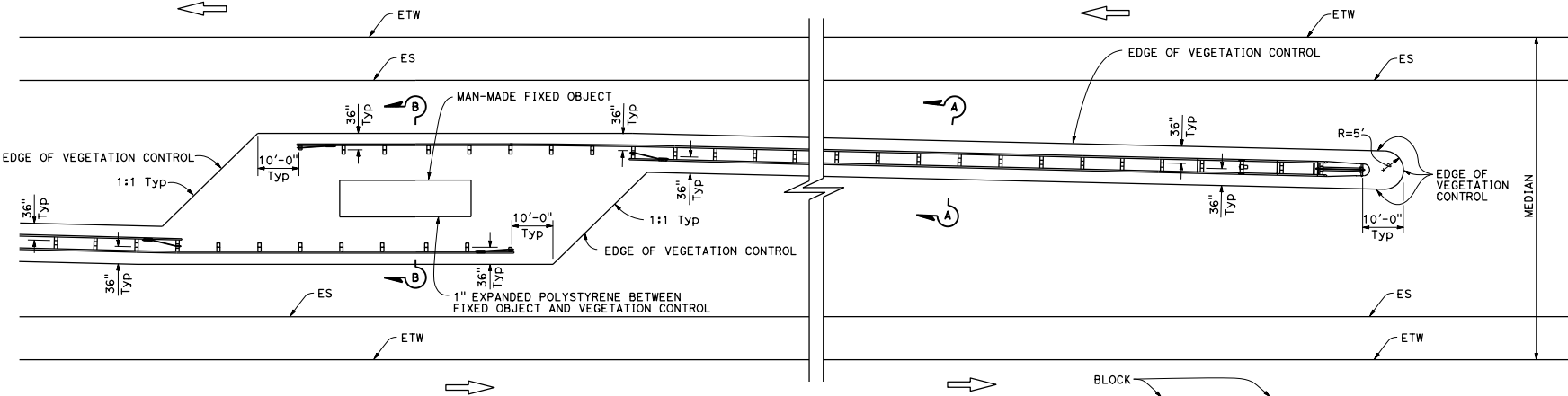
**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

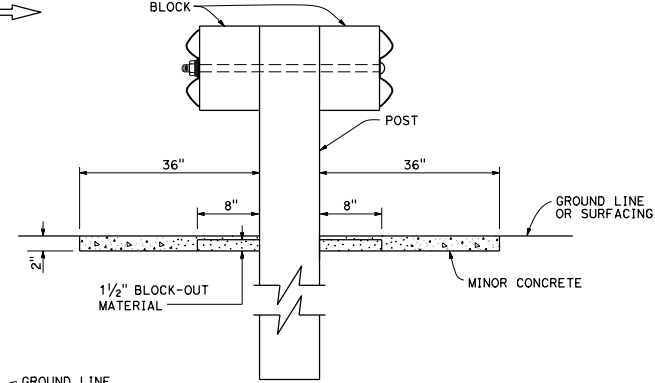
**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

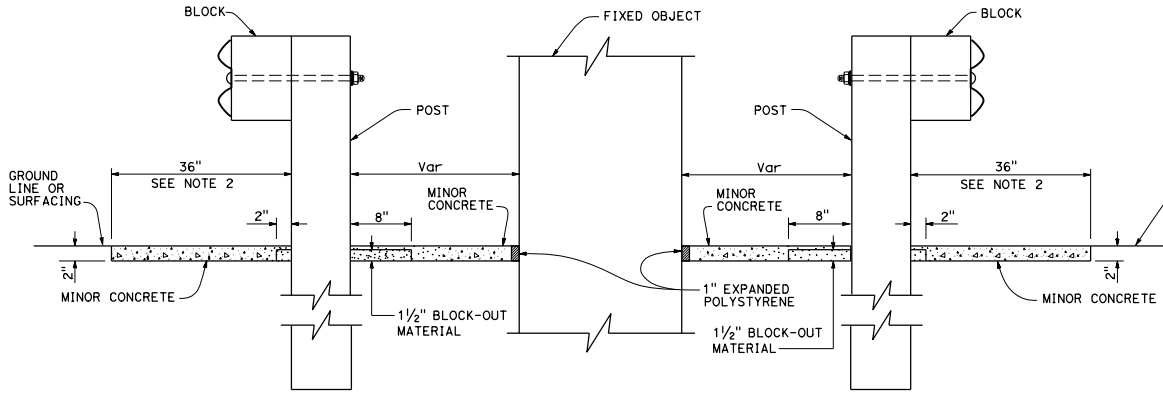
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**PLAN**  
Fixed object(s) in median



**SECTION A-A**



**SECTION B-B**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**MIDWEST GUARDRAIL SYSTEM  
TYPICAL VEGETATION CONTROL  
AT FIXED OBJECT**

NO SCALE

**A77N9**

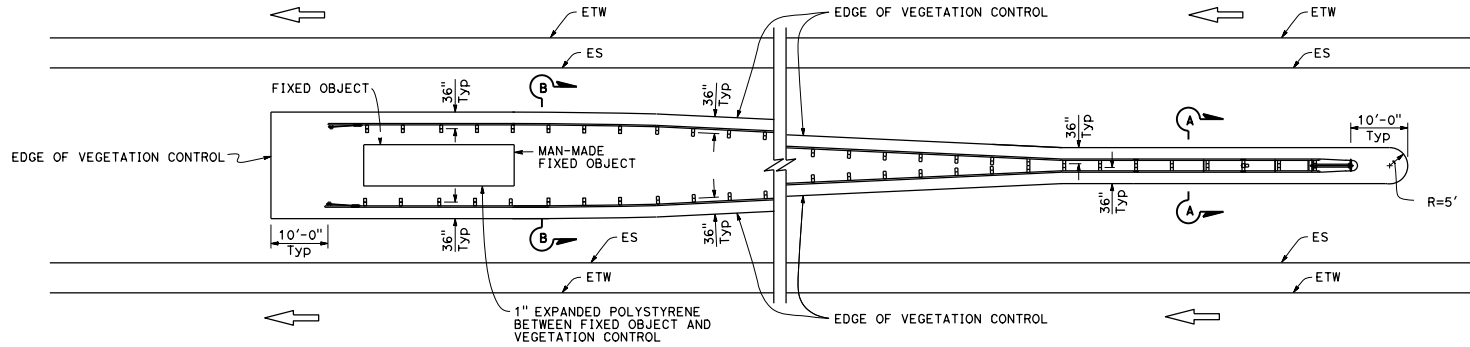
2015 STANDARD PLAN A77N9

**NOTES:**

1. See Standard Plan A77N5 for additional vegetation control details.
2. Where dike is constructed under railing, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.

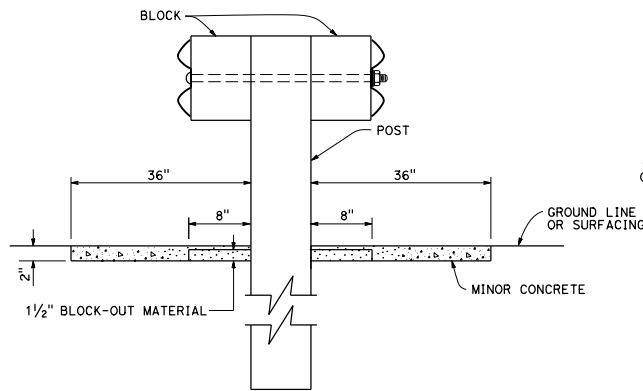
Dist	County	Route	Post Miles	Sheet	Total
			Total Project	No.	Sheets
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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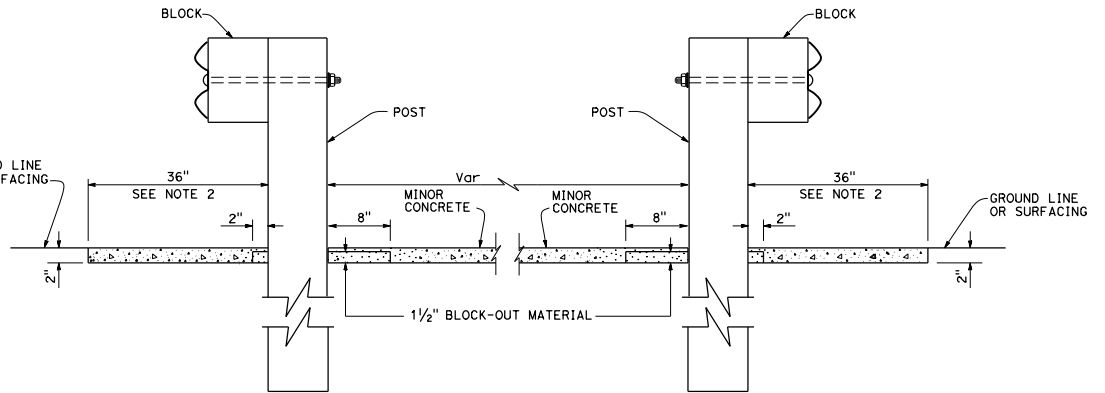


**PLAN**

Fixed object(s) between separate roadbeds  
(One-Way Traffic)



**SECTION A-A**

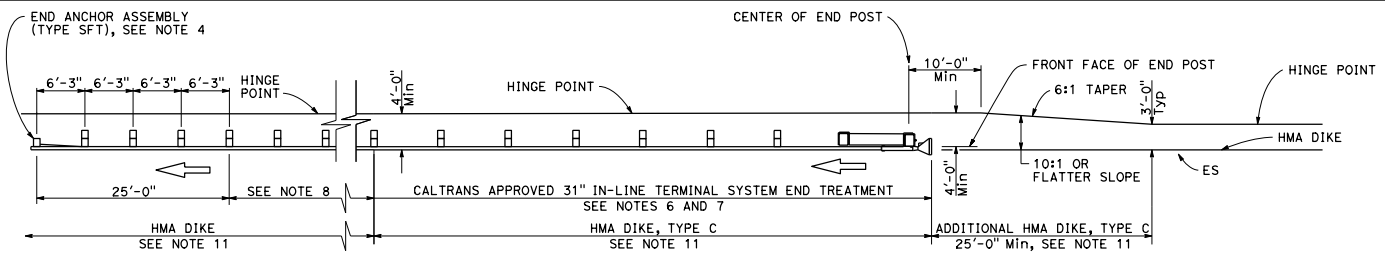


**SECTION B-B**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
TYPICAL VEGETATION CONTROL  
AT FIXED OBJECT**

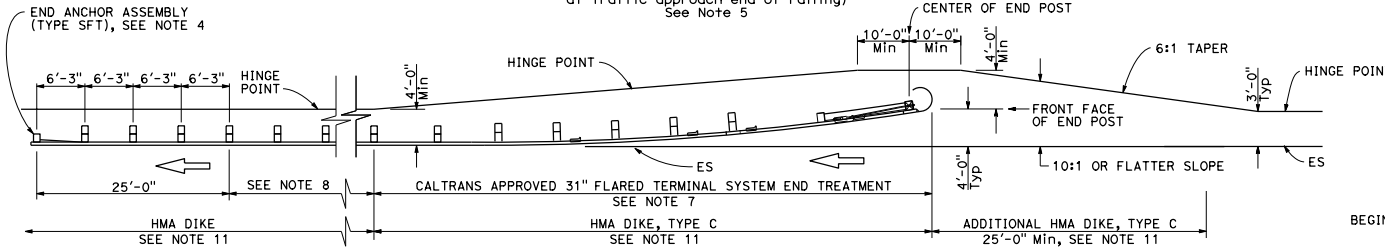
NO SCALE

**A77N10**



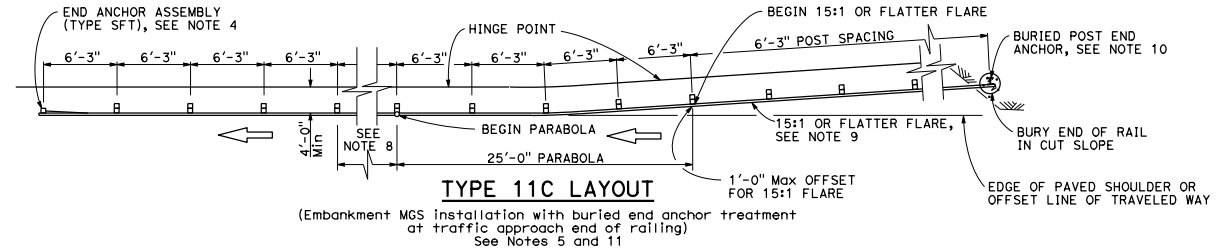
**TYPE 11A LAYOUT**

(Embankment MGS installation with 31" in-line end treatment at traffic approach end of railing) See Note 5



**TYPE 11B LAYOUT**

(Embankment MGS installation with 31" flared end treatment at traffic approach end of railing) See Note 5



**TYPE 11C LAYOUT**

(Embankment MGS installation with buried end anchor treatment at traffic approach end of railing) See Notes 5 and 11

**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or recycled plastic blocks may be used for 6" x 8" x 6'-0" wood post with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- For End Anchor Assembly (Type SFT) details, see Standard Plan A77S1.
- Layout Types 11A, 11B or 11C are typically used where MGS is recommended to shield embankment slopes and a crashworthy end treatment is required for only one direction of traffic.
- 31" in-line terminal system end treatments are used where site conditions will not accommodate a flared end treatment.
- The type of 31" terminal system end treatment to be used will be shown on the Project Plans.
- Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
- The 15:1 or flatter flare used with buried end anchors is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the buried post end anchor used with Type 11C Layout, see Standard Plan A77T2.
- Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.

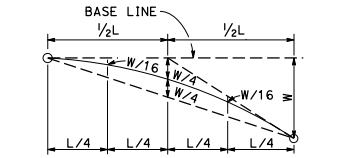
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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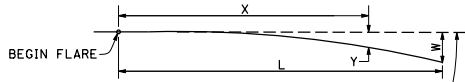
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**TYPICAL PARABOLIC LAYOUT**

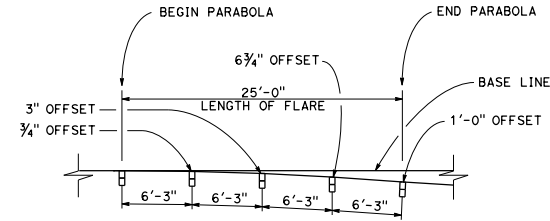


BASE LINE (EDGE OF PAVED SHOULDER OR OFFSET LINE OF EDGE OF TRAVELED WAY)

Y = OFFSET FROM BASE LINE  
W = MAXIMUM OFFSET  
X = DISTANCE ALONG BASE LINE  
L = LENGTH OF FLARE

$$Y = \frac{WX^2}{L^2}$$

**PARABOLIC FLARE OFFSETS**



**TYPICAL FLARE OFFSETS FOR 1 FOOT Max END OFFSET**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
EMBANKMENTS**

NO SCALE

**A77P1**

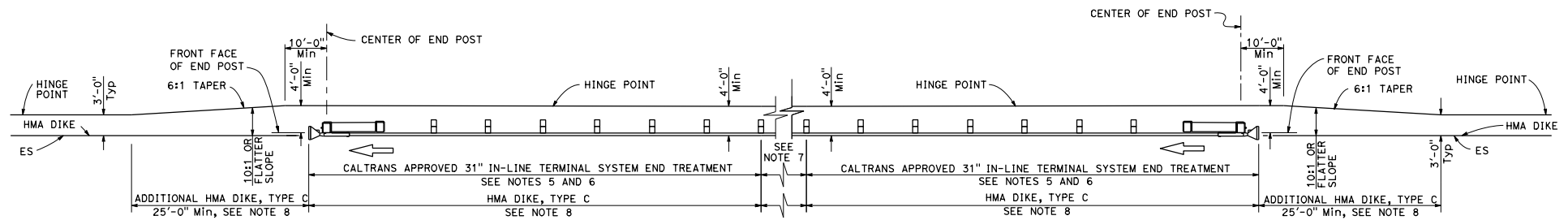
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

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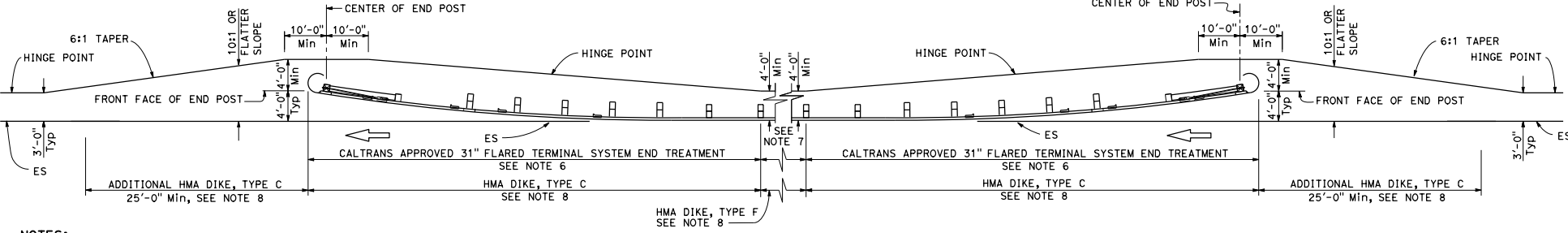
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**TYPE 11D LAYOUT**

(Embankment MGS installation with 31" in-line end treatment at each end of railing)  
See Note 4



**TYPE 11E LAYOUT**

(Embankment MGS installation with 31" flared end treatment at each end of railing)  
See Note 4

**NOTES:**

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or plastic blocks may be used for 6" x 8" x 6'-0" wood post with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
4. Layout Types 11D through 11L, shown on the A77P Series of Standard Plans, are typically used where MGS is recommended to shield embankment slopes and a crashworthy 31" end treatment is required for both directions of traffic.
5. 31" in-line terminal system end treatments are used where site conditions will not accommodate a flared end treatment.
6. The type of 31" terminal system end treatment to be used will be shown on the Project Plans.
7. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
8. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.

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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
EMBANKMENTS**

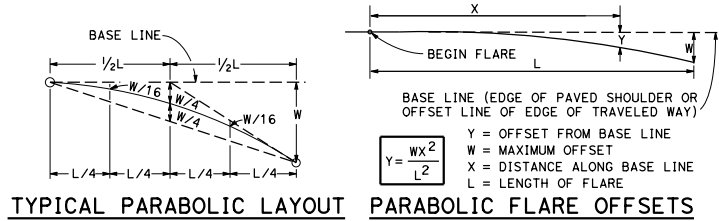
NO SCALE

**A77P2**

2015 STANDARD PLAN A77P2

64





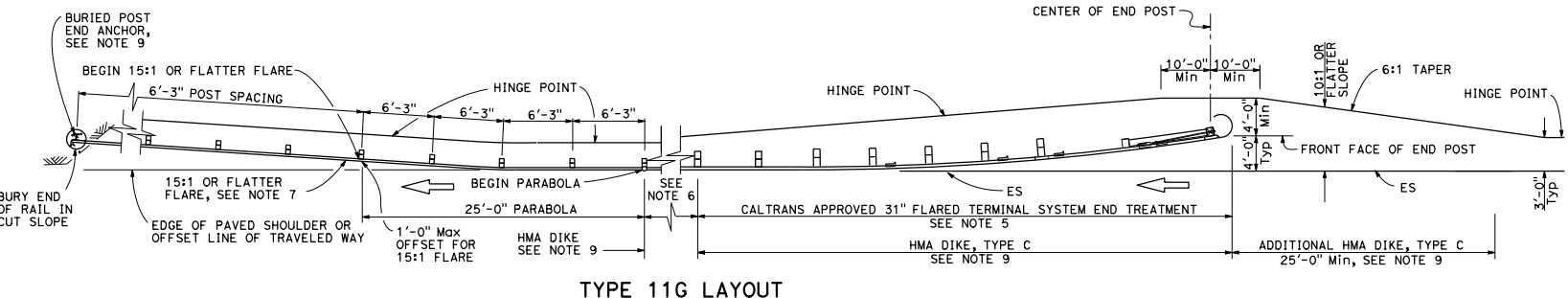
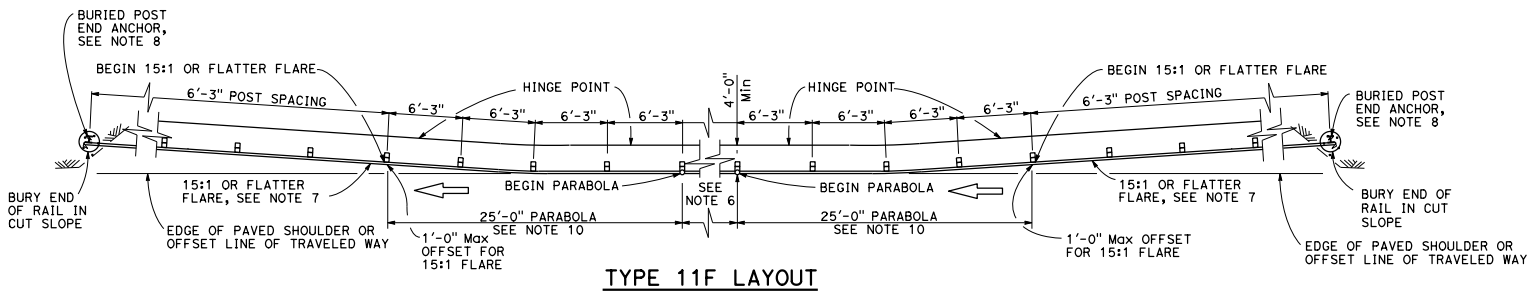
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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**NOTES:**


- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or plastic blocks may be used for 6" x 8" x 6'-0" wood post with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- Layout Types 11D through 11L, shown on the A77P Series of Standard Plans, are typically used where MGS is recommended to shield embankment slopes and a crashworthy 31" end treatment is required for both directions of traffic.
- The type of 31" terminal system end treatment to be used will be shown on the Project Plans.
- Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
- The 15:1 or flatter flare used with buried end anchors is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the buried post end anchor used with Type 11F and 11G Layouts, see Standard Plan A77T2.
- Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.

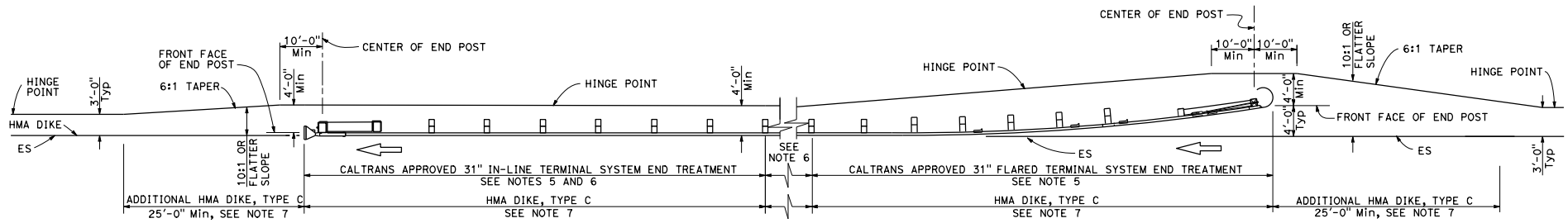
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**MIDWEST GUARDRAIL SYSTEM  
 TYPICAL LAYOUTS FOR  
 EMBANKMENTS**

NO SCALE

**A77P3**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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October 30, 2015 PLANS APPROVAL DATE					
					
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**TYPE 11H LAYOUT**

(Embankment MGS installation with 31" flared end treatment and 31" in-line end treatment at the ends of railing)  
See Notes 4 and 7

**NOTES:**

1. Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
2. MGS post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks, or plastic blocks may be used for 6" x 8" x 6'-0" wood post with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
4. Layout Types 11D through 11L, shown on the A77P Series of Standard Plans, are typically used where MGS is recommended to shield embankment slopes and a crashworthy 31" end treatment is required for both directions of traffic.
5. The type of 31" terminal system end treatment to be used will be shown on the Project Plans.
6. Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
7. Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
EMBANKMENTS**

NO SCALE

**A77P4**

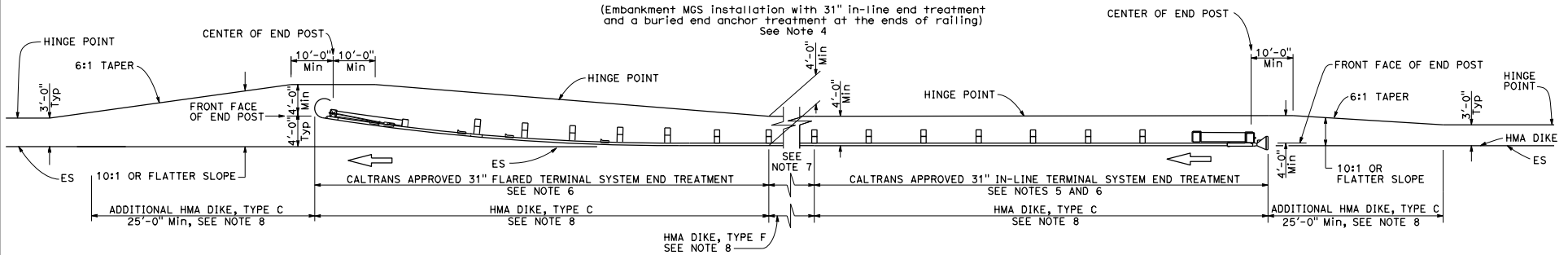
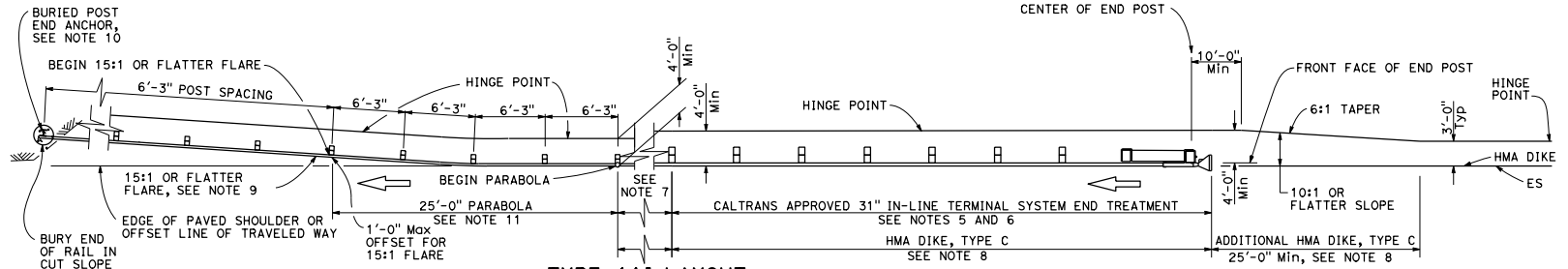
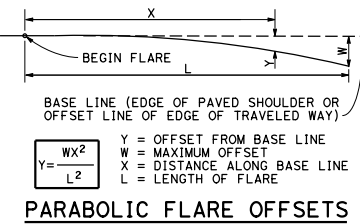
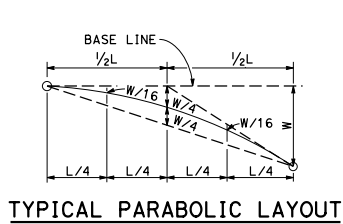
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or plastic blocks may be used for 6" x 8" x 6'-0" wood post with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- Layout Types 11D through 11L, shown on the A77P Series of Standard Plans, are typically used where MGS is recommended to shield embankment slopes and a crashworthy 31" end treatment is required for both directions of traffic.
- 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.
- The type of 31" terminal system end treatment to be used will be shown on the Project Plans.
- Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
- Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
- The 15:1 or flatter flare used with buried end anchors is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the buried post end anchor used with Type 11I Layout, see Standard Plan A77T2.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.

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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
EMBANKMENTS**

NO SCALE

**A77P5**

2015 STANDARD PLAN A77P5

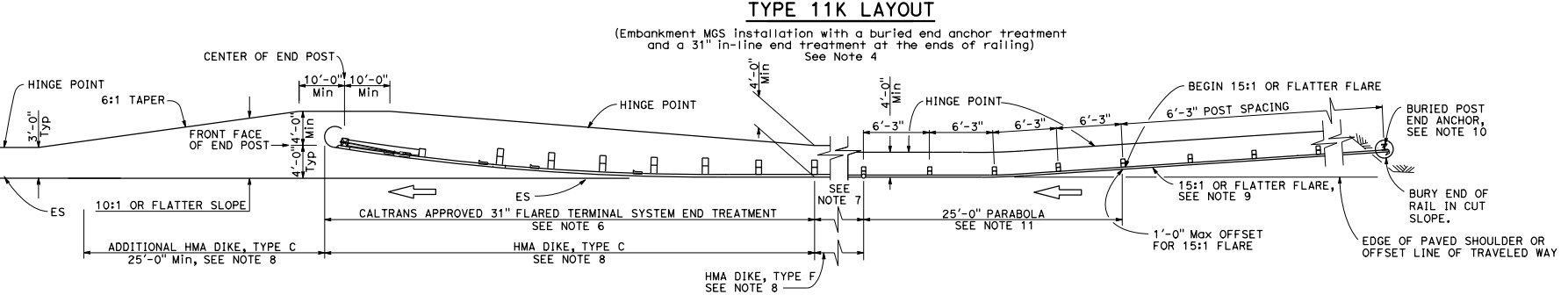
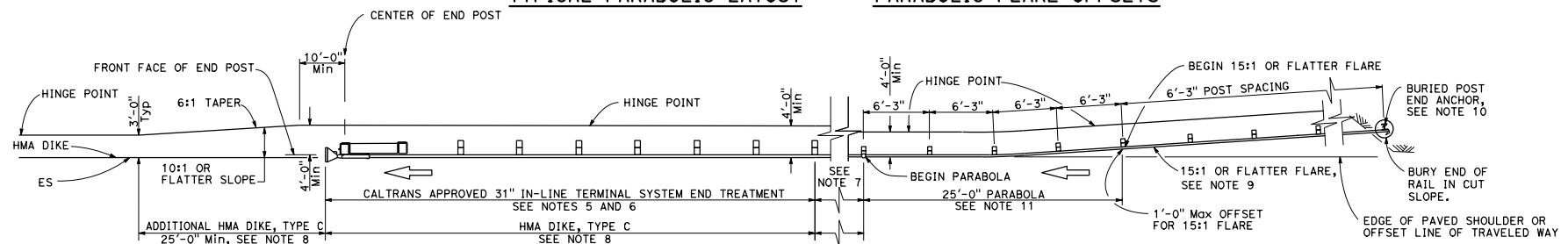
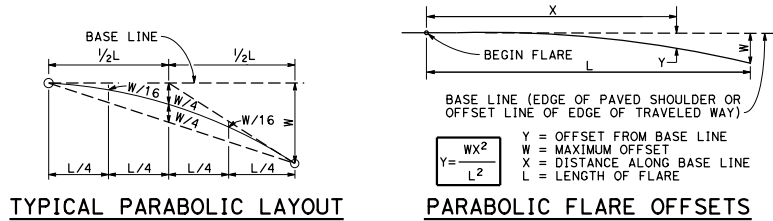
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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October 30, 2015  
PLANS APPROVAL DATE

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- NOTES:**
- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
  - MGS post spacing to be 6'-3" center to center, except as otherwise noted.
  - Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or plastic blocks may be used for 6" x 8" x 6'-0" wood post with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
  - Layout Types 11D through 11L, shown on the A77P Series of Standard Plans, are typically used where MGS is recommended to shield embankment slopes and a crashworthy 31" end treatment is required for both directions of traffic.
  - 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.

- The type of 31" terminal system end treatment to be used will be shown on the Project Plans.
- Dependent on site conditions (embankment height and side slope), construction of additional MGS (length equal to multiples of 12'-6" with 6'-3" post spacing) may be advisable.
- Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
- The 15:1 or flatter flare used with buried end anchors is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the buried post end anchor used with Type 11K and 11L Layouts, see Standard Plan A77T2.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.

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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
EMBANKMENTS**

NO SCALE

**A77P6**

2015 STANDARD PLAN A77P6

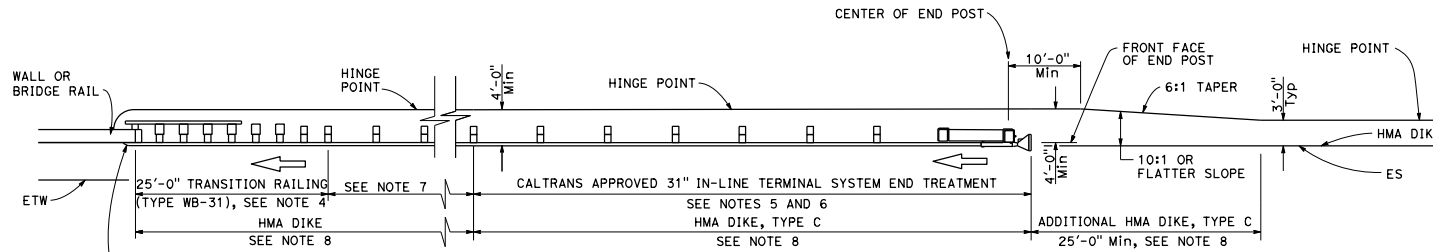
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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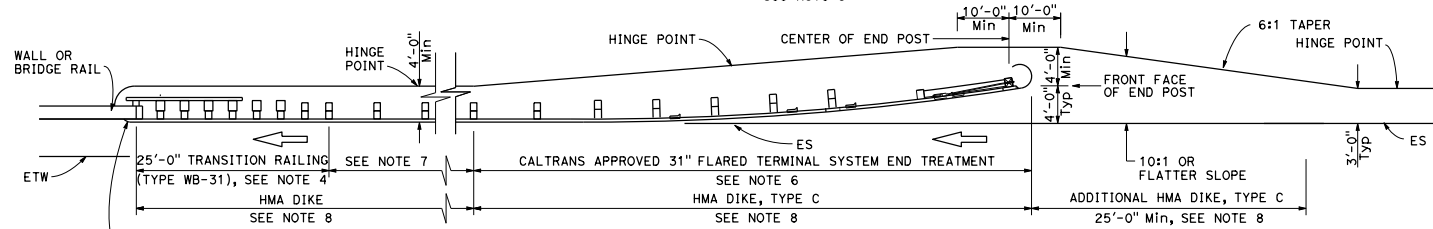
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**TYPE 12A LAYOUT**

(MGS installation at structure approach with 31" in-line end treatment at traffic approach end of railing)  
See Note 9



**TYPE 12B LAYOUT**

(MGS installation at structure approach with 31" flared end treatment at traffic approach end of railing)  
See Note 9

**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks. W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- For Transition Railing (Type WB-31) details for Types 12A and 12B Layouts, see Standard Plan A77U4.
- 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.
- The type of 31" terminal system end treatment to be used will be shown on the Project Plans.
- Dependent on site conditions (embankment height, side slopes, or other fixed objects), it may be advisable to construct additional guard railing (a length equal to multiples of 12'-6" with 6'-3" post spacing) between the transition railing and end treatment. A 12.5 degree angle of departure can be drawn on the Project Plans from the edge of traveled way through the outer most point of the fixed object to determine the additional length of railing needed.
- Where placement of dike is required with guard railing installations, see Standard Plan A77N4 for dike positioning details.
- Type 12A or Type 12B Layouts are typically used:
  - To the right of approaching traffic, at the end of a structure, on two-lane conventional highway where the roadbed width across the structure is less than 40 feet.
  - To the left of approaching traffic, at the end of a structure, on two-lane conventional highway where the roadbed width across the structure is less than 40 feet.
  - To the right of approaching traffic at the end of each structure on multilane freeways or expressways with separate adjacent or parallel bridges.
  - To the right of approaching traffic at the end of the structure on multilane freeways or expressways with decked median on the bridge.
- See Standard Plan A77Q3 for typical layout used left of approaching traffic at the ends of each structure on multilane freeways or expressways with separate adjacent or parallel bridges.
- For additional details of typical connections to bridge rail, see Connection Detail AA on Standard Plans A77U1 and A77U2 and Connection Detail FF on Standard Plans A77V1 and A77V2.
- For additional details of a typical connection to walls or abutments, see Standard Plan A77U3.

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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
STRUCTURE APPROACH**

NO SCALE

**A77Q1**

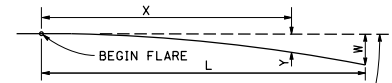
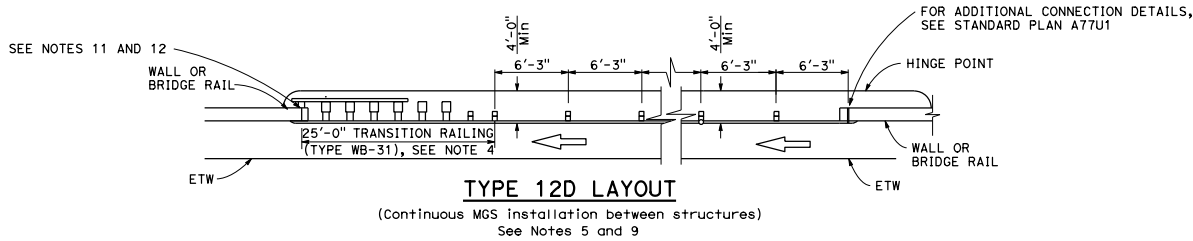
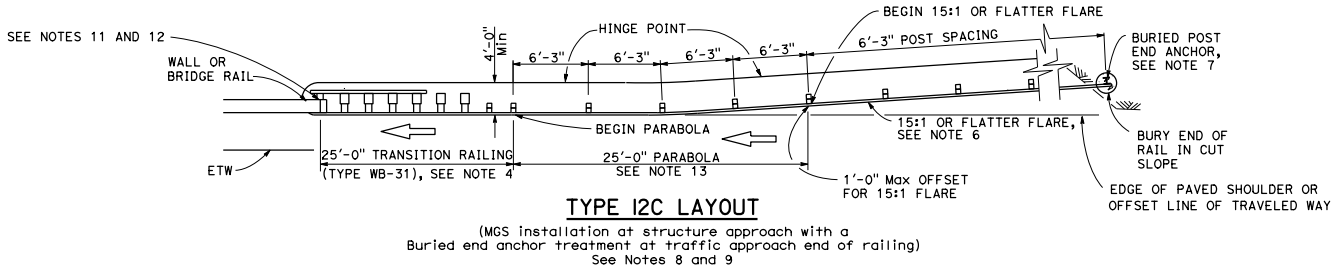
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

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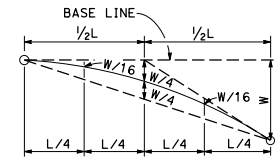
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BASE LINE (EDGE OF PAVED SHOULDER OR OFFSET LINE OF EDGE OF TRAVELED WAY)

$Y = \frac{WX^2}{L^2}$   
 Y = OFFSET FROM BASE LINE  
 W = MAXIMUM OFFSET  
 X = DISTANCE ALONG BASE LINE  
 L = LENGTH OF FLARE

**PARABOLIC FLARE OFFSETS**



**TYPICAL PARABOLIC LAYOUT**

**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" m wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- For Transition Railing (Type WB-31) details for Types 12C and 12D Layouts, see Standard Plan A77U4.
- Type 12D layout is typically used where continuous MGS is recommended between structures.
- The 15:1 or flatter flare for Type 12C Layout is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS with the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the buried post end anchor used with Type 12C Layout, see Standard Plan A77T2.
- Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
- Type 12C Layout is typically used:
  - To the right of approaching traffic, at the end of the structure, on two-lane conventional highway where the roadbed width across the structure is less than 40 feet.
  - To the left of approaching traffic, at each of a structure, on two-lane conventional highway where the roadbed width across the structure is less than 40 feet.
  - To the right of approaching traffic at the end of each structure on multilane freeways or expressways with separate adjacent or parallel bridges.
  - To the right of approaching traffic at the end of the structure on multilane freeways or expressways with decked median on the bridge.
- See Standard Plan A77Q3 for typical layout used left of approaching traffic at the ends of each structure on multilane freeways or expressways with separate adjacent or parallel bridges.
- For additional details of typical connections to bridge rail, see Connection Detail AA on Standard Plans A77U1 and A77U2 and Connection Detail FF on Standard Plans A77V1 and A77V2.
- For additional details of a typical connection to walls or abutments, see Standard Plan A77U3.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.

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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
STRUCTURE APPROACH  
AND BETWEEN STRUCTURES**

NO SCALE

**A77Q2**

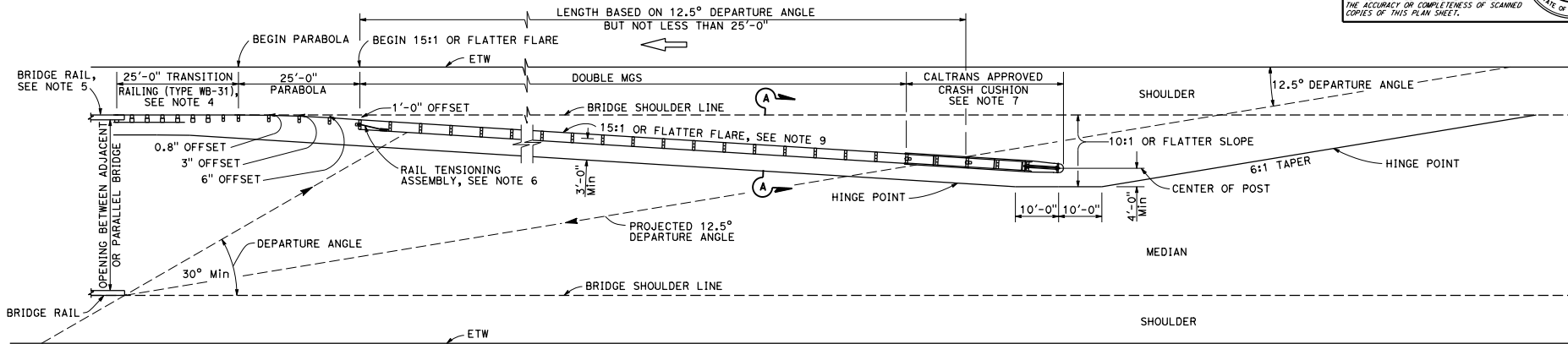
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

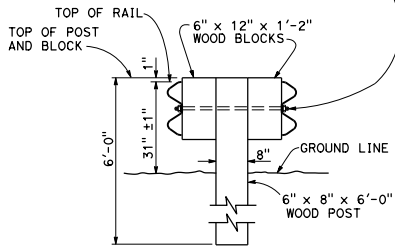
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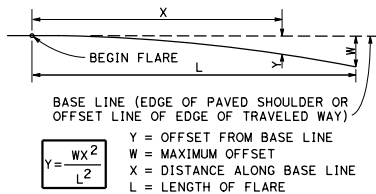
**TYPE 12E LAYOUT**

See Note 9

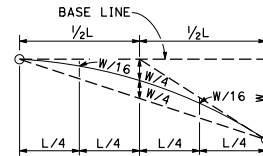
5/8" Ø BUTTON HEAD BOLT WITH HEX NUT OR  
5/8" Ø ROD, THREADED BOTH ENDS, WITH  
HEX NUTS, 1/2" MAX EXPOSED THREADS  
AFTER HEX NUT(S) TIGHTENED. NO WASHER ON  
RAIL FACES FOR BOLTED CONNECTION TO LINE POST



**SECTION A-A**  
**TYPICAL DOUBLE MIDWEST**  
**GUARDRAIL SYSTEM**



**PARABOLIC FLARE OFFSETS**



**TYPICAL PARABOLIC LAYOUT**

**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks. W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood line posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- For Transition Railing (Type WB-31) details, see Standard Plan A77U4.
- For additional details of a typical connection to bridge rail, see Connection Detail AA on Standard Plan A77U1.
- For Rail Tensioning Assembly details, see Standard Plan A77S2.
- The type of Crash Cushion to be used will be shown on the Project Plans.
- Type 12E Layout is typically used left of approaching traffic at the end of each structure on multilane freeways or expressways where a median type barrier is not constructed between separated roadbeds.
- The 15:1 or flatter flare is measured off of the edge of traveled way.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM**  
**TYPICAL LAYOUTS FOR**  
**STRUCTURE APPROACH**

NO SCALE

**A77Q3**

2015 STANDARD PLAN A77Q3

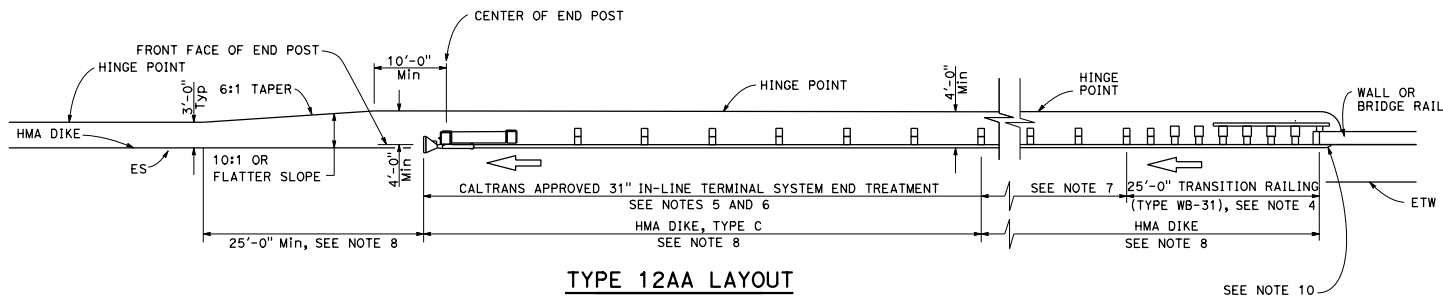
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

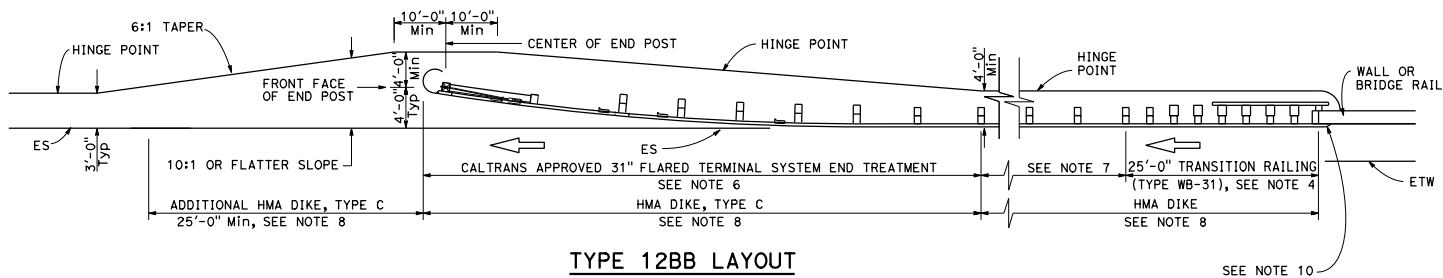
October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
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STATE OF CALIFORNIA

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**TYPE 12AA LAYOUT**  
(MGS installation at structure departure with 31" in-line end treatment at trailing end of railing)  
See Notes 8 and 9



**TYPE 12BB LAYOUT**  
(MGS installation at structure departure with 31" flared end treatment at trailing end of railing)  
See Notes 8 and 9

**NOTES:**

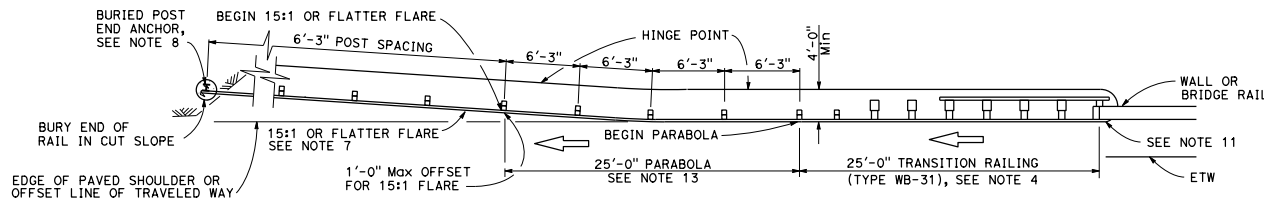
- Line post, blocks and hardware to be used are shown on Standard Line Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- For Transition Railing (Type WB-31) details for Types 12AA and 12BB Layouts, see Standard Plan A77U4.
- 31" in-line terminal system treatments are used where site conditions will not accommodate a 31" flared end treatment.
- The type of 31" terminal system to be used will be shown on the Project Plans.
- Dependent on site conditions (embankment height, side slopes, other fixed objects), it may be advisable to construct additional MGS (a length equal to multiples of 12'-6" with 6'-3" post spacing) between the transition railing and 31" end treatments.
- Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
- Type 12AA or Type 12BB Layouts are typically used to the right of traffic departing a structure on two-way conventional highways where the roadbed width across the structure is less than 40 feet.
- For additional details of typical connections to bridge rail, see Connection Detail CC on Standard Plan A77U2 and Connection Detail HH on Standard Plan A77V2.

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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
STRUCTURE DEPARTURE**

NO SCALE

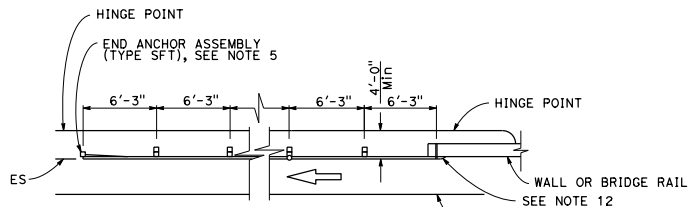
**A77Q4**





**TYPE 12CC LAYOUT**

(MGS installation at structure departure with a Buried end anchor treatment at trailing end of railing)  
See Notes 9 and 10



**TYPE 12DD LAYOUT**

(MGS installation at structure departure With end anchor assembly at trailing end of railing)  
See Notes 6 and 9

**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MSG post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks. W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood line posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- For Transition Railing (Type WB-31) details for Type 12CC Layout, see Standard Plan A77U4.
- For details of End Anchor Assembly (Type SFT) used with Type 12DD Layout, see Standard Plan A77S1.
- Type 12DD layout is typically used to the right of traffic departing a structure on two-way conventional highways where the roadbed width across the structure is equal to or greater than 40 feet and MGS is recommended (embankment height, side slopes, other fixed objects). Length of railing to be equal to multiples of 12'-6". For MGS connection details to bridge rail, see Standard Plans A77U1 and A77V1. For MGS connection details to wall, see Standard Plan A77U3.
- The 15:1 or flatter flare for Type 12CC Layout is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the buried post end anchor used with Type 12CC Layout, see Standard Plan A77T2.
- Where placement of dike is required with MGS installations, see Standard Plan A77N4 for dike positioning details.
- Type 12CC Layout is typically used to the right of traffic departing a structure on two-way conventional highways where the roadbed width across the structure is less than 40 feet.
- For additional details of a typical connection to bridge rail for Layout Type 12CC, see Connection Detail CC on Standard Plan A77U2 and Connection Detail HH on Standard Plan A77V2.
- For additional details of a typical connection to bridge rail for Layout Type 12DD, see Connection Detail BB on Standard Plan A77U1 and Connection Detail GG on Standard Plan A77V1.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.

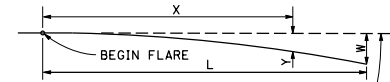
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
No. CS0200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

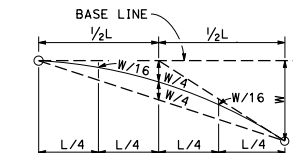
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BASE LINE (EDGE OF PAVED SHOULDER OR OFFSET LINE OF EDGE OF TRAVELED WAY)

Y = OFFSET FROM BASE LINE  
W = MAXIMUM OFFSET  
X = DISTANCE ALONG BASE LINE  
L = LENGTH OF FLARE

**PARABOLIC FLARE OFFSETS**



**TYPICAL PARABOLIC LAYOUT**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

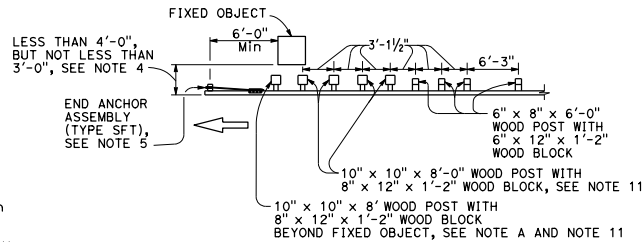
**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
STRUCTURE DEPARTURE**

NO SCALE

**A77Q5**

**NOTES:**

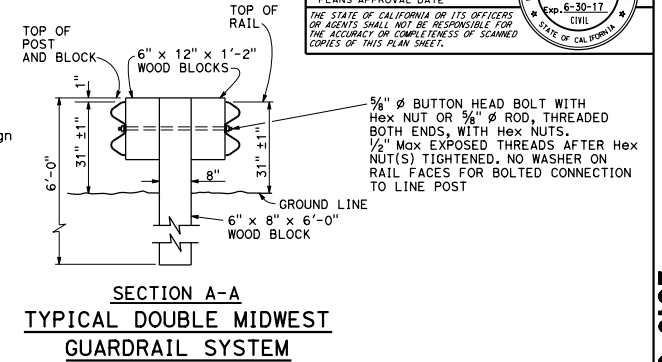
- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood line posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS sections with post spacing of 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object" on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0", but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).
- For End Anchor Assembly (Type SFT) details, see Standard Plan A77S1.
- For details of Rail Tensioning Assembly, see Standard Plan A77S2.
- The type of crash cushion to be used will be shown on the Project Plans.
- Type 14A layout is typically used on multilane freeways or expressways to shield fixed objects where a median type barrier is not constructed between the separated roadbeds.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.
- The 15:1 or flatter flare is measured off of the edge of traveled way.
- W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic block may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood block shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".



**NOTE A:** For a series of fixed objects (bridge columns, overhead sign supports, etc.) additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks at 3'-1/2" center to center spacing are to be used between fixed objects.

**STRENGTHENED MIDWEST GUARDRAIL SYSTEM  
SECTIONS FOR FIXED OBJECT**

Use strengthened MGS sections with Type 14A layout where minimum clearance between the face of the railing and fixed object(s) is less than 4'-0", but not less than 3'-0", See Note 4.



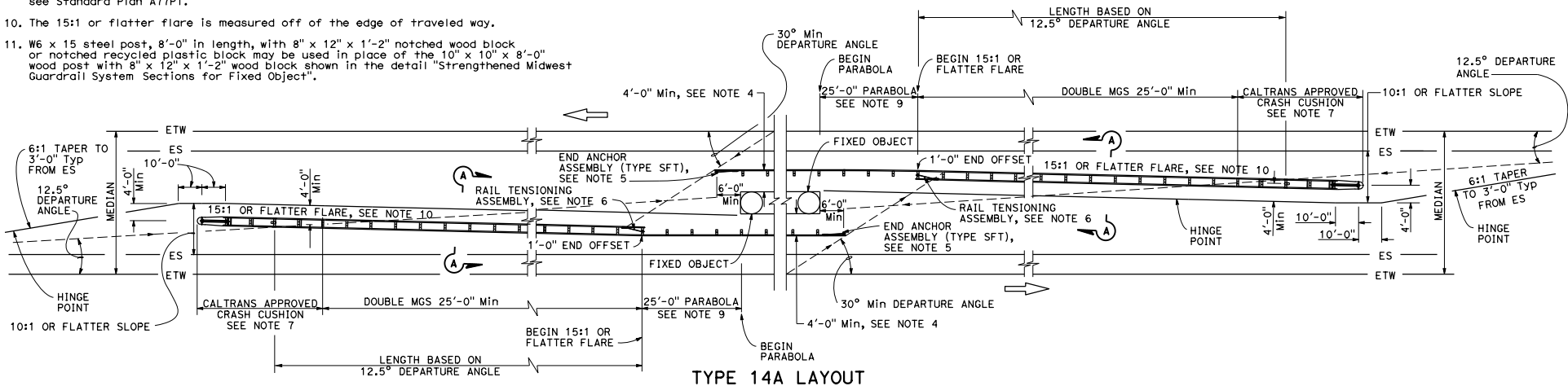
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

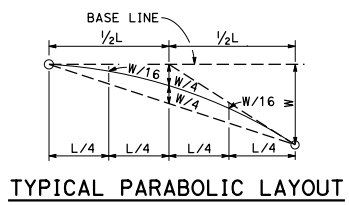
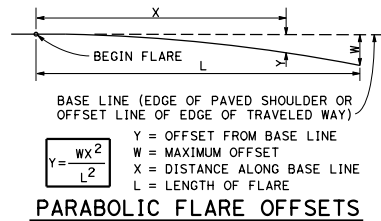
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PLANS APPROVAL DATE

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Randell D. Hiatt  
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CIVIL  
STATE OF CALIFORNIA



**TYPE 14A LAYOUT**  
See Note 8



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
FIXED OBJECTS  
BETWEEN SEPARATE ROADBEDS  
(TWO-WAY TRAFFIC)**

NO SCALE

**A77R1**

**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks. W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood line posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS section with post spacing of 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object" on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0", but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).

- For End Anchor Assembly (Type SFT) details, see Standard Plan A77S1.
- Type of crash cushion to be used will be shown on the Project Plans.
- Type 15A layout is typically used on multilane freeways or expressways to shield fixed objects in the area between separated one-way roadbeds.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.
- The 15:1 or flatter flare is measured off of the edge of the traveled way.
- W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic blocks may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood block shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".

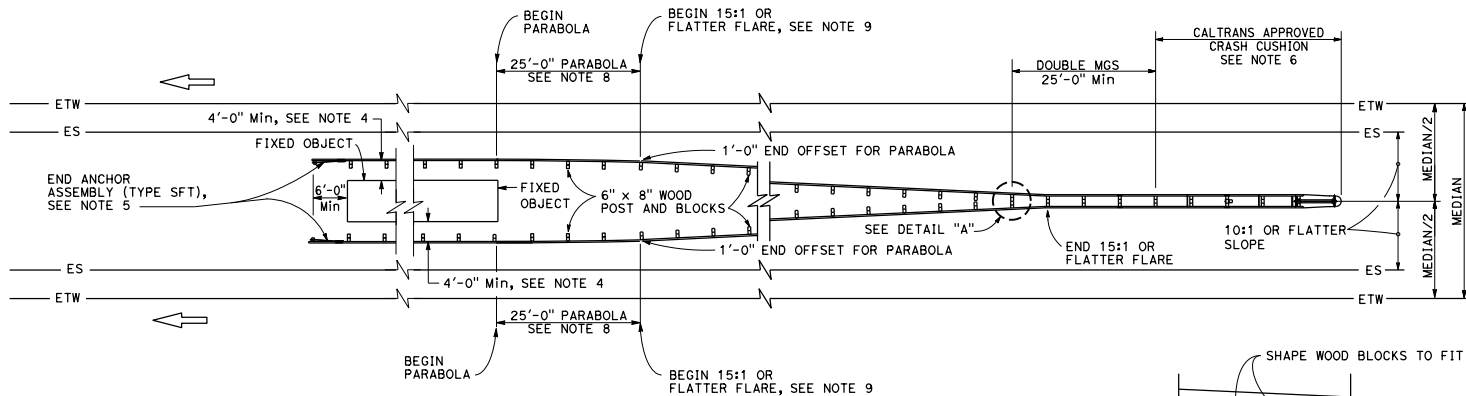
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

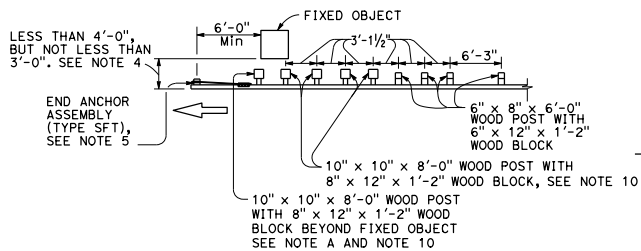
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**TYPE 15A LAYOUT**

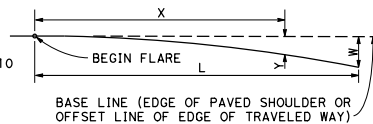
See Note 7



**NOTE A:** For a series of fixed objects (bridge columns, overhead sign supports, etc.) additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks at 3'-1/2" center to center spacing are to be used between fixed objects.

**STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT**

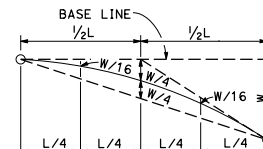
Use strengthened MGS sections with Type 15A layout where minimum clearance between the face of the MGS and the fixed object(s) is less than 4'-0", but not less than 3'-0". See Note 4.



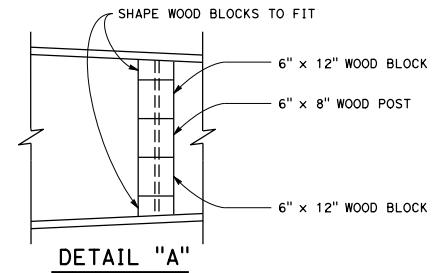
Y = OFFSET FROM BASE LINE  
W = MAXIMUM OFFSET  
X = DISTANCE ALONG BASE LINE  
L = LENGTH OF FLARE

$$Y = \frac{WX^2}{L^2}$$

**PARABOLIC FLARE OFFSETS**



**TYPICAL PARABOLIC LAYOUT**



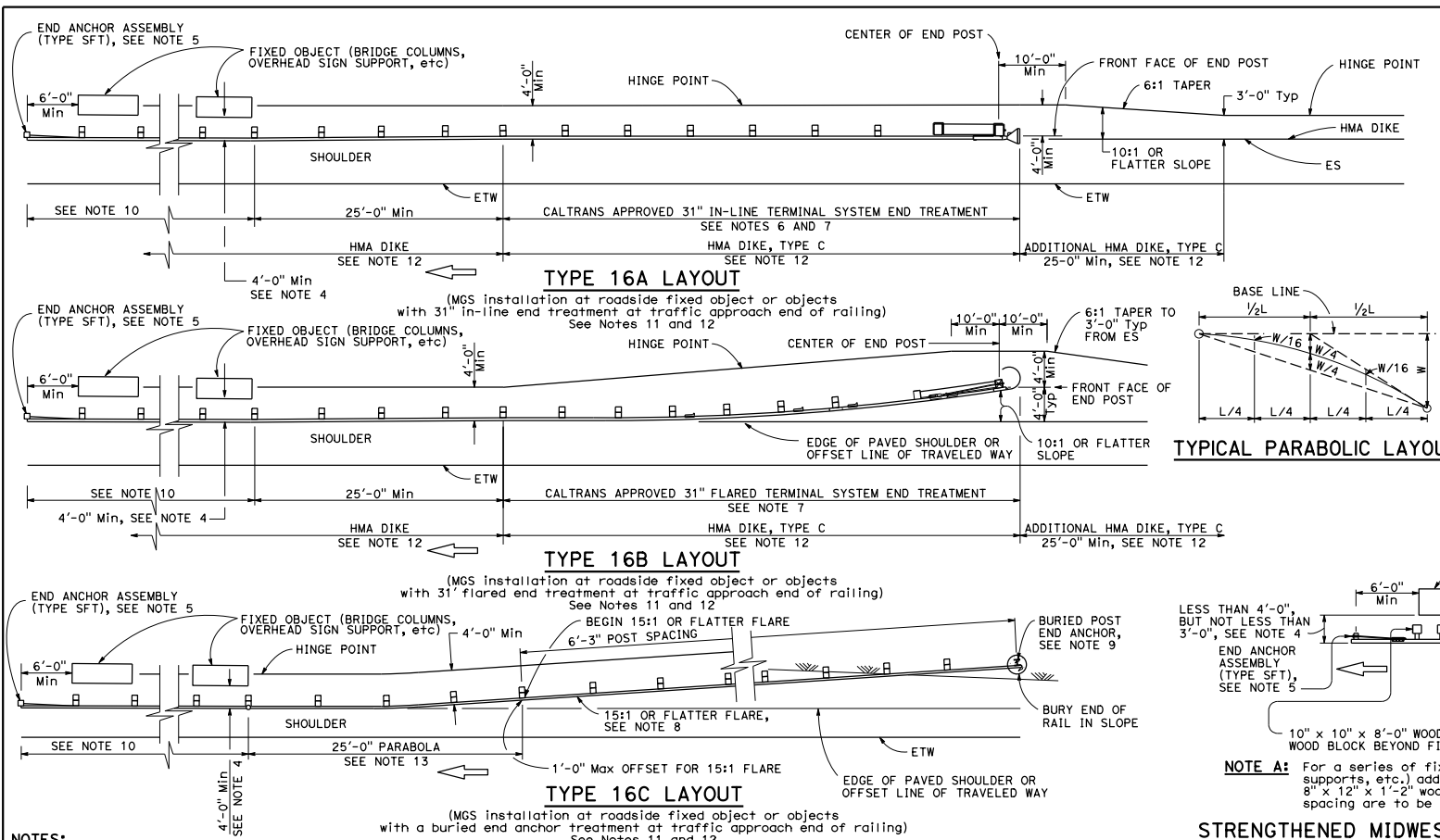
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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
FIXED OBJECTS  
BETWEEN SEPARATE ROADBEDS  
(ONE-WAY TRAFFIC)**

NO SCALE

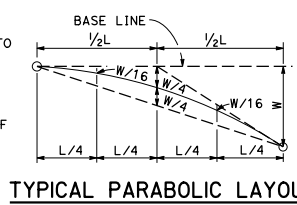
**A77R2**

2015 STANDARD PLAN A77R2

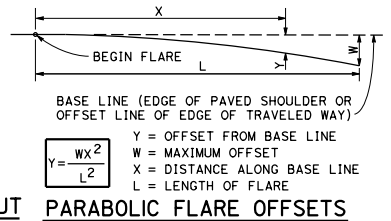


- NOTES:**
- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
  - MGS post spacing to be 6'-3" center to center, except as otherwise noted.
  - Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood line posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
  - A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS sections with post spacing of 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object" on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0" but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).
  - For End Anchor Assembly (Type SFT) details, see Standard Plan A77S1.
  - 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.
  - The type of 31" terminal system to be used will be shown on the Project Plans.

- The 15:1 or flatter flare used with Type 16C Layout is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the Buried Post End Anchor used with Type 16C Layout, see Standard Plan A77T2.
- As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3" except as specified in Note 4.
- Layout Types 16A, 16B or 16C are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy 31" end treatment is required for only one direction of traffic.
- Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.
- W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic blocks may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood block shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".



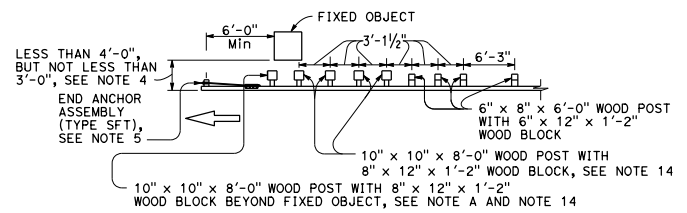
**TYPICAL PARABOLIC LAYOUT**



**PARABOLIC FLARE OFFSETS**

BASE LINE (EDGE OF PAVED SHOULDER OR OFFSET LINE OF EDGE OF TRAVELED WAY)

Y = OFFSET FROM BASE LINE  
W = MAXIMUM OFFSET  
X = DISTANCE ALONG BASE LINE  
L = LENGTH OF FLARE

$$Y = \frac{WX^2}{L^2}$$


**NOTE A:** For a series of fixed objects (bridge columns, overhead sign supports, etc.), additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks to be used between fixed objects.

**STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT**

Use strengthened MGS sections with Types 16A, 16B or 16C layouts where minimum clearance between the face of the railing and fixed object(s) is less than 4'-0", but not less than 3'-0". See Note 4

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**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
ROADSIDE FIXED OBJECTS**

NO SCALE

**A77R3**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

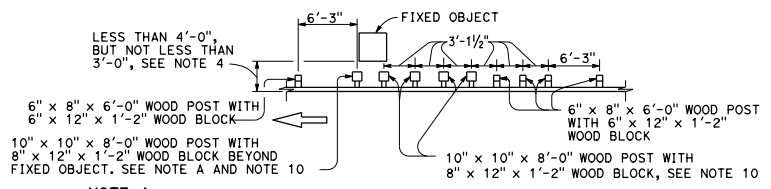
**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
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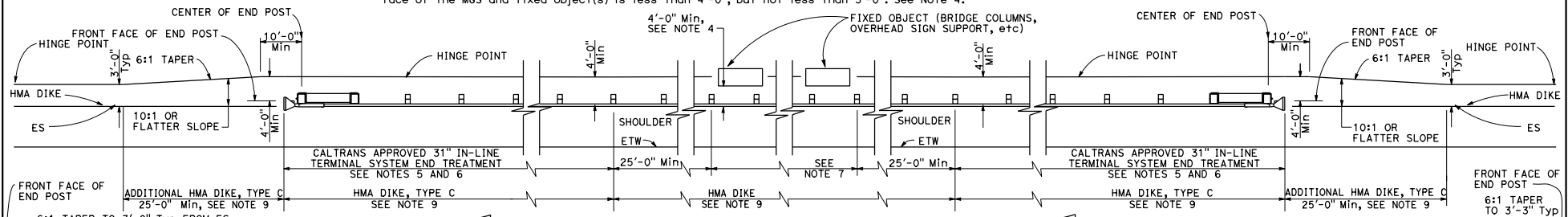
Dist*	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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**NOTE A:** For a series of fixed objects (bridge columns, overhead sign supports, etc.) additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks at 3'-1/2" center to center spacing are to be used between fixed object(s).

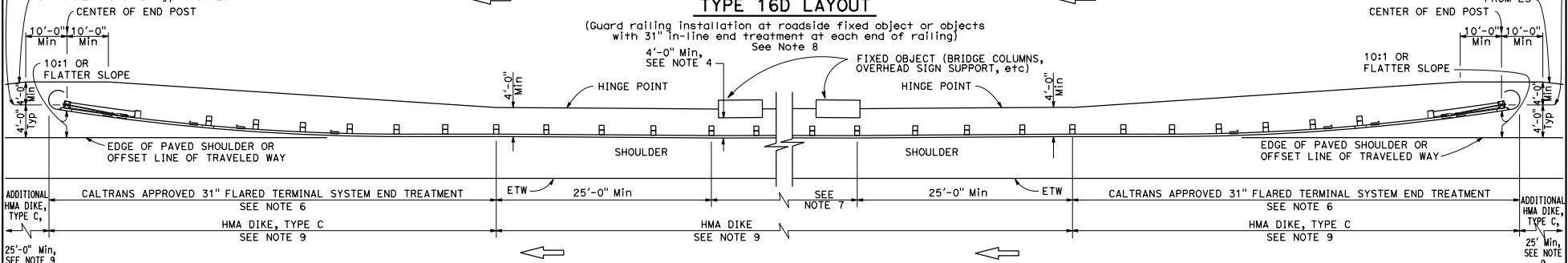
**STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT**

Use strengthened MGS sections with layout Types 16D or 16E where minimum clearance between the face of the MGS and fixed object(s) is less than 4'-0", but not less than 3'-0". See Note 4.



**TYPE 16D LAYOUT**

(Guard railing installation at roadside fixed object or objects with 31" in-line end treatment at each end of railing See Note 8)



**TYPE 16E LAYOUT**

(MGS installation at roadside fixed object or objects with 31" flared end treatment at each end of railing See Note 8)

- NOTES:**
- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
  - MGS post spacing to be 6'-3" center to center, except as otherwise noted.
  - Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks. W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood line posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
  - A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object", on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0", but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).
  - 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.
  - The type of 31" terminal system to be used will be shown on the Project Plans.
  - As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
  - Layout Types 16D through 16L, shown on the A77R Series of Standard Plans, are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy 31" end treatment is required for both directions of traffic.
  - Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
  - W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic block may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood block shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".

**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
ROADSIDE FIXED OBJECTS**

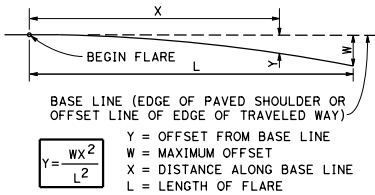
NO SCALE

**A77R4**

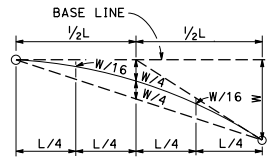
2015 STANDARD PLAN A77R4

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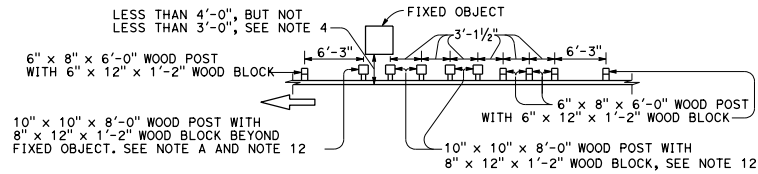




**PARABOLIC FLARE OFFSETS**



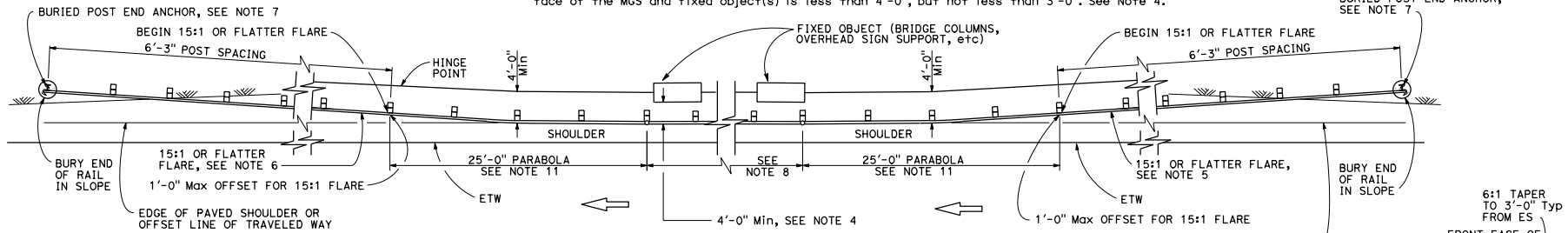
**TYPICAL PARABOLIC LAYOUT**



**NOTE A:** For a series of fixed objects (bridge columns, overhead sign supports, etc) additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks at 3'-1 1/2" center to center spacing are to be used between fixed object(s).

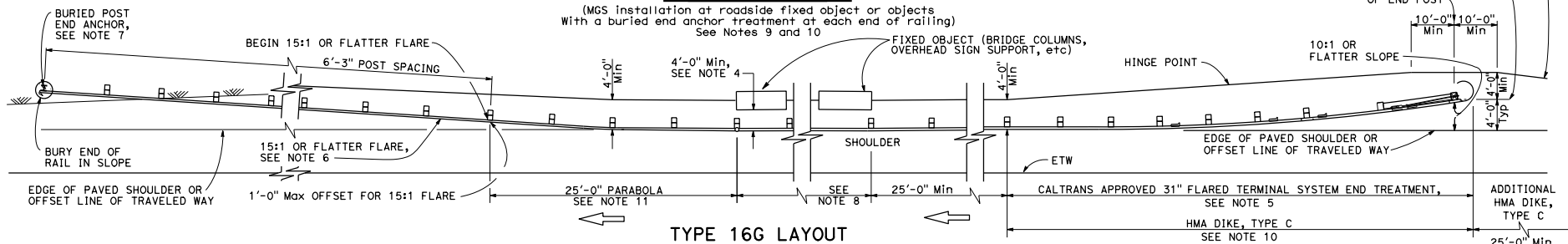
**STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT**

Use strengthened MGS sections with layout Types 16F or 16G where minimum clearance between the face of the MGS and fixed object(s) is less than 4'-0", but not less than 3'-0". See Note 4.



**TYPE 16F LAYOUT**

(MGS installation at roadside fixed object or objects with a buried end anchor treatment at each end of railing) See Notes 9 and 10



**TYPE 16G LAYOUT**

(MGS installation at roadside fixed object or objects with 31" flared end treatment and a buried end anchor treatment at the ends of railing) See Notes 9 and 10

**NOTES:**

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8,5 or W6 x 9 steel posts, 6'-0" in length, with 8" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Objects" on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0", but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).
- The type of 31" terminal system to be used will be shown on the Project Plans.
- The 15:1 or flatter flare for the buried post anchor is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
- For details of the Buried Post End Anchor, see Standard Plan A77T2.
- As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
- Layout Types 16D through 16L, shown on the A77R Series of Standard Plans, are typically used on highways where MGS is recommended to shield roadside fixed object(s) and a crashworthy 31" end treatment is required for both directions of traffic.
- Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.
- W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic blocks may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood block shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".

**MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS**

NO SCALE

**A77R5**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

RANDALL D. HIATT  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C50200  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

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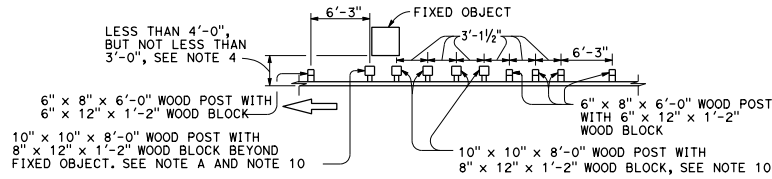
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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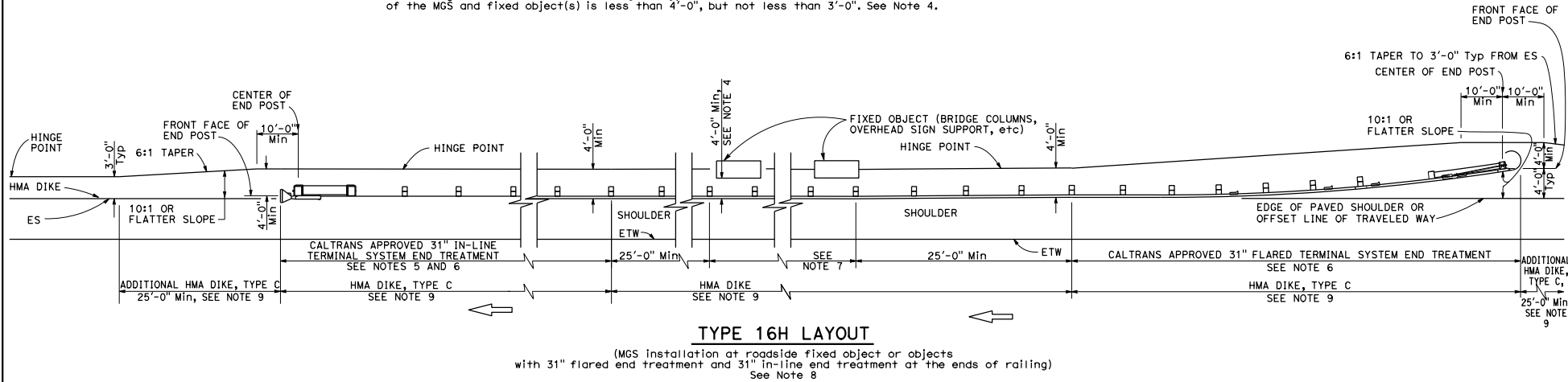
REGISTERED PROFESSIONAL ENGINEER  
No. CS0200  
Exp. 6-30-17  
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STATE OF CALIFORNIA



**NOTE A:** For a series of fixed objects (bridge columns, overhead sign supports, etc.) additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks at 3'-1/2" center to center spacing are to be used between fixed object(s).

### STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT

Use strengthened MGS sections with layout Type 16H where minimum clearance between the face of the MGS and fixed object(s) is less than 4'-0", but not less than 3'-0". See Note 4.



### TYPE 16H LAYOUT

(MGS installation at roadside fixed object or objects with 31" flared end treatment and 31" in-line end treatment at the ends of railing) See Note 8

#### NOTES:

- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
- MGS post spacing to be 6'-3" center to center, except as otherwise noted.
- Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks. W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
- A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Objects" on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0", but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).
- 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.
- The type of 31" terminal system to be used will be shown on the Project Plans.
- As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
- Layout Types 16D through 16L, shown on the A77R Series of Standard Plans, typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy 31" end treatment is required for both directions of traffic.
- Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
- W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic blocks may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood block shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
ROADSIDE FIXED OBJECTS**

NO SCALE

**A77R6**

2015 STANDARD PLAN A77R6

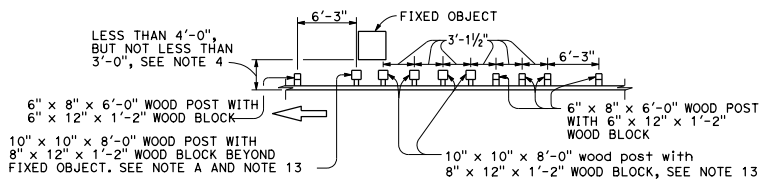
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

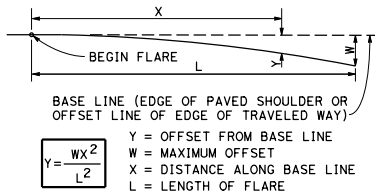
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**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
STATE OF CALIFORNIA

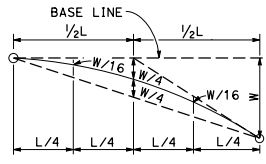


**NOTE A:** For a series of fixed objects (bridge columns, overhead sign supports, etc.) additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks at 3'-1/2" center to center spacing are to be used between fixed object(s).

**STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT**

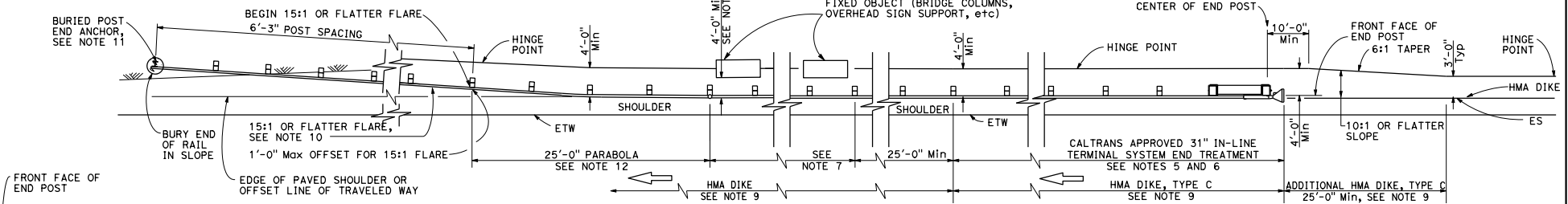


**PARABOLIC FLARE OFFSETS**



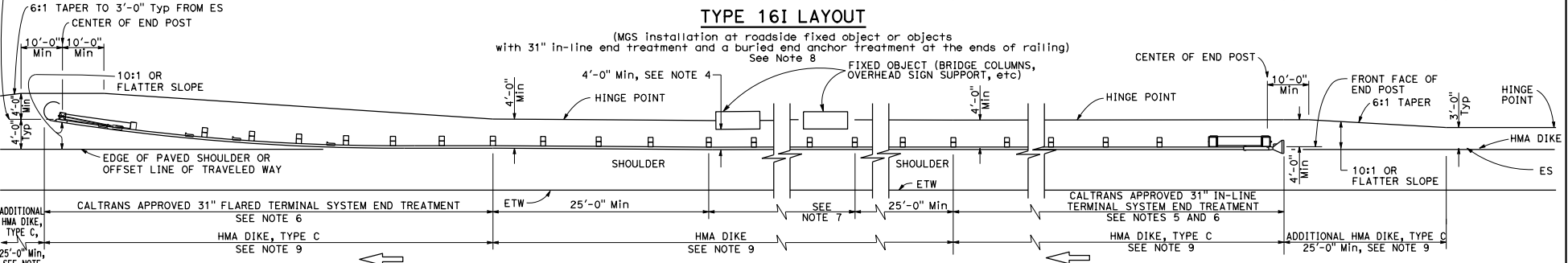
**TYPICAL PARABOLIC LAYOUT**

Use strengthened MGS sections with layout Types 16I or 16J Layouts where minimum clearance between the face of the MGS and fixed object(s) is less than 4'-0", but not less than 3'-0". See Note 4.



**TYPE 16I LAYOUT**

(MGS installation at roadside fixed object or objects with 31" in-line end treatment and a buried end anchor at the ends of railing) See Note 8



**TYPE 16J LAYOUT**

(MGS installation at roadside fixed object or objects With a 31" in-line end treatment and a 31" flared end treatment at the ends of railing) See Note 8

- NOTES:**
- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
  - MGS post spacing to be 6'-3" center to center, except as otherwise noted.
  - Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks, W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 8" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
  - A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Objects" on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0", but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).
  - 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.
  - The type of 31" terminal system to be used will be shown on the Project Plans.
  - As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
  - Layout Types 16D through 16L, shown on the A77R Series of Standard Plans, are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy 31" end treatment is required for both directions of traffic.
  - Where placement of dike is required with guard railing, see Standard Plan A77N4 for dike positioning details.
  - The 15:1 or flatter flare for the buried post anchor is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
  - For details of Buried Post End Anchor, see Standard Plan A77T2.
  - For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.
  - W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic blocks may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood block shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
TYPICAL LAYOUTS FOR  
ROADSIDE FIXED OBJECTS**  
NO SCALE

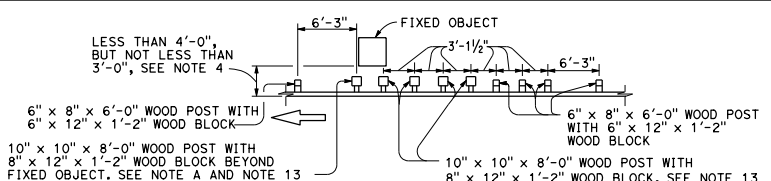
**A77R7**

2015 STANDARD PLAN A77R7



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C50200  
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 CIVIL  
 STATE OF CALIFORNIA



LESS THAN 4'-0", BUT NOT LESS THAN 3'-0", SEE NOTE 4

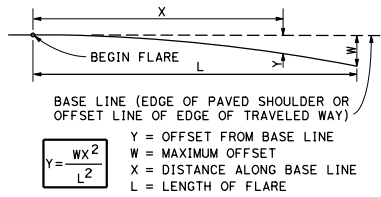
6" x 8" x 6'-0" WOOD POST WITH 6" x 12" x 1'-2" WOOD BLOCK

10" x 10" x 8'-0" WOOD POST WITH 8" x 12" x 1'-2" WOOD BLOCK BEYOND FIXED OBJECT. SEE NOTE A AND NOTE 13

NOTE A: For a series of fixed objects (bridge columns, overhead sign supports, etc.) additional 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks at 3'-1/2" center to center spacing are to be used between fixed object(s).

### STRENGTHENED MIDWEST GUARDRAIL SYSTEM SECTIONS FOR FIXED OBJECT

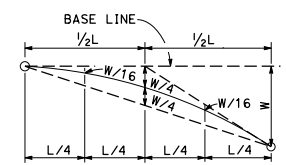
Use strengthened MGS sections with layout Types 16K or 16L layouts where minimum clearance between the face of the MGS and fixed object(s) is less than 4'-0", but not less than 3'-0". See Note 4.



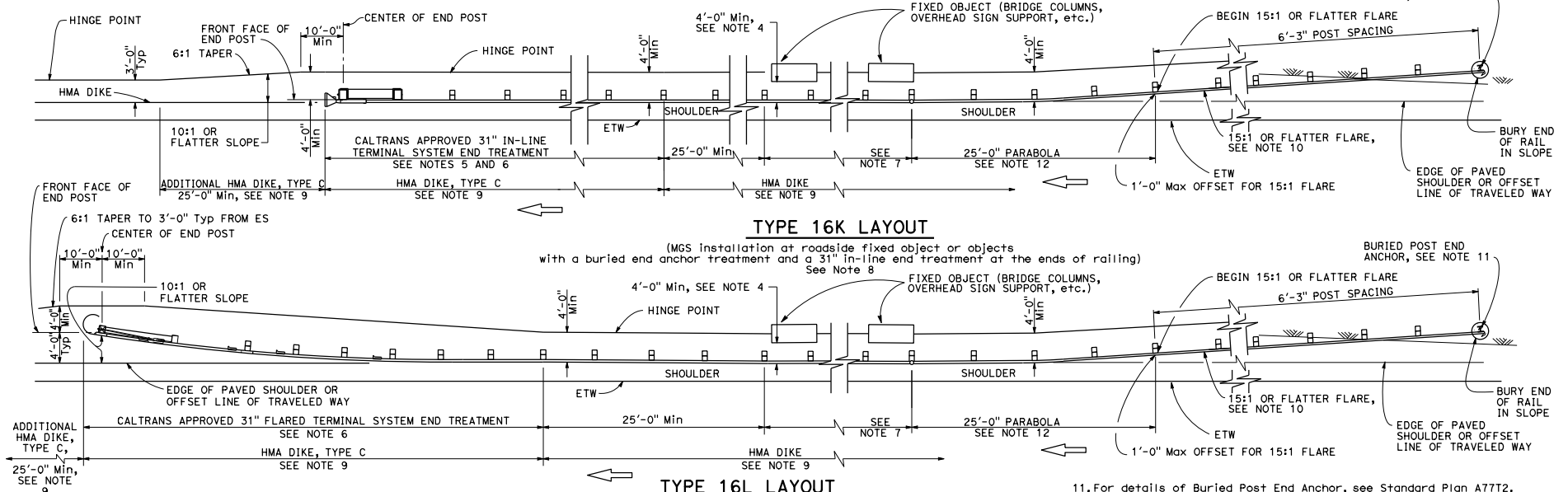
### PARABOLIC FLARE OFFSETS

$$Y = \frac{WX^2}{L^2}$$

Y = OFFSET FROM BASE LINE  
 W = MAXIMUM OFFSET  
 X = DISTANCE ALONG BASE LINE  
 L = LENGTH OF FLARE



### TYPICAL PARABOLIC LAYOUT



### TYPE 16K LAYOUT

(MGS installation at roadside fixed object or objects with a buried end anchor treatment and a 31" in-line end treatment at the ends of railing) See Note 8

### TYPE 16L LAYOUT

(MGS installation at roadside fixed object or objects with a buried end anchor treatment and a 31" flared end treatment at the ends of railing) See Note 8

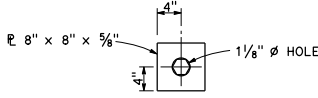
- NOTES:**
- Line post, blocks and hardware to be used are shown on Standard Plans A77L1, A77L2, A77M1, A77N1 and A77N2.
  - MGS post spacing to be 6'-3" center to center, except as otherwise noted.
  - Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 12" x 1'-2" wood blocks. W6 x 8.5 or W6 x 9 steel posts, 6'-0" in length, with 6" x 12" x 1'-2" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 12" x 1'-2" wood blocks where applicable and when specified.
  - A 4'-0" minimum clearance is required between the face of the railing and the face of a fixed object located directly behind MGS sections with post spacing at 6'-3". Construct MGS as shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Objects" on this plan, where the clearance between the face of the railing and the face of a fixed object is less than 4'-0", but not less than 3'-0". Where the clearance is less than 3'-0", a concrete wall or barrier should be constructed to shield the fixed object(s).
  - 31" in-line terminal system end treatments are used where site conditions will not accommodate a 31" flared end treatment.
  - The type of 31" terminal system to be used will be shown on the Project Plans.
  - As site conditions dictate, construct additional MGS to shield fixed object(s). Additional MGS length equal to multiples of 12'-6". Post spacing at 6'-3", except as specified in Note 4.
  - Layout Types 16D through 16L, shown on the A77R Series of Standard Plans are typically used where MGS is recommended to shield roadside fixed object(s) and a crashworthy 31" end treatment is required for both directions of traffic.
  - Where placement of dike is required with MGS, see Standard Plan A77N4 for dike positioning details.
  - The 15:1 or flatter flare for the buried post anchor is based on the edge of the paved shoulder or offset line of edge of the traveled way. The length of MGS within the 15:1 or flatter flare is based on site conditions and should be a length equal to multiples of 12'-6".
  - For details of Buried Post End Anchor, see Standard Plan A77T2.
  - For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.
  - W6 x 15 steel post, 8'-0" in length, with 8" x 12" x 1'-2" notched wood block or notched recycled plastic blocks may be used in place of the 10" x 10" x 8'-0" wood post with 8" x 12" x 1'-2" wood blocks shown in the detail "Strengthened Midwest Guardrail System Sections for Fixed Object".

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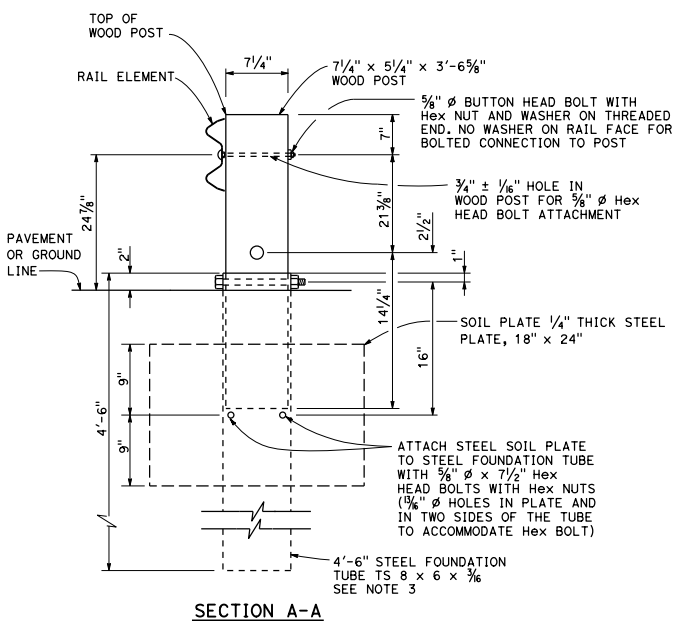
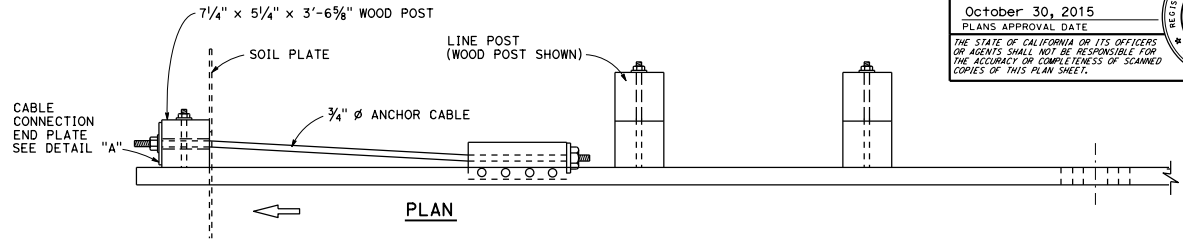
## MIDWEST GUARDRAIL SYSTEM TYPICAL LAYOUTS FOR ROADSIDE FIXED OBJECTS

NO SCALE

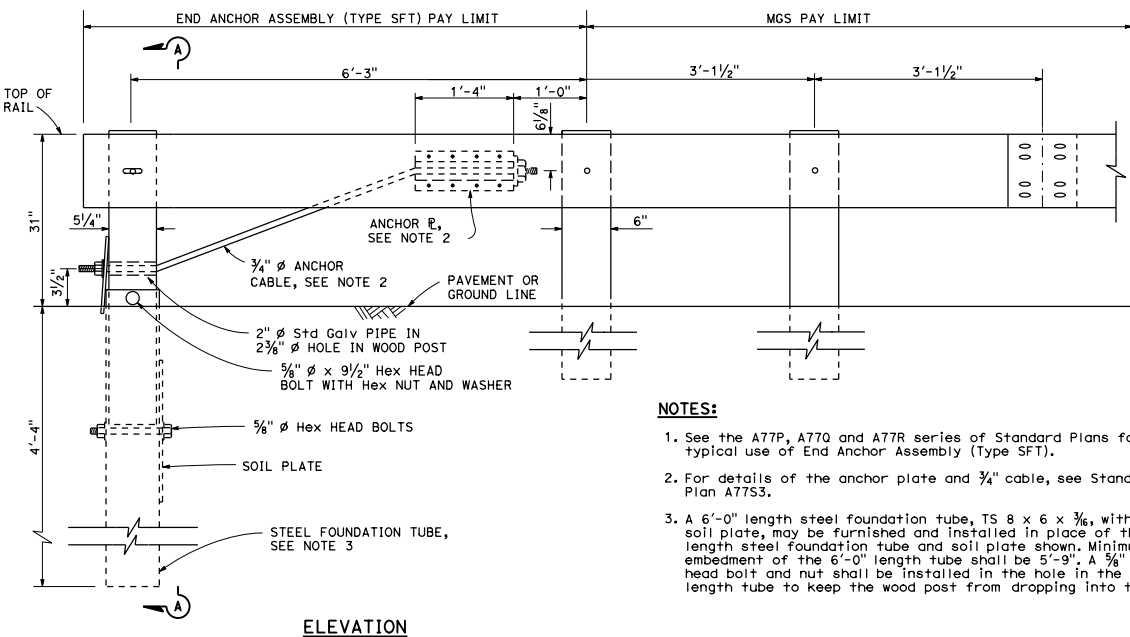
**A77R8**



**DETAIL "A"**  
**CABLE CONNECTION**  
**END PLATE**



**SECTION A-A**



**ELEVATION**  
**END ANCHOR**  
**ASSEMBLY (TYPE SFT)**  
See Note 1

**NOTES:**

1. See the A77P, A77Q and A77R series of Standard Plans for typical use of End Anchor Assembly (Type SFT).
2. For details of the anchor plate and 3/4" cable, see Standard Plan A77S3.
3. A 6'-0" length steel foundation tube, TS 8 x 6 x 3/8, without a soil plate, may be furnished and installed in place of the 4'-6" length steel foundation tube and soil plate shown. Minimum embedment of the 6'-0" length tube shall be 5'-9". A 5/8" diameter hex head bolt and nut shall be installed in the hole in the 6'-0" length tube to keep the wood post from dropping into the tube.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

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**MIDWEST GUARDRAIL SYSTEM**  
**END ANCHOR ASSEMBLY**  
**(TYPE SFT)**

NO SCALE

**A77S1**

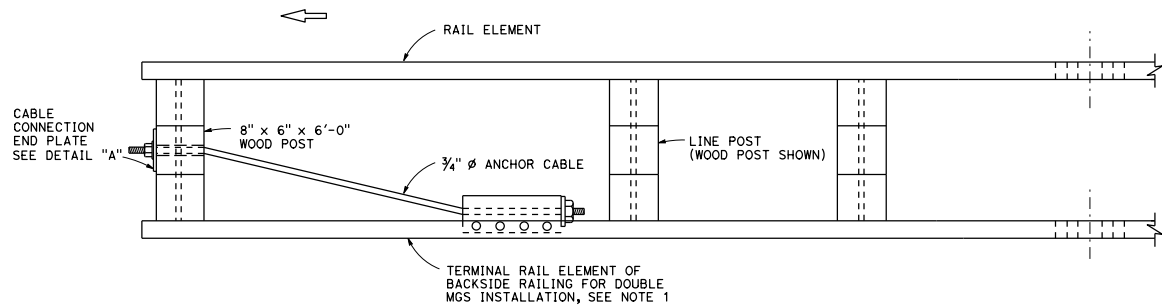
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Randell D. Hiatt*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

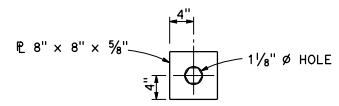
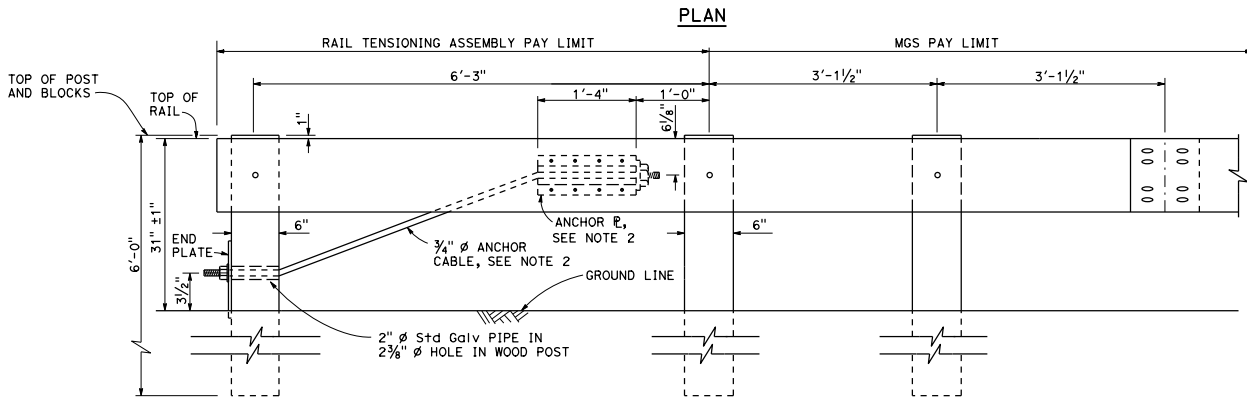
*Randell D. Hiatt*  
REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**

1. See Standard Plans A7703 and A77R1 for typical use of rail ensioning assembly.
2. For details of the anchor plate and 3/4" cable, see Standard Plan A77S3.



**DETAIL "A"**  
**CABLE CONNECTION**  
**END PLATE**

**ELEVATION**  
**RAIL TENSIONING**  
**ASSEMBLY**  
See Note 1

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM**  
**RAIL TENSIONING ASSEMBLY**  
NO SCALE

**A77S2**

2015 STANDARD PLAN A77S2

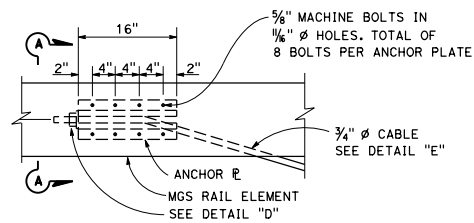
83

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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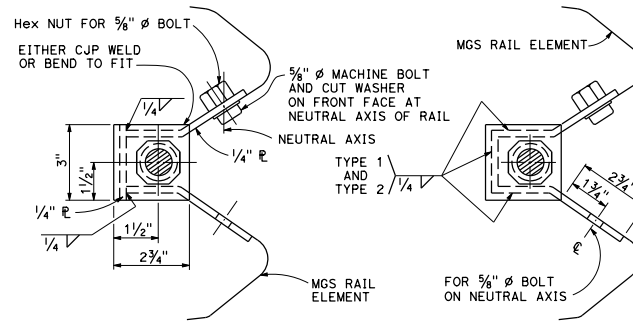


**NOTE:**

See Standard Plans A77S1, A77S2 and A77T1 for typical use of anchor cable and anchor plate.



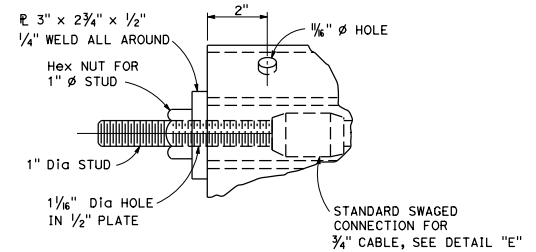
**ANCHOR PLATE DETAIL**  
(MGS shown, TBB similar)



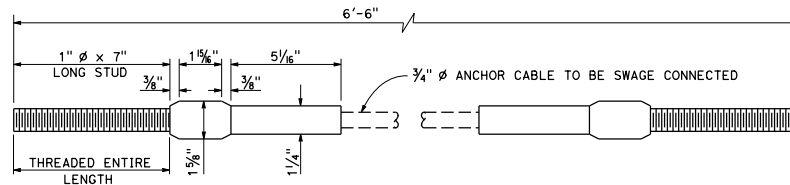
**NOTE:**  
Dimensioning applies to both types.

**SECTION A-A**  
(ALTERNATIVE TYPE 1)

**SECTION A-A**  
(ALTERNATIVE TYPE 2)



**DETAIL "D"**

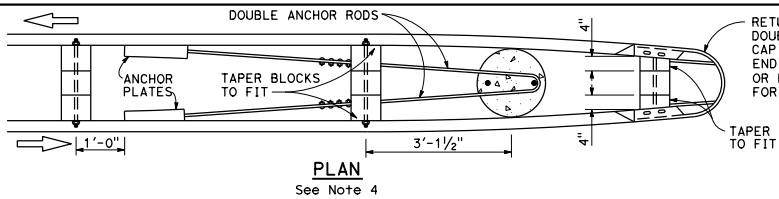


**ANCHOR CABLE WITH  
SWAGED FITTING AND STUD**  
**DETAIL "E"**

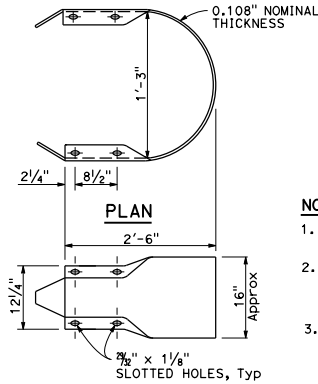
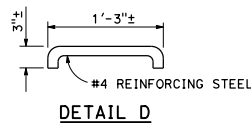
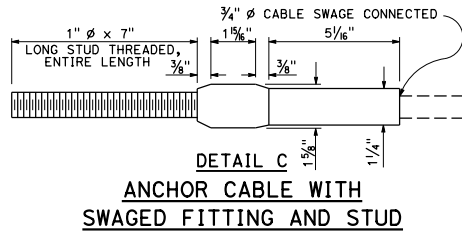
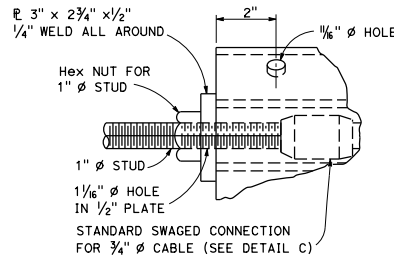
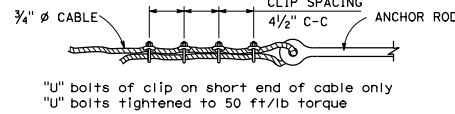
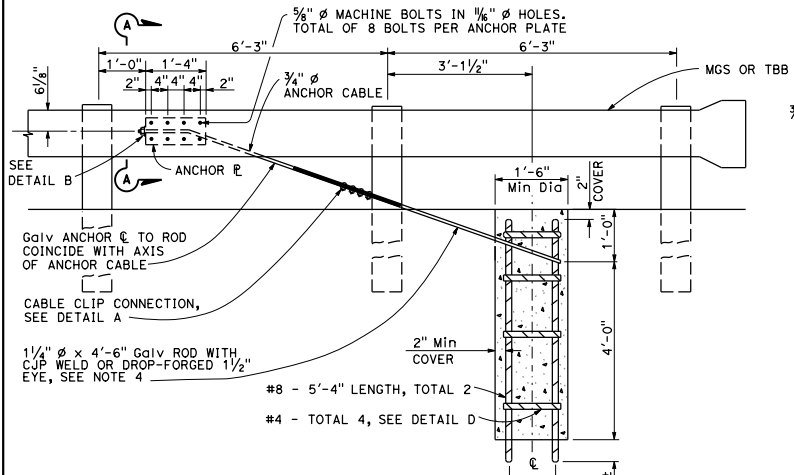
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**METAL RAILING  
ANCHOR CABLE AND  
ANCHOR PLATE DETAILS**

NO SCALE

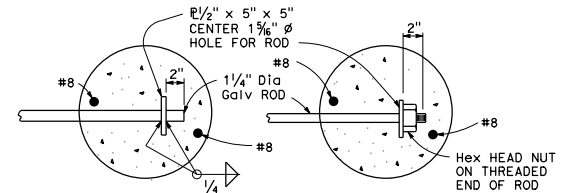
**A77S3**



RETURN CAP (TYPE TA) FOR DOUBLE THRIE BEAM OR RETURN CAP (TYPE A) FOR DOUBLE MGS. END CAP (TYPE A) FOR SINGLE MGS OR END CAP (TYPE TC) FOR SINGLE THRIE BEAM

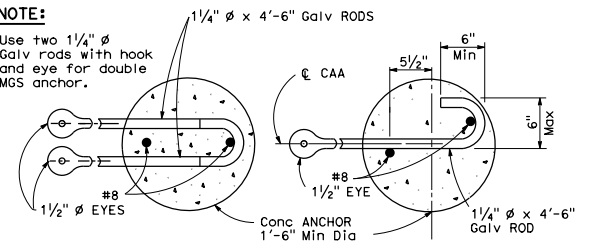


**ELEVATION**  
**RETURN CAP (TYPE A)**



**NOTE:**

Use two 1/4" Galv rods with hook and eye for double MGS anchor.



**DOUBLE ANCHOR ANCHOR RODS**  
**SINGLE ANCHOR ANCHOR RODS**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**METAL RAILING END ANCHOR ASSEMBLY (TYPE CA)**  
NO SCALE

**A77T1**

DIS#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**

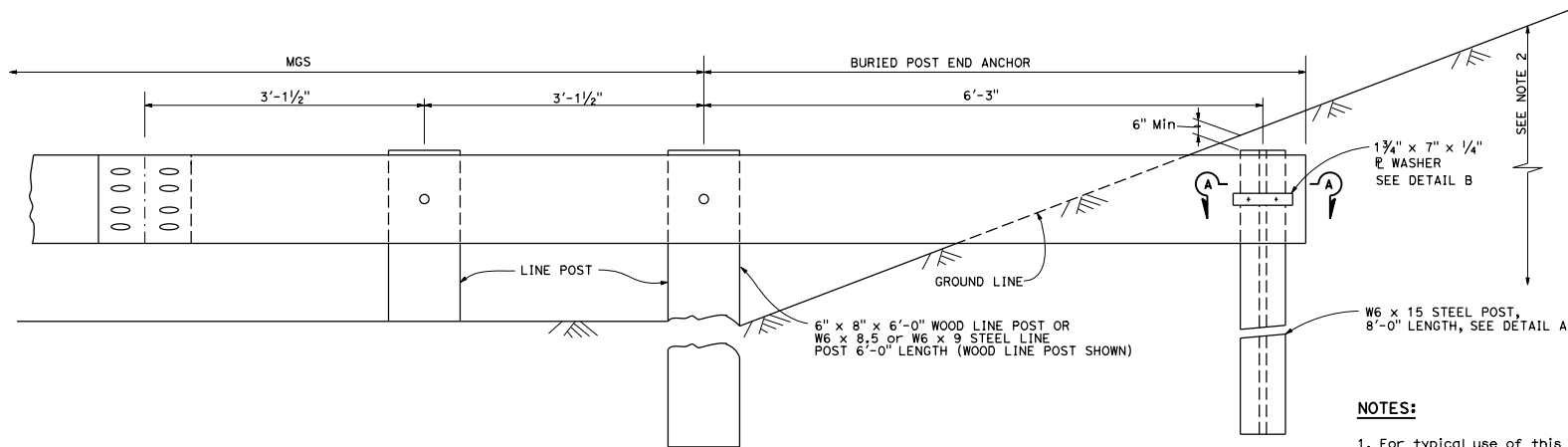
- For typical use of this type of end anchor, see Standard Plan A78E2.
- Anchor cable to be parallel to railing for straight runs of rail. Anchor cable may have angle point at anchor plate if railing is curved.
- Anchor rod hooks to be in contact with anchor reinforcement when concrete is placed. Wire ties may be used to position anchor rods.
- Single sided railing installations require only one anchor plate, anchor rod and anchor cable. Single sided railing will not have a rail element or blockouts on backside of line posts as shown in the plan view.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

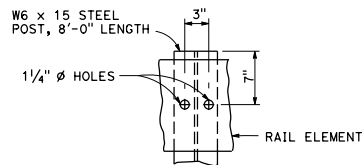
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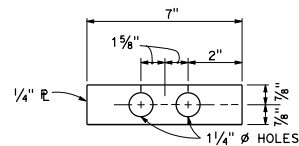
**BURIED POST END ANCHOR**  
See Note 2

**NOTES:**

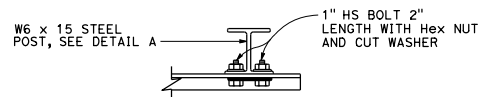
1. For typical use of this type of end anchor with MGS see the A77P, A77Q and A77R Series of the Standard Plans.
2. The buried post end anchor shall only be constructed at those locations where the slope perpendicular to the roadway is non-traversable.



**DETAIL A**



**DETAIL B**



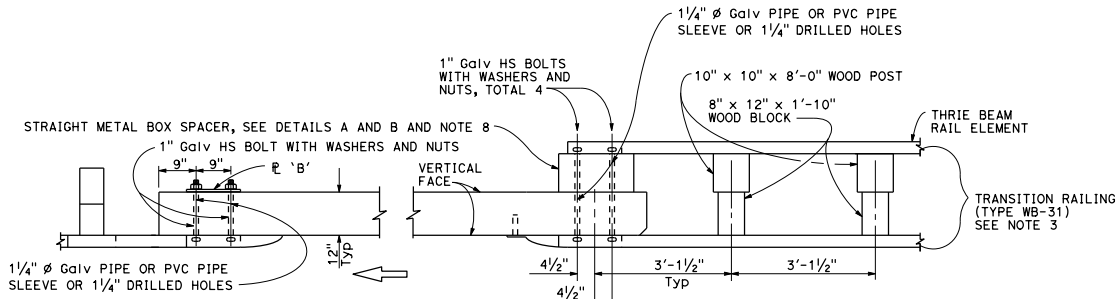
**SECTION A-A**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
BURIED POST END ANCHOR**

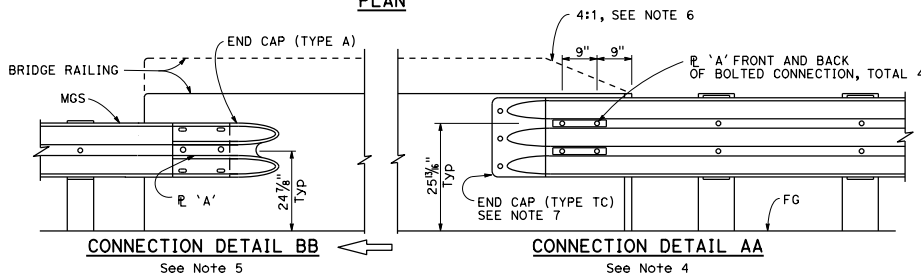
NO SCALE

**A77T2**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER				
October 30, 2015 PLANS APPROVAL DATE				
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PLAN

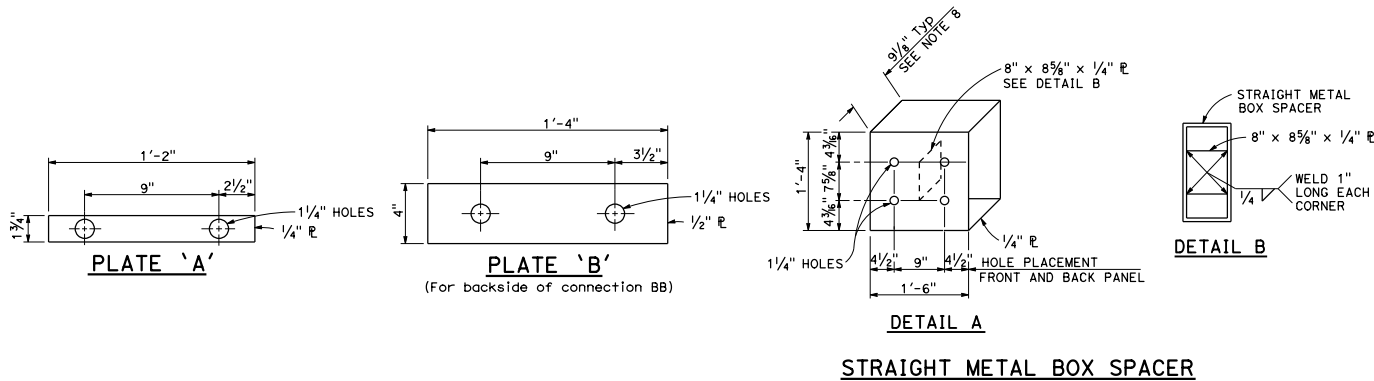


ELEVATION

**MIDWEST GUARDRAIL SYSTEM CONNECTION TO BRIDGE RAILING WITHOUT SIDEWALK**

**NOTES:**

1. See Standard Plan A77U2 for additional connection details to bridges without sidewalks.
2. Additional details of posts, blocks and hardware are shown on Standard Plans A77M1, A77N1 and A77N2.
3. For additional details of Transition Railing (Type WB-31), see Standard Plan A77U4. Transition Railing (Type WB-31) transitions the 12 gauge MGS railing section to a heavier gauge nested thrie beam railing section which is connected to the concrete bridge railing.
4. For typical use of Connection Detail AA, see Layout Types 12A and 12B on Standard Plan A77Q1, Layout Types 12C and 12D on Standard Plan A77Q2, and Layout Type 12E on Standard Plan A77Q3.
5. For typical use of Connection Detail BB, see Layout Type 12D (structure departure railing connection) on Standard Plan A77Q2 and Layout Type 12DD on Standard Plan A77Q5.
6. Where the height of the bridge railing exceeds the height of the thrie beam railing by more than 1" at Connection Detail AA, taper the top of the end of the bridge railing at 4:1 to match the top elevation of the thrie beam rail.
7. For details of End Cap (Type TC), see Standard Plan A77U4.
8. See Standard Plan A77U4 for additional details regarding depth dimension for straight metal box spacer.



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM CONNECTIONS TO BRIDGE RAILINGS WITHOUT SIDEWALKS**  
**DETAILS No. 1**

NO SCALE

**A77U1**

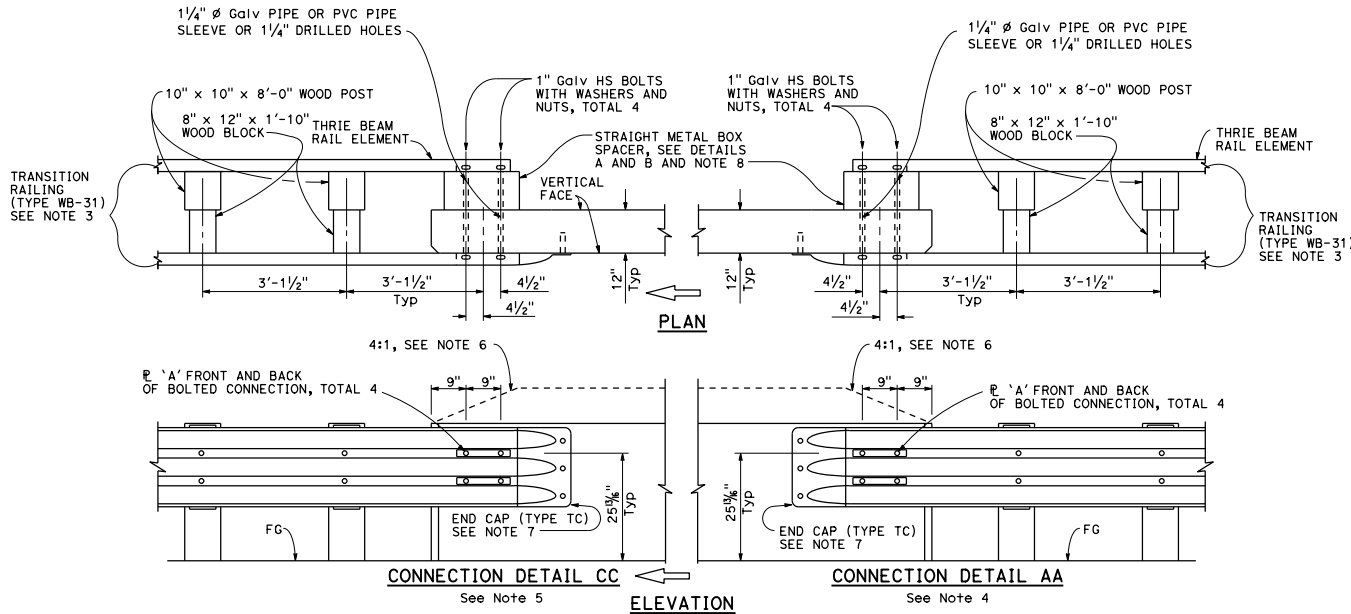
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

No. C50200  
Exp. 6-30-17  
CIVIL

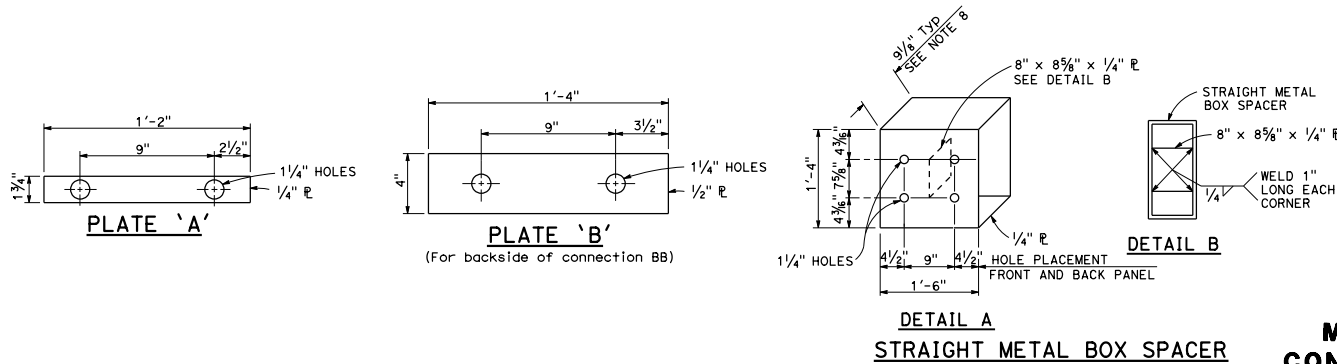
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**MIDWEST GUARDRAIL SYSTEM CONNECTION TO BRIDGE RAILING WITHOUT SIDEWALK**

**NOTES:**

1. See Standard Plan A77U1 for additional connection details to bridges without sidewalks.
2. Additional details of posts, blocks and hardware are shown on Standard Plans A77M1, A77N1 and A77N2.
3. For additional details of Transition Railing (Type WB-31), see Standard Plan A77U4. Transition Railing (Type WB-31) transitions the 12 gauge MGS railing section to a heavier gauge nested thrie beam railing section which is connected to the concrete bridge railing.
4. For typical use of Connection Detail AA, see Layout Types 12A and 12B on Standard Plan A7701, Layout Types 12C and 12D on Standard Plan A7702, and Layout Type 12E on Standard Plan A7703.
5. For typical use of Connection Detail CC, see Layout Types 12AA and 12BB on Standard Plan A7704 and Layout Type 12CC on Standard Plan A7705.
6. Where the height of the bridge railing exceeds the height of the thrie beam railing by more than 1" at connection Detail AA and connection Detail CC, taper the top of the end of the bridge railing at 4:1 to match the top elevation of the thrie beam railing.
7. For details of End Cap (Type TC), see Standard Plan A77U4.
8. See Standard Plan A77U4 for additional details regarding depth dimension for straight metal box spacer.



**DETAIL A  
STRAIGHT METAL BOX SPACER**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
CONNECTIONS TO BRIDGE RAILINGS  
WITHOUT SIDEWALKS DETAILS No. 2**

NO SCALE

**A77U2**



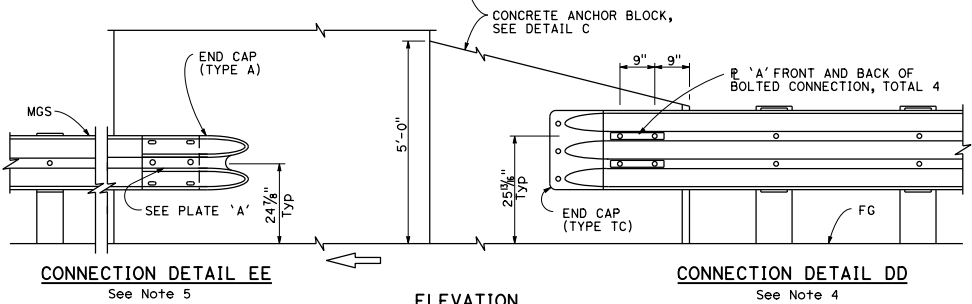
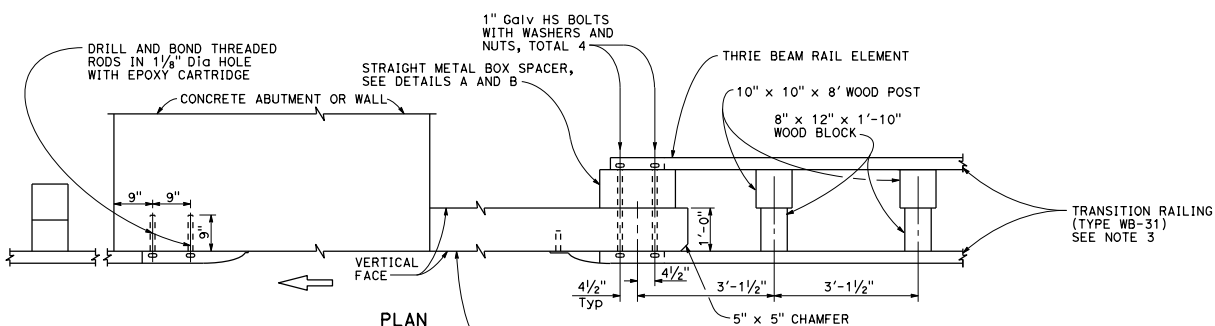
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

No. C50200  
Exp. 6-30-17  
CIVIL

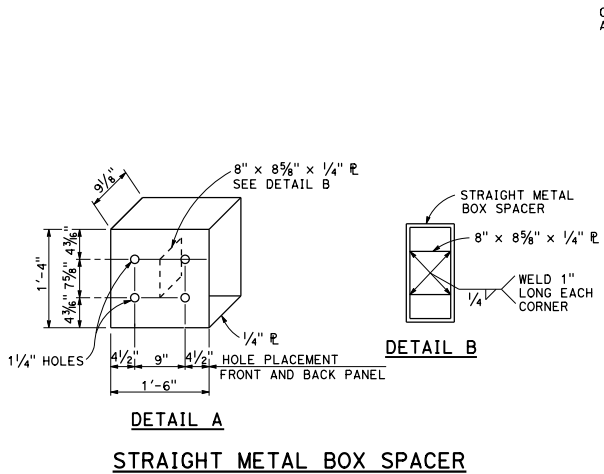
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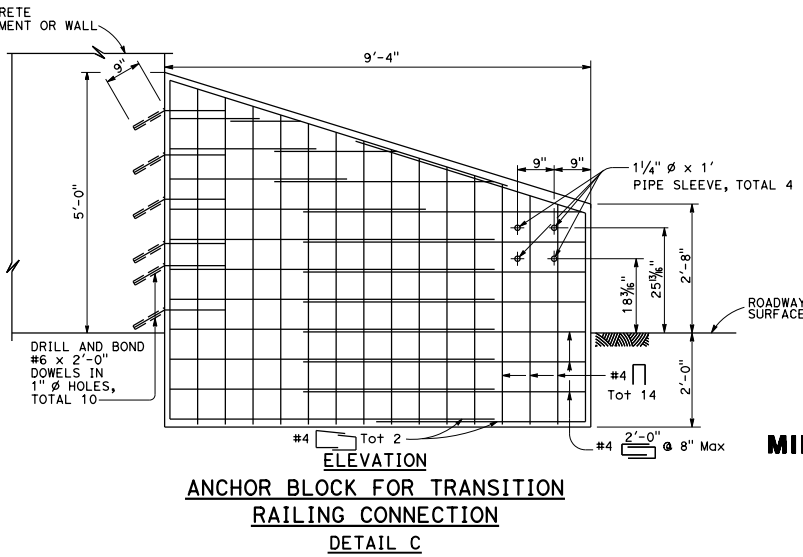
**MIDWEST GUARDRAIL SYSTEM CONNECTION TO ABUTMENT OR WALL**

**NOTES:**

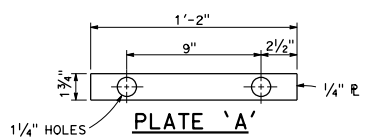
1. These connection details apply to abutments and walls.
2. Additional details of posts, blocks and hardware are shown on Standard Plans A77M1, A77N1 and A77N2.
3. For additional details of Transition Railing (Type WB-31), see Standard Plan A77U4. Transition Railing (Type WB-31) transitions the 12 gauge MGS railing section to a heavier gauge nested three beam railing section which is connected to the concrete anchor block.
4. For typical use of Connection Details DD, see Layout Types 12A and 12B on Standard Plan A77Q1 and Layout Types 12C and 12D on Standard Plan A77Q2.
5. For typical use of Connection Detail EE, see Layout Type 12D on Standard Plan A77Q2 and Layout Type 12DD on Standard Plan A77Q5.



**STRAIGHT METAL BOX SPACER**



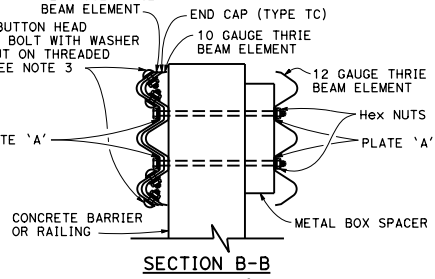
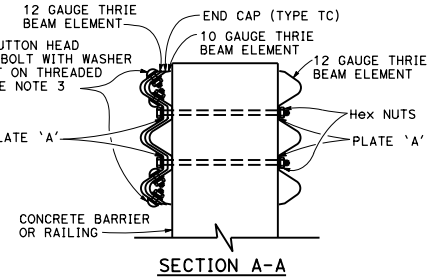
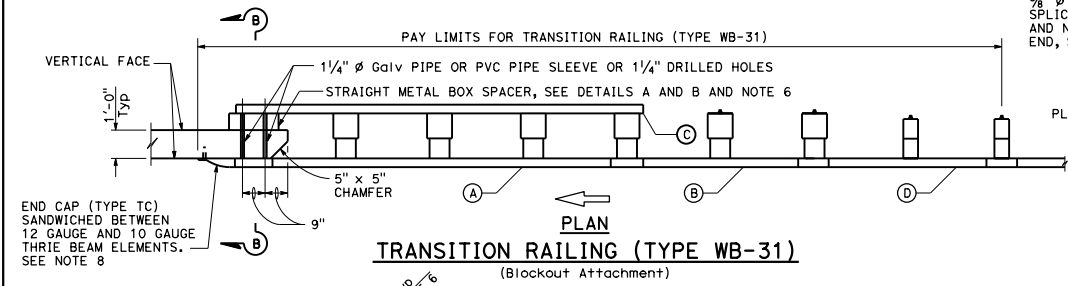
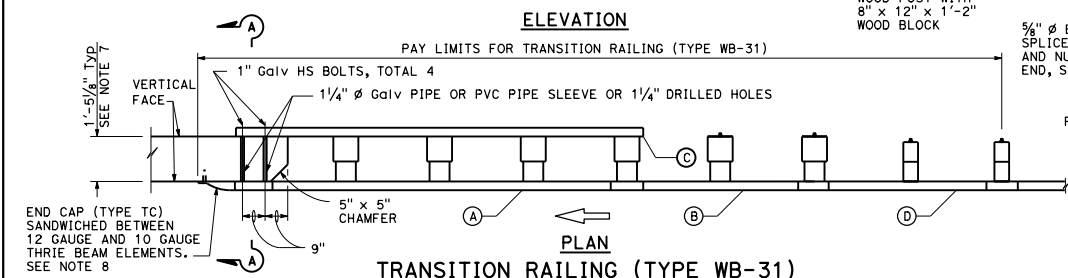
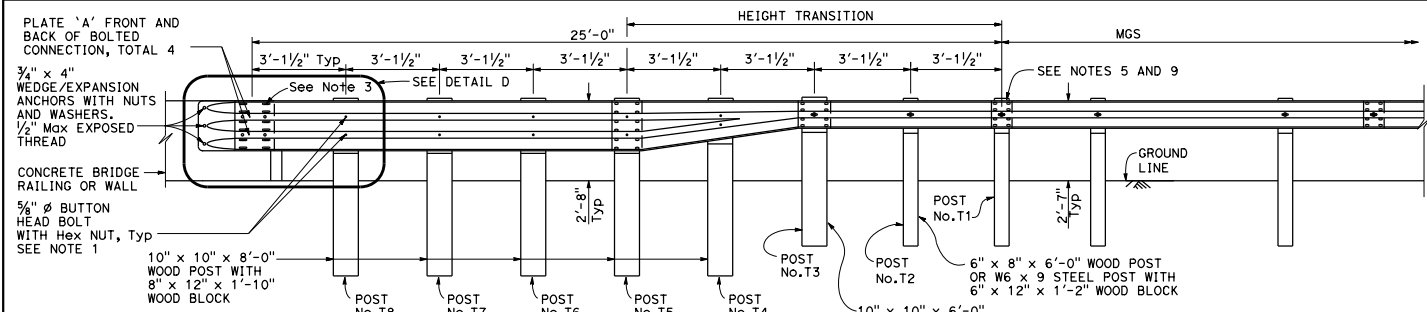
**ANCHOR BLOCK FOR TRANSITION RAILING CONNECTION**



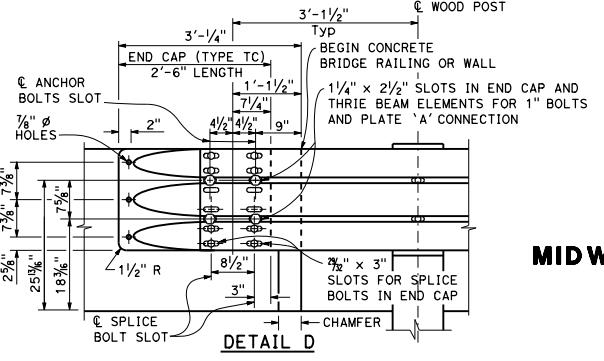
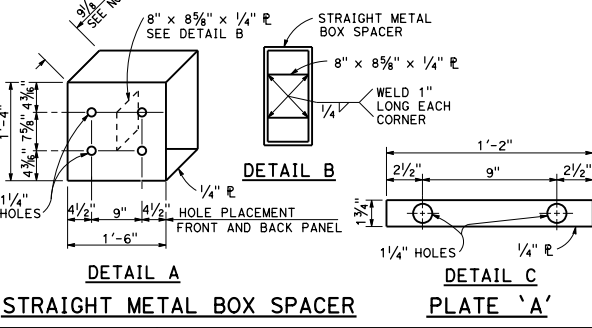
**MIDWEST GUARDRAIL SYSTEM CONNECTIONS TO ABUTMENTS AND WALLS**

NO SCALE

**A77U3**



- LEGEND:**
- (A) NESTED THRIE BEAM ELEMENTS (ONE 12 GAUGE ELEMENT NESTED OVER ONE 10 GAUGE ELEMENT).
  - (B) ONE ASYMMETRICAL 10 GAUGE "W" BEAM TO THRIE BEAM ELEMENT.
  - (C) ONE 12 GAUGE THRIE BEAM ELEMENT.
  - (D) ONE 10 GAUGE "W" BEAM RAIL ELEMENT (7'-3 1/2" LENGTH)
- 10 GAUGE = 0.138" THICK  
12 GAUGE = 0.108" THICK



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER  
No. C50200  
PLANS APPROVAL DATE  
October 30, 2015

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- NOTES:**
- Use 5/8"  $\phi$  Button head bolts and hex nuts for connections to posts. No washer on rail face for bolted connections to post.
  - The nested rail elements, end cap, and "W" beam to thrie beam element may be spliced together prior to bolting the elements to the wood post and concrete barrier or railing.
  - Exterior splice bolt holes for rail element splices at Post No. T5 and the connection to the concrete barrier or railing shall be the standard 7/8" x 1 1/8" slot size. Interior splice bolt holes at these locations may be increased up to 1 1/4"  $\phi$ . Only the top 4 and the bottom 4 splice bolts with washers and nuts are required for rail splices at Post No. T5 and the connection to the concrete barrier or railing.
  - The top elevation of Posts No. T2 through No. T7 shall not project more than 1" above the top elevation of the rail element.
  - Typically, the railing connected to Transition Railing (Type WB-31) will be either standard railing section of MGS with height transition ratio of 150:1 or a Caltrans approved 31" end treatment attached to Post No. T1.
  - The depth of the metal box spacer varies from the 9/8" to 1 1/2" and is dependent on the width of the concrete railing or wall. The combined dimension for the depth of the metal box spacer plus the width of railing or wall is typically 21 1/8". Where the space between the backside of the concrete railing or wall and the rear thrie beam element is less than 1 1/2", metal plates similar to Plate 'A' are to be used as spacers.
  - Where the width of the concrete railing or wall is greater than 17/8", wood blocks are to be used to fill the space created between the backside of Posts No. T5 through No. T8 and the rear thrie beam element. These wood blocks shall be 8" in width and 1'-2" in length. The dimension between the front thrie beam element and the rear thrie beam element is to match the width of the concrete railing or wall.
  - End cap may be installed over 12 gauge and 10 gauge thrie beam elements where transition railing is installed on the departure end of bridge railing.
  - Conform standard railing section height to 31" at Post No. T1 using height transition ratio of 150:1.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**MIDWEST GUARDRAIL SYSTEM  
TRANSITION RAILING  
(TYPE WB-31)**

NO SCALE

**A77U4**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

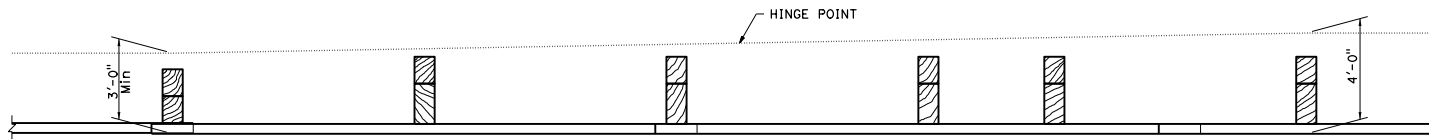
October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

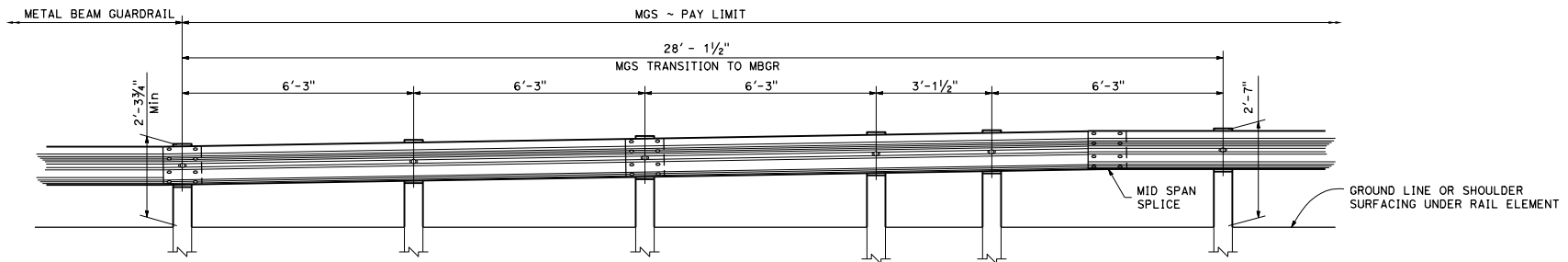
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**NOTE:**

1. Refer to Standard Plans A77L1 and A77L2 for component details for MGS not shown on this plan.



PLAN



ELEVATION

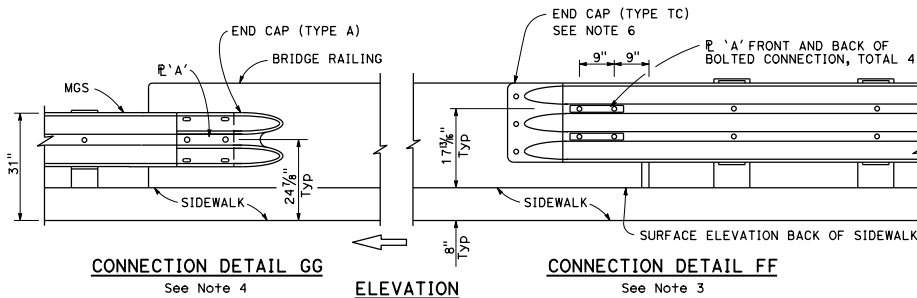
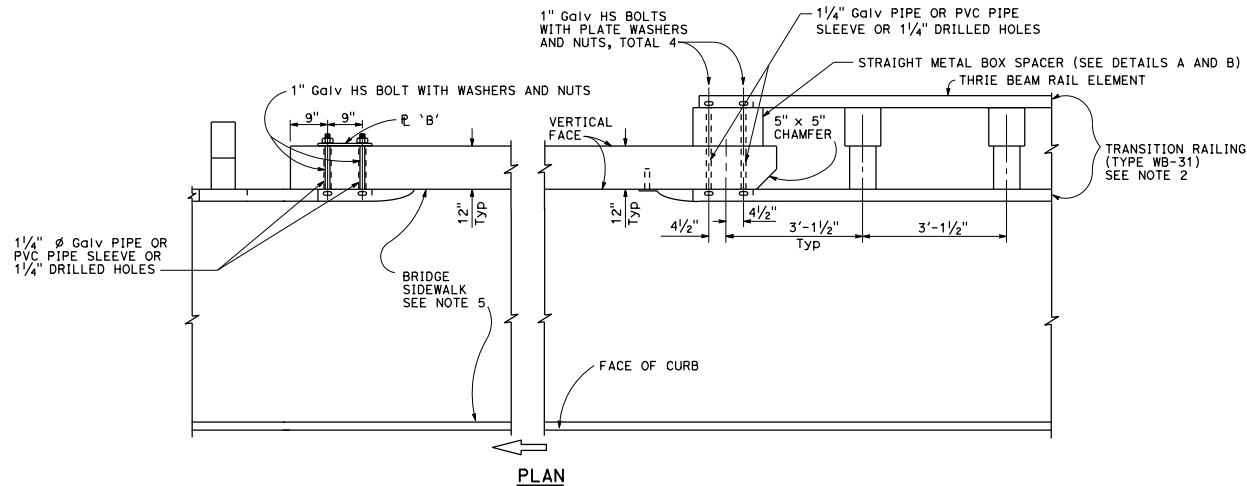
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**MIDWEST GUARDRAIL SYSTEM  
TRANSITION TO METAL BEAM GUARDRAIL**

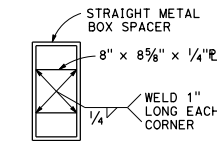
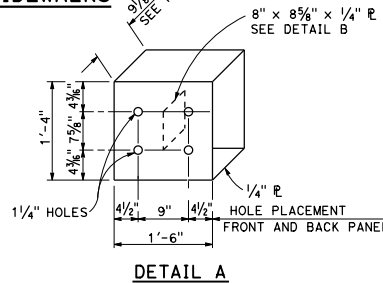
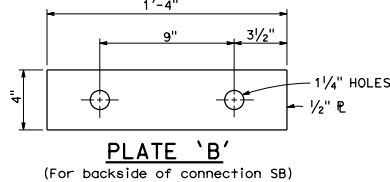
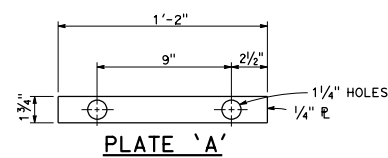
NO SCALE

**A77U5**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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**MIDWEST GUARDRAIL SYSTEM CONNECTION TO BRIDGE RAILING WITH SIDEWALKS**



**DETAIL B**

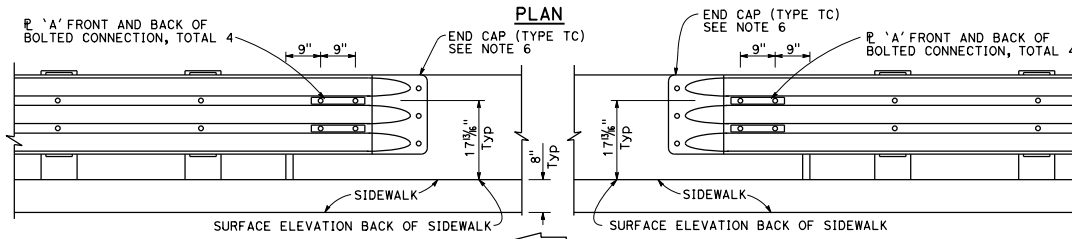
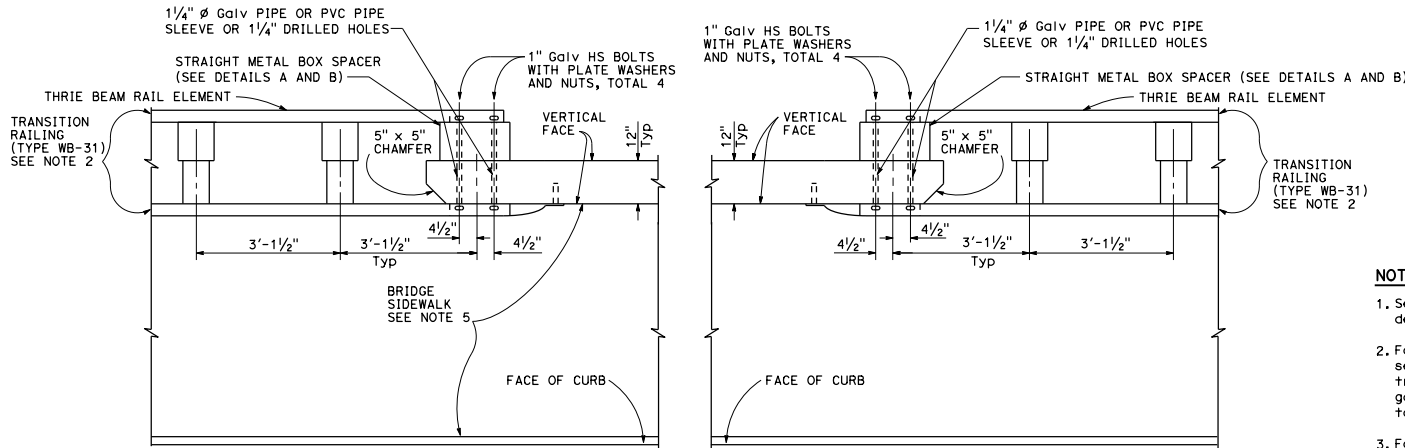
**DETAIL A**  
**STRAIGHT METAL BOX SPACER**

**NOTES:**

1. See Standard Plan A77V2 for additional connection details to bridges with sidewalks.
2. For additional details of Transition Railing (Type WB-31), see Standard Plan A77U4. Transition Railing (Type WB-31) transitions the 12 gauge MGS railing section to a heavier gauge nested three beam railing section which is connected to the concrete bridge railing.
3. For typical use of Connection Detail FF, see Layout Types 12A and 12B on Standard Plan A77Q1.
4. For typical use of Connection Detail GG, see Layout Type 12D on Standard Plan A77Q2 and Layout Type 12DD on Standard Plan A77Q5.
5. Where the bridge sidewalk is not continued beyond the end of the bridge railing, the portion of the sidewalk beyond each end of the bridge railing shall be transitioned down from the top elevation of the sidewalk, for its entire width, to the finished grade of the adjacent roadbed. The longitudinal slope of each sidewalk elevation transition shall not exceed 8.33 percent.
6. For details of End Cap (Type TC), see Standard Plan A77U4.
7. See Standard Plan A77U4 for additional details regarding depth dimension for straight metal box spacer.

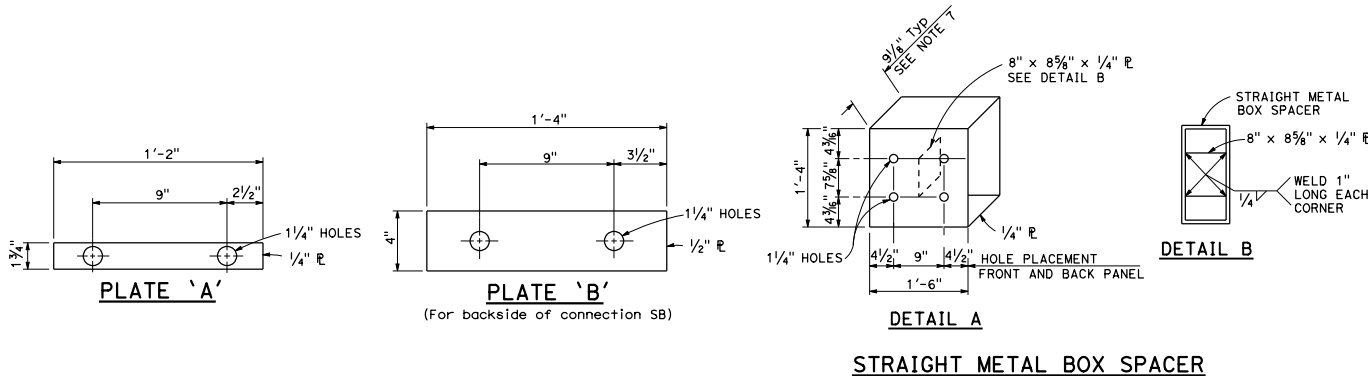
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM  
CONNECTIONS TO BRIDGE  
RAILINGS WITH SIDEWALKS  
DETAILS No. 1**  
NO SCALE

**A77V1**



**CONNECTION DETAIL HH** See Note 4  
**CONNECTION DETAIL FF** See Note 3

**MIDWEST GUARDRAIL SYSTEM CONNECTION TO BRIDGE RAILING WITH SIDEWALKS**



**STRAIGHT METAL BOX SPACER**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Randell D. Hiatt**  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

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**REGISTERED PROFESSIONAL ENGINEER**  
 No. C50200  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

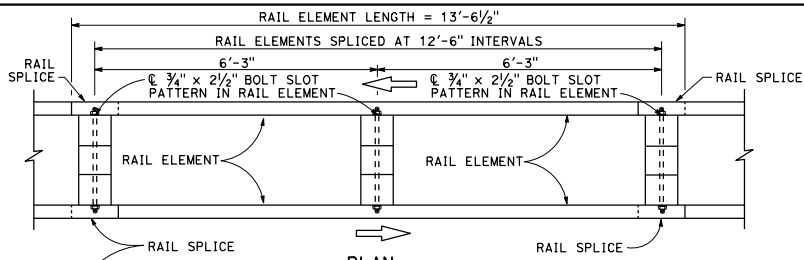
**NOTES:**

1. See Standard Plan A77V1 for additional connection details to bridges with sidewalks.
2. For additional details of Transition Railing (Type WB-31), see Standard Plan A77U4. Transition Railing (Type WB-31) transitions the 12 gauge MGS railing section to a heavier gauge nested three beam railing section which is connected to the concrete bridge railing.
3. For typical use of Connection Detail FF, see Layout Types 12A and 12B on Standard Plan A77Q1.
4. For typical use of Connection Detail HH, see Layout Types 12AA and 12BB on Standard Plan A77Q4.
5. Where the bridge sidewalk is not continued beyond the end of the bridge railing, the portion of the sidewalk beyond each end of the bridge railing shall be transitioned down from the top elevation of the sidewalk, for its entire width, to the finished grade of the adjacent roadbed. The longitudinal slope of each sidewalk elevation transition shall not exceed 8.33 percent.
6. For details of End Cap (Type TC), see Standard Plan A77U4.
7. See Standard Plan A77U4 for additional details regarding depth dimension for straight metal box spacer.

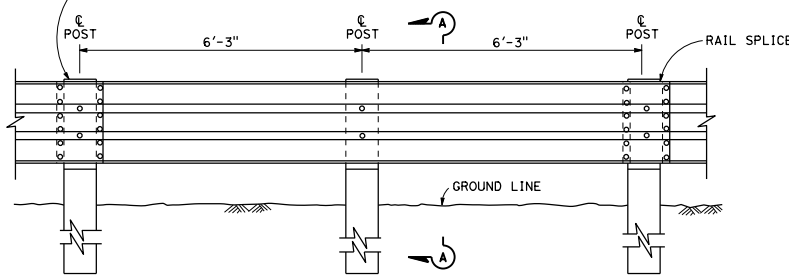
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**MIDWEST GUARDRAIL SYSTEM CONNECTIONS TO BRIDGE RAILINGS WITH SIDEWALKS**  
**DETAILS No. 2**

NO SCALE

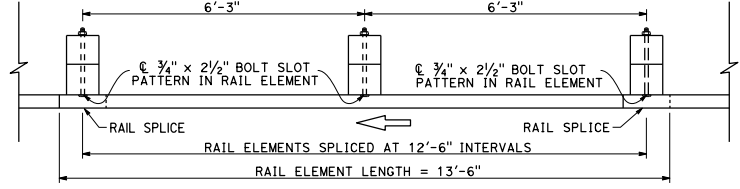
**A77V2**



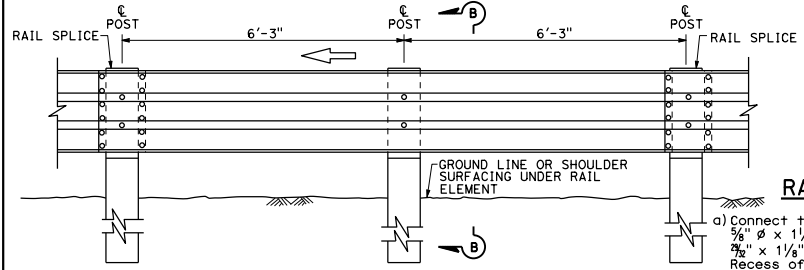
PLAN



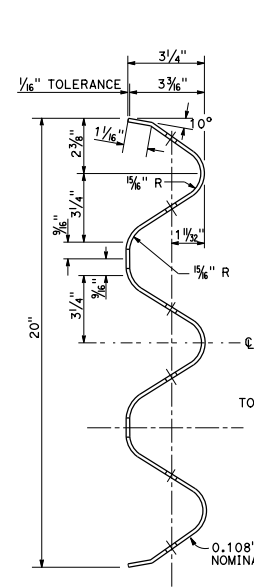
**ELEVATION**  
**DOUBLE THRIE BEAM BARRIER**  
(Wood post and blocks)  
See Note 1



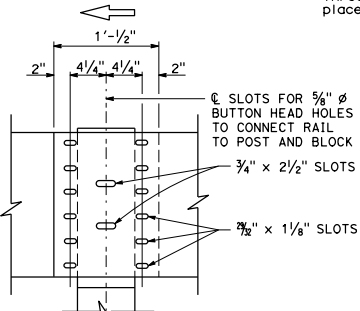
PLAN



**ELEVATION**  
**SINGLE THRIE BEAM BARRIER**  
(Wood post and blocks)  
See Note 1

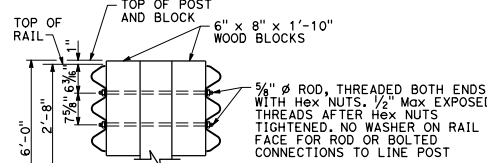


**SECTION THRU**  
**RAIL ELEMENT**

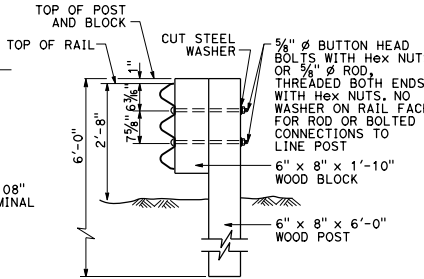


**ELEVATION**  
**RAIL ELEMENT SPLICE DETAIL**

- Connect the overlapped ends of the thrie beam rail elements with  $\frac{5}{8}$ "  $\phi$  x  $\frac{1}{4}$ " button head oval shoulder bolts inserted into the  $\frac{7}{8}$ " x  $\frac{1}{4}$ " slots and bolted together with  $\frac{5}{8}$ "  $\phi$  recessed hex nuts. Recess of hex nut points toward rail element. A total of 12 bolts and nuts are to be used at each rail splice connection.
- The ends of the rail elements are to be overlapped in the direction of traffic (see details).
- Where end cap is to be attached to the end of a rail element, a total of 4 of the above described splice bolts and nuts are to be used. Where a return cap is to be attached to the ends of rail elements, a total of 8 of the above described splice bolts and nuts are to be used.

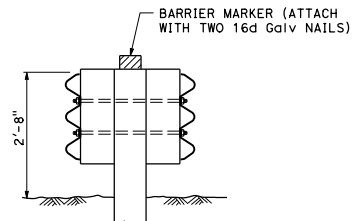


**SECTION A-A**  
**TYPICAL WOOD LINE**  
**POST INSTALLATION**



**SECTION B-B**  
**TYPICAL WOOD LINE**  
**POST INSTALLATION**

Where bolts are used, install so that the threaded end of the bolts and nuts are placed away from traffic side of rail.



**THRIE BEAM BARRIER**  
**DELINEATION**  
See Note 8

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
Randell D. Hiatt  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

- NOTES:**
- For details of steel post thrie beam barrier, see Standard Plan A78B.
  - For details of standard hardware, posts and blocks used to construct thrie beam barrier, see Standard Plans A78C1 and A78C2.
  - Thrie beam barrier post spacing to be 6'-3" center to center, except as otherwise noted.
  - Top of barrier rail to be 2'-8" above ground line or shoulder surfacing under the rail element.
  - For barrier end treatments and barrier connections, see Standard Plans A78E3 and A78G, and Standard Plans A78E1, A78E2, A77Q1, A77Q2 and A78H.
  - For connection to Concrete Barrier (Type 60), see Standard Plans A78L.
  - For details of thrie beam barrier on bridge see Standard Plan A78D2. For details of thrie beam barrier at fixed object, see Standard Plan A78D1.
  - See Project Plans for barrier delineation locations.

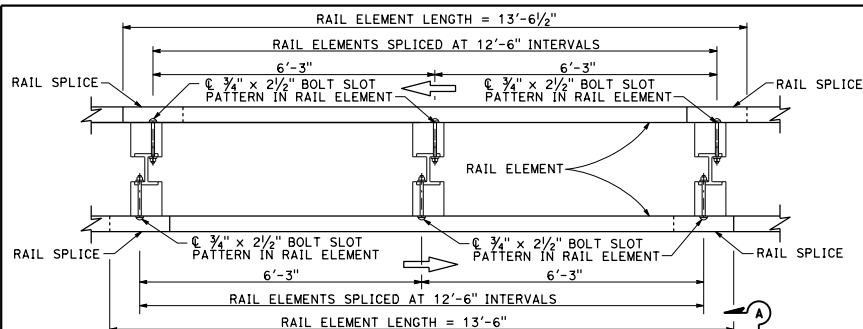
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**THRIE BEAM BARRIER**  
**STANDARD BARRIER RAILING**  
**SECTION (WOOD POST**  
**WITH WOOD BLOCK)**

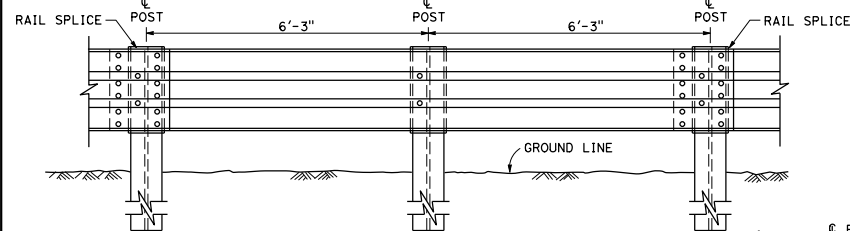
NO SCALE

**A78A**

2015 STANDARD PLAN A78A

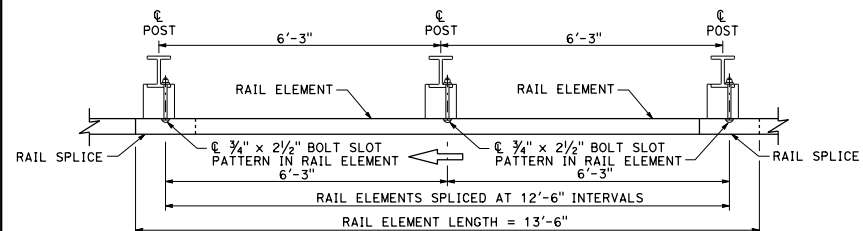


PLAN

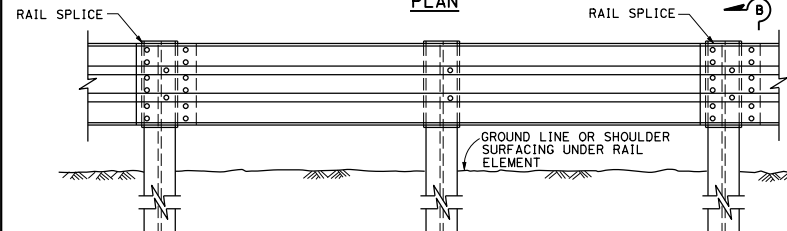


ELEVATION

**DOUBLE THRIE BEAM BARRIER**  
(Steel post with notched wood or notched plastic blocks)  
See Note 1

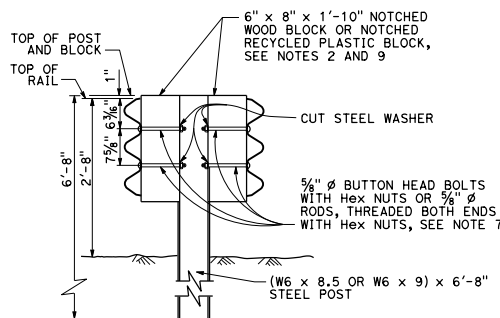


PLAN



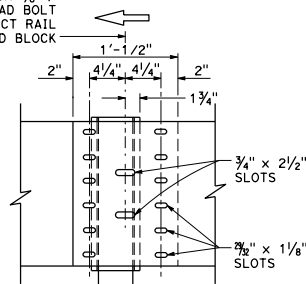
ELEVATION

**SINGLE THRIE BEAM BARRIER**  
(Steel post with notched wood or notched plastic blocks)  
See Note 1



**SECTION A-A**  
**TYPICAL STEEL LINE**  
**POST INSTALLATION**

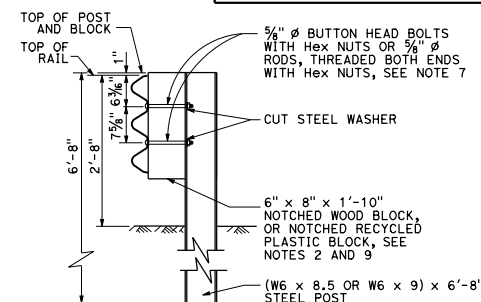
CL RAIL SPLICE AND SLOTS FOR 5/8" Ø BUTTON HEAD BOLT TO CONNECT RAIL TO POST AND BLOCK



ELEVATION

**RAIL ELEMENT SPLICE DETAIL**

- Connect the overlapped ends of the thrie beam rail elements with 5/8" Ø x 1 1/4" button head oval shoulder bolts inserted into the 7/8" x 1 1/8" slots and bolted together with 5/8" Ø recessed hex nuts. Recess of hex nut points toward rail element. A total of 12 bolts and nuts are to be used at each rail splice connection.
- The ends of the rail elements are to be overlapped in the direction of traffic (see details).
- Where end cap is to be attached to the end of a rail element, a total of 4 of the above described splice bolts and nuts are to be used. Where a return cap is to be attached to the ends of rail elements, a total of 8 of the above described splice bolts and nuts are to be used.



**SECTION B-B**  
**TYPICAL STEEL LINE**  
**POST INSTALLATION**

**NOTES:**

- For details of the cross section of the thrie beam rail element and details for wood post with wood block installations, see Standard Plan A78A.
- For details of standard hardware, posts and blocks used to construct thrie beam barrier, see Standard Plans A78C1 and A78C2.
- Thrie beam barrier post spacing to be 6'-3" center to center, except as otherwise noted.
- Top of barrier rail to be 2'-8" above ground line or shoulder surfacing under the rail element.
- For barrier end treatments and barrier connections, see Standard Plans A78E1, A78E2, A78E3, A78F1, A78F2, A78G and A78H.
- For connection to Concrete Barrier, see Standard Plan A78I.
- Attach rail element to block and steel post with 2 bolts or rods on approaching traffic side of block and post web. No washer on rail face for rod or bolted connections to line post.
- For details of thrie beam barrier on bridges, see Standard Plan A78D2. For details of thrie beam barrier at fixed objects, see Standard Plan A78D1.
- Notched face of block faces steel post.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**THRIE BEAM BARRIER**  
**STANDARD BARRIER RAILING**  
**SECTION (STEEL POST**  
**WITH NOTCHED WOOD BLOCK**  
**OR NOTCHED RECYCLED**  
**PLASTIC BLOCK)**

NO SCALE

**A78B**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

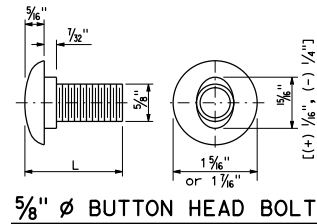
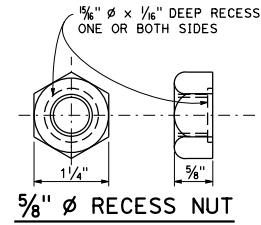
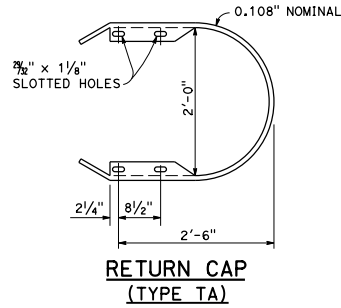
**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

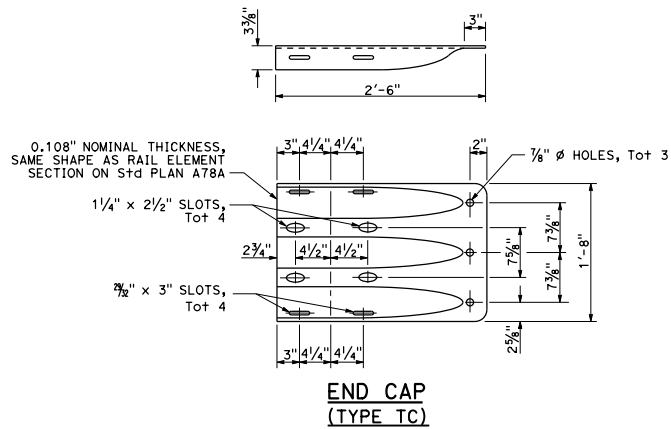
**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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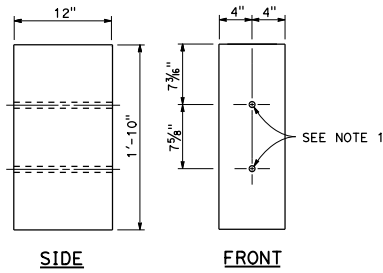
L	THREAD LENGTH
1 1/4"	FULL THREAD LENGTH
2"	FULL THREAD LENGTH
9/2"	4" Min THREAD LENGTH
18"	4" Min THREAD LENGTH
27"	4" Min THREAD LENGTH



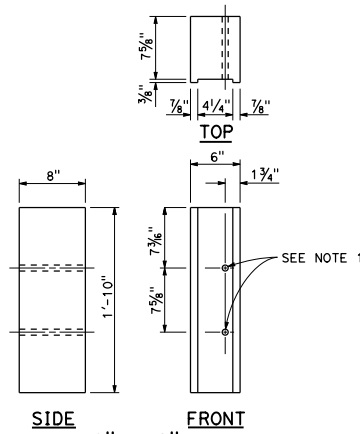
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**THREE BEAM BARRIER  
 STANDARD HARDWARE DETAILS**  
 NO SCALE

**A78C1**



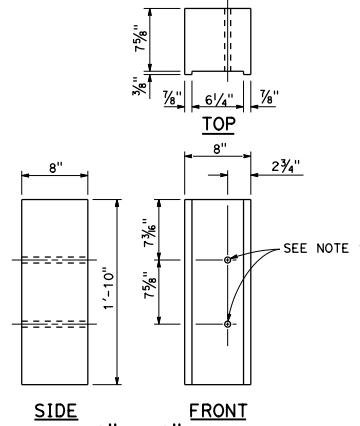


**8" x 12"  
WOOD BLOCK**



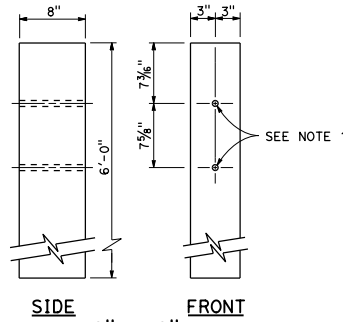
**6" x 8"  
NOTCHED WOOD BLOCK**

See Notes 3 and 5

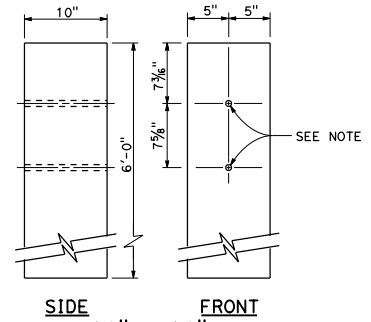


**8" x 8"  
NOTCHED WOOD BLOCK**

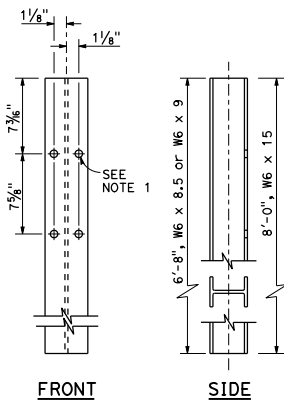
See Notes 4 and 5



**6" x 8"  
WOOD POST**

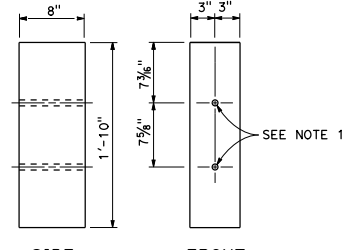


**10" x 10"  
WOOD POST**

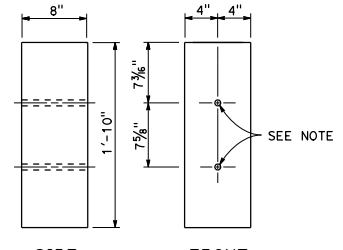


**STEEL POST**

W6 x 9 or W6 x 8.5 and  
W6 x 15



**6" x 8"  
WOOD BLOCK**



**8" x 8"  
WOOD BLOCK**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER  
Randell D. Hiatt  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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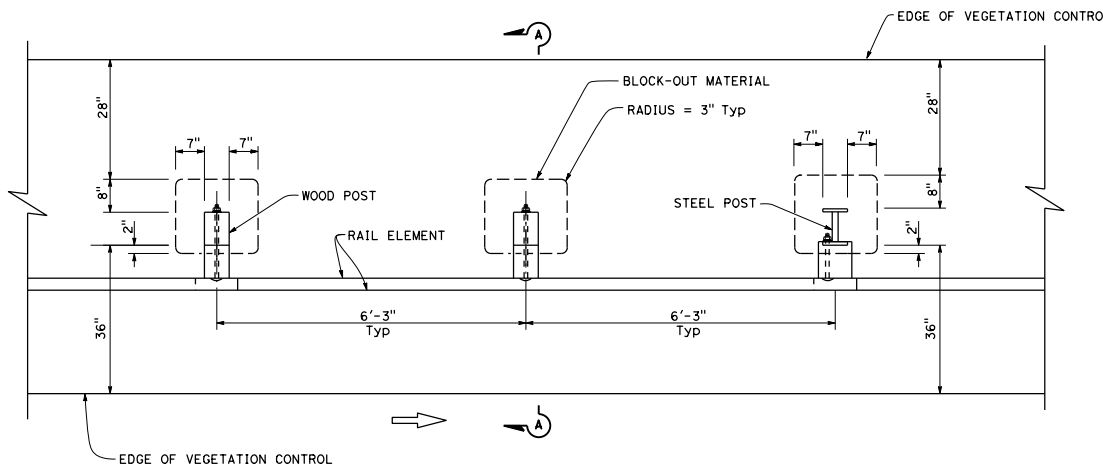
**NOTES:**

1. All holes in steel post to be 3/8" Dia maximum. Holes in wood posts and wood blocks to be 3/4" Dia ± 1/16".
2. Dimensions shown for wood post are nominal.
3. For use with W6 x 8.5 or W6 x 9 steel post.
4. For use with W6 x 15 steel post.
5. Notched face of block faces steel post.

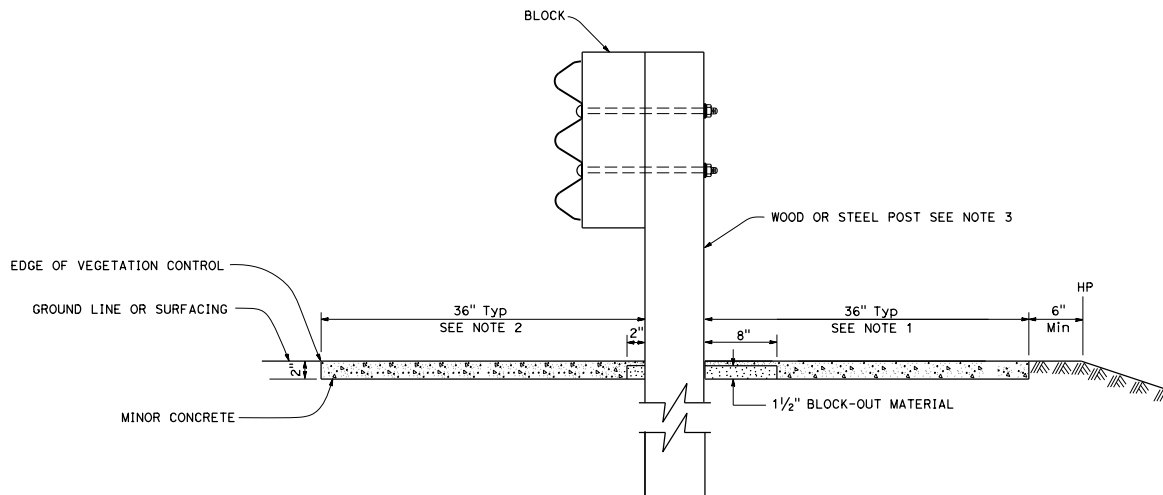
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**THREE BEAM BARRIER  
POST AND BLOCK DETAILS**

NO SCALE

**A78C2**



**PLAN**



**SECTION A-A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Randell D. Hiatt*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Randell D. Hiatt*  
REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**


1. Where the distance between back of post and hinge point is less than 42", construct vegetation control to 6" from hinge point while maintaining the 8" block-out at back of post. If the 8" block-out at back of post can not be maintained, construct vegetation control flush with the back edge of post.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. For wood and steel post sizes, see Standard Plan A77N2.
4. For details not shown, see Standard Plan A78A and A78B.

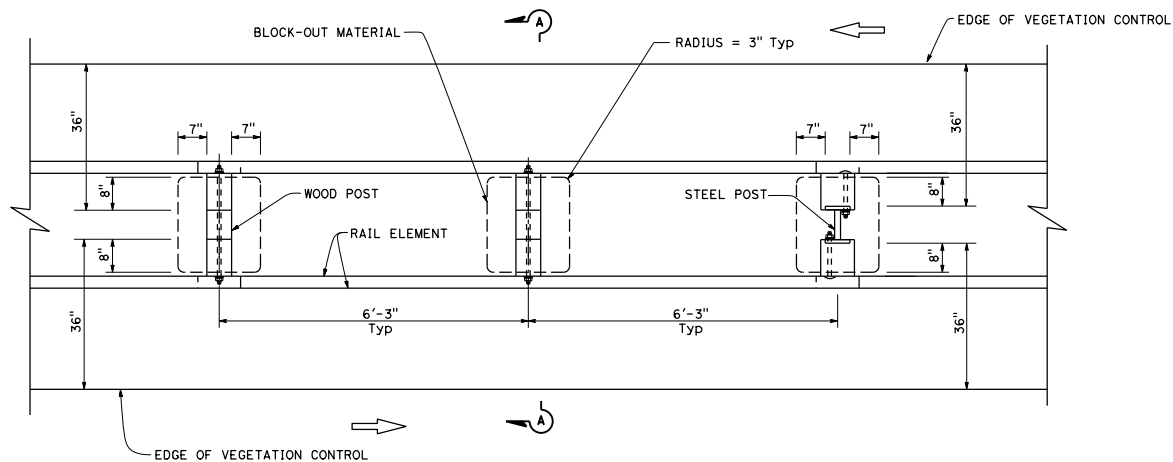
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**SINGLE THRIE BEAM BARRIER  
TYPICAL VEGETATION CONTROL  
STANDARD BARRIER RAILING SECTION**

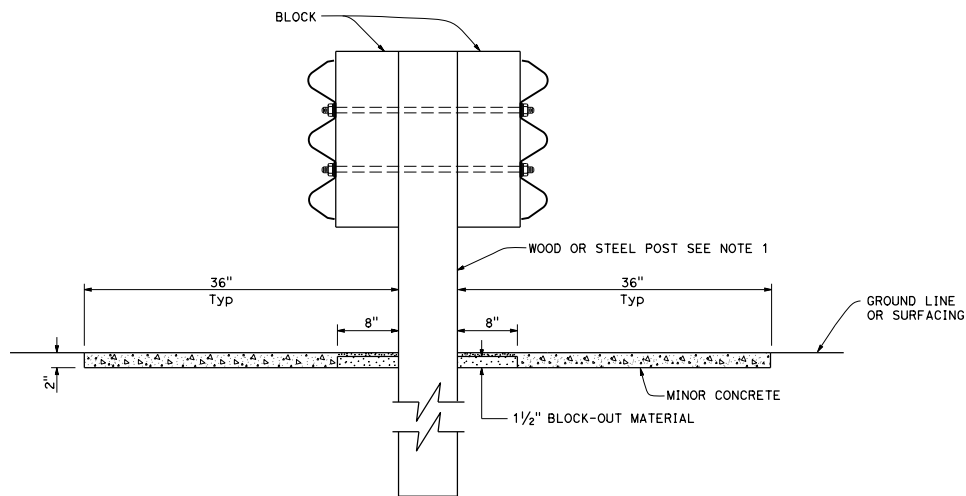
NO SCALE

**A78C3**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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**PLAN**



**SECTION A-A**

**NOTES:**


1. For wood and steel post sizes, see Standard Plan A78C2.
2. For details not shown, see Standard Plans A78A and A78B.

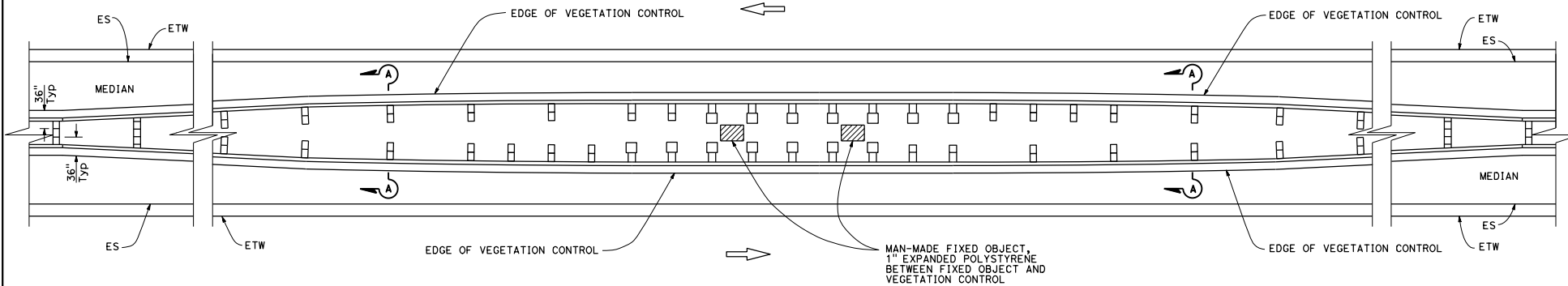
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**DOUBLE THRIE BEAM BARRIER  
TYPICAL VEGETATION CONTROL  
STANDARD BARRIER RAILING SECTION**

NO SCALE

**A78C4**

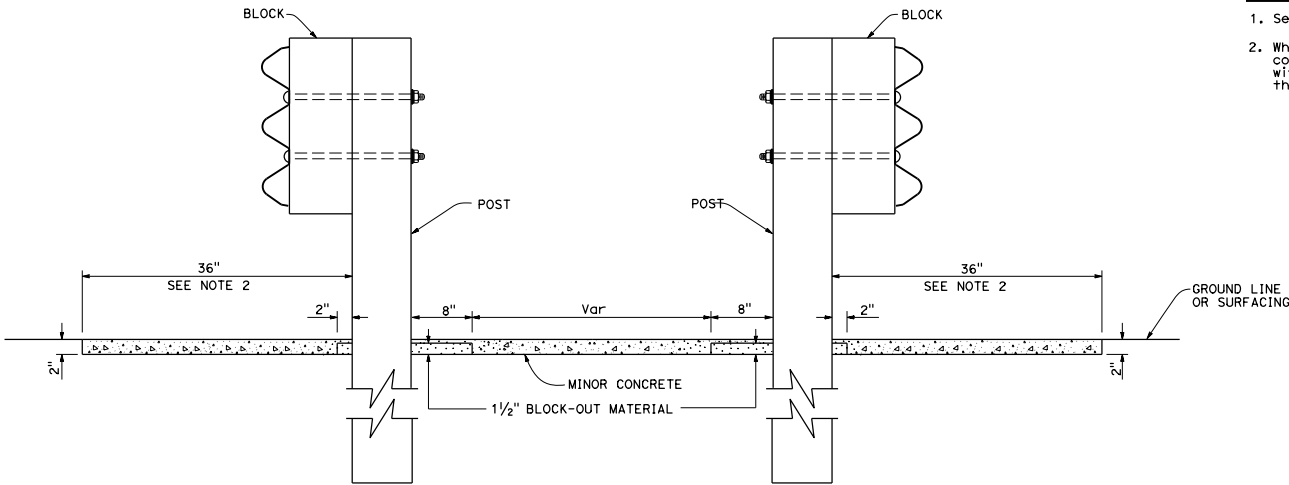
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



**PLAN**

**NOTES:**

1. See Standard Plan A78C3 for additional vegetation control.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.



**SECTION A-A**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**THREE BEAM BARRIER  
 TYPICAL VEGETATION CONTROL  
 AT FIXED OBJECTS  
 IN MEDIAN**

NO SCALE

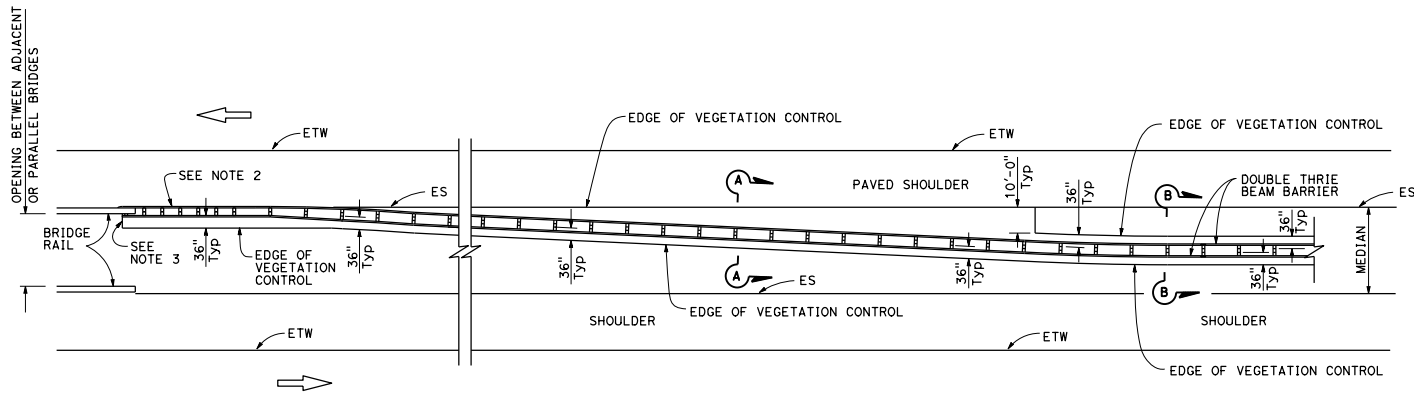
**A78C5**

100

2015 STANDARD PLAN A78C5

DIS*	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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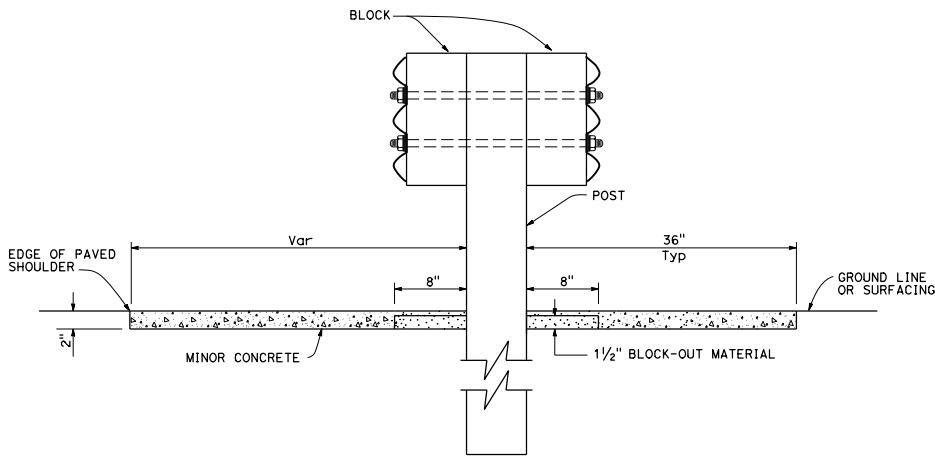
REGISTERED PROFESSIONAL ENGINEER  
*Randell D. Hiatt*  
 No. C50200  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA



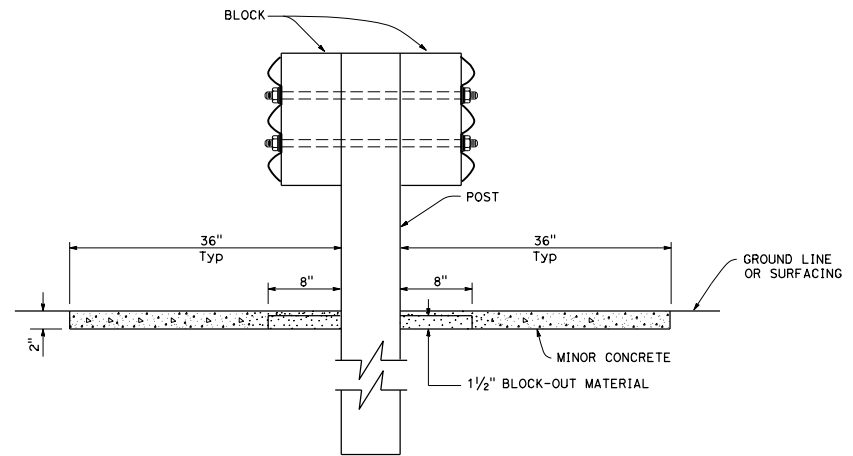
PLAN

**NOTES:**

1. See Standard Plan A78C4 for additional vegetation control details.
2. Where dike is constructed under barrier, construct vegetation control to back edge of dike. Where paved shoulder is constructed within 36" in front of the post, construct vegetation control to the edge of paved shoulder.
3. End vegetation control at end of backside rail element attached to bridge railing.



SECTION A-A



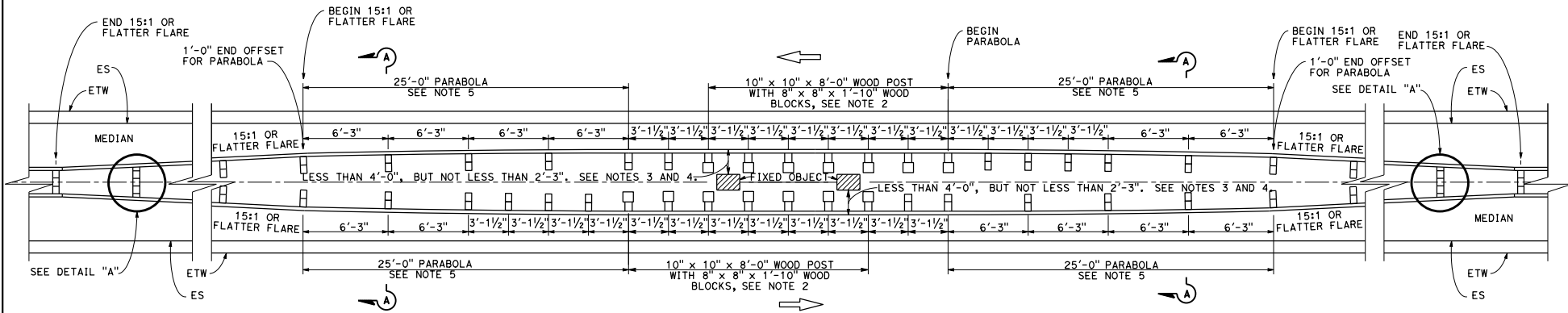
SECTION B-B

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**THRIE BEAM BARRIER  
TYPICAL VEGETATION CONTROL  
AT STRUCTURE APPROACH**

NO SCALE

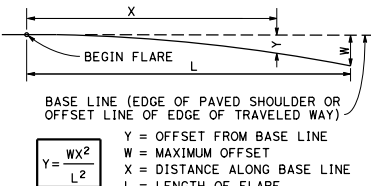
**A78C6**

DIST	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	NO.	SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
No. C50200 Exp. 6-30-17 CIVIL					
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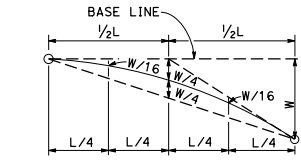


**THRE BEAM BARRIER AT FIXED OBJECTS**

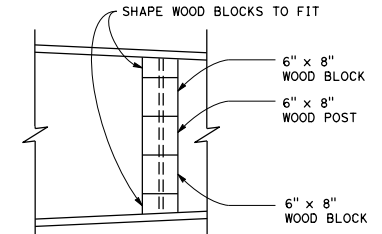
(Wood post and block shown)  
See Notes 1, 2 and 3.



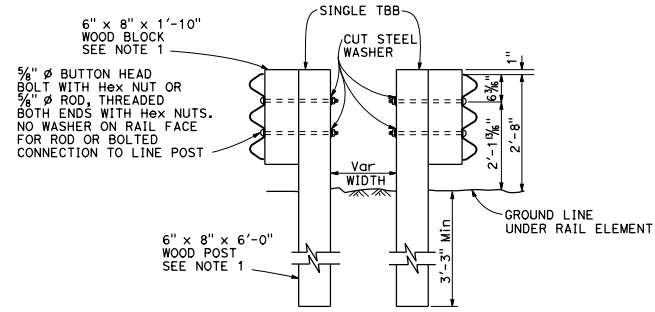
**PARABOLIC FLARE OFFSETS**



**TYPICAL PARABOLIC LAYOUT**



**DETAIL "A"**



**SECTION A-A**

Wood post with wood block shown  
See Note 1

**NOTES:**

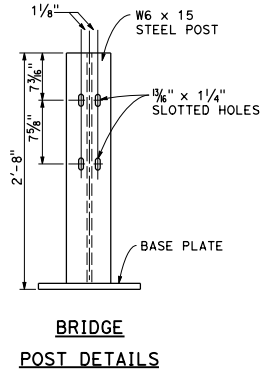
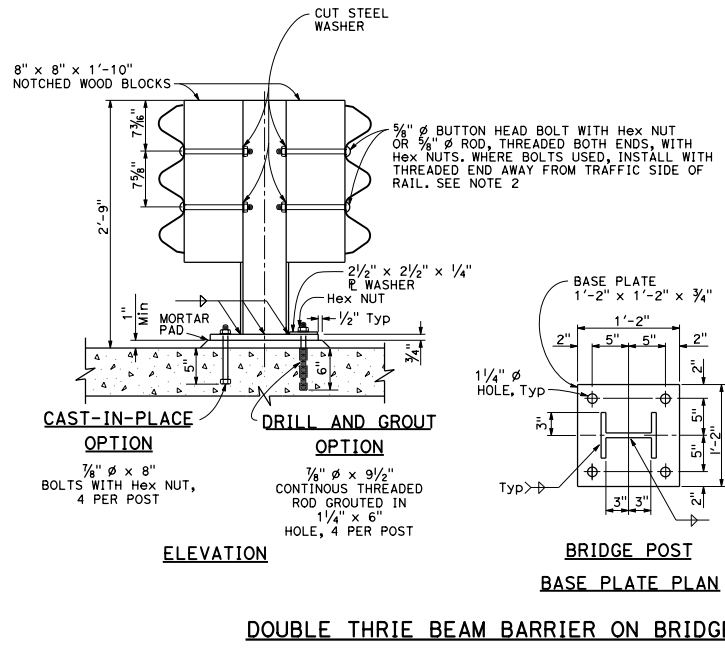
- Where applicable and when specified, (W6 x 8.5 or W6 x 9) x 6'-8" steel post with 6" x 8" x 1'-10" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood post with 6" x 8" x 1'-10" wood block.
- Where applicable and when specified, (W6 x 15) x 8'-0" steel post with 8" x 8" x 1'-10" notched wood blocks or notched recycled plastic blocks may be used for the 10" x 10" x 8'-0" wood post with 8" x 8" x 1'-10" wood blocks shown at 3'-1/2" center to center spacing.
- Where a minimum clearance of 4'-0" or more can be obtained between the face of the three beam rail and the face of the fixed object(s), the following substitutions may be made:
  - 6" x 8" x 6'-0" wood posts with 6" x 8" x 1'-10" wood blocks for the 10" x 10" x 8'-0" wood post with 8" x 8" x 1'-10" wood blocks shown.
  - 6'-3" post spacing for the 3'-1/2" spacing shown.
- Where the clearance between the face of the railing and the face of a fixed object is less than 2'-3", a concrete barrier should be constructed to shield the fixed object(s).
- For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**THRE BEAM BARRIER  
AT FIXED OBJECTS  
IN MEDIAN**

NO SCALE

**A78D1**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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- NOTES:**
1. See Standard Plan A78B for steel post with notched wood block construction details.
  2. Attach rail element to wood block and steel post with 2 bolts or rods on approaching traffic side of block and post web. No washer on rail faces for rods or bolted connections to post.

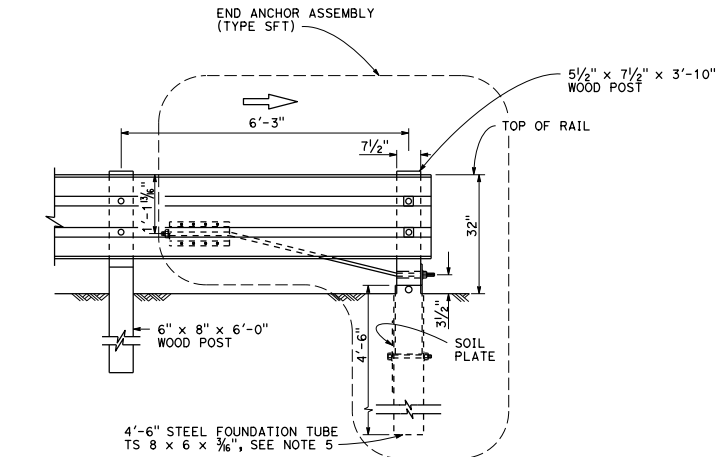
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**DOUBLE THRIE BEAM BARRIER  
ON BRIDGE**

NO SCALE

**A78D2**

104



**END ANCHOR FOR TRAFFIC DEPARTURE END OF SINGLE THRIE BEAM BARRIER**  
(For one-way roadways)  
See Note 1

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

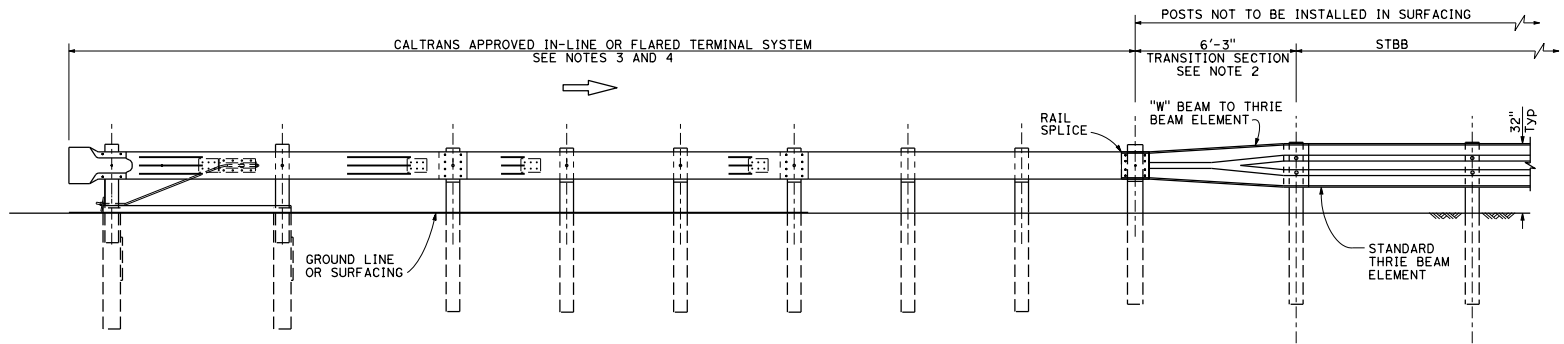
October 30, 2015  
PLANS APPROVAL DATE

**Randell D. Hiatt**  
REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**

- For additional details of End Anchor Assembly (Type SFT), see Standard Plan A77S1.
- The "W" beam to thrie beam section is only required where the terminal system connection to the thrie beam barrier is a "W" beam rail.
- In-line Terminal System End Treatments are used where site conditions will not accommodate a flared end treatment. The type of terminal system to be used will be shown on the Project Plans. Do not use a Caltrans approved 31" end treatment.
- A Caltrans approved crash cushion should be used in place of a terminal system end treatment where the backside of the railing would be exposed to traffic.
- A 6'-0" length steel foundation tube, TS 8 x 6 x 3/8", without a soil plate, may be furnished and installed in place of the 4'-6" length steel foundation tube and soil plate shown. Minimum embedment of the 6'-0" length tube shall be 5'-3". A 3/8" hex head bolt and nut shall be installed in the hole in the 6'-0" length tube to keep the wood post from dropping into the tube.



**ELEVATION**  
**END TREATMENT FOR TRAFFIC APPROACH END OF SINGLE THRIE BEAM BARRIER**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**SINGLE THRIE BEAM BARRIER  
END ANCHOR ASSEMBLY AND  
TERMINAL SYSTEM  
END TREATMENT**

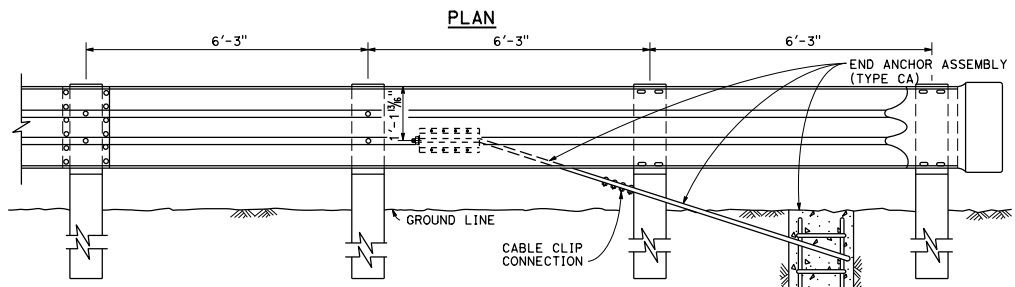
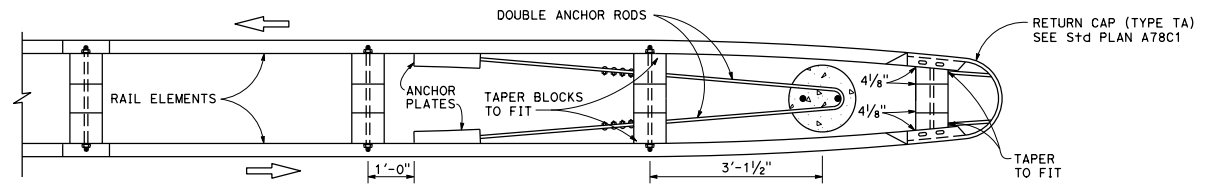
NO SCALE

**A78E1**

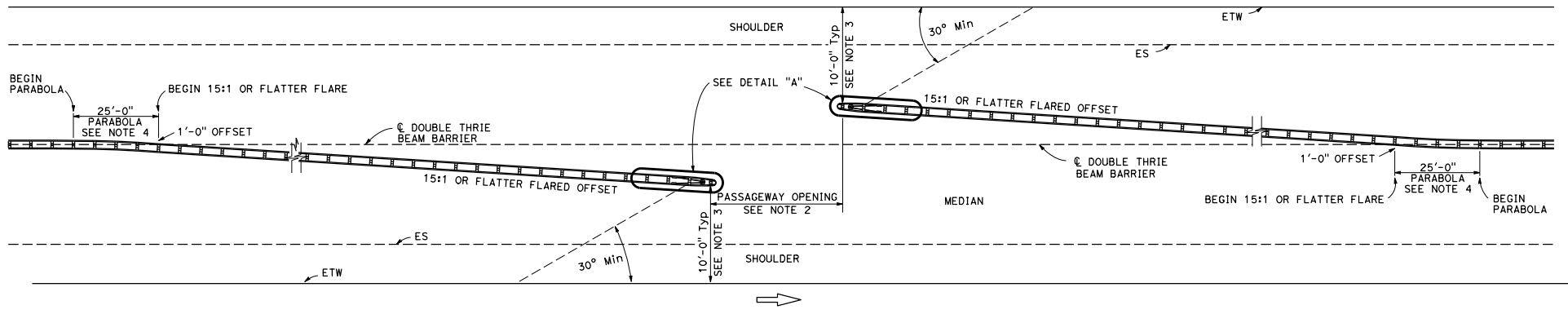
2015 STANDARD PLAN A78E1



105



**ELEVATION**  
**END ANCHOR FOR DOUBLE THRIE BEAM BARRIER**  
**DETAIL "A"**



**PLAN**  
**EMERGENCY PASSAGWAY**  
**IN THRIE BEAM BARRIER**

DIS*	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
Randell D. Hiatt  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

**NOTES:**

1. For End Anchor Assembly (Type CA) details, see Standard Plan A77T1.
2. The typical passageway opening for motorcycles is 6'-0" to 8'-0". Generally, motorcycle passageways are not used where median width is less than 22'-0". The typical passageway opening for motor vehicles is 12'-0" to 16'-0". Generally, motor vehicle passageways are not used where median width is 32'-0" or less. See Project Plans for width of passageway opening.
3. Barrier end offsets from edge of traveled way vary depending on type of highway facility involved. End offsets other than 10'-0" will be shown on the Project Plans.
4. For typical flare offsets for 25'-0" length parabola with maximum offset of 1'-0", see Standard Plan A77P1.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**DOUBLE THRIE BEAM BARRIER**  
**EMERGENCY PASSAGWAY**  
**AND END ANCHOR**  
**ASSEMBLY DETAILS**

NO SCALE

**A78E2**

2015 STANDARD PLAN A78E2

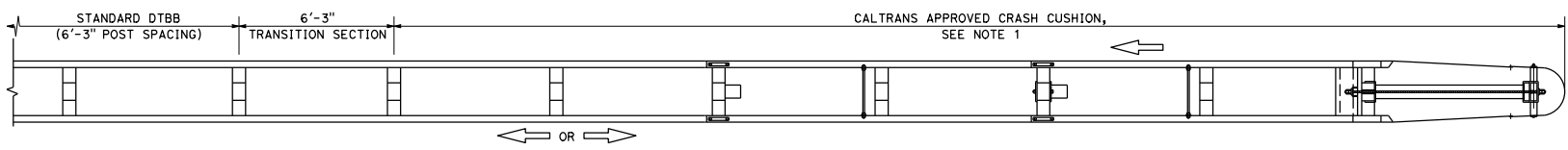
106

Dist.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

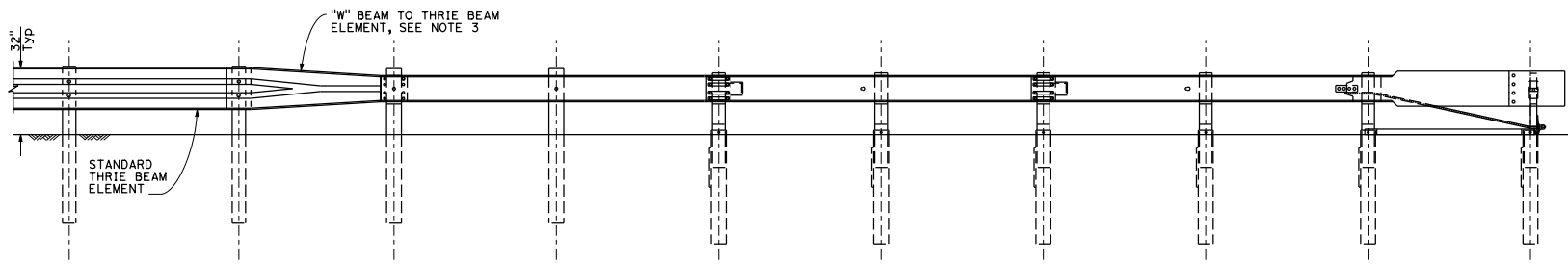


**NOTES:**

1. For the type of Crash Cushion to be used, see Project Plans and Special Provisions.
2. For details of standard double thrie beam barrier, see Standard Plans A78A, A78B, A78C1, and A78C2.
3. The 'W' beam to thrie beam sections are only required where the crash cushion connection to the thrie beam barrier assembly is a 'W' beam rail.



**PLAN**



**ELEVATION**

**END TREATMENT FOR DOUBLE THRIE BEAM BARRIER**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**DOUBLE THRIE BEAM BARRIER  
CRASH CUSHION END TREATMENT**

NO SCALE

**A78E3**

**2015 STANDARD PLAN A78E3**

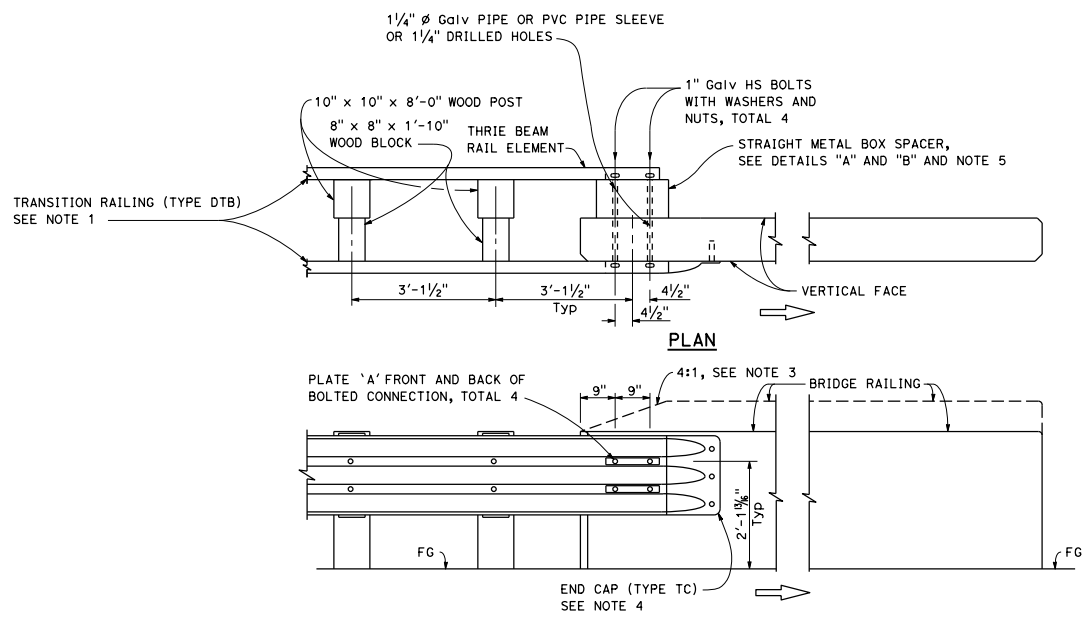
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

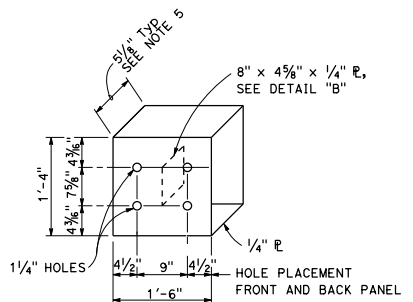


**CONNECTION DETAIL 1A**  
See Note 2

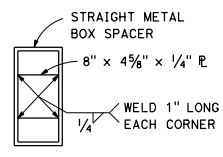
**DOUBLE THRIE BEAM BARRIER CONNECTION TO BRIDGE RAILING WITHOUT SIDEWALK**

**NOTES:**

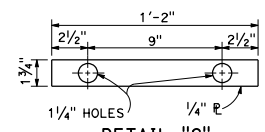
1. For additional details of Transition Railing (Type DTB), see Standard Plans A78K. Transition Railing (Type DTB) transitions the standard 12 gauge double thrie beam barrier to a heavier gauge double thrie beam railing section then to a heavier gauge nested double thrie beam barrier section which then is connected to the concrete bridge railing.
2. For typical use of Connection Detail 1A, see Type 25A Connection Layout on Standard Plan A78H.
3. Where the height of the bridge railing exceeds the height of the thrie beam railing by more than 1" at Connection Detail 1A, taper the top of the end of the bridge railing at 4:1 to match the top elevation of the thrie beam railing.
4. For details of End Cap (Type TC), see Standard Plan A78C1.
5. See Standard Plan A78K for additional details regarding depth dimension for straight metal box spacer.



**DETAIL "A"**  
**STRAIGHT METAL BOX SPACER**



**DETAIL "B"**



**DETAIL "C"**  
**PLATE 'A'**

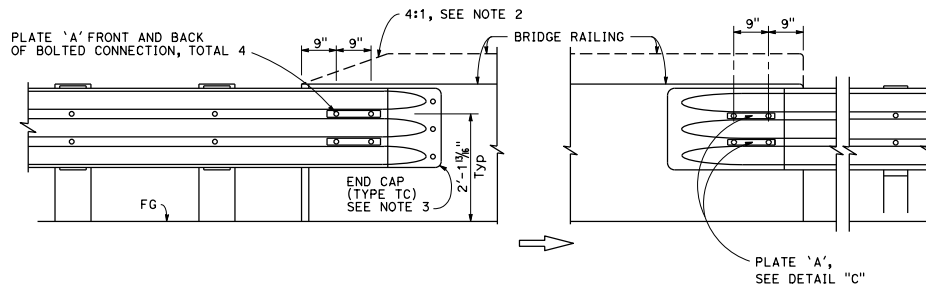
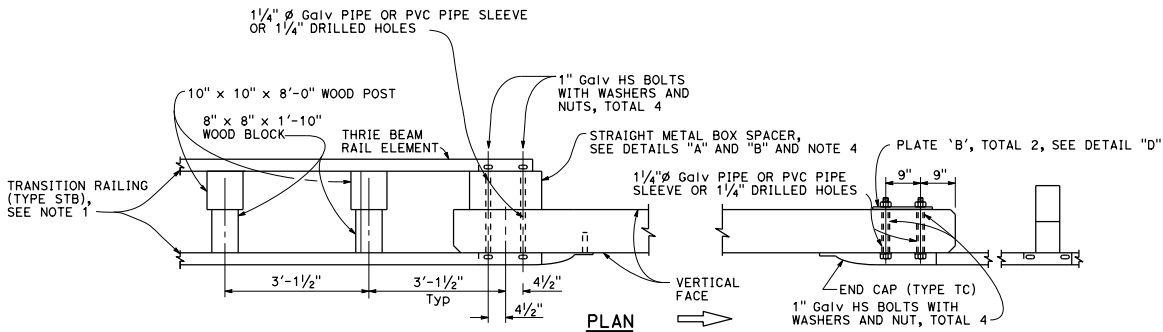
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**DOUBLE THRIE BEAM BARRIER CONNECTIONS TO BRIDGE RAILINGS WITHOUT SIDEWALKS**

NO SCALE

**A78F1**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
No. C50200 Exp. 6-30-17 CIVIL					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

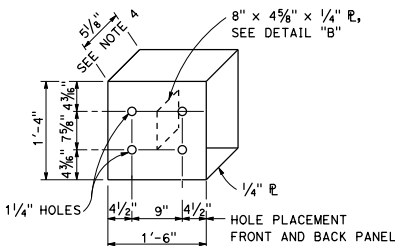


CONNECTION DETAIL 2A

CONNECTION DETAIL 3A

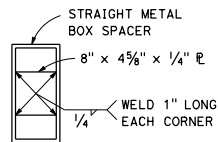
ELEVATION

SINGLE THRIE BEAM BARRIER CONNECTION TO BRIDGE RAILING WITHOUT SIDEWALK

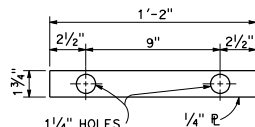


DETAIL "A"

STRAIGHT METAL BOX SPACER

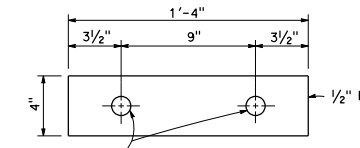


DETAIL "B"



DETAIL "C"

PLATE 'A'

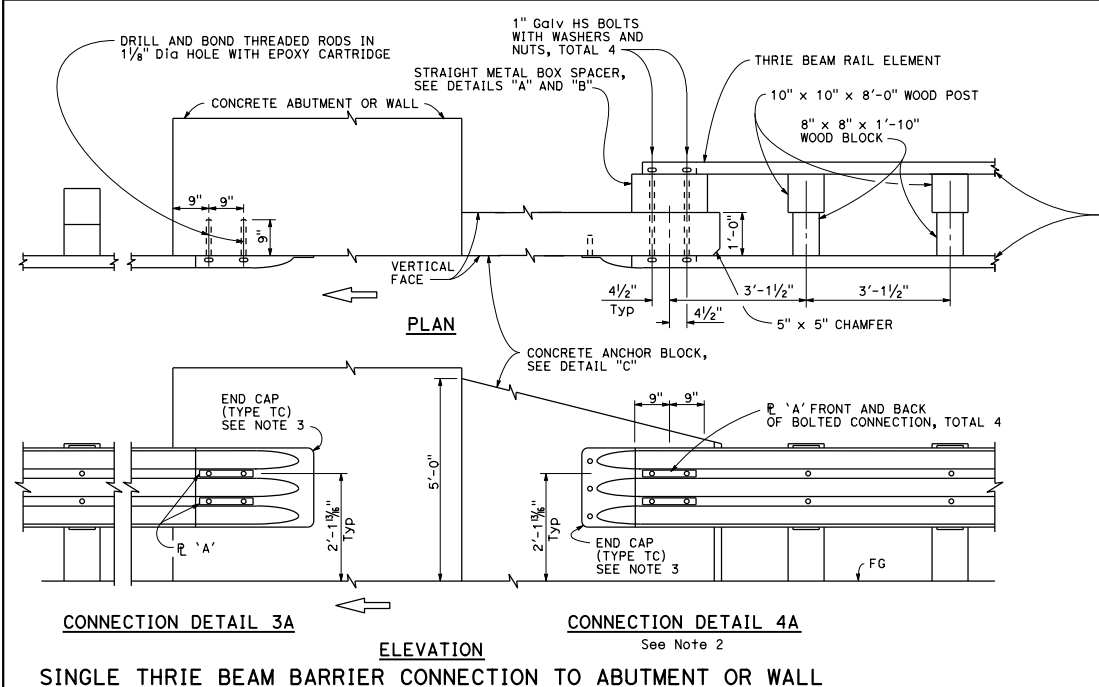


DETAIL "D"

PLATE 'B'

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**SINGLE THRIE BEAM BARRIER CONNECTIONS TO BRIDGE RAILINGS WITHOUT SIDEWALKS**  
 NO SCALE

A78F2



TRANSITION RAILING (TYPE STB)  
SEE NOTE 2

**NOTES:**

1. These connection details apply to concrete abutments and walls. For additional connections details, see Project Plans.
2. For additional details of Transition Railing (Type STB), see Standard Plan A78J. Transition Railing (Type STB) transitions the standard 12 gauge single thrie beam barrier to a heavier gauge single thrie beam railing section then to a heavier gauge nested double thrie beam barrier section which then is connected to the concrete anchor block.
3. For details of End Cap (Type TC), see Standard Plan A78C1.

Dist*	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

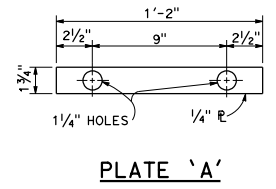
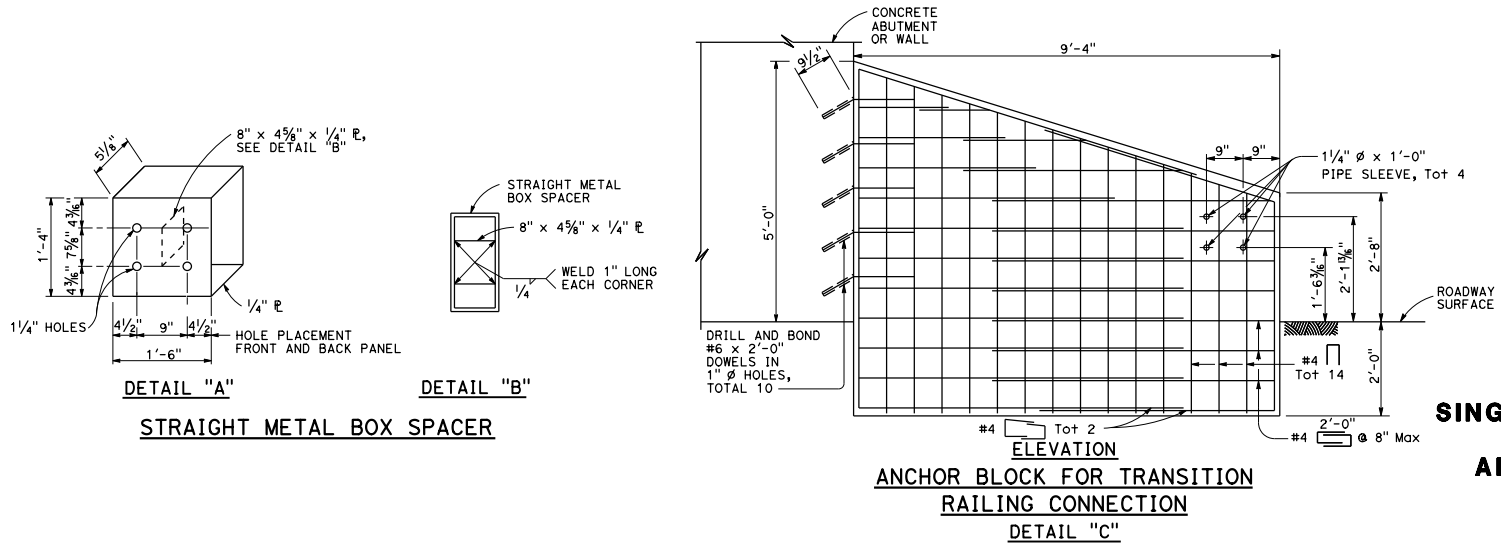
October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
Randell D. Hiatt  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

2015 STANDARD PLAN A78G

CONNECTION DETAIL 3A  
ELEVATION  
CONNECTION DETAIL 4A  
See Note 2  
SINGLE THRIE BEAM BARRIER CONNECTION TO ABUTMENT OR WALL



**SINGLE THRIE BEAM BARRIER CONNECTIONS TO ABUTMENTS AND WALLS**

NO SCALE

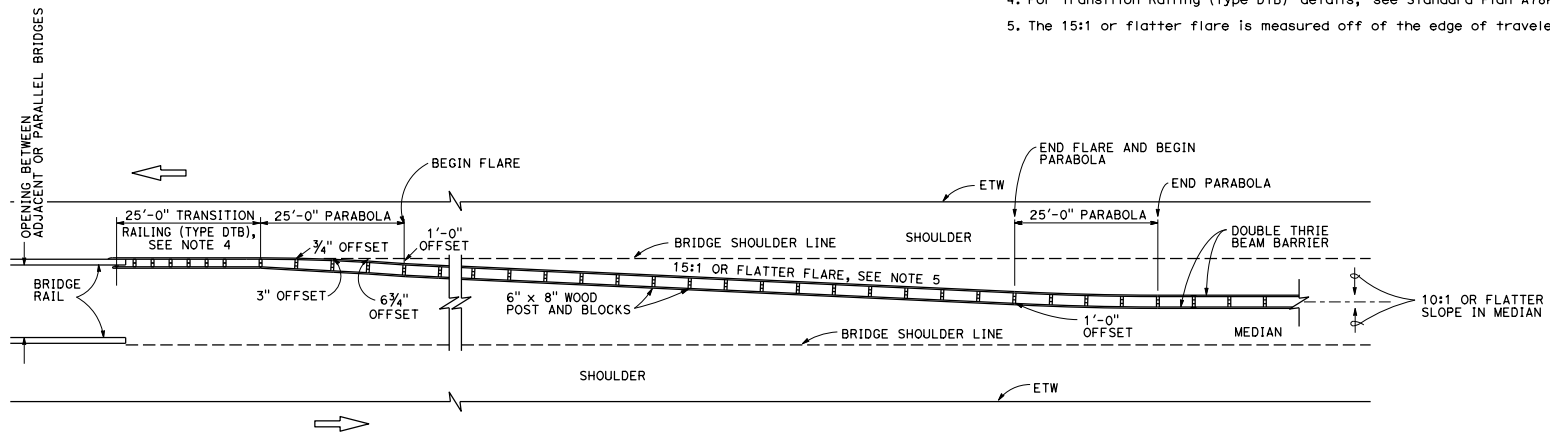
**A78G**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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REGISTERED PROFESSIONAL ENGINEER  
 No. C50200  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

**NOTES:**

1. Line post, blocks and hardware to be used are shown on Standard Plans A78A, A78B, A78C1 and A78C2.
2. Post spacing to be 6'-3" center to center, except as otherwise noted.
3. Except as noted, line posts are 6" x 8" x 6'-0" wood with 6" x 8" x 1'-10" wood blocks, (W6 x 8.5 or W6 x 9) steel posts, 6'-8" in length, with 6" x 8" x 1'-10" notched wood blocks or notched recycled plastic blocks may be used for 6" x 8" x 6'-0" wood posts with 6" x 8" x 1'-10" wood blocks where applicable and when specified.
4. For Transition Railing (Type DTB) details, see Standard Plan A78K.
5. The 15:1 or flatter flare is measured off of the edge of traveled way.



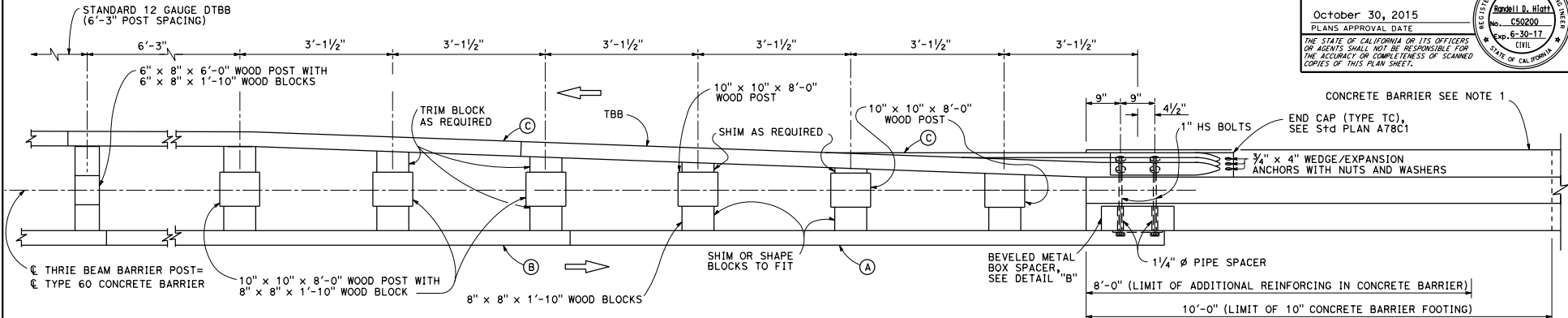
**TYPE 25A CONNECTION LAYOUT**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**THRIE BEAM BARRIER  
 TYPICAL LAYOUT  
 FOR CONNECTION TO  
 BRIDGE RAILING**

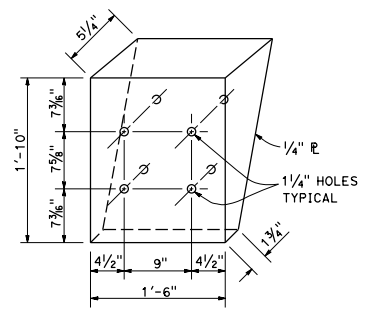
NO SCALE

**A78H**

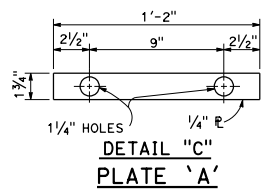
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER October 30, 2015 PLANS APPROVAL DATE THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					
REGISTERED PROFESSIONAL ENGINEER No. C50200 Exp. 6-30-17 CIVIL STATE OF CALIFORNIA					



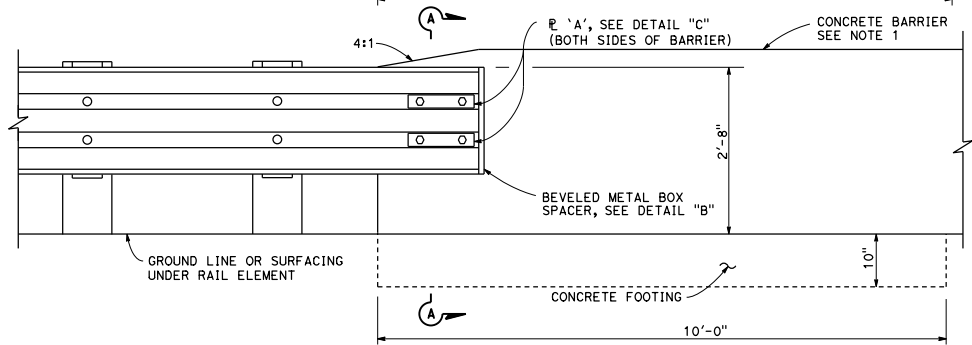
PLAN



**DETAIL "B"**  
Beveled metal box spacer  
See Note 3



**DETAIL "C"**  
PLATE 'A'



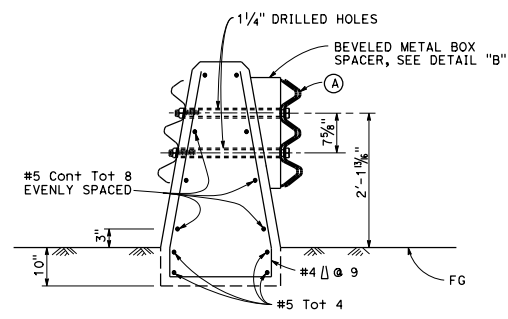
**ELEVATION**

**NOTES:**

1. For details of Concrete Barrier Type 60, see Standard Plan A76A. Thrie beam barrier connections to Concrete Barrier Type 60S and Type 60G are similar to details shown on this plan.
2. For additional thrie beam barrier details, see Standard Plans A78A, A78B, A78C1, and A78C2.
3. Where beveled metal box spacer is installed, place 1/4"  $\phi$  x 3/4" and 1/4"  $\phi$  x 2" pipe spacers on 1" HS bolts passing through interior of box.

**LEGEND**

- (A) NESTED THRIE BEAM ELEMENTS (ONE 12 GAUGE ELEMENT NESTED OVER ONE 10 GAUGE ELEMENT).
- (B) ONE 10 GAUGE THRIE BEAM ELEMENT.
- (C) ONE 12 GAUGE THRIE BEAM ELEMENT.  
10 GAUGE = 0.135" THICK  
12 GAUGE = 0.108" THICK

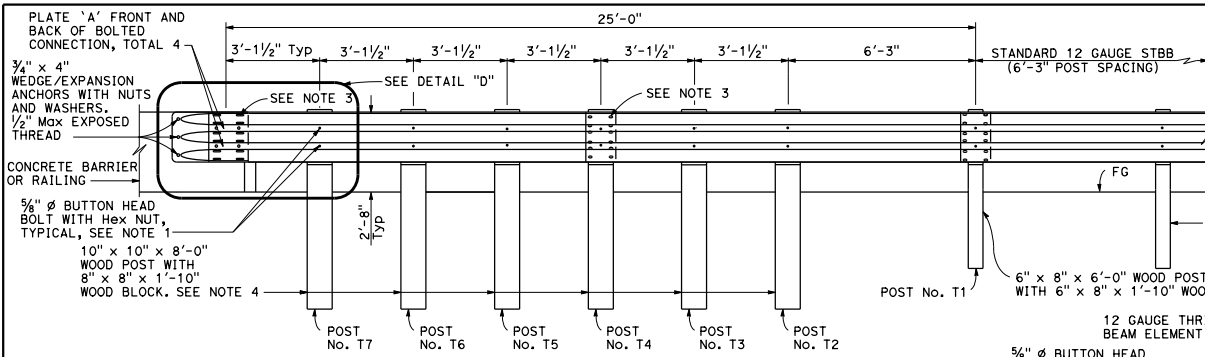


**SECTION A-A**

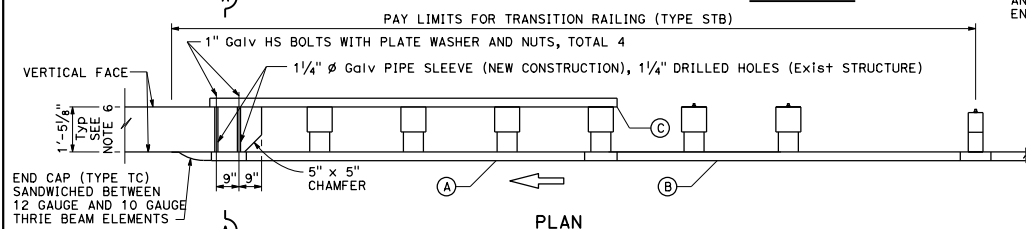
(Type 60 Concrete Barrier shown)

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DOUBLE THRIE BEAM BARRIER  
CONNECTION TO CONCRETE  
BARRIER**  
NO SCALE

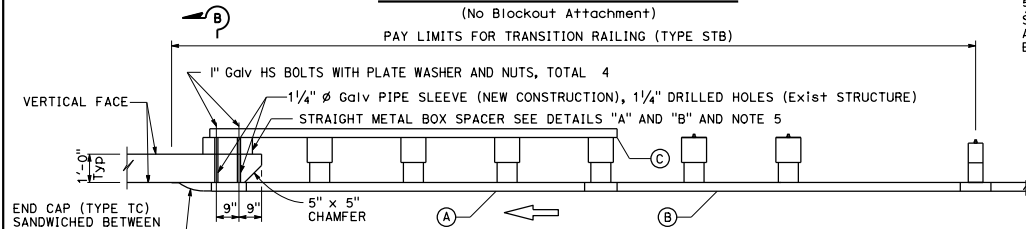
**A781**



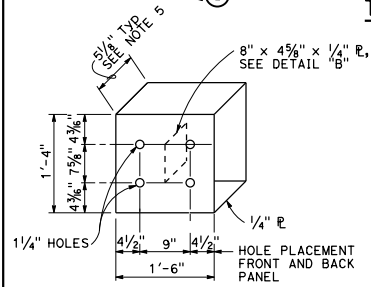
ELEVATION



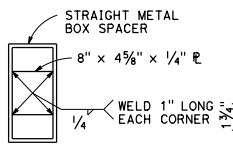
TRANSITION RAILING (TYPE STB)



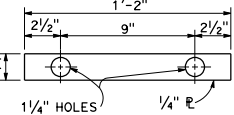
TRANSITION RAILING (TYPE STB)



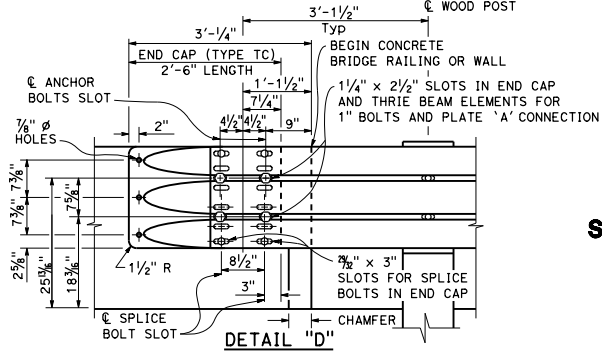
DETAIL "A" STRAIGHT METAL BOX SPACER



DETAIL "B"



DETAIL "C" PLATE 'A'



DETAIL "D"

LEGEND

- (A) NESTED THRIE BEAM ELEMENTS (ONE 12 GAUGE ELEMENT NESTED OVER ONE 10 GAUGE ELEMENT)
  - (B) ONE 10 GAUGE THRIE BEAM ELEMENT
  - (C) ONE 12 GAUGE THRIE BEAM ELEMENT
- 10 GAUGE = 0.135" THICK  
12 GAUGE = 0.108" THICK

NOTES:

1. Use 5/8" Ø Button head bolts and hex nuts for connection to posts. No washer on rail face for bolted connections to post.
2. The nested rail elements, end cap and single 10 gauge thrie beam element, may be spliced together prior to bolting the elements to the wood post and concrete barrier or railing.
3. Exterior splice bolt holes for rail element splices at Post No. T4 and the connection to the concrete barrier or railing shall be the standard 7/8" x 1/4" slot size. Interior splice bolt holes at these locations may be increased up to 1 1/4" Ø. Only the top 2 and the bottom 2 splice bolts with washers and nuts are required for rail splices at Post No. T4 and the connection to the concrete barrier or railing.
4. The top elevation of Post Nos. T2 through T7 shall not project more than 1" above the top elevation of the rail element.
5. The depth of the metal box spacer varies from the 5/8" to 1 1/2" and is dependent on the width of the concrete railing or wall. The combined dimension for the depth of the metal box spacer plus the width of railing or wall is typically 17 7/8". Where the space between the backside of the concrete railing or wall and the rear thrie beam element is less than 1 1/2", metal plates similar to Plate 'A' are to be used as spacers.
6. Where the width of the concrete railing or wall is greater than 17 7/8", wood blocks are to be used to fill the space created between the backside of Post No.4 through No. 7 and the rear thrie beam element. These wood blocks shall be 8" in width and 1'-2" in length. The dimension between the front thrie beam element and the rear thrie beam element is to match the width of the concrete railing or wall.
7. For details of End Cap (Type TC), see Standard Plan A78C1.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

## SINGLE THRIE BEAM BARRIER TRANSITION RAILING (TYPE STB)

NO SCALE

A78J

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

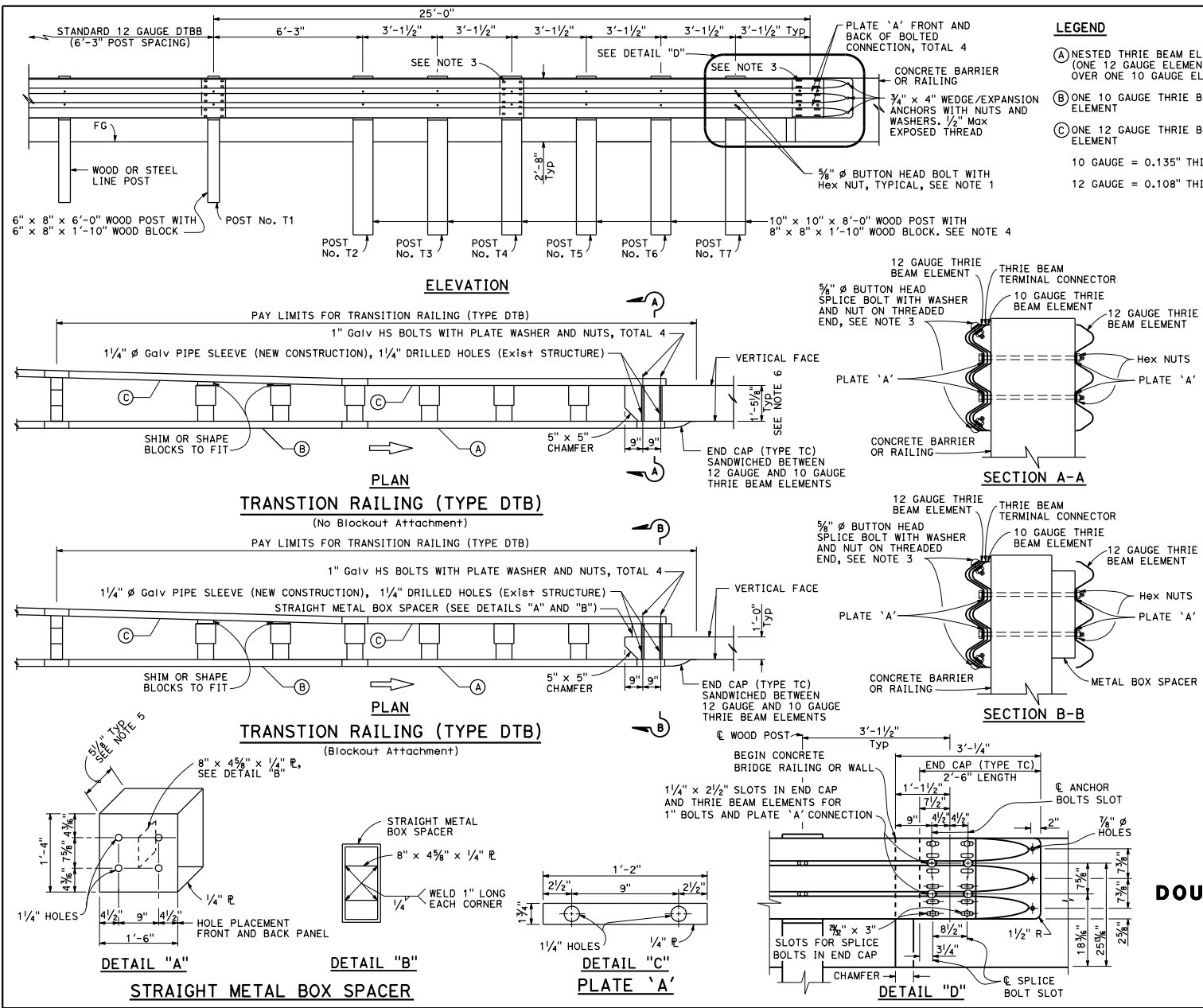
**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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**Randell D. Hiatt**  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA





**LEGEND**

- (A) NESTED THRIE BEAM ELEMENTS (ONE 12 GAUGE ELEMENT NESTED OVER ONE 10 GAUGE ELEMENT)
  - (B) ONE 10 GAUGE THRIE BEAM ELEMENT
  - (C) ONE 12 GAUGE THRIE BEAM ELEMENT
- 10 GAUGE = 0.135" THICK  
12 GAUGE = 0.108" THICK

**NOTES:**

1. Use 5/8" Ø Button head bolts and hex nuts for connections to posts. No washer on rail face for bolted connections to post.
2. The nested rail elements, end cap and single 10 gauge thrie beam element, may be spliced together prior to bolting the elements to the wood post and concrete barrier or railing.
3. Exterior splice bolt holes for rail element splices at Post No. T4 and the connection to the concrete barrier or railing shall be the standard 5/8" x 1 1/8" slot size. Interior splice bolt holes at these locations may be increased up to 1 1/4" Ø. Only the top 2 and the bottom 2 splice bolts with washers and nuts are required for rail splices at Post No. T4 and the connection to the concrete barrier or railing.
4. The top elevation of Post Nos. T1 through T7 shall not project more than 1" above the top elevation of the rail element.
5. The depth of the metal box spacer varies from the 5/8" to 1 1/2" and is dependent on the width of the concrete railing or wall. The combined dimension for the depth of the metal box spacer plus the width of railing or wall is typically 17 1/8". Where the space between the backside of the concrete railing or wall and the rear thrie beam element is less than 1 1/2", metal plates similar to Plate 'A' are used as spacers.
6. Where the width of the concrete railing or wall is greater than 17 1/8", wood blocks are to be used to fill the space created between the backside of Post No.4 through No.7 and the rear thrie beam element. These wood blocks shall be 8" in width and 1'-2" in length. The dimension between the front thrie beam element and the rear thrie beam element is to match the width of the concrete railing or wall.
7. For details of End Cap (Type TC), see Standard Plan A78C1.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**DOUBLE THRIE BEAM BARRIER  
TRANSITION RAILING  
(TYPE DTB)**

NO SCALE

**A78K**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Randell D. Hiatt*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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*Randell D. Hiatt*  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

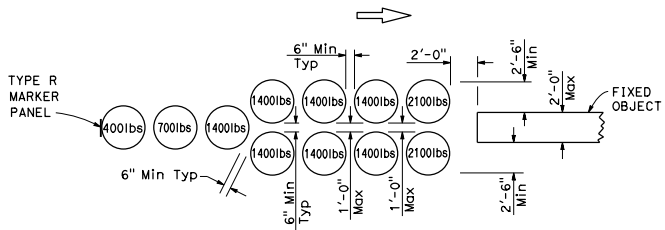
**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

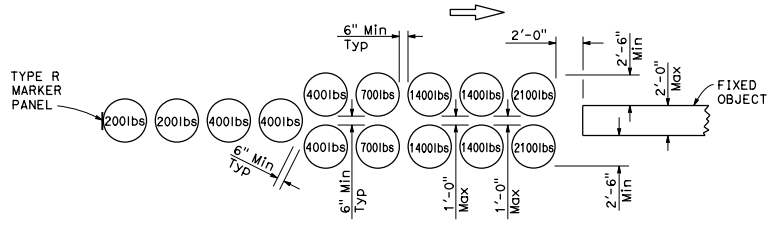
No. C50200  
Exp. 6-30-17  
CIVIL

REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

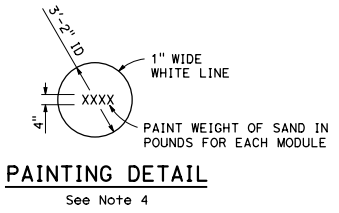
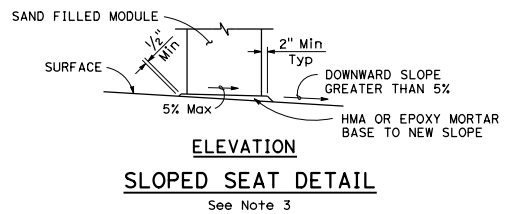
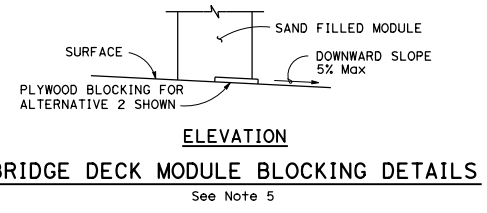
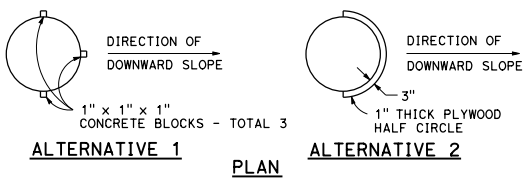
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**ARRAY 'U11'**  
Approach speed less than 45 mph



**ARRAY 'U14'**  
Approach speed 45 mph or more

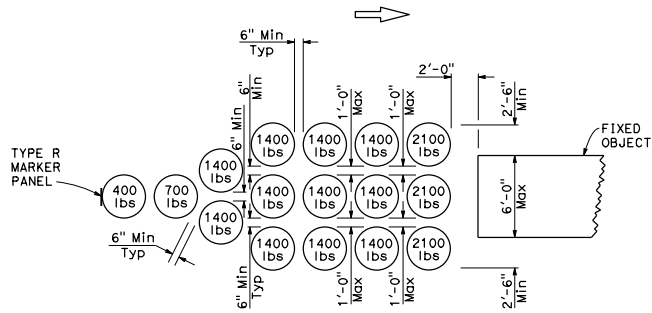


- NOTES:**
1. (XXX) Indicates module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the modules.
  2. All sand weights are nominal.
  3. Modules shall be placed on hot mix asphalt, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
  4. Weight of sand and outline of each module shall be painted on the surface at each module location.
  5. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
  6. Approach speeds indicated conform to NCHRP Report criteria.

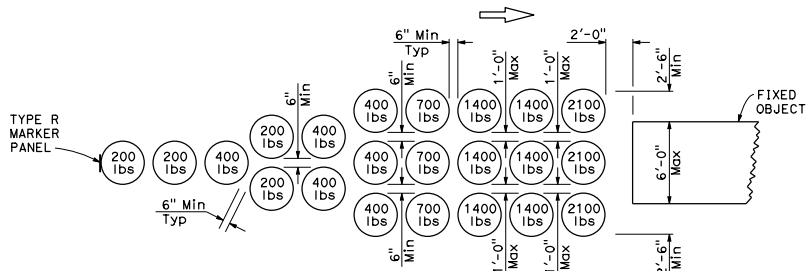
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CRASH CUSHION,  
SAND FILLED  
(UNIDIRECTIONAL)**  
NO SCALE

**A81A**

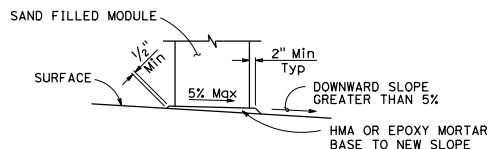
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
No. C50200 Exp. 6-30-17 CIVIL					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



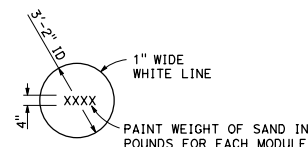
**ARRAY 'U16'**  
Approach speed less than 45 mph



**ARRAY 'U21'**  
Approach speed 45 mph or more



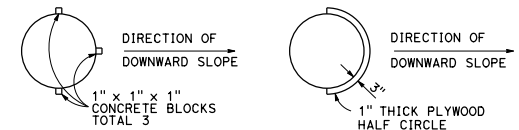
**ELEVATION SLOPED SEAT DETAIL**  
See Note 3



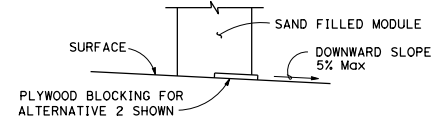
**PAINTING DETAIL**  
See Note 4

**NOTES:**

1. (XXX) Indicates module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the modules.
2. All sand weights are nominal.
3. Modules shall be placed on hot mix asphalt, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
4. Weight of sand and outline of each module shall be painted on the surface at each module location.
5. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
6. Approach speeds indicated conform to NCHRP Report criteria.



**ALTERNATIVE 1 PLAN ALTERNATIVE 2 PLAN**



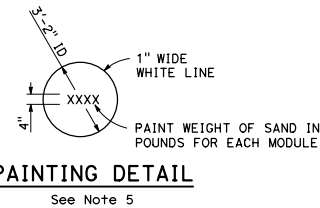
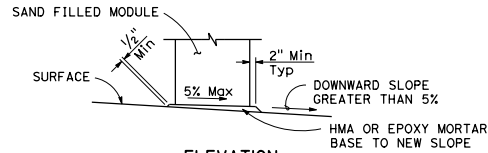
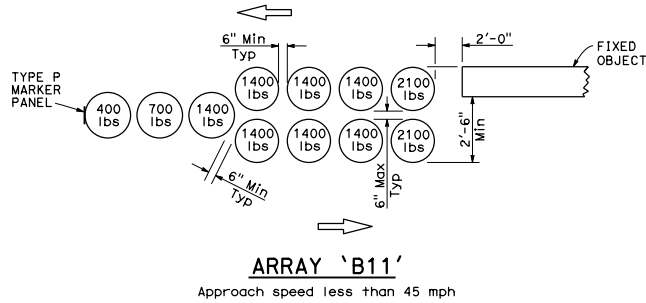
**ELEVATION BRIDGE DECK MODULE BLOCKING DETAILS**  
See Note 5

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CASH CUSHION,  
SAND FILLED  
(UNIDIRECTIONAL)**

NO SCALE

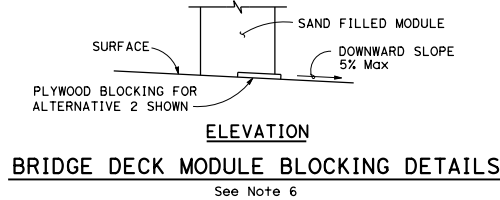
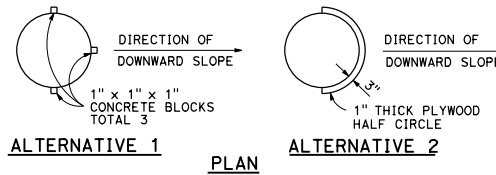
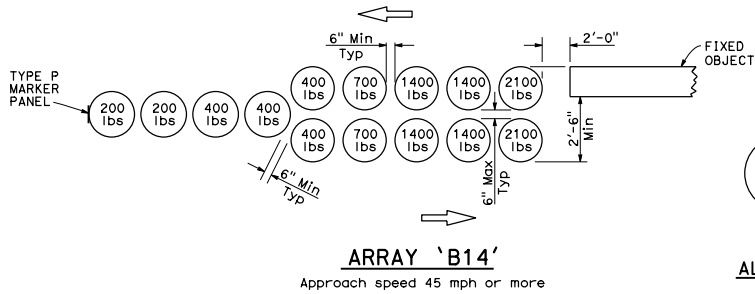
**A81B**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
No. <b>C50200</b> Exp. <b>6-30-17</b> CIVIL					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



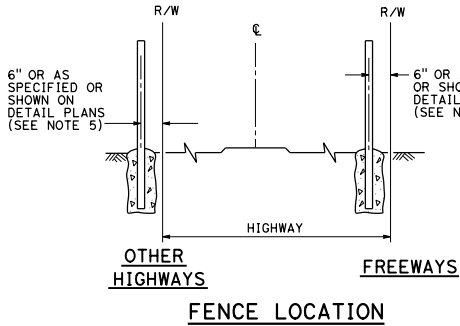
**NOTES:**

1. (XXX) Indicates module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal.
3. Bidirectional crash cushion arrays may be angled toward approaching traffic. Amount of angle not to exceed 10 degrees.
4. Modules shall be placed on hot mix asphalt, epoxy mortar or concrete surface. Modules to be placed on surfacing with greater than 5% downward slope shall be seated as shown.
5. Weight of sand and outline of each module shall be painted on the surface at each module location.
6. Module blocking, epoxied to the deck surface, is required for all modules placed on bridge decks. Two acceptable alternatives are shown. Other alternatives recommended by the manufacturer and approved by the Engineer will be accepted.
7. Approach speeds indicated conform to NCHRP Report criteria.

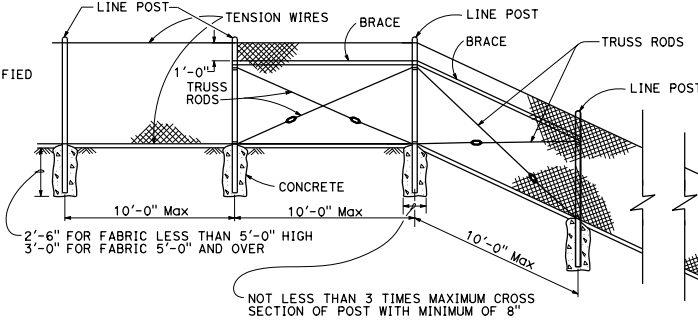


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CRASH CUSHION,  
SAND FILLED  
(BIDIRECTIONAL)**  
NO SCALE

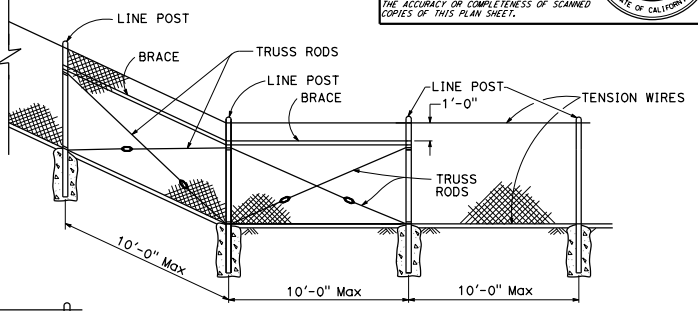
**A81C**



**FENCE LOCATION**



**CHAIN LINK FENCE ON SHARP BREAK IN GRADE**



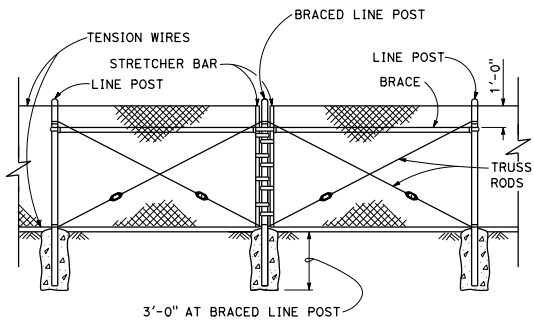
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

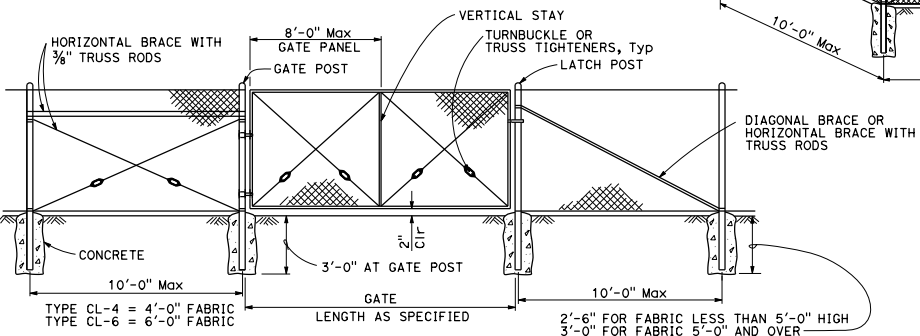
BRUCE D. SWANGER  
No. C61257  
Exp. 6-30-17  
CIVIL

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**BRACED LINE POST INSTALLATION**

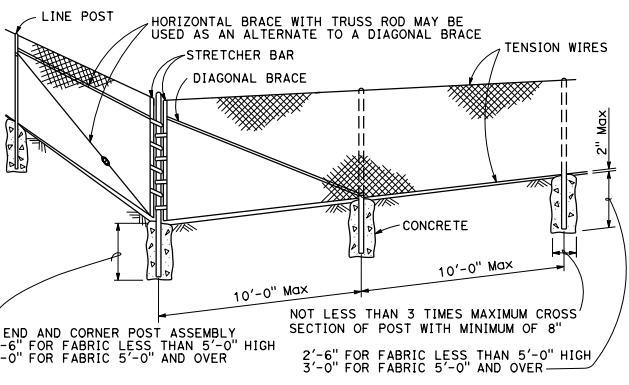
Braced line post at intervals not exceeding 1000'



**CHAIN LINK GATE INSTALLATION**

GATE POST			
FENCE HEIGHT	GATE WIDTHS	ROUND OD PIPE	WEIGHT (lb/ft)
6'-0" AND LESS	UP THRU 6'-0"	2.875"	5.80
	THRU 12'-0"	4.500"	10.80
	OVER 12'-0" THRU 18'-0"	5.563"	14.63
OVER 6'-0" TO 8'-0" Max	OVER 18'-0" TO 24'-0" Max	6.625"	18.99
	UP THRU 6'-0"	3.500"	7.58
	OVER 6'-0" THRU 12'-0"	5.563"	14.63
OVER 12'-0" THRU 18'-0"	OVER 12'-0" THRU 18'-0"	6.625"	18.99
	OVER 18'-0" TO 24'-0" Max	8.625"	28.58

Above post dimensions and weights are minimums. Larger sizes may be used upon approval.



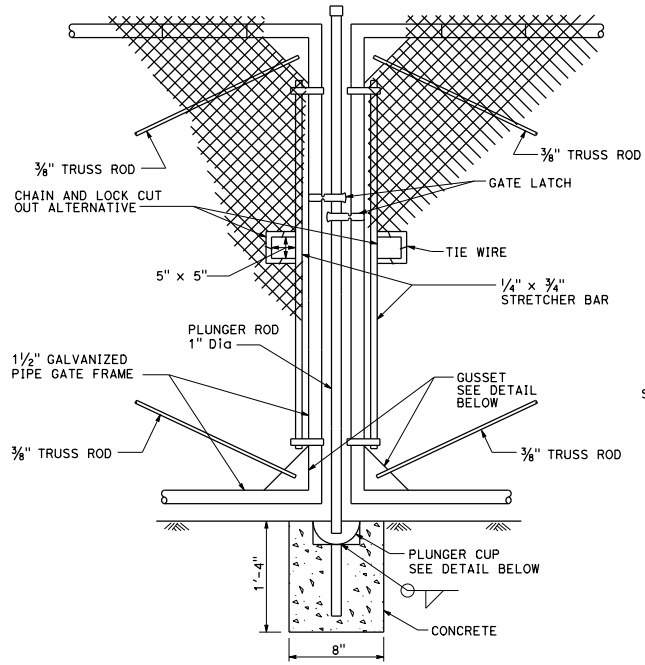
**CORNER POST**

**NOTES:**

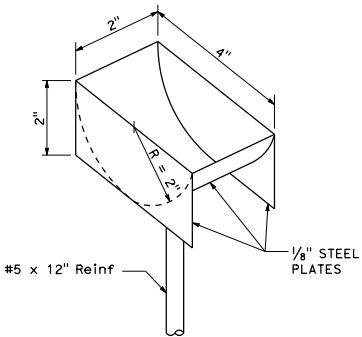
- The table below shows minimum sized posts and braces complying with the specifications. Larger or heavier post and brace sizes may be used upon approval.
- Sections shown in the tables must also comply with the strength requirements and other provisions of the Specifications.
- Other sections which comply with the strength requirements and other provisions of the Specifications may be used upon approval.
- Options exercised shall be uniform on any one project.
- Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.
- See Standard Plan A85B for Brace, Stretcher Bar, and Truss Tightener Details.

FENCE HEIGHT	TYPICAL MEMBER DIMENSIONS (See Notes)									
	LINE POSTS				END, LATCH AND CORNER POSTS		BRACES			
	ROUND OD PIPE	WEIGHT (lb/ft)	ROLL FORMED		ROUND OD PIPE	WEIGHT (lb/ft)	ROUND OD PIPE	WEIGHT (lb/ft)		
			SECTION	WEIGHT (lb/ft)					SECTION	WEIGHT (lb/ft)
6'-0" AND LESS	1.900"	2.72	1.875" x 1.625"	1.85	2.375"	3.65	1.66"	2.27	1.625" x 1.25"	1.35
OVER 6'-0" TO 8'-0" Max	2.375"	3.65	2.25" x 1.70"	2.78	2.875"	5.80	1.66"	2.27	1.625" x 1.25"	1.35

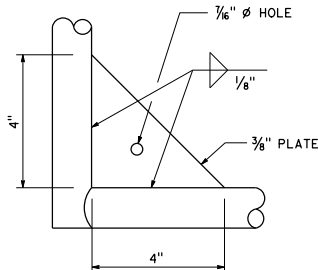
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CHAIN LINK FENCE**  
NO SCALE



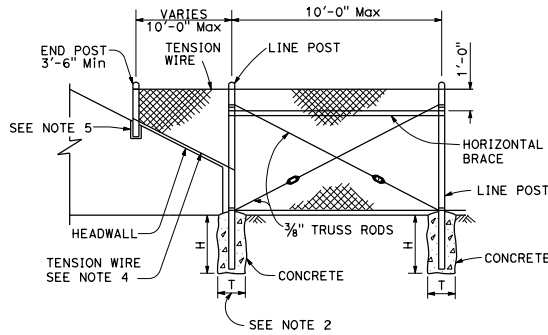
**DOUBLE GATE  
REMOVABLE CENTER POST**



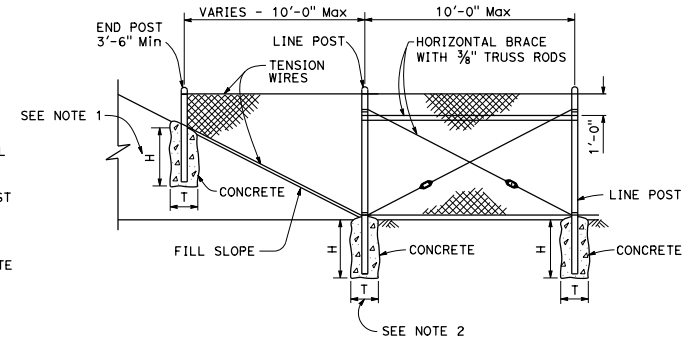
**PLUNGER CUP DETAIL**



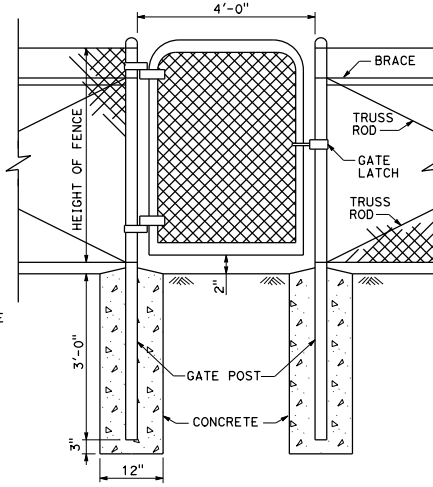
**GUSSET DETAIL**



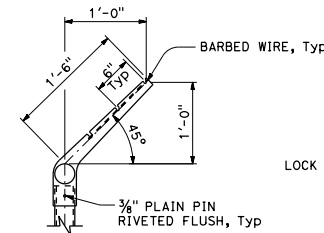
**METHOD OF TYING FENCE TO HEADWALL**



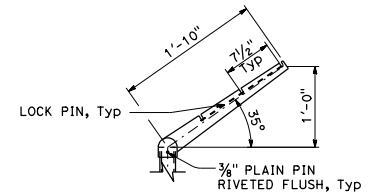
**METHOD OF ERECTING FENCE FOR FILL SLOPE**



**WALK GATE**



**LINE POST**



**CORNER POST**

**BARBED WIRE POST TOP**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CHAIN LINK FENCE DETAILS**

NO SCALE

**A85A**

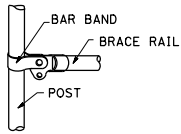
**NOTES:**

1. H is 2'-6" for fabric less than 5'-0" high.  
H is 3'-0" for fabric 5'-0" and over.
2. T is not less than 3 times maximum cross section of post with minimum of 8".
3. See Standard Plan A85 for Chain Link Fencing dimensions.
4. See Detail A on Standard Plan A86B for connection at headwall.
5. See Detail D on Standard Plan A86B for connection at headwall.

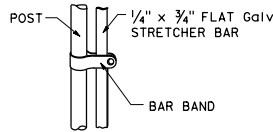
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
Bruce D. Swanger  
No. C61257  
PLANS APPROVAL DATE  
October 30, 2015  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

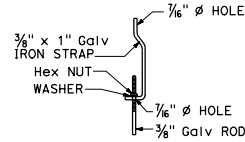
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
**BRACE RAIL**



**STRETCHER BAR**

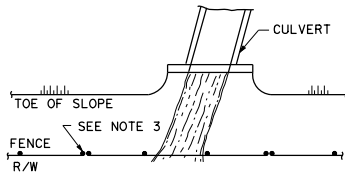


**TRUSS TIGHTENER**

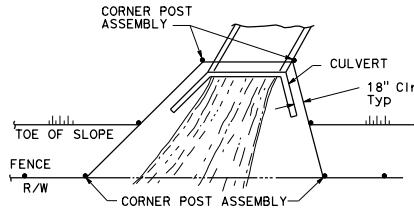
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
 REGISTERED CIVIL ENGINEER No. C61257 Exp. 6-30-17 CIVIL STATE OF CALIFORNIA				
October 30, 2015 PLANS APPROVAL DATE <small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>				

**NOTES:**

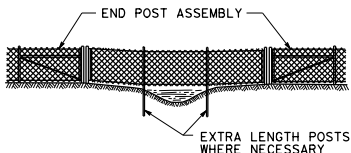
1. All material for abutment connection to be galvanized.
2. The chain link fabric shall be replaced by barbed wire strands at 12" maximum centers between the double posts.
3. When the width of the culvert makes it necessary to anchor a post to the top of the culvert, a cast iron shoe or other device approved by the Engineer shall be used.
4. Fencing over stream and around headwall may also use Barbed Wire or Wire Mesh fencing with either wood post or steel post installation.
5. See Standard Plan A85 for Chain Link fence dimensions. See Standard Plan A86 for Barbed Wire and Wire Mesh fence dimensions and for wood post and steel post installation.



**PLAN**

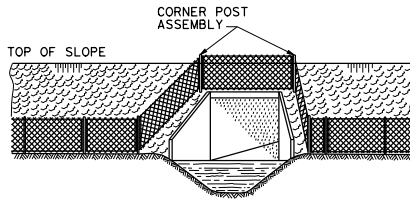


**PLAN**



**ELEVATION**

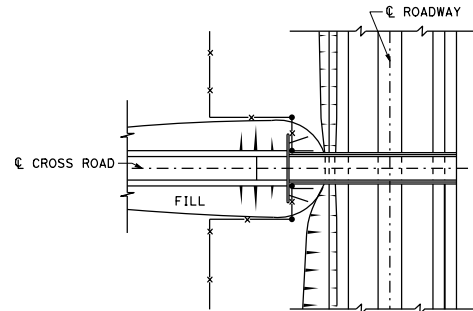
**INSTALLATION OVER STREAM**



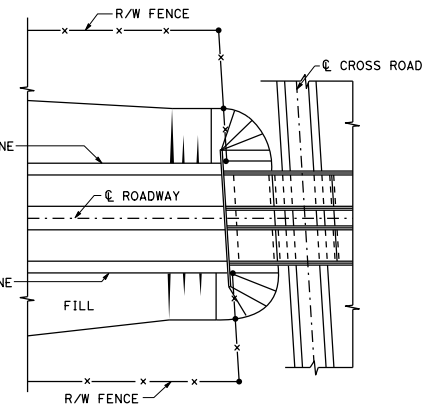
**ELEVATION**

**INSTALLATION AROUND HEADWALL**

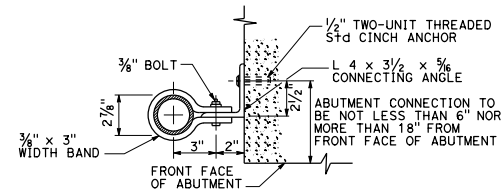
See Note 4



**PLAN OF ROADWAY - OVERCROSSING**



**PLAN OF ROADWAY - UNDERCROSSING**



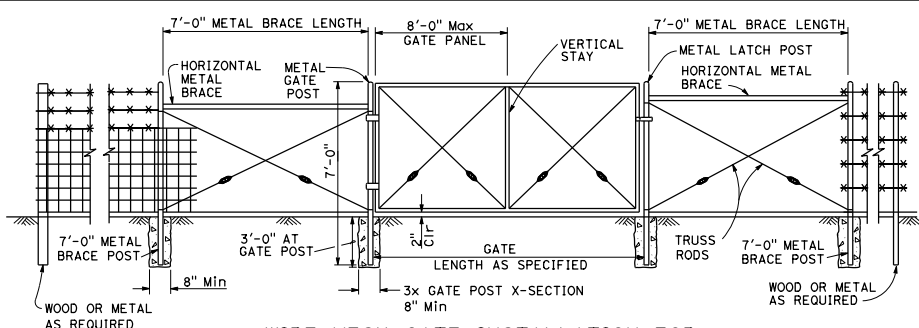
**ABUTMENT CONNECTION**

**TYPICAL INSTALLATION AT BRIDGES**

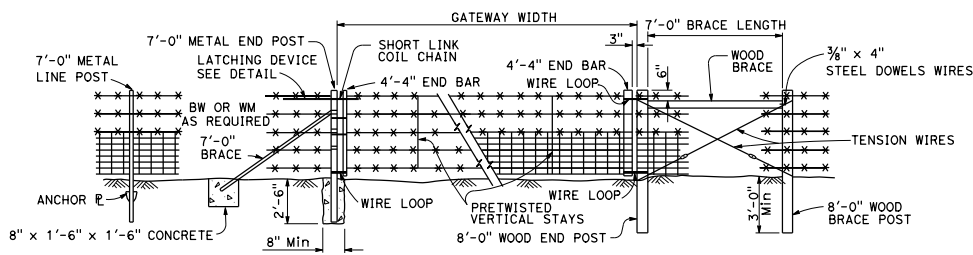
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CHAIN LINK FENCE DETAILS**  
NO SCALE

**A85B**





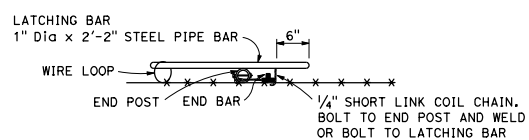
**WIRE MESH GATE INSTALLATION FOR EITHER WOOD OR METAL POST FENCES**



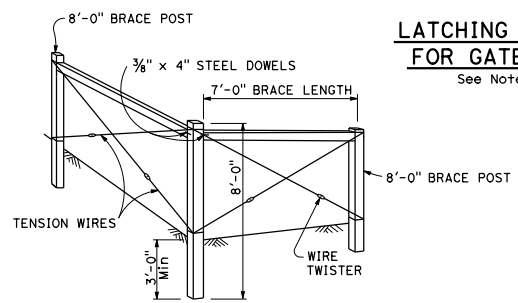
**METAL POST INSTALLATION**

**WOOD POST INSTALLATION**

**GATEWAY**

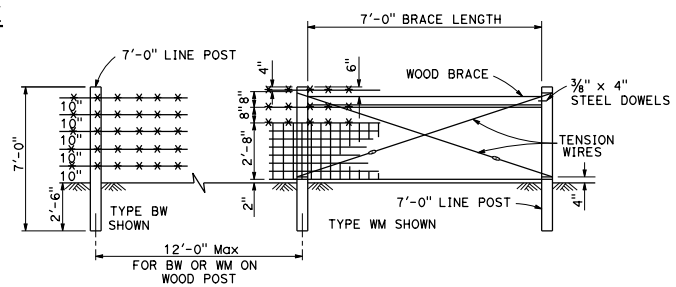


**LATCHING DEVICE FOR GATEWAYS**  
See Note 1



**END AND CORNER POST ASSEMBLY**

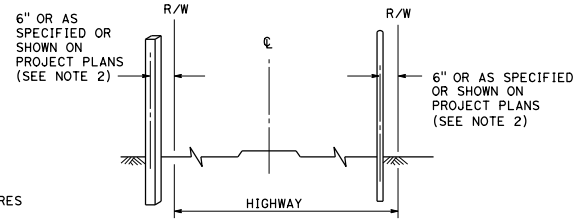
**WOOD POST INSTALLATION**



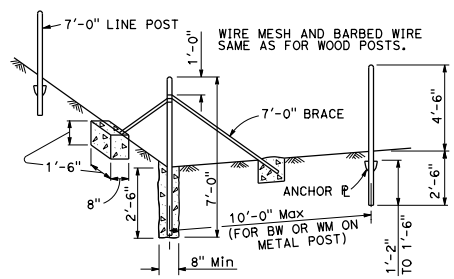
**PULL POST ASSEMBLY**

At 660'-0" maximum intervals for WM fence.  
At 1320'-0" maximum intervals for BW fence.

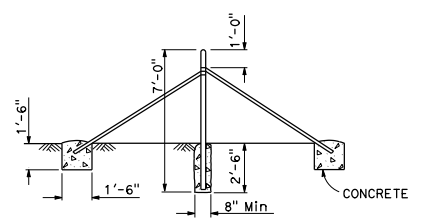
WIRE MESH GATE POST (SEE NOTE 3)		
GATE WIDTHS	NOMINAL Dia	WEIGHT PER FOOT
UP THRU 6'-0"	2 1/2"	5.79 LB
OVER 6'-0" THRU 12'-0"	3 1/2"	9.11 LB
OVER 12'-0" THRU 18'-0"	5"	14.62 LB
OVER 18'-0" TO 24'-0" Max	6"	18.97 LB



**OTHER HIGHWAYS FREEWAYS FENCE LOCATION**



**END AND CORNER POST ASSEMBLY**



**PULL POST ASSEMBLY**

At 660'-0" maximum intervals for WM fence.  
At 1320'-0" maximum intervals for BW fence.

**METAL POST INSTALLATION**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**BARBED WIRE AND WIRE MESH FENCES**

NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS


REGISTERED CIVIL ENGINEER  
Bruce D. Swanger  
No. C61257  
PLANS APPROVAL DATE  
October 30, 2015  
EXP. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**

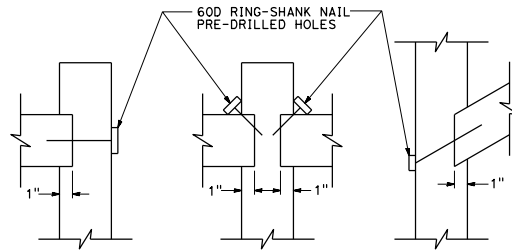
1. Metal end post and end bar shown. Use wood end post and end bar for wood post installation.
2. Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.
3. Post dimensions and weights are minimums. Larger sizes may be used on approval of the Engineer.



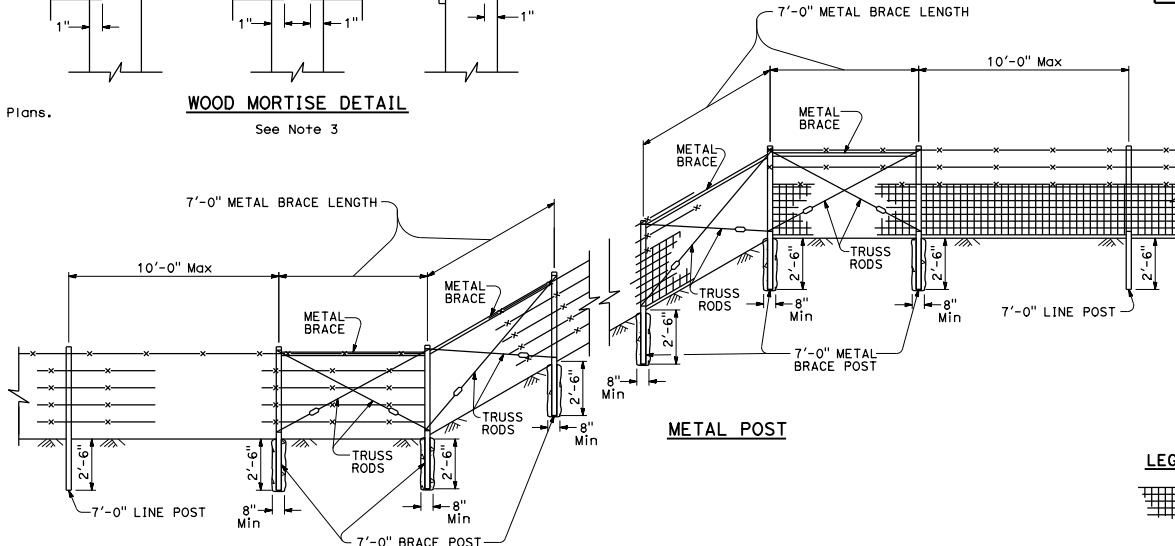
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER October 30, 2015 PLANS APPROVAL DATE No. C61257 Exp. 6-30-17 CIVIL STATE OF CALIFORNIA					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

**NOTES:**

- Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.
- See Standard Plan A86 for Barbed Wire and Wire Mesh dimensions and for steel post and wood post dimensions and weight.
- Use wood posts when specified in the Special Provisions or shown on the Project Plans.





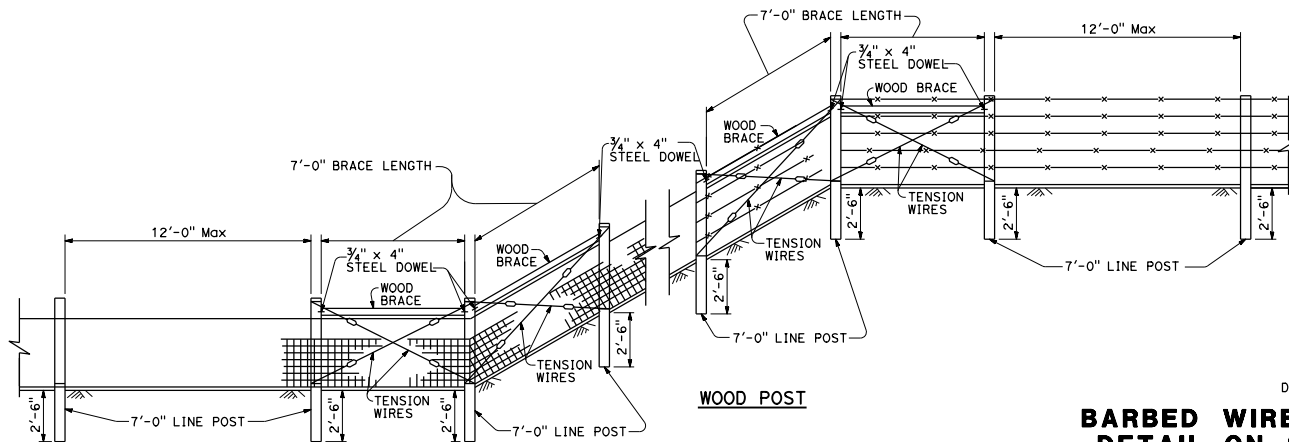
**WOOD MORTISE DETAIL**  
See Note 3



**METAL POST**

**LEGEND:**

-  WIRE MESH FENCING
-  BARBED WIRE FENCING



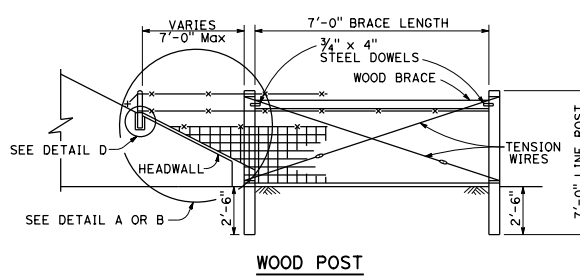
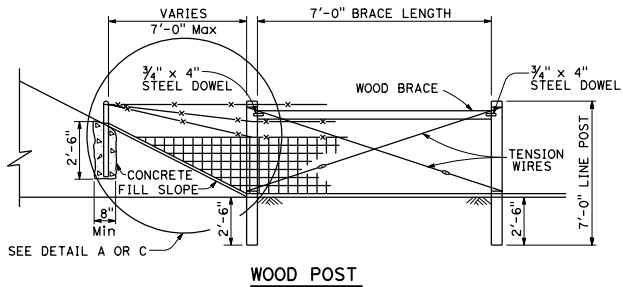
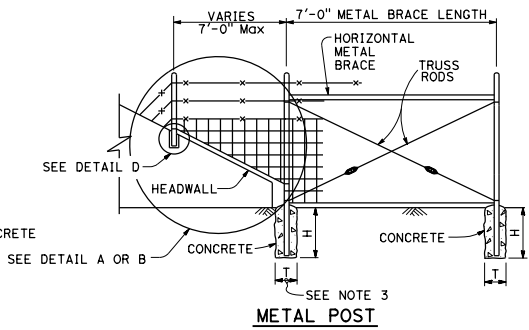
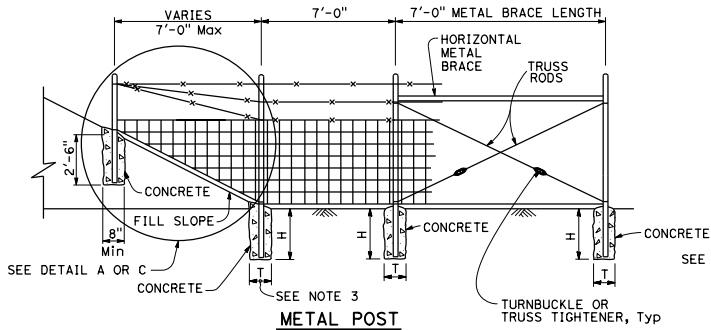
**WOOD POST**

**FENCE ON SHARP BREAK IN GRADE**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**BARBED WIRE AND WIRE MESH FENCE  
DETAIL ON SHARP BREAK IN GRADE**

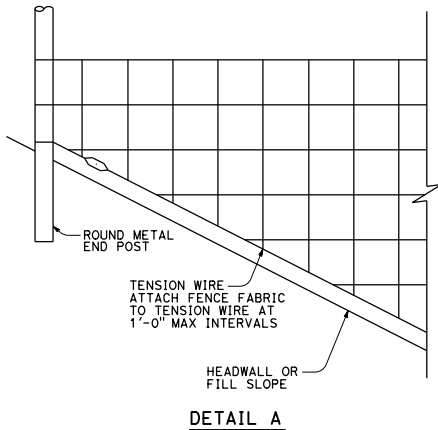
NO SCALE

**A86A**

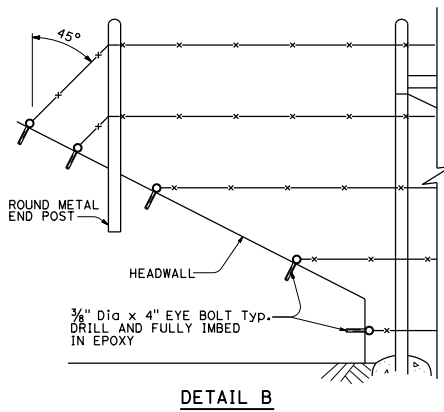


**METHOD OF ERECTING FENCE FOR FILL SLOPE**

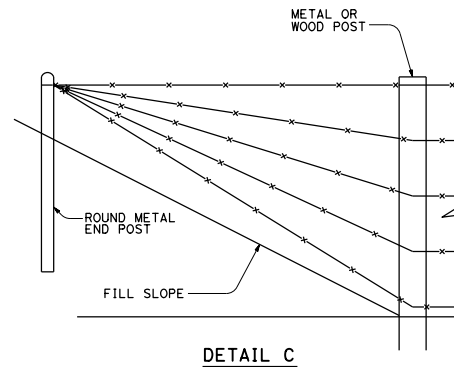
**METHOD OF TYING FENCE TO HEADWALL**



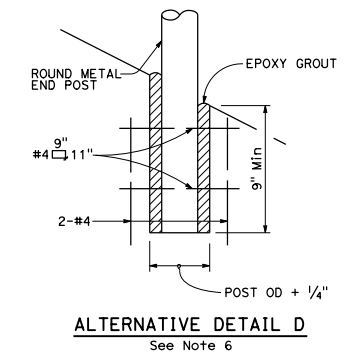
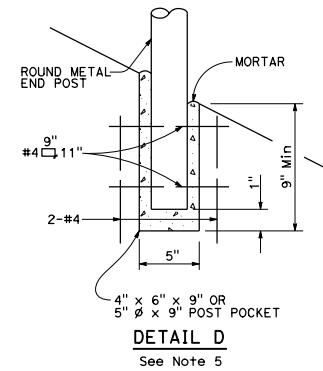
**DETAIL A**



**DETAIL B**



**DETAIL C**



**NOTES:**

1. Wire Mesh fencing shown, can also use Barbed Wire fencing.
2. See Standard Plan A86 for Wire Mesh and Barbed Wire fence dimensions.
3. T is not less than 3 times maximum cross section of post with minimum of 8".
4. H is 2'-6" for fabric less than 5'-0" high. H is 3'-0" for fabric 5'-0" and over.
5. May be used when thickness of concrete is 1'-0" or more.
6. May be used when thickness of concrete is 10" or more.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

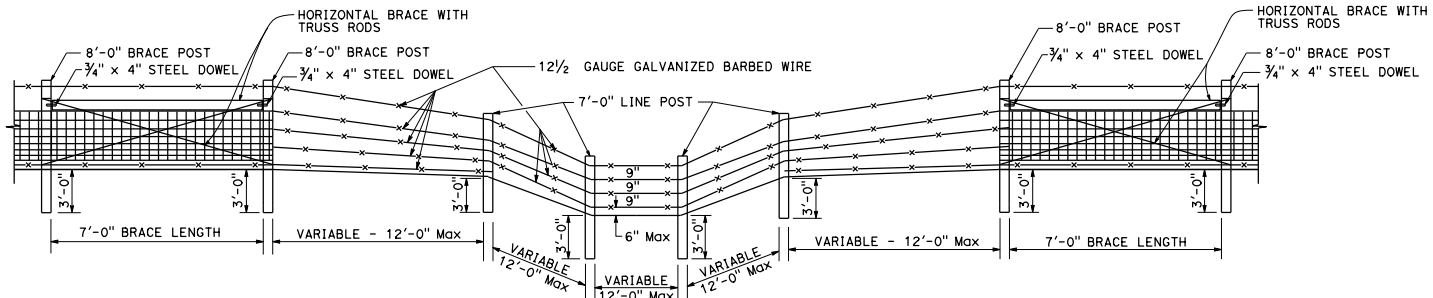
October 30, 2015  
 PLANS APPROVAL DATE  
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**BARBED WIRE AND WIRE MESH FENCE DETAILS**

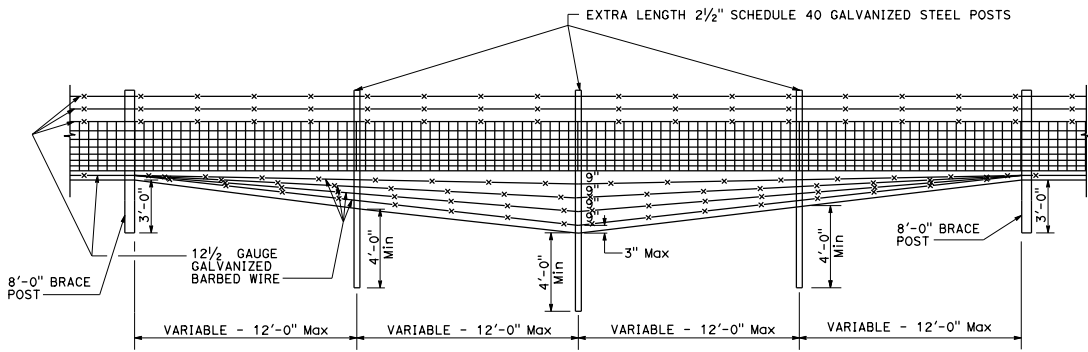
NO SCALE

**A86B**

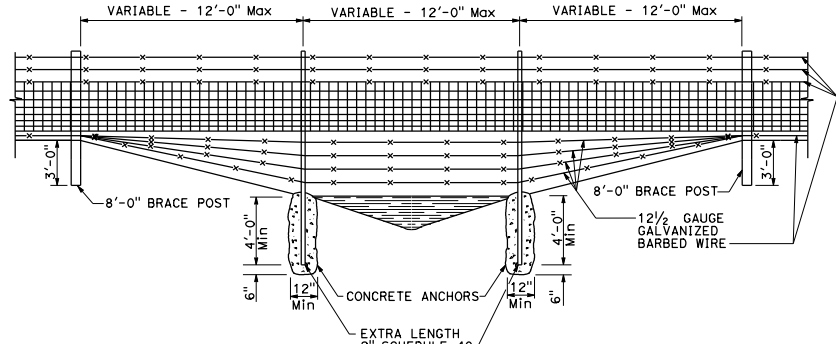
123



**TYPE I**



**TYPE II**



**TYPE III**  
**DITCH CROSSINGS**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

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**NOTES:**

1. Type I Ditch Crossing shows wood posts. Steel posts may be used in place of wood.
2. Ditch crossings show Wire Mesh fencing. Barbed Wire fencing may be used in place of Wire Mesh.
3. See Standard Plan A86 for Wire Mesh and Barbed Wire fence dimensions.
4. See Standard Plan A86 for steel post installation.

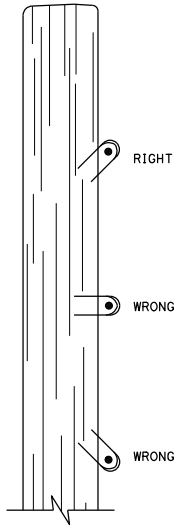
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**BARBED WIRE AND WIRE MESH  
FENCE DETAILS AT DITCH CROSSING**

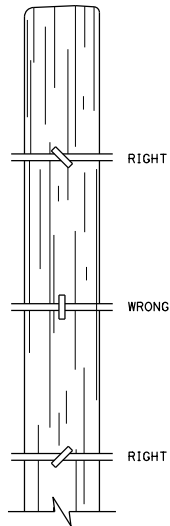
NO SCALE

**A86C**

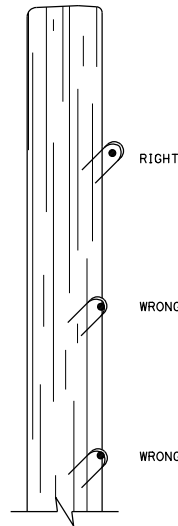
**2015 STANDARD PLAN A86C**



**DRIVE STAPLES AT ANGLE**



**DO NOT DRIVE STAPLES PARALLEL TO SIDE OF POST**

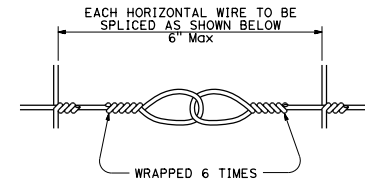


**LEAVE WIRE LOOSE IN STAPLE**

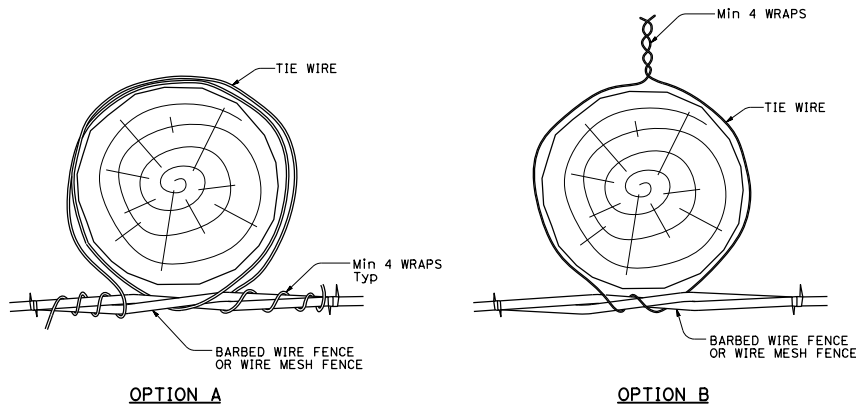
**LINE POST STAPLING DETAILS**  
(Apply to rectangular/square and round posts)  
Do not staple vertical wire in wire mesh.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Raymond Don Isztos  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
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**SPLICE DETAIL FOR BARBED WIRE/WIRE MESH FENCE**

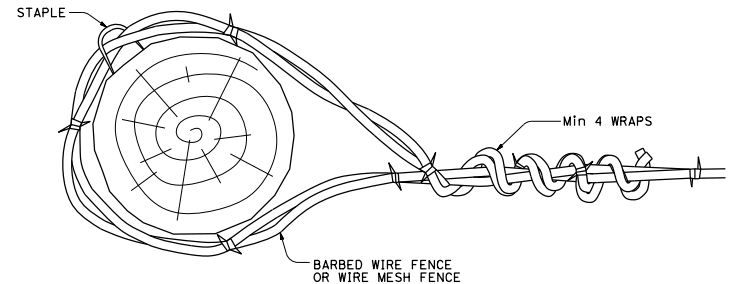


**OPTION A**

**OPTION B**

**LINE POST WIRE TIE OPTION DETAILS**

(Option details also apply to rectangular/square posts)



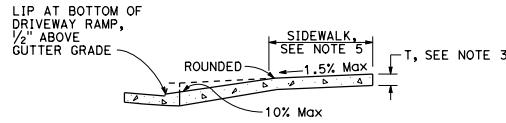
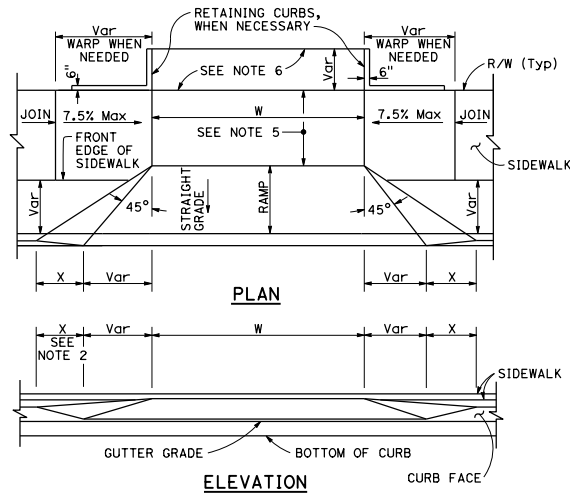
**END, LATCH, PULL, AND CORNER POST DETAIL**

(Also applies to rectangular/square posts)

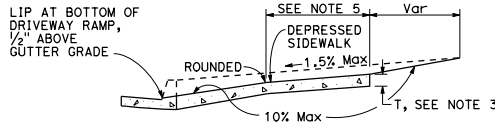
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**BARBED WIRE AND WIRE MESH FENCE - MISCELLANEOUS DETAILS**

NO SCALE

**A86D**



**CASE A**  
Typical driveway, sidewalk not depressed



**CASE B**  
Driveway with depressed sidewalk

**SECTIONS**

**TABLE A**

CURB TYPE	DIMENSIONS			
	"H1"	"H2"	"W1"	"W2"
A1-6	1'-2"	6"	7 1/2"	1 1/2"
A1-8	1'-4"	8"	8"	2"
A2-6	1'-0"	6"	2'-7 1/2"	1 1/2"
A2-8	1'-2"	8"	2'-8"	2"
A3-6	6"	5"	7 1/4"	1 1/4"
A3-8	8"	7"	7 3/4"	1 3/4"
B1-4	1'-0"	4"	7 1/2"	2 1/2"
B1-6	1'-2"	6"	9"	4"
B2-4	10"	4"	2'-7 1/2"	2 1/2"
B2-6	1'-0"	6"	2'-9"	4"
B3-4	4"	3"	7"	2"
B3-6	6"	5"	8 1/2"	3 1/2"
D-4	10"	4"	1'-6"	1'-1"
D-6	1'-0"	6"	2'-2"	1'-9"

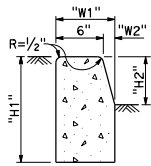
Dist	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	NO.	SHEETS

REGISTERED CIVIL ENGINEER  
Michael Janzen  
No. 44788  
PLANS APPROVAL DATE  
October 30, 2015  
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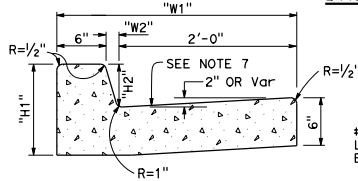
**CURB QUANTITIES**

TYPE	CUBIC YARDS PER LINEAR FOOT
A1-6	0.02585
A1-8	0.03084
A2-6	0.05903
A2-8	0.06379
A3-6	0.01036
A3-8	0.01435
B1-4	0.02185
B1-6	0.02930
B2-4	0.05515
B2-6	0.06171
B3-4	0.00641
B3-6	0.01074
B4	0.05709
D-4	0.04083
D-6	0.06804
E	0.06661

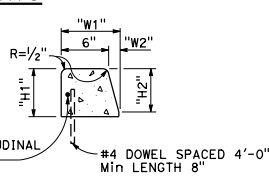
**DRIVEWAYS**



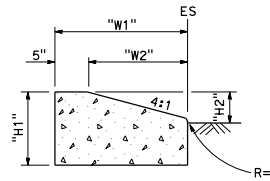
**TYPE A1 CURBS**  
See Table A



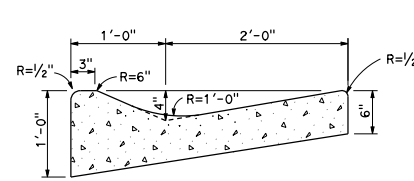
**TYPE A2 CURBS**  
See Table A



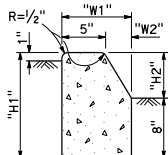
**TYPE A3 CURBS**  
Superimposed on existing pavement  
See Table A



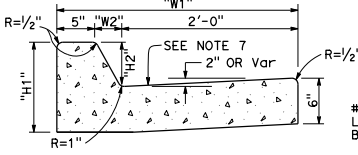
**TYPE D CURBS**  
See Table A



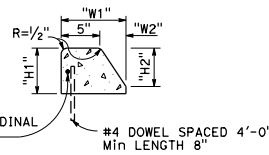
**TYPE E CURB**



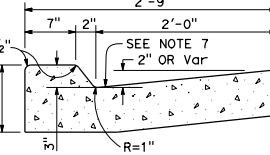
**TYPE B1 CURBS**  
See Table A



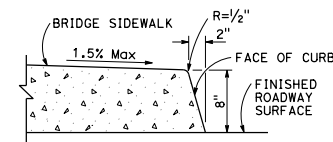
**TYPE B2 CURBS**  
See Table A



**TYPE B3 CURBS**  
Superimposed on existing pavement  
See Table A



**TYPE B4 CURBS**



**TYPE H CURB**  
On Bridges

**CURBS**

**NOTES:**


- Case A driveway section typically applies.
- X=3'-0" except for curb heights over 10" where 4:1 slopes shall be used on curb slope.
- Sidewalk and ramp thickness "T" for driveway shall be 4" for residential and 6" for commercial.
- Difference in slope of the driveway ramp and the slope of a line between the gutter and a point on the roadway 5'-0" from gutter line shall not exceed 15%. Reduce driveway ramp slope, not gutter slope, where required.
- Minimum width of clear passageway for sidewalk shall be 4'-2".
- Retaining curbs and acquisition of construction easement may be necessary for narrow sidewalks or curb heights in excess of 6".
- Across the pedestrian route at curb ramp locations, the gutter pan slope shall not exceed 1" of depth for each 2'-0" of width.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CURBS AND DRIVEWAYS**


NO SCALE

**A87A**

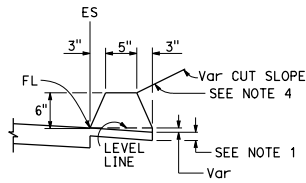
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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 REGISTERED CIVIL ENGINEER

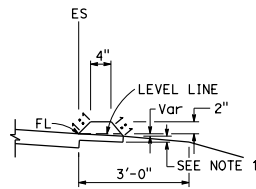
October 30, 2015  
 PLANS APPROVAL DATE



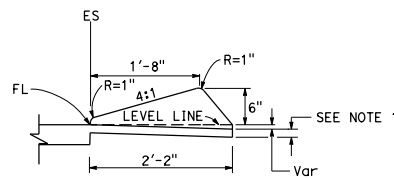
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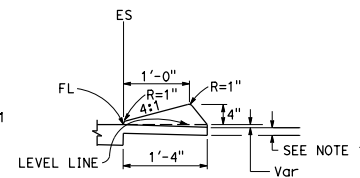
**TYPE A**  
See Note 3



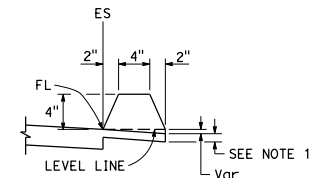
**TYPE C**



**TYPE D**

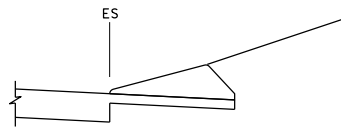


**TYPE E**

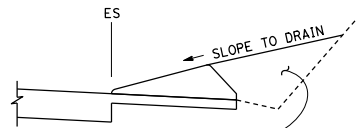


**TYPE F**  
See Note 5

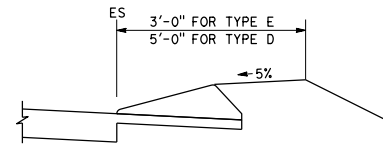
**DIKES**



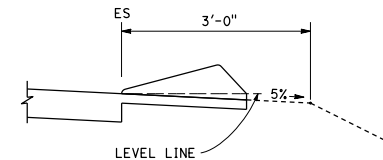
**CASE C-1**  
Cut Slope



**CASE C-2**  
Cut Slope



**CASE F**



**CASE R**  
See Note 2

**TYPE D AND E BACKFILL DETAILS**

**NOTES:**

- For HMA shoulders only, extend top layer of HMA placed on the shoulder under dike with no joint at the ES. For projects with OGFC shoulders, do not extend OGFC under dike. See project plans for modified dike detail.
- Case R applies to retrofit only projects where restrictive conditions do not provide enough width for Case F backfill.
- Type A dike only to be used where restrictive slope conditions do not provide enough width to use Type D or Type E dike.
- Fill and compact with excavated material to top of dike.
- Use Type F dike, where dike is required with guardrail installations. See Standard Plan A77N4 for dike positioning details.

**DIKE QUANTITIES**

TYPE	CUBIC YARDS PER LINEAR FOOT
A	0.0135
C	0.0038
D	0.0293
E	0.0130
F	0.0066

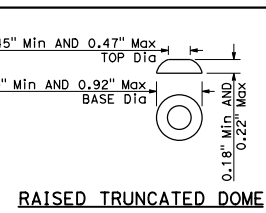
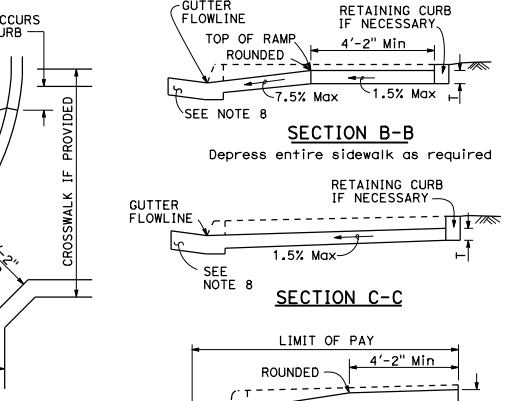
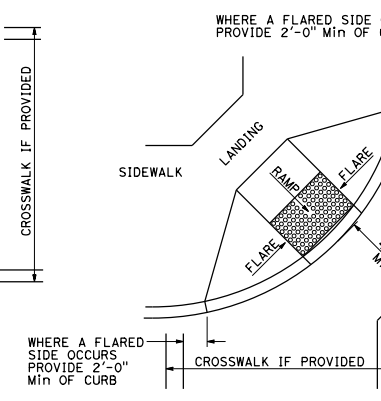
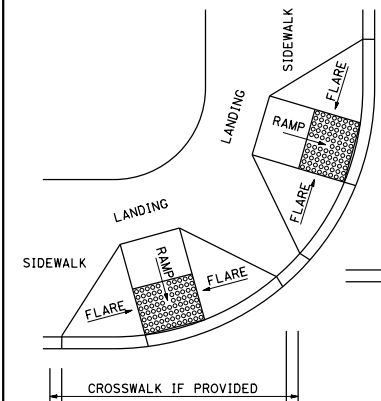
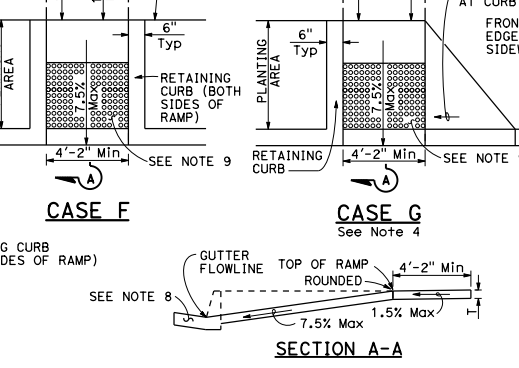
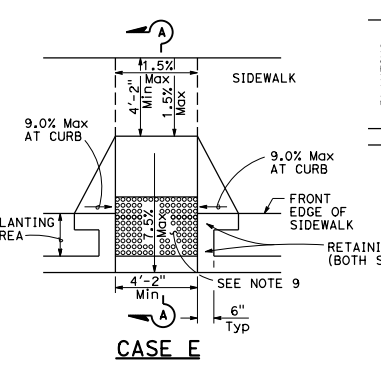
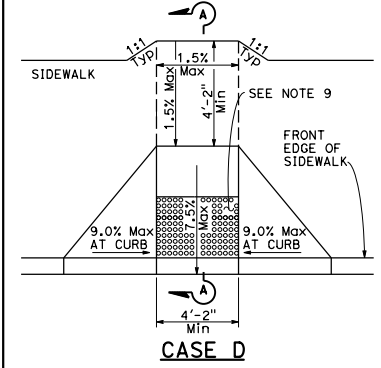
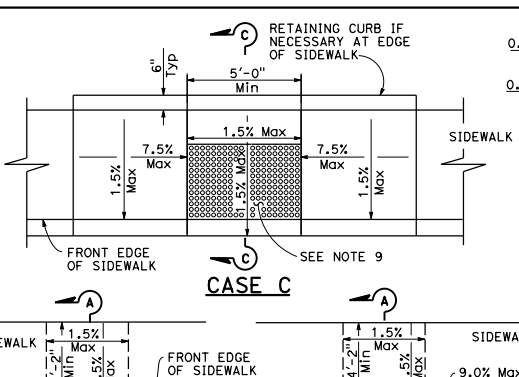
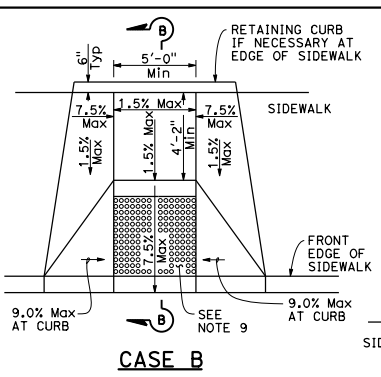
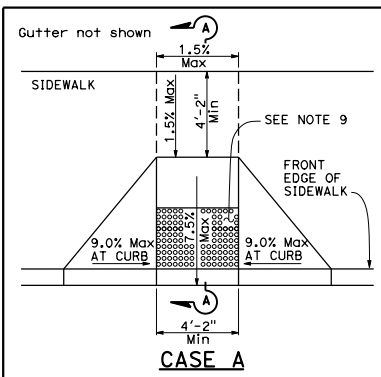
Quantities based on 5% cross slope.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**HOT MIX ASPHALT DIKES**

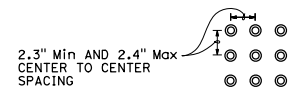
NO SCALE

**A87B**



**NOTES:**

1. As site conditions dictate, Case A through Case G curb ramps may be used for corner installations similar to those shown in Detail A and Detail B. The case of curb ramps used in Detail A do not have to be the same. Case A through Case G curb ramps also may be used at mid block locations, as site conditions dictate.
2. If distance from curb to back of sidewalk is too short to accommodate ramp and 4'-2" platform (landing) as shown in Case A, the sidewalk may be depressed longitudinally as in Case B or C or may be widened as in Case D.
3. When ramp is located in center of curb return, crosswalk configuration must be similar to that shown for Detail B.
4. As site conditions dictate, the retaining curb side and the flared side of the Case G ramp shall be constructed in reversed position.
5. If located on a curve, the sides of the ramp need not be parallel, but the minimum width of the ramp shall be 4'-2".
6. Side slope of ramp flares vary uniformly from a maximum of 9.0% at curb to conform with longitudinal sidewalk slope adjacent to top of the ramp, except in Case C and Case F.
7. Transitions from ramps and landing to walks, gutters or streets shall be flush (no lip) and free of abrupt changes.
8. Counter slopes of adjoining gutters and road surfaces immediately adjacent to and within 24 inches of the curb ramp shall not be steeper than 1V:20H (5.0%). Gutter pan slope shall not exceed 1" of depth for each 2'-0" of width.
9. Curb ramps shall have a detectable warning surface that extends the full width and 3'-0" depth of the ramp. A 4'-0" wide detectable warning surface may be used on a 4'-2" wide curb ramp. Detectable Warning Surfaces shall conform to the requirements in the Standard Specifications.
10. Sidewalk and ramp thickness, "T", shall be 3/2" minimum.
11. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
12. Detectable warning surface may have to be cut to allow removal of utility covers while maintaining full detectable warning width and depth.



**RAISED TRUNCATED DOME PATTERN (IN-LINE) DETECTABLE WARNING SURFACE**

See Note 9

**CURB RAMP DETAILS**

NO SCALE

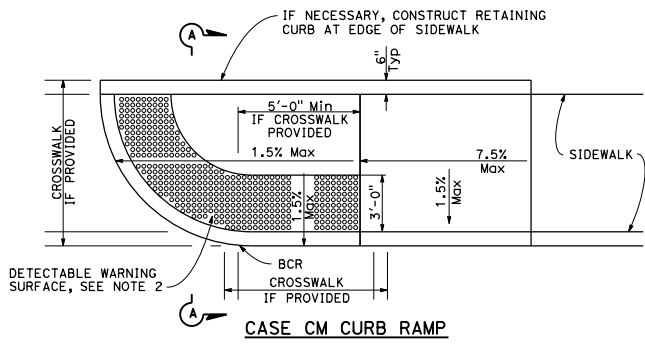
**A88A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

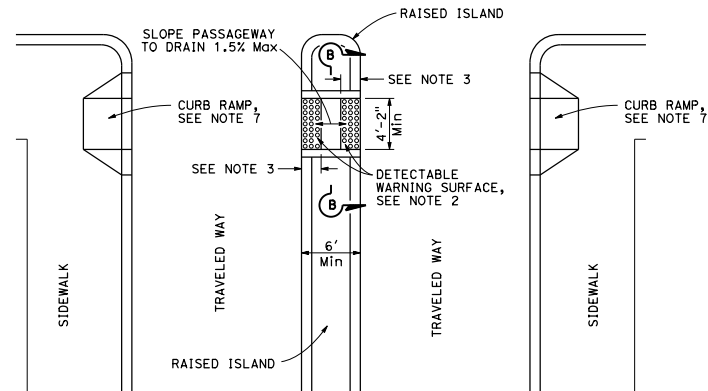
**H. David Cordova**  
 REGISTERED CIVIL ENGINEER  
 No. C41957  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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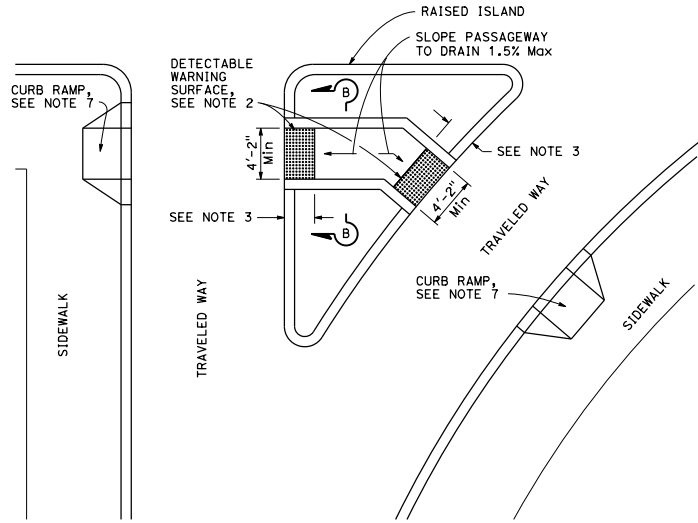
Gutter not shown



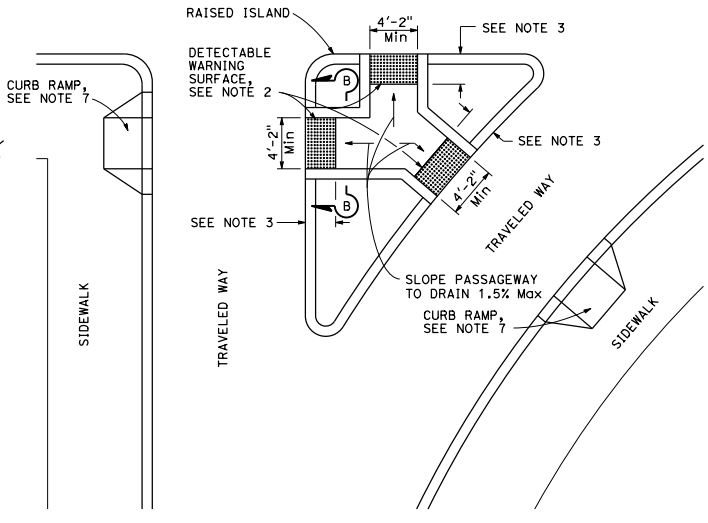
**CASE CM CURB RAMP**



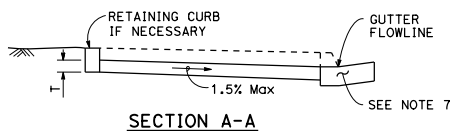
**TYPE A PASSAGEWAY**



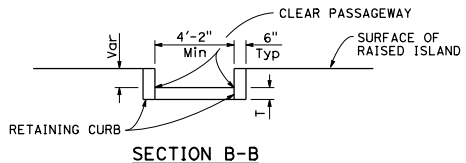
**TYPE B PASSAGEWAY**



**TYPE C PASSAGEWAY**



**SECTION A-A**



**SECTION B-B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*H. David Cordova*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER  
Hector David Cordova  
No. C41957  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

**NOTES:**

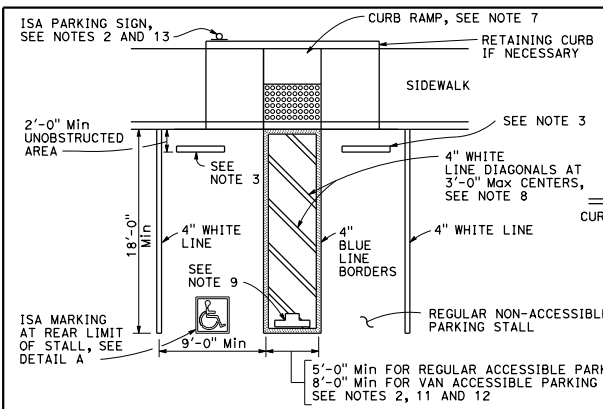
1. Sidewalk, ramp and passageway thickness, "T", shall be 3 1/2" minimum.
2. For details of detectable warning surfaces, see Standard Plan A88A.
3. Where an island passageway length is greater than or equal to 6'-0", but less than 8'-0", each detectable warning surface shall extend the full width and 2'-0" depth of the passageway length. Where an island passageway length is greater than or equal to 8'-0", each detectable warning surface shall extend the full width and 3'-0" depth of the passageway length. A 4'-0" wide detectable warning surface may be used on a 4'-2" wide island passageway.
4. Transitions from ramps to walks, gutters or streets shall be flush (no lip) and free of abrupt changes.
5. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
6. Detectable warning surface may have to be cut to allow removal of utility covers while maintaining full detectable warning width and depth.
7. For additional curb ramp details, see Standard Plan A88A.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CURB RAMP AND ISLAND PASSAGEWAY DETAILS**

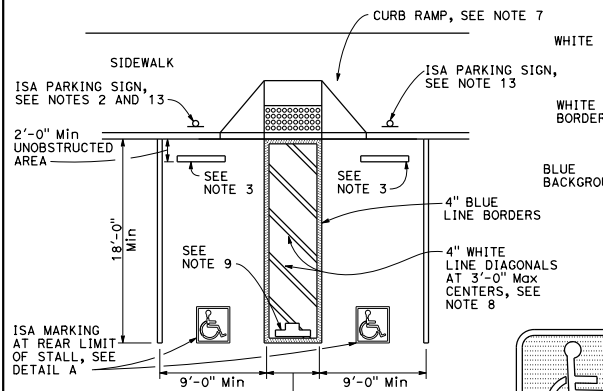
NO SCALE

**A88B**





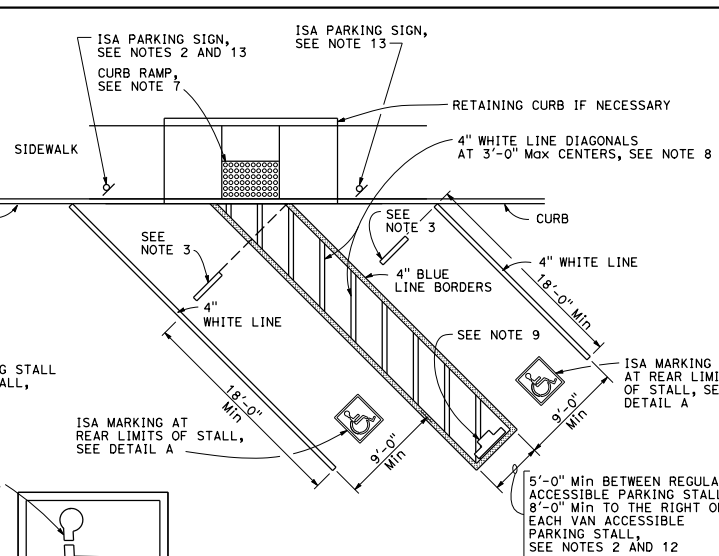
**SINGLE PARKING STALL**



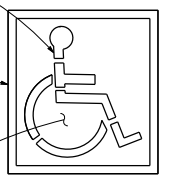
**DOUBLE PARKING STALL**

**TABLE A**

TOTAL NUMBER OF PARKING SPACES PROVIDED IN PARKING FACILITY	MINIMUM NUMBER OF REQUIRED ACCESSIBLE PARKING SPACES
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-300	7
301-400	8
401-500	9
501-1000	2 PERCENT OF TOTAL
1001 AND OVER	20 PLUS 1 FOR EACH 100 OR FRACTION THEREOF OVER 1000



**DIAGONAL DOUBLE PARKING STALLS**



**DETAIL A**  
ISA MARKING  
See Standard Plan A24C



SIGN R99 (CA)



PLAQUE R99B (CA)

SIGN R99 (CA) with PLAQUE R99B (CA)  
See Note 6



SIGN R99C (CA)  
See Note 6



SIGN R100B (CA)  
See Note 10



SIGN R7-8b  
See Notes 2 and 6

**OFF-STREET PARKING SIGNS**

(Parking lot or garage)  
See Note 6

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*H. David Cordova*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Hector David Cordova  
No. C41957  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**

1. Accessible parking spaces serving a particular building shall be located on the shortest accessible route of travel from adjacent parking to an accessible entrance. In parking facilities that do not serve a particular building, accessible parking shall be located on the shortest accessible route of travel to an accessible pedestrian entrance of the parking facility.
2. One in every six accessible off-street parking stalls, but not less than one, shall be served by an accessible aisle of 8'-0" minimum width and shall be signed with accessible. The R7-8b sign shall be mounted below the R99B (CA) plaque or the R99C (CA) sign.
3. In each parking stall, a curb or parking bumper shall be provided if required to prevent encroachment of vehicles over the required width of walkways. Parking stalls shall be so located that persons with disabilities are not compelled to wheel or walk behind parked vehicles other than their own. For more parking bumper requirements, see the Standard Specifications.
4. Parking spaces and access aisles shall be level with surface slopes not exceeding 1.5% in all directions.
5. Table A shall be used to determine the required number of accessible parking stalls in each parking lot or garage.
6. Where Plaque R99B (CA), Sign R99C (CA) or Sign R7-8b are installed, the bottom of the sign or plaque panel shall be a minimum of 7'-0" above the surrounding surface.
7. Curb ramps shall conform to the details shown on Standard Plan A88A.
8. Blue paint, instead of white may be used for marking accessibility aisles in areas where snow may cause white markings to not be visible.
9. The words "NO PARKING", shall be painted in white letters no less than 1'-0" high and located so that it is visible to traffic enforcement officials. See Standard Plan A90B for details of the "NO PARKING" pavement marking.
10. A R100B (CA) sign shall be posted in a conspicuous place at each entrance to off-street parking facilities or immediately adjacent to and visible from each stall. The sign shall include the address where the towed vehicle may be reclaimed and the telephone number of the local traffic law enforcement agency.
11. Where a single (non-van) accessible parking space is provided, the loading and unloading access aisle shall be on the passenger side of the vehicle as the vehicle is going forward into the parking space.
12. Where a van accessible parking space is provided, the loading and unloading access aisle shall be 8'-0" wide minimum, and shall be on the passenger side of the vehicle as the vehicle is going forward into the parking space.
13. Accessible Parking Only Sign shall be Sign R99C (CA) or Sign R99 (CA) with Plaque R99B (CA).

**LEGEND**

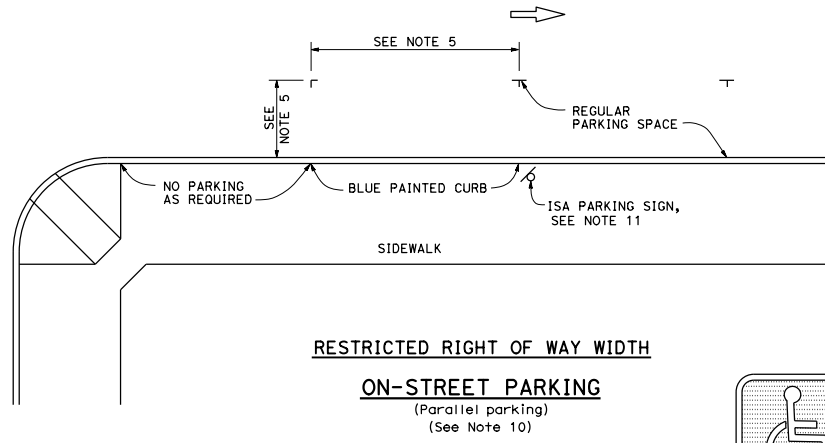
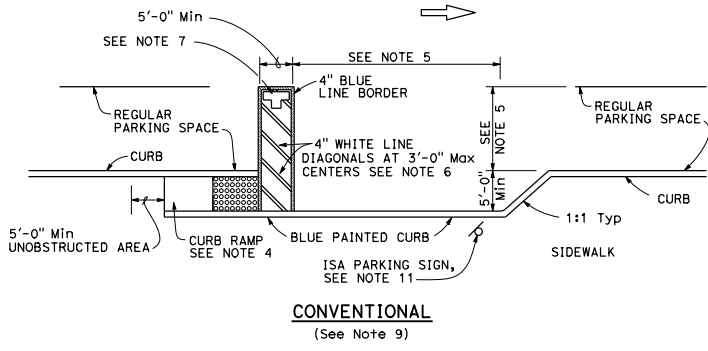
ISA = International Symbol of Accessibility

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ACCESSIBLE PARKING  
OFF-STREET**

NO SCALE

**A90A**

130



**NO  
PARKING**

**PAVEMENT MARKING**  
See Note 7



SIGN R99 (CA)



PLAQUE R99B (CA)  
SIGN R99 (CA) with PLAQUE R99B (CA)  
See Note 3



SIGN R99C (CA)  
See Note 3

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*H. David Cordova*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Hector David Cordova  
No. C41957  
Exp. 3-31-16  
CIVIL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

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**NOTES:**

- Parking spaces shall be so located that persons with disabilities are not compelled to wheel or walk behind parked vehicles other than their own.
- Surface slopes of accessible on-street parking spaces shall be the minimum feasible.
- Where Plaque R99B (CA) or Sign R99C (CA) are installed, the bottom of the sign or plaque panel shall be a minimum of 7'-0" above the surrounding surface.
- Curb ramps shall conform to the details shown on Standard Plan A88A.
- Accessible on-street parking spaces shall not be smaller in length or width than that specified by the local jurisdiction for other parking spaces, but not less than 20'-0" in length and not less than 8'-0" in width.
- Blue paint, instead of white may be used for marking accessibility aisles in areas where snow may cause white markings to not be visible.
- The words "NO PARKING", shall be painted in white letters no less than 1'-0" high on a contrasting background and located so that it is visible to traffic enforcement officials. See Standard Plan A24E for square foot area for painting the words "NO PARKING".
- There shall be no obstructions on the sidewalk adjacent to and for the full length of the parking space, except for the ISA parking sign snow.
- The Conventional detail should be the primary choice of accessible on-street parking. However, if the sidewalk lacks adequate space to construct a standard curb ramp, the Restricted Right of Way detail should be used.
- If the Restricted Right of Way width detail is selected and it conflicts with a bus stop or other uses, this detail may apply to the other end of the block.
- Accessible Parking Only Sign shall be Sign R99C (CA) or Sign R99 (CA) with Plaque R99B (CA).

**LEGEND**

ISA = International Symbol of Accessibility

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ACCESSIBLE PARKING  
ON-STREET**

NO SCALE

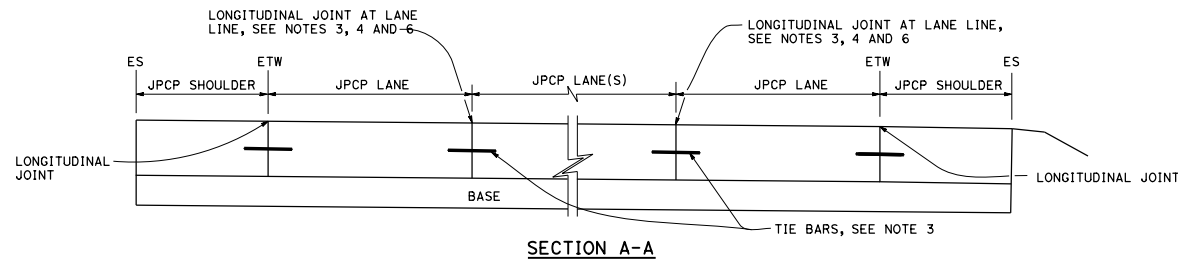
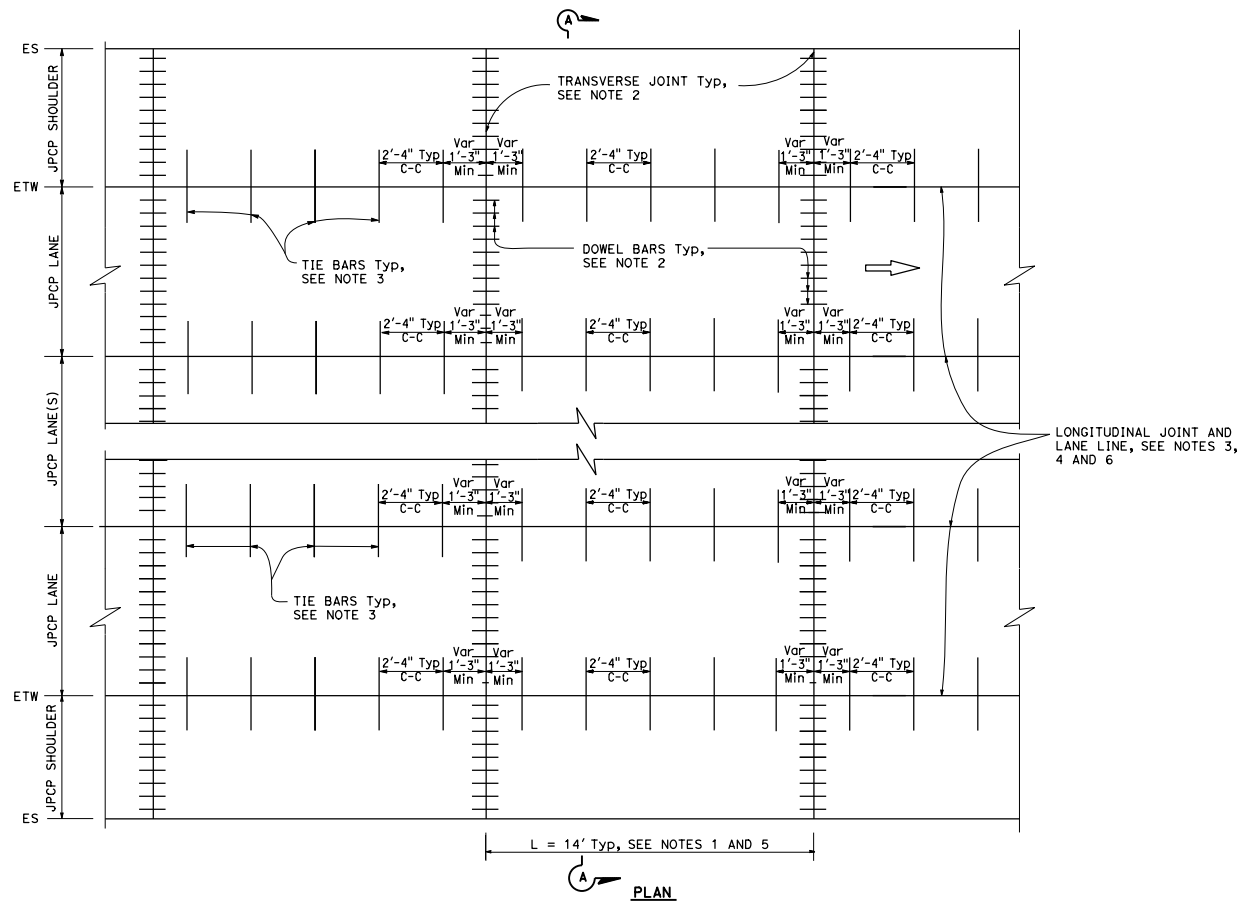
**A90B**

2015 STANDARD PLAN A90B

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*William K. Farnbach*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
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REGISTERED PROFESSIONAL ENGINEER  
 William K. Farnbach  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA



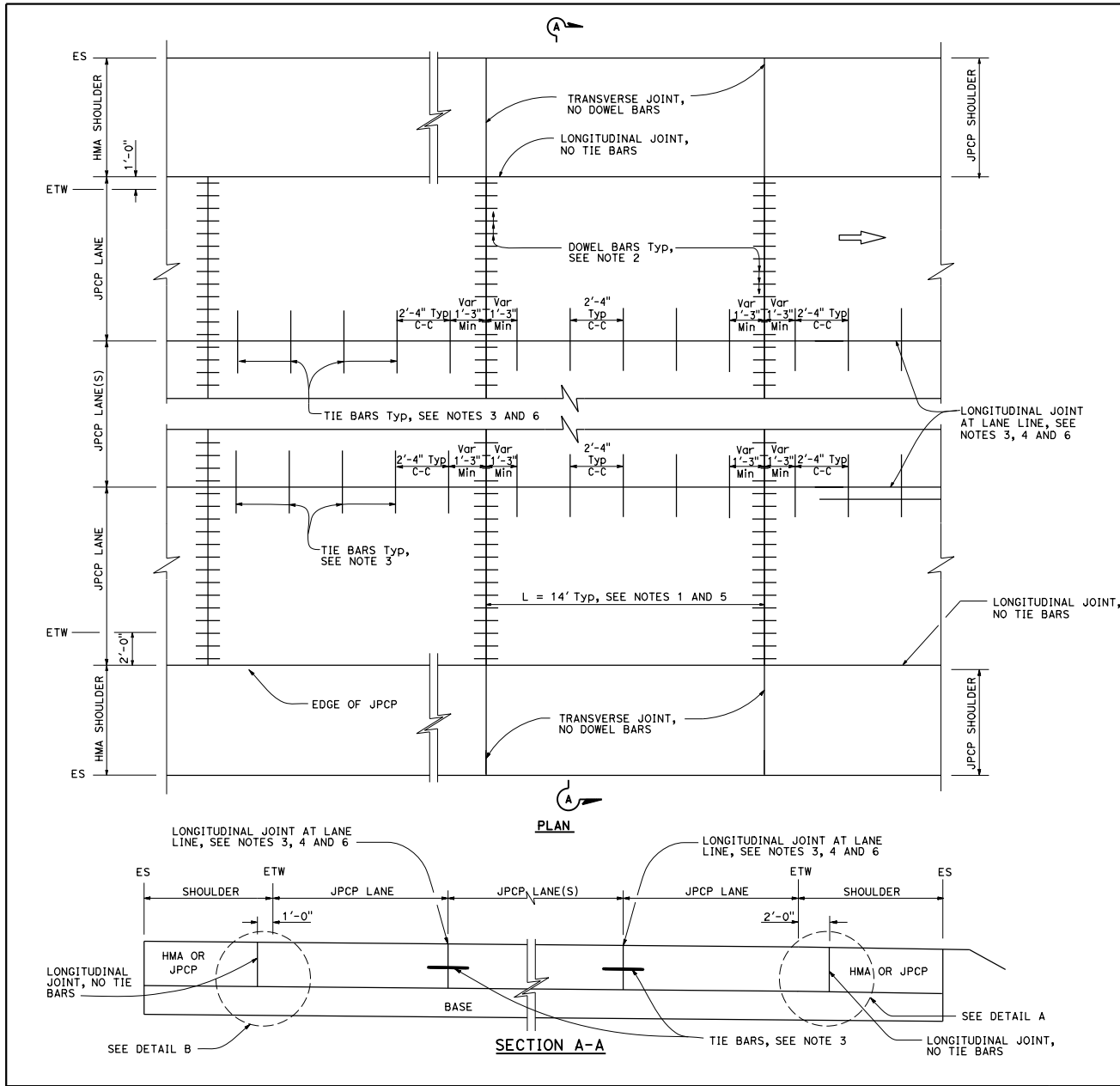
**NOTES:**

1. Transverse joint spacing may be adjusted to no less than 10' and no more than 14' to conform to bridges, change in pavement type, and hardened concrete pavement.
2. For transverse joint and dowel bar details not shown, see Standard Plan P10.
3. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
4. For additional longitudinal joint layout details, see Standard Plan P18.
5. For joint layout at intersections, see Project Plans.
6. For dowel bars at longitudinal joint, see Standard Plan P18.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**JOINTED PLAIN  
 CONCRETE PAVEMENT  
 NEW CONSTRUCTION**

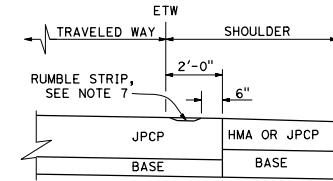
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**P1**

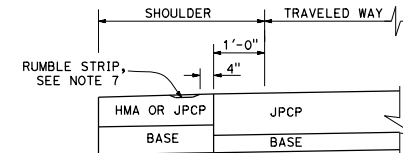


**NOTES:**

1. Transverse joint spacing may be adjusted to no less than 10' and no more than 14' to conform to bridges, change in pavement type, and hardened concrete pavement.
2. For transverse joint and dowel bar details not shown, see Standard Plan P10.
3. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
4. For additional longitudinal joint layout details, see Standard Plan P18.
5. For joint layout at intersections, see Project Plans.
6. For dowel bars at longitudinal joint, see Standard Plan P18.
7. For limits of rumble strips, see Projects Plans.



**DETAIL A**



**DETAIL B**

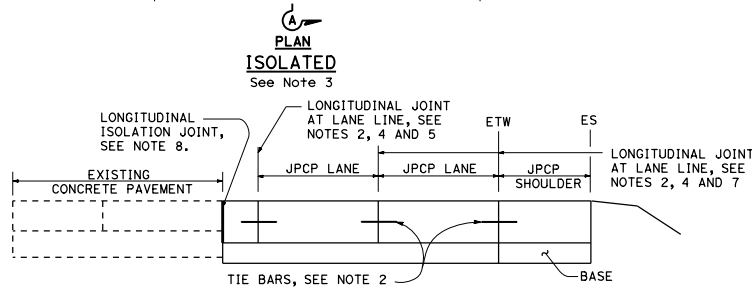
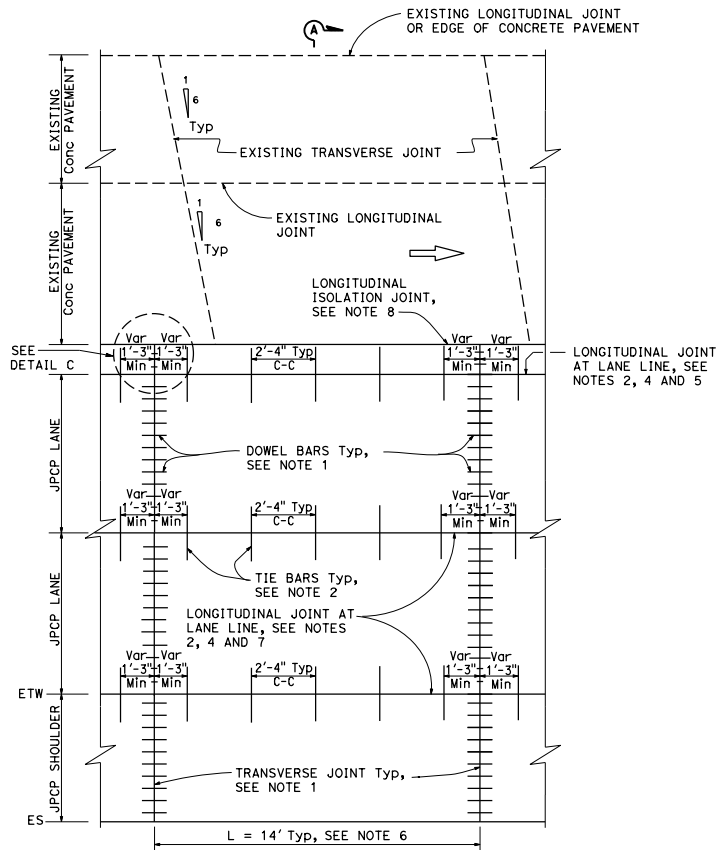
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**JOINTED PLAIN  
CONCRETE PAVEMENT  
(WIDENED LANE)  
NEW CONSTRUCTION**

NO SCALE

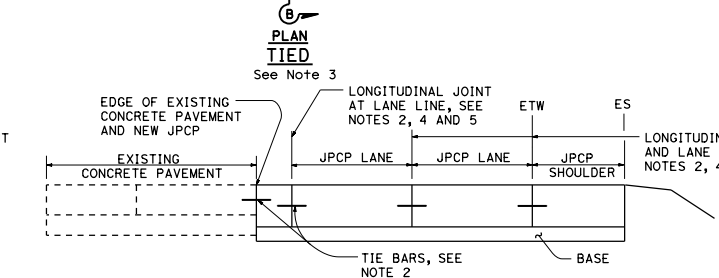
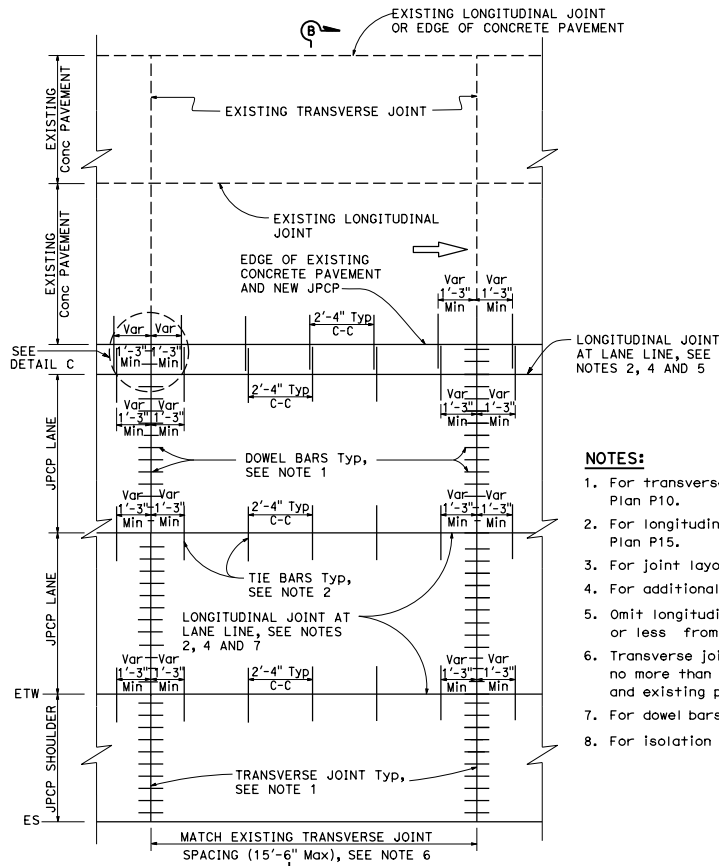
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
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*William K. Farnbach*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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SECTION A-A

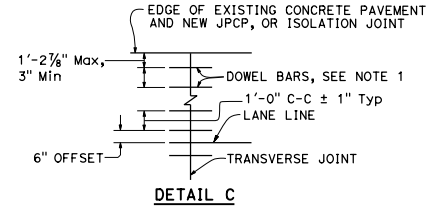


SECTION B-B

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*William K. Farnbach*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA  
 REGISTERED PROFESSIONAL ENGINEERS

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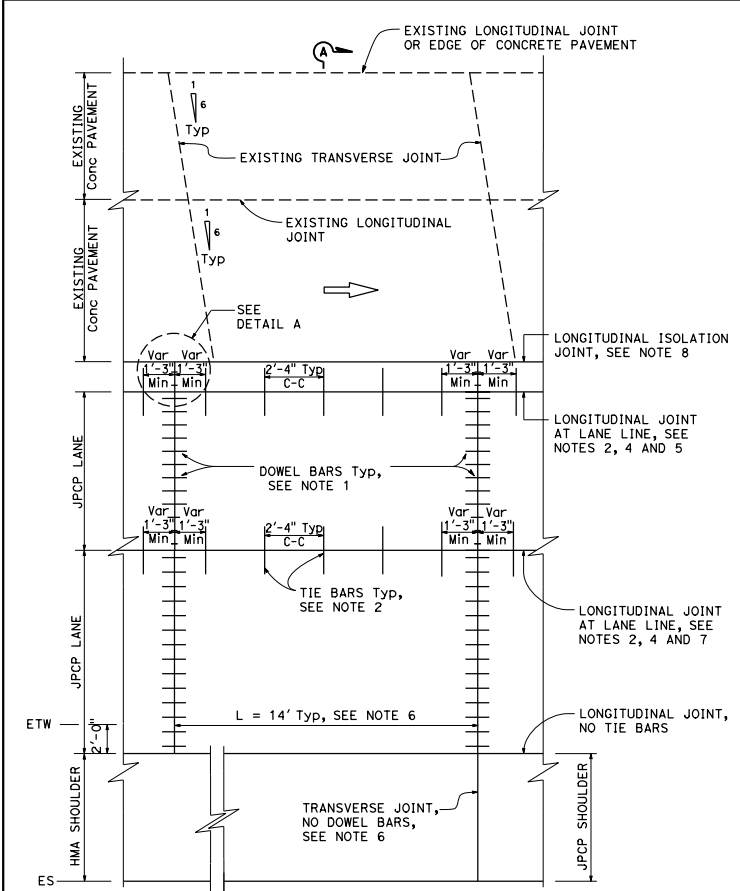
DETAIL C

**NOTES:**

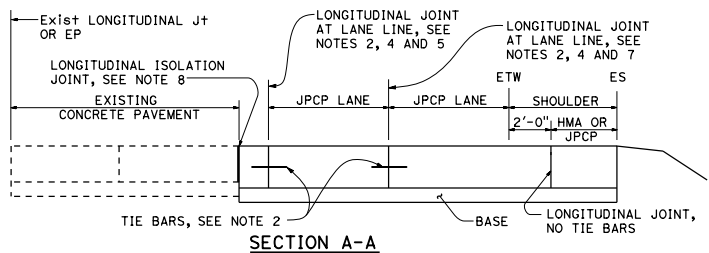
1. For transverse joint and dowel bar details not shown, see Standard Plan P10.
2. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
3. For joint layout at intersections, see Project Plans.
4. For additional longitudinal joint details, see Standard Plan P18.
5. Omit longitudinal joint when edge of new concrete pavement is 3'-3" or less from JPCP lane line.
6. Transverse joint spacing may be adjusted to no less than 10' and no more than 15'-6" to conform to bridges, change in pavement type and existing pavement.
7. For dowel bars at longitudinal joint. see Standard Plan P18.
8. For isolation joints, see Detail A on Standard Plan P18.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**JOINED PLAIN CONCRETE PAVEMENT LANE AND SHOULDER ADDITION OR REPLACEMENT**

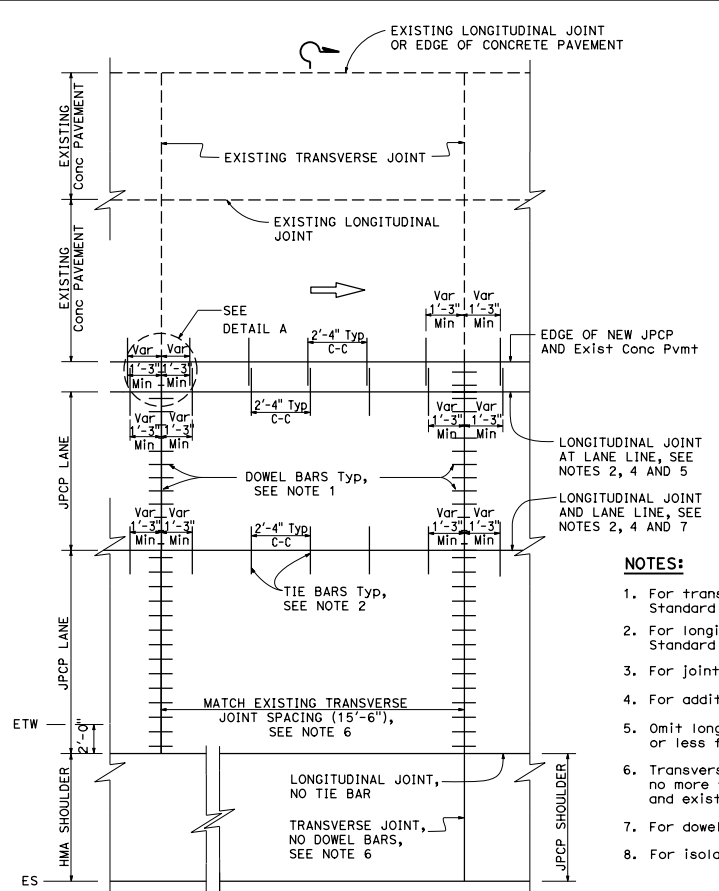
NO SCALE **P3A**



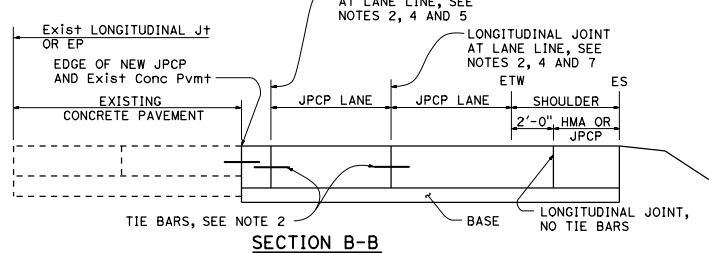
**PLAN ISOLATED**  
See Note 3



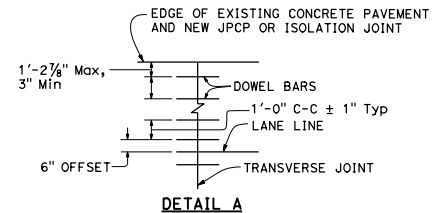
**SECTION A-A**



**PLAN TIED**  
See Note 3



**SECTION B-B**



**DETAIL A**

**NOTES:**

1. For transverse joint and dowel bar details not shown, see Standard Plan P10.
2. For longitudinal joint and tie bar details not shown, see Standard Plan P15.
3. For joint layout at intersections, see Project Plans.
4. For additional longitudinal joint details, see Standard Plan P18.
5. Omit longitudinal joint when edge of new concrete pavement is 3'-3" or less from JPCP lane line.
6. Transverse joint spacing may be adjusted to no less than 10' and no more than 15'-6" to conform to bridges, change in pavement type and existing pavement.
7. For dowel bars at longitudinal joint, see Standard Plan P18.
8. For isolation joints, see Detail A on Standard Plan P18.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**JOINED PLAIN  
CONCRETE PAVEMENT  
(WIDENED LANE)  
LANE AND SHOULDER  
ADDITION OR  
REPLACEMENT**

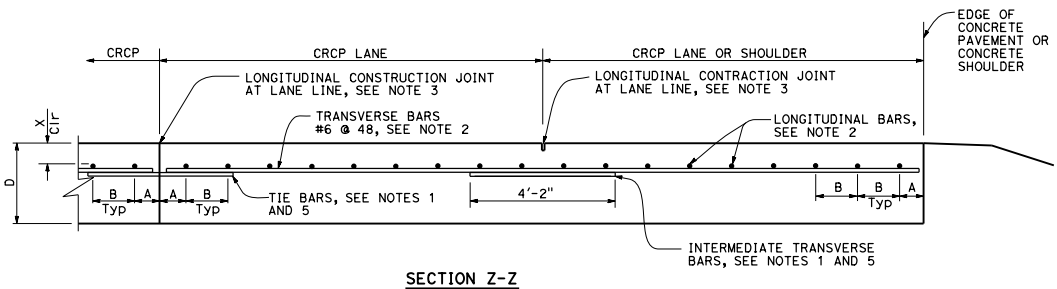
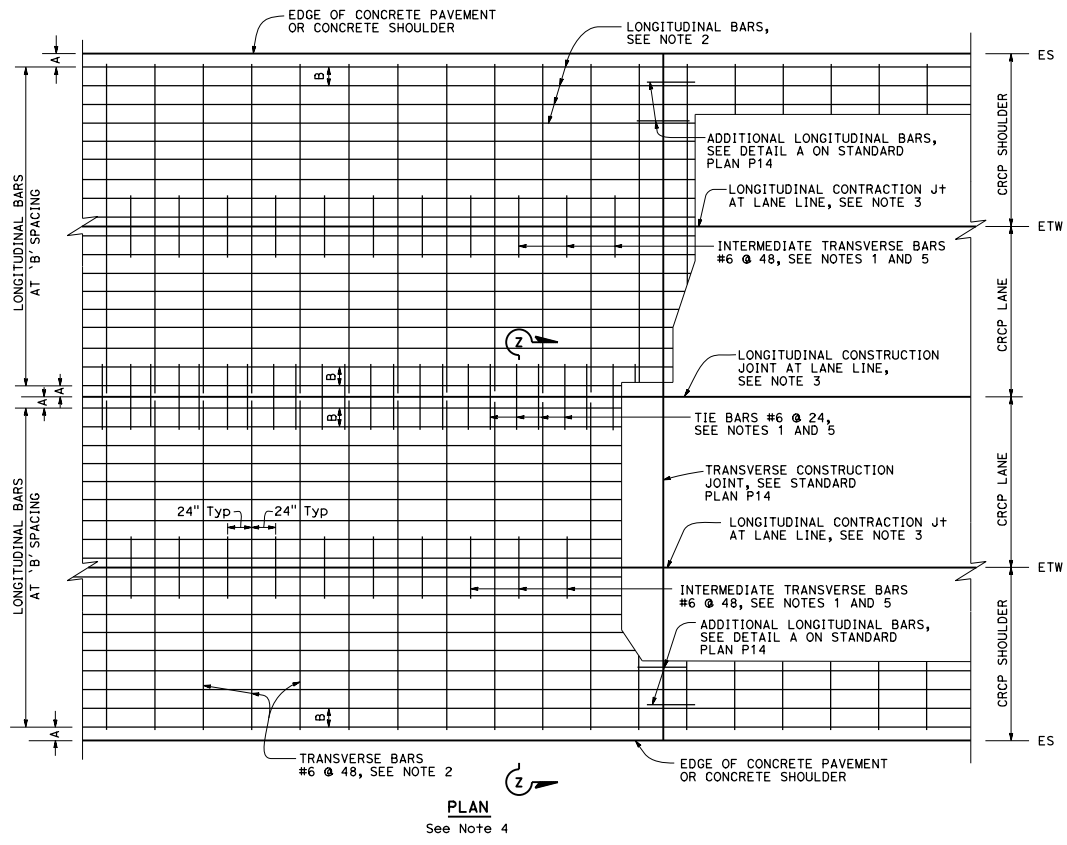
NO SCALE

**P3B**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

William K. Farnbach  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Flornie E. Baultista*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Flornie E. Baultista  
No. 054859  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

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**TABLE No. 1 LONGITUDINAL BAR REINFORCEMENT**

SLAB THICKNESS AND BAR SIZE		FIRST SPACING AT EDGE OR JOINT	REGULAR BARS	ADDITIONAL BARS AT TRANSVERSE CONSTRUCTION JOINT	Clr
D	BAR SIZE	SPACING A	SPACING B	SPACING 2 x B	X
.75'	#6	3" TO 4"	8.0"	16"	4"
.80'	#6	3" TO 4"	7.5"	15"	4"
.85'	#6	3" TO 4"	7.0"	14"	4"
.90'	#6	3" TO 4"	6.5"	13"	4"
.95'	#6	3" TO 4"	6.25"	12.5"	4"
1.00'	#6	3" TO 4"	6.0"	12"	5"
1.05'	#6	3" TO 4"	5.75"	11.5"	5"
1.10'	#6	3" TO 4"	5.5"	11"	5.5"

- NOTES:**
1. Place tie bars and intermediate transverse bars parallel to and in the same plane as transverse bars.
  2. The length of lap splices for bar reinforcement must be at least 25'.
  3. For longitudinal contraction and construction joint details, see Standard Plan P16.
  4. For curved lane layout see Standard Plan P16.
  5. For tie bar and intermediate transverse bar details, see Standard Plan P16.

**ABBREVIATION:**  
D = Thickness of CRCP

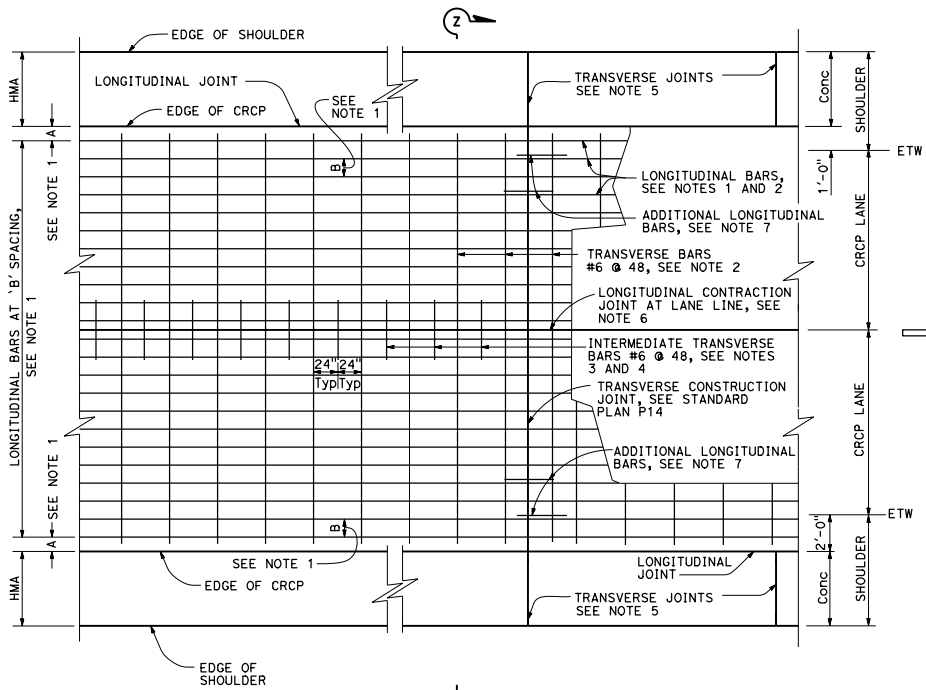
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT**

NO SCALE

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Pump & Blum**  
 REGISTERED CIVIL ENGINEER  
 Florante E. Bautista  
 No. CS4859  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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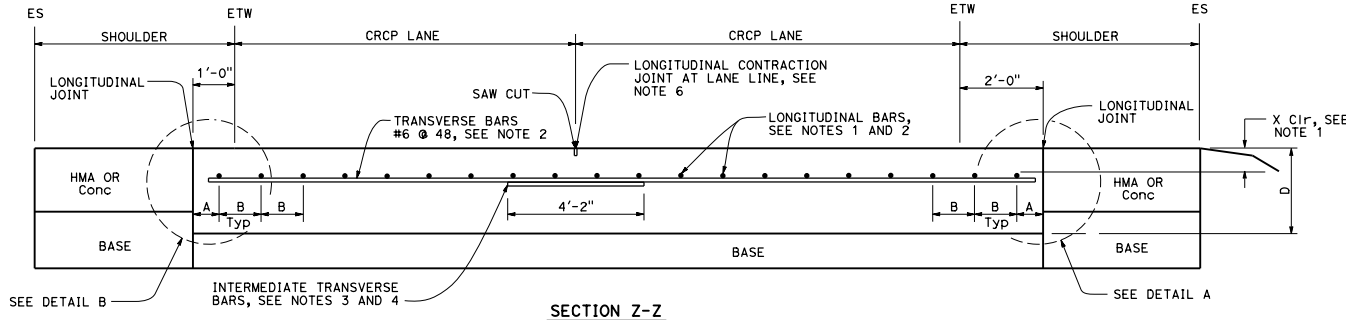
**NOTES:**

1. For longitudinal bar size, spacing and clearances, see Standard Plan P4.
2. The length of lap splices for bar reinforcement must be at least 25".
3. For tie bar and intermediate transverse bar details, see Standard Plan P16.
4. Place intermediate transverse bars parallel to and in the same plane as transverse bars.
5. Construct transverse joints at right angle to the longitudinal joints in adjacent CRCP. Space joints at no less than 10' intervals and no more than 14' intervals. Match location of JPCP transverse joint with CRCP transverse construction joint, expansion joint or wide flange beam. Omit dowel bars.
6. For longitudinal contraction joint details, see Standard Plan P16.
7. For additional longitudinal bars detail, see Detail A on Standard Plan P14.
8. For longitudinal construction joint plan layout not shown, see Standard Plan P4. For tie bar details at longitudinal construction joint, see Standard Plan P16.
9. For limits of rumble strips, see Project Plans.

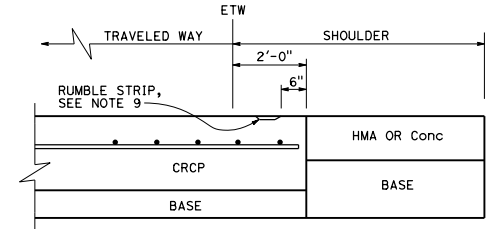
**ABBREVIATION:**

D = Thickness of CRCP

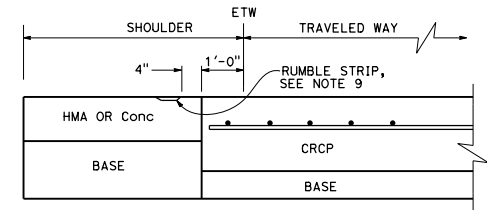
**PLAN**  
See Note 8



**SECTION Z-Z**



**DETAIL A**



**DETAIL B**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONTINUOUSLY REINFORCED  
 CONCRETE PAVEMENT  
 (WIDENED LANE)**

NO SCALE

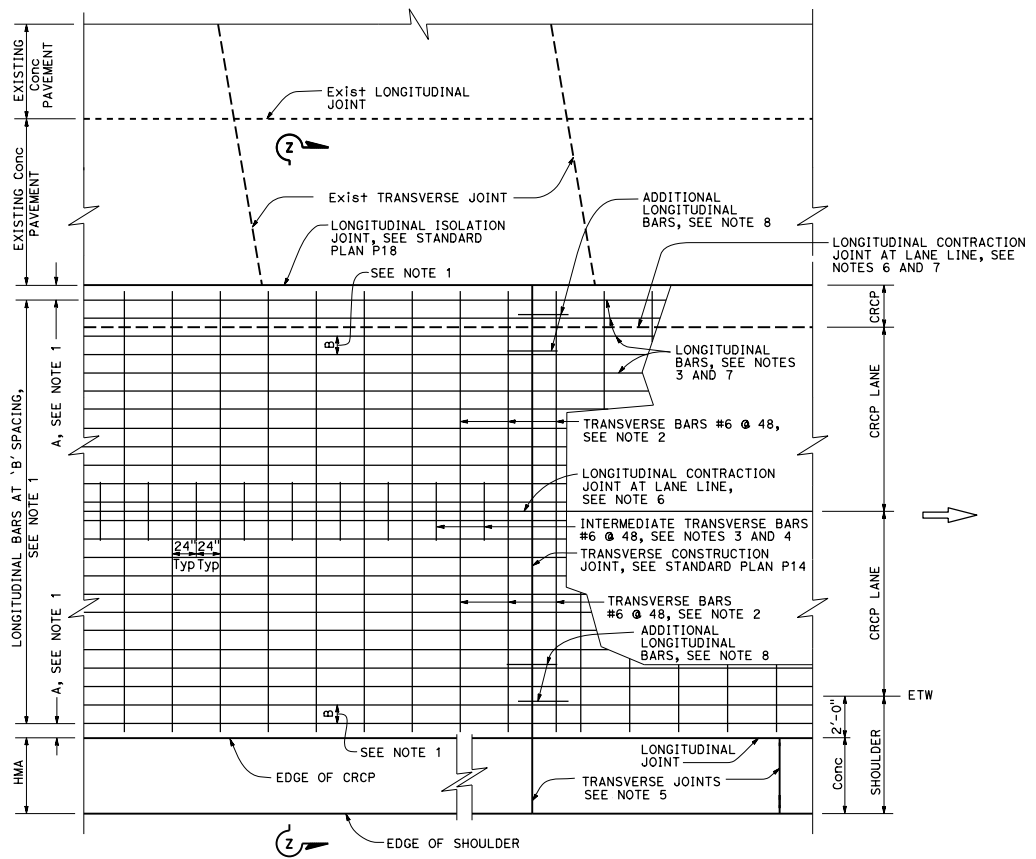
**P5A**



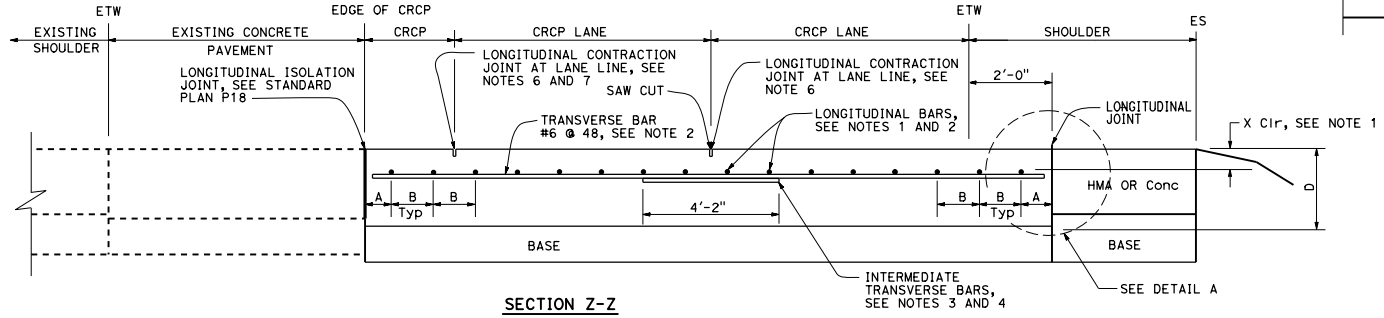
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Florio E. Bartlett**  
 REGISTERED CIVIL ENGINEER  
 No. 054959  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**PLAN**  
See Note 9



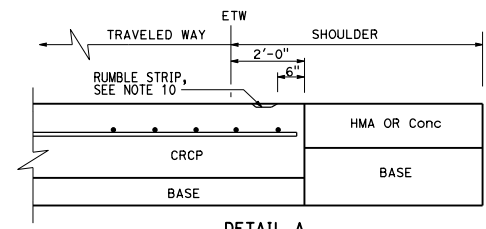
**SECTION Z-Z**

**NOTES:**

1. For longitudinal bar size, spacing and clearances, see Standard Plan P4.
2. The length of lap splices for bar reinforcement must be at least 25".
3. For tie bar and intermediate transverse bar details, see Standard Plan P16.
4. Place intermediate transverse bars parallel to and in the same plane as transverse bars.
5. Construct transverse joints at right angle to the longitudinal joints in adjacent CRCP. Space joints at no less than 10' intervals and no more than 14' intervals. Match location of JPCP transverse joint with CRCP transverse construction joint, expansion joint or wide flange beam. Omit dowel bars.
6. For longitudinal contraction joint details, see Standard Plan P16.
7. Do not construct longitudinal contraction joint when edge of new CRCP is less than 3'-3" from lane line.
8. For additional longitudinal bars detail, see Detail A on Standard Plan P14.
9. For longitudinal construction joint plan layout not shown, see Standard Plan P4. For tie bar details at longitudinal construction joint, see Standard Plan P16.
10. For limits of rumble strips, see Project Plans.

**ABBREVIATION:**

D = Thickness of CRCP



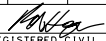
**DETAIL A**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONTINUOUSLY REINFORCED  
 CONCRETE PAVEMENT  
 (WIDENED LANE)  
 LANE AND SHOULDER  
 ADDITION OR REPLACEMENT**

NO SCALE

**P5B**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER  
 Robert B. Hoggan  
 No. 667378  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA

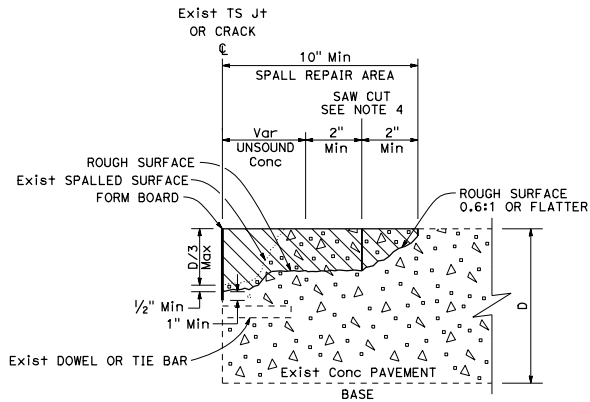
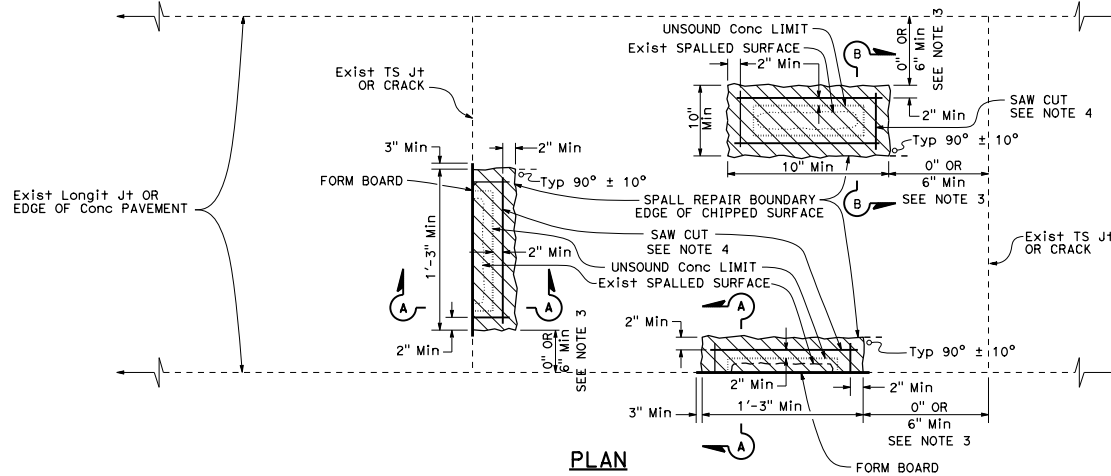
**LEGEND**



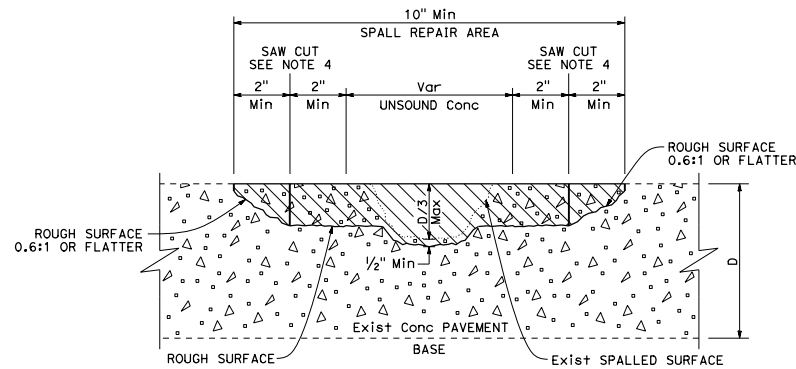
**NOTES:**

1. See Project Plans for spall repair locations.
2. Combine spall repair areas closer than 2' apart.
3. If the spall repair area is less than 6" from a joint, extend the repair to the joint.
4. Cut at least 2" beyond the rectangular limits of unsound concrete determined by the Engineer. Determine the saw cut depth using the following table:

Conc MATERIAL	SAW CUT DEPTH	
	Min	Max
FAST-SETTING	2"	3½"
POLYESTER	1½"	3½"



**JOINT, CRACK, OR EDGE OF CONCRETE PAVEMENT REPAIR**



**MISCELLANEOUS SPALL REPAIR**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**SPALL REPAIR**

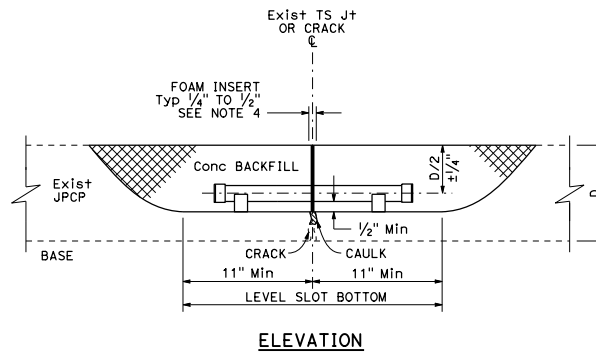
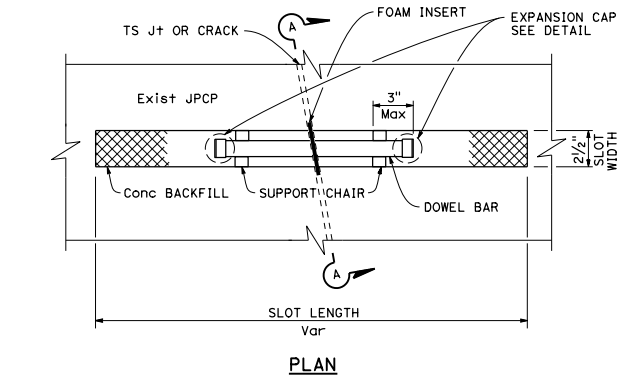
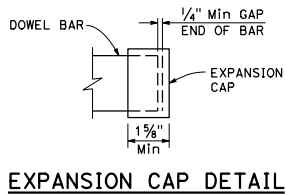
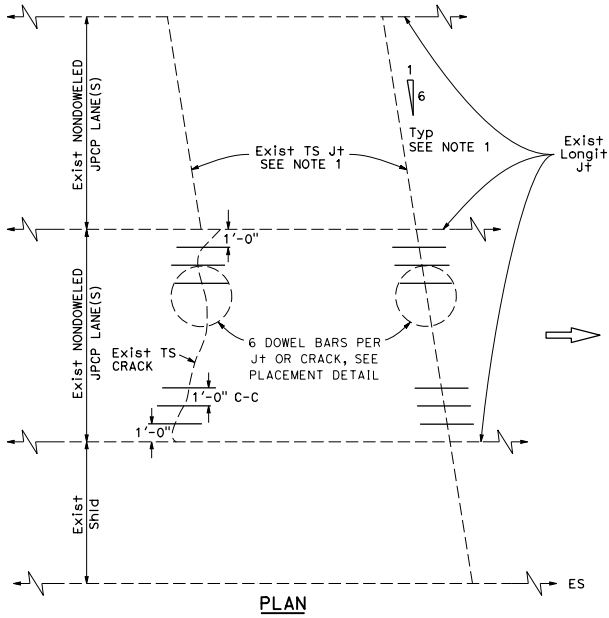
NO SCALE

**P6**

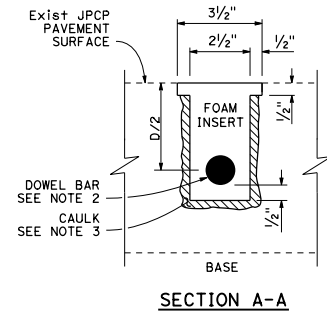
139

**NOTES:**

1. Details for skewed joints also apply to perpendicular joints.
2. Use 1'-6" ± 1/4" long dowel bars with a 1/4" diameter except 1" diameter dowel bars may be used if  $D < 0.70'$ .
3. Caulk existing transverse joint at bottom and sides of the dowel bar slot prior to placing dowel bar and foam insert.
4. Foam insert thickness must match width of existing transverse joint or crack.



**DOWEL BAR PLACEMENT DETAIL**



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DOWEL BAR RETROFIT**

NO SCALE

**P7**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

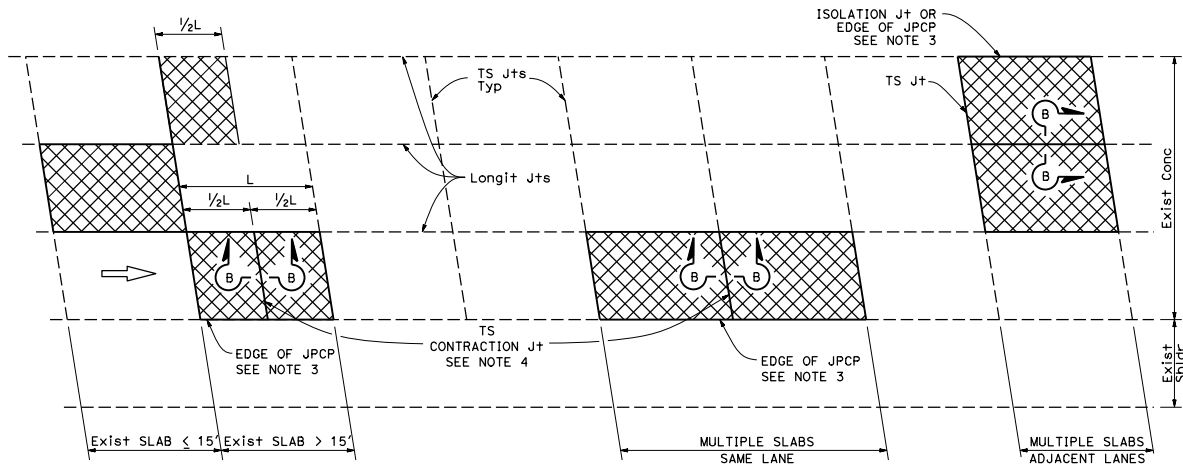
REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

2015 STANDARD PLAN P7

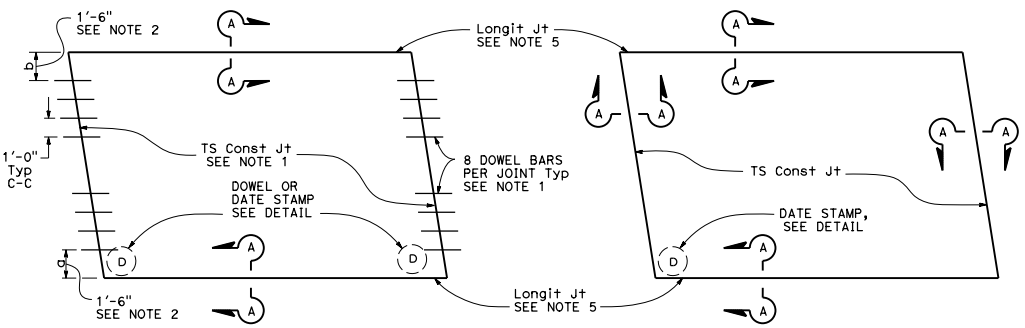
*Return to Table of Contents*

Dist	County	Route	Post Miles Total Project	Sheet No.	Total Sheets

REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. 66738  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA



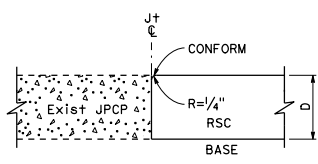
**PLAN**



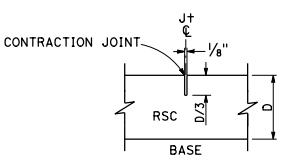
**TYPE I**  
See Design Note 1

**TYPE II**  
See Design Note 2

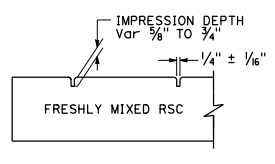
**SLAB LAYOUT**



**SECTION A-A**



**SECTION B-B**



**SECTION C-C**

**LEGEND:**

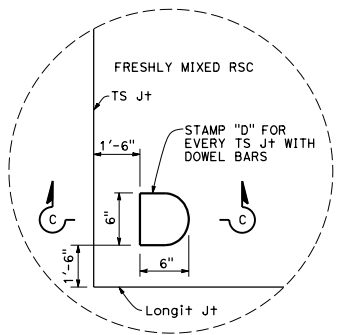
- RSC RAPID STRENGTH CONCRETE
- INDIVIDUAL SLAB REPLACEMENT WITH RSC

**NOTES:**

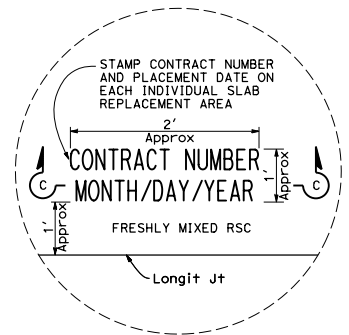
- For details not shown, see Standard Plan P10.
- Where the existing outside shoulder is asphalt concrete pavement, "a" = 1'-0" and "b" = 2'-0".
- Use side forms where edge of RSC pavement is adjacent to asphalt concrete.
- Transverse contraction joint to match skew of existing joint. Omit dowel bars.
- Do not place tie bars at longitudinal joints.

**DESIGN NOTES:**

- For concrete slab repair with > 5 years design life.
- For short term repairs with 5 yrs or less design life or for slab replacements with cracking and seating.

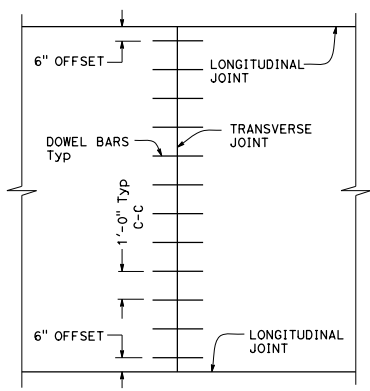


**DOWEL STAMP DETAIL**

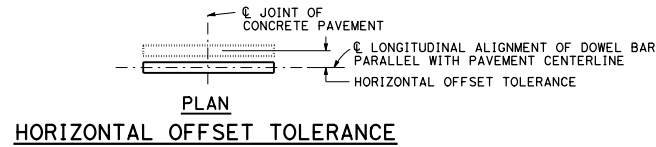


**DATE STAMP DETAIL**

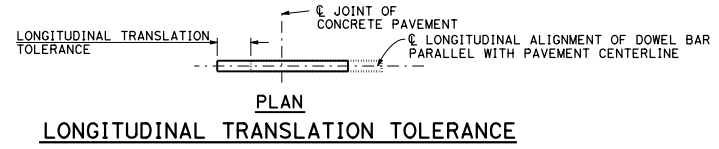
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**INDIVIDUAL SLAB REPLACEMENT  
 WITH RAPID STRENGTH CONCRETE**  
 NO SCALE



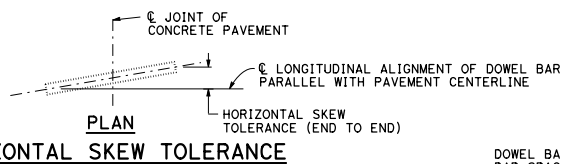
**TRANSVERSE JOINT  
DOWEL BAR LAYOUT**



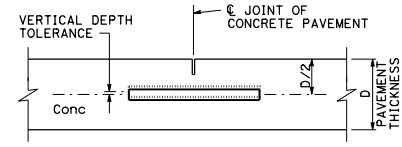
**HORIZONTAL OFFSET TOLERANCE**



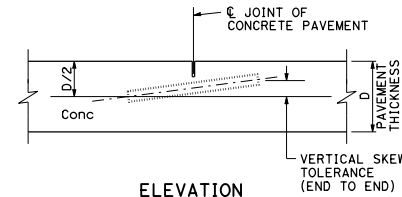
**LONGITUDINAL TRANSLATION TOLERANCE**



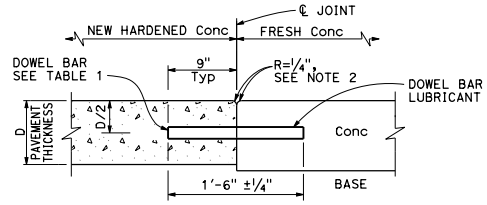
**HORIZONTAL SKEW TOLERANCE**



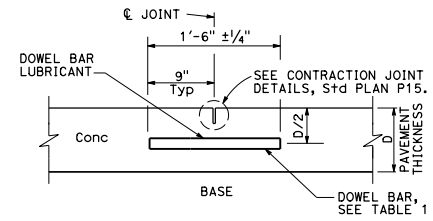
**ELEVATION  
VERTICAL DEPTH TOLERANCE**



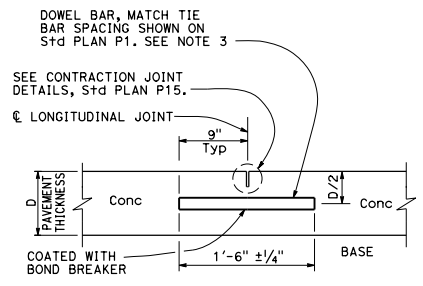
**ELEVATION  
VERTICAL SKEW TOLERANCE**



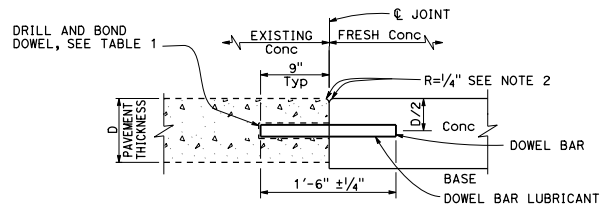
**TRANSVERSE  
CONSTRUCTION JOINT DETAIL**



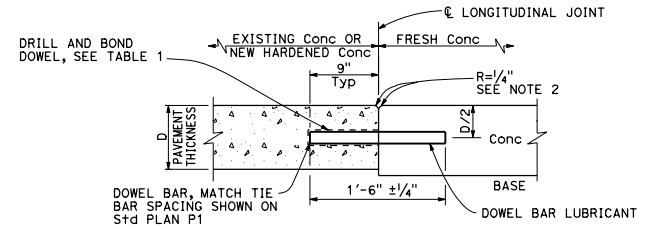
**TRANSVERSE CONTRACTION JOINT**



**LONGITUDINAL CONTRACTION  
JOINT WITH DOWEL BARS**  
See Std Plan P18



**TRANSVERSE CONSTRUCTION JOINT  
FOR EXISTING CONCRETE PAVEMENT**



**LONGITUDINAL CONSTRUCTION JOINT  
WITH DOWEL BARS**  
See Std Plan P18

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
-------	--------	-------	--------------------------	-----------	--------------

*William K. Farnbach*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
William K. Farnbach  
No. C49042  
Exp. 9-30-16  
CIVIL  
STATE OF CALIFORNIA

**NOTES:**

1. See Standard Plan P1 for typical dowel bar placement and locations.
2. Where fresh concrete pavement is placed against new concrete or existing concrete pavement, rounding the corner of the existing concrete pavement is not required.
3. May also use 3/4" Dia dowel bars 2'-4" ± 1/4" in length. Center the length of dowel bars at the centerline of longitudinal joint.

**TABLE 1**

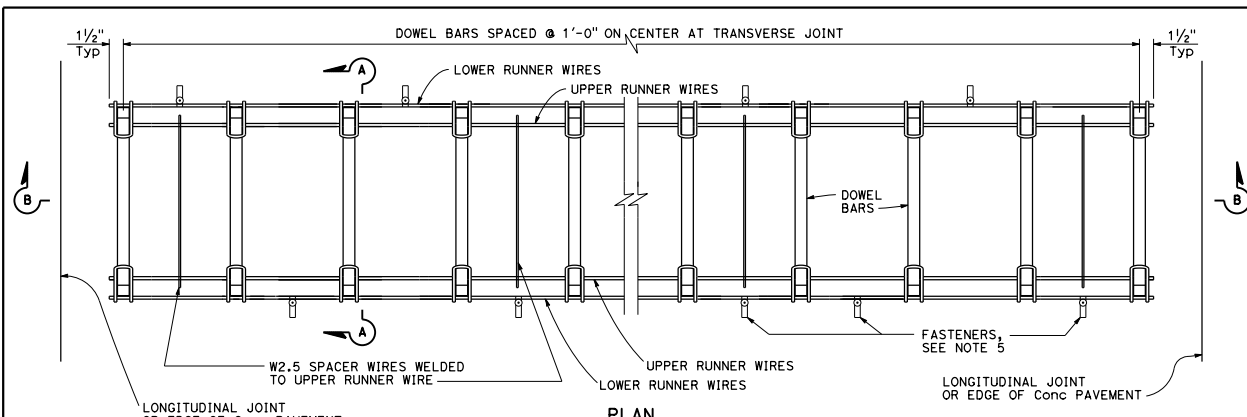
DOWEL BAR DIAMETER TABLE			
PAVEMENT THICKNESS	0.65'	> 0.65' - 0.85'	> 0.85'
MINIMUM DOWEL * BAR DIAMETER	1"	1 1/4"	1 1/2"

\* The drilled hole diameter must be 1/8" to 3/16" larger than the bar diameter.

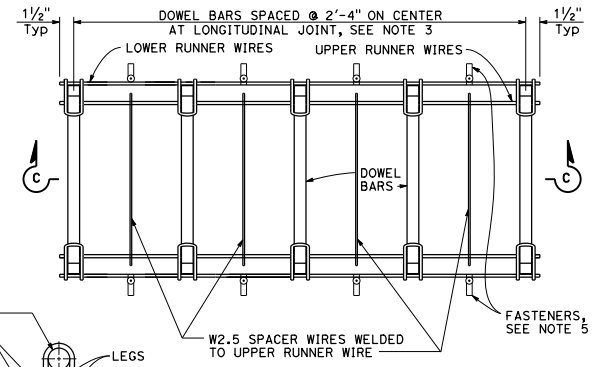
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT  
DOWEL BAR  
DETAILS**  
NO SCALE

**P10**

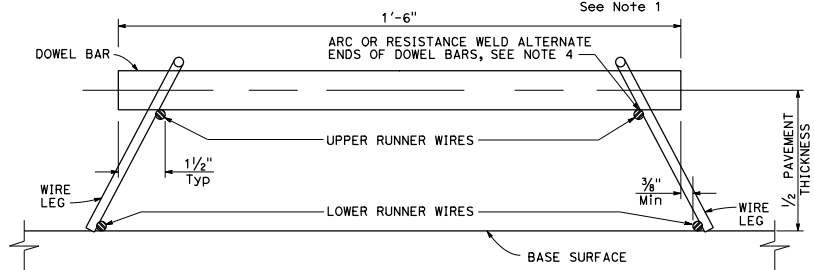
142



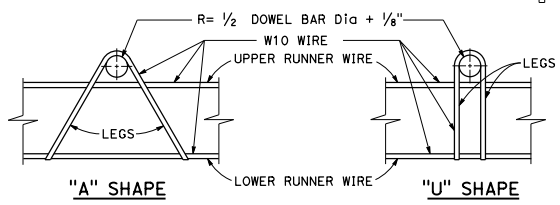
**PLAN**  
**DOWEL BAR BASKET**  
**(TRANSVERSE JOINT)**  
See Note 1



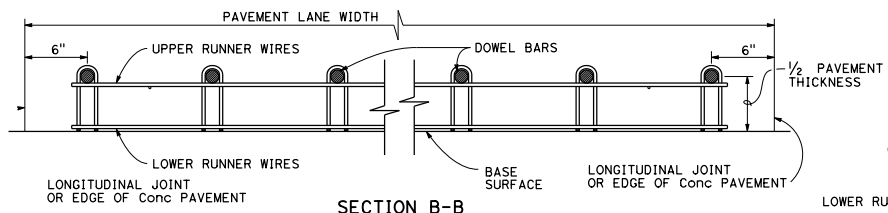
**PLAN**  
**DOWEL BAR BASKET**  
**(LONGITUDINAL JOINT)**  
See Note 1



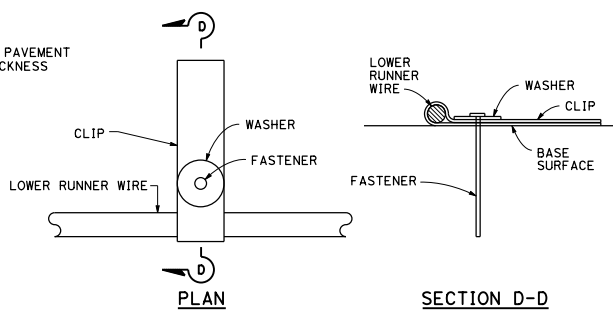
**SECTION A-A**



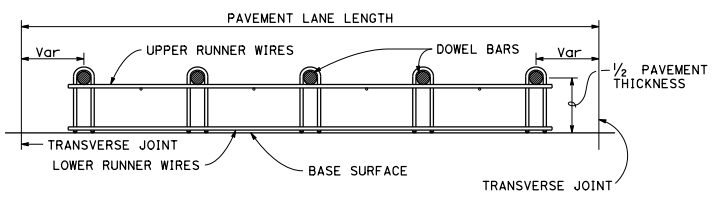
**ASSEMBLY FRAME DETAILS**



**SECTION B-B**  
See Note 1



**FASTENER DETAIL**  
See Note 5



**SECTION C-C**  
See Notes 1 and 3

**NOTES:**

1. "U" frame shape assembly shown. Use either "U" frame shape or "A" frame shape.
2. Wire sizes shown are the minimum required.
3. Use tie bar spacing for longitudinal dowel bar locations. See Standard Plans P1, P2, P3A, and P3B for tie bar requirements.
4. Weld may be at the top or bottom of the dowel bar.
5. Use anchor pins where soil or granular base is used. See Standard Plan P17 for Anchor Pin Detail.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT**  
**DOWEL BAR BASKET**  
**DETAILS**  
NO SCALE

**P12**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS


*William K. Farnbach*  
REGISTERED CIVIL ENGINEER

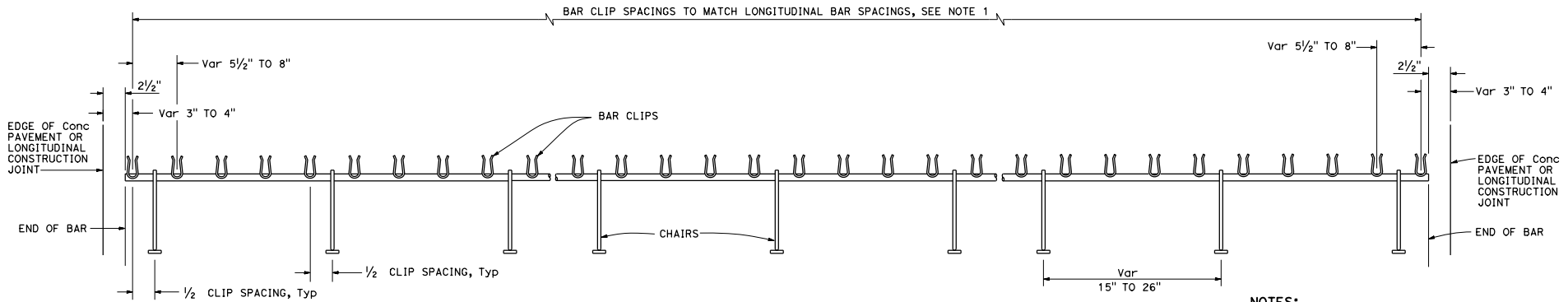
October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
William K. Farnbach  
No. C49042  
Exp. 9-30-16  
CIVIL  
STATE OF CALIFORNIA

2015 STANDARD PLAN P12

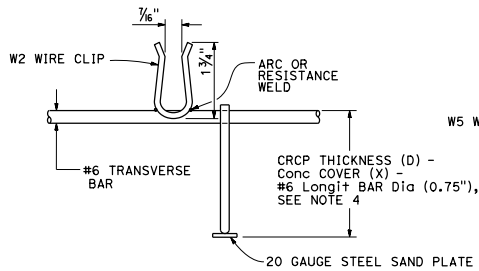
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
					
<b>October 30, 2015</b> PLANS APPROVAL DATE					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



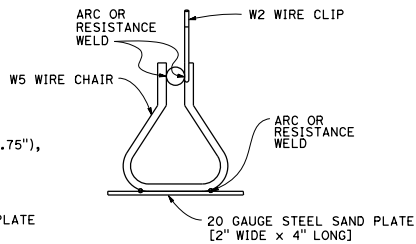
**TRANSVERSE BAR ASSEMBLY**

**NOTES:**

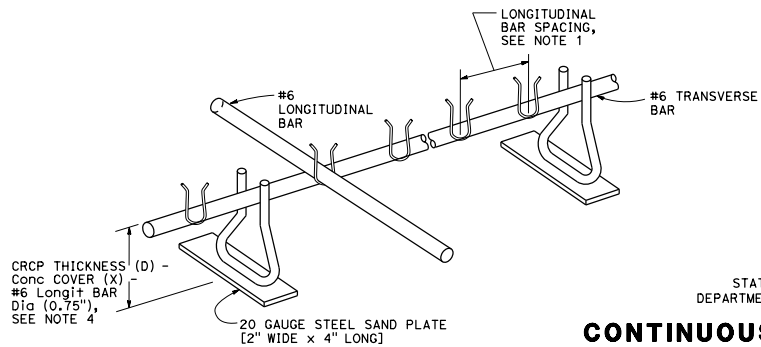
1. See Standard Plan P4 for spacing of longitudinal bars.
2. Tensile strength of chair shall be at least 50,000 psi.
3. Wire sizes shown are minimum required.
4. For concrete cover (X), see Table 1 in Standard Plan P4.



**#6 BAR CLIP DETAIL**



**CHAIR DETAIL**



**ISOMETRIC VIEW OF CHAIR ASSEMBLY**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT-SINGLE  
PIECE TRANSVERSE BAR  
ASSEMBLY**

NO SCALE

**P13**

**NOTES:**

1. For longitudinal bar size, spacing and clearances, see Table 1 on Standard Plan P4.
2. The length of lap splices for bar reinforcement must be at least 25".
3. For tie bars in longitudinal construction joint, see Standard Plan P16.
4. Place additional longitudinal bars parallel to and in the same plane as the longitudinal bars.
5. Place additional longitudinal bars symmetrically about longitudinal construction joint.

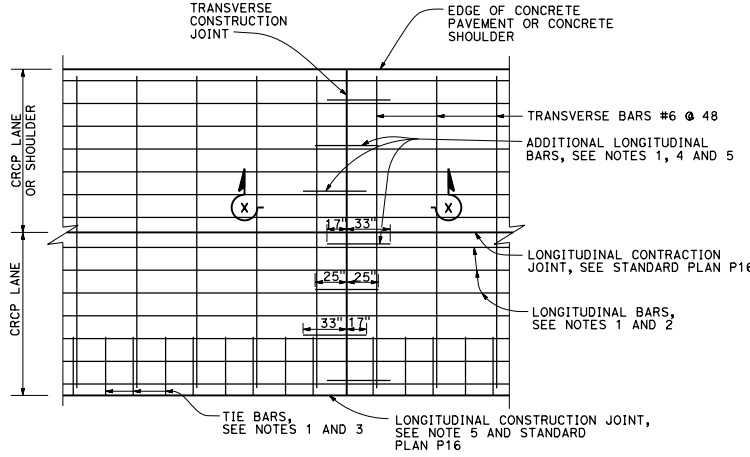
**ABBREVIATION**

D = Thickness of CRCP

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

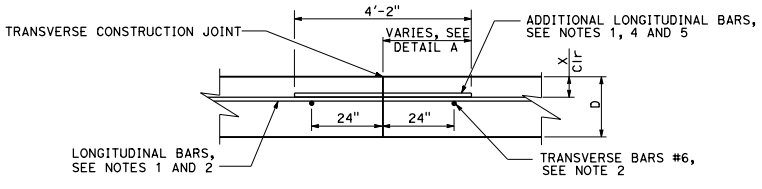
**Florencio E. Baulista**  
 REGISTERED CIVIL ENGINEER  
 No. CS4859  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**DETAIL A**

Additional longitudinal bars at transverse construction joint



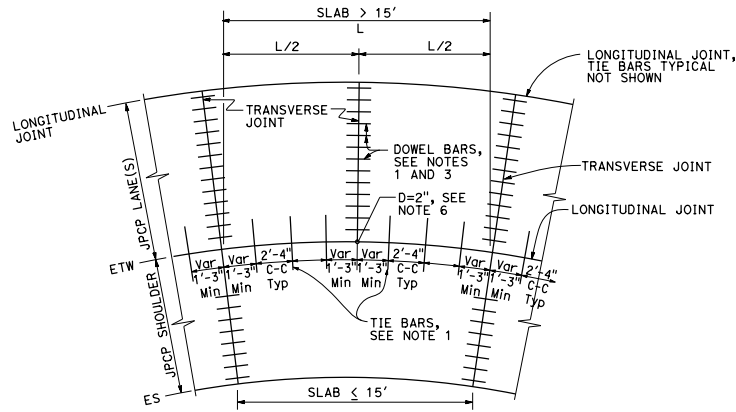
**SECTION X-X**

**TRANSVERSE CONSTRUCTION JOINT**

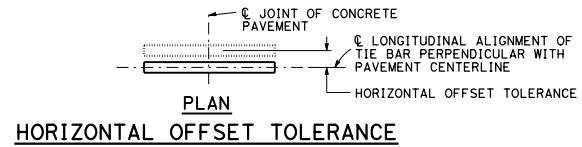
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONTINUOUSLY REINFORCED  
 CONCRETE PAVEMENT  
 TRANSVERSE CONSTRUCTION JOINT**  
 NO SCALE

**P14**

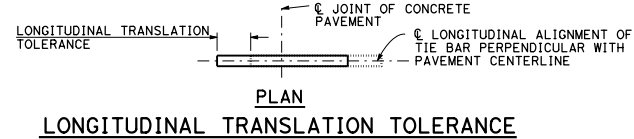




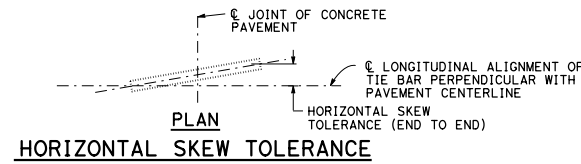
**TIE BAR LAYOUT IN CURVED LANES**



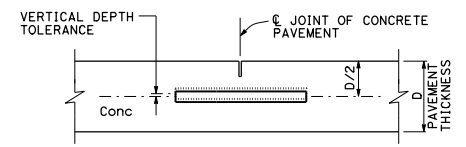
**HORIZONTAL OFFSET TOLERANCE**



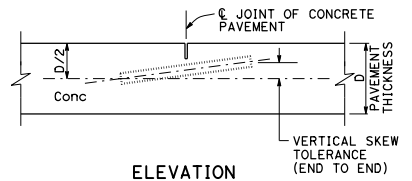
**LONGITUDINAL TRANSLATION TOLERANCE**



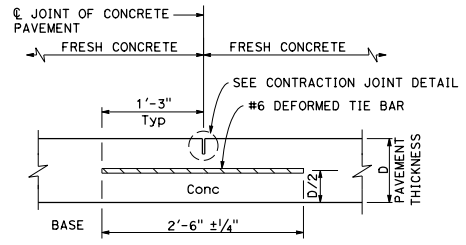
**HORIZONTAL SKEW TOLERANCE**



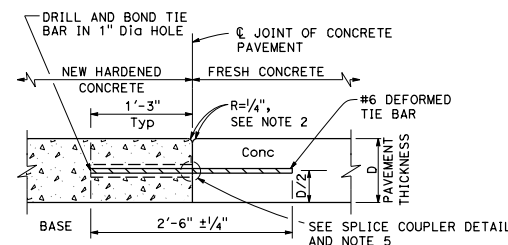
**VERTICAL DEPTH TOLERANCE**



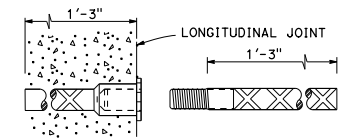
**VERTICAL SKEW TOLERANCE**



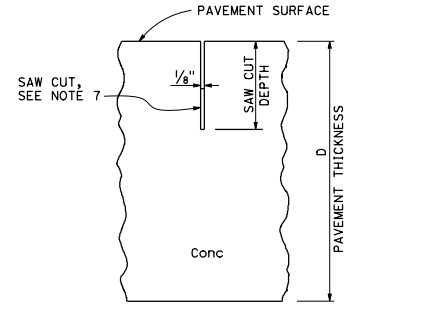
**LONGITUDINAL CONTRACTION JOINT**



**LONGITUDINAL CONSTRUCTION JOINT**



**ALTERNATIVE SPLICE COUPLER**



**CONTRACTION JOINT DETAIL**

- NOTES:**
1. See Standard Plan P1 for typical dowel bar and tie bar placement and locations.
  2. Where new pavement is placed against existing concrete pavement, rounding the corner is not required.
  3. For dowel bar sizes, See Standard Plan P10.
  4. Tie bar details apply to inside widenings.
  5. Use either drill and bond or splice couplers.
  6. Full depth drilled hole. Fill hole with filler material.
  7. The bottom of the saw cut must be at least 0.5" clear of any dowel bar, tie bar and bar reinforcement.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT -  
TIE BAR  
DETAILS**  
NO SCALE

**P15**

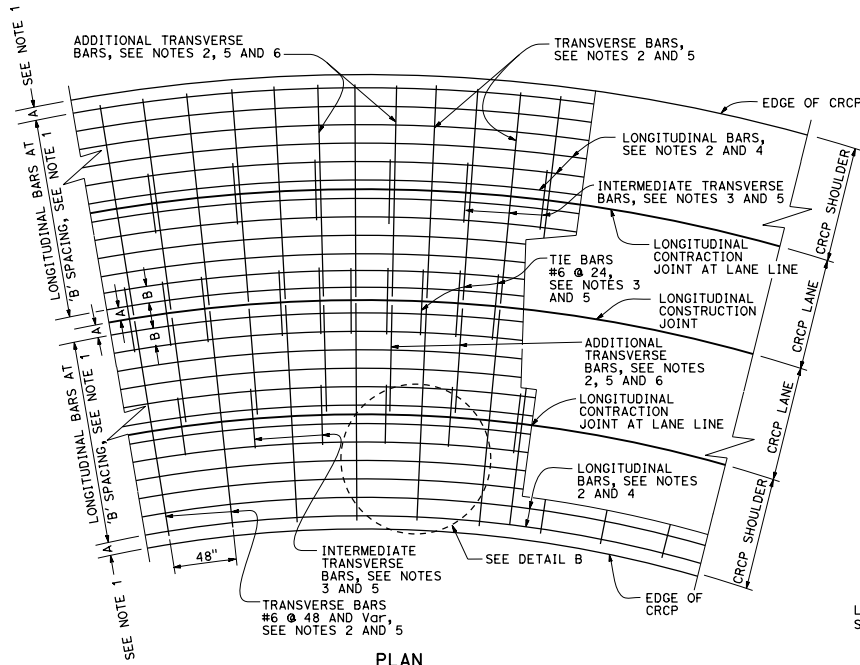
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

William K. Farbach  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
William K. Farbach  
No. C49042  
Exp. 9-30-16  
CIVIL  
STATE OF CALIFORNIA



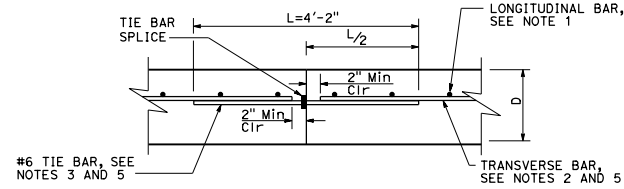
**PLAN**  
**CURVED LANES**

**NOTES:**

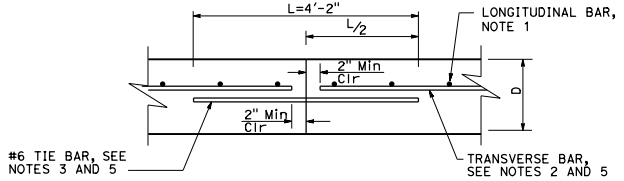
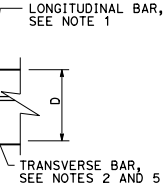
1. For longitudinal bar spacing and clearances, see Table 1 on Standard Plan P4.
2. The length of lap splices for bar reinforcement must be at least 25".
3. Place tie bars and intermediate transverse bars parallel to and in the same plane as the transverse bars.
4. Place longitudinal bars parallel to roadway curvature.
5. Place transverse bars, additional transverse bars, tie bars and intermediate transverse bars perpendicular to the pavement curvature.
6. Place additional transverse bars where required, see Detail B.
7. The bottom of the saw cut must be at least 0.5" clear of any dowel bar, tie bar and bar reinforcement.

**ABBREVIATION:**

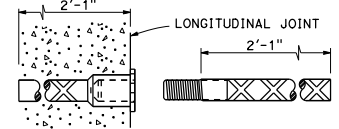
D = Thickness of CRCP



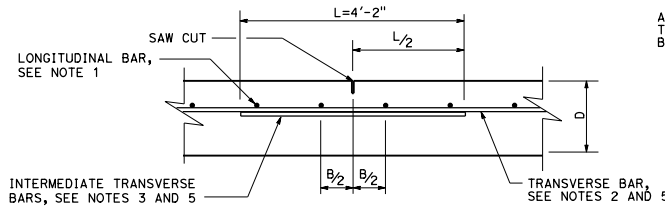
#6 TIE BAR, SEE NOTES 3 AND 5



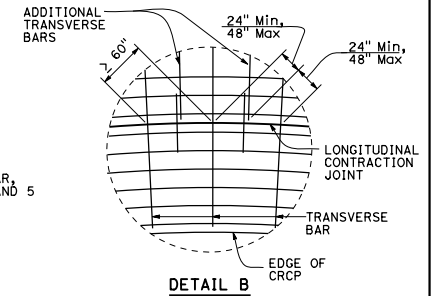
**ALTERNATE**  
**LONGITUDINAL CONSTRUCTION JOINT**



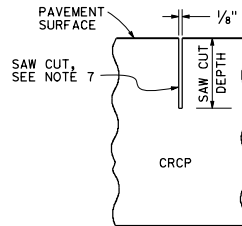
**TIE BAR SPLICE COUPLER DETAIL**



**LONGITUDINAL CONTRACTION JOINT**



**DETAIL B**



**CONTRACTION JOINT SAW CUT DETAIL**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT  
TIE BARS AND JOINT DETAILS**

NO SCALE

**P16**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

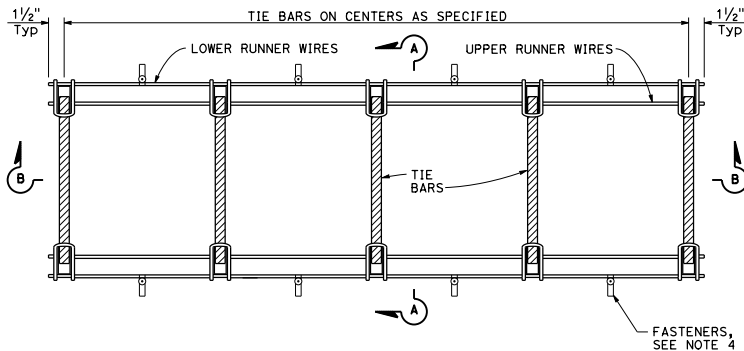
**Flornie E. Bauriata**  
 REGISTERED CIVIL ENGINEER  
 No. CS4859  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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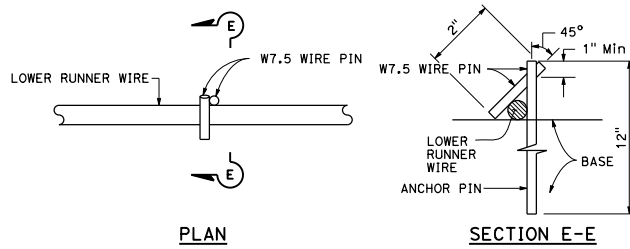
Dist.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

<i>William K. Fairbank</i> REGISTERED CIVIL ENGINEER		
October 30, 2015 PLANS APPROVAL DATE		
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>		



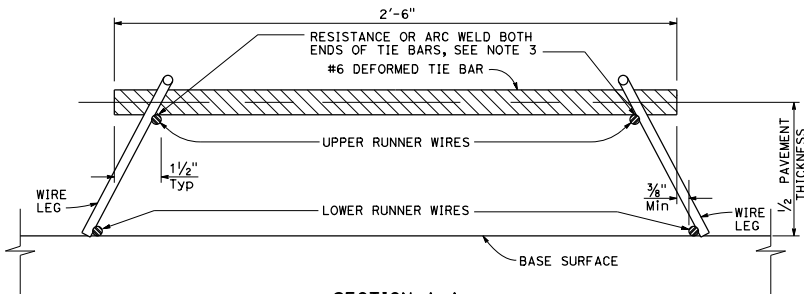
**PLAN**  
**TIE BAR BASKET**  
 (Tie bars at longitudinal joint)  
 See Note 1



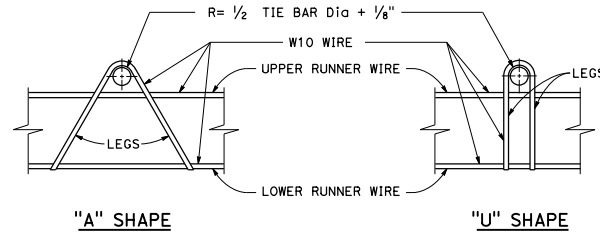
**SECTION E-E**  
**ANCHOR PIN DETAIL**  
 See Note 4

**NOTES:**

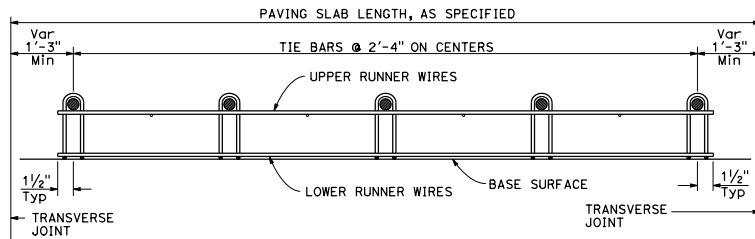
- "U" frame shape assembly shown. Use either "U" frame shape or "A" frame shape.
- Wire sizes shown are the minimum required.
- Weld may be at top or bottom of tie bars.
- Use anchor pins where soil or granular base is used.



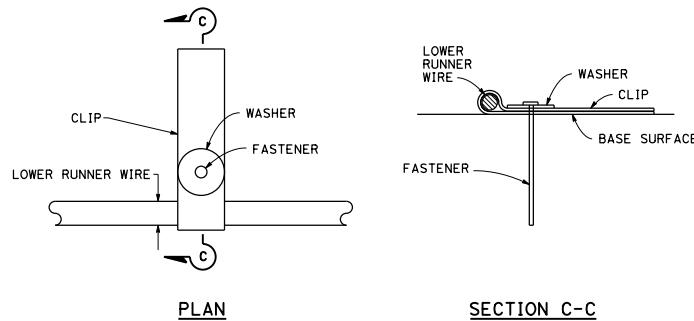
**SECTION A-A**



**"A" SHAPE**  
**"U" SHAPE**  
**ASSEMBLY FRAME DETAILS**  
 See Note 1



**SECTION B-B**  
 See Note 1



**PLAN**  
**SECTION C-C**  
**FASTENER DETAIL**

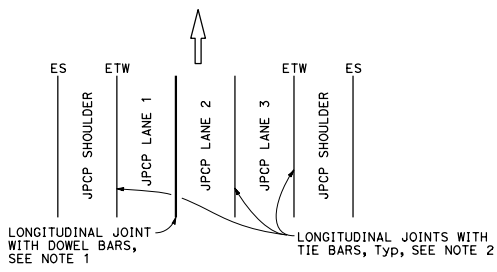
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT  
 TIE BAR BASKET  
 DETAILS**  
 NO SCALE

**P17**

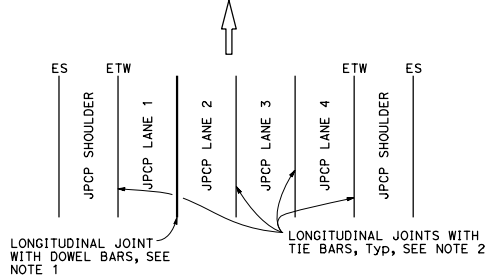
2015 STANDARD PLAN P17

1 47

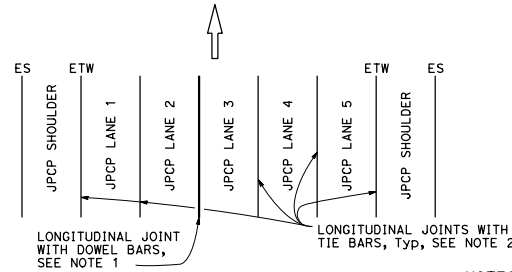
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
William K. Farnbach REGISTERED CIVIL ENGINEER October 30, 2015 PLANS APPROVAL DATE No. C49042 Exp. 9-30-16 CIVIL STATE OF CALIFORNIA					



**3 LANES WITH CONCRETE SHOULDERS**  
PLAN



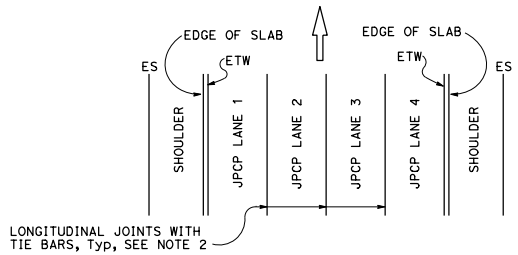
**4 LANES WITH CONCRETE SHOULDERS**  
PLAN



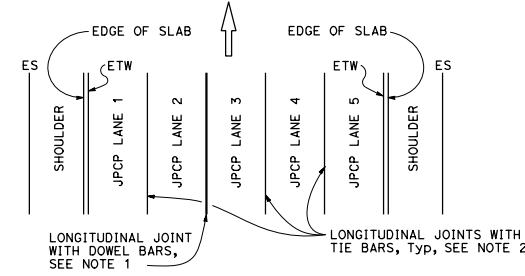
**5 LANES WITH CONCRETE SHOULDERS**  
PLAN

**NOTES:**

1. See Standard Plan P10 for longitudinal joint with dowel bars.
2. See Standard Plan P15 for longitudinal joint with tie bars.
3. S = Reservoir depth.  
 $S = \frac{7}{8}'' \pm \frac{1}{16}''$  for asphalt rubber seals  
 $S = \frac{3}{8}'' \pm \frac{1}{16}''$  for silicone seals  
 Preformed compression seals must be  $\frac{3}{8}''$  wide and  $S = 1\frac{1}{16}'' \pm \frac{1}{16}''$

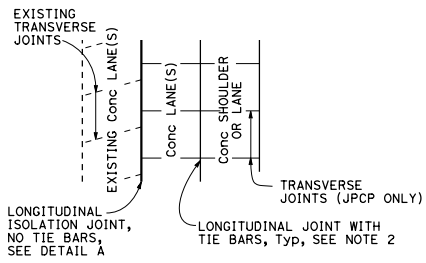


**4 LANES OR LESS WITH AC SHOULDERS**  
PLAN



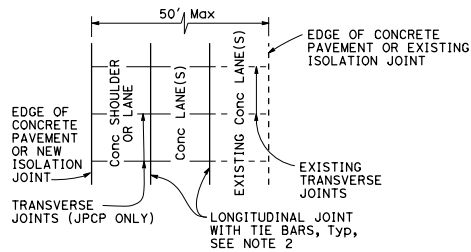
**5 LANES WITH AC SHOULDERS**  
PLAN

**NEW CONSTRUCTION**  
Location of Longitudinal Joints For JPCP



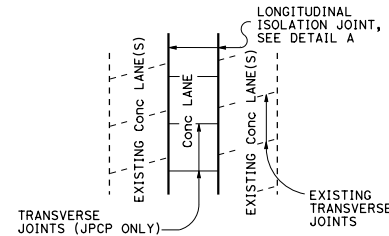
**CASE 1**  
PLAN

Transverse joints do not align between new and existing.



**CASE 2**  
PLAN

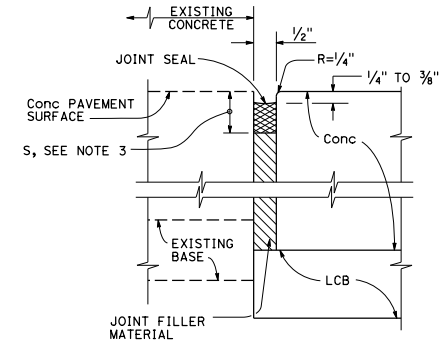
Transverse joints align between new and existing. (For JPCP only)



**CASE 3 (INTERIOR LANE REPLACEMENT)**  
PLAN

Transverse joints do not align between new and existing.


**LANE/SHOULDER ADDITION OR RECONSTRUCTION**  
For JPCP and CRCP



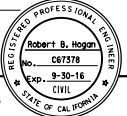
**DETAIL "A"**  
ISOLATION JOINT

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT  
LANE SCHEMATICS  
AND ISOLATION JOINT DETAIL**  
NO SCALE

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER

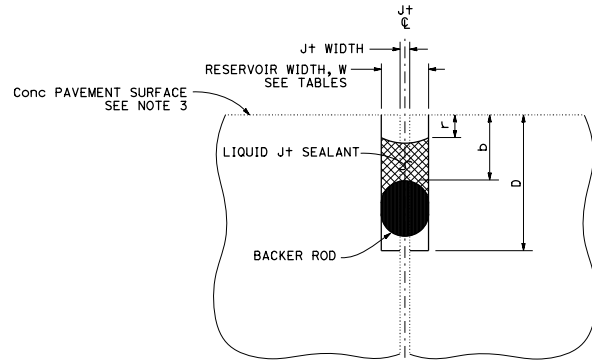
October 30, 2015  
 PLANS APPROVAL DATE



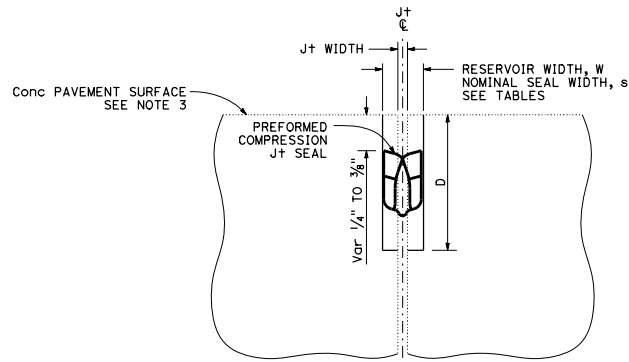
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**NOTES:**

- Details do not apply to isolation joints and longitudinal construction joints.
- Tie bars, dowel bars, and bar reinforcement are not shown.
- Depths are measured from the final concrete pavement surface elevation after any grinding.



**LIQUID JOINT SEALANT**



**PREFORMED COMPRESSION JOINT SEAL**

Const SEASON	Min RESERVOIR WIDTH * W ± 1/16"
WINTER	1/4"
SPRING	3/8"
SUMMER	
FALL	

\* Minimum reservoir width for replace joint seal = existing joint width + 1/8"

RESERVOIR WIDTH W ± 1/16"	LIQUID JOINT SEALANT DIMENSIONS					
	BACKER ROD NOMINAL Dia *	DEPTHS (ASPHALT RUBBER) **		DEPTHS (SILICONE)		
		RESERVOIR D ± 1/4"	BACKER ROD b ± 1/16"	RESERVOIR D ± 1/4"	BACKER ROD b ± 1/16"	RECESS r ± 1/16"
1/4"	3/8"	1 3/4"	7/8"	1 3/8"	1/2"	1/4"
3/8"	1/2"	1 7/8"	7/8"	1 1/2"	1/2"	1/4"
1/2"	3/4"	2"	7/8"	1 3/4"	3/8"	3/16"
5/8"	7/8"	2 1/4"	1"	2"	5/8"	5/16"
3/4"	1"	2 3/4"	1 1/8"	2 1/4"	3/4"	3/8"
7/8"	1 1/4"	3"	1 1/4"	2 1/2"	15/16"	3/8"
1"	1 1/2"	3 1/4"	1 3/8"	2 5/8"	7/8"	3/8"
1 1/8"	1 1/2"	3 1/2"	1 1/2"	2 13/16"	1"	1/2"

\* Larger diameter backer rods may be substituted according to manufacturer recommendations if reservoir depth is increased equivalently.

\*\* Asphalt rubber sealant recess depth "r" varies from 1/4" to 3/8"

RESERVOIR WIDTH W ± 1/16"	PREFORMED COMPRESSION JOINT SEAL DIMENSIONS	
	NOMINAL SEAL WIDTH S	RESERVOIR DEPTH D ± 1/4"
1/4"	3/8"	1 1/4"
3/8"	1/2"	1 7/8"
1/2"	5/8"	1 11/8"
5/8"	1"	1 7/8"
3/4"	1 1/4"	2 1/4"
7/8"	1 5/8"	2 5/8"
1"	1 5/8"	2 5/8"
1 1/8"	2"	2 7/8"

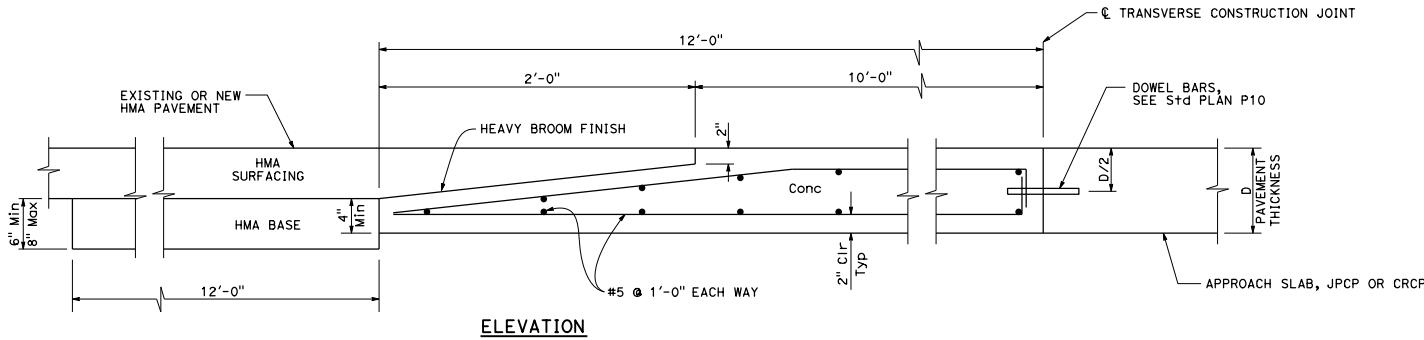
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**JOINT SEALS**

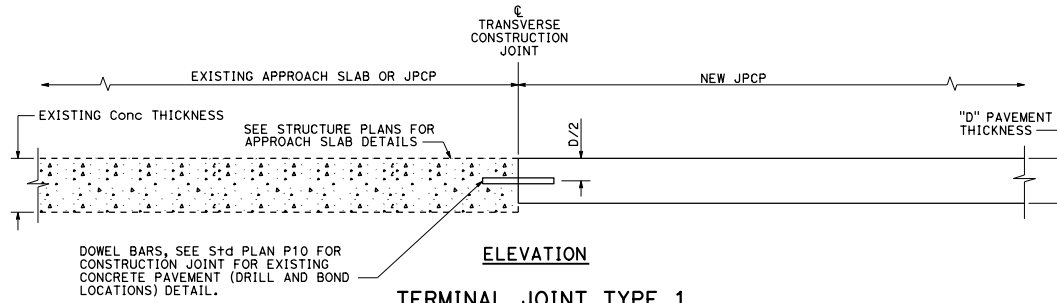
NO SCALE

**P20**

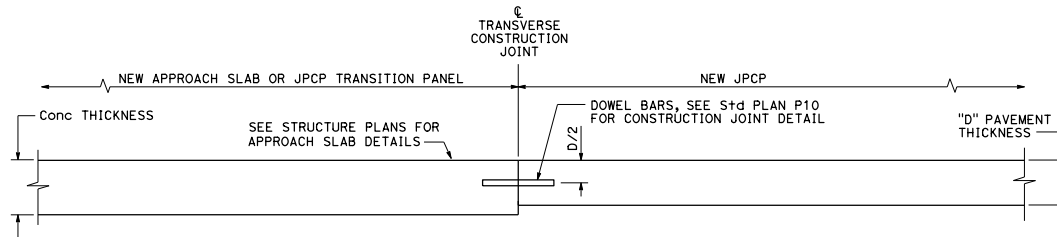
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>William K. Farnbach</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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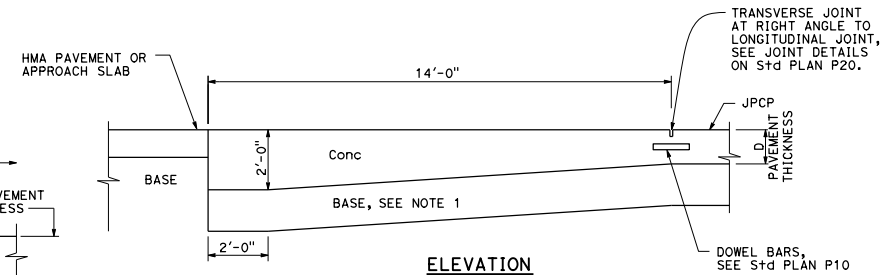
**ELEVATION**  
**CONCRETE PAVEMENT**  
**TRANSITION PANEL**



**ELEVATION**  
**TERMINAL JOINT TYPE 1**  
For Exist JPCP or Approach Slab



**ELEVATION**  
**TERMINAL JOINT TYPE 2**  
For JPCP Transition Panel or Approach Slab



**ELEVATION**  
**PAVEMENT END ANCHOR**  
For HMA Pvmt or Approach Slab

**NOTE:**

1. Maintain same base thickness as JPCP.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT-  
END PANEL  
PAVEMENT TRANSITIONS**

NO SCALE

**P30**

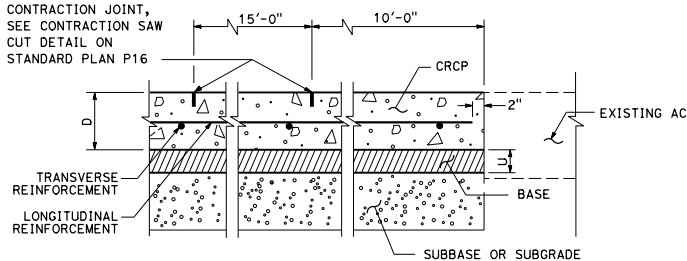
2015 STANDARD PLAN P30

150

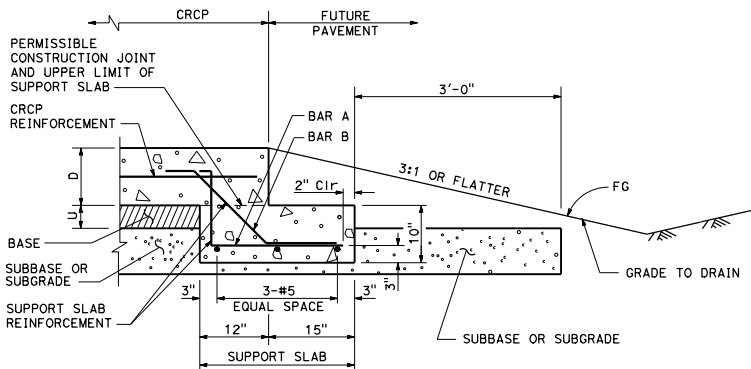
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

**Flornor E. Baultista**  
 REGISTERED CIVIL ENGINEER  
 No. 054859  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

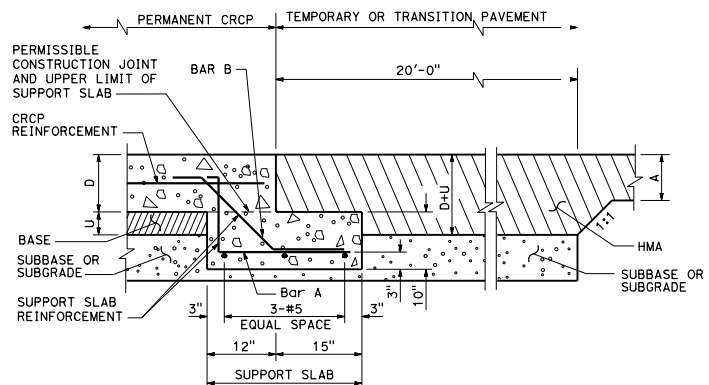
October 30, 2015  
 PLANS APPROVAL DATE  
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**TERMINAL JOINT TYPE A**  
(For Existing AC)



**TERMINAL JOINT TYPE B**  
(For Future Pavement)



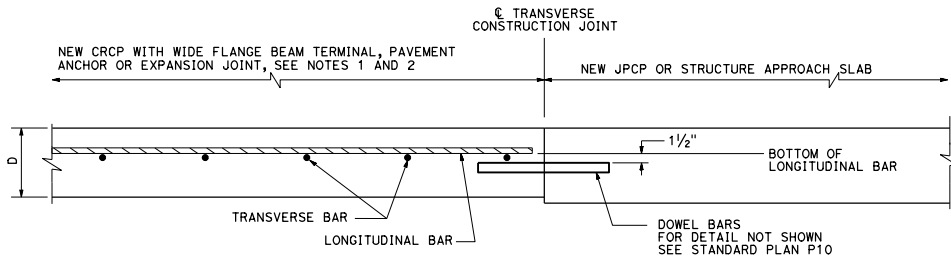
**TERMINAL JOINT TYPE C**  
(For Temporary HMA Pavement)

**NOTES:**

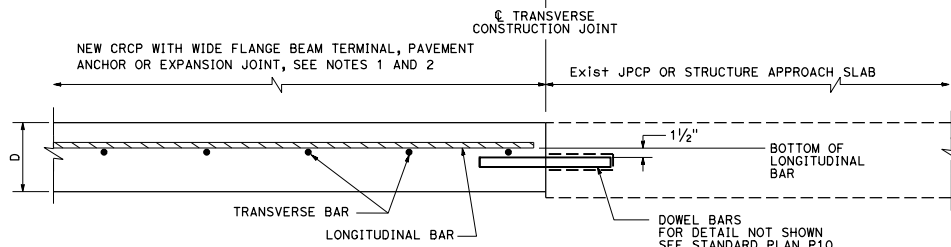
- For the locations of wide flange beam terminal, pavement anchors and expansion joints, see Projects Plans.
- See Standard Plans P31B and P32A.

**ABBREVIATIONS**

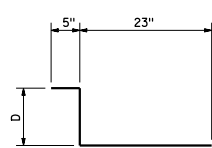
- D = Thickness of CRCP
- A = Depth of HMA as shown on Project Plans
- U = Thickness of Base



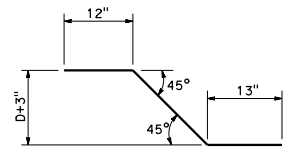
**TERMINAL JOINT TYPE E**  
(For New JPCP or Structure Approach Slabs)



**TERMINAL JOINT TYPE D**  
(For Existing JPCP or Structure Approach Slabs)



**BAR "A" (#5)**  
AT 12" C-C



**BAR "B" (#5)**  
AT 12" C-C

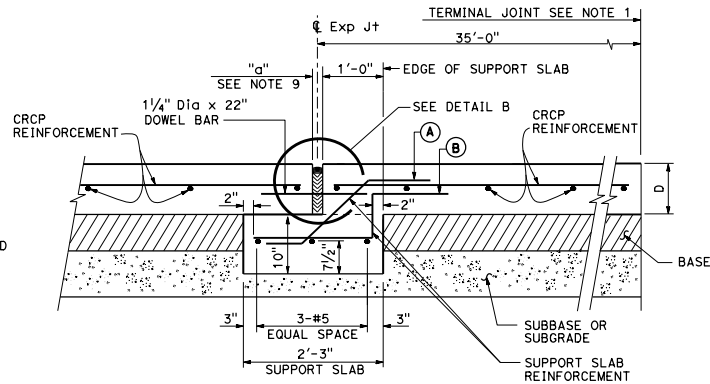
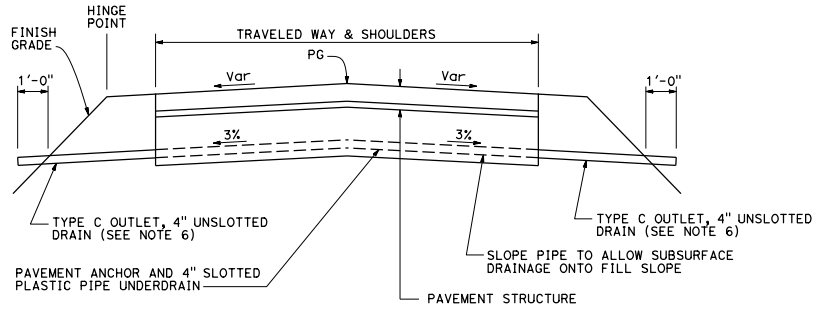
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONTINUOUSLY REINFORCED  
CONCRETE PAVEMENT  
TERMINAL JOINT DETAILS**  
NO SCALE

**P31A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

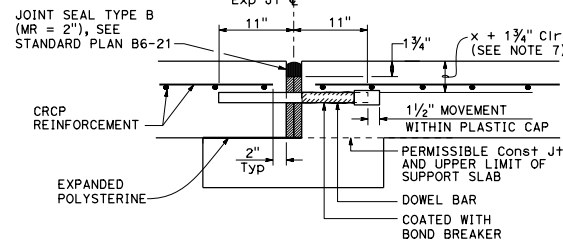
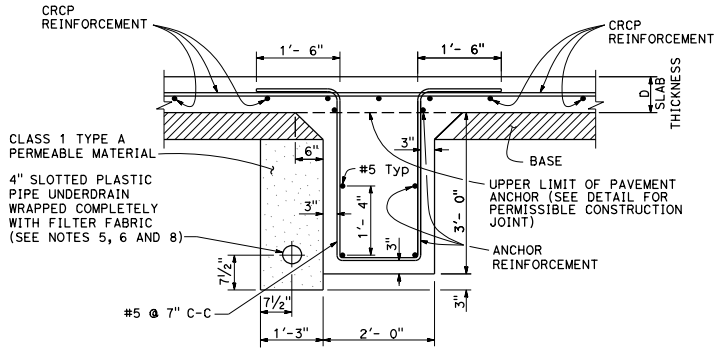
REGISTERED CIVIL ENGINEER  
 Florante E. Bautista  
 No. CS4859  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**PAVEMENT ANCHOR PROFILE**

**EXPANSION JOINT TYPE AN**



**PAVEMENT ANCHOR**

**DETAIL B**

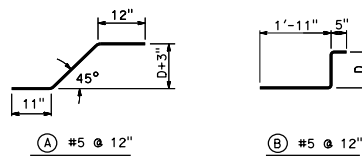
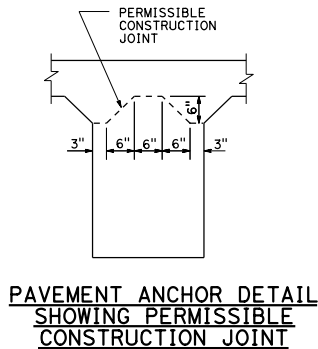
(For layout, tolerances, and other details not shown, see Standard Plan P10.)

**NOTES:**

1. For the locations of the terminal joints, expansion joints and pavement anchors, see project plans.
2. The CRCP shall continue across the pavement anchor and expansion joints as shown.
3. Details of reinforcement, tie bars, and longitudinal joints (and if necessary, transverse construction joints) are shown on Standard Plans P4 and P16.
4. Transverse construction joints are not allowed within 20'-0" of the pavement anchor.
5. When placing pipe through concrete barrier, use 4" unslotted plastic pipe wrapped completely with 3/8" polystyrene.
6. See Standard Plan P51 for details not shown.
7. See Standard Plan P4 for "x".
8. Place the 4" Slotted Plastic Pipe on the high side of the longitudinal grade.
9. See Standard Plan B6-21 for "a".

**ABBREVIATION:**

D = Thickness of CRCP



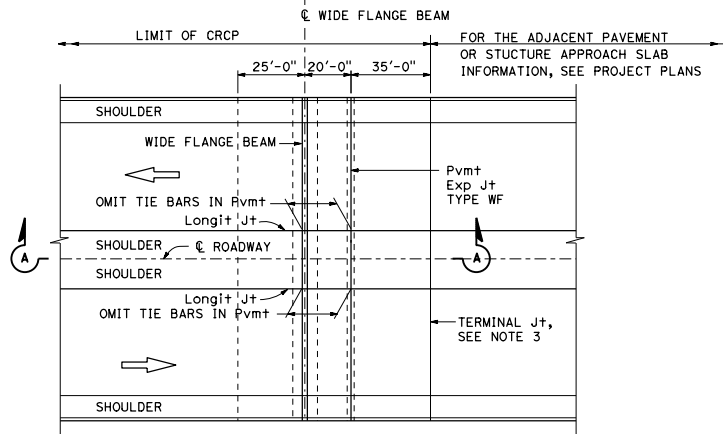
**REINFORCEMENT DETAIL**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONTINUOUSLY REINFORCED  
 CONCRETE PAVEMENT -  
 EXPANSION JOINT AND ANCHOR DETAILS**

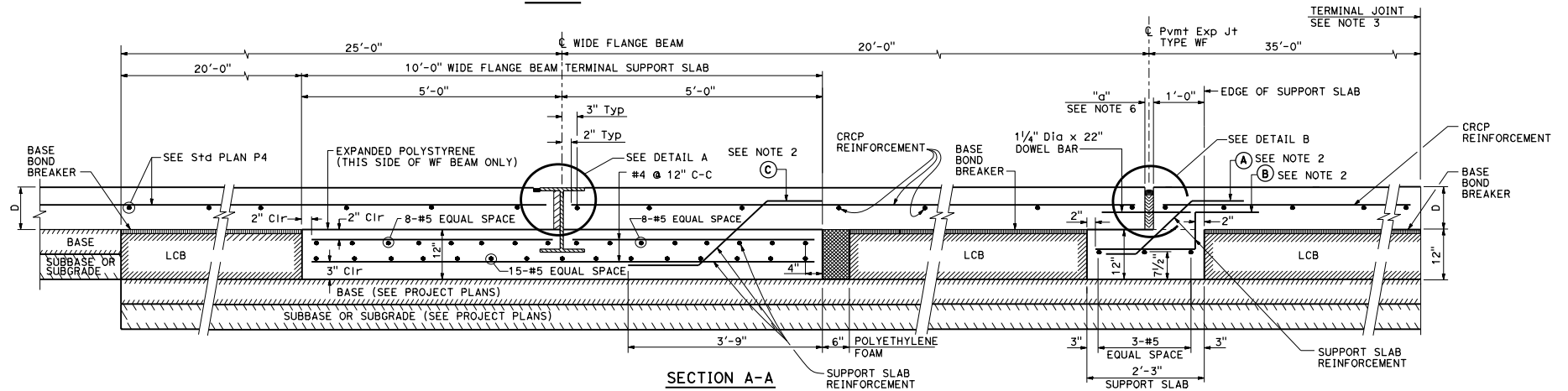
NO SCALE

**P31B**

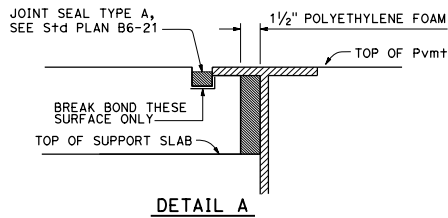




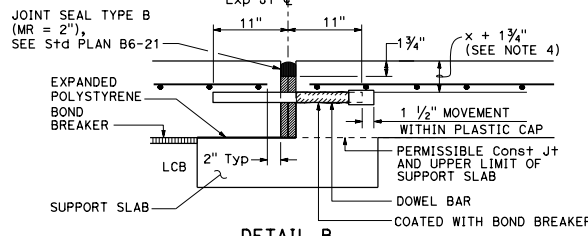
**PLAN**



**SECTION A-A**



**DETAIL A**



**DETAIL B**

For layout, tolerances, and other details not shown see Std Plan P10.

**NOTES:**

- For additional details on reinforcement member quantities of the wide flange beam terminal and Pavement Expansion Joint Type WF, see Standard Plan P32B.
- For reinforcement (A), (B), and (C) Details, see Standard Plan P32B.
- For the Pavement Terminal Joint Details, see Standard Plan P31A. For Pavement Terminal Joint Type, see Project Plans.
- See Standard Plan P4 for "x".
- D = Thickness of CRCP
- See Standard Plan B6-21 for "a".

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

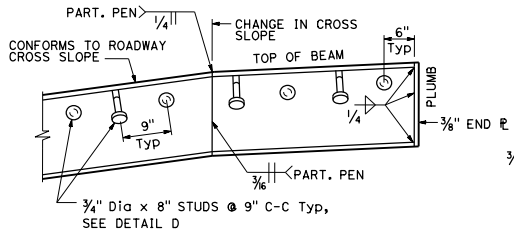
**Florio E. Bartolotta**  
 REGISTERED CIVIL ENGINEER  
 No. CS4859  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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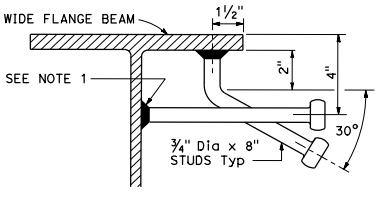
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONTINUOUSLY REINFORCED  
 CONCRETE PAVEMENT -  
 WIDE FLANGE BEAM TERMINALS**

NO SCALE

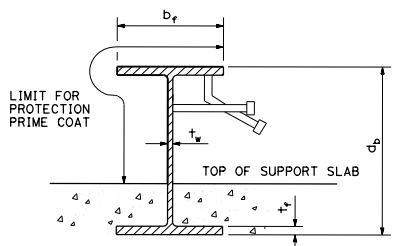
**P32A**



**WIDE FLANGE DETAIL**



**DETAIL D**



**WIDE FLANGE PAINTING DETAIL**

See "TABLE OF BEAM SIZES"

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Florencio E. Bautista**  
 REGISTERED CIVIL ENGINEER  
 No. CS4859  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

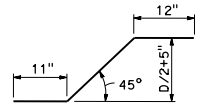
October 30, 2015  
 PLANS APPROVAL DATE  
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**LEGEND:**

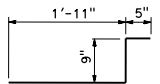
- b<sub>f</sub> - FLANGE WIDTH
- t<sub>f</sub> - FLANGE THICKNESS
- t<sub>w</sub> - WEB THICKNESS
- d<sub>b</sub> - BEAM DEPTH
- D1 - PAVEMENT THICKNESSES
- D2 - PAVEMENT THICKNESSES

**NOTES:**

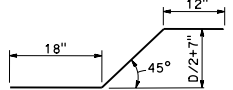
1. Studs must be electric arc end welded with complete fusion. Any stud dislodged in shipping or that can be dislodged by hammer must be replaced.
2. Weld 3/8 inch plate to each end of wide flange beam at pavement edges only. End plate covers the entire wide flange beam.
3. Extend polyethylene foam to the sides and edges of the front part of the plate.



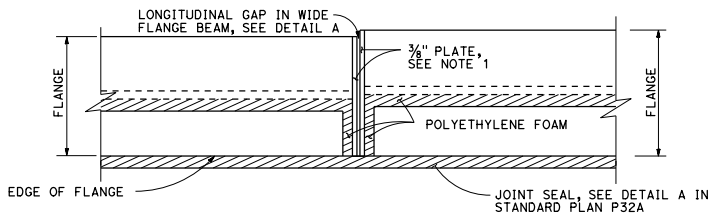
**(A) #5 @ 12"**



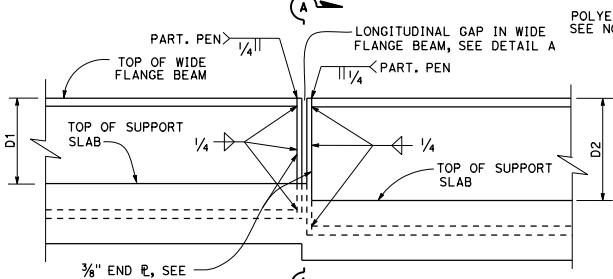
**(B) #5 @ 12"**



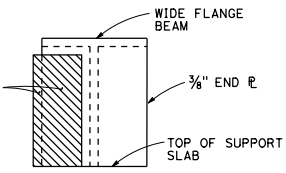
**(C) #4 @ 12"**



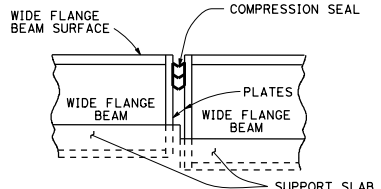
**PLAN**



**ELEVATION**



**SECTION A-A**



**DETAIL A**

**CONCRETE AND STEEL QUANTITIES**

ITEM	PAVEMENT THICKNESS							
	.75'	.80'	.85'	.90'	.95'	1.00'	1.05'	1.10'
WIDE FLANGE BEAM CONCRETE	4.8 CY	4.8 CY	4.8 CY	4.8 CY	4.8 CY	4.8 CY	4.8 CY	4.8 CY
WIDE FLANGE BEAM REINFORCING STEEL	552.0 LBS	552.2 LBS	552.4 LBS	552.6 LBS	552.8 LBS	553.0 LBS	553.1 LBS	553.3 LBS
TERMINAL SLAB CONCRETE	1.1 CY	1.1 CY	1.1 CY	1.1 CY	1.1 CY	1.1 CY	1.1 CY	1.1 CY
TERMINAL SLAB REINFORCING STEEL	99.9 LBS	99.9 LBS	100.2 LBS	100.5 LBS	100.8 LBS	101.1 LBS	101.1 LBS	101.6 LBS
STEEL BEAM (WEIGHT OF WIDE FLANGE BEAM AND STUDS)	43.0 LBS/LF +2 PLATES @ 14.9 LBS EA	69.51 LBS/LF +2 PLATES @ 14.9 LBS EA	90.51 LBS/LF +2 PLATES @ 18.5 LBS EA	90.51 LBS/LF +2 PLATES @ 18.5 LBS EA	98.51 LBS/LF +2 PLATES @ 22.0 LBS EA	98.51 LBS/LF +2 PLATES @ 22.0 LBS EA	98.51 LBS/LF +2 PLATES @ 22.0 LBS EA	98.51 LBS/LF +2 PLATES @ 22.0 LBS EA

TABLE OF BEAM SIZES					
PAVEMENT THICKNESS	WIDE FLANGE BEAM DESIGNATION	d <sub>b</sub>	b <sub>f</sub>	t <sub>f</sub>	t <sub>w</sub>
.75'	W14 x 43	13.70"	8.00"	0.53"	0.31"
.80'	W14 x 68	14.04"	10.04"	0.72"	0.42"
.85'	W16 x 89	16.75"	10.37"	0.88"	0.53"
.90'	W16 x 89	16.75"	10.37"	0.88"	0.53"
.95'	W18 x 97	18.59"	11.15"	0.87"	0.54"
1.00'	W18 x 97	18.59"	11.15"	0.87"	0.54"
1.05'	W18 x 97	18.59"	11.15"	0.87"	0.54"
1.10'	W18 x 97	18.59"	11.15"	0.87"	0.54"

STATE OF CALIFORNIA  
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**CONTINUOUSLY REINFORCED  
 CONCRETE PAVEMENT  
 WIDE FLANGE BEAM TERMINALS**

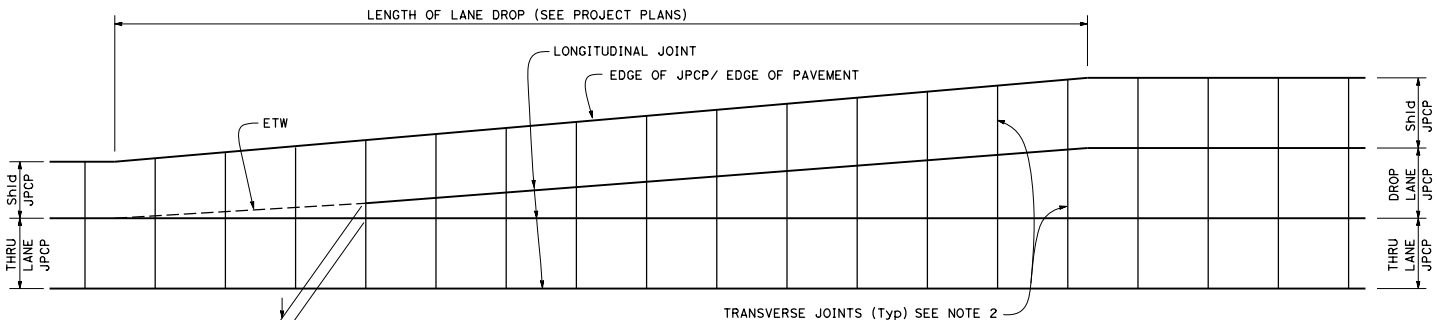
NO SCALE

**P32B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*William K. Fairbairn*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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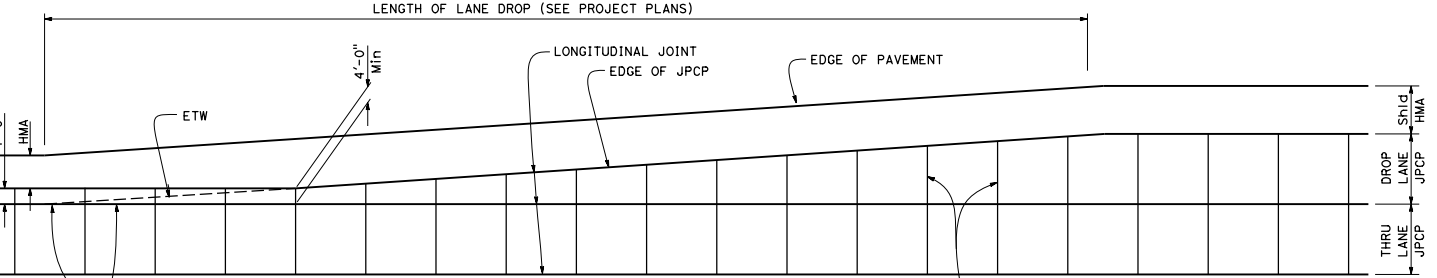


**TYPE I  
JOINED PLAIN CONCRETE PAVEMENT  
WITH CONCRETE SHOULDER**

(See Std Plan P1 for joint spacing and other details not shown)

**NOTES:**

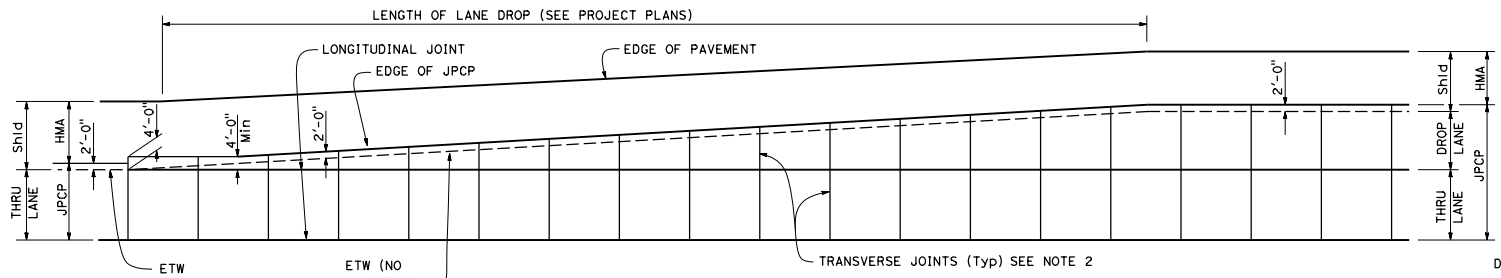
1. Location of transverse joint to match transverse joint of adjacent lane.
2. Place transverse joint of lane and shoulder perpendicular to longitudinal joint of thru lane.



**TYPE II  
JOINED PLAIN CONCRETE PAVEMENT  
WITH ASPHALT SHOULDER**

(See Std Plan P2 for joint spacing and other details not shown)

LONGITUDINAL JOINT OPTIONAL



**TYPE III  
JOINED PLAIN CONCRETE PAVEMENT  
WITH WIDENED SLAB AND ASPHALT SHOULDER**

(See Std Plan P2 for joint spacing and other details not shown)

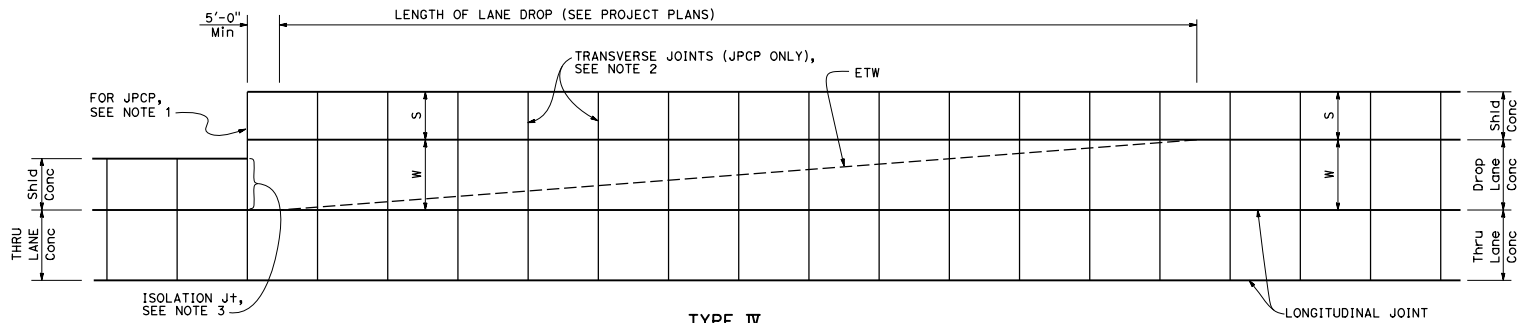
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT-  
LANE DROP PAVING DETAILS No. 1**  
NO SCALE

**P33**

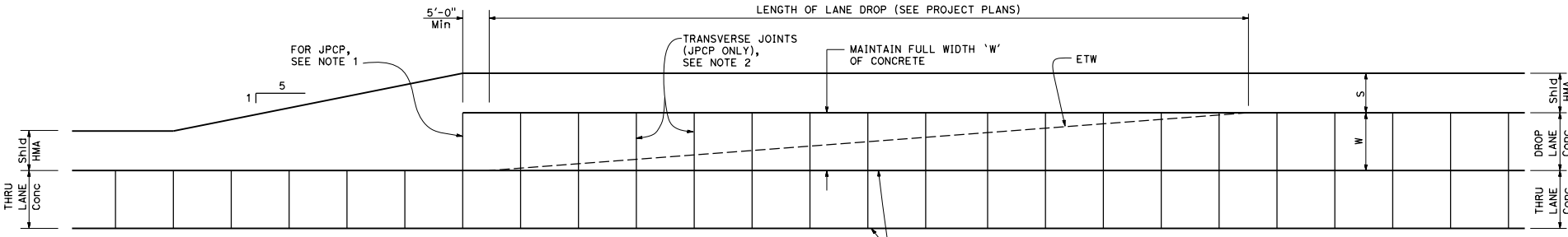
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*William K. Fairbank*  
 REGISTERED CIVIL ENGINEER  
 No. C49042  
 Exp. 9-30-16  
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 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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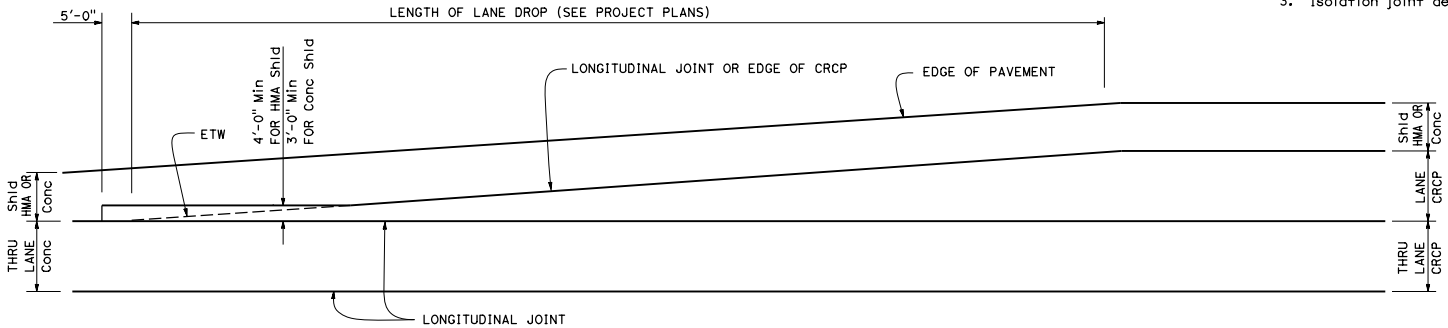


**TYPE IV**  
**JOINED PLAIN AND CONTINUOUSLY REINFORCED CONCRETE PAVEMENT**  
 (See Std Plans P1, P2, or P4 for details not shown)



**TYPE V**  
**JOINED PLAIN AND CONTINUOUSLY REINFORCED CONCRETE PAVEMENT**  
 (See Std Plans P1, P2, or P4 for details not shown)

- NOTES:**
1. Location of transverse joint to match transverse joint of adjacent lane.
  2. Place transverse joint of lane and shoulder perpendicular to longitudinal joint of through lane.
  3. Isolation joint detail shown on Standard Plan P18.



**TYPE VI**  
**CONTINUOUSLY REINFORCED CONCRETE PAVEMENT**  
 (See Std Plan P4 for details not shown)

**LEGEND**  
 S - SHOULDER WIDTH  
 W - LANE WIDTH

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT-  
 LANE DROP PAVING DETAILS No. 2**  
 NO SCALE

**P34**

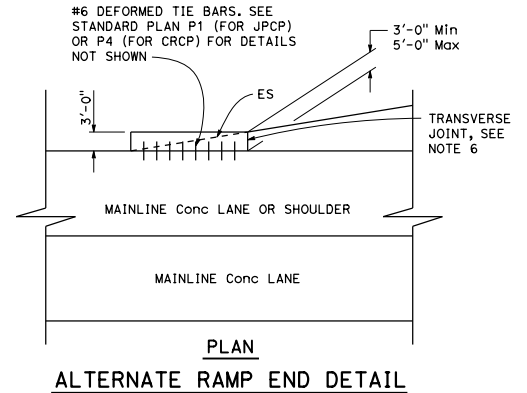
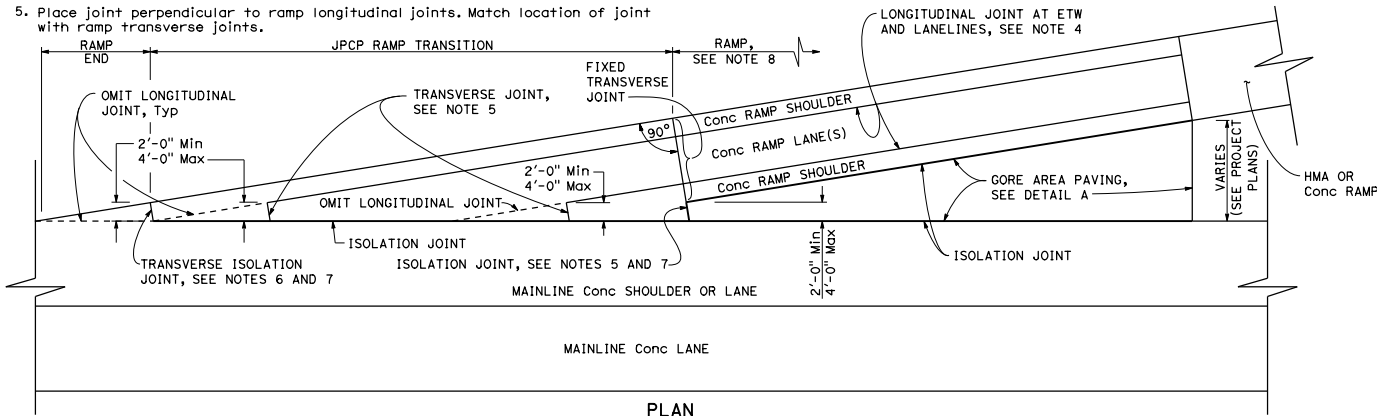
**NOTES:**

1. Details for gore area paving are applicable to both exit and entrance ramps.
2. Transverse Joint Layouts are not shown. Refer to Standard Plan P1 or Project Plans for details regarding joint layouts, tie bars, and dowel bars not shown.
3. WWF 4 x 4 - W4.0 x W4.0 can be used in place of steel reinforcement for gore area paving only.
4. Omit longitudinal joint when concrete on ramp shoulder is less than 3'-0".
5. Place joint perpendicular to ramp longitudinal joints. Match location of joint with ramp transverse joints.
6. Place joint perpendicular to ramp longitudinal joints. Match location of joint with mainline transverse joints.
7. Isolation joint detail shown on Standard Plan P18.
8. For jointed plain concrete pavement, transverse joints to be spaced from fixed transverse joint and shall follow spacing pattern on Standard Plan P1. Minimum spacing shall be 6 feet.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

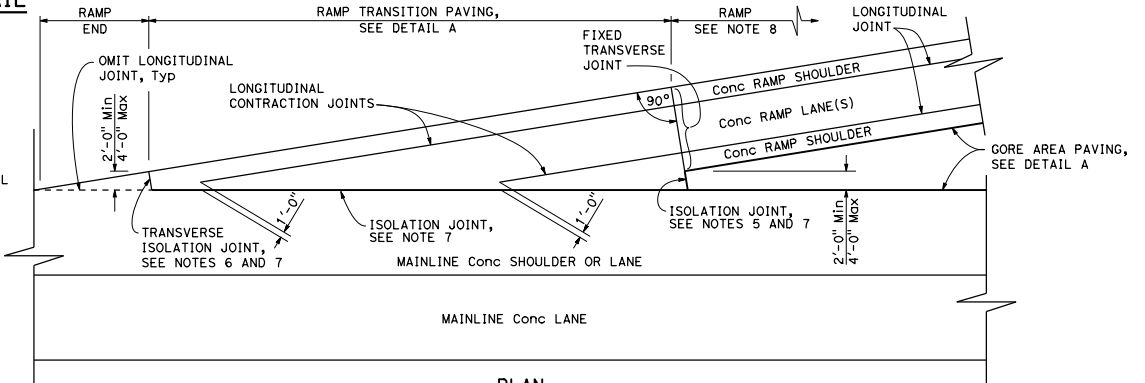
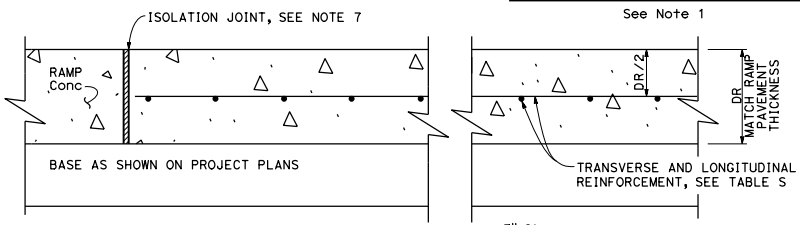
*William K. Farnbach*  
 REGISTERED CIVIL ENGINEER  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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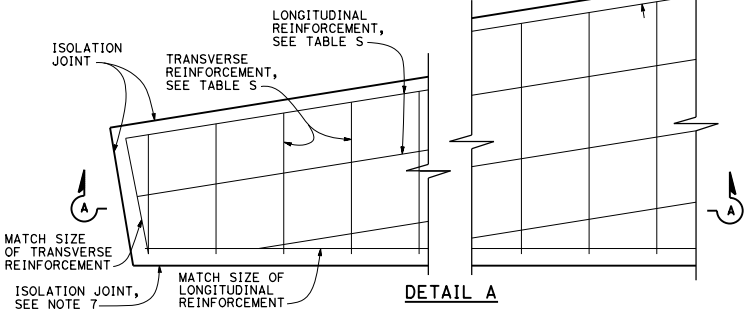


**PLAN RAMP TRANSITION DETAIL**

**PLAN ALTERNATE RAMP END DETAIL**



**PLAN ALTERNATE RAMP TRANSITION DETAIL**



**TABLE S**

LOCATION	TRANSVERSE BAR	LONGITUDINAL BAR
GORE AREA PAVING	#4 @ 1'-0" *	#4 @ 1'-0" *
RAMP TRANSITION (JPCP)	#6 @ 1'-6"	#6 @ 9"
RAMP TRANSITION (CRCP)	SEE Std PLAN P4, TABLE No. 2	SEE Std PLAN P4, TABLE No. 1

\* See Note 3

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT-  
 RAMP TRANSITION  
 PAVING DETAILS**

NO SCALE

**P35**

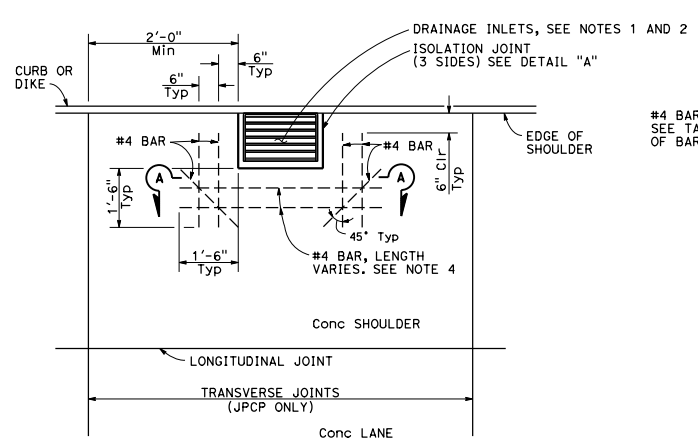
157

2015 STANDARD PLAN P35

DIST	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	NO.	SHEETS

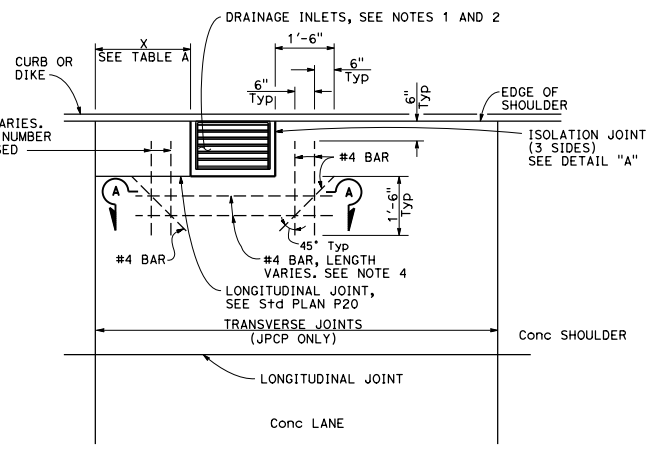
*William K. Farnbach*  
 REGISTERED CIVIL ENGINEER  
 No. C49042  
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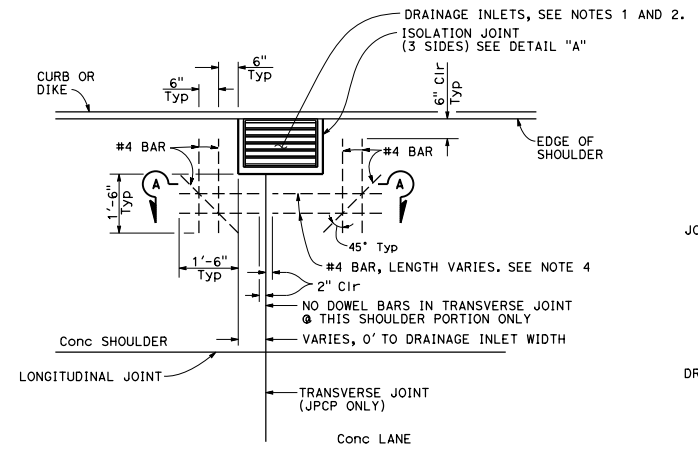
**CASE 1**

Transverse joint more than 2'-0" clear of drainage inlet wall or no transverse joint



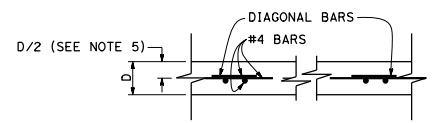
**CASE 3**

Transverse joint within 2'-0" of drainage inlet wall, or matches drainage inlet wall.



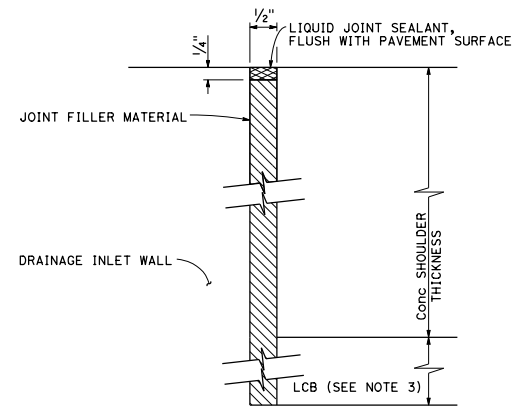
**CASE 2**

Transverse joint intersects drainage inlet, or matches drainage inlet wall.



**SECTION A-A**

D = Pavement Thickness



**DETAIL "A"**

**ISOLATION JOINT AROUND DRAINAGE INLET**

**NOTES:**

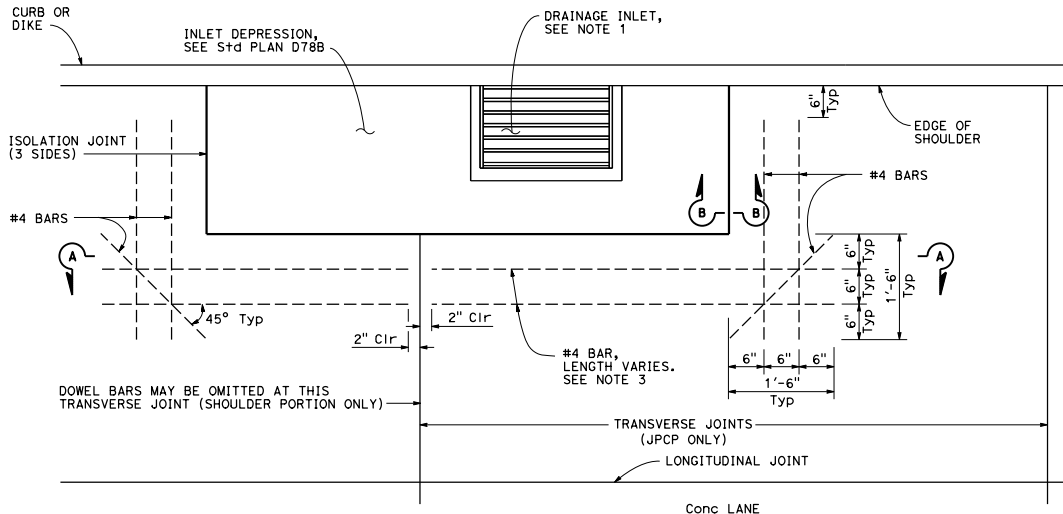
1. Refer to Project Plans for location and Type of drainage inlets.
2. Top of inlet shall be flush with shoulder surface.
3. Extend joint filler material to bottom of Lean Concrete Base. Where Lean Concrete Base is not used as base material, the joint filler material shall only extend to the bottom of the new concrete pavement.
4. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, terminate pavement steel reinforcement 2' clear from all outside edges of isolation joint.
5. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, see Standard Plan P4.
6. Dowel and tie bars not shown, see Standard Plan P1.

**TABLE A**

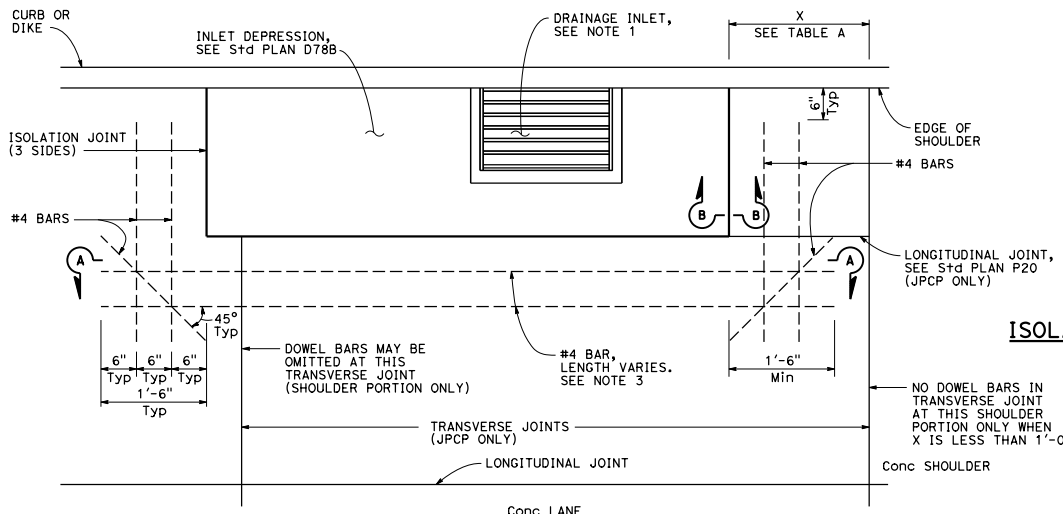
DISTANCE X	BARs REQUIRED
2'-0" TO 1'-6"	2
1'-6" TO 9"	1 @ X/2
9" OR LESS	NONE

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CONCRETE PAVEMENT-  
 DRAINAGE INLET  
 DETAILS No. 1**

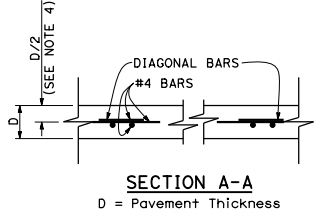
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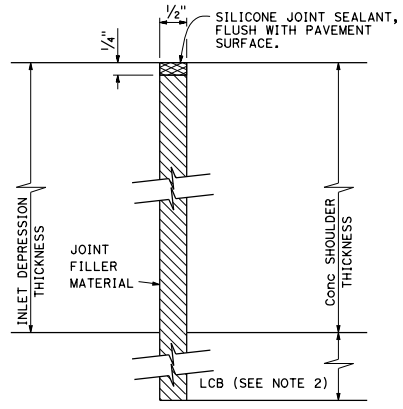
**CASE A**  
Transverse Joint intersects inlet depression or no transverse joints.



**CASE B**  
Transverse Joint within 2'-0" of edge of inlet depression.



**SECTION A-A**  
D = Pavement Thickness



**SECTION B-B**  
**ISOLATION JOINT AROUND INLET DEPRESSION**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*William K. Farbach*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

William K. Farbach  
No. C49042  
Exp. 9-30-16  
CIVIL  
STATE OF CALIFORNIA

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**TABLE A**

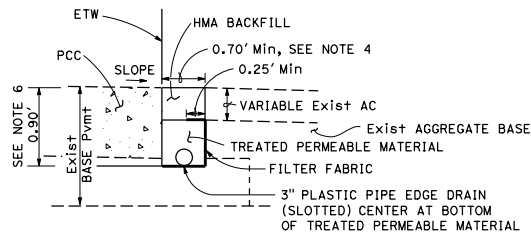
DISTANCE X	BARNS REQUIRED
2'-0" TO 1'-6"	2
1'-6" TO 1'-0"	1
1'-0" OR LESS	NONE

- NOTES:**
1. Refer to Project Plans for location and type of drainage inlets.
  2. Extend joint filler material to bottom of Lean Concrete Base. Where Lean Concrete Base is not used as base material, the joint filler material shall only extend to the bottom of the new concrete pavement.
  3. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, terminate pavement steel reinforcement 2" clear from all outside edges of isolation joint.
  4. For Jointed Plain Concrete Pavement only. For Continuously Reinforced Concrete Pavement, see Standard Plan P4.

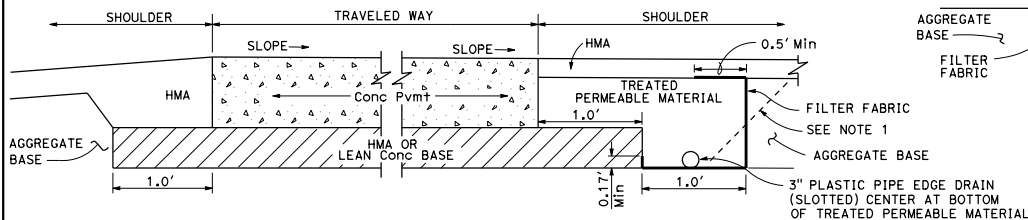
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONCRETE PAVEMENT-  
DRAINAGE INLET  
DETAILS No. 2**

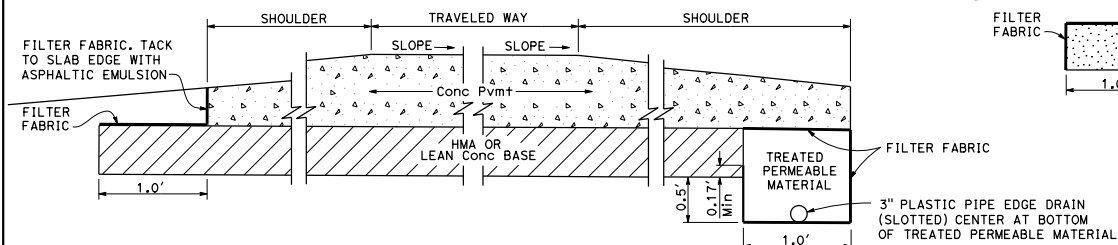
NO SCALE



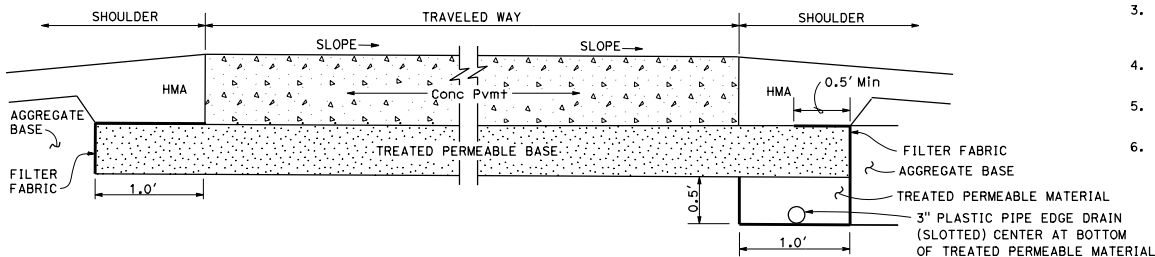
**TYPE 1 PAVEMENT STRUCTURE DRAINAGE SYSTEM**  
(For existing highway facility)



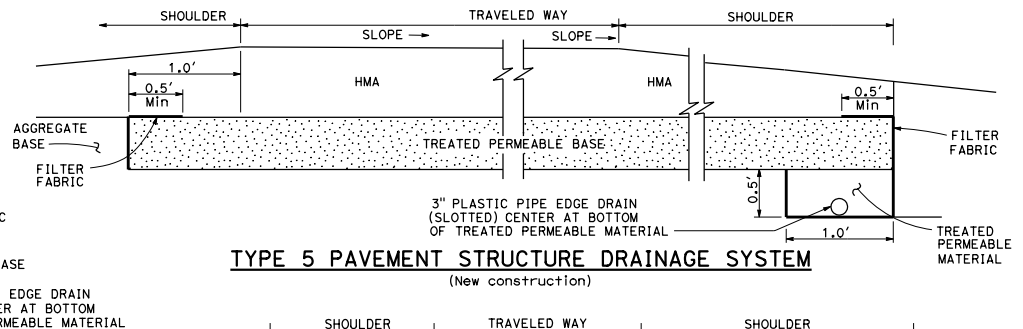
**TYPE 2 PAVEMENT STRUCTURE DRAINAGE SYSTEM**  
(New construction)



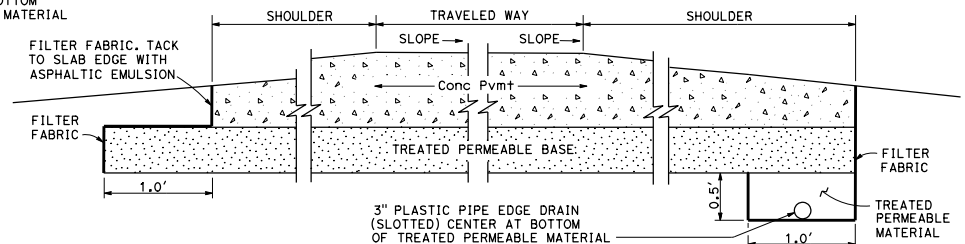
**TYPE 3 PAVEMENT STRUCTURE DRAINAGE SYSTEM**  
(New construction)



**TYPE 4 PAVEMENT STRUCTURE DRAINAGE SYSTEM**  
(New construction)



**TYPE 5 PAVEMENT STRUCTURE DRAINAGE SYSTEM**  
(New construction)



**TYPE 6 PAVEMENT STRUCTURE DRAINAGE SYSTEM**  
(New construction)

**NOTES:**

1. At the Contractor's option, on new construction, the vertical jointline (including the filter fabric) between the treated permeable material and the shoulder base/subgrade material may be rotated about its midpoint to a slope not flatter than 1:1 as shown by the dashed lines.
2. See the project plans and typical cross sections for pavement structure details.
3. The plan layout for pavement structure drainage collector and outlet systems for new concrete pavement and new hot mix asphalt pavement is the same as that shown on Standard Plan P51.
4. For plastic pipe edge drain diameter larger than 3", the minimum trench width shall be equal to the outside diameter of the plastic pipe plus 4".
5. For plastic pipe edge drain diameters larger than 3", all details for 3" plastic pipe edge drain shall apply.
6. For pavements thicker than 0.75', the minimum trench depth is 1.0'.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT STRUCTURE  
DRAINAGE SYSTEM DETAILS**

NO SCALE

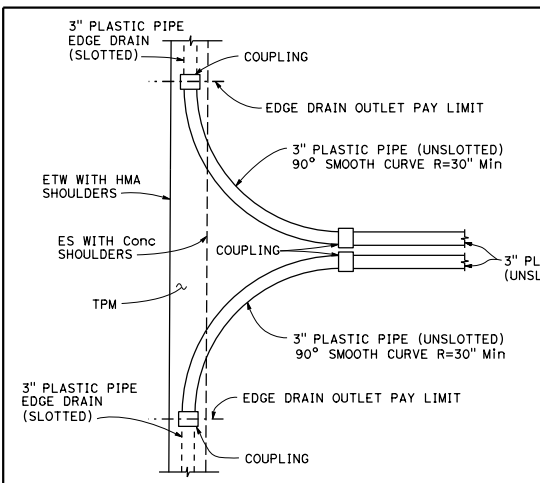
**P50**

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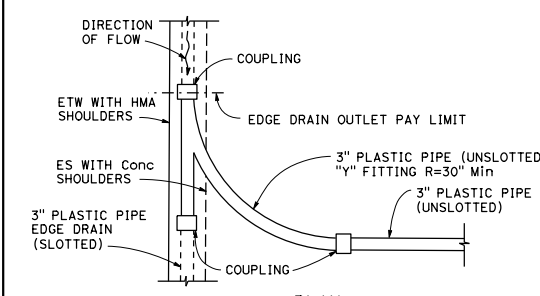
*William K. Farnbach*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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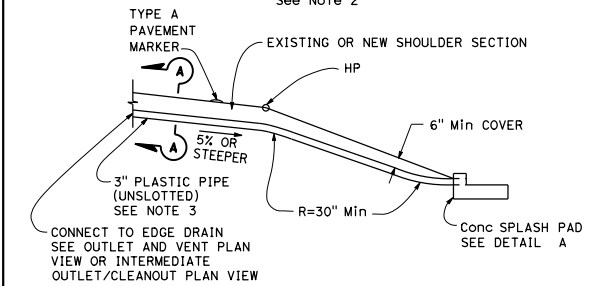




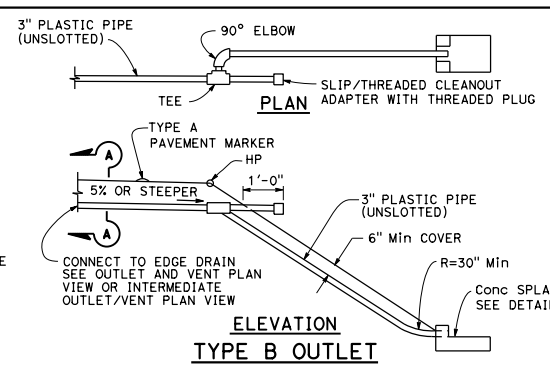
**PLAN**  
**DUAL OUTLET AND/OR VENT**  
See Note 2



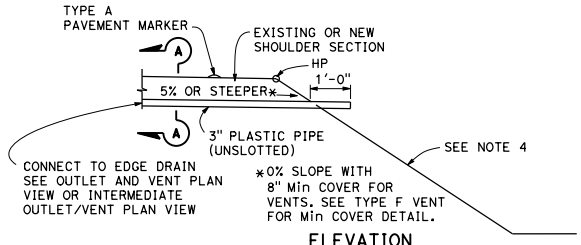
**PLAN**  
**INTERMEDIATE OUTLET**  
See Note 2



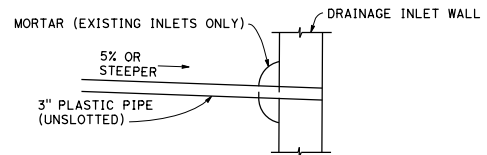
**ELEVATION**  
**TYPE A OUTLET**



**ELEVATION**  
**TYPE B OUTLET**

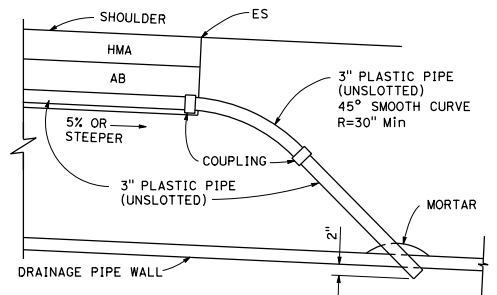


**ELEVATION**  
**TYPE C OUTLET AND/OR VENT**



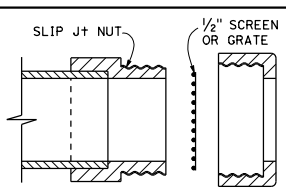
**ELEVATION**

**TYPE D OUTLET CONNECTION TO DRAINAGE INLET**

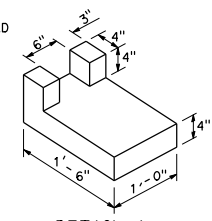


**ELEVATION**

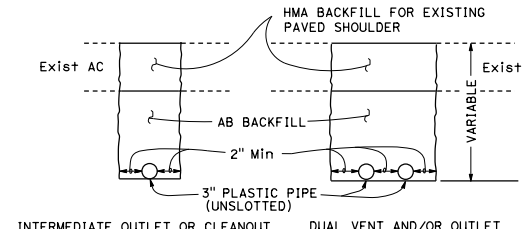
**TYPE E OUTLET CONNECTION TO DRAINAGE PIPE**



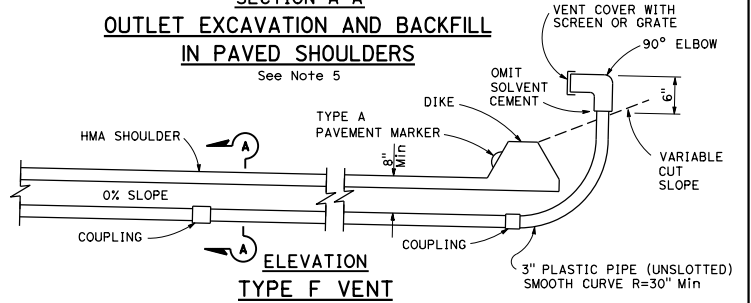
**EDGE DRAIN OUTLET AND VENT COVER**



**DETAIL A**  
**CONCRETE SPLASH PAD**



**SECTION A-A**  
**OUTLET EXCAVATION AND BACKFILL IN PAVED SHOULDERS**  
See Note 5



**ELEVATION**  
**TYPE F VENT**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**EDGE DRAIN OUTLET AND VENT DETAILS**  
NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

William K. Farbach  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C49042  
 Exp. 9-30-16  
 CIVIL  
 STATE OF CALIFORNIA

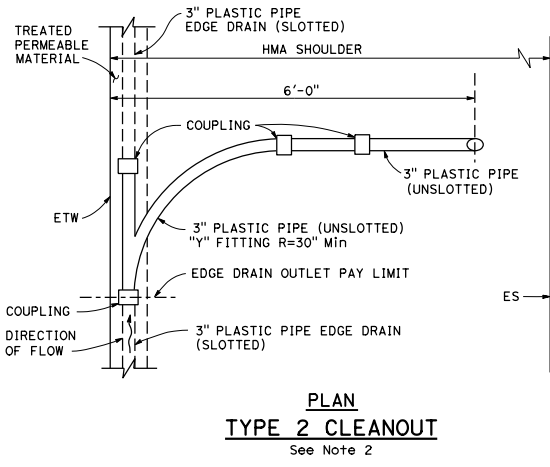
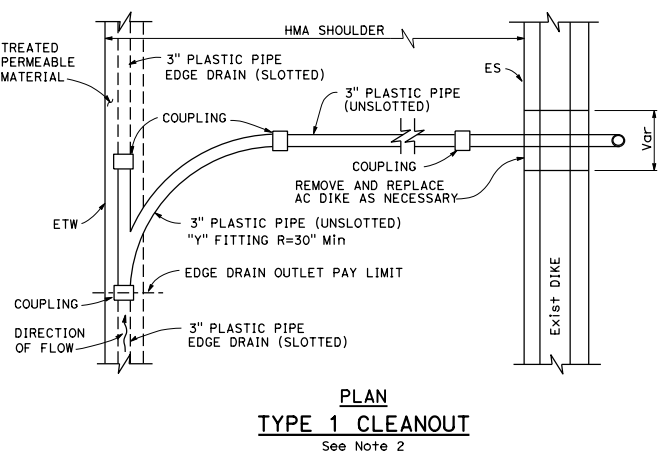
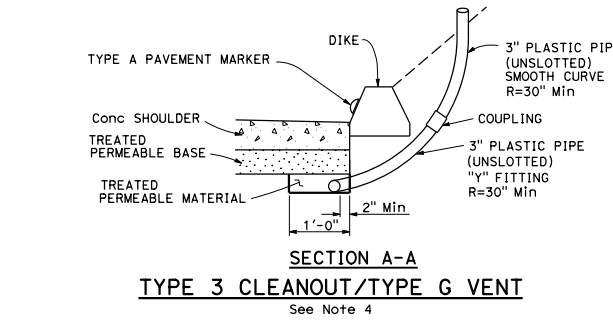
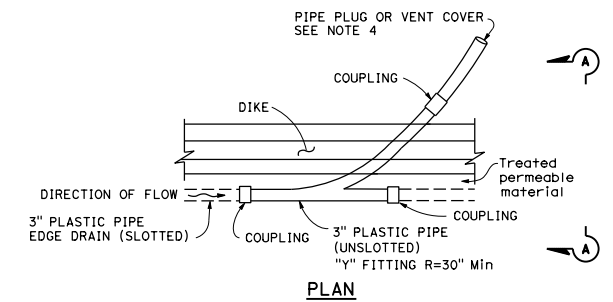
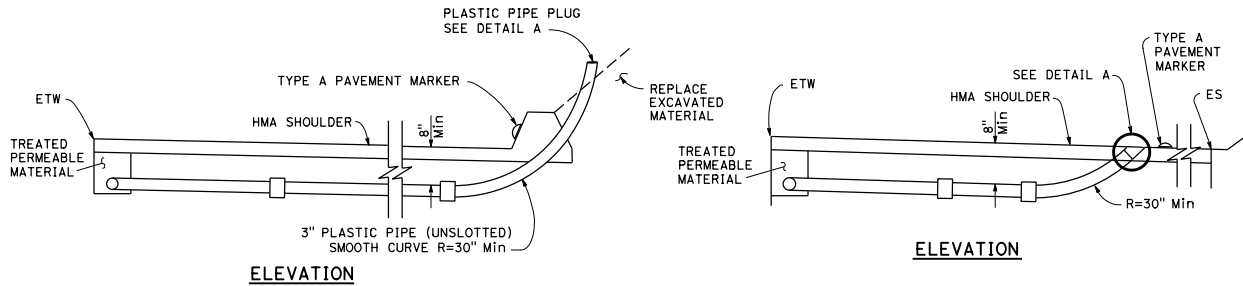
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- NOTES:**
1. See project plans for location and type of outlet and/or vent installations.
  2. The position of slotted plastic pipe and limits of treated permeable material shown are for the Type 1 structural section drainage system shown on Standard Plan P50.
  3. The maximum length of plastic pipe outlet shall be 50'-0" measured from the longitudinal centerline of the collector trench to the pipe outlet. For pipe lengths greater than 50'-0" use Type B outlets.
  4. See project plans for slope protection details at Type C pipe outlets.
  5. Backfill with aggregate base from outside edge paved shoulder to hinge point and backfill with native material in slope area.
  6. See Standard Plan P52 for Type G vent detail used with concrete shoulders.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*William K. Farnbach*  
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 STATE OF CALIFORNIA

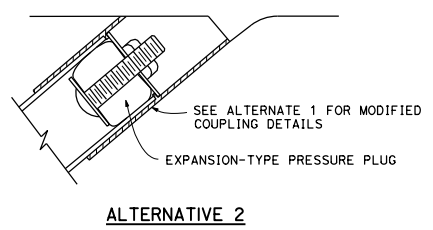
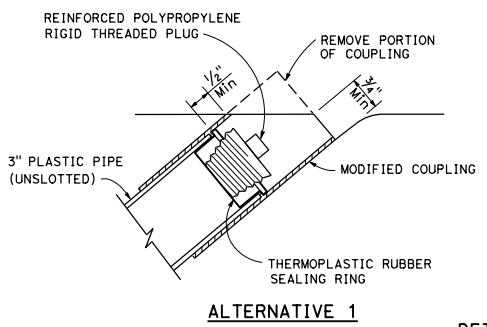
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**NOTES:**

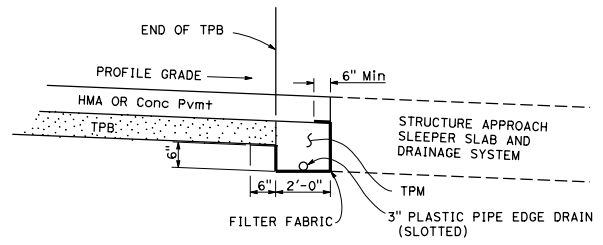
1. See project plans for location and type of cleanout or vent installations.
2. The position of slotted plastic pipe and limits of treated permeable material shown are for the Type 1 structural section drainage system shown on Standard Plan P50.
3. Other types of plugs may be substituted with the Engineer's approval.
4. The Type 3 cleanout and Type G vent is for use with concrete shoulders. The Type 6 structural section drainage system from Standard Plan P50 is shown. Use plastic pipe plug shown in Detail A with Type 3 cleanouts. Use vent cover shown on Standard Plan P51 with Type G vents.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**EDGE DRAIN CLEANOUT AND VENT DETAILS**  
 NO SCALE

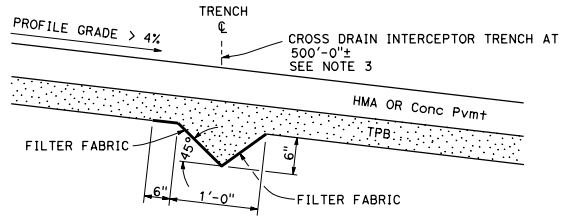


**DETAIL A**  
**PLASTIC PIPE PLUG**  
See Note 3

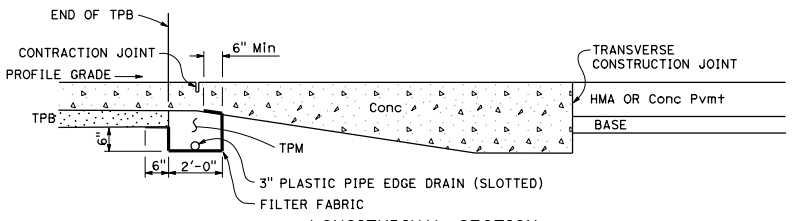
163



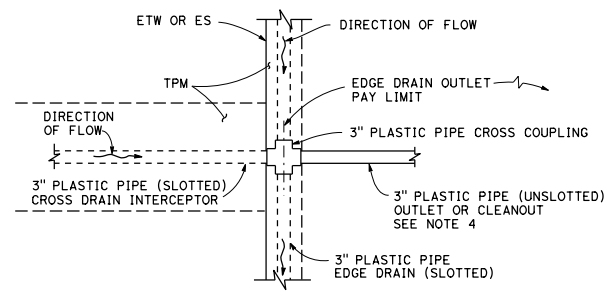
**LONGITUDINAL SECTION  
CROSS DRAIN INTERCEPTOR AT STRUCTURE APPROACH**



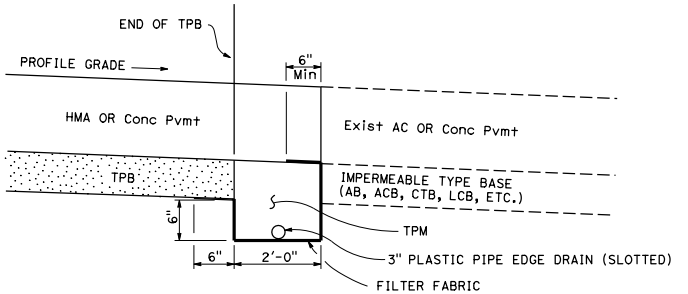
**LONGITUDINAL SECTION  
INTERMEDIATE CROSS DRAIN INTERCEPTOR**



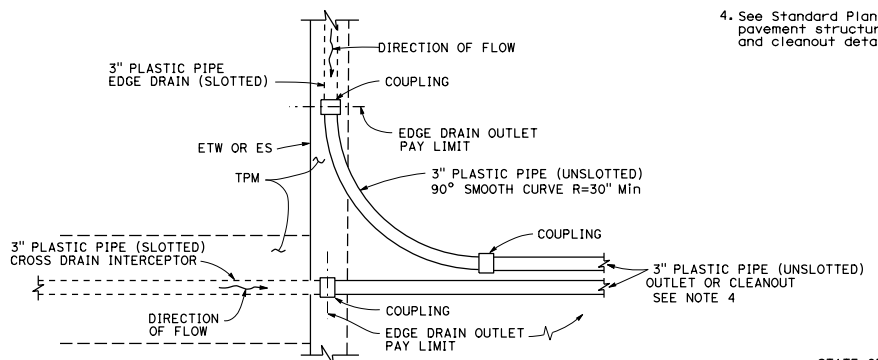
**LONGITUDINAL SECTION  
CROSS DRAIN INTERCEPTOR AT END ANCHOR**  
See Note 2



**PLAN  
CROSS DRAIN INTERCEPTOR OUTLET  
CONNECTION DETAILS**



**LONGITUDINAL SECTION  
TERMINAL CROSS DRAIN INTERCEPTOR**



**PLAN  
COMBINED CROSS DRAIN  
INTERCEPTOR/EDGE DRAIN  
OUTLET DETAILS**

- NOTES:**
1. Cross drain interceptors are for use with treated permeable bases.
  2. See Standard Plan P30 for Pavement End Anchor details. A typical pavement end anchor is shown.
  3. The cross drain interceptor trench shall slope to drain. See project plans for location and skew of cross drains.
  4. See Standard Plans P51 and P52 for pavement structure drainage system outlet and cleanout details, respectively.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CROSS DRAIN INTERCEPTOR  
DETAILS**  
NO SCALE

**P53**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*William K. Farnbach*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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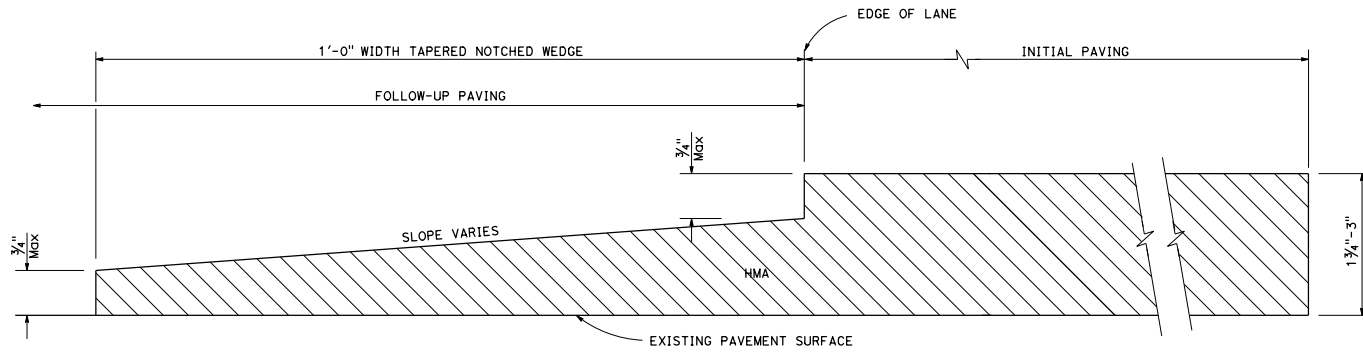
REGISTERED PROFESSIONAL ENGINEER  
William K. Farnbach  
No. C49042  
Exp. 9-30-16  
CIVIL  
STATE OF CALIFORNIA

2015 STANDARD PLAN P53

9-22-15

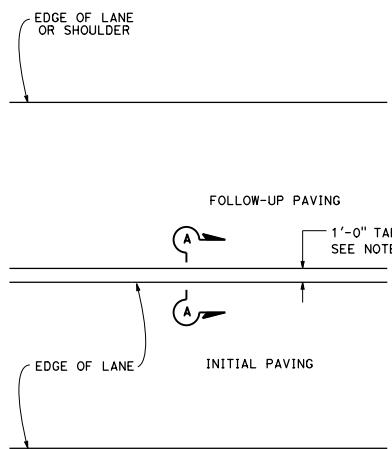
*Return to Table of Contents*

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>William K. Farnbach</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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**SECTION A-A**  
**LONGITUDINAL TAPERED NOTCHED WEDGE JOINT**

**NOTE:**  
1. Tapered notch wedge shall extend 1'-0" into adjacent lane or shoulder to receive follow-up paving.



**PLAN**  
**DIVIDED MULTILANE HIGHWAY**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**HOT MIX ASPHALT PAVING**  
**(LONGITUDINAL TAPERED NOTCHED**  
**WEDGE JOINT)**

NO SCALE

**P70**

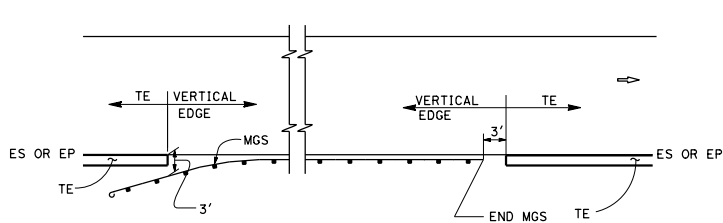
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2015 STANDARD PLAN P70

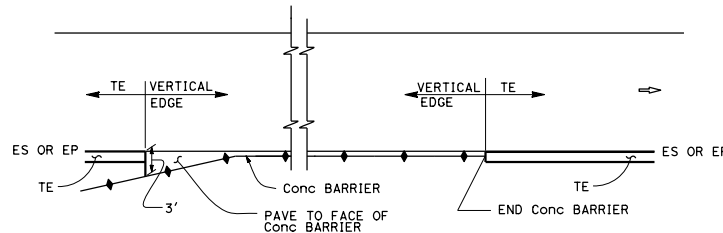
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
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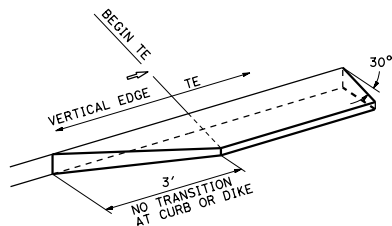
REGISTERED PROFESSIONAL ENGINEER  
 Srikanth N. Balasubramanian  
 No. C56426  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA



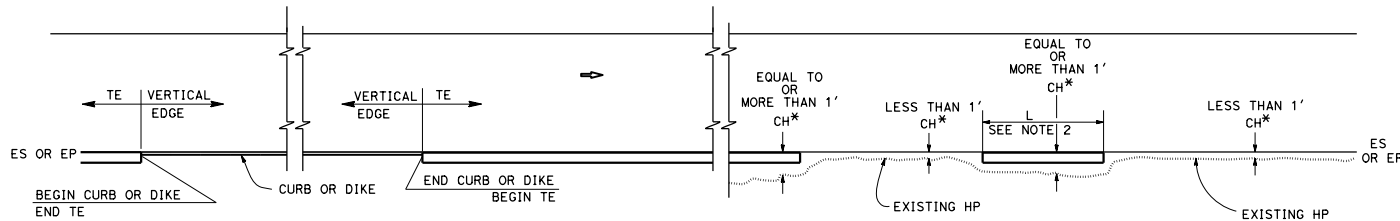
**MGS**



**CONCRETE BARRIER**



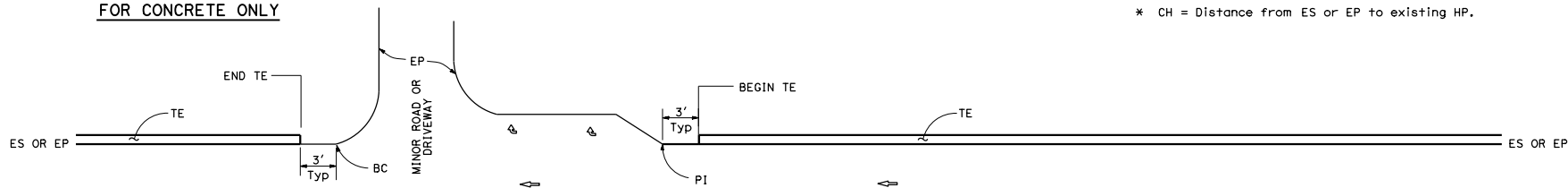
**TRANSITION DETAIL FOR CONCRETE ONLY**



**CURB OR DIKE**

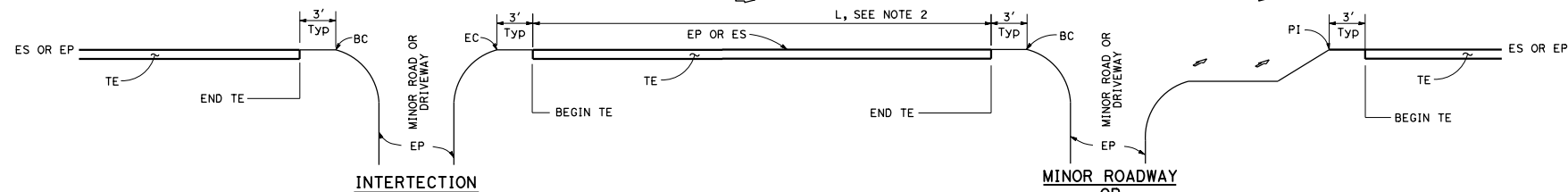
**NARROW SIDE SLOPE**

\* CH = Distance from ES or EP to existing HP.



**STATE ROUTE**

**STATE ROUTE**



**INTERSECTION**

**DRIVEWAY AND INTERSECTION**

**MINOR ROADWAY OR DRIVEWAY**

**NOTES:**

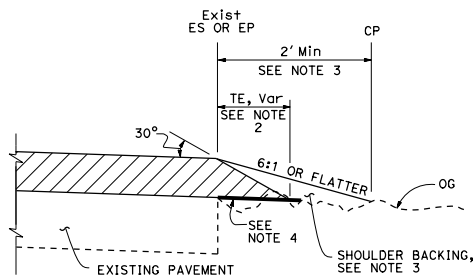
- For details not shown, see Standard Plans P75 and P76.
- Tapered edge is optional when L is less than 30'.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

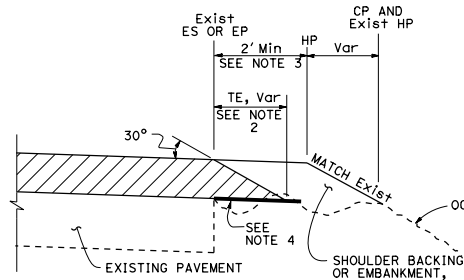
**PAVEMENT EDGE TREATMENTS**

NO SCALE

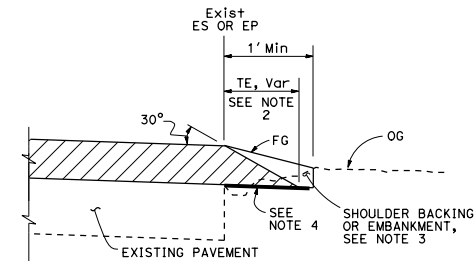
**P74**



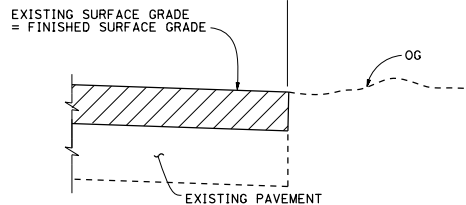
**CASE A**  
Tapered Edge



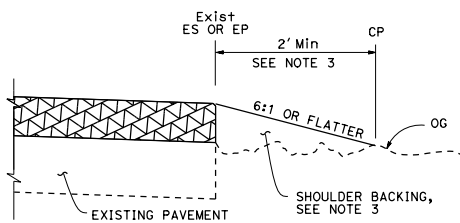
**CASE B**  
Tapered Edge



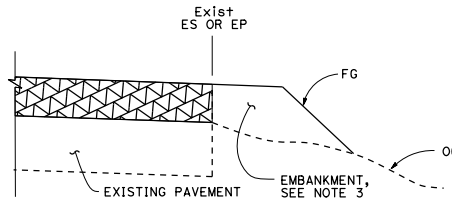
**CASE C**  
Tapered Edge



**CASE D**  
Vertical Edge



**CASE E**  
Vertical Edge



**CASE F**  
Vertical Edge  
\* See Table A and Standard Plan P74

**LEGEND:**

- HMA OVERLAY
- HMA OR CONCRETE OVERLAY
- CONCRETE OVERLAY

**ABBREVIATIONS:**

- TE TAPERED EDGE
- TT TOTAL THICKNESS OF TE

**TABLE A**  
EDGE TREATMENT FOR VARIOUS OVERLAY THICKNESS AND CONDITIONS

FIELD CONDITION	OVERLAY THICKNESS	
	LESS THAN 0.15'	0.15' OR MORE
Exist SLOPE 6:1 OR FLATTER	CASE E	CASE A
Exist SLOPE 3:1 TO 6:1	CASE E	CASE B
Exist SLOPE STEEPER THAN 3:1	CASE F	CASE F
CUT SECTION (REPLACE, COLD PLANE, MILL PAVEMENT)	CASE D	CASE C

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

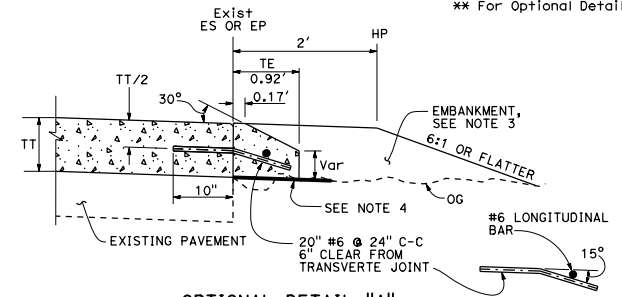
REGISTERED CIVIL ENGINEER  
Srikanth N. Balasubramanian  
No. C56426  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
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**ADDITIONAL HMA OR CONCRETE QUANTITIES FOR TE/SIDE/MILE**

TYPICAL CROSS SECTION	TT	TOTAL ADDITIONAL MATERIAL FOR TE/SIDE/MILE		
		HMA (TON)	CONCRETE (CY)*	CONCRETE (CY)**
	0.15'	7.7	NA	NA
	0.20'	13.7	NA	NA
	0.30'	30.9	NA	NA
	0.40'	54.9	NA	NA
	0.45'	69.4	NA	NA
	0.50'	84.2	NA	NA
	0.60'	113.9	NA	NA
	0.70'	143.6	70.9	94.2
	0.80'	173.3	85.6	112.2
	0.90'	203.0	100.3	130.2
	1.00'	232.7	114.9	148.2
	1.10'	262.4	129.6	166.2
1.20'	292.1	144.3	184.2	

\* For Detail "A"  
\*\* For Optional Detail "A"

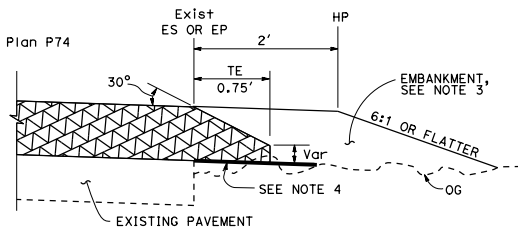


**OPTIONAL DETAIL "A"**

For concrete overlay  
See Note 5

**NOTES:**

- For limits of tapered edge and vertical edge treatments, see Standard Plan P74.
- Details shown for HMA overlay thickness less than 0.43'. See Detail "A" for HMA overlay thickness more than 0.43' or concrete overlay.
- For locations and limits of shoulder backing or embankment see project plans.
- Grade existing ground to place tapered edge, 1' minimum width
- Tapered edge transverse joint must match overlay transverse joint. End of #6 longitudinal bar must be 2" ± 1/2" clear from transverse joint.
- Tapered edge is not needed in the area of MGS, barrier, right turn lane and acceleration lane. See Standard Plan P74.



**DETAIL "A"**

For HMA overlay thickness more than 0.43' or concrete overlay

**PAVEMENT EDGE TREATMENTS-OVERLAYS**




NO SCALE

**P75**

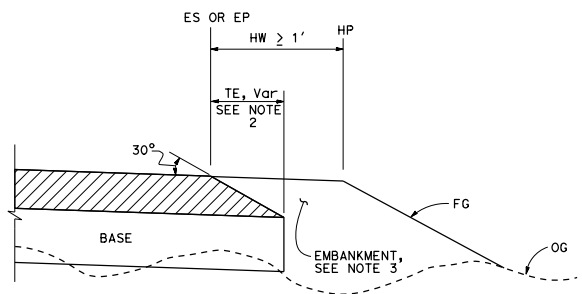
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Srikant N. Balasubramanian**  
 REGISTERED CIVIL ENGINEER  
 No. C56426  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

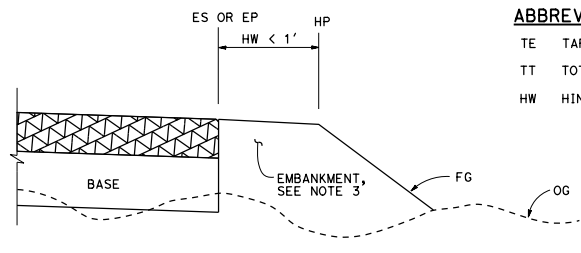
October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

- LEGEND:**
-  HMA PAVEMENT
  -  HMA OR CONCRETE PAVEMENT
  -  CONCRETE PAVEMENT

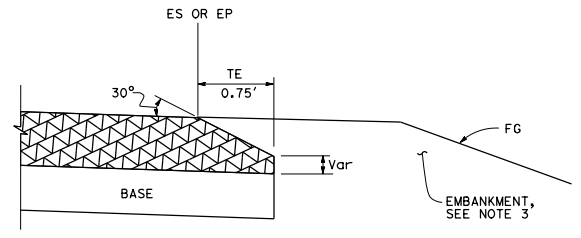
- ABBREVIATIONS:**
- TE TAPERED EDGE
  - TT TOTAL THICKNESS OF TE
  - HW HINGE WIDTH, DISTANCE FROM ES OR EP TO HP



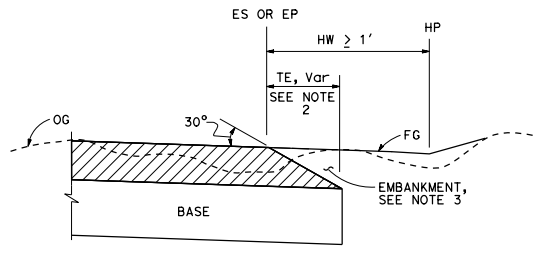
**CASE K**  
Tapered Edge - Fill Section, HW > 1'



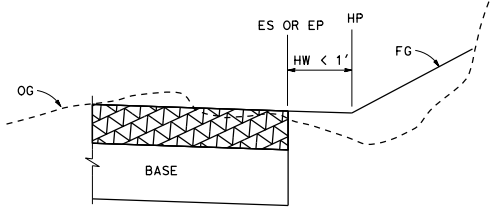
**CASE L**  
Vertical Edge - Fill Section, HW < 1'



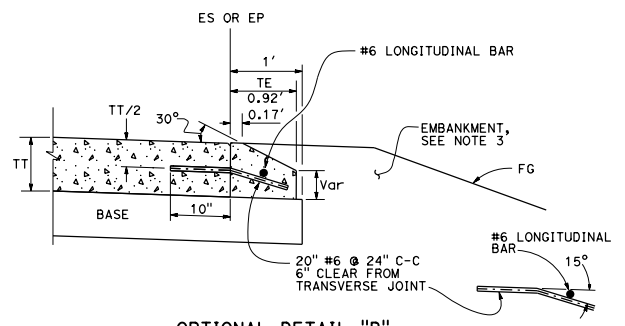
**DETAIL "B"**  
For HMA pavement thickness more than 0.43' or concrete pavement



**CASE M**  
Tapered Edge - Cut Section, HW > 1'



**CASE N**  
Vertical Edge - Cut Section, HW < 1'



**OPTIONAL DETAIL "B"**  
For concrete pavement  
See Note 4



- NOTES:**
- For limits of tapered edge and vertical edge treatments, see Standard Plan P74
  - Details shown for HMA pavement thickness less than 0.43'. See Detail "B" for HMA pavement thickness more than 0.43' or concrete pavement.
  - For locations and limits of embankment see project plans.
  - Tapered edge transverse joint must match pavement transverse joint. End of #6 longitudinal bar must be 2" ± 1/2" clear from transverse joint.
  - Tapered edge is not needed in the area of MGS, barrier, right turn lane and acceleration lane. See Standard Plan P74.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PAVEMENT EDGE TREATMENTS-  
NEW CONSTRUCTION**

NO SCALE

**P76**

**LEGEND:**

-  10" x 6" x 1'-0" FILLER BLOCK ALIGNED AGAINST HEADER.
-  10" x 6" STRETCHERS
- LC1 = LOADING CASE I
- LC2 = LOADING CASE II
- y = 4 AND 6 FOR BATTERED FOR TYPES A, B, AND C

MAXIMUM WALL HEIGHTS						
BATTER	TYPE A		TYPE B		TYPE C	
	LC1	LC2	LC1	LC2	LC1	LC2
VERTICAL	24'-0"	11'-0"	27'-0"	20'-0"	31'-0"	27'-0"
1:6	31'-0"	13'-0"	36'-0"	23'-0"	36'-0"	33'-0"
1:4	33'-0"	15'-0"	36'-0"	25'-0"	36'-0"	36'-0"

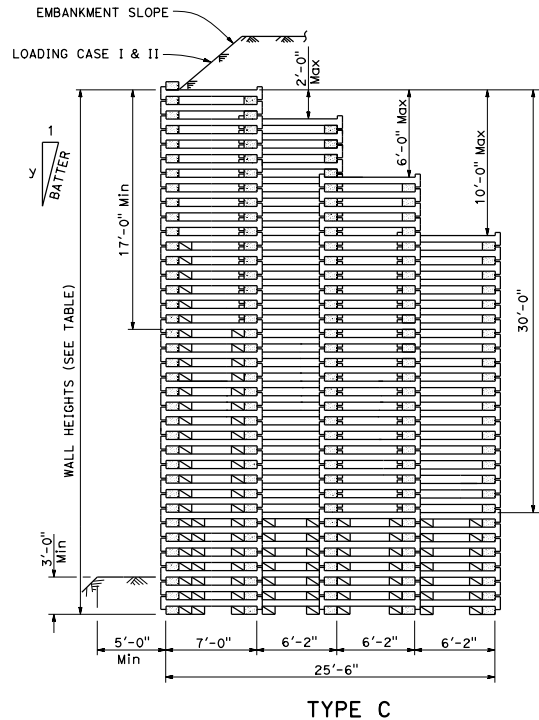
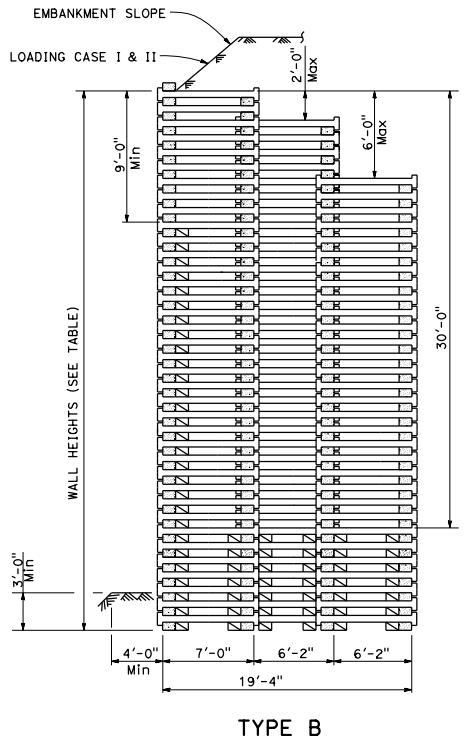
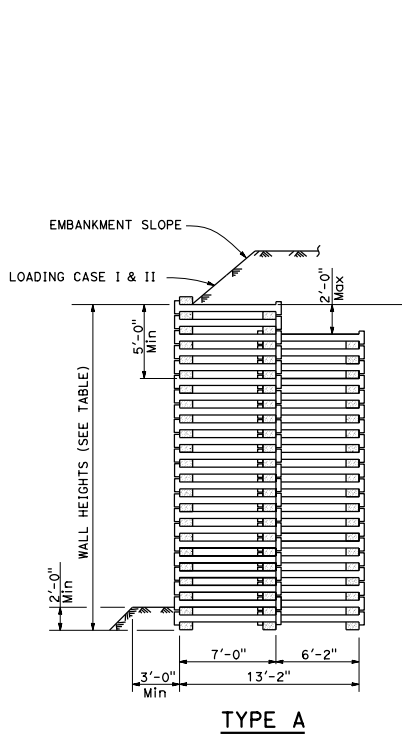
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Kathy Orinell*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Kathryn Orinell*  
No. C55599  
Exp. 12-31-16  
CIVIL  
STATE OF CALIFORNIA

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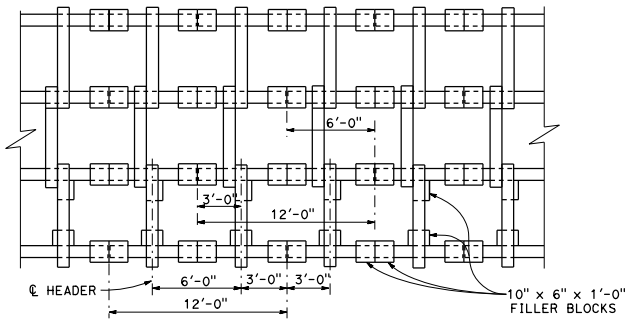
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**REINFORCED CONCRETE CRIB WALL  
TYPES A, B AND C**

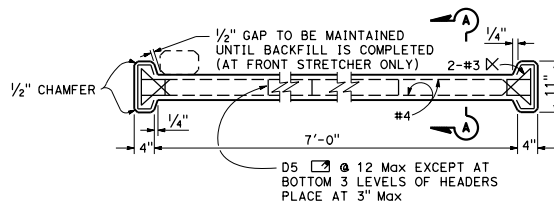
NO SCALE

**C7A**

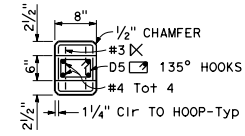




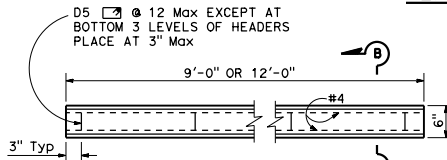
**PARTIAL PLAN AT BASE**  
Type "B" shown, others similar



**ELEVATION**

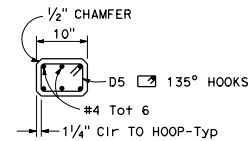


**SECTION A-A**



**ELEVATION**

**STRETCHER DETAIL**



**SECTION B-B**

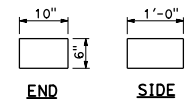
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Kathryn Orswell*  
REGISTERED CIVIL ENGINEER

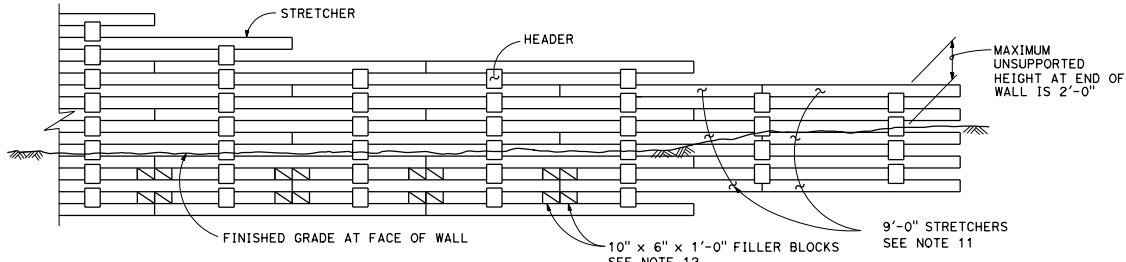
October 30, 2015  
PLANS APPROVAL DATE

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Kathryn Orswell  
No. C55599  
Exp. 12-31-16  
CIVIL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

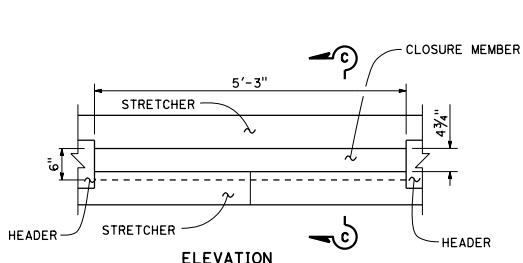


**FILLER BLOCK DETAIL**



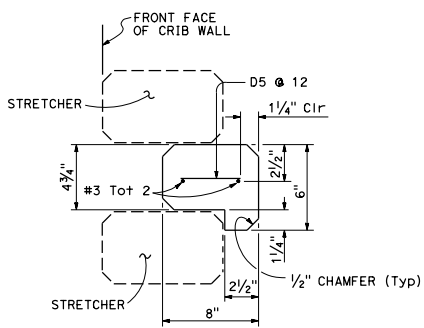
**PARTIAL ELEVATION**

- NOTES:**
- Design: AASHTO LRFD Bridge Design Specifications, 4th edition with the California Amendments.
  - Reinforced Concrete:  $f_y = 60$  ksi,  $f'_c = 3.6$  ksi,  $n = 8$
  - Soil Parameters:  $\phi = 34^\circ$ ,  $\delta = 25.5^\circ$ ,  $\lambda = 120$  pcf,  $A = 0.2g$   
Lateral earth pressure determined by Coulomb's theory.
  - Concrete to concrete bearing surfaces shall be finished to a smooth plane. The gap between bearing surfaces shall not exceed  $1/8$  inch. Where a gap of  $1/16$  inch to  $1/8$  inch exists, a  $1/16$  inch pad of asphalt felt or sheet neoprene shall be placed between the bearing surfaces. For wall Types B and C, a  $1/16$  inch asphalt felt pad or sheet neoprene shall be placed between all concrete bearing surfaces below the 29'-10" level.
  - All members may be manufactured to dimensions  $1/8$  inch greater in thickness and stretchers  $1/2$  inch less in length.
  - Where an opening is specified in the face of a wall, special length stretchers and additional headers may be required.
  - For non-tangent wall alignment, special length stretchers may be required.
  - For non-tangent wall alignment and at locations where filler blocks are required, special length front face closure members may be required.
  - The thickness of the lowest step for each wall type shall not be less than the dimension shown on these plans.
  - Use "Front Face Closure Member" only when specified on project plans or in the Special Provisions.
  - All stretchers are 12'-0" except as noted.
  - Place 2 filler blocks midspan between stretchers in the bottom 2 levels of walls 9' high and higher.



**ELEVATION**

**FRONT FACE CLOSURE MEMBER**



**SECTION C-C**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**REINFORCED CONCRETE CRIB WALL  
TYPES A, B, AND C  
HEADER AND STRETCHER DETAILS**  
NO SCALE

**C7B**

2015 STANDARD PLAN C7B

TYPE	CASE	BEARING AND B' (ksf/ft)	VERTICAL WALL HEIGHT																																			
			5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'	29'	30'	31'	32'	33'	34'	35'	36'				
A	I	qu	1.4	1.6	1.8	2.0	2.1	2.4	2.6	2.9	3.2	3.5	3.8	4.1	4.4	4.8	5.2	5.6	6.1	6.6	7.1	7.7]																
		B'	13.2	13.2	13.2	13.2	13.1	12.9	12.7	12.4	12.1	11.9	11.6	11.4	11.1	10.8	10.5	10.2	9.9	9.6	9.3	9.0																
	II	qu	1.8	1.9	2.1	2.3	2.5	2.7	2.9]																													
		B'	13.2	13.2	13.2	13.2	13.2	13.2	13.1																													
B	I	qu					2.2	2.4	2.5	2.7	2.9	3.2	3.4	3.6	3.9	4.1	4.4	4.7	5.0	5.3	5.6	5.9	6.3	6.6	7.0]													
		B'					19.3	19.3	19.3	19.3	19.2	19.0	18.8	18.6	18.4	18.2	18.0	17.8	17.6	17.4	17.2	16.9	16.7	16.5	16.2													
	II	qu					3.0	3.1	3.3	3.5	3.6	3.9	4.1	4.3	4.5	4.8	5.1	5.5]																				
		B'					19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.1	18.8	18.4																				
C	I	qu													3.7	3.9	4.1	4.4	4.6	4.9	5.2	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5]									
		B'														25.2	25.1	25.0	24.8	24.7	24.5	24.4	24.2	24.0	23.9	23.7	23.5	23.3	23.1	22.9								
	II	qu														5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.5	6.8	7.2	7.5]												
		B'														25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.4	25.1	24.8	24.5											

TYPE	CASE	BEARING AND B' (ksf/ft)	1:6 BATTERED WALL HEIGHT																																				
			5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'	29'	30'	31'	32'	33'	34'	35'	36'					
A	I	qu	1.4	1.5	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.1	4.3	4.6	4.9	5.2	5.5	5.8	6.1	6.4	6.8	7.1	7.6	8.2]										
		B'	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.0	12.9	12.8	12.6	12.5	12.3	12.1	11.9	11.8	11.6	11.4	11.2	8.2	7.8									
	II	qu	1.8	1.9	2.1	2.2	2.4	2.6	2.8	3.0	3.2]																												
		B'	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2																												
B	I	qu					2.0	2.2	2.4	2.6	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.2	5.4	5.6	5.8	6.0	6.2	6.5	6.8	7.0	7.3	7.6	7.8]					
		B'					19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.2	19.0	18.9	18.8	18.7	18.5				
	II	qu					2.9	3.0	3.2	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.2	5.4	5.6]																		
		B'					19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3																	
C	I	qu													3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.2	6.4	6.6	6.9	7.1	7.3	7.5]					
		B'													25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5		
	II	qu													4.7	4.9	5.1	5.3	5.5	5.7	5.9	6.1	6.3	6.5	6.8	7.0	7.3	7.5	7.7	8.0	8.3]								
		B'													25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.4	25.3							

TYPE	CASE	BEARING AND B' (ksf/ft)	1:4 BATTERED WALL HEIGHT																																						
			5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'	29'	30'	31'	32'	33'	34'	35'	36'							
A	I	qu	1.3	1.5	1.6	1.9	2.0	2.2	2.4	2.6	2.8	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.1	5.3	5.5	5.7	5.9	6.2	6.5	6.7	7.0]										
		B'	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.1	13.0	12.9	12.8	12.7								
	II	qu	1.9	1.9	2.1	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6]																												
		B'	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2																												
B	I	qu					2.0	2.1	2.3	2.5	2.7	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.4	6.6	6.9	7.1	7.3]							
		B'					19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3		
	II	qu					2.8	2.9	3.1	3.3	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.9]																		
		B'					19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3	19.3																			
C	I	qu													3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.1	5.3	5.6	5.8	6.0	6.2	6.4	6.6	6.9	7.1	7.3]							
		B'													25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5			
	II	qu													4.5	4.7	4.9	5.1	5.3	5.5	5.7	5.9	6.1	6.3	6.5	6.8	7.0	7.2	7.4	7.7	7.9	8.1	8.4	8.6]							
		B'													25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5			

**DESIGN FOOTNOTE:**

- Nominal soil bearing resistance, design lateral loads, settlement and overall slope stability shall be determined by analysis based on a foundation site investigation. Walls shall not be founded on unimproved original ground with nominal bearing resistance less than 3 ksf.

**LEGEND:**

- B' - EFFECTIVE FOOTING WIDTH (ft)
- qu - GROSS FACTORED BEARING STRESS (ksf)
- ] - INDICATES MAXIMUM ALLOWABLE WALL HEIGHT FOR PARTICULAR WALL TYPE AND PARTICULAR LOADING CASE.
- y = 4 AND 6 FOR BATTERED

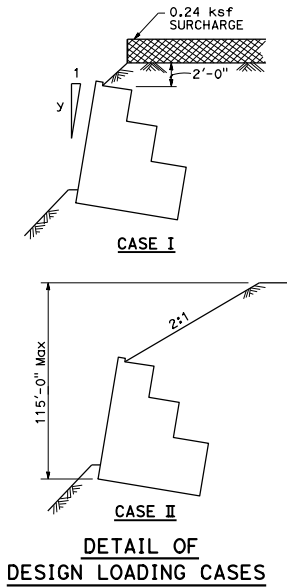
**REINFORCED CONCRETE CRIB WALL  
FOUNDATION PRESSURE**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

NO SCALE

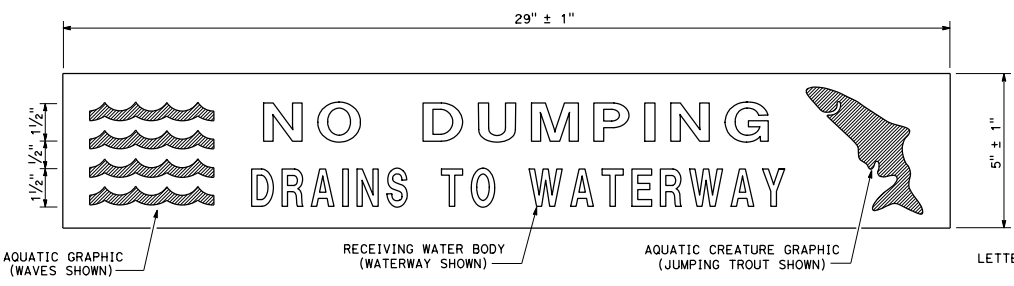
**C7C**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
<i>Kathryn Orlewil</i> REGISTERED/CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



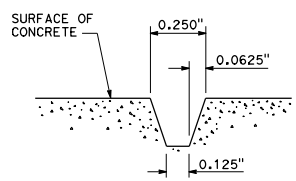
**PLAN**  
**DRAINAGE INLET MARKER**  
**(PREFABRICATED THERMOPLASTIC)**



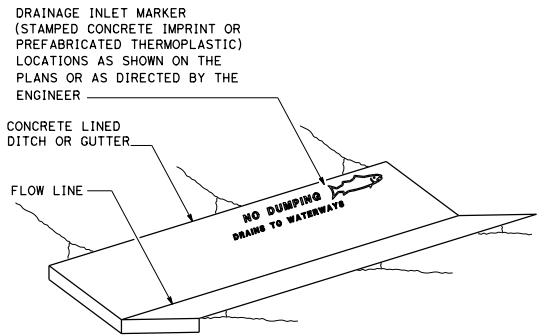
**PLAN**  
**DRAINAGE INLET MARKER**  
**(MEDALLION)**



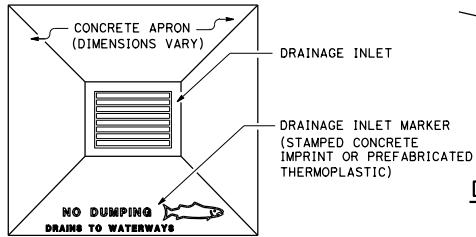
**PLAN**  
**DRAINAGE INLET MARKER**  
**(STAMPED CONCRETE IMPRINT)**



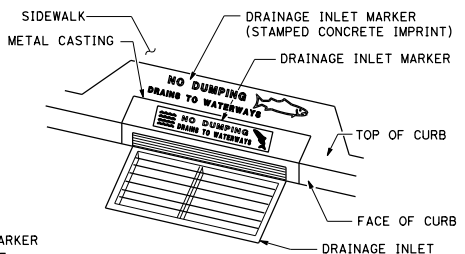
**SECTION A-A**  
**STAMPED CONCRETE**  
**IMPRINT DETAIL**



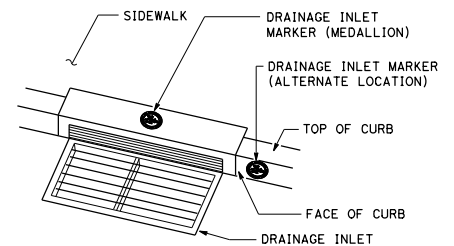
**PERSPECTIVE**  
**DRAINAGE INLET MARKER ON**  
**CONCRETE LINED DITCH**



**PLAN**  
**DRAINAGE INLET MARKER ON**  
**DRAINAGE INLET APRON**




**PERSPECTIVE**  
**DRAINAGE INLET MARKER ON**  
**DRAINAGE INLET**

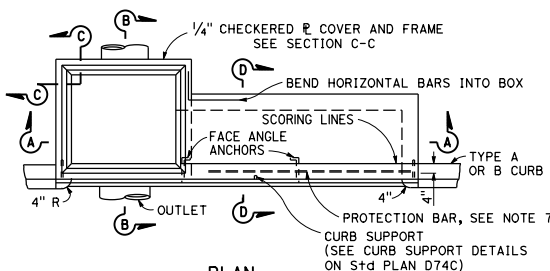


**PERSPECTIVE**  
**DRAINAGE INLET MARKER (MEDALLION)**  
**ON DRAINAGE INLET**

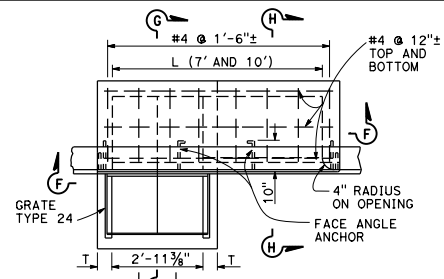
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLET MARKERS**  
 NO SCALE

**D71**

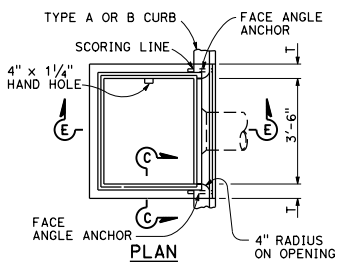
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REGISTERED CIVIL ENGINEER October 30, 2015 PLANS APPROVAL DATE No. C59976 Exp. 6-30-16 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					



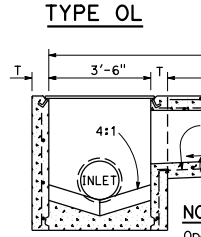
PLAN



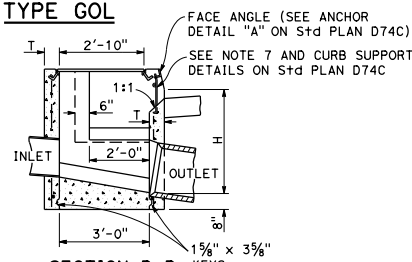
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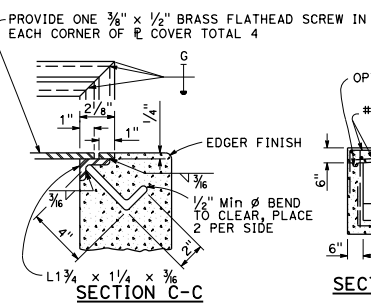
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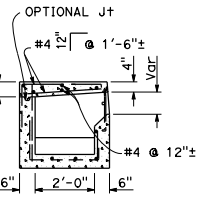
SECTION A-A



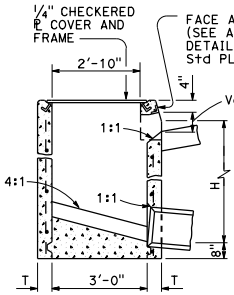
SECTION B-B



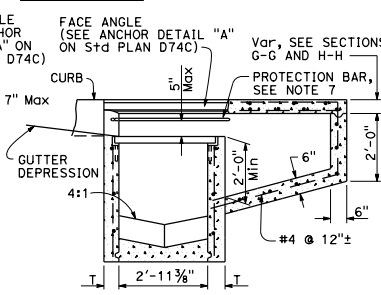
SECTION C-C



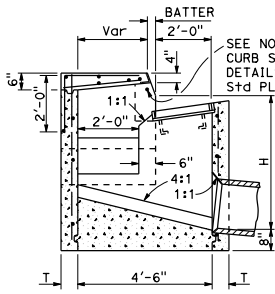
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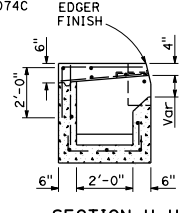
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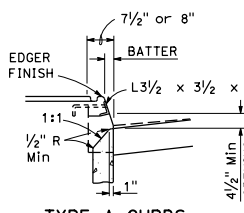
SECTION F-F



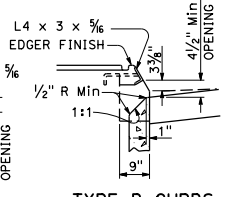
SECTION G-G



SECTION H-H



TYPE A CURBS



TYPE B CURBS

CURB OPENING DETAILS

**NOTES:**

- "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line undepressed at the curb face.
- For "T" wall thickness, see Table A below.
- Height of curb opening will vary with the type of curb and the depth of the local depression.
- Wall reinforcing not required when "H" is 8'-0" or less and the unsupported width or length is 7'-0" or less. Walls exceeding these limits shall be reinforced with #4 bars @ 1'-6" ± centers placed 1/2" clear to inside of box unless otherwise shown.
- Inlet bottom reinforcing not required. See Standard Plan D74C for alternative reinforced bottom.
- Steps-None required where "H" is less than 2'-6". Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below top of inlet. The distance between steps shall not exceed 1'-0" and be uniform throughout the length of the wall. Place steps in the wall without an opening. Step inserts may be substituted for the bar steps. Step inserts shall comply with State Industrial Safety requirements. See Standard Plan D74C for step details.
- When shown on the project plans, place a 3/4" plain, round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
- Pipe(s) can be placed in any wall.
- Curb section shall match adjacent curb.
- Except for inlets used as junction boxes, basin floor shall have a minimum slope of 4:1 from all directions toward outlet pipe and shall have a wood trowel finish.
- See Standard Plans D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
- See Standard Plan D78A for gutter depression details.
- Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
- Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
- Cast-in-place inlets to be formed around all pipes/stubs intersecting the inlet, and concrete poured in one continuous operation. Precast inlets shall have mortared connections conforming to details for Type GCP Inlet shown on Standard Plan D75B. See Standard Specifications for mortar composition.

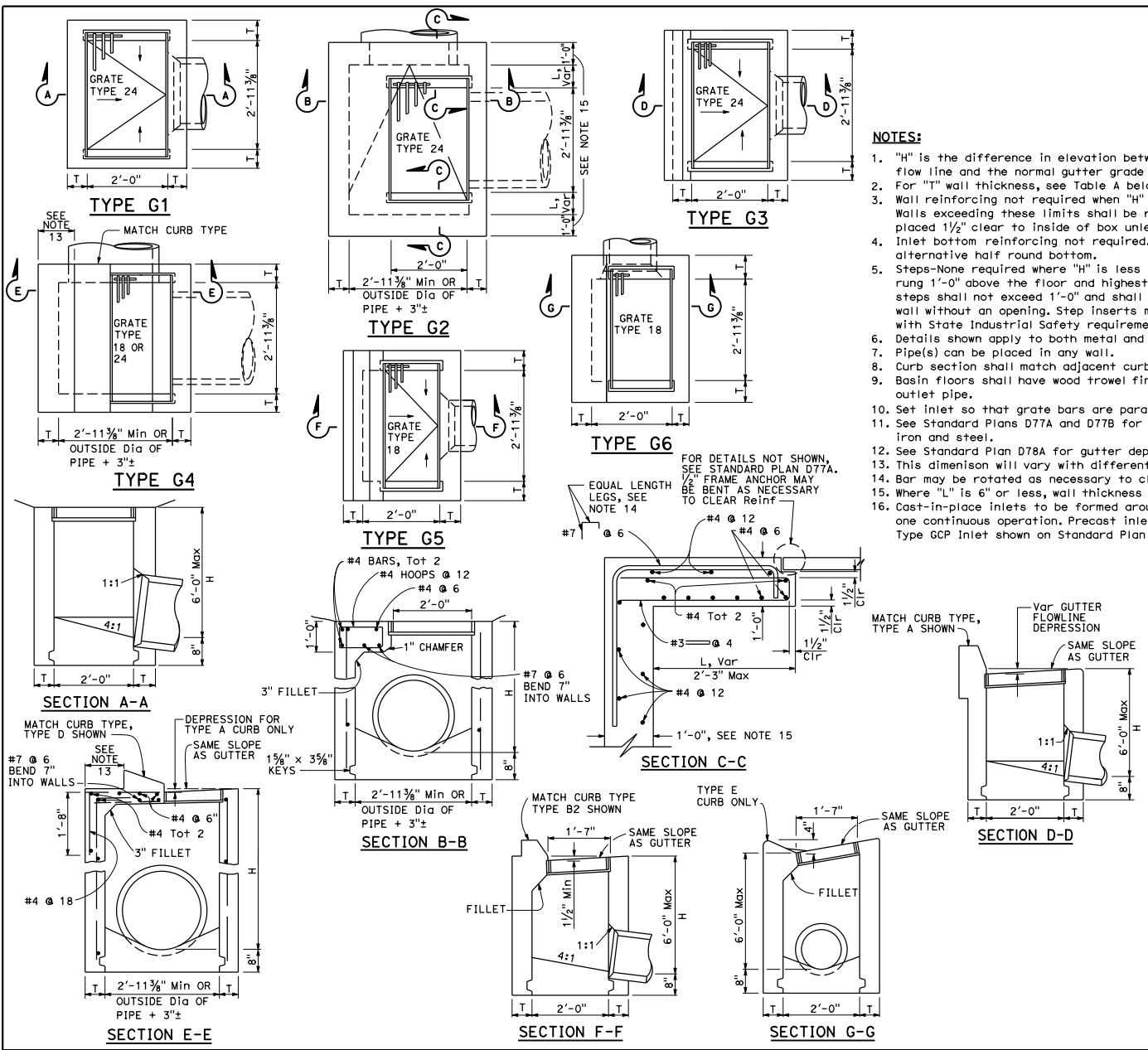
**TABLE A  
CONCRETE QUANTITIES**

TYPE	H=3'-0" TO 8'-0" (T=6")		H=8'-1" TO 20'-0" (T=8")	
	H=3'-0" (CY)	ADDITIONAL PCC PER FOOT (CY)	H=8'-1" (CY)	ADDITIONAL PCC PER FOOT (CY)
OS	1.41	0.278	3.81	0.387
OL-7	1.92	0.278	4.29	0.387
OL-10	2.39	0.278	4.77	0.387
OL-14	3.06	0.278	5.45	0.387
OL-21	4.42 *	0.278	6.78	0.387
GOL-7	2.33	0.313	4.96	0.434
GOL-10	2.84	0.313	5.47	0.434

\* Based on H=3.1'  
Table based on 8" floor slab, 7" curb openings, and curb type giving highest quantity of concrete. No deductions or adjustments are to be made to these quantities because of pipe openings, different floor alternatives, different curb types or different height of curb openings.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLETS**  
NO SCALE

**D72**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*C.M. Durr*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Carl M. Durr  
No. C59976  
Exp. 6-30-16  
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 SCANNED COPIES OF THIS PLAN SHEET.

- NOTES:**
- "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line undepressed.
  - For "T" wall thickness, see Table A below.
  - Wall reinforcing not required when "H" is 8'-0" or less and the unsupported width or length is 7'-0" or less. Walls exceeding these limits shall be reinforced with #4 bars @ 1'-6" ± centers placed 1/2" clear to inside of box unless otherwise shown.
  - Inlet bottom reinforcing not required. See Standard Plan D74C for alternative reinforced bottom and alternative half round bottom.
  - Steps-None required where "H" is less than 2'-6". Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below top of inlet. The distance between steps shall not exceed 1'-0" and shall be uniform throughout the length of the wall. Place steps in the wall without an opening. Step inserts may be substituted for the bar steps. Step inserts shall comply with State Industrial Safety requirements. See Standard Plan D74C for step details.
  - Details shown apply to both metal and concrete pipe.
  - Pipe(s) can be placed in any wall.
  - Curb section shall match adjacent curb.
  - Basin floors shall have wood trowel finish and a minimum slope of 4:1 from all directions toward outlet pipe.
  - Set inlet so that grate bars are parallel to direction of principal surface flow.
  - See Standard Plans D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
  - See Standard Plan D78A for gutter depression details.
  - This dimension will vary with different grates, curbs types, box width and wall thickness.
  - Bar may be rotated as necessary to clear opening. Where "L" is 6" or less, bar may be omitted.
  - Where "L" is 6" or less, wall thickness shall be as shown in Table A.
  - Cast-in-place inlets to be formed around all pipes/stubs intersecting the inlet, and concrete poured in one continuous operation. Precast inlets shall have mortared connections conforming to details for Type GCP Inlet shown on Standard Plan D75B. See Standard Specifications for mortar composition.

**TABLE A**  
**CONCRETE QUANTITIES**

TYPE	H=3'-0" TO 8'-0" (T=6")		H=8'-1" TO 20'-0" (T=8")	
	H=3'-0" (CY)	ADDITIONAL PCC PER FOOT (CY)	H=8'-1" (CY)	ADDITIONAL PCC PER FOOT (CY)
G-1	0.95	0.220	**	**
G-2*	1.31	0.255	3.50	0.357
G-3	1.03	0.220	**	**
G-4* (TYPE 24)	1.27	0.255	3.48	0.357
G-4* (TYPE 18)	1.30	0.255	3.50	0.357
G-5	1.02	0.220	**	**
G-6	1.04	0.220	**	**

Table based on 8" floor slab. No deductions are to be made to these quantities because of pipe openings, different floor alternatives or different curb types.

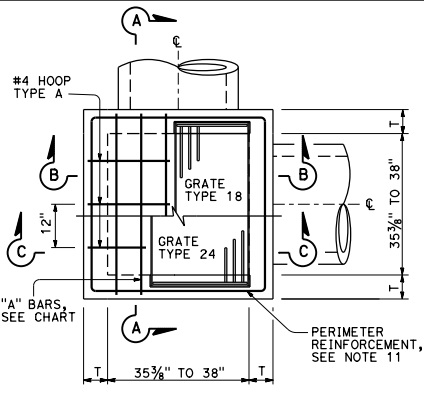
\* Quantities for Type G-2 and G-4 inlets based on the minimum interior dimensions.

\*\* Maximum allowable height 6'-0".

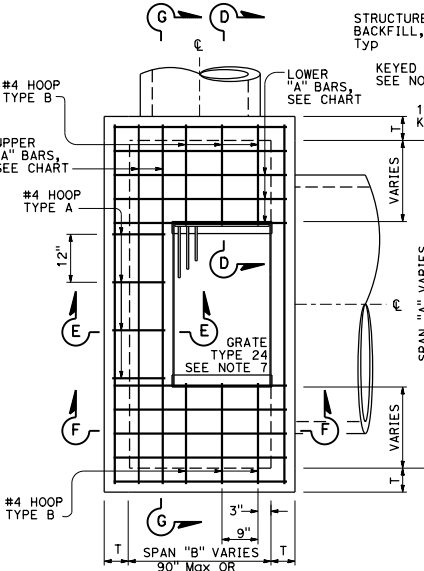
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLETS**

NO SCALE

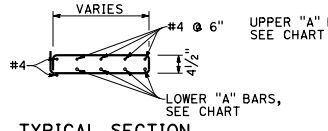
**D73**



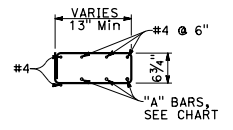
**STANDARD TYPE G2 OR G4**



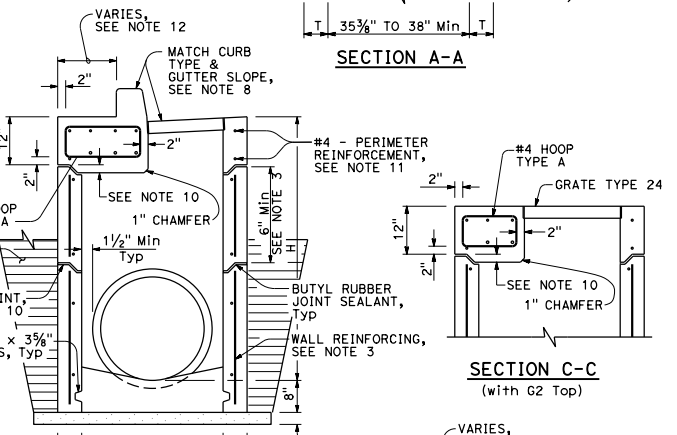
**EXPANDED TYPE G2 OR G4**  
(Top Reinforcement Not Shown)



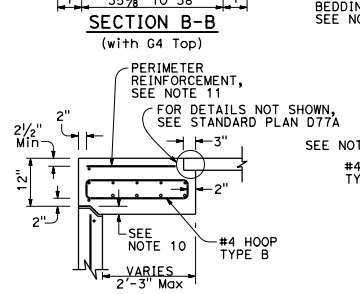
**TYPICAL SECTION**  
(HOOP TYPE B)



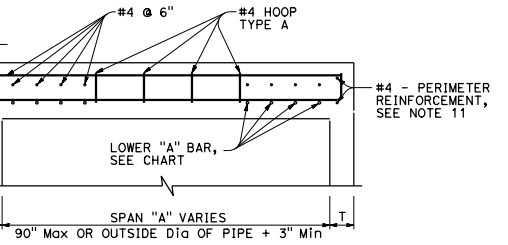
**TYPICAL SECTION**  
(HOOP TYPE A)



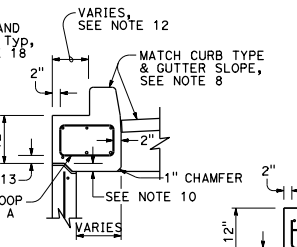
**SECTION A-A**



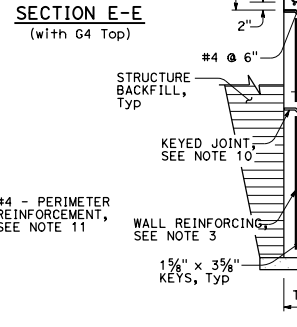
**SECTION B-B**  
(with G4 Top)



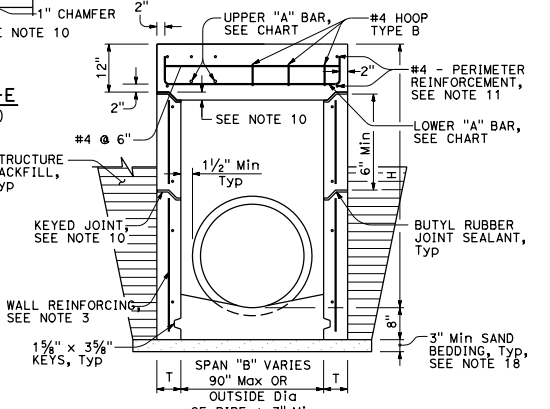
**SECTION G-G**



**SECTION C-C**  
(with G2 Top)



**SECTION E-E**  
(with G4 Top)



**SECTION F-F**  
(with G2 Top)

**NOTES:**

- "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line undepressed.
- For "T" wall thickness: T=6" when "H" is 8' or less. T=8" when "H" is over 8'.
- Wall reinforcing not required when "H" is 8' or less and the unsupported width or length is 6'-0" or less. Reinforcing wall exceeding these limits with #4 bars @ 1'-6" ± centers placed 2" clear to the inside of inlet unless otherwise shown. Short independent wall sections or height adjustment rings 6" to 24" high must have a minimum of two #4 horizontal bars.
- Seal precast inlets connection openings between wall and pipe with non-shrink grout or resilient connectors as specified in the Special Provisions.
- Steps - None required where "H" is less than 2'-6". Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below bottom of lid. The distance between steps must not exceed 1'-0" and be uniform throughout the length of the wall. Place steps in the wall without an opening. Step inserts may be substituted for the bar steps. Step inserts must comply with State Industrial Safety Requirements. See Standard Plan D74C for step details.
- Pipe(s) can be placed in any wall.
- Set inlet so that grate bars are parallel to direction of principal surface flow.
- Type G4 inlet can use Grate Type 18 or 24. Type G2 inlet uses Grate Type 24. See Standard Plan D77A and Standard Plan D77B for grate and frame details and weights of miscellaneous Iron and Steel.
- G4 inlet details are the same as the G2 with the addition of a curb and sloped grate that matches the adjacent curb and gutter depression. See Standard Plans D78A & D78B for gutter and inlet depression details. See Standard Plans A87A & A87B for Curb and Dike Details.
- Provide precast inlets with separate top sections for final grade adjustment. Provide keyed joints between the top and wall and multiple wall sections. Joint design may vary but must be 1" to 3" in depth.
- Perimeter reinforcement serves as a rigid frame to position and attach the required structural reinforcement and may be tack welded at outer corners when using ASTM A706 weldable bars.
- This dimension will vary with different grates, curbs types, box width and wall thickness.
- 2" unless inlet is expanded in the Span "A" direction, then clearance is 2" plus the diameter of the lower "A" bar.
- Place "A" Bars at an angle so hooked ends will maintain 2" clear coverage.
- Refer to Standard Plan D73, Table A for concrete quantities.
- Non-shrink grout can be used for upper most joint to facilitate final top grade adjustment.
- Slope inlet floors 4:1 towards the outlet pipe. Precast inlets may have monolithic sloped floors, flat floors, or no floors in which case a sloped floor must be cast in the field. Inlet floors do not require reinforcing.
- Extend sand bedding under all structure backfill.

TOP REINFORCEMENT CHART		
"A" BARS		
SPAN	"A" BARS	REQUIRED STEEL AREA PER FOOT (in <sup>2</sup> /ft)
UNDER 38" WITH TYPE 24 GRATE	#5 @ 7" C-C 2-#5 Min	0.525
UNDER 38" WITH TYPE 18 GRATE	#5 @ 7" C-C 3-#5 Min	0.525
38"-60"	#5 @ 6" C-C	0.621
61"-72"	#5 @ 5" C-C	0.744
73"-90"	#6 @ 6" C-C	0.811

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLETS**  
(PRECAST)  
NO SCALE

**D73A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

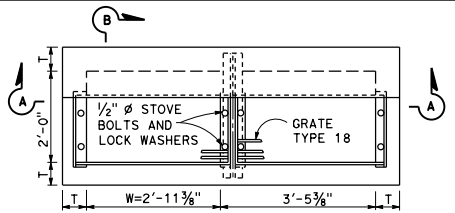
*C.M. Durr*  
REGISTERED CIVIL ENGINEER  
No. C59976

October 30, 2015  
PLANS APPROVAL DATE

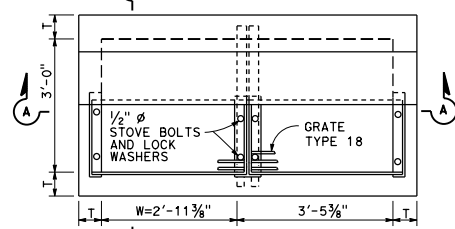
Carl M. Durr  
REGISTERED PROFESSIONAL ENGINEER  
No. C59976  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

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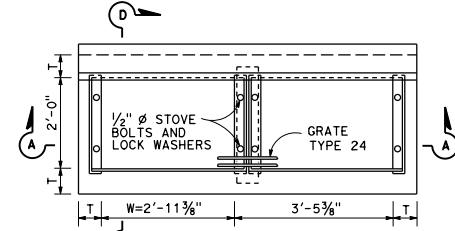




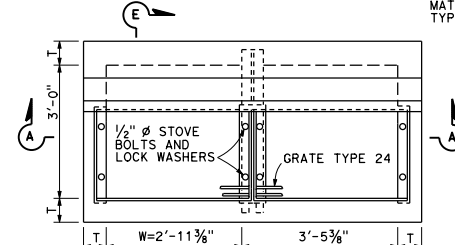
PLAN  
TYPE GT1



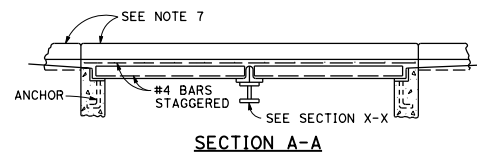
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TYPE GT2



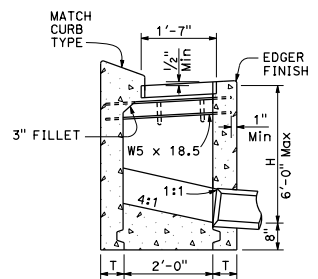
PLAN  
TYPE GT3



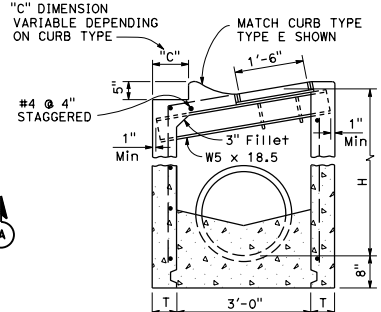
PLAN  
TYPE GT4



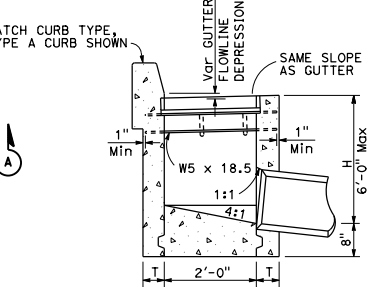
SECTION A-A



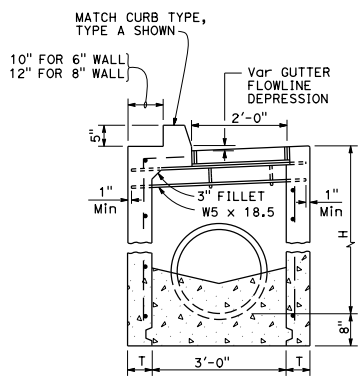
SECTION B-B



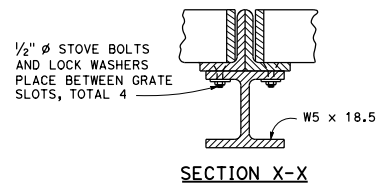
SECTION C-C



SECTION D-D



SECTION E-E



SECTION X-X

NOTES:

- "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line undepressed.
- For "T" wall thickness, see Table A below.
- Wall reinforcing not required when "H" is 8'-0" or less and the unsupported width or length is 7'-0" or less. Walls exceeding these limits shall be reinforced with #4 bars @ 1'-6" ± centers placed 1/2" clear to inside of box unless otherwise shown.
- Inlet bottom reinforcing not required. See Standard Plan D74C for alternative reinforced bottom.
- Steps - None required where "H" is less than 2'-6". Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below top of inlet. The distance between steps shall not exceed 1'-0" and shall be uniform throughout the length of the wall. Place steps in the wall without an opening. Step inserts may be substituted for the bar steps. Step inserts shall comply with State Industrial Safety requirement. See Standard Plan D74C for step details.
- Pipe(s) can be placed in any wall.
- Curb section shall match adjacent curb.
- Basin floors shall have wood trowel finish and a minimum slope of 4:1 from all directions toward outlet pipe.
- W = 2'-11 3/8" for one grate. Add 3'-5 3/8" for additional grates in tandem.
- See Standard Plans D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
- See Standard Plan D78A for gutter depression details.
- Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
- Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
- Cast-in-place inlets to be formed around all pipes/stubs intersecting the inlet and concrete poured in one continuous operation. Precast inlets shall have mortared pipe connections conforming to details for Type GCP inlet on Standard Plan D75B. See Standard Specifications for mortar composition.

TABLE A  
CONCRETE QUANTITIES

TYPE	H=3'-0" TO 8'-0" (T=6")		H=8'-1" TO 20'-0" (T=8")	
	H=3'-0" CY	ADDITIONAL PCC PER FOOT CY	H=8'-1" CY	ADDITIONAL PCC PER FOOT CY
GT1	1.74	0.348	*	*
GT2	2.11	0.385	5.40	0.530
GT3	1.73	0.348	*	*
GT4	2.18	0.385	5.41	0.530

Table based on 8" floor slab and curb type giving highest quantity of concrete. No deductions or adjustments are to be made to these quantities because of pipe openings, different floor alternatives or different curb type.

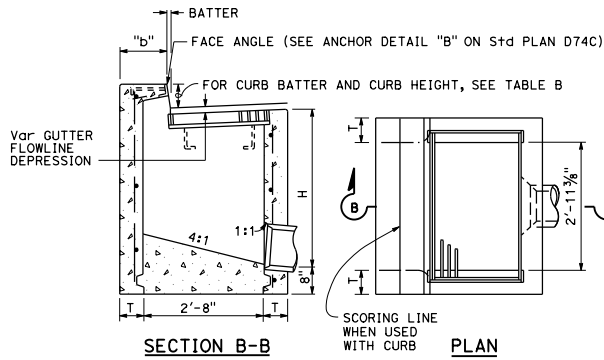
\* Maximum allowable height = 6'-0".

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

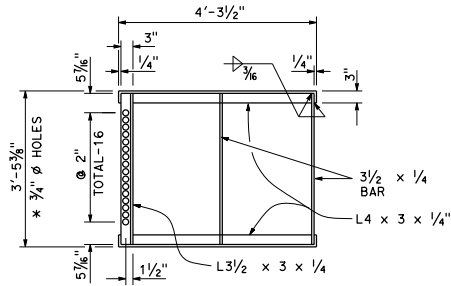
REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLETS**  
 NO SCALE

**D74A**

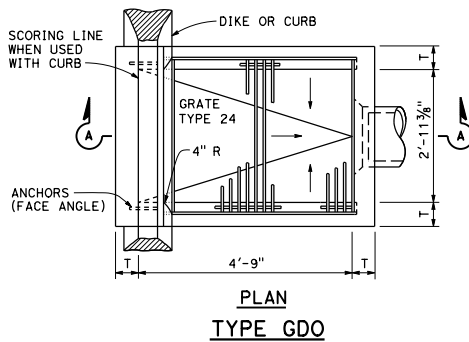


TYPE GO

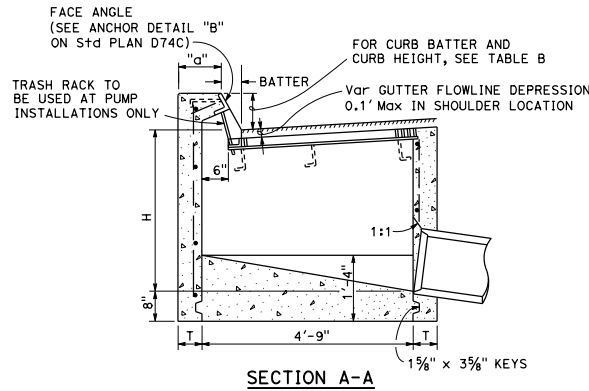


\* 3/4"  $\phi$  Holes required only with trash rack

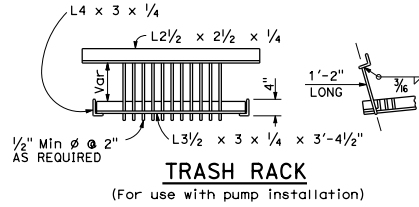
GRATE FRAME FOR TYPE GDO INLET



TYPE GDO



SECTION A-A



TRASH RACK

(For use with pump installation)

TABLE A  
CONCRETE QUANTITIES

TYPE	H=3'-0" TO 8'-0" (T=6")		H=8'-1" TO 20'-0" (T=8")	
	H=3'-0"	ADDITIONAL PCC PER FOOT (CY)	H=8'-1"	ADDITIONAL PCC PER FOOT (CY)
GO	1.24	0.245	3.39	0.346
GDO	1.62	0.322	4.36	0.446

Table based on 8" floor slab and curb type giving highest quantity of concrete. No deductions or adjustments are to be made to these quantities because of pipe openings, different floor alternatives or different curb type.

TABLE B

CURB TYPE	NORMAL CURB HEIGHT	CURB BATTER	"a" DIMENSION	"b" DIMENSION
A1-6	6"	1/2"	T+7 1/2"	T+6 1/2"
A1-8	8"	2"	T+7"	T+6"
B1-6	6"	4"	T+5"	T+4"
TYPE A DIKE	6"	3"	T+6"	T+5"

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Carl M. Duan**  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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NOTES:

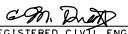
- "H" is the difference in elevation between the outlet pipe flow line and the normal gutter grade line undepressed.
- For "T" wall thickness, see Table A below.
- Wall reinforcing not required when "H" is 8'-0" or less and the unsupported width or length is 7'-0" or less. Walls exceeding these limits shall be reinforced with #4 @ 1'-6" centers placed 1/2" clear to inside of box unless otherwise shown.
- Inlet bottom reinforcing not required. See Standard Plan D74C for alternative reinforced bottom.
- Steps - None required where "H" is less than 2'-6" Where "H" is 2'-6" or more, install steps with lowest rung 1'-0" above the floor and highest rung not more than 6" below top of inlet. The distance between steps shall not exceed 1'-0" and shall be uniform throughout the length of the wall. Place steps in the wall without an opening. Step inserts may be substituted for the bar steps. Step Inserts shall comply with State Industrial Safety requirements. See Standard Plan D74C for step details.
- When shown on the project plans, place a 3/4" plain round protection bar horizontally across the length of the opening and bend back 4" into the inlet wall on each side.
- Pipe(s) can be placed in any wall.
- Curb section shall match adjacent curb.
- Basin floors shall have wood trowel finish and shall slope toward the outlet pipe as shown.
- See Standard Plan D77A and D77B for grate and frame details and weights of miscellaneous iron and steel.
- See Standard Plan D78A for gutter depression details.
- Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
- Standard square, hexagon, round or equivalent headed anchors may be substituted for the right angle hooks on the anchors shown on this plan.
- Cast-in-place inlets to be formed around all pipes/stubs intersecting the inlet and concrete poured in one continuous operation. Precast inlets shall have mortared pipe connections conforming to details for Type GCP inlets on Standard Plan D75B. See Standard Specifications for mortar composition.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLETS**  
NO SCALE

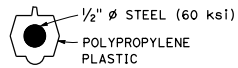
**D74B**



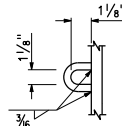
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

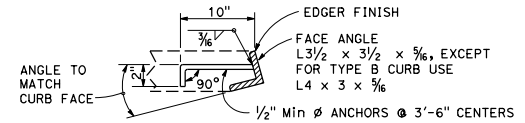
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**TYPICAL SECTION**  
(Step insert)

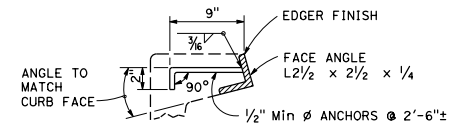


**STIRRUP**



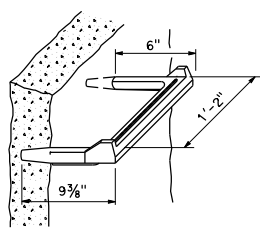
**FACE ANGLE ANCHOR DETAIL "A"**

FACE ANGLE DETAIL "A"	
LENGTH OF CURB OPENING	No. OF ANCHORS
3'-6" OR LESS	2
7'-0"	3
10'-0"	4
14'-0"	5
21'-0"	7

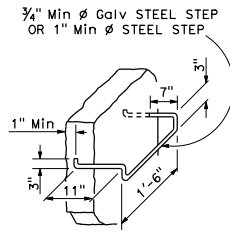


**FACE ANGLE ANCHOR DETAIL "B"**

177

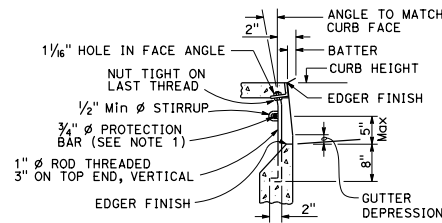


**STEP INSERT**

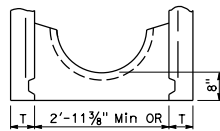


**BAR STEP**

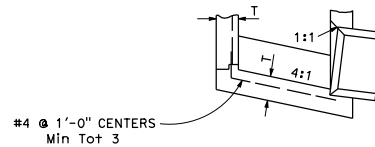
**STEP DETAILS**



**CURB SUPPORT DETAIL**  
See Note 2



**ALTERNATIVE  
HALF ROUND BOTTOM**



**ALTERNATIVE  
REINFORCED BOTTOM**

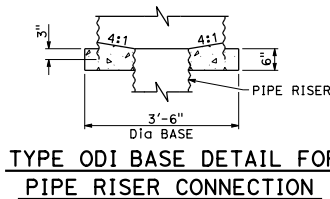
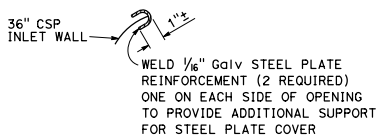
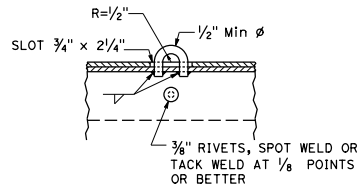
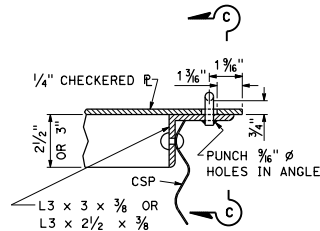
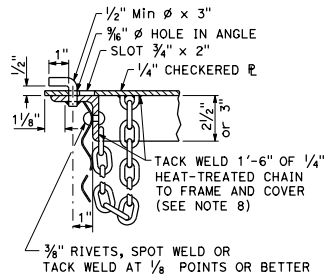
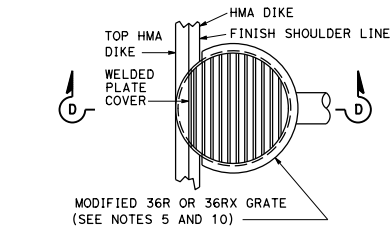
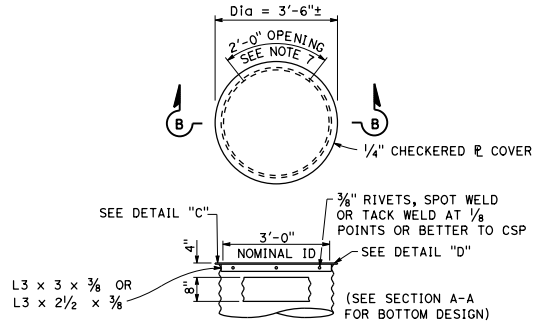
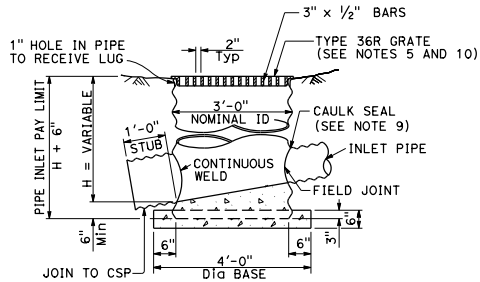
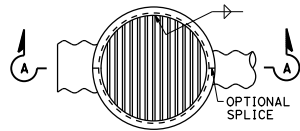
**NOTES:**

- When shown on the project plans, place a 3/4 inch diameter plain round protection bar horizontally across length of the opening and bend back 4 inches into the inlet wall on each side.
- Curb supports shall be evenly spaced and minimal in number such that maximum span of unsupported curb is 7'-0 inches.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLET DETAILS**  
NO SCALE

**D74C**

2015 STANDARD PLAN D74C



**NOTES:**

1. For details of concrete pipe inlets, see Standard Plan D75B.
2. For details of ladder and steps and when ladder or steps are required, see Standard Plan D75C.
3. Inlet pipes shall not protrude into basin.
4. Except for inlets used for junction boxes, basin floors shall have minimum slope of 4:1 from all directions toward outlet pipe, and a wood trowel finish.
5. See Standard Plans D77A and D77B for Grate and Frame Details and weights of Miscellaneous Iron and Steel.
6. Designation of Type OMPI pipe inlets on plans indicates trash racks are to be furnished and installed on all side openings. See Standard Plan D75C for trash rack details.
7. More than one side opening may be required. Location and number as ordered by the Engineer.
8. Chain to be provided when specified.
9. Caulk seal with pliable mixture of sand, portland cement, and emulsified asphalt (Mixture of 1 part portland cement, 3-5 parts sand, and 1 1/2 parts SSI emulsified asphalt).
10. Place pipe so bars of grate will be parallel with main surface flow.

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**STEEL PIPE INLETS**  
NO SCALE

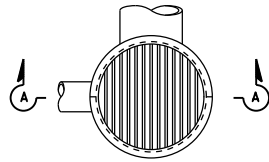
**D75A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

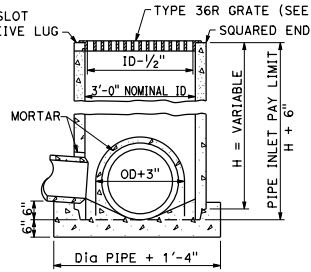
REGISTERED CIVIL ENGINEER  
Bruce D. Swanger  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
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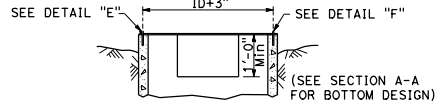
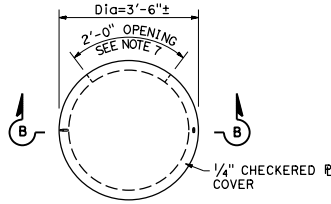


CAST 1" x 2 1/2" SLOT IN PIPE TO RECEIVE LUG



**SECTION A-A**  
**TYPE GCP**

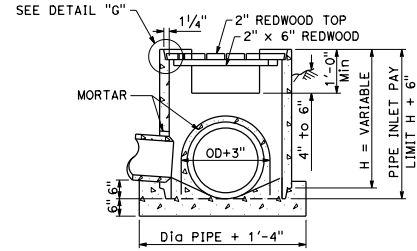
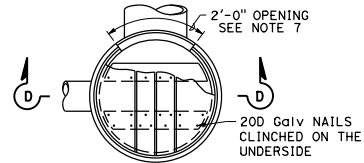
Concrete pipe inlet with grate



**SECTION B-B**

**TYPE OCP or OCPI**

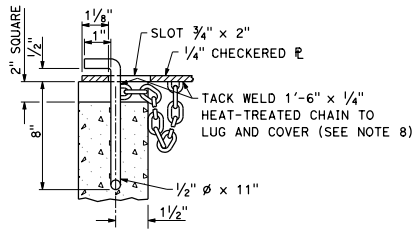
Concrete pipe inlet with steel cover  
(See Note 6)



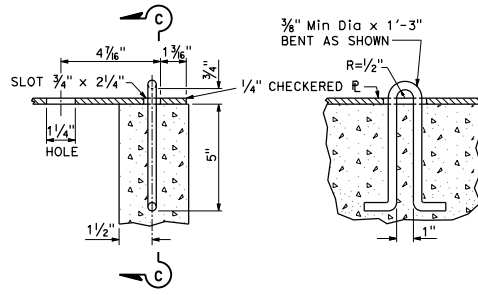
**SECTION D-D**

**TYPE OCP or OCPI**

Concrete pipe inlet with redwood cover  
(See Notes 6 and 10)

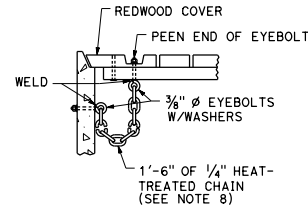


**DETAIL 'E'**



**DETAIL 'F'**

**SECTION C-C**



**DETAIL 'G'**

**NOTES:**

1. For details of steel pipe inlets, see Standard Plan D75A.
2. For details of ladder and steps and when ladder or steps are required, see Standard Plan D75C.
3. Inlet pipes shall not protrude into basin.
4. Except for inlets used for junction boxes, basin floors shall have minimum slope of 4:1 from all directions toward outlet pipe, and a wood trowel finish.
5. See Standard Plan D77A and Standard Plan D77B for Grate and Frame Details and Weights of Miscellaneous Iron and Steel.
6. Designation of Type OCPI pipe inlets on plans indicates trash racks are to be furnished and installed on all side openings. See Standard Plan D75C for Trash Rack details.
7. More than one side opening may be required. Location and number as ordered by the Engineer. Opening may be cast in pipe.
8. Chain to be provided when specified.
9. Place pipe so bars of grate will be parallel with main surface flow.
10. Redwood covers shall only be placed at locations designated on the plans.

STATE OF CALIFORNIA  
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**CONCRETE PIPE INLETS**

NO SCALE

**D75B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS



Raymond A. Jester  
REGISTERED CIVIL ENGINEER

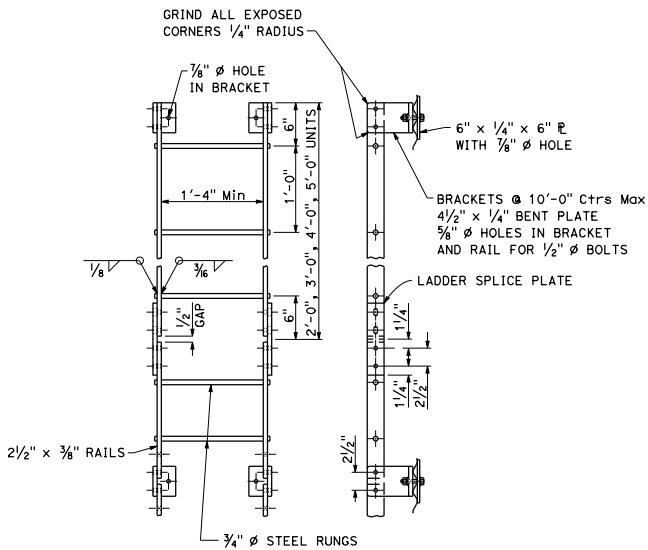
October 30, 2015  
PLANS APPROVAL DATE

Raymond Don Tszto  
No. C37332  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

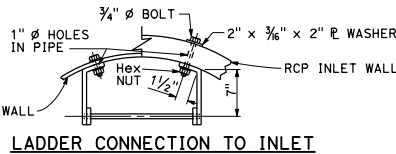
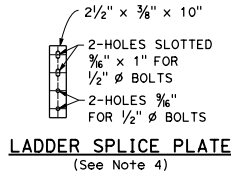
REGISTERED PROFESSIONAL ENGINEER

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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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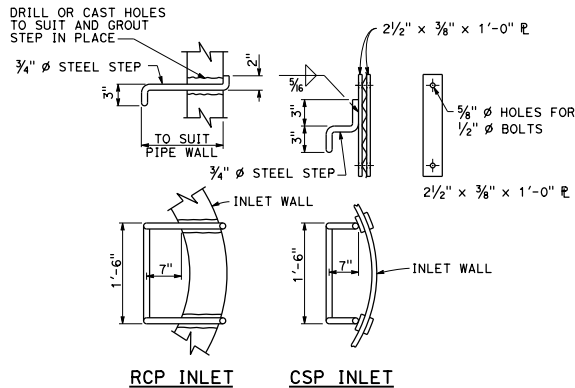
**LADDER DETAILS**  
See Notes 1, 2, 3 and 4



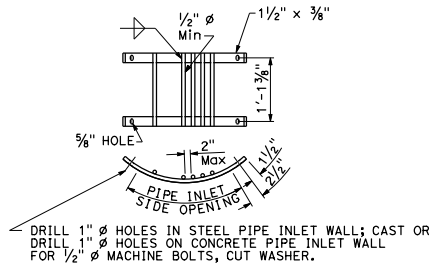
**LADDER CONNECTION TO INLET**

**NOTES:**

- Ladders and Steps - None required where "H" dimension of pipe inlet is less than 2'-6". Where "H" is 2'-6" or more, install steps or ladder with lowest rung not more than 1'-0" above the floor and highest rung not more than 1'-0" below top of inlet. The distance between steps or rungs shall not exceed 1'-0" and shall be uniform throughout the length of the wall. Place steps or ladder in the wall without an opening.
- Ladder may be constructed in one length at contractor's option on RCP inlet.
- On CSP inlet, connect ladder splice plate so joint can compress 1/2".
- Ladder splice plate to be connected with 1/2" bolts with double nuts.
- Trash racks used on Type OCP1 and OMP1 inlets. Trash racks required for pumping installations.



**STEP DETAILS**  
(See Note 1)

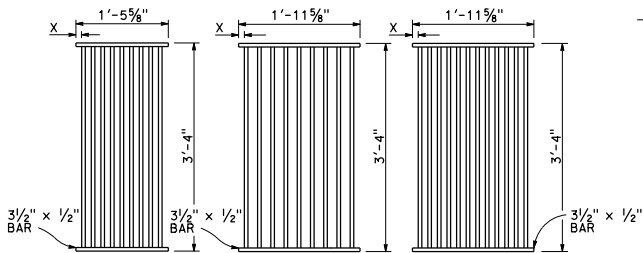


**TRASH RACK DETAILS**  
(See Note 5)

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**PIPE INLETS  
LADDER AND TRASH  
RACK DETAILS**

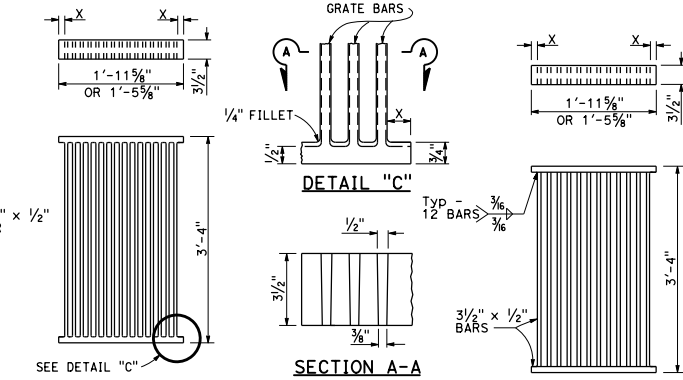
NO SCALE

**D75C**



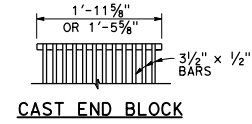
**RECTANGULAR GRATE DETAILS**

(See table below)

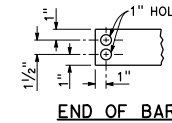


**ALTERNATIVE CAST DUCTILE IRON GRATE OR CAST CARBON STEEL GRATE**

**ALTERNATIVE WELDED GRATE**

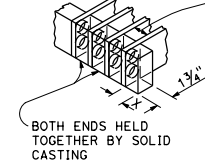


**CAST END BLOCK**

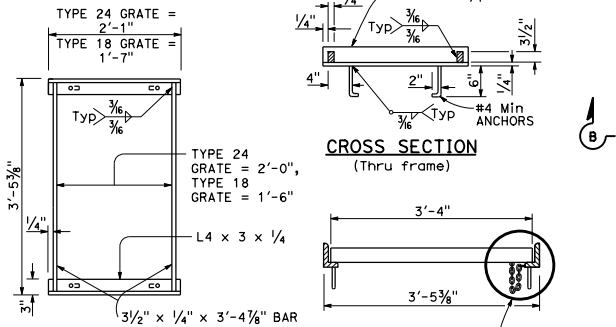


**END OF BAR**

SPACING SAME AS FOR WELDED OR BOLTED GRATE

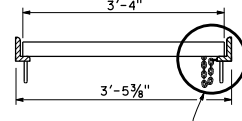


**ALTERNATIVE CAST DUCTILE IRON OR CAST CARBON STEEL END BLOCK GRATE**

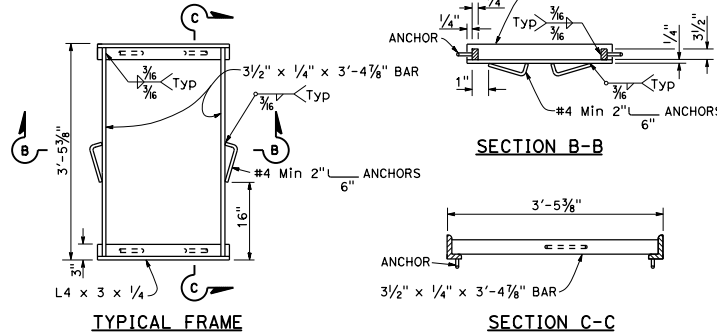


**TYPICAL FRAME**

**CROSS SECTION (Thru frame)**

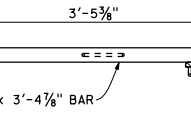


**LONGITUDINAL SECTION (Thru frame and grate)**



**TYPICAL FRAME**

**SECTION B-B**



**SECTION C-C**

**ALTERNATIVE ANCHOR FOR RECTANGULAR FRAME**

(For details not shown, See Rectangular Frame Details)

**RECTANGULAR FRAME DETAILS**

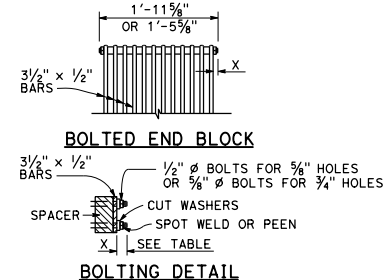
(For all rectangular grates)

**GRATE BAR SPACING TABLE**

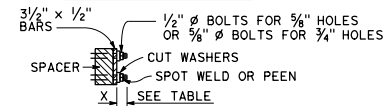
TYPE	No. OF BARS	CLEAR BAR SPACING	X
18-9	9	1 3/8"	1 1/16"
24-9	9	2"	1 1/8"
24-12	12	1 3/8"	1 1/4"

INLET TYPE	COVER TYPE	WEIGHT LB
OS	PLATE	174
OL-7	PLATE	170
OL-10	PLATE	170
OL-14	PLATE	170
OL-21	PLATE	170
OCF	PLATE	112
OCPI	PLATE	112
OCPI	REDWOOD	42
OMP	PLATE	177
OMPI	PLATE	177

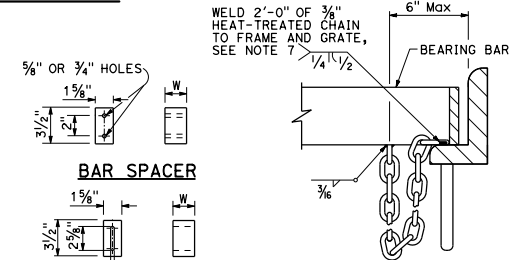
INLET TYPE	GRATE TYPE	No. OF GRATES	WEIGHT LB
GDO	24-12	2	634
GOL-7	24-12	1	326
GOL-10	24-12	1	326
GO,G1,G2,G3,G4 (TYPE 24)	24-9	1	263
	24-12	1	326
G4 (TYPE 18),G5,G6	18-9	1	249
GT1	18-9	2	498
GT2	18-9	2	498
GT3	24-12	2	652
GT4	24-12	2	652
TRASH RACK			22
GRATE CHAIN			3



**BOLTED END BLOCK**



**BOLTING DETAIL ALTERNATIVE BOLTED GRATE**



**BAR SPACER**

**ALTERNATIVE SPACER**

**DETAIL "D"**

(Steel grates only)

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**GRATE DETAILS No. 1**  
NO SCALE

**D77A**

**NOTES:**

1. Grate type numbers refer to approximate width of grate in inches and number of bars, respectively.
2. Rounded top of bars optional on all grates.
3. Pipe inlets with a grate shall be placed so that bars parallel direction of principle surface flow.
4. Complete joint penetration butt welds may be substituted for the fillet welds on all anchors.
5. Standard square, hexagon, round or equivalent headed anchors are based on welded grates (weights of face angles, steps, protection bars, etc. are not included).
6. Grate and frame weights are based on welded grates (weights of face angles, steps, protection bars, etc. are not included).
7. Connect chain to grate and frame only at locations shown on the plans. When chain is required, do not use cast ductile iron grates.

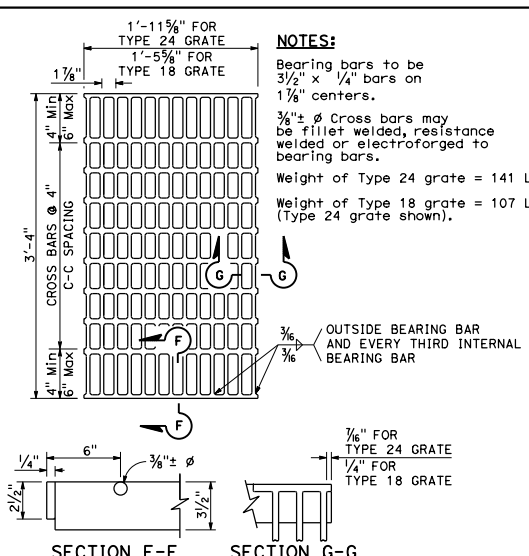
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Raymond Don Isztos  
REGISTERED CIVIL ENGINEER

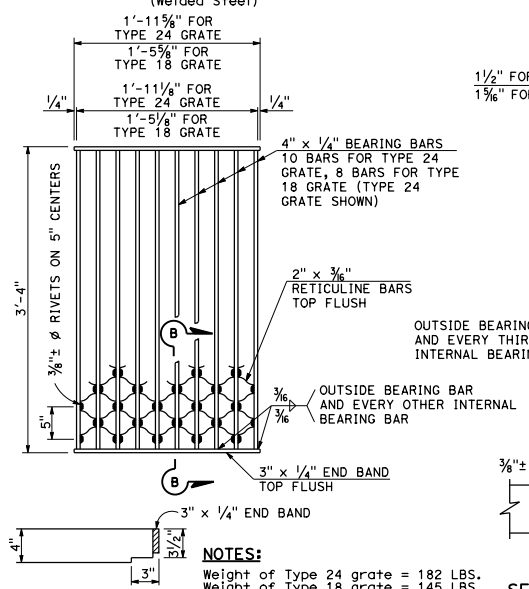
October 30, 2015  
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REGISTERED PROFESSIONAL ENGINEER  
Raymond Don Isztos  
No. C37332  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA



**SECTION F-F**  
**SECTION G-G**  
**TYPE 18-10 AND 24-13 GRATE**  
(Welded Steel)

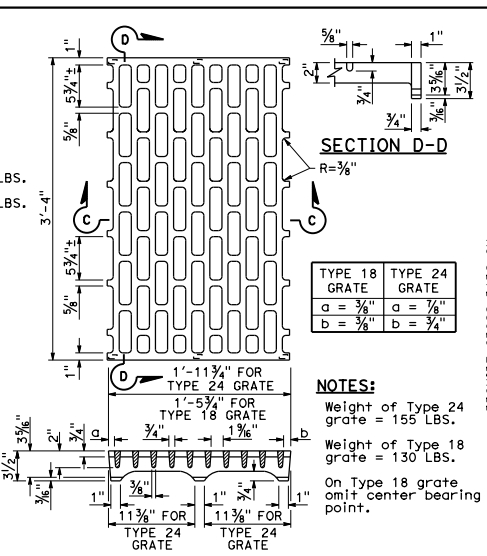


**SECTION B-B**  
**TYPE 18-8S AND 24-10S GRATE**  
(Welded Steel) Reticuline type

**NOTES:**  
Bearing bars to be 3/2" x 1/4" bars on 1 7/8" centers.  
3/8" ±  $\phi$  Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.  
Weight of Type 24 grate = 141 LBS.  
Weight of Type 18 grate = 107 LBS. (Type 24 grate shown).

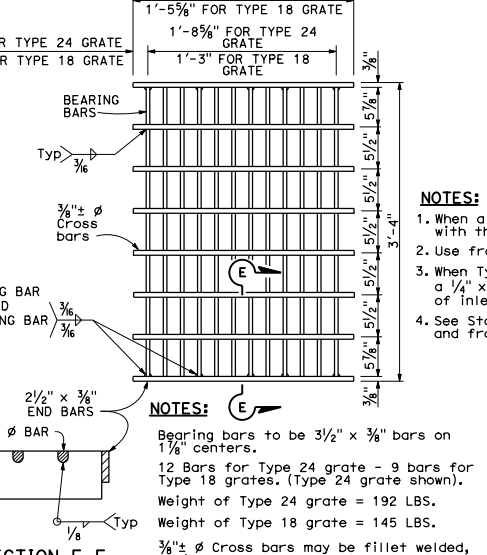
OUTSIDE BEARING BAR AND EVERY THIRD INTERNAL BEARING BAR  
3/8" ±  $\phi$

7/16" FOR TYPE 24 GRATE  
1/4" FOR TYPE 18 GRATE



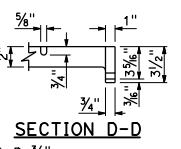
**SECTION C-C**  
**TYPE 18-8C AND 24-10C GRATE**  
(Cast ductile iron)

**NOTES:**  
Weight of Type 24 grate = 155 LBS.  
Weight of Type 18 grate = 130 LBS.  
On Type 18 grate omit center bearing point.

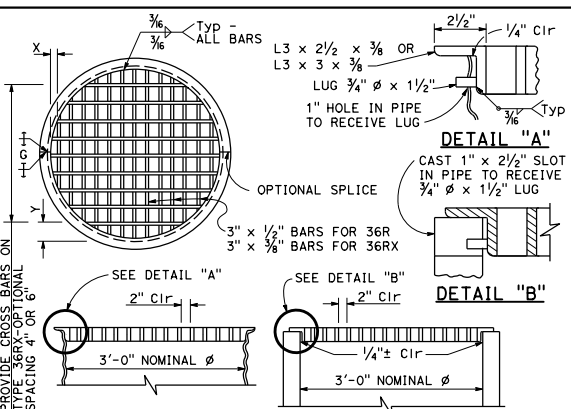


**SECTION E-E**  
**TYPE 18-9X AND 24-12X GRATE**  
(Welded Steel)

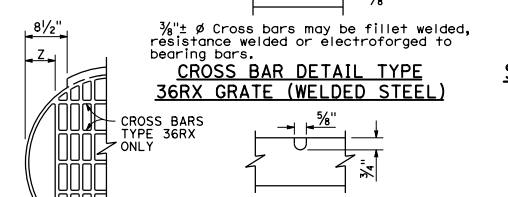
**NOTES:**  
Bearing bars to be 3/2" x 3/8" bars on 1 7/8" centers.  
12 Bars for Type 24 grate - 9 bars for Type 18 grates. (Type 24 grate shown).  
Weight of Type 24 grate = 192 LBS.  
Weight of Type 18 grate = 145 LBS.  
3/8" ±  $\phi$  Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.



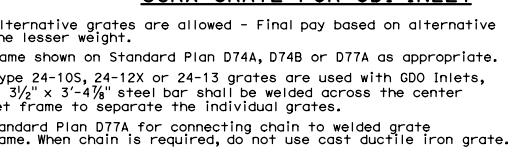
TYPE 18 GRATE	TYPE 24 GRATE
a = 3/8"	a = 7/8"
b = 3/8"	b = 3/4"



**TYPE 36R AND 36RX GRATE DETAILS**



**CROSS BAR DETAIL TYPE 36RX GRATE (WELDED STEEL)**



**CROSS BAR DETAIL ALTERNATIVE CAST DUCTILE IRON OR CAST CARBON STEEL GRATE TYPE 36RX MODIFIED TYPE 36R AND 36RX GRATE FOR ODI INLET**

**NOTES:**  
1. When alternative grates are allowed - Final pay based on alternative with the lesser weight.  
2. Use frame shown on Standard Plan D74A, D74B or D77A as appropriate.  
3. When Type 24-10S, 24-12X or 24-13 grates are used with GDO inlets, a 1/4" x 3/2" x 3'-4 1/8" steel bar shall be welded across the center of inlet frame to separate the individual grates.  
4. See Standard Plan D77A for connecting chain to welded grate and frame. When chain is required, do not use cast ductile iron grate.

**GRATE BAR SPACING TABLE**

TYPE	No. OF BARS	CLEAR BAR SPACING	X	Y	Z
36R	13	2"	2 7/8"	-	-
36RX (STEEL)	15	2"	3/8"	3 3/4"	5 3/4"
36RX (CAST)	13	2"	2 7/8"	3 3/4"	5 3/4"
36R Mod	12	2"	2 7/8"	-	5"
36RX Mod (STEEL)	13	2"	3/8"	3 3/4"	5 3/4"
36RX Mod (CAST)	12	2"	2 7/8"	3 3/4"	5"

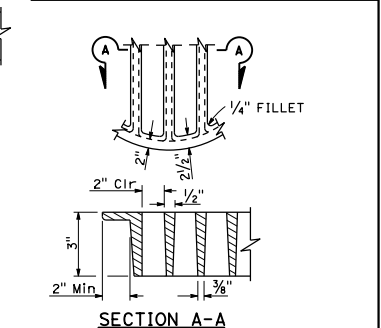
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Raymond J. Jordan  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Raymond Don Tzotzo  
No. C37332  
Exp. 6-30-16  
CIVIL ENGINEER PROFESSIONAL SERVICES  
STATE OF CALIFORNIA

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
**SECTION A-A**  
**ALTERNATIVE CAST DUCTILE IRON GRATE OR CAST CARBON STEEL GRATE TYPE 36R AND 36RX**

**BASIS FOR MISC IRON AND STEEL FINAL PAY WEIGHTS FOR DRAINAGE INLETS**

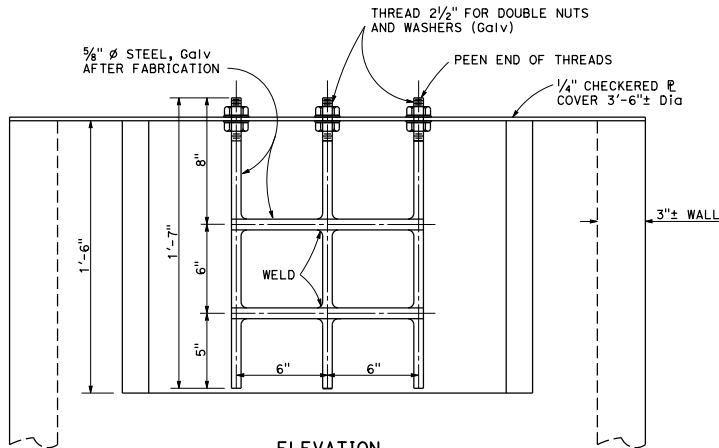
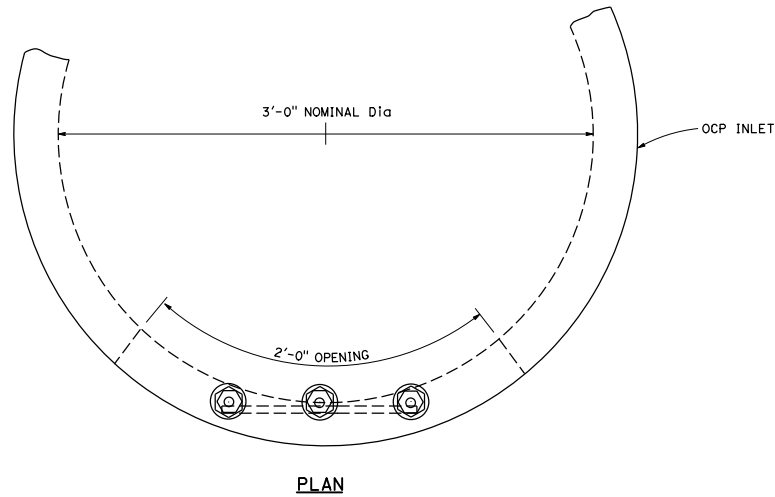
INLET TYPE	GRATE TYPE	No. OF GRATES	WEIGHT LB
GDO (SEE NOTE 4)	24-10C	2	391
	24-10S	2	456
	24-12X	2	473
	24-13	2	374
G0,G0L,G1,G2,G3,G4 (TYPE 24)	24-10C	1	202
	24-10S	1	229
	24-12X	1	239
	24-13	1	188
G4 (TYPE 18)	18-8S	1	187
	18-9X	1	187
	18-10	1	149
GT1,GT2	18-8S	2	374
	18-9X	2	374
	18-10	2	298
GT3,GT4	24-10C	2	404
	24-10S	2	458
	24-12X	2	478
	24-13	2	376
ODI	36RX (Mod)	1	196
GMP,GCP,GCP1	36RX	1	215
ODI	36R (Mod)	1	220
GMP,GCP,GCP1	36R	1	236
TRASH RACK			22
GRATE CHAIN			3

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**GRATE DETAILS No. 2**  
NO SCALE  
**D77B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

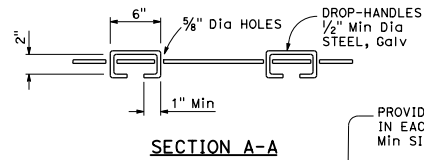
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**ELEVATION**  
**ALTERNATIVE**  
**TRASH RACK FOR TYPE OCP INLET**  
 Single or double opening

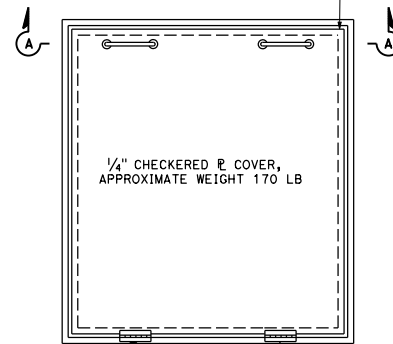
**NOTES:**

1. Alternative methods of securing drop-handles to cover will be acceptable.
2. This hinged cover is to be used only on embankment or steep slopes.



**SECTION A-A**

PROVIDE ONE BRASS FLATHEAD SCREW IN EACH TOP CORNER OF COVER. Min SIZE TO BE 3/8" x 1/2", Tot 2



**PLAN**

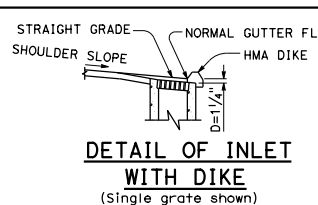
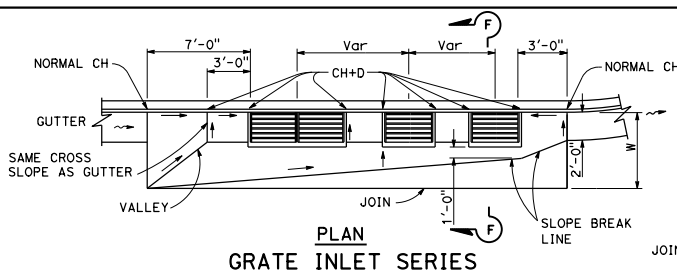
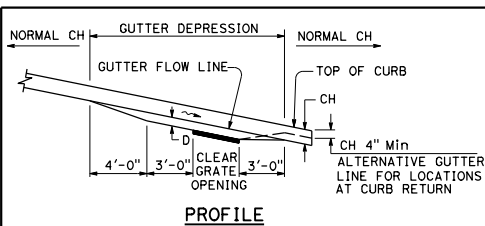
**HINGED COVER FOR**  
**TYPE OL AND OS INLETS**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ALTERNATIVE HINGED COVER**  
**FOR TYPE OL AND OS INLETS**  
**AND TRASH RACK FOR**  
**TYPE OCP INLET**

NO SCALE

**D77C**

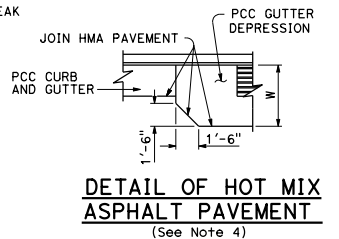
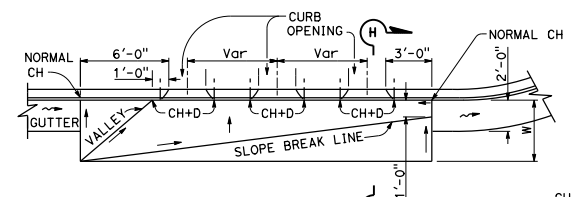
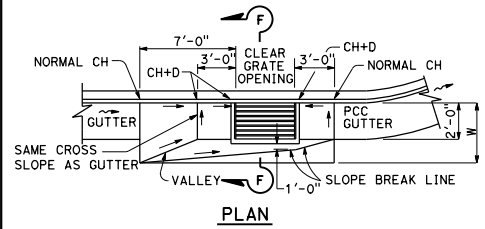




DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

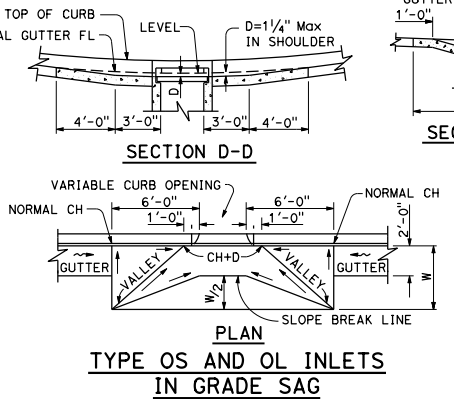
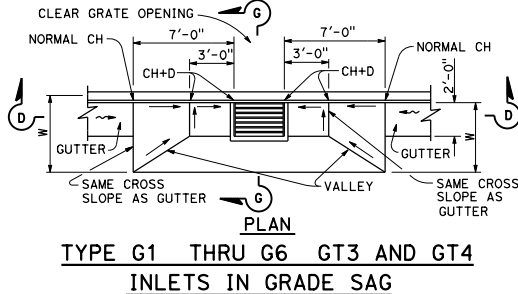
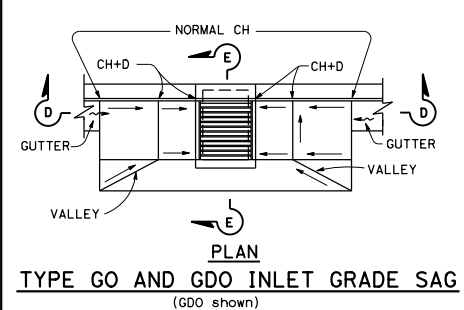
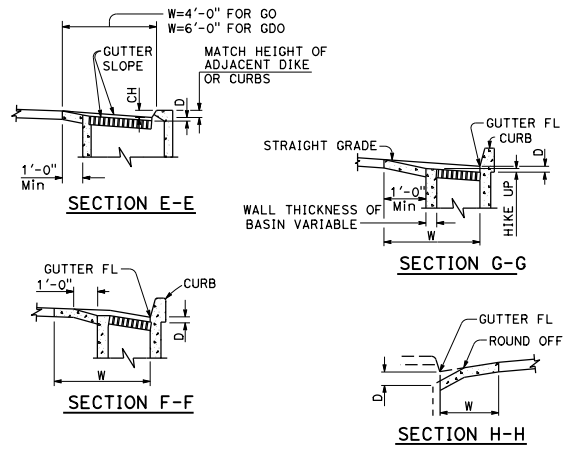
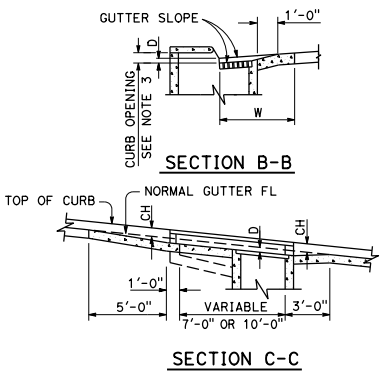
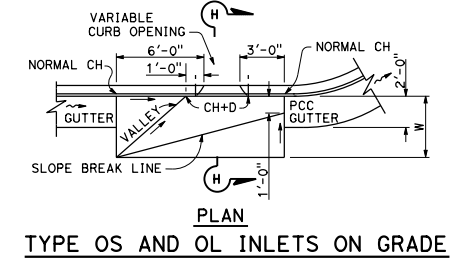
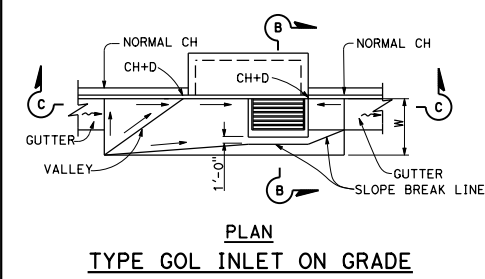
REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



- NOTES:**
1. W = Width of depressed apron. Depressed aprons shall be 4'-0" on shoulder and 4'-0" to 6'-0" in city street gutters unless otherwise shown.
  2. Gutter depressions shall be 8" thick.
  3. Establish curb opening height at midpoint of grate.
  4. Details shown for concrete pavement. When hot mix asphalt pavement is used, corners to be cut off as shown on Detail of Hot Mix Asphalt Pavement.
- D = Gutter depression. The gutter depression shall be 1/4" for shoulder and 1/4" to 3" in city street gutter or locations outside of shoulder unless otherwise shown.
- CH = Curb Height.  
 → = Straight grade, downward slope.  
 ~ = Gutter or shoulders direction of flow.

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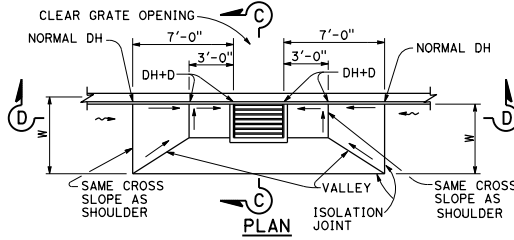
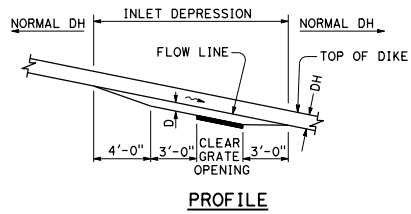


STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**GUTTER DEPRESSIONS**  
 NO SCALE

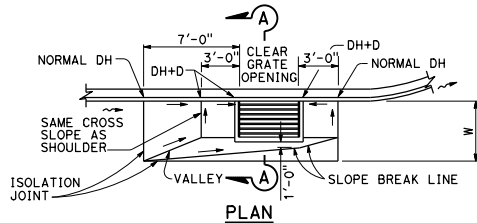
**D78A**

2015 STANDARD PLAN D78A

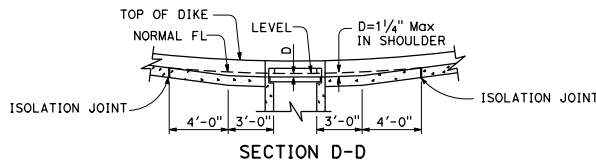
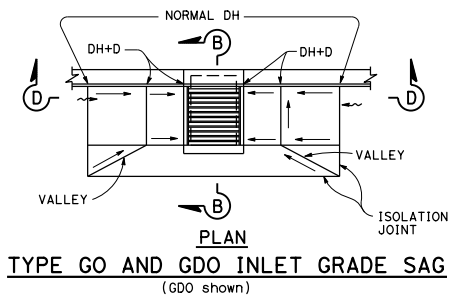
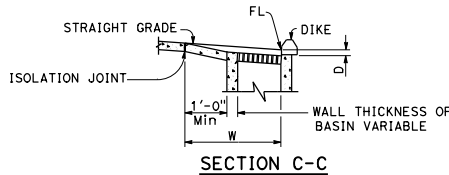
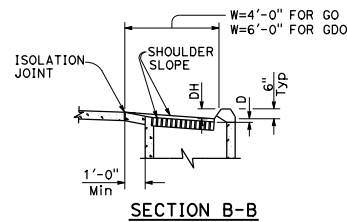
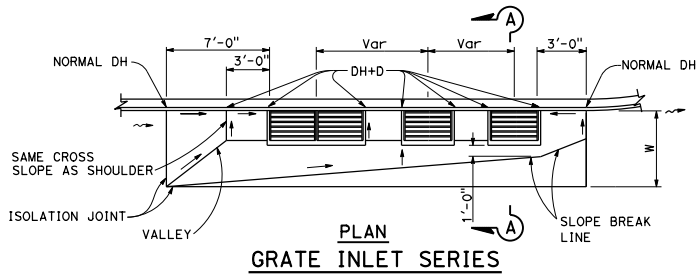
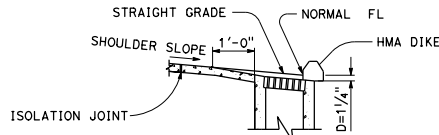




**TYPE G1 THRU G6 GT3 AND GT4  
INLETS IN GRADE SAG**



**TYPE G0 AND G1 THRU G6 INLETS ON GRADE**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

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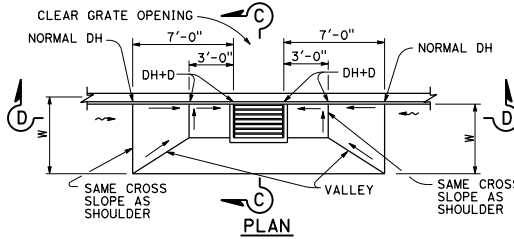
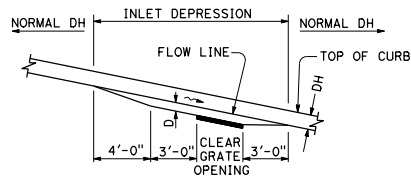
**NOTES:**

1. W = Width of depressed apron. Depressed aprons shall be 4'-0" unless indicated otherwise.
2. D = Inlet depression. The inlet depression shall be 1/4" unless indicated otherwise.
3. DH = Dike Height.
4. → = Straight grade, downward slope.
5. ~ = Direction of flow.
6. Apron shall be portland cement concrete and match thickness of adjacent shoulder pavement.
7. Establish curb opening height of Type G0 or GDO at midpoint of grate.
8. See Standard Plans P45 and P46 for Isolation Joint Details.

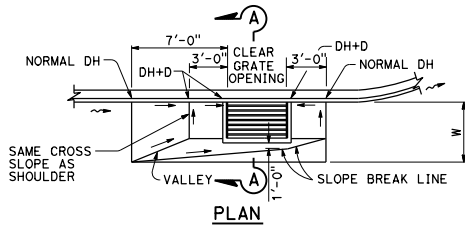
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**INLET DEPRESSIONS  
 CONCRETE SHOULDERS**

NO SCALE

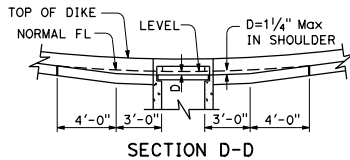
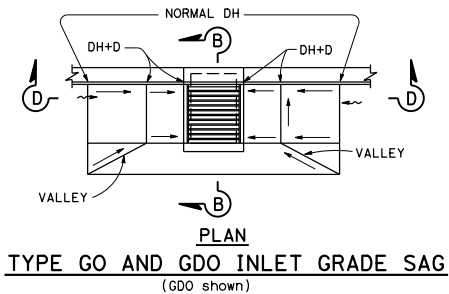
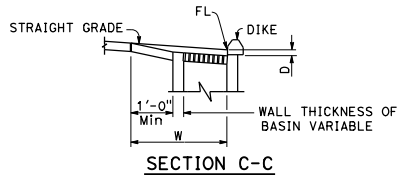
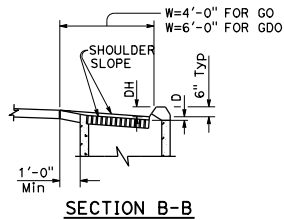
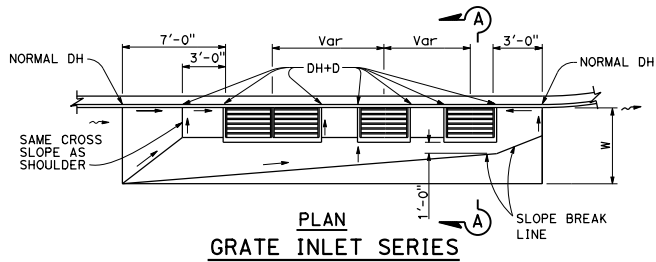
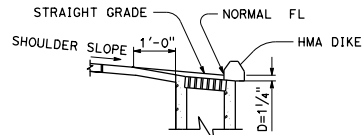
**D78B**



**TYPE G1 THRU G6 GT3 AND GT4  
INLETS IN GRADE SAG**



**TYPE G0 AND G1 THRU G6 INLETS ON GRADE**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

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**NOTES:**

1. W = Width of depressed apron. Depressed aprons shall be 4'-0" unless indicated otherwise.  
 D = Inlet depression. The Inlet depression shall be 1/4" unless indicated otherwise.  
 DH = Dike Height.  
 → = Straight grade, downward slope.  
 ~ = Direction of flow.
2. Apron shall be hot mix asphalt and match thickness of adjacent shoulder pavement.
3. Establish curb opening height of Type G0 or GDO at midpoint of grate.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**INLET DEPRESSIONS  
 HOT MIX ASPHALT SHOULDERS**  
 NO SCALE

**D78C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
October 30, 2015 PLANS APPROVAL DATE THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					

WALL A																					
ID	t	MINIMUM COVER TO 10'-0" Max COVER						20'-0" Max COVER						40'-0" Max COVER							
		METHOD 1		METHOD 2		METHOD 3A		METHOD 1		METHOD 2		METHOD 3A		METHOD 1		METHOD 2		METHOD 3A			
		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase		
24"	2 1/2"	0.22	-	0.17	-	0.14	0.15	-	0.12	0.28	-	0.22	0.19	-	0.15	0.14	-	0.11	0.25	-	
30"	2 3/4"	0.29	-	0.21	0.23	-	0.17	0.19	-	0.14	0.28	0.16	0.29	0.27	-	0.19	0.18	-	0.13	0.27	0.22
36"	3"	0.22	0.14	0.22	0.17	0.13	0.18	0.15	0.11	0.15	0.34	0.20	0.40	0.23	0.16	0.24	0.15	0.12	0.15	0.32	0.25
42"	3 1/2"	0.18	0.12	0.18	0.15	0.11	0.15	0.13	0.10	0.13	0.36	0.21	0.44	0.25	0.17	0.25	0.16	0.12	0.17	0.34	0.27
48"	4"	0.20	0.12	0.20	0.14	0.10	0.14	0.11	0.08	0.11	0.38	0.23	0.48	0.27	0.19	0.27	0.18	0.13	0.18	0.36	0.28
54"	4 1/2"	0.21	0.13	0.22	0.15	0.11	0.16	0.10	0.08	0.11	0.41	0.25	0.52	0.29	0.20	0.30	0.19	0.14	0.20	0.39	0.30
60"	5"	0.23	0.14	0.24	0.17	0.11	0.17	0.11	0.08	0.13	0.45	0.26	0.57	0.31	0.22	0.32	0.21	0.16	0.21	0.41	0.33
66"	5 1/2"	0.25	0.15	0.26	0.18	0.12	0.18	0.12	0.09	0.16	0.48	0.28	-	0.34	0.24	0.35	0.22	0.17	0.23	0.44	0.35
72"	6"	0.27	0.16	0.28	0.19	0.13	0.20	0.13	0.10	0.19	0.52	0.30	-	0.36	0.25	0.37	0.24	0.18	0.24	0.47	0.40
78"	6 1/2"	0.29	0.17	0.30	0.21	0.14	0.22	0.14	0.10	0.22	0.56	0.33	-	0.39	0.27	0.40	0.26	0.19	0.26	0.50	0.45
84"	7"	0.31	0.18	0.32	0.22	0.15	0.26	0.15	0.11	0.26	0.60	0.35	-	0.41	0.29	0.42	0.27	0.21	0.28	0.54	0.51
90"	7 1/2"	0.33	0.20	0.34	0.24	0.16	0.30	0.16	0.12	0.30	0.64	0.37	-	0.44	0.31	0.45	0.29	0.22	0.30	0.57	0.56
96"	8"	0.35	0.21	0.36	0.26	0.18	0.34	0.17	0.13	0.34	0.68	0.39	-	0.47	0.33	0.48	0.31	0.23	0.34	0.60	0.62
102"	8 1/2"	0.38	0.22	0.39	0.27	0.19	0.38	0.19	0.14	0.38	0.73	0.41	-	0.49	0.34	0.51	0.33	0.25	0.38	0.63	0.68
108"	9"	0.40	0.24	0.43	0.29	0.20	0.43	0.22	0.15	0.43	0.77	0.44	-	0.52	0.36	0.55	0.35	0.26	0.43	0.67	0.74
114"	9 1/2"	0.42	0.25	0.47	0.31	0.21	0.47	0.24	0.15	0.47	0.82	0.46	-	0.55	0.38	0.58	0.37	0.28	0.47	0.70	0.80
120"	10"	0.45	0.26	0.52	0.32	0.22	0.52	0.26	0.16	0.52	0.86	0.48	-	0.58	0.40	0.62	0.39	0.29	0.52	0.74	0.86

WALL B																					
ID	t	MINIMUM COVER TO 10'-0" Max COVER						20'-0" Max COVER						40'-0" Max COVER							
		METHOD 1		METHOD 2		METHOD 3A		METHOD 1		METHOD 2		METHOD 3A		METHOD 1		METHOD 2		METHOD 3A			
		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase		
24"	3"	0.19	-	0.13	0.15	-	0.11	0.13	-	0.09	0.25	-	0.17	0.17	-	0.12	0.12	-	0.09	0.26	-
30"	3 1/2"	0.23	-	0.14	0.19	-	0.12	0.16	-	0.10	0.34	-	0.20	0.23	-	0.14	0.17	-	0.10	0.21	0.17
36"	4"	0.14	0.08	0.14	0.12	0.08	0.12	0.10	0.07	0.10	0.23	0.12	0.24	0.16	0.10	0.17	0.12	0.08	0.12	0.24	0.18
42"	4 1/2"	0.14	0.08	0.14	0.10	0.07	0.11	0.09	0.07	0.09	0.27	0.14	0.27	0.19	0.12	0.19	0.14	0.09	0.14	0.27	0.20
48"	5"	0.16	0.09	0.16	0.11	0.07	0.12	0.09	0.07	0.09	0.30	0.17	0.31	0.21	0.14	0.22	0.16	0.10	0.16	0.31	0.26
54"	5 1/2"	0.18	0.10	0.18	0.13	0.08	0.13	0.09	0.07	0.11	0.34	0.19	0.35	0.24	0.15	0.24	0.17	0.12	0.18	0.34	0.33
60"	6"	0.20	0.11	0.20	0.14	0.09	0.14	0.10	0.07	0.14	0.37	0.21	0.41	0.26	0.17	0.27	0.19	0.13	0.20	0.38	0.39
66"	6 1/2"	0.22	0.12	0.22	0.16	0.10	0.17	0.12	0.08	0.17	0.41	0.23	0.46	0.29	0.19	0.30	0.21	0.15	0.21	0.41	0.46
72"	7"	0.24	0.13	0.24	0.17	0.11	0.20	0.13	0.09	0.20	0.45	0.25	0.52	0.32	0.21	0.32	0.23	0.16	0.23	0.45	0.52
78"	7 1/2"	0.26	0.15	0.26	0.19	0.12	0.23	0.14	0.09	0.23	0.48	0.27	0.57	0.34	0.23	0.35	0.25	0.17	0.25	0.48	0.59
84"	8"	0.28	0.16	0.29	0.20	0.13	0.27	0.15	0.10	0.27	0.52	0.30	0.63	0.37	0.25	0.38	0.26	0.19	0.27	0.51	0.66
90"	8 1/2"	0.30	0.17	0.31	0.22	0.14	0.30	0.16	0.11	0.30	0.56	0.32	-	0.40	0.26	0.41	0.28	0.20	0.30	0.55	0.73
96"	9"	0.32	0.18	0.34	0.23	0.15	0.34	0.17	0.12	0.34	0.60	0.34	-	0.43	0.28	0.44	0.30	0.22	0.34	0.58	0.80
102"	9 1/2"	0.35	0.20	0.39	0.25	0.17	0.39	0.20	0.13	0.39	0.64	0.37	-	0.45	0.30	0.46	0.32	0.23	0.39	0.62	0.88
108"	10"	0.37	0.21	0.43	0.27	0.18	0.43	0.22	0.14	0.43	0.68	0.39	-	0.48	0.32	0.49	0.34	0.24	0.43	0.65	0.95
114"	10 1/2"	0.39	0.23	0.48	0.29	0.19	0.48	0.24	0.15	0.48	0.72	0.42	-	0.51	0.34	0.52	0.36	0.26	0.48	0.69	1.03
120"	11"	0.42	0.24	0.53	0.30	0.20	0.53	0.27	0.16	0.53	0.77	0.44	-	0.54	0.36	0.55	0.38	0.27	0.53	0.73	1.10

WALL X																					
ID	t	Min COVER TO 10'-0" Max COVER						10.1' TO 20'-0" Max COVER						20.1' TO 30'-0" Max COVER							
		METHOD 3A		METHOD 3B		METHOD 3A		METHOD 3B		METHOD 3A		METHOD 3B		METHOD 3A		METHOD 3B					
		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase		
24"	1 1/8"	0.19	-	0.16	0.18	-	0.15	0.14	-	0.12	0.12	-	0.10	0.22	-	0.19	-	-	-	-	-
30"	2 1/8"	0.24	-	0.18	0.22	-	0.17	0.17	-	0.13	0.14	-	0.11	0.20	0.17	0.23	-	-	-	-	-
36"	2 3/8"	0.18	0.15	0.18	0.17	0.14	0.17	0.13	0.11	0.14	0.11	0.10	0.11	0.21	0.18	0.17	0.16	-	-	-	-
42"	2 1/2"	0.22	0.18	0.22	0.21	0.17	0.21	0.18	0.16	0.19	0.15	0.14	0.15	0.29	0.27	0.23	0.23	-	-	-	-
48"	2 5/8"	0.21	0.17	0.21	0.20	0.16	0.21	0.23	0.21	0.23	0.18	0.18	0.18	0.36	0.35	0.29	0.30	-	-	-	-
54"	2 7/8"	0.18	0.15	0.19	0.18	0.14	0.18	0.25	0.23	0.25	0.20	0.20	0.20	0.39	0.38	0.31	0.33	-	-	-	-
60"	3 1/2"	0.14	0.11	0.14	0.13	0.10	0.14	0.22	0.19	0.22	0.18	0.17	0.18	0.33	0.30	0.26	0.26	-	-	-	-
66"	3 3/4"	0.13	0.11	0.15	0.13	0.10	0.15	0.24	0.21	0.24	0.19	0.19	0.20	0.37	0.34	0.29	0.29	-	-	-	-
72"	4 1/4"	0.13	0.11	0.18	0.11	0.10	0.18	0.24	0.21	0.24	0.19	0.18	0.20	0.36	0.32	0.29	0.28	-	-	-	-
78"	4 3/4"	0.13	0.11	0.22	0.11	0.10	0.22	0.24	0.21	0.24	0.19	0.18	0.22	0.36	0.32	0.29	0.28	-	-	-	-
84"	5 1/4"	0.14	0.11	0.25	0.13	0.10	0.25	0.24	0.21	0.25	0.20	0.18	0.25	0.36	0.32	0.29	0.28	-	-	-	-
90"	5 1/2"	0.15	0.12	0.29	0.15	0.11	0.29	0.26	0.22	0.29	0.22	0.20	0.29	0.39	0.34	0.32	0.30	-	-	-	-
96"	6"	0.17	0.13	0.33	0.17	0.11	0.33	0.27	0.23	0.33	0.22	0.20	0.33	0.40	0.36	0.32	0.31	-	-	-	-
102"	6 1/2"	0.19	0.14	0.37	0.19	0.12	0.37	0.29	0.25	0.37	0.24	0.22	0.37	0.43	0.38	0.35	0.33	-	-	-	-
108"	7"	0.21	0.15	0.41	0.21	0.13	0.41	0.32	0.27	0.41	0.26	0.23	0.41	0.46	0.40	0.38	0.35	-	-	-	-
114"	7 1/2"	0.23	0.16	0.46	0.23	0.14	0.46	0.34	0.28	0.46	0.28	0.25	0.46	0.49	0.42	0.41	0.37	-	-	-	-
120"	8"	0.26	0.17	0.51	0.26	0.16	0.51	0.36	0.30	0.51	0.30	0.26	0.51	0.52	0.44	0.43	0.39	-	-	-	-

WALL AA						
ID	t	80'-0" Max COVER				
		METHOD 3B				
Asi	Aso	Ase	Asi	Aso	Ase	
24"	5 3/4"	0.14	0.07	-	-	-
30"	6"	0.20	0.15	-	-	-
36"	6 1/2"	0.25	0.28	-	-	-
42"	7"	0.31	0.42	-	-	-
48"	7 1/2"	0.37	0.56	-	-	-
54"	8"	0.43	0.70	-	-	-
60"	8 1/2"	0.49	0.85	-	-	-
66"	9"	0.55	1.00	-	-	-
72"	9 1/2"	0.61	1.15	-	-	-
78"	10"	0.67	1.06	-	-	-
84"	10 1/2"	0.73	1.20	-	-	-

WALL BB						
ID	t	80'-0" Max COVER				
		METHOD 3B				
Asi	Aso	Ase	Asi	Aso	Ase	
24"	6 1/2"	0.13	0.07	-	-	-
30"	7"	0.17	0.11	-	-	-
36"	7 1/2"	0.22	0.27	-	-	-

		WALL B														
		MINIMUM COVER TO 10'-0" Max COVER						20'-0" Max COVER								
ID	t	INSTALLATION TYPE 1		INSTALLATION TYPE 2		INSTALLATION TYPE 3		INSTALLATION TYPE 1		INSTALLATION TYPE 2		INSTALLATION TYPE 3				
		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase			
24"	3"	0.14	-	0.09	0.15	-	0.10	0.18	-	0.12	0.15	-	0.10	0.28	-	0.18
30"	3 1/2"	0.18	-	0.11	0.20	-	0.12	0.24	-	0.14	0.21	-	0.13	0.29	-	0.17
36"	4"	0.11	0.07	0.12	0.12	0.07	0.12	0.14	0.08	0.15	0.15	0.07	0.15	0.20	0.09	0.20
42"	4 1/2"	0.10	0.07	0.10	0.12	0.07	0.12	0.15	0.07	0.16	0.17	0.09	0.17	0.23	0.11	0.23
48"	5"	0.10	0.07	0.11	0.14	0.07	0.14	0.18	0.08	0.18	0.19	0.10	0.20	0.26	0.13	0.26
54"	5 1/2"	0.12	0.07	0.12	0.15	0.08	0.16	0.20	0.09	0.20	0.22	0.11	0.22	0.29	0.14	0.30
60"	6"	0.13	0.07	0.14	0.17	0.09	0.18	0.22	0.11	0.23	0.24	0.13	0.25	0.32	0.16	0.33
66"	6 1/2"	0.14	0.08	0.17	0.19	0.10	0.19	0.25	0.12	0.25	0.27	0.14	0.27	0.36	0.18	0.36
72"	7"	0.16	0.09	0.20	0.21	0.11	0.21	0.27	0.13	0.28	0.29	0.16	0.30	0.39	0.20	0.40
78"	7 1/2"	0.17	0.10	0.23	0.23	0.12	0.23	0.30	0.14	0.30	0.32	0.18	0.33	0.42	0.22	0.43
84"	8"	0.19	0.10	0.27	0.25	0.13	0.27	0.32	0.16	0.33	0.34	0.19	0.35	0.46	0.24	0.47
90"	8 1/2"	0.20	0.11	0.30	0.27	0.14	0.30	0.35	0.17	0.35	0.37	0.21	0.38	0.49	0.25	0.50
96"	9"	0.22	0.12	0.34	0.29	0.15	0.34	0.37	0.18	0.38	0.40	0.22	0.41	0.53	0.27	0.54
102"	9 1/2"	0.23	0.13	0.39	0.31	0.16	0.39	0.40	0.20	0.41	0.42	0.24	0.43	0.56	0.29	0.57
108"	10"	0.25	0.14	0.43	0.33	0.17	0.43	0.43	0.21	0.44	0.45	0.26	0.46	0.60	0.31	0.61
114"	10 1/2"	0.26	0.15	0.48	0.35	0.18	0.48	0.45	0.23	0.48	0.48	0.28	0.49	0.63	0.33	0.65
120"	11"	0.28	0.16	0.53	0.37	0.20	0.53	0.48	0.24	0.53	0.50	0.29	0.53	0.67	0.35	0.69

		WALL C														
		MINIMUM COVER TO 10'-0" Max COVER						20'-0" Max COVER								
ID	t	INSTALLATION TYPE 1		INSTALLATION TYPE 2		INSTALLATION TYPE 3		INSTALLATION TYPE 1		INSTALLATION TYPE 2		INSTALLATION TYPE 3				
		Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase	Asi	Aso	Ase			
24"	3 3/4"	0.11	-	0.07	0.12	-	0.08	0.15	-	0.09	0.13	-	0.08	0.18	-	0.10
30"	4 1/4"	0.16	-	0.09	0.17	-	0.10	0.20	-	0.11	0.18	-	0.10	0.25	-	0.13
36"	4 3/4"	0.09	0.07	0.09	0.10	0.07	0.10	0.11	0.07	0.12	0.12	0.07	0.12	0.16	0.07	0.16
42"	5 1/4"	0.08	0.07	0.09	0.10	0.07	0.10	0.13	0.07	0.13	0.14	0.07	0.15	0.19	0.08	0.20
48"	5 3/4"	0.09	0.07	0.09	0.12	0.07	0.12	0.15	0.07	0.16	0.17	0.07	0.17	0.22	0.10	0.23
54"	6 1/4"	0.10	0.07	0.12	0.14	0.07	0.14	0.18	0.08	0.18	0.19	0.09	0.19	0.26	0.11	0.26
60"	6 3/4"	0.12	0.07	0.14	0.15	0.07	0.16	0.20	0.09	0.20	0.21	0.10	0.22	0.29	0.13	0.29
66"	7 1/4"	0.13	0.07	0.17	0.17	0.08	0.18	0.22	0.10	0.23	0.24	0.12	0.24	0.32	0.15	0.33
72"	7 3/4"	0.14	0.07	0.20	0.19	0.09	0.20	0.25	0.11	0.25	0.26	0.13	0.27	0.35	0.17	0.36
78"	8 1/4"	0.16	0.08	0.23	0.21	0.10	0.23	0.27	0.13	0.28	0.29	0.15	0.30	0.39	0.19	0.40
84"	8 3/4"	0.17	0.09	0.27	0.23	0.11	0.27	0.30	0.14	0.30	0.32	0.16	0.32	0.42	0.21	0.43
90"	9 1/4"	0.19	0.10	0.31	0.25	0.12	0.31	0.32	0.15	0.33	0.34	0.18	0.35	0.46	0.23	0.47
96"	9 3/4"	0.20	0.11	0.35	0.27	0.13	0.35	0.35	0.17	0.36	0.37	0.20	0.38	0.49	0.25	0.50
102"	10 1/4"	0.22	0.12	0.39	0.29	0.14	0.39	0.38	0.18	0.39	0.39	0.21	0.40	0.53	0.26	0.54
108"	10 3/4"	0.23	0.14	0.44	0.31	0.16	0.44	0.40	0.19	0.44	0.42	0.23	0.44	0.56	0.29	0.57
114"	11 1/4"	0.25	0.15	0.49	0.33	0.17	0.49	0.43	0.21	0.49	0.45	0.25	0.49	0.60	0.31	0.61
120"	11 3/4"	0.27	0.17	0.54	0.35	0.18	0.54	0.46	0.22	0.54	0.48	0.27	0.54	0.63	0.33	0.65

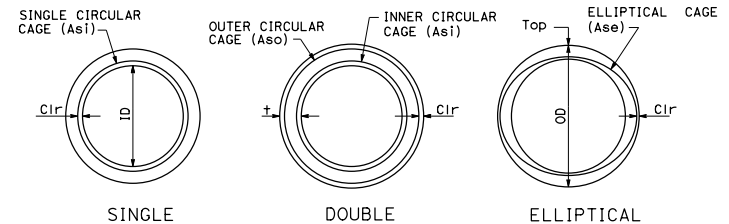
		WALL X					
		Min COVER TO 10'-0" Max COVER			10.1' TO 20'-0" Max COVER		
ID	t	INSTALLATION TYPE 1			INSTALLATION TYPE 1		
		Asi	Aso	Ase	Asi	Aso	Ase
24"	2"	0.22	-	0.17	0.24	-	0.17
30"	2 1/2"	0.28	-	0.18	0.30	-	0.22
36"	2 3/4"	0.22	0.16	0.22	0.29	0.20	0.29
42"	2 3/4"	0.26	0.21	0.27	0.37	0.26	0.38
48"	3"	0.26	0.20	0.26	0.42	0.30	0.43
54"	3 1/4"	0.28	0.21	0.29	0.47	0.34	0.48
60"	3 1/2"	0.25	0.18	0.26	0.52	0.38	0.54
66"	3 3/4"	0.28	0.20	0.28	0.58	0.43	0.61
72"	4 1/4"	0.28	0.20	0.29	0.56	0.41	0.60
78"	4 3/4"	0.29	0.20	0.29	0.57	0.41	0.60
84"	5 1/4"	0.29	0.21	0.30	0.58	0.41	0.60
90"	5 3/4"	0.30	0.21	0.31	0.59	0.42	0.61
96"	6"	0.33	0.23	0.34	0.64	0.46	0.67
102"	6 1/2"	0.34	0.24	0.37	0.65	0.47	0.68
108"	7"	0.35	0.25	0.41	0.67	0.48	0.70
114"	7 1/2"	0.37	0.26	0.46	0.69	0.49	0.71
120"	8"	0.38	0.26	0.51	0.71	0.50	0.73

NOTES:

- For details of the method of excavation, backfill and bedding (Installation Type 1, Installation Type 2, etc.), see Standard Plan A62DA.
- The tables for minimum allowable classes and D-loads of RCP on Standard Plan A62DA shall not apply to direct design RCP.
- Notes 3 and 7 on Standard Plan A62DA shall apply to direct design RCP.
- Throughout the length of any given culvert, the direct design selected by the Contractor shall be the same, including the method of excavation, backfill and bedding.
- For single circular cage reinforcement, minimum clearance shall be 40% of the wall thickness (t). For elliptical and double circular cage reinforcement where the wall thickness (t) is less than 2 1/2", the minimum clearance (Cir) for reinforcement shall be 3/4", and where the wall thickness (t) is 2 1/2" or more, the minimum clearance (Cir) for reinforcement shall be 1".
- Minimum cover measured at the edge of pavement shall be 2'-0" to top of HMA or existing AC pavement and 1'-0" to top of rigid pavement.
- Cover greater than the table maximum requires a special design.

		WALL BB	
		40'-0" Max COVER	
ID	t	INSTALLATION TYPE 1	
		Asi	Aso
24"	3"	0.20	0.14
30"	3 1/2"	0.25	0.15
36"	4"	0.30	0.16
42"	4 1/2"	0.34	0.19
48"	5"	0.39	0.26
54"	5 1/2"	0.44	0.32
60"	6"	0.49	0.40
66"	6 1/2"	0.54	0.47
72"	7"	0.58	0.54
78"	7 1/2"	0.63	0.62
84"	8"	0.68	0.70
90"	8 1/2"	0.73	0.78
96"	9 3/4"	0.71	0.76
102"	10 1/4"	0.76	0.84
108"	10 3/4"	0.81	0.93
114"	11 1/4"	0.85	0.78
120"	11 3/4"	0.90	0.86

		WALL CC	
		80'-0" Max COVER	
ID	t	INSTALLATION TYPE 1	
		Asi	Aso
24"	6 1/2"	0.15	0.07
30"	7"	0.21	0.17
36"	7 1/2"	0.27	0.35
42"	8"	0.34	0.54
48"	8 1/2"	0.42	0.73
54"	9"	0.50	0.92
60"	9 1/2"	0.58	1.12
66"	10"	0.65	1.08
72"	11 1/4"	0.68	1.15
78"	13 1/2"	0.66	1.06
84"	14"	0.73	1.24



CAGE REINFORCEMENT

t = Pipe barrel wall thickness, inches  
 Asi = Inner cage reinforcement, or single circular cage reinforcement, square inches/LF  
 Aso = Outer cage reinforcement, square inches/LF  
 Ase = Elliptical single cage reinforcement, square inches/LF  
 Cir = Design clearance, inches (see Note 5)

DESIGN NOTES:

Design: AASHTO LRFD Bridge Design Specifications, 4th edition with California Amendments, ACPA DESIGN DATA 1, October 2007, DIRECT DESIGN METHOD

Earth Loading: Heger Soil Pressure Distribution  
 $\gamma = 140$  pcf  
 VAF & HAF modification factor = 0.86

Unit Stresses: (Used in Design Tables)  
 $f_y = 65$  ksi  
 $f'_c =$  See Tables

The RCP as shown on this sheet is not intended to be used in a corrosive environment. A special design may be required.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**PRECAST REINFORCED  
 CONCRETE PIPE  
 DIRECT DESIGN METHOD**

NO SCALE

D79A

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

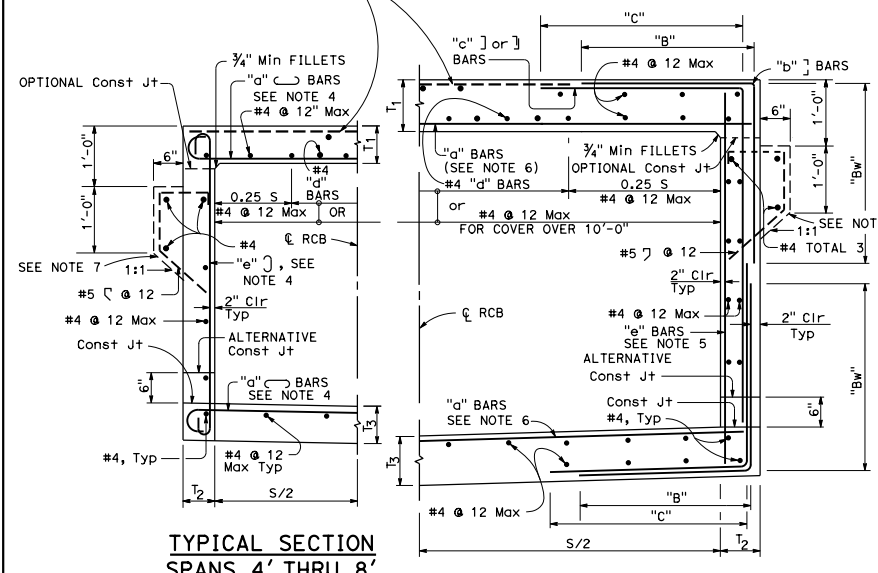
REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

SPAN, S		2'				4'				5'				6'				7'				8'			
HEIGHT, H		2'	3'	4'	5'	2'	3'	4'	5'	2'	3'	4'	5'	2'	3'	4'	5'	2'	3'	4'	5'	2'	3'	4'	5'
MAXIMUM EARTH COVER	T <sub>1</sub>	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'
ROOF	T <sub>1</sub>	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"
WALLS	T <sub>2</sub>	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"	6"	6 1/2"
INVERT	T <sub>3</sub>	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"	7"	7 1/2"
SPACING		7"	6"	7"	6"	7"	6"	7"	6"	8 1/2"	5 1/2"	8"	5 1/2"	8"	5 1/2"	7"	5"	7"	4 1/2"	6"	5 1/2"	6"	5 1/2"	6"	4 1/2"
"a"	SIZE BAR	#6	#6	#6	#6	#6	#6	#6	#6	#7	#7	#7	#7	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6
"e"	SIZE BAR	#4	#4	#5	#5	#6	#6	#6	#6	#4	#4	#5	#5	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6
CONCRETE	CF/LF	7.8	8.3	9.2	9.6	10.7	11.6	9.5	10.0	10.9	11.4	12.4	12.9	14.1	15.1	13.1	14.3	14.2	15.4	15.9	18.0	17.8	21.2	14.0	17.5
REINFORCEMENT	LB/LF	47.7	51.1	57.8	71.4	63.5	80.8	57.8	73.7	66.6	92.5	83.0	111	101	114	77.6	94.7	96.6	114	110	126	132	152	102	106
*** SOIL PRESSURE (ksf)		2.4	4.5	2.4	4.5	2.5	4.6	2.4	4.5	2.4	4.5	2.5	4.6	2.5	4.6	2.5	4.6	2.5	4.6	2.5	4.7	2.4	4.6	2.4	4.6

SPAN, S		5'				6'				7'				8'				9'				10'				11'				12'				13'				14'			
HEIGHT, H		5'	6'	7'	8'	5'	6'	7'	8'	5'	6'	7'	8'	5'	6'	7'	8'	5'	6'	7'	8'	5'	6'	7'	8'	5'	6'	7'	8'	5'	6'	7'	8'	5'	6'	7'	8'				
MAXIMUM EARTH COVER	T <sub>1</sub>	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'						
ROOF	T <sub>1</sub>	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"	9 1/2"	12"						
WALLS	T <sub>2</sub>	8 1/2"	8 1/2"	8 1/2"	9 1/2"	9"	10 1/2"	9"	12"	10"	13 1/2"	11"	15"	9"	10 1/2"	9 1/2"	12"	10"	13 1/2"	11"	15"	9"	10 1/2"	9 1/2"	12"	10"	13 1/2"	11"	15"	9"	10 1/2"	9 1/2"	12"	10"	13 1/2"						
INVERT	T <sub>3</sub>	10"	12 1/2"	10"	12 1/2"	10"	12 1/2"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"	10"	13"						
SPACING		11"	12"	12"	11"	11"	10"	10"	10"	11"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"	9"	10"						
**"a"	SIZE BAR	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8	#7	#8						
"b"	SIZE BAR	#7	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7						
DIMENSION "B"	ft-inch	2-11	2-11	2-11	3-0	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9	2-11	3-9						
DIMENSION "Bw"	ft-inch	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0	4-10	5-0						
"c"	SIZE BAR #	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7	#6	#7						
DIMENSION "C"	ft-inch	3-4	3-6	7-4	4-8	7-7	4-8	8-2	4-8	7-7	5-2	7-7	5-11	4-4	3-10	8-1	5-7	8-1	5-7	8-1	5-7	8-1	5-7	8-1	6-4	8-1	6-10	4-3	4-2	6-9	6-9	5-10	5-10	6-0	6-4						
"e"	SIZE BAR	#4	#4	#4	#5	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6	#6						
CONCRETE	CF/LF	25.1	30.4	27.1	33.1	29.2	36.2	30.7	41	34	45.8	37.6	51	33.2	43.7	34.7	46.1	37	50.4	39.5	55.3	43.7	60.6	48.7	67.1	53.1	73.5	42.9	57	44.5	60.7	47	65.6								
REINFORCEMENT	LB/LF	271	296	278	333	341	366	359	406	428	469	487	530	322	371	379	417	390	449	430	477	499	500	527	610	530	614	413	529	467	595	467	608								
*** SOIL PRESSURE (ksf)		3.7	4.7	3.8	4.7	3.8	4.8	3.8	4.8	3.9	4.9	3.9	5.0	3.6	4.8	3.6	4.8	3.6	4.9	3.6	4.9	3.7	5.0	3.7	5.0	3.8	5.1	3.4	4.9	3.5	4.9	3.5	4.9								

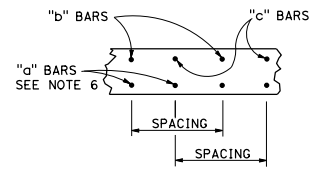
\* See Note 5  
 \*\* See Note 6  
 \*\*\* See Note 10

SEE NOTE 9

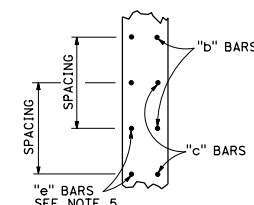


TYPICAL SECTION SPANS 4' THRU 8'

TYPICAL SECTION SPANS 10' THRU 14'

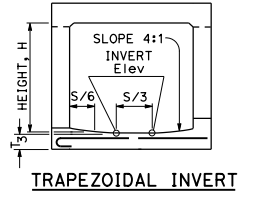
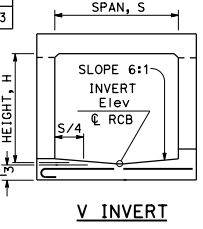
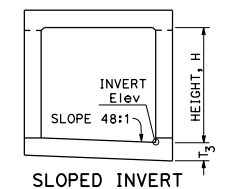


ROOF SECTION SPANS 10' THRU 14' INVERT SIMILAR



WALL SECTION SPANS 10' THRU 14'

"d" BARS, FOR EARTH COVERS UP TO AND INCLUDING 10'-0"		SPAN		4'		5'		6'		7'		8'		10'		12'		14'	
NUMBER		7	8	9	10	11	12	15	20										
		7	8	9	10	11	12	15	20										



ALTERNATIVE INVERTS

NOTES:

- For boxes with span or height less than any of those shown in table, use next greater size box concrete dimensions and reinforcement. Make necessary changes in bar lengths and quantities.
- Quantities are approximate and for design purposes only.
- For boxes with span or height or cover greater than those shown in tables, a special design is required.
- It is permissible to eliminate the 180° hooks on every other bar.
- "e" bars are at half spacing (spans 10' - 14') only.
- "a" bars are at half spacing (spans 10' - 14') only.
- Provide paving notch when top is exposed and when pavement is concrete, and adjust quantities.
- For design and details not shown, see Standard Plan D82.
- For exposed top, provide #4 @ 12 each way, lap "c" bars 2'-0" or use full span length.
- Soil pressures shown are factored per AASHTO LRFD and include soil weight of fill over box, self weight of box and live load where applicable.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CAST-IN-PLACE REINFORCED CONCRETE SINGLE BOX CULVERT**  
 NO SCALE

**D80**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*C. M. Dunn*  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL

October 30, 2015  
 PLANS APPROVAL DATE

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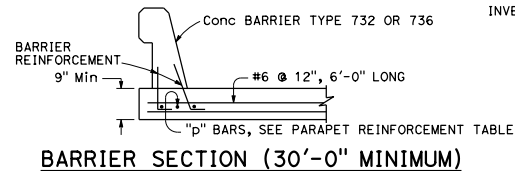


**DESIGN NOTES:**

Design Specifications:  
 AASHTO LRFD Bridge Design Specifications, 6th Edition with California Amendments.  
 Loading:  
 Live load: (AASHTO LRFD 3.6.1.2)  
 HL-93 consists of design truck or design tandem and design lane load.  
 Impact Factor: (Apply to roof slab only)  
 $IM = 33(1.0 - 0.125D_c) \geq 0\%$  (AASHTO LRFD 3.6.2.2)  
 $D_c$  = minimum depth of earth cover  
 Earth load:  
 Earth pressure for two conditions:  
 140 pcf vertical, 42 pcf horizontal  
 140 pcf vertical, 140 pcf horizontal  
 Load Factors:  
 AASHTO LRFD Table 3.4.1.1 & Table 3.4.1.2  
 Unit stresses:  
 $f'_c = 3600$  psi  
 $f_y = 60,000$  psi  
 Distribution "d" bars:  
 Up to and including 10'-0" cover  
 Express as a percentage of main positive reinforcement required:  $\frac{100}{\sqrt{s}}$ , Max 50%,  
 Over 10'-0" cover,  
 # 4 @ 12 maximum  
 Shear:  
 $V_c = \{2.14\sqrt{f'_c} + 4600 \frac{A_s V_u d_c}{b_w d_u}\} b_w d_c \leq 4.0 \sqrt{f'_c} b_w d_c$  (Pounds)  
 $V_c$  shall not be less than  $3.00 \sqrt{f'_c} b_w d_c$  for frame members and  $2.5 \sqrt{f'_c} b_w d_c$  for simply supported members.  
 Exclusion:  
 Compressive reinforcement and negative moment reduction (for continuity) do not apply.  
 Axial loading on members has not been considered.

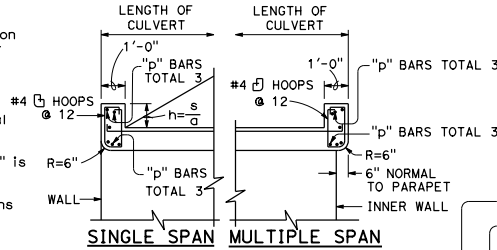
**CONSTRUCTION NOTES:**

Construction loads:  
 Strutting required as shown on Standard Plan D88.  
 Strutting may be required on culvert extensions when existing parapet is removed.  
 Expansion joints:  
 Invert:  
 No expansion joints shall be permitted.  
 Roof and Walls:  
 When cover is less than span length-  
 Place 1/2" preformed expansion joint filler at 30'-0" ± centers outside the paved roadway lanes and place Bridge Detail 3-2, Standard Plan B0-3, at 30'-0" centers under paved roadway lanes.  
 When cover is more than span length-  
 Place 1/2" preformed expansion joint filler at 30'-0" ± centers and additional 1/2" preformed expansion joints at locations of change in foundation character, as directed by the Engineer.  
 Construction joints:  
 Temporary joints may be permitted if normal (or radial) to centerline of RCB. Otherwise, the contractor is to submit a proposal for consideration.  
 Cutoff walls:  
 4'-0" cutoff walls are to be provided at inlet and/or outlet unless adjacent channel is lined and unless otherwise shown. These walls are to be extended if scour conditions warrant.  
 Earthwork:  
 See Standard Plan A62E.  
 Backfill:  
 See Standard Specifications, except that the difference in level of backfill (against outside walls) shall not exceed 2'-0".



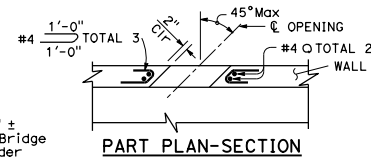
**GENERAL NOTES:**

Designation:  
 Standard single or multiple box culverts are shown on plans as span times height with maximum cover over roof thus: 8' x 5' RCB with 10' or double 10' x 5' RCB with 20', followed by alternatives.  
 Alternatives:  
 Single cell: Invert will be sloped unless "trapezoidal invert", "flat invert" or "V invert" is included in designation.  
 Multiple cell: Invert will be vee unless "flat invert" is specified. Ends of culvert will be rounded unless "square ends" are designated. Parapets will be as shown unless designated in plans. Such designations may be different for inlet and outlet ends.  
 Quantities:  
 Quantities do not include the following:  
 • Concrete for parapet, paving notches and cut-off wall.  
 • Reinforcement for 2% splices, parapets, paving notches, cut-off wall and additional required bars for exposed top slab (D-80, Note 9).  
 Reinforcement placement:  
 Main reinforcement is to be placed transversely or, for curved culverts, radially. When radial, reinforcing spacing of the "a", "f" and "g" bars is measured along the centerline. Stagger splices not shown. Hooks may be rotated or fillet, as necessary, for clearance.  
 Special reinforcement coverage:  
 Box standard plans are not to be used for culverts in a corrosive environment or where there is a severe abrasive flow condition or in freeze-thaw locations.  
 Special design:  
 Required for culverts with conditions, loads, design bearing pressures or sizes greater than those given on this plan or Standard Plans D80 & D81. Also required for multiple cell culverts with unequal spans. For culverts with railroad loading, see the current AREMA design specification.  
 3 or more cells:  
 For culverts with more than two cells, use dimensions and reinforcement for the standard "double box culvert" and adjust quantities accordingly.

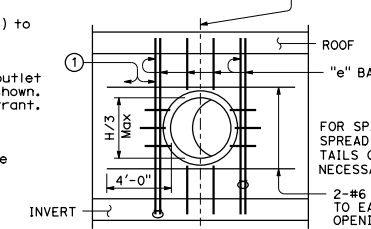


SPAN	PARAPET "p" BARS		
	SKW ANGLE TO	TO	TO
4'	0°	16°	31°
6'	15°	30°	45°
8'	#4	#4	#4
10'	#4	#4	#5
12'	#4	#5	#6
14'	#6	#7	#8

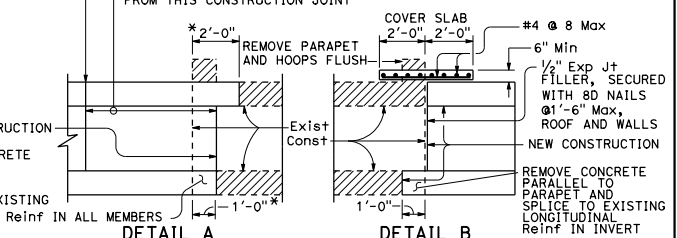
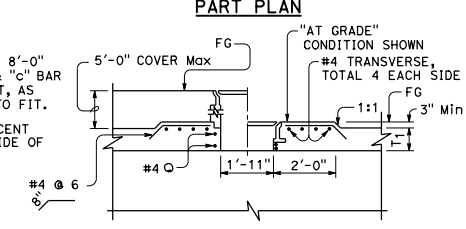
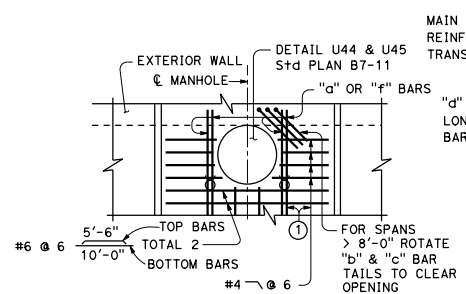
**PARAPET REINFORCEMENT**



BRIDGE DETAIL 3-2 Std PLAN B0-3, NO EXPANSION JOINT WITHIN 4'-0" OF CENTERLINE

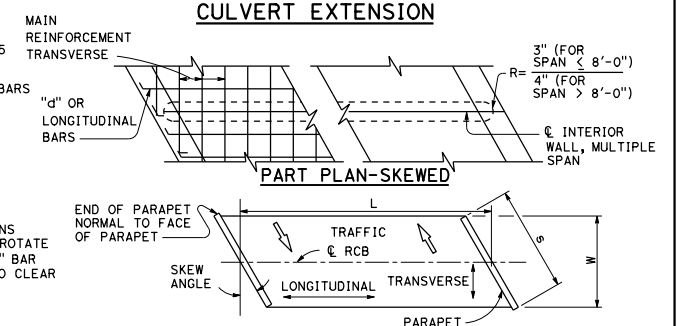


① Adjacent to each side of the opening, place additional bars equivalent to half the interrupted main reinforcement.



20° maximum skew as shown. If existing longitudinal and transverse reinforcing bars in top slab are lap spliced with new longitudinal and transverse reinforcing bars, the 20° skew may be exceeded. Lap splicing may require removal of top slab in excess of 2'-0" shown.

Single cell only, no skew allowed, 1'-0" minimum cover.  
 \* Measured perpendicular to parapet



**CAST-IN-PLACE REINFORCED CONCRETE BOX CULVERT MISCELLANEOUS DETAILS**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

NO SCALE

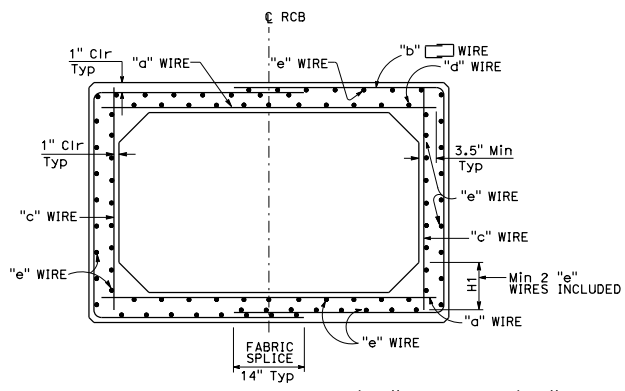
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 No. C59876  
 Exp. 6-30-16  
 CIVIL

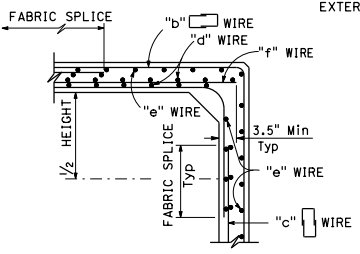
October 30, 2015  
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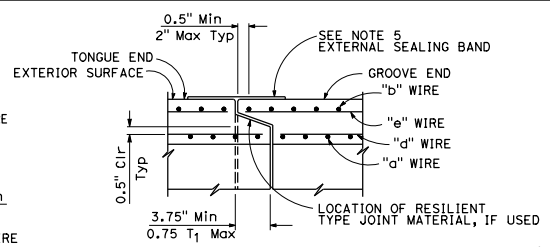
2015 STANDARD PLAN D82



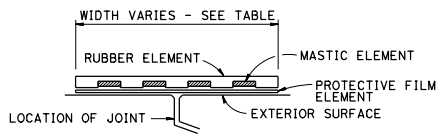
TYPICAL SECTION - SPANS 4'-0" THRU 12'-0"



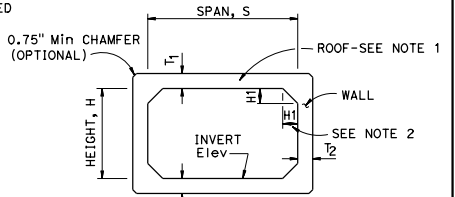
ALTERNATIVE DETAILING OPTION



END JOINT DETAIL



EXTERNAL SEALING BAND SCHEMATIC



SCHEMATIC

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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TABLE	
SPAN	EXTERNAL SEALING BAND WIDTH
4'-6'	9"
7'-8'	11"
10'-12'	13"

SPAN, S	4'				5'				6'				7'				
	2'	2'	3'	4'	2'	2'	3'	4'	3'	4'	5'	6'	3'	4'	5'	6'	
HEIGHT, H	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	
MAXIMUM EARTH COVER	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	
CONCRETE (INCH)	ROOF	5.5"	5.5"	5.5"	5.5"	6"	6"	6"	6"	6"	6"	7"	7"	7"	7"	8"	8"
	SIDE WALL	T2	T2	T2	T2	6"	6"	6"	6"	6"	6"	7"	7"	7"	7"	8"	8"
MINIMUM WELDED WIRE FABRIC (Inch <sup>2</sup> /ft)	INVERT	T3	T3	T3	T3	6"	6"	6"	6"	6"	6"	7"	7"	7"	7"	8"	8"
	"a"	.33	.47	.34	.49	.41	.41	.42	.42	.43	.44	.47	.47	.47	.47	.48	.51
	"b"	.23	.28	.23	.25	.21	.23	.26	.26	.24	.33	.24	.30	.28	.44	.27	.40
	"c"	.11	.11	.11	.12	.18	.11	.11	.11	.13	.23	.24	.34	.11	.11	.11	.11
	"d"	.16	.11	.16	.11	.16	.11	.17	.11	.18	.11	.18	.11	.18	.11	.17	.11
"e"	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	
"f"	.22	.36	.23	.37	.22	.26	.29	.51	.30	.51	.29	.41	.26	.30	.33	.56	
* QUANTITY	Conc	.31	.34	.38	.37	.41	.44	.48	.51	.56	.60	.64	.63	.68	.73	.78	
Reinf	LB/LF	35	41	39	45	51	49	62	54	69	62	78	60	79	64	83	
** SOIL PRESSURE (ksf)		2.3	4.4	2.4	4.5	2.4	4.5	3.1	4.4	3.1	4.5	3.1	4.5	2.7	4.5	2.8	

SPAN, S	8'				10'				12'			
	4'	5'	6'	7'	5'	6'	7'	8'	6'	7'	8'	9'
HEIGHT, H	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'	10'	20'
MAXIMUM EARTH COVER	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
CONCRETE (INCH)	ROOF	8.5"	8.5"	8.5"	8.5"	10"	10"	10"	10"	10"	10"	12"
	SIDE WALL	T2	T2	T2	T2	10"	10"	10"	10"	10"	10"	12"
MINIMUM WELDED WIRE FABRIC (Inch <sup>2</sup> /ft)	INVERT	T3	T3	T3	T3	10"	10"	10"	10"	10"	10"	12"
	"a"	.55	.87	.56	.90	.57	.92	.58	.93	.58	.94	.66
	"b"	.37	.59	.35	.55	.33	.52	.36	.57	.45	.74	.43
	"c"	.11	.11	.11	.11	.20	.31	.31	.42	.38	.62	.11
	"d"	.19	.11	.19	.11	.20	.11	.20	.11	.20	.11	.20
"e"	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	
"f"	.44	.76	.45	.79	.37	.61	.27	.52	.20	.31	.55	
* QUANTITY	Conc	.78	.83	.88	.94	.99	1.10	1.17	1.23	1.29	1.35	
Reinf	LB/LF	93	129	97	133	105	148	117	161	131	189	
** SOIL PRESSURE (ksf)		2.5	4.6	2.5	4.6	2.5	4.6	3.8	4.6	3.8	4.7	

\* See Note 3      \*\* See Note 6

- NOTES:**
- The inside and outside surfaces of the RCB roof shall be marked "TOP".
  - H1 minimum shall equal the wall thickness. H1 maximum shall be 8" for spans through 8" and 14" for spans over 8".
  - Quantities are approximate and for design purposes only.
  - For design and details not shown see Standard Plan D83B.
  - For external sealing band applications see Standard Plan A62G.
  - Soil pressures shown are factored per AASHTO LRFD and include soil weight of fill over box, self weight of box and live load where applicable.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**PRECAST REINFORCED  
CONCRETE BOX CULVERT**

NO SCALE

**D83A**



**DESIGN NOTES:**

Specifications:  
AASHTO LRFD Bridge Design Specifications,  
4th Edition with California Amendments.

Earth load:  
Earth pressures for two conditions:  
140 pcf Vert, 42 pcf Horiz  
140 pcf Vert, 140 pcf Horiz

Unit stresses:  
 $f'c = 5.0 \text{ ksi}$   
 $f_y = 65.0 \text{ ksi}$  for weld wire fabric  
 $n = 7$

Shear:  
Based on  
 $V_c = (2.14\sqrt{f'c} + 4600 \frac{A_s V_u d_e}{D d_o M_u}) b_w d_o \leq 4.0\sqrt{f'c} b_w d_o$  (Pounds)  
 $V_c$  shall not be less than  $3.00\sqrt{f'c} b_w d_o$   
for frame members and  $2.5\sqrt{f'c} b_w d_o$   
for simply supported members.

Exclusion:  
Axial loading on the members has  
not been considered.

**GENERAL NOTES:**

Designation:  
Standard single or multiple precast box culverts are shown on the plans  
as span times height with maximum cover over roof thus: 8' x 5' RCB  
with 10'-0" or double 10' x 5' RCB with 20'-0", followed by alternatives.

Alternatives:  
Single cell:  
Standard dimensions of AASHTO Material Specification 'M259' or 'M273'.  
Multiple cell:  
Constructed by placing single cells adjacent to each other. Inlet  
and outlet ends of culvert will be rounded unless square ends are  
designated. Parapet will be shown unless designated in plans. Such  
designation may be different for inlet and outlet ends.

Limitations:  
Where the overfill is less than 12", Precast RCB culverts are  
not to be used. Precast RCB culverts are not to be used in siphon  
or pressurized installations unless appropriate "watertight"  
jointing is provided.

Special reinforcement coverage:  
Precast RCB culvert standard plans are not to be used in a  
corrosive environment or where there is a severe abrasive flow  
condition or freeze-thaw locations.

Special design:  
Required for culvert with different conditions, loads or design bearing  
pressures greater than those given on these plans. Required  
for culverts where end details need higher skew angles,  
higher parapets or barrier sections.

**CONSTRUCTION NOTES:**

Cutoff walls:  
4'-0" Cutoff walls are to be provided at inlet and/or  
outlet unless channel is lined and unless otherwise  
shown. These walls are to be extended if scour  
conditions warrant. See Standard Plans D84,  
D85 and D86A.

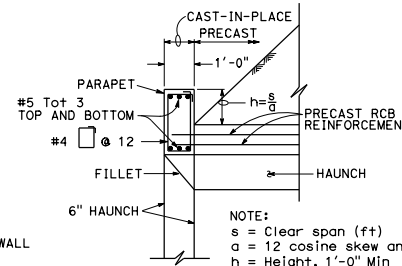
Wingwalls:  
Wingwalls shall be cast-in-place and shall conform to  
standard plan details for box culvert wingwalls. See  
Standard Plans D84, D85 and D86A.

Earthwork:  
See Standard Plan A62G.

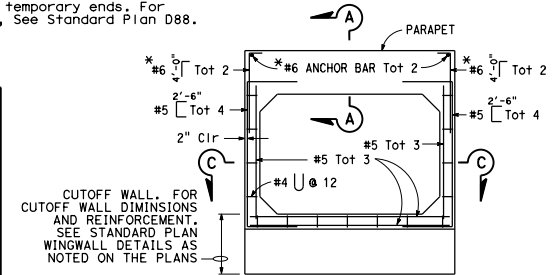
Construction loads:  
Strutting may be required near temporary ends. For  
construction loads on culverts, See Standard Plan D88.

SPAN	PARAPET "P" BARS		
	0° TO 15°	16° TO 30°	31° TO 45°
4'-0"	#5	#5	#5
5'-0"	#5	#5	#6
6'-0"	#6	#6	#6
7'-0"	#7	#7	#7
8'-0"	#7	#7	#8
10'-0"	#8	#8	#9
12'-0"	#9	#9	#10

**BARRIER PARAPET REINFORCEMENT**

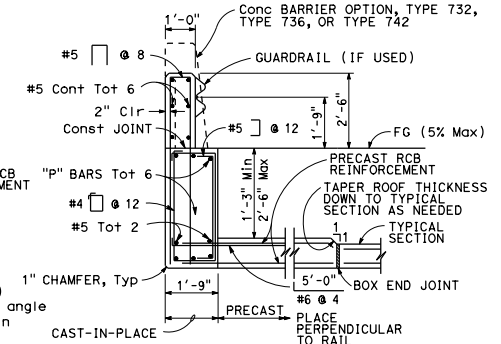


**SECTION A-A**  
(Standard Height Parapet)



**CAST-IN-PLACE END ELEVATION**

\* Reinforcing required for barrier parapet application only.



**SECTION A-A**  
(Barrier Parapet)

**TYPICAL CULVERT END DETAILS**

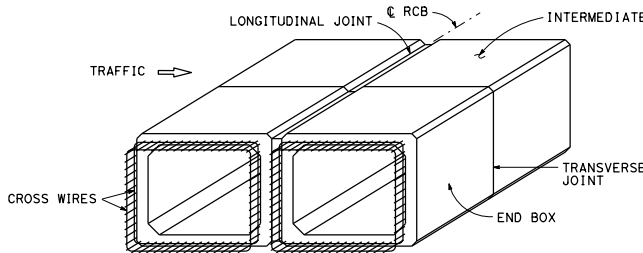
For wall and invert reinforcement not shown, See "End Elevation" detail.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**PRECAST REINFORCED  
CONCRETE BOX CULVERT  
MISCELLANEOUS DETAILS**

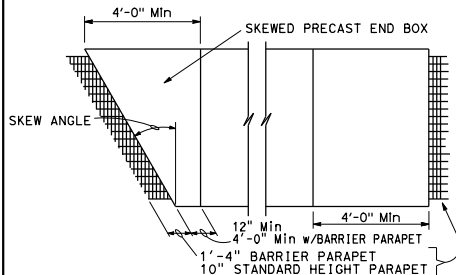
NO SCALE

**D83B**



**PRECAST RCB TERMINOLOGY**

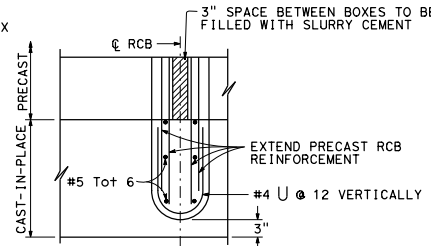
NOTE: Inner and outer reinforcement to be exposed as required to tie to cast-in-place construction. A minimum of two cross wires shall be exposed on all sides.



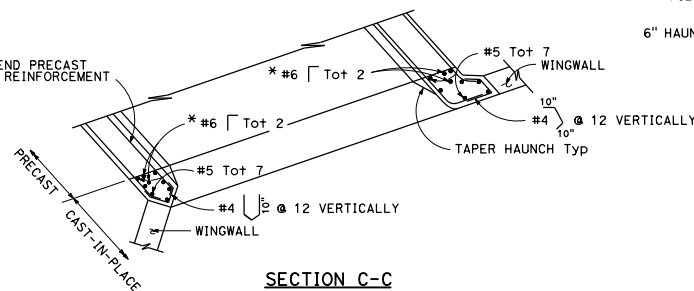
**PARTIAL PLAN VIEW**

For illustrative purposes only.  
For correct skew direction see plans.

**PARTIAL PLAN INTERIOR WALL  
MULTICELL CULVERT**



**PARTIAL PLAN INTERIOR WALL  
MULTICELL CULVERT**

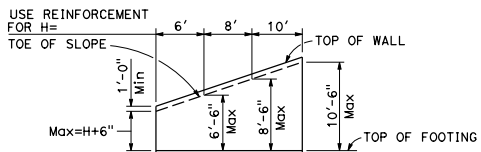


**SECTION C-C**

\* Reinforcing required for barrier parapet application only.

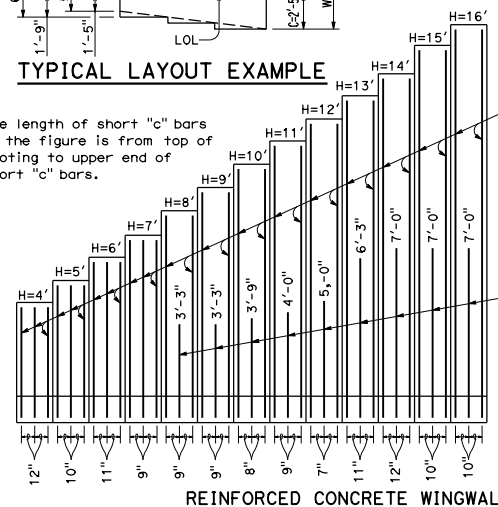
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
October 30, 2015  
PLANS APPROVAL DATE  
No. C59976  
Exp. 6-30-16  
CIVIL  
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**TYPICAL LAYOUT EXAMPLE**

The length of short "c" bars in the figure is from top of footing to upper end of short "c" bars.



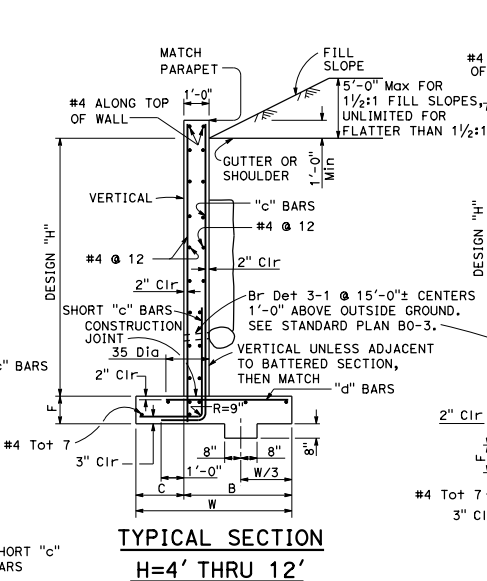
**REINFORCED CONCRETE WINGWALLS**

"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
W	5'-7"	6'-2"	6'-8"	7'-1"	7'-6"	7'-10"	8'-3"	8'-8"	9'-2"	9'-7"	10'-2"	10'-6"	11'-1"
C	1'-5"	1'-7"	1'-9"	1'-11"	2'-1"	2'-3"	2'-5"	2'-8"	2'-10"	3'-1"	3'-4"	3'-6"	3'-8"
B	4'-2"	4'-7"	4'-11"	5'-2"	5'-5"	5'-7"	5'-10"	6'-0"	6'-4"	6'-6"	6'-10"	7'-0"	7'-5"
F	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-3"	1'-5"	1'-5"	1'-6"	1'-6"	1'-8"
BATTER	None						1/2:12						
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6 1/2"	1'-7"	1'-7 1/2"	1'-8"
"c" BARS	#4@12	#4@10	#5@11	#5@9	#6@9	#7@9	#7@8	#8@9	#7@7	#8@11	#9@12	#10@10	#10@10
"d" BARS	#5@12	#5@10	#6@11	#6@9	#6@9	#6@9	#6@9	#7@9	#6@7	#7@11	#8@12	#8@10	#9@10
* Conc CY/LF	0.46	0.52	0.58	0.64	0.69	0.74	0.80	0.88	1.00	1.25	1.37	1.45	1.61
* Reinf LB/LF	26	32	41	50	59	70	81	95	102	99	120	156	171

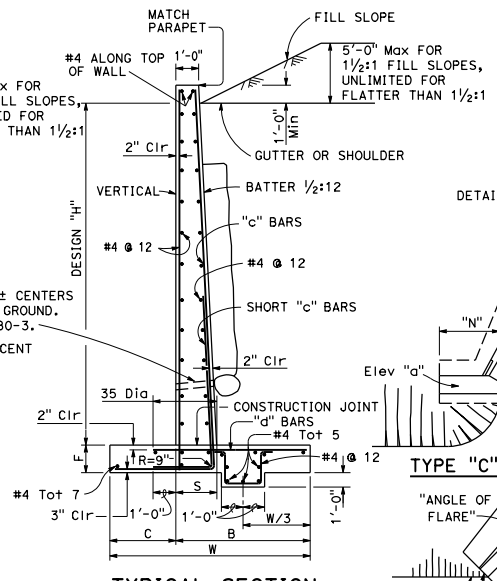
\*\* CASE I qu (ksf), B' (ft) 3.75,2.24 3.66,2.69 3.59,3.11 3.56,3.49 3.52,3.89 3.52,4.21 3.69,4.46 3.77,4.77 3.89,5.17 3.92,5.61 3.92,6.18 4.04,6.40 4.13,6.95  
 \*\* CASE II qu (ksf), B' (ft) 1.16,5.58 1.33,6.13 1.51,6.55 1.69,6.86 1.88,7.16 2.08,7.33 2.29,7.60 2.50,7.86 2.77,8.14 2.97,8.47 3.18,8.93 3.41,9.05 3.70,9.43  
 \*\* CASE III qu (ksf), B' (ft) 1.26,5.46 1.36,5.97 1.49,6.37 1.64,6.66 1.79,6.93 1.95,7.08 2.11,7.33 2.28,7.55 2.50,7.84 2.66,8.12 2.81,8.59 3.00,8.69 3.22,9.10

B'=B-(2) eccentricity, B' is the effective footing width.  
 \* Quantities include 1'-0" extension above the design "H" limit.  
 \*\* Soil bearing pressure shown in the table is the equivalent uniform pressure per AASHTO LRFD - 11.6.3.2

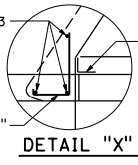
**NOTES:**  
 Unit Stresses: f'c=3,600 psi, fy=60,000 psi  
 Earth density: 120 pcf  
 Equivalent fluid pressure: 36 pcf  
 Elevations, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field.  
 Dimensions "H","L","M","N", Elevation "a" and "Angle of flare" (as applicable) are shown on the plans.  
 Wall height may be exceeded by 6" before going to next greater "H".  
 Eliminate cutoff wall if adjacent channel is paved and skew is 20° maximum.  
 For wall offset values, see Standard Plan B3-5.



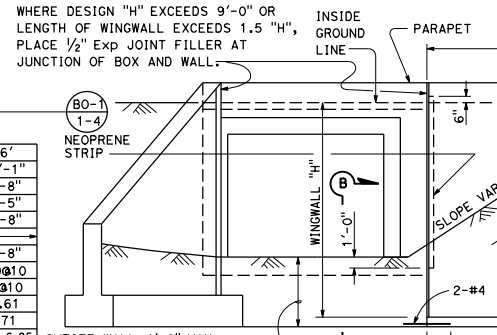
**TYPICAL SECTION H=4' THRU 12'**



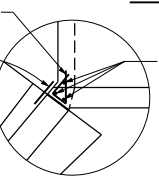
**TYPICAL SECTION H=13' THRU 16'**



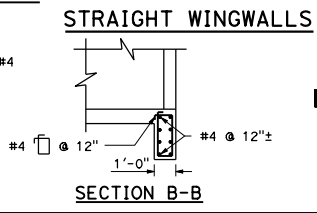
**DETAIL "X"**



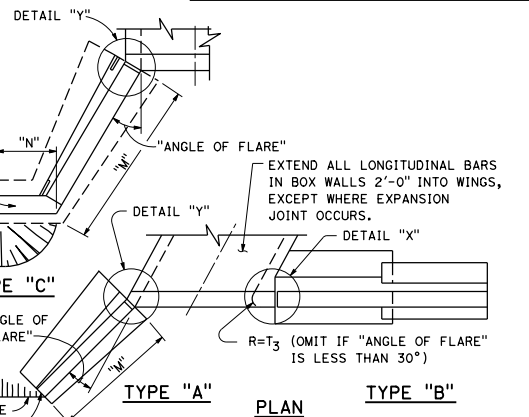
**END ELEVATION TYPE "A"**



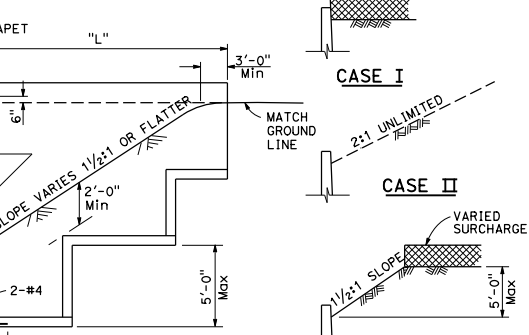
**DETAIL "Y"**



**STRAIGHT WINGWALLS SECTION B-B**



**PLAN TYPE "A" TYPE "B" TYPE "C"**



**DETAIL OF DESIGN LOADING CASES**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**BOX CULVERT WINGWALLS  
 TYPES A, B AND C**

NO SCALE

**D84**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**C. M. DUFF**  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL ENGINEERING PROFESSIONAL SERVICES  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

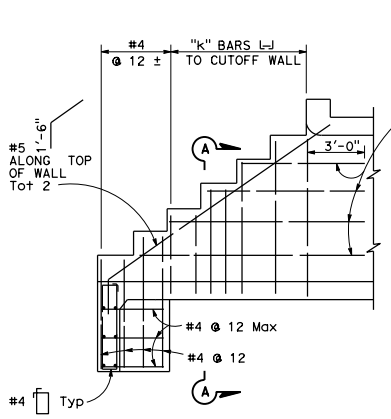
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D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

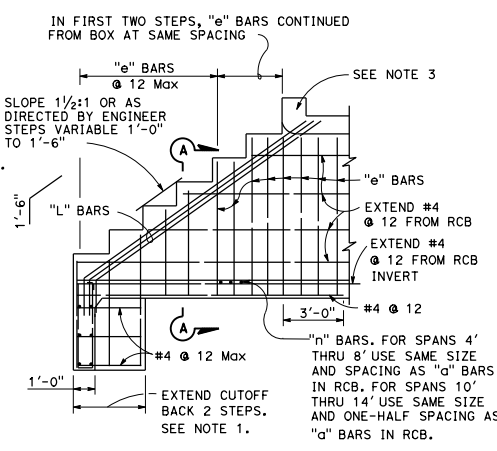
*C.M. Duon*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE  
No. C59876  
Exp. 6-30-16  
CIVIL ENGINEER

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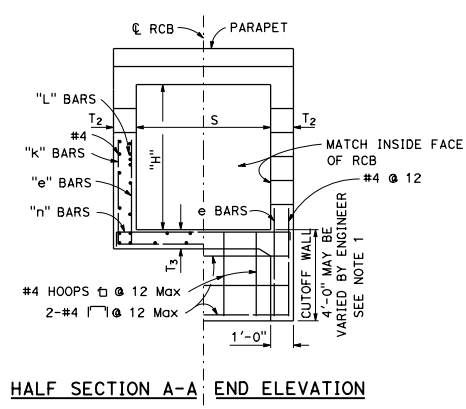


**LONGITUDINAL SECTION**  
Showing reinforcement in outside face



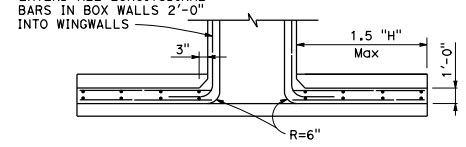
**LONGITUDINAL SECTION**  
Showing reinforcement in inside face

**TYPE "E" STEPPED WINGWALL (SINGLE BOX CULVERT)**

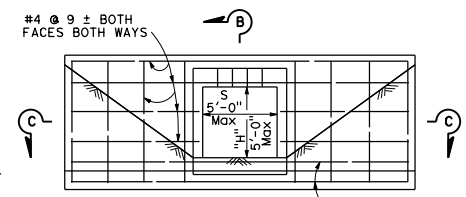


**HALF SECTION A-A END ELEVATION**  
Dimensions S and T<sub>3</sub> to be same as adjacent RCB.  
T<sub>2</sub> = Same as adjacent RCB (8" Min).

**SECTION B-B**



**SECTION C-C**



**ELEVATION**

**TYPE "D" STRAIGHT WINGWALL**

Details similar for multiple span boxes. See Note 3.

**DETAIL OF DESIGN LOADING CASES - TYPE "D" STRAIGHT WINGWALL**

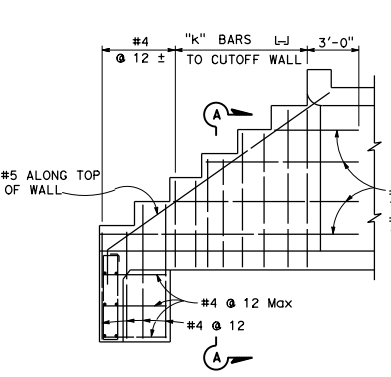
- Case I Level + 240 psf surcharge
- Case II 2:1 sloping ground with no surcharge
- Case III 1 1/2:1 limited slope (5'-0" Max height) + 240 psf surcharge

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

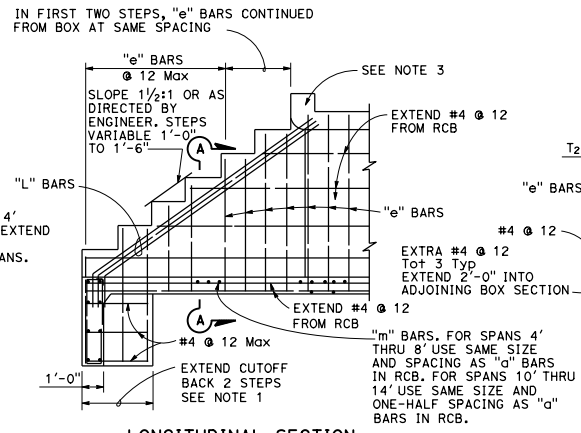
**BOX CULVERT WINGWALLS  
TYPES D AND E**

NO SCALE

**D85**

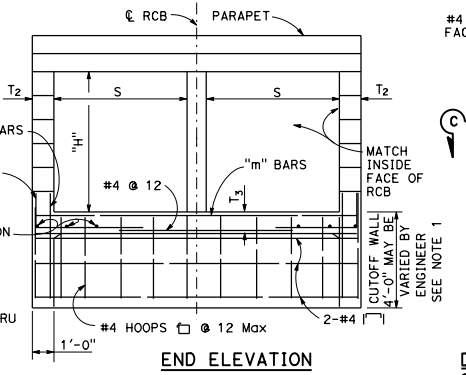


**LONGITUDINAL SECTION**  
Showing reinforcement in outside face



**LONGITUDINAL SECTION**  
Showing reinforcement in inside face

**TYPE "E" STEPPED WINGWALL (MULTIPLE BOX CULVERT)**



**END ELEVATION**  
Dimensions S and T<sub>3</sub> to be same as adjacent RCB.  
T<sub>2</sub> = Same as adjacent RCB (8" Min).

**NOTES:**

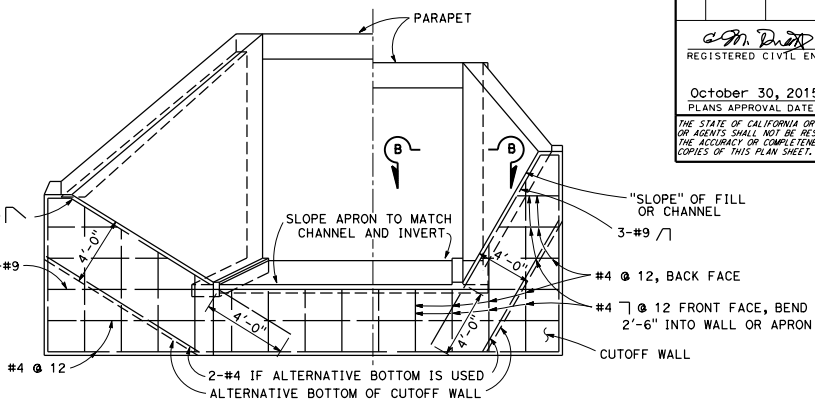
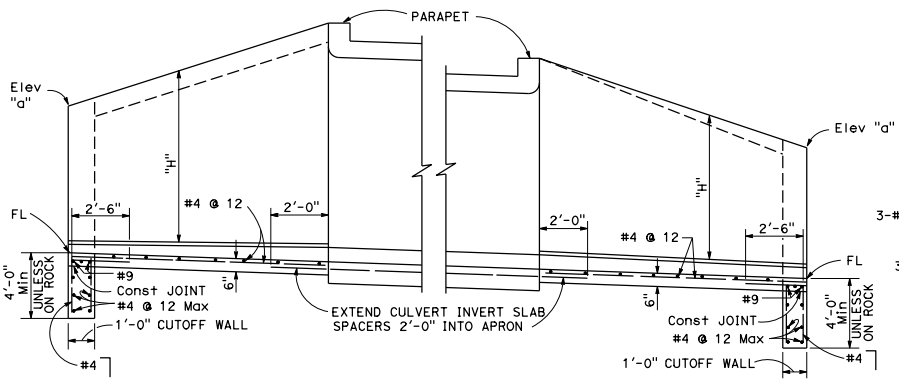
- Eliminate cutoff walls if adjacent channel is paved.
- For "h" not shown use reinforcement for next greater height.
- For parapet details not shown see Standard Plan D82.

TABLE OF REINFORCEMENT FOR TYPE "E" WINGWALLS									
"H" (SEE NOTE 2)	3'	4'	5'	6'	7'	8'	10'	12'	14'
"k" BARS	BAR No. #4	#4	#5	#5	#5	#5	#5	#5	#5
	SPACING @ 12	@ 12	@ 12	@ 10	@ 9	@ 8	@ 7	@ 5	@ 4
"L" BARS	BAR No. #5	#5	#6	#6	#7	#7	#7	#7	#7
	NUMBER EACH WALL	2	2	3	3	3	3	3	3

Dist	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	No.	SHEETS

*C.M. Durr*  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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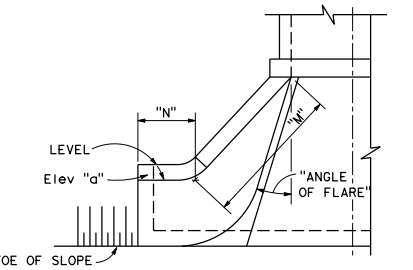


TYPICAL WITH STIFFENING BEAM TYPICAL WITHOUT STIFFENING BEAM  
PART LONGITUDINAL SECTION

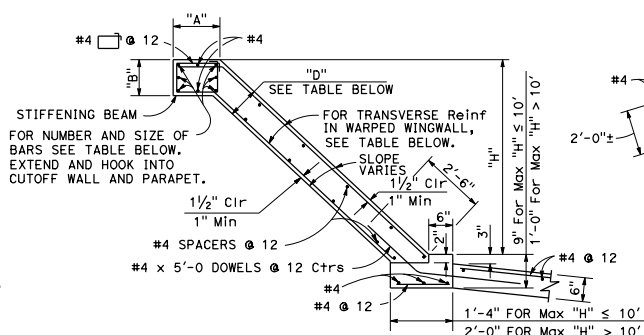
END ELEVATION



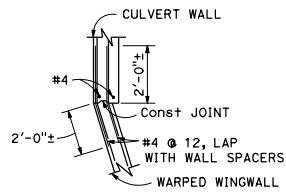
WITHOUT STIFFENING BEAM



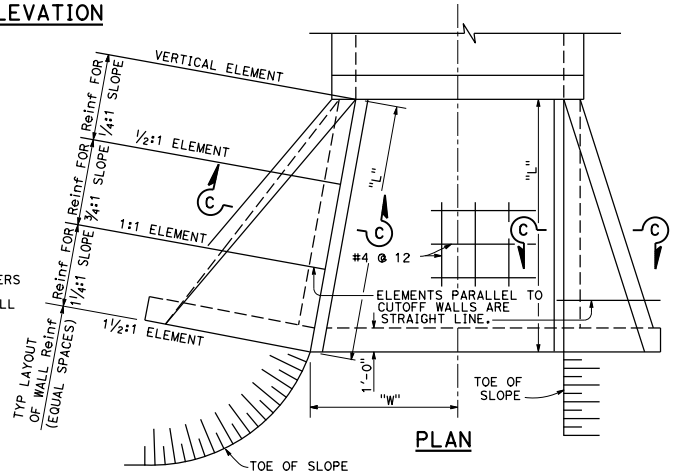
ALTERNATIVE WARPED WINGWALL  
Use where additional protection to toe of embankment is required.



SECTION C-C



SECTION B-B



PLAN

ELEMENT SLOPE	WALL DIMENSIONS AND REINFORCING								STIFFENING BEAM DIMENSIONS AND REINFORCING									
	"H"	8' OR LESS	10'	12'	14'	16'	18'	20'	"H" Max	"H" Min	12'	14'	16'	18'	20'	25'	30'	35'
1/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 7	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6	6"	8"	NO BEAM. PLACE 2-#6 IN EACH FACE ALONG TOP OF WALL.							
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	8"	10"	"B" = 9"							
3/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 8	#4 @ 8	#4 @ 8	#4 @ 6	#4 @ 6	10"	12"	"A" = 1'-6"							
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 6	#5 @ 8	12"	14"	"A" = 1'-10"							
1 1/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	14"	16"	TOTAL 6-#6							
	REAR FACE Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 6	#6 @ 7	#6 @ 6	#7 @ 6	16"	18"	"B" = 1'-0"							
"D" AT CUTOFF WALL	6"	6"	6"	7 1/2"	8"	9 1/2"	11"		18"	20"	"B" = 1'-3"							
"D" AT CULVERT	6"	6"	6"	8"	9 1/2"	11"	1'-1"				"A" = 2'-2"							
											TOTAL 8-#8							
											TOTAL 8-#9							

**NOTES:** Walls designed for 2'-0" surcharge; earth density = 120 pcf; equivalent fluid pressure = 36 pcf. Vary "D" of warped wall uniformly from that at cutoff wall to that at culvert, for maximum "H" > 12'-0". Where abrasion is anticipated increase apron thickness to 7" minimum to provide 2" minimum reinforcement coverage. Dimensions "L", "W", "H", "M", "N", "Elevation "a", "Angle of flare", and end "Slope" (as applicable) are shown on the plans.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**BOX CULVERT  
WARPED WINGWALLS**

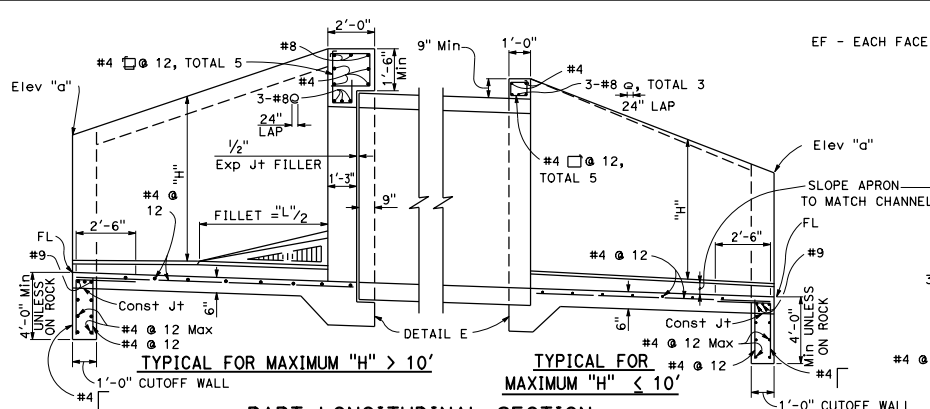
NO SCALE

**D86A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

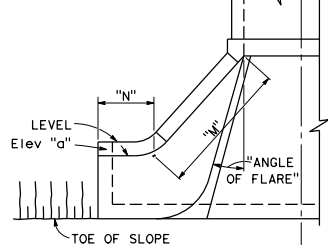
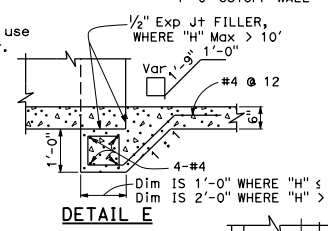
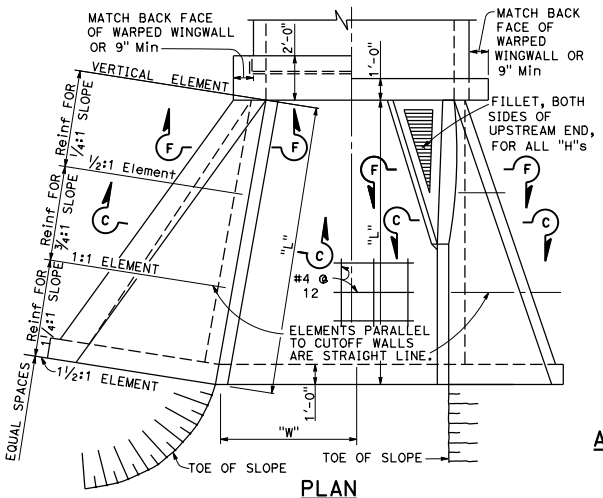
**C. M. DUFF**  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL ENGINEER PROFESSIONAL SEAL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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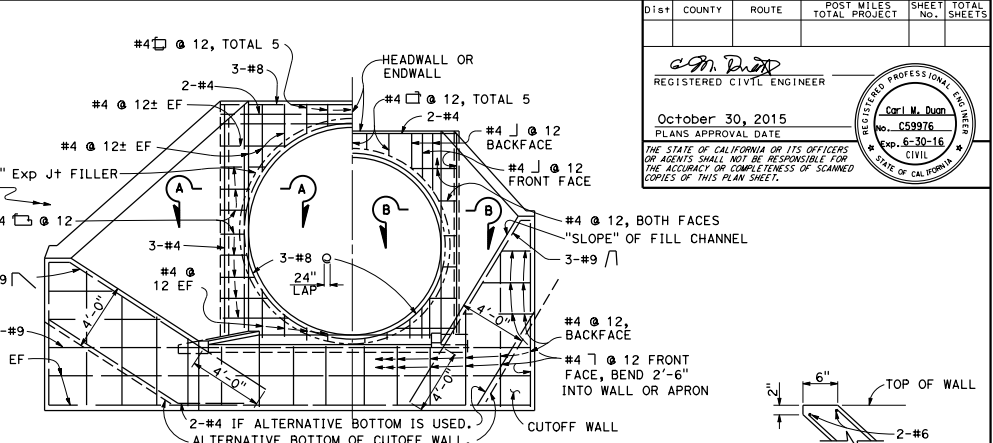


**NOTE:** PART LONGITUDINAL SECTION

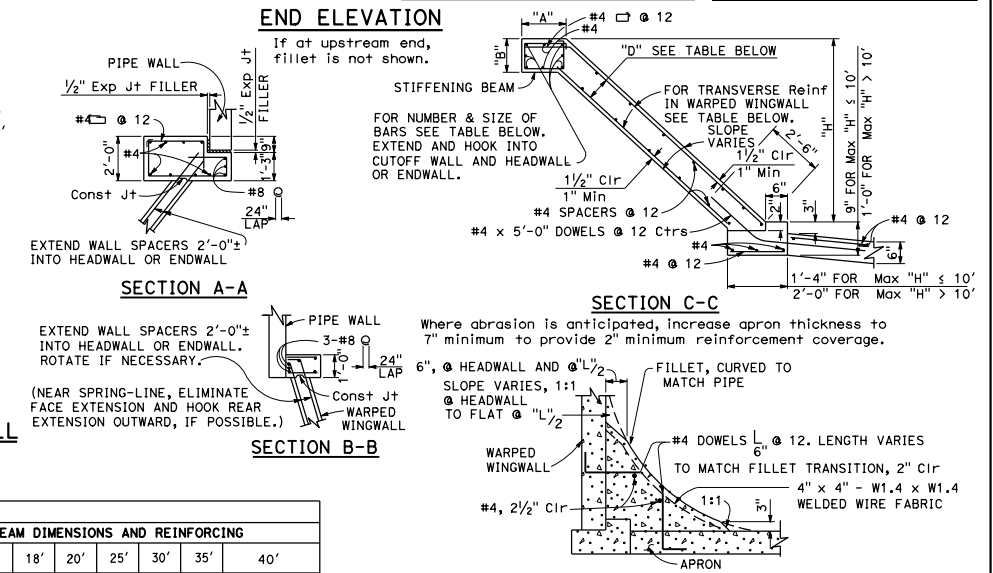
RCP shown. Metal pipe similar except eliminate the expansion joint and use hook bolts @ 1'-7" ± spacing. Size and length provided by manufacturer.



Use where additional protection to toe of embankment is required. If at upstream end, fillet is not shown.



**TYPICAL FOR MAXIMUM "H" > 10'** **TYPICAL FOR MAXIMUM "H" ≤ 10' WITHOUT STIFFENING BEAM**



ELEMENT SLOPE	WALL DIMENSIONS AND REINFORCING							STIFFENING BEAM DIMENSIONS AND REINFORCING									
	"H" 8' OR LESS	10'	12'	14'	16'	18'	20'	"H" MAX	12'	14'	16'	18'	20'	25'	30'	35'	40'
1/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 7	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6	6'	NO BEAM. PLACE 2-#6 IN EACH FACE ALONG TOP							
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	8'	OF WALL, "A" = 1'-0"							
3/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 8	#4 @ 8	#4 @ 8	#4 @ 6	#4 @ 6	10'	"B" = 9"	"A" = 1'-6"						
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 6	#5 @ 8	12'	"A" = 1'-6"	"A" = 1'-10"						
1 1/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	14'	TOTAL 6-#6	"B" = 1'-0"	"B" = 1'-3"	"A" = 2'-2"				
	REAR FACE Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 6	#6 @ 7	#6 @ 6	#7 @ 6	16'	TOTAL 6-#7	TOTAL 8-#8	"B" = 1'-6"					
"D" AT CUTOFF WALL	6"	6"	6"	7 1/2"	8"	9 1/2"	11"	18"									
"D" AT CULVERT	6"	6"	6"	8"	9 1/2"	11"	1'-1"	20"									

**NOTES:** Walls designed for 2'-0" surcharge; earth density = 120 pcf; equivalent fluid pressure = 36 pcf. Vary "D" of warped wall uniformly from that at cutoff wall to that at headwall or endwall, for maximum "H" > 12'-0". Dimensions "L", "W", "H", "M", "N", "Angle of flare", and end "Slope" (as applicable) are shown on the plans.

**PIPE CULVERT HEADWALLS, ENDWALLS AND WARPED WINGWALLS**

NO SCALE

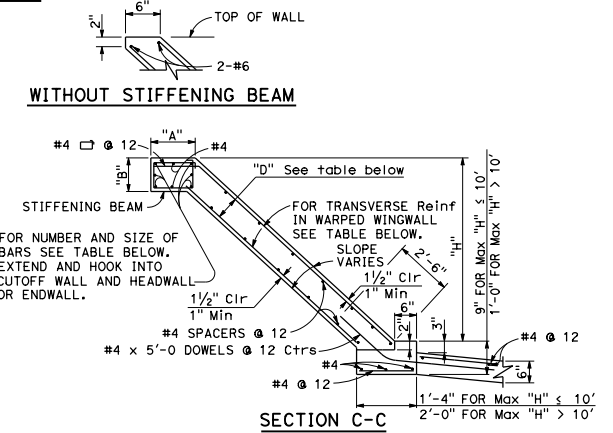
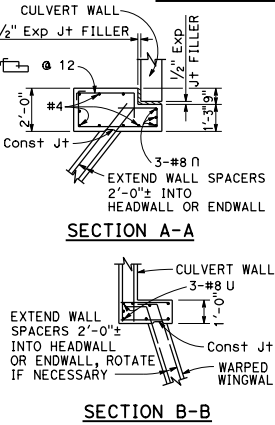
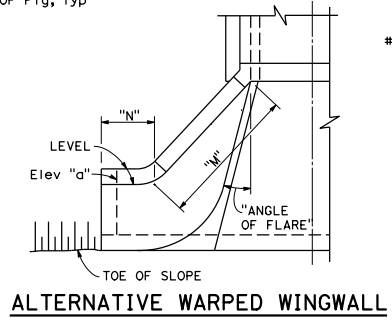
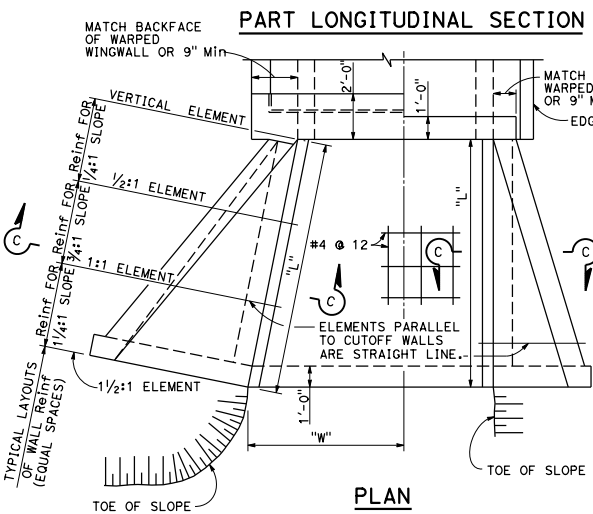
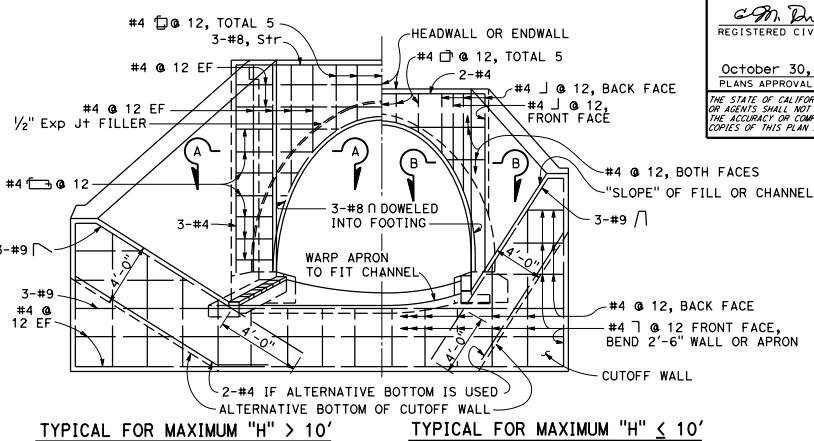
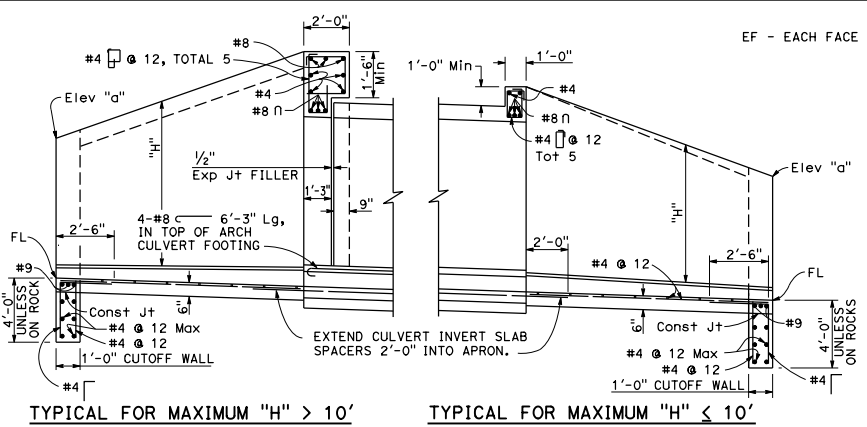
**D86B**



Dist	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	NO. SHEETS

*C.M. Dunn*  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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		WARPED WINGWALLS							STIFFENING BEAM DIMENSIONS AND REINFORCING								
ELEMENT SLOPE	"H"	WALL DIMENSIONS AND REINFORCING							"d" Max	STIFFENING BEAM DIMENSIONS AND REINFORCING							
		8' OR LESS	10'	12'	14'	16'	18'	20'		12'	14'	16'	18'	20'	25'	30'	35'
1/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 7	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6	6'	NO BEAM. PLACE 2-#6 IN EACH FACE ALONG TOP OF WALL.							
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12		#4 @ 12	8'	"A" = 1'-0"					
3/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 8	#4 @ 8	#4 @ 8	#4 @ 6	#4 @ 6	10'	"B" = 9"							
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 6	#5 @ 8		12'	"A" = 1'-6"						
1 1/4:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	14'	"B" = 1'-0"							
	REAR FACE Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 6	#6 @ 7	#6 @ 6	#7 @ 6		16'	"A" = 1'-10"						
"d" AT CUTOFF WALL		6"	6"	6"	7 1/2"	8"	9 1/2"	11"	18'	TOTAL 6-#6		TOTAL 8-#8		TOTAL 8-#9			
"d" AT CULVERT		6"	6"	6"	8"	9 1/2"	11"	1'-1"	20'								

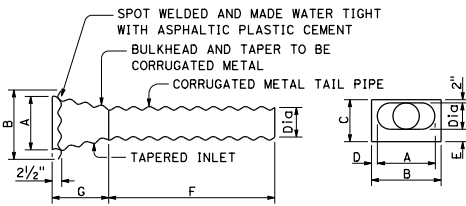
**NOTES:**  
 Walls designed for 2'-0" surcharge; earth density = 120 pcf; equivalent fluid pressure = 36 pcf.  
 Vary "d" of warped wall uniformly from that at cutoff wall to that at headwall or endwall, for maximum "H" > 12'.  
 Dimensions "L", "W", "H", "M", "N", "Elev "a", "Angle of flare", and "Slope" (as applicable) are shown on the plans.

Where abrasion is anticipated, increase apron thickness to 7" minimum to provide 2" minimum reinforcement coverage.

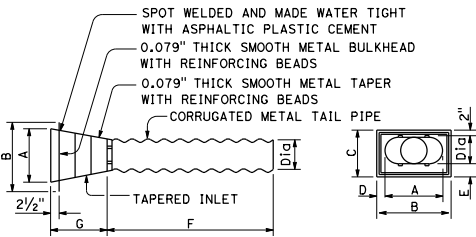
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ARCH CULVERT  
 HEADWALLS, ENDWALLS  
 AND WARPED WINGWALLS**

NO SCALE

**D86C**



**PLAN** **END VIEW**  
Bulkhead and taper of same thickness as tail pipe with 0.079" maximum. Tail pipe of same thickness as downdrain pipe.  
**ENTRANCE TAPER - TYPE 1**  
**ALTERNATIVE A**



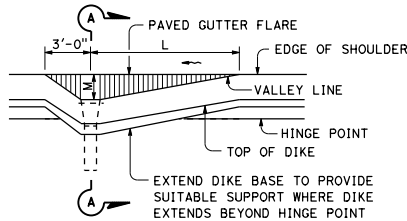
**PLAN** **END VIEW**  
Tail pipe of same thickness as downdrain pipe.  
**ENTRANCE TAPER - TYPE 1**  
**ALTERNATIVE B**

CMP dimensions as tabulated below

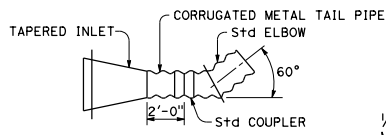
P	10"	15"	18"	21"	27"
Q	8"	12"	15"	18"	24"

Slip joint to be same thickness as downdrain pipe.

Dia	Min L	M	N
8"	10'-0"	1'-6"	8"
12"	15'-0"	1'-8"	1'-0"
15"	25'-0"	2'-0"	1'-3"
18"	30'-0"	2'-6"	1'-4"
24"	40'-0"	3'-0"	1'-6"



**PLAN**  
**MOUNTABLE DIKE TYPE 1**

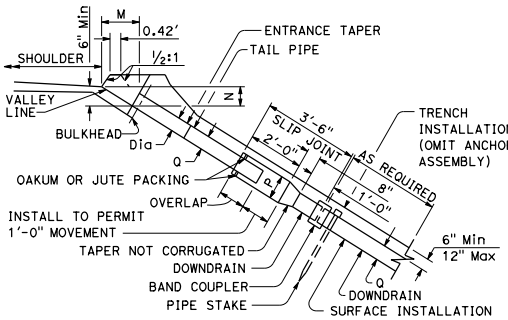


Tapered inlet of same construction and dimensions as Type 1 - Alternative A or B except tail pipe length will be 2'-0".  
**ENTRANCE TAPER - TYPE 2**

Taper joints may be welded or riveted. Dimensions to be as tabulated below for Type 1 Alternatives A and B.

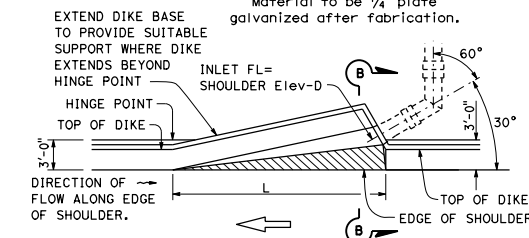
Dia	A	B	C	D	E	F	G
8"	1'-4"	2'-1 1/2"	1'-3"	4 3/4"	5"	6'-0"	2'-0"
12"	1'-6"	2'-1 1/2"	1'-7"	3 3/4"	5"	6'-0"	2'-0"
15"	1'-9"	2'-6"	1'-11"	4 1/2"	6"	6'-0"	2'-0"
18"	2'-0"	2'-10"	2'-3"	5"	7"	6'-0"	2'-0"
24"	2'-10"	3'-10"	2'-11"	6"	9"	4'-0"	4'-0"

**ENTRANCE TAPER - TYPE 1**  
**ALTERNATIVE A AND B**



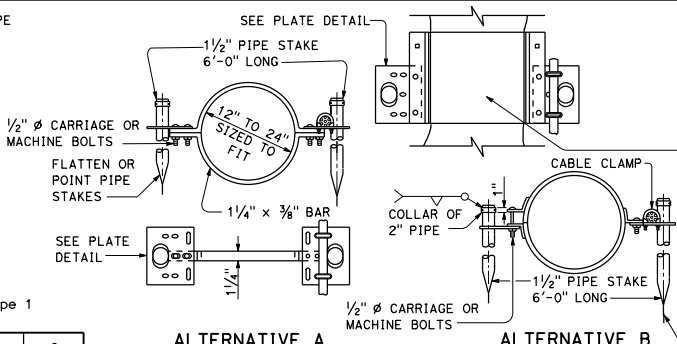
**SECTION A-A TYPE 1**

- NOTES:**
1. Cable, slip joint or anchor assembly to be used when specified.
  2. Slip joint to be omitted when completely buried.
  3. Slip joint for Type 1 entrance taper shown. Type 2 similar.



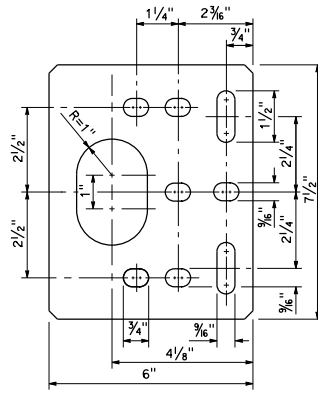
**PLAN**  
**MOUNTABLE DIKE TYPE 2**  
(For use on full freeway sections ONLY with grades of 2% or greater)

**ENTRANCE TAPER AND PIPE DOWNDRAIN**



**ALTERNATIVE A**  
**ALTERNATIVE B**  
**CORRUGATED METAL PIPE DOWNDRAIN ANCHOR ASSEMBLY**

Cable and cable clamps to be used when required by the Special Provisions.



**PLATE DETAIL**

Material to be 1/4" plate galvanized after fabrication.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
Bruce D. Swager  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE

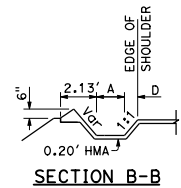
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

- 12" ANNULAR COUPLING BAND
- HELICAL COUPLING BAND
- TWO PIECE INTEGRAL FLANGE DIE FORMED BAND FOR HELICAL CORRUGATED STEEL PIPE
- FLATTEN OR POINT PIPE STAKES

**NOTES:**

1. Either Alternative A or Alternative B anchor assemblies and pipe stakes may be used at Contractor's option for corrugated steel pipe or corrugated aluminum pipe. Alternative A anchor assembly only to be placed in annular corrugation. Alternative A anchor assembly may be placed on annular coupling band if securely fastened on downstream side of joint. Alternative B anchor assembly to be fastened to pipe sections and not to a band coupler used to join sections.
2. For cable anchorage system details, see Standard Plan D87C.

Dia D	Min L
8"	15'
12"	20'
15"	30'
18"	35'
24"	45'

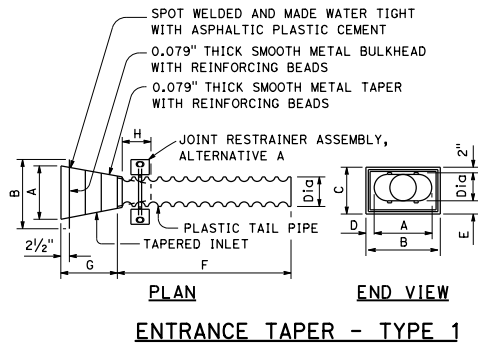


**SECTION B-B**

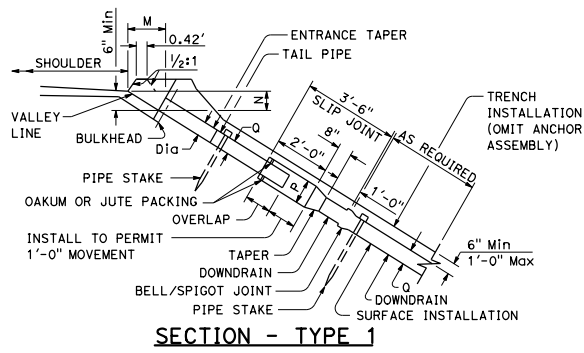
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CORRUGATED METAL PIPE DOWNDRAIN DETAILS**

NO SCALE

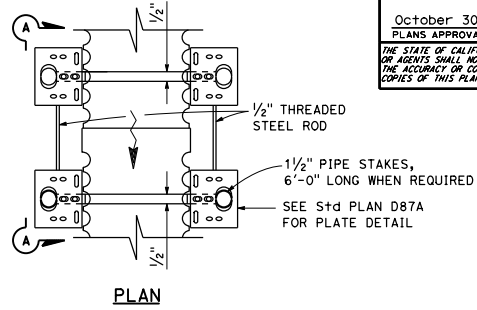
**D87A**



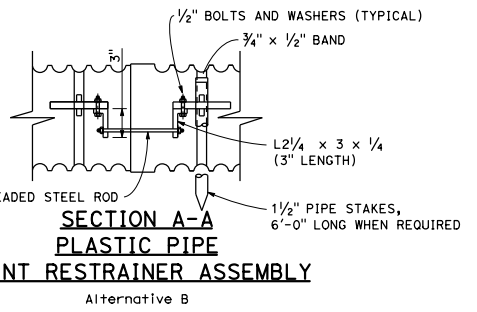
**ENTRANCE TAPER - TYPE 1**



**SECTION - TYPE 1**



**PLAN**



**SECTION A-A  
PLASTIC PIPE  
JOINT RESTRAINER ASSEMBLY**

Alternative B

**NOTES:**

1. Cable or slip joint to be used when specified.
2. Slip joint to be omitted when completely buried.

**PLASTIC PIPE DIMENSIONS AS TABULATED BELOW.**

P	10"	15"	18"	21"	27"
Q	8"	12"	15"	18"	24"

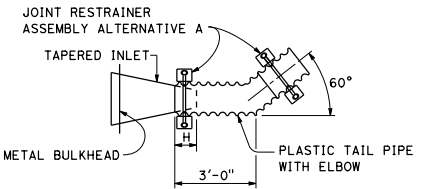
  

Dia	Min L	M	N
8"	10'-0"	1'-6"	8"
12"	15'-0"	1'-8"	1'-0"
15"	25'-0"	2'-0"	1'-3"
18"	30'-0"	2'-6"	1'-4"
24"	40'-0"	3'-0"	1'-6"

**TAPER JOINTS MAY BE WELDED OR RIVETED. DIMENSIONS TO BE AS TABULATED BELOW.**

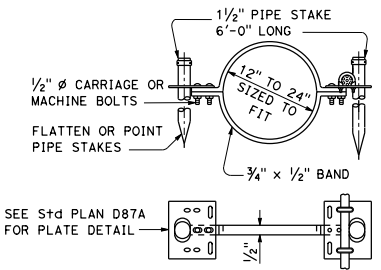
Dia	A	B	C	D	E	F	G	H
8"	1'-4"	2'-1 1/2"	1'-3"	4 3/4"	5"	6'-0"	2'-0"	1'-0"
12"	1'-6"	2'-1 1/2"	1'-7"	3 3/4"	5"	6'-0"	2'-0"	1'-0"
15"	1'-9"	2'-6"	1'-11"	4 1/2"	6"	6'-0"	2'-0"	1'-2"
18"	2'-0"	2'-10"	2'-3"	5"	7"	6'-0"	2'-0"	1'-4"
24"	2'-10"	3'-10"	2'-11"	6"	9"	4'-0"	4'-0"	1'-6"

**ENTRANCE TAPER - TYPE 1**



Tapered inlet of same construction and dimensions as type 1.

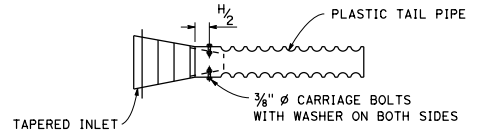
**ENTRANCE TAPER - TYPE 2**



SEE Std PLAN D87A FOR PLATE DETAIL

**PLASTIC PIPE  
JOINT RESTRAINER ASSEMBLY**

Alternative A



**PLAN**

Alternative tail pipe to entrance pipe connection

**DETAIL "A"**  
(See Note 5)

**NOTES:**

1. See Standard Plan D87A for details of entrance taper placement at dike.
2. Pipe stakes to be used with joint restrainer when specified.
3. Entrance taper "H" dimension is length of insertion of metal taper into plastic pipe.
4. For cable anchorage system details, see Standard Plan D87C.
5. At contractors option, tail pipe and tapered inlet may be supplied from manufacturer as a pre-connected unit as shown in Detail "A".

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**PLASTIC PIPE  
DOWNDRAIN DETAILS**

NO SCALE

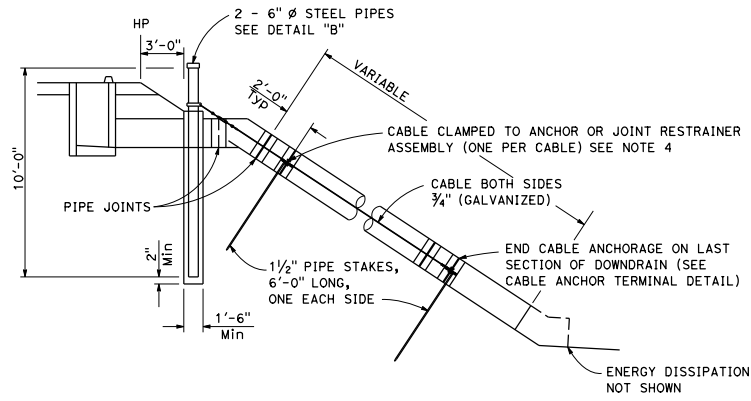
**D87B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

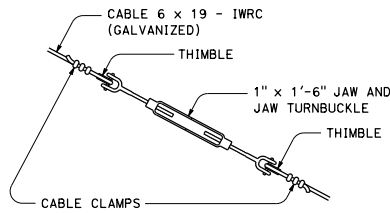
REGISTERED CIVIL ENGINEER  
Bruce D. Swanger  
No. C61257  
PLANS APPROVAL DATE  
October 30, 2015  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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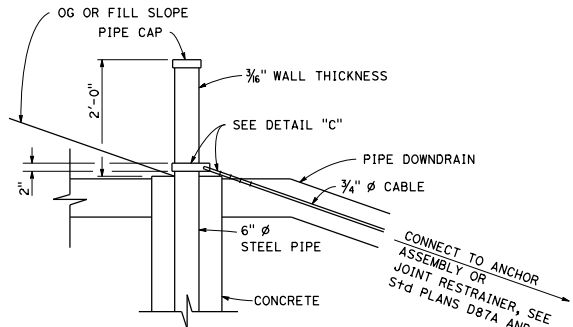




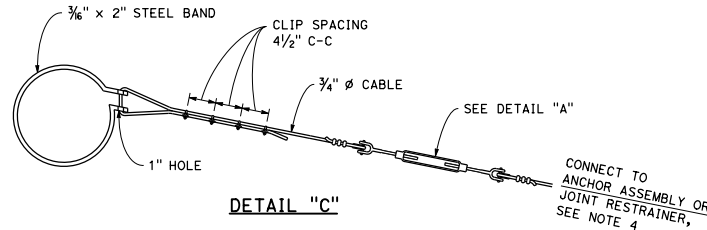
**CABLE ANCHORAGE SYSTEM**



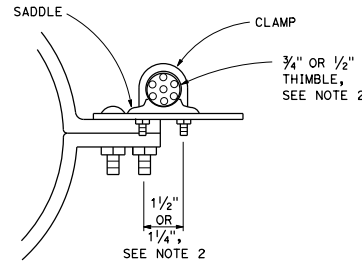
**DETAIL "A"**



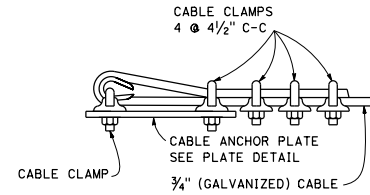
**STEEL PIPE PILE DETAILS FOR CABLE ANCHORAGE SYSTEM**



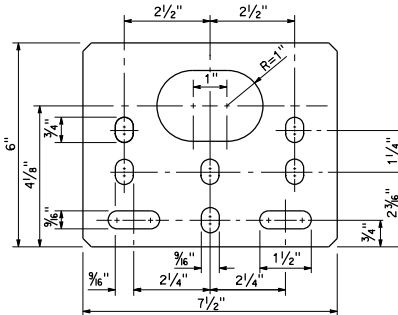
**BAND AND CABLE ASSEMBLY DETAIL FOR CABLE ANCHORAGE SYSTEM**



**END VIEW**



**CABLE ANCHOR TERMINAL DETAIL**



**PLATE DETAIL**

**NOTES:**

1. Diameter of downdrain 24" maximum.
2. 3/4"  $\phi$  cable shown, 1/2"  $\phi$  cable is allowable for pipe downdrain diameters of 8" to 15". Use 1 1/2" dimension for 3/4" cable and 1 1/4" dimension for 1/2" cable.
3. Slip joints not shown.
4. See Standard Plan D87A for Corrugated Metal Pipe Downdrain Anchor Assembly. See Standard Plan D87B for Plastic Pipe Joint Restrainer Assembly.
5. Cable shall not contact soil in finished position. Either adjust position, or replace affected portion of cable with galvanized steel rod of equivalent diameter.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CABLE ANCHORAGE SYSTEM**

NO SCALE

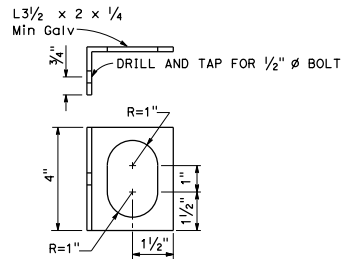
**D87C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

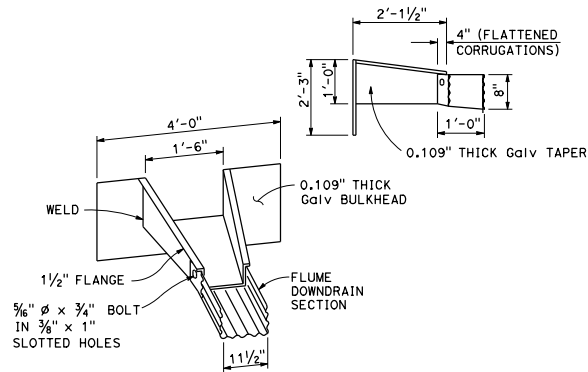
REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

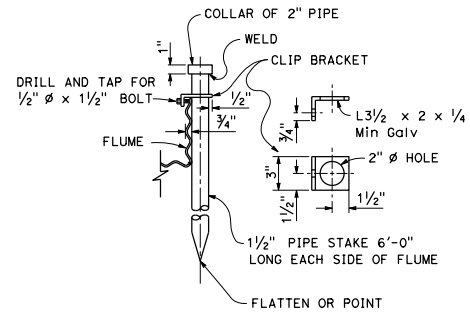
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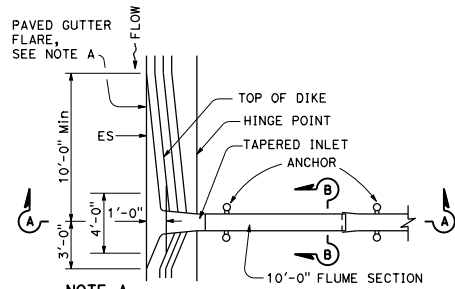
**ALTERNATIVE CLIP BRACKET DETAIL**



**TAPERED INLET**



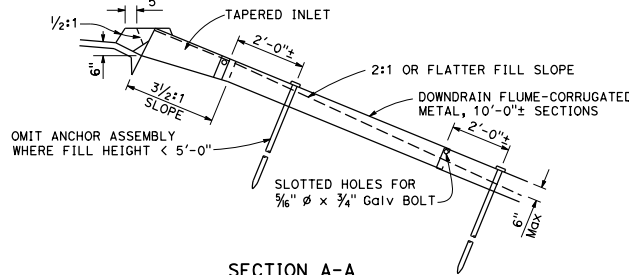
**PIPE STAKE ANCHOR DETAIL**



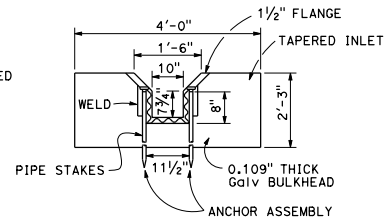
**NOTE A**  
In sag location, use 10'-0" length of paved gutter flare on both sides of inlet.

**PLAN**

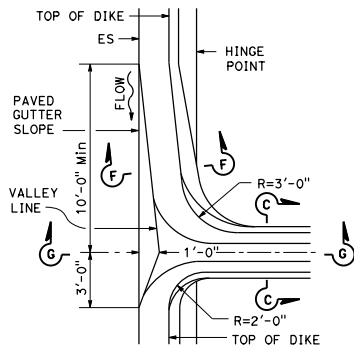
**TAPERED INLET AND FLUME DOWNDRAIN**



**SECTION A-A**



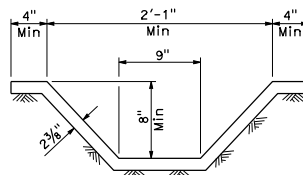
**SECTION B-B**



**PLAN**

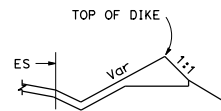
**MOUNTABLE DIKE**

**HOT MIX ASPHALT OVERSIDE DRAINS**

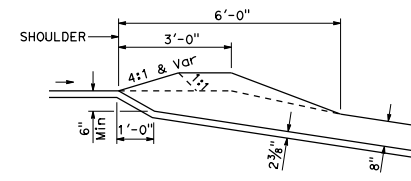


**SECTION C-C**

**NOTE:**  
1. Cross section of slope ditch may be semicircular, vee or trapezoidal.



**SECTION F-F**



**SECTION G-G**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERSIDE DRAINS**  
NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
*Bruce D. Swanger*  
October 30, 2015  
PLANS APPROVAL DATE  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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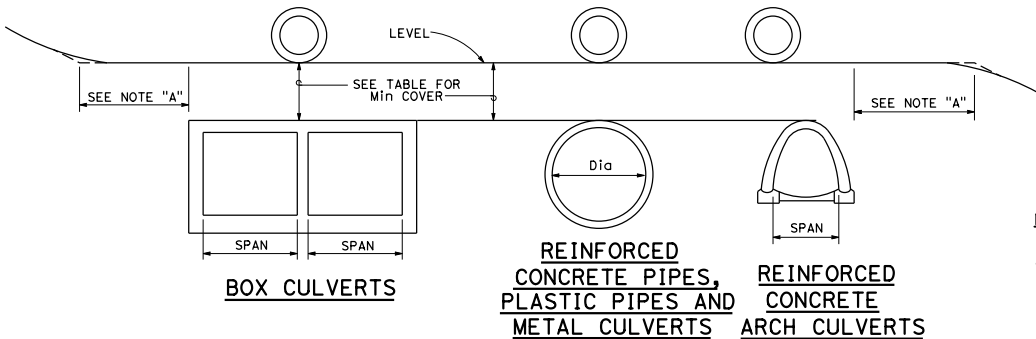
**TABLE OF MINIMUM COVER AND STRUTTING REQUIREMENTS FOR CONSTRUCTION LOADS**

	TYPE				18-50 k AXLE		50-75 k AXLE		75-110 k AXLE		110-150 k AXLE	
	MAXIMUM DESIGN FILL	SPAN	CELLS	Min COVER	STRUTS REQUIRED	STRUT SIZE AND SPACING	STRUTS REQUIRED	STRUT SIZE AND SPACING	STRUTS REQUIRED	STRUT SIZE AND SPACING	STRUTS REQUIRED	STRUT SIZE AND SPACING
BOX CULVERTS	10'-0" AND 20'-0"	4'-0" TO 8'-0"	SINGLE AND MULTIPLE	5'-0"	---	---	---	---	---	---	---	---
	10'-0"	10'-0" TO 14'-0"	SINGLE AND MULTIPLE	5'-0"	---	---	1/3 Points	STRUTS 6" x 6" @ 3'-6" SILLS 6" x 8"	1/3 Points	STRUTS 6" x 8" @ 3'-6" SILLS 6" x 8"	1/3 Points	STRUTS 6" x 8" @ 3'-6" SILLS 6" x 8"
	20'-0"	10'-0" TO 14'-0"	SINGLE AND MULTIPLE	5'-0"	---	---	---	---	---	---	---	---

**TABLE OF MINIMUM COVER FOR CONSTRUCTION LOADS**

TYPE		Dia OR SPAN	18-50 k AXLE	50-75 k AXLE	75-110 k AXLE	110-150 k AXLE
REINFORCED CONCRETE CULVERTS	PIPES	Dia 12" TO 39"	2'-0"	3'-0"	3'-0"	3'-0"
		Dia 42" TO 108"	$\frac{Dia}{1.75}$ OR 3'-0"	$\frac{Dia}{1.75}$ OR 3'-0"	$\frac{Dia}{1.75}$ OR 3'-0"	$\frac{Dia}{1.75}$ OR 3'-0"
	ARCHES	SPANS TO 14'-0"	$\frac{SPAN}{2.5}$ OR 4'-0"	$\frac{SPAN}{2.5}$ OR 4'-0"	$\frac{SPAN}{2.5}$ OR 4'-0"	$\frac{SPAN}{2.5}$ OR 4'-0"
		SPANS 15'-0" TO 22'-0"	$\frac{SPAN}{3.5}$ OR 6'-0"	$\frac{SPAN}{3.5}$ OR 6'-0"	$\frac{SPAN}{3.5}$ OR 6'-0"	$\frac{SPAN}{3.5}$ OR 6'-0"
METAL CULVERTS	PIPES	Dia TO 120"	$\frac{Dia}{1.75}$ OR 4'-0"	$\frac{Dia}{1.75}$ OR 4'-0"	$\frac{Dia}{1.75}$ OR 4'-0"	$\frac{Dia}{1.75}$ OR 4'-0"
		Dia OVER 120"	$\frac{Dia}{3}$ OR 6'-0"	$\frac{Dia}{3}$ OR 6'-0"	$\frac{Dia}{3}$ OR 6'-0"	$\frac{Dia}{3}$ OR 6'-0"
	PIPE ARCHES	All Spans	$\frac{SPAN}{3}$ OR 4'-0"	$\frac{SPAN}{3}$ OR 4'-0"	$\frac{SPAN}{3}$ OR 4'-0"	$\frac{SPAN}{3}$ OR 4'-0"
	STRUCTURAL PLATE PIPE, ARCHES AND VEHICULAR UNDERCROSSINGS	ALL SPANS	$\frac{SPAN}{3}$ OR 5'-0"	$\frac{SPAN}{3}$ OR 5'-0"	$\frac{SPAN}{3}$ OR 5'-0"	$\frac{SPAN}{3}$ OR 5'-0"
	PLASTIC PIPE	Dia 12" TO 60"	$\frac{Dia}{1.75}$ OR 4'-0"	$\frac{Dia}{1.75}$ OR 4'-0"	$\frac{Dia}{1.75}$ OR 4'-0"	$\frac{Dia}{1.75}$ OR 4'-0"

**NOTE:** Minimum cover shall be the greater value of alternatives shown. The diameter and spans shown in the table to calculate the minimum cover (Example:  $\frac{Dia}{1.75}$ ) is the diameter or span of the facility expressed in number of feet.

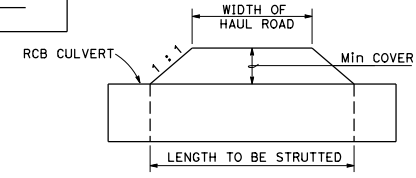


**NOTE "A"**  
Minimum distance equals 3 times the span or 3 times the diameter.

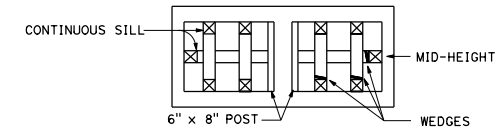
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*C. M. Dunn*  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**MINIMUM LENGTH OF STRUTTING**



**RCB STRUTTING DETAILS**

**NOTES:**

Length of strutting to be determined by the Engineer, but shall not be less than as shown in the sketch above.

- Assumed tire patterns:
- 50 k axle 2'-0" x 1'-6"
  - 75 k axle 3'-0" x 2'-0"
  - 110 k axle 3'-0" x 2'-5"
  - 150 k axle 3'-0" x 3'-0"

Impact = 10%

Sills to be glue-laminated or solid timber.

For strutting requirements of Structural Steel Plate Vehicular Undercrossing, Structural Steel Plate Arches and Structural Steel Plate Pipes during construction, see Standard Plan D88A.

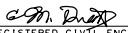
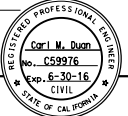
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONSTRUCTION LOADS  
ON CULVERTS**

NO SCALE

**D88**

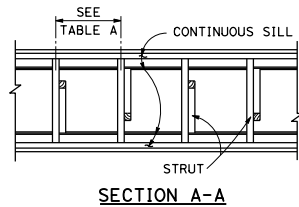
203

2015 STANDARD PLAN D88

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					
					

**TABLE A**

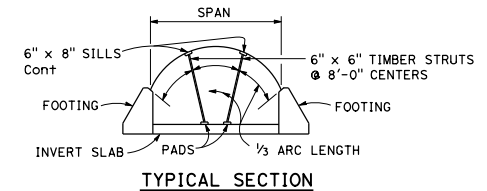
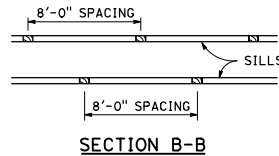
PIPE Dia	STRUT SIZE	HEIGHT OF FILL	
		0 TO 20'-0"	GREATER THAN 20'-0"
240" THRU 252"	8" x 8"	5'-0" SPACING	3'-0" SPACING
	10" x 10"	8'-0" SPACING	4'-6" SPACING



**TABLE B**

SPAN	STRUT SIZE	SILL SIZE
13'-2" - 15'-6"	4" x 4"	4" x 6"
15'-9" - 17'-3"	4" x 4"	4" x 8"
Over 17'-3"	6" x 6"	6" x 8"

Tabular data in Table B based on 6" x 2" corrugations, (Structural steel plate).

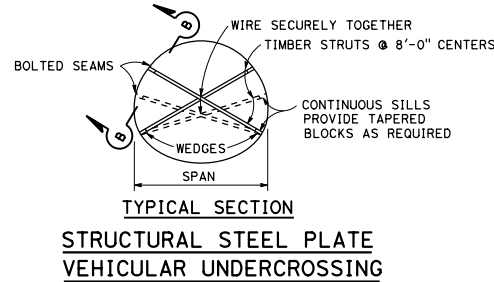
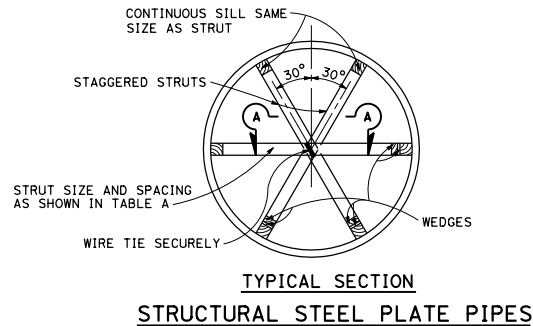


**STRUCTURAL STEEL PLATE ARCHES**

Struts required when span of structural steel plate arch exceeds 18'-0" pad size as directed by Engineer.

**NOTES:**

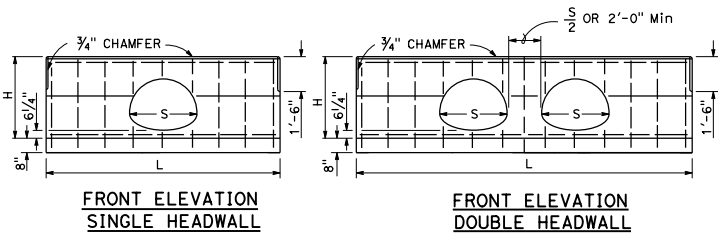
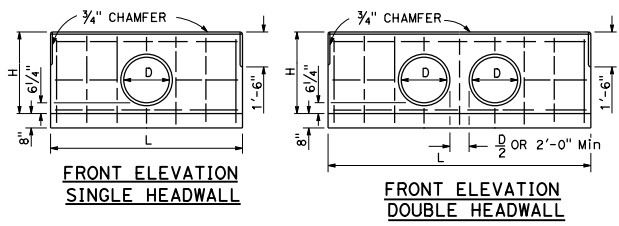
1. Struts shown are minimum required during construction when construction vehicle loading exceeds 32 kip/axle, and minimum cover is less than that shown for metal culverts in the table on Standard Plan D88.
2. Backfill shall be brought up uniformly on both sides of the structure.
3. For minimum cover over structure for construction loads, see Standard Plan D88.
4. Strut all situations where overfill is removed in an unbalanced manner.



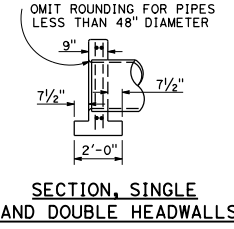
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**STRUT DETAILS FOR**  
**STRUCTURAL STEEL PIPES,**  
**ARCHES AND**  
**VEHICULAR UNDERCROSSING**

NO SCALE

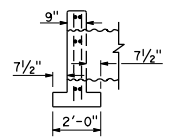
**D88A**



D	H	L	SINGLE		DOUBLE		
			STEEL LB	Conc CY	STEEL LB	Conc CY	
12"	2'-8"	5'-0"	35	0.60	8'-0"	50	0.94
15"	2'-11"	6'-0"	40	0.75	9'-6"	60	1.17
18"	3'-2"	7'-0"	50	0.91	10'-6"	75	1.35
21"	3'-5"	7'-6"	60	1.02	11'-6"	90	1.52
24"	3'-8"	8'-6"	75	1.20	12'-6"	100	1.72
27"	3'-11"	9'-6"	85	1.39	14'-0"	115	2.00
30"	4'-2"	10'-0"	90	1.52	15'-0"	126	2.21
33"	4'-5"	11'-0"	100	1.73	16'-0"	130	2.42
36"	4'-8"	12'-0"	105	1.95	17'-0"	145	2.65
39"	4'-11"	12'-6"	130	2.09	18'-0"	170	2.88
42"	5'-2"	13'-6"	140	2.34	19'-0"	185	3.13
45"	5'-5"	14'-6"	150	2.60	20'-0"	195	3.38
48"	5'-8"	15'-0"	160	2.75	21'-0"	200	3.64
51"	5'-11"	16'-0"	180	3.03	22'-6"	225	4.02
54"	6'-2"	17'-0"	190	3.31	23'-6"	240	4.30



CMP ARCH SIZE	SINGLE				DOUBLE			
	H	L	STEEL LB	Conc CY	L	STEEL LB	Conc CY	
21" x 15"	2'-11"	6'-6"	45	0.80	10'-0"	60	1.22	
24" x 18"	3'-2"	7'-6"	50	0.96	11'-6"	70	1.45	
28" x 20"	3'-4"	8'-6"	60	1.12	13'-6"	90	1.76	
35" x 24"	3'-8"	10'-6"	85	1.47	15'-6"	120	2.16	
42" x 29"	4'-1"	12'-6"	110	1.76	18'-0"	145	2.57	
49" x 33"	4'-5"	14'-6"	130	2.26	21'-0"	170	3.13	
57" x 38"	4'-10"	17'-0"	155	2.81	24'-6"	210	3.86	
64" x 43"	5'-3"	19'-0"	175	3.31	27'-0"	230	4.42	
71" x 47"	5'-7"	21'-0"	195	3.81	30'-0"	255	5.09	

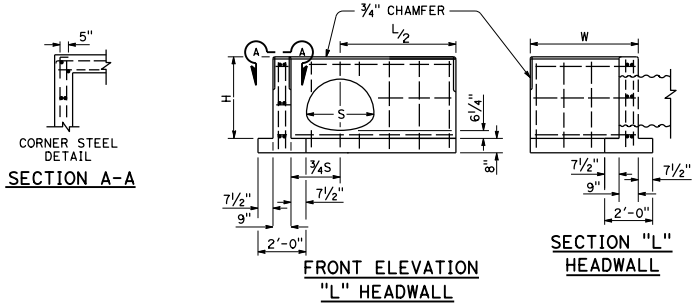
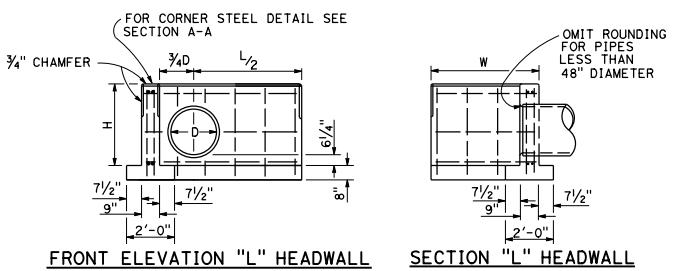


- NOTES:**
- No deduction made in quantities for thickness of pipe walls.
  - All reinforcing steel #4 bars. All vertical and horizontal tie bars 1'-0" maximum spacing.
  - Length of wall "W" may be varied to suit conditions encountered in the field, and straight line interpolation may be used to calculate quantities.
  - Quantities are for design purposes only.
  - Cable railing to be installed on top of headwall when shown on Project Plans. See Standard Plan B11-47 for cable railing details.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**C. M. Duff**  
 REGISTERED CIVIL ENGINEER  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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D	H	L/2	LENGTH OF W											
			3'-4"		4'-10"		6'-4"		7'-10"		9'-4"			
			STEEL LB	Conc CY	STEEL LB	Conc CY	STEEL LB	Conc CY	STEEL LB	Conc CY	STEEL LB	Conc CY		
12"	2'-8"	2'-6"	50	0.79	60	0.98								
15"	2'-11"	3'-0"	55	0.91	65	1.11								
18"	3'-2"	3'-6"	65	1.04	75	1.25								
21"	3'-5"	3'-9"	75	1.15	90	1.36								
24"	3'-8"	4'-3"	85	1.29	100	1.51	110	1.74						
27"	3'-11"	4'-9"	90	1.44	105	1.67	115	1.91						
30"	4'-2"	5'-0"	95	1.55	110	1.80	120	2.05	135	2.29				
33"	4'-5"	5'-6"	105	1.71	120	1.97	135	2.23	150	2.48				
36"	4'-8"	6'-0"	110	1.88	125	2.15	140	2.41	155	2.68	170	2.95		
39"	4'-11"	6'-3"			150	2.28	170	2.56	185	2.84	200	3.12		
42"	5'-2"	6'-9"			155	2.42	175	2.76	190	3.05	210	3.34		
45"	5'-5"	7'-3"					180	2.97	200	3.27	215	3.57		
48"	5'-8"	7'-6"					190	3.13	215	3.44	230	3.75		
51"	5'-11"	8'-0"						220	3.67	235	3.99			
54"	6'-2"	8'-6"						235	3.91	250	4.24			

CMP ARCH SIZE	H	L/2	LENGTH OF W											
			3'-4"		4'-10"		6'-4"		7'-10"		9'-4"			
			STEEL LB	Conc CY	STEEL LB	Conc CY	STEEL LB	Conc CY	STEEL LB	Conc CY	STEEL LB	Conc CY		
21" x 15"	2'-11"	3'-3"	60	1.00	65	1.18	75	1.38	90	1.58	100	1.77		
24" x 18"	3'-2"	3'-9"	60	1.07	70	1.32	80	1.53	95	1.74	110	1.94		
28" x 20"	3'-4"	4'-3"	70	1.26	80	1.47	90	1.68	100	1.90	115	2.11		
35" x 24"	3'-8"	5'-3"	100	1.51	110	1.74	120	1.97	140	2.20	155	2.42		
42" x 29"	4'-1"	6'-3"	115	1.82	130	2.06	140	2.31	155	2.55	170	2.83		
49" x 33"	4'-5"	7'-3"	130	2.12	145	2.37	155	2.64	170	2.90	185	3.15		
57" x 38"	4'-10"	8'-6"	145	2.52	160	2.79	175	3.07	190	3.35	205	3.61		
64" x 43"	5'-3"	9'-6"	185	2.89	200	3.11	215	3.48	235	3.77	250	4.06		
71" x 47"	5'-7"	10'-6"	200	3.25	215	3.56	235	3.86	250	4.17	270	4.48		

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**PIPE CULVERT HEADWALLS  
 STRAIGHT AND "L"**  
 NO SCALE

**D89**

**RC PIPE DETAILS**

**INLET OUTLET**

**PART PLAN A-A**

**SECTION B-B**

**SECTION C-C**

**SECTION D-D**

**SECTION E-E**

**DETAIL OF DESIGN LOADING CASES**

"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'
W	5'-7"	6'-2"	6'-8"	7'-1"	7'-6"	7'-10"	8'-3"	8'-8"	9'-2"	9'-7"	10'-2"	10'-6"	11'-1"	11'-6"	11'-11"	12'-5"	12'-10"
C	1'-5"	1'-7"	1'-9"	1'-11"	2'-1"	2'-3"	2'-5"	2'-8"	2'-10"	3'-1"	3'-4"	3'-6"	3'-8"	3'-10"	4'-0"	4'-2"	4'-4"
B	4'-2"	4'-7"	4'-11"	5'-2"	5'-5"	5'-7"	5'-10"	6'-0"	6'-4"	6'-6"	6'-10"	7'-5"	7'-8"	7'-11"	8'-3"	8'-6"	
F	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-2"	1'-3"	1'-5"	1'-5"	1'-6"	1'-8"	1'-10"	1'-10"	2'-0"	2'-0"	
D	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	0'-8"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	
BATTER	None																
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6/8"	1'-7"	1'-7/2"	1'-8"	1'-8/2"	1'-9"	1'-9/2"	1'-10"
"c" BARS	#4@12	#4@10	#5@11	#5@9	#6@9	#7@9	#7@8	#8@9	#7@7	#8@11	#9@12	#10@10	#10@10	#10@10	#10@9	#10@9	#11@9
"d" BARS	#5@12	#5@10	#6@11	#6@9	#6@9	#6@9	#6@8	#7@9	#6@7	#7@11	#8@12	#8@10	#9@10	#9@10	#9@9	#9@9	#10@9
* Conc CY/LF	0.459	0.522	0.58	0.635	0.69	0.742	0.797	0.879	0.995	1.247	1.368	1.448	1.611	1.772	1.865	2.043	2.143
* Reinf LB/LF	26	32	41	50	59	70	81	95	102	99	120	156	171	181	190	217	267
** Case I qu (ksf), B' (ft)	3.75,2.24	3.66,2.69	3.59,3.11	3.56,3.49	3.52,3.89	3.52,4.21	3.69,4.46	3.77,4.77	3.89,5.17	3.92,5.61	3.92,6.18	4.03,6.40	4.13,6.95	4.28,7.26	4.39,7.57	4.65,7.82	4.85,8.02
** Case II qu (ksf), B' (ft)	1.16,5.58	1.33,6.13	1.51,6.55	1.69,6.86	1.88,7.16	2.08,7.33	2.29,7.60	2.50,7.86	2.77,8.14	2.97,8.47	3.18,8.93	3.41,9.05	3.70,9.43	4.02,9.58	4.26,9.80	4.57,10.04	4.82,10.27
** Case III qu (ksf), B' (ft)	1.26,5.46	1.36,5.97	1.49,6.37	1.64,6.66	1.79,6.93	1.95,7.08	2.11,7.33	2.28,7.55	2.50,7.84	2.66,8.12	2.81,8.59	3.00,8.69	3.22,9.10	3.49,9.18	3.65,9.79	3.89,9.74	4.07,9.96

**REINFORCED CONCRETE WINGWALLS**

**TYPICAL SECTION H=4' THRU 12'**

**TYPICAL SECTION H=13' THRU 20'**

**END ELEVATION STRAIGHT WINGWALLS**

**TYPE A**

**TYPE B**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*C.M. Duff*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Exp. 6-30-16  
CIVIL

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Carli W. Duff  
REGISTERED PROFESSIONAL ENGINEER  
No. C59876

GROUND LINE OR CHANNEL SLOPE

USE HOOK BOLTS @ 1'-7"± SPACING, SIZE AND LENGTH PROVIDED BY MANUFACTURER FOR METAL PIPES ONLY.

2-#6 BARS FOR RC PIPES

#6 @ 12

#6 @ 12

MAY BE VARIED BY THE ENGINEER TO SUIT CONDITIONS IN THE FIELD.

B'=B-(2) eccentricity, B' is the effective footing width.  
\* Quantities include 1'-0" extension above the design "H" limit.  
\*\* Soil pressure shown in the table is the equivalent uniform pressure per AASHTO LRFD - 11.6.3.2

**NOTES:**

Unit Stresses: fy = 60,000 psi  
f'c = 3,600 psi  
Earth density: 120 pcf  
Equivalent fluid pressure: 36 pcf  
Elevation, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field. Wall height may be exceeded by 6" before going to the next greater "H".

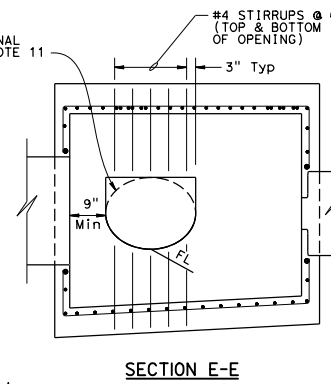
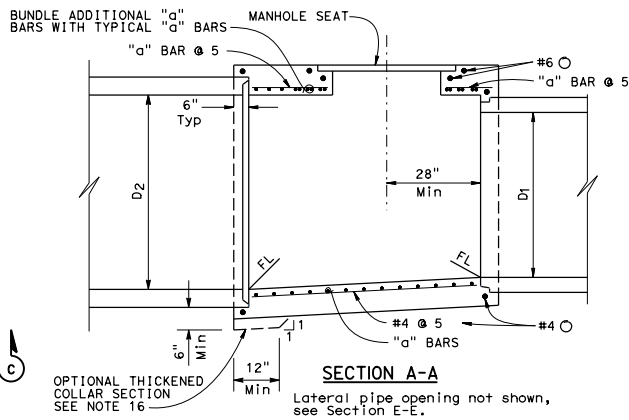
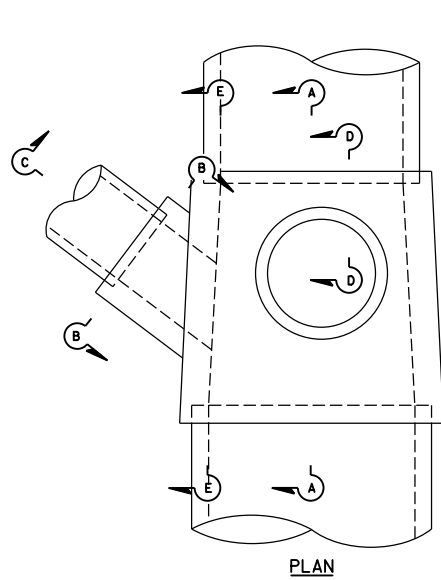
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**PIPE CULVERT HEADWALLS, ENDWALLS AND WINGWALLS TYPES A, B AND C**

NO SCALE

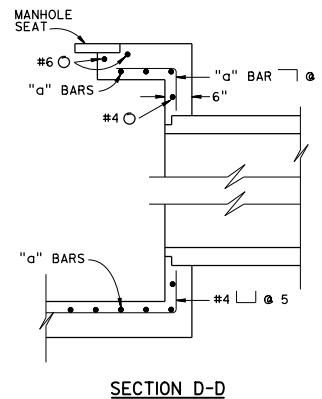
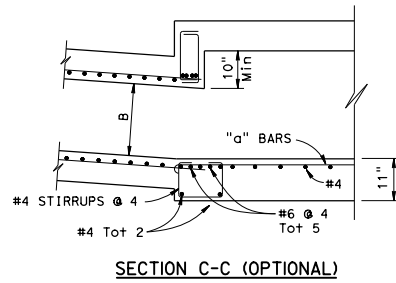
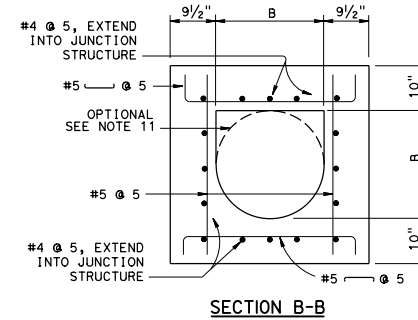
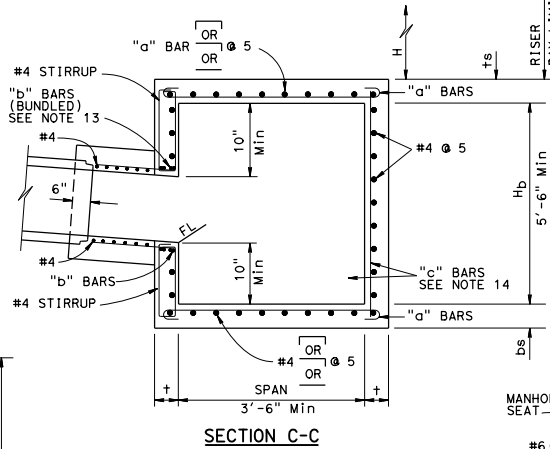
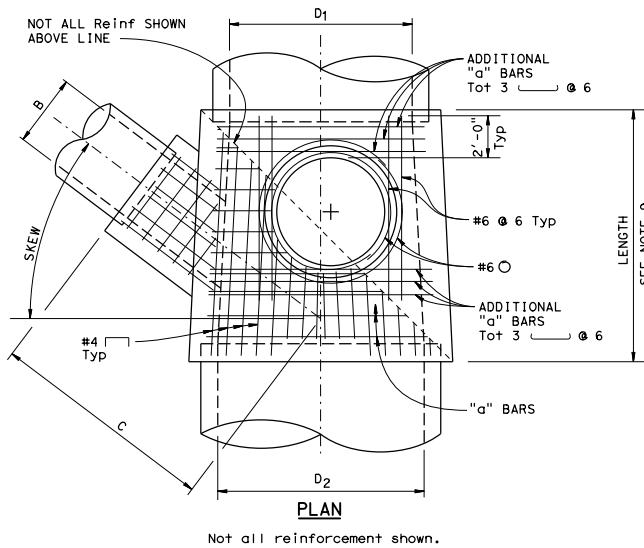
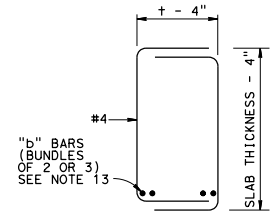
**D90**

For footing step dimensions and reinforcement see "Footing Step" on Std Plan B3-5



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA



For Design Notes, General Notes, Design Tables and additional details, see Standard Plan D91B.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CAST-IN-PLACE REINFORCED CONCRETE JUNCTION STRUCTURE**  
NO SCALE

**D91A**

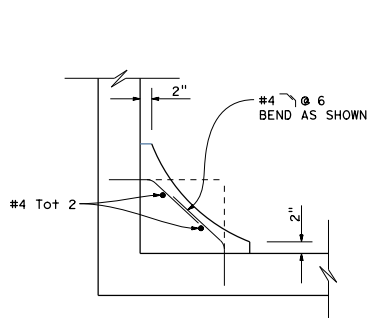


**DESIGN NOTES:**

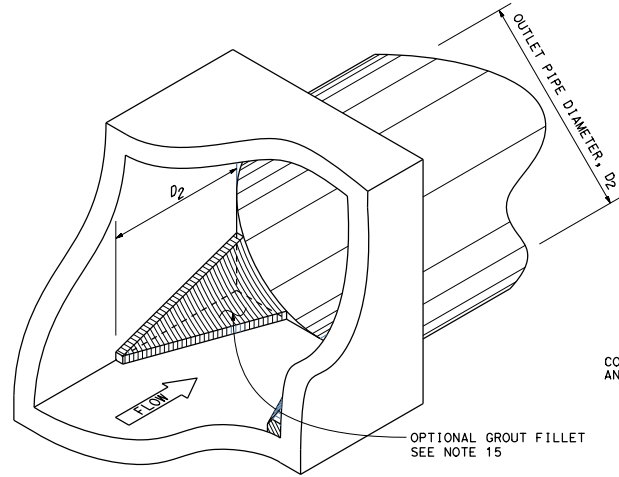
Design Specifications:  
 AASHTO LRFD Bridge Design Specifications,  
 4th Edition with California Amendments.  
 Loading:  
 Live load: (AASHTO LRFD Chapter 3.6.1.2)  
 HL-93 consists of design truck or  
 design tandem and design lane load  
 Impact Factor: (Apply to top slab only)  
 $IM = 33(1.0 - 0.125D_e) \geq 0\%$   
 $D_e$  = minimum depth of earth cover  
 Earth load:  
 Earth pressure for one condition:  
 140 pcf vertical, 100 pcf horizontal  
 Load Factors:  
 AASHTO LRFD Table 3.4.1.1 & Table 3.4.1.2  
 Unit stresses:  
 $f'_c = 3600$  psi  
 $f_y = 60,000$  psi  
 Shear:  
 $V_c = \text{Beta} \sqrt{f'_c} b v d_v$  (Pounds)

**GENERAL NOTES:**

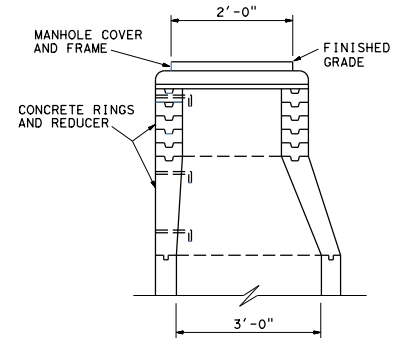
- Risers shall be positioned to either side of the structure as shown.
- Each riser shall have a ladder. For details see Standard Plan D93A.
- Thickness of deck shall vary as necessary to provide a level manhole seat. Hb is equal to the largest inside height dimension between the top and bottom slabs.
- Reinforcing steel shall be placed 2" clear, except as shown.
- Maximum skew of lateral pipe B is 45°.
- Lateral pipe may be placed in either side wall.
- Where D<sub>1</sub> or D<sub>2</sub> is less than 3.5', clear distance between side walls shall be 3.5'. Where D<sub>1</sub> or D<sub>2</sub> is less than 5.5', Hb shall be 5.5'. D<sub>1</sub> and D<sub>2</sub> limited to 10' maximum diameter. End walls shall be 6" thick with #4 @ 12 placed both ways.
- Side walls shall be flush with the inside of the inlet and outlet pipes when pipe diameters are 3.5' or more. Span is equal to the largest inside width dimension between the side walls.
- Length is 5'-0" minimum.
- When C is not specified, bring the lateral pipe directly into the wall of the structure.
- When C is specified, the Contractor may, at his option, bring the lateral pipe directly into the wall for use as an inside form. A collar conforming with the wall thickness and reinforcement as shown in section B-B shall be poured around the pipe.
- When the lateral pipe is extended directly into the wall, it shall be mitered as necessary to be flush with wall.
- "b" bars shall extend a minimum of 8" on either side of the opening.
- Adjacent to each side of the opening, place additional reinforcement equivalent to half the interrupted main reinforcement.
- Optional fillet at outlet pipe placed at the direction of the Engineer.
- Minimum thickness around pipe connections shall be 6". Wall and slab thicknesses may be increased beyond the minimums shown in the design tables or a thickened collar may be added to the local pipe connection area to achieve the minimum thickness. If a thickened collar is used, minimum width shall be one half of the corresponding pipe diameter and centered on the pipe section.



**TYPICAL FILLET SECTION**



**ISOMETRIC FILLET DETAIL**



**TYPE MH  
UPPER STRUCTURE**

SPAN	10.0' Max COVER		20.0' Max COVER	
	"a" BARS	TOP AND BOTTOM SLAB THICKNESS ( ts, bs )	"a" BARS	TOP AND BOTTOM SLAB THICKNESS ( ts, bs )
3.5'	#4 @ 7	14.5"	#4 @ 7	14.5"
4.0'	#4 @ 7	14.5"	#4 @ 7	14.5"
4.5'	#4 @ 6	13.5"	#4 @ 6	13.5"
5.0'	#4 @ 5	12"	#4 @ 5	12"
5.5'	#4 @ 4	10.5"	#4 @ 4	10.5"
6.0'	#4 @ 4	10.5"	#5 @ 5	10.5"
6.5'	#5 @ 6	10"	#5 @ 4.5	10.5"
7.0'	#5 @ 6	10"	#5 @ 4.5	11.5"
7.5'	#5 @ 5.5	10"	#5 @ 4.5	12.5"
8.0'	#5 @ 5	10"	#5 @ 4.5	13.5"
8.5'	#6 @ 5	9.5"	#6 @ 5.5	13.5"
9.0'	#6 @ 4.5	9.5"	#6 @ 5.5	14.5"
9.5'	#6 @ 4.5	10"	#6 @ 5	15.5"
10.0'	#6 @ 4.5	10.5"	#6 @ 5	16.5"

H <sub>b</sub>	10.0' Max COVER		20.0' Max COVER	
	"c" BARS	SIDEWALL THICKNESS ( t )	"c" BARS	SIDEWALL THICKNESS ( t )
5.5'	#4 @ 6	8"	#4 @ 4.5	9.5"
6.0'	#4 @ 5	8"	#5 @ 5.5	9.5"
6.5'	#5 @ 6	8"	#5 @ 4.5	9.5"
7.0'	#5 @ 5	8"	#5 @ 4.5	10"
7.5'	#5 @ 4.5	8"	#5 @ 4.5	11"
8.0'	#5 @ 4	8.5"	#5 @ 4	11.5"
8.5'	#6 @ 5	9"	#6 @ 6	12.5"
9.0'	#6 @ 5	9.5"	#6 @ 5	13"
9.5'	#6 @ 4.5	10"	#6 @ 5	14"
10.0'	#6 @ 4.5	10.5"	#6 @ 5	15"

B	"b" BARS TOP & BOTTOM
2.5'	#5 Tot 4
3.0'	#5 Tot 4
3.5'	#5 Tot 4
4.0'	#5 Tot 4
4.5'	#5 Tot 4
5.0'	#6 Tot 4
5.5'	#6 Tot 6
6.0'	#6 Tot 6

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CAST-IN-PLACE  
 REINFORCED CONCRETE  
 JUNCTION STRUCTURE**  
 NO SCALE

**D91B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Carl M. Duan  
 No. C59976  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

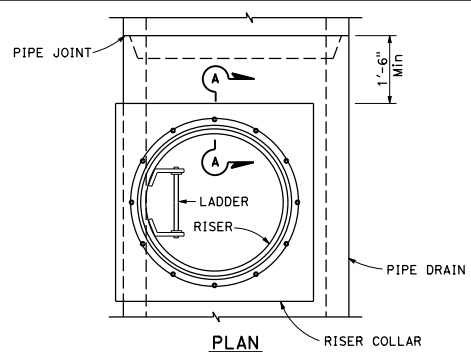
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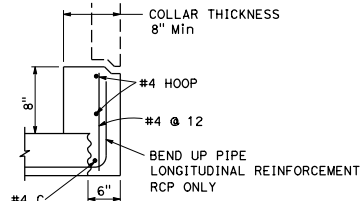
2015 STANDARD PLAN D91B

*Return to Table of Contents*

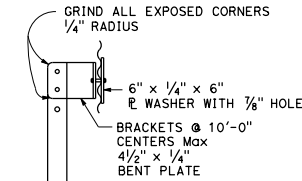
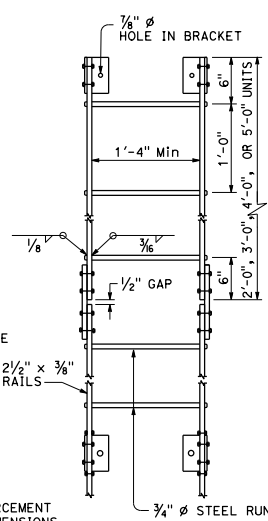




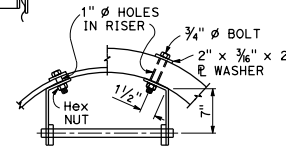
**PLAN**



**SECTION A-A**

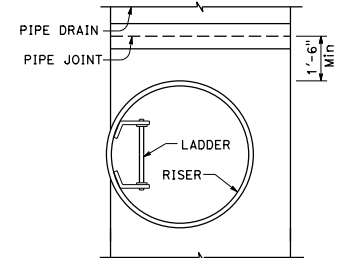


**LADDER SPLICE PLATE**  
2 1/2" x 3/8" x 10"  
See Note 3

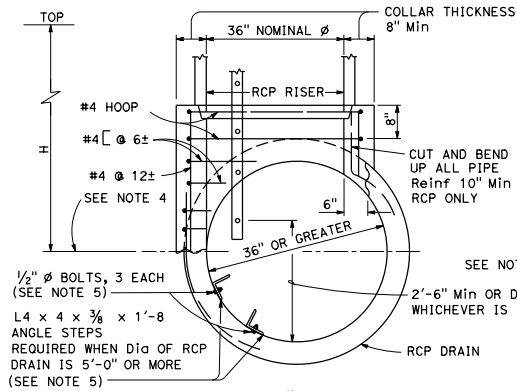


**LADDER CONNECTION TO RISER**

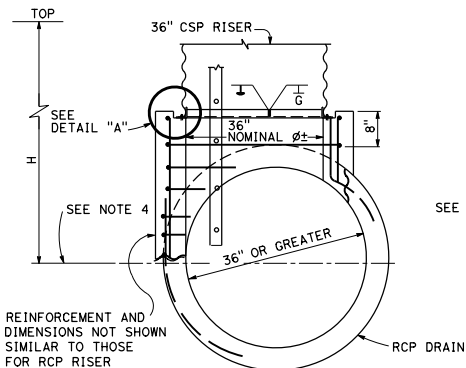
**LADDER DETAILS**  
See Notes 1, 2 and 6



**PLAN**

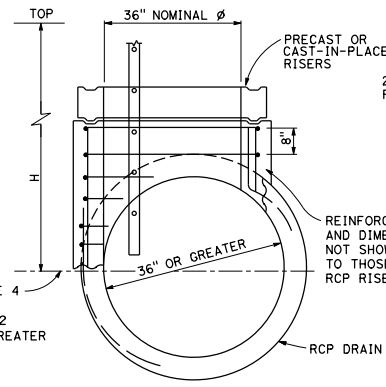


**WITH 36" RCP RISER**

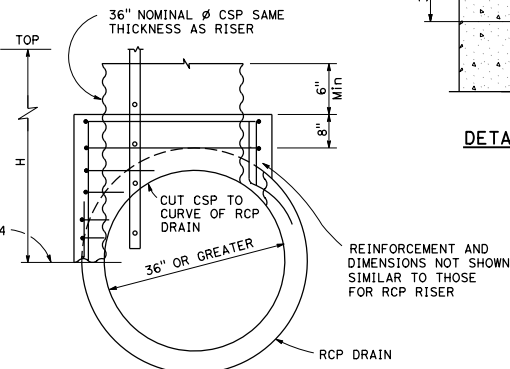


**WITH 36" CSP RISER**

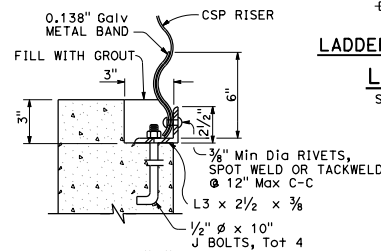
**REINFORCED CONCRETE PIPE DRAIN**



**WITH 36" PRECAST RISERS**



**WITH 36" CSP RISER  
ALTERNATIVE COLLAR DETAIL**



**DETAIL "A"**

**NOTES:**

- Ladder may be constructed in one length at contractor's option on reinforced concrete pipe risers.
- On corrugated steel pipe riser, connect ladder splice plate so joint can compress 1/2".
- Ladder splice plate to be connected with 1/2" bolts with double nuts.
- Pay limit for 36" risers to centerline of cross pipe.
- Where angle steps are required, the lowest angle shall not be more than 1'-0" above the flowline of the drain. The distance between angle steps and between the uppermost angle step and the lowest rung of the ladder shall not exceed 1'-0". Power driven fasteners, equivalent to the 1/2" bolts shown, may be used for fixing the angle steps to the wall of the reinforced concrete pipe drain.
- Install ladder so that the highest rung is not more than 1'-0" below the top of the riser.

STATE OF CALIFORNIA  
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**PIPE RISER CONNECTIONS**



NO SCALE

**D93A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

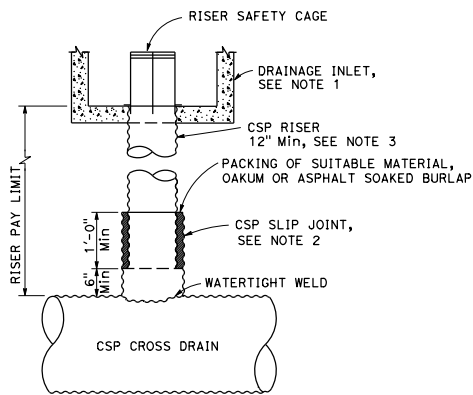
REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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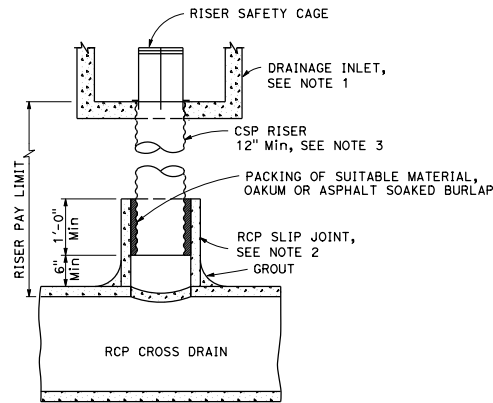
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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**NOTES:**

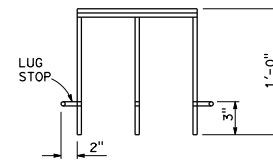
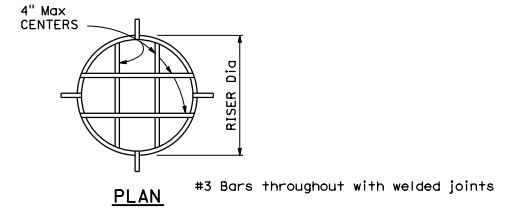
1. Structure at top of riser may be any standard drainage inlet or pipe inlet.
2. Diameter of slip joint to be 3" greater than diameter of riser.
3. Plastic pipe riser may be substituted for CSP riser shown. Slip joint diameter to be as necessary to accommodate plastic pipe outside diameter.
4. For plastic pipe cross drain, use fabricated reducing tee of same material as cross drain as appropriate to provide watertight connection.



**CSP RISER FOR  
DRAINAGE INLET**



**RCP RISER FOR  
DRAINAGE INLET**



**RISER SAFETY CAGE DETAIL**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DRAINAGE INLET  
RISER CONNECTIONS**

NO SCALE

**D93B**

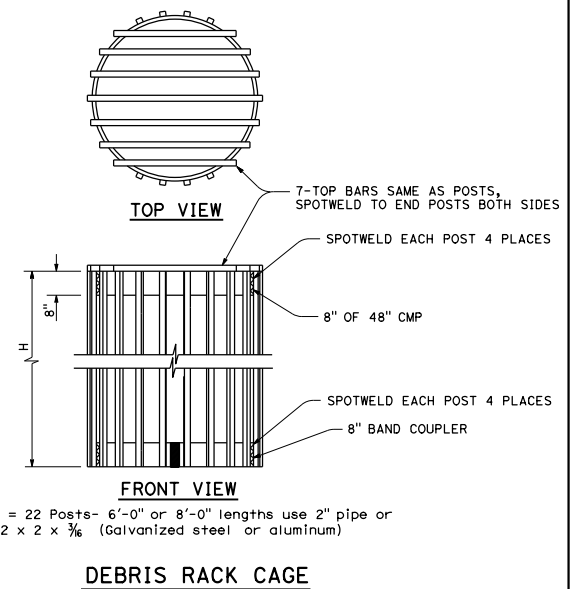
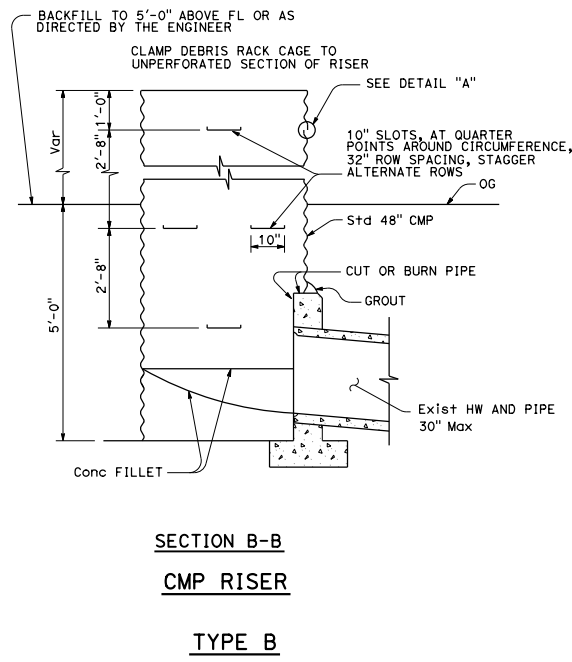
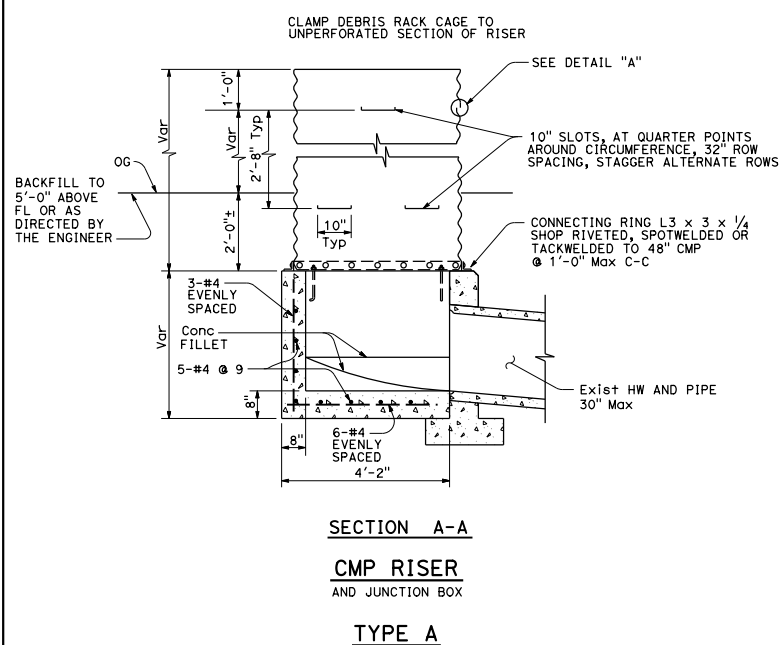
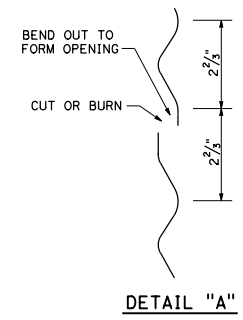
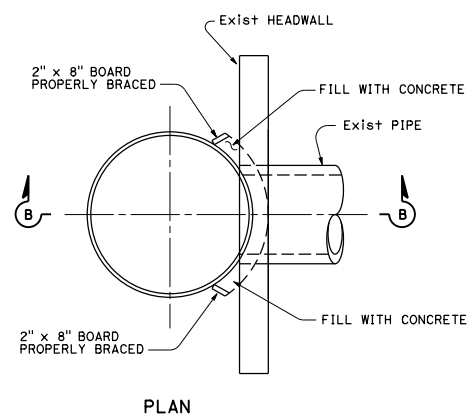
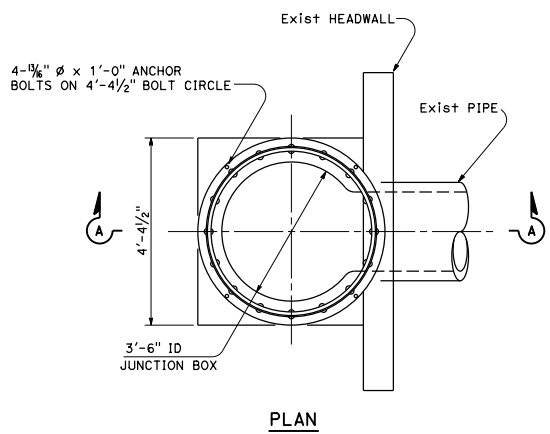
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
Bruce D. Swanger  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA



H = 22 Posts- 6'-0" or 8'-0" lengths use 2" pipe or L2 x 2 x  $\frac{3}{8}$  (galvanized steel or aluminum)

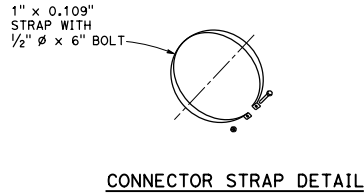
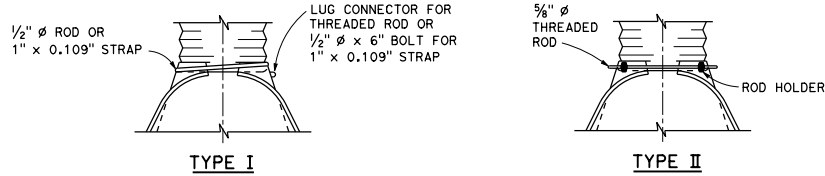
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**PIPE RISER WITH DEBRIS RACK CAGE**

NO SCALE

D93C

2015 STANDARD PLAN D93C



**ALTERNATIVE CONNECTIONS FOR PIPE TO METAL FLARED END SECTIONS**

See Note 7

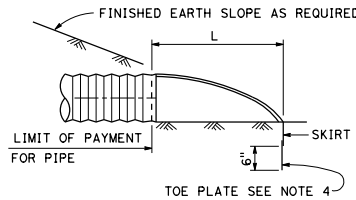
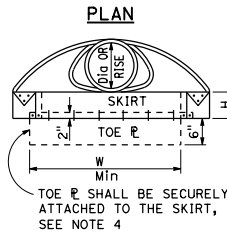
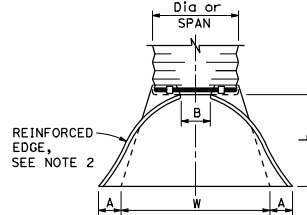
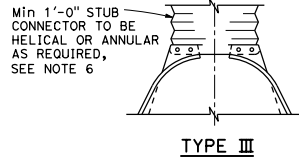
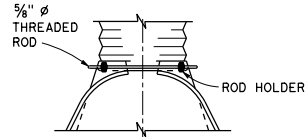


**ALTERNATIVE CONNECTIONS FOR PIPE TO PLASTIC FLARED END SECTIONS**

CIRCULAR PIPES					
PIPE Dia	END SECTION THICKNESS	DIMENSION			
		A	B	H	L
12"*	0.064"	6"	6"	6"	1'-9"
15"*	0.064"	7"	8"	6"	2'-2"
18"*	0.064"	8"	10"	6"	2'-7"
21"	0.064"	9"	1'-0"	6"	3'-0"
24"*	0.064"	10"	1'-1"	6"	3'-5"
30"*	0.079"	1'-0"	1'-4"	8"	4'-3"
36"*	0.079"	1'-2"	1'-7"	9"	5'-0"
42"	0.109"	1'-4"	1'-10"	11"	5'-9"
48"	0.109"	1'-6"	2'-3"	1'-0"	6'-6"
54"	0.109"	1'-6"	2'-6"	1'-0"	7'-0"
60"	0.109"	1'-6"	2'-9"	1'-0"	7'-3"
66"	0.109"	1'-6"	3'-0"	1'-0"	7'-3"
72"	0.109"	1'-6"	3'-3"	1'-0"	7'-3"
78"	0.109"	1'-6"	3'-6"	1'-0"	7'-3"
84"	0.109"	1'-6"	3'-9"	1'-0"	7'-3"

\* Equivalent plastic FES to meet AASHTO M-294 and ASTM D-1248 Specifications, and shall conform to all dimensions shown above except for end section thickness, which may be 0.004" thinner.

**FLARED END SECTIONS FOR CORRUGATED METAL AND PLASTIC PIPE CULVERTS**



**TYPICAL CROSS-SECTION**

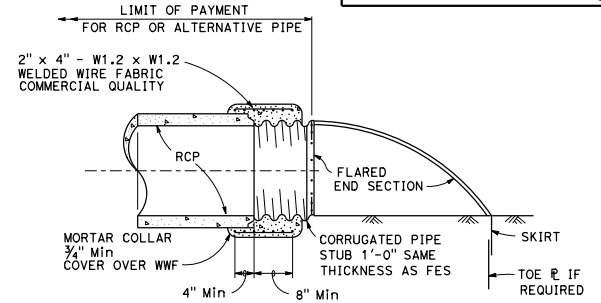
PIPE-ARCHES						
DESIGNATION	SPAN	RISE	END SECTION THICKNESS	DIMENSION		
				A	B	H
				1"±	Max	1"±
						1 1/2"±
						2"±
21"	15"	0.064"	7"	10"	6"	1'-11"
24"	18"	0.064"	8"	1'-0"	6"	2'-4"
28"	20"	0.064"	9"	1'-2"	6"	2'-8"
35"	24"	0.079"	10"	1'-4"	6"	3'-3"
42"	29"	0.079"	1'-0"	1'-6"	8"	3'-10"
49"	33"	0.109"	1'-1"	1'-9"	9"	4'-5"
57"	38"	0.109"	1'-6"	2'-2"	1'-0"	5'-3"
64"	43"	0.109"	1'-6"	2'-6"	1'-0"	5'-10"
71"	47"	0.109"	1'-6"	2'-9"	1'-0"	6'-5"
77"	52"	0.109"	1'-6"	3'-0"	1'-0"	6'-5"
83"	57"	0.109"	1'-6"	3'-3"	1'-0"	6'-5"

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

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**FLARED END SECTION CONNECTION TO RCP**

**NOTES:**

- All 3-piece bodies to have 0.109" thick sides and 0.138" thick center panels. Width of center panels to be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams which are to be tightly joined by rivets or bolts.
- Reinforced edges to be supplemented with stiffener angles for the 60" thru 84" round, 77" x 52" and 83" x 57" pipe-arch sizes. The angles will be 2" x 2" x 1/4" for the 60" thru 72" round, 77" x 52" and 83" x 57" pipe-arch sizes and 2 1/2" x 2 1/2" x 1/4" for 78" and 84" round. The angles to be attached by 3/8" diameter nuts and bolts.
- Angle reinforcement shall be placed under the center panel seams on the 77" x 52" and 83" x 57" pipe-arch sizes.
- Toe plate to be available as an accessory when specified.
- End of pipe to be finished with annular corrugations to conform flared end section so that minimal leakage results from the connection. Other designs may be used with approval of the Engineer.
- For 12" thru 24" helical end section connection, a universal coupling band attached to the metal end section by rivets, bolts or 1" long shop tack welds spaced at same intervals as dimples may be used in place of the 12" stub. See Standard Plan D97C.
- The types of alternative connections for pipe to metal flared end sections shall conform to the following:

CIRCULAR PIPES -  
 12" thru 24" Type I or III  
 30" thru 84" Type II or III

PIPE-ARCHES -  
 21" x 15" thru 57" x 38" Type II or III  
 64" x 43" thru 83" x 57" Type III

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**METAL AND PLASTIC FLARED END SECTIONS**

NO SCALE

**D94A**

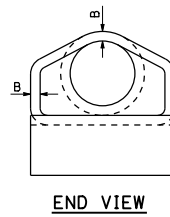
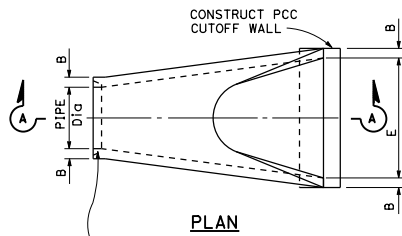
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

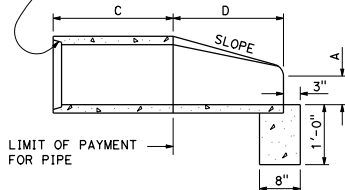
October 30, 2015  
PLANS APPROVAL DATE

BRUCE D. SWANGER  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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TONGUE END ON INLET SECTION  
GROOVE END ON OUTLET SECTION



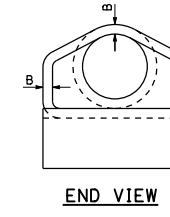
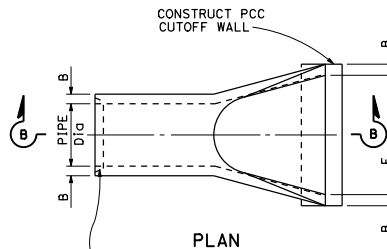
SECTION A-A

PIPE Dia	MINIMUM DIMENSIONS					SLOPE
	A	B	C	D	E	
12"	4"	1 3/4"	SEE NOTE 2	2'-0"	2'-0"	2:1 OR FLATTER
18"	9"	2 1/4"		2'-3"	3'-0"	
24"	9 1/2"	2 3/4"		3'-7 1/2"	4'-0"	
30"	1'-0"	3 1/4"		4'-6"	5'-0"	
36"	1'-3"	3 3/4"		5'-3"	6'-0"	
42"	1'-9"	4 1/4"		5'-3"	6'-6"	
48"	2'-0"	4 3/4"	6'-0"	7'-0"		
54"	2'-3"	5 1/4"	5'-5"	7'-6"		

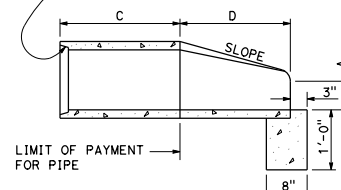
PRECAST CONCRETE FLARED END SECTION TYPE A

**NOTES:**

- Contractor has the option of using either Type A or B precast concrete flared end section.
- "C" dimension varies by manufacturer and will be paid for as concrete pipe.



TONGUE END ON INLET SECTION  
GROOVE END ON OUTLET SECTION





SECTION B-B

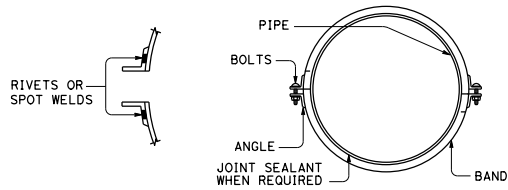
PIPE Dia	MINIMUM DIMENSIONS					SLOPE
	A	B	C	D	E	
12"	4"	1 1/2"	SEE NOTE 2	1'-10"	2'-0"	2:1 OR FLATTER
18"	9"	1 3/4"		2'-1"	3'-0"	
24"	9 1/2"	2 1/4"		3'-6"	4'-0"	
30"	1'-0"	2 3/4"		4'-5"	5'-0"	
36"	1'-3"	3 1/4"		5'-2"	6'-0"	
42"	1'-9"	3 1/2"		5'-3"	6'-6"	
48"	2'-0"	4"	6'-0"	7'-0"		
54"	2'-3"	4 3/8"	5'-6"	6'-10"		

PRECAST CONCRETE FLARED END SECTION TYPE B

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE FLARED  
END SECTIONS**  
NO SCALE

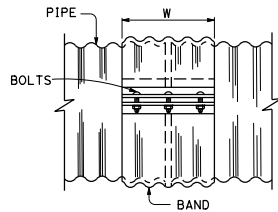
D94B

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

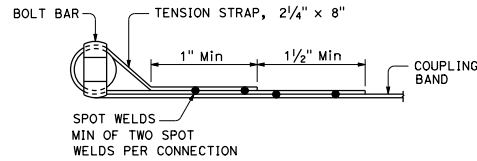


END VIEW

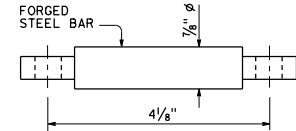
ANNULAR BAND



SIDE VIEW



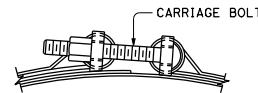
STRAP DETAIL



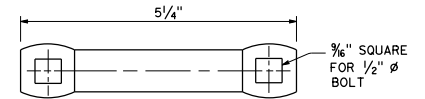
TOP VIEW



LEFT SIDE VIEW



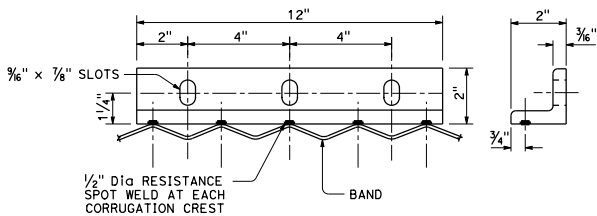
BOLT DETAIL



FRONT VIEW

BAR DETAIL

BAR AND STRAP CONNECTOR



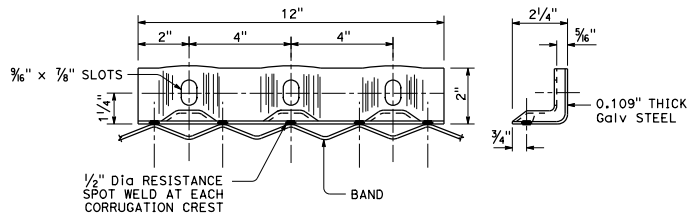
SIDE VIEW

END VIEW

2" x 2" x 3/16" ANGLE

See tables on Standard Plans D97E, D97F and D97G for width, W=12" shown.

ANGLE CONNECTORS



SIDE VIEW

END VIEW

DIE-FORMED ANGLE

See tables on Standard Plans D97E and D97G for width, W=12" shown. Alternate only for standard joints on pipes through 72" diameter and downdrains through 24" diameter.

**NOTES:**



1. All ferrous metal coupling band connection hardware shall be galvanized or electroplated in accordance with the Standard Specifications.
2. Dimensions and thicknesses shown are minimum.
3. Spot welds shall develop minimum required strength of strap.
4. Fillet welds of equivalent strength may be substituted for spot welds or rivets.

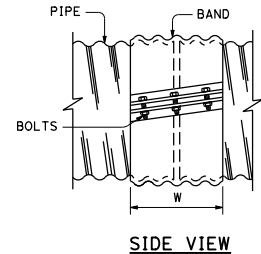
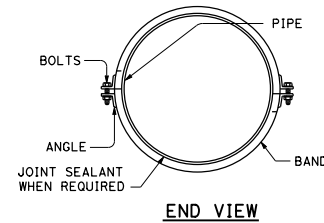
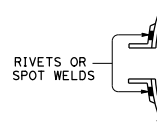
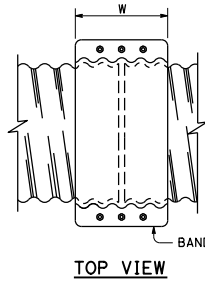
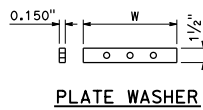
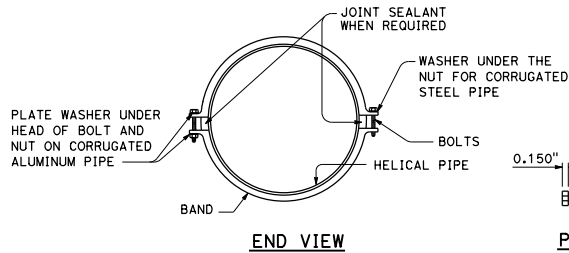
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CORRUGATED METAL PIPE  
COUPLING DETAILS No. 1  
ANNULAR COUPLING BAND BAR  
AND STRAP AND  
ANGLE CONNECTIONS**

NO SCALE

**D97A**

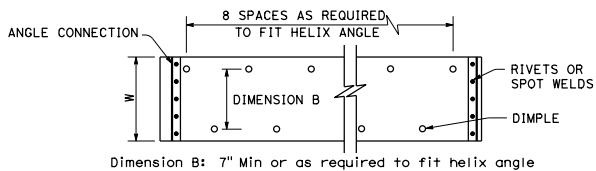
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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**TWO PIECE INTEGRAL FLANGE DIE FORMED BAND**

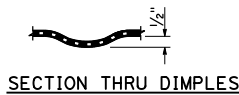
**HELICAL COUPLING BANDS**

**HELICAL BAND**

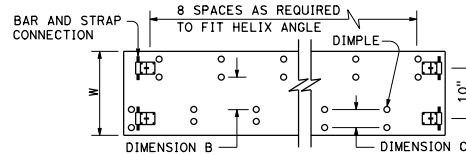


Dimension B: 7" Min or as required to fit helix angle

**PLAN**



**SECTION THRU DIMPLES**

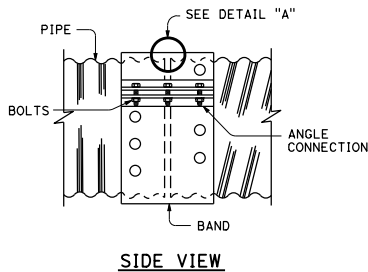


Dimension B: 7" Min or as required to fit helix angle.  
 Dimension C: 2 3/4" Min or as required to fit helix angle.  
 (Double dimple shown for use with 16/4" bands)

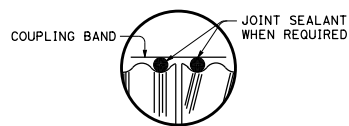
**PLAN**

**NOTES:**

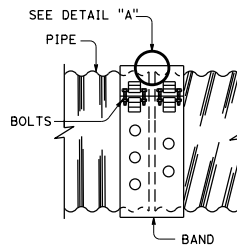
1. All ferrous metal coupling band connection hardware shall be galvanized or electroplated in accordance with the Standard specifications.
2. Dimensions and thicknesses shown are minimum.
3. Spot welds shall develop minimum required strength of strap.
4. Fillet welds of equivalent strength may be substituted for spot welds or rivets.



**SIDE VIEW**



**DETAIL "A"**



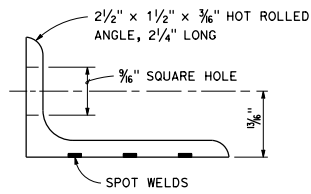
**SIDE VIEW**

**UNIVERSAL COUPLING BANDS**

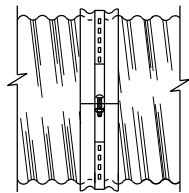
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CORRUGATED METAL PIPE  
 COUPLING DETAILS No. 3  
 HELICAL AND UNIVERSAL  
 COUPLERS**

NO SCALE

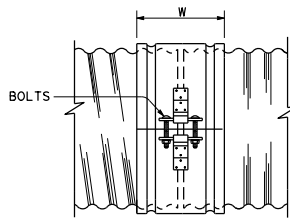
**D97C**



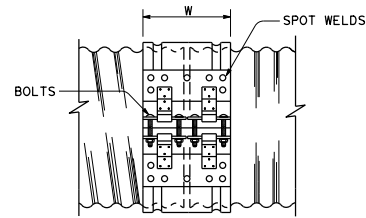
ANGLE



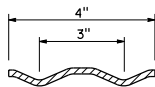
SIDE VIEW  
ANGLE



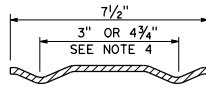
SIDE VIEW  
SINGLE BAR AND STRAP



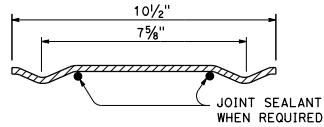
SIDE VIEW  
DOUBLE BAR AND STRAP



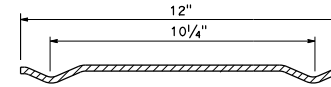
SECTION  
H-4 HUGGER BAND



SECTION  
H-7 HUGGER BAND



SECTION  
H-10 HUGGER BAND



SECTION  
H-12 HUGGER BAND

HUGGER COUPLING BANDS

**NOTES:**

1. Dimensions and thicknesses shown are minimum.
2. Spot welds shall develop minimum required strength of strap.
3. Fillet welds of equivalent strength may be substituted for spot welds or rivets.
4. Dimension depends upon whether end condition is lips up or lips down.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Raymond A. Jester  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Raymond Don Isztsoo  
No. C37332  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CORRUGATED METAL PIPE  
COUPLING DETAILS No. 4  
HUGGER COUPLING BANDS**

NO SCALE

**D97D**



ANNULAR AND HELICAL PROFILE

COUPLING TYPE	PIPE CORRUGATION	PIPE SIZE	W OR A	PIPE WALL THICKNESS				BAR AND STRAP (CSP ONLY)				ANGLE							
				CSP		CAP		STRAP THICKNESS	BOLTS Dia	BAR Dia	BAR YIELD STRENGTH	DIMENSIONS		BOLTS (No.- Dia)		RIVETS ANGLE TO BAND		SPOT WELDS ANGLE TO BAND	
				SSRP	ASRP	SSRP	ASRP					CSP	CAP	CSP	CAP	CSP	CAP		CSP
TWO PIECE INTEGRAL FLANGE	1/2' x 1/4"	6"-10"	7"	0.052"-0.079"	0.048"-0.060"	0.052"	0.060"							2-3/8"	2-3/8"				
		12"-18"	7"	0.052"-0.079"		0.064"								2-1/2"					
UNIVERSAL	2 2/3" x 1/2"	THROUGH 36"	12"	0.052"-0.138"	0.060"-0.135"	0.052"	0.060"					2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	3-1/2"	
		42"-60"	12"	0.052"-0.168"	0.075"-0.164"	0.052"	0.060"					2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	5-1/2"	
		THROUGH 72"	12"	0.052"-0.168"	0.164"	0.052"	0.105"	0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	5-1/2"	
		78"-84"	16 1/4"	0.168"		0.079"	DOUBLE 0.079"	1/2"	7/8"	32 ksi									
ANNULAR	2 2/3" x 1/2"	THROUGH 36"	7"	0.064"-0.138"	0.060"-0.135"	0.052"	0.060"	0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	2-1/2"	2-1/2"	3-3/8"	3-3/8"	3-1/2"	
		42"-72"	12"	0.064"-0.168"	0.075"-0.164"	0.052"	0.105"	0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	5-1/2"	
		78"-84"	12"	0.168"		0.079"		0.109"	1/2"	7/8"	45 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"		3-3/8"		5-1/2"	
		48"-90"	14"	0.064"-0.109"		0.052"		0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"		3-3/8"		5-1/2"	
HELICAL	2 2/3" x 1/2"	96"-120"	14"	0.079"-0.109"		0.052"		0.109"	1/2"	7/8"	45 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"		4-3/8"			
		42"-108"	14"		0.060"-0.135"		0.060"					2" x 2" x 3/16"		3-1/2"		3-3/8"			
		THROUGH 36"	12"	0.052"-0.138"	0.060"-0.135"	0.052"	0.060"	0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	3-1/2"	
		42"-72"	12"	0.052"-0.168"	0.075"-0.164"	0.052"	0.060"	0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	5-1/2"	
HUGGER	2 2/3" x 1/2"	78"-84"	12"	0.168"		0.079"		0.109"	1/2"	7/8"	45 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"		3-3/8"		5-1/2"	
		48"-90"	14"	0.064"-0.109"		0.052"		0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"		3-3/8"		5-1/2"	
		96"-120"	14"	0.079"-0.109"		0.052"		0.109"	1/2"	7/8"	45 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"		4-3/8"			
		42"-108"	14"		0.060"-0.135"		0.060"					2" x 2" x 3/16"		3-1/2"		3-3/8"			
HUGGER	2 2/3" x 1/2"	12"-54"	4"	0.052"-0.109"		0.052"						2 1/2" x 1 1/2" x 3/16"	2 1/2" x 1 1/2" x 3/16"	1-1/2"				3-1/2"	
		60"-66"	4"	0.109"		0.064"						2 1/2" x 1 1/2" x 3/16"	2 1/2" x 1 1/2" x 3/16"	1-1/2"				3-1/2"	
		36"-48"	4"	0.138"		0.064"						2 1/2" x 1 1/2" x 3/16"	2 1/2" x 1 1/2" x 3/16"	1-1/2"				3-1/2"	
		THROUGH 72"	10 1/2"	0.052"-0.168"		0.052"		0.079"	1/2"	7/8"	32 ksi								
		78"-84"	10 1/2"	0.168"		0.079"		0.109"	1/2"	7/8"	45 ksi								
		48"-90"	10 1/2"	0.064"-0.109"		0.052"		0.079"	1/2"	7/8"	32 ksi								
	96"-120"	10 1/2"	0.079"-0.109"		0.052"		0.109"	1/2"	7/8"	45 ksi									
	5" x 1"	48"-66"	7 1/2"	0.064"-0.109"		0.064"		0.079"	1/2"	7/8"	32 ksi	2 1/2" x 1 1/2" x 3/16"	2 1/2" x 1 1/2" x 3/16"	1-1/2"					3-1/2"
		72"-90"	7 1/2"	0.064"-0.079"		0.064"		0.079"	1/2"	7/8"	32 ksi	2 1/2" x 1 1/2" x 3/16"	2 1/2" x 1 1/2" x 3/16"	1-1/2"					3-1/2"
		48"-90"	7 1/2"	0.064"-0.138"		0.064"		0.079"	1/2"	7/8"	32 ksi	2 1/2" x 1 1/2" x 3/16"	2 1/2" x 1 1/2" x 3/16"	1-1/2"					
		48"-120"	12" SEE NOTE	0.064"-0.109"		0.064"		0.079"	1/2"	7/8"	32 ksi								
		48"-84"	12" NOTE	0.138"		0.064"		0.079"	1/2"	7/8"	32 ksi								
90"-120"		12" 10	0.138"		0.064"		DOUBLE 0.079"	1/2"	7/8"	32 ksi									

SPIRAL RIB PROFILE

COUPLING TYPE	PIPE CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS				BAR AND STRAP (SSRP ONLY)				ANGLE						
				SSRP		ASRP		STRAP THICKNESS	BOLTS Dia	BAR Dia	BAR YIELD STRENGTH	DIMENSIONS		BOLTS (No.- Dia)		RIVETS ANGLE TO BAND		SPOT WELDS ANGLE TO BAND
				SSRP	ASRP	SSRP	ASRP					SSRP	ASRP	SSRP	ASRP	SSRP	ASRP	
ANNULAR	2 2/3" x 1/2" * REROLLED END	24"-36"	12"	0.064"-0.109"	0.060"-0.105"	0.052"	0.060"	0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	5-1/2"
		42"-60"	12"	0.064"-0.109"	0.075"-0.105"	0.052"	0.105"	0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	5-1/2"
		66"-72"	12"	0.064"-0.109"		0.052"		0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	5-1/2"
HUGGER	2 2/3" x 1/2" * REROLLED END	24"-72"	10 1/2"	0.064"-0.109"		0.052"		0.079"	1/2"	7/8"	32 ksi	2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"		3-3/8"		5-1/2"
		78"-84"	10 1/2"	0.109"		0.079"		0.109"	1/2"	7/8"	45 ksi							

\* See Note 13.

13. All profiles of Spiral Rib Pipe (3/4" x 3/4" ribs at 7 1/2" pitch and 3/4" x 1" ribs at 11 1/2" pitch in both steel and aluminum and 3/4" x 1" ribs at 8 1/2" pitch in steel only) shall be manufactured with rerolled ends. Corrugation profile of the rerolled ends shall be 2 2/3" x 1/2" annual corrugations with a minimum of two full corrugations at each end.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Raymond A. Jester  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Raymond Don Tsztoo  
No. C37332  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

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NOTES:

- For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis, provided connecting holes are slotted lengthwise sufficiently to allow adjustment for the helix angle.
- Tension strap may be connected to band with either spot welds or fillet welds that develop minimum required strength of strap.
- Use 1/4" gage line dimension on attached angle leg for rivets and spot welds.
- Band thickness shall not be less than:
  - 3 standard thicknesses lighter than the thickness of the pipe for Corrugated Steel Pipe.
  - 2 standard thicknesses lighter than the thickness of the pipe and in no case lighter than 0.060" for Corrugated Aluminum Pipe.
- Dimensions, thicknesses and strengths shown are minimum.
- For pipe arches use same width band as for round pipe of equal perimeter.
- Fillet welds of equivalent strength may be substituted for spot welds or rivets.
- Spot welds shall develop minimum required strength of strap.
- Pipe with rerolled ends having at least two 2 2/3" x 1/2" annular corrugations at each end with or without an upturned flange may be connected with any of the annular coupling bands shown for pipe of the same diameter and wall thickness and having 2 2/3" x 1/2" corrugations.
- In the case of H-12 huggerbands, two piece bands are required for diameters through 96" and three piece bands are required for diameters 102" through 120".
- Two piece bands are required for pipes greater than 42" diameter.
- The 2 1/4" x 2" x 0.109" thick galvanized die-formed angle connector may be used in lieu of the 2" x 2" x 3/16" angle connector for standard joints only on pipes through 72" diameter.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CORRUGATED METAL PIPE  
COUPLING DETAILS No. 5  
STANDARD JOINT**  
NO SCALE

D97E

ANNULAR AND HELICAL PROFILE

Table with columns for COUPLING TYPE, PIPE CORRUGATION, PIPE SIZE, W OR A, PIPE WALL THICKNESS, BAND THICKNESS, STRAP THICKNESS, BOLTS Dia, BAR Dia, BAR YIELD STRENGTH, DIMENSIONS (CSP, CAP), ANGLE (BOLTS No. - Dia), RIVETS ANGLE TO BAND, SPOT WELDS ANGLE TO BAND.

SPIRAL RIB PROFILE

Table with columns for COUPLING TYPE, PIPE CORRUGATION, PIPE SIZE, W, PIPE WALL THICKNESS, BAND THICKNESS, STRAP THICKNESS, BOLTS Dia, BAR Dia, BAR YIELD STRENGTH, DIMENSIONS (SSRP, ASRP), ANGLE (BOLTS No. - Dia), RIVETS ANGLE TO BAND, SPOT WELDS ANGLE TO BAND.

\* See Note 12.

12. All profiles of Spiral Rib Pipe (3/4" x 3/4" ribs at 7 1/2" pitch and 3/4" x 1" ribs at 11 1/2" pitch in both steel and aluminum and 3/4" x 1" ribs at 8 1/2" pitch in steel only) shall be manufactured with rerolled ends. Corrugation profile of the rerolled ends shall be 2 3/8" x 1/2" annular corrugations with a minimum of two full corrugations at each end.

Professional Engineer stamp for Raymond Don Isztout, Registered Civil Engineer, No. C37332, State of California, dated October 30, 2015.

NOTES:

- 1. For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis... 2. Tension strap may be connected to band with either spot welds or fillet welds... 3. Use 1/4" gage line dimension on attached angle leg for rivets and spot welds... 4. Band thickness shall not be less than: a. 3 standard thicknesses lighter than the thickness of the pipe for Corrugated Steel Pipe. b. 2 standard thicknesses lighter than the thickness of the pipe and in no case lighter than 0.060" for Corrugated Aluminum Pipe... 5. Dimensions, thicknesses and strengths shown are minimum... 6. For pipe arches use same width band as for round pipe of equal periphery... 7. Fillet welds of equivalent strength may be substituted for spot welds or rivets... 8. Spot welds shall develop minimum required strength of strap... 9. Pipe with rerolled ends having at least two 2 3/8" x 1/2" annular corrugations at each end with or without an upturned flange may be connected with any of the annular coupling bands shown for pipe of the same diameter and wall thickness and having 2 3/8" x 1/2" corrugations... 10. In the case of H-12 huggerbands, two piece bands are required for diameters through 96" and three piece bands are required for diameters 102" through 120"... 11. Two piece bands are required for pipes greater than 42" diameter.

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION CORRUGATED METAL PIPE COUPLING DETAILS No. 6 POSITIVE JOINT

NO SCALE

D97F

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS

*Raymond Don Isztog*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

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ANNULAR AND HELICAL PROFILE

COUPLING TYPE	PIPE CORRUGATION	PIPE SIZE	W OR A	PIPE WALL THICKNESS				BAND THICKNESS				ANGLE								
				CSP		CAP		STRAP THICKNESS	BOLTS Dia	BAR Dia	BAR YIELD STRENGTH	DIMENSIONS		BOLTS (No.- Dia)		RIVETS ANGLE TO BAND		SPOT WELDS ANGLE TO BAND		
				CSP	CAP	CSP	CAP					CSP	CAP	CSP	CAP	CSP	CAP	CSP		
TWO PIECE INTEGRAL FLANGE	1 1/2" x 1/4"	6"	7"	0.064"-0.168"		0.052"														
	1 1/2" x 1/4"	8"-10"	7"	0.064"-0.168"	0.060"-0.164"	0.064"	0.060"													
ANNULAR	2 2/3" x 1/2"	THROUGH 24"	12"	0.064"-0.168"	0.060"-0.164"	0.064"	0.060"							2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	3-1/2"
HUGGER	2 2/3" x 1/2" REROLLED END	THROUGH 24"	10 1/2"	0.064"-0.168"		0.064"		0.079"	1/2"	7/8"	32 ksi									

NOTES:

- For helically corrugated coupling bands, the connection angles may be oriented parallel to the pipe axis, provided connecting holes are slotted lengthwise sufficiently to allow adjustment for the helix angle.
- Tension strap may be connected to band with either spot welds or fillet welds that develop minimum required strength of strap.
- Use 1/4" gage line dimension on attached angle leg for rivets and spot welds.
- Band thickness shall not be less than:
  - 3 standard thicknesses lighter than the thickness of the pipe for Corrugated Steel Pipe.
  - 2 standard thicknesses lighter than the thickness of the pipe and in no case lighter than 0.060" for Corrugated Aluminum Pipe.
- Dimensions, thicknesses and strengths shown are minimum.
- For pipe arches use same width band as for round pipe of equal periphery.
- Fillet welds of equivalent strength may be substituted for spot welds or rivets.
- Spot welds shall develop minimum required strength of strap.
- Pipe with rerolled ends having at least two 2 2/3" x 1/2" annular corrugations at each end with or without an upturned flange may be connected with any of the annular coupling bands shown for pipe of the same diameter and wall thickness and having 2 2/3" x 1/2" corrugations.
- For downdrain applications, two piece integral flange couplers shall have factory applied sleeve type rubber gaskets with a minimum length of 7" measured along the length of the pipe.

SPIRAL RIB PROFILE

COUPLING TYPE	PIPE CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS				BAND THICKNESS				ANGLE								
				SSRP		ASRP		STRAP THICKNESS	BOLTS Dia	BAR Dia	BAR YIELD STRENGTH	DIMENSIONS		BOLTS (No.- Dia)		RIVETS ANGLE TO BAND		SPOT WELDS ANGLE TO BAND		
				SSRP	ASRP	SSRP	ASRP					SSRP	ASRP	SSRP	ASRP	SSRP	ASRP	SSRP		
ANNULAR	2 2/3" x 1/2" * REROLLED END	24"	12"	0.064"-0.168"	0.060"-0.164"	0.064"	0.060"							2" x 2" x 3/16"	2" x 2" x 3/16"	3-1/2"	3-1/2"	3-3/8"	3-3/8"	3-1/2"
HUGGER	2 2/3" x 1/2" * REROLLED END	24"	10 1/2"	0.064"-0.168"		0.064"		0.079"	1/2"	7/8"	32 ksi									

\* See Note 11.

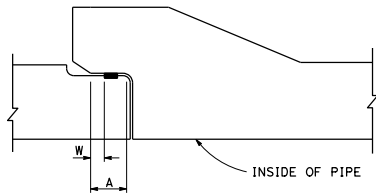
11. All profiles of Spiral Rib Pipe (3/4" x 3/4" ribs at 7 1/2" pitch and 3/4" x 1" ribs at 11 1/2" pitch in both steel and aluminum and 3/4" x 1" ribs at 8 1/2" pitch in steel only) shall be manufactured with rerolled ends. Corrugation profile of the rerolled ends shall be 2 2/3" x 1/2" annual corrugations with a minimum of two full corrugations at each end.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

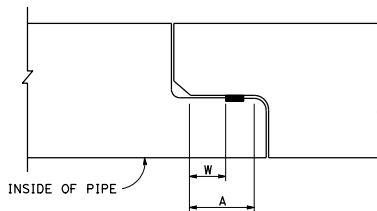
**CORRUGATED METAL PIPE  
COUPLING DETAILS No. 7  
DOWNDRAIN**

NO SCALE

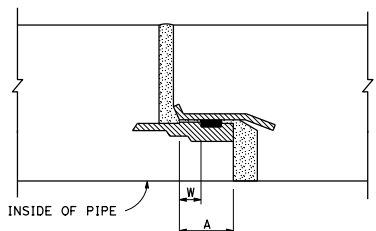
**D97G**



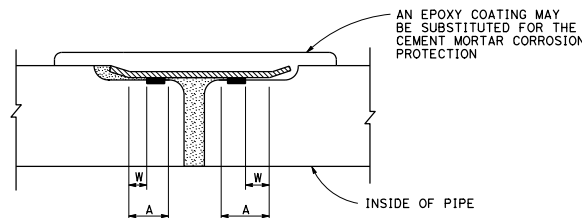
**CONCRETE JOINT-FLARED BELL DESIGN**



**CONCRETE JOINT-FLUSH BELL DESIGN**



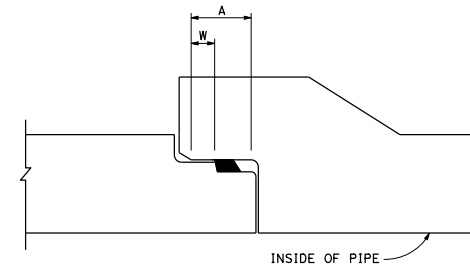
**STEEL JOINT-FLUSH BELL DESIGN**



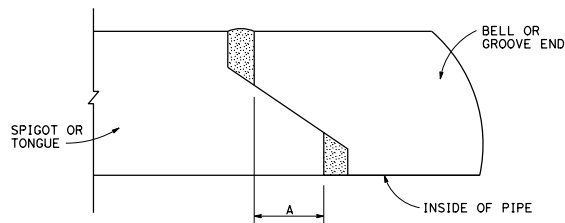
**CONCRETE JOINT-DOUBLE GASKET DESIGN**

**LEGEND**

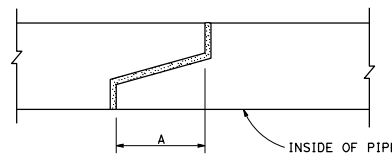
- CEMENT MORTAR
- RUBBER GASKET
- STEEL



**CONCRETE JOINT-SINGLE OR DOUBLE OFFSET DESIGN**  
(Flared or Flush Bell)



**SELF-CENTERING TONGUE & GROOVE**  
(See Note 4)



**TONGUE & GROOVE DESIGN**

**TABLE A**

PIPE DIAMETER LIMITS	MINIMUM JOINT OVERLAP			
	STANDARD "A"	POSITIVE "A"	STANDARD "W"	POSITIVE "W"
6" THROUGH 12"	1/4"	1/2"	1/4"	3/8"
15" THROUGH 33"	1/2"	3/4"	1/4"	1/2"
GREATER THAN 33"	3/4"	1"	3/8"	5/8"

**NOTES:**

1. For pipe sections installed on straight alignment, the pipe sections shall be joined to provide maximum joint overlap at all points on the joint periphery, but in no case less than the values shown in Table A for "W" if the installation is required to be watertight or "A" for all other installations.
2. For pipe sections installed on curved alignment, the pipe sections shall be joined to provide maximum joint overlap on one side of the joint and not less than 1/4" overlap on the other. The 1/4" overlap shall be the "W" dimension for installations required to be watertight, or the "A" dimension for all other installations.
3. Watertight joint requirement shall typically be met with the use of rubber gaskets as shown. Pipe installed with rubber gaskets shall have a minimum overlap meeting or exceeding the indicated "W" dimension shown in Table A or indicated in Note 2. Joints shown with rubber gaskets may be installed without gaskets in non-watertight applications, in which case the joint shall be sealed with sealing materials and the minimum joint overlap shall meet or exceed the "A" dimension shown in Table A or indicated in Note 2.
4. For Self-Centering Tongue and Groove Joints, the mortar shall be applied after the pipe ends are pushed together. The mortar shall be applied to the joint gap on the inside of the pipe for pipe diameters of 24" or more, or to the gap on the outside of the pipe for pipe smaller than 24" in diameter.
5. When watertight joints are required (See Note 3) and cement mortar joints are not allowed, the taper on surfaces within the "W" dimension at full joint closure and the opposing sealing surfaces of the bells and spigots on which the rubber gaskets may bear during closure of the joint and at any degree of partial closure shall form an angle of not more than 2 degrees with the longitudinal axis of the pipe.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**REINFORCED CONCRETE PIPE OR  
NON-REINFORCED CONCRETE PIPE  
STANDARD AND POSITIVE JOINTS**

NO SCALE

**D97H**

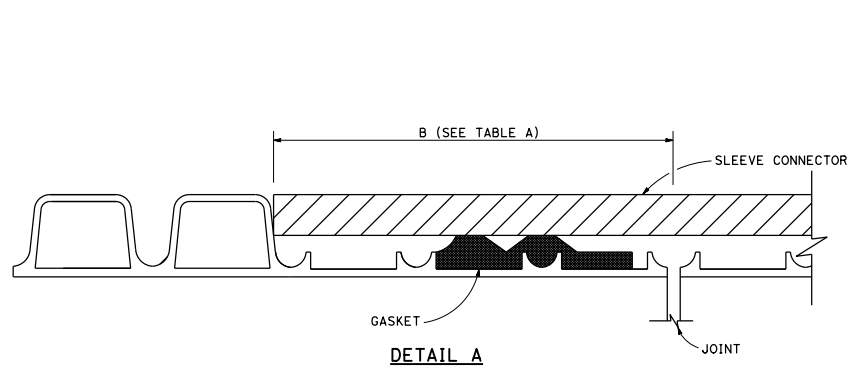
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

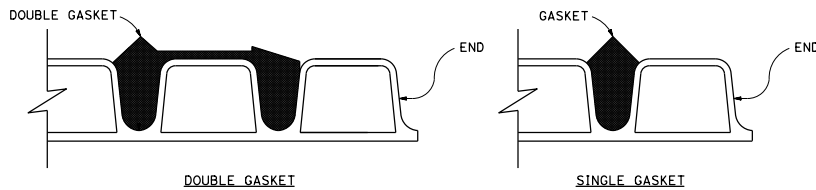
Bruce D. Swanger  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE

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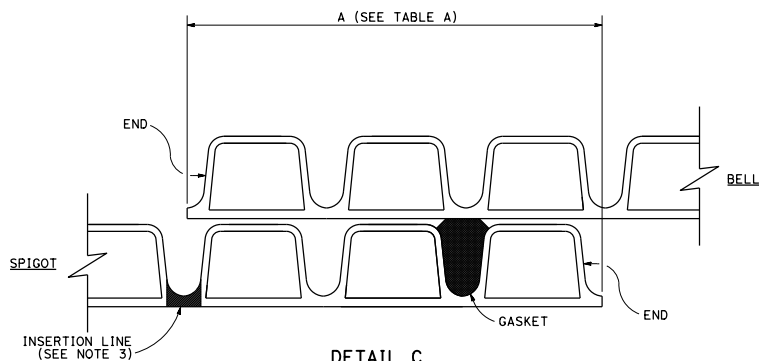
**DETAIL A**



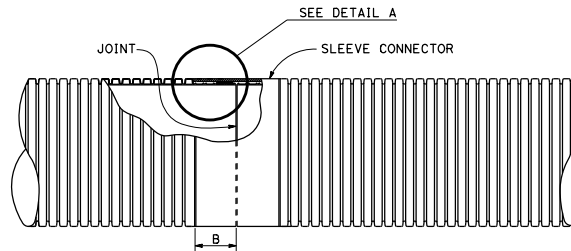
**DOUBLE GASKET**

**SINGLE GASKET**

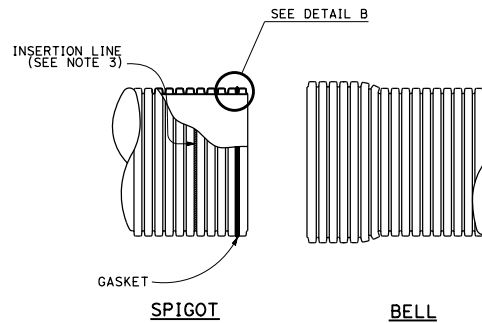
**DETAIL B**



**DETAIL C**  
(Single gasket shown)

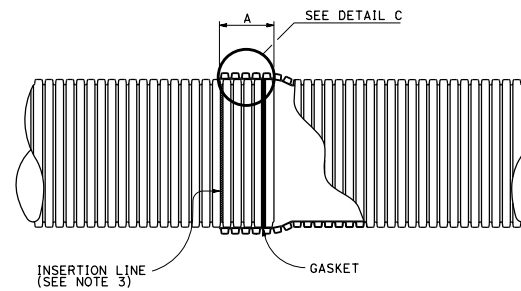


**PLAN VIEW  
LINER INSERT**  
See Note 4



**SPIGOT**

**BELL**



**BELL AND SPIGOT JOINT**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Raymond Don Isztou**  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER  
 Raymond Don Isztou  
 No. C37332  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

**NOTES:**

- For pipe sections installed on straight alignment, the pipe sections shall be joined to achieve maximum joint overlap at all points on the periphery as indicated in Table A where the plans call for positive or watertight joints. Maximum joint overlap is recommended where the plans call for standard joints, but in no case shall the joint overlap be less than 3/2".
- For pipe sections installed on curved alignment, the maximum angle of deflection from straight alignment at any joint shall not exceed two degrees. Where the plans call for watertightness, field testing for compliance is required. Where plans call for positive joints, the pipe sections shall be joined to achieve Table A dimensions on one side of the joint. Joints classified as standard shall have no less than 3/2" joint overlap at any point on the periphery.
- Factory applied insertion line limit shall be placed on spigot.
- Liner insert to be used inside of existing pipe.

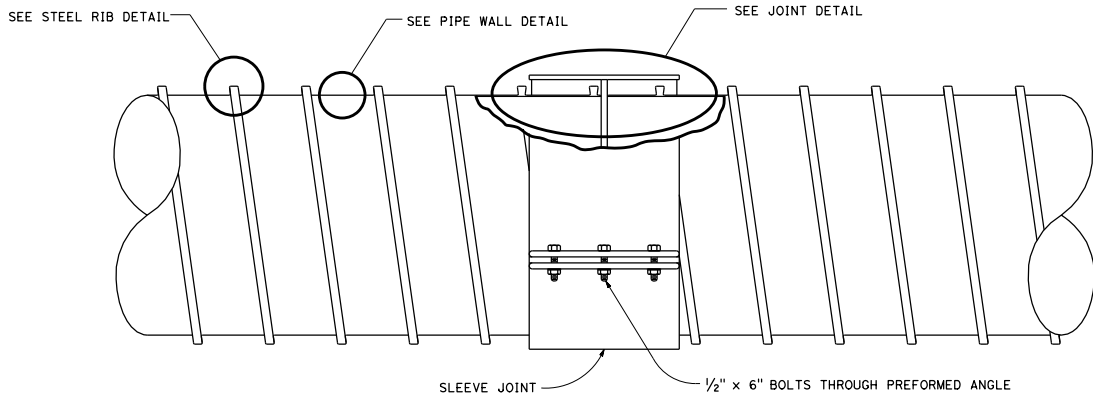
**TABLE A**

JOINT OVERLAP DIMENSIONS		
PIPE Dia (NOMINAL)	A	B
12"	5 3/4"	4 1/4"
15"	6 3/4"	5 5/8"
18"	6 3/4"	5 5/8"
21"	8 1/2"	5 5/8"
24"	8 1/2"	6 1/8"
30"	8 1/2"	7 1/8"
36"	8 1/2"	8 1/8"

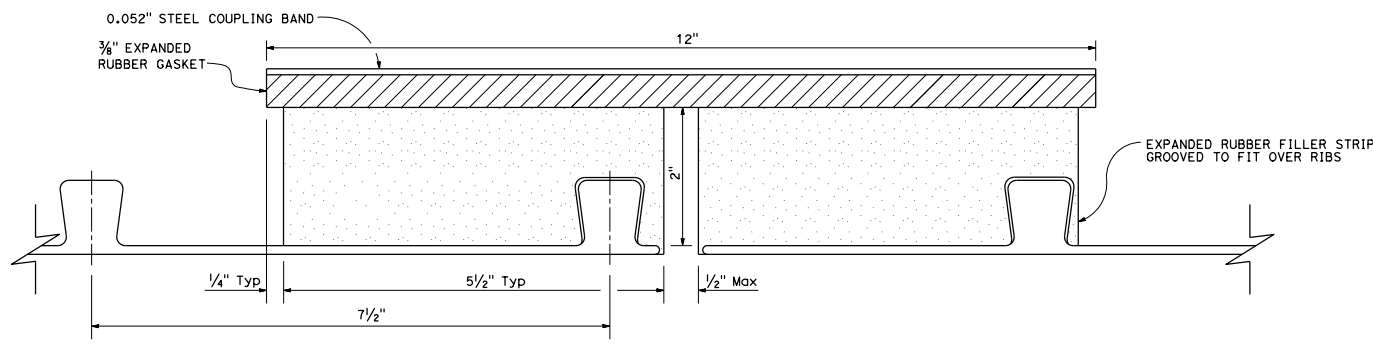
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CORRUGATED POLYVINYL CHLORIDE PIPE  
 WITH SMOOTH INTERIOR  
 STANDARD AND POSITIVE JOINTS**  
 NO SCALE

**D97I**

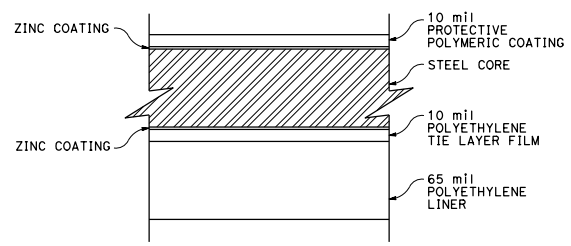
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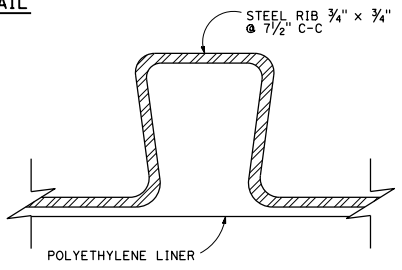
**COMPOSITE STEEL SPIRAL RIB PIPE**



**JOINT DETAIL**



**PIPE WALL DETAIL**



**STEEL RIB DETAIL**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Raymond A. Jester  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

REGISTERED PROFESSIONAL ENGINEER  
 Raymond Don Isztos  
 No. C37332  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

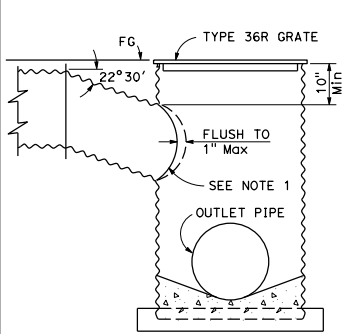
**NOTES:**

1. See Standard Plan A62F for backfill details.
2. See Standard Plan D97C for Universal Coupling details.
3. Strap joint connection shall consist of 2 separate bolted preformed connectors joined to form one strap when pipe inside diameter is greater than or equal to 60".

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**COMPOSITE STEEL SPIRAL RIB PIPE WITH SMOOTH INTERIOR STANDARD JOINT**  
 NO SCALE

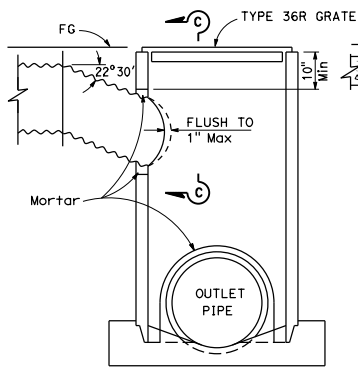
**D97J**

2015 STANDARD PLAN D97J



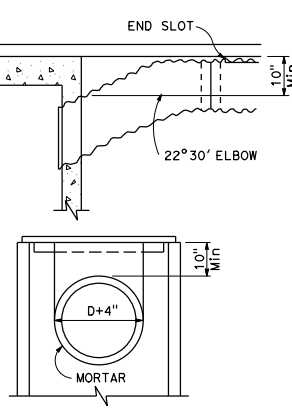
**TYPE GMP INLET**

See Standard Plans D75A, D75C and D77B for additional inlet details.



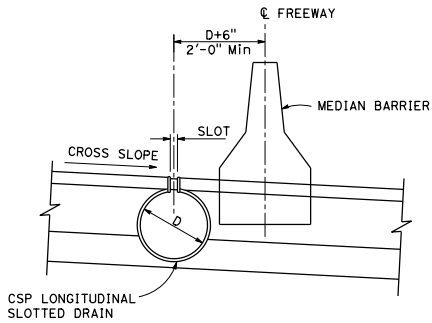
**TYPE GCP INLET**

See Standard Plans D75B, D75C and D77B for additional inlet details.

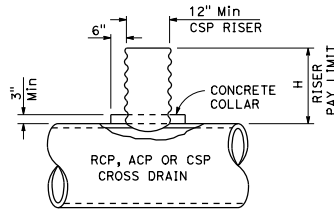


**SECTION C-C**

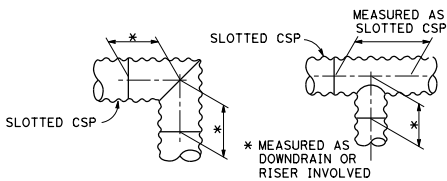
**SLOTTED DRAIN CONNECTIONS TO STANDARD INLET STRUCTURES**



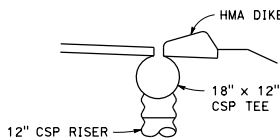
**TYPICAL CROSS SECTION**



**RISER CONNECTION DETAIL**

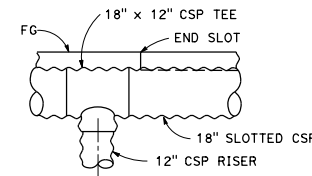


**MEASUREMENT OF CORRUGATED STEEL PIPE ELBOWS AND TEES USED WITH SLOTTED DRAINS**



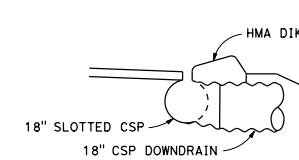
**ELEVATION-END VIEW**

**SHOULDER INSTALLATION 18" SLOTTED CSP TO 12" CSP RISER**



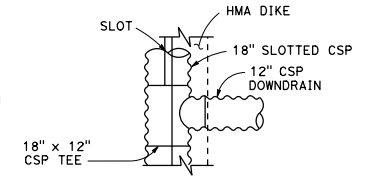
**ELEVATION-SIDE VIEW**

**SHOULDER INSTALLATION 18" SLOTTED CSP TO 18" CSP DOWNDRAIN**

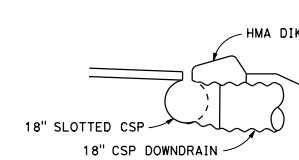


**ELEVATION**

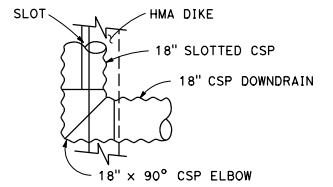
**SHOULDER INSTALLATION 18" SLOTTED CSP TO 12" DOWNDRAIN**



**PLAN**



**ELEVATION**

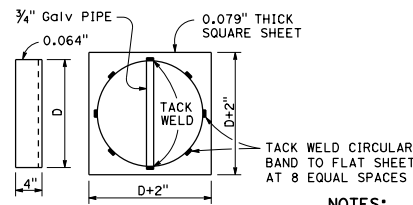


**PLAN**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

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**METAL CAP DETAIL**

See Note 2

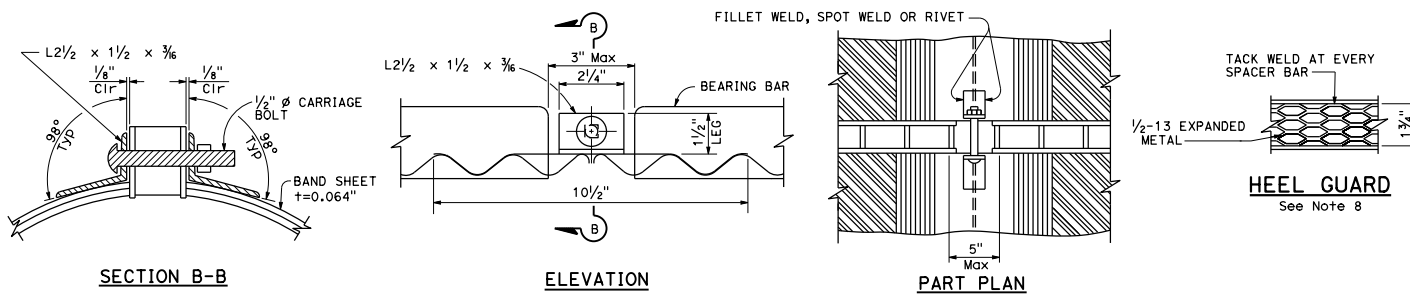
**NOTES:**

1. Either field joint sealed with a pliable mixture of sand, portland cement and emulsified asphalt (mixture of 1 part portland cement, 3-5 parts sand and 1/2 parts SSI emulsified asphalt) or continuous weld.
2. "D" equals nominal pipe diameter.

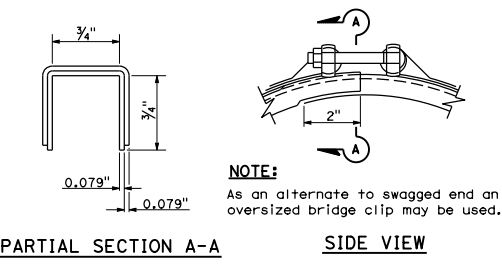
**SLOTTED CORRUGATED STEEL PIPE DRAIN DETAILS**

NO SCALE

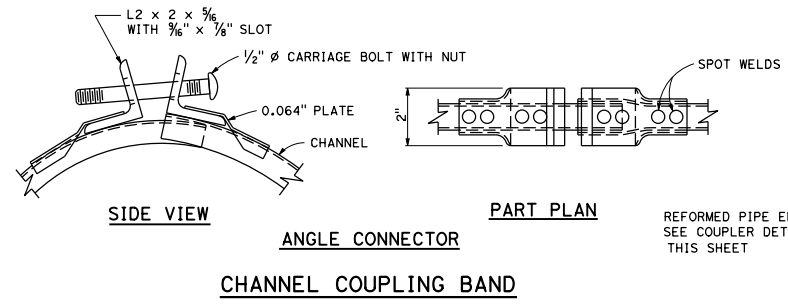




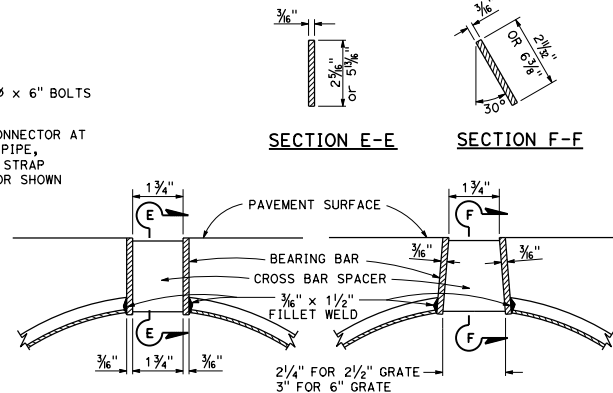
**MODIFIED HUGGER BAND**



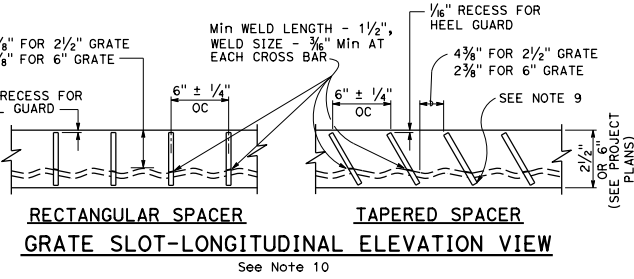
**BAR & STRAP CONNECTOR**  
See Standard Plan D97A



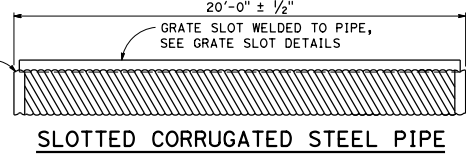
**CHANNEL COUPLING BAND**



**RECTANGULAR SPACER**      **TAPERED SPACER**  
**GRATE SLOT-SECTION**



**RECTANGULAR SPACER**      **TAPERED SPACER**  
**GRATE SLOT-LONGITUDINAL ELEVATION VIEW**  
See Note 10



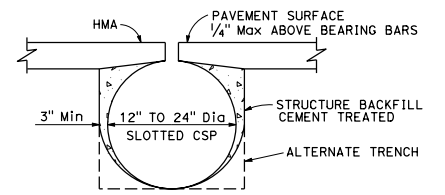
**SLOTTED CORRUGATED STEEL PIPE**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Bruce D. Swanger  
 No. C61257  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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- NOTES:**
1. Drain pipe seams may be continuous helical lock seam or helical weld seam.
  2. Drain sections shall be assembled with either of the coupling bands shown.
  3. The cross bar spacer shall be welded to the bearing bars in such a manner as to develop a minimum tensile strength of 12,000 LBS normal to the longitudinal axis of the bearing bars.
  4. The maximum variance from a straight line between the extreme top corners of the bearing bars shall be 1/2" in 20'-0".
  5. Spot welds shall develop minimum required strength of strap.
  6. Dimensions shown are minimums.
  7. Minimum pipe wall thickness is 0.064".
  8. Use heel guard when specified.
  9. Bottom edge of cross bar spacer offset in direction of flow.
  10. Unless otherwise shown on the plans or specified in the special provisions, cross bar spacers shall be either rectangular or tapered at the contractor's option.



**BACKFILL**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**SLOTTED CORRUGATED STEEL PIPE DRAIN DETAILS**  
 NO SCALE

**D98B**

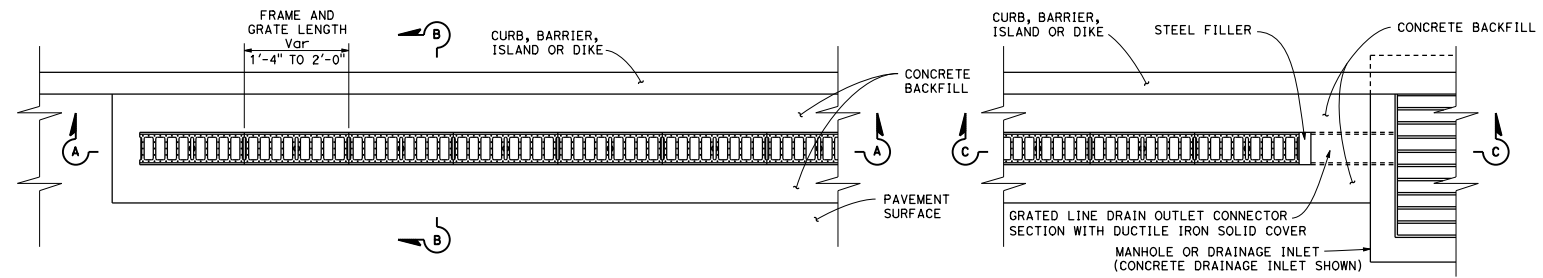
2015 STANDARD PLAN D98B



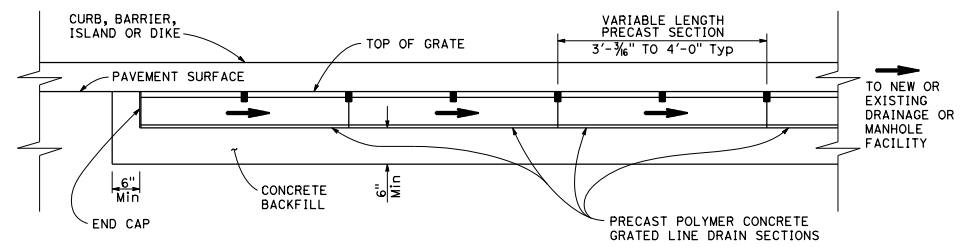
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Paul R. Davies  
 REGISTERED CIVIL ENGINEER  
 No. C52193  
 Exp. 12-31-16  
 CIVIL  
 STATE OF CALIFORNIA

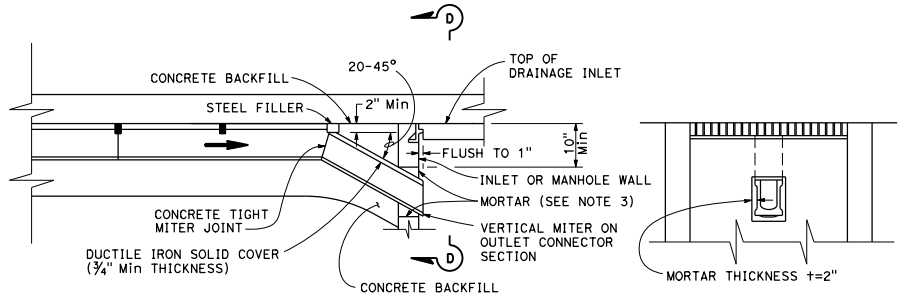
October 30, 2015  
 PLANS APPROVAL DATE  
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GRADED LINE DRAIN PLAN

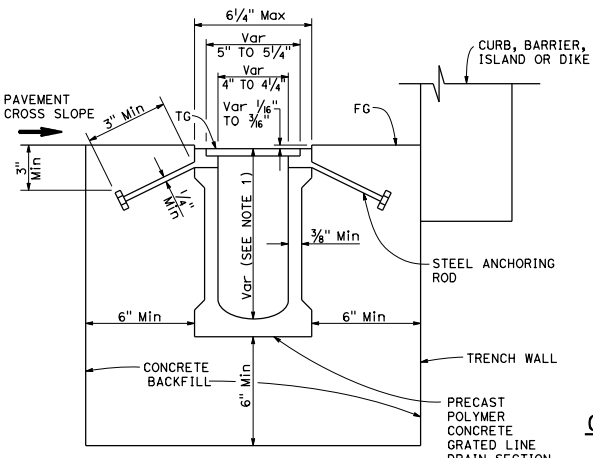


SECTION A-A See Note 1



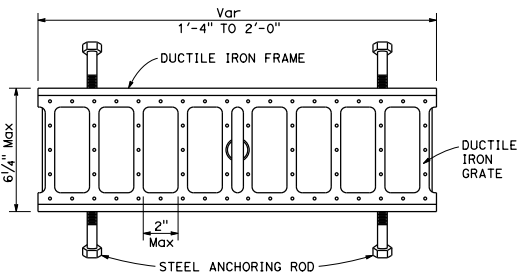
SECTION C-C

SECTION D-D



SECTION B-B

(Precast graded line drain with non-integral frame) See Note 6



GRADED LINE DRAIN FRAME AND GRATE DETAIL

See Notes 4, 5, 6 and 7

NOTES:

1. See Project Plans for trench sections to be installed.
2. Nominal dimensions shown. Allowable tolerance ± 2% .
3. For GMP inlet connection, field joint sealed with a pliable mixture of sand, portland cement and emulsified asphalt (mixture of 1 part portland cement, 3-5 parts sand and 1/2 part SSI emulsified asphalt).
4. Within designated pedestrian paths of travel, the maximum grate opening in the direction of pedestrian traffic shall be 1/2".
5. Grate patterns may vary from detail shown. See Special Provisions for requirements.
6. Steel anchoring rods not used when frame is integral with polymer concrete graded line drain section.
7. 3/16" maximum gap between adjacent gratings.

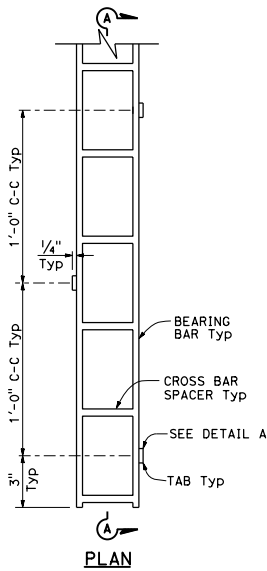
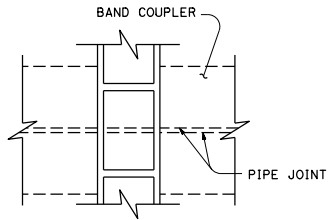
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**GRADED LINE DRAIN DETAILS**  
 NO SCALE

D98C

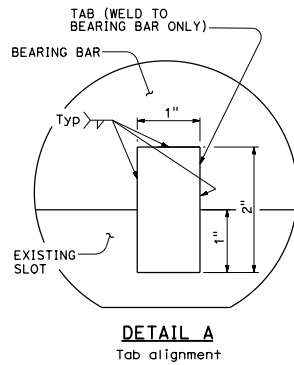
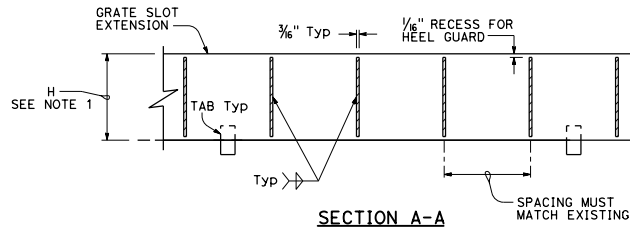
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Raymond Don Isztos**  
 REGISTERED CIVIL ENGINEER  
 No. C37332  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

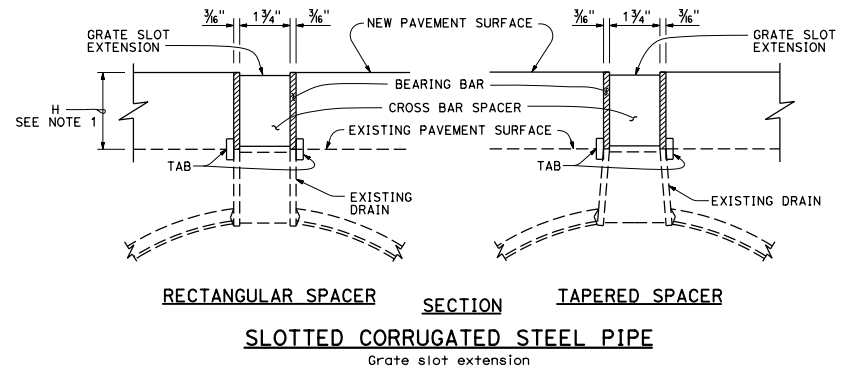
October 30, 2015  
 PLANS APPROVAL DATE  
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**SLOTTED CORRUGATED  
STEEL PIPE**  
Grate slot extension



**DETAIL A**  
Tab alignment



**RECTANGULAR SPACER SECTION TAPERED SPACER**  
**SLOTTED CORRUGATED STEEL PIPE**  
Grate slot extension

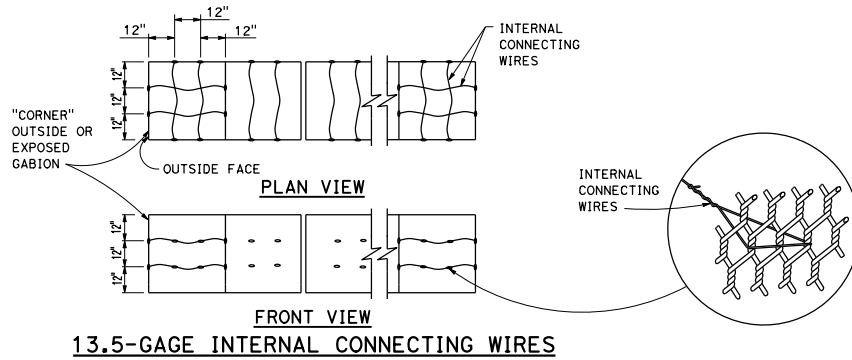
**NOTES:**

- H must be a minimum of 2 1/2", or otherwise shown on the plans.
- For Slotted Corrugated Steel Pipe Drain Details, see Standard Plans D98A and D98B.
- Use heel guard when shown. See Standard Plan D98B for heel guard details.
- Minimum grate slot extension length is 80".
- The top corners of the grate slot extension's bearing bars must not vary from a straight line more than 1/2" in 20'-0".
- Cross bar spacers must be welded to the grate slot extension's bearing bars to achieve a minimum tensile strength of 12,000 LB normal to the longitudinal axis of the bearing bars.

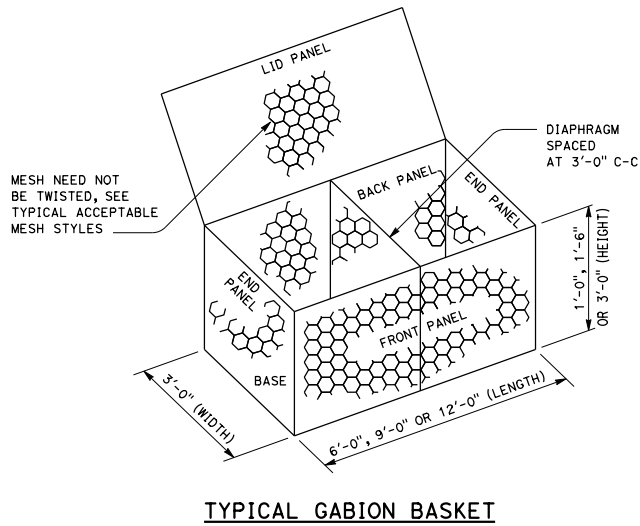
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**SLOTTED STEEL PIPE GRATE  
EXTENSION DETAILS**

NO SCALE

**D98F**

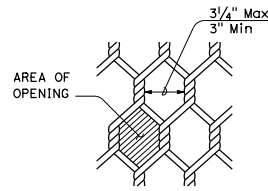


**13.5-GAGE INTERNAL CONNECTING WIRES**

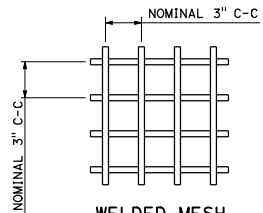


**TYPICAL GABION BASKET**

**NOTE:**  
Area of opening not to exceed 10.3 square inches.



**TWISTED MESH**



**WELDED MESH  
TYPICAL ACCEPTABLE  
MESH STYLES**

STANDARD GABION SIZES					
LETTER CODE	LENGTH	WIDTH	HEIGHT	NUMBER OF DIAPHRAGMS	VOLUME CY
A	6'-0"	3'-0"	3'-0"	1	2.0
B	9'-0"	3'-0"	3'-0"	2	3.0
C	12'-0"	3'-0"	3'-0"	3	4.0
D	6'-0"	3'-0"	1'-6"	1	1.0
E	9'-0"	3'-0"	1'-6"	2	1.5
F	12'-0"	3'-0"	1'-6"	3	2.0
G	6'-0"	3'-0"	1'-0"	1	0.66
H	9'-0"	3'-0"	1'-0"	2	1.0
I	12'-0"	3'-0"	1'-0"	3	1.33

**NOTES:**

1. Internal connecting wire (13.5-gage) to be installed across width of interior gabions and across width and length of end gabions.
2. Internal connecting wires required on all gabions 3'-0" high.
3. Preformed stiffeners (11-gage or 9-gage) are an acceptable alternative to internal connecting wires. Install them as recommended by manufacturer or as directed by the Engineer at 1/3 points.
4. Place rock in end gabion cell first, and continue by filling interior gabion cells.
5. For gabion dimensions, refer to table "Standard Gabion Sizes".

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**GABION BASKET DETAILS No. 1**

NO SCALE

**D100A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Bruce D. Swanger  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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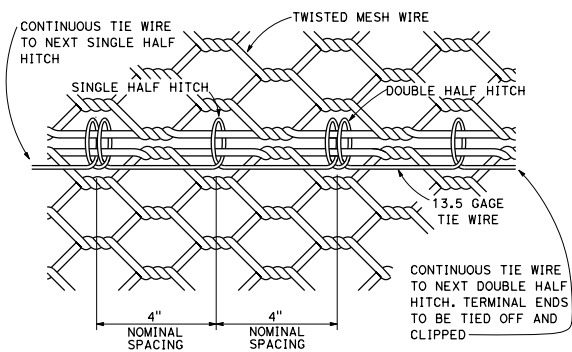
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

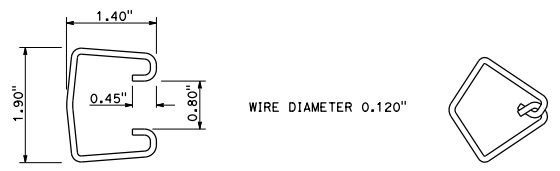
BRUCE D. SWANGER  
No. C61257  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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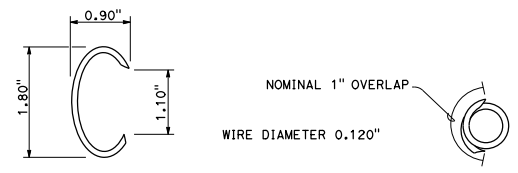


**STANDARD TIE WIRE DETAIL**

Alternating single and double half hitches (locked loops)  
(See Note 2)



**BEFORE CLOSURE AFTER CLOSURE**  
**INTERLOCKING FASTENER**



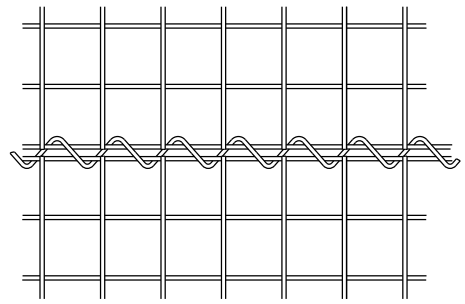
**BEFORE CLOSURE AFTER CLOSURE**  
**OVERLAPPING FASTENER**

**ALTERNATIVE GABION JOINT MATERIAL FASTENERS**

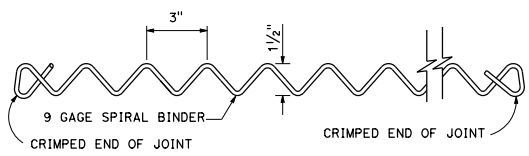
(Fastener dimensions nominal)  
(See Note 3)

**NOTES:**

1. A joint connection must be made where any panel edge meets another panel. This includes adjacent gabion baskets, individual panels within a basket, diaphragm edges, etc.
2. Standard tie wire may be used as a joint connector for either twisted or welded mesh. Spiral binder is to be used with welded mesh only.
3. When alternative gabion joint material fasteners are not capable of enclosing all wires along a joint, especially at Basket-To-Basket Joints, either standard tie wire or spiral binder, as applicable, must be used.

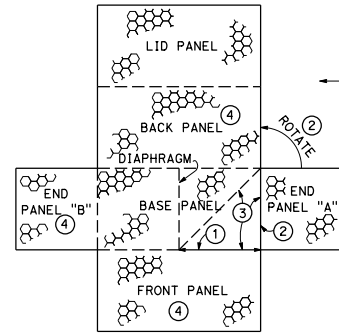


**SPIRAL BINDER LACING**



**STANDARD SPIRAL BINDER**

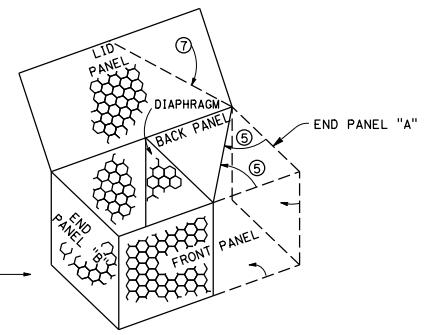
(See Note 2)



**FLAT LAYOUT OF GABION BASKET**

**To Assemble Transitional Gabion Basket:**

- Step 1 Cut mesh along joint between Front Panel and Base Panel.
- Step 2 Unfasten End Panel "A" from Base Panel and rotate End Panel "A". Fasten End Panel "A" to Back Panel.
- Step 3 Fold the cut portion of the Base Panel into upright position along diagonal from the diaphragm to the corner of the Back Panel.
- Step 4 Fold the Back Panel, Front Panel and End Panel "B" into upright positions. Fasten End Panel "B" to the Back Panel and the Front Panel.
- Step 5 Rotate End Panel "A" and the cut portion of the Front Panel inward against the upturned portion of the Base Panel. Fasten along the overlapped portion of the Front Panel and End Panel "A". Fasten the overlapped portion of the Front Panel and End Panel "A" to the folded upright portion of the Base Panel along the diagonal (described in Step 3).
- Step 6 Fill the Transitional Gabion Basket with rock as per specifications.
- Step 7 Close lid and fold over corner of Lid Panel. Fasten along Lid Panel edges.



**ASSEMBLED TRANSITIONAL GABION BASKET**

**TRANSITIONAL GABION BASKET**


(For 6'-0", 9'-0" or 12'-0" gabion)

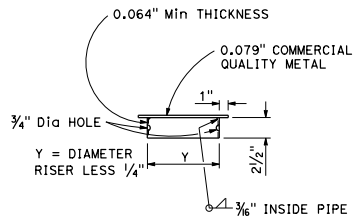
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**GABION BASKET DETAILS No. 2**

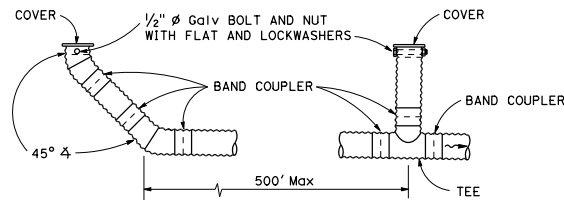
NO SCALE

**D100B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
					
REGISTERED CIVIL ENGINEER Bruce D. Swanger No. C61257 Exp. 6-30-17 CIVIL STATE OF CALIFORNIA					
October 30, 2015 PLANS APPROVAL DATE <small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

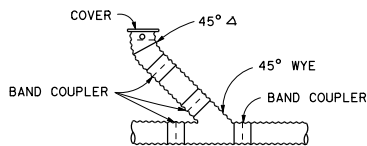


**WELDED METAL COVER**



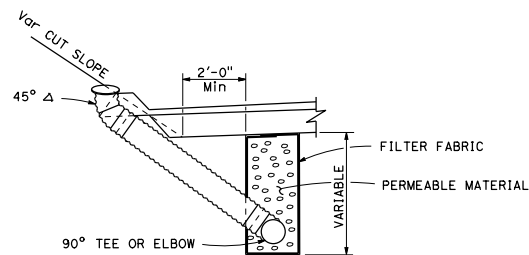
**TERMINAL RISER      VERTICAL RISER**

Metal pipe risers and perforated metal pipe underdrain shown. Use type of pipe specified.

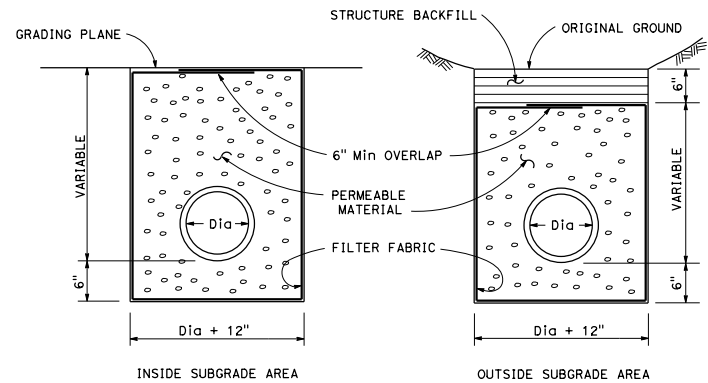


**45° RISER**

**UNDERDRAIN RISERS**



**UNDERDRAIN LOCATION AND RISERS ANGLED TO CUT SLOPE**



**EXCAVATION AND BACKFILL**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

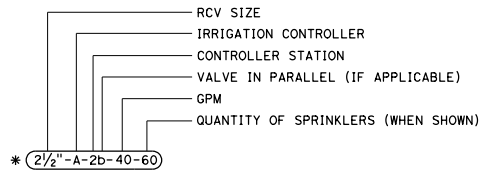
**UNDERDRAINS**

NO SCALE

**D102**

EXISTING	NEW	ITEM DESCRIPTION
		WATER METER (WM)
		BACKFLOW PREVENTER ASSEMBLY (BPA)
		BACKFLOW PREVENTER ENCLOSURE (BPE)
		BOOSTER PUMP (BP)
		TRUCK LOADING STANDPIPE (TLS)
		FLOW SENSOR (FS)
		MASTER IRRIGATION CONTROLLER (MIC)
		AUXILIARY IRRIGATION CONTROLLER (AIC)
		IRRIGATION CONTROLLER (IC)
		IRRIGATION CONTROLLER (IC) (BATTERY)
		IRRIGATION CONTROLLER (IC) (SOLAR)
		IRRIGATION CONTROLLER (IC) (TWO WIRE)
		IRRIGATION CONTROLLER(S) IN CONTROLLER ENCLOSURE CABINET (ICC)
		ARMOR-CLAD CONDUCTORS (ACC)
		CONTROL AND NEUTRAL CONDUCTORS (CNC)
		IRRIGATION CONDUIT
		EXTEND IRRIGATION CONDUIT
		DUCTILE IRON PIPE (SUPPLY LINE) (MAIN) (DIP)
		GALVANIZED STEEL PIPE (SUPPLY LINE) (MAIN) (GSP)
		GALVANIZED STEEL PIPE (SUPPLY LINE) (LATERAL) (GSP)
		PLASTIC PIPE (SUPPLY LINE) (MAIN)
		PLASTIC PIPE (SUPPLY LINE) (LATERAL)
		COPPER PIPE (SUPPLY LINE)
		DRIP IRRIGATION TUBING
		REMOTE CONTROL VALVE (RCV)
		REMOTE CONTROL VALVE (MASTER) (RCVM)
		REMOTE CONTROL VALVE (MASTER) W/FLOW METER (RCVMF)
		REMOTE CONTROL VALVE W/PRESSURE REGULATOR (RCVP)
		EXISTING MANUAL CONTROL VALVE (MCV)
		DRIP VALVE ASSEMBLY (DVA)
		WYE STRAINER ASSEMBLY (WSA)

EXISTING	NEW	ITEM DESCRIPTION
		GATE VALVE (GV)
		BALL VALVE (BV)
		QUICK COUPLING VALVE (QCV)
		CAM COUPLER ASSEMBLY (CCA)
		GARDEN VALVE ASSEMBLY (GARVA)
		PRESSURE REGULATING VALVE (PRV)
		PRESSURE RELIEF VALVE (PRLV)
		FLOW CONTROL VALVE (FCV)
		COMBINATION AIR RELEASE VALVE (CARV)
		CHECK VALVE (CV)
		FLUSH VALVE (FV)
		EXISTING NOZZLE LINE W/TURNING UNION
		EXISTING IRRIGATION SYSTEM
		EXISTING IRRIGATION SYSTEM TO BE REMOVED
		CHAIN LINK GATE
		QUICK COUPLING VALVE W/SPRINKLER PROTECTOR
		SPRINKLER W/SPRINKLER PROTECTOR
		CONNECT TO EXISTING SYSTEM
		CAP
		CAP EXISTING
		FIBER ROLL
		COMPOST SOCK



**VALVE CODE**

\* VALVE CODES FOR EXISTING VALVES ARE SHOWN IN A DASHED ENCLOSURE.


DIS#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS


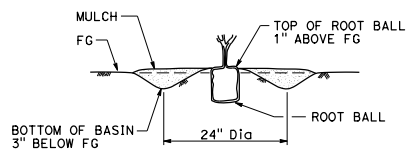
LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE AND EROSION CONTROL SYMBOLS**  
 NO SCALE

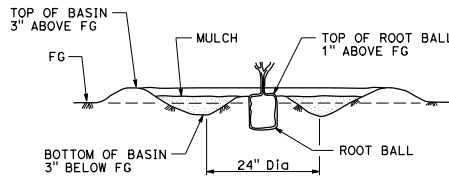
**H1**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

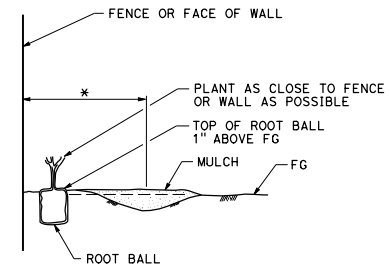
  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

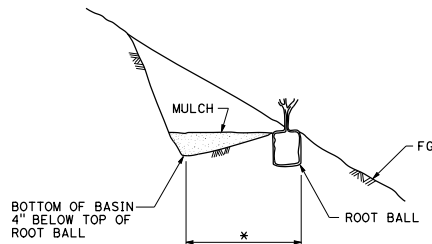
**SECTION**  
(Flat Area)



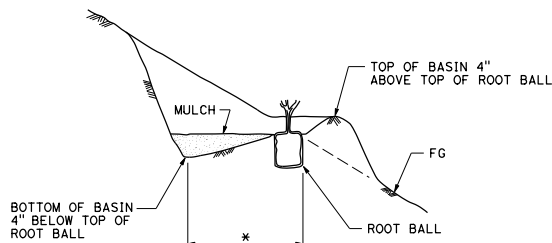
**SECTION**  
(Flat Area)



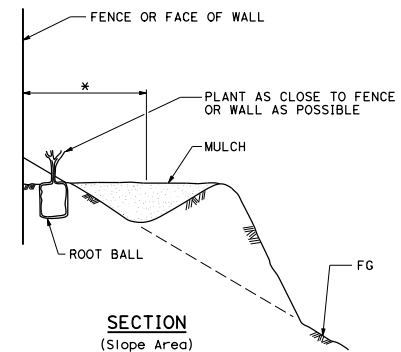
**SECTION**  
(Flat Area)



**SECTION**  
(Slope Area)  
**BASIN TYPE I**



**SECTION**  
(Slope Area)  
**BASIN TYPE II**



**SECTION**  
(Slope Area)  
**BASIN TYPE III**

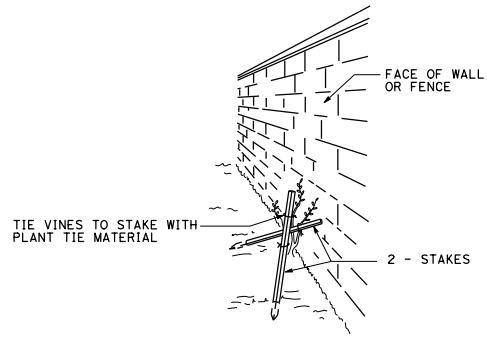
\* Basin area equivalent to 24" Dia

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**

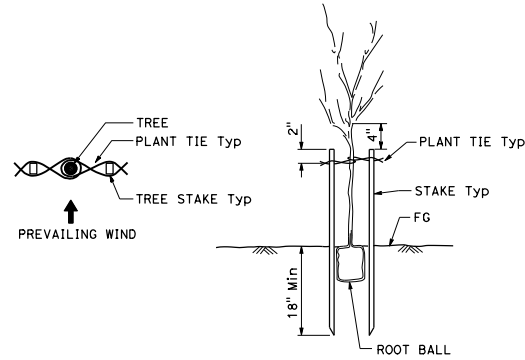
NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

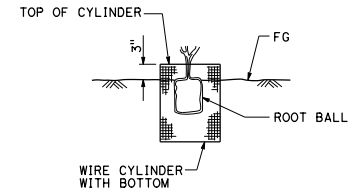
*Paul W. Ferrero*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
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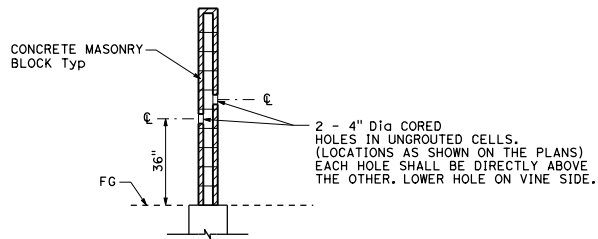
**PERSPECTIVE VINE STAKING**



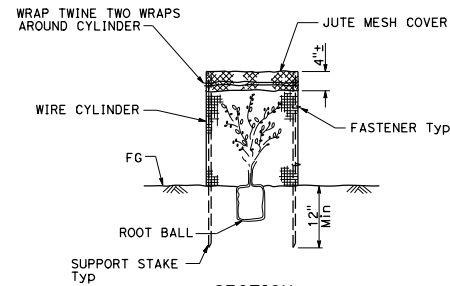
**TREE STAKING**



**SECTION ROOT PROTECTOR**



**SECTION CORE HOLE (VINE)**



**SECTION FOLIAGE PROTECTOR**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**

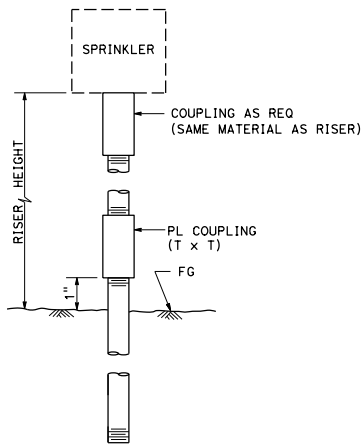
NO SCALE

**H3**

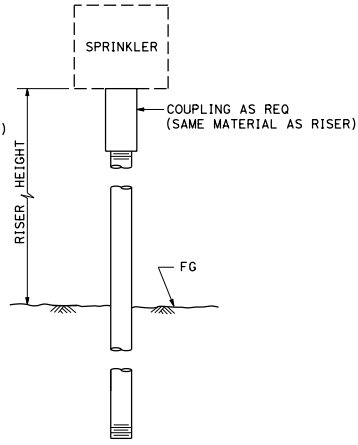


Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

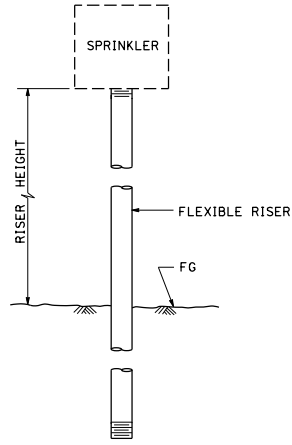
*Paul W. ...*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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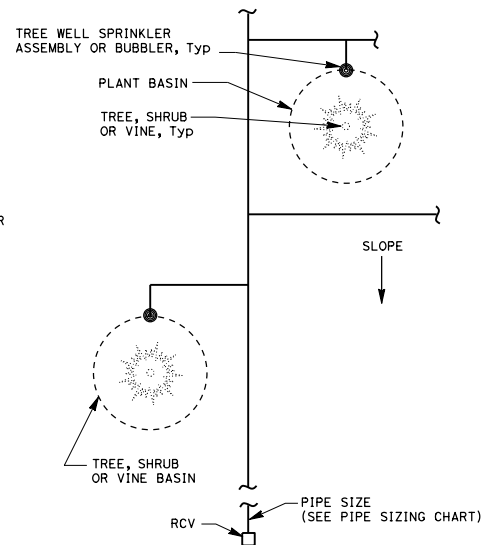
**ELEVATION**  
**RISER SPRINKLER ASSEMBLY TYPE I**



**ELEVATION**  
**RISER SPRINKLER ASSEMBLY TYPE II**



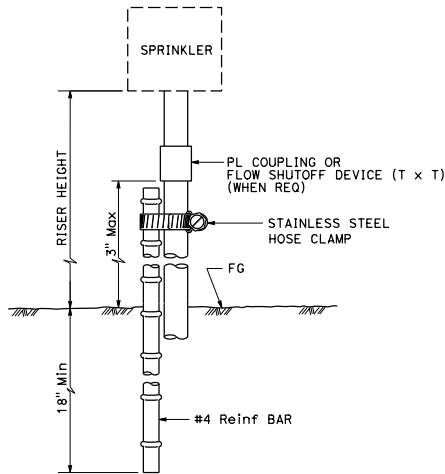
**ELEVATION**  
**RISER SPRINKLER ASSEMBLY TYPE III**



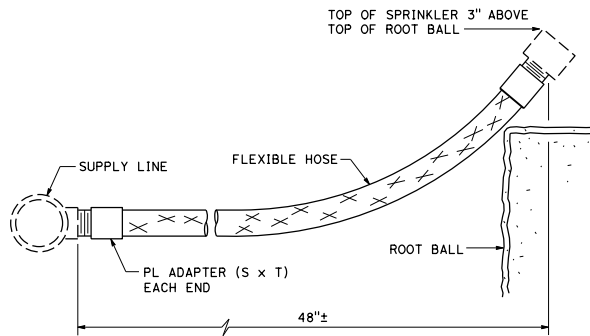
**PLAN**

**NOTES:**

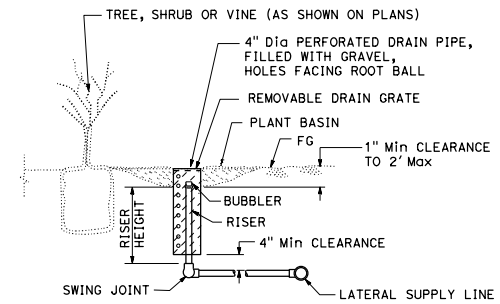
1. Install tree well sprinkler assembly on up-hill side of plant when on slope.
2. Install bubbler within basin.



**ELEVATION**  
**RISER SPRINKLER ASSEMBLY TYPE IV**



**ELEVATION**  
**RISER SPRINKLER ASSEMBLY TYPE V**

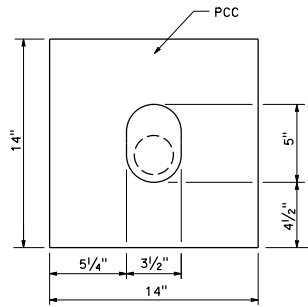


**SECTION**  
**TREE WELL SPRINKLER ASSEMBLY**

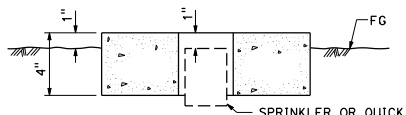
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**

NO SCALE

**H4**

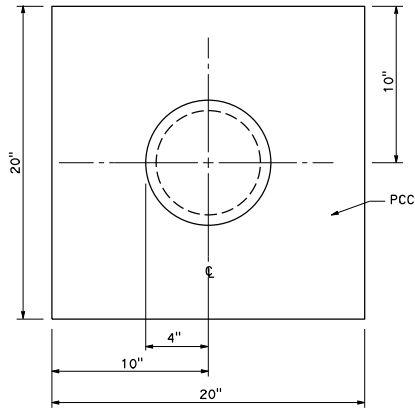


PLAN

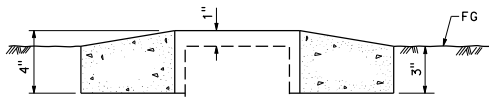


SECTION

**SPRINKLER PROTECTOR TYPE I**

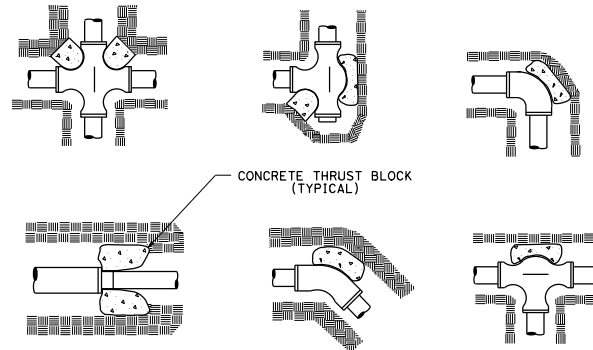


PLAN

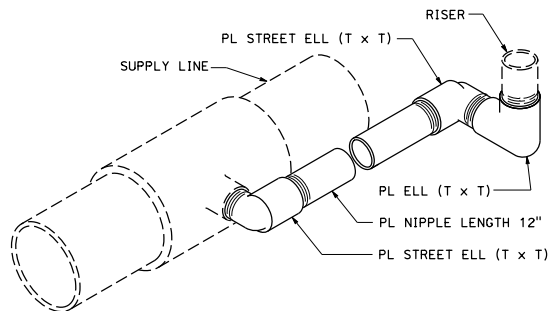


SECTION

**SPRINKLER PROTECTOR TYPE II**

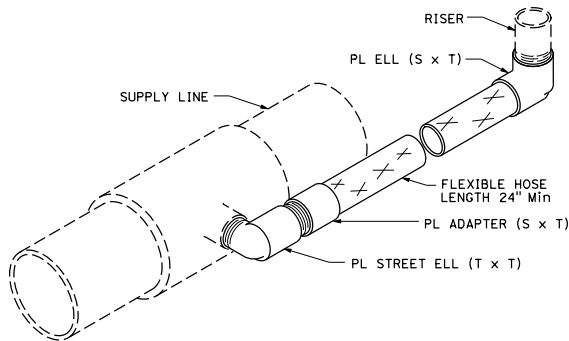


**TYPICAL THRUST BLOCKS**



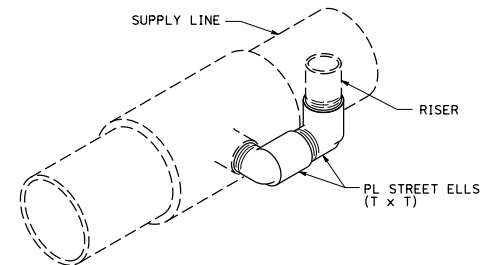
ISOMETRIC

**POP-UP SPRINKLER ASSEMBLY TYPE I**



ISOMETRIC

**POP-UP SPRINKLER ASSEMBLY TYPE II**



ISOMETRIC

**POP-UP SPRINKLER ASSEMBLY TYPE III**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

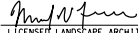
*Paul W. [Signature]*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**

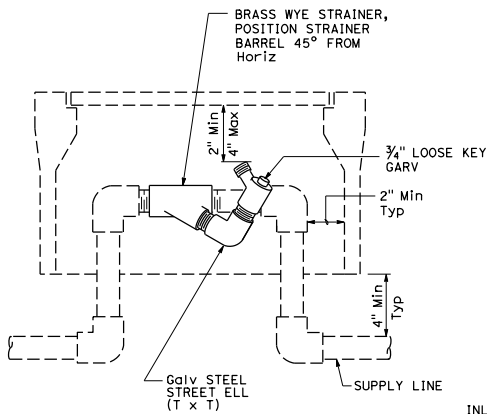
NO SCALE

**H5**

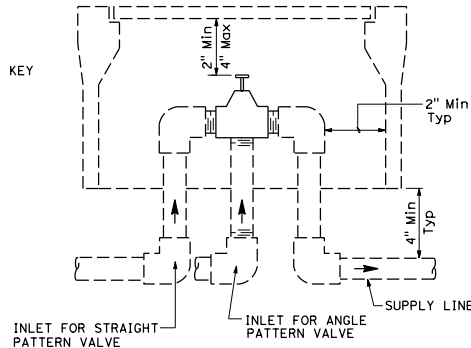
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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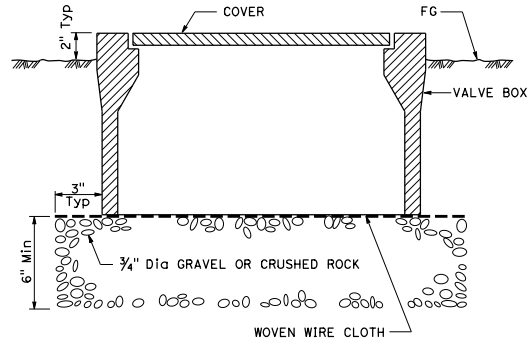
  
 LICENSED LANDSCAPE ARCHITECT  
 Paul W. Ferris  
 No. 117  
 8-30-15  
 2014  
 STATE OF CALIFORNIA



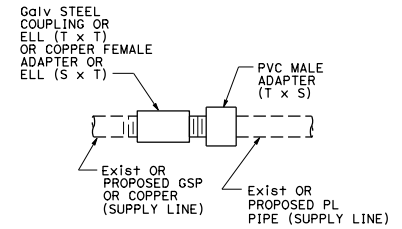
**ELEVATION**  
**WYE STRAINER ASSEMBLY**



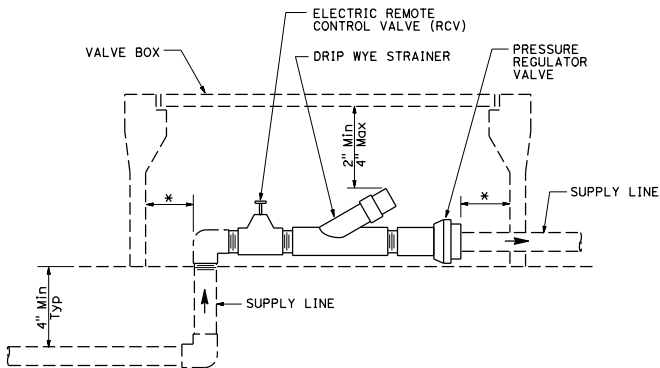
**ELEVATION**  
**VALVE**



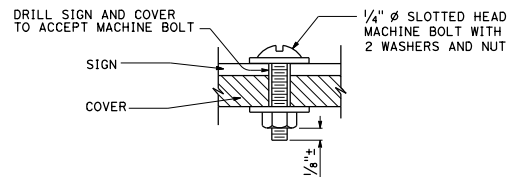
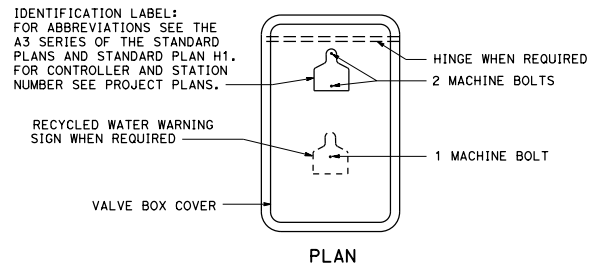
**SECTION**  
**VALVE BOX**



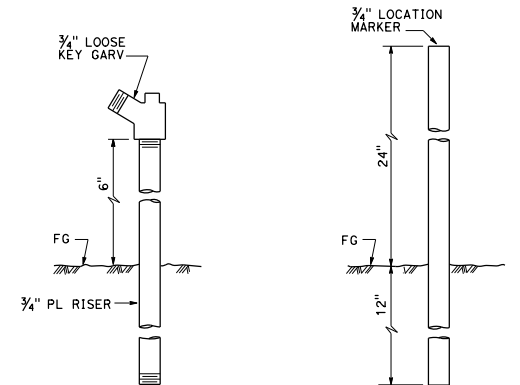
**GALVANIZED OR COPPER PIPE CONNECTION TO PLASTIC PIPE**



**ELEVATION**  
**DRIP VALVE ASSEMBLY**



**SECTION**  
**VALVE BOX IDENTIFICATION**



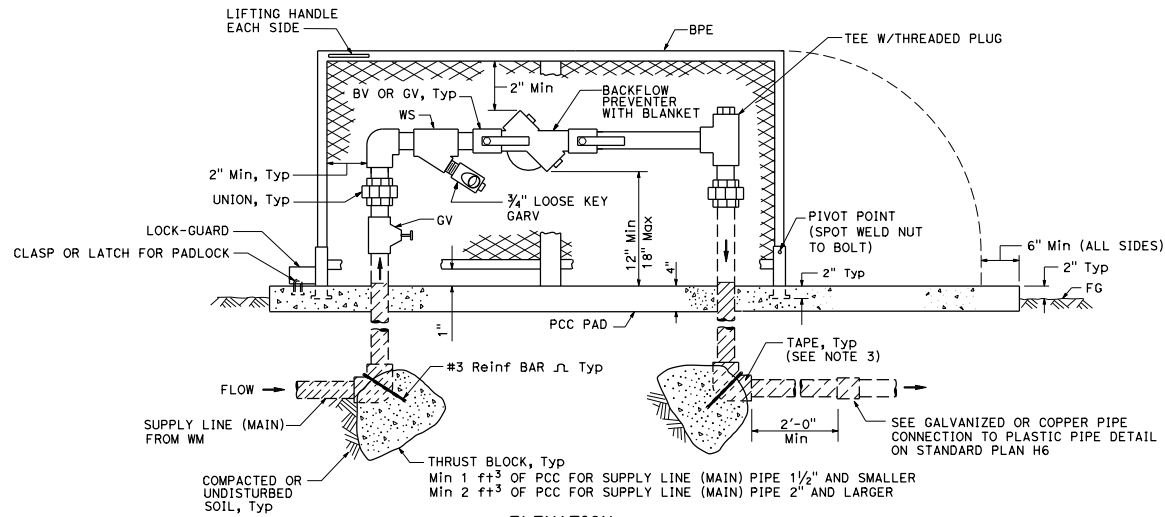
**ELEVATION**  
**GARDEN VALVE ASSEMBLY**

**ELEVATION**  
**LOCATION MARKER**

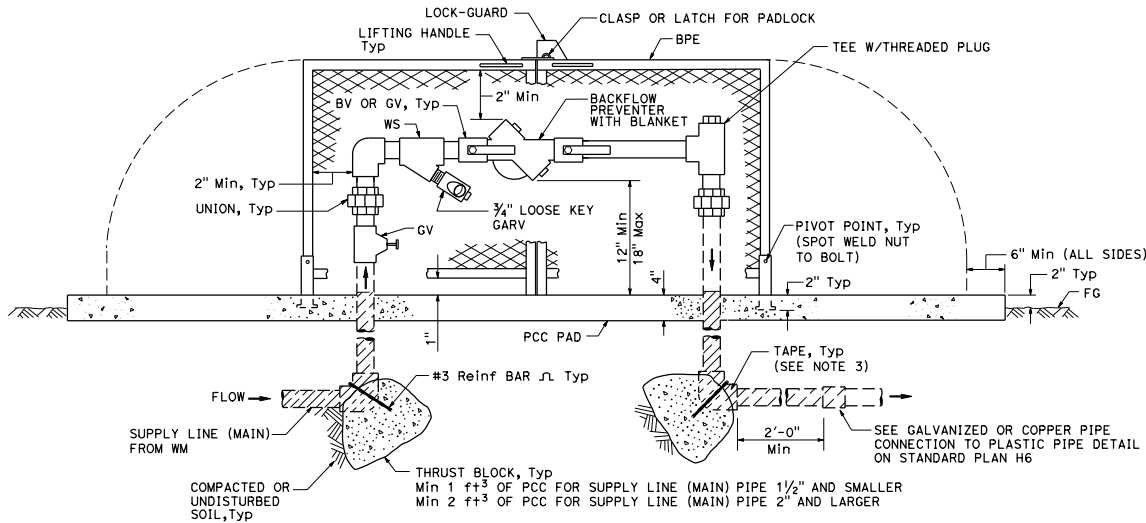
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**

NO SCALE

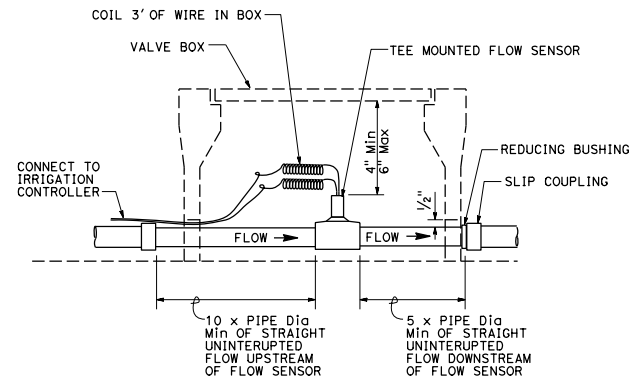
**H6**



**ELEVATION**  
**BACKFLOW PREVENTER ASSEMBLY**  
IN ONE PIECE ENCLOSURE



**ELEVATION**  
**BACKFLOW PREVENTER ASSEMBLY**  
IN TWO PIECE ENCLOSURE



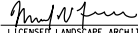

**SECTION**  
**FLOW SENSOR**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**

NO SCALE

**H7**

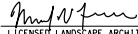
DIS#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS


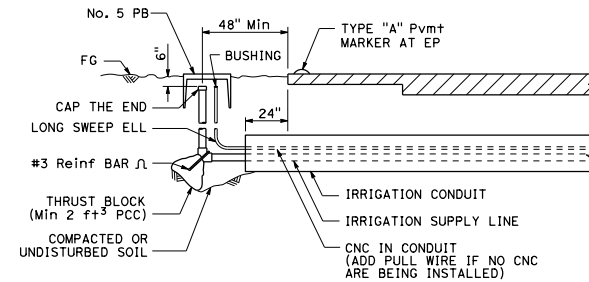
  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
  
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**NOTES:**

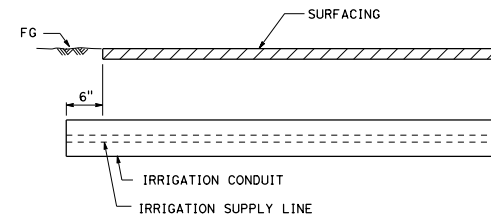
1. Wye strainer and fittings must be the same size as the backflow preventer shown on the plans.
2. Backflow preventer assembly manifold pipe must be the same pipe as the supply line (main) pipe to be installed from the water meter to the backflow preventer assembly.
3. All metal in contact with soil and Portland Cement Concrete must be wrapped with 2" wide plastic backed adhesive polyethylene tape 20 mil thick with 1/2" overlap.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

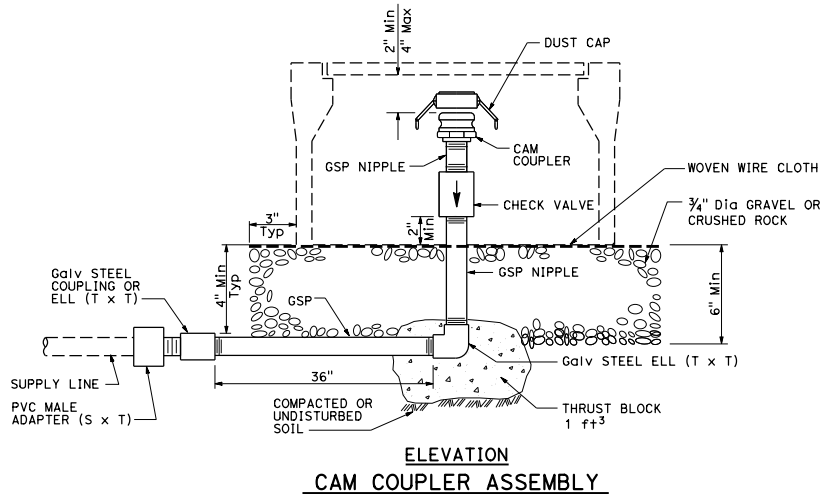
  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
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**SECTION**  
**IRRIGATION CONDUIT**  
UNDER TRAVELED WAY



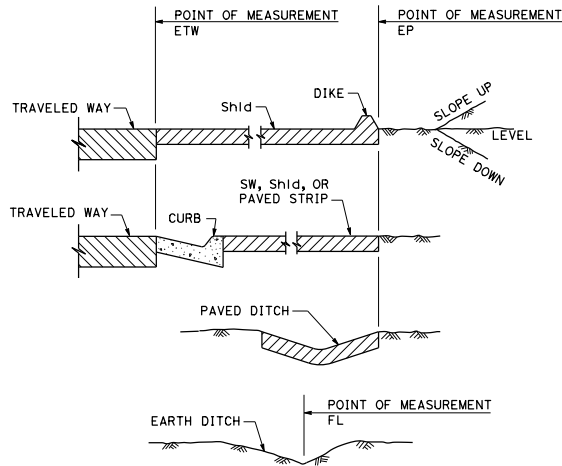
**SECTION**  
**IRRIGATION CONDUIT**  
UNDER SIDEWALKS, DRIVEWAYS AND PATHS



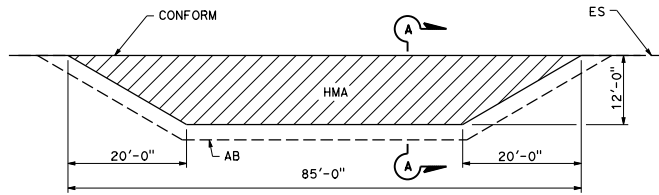
**ELEVATION**  
**CAM COUPLER ASSEMBLY**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**  
NO SCALE

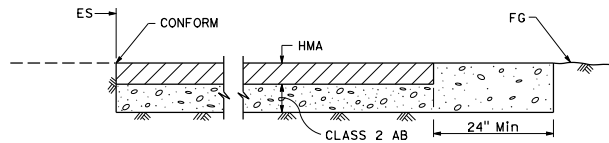
**H8**



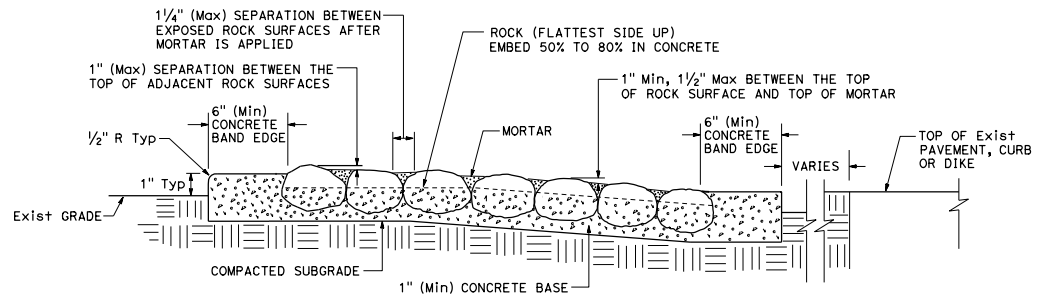
**SECTION POINTS OF MEASUREMENT**



**PLAN**

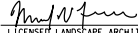



**SECTION A-A MAINTENANCE VEHICLE PULLOUT**



**SECTION ROCK BLANKET**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

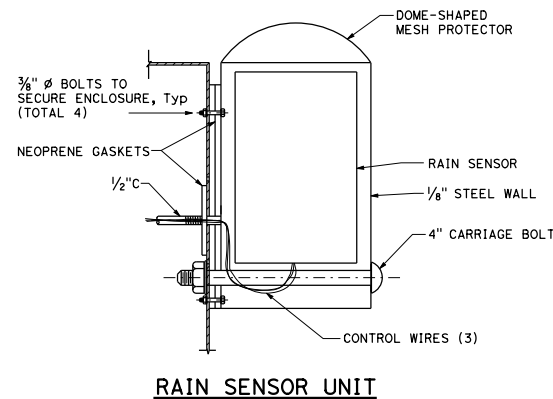
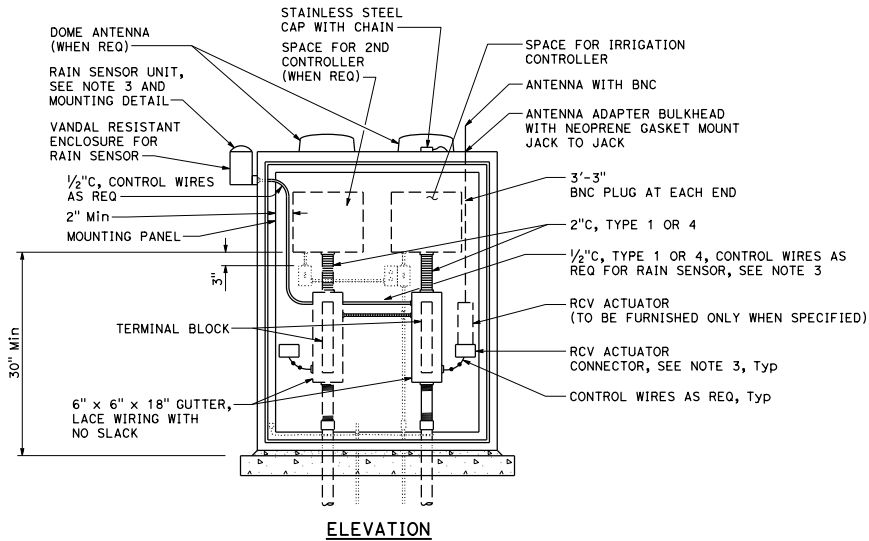
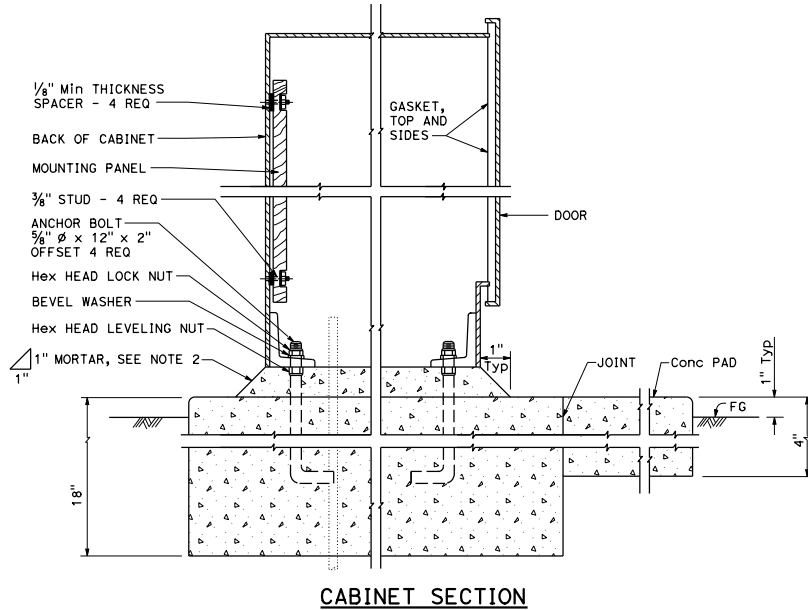
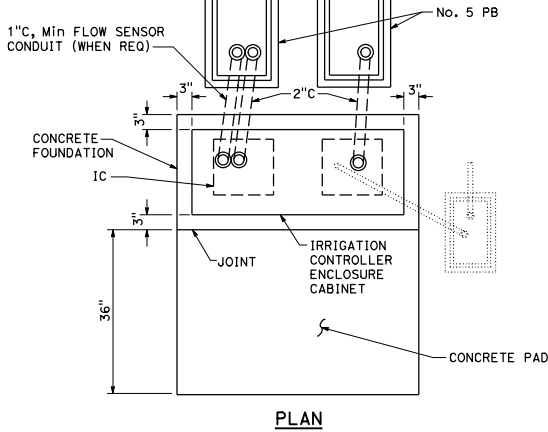
  
 LICENSED LANDSCAPE ARCHITECT  
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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LANDSCAPE DETAILS**

NO SCALE

**H9**



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Paul W. Ferrero*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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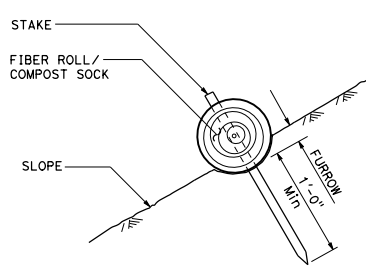
- NOTES:**
- All dimensions are nominal.
  - Mortar shall be 1-part cement, 2-parts plaster sand.
  - Rain sensor unit and/or remote control valve actuator connectors. To be provided only when specified.
  - See project plans for location and number of irrigation controllers for each cabinet.
  - The electrical items shown in dropout are not labeled. See Standard Plan ES-3H for electrical requirements.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**IRRIGATION CONTROLLER  
 ENCLOSURE CABINET**  
 NO SCALE

**H10**

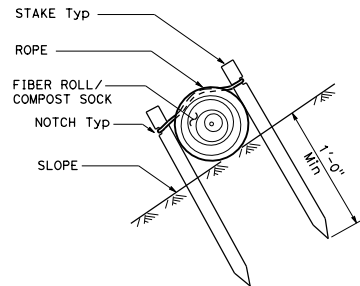
2015 STANDARD PLAN H10

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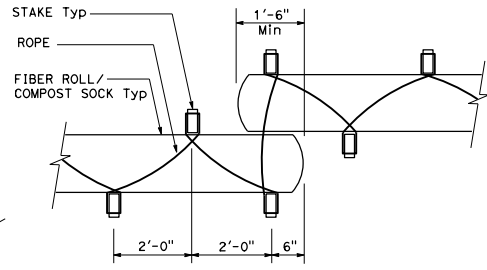
SECTION

FIBER ROLL/COMPOST SOCK  
(TYPE 1)

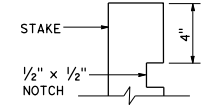


SECTION

FIBER ROLL/COMPOST SOCK  
(TYPE 2)



PLAN



ELEVATION

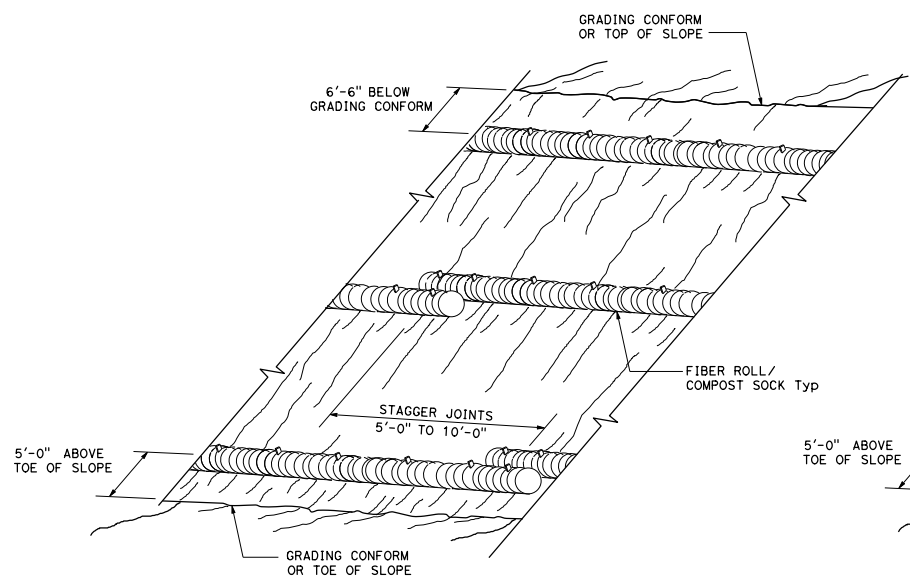
STAKE NOTCH DETAIL

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

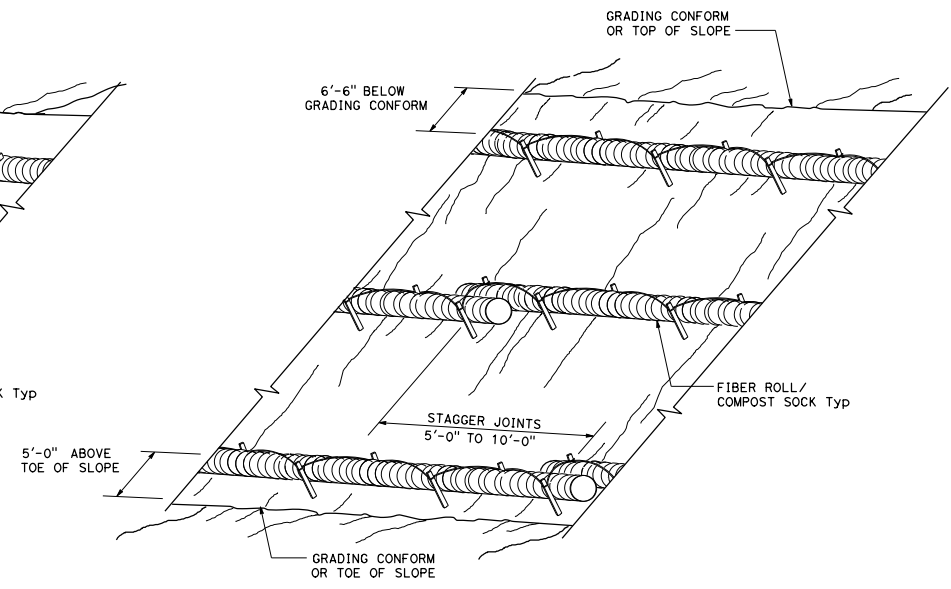
**NOTE:**

1. Installations shown in the perspectives are for slope inclination of 10:1 (Horiz:Vert) and steeper.



PERSPECTIVE

FIBER ROLL/COMPOST SOCK  
(TYPE 1)



PERSPECTIVE

FIBER ROLL/COMPOST SOCK  
(TYPE 2)

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**EROSION CONTROL DETAILS  
FIBER ROLL AND COMPOST SOCK**

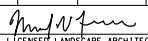
NO SCALE


H51

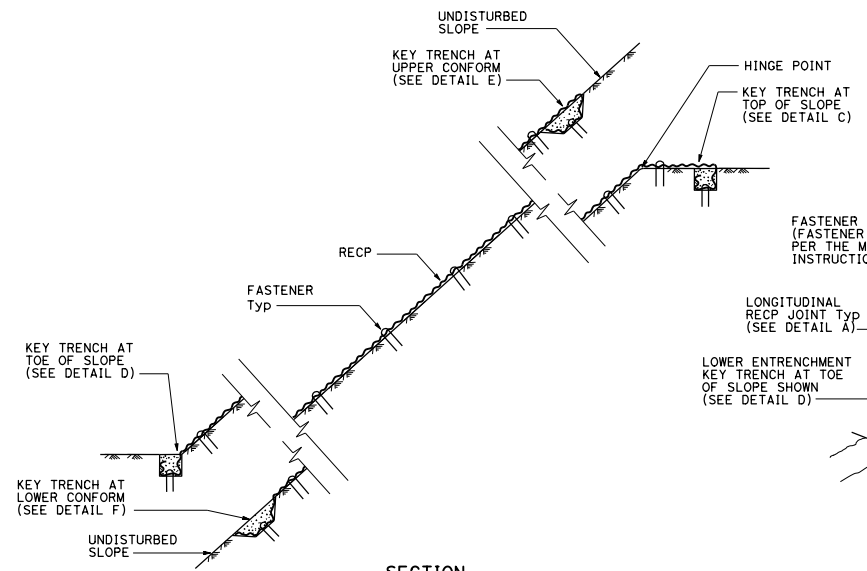
2015 STANDARD PLAN H51



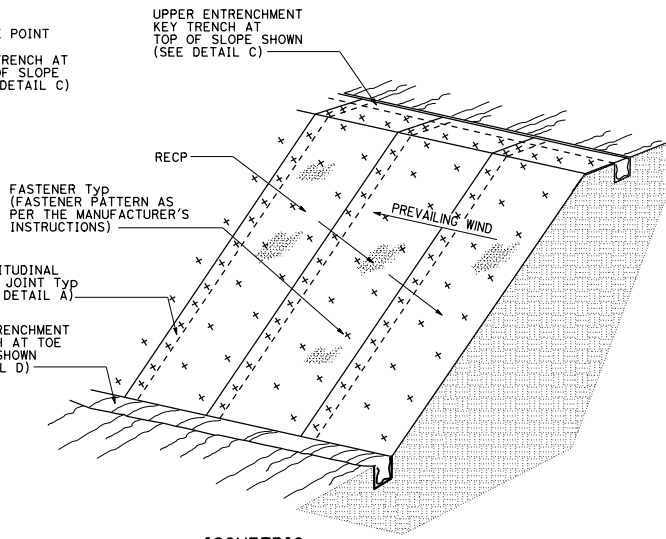
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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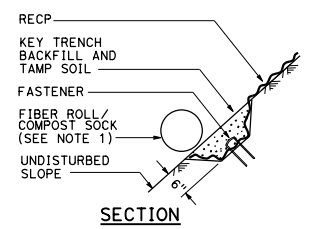


**SECTION**  
**ROLLED EROSION CONTROL PRODUCT**  
**ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS**

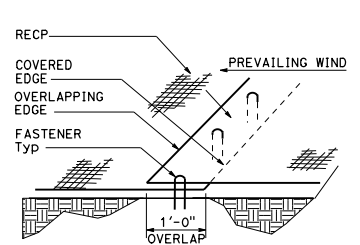


**ISOMETRIC**  
**ROLLED EROSION CONTROL PRODUCT**  
**ON SLOPE**

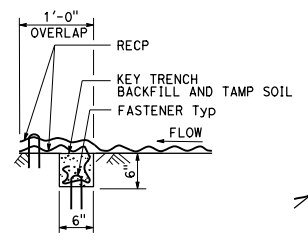
- NOTES:**
1. Fiber Roll/Compost Sock shown for reference purposes only.
  2. If transverse rolled erosion control product joints are required on slopes, see Detail B.



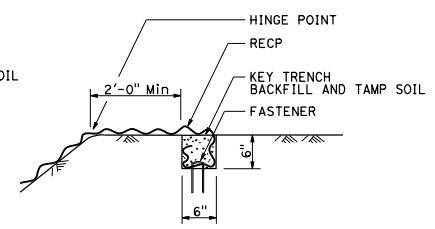
**SECTION**  
**DETAIL F**  
**KEY TRENCH AT**  
**LOWER CONFORM**



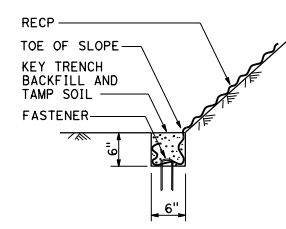
**PERSPECTIVE**  
**DETAIL A**  
**LONGITUDINAL ROLLED EROSION**  
**CONTROL PRODUCT JOINT**



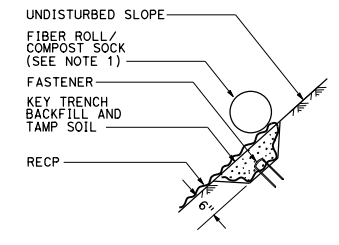
**SECTION**  
**DETAIL B**  
**TRANSVERSE ROLLED EROSION**  
**CONTROL PRODUCT JOINT**



**SECTION**  
**DETAIL C**  
**KEY TRENCH AT**  
**TOP OF SLOPE**



**SECTION**  
**DETAIL D**  
**KEY TRENCH AT**  
**TOE OF SLOPE**

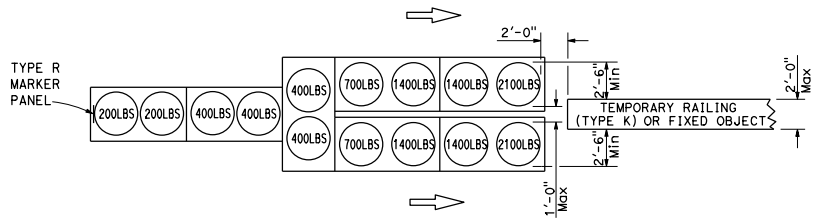
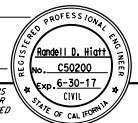


**SECTION**  
**DETAIL E**  
**KEY TRENCH AT**  
**UPPER CONFORM**

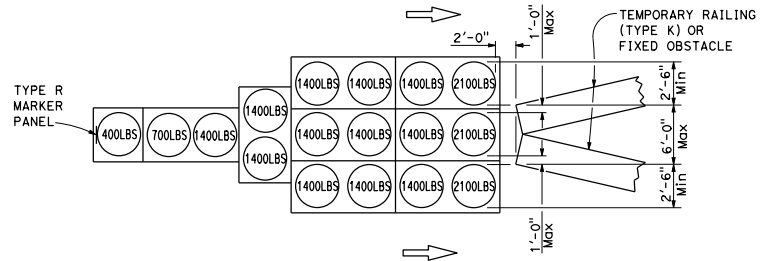
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ROLLED EROSION CONTROL PRODUCT**  
 NO SCALE

**H52**

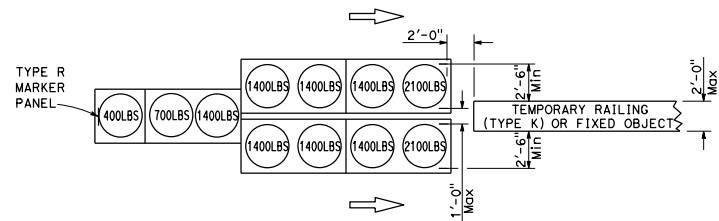
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
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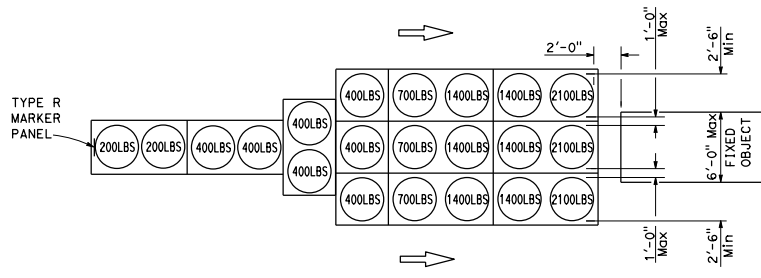
**ARRAY 'TU14'**  
Approach speed 45 mph or more



**ARRAY 'TU17'**  
Approach speed less than 45 mph



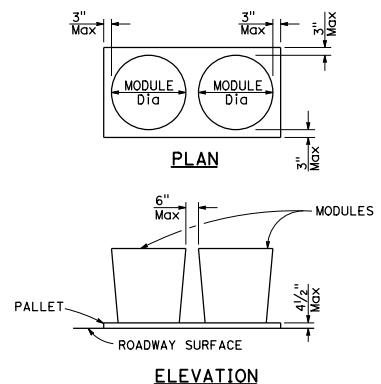
**ARRAY 'TU11'**  
Approach speed less than 45 mph



**ARRAY 'TU21'**  
Approach speed 45 mph or more

**NOTES:**

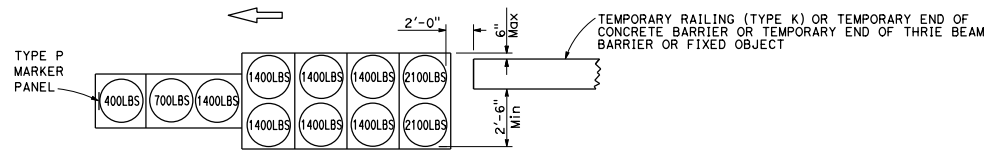
1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal.
3. Refer to Standard Plan A73B for marker details.
4. Approach speeds indicated conform to NCHRP 350 Report criteria.



**CRASH CUSHION PALLET DETAIL**

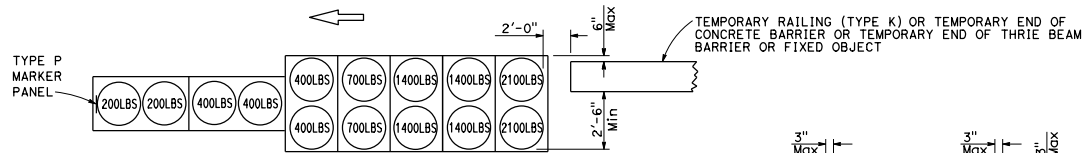
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY CRASH CUSHION,  
SAND FILLED  
(UNIDIRECTIONAL)**  
NO SCALE

**T1A**



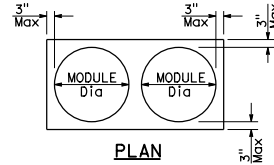
**ARRAY 'TB11'**

Approach speed less than 45 mph

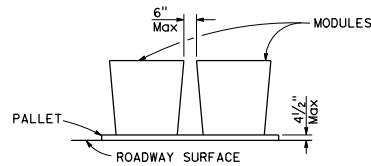


**ARRAY 'TB14'**

Approach speed 45 mph or more



**PLAN**



**ELEVATION**

**CRASH CUSHION PALLET DETAIL**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Randell D. Hiatt</i> REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
No. C50200 Exp. 6-30-17 CIVIL					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

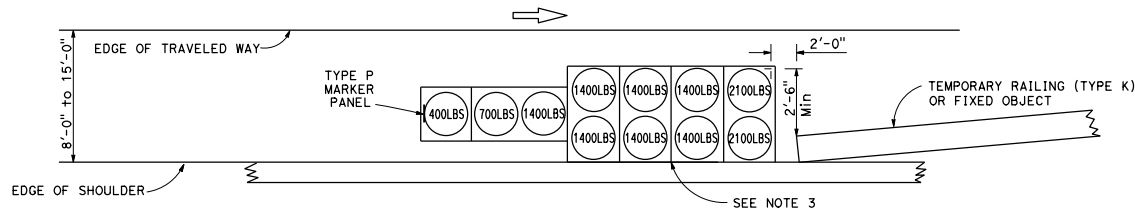
**NOTES:**

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal.
3. Refer to Standard Plan A73B for marker details.
4. Approach speeds indicated conform to NCHRP 350 Report criteria.

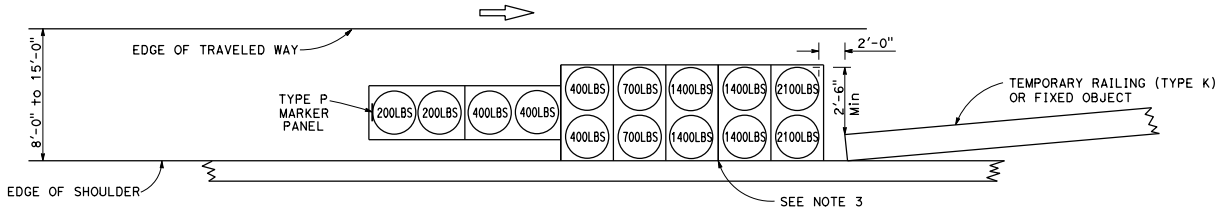
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TEMPORARY CRASH CUSHION,  
 SAND FILLED  
 (BIDIRECTIONAL)**

NO SCALE

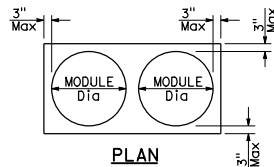
**T1B**



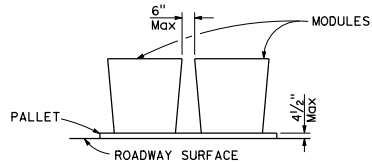
**ARRAY 'TS11'**  
Approach speed less than 45 mph  
See Note 6



**ARRAY 'TS14'**  
Approach speed 45 mph or more  
See Note 6



**PLAN**



**ELEVATION**

**CRASH CUSHION PALLET DETAIL**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Randell D. Hiatt*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Randell D. Hiatt*  
No. C50200  
Exp. 6-30-17  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
STATE OF CALIFORNIA

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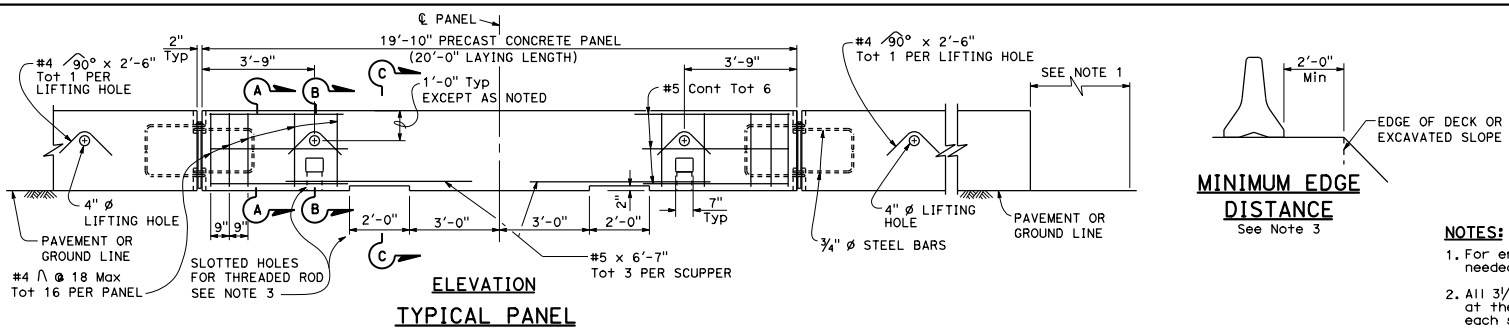
**NOTES:**

1. (XXX) Indicates sand filled module location and weight of sand in pounds for each module. Module spacing is based on the greater diameter of the module.
2. All sand weights are nominal.
3. The temporary crash cushion arrays shown on this plan shall be used only in locations where there will be traffic on one side of the temporary crash cushion array.
4. Arrays for median shoulders shall conform to details shown on this plan for outside shoulders.
5. Refer to Standard Plan A73B for marker details.
6. For shoulder widths less than 8'-0", appropriate approved crash cushion protection, other than sand filled modules, shall be provided at fixed objects and at approach ends of temporary railing. The specific type of crash cushion shall be as shown on the project plans or as specified in the Special Provisions, or if not shown on the project plans or specified in the Special Provisions, shall be as approved by the Engineer.
7. Approach speeds indicated conform to NCHRP 350 Report criteria.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY CRASH CUSHION,  
SAND FILLED  
(SHOULDER INSTALLATIONS)**

NO SCALE

**T2**



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

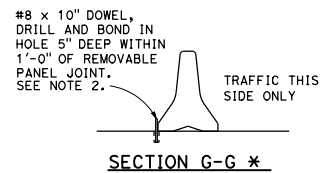
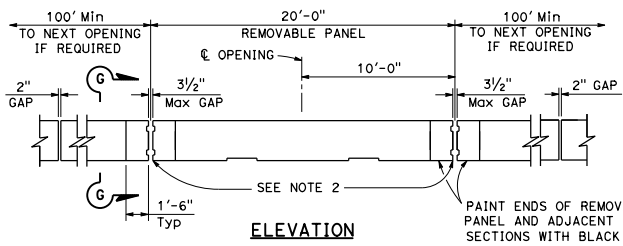
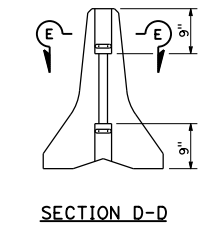
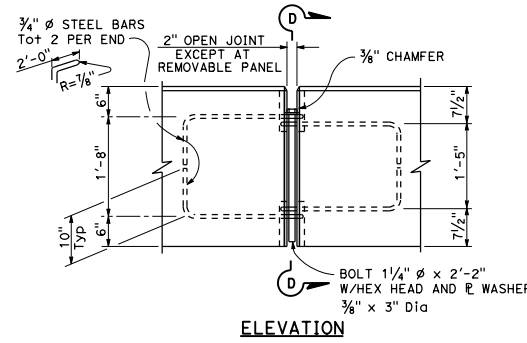
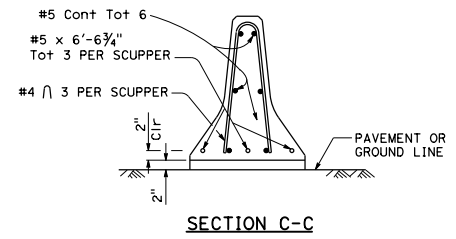
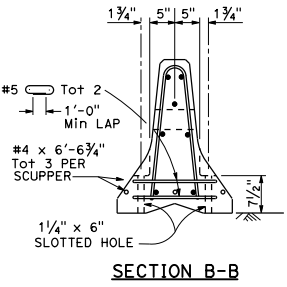
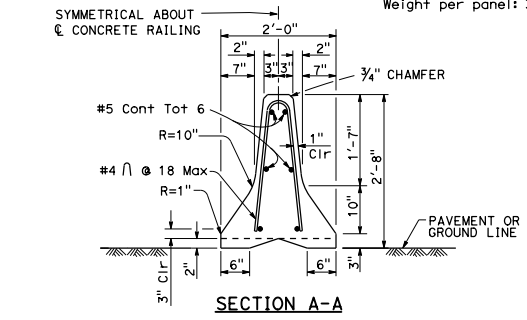
**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

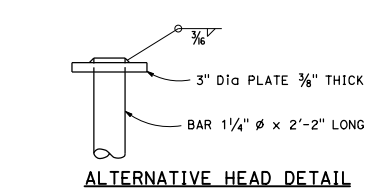
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REGISTERED PROFESSIONAL ENGINEER  
Randell D. Hiatt  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

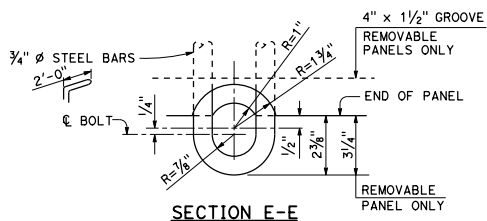
- NOTES:**
- For end treatment, layout and crash cushions, where needed, see Project Plans or Special Provisions.
  - All 3/2" gaps at removable panels are to be backed at the base with #8 x 10" dowel or 1" ∅ pin each side of joint. See Section G-G.
  - Where the offset distance from the exposed edge of deck to the closest edge of the temporary railing is less than 2'-0", attach each panel to deck slab with 1" diameter threaded rods (total four per panel) inserted through the slotted holes of the panel and bond in drilled holes 6" deep in the deck slabs. See "Bridge Memo to Designers" Manual.



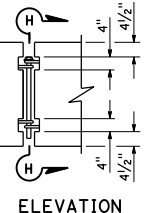
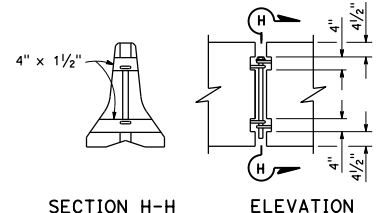
\* Section G-G is for concrete pavement. Alternative detail, 1" ∅ pins 2'-0" long driven in existing AC or HMA.



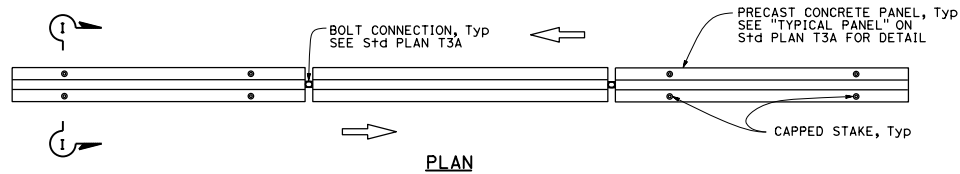
**BOLT CONNECTION DETAIL**



**REMOVABLE PANEL GROOVE DETAILS**

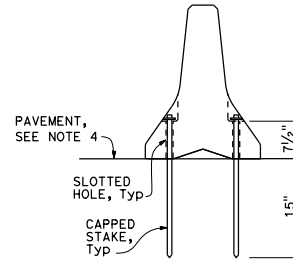


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY RAILING (TYPE K)**  
NO SCALE

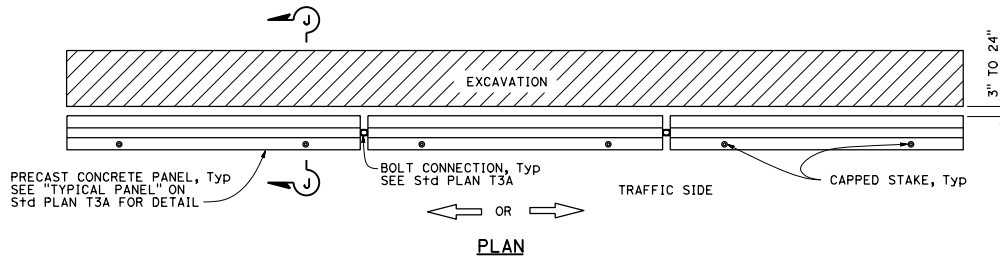


**RAILING STAKING CONFIGURATION FOR TWO-WAY TRAFFIC**

See Note 2

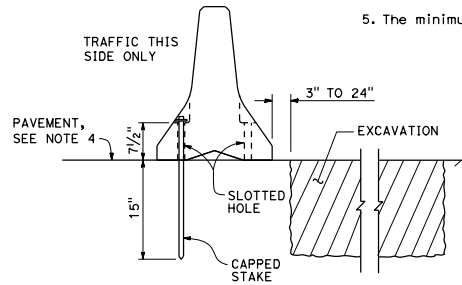


**SECTION I-I**

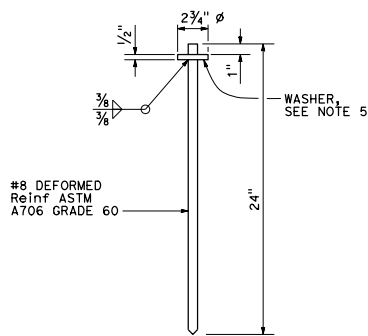


**RAILING STAKING CONFIGURATION ADJACENT TO AN EXCAVATION**

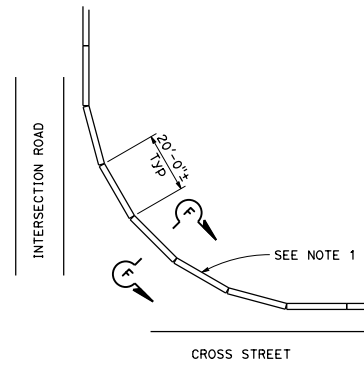
See Note 3



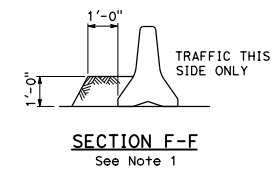
**SECTION J-J**



**CAPPED STAKE DETAIL**



**CURVED LAYOUT**



**SECTION F-F**  
See Note 1

**NOTES:**

1. Where Type K Temporary Railing is placed on curves and radii that are too severe to connect panels with bolted joints, the railing must be backed continuously with earth fill. See Section F-F.
2. Where Type K Temporary Railing is placed as a temporary or long term barrier in two-way traffic on highways with less than 24" from the edge of traveled way, use four capped stakes per every other panel with end panels staked.
3. Where Type K Temporary Railing is placed 3" to 24" from the edge of an excavation on highways, use two capped stakes per panel along the traffic side.
4. Staked Type K Temporary Railing must be supported by at least 4" thick concrete, hot mix asphalt or existing asphalt concrete pavement.
5. The minimum yield strength for the washer must be 60,000 psi.

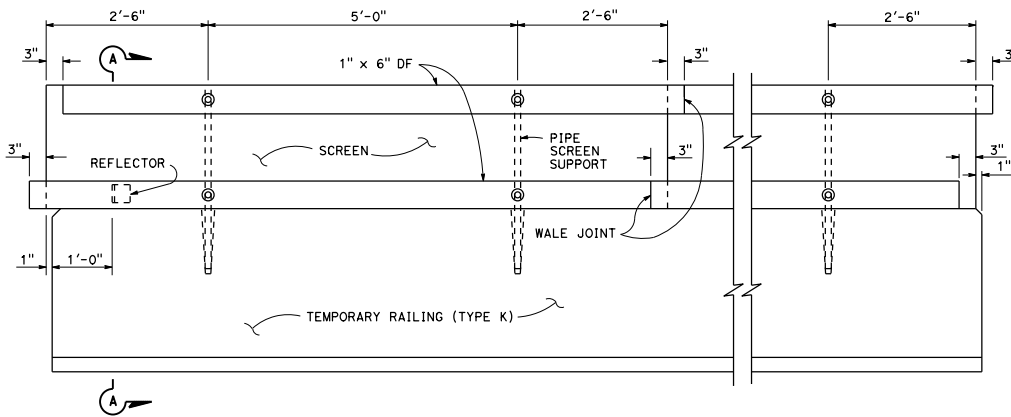
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
<b>Randell D. Hiatt</b> REGISTERED CIVIL ENGINEER				
October 30, 2015 PLANS APPROVAL DATE				
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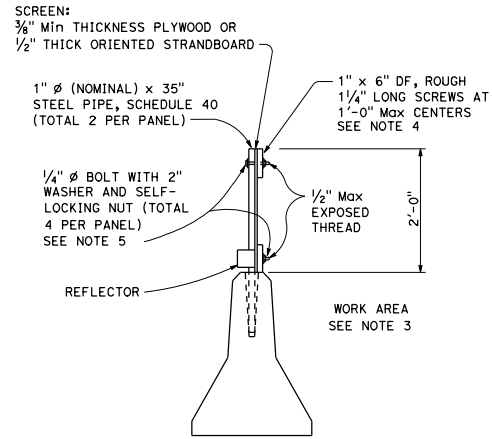
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY RAILING (TYPE K)**  
NO SCALE

**T3B**

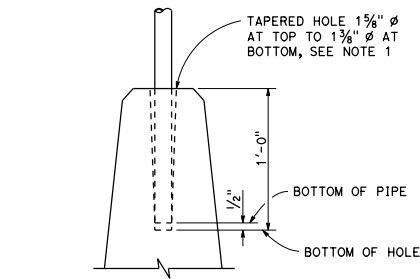
2015 STANDARD PLAN T3B



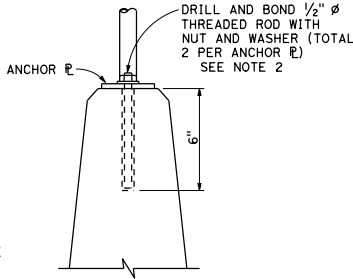
**ELEVATION**



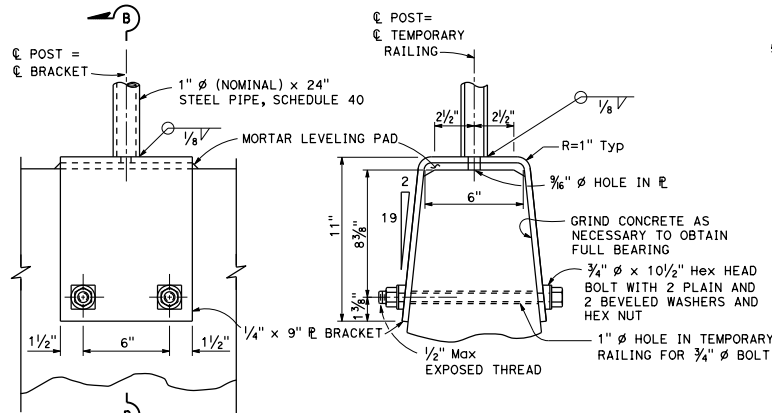
**SECTION A-A**



**SCREEN ANCHORAGE DETAIL**



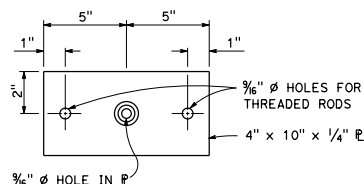
**SCREEN ANCHORAGE DETAIL ALTERNATIVE "A"**



**ELEVATION**

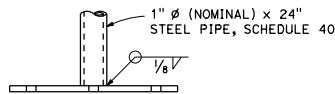
**SECTION B-B**

**SCREEN ANCHORAGE DETAIL ALTERNATIVE "B"**



**PLAN**

**ANCHOR PLATE DETAIL ALTERNATIVE "A"**



**ELEVATION**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
No. C50200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

**NOTES:**

1. Straight holes 1/2"  $\phi$  of the depth shown may be used in lieu of the tapered holes.
2. Resin capsule-type anchorage devices may be substituted for threaded rods.
3. Place screen on work area side of the temporary railing where traffic will only be on one side of the temporary railing.
4. Clinched 8d box nails may be substituted for screws. The nails shall be clinched on the work area side of the screen where traffic will only be on one side of the temporary railing.
5. U-bolts may be substituted for 1/4"  $\phi$  bolts.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**TEMPORARY TRAFFIC SCREEN**

NO SCALE

**T4**

2015 STANDARD PLAN T4

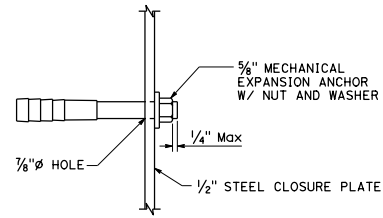
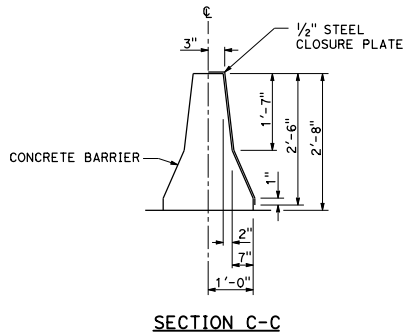
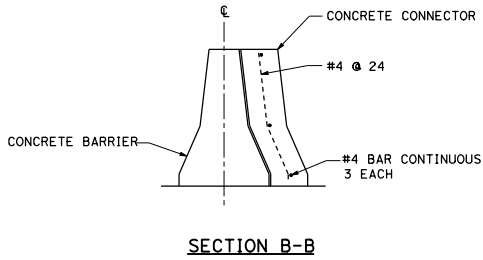
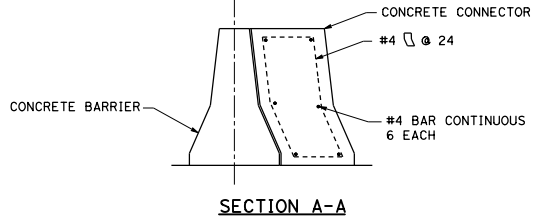
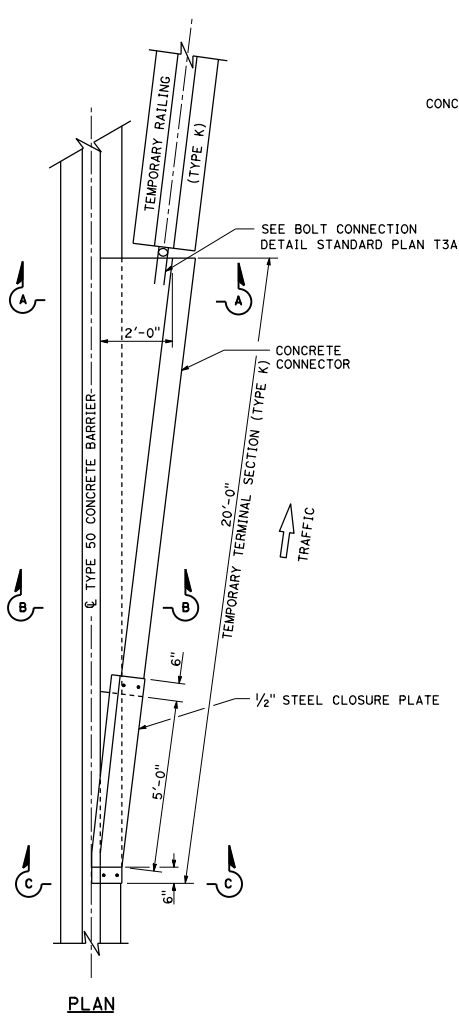
DIS#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Randell D. Hiatt**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

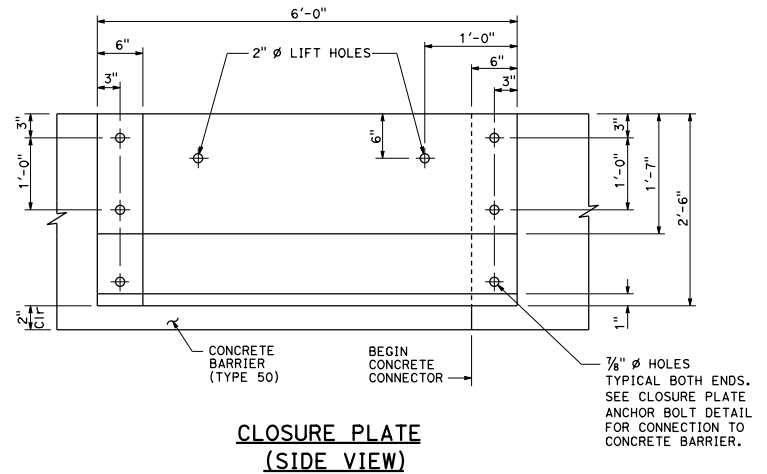
**Randell D. Hiatt**  
REGISTERED PROFESSIONAL ENGINEER  
No. CS0200  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**CLOSURE PLATE ANCHOR BOLT DETAIL**

**NOTE:**  
1. If lifting holes are used with the concrete connector, they shall conform to the lifting hole details shown on Standard Plan T3A.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY TERMINAL SECTION (TYPE K)**

NO SCALE

**T5**



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Devinder Singh*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Devinder Singh  
No. C50470  
Exp. 6-30-17  
CIVIL

REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

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TABLE 1

SPEED (S)	MINIMUM TAPER LENGTH * FOR WIDTH OF OFFSET 12 FEET (W)				MAXIMUM CHANNELIZING DEVICE SPACING		
	TANGENT 2L	MERGING L	SHIFTING L/2	SHOULDER L/3	X	Y	Z **
					TAPER	TANGENT	CONFLICT
mph	ft	ft	ft	ft	ft	ft	ft
20	160	80	40	27	20	40	10
25	250	125	63	42	25	50	12
30	360	180	90	60	30	60	15
35	490	245	123	82	35	70	17
40	640	320	160	107	40	80	20
45	1080	540	270	180	45	90	22
50	1200	600	300	200	50	100	25
55	1320	660	330	220	55	110	27
60	1440	720	360	240	60	120	30
65	1560	780	390	260	65	130	32
70	1680	840	420	280	70	140	35

\* - For other offsets, use the following merging taper length formula for L:  
For speed of 40 mph or less,  $L = WS^2/60$   
For speed of 45 mph or more,  $L = WS$

Where: L = Taper length in feet

W = Width of offset in feet

S = Posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

\*\* - Use for taper and tangent sections where there are no pavement markings or where there is a conflict between existing pavement markings and channelizers (CA).

TABLE 2

SPEED *	Min D **	DOWNGRADE Min D ***		
		-3%	-6%	-9%
		ft	ft	ft
mph	ft	ft	ft	ft
20	115	116	120	126
25	155	158	165	173
30	200	205	215	227
35	250	257	271	287
40	305	315	333	354
45	360	378	400	427
50	425	446	474	507
55	495	520	553	593
60	570	598	638	686
65	645	682	728	785
70	730	771	825	891

\* - Speed is posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

\*\* - Longitudinal buffer space or flagger station spacing

\*\*\* - Use on sustained downgrade steeper than -3 percent and longer than 1 mile.

TABLE 3

ROAD TYPE	DISTANCE BETWEEN SIGNS *		
	A	B	C
	ft	ft	ft
URBAN - 25 mph OR LESS	100	100	100
URBAN - MORE THAN 25 mph TO 40 mph	250	250	250
URBAN - MORE THAN 40 mph	350	350	350
RURAL	500	500	500
EXPRESSWAY / FREEWAY	1000	1500	2640

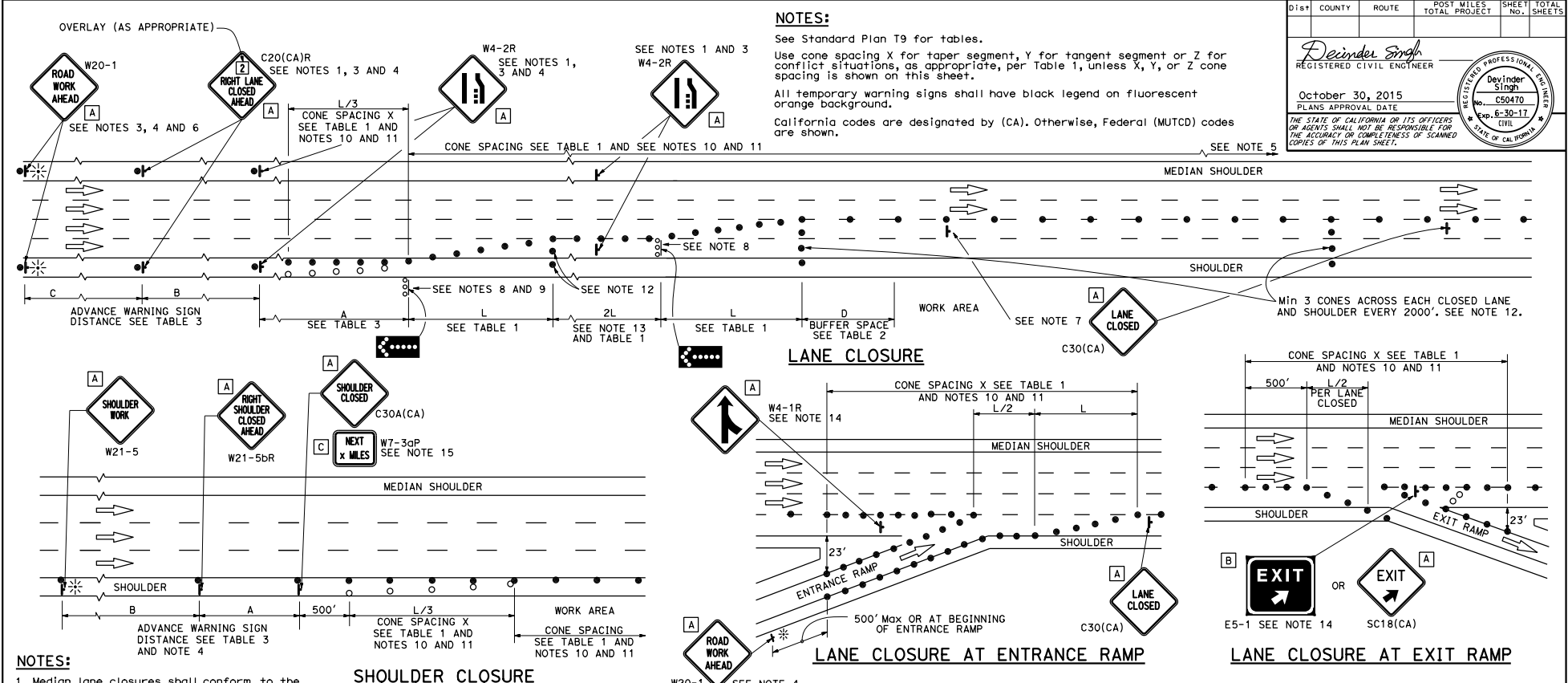
\* - The distances are approximate, are intended for guidance purposes only, and should be applied with engineering judgment. These distances should be adjusted by the Engineer for field conditions, if necessary, by increasing or decreasing the recommended distances.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**TRAFFIC CONTROL SYSTEM TABLES  
FOR LANE AND RAMP CLOSURES**

NO SCALE

**T9**



**NOTES:**

See Standard Plan T9 for tables.  
 Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.  
 All temporary warning signs shall have black legend on fluorescent orange background.  
 California codes are designated by (CA). Otherwise, Federal (MUTCD) codes are shown.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL No. SHEETS

*Devinder Singh*  
 REGISTERED CIVIL ENGINEER  
 No. C50470  
 Exp. 6-30-17  
 CIVIL ENGINEERING PROFESSIONAL ENGINEER  
 STATE OF CALIFORNIA

October 30, 2015  
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**NOTES:**

- Median lane closures shall conform to the details as shown except that C20(CA)L and W4-2L signs shall be used.
- At least one person shall be assigned to provide full time maintenance of traffic control devices for lane closures.
- Duplicate sign installations are not required:
  - On opposite shoulder if at least one-half of the available lanes remain open to traffic.
  - In the median if the width of the median shoulder is less than 8' and the outside lanes are to be closed.
- Each advance warning sign on each side of the roadway shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
- A G20-2 "END ROAD WORK" sign, with minimum size of 48" x 24" as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within a larger project's limits.

**SHOULDER CLOSURE**

- If the W20-1 sign would follow within 2000' of a stationary W20-1 or G20-1 "ROAD WORK NEXT X MILES", use a C20(CA) sign for the first advance warning sign.
- Place a C30(CA) sign every 2000' throughout length of lane closure.
- Use one flashing arrow sign for each lane closed. The flashing arrow signs shall be Type I.
- A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at top of crest vertical curve or on a horizontal curve.
- All cones used for lane closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves).
- Portable delineators, placed at one-half the spacing indicated for traffic cones may be used instead of cones for daytime closures only.

**LANE CLOSURE AT ENTRANCE RAMP**

- A minimum of 3 cones shall be placed transversely across each closed lane and shoulder at each location where a taper across a traffic lane ends and every 2000' as shown on the "Lane Closure" detail. Two Type II barricades may be used instead of the 3 cones. The transverse alignment of the cones or barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.
- The 2L tangent shown along lane lines shall be used between the L tapers required for each closed traffic lane.
- The E5-1 or SC18(CA) and W4-1 signs shall be used as shown.
- A W7-3aP "NEXT X MILES" plaque must be used if the shoulder closure extends beyond the distance that can be perceived by road users.

**LEGEND**

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- ⬇️ TEMPORARY TRAFFIC CONTROL SIGN
- ⬇️⬇️ FLASHING ARROW SIGN (FAS)
- ⬇️⬇️ FAS SUPPORT OR TRAILER
- ⬇️ PORTABLE FLASHING BEACON

**SIGN PANEL SIZE (Min)**

A	48" x 48"
B	72" x 60"
C	36" x 30"

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TRAFFIC CONTROL SYSTEM  
 FOR LANE CLOSURE ON  
 FREEWAYS AND EXPRESSWAYS**  
 NO SCALE

**T10**

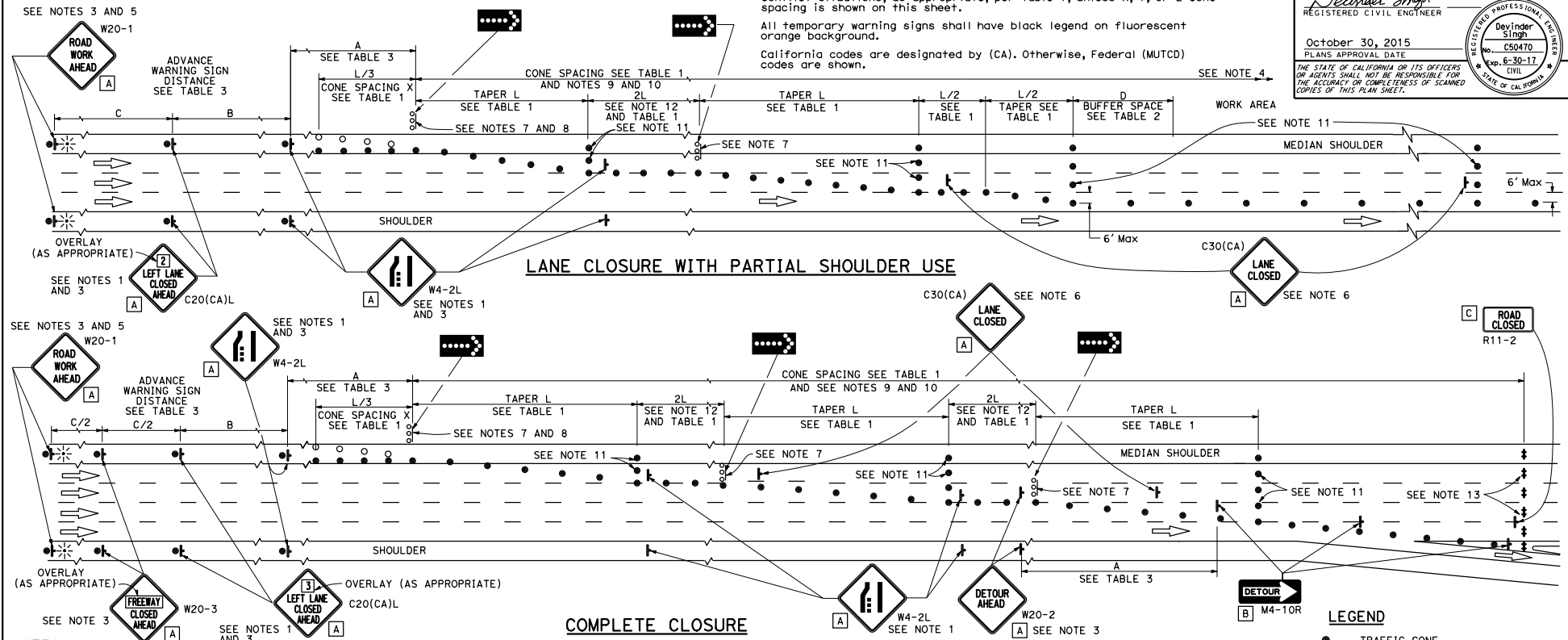
**NOTES:** See Standard Plan T9 for tables.  
 Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.  
 All temporary warning signs shall have black legend on fluorescent orange background.  
 California codes are designated by (CA). Otherwise, Federal (MUTCD) codes are shown.

Dist	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	NO. SHEETS

*Devinder Singh*  
 REGISTERED CIVIL ENGINEER  
 No. C50470  
 Exp. 6-30-17  
 CIVIL

October 30, 2015  
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- NOTES:**
- Lane closures on the right side using partial median shoulder as a traffic lane shall conform to the details shown except that C20(CA)R and W4-2R signs shall be used.
  - At least one person shall be assigned to provide full time maintenance of traffic control devices for lane closures.
  - Each advance warning sign on each side of the roadway shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
  - A G20-2 "END ROAD WORK" sign, with minimum size of 48" x 24" as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious or ends within a larger project's limits.
  - If the W20-1 sign would follow within 2000' of a stationary W20-1 or G20-1 "ROAD WORK NEXT \_\_\_ MILES", use a C20(CA) sign for the first advance warning sign.
  - Place a C30(CA) sign every 2000' throughout length of lane closure.

- Use one flashing arrow sign for each lane closed. The flashing arrow signs shall be Type I.
- A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
- All cones used for lane closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves).
- Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used instead of cones for daytime closures only.
- A minimum of 3 cones shall be placed transversely across each closed lane and shoulder at each location where a taper across a traffic lane ends and every 2000' as shown on the "Lane Closure With Partial Shoulder Use" detail. Two Type II barricades may be used instead of the 3 cones. The transverse alignment of the cones or barricades on the closed shoulder may be shifted from the transverse alignment to provide access to the work.
- The 2L tangent shown along lane lines shall be used between the L tapers required for each closed traffic lane.
- A minimum of Two Type II or III barricades shall be placed across each closed lane and shoulder at the location shown and every 2000' within the complete closure area. Within the complete closure area, the transverse alignment of the barricades on the closed shoulder shall be shifted from the transverse alignment to provide access to the work.

**SIGN PANEL SIZE (Min)**

A	48" x 48"
B	48" x 18"
C	48" x 30"

**LEGEND**

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- ⊥ TEMPORARY TRAFFIC CONTROL SIGN
- ⬠ FLASHING ARROW SIGN (FAS)
- FAS SUPPORT OR TRAILER
- ⚡ PORTABLE FLASHING BEACON

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**TRAFFIC CONTROL SYSTEM  
 FOR LANE CLOSURE ON  
 FREEWAYS AND EXPRESSWAYS**

NO SCALE

**T10A**

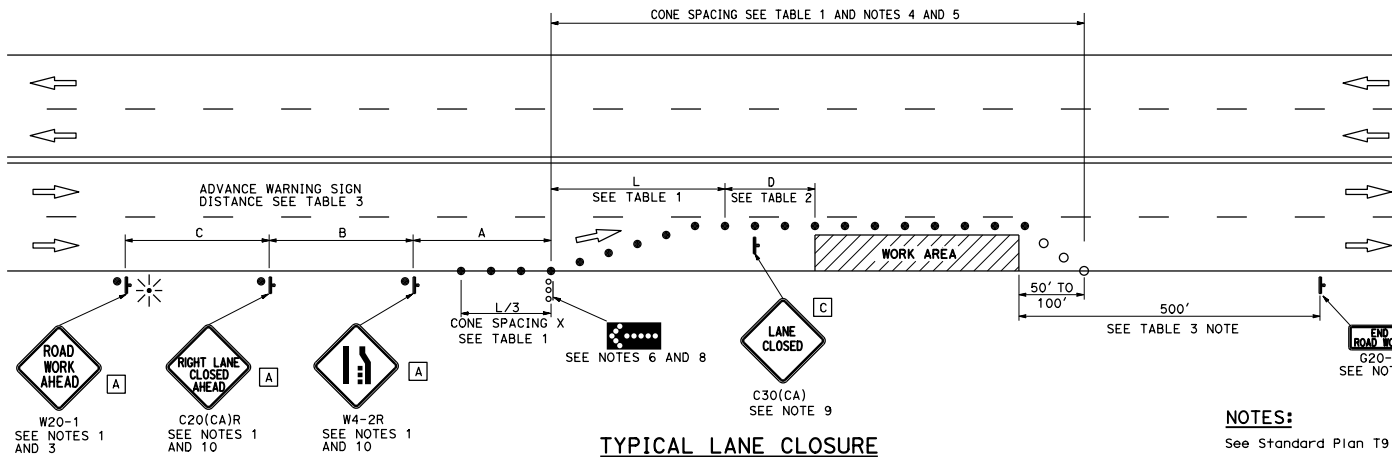
Dist	County	Route	Post Miles Total Project	Sheet No.	Total Sheets

*Devinder Singh*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Devinder Singh*  
No. C50470  
Exp. 6-30-17  
CIVIL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

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TYPICAL LANE CLOSURE

**NOTES:**

See Standard Plan T9 for tables.  
Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.  
All temporary warning signs shall have black legend on fluorescent orange background.  
California codes are designated by (CA). Otherwise, Federal (MUTCD) codes are shown.

**LEGEND**

- TRAFFIC CONE
- TRAFFIC CONE (OPTIONAL TAPER)
- † TEMPORARY TRAFFIC CONTROL SIGN
- ⬢ FLASHING ARROW SIGN (FAS)
- ▬ FAS SUPPORT OR TRAILER
- ☀ PORTABLE FLASHING BEACON

**SIGN PANEL SIZE (Min)**

- A 48" x 48"
- B 36" x 18"
- C 30" x 30"

**NOTES:**

1. Each advance warning sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
2. A G20-2 "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious, or ends within a larger project's limits.
3. If the W20-1 sign would follow within 2000' of a stationary W20-1 or G20-1 "ROAD WORK NEXT \_\_\_\_\_ MILES", use a C20(CA) sign for the first advance warning sign.
4. All cones used for lane closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves).
5. Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used instead of cones for daytime closures only.
6. Flashing arrow sign shall be either Type I or Type II.
7. For approach speeds over 50 mph, use the "Traffic Control System for Lane Closure On Freeways And Expressways" plan for lane closure details and requirements.
8. A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.
9. Place a C30(CA) sign every 2000' throughout length of lane closure.
10. Median lane closures shall conform to the details shown except that C20(CA)L and W4-2L signs shall be used.
11. At least one person shall be assigned to provide full time maintenance of traffic control devices for lane closure unless, otherwise directed by the Engineer.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TRAFFIC CONTROL SYSTEM  
FOR LANE CLOSURE ON  
MULTILANE CONVENTIONAL  
HIGHWAYS**

NO SCALE

**T11**

**LEGEND**

- TRAFFIC CONE
- ⊥ TEMPORARY TRAFFIC CONTROL SIGN
- ⬇⬆⬇⬆⬇⬆⬆ FLASHING ARROW SIGN (FAS)
- ☀ FAS SUPPORT OR TRAILER
- ⊛ PORTABLE FLASHING BEACON

**SIGN PANEL SIZE (Min)**

- A 48" x 48"
- B 24" x 24"
- C 36" x 18"

**NOTES:**

See Standard Plan T9 for tables.  
 Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.  
 All temporary warning signs shall have black legend on fluorescent orange background.  
 California codes are designated by (CA). Otherwise, Federal (MUTCD) codes are shown.

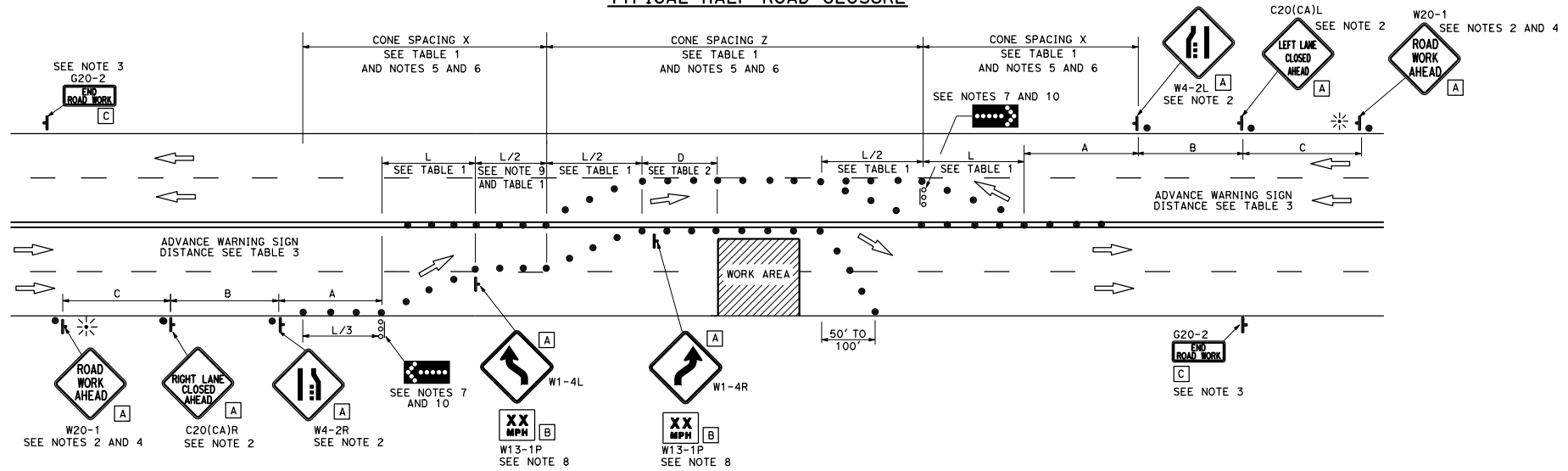
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Devinder Singh*  
 REGISTERED CIVIL ENGINEER  
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**TYPICAL HALF ROAD CLOSURE**



**NOTES:**

- At least one person shall be assigned to provide full time maintenance of traffic control devices for lane closure unless, otherwise directed by the Engineer.
- Each advance warning sign in each direction of travel shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
- A G20-2 "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious, or ends within a larger project's limits.
- If the W20-1 sign would follow within 2000' of a stationary W20-1 or G20-1 "ROAD WORK NEXT" MILES", use a C20(CA) sign for the first advance warning sign.
- All cones used for lane closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves).
- Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used instead of cones for daytime closures only.
- Flashing arrow signs shall be either Type I or Type II.
- Advisory speed will be determined by the Engineer. The W13-1P Plaque will not be required when advisory speed is more than the posted or maximum speed limit.
- The tangent (L/2) shall be used.
- A minimum 1500' of sight distance shall be provided where possible for vehicles approaching the first flashing arrow sign. Lane closures shall not begin at the top of crest vertical curve or on a horizontal curve.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**TRAFFIC CONTROL SYSTEM  
 FOR HALF ROAD CLOSURE ON  
 MULTILANE CONVENTIONAL  
 HIGHWAYS AND EXPRESSWAYS**

NO SCALE

**T12**

**NOTES:**

See Standard Plan T9 for tables.

Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.

All temporary warning signs shall have black legend on fluorescent orange background.

California codes are designated by (CA). Otherwise, Federal (MUTCD) codes are shown.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

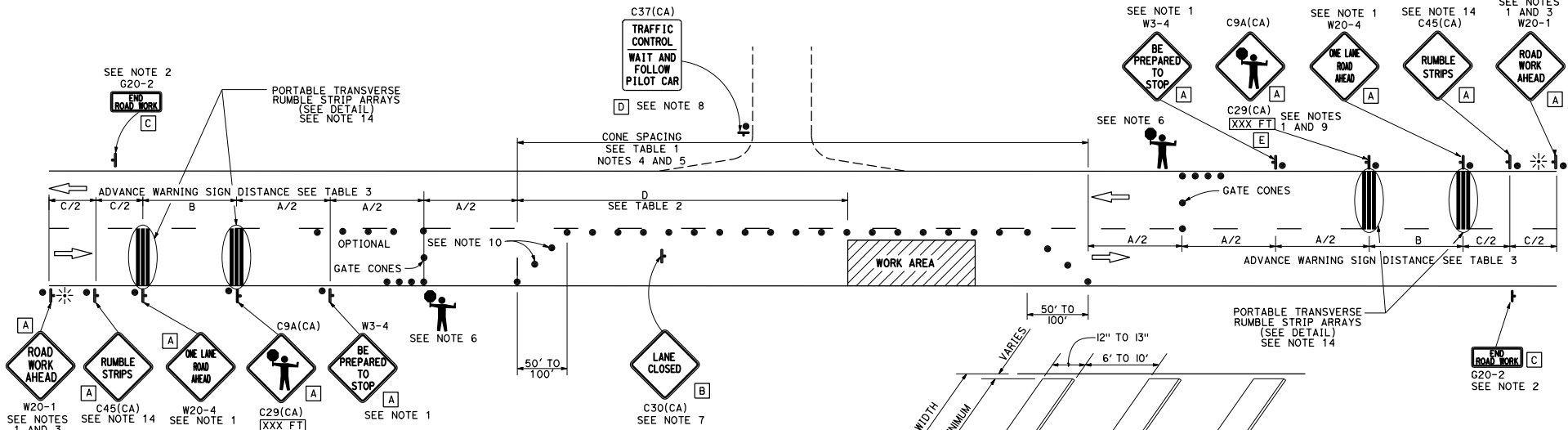
*Devinder Singh*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
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REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

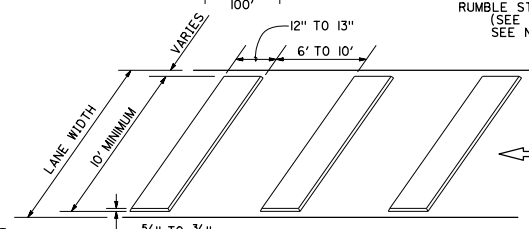
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**TYPICAL LANE CLOSURE WITH REVERSIBLE CONTROL**



**NOTES:**

- Each advance warning sign in each direction of travel shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the locations indicated for lane closure during hours of darkness.
- A G20-2 "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane control unless the end of work area is obvious, or ends within a larger project's limits.
- If the W20-1 sign would follow within 2000' of a stationary W20-1 or G20-1 "ROAD WORK NEXT \_\_\_\_\_ MILES", use a W20-4 sign for the first advance warning sign.
- All cones used for lane closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves).
- Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used instead of cones for daytime closures only.
- Additional advance flaggers may be required. Flagger should stand in a conspicuous place, be visible to approaching traffic as well as approaching vehicles after the first vehicle has stopped. During the hours of darkness, the flagging station and flagger shall be illuminated and clearly visible to approaching traffic. The illumination footprint of the lighting on the ground shall be at least 20' in diameter. Place a minimum of four cones at 50' intervals in advance of flagger station as shown.
- Place C30(CA) "LANE CLOSED" sign at 500' to 1000' intervals throughout extended work areas. They are optional if the work area is visible from the flagger station.
- When a pilot car is used, place a C37(CA) "TRAFFIC CONTROL-WAIT AND FOLLOW PILOT CAR" sign with black legend on white background at all intersections, driveways and alleys without a flagger within traffic control area. Signs shall be clean and visible at all times. Where traffic can not be effectively self-regulated, at least one flagger shall be used at each intersection within traffic control area.
- An optional C29(CA) sign may be placed below the C9A(CA) sign.
- Either traffic cones or barricades shall be placed on the taper. Barricades shall be Type I, II, or III.
- The color of the portable transverse rumble strips shall be black or orange. Use 2 arrays, each array shall consist of 3 rumble strips.
- Portable transverse rumble strips shall not be placed on sharp horizontal or vertical curves nor shall they be placed through pedestrian crossings.
- If the portable transverse rumble strips become out of alignment (skewed) by more than 6 inches, measured from one end to the other, they shall be readjusted to bring the placement back to the original location.
- Portable transverse rumble strips are not required if any one of the following conditions is satisfied:
  - Work duration occupies a location for four hours or less
  - Posted speed limit is below 45 MPH
  - Work is of emergency nature
  - Work zone is in snow or icy weather conditions



**PORTABLE TRANSVERSE RUMBLE STRIP ARRAY DETAIL**

**SIGN PANEL SIZE (Min)**

- A 48" x 48"
- B 30" x 30"
- C 36" x 18"
- D 36" x 42"
- E 20" x 7"

**LEGEND**

- TRAFFIC CONE
- ⊥ TEMPORARY TRAFFIC CONTROL SIGN
- ⚡ PORTABLE FLASHING BEACON
- 👤 FLAGGER

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON TWO LANE CONVENTIONAL HIGHWAYS**

NO SCALE

**T13**

254

2015 STANDARD PLAN T13



# TYPICAL RAMP CLOSURES

## SIGN PANEL SIZE (Min)

- A 48" x 48"
- B 48" x 30"
- C 36" x 36"
- D 48" x 36"

## LEGEND

- TRAFFIC CONE
- † TEMPORARY TRAFFIC CONTROL SIGN
- ‡ BARRICADES
- ⚡ PORTABLE FLASHING BEACON

## NOTES:

1. Barricades shall be Type I, II, or III for closures lasting one week or less and Type III for closures lasting longer than one week.
2. In addition to placing the C19(CA) "RAMP CLOSED AHEAD" and C30(CA) "RAMP CLOSED" signs, black on orange overlay plates with the word "CLOSED" may be mounted, as directed by the Engineer, on all guide signs that refer to the closed ramp. The letter size on the overlay shall be the same as the guide sign.
3. Each advance C19(CA) "RAMP CLOSED AHEAD" sign shall be equipped with at least two flags for daytime closure. Each flag shall be at least 16" x 16" in size and shall be orange or fluorescent red-orange in color. A flashing beacon shall be placed on top of the first C19(CA) sign during hours of darkness.
4. All cones used for ramp closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves) as specified in the specifications.
5. Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used instead of cones for daytime ramp closures only.
6. At least one person shall be assigned to provide full time maintenance of traffic control devices, unless otherwise directed by the Engineer.
7. The existing "EXIT" signs shall be covered during ramp closures.
8. A minimum of 3 cones shall be placed transversely across each closed lane and shoulder.

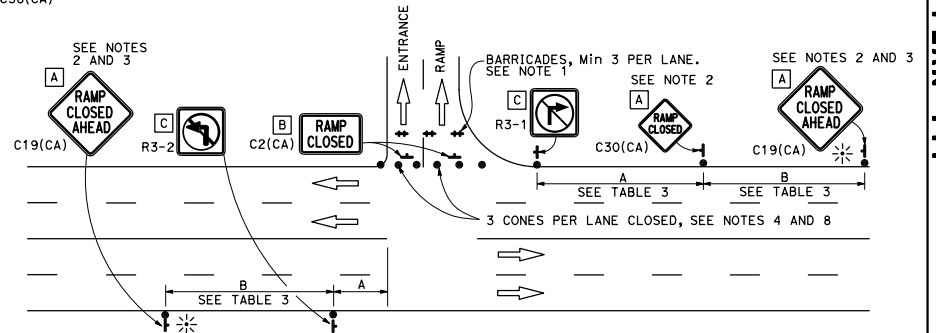
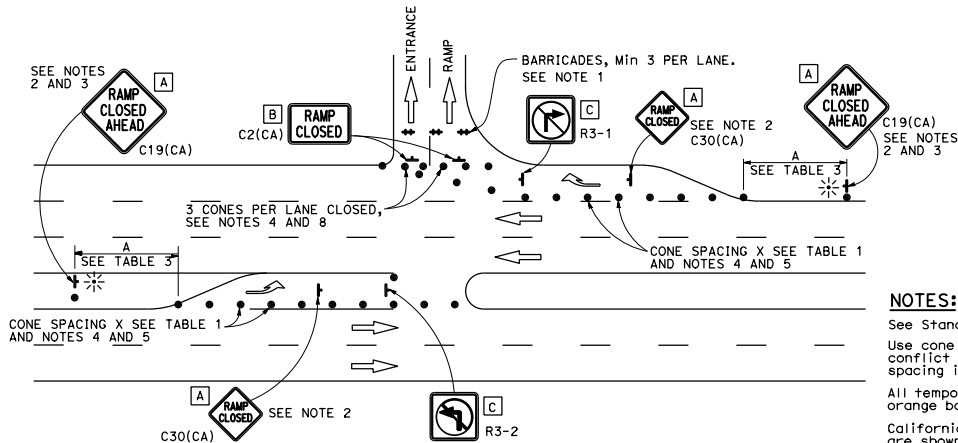
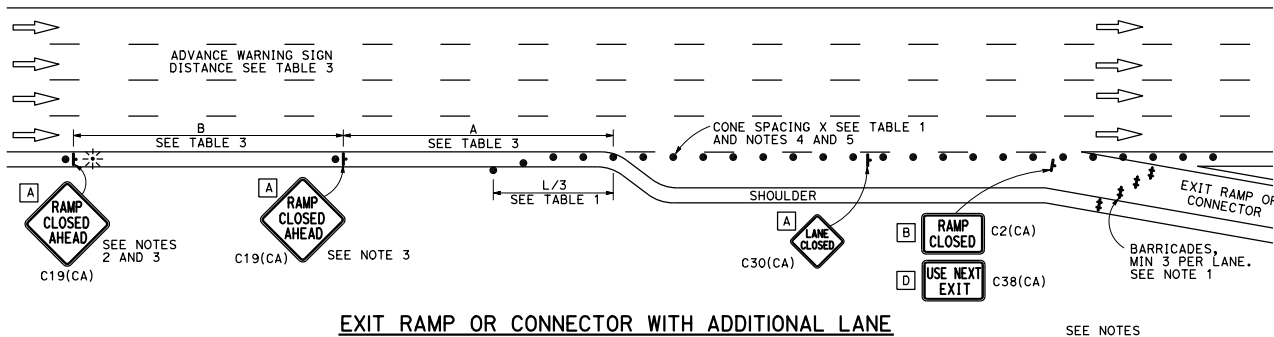
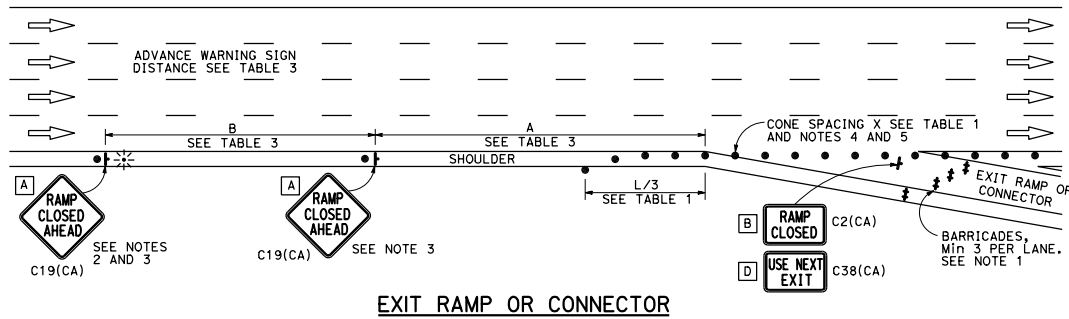
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Devinder Singh*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
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CIVIL

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## NOTES:

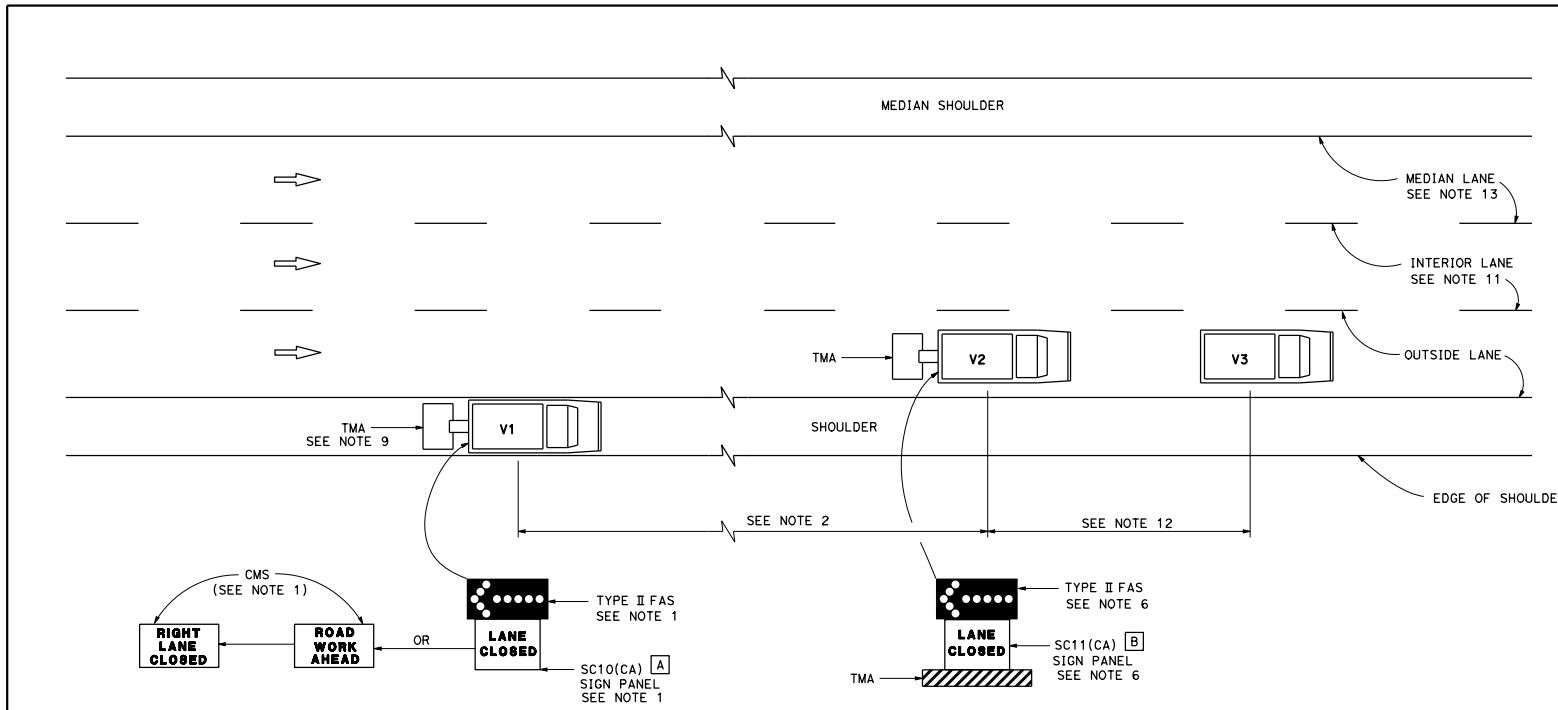
- See Standard Plan T9 for tables.
- Use cone spacing X for taper segment, Y for tangent segment or Z for conflict situations, as appropriate, per Table 1, unless X, Y, or Z cone spacing is shown on this sheet.
- All temporary warning signs shall have black legend on fluorescent orange background.
- California codes are designated by (CA). Otherwise, Federal (MUTCD) codes are shown.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TRAFFIC CONTROL SYSTEM  
FOR RAMP CLOSURE**  
NO SCALE

**T14**

215

2015 STANDARD PLAN T14



Dist.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Devinder Singh*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Devinder Singh  
No. C50470  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**SIGN PANEL SIZE (Min)**

- A 66" x 36"
- B 54" x 42"

**LEGEND**

- V1 SIGN VEHICLE
- V2 SHADOW VEHICLE
- V3 WORK/APPLICATION VEHICLE
- FLASHING ARROW SIGN (FAS)
- CMS CHANGEABLE MESSAGE SIGN
- TMA TRUCK-MOUNTED ATTENUATOR

**MOVING LANE CLOSURE ON MEDIAN LANE OR OUTSIDE LANE OF MULTILANE HIGHWAYS**

**NOTES:**

1. Either a changeable message sign or a SC10(CA) sign panel and a Type II flashing arrow sign shall be mounted on the rear of sign vehicle V1. The changeable message sign shall be sequenced to show the "ROAD WORK AHEAD" message first, followed by the "RIGHT LANE CLOSED" message. For median lane closure, the flashing arrow symbol shall be reversed with the arrowhead on the right and the changeable message sign shall show "LEFT LANE CLOSED".
2. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue. Sign vehicle V1 shall be positioned where highly visible when shoulders are not available.
3. A minimum sight distance of 1500' should be provided in advance of sign vehicle V1.
4. Sign vehicle V1 should remain at the beginning of horizontal or vertical curves until the other vehicles (V2 and V3) are far enough beyond the curve to resume the minimum sight distance of 1500'.
5. Vehicle-mounted sign panels shall have Type III or above retroreflective sheeting, black on white, or black on fluorescent orange, with 6" minimum series D letters per Caltrans sign specifications.
6. Shadow vehicle V2 shall be equipped with a truck-mounted attenuator. The sign panel shown and a Type II flashing arrow sign shall be mounted on the rear of shadow vehicle V2. For median lane closure the flashing arrow sign symbol shall be displayed with the arrowhead on the right.
7. All vehicles used for lane closures shall be equipped with two-way radios, and the vehicle operators shall maintain communication during the work or application operation.
8. All vehicles shall be equipped with flashing or rotating amber lights.
9. If sign vehicle V1 encroaches into the traffic lane due to insufficient shoulder width, sign vehicle V1 shall be equipped with a truck-mounted attenuator. Sign vehicle V1 shall stay as close to the edge of shoulder as practicable.
10. Where workers would be on foot in the work area, a stationary type lane closure (Standard Plan T10, T11, etc., as applicable) shall be used instead of this plan.
11. For moving lane closure on interior lane of multilane highways, use Standard Plan T16.
12. The spacing between work vehicle(s) and the shadow vehicles, and between each shadow vehicle should be minimized to deter road users from driving in between.
13. When the work/application vehicle V3 occupies the median lane, sign vehicle V1 should drive in the median shoulder and indicate left lane closed ahead.

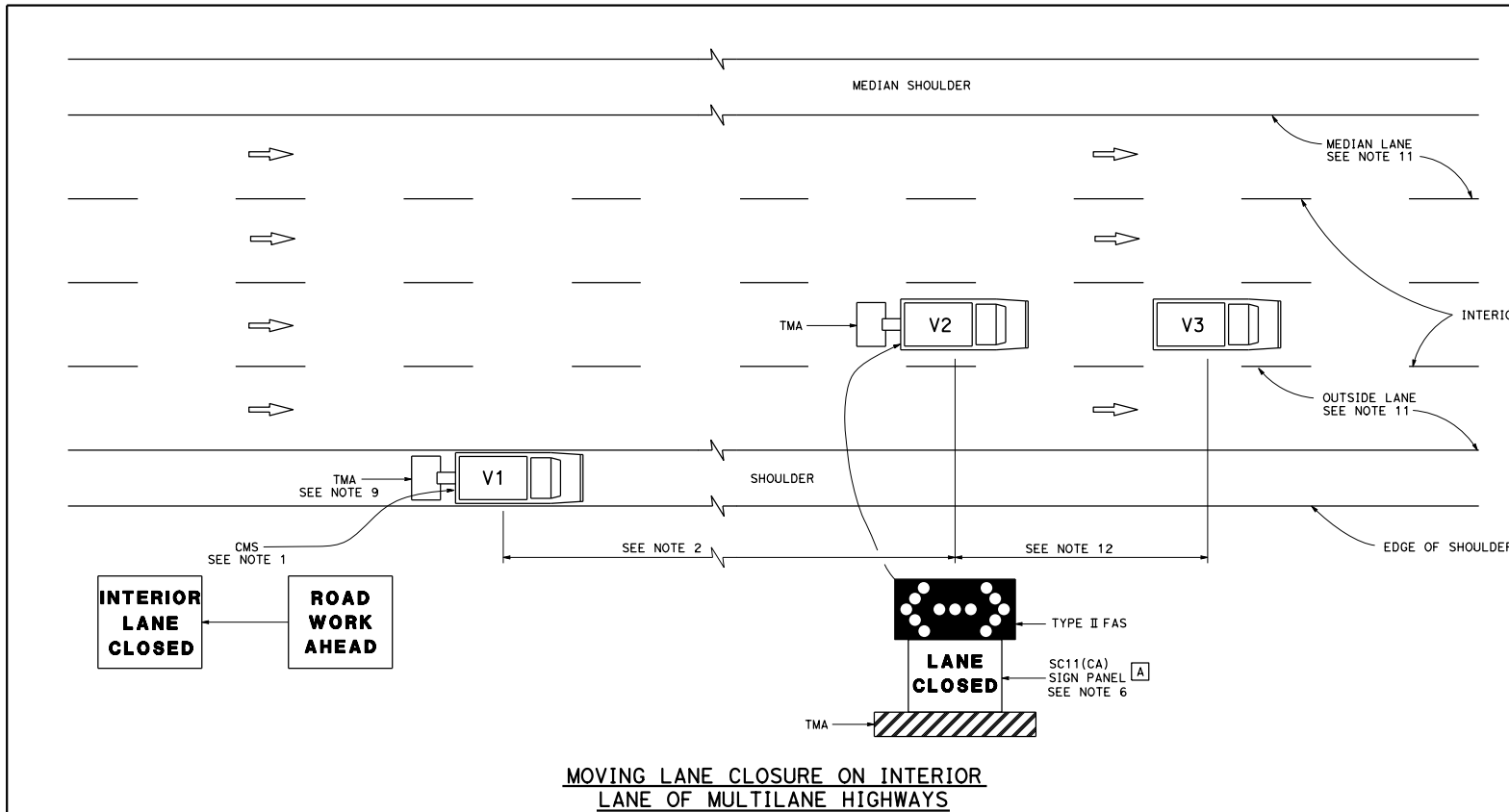
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**TRAFFIC CONTROL SYSTEM FOR MOVING LANE CLOSURE ON MULTILANE HIGHWAYS**

NO SCALE

**T15**





**MOVING LANE CLOSURE ON INTERIOR LANE OF MULTILANE HIGHWAYS**

**NOTES:**

1. A changeable message sign shall be mounted on the rear of sign vehicle V1. The changeable message sign shall be sequenced to show the "ROAD WORK AHEAD" message first, followed by the "INTERIOR LANE CLOSED" message. The message "CENTER LANE CLOSED" may be used in place of the "INTERIOR LANE CLOSED" message.
2. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue. Sign vehicle V1 shall be positioned where highly visible when shoulders are not available.
3. A minimum sight distance of 1500' should be provided in advance of sign vehicle V1.
4. Sign vehicle V1 should remain at the beginning of horizontal or vertical curves until the other vehicles (V2 and V3) are far enough beyond the curve to resume the minimum sight distance of 1500'.
5. Vehicle-mounted sign panels shall have Type III or above retroreflective sheeting, black on white, or black on fluorescent orange, with 6" minimum series D letters per Caltrans sign specifications.

6. Shadow vehicle V2 shall be equipped with a truck-mounted attenuator. The sign panel shown and a Type II flashing arrow sign shall be mounted on the rear of shadow vehicle V2.
7. All vehicles used for lane closures shall be equipped with two-way radios, and the vehicle operators shall maintain communication during the work or application operation.
8. All vehicles shall be equipped with flashing or rotating amber lights.
9. If sign vehicle V1 encroaches into the traffic lane due to insufficient shoulder width, sign vehicle V1 shall be equipped with a truck-mounted attenuator. Sign vehicle V1 shall stay as close to the edge of shoulder as practicable.

10. Where workers would be on foot in the work area, a stationary type lane closure (Standard Plan T10, T11 etc., as applicable) shall be used instead of this plan.
11. For moving lane closure on median lane or outside lane of multilane highways, use Standard Plan T15.
12. The spacing between work vehicle(s) and the shadow vehicles, and between each shadow vehicle should be minimized to deter road users from driving in between.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Devinder Singh*  
REGISTERED CIVIL ENGINEER


October 30, 2015  
PLANS APPROVAL DATE

Devinder Singh  
No. C50470  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

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**SIGN PANEL SIZE (Min)**  
A 54" x 42"

**LEGEND**

- V1 SIGN VEHICLE
- V2 SHADOW VEHICLE
- V3 WORK/APPLICATION VEHICLE
-  FLASHING ARROW SIGN (FAS) IN FLASHING DOUBLE ARROW MODE
- CMS CHANGEABLE MESSAGE SIGN
- TMA TRUCK-MOUNTED ATTENUATOR

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TRAFFIC CONTROL SYSTEM  
FOR MOVING LANE CLOSURE  
ON MULTILANE HIGHWAYS**

NO SCALE

**T16**

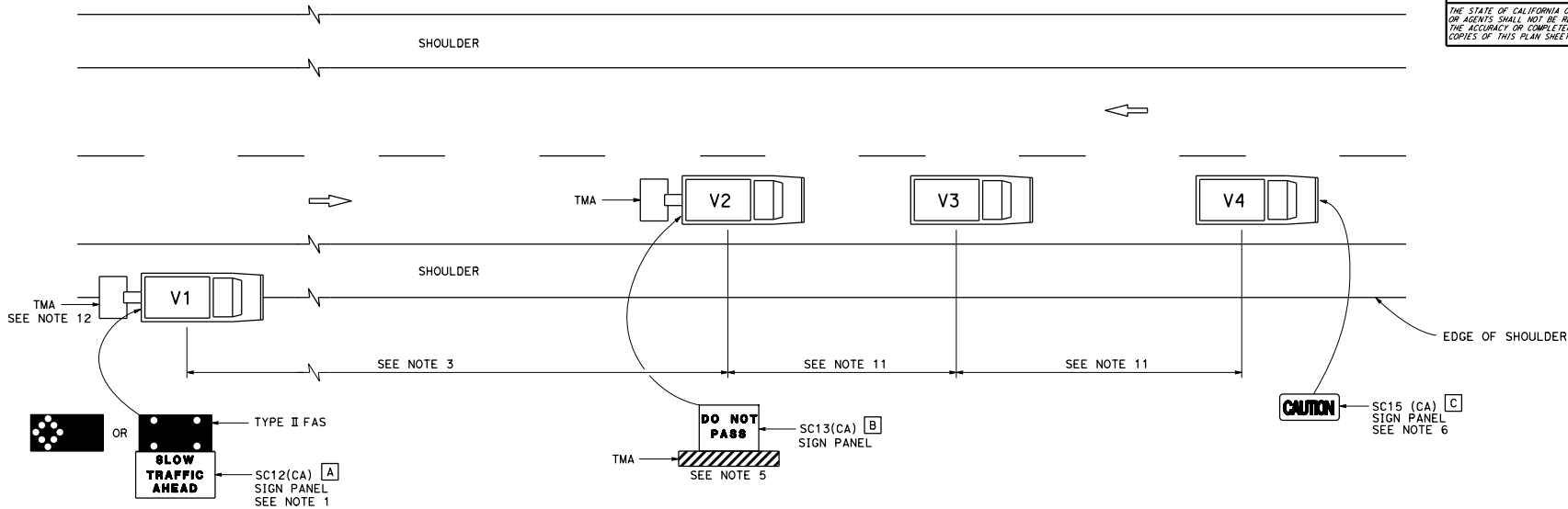
Dist.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Devinder Singh*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Devinder Singh*  
REGISTERED PROFESSIONAL ENGINEER  
No. C50470  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**NOTES:**

1. Either a changeable message sign or a SC12(CA) "SLOW TRAFFIC AHEAD" sign shall be mounted on the rear of sign vehicle V1. The changeable message sign shall be sequenced to show the "CAUTION" message first, follow by the "SLOW TRAFFIC AHEAD" message. A Type II flashing arrow sign may be used with the SC12(CA) sign panel.
2. Sign vehicle V1 should be positioned where highly visible when shoulders are not available.
3. If traffic queues develop, sign vehicle V1 should be positioned upstream from the end of queue.
4. Vehicle-mounted sign panels shall have Type III or above retroreflective sheeting, black on white, or black on fluorescent orange, with 6" minimum series D letters per Caltrans sign specifications.
5. Shadow vehicle shall be equipped with a truck-mounted attenuator. The sign panel shown shall be mounted on the rear of shadow vehicle V2. The message "LANE CLOSED" may be used in place of the "DO NOT PASS" message.
6. The sign panel shown shall be mounted on the front of sign vehicle V4, facing opposing traffic.

7. All vehicles shall be equipped with flashing or rotating amber lights.
8. Sign vehicle V4 will not be required when the work and vehicles V2 and V3 are 2' or more from the centerline of the highway during the work or application operations.
9. All vehicles used for lane closures shall be equipped with two-way radios and the vehicle operators shall maintain communication during the work or application operation.
10. This plan shall not be used where workers would be on foot in the work area. Use a stationary type lane closure (Standard Plan T13) for this condition.
11. Minimize spacing between vehicles V2 and V3 and vehicles V3 and V4 to deter road users from driving in between them.
12. If sign vehicle V1 encroaches into the traffic lane due to insufficient shoulder width, sign vehicle V1 shall be equipped with a truck-mounted attenuator. Sign vehicle V1 shall stay as close to the edge of shoulder as practicable.

**LEGEND**

- V1 SIGN VEHICLE
- V2 SHADOW VEHICLE
- V3 WORK/APPLICATION VEHICLE
- V4 SIGN VEHICLE
- TMA TRUCK-MOUNTED ATTENUATOR



FLASHING ARROW SIGN (FAS)  
IN FLASHING CAUTION MODE



FLASHING ARROW SIGN (FAS)  
IN ALTERNATING DIAMOND CAUTION

**SIGN PANEL SIZE (Min)**

- A 72" x 42"
- B 54" x 42"
- C 54" x 24"

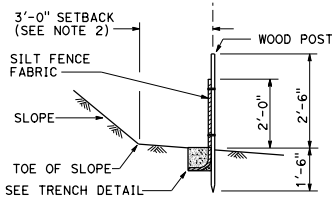
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TRAFFIC CONTROL SYSTEM  
FOR MOVING LANE CLOSURE  
ON TWO LANE HIGHWAYS**

NO SCALE

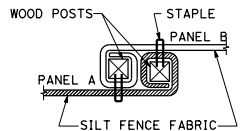
**T17**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

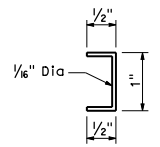
*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



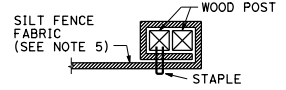
**SECTION A-A  
TEMPORARY SILT FENCE**



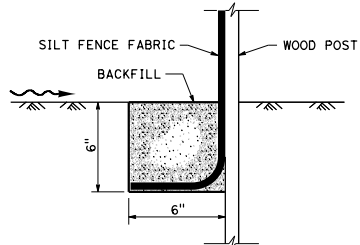
**PLAN  
POST AT JOINTS**  
(SEE NOTE 3)



**STAPLE DETAIL**  
(SEE NOTE 6)



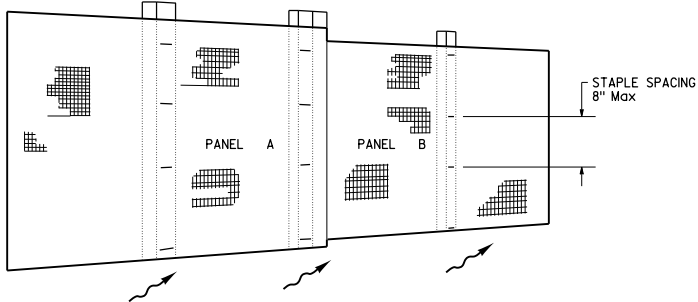
**PLAN  
END POST DETAIL**



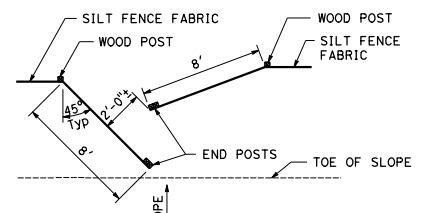
**SECTION  
TRENCH DETAIL**

**NOTES:**

1. The down stream end of the temporary silt fence shall have the last 8' angled up slope.
2. Setback dimensions may vary to fit field conditions.
3. Posts to overlap and fence fabric to fold around each post one full turn. Secure fabric with 4 staples for each post.
4. Posts shall be driven tightly together to prevent potential flow-through of sediment at the joint. The tops of the posts shall be secured to each other with wire.
5. For each end post, fence fabric shall be folded around two posts one full turn and secured with 4 staples.
6. Minimum of 4 staples shall be installed per post. Dimensions shown are typical.
7. Maintenance openings shall be constructed in a manner to ensure that sediment is retained by the temporary silt fence.
8. Joint sections shall not be placed at sump locations.



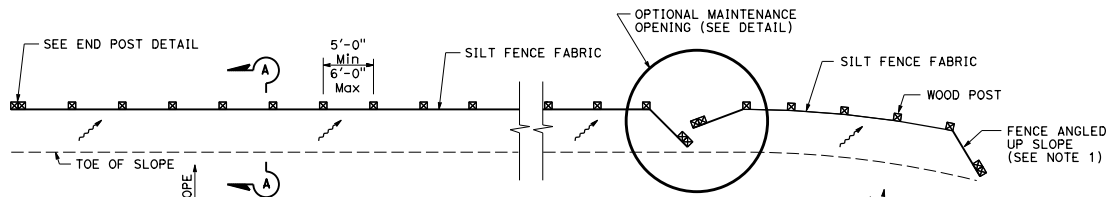
**PERSPECTIVE  
SILT FENCE PANELS AT JOINTS**



**OPTIONAL MAINTENANCE OPENING DETAIL**

**LEGEND**

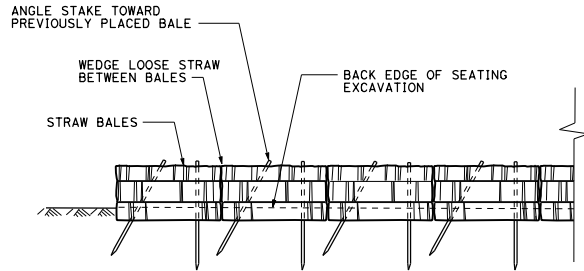
- TAMPED BACKFILL
- SLOPE DIRECTION
- DIRECTION OF FLOW



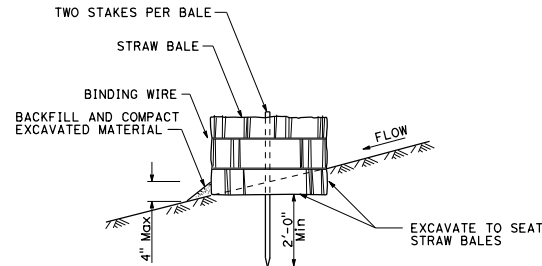
**PLAN  
TEMPORARY SILT FENCE**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS  
(TEMPORARY SILT FENCE)**

NO SCALE

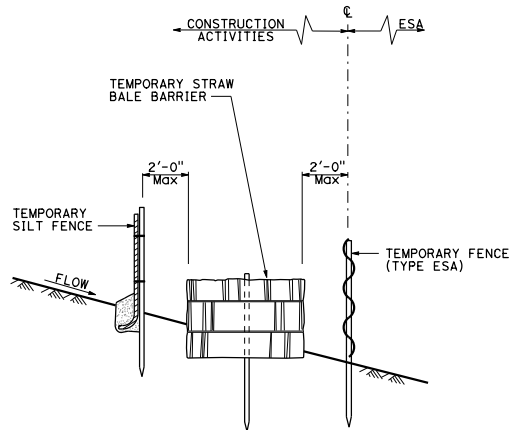


FRONT ELEVATION

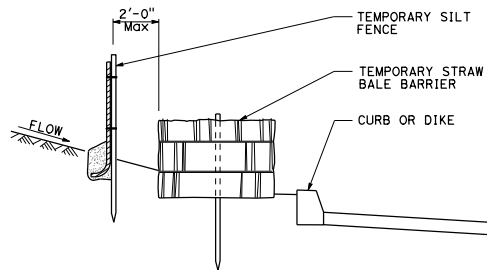


SECTION

**TEMPORARY STRAW BALE BARRIER**



SECTION  
**PLACEMENT DETAIL  
 FOR TEMPORARY SILT FENCE  
 AND TEMPORARY FENCE (TYPE ESA)  
 USED WITH TEMPORARY STRAW BALE BARRIER**  
 (See Note 1)



SECTION  
**PLACEMENT DETAIL  
 FOR TEMPORARY SILT FENCE  
 USED WITH TEMPORARY  
 STRAW BALE BARRIER**  
 (See Note 1)

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
 CONTROL DETAILS  
 (TEMPORARY STRAW BALE BARRIER)**  
 NO SCALE

**T52**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT

October 30, 2015  
 PLANS APPROVAL DATE

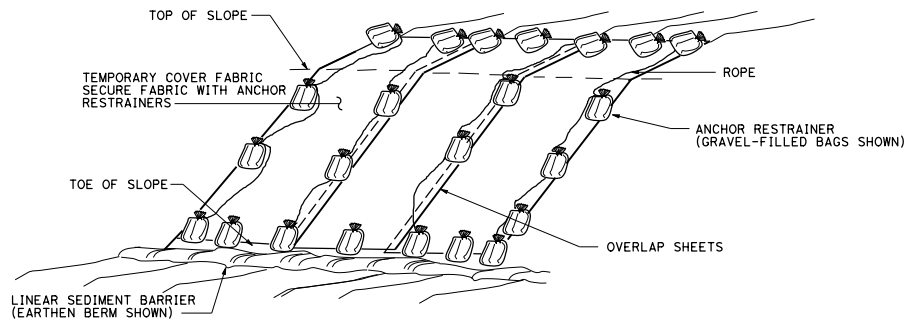
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**NOTE:**

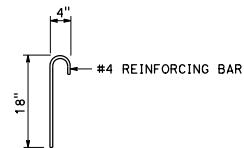
1. Temporary silt fence and temporary fence (Type ESA) shown for reference purposes only.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

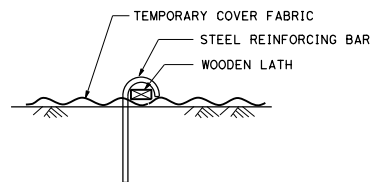
*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



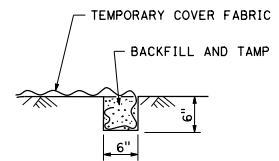
**PERSPECTIVE  
TEMPORARY COVER ON SLOPE**



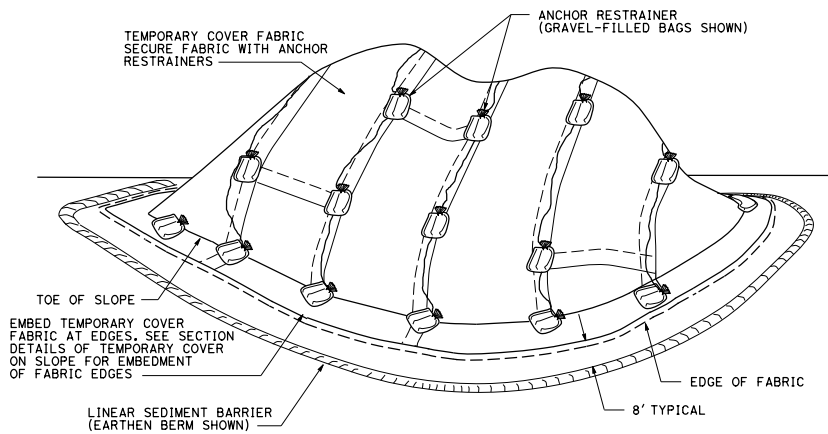
**STEEL REINFORCING BAR DETAIL**



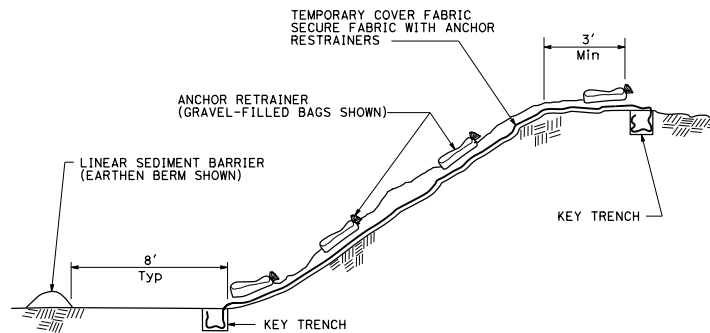
**SECTION  
ANCHOR RESTRAINER**  
(Steel bar and wooden lath)



**SECTION  
KEY TRENCH DETAIL**



**PERSPECTIVE  
TEMPORARY COVER ON STOCKPILE**

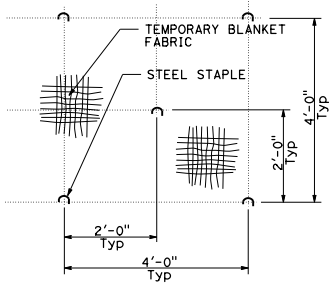


**SECTION  
TEMPORARY COVER ON SLOPE**

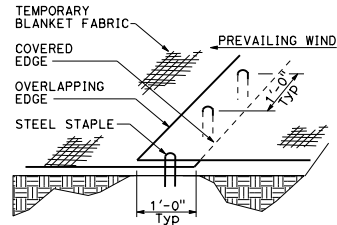
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS  
(TEMPORARY COVER)**

NO SCALE

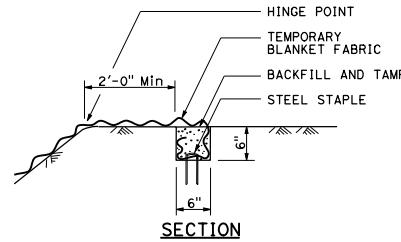
**T53**



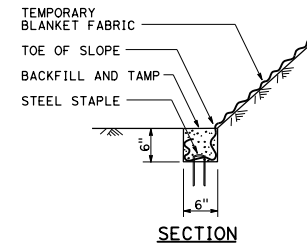
**STAPLE PATTERN  
DETAIL A**



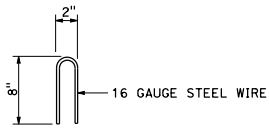
**LONGITUDINAL BLANKET JOINT  
DETAIL B**



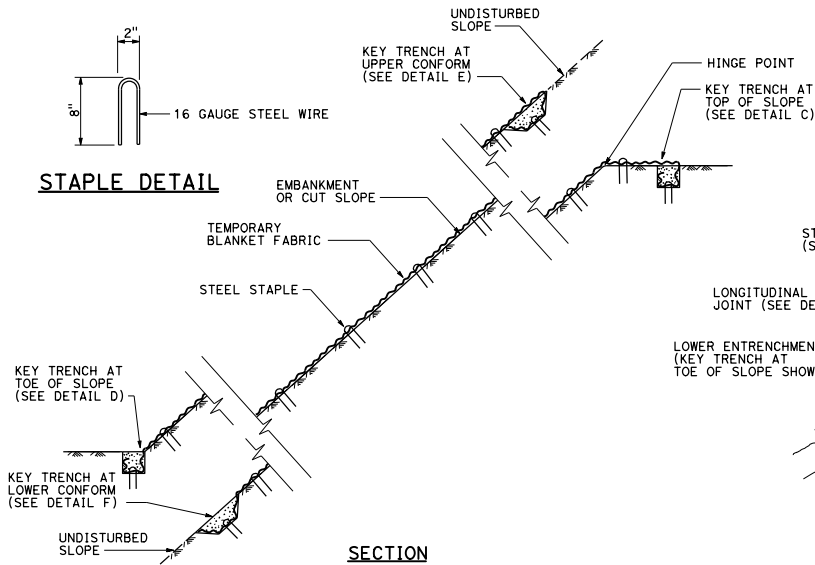
**KEY TRENCH AT  
TOP OF SLOPE  
DETAIL C**



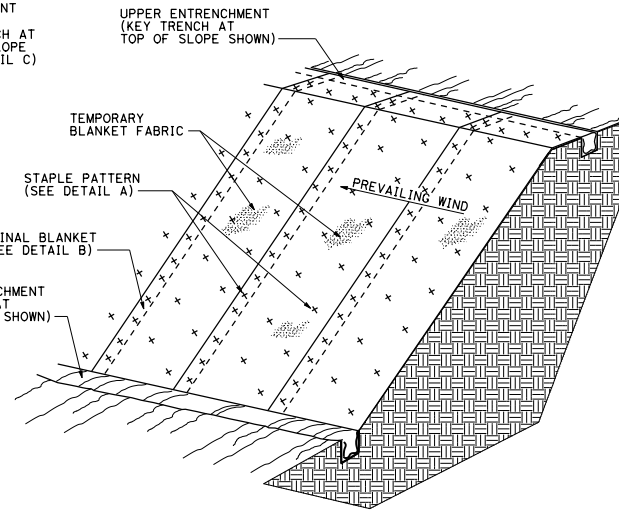
**KEY TRENCH AT  
TOE OF SLOPE  
DETAIL D**



**STAPLE DETAIL**



**TEMPORARY EROSION CONTROL BLANKET  
ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS**



**TEMPORARY EROSION CONTROL BLANKET  
ON SLOPE**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

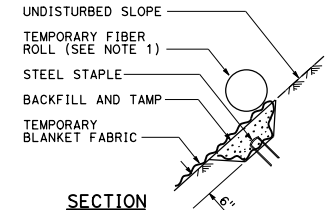
*Robert P. Abbott*  
LICENSED LANDSCAPE ARCHITECT

October 30, 2015  
PLANS APPROVAL DATE

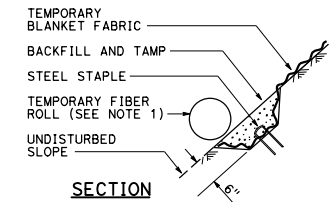
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**NOTE:**

1. Temporary fiber roll shown for reference purposes only.



**SECTION  
KEY TRENCH AT  
UPPER CONFORM  
DETAIL E**




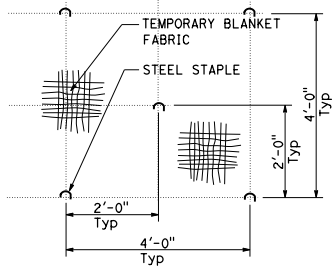
**SECTION  
KEY TRENCH AT  
LOWER CONFORM  
DETAIL F**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

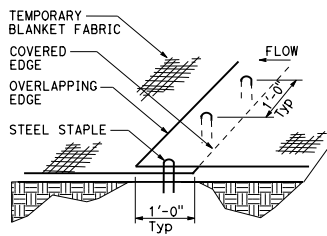
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS  
(TEMPORARY EROSION CONTROL BLANKET)**

NO SCALE

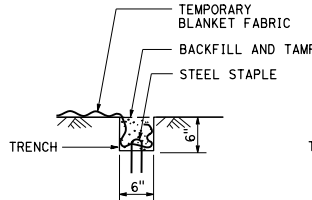
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Robert P. Albright</i> LICENSED LANDSCAPE ARCHITECT October 30, 2015 PLANS APPROVAL DATE <small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					
					



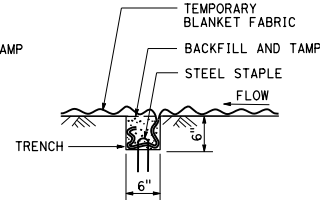
**PLAN  
DETAIL A  
STAPLE PATTERN**



**PERSPECTIVE  
DETAIL B  
LONGITUDINAL BLANKET JOINT**



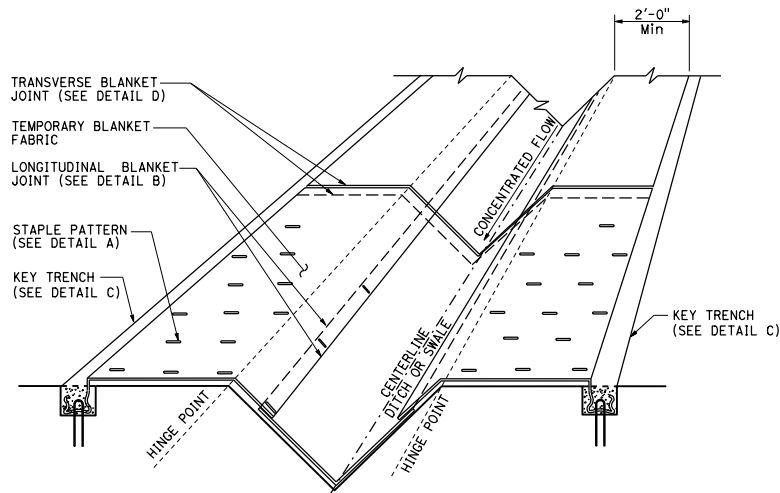
**SECTION  
DETAIL C  
KEY TRENCH**



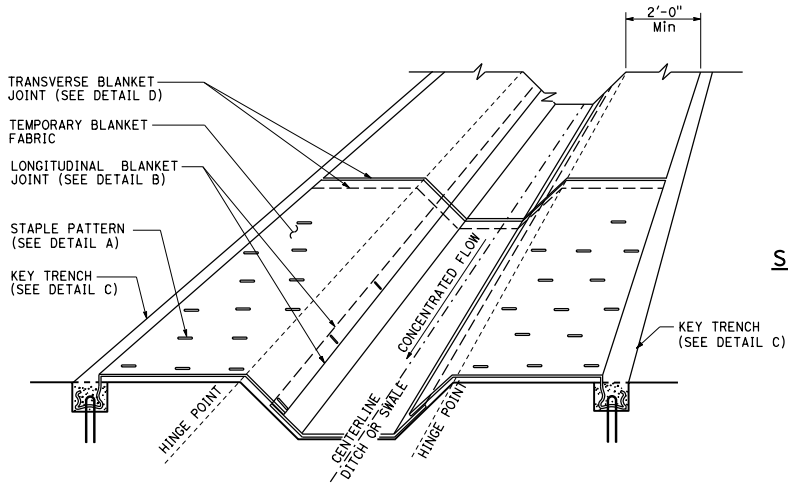
**SECTION  
DETAIL D  
TRANSVERSE BLANKET JOINT**

**NOTE:**

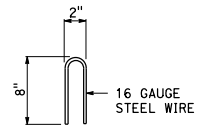
1. For clarity, perspective view does not show all staples.



**PERSPECTIVE  
TEMPORARY EROSION CONTROL BLANKET  
IN V-DITCH OR SWALE**



**PERSPECTIVE  
TEMPORARY EROSION CONTROL BLANKET  
IN TRAPEZOIDAL DITCH OR SWALE**



**STAPLE DETAIL**

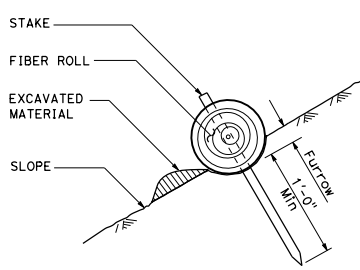
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS  
(TEMPORARY EROSION CONTROL BLANKET)**

NO SCALE

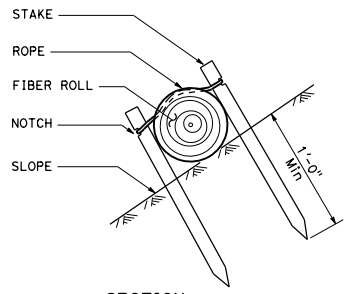
**T55**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

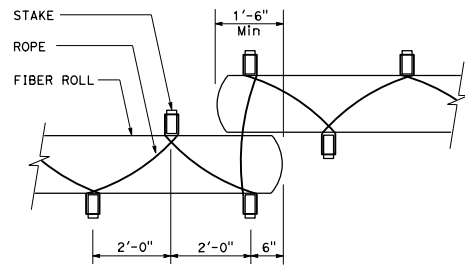
*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



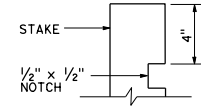
**SECTION**  
**TEMPORARY FIBER ROLL**  
**(TYPE 1)**



**SECTION**  
**TEMPORARY FIBER ROLL**  
**(TYPE 2)**

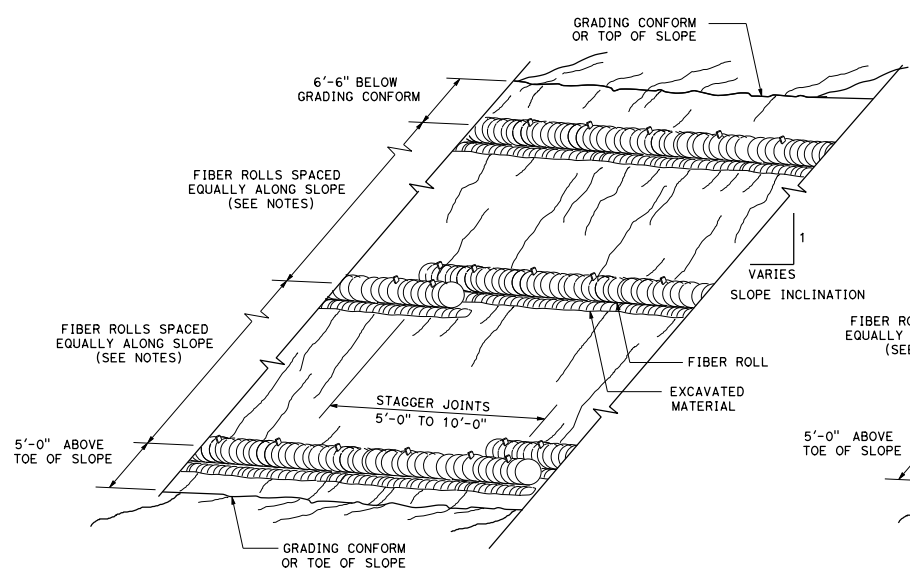


**PLAN**

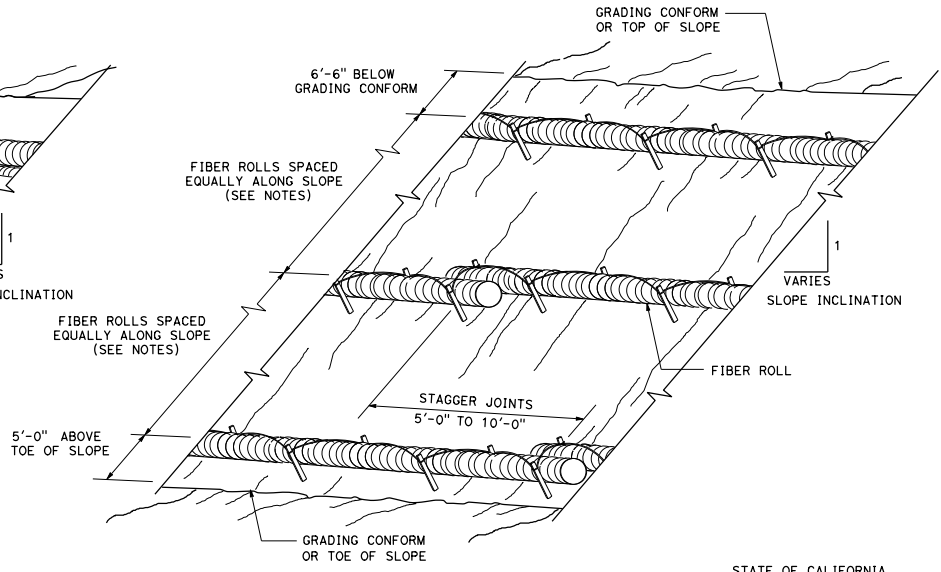


**ELEVATION**  
**STAKE NOTCH DETAIL**

- NOTES:**
1. Temporary fiber roll spacing varies depending upon slope inclination.
  2. Installations shown in the perspectives are for slope inclination of 10:1 and steeper.



**PERSPECTIVE**  
**TEMPORARY FIBER ROLL (TYPE 1)**



**PERSPECTIVE**  
**TEMPORARY FIBER ROLL (TYPE 2)**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION CONTROL DETAILS**  
**(TEMPORARY FIBER ROLL)**

NO SCALE

**T56**

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2015 STANDARD PLAN T56

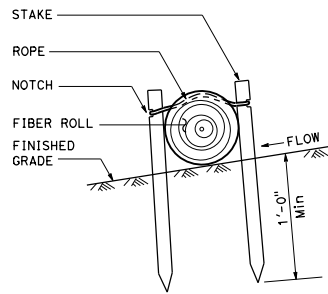


265

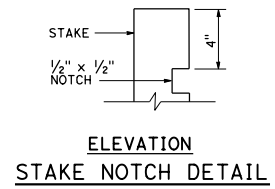
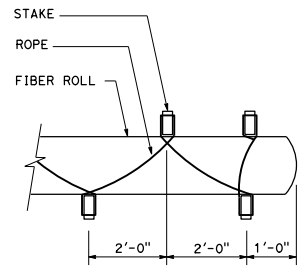
2015 STANDARD PLAN T57

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

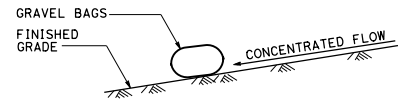
*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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**SECTION**  
**STAKING AND LASHING DETAIL**

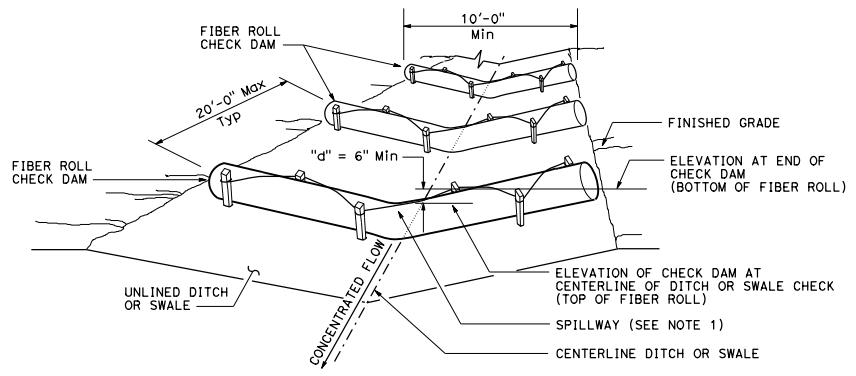


**ELEVATION**  
**STAKE NOTCH DETAIL**

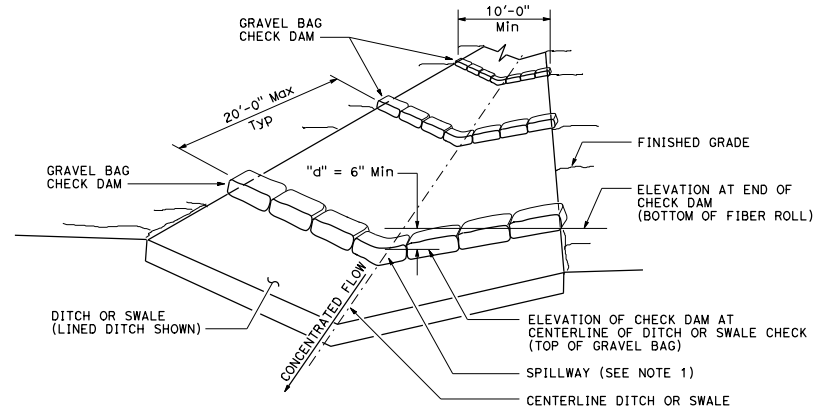


**SECTION**  
**TEMPORARY CHECK DAM (TYPE 2)**

**NOTE:**  
1. Spillway depth "d" shall be maintained to prevent flanking of concentrated flow around the ends of each check dam.



**PERSPECTIVE**  
**TEMPORARY CHECK DAM (TYPE 1)**  
(Total of 3 check dams shown)



**PERSPECTIVE**  
**TEMPORARY CHECK DAM (TYPE 2)**  
(Total of 3 check dams shown)

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS  
(TEMPORARY CHECK DAM)**

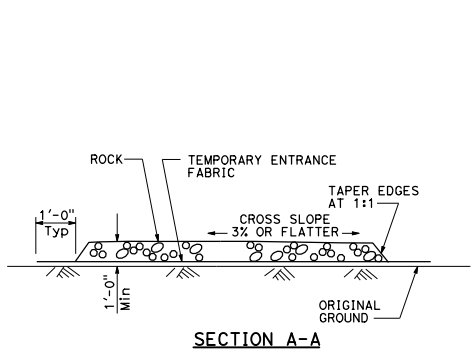
NO SCALE

**T57**

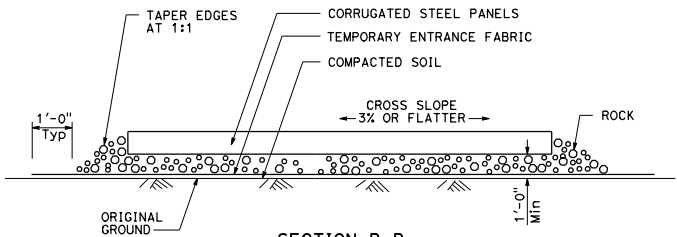
9-22-15

*Return to Table of Contents*

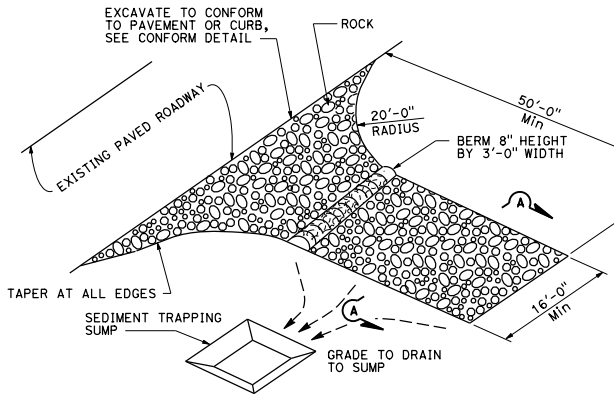
D18+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Robert B. Abbott</i> LICENSED LANDSCAPE ARCHITECT					
October 30, 2015 PLANS APPROVAL DATE					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



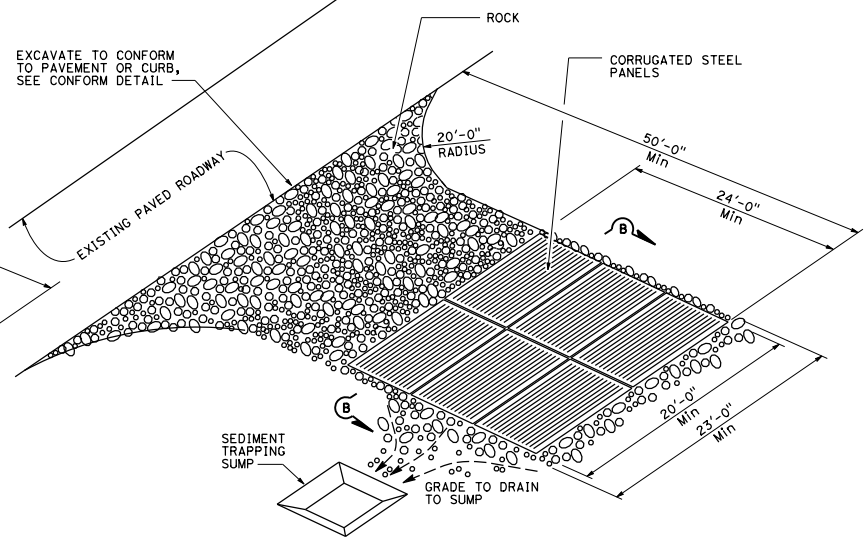
SECTION A-A



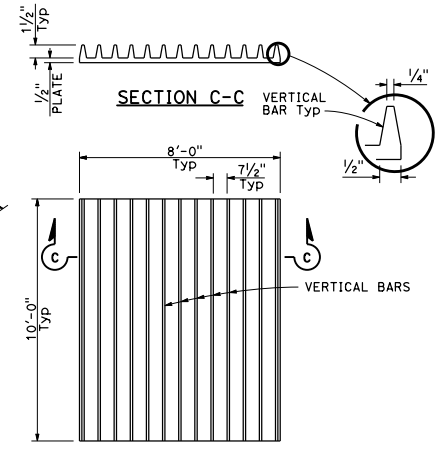
SECTION B-B



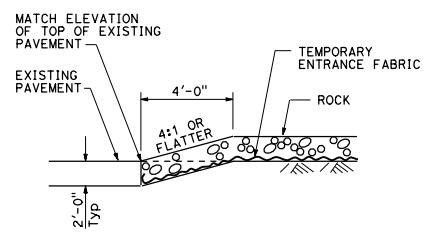
PERSPECTIVE TEMPORARY CONSTRUCTION ENTRANCE (TYPE 1)



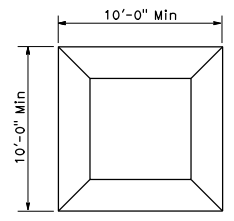
PERSPECTIVE TEMPORARY CONSTRUCTION ENTRANCE (TYPE 2)



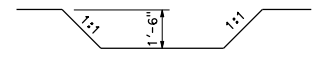
PLAN TYPICAL CORRUGATED STEEL PANEL DETAIL



SECTION CONFORM DETAIL



PLAN SEDIMENT TRAPPING SUMP

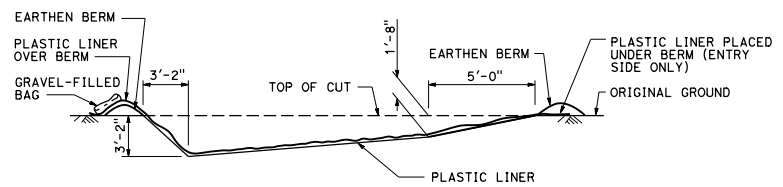


ELEVATION SEDIMENT TRAPPING SUMP

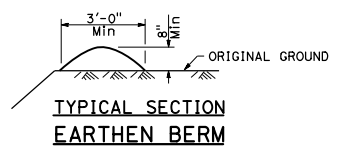
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CONSTRUCTION ENTRANCE)**  
 NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

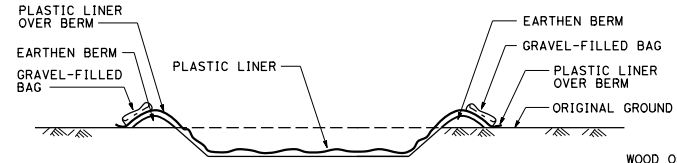
*Robert P. Albright*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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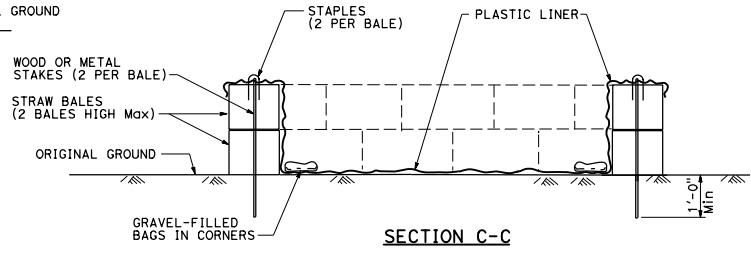
**SECTION B-B**



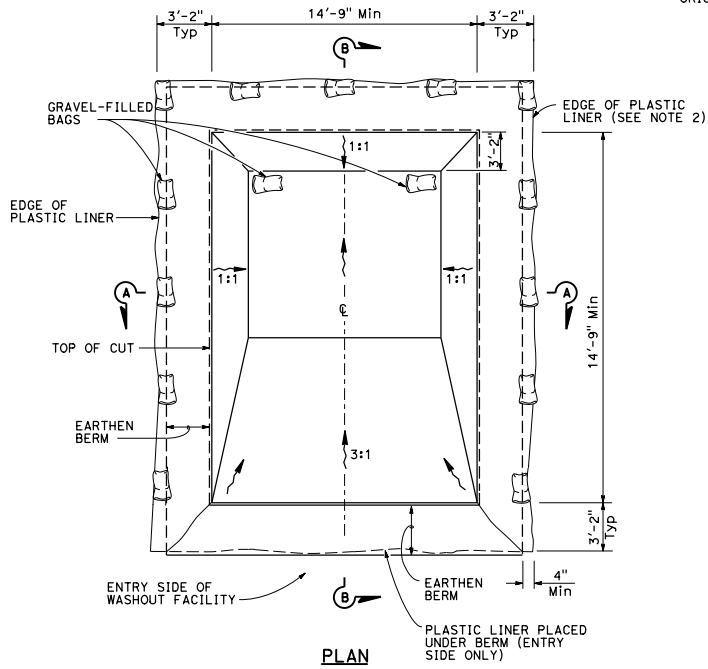
**TYPICAL SECTION EARTHEN BERM**



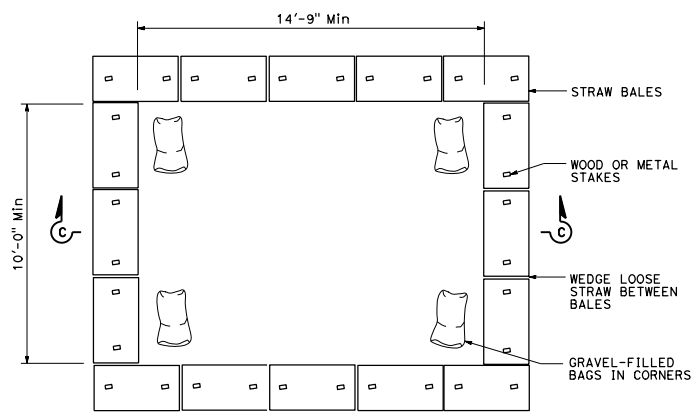
**SECTION A-A**



**SECTION C-C**



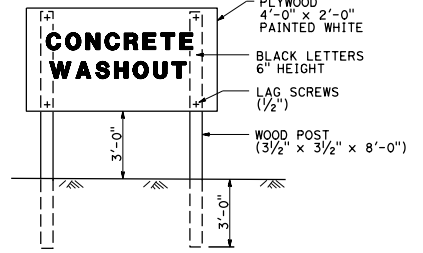
**TEMPORARY CONCRETE WASHOUT FACILITY (Below Grade)**



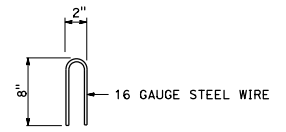
**PLAN TEMPORARY CONCRETE WASHOUT FACILITY (On Grade)**

**NOTES:**

1. The concrete washout sign shall be installed within 32'-10" of the temporary concrete washout facility.
2. Plastic liner shall be anchored with gravel-filled bags for below grade concrete washout facility.

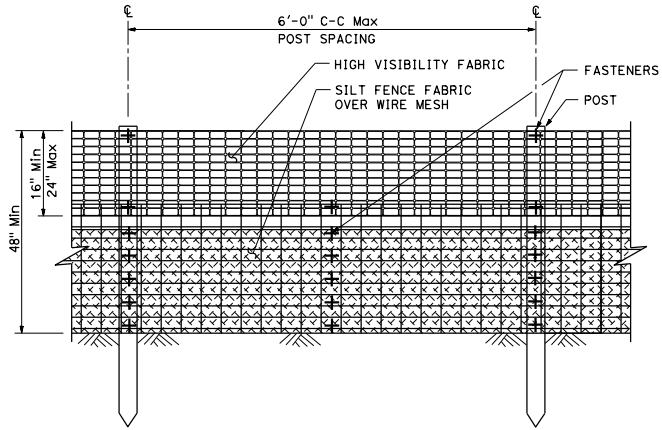


**CONCRETE WASHOUT SIGN DETAIL**

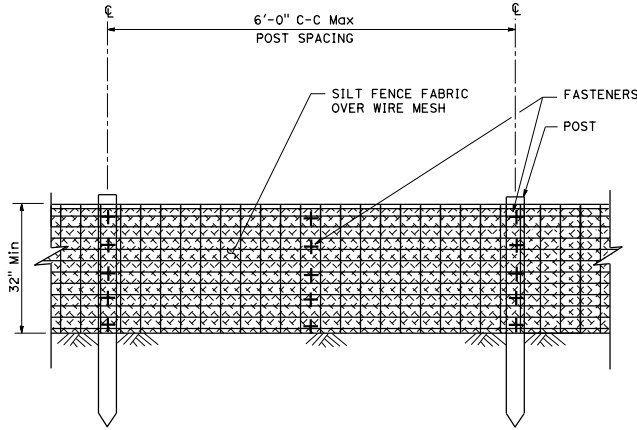


**STAPLE DETAIL**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY CONCRETE WASHOUT FACILITY)**  
 NO SCALE



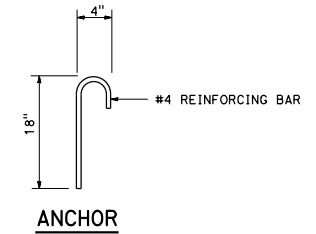
**ELEVATION**



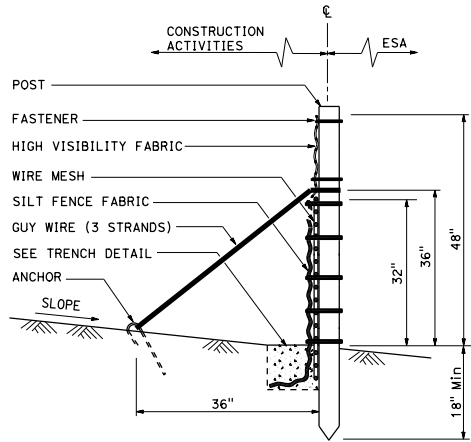
**ELEVATION**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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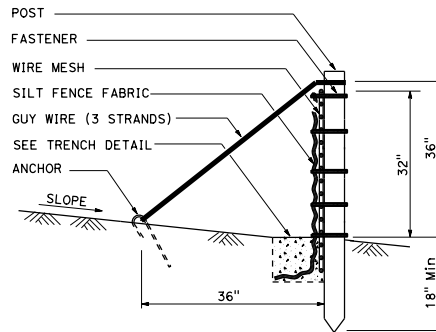


**ANCHOR**



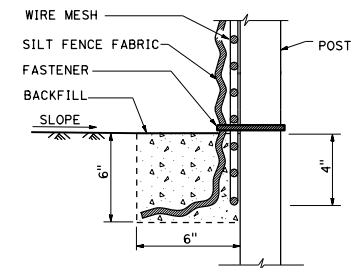
**SECTION**

**TEMPORARY REINFORCED SILT FENCE (TYPE 1)**



**SECTION**

**TEMPORARY REINFORCED SILT FENCE (TYPE 2)**



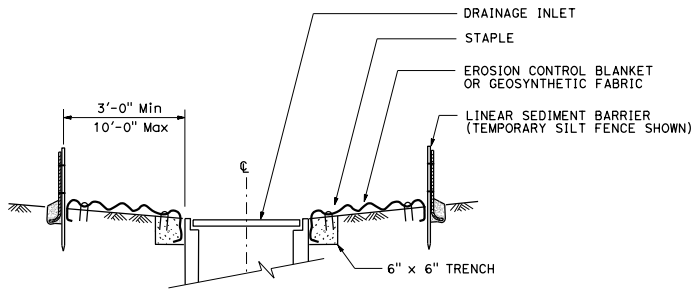
**SECTION  
TRENCH DETAIL**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
CONTROL DETAILS  
(TEMPORARY REINFORCED SILT FENCE)**  
NO SCALE

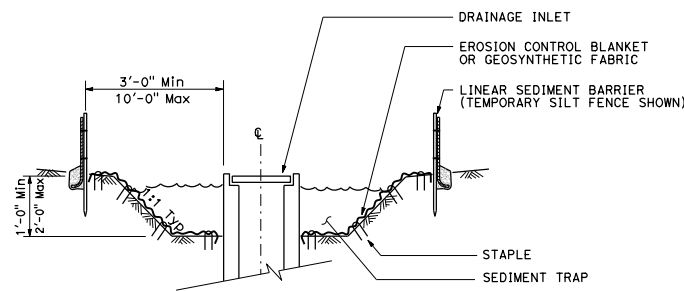
**T60**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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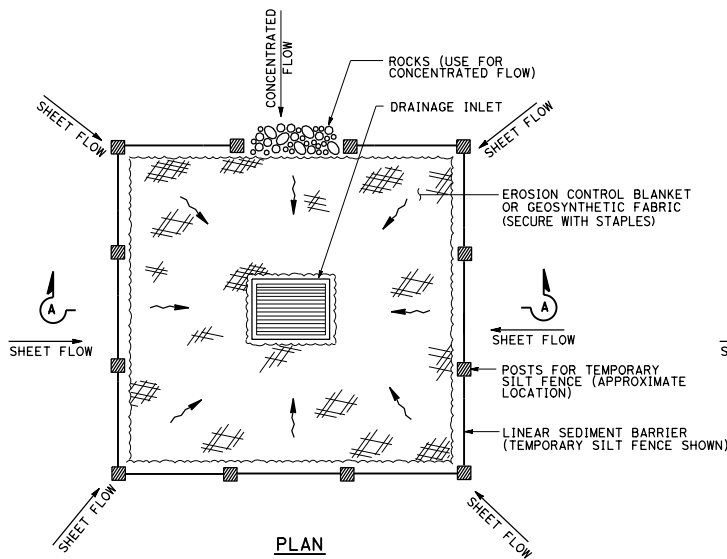


SECTION A-A

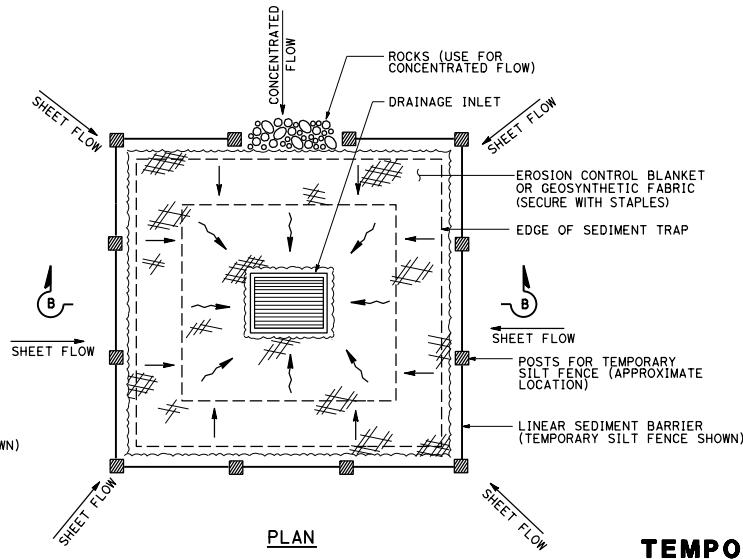


SECTION B-B

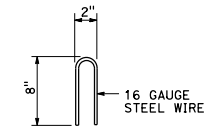
- NOTES:**
1. See Standard Plan T51 for Temporary Silt Fence.
  2. Dimensions may vary to fit field conditions.



TEMPORARY DRAINAGE INLET PROTECTION (TYPE 1)



TEMPORARY DRAINAGE INLET PROTECTION (TYPE 2) (EXCAVATED SEDIMENT TRAP)



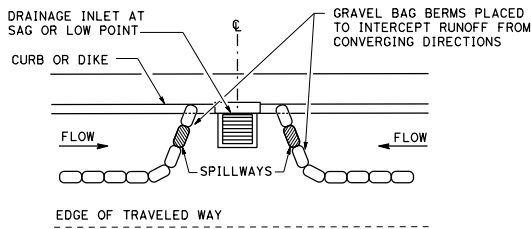
STAPLE DETAIL

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY DRAINAGE INLET PROTECTION)**

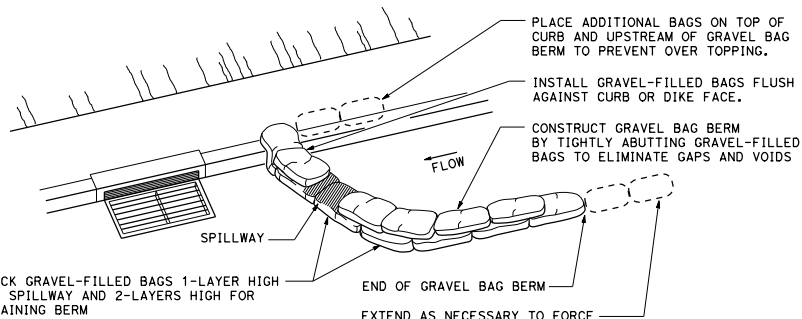
NO SCALE

**T61**

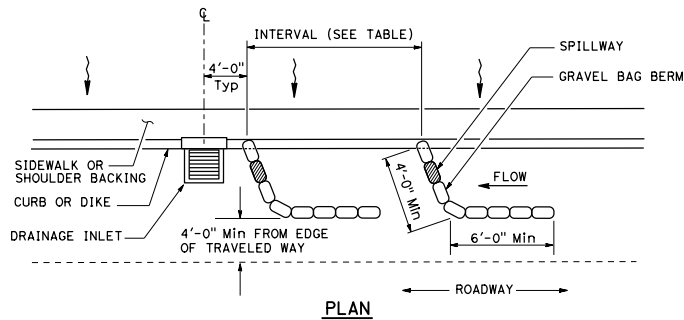
270



**PLAN**  
**CONFIGURATION FOR SAG POINT INLET**  
**(GRAVEL BAG BERM)**



**PERSPECTIVE**

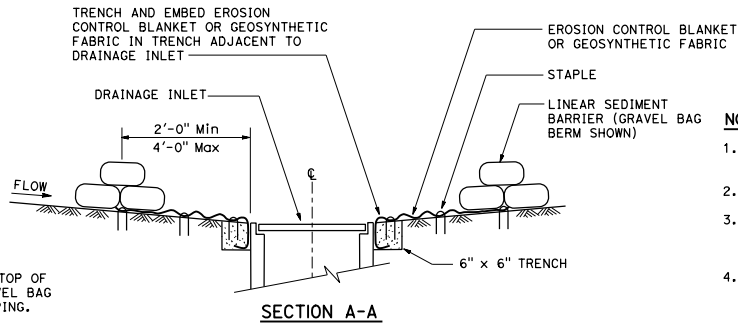


**PLAN**  
**TEMPORARY DRAINAGE**  
**INLET PROTECTION (TYPE 3A)**  
**(GRAVEL BAG BERM)**

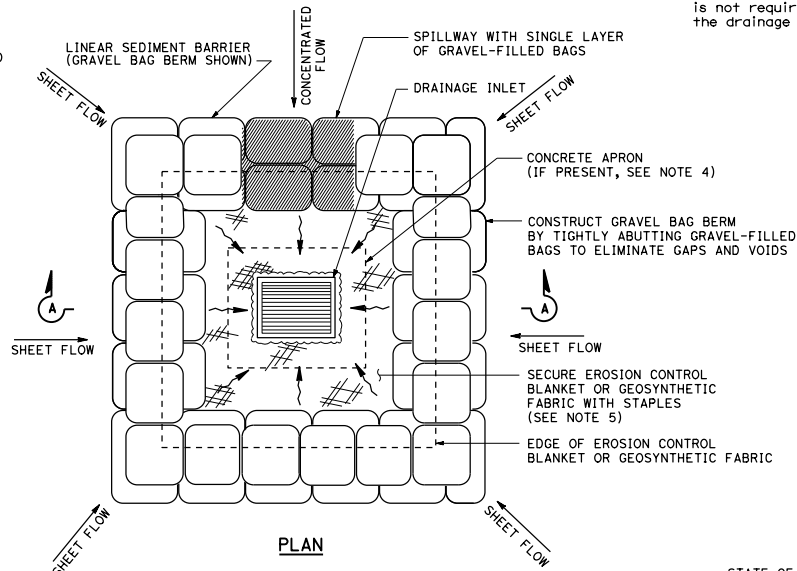
**GRAVEL BAG BERM (TYPE 3A) SPACING TABLE**

SLOPE OF ROADWAY (PERCENT)	1 TO 3.9	4 TO 5.9	6 TO 7.9	8 TO 10	10+
INTERVAL BETWEEN BERM	100'	75'	50'	25'	12'

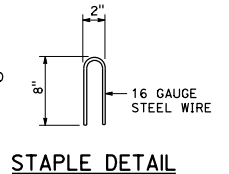
For slope of less than 1%, install barriers only if erosion/sediment is prevalent



**SECTION A-A**



**PLAN**  
**TEMPORARY DRAINAGE**  
**INLET PROTECTION (TYPE 3B)**



**NOTES:**

1. Place safety cones adjacent to drainage inlet protection.
2. Dimensions may vary to fit field conditions.
3. Install a minimum of 3 gravel bag berms upstream of each drainage inlet to be protected.
4. Position erosion control blanket or geosynthetic fabric at edge of concrete apron and secure in trench.
5. Erosion control blanket or geosynthetic fabric is not required if the area adjacent to the drainage inlet is vegetated or paved.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Robert P. Abbott  
LICENSED LANDSCAPE ARCHITECT

October 30, 2015  
PLANS APPROVAL DATE

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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION**  
**CONTROL DETAILS**  
**(TEMPORARY DRAINAGE**  
**INLET PROTECTION)**

NO SCALE

**T62**

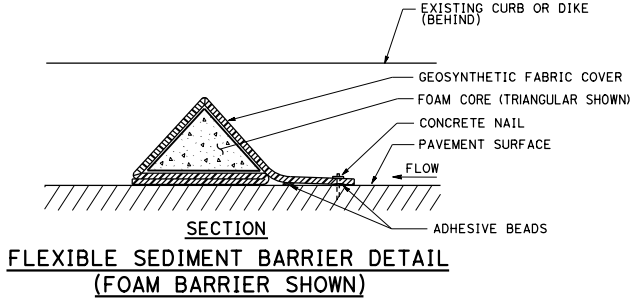
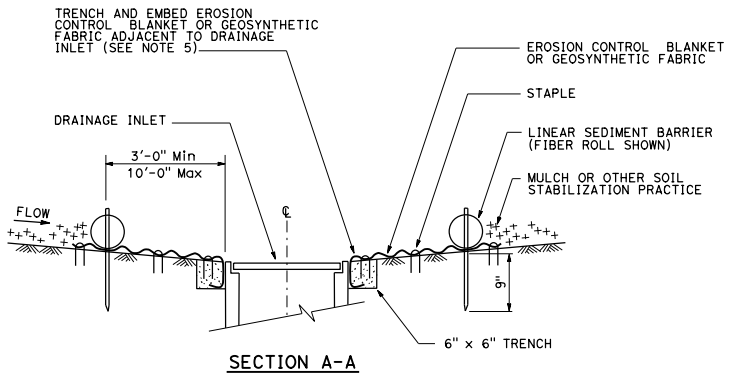
2015 STANDARD PLAN T62

**FLEXIBLE SEDIMENT BARRIER SPACING TABLE**

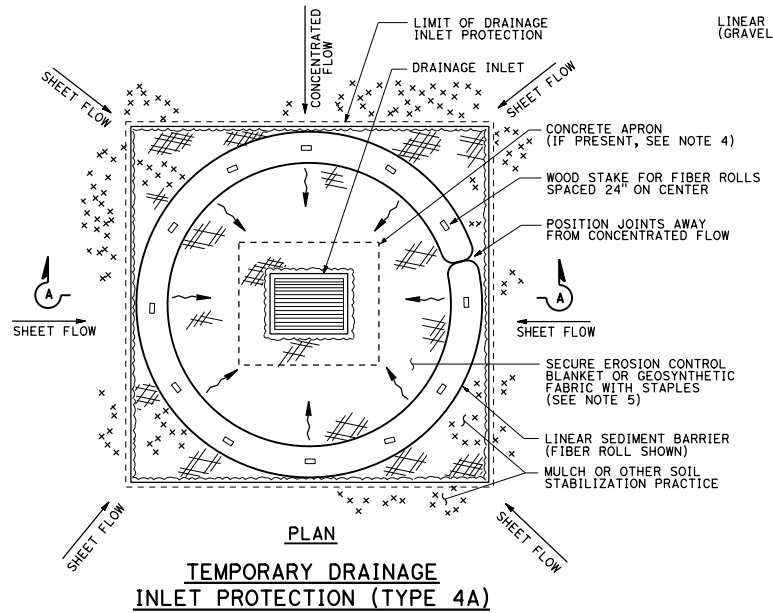
SLOPE OF ROADWAY (PERCENT)	0 TO 0.9	1 TO 1.9	2 TO 2.9	3 TO 4	5+
INTERVAL BETWEEN BARRIERS	50'	35'	30'	25'	20'
ANGLE FROM FACE OF CURB	70°	70°	70°	45°	45°
SUGGESTED BARRIER LENGTH	6'	6'	6'	6'	6'

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

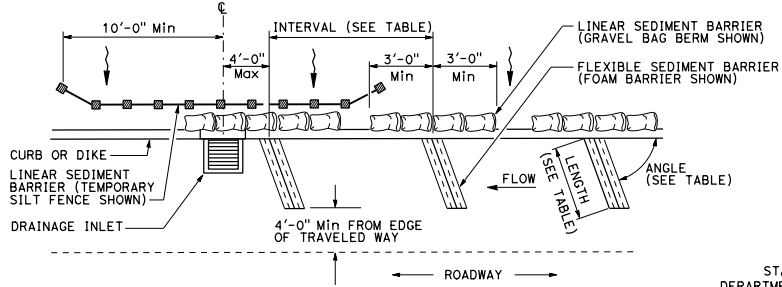
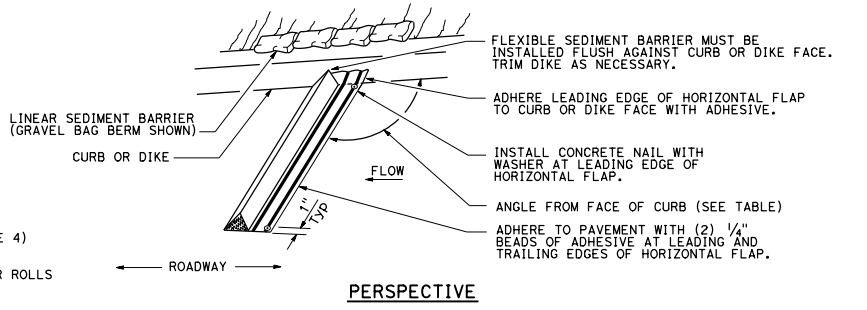
*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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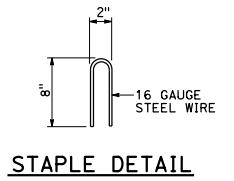
- NOTES:**
- See Standard Plan T51 for Temporary Silt Fence.
  - Dimensions may vary to fit field conditions.
  - Install a minimum of 3 flexible sediment barriers upstream of each drainage inlet to be protected.
  - Position erosion control blanket or geosynthetic fabric at edge of concrete apron and secure in trench.
  - Erosion control blanket or geosynthetic fabric is not required if the area adjacent to the drainage inlet is vegetated.



**TEMPORARY DRAINAGE INLET PROTECTION (TYPE 4A)**



**TEMPORARY DRAINAGE INLET PROTECTION (TYPE 4B) FLEXIBLE SEDIMENT BARRIER**

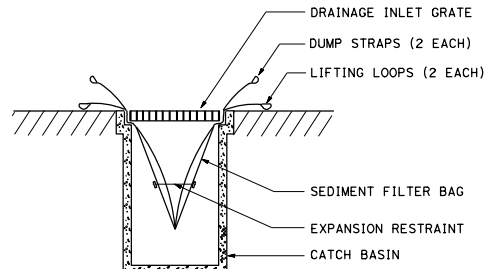


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY DRAINAGE INLET PROTECTION)**

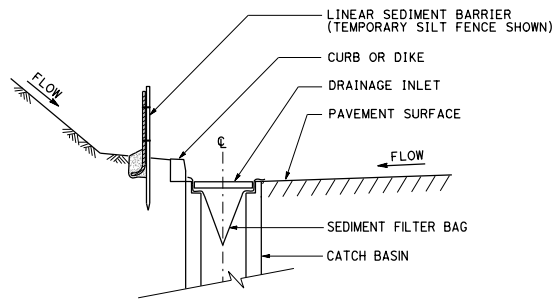
NO SCALE

**T63**

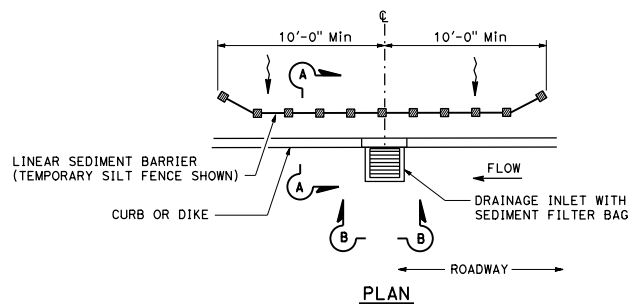




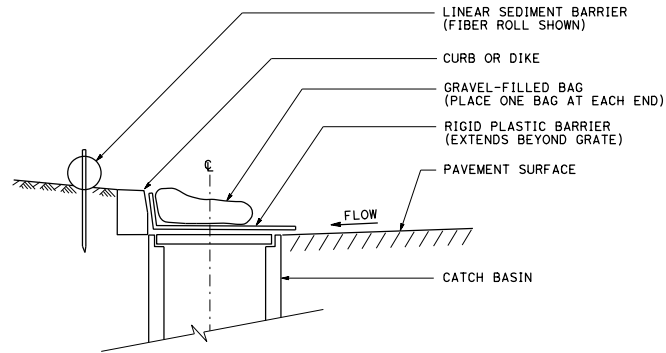
**SECTION B-B**  
**SEDIMENT FILTER BAG DETAIL**



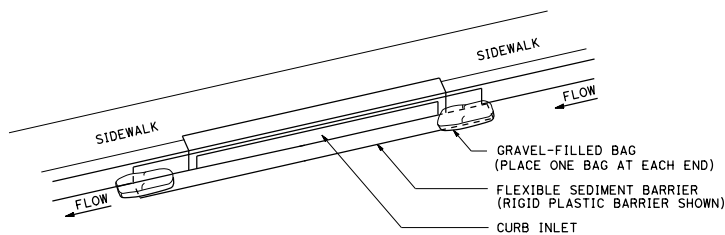
**SECTION A-A**



**TEMPORARY DRAINAGE**  
**INLET PROTECTION (TYPE 5)**  
**(SEDIMENT FILTER BAG)**



**SECTION**  
**TEMPORARY DRAINAGE**  
**INLET PROTECTION (TYPE 6A)**  
**(CATCH BASIN WITH GRATE)**



**PERSPECTIVE**  
**TEMPORARY DRAINAGE**  
**INLET PROTECTION (TYPE 6B)**  
**(CURB INLET WITHOUT GRATE)**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

1. See Standard Plan T51 for Temporary Silt Fence.
2. Dimensions may vary to fit field conditions.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY DRAINAGE INLET PROTECTION)**

NO SCALE

**T64**

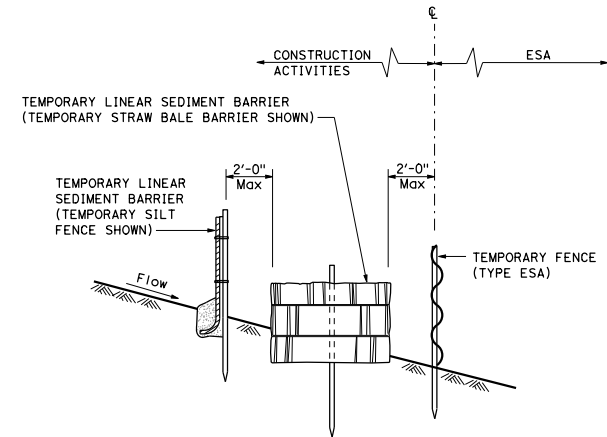
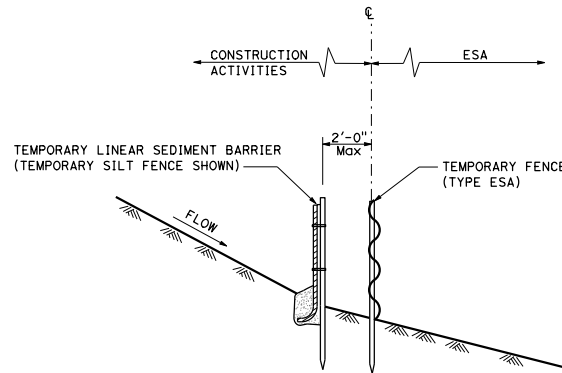
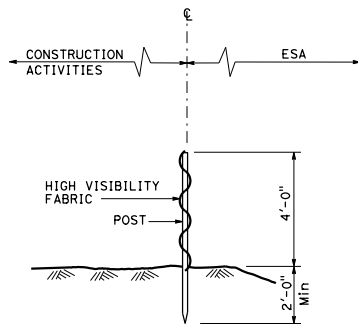
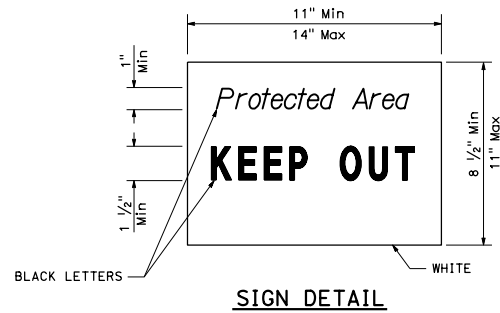


DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT

October 30, 2015  
 PLANS APPROVAL DATE

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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**TEMPORARY WATER POLLUTION CONTROL DETAILS [TEMPORARY FENCE (TYPE ESA)]**

NO SCALE

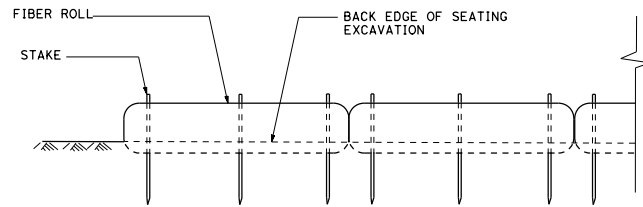
**T65**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
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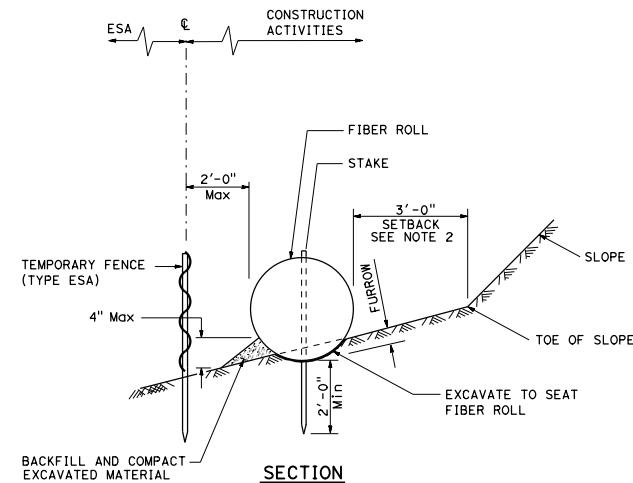
**NOTES:**

1. Temporary fence (Type ESA) shown for reference purposes only.
2. Setback dimension may vary according to field conditions or as designated on plans



**FRONT ELEVATION**

**TEMPORARY LARGE SEDIMENT BARRIER**



**SECTION**

**PLACEMENT DETAIL FOR TEMPORARY FENCE (TYPE ESA) USED WITH TEMPORARY LARGE SEDIMENT BARRIER**

(See Note 1)

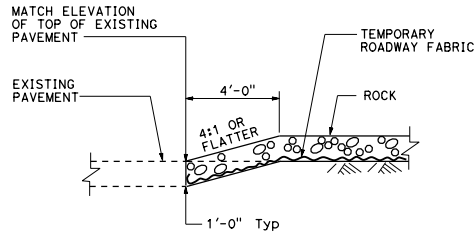
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**TEMPORARY WATER POLLUTION CONTROL DETAILS (TEMPORARY LARGE SEDIMENT BARRIER)**

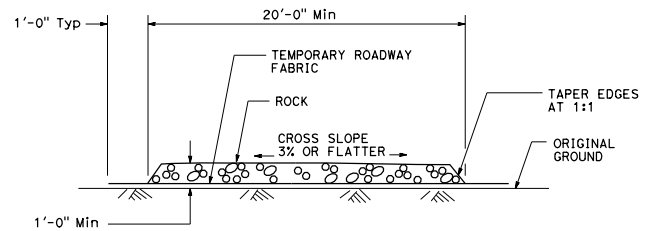
NO SCALE

**T66**

275



**SECTION  
CONFORM DETAIL**



**SECTION  
TEMPORARY CONSTRUCTION ROADWAY**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Robert P. Abbott*  
 LICENSED LANDSCAPE ARCHITECT  
 October 30, 2015  
 PLANS APPROVAL DATE  
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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TEMPORARY WATER POLLUTION  
 CONTROL DETAILS  
 (TEMPORARY CONSTRUCTION  
 ROADWAY)**

NO SCALE

**T67**

2015 STANDARD PLAN T67

**BRIDGE DESIGNATIONS**

- J Outer, outer left bridge
- K Outer left bridge
- S Outer right bridge
- T Outer, outer right bridge

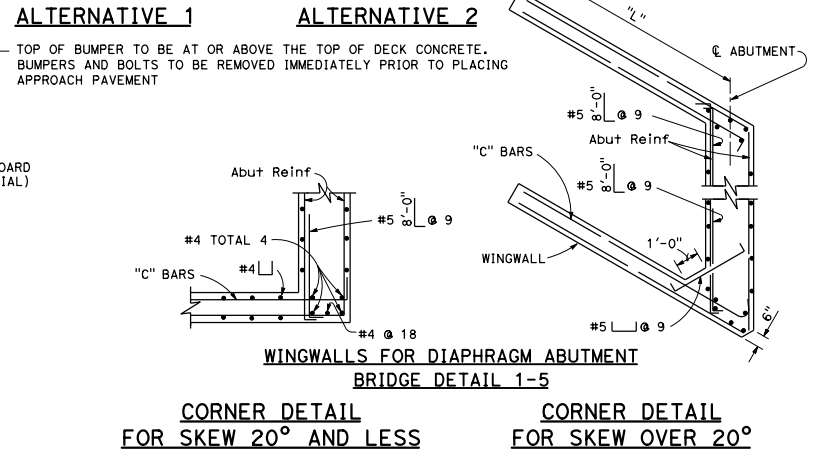
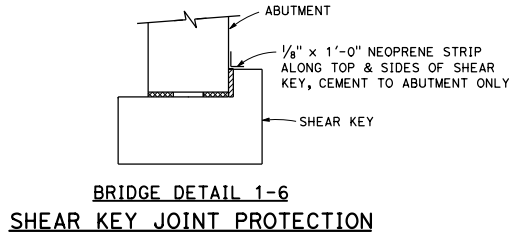
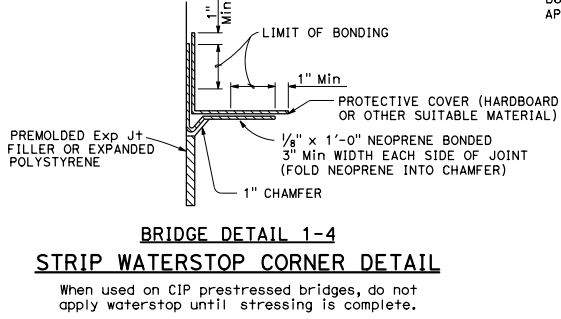
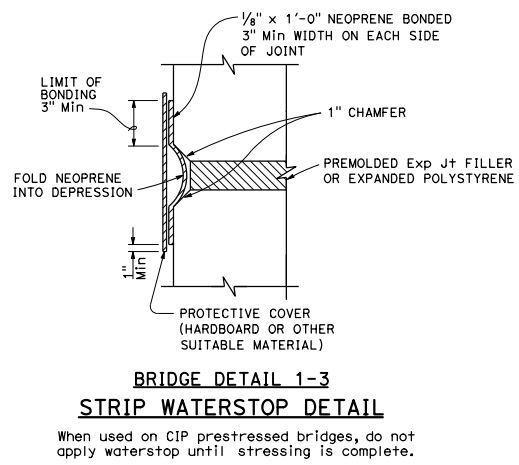
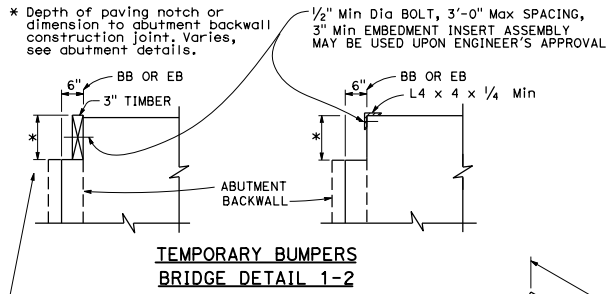
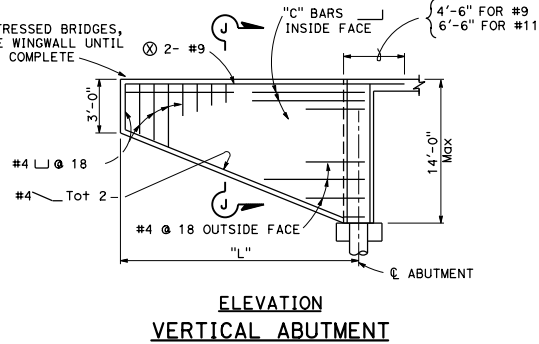
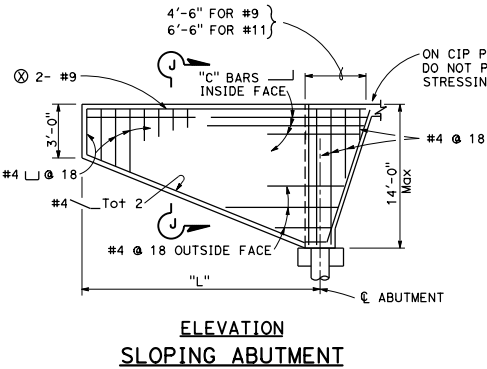
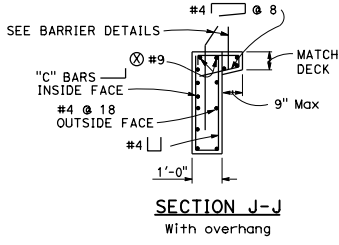
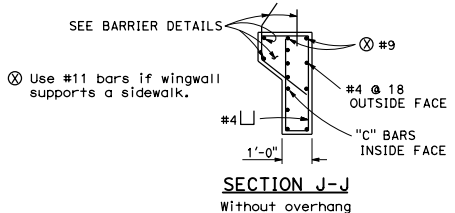
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Peter W. Norbo*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Peter W. Norbo*  
No. C57519  
Exp. 12-31-15  
CIVIL  
STATE OF CALIFORNIA

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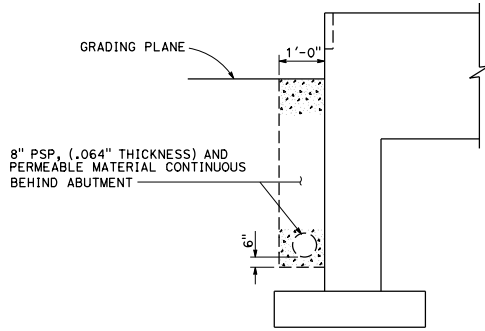
"L"	"C" BARS
12'-0"	#5 @ 9"
14'-0"	#6 @ 9"
16'-0"	#7 @ 9"
18'-0"	#8 @ 9"
20'-0"	#9 @ 9"

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**BRIDGE DETAILS**  
NO SCALE

**B0-1**

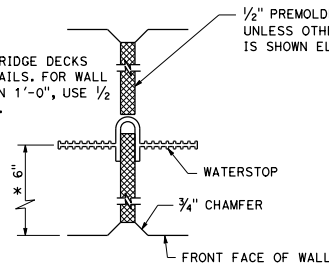
276

2015 STANDARD PLAN BO-1

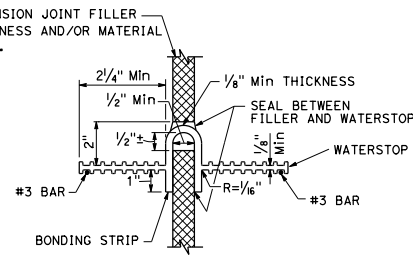


**BRIDGE DETAIL 3-5**  
**8" PSP AND PERMEABLE MATERIAL**

\* FOR PLACEMENT IN BRIDGE DECKS  
SEE JOINT SEAL DETAILS. FOR WALL  
THICKNESS LESS THAN 1'-0", USE 1/2  
THE WALL THICKNESS.



**BRIDGE DETAIL 3-4**  
**WALL EXPANSION JOINT**



**BRIDGE DETAIL 3-6**  
**WATERSTOP**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Gary Wong*  
REGISTERED CIVIL ENGINEER

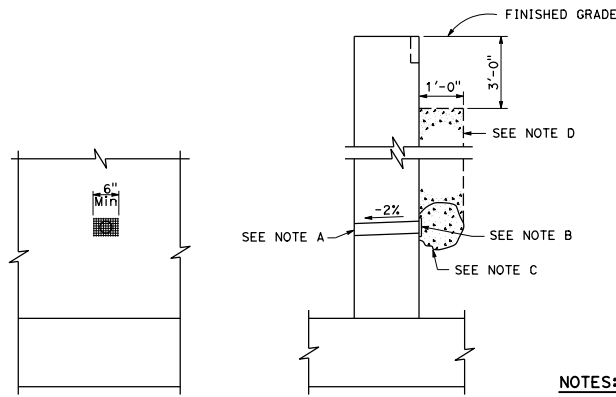
October 30, 2015  
PLANS APPROVAL DATE

Gary Wong  
No. C58238  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

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**NOTES:**

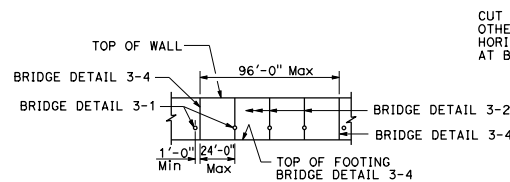
- Holes will be permitted in the outer 1/2" of the web for wire, rings, etc. Tie web to #3 reinforcing bars @ 12 maximum intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the Engineer.
- Waterstop to have 5 or more pairs of raised ribs to provide 0.1 square inch minimum rib cross-section area on each half of the waterstop.



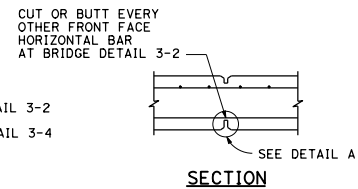
**ELEVATION**  
**BRIDGE DETAIL 3-1**  
**WEEP HOLE AND PERVIOUS BACKFILL**

**NOTES:**

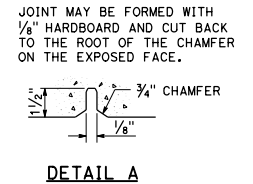
- 4"  $\phi$  Drains @ 25'-0" maximum center to center, 9'-0" center to center for Type 3 and 9'-3" center to center for Type 4 retaining walls. For walls adjacent to sidewalks or curbs, provide 4" plastic pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 3" above finished grade.
- 6" square aluminum or galvanized steel wire 1/4" mesh hardware cloth, minimum wire diameter 0.025". Anchor firmly to backface.
- One cubic foot pervious backfill material in a nonwoven filter fabric, securely tied.
- Pervious backfill material continuous behind retaining wall or abutment.



**BRIDGE DETAIL 3-3**  
**WALL EXPANSION JOINTS**  
**AND WEAKENED PLANES**



**SECTION**  
**BRIDGE DETAIL 3-2**  
**WEAKENED PLANES**



**DETAIL A**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**BRIDGE DETAILS**

NO SCALE

**B0-3**

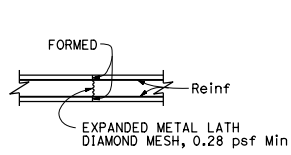
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Peter W. Norbo*  
REGISTERED CIVIL ENGINEER

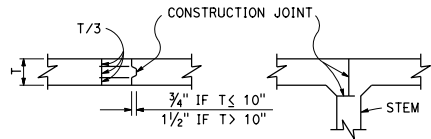
October 30, 2015  
PLANS APPROVAL DATE

**Peter W. Norbo**  
REGISTERED PROFESSIONAL ENGINEER  
No. C57519  
Exp. 12-31-15  
CIVIL  
STATE OF CALIFORNIA

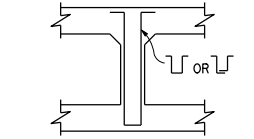
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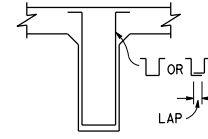
**ALTERNATIVE DECK  
CONSTRUCTION JOINTS**



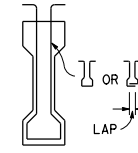
**BRIDGE DETAIL 5-2** **BRIDGE DETAIL 5-3**  
Top or bottom slab  
**DECK CONSTRUCTION JOINTS**



**REINFORCED BOX GIRDER**  
Girder or diaphragm



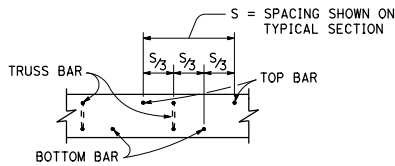
**T-BEAM**  
Girder, bent cap or diaphragm  
A reinforcement bar must be placed inside of each stirrup hook or 90° bend.



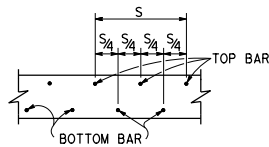
**PRECAST GIRDER**

STIRRUP SIZE	LAP
#4	5"
#5	6"
#6	7 1/2"
#7	9"
#8	10"

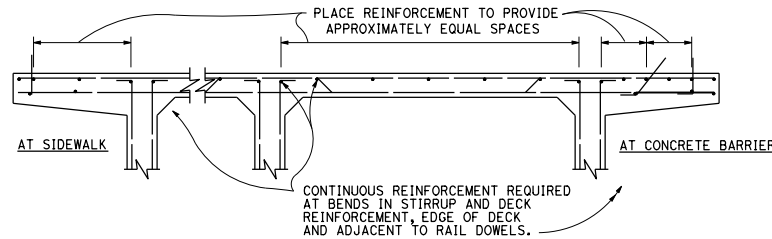
**BRIDGE DETAIL 5-5**  
**ALTERNATIVE STIRRUPS**



**BRIDGE DETAIL 5-10**



**BRIDGE DETAIL 5-11**  
**TRANSVERSE DECK REINFORCEMENT  
SPACING DIAGRAMS**



**BRIDGE DETAIL 5-15**  
**TOP GIRDER REINFORCEMENT**

**NOTES:**

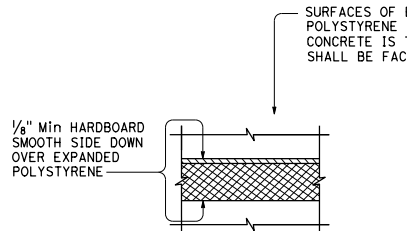
1. In simple spans, transverse joints are not permitted unless approved by the Engineer.
2. In continuous spans, transverse joints may be located at about the 1/4 point of the span.
3. Reinforcing steel shall be continuous through all construction joints.
4. Longitudinal joints shall be located at the edge of a traffic lane unless otherwise permitted by the Engineer.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

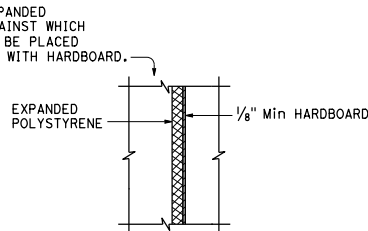
**BRIDGE DETAILS**

NO SCALE

**B0-5**

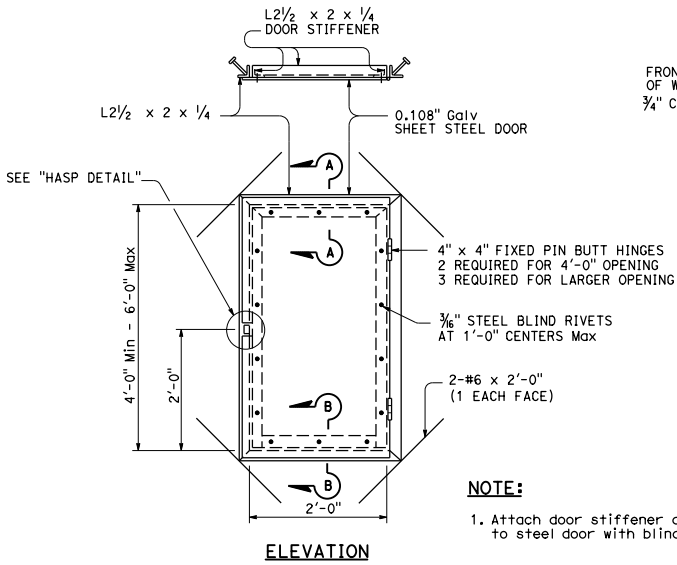


**BRIDGE DETAIL 13-1**  
**PROTECTION OF HORIZONTAL POLYSTYRENE**



**BRIDGE DETAIL 13-2**  
**PROTECTION OF VERTICAL POLYSTYRENE**

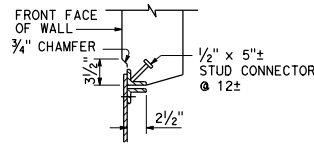
SURFACES OF EXPANDED POLYSTYRENE AGAINST WHICH CONCRETE IS TO BE PLACED SHALL BE FACED WITH HARDBOARD.



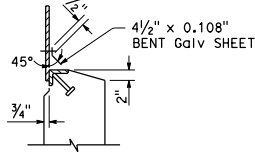
**BRIDGE DETAIL 13-3**  
**ACCESS DOOR**

**NOTE:**

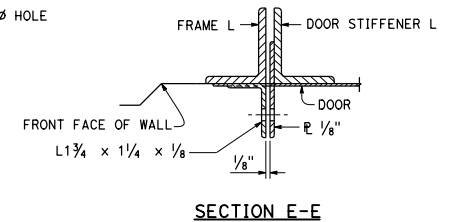
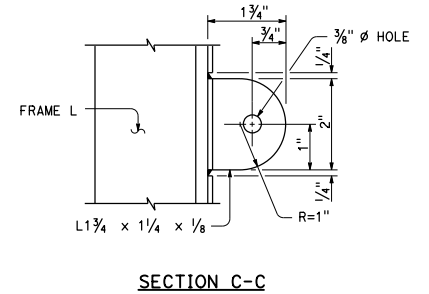
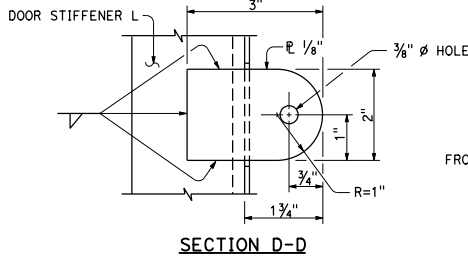
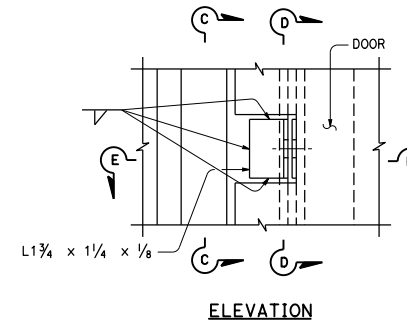
1. Attach door stiffener angles and bent sheet to steel door with blind rivets.



**SECTION A-A**



**SECTION B-B**



**HASP DETAIL**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**BRIDGE DETAILS**  
NO SCALE

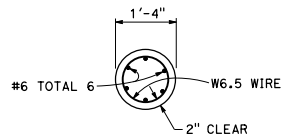
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Peter W. Norbo*  
REGISTERED CIVIL ENGINEER

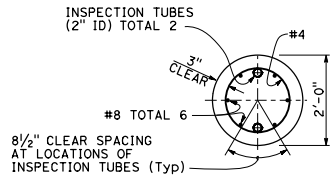
October 30, 2015  
PLANS APPROVAL DATE

**Peter W. Norbo**  
No. C57519  
Exp. 12-31-15  
REGISTERED PROFESSIONAL ENGINEER  
CIVIL  
STATE OF CALIFORNIA

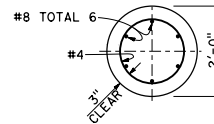
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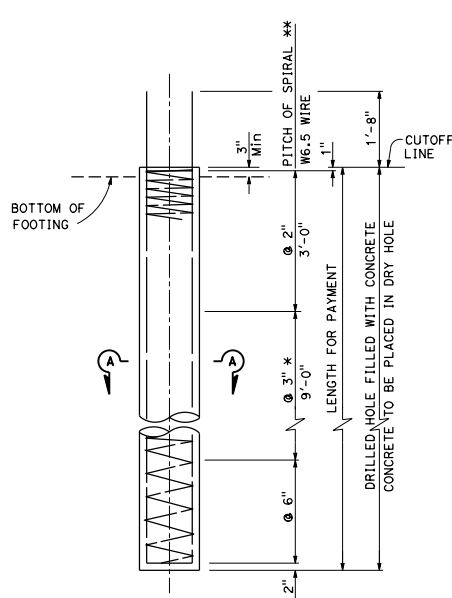
**SECTION A-A**



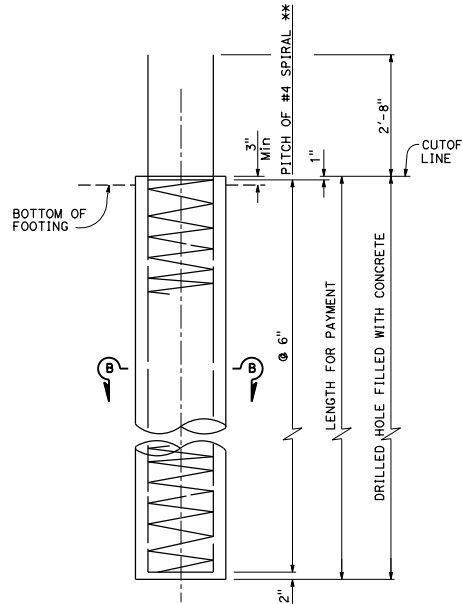
**SECTION B-B**  
(With inspection tubes)



**SECTION B-B**  
(Without inspection tubes)



**ELEVATION**  
**90 kip AND 140 kip**  
**DESIGN CAPACITY**



**ELEVATION**  
**200 kip**  
**DESIGN CAPACITY**

- \* @ 2" at option of Contractor
- \*\* Extend at 2" pitch to top of anchor piles and load test piles. For longitudinal reinforcement for anchor piles and load test piles, see "Load Test Pile Details (2)", Standard Plan B2-10.

**NOTES:**

1. Reinforcement extending into footing shall be hooked as required to provide clearance to top of footing.
2. Piles shall be extended only in accordance with details shown on the Project Plans.

**DESIGN NOTES:**

**REINFORCED CONCRETE**

$f_y = 60,000$  psi  
 $f'_c = 4,000$  psi

**DESIGN CAPACITY**

**90 kip and 140 kip PILE**

**COMPRESSION:**

140 kip (Service state)  
280 kip (Nominal axial structural resistance)

**TENSION:**

56 kip (Service state)  
140 kip (Nominal axial structural resistance)

**200 kip PILE**

**COMPRESSION:**

200 kip (Service state)  
400 kip (Nominal axial structural resistance)

**TENSION:**

80 kip (Service state)  
200 kip (Nominal axial structural resistance)

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**16" AND 24"**  
**CAST-IN-DRILLED-HOLE**  
**CONCRETE PILE**  
NO SCALE

**B2-3**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

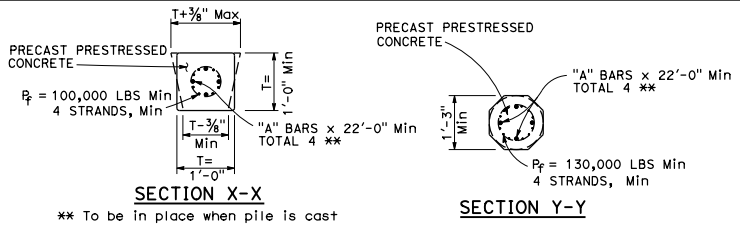
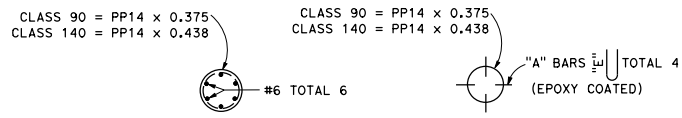
Amir M. Malek  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Amir M. Malek  
No. C62397  
Exp. 9-30-17  
CIVIL  
STATE OF CALIFORNIA

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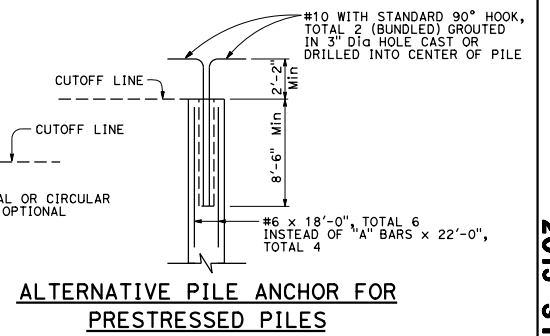
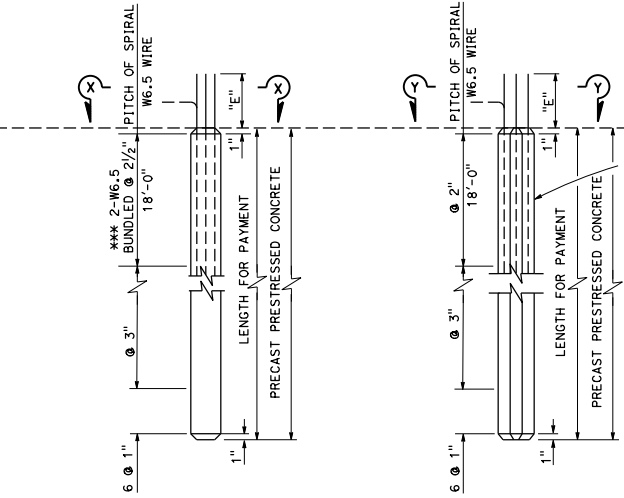
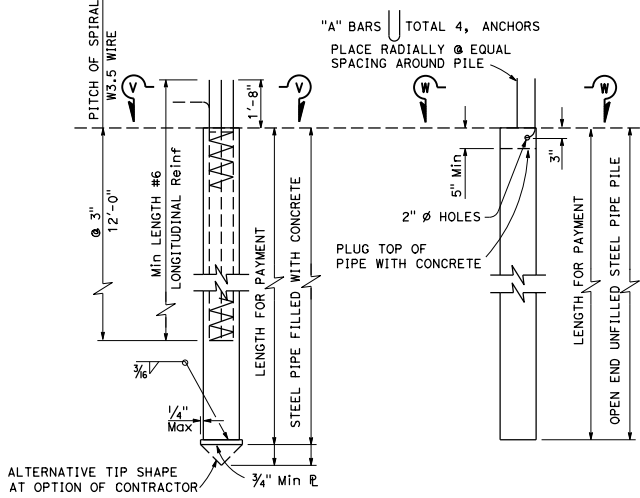


DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Amir M. Malek  
 REGISTERED CIVIL ENGINEER  
 No. C62397  
 Exp. 9-30-17  
 CIVIL

October 30, 2015  
 PLANS APPROVAL DATE

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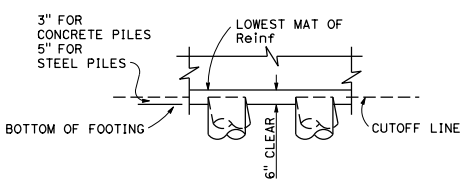
**DESIGN NOTES**

- PRECAST PRESTRESSED PILES**
- $P_f$  = Prestressing force (after losses) If section used is larger than the minimum section shown, then " $P_f$ " shall provide 700 psi minimum.
- Concrete Strength:  $f'_c$  @ 28 days = 6,000 psi (Alternative "X")  
 5,000 psi (Alternative "Y")  
 $f'_{ci}$  @ transfer = 4,000 psi
- REINFORCED CONCRETE**
- $f'_c$  = 4,000 psi  
 $f_y$  = 60,000 psi
- STEEL PIPE PILE**
- $F_y$  (Minimum yield strength) = 45,000 psi  
 $F_u$  (Minimum tensile strength) = 66,000 psi

**DESIGN CAPACITY**

<b>Class 90</b>	
Compression	= 90 kip (Service state) = 180 kip (Nominal axial structural resistance)
Tension	= 36 kip (Service state) = 90 kip (Nominal axial structural resistance)
<b>Class 140</b>	
Compression	= 140 kip (Service state) = 280 kip (Nominal axial structural resistance)
Tension	= 56 kip (Service state) = 140 kip (Nominal axial structural resistance)

- NOTES:**
- Details are the same for both Class 90 and Class 140 piles unless noted otherwise.
  - At the Contractor's option, alternative steel pipe with at least the diameter and wall thickness shown on these plans may be used. The diameter shall not exceed 1'-6".
  - Pile reinforcement and steel pile anchor bars extending into a footing shall be hooked as required to provide clearance to top of footing. Piles shall be extended only with details shown on the Project Plans.
  - 2" clearance to spiral reinforcement shall be maintained if section used is larger than the minimum section shown.
  - Maximum cutoff length at the top of the Alternative "X" and Alternative "Y" Piles is 10'-0".
  - For longitudinal reinforcement and prestressing for anchor piles and load test piles, see "Load Test Pile Details (2)", Standard Plan B2-10.



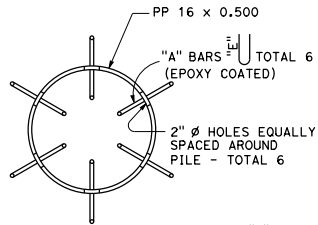
	REQUIRED NOMINAL RESISTANCE (TENSION) *	
	60 kips OR LESS	GREATER THAN 60 kips
"A" BARS	#6	#8
"E" DIMENSION	1'-8"	2'-8"

\* See Pile Data Table on the Project Plans for Nominal Resistance (Tension) Requirements

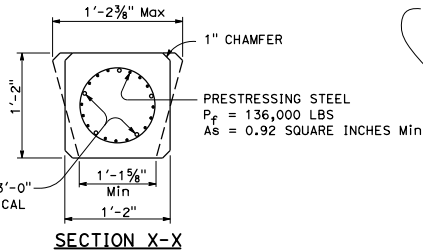
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**PILE DETAILS**  
**CLASS 90 AND CLASS 140**  
 NO SCALE

**B2-5**

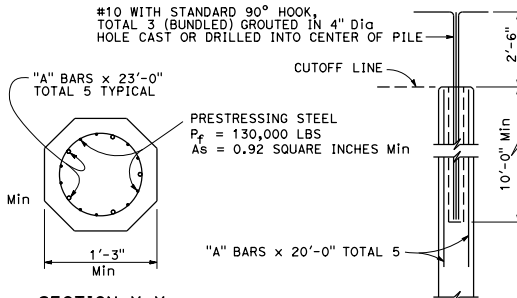
2015 STANDARD PLAN B2-5



**SECTION W-W**  
PP = Steel pipe pile

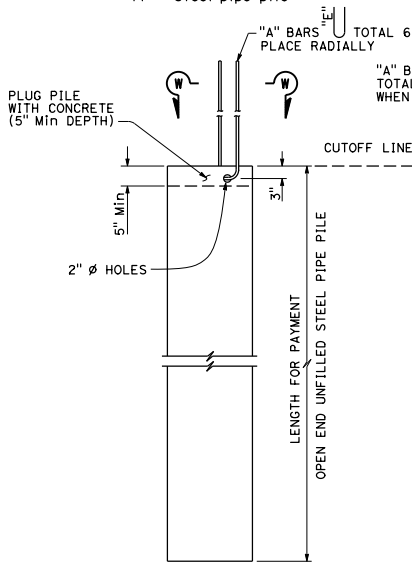


**SECTION X-X**

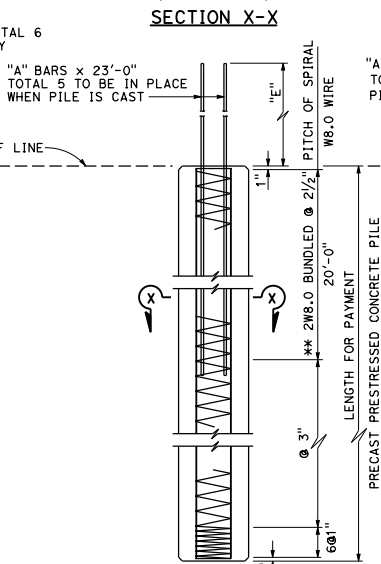


**SECTION Y-Y**

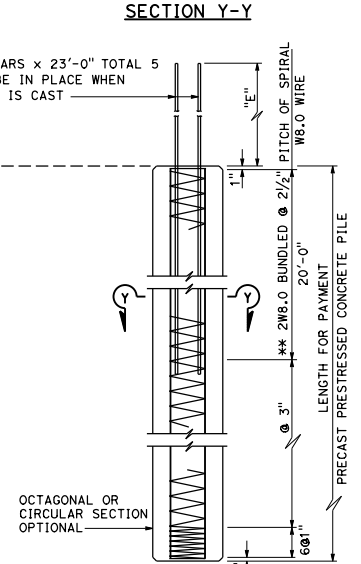
**ALTERNATIVE PILE ANCHOR FOR PRESTRESSED PILE**



**ALTERNATIVE "W"**



**ALTERNATIVE "X"**



**ALTERNATIVE "Y"**

**NOTES:**

1. Pile reinforcement extending into footing shall be hooked as required to provide clearance to top of footing. Piles shall be extended only with details shown on the Project Plans.
2. At the Contractor's option, alternative steel pipe with at least the diameter and wall thickness shown on these plans may be used. The diameter shall not exceed 1'-6".
3. Maximum cut-off length at the top of the Alternative "X" and Alternative "Y" piles is 10'-0".

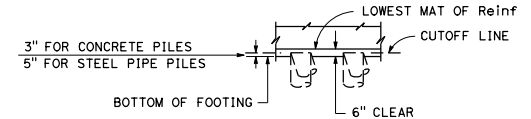
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Amir M. Malek**  
 REGISTERED CIVIL ENGINEER  
 No. C62397  
 Exp. 9-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

	REQUIRED NOMINAL RESISTANCE (TENSION) *	
	75 kips OR LESS	GREATER THAN 75 kips
"A" BARS	#6	#8
"E" DIMENSION	1'-8"	2'-8"

\* See Pile Data Table on the Project Plans for Nominal Resistance (Tension) Requirements



**PILE EMBEDMENT**

**DESIGN NOTES:**

**DESIGN CAPACITY**

- Compression = 200 kip (Service state)
- = 400 kip (Nominal axial structural resistance)
- Tension = 80 kip (Service state)
- = 200 kip (Nominal axial structural resistance)

**REINFORCED CONCRETE**

- f'c = 4,000 psi
- fy = 60,000 psi

**PRECAST PRESTRESSED PILES**

- Pf = Prestress Force (After losses)
- Concrete Strength f'c @ 28 days = 7,000 psi
- f'ci @ transfer = 4,000 psi

**STEEL PIPE PILE**

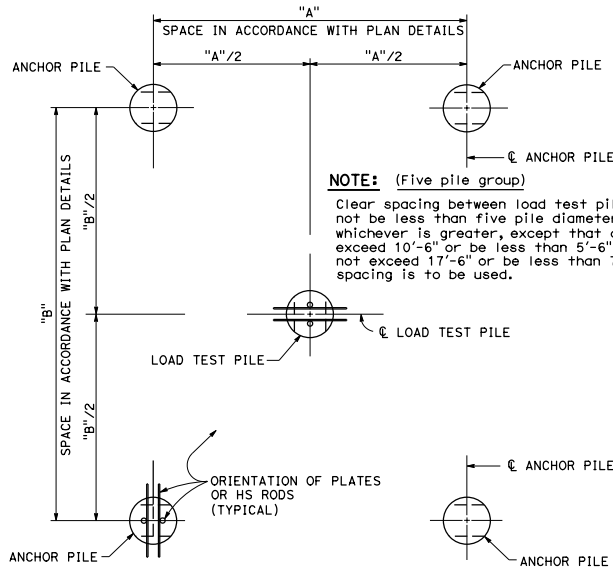
- Fy (minimum yield strength) = 45,000 psi
- Fu (minimum tensile strength) = 66,000 psi

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

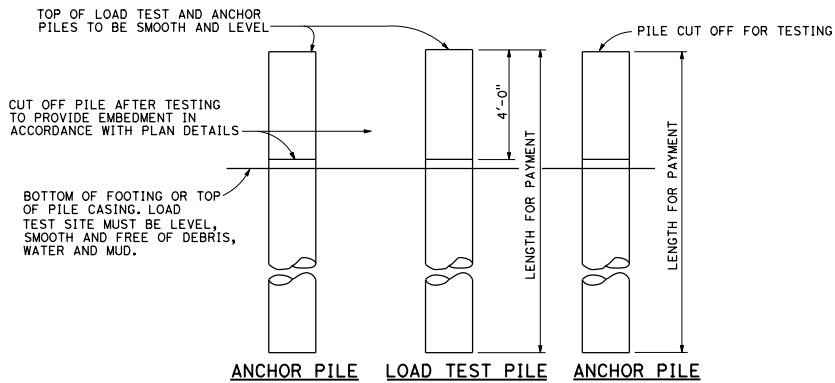
**PILE DETAILS CLASS 200**

NO SCALE

**B2-8**



**PLAN**



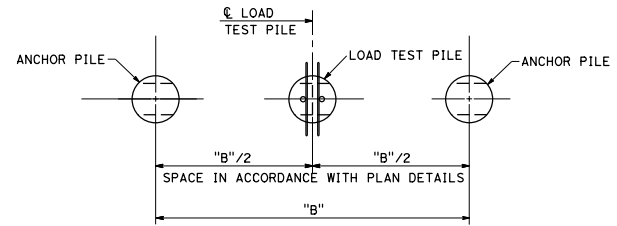
**ANCHOR PILE    LOAD TEST PILE    ANCHOR PILE**  
**ELEVATION**  
**FIVE - PILE LOAD TEST PILE GROUP**  
 (FOR COMPRESSION - TENSION PILE LOAD TESTS)

**NOTE:** (Five pile group)

Clear spacing between load test pile and anchor pile shall not be less than five pile diameters or 7'-0", whichever is greater, except that dimension "A" shall not exceed 10'-6" or be less than 5'-6" and dimension "B" shall not exceed 17'-6" or be less than 7'-6". When possible, maximum spacing is to be used.

**NOTE:** (Three pile group)

Clear spacing between load test pile and anchor pile shall not be less than five pile diameters or 7'-0", whichever is greater, except that dimension "B" shall not exceed 17'-6" or be less than 6'-6". When possible, maximum spacing is to be used.

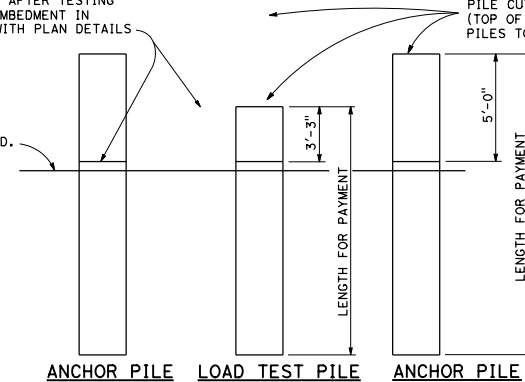


**PLAN**

CUT OFF PILE AFTER TESTING TO PROVIDE EMBEDMENT IN ACCORDANCE WITH PLAN DETAILS

PILE CUT OFF FOR TESTING (TOP OF LOAD TEST AND ANCHOR PILES TO BE SMOOTH AND LEVEL)

BOTTOM OF FOOTING OR TOP OF PILE CASING. LOAD TEST SITE MUST BE LEVEL, SMOOTH AND FREE OF DEBRIS, WATER AND MUD.



**ANCHOR PILE    LOAD TEST PILE    ANCHOR PILE**  
**ELEVATION**

**THREE - PILE LOAD TEST PILE GROUP**  
 (FOR TENSION PILE LOAD TESTS ONLY)

**NOTE:**

For pile details see Load Test Pile Details (2), Standard Plan B2-10 and Load Test Pile Details (3), Standard Plan B2-11.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**LOAD TEST PILE DETAILS (1)**

NO SCALE

**B2-9**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

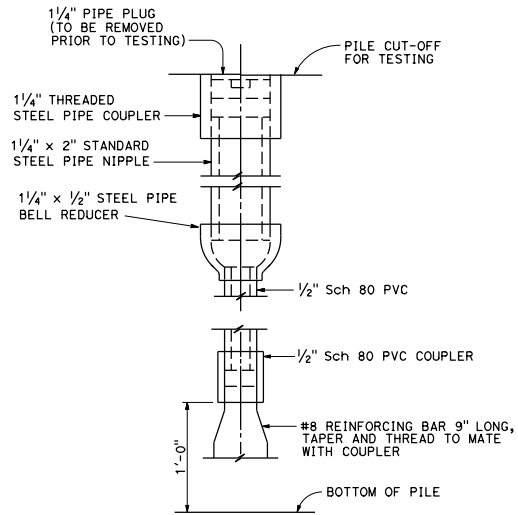
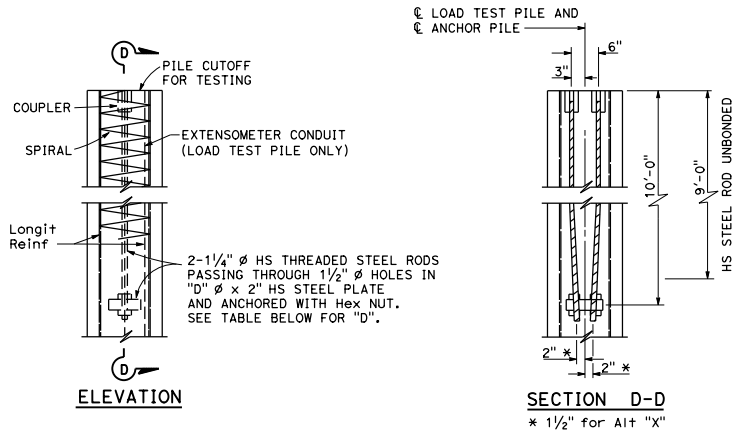
*Amir M. Malek*  
 REGISTERED CIVIL ENGINEER  
 No. C62397  
 Exp. 9-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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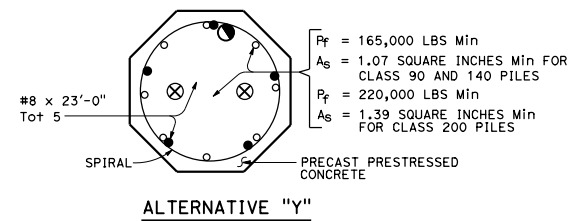
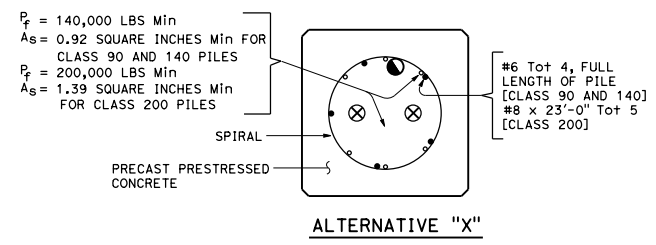
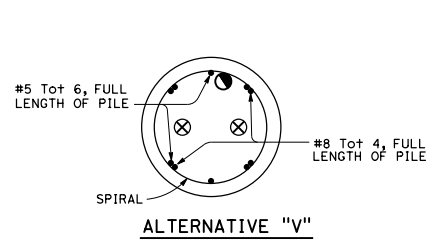
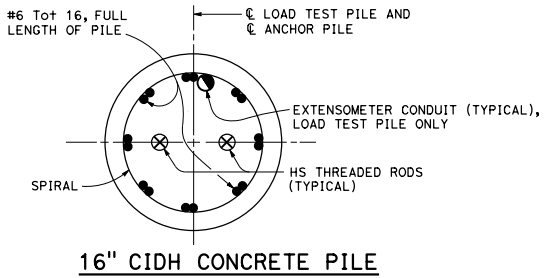
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*A. M. Malik*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C62397  
 Exp. 9-30-17  
 CIVIL  
 STATE OF CALIFORNIA

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EXTENSOMETER CONDUIT DETAILS



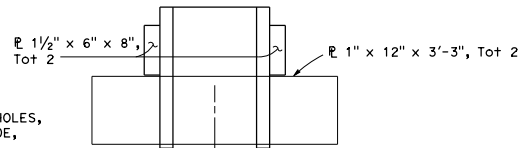
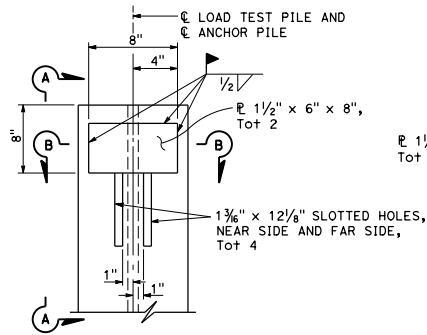
CONCRETE PILE DETAILS

PILE TYPE	"D"	MAXIMUM TENSILE TEST FORCE PER PILE
CLASS 90 AND 140 A1+ "V", "Y"	7"	210 kips
CLASS 90 AND 140 A1+ "X"	6"	210 kips
CLASS 200 A1+ "X", "Y"	6 3/4"	300 kips
CIDH	8"	300 kips

- NOTES:**
- For details not shown, see applicable pile details shown on the Project Plans.
  - For the additional top 4'-0" of pile for testing, the spiral reinforcement shall be the same size and placed at the same pitch as detailed for the top of piles shown in the Project Plans.
  - Details applicable for load test and anchor piles.

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**LOAD TEST PILE DETAILS (2)**  
 NO SCALE

B2-10

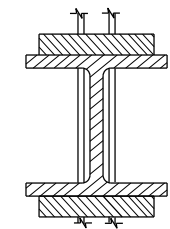


Maximum Tensile Test Force Per Pile : HP 10 x 42 = 180 kips  
 HP 10 x 57 = 245 kips  
 HP 14 x 89 = 300 kips

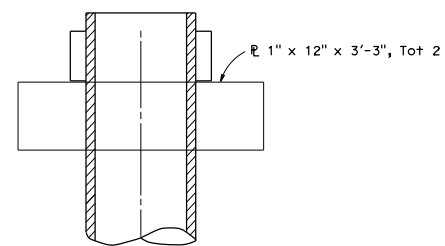
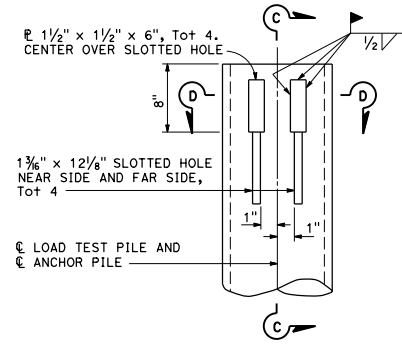
**STEEL H-PILE DETAILS**

**NOTE:**

Alignment of slots and 1/2" L's shall permit a 1" x 12" x 3'-3" to pass through pile parallel to C web of pile and achieve a snug fit. Details applicable for load test and anchor piles. Slots to be cut after piles are driven.



**SECTION B-B**

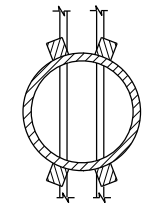


Maximum Tensile Test Force Per Pile : Class 90 (PP 14 x 0.375) = 180 kips  
 Class 140 (PP 14 x 0.438) = 280 kips  
 Class 200 (PP 16 x 0.50) = 300 kips

**ALTERNATIVE "W" STEEL PIPE - PILE**

**NOTES:**

Alignment of slots and 1/2" L's shall permit a 1" x 12" x 3'-3" to pass through pile.  
 Details applicable for load test and anchor piles.  
 Slots to be cut after piles are driven.



**SECTION D-D**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

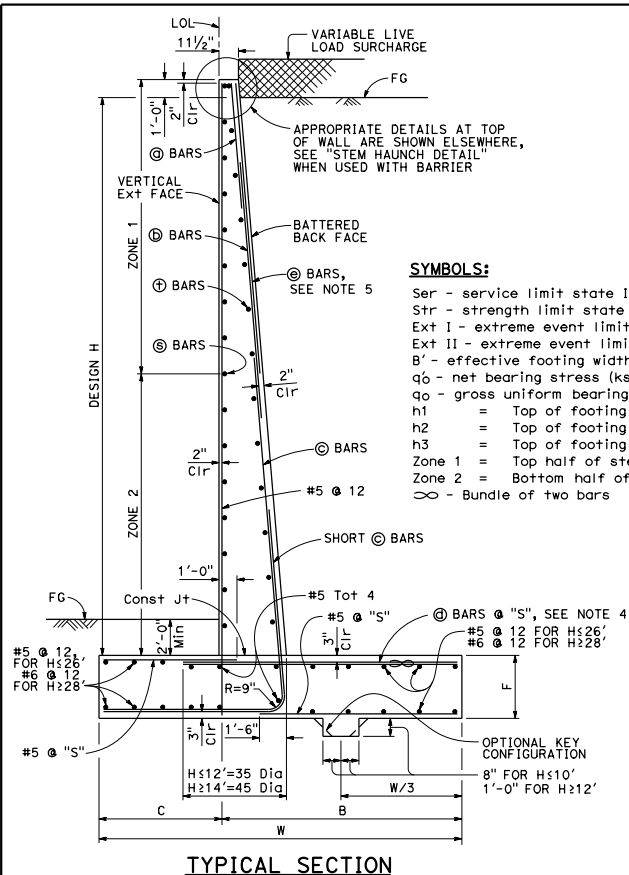
*Amir M. Malek*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 Amir M. Malek  
 No. C62397  
 Exp. 9-30-17  
 CIVIL  
 STATE OF CALIFORNIA

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**LOAD TEST PILE DETAILS (3)**

NO SCALE

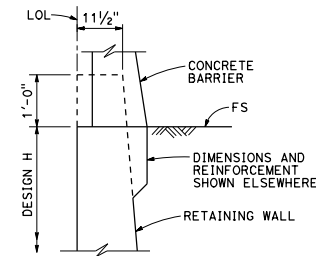
**B2-11**



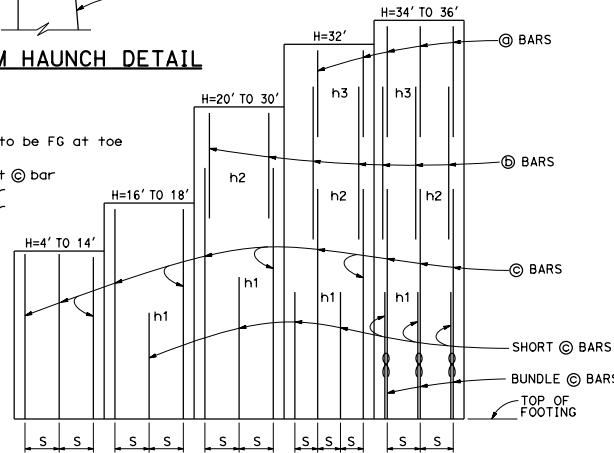
TYPICAL SECTION

NOTES:

- For details not shown and drainage notes see (B3-5)
- For wall stem joint details see (B0-3/3-3) and (B0-3/3-4)
- At  $\textcircled{C}$  bars:  
 $H < 6'$ , no splices are allowed within 1'-8" above the top of footing.  
 $H > 6'$ , no splices are allowed within  $H/4$  above the top of footing.
- Bundle  $\textcircled{B}$  bars for  $H = 34'$  &  $36'$ .
- Provide #6 @  $10' \times 15'-0"$  @ bars over a distance of 8'-0" measured from all expansion joints, begin wall and end wall locations. For  $H \leq 14'$ , hook  $\textcircled{B}$  bar into footing and reduce bar length as needed to maintain Min Clr cover.



STEM HAUNCH DETAIL



ELEVATION

DESIGN CONDITIONS:

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

DESIGN NOTES:

- DESIGN: AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments
- LS: Varied surcharge on level ground surface
- DC: Stem Architectural Treatment of thickness up to 6' of concrete (75 psf) considered
- CT: 54 kip transverse force applied at  $H_e = 32'$ , distributed over 10 feet at the top of wall and 1:1 distribution down and outward. Distribution below footing taken no less than 40'.
- SEISMIC:  $k_h = 0.2, k_v = 0.0$
- SOIL:  $\phi = 34^\circ, \gamma = 120$  pcf
- REINFORCED CONCRETE:  $f'_c = 3,600$  psi,  $f_y = 60,000$  psi
- LOAD COMBINATIONS AND LIMIT STATES:  
 Service I  $Q = 1.00DC+1.00EV+1.00EH+1.00LS$   
 Strength I  $Q = aDC+PE+RE+H+1.75LS$   
 Extreme I  $Q = 1.00DC+1.00EV+1.00EH+1.00EOD+1.00EQE$   
 Extreme II  $Q = 1.00DC+1.00EV+1.00EH+1.00CT$
- Where:  
 Q: Force Effects  
 $\phi$ : 1.25 or 0.90, Whichever Controls Design  
 $\rho$ : 1.35 or 1.00, Whichever Controls Design  
 $\eta$ : 1.50 or 0.90, Whichever Controls Design  
 DC: Dead Load of Structure Components  
 EH: Horizontal Earth Fill Pressure  
 EV: Vertical Earth Pressure from Earth Fill Weight  
 LS: Live Load Surcharge  
 EQE: Seismic Earth Pressure  
 EOD: Soil and Structural and Nonstructural Components Inertia  
 CT: Vehicular Collision Force

DESIGN H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'
W	6'-10"	7'-0"	7'-3"	7'-7"	8'-4"	9'-7"	10'-9"	12'-0"	13'-3"	14'-6"	15'-9"	17'-1"	18'-5"	19'-10"	21'-2"	22'-7"	24'-0"
C	2'-2"	2'-3"	2'-3"	2'-4"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-5"	6'-0"	6'-6"	7'-2"	7'-8"	8'-2"	9'-0"
B	4'-8"	4'-9"	5'-0"	5'-3"	5'-10"	6'-7"	7'-3"	8'-0"	8'-9"	9'-6"	10'-4"	11'-1"	11'-11"	12'-8"	13'-6"	14'-5"	15'-0"
F	1'-4"	1'-4"	1'-4"	1'-4"	1'-6"	1'-8"	1'-8"	1'-9"	1'-9"	1'-11"	2'-2"	2'-5"	2'-10"	3'-3"	3'-6"	4'-0"	4'-3"
BATTER	1/2: 12	1/2: 12	1/2: 12	1/2: 12	1/2: 12	1/2: 12	1/2: 12	1/2: 12	1/2: 12	1/2: 12	5/8: 12	5/8: 12	3/4: 12	3/4: 12	1: 12	1: 12	1: 12
SPACING "S"	9"	9"	9"	9"	9"	9"	6"	5"	6"	6"	6"	6"	6"	6"	6"	10"	8"
$\textcircled{C}$ BARS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#7	#6
$\textcircled{D}$ BARS	-	-	-	-	-	-	-	-	#7	#7	#7	#7	#7	#7	#7	#9	#8
$\textcircled{B}$ BARS	#6	#6	#6	#6	#6	#6	#7	#7	#8	#9	#9	#10	#10	#10	#11	#11	#11
$\textcircled{A}$ BARS	#5	#5	#6	#6	#6	#6	#9	#8	#8	#9	#9	#10	#10	#10	#11	#11	#11
h1	-	-	-	-	-	-	5'-9"	5'-10"	8'-0"	9'-0"	10'-1"	11'-0"	12'-1"	13'-0"	13'-0"	12'-7"	11'-6"
h2	-	-	-	-	-	-	-	-	10'-5"	13'-0"	14'-7"	17'-6"	19'-0"	20'-5"	19'-0"	18'-0"	20'-2"
h3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21'-2"	21'-10"	24'-0"
ZONE 1 $\textcircled{C}$ BARS	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12
ZONE 2 $\textcircled{C}$ BARS	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12
ZONE 1 $\textcircled{D}$ BARS	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18
ZONE 2 $\textcircled{D}$ BARS	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#5 @ 12	#5 @ 12
Ser: B', q <sub>o</sub>	6.8, 0.7	6.5, 1.0	6.2, 1.3	6.0, 1.6	6.3, 2.0	7.5, 2.1	8.6, 2.2	9.8, 2.3	11.0, 2.4	12.1, 2.5	13.2, 2.8	14.4, 2.9	15.5, 3.1	16.8, 3.3	18.0, 3.5	19.2, 3.7	20.6, 3.7
Str: B', q <sub>o</sub>	6.6, 1.6	5.0, 1.8	3.6, 2.3	3.0, 3.3	3.2, 4.0	4.3, 3.8	5.3, 3.7	6.4, 3.7	7.4, 3.8	8.2, 4.1	9.0, 4.4	9.9, 4.6	10.7, 4.9	11.7, 5.2	12.6, 5.4	13.6, 5.8	14.6, 5.9
Ext I: B', q <sub>o</sub>	5.2, 1.1	4.7, 1.5	3.9, 2.2	3.1, 3.4	2.8, 4.8	3.2, 5.3	3.6, 5.7	4.1, 6.1	4.6, 6.4	5.0, 6.9	5.3, 7.6	5.8, 8.1	6.1, 8.9	6.7, 9.4	7.1, 10.0	7.5, 10.7	8.2, 10.9
Ext II: B', q <sub>o</sub>	2.6, 2.2	2.7, 2.6	2.8, 3.1	2.9, 3.6	3.7, 3.6	5.2, 3.3	6.7, 3.1	8.3, 3.0	9.8, 3.0	11.2, 3.1	12.5, 3.2	13.9, 3.4	15.2, 3.6	16.7, 3.8	18.0, 4.0	19.3, 4.2	20.8, 4.3

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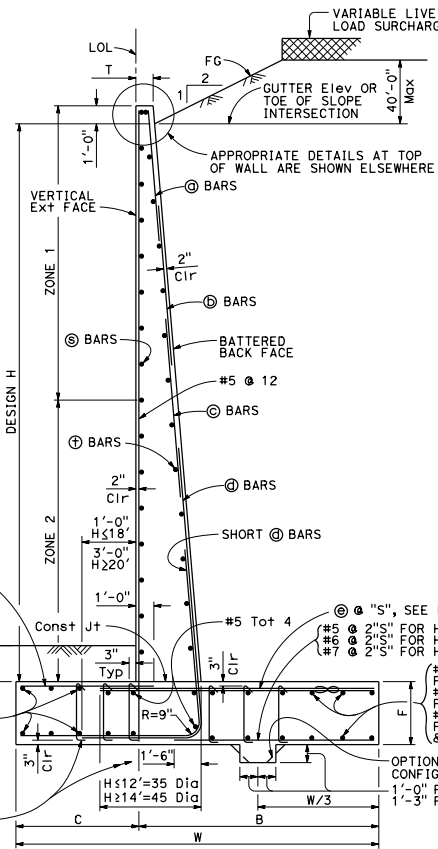
RETAINING WALL TYPE 1 (CASE 1)

NO SCALE

B3-1A

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Gary Wong  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**TYPICAL SECTION**

- NOTES:**
- For details not shown and drainage notes see (B3-5)
  - For wall stem joint details see (B0-3/3-3) and (B0-3/3-4)
  - At (C) and short (C) bars:  
 $H < 6'$ , no splices are allowed within 1'-8" above the top of footing.  
 $H > 6'$ , no splices are allowed within H/4 above the top of footing.
  - Bundle (C) bars for  $H \geq 26'$ .
  - Hook stirrups around & space with alternating transverse reinforcement at 2 x "S".

**DESIGN CONDITIONS:**

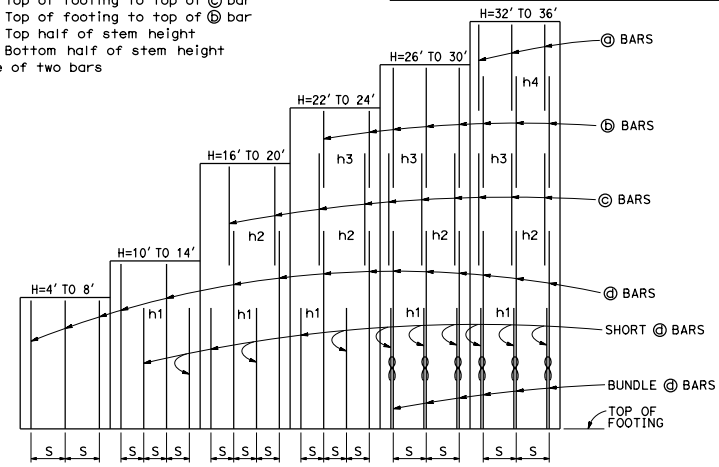
Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

**DESIGN NOTES:**

- DESIGN:** AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments
- LS:** Varied surcharge on level ground surface
- DC:** Stem Architectural Treatment of thickness up to 6" of concrete (75 psf) considered
- SEISMIC:**  $k_h = 0.2$   
 $k_v = 0.0$
- SOIL:**  $\phi = 34^\circ$   
 $\gamma = 120$  pcf
- REINFORCED CONCRETE:**  $f'_c = 3,600$  psi  
 $f_y = 60,000$  psi
- LOAD COMBINATIONS AND LIMIT STATES:**  
 Service I  $0 = 1.00DC+1.00EV+1.00EH+1.00LS$   
 Strength I  $0 = \alpha DC+\beta EV+\eta EH+1.75LS$   
 Extreme I  $0 = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE$
- Where:**  
 Q: Force Effects  
 $\alpha$ : 1.25 or 0.90, Whichever Controls Design  
 $\beta$ : 1.35 or 1.00, Whichever Controls Design  
 $\eta$ : 1.50 or 0.90, Whichever Controls Design  
 DC: Dead Load of Structure Components  
 EH: Horizontal Earth Fill Pressure  
 EV: Vertical Earth Pressure from Earth Fill Weight  
 LS: Live Load Surcharge  
 EQE: Seismic Earth Pressure  
 EQD: Soil and Structural and Nonstructural Components Inertia

**SYMBOLS:**

- Ser - service limit state I  
 Str - strength limit state I  
 Ext - extreme event limit state I  
 B' - effective footing width (ft)  
 $q_0$  - net bearing stress (ksf), OG assumed to be FG at toe  
 $q_0$  - gross uniform bearing stress (ksf)  
 $h_1$  = Top of footing to top of short (C) bar  
 $h_2$  = Top of footing to top of (C) bar  
 $h_3$  = Top of footing to top of (C) bar  
 $h_4$  = Top of footing to top of (C) bar  
 Zone 1 = Top half of stem height  
 Zone 2 = Bottom half of stem height  
 (C) - Bundle of two bars



**ELEVATION**

**TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA**

DESIGN H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'
W	6'-0"	7'-6"	9'-6"	11'-0"	12'-6"	15'-6"	17'-3"	19'-6"	21'-9"	23'-6"	26'-0"	28'-1"	30'-3"	31'-6"	33'-0"	34'-8"	35'-11"
C	2'-0"	2'-6"	3'-3"	3'-6"	4'-3"	5'-0"	5'-3"	5'-9"	6'-9"	7'-3"	8'-3"	8'-9"	9'-6"	9'-6"	10'-0"	10'-10"	11'-3"
B	4'-0"	5'-0"	6'-3"	7'-6"	8'-3"	10'-6"	12'-0"	13'-9"	15'-0"	16'-3"	17'-9"	19'-4"	21'-3"	22'-0"	23'-0"	23'-10"	24'-8"
F	1'-6"	1'-6"	2'-0"	2'-3"	2'-6"	2'-8"	2'-10"	3'-0"	3'-4"	3'-6"	3'-6"	3'-7"	3'-7"	3'-9"	3'-9"	4'-0"	4'-4"
T	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"	11 1/2"
BATTER	1/2: 12	1/2: 12	1/2: 12	1/2: 12	1/2: 12	5/8: 12	5/8: 12	3/4: 12	7/8: 12	1: 12	1 1/8: 12	1 1/8: 12	1 1/8: 12	1 1/8: 12	1 1/8: 12	1 1/8: 12	1 1/8: 12
SPACING "S"	16"	12"	10"	7"	7"	7"	7"	7"	7"	6"	6"	10"	8"	7"	7"	7"	7"
(C) BARS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#5	#5
(C) BARS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#5	#5
(C) BARS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	#5	#5
(C) BARS	#5	#5	#6	#6	#7	#8	#9	#10	#10	#10	#11	#11	#11	#11	#11	#11	#11
(C) BARS	#5	#5	#6	#6	#7	#8	#9	#10	#10	#10	#10	#11	#11	#11	#11	#11	#11
h1	-	-	-	5'-3"	6'-4"	7'-6"	8'-9"	9'-9"	11'-0"	11'-3"	11'-6"	10'-3"	11'-9"	12'-3"	12'-6"	13'-3"	13'-8"
h2	-	-	-	-	-	-	12'-8"	15'-6"	17'-0"	16'-6"	17'-3"	18'-0"	17'-3"	14'-10"	15'-9"	16'-4"	16'-4"
h3	-	-	-	-	-	-	-	-	-	18'-9"	21'-3"	21'-3"	22'-4"	22'-8"	18'-0"	18'-6"	19'-6"
h4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26'-3"	27'-4"	28'-6"
No. of Toe Stirrups	0	0	0	0	0	0	0	0	0	0	0	5	5	6	7	8	9
No. of Heel Stirrups	0	0	0	0	0	0	0	0	4	6	7	8	10	10	11	11	11
ZONE 1 (C) BARS	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#6 @ 12	#6 @ 12	#6 @ 10	#6 @ 10
ZONE 2 (C) BARS	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#6 @ 12	#6 @ 12	#7 @ 12	#7 @ 12	#7 @ 12	#7 @ 12	#7 @ 10	#7 @ 10
ZONE 1 (C) BARS	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 12	#4 @ 12	#5 @ 12	#5 @ 12
ZONE 2 (C) BARS	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#6 @ 12	#6 @ 12
Ser: B', q0	4.0, 0.9	5.5, 1.0	9.3, 1.0	10.9, 1.3	12.3, 1.5	14.8, 1.9	16.6, 2.1	18.7, 2.4	20.6, 2.7	22.3, 3.0	24.2, 3.3	26.1, 3.5	28.2, 3.9	29.6, 4.0	31.1, 4.2	32.7, 4.4	34.1, 4.6
Str: B', q0	2.2, 2.2	3.5, 2.2	5.1, 2.3	6.3, 2.6	7.6, 2.7	12.9, 3.1	14.3, 3.6	16.5, 3.9	19.4, 4.5	20.7, 4.8	22.5, 5.2	24.3, 5.6	26.2, 6.0	27.5, 6.3	28.8, 6.6	30.3, 6.9	31.8, 7.2
Ext: B', q0	2.3, 3.4	2.7, 4.4	3.6, 5.0	3.8, 6.5	4.5, 7.0	7.0, 6.1	7.6, 6.9	9.3, 7.0	11.0, 7.1	11.8, 7.6	14.1, 7.4	15.6, 7.7	17.1, 8.0	17.2, 8.7	18.1, 9.0	19.0, 9.4	19.4, 10.0

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**RETAINING WALL TYPE 1 (CASE 2)**

NO SCALE

**B3-1B**

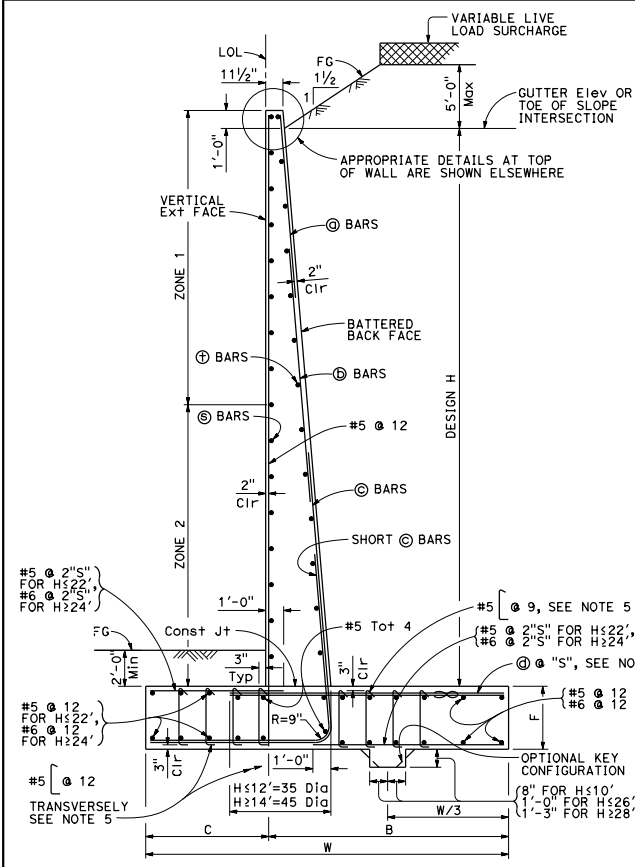
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Gary Wong**  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.





**TYPICAL SECTION**

**NOTES:**

- For details not shown and drainage notes see **B3-5**
- For wall stem joint details see **B0-3** and **B0-3**
- At **⊙** bars:  
 $H < 6'$ , no splices are allowed within 1'-8" above the top of footing.  
 $H > 6'$ , no splices are allowed within  $H/4$  above the top of footing.
- Bundle **⊙** bars for  $H = 36'$ .
- Hook stirrups around & space with alternating transverse reinforcement at  $2 \times 'S'$ .

**DESIGN CONDITIONS:**

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

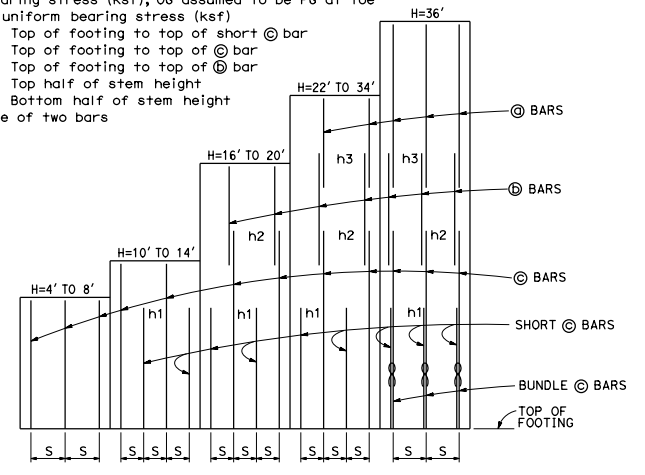
**DESIGN NOTES:**

**DESIGN:** AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments  
**LS:** Varied surcharge on level ground surface  
**DC:** Stem Architectural Treatment of thickness up to 6" of concrete (75 psf) considered  
**SEISMIC:**  $k_h = 0.2$   
 $k_v = 0.0$   
**SOIL:**  $\phi = 34^\circ$   
 $\gamma = 120 \text{ pcf}$   
**REINFORCED CONCRETE:**  $f'_c = 3,600 \text{ psi}$   
 $f_y = 60,000 \text{ psi}$   
**LOAD COMBINATIONS AND LIMIT STATES:**  
 Service I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00LS$   
 Strength I  $Q = \alpha DC + \beta EV + \eta EH + 1.75LS$   
 Extreme I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00EQD + 1.00EQE$

Where:  
**Q:** Force Effects  
 **$\alpha$ :** 1.25 or 0.90, Whichever Controls Design  
 **$\beta$ :** 1.35 or 1.00, Whichever Controls Design  
 **$\eta$ :** 1.50 or 0.90, Whichever Controls Design  
**DC:** Dead Load of Structure Components  
**EH:** Horizontal Earth Fill Pressure  
**EV:** Vertical Earth Pressure from Earth Fill Weight  
**LS:** Live Load Surcharge  
**EQE:** Seismic Earth Pressure  
**EQD:** Soil and Structural and Nonstructural Components Inertia

**SYMBOLS:**

Ser - service limit state I  
 Str - strength limit state I  
 Ext - extreme event limit state I  
**B'** - effective footing width (ft)  
**q<sub>0</sub>** - net bearing stress (ksf), OG assumed to be FG at toe  
**q<sub>1</sub>** - gross uniform bearing stress (ksf)  
**h1** = Top of footing to top of short **⊙** bar  
**h2** = Top of footing to top of **⊙** bar  
**h3** = Top of footing to top of **⊙** bar  
 Zone 1 = Top half of stem height  
 Zone 2 = Bottom half of stem height  
**∞** - Bundle of two bars



**ELEVATION**

TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA																	
DESIGN H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'
W	6'-5"	7'-3"	8'-3"	9'-3"	10'-8"	12'-6"	13'-9"	15'-1"	16'-6"	17'-10"	19'-3"	20'-4"	21'-5"	22'-8"	23'-11"	25'-1"	26'-4"
C	2'-2"	2'-6"	3'-0"	3'-6"	3'-8"	3'-11"	4'-0"	4'-7"	5'-3"	6'-0"	7'-0"	7'-9"	8'-3"	8'-8"	9'-0"	9'-6"	9'-10"
B	4'-3"	4'-9"	5'-3"	5'-9"	7'-0"	8'-7"	9'-9"	10'-6"	11'-3"	11'-10"	12'-3"	12'-7"	13'-2"	14'-0"	14'-11"	15'-7"	16'-6"
F	1'-4"	1'-4"	1'-4"	1'-6"	1'-6"	1'-6"	1'-8"	2'-0"	2'-4"	2'-9"	3'-2"	3'-0"	3'-0"	3'-0"	3'-3"	3'-3"	3'-3"
BATTER	1/2" @ 12	1/2" @ 12	1/2" @ 12	1/2" @ 12	1/2" @ 12	1/2" @ 12	1/2" @ 12	1/2" @ 12	1/2" @ 12	1/2" @ 12	3/4" @ 12	3/4" @ 12	1" @ 12	1" @ 12	1 1/4" @ 12	1 1/4" @ 12	1 1/2" @ 12
SPACING "S"	16"	16"	16"	8"	8"	7"	7"	6"	6"	7"	7"	7"	7"	7"	6"	6"	8"
⊙ BARS	-	-	-	-	-	-	-	-	-	#5	#5	#5	#5	#5	#5	#5	#6
⊙ BARS	-	-	-	-	-	-	#5	#5	#5	#7	#7	#7	#8	#8	#8	#8	#9
⊙ BARS	#5	#5	#6	#5	#6	#6	#7	#8	#8	#9	#10	#10	#10	#10	#10	#11	#11
⊙ BARS	#5	#5	#6	#5	#6	#8	#9	#9	#9	#10	#11	#9	#9	#9	#10	#10	#9
h1	-	-	-	4'-2"	4'-7"	6'-2"	7'-3"	8'-6"	8'-8"	9'-8"	11'-0"	12'-2"	14'-0"	13'-0"	15'-10"	14'-6"	12'-0"
h2	-	-	-	-	-	-	10'-6"	12'-9"	14'-2"	13'-8"	17'-0"	18'-6"	17'-10"	18'-9"	20'-3"	21'-0"	17'-0"
h3	-	-	-	-	-	-	-	-	-	15'-6"	17'-9"	19'-6"	19'-6"	21'-8"	24'-8"	25'-6"	24'-8"
No. of Toe Stirrups	0	0	0	0	0	0	0	0	0	0	0	6	6	7	7	7	8
No. of Heel Stirrups	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6	6	6
ZONE 1 ⊙ BARS	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12
ZONE 2 ⊙ BARS	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 18	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#6 @ 12	#6 @ 12	#6 @ 12	#6 @ 12	#7 @ 12	#7 @ 12
ZONE 1 ⊙ BARS	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18
ZONE 2 ⊙ BARS	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 18	#4 @ 12	#4 @ 12	#5 @ 12	#5 @ 12	#5 @ 12	#5 @ 12
Ser: B', q <sub>0</sub>	4.3, 0.8	4.9, 1.1	5.6, 1.3	7.1, 1.5	8.0, 1.8	9.3, 2.1	10.6, 2.3	11.9, 2.5	13.3, 2.6	14.6, 2.8	15.9, 2.9	17.0, 3.0	18.0, 3.1	19.3, 3.3	20.4, 3.5	21.5, 3.7	22.7, 3.9
Str: B', q <sub>0</sub>	2.4, 2.2	2.4, 2.7	2.7, 3.2	3.0, 3.7	4.3, 3.8	5.9, 3.8	7.0, 4.1	7.9, 4.3	9.0, 4.5	9.9, 4.7	10.8, 4.9	11.6, 5.0	12.3, 5.2	13.3, 5.4	14.2, 5.7	15.0, 5.9	16.0, 6.1
Ext: B', q <sub>0</sub>	4.1, 1.5	3.9, 2.1	3.8, 2.8	3.5, 3.9	3.6, 4.9	4.2, 5.5	4.6, 6.3	5.0, 7.0	5.6, 7.4	6.0, 8.0	6.5, 8.4	6.9, 8.6	7.2, 9.2	7.7, 9.6	8.1, 10.4	8.4, 10.9	8.9, 11.3

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**RETAINING WALL TYPE 1 (CASE 3)**

NO SCALE

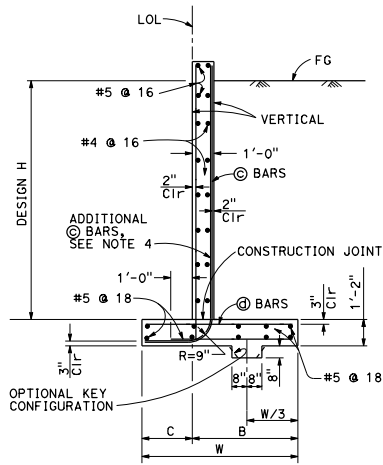
**B3-1C**

2015 STANDARD PLAN B3-1C

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

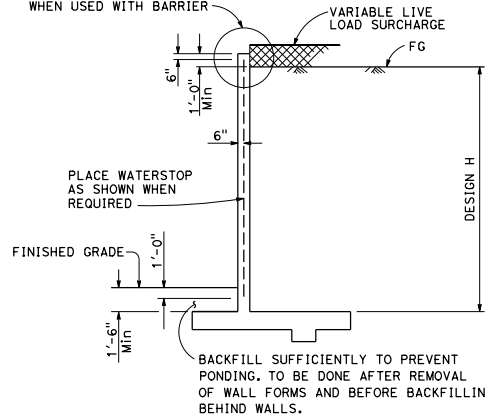




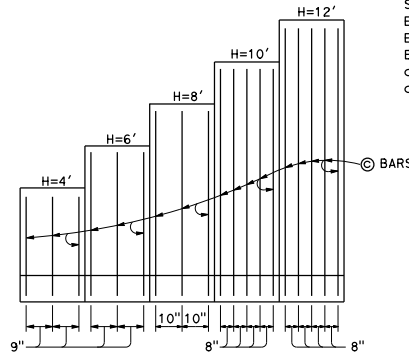
**SPREAD FOOTING SECTION**

Place concrete in toe against undisturbed material, except as permitted by the Engineer.

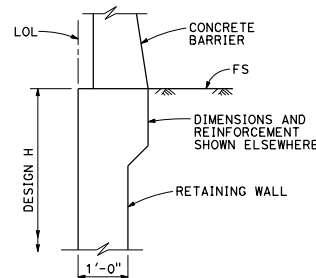
APPROPRIATE DETAILS AT TOP OF WALL ARE SHOWN ELSEWHERE, SEE "STEM HAUNCH DETAIL" WHEN USED WITH BARRIER



**DESIGN SECTION**



**ELEVATION**



**STEM HAUNCH DETAIL**

TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA						
DESIGN H	4'	6'	8'	10'	12'	
W	7'-0"	7'-0"	7'-3"	7'-5"	8'-2"	
C	2'-3"	2'-3"	2'-3"	2'-5"	2'-7"	
B	4'-9"	4'-9"	5'-0"	5'-0"	5'-7"	
⊙ BARS	#6 @ 9	#6 @ 9	#7 @ 10	#7 @ 8	#7 @ 8	
⊙ BARS	#5 @ 9	#5 @ 9	#6 @ 10	#7 @ 8	#7 @ 8	
Ser: B', q <sub>0</sub>	6.7, 0.8	6.7, 1.0	6.3, 1.3	5.8, 1.6	6.2, 1.9	
Str: B', q <sub>0</sub>	6.6, 1.6	5.2, 1.7	3.7, 2.2	2.8, 3.3	3.0, 3.9	
Ext I: B', q <sub>0</sub>	5.6, 0.9	4.8, 1.4	4.1, 2.0	3.1, 3.2	2.7, 4.5	
Ext II: B', q <sub>0</sub>	2.8, 1.9	2.7, 2.5	2.8, 3.0	2.6, 3.7	3.4, 3.6	

**SYMBOLS:**

- Ser - service limit state I
- Str - strength limit state I
- Ext I - extreme event limit state I
- Ext II - extreme event limit state II
- B' - effective footing width (ft)
- q<sub>0</sub> - net bearing stress (ksf), OG assumed to be FG at toe
- q<sub>o</sub> - gross uniform bearing stress (ksf)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Gary Wong*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Gary Wong  
No. C58238  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**DESIGN CONDITIONS:**

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

**DESIGN NOTES:**

- DESIGN: AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments
- LS: Varied surcharge on level ground surface
- DC: Stem Architectural Treatment of thickness up to 6' of concrete (75 psf) considered
- CT: 54 kip transverse force applied at H<sub>e</sub> = 32", distributed over 10 feet at the top of wall and 1 : 1 distribution down and outward. Distribution below footing taken no less than 40'.
- SEISMIC: K<sub>h</sub> = 0.2  
K<sub>v</sub> = 0.0
- SOIL: φ = 34°  
γ = 120 pcf
- REINFORCED CONCRETE: f'<sub>c</sub> = 3,600 psi  
f<sub>y</sub> = 60,000 psi
- LOAD COMBINATIONS AND LIMIT STATES:  
Service I Q = 1.00DC+1.00EV+1.00EH+1.00LS  
Strength I Q = aDC+φEV+φEH+1.75LS  
Extreme I Q = 1.00DC+1.00EV+1.00EH+1.00EOD+1.00EOE  
Extreme II Q = 1.00DC+1.00EV+1.00EH+1.00CT
- Where:  
Q: Force Effects  
a: 1.25 or 0.90, Whichever Controls Design  
φ: 1.35 or 1.00, Whichever Controls Design  
φ: 1.50 or 0.90, Whichever Controls Design  
DC: Dead Load of Structure Components  
EH: Horizontal Earth Fill Pressure  
EV: Vertical Earth Pressure from Earth Fill Weight  
LS: Live Load Surcharge  
EOE: Seismic Earth Pressure  
EOD: Soil and Structural and Nonstructural Components Inertia  
CT: Vehicular Collision Force

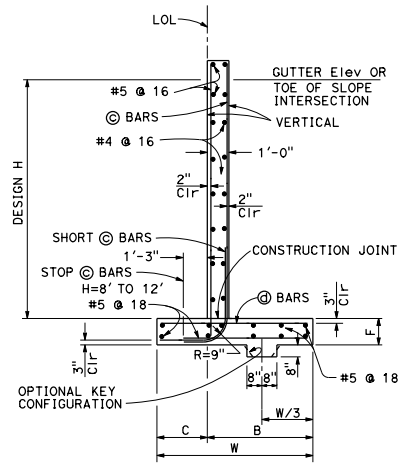
**NOTES:**

1. For details not shown and drainage notes see B3-5
2. For wall stem joint details see B0-3/3-3 and B0-3/3-4
3. At ⊙ bars:  
H < 6', no splices are allowed within 1'-8" above the top of footing.  
H > 6', no splices are allowed within H/4 above the top of footing.
4. Provide #6 @ 8" ⊙ bars in addition to tabulated ⊙ bars over a distance of 8'-0" measured from all expansion joints, begin wall and end wall location.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**RETAINING WALL TYPE 1A (CASE 1)**

NO SCALE

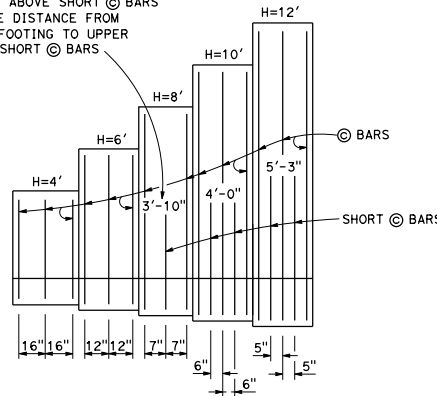
**B3-3A**



**SPREAD FOOTING SECTION**

Place concrete in toe against undisturbed material, except as permitted by the Engineer.

NUMBERS ABOVE SHORT @ BARS INDICATE DISTANCE FROM TOP OF FOOTING TO UPPER END OF SHORT @ BARS



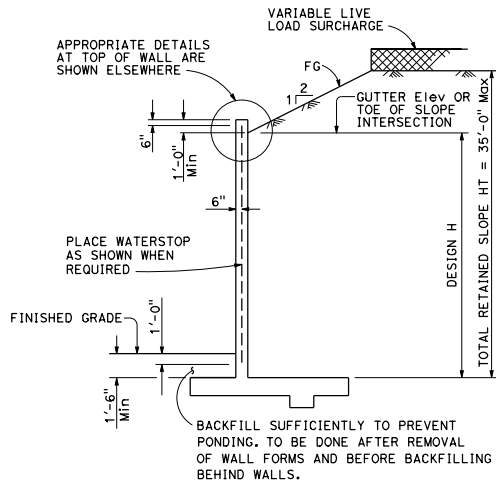
**ELEVATION**

**SYMBOLS:**

- Ser - service limit state I
- Str - strength limit state I
- Ext - extreme event limit state I
- B' - effective footing width (ft)
- q<sub>0</sub> - net bearing stress (ksf), OG assumed to be FG at toe
- q<sub>o</sub> - gross uniform bearing stress (ksf)

**TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA**

DESIGN H	4'	6'	8'	10'	12'
W	5'-10"	7'-7"	9'-0"	11'-0"	12'-5"
C	2'-4"	2'-7"	3'-0"	3'-6"	4'-0"
B	3'-6"	5'-0"	6'-0"	7'-6"	8'-5"
F	1'-4"	1'-7"	1'-7"	1'-9"	1'-9"
@ BARS	#5 @ 16	#5 @ 12	#5 @ 7	#6 @ 6	#7 @ 5
@ BARS	#5 @ 16	#5 @ 12	#5 @ 7	#6 @ 6	#7 @ 5
Ser: B', q <sub>0</sub>	4.0, 0.8	5.6, 1.0	8.8, 1.1	10.6, 1.3	12.0, 1.6
Str: B', q <sub>0</sub>	1.9, 2.0	3.5, 2.1	4.5, 2.3	6.5, 2.3	7.7, 2.5
Ext: B', q <sub>0</sub>	2.8, 2.3	3.3, 3.3	3.9, 3.9	5.3, 4.1	5.9, 4.5



**DESIGN SECTION**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Gary Wong*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Gary Wong  
No. C58238  
Exp. 6-30-16  
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 SCANNED COPIES OF THIS PLAN SHEET.

**DESIGN CONDITIONS:**

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

**DESIGN NOTES:**

- DESIGN: AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments
- LS: Varied surcharge on level ground surface
- DC: Stem Architectural Treatment of thickness up to 6" of concrete (75 psf) considered
- SEISMIC: k<sub>h</sub> = 0.2  
k<sub>v</sub> = 0.0
- SOIL: φ = 34°  
γ = 120 pcf
- REINFORCED CONCRETE: f'c = 3,600 psi  
fy = 60,000 psi
- LOAD COMBINATIONS AND LIMIT STATES:  
Service I Q = 1.00DC+1.00EV+1.00EH+1.00LS  
Strength I Q = αDC+βEV+γEH+1.75LS  
Extreme I Q = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE
- Where:  
Q: Force Effects  
α: 1.25 or 0.90, Whichever Controls Design  
β: 1.35 or 1.00, Whichever Controls Design  
γ: 1.50 or 0.90, Whichever Controls Design  
DC: Dead Load of Structure Components  
EH: Horizontal Earth Fill Pressure  
EV: Vertical Earth Pressure from Earth Fill Weight  
LS: Live Load Surcharge  
EQE: Seismic Earth Pressure  
EQD: Soil and Structural and Nonstructural Components Inertia

**NOTES:**

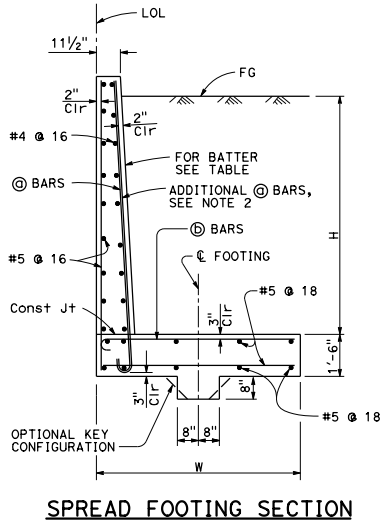
- For details not shown and drainage notes see B3-5
- For wall stem joint details see B0-3/3-3 and B0-3/3-4
- At @ and short @ bars:  
H ≤ 6', no splices are allowed within 1'-8" above the top of footing.  
H > 6', no splices are allowed within H/4 above the top of footing.

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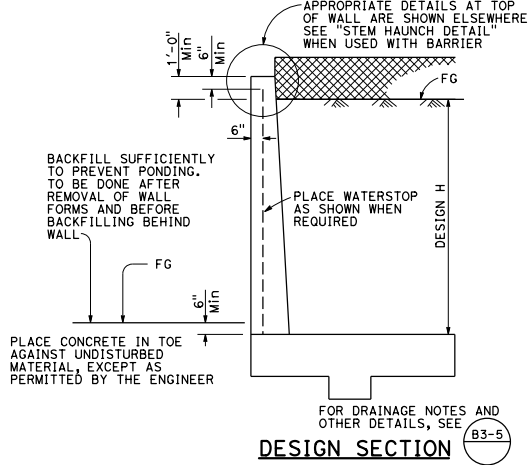
**RETAINING WALL TYPE 1A (CASE 2)**

NO SCALE

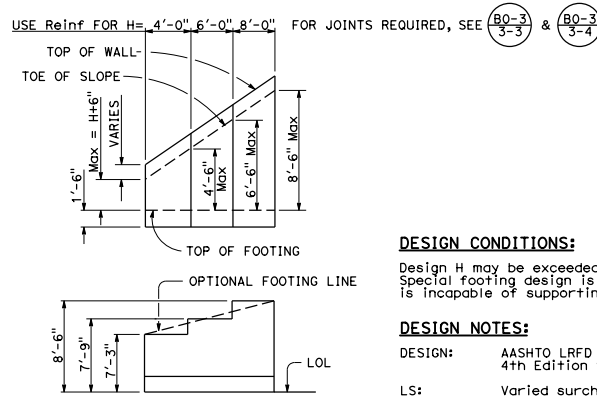
**B3-3B**



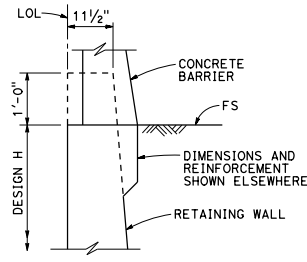
**SPREAD FOOTING SECTION**



**DESIGN SECTION**



**TYPICAL LAYOUT EXAMPLE**



**STEM HAUNCH DETAIL**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Gary Wong**  
 REGISTERED CIVIL ENGINEER  
 No. C58238  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**DESIGN CONDITIONS:**

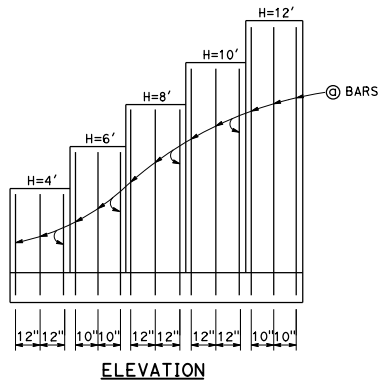
Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

**DESIGN NOTES:**

- DESIGN:** AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments
- LS:** Varied surcharge on level ground surface
- DC:** Stem Architectural Treatment of thickness up to 6" of concrete (75 psf) considered
- CT:** 54 kip transverse force applied at  $H_e = 32'$ , distributed over 10 feet at the top of wall and 1 : 1 distribution down and outward. Distribution below footing taken no less than 40'.
- SEISMIC:**  $k_h = 0.2$   
 $k_v = 0.0$
- SOIL:**  $\phi = 34^\circ$   
 $\gamma = 120$  pcf
- REINFORCED CONCRETE:**  $f'_c = 3,600$  psi  
 $f_y = 60,000$  psi
- LOAD COMBINATIONS AND LIMIT STATES:**  
 Service I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00LS$   
 Strength I  $Q = aDC + \phi EV + nEH + 1.75LS$   
 Extreme I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00EQD + 1.00EQE$   
 Extreme II  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00CT$
- Where:**  
 Q: Force Effects  
 a: 1.25 or 0.90, Whichever Controls Design  
 $\phi$ : 1.35 or 1.00, Whichever Controls Design  
 n: 1.50 or 0.90, Whichever Controls Design  
 DC: Dead Load of Structure Components  
 EH: Horizontal Earth Fill Pressure  
 EV: Vertical Earth Pressure from Earth Fill Weight  
 LS: Live Load Surcharge  
 EQE: Seismic Earth Pressure  
 EQD: Soil and Structural and Nonstructural Components Inertia  
 CT: Vehicular Collision Force

**NOTES:**

- At @ bars:  
 $H \leq 6'$ , no splices are allowed within 1'-8" above the top of footing.  
 $H > 6'$ , no splices are allowed within H/4 above the top of footing.
- Provide #6 @ 8" @ bars in addition to tabulated @ bars over a distance of 8'-0" measured from all expansion joints, begin wall and end wall locations.

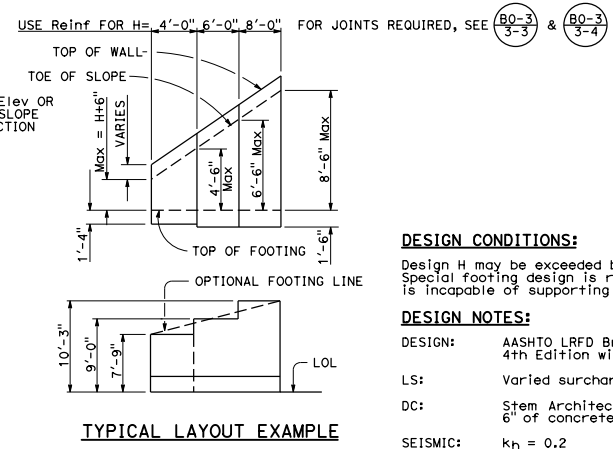
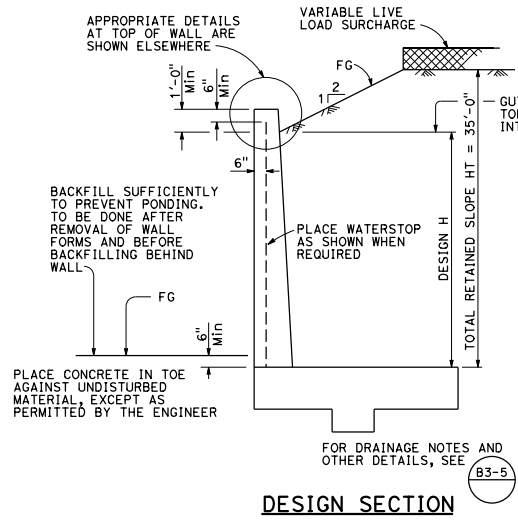
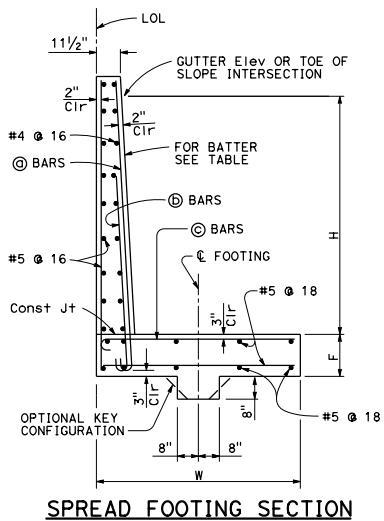


**ELEVATION**

**SYMBOLS:**

- Ser - service limit state I
- Str - strength limit state I
- Ext I - extreme event limit state I
- Ext II - extreme event limit state II
- B' - effective footing width (ft)
- $q_0$  - net bearing stress (ksf), OG assumed to be FG at toe
- $q_0$  - gross uniform bearing stress (ksf)

DESIGN H	4'	6'	8'	10'	12'
W	7'-3"	7'-9"	8'-6"	9'-6"	10'-6"
BATTER	NONE	NONE	100 : 2	100 : 3	100 : 4
@ BARS	#7 @ 12	#7 @ 10	#7 @ 12	#7 @ 12	#7 @ 10
⊙ BARS	#7 @ 12	#7 @ 10	#8 @ 12	#9 @ 12	#10 @ 10
Ser: B', $q_0$	6.2, 1.4	6.1, 1.8	6.4, 2.1	7.0, 2.5	7.7, 2.8
Str: B', $q_0$	6.2, 2.4	6.1, 2.9	5.3, 3.0	6.0, 3.5	6.6, 4.0
Ext I: B', $q_0$	4.4, 1.5	4.1, 2.2	4.0, 3.1	4.1, 3.9	4.2, 4.8
Ext II: B', $q_0$	2.5, 2.7	3.1, 3.0	3.8, 3.2	4.9, 3.3	5.8, 3.5



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

**Gary Wong**  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

**Gary Wong**  
REGISTERED PROFESSIONAL ENGINEER  
No. C58238  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

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**DESIGN CONDITIONS:**

Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

**DESIGN NOTES:**

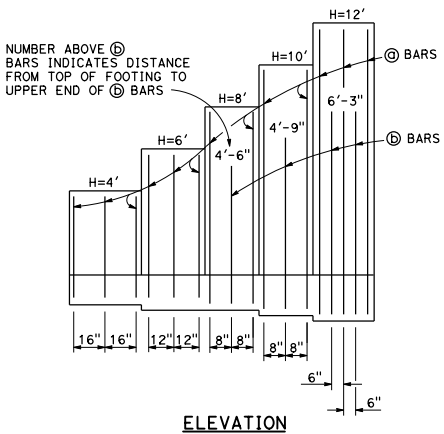
- DESIGN: AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments
- LS: Varied surcharge on level ground surface
- DC: Stem Architectural Treatment of thickness up to 6" of concrete (75 psf) considered
- SEISMIC:  $K_h = 0.2$   
 $K_v = 0.0$
- SOIL:  $\phi = 34^\circ$   
 $\gamma = 120 \text{ pcf}$
- REINFORCED CONCRETE:  $f'_c = 3,600 \text{ psi}$   
 $f_y = 60,000 \text{ psi}$

- LOAD COMBINATIONS AND LIMIT STATES:
- Service I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00LS$
- Strength I  $Q = aDC + \rho EV + \eta EH + 1.75LS$
- Extreme I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00EQD + 1.00EQE$

- Where:
- Q: Force Effects
  - a: 1.25 or 0.90, Whichever Controls Design
  - $\rho$ : 1.35 or 1.00, Whichever Controls Design
  - $\eta$ : 1.50 or 0.90, Whichever Controls Design
  - DC: Dead Load of Structure Components
  - EH: Horizontal Earth Fill Pressure
  - EV: Vertical Earth Pressure from Earth Fill Weight
  - LS: Live Load Surcharge
  - EQE: Seismic Earth Pressure
  - EQD: Soil and Structural and Nonstructural Components Inertia

**NOTES:**

- At  $\odot$  and  $\ominus$  bars:  
 H  $\leq$  6', no splices are allowed within 1'-8" above the top of footing.  
 H > 6', no splices are allowed within H/4 above the top of footing.



**SYMBOLS:**

- Ser - service limit state I
- Str - strength limit state I
- Ext - extreme event limit state I
- B' - effective footing width (ft)
- $q_0$  - net bearing stress (ksf), OG assumed to be FG at toe
- $q_0$  - gross uniform bearing stress (ksf)

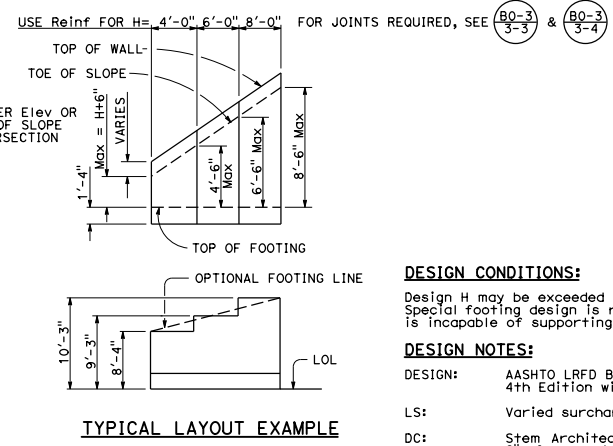
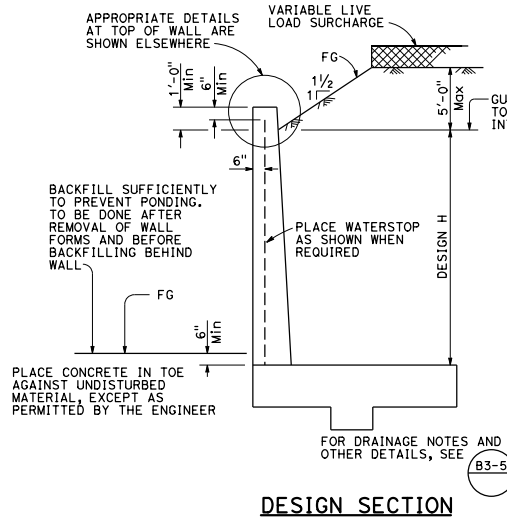
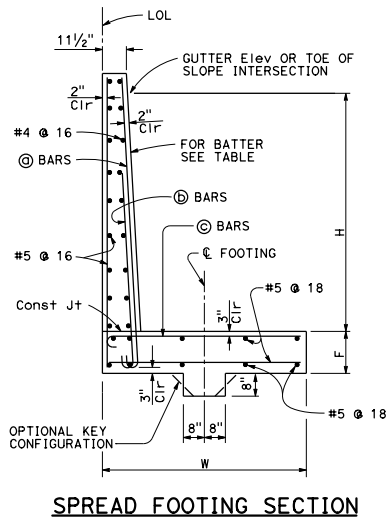
TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA					
DESIGN H	4'	6'	8'	10'	12'
W	7'-9"	9'-0"	10'-3"	11'-6"	13'-3"
F SPREAD FOOTING	1'-4"	1'-6"	1'-6"	1'-6"	1'-10"
BATTER	NONE	NONE	NONE	100 : 3	100 : 5
$\odot$ BARS	#5 @ 16	#5 @ 12	#5 @ 16	#6 @ 16	#5 @ 12
$\ominus$ BARS	NONE	NONE	#6 @ 16	#6 @ 16	#6 @ 12
$\oplus$ BARS	#7 @ 8	#7 @ 12	#8 @ 8	#9 @ 8	#10 @ 6
Ser: B', $q_0$	5.2, 1.3	6.0, 1.8	9.1, 1.8	10.0, 2.3	11.4, 2.7
Str: B', $q_0$	3.6, 2.2	4.1, 2.8	4.8, 3.4	5.5, 3.9	6.7, 4.3
Ext: B', $q_0$	3.7, 2.9	3.6, 4.5	3.7, 5.9	3.9, 7.2	4.4, 8.4

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**RETAINING WALL TYPE 5 (CASE 2)**

NO SCALE

**B3-4B**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Gary Wong**  
 REGISTERED CIVIL ENGINEER  
 No. C58238  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**DESIGN CONDITIONS:**  
 Design H may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in the table.

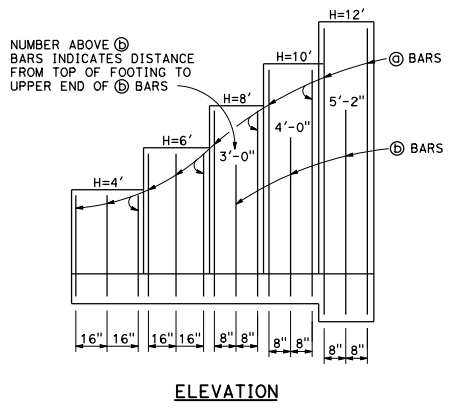
**DESIGN NOTES:**  
 DESIGN: AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments  
 LS: Varied surcharge on level ground surface  
 DC: Stem Architectural Treatment of thickness up to 6' of concrete (75 psf) considered  
 SEISMIC:  $K_h = 0.2$   
 $K_v = 0.0$   
 SOIL:  $\phi = 34^\circ$   
 $\gamma = 120$  pcf  
 REINFORCED CONCRETE:  $f'_c = 3,600$  psi  
 $f_y = 60,000$  psi

**LOAD COMBINATIONS AND LIMIT STATES:**  
 Service I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00LS$   
 Strength I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.75LS$   
 Extreme I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00EQD + 1.00EQE$

Where:  
 Force Effects  
 $a$ : 1.25 or 0.90, Whichever Controls Design  
 $p$ : 1.35 or 1.00, Whichever Controls Design  
 $r$ : 1.50 or 0.90, Whichever Controls Design  
 DC: Dead Load of Structure Components  
 EH: Horizontal Earth Fill Pressure  
 EV: Vertical Earth Pressure from Earth Fill Weight  
 LS: Live Load Surcharge  
 EQE: Seismic Earth Pressure  
 EQD: Soil and Structural and Nonstructural Components Inertia

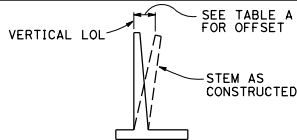
**NOTES:**  
 1. At  $\textcircled{a}$  and  $\textcircled{b}$  bars:  
 $H \leq 6'$ , no splices are allowed within 1'-8" above the top of footing.  
 $H > 6'$ , no splices are allowed within H/4 above the top of footing.

**SYMBOLS:**  
 Ser - service limit state I  
 Str - strength limit state I  
 Ext - extreme event limit state I  
 $B'$  - effective footing width (ft)  
 $q_0$  - net bearing stress (ksf), OG assumed to be FG at toe  
 $q_0$  - gross uniform bearing stress (ksf)



DESIGN H	4'	6'	8'	10'	12'
W	8'-4"	9'-3"	10'-3"	11'-0"	12'-4"
F SPREAD FOOTING	1'-4"	1'-4"	1'-4"	1'-4"	1'-7"
BATTER	NONE	NONE	NONE	100 : 3	100 : 5
$\textcircled{a}$ BARS	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16
$\textcircled{b}$ BARS	NONE	NONE	#5 @ 16	#5 @ 16	#5 @ 16
$\textcircled{c}$ BARS	#6 @ 8	#7 @ 8	#8 @ 8	#9 @ 8	#9 @ 8
Ser: $B'$ , $q_0$	5.6, 1.4	6.4, 1.8	7.4, 2.2	7.8, 2.6	8.9, 3.0
Str: $B'$ , $q_0$	3.6, 2.4	4.2, 3.0	5.0, 3.4	5.3, 4.0	6.4, 4.2
Ext: $B'$ , $q_0$	4.4, 2.1	4.2, 3.0	4.2, 4.0	3.9, 5.5	4.2, 6.7

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**RETAINING WALL TYPE 5 (CASE 3)**  
 NO SCALE  
**B3-4C**

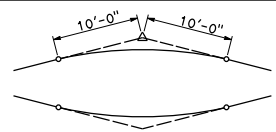


**TABLE A**

H	OFFSET
4'-12'	H/200
14'-16'	H/160
18'-20'	H/140
22'-24'	H/130
26'-36'	2 1/2"

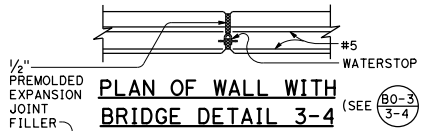
**APPROXIMATE WALL OFFSET VALUES**

Values for offsetting forms to be determined by the Engineer.

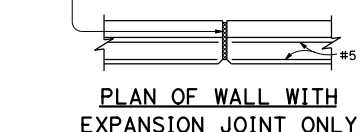


**20'-0" VC AT TOP OF WALL SLOPE CHANGE**

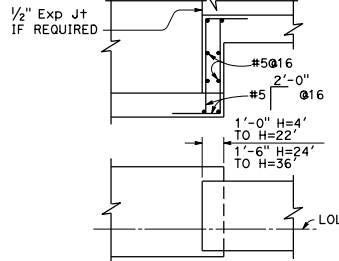
Where shown on the plans



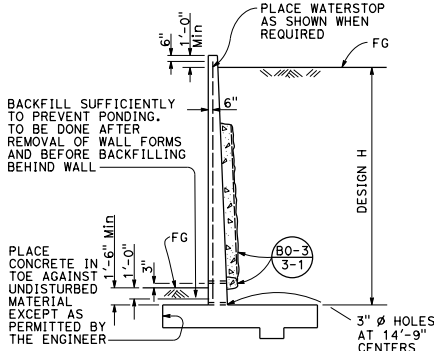
**PLAN OF WALL WITH BRIDGE DETAIL 3-4**



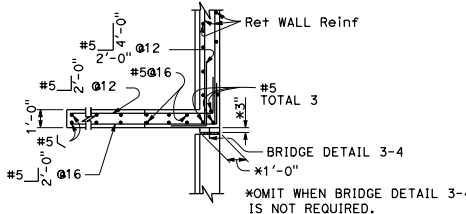
**PLAN OF WALL WITH EXPANSION JOINT ONLY**



**FOOTING STEP**

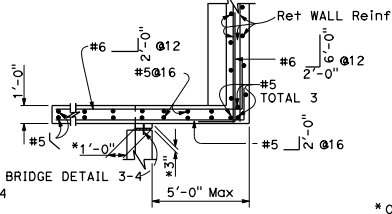


**DESIGN AND DRAINAGE**



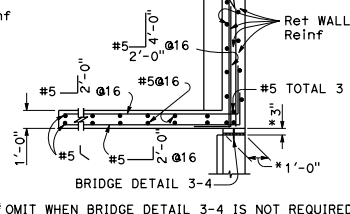
**PLAN**

(For return wall Type "A")



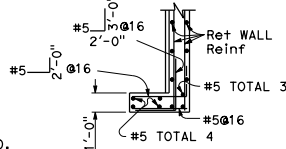
**PLAN**

(For return wall Type "B")



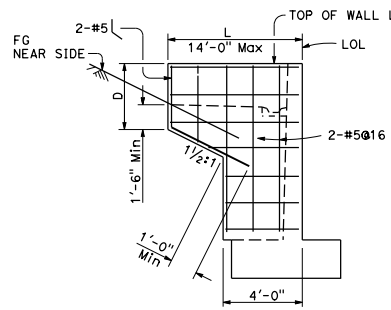
**PLAN**

(For return wall Type "C")



**PLAN**

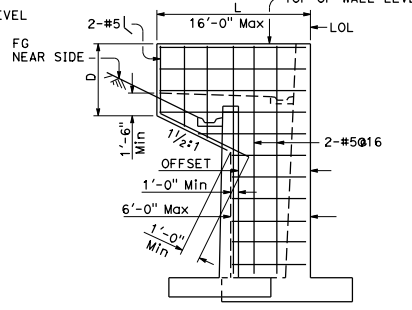
(For return wall Type "D")



**ELEVATION**

**RETURN WALL TYPE "A"**

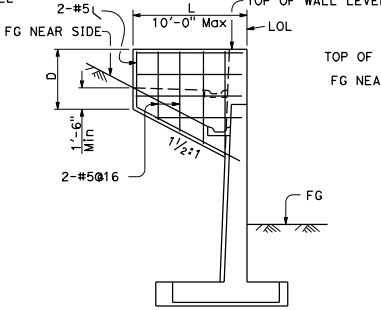
Use where H=8' or less



**ELEVATION**

**RETURN WALL TYPE "B"**

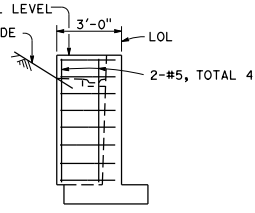
Use where H=10' or more on offset walls



**ELEVATION**

**RETURN WALL TYPE "C"**

Use where H=10' or more on straight walls



**ELEVATION**

**RETURN WALL TYPE "D"**

Use where H=6' or less

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Gary Wong*  
 REGISTERED CIVIL ENGINEER  
 No. C58238  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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**DESIGN CONDITIONS:**

Design "H" may be exceeded by 6" before going to the next size. Special footing design is required where foundation material is incapable of supporting bearing stress listed in table

Return wall not required unless shown elsewhere

**DESIGN NOTES:**

DESIGN: AASHTO LRFD Bridge Design Specifications, 4th edition with California Amendments

LIVE LOAD: Surcharge on level ground surface

SOIL:  $\phi = 34^\circ$   
 $\gamma = 120 \text{ pcf}$

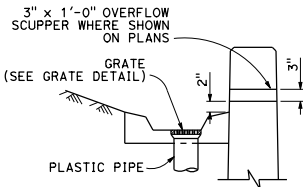
REINFORCED CONCRETE:  $f_y = 60,000 \text{ psi}$   
 $f_c' = 3,600 \text{ psi}$

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

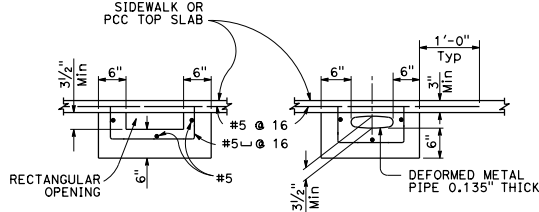
**RETAINING WALL DETAILS No. 1**

NO SCALE

**B3-5**

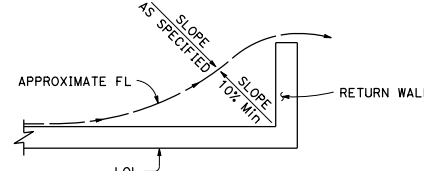


**WALL DRAIN DETAIL**

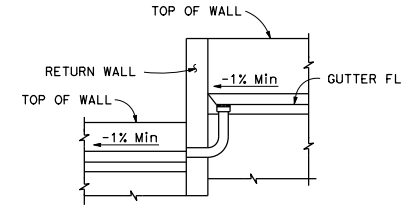


**NOTES:**  
 Area of opening to be not less than that of pipe from wall gutter. Make opening transition in wall. Edge opening in curb face to 3/4" minimum radius.

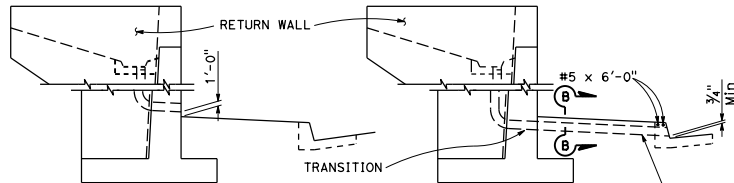
**OUTLET DETAIL - SECTION B-B**



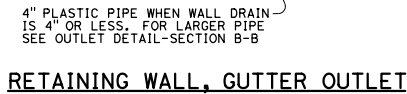
**WALL DRAINAGE WHERE GUTTER NOT REQUIRED**



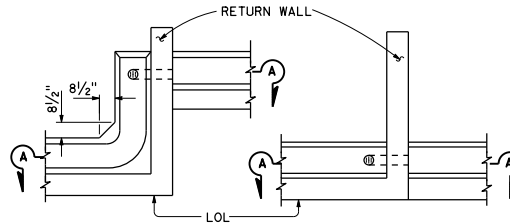
**SECTION A-A**



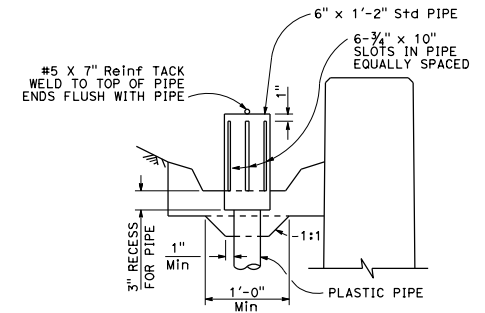
**RETAINING WALL, FACE OF WALL OUTLET**



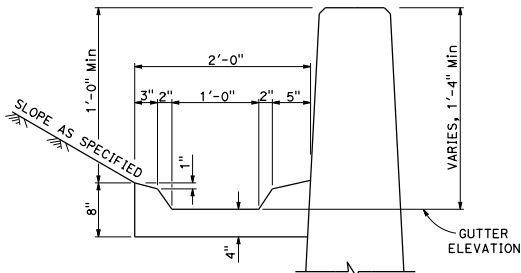
**RETAINING WALL, GUTTER OUTLET**



**PLAN-OFFSET WALL PLAN-CONTINUOUS WALL DRAIN THROUGH RETURN WALL**



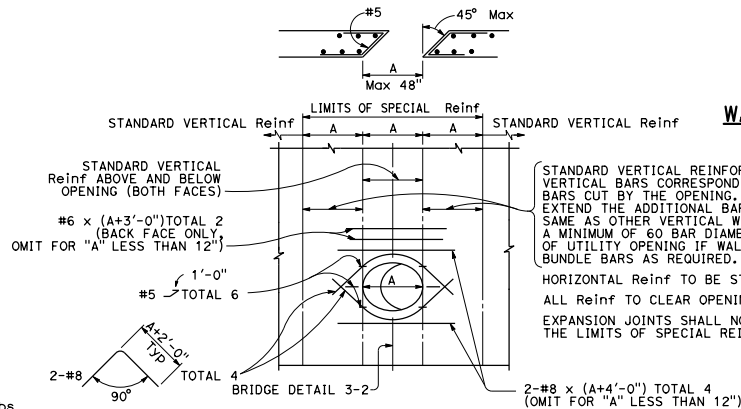
**WALL DRAIN WITH PIPE DOME**



**TYPICAL GUTTER DETAIL**



**GRATE DETAIL**  
Sizes to fit standard hubs



**RETAINING WALL UTILITY OPENING**

Max size of opening (A) = 48"  
 To be used in conjunction with sheet **B3-5**

STANDARD VERTICAL REINFORCEMENT PLUS ADDITIONAL VERTICAL BARS CORRESPONDING IN SIZE AND NUMBER TO BARS CUT BY THE OPENING. PLACE HALF ON EACH SIDE. EXTEND THE ADDITIONAL BARS INTO THE FOOTING THE SAME AS OTHER VERTICAL WALL REINFORCEMENT AND TO A MINIMUM OF 60 BAR DIAMETERS ABOVE THE TOP OF UTILITY OPENING IF WALL HEIGHT PERMITS. BUNDLE BARS AS REQUIRED.  
 HORIZONTAL Reinf to be STANDARD EXCEPT AS SHOWN. ALL Reinf to CLEAR OPENING BY 2" MINIMUM. EXPANSION JOINTS SHALL NOT BE LOCATED WITHIN THE LIMITS OF SPECIAL REINFORCING

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**RETAINING WALL DETAILS No. 2**

NO SCALE

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

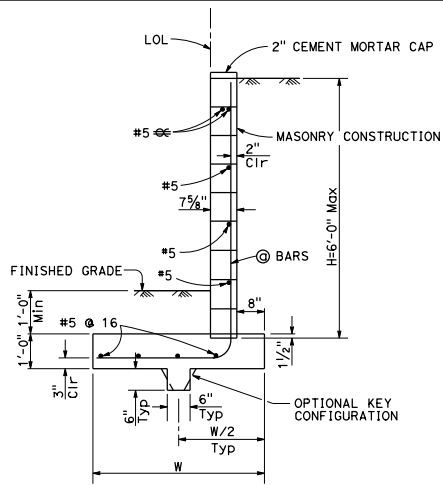
*Gary Wong*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

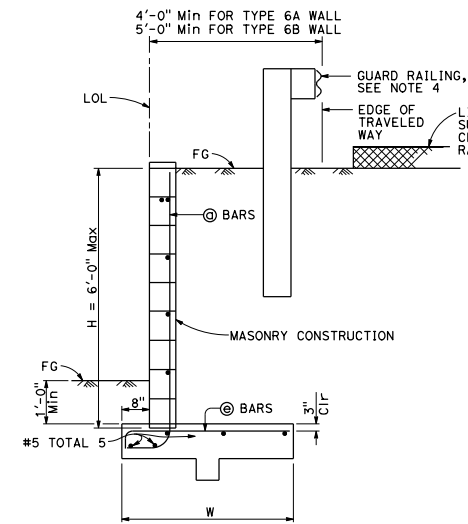
Gary Wong  
 No. C58238  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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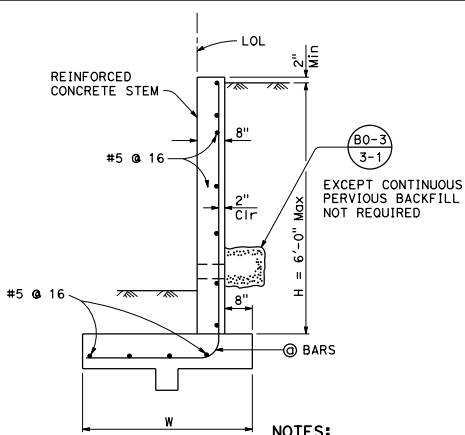




**TYPE 6A WALL**



**TYPE 6B WALL**



**NOTES:**

1. For details not shown at "6B", see "6A", similarly, for details not shown at "6A", see "6B".
2. Design loading for both Type "6A" and "6B" is as shown at "6B".
3. Type 6 retaining wall shall be limited to use for walls of Design H of 6'-0" or less.
4. Where traffic is adjacent to the top of wall, guard railing should be set back from the top front face of wall at least 4'-0" or 5'-0", dependent on wall type.
5. For reinforced concrete wall stem joint details, See (B0-3) and (B0-3) 3-1 and 3-4.
6. No splices are allowed on @ bars.
7. See "Retaining Wall Type 6 Details" sheet for Elevation View and Footing Step Details.

**SYMBOLS:**

- Ser - service limit state I
- Str - strength limit state I
- Ext - extreme event limit state I
- B' - effective footing width (ft)
- q<sub>o</sub> - net bearing stress (ksf), OG assumed to be FG at toe
- q<sub>o</sub> - gross uniform bearing stress (ksf)

**DESIGN NOTES:**

- DESIGN:** AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments  
 Building Code Requirements for Masonry Structures (TMS 402-08/ACI 530-08/ASCE 5-08)
- LS:** 240 psf surcharge on level ground surface as limited by Guard Railing location
- SEISMIC:** k<sub>h</sub> = 0.2  
 k<sub>v</sub> = 0.0
- SOIL:** φ = 34°  
 γ = 120 pcf
- REINFORCED CONCRETE:** f'<sub>c</sub> = 3,600 psi  
 f<sub>y</sub> = 60,000 psi
- REINFORCED MASONRY:** f<sub>m</sub>' = 1,500 psi  
 f<sub>y</sub> = 60,000 psi
- LOAD COMBINATIONS AND LIMIT STATES:**  
 Service I 0 = 1.00DC+1.00EV+1.00EH+1.00LS  
 Strength I 0 = αDC+PEV+ηEH+1.75LS  
 Extreme I 0 = 1.00DC+1.00EV+1.00EH+1.00EQD+1.00EQE
- Where:**  
 Q: Force Effects  
 α: 1.25 or 0.90, Whichever Controls Design  
 β: 1.35 or 1.00, Whichever Controls Design  
 η: 1.50 or 0.90, Whichever Controls Design  
 DC: Dead Load of Structure Components  
 EH: Horizontal Earth Fill Pressure  
 EV: Vertical Earth Pressure from Earth Fill Weight  
 LS: Live Load Surcharge  
 EQE: Seismic Earth Pressure  
 EQD: Soil and Structural and Nonstructural Components Inertia

**TYPE 6A WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA**

DESIGN H	3'-4"	4'-0"	4'-8"	5'-4"	6'-0"
W	3'-0"	3'-3"	3'-8"	4'-2"	4'-8"
@ BARS	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16
Ser: B', q <sub>o</sub>	2.8, 0.2	3.0, 0.3	3.4, 0.3	3.8, 0.3	4.3, 0.3
Str: B', q <sub>o</sub>	2.7, 0.6	2.9, 0.7	3.2, 0.7	3.6, 0.7	3.3, 0.6
Ext: B', q <sub>o</sub>	1.7, 0.8	1.6, 0.9	1.7, 1.0	2.0, 1.0	2.1, 1.0

**TYPE 6B WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA**

DESIGN H	3'-4"	4'-0"	4'-8"	5'-4"	6'-0"
W	3'-0"	3'-9"	4'-0"	4'-6"	4'-9"
@ BARS	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16
@ BARS	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16
Ser: B', q <sub>o</sub>	2.6, 0.4	3.4, 0.4	2.7, 0.8	3.1, 0.8	3.2, 1.0
Str: B', q <sub>o</sub>	2.6, 0.8	3.3, 0.9	1.7, 1.6	2.1, 1.6	2.0, 1.8
Ext: B', q <sub>o</sub>	1.5, 1.1	2.0, 1.1	2.0, 1.4	2.2, 1.5	2.1, 1.9

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**RETAINING WALL TYPE 6 (CASE 1)**

NO SCALE

**B3-7A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

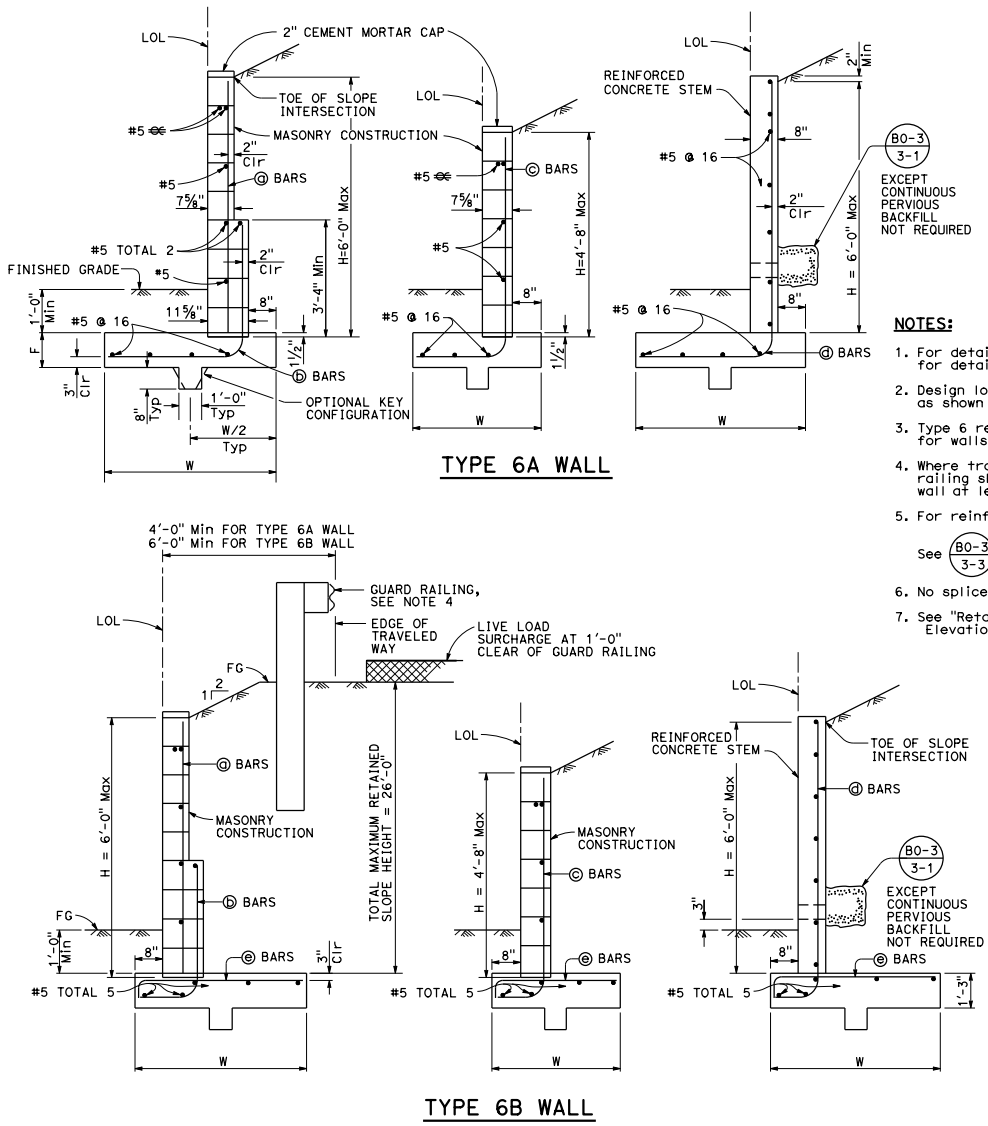
*Gary Wong*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

Gary Wong  
 No. C58238  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

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**TYPE 6A WALL**

**TYPE 6B WALL**

**SYMBOLS:**

- Ser - service limit state 1
- Str - strength limit state 1
- Ext - extreme event limit state I
- B' - effective footing width (ft)
- q<sub>o</sub> - net bearing stress (ksf), OG assumed to be FG at toe
- q<sub>o</sub> - gross uniform bearing stress (ksf)

EXCEPT CONTINUOUS PERVIOUS BACKFILL NOT REQUIRED

**NOTES:**

1. For details not shown at "6B", see "6A", similarly, for details not shown at "6A", see "6B".
2. Design loading for both Type "6A" and "6B" is as shown at "6B".
3. Type 6 retaining wall shall be limited to use for walls of Design H of 6'-0" or less.
4. Where traffic is adjacent to the top of wall, guard railing should be set back from the top front face of wall at least 4'-0" or 6'-0", dependent on wall type.
5. For reinforced concrete wall stem joint details, see (B0-3/3-3) and (B0-3/3-4).
6. No splices are allowed on (A), (B), (C), and (D) bars.
7. See "Retaining Wall Type 6 Details" sheet for Elevation View and Footing Step Details.

**DESIGN NOTES:**

- DESIGN: AASHTO LRFD Bridge Design Specifications, 4th Edition with California Amendments  
 Building Code Requirements for Masonry Structures (TMS 402-08/ACI 530-08/ASCE 5-08)
- LS: 240 psf surcharge on level ground surface as limited by Guard Railing location
- SEISMIC:  $k_h = 0.2$   
 $k_v = 0.0$
- SOIL:  $\phi = 34^\circ$   
 $\gamma = 120$  pcf
- REINFORCED CONCRETE:  $f'_c = 3,600$  psi  
 $f_y = 60,000$  psi
- REINFORCED MASONRY:  $f_m' = 1,500$  psi  
 $f_y = 60,000$  psi
- LOAD COMBINATIONS AND LIMIT STATES:  
 Service I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00LS$   
 Strength I  $Q = aDC + bEV + cEH + 1.75LS$   
 Extreme I  $Q = 1.00DC + 1.00EV + 1.00EH + 1.00EQD + 1.00EQE$

Where:  
 Force Effects  
 Q: 1.25 or 0.90, Whichever Controls Design  
 a: 1.35 or 1.00, Whichever Controls Design  
 b: 1.50 or 0.90, Whichever Controls Design  
 DC: Dead Load of Structure Components  
 EH: Horizontal Earth Fill Pressure  
 EV: Vertical Earth Pressure from Earth Fill Weight  
 LS: Live Load Surcharge  
 EQE: Seismic Earth Pressure  
 EQD: Soil and Structural and Nonstructural Components Inertia

**TYPE 6A WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA**

DESIGN H	3'-4"	4'-0"	4'-8"	5'-4"	6'-0"
W	3'-8"	4'-1"	4'-8"	5'-3"	6'-9"
F	1'-0"	1'-0"	1'-2"	1'-3"	1'-4"
(A) BARS	NONE	NONE	NONE	#5 @ 16"	#5 @ 16"
(B) BARS	NONE	NONE	NONE	#5 @ 16"	#5 @ 16"
(C) BARS	#5 @ 16	#5 @ 16	#5 @ 16	NONE	NONE
(D) BARS	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16	#6 @ 16
Ser: B', q <sub>o</sub>	3.4, 0.3	3.8, 0.3	4.3, 0.3	4.9, 0.4	6.0, 0.4
Str: B', q <sub>o</sub>	3.3, 0.7	3.6, 0.7	4.1, 0.8	4.7, 0.8	5.7, 0.9
Ext: B', q <sub>o</sub>	1.3, 1.9	1.4, 2.0	1.7, 2.1	1.9, 2.2	3.9, 1.4

**TYPE 6B WALL - TABLE OF REINFORCING STEEL, DIMENSIONS AND DATA**

DESIGN H	3'-4"	4'-0"	4'-8"	5'-4"	6'-0"
W	4'-6"	5'-1"	5'-7"	6'-2"	6'-9"
(A) BARS	NONE	NONE	NONE	#5 @ 16"	#5 @ 16"
(B) BARS	NONE	NONE	NONE	#5 @ 16"	#5 @ 16"
(C) BARS	#5 @ 16	#5 @ 16	#5 @ 16	NONE	NONE
(D) BARS	#5 @ 16	#5 @ 16	#5 @ 16	#5 @ 16	#6 @ 16
(E) BARS	#5 @ 16	#5 @ 16	#6 @ 16	#6 @ 16	#7 @ 16
Ser: B', q <sub>o</sub>	3.3, 0.6	3.7, 0.8	4.0, 0.9	4.5, 1.0	4.1, 1.4
Str: B', q <sub>o</sub>	1.9, 1.4	2.3, 1.6	2.5, 1.8	2.8, 1.9	1.8, 3.6
Ext: B', q <sub>o</sub>	1.5, 2.8	1.8, 3.1	1.9, 3.6	2.1, 3.8	2.4, 3.9

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**RETAINING WALL TYPE 6 (CASE 2)**  
 NO SCALE

**B3-7B**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

October 30, 2015  
 PLANS APPROVAL DATE

Gary Wong  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 No. C58238  
 Exp. 6-30-16  
 CIVIL

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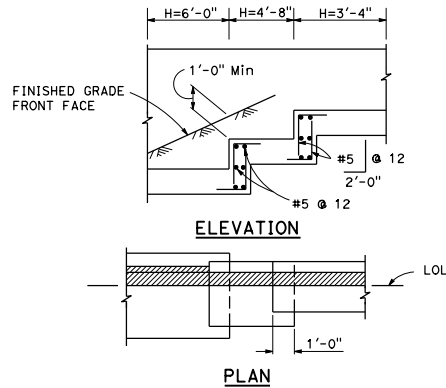
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Gary Wong*  
 REGISTERED CIVIL ENGINEER

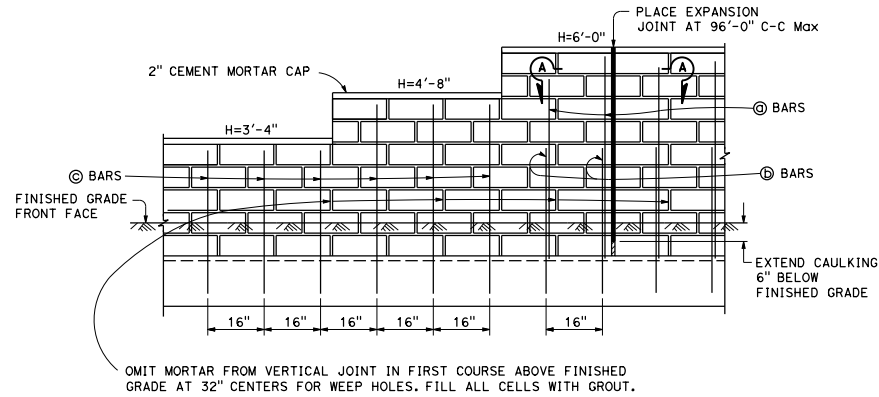
October 30, 2015  
 PLANS APPROVAL DATE

GARY WONG  
 No. C58238  
 Exp. 6-30-16  
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 STATE OF CALIFORNIA

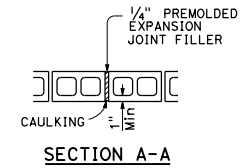
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FOOTING STEP DETAILS



ELEVATION - MASONRY CONSTRUCTION



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**RETAINING WALL TYPE 6 DETAILS**

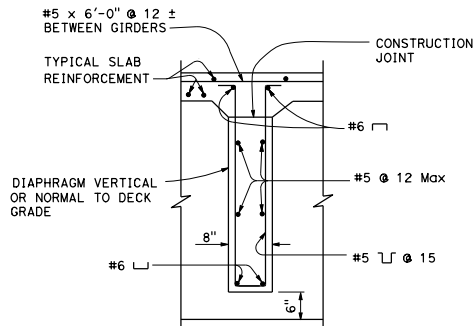
NO SCALE

**B3-7C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

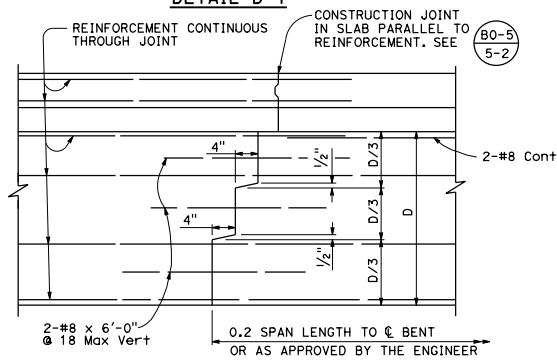
*Peter W. Norbo*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 Peter W. Norbo  
 No. C57519  
 Exp. 12-31-15  
 CIVIL  
 STATE OF CALIFORNIA

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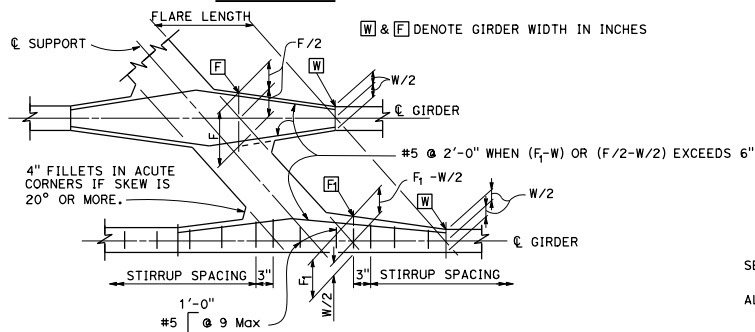
**INTERMEDIATE DIAPHRAGM SECTION**

**DETAIL D-1**



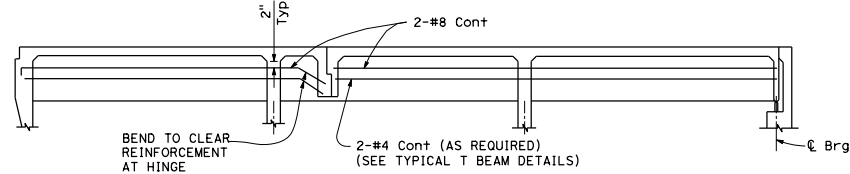
**TRANSVERSE GIRDER CONSTRUCTION JOINTS**

**DETAIL J-3**



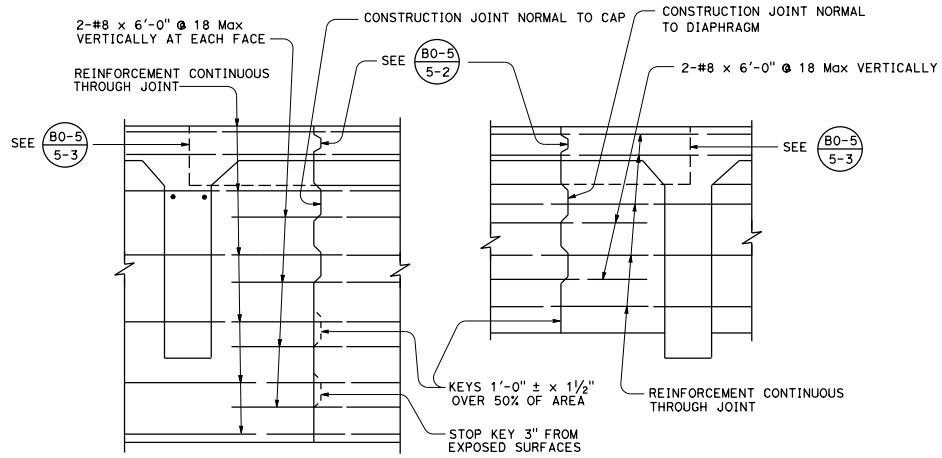
**TYPICAL GIRDER FLARE AND STIRRUP SPACING DIAGRAM**

**DETAIL S-3**



**GIRDER WEB REINFORCEMENT**

**DETAIL J-1**

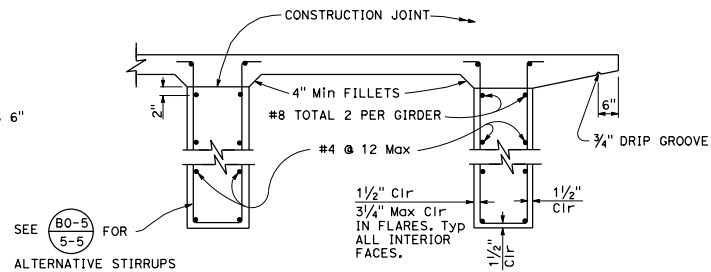


**BENT CAP**

**DIAPHRAGMS**

**LONGITUDINAL CONSTRUCTION JOINTS**

**DETAIL J-4**



**TYPICAL T BEAM DETAILS**

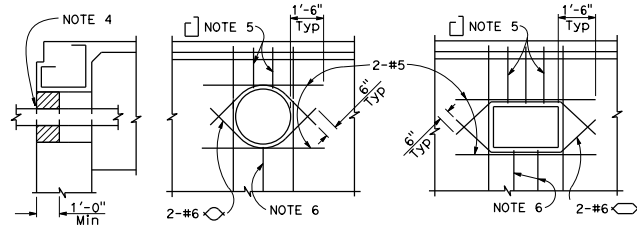
**DETAIL T-1**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

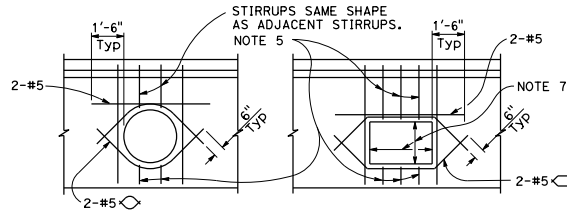
**T-BEAM DETAILS**

NO SCALE

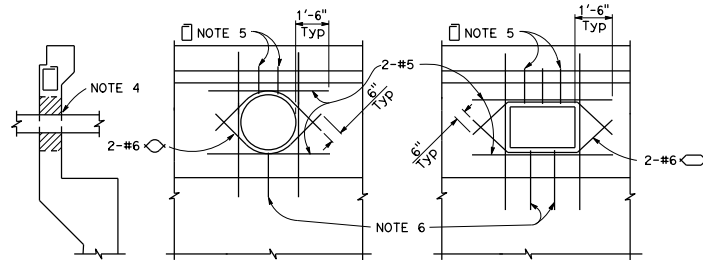
**B6-1**



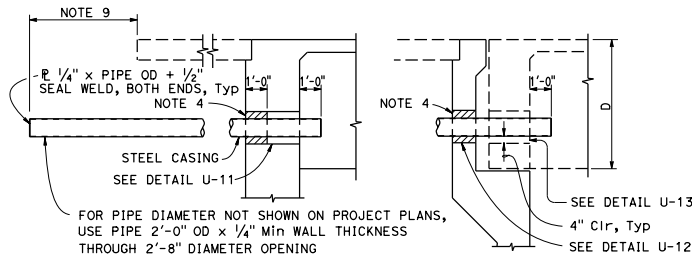
**DETAIL U-11**



**DETAIL U-15**  
**INTERMEDIATE DIAPHRAGMS**

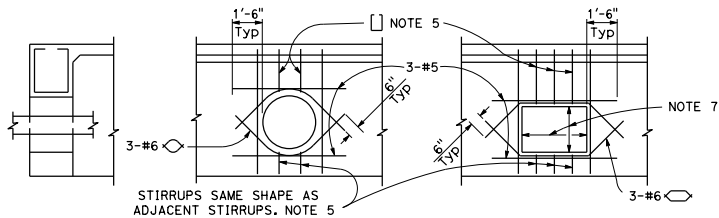


**DETAIL U-12**

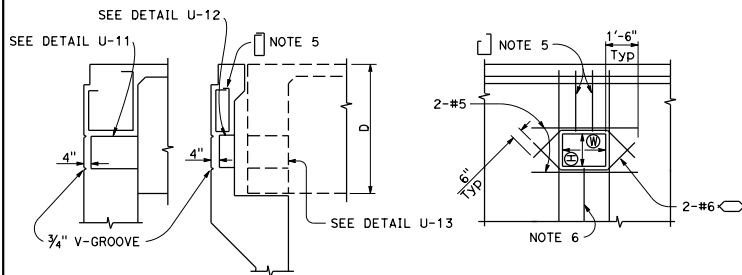


**DETAIL U-16**  
(For future utility provisions under approach slab)

**ABUTMENT DIAPHRAGMS**

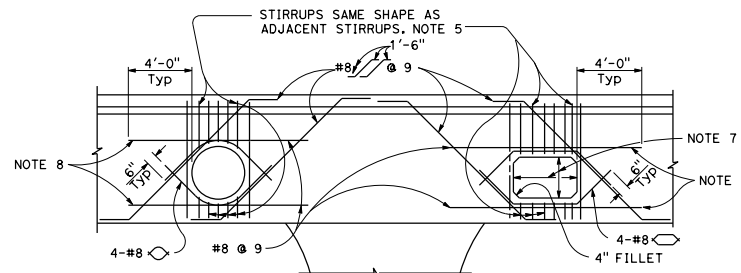


**DETAIL U-13**



**DETAIL U-14**  
(For future utility opening)  
**ABUTMENT DIAPHRAGMS**

For future utility opening dimensions not shown on Project Plans use:  
 (⊕) = 1/3 D or 1'-3" Min, whichever is greater.  
 (⊖) = 1/3 D or 1'-3" Min, whichever is greater.



**DETAIL U-17**  
**BENT CAPS**  
Near or between columns

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Peter W. Norbo*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

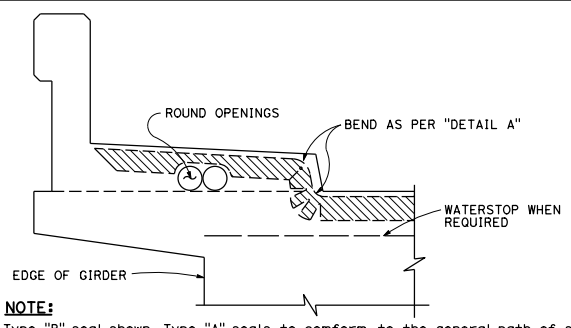
*Peter W. Norbo*  
No. C57519  
Exp. 12-31-15  
CIVIL  
STATE OF CALIFORNIA

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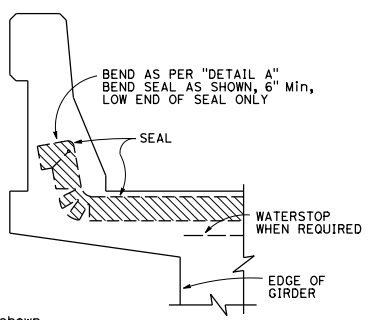
**NOTES:**

1. The exact location, elevation, size and direction of openings shall be in accordance with the Project Plans and as directed by the Engineer.
2. Girders not shown. See Project Plans.
3. All reinforcement detailed to be placed in addition to reinforcement shown on Project Plans.
4. Seal utilities at abutments with concrete or mortar, after tightly wrapping utility with 2 layers of 15 LBS building paper.
5. Reinforcement to be same bar size, and 2/3 the spacing of adjacent reinforcement shown on Project Plans.
6. Reinforcement to be same bar size and shape as adjacent reinforcement shown on Project Plans.
7. For future utility opening dimensions, see Project Plans and Detail U-14.
8. When there is insufficient space to place reinforcement as shown, hook reinforcement into exterior girder.
9. Unless otherwise shown on Project Plans, casing shall extend to the greater of 5'-0" beyond the end of the approach slab, 5'-0" beyond the end of the adjacent wingwall, or 20'-0" beyond the back of the abutment.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**UTILITY OPENINGS**  
**T-BEAM**  
NO SCALE



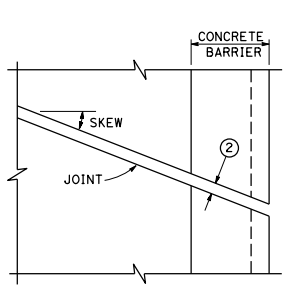
**NOTE:**  
Type "B" seal shown. Type "A" seals to conform to the general path of seal shown, cuts for bending not required. Bend type "A" seals 3' up into curb or barrier rail on only the low end of the seal.



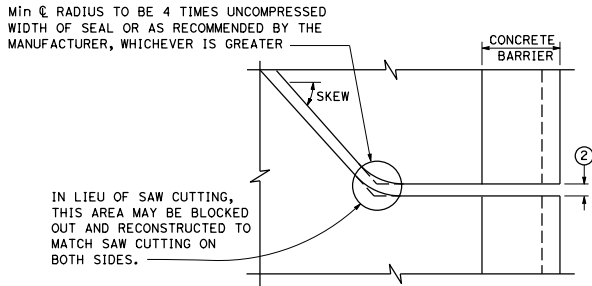
**CONCRETE BARRIER**

**CONCRETE BARRIER AND SIDEWALK**

**JOINT SEALS DETAILS**



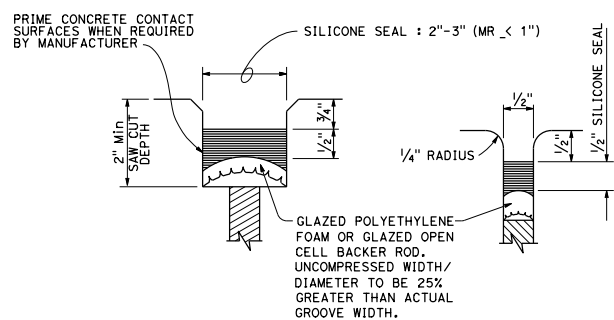
**PLAN OF JOINT (SKEW ≤ 20°)**



**PLAN OF JOINT (SKEW > 20°)**

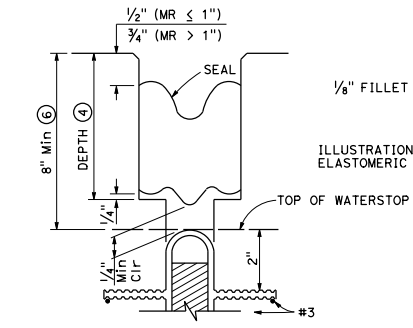
Min  $\phi$  RADIUS TO BE 4 TIMES UNCOMPRESSED WIDTH OF SEAL OR AS RECOMMENDED BY THE MANUFACTURER, WHICHEVER IS GREATER.

IN LIEU OF SAW CUTTING, THIS AREA MAY BE BLOCKED OUT AND RECONSTRUCTED TO MATCH SAW CUTTING ON BOTH SIDES.

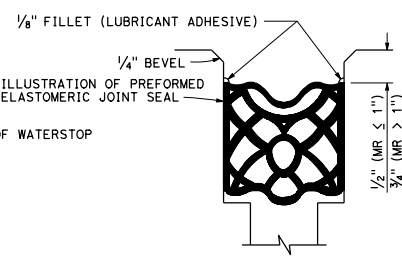


**TYPE A SEAL**  
Movement rating : Silicone = 1" Max

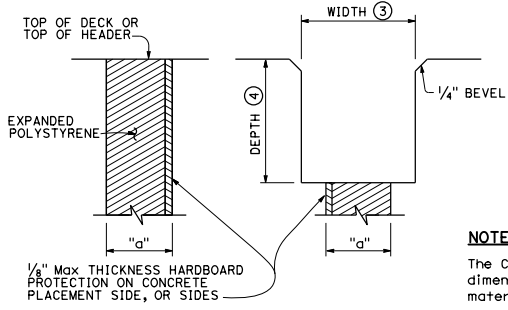
**TYPE A1 SEAL**  
Longitudinal joints only



**TYPE B JOINT SEAL IN MINIMUM WIDTH POSITION (W<sub>2</sub>)**



**TYPE B SEAL**  
Movement Rating ≤ 2"



**FORMING DETAIL SAWCUT DETAIL**

**NOTES:**

- Make smooth cuts from the bottom of seal to 1/2" clear of top leaving at least one complete cell between the top of the cut and top of the seal. When necessary cut back of seal to clear conduit and round openings.
- Opening in barrier to match width of sawn deck joint.
- Sawcut groove widths shall be as ordered by the Engineer.
- Depth of sawcut: Type A - Depth to be 2" minimum. Type B - Depth to be equal to or greater than the depth of seal measured along the contact surface, when compressed to minimum width position (W<sub>2</sub>) plus dimensions shown.
- MR (movement rating) as shown on other plan sheets.
- Other depths must be approved by the Engineer.
- A sidewalk joint shall be covered by an expansion joint armor.

**DIMENSIONS "a" OF JOINT REQUIRED**

MOVEMENT RATING (MR) (5)	BRIDGE TYPE	"a" DIMENSION DECK CONCRETE PLACED		
		WINTER	FALL-SPRING	SUMMER
2"	ALL EXCEPT CIP/PS	1/2"	1/4"	3/4"
	CIP/PS	1/4"	1"	1/2"
1 1/2"	ALL EXCEPT CIP/PS	1/4"	1"	1/2"
	CIP/PS	1"	3/4"	1/2"
1"	ALL EXCEPT CIP/PS	1"	3/4"	1/2"
	CIP/PS	3/4"	1/2"	1/2"
1/2"	ALL EXCEPT CIP/PS	3/4"	3/4"	1/2"
	CIP/PS	1/2"	1/2"	1/2"

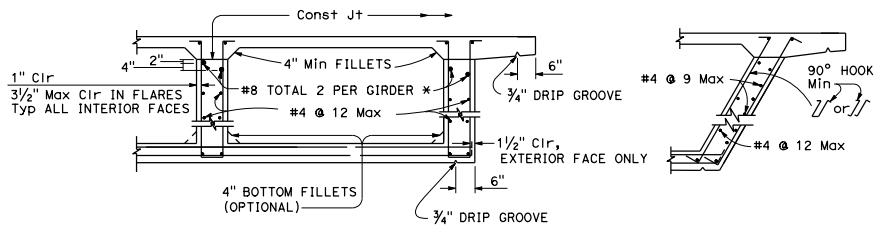
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**JOINT SEALS**  
**(MAXIMUM MOVEMENT RATING = 2")**  
NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
October 30, 2015  
PLANS APPROVAL DATE  
No. C51434  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER  
Efthymios Delis  
No. C51434  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

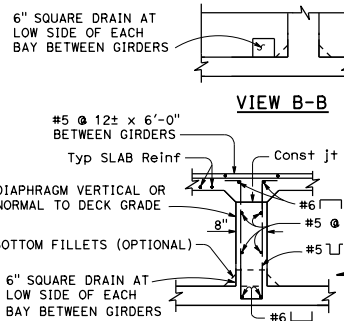
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



SEE (BO-5/5-5) FOR ALTERNATIVE STIRRUPS. SEE (BB-5) FOR PRESTRESSED GIRDER DETAILS.

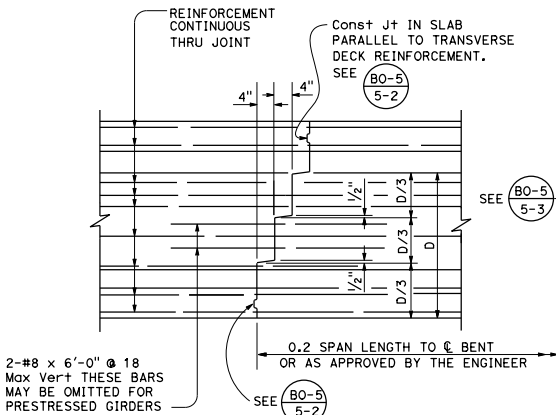
**TYPICAL BOX GIRDER DETAILS**  
**DETAIL B-1**

\* At all web construction joints

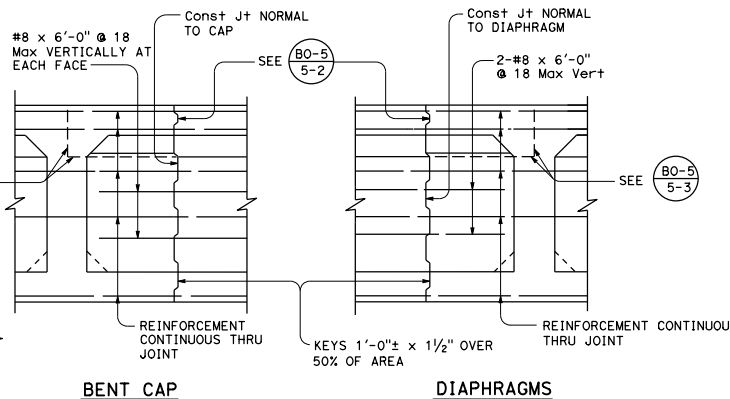


**INTERMEDIATE DIAPHRAGM SECTION**

**DETAIL D-1**

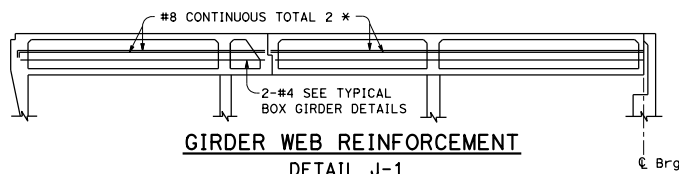


**TRANSVERSE GIRDER CONSTRUCTION JOINTS**  
**DETAIL J-3**

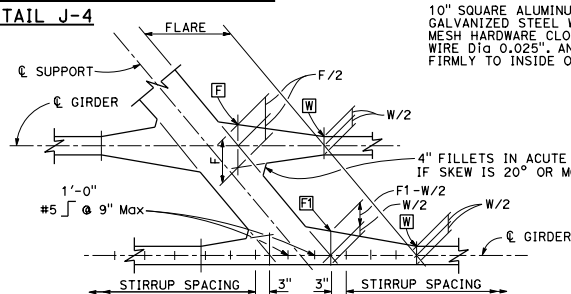


**BENT CAP**  
**LONGITUDINAL CONSTRUCTION JOINTS**  
**DIAPHRAGMS**

**DETAIL J-4**

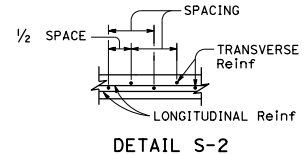
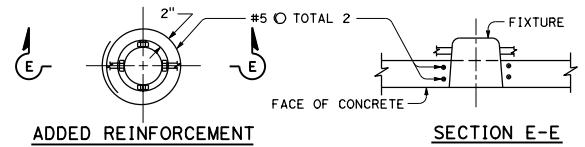


**GIRDER WEB REINFORCEMENT**  
**DETAIL J-1**

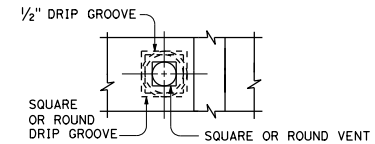


**TYPICAL GIRDER FLARE AND STIRRUP SPACING DIAGRAM**  
**DETAIL S-3**

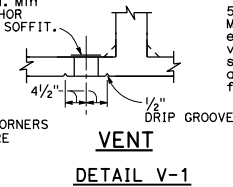
[W] and [F] denote girder width in inches.



**BOTTOM SLAB TRANSVERSE REINFORCEMENT**  
**SPACING DIAGRAM**



**NOTE:**  
5" ø or ø vent in lower slab. Minimum of two vents per span in each bay between girders. One vent to be located at low point of span and other vent to be located at opposite end of span @ 1'-6" from face of abutment or bent.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**BOX GIRDER DETAILS**  
NO SCALE

**B7-1**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

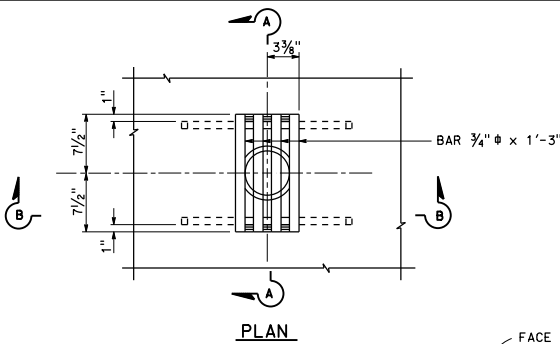
*Peter W. Norbo*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

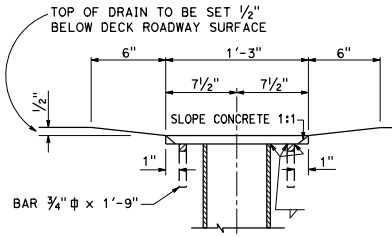
Peter W. Norbo  
No. C57519  
Exp. 12-31-15  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

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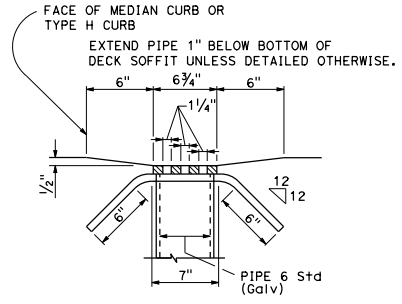


PLAN

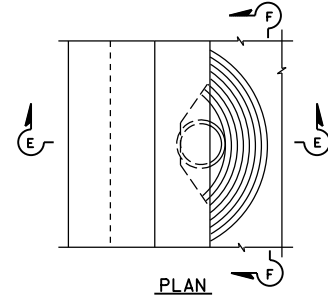


SECTION A-A

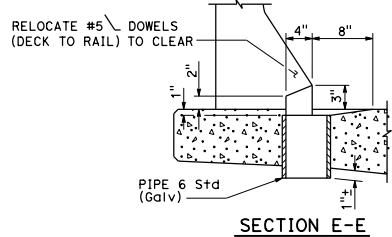
DRAIN - TYPE "A" DETAIL 7-1



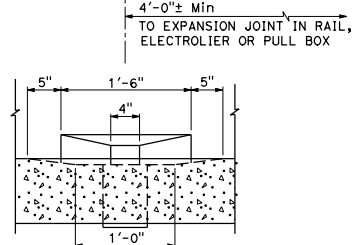
SECTION B-B



PLAN



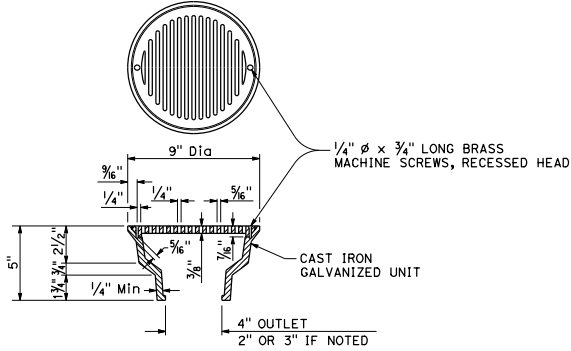
SECTION E-E



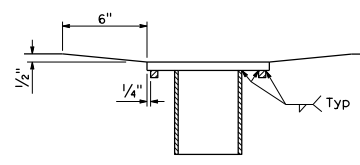
SECTION F-F

DRAIN - TYPE "B" DETAIL 7-3

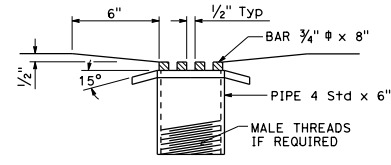
For Type 25 barrier railing



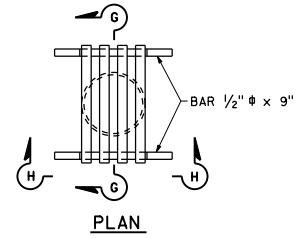
AREA DRAIN DETAIL 7-4



SECTION G-G

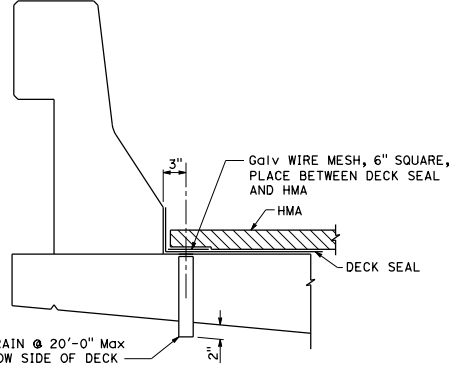


SECTION H-H



PLAN

PEDESTRIAN STRUCTURE DRAIN DETAIL 7-5



DECK BLEEDER DRAIN DETAIL 7-6

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

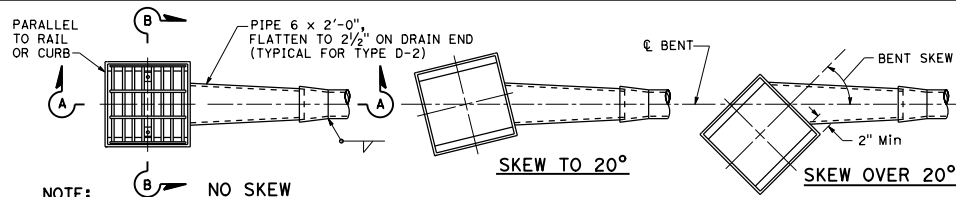
**DECK DRAINS**

NO SCALE

**B7-5**

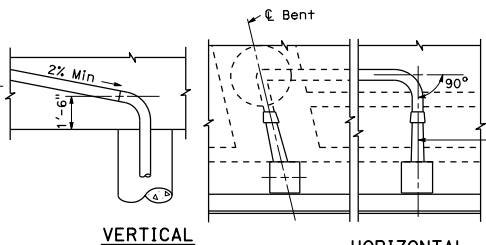
Dist	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	NO.	SHEETS

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



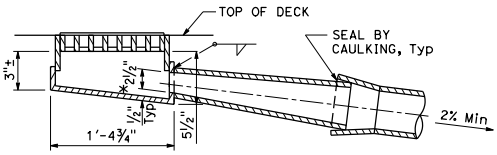
**NOTE:**  
D-2 shown, D-1 similar except for pan depth and pipe not flattened.

**PLAN-DECK DRAIN ASSEMBLY**

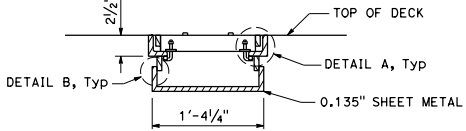


STATION SHOWN ON GENERAL PLAN IF DRAIN LOCATION IS OTHER THAN  $\ominus$  BENT

**DRAIN PIPE ALIGNMENT**



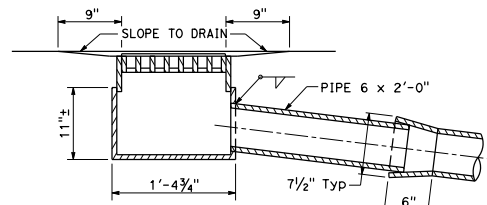
SECTION A-A



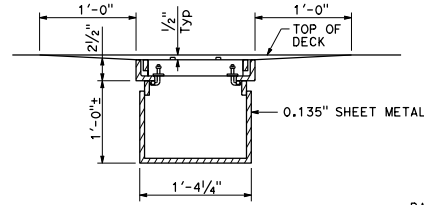
SECTION B-B

\* 2 1/2" Flattened pipe opening to be maintained. Cut skirt of frame if it encroaches on the opening.

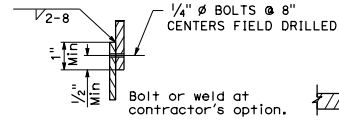
**TYPE D-2 DETAIL 7-8**



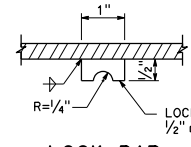
SECTION A-A



SECTION B-B

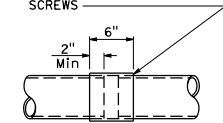


DETAIL B

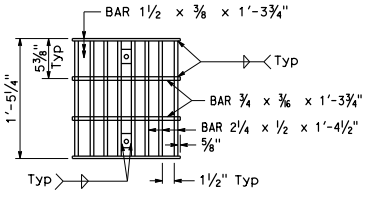


LOCK BAR

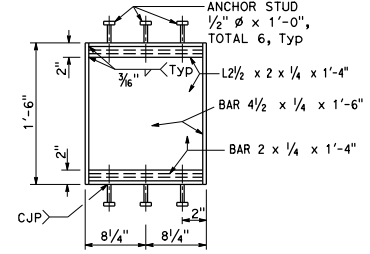
Sleeve inside diameter no greater than pipe outside diameter + 1/16"



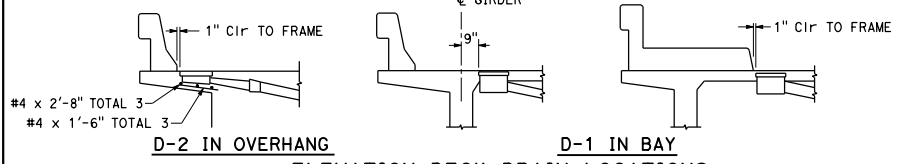
**SLEEVE CONNECTION**



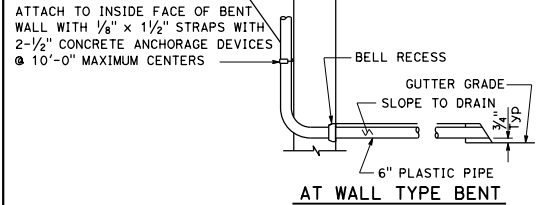
GRATE



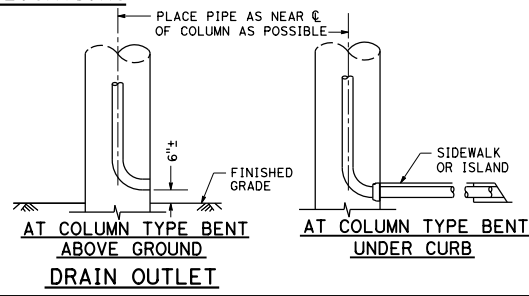
FRAME



**ELEVATION-DECK DRAIN LOCATIONS**

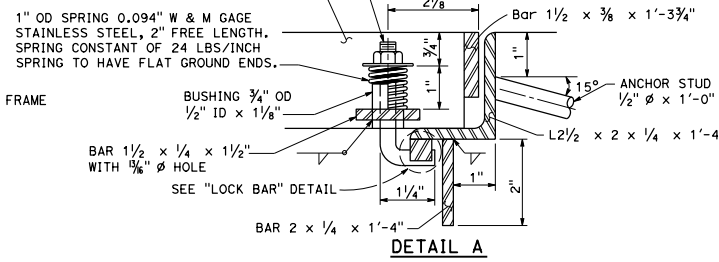


AT WALL TYPE BENT



AT COLUMN TYPE BENT ABOVE GROUND  
DRAIN OUTLET

AT COLUMN TYPE BENT UNDER CURB



DETAIL A

**NOTE:**  
All pipe to be NPS 6 x 0.135" welded steel pipe except as noted and galvanized if not encased in concrete. Fittings and bends shall have a minimum wall thickness of 1/8". All joints or connections to be butt welded or connected by a steel pipe sleeve and to be smooth throughout inside of pipe except as noted. All bends to be on 1'-6" minimum radius measured along  $\ominus$  pipe. All bends to be smooth. Pipes not encased in concrete to be supported by suitable galvanized hangers @ 10'-0" maximum spacing throughout. Galvanize deck drain assembly after fabrication.

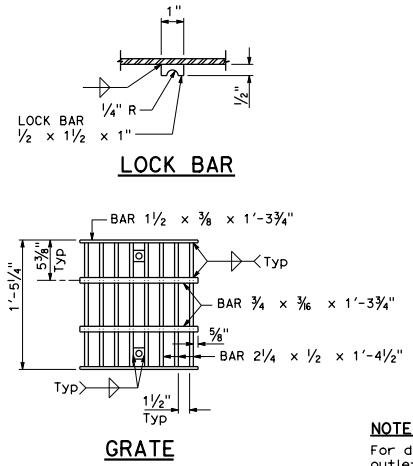
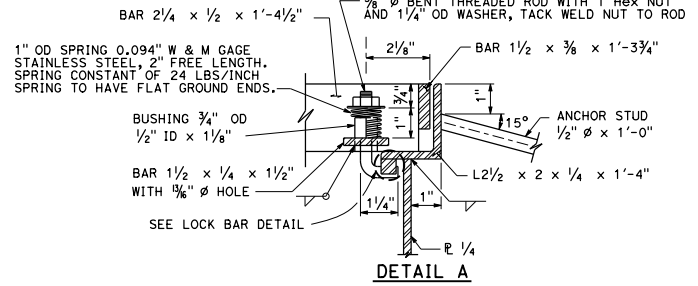
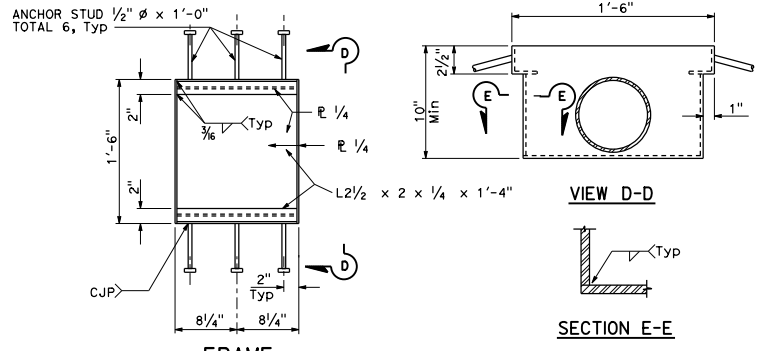
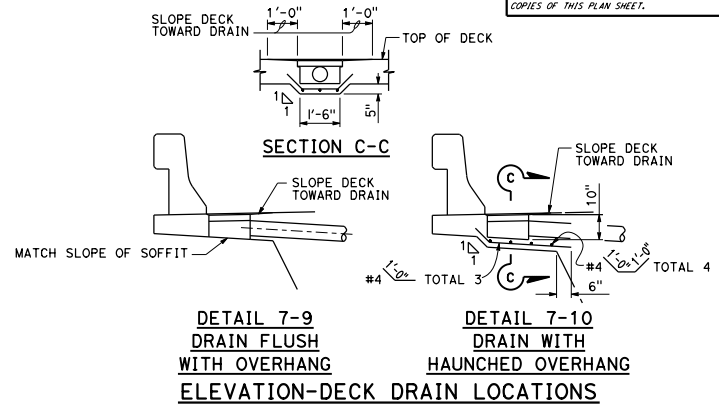
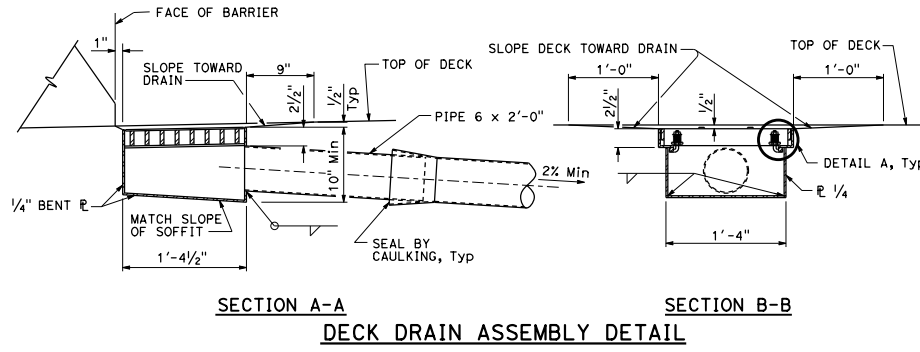
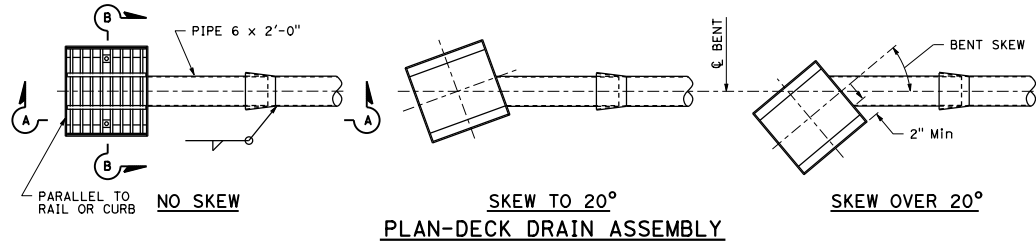
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

APPLY ADHESIVE SEALANT ON PIPE PERIPHERY TO SEAL JOINT. SECURE EACH END OF SLEEVE TO PIPE WITH 3-#10-24 x 1/2" SELF TAPPING Hex HEAD SCREWS

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DECK DRAINS  
TYPES D-1 AND D-2**  
NO SCALE





**NOTE:**  
For drain pipe alignment, sleeve connection, drain outlet details and notes, see Standard Plan B7-6.

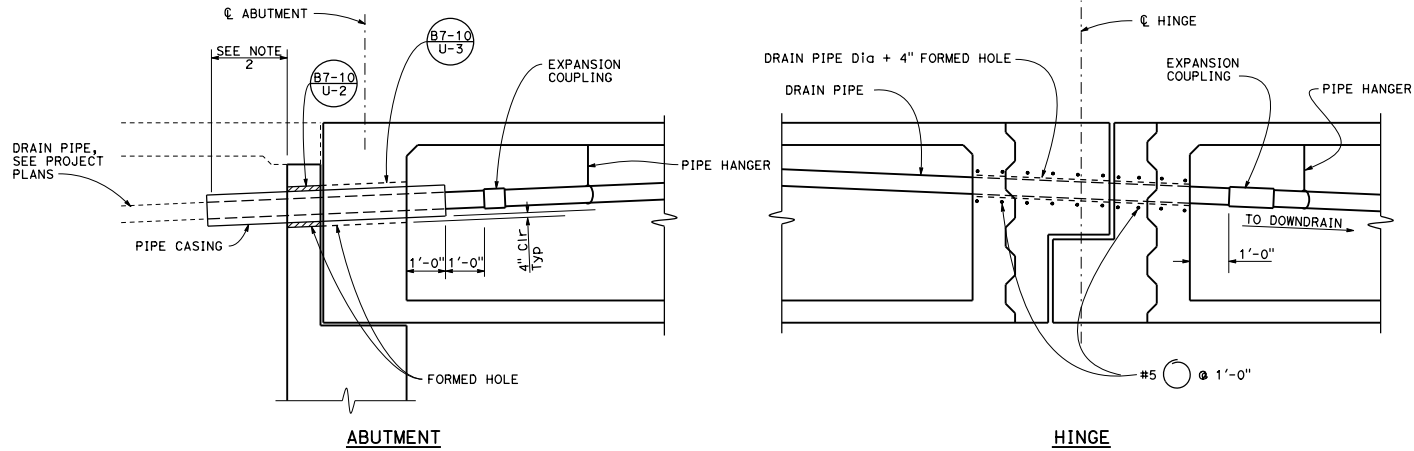
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DECK DRAIN TYPE D-3**  
NO SCALE

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
*C.J. Sims*  
No. C46471  
Exp. 6-30-17  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE

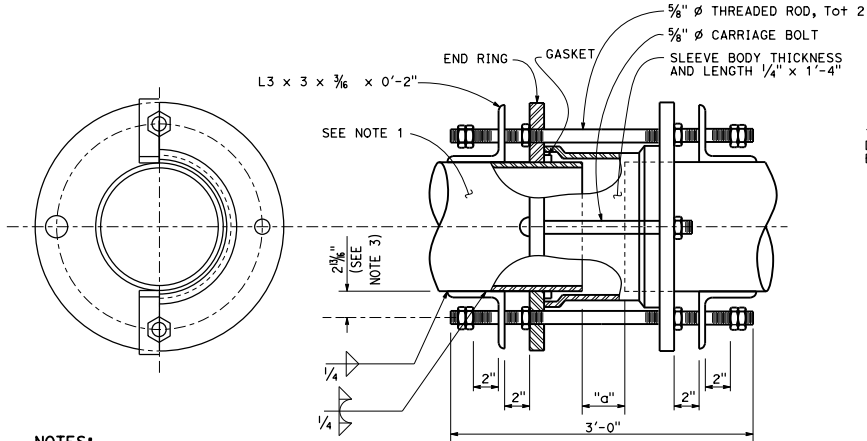
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**DECK DRAIN PIPE DETAIL**

**NOTES:**

1. Pipe casing OD = Drain pipe Dia + 4" ( $\frac{1}{4}$ " Min wall thickness)
2. Unless otherwise shown on Project Plans, casing shall extend to the greater of 5'-0" beyond the end of approach slab or 20'-0" beyond the back of abutment.



**EXPANSION COUPLING**

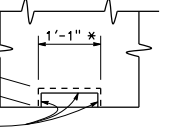
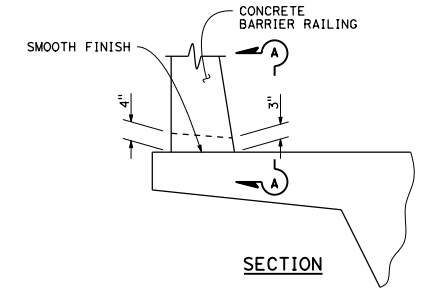
**NOTES:**

1. For "a" dimension and pipe diameter, see Project Plans.
2. Expansion coupling with 4 bolts shown. Coupling with a greater number of bolts allowed.
3. Adjust dimension to suit coupler end ring bolt circle.

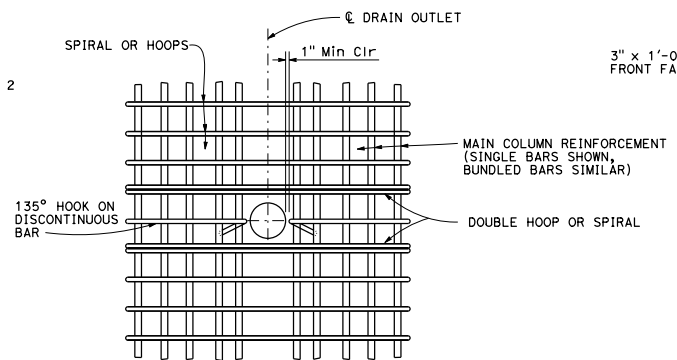
Dist	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	No.	SHEETS

**Civil Engineer**  
 REGISTERED CIVIL ENGINEER  
 C.J. Sims  
 No. C46471  
 Exp. 6-30-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**ELEVATION A-A SCUPPER DETAIL**  
\* At exterior face of barrier



**NOTE:**  
Adjust spacing of main column reinforcement to clear drain outlet.

**COLUMN REINFORCEMENT AT DRAIN OUTLET**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**DECK DRAINAGE DETAILS**  
NO SCALE

**B7-8**

**ABUTMENT DIAPHRAGMS**

**INTERMEDIATE DIAPHRAGMS AND HINGES**

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Peter W. Norbo*  
REGISTERED CIVIL ENGINEER

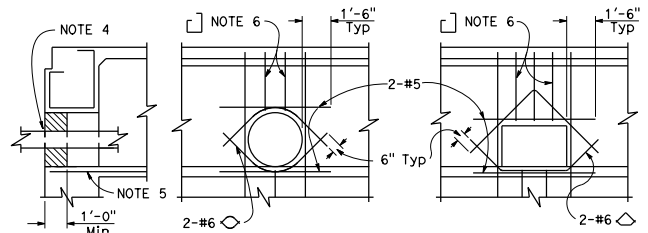
October 30, 2015  
PLANS APPROVAL DATE

Peter W. Norbo  
No. C57519  
Exp. 12-31-15  
CIVIL  
STATE OF CALIFORNIA

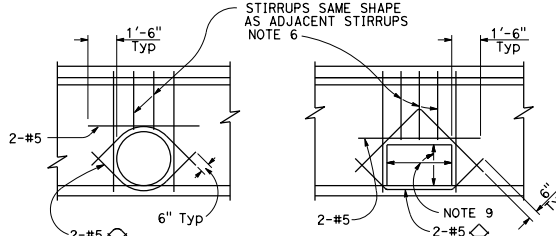
REGISTERED PROFESSIONAL ENGINEER

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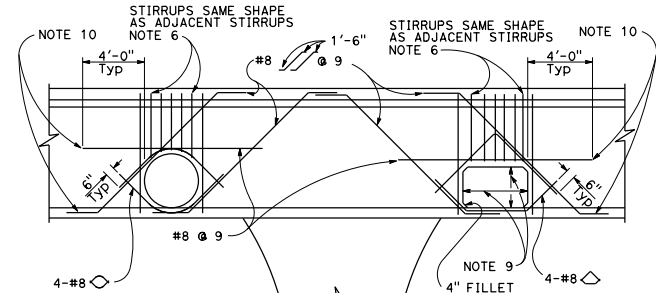
**BENT CAPS**



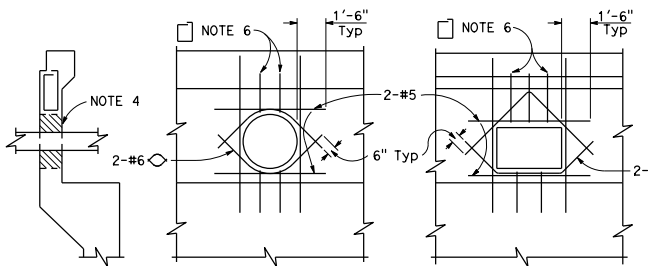
**DETAIL U-1**



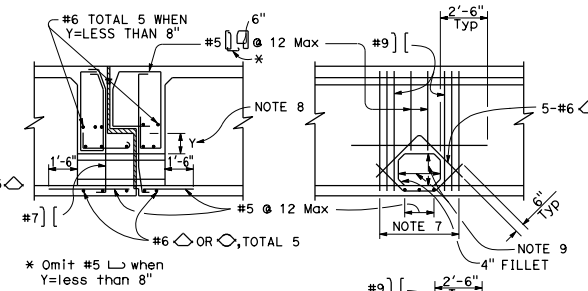
**DETAIL U-5**  
AT INTERMEDIATE DIAPHRAGM



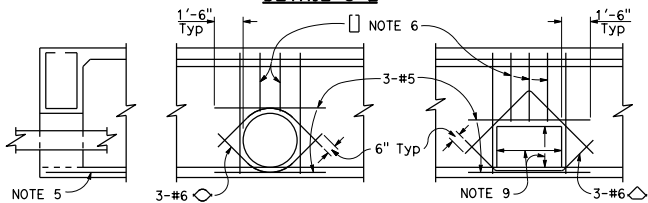
**DETAIL U-7**  
NEAR OR BETWEEN COLUMNS



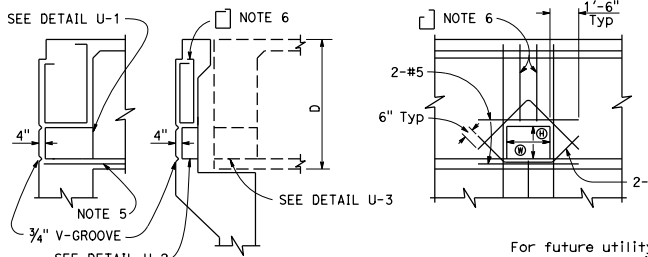
**DETAIL U-2**



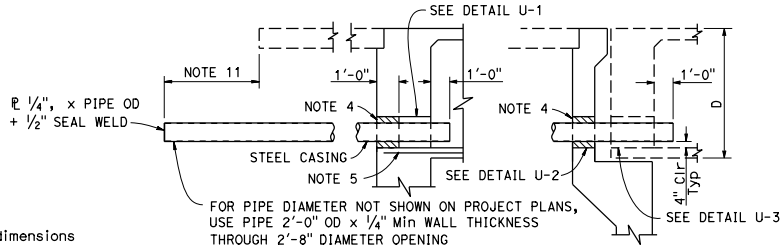
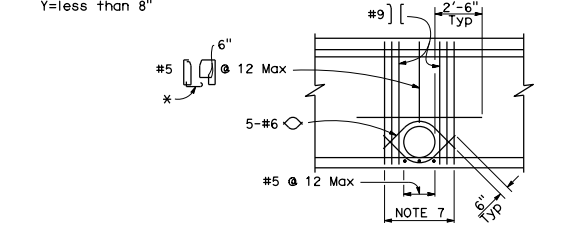
**DETAIL U-6**  
AT HINGE



**DETAIL U-3**



**DETAIL U-4**  
(FOR FUTURE UTILITY OPENING)



**DETAIL U-8**  
(FOR FUTURE UTILITY PROVISIONS UNDER APPROACH SLAB)

**NOTES:**

1. The exact location, elevation, size, and direction of openings shall be in accordance with the Project Plans and as directed by the Engineer. Girders not shown. See Project Plans.
2. All reinforcement detailed to be placed in addition to reinforcement shown on Project Plans.
3. Seal utilities at abutments with concrete or mortar, after tightly wrapping utility with 2 layers of 15 LBS building paper. If structure is prestressed, seal to be placed after stressing is completed.
4. Main reinforcement to clear opening.
5. Reinforcement to be same bar size and 2/3 the spacing of adjacent reinforcement shown on Project Plans.
6. Replace each set of 2-#9 bars cut off by opening. Place 1/2 on each side of opening.
7. When "y" is less than 8", extend top of opening to bottom of bearing seat elevation.
8. For future utility opening dimensions, see Project Plans and Detail U-4.
9. When there is insufficient space to place reinforcement as shown, hook reinforcement into exterior girder.
10. Unless otherwise shown on Project Plans, casing shall extend to the greater of 5'-0" beyond the end of the approach slab, 5'-0" beyond the end of the adjacent wingwall, or 20'-0" beyond the back of the abutment.

For future utility opening dimensions not shown on Project Plans use:

⊕ = 1/3 D or 1'-6" minimum, whichever is greater.

⊙ = 1/3 D or 2'-0" minimum, whichever is greater.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**UTILITY OPENING  
BOX GIRDER**

NO SCALE

**B7-10**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

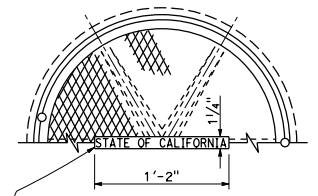
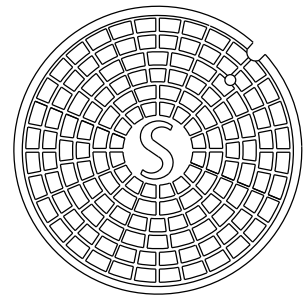
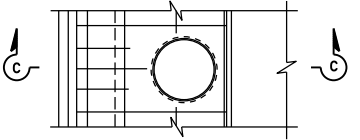
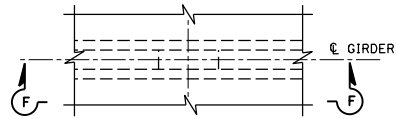
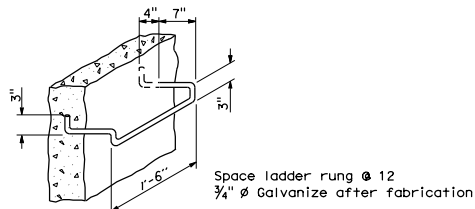
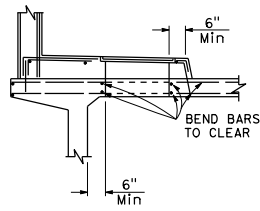
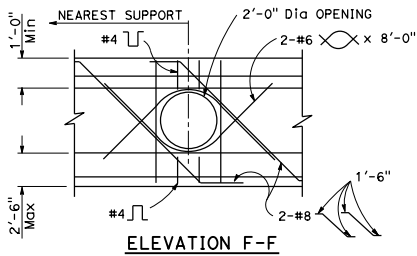
*Peter W. Norbo*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

*Peter W. Norbo*  
No. C57519  
Exp. 12-31-15  
CIVIL  
STATE OF CALIFORNIA

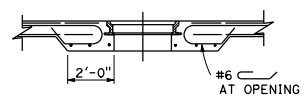
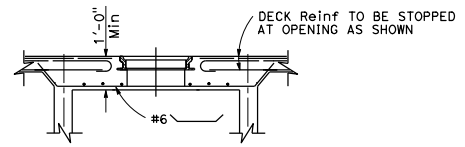
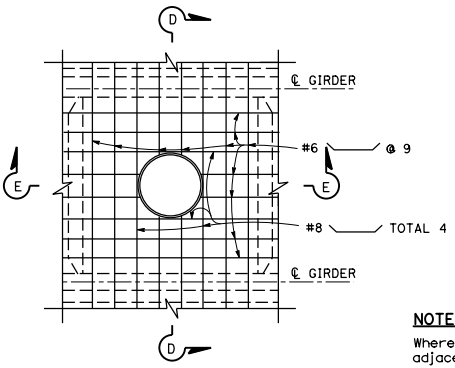
REGISTERED PROFESSIONAL ENGINEER

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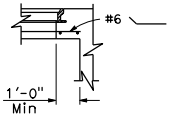
**NOTES:**

1. For exact location of openings see other sheets.
2. Location and size of manholes may be modified as directed by the Engineer, provided minimum dimensions are maintained.
3. All reinforcement detailed to be placed in addition to reinforcement shown on other sheets.

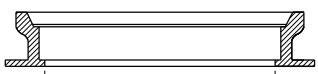


**NOTE:**

Where manhole is located adjacent to a diaphragm or abut, substitute half Section E-E on one side of Section E-E.



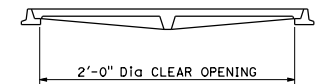
**TOP OF MANHOLE COVER**



**NON-ROCKING MANHOLE FRAME & COVER FOR DECKS**  
**DETAIL U45**

**NOTE:**

1. Step inserts may be substituted for the standard step detail. Step inserts shall comply with State Industrial Safety requirements.



**MANHOLE FRAME & COVER FOR SIDEWALKS**  
**DETAIL U46**

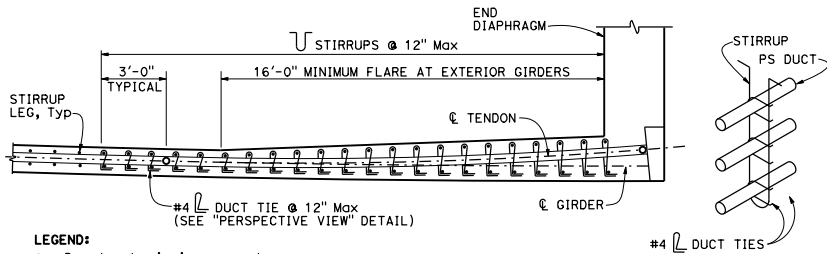
**NOTES:**

1. Frame and cover shall be cast iron.
2. Cover shall be supplied with bolt down or locking devices.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

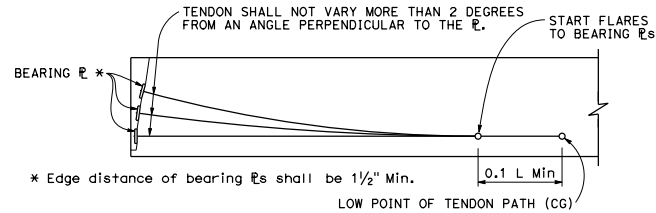
**UTILITY DETAILS**

NO SCALE



**LEGEND:**  
 ○ - Denotes beginning or end of tendon horizontal angle change (BC, EC or PCC)

**PLAN**  
**PERSPECTIVE VIEW**  
**DUCT TIES AT TENDON HORIZONTAL ANGLE CHANGES**  
**DETAIL 5-1**



**ELEVATION - BEARING PLATE AND PRESTRESSING PATH**  
**DETAIL 5-2**

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

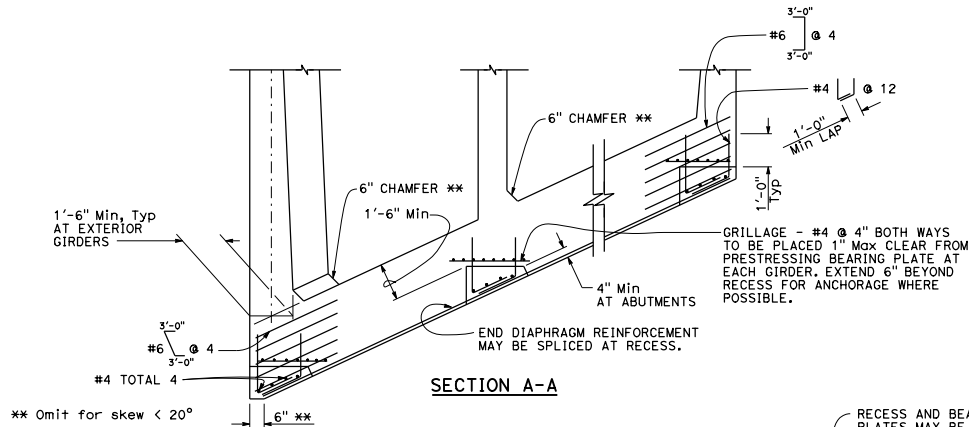
REGISTERED CIVIL ENGINEER  
 Marc Friedheim  
 No. C57968  
 Exp. 6-30-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

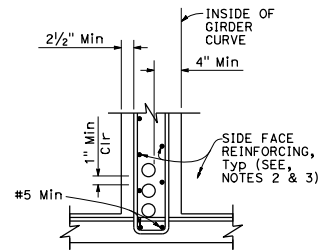
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**NOTES FOR DETAIL 5-1**

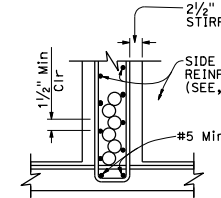
1. Tendon horizontal angle change at end diaphragm shown. Duct tie placement similar for other locations where tendon horizontal angle changes occur. For curved girders place duct ties at tendon angle changes where tendon radius is smaller than tendon radius.
2. Adjacent duct ties may be staggered to facilitate placement if stirrup spacing is less than 12 inches.
3. Place closed end of duct ties toward inside of tendon curve.
4. Wrap duct ties around both stirrup legs.
5. Individual duct ties may only be used to anchor one duct.



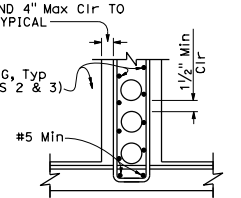
**SECTION A-A**  
**PRESTRESS ANCHORAGE DETAILS AT END DIAPHRAGMS**  
**DETAIL 5-3**



**DUCTS 4 1/2" OD AND LESS FOR HORIZONTAL CURVE**  
**RADIUS ≤ 2000'**



**DUCTS 4 1/2" OD AND LESS**

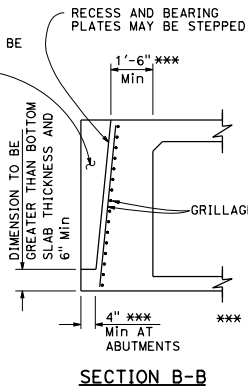


**DUCTS OVER 4 1/2" OD**

**CLEARANCE REQUIREMENTS FOR DUCTS**  
**DETAIL 5-4**

**NOTES FOR DETAIL 5-4:**

1. Stirrups may also be used.
2. For additional details, see Standard Plan B7-1, and Project Plans.
3. Bar reinforcing which interferes with prestressing ducts may be adjusted as approved by the Engineer.

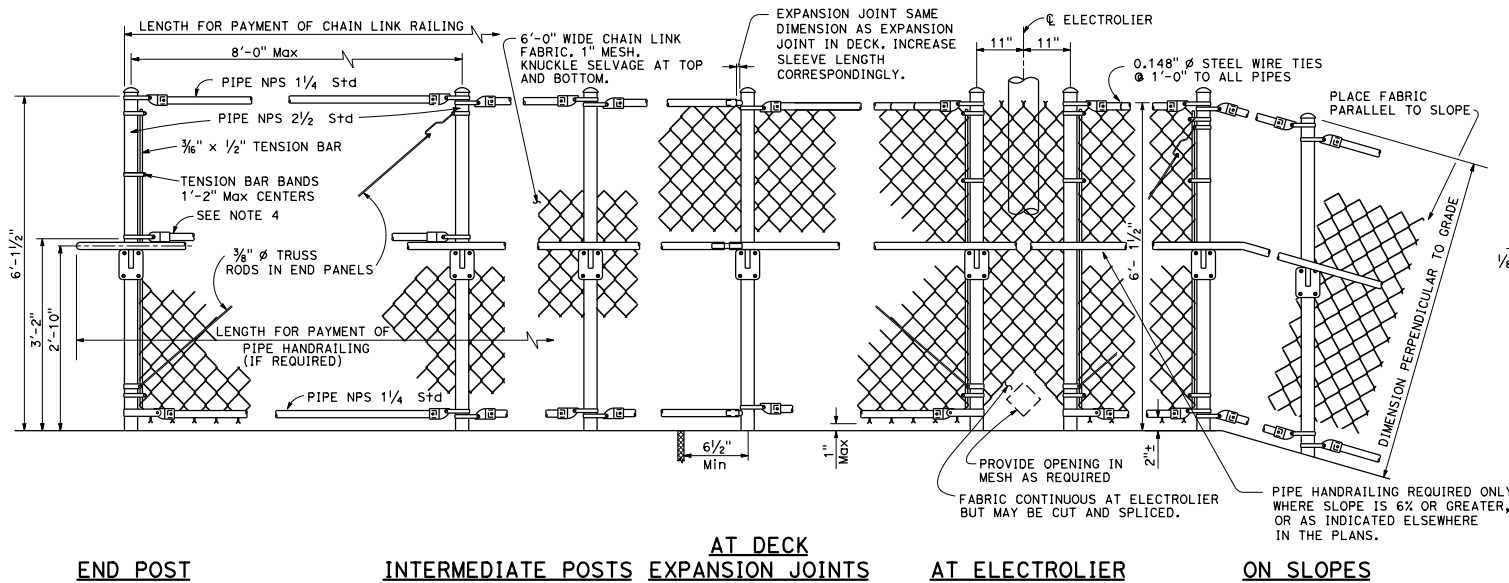


**SECTION B-B**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**CAST-IN-PLACE POST-TENSIONED GIRDER DETAILS**

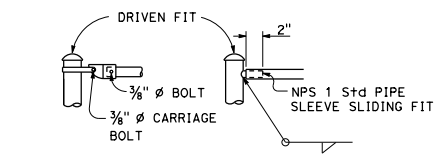
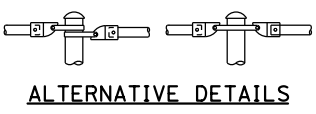
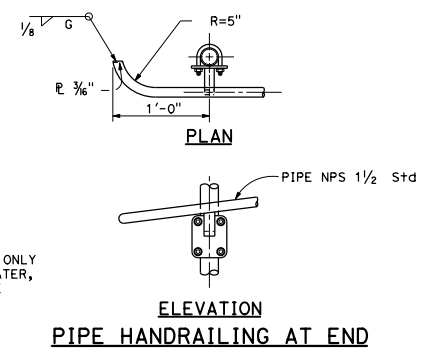
NO SCALE



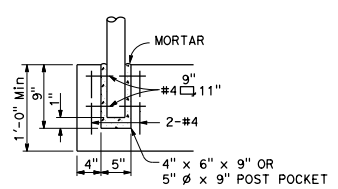
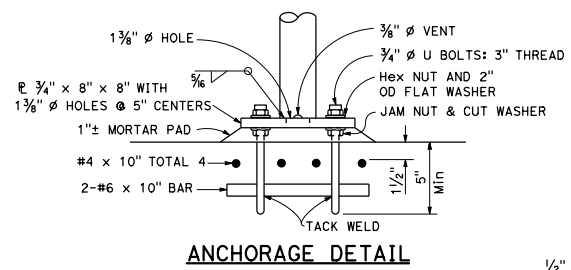
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Tiliot Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

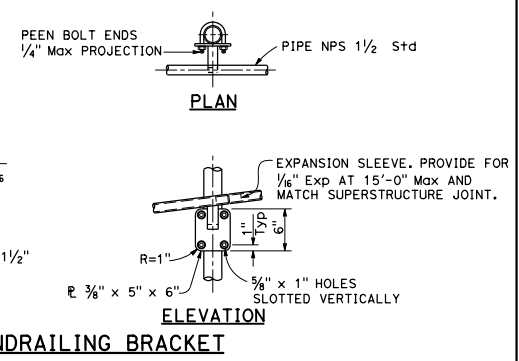
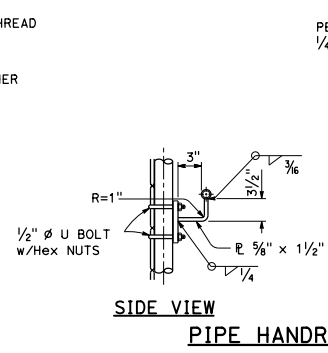
October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



- NOTES:**
1. Peen all bolt threads.
  2. Railing shall conform to horizontal and vertical alignment. Posts shall be vertical. Top and bottom pipes shall be bent if radius is 148'-0" or less; may be on 8'-0" chords if radius is over 148'-0".
  3. When railing is on slope, 6'-0" chain link fabric shall be placed parallel to slope.
  4. Additional pipe NPS 1/4 Std required when radius is less than 150'-0".



May be used when thickness of concrete is 1'-0" or more.



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CHAIN LINK RAILING**  
 NO SCALE

B11-7

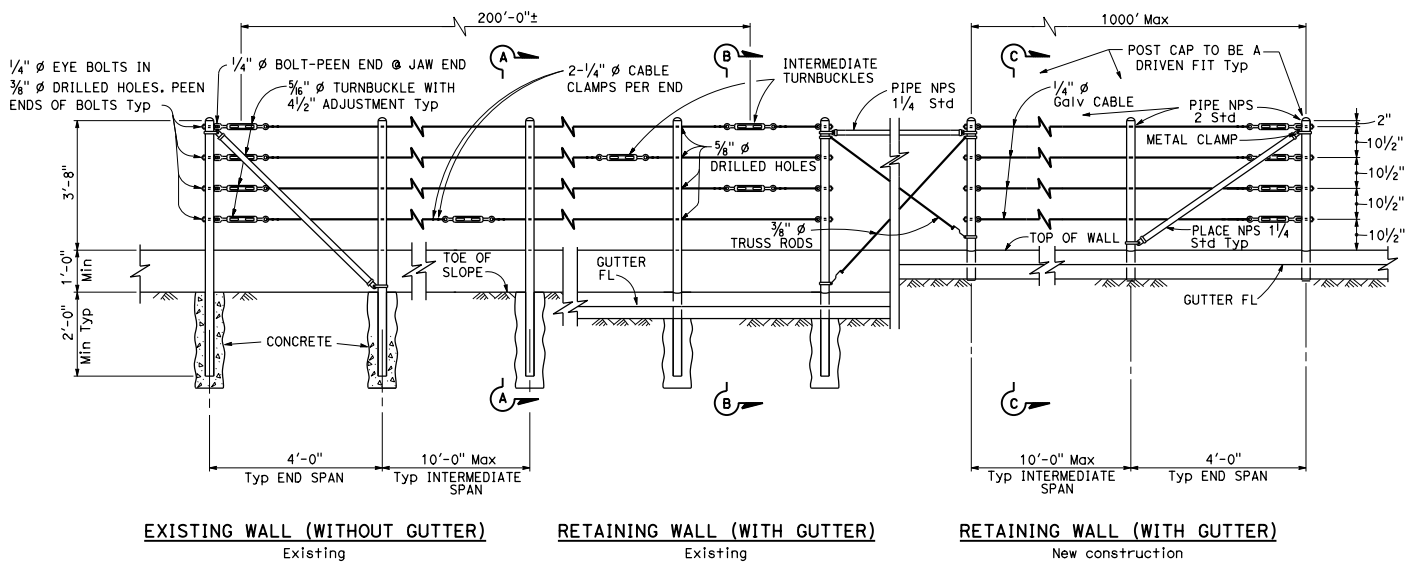
2015 STANDARD PLAN B11-7

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Tillet Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

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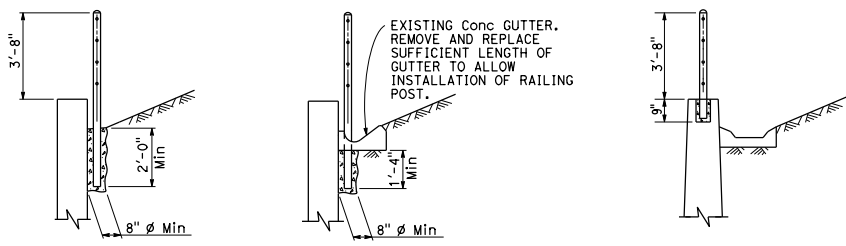


**EXISTING WALL (WITHOUT GUTTER)** Existing  
**RETAINING WALL (WITH GUTTER)** Existing  
**RETAINING WALL (WITH GUTTER)** New construction

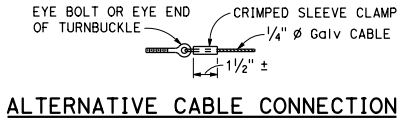
**ELEVATION**

**NOTES:**

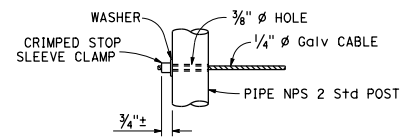
1. Maximum distance between turnbuckles shall be 200'-0"±.
2. Intermediate turnbuckles to be placed in adjacent spans.
3. Cable shall not be spliced between intermediate turnbuckles and end posts.
4. Posts to be vertical.
5. Alignment of holes in posts may vary to conform to slope of top of retaining wall.
6. The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.
7. Line posts shall be braced horizontally and trussed diagonally in both directions at intervals not to exceed 1000'.
8. Post pockets to be centered in top of wall.
9. Typical end spans, braced in both directions, shall be constructed at changes in line where the angle of deflection is 15° or more.



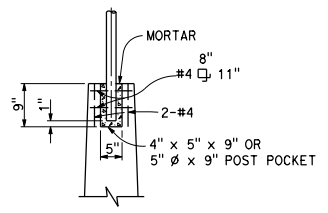
**SECTION A-A** Existing  
**SECTION B-B** Existing  
**SECTION C-C** New construction



**ALTERNATIVE CABLE CONNECTION**



**ALTERNATIVE DEAD END ANCHORAGE**



**POST POCKET**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CABLE RAILING**  
 NO SCALE

**B11-47**

2015 STANDARD PLAN B11-47



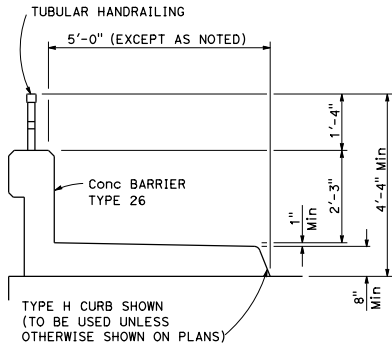
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS

REGISTERED CIVIL ENGINEER

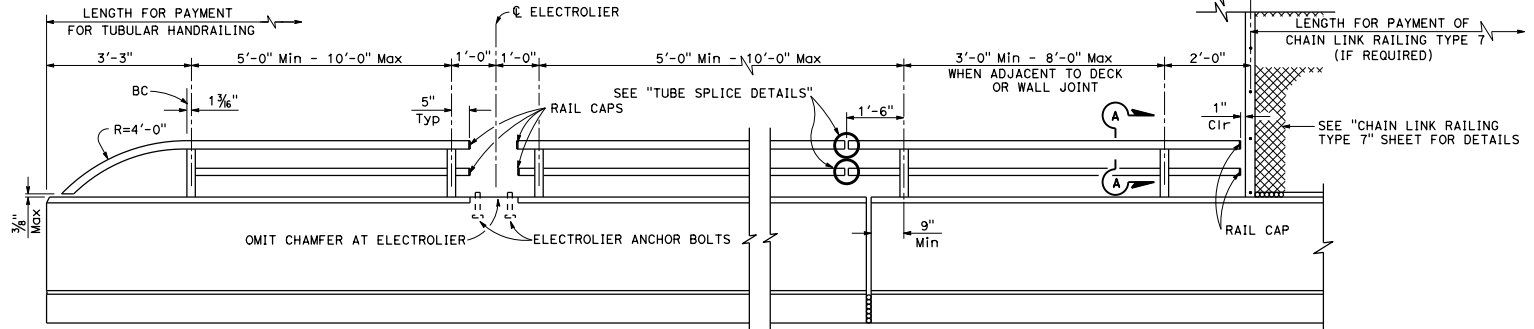
October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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**TYPICAL SECTION**



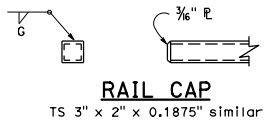
**END POST**

**ELECTROLIER**

**DECK OR WALL JOINT**

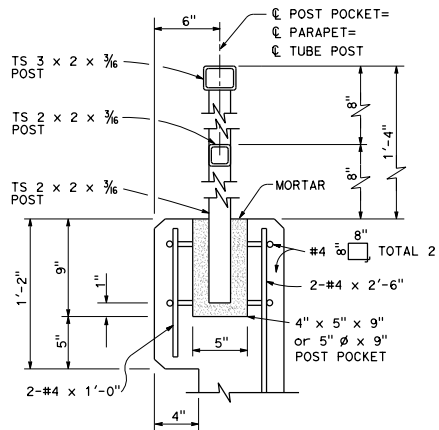
**CHAIN LINK RAILING TYPE 7**

**ELEVATION**

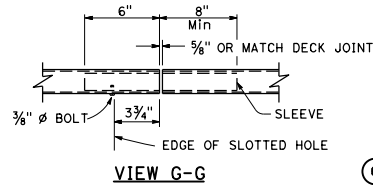


**RAIL CAP**

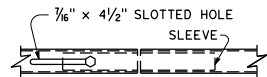
TS 3" x 2" x 0.1875" similar



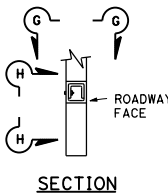
**POST ANCHORAGE DETAILS**



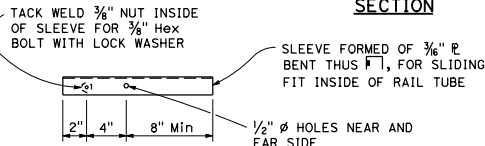
**VIEW G-G**



**VIEW H-H**



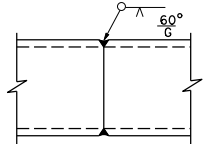
**SECTION**



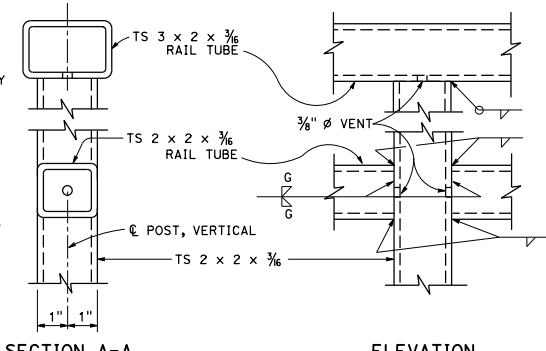
**SLEEVE TUBE SPLICE DETAILS**

TS 3 x 2 x 3/16 similar

**NOTES:**  
3/8" Nut tack welded to sleeve may be replaced by drilled and tapped hole in sleeve.



**TUBE-WELDED SPLICE**



**SECTION A-A**

**RAIL CONNECTION DETAILS**

**ELEVATION**

**NOTES:**

1. Post shall be normal to railing.
2. 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.
3. 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.
4. For details and reinforcement not shown see Standard Plan B11-54.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**TUBULAR HANDRAILING**

NO SCALE

**B11-51**



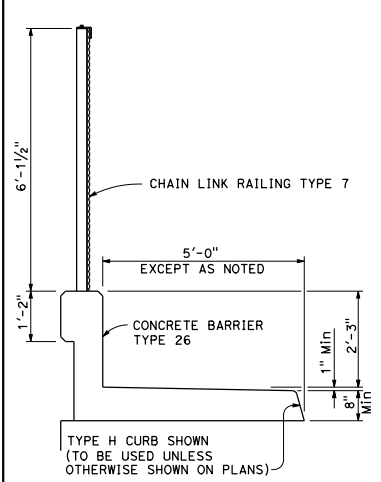
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

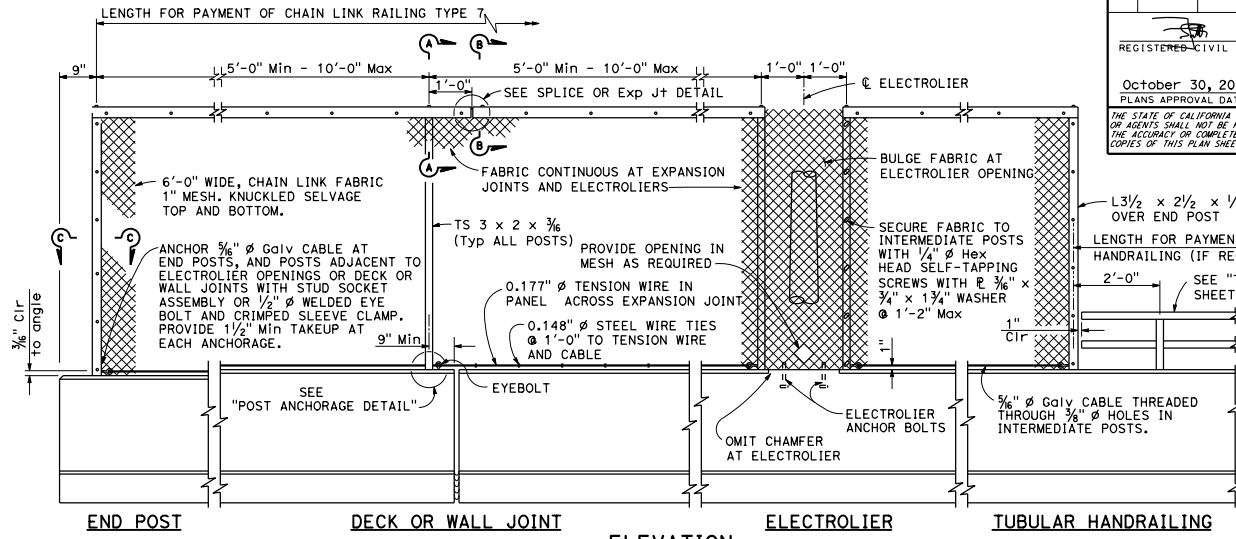
October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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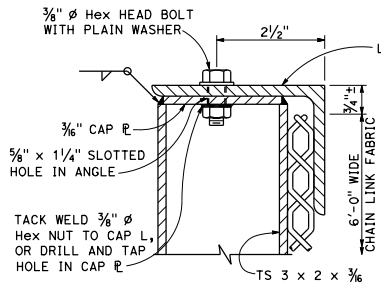


**TYPICAL SECTION**

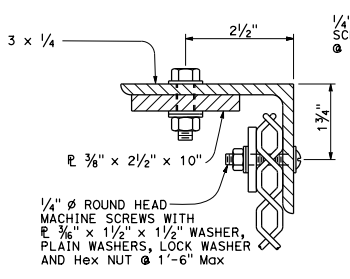


**ELEVATION**

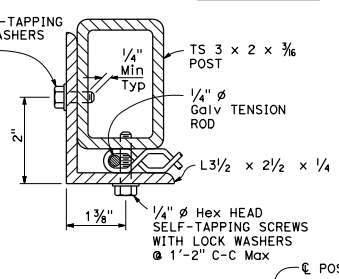
313



**SECTION A-A**



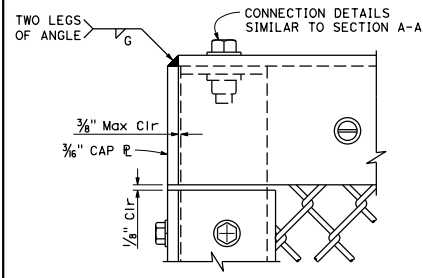
**SECTION B-B**



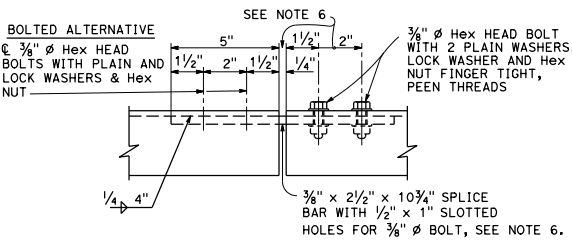
**SECTION C-C**

**NOTES:**

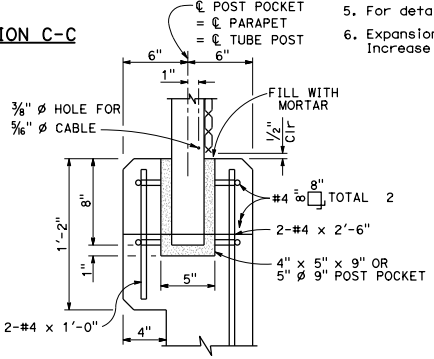
1. Posts shall be vertical.
2. Railing shall conform to horizontal and vertical alignment. When railing is placed on a curved horizontal alignment with radius of 148'-0" or less, thread the 3/8" cable through 3/8" welded eye rods embedded 4" into the top of the concrete parapet and equally spaced to limit the midordinate distance between the 3/8" cable and the curve to 1" maximum. Horizontal angle shall be bent to conform to horizontal alignment if radius is 148'-0" or less and may be on 10'-0" chords if radius is over 148'-0".
3. Horizontal angle shall be continuous over not less than two intermediate posts, except that a shorter length is permitted at expansion joints, electroliers and other rail discontinuities.
4. When rail is on slope, place fabric parallel to slope.
5. For details and reinforcement not shown see Standard Plan B11-54.
6. Expansion joint same dimension as expansion joint in deck or wall. Increase slotted hole length and splice bar length correspondingly.



**END POST ELEVATION**



**SPLICE OR EXPANSION JOINT DETAIL**

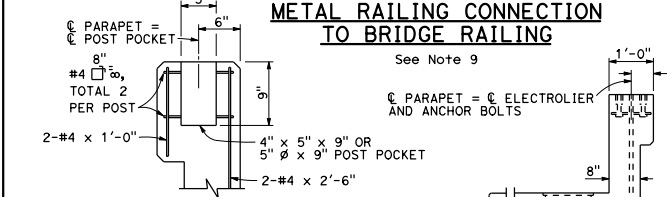
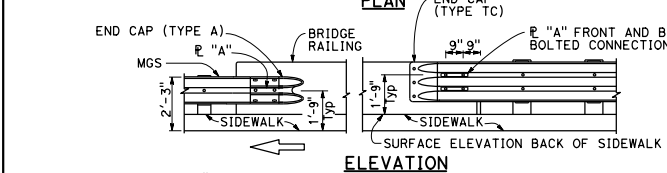
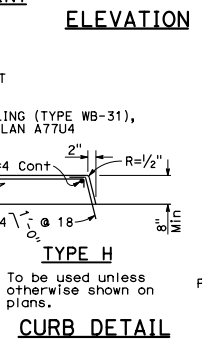
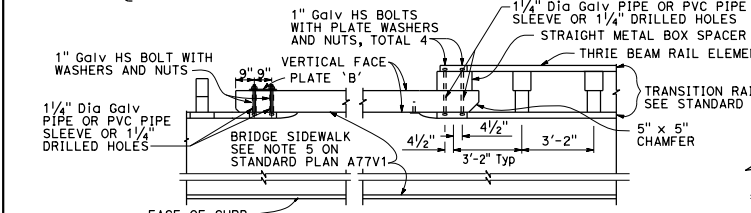
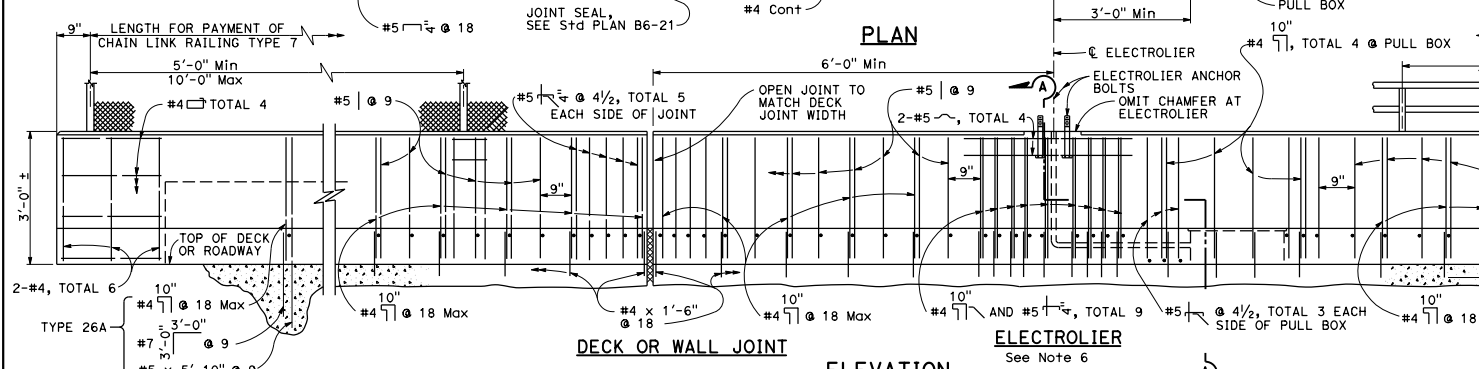
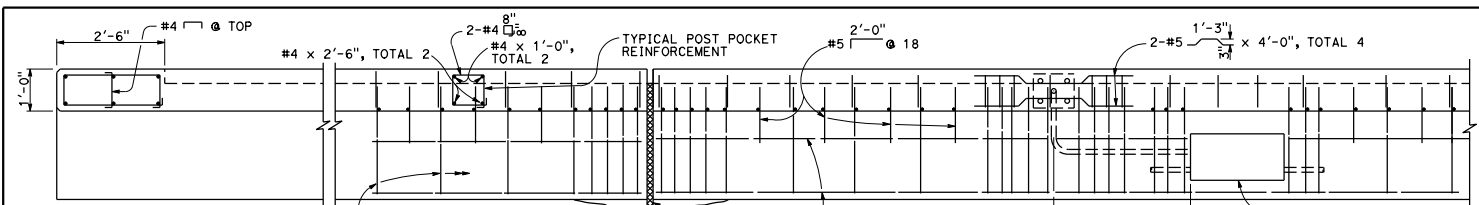


**POST ANCHORAGE DETAIL**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CHAIN LINK RAILING  
TYPE 7**  
NO SCALE

**B11-52**

2015 STANDARD PLAN B11-52



**POST ANCHORAGE DETAIL**  
Applies to Chain Link Railing Type 7 and Tubular Handrailing. See respective Standard Plans for additional details.

- NOTES:**
- For Chain Link Railing notes and details not shown, see Standard Plan B11-52.
  - For Handrailing notes and details not shown, see Standard Plan B11-51.
  - Dimensions will vary with cross slope and with certain thicknesses of surfacing. See Project Plans.
  - Walls are to be backfilled before railing is placed.
  - Clearance to reinforcing steel in curb and railing to be 1" except as noted. Longitudinal reinforcement to stop at all expansion joints.
  - See Project Plans for electrolier locations and pull box type.
  - For electrical details, see Standard Plans ES-9A, ES-9B, ES-9C, ES-9D, and ES-9E.
  - A maximum of five - 4" and a minimum of two - 4" round openings for future utilities. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. Minimum of 6" from face of rail to utility opening.
  - For typical metal railing connection details not shown, see Standard Plans A77V1 and A77V2.
  - This barrier is to be used only for speeds of 45 MPH or less. For speeds greater than 45 MPH, pedestrians, should be protected by a separation traffic barrier.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER TYPE 26**  
NO SCALE

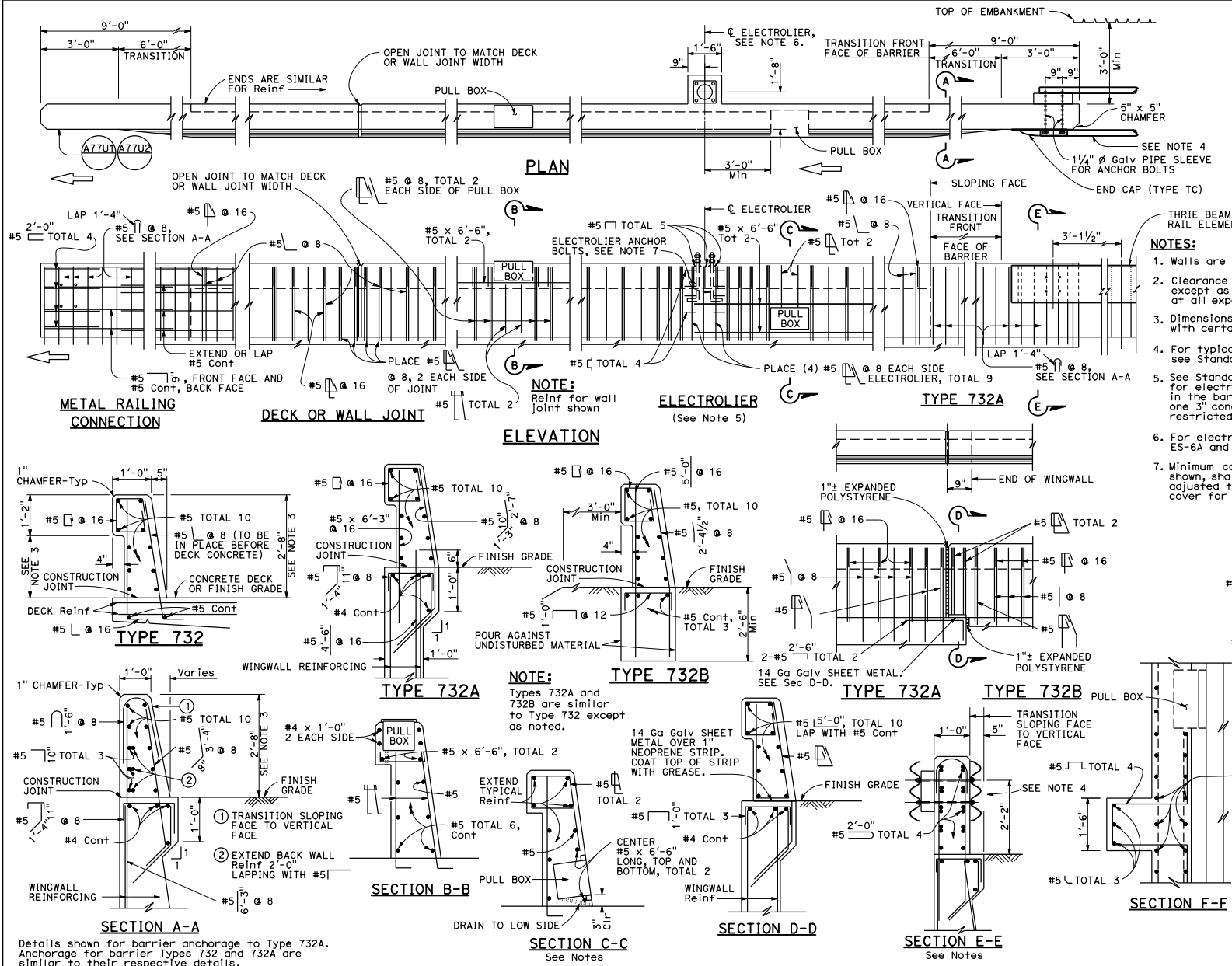
**B11-54**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE

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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

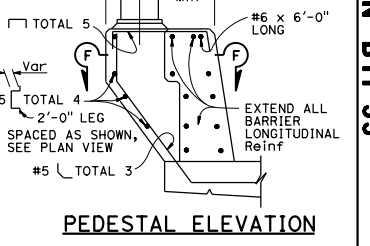
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

- NOTES:**
1. Walls are to be backfilled before barrier is placed.
  2. Clearance to reinforcing steel in barrier to be 1", except as noted. Longitudinal reinforcement to stop at all expansion joints.
  3. Dimensions may vary with roadway cross slope and with certain thickness of surfacing. See Project Plans.
  4. For typical metal railing connection details not shown, see Standard Plans A77U1 and A77U2.
  5. See Standard Plans ES-9A, ES-9B, ES-9C, ES-9D and ES-9E for electrical details. The maximum number of conduits in the barrier is limited to two 2" conduits along with one 3" conduit. When a 3" conduit is used, it is restricted to the base of the barrier.
  6. For electrolier mounting details, See Standard Plans ES-6A and ES-6B.
  7. Minimum concrete edge distance, to the reinforcing shown, shall be maintained. Edge distance may be adjusted to accommodate increase in concrete cover for architectural treatment.



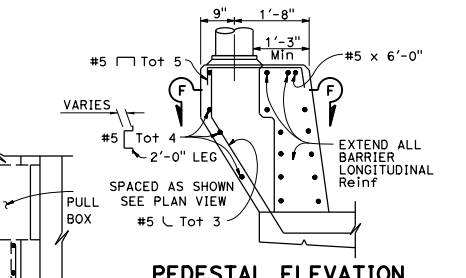
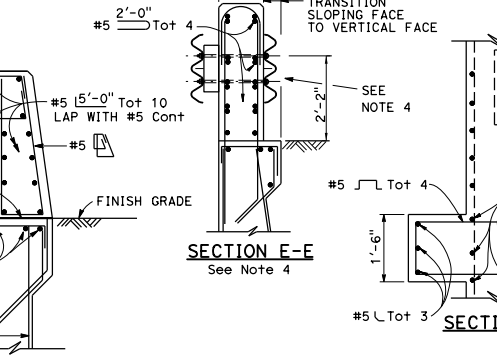
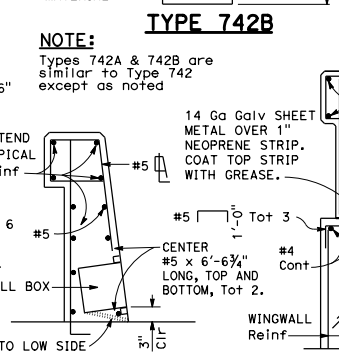
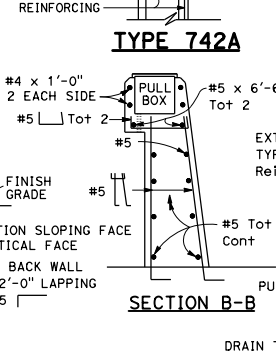
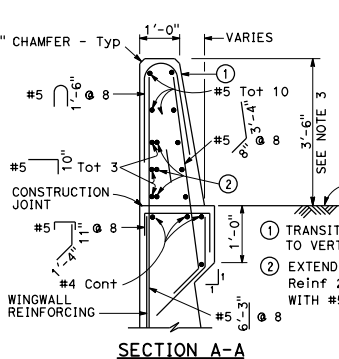
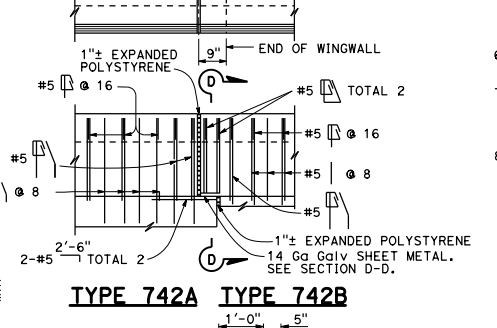
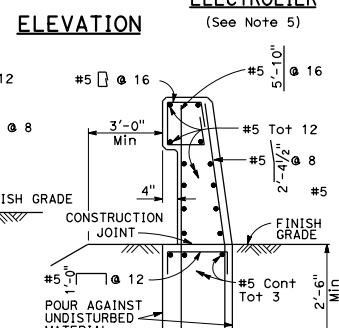
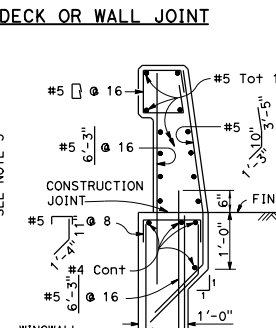
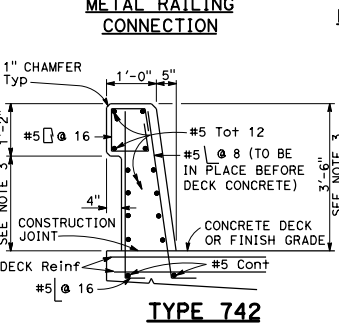
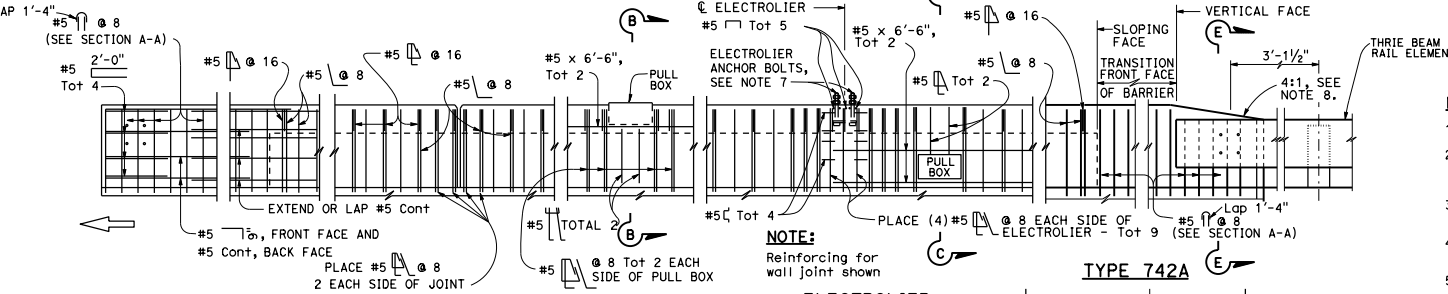
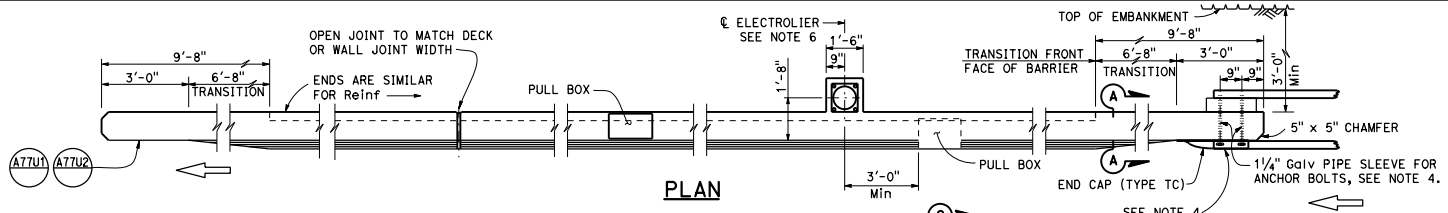
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER  
TYPE 732**

NO SCALE

B11-55





Details shown for barrier anchorage to Type 742A. Anchorage for barrier Types 742 and 742A are similar to their respective details.

- NOTES:**
1. Walls are to be backfilled before barrier is placed.
  2. Clearance to reinforcing steel in barrier to be 1", except as noted. Longitudinal reinforcement to stop at all expansion joints.
  3. Dimensions may vary with roadway cross slope and with certain thickness of surfacing. See Project Plans.
  4. For typical metal railing connection details not shown, see Standard Plans A77U1 and A77U2.
  5. See Standard Plans ES-9A, ES-9B, ES-9C, ES-9D and ES-9E for electrical details. The maximum number of conduits in the barrier is limited to two 2" conduits along with one 3" conduit. When a 3" conduit is used, it is restricted to the base of the barrier.
  6. For electrolier mounting details, See Standard Plans ES-6A and ES-6B.
  7. Minimum concrete edge distance, to the reinforcing shown, shall be maintained. Edge distance may be adjusted to accommodate increase in concrete cover for architectural treatment.
  8. Taper the top of the end of the bridge railing at 4:1 to match the top of the end of the thrie beam rail element.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

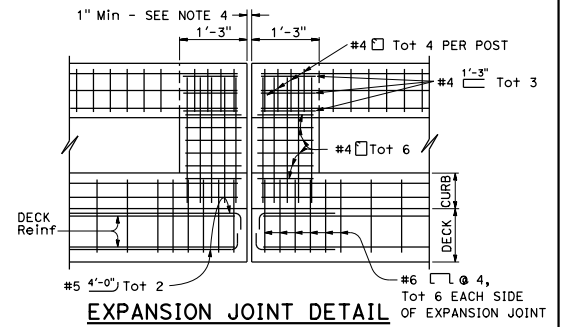
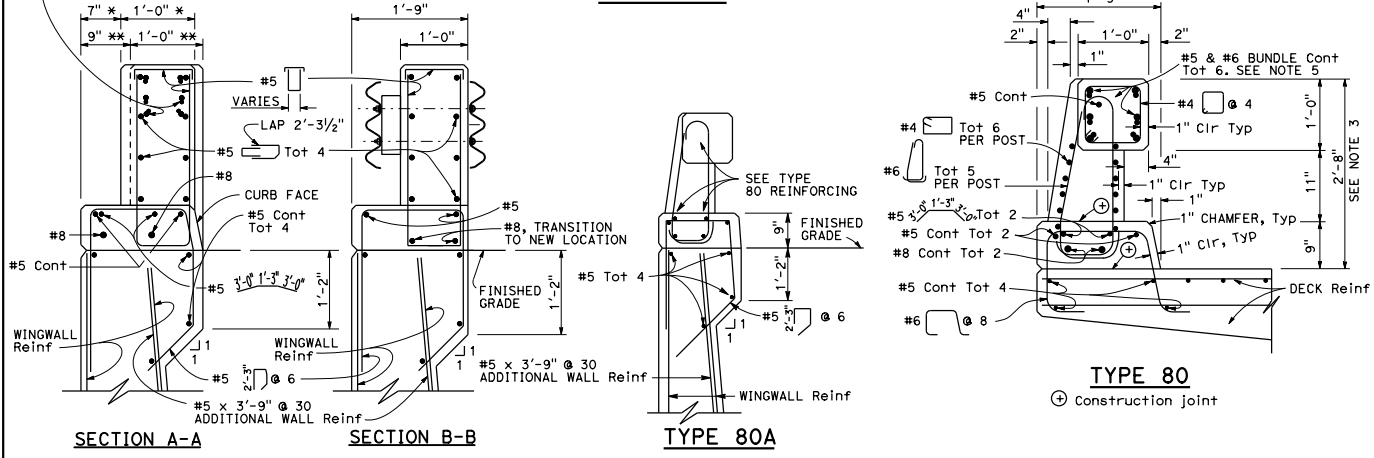
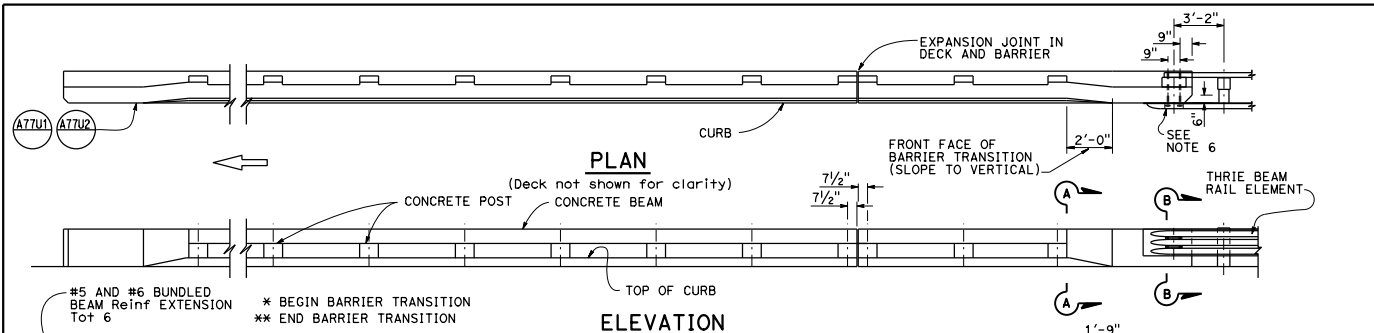
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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER  
TYPE 742**  
NO SCALE

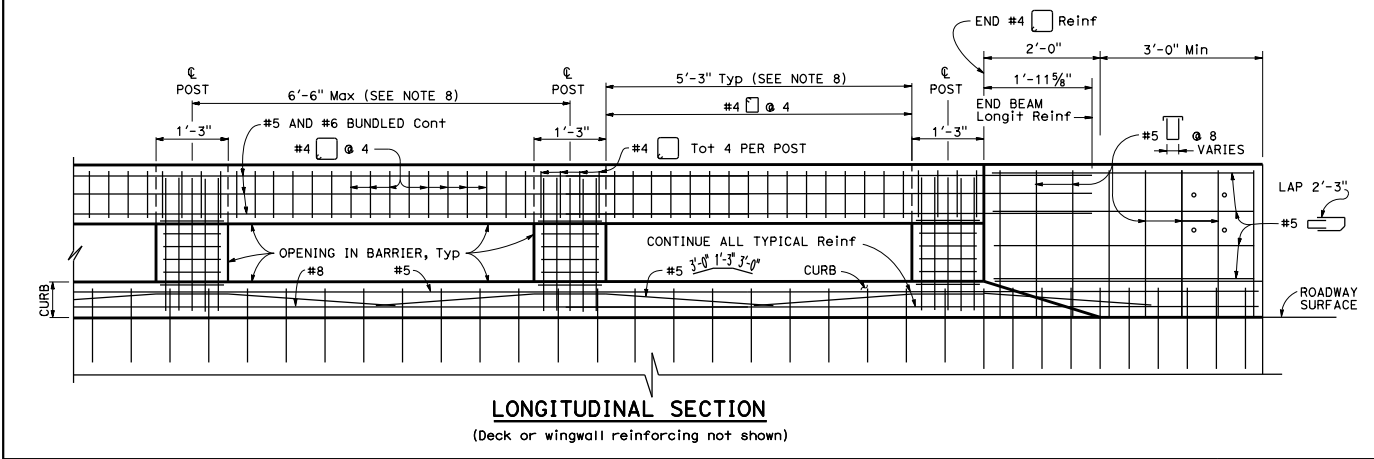
**B11-57**



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
<b>October 30, 2015</b> PLANS APPROVAL DATE				
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>				



- NOTES:**
1. Walls are to be backfilled before the barrier is placed.
  2. Longitudinal reinforcing steel to stop at all expansion joints.
  3. The front face dimensions are to be constant above the finish roadway profile, but the overall height will vary with certain thicknesses of surfacing and roadway slopes.
  4. Expansion joint to match deck joint.
  5. No lap splicing allowed on the longitudinal rail reinforcing. Splicing shall be staggered.
  6. For typical metal railing connection details not shown, see Standard Plans A77U1 and A77U2.
  7. Chain link railing is not allowed on Type 80 Barriers.
  8. Post to be spaced equally, typically 6'-6" spacing. Post spacing may be reduced where location of hinges or expansion joints or the length of wingwalls will not accommodate the 6'-6" spacing. Maximum see-through availability is to be strived for, where 6'-6" post spacing can not be achieved.

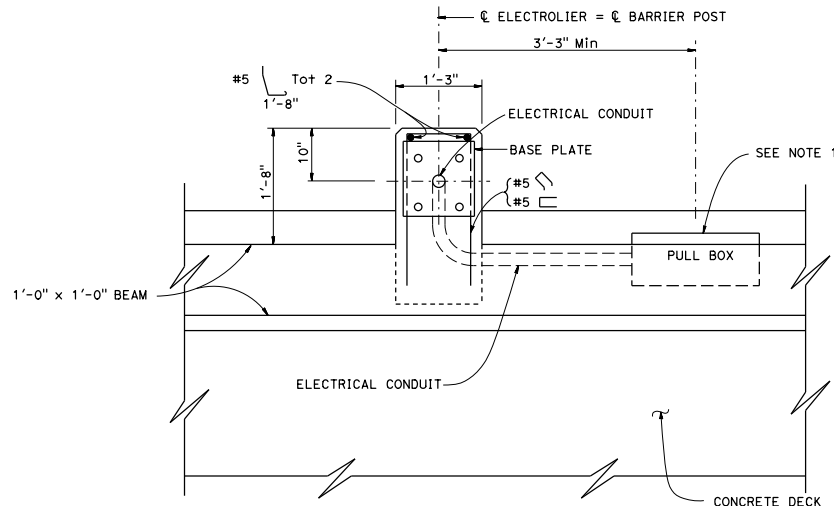


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER  
TYPE 80  
(SHEET 1 OF 2)**  
NO SCALE

**B11-60**

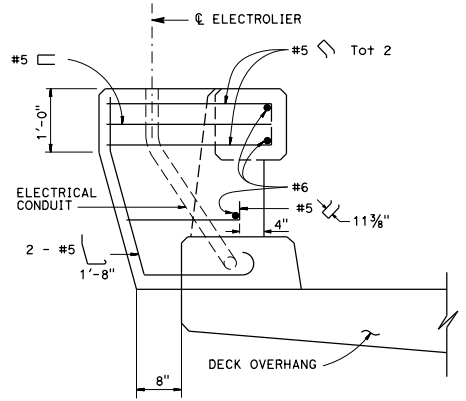
2015 STANDARD PLAN B11-60

318



**PLAN**

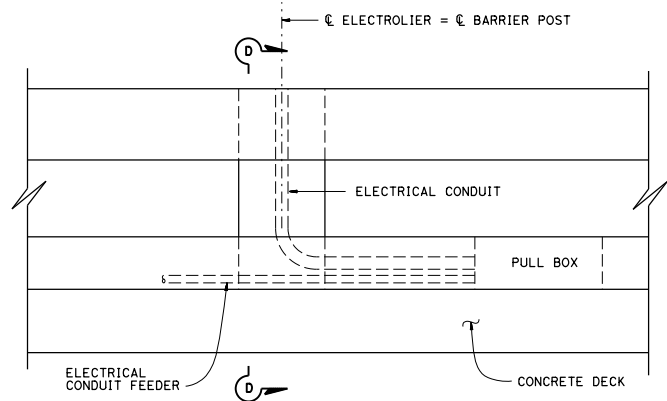
Bend #5 and #8 Reinf in curb as required to clear pull box.



**SECTION D-D**

**BARRIER MODIFICATION FOR ELECTROLIER**

See Note 4



**ELEVATION**

**ELECTROLIER NOTES:**

1. See Project Plans for electrolier and pull box locations.
2. For electrical details, see Standard Plans ES-9A, ES-9B, ES-9C, ES-9D, and ES-9E.
3. This barrier is designed to accommodate only two 1 1/2" electrical conduit for electroliers on the structure. Any transporting of larger conduit is restricted to within the structure.
4. Only the additional reinforcing for the electrolier pedestal is shown. For other typical reinforcing for Type 80 Barrier, see Standard Plan B11-60.

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

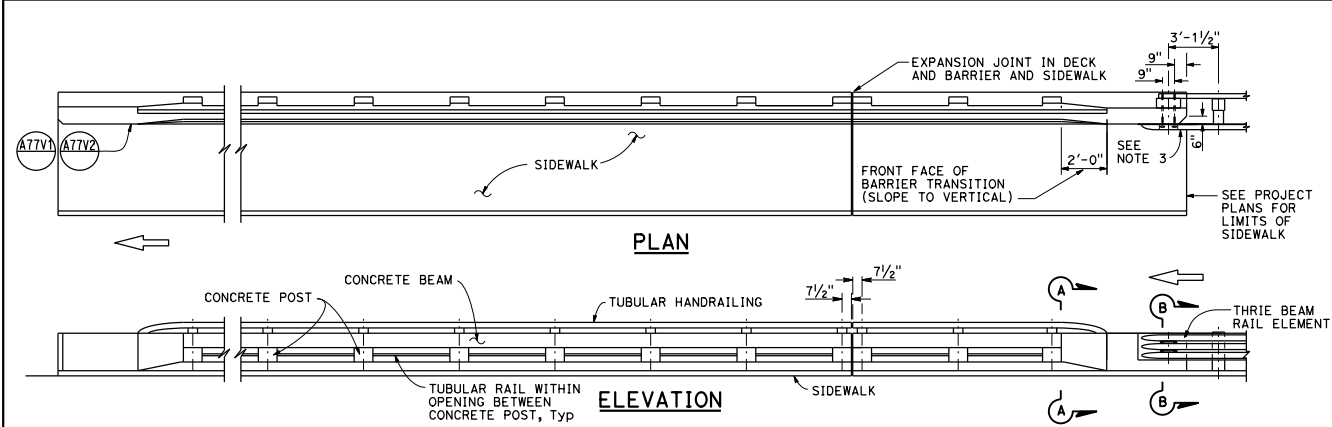
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REGISTERED PROFESSIONAL ENGINEER  
Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER  
TYPE 80  
(SHEET 2 of 2)**

NO SCALE

**B11-61**



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

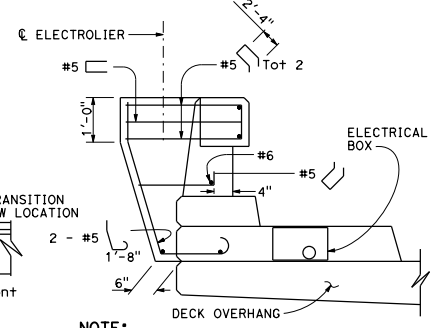
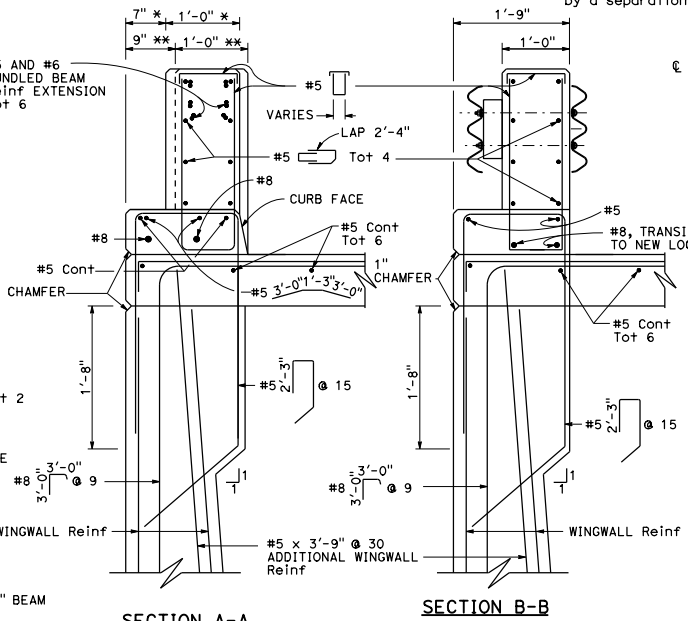
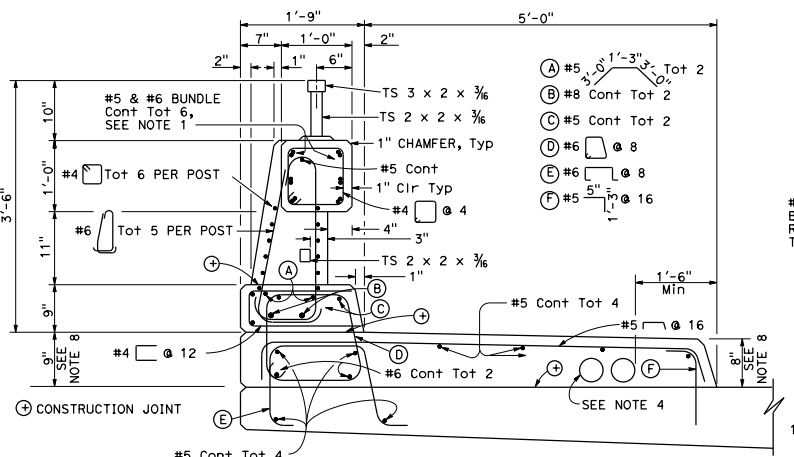
October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL

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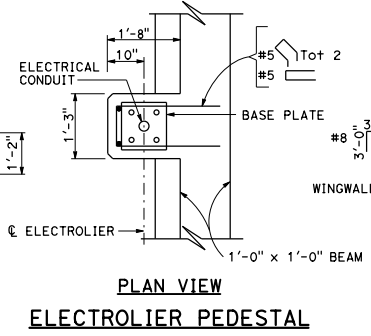
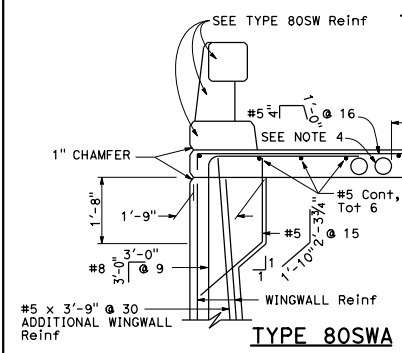
**NOTES:**

1. No lap splicing allowed on the longitudinal rail reinforcing. Splicing shall be staggered.
2. For electrical details, see Standard Plans ES-9A, ES-9B, ES-9C, ES-9D and ES-9E. See Project Plans for electrical layout.
3. For typical metal railing connection details not shown, see Standard Plans A77V1 and A77V2.
4. A maximum of five - 4" and a minimum of two - 4" round openings for future utilities. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. Minimum of 6" from face of rail to utility opening.
5. Chain link railing is not allowed on Type 80SW Barrier.
6. Walls are to be backfilled before railing is placed.
7. Terminate all longitudinal curb, sidewalk, and deck reinforcement in standard 90° hooks.
8. Dimensions will vary with cross slope and with certain thickness of surfacing.
9. Expansion joint to match deck joint, see Standard Plan B11-63 for expansion joint details.
10. This barrier is to be used only for speeds of 45 MPH or less. For speeds greater than 45 MPH, pedestrians should be protected by a separation traffic barrier.



**NOTE:**  
Pedestal design for 1'-0" base plate.

**BARRIER MODIFICATION FOR ELECTROLIER**

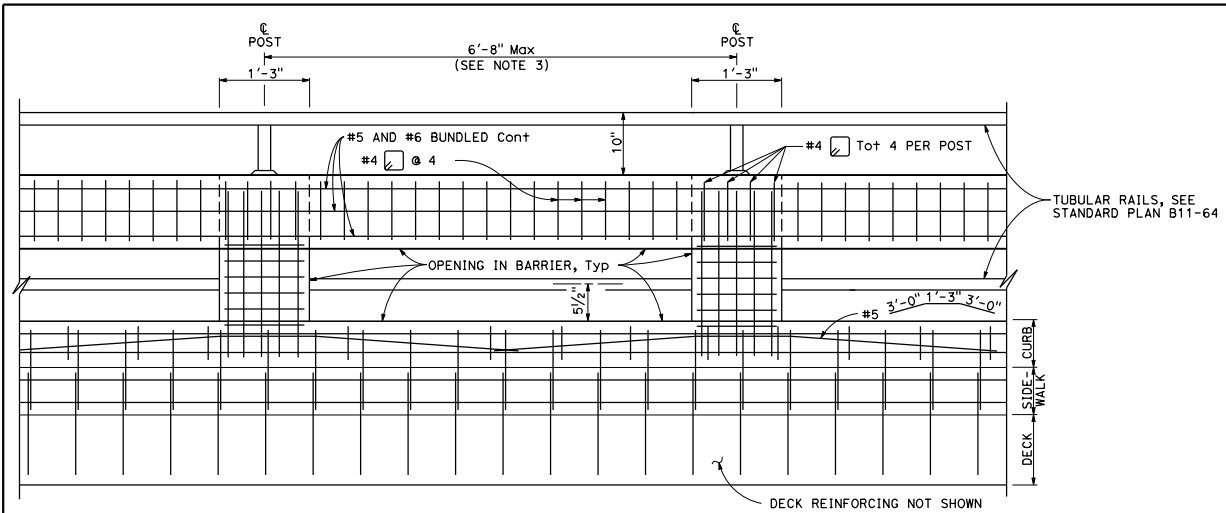


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

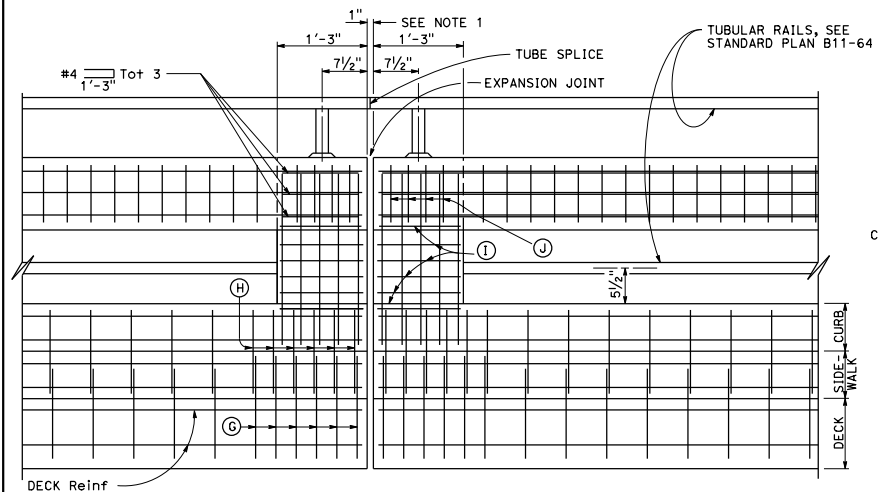
**CONCRETE BARRIER TYPE 80SW**  
**(SHEET 1 OF 3)**

NO SCALE

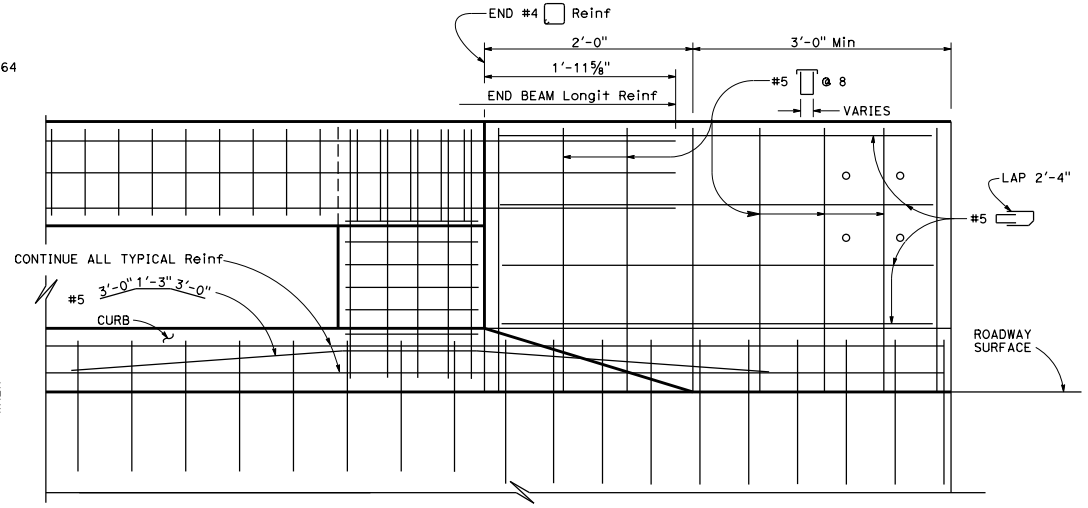




**LONGITUDINAL SECTION**



**EXPANSION JOINT DETAIL**



**END SECTION**  
(Handrailing not shown)

- ⓐ #6 Tot 6 @ 4  
each side of expansion joint
- ⓑ #6 Tot 6 @ 4  
each side of expansion joint
- ⓒ #4 Tot 6 per post
- ⓓ #4 Tot 4 per post

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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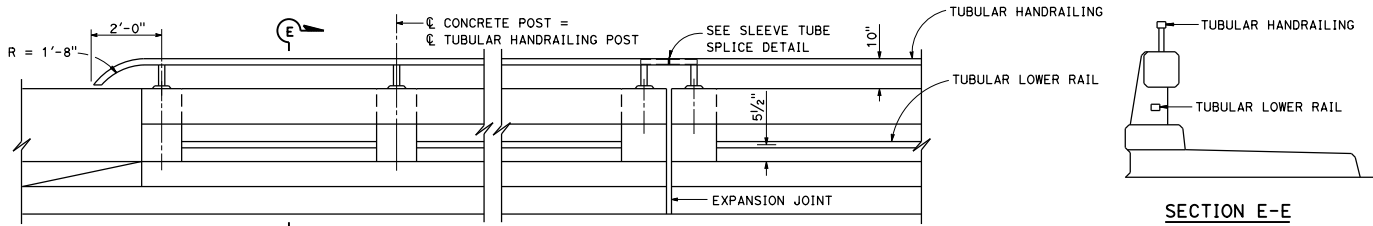
**NOTES:**

1. Expansion joint to match deck joint.
2. Continue (A), (B), (C), and #4 longitudinal reinforcing. See Type 80SW typical section on Standard Plan B11-62.
3. Post to be spaced equally, typically 6'-8" spacing. Post spacing may be reduced where location of hinges or expansion joints or the length of wingwalls will not accommodate the 6'-8" spacing. Maximum see-through availability is to be strived for, where 6'-8" post spacing can not be achieved.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER  
TYPE 80SW  
(SHEET 2 OF 3)**  
NO SCALE

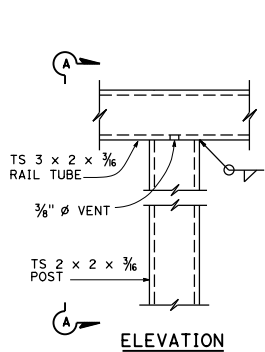
**B11-63**

Dist	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	NO. SHEETS
REGISTERED CIVIL ENGINEER October 30, 2015 PLANS APPROVAL DATE <small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>				

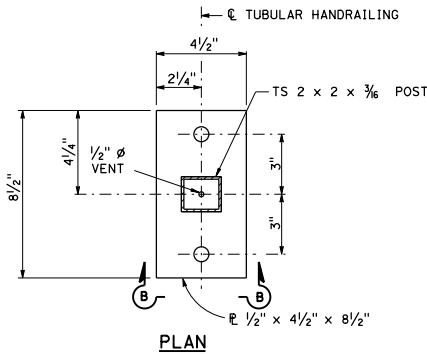


**ELEVATION**

**SECTION E-E**

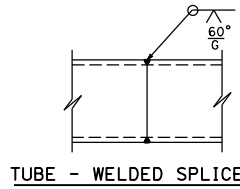


**ELEVATION**

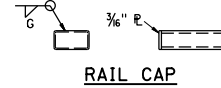


**PLAN**

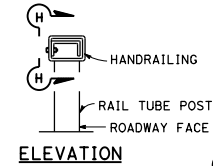
This plate detail is restricted to Tubular Handrail (TS 2 x 2 x 3/8 post)



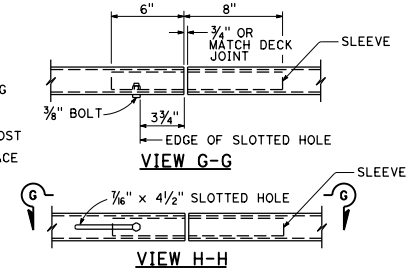
**TUBE - WELDED SPLICE**



**RAIL CAP**

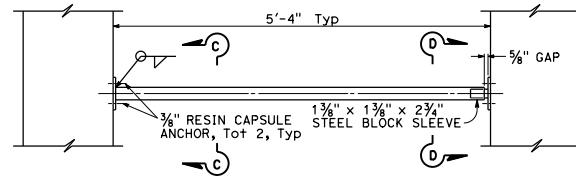


**ELEVATION**



**VIEW G-G**

**VIEW H-H**



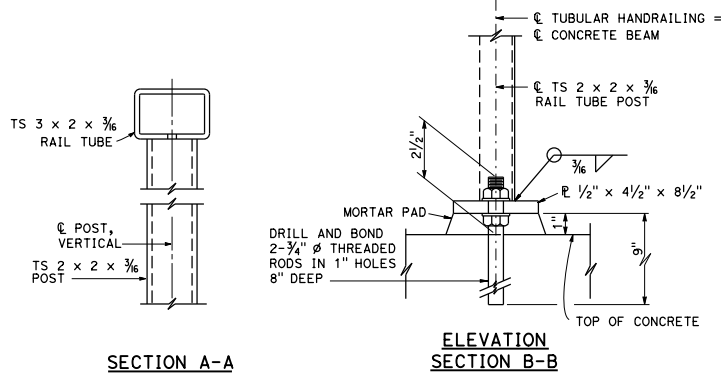
**LOWER RAIL DETAIL**

TACK WELD 3/8" NUT INSIDE OF SLEEVE FOR 3/8" Hex BOLT WITH LOCK WASHER, SEE NOTE 4

**SLEEVE TUBE SPLICE DETAIL**

**NOTES:**

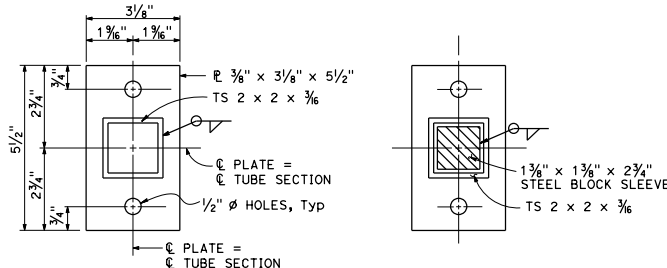
1. Posts shall be normal to railing.
2. Tube splices shall be located in the tubes spanning deck or wall joints. Increase joint width in tubes to match expansion joint width and increase sleeve length accordingly.
3. Top rail tube shall be continuous over not less than two posts except a short length is permitted near deck or wall joints, electroliers, or other rail discontinuities.
4. 3/8" nut tack welded to sleeve may be replaced by drilled and tapped hole in sleeve.



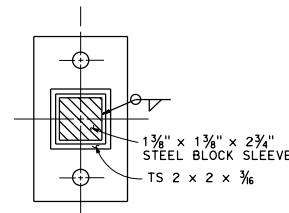
**SECTION A-A**

**SECTION B-B**

**TUBULAR RAILING CONNECTION DETAILS**



**SECTION C-C**



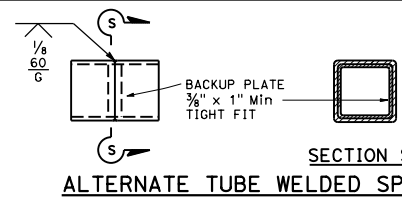
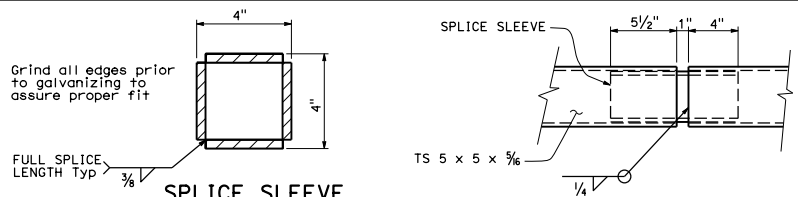
**SECTION D-D**

See Section C-C for details not shown

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CONCRETE BARRIER  
TYPE 80SW  
(SHEET 3 OF 3)**  
NO SCALE

**B11-64**

2015 STANDARD PLAN B11-64

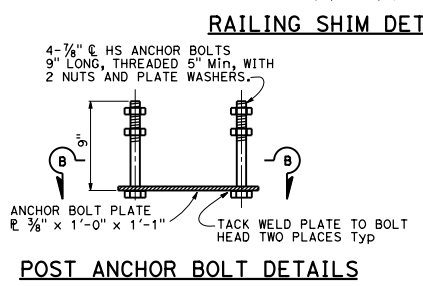
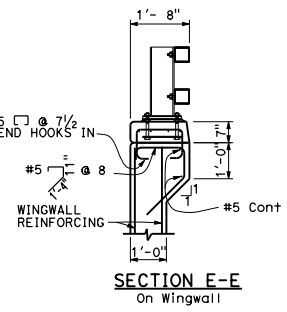
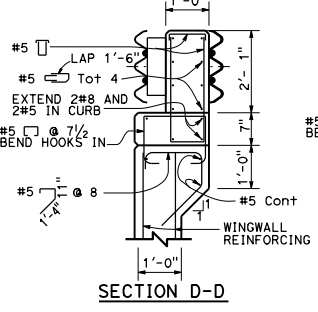
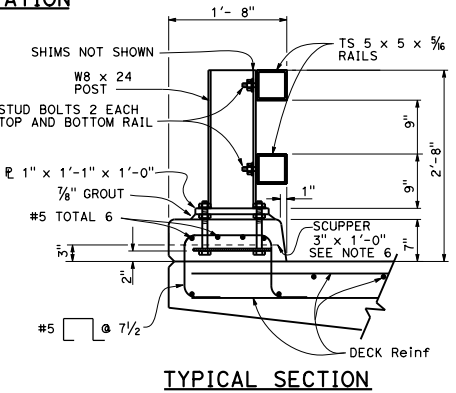
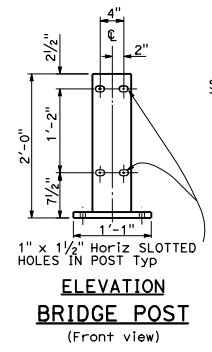
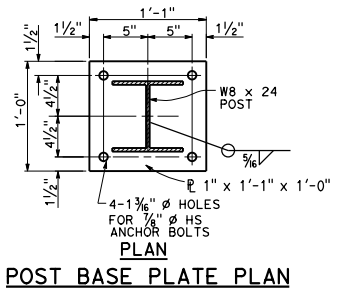
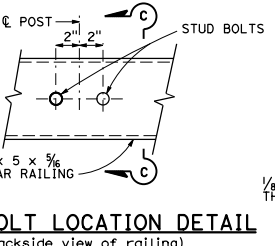
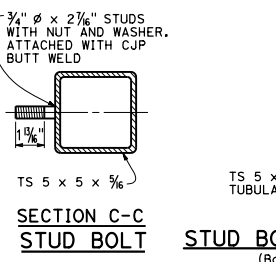
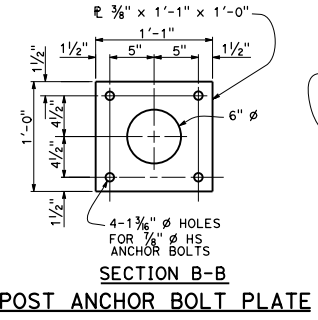
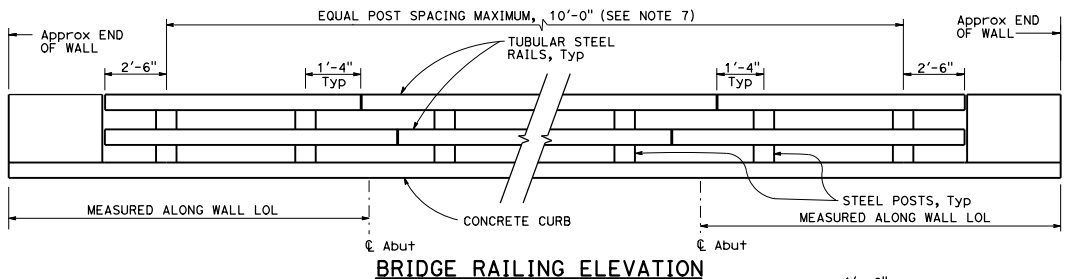
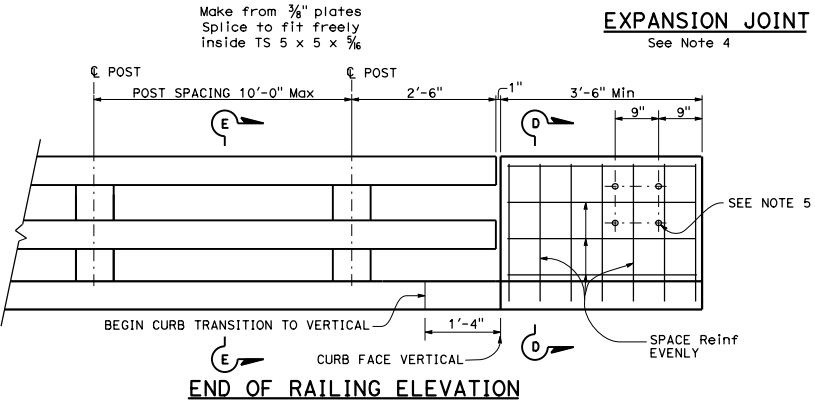


Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Tiliot Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

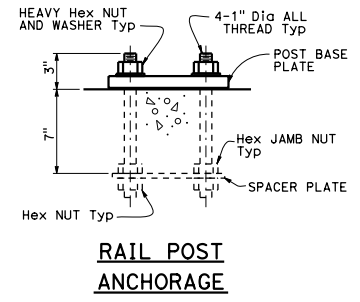
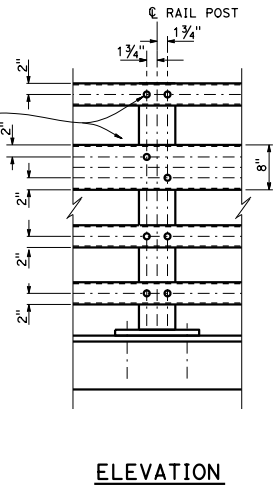
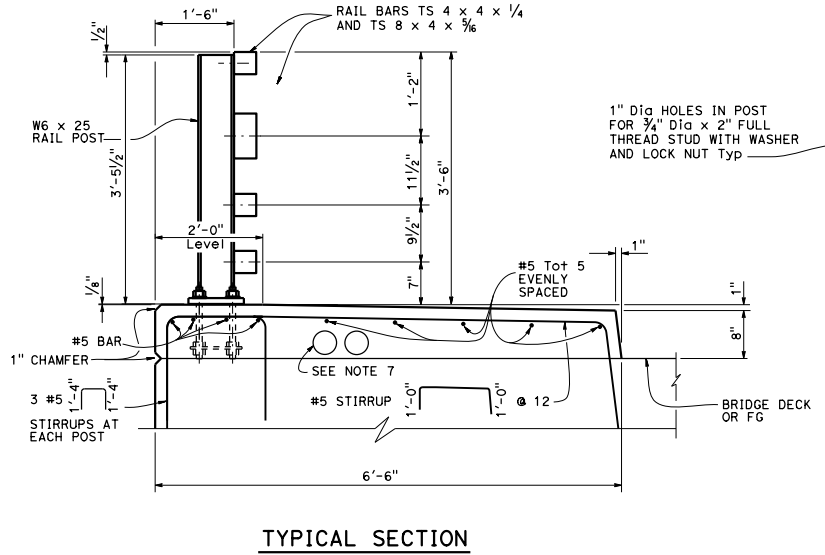
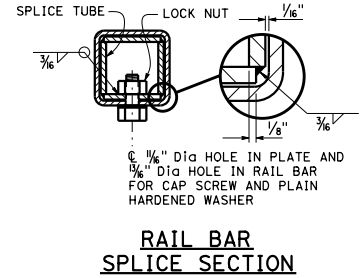
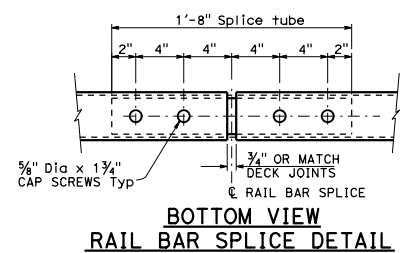
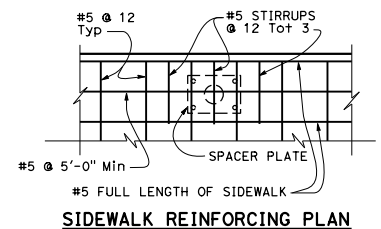
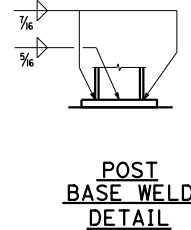
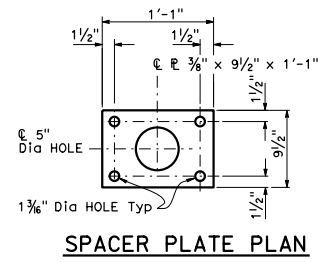
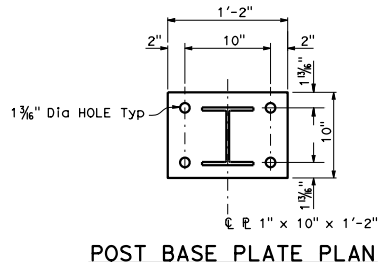
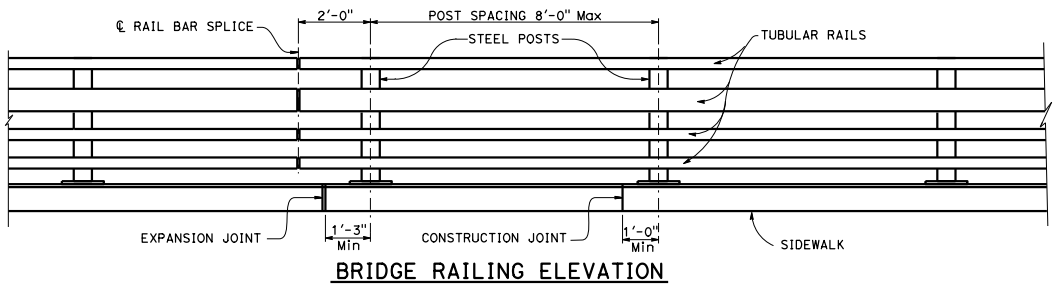
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- GENERAL NOTES:**
1. Post shall be normal to railing.
  2. All exposed corners shall be ground smooth.
  3. Tubing shall be continuous over not less than 3 intermediate posts.
  4. Expansion joints in rail tubes shall match deck expansion joints.
  5. For typical metal railing connection details not shown, see Standard Plans A77U1 and A77U2.
  6. If required, place scuppers midway between rail posts near centerline spans. Adjust reinforcing spacing to clear openings.
  7. Post spacing and/or end block length to be adjusted to fit bridge length or approach slab.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CALIFORNIA ST-30**  
**BRIDGE RAIL**  
 NO SCALE

B11-65



- NOTES:**
- All exposed cuts or sheared edges shall be rounded and free of burrs.
  - Rail posts shall be set normal to grade.
  - Lengths of rail bar shall be attached to a minimum of two rail posts.
  - Rail post anchoring nuts shall be tightened to a snug fit and given additional 1/8 turn.
  - Holes in posts for rail bar attachment may be field drilled. Holes shall be coated with an approved zinc-rich paint prior to erection.
  - This barrier is to be used only for speeds of 45 mph or less. For speeds greater than 45 mph, pedestrians should be protected by a separation traffic barrier.
  - A maximum of six - 4" and a minimum of two - 4" round openings for future utilities. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. Round openings are to be a minimum of 1'-6" from face of sidewalk curb and a minimum of 6" from face of rail.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CALIFORNIA ST-40  
BRIDGE RAIL  
(SHEET 1 OF 2)**  
NO SCALE

**B11-66**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE

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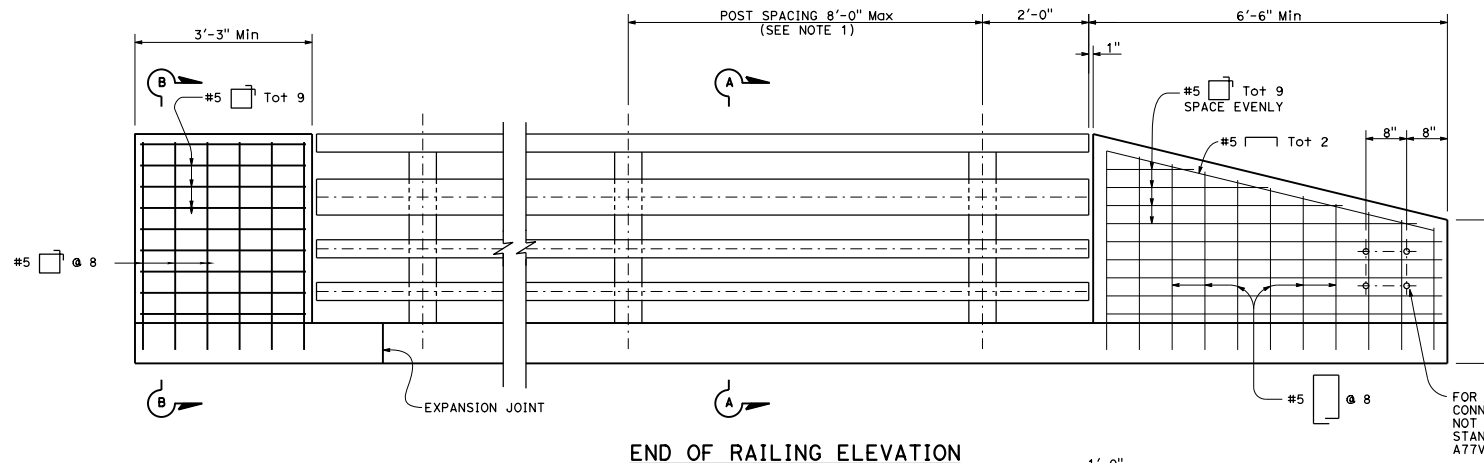
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

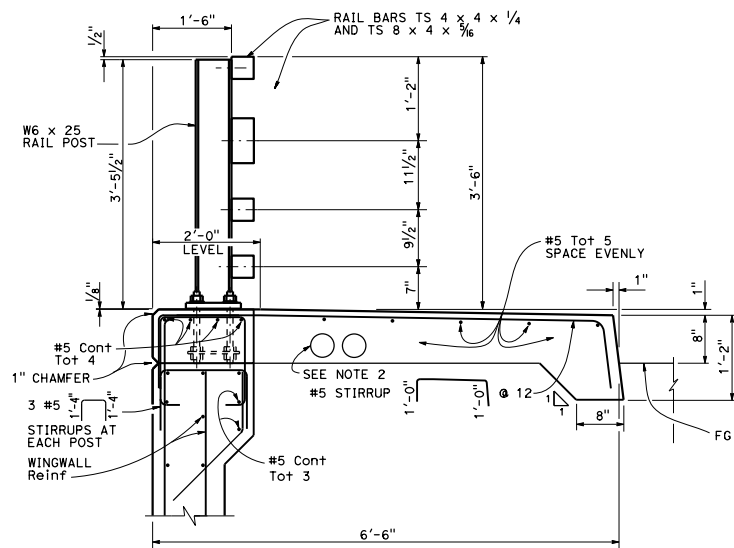
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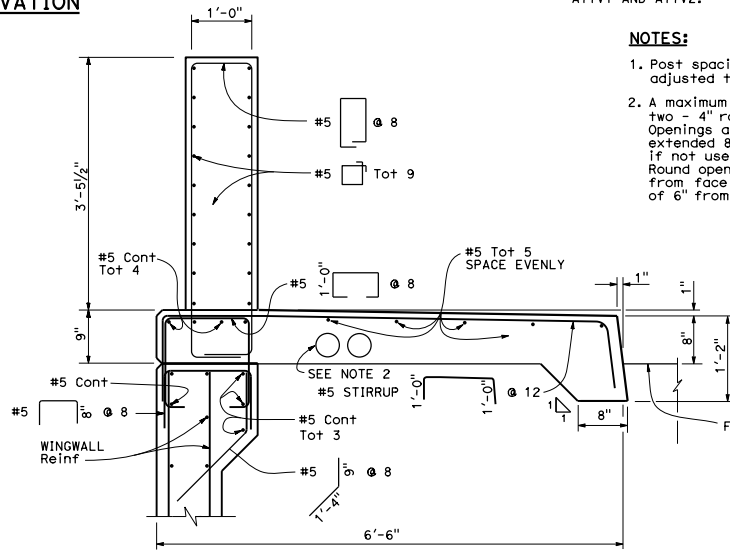
END OF RAILING ELEVATION

NOTES:

1. Post spacing and/or end block length to be adjusted to fit bridge length or wingwall length.
2. A maximum of six - 4" and a minimum of two - 4" round openings for future utilities. Openings are to be sealed at ends and extended 8" minimum past end of sidewalk if not used. Duct forms are to be tied down. Round openings are to be a minimum of 1'-6" from face of sidewalk curb and a minimum of 6" from face of rail.



SECTION A-A

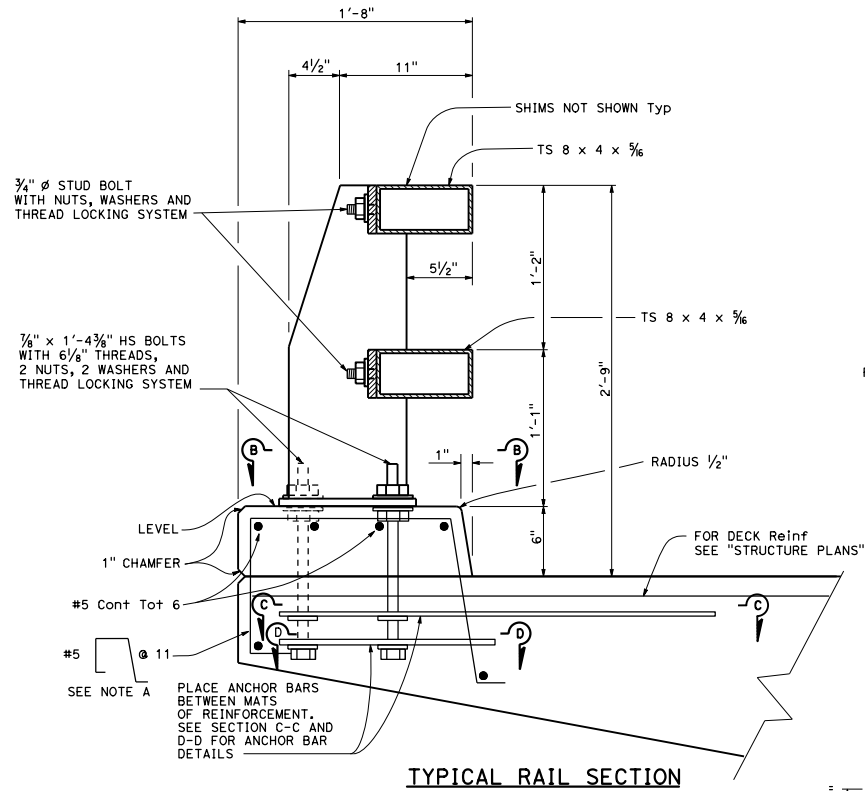


SECTION B-B

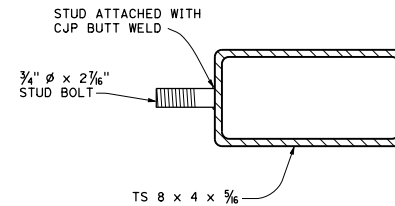
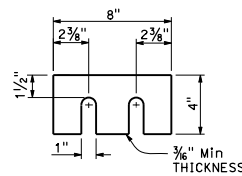
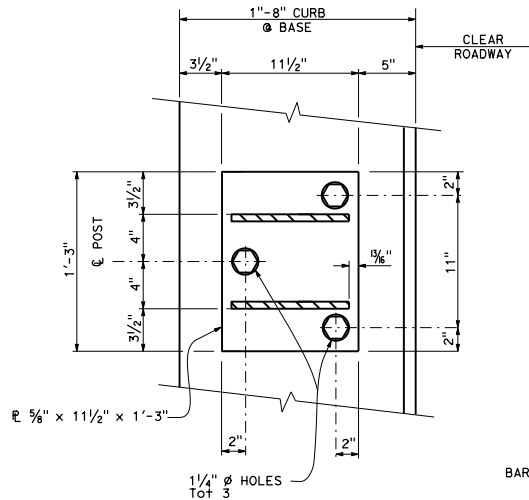
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CALIFORNIA ST-40  
BRIDGE RAIL  
(SHEET 2 OF 2)**

NO SCALE

**B11-67**



**NOTE A**  
Adjust spacing to clear scupper opening by 2" if applicable.

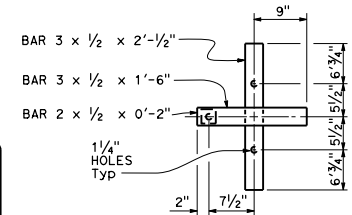
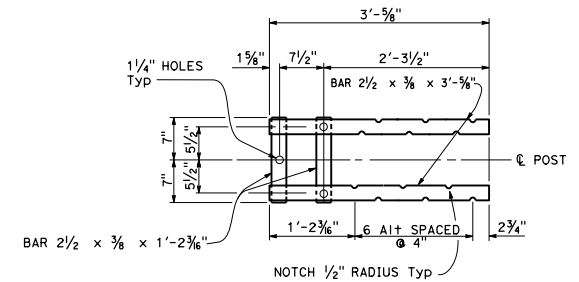


**STUD BOLT DETAIL**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Tillet Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

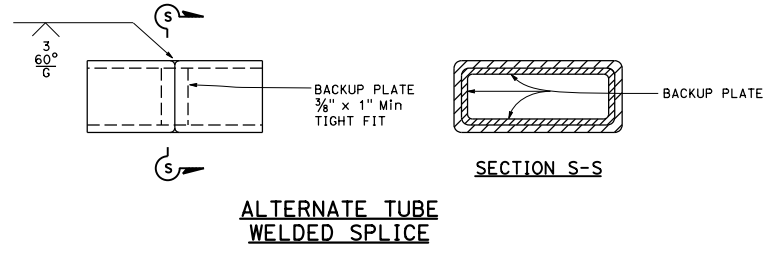
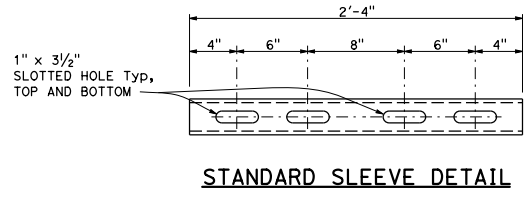
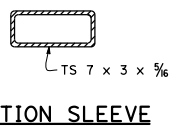
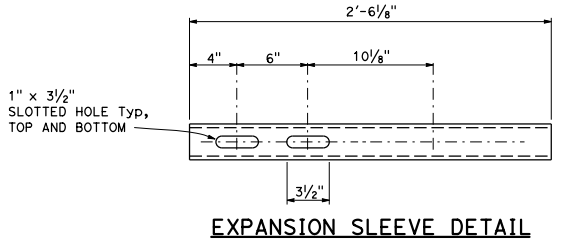
October 30, 2015  
 PLANS APPROVAL DATE  
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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**CALIFORNIA ST-10**  
**BRIDGE RAIL**  
**(SHEET 1 OF 3)**  
 NO SCALE

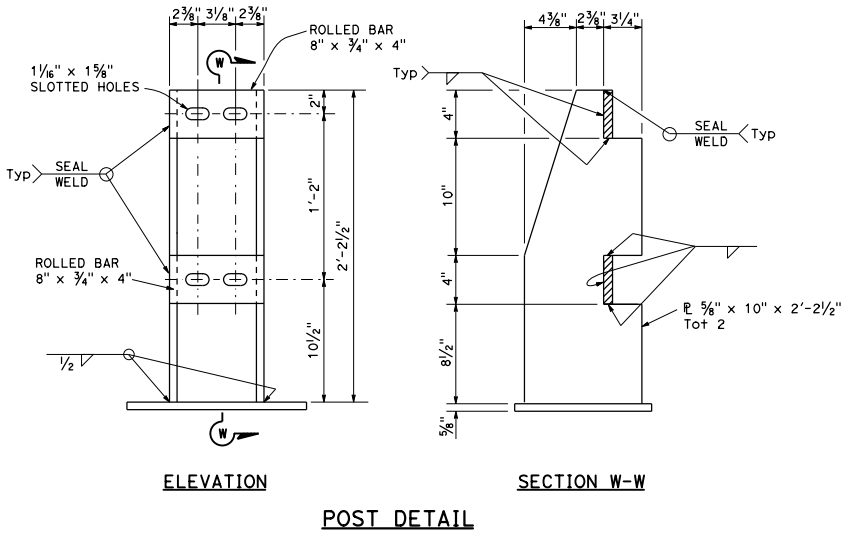
**B11-68**

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**GENERAL NOTES:**

1. Anchor bolts may be tack welded (shop or field) to anchorage.
2. All rough edges on posts and rails shall be ground smooth.
3. The alternative welded splice may be used in lieu of the Standard Splice.
4. Each rail length shall be continuous over a minimum of two posts.
5. The contractor shall check that the tubular sleeves splices conform to the dimensions indicated to assure proper clearance.
6. Except for expansion splices, not more than one splice shall be permitted per same side of post.
7. See project plans for approach guard railing details.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CALIFORNIA ST-10  
BRIDGE RAIL  
(SHEET 2 OF 3)**

NO SCALE

**B11-69**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

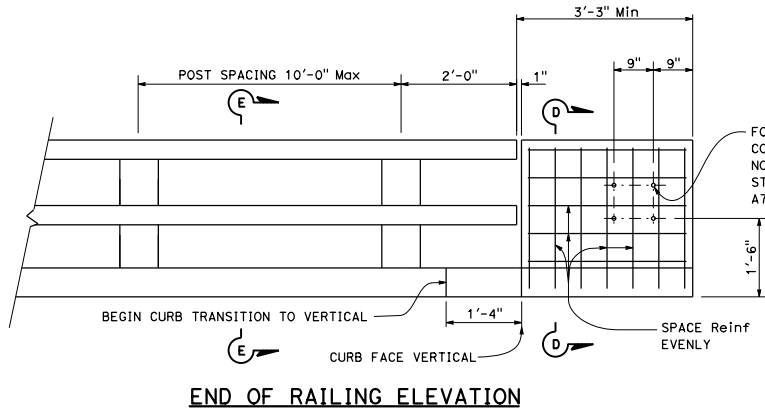
Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

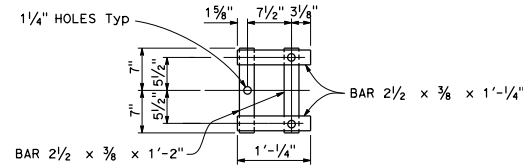
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2015 STANDARD PLAN B11-69

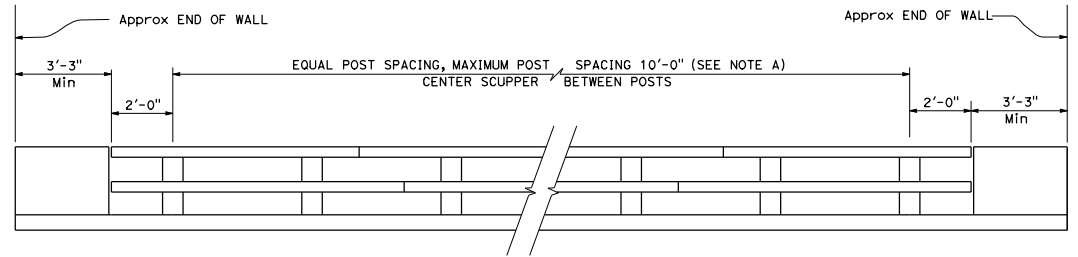
Return to Table of Contents



**END OF RAILING ELEVATION**



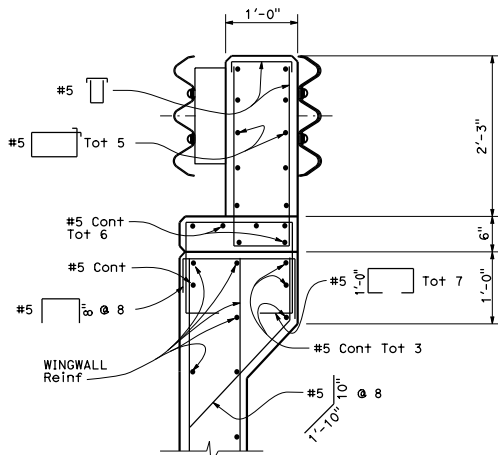
**WALL ANCHOR PLATE DETAIL**



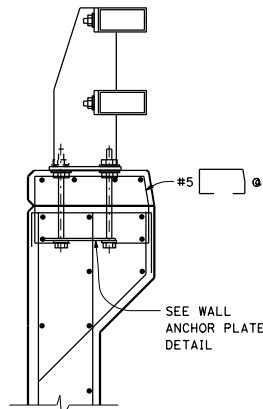
**BRIDGE RAILING ELEVATION**

**NOTE A:**

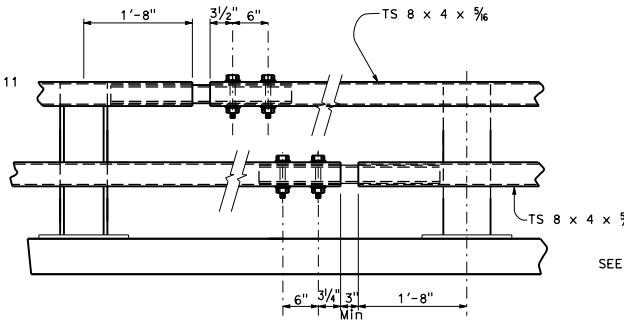
Post spacing and/or block length to be adjusted to fit bridge length or wingwall length.



**SECTION D-D**



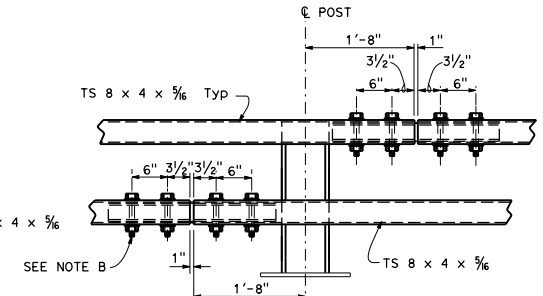
**SECTION E-E**  
Reinf same as for Section D-D except as noted.



**EXPANSION SPLICE**

**NOTE B:**

Use 3/4" x 5 1/2" HS bolts with washers, fully tensioned. 1" holes in rail Typ



**STANDARD SPLICE**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CALIFORNIA ST-10  
BRIDGE RAIL  
(SHEET 3 OF 3)**

NO SCALE

**B11-70**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

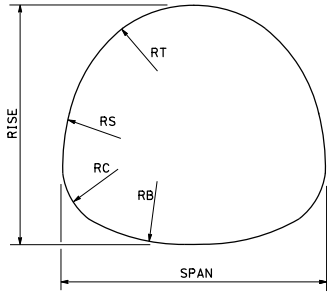
October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL

REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

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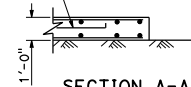
**DESIGN NOTES:**

Design: AASHTO LRFD Bridge Design Specifications, 4th edition with California Amendments.  
 Soil:  $\gamma = 140$  pcf  
 Reinforced Concrete:  $f_y = 60$  ksi,  $n = 8$ ,  $f'_c = 3.6$  ksi  
 Structural Steel Plate: 6" x 2" Annular Corrugations,  $f_y = 33$  ksi  
 Specified thickness includes galvanization

**NOTES:**

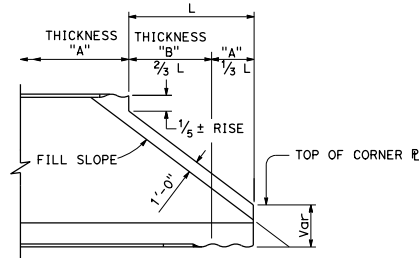
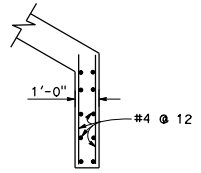
- For strutting requirements of structural steel plate vehicular undercrossing during construction, see Standard Plan D88A.
- Minimum cover from crown to shoulder hinge point = 5'-0".
- Backfill shall be brought up uniformly on both sides of the structure.
- Minimum cover for construction loading, see Standard Plan D88.

$\frac{3}{4}$ "  $\phi$  HOOK BOLTS @ 2'-0"  $\pm$  CENTERS. LENGTH AS PROVIDED BY MANUFACTURER.



**NOTE:**

Reinforce both faces of concrete collar with #4 @ 12 both ways. Maximum skew is 35°.

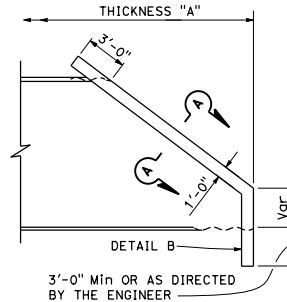


**SIDE ELEVATION**

**NOTE:**

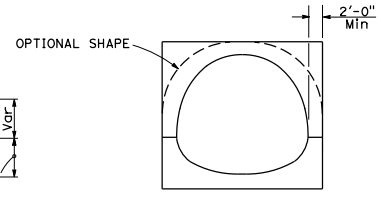
Thickness "B" two thicknesses greater than thickness "A" except for 0.249" and 0.280" thicknesses. Skew-bevels not permitted with Alternative 1. Cutoff dimensions are approximate only and may be varied by fabricator to suit plate layout.

**ALTERNATIVE 1**



**SIDE ELEVATION**

**END BEVELS**



**END ELEVATION**

**ALTERNATIVE 2**

MAXIMUM HEIGHT OF FILL										LAYOUT DATA				
GAGE	12	10	12	10	8	5	3	1						
THICKNESS	0.110"	0.140"	0.110"	0.140"	0.170"	0.218"	0.249"	0.280"						
SPAN	RISE	SOIL PRESSURE 6.0 ksf FOR SOIL PRESSURES SEE TABLE A								RT	RS	RC	RB	
12'-2"	11'-0"	14.0'	14.0'	14.0'	25.0'	31.0'	44.0'	53.0'	58.0'	5'-8"	7'-9"	3'-2"	11'-2"	
12'-11"	11'-3"	13.0'	13.0'	13.0'	24.0'	29.0'	42.0'	49.0'	55.0'	6'-1"	7'-11"	3'-2"	12'-0"	
13'-2"	11'-11"	13.0'	13.0'	13.0'	23.0'	28.0'	41.0'	48.0'	54.0'	6'-1"	8'-7"	3'-2"	13'-3"	
13'-10"	12'-3"	12.0'	12.0'	12.0'	22.0'	27.0'	39.0'	46.0'	51.0'	6'-5"	9'-0"	3'-2"	13'-8"	
14'-1"	12'-10"	12.0'	12.0'	12.0'	21.0'	26.0'	38.0'	45.0'	50.0'	6'-5"	9'-7"	3'-2"	15'-2"	
14'-6"	13'-6"	11.0'	11.0'	11.0'	20.0'	25.0'	37.0'	44.0'	48.0'	6'-6"	10'-11"	3'-2"	14'-6"	
14'-10"	14'-0"	11.0'	11.0'	11.0'	20.0'	24.0'	36.0'	42.0'	47.0'	6'-7"	11'-4"	3'-2"	16'-0"	
15'-6"	14'-4"	10.0'	10.0'	10.0'	19.0'	23.0'	34.0'	40.0'	45.0'	7'-0"	11'-6"	3'-2"	16'-9"	
15'-9"	15'-1"	10.0'	10.0'	10.0'	18.0'	22.0'	33.0'	40.0'	44.0'	6'-11"	12'-6"	3'-2"	17'-8"	
16'-4"	15'-5"	9.0'	9.0'	9.0'	18.0'	22.0'	32.0'	38.0'	42.0'	7'-2"	13'-1"	3'-2"	17'-11"	
16'-5"	16'-1"	8.0'	8.0'	8.0'	17.0'	21.0'	31.0'	37.0'	41.0'	7'-4"	13'-2"	3'-2"	22'-7"	
16'-9"	16'-3"	8.0'	8.0'	9.0'	17.0'	20.0'	30.0'	36.0'	40.0'	7'-5"	13'-11"	3'-2"	20'-7"	
17'-3"	17'-0"	11.0'	11.0'	8.0'	16.0'	20.0'	29.0'	36.0'	39.0'	7'-6"	14'-6"	3'-11"	17'-11"	
18'-4"	16'-11"	10.0'	10.0'	6.0'	15.0'	19.0'	28.0'	33.0'	37.0'	8'-3"	13'-1"	3'-11"	20'-9"	
19'-2"	17'-2"		9.0'		14.0'	18.0'	26.0'	32.0'	35.0'	8'-9"	13'-0"	3'-11"	22'-0"	
19'-6"	17'-7"	*	9.0'	*	14.0'	17.0'	25.0'	31.0'	34.0'	8'-11"	13'-2"	3'-11"	24'-9"	
20'-4"	17'-10"		9.0'		13.0'	16.0'	24.0'	29.0'	32.0'	9'-5"	13'-0"	3'-11"	26'-2"	

\* - Strutting required. See Note 1.

GAGE	12	10	8	5	3	1
THICKNESS	0.110"	0.140"	0.170"	0.218"	0.249"	0.280"
SPANS	STRENGTH I SOIL PRESSURE (ksf)					
12'-2" TO 16'-9"	6.0	10.0	12.0	17.0	20.0	22.0
17'-3" TO 20'-4"	4.9	8.1	9.7	13.7	16.2	17.8

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**STRUCTURAL STEEL PLATE  
 VEHICULAR UNDERCROSSING**  
 NO SCALE

**B14-1**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
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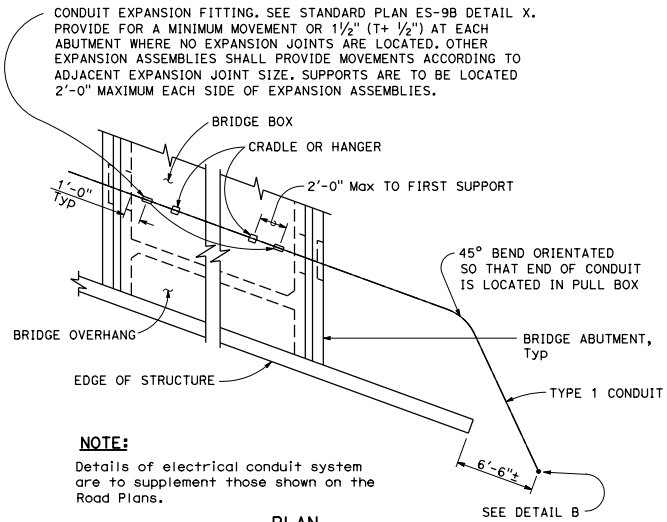
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Joseph S. Gill*  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

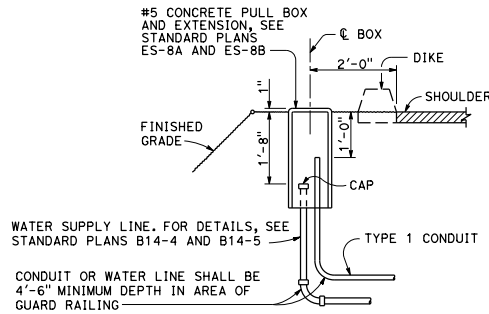
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Professional Engineer  
Joseph S. Gill  
No. E18551  
Exp. 12-31-16  
ELECTRICAL  
STATE OF CALIFORNIA

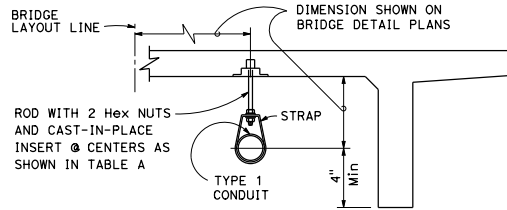


**PLAN  
COMMUNICATION OR  
SPRINKLER CONTROL CONDUITS**

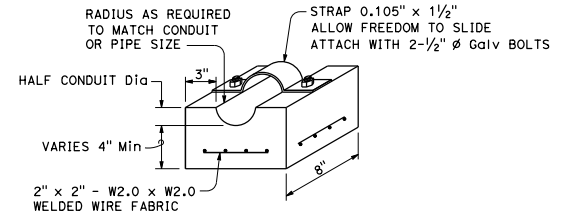
**NOTE:**  
Details of electrical conduit system are to supplement those shown on the Road Plans.



**DETAIL B**



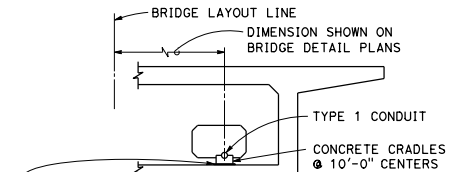
**OTHER THAN BOX GIRDER  
CONDUIT HANGER SUPPORT DETAILS**



**NOTES:**

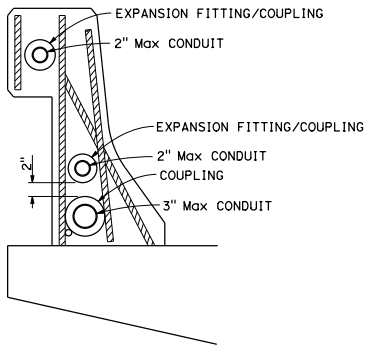
1. Cradles to be precast concrete.
2. Secure all cradles to bottom slab of bridge with epoxy adhesive, except as provided below.

**CONCRETE CRADLE**



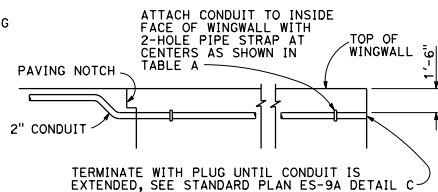
**BOX GIRDER  
CONDUIT SUPPORT DETAILS**

UNDER THE FIRST CRADLE SUPPORT INSIDE BRIDGE NEAR ABUTMENT OR HINGE, EPOXY 12 GAGE GALVANIZE STEEL SHEET 2'-8" x 1'-4" TO THE FLOOR OF CELL. DO NOT SECURE CRADLE TO STEEL SHEET. CRADLE SHALL BE FREE TO SLIDE TO ACCOMMODATE LATERAL MOVEMENT.



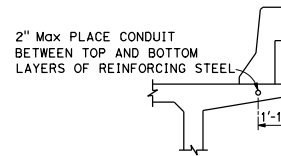
**CONDUIT IN BRIDGE RAILING**

- NOTES:**
1. The maximum conduit sizes shown are for a straight run across the bridge without pull boxes.
  2. In a bridge railing with lighting standards or pull boxes, reduce size of affected conduits as needed.



**CONDUIT IN OVERHANG-WINGWALL DETAIL**

TERMINATE WITH PLUG UNTIL CONDUIT IS EXTENDED, SEE STANDARD PLAN ES-9A DETAIL C



**CONDUIT IN OVERHANG**

**CONDUIT LOCATIONS**

(For 2" conduit only except as noted)  
For location see Bridge Detail plans.

**TABLE A**

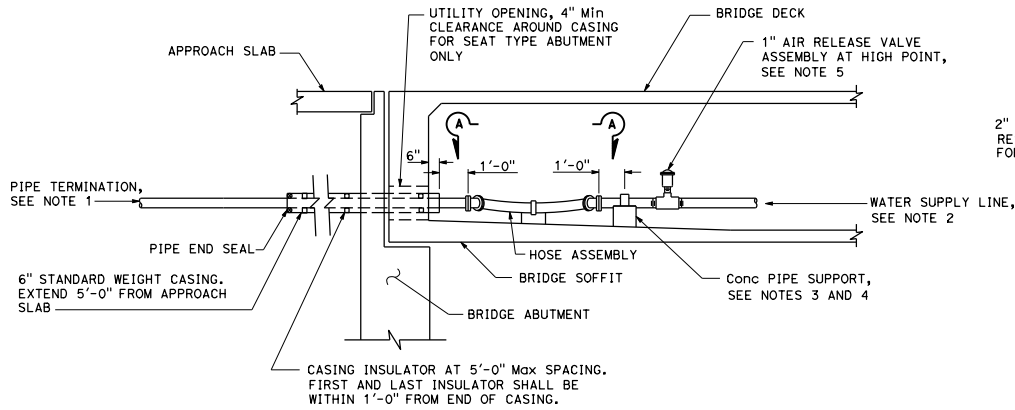
CONDUIT	2 1/2" OR LESS	3"	3 1/2"
ROD	3/8" Ø	1/2" Ø	5/8" Ø
STRAP	0.090" x 1"	0.090" x 1"	0.105" x 1 1/2"
SUPPORT SPACING	10'-0"	10'-0"	10'-0"

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DEPARTMENT OF TRANSPORTATION

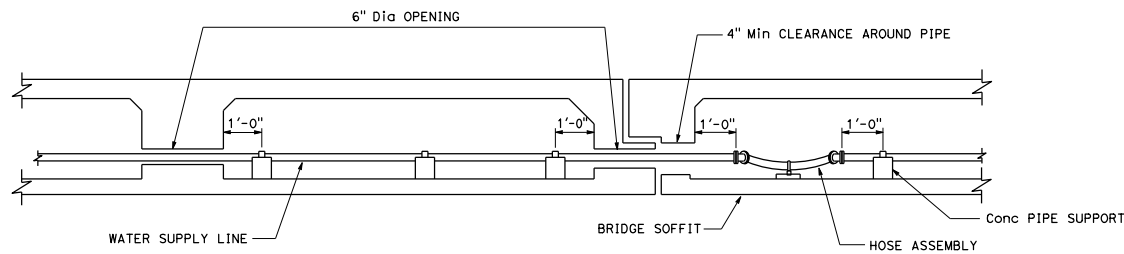
**COMMUNICATION AND  
SPRINKLER CONTROL CONDUITS  
(CONDUIT LESS THAN 4")**

NO SCALE

**B14-3**

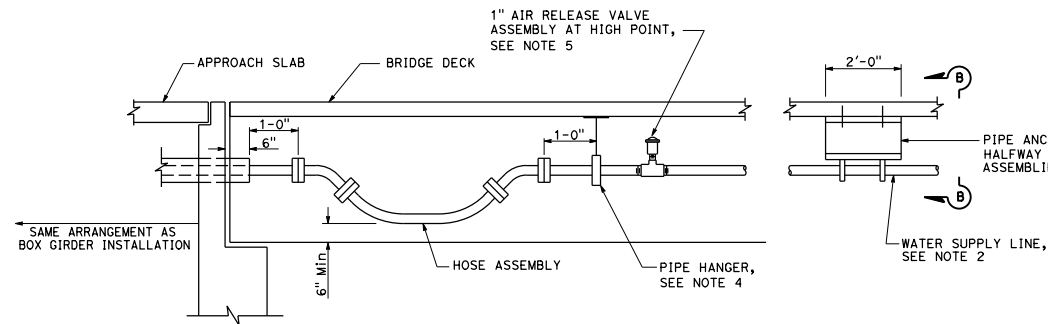


**BOX GIRDER INSTALLATION**

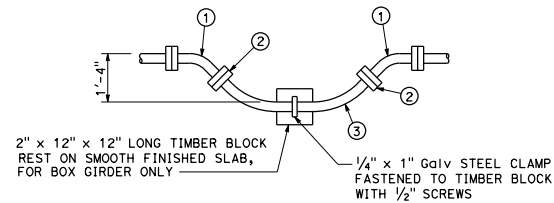


**PIPE INSTALLATION AT HINGE**

Same for hanger type installation



**INSTALLATION FOR OTHER STRUCTURE TYPES**



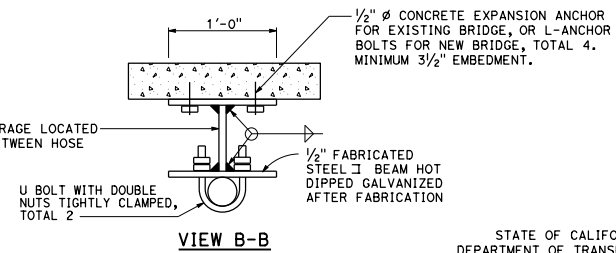
**VIEW A-A  
HOSE ASSEMBLY**

**NUMBERED ITEM**

- ① 45° flanged elbow with insulated flange connection
- ② Flanged hose fitting
- ③ Hose 6'-6" in length (size shall be same as pipe)

**NOTES:**

1. Extend pipe 5'-0"+ beyond the edge of shoulder or as shown on bridge plans. Terminate in a pull box as shown on Standard Plan B14-3, Detail B.
2. Water supply line shall be installed parallel to bridge soffit or deck.
3. For concrete pipe support, pipe shall be tightly clamped at the pipe support, located halfway between hose assemblies. At all other supports, pipe clamp shall be shimmed with steel washer plate to provide 1/4" clearance between pipe and clamp.
4. Maximum spacing between pipe hangers or supports shall be 10'-0" unless otherwise detailed on the plans.
5. Install air release valve using threaded tee or pipe saddle.
6. Openings through diaphragm and bent caps shall be 6" diameter unless otherwise detailed on the plans.
7. For details of pipe hanger and concrete pipe support see Standard Plan B14-5.



**VIEW B-B**

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**WATER SUPPLY LINE (BRIDGE)  
(PIPE SIZES LESS THAN 4")**

NO SCALE

**B14-4**

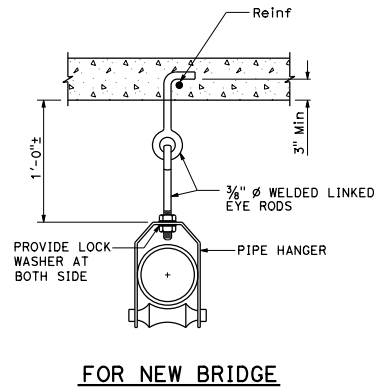
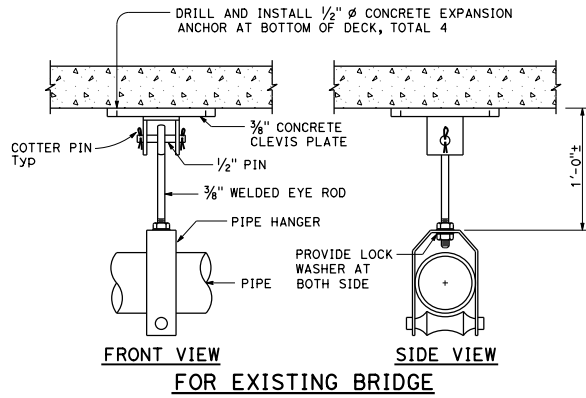
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Jerry Marcotto*  
REGISTERED CIVIL ENGINEER

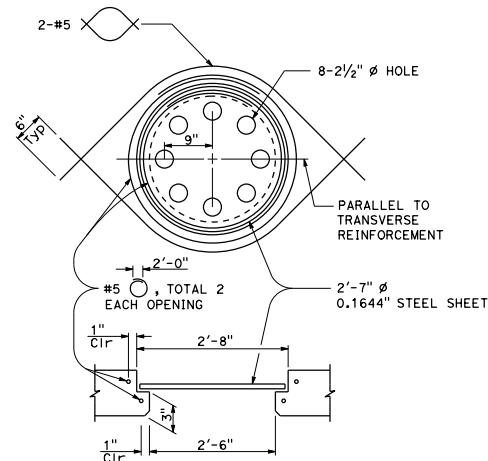
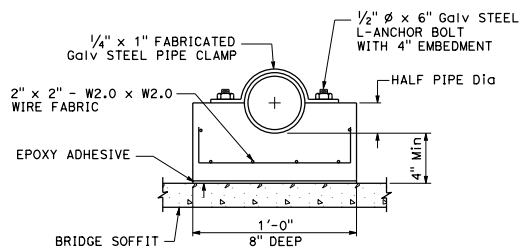
October 30, 2015  
PLANS APPROVAL DATE

Jerry Marcotto  
No. C36844  
Exp. 6-30-16  
CIVIL  
STATE OF CALIFORNIA

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PIPE HANGER



Locate where called for on bridge plans.  
Adjust reinforcement to clear opening.  
Plate must be installed before top deck  
is placed.

SOFFIT ACCESS OPENING

Dist	County	Route	Post Miles Total Project	Sheet No.	Total Sheets

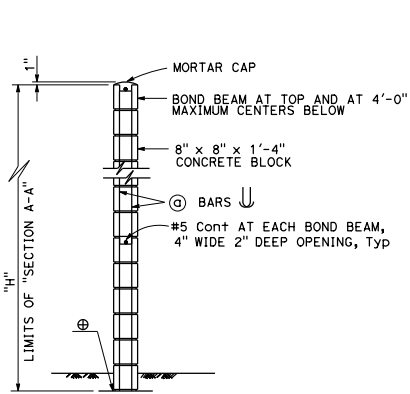
*Jerry Marcotte*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
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REGISTERED PROFESSIONAL ENGINEER  
 Jerry Marcotte  
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 Exp. 6-30-16  
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 STATE OF CALIFORNIA

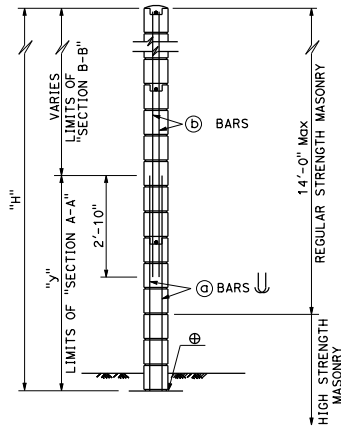
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**WATER SUPPLY LINE (DETAILS)  
(PIPE SIZES LESS THAN 4")**

NO SCALE

**B14-5**



H=6'-0" THRU H=10'-0"

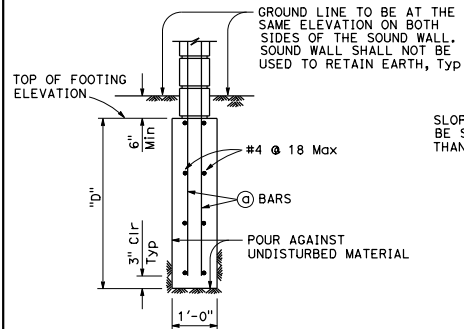


H=12'-0" THRU H=16'-0"

For details not shown, see H=6'-0" thru H=10'-0".

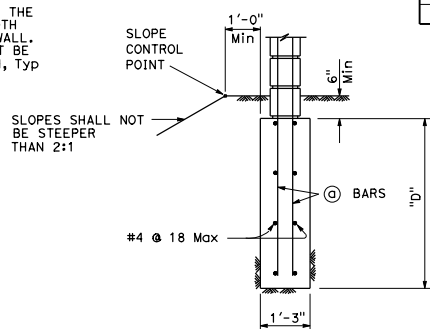
**TYPICAL SECTION**

⊕ Full mortar bed at bottom of wall



**CASE 1**

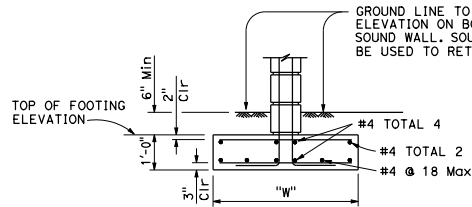
For details not shown, see Case 2. Level ground (±10%) on both sides of the sound wall.



**CASE 2**

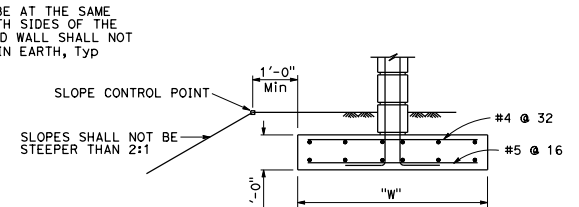
For details not shown, see Case 1. Level ground (±10%) on one side of the sound wall and sloping ground on the opposite side.

**TRENCH FOOTING SECTION**



**CASE 1**

For details not shown, see Case 2. Level ground (±10%) on both sides of the sound wall.



**CASE 2**

For details not shown, see Case 1. Level ground (±10%) on the traffic side of the sound wall and sloping ground on the opposite side.

**SPREAD FOOTING SECTION**

**TRENCH FOOTING**

MAXIMUM H	CASE 1		CASE 2		MAXIMUM H	
	φ = 25 Min	φ = 30 Min	φ = 30 Min	φ = 35 Min		
	D	D	D	D		
6'-0"	5'-0"	4'-3"	3'-6"	6'-6"	5'-0"	6'-0"
8'-0"	6'-0"	5'-0"	4'-3"	7'-9"	6'-0"	8'-0"
10'-0"	6'-9"	5'-9"	5'-0"	8'-9"	6'-9"	10'-0"
12'-0"	7'-9"	6'-6"	5'-6"	9'-9"	7'-9"	12'-0"
14'-0"	8'-6"	7'-3"	6'-0"	10'-9"	8'-6"	14'-0"
16'-0"	9'-3"	7'-9"	6'-6"	11'-9"	9'-3"	16'-0"

Case 1 - Level ground (±10%) on both sides of the sound wall.  
Case 2 - Level ground (±10%) on traffic side of the sound wall and sloping ground on opposite side.

**SOUND WALL REINFORCEMENT TABLE**

MAXIMUM H	⊙ BARS @ 1'-4" Max	⊙ BARS @ 1'-4" Max	"y"	f'm (psi)	COMPRESSIVE STRENGTH OF CMU (psi)	MAXIMUM H
6'-0"	#4	---	---	1500	1900	6'-0"
8'-0"	#4	---	---	1500	1900	8'-0"
10'-0"	#4	---	---	1500	1900	10'-0"
12'-0"	#5	#4	6'-0"	1500	1900	12'-0"
14'-0"	#6	#4	8'-0"	1500	1900	14'-0"
16'-0"	#6	#4	10'-0"	2000	2800	16'-0"

**GENERAL NOTES:**

- For type of block and joint finish, see other sheets.
- When blocks are laid in stacked bond, ladder type, galvanized joint reinforcement shall be provided. A minimum of 2-9 gauge wires continuous at 4'-0" maximum to be used. Locate reinforcement in joints that are at the approximate midpoint between bond and beams.
- Horizontal joints shall be tooled concave or may be weathered. Vertical joints shall be tooled concave or may be raked.
- For intermediate wall heights that are between the "H"s given, use the tabular information for the next higher "H".
- Masonry strengths are listed in the "SOUND WALL REINFORCEMENT TABLE".

**SPREAD FOOTING**

MAXIMUM H	W
6'-0"	3'-0"
8'-0"	4'-0"
10'-0"	5'-0"
12'-0"	5'-9"
14'-0"	6'-6"
16'-0"	7'-6"

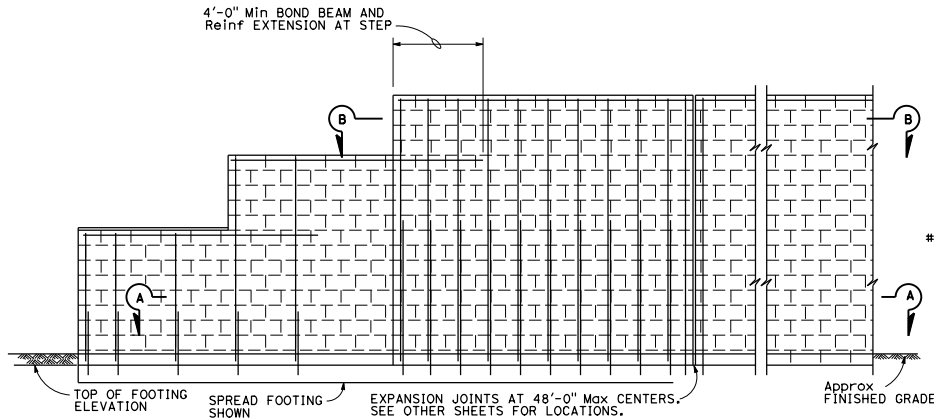
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**SOUND WALL MASONRY BLOCK ON FOOTING DETAILS (1)**

NO SCALE

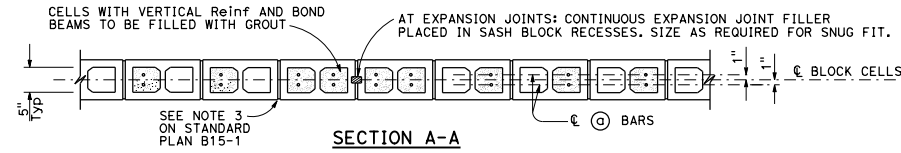
**B15-1**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

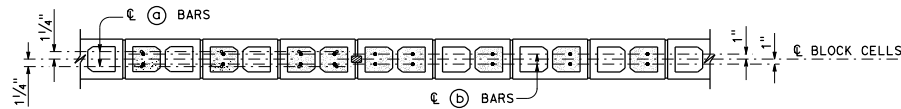
REGISTERED CIVIL ENGINEER  
Tillot Satter  
No. C42892  
Exp. 3-31-16  
PLANS APPROVAL DATE  
October 30, 2015  
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**ELEVATION**

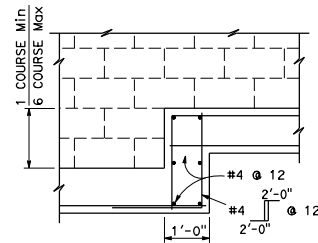


**SECTION A-A**  
For details not shown, see other sections.  
**H=6'-0" THRU H=10'-0"**

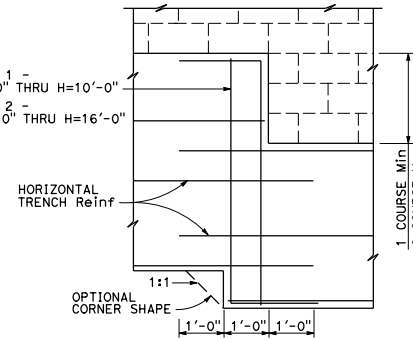


**SECTION A-A**                      **SECTION B-B**  
For details not shown, see other sections.  
**H=12'-0" THRU H=16'-0"**

Note 1: For details not shown, see Standard Plan B15-1



**SPREAD FOOTING**



**TRENCH FOOTING**  
**FOOTING STEP DETAILS**

**DESIGN NOTES:**

**DESIGN**

Uniform Building Code, 1997 Edition and the Bridge Design Specifications.

**DESIGN WIND LOAD**

20 psf

**DESIGN SEISMIC LOAD**

0.57 Dead load

**REINFORCED CONCRETE**

f'c = 3.6 ksi  
fy = 60 ksi

**CONCRETE MASONRY**

**REGULAR STRENGTH**

f'm = 1500 psi  
fb = 495 psi  
fs = 24,000 psi  
n = 25.8

**HIGH STRENGTH**

f'm = 2000 psi    f'm = 2500 psi  
fb = 660 psi      fb = 830 psi  
fs = 24,000 psi    fs = 24,000 psi  
n = 19.3            n = 15.5

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DEPARTMENT OF TRANSPORTATION

**SOUND WALL  
MASONRY BLOCK ON FOOTING  
DETAILS (2)**

NO SCALE

**B15-2**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

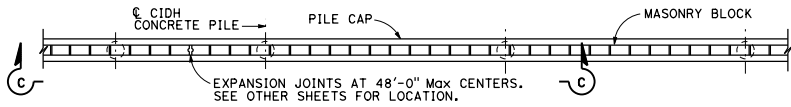
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Dist	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	No.	SHEETS

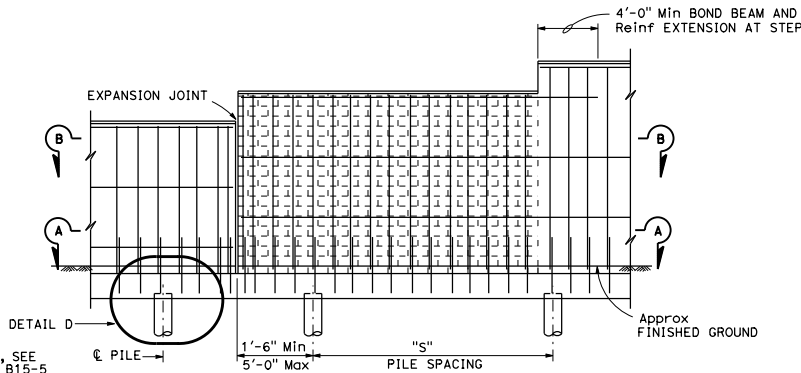
REGISTERED CIVIL ENGINEER  
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 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE

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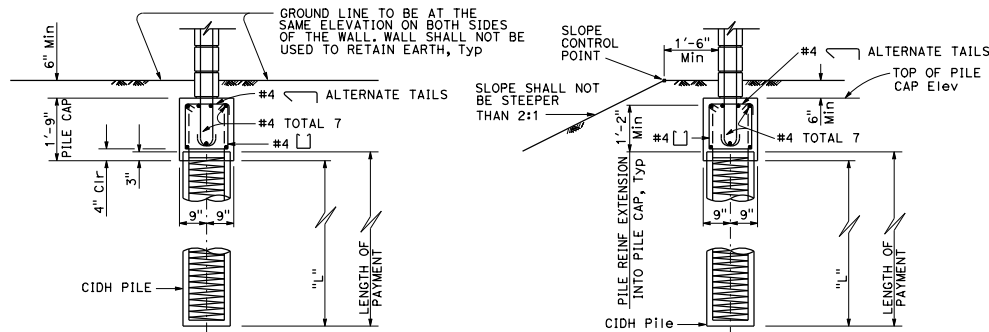
PLAN



ELEVATION C-C

NOTE:  
 FOR "DETAIL D", SEE STANDARD PLAN B15-5

Note I : For details not shown, see Standard Plans B15-4 and B15-5.  
 Note II: See Standard Plan B15-9 for other details.



CASE 1

For details not shown, see Case 2.  
 Level ground (±10%) on one side of the sound wall.

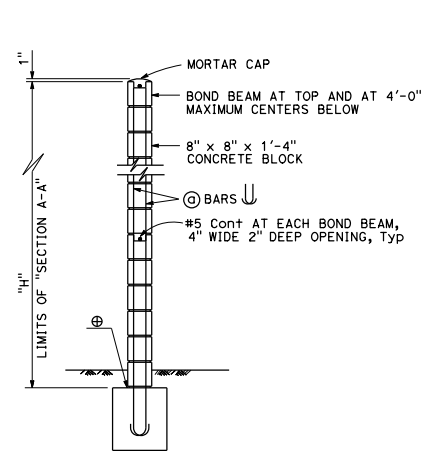
CASE 2

For details not shown, see Case 1.  
 Level ground (±10%) on one side of the sound wall and sloping ground on the opposite side.

PILE CAP SECTION

SOUND WALL REINFORCEMENT TABLE

MAXIMUM "H"	⊕ BARS @ 1'-4" Max	⊕ BARS @ 1'-4" Max	"y"	f'm (psi)	COMPRESSIVE STRENGTH OF CMU (psi)	MAXIMUM "H"
6'-0"	#4	—	—	1500	1900	6'-0"
8'-0"	#4	—	—	1500	1900	8'-0"
10'-0"	#4	—	—	1500	1900	10'-0"
12'-0"	#5	#4	6'-0"	1500	1900	12'-0"
14'-0"	#6	#4	8'-0"	1500	1900	14'-0"
16'-0"	#6	#4	10'-0"	2000	2800	16'-0"



H=6'-0" THRU H=10'-0"

H=12'-0" THRU H=16'-0"

For details not shown, see H=6'-0" thru H=10'-0".

TYPICAL SECTION

⊕ Full mortar bed at bottom of wall.

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**SOUND WALL  
 MASONRY BLOCK ON PILE CAP  
 DETAILS (1)**

NO SCALE

**B15-3**

2015 STANDARD PLAN B15-3

335

**GENERAL NOTES:**

1. For type of block and joint finish, see other sheets.
2. When blocks are laid in stacked bond, ladder type, galvanized joint reinforcement shall be provided. A minimum of 2-9 gauge wires continuous at 4'-0" maximum to be used. Locate reinforcement in joints that are at the approximate midpoint between bond beams.
3. Horizontal joints shall be tooled concave or may be weathered. Vertical joints shall be tooled concave or may be raked.
4. For intermediate wall heights that are between the "H's" given, use the tabular information for the next higher "H".
5. Masonry strengths are listed in the "SOUND WALL REINFORCEMENT TABLE". See Standard Plan B15-3.

**DESIGN NOTES:**

**DESIGN**

Uniform Building Code, 1997 Edition and the Bridge Design Specifications.

**DESIGN WIND LOAD**

20 psf

**DESIGN SEISMIC LOAD**

0.57 Dead load

**REINFORCED CONCRETE**

$f'_c = 3.6 \text{ ksi}$   
 $f_y = 60 \text{ ksi}$

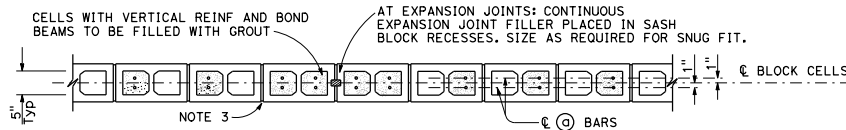
**CONCRETE MASONRY**

**REGULAR STRENGTH**

$f'_m = 1500 \text{ psi}$   
 $f_b = 495 \text{ psi}$   
 $f_s = 24,000 \text{ psi}$   
 $n = 25.8$

**HIGH STRENGTH**

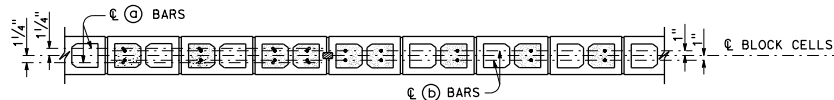
$f'_m = 2000 \text{ psi}$	$f'_m = 2500 \text{ psi}$
$f_b = 660 \text{ psi}$	$f_b = 830 \text{ psi}$
$f_s = 24,000 \text{ psi}$	$f_s = 24,000 \text{ psi}$
$n = 19.3$	$n = 15.5$



**SECTION A-A**

For details not shown, see other sections.

**H=6'-0" THRU H=10'-0"**



**SECTION A-A**

**SECTION B-B**

For details not shown, see other sections.

**H=12'-0" THRU H=16'-0"**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
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STATE OF CALIFORNIA

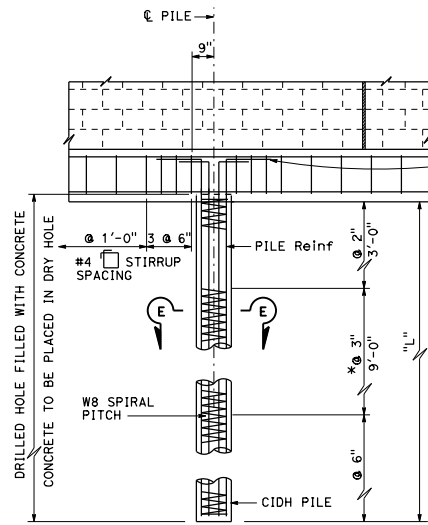
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DEPARTMENT OF TRANSPORTATION  
**SOUND WALL  
MASONRY BLOCK ON PILE CAP  
DETAILS (2)**

NO SCALE

**B15-4**

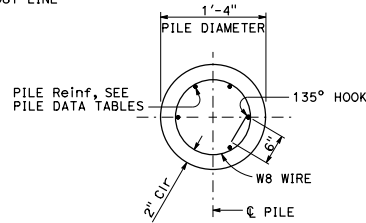




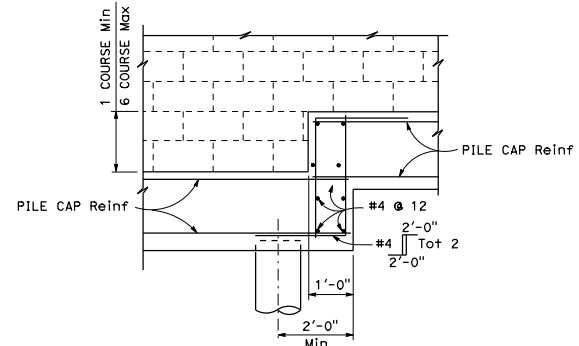
**DETAIL D**

\* @ 2" at option of Contractor

PILE HOOKS PARALLEL TO WALL LAYOUT LINE



**SECTION E-E**



**PILE CAP STEP DETAIL**

**NOTE:**

1. For details not shown, see Standard Plans B15-3 and B15-4.

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
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MAXIMUM H	ø = 25 Min			ø = 30 Min			ø = 35 Min			MAXIMUM H
	S	L	PILE Reinf	S	L	PILE Reinf	S	L	PILE Reinf	
6'-0"	16'-0"	7'-0"	#6 Tot 6	16'-0"	5'-6"	#6 Tot 6	16'-0"	4'-6"	#6 Tot 6	6'-0"
8'-0"	16'-0"	8'-6"	#6 Tot 7	16'-0"	7'-0"	#6 Tot 7	16'-0"	5'-6"	#6 Tot 7	8'-0"
10'-0"	16'-0"	10'-0"	#7 Tot 6	16'-0"	8'-0"	#7 Tot 6	16'-0"	6'-6"	#7 Tot 6	10'-0"
12'-0"	15'-0"	11'-6"	#8 Tot 7	16'-0"	9'-6"	#8 Tot 7	16'-0"	7'-6"	#8 Tot 7	12'-0"
14'-0"	13'-0"	11'-6"	#8 Tot 7	14'-0"	10'-0"	#8 Tot 7	14'-0"	8'-0"	#8 Tot 7	14'-0"
16'-0"	12'-0"	12'-0"	#8 Tot 7	13'-0"	10'-6"	#8 Tot 7	13'-0"	8'-6"	#8 Tot 7	16'-0"

Case 1 - Level ground (±10%) on both sides of the sound wall.

MAXIMUM H	ø = 30 Min			ø = 35 Min			MAXIMUM H
	S	L	PILE Reinf	S	L	PILE Reinf	
6'-0"	16'-0"	11'-6"	#8 Tot 7	16'-0"	8'-6"	#6 Tot 7	6'-0"
8'-0"	16'-0"	14'-0"	#8 Tot 7	16'-0"	10'-6"	#7 Tot 6	8'-0"
10'-0"	15'-0"	16'-0"	#8 Tot 7	16'-0"	12'-0"	#7 Tot 7	10'-0"
12'-0"	12'-0"	16'-0"	#8 Tot 7	15'-0"	13'-6"	#8 Tot 7	12'-0"
14'-0"	10'-0"	16'-0"	#8 Tot 7	12'-0"	13'-6"	#8 Tot 7	14'-0"
16'-0"	8'-0"	16'-0"	#8 Tot 7	11'-0"	14'-0"	#8 Tot 7	16'-0"

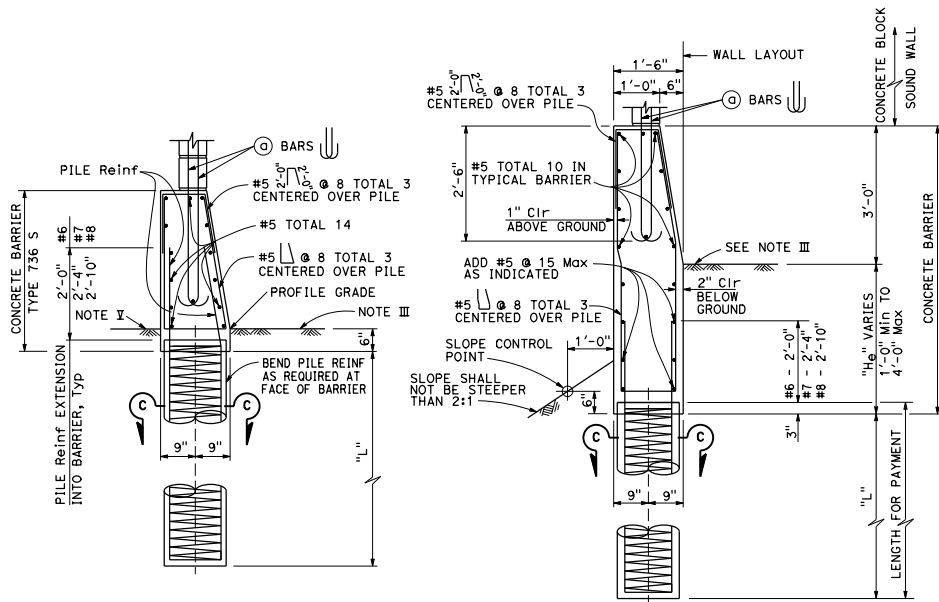
Case 2 - Level ground (±10%) on traffic side of the sound wall and sloping ground on opposite side.

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DEPARTMENT OF TRANSPORTATION

**SOUND WALL  
MASONRY BLOCK ON PILE CAP  
DETAILS (3)**

NO SCALE

**B15-5**



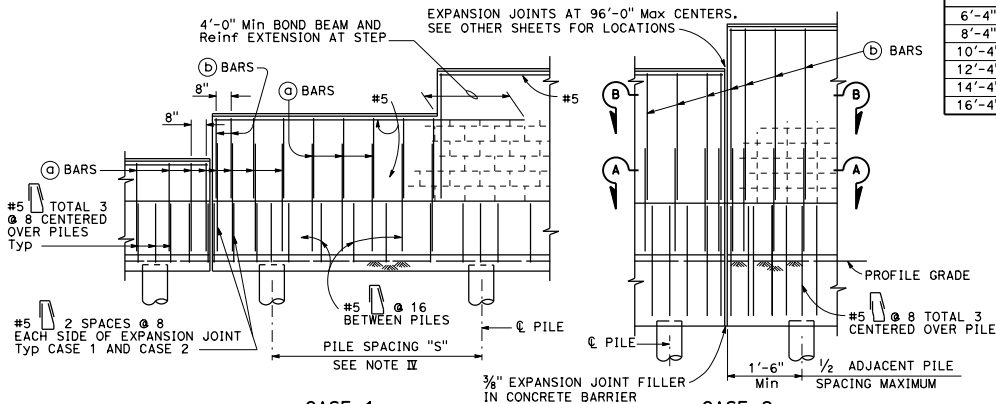
**CASE 1**

For details not shown, See Case 2. Level ground  $\pm 10\%$  on both sides of barrier.

**CASE 2**

For details not shown, See Case 1. Level ground  $\pm 10\%$  at the traffic side of barrier and sloping ground on the opposite side.

**BARRIER SECTIONS**



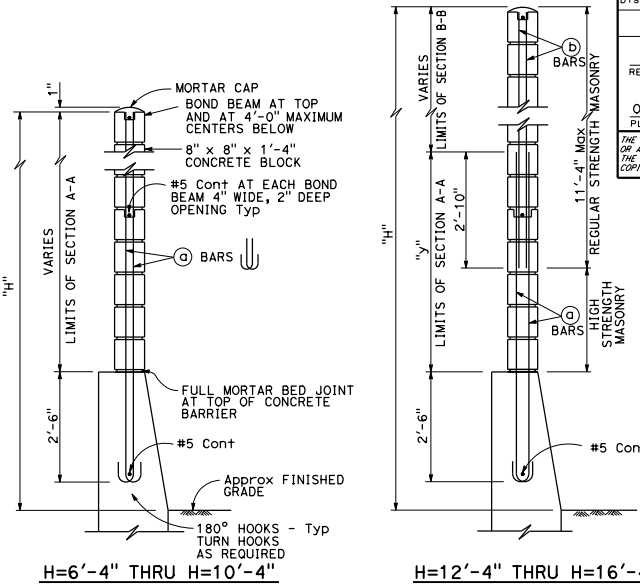
**CASE 1**

For details not shown, See Case 2.

**CASE 2**

For details not shown, See Case 1.

**PARTIAL ELEVATIONS**



**TYPICAL SECTIONS**

See Standard Plan B15-8 for pile details.

**SOUND WALL REINFORCEMENT TABLE**

MAXIMUM H	(a) BARS @ 1'-4" Max	(b) BARS @ 1'-4" Max	"y"	f'm (psi)	COMPRESSIVE STRENGTH OF CMU (psi)	H
6'-4"	#4	---	---	1500	1900	6'-4"
8'-4"	#4	---	---	1500	1900	8'-4"
10'-4"	#4	---	---	1500	1900	10'-4"
12'-4"	#5	#4	5'-0"	1500	1900	12'-4"
14'-4"	#6	#4	7'-0"	1500	1900	14'-4"
16'-4"	#6	#4	9'-0"	2500	3750	16'-4"

**NOTES I THROUGH VI:**

- I. Details shown are primarily to conform design of sound walls to Type 736S and Type 736 SV Concrete Barriers. For sound wall details conforming with barriers see Standard Plans B15-7 and B15-8.
- II. For details and sections not shown, see Standard Plans B15-7 and B15-8.
- III. Slope ground at traffic side of barrier to drain. Maximum slope  $\pm 10\%$ . See Std Plan B11-56, Note 3.
- IV. Pile spacing may be varied, but shall not exceed the tabular values. See Standard Plan B15-8.
- V. For Case 1 - ground line to be at the same elevation on both sides of the barrier. Barrier shall not be used to retain earth.
- VI. See Standard Plan B15-9 for other details.

**NOTES A THROUGH E:**

- A. For type of block, type of block bond, and joint finish, see other sheets.
- B. When blocks are laid in stacked bond, ladder type, galvanized joint reinforcement shall be provided. A minimum of 2-9 gauge wires continuous at 4'-0" maximum to be used. Locate reinforcement in joints that are at the approximate midpoint between bond beams.
- C. Horizontal joints shall be tooled concave or may be weathered. Vertical joints shall be tooled concave or may be raked.
- D. For intermediate wall heights (H), or barrier depths (H<sub>0</sub>), that are between the values given, use the tabular information for the next higher (H) or (H<sub>0</sub>).
- E. Masonry strengths are listed in the "SOUND WALL REINFORCEMENT TABLE".

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**SOUND WALL  
MASONRY BLOCK ON  
TYPE 736S/SV BARRIER  
DETAILS (1)**

NO SCALE

**B15-6**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

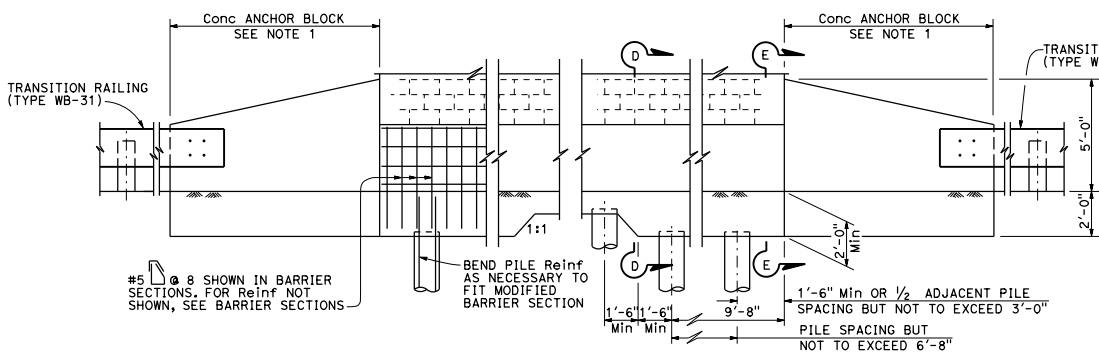
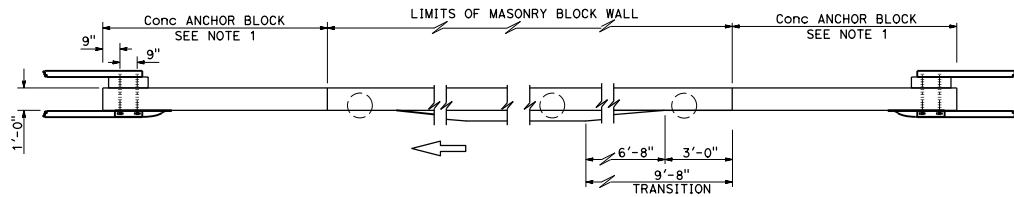
REGISTERED CIVIL ENGINEER  
Tillot Satter  
No. C42892  
PLANS APPROVAL DATE  
October 30, 2015  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Tiliot Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

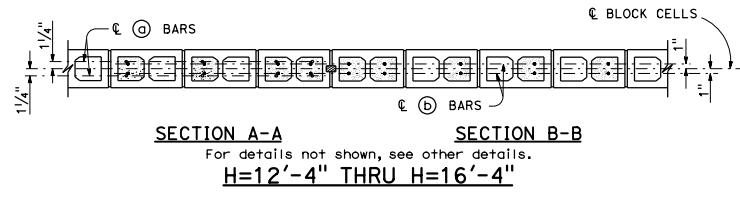
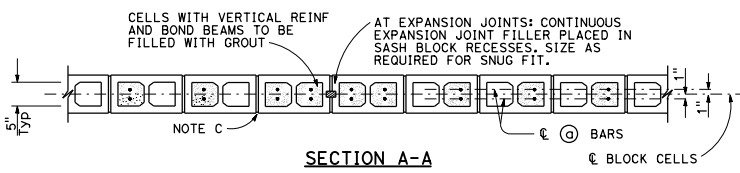
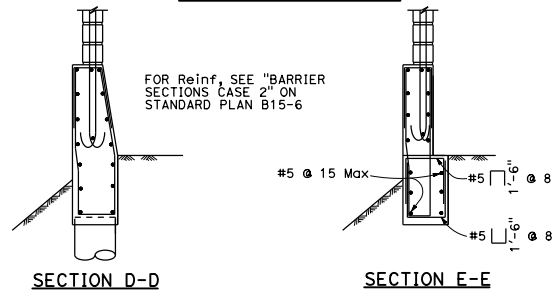
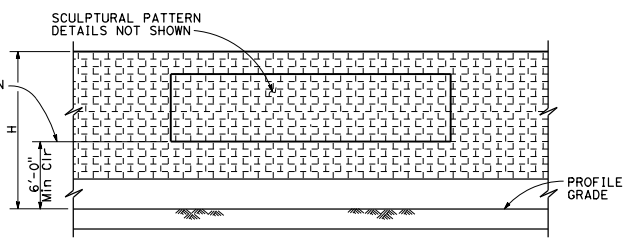
October 30, 2015  
 PLANS APPROVAL DATE

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**MIDWEST GUARDRAIL SYSTEM ANCHORAGE**

For details not shown, see Standard Plan B11-56.



**NOTE:**

1. For Concrete Anchor Block and connection details, see "Connection Detail DD" on Standard Plan A77U3.

**DESIGN NOTES:**

**DESIGN**  
 Uniform Building Code, 1997 Edition and the Bridge Design Specifications.

**DESIGN WIND LOAD**  
 27 psf

**DESIGN SEISMIC LOAD**  
 0.57 Dead load

**REINFORCED CONCRETE**  
 f'c = 3.6 ksi  
 fy = 60 ksi

**CONCRETE MASONRY**

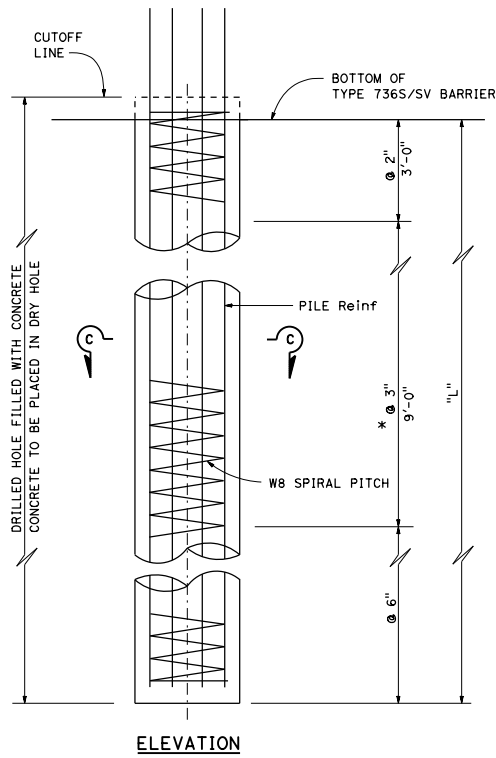
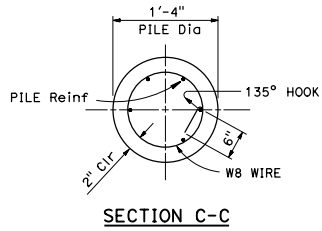
REGULAR STRENGTH	HIGH STRENGTH	
f'm = 1500 psi	f'm = 2000 psi	f'm = 2500 psi
fb = 495 psi	fb = 660 psi	fb = 830 psi
fs = 24,000 psi	fs = 24,000 psi	fs = 24,000 psi
n = 25.8	n = 19.3	n = 15.5

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**SOUND WALL MASONRY BLOCK ON TYPE 736S/SV BARRIER DETAILS (2)**

NO SCALE

**B15-7**



**CASE 1: PILE DATA TABLE**

MAXIMUM H	ø = 25 Min			ø = 30 Min			ø = 35 Min			MAXIMUM H
	S	L	PILE Reinf	S	L	PILE Reinf	S	L	PILE Reinf	
6'-4"	10'-0"	8'-6"	#6 Tot 6	10'-0"	7'-0"	#6 Tot 6	10'-0"	6'-0"	#6 Tot 6	6'-4"
8'-4"	10'-0"	9'-6"	#6 Tot 6	10'-0"	8'-0"	#6 Tot 6	10'-0"	7'-0"	#6 Tot 6	8'-4"
10'-4"	10'-0"	10'-6"	#6 Tot 6	10'-0"	9'-0"	#6 Tot 6	10'-0"	7'-6"	#6 Tot 6	10'-4"
12'-4"	10'-0"	11'-6"	#7 Tot 6	10'-0"	9'-6"	#7 Tot 6	10'-0"	8'-6"	#6 Tot 6	12'-4"
14'-4"	10'-0"	12'-6"	#7 Tot 7	10'-0"	10'-6"	#7 Tot 7	10'-0"	9'-0"	#7 Tot 7	14'-4"
16'-4"	10'-0"	13'-0"	#8 Tot 7	10'-0"	11'-6"	#8 Tot 7	10'-0"	9'-6"	#7 Tot 7	16'-4"

**CASE 2: PILE DATA TABLE**

H <sub>o</sub>	MAXIMUM H	ø = 30 Min			ø = 35 Min			MAXIMUM H
		S	L	PILE Reinf	S	L	PILE Reinf	
1'-0"	6'-4"	10'-0"	15'-0"	#7 Tot 6	10'-0"	12'-0"	#6 Tot 6	6'-4"
	8'-4"	9'-9"	16'-0"	#7 Tot 6	10'-0"	13'-0"	#7 Tot 6	8'-4"
	10'-4"	8'-0"	16'-0"	#7 Tot 6	10'-0"	14'-0"	#7 Tot 6	10'-4"
	12'-4"	6'-9"	16'-0"	#7 Tot 6	10'-0"	15'-0"	#8 Tot 7	12'-4"
	14'-4"	5'-9"	16'-0"	#7 Tot 6	9'-6"	15'-6"	#8 Tot 7	14'-4"
2'-0"	16'-4"	5'-0"	16'-0"	#7 Tot 6	8'-9"	16'-0"	#8 Tot 7	16'-4"
	6'-4"	8'-3"	16'-0"	#7 Tot 6	10'-0"	13'-6"	#7 Tot 6	6'-4"
	8'-4"	7'-0"	16'-0"	#7 Tot 6	10'-0"	14'-6"	#7 Tot 7	8'-4"
	10'-4"	6'-0"	16'-0"	#7 Tot 6	10'-0"	15'-3"	#8 Tot 7	10'-4"
	12'-4"	5'-3"	16'-0"	#7 Tot 6	9'-9"	16'-0"	#8 Tot 7	12'-4"
3'-0"	14'-4"	4'-6"	16'-0"	#7 Tot 6	8'-4"	16'-0"	#8 Tot 7	14'-4"
	16'-4"	4'-0"	16'-0"	#7 Tot 6	7'-4"	16'-0"	#8 Tot 7	16'-4"
	6'-4"	6'-0"	16'-0"	#7 Tot 6	10'-0"	15'-3"	#8 Tot 7	6'-4"
	8'-4"	5'-3"	16'-0"	#7 Tot 6	10'-0"	16'-0"	#8 Tot 7	8'-4"
	10'-4"	4'-6"	16'-0"	#7 Tot 6	8'-10"	16'-0"	#8 Tot 7	10'-4"
4'-0"	12'-4"	4'-0"	16'-0"	#7 Tot 6	7'-10"	16'-0"	#8 Tot 7	12'-4"
	14'-4"	3'-6"	16'-0"	#7 Tot 6	6'-10"	16'-0"	#8 Tot 7	14'-4"
	16'-4"	3'-3"	16'-0"	#7 Tot 6	6'-2"	16'-0"	#8 Tot 7	16'-4"
	6'-4"	4'-3"	16'-0"	#7 Tot 6	8'-0"	15'-6"	#8 Tot 7	6'-4"
	8'-4"	3'-10"	16'-0"	#7 Tot 6	7'-4"	15'-9"	#8 Tot 7	8'-4"

**NOTE:**

1. For details not shown, see Standard Plans B15-6 and B15-7.

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

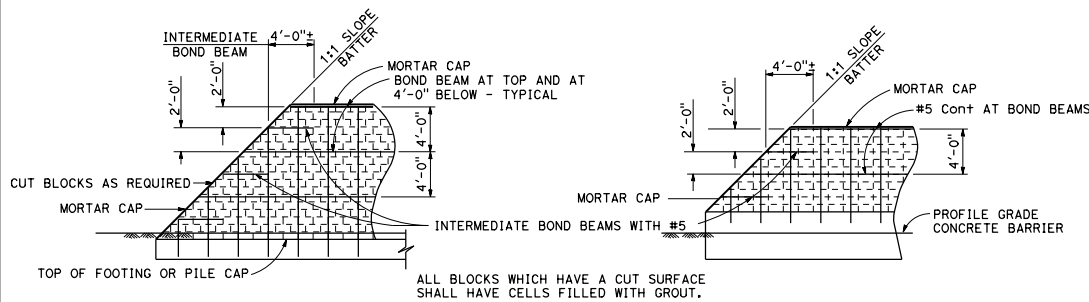
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**SOUND WALL MASONRY BLOCK  
ON TYPE 736S/SV BARRIER  
DETAILS (3)**

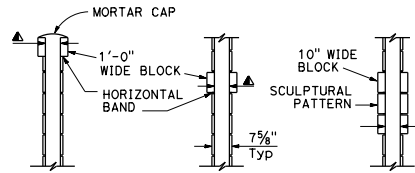
NO SCALE

**B15-8**



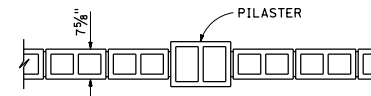
**TYPE I**

Slope batter shall not be flatter than 1:1.

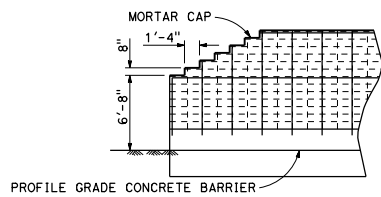


**ARCHITECTURAL ALTERNATIVES**

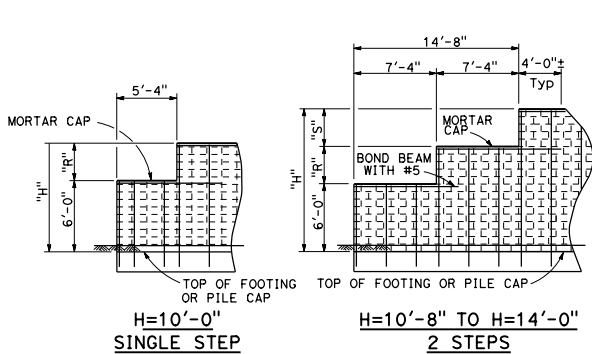
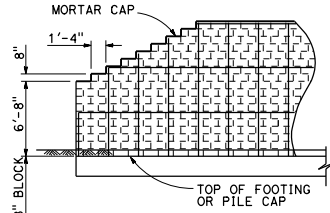
▲ Cell width to match 8" block.



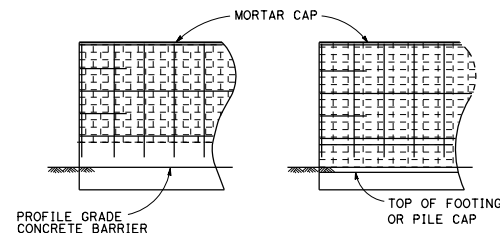
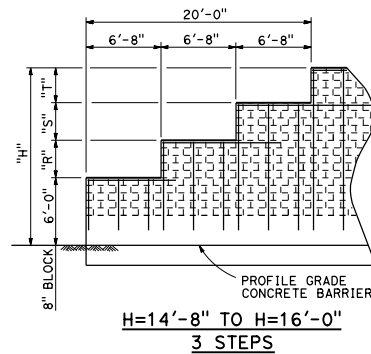
**1'-0" WIDE PROJECTING BLOCK**



**TYPE II**



**TYPE III**



**TYPE IV**

**END OF WALL DETAILS**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Tiliot Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

- 1'-0" wide block not allowed within 6'-0" of profile grade.
- For structural details, see other sheets.
- Type III not permitted for sound walls with "H" less than 10'-0".
- The end of the wall details may be used with any of the standard supporting foundations for masonry block. The foundations shown for the different types are for the purpose of illustration only.

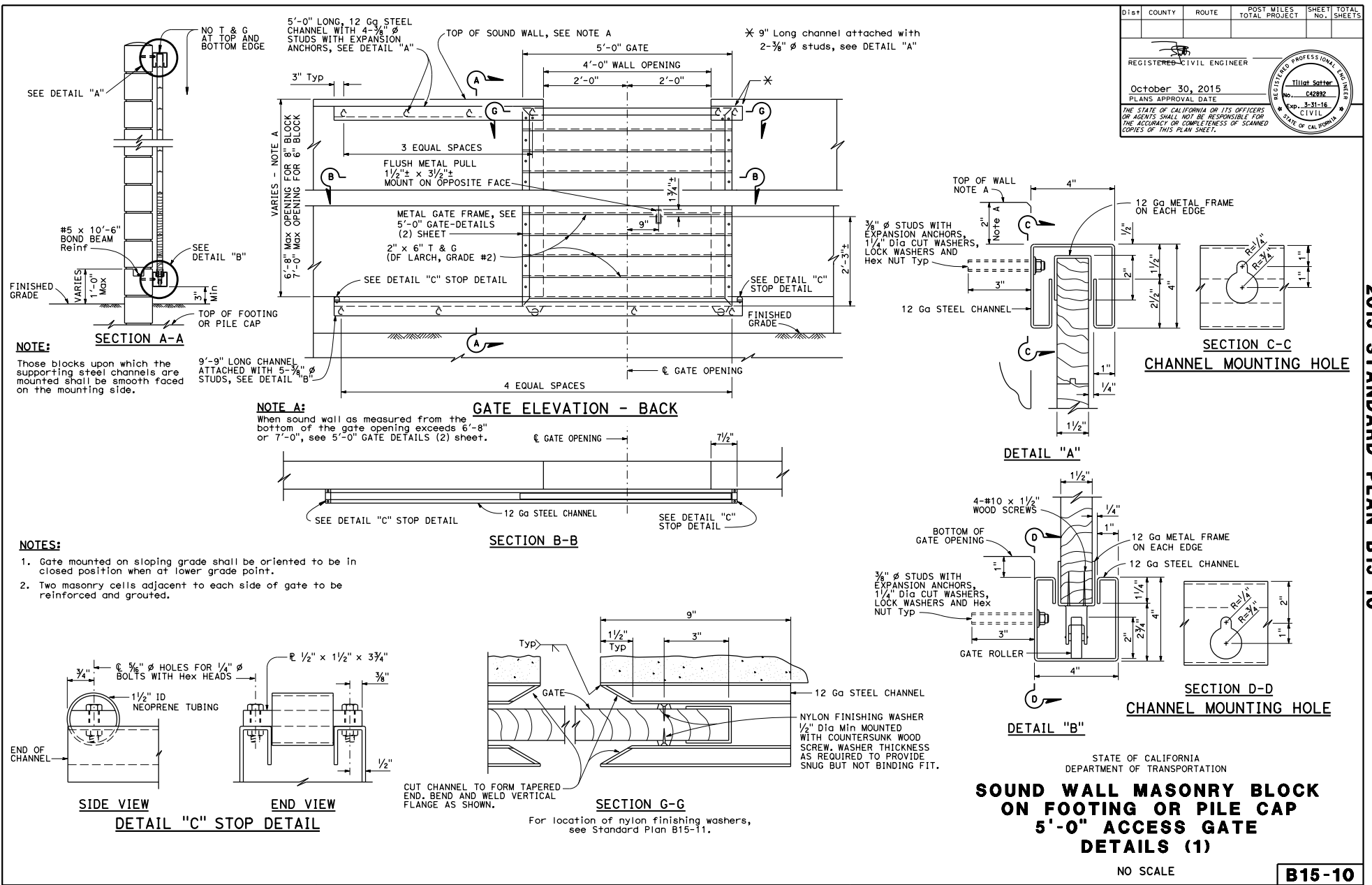
**8" x 8" x 16" BLOCK**

H	R	S	T
10'-0"	4'-0"	—	—
10'-8"	2'-8"	2'-0"	—
11'-4"	2'-8"	2'-8"	—
12'-0"	3'-4"	2'-8"	—
12'-8"	3'-4"	3'-4"	—
13'-4"	4'-0"	3'-4"	—
14'-0"	4'-0"	4'-0"	—
14'-8"	3'-4"	2'-8"	2'-8"
15'-4"	3'-4"	3'-4"	2'-8"
16'-0"	3'-4"	3'-4"	3'-4"

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**SOUND WALL  
 MASONRY BLOCK  
 MISCELLANEOUS DETAILS**

NO SCALE

**B15-9**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Tiliot Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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2015 STANDARD PLAN B15-10

**NOTE:**  
 Those blocks upon which the supporting steel channels are mounted shall be smooth faced on the mounting side.

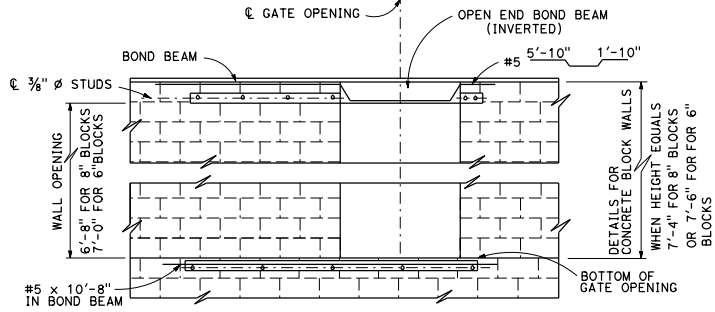
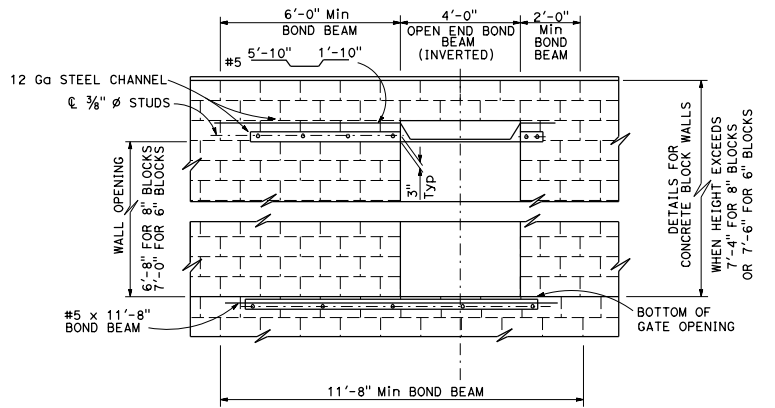
**NOTE A:**  
 When sound wall as measured from the bottom of the gate opening exceeds 6'-8" or 7'-0", see 5'-0" GATE DETAILS (2) sheet.

- NOTES:**
1. Gate mounted on sloping grade shall be oriented to be in closed position when at lower grade point.
  2. Two masonry cells adjacent to each side of gate to be reinforced and grouted.

**SOUND WALL MASONRY BLOCK ON FOOTING OR PILE CAP 5'-0" ACCESS GATE DETAILS (1)**

NO SCALE

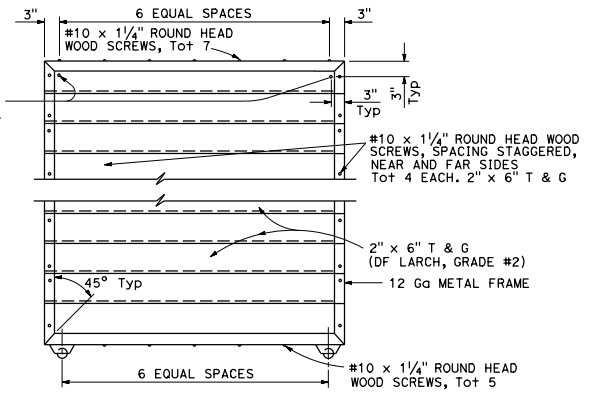
**B15-10**



**PART ELEVATION (BACK)**

For details not shown, see above.

2-NYLON FINISHING WASHERS 1/2" Dia Min MOUNTED WITH COUNTER SUNK WOOD SCREW. WASHER THICKNESS AS REQUIRED TO PROVIDE SNUG BUT NOT BINDING FIT



**ELEVATION - METAL FRAME**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

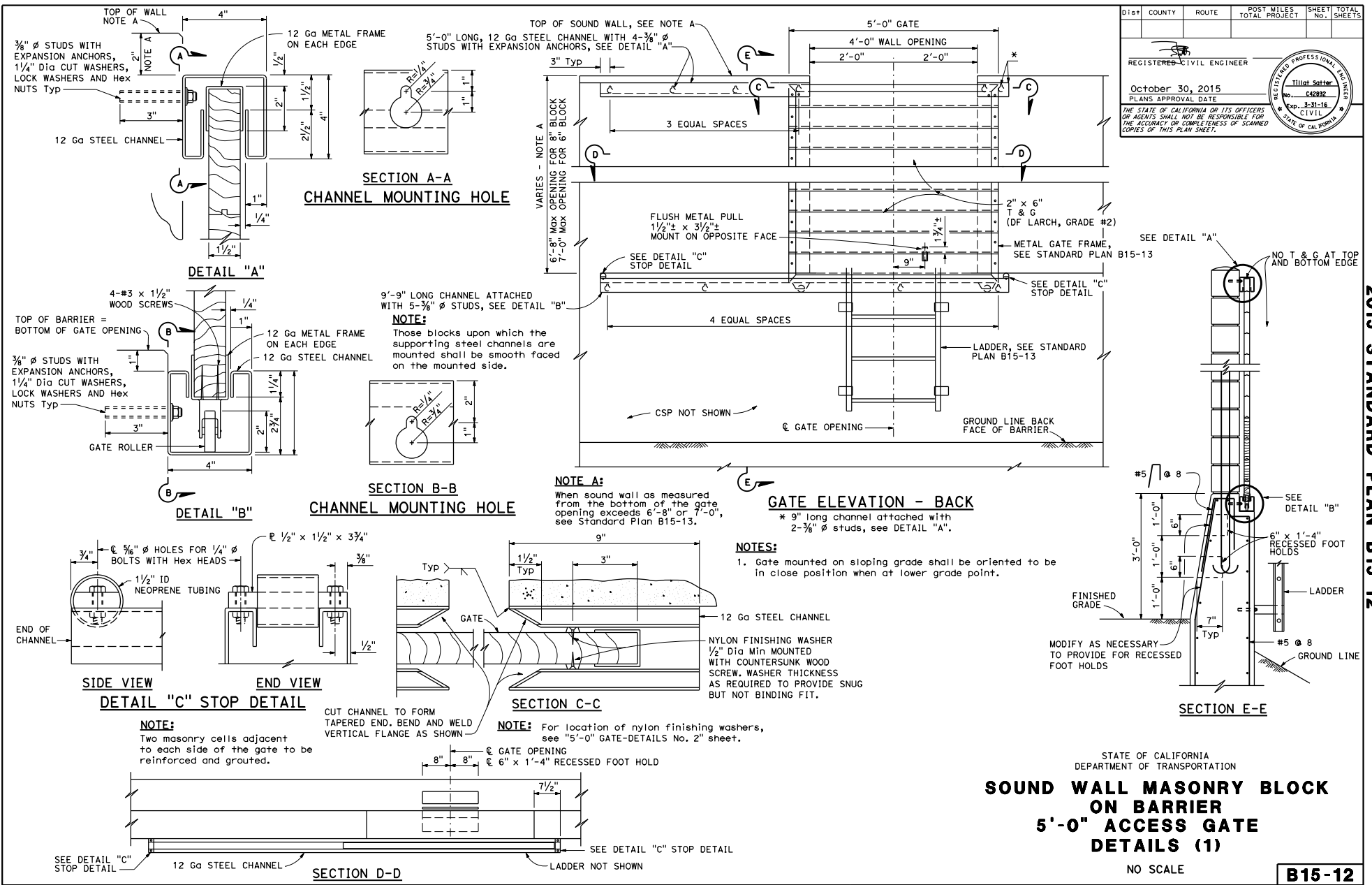
REGISTERED CIVIL ENGINEER  
 Tillet Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**SOUND WALL MASONRY BLOCK  
 ON FOOTING OR PILE CAP  
 5'-0" ACCESS GATE  
 DETAILS (2)**

NO SCALE

**B15-11**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 T. J. Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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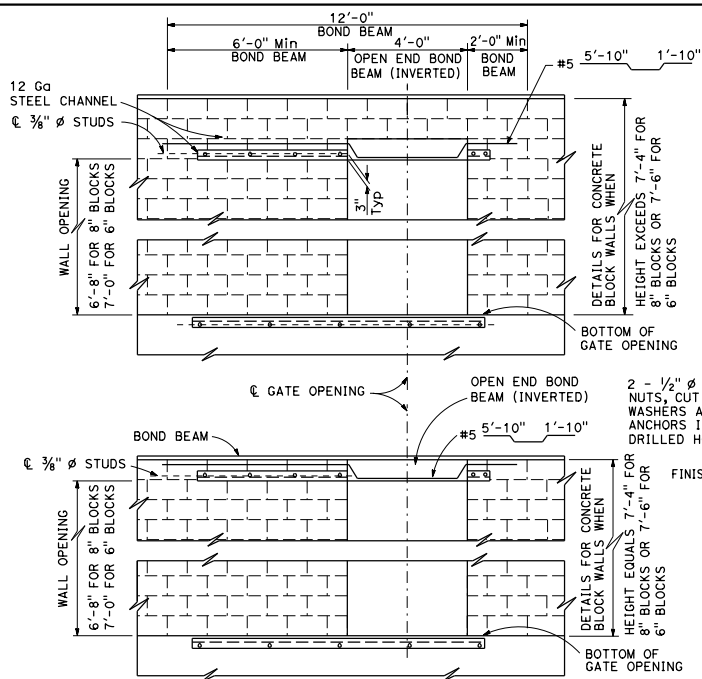
**SOUND WALL MASONRY BLOCK ON BARRIER 5'-0" ACCESS GATE DETAILS (1)**

NO SCALE

**B15-12**

2015 STANDARD PLAN B15-12





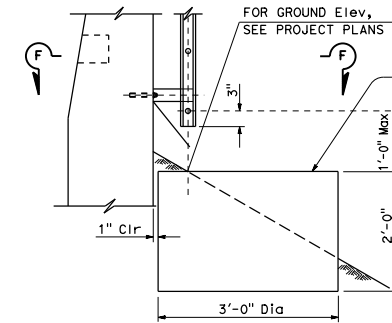
**PART ELEVATION (BACK)**

For details not shown, see above.

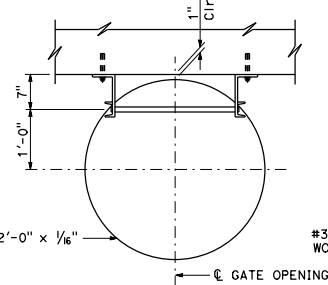
**NOTE:**

CSP landing required when slope of ground behind barrier is steeper than 8:1. See additional detail sheets for location where required

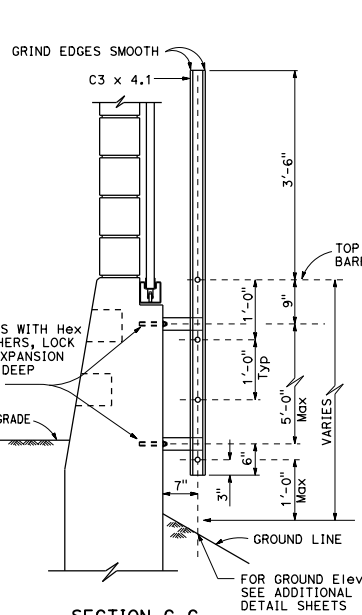
CSP INTERIOR TO BE BACKFILLED  
 LOWER CSP AS REQUIRED TO PROVIDE MINIMUM CLEARANCE  
 1'-0" Max  
 6" Min  
 2'-0"



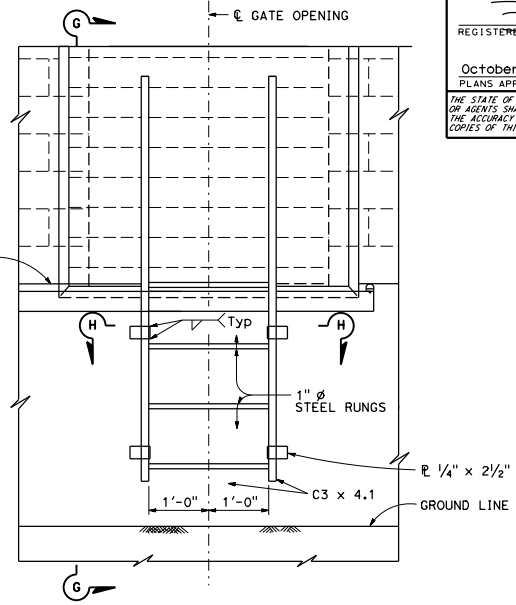
**CORRUGATED STEEL PIPE LANDING DETAILS**



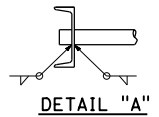
**SECTION F-F**



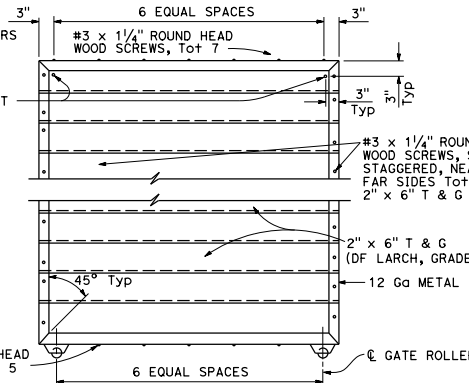
**SECTION G-G**



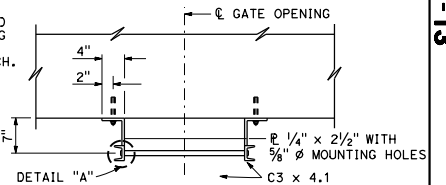
**ELEVATION (BACK)**



2-NYLON FINISHING WASHERS  
 1/2" Dia Min MOUNTED WITH COUNTERSUNK WOOD SCREW. WASHER THICKNESS AS REQUIRED TO PROVIDE SNUG BUT NOT BINDING FIT



**ELEVATION - METAL FRAME**



**SECTION H-H**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**SOUND WALL MASONRY BLOCK ON BARRIER  
 5'-0" ACCESS GATE  
 DETAILS (2)**

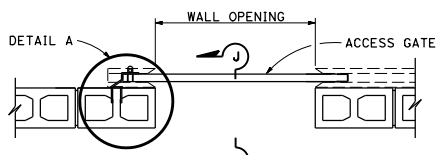
NO SCALE

**B15-13**

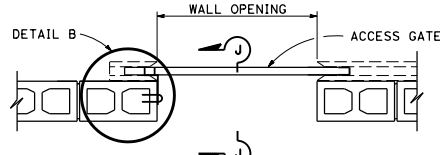
Dist#	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	NO.	SHEETS

REGISTERED CIVIL ENGINEER  
 Tiliot Satter  
 No. C42892  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

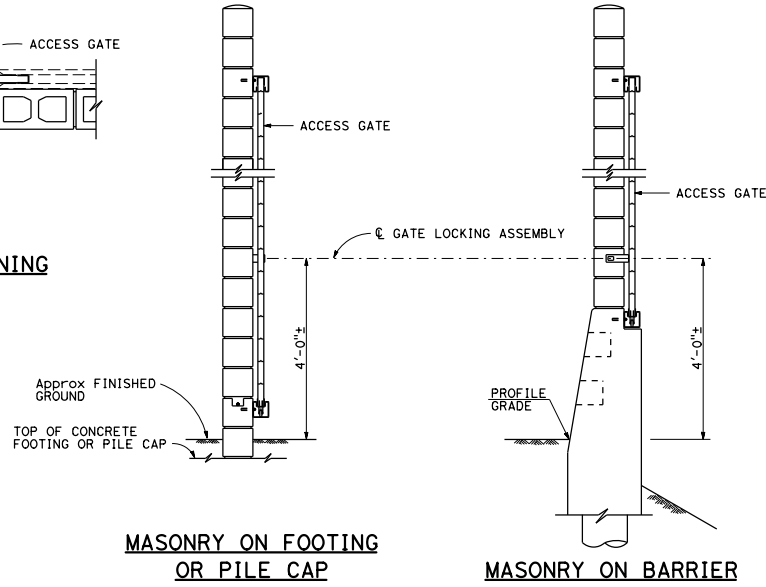
October 30, 2015  
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**PLAN  
LOCK ON  
GATE SIDE OF WALL**



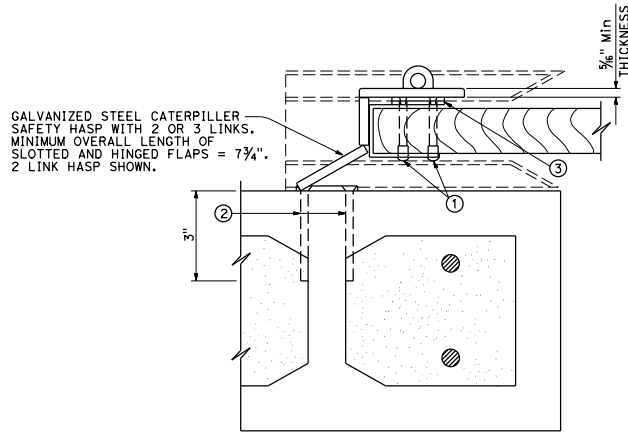
**PLAN  
LOCK ON  
INSIDE OF WALL OPENING**



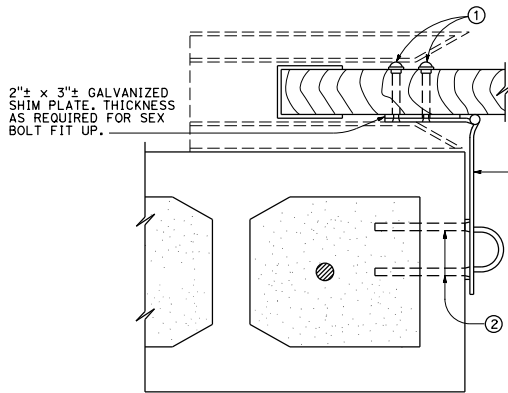
**MASONRY ON FOOTING  
OR PILE CAP**

**MASONRY ON BARRIER**

**SECTION J-J**



**DETAIL A**



**DETAIL B**

**NOTES:**

1. Masonry anchors to be installed after the grout in the block cells has attained specified strength.
2. Contractor may submit alternative gate locking assemblies for approval by the Engineer.
3. See other sheets for gate details.

- ① 4 - SEX BOLTS WITH 1/4" - 20 FLAT HEAD CORROSION RESISTANT MACHINE SCREWS.
- ② 4 - 1/4" Ø x 3" LONG FLAT HEAD SLEEVE TYPE CORROSION RESISTANT MASONRY ANCHORS.
- ③ GALVANIZED SHIM PLATE. SIZE AS REQUIRED TO MATCH HASP STAPLE PLATE±. THICKNESS AS REQUIRED FOR SEX BOLT FIT UP.

GALVANIZED HEAVY DUTY WROUGHT STEEL SAFETY HASP AND STAPLE PLATE. MINIMUM LENGTH OF SLOTTED FLAP = 6" SLOT TO BE HORIZONTAL.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**SOUND WALL MASONRY BLOCK  
ACCESS GATE LOCKING  
DETAILS**

NO SCALE

**B15-14**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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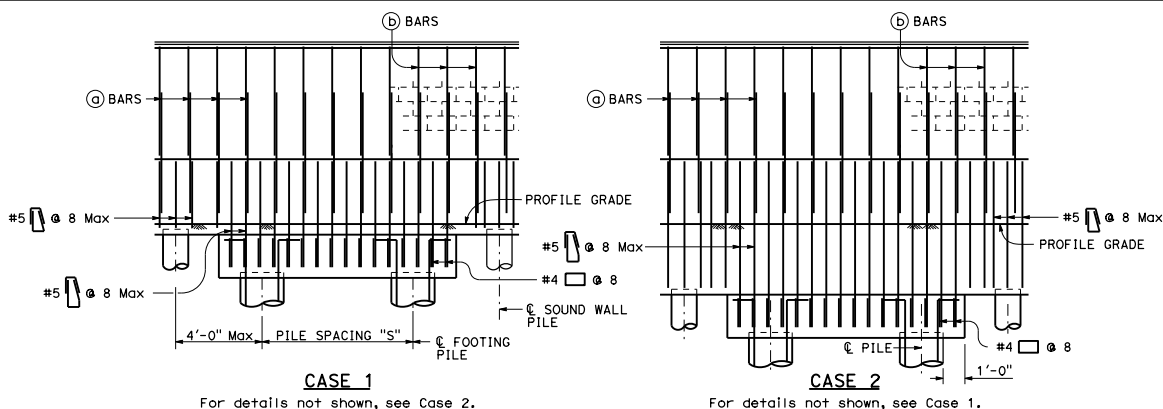
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Tillot Satter  
No. C42892  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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**PART ELEVATIONS**

**DESIGN NOTES:**

**DESIGN**  
Uniform Building Code, 1997 Edition and the Bridge Design Specifications.

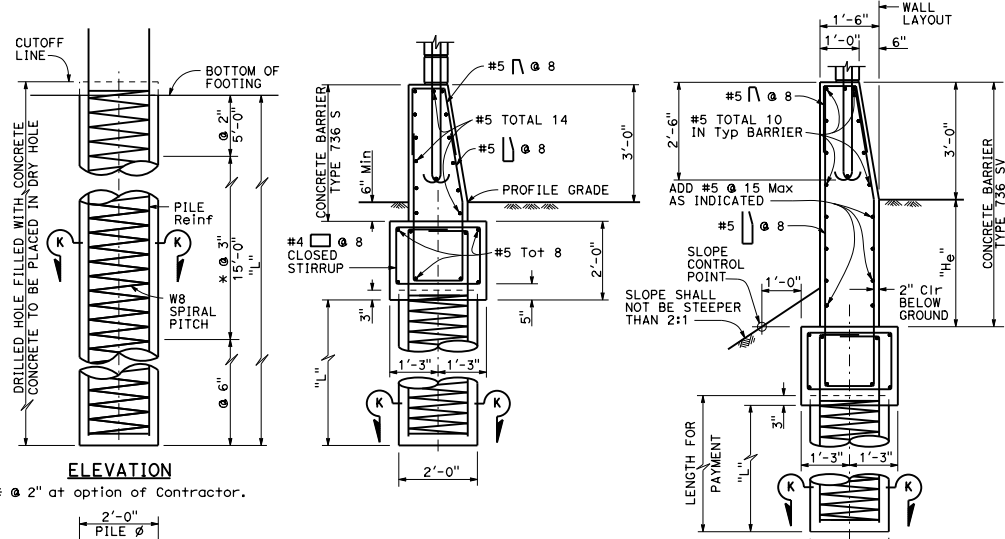
**DESIGN WIND LOAD**  
27 psf

**REINFORCED CONCRETE**  
f'c = 3.6 ksi  
fy = 60 ksi

**DESIGN SEISMIC LOAD**  
0.57 Dead load

**CONCRETE MASONRY**

<b>REGULAR STRENGTH</b>	<b>HIGH STRENGTH</b>
f'm = 1500 psi	f'm = 2000 psi
fb = 495 psi	fb = 660 psi
fs = 24,000 psi	fs = 24,000 psi
n = 25.8	n = 19.3
	fb = 830 psi
	fs = 24,000 psi
	n = 15.5



**CASE 1**  
Level ground  $\pm 10\%$  on both sides of barrier.  
For details not shown, see Case 2.

**CASE 2**  
Level ground  $\pm 10\%$  at the traffic side of barrier and sloping ground on the opposite side.  
For details not shown, see Case 1.

**BARRIER SECTIONS**

**CASE 1 : PILE DATA TABLE**

MAXIMUM H	$\phi = 25$		$\phi = 30$		$\phi = 35$		MAXIMUM H
	S	L	S	L	S	L	
6'-4"	16'-0"	8'-6"	16'-0"	7'-6"	16'-0"	6'-0"	6'-4"
8'-4"	16'-0"	9'-6"	16'-0"	8'-0"	16'-0"	7'-0"	8'-4"
10'-4"	16'-0"	10'-6"	16'-0"	9'-0"	16'-0"	7'-6"	10'-4"
12'-4"	16'-0"	11'-6"	16'-0"	10'-0"	16'-0"	8'-6"	12'-4"
14'-4"	16'-0"	12'-6"	16'-0"	11'-0"	16'-0"	9'-0"	14'-4"
16'-4"	16'-0"	13'-6"	16'-0"	11'-6"	16'-0"	10'-0"	16'-4"

**CASE 2 : PILE DATA TABLE**

He	H	$\phi = 30$		$\phi = 35$		H
		S	L	S	L	
1'-0"	6'-4"	16'-0"	15'-6"	16'-0"	12'-0"	6'-4"
	8'-4"	16'-0"	17'-0"	16'-0"	13'-6"	8'-4"
	10'-4"	16'-0"	18'-0"	16'-0"	14'-6"	10'-4"
	12'-4"	16'-0"	19'-6"	16'-0"	15'-6"	12'-4"
	14'-4"	16'-0"	20'-6"	16'-0"	16'-6"	14'-4"
	16'-4"	16'-0"	21'-6"	16'-0"	17'-6"	16'-4"
2'-0"	6'-4"	16'-0"	18'-0"	16'-0"	14'-0"	6'-4"
	8'-4"	16'-0"	19'-0"	16'-0"	15'-0"	8'-4"
	10'-4"	16'-0"	20'-0"	16'-0"	16'-0"	10'-4"
	12'-4"	16'-0"	21'-6"	16'-0"	17'-0"	12'-4"
	14'-4"	16'-0"	22'-6"	16'-0"	18'-0"	14'-4"
	16'-4"	14'-6"	22'-6"	16'-0"	18'-6"	16'-4"
3'-0"	6'-4"	16'-0"	20'-6"	16'-0"	15'-6"	6'-4"
	8'-4"	16'-0"	21'-6"	16'-0"	16'-6"	8'-4"
	10'-4"	15'-6"	22'-0"	16'-0"	17'-6"	10'-4"
	12'-4"	14'-0"	22'-0"	16'-0"	18'-6"	12'-4"
	14'-4"	13'-0"	22'-6"	15'-6"	19'-0"	14'-4"
	16'-4"	12'-0"	22'-6"	14'-0"	19'-0"	16'-4"
4'-0"	6'-4"	13'-0"	21'-0"	16'-0"	17'-6"	6'-4"
	8'-4"	12'-3"	21'-6"	15'-3"	18'-0"	8'-4"
	10'-4"	11'-6"	21'-6"	14'-3"	18'-6"	10'-4"
	12'-4"	10'-9"	22'-0"	13'-3"	18'-6"	12'-4"
	14'-4"	10'-0"	22'-0"	12'-3"	18'-6"	14'-4"
	16'-4"	9'-6"	22'-6"	11'-3"	19'-0"	16'-4"

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**SOUND WALL MASONRY BLOCK  
ON TYPE 736S/SV BARRIER ON  
PILE FOOTING FOR  
SPANNING UTILITIES**

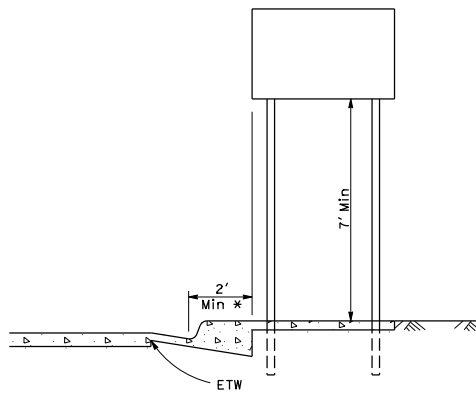
NO SCALE

**B15-15**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

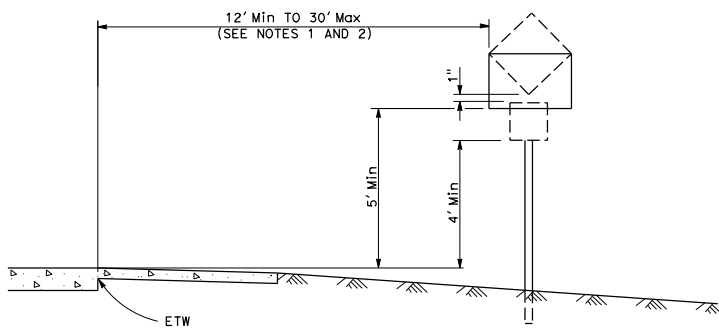
*Donald E. Howe*  
 REGISTERED CIVIL ENGINEER  
 No. C46402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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\* 1' Min WHERE LATERAL CLEARANCE LIMITED

**URBAN LOCATIONS**



**RURAL LOCATIONS**

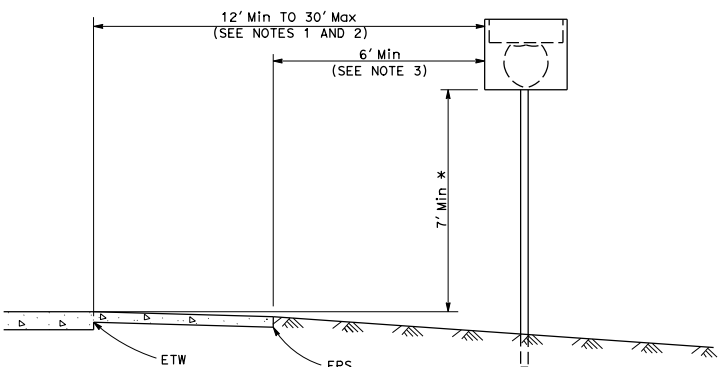
**CONVENTIONAL HIGHWAYS AND INTERCHANGE AREAS**

**NOTES:**

1. When clear roadside recovery areas are provided, signs shall be placed as far from the edge of traveled way as possible, up to a maximum of 30'. When possible, they shall be placed in protected locations.
2. Signs in medians shall be placed at midpoint of median up to a maximum distance of 30' from edge of traveled way. When appropriate, signs for opposing directions shall be placed back to back.
3. Does not apply at locations where minimum horizontal distance is not reasonable due to terrain characteristics, steep slopes, roadway features, or when signs are installed on structures or signal or lighting standards.

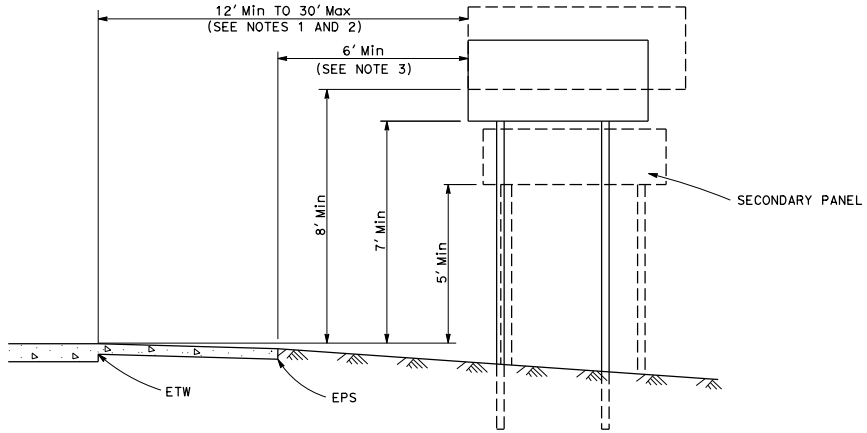
**ABBREVIATION:**

EPS = Edge of Paved Shoulder



\* 5' Min AT 30' FROM ETW

**REGULATORY AND WARNING SIGNS AND ROUTE SHIELDS**



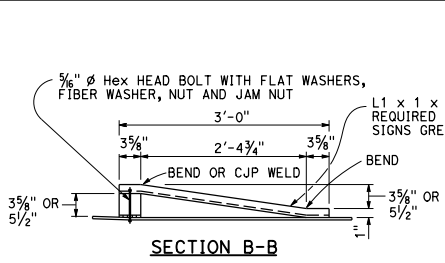
**GUIDE SIGNS**

**FREEWAY AND EXPRESSWAY LOCATIONS**

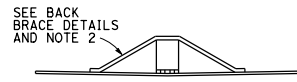
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ROADSIDE SIGNS  
 TYPICAL INSTALLATION  
 DETAILS No. 1**

NO SCALE

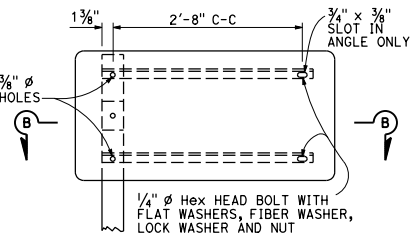
**RS1**



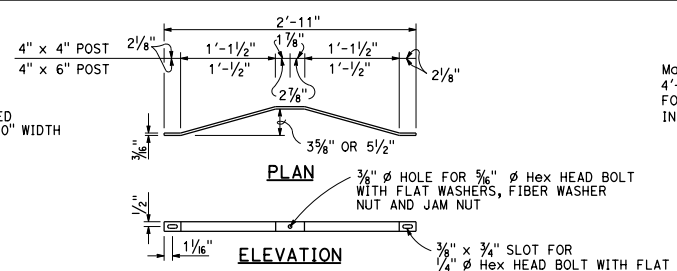
**SECTION B-B**



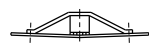
**SECTION C-C**



**UNBALANCED**

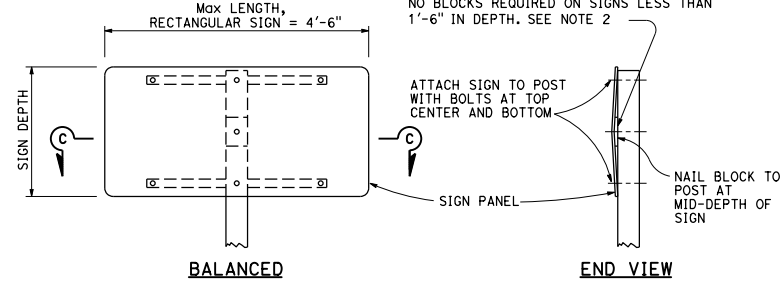


**BACK BRACE DETAILS**  
See Note 2

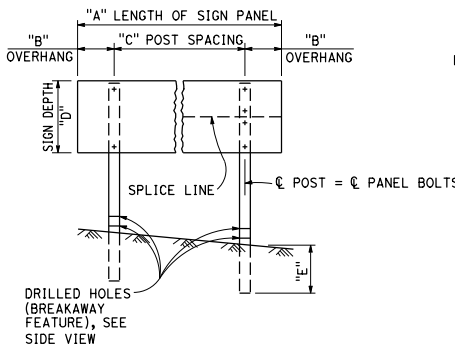


**SECTION D-D**

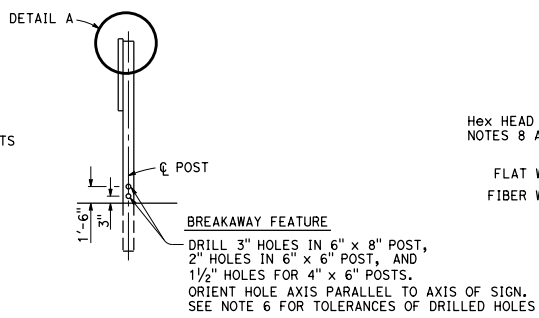
WOOD BLOCK SPACER -  
3/4" x 4" x 6" FOR  
2'-0" - 3'-0" WIDTH SIGNS  
1 1/2" x 4" x 6" FOR  
3'-1" - 4'-6" WIDTH SIGNS  
NO BLOCKS REQUIRED ON SIGNS LESS THAN  
1'-6" IN DEPTH. SEE NOTE 2



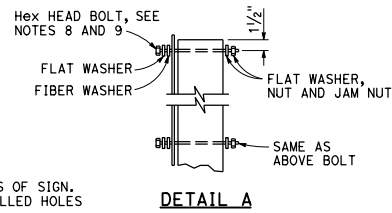
**SINGLE POST INSTALLATION**  
See Note 5 regarding breakaway feature for single post installations.



**ELEVATION**  
See Note 7

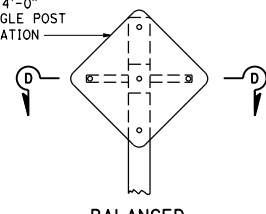


**SIDE VIEW**  
**TWO POST INSTALLATION**

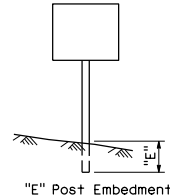


**DETAIL A**

Max DIAMOND SIGN =  
4'-0" x 4'-0"  
FOR SINGLE POST  
INSTALLATION



**BALANCED**



POST SIZE	"E"
4" x 4"	3.5'
4" x 6"	4.5'
6" x 6"	5.0'
6" x 8"	6.0'

**NOTES:**

1. Place long dimension of post cross section normal to sign axis. See Section C-C.
2. Balanced single post installations of unframed single sheet aluminum panel signs shall have block spacers if 1'-6" or more in depth and a combination of block spacers and back braces if 1'-6" or more in depth and 2'-10" or more in width. Sign panels less than 1'-6" in depth and 2'-10" or more in width shall have back braces only.
3. For post size see sign layout, format or quantity sheets.
4. Balanced single post installations of Laminated Panel and Framed single sheet panel signs require back braces when 2'-10" or more in length.
5. Breakaway feature for single post installation shall be the same as the breakaway feature shown for the two post installation.
6. Tolerance for diameter of drilled holes in breakaway feature is ±1/8".
7. Bolt hole layout is dependent on type of panel.
8. Drill holes in post to match panel.
8. 3/8" diameter for single sheet aluminum panel signs.
9. 3/8" diameter for laminated panel signs or framed single sheet aluminum panel signs.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ROADSIDE SIGNS  
WOOD POST  
TYPICAL INSTALLATION  
DETAILS No. 2**

NO SCALE

**RS2**

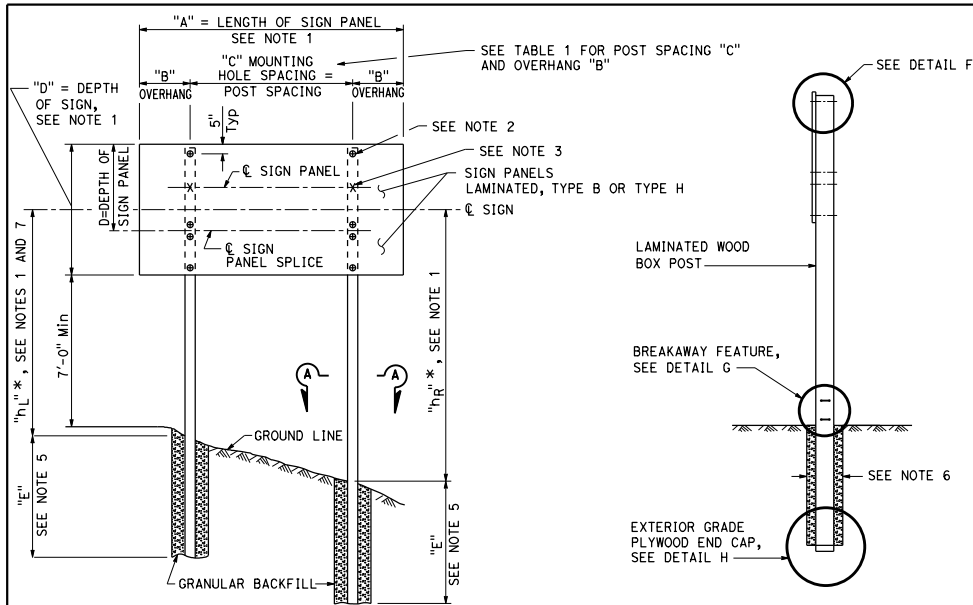
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER  
No. CS7393  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE

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POST SPACING TABLE		
SIGN PANEL LENGTH	SIGN PANEL OVERHANG	POST SPACING
"A"	"B"	"C"
4'-6"	6"	3'-6"
4'-8" TO 5'-6"	7" TO 1'-0"	3'-6"
6'-0" & 6'-6"	1'-0" & 1'-3"	4'-0"
7'-0" & 7'-6"	1'-3" & 1'-6"	4'-6"
8'-0"	1'-6"	5'-0"
8'-6"	1'-8"	5'-2"
9'-0"	1'-10"	5'-4"
9'-6"	1'-11"	5'-8"
10'-0"	2'-0"	6'-0"
10'-6"	2'-0"	6'-6"
11'-0", 11'-6", 12'-0"	2'-0", 2'-3", 2'-6"	7'-0"
12'-6"	2'-6"	7'-6"
13'-0"	2'-6"	8'-0"
13'-6", 14'-6"	2'-6", 3'-0"	8'-6"
14'-0", 15'-0"	2'-6", 3'-0"	9'-0"
15'-6", 16'-0"	3'-0", 3'-3"	9'-6"
16'-6"	3'-3"	10'-0"
17'-0", 17'-6"	3'-3", 3'-6"	10'-6"
18'-0", 18'-6"	3'-6", 3'-9"	11'-0"
19'-0"	3'-9"	11'-6"
19'-6", 20'-0"	3'-9", 4'-0"	12'-0"
20'-6", 21'-0"	4'-0", 4'-3"	12'-6"
21'-6"	4'-3"	13'-0"
22'-0", 22'-6"	4'-3", 4'-6"	13'-6"
23'-0"	4'-6"	14'-0"
23'-6", 24'-0"	4'-6", 4'-9"	14'-6"



ELEVATION

SIDE VIEW

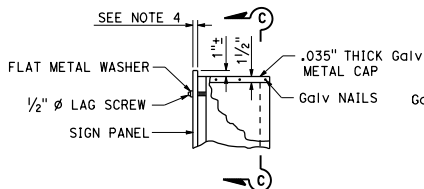
SIGN PANEL LENGTH (SEE NOTE 1)	SIGN PANEL OVERHANG	MOUNTING HOLE SPACING
"A"	"B"	"C"
8'-0"	1'-6"	5'-0"
9'-0"	1'-10"	5'-4"
10'-0"	2'-0"	6'-0"
11'-0"	2'-0"	7'-0"
12'-0"	2'-6"	7'-0"
13'-0"	2'-6"	8'-0"
14'-0"	2'-6"	9'-0"
15'-0"	3'-0"	9'-0"
16'-0"	3'-3"	9'-6"
17'-0"	3'-3"	10'-6"
18'-0"	3'-6"	11'-0"
19'-0"	3'-9"	11'-6"
20'-0"	4'-0"	12'-0"
21'-0"	4'-3"	12'-6"
22'-0"	4'-3"	13'-6"
23'-0"	4'-6"	14'-0"
24'-0"	4'-9"	14'-6"

TABLE 1

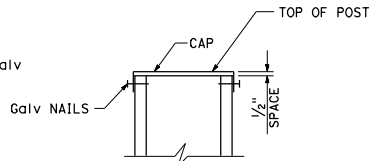
"hL" OR "hR" (IN FEET)	TOTAL SIGN AREA SQFT				
	40 TO 90	90+ TO 140	140+ TO 190	190+ TO 240	240+ TO 290
9'-0" TO 13'-0"	6'	6.5'	7.5'	8.5'	9'
13'-0"+ TO 17'-0"	6'	7'	8'	9'	10'
17'-0"+ TO 21'-0"	6'	7.5'	8'	9'	9'
21'-0"+ TO 26'-0"	7'	8'	9'		

TABLE 2

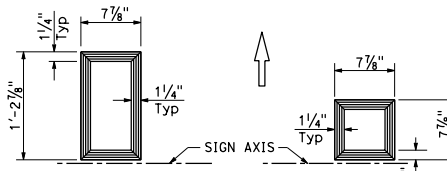
See Note 8



DETAIL F



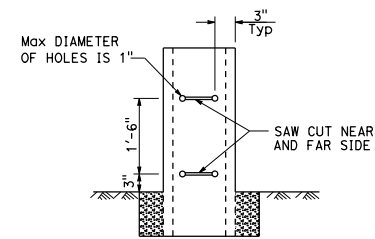
SECTION C-C



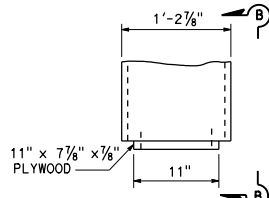
TYPE L POST

TYPE M POST

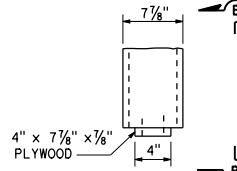
SECTION A-A



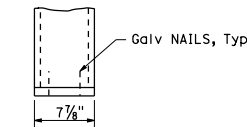
DETAIL G



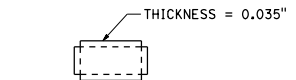
TYPE L POST



TYPE M POST



SECTION B-B



GALV METAL CAP

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ROADSIDE SIGNS  
LAMINATED WOOD BOX POST  
TYPICAL INSTALLATION  
DETAILS No. 3**

NO SCALE

RS3

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

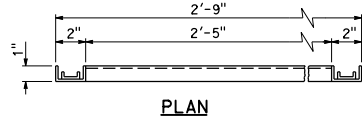
Stanley P. Johnson  
REGISTERED CIVIL ENGINEER  
No. CS7935  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE  
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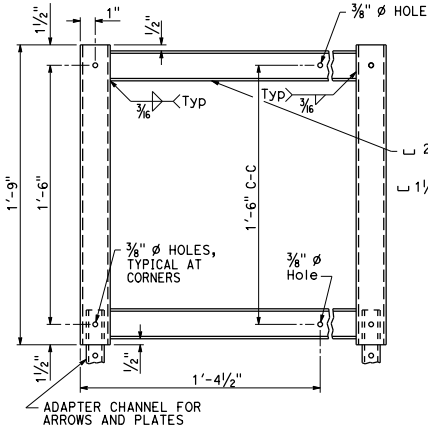
NOTES:

- See Project Plans for:  
Location of each sign.  
Length of sign panel "A".  
Depth of sign "D".  
Height "h<sub>L</sub>" and "h<sub>R</sub>" of centerline of sign above ground line at each post.  
Type of post, L and M.  
See Standard Plan RS1 for other details.
- "e" Indicates location of 1/2" lag screws and existing holes in panels. Lag screws are to be embedded at least 1" into post using 3/8" diameter pilot holes.
- "x" Indicates location of additional 1/2" lag screws required when the depth of sign panel (d) and the length of sign panel (A) are as follows:
 

A	d
17'-0" to 24'-0"	5'-0"
19'-0" to 24'-0"	4'-6"
21'-0" to 24'-0"	4'-0"
24'-0"	3'-6"
- Type B laminated sign panels are 1" nominal thick for sign lengths of 15'-0" and less. Panels over 15'-0" in length and Type H laminated sign panels are 2 1/2" nominal thick.
- Embedment "E" for Type L post shall conform to the requirements in Table 2. Embedment for Type M posts shall be 6'-0" minimum.
- Diameter of post holes for Type L posts shall be at least 2'-6". Diameter of post holes for Type M posts shall be at least 2'-0".
- Dimensions shown on project plans are for fabrication. During installation adjust these dimensions to provide A level sign approximately 7'-0" above roadway shoulder.
- Minimum post embedment "E" for Type L post.

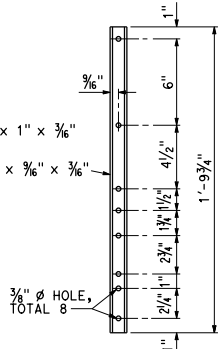


PLAN



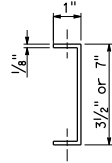
ELEVATION

GALVANIZED STEEL FRAME



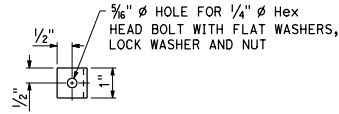
ADAPTER CHANNEL

**NOTE:**  
Adapter channel rests inside frame channel when used.

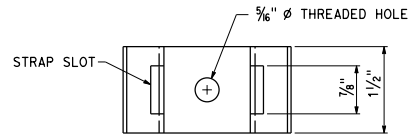


PLAN

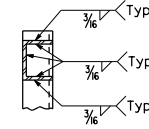
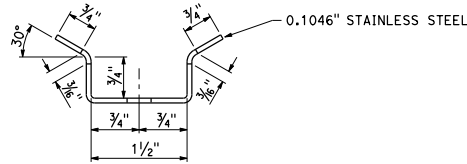
SPECIAL BRACKET



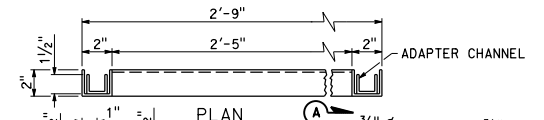
ELEVATION



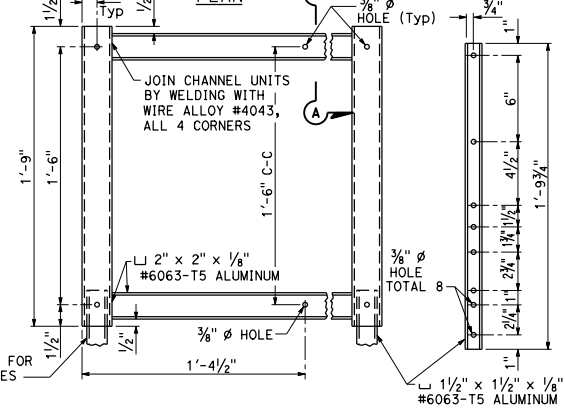
SADDLE BRACKET



SECTION A-A

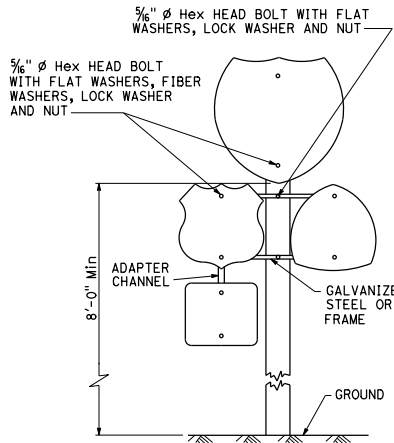


PLAN



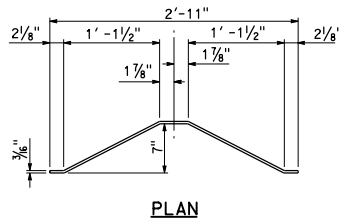
ELEVATION

ALUMINUM FRAME

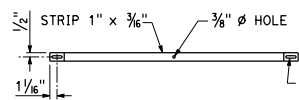


ELEVATION

MULTIPLE SIGN INSTALLATION

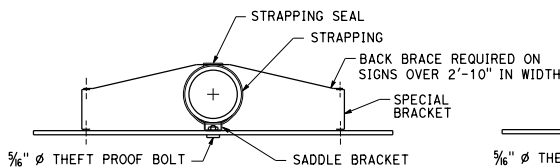


PLAN



ELEVATION

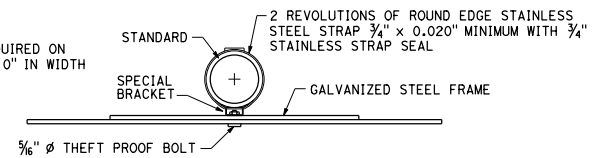
BACK BRACE DETAILS



SINGLE SIGN

INSTALLATION ON ELECTROLIER, SIGNAL STANDARD

OR SIGN STRUCTURE POST



MULTIPLE SIGN

**ROADSIDE SIGNS  
TYPICAL INSTALLATION  
DETAILS No. 4**

NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Stanley P. Johnson  
 REGISTERED CIVIL ENGINEER  
 No. CS793  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**INSTRUCTIONS TO FABRICATOR**

**PROJECT PLANS SHOW:**

1. Sign structure location.
2. Length of structure frame.
3. Panel size and locations on structure.
4. Walkway length for two post signs.
5. Post type and height to bottom of frame.
6. Base plate elevation.
7. Footing elevation or location of pile foundation.
8. Photoelectric unit location if required.

REFER TO THE FOLLOWING STANDARD PLANS FOR DETAILS NOT SHOWN ON PROJECT PLANS:

Sheet No.	SHEET NAME
S1	Overhead Signs-Truss, Instructions and Examples
S2	Overhead Signs-Truss, Single Post Type, Post Types II to IX
S3	Overhead Signs-Truss, Single Post Type, Base Plate and Anchorage Details
S4	Overhead Signs-Truss, Single Post Type, Structural Frame Members Details No. 1
S5	Overhead Signs-Truss, Single Post Type, Structural Frame Members Details No. 2
S6	Overhead Signs-Truss, Gusset Plate Details
S8	Overhead Signs-Truss, Single Post Type, Round Pedestal Pile Foundation
S9	Overhead Signs-Truss, Two Post Type, Post Types I-S through VII-S
S10	Overhead Signs-Truss, Two Post Type, Base Plate and Anchorage Details
S11	Overhead Signs-Truss, Two Post Type, Structural Frame Members
S12	Overhead Signs-Truss, Structural Frame Details
S13	Overhead Signs-Truss, Frame Juncture Details
S15	Overhead Signs-Truss, Two Post Type, Round Pedestal Pile Foundation
S16	Overhead Signs, Walkway Details No. 1
S17	Overhead Signs, Walkway Details No. 2
S17A	Overhead Signs, Walkway Details No. 3
S18	Overhead Signs, Walkway Safety Railing Details
S19	Overhead Signs-Truss, Sign Mounting Details, Laminated Panel-Type A
S20	Overhead Signs, Steel Frames, Removable Sign Panel Frames
S21	Overhead Signs, Removable Sign Panel Frames, Mounting Details
S22	Overhead Signs-Truss, Removable Sign Panel Frames, 9'-2" and 10'-0" Sign Panels

**WALKWAY BRACKETS:**

Space all walkway brackets maintaining uniform spacing where possible. Maximum spacing shall not exceed 5'-6".

**LIGHTING FIXTURE SUPPORTS:**

Where distance from walkway bracket to end of sign panel exceeds 1'-4", extend lighting fixture supports to next walkway bracket. See Example No. 2.

**WALKWAY AND SAFETY RAILING:**

Walkway to be continuous for entire length of frame for single post signs. For two post signs, see Project Plans. Safety railing to protect entire walkway, but continuous for no more than 11'-0" in one unit.

**GENERAL NOTES:**

**LOADING:**

**WIND LOADING:**

Normal to face of sign: 40.3 psf on 100% Truss surface area (i.e. 100% panel coverage).  
 Transverse to face of sign: 20% of normal force.

**WALKWAY LOADING:**

Dead load +500 LB concentrated live load.

**UNIT STRESSES:**

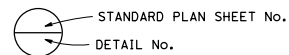
STRUCTURAL STEEL:  $f_y = 36,000$  psi  
 REINFORCED CONCRETE:  $f_y = 60,000$  psi  
 $f'_c = 3,600$  psi  
 FOOTING SOIL PRESSURE: 2.5 ksf (spread footing)

**MINIMUM CLEARANCE**

Vertical roadway clearance 18'-0" (bottom of walkway system)

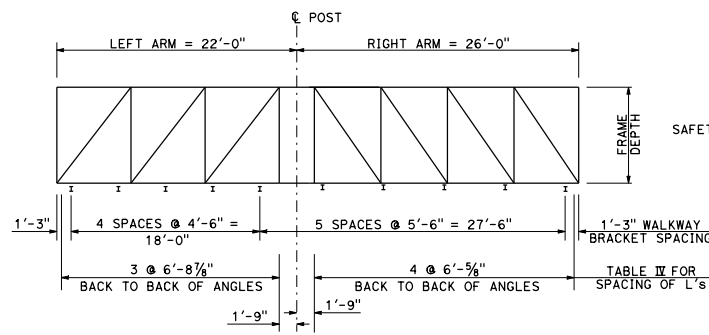
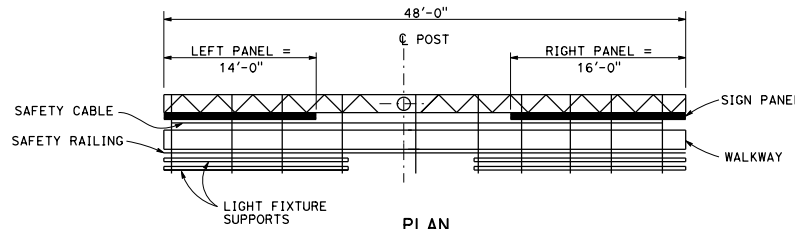
**WELDING:**

All welding continuous unless otherwise noted on the plans.



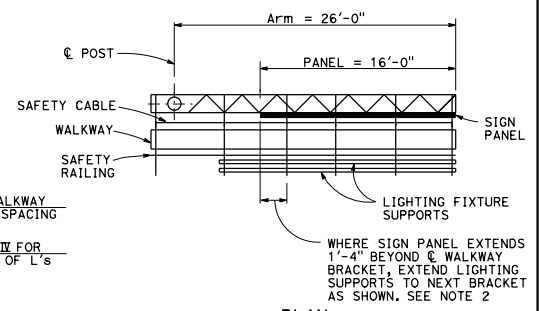
**NOTES:**

1. Signs are shown and dimensioned looking in the direction of traffic. Double faced signs are shown and dimensioned looking ahead along stationing.
2. Mandatory dimension limit.



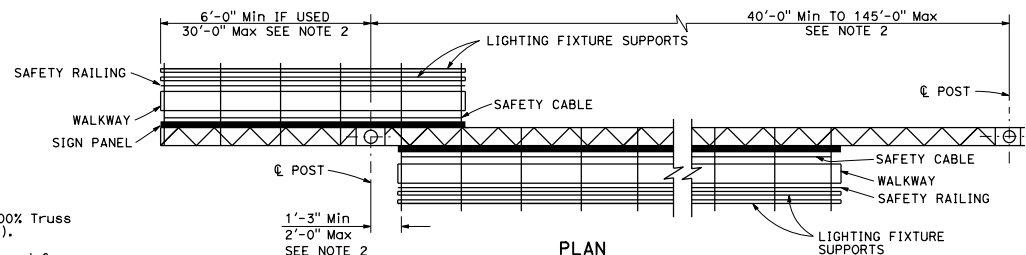
**UNBALANCED SINGLE POST TYPE**

Example No. 1



**CANTILEVER SINGLE POST TYPE**

Example No. 2



**TWO POST TYPE WITH CANTILEVER (PART DOUBLE-FACED)**

Example No. 3

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS-TRUSS INSTRUCTIONS AND EXAMPLES**

NO SCALE

**S1**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Stephen B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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S12

2015 STANDARD PLAN S1



**TABLE XV**

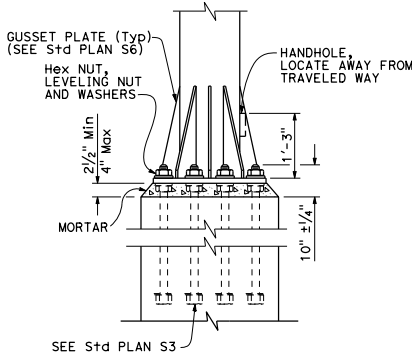
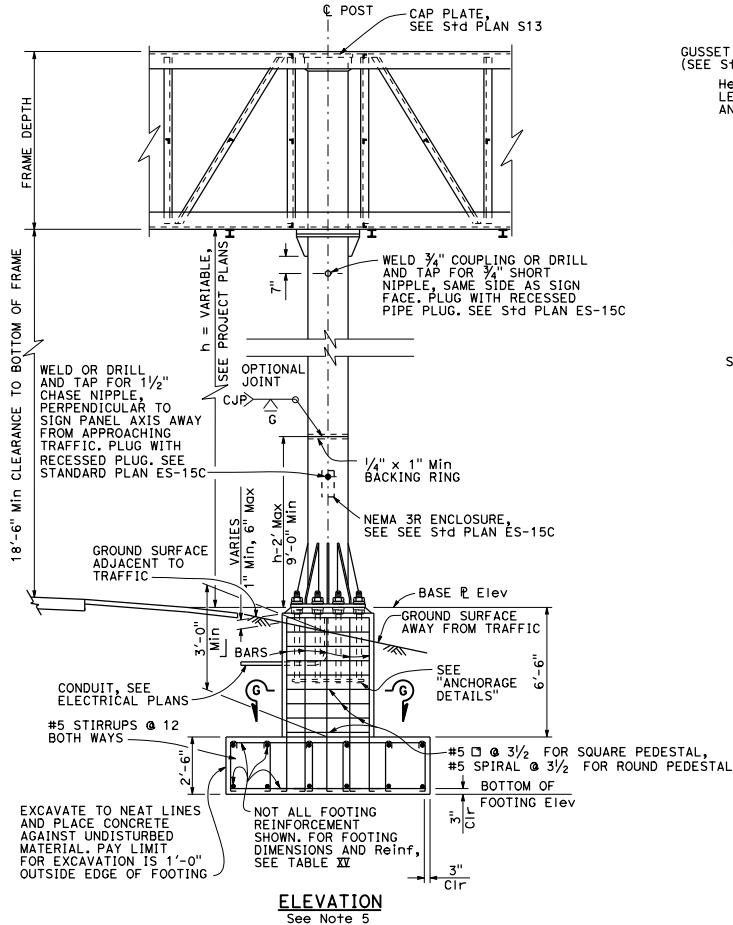
POST TYPE	PIPE NPS	PIPE THICKNESS	CAP PLATE SIZE FOR CHORD L's 5 x 5		CAP PLATE SIZE FOR CHORD L's 6 x 6		ROUND PEDESTAL					SQUARE PEDESTAL					SPREAD FOOTING				
			PEDESTAL SIZE Dia	VERTICAL EQUALLY SPACED TOTAL	J-BARS BAR SIZE	SPIRAL BAR SIZE	PITCH	PEDESTAL SIZE SQUARE	VERTICAL EQUALLY SPACED TOTAL	J-BARS BAR SIZE	# OF BARS EA FACE	HOOP BAR SIZE	SPACING	(SEE NOTE 2)							
														REINFORCEMENT WIDTH TOP	REINFORCEMENT WIDTH BOTTOM	REINFORCEMENT LONGITUDINAL TOP	REINFORCEMENT LONGITUDINAL BOTTOM	FOOTING STIRRUPS			
II	14	1/2"	2'-0" x 2'-0" x 1"	2'-2" x 2'-2" x 1"	5'-3"	16	#10	#5	3/2"	5'-3"	16	#10	5	#5	3/2"	12'-0" x 14'-0" x 2'-6"	14-#6	14-#7	13-#9	13-#9	#5 @ 12
III	16		2'-2" x 2'-2" x 1"	2'-4" x 2'-4" x 1"											12'-0" x 14'-0" x 2'-6"	15-#6	15-#7				
IV	18		2'-4" x 2'-4" x 1"	2'-6" x 2'-6" x 1"											12'-0" x 14'-0" x 2'-6"	15-#6	15-#7				
V	20		2'-6" x 2'-6" x 1"	2'-8" x 2'-8" x 1"											13'-0" x 14'-0" x 2'-6"	15-#6	15-#7	14-#9	14-#9		
VI	24		2'-10" x 2'-10" x 1"	3'-0" x 3'-0" x 1"	5'-9"					5'-9"					13'-0" x 16'-0" x 2'-6"	17-#7	17-#7		14-#11		
VII	24	3/4"													13'-0" x 17'-0" x 2'-6"	18-#7	18-#7				
VIII	24	3/32"													13'-0" x 18'-0" x 2'-6"	19-#7	19-#7				
IX	24	3/32"													13'-0" x 18'-0" x 2'-6"	19-#7	19-#7				

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

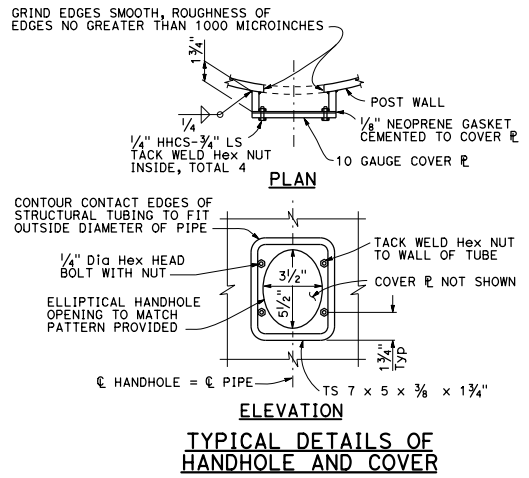
**Jeffrey B. Woody**  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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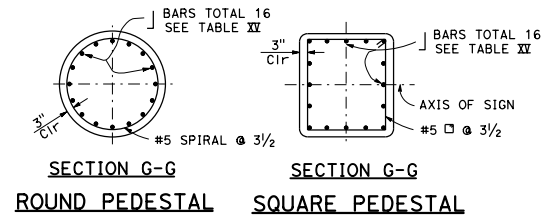


**ELEVATION ANCHORAGE DETAILS**



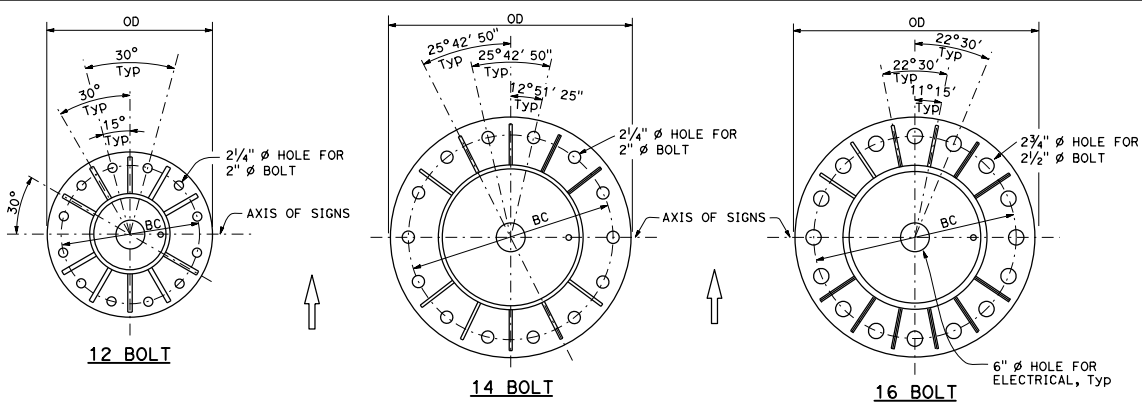
**NOTES:**

- For "General Notes", see Standard Plan S1.
- Longer side of footing (longitudinal) shall be normal to axis of sign.
- Backfill shall be in place prior to erection of post.
- Thread upper 10" of anchor bolts and galvanize upper 1'-0".
- Spread footing with square pedestal foundation shown, use Pile Foundation when shown on the Project Plans. For pile foundation details, see Standard Plan S8.
- Anchor plates may be retained with hexagon nut or formed head as alternatives to details shown.
- On single post sign structures, the post shall be raked out of plumb, with the use of the leveling nuts to make the bottom of the sign frame level.
- At final position of post all top and bottom nuts shall be tightened against base plate.
- When foundation is located on a steep slope with exposed face of concrete adjacent to traffic, see "Detail C" on Standard Plan S8, as applicable.
- Slope protection required when indicated on the Project Plans.



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS SINGLE POST TYPE POST TYPES II THROUGH IX**  
 NO SCALE  
**S2**

2015 STANDARD PLAN S2



**BASE PLATE DETAILS  
SINGLE POST TYPE**

**ABBREVIATION:**  
BC = Bolt Circle Diameter

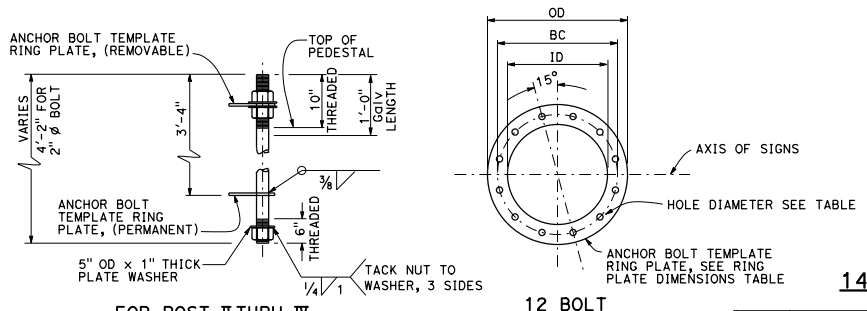
**SINGLE POST TRUSS**

POST TYPE No.	PIPE		BASE R OD AND THICKNESS	ANCHOR BOLTS	
	NPS	THICKNESS		BOLT CIRCLE Dia	BOLT TOTALS AND Dia OF BOLT
II	14	1/2"	2'-10" x 2"	2'-0"	12-2"
III	16		2'-10" x 2"	2'-0"	12-2"
IV	18		2'-10" x 2"	2'-0"	12-2"
V	20		3'-5" x 2 1/2"	2'-10"	14-2"
VI	24		3'-6" x 2 1/2"		16-2 1/2"
VII	24	3/4"	3'-6" x 2 1/2"		
VIII	24	3/4"	3'-6" x 3 1/2"		
IX	24	3/4"	3'-6" x 3 1/2"		

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Jeffrey B. Boody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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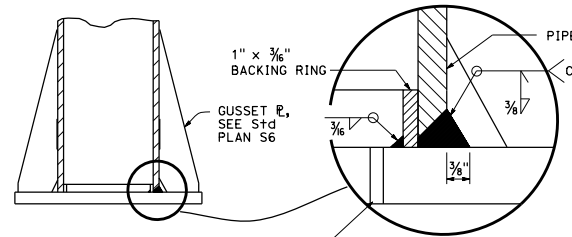


**FOR POST II THRU IV  
12 BOLT PATTERN**

**ANCHOR BOLT TEMPLATE**

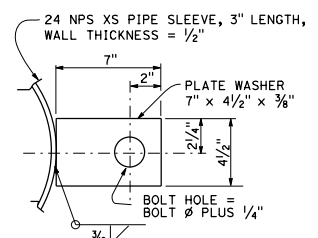
**ANCHOR BOLT TEMPLATE ASSEMBLY**

**NOTE:** One bolt shown only. Other bolts same configuration around ring plate.

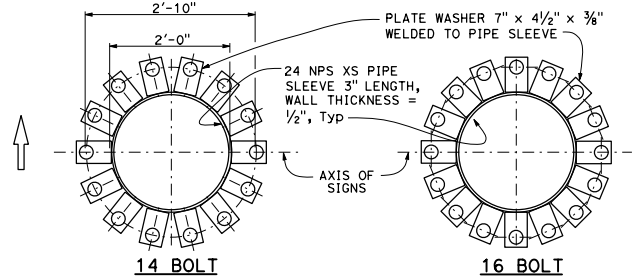


**POST TO BASE PLATE  
CONNECTION DETAIL**

1/4" Ø GALVANIZING DRAIN HOLE, TYP, 1/4" CLEAR OF BACKING RING

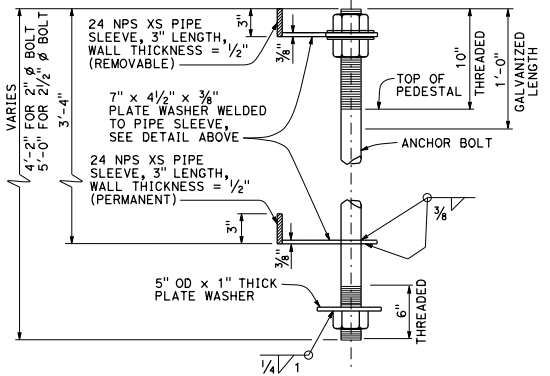


**PLATE WASHER DETAIL FOR  
14 AND 16 BOLT TEMPLATE PATTERN**



**ANCHOR BOLT TEMPLATE**

Template to match base plate anchor bolt pattern. (Option: Template similar to ring plate type can be used in lieu of plate washer type).



**ANCHOR BOLT TEMPLATE ASSEMBLY  
FOR 14 AND 16 BOLT PATTERN**

**NOTE:** One bolt shown only. Other bolts same configuration around pipe sleeve.

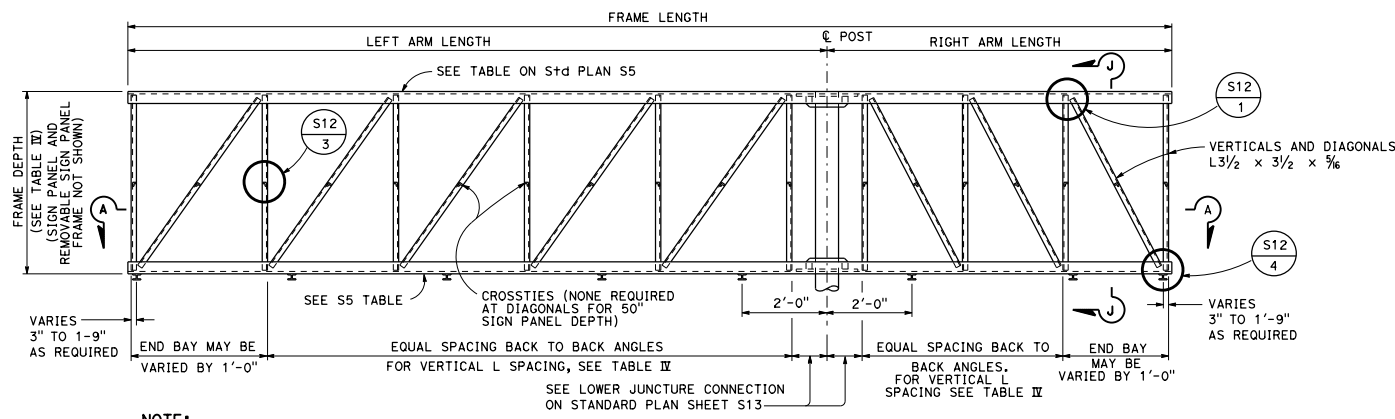
**RING PLATE DIMENSIONS**

No. OF BOLTS	OD	BC	ID	HOLE Dia	PERMANENT TEMPLATE THICKNESS	TEMPORARY TEMPLATE THICKNESS
12	2'-1"	2'-0"	1'-9"	2 1/8" Max	5/8"	1/2"
14	3'-1"	2'-10"	2'-7"	2 1/8" Max	5/8"	1/2"
16	3'-2"	2'-10"	2'-6"	2 3/8" Max	3/4"	1/2"

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
 SINGLE POST TYPE  
 BASE PLATE AND  
 ANCHORAGE DETAILS**  
 NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA



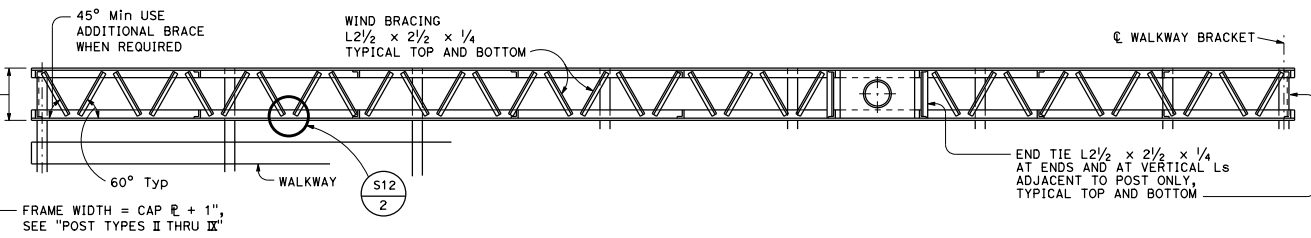
**NOTE:**  
 1. Left arm may be shorter, longer or equal to right arm length.

**ELEVATION**

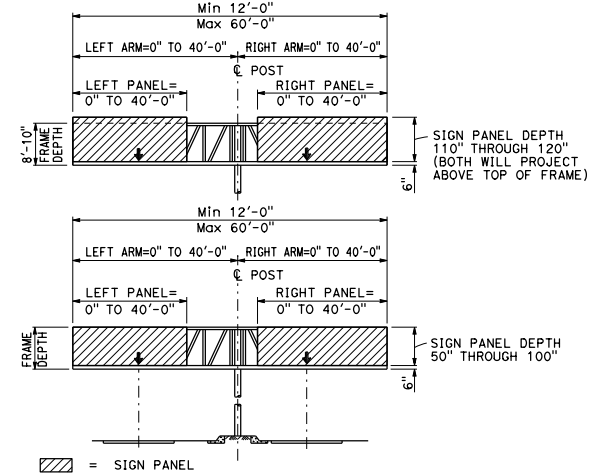
**TABLE IV**

SIGN PANEL DEPTH	FRAME DEPTH	MAXIMUM VERTICAL L SPACING	SEE NOTE 6
50"	4'-8"	4'-6"	4'-0"
60"	5'-6"	5'-0"	4'-0"
70"	6'-4"	5'-6"	4'-0"
80"	7'-2"	6'-0"	5'-0"
90"	8'-0"	7'-0"	5'-0"
100"	8'-10"		6'-0"
110"	8'-10"		6'-0"
120"	8'-10"		6'-0"

355

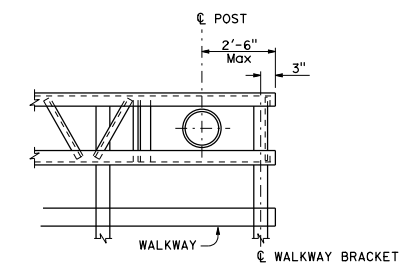


**SECTION A-A**

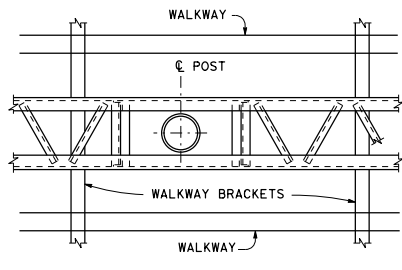


**RANGE OF STRUCTURE SIZES**

- NOTES:**
1. For connection of frame to post see S13.
  2. For walkway details see S16 and S17.
  3. For walkway length see S1.
  4. Minimum length of frame = 12'-0".
  5. Maximum length of frame = 60'-0".
  6. Diagonal not required if arm length is equal to or less than shown in this column see table IV.
  7. For Section J-J, See Std Plan S12.



**PART PLAN OF CANTILEVER TYPE AT POST**



**PART PLAN OF DOUBLE FACED TYPE AT POST**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
 SINGLE POST TYPE  
 STRUCTURAL FRAME MEMBERS  
 DETAILS No. 1**  
 NO SCALE

**S4**

2015 STANDARD PLAN S4

SPAN $L_1 + L_2$	50" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	4'-8"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

SPAN $L_1 + L_2$	60" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	5'-6"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

SPAN $L_1 + L_2$	70" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	6'-4"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

SPAN $L_1 + L_2$	80" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	7'-2"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

SPAN $L_1 + L_2$	90" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	8'-0"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

SPAN $L_1 + L_2$	100" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	8'-10"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

SPAN $L_1 + L_2$	110" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	8'-10"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

SPAN $L_1 + L_2$	120" SIGN PANEL DEPTH					
	FRAME DEPTH	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	TOP AND BOTTOM WIND BRACING L's
12'-0"	8'-10"	SEE NOTE	$5 \times 5 \times \frac{1}{2}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{5}{16}$	$2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$
OVER 12'-0" TO 20'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 20'-0" TO 30'-0"			$5 \times 5 \times \frac{1}{2}$			
OVER 30'-0" TO 40'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 40'-0" TO 50'-0"			$6 \times 6 \times \frac{1}{2}$			
OVER 50'-0" TO 60'-0"			$6 \times 6 \times \frac{1}{2}$			

**NOTES:**


1. Frame width = Pipe Dia plus 2 x shorter L leg plus 1".
2. Frame length  $L_1$  = Left arm length.
3. Frame length  $L_2$  = right arm length.
4. For full cantilever, short arm used to compute  $L_1 + L_2$  on this sheet shall be taken as 2'-6".

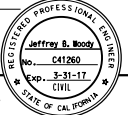
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
SINGLE POST TYPE  
STRUCTURAL FRAME MEMBERS  
DETAILS No. 2**

NO SCALE

**S5**

Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER



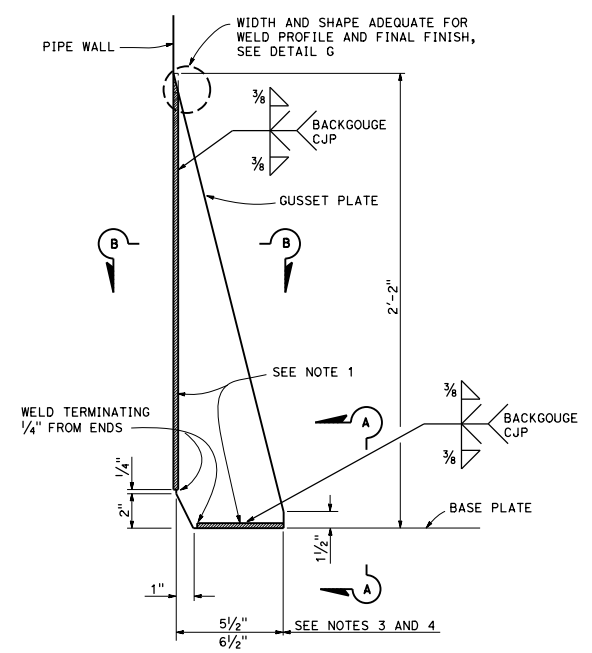
October 30, 2015  
PLANS APPROVAL DATE

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

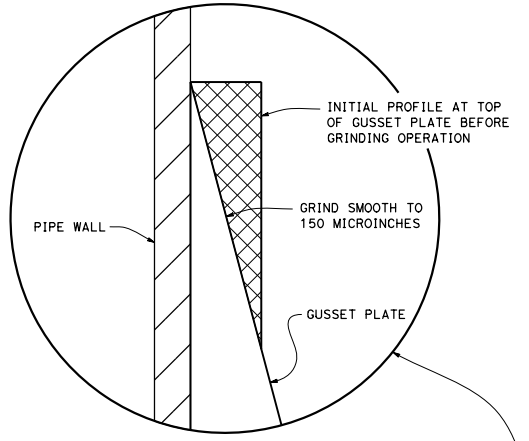
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

**Stanley P. Johnson**  
 REGISTERED CIVIL ENGINEER  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

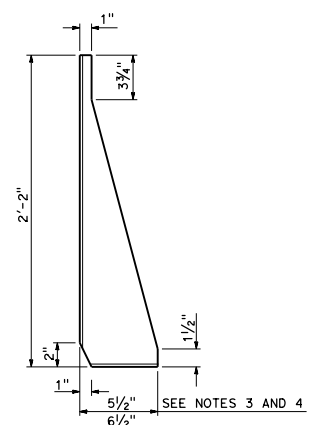
October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



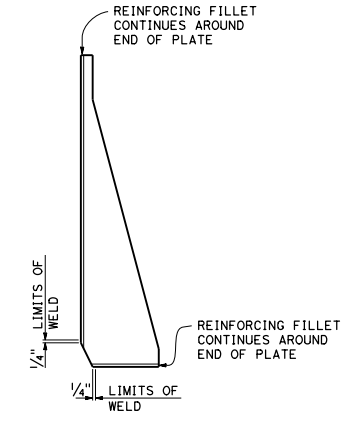
**WELD DETAILS**



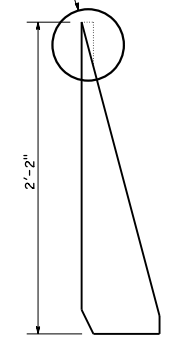
**DETAIL G**



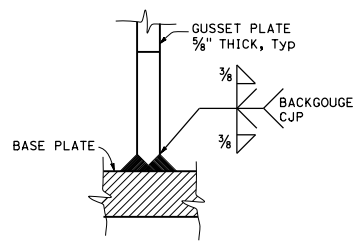
**GUSSET PLATE**  
(Initial Shape)



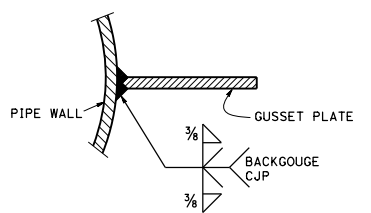
**GUSSET PLATE WELDING**  
(See Weld Details)



**GUSSET PLATE GRINDING**  
(See Detail G)



**SECTION A-A**

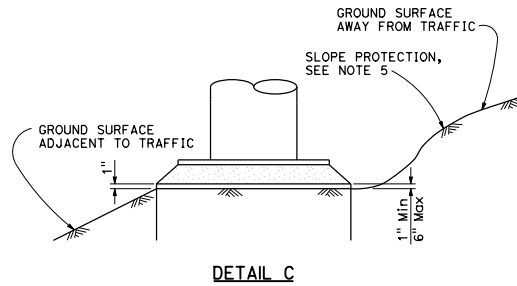
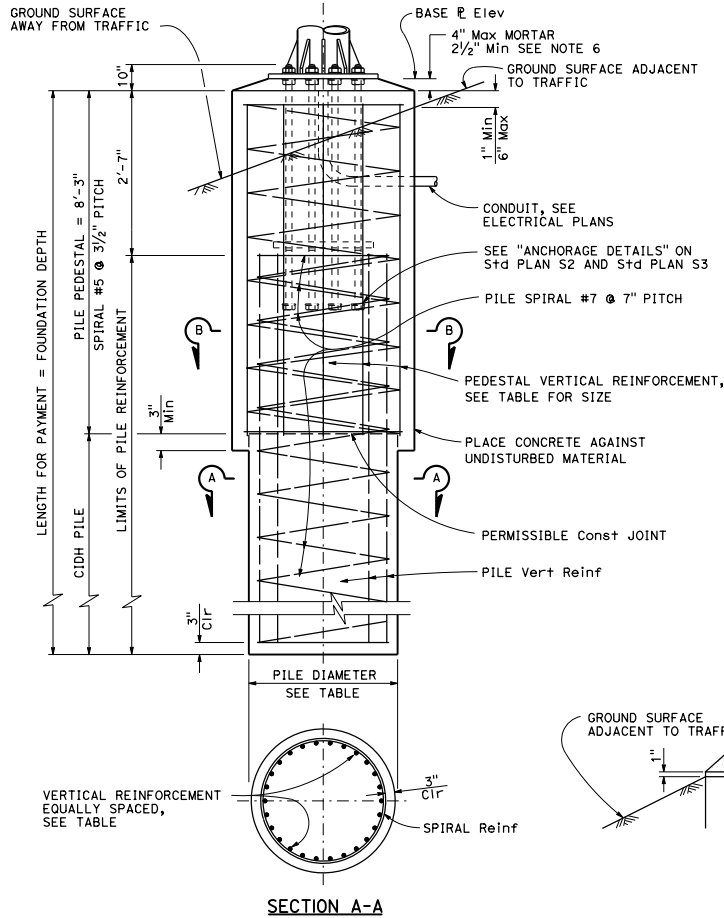
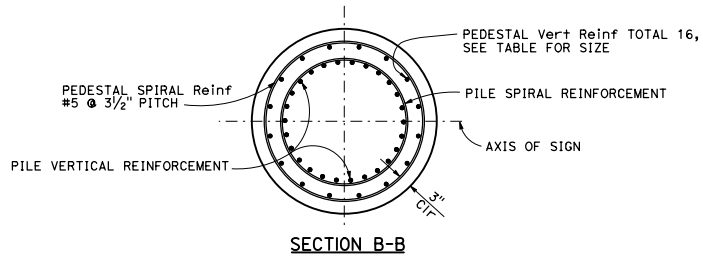


**SECTION B-B**

**NOTES:**

1. All gussets to be same height.
2. Provide a smooth transition from gusset plate to tube.
3. 5/2" for post Types I-S through V-S.
4. 6/2" for post Types VI-S and VII-S, single post trusses and tubular.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
 GUSSET PLATE DETAILS**  
 NO SCALE



POST TYPE No.	ANCHOR BOLTS			ROUND PILE PEDESTAL				CIDH PILE				FOUNDATION DEPTH **		
	BOLT CIRCLE	BOLT TOTAL AND Dia	TOTAL LENGTH	Dia	VERTICAL REINFORCING		SPIRAL		PILE Dia	VERTICAL REINFORCING			SPIRAL	
					TOTAL	BAR SIZE	BAR SIZE	PITCH		TOTAL	BAR SIZE		BAR SIZE	PITCH
II	2'-0"	12-2"	4'-2"	5'-3"	16	#10	#5	3 1/2"	4'-6"	26	#10	#5	3 1/2"	14'-9"
III	2'-0"	12-2"												16'-0"
IV	2'-0"	12-2"												18'-0"
V	2'-10"	14-2"												19'-0"
VI		16-2 1/2"	5'-0"	5'-9"		#11			5'-0"	28	#11			22'-0"
VII														23'-0"
VIII														25'-0"
IX														25'-0"

\*\* Use Foundation Depth shown in table unless otherwise shown on the Project Plans.

**NOTES:**

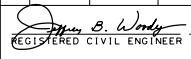
1. For anchor bolt layout, see Standard Plan S3.
2. For "Base Elevation" see Project Plans.
3. Prior to erection of the post, backfill which is equivalent to the surrounding material shall be in place.
4. Pedestal shall be formed 6" minimum below ground surface. Remainder to be placed against undisturbed material.
5. Slope protection required when indicated on the Project Plans.
6. For drain holes and central void in mortar see Standard Plan ES-6B detail N.

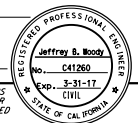
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
SINGLE POST TYPE  
ROUND PEDESTAL PILE FOUNDATION**

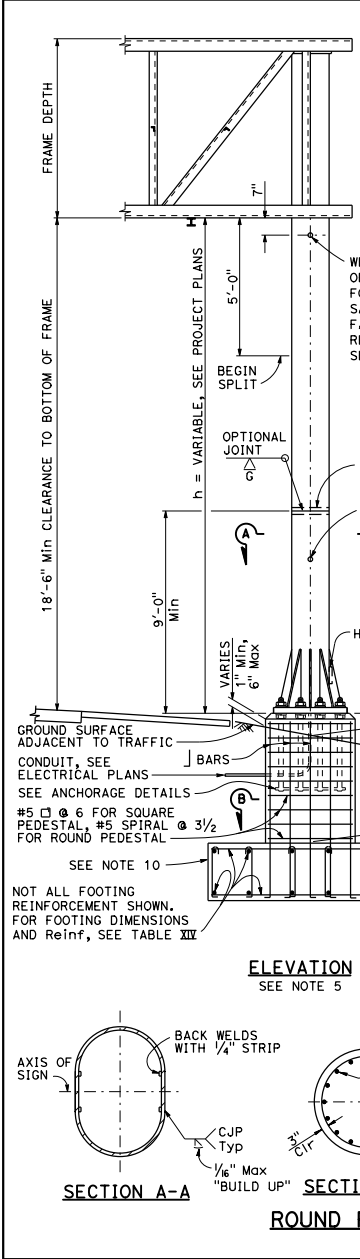
NO SCALE

**S8**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.





**NOTES:**

1. For "General Notes", see Standard Plan S1.
2. Longer side of post and footing (longitudinal) shall be normal to axis of sign.
3. Backfill shall be in place prior to erection of post.
4. Thread upper 10" of anchor bolts and galvanize upper 1'-0".
5. Spread footing with square pedestal shown, use pile foundation when shown on the Project Plans. For pile foundation details, see Standard Plan S15.
6. Anchor plates may be retained with Hex nut or formed head as an alternative to details shown.
7. When foundation is located on a steep slope with exposed face of concrete adjacent to traffic, see "Detail C" on Standard Plan S15.
8. Slope protection required when indicated on Project Plans.
9. Weld coupling or drill and tap for 1/2" C chase nipple, perpendicular to sign panel axis away from approaching traffic. Plug with recessed pipe plug. See Standard Plan ES-15C.
10. Excavate to neat lines and place concrete against undisturbed material.

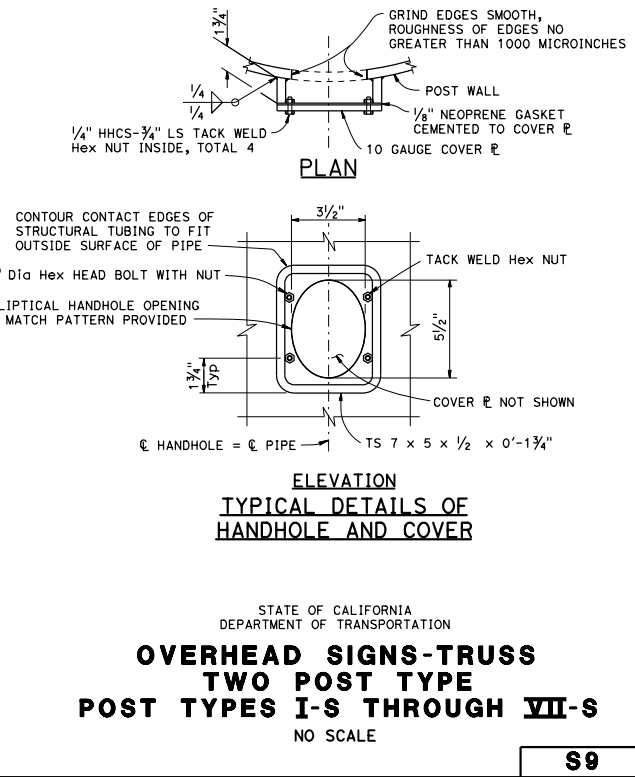
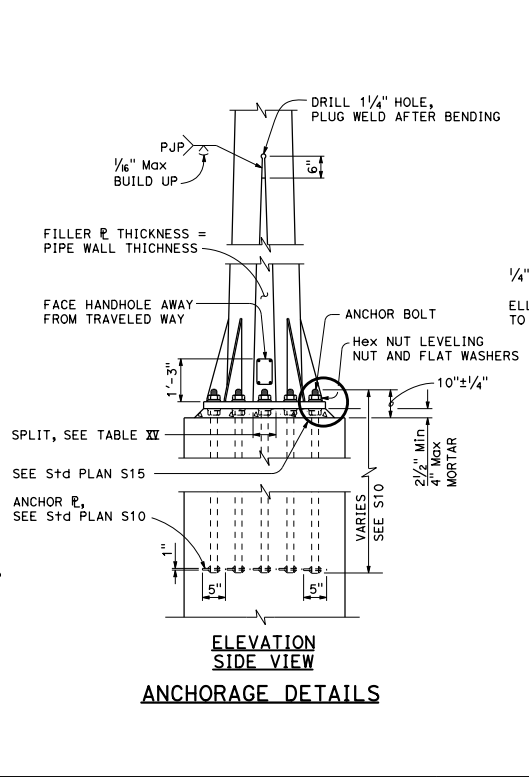
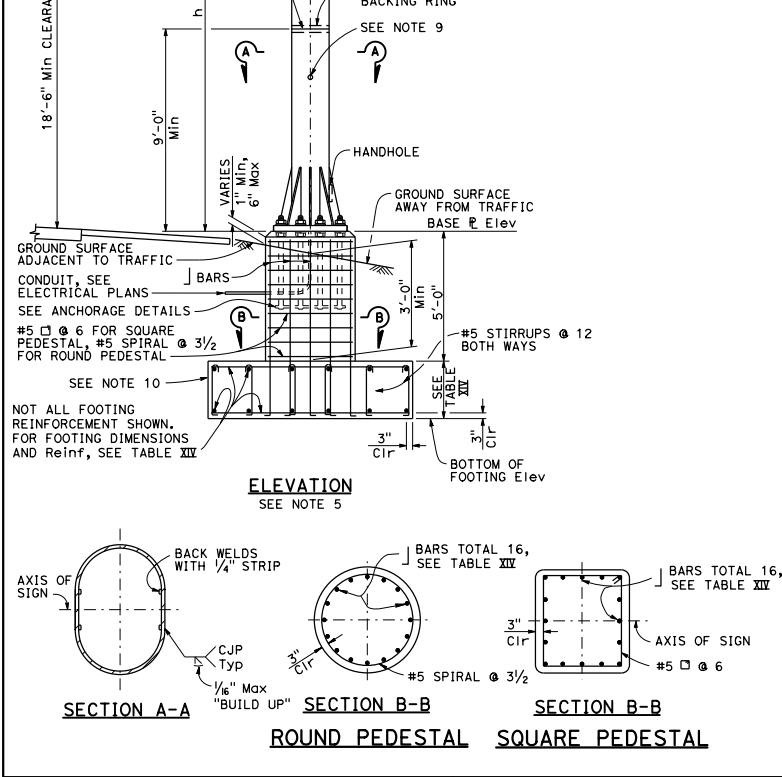
D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Jeffrey B. Woody**  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**TABLE XIV**

POST TYPE	PIPE			ROUND PEDESTAL				SQUARE PEDESTAL				SPREAD FOOTING							
	NPS	THICKNESS	SPLIT	PEDESTAL SIZE	VERTICAL J-BARS		SPIRAL	PEDESTAL SIZE	VERTICAL J-BARS		HOOP		(SEE NOTE 2)	REINFORCEMENT					
					EQUALLY SPACED TOTAL	BAR SIZE			EQUALLY SPACED TOTAL	BAR SIZE	# OF BARS EA FACE	BAR SIZE		SPACING	WIDTH	LONGITUDINAL	FOOTING STIRRUPS		
I-S	14	1/2"	5"	5'-3"	16	#10	#5	3 1/2"	5'-3"	16	#10	5	6"	7'-0" x 13'-0" x 2'-6"	14-#6	14-#7	10-#9	10-#9	#5 @ 12
II-S	16		6"											7'-0" x 13'-0" x 2'-6"	14-#6	14-#7	10-#9	10-#9	
III-S	18		7"											7'-0" x 13'-0" x 2'-6"	14-#6	14-#7	11-#9	11-#9	
IV-S	20		8"											8'-0" x 14'-0" x 2'-6"	15-#7	15-#7	12-#9	12-#11	
V-S	24		8"	5'-9"		#11			5'-9"		#11			8'-0" x 16'-0" x 3'-0"	17-#7	17-#7	12-#9	12-#11	
VI-S	24	3/32"	10"	5'-9"		#11			5'-9"		#11			9'-0" x 17'-0" x 3'-0"	18-#7	18-#7	12-#9	12-#11	
VII-S	24	3/32"	10"	5'-9"		#11			5'-9"		#11			10'-0" x 18'-0" x 3'-0"	19-#7	19-#7	13-#9	13-#11	

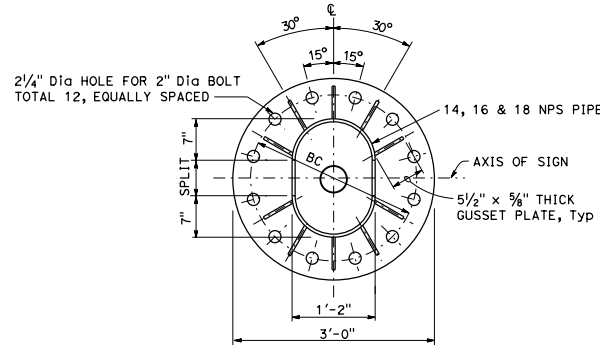


**OVERHEAD SIGNS-TRUSS**  
**TWO POST TYPE**  
**POST TYPES I-S THROUGH VII-S**  
 NO SCALE

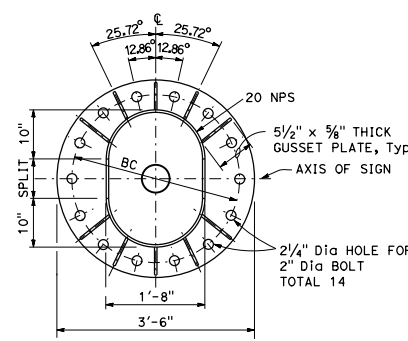


**TWO POST TRUSS**

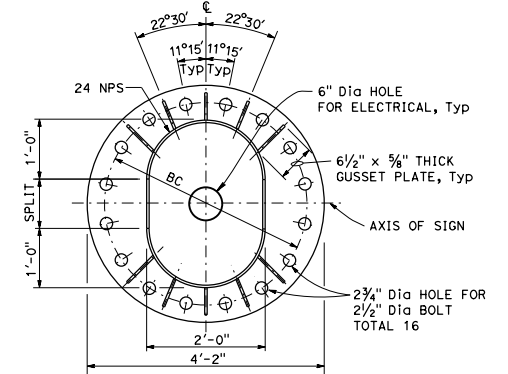
POST TYPE	PIPE			BASE P. OD AND THICKNESS	ANCHOR		
	NPS	THICKNESS	SPLIT		BOLT CIRCLE	BOLT TOTALS AND Dia	LENGTH
I-S	14	1/2"	5"	3'-1" x 2"	2'-4"	12-2"	4'-2"
II-S	16		6"	3'-1" x 2"	2'-4"	12-2"	
III-S	18		7"	3'-2" x 2"	2'-7"	12-2"	
IV-S	20		8"	3'-5" x 2"	2'-10"	14-2"	
V-S	24		8"	4'-0" x 2"	3'-2"	16-2 1/2"	5'-0"
VI-S	24	3/32"	10"	4'-3" x 2 1/2"	3'-5"	16-2 1/2"	5'-0"
VII-S	24	3/32"	10"	4'-3" x 2 1/2"	3'-5"	16-2 1/2"	5'-0"



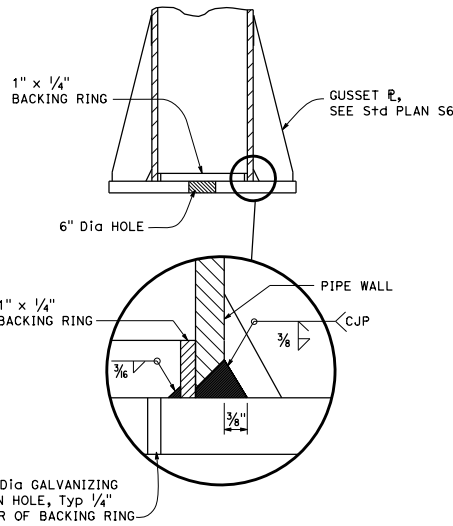
**12 BOLTS**  
Type I-S shown



**14 BOLTS**  
**BASE PLATE DETAILS**  
**TWO POST TYPE**



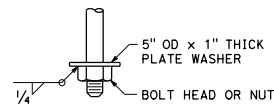
**16 BOLTS**  
Type VI-S shown



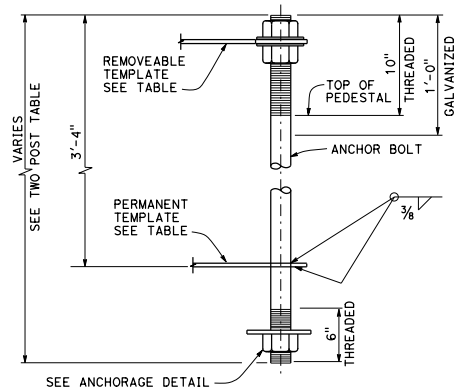
**POST TO BASE PLATE CONNECTION DETAIL**

**TEMPLATE DIMENSIONS**

No. OF BOLTS	OD	ID	HOLE Dia	PERMANENT TEMPLATE THICKNESS	TEMPORARY TEMPLATE THICKNESS
12	BC+3"	BC-3"	2 1/8" Max	5/8"	1/2"
14	BC+3"	BC-3"	2 1/8" Max	5/8"	1/2"
16	BC+4"	BC-4"	2 5/8" Max	3/4"	1/2"



**ANCHORAGE DETAIL**



**ANCHOR BOLT TEMPLATE ASSEMBLY**

**NOTE:** One bolt shown only. Other bolts same configuration around pipe sleeve. Template to match base plate anchor bolt pattern.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS**  
**TWO POST TYPE**  
**BASE PLATE AND**  
**ANCHORAGE DETAILS**

NO SCALE

**S10**

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

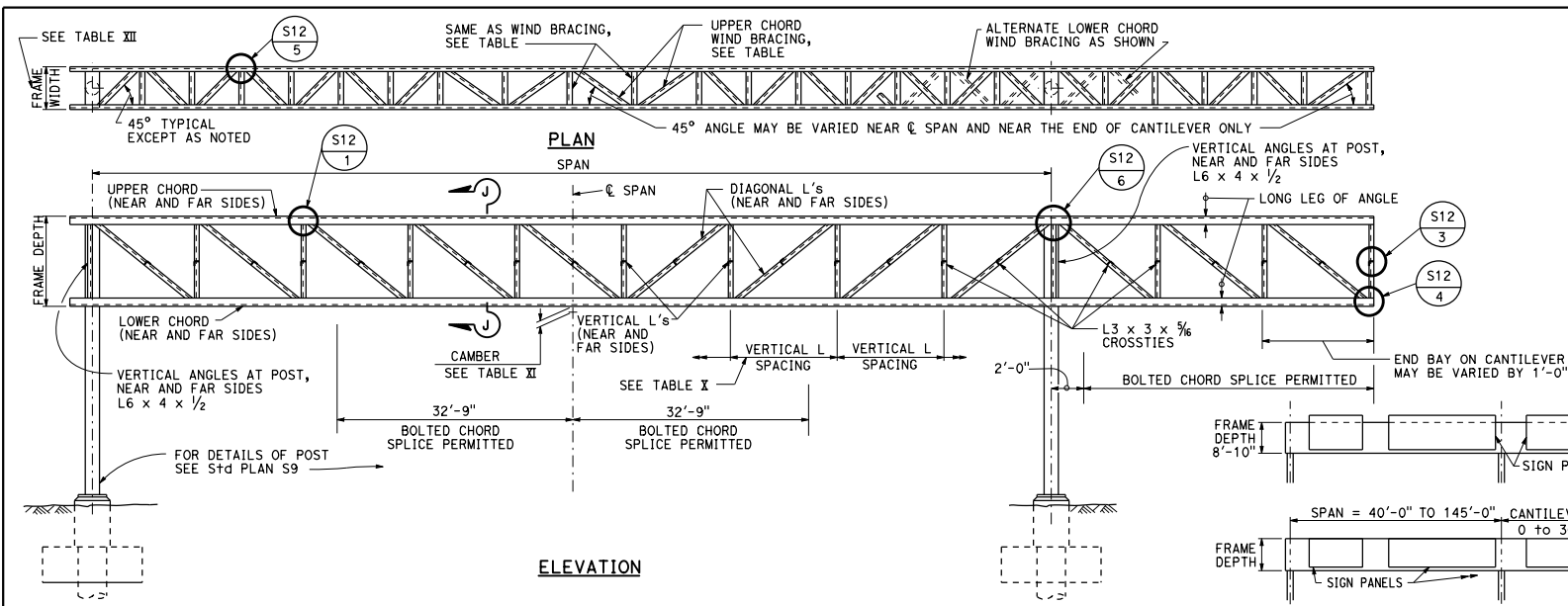
*Stephen B. Woody*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

Jeffrey B. Boody  
 No. C41260  
 Exp. 3-31-17  
 CIVIL ENGINEER  
 STATE OF CALIFORNIA

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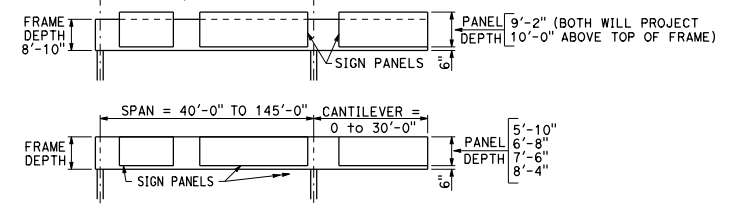




DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Jeffrey B. Woody**  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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Right cantilever shown. Cantilever may be left or right.

SPAN	70" PANEL DEPTH					80" PANEL DEPTH					90" PANEL DEPTH				
	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	WIND BRACING L's	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	WIND BRACING L's	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	WIND BRACING L's
40'-0"-50'-0"	3'-0"	5 x 3/2 x 3/8	3/2 x 3/2 x 3/8	3/2 x 3/2 x 3/8	2 1/2 x 2 1/2 x 1/4	3'-0"	5 x 3/2 x 3/8	3/2 x 3/2 x 3/8	3/2 x 3/2 x 3/8	2 1/2 x 2 1/2 x 1/4	3'-0"	5 x 3/2 x 3/8	3/2 x 3/2 x 3/8	3/2 x 3/2 x 3/8	2 1/2 x 2 1/2 x 1/4
51'-0"-60'-0"		5 x 3/2 x 3/8					5 x 3/2 x 3/8					5 x 3/2 x 3/8			
61'-0"-70'-0"		5 x 3/2 x 3/8					5 x 3/2 x 3/8					5 x 3/2 x 3/8			
71'-0"-80'-0"		6 x 4 x 1/2					6 x 4 x 1/2					6 x 4 x 1/2			
81'-0"-90'-0"		6 x 4 x 1/2					6 x 4 x 1/2					6 x 4 x 1/2			
91'-0"-100'-0"		6 x 4 x 1/2					6 x 4 x 1/2					6 x 4 x 1/2			
101'-0"-110'-0"		8 x 4 x 3/4					8 x 4 x 3/4					8 x 4 x 3/4			3 x 3 x 3/8
111'-0"-120'-0"															
121'-0"-130'-0"											3'-6"				
131'-0"-145'-0"															3/2 x 3/2 x 3/8

**RANGE OF STRUCTURE SIZES**

PANEL DEPTH	FRAME DEPTH	Max VERTICAL L SPACING	CAMBER FOR FABRICATION AT & SPAN	
			SPAN	CAMBER
70"	6'-4"	6'-0"	40'-0" TO 50'-0"	1/16"
80"	7'-2"	6'-0"	51'-0" TO 100'-0"	2/8"
90"	8'-0"	7'-6"	101'-0" TO 145'-0"	3/4"
100"	8'-10"			
110"	8'-10"			
120"	8'-10"			

**TABLE I**

**TABLE II**

SPAN	100" PANEL DEPTH					110" AND 120" PANEL DEPTH				
	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	WIND BRACING L's	FRAME WIDTH	CHORD L's	VERTICAL L's	DIAGONAL L's	WIND BRACING L's
40'-0"-50'-0"	3'-0"	5 x 3/2 x 3/8	3/2 x 3/2 x 3/8	3/2 x 3/2 x 3/8	2 1/2 x 2 1/2 x 1/4	3'-0"	5 x 3/2 x 3/8	3/2 x 3/2 x 3/8	3/2 x 3/2 x 3/8	2 1/2 x 2 1/2 x 1/4
51'-0"-60'-0"		5 x 3/2 x 3/8					5 x 3/2 x 3/8			2 1/2 x 2 1/2 x 1/4
61'-0"-70'-0"		5 x 3/2 x 3/8					5 x 3/2 x 3/8			2 1/2 x 2 1/2 x 1/4
71'-0"-80'-0"		6 x 4 x 1/2					6 x 4 x 1/2			3 x 3 x 3/8
81'-0"-90'-0"		6 x 4 x 1/2					6 x 4 x 1/2			
91'-0"-100'-0"		6 x 4 x 1/2				3'-6"	6 x 4 x 1/2			
101'-0"-110'-0"	3'-6"	8 x 4 x 3/4			3 x 3 x 3/8		8 x 4 x 3/4			
111'-0"-120'-0"							8 x 4 x 3/4			
121'-0"-130'-0"							8 x 4 x 3/4			
131'-0"-145'-0"							8 x 6 x 3/4			

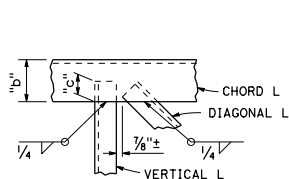
**TABLE III**

**NOTES:**

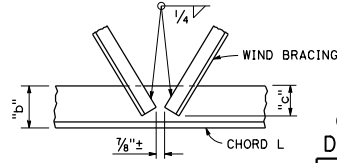
1. Frame widths shown are nominal. These widths may be varied by 1/4" to standardize fabrication methods.
2. Walkway brackets not shown. Locate first interior bracket 2'-8" Max from & of post.
3. For Section J-J, See Std Plan S12.

STANDARD PLAN SHEET No.  
 DETAIL No.

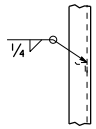
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
 TWO POST TYPE  
 STRUCTURAL FRAME MEMBERS**  
 NO SCALE



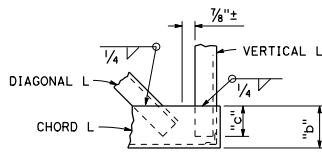
DETAIL 1



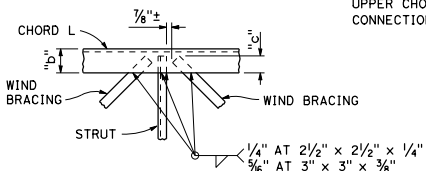
DETAIL 2



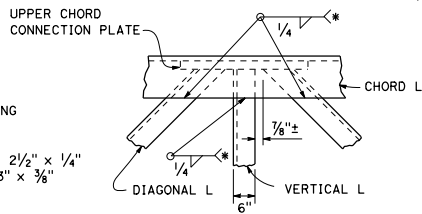
DETAIL 3



DETAIL 4



DETAIL 5

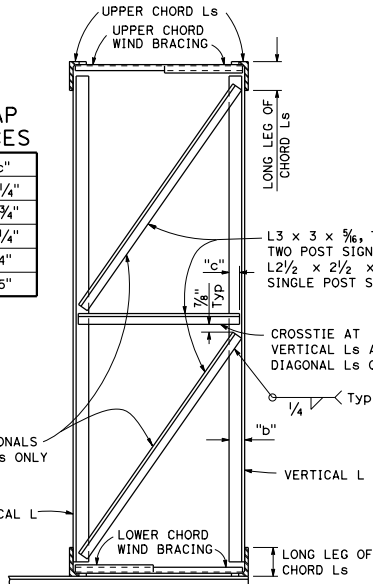


DETAIL 6

\* Welds are to upper chord connection plate and chord angle.

OVERLAP DISTANCES

"b"	"c"
3 1/2"	2 1/4"
4"	2 3/4"
5"	3 1/4"
6"	4"
8"	5"



TYPICAL SECTION J-J

NOTE: Diagonal Ls in plane of truss not shown. Bracing shown is at all vertical Ls of truss.

BOLTED CHORD SPLICE  
TWO POST SIGNS

CHORD L	NOMINAL BOLT DIAMETER	"a"
5 x 3 1/2 x 3/8	3/4"	2 1/2"
6 x 4 x 1/2	7/8"	3"
8 x 4 x 3/4	1 1/4"	3 3/4"
8 x 6 x 3/4	1 1/4"	3 3/4"

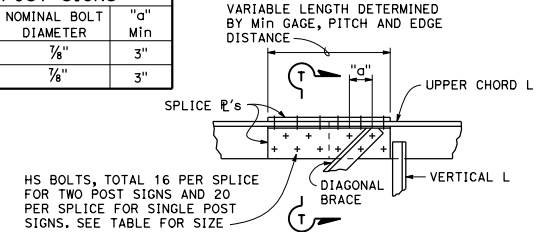
SINGLE POST SIGNS

CHORD L	NOMINAL BOLT DIAMETER	"a"
5 x 5 x 1/2	7/8"	3"
6 x 6 x 1/2	7/8"	3"

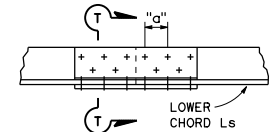
D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Stephen B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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SPLICE WITH DIAGONAL ANGLE

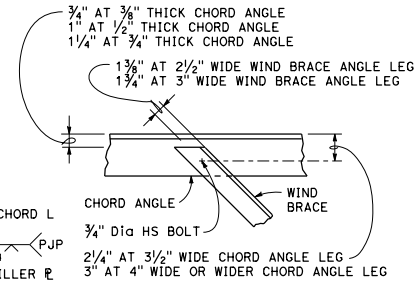


SPLICE WITHOUT DIAGONAL ANGLE  
BOLTED CHORD SPLICE

SPLICE NOTES:

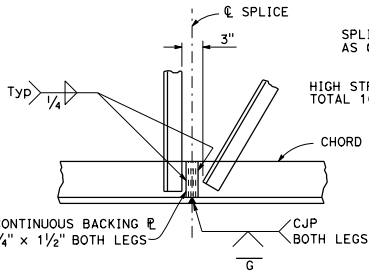
Location of Splices:  
The splice shall be located so as not to interfere with mounting the walkway brackets or the clip angles for the removable sign panel frame. For two post type see also S11.

Filler  $\epsilon$ :  
The plates welded to the angle legs on the inside shall be welded before drilling the bolt holes. The plates shall be the same length as the cover plates. The plates are not necessary on the single post signs if the splice is located over 1/3 of the cantilever length from the post. Alternative splice details may be used if approved by the Engineer.

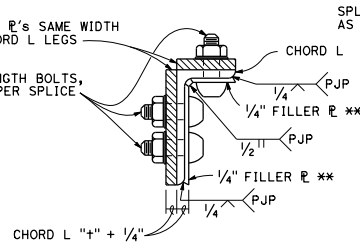


BOLTED WIND BRACE DETAIL

Each end of wind brace at bolted chord splice

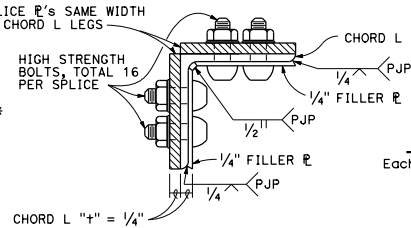


WELDED CHORD SPLICE



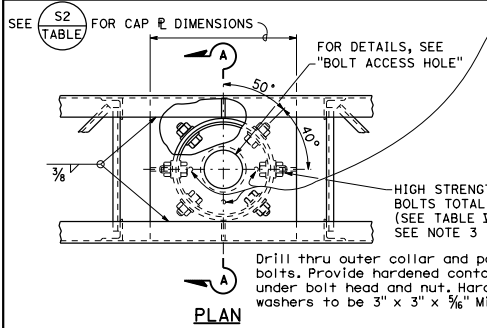
SECTION T-T  
TWO POST SIGNS

\*\* 5/8" Filler  $\epsilon$  at 3/4" thick chord angle



SECTION T-T  
SINGLE POST SIGNS

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
STRUCTURAL FRAME DETAILS**  
NO SCALE



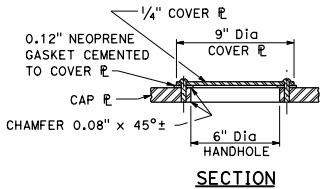
PLAN

OPTIONAL GALVANIZING DRAIN HOLES: DRILL AND TAP THROUGH CAP PLATE FOR 3/8" Max Dia BOLT. HOLE SHALL BE 1/4" CLEAR OF INSIDE COLLAR WALL. BOLT LENGTH SIZED NOT TO INTERFERE WITH POST. INSTALL BOLT AFTER GALVANIZING.

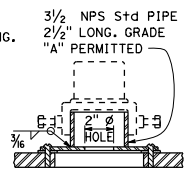
POST TYPE	BOLT SIZE
II	3/8"
III	1"
IV	1 1/8"
V	1 1/8"
VI	1 1/4"
VII	1 1/4"
VIII	1 1/2"
IX	1 1/2"

HIGH STRENGTH BOLTS TOTAL 6 (SEE TABLE VIII FOR SIZE), SEE NOTE 3

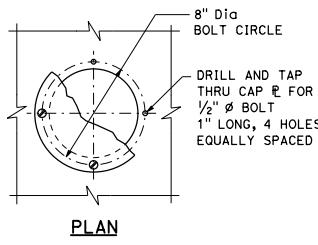
Drill thru outer collar and post wall for bolts. Provide hardened contoured washers under bolt head and nut. Hardened contoured washers to be 3" x 3" x 3/8" Min. Grind face to fit.



SECTION Without photoelectric unit

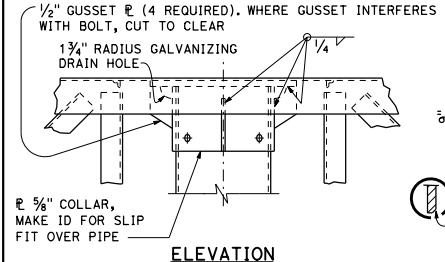


SECTION With photoelectric unit



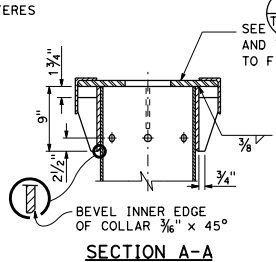
PLAN

**BOLT-ACCESS HOLE SINGLE POST TYPE**



ELEVATION

**UPPER JUNCTURE CONNECTION SINGLE POST TYPE**

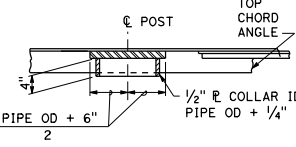
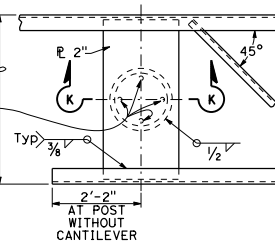


SECTION A-A

OPTIONAL GALVANIZING DRAIN HOLES: DRILL AND TAP THROUGH CAP PLATE FOR 3/8" Max Dia BOLT. HOLE SHALL BE 1/4" CLEAR OF INSIDE COLLAR WALL. BOLT LENGTH SIZED NOT TO INTERFERE WITH POST. INSTALL BOLT AFTER GALVANIZING.

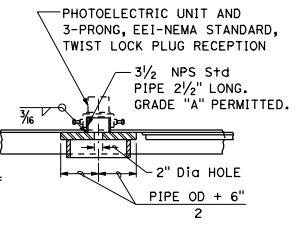
SEE TABLE FOR CAP PLATE SIZE AND THICKNESS. CHAMFER TO FIT CHORD FILLETS

R LENGTH = FRAME WIDTH LESS THICKNESS OF CHORD ANGLES. CHAMFER TO FIT CHORD FILLETS.



SECTION K-K Without photoelectric unit

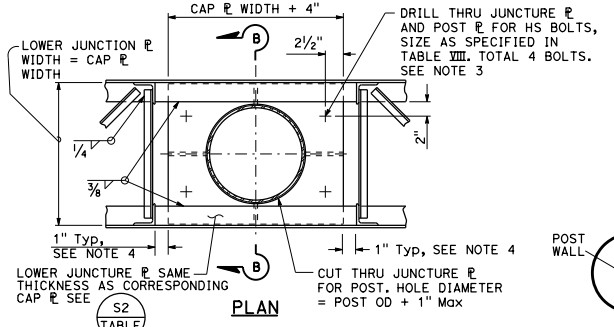
**UPPER CHORD CONNECTION TO POST TWO POST TYPE**



SECTION K-K With photoelectric unit

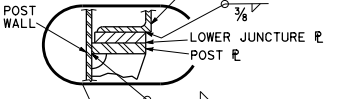
**NOTES: (SINGLE POST TYPE)**

- In all cases, truss shall be supported at lower juncture connection. Bearing surface shall be finished true.
- Post to truss connections shall be fitted in shop.
- High strength bolts shall be snug tighten. Torque requirements are waived.
- See Part Plan of Cantilever Type at post on Standard Plan S4.

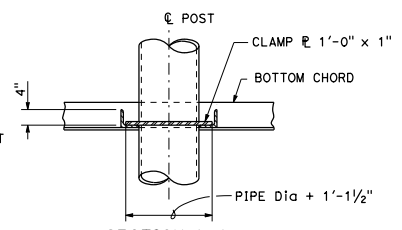
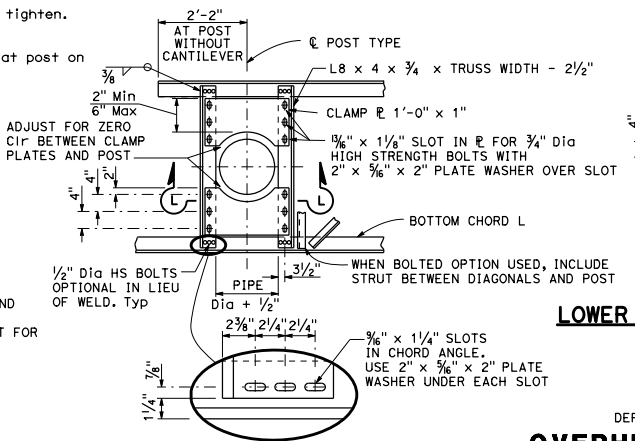


PLAN

**LOWER JUNCTURE CONNECTION SINGLE POST TYPE**



SECTION B-B



SECTION L-L

**LOWER CHORD CONNECTION TO POST TWO POST TYPE**

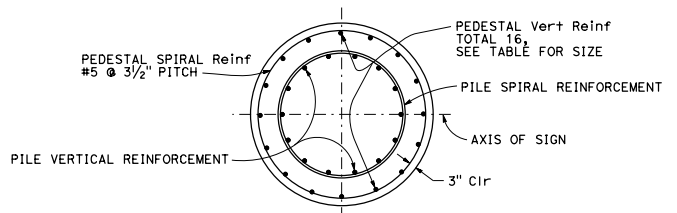
**OVERHEAD SIGNS-TRUSS FRAME JUNCTURE DETAILS**

NO SCALE

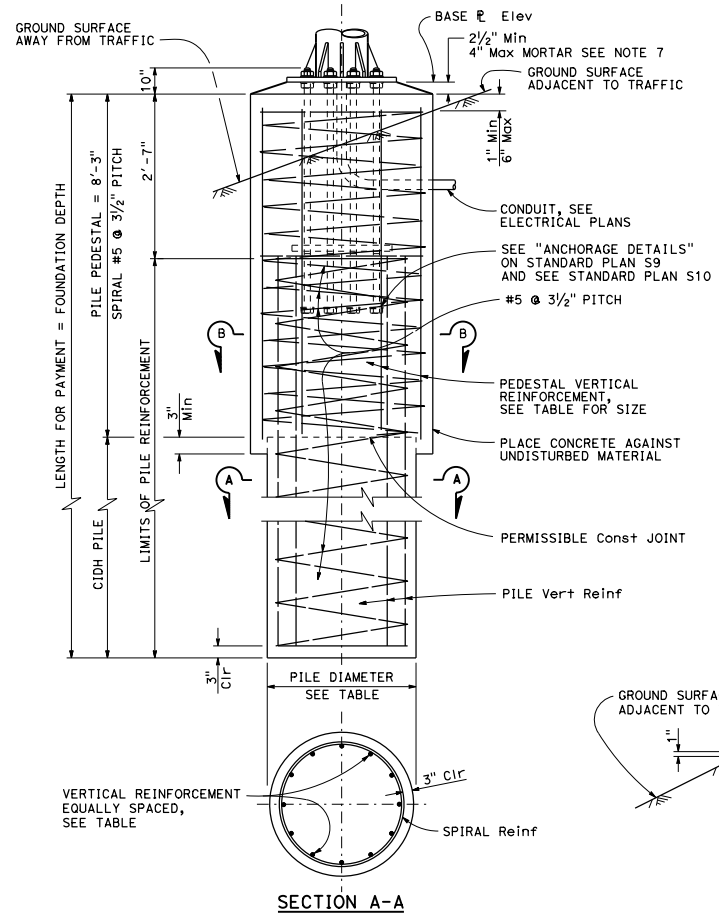
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Jeffrey B. Boody  
 No. C41260  
 Exp. 3-31-17  
 CIVIL ENGINEER  
 STATE OF CALIFORNIA

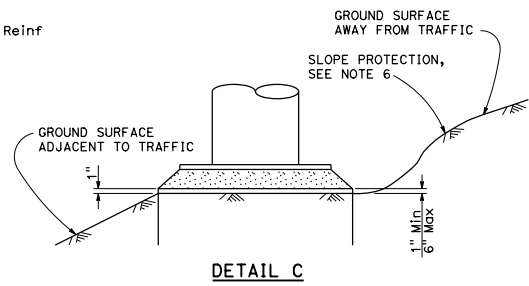
October 30, 2015  
 PLANS APPROVAL DATE  
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SECTION B-B



SECTION A-A



DETAIL C

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
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 STATE OF CALIFORNIA

October 30, 2015  
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POST TYPE	ANCHOR BOLTS				ROUND PILE PEDESTAL				CIDH PILE				FOUNDATION DEPTH **		
	TOTAL	Dia	BOLT CIRCLE	TOTAL LENGTH	VERTICAL REINFORCING		SPIRAL		PILE Dia	VERTICAL REINFORCING		SPIRAL			
					BAR SIZE	BAR SIZE	BAR SIZE	PITCH		BAR SIZE	PITCH				
I-S	12	2"	2'-4"	4'-2"	5'-3"	16	#10	#5	3/2"	4'-6"	26	#10	#5	3/2"	18'-0"
II-S	12	2"	2'-4"	4'-2"	5'-3"	16	#10	#5	3/2"	4'-6"	26	#10	#5	3/2"	19'-8"
III-S	12	2"	2'-7"	4'-5"	5'-6"	16	#10	#5	3/2"	4'-6"	26	#10	#5	3/2"	23'-0"
IV-S	14	2"	2'-10"	4'-8"	5'-9"	16	#10	#5	3/2"	4'-6"	26	#10	#5	3/2"	23'-0"
V-S	16	2 1/2"	3'-2"	5'-0"	5'-9"	16	#11	#5	3/2"	5'-0"	28	#11	#5	3/2"	26'-3"
VI-S	16	2 1/2"	3'-5"	5'-0"	5'-9"	16	#11	#5	3/2"	5'-0"	28	#11	#5	3/2"	27'-10"
VII-S	16	2 1/2"	3'-5"	5'-0"	5'-9"	16	#11	#5	3/2"	5'-0"	28	#11	#5	3/2"	27'-10"

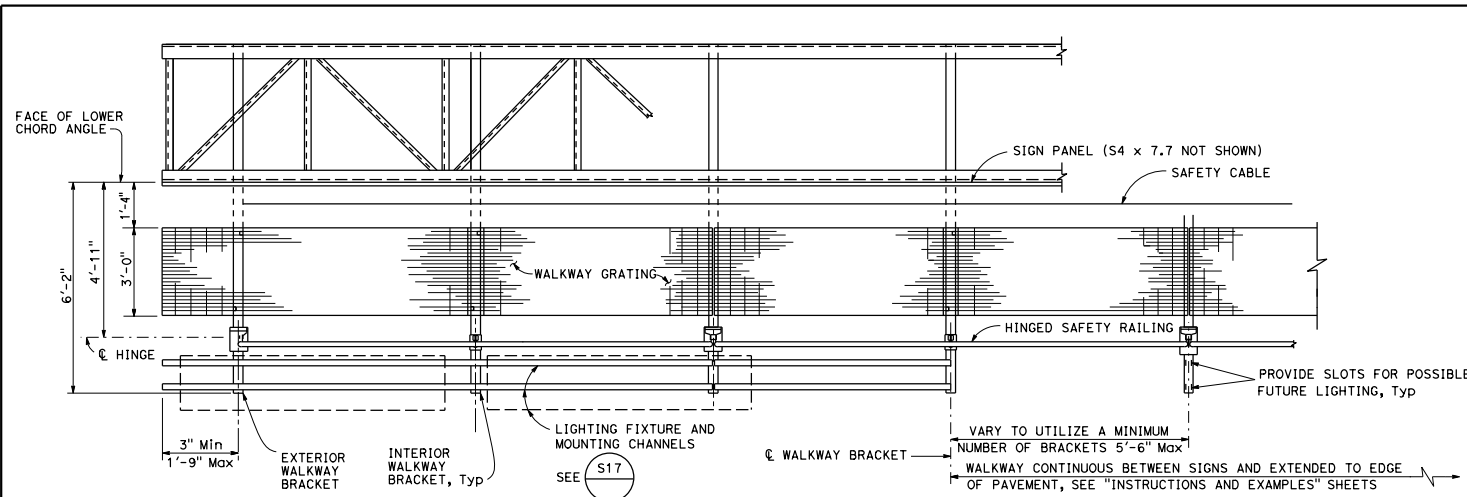
\*\* Use Foundation Depth shown in table unless otherwise shown on the Project Plans.

NOTES:

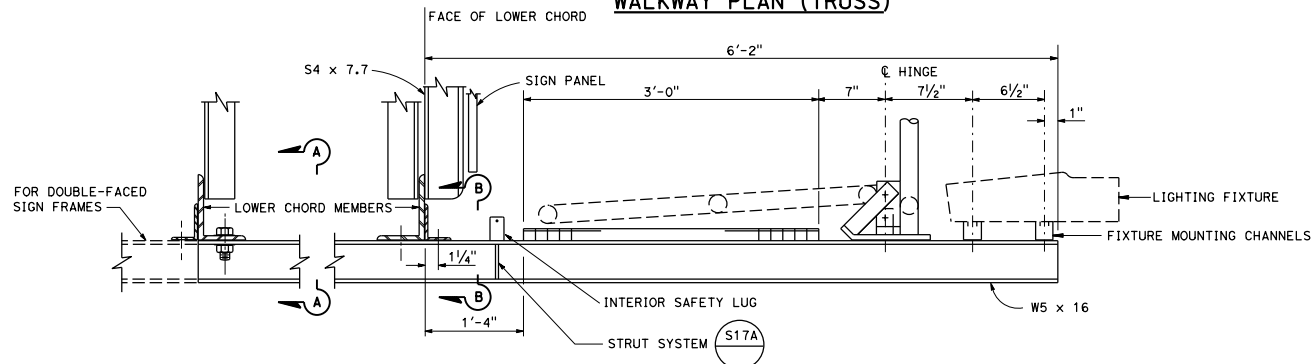
- For anchor bolt layout, see Standard Plan S10.
- For "Base E elevation" see Project Plans.
- Longer side of post shall be normal to axis of sign.
- Prior to erection of the post, backfill which is equivalent to the surrounding material, shall be in place.
- Pedestal shall be formed 6" Min below ground surface. Remainder to be placed against undisturbed material.
- Slope protection required when indicated on the Project Plans.
- For drain holes and central void in mortar see Standard Plan ES-6B detail N.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
 TWO POST TYPE  
 ROUND PEDESTAL PILE FOUNDATION**  
 NO SCALE

S15

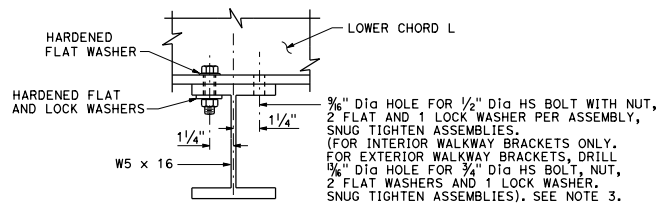


**WALKWAY PLAN (TRUSS)**

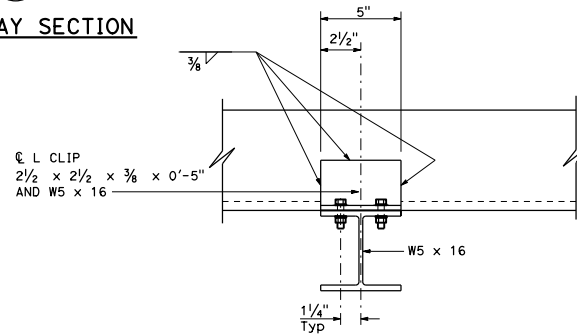


**TRUSS**

**TYPICAL WALKWAY SECTION**



**SECTION A-A**



**SECTION B-B**

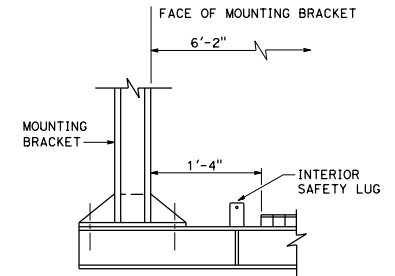
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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REGISTERED CIVIL ENGINEER

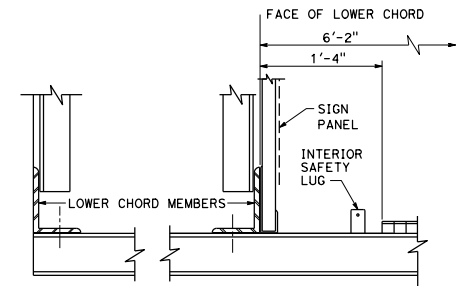
October 30, 2015  
 PLANS APPROVAL DATE  
 No. C41260  
 Exp. 3-31-17  
 CIVIL

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 STATE OF CALIFORNIA



**TUBULAR AND BRIDGE MOUNTED**



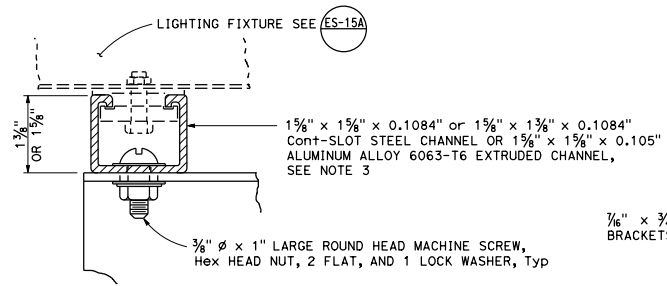
**BOX BEAM CLOSED TRUSS**

**NOTES:**

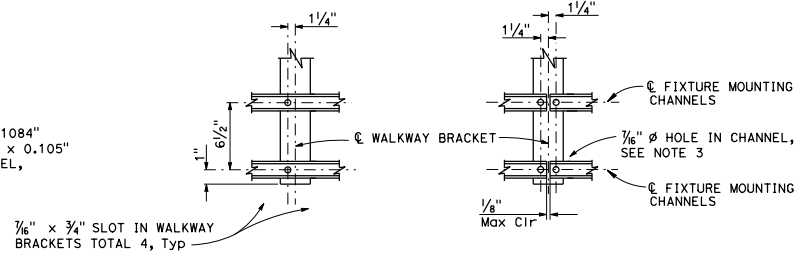
1. For spacing of lighting fixtures, see Standard Plan ES-15A.
2. For safety lug details, see Standard Plan S17.
3. For double faced sign frames with double walkways, use a total 8 bolt assemblies per bracket.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS  
 WALKWAY DETAILS No. 1**  
 NO SCALE

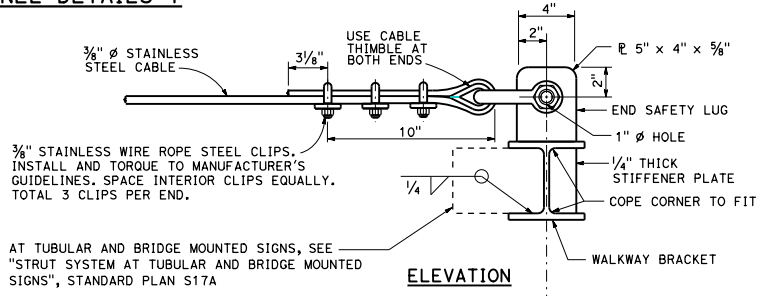
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
REGISTERED CIVIL ENGINEER October 30, 2015 PLANS APPROVAL DATE				
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**LIGHTING FIXTURE MOUNTING CHANNEL DETAILS 1**



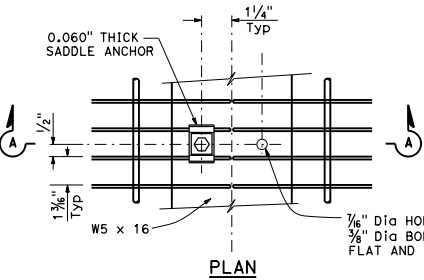
**TYPICAL CONNECTION CONNECTION AT SPLICE LIGHTING FIXTURE MOUNTING CHANNEL DETAILS 2**



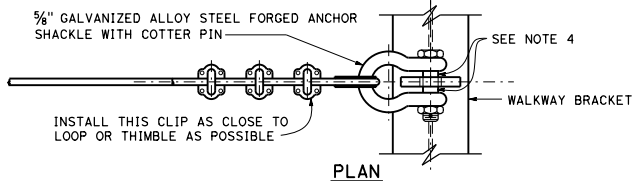
**NOTES:**

1. Welded type grating shall have 1/4" x 1/8" bearing bars at 1 1/2" centers with 1/4" diameter (or equal) cross bars at 4" centers. If mechanical lock grating is used, it shall be equal in strength to the welded type. Alternate hold-down clips may be submitted for approval.
2. Walkway grating and light fixture mounting channels to be continuous (no splices) over as many walkway brackets as practical and consistent with fabrication, ease of handling and assembly.
3. Contractor may substitute 1 5/8" x 1 5/8" x .1084" cont-slot steel channel with pre-punched slots not larger than 1/2" x 3". Slots shall be at bottom of channel and shall be parallel to channel. Slots shall be spaced not closer than 4" center to center.
4. Place an equal amount of washers on each side to align cable with end lug without restricting shackle bolt rotation or contacting cable.

AT TUBULAR AND BRIDGE MOUNTED SIGNS, SEE "STRUT SYSTEM AT TUBULAR AND BRIDGE MOUNTED SIGNS", STANDARD PLAN S17A

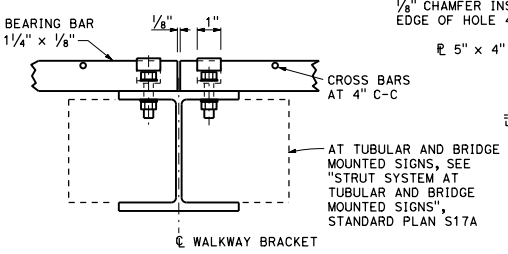


**PLAN**



**PLAN**

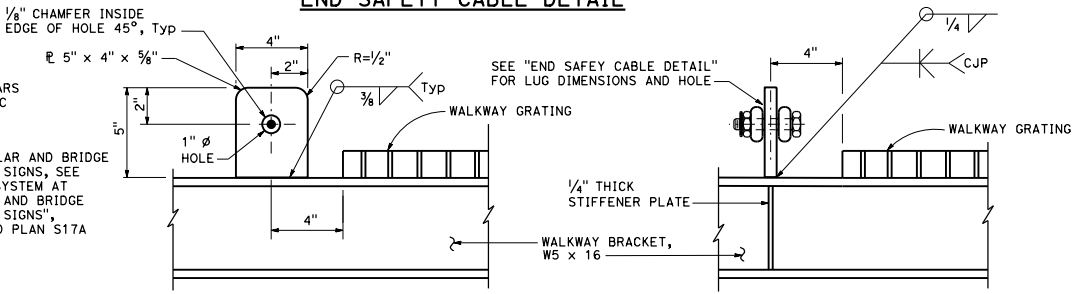
**END SAFETY CABLE DETAIL**



**SECTION A-A**

**WALKWAY GRATING DETAILS**

Shown at splice



**INTERIOR SAFETY LUG DETAIL**

(At every walkway bracket between exterior walkway brackets)

**END SAFETY LUG DETAIL**

(At exterior walkway brackets)

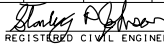

**OVERHEAD SIGNS WALKWAY DETAILS No. 2**

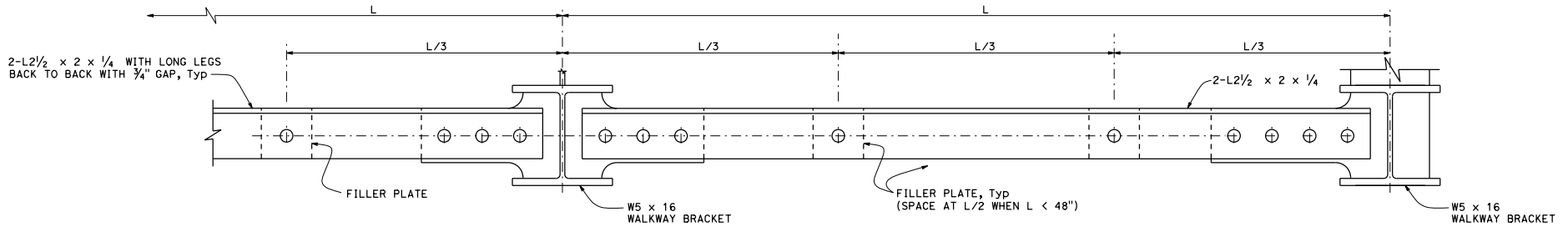
NO SCALE

**S17**

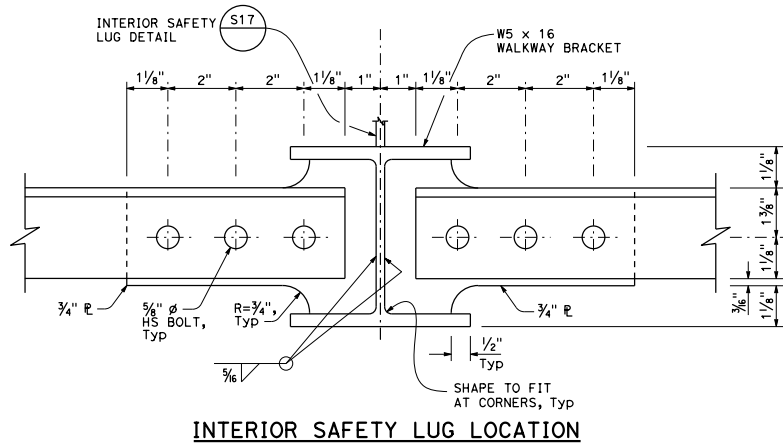
366

2015 STANDARD PLAN S17

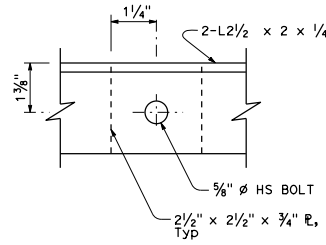
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



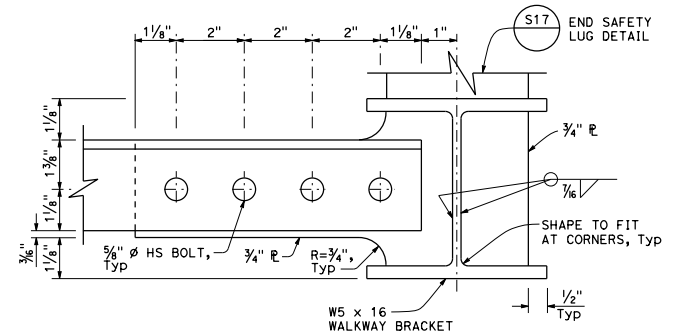
**STRUT SYSTEM AT TUBULAR AND BRIDGE MOUNTED SIGNS**  
(Continuous between end safety lug locations)



**INTERIOR SAFETY LUG LOCATION**



**FILLER PLATE**

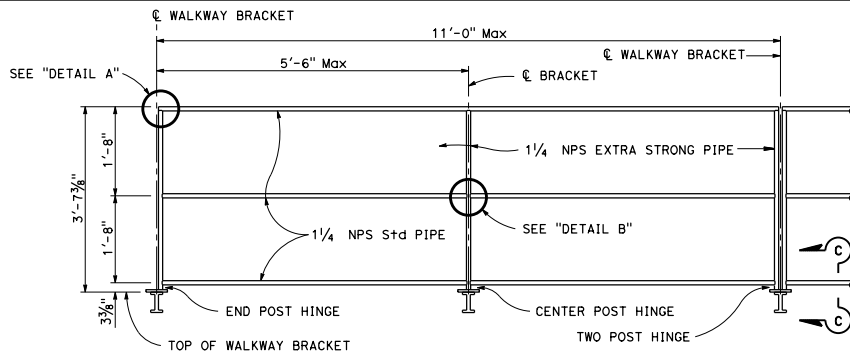


**END SAFETY LUG LOCATION**

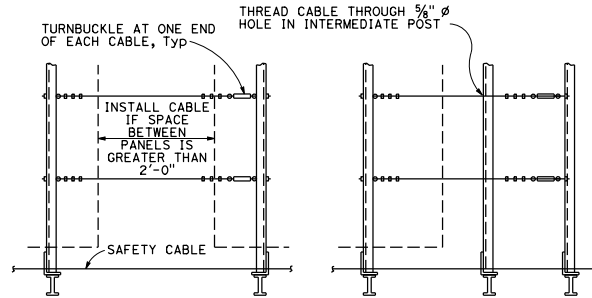
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS  
WALKWAY DETAILS No. 3**  
NO SCALE

**S17A**





**SAFETY RAILING ELEVATION**

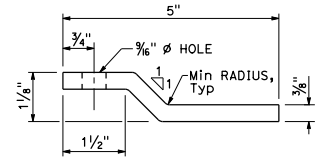


**UPPER SAFETY CABLE ELEVATION**  
For tubular structures

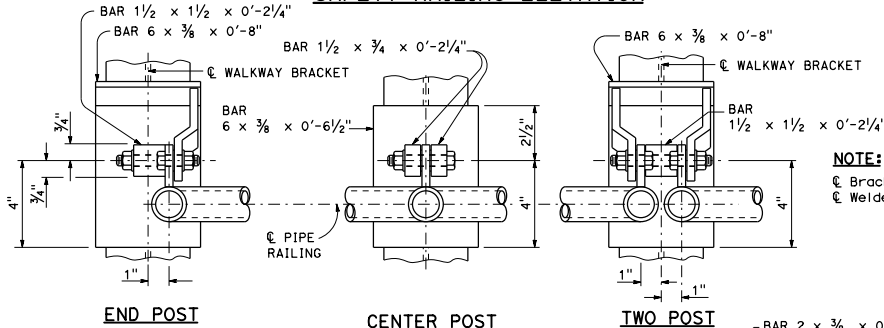
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Jeffrey B. Boody  
 No. C41260  
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 CIVIL  
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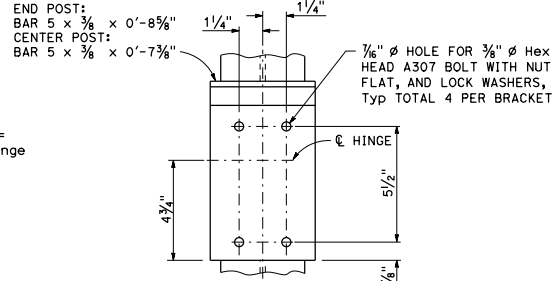


**PLAN - KICKER BAR**

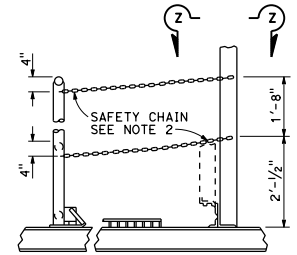


**WELDED HINGE - PLAN**

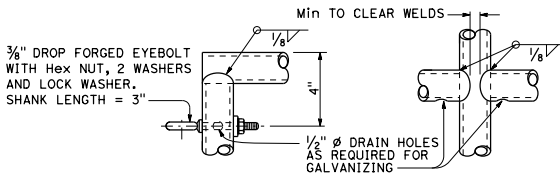
**NOTE:**  
⊕ Bracket =  
⊕ Welded hinge



**TYPICAL BOLTED (ALTERNATIVE) HINGED CONNECTION**

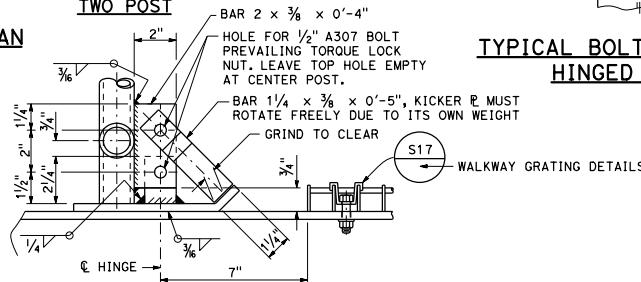


**CHAIN ASSEMBLY**

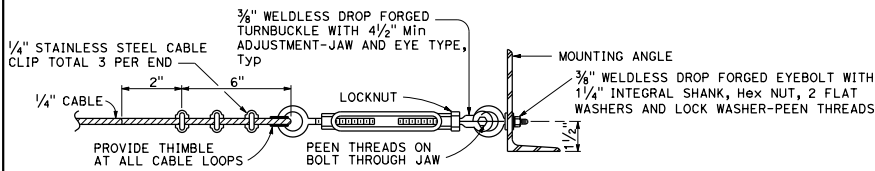


**DETAIL A**      **DETAIL B**

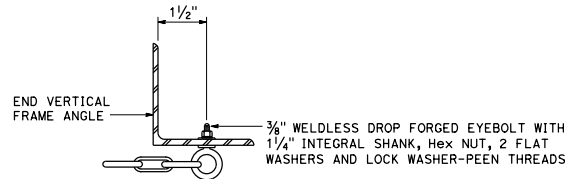
**NOTE:** Alternative venting methods may be used if approved by the Engineer.



**SECTION C-C**



**TURNBUCKLE DETAILS**




**VIEW Z-Z**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS  
WALKWAY SAFETY  
RAILING DETAILS**

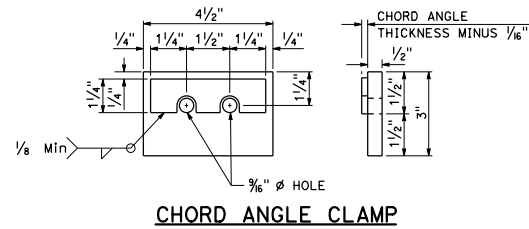
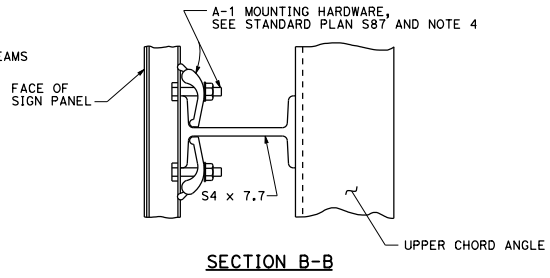
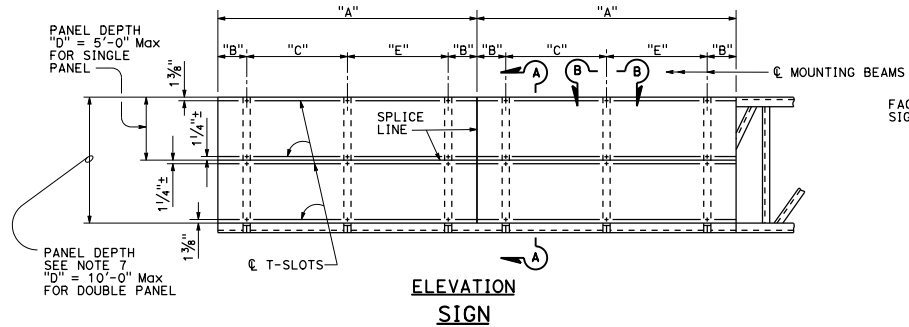
NO SCALE



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

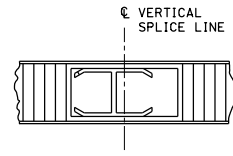
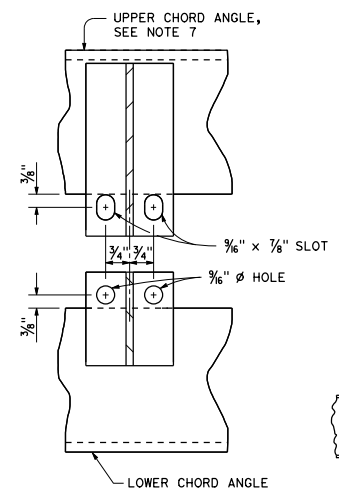
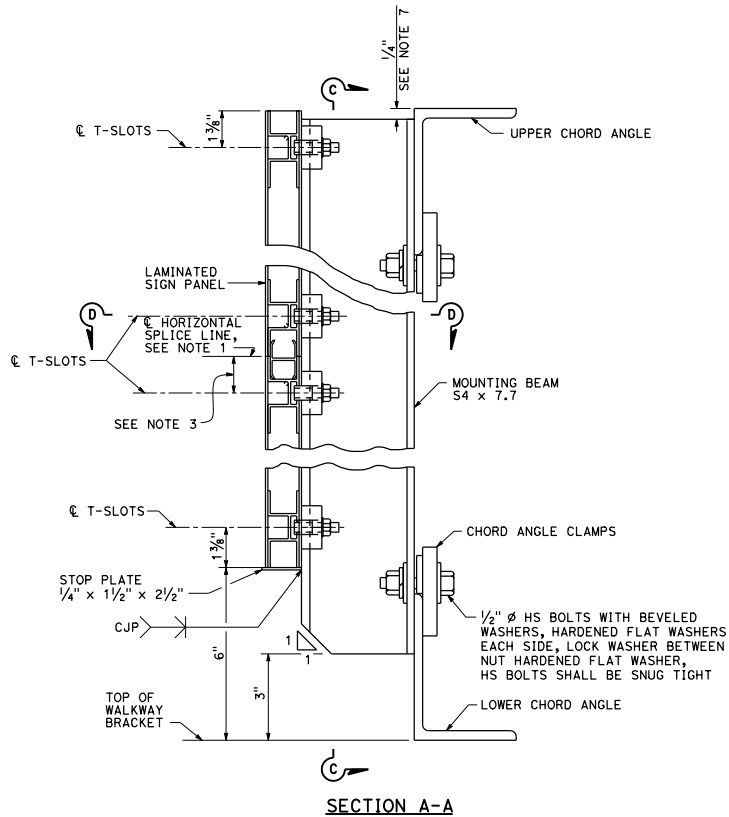
  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**MOUNTING BEAM SPACING TABLE**

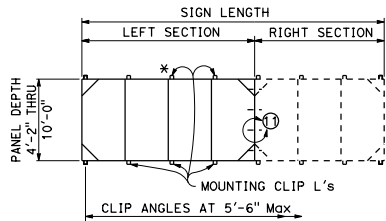
SIGN PANEL LENGTH *	NUMBER MOUNTING BEAMS	SIGN PANEL OVERHANG			MOUNTING BEAM SPACING
		"B"	"C"	"E"	
5'-0"	2	9"	3'-6"		
6'-0"		1'-0"	4'-0"		
7'-0"		1'-3"	4'-6"		
8'-0"		1'-6"	5'-0"		
9'-0"		1'-10"	5'-6"		
10'-0"		2'-0"	6'-0"		
11'-0"		2'-0"	7'-0"		
12'-0"		2'-6"	7'-0"		
13'-0"		2'-6"	8'-0"		
14'-0"		2'-6"	9'-0"		
15'-0"		3'-0"	9'-0"		
16'-0"	3	6"	7'-6"	7'-6"	
17'-0"		1'-0"	7'-6"	7'-6"	
18'-0"		1'-0"	8'-0"	8'-0"	
19'-0"		1'-0"	8'-6"	8'-6"	
20'-0"		1'-6"	8'-6"	8'-6"	
21'-0"		1'-6"	9'-0"	9'-0"	
22'-0"		2'-0"	9'-0"	9'-0"	
23'-0"		2'-6"	9'-0"	9'-0"	
24'-0"		3'-0"	9'-0"	9'-0"	



**NOTES:**

- The location of the horizontal splice line is dependent on the Contractor for signs greater than 60" in depth.
- Mounting bolts and clamps are required on each side of the horizontal splice lines at each support beam.
- Dimension varies from panel to panel. Average value approximate 1 1/4".
- Torque stainless steel sign panel mounting bolts to 100 inch-pounds.
- Chord angle clamp to be galvanized after fabrication.
- The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.
- 9'-2" and 10'-0" sign panel along with the mounting beams will project above the top chord truss member 10" and 1'-8" respectively. Attachment details shall be the same.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
 SIGN MOUNTING DETAILS  
 LAMINATED PANEL-TYPE A**  
 NO SCALE



**REMOVABLE FRAME  
GREATER THAN 20'-0"**

\* 9'-2" & 10'-0" sign panel frames will project above the topchord of the truss. In these cases the top clips shall be bolted to vertical frame members. See Standard Plan S22 for details.

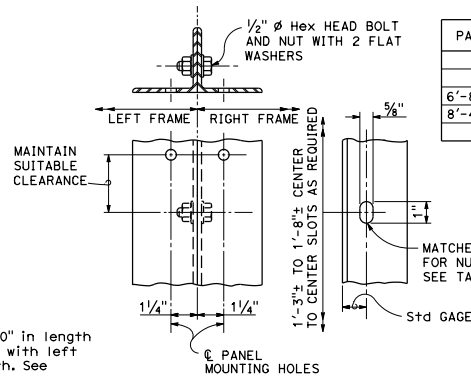
SIGN LENGTH	LEFT SECTION	RIGHT SECTION
22'-0"	12'-0"	10'-0"
24'-0"	12'-0"	12'-0"
26'-0"	12'-0"	14'-0"
28'-0"	16'-0"	12'-0"
30'-0"	16'-0"	14'-0"
32'-0"	16'-0"	16'-0"
34'-0"	16'-0"	18'-0"
36'-0"	20'-0"	16'-0"
38'-0"	20'-0"	18'-0"
40'-0"	20'-0"	20'-0"

**NOTES:**

Frames for signs greater than 20'-0" in length shall be fabricated in two sections with left section a multiple of 4'-0" in length. See table above.

Sections shall be hoisted into place individually and bolted together as per detail 11 prior to tightening of mounting clip bolts.

Bolting two sections together and hoisting simultaneously will not be permitted.



**FRAME TO FRAME  
CONNECTION DETAILS**

PANEL DEPTH	No. OF SLOTS
4'-2"	2
5'-10"	3
6'-8" AND 7'-6"	4
8'-4" AND 9'-2"	5
10'-0"	6

**NOTES:**

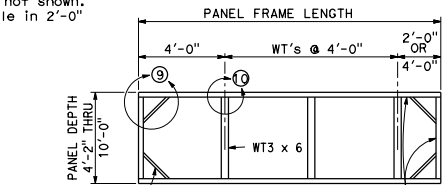
Panel mounting holes not shown. Panel lengths available in 2'-0" increments.

MATCHED SLOTS IN, END L's. FOR NUMBER REQUIRED, SEE TABLE ABOVE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Jeffrey B. Woody**  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

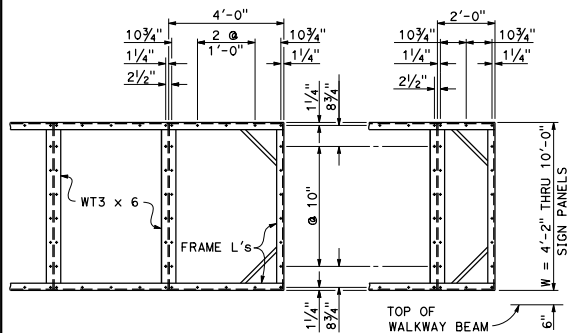
October 30, 2015  
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**TYPICAL REMOVABLE FRAME  
(4'-0" thru 20'-0")**

**NOTES:**

1. Frames shall be all-welded construction.
2. Panel mounting holes shall be drilled by template. Sign panel may be considered as a template.
3. Drilled and tapped holes 1/4" may be used where interference due to welds or structural members is encountered.
4. WT3 x 6 shall be flush with faces of frame angles.
5. Mounting clip angles shall be located such as to allow the top and bottom frame angles of the removable sign panel to lie on a straight horizontal line.
6. Holes for mounting removable sign panel frame may be slotted 1" maximum parallel to the axis of the sign.
7. WT3 x 6 may be crimped at ends to join frame angles. Fillet weld all around.

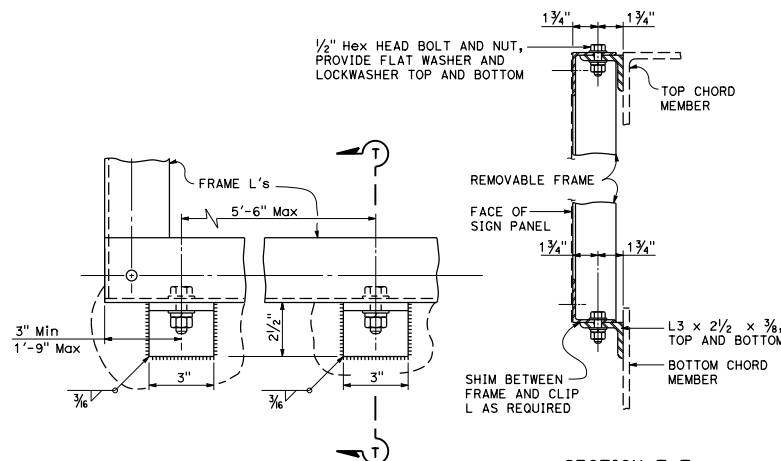


**TYPICAL 4'-0" PANEL      TYPICAL 2'-0" PANEL**

All holes 1/2" diameter maximum.

**MOUNTING HOLE SPACING  
SIGN PANEL & FRAME**

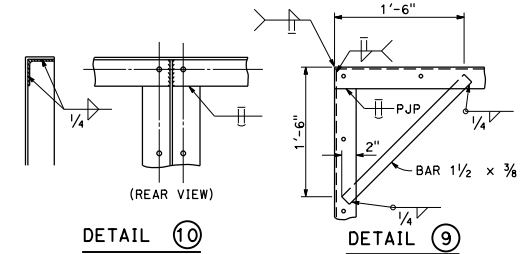
Hole spacing is for single sheet sign panels. For Overhead Formed Panels refer to "Removable Sign Panel Frames, Mounting Details" Sheet.



**FRAME MOUNTING DETAILS**

Details shown apply for sign panel frames ≤ 8'-4" deep. Mounting details for deeper panels shown on Standard Plan S22.

**SECTION T-T**



**DETAIL 10**

**DETAIL 9**

**TYPICAL FRAME JOINT DETAILS**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS  
STEEL FRAMES  
REMOVABLE SIGN PANEL FRAMES**

NO SCALE

**S20**

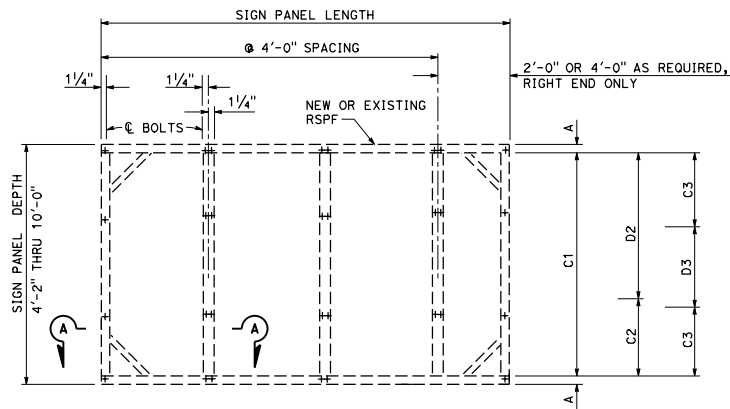
D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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 COPIES OF THIS PLAN SHEET.

PANEL DEPTH	A	MOUNTING BOLT SPACING					
		1 SPACE		2 SPACE		3 SPACE	
		C1	C2	D2	C3	D3	C3
50"	1 1/4"	3'-11 1/2"					
60"			2'-4 3/4"	2'-4 3/4"			
70"			1'-6 3/4"	4'-3/4"			
80"			3'-2 3/4"	3'-2 3/4"			
90"			3'-2 3/4"	4'-3/4"			
100"			4'-3/4"	4'-3/4"			
110"					3'-2 3/4"	2'-6"	3'-2 3/4"
120"	1 1/4"				4'-3/4"	1'-8"	4'-3/4"

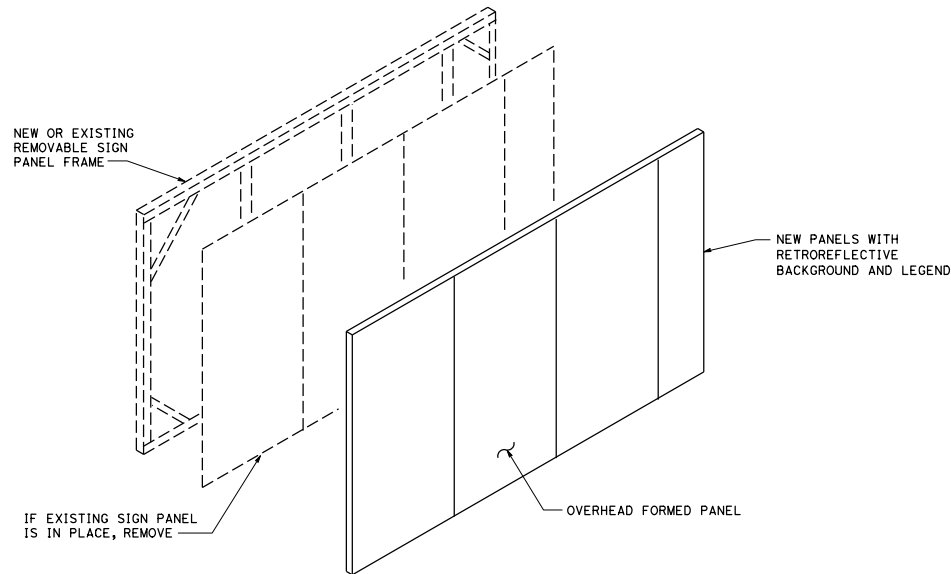
TABLE 1



ELEVATION VIEW  
 NEW OR EXISTING REMOVABLE SIGN PANEL FRAME  
 MOUNTING HOLE SPACING

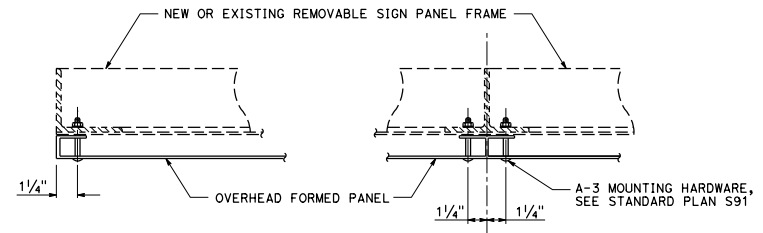
**NOTE:**

Sign panel mounting holes 1/2"  $\phi$   
 maximum for 3/8"  $\phi$  bolts.



**NOTE:**

The Contractor shall verify all dependent dimensions in the field  
 before ordering or fabricating any material.



CORNER DETAIL

PANEL CONNECTION

SECTION A-A

**NOTES:**

- When constructing a new frame:
- (1) Refer to Standard Plan Sheet S20 for structural details.
  - (2) Sign panels shall be considered as a template for drilling holes for mounting bolts.

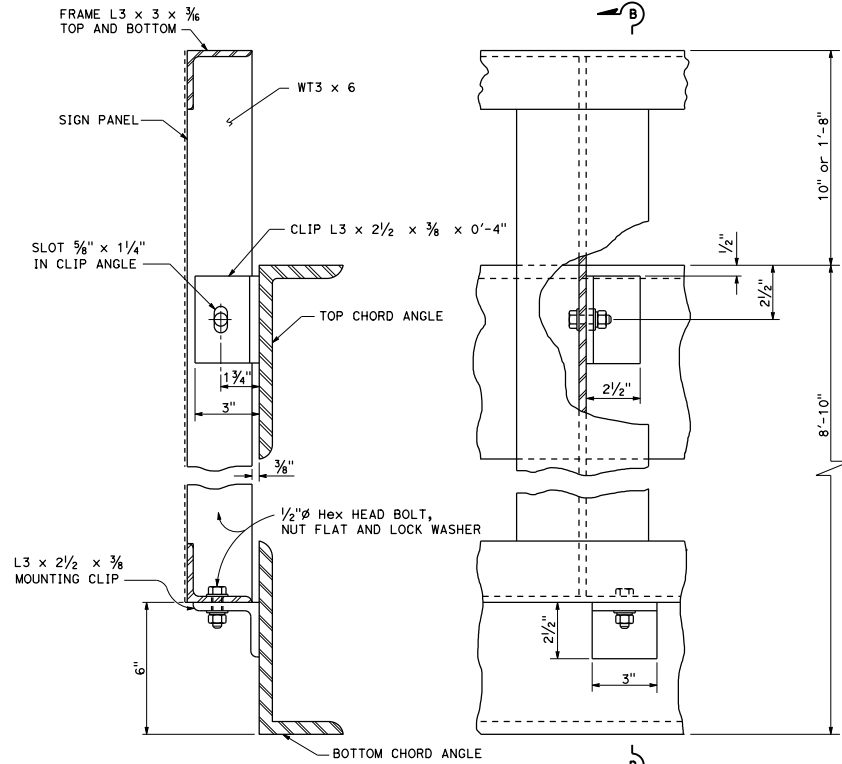
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS  
 REMOVABLE SIGN PANEL FRAMES  
 MOUNTING DETAILS**

NO SCALE

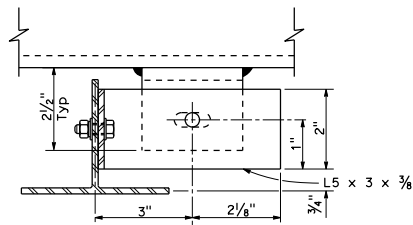
**S21**

371

2015 STANDARD PLAN S21



**SECTION B-B ELEVATION VIEW  
STEEL REMOVABLE SIGN PANEL FRAMES**



**BOLTED ALTERNATIVE CONNECTION AT TOP CHORD**  
For details not shown, see Sections C-C and D-D.

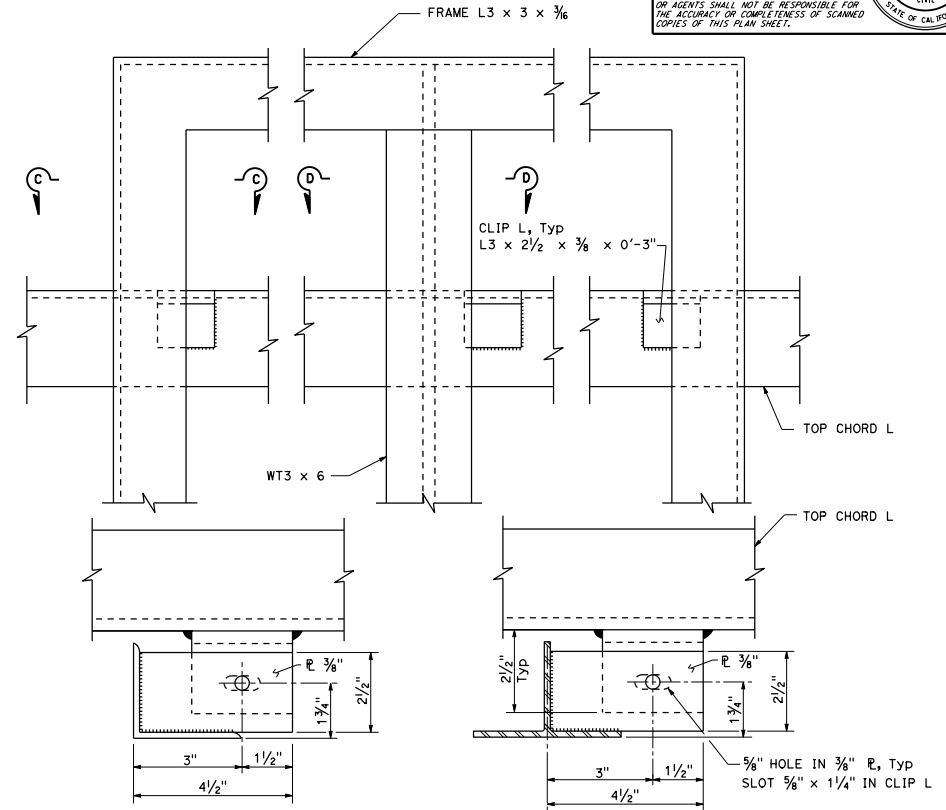
**NOTES:**

1. For Steel Removable Sign Panel Frame details see Standard Plan S20.
2. Minimum fillet weld is 1/4" for clip angles welded to chord member of truss.
3. Maximum spacing of bottom clip angle is 5'-6".
4. Top clips required for each vertical member of Removable Sign Panel Frame.

DIST	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	No.	SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

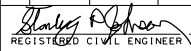

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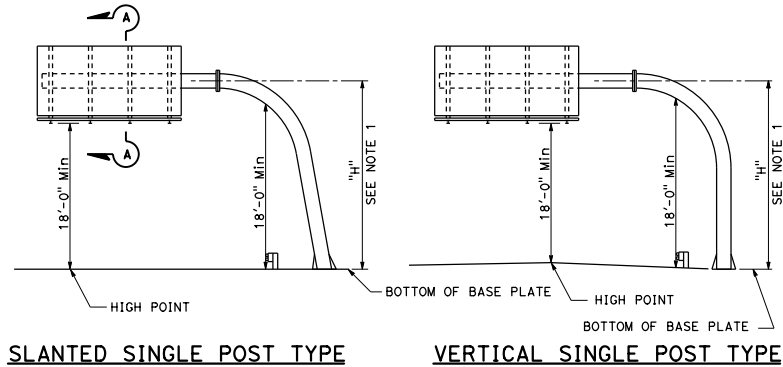


**SECTION C-C SECTION D-D  
ALTERNATIVE CONNECTION AT TOP CHORD**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TRUSS  
 REMOVABLE SIGN PANEL FRAMES  
 110" AND 120"  
 SIGN PANELS**  
 NO SCALE

**S22**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
 REGISTERED CIVIL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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**SLANTED SINGLE POST TYPE**

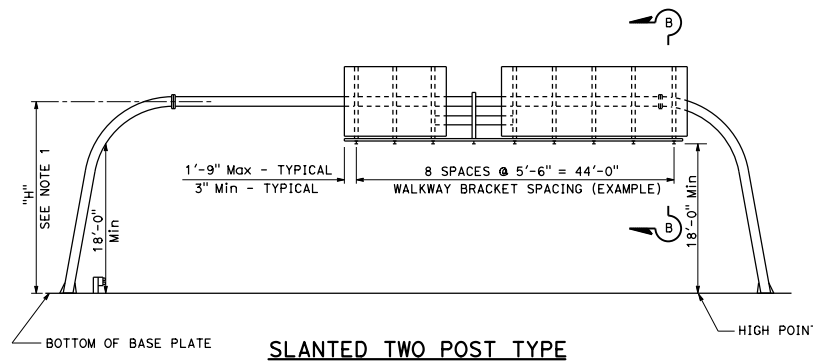
**VERTICAL SINGLE POST TYPE**

**INSTRUCTIONS TO FABRICATOR**

- Format sheet shows:
1. Sign structure location.
  2. Length of structure span.
  3. Panel size and location on structure.
  4. Post height to bottom of panel or mast arm elevation.
  5. Base plate elevation.
  6. Photoelectric unit location if required.
  7. Walkway location.

**GENERAL NOTES:**

- LOADING:**
- WIND LOADING:**
- Normal to face of sign: 40.3 psf on 100% panel coverage.
  - Transverse to face of sign: 20% of normal force.
- WALKWAY LOADING:**
- Dead load 500 LBS concentrated live load.
- UNIT STRESSES:**
- STRUCTURAL STEEL:  $f_y = 36,000$  psi
  - REINFORCED CONCRETE:  $f_y = 60,000$  psi
  - FOOTING SOIL PRESSURE: 2.5 ksf (spread footing)



**SLANTED TWO POST TYPE**

**WALKWAY BRACKETS:**

Maintain uniform spacing where possible. Maximum spacing shall not exceed 5'-6" Minimum clear to field splice = 1'-0"±

**WALKWAY AND SAFETY RAILING:**

Walkway to extend full length of sign area and be continuous between signs. Extend walkway to edge of pavement if required. Safety railing to protect entire walkway.

**PHOTOELECTRIC UNIT:**

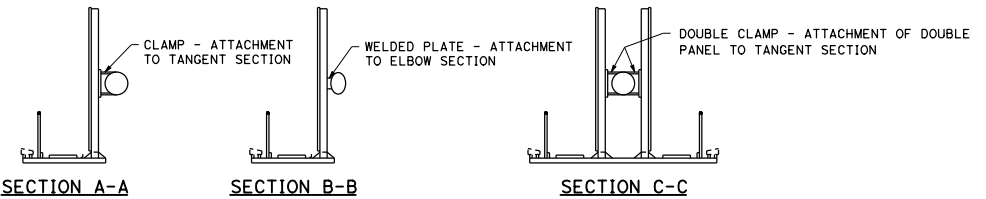
Place behind sign panel nearest right shoulder unless otherwise shown on format sheet.

**MINIMUM CLEARANCE**

Vertical roadway clearance 18'-0" above roadway and shoulders

**WELDING:**

All welding continuous unless otherwise noted on the plans.



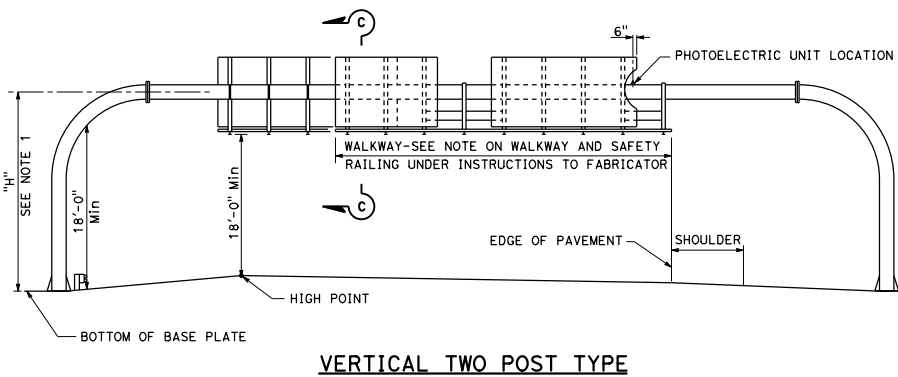
**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**NOTES:**

1. Maximum post height = 24'-0" + sign panel depth/2.
2. For walkway details, see Standard Plan S16.
3. For safety railing and cable details, see Standard Plans S17 and S18.

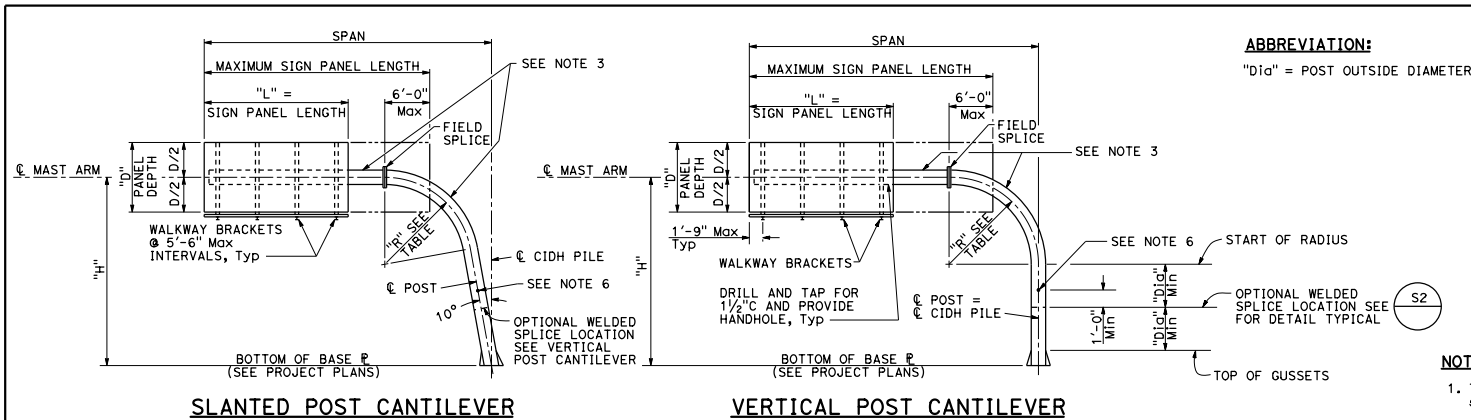


**VERTICAL TWO POST TYPE**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TUBULAR  
INSTRUCTIONS AND EXAMPLES**

NO SCALE

**S30**



**SLANTED POST CANTILEVER**

**VERTICAL POST CANTILEVER**

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
------	--------	-------	--------------------------	-----------	--------------

**Stanley P. Johnson**  
 REGISTERED CIVIL ENGINEER  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

1. The maximum sign panel overlap onto the post elbow shall not exceed 6'-0" from the field splice.
2. When several sign panels are to be installed with a space between the panels, the space shall be as small as possible and 2'-0" maximum.
3. All posts between base plate and field splice shall be as scheduled in table. All mast arms are standard pipe.
4. During sign erection the post shall be raked as necessary with the use of leveling nuts to level the sign panel.
5. At final position of post all top and bottom anchor bolt nuts shall be snug tighten against base plate.
6. Drill and tap for 1/2" C chase nipple and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. See Standard Plan ES-15C.

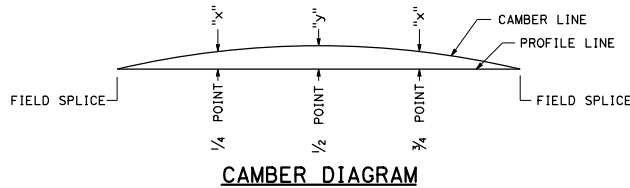
"D" PANEL DEPTH	"H" POST HEIGHT	POST TYPE No. FOR SPANS OF CANTILEVER																			
		38'-0" SPAN Col #	37'-0" SPAN Col #	36'-0" SPAN Col #	35'-0" SPAN Col #	34'-0" SPAN Col #	33'-0" SPAN Col #	32'-0" SPAN Col #	31'-0" SPAN Col #	30'-0" SPAN Col #	29'-0" SPAN Col #	28'-0" SPAN Col #	27'-0" SPAN Col #	26'-0" SPAN Col #	25'-0" SPAN Col #	24'-0" SPAN Col #	23'-0" SPAN Col #	22'-0" SPAN Col #	21'-0" SPAN Col #	20'-0" SPAN Col #	
120"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
110"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
100"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
90"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
80"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
70"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
60"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
50"	29'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	27'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	25'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	23'-0"	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	

POST TYPE No.	PIPE		"R" RADIUS
	NPS	THICKNESS	
I	20	1/2"	12'-0"
II	24	1/2"	
III	24	5/8"	
IV	30	1/2"	
V	30	5/8"	
VI	30	3/4"	

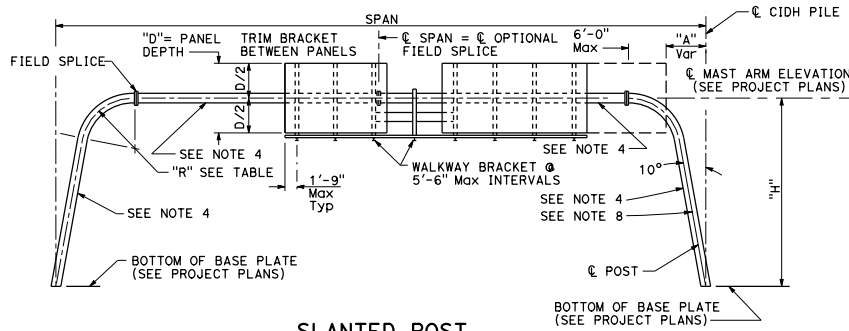
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TUBULAR  
 SINGLE POST TYPE  
 LAYOUT AND PIPE SELECTION**

NO SCALE

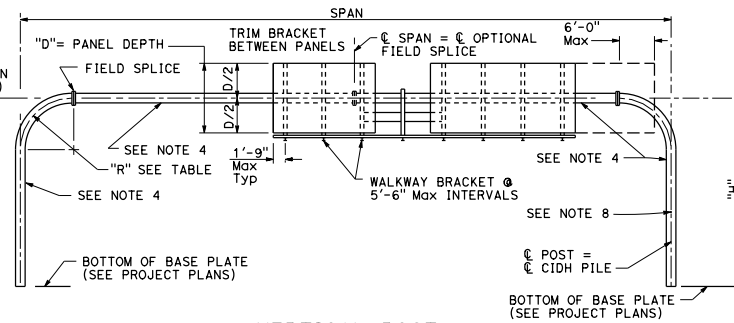
**S31**



**ABBREVIATION:**  
R = Radius of 90° elbow



**SLANTED POST**



**VERTICAL POST**

**TABLE A**

"D" PANEL DEPTH	"H" POST HEIGHT	POST TYPE No. FOR SPAN LENGTH BELOW									
		140'-0" TO 145'-0"	130'-0" TO 139'-0"	120'-0" TO 129'-0"	110'-0" TO 119'-0"	100'-0" TO 109'-0"	90'-0" TO 99'-0"	80'-0" TO 89'-0"	70'-0" TO 79'-0"	60'-0" TO 69'-0"	50'-0" TO 59'-0"
120"	29'-0"	VI	VI	VI	VI	V	V	IV	III	III	II
	27'-0"	VI	VI	VI	V	V	IV	IV	III	III	II
	25'-0"	VI	VI	V	V	IV	IV	III	III	II	I
	23'-0"	VI	V	V	IV	IV	IV	III	II	II	I
	21'-0"	V	V	IV	IV	IV	III	III	II	II	I
110"	29'-0"	VI	VI	VI	V	V	IV	IV	III	III	II
	27'-0"	VI	VI	V	V	IV	IV	III	III	II	I
	25'-0"	V	V	V	IV	IV	IV	III	II	II	I
	23'-0"	V	V	IV	IV	IV	III	III	II	II	I
	21'-0"	V	V	IV	IV	IV	III	III	II	II	I
100"	29'-0"	VI	V	V	V	IV	IV	IV	III	III	II
	27'-0"	V	V	V	IV	IV	IV	III	III	II	I
	25'-0"	V	V	IV	IV	IV	III	III	II	II	I
	23'-0"	V	IV	IV	IV	IV	III	III	II	II	I
	21'-0"	V	IV	IV	IV	III	III	III	II	II	I
90"	29'-0"	V	V	V	IV	IV	IV	III	III	III	II
	27'-0"	V	V	IV	IV	IV	III	III	III	II	I
	25'-0"	IV	IV	IV	IV	III	III	III	II	II	I
	23'-0"	IV	IV	IV	III	III	III	III	II	II	I
	21'-0"	IV	IV	IV	III	III	III	III	II	II	I
80"	29'-0"	V	IV	IV	IV	III	III	III	III	III	II
	27'-0"	IV	IV	IV	III	III	III	III	III	III	II
	25'-0"	IV	IV	IV	III	III	III	III	III	III	II
	23'-0"	IV	IV	III	III	III	III	III	III	III	II
	21'-0"	IV	III	III	III	III	III	III	III	III	II
70"	29'-0"	IV	IV	IV	III	III	III	III	III	III	II
	27'-0"	IV	IV	IV	III	III	III	III	III	III	II
	25'-0"	III	III	III	III	III	III	III	III	III	II
	23'-0"	III	III	III	III	III	III	III	III	III	II
	21'-0"	III	III	III	III	III	III	III	III	III	II

**NOTES:**

- The maximum sign panel overlap onto elbow shall not exceed 6'-0" from the field splice.
- When several sign panels are to be installed with spaces between panels, the total sign panel length is the sum of individual sign panel lengths only.
- For spans ranging from 50'-0" to 145'-0", maximum sign panel coverage is as follows:
  - a) For slanted post type: Span - "A" on both sides from  $\phi$  of CIDH Pile.
  - b) For vertical post type: Span - 6'-0" on both sides from  $\phi$  of CIDH Pile.
- All posts between base plate and field plate splice shall be as scheduled in table. All mast arms are standard pipe.
- Before any portion of sign frame is assembled in its final position, the Contractor shall demonstrate to the Engineer by preassembly or other approved methods that the span length of the frame, with no load condition, is within  $\pm 1/2$ " of field measured span length between foundations.
- If sign frames are erected as one unit, they shall be adequately suspended to avoid distortions or changes in span lengths between base plates.
- At final position of post, all top and bottom anchor bolt nuts shall be snug tighten against base plate.
- Drill and tap for 1 1/2" C chase nipple and plug with recessed pipe plugs. Place perpendicular to sign panel axis and away from approaching traffic. See Standard Plan ES-15C.
- Maximum difference between post heights on an individual frame = 5'-0".
- For standard pipe members (mast arms) with lengths greater than 78'-9", an optional field splice will be permitted at the centerline of span to facilitate hauling operations.
- For location of optional welded splice in post, see Standard Plan S31.

**TABLE B**

POST TYPE No.	PIPE		"R" RADIUS
	NPS	THICKNESS	
I	20	1/2"	12'-0"
II	24	1/2"	
III	24	5/8"	
IV	30	1/2"	
V	30	5/8"	
VI	30	3/4"	

**TABLE C**

CAMBER			
POST TYPE No.	SPAN LENGTH	X	Y
II	50'-0" TO 119'-0"	2 1/4"	3 1/2"
II	120'-0" TO 145'-0"	3 3/4"	5"
III	50'-0" TO 119'-0"	2 1/4"	3 1/2"
III	120'-0" TO 145'-0"	3 3/4"	5"
IV	50'-0" TO 119'-0"	2 1/4"	3 1/2"
IV	120'-0" TO 145'-0"	3 3/4"	5"
V	50'-0" TO 119'-0"	2 1/4"	3 1/2"
V	120'-0" TO 145'-0"	3 3/4"	5"
VI	50'-0" TO 119'-0"	2 1/4"	3 1/2"
VI	120'-0" TO 145'-0"	3 3/4"	5"

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TUBULAR  
TWO POST TYPE  
LAYOUT AND PIPE SELECTION**

NO SCALE

**S32**

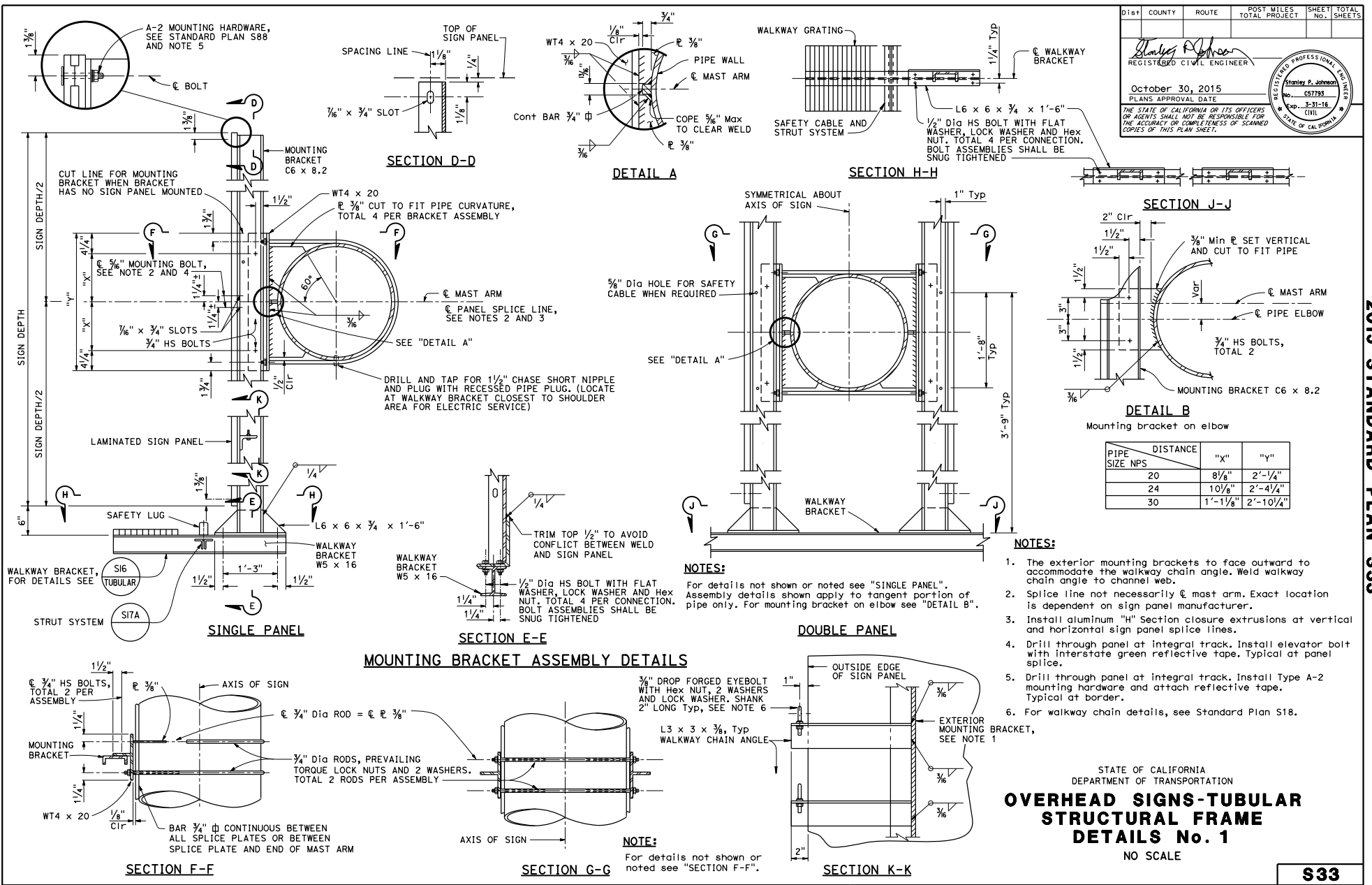
D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER  
No. CS793  
Exp. 3-31-16  
CIVIL

October 30, 2015  
PLANS APPROVAL DATE

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DIST	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	No.	SHEETS

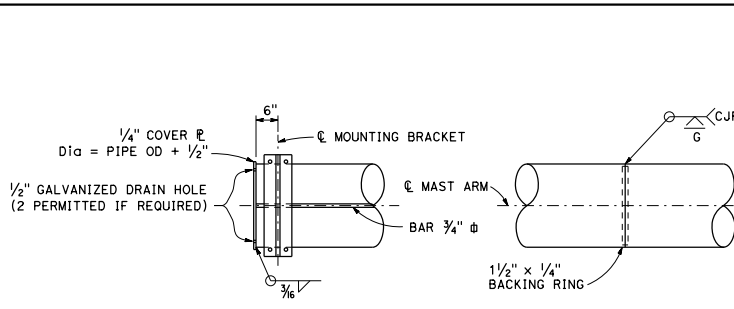
**Stanley P. Johnson**  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS7393  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

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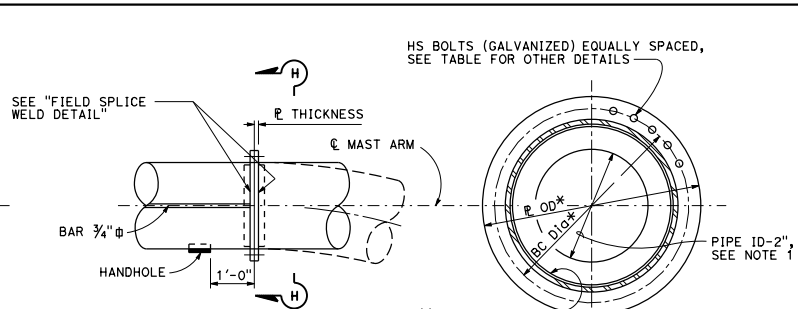
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TUBULAR  
 STRUCTURAL FRAME  
 DETAILS No. 1**  
 NO SCALE

**S33**





**MAST ARM END DETAIL**  
(For "Single Post Type" only)



**SHOP SPLICE**

**FIELD SPLICE**

**SECTION H-H**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Stanley P. Johnson**  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

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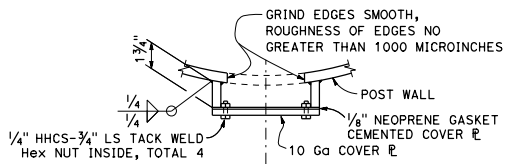
**ABBREVIATIONS:**  
 BC = Bolt Circle  
 ID = Inside Diameter of Post Pipe

**FIELD SPLICE TABLE**

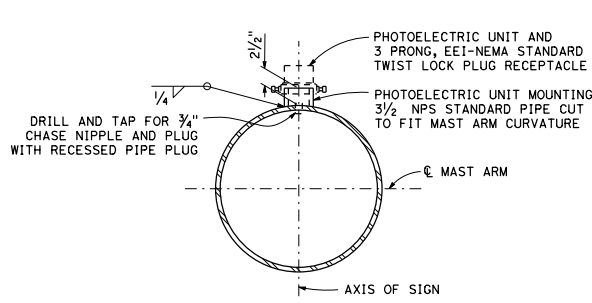
PIPE SIZE (NPS)	ℓ OD *	ℓ THICKNESS	BC Dia *	No. OF HS BOLTS AND BOLT Dia
20	2'-3"	1 3/8"	2'-0"	22-1"
24	2'-7"	1 1/2"	2'-6"	26-1"
30	3'-1"	1 5/8"	2'-10"	34-1"

**NOTE:**  
 Design based on capacity of standard pipe.

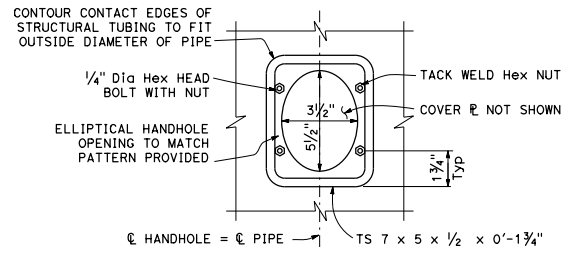
- NOTES:**
- Place single thin bead of silicone caulking compound around hole before bolting. Caulking not to interfere with friction between plates in bolted area.
  - Prime and paint post interior from base ℓ to 6" above lower handhole unless post is galvanized.
  - Field splice diameters marked "\*" may be increased 2" to facilitate bolting.



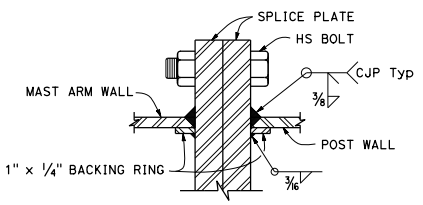
**PLAN**



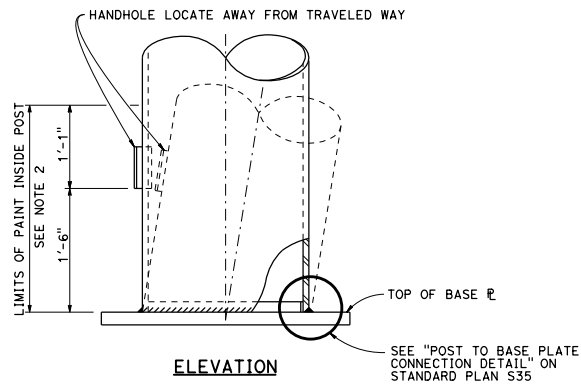
**PHOTOELECTRIC UNIT DETAILS**  
(See "Layout" sheet for location when required)



**ELEVATION**  
**DETAILS OF LOWER HANDHOLE & COVER**



**FIELD SPLICE WELD DETAIL**



**ELEVATION**  
**POST BASE**

(For base ℓ details, see Standard Plan S35)

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TUBULAR STRUCTURAL FRAME**  
**DETAILS No. 2**

NO SCALE

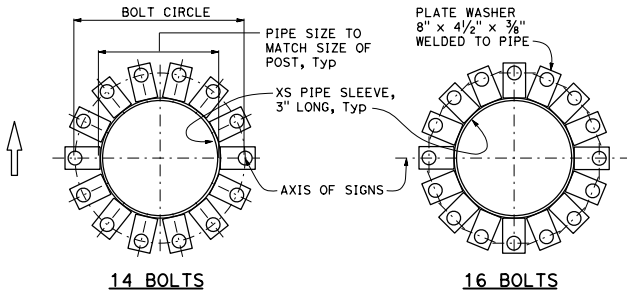
**SINGLE POST AND TWO POST TUBULAR**

POST TYPE	PIPE		BASE Ø OD AND THICKNESS	ANCHOR BOLTS	
	NPS	THICKNESS		BOLT CIRCLE Dia	BOLT TOTALS AND Dia OF BOLT
I	20	1/2"	3'-1" x 2 1/2"	2'-6"	14-2"
II	24	1/2"	3'-6" x 2 1/2"	2'-10"	14-2 1/2"
III	24	5/8"	3'-6" x 2 1/2"	2'-10"	14-2 1/2"
IV	30	1/2"	4'-0" x 2 1/2"	3'-4"	16-2 1/2"
V	30	5/8"	4'-0" x 2 1/2"	3'-4"	16-2 1/2"
VI	30	3/4"	4'-0" x 3"	3'-4"	16-2 1/2"

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

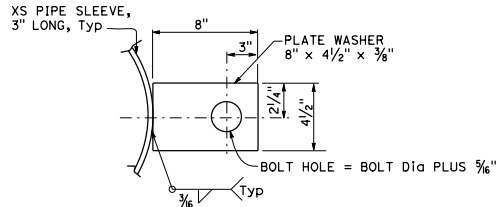
*Stanley P. Johnson*  
 REGISTERED CIVIL ENGINEER  
 No. CS7935  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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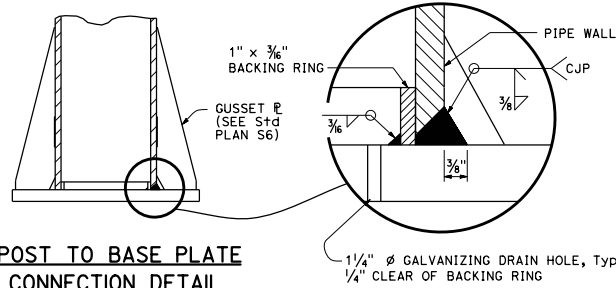


**ANCHOR BOLT TEMPLATE**

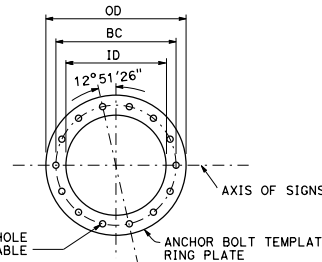
Template to match base plate anchor bolt pattern (Option: Template similar to ring plate type can be used in lieu of plate washer type).



**PLATE WASHER DETAIL FOR 14 AND 16 BOLT TEMPLATE PATTERN**

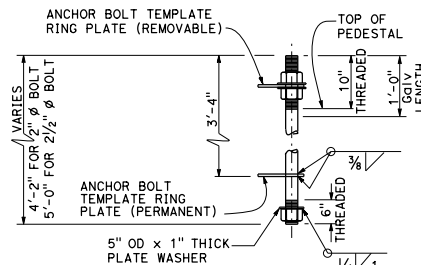


**POST TO BASE PLATE CONNECTION DETAIL**



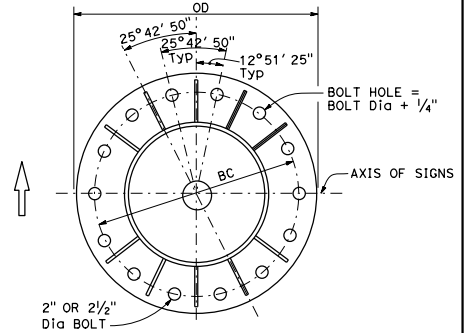
**14 BOLTS**

Type I shown

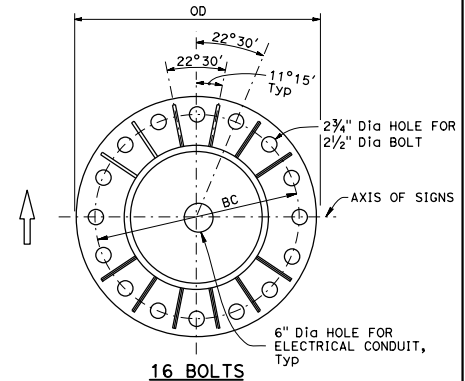


**ANCHOR BOLT TEMPLATE RING PLATE TYPE**

NOTE: One bolt shown only. Other bolts same configuration around ring plate.



**14 BOLTS**



**16 BOLTS**

**BASE PLATE DETAILS SINGLE AND TWO POST TYPE**


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS-TUBULAR SINGLE AND TWO POST TYPE BASE PLATE AND ANCHORAGE DETAILS**

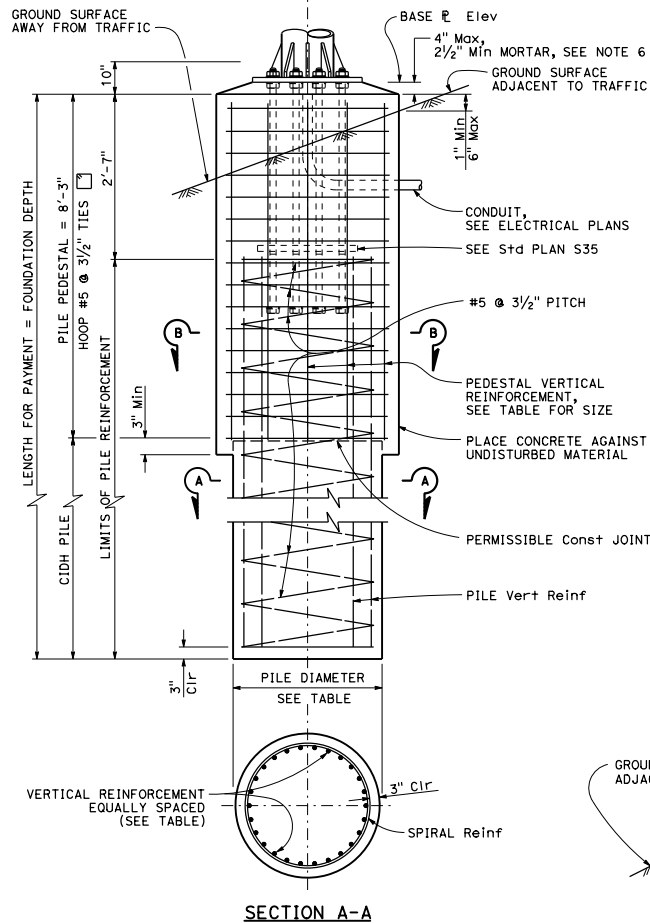
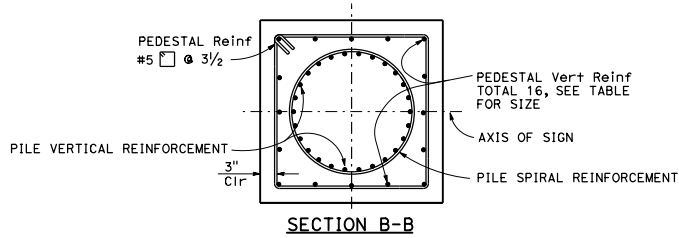
NO SCALE

**S35**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER  
 No. CS793  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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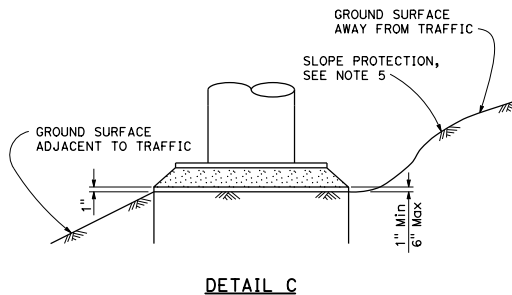


POST TYPE No.	ANCHOR BOLTS			SQUARE PILE PEDESTAL					CIDH PILE				FOUNDATION DEPTH **		
	BOLT CIRCLE Dia	BOLT TOTAL AND Dia	TOTAL LENGTH	PEDESTAL SQUARE ONE SIDE	VERTICAL REINFORCING		HOOP		PILE Dia	VERTICAL REINFORCING		SPIRAL			
					TOTAL	BAR SIZE	# OF BARS EACH FACE	BAR SIZE	SPACING		TOTAL	BAR SIZE	BAR SIZE	PITCH	
I	2'-6"	14-2"	4'-2"	5'-6"	16	#11	5	#5	3 1/2"	5'-0"	28	#11	#5	3 1/2"	25'-0"
II	2'-10"	14-2 1/2"	5'-0"												25'-0"
III	2'-10"	14-2 1/2"													25'-0"
IV	3'-4"	16-2 1/2"													33'-0"
V	3'-4"	16-2 1/2"													33'-0"
VI	3'-4"	16-2 1/2"													33'-0"

\*\* Use Foundation Depth shown in table unless otherwise shown on the Project Plans.

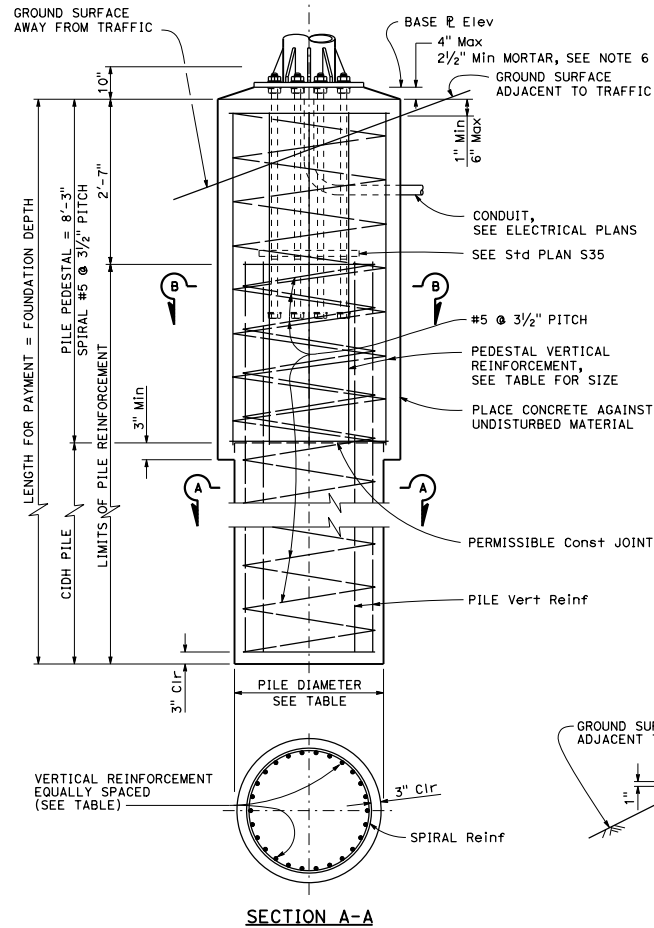
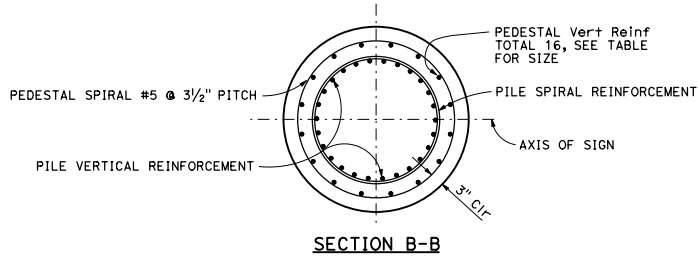
**NOTES:**

1. For anchor bolt layout, see Standard Plan S35.
2. For "Base E elevation", see Project Plans.
3. Before erection of the post, backfill which is equivalent to the surrounding material, shall be in place.
4. Pedestal shall be formed 6" minimum below ground surface. Remainder to be placed against undisturbed material.
5. Slope protection required when indicated on the Project Plans.
6. For drain holes and central void in mortar, see Standard Plan ES-6B detail N.



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TUBULAR  
 SINGLE POST AND TWO POST TYPE  
 SQUARE PEDESTAL PILE FOUNDATION**  
 NO SCALE

**S36**

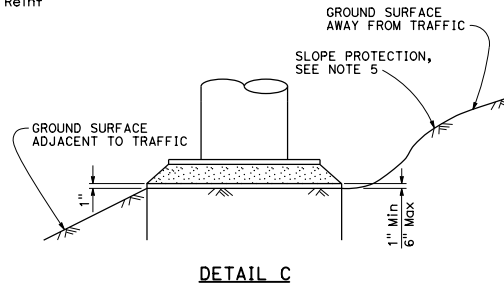


POST TYPE No.	ANCHOR BOLTS				ROUND PILE PEDESTAL				CIDH PILE				FOUNDATION DEPTH **	
	BOLT CIRCLE Dia	BOLT TOTAL AND Dia	TOTAL LENGTH	Dia	VERTICAL REINFORCING		SPIRAL		PILE Dia	VERTICAL REINFORCING		SPIRAL		
					TOTAL	BAR SIZE	BAR SIZE	PITCH		TOTAL	BAR SIZE	BAR SIZE		PITCH
I	2'-6"	14-2"	4'-2"	5'-6"	16	#11	#5	3/2"	5'-0"	28	#11	#5	3/2"	25'-0"
II	2'-10"	14-2 1/2"	5'-0"											25'-0"
III	2'-10"	14-2 1/2"	5'-0"											25'-0"
IV	3'-4"	16-2 1/2"												33'-0"
V	3'-4"	16-2 1/2"												33'-0"
VI	3'-4"	16-2 1/2"												33'-0"

\*\* Use Foundation Depth shown in table unless otherwise shown on the Project Plans.

**NOTES:**

1. For anchor bolt layout, see Standard Plan S35.
2. For "Base E elevation", see Project Plans.
3. Before erection of the post, backfill which is equivalent to the surrounding material, shall be in place.
4. Pedestal shall be formed 6" minimum below ground surface. Remainder to be placed against undisturbed material.
5. Slope protection required when indicated on the Project Plans.
6. For drain holes and central void in mortar, see Standard Plan ES-6B detail N.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGNS-TUBULAR  
SINGLE POST AND TWO POST TYPE  
ROUND PEDESTAL PILE FOUNDATION**

NO SCALE

**S37**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

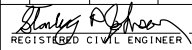
Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

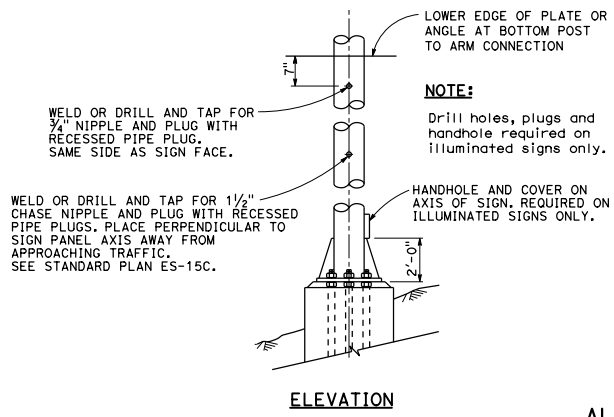
Stanley P. Johnson  
No. CS795  
Exp. 3-31-16  
CIVIL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

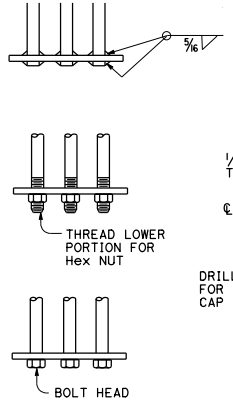
  
 REGISTERED CIVIL ENGINEER  
 No. CS793  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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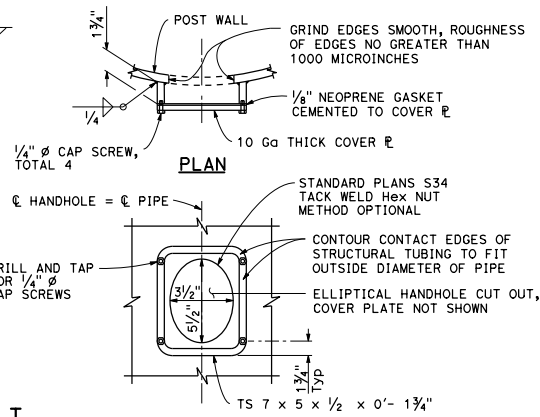


**NOTE:**  
Drill holes, plugs and handhole required on illuminated signs only.

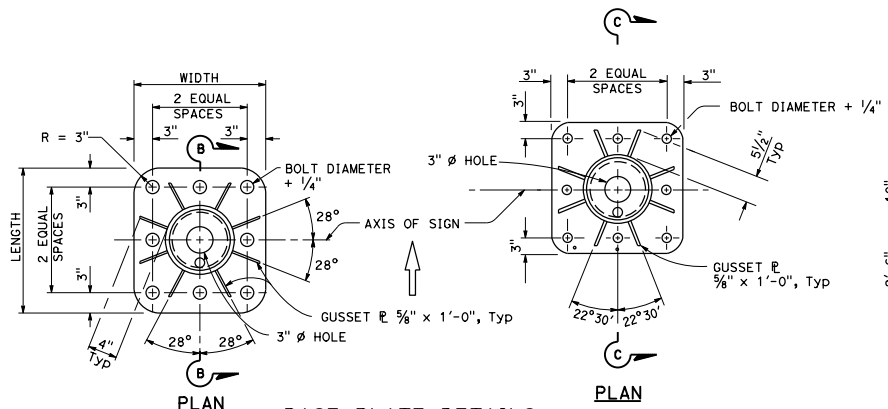
WELD OR DRILL AND TAP FOR 1/2" CHASE NIPPLE AND PLUG WITH RECESSED PIPE PLUGS, PLACE PERPENDICULAR TO SIGN PANEL AXIS AWAY FROM APPROACHING TRAFFIC. SEE STANDARD PLAN ES-15C.



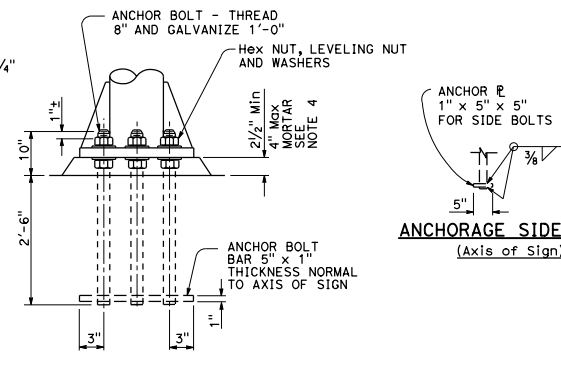
**ALTERNATIVE ANCHOR BOLT BAR CONNECTIONS**



**TYPICAL DETAILS OF HANDHOLE AND COVER**



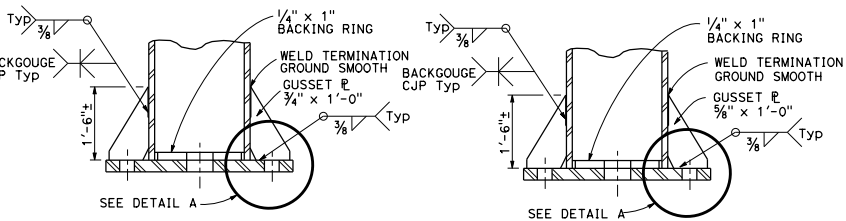
**BASE PLATE DETAILS**



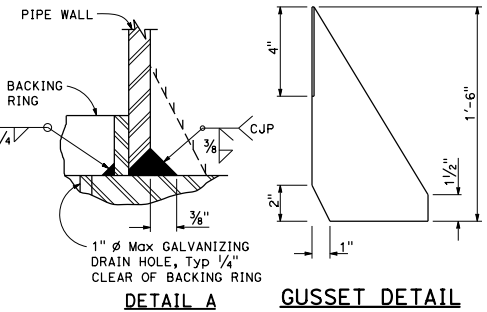
**ANCHORAGE BOLT**

POST NPS	"t"	BASE PLATE	ANCHOR BOLTS #	BOLT Ø
6	3/4"	2" x 1'-9" x 1'-9"	8	2"
6	7/8"			
8	1"			
8	1 1/2"			
10		2" x 2'-4" x 2'-4"		2 1/4"
12				
14				
14	3/4"			

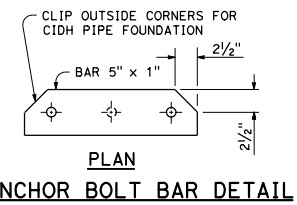
"t" = Wall Thickness



**POST TO BASE PLATE CONNECTION DETAILS**



**GUSSET DETAIL**



**ANCHOR BOLT BAR DETAIL**

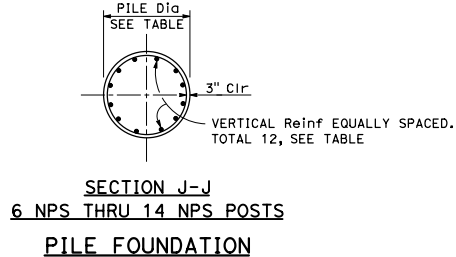
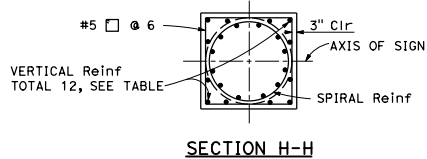
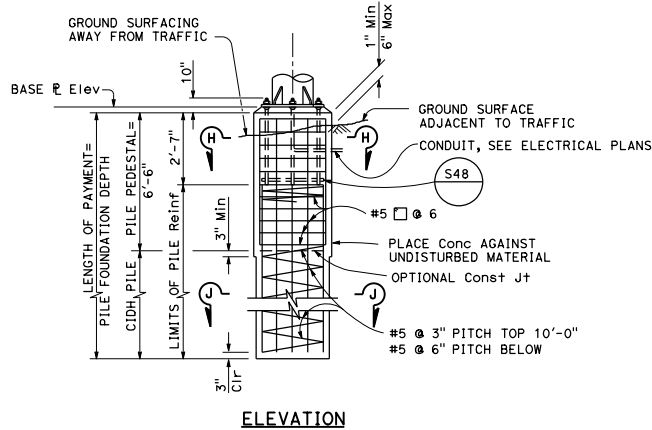
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DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGNS-LIGHTWEIGHT POST DETAILS**

NO SCALE

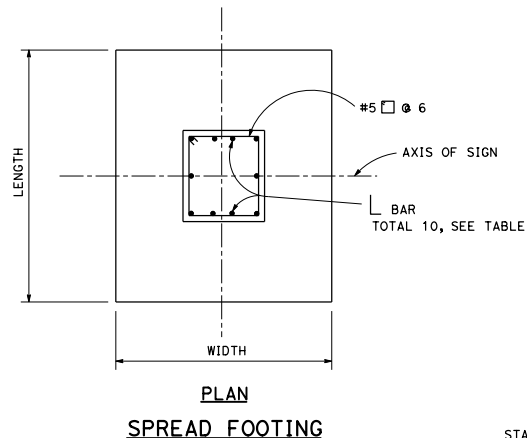
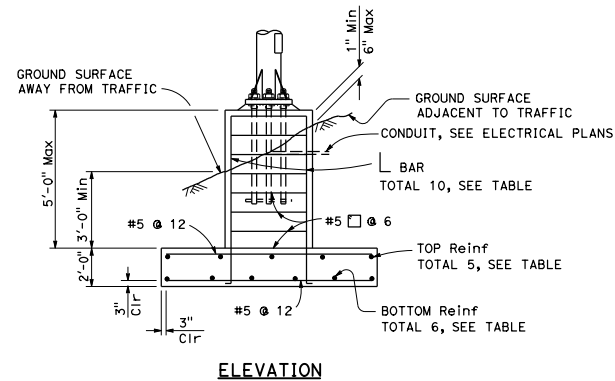
POST	PILE FOUNDATION					SPREAD FOOTING				
	NPS	"+"	PEDESTAL	PILE Dia	PILE DEPTH	VERTICAL Reinf	PEDESTAL	FOOTING WIDTH x LENGTH	REINFORCEMENT	
								TOP	BOTTOM	L BAR
6	7/8"		2'-10" x 2'-10"	30"	10'-0"	#6	2'-6" x 2'-6"	#5	#5	#5
6	7/8"				10'-0"	#6		4'-0" x 6'-0"		
8	5/8"				10'-0"	#6		4'-0" x 7'-0"		
8	1/2"				11'-0"	#7		5'-0" x 8'-0"		
8	1/2"				11'-0"	#7		6'-0" x 9'-0"		
10		3'-4" x 3'-4"		36"	13'-0"	#8	3'-0" x 3'-0"	7'-0" x 10'-0"	#8	#8
12					15'-0"	#10		7'-0" x 12'-0"	#6	#8
14					15'-0"	#10		7'-0" x 13'-0"	#8	#9
14	3/4"				16'-0"	#10		8'-0" x 14'-0"	#8	#9

"+" = WALL THICKNESS



**NOTES:**

1. Backfill shall be in place before erection of post.
2. Slope protection required when indicated on the plans.
3. Pile pedestal shall be formed 6" minimum below ground surface. Remainder to be placed against undisturbed material.



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**OVERHEAD SIGNS-LIGHTWEIGHT  
FOUNDATION DETAILS**

NO SCALE

**S49**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Stanley P. Johnson  
No. CS795  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

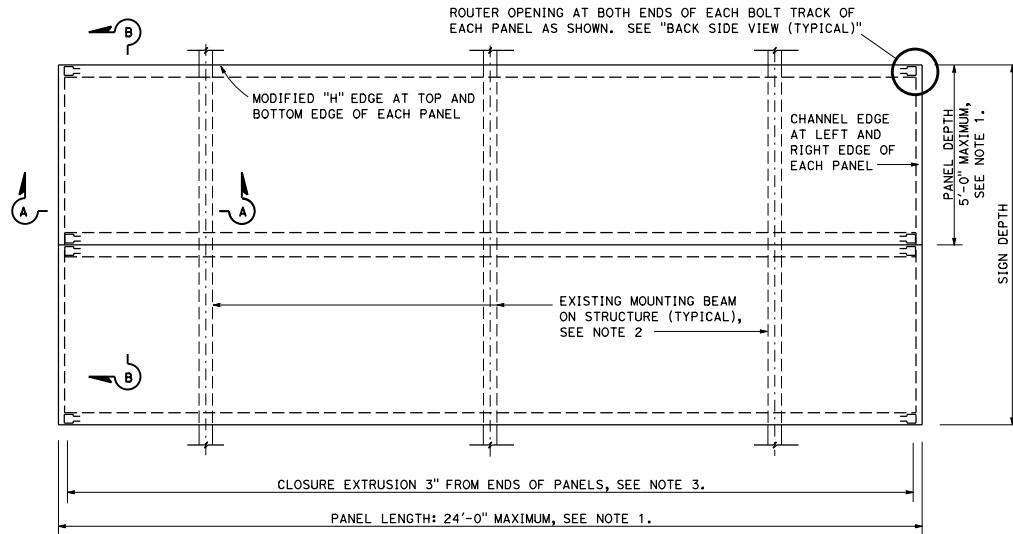
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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

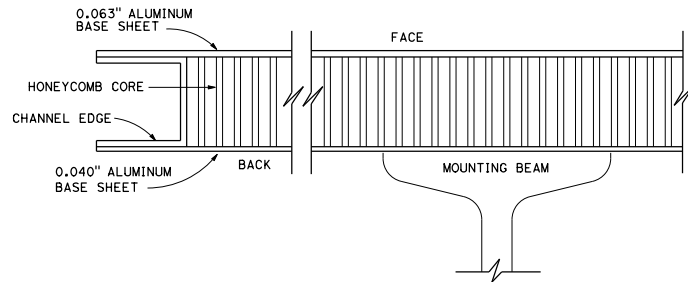
*Donald E. Howe*  
 REGISTERED CIVIL ENGINEER  
 No. C46402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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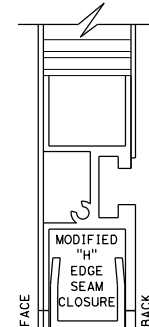
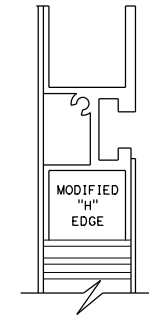


**FACE VIEW OF LAMINATED PANEL**

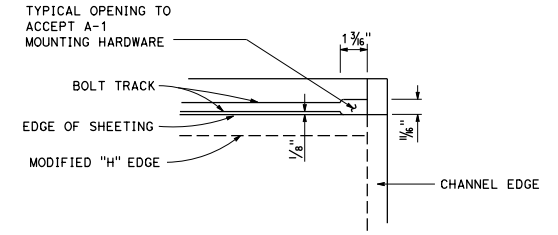
Two panels shown, see Note 7



**SECTION A-A**



**SECTION B-B**



**BACK SIDE VIEW (TYPICAL)**

**NOTES:**

1. Panel length shall be graduated in increments of 1'-0". Panel depth shall be 1'-8" to 5'-0", graduated in increments of 10".
2. Unless otherwise shown on the plans, refer to applicable Standard Plan for location of structure supports and mounting details.
3. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
4. See Standard Plan S86 for extrusion details.
5. See Standard Plan S87 for A-1 and Standard Plan S88 for A-2 mounting hardware.
6. All horizontal extrusions shall be continuous.
7. Place three 1/8"  $\phi$  weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.

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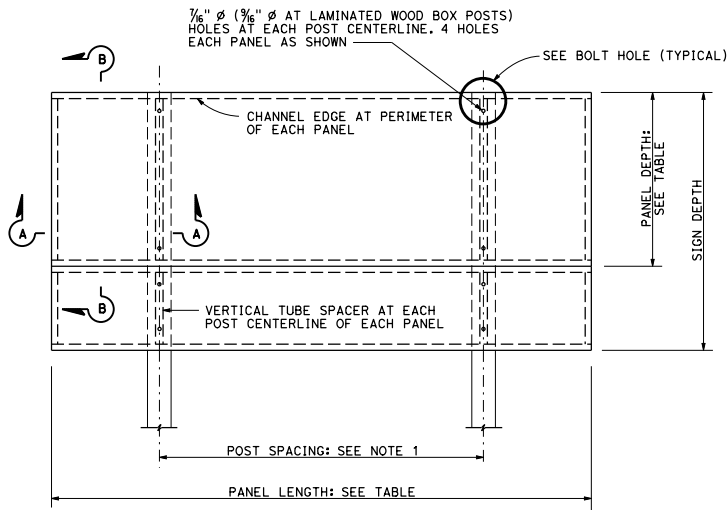
**OVERHEAD LAMINATED SIGN  
SINGLE OR MULTIPLE PANEL  
(TYPE A, 1" THICK)**

NO SCALE

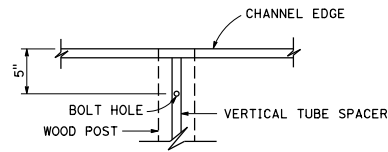
**S81**



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
October 30, 2015 PLANS APPROVAL DATE					
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**FACE VIEW OF LAMINATED PANEL**  
Two panels shown, see Note 6

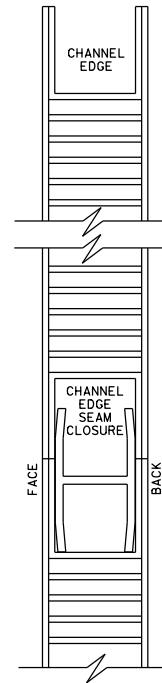


**BOLT HOLE (TYPICAL)**

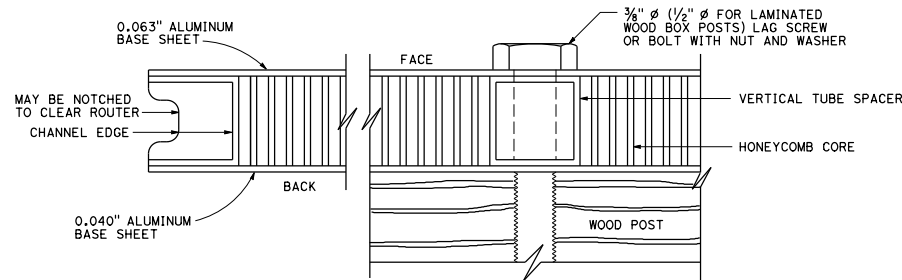
**TABLE**  
TYPE B PANEL  
1" THICK

DEPTH	LENGTH
5'-0"	4'-6" TO 15'-0"
4'-6"	4'-6" TO 15'-0"
4'-0"	4'-6" TO 15'-0"
3'-6"	4'-6" TO 15'-0"
3'-0"	4'-6" TO 15'-0"
2'-6"	4'-6" TO 15'-0"
2'-0"	4'-6" TO 15'-0"
1'-6"	4'-6" TO 15'-0"

See Note 4



**SECTION B-B**



**SECTION A-A**

**NOTES:**

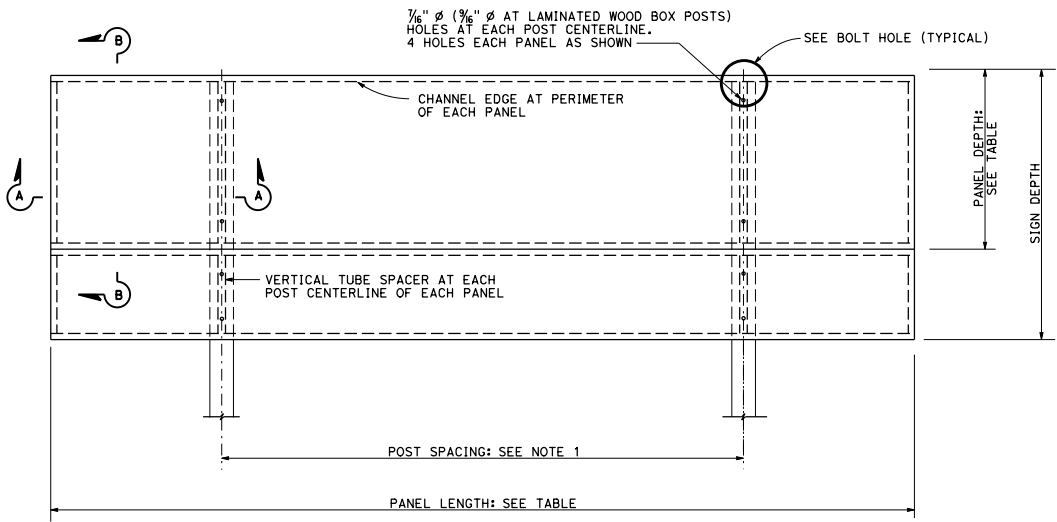
1. See Standard Plan S85 for post spacing table.
2. See Standard Plan S86 for extrusion details.
3. All horizontal extrusions shall be continuous.
4. Depth and length of panel shall be graduated in increments of 6".
5. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
6. Place three 1/8" diameter weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.

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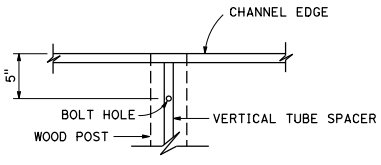
**ROADSIDE LAMINATED SIGN  
SINGLE OR MULTIPLE PANEL  
(TYPE B, 1" THICK)**

NO SCALE

**S82**



**FACE VIEW OF LAMINATED PANEL**  
Two panels shown, see Note 6



**BOLT HOLE (TYPICAL)**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

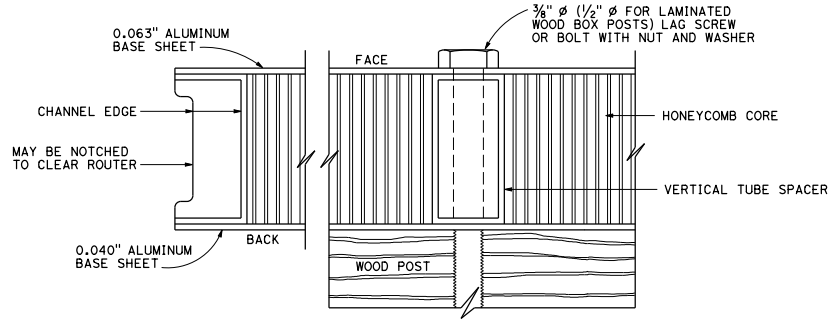
Donald E. Howe  
No. C46402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

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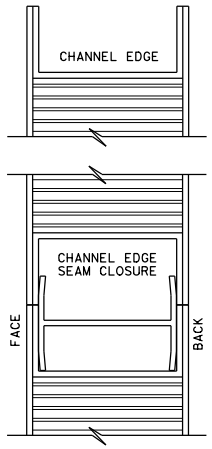
**TABLE**  
TYPE B PANEL  
2 1/2" THICK

DEPTH	LENGTH
5'-0"	15'-6" TO 16'-6"
4'-6"	15'-6" TO 18'-6"
4'-0"	15'-6" TO 20'-6"
3'-6"	15'-6" TO 23'-6"
3'-0"	15'-6" TO 24'-0"
2'-6"	15'-6" TO 24'-0"
2'-0"	15'-6" TO 24'-0"
1'-6"	15'-6" TO 24'-0"

See Note 4



**SECTION A-A**



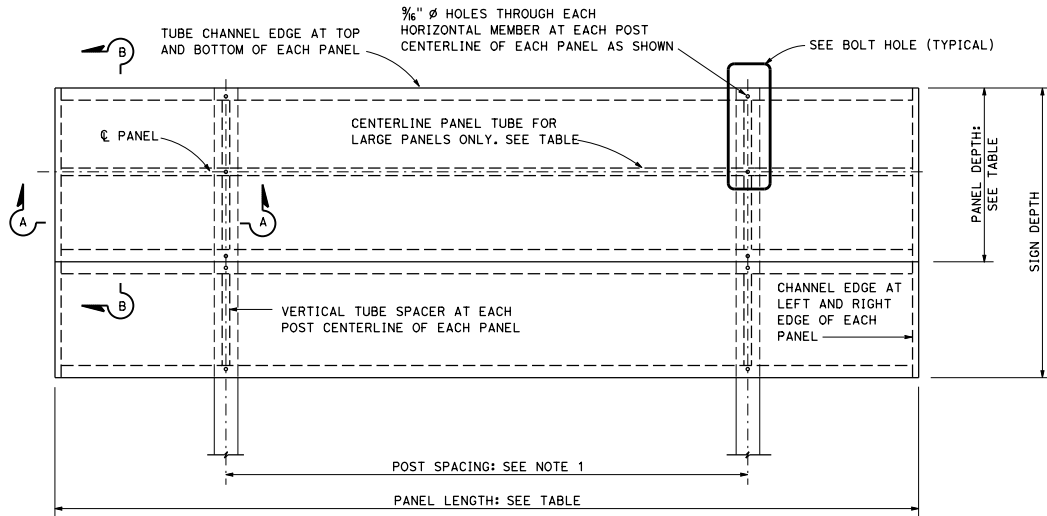
**SECTION B-B**

- NOTES:**
1. See Standard Plan S85 for post spacing table.
  2. See Standard Plan S86 for extrusion details.
  3. All horizontal extrusions shall be continuous.
  4. Depth and length of panel shall be graduated in increments of 6".
  5. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
  6. Place three 1/8"  $\phi$  weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.

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**ROADSIDE LAMINATED SIGN  
SINGLE OR MULTIPLE PANEL  
(TYPE B, 2 1/2" THICK)**

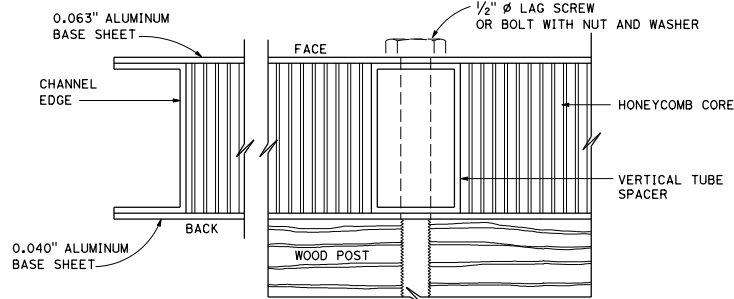
NO SCALE

**S83**

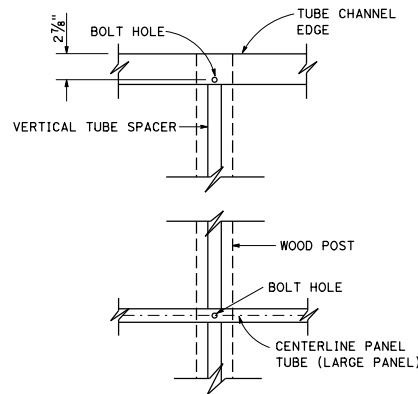


**FACE VIEW OF LAMINATED PANEL**

Two panels shown, see Note 7

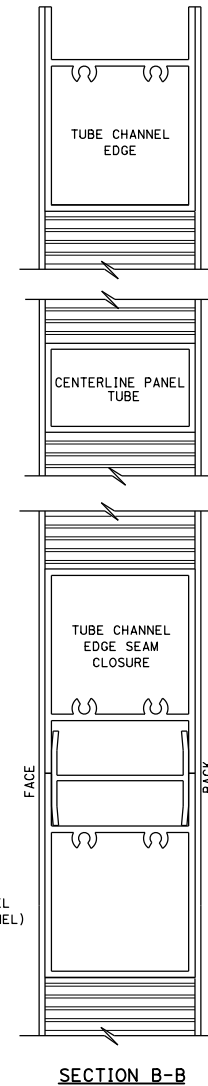


**SECTION A-A**



**BOLT HOLE (TYPICAL)**

Large panel shown



**SECTION B-B**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
 REGISTERED CIVIL ENGINEER  
 No. C46402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**TABLE A**

PANEL DEPTH	PANEL LENGTH
5'-0"	17'-0" TO 24'-0"
4'-6"	19'-0" TO 24'-0"
4'-0"	21'-0" TO 24'-0"
3'-6"	24'-0"

See Notes 4 and 6.

**NOTES:**

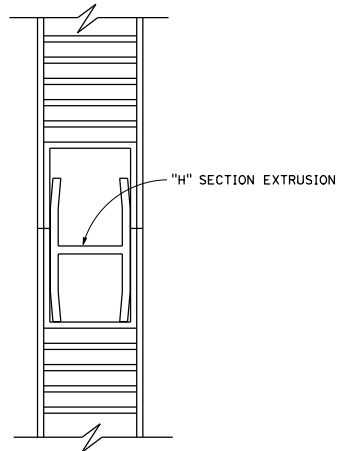
1. See Standard Plan S85 for post spacing table.
2. See Standard Plan S86 for extrusion details.
3. All horizontal extrusions shall be continuous.
4. Depth and length of panel shall be graduated in increments of 6".
5. For multiple panel signs, see Standard Plan S85 for seam closure extrusion quantities.
6. Panels with the dimensions shown in Table A are designated as large panels.
7. Place three 1/8"  $\phi$  weep holes in bottom of each panel. One hole in the center and one hole 3" from each end.

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**ROADSIDE LAMINATED SIGN  
SINGLE OR MULTIPLE PANEL  
(TYPE H, 2 1/2" THICK)**

NO SCALE

**S84**

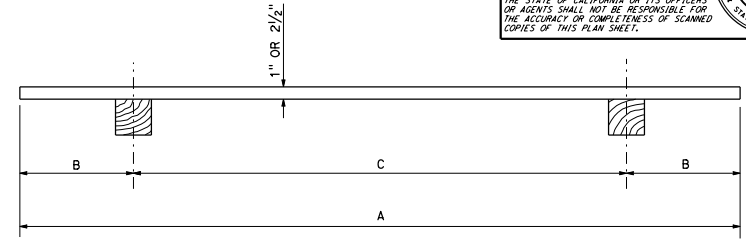


TYPICAL SEAM CLOSURE DETAIL

PANEL LENGTH	CLOSURE LENGTH	NUMBER OF PIECES & LENGTH REQUIRED
3'-6"	3'-0"	One 3'-0"
4'-0"	3'-6"	One 3'-6"
4'-6"	4'-0"	One 4'-0"
5'-0"	4'-6"	One 4'-6"
5'-6"	5'-0"	One 5'-0"
6'-0"	5'-6"	One 5'-6"
6'-6"	6'-0"	Two 3'-0"
7'-0"	6'-6"	One 3'-0", One 3'-6"
7'-6"	7'-0"	Two 3'-6"
8'-0"	7'-6"	One 3'-6", One 4'-0"
8'-6"	8'-0"	Two 4'-0"
9'-0"	8'-6"	One 4'-0", One 4'-6"
9'-6"	9'-0"	Two 4'-6"
10'-0"	9'-6"	One 4'-6", One 5'-0"
10'-6"	10'-0"	Two 5'-0"
11'-0"	10'-6"	One 5'-0", One 5'-6"
11'-6"	11'-0"	Two 5'-6"
12'-0"	11'-6"	Two 4'-0", One 3'-6"
12'-6"	12'-0"	Three 4'-0"
13'-0"	12'-6"	Two 4'-0", One 4'-6"
13'-6"	13'-0"	Two 4'-6"
14'-0"	13'-6"	Three 4'-6", One 4'-0"
14'-6"	14'-0"	Two 4'-6", One 5'-0"
15'-0"	14'-6"	Two 5'-0", One 4'-6"
15'-6"	15'-0"	Three 5'-0"
16'-0"	15'-6"	Two 5'-6", One 4'-6"
16'-6"	16'-0"	Two 5'-6"
17'-0"	16'-6"	Three 5'-6", One 5'-0"
17'-6"	17'-0"	Three 4'-0", One 5'-0"
18'-0"	17'-6"	Three 4'-6", One 4'-0"
18'-6"	18'-0"	Four 4'-6"
19'-0"	18'-6"	Three 4'-6", One 5'-0"
19'-6"	19'-0"	Three 5'-0", One 4'-0"
20'-0"	19'-6"	Three 5'-0", One 4'-6"
20'-6"	20'-0"	Four 5'-0"
21'-0"	20'-6"	Three 5'-6", One 4'-0"
21'-6"	21'-0"	Three 5'-6", One 4'-6"
22'-0"	21'-6"	Three 5'-6", One 5'-0"
22'-6"	22'-0"	Four 5'-6"
23'-0"	22'-6"	Five 4'-6"
23'-6"	23'-0"	Four 4'-6", One 5'-0"
24'-0"	23'-6"	Three 4'-6", Two 5'-0"

"H" sections will be set in 3" from edge of panels to allow for rivet clearance in borders. Standard length in stock: 3'-0", 3'-6", 4'-0", 4'-6", 5'-0" and 5'-6".

**SEAM CLOSURE  
"H" SECTION EXTRUSION**



PLAN VIEW

**1" PANEL**

LENGTH OF SIGN A	NUMBER OF POSTS	OVERHANG B	POST SPACING C
4'-6"	2	6"	3'-6"
5'-0"	2	9"	3'-6"
5'-6"	2	1'-0"	3'-6"
6'-0"	2	1'-0"	4'-0"
6'-6"	2	1'-3"	4'-0"
7'-0"	2	1'-3"	4'-6"
7'-6"	2	1'-6"	4'-6"
8'-0"	2	1'-6"	5'-0"
8'-6"	2	1'-8"	5'-2"
9'-0"	2	1'-10"	5'-4"
9'-6"	2	1'-11"	5'-8"
10'-0"	2	2'-0"	6'-0"
10'-6"	2	2'-0"	6'-6"
11'-0"	2	2'-0"	7'-0"
11'-6"	2	2'-3"	7'-0"
12'-0"	2	2'-6"	7'-0"
12'-6"	2	2'-6"	7'-6"
13'-0"	2	2'-6"	8'-0"
13'-6"	2	2'-6"	8'-6"
14'-0"	2	2'-6"	9'-0"
14'-6"	2	3'-0"	8'-6"
15'-0"	2	3'-0"	9'-0"

**2 1/2" PANEL**

LENGTH OF SIGN A	NUMBER OF POSTS	OVERHANG B	POST SPACING C
15'-6"	2	3'-0"	9'-6"
16'-0"	2	3'-3"	9'-6"
16'-6"	2	3'-3"	10'-0"
17'-0"	2	3'-3"	10'-6"
17'-6"	2	3'-6"	10'-6"
18'-0"	2	3'-6"	11'-0"
18'-6"	2	3'-9"	11'-0"
19'-0"	2	3'-9"	11'-6"
19'-6"	2	3'-9"	12'-0"
20'-0"	2	4'-0"	12'-0"
20'-6"	2	4'-0"	12'-6"
21'-0"	2	4'-3"	12'-6"
21'-6"	2	4'-3"	13'-0"
22'-0"	2	4'-3"	13'-6"
22'-6"	2	4'-6"	13'-6"
23'-0"	2	4'-6"	14'-0"
23'-6"	2	4'-6"	14'-6"
24'-0"	2	4'-9"	14'-6"

**STANDARD POST SPACING**

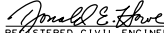
STATE OF CALIFORNIA  
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**SEAM CLOSURE,  
"H" SECTION EXTRUSION AND  
POST SPACING TABLES  
(MULTI-HORIZONTAL LAMINATED  
PANEL ALUMINUM SIGNS)**

NO SCALE

**S85**

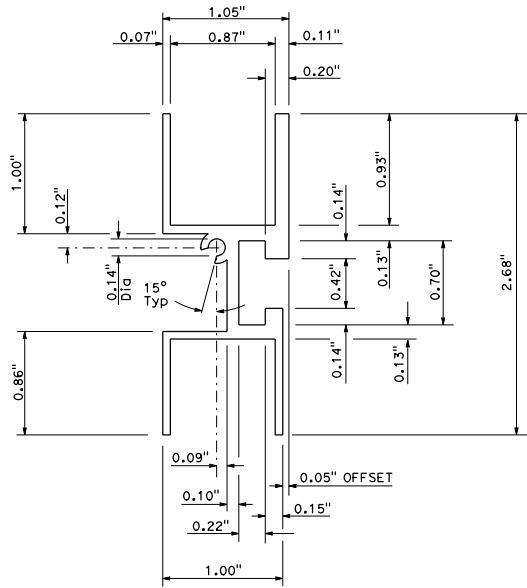
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

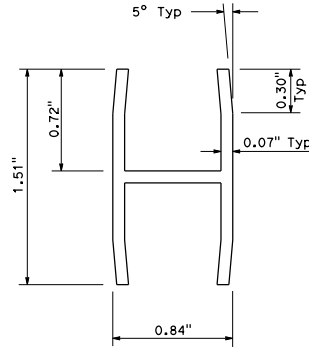
No. C46402  
 Exp. 3-31-17  
 CIVIL

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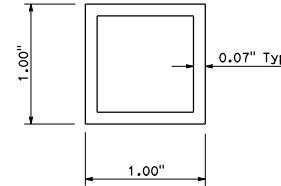


**DETAIL No. 1**

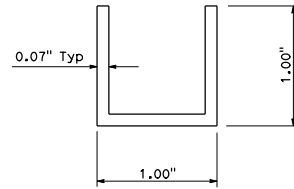
Unless noted, wall thickness is 0.07".



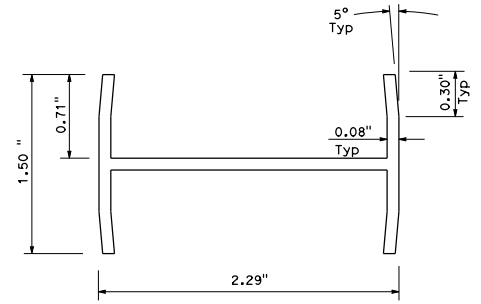
**DETAIL No. 2**



**DETAIL No. 3**



**DETAIL No. 4**

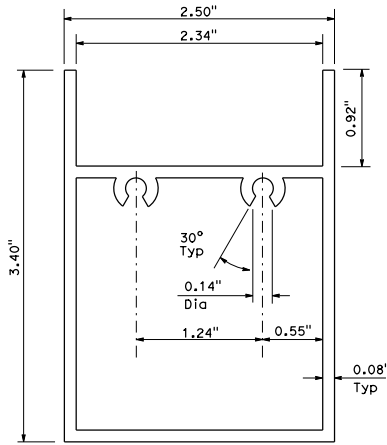


**DETAIL No. 5**

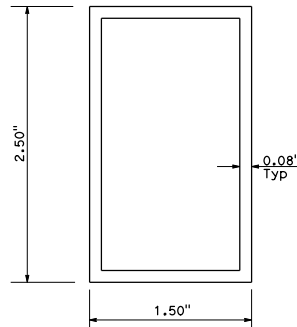
**TABLE**

EXTRUSION TYPE	1" THICK PANEL		2 1/2" THICK PANEL	
	TYPE A PANEL	TYPE B PANEL	TYPE B PANEL	TYPE H PANEL
CHANNEL EDGE	DETAIL No. 4	DETAIL No. 4	DETAIL No. 9	DETAIL No. 9
TUBE-CHANNEL EDGE	N/A	N/A	N/A	DETAIL No. 6
MODIFIED "H" EDGE	DETAIL No. 1	N/A	N/A	N/A
VERTICAL TUBE SPACER	N/A	DETAIL No. 3	DETAIL No. 8	N/A
VERTICAL TUBE SPACER (LARGE PANEL)	N/A	N/A	N/A	DETAIL No. 7
Q PANEL TUBE (LARGE PANEL)	N/A	N/A	N/A	DETAIL No. 7
SEAM CLOSURE "H" SECTION	DETAIL No. 2	DETAIL No. 2	DETAIL No. 5	DETAIL No. 5

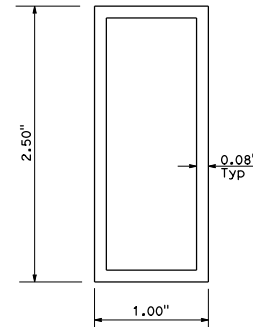
Note: All extrusions shall be aluminum alloy 6063-T6.



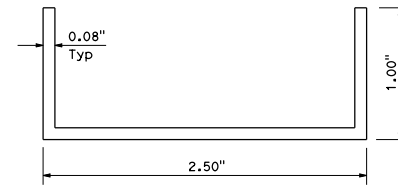
**DETAIL No. 6**



**DETAIL No. 7**



**DETAIL No. 8**



**DETAIL No. 9**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**LAMINATED PANEL DETAILS**  
**(EXTRUSIONS FOR TYPE A,**  
**B AND H PANELS)**

NO SCALE

**S86**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

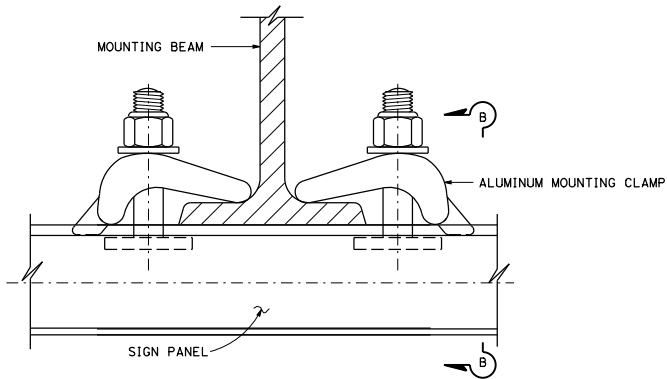
*Donald E. Howe*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

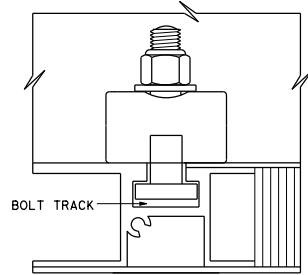
Donald E. Howe  
No. C46402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

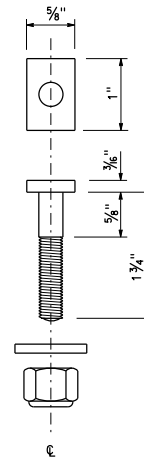
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**TYPICAL ALUMINUM CLAMP MOUNTING**



**SECTION B-B  
TYPICAL BOLTED CONNECTION  
TO STRUCTURE SUPPORT**



**STAINLESS STEEL BOLT**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
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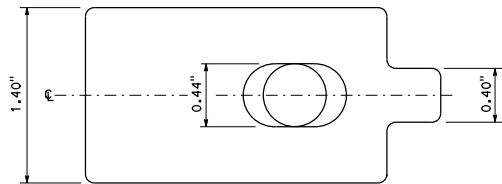
October 30, 2015  
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**A-1 HARDWARE QUANTITY TABLE**

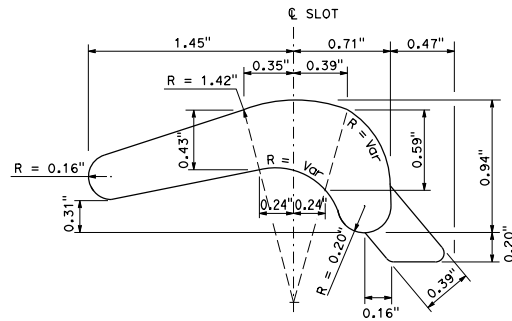
SIGN LENGTH	SIGN DEPTH SEE NOTE 4	UNITS REQUIRED SEE NOTE 3
15'-0" OR LESS	4'-2" - 5'-0"	4
16'-0" - 24'-0"	4'-2" - 5'-0"	6
15'-0" OR LESS	5'-10" - 10'-0"	8
16'-0" - 24'-0"	5'-10" - 10'-0"	12

**NOTES:**

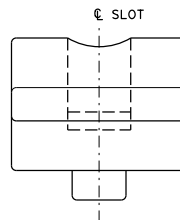
1. Refer to applicable Standard Plan for additional mounting details.
2. Rectangular head bolt, hexagon stop nut, and flat washer shall be 3/8" diameter (18-8) stainless steel.
3. One unit of A-1 hardware shall consist of two sets of these components: clamp, bolt, nut and washer.
4. Signs 9'-2" and 10'-0" in depth may be fabricated in three panel sections to avoid legend from being placed on a horizontal seam. Increase number of units of mounting hardware accordingly.



**TOP VIEW**



**SIDE VIEW**

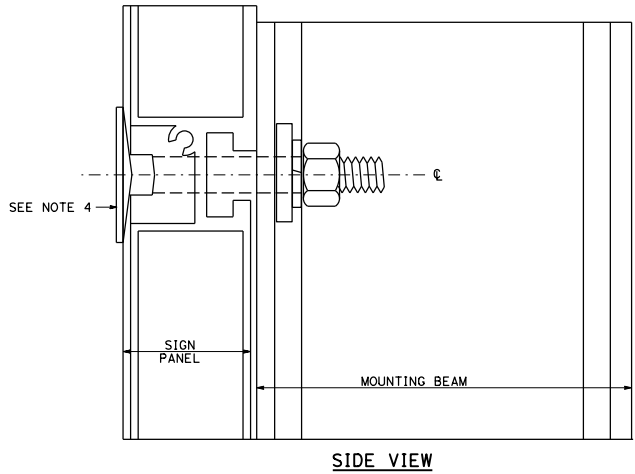


**FRONT VIEW**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TYPE A-1 MOUNTING HARDWARE  
 FOR OVERHEAD LAMINATED  
 TYPE A PANEL  
 (TRUSS AND LIGHTWEIGHT  
 SIGN STRUCTURES)**

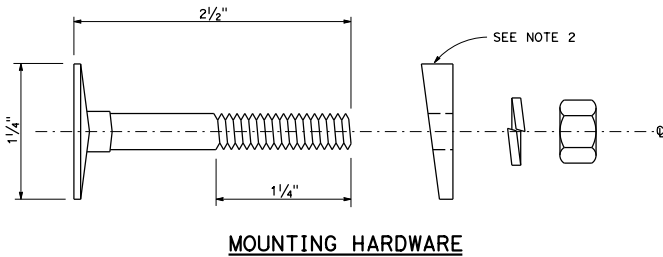
NO SCALE

**S87**



**A-2 HARDWARE QUANTITY TABLE  
(STANDARD TUBULAR)**

SIGN LENGTH	SIGN DEPTH SEE NOTE 6	UNITS REQUIRED SEE NOTE 5
14'-0" OR LESS	4'-2" TO 5'-0"	9
15'-0" TO 20'-0"	4'-2" TO 5'-0"	13
21'-0" TO 24'-0"	4'-2" TO 5'-0"	17
14'-0" OR LESS	5'-10" TO 10'-0"	17
15'-0" TO 20'-0"	5'-10" TO 10'-0"	25
21'-0" TO 24'-0"	5'-10" TO 10'-0"	33



**NOTES:**

1. Refer to applicable Standard Plan for additional mounting details.
2. Beveled washer for tapered flange only.
3. Elevator head bolt, hexagon nut, and lock washer shall be 5/8" diameter (18-8) stainless steel.
4. Furnish retroreflective stick-ons for bolt head in same color as sign. Apply during installation.
5. One unit of A-2 hardware shall consist of one each; bolt nut, lock washer and beveled washer. Quantity listed includes 1 spare unit.
6. Signs 9'-2" and 10'-0" in depth may be fabricated in three panel sections to avoid legend from being placed on a horizontal seam. Increase number of units of mounting hardware accordingly.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER  
No. C46402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**TYPE A-2 MOUNTING HARDWARE  
FOR OVERHEAD LAMINATED  
TYPE A PANEL  
(BRIDGE MOUNTED AND  
TUBULAR SIGN STRUCTURES)**

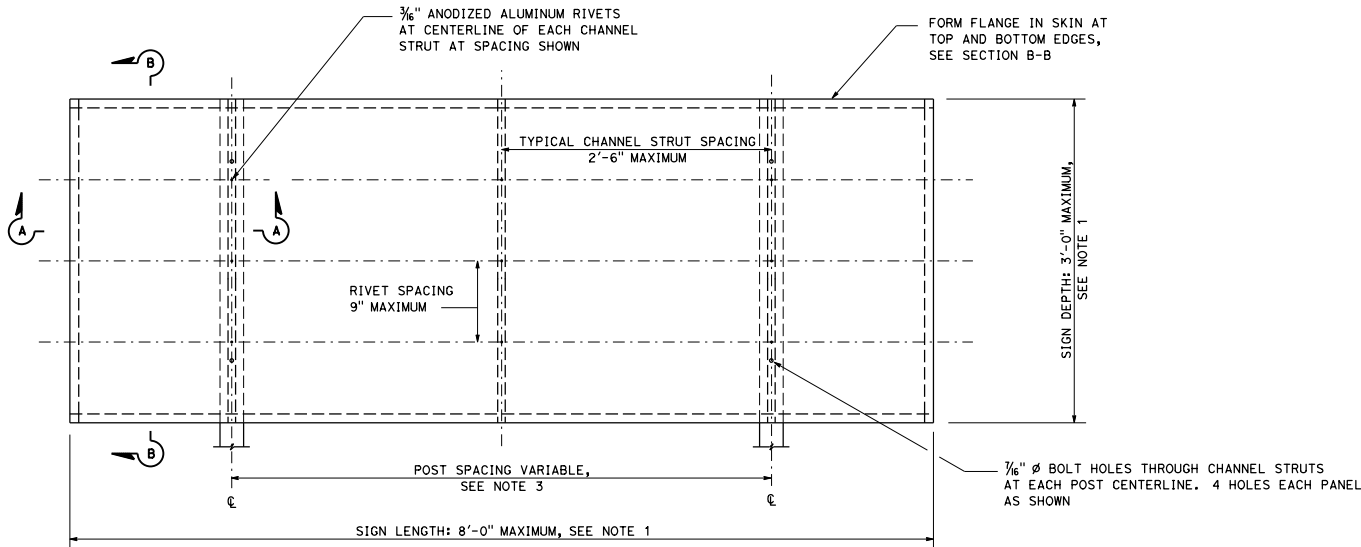
NO SCALE

**S88**

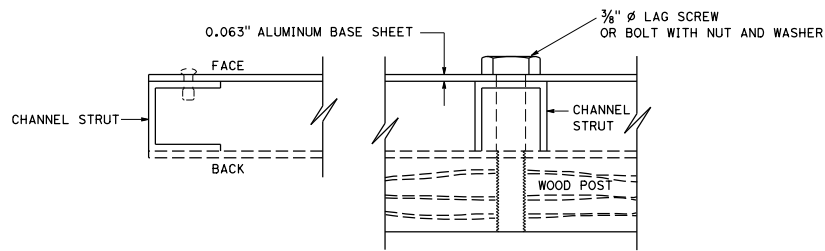
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
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 No. C46402  
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 CIVIL  
 STATE OF CALIFORNIA

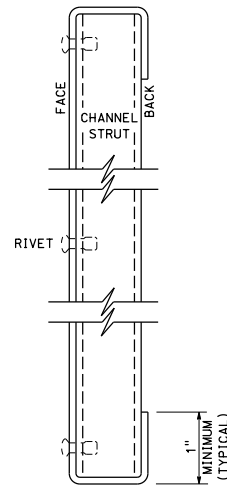
October 30, 2015  
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**FACE VIEW OF FORMED PANEL**



**SECTION A-A**



**SECTION B-B**

**NOTES:**

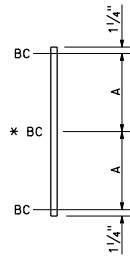
1. Sign size to be graduated in 6" increments, both vertically and horizontally. Area of sign not to exceed 20 square feet.
2. Channel strut extrusions shall be 1" x 1" x  $\frac{1}{16}$ " aluminum alloy 6063-T6.
3. See Standard Plan RS2 for post spacing and mounting details.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ROADSIDE SIGN-FORMED  
 SINGLE SHEET ALUMINUM PANEL**  
 NO SCALE

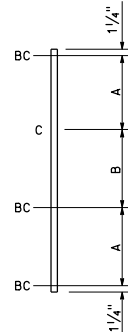
**S89**



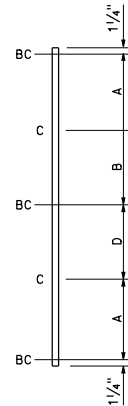
PANEL DEPTH	DIMENSION "A"	DIMENSION "B"	DIMENSION "D"	TOTAL NO. OF CHANNELS PER PANEL
4'-2"	1'-11 3/4"			3
5'-0"	2'-4 3/4"			3
5'-10"	1'-6 3/4"	2'-6"		4
6'-8"	1'-6 3/4"	1'-8"		5
7'-6"	1'-6 3/4"	2'-6"	1'-8"	5
8'-4"	1'-6 3/4"	2'-6"		5
9'-2"	1'-6 3/4"	1'-8"	2'-6"	6
10'-0"	1'-6 3/4"	2'-6"	1'-8"	6



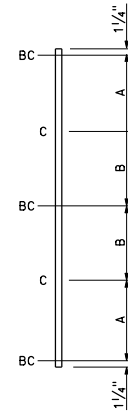
**3 CHANNELS FOR  
4'-2" AND  
5'-0" DEPTH**



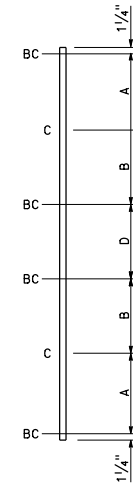
**4 CHANNELS FOR  
5'-10" DEPTH**



**5 CHANNELS FOR  
7'-6" DEPTH**



**5 CHANNELS FOR  
6'-8" AND  
8'-4" DEPTH**



**6 CHANNELS FOR  
9'-2" AND  
10'-0" DEPTH**

**LEGEND:**

"C" INDICATES LOCATION OF CHANNEL.

"BC" INDICATED LOCATION OF BOLT AND CHANNEL.

\* THIS BOLT MAY BE OMITTED WHEN DEPTH IS 4'-2".

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

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CIVIL  
STATE OF CALIFORNIA

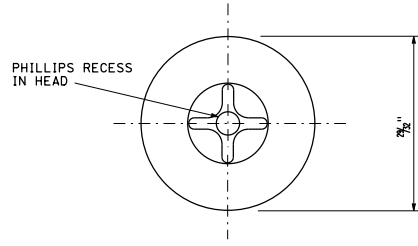
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STATE OF CALIFORNIA  
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**CHANNEL AND BOLT HOLE  
LOCATION FOR  
OVERHEAD FORMED  
SIGN PANEL**

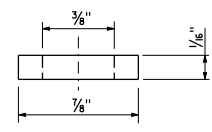
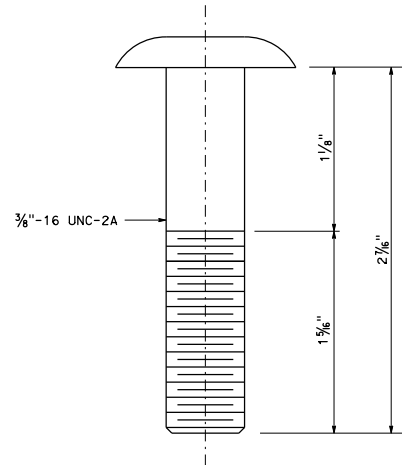
NO SCALE

**S90**

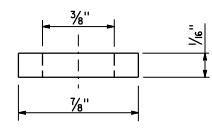


**TRUSS HEAD BOLT**

2024 Aluminum alloy per QQ-A-430 or ASTM B316  
Anodize interstate green per MIL-A-8625

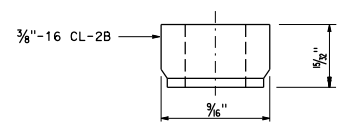


**WASHER**  
Fiber/Nylon



**WASHER**

2024 Aluminum alloy  
Clear anodize per MIL-A-8625



**LOCKNUT WITH NYLON INSERT**


6061-T6 or 2011-T3 Aluminum alloy or equivalent  
Anodize per MIL-A-8625  
Maximum torque - 60 in-lbs

**MOUNTING HARDWARE QUANTITY CHART**

SIGN LENGTH	SIGN DEPTH	NUMBER OF UNITS REQUIRED
8'-0"	4'-2"	8
10'-0" TO 12'-0"	4'-2"	12
14'-0" TO 16'-0"	4'-2"	16
18'-0" TO 20'-0"	4'-2"	20
22'-0" TO 24'-0"	4'-2"	24
26'-0" TO 28'-0"	4'-2"	28
30'-0" TO 32'-0"	4'-2"	32
34'-0" TO 36'-0"	4'-2"	36
38'-0" TO 40'-0"	4'-2"	40
42'-0" TO 44'-0"	4'-2"	44
46'-0" TO 48'-0"	4'-2"	48
8'-0"	5'-0" TO 8'-4"	12
10'-0" TO 12'-0"	5'-0" TO 8'-4"	18
14'-0" TO 16'-0"	5'-0" TO 8'-4"	24
18'-0" TO 20'-0"	5'-0" TO 8'-4"	30
22'-0" TO 24'-0"	5'-0" TO 8'-4"	36
26'-0" TO 28'-0"	5'-0" TO 8'-4"	42
30'-0" TO 32'-0"	5'-0" TO 8'-4"	48
34'-0" TO 36'-0"	5'-0" TO 8'-4"	54
38'-0" TO 40'-0"	5'-0" TO 8'-4"	60
42'-0" TO 44'-0"	5'-0" TO 8'-4"	66
46'-0" TO 48'-0"	5'-0" TO 8'-4"	72
8'-0"	9'-2" TO 10'-0"	16
10'-0" TO 12'-0"	9'-2" TO 10'-0"	24
14'-0" TO 16'-0"	9'-2" TO 10'-0"	32
18'-0" TO 20'-0"	9'-2" TO 10'-0"	40
22'-0" TO 24'-0"	9'-2" TO 10'-0"	48
26'-0" TO 28'-0"	9'-2" TO 10'-0"	56
30'-0" TO 32'-0"	9'-2" TO 10'-0"	64
34'-0" TO 36'-0"	9'-2" TO 10'-0"	72
38'-0" TO 40'-0"	9'-2" TO 10'-0"	80
42'-0" TO 44'-0"	9'-2" TO 10'-0"	88
46'-0" TO 48'-0"	9'-2" TO 10'-0"	96

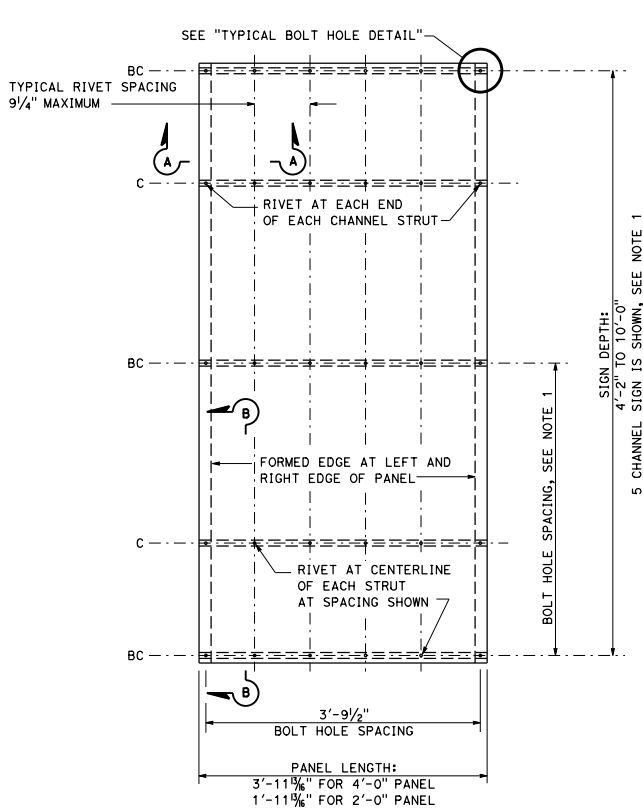
Unit - 1 Truss head bolt, 1 Nylon insert locknut, 1 washer (Fiber/Nylon), 1 washer (Aluminum)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

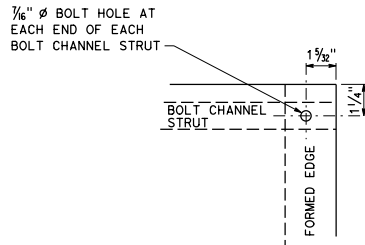
  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C46402  
 Donald F. Howe  
 REGISTERED PROFESSIONAL ENGINEER  
 No. C46402  
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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN FORMED SIGN PANEL TYPE A-3 MOUNTING HARDWARE**  
NO SCALE

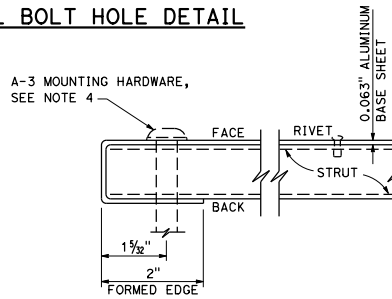
**S91**



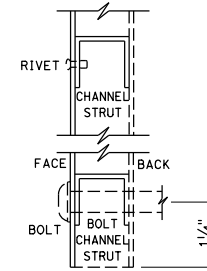
**FACE VIEW OF FORMED PANEL**  
Single panel shown



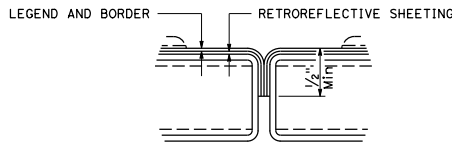
**TYPICAL BOLT HOLE DETAIL**



**SECTION A-A**



**SECTION B-B**



**RETROREFLECTIVE SHEETING OVERLAP ON INTERIOR EDGES**

Two panels shown

**ABBREVIATIONS:**

BC = Centerline of Bolt Channel Strut  
C = Centerline of Channel Strut

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
 REGISTERED CIVIL ENGINEER  
 No. C46402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
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**NOTES:**

1. See Standard Plan S90 for location and configuration of struts.
2. Bolt channel and channel extrusions shall be 1" x 1" x 1/16" aluminum alloy 6063-T6..
3. See Standard Plan S21 for mounting details.
4. See Standard Plan S91 for A-3 mounting hardware.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN  
FORMED SIGN PANEL**  
NO SCALE

**S92**

**CHANNEL SIZES**

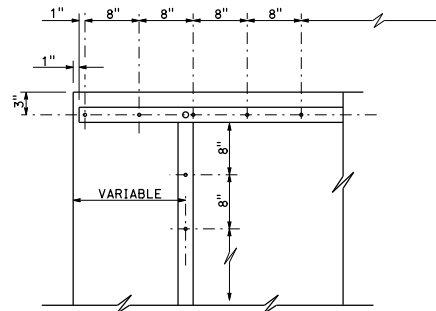
SIGN LENGTH	SIGN DEPTH	PANEL THICKNESS	No. OF HORIZONTAL MEMBERS	No. OF VERTICAL MEMBERS	Horiz MEMBER TYPE	Vert MEMBER TYPE	
UP TO 3'-11"		0.063"	NO FRAME REQUIRED				
4'-0" TO 4'-7"		0.080"	NO FRAME REQUIRED				
4'-8" TO 5'-10"	1'-0" TO 2'-0"	0.063"	2		A		
	2'-1" TO 3'-0"	0.063"	2	2	A	A	
	3'-1" TO 4'-0"	0.063"	2	3	A	A	
	4'-1" TO 8'-0"	0.063"	3	3	B	A	
6'-0" TO 6'-6"	1'-0" TO 2'-0"	0.063"	2		A		
	2'-1" TO 3'-0"	0.063"	2	2	A	A	
	3'-1" TO 4'-0"	0.063"	2	3	A	A	
	4'-1" TO 6'-0"	0.063"	3	3	B	B	
6'-1" TO 8'-0"	6'-1" TO 8'-0"	0.063"	3	3	C	C	
	6'-8" TO 7'-6"	1'-6" TO 4'-0"	0.080"	2	3	B	B
		4'-1" TO 6'-0"	0.080"	3	3	B	B
6'-1" TO 8'-0"	6'-1" TO 8'-0"	0.080"	3	3	C	C	
	7'-8" TO 8'-6"	1'-6" TO 4'-0"	0.080"	2	3	B	B
4'-1" TO 8'-0"		0.080"	3	3	C	C	
8'-8" TO 9'-6"	1'-6" TO 4'-0"	0.080"	2	3	B	B	
	4'-1" TO 8'-0"	0.080"	3	3	C	C	
9'-8" TO 11'-0"	1'-6" TO 4'-0"	0.080"	2	3	C	C	
	4'-1" TO 8'-0"	0.080"	3	3	C	C	
	8'-1" TO 11'-0"	0.080"	4	3	C	C	

**NOTES:**

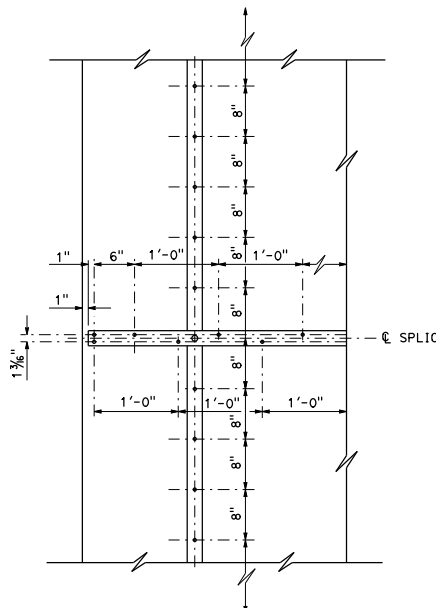
- Type A - 1 1/4" x 1 1/4" x 1/8" Channel to be aluminum alloy 6063-T5.
- Type B - 2 3/8" x 1 1/4" x 3/16" Channel to be aluminum alloy 6063-T6.
- Type C - 2" x 2" x 1/4" Channel to be aluminum alloy 6063-T6.
- 1 3/4" x 1 1/2" x 1/8" Rectangular tubing aluminum alloy 6063-T6 may be substituted for Types B and C, but more than one type of framing material used on one sign is unacceptable.
- For rectangular tubing, weld all around and grind beads flush where weld contacts sign panel.

**POST SPACING**

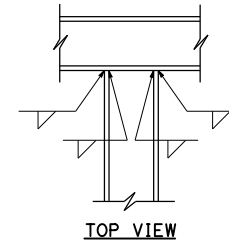
SIGN LENGTH	CENTERLINE SPACING
4'-8" TO 5'-8"	3'-6"
5'-10" TO 6'-8"	4'-0"
6'-10" TO 7'-8"	4'-6"
7'-10" TO 8'-2"	5'-0"
8'-4" TO 8'-8"	5'-2"
8'-10" TO 9'-2"	5'-4"
9'-4" TO 9'-8"	5'-8"
9'-10" TO 10'-2"	6'-0"
10'-4" TO 10'-10"	6'-6"
10'-11" TO 11'-0"	7'-0"



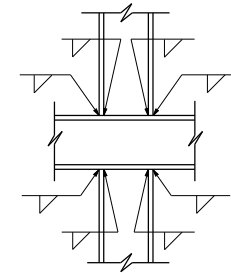
**TYPICAL RIVET  
DETAIL A**



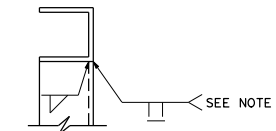
**RIVET AT SPLICE  
DETAIL B**



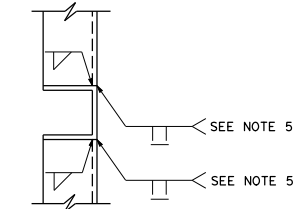
**TOP VIEW**



**TOP VIEW**



**SIDE VIEW  
WELD DETAIL No. 1**



**SIDE VIEW  
WELD DETAIL No. 2**

**TYPICAL WELD DETAILS**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**FRAMING DETAILS FOR  
SHEET METAL  
RECTANGULAR SHAPE**

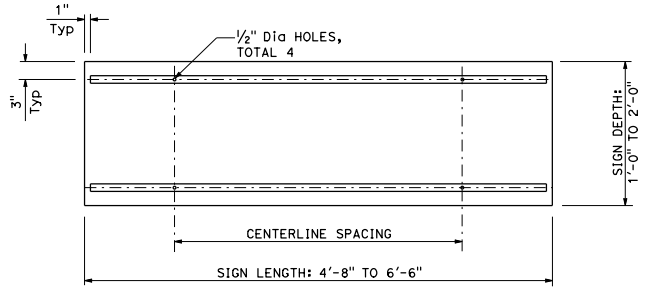
NO SCALE

**S93**

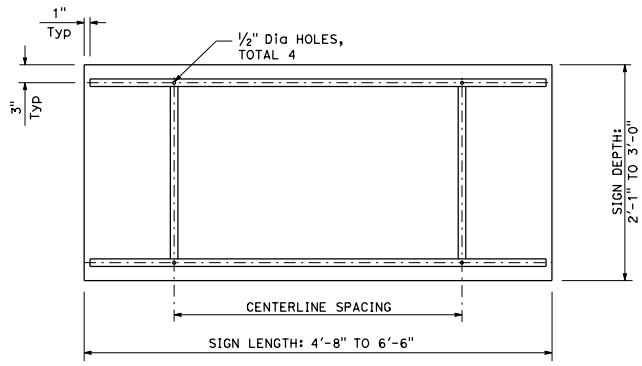
Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Donald E. Howe*  
 REGISTERED CIVIL ENGINEER  
 No. C46402  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

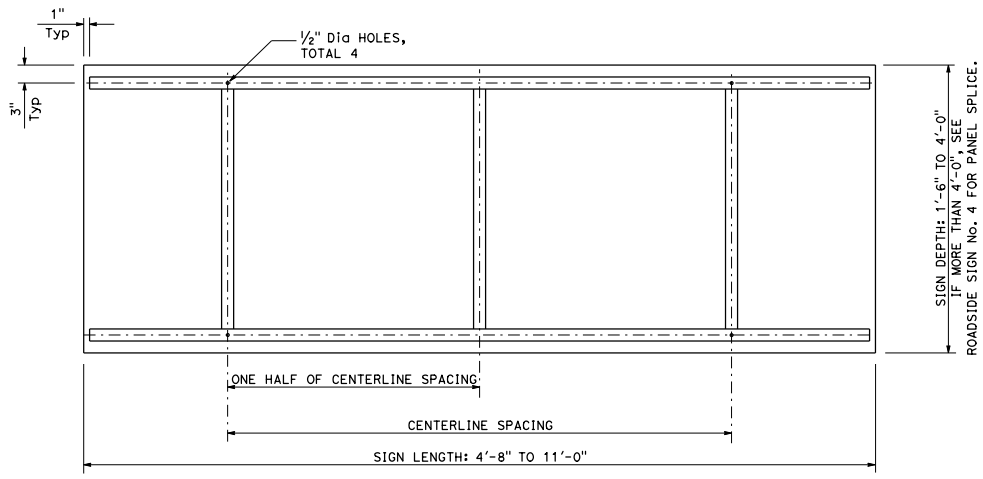
October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS  
 OR AGENTS SHALL NOT BE RESPONSIBLE FOR  
 THE ACCURACY OR COMPLETENESS OF SCANNED  
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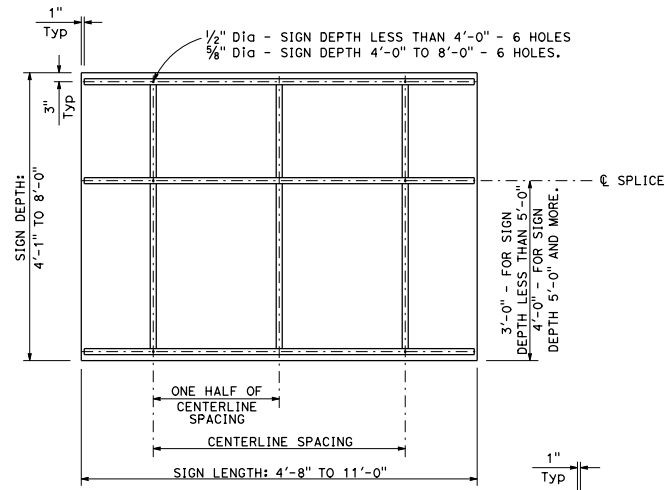
**ROADSIDE SIGN DETAIL No. 1**



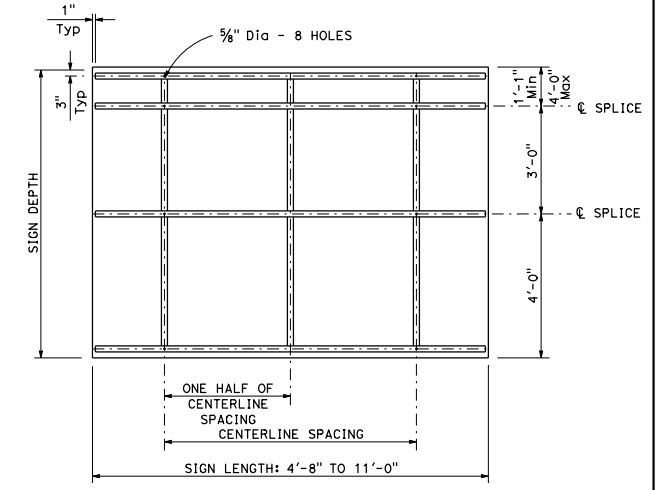
**ROADSIDE SIGN DETAIL No. 2**



**ROADSIDE SIGN DETAIL No. 3**



**ROADSIDE SIGN DETAIL No. 4**



**ROADSIDE SIGN DETAIL No. 5**

**NOTES:**

1. See Standard Plan S93 for framing details.
2. All members welded at joints as shown on Standard Plan S93.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ROADSIDE FRAMED SINGLE SHEET  
ALUMINUM SIGNS,  
RECTANGULAR SHAPE**

NO SCALE

**S94**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Donald E. Howe*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Donald E. Howe  
No. C46402  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

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Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
------	--------	-------	-----------------------------	--------------	-----------------

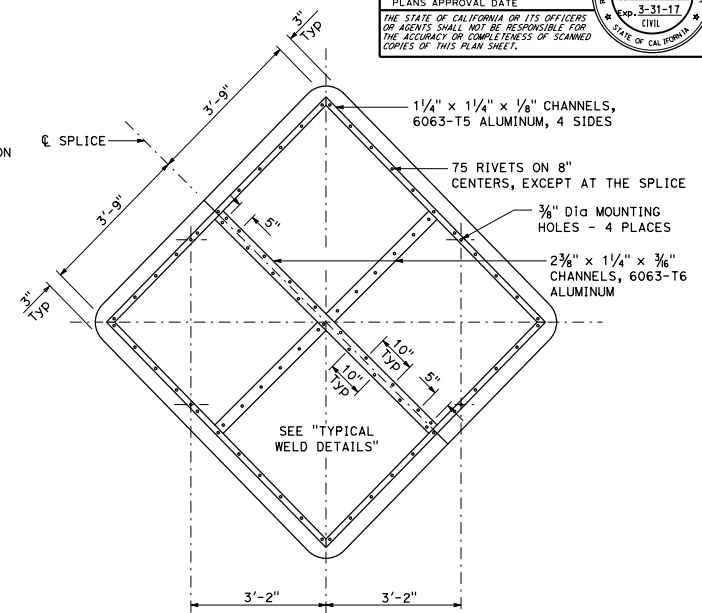
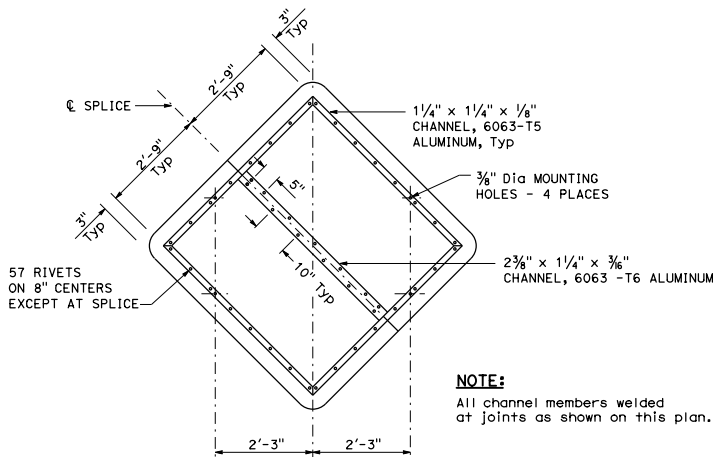
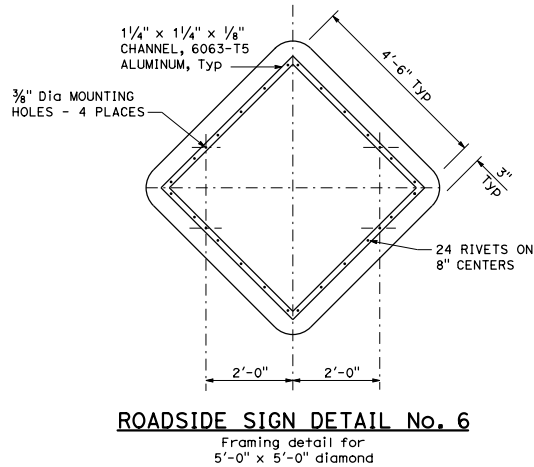
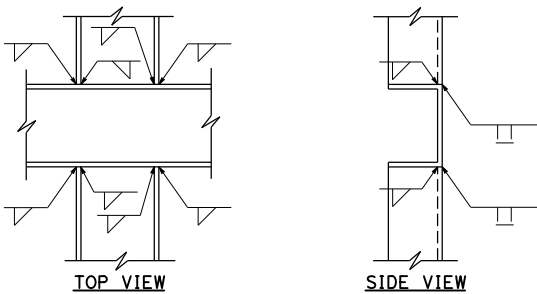
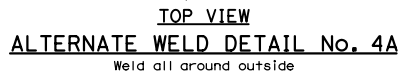
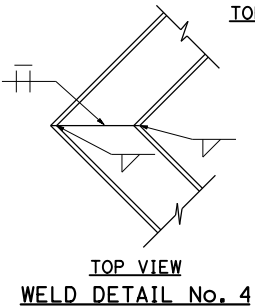
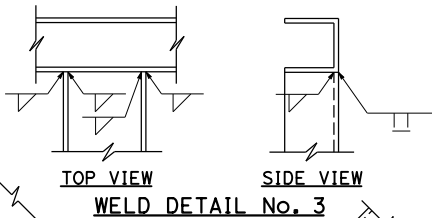
*Donald E. Howe*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

No. C46402  
Donald E. Howe  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

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CHANNEL SIZES		
SIGN SIZE	PANEL THICKNESS	FRAME TYPE
4'-0" x 4'-0"	0.063"	NO FRAME REQUIRED
4'-0" x 4'-0"	0.080"	NO FRAME REQUIRED
5'-0" x 5'-0"	0.080"	SEE ROADSIDE SIGN No. 6
6'-0" x 6'-0"	0.080"	SEE ROADSIDE SIGN No. 7
8'-0" x 8'-0"	0.080"	SEE ROADSIDE SIGN No. 8

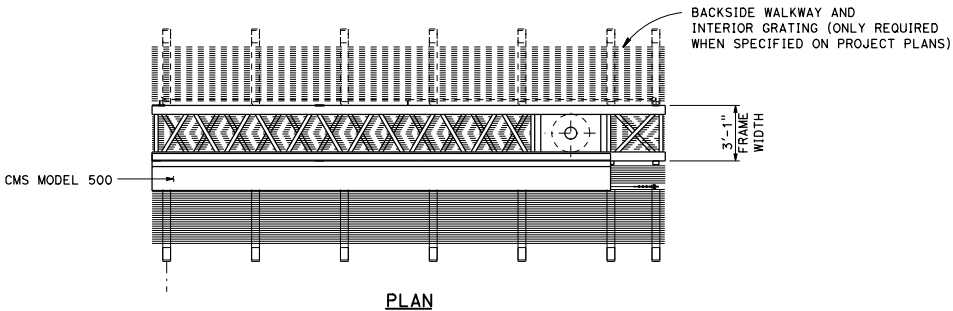
**NOTE:**  
All channel members welded at joints as shown on this plan.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

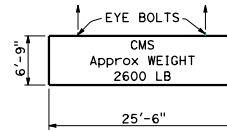
**ROADSIDE SINGLE SHEET  
ALUMINUM SIGNS,  
DIAMOND SHAPE**

NO SCALE

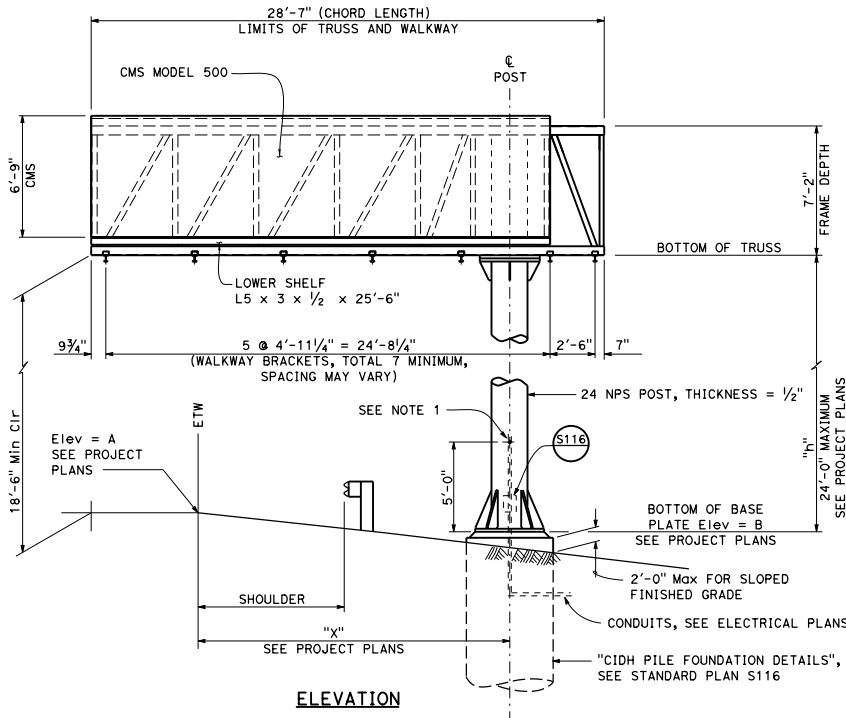
**S95**



PLAN



LIFTING DIAGRAM



ELEVATION

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
 Jeffrey B. Woody  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
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**GENERAL NOTES:**

**LOADING:**

**WIND LOADING:**

- 100 mph (3-second gust)
- Normal to face of sign: 40 psf on 100% panel coverage.
- Transverse to face of sign: 20% of normal force.

**WALKWAY LOADING:**

- Dead load +500 LBS concentrated live load.

**UNIT STRESSES:**

- STRUCTURAL STEEL:  $f_y = 36000$  psi
- REINFORCED CONCRETE:  $f_y = 60000$  psi
- $f'_c = 3600$  psi
- FOOTING SOIL PRESSURE: 2.50 ksf (spread footing)

**MINIMUM CLEARANCE**

- Vertical roadway clearance 18'-0" above roadway and shoulders

**WELDING:**

- All welding continuous unless otherwise noted on the plans.

**NOTES:**

1. Drill and tap for 2 1/2" recessed pipe plug, See Standard Plan ES-15C.
2. For location and elevation of sign structure see Project Plans.
3. Sign support post shall be raked out of plumb with leveling nuts to make the bottom of the sign frame level.
4. At final position of post, top and bottom nuts shall be tightened against base plate.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE LAYOUT  
UNBALANCED BUTTERFLY  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**

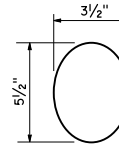
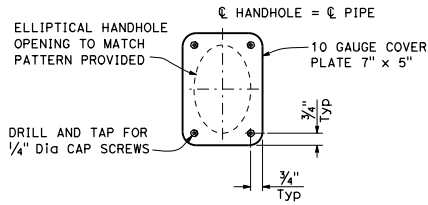
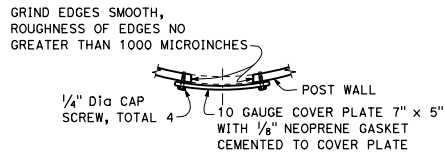
NO SCALE

**S101**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

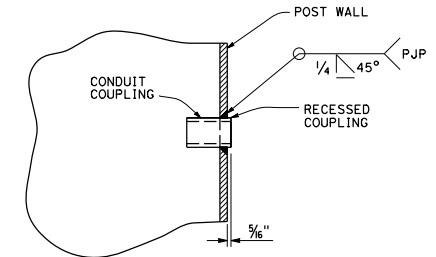


**PATTERN OF ELLIPTICAL HANDHOLE CUT OUT**

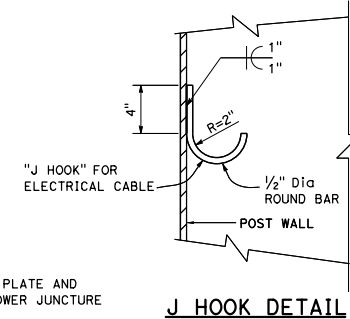
**PLAN**

**ELEVATION**

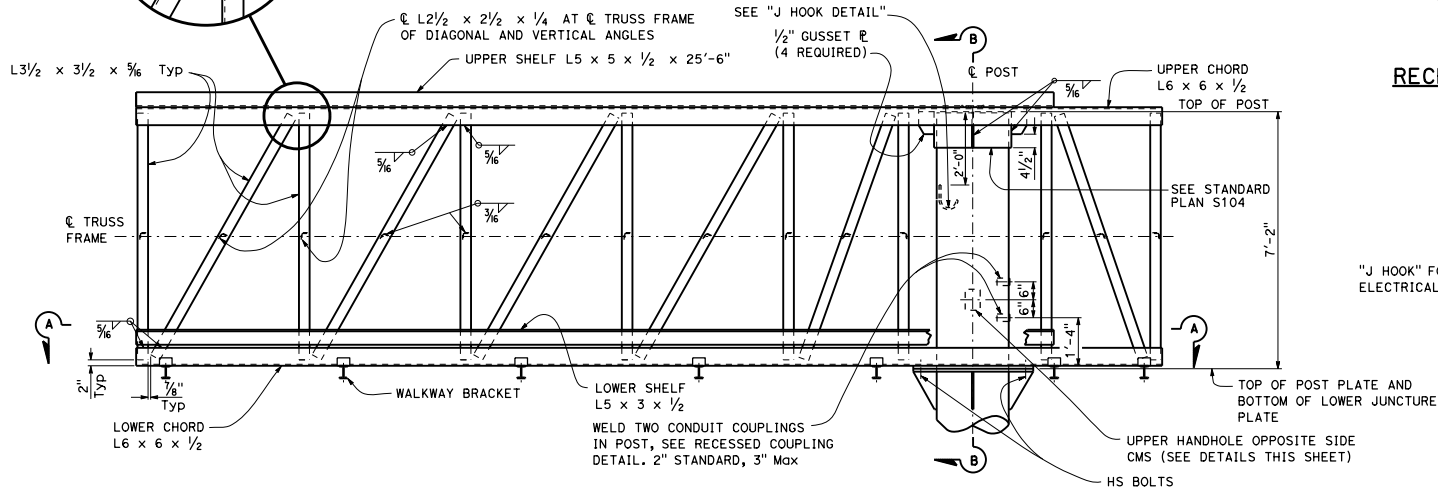
**UPPER HANDHOLE AND COVER DETAILS**



**RECESSED COUPLING DETAIL**



**J HOOK DETAIL**



**FRAME ELEVATION**

See Note 1

**NOTES:**

1. Walkways and safety anchorages not shown for clarity.
2. For Section B-B details, see Standard Plan S104.
3. For Section A-A details, including vertical angle spacing, see Standard Plan S104.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS  
 SINGLE POST TYPE  
 STRUCTURAL FRAME DETAILS  
 UNBALANCED BUTTERFLY  
 CHANGEABLE MESSAGE SIGNS  
 MODEL 500**

NO SCALE

**S102**

400

2015 STANDARD PLAN S102



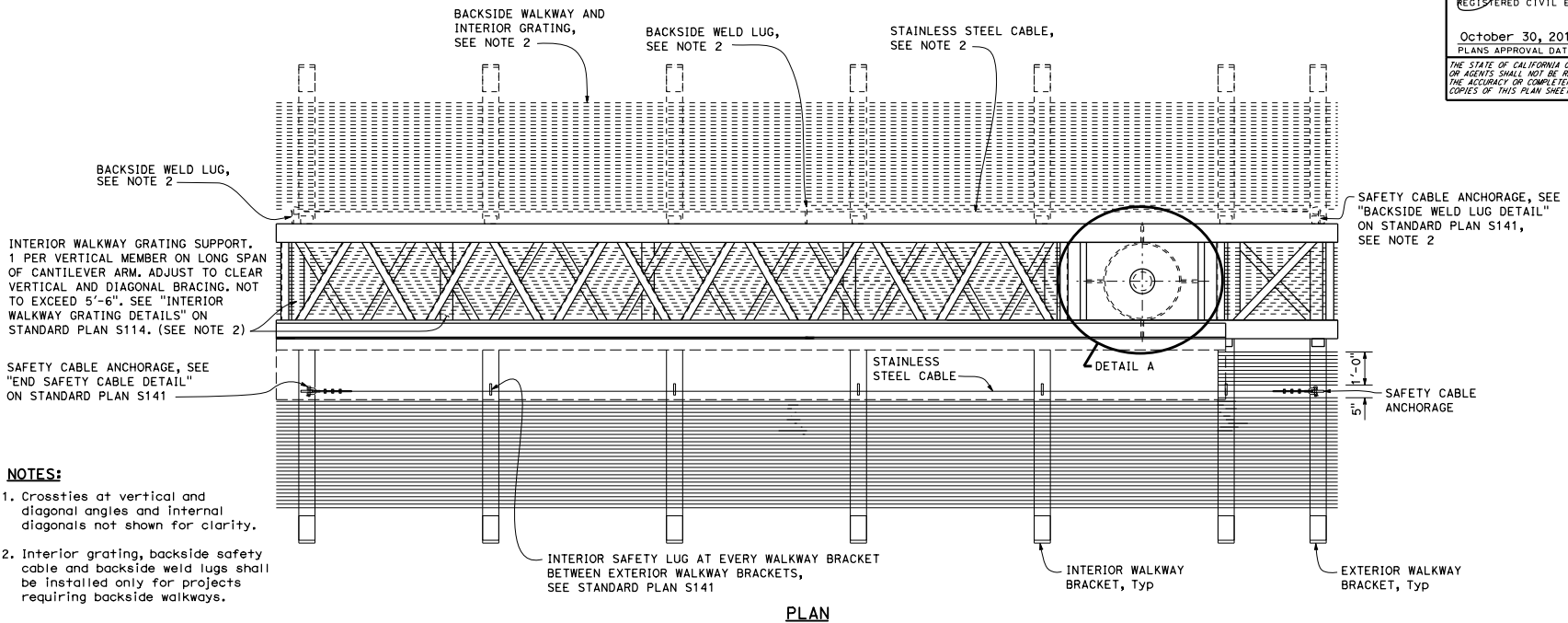
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER  
 Jeffrey B. Woody  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
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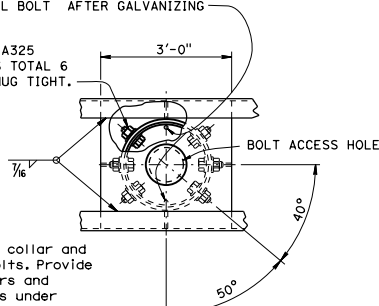
**NOTES:**

1. Crossies at vertical and diagonal angles and internal diagonals not shown for clarity.
2. Interior grating, backside safety cable and backside weld lugs shall be installed only for projects requiring backside walkways.

**PLAN**

GALVANIZING DRAIN HOLE. DRILL AND TAP THRU CAP PLATE FOR 1" Dia A307 BOLT, 3/16" CLEAR OF INSIDE COLLAR WALL. INSTALL BOLT AFTER GALVANIZING

1 1/2" Dia A325 HS BOLTS TOTAL 6 TO BE SNUG TIGHT.



**DETAIL A**

**NOTES:**

Drill thru outer collar and post wall for bolts. Provide contoured washers and hardened washers under bolt head and nut. Contoured washers to be 3" x 3" x 3/16" minimum. Grind face to fit.

7" Dia BOLT CIRCLE

DRILL AND TAP THRU CAP PLATE FOR 1/4" Dia ROUND HEAD BRASS MACHINE SCREW 1" LONG, 4 HOLES EQUALLY SPACED

8" Dia x 1/4" COVER PLATE

**PLAN**  
**BOLT-ACCESS HOLE**  
Single Post Type

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
PLAN AND UPPER BOLT DETAILS  
UNBALANCED BUTTERFLY  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**

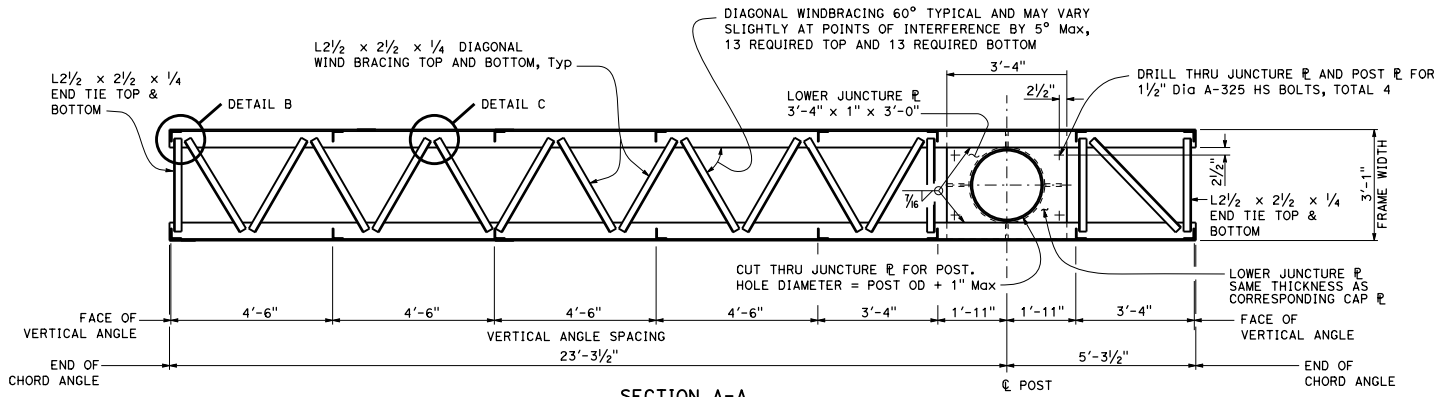
NO SCALE

**S103**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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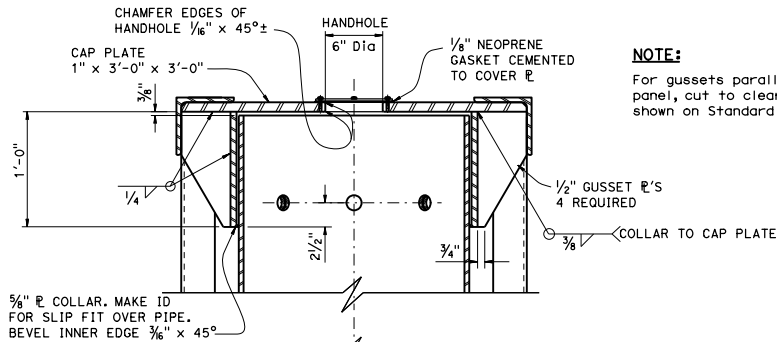


**SECTION A-A**  
**LOWER JUNCTURE CONNECTION**  
 See Standard Plan S102

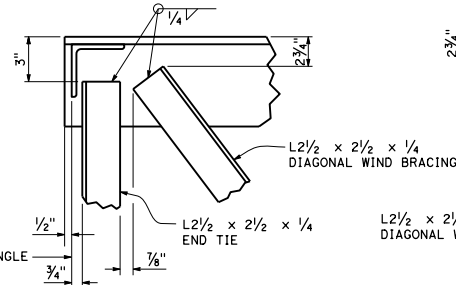
**NOTES:**

1. In all cases truss shall be supported at lower junction connection.
2. Post to truss connections shall be fitted in shop.

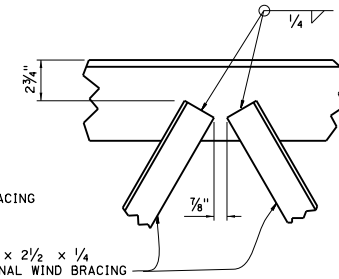
402



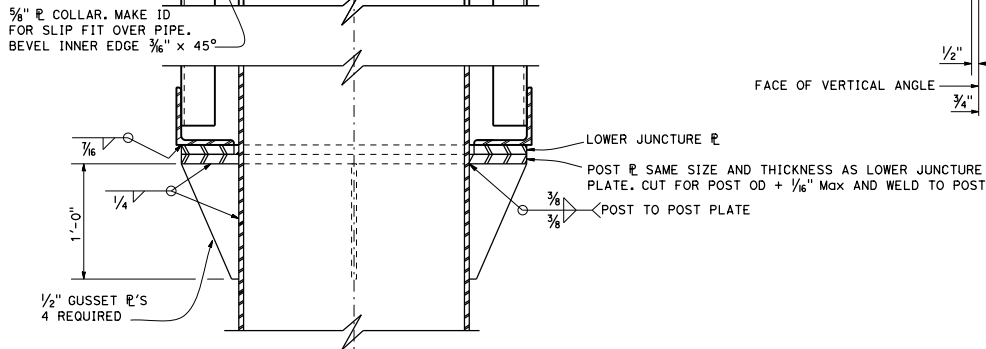
**NOTE:**  
 For gussets parallel to the sign panel, cut to clear bolts as shown on Standard Plan S102.



**DETAIL B**



**DETAIL C**



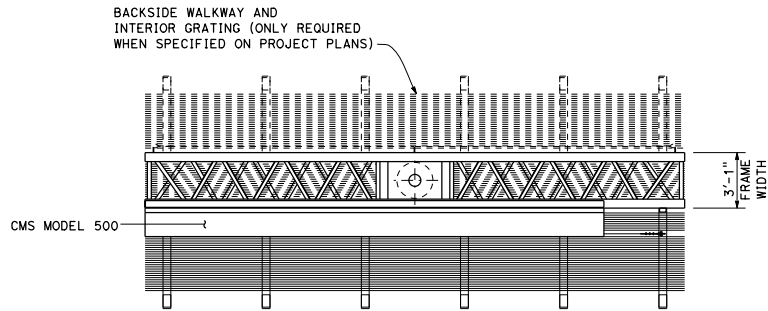
**SECTION B-B**  
 See Standard Plan S10

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS**  
**SINGLE POST TYPE**  
**FRAME JUNCTURE DETAILS**  
**UNBALANCED BUTTERFLY**  
**CHANGEABLE MESSAGE SIGNS**  
**MODEL 500**

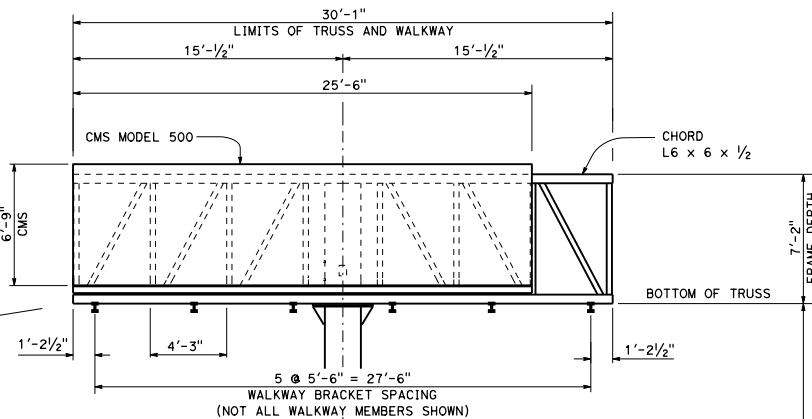
NO SCALE

**S104**

2015 STANDARD PLAN S104



PLAN

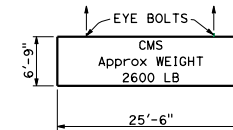


ELEVATION

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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LIFTING DIAGRAM

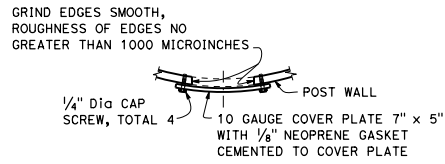
**NOTES:**

1. Drill and tap for 2½" recessed pipe plug.
2. For location and elevation of sign structure, see Project Plans.
3. Sign support post shall be raked out of plumb with leveling nuts to make the bottom of the sign frame level.
4. At final position of post, top and bottom nuts shall be tightened against base plate.
5. For "General Notes", see Standard Plan S101.

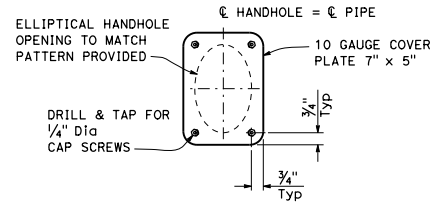
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS  
 SINGLE POST TYPE  
 LAYOUT  
 BALANCED BUTTERFLY  
 CHANGEABLE MESSAGE SIGNS  
 MODEL 500**

NO SCALE

**S105**

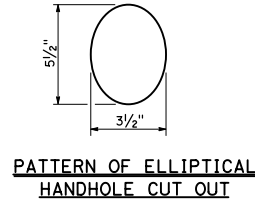


PLAN



ELEVATION

UPPER HANDHOLE AND COVER DETAILS



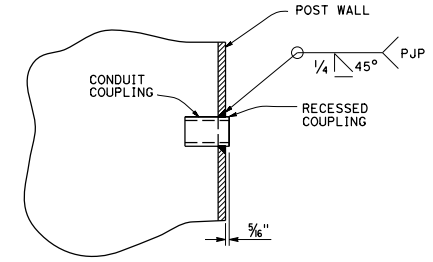
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER

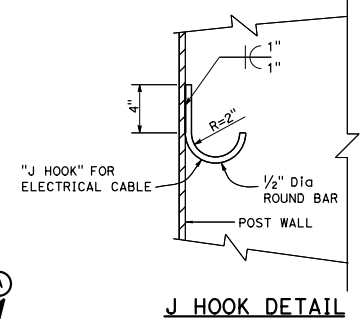
October 30, 2015  
PLANS APPROVAL DATE

Jeffrey B. Boody  
No. C41260  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

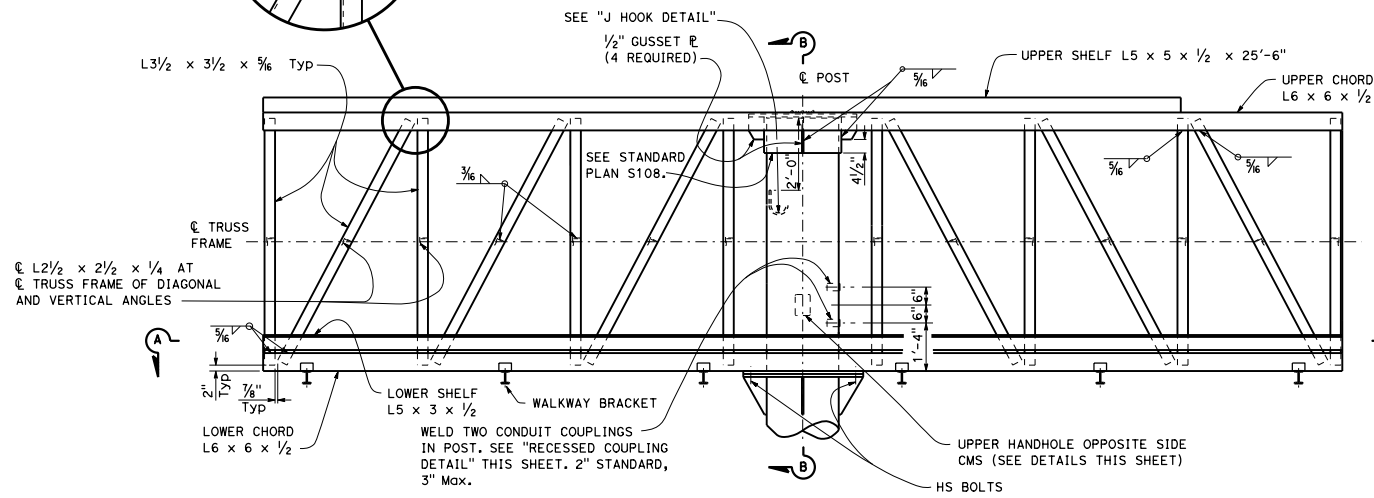
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RECESSED COUPLING DETAIL



J HOOK DETAIL



FRAME ELEVATION

See Note 1

NOTES:

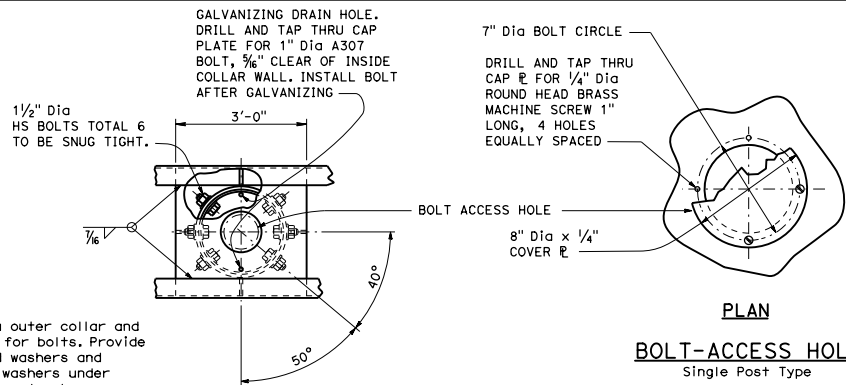
1. Walkways and safety anchors not shown for clarity.
2. For Section B-B details, see Standard Plan S108.
3. For Section A-A details, including vertical angle spacing, see Standard Plan S108.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
STRUCTURAL FRAME DETAILS  
BALANCED BUTTERFLY  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**

NO SCALE

**S106**



**NOTE:**

Drill thru outer collar and post wall for bolts. Provide contoured washers and hardened washers under bolt head and nut. Contoured washers to be 3" x 3" x 3/8" Min. Grind face to fit.

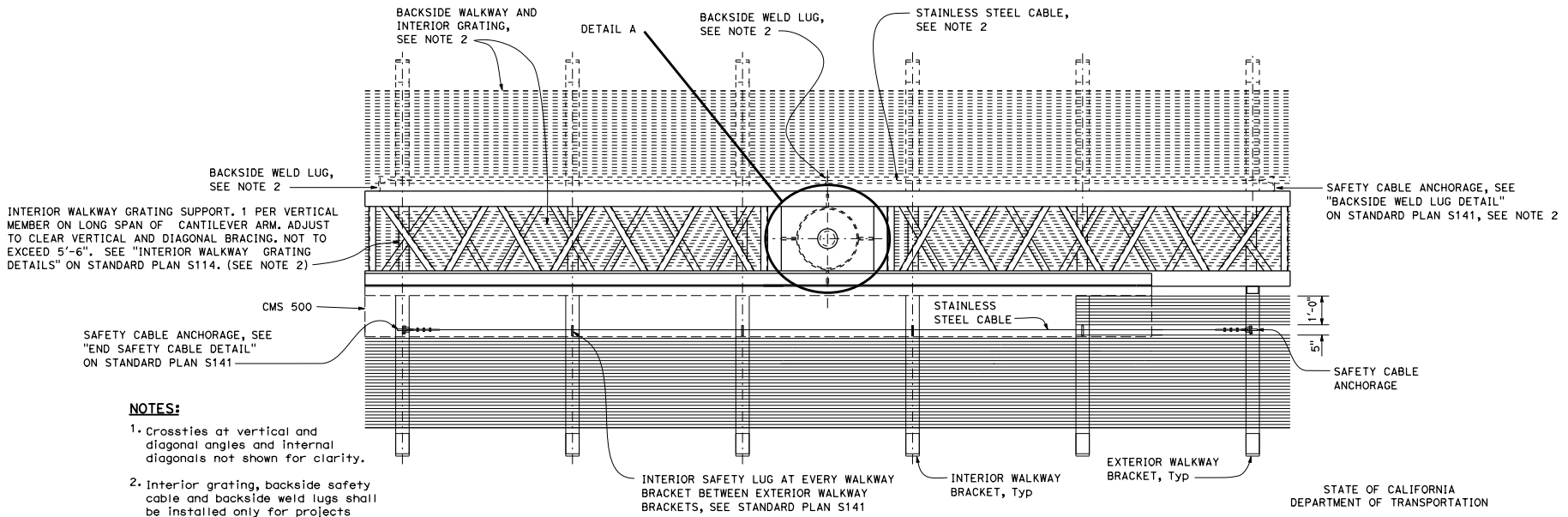
**DETAIL A**

**PLAN**  
**BOLT-ACCESS HOLE**  
Single Post Type

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

1. Crossties at vertical and diagonal angles and internal diagonals not shown for clarity.
2. Interior grating, backside safety cable and backside weld lugs shall be installed only for projects requiring backside walkways.

**PLAN**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS**  
**SINGLE POST TYPE**  
**PLAN AND UPPER BOLT DETAILS**  
**BALANCED BUTTERFLY**  
**CHANGEABLE MESSAGE SIGNS**  
**MODEL 500**

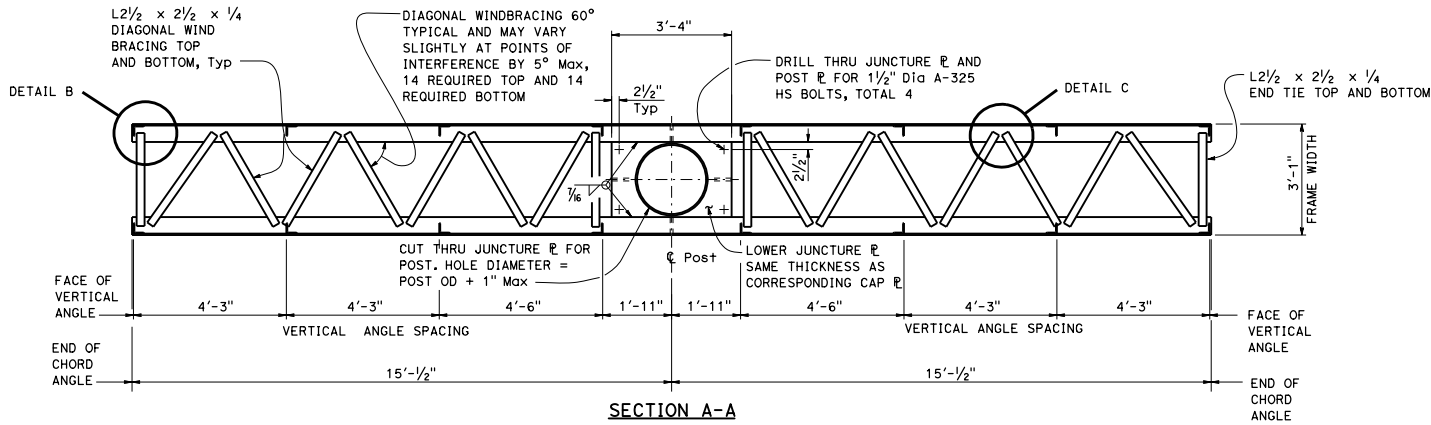
NO SCALE

**S107**

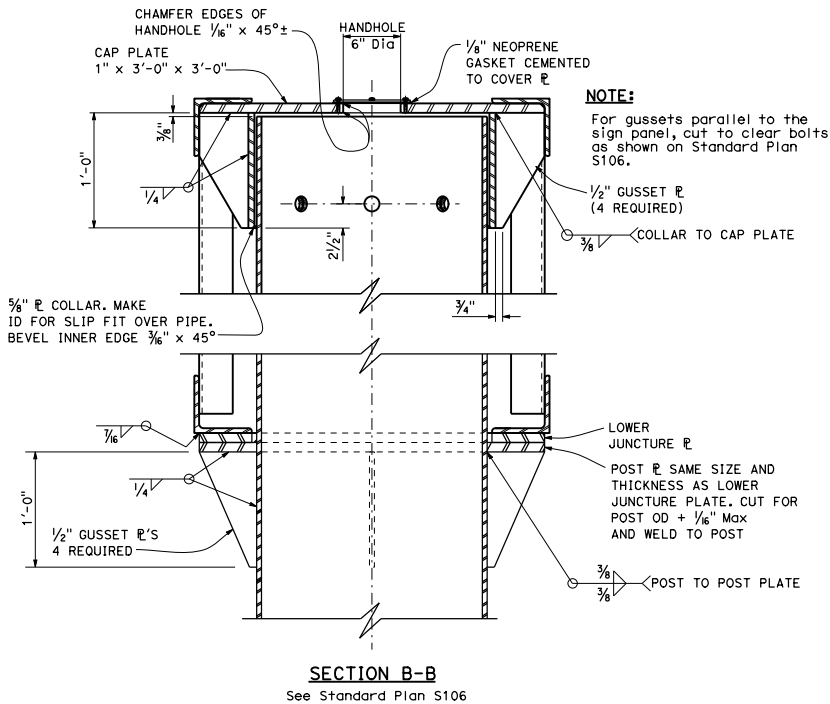
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Stephen B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

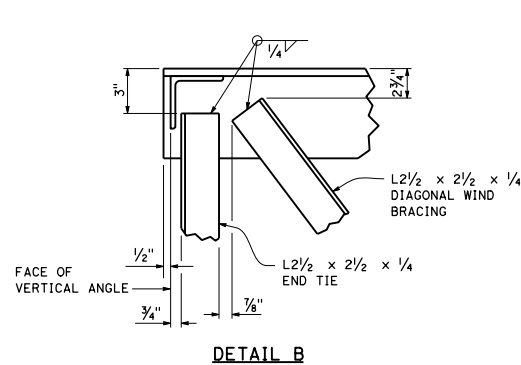
October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



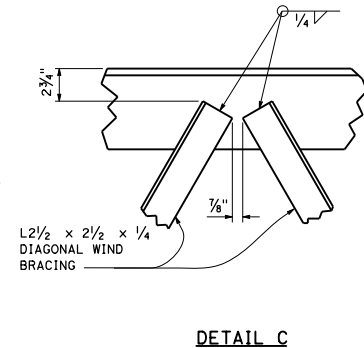
**SECTION A-A**  
**LOWER JUNCTURE CONNECTION**  
 See Standard Plan S106



**SECTION B-B**  
 See Standard Plan S106



**DETAIL B**



**DETAIL C**

**NOTES:**

1. In all cases, truss shall be supported at lower juncture connection.
2. Post to truss connections shall be fitted in shop.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS**  
**SINGLE POST TYPE**  
**FRAME JUNCTURE DETAILS**  
**BALANCED BUTTERFLY**  
**CHANGEABLE MESSAGE SIGNS**  
**MODEL 500**

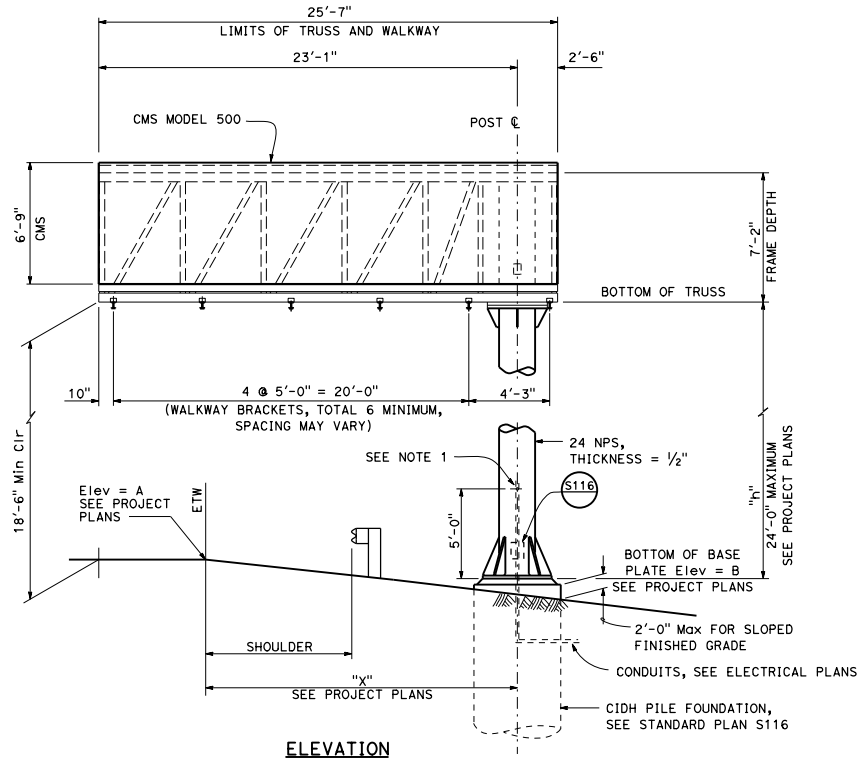
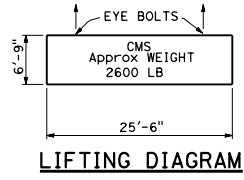
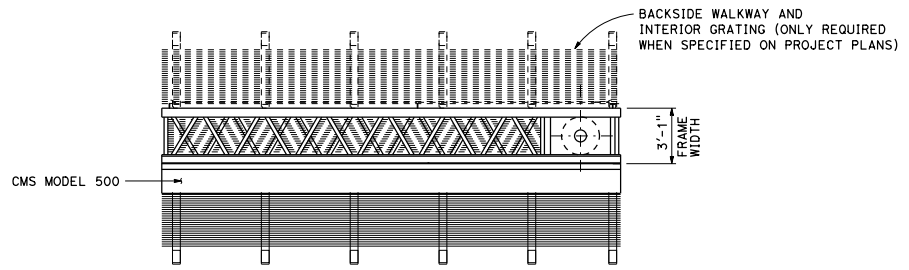
NO SCALE

**S108**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

1. Drill and tap for 2 1/2" recessed pipe plug.
2. For location and elevation of sign structure see Project Plans.
3. Sign support post shall be raked out of plumb with leveling nuts to make the bottom of the sign frame level.
4. At final position of post, top and bottom nuts shall be tightened against base plate.
5. For "General Notes", see Standard Plan S101.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGN-TRUSS  
 SINGLE POST TYPE  
 LAYOUT  
 FULL CANTILEVER  
 CHANGEABLE MESSAGE SIGNS  
 MODEL 500**

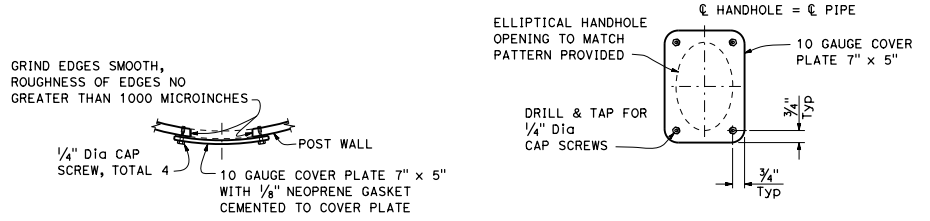
NO SCALE

**S109**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 Signature: *Jeffrey B. Woody*  
 No. 41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

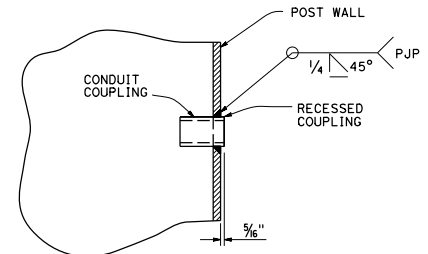
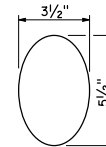
October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



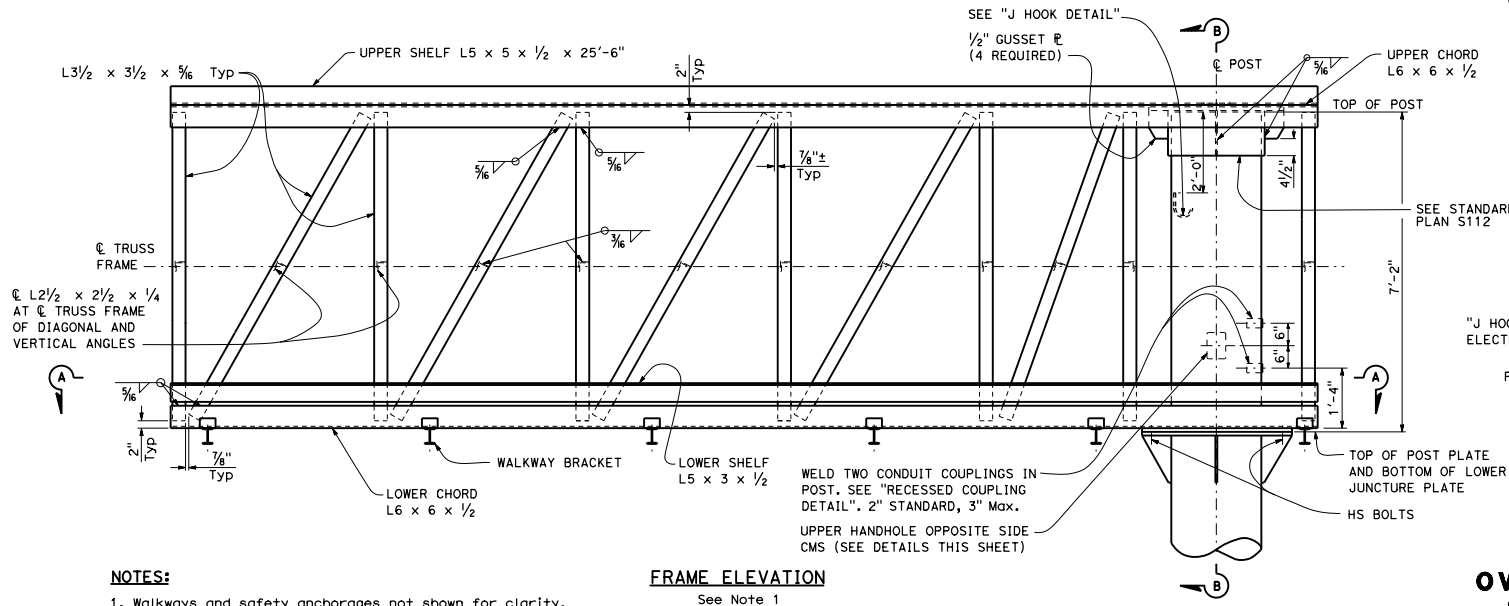
PLAN

ELEVATION  
UPPER HANDHOLE AND COVER DETAILS

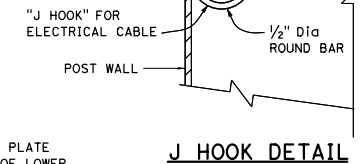
PATTERN OF ELLIPTICAL HANDHOLE CUT OUT



RECESSED COUPLING DETAIL



FRAME ELEVATION



J HOOK DETAIL

**NOTES:**

1. Walkways and safety anchorages not shown for clarity.
2. For Section B-B details, see Standard Plan S112.
3. For Section A-A details, including vertical angle spacing, see Standard Plan S112.

See Note 1

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
STRUCTURAL FRAME DETAILS  
FULL CANTILEVER  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**

NO SCALE

**S110**

408

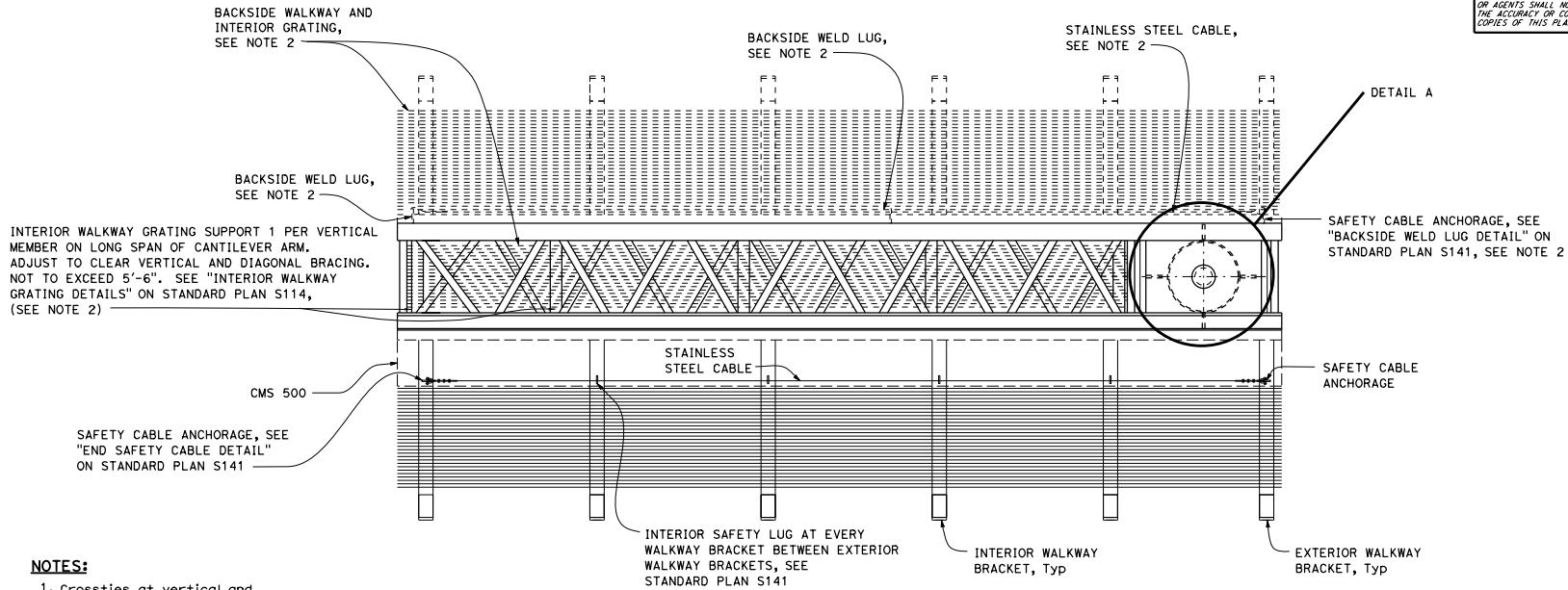
2015 STANDARD PLAN S110



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**NOTES:**

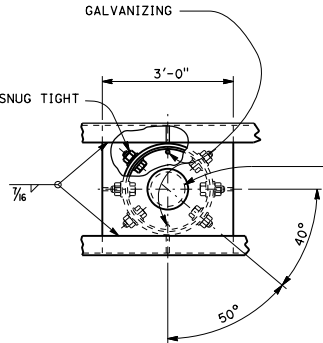
1. Crossties at vertical and diagonal angles and internal diagonals not shown for clarity.
2. Interior grating, backside safety cable and backside weld lugs shall be installed only for projects requiring backside walkways.

**NOTE:**

Drill thru outer collar and post wall for bolts. Provide contoured washers and hardened washers under bolt head and nut. Contoured washers to be 3" x 3" x 5/16" Min Grind face to fit.

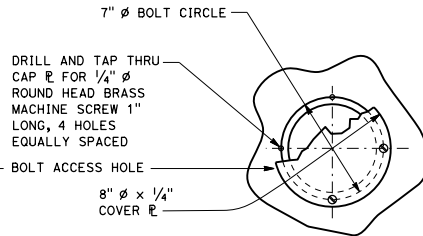
GALVANIZING DRAIN HOLE. DRILL AND TAP THRU CAP PLATE FOR 1"  $\phi$  A307 BOLT, 5/16" CLEAR OF INSIDE COLLAR WALL. INSTALL BOLT AFTER GALVANIZING

1/2"  $\phi$  HS BOLTS  
TOTAL 6 TO BE SNUG TIGHT



**DETAIL A**

**PLAN**

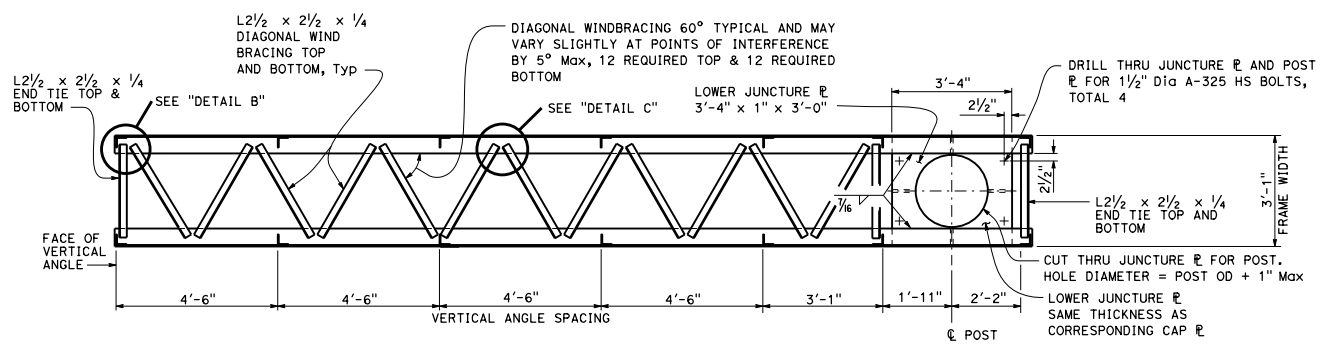


**PLAN**  
**BOLT-ACCESS HOLE**  
Single Post Type

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS  
 SINGLE POST TYPE  
 PLAN AND UPPER BOLT DETAILS  
 FULL CANTILEVER  
 CHANGEABLE MESSAGE SIGNS  
 MODEL 500**

NO SCALE

**S111**

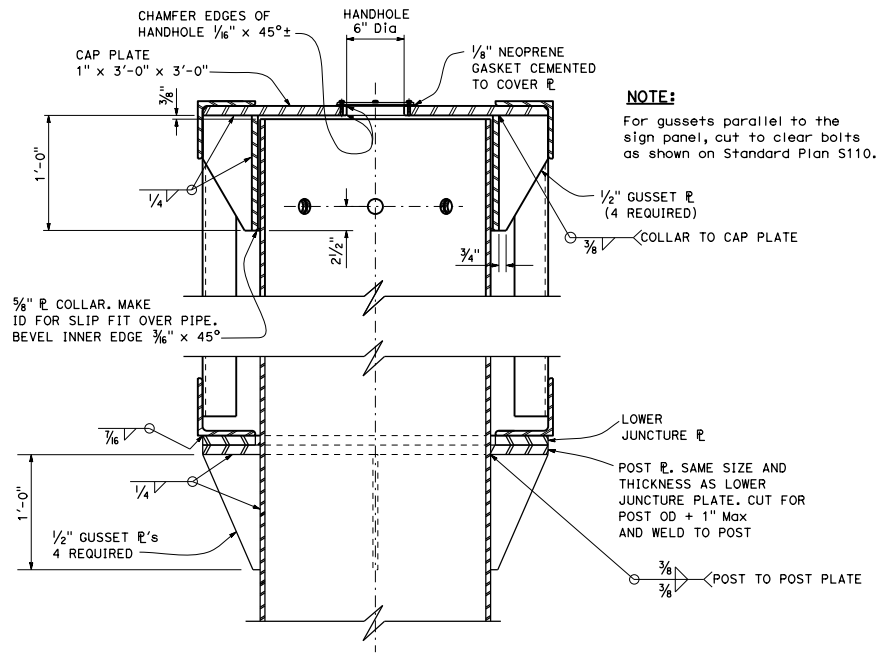


**SECTION A-A**  
**LOWER JUNCTURE CONNECTION**  
See Standard Plan S110

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

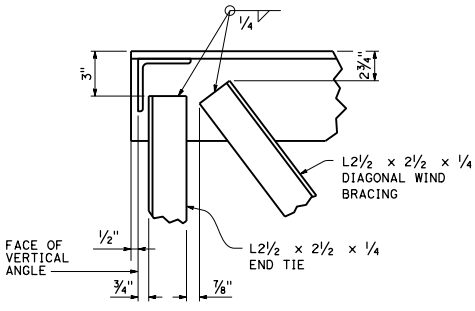
*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

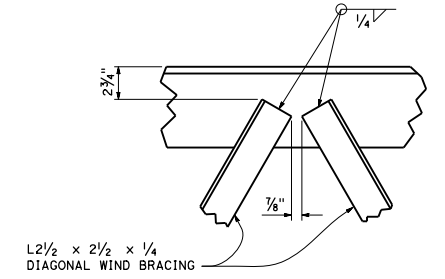


**SECTION B-B**  
See Standard Plan S110

**NOTE:**  
For gussets parallel to the sign panel, cut to clear bolts as shown on Standard Plan S110.



**DETAIL B**



**DETAIL C**

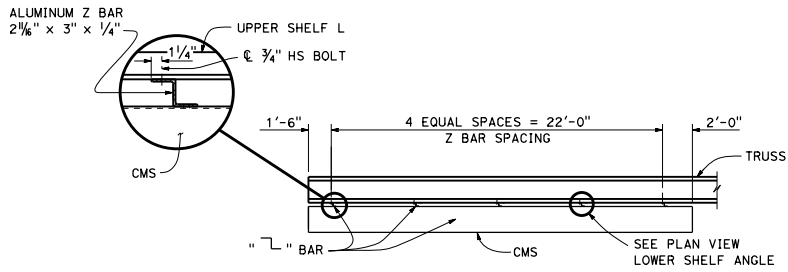
**NOTES:**

1. In all cases truss shall be supported at lower juncture connection.
2. Post to truss connections shall be fitted in shop.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS**  
**SINGLE POST TYPE**  
**FRAME JUNCTURE DETAILS**  
**FULL CANTILEVER**  
**CHANGEABLE MESSAGE SIGNS**  
**MODEL 500**

NO SCALE

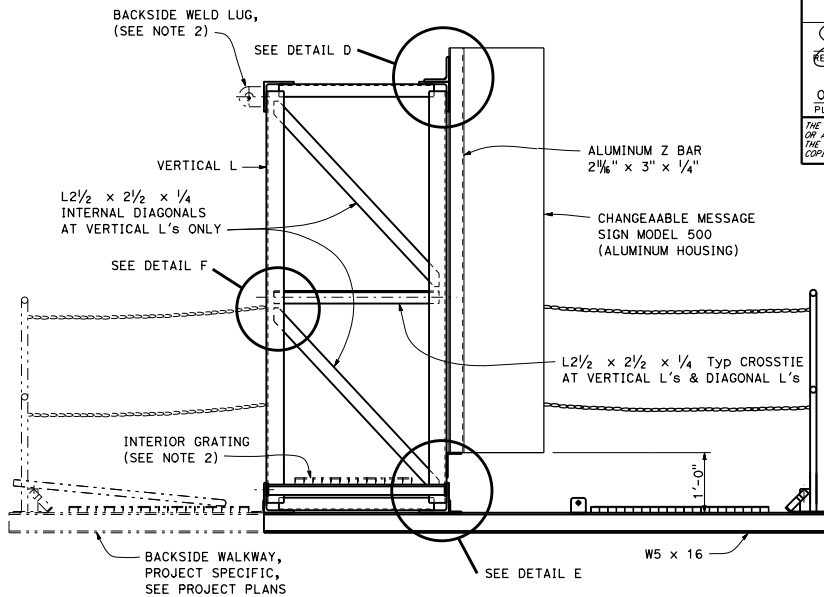
**S112**



**ALUMINUM Z BAR SPACING**

**NOTE:**

Contractor shall verify Z bar spacing prior to drilling holes in shelf angle.



**TYPICAL SECTION FRAME**

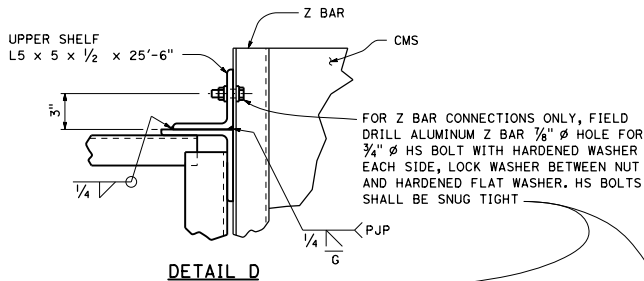
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
*Jeffrey B. Woody*  
 No. 041260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

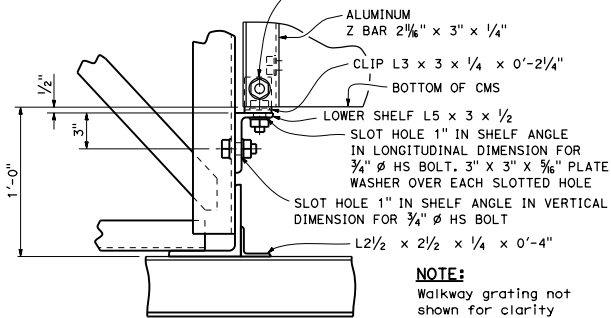
October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

1. Diagonal angles in plane of truss not shown. Bracing shown is at all vertical angles of truss.
2. Interior grating and backside weld lugs shall be installed only for projects requiring backside walkways.



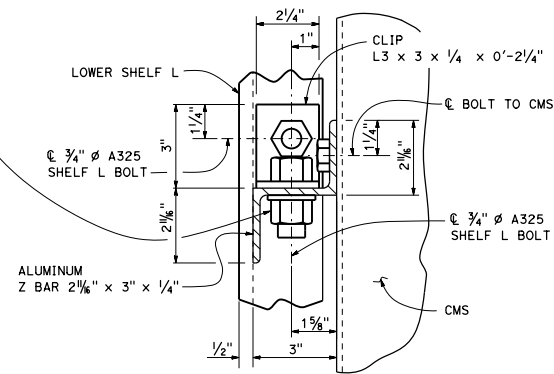
**DETAIL D**



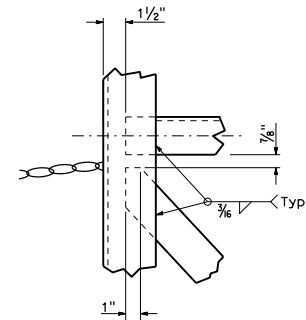
**DETAIL E**

**NOTE:**

Walkway grating not shown for clarity



**PLAN VIEW Z BAR AT LOWER SHELF ANGLE**



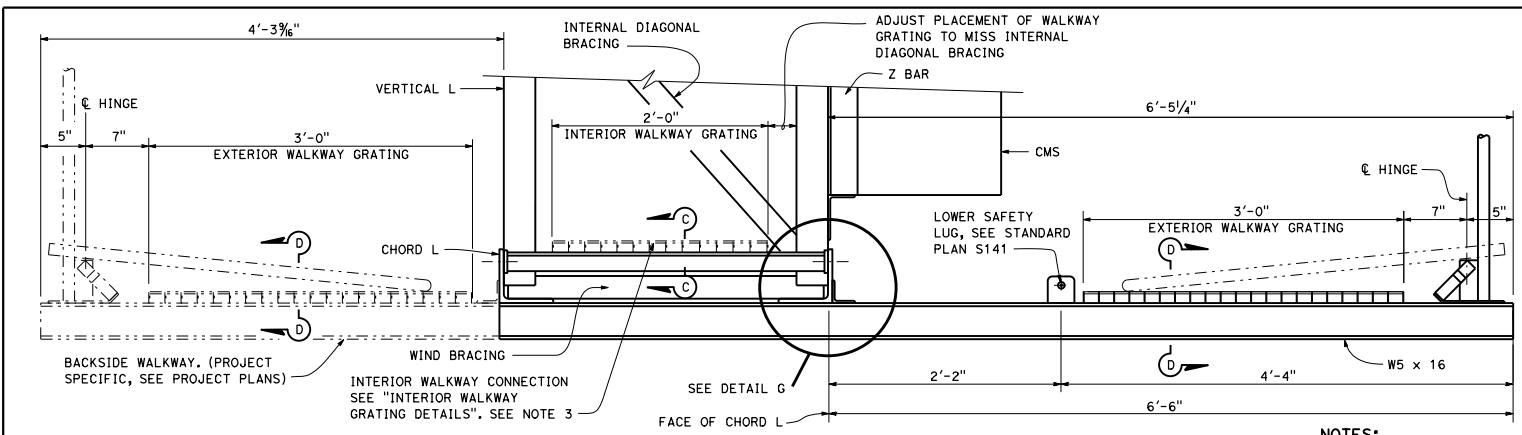
**DETAIL F**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

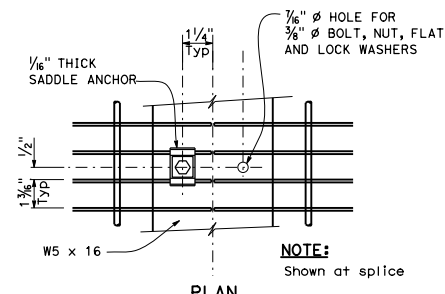
**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
MOUNTING DETAILS  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**

NO SCALE

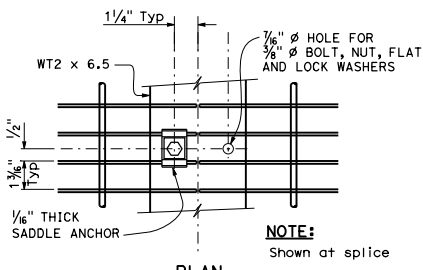
**S113**



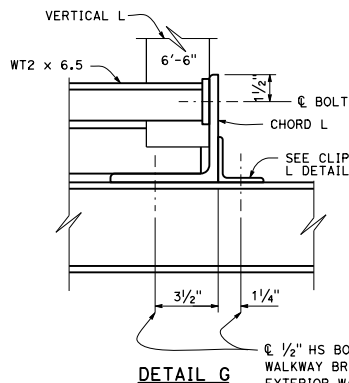
TYPICAL WALKWAY SECTION



EXTERIOR WALKWAY GRATING DETAILS



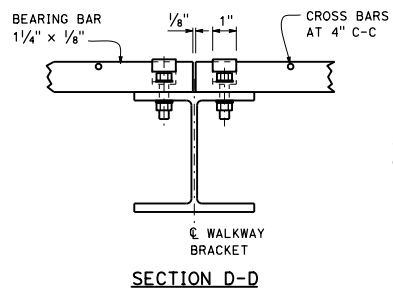
INTERIOR WALKWAY GRATING DETAILS



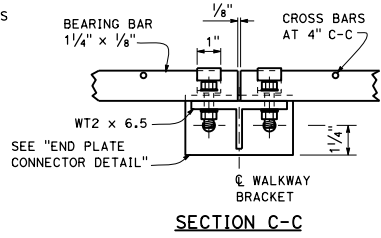
DETAIL G

NOTES:

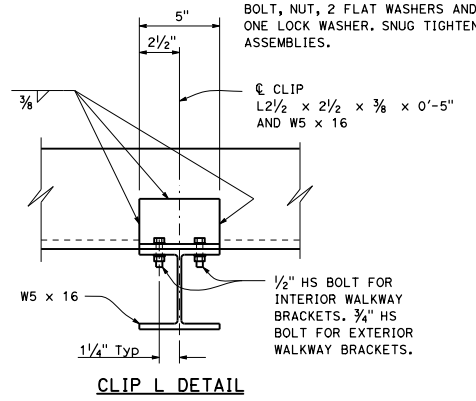
1. Welded type grating shall have 1/4" x 1/8" bearing bars at 1 3/8" centers with 1/4" diameter (or equal) cross bars at 4" centers. If mechanical lock grating is used, it shall be equal in strength to the welded type. Alternate hold-down clips may be submitted for approval.
2. Walkway grating to be continuous (no splices) over as many walkway brackets as practical and consistent with fabrication, ease of handling and assembly.
3. Interior grating shall be installed for project requiring backside walkways.



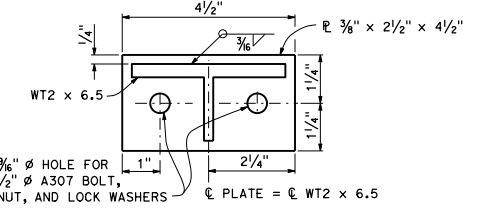
SECTION D-D



SECTION C-C



CLIP L DETAIL



END PLATE CONNECTOR DETAIL

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
WALKWAY DETAILS  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**  
NO SCALE

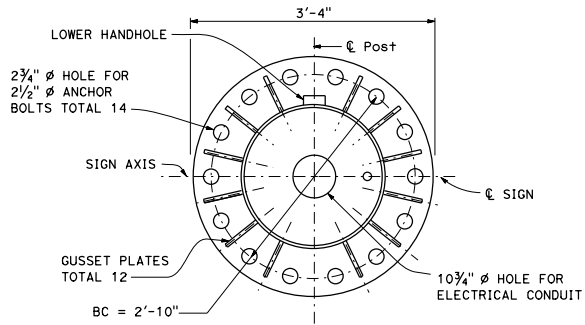
S114

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

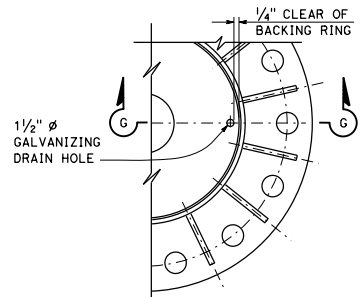
October 30, 2015  
PLANS APPROVAL DATE

REGISTERED CIVIL ENGINEER  
Jeffrey B. Woody  
No. C41260  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

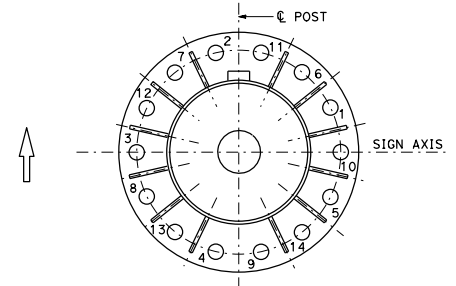
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



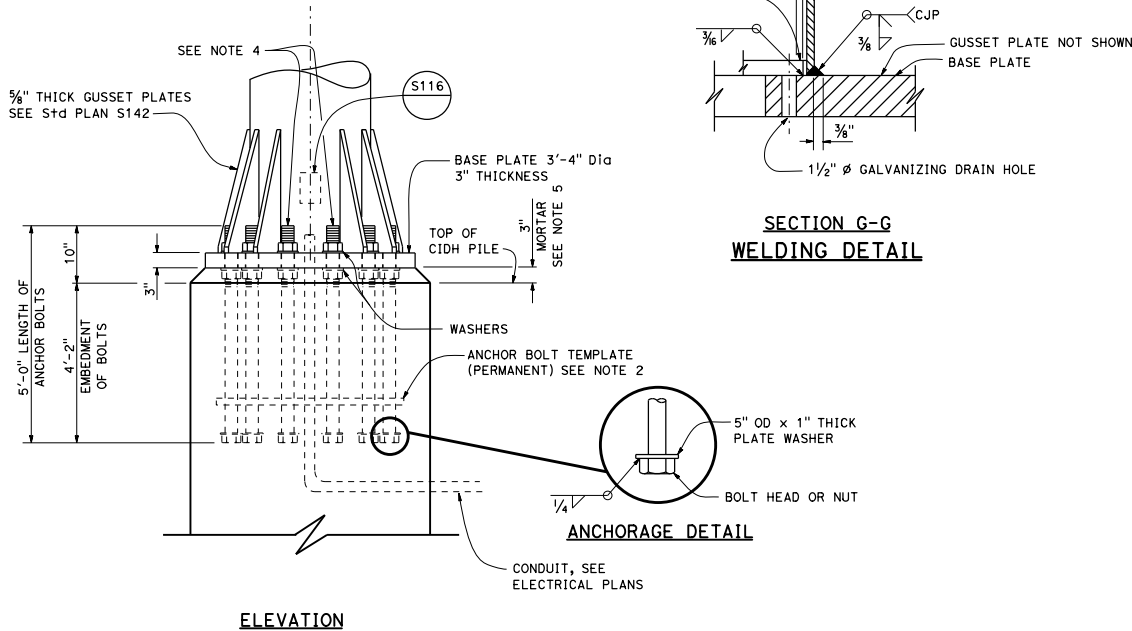
**14 BOLTS  
BASE PLATE DETAILS**



**GALVANIZING HOLE LAYOUT**



**TIGHTENING SEQUENCE**



**NOTES:**

1. Thread upper 10" and galvanize upper 1'-0" of the anchor bolts.
2. Provide anchor bolt templates during installation of anchor bolts. Templates to match base plate anchor bolts pattern. See Standard Plans S3 for typical use of templates. OD = 3'-2", ID = 2'-6", hole = 2 5/8" Max. Permanent template thick = 3/4", temporary template thick = 1/2"
3. Following initial tightening, upper nuts shall be brought to a snug tight condition. This can be obtained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. Snug tightening shall progress systematically according to the tightening sequence as shown. Upper nuts and washers to have full even bearing on base plate.
4. 2 1/2" Ø Anchor bolts with nut, leveling nut, 2 flat washers, and plate washer per bolt. Leveling nuts and washers to be adjusted for full even bearing on base plate prior to final tightening of upper nuts. (See Note 3).
5. For drain holes and central void in mortar see Standard Plan ES-6B detail N.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
ANCHORAGE AND BASE  
PLATE DETAILS  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**

NO SCALE

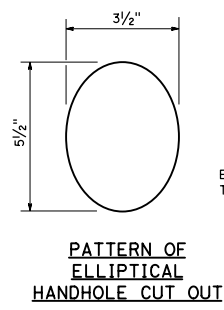
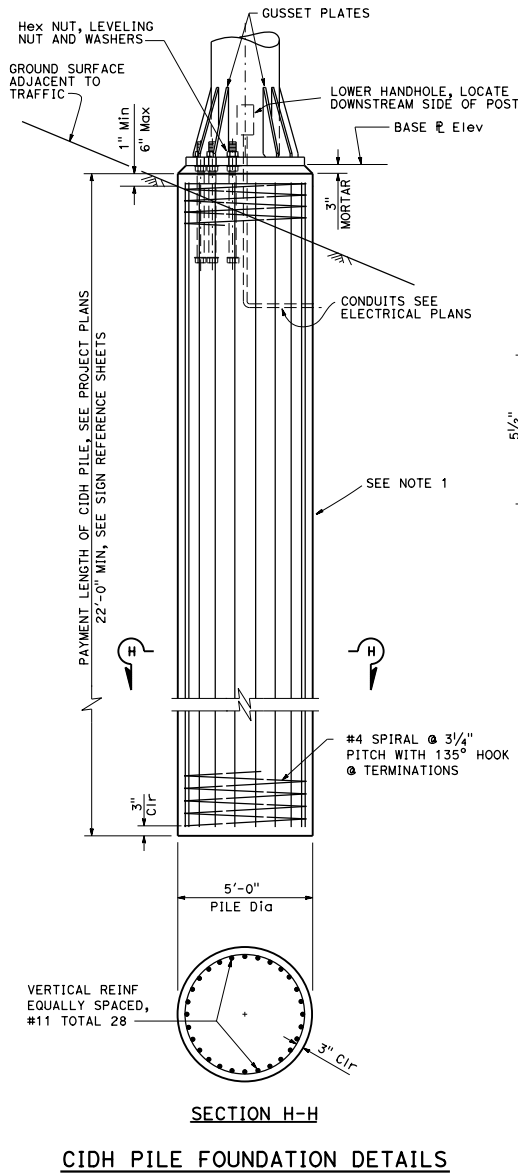
**S115**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

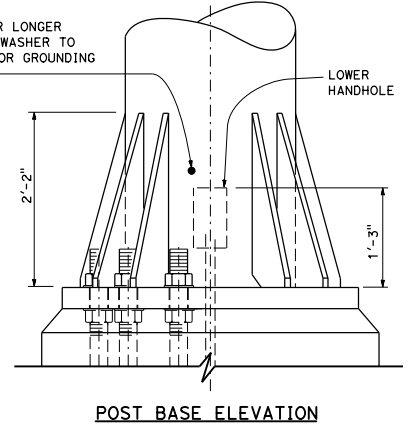
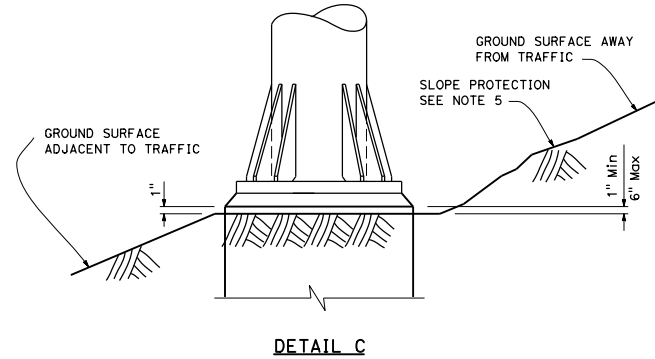
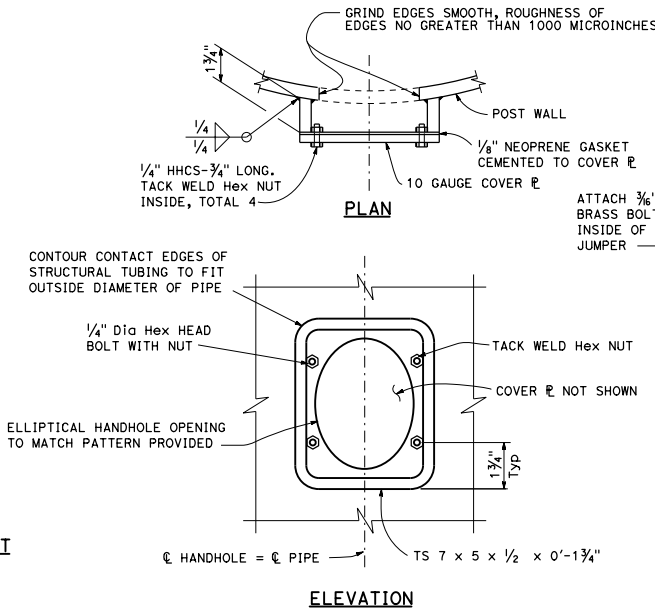
*Jeffrey B. Woody*  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE  
 No. C41260  
 Exp. 3-31-17  
 CIVIL  
 STATE OF CALIFORNIA

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**LOWER HANDHOLE AND COVER DETAILS**



**NOTES:**

1. Pile shall be placed against undisturbed material.
2. Primer and paint post interior from base plate to 6" above lower handhole-unless post is galvanized.
3. On single post sign structures, the post shall be raked out of plumb, with the use of leveling nuts to make the bottom of the sign frame level.
4. When foundation is located on a steep slope with exposed face of concrete adjacent to traffic, see "DETAIL C".
5. Slope protection required when indicated on Project Plans.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
FOUNDATION AND  
MISCELLANEOUS DETAILS  
CHANGEABLE MESSAGE SIGNS  
MODEL 500**  
NO SCALE

**S116**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

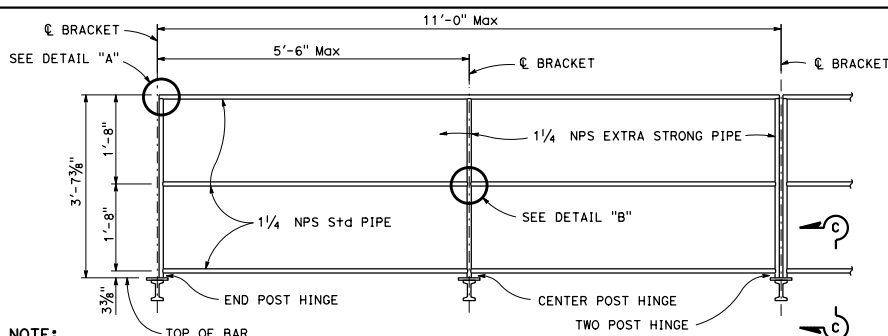
REGISTERED CIVIL ENGINEER  
October 30, 2015  
PLANS APPROVAL DATE  
Jeffrey B. Woody  
No. C41260  
Exp. 3-31-17  
CIVIL  
STATE OF CALIFORNIA

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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

**Stanley P. Johnson**  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

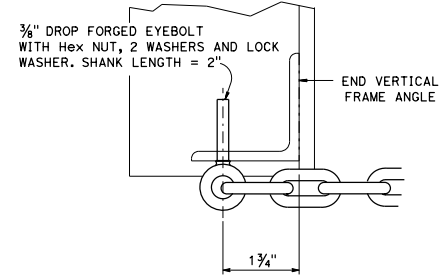
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



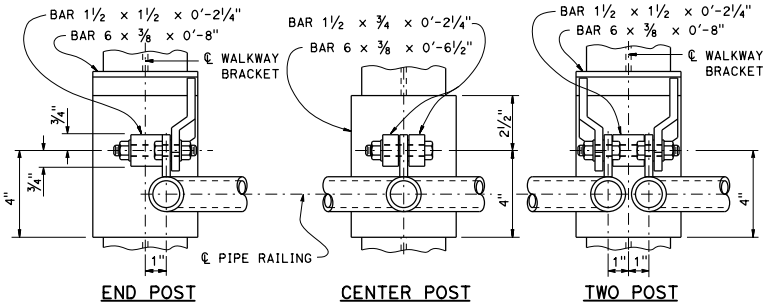
**NOTE:**  
Chain assembly behind (see detail this page)

**SAFETY RAILING ELEVATION**

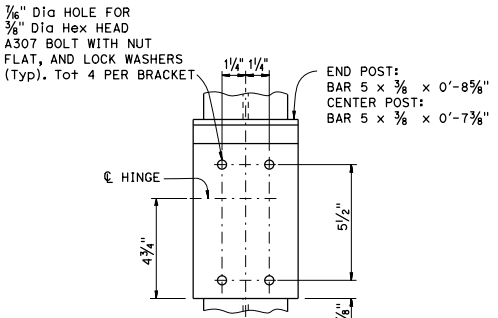
**NOTE:**  
See Standard Plans S101 and S105 and S109 for walkway bracket spacing.



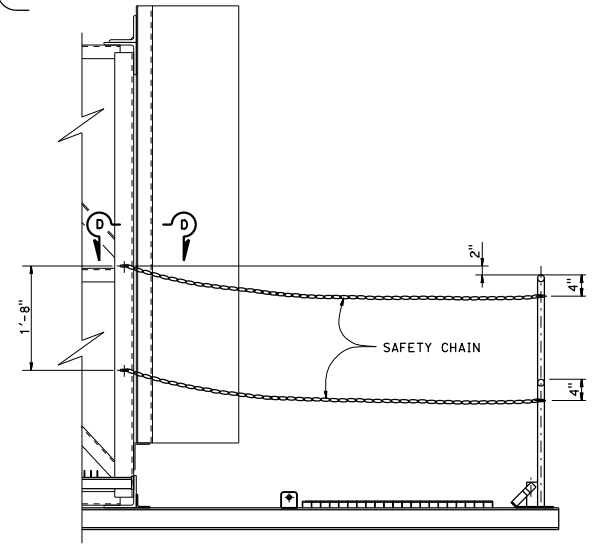
**SECTION D-D**



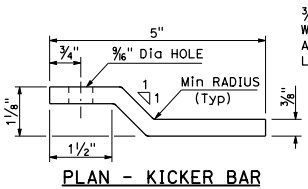
**WELDED HINGE - PLAN**



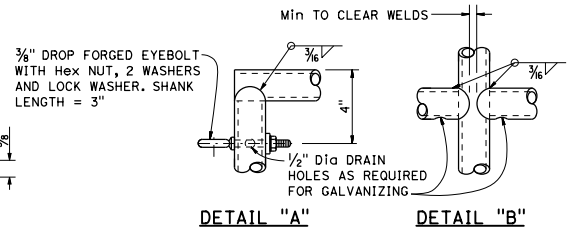
**TYPICAL BOLTED (ALTERNATIVE) HINGED CONNECTION**



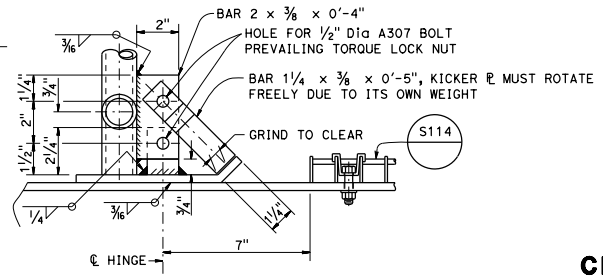
**CHAIN ASSEMBLY**



**PLAN - KICKER BAR**



**NOTE:**  
Alternative venting methods may be used if approved by the Engineer.



**SECTION C-C ELEVATION VIEW**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS  
 SINGLE POST TYPE  
 WALKWAY SAFETY  
 RAILING DETAILS  
 CHANGEABLE MESSAGE SIGNS  
 MODEL 500 AND 510**

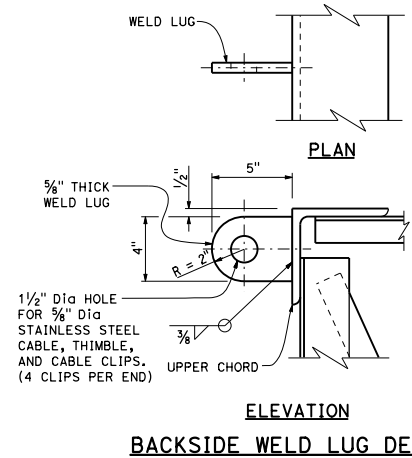
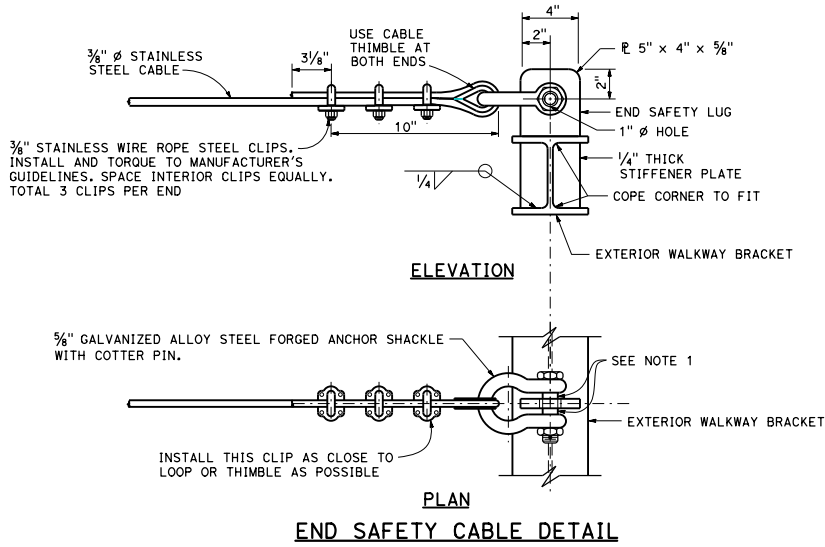
NO SCALE

**S140**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Stanley P. Johnson  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

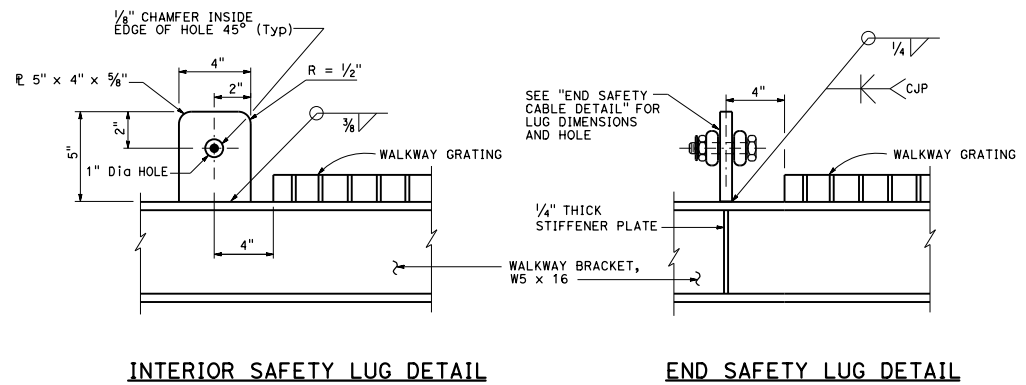
REGISTERED PROFESSIONAL ENGINEER  
 Stanley P. Johnson  
 No. CS7793  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA



**NOTE:** Backside weld lug shall be installed only for projects requiring backside walkways.

**NOTES:**

1. Place an equal amount of washers on each side to align cable with end lug without restricting shackle bolt rotation or contacting cable.
2. For walkway grating details, see Standard Plan S114.



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**OVERHEAD SIGN-TRUSS  
 SINGLE POST TYPE  
 SAFETY CABLE  
 ANCHORAGE DETAILS  
 CHANGEABLE MESSAGE SIGNS  
 MODEL 500 AND 510**

NO SCALE

**S141**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

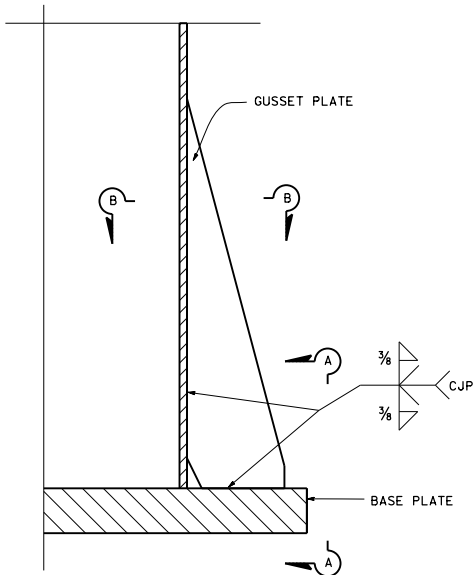
*Stanley P. Johnson*  
 REGISTERED CIVIL ENGINEER  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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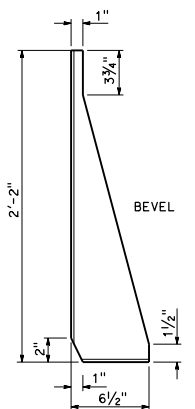
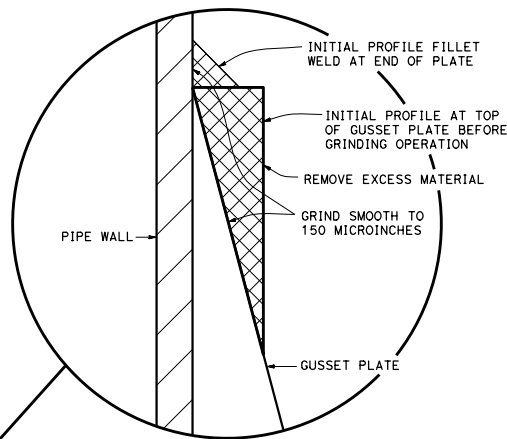
**NOTES:**

1. All gussets to be same height.
2. Provide a smooth transition from gusset plate to tube.

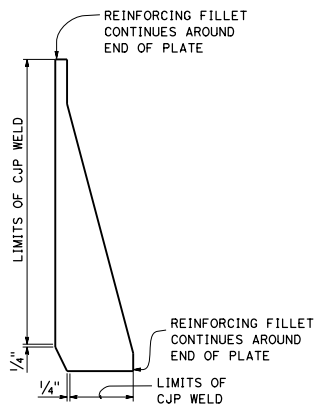
**LEGEND:**



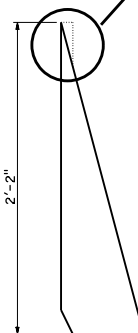
**WELD DETAILS**



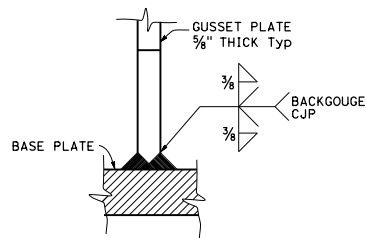
**GUSSET PLATE**  
(Initial Shape)



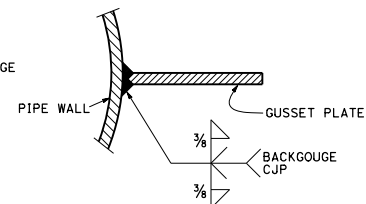
**GUSSET PLATE WELDING**  
(See Weld Details)



**GUSSET PLATE GRINDING**



**SECTION A-A**



**SECTION B-B**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**OVERHEAD SIGN-TRUSS  
SINGLE POST TYPE  
GUSSET PLATE DETAILS  
CHANGEABLE MESSAGE SIGNS  
MODEL 500 AND 510**

NO SCALE

**S142**

**LEGEND:**

- AB** ABANDON. IF APPLIED TO CONDUIT, REMOVE CONDUCTORS
- BC** INSTALL PULL BOX IN EXISTING CONDUIT RUN
- BP** PEDESTRIAN BARRICADE, TYPE AS INDICATED ON PLAN
- CB** INSTALL CONDUIT INTO EXISTING PULL BOX
- CC** CONNECT NEW AND EXISTING CONDUIT. REMOVE EXISTING CONDUCTORS AND INSTALL CONDUCTORS AS INDICATED
- CF** CONDUIT TO REMAIN FOR FUTURE USE. REMOVE CONDUCTORS. INSTALL PULL TAPE
- DH** DETECTOR HANDHOLE
- FA** FOUNDATION TO BE ABANDONED
- IS** INSTALL SIGN ON SIGNAL MAST ARM
- NS** NO SLIP BASE ON STANDARD
- PEC** PHOTOELECTRIC CONTROL
- PEU** PHOTOELECTRIC UNIT
- RC** EQUIPMENT OR MATERIAL TO BE REMOVED AND BECOME THE PROPERTY OF THE CONTRACTOR
- RE** REMOVE ELECTROLIER, FUSES AND BALLAST. TAPE ENDS OF CONDUCTORS
- RL** RELOCATE EQUIPMENT
- RR** REMOVE AND REUSE EQUIPMENT
- RS** REMOVE AND SALVAGE EQUIPMENT
- SC** SPLICE NEW TO EXISTING CONDUCTORS
- SD** SERVICE DISCONNECT
- TSP** TELEPHONE SERVICE POINT

**MISCELLANEOUS ELECTROLIERS**

NEW	EXISTING	
		LUMINAIRE ON WOOD POLE
		NON-STANDARD ELECTROLIER (SEE PROJECT LEGEND)
		CITY ELECTROLIER
		ELECTROLIER FOUNDATION (FUTURE INSTALLATION)

**NOTES:**

1. LED luminaires shall be 235 W when installed on Type 21, 21D, 30, 31 and 32 Standards, unless otherwise specified. LED luminaires shall be 165 W when installed on other type standards or poles, unless otherwise specified.
2. Luminaires shall be the cutoff type, ANSI Type III medium cutoff lighting distribution, unless otherwise specified.

**STANDARD ELECTROLIER**

NEW	EXISTING	STANDARD TYPE
		15
		15D
		15 STRUCTURE
		15D STRUCTURE
		21
		21D
		21 STRUCTURE
		21D STRUCTURE
		30
		31
		32

**SOFFIT AND WALL-MOUNTED LUMINAIRES**

- PENDANT SOFFIT LUMINAIRE, 70 W HPS UNLESS OTHERWISE SPECIFIED
- FLUSH-MOUNTED SOFFIT LUMINAIRE, 70 W HPS UNLESS OTHERWISE SPECIFIED
- WALL-MOUNTED LUMINAIRE, 70 W HPS UNLESS OTHERWISE SPECIFIED
- EXISTING SOFFIT OR WALL-MOUNTED LUMINAIRE TO REMAIN UNMODIFIED
- EXISTING SOFFIT OR WALL-MOUNTED LUMINAIRE TO BE MODIFIED AS SPECIFIED

**NOTE:**

Arrow indicates "street side" of luminaire.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
Theresa Gabriel REGISTERED ELECTRICAL ENGINEER October 30, 2015 PLANS APPROVAL DATE					
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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS (LEGEND)**

NO SCALE

**ES-1A**

**CONDUIT**

NEW	EXISTING	
---	---	LIGHTING CONDUIT, UNLESS OTHERWISE INDICATED OR NOTED
----	----	TRAFFIC SIGNAL CONDUIT
-C-	-c-	COMMUNICATION CONDUIT
-T-	-t-	TELEPHONE CONDUIT
-F-	-f-	FIRE ALARM CONDUIT
-FO-	-fo-	FIBER OPTIC CONDUIT
---	---	CONDUIT TERMINATION
		CONDUIT RISER ATTACHED TO THE STRUCTURE OR SERVICE POLE

**SERVICE EQUIPMENT**

NEW	EXISTING	
---OH---	---oh---	OVERHEAD LINES
		WOOD POLE, "U" INDICATES UTILITY OWNED
		POLE GUY WITH ANCHOR
		UTILITY TRANSFORMER - GROUND MOUNTED
		SERVICE EQUIPMENT ENCLOSURE TYPE. DOOR INDICATES FRONT OF ENCLOSURE
		TELEPHONE DEMARCATION CABINET

**POLE-MOUNTED SERVICE DESIGNATION**

	TYPE H SERVICE, 28'-10"	TYPE OF INSTALLATION AND POLE HEIGHT ABOVE GRADE
--	-------------------------	--

**FLASHING BEACON**

NEW	EXISTING	
		FLASHING BEACON (ONE VEHICLE SIGNAL HEAD WITH BACKPLATE AND VISOR) "R" INDICATES RED INDICATION, "Y" INDICATES YELLOW INDICATION
		FLASHING BEACON WITH TYPE 15-FBS STANDARD AND A SIGN.
		FLASHING BEACON WITH TYPES 9, 9A OR 9B SIGN UNLESS OTHERWISE SPECIFIED OR INDICATED

**SIGNAL EQUIPMENT**

NEW	EXISTING	
		PEDESTRIAN SIGNAL HEAD
		PUSH BUTTON ASSEMBLY POST
		PEDESTRIAN BARRICADE
		VEHICLE SIGNAL HEAD (WITH BACKPLATE AND 3-SECTIONS: RED, YELLOW AND GREEN)
		VEHICLE SIGNAL HEAD WITH ANGLE VISOR
		MODIFICATIONS OF BASIC SYMBOL: "L" INDICATES ALL NON-ARROW SECTIONS LOUVERED "G" INDICATES LOUVERED GREEN SECTION ONLY "P" INDICATES ALL 12" SECTIONS PROGRAMMED VISIBILITY "8" INDICATES ALL 8" SECTIONS (ONLY WHEN SPECIFIED)
		VEHICLE SIGNAL HEAD CONSISTING OF RED, YELLOW AND GREEN LEFT ARROW SECTIONS
		VEHICLE SIGNAL HEAD CONSISTING OF RED AND YELLOW SECTIONS WITH AN UP GREEN ARROW SECTION
		VEHICLE SIGNAL HEAD (5 SECTION) CONSISTING OF RED, YELLOW AND GREEN SECTIONS WITH YELLOW AND GREEN RIGHT ARROW SECTIONS
		TYPE 15TS STANDARD WITH VEHICLE SIGNAL HEAD AND LUMINAIRE
		TYPE 21TS STANDARD WITH VEHICLE SIGNAL HEAD AND LUMINAIRE
		STANDARD WITH LUMINAIRE AND SIGNAL MAST ARMS AND ATTACHED VEHICLE SIGNAL HEADS
		TYPE 1 STANDARD WITH ATTACHED VEHICLE SIGNAL HEADS
		STANDARD WITH A SIGNAL MAST ARM, ATTACHED VEHICLE SIGNAL HEADS AND INTERNALLY ILLUMINATED STREET NAME SIGN
		CONTROLLER ASSEMBLY. DOOR INDICATES FRONT OF CABINET

**SIGNAL EQUIPMENT Cont**

NEW	EXISTING	
		GUARD POST
		TYPE 1 STANDARD WITH RAMP METERING SIGN
		OPTICAL DETECTOR FOR THE EMERGENCY VEHICLE DETECTION

**NOTES:**

1. All signal sections shall be 12" unless shown otherwise.
2. Signal heads shall be provided with backplates unless shown otherwise.

**ILLUMINATED OVERHEAD SIGN**

NEW	EXISTING	
		SINGLE POST, SINGLE ILLUMINATED SIGN, BALANCED BUTTERFLY
		SINGLE POST, DOUBLE ILLUMINATED SIGN, BALANCED BUTTERFLY
		SINGLE POST, SINGLE ILLUMINATED SIGN, FULL CANTILEVER
		DOUBLE POST, SINGLE ILLUMINATED SIGN
		SINGLE ILLUMINATED SIGN MOUNTED ON STRUCTURE
		DOUBLE POST, SINGLE ILLUMINATED SIGN WITH ELECTROLIER

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(LEGEND)**

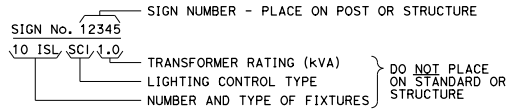
NO SCALE

**ES-1B**

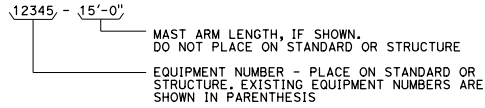
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER October 30, 2015 PLANS APPROVAL DATE No. E15129 Exp. 6-30-16 ELECTRICAL STATE OF CALIFORNIA					
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**EQUIPMENT IDENTIFICATION**

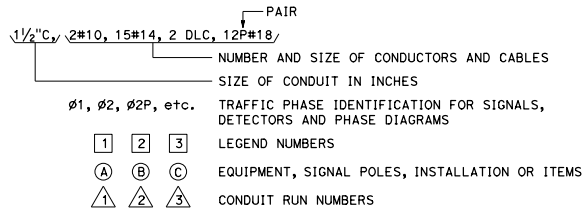
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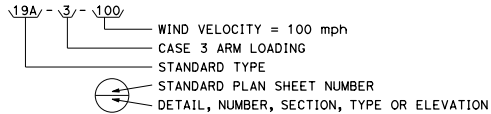
**ELECTROLIER OR EQUIPMENT IDENTIFICATION NUMBER:**



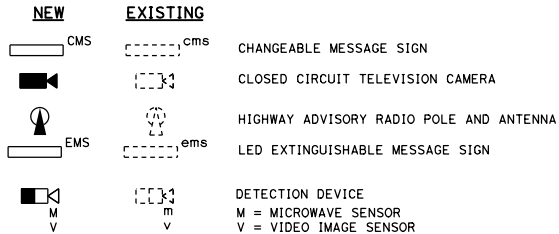
**CONDUIT AND CONDUCTOR IDENTIFICATION:**



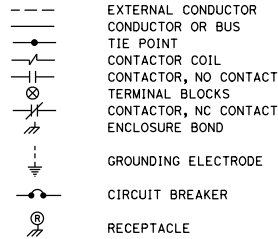
**SIGNAL AND LIGHTING STANDARD (TYPICAL DESIGNATION):**



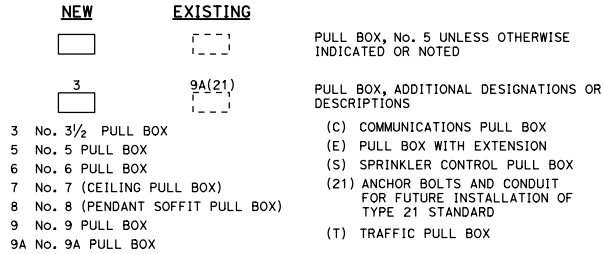
**MISCELLANEOUS EQUIPMENT**



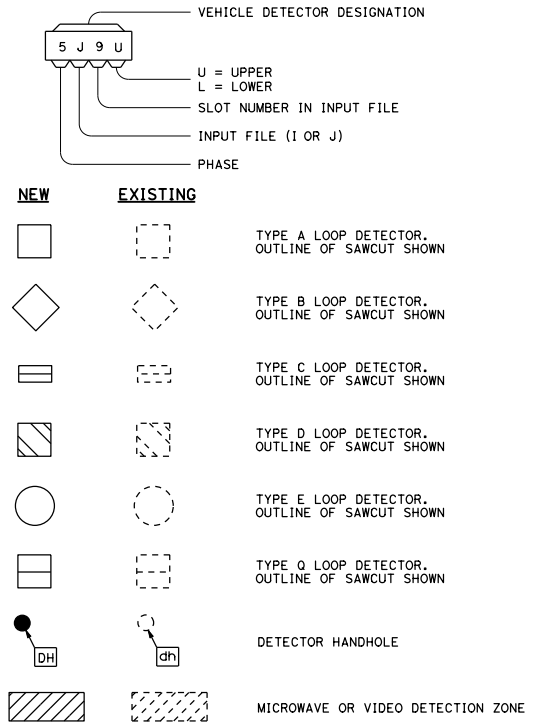
**WIRING DIAGRAM LEGEND**



**PULL BOXES**



**VEHICLE DETECTORS**

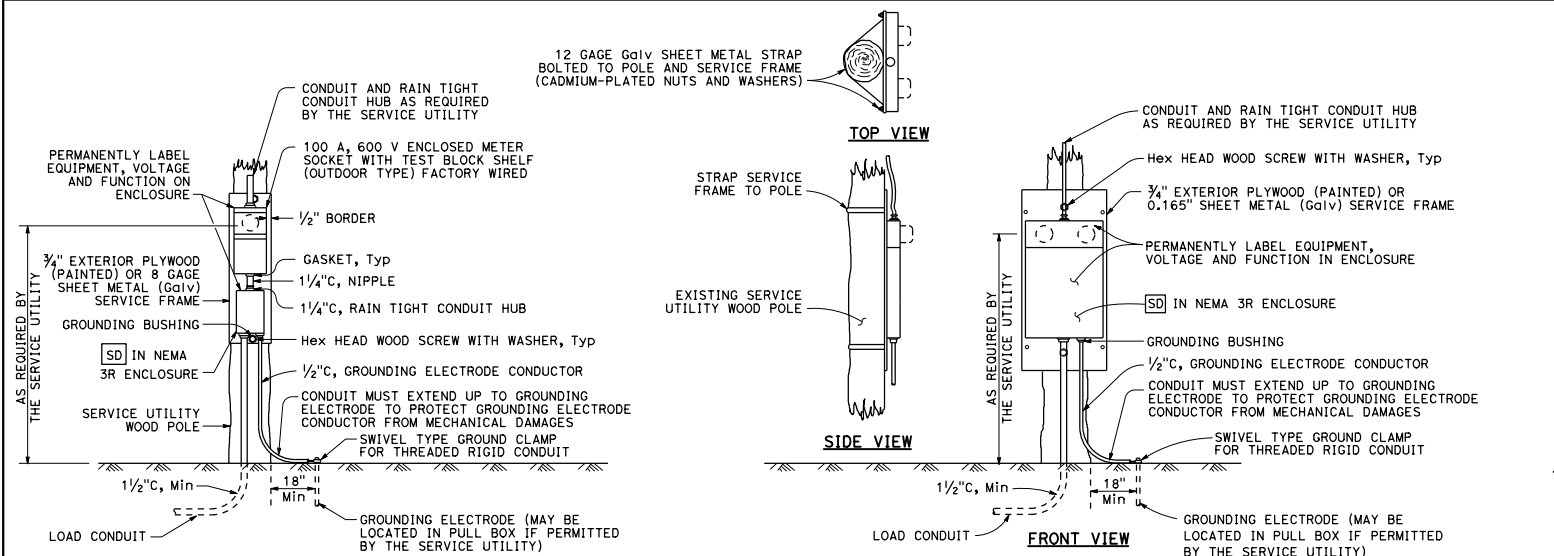


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(LEGEND)**

NO SCALE

**ES-1C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER October 30, 2015 PLANS APPROVAL DATE No. E15129 Exp. 6-30-16 ELECTRICAL STATE OF CALIFORNIA				
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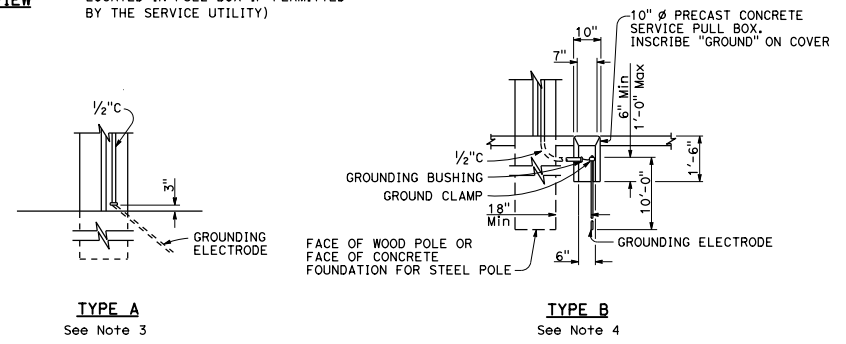
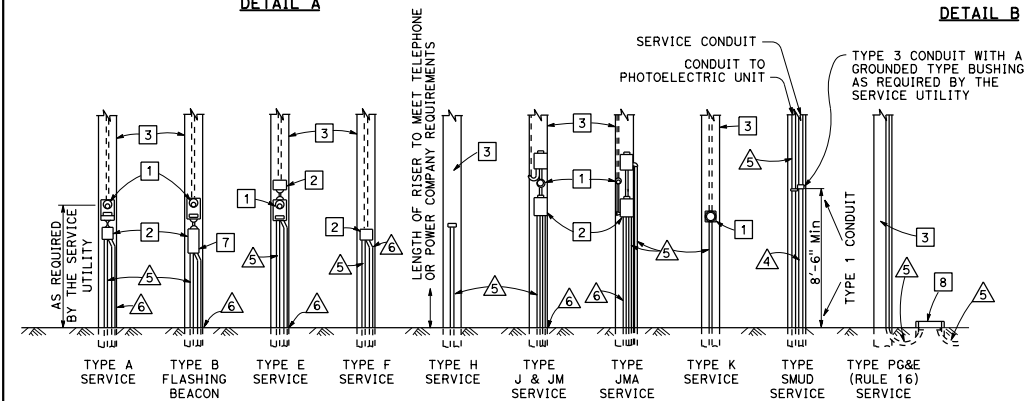
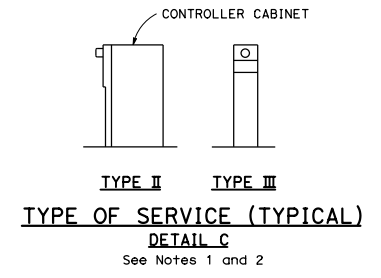
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Theresa Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

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- LEGEND:**
- 1 METER SOCKET.
  - 2 SERVICE ENCLOSURE WITH A MINIMUM 60 A RATED MAIN CIRCUIT BREAKER, UNLESS OTHERWISE SHOWN.
  - 3 A. UTILITY OWNED POLE. THE SERVICE UTILITY WILL FURNISH AND INSTALL REQUIRED SERVICE RISER, PEU WITH CONDUCTORS AND OTHER EQUIPMENT AS NEEDED.  
B. STATE OWNED POLE. THE CONTRACTOR SHALL FURNISH AND INSTALL REQUIRED SERVICE RISER AND EQUIPMENT.
  - 4 2" SERVICE CONDUIT MUST HAVE A GROUNDED TYPE BUSHING INSTALLED AT UPPER END OF THE METALLIC POLE RISER CONDUIT. A GROUNDING CONDUCTOR MUST BE ATTACHED TO THE BUSHING, CARRIED THROUGH THE CONDUIT RUN AND ATTACHED TO THE SERVICE EQUIPMENT ENCLOSURE'S GROUNDING ELECTRODE.
  - 5 CONDUIT, LENGTH AND SIZE AS REQUIRED.
  - 6 1/2" C, 1#6. SEE DETAIL E.
  - 7 FLASHING BEACON CONTROL ASSEMBLY.
  - 8 SERVICE PULL BOX, No. 5 UNLESS OTHERWISE NOTED, FURNISHED AND INSTALLED BY THE CONTRACTOR. SERVICE UTILITY SHALL DETERMINE THE EXACT LOCATION.

- NOTES:**
- Type II service equipment enclosure mounted on the side of a controller cabinet.
  - Type III complete free-standing service equipment enclosure.
  - Ground clamp and required fittings must be accessible. Conduit must extend to protect grounding electrode conductor from mechanical damage.
  - Use where service utility requires 18" clearance between grounding electrode and the pole or service equipment enclosure. Installation shown is for sidewalk or paved areas. In unpaved areas, omit special service pull box and locate ground clamp above ground or locate ground clamp in nearest pull box.

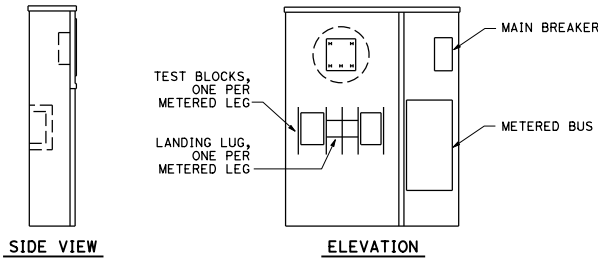
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(SERVICE EQUIPMENT)**

NO SCALE

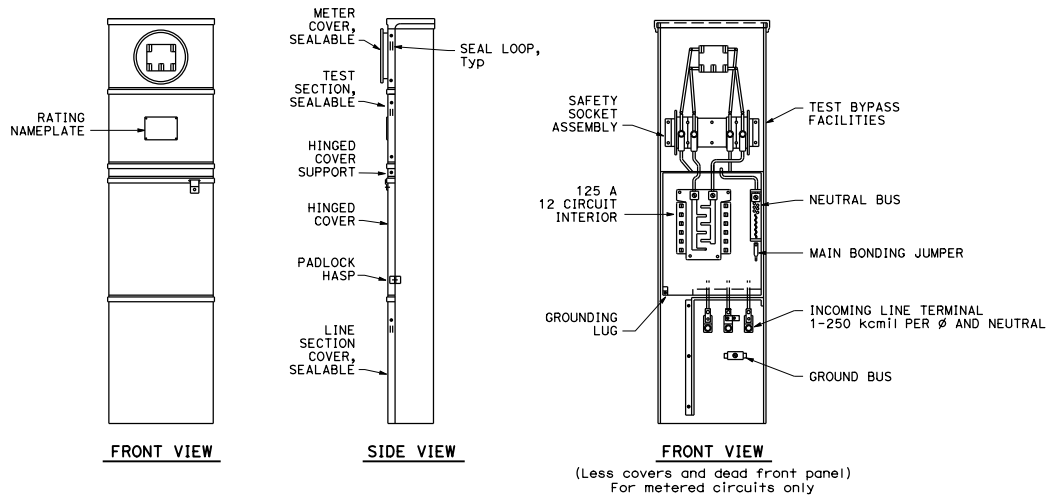
**ES-2A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Theresa Gabriel</i> REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
REGISTERED PROFESSIONAL ENGINEER Theresa Aziz Gabriel No. E15129 Exp. 6-30-16 ELECTRICAL STATE OF CALIFORNIA					
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**NOTES:**

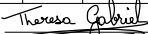
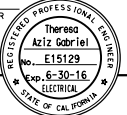
1. In unpaved areas, a raised portland cement concrete pad of 2'-0" x 4" x width of service equipment enclosure or controller cabinet foundation shall be constructed in front of Type II service equipment enclosure.
2. Circuit breakers may be mounted in the vertical or horizontal position.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(SERVICE EQUIPMENT ENCLOSURE  
TYPE II SERIES)**

NO SCALE

**ES-2B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER					
					
October 30, 2015 PLANS APPROVAL DATE					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

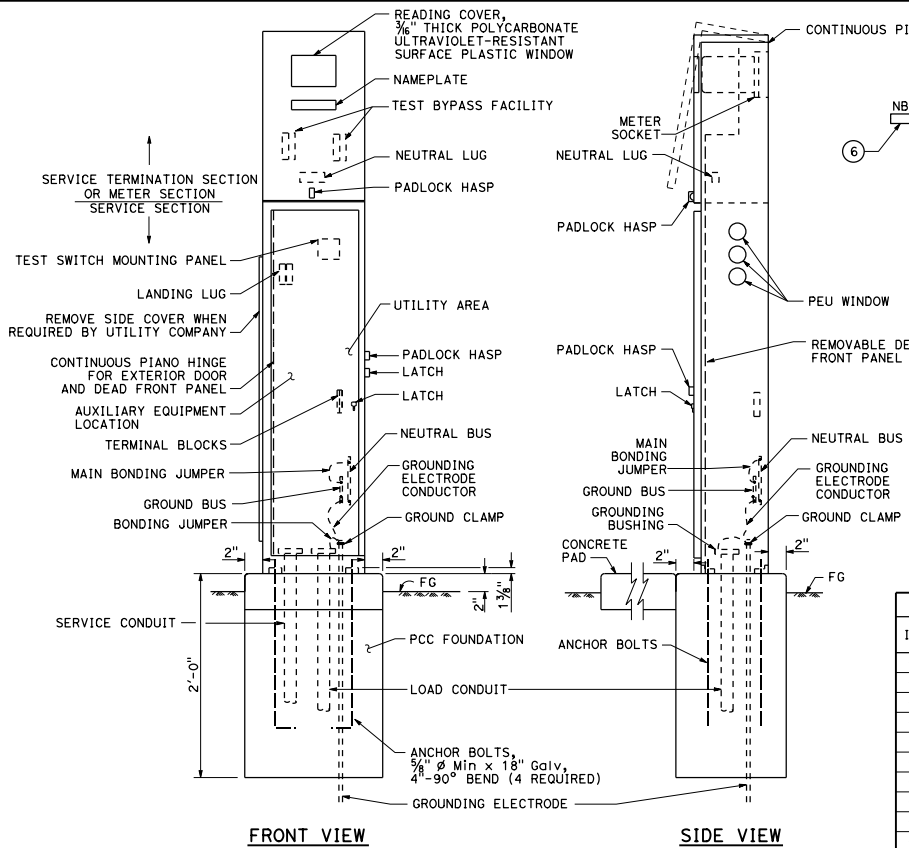
**NOTES:**

1. The plan shows the approximate location of devices within the enclosure. Components may be rearranged, however, the "working" clearances within the service equipment enclosure shall be maintained.
2. In unpaved areas a raised portland cement concrete pad 2'-0" x 4" x width of foundation shall be constructed in front of new service equipment enclosure installation. Pad shall be set to elevation of foundation.
3. Plug-in circuit breakers may be mounted in the vertical or horizontal position. Cable-in/cable-out circuit breakers shall be mounted in the vertical position.
4. Type III-AF and Type III-BF service equipment enclosures shall have the meter viewing windows located on the front side of the service equipment enclosures.
5. Type III-AR and Type III-BR service equipment enclosure shall be similarly constructed as Type III-AF and Type III-BF respectively, except the meter viewing windows shall be located on the back side of the service equipment enclosures.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(SERVICE EQUIPMENT ENCLOSURE  
NOTES TYPE III SERIES)**

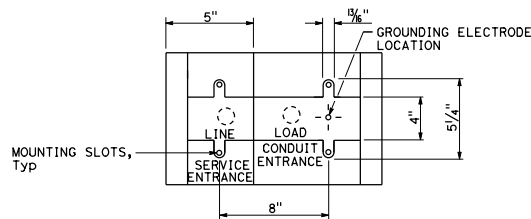
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**ES-2C**

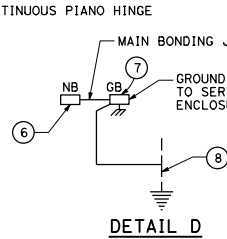


FRONT VIEW SIDE VIEW

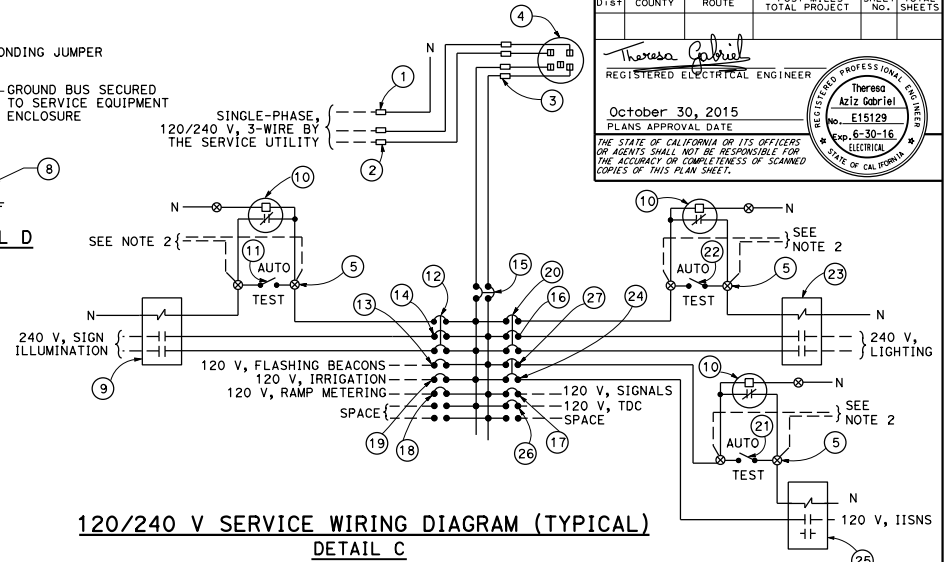
**TYPE III-AF SERVICE EQUIPMENT ENCLOSURE (TYPICAL)**  
DETAIL A



**BASE FOR TYPE III-A SERVICE EQUIPMENT ENCLOSURE**  
DETAIL B



DETAIL D



**120/240 V SERVICE WIRING DIAGRAM (TYPICAL)**  
DETAIL C

**TYPE III-A SERVICE EQUIPMENT ENCLOSURE LEGEND (120/240 V)**

ITEM	COMPONENT	NAMEPLATE DESCRIPTION	ITEM	COMPONENT	NAMEPLATE DESCRIPTION
1	NEUTRAL LUG		14	30 A, 240 V, 2P, CB	SIGN ILLUMINATION
2	LANDING LUG		15	100 A, 240 V, 2P, CB	MAIN BREAKER
3	TEST BYPASS FACILITY		16	30 A, 240 V, 2P, CB	LIGHTING
4	METER SOCKET AND SUPPORT		17	50 A, 120 V, 1P, CB	SIGNALS
5	TERMINAL BLOCKS		18	30 A, 120 V, 1P, CB	RAMP METERING
6	NEUTRAL BUS		19	20 A, 120 V, 1P, CB	IRRIGATION
7	GROUND BUS		20	15 A, 120 V, 1P, CB	LIGHTING CONTROL
8	GROUNDING ELECTRODE		21	15 A, 1P, TEST SWITCH	IISNS TEST SWITCH
9	30 A, 2P, NO CONTACTOR	SIGN ILLUMINATION	22	15 A, 1P, TEST SWITCH	LIGHTING TEST SWITCH
10	PHOTOELECTRIC UNIT (NOTE 4)	PEU	23	60 A, 2P, NO CONTACTOR	LIGHTING
11	15 A, 1P, TEST SWITCH	SIGN ILLUMINATION TEST SWITCH	24	15 A, 120 V, 1P, CB	IISNS
12	15 A, 120 V, 1P, CB	SIGN ILLUMINATION CONTROL	25	30 A, 2P, NO CONTACTOR	IISNS
13	15 A, 120 V, 1P, CB	FLASHING BEACON	26	20 A, 120 V, 1P, CB	TELEPHONE DEMARCATION CABINET
			27	15 A, 120 V, 1P, CB	IISNS CONTROL

**NOTES:**

- Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
- Connect to remote test switch mounted on lighting standards, sign post or structure when required.
- Items 1 and 6 shall be isolated from the service equipment enclosure.
- Type I photoelectric control shall be used unless otherwise indicated on the plans.
- Item 12, 29 and 27 shall be ganged operated CB.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Theresa Aziz Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

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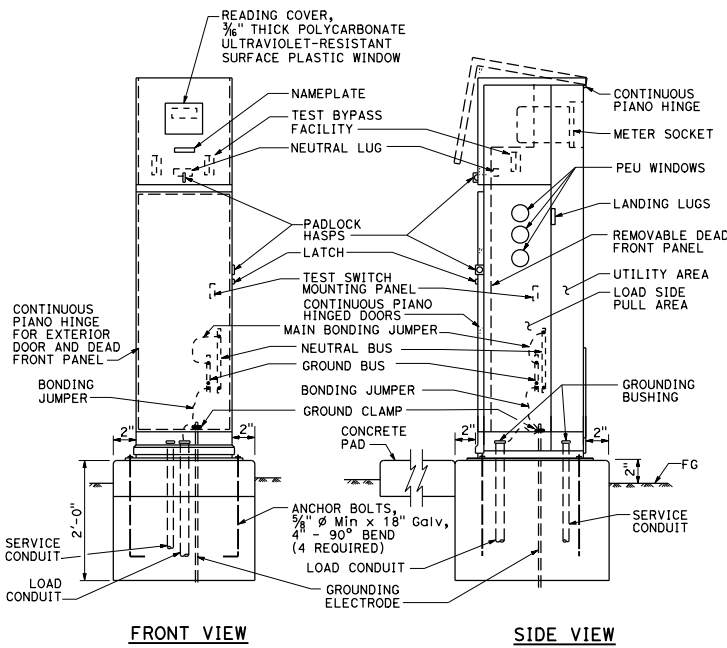
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(SERVICE EQUIPMENT ENCLOSURE  
AND TYPICAL WIRING DIAGRAM,  
TYPE III-A SERIES)**

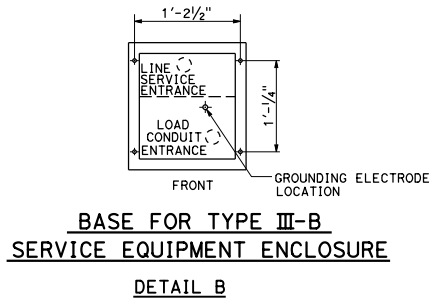
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**ES-2D**

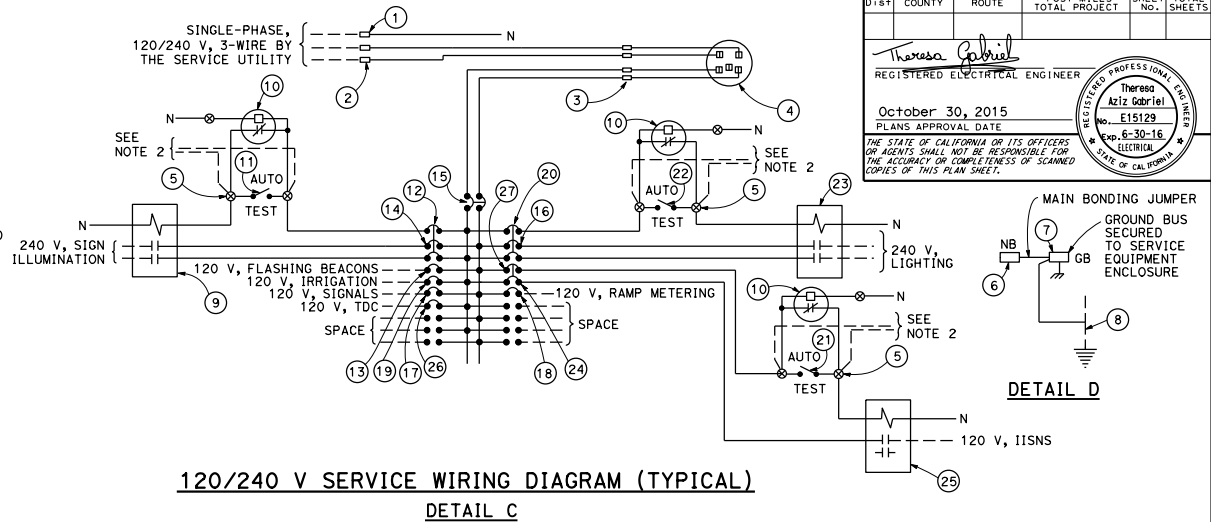




**TYPE III-BF SERVICE EQUIPMENT ENCLOSURE (TYPICAL)**  
**DETAIL A**



**DETAIL B**



**120/240 V SERVICE WIRING DIAGRAM (TYPICAL)**  
**DETAIL C**

**TYPE III-B SERVICE EQUIPMENT ENCLOSURE LEGEND (120/240 V)**

ITEM	COMPONENT	NAMEPLATE DESCRIPTION	ITEM	COMPONENT	NAMEPLATE DESCRIPTION
①	NEUTRAL LUG		⑭	30 A, 240 V, 2P, CB	SIGN ILLUMINATION
②	LANDING LUG		⑮	100 A, 240 V, 2P, CB	MAIN BREAKER
③	TEST BYPASS FACILITY		⑯	30 A, 240 V, 2P, CB	LIGHTING
④	METER SOCKET AND SUPPORT		⑰	50 A, 120 V, 1P, CB	SIGNALS
⑤	TERMINAL BLOCKS		⑱	30 A, 120 V, 1P, CB	RAMP METERING
⑥	NEUTRAL BUS		⑲	20 A, 120 V, 1P, CB	IRRIGATION
⑦	GROUND BUS		⑳	15 A, 120 V, 1P, CB	LIGHTING CONTROL
⑧	GROUNDING ELECTRODE		㉑	15 A, 1P, TEST SWITCH	IISNS TEST SWITCH
⑨	30 A, 2P, NO CONTACTOR	SIGN ILLUMINATION	㉒	15 A, 1P, TEST SWITCH	LIGHTING TEST SWITCH
⑩	PHOTOELECTRIC UNIT (NOTE 4)	PEU	㉓	60 A, 2P, NO CONTACTOR	LIGHTING
⑪	15 A, 1P, TEST SWITCH	SIGN ILLUMINATION TEST SWITCH	㉔	15 A, 120 V, 1P, CB	IISNS
⑫	15 A, 120 V, 1P, CB	SIGN ILLUMINATION CONTROL	㉕	30 A, 2P, NO CONTACTOR	IISNS
⑬	15 A, 120 V, 1P, CB	FLASHING BEACON	㉖	20 A, 120 V, 1P, CB	TELEPHONE DEMARCATION CABINET
			㉗	15 A, 120 V, 1P, CB	IISNS CONTROL

**NOTES:**

1. Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
2. Connect to remote test switch mounted on lighting standards, sign post or structure when required.
3. Items ① and ⑥ shall be isolated from the service equipment enclosure.
4. Type I photoelectric control shall be used unless otherwise indicated on the plans.
5. Item ⑫, ⑳ and ㉗ shall be ganged operated CB.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

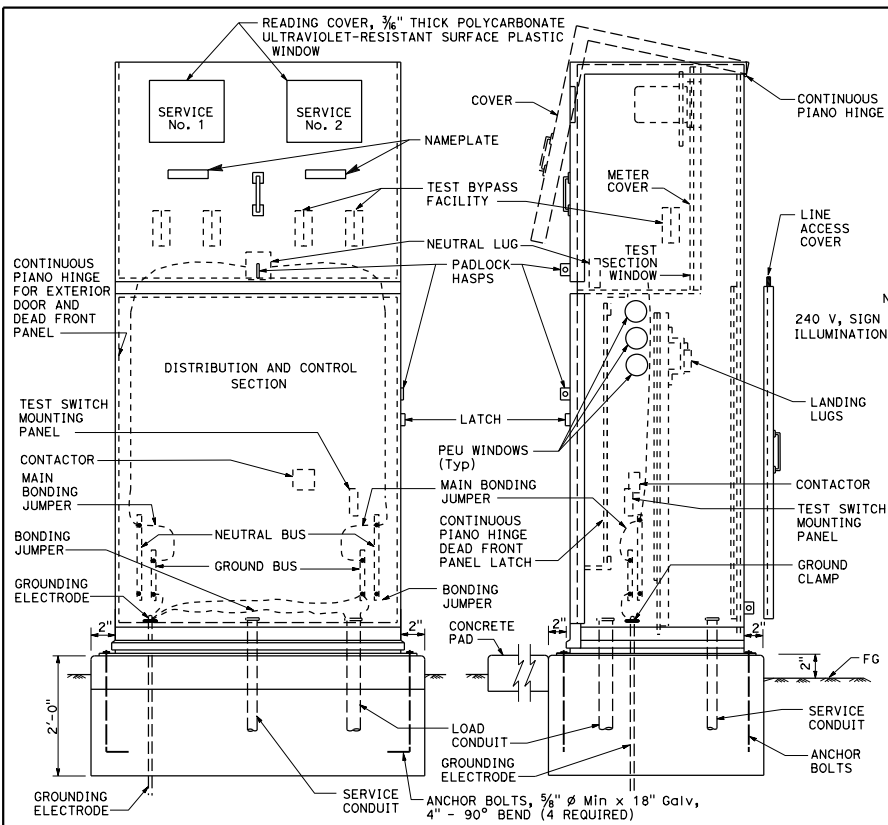
Theresa Gabriel  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 Theresa Aziz Gabriel  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 STATE OF CALIFORNIA

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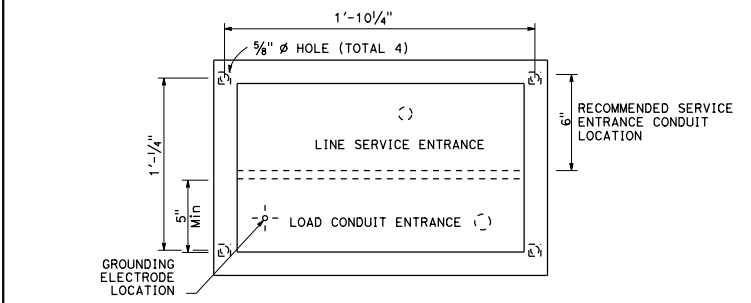
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(SERVICE EQUIPMENT ENCLOSURE AND**  
**TYPICAL WIRING DIAGRAM,**  
**TYPE III-B SERIES)**

NO SCALE

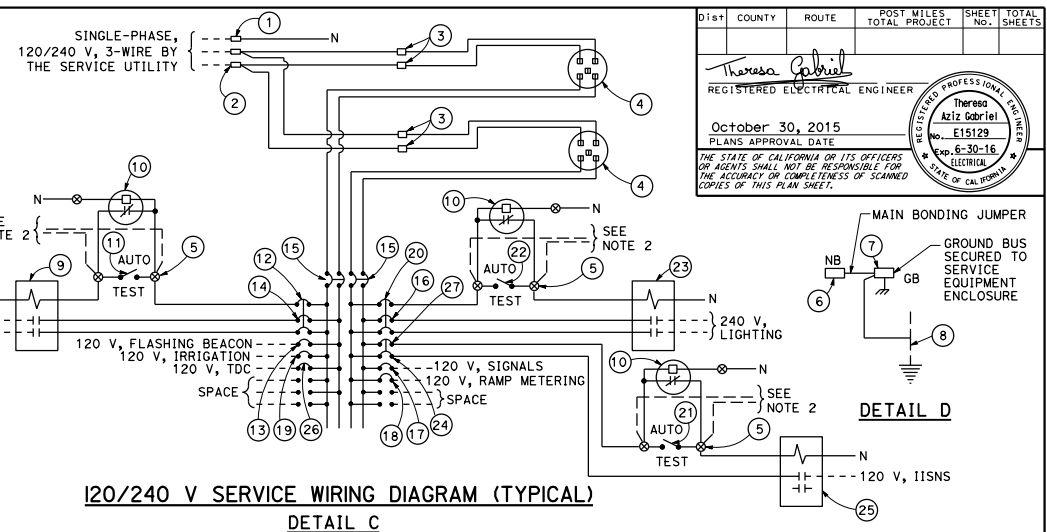
**ES-2E**



**FRONT VIEW**  
**SIDE VIEW**  
**TYPE III-CF SERVICE EQUIPMENT ENCLOSURE (TYPICAL)**  
**DETAIL A**



**BASE FOR TYPE III-C SERVICE EQUIPMENT ENCLOSURE**  
**DETAIL B**



**120/240 V SERVICE WIRING DIAGRAM (TYPICAL)**  
**DETAIL C**

TYPE III-C SERVICE EQUIPMENT ENCLOSURE LEGEND (120/240 V)					
ITEM	COMPONENT	NAMEPLATE DESCRIPTION	ITEM	COMPONENT	NAMEPLATE DESCRIPTION
①	NEUTRAL LUG		⑭	30 A, 240 V, 2P, CB	SIGN ILLUMINATION
②	LANDING LUG		⑮	100 A, 240 V, 2P, CB	MAIN BREAKER
③	TEST BYPASS FACILITY		⑯	30 A, 240 V, 2P, CB	LIGHTING
④	METER SOCKET AND SUPPORT		⑰	50 A, 120 V, 1P, CB	SIGNALS
⑤	TERMINAL BLOCKS		⑱	30 A, 120 V, 1P, CB	RAMP METERING
⑥	NEUTRAL BUS		⑲	20 A, 120 V, 1P, CB	IRRIGATION
⑦	GROUND BUS		⑳	15 A, 120 V, 1P, CB	LIGHTING CONTROL
⑧	GROUNDING ELECTRODE		㉑	15 A, 1P, TEST SWITCH	IISNS TEST SWITCH
⑨	30 A, 2P, NO CONTACTOR	SIGN ILLUMINATION	㉒	15 A, 1P, TEST SWITCH	LIGHTING TEST SWITCH
⑩	PHOTOELECTRIC UNIT (NOTE 4)	PEU	㉓	60 A, 2P, NO CONTACTOR	LIGHTING
⑪	15 A, 1P, TEST SWITCH	SIGN ILLUMINATION TEST SWITCH	㉔	15 A, 120 V, 1P, CB	IISNS
⑫	15 A, 120 V, 1P, CB	SIGN ILLUMINATION CONTROL	㉕	30 A, 2P, NO CONTACTOR	IISNS
⑬	15 A, 120 V, 1P, CB	FLASHING BEACON	㉖	20 A, 120 V, 1P, CB	TELEPHONE DEMARCATION CABINET
			㉗	15 A, 120 V, 1P, CB	IISNS CONTROL

- NOTES:**
- Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
  - Connect to remote test switch mounted on lighting standards, sign post or structure when required.
  - Items ① and ⑥ shall be isolated from the service equipment enclosure.
  - Type I photoelectric control shall be used unless otherwise indicated on the plans.
  - Item ⑫, ⑲ and ㉗ shall be ganged operated CB.

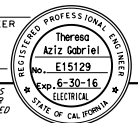
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(SERVICE EQUIPMENT ENCLOSURE AND**  
**TYPICAL WIRING DIAGRAM,**  
**TYPE III-C SERIES)**

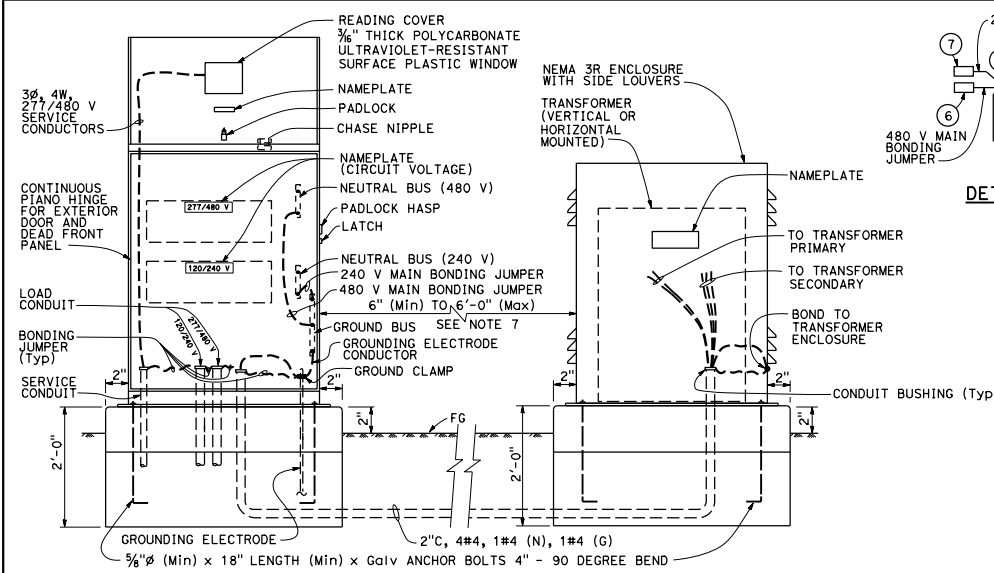
NO SCALE

**ES-2F**

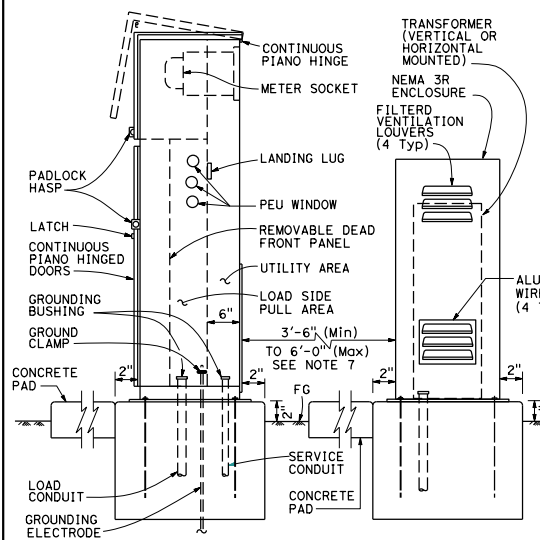
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
 REGISTERED ELECTRICAL ENGINEER  
 PLANS APPROVAL DATE  
 October 30, 2015  
 No. E15129  
 Exp. 6-30-16  
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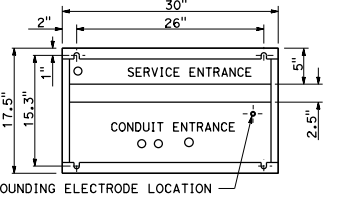




**SIDE INSTALLATION OF TRANSFORMER**

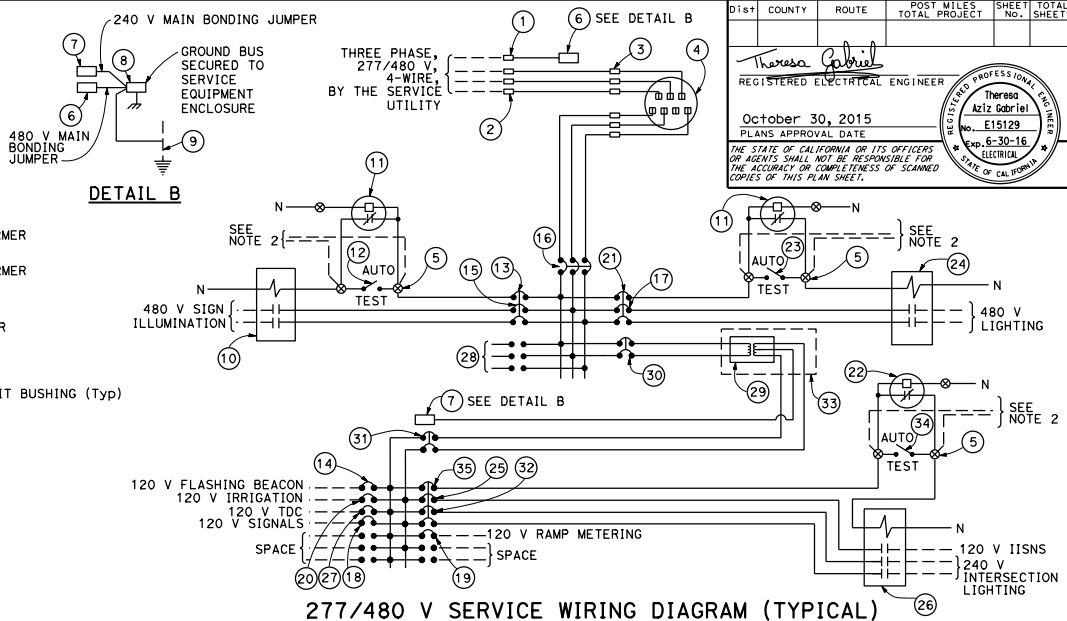


**REAR INSTALLATION OF TRANSFORMER  
TYPE III-DF SERVICE EQUIPMENT ENCLOSURE  
TYPICAL**



**BASE FOR TYPE III-D  
SERVICE EQUIPMENT ENCLOSURE  
DETAIL A**

- NOTES:**
1. Unless otherwise indicated on the plans, service equipment items shall be provided for each service equipment enclosure as shown.
  2. Connect to remote test switch mounted on lighting standards, sign post or structure when required.
  3. Items No. ①, ⑥ and ⑦ shall be isolated from the service equipment enclosure.
  4. Type I photoelectric control shall be used unless otherwise indicated on the plans.



**277/480 V SERVICE WIRING DIAGRAM (TYPICAL)  
DETAIL C**

TYPE III-D SERVICE (277/480 V) EQUIPMENT LEGEND					
ITEM No.	COMPONENT	NAMEPLATE DESCRIPTION	ITEM No.	COMPONENT	NAMEPLATE DESCRIPTION
①	NEUTRAL LUG		⑲	30 A, 120 V, 1P, CB	RAMP METERING (120 V)
②	LANDING LUG		⑳	20 A, 120 V, 1P, CB	IRRIGATION (120 V)
③	TEST BYPASS FACILITY		㉑	10 A, 277 V, 1P, CB	LIGHTING CONTROL (277 V)
④	METER SOCKET AND SUPPORT		㉒	PHOTOELECTRIC UNIT (NOTE 4)	PEU (120/240 V)
⑤	TERMINAL BLOCKS		㉓	15 A, 1P, TEST SWITCH	LIGHTING TEST SWITCH (277 V)
⑥	NEUTRAL BUS	NEUTRAL BUS (480 V)	㉔	30 A, 2P, NO CONTACTOR	LIGHTING (480 V)
⑦	NEUTRAL BUS	NEUTRAL BUS (240 V)	㉕	15 A, 120 V, 1P, CB	IISNS (120 V)
⑧	GROUND BUS		㉖	30 A, 3P, NO CONTACTOR	INTERSECTION LIGHTING (120 V)
⑨	GROUNDING ELECTRODE		㉗	20 A, 120 V, 1P, CB	TELEPHONE DEMARCATION CABINET (120 V)
⑩	30 A, 2P, NO CONTACTOR	SIGN ILLUMINATION (480 V)	㉘	20 A, 480 V, 3P, CB	SPACE
⑪	PHOTOELECTRIC UNIT (NOTE 4)	PEU (277/480 V PEU)	㉙	15 kVA, 480-120/240 V TRANSFORMER	TRANSFORMER, 15 kVA, 480-240 V
⑫	15 A, 1P, TEST SWITCH	SIGN ILLUMINATION TEST SWITCH (277 V)	㉚	40 A, 480 V, 2P, CB	TRANSFORMER PRIMARY (480 V)
⑬	10 A, 277 V, 1P, CB	SIGN ILLUMINATION CONTROL (277 V)	㉛	80 A, 240 V, 2P, CB	TRANSFORMER SECONDARY (240 V)
⑭	15 A, 120 V, 1P, CB	FLASHING BEACON (120 V)	㉜	30 A, 240 V, 2P, CB	INTERSECTION LIGHTING (240 V)
⑮	15 A, 480 V, 2P, CB	SIGN ILLUMINATION (480 V)	㉝	NEMA 3R ENCLOSURE WITH LOUVERS	TRANSFORMER, 15 kVA, 480-240 V
⑯	100 A, 480 V, 3P, CB	MAIN BREAKER (480 V)	㉞	15 A, 1P, TEST SWITCH	IISNS AND INTERSECTION LIGHTING TEST SWITCH (120 V)
⑰	15 A, 480 V, 2P, CB	LIGHTING (480 V)	㉟	10 A, 120 V, 1P, CB	IISNS AND INTERSECTION LIGHTING CONTROL (120 V)
⑱	50 A, 120 V, 1P, CB	SIGNAL (120 V)			

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(SERVICE EQUIPMENT ENCLOSURE  
AND TYPICAL WIRING DIAGRAM,  
TYPE III-D SERIES)**

NO SCALE

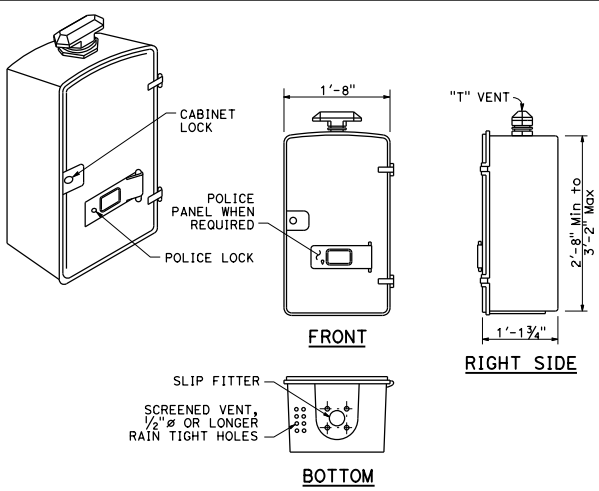
**ES-2G**

DIST	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	NO.	SHEETS

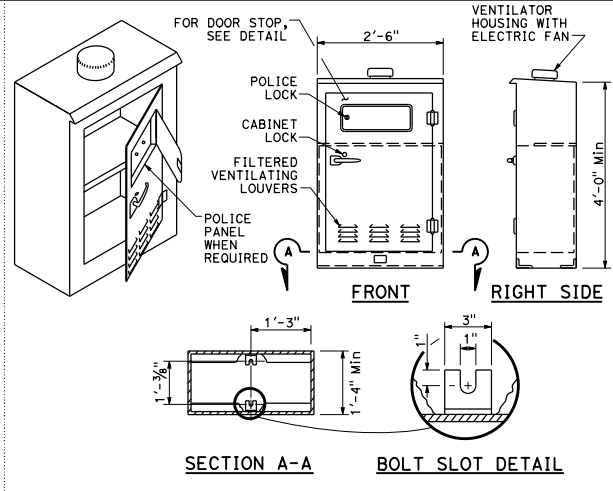
Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER  
PLANS APPROVAL DATE  
October 30, 2015  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER  
Theresa Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

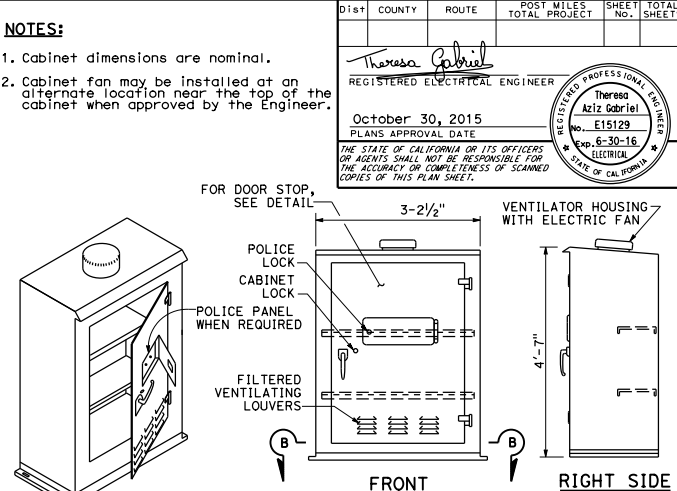
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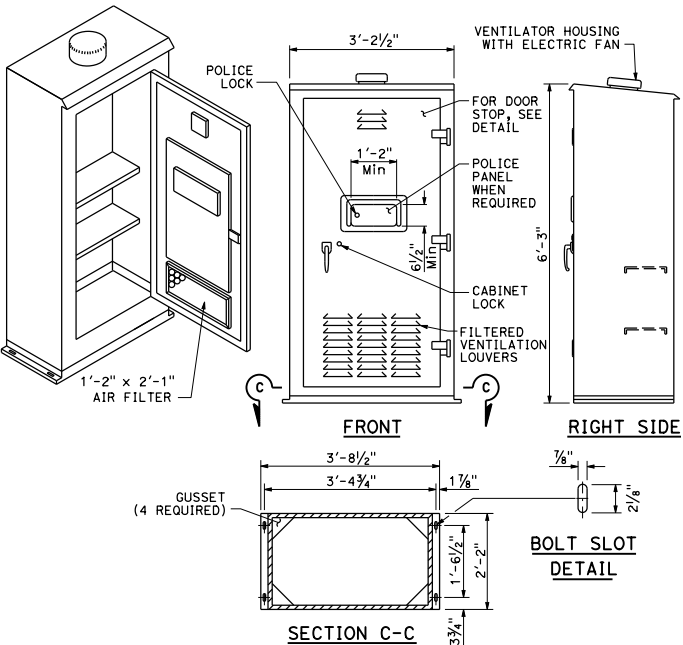
**TYPE G CABINET**



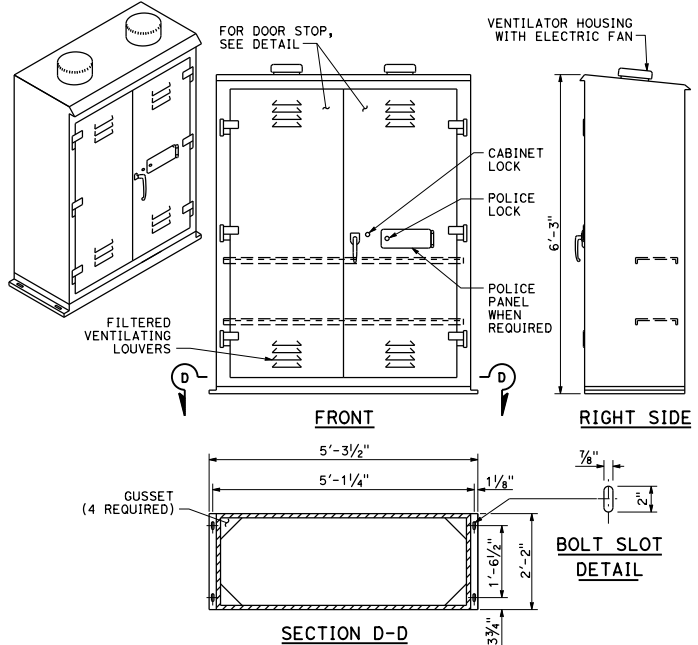
**TYPE M CABINET**



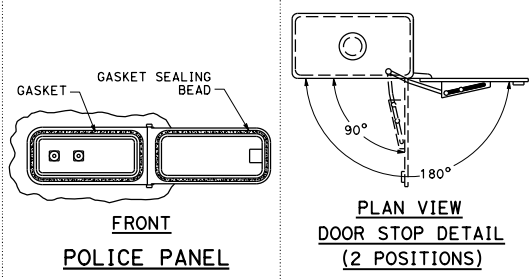
**TYPE P CABINET**



**TYPE R CABINET**



**TYPE S CABINET**



**POLICE PANEL**

**DOOR STOP DETAIL (2 POSITIONS)**

**NOTES:**

- 1. Cabinet dimensions are nominal.
- 2. Cabinet fan may be installed at an alternate location near the top of the cabinet when approved by the Engineer.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
 REGISTERED ELECTRICAL ENGINEER  
 No. E15129  
 Exp. 6-30-16  
 STATE OF CALIFORNIA  
 ELECTRICAL ENGINEERS PROFESSIONAL SERVICES

October 30, 2015  
 PLANS APPROVAL DATE  
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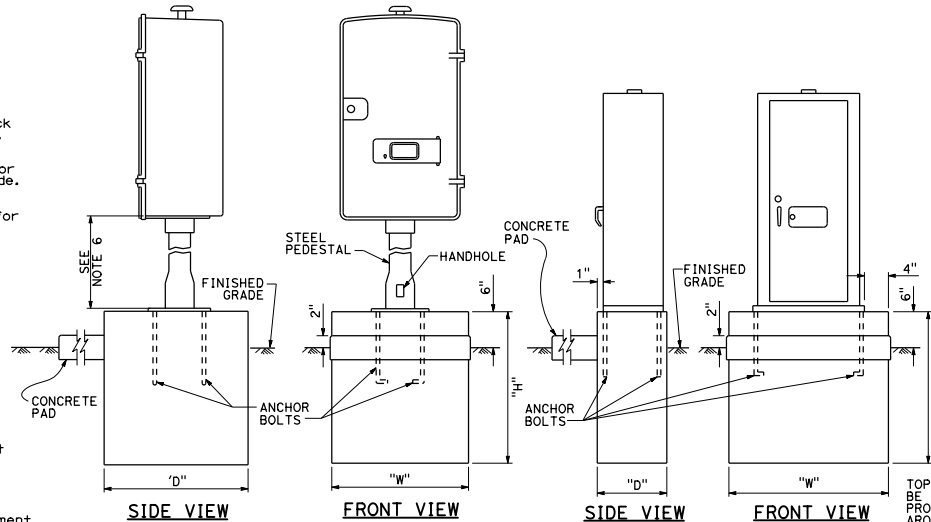
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(CONTROLLER CABINET  
DETAILS)**

NO SCALE

**ES-3A**

**NOTES:**

- Foundation shall be located to provide 2'-0" minimum clearance between face of curb and any portion of cabinet.
- Type G, M, P, R, S and Model 336L cabinets shall be installed with the back toward the nearest lane of traffic.
- In unpaved areas, a raised portland cement concrete pad shall be constructed in front of each controller cabinet. The pad shall be 3'-0" x 3'-0" x 4" for a Type G cabinet and shall be 3'-0" x 4" thick x width of foundation for Type M, P, R, S and Model 336L cabinets.
- In unpaved areas, the top of foundation for Type G, P, R and S cabinets shall be 6" above surrounding grade. Top of foundation for Type M or Model 336L cabinet shall be 1'-6" above surrounding grade.
- In sidewalks and other paved areas, top of foundation for Type G cabinet shall be level with surrounding grade. Top of foundation for Type P, R and S cabinets shall be 3/2" above surrounding grade.
- The steel pedestal, base plate, bolt circle and foundation for Type G cabinet shall be the same as that shown for a Type 1-C Standard (see ES-7B). Pedestal shall be 2'-1" to 2'-6" in length. Anchor bolts shall be 3/4"  $\phi$  x 1'-6" with a 2" - 90° bend. Four bolts required per cabinet.
- Type G cabinet shall be provided with a slipfitter to permit mounting an 4 1/2" outside diameter pedestal. Slipfitter shall be bolted to bottom of the cabinet.
- A 1" drain shall be provided through the foundation of a Type M or Model 336L cabinet. Drain pipe shall be screened.
- Cabinet shelves shall be adjustable for vertical spacing and shall be removable. Type M, P, R and S cabinets shall be provided with a minimum of two shelves.
- Controller units, plug-mounted equipment, shelf-mounted equipment and wall-mounted equipment shall be located to permit safe and easy removal or replacement without removing any other piece of equipment.
- Where telephone interconnect is required, a minimum of 5" clear vertical space shall be provided inside the cabinet for the equipment.
- Telephone interconnect conductors shall be enclosed in a 3/4" C or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in cabinets or pedestals.
- Anchor bolts for Type M, P, R, S and Model 336L cabinets shall be 3/4"  $\phi$  x 1'-6" with a 2" - 90° bend.

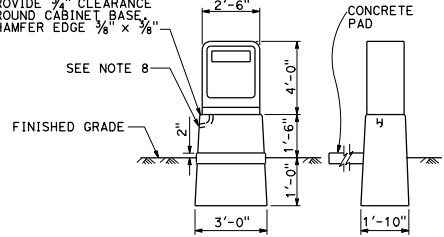


**FOUNDATION FOR  
TYPE G CABINET  
DETAIL A**

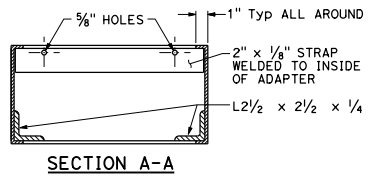
**FOUNDATION FOR  
TYPE P, R AND S CABINETS  
DETAIL B**

TOP OF PEDESTAL SHALL BE LARGE ENOUGH TO PROVIDE 3/4" CLEARANCE AROUND CABINET BASE. CHAMFER EDGE 3/8" x 3/8"

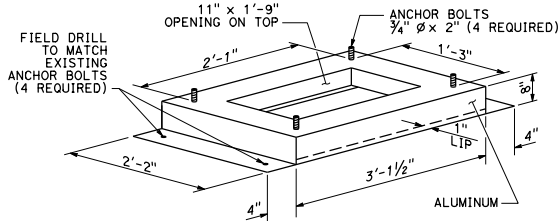
CABINET TYPE	FOUNDATION		
	"W"	"H"	"D"
G	2'-0"	3'-6"	2'-0"
M	3'-2"	2'-6"	1'-6"
P	4'-4 1/2"	1'-6"	2'-4"
R	4'-2"	1'-6"	2'-4"
S	5'-11 1/2"	1'-6"	2'-4"



**FRONT VIEW SIDE VIEW  
PEDESTAL FOUNDATION  
FOR TYPE M OR  
MODEL 336L CABINET  
DETAIL C**

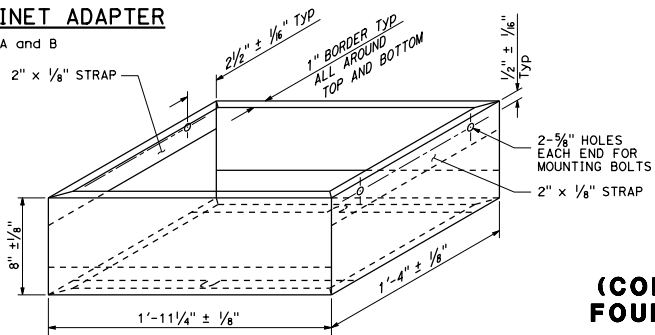


**SECTION A-A**



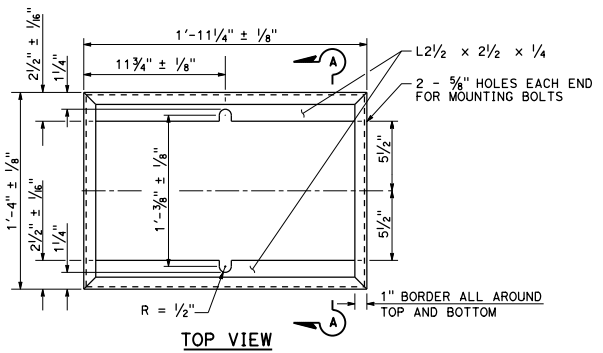
**TYPE PR CABINET ADAPTER**

See Notes A and B



**TYPE M CABINET ADAPTER**

See Notes A, C, and D



**TOP VIEW**

**NOTES:**

- Material: 0.188" thickness aluminum plate.
- Adapter for Type P or Type R cabinet foundation.
- Adapter for Type M cabinet foundation.
- Mounting bolts shall be 3/8"  $\phi$  minimum size.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(CONTROLLER CABINET ADAPTER,  
FOUNDATIONS, AND PAD DETAILS)**

NO SCALE

**ES-3B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

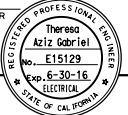
October 30, 2015  
PLANS APPROVAL DATE

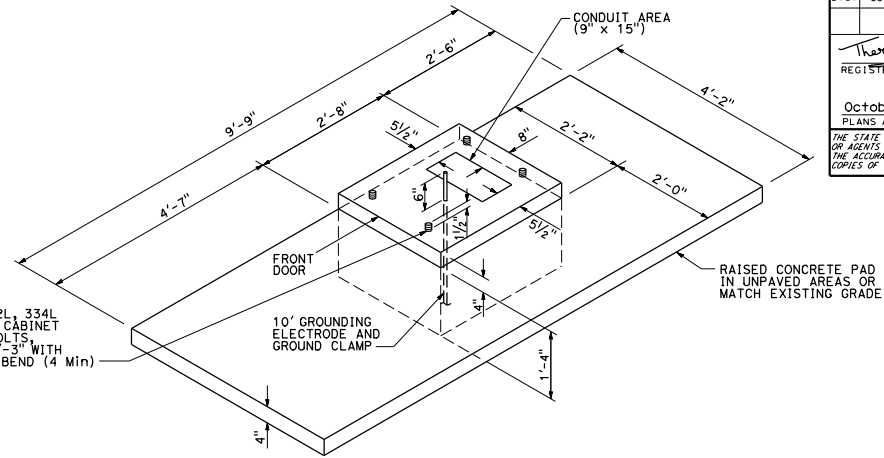
Theresa Gabriel  
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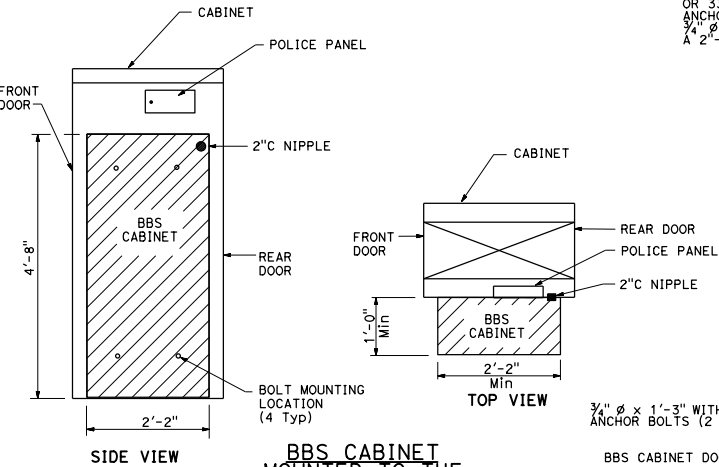
**NOTES:**

1. Foundation shall be located to provide 2'-0" minimum clearance between face of curb and any portion of cabinet.
2. Controller units, plug-mounted equipment, shelf-mounted equipment and wall-mounted equipment shall be located to permit safe and easy removal or replacement without removing any other piece of equipment.
3. Cabinet fan may be installed at an alternate location near the top of the cabinet when approved by the Engineer.
4. Where telephone interconnect is required, a minimum of 5" clear vertical space shall be provided inside the cabinet for the equipment.
5. Telephone interconnect conductors shall be enclosed in a 3/4" or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in cabinets.

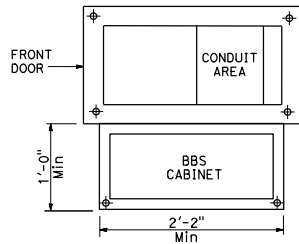
DIST	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	NO.	SHEETS
					
Theresa Gabriel REGISTERED ELECTRICAL ENGINEER October 30, 2015 PLANS APPROVAL DATE No. E15129 Exp. 6-30-16 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					



**FOUNDATION AND PAD DETAIL**  
Model 332L, 334L and 334LC

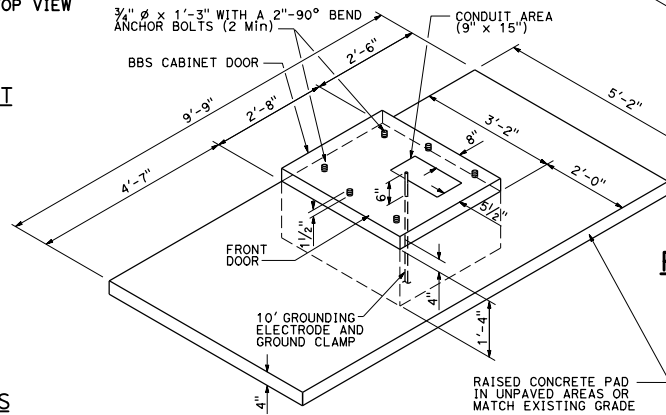


**BBS CABINET MOUNTED TO THE MODEL 332L CABINET**

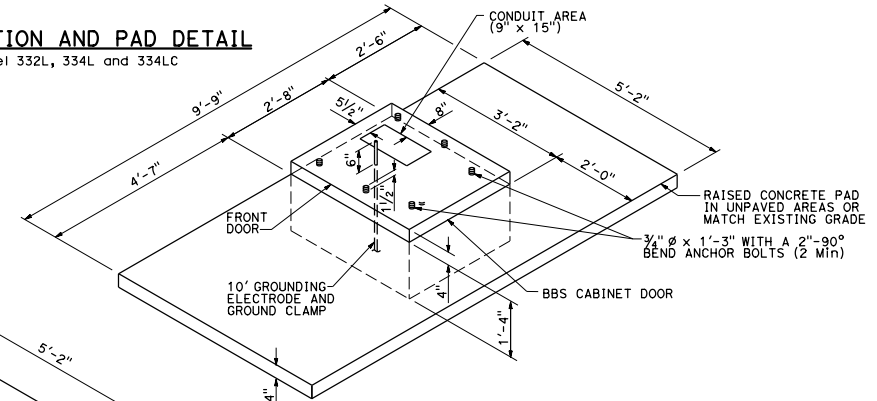


**BASE PLAN FOR BBS MOUNTED TO THE MODEL 332L CABINET**

(FOR DIMENSIONS AND DETAILS NOT SHOWN, SEE CABINET HOUSING DETAILS OF THE TRANSPORTATION ELECTRICAL EQUIPMENT SPECIFICATION (TEES))



**LEFT SIDE INSTALLATION DETAIL A**



**RIGHT SIDE INSTALLATION DETAIL B**  
**MODIFIED MODEL 332L CABINET**  
**FOUNDATION DETAIL FOR BATTERY BACKUP SYSTEM**

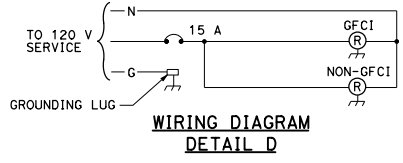
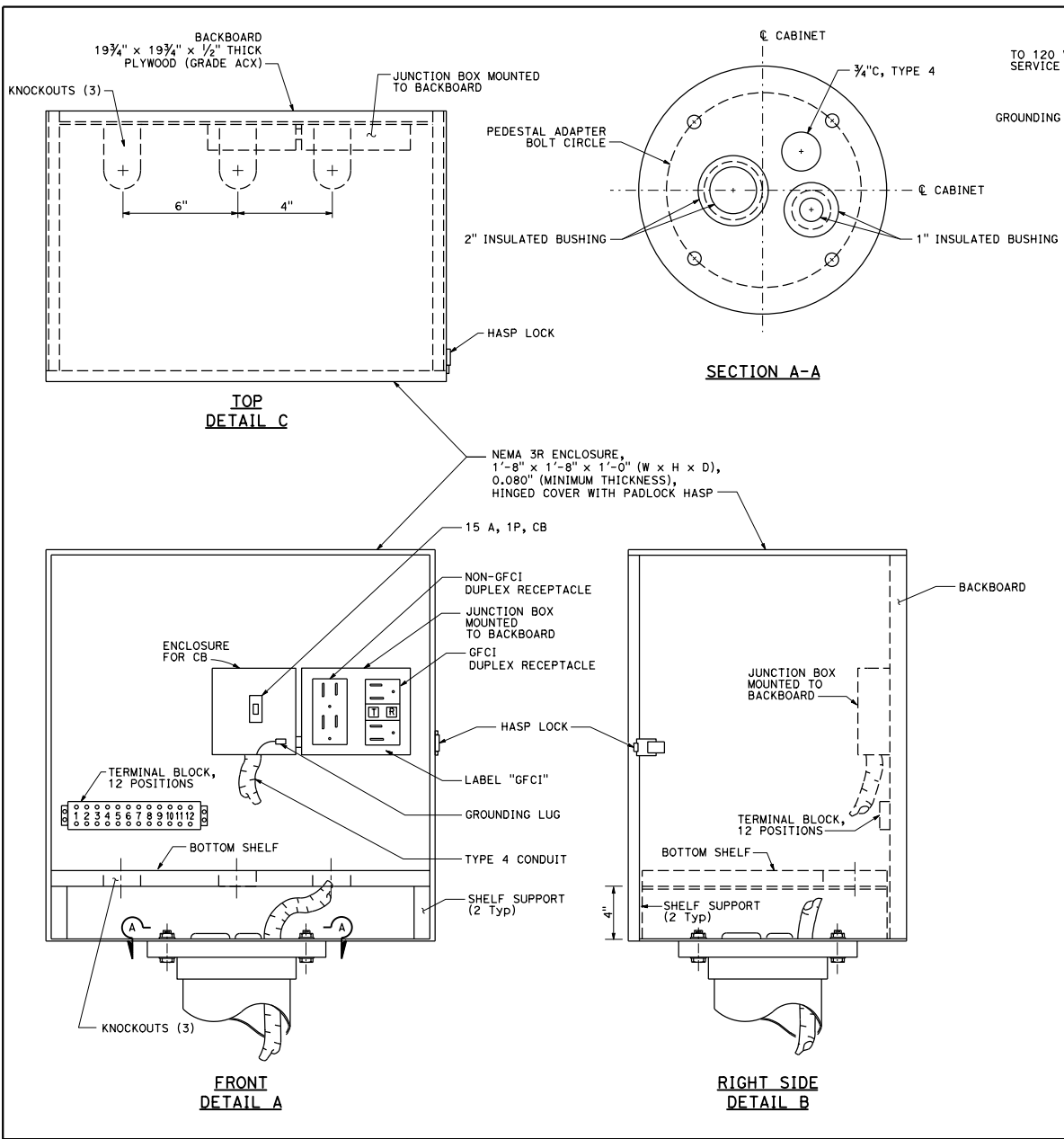
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(CONTROLLER CABINET FOUNDATION AND PAD DETAILS)**  
NO SCALE

**ES-3C**

430

2015 STANDARD PLAN ES-3C





**NOTES:**

- Dimensions are nominal.
- The steel pedestal, base plate, bolt circle and foundation for the telephone demarcation cabinet shall be the same as that shown for a Type 1-C Standard. The steel pedestal shall be 2'-1" to 2'-6" in length. Anchor bolts shall be 3/4" ø x 1'-6" with a 2" - 90° bend. Four bolts required per cabinet.
- Telephone interconnect conductors shall be enclosed in a 3/4" C or larger conduit through the foundation. Type 4 conduit shall be used to separate telephone and power conductors in the cabinet and pedestal.
- For termination cabinet:
  - Mount cabinet on Type G cabinet pedestal (see ES-3B).
  - Use Type G cabinet foundation.

**FASTENER SCHEDULE**

BACKBOARD	4 - 3/4" (LENGTH) WOOD SCREWS
2 SHELF SUPPORTS	4 - 3/4" (LENGTH) WOOD SCREWS
JUNCTION BOX	4 - 1/2" (LENGTH) WOOD SCREWS
TERMINAL BLOCK	4 - 3/4" (LENGTH) WOOD SCREWS

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(TELEPHONE DEMARCATION  
CABINET, TYPE A)**

NO SCALE

**ES-3D**

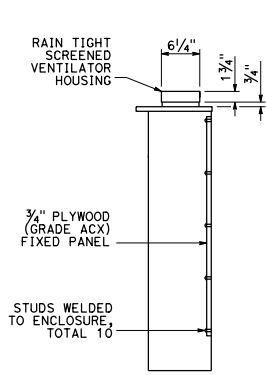
Dist#	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

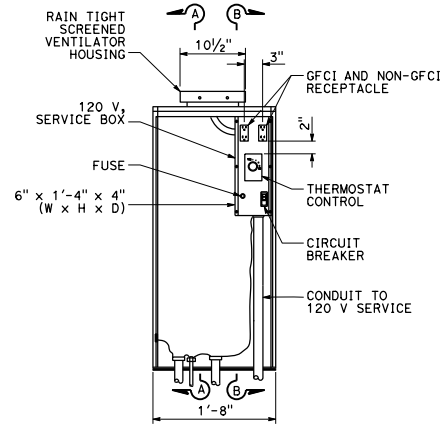
October 30, 2015  
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No. E15129  
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ELECTRICAL  
STATE OF CALIFORNIA

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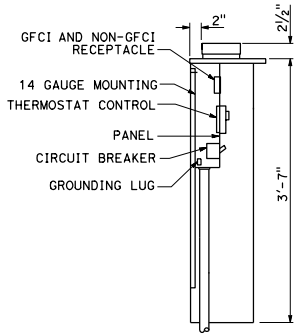


SECTION A-A

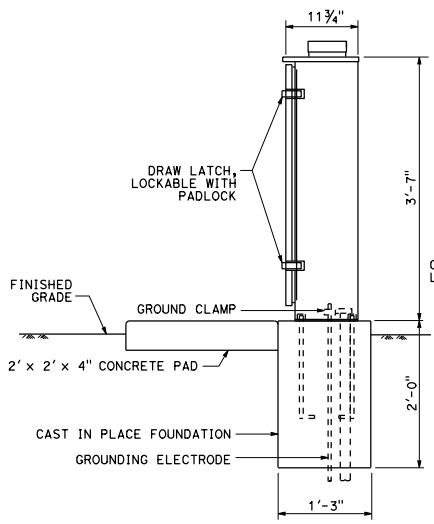


FRONT VIEW

INTERIOR DETAIL A

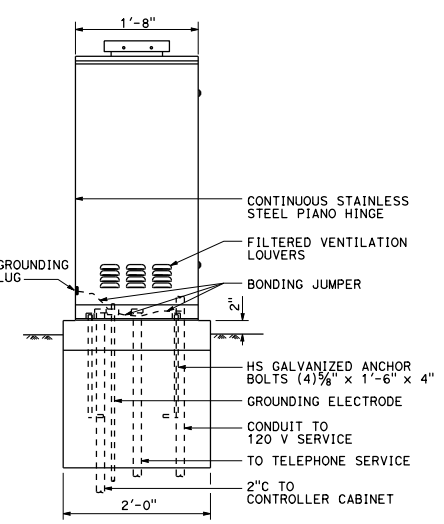


SECTION B-B



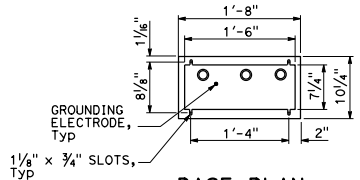
SIDE VIEW

EXTERIOR DETAIL B

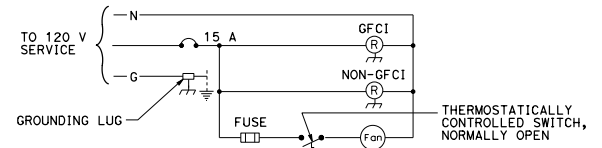


FRONT VIEW

EXTERIOR DETAIL B



BASE PLAN DETAIL C



WIRING DIAGRAM DETAIL D

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(TELEPHONE DEMARCATION  
CABINET, TYPE B)**

NO SCALE

ES-3E

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

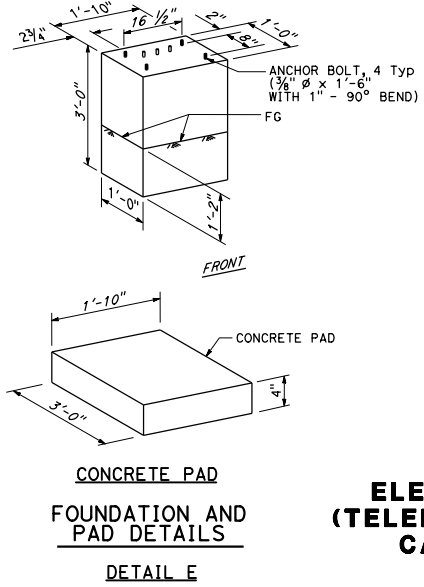
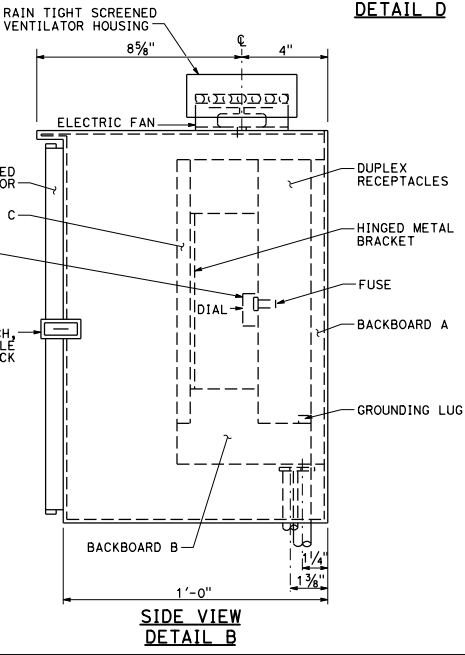
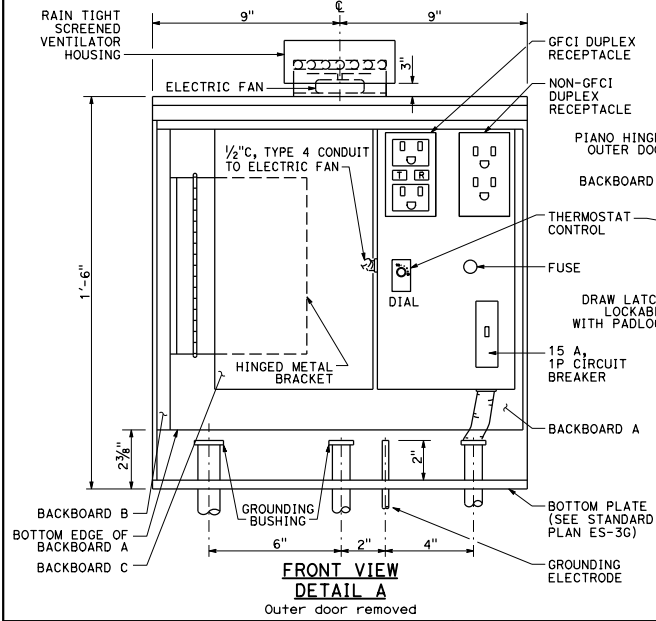
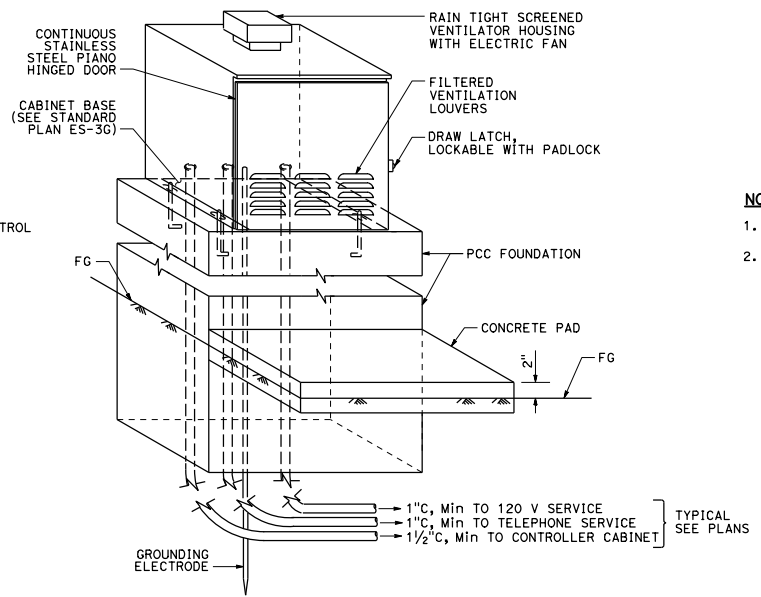
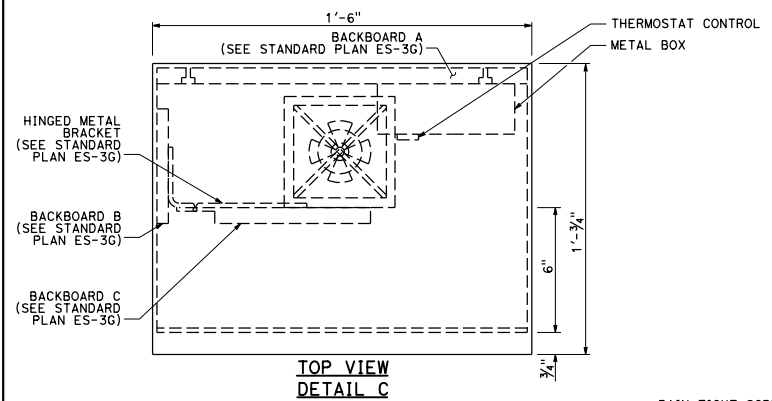
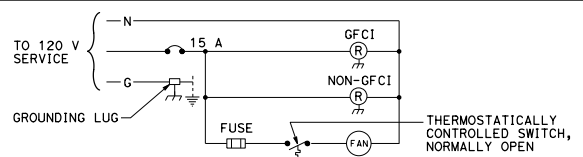
October 30, 2015  
PLANS APPROVAL DATE

Theresa Aziz Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**NOTE:**  
1. Dimensions are nominal.





- NOTES:**
- Dimensions are nominal.
  - Hardware for fastening of mounting boards:
    - Fasten backboard A and backboard B to telephone demarcation cabinet with 3/8" Ø x 3/4" stainless steel carriage bolts (8 required).
    - Fasten hinged metal bracket to backboard B and backboard C to hinged metal bracket with number No. 10 x 3/4" wood screws (9 required).

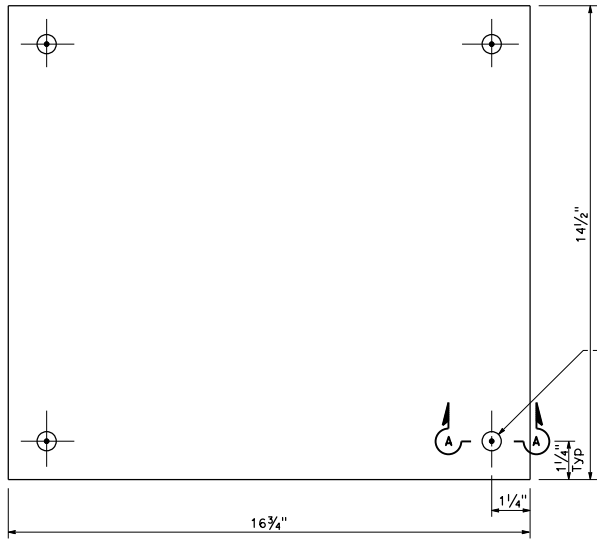
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(TELEPHONE DEMARCATION  
CABINET, TYPE C)**  
NO SCALE

**ES-3F**

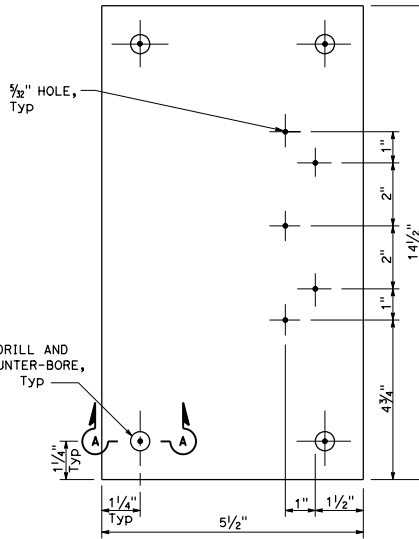
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER  
October 30, 2015  
PLANS APPROVAL DATE  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA  
REGISTERED PROFESSIONAL ENGINEERS

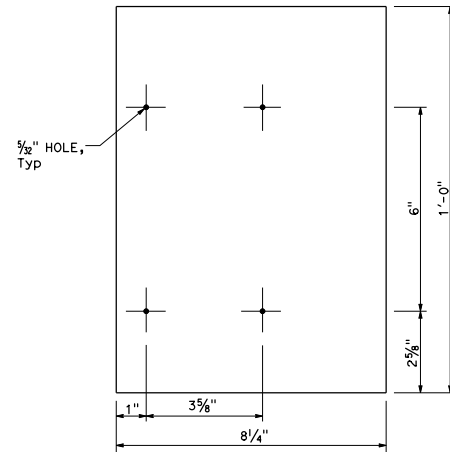
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



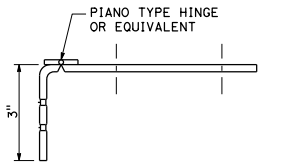
**BACKBOARD A  
DETAIL A**



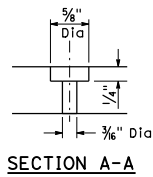
**BACKBOARD B  
DETAIL B**



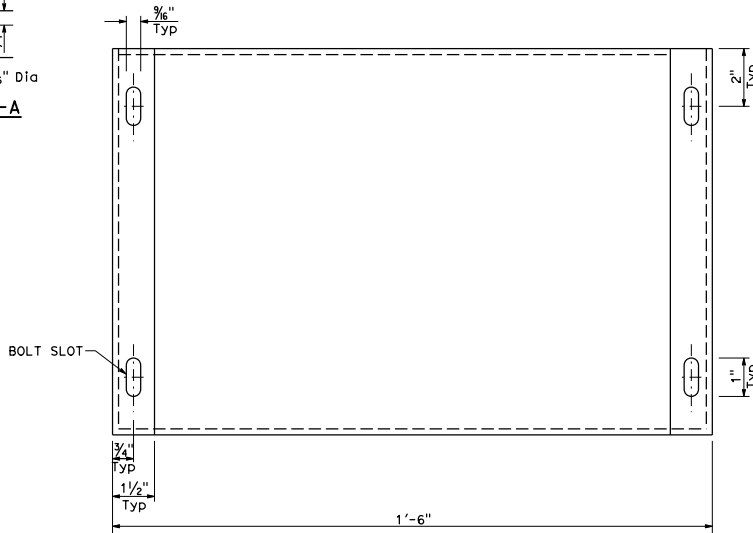
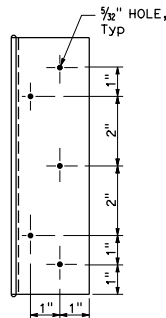
**BACKBOARD C  
DETAIL C**



**HINGED METAL BRACKET  
DETAIL D**



**SECTION A-A**



**CABINET BASE  
DETAIL E**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**NOTE:**  
 1. Base mounting frame shall be constructed with 0.134" galvanized steel.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (TELEPHONE DEMARCATION  
 CABINET, TYPE C DETAILS)**

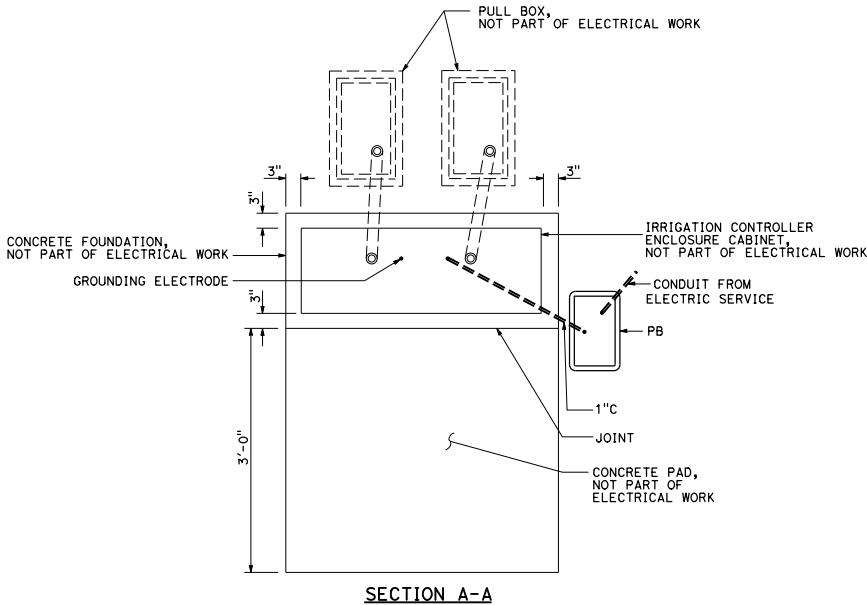
NO SCALE

**ES-3G**

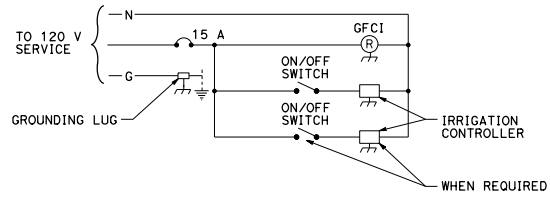
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 REGISTERED PROFESSIONAL ENGINEER  
 STATE OF CALIFORNIA

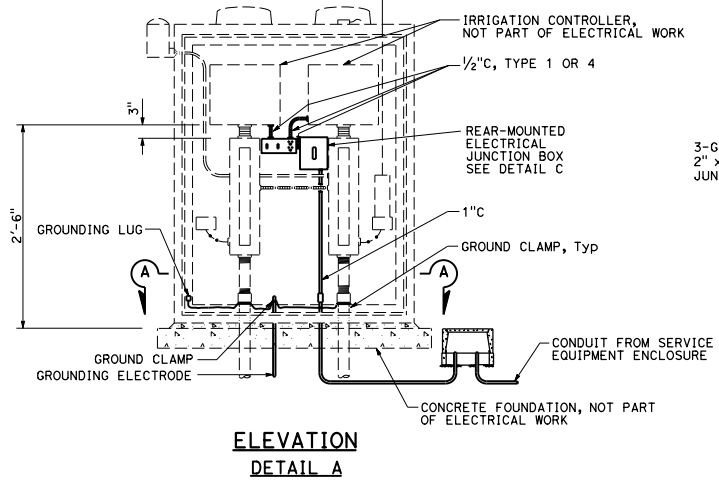
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



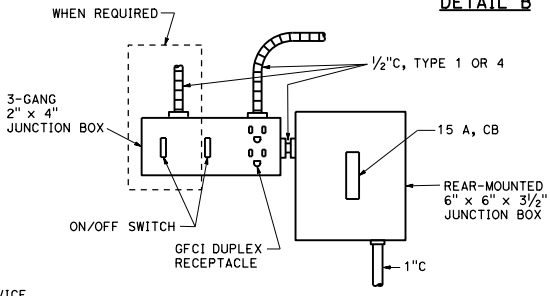
SECTION A-A



IRRIGATION CONTROLLER ENCLOSURE CABINET WIRING DIAGRAM (Typ) DETAIL B



ELEVATION DETAIL A



ELECTRICAL JUNCTION BOX LAYOUT DETAIL C

- NOTES:**
1. See Standard Plan H10 for other details.
  2. Underground electrical work done prior to foundation installation.

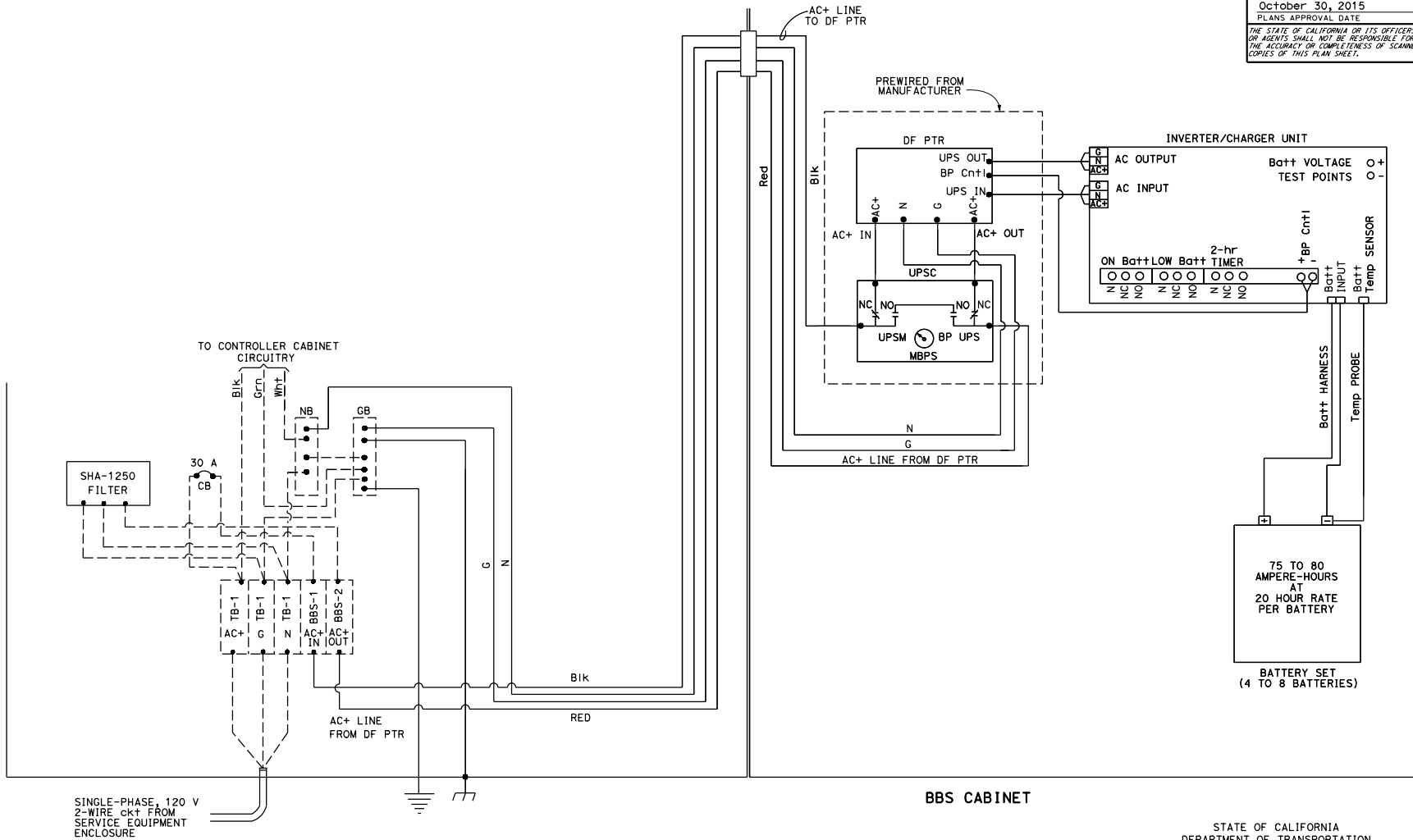
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (IRRIGATION CONTROLLER  
 ENCLOSURE CABINET)**

NO SCALE

ES-3H

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. E15129  
 Exp. 6-30-16  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



SINGLE-PHASE, 120 V  
2-WIRE ckt FROM  
SERVICE EQUIPMENT  
ENCLOSURE

CONTROLLER CABINET

BBS CABINET

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(BBS POWER CONNECTION DIAGRAM,**  
**WITH BYPASS CONTROL LINE)**  
NO SCALE

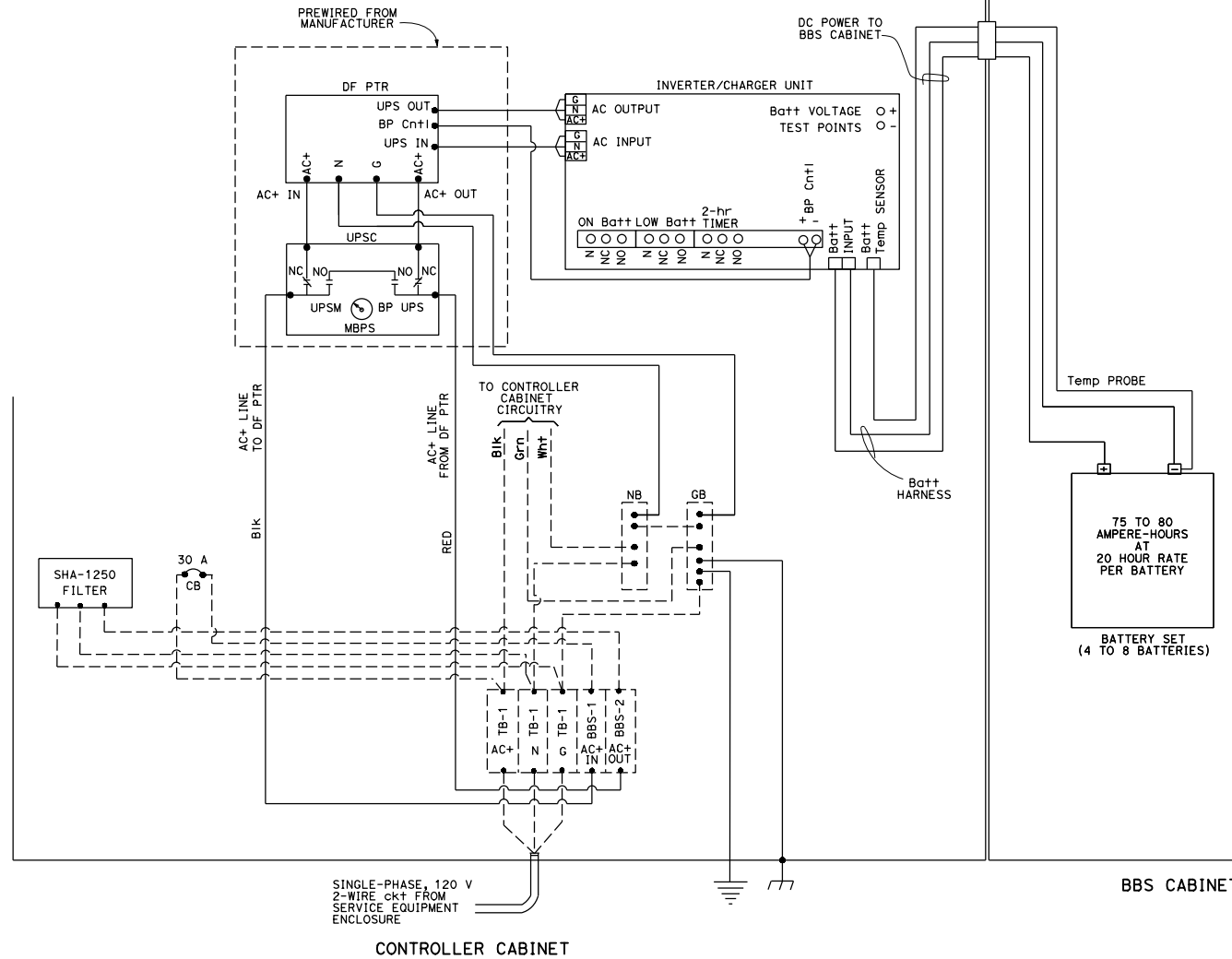
ES-3I

2015 STANDARD PLAN ES-3I

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Theresa Gabriel  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 Theresa Aziz Gabriel  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 STATE OF CALIFORNIA

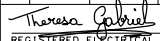
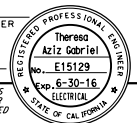
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

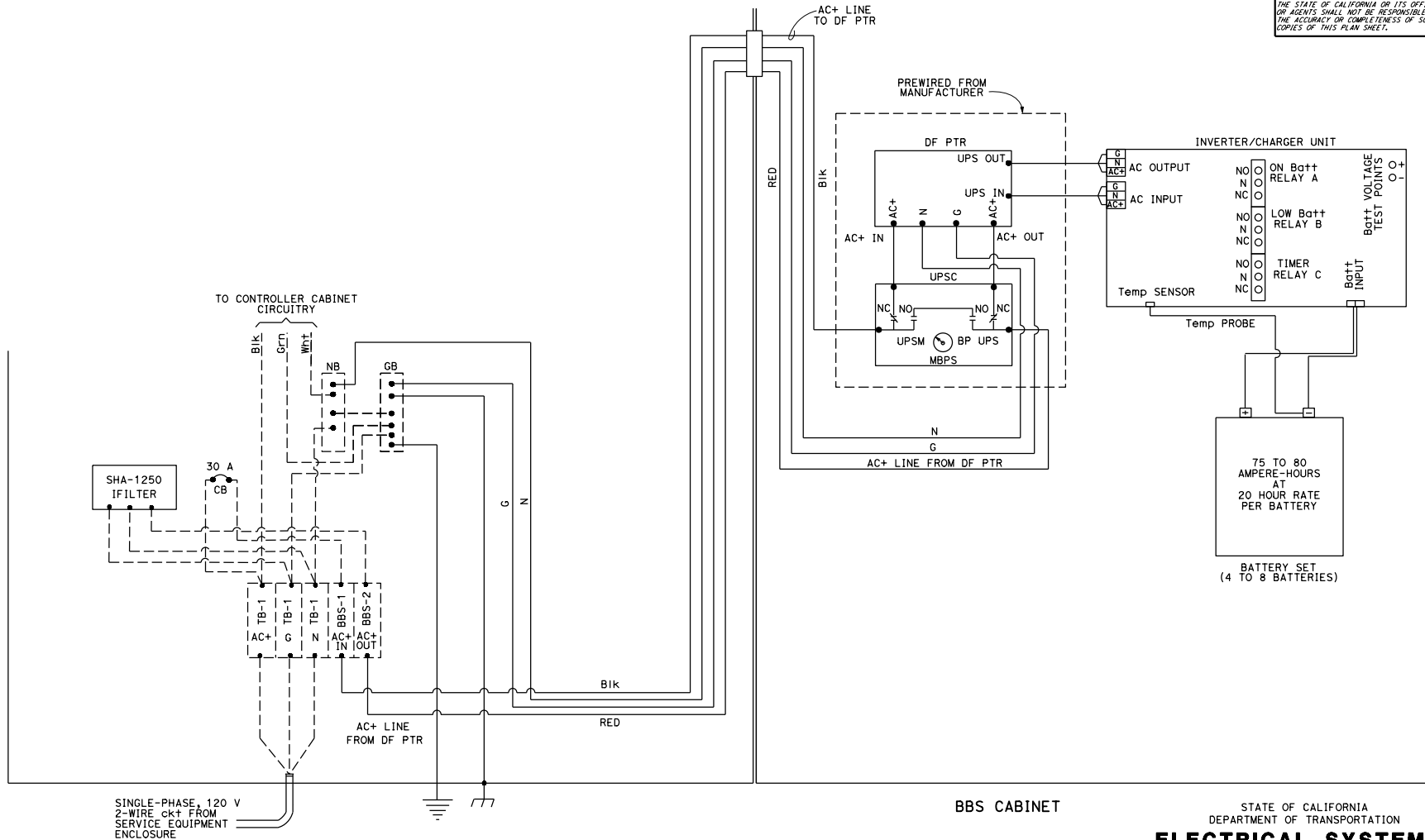


STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(BBS POWER CONNECTION DIAGRAM,**  
**WITH BYPASS CONTROL LINE)**  
 NO SCALE  
**ES-3J**

2015 STANDARD PLAN ES-3J

438

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

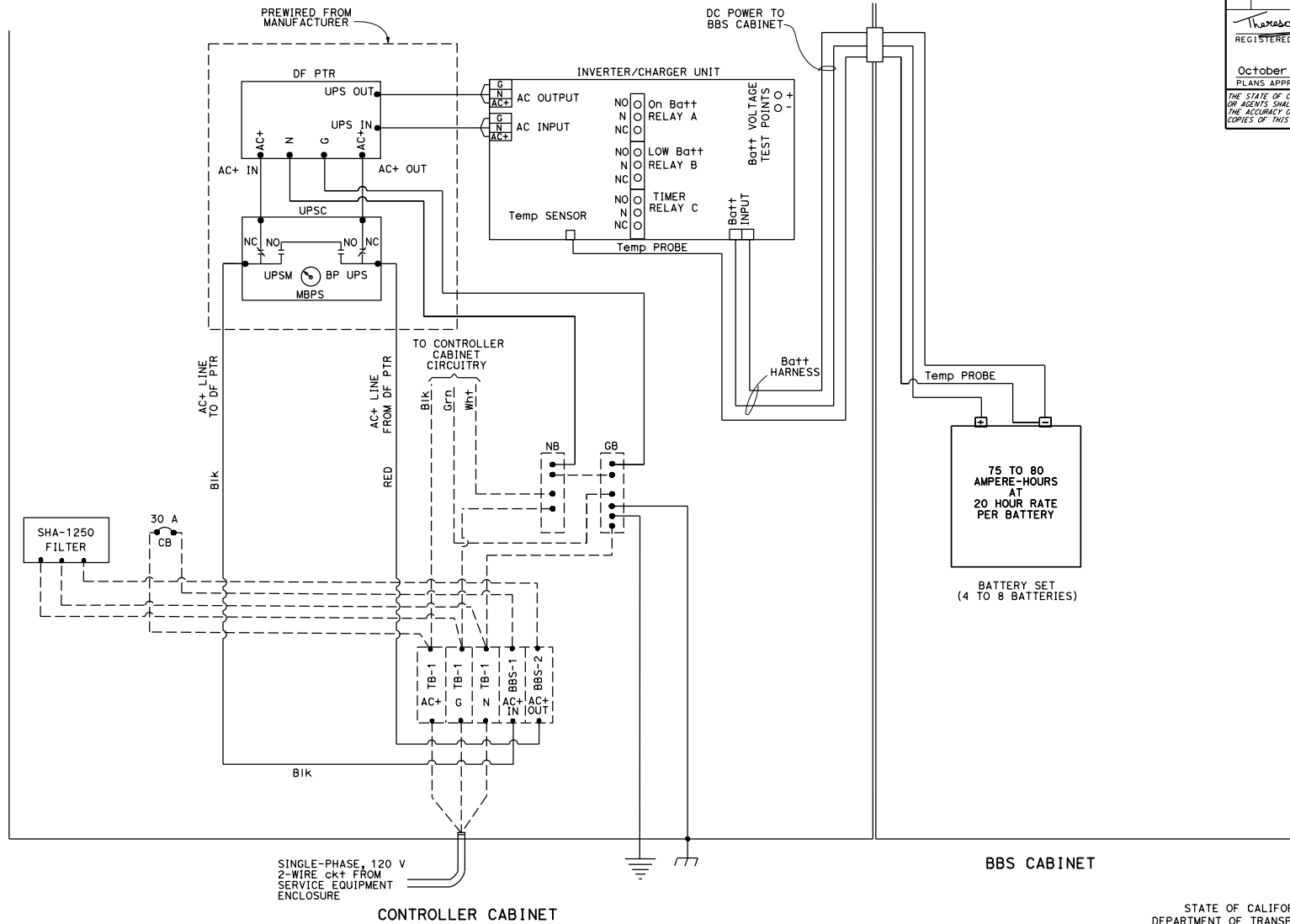


STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(BBS POWER CONNECTION DIAGRAM,  
WITHOUT BYPASS CONTROL LINE)**  
NO SCALE

**ES-3K**

2015 STANDARD PLAN ES-3K

[Return to Table of Contents](#)



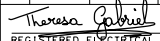
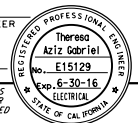
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

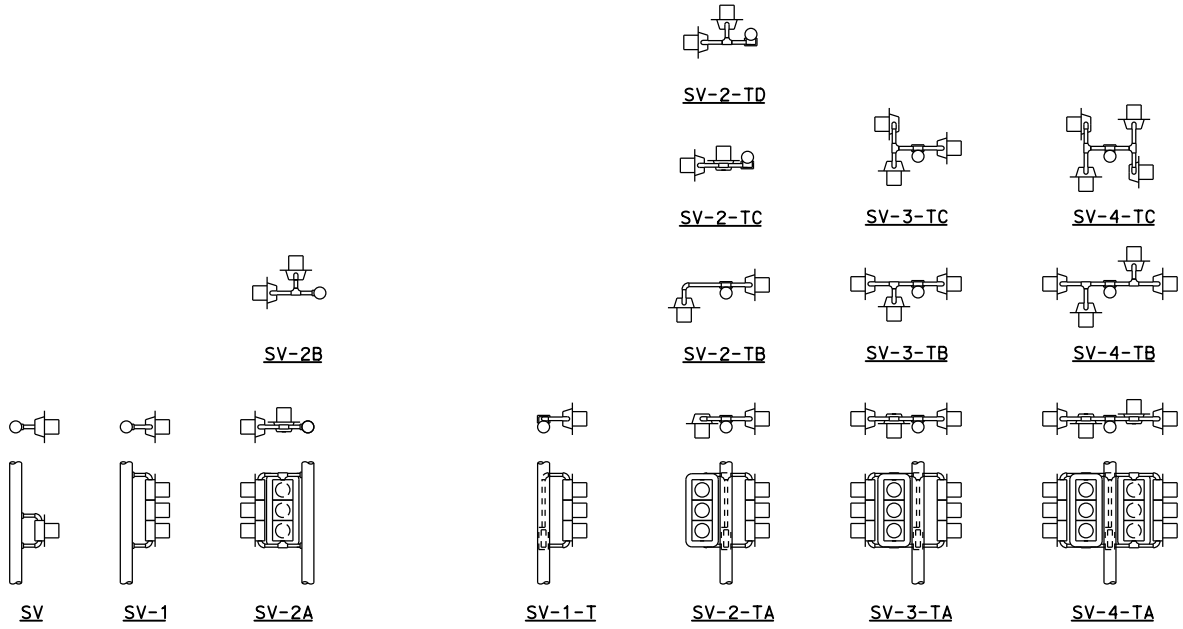
Theresa Gabriel  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 Theresa Aziz Gabriel  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 STATE OF CALIFORNIA

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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(BBS POWER CONNECTION DIAGRAM,**  
**WITHOUT BYPASS CONTROL LINE)**  
 NO SCALE

ES-3L

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



PLAN VIEW OF OTHER SIDE MOUNTINGS

**ABBREVIATIONS:**

- SV SIDE MOUNTED SIGNAL HEADS
- T TERMINAL COMPARTMENT
- TV TOP MOUNTED SIGNAL HEADS
- 1, 2, 3, 4 NUMBER OF SIGNAL FACES (3 - SECTION, UNLESS OTHERWISE INDICATED)
- A, B, C, D CONFIGURATION OF SIGNALS

**NOTES:**

1. Mountings shall be oriented to provide maximum horizontal clearance to adjacent roadway.
2. Bracket arms shall be long enough to permit proper alignment of signals and backplate installation.
3. See Standard Plans ES-4D and ES-4E for attachment fitting details.

PLAN VIEW OF TOP MOUNTINGS

SIDE MOUNTINGS

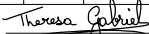
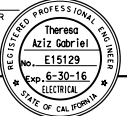
TOP MOUNTINGS

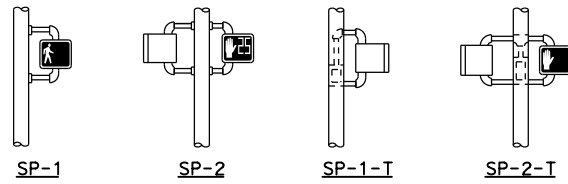
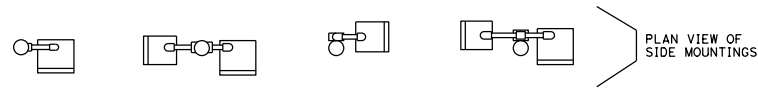
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(SIGNAL HEADS  
AND MOUNTINGS)**

NO SCALE

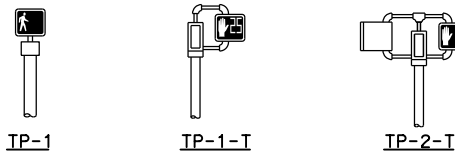
**ES-4A**



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
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SIDE MOUNTINGS



TOP MOUNTINGS

**PEDESTRIAN SIGNAL HEAD MOUNTINGS**

DETAIL A



PERSON WALKING INTERVAL    FLASHING UPRaised HAND INTERVAL    STEADY UPRaised HAND INTERVAL

LED COUNTDOWN PEDESTRIAN SIGNAL FACE MODULE

DETAIL B

**NOTES:**

1. Mounting shall be oriented to provide maximum horizontal clearance to adjacent roadway.
2. Bracket arms shall be long enough to permit proper alignment of signals.
3. See Standard Plan ES-4D for attachment fittings details.

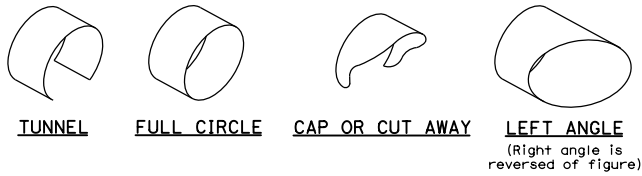
**ABBREVIATIONS:**

- 1, 2 NUMBER OF SIGNAL FACES
- SP SIDE MOUNTED PEDESTRIAN SIGNAL
- T TERMINAL COMPARTMENT
- TP TOP MOUNTED PEDESTRIAN SIGNAL

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (PEDESTRIAN SIGNAL HEADS)**

NO SCALE

**ES-4B**



**VISORS**

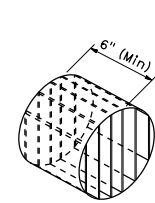
8" ± 1/2" FOR 8" SECTIONS  
5 1/2" ± 1/2" FOR 12" SECTIONS

DRILL SIGNAL FACE AND ATTACH BACKPLATE WITH SIX 10-24 OR 10-32 SELF-TAPPING AND LOCKING STAINLESS STEEL MACHINE SCREWS AND FLAT WASHERS

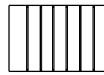
R = 2" ± 1/2"

**8" AND 12" SECTIONS**

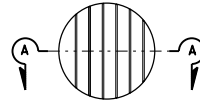
**BACKPLATE**



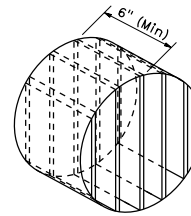
**ISOMETRIC VIEW**



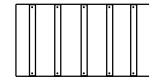
**SECTION A-A**



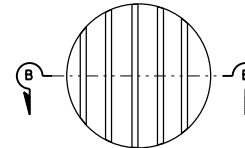
**8" DIAMETER FRONT VIEW**



**ISOMETRIC VIEW**



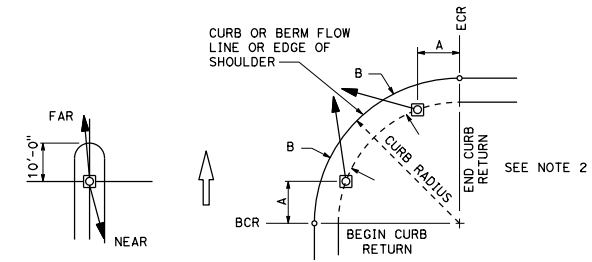
**SECTION B-B**



**12" DIAMETER FRONT VIEW**

**DIRECTIONAL LOUVER**

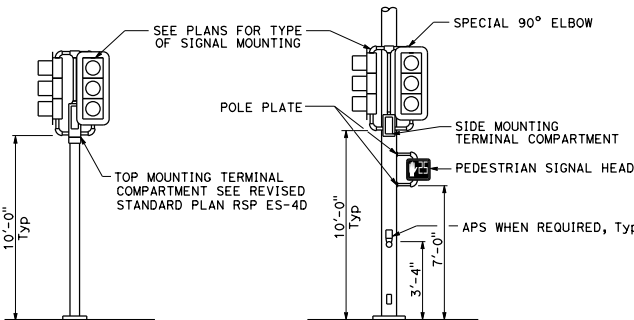
Directional louvers shall be oriented and secured in place with one plated brass machine screw and nut.



**NOTES:**

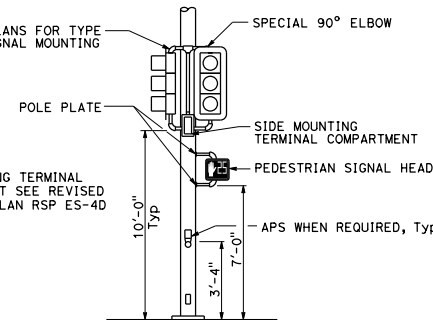
1. Typical signal pole placement unless dimensioned on plans.
2. For A and B dimensions, see Pole Schedule.

**SIGNAL STANDARD PLACEMENT DIMENSIONS AND EQUIPMENT LOCATIONS**



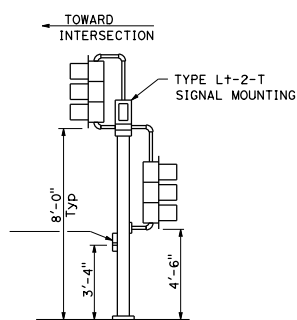
**TOP MOUNTED SIGNALS (TV)**

Type 1-A, 1-B, 1-C and 1-D standard as indicated on the plans



**SIDE MOUNTED SIGNALS (SV AND SP)**

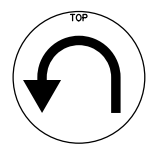
Normally used on standards with luminaire or signal mast arm



**LEFT TURN LANE SIGNAL**

Type 1-A, 1-B, 1-C and 1-D standard as indicated on plans

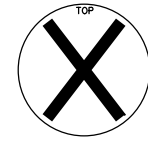
**TYPICAL SIGNAL HEAD INSTALLATIONS**



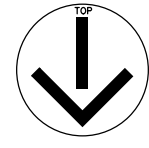
**U-TURN**



**BICYCLE**



**LANE CONTROL**



**LANE CONTROL**

**SIGNAL FACES**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS (SIGNAL HEADS AND MOUNTINGS)**  
NO SCALE

**ES-4C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

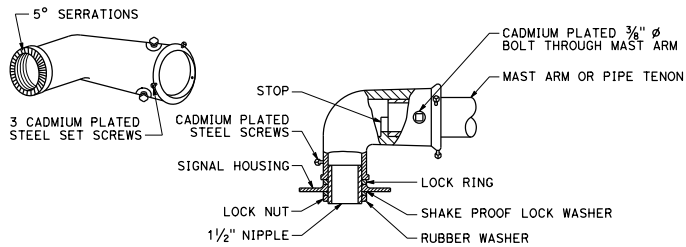
Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

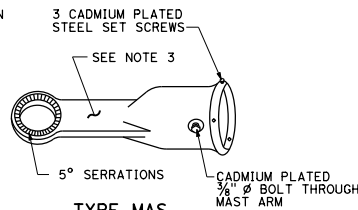
Theresa Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL ENGINEER  
STATE OF CALIFORNIA

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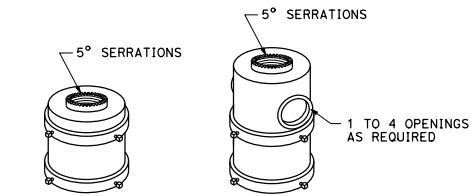
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
Theresa Aziz Gabriel REGISTERED ELECTRICAL ENGINEER October 30, 2015 PLANS APPROVAL DATE No. E15129 Exp. 6-30-16 ELECTRICAL THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					



**TYPE MAT**  
**MAST ARM MOUNTING**  
 For 2 NPS pipe, see Note 1.



**TYPE MAS**  
**MAST ARM MOUNTING**  
 For 2 NPS pipe, see Note 1.

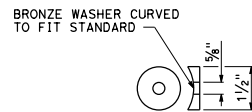


**TOP MOUNTINGS**  
 For 4 NPS pipe, see Note 2.

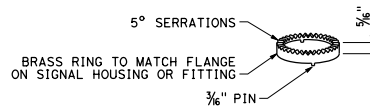
**NOTES:**

- After mast arm signal has been plumbed and secured, drill  $\frac{1}{16}$ " hole through mast arm tenon in line with slip fitter hole. Place a cadmium plated  $\frac{3}{16}$ " galvanized bolt with washer under bolt head through hole and secure with washer, nut, and locknut. Seal openings between mast arm mountings and mast arm with mastic.
- (A) Threaded top mounted slip fitter openings shall be  $\frac{1}{2}$ " NPS.  
 (B) Serrations in fittings shall match those on bottom of signal heads or in lock ring.  
 (C) Top opening shall be offset when backplate is used.
- Wireway shall have a cross section area of 0.95 square inch minimum. Minimum width of  $\frac{1}{2}$ ".

**SIGNAL SLIP FITTERS**

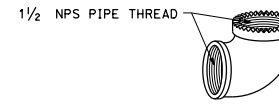


**DETAIL C**



**LOCK RING**

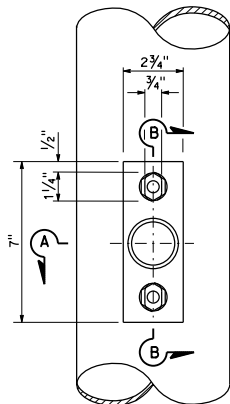
Use where locking ring is not integral with signal housing or fitting.



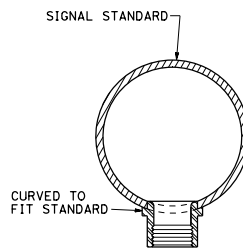
**SPECIAL 90° ELBOW**

One for each signal head, except those with special slip fitter mounting

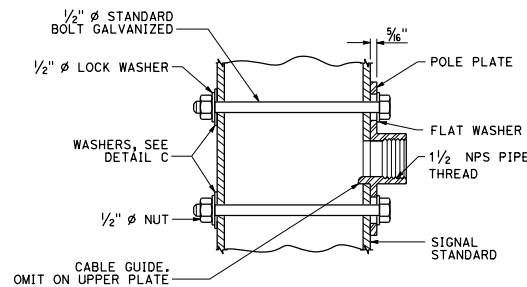
**MISCELLANEOUS MOUNTING HARDWARE**



**TOP VIEW**

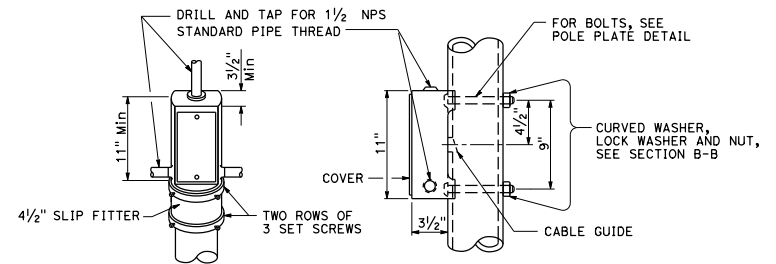


**SECTION A-A**



**SECTION B-B**

**POLE PLATE FOR SIDE MOUNTED SIGNAL HEAD WITHOUT TERMINAL COMPARTMENT**



**TOP MOUNTING**

**SIDE MOUNTING**


**TERMINAL COMPARTMENT**

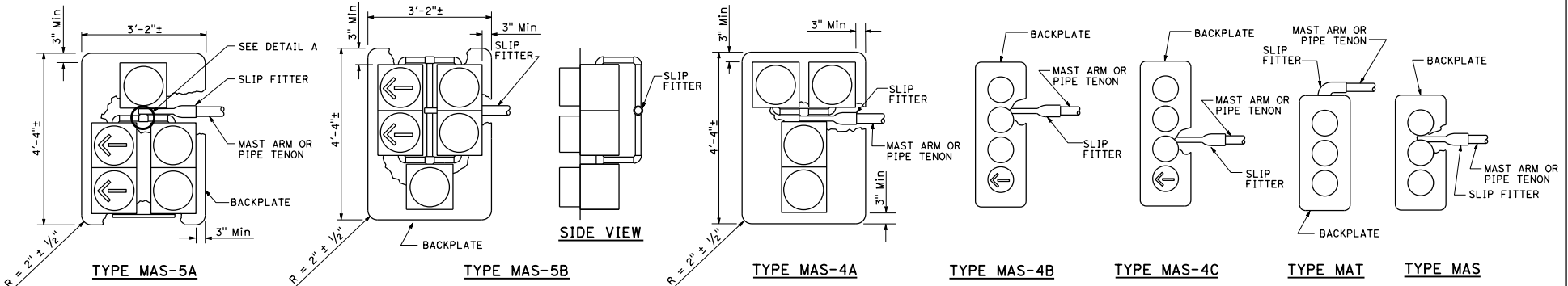
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(SIGNAL HEAD MOUNTING)**

NO SCALE

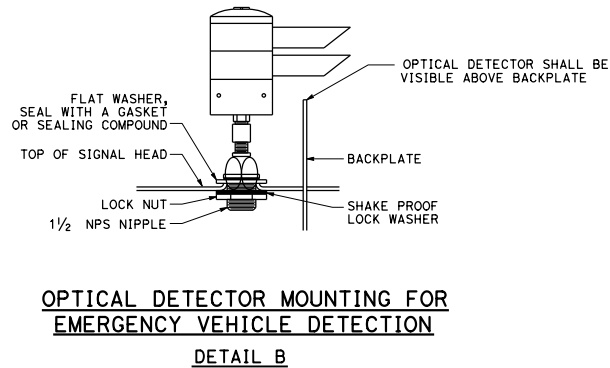
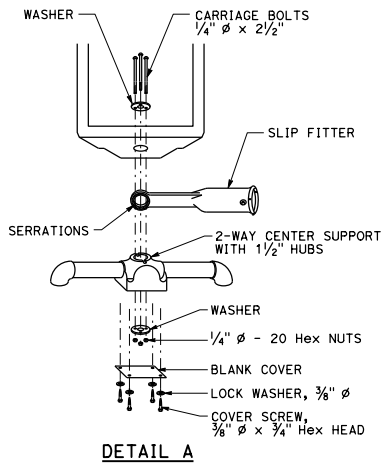
**ES-4D**

2015 STANDARD PLAN ES-4D

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Theresa Gabriel</i> REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



**MAST ARM MOUNTINGS**



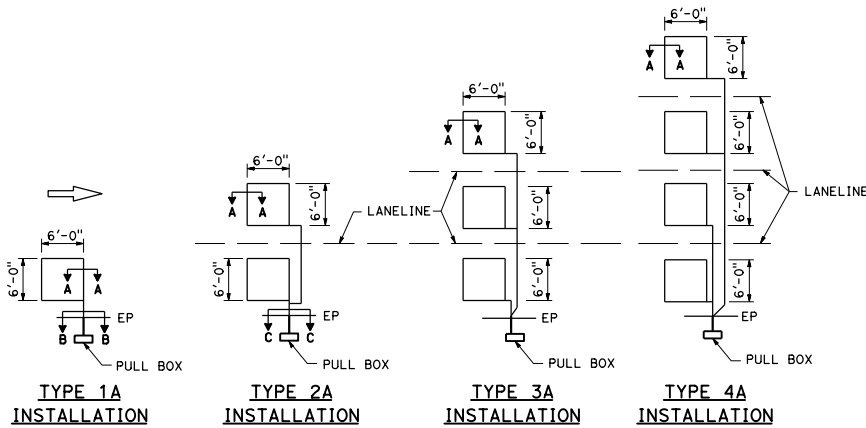
**OPTICAL DETECTOR MOUNTING FOR EMERGENCY VEHICLE DETECTION**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (SIGNAL HEADS AND  
 OPTICAL DETECTOR MOUNTING)**

NO SCALE

**ES-4E**

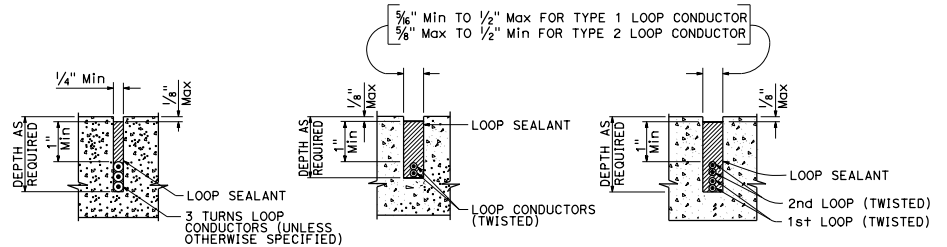
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Theresa Gabriel</i> REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
Theresa Aziz Gabriel No. E15129 Exp. 6-30-16 ELECTRICAL					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



**SAWCUT DETAILS**

Type A loop detector configurations illustrated

- 1A thru 4A = 1 Type A loop configuration in each lane.
  - 1B thru 4B = 1 Type B loop configuration in each lane.
  - 1C = 1 Type C loop configuration entering lanes as required.
  - 1D thru 4D = 1 Type D loop configuration in each lane.
  - 1E thru 4E = 1 Type E loop configuration in each lane.
  - 1Q thru 4Q = 1 Type Q loop configuration in each lane.
- Use Type A, B, C, D, E or Q loop detector configurations only when specified or shown on plans.

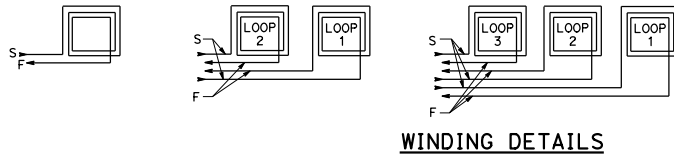


SECTION A-A

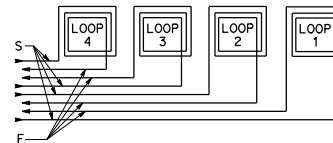
SECTION B-B

SECTION C-C

**SLOT DETAILS - TYPE 1 AND TYPE 2 LOOP CONDUCTOR**

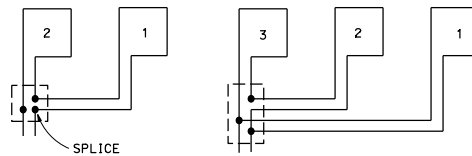


**WINDING DETAILS**



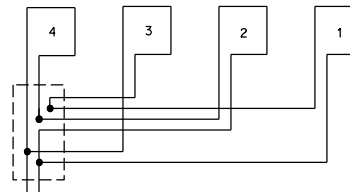
**ABBREVIATIONS:**

- S - START
- F - FINISH



**TYPICAL LOOP CONNECTIONS**

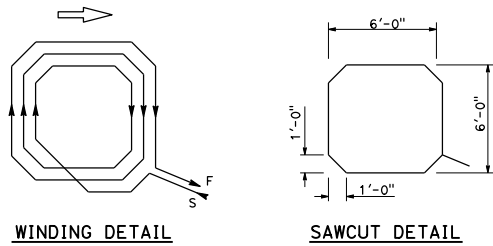
Dashed lines represent the pull box



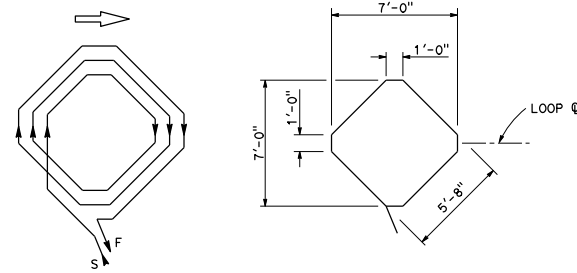
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (LOOP DETECTORS)**

NO SCALE

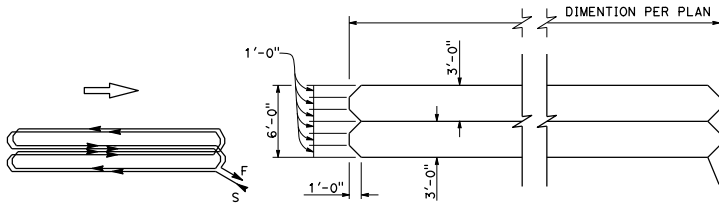
**ES-5A**



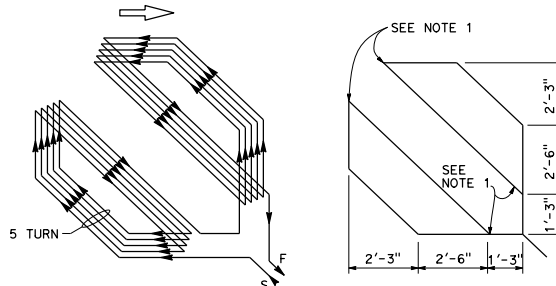
**TYPE A LOOP DETECTOR CONFIGURATION**



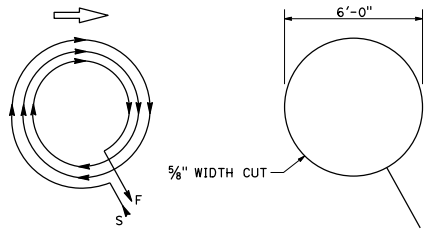
**TYPE B LOOP DETECTOR CONFIGURATION**



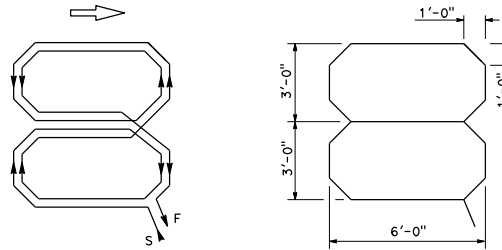
**TYPE C LOOP DETECTOR CONFIGURATION**



**TYPE D LOOP DETECTOR CONFIGURATION**



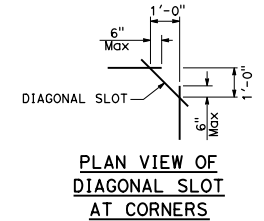
**TYPE E LOOP DETECTOR CONFIGURATION**



**TYPE Q LOOP DETECTOR CONFIGURATION**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

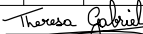



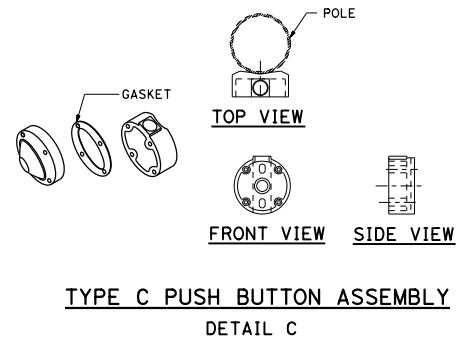
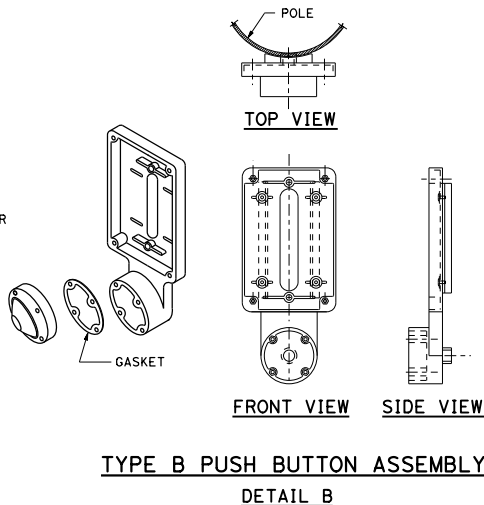
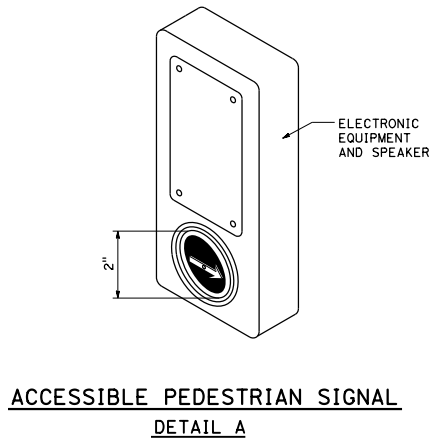
- NOTES:**
1. Round corners of acute angle sawcuts to prevent damage to conductors.
  2. Typical distance separating loops from edge to edge is 10' for Type A, B, D and E installation in single lane.
  3. Use Type D loops for limit line detector installations in left turn and bicycle lanes.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS (DETECTORS)**

NO SCALE

**ES-5B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



**NOTES:**

1. Back casting shape to fit curvature of pole.
2. Provide cover fitting for top of post, when PBA is mounted on push button assembly post.
3. Install push button on crosswalk side of standard.
4. Use R10 series regulatory signs and plaques for pedestrian and bicycle facilities.

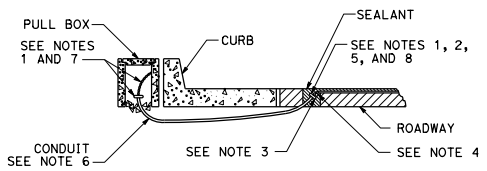
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(ACCESSIBLE PEDESTRIAN SIGNAL**  
**AND PUSH BUTTON ASSEMBLIES)**  
NO SCALE

**ES-5C**

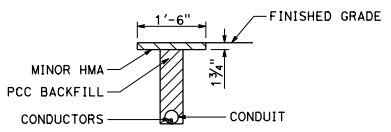
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

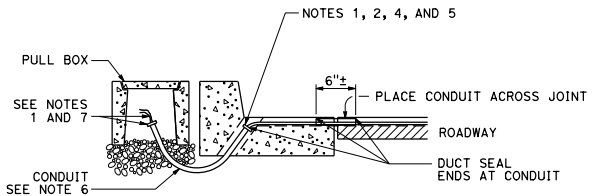
REGISTERED PROFESSIONAL ENGINEER Theresa Aziz Gabriel No. E15129 Exp. 6-30-16 ELECTRICAL STATE OF CALIFORNIA
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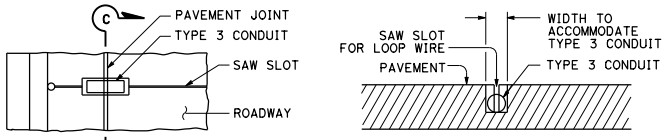
**TYPE A  
CURB TERMINATION DETAIL**



**"T" TRENCH  
DETAIL T**



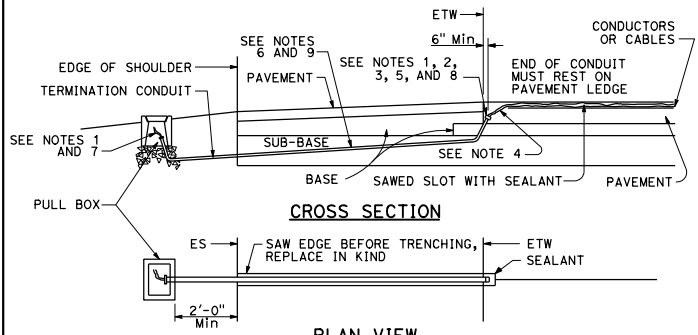
**CROSS SECTION**



**PLAN VIEW**

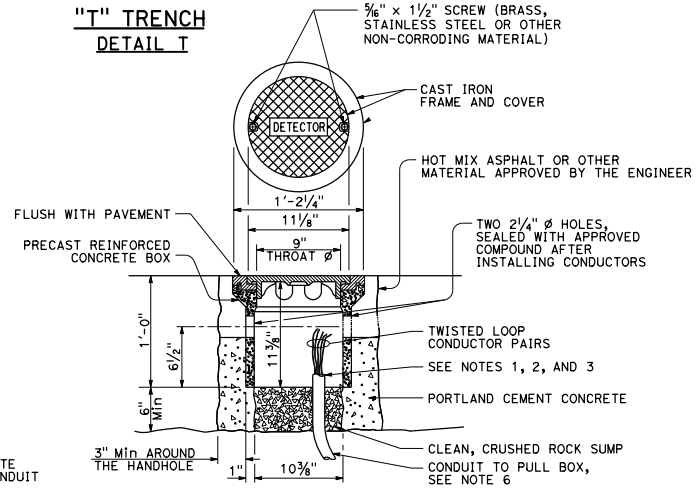
**TYPE B**

**CURB TERMINATION DETAIL**

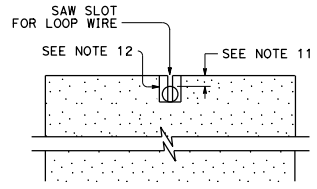


**CROSS SECTION**

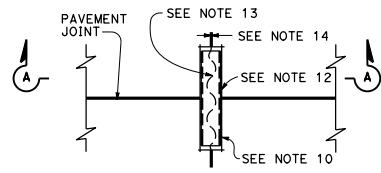
**PLAN VIEW  
SHOULDER TERMINATION DETAILS**



**DETECTOR HANDHOLE DETAIL**

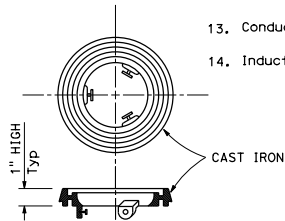


**SECTION A-A**



**PLAN VIEW**

**TYPICAL LOOP LEAD-IN DETAIL  
AT PAVEMENT JOINT**



**LOCKING GRADE RING**

**NOTES:**

- Bushing shall be used at end of conduit.
- Tape detector conductors or cables 3" each side of bushings.
- Install duct seal compound to each end of termination conduit before installing sealant.
- Round all sharp edges where detector conductors or cables have to pass.
- End of conduit shall be 3/8" below roadway surface.
- Conduit size      Loop conductors  
 1"C minimum      1 to 2 pairs  
 1 1/2"C minimum      3 to 4 pairs  
 2"C minimum      5 or more pairs
- Splice detector conductors or cables to detector lead-in-cable.
- Location of detector handhole when shown on plans.
- When the shoulder and traveled way are paved with the same material and there is no joint between them, the conduit shall extend only 2'-0" into the shoulder pavement.
- 3/4"C, Type 3 conduit 6" long minimum, plug both ends with duct compound to keep out sealant.
- 1/2" Minimum between top of conduit and pavement surface.
- Sawcut shall not exceed 1" in width and 1/8" longer than conduit to be installed.
- Conductors with 1/2" minimum slack inside conduit.
- Inductive loop detector saw slot.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

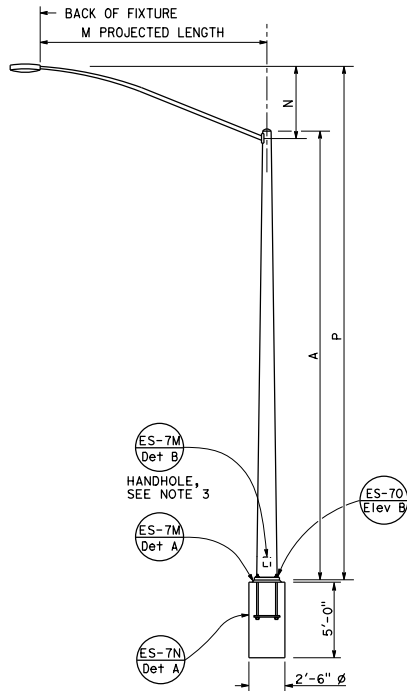
**ELECTRICAL SYSTEMS  
(CURB AND SHOULDER TERMINATION,  
TRENCH, AND HANDHOLE DETAILS)**

NO SCALE

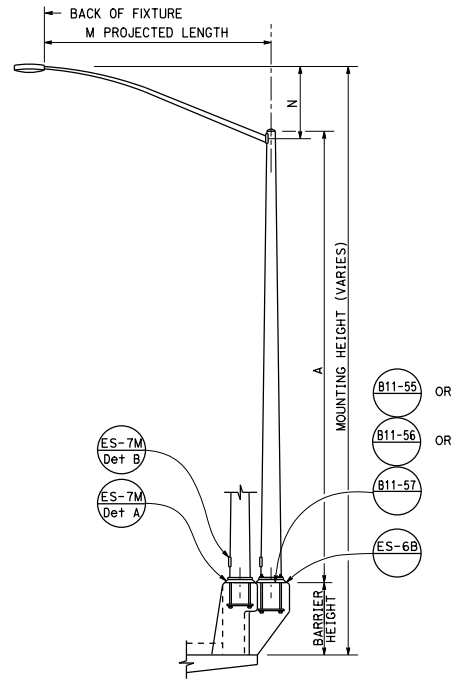
**ES-5D**

2015 STANDARD PLAN ES-5D





**TYPE 15 AND TYPE 21  
ELEVATION A**



**TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED  
ELEVATION B**

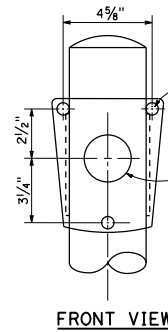
POLE TYPE	POLE DATA				BASE PLATE DATA			
	A HEIGHT	Min OD		WALL THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE
	BASE	TOP						
15	30'-0"	8"	3 1/8"	0.1196"	1'-0"	1'-0"	2"	1" $\phi$ x 3'-0" *
21	35'-0"	8 3/8"	3 3/8"	0.1793"				1 1/4" $\phi$ x 3'-0" *

\* FOR BARRIER RAIL BOLTS, SEE STANDARD PLAN ES-6B.

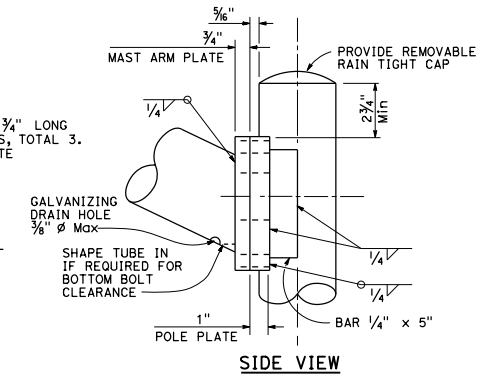
**NOTES:**

1.  Indicates mast arm length to be used unless otherwise noted on the plans.
2. For Type 15-SB, use Type 15 standard with Type 30 slip base plate details, see Standard Plan ES-6F.
3. Handhole shall be located on the downstream side of traffic.
4. For additional notes and details, see Standard Plans ES-7M and ES-7N.

LUMINAIRE MAST ARM DATA					
M PROJECTED LENGTH	N RISE	Min OD AT POLE	NOMINAL THICKNESS	P	
				TYPE 15	TYPE 21
6'-0"	2'-0" $\pm$	3 1/4"	0.1196"	31'-6" $\pm$	36'-6" $\pm$
8'-0"	2'-6" $\pm$	3 1/2"		32'-0" $\pm$	37'-0" $\pm$
10'-0"	3'-3" $\pm$	3 3/4"		32'-9" $\pm$	37'-9" $\pm$
12'-0"	4'-3" $\pm$	3 3/4"		33'-9" $\pm$	38'-9" $\pm$
15'-0"	4'-9" $\pm$	4 1/4"		34'-3" $\pm$	39'-3" $\pm$

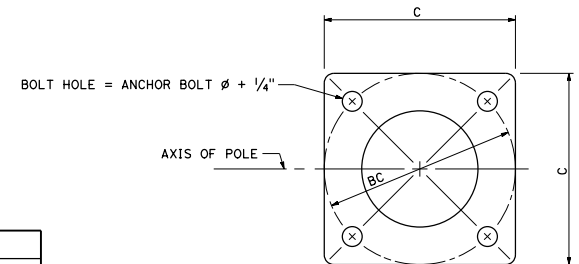


**FRONT VIEW**



**SIDE VIEW**

**LUMINAIRE MAST ARM CONNECTION  
DETAIL R**



**BASE PLATE  
DETAIL A**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(LIGHTING STANDARD,  
TYPES 15 AND 21)**

NO SCALE

**ES-6A**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

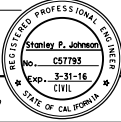
Stanley P. Johnson  
No. CS793  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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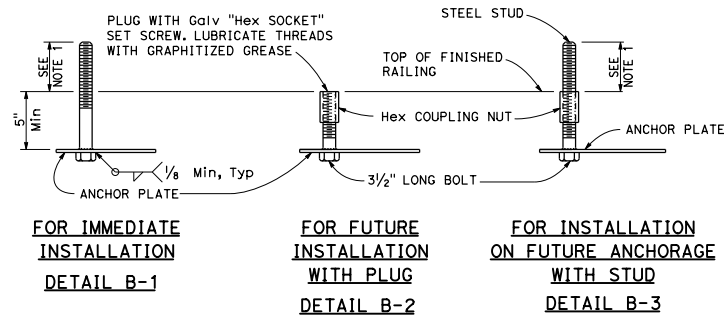
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE



THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**ELECTROLIER ANCHORAGES**  
**DETAIL B**

**NOTES:**

- Anchor bolt or stud length shall be such that thread extends 1/2" maximum above nut on level base plate after grouting. See Detail N.
- Electrolier anchor bolts shall be held in position for pouring by means of anchor plates and suitable templates. Deviation from the true position, vertical and height shall not exceed 1/16".
- See railing sheets for reinforcement and structural details at electroliers and pull boxes.

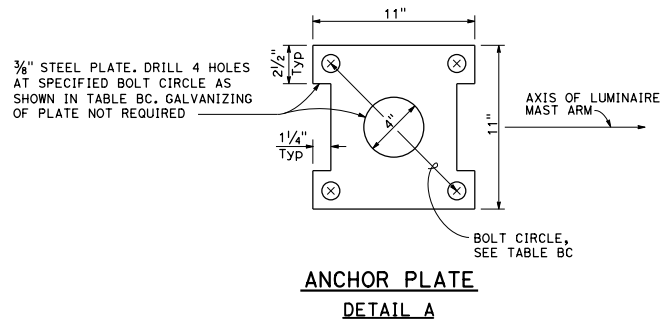
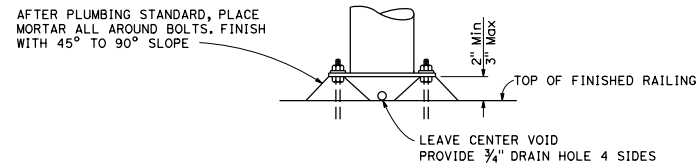


TABLE BC				
TYPE	BC = BOLT CIRCLE	ANCHOR BOLT DIAMETER	COUPLING NUT BASIC LENGTH	SET SCREW LENGTH DETAIL B-2
15	1'-0"	1"	3"	1 1/2"
21	1'-0"	1 1/4"	3 3/4"	1 7/8"



**GROUTING AT ELECTROLIER**  
**DETAIL N**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(ELECTROLIER ANCHORAGE AND**  
**GROUTING FOR**  
**TYPE 15 AND TYPE 21**  
**BARRIER RAIL MOUNTED)**

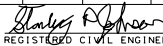
NO SCALE

**ES-6B**


LUMINAIRE MAST ARM DATA			
M PROJECTED LENGTH	N RISE	Min OD AT POLE	NOMINAL THICKNESS
15'-0"	4'-9"±	4 1/4"	0.1196"
20'-0"	2'-6"±	5"	0.1793"

POLE DATA				
POLE EXTENSION TYPE	HEIGHT "H"	Min OD		THICKNESS
		BASE	TOP	
5	5'-0"	6 1/2"	5 1/8"	0.1793"
10	10'-0"	7 1/4"		

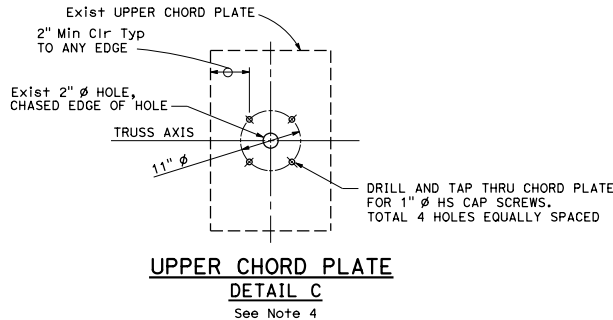
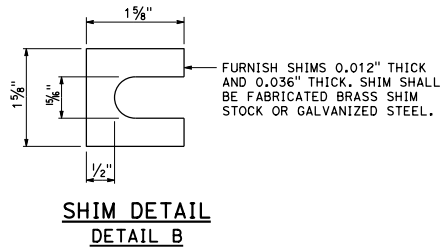
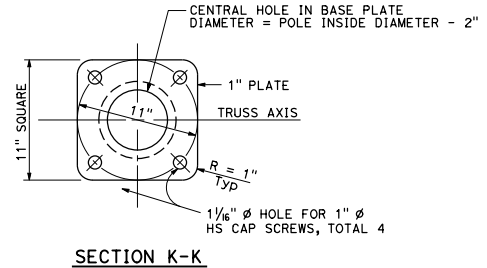
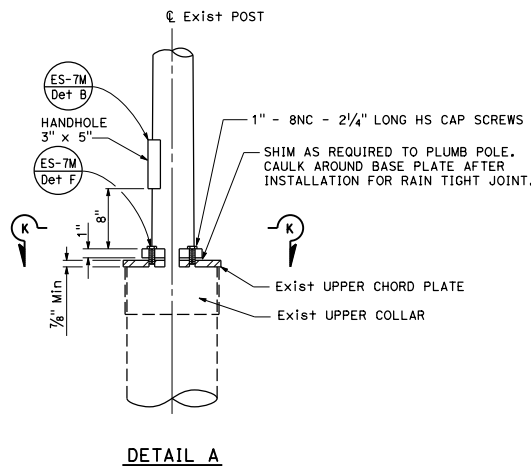
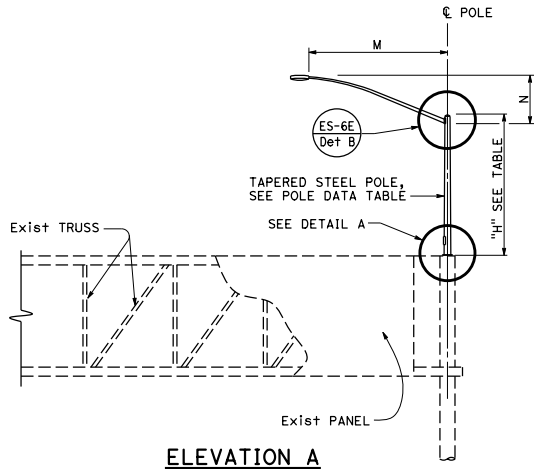
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE



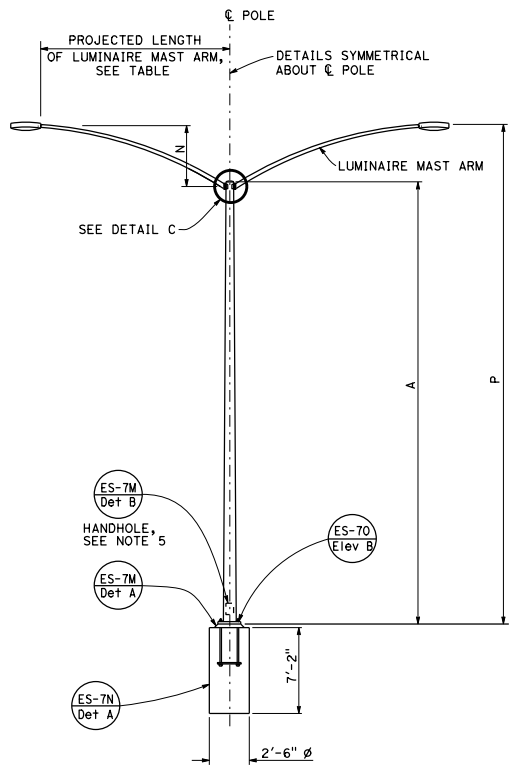
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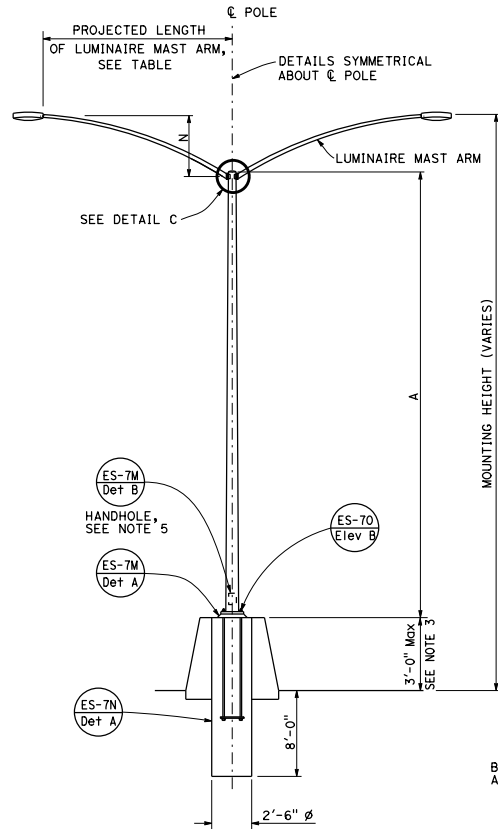
**NOTES:**

- The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.
- Bolt hole locations may vary at the discretion of the Engineer.
- Wind Loading (Fastest Mile): 80 mph AASHTO.
- See Std Plan S13.
- Unit stresses (Structural Steel):
  - a. fy = 55,000 psi tapered steel tube (pole)
  - b. fy = 50,000 psi unless otherwise noted

STATE OF CALIFORNIA  
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**ELECTRICAL SYSTEMS  
 (LIGHTING STANDARD,  
 TYPES 5 AND 10,  
 OVERHEAD SIGN MOUNTED)**  
 NO SCALE



**TYPE 15D AND TYPE 21D  
ELEVATION A**



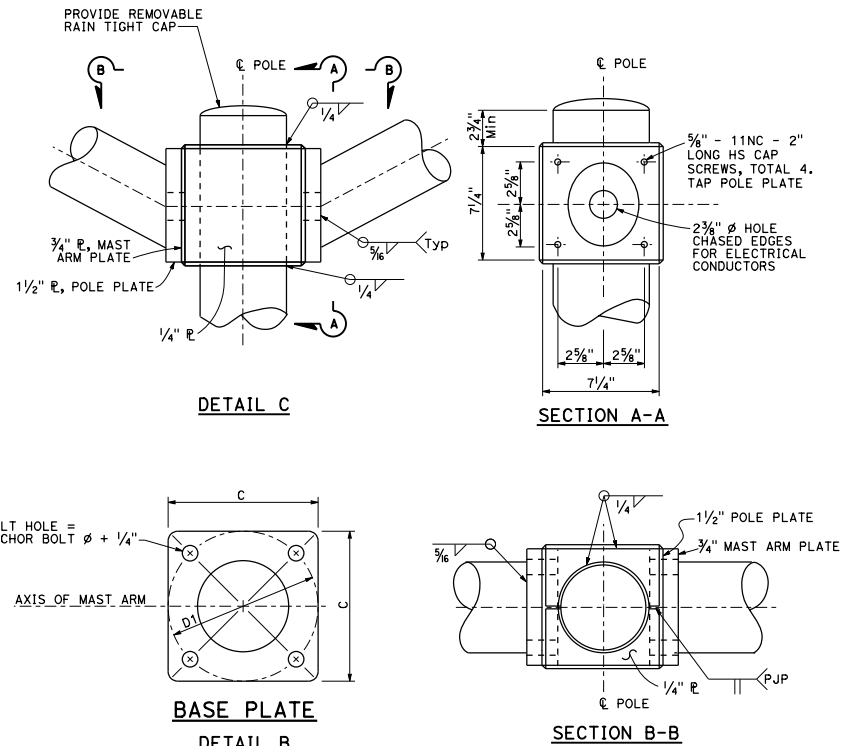
**TYPE 15D AND TYPE 21D  
MEDIAN BARRIER MOUNTED  
ELEVATION B**

POLE TYPE	POLE DATA				BASE PLATE DATA			
	A HEIGHT	Min OD	TOP	Min THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE
15D	30'-0"	8"	3 1/8"	0.1793"	1'-0"	1'-0"	2"	1 1/4" ø x 42"
21D	35'-0"	8 5/8"	3 3/8"					

LUMINAIRE MAST ARM DATA					
PROJECTED LENGTH	N RISE	Min OD AT POLE	NOMINAL THICKNESS	P	
				TYPE 15D	TYPE 21D
6'-0"	2'-0"±	3 1/4"	0.1196"	31'-6"±	36'-6"±
8'-0"	2'-6"±	3 1/2"		32'-0"±	37'-0"±
10'-0"	3'-3"±	3 5/8"		32'-9"±	37'-9"±
12'-0"	4'-3"±	3 3/4"		33'-9"±	38'-9"±

**NOTES:**

1. [ ] Indicates mast arm length to be used unless otherwise noted on the plans.
2. For additional notes and details, see Standard Plans ES-7M and ES-7N.
3. See Concrete Barrier Details Type 60E and 60SE.
4. For locations with one arm, plug unused cap screw holes and chased outlet with galvanized cap screws and knockout plug.
5. Handhole shall be located perpendicular to the luminaire mast arm and as directed by the Engineer.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(LIGHTING STANDARD,  
TYPES 15D AND 21D,  
DOUBLE LUMINAIRE MAST ARM)**

NO SCALE

**ES-6D**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

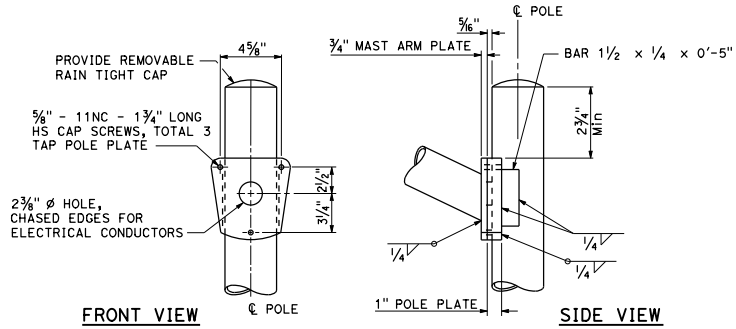
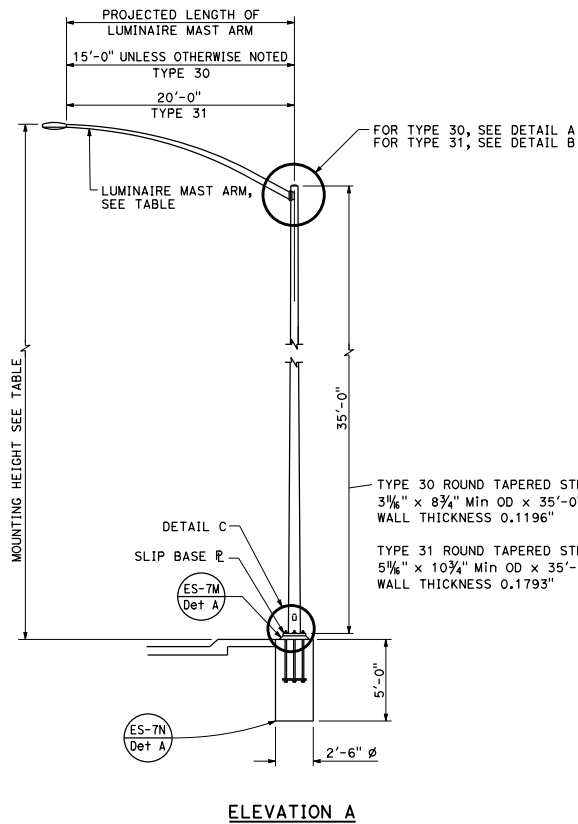
October 30, 2015  
PLANS APPROVAL DATE

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No. CS793  
Exp. 3-31-16  
CIVIL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

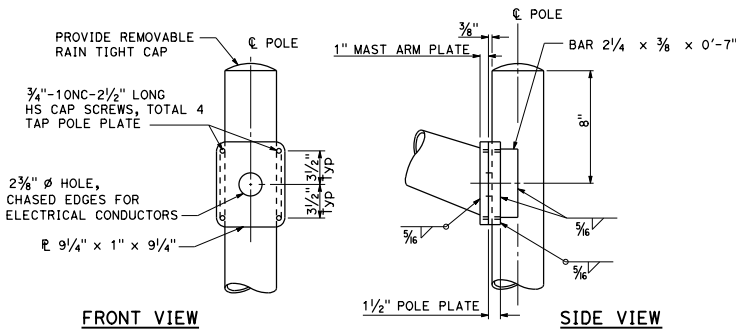
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LUMINAIRE MAST ARM DATA			
PROJECTED LENGTH	THICKNESS	MINIMUM OD AT POLE	MOUNTING HEIGHT
* 6'-0"	0.1196"	3 1/4"	36'-9"±
* 8'-0"		3 1/2"	37'-3"±
* 10'-0"		3 3/4"	38'-0"±
* 12'-0"		3 3/4"	39'-0"±
* 15'-0"	4 1/4"	39'-6"±	
** 20'-0"	0.1793"	5"	37'-0"±

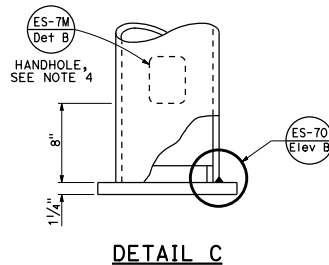
\* TYPE 30  
 \*\* TYPE 31



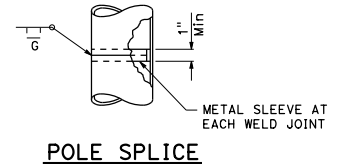
**TYPE 30  
 DETAIL A**



**TYPE 31  
 DETAIL B**



**DETAIL C**



**POLE SPLICE**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (LIGHTING STANDARD,  
 TYPES 30 AND 31)**

NO SCALE

**ES-6E**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Stanley P. Johnson  
 REGISTERED CIVIL ENGINEER

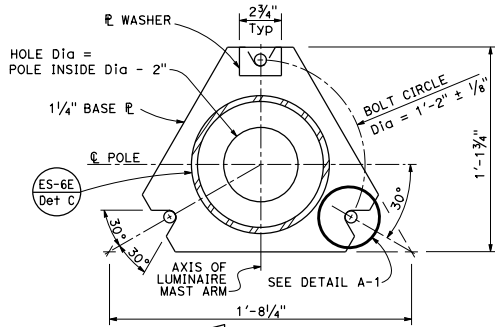
October 30, 2015  
 PLANS APPROVAL DATE

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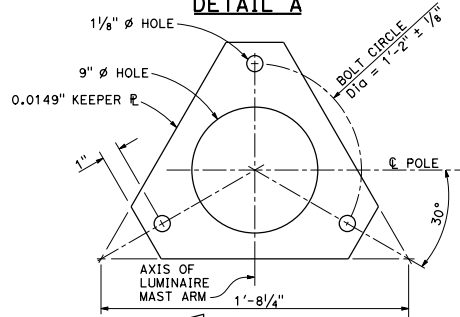
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**NOTES:**

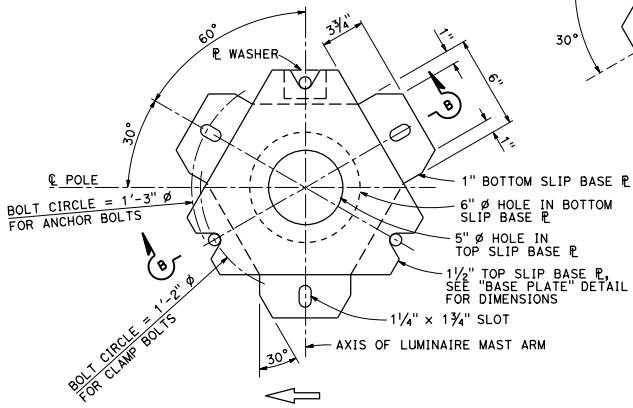
1. For slip base plate details, see Standard Plan ES-6F.
2. For Type 30 fixed base use Type 15 base plate and foundation shown on Standard Plan ES-6A. Use 1 1/4" Dia x 3'-6" anchor bolts.
3. For Type 31 fixed base use Type 32 base plate, anchor bolts and foundation on Standard Plan ES-6G.
4. Handhole shall be located on the downstream side of traffic.
5. For additional notes and details, see Standard Plans ES-7M and ES-7N.



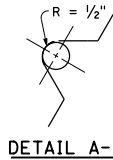
**BASE PLATE  
DETAIL A**



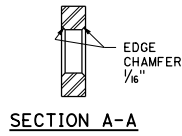
**KEEPER PLATE  
DETAIL B**



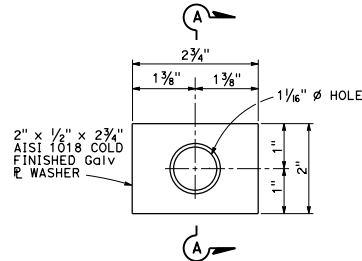
**BOTTOM PLATE  
DETAIL C**



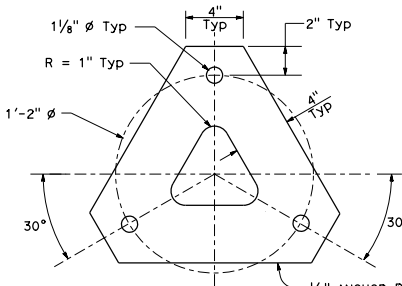
**DETAIL A-1**



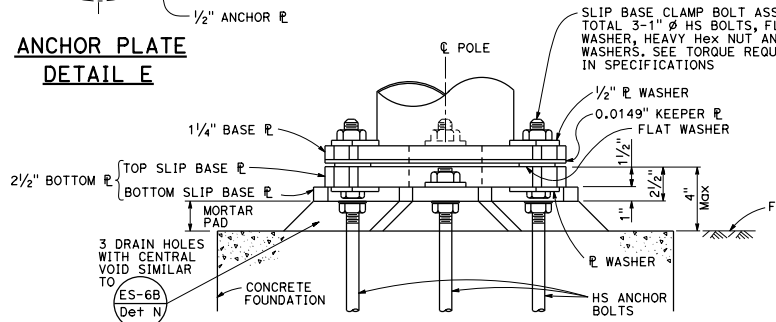
**SECTION A-A**



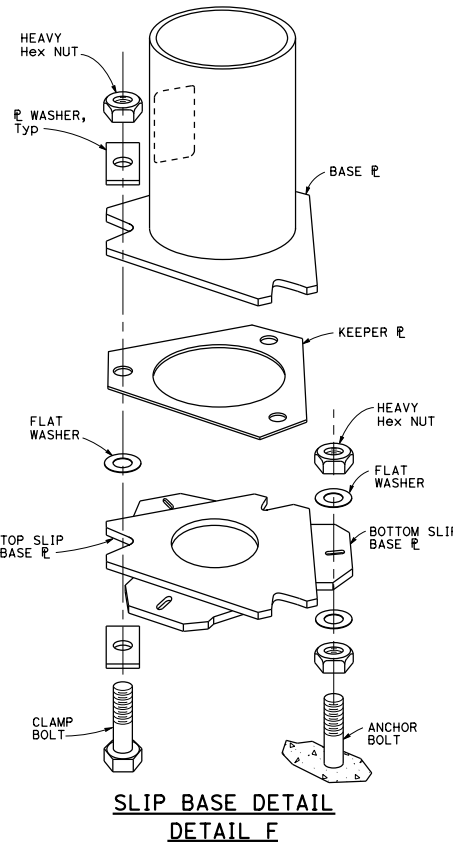
**PLATE WASHER  
DETAIL D**



**ANCHOR PLATE  
DETAIL E**



**SLIP BASE  
ELEVATION A**



**SLIP BASE DETAIL  
DETAIL F**

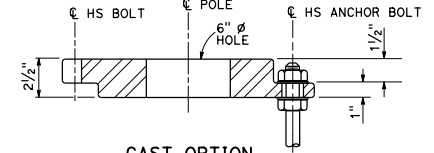
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Stanley P. Johnson  
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 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

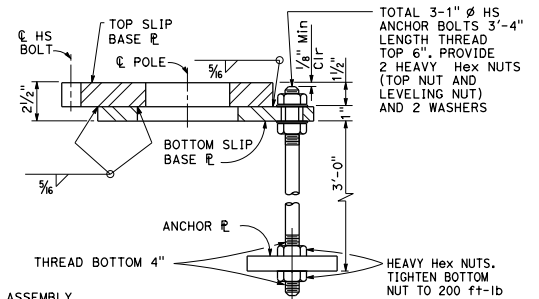
October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

- 1"  $\phi$  HS anchor bolts. For clamp bolts, see specifications.
- Conduit shall not protrude more than 2" above top of foundation.
- Handhole shall be located on the downstream side of traffic.
- For Type 30 fixed base and for Type 31 fixed base, see Notes 2 and 3 on Standard Plan ES-6E.



**CAST OPTION**



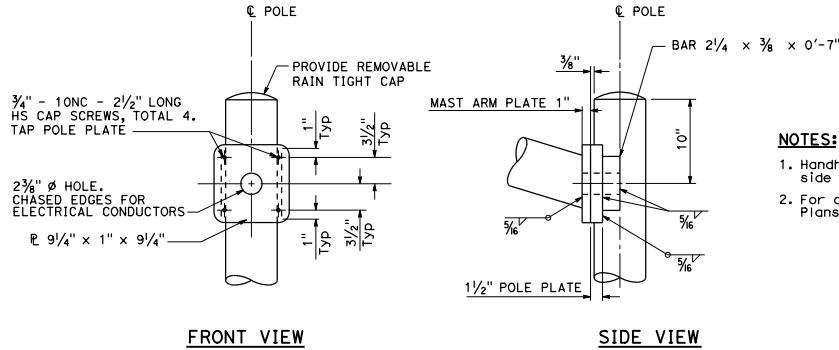
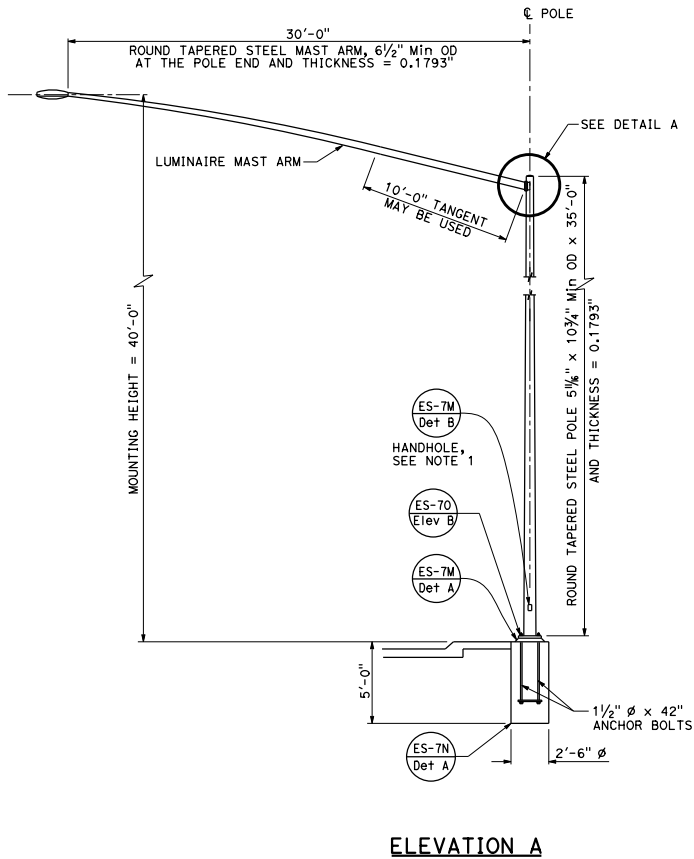
**WELDED OPTION  
SECTION B-B**

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (LIGHTING STANDARD,  
 SLIP BASE PLATE)**

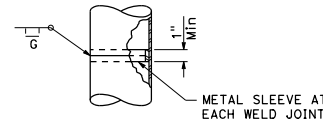
NO SCALE

**ES-6F**

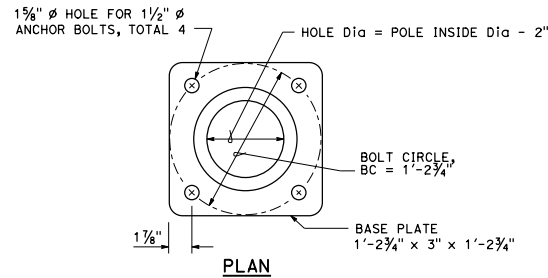
2015 STANDARD PLAN ES-6F



**DETAIL A**



**POLE SPLICE  
DETAIL B**



**BASE PLATE DETAIL  
DETAIL C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Stanley P. Johnson  
No. CS793  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

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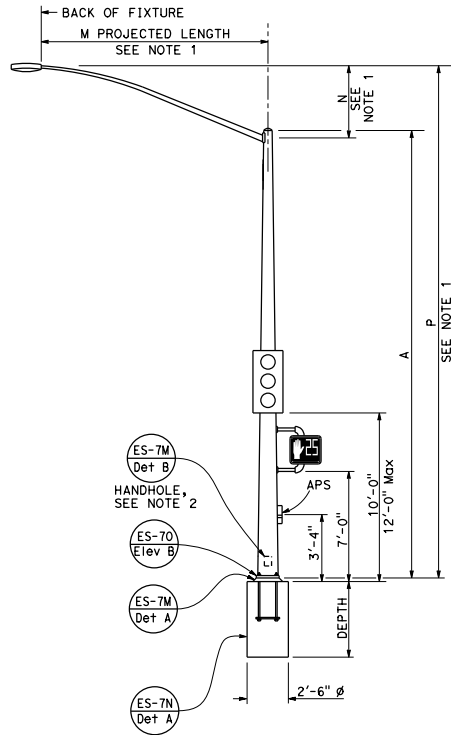
**NOTES:**

1. Handhole shall be located on the downstream side of traffic.
2. For additional notes and details, see Standard Plans ES-7M and ES-7N.

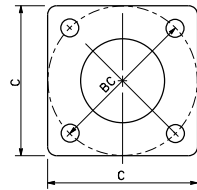
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(LIGHTING STANDARD,  
TYPE 32)**

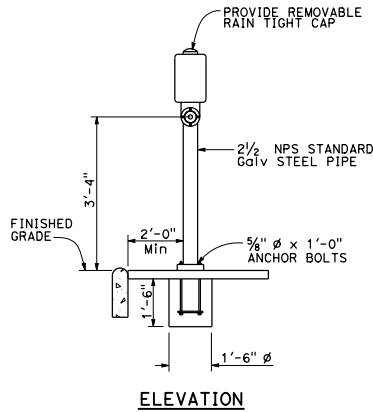
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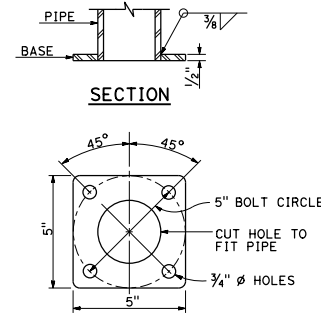
**TYPE 15TS AND 21TS STANDARD**  
**ELEVATION A**  
 (See Note 1)



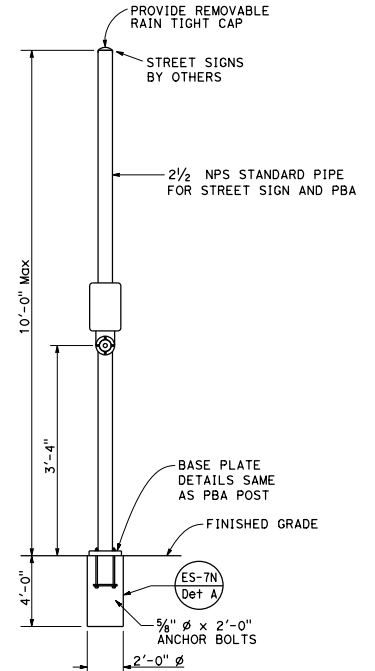
**BASE PLATE**  
**TYPE 15TS AND 21TS**  
**DETAIL A**



**PUSH BUTTON ASSEMBLY POST**  
**DETAIL B**



**BASE PLATE**  
**PBA POST**



**COMBINED STREET SIGN**  
**PUSH BUTTON ASSEMBLY POST**  
**DETAIL C**

**NOTES:**

- For additional notes, details and data for Type 15TS and Type 21TS Standards, see Standard Plan ES-6A.
- Handhole shall be located on the downstream side of traffic.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Stanley P. Johnson  
 REGISTERED CIVIL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

Stanley P. Johnson  
 No. CS793  
 Exp. 3-31-16  
 CIVIL

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POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH
	A HEIGHT	Min OD	WALL THICKNESS	C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	DEPTH	
15TS	30'-0"	8"	3 3/8"	0.1793"	1'-1 1/2"	1'-0"	2"	1 1/2" x 42"	7'-6"
21TS	35'-0"	9 3/8"	3 3/8"	0.1793"	1'-3"	1'-2"	2"	1 1/2" x 42"	8'-6"

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION


**ELECTRICAL SYSTEMS**  
**(SIGNAL AND LIGHTING STANDARD, TYPE TS, AND PUSH BUTTON ASSEMBLY POST)**

NO SCALE

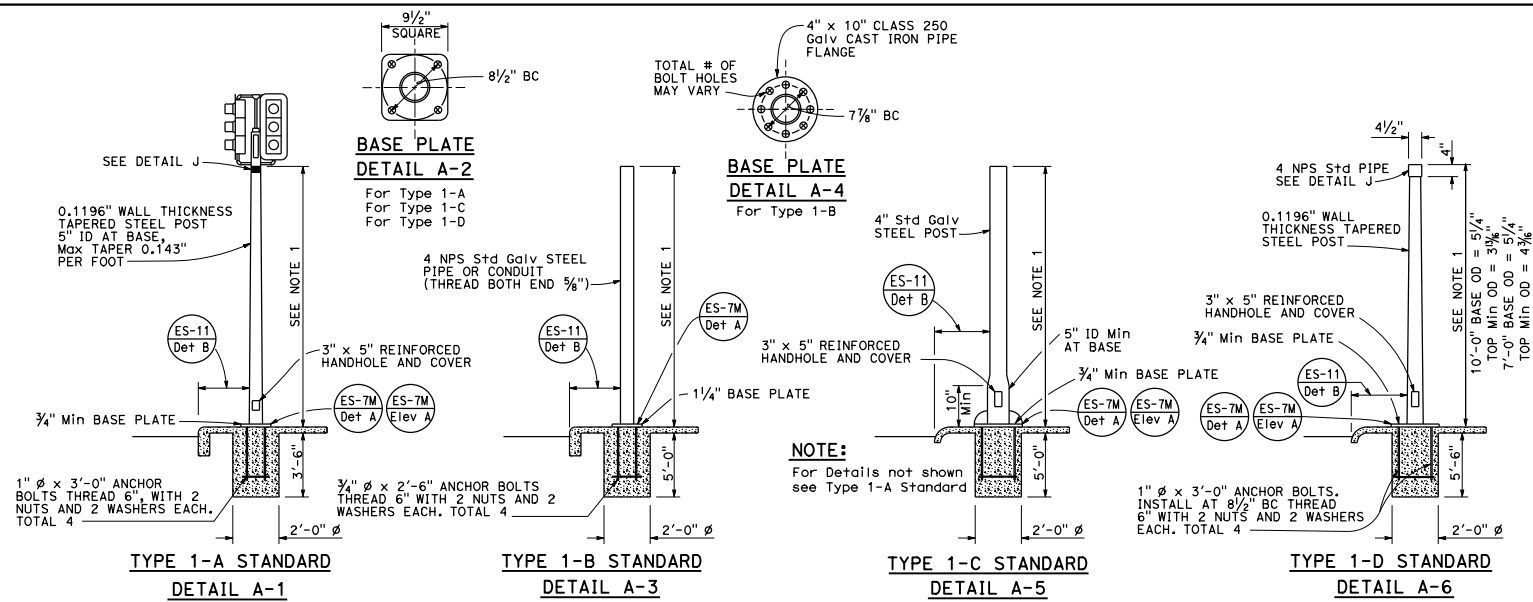
**ES-7A**



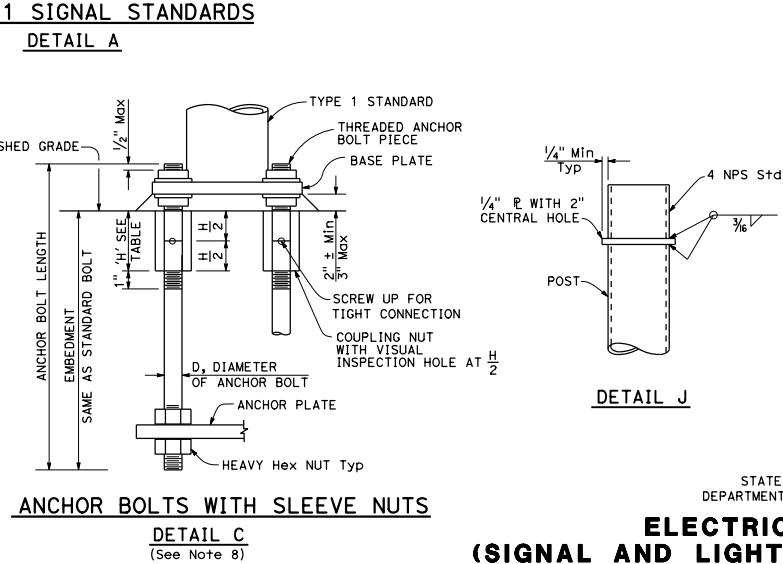
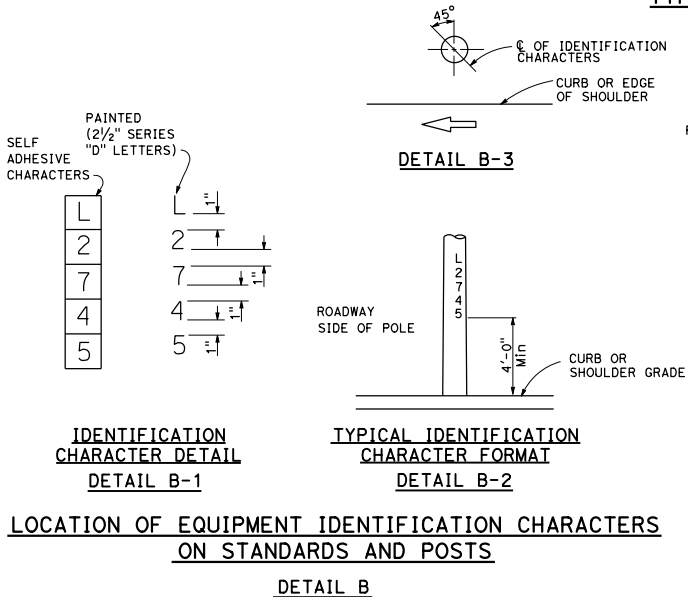
DIST	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	SHEETS

  
 REGISTERED CIVIL ENGINEER  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
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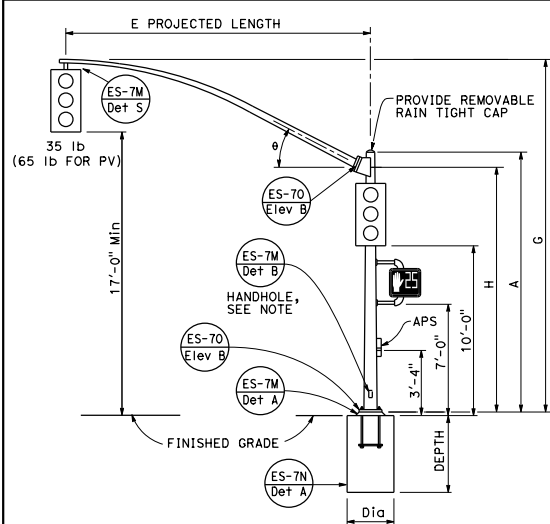
- NOTES:**
- Standards shall be 10'-0" ± 2" for vehicle signals and 7'-0" ± 2" for pedestrian signals unless shorter pole is noted on project plans.
  - Top of standards shall be 4 1/2" OD.
  - Conduits shall extend 2" maximum above finished surface of foundation and for Types 1-A, 1-C and 1-D shall be sloped toward handhole.
  - Anchor bolts shall be bonded to conduit or grounding conductor.
  - For additional notes and details, see Standard Plans ES-7M and ES-7N.
  - Pour foundation concrete against undisturbed soil.
  - For standards with handhole, locate in the downstream side of traffic.
  - Coupling nuts to be used only when shown or specified on project plans.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

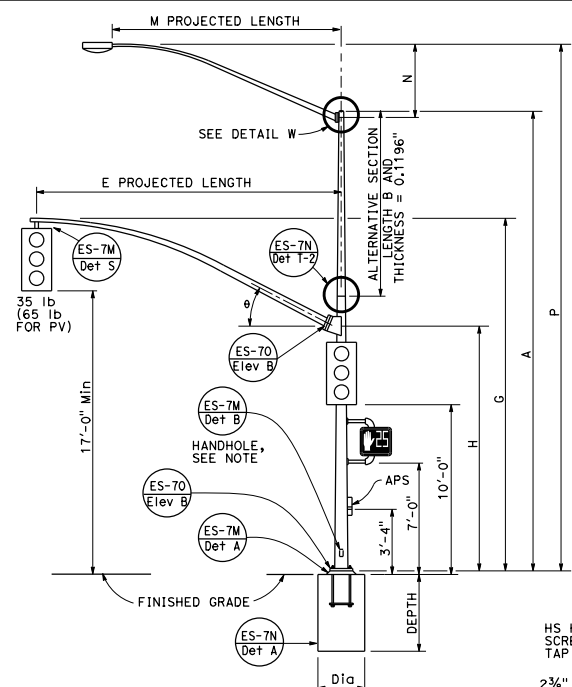
**ELECTRICAL SYSTEMS  
(SIGNAL AND LIGHTING STANDARD, TYPE 1  
AND EQUIPMENT IDENTIFICATION CHARACTERS)**

NO SCALE



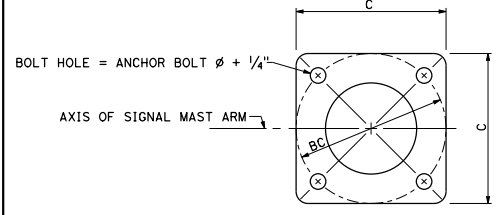
TYPE 16-1-100, 18-1-100

ELEVATION A



TYPE 19-1-100, 19A-1-100

ELEVATION B

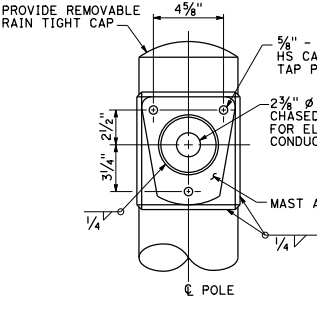


BASE PLATE

DETAIL D

$\Delta$  = LUMINAIRE MAST ARM SKEW  $-90^\circ$  TO  $+90^\circ$   
DEFAULT  $0^\circ$

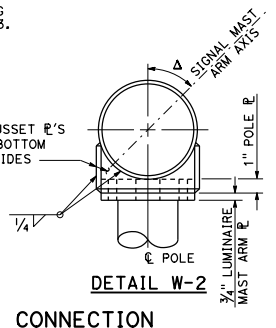
**NOTE:**  
Handhole shall be located on the downstream side of traffic.



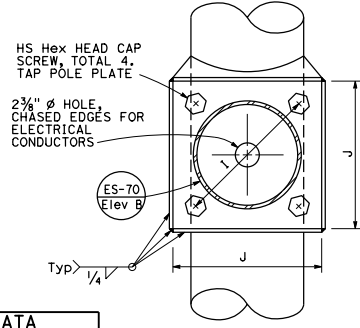
DETAIL W-1

LUMINAIRE MAST ARM CONNECTION

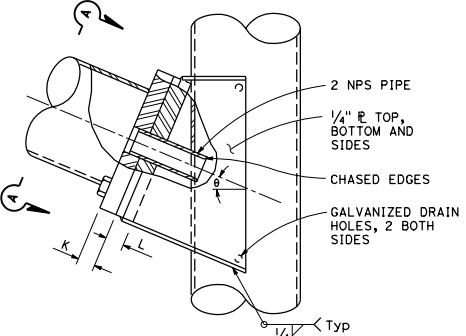
DETAIL W



DETAIL W-2



VIEW A-A



ELEVATION C

SIGNAL MAST ARM CONNECTION

DETAIL C

SIGNAL MAST ARM DATA										
E PROJECTED LENGTH	G MOUNTING HEIGHT	H	Min OD AT POLE	THICKNESS	I BOLT CIRCLE	HS CAP SCREWS	J PLATE SIZE	K MAST ARM R THICKNESS	L POLE R THICKNESS	$\theta$
15'-0"	21'-8"±	17'-6"	7 3/8"	0.1196"	12"	1 1/4"-7NC-3"	1'-0"	1 1/4"	1 1/2"	23°
20'-0"	22'-8"±	16'-0"								
25'-0"	22'-8"±	16'-0"	8"	0.1196"	12"	1 1/4"-7NC-3"	1'-0"	1 1/4"	1 1/2"	23°
30'-0"	23'-0"±	16'-0"								

LUMINAIRE MAST ARM DATA					
M PROJECTED LENGTH	N RISE	Min OD AT POLE	THICKNESS	P MOUNTING HEIGHT	
				30'-0" POLE	35'-0" POLE
6'-0"	2'-0"±	3 1/4"	0.1196"	31'-6"±	36'-6"±
8'-0"	2'-6"±	3 1/2"		32'-0"±	37'-0"±
10'-0"	3'-3"±	3 3/8"		32'-9"±	37'-9"±
12'-0"	4'-3"±	3 7/8"		33'-9"±	38'-9"±
15'-0"	4'-9"±	4 1/4"		34'-3"±	39'-3"±
15'-0"	4'-9"±	4 1/4"		34'-3"±	39'-3"±

POLE TYPE	LOAD CASE	WIND VELOCITY (mph)	POLE DATA					BASE PLATE DATA				LUMINAIRE MAST ARM		SIGNAL MAST ARM		CIDH PILE FOUNDATION		
			A HEIGHT	Min OD		THICKNESS	ALTERNATIVE SECTION B LENGTH			C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	LUMINAIRE MAST ARM	SIGNAL MAST ARM	DIAMETER	DEPTH	REINFORCED
				BASE	TOP		None	None	None									
16-1-100	1	100	18'-6"	8 1/8"	0.1793"	None			1'-5 1/2"	1'-5 1/2"	3"	1 1/2" Ø x 42"	NONE	15'-0", [20'-0"]	2'-6"	9'-0"	YES	
18-1-100			17'-0"	8 3/8"		None							NONE					
19-1-100			30'-0"	6 7/8"		10'-0"	7 7/8"	6 7/8"					6'-15' [12'-0"]	25'-0", [30'-0"]				
19A-1-100			35'-0"	5 1/2"		15'-0"	7 7/8"	5 1/2"					6'-15' [15'-0"]					

□ INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

NO SCALE

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS (SIGNAL AND LIGHTING STANDARD, CASE 1 SIGNAL MAST ARM LOADING, WIND VELOCITY = 100 MPH AND SIGNAL MAST ARM LENGTHS 15' TO 30')**

ES-7C

DIST	COUNTY	ROUTE	POST MILES	TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

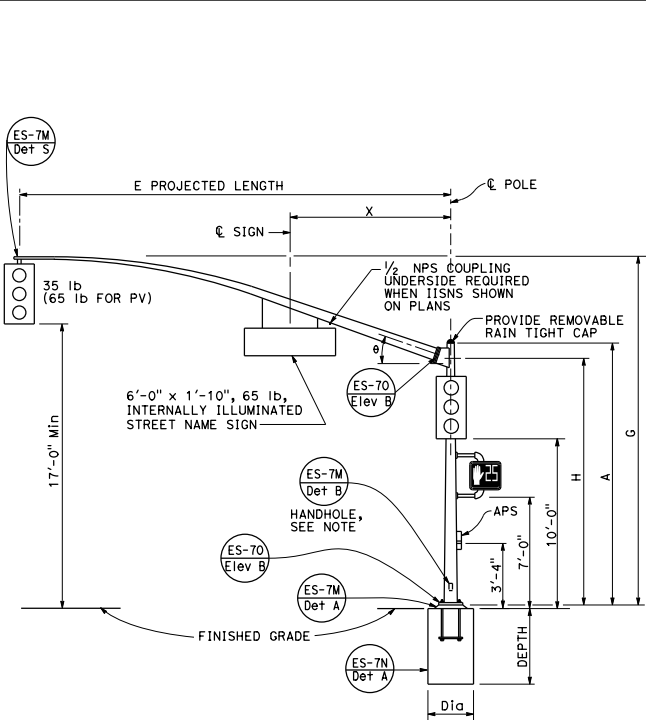
Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

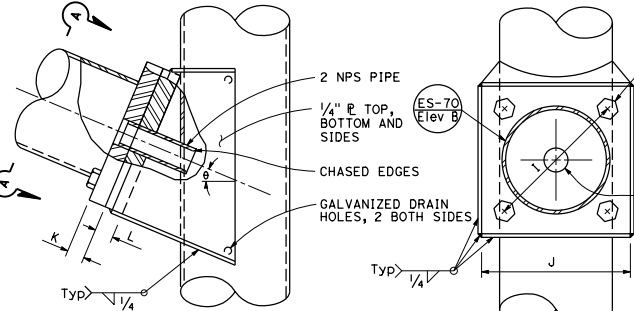
Stanley P. Johnson  
No. CS793  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

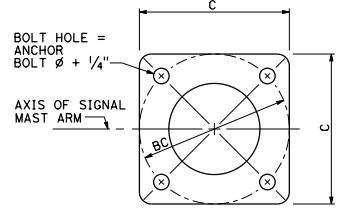
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**TYPE 16-2-100, 18-2-100**  
ELEVATION A



**SIGNAL MAST ARM CONNECTION**  
ELEVATION C  
VIEW A-A  
DETAIL A



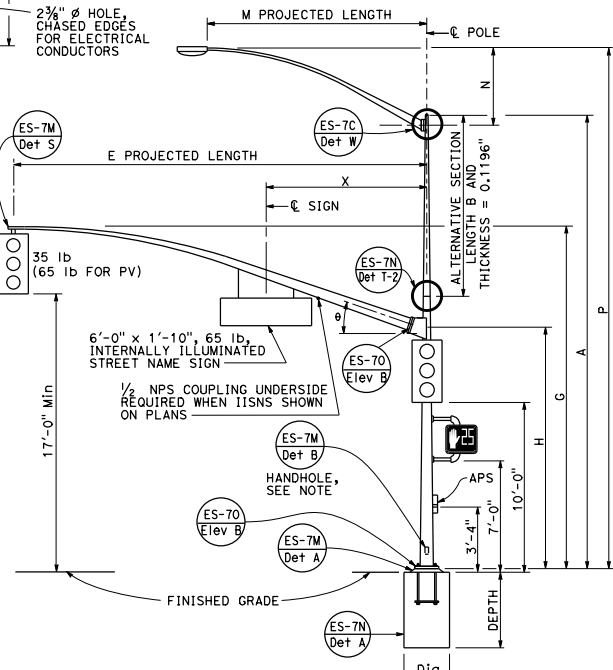
**BASE PLATE**  
DETAIL B

**NOTE:**  
Handhole shall be located on the downstream side of traffic.

Dist	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	No. SHEETS

*Stanley P. Johnson*  
 REGISTERED CIVIL ENGINEER  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**TYPE 17-2-100, 17A-2-100, 19-2-100, 19A-2-100**  
ELEVATION B

E PROJECTED LENGTH	G MOUNTING HEIGHT	H	Min OD AT POLE	THICKNESS	I BOLT CIRCLE	HS CAP SCREWS	J PLATE SIZE	K MAST ARM THICKNESS	L POLE THICKNESS	θ	X Max
15'-0"	21'-8"±	17'-6"	7 3/8"	0.1793"	12"	1 1/4"-7NC-3"	1'-0"	1/4"	1 1/2"	23°	10'-6"
20'-0"	21'-8"±	17'-6"	7 3/8"								11'-0"
25'-0"	22'-8"±	16'-0"	7 3/8"								10'-0"
25'-0"	22'-8"±	16'-0"	7 3/8"								9'-0"
30'-0"	23'-0"±	16'-0"	8"								8'-0"

M PROJECTED LENGTH	N RISE	Min OD AT POLE	THICKNESS	P MOUNTING HEIGHT
6'-0"	2'-0"±	3 3/4"	0.1196"	30'-0" POLE
8'-0"	2'-6"±	3 1/2"		31'-6"±
10'-0"	3'-3"±	3 1/2"		32'-0"±
12'-0"	4'-3"±	3 3/8"		32'-9"±
15'-0"	4'-9"±	4 1/4"		33'-9"±

POLE TYPE	LOAD CASE	WIND VELOCITY (mph)	POLE DATA			BASE PLATE DATA			LUMINAIRE MAST ARM	SIGNAL MAST ARM	CIDH PILE FOUNDATION				
			A HEIGHT	Min OD BASE	THICKNESS TOP	B LENGTH	THICKNESS	C			ANCHOR BOLT SIZE	DIAMETER	DEPTH	REINFORCED	
16-2-100	2	100	18'-6"	8 1/8"	0.1793"	NONE	3"	1 1/2"ø x 42"	NONE	15'-0", 20'-0"	2'-6"	9'-0"	YES		
17-2-100			30'-0"	6 7/8"		10'-0"			7 7/8"					6 7/8"	6'-15" [2'-0"]
17A-2-100			35'-0"	5 1/2"		15'-0"			5 1/2"					5 1/2"	6'-15" [15'-0"]
18-2-100			17'-0"	8 3/8"		NONE			NONE					NONE	None
19-2-100			30'-0"	6 7/8"		10'-0"			7 7/8"					6 7/8"	6'-15" [2'-0"]
19A-2-100	35'-0"	5 1/8"	15'-0"	5 1/8"	5 1/8"	6'-15" [15'-0"]									

□ INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

NO SCALE

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS**  
**(SIGNAL AND LIGHTING STANDARD,**  
**CASE 2 SIGNAL MAST ARM LOADING,**  
**WIND VELOCITY=100 MPH AND SIGNAL**  
**MAST ARM LENGTHS 15' TO 30')**

**ES-7D**

2015 STANDARD PLAN ES-7D

Dist	COUNTY	ROUTE	POST MILES	TOTAL PROJECT	SHEET	TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER  
October 30, 2015  
PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**TYPE 16-3-100, 18-3-100, 23-3-100, 27-3-100**  
ELEVATION A

**SIGNAL MAST ARM CONNECTION**  
DETAIL A

**VIEW A-A**

**BASE PLATE**  
DETAIL B

**TYPE 17-3-100, 24A-3-100, 19-3-100, 26-3-100, 19A-3-100, 26A-3-100, 24-3-100**  
ELEVATION B

**SIGNAL MAST ARM DATA**

E PROJECTED LENGTH	F Min SPACING	G MOUNTING HEIGHT	H	Min OD AT POLE	THICKNESS	I BOLT CIRCLE	HS CAP SCREWS	J PLATE SIZE	K MAST ARM THICKNESS	L POLE THICKNESS	θ	X Max		
15'-0"	8'-0"	21'-8"±	17'-6"	7 7/8"	0.1793"	12"	1 1/4"-7NC-3"	1'-0"	1 1/4"	1 1/2"	23°	-		
20'-0"		21'-8"±		7 7/8"										
25'-0"	12'-0"	22'-8"±		7 7/8"										
30'-0"		22'-8"±		8"	0.2391"	13"		1'-1"	1 1/2"	1 3/4"	21°	10'-6"		
35'-0"	14'-0"	23'-0"±	16'-0"	8 3/4"										
40'-0"		23'-0"±		9"										
45'-0"	15'-0"	23'-8"±		10 1/8"							15°	13'-0"		

**LUMINAIRE MAST ARM DATA**

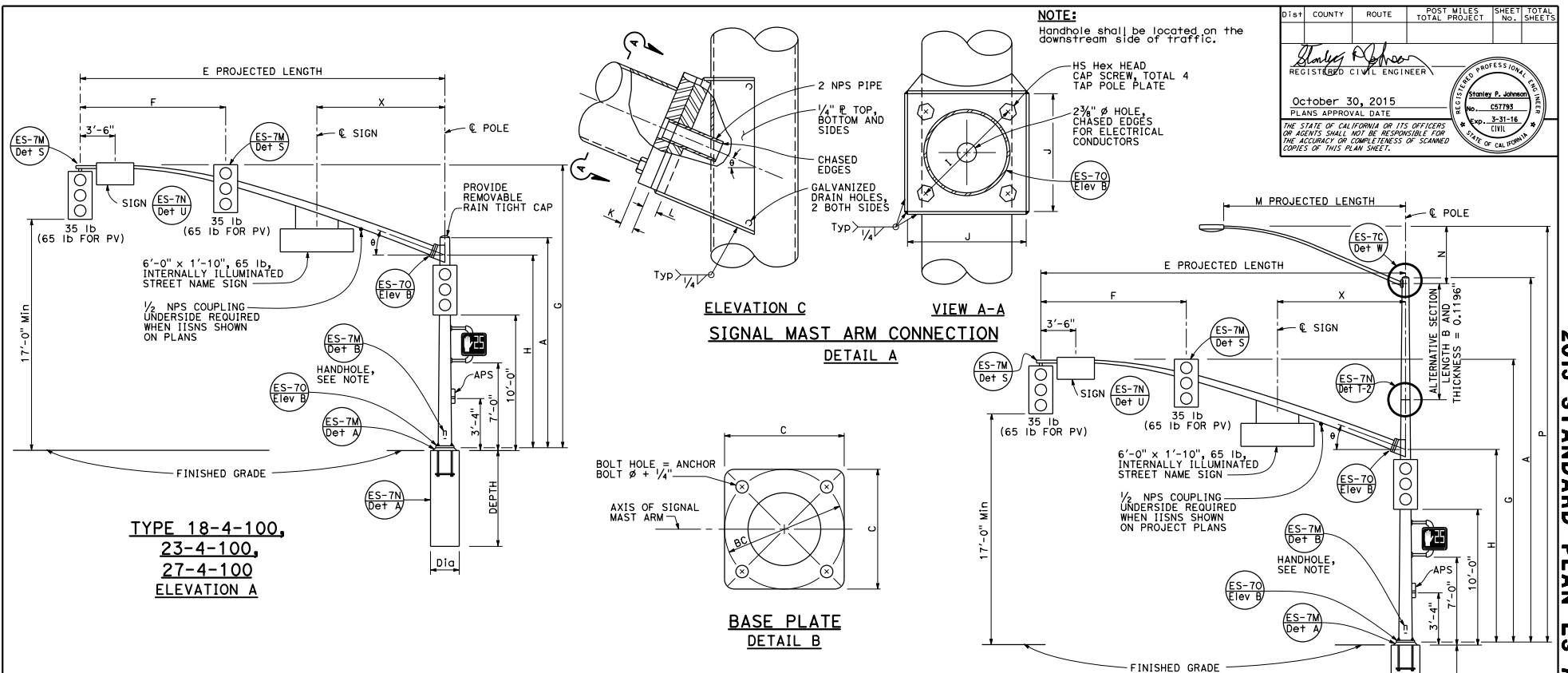
M PROJECTED LENGTH	N RISE	Min OD AT POLE	THICKNESS	P MOUNTING HEIGHT
6'-0"	2'-0"±	3 1/4"	0.1196"	30'-0" POLE
8'-0"	2'-6"±	3 1/2"		31'-6"±
10'-0"	3'-3"±	3 3/4"		32'-0"±
12'-0"	4'-3"±	3 3/4"		32'-9"±
15'-0"	4'-9"±	4 1/4"		33'-9"±
				34'-3"±
				35'-0" POLE
				36'-6"±
				37'-0"±
				37'-9"±
				38'-9"±
				39'-3"±

**POLE DATA**

POLE TYPE	LOAD CASE	WIND VELOCITY (mph)	A HEIGHT			THICKNESS	ALTERNATIVE SECTION			C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	LUMINAIRE MAST ARM	SIGNAL MAST ARM	DIAMETER	DEPTH	REINFORCED	
			Min	Base	Top		B Length	Bottom	Top										
16-3-100			18'-6"			0.1793"	NONE			1'-5 1/2"	3"	2" φ x 42"	NONE	15'-0"	3'-0"	11'-0"	YES		
17-3-100			30'-0"	10 3/4"	8 1/8"		NONE	10'-0"	7 7/8"				6 7/8"	6'-15' [12'-0"]				20'-0"	8'-6"
18-3-100			17'-0"		8 7/8"		NONE	10'-0"	7 1/8"				7 1/8"	6'-15' [12'-0"]				25'-0"	9'-6"
19-3-100			30'-0"		7 1/8"	0.2391"	10'-0"	9 1/8"	7 1/8"	1'-7"	1'-5 1/2"	2" φ x 42"	6'-15' [12'-0"]	35'-0"	3'-0"	11'-0"	YES		
19A-3-100			35'-0"		6 5/8"		NONE	15'-0"	6 5/8"				6 5/8"	6'-15' [15'-0"]				30'-0"	
23-3-100			17'-0"	1'-0"	9 3/8"		NONE	10'-0"	9 1/8"				7 1/8"	6'-15' [12'-0"]				35'-0"	
24-3-100			30'-0"		7 1/8"	0.3125"	10'-0"	9 1/8"	7 1/8"	1'-11"	1'-9"	2 1/2" φ x 42"	6'-15' [12'-0"]	40'-0"	3'-6"	12'-0"	YES		
24A-3-100			35'-0"		6 5/8"		NONE	15'-0"	7 1/8"				7 1/8"	6'-15' [15'-0"]				45'-0"	
26-3-100			30'-0"		7 1/8"		NONE	10'-0"	9 1/4"				7 1/8"	6'-15' [12'-0"]				45'-0"	
26A-3-100			35'-0"	1'-2"	7 1/8"		15'-0"	7 1/8"	7 1/8"										
27-3-100			17'-0"		9 1/8"		NONE												

□ INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

NO SCALE



**NOTE:**  
Handhole shall be located on the downstream side of traffic.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

**Stanley P. Johnson**  
 REGISTERED CIVIL ENGINEER  
 No. C5793  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**TYPE 18-4-100,  
23-4-100,  
27-4-100  
ELEVATION A**

**TYPE 19-4-100, 19A-4-100,  
24-4-100, 24A-4-100,  
26-4-100, 26A-4-100  
ELEVATION B**

SIGNAL MAST ARM DATA											LUMINAIRE MAST ARM DATA							
E PROJECTED LENGTH	F Min SPACING	G MOUNTING HEIGHT	H	Min OD AT POLE	THICKNESS	I BOLT CIRCLE	HS CAP SCREWS	J PLATE SIZE	K MAST ARM ϕ THICKNESS	L POLE ϕ THICKNESS	θ	X Max	M PROJECTED LENGTH	N RISE	Min OD AT POLE	THICKNESS	P MOUNTING HEIGHT	
																	30'-0" POLE	35'-0" POLE
25'-0"	10'-0"	22'-8"±		7 3/8"	0.2391"	12"	1 1/4"-7NC-3"	1'-0"	1 1/4"	1 1/2"	23°	10'-6"	6'-0"	2'-0"±	3 1/4"	0.1196"	31'-6"±	36'-6"±
30'-0"	12'-0"		8"	1'-0"		1 1/4"		1 1/2"	21°	10'-0"	3'-3"±	3 1/2"	32'-0"±	37'-0"±				
35'-0"	14'-0"	23'-0"±	16'-0"	8 1/2"		1'-1 1/2"		1 1/2"	15°	12'-0"	4'-3"±	3 3/8"	32'-9"±	37'-9"±				
40'-0"	15'-0"			9 3/8"						15'-0"	4'-9"±	4 1/4"	33'-9"±	38'-9"±				
45'-0"		23'-8"±		10 1/4"									34'-3"±	39'-3"±				

POLE TYPE	LOAD CASE	WIND VELOCITY (mph)	POLE DATA			BASE PLATE DATA				LUMINAIRE MAST ARM			SIGNAL MAST ARM			CIDH PILE FOUNDATION				
			A HEIGHT	Min BASE	Min OD TOP	THICKNESS	ALTERNATIVE SECTION			C	BC BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE	LUMINAIRE MAST ARM	SIGNAL MAST ARM	Dia	DEPTH	REINFORCED		
			B LENGTH	BOTTOM	TOP		None	9/8"	7 1/8"											
18-4-100	4	100	17'-0"	12 1/8"	9 3/8"	0.3125"	None	1'-7"	1'-5 1/2"	3"	2" ϕ x 42"	None	25'-0"	3'-0"	11'-0"	Yes				
19-4-100			30'-0"		7 1/8"		10'-0"										9/8"	7 1/8"	6'-15' 12'-0"	30'-0"
19A-4-100			35'-0"		6 5/8"		15'-0"										None	None	6'-15' 15'-0"	30'-0"
23-4-100			17'-0"		9 3/8"		None										None	None	None	None
24-4-100			30'-0"		7 1/8"		10'-0"										7 1/8"	9/8"	6'-15' 12'-0"	35'-0"
24A-4-100			35'-0"	6 5/8"	15'-0"	7 1/8"	9/8"	6'-15' 15'-0"	35'-0"											
26-4-100			30'-0"	8 3/8"	10'-0"	8 3/8"	None	6'-15' 12'-0"	40'-0"											
26A-4-100			35'-0"	7 7/8"	15'-0"	9 3/8"	7 7/8"	6'-15' 15'-0"	45'-0"											
27-4-100			17'-0"	10 1/8"	None	None	None	None	None											

□ INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (SIGNAL AND LIGHTING STANDARD,  
 CASE 4 SIGNAL MAST ARM LOADING,  
 WIND VELOCITY=100 MPH AND SIGNAL  
 MAST ARM LENGTHS 25' TO 45')**

NO SCALE

**ES-7F**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Stanley P. Johnson*  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Stanley P. Johnson  
No. C5795  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

**TYPE 28-5-100  
ELEVATION A**

**TYPE 29-5-100,  
29A-5-100  
ELEVATION B**

M PROJECTED LENGTH	N RISE	Min OD AT POLE	THICKNESS	P MOUNTING HEIGHT	
				30'-0" POLE	35'-0" POLE
6'-0"	2'-0"±	3 1/4"	0.1196"	31'-6"±	36'-6"±
8'-0"	2'-6"±	3 1/2"		32'-0"±	37'-0"±
10'-0"	3'-3"±	3 3/8"		32'-9"±	37'-9"±
12'-0"	4'-3"±	3 7/8"		33'-9"±	38'-9"±
15'-0"	4'-9"±	4 1/4"		34'-3"±	39'-3"±

**BASE PLATE  
DETAIL B**

E PROJECTED LENGTH	F Min SPACING	G MOUNTING HEIGHT	H	Min OD AT POLE	THICKNESS	I BOLT CIRCLE	HS CAP SCREWS	J PLATE SIZE	K MAST ARM THICKNESS	L POLE R THICKNESS	θ	Q SECTION		X Max
												LENGTH	THICKNESS	
50'-0"	15'-0"	23'-7"± TO 25'-7"±	16'-0"	11 1/8"	0.1793"	16"	1 1/2"-6NC-3/4"	1'-4"	1 3/4"	1 3/4"	15°	18'-0"	0.2391"	14'-0"
55'-0"				23'-0"										

POLE TYPE	LOAD CASE	WIND VELOCITY (mph)	A HEIGHT	Min OD		THICKNESS	ALTERNATIVE SECTION	
				HEIGHT	TOP		B LENGTH	BOTTOM
28-5-100	5	100	17'-0"	11 1/8"	0.3125"	NONE	11 1/8"	
29-5-100			30'-0"	9 1/8"		10'-0"		
29A-5-100			35'-0"	8 5/8"		15'-0"	9 1/8"	

C	BC = BOLT CIRCLE	THICKNESS	ANCHOR BOLT SIZE
23"	21"	3"	2 1/2" φ x 42"

POLE TYPE	MIN MAST ARM	MAX MAST ARM
28-5-100	NONE	NONE
29-5-100	6'-15"	15'-0"

Dia	DEPTH	REINFORCED
3'-6"	12'-0"	YES

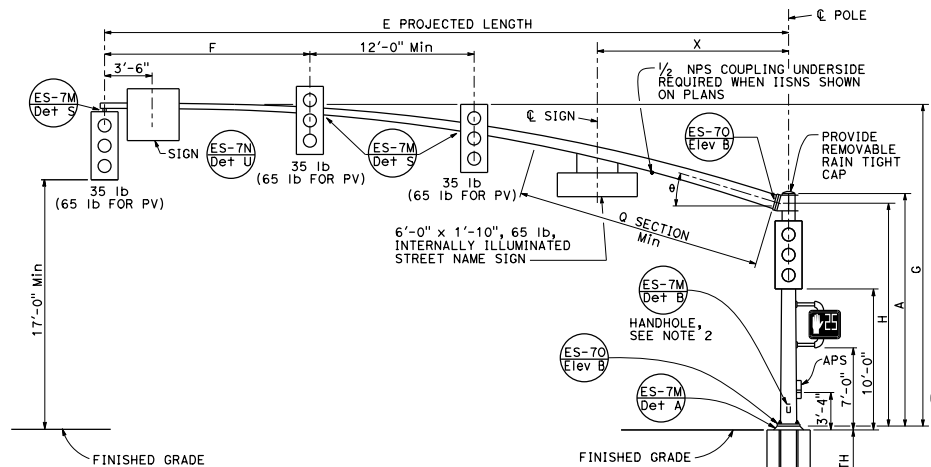
□ INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

NO SCALE

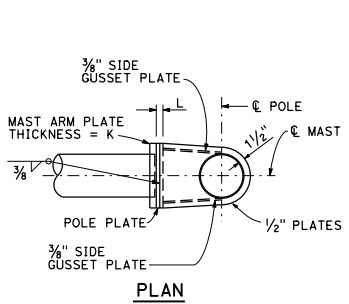
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(SIGNAL AND LIGHTING STANDARD,  
CASE 5 SIGNAL MAST ARM LOADING,  
WIND VELOCITY=100 MPH AND SIGNAL  
MAST ARM LENGTHS 50' TO 55')**

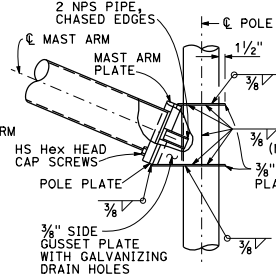




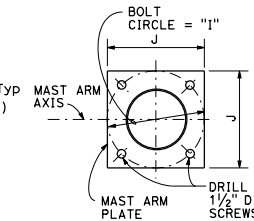
**TYPE 60-5-100**  
**ELEVATION A**



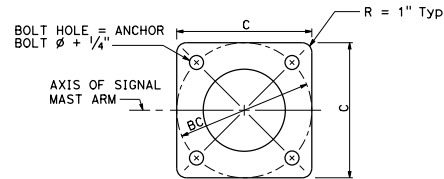
**PLAN**



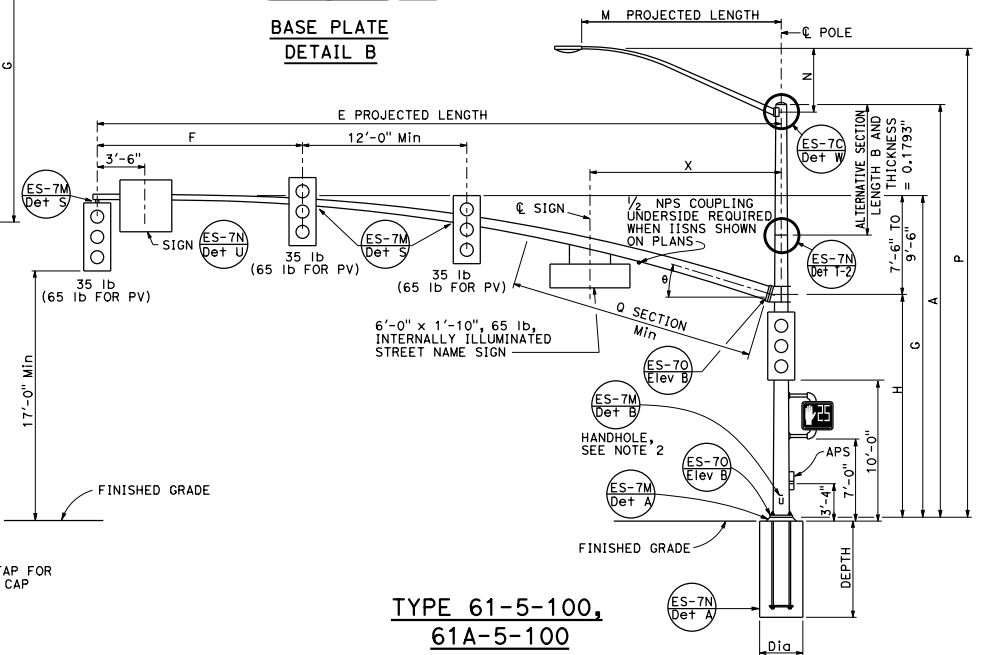
**ELEVATION**  
(See Note 1)



**MAST ARM PLATE**



**BASE PLATE**  
**DETAIL B**



**TYPE 61-5-100,**  
**61A-5-100**  
**ELEVATION B**

SIGNAL MAST ARM DATA														
E PROJECTED LENGTH	F Min SPACING	G MOUNTING HEIGHT	H	Min OD AT POLE	THICKNESS	I BOLT CIRCLE	HS CAP SCREWS	J PLATE SIZE	K MAST ARM THICKNESS	L Pole Thickness	Q SECTION			
											Length	Thickness		
60'-0"	15'-0"	23'-7" TO 25'-7"	16'-0"	1'-1 1/2"	0.1793"	20"	1 1/2"-6NC-4"	1'-8"	2"	2"	15°	24'-0"	0.2391"	14'-0"
65'-0"					0.2391"							29'-0"	0.3125"	

LUMINAIRE MAST ARM DATA					
M PROJECTED LENGTH	N RISE	Min OD AT POLE	THICKNESS	P MOUNTING HEIGHT	
				POLE	POLE
6'-0"	2'-0"±	3/4"	0.1196"	30'-0"	35'-0"
8'-0"	2'-6"±	3/2"		31'-6"±	36'-6"±
10'-0"	3'-3"±	3 3/8"		32'-0"±	37'-0"±
12'-0"	4'-3"±	3 7/8"		32'-9"±	37'-9"±
15'-0"	4'-9"±	4 1/4"		33'-9"±	38'-9"±
				34'-3"±	39'-3"±

**NOTES:**

- The radial separation between the face of the pole and the adjacent insides of the top and bottom gusset plates shall not exceed 3/16". Fillet weld size to be increased by amount of gap.
- Handhole shall be located on the downstream side of traffic.

POLE TYPE	LOAD CASE	WIND VELOCITY (mph)	POLE DATA		BASE PLATE DATA				LUMINAIRE MAST ARM	SIGNAL MAST ARM	CIDH PILE FOUNDATION				
			A HEIGHT	Min OD		C	BC = BOLT CIRCLE	THICKNESS			ANCHOR BOLT SIZE	DIAMETER	DEPTH	REINFORCED	
				BASE	TOP										
60-5-100	5	100	17'-0"	16"	1'-1 3/8"	0.3125"	2'-0"	1'-11"	3"	2 1/2" ø x 60"	NONE	60'-0"	3'-6"	13'-0"	YES
61-5-100			30'-0"	16"	1 1/8"						61-15' [15'-0"]	65'-0"			
61A-5-100			35'-0"	16"	1 0 5/8"										

INDICATES MAST ARM LENGTH TO BE USED UNLESS OTHERWISE NOTED ON PLANS.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(SIGNAL AND LIGHTING STANDARD,**  
**CASE 5 SIGNAL MAST ARM LOADING,**  
**WIND VELOCITY=100 MPH AND SIGNAL**  
**MAST ARM LENGTHS 60' TO 65')**

NO SCALE

**ES-7H**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

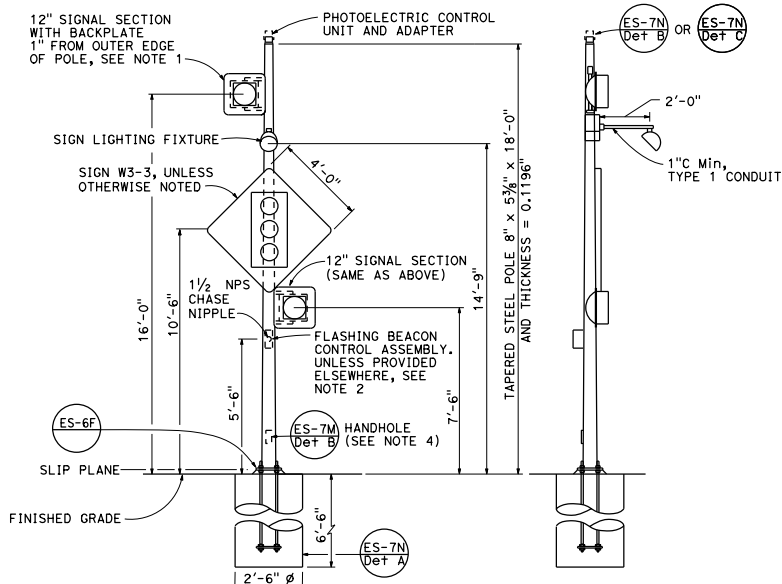
REGISTERED CIVIL ENGINEER  
October 30, 2015  
PLANS APPROVAL DATE  
Stanley P. Johnson  
No. C5793  
Exp. 3-31-16  
CIVIL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

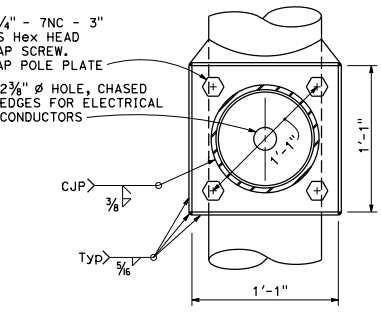
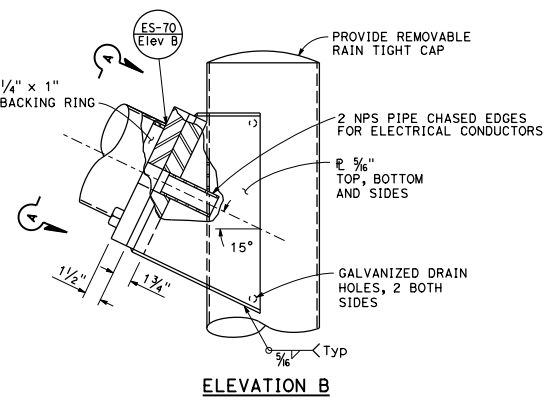
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

**Stanley P. Johnson**  
 REGISTERED CIVIL ENGINEER  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

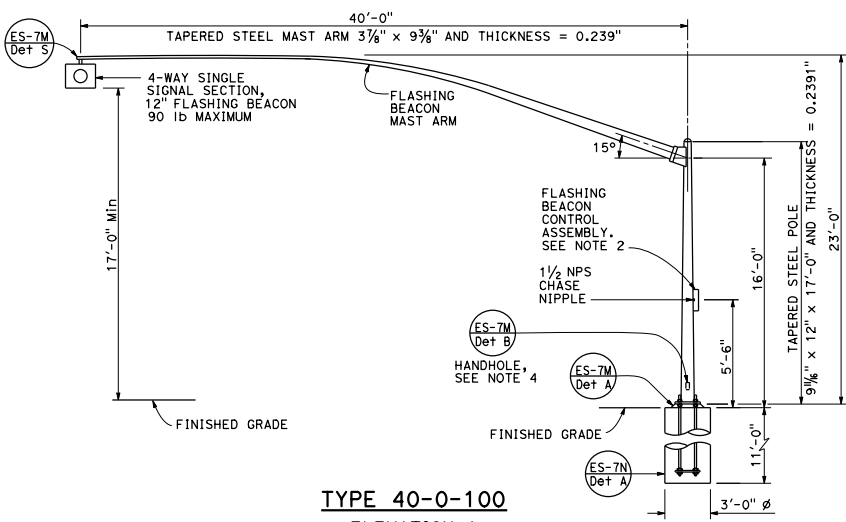
October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



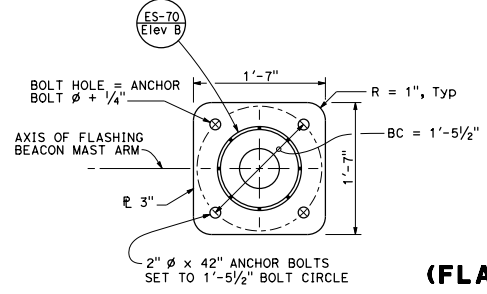
**TYPE 15-FBS**  
**ADVANCE FLASHING BEACON WITH SLIP BASE INSTALLATION**  
**DETAIL A**



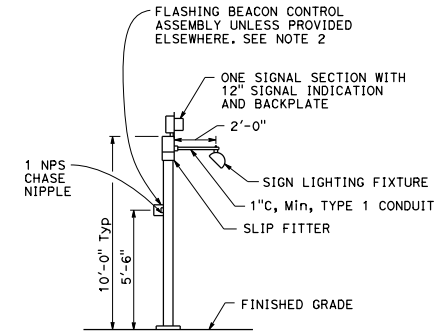
**VIEW A-A**  
**FLASHING BEACON MAST ARM**  
**CONNECTION DETAIL**  
**DETAIL B**



**TYPE 40-0-100**  
**ELEVATION A**



**BASE PLATE**  
**DETAIL C**



**TYPE 1-A, 1-B, 1-C, AND 1-D**  
**ADVANCE FLASHING**  
**BEACON INSTALLATION**  
**DETAIL D**  
 See Note 5

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(FLASHING BEACON ON A TYPE 1,**  
**TYPE 15-FBS, AND TYPE 40 STANDARD)**  
 NO SCALE

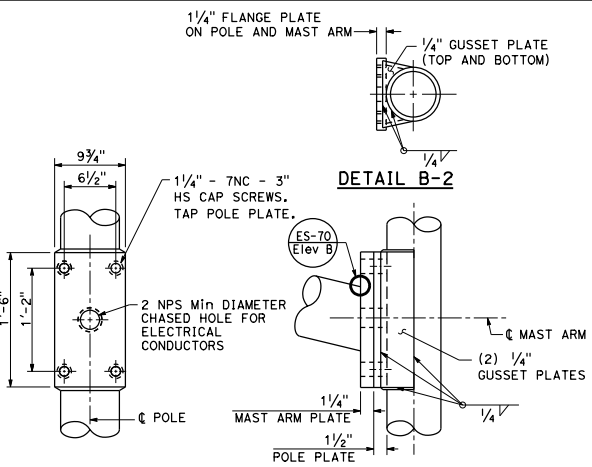




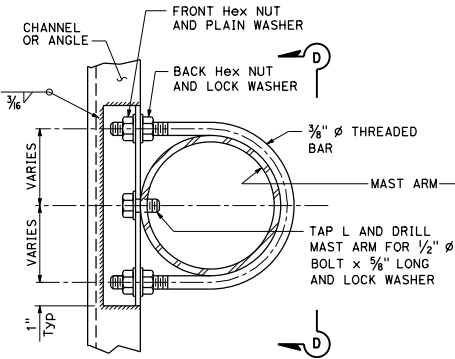
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Stanley P. Johnson  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

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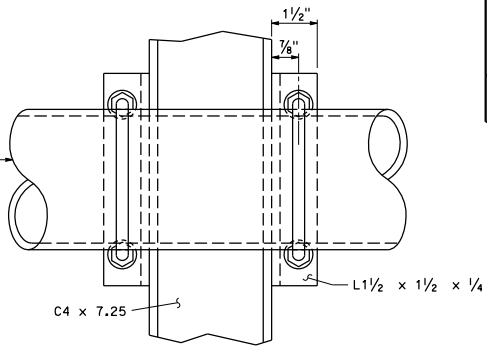
**FLASHING BEACON MAST ARM CONNECTION DETAILS**  
**DETAIL B-1**



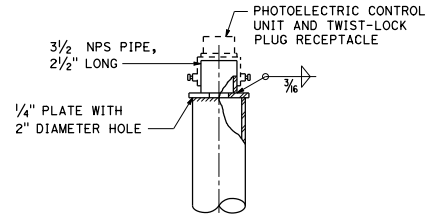
**DETAIL B-3**

**NOTE:** Tighten front Hex nuts first, then tighten back Hex nuts.

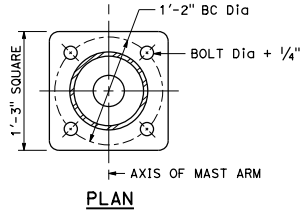
**SIGN FRAME MOUNTING DETAILS**  
 All types  
**DETAIL B**



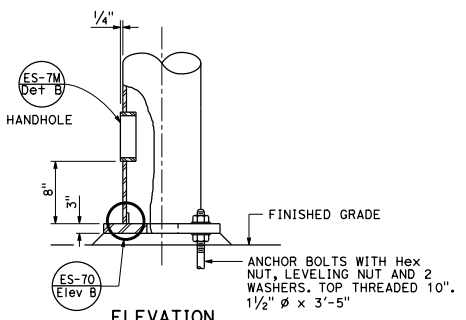
**VIEW D-D**



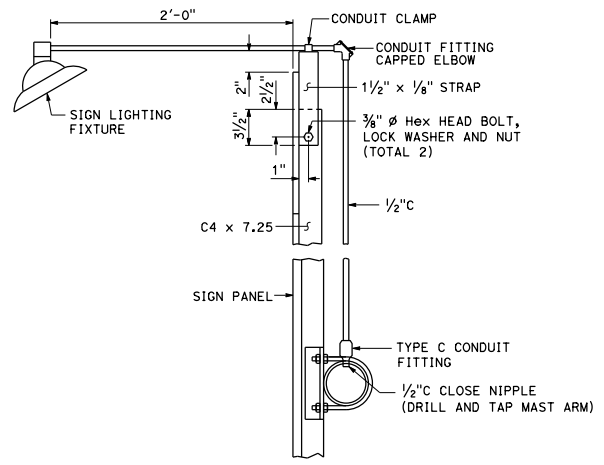
**POLE TOP DETAIL**  
**DETAIL E**



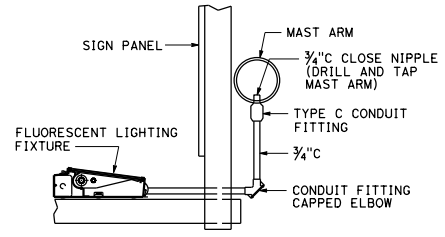
**PLAN**



**BASE PLATE AND ANCHORAGE DETAIL**  
**DETAIL C**

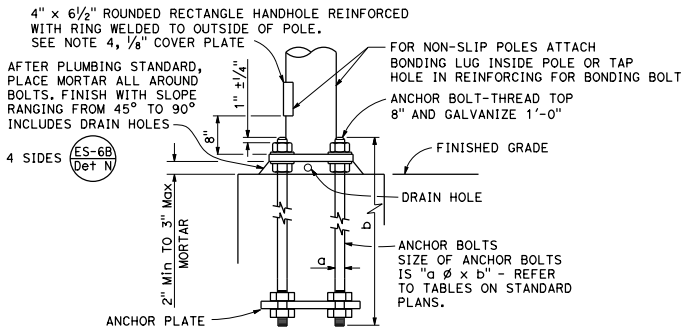


**SIGN LIGHTING FIXTURE TYPES 9A AND 9B**  
**DETAIL D**



**SIGN LIGHTING FIXTURE TYPE 9 FRAME**  
**DETAIL F**

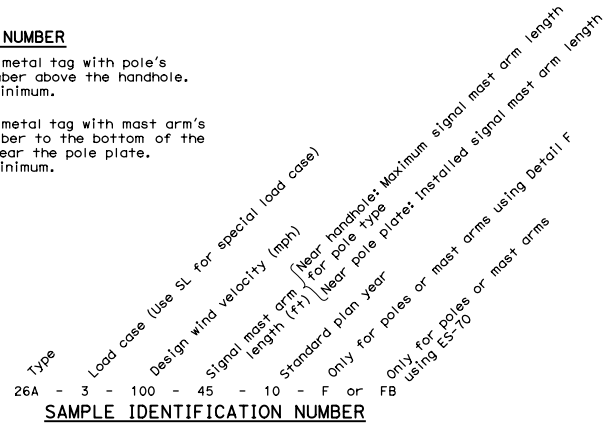
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS (FLASHING BEACON WITH TYPE 9, 9A AND 9B SIGN)**  
 NO SCALE



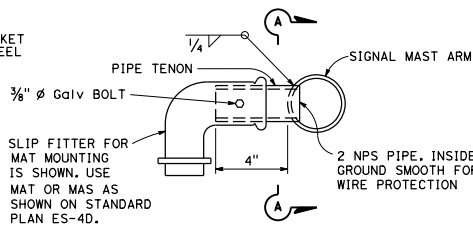
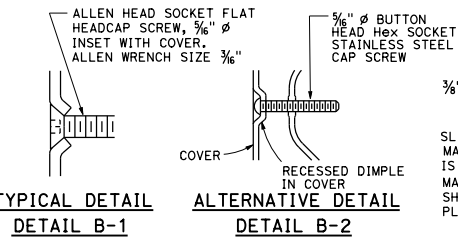
**HANDHOLE AND ANCHORAGE**  
**DETAIL A**

**IDENTIFICATION NUMBER**

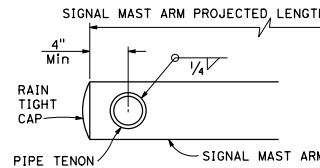
1. Attach a stamped metal tag with pole's identification number above the handhole. 1/4" high number, minimum.
2. Attach a stamped metal tag with mast arm's identification number to the bottom of the signal mast arm near the pole plate. 1/4" high number, minimum.



**SAMPLE IDENTIFICATION NUMBER**



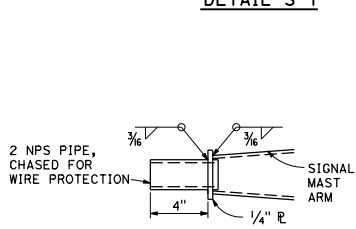
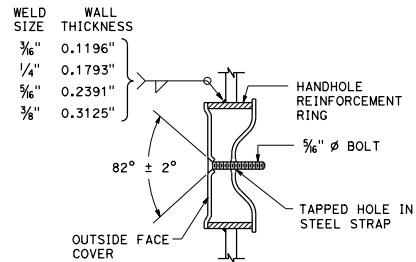
**SIDE TENON**  
**DETAIL S-1**



**SECTION A-A**

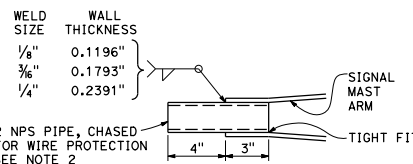
**NOTES:**

1. Provide a Hex nut, leveling nut and 2 washers for each bolt.
2. Luminaire mast arms shall be round, tapered steel tubes, taper of 0.1375" to 0.143-inch per foot with an end section 2 3/8" OD for mounting hardware. Extensions of 2 NPS Standard pipe and 7" long may be used at the option of the manufacturer. When low pressure sodium luminaires are required, the extension shall be 1'-3".
3. Signal mast arms shall be round, tapered steel tubes, maximum taper 0.143-inch per foot.
4. Handhole reinforcement ring shall be 1/4" x 2" for 0.1196" to 0.2391" thick poles, 3/8" x 2" for 0.3125" thick poles.
5. Handholes shall be located on the downstream side of traffic.
6. Detail F, fatigue resistant weld, is required at socket welded signal mast arm plate and pole base plate.
7. Cap screws shall be tightened by the turn-of-nut method 1/3 turn from a snug tight condition. No washer will be required.
8. Outside diameter, wall thickness, and corresponding section properties of poles and mast arms as shown in the Standard Plans are minimums. Unless otherwise specified, alternative sections shall require approval by the Engineer.
9. Wind Loading (3 seconds gust): 100 mph
10. Unit Stresses (Structural steel):  
fy = 55,000 psi (tapered steel tube and anchor bolts)  
fy = 50,000 psi (unless otherwise noted)
11. Unit Stresses (Reinforced concrete):  
f'c = 3,625 psi  
fy = 60,000 psi

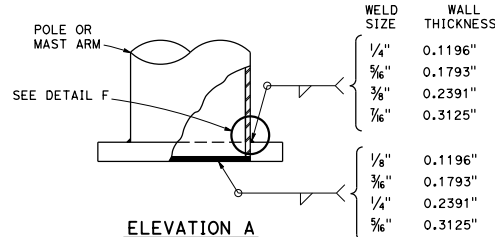
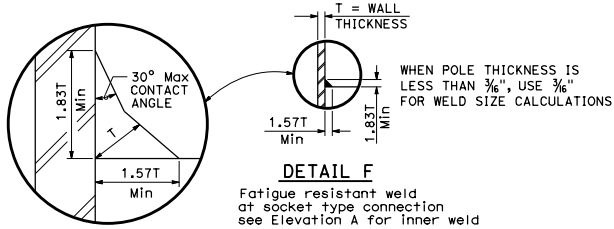


This detail supersedes Detail S when so designated

**PIPE TENONS**  
**DETAIL S**



**TIP TENON**  
**DETAIL TS**



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS**  
**(SIGNAL AND LIGHTING STANDARD,**  
**DETAIL No. 1)**

NO SCALE

**ES-7M**

2015 STANDARD PLAN ES-7M

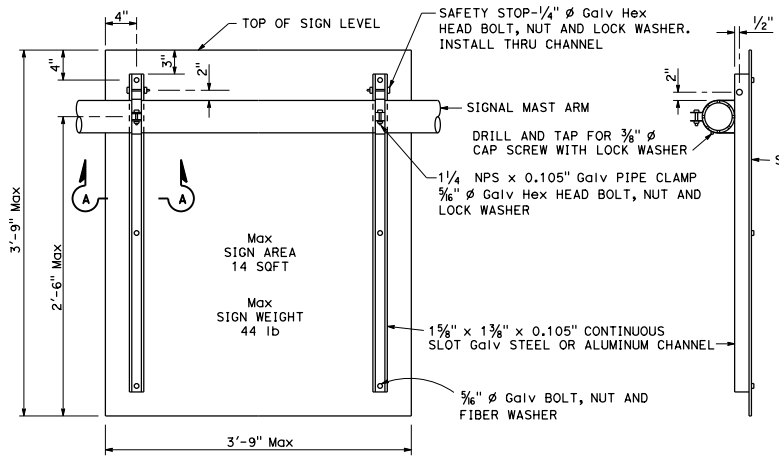
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Stanley P. Johnson  
No. CS793  
Exp. 3-31-16  
CIVIL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

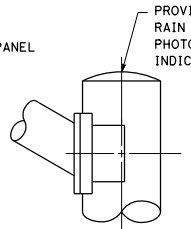
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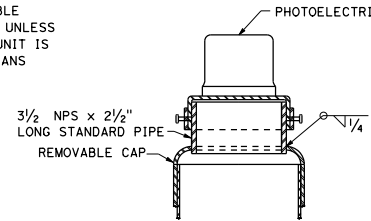
REAR VIEW

SIDE VIEW

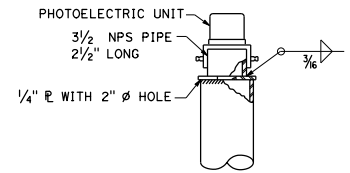
**SIGN MOUNTING DETAILS  
DETAIL U**



STANDARD TOP  
DETAIL B-1

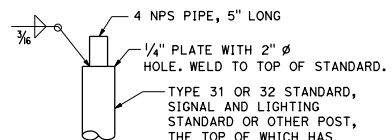


MOUNTING ADAPTER FOR  
PHOTOELECTRIC UNIT  
DETAIL B-2



ALTERNATIVE  
MOUNTING ADAPTER  
DETAIL B-3

**POLE TOP DETAILS  
DETAIL B**

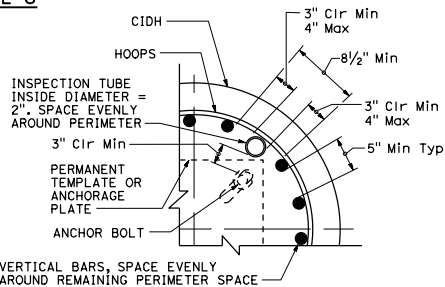


DETAIL C-1

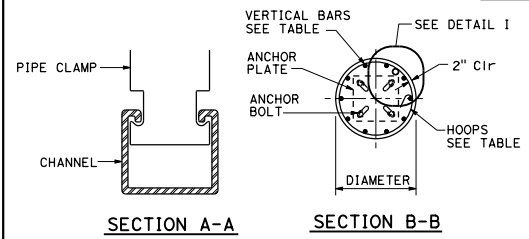
**CIDH REINFORCING AND INSPECTION TUBE SCHEDULE**

CIDH DIAMETER	VERTICAL BARS	HOOPS (WELDED)	INSPECTION TUBE
2 ft	8-#5	#4 AT 6	2
2.5 ft	10-#6	#4 AT 6	4*
3 ft	12-#7	#5 AT 6	4
3.5 ft	14-#8	2-#4 AT 7	5
4 ft	18-#9	2-#5 AT 7	6
5 ft	22-#10	2-#6 AT 7	7
6 ft	26-#11	2-#6 AT 7	7

\* FOR SLIP BASE VERSIONS WITH 3 ANCHOR BOLTS USE 3 INSPECTION TUBES.

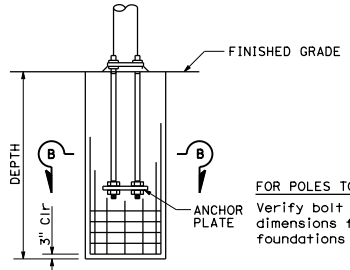


**INSPECTION TUBE PLACEMENT  
DETAIL I**



SECTION A-A

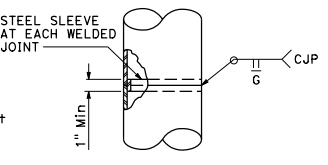
SECTION B-B



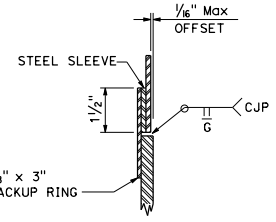
ELEVATION

**CAST-IN-DRILLED-HOLE PILE FOUNDATION,  
REINFORCED PILE  
DETAIL A**

FOR POLES TO BE INSTALLED ON EXISTING FOUNDATION:  
Verify bolt circles, anchor bolt sizes and dependent dimensions for poles to be installed on existing foundations before fabricating the poles.

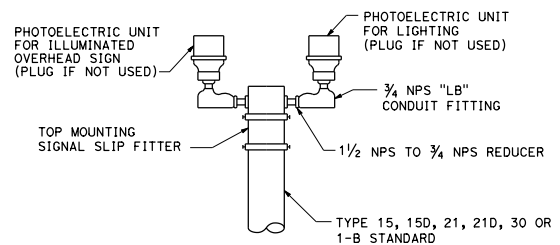


FOR UNIFORM TUBE THICKNESS  
DETAIL T-1



AT TUBE THICKNESS CHANGE  
DETAIL T-2

**POLE SPLICES  
DETAIL T**



**DUAL PHOTOELECTRIC UNIT MOUNTING DETAIL  
DETAIL C**

**ELECTRICAL SYSTEMS  
(SIGNAL AND LIGHTING STANDARD,  
DETAIL No. 2)**

NO SCALE

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

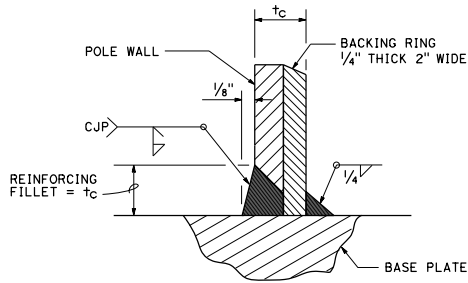
Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

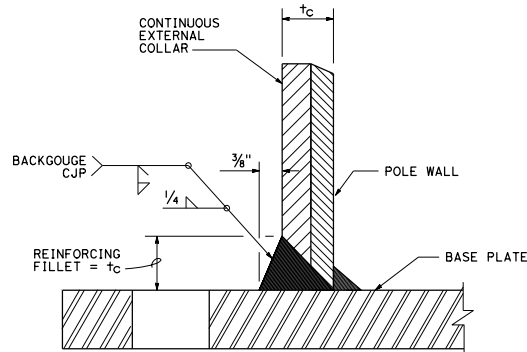
Stanley P. Johnson  
No. CS795  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

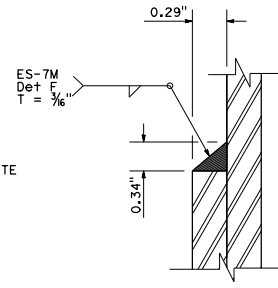
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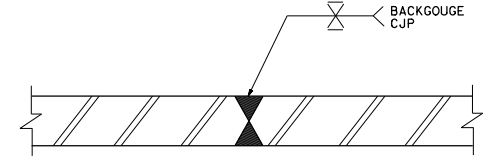
**DETAIL B**



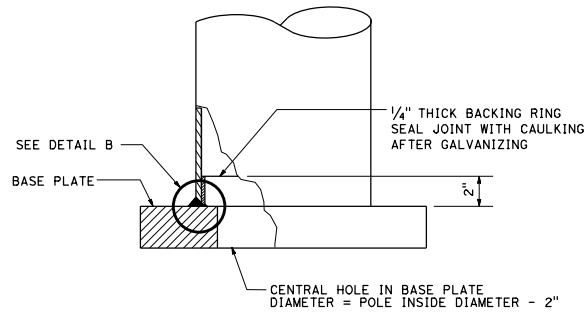
**DETAIL C1**



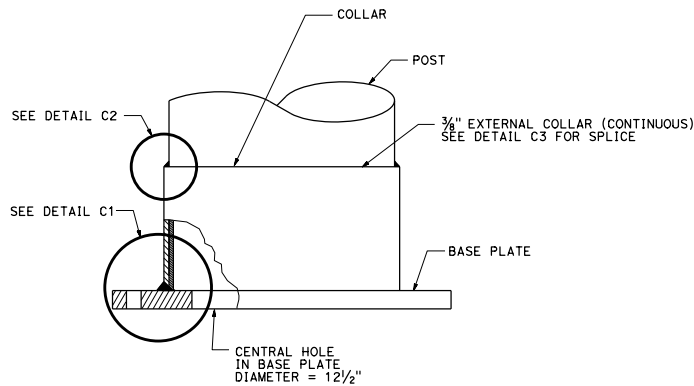
**DETAIL C2**



**DETAIL C3**

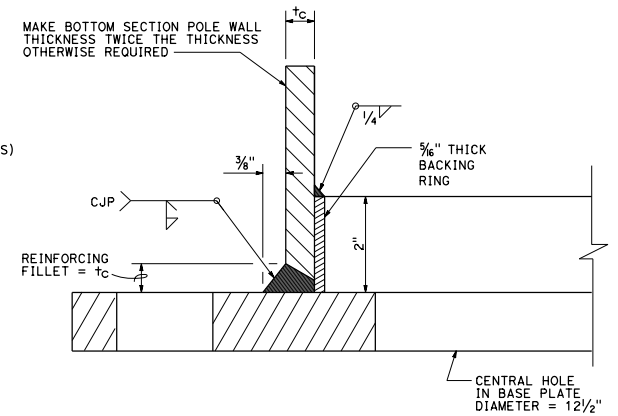


**ELEVATION B**



**ELEVATION C**

For alternative base, see Detail C4



**DETAIL C4**

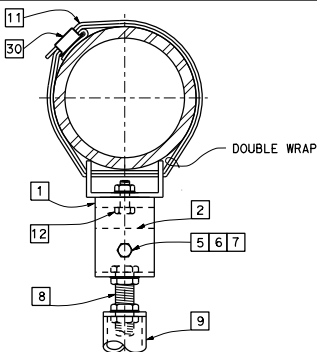
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(SIGNAL AND LIGHTING STANDARD,**  
**DETAIL No. 3)**  
NO SCALE

**ES-70**

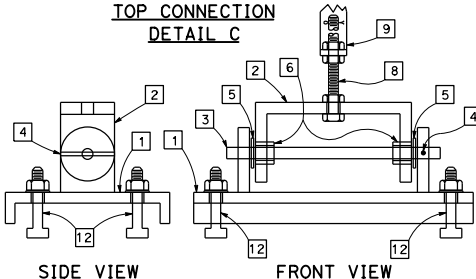
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Stanley P. Johnson*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
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 No. CS793  
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 STATE OF CALIFORNIA

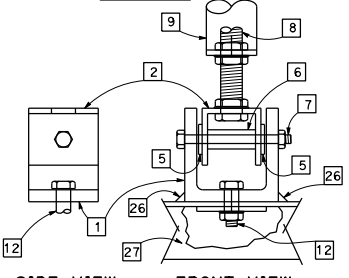
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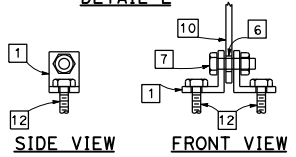
**TOP CONNECTION  
DETAIL C**



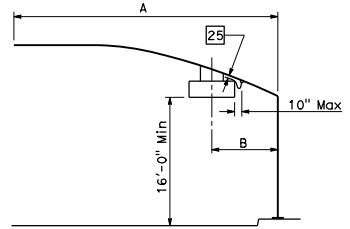
**TYPE 1 OPTION  
DETAIL D**



**TYPE 2 OPTION  
DETAIL E**



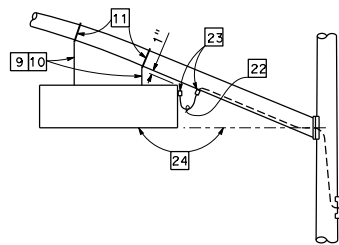
**MOUNTING ASSEMBLY OPTIONS  
DETAIL F**



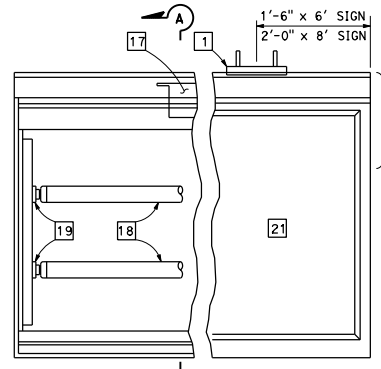
**SIGN PLACEMENT  
DETAIL G**

**SIGN PLACEMENT**

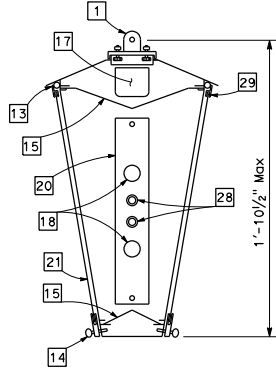
A	B	B
PROJECTED LENGTH	6'-0" SIGN	8'-0" SIGN
20'-0"	7'-10"	8'-10"
25'-0"	9'-2"	10'-2"
30'-0"	9'-6"	10'-6"
35'-0"	10'-6"	11'-6"
40'-0"		
45'-0"		
50'-0"		
55'-0"	12'-6"	13'-6"
60'-0"		
65'-0"		



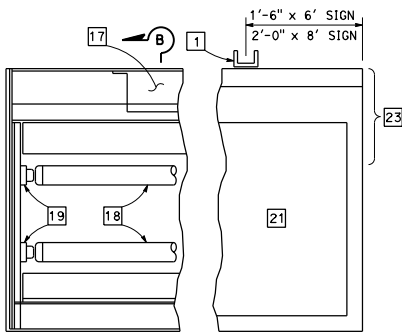
**SIGN MOUNTING  
DETAIL H**



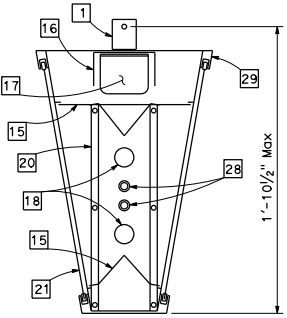
**TYPE A SIGN  
DETAIL A**



**SECTION A-A**



**TYPE B SIGN  
DETAIL B**



**SECTION B-B**

**LEGEND:**

- 1 LOWER MOUNTING ASSEMBLY WITH GASKET.
- 2 UPPER MOUNTING ASSEMBLY.
- 3 ROD, 1/2" Ø, STAINLESS STEEL.
- 4 LOCKING PIN, STEEL.
- 5 FLAT WASHER, STAINLESS STEEL.
- 6 BUSHING, BRONZE.
- 7 BOLT, 1/2" Ø STAINLESS STEEL, WITH THREE NUTS, AND COTTER KEY. LENGTH AS REQUIRED FOR PROPER MOUNTING OF SIGN.
- 8 BOLT, 1/2" Ø STAINLESS STEEL, WITH THREE NUTS, AND COTTER KEY. LENGTH AS REQUIRED FOR PROPER MOUNTING OF SIGN.
- 9 BRACKET, 1/4" X 1 1/2" MINIMUM, LENGTH VARIABLE.
- 10 BRACKET, 2-PIECE ADJUSTABLE. 1/4" X 1 1/2" MINIMUM. TWO 1/2" Ø HEXAGON HEAD BOLTS WITH NUTS AND LOCKWASHERS.
- 11 3/4" X 0.020" MINIMUM ROUNDED EDGE STAINLESS STEEL STRAP WITH 2" LONG BEND UNDER BUCKLE. IF ATTACHING TO A MULTISIDED SECTION BEND UNDER SECTION SHALL BE LONG ENOUGH TO CONTACT AT LEAST 3 CORNERS.
- 12 MOUNTING BOLT, 1/4" Ø MINIMUM, WITH NUT AND LOCKWASHER, OR SELF-LOCKING NUT AND COTTER KEY.
- 13 CONTINUOUS HINGE.
- 14 THUMB SCREW, 5/8" Ø MINIMUM TWO PER SIDE ON 4'-0" CENTERS.
- 15 REFLECTOR, 0.040" MINIMUM THICKNESS.
- 16 ALUMINUM STIFFENER.
- 17 FLUORESCENT BALLAST (2 REQUIRED).
- 18 LAMP, F72T12CW FOR 6'-0" SIGN F96T12CW FOR 8'-0" SIGN
- 19 LAMP HOLDER.
- 20 LAMP HOLDER TURRET.
- 21 SIGN PANEL, 1'-3" MINIMUM HEIGHT. MESSAGE IS SHOWN ELSEWHERE.
- 22 CORD, 16/3 TYPE SJT. CONTINUOUS FROM SIGN TERMINAL BLOCK TO SIGNAL HEAD MOUNTING TERMINAL COMPARTMENT. FORM A 1'-0" DRIP LOOP BETWEEN SIGN AND SIGNAL MAST ARM.
- 23 CORD CONNECTOR, 90° ANGLE CONNECTOR AT THE SIGN LOCATED IN UPPER 1/3 OF THE SIGN AND STRAIGHT CONNECTOR AT THE SIGNAL MAST ARM. DRILL AND TAP BOTTOM OF THE SIGNAL MAST ARM.
- 24 ADJUST FIXTURE LEVEL NO LOWER THAN CENTER OF SIGNAL MAST ARM CONNECTION.
- 25 APPROXIMATE CLEARANCE, 1".
- 26 1/4" FILLET WELD, 1/4" LONG.
- 27 SIGN FRAME.
- 28 FUSE HOLDER AND FUSE.
- 29 CLOSE CELL NEOPRENE GASKET (CONTINUOUS).
- 30 STAINLESS STEEL STRAP BUCKLE.

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

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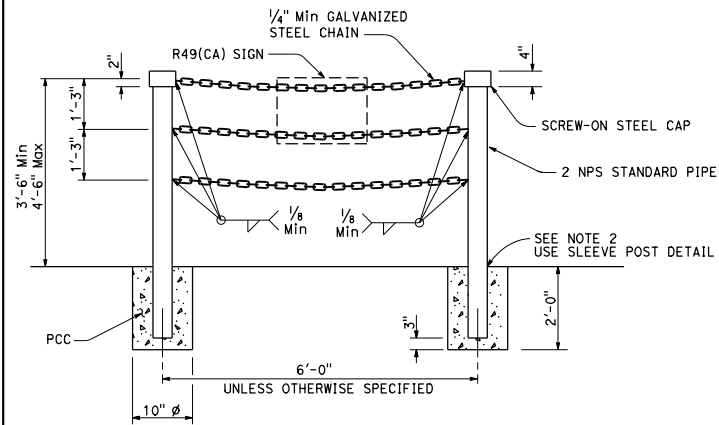
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STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (INTERNALLY ILLUMINATED  
 STREET NAME SIGN)**  
 NO SCALE

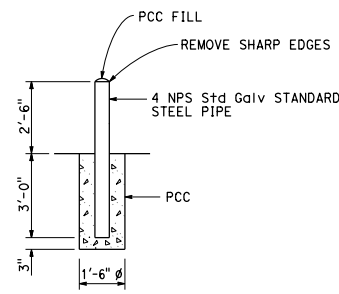
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

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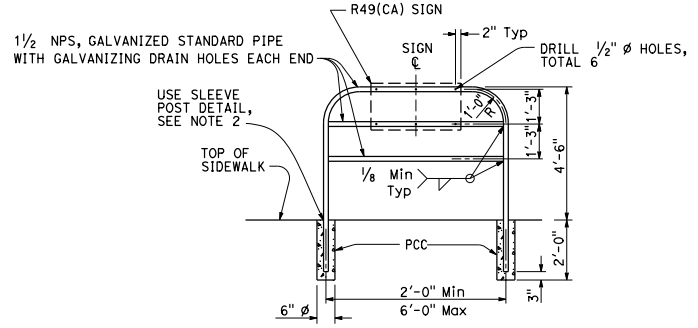
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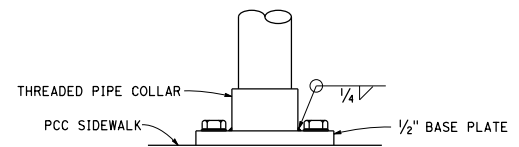
**TYPE II**  
**DETAIL A**



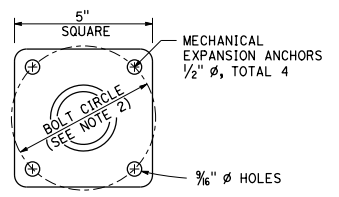
**GUARD POST**  
**DETAIL B**



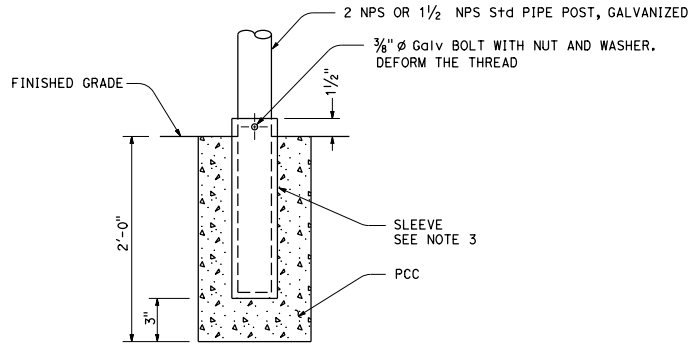
**TYPE I**  
**DETAIL C**



**ELEVATION**



**POST ANCHORAGE DETAIL**  
**DETAIL D**



**SLEEVE POST DETAIL**  
**DETAIL E**  
Use unless otherwise specified or shown on plans

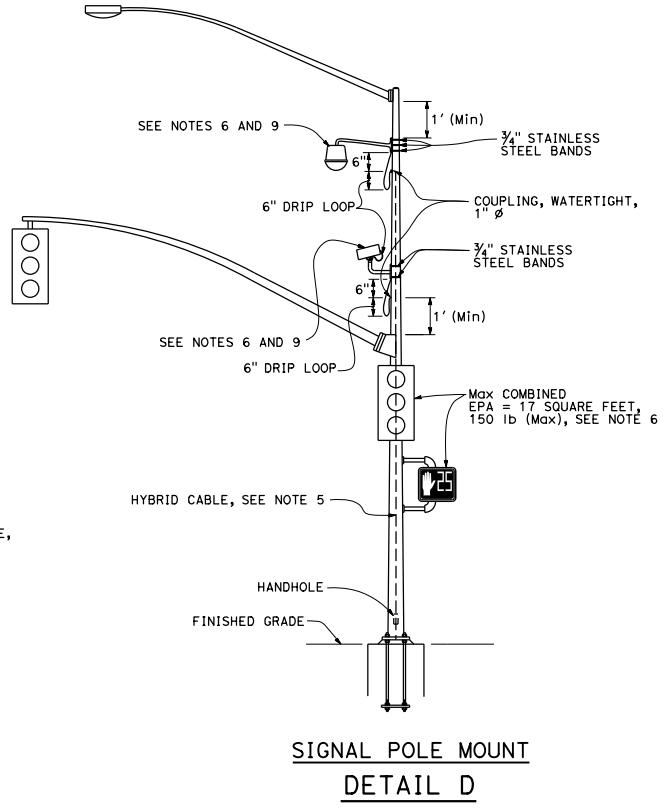
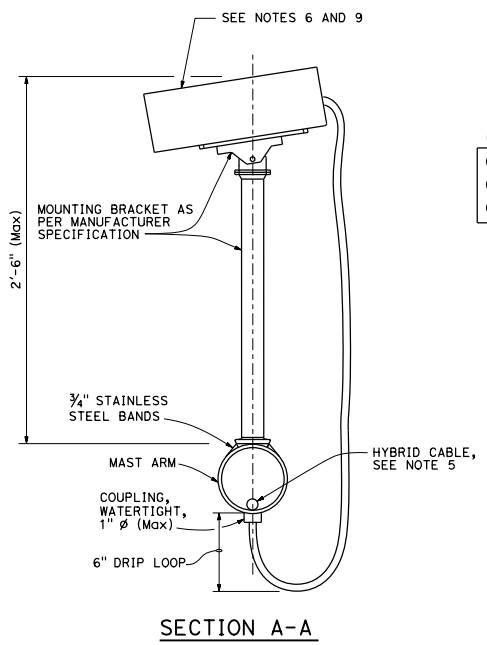
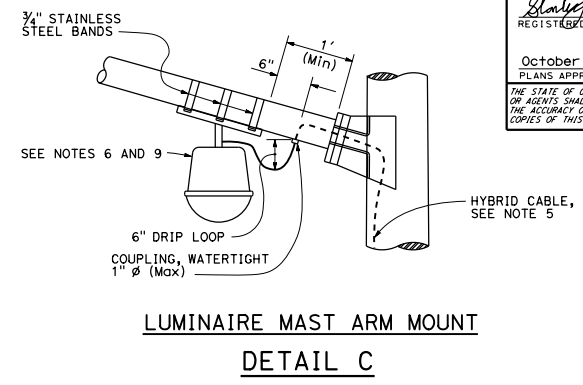
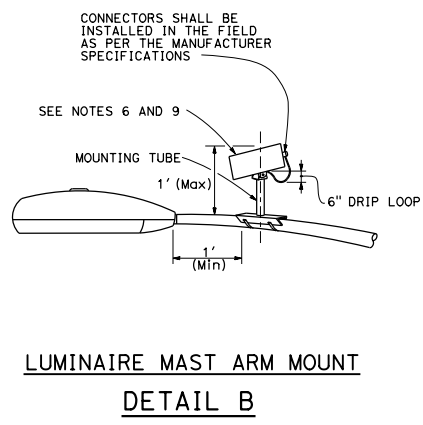
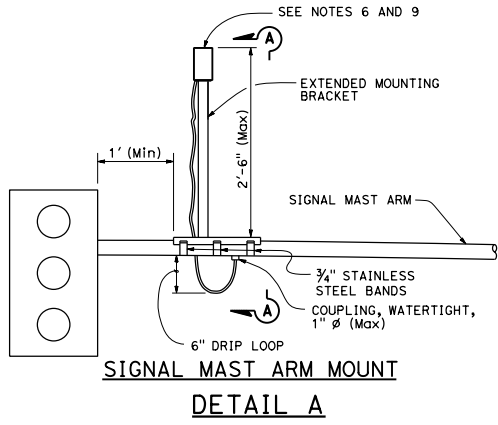
**NOTES:**

1. Pipe post to be set 1'-6" back from face of curb unless otherwise specified.
2. Where barricade posts are installed in existing concrete sidewalk, the post may be anchored to the sidewalk as shown in the "Post Anchorage Detail". Bolt circle diameter shall be 4" minimum for Type I barricade and 5" minimum for Type II barricade.
3. Steel sleeve shall be constructed with an inside diameter 1/10" larger than the post's outside diameter. Wall thickness of sleeve shall be same as post or larger.
4. Alternative details may be submitted for approval by the Engineer.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(PEDESTRIAN BARRICADES)**  
 NO SCALE

**ES-7Q**

2015 STANDARD PLAN ES-7Q



DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Stanley P. Johnson*  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

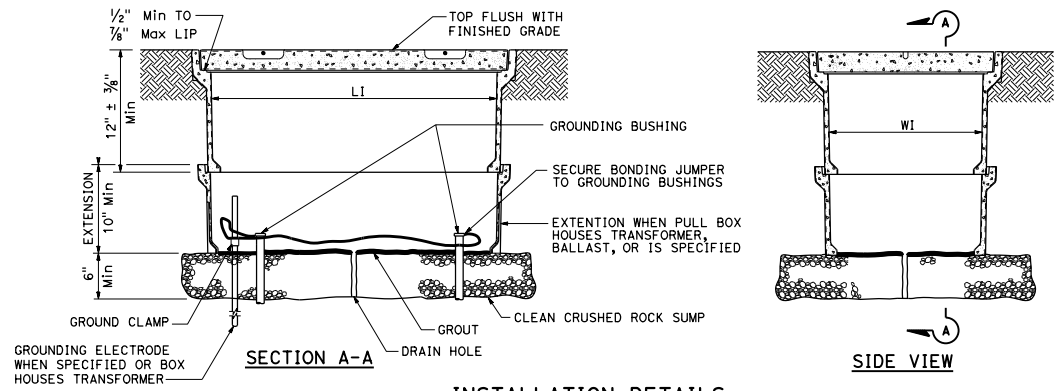
**NOTES:**

1. Exact mounting location of miscellaneous attachment and bracket shall be approved by the Engineer per manufacturer's recommendation.
2. Location of cable entrances on signal pole shall be a minimum of 1' from any flange or base plate.
3. Hybrid cable entrances on signal pole shall be drilled for weathertight coupling as required.
4. Hybrid cable shall have a drip loop at the entrance into signal pole, luminaire mast arm and signal mast arm.
5. A single hybrid cable shall run continuous and shall not be twisted from the miscellaneous attachment to the controller cabinet. No splices shall be allowed.
6. Use the manufacturer's Effective Projected Area (EPA) for miscellaneous attachment. The maximum EPA for each miscellaneous attachment shall be 1.6 square feet with 10 lb Max.
7. Maximum of two miscellaneous attachments per traffic signal standard.
8. Maximum of one miscellaneous attachment per mast arm.
9. Miscellaneous attachment shall be mounted using clamping devices.

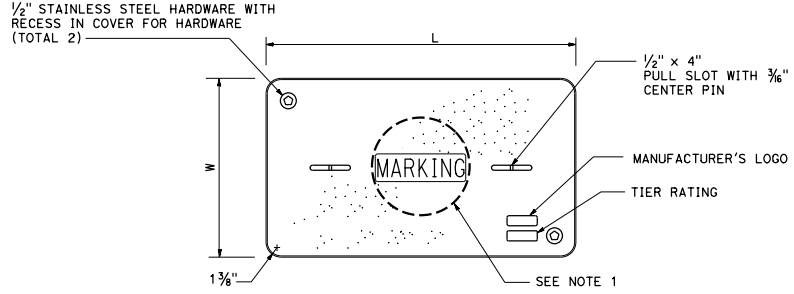
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (SIGNAL AND LIGHTING,  
 MISCELLANEOUS ATTACHMENT)**  
 NO SCALE

**ES-7R**

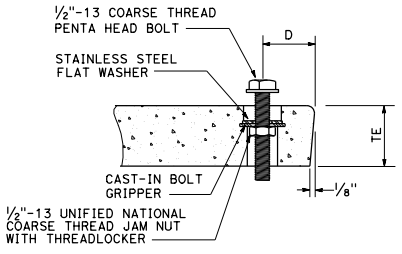




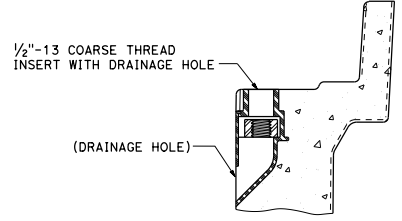
**INSTALLATION DETAILS**  
**DETAIL A**



**COVER TOP VIEW**



**TYPICAL COVER CAPTIVE BOLT**  
OR SIMILAR



**TYPICAL THREADED INSERT**  
OR SIMILAR

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Theresa Aziz Gabriel  
No. E15129  
Exp. 6-30-16  
REGISTERED PROFESSIONAL ENGINEER  
ELECTRICAL  
STATE OF CALIFORNIA

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**NOTES:**

- Pull box covers shall be marked as follows: "SERVICE" Service circuits between service point and service disconnect; "SPRINKLER-CONTROL" sprinkler control circuits, 50 V or less; "CALTRANS" on all pull boxes, except pull boxes marked "SPRINKLER-CONTROL"; and "TELEPHONE" Telephone service;
  - No. 3/2 pull box.
    - "SIGNAL" - Traffic signal circuits with or without lighting or sign lighting circuits.
    - "LIGHTING" - Lighting or sign lighting circuits where voltage is under 600 V.
  - No. 5, 6, 9 or 9A pull box.
    - "TRAFFIC SIGNAL" - Traffic signal circuits with or without lighting or sign lighting circuits.
    - "LIGHTING" - Lighting or sign lighting circuits where voltage is under 600 V.
    - "LIGHTING-HIGH VOLTAGE" - Lighting or sign lighting circuits where voltage is above 600 V.
    - "IRRIGATION" - Circuits to irrigation controller 120 V or more.
    - "RAMP METER" - Ramp meter circuits.
    - "COUNT STATION" - Count or speed monitor circuits.
    - "COMMUNICATIONS" - Communication circuits.
    - "TOS COMMUNICATIONS" - TOS communication line.
    - "TOS POWER" - TOS power.
    - "TDC POWER" - Telephone demarcation cabinet power.
    - "CCTV" - Closed circuit television circuits.
    - "TMS" - Traffic monitoring station circuits.
    - "CMS" - Changeable message sign circuits.
    - "HAR" - Highway advisory radio circuits.
    - "BOOSTER PUMP" - Booster pump circuit.
- The nominal dimensions of the opening in which the cover sets shall be the same as the cover dimensions except the length and width dimensions shall be 1/8" greater.
- Covers and boxes shall be interchangeable with California standard male and female gages. When interchanged with a standard male or female gage, the top surfaces shall be flush within 1/8". Top outside radius of covers and pull boxes shall have a 1/8" radius.
- Dimensions for the cover for non-traffic pull box are nominal values.

PULL BOX	PULL BOX			COVER						
	MINIMUM DEPTH BOX	MINIMUM DEPTH EXTENSION	MINIMUM WEIGHT	LI Min	WI Min	TE	D	L	W	MINIMUM WEIGHT
No. 3/2	12"	N/A	40 lb	1' - 3"	9"	1 3/4"	1 3/4"	1' - 3 1/4" - 1' - 3 3/8"	10" - 10 1/8"	30 lb
No. 5	12"	10"	55 lb	1' - 8"	11"	2"	1 3/4"	1' - 11 1/4"	1' - 1 3/4"	60 lb
No. 6	12"	10"	70 lb	2' - 4 1/4"	1' - 3 1/4"	2"	2"	2' - 6 1/2"	1' - 5 1/2"	85 lb

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(NON-TRAFFIC PULL BOX)**

NO SCALE

**ES-8A**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

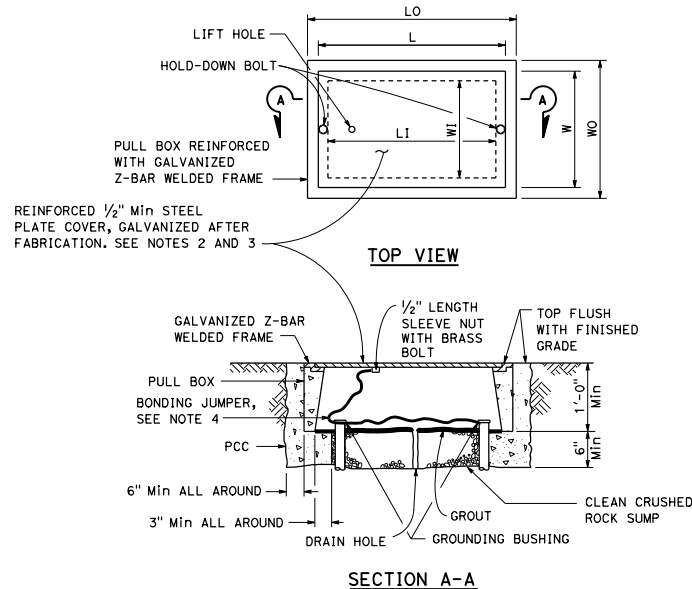
*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

No. E15129  
 Exp. 6-30-16  
 ELECTRICAL

REGISTERED PROFESSIONAL ENGINEER  
 Theresa Aziz Gabriel  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 STATE OF CALIFORNIA

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**No. 3 1/2(T), No. 5(T) AND No. 6(T) TRAFFIC PULL BOX**

**NOTES:**

- Traffic pull box shall be provided with steel cover and special concrete footing. Steel cover shall have embossed non-skid pattern.
- Steel reinforcing shall be as regularly used in the standard products of the respective manufacturer.
- Pull box covers shall be marked as follows: "SERVICE" service circuits between service point and service disconnect; "SPRINKLER-CONTROL" Sprinkler control circuits, 50 V or less; "CALTRANS" On all pull boxes, except pull boxes marked "SPRINKLER-CONTROL"; and "TELEPHONE" Telephone service.
  - No. 3 1/2(T) pull box.
    - "SIGNAL" - Traffic signal circuits with or without lighting or sign lighting circuits.
    - "LIGHTING" - Lighting or sign lighting circuits where voltage is under 600 V.
  - No. 5(T) or 6(T) pull box.
    - "TRAFFIC SIGNAL" - Traffic signal circuits with or without lighting or sign lighting circuits.
    - "LIGHTING" - Lighting or sign lighting circuits where voltage is under 600 V.
    - "LIGHTING-HIGH VOLTAGE" - Lighting or sign lighting circuits where voltage is above 600 V.
    - "IRRIGATION" - Circuits to irrigation controller 120 V or more.
    - "RAMP METER" - Ramp meter circuits.
    - "COUNT STATION" - Count or speed monitor circuits.
    - "COMMUNICATION" - Communication circuits.
    - "TOS COMMUNICATIONS" - TOS communications line.
    - "TOS POWER" - TOS power.
    - "TDC POWER" - Telephone demarcation cabinet power.
    - "CCTV" - Closed circuit television circuits.
    - "TMS" - Traffic monitoring station circuits.
    - "CMS" - Changeable message sign circuits.
    - "HAR" - Highway advisory radio circuits.
    - "BOOSTER PUMP" - Booster pump circuit.
- Bonding jumper for metal covers shall be 3' long, minimum.
- The nominal dimensions of the opening in which the cover sets shall be the same as the cover dimensions except the length and width dimensions shall be 1/8" greater.
- Covers and boxes shall be interchangeable with California standard male and female gages. When interchanged with a standard male or female gage, the top surfaces shall be flush within 1/8".

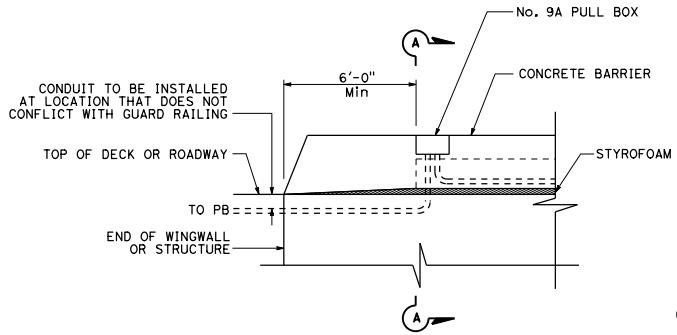
**DIMENSION TABLE**

PULL BOX	MINIMUM * THICKNESS	MINIMUM DEPTH BOX AND EXTENSION	PULL BOX				COVER	
			LO	LI	WO	WI	L **	W **
No. 3 1/2(T)	1 1/2"	1'-0"	1'-10" - 1'-11"	1'-5" - 1'-6 1/2"	1'-3" - 1'-4"	10" - 1'-0"	1'-8" - 1'-8 1/2"	1'-1" - 1'-2"
No. 5(T)	1 3/4"	1'-0"	2'-5" - 2'-6"	2'-0" - 2'-1"	1'-6" - 1'-7"	1'-1" - 1'-2"	2'-3" - 2'-3 1/2"	1'-4" - 1'-4 1/2"
No. 6(T)	2"	1'-0"	2'-11" - 3'-1"	2'-6" - 2'-7"	1'-10" - 2'-0"	1'-5" - 1'-6"	2'-9" - 2'-9 1/2"	1'-8" - 1'-8 1/2"

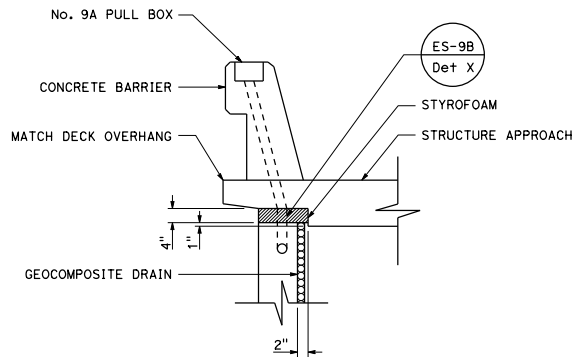
\* EXCLUDING CONDUIT WEB      \*\* TOP DIMENSION

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (TRAFFIC PULL BOX)**  
 NO SCALE

**ES-8B**

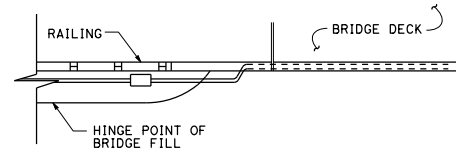


**SIDE VIEW**

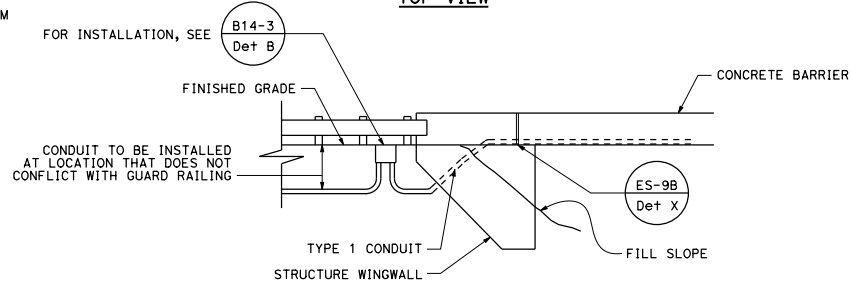


**SECTION A-A**

**CONDUIT TERMINATION  
DETAIL A**

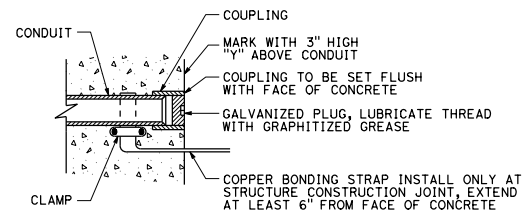


**TOP VIEW**



**SIDE VIEW**

**CONDUIT TERMINATION  
DETAIL I**



**CONDUIT TERMINATION  
DETAIL C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

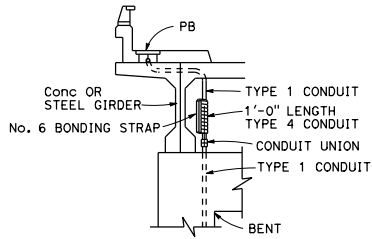
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (STRUCTURE PULL BOX  
 INSTALLATIONS)**

NO SCALE

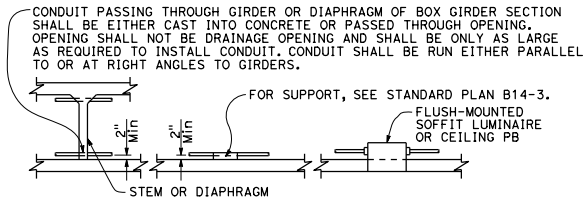
**ES-9A**

D18+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

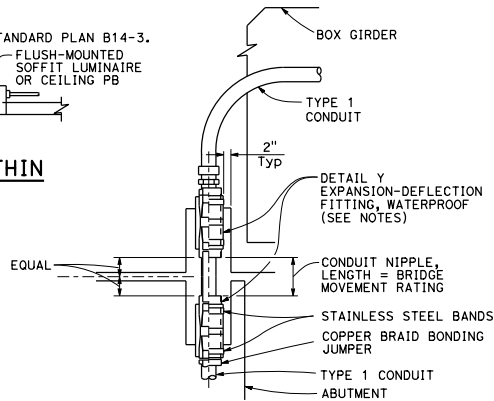
Jaywinder S. Gill  
 REGISTERED ELECTRICAL ENGINEER  
 No. E18551  
 Exp. 12-31-16  
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**CONDUIT RISER CONNECTION**  
**DETAIL R**

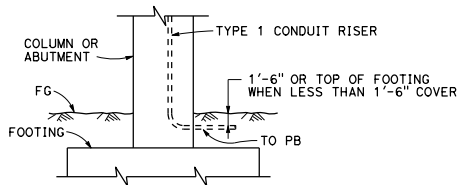


**CONDUIT INSTALLATION WITHIN BOX GIRDER SECTIONS**  
**DETAIL S**

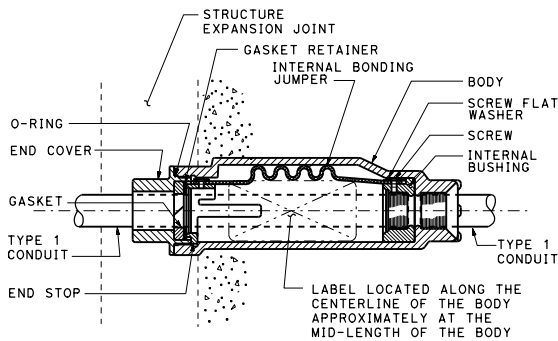


- NOTES:**
1. Fitting and pocket required only where movement can occur between girder and abutment.
  2. Fill pocket around fitting with resilient waterproof compound.

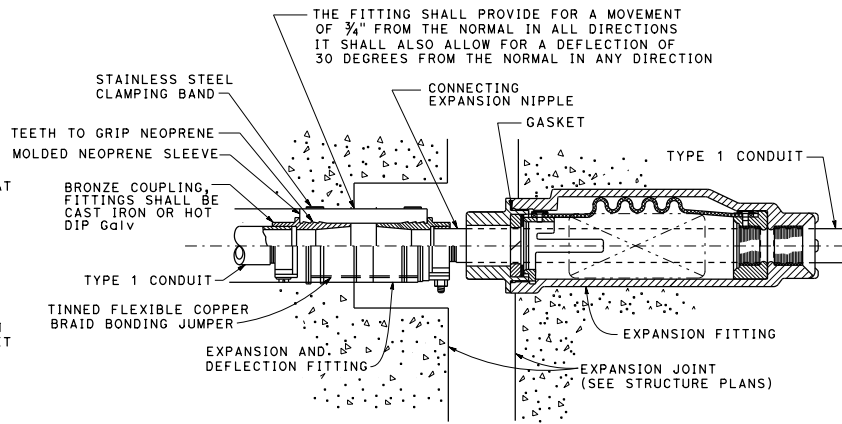
**CONDUIT RISER CONNECTION AT COLUMN, ABUTMENT OR STRUCTURE WING WALL**  
**DETAIL U**



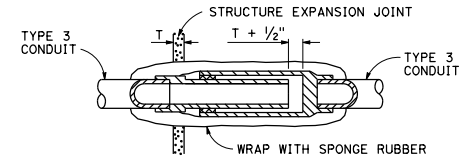
**LOWER END OF CONDUIT RISER AT COLUMN OR ABUTMENT**  
**DETAIL T**



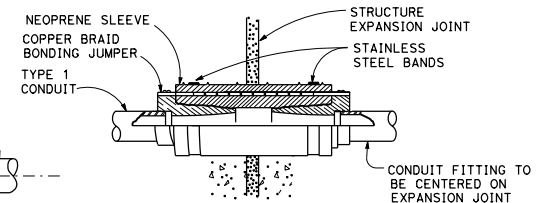
**CONDUIT EXPANSION FITTING**  
**DETAIL X**



**COMBINATION EXPANSION-DEFLECTION FITTINGS METALLIC CONDUIT INSTALLATION**  
**DETAIL XY**



**NON-METALLIC CONDUIT EXPANSION FITTING INSTALLATION DETAIL**  
**DETAIL V**  
To be used only when shown or specified on Project Plans



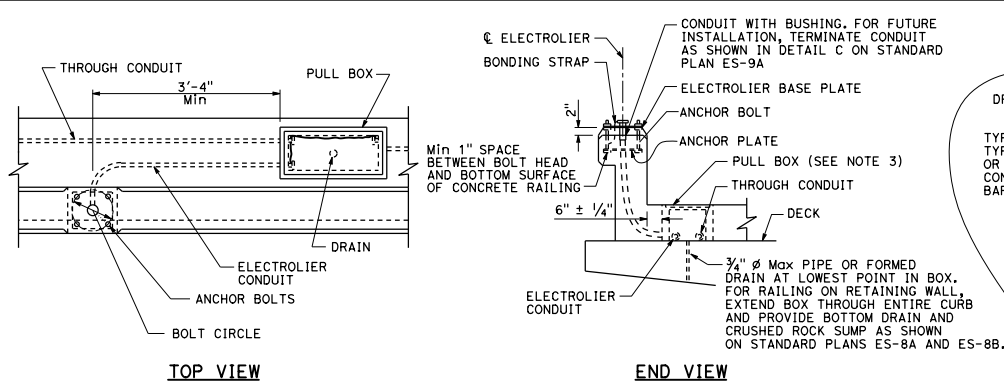
**CONDUIT EXPANSION-DEFLECTION FITTING**  
**DETAIL Y**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS (CONDUIT RISER AND EXPANSION FITTING, STRUCTURE INSTALLATIONS)**  
NO SCALE

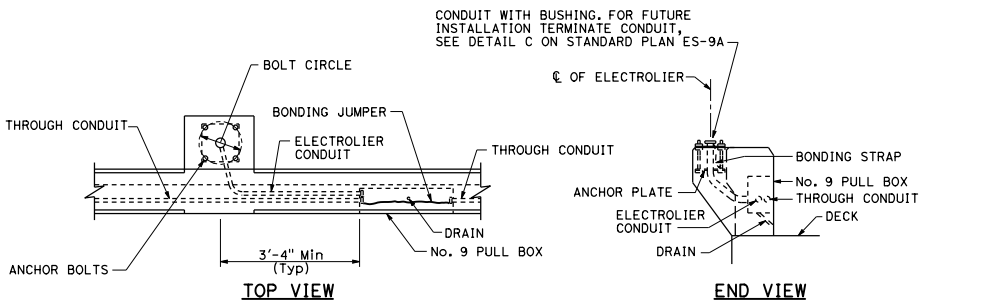
**ES-9B**

2015 STANDARD PLAN ES-9B

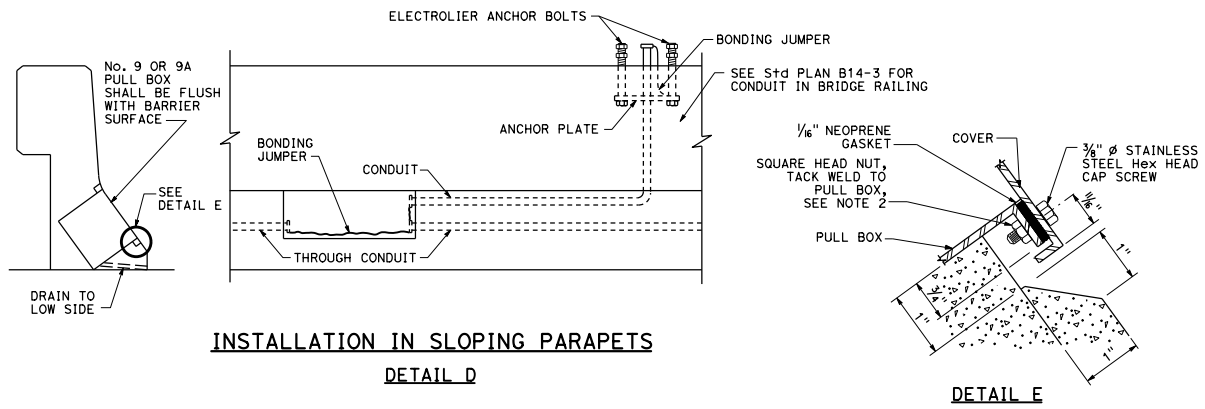




**TOP VIEW**  
**END VIEW**  
**No. 3 1/2, 5, OR 6 PULL BOX INSTALLATION**  
**DETAIL A**

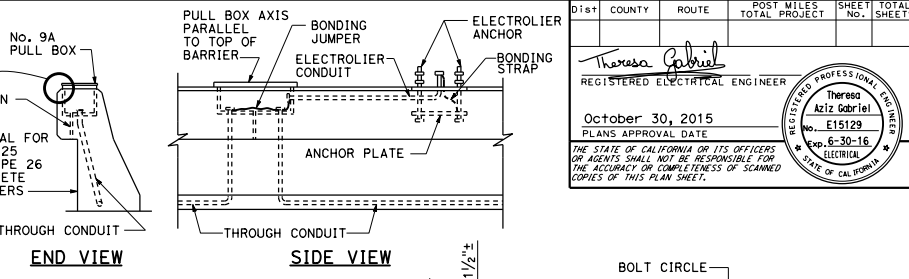


**TOP VIEW**  
**END VIEW**  
**No. 9 PULL BOX INSTALLATION**  
**DETAIL B**

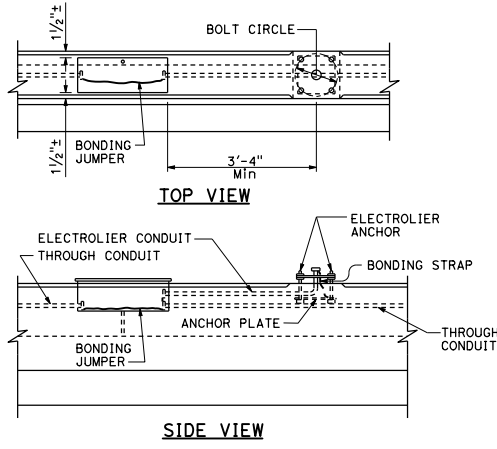


**INSTALLATION IN SLOPING PARAPETS**  
**DETAIL D**

**DETAIL E**



**END VIEW**  
**SIDE VIEW**  
**No. 9A PULL BOX INSTALLATION**  
**DETAIL C**



**TOP VIEW**  
**SIDE VIEW**

**NOTES:**

1. Axis of pull box shall be parallel to top of barrier, sidewalk or railing.
2. See railing sheet for reinforcement and structural details at electroliers and pull boxes.
3. Top of pull boxes in sidewalk areas shall be flush with sidewalk. Modify base of pull box as required.
4. Boxes inside of vertical barrier or railing shall be closed during pouring of PCC with 1/4" plywood of sufficient size to provide 1:1 chamfer on 3 sides of cover. Upper edge of plywood shall fit against lower edge of raintight hood.
5. Use drain in center if box is horizontal, or at low end if box is inclined. When box is mounted in sloping parapet 1/2" elongated drain hole inside at center or near end as required for drainage.
6. For electrolier anchorage bolts and grouting details, see Standard Plan ES-6B.
7. See Standard Plan B14-3 for conduit in concrete barrier.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS**  
**(STRUCTURE PULL BOX**  
**INSTALLATIONS)**

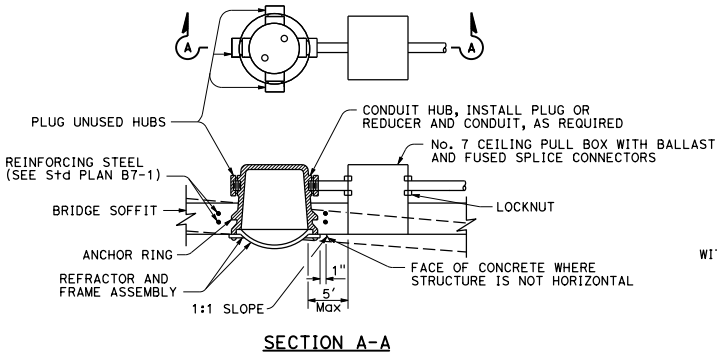
NO SCALE

**ES-9D**

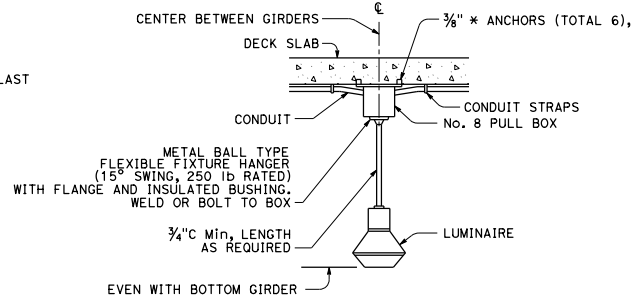
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL ENGINEER  
 STATE OF CALIFORNIA

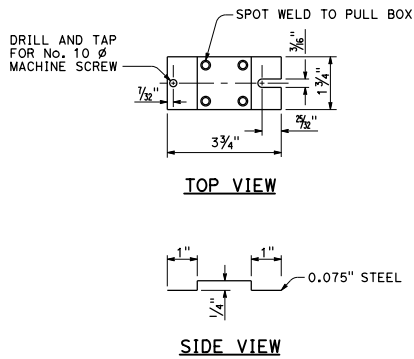
October 30, 2015  
 PLANS APPROVAL DATE  
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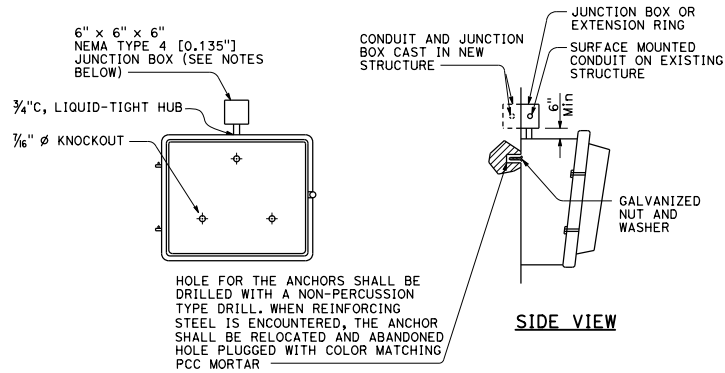
**FLUSH-MOUNTED SOFFIT LUMINAIRE INSTALLATION**  
**DETAIL F**



**PENDANT SOFFIT LUMINAIRE INSTALLATION**  
**DETAIL P**



**TERMINAL BLOCK**  
**MOUNTING BRACKET**  
**DETAIL T**



**WALL-MOUNTED LUMINAIRE INSTALLATION**  
**DETAIL W**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

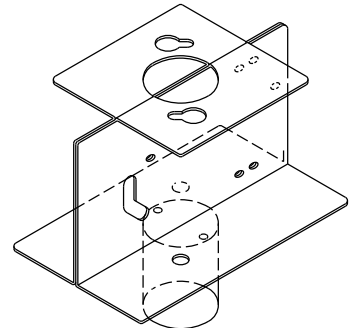
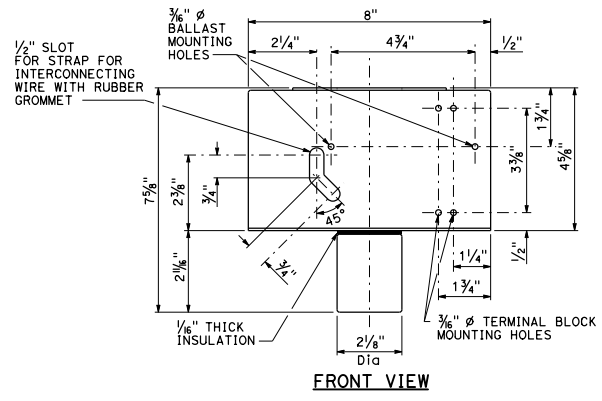
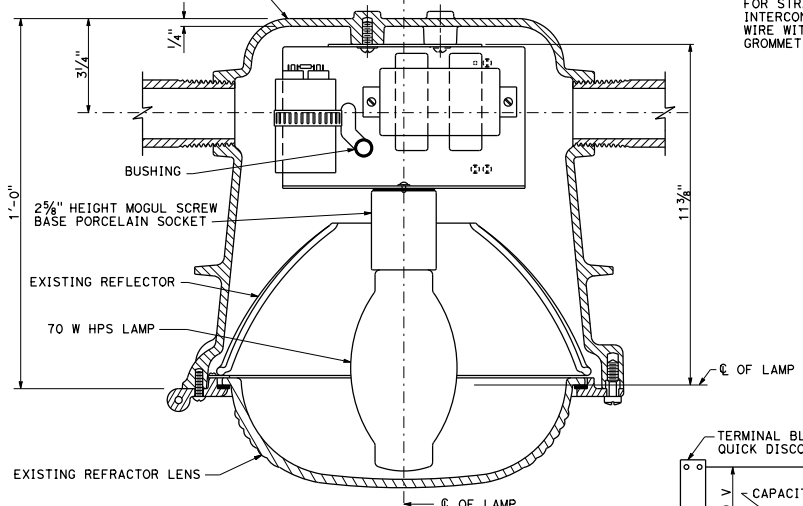
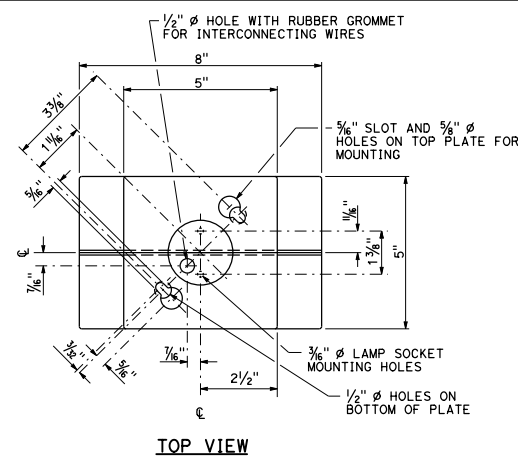
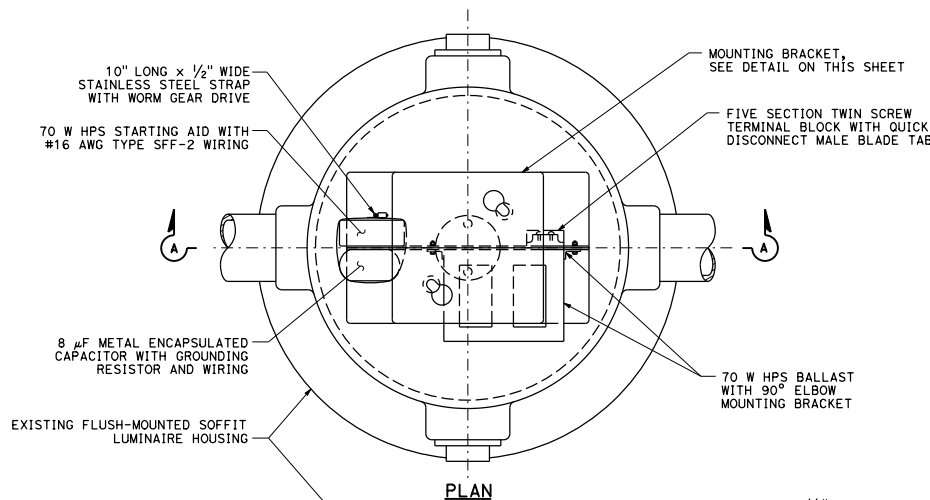
*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(FLUSH-MOUNTED SOFFIT,**  
**PENDANT SOFFIT**  
**AND WALL-MOUNTED LUMINAIRE**  
**STRUCTURE INSTALLATIONS)**

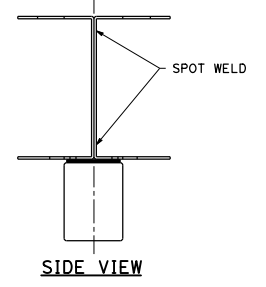
NO SCALE

**ES-9E**



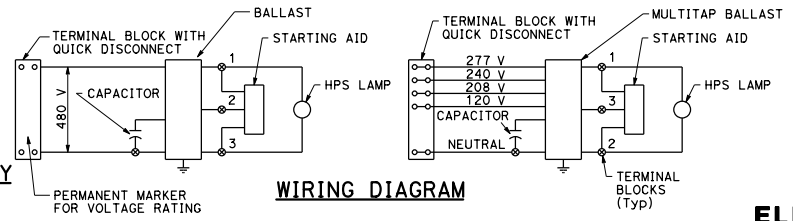


PERFORM TWO SHEETS 1/16" MILD STEEL AS SHOWN, SPOTWELD TOGETHER IN EACH CORNER WITH FOUR SPOTWELDS.



**MOUNTING BRACKET DETAILS**

**FLUSH-MOUNTED SOFFIT LUMINAIRE ASSEMBLY**



- NOTES:**
1. Use No. 8 Ø machine screws, lockwashers and nuts for mounting ballast and terminal strips.
  2. In-line fuse as required on Standard Plan ES-13B.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Theresa Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

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STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(FLUSH-MOUNTED SOFFIT LUMINAIRE  
DETAILS)**  
NO SCALE

**ES-9F**



**NOTE:**  
Curves represent the minimum footcandle (FC).

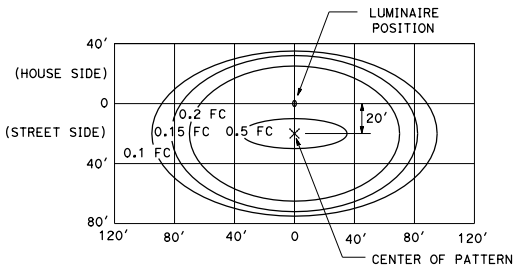
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
REGISTERED ELECTRICAL ENGINEER

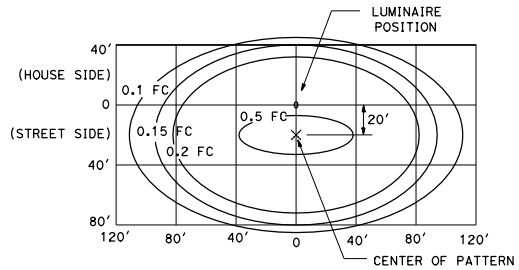
October 30, 2015  
PLANS APPROVAL DATE

Theresa Aziz Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

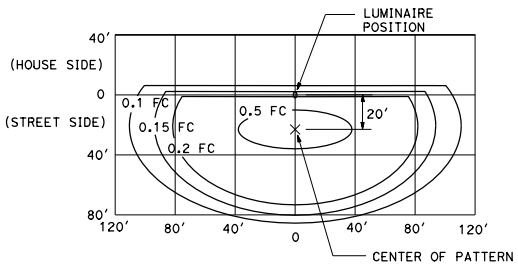
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



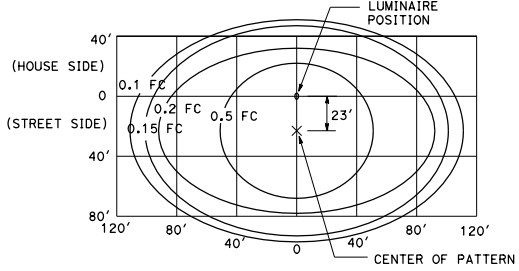
**LED LUMINAIRE 165 W**  
34' Mounting Height



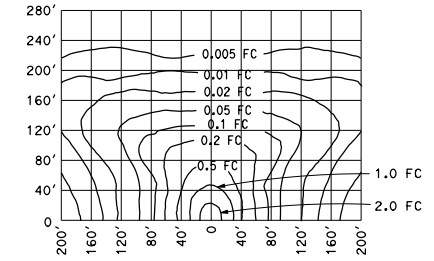
**LED LUMINAIRE 235 W**  
40' Mounting Height



**LED LUMINAIRE 235 W**  
40' Mounting Height  
with back side control



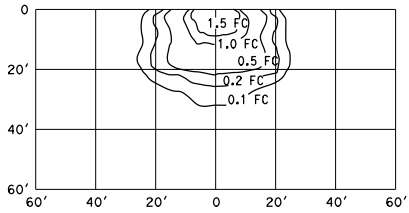
**LED LUMINAIRE 300 W**  
40' Mounting Height



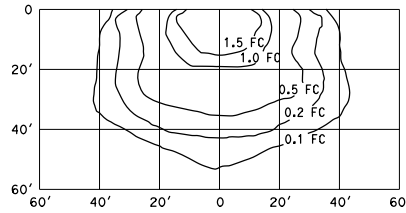
**LOW-PRESSURE SODIUM LUMINAIRE 180 W**  
40' Mounting Height  
Lamp operated at 33,000 lm

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(ISOFOOTCANDLE CURVES)**  
NO SCALE

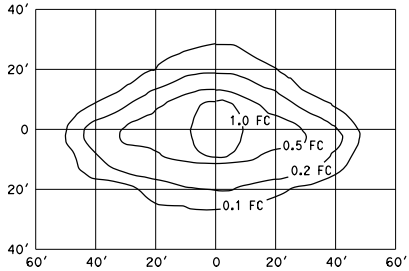
**ES-10A**



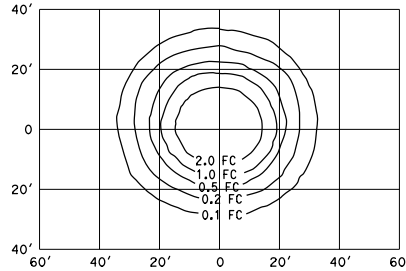
**HIGH-PRESSURE SODIUM  
WALL-MOUNTED LUMINAIRE 70 W**  
15' Mounting Height  
ANSI Designation S62  
Lamp operated at 5,800 lm



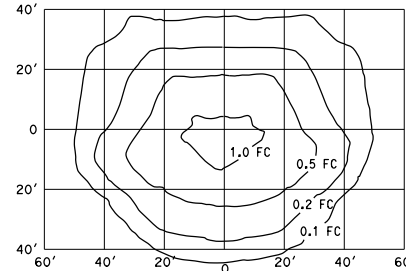
**HIGH-PRESSURE SODIUM  
WALL-MOUNTED LUMINAIRE 100 W**  
15' Mounting Height  
ANSI Designation S54  
Lamp operated at 9,500 lm



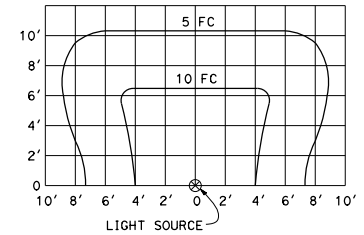
**HIGH-PRESSURE SODIUM  
PENDANT SOFFIT LUMINAIRE 70 W  
TYPE III SHORT**  
17' Mounting Height  
ANSI Designation S62  
Lamp operated at 5,800 lm



**HIGH-PRESSURE SODIUM  
PENDANT SOFFIT LUMINAIRE 70 W**  
17' Mounting Height  
ANSI Designation S62  
Lamp operated at 5,800 lm



**HIGH-PRESSURE SODIUM  
FLUSH-MOUNTED SOFFIT LUMINAIRE 70 W**  
17' Mounting Height  
ANSI Designation S62  
Lamp operated at 5,800 lm



**INDUCTION SIGN  
LIGHTING FIXTURE 85 W**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Theresa Aziz Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

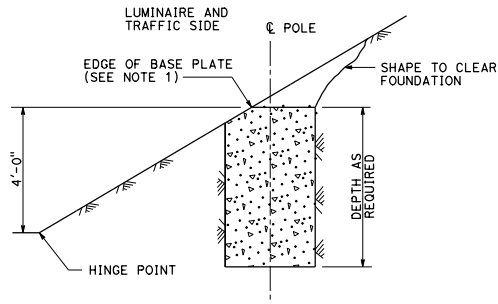
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**NOTE:**  
Curves represent the minimum footcandle (FC).

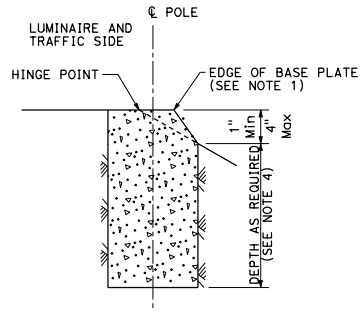
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(ISOFOOTCANDLE CURVES)**

NO SCALE

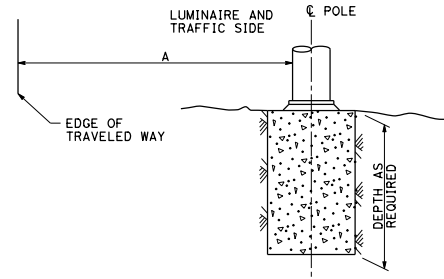
**ES-10B**



**CUT SLOPES  
STEEPER THAN 4:1,  
LESS THAN 2:1  
DETAIL A-1**  
See Note 2 and 3

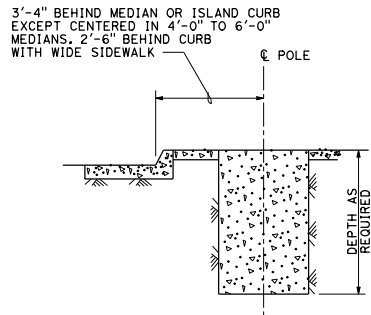


**FILL SLOPES  
STEEPER THAN 4:1,  
LESS THAN 2:1  
DETAIL A-2**  
See Note 2 and 3

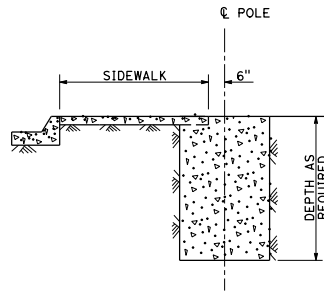


**FLAT SECTIONS, CUT OR FILL SLOPES  
4:1 OR FLATTER  
DETAIL A-3**  
See Note 2

**FOUNDATIONS ADJACENT TO ALL ROADWAYS EXCEPT  
IN SIDEWALK, MEDIAN AND ISLAND AREAS  
DETAIL A**



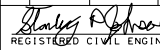
**MEDIAN, ISLAND  
OR WIDE SIDEWALK  
DETAIL B-1**  
7' Wide and wider



**NARROW SIDEWALK  
DETAIL B-2**  
Less than 7' wide

**FOUNDATIONS IN SIDEWALK, MEDIAN AND ISLAND AREAS  
DETAIL B**

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

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STANDARD TYPE	SETBACK (DIMENSION A)
32	30'-0" (Min)
31	20'-0" (Min)
15, 15D, 15-SB, 21, 21D, 30	ARM LENGTH (Min)

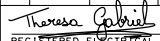
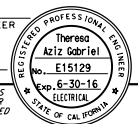
**NOTES:**

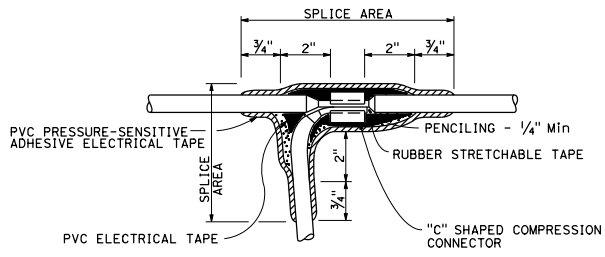
1. Where a portion of the foundation is above grade, the top edges shall have a 1" chamfer.
2. Slopes shall be horizontal to vertical ratio (Horizontal : Vertical).
3. Horizontal setbacks on cut and fill slopes steeper than 4:1 shall not exceed the distance shown for flat sections.
4. CIDH embedment depth shall be increased beyond standard depths by the diameter of the CIDH.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(FOUNDATION INSTALLATIONS)**

NO SCALE

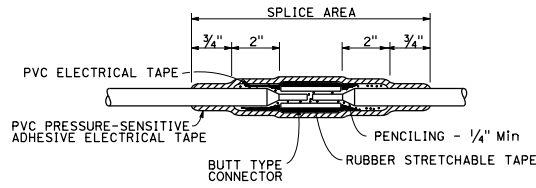
**ES-11**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
 REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					



**TYPE C SPLICE**

See Note 3

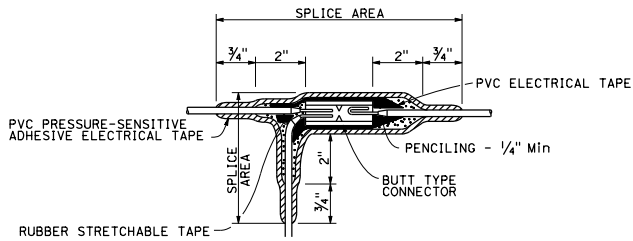


**TYPE S SPLICE**

See Note 4

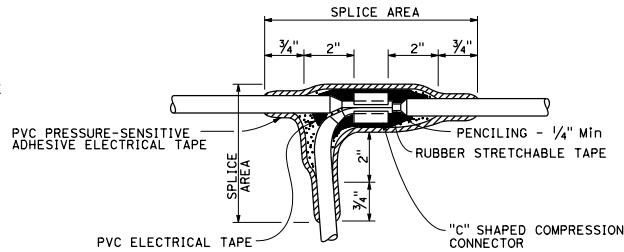
**NOTES:**

1. Dimensions are minimum.
2. Rubber tapes shall be rolled after application.
3. Between 1 free-end and 1 through conductor.
4. Between 2 free-end conductors.
5. Between 3 free-end conductors.



**TYPE ST SPLICE**

See Note 5



**TYPE T SPLICE**

See Note 5

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(SPlicing DETAILS)**

NO SCALE

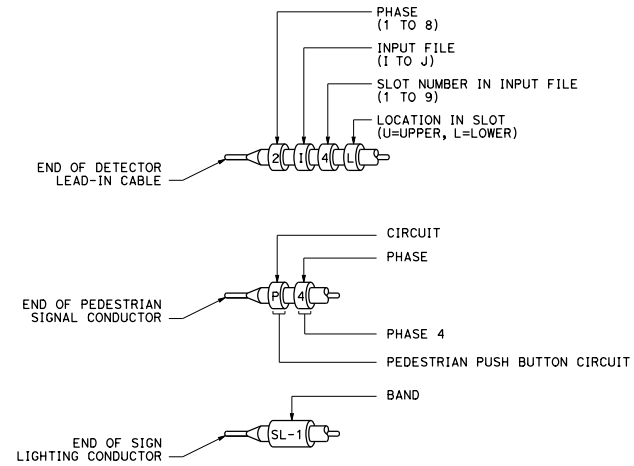
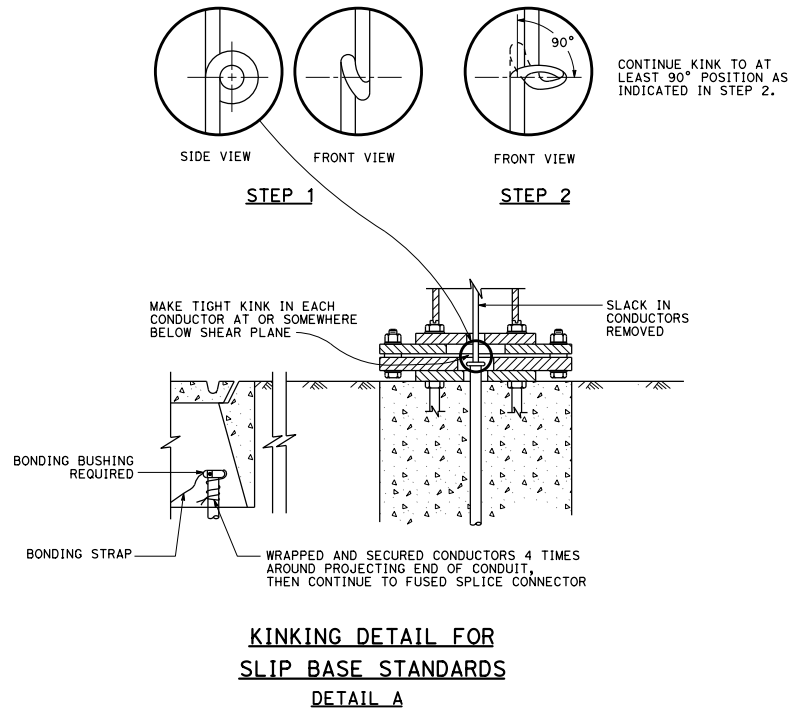
**ES-13A**

CIRCUIT VOLTAGE	FUSE VOLTAGE RATING	FUSE CURRENT RATING																
		HPS LAMP BALLAST								LOW PRESSURE SODIUM BALLAST					INDUCTION SIGN LIGHTING	SINGLE PHASE (TWO WIRE) TRANSFORMERS (PRIMARY SIDE)		
		70 W	100 W	150 W	200 W	250 W	310 W	400 W	1000 W	35 W	55 W	90 W	135 W	180 W	85 W	1 kVA	2 kVA	3 kVA
120 V	250 V	5 A	5 A	5 A	5 A	5 A	5 A	5 A	-	5 A	5 A	5 A	5 A	5 A	5 A	10 A	20 A	30 A
240 V	250 V	5 A	5 A	5 A	5 A	5 A	5 A	5 A	5 A	3 A	3 A	3 A	5 A	5 A	5 A	6 A	10 A	20 A
480 V	500-600 V	5 A	5 A	5 A	5 A	5 A	5 A	5 A	5 A	2 A	2 A	2 A	3 A	3 A	1 A (SEE NOTE 2)	3 A	6 A	10 A

**NOTES:**

1. Primary lines of multiple ballasts shall be provided with fused connectors. Fuse ratings shall be as noted above.
2. See Standard Plan ES-15D, Type SC3 control.

**FUSE RATINGS FOR FUSED CONNECTORS  
LUMINAIRE BALLAST FUSING**



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(FUSE RATING, KINKING AND  
BANDING DETAIL)**

NO SCALE

**ES-13B**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

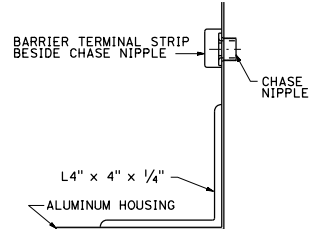
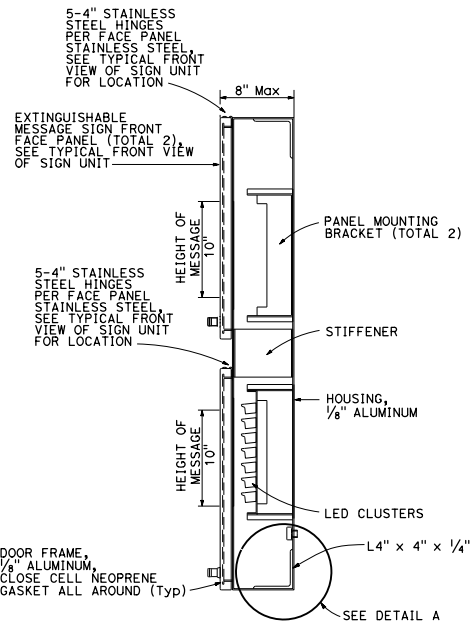
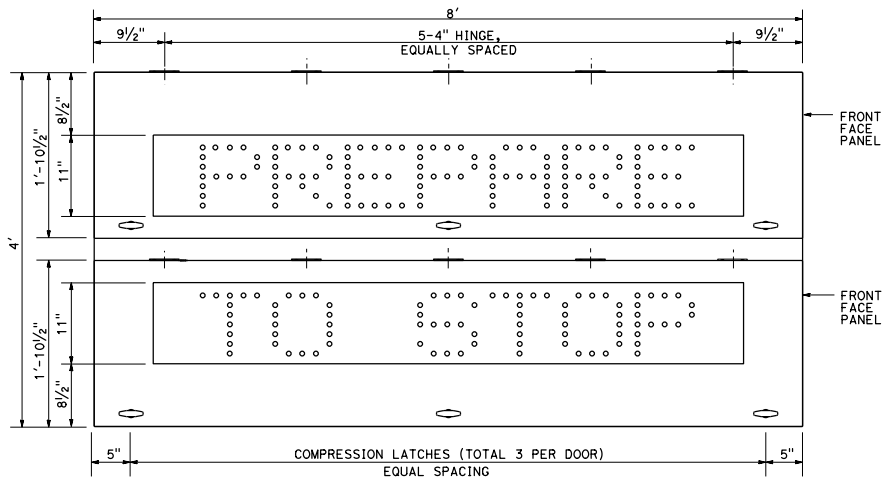
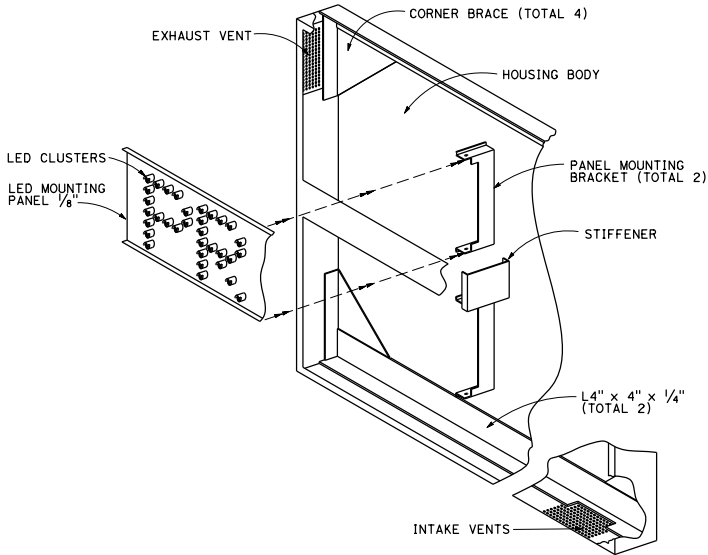
*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 Theresa Aziz Gabriel  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 STATE OF CALIFORNIA  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

**NOTES:**

1. Sheet metal shall be 1/8".
2. Welds shall be continuous.
3. Powder coat all internal and external surfaces black.
4. The door frame shall utilize two gas spring lift arms and two latching devices to maintain an open position.
5. See Wiring Notes and Symbols on Standard Plan ES-14B, Detail A.



STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (LED EXTINGUISHABLE MESSAGE SIGN  
 10" LETTERS)**

NO SCALE

**ES-14A**

487

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

*Theresa Gabriel*  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Theresa  
Aziz Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF CALIFORNIA

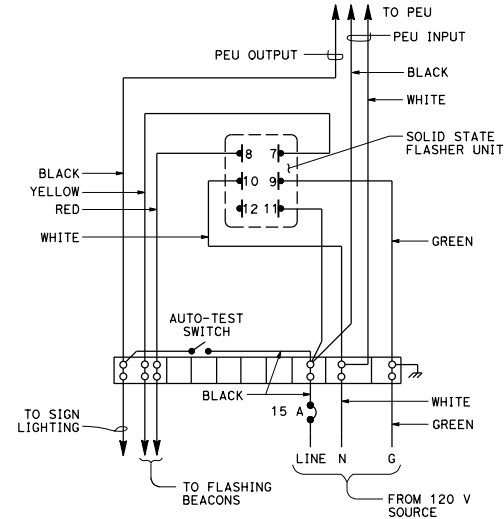
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THE FLASHER SHALL MATE WITH A CINCH-JONES SOCKET S-406-SB OR EQUAL AND CONNECTED AS FOLLOWS:

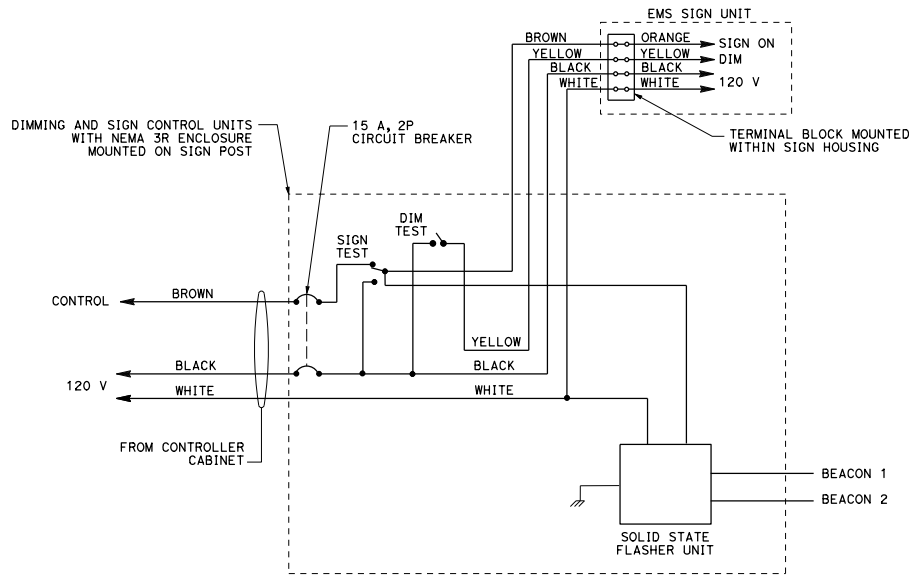
PIN	CIRCUIT	PIN	CIRCUIT
7	LOAD	10	NEUTRAL
8	LOAD	11	LINE
9	CHASSIS GROUND	12	NOT USED

8	7
10	9
12	11

**CONNECTOR SOCKET  
SOLID STATE FLASHER UNIT**



**WIRING DIAGRAM  
LED FLASHING BEACON CONTROL ASSEMBLY  
DETAIL B**

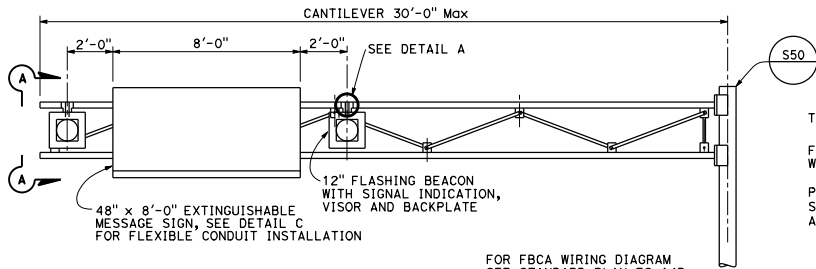


**WIRING DIAGRAM  
LED EXTINGUISHABLE MESSAGE SIGN  
DETAIL A**

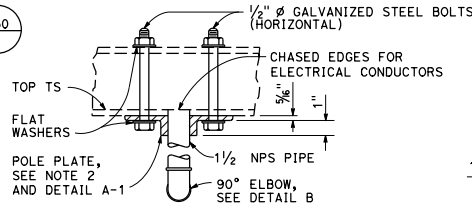
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(CONTROL ASSEMBLY  
WIRING DIAGRAMS)**  
NO SCALE

**ES-14B**

2015 STANDARD PLAN ES-14B

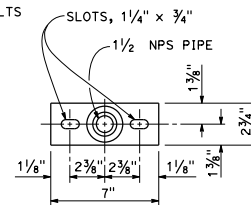


FOR FBCA WIRING DIAGRAM  
SEE STANDARD PLAN ES-14B.  
LOCATE ON THE SIDE OF POLE  
AWAY FROM TRAFFIC.

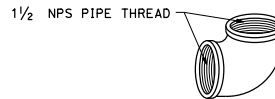
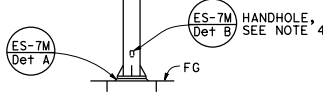


**TOP VIEW**  
**SECTION B-B**

**POLE PLATE**  
**DETAIL A**

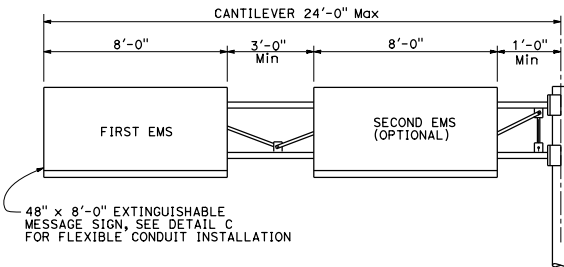


**DETAIL A-1**

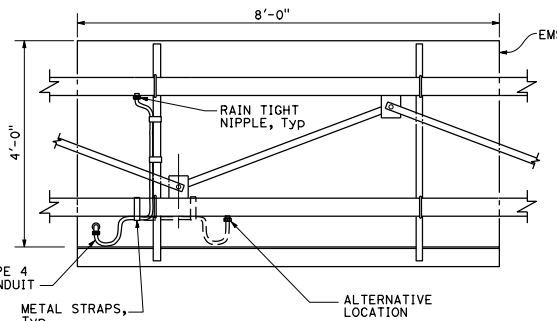


**90° ELBOW**  
**DETAIL B**

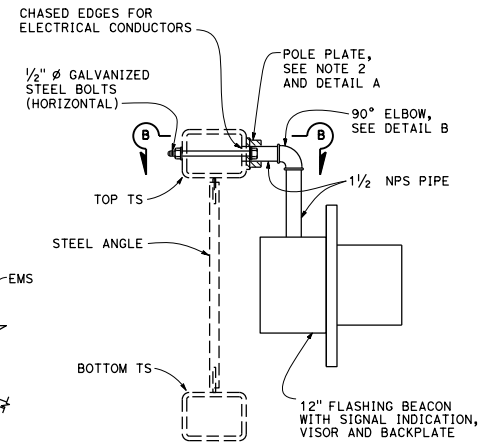
**EMS WITH FLASHING BEACONS**  
**ELEVATION A**



**EMS WITHOUT FLASHING BEACONS**  
**ELEVATION B**



**FLEXIBLE CONDUIT INSTALLATION**  
**DETAIL C**  
Back view of sign



**SECTION A-A**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(EXTINGUISHABLE MESSAGE**  
**SIGN ON A FULL CANTILEVER)**  
NO SCALE

**ES-14C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

*Stanley P. Johnson*  
 REGISTERED CIVIL ENGINEER  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

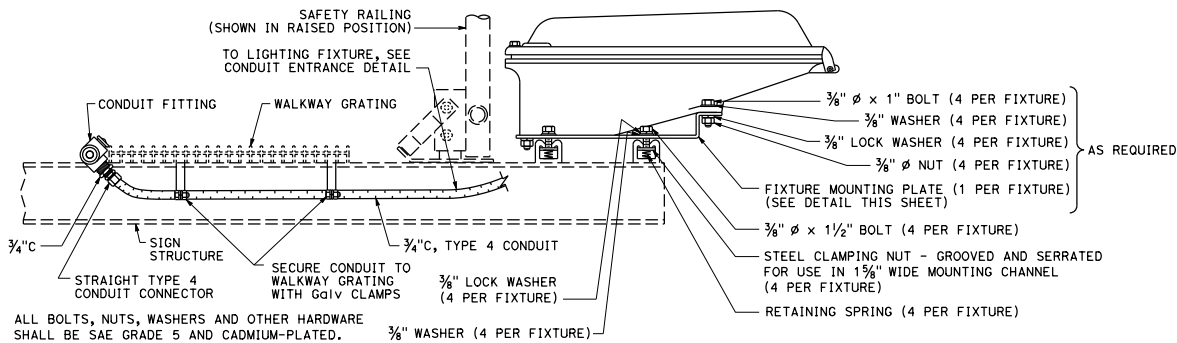
October 30, 2015  
 PLANS APPROVAL DATE  
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**NOTES:**

1. Pole plate shall be bronze or galvanized ductile iron.
2. For structure information, see Standard Plan S50.
3. Wind loading (3-second gust): 100 mph.
4. Handhole shall be located on the downstream side of traffic.



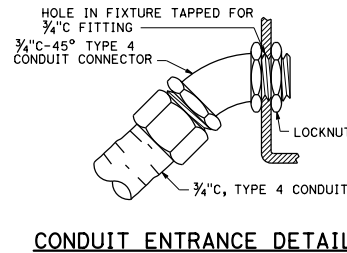
LENGTH OF PANEL	NUMBER OF FIXTURES (EACH)	FIXTURE SPACING SEE NOTES
5'-0"	1	2'-6"
6'-0"		3'-0"
7'-0"		3'-6"
8'-0"		4'-0"
9'-0"		4'-6"
10'-0"		5'-0"
11'-0"		5'-6"
12'-0"		6'-0"
13'-0"		6'-6"
14'-0"		7'-0"
15'-0"	7'-6"	
16'-0"	8'-0"	
17'-0"	2	4'-3":8'-6"
18'-0"		4'-6":9'-0"
19'-0"		4'-9":9'-6"
20'-0"		5'-0":10'-0"
21'-0"		5'-3":10'-6"
22'-0"		5'-6":11'-0"
23'-0"		5'-9":11'-6"
24'-0"		6'-0":12'-0"
25'-0"		6'-3":12'-6"
26'-0"		6'-6":13'-0"
27'-0"	6'-9":13'-6"	
28'-0"	7'-0":14'-0"	
29'-0"	7'-3":14'-6"	
30'-0"	7'-6":15'-0"	
31'-0"	7'-9":15'-6"	
32'-0"	3	8'-0":16'-0"
33'-0"		5'-6":11'-0"
34'-0"		5'-8":11'-4"
35'-0"		5'-10":11'-8"
36'-0"		6'-0":12'-0"
37'-0"		6'-2":12'-4"
38'-0"		6'-4":12'-8"
39'-0"		6'-6":13'-0"
40'-0"		6'-8":13'-4"
41'-0"		6'-10":13'-8"
42'-0"	7'-0":14'-0"	
43'-0"	7'-2":14'-4"	
44'-0"	7'-4":14'-8"	
45'-0"	7'-6":15'-0"	
46'-0"	7'-8":15'-4"	
47'-0"	7'-10":15'-8"	
48'-0"	8'-0":16'-0"	
49'-0"	4	6'-11/2":12'-3"
50'-0"		6'-3":12'-6"
51'-0"		6'-4/2":12'-9"
52'-0"		6'-6":13'-0"
53'-0"		6'-7/2":13'-3"
54'-0"		6'-9":13'-6"
55'-0"		6'-10/2":13'-9"
56'-0"		7'-0":14'-0"
57'-0"		7'-1/2":14'-3"
58'-0"		7'-3":14'-6"
59'-0"	7'-4/2":14'-9"	
60'-0"	7'-6":15'-0"	
61'-0"	7'-7/2":15'-3"	
62'-0"	7'-9":15'-6"	
63'-0"	7'-10/2":15'-9"	
64'-0"	8'-0":16'-0"	



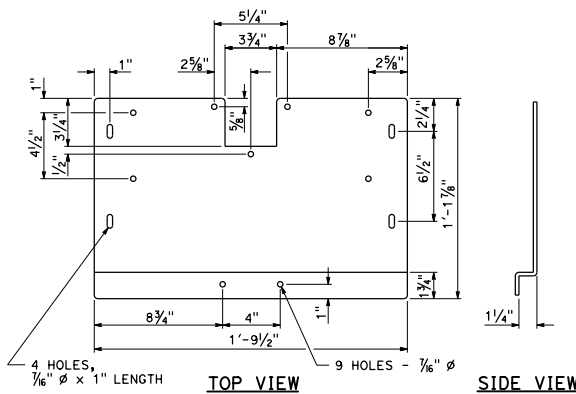
**LIGHTING FIXTURE MOUNTING DETAIL (TYPICAL)**

**NOTES:**

1. The first number listed is the dimension from the edge of the sign panel to the center of the end-most fixture. The second number listed is the dimension between centers of successive fixtures.
2. Where adjacent sign panels are spaced 1'-0" or less the combination of these panels (and spaces) shall be considered a single panel.
3. Physical configuration and mounting details may vary from what is shown.



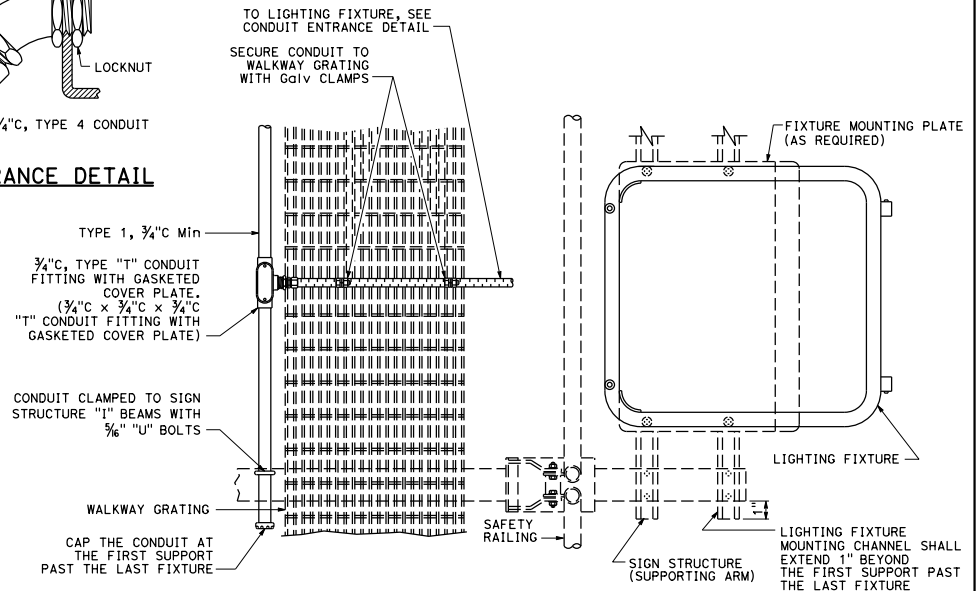
**CONDUIT ENTRANCE DETAIL**



**SIGN ILLUMINATION FIXTURE MOUNTING PLATE (TYPICAL)**

**NOTES:**

1. Material: 0.135" hot-dip galvanized sheet steel after fabrication.
2. Left side is symmetrical with right side.



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(SIGN ILLUMINATION EQUIPMENT)**  
NO SCALE

**ES-15A**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel  
REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Theresa Aziz Gabriel  
No. E15129  
Exp. 6-30-16  
ELECTRICAL  
STATE OF CALIFORNIA

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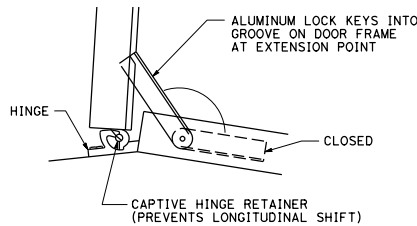
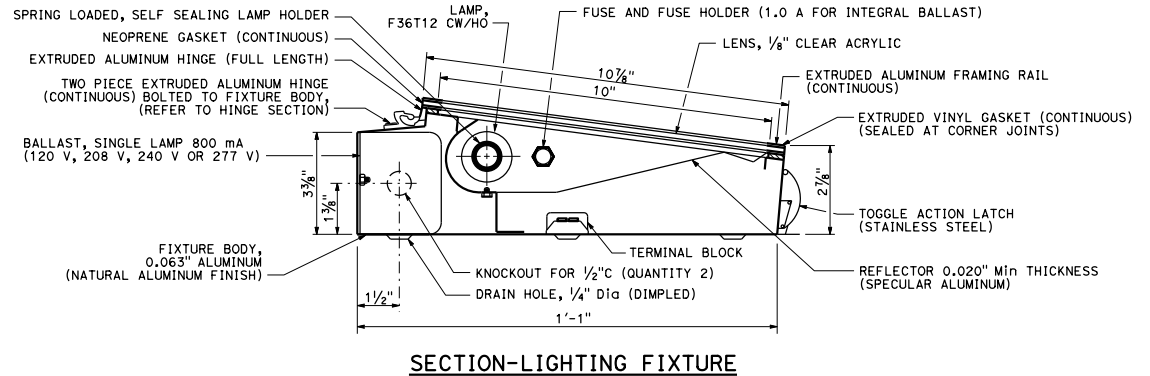
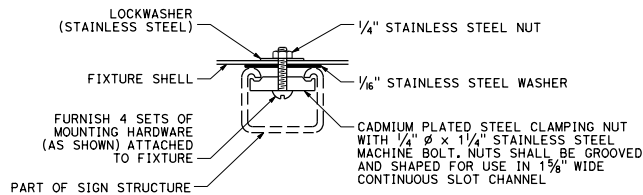
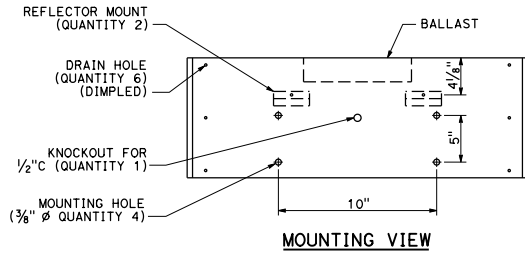
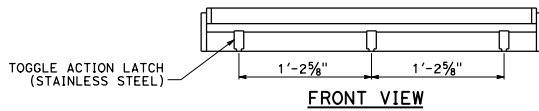
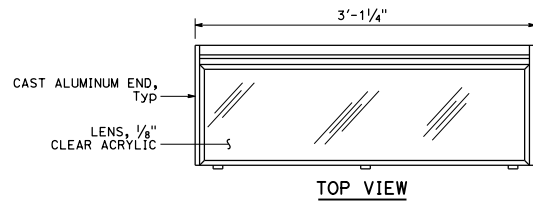
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER

October 30, 2015  
 PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER  
 Theresa  
 Aziz Gabriel  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 STATE OF CALIFORNIA

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**NOTES:**

1. Conduit shall be secured to nearest member using one-hole galvanized malleable iron or steel straps at 5'-0" maximum centers and brass machine screws tapped into the member.
2. Ballasts and terminal boards shall be marked with legible symbols. Conductors shall be tagged and their identification marked on the corresponding terminal on the terminal board as shown on the typical fixture wiring diagram. An alternative cover design shall be submitted for approval.
3. Ballast shall be one, two or three lamp types as required, rated at 800 mA.
4. Each ballast shall be fused with 1/4" x 1/4" slow-blow glass tube fuse.
5. Fuseholder shall be a panel mounted type.
6. The fixture shall have an integral ballast.

SIGN LOAD (WATTS) AND FUSING	
1 LAMP AND BALLAST - 75 W	1 A
2 LAMPS AND BALLAST - 150 W	2.5 A
3 LAMPS AND BALLAST - 225 W	3 A

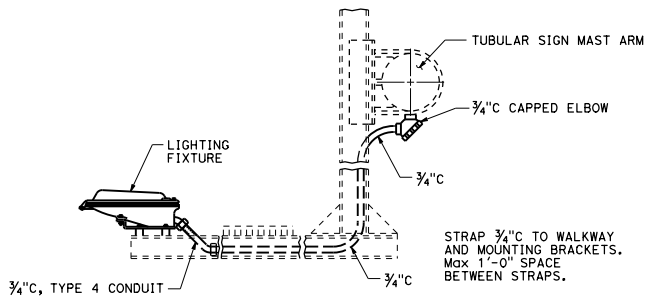
STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(36" FLUORESCENT SIGN ILLUMINATION EQUIPMENT)**

NO SCALE

**ES-15B**

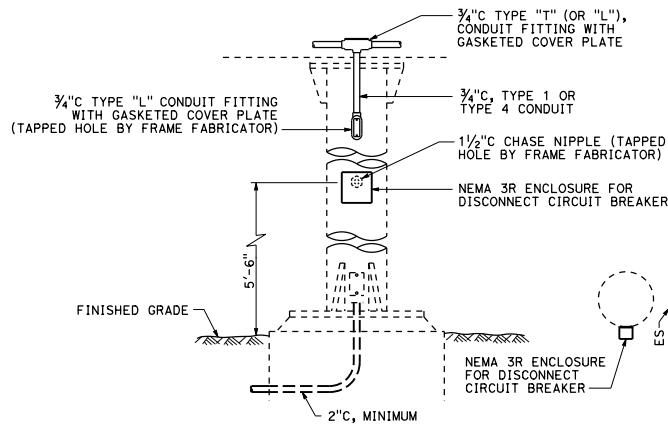
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

*Theresa Gabriel*  
 REGISTERED ELECTRICAL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 Theresa Aziz Gabriel  
 No. E15129  
 Exp. 6-30-16  
 ELECTRICAL  
 STATE OF CALIFORNIA  
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.



**TYPICAL SIGN ILLUMINATION EQUIPMENT  
INSTALLATION FOR OVERHEAD SIGNS TUBULAR**

DETAIL A

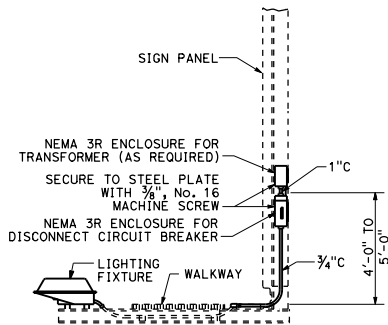


**TYPICAL SIGN ILLUMINATION EQUIPMENT  
INSTALLATION FOR OVERHEAD SIGNS ROUND POST**

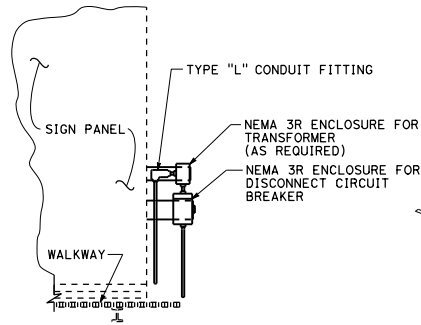
DETAIL B

**NOTES:**

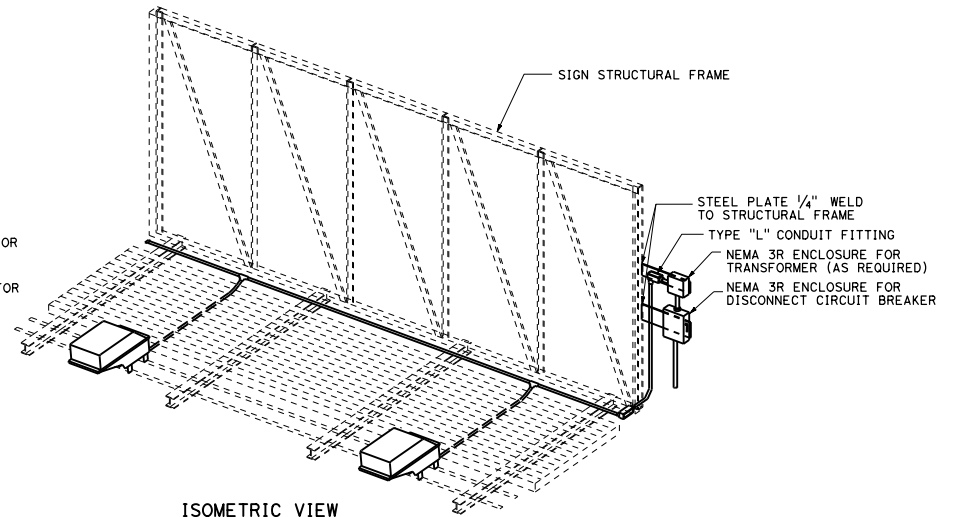
1. Type 4 conduit shall be secured to the nearest walkway bracket using one-hole galvanized malleable iron or steel straps and brass machine screws tapped into the bracket.
2. See Overhead Signs Standard Plans for overhead signs and frame juncture details for photoelectric unit installation.
3. Enclosures and straps shall be secured by 3/8 inch maximum size screws.
4. The Contactor and test switch enclosures shall be readily accessible from the sign walkway.



SIDE VIEW



FRONT VIEW



ISOMETRIC VIEW

**TYPICAL SIGN ILLUMINATION EQUIPMENT  
INSTALLATION FOR OVERHEAD SIGNS  
BRIDGE MOUNTED**

DETAIL C  
See Note 4

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(SIGN ILLUMINATION EQUIPMENT)**

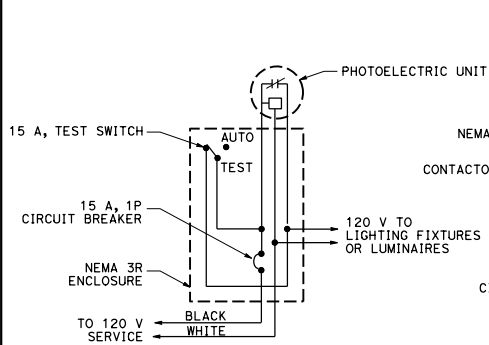
NO SCALE

**ES-15C**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
<i>Theresa Gabriel</i> REGISTERED ELECTRICAL ENGINEER					
October 30, 2015 PLANS APPROVAL DATE					
Theresa Aziz Gabriel No. E15129 Exp. 6-30-16 ELECTRICAL					
<small>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</small>					

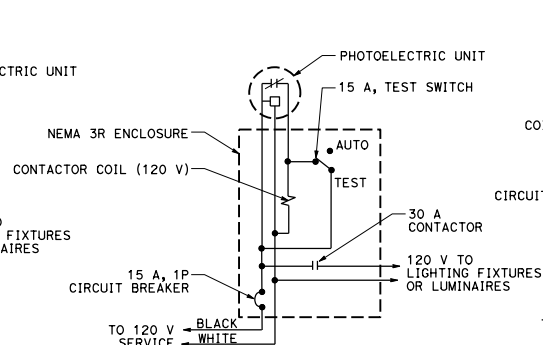
**NOTE:**

1. Type SC1A, SC2A, SC3A controls are similar to Types SC1, SC2 and SC3 controls respectively except test switch and wiring are not required.



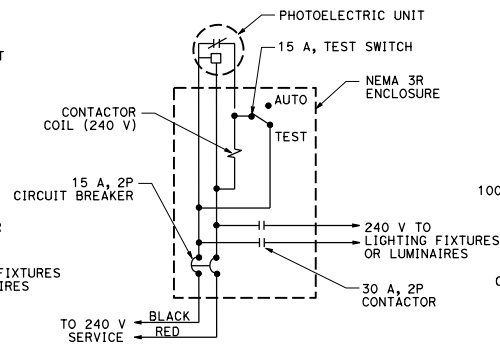
**TYPE LC1 CONTROL**

For 120 V unswitched circuit with no more than 1000 W load.



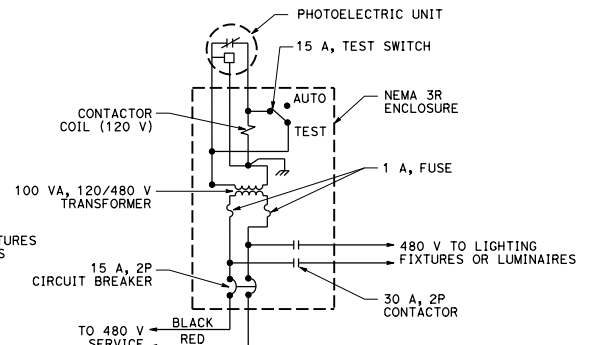
**TYPE LC2 CONTROL**

For 120 V unswitched circuit



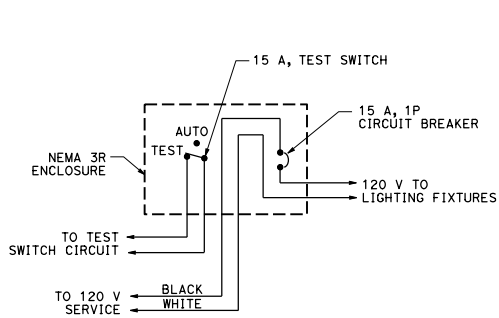
**TYPE LC3 CONTROL**

For 240 V unswitched circuits



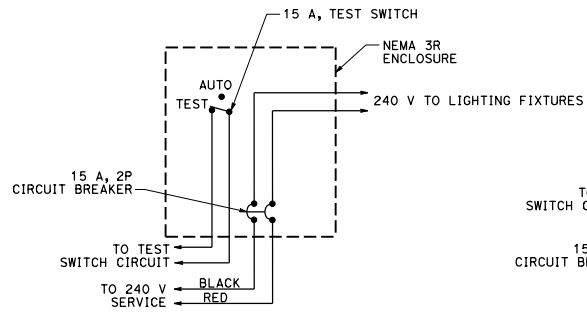
**TYPE LC4 CONTROL**

For 480 V unswitched circuits



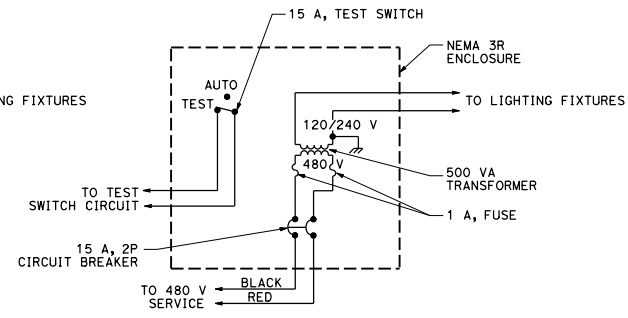
**TYPE SC1 CONTROL**

For 120 V switched circuit, see Note 1 for Type SC1A



**TYPE SC2 CONTROL**

For 240 V switched circuit, see Note 1 for Type SC2A



**TYPE SC3 CONTROL**

For 480 V switched sign circuit, see Note 1 for Type SC3A

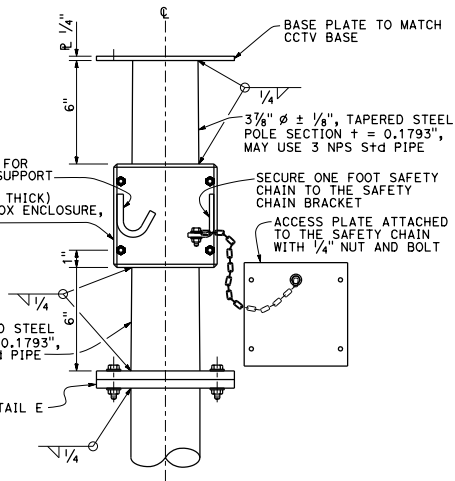
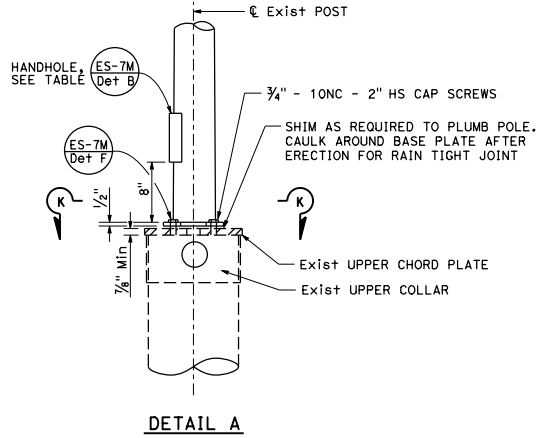
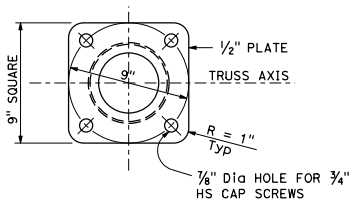
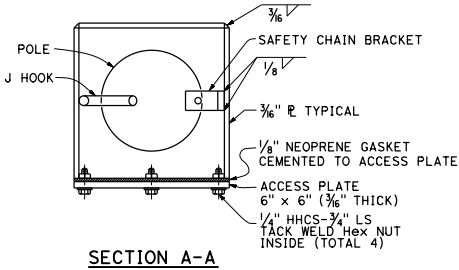
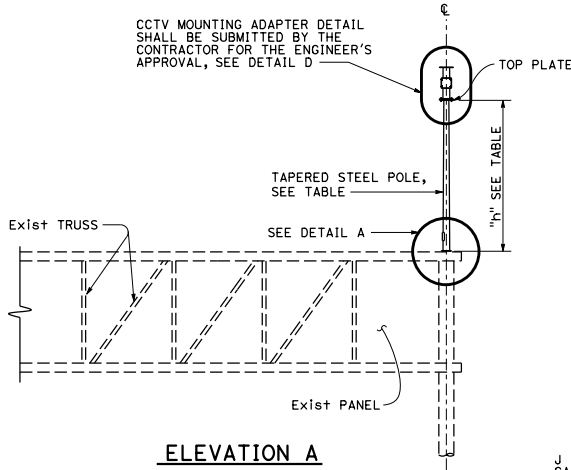
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
(LIGHTING AND SIGN  
ILLUMINATION CONTROL)**

NO SCALE

**ES-15D**

POLE EXTENSION TYPE	POLE DATA				HANDHOLE SIZE
	HEIGHT "h"	Min OD		THICKNESS	
		BASE	TOP		
CCTV 5	5'	4 $\frac{3}{8}$ "	3 $\frac{3}{4}$ "	0.1793"	3" x 5"
CCTV 10	10'	5 $\frac{1}{4}$ "			
CCTV 15	15'	5 $\frac{5}{8}$ "			

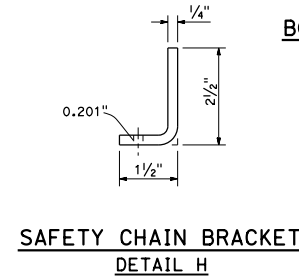
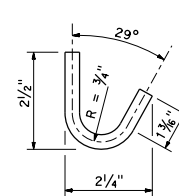
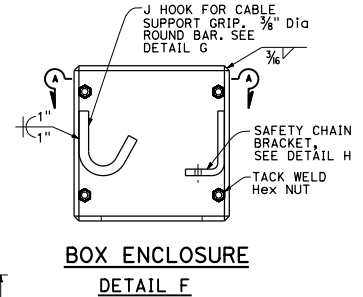
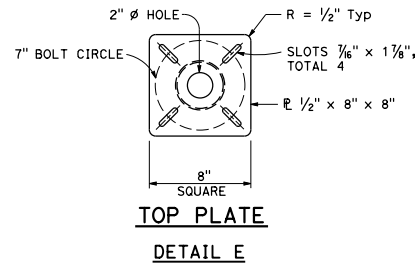
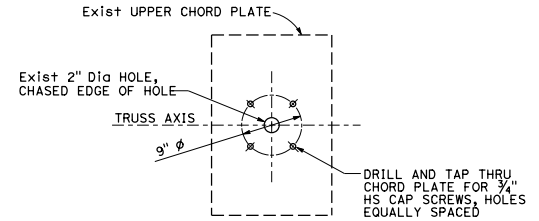
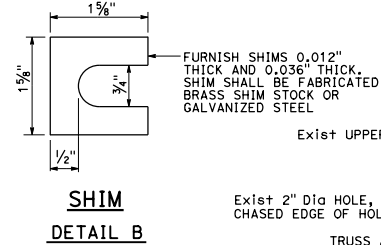
CCTV MOUNTING ADAPTER DETAIL SHALL BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEER'S APPROVAL, SEE DETAIL D



**CLOSED CIRCUIT TELEVISION MOUNTING ADAPTER**

**NOTES:**

1. Verify controlling field dimensions before ordering or fabricating any material.
2. Bolt hole locations may vary at the discretion of the Engineer.
3. See Std Plan S13.
4. Wind Loadings (3-second gust) : 100 mph.
5. Unit Stresses (Structural Steel):
  - a. fy = 55,000 psi (tapered steel tube)
  - b. fy = 50,000 psi (unless otherwise noted)



STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS**  
**(CLOSED CIRCUIT TELEVISION,**  
**5' TO 15' OVERHEAD SIGN MOUNTED POLE)**

NO SCALE

**ES-16A**

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER  
No. CS795  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

October 30, 2015  
PLANS APPROVAL DATE  
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2015 STANDARD PLAN ES-16A

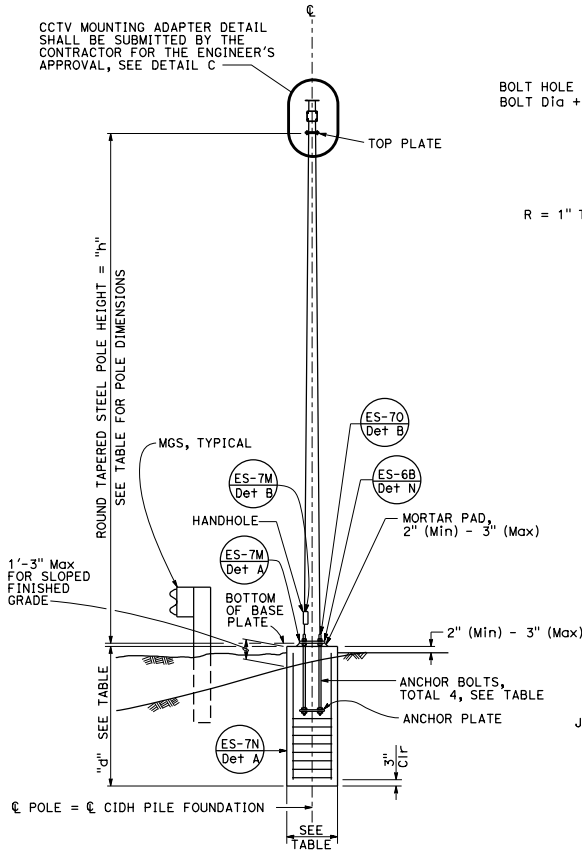
POLE TYPE	POLE DATA			BASE PLATE DATA				CIDH		
	HEIGHT "h"	Min OD		THICKNESS	"c"	THICKNESS	ANCHOR BOLT SIZE	BC = BOLT CIRCLE	Dia	"d"
		BASE	TOP							
CCTV 25	25'	7 $\frac{3}{8}$ "	3 $\frac{3}{4}$ "	0.1793"	1'-1"	1"	1 $\frac{1}{2}$ " $\phi$ x 36"	11 $\frac{1}{2}$ "	2'-6"	7'-0"
CCTV 30	30'	8"			1'-1 $\frac{1}{2}$ "			1'-0"		7'-6"
CCTV 35	35'	8 $\frac{5}{8}$ "			1'-2"			1'-1"		8'-0"
CCTV 40	40'	9 $\frac{3}{8}$ "			1'-1 $\frac{1}{2}$ "			1'-1 $\frac{1}{2}$ "		8'-0"
CCTV 45	45'	10"			1'-3"			1'-2"		8'-6"

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

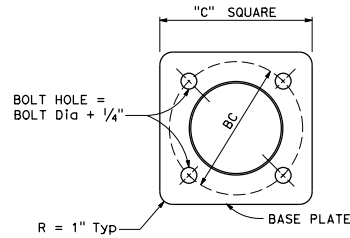
Stanley P. Johnson  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS793  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

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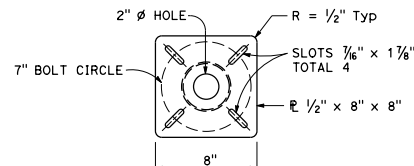
CCTV MOUNTING ADAPTER DETAIL SHALL BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEER'S APPROVAL, SEE DETAIL C



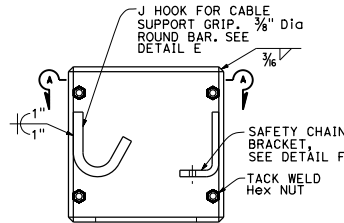
**ELEVATION A**



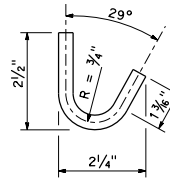
**BASE PLATE  
DETAIL A**



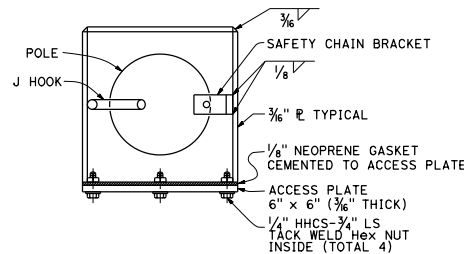
**TOP PLATE  
DETAIL B**



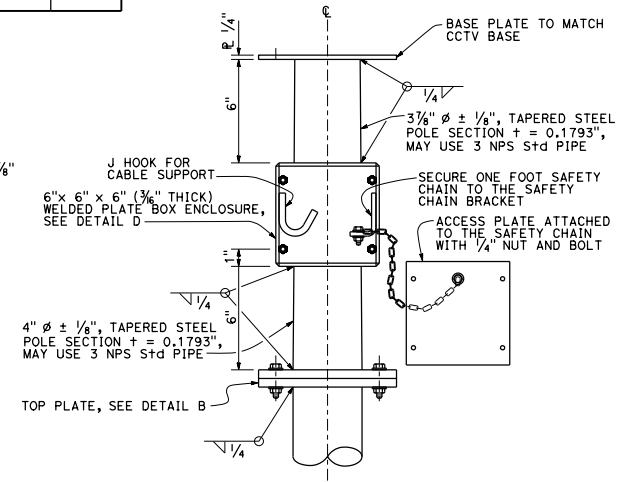
**BOX ENCLOSURE  
DETAIL D**



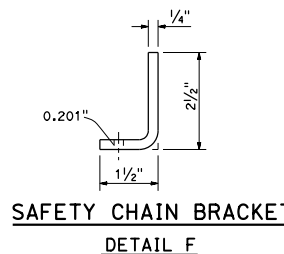
**J HOOK  
DETAIL E**



**SECTION A-A**



**CLOSED CIRCUIT TELEVISION MOUNTING ADAPTER  
DETAIL C**



**SAFETY CHAIN BRACKET  
DETAIL F**

**NOTES:**

1. Verify controlling field dimensions before ordering or fabricating any material.
2. During pole installation, the post shall be raked as necessary with the use of leveling nuts to provide a plumb pole axis.
3. Wind Loadings (3-second gust): 100 mph
4. Unit Stresses (Structural Steel):
  - a. fy = 55,000 psi (tapered steel tube and anchor bolts)
  - b. fy = 50,000 psi (unless otherwise noted)
5. Unit Stresses (Reinforced Concrete):
  - a. f'c = 3,625 psi
  - b. fy = 60,000 psi

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**ELECTRICAL SYSTEMS  
 (CLOSED CIRCUIT TELEVISION,  
 25' TO 45' POLE)**

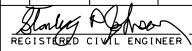
NO SCALE

**ES-16B**

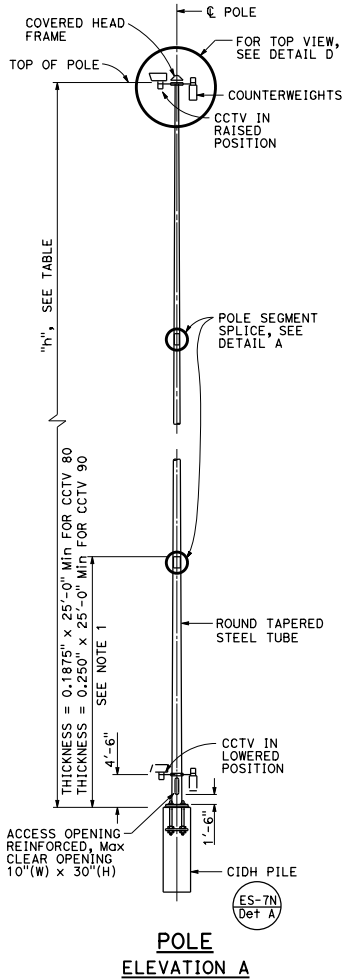
POLE TYPE	POLE DATA				BASE PLATE DATA				CIDH PILE DATA			
	HEIGHT "h"	Min OD		Min THICKNESS	Dia	THICKNESS	ANCHOR BOLT SIZE		BC = BOLT CIRCLE	"D"	"L"	PILE ReInf
		BASE	TOP				TOTAL	"d"				
HM CCTV 50	50'	18"	9 3/4"	0.3125" *	28"	3"	12	1 1/2"	23"	3'-6"	12'	13 - #7
HM CCTV 60	60'	20"	10 1/4"		30"							
HM CCTV 70	70'	22"	10 5/8"		33"							
HM CCTV 80	80'	24"	11 1/8"	0.375" *	35"	1 3/4"	29"	4'-0"	14'	15 - #7		
HM CCTV 90	90'											

\* LOWER POLE SEGMENT THICKNESS, SEE POLE DETAILS

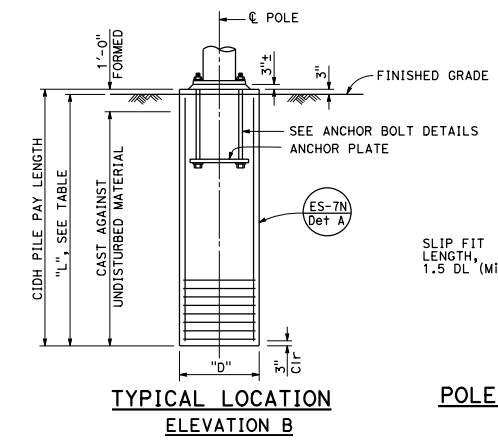
DIST	COUNTY	ROUTE	POST MILES	SHEET	TOTAL
			TOTAL PROJECT	No.	SHEETS

  
 REGISTERED CIVIL ENGINEER  
 October 30, 2015  
 PLANS APPROVAL DATE  
 No. CS795  
 Exp. 3-31-16  
 CIVIL  
 STATE OF CALIFORNIA

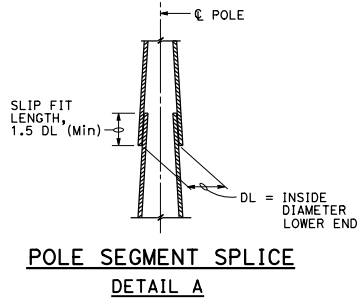
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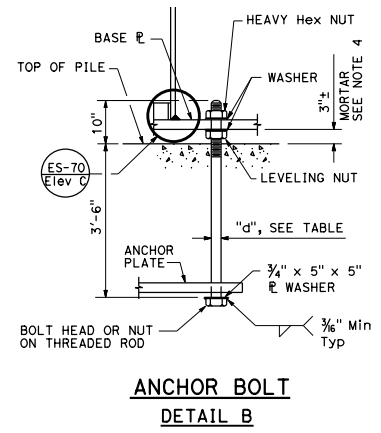
**POLE ELEVATION A**



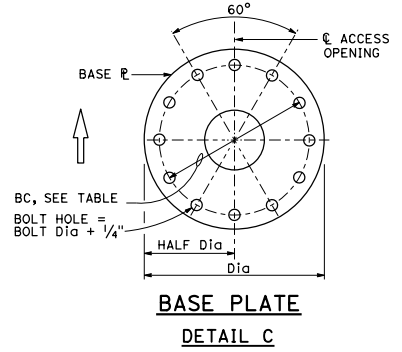
**TYPICAL LOCATION ELEVATION B**



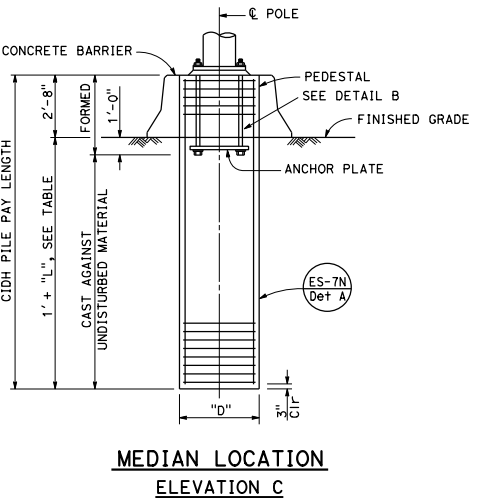
**POLE SEGMENT SPLICE DETAIL A**



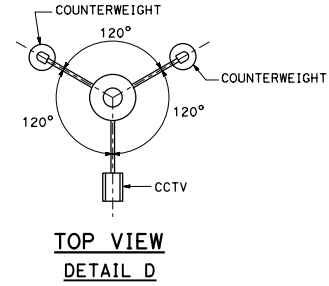
**ANCHOR BOLT DETAIL B**



**BASE PLATE DETAIL C**



**MEDIAN LOCATION ELEVATION C**



**TOP VIEW DETAIL D**

**NOTES:**

- Pole details shall suit the lowering device and this foundation plan. Pole details shall be submitted to the Engineer for approval.
- For closed circuit television details, see Electrical Plans.
- Foundation design is based on a maximum wind velocity of 80 mph.
- For central void and drain holes in mortar, see Standard Plan ES-6B detail N.
- Wind Loadings (fastest mile): 80 mph
- Unit Stress (Structural Steel):  
 fy = 55,000 psi (tapered steel tube)  
 fy = 50,000 psi (unless otherwise noted)
- Access opening shall be located on the downstream side of traffic unless otherwise determined by the Engineer.

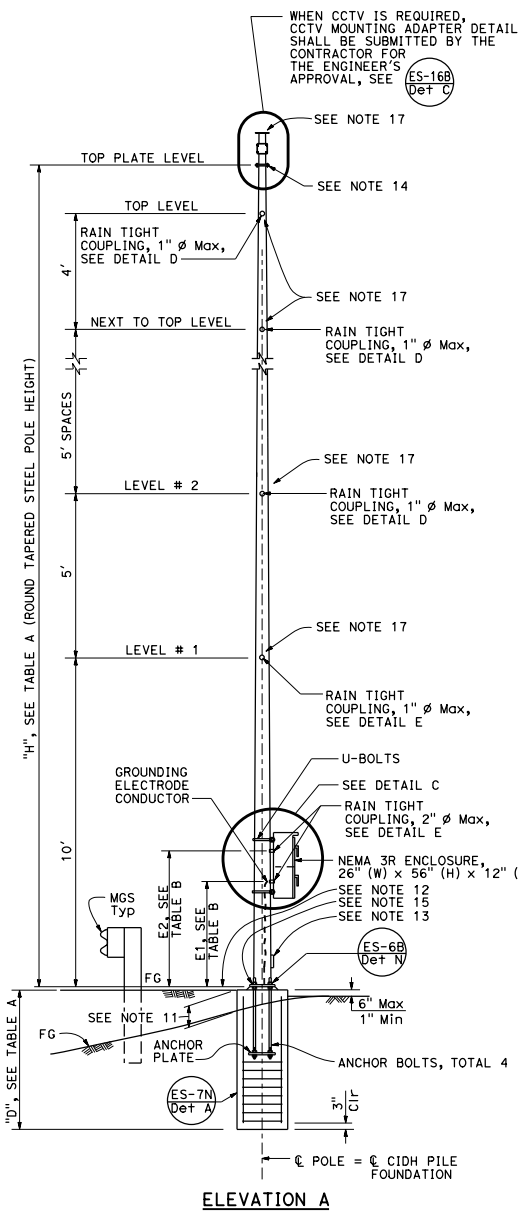
STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(CLOSED CIRCUIT TELEVISION,  
50' TO 90' HIGH MAST POLE)**

NO SCALE

**ES-16C**





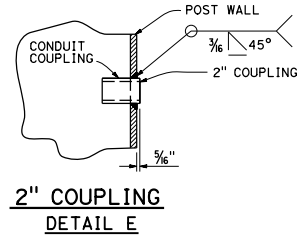
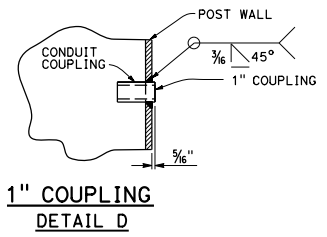
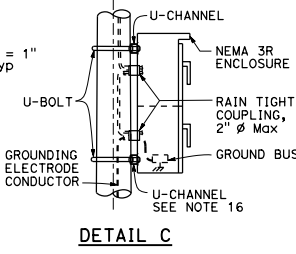
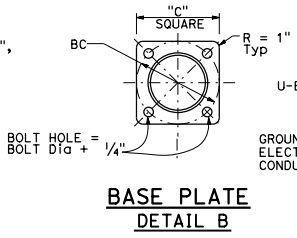
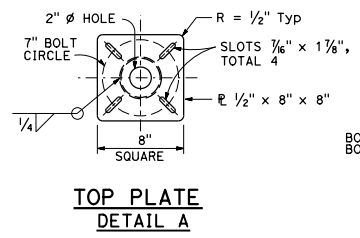
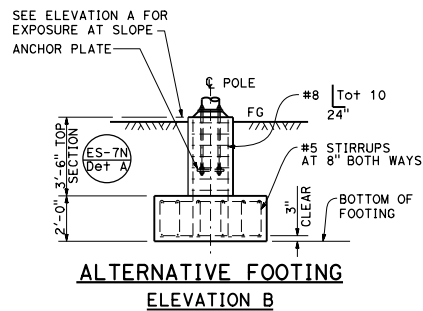
WHEN CCTV IS REQUIRED, CCTV MOUNTING ADAPTER DETAIL SHALL BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEER'S APPROVAL, SEE ES-16B Det C

POLE TYPE	POLE DATA			BASE PLATE DATA				"D" 2'-6" Ø CIDH Pile	
	HEIGHT "H"	Min OD		"C"	THICKNESS	ANCHOR BOLTS SIZE	BC = BOLT CIRCLE	LEVEL GROUND	UP TO 2:1
		BASE	TOP						
VDS 30	30'	8"		1'-1 1/2"			1'-1 1/2"	11'-0"	13'-0"
VDS 35	35'	8 5/8"	3 7/8"	1'-2"	1 1/2"	1 1/2" Ø x 3'-0"	1'-2"	11'-0"	
VDS 40	40'	9 3/8"		1'-3"			1'-3"	12'-0"	14'-0"

POLE TYPE	COUPLING	
	E1(Max)	E2(Max)
VDS 30		
VDS 35	3'-6"	4'-9"
VDS 40		

SPREAD FOOTING		
GROUND LEVEL	FOOTING SIZE (LENGTH x WIDTH x DEPTH)	REINFORCEMENT TOP & BOTTOM

LOCATION	MAXIMUM TOTAL EPA PER LEVEL (SQ. FEET)	MAXIMUM TOTAL WEIGHT (lb)
LEVEL #1		
LEVEL #2	14	200
LEVEL #3	10 ***	
LEVEL #4 (VDS 35 AND VDS 40 ONLY)		
LEVEL #5 (VDS 40 ONLY)	2.5	50
NEXT TO TOP LEVEL		
ON TOP PLATE LEVEL **		



D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL SHEETS

Stanley P. Johnson  
REGISTERED CIVIL ENGINEER

October 30, 2015  
PLANS APPROVAL DATE

Stanley P. Johnson  
No. CS793  
Exp. 3-31-16  
CIVIL  
STATE OF CALIFORNIA

THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

- NOTES:**
- All steel shall be galvanized after fabrication.
  - The foundation shall be treated as level ground condition if the slope inclination is flatter than 4 : 1 (Horizontal : Vertical)
  - For devices mounted and mounting heights, see TABLE B.
  - Design Specification: AASHTO Standard Specification for structural support for highway signs, luminaires and traffic signal dated 2001.
  - Wind Loadings: 100 mph (3-second gust)
  - Unit Stresses (Structural Steel):
    - a. fy = 55,000 psi (tapered steel tube)
    - b. fy = 50,000 psi (unless otherwise noted)
  - Anchor bolts: fy = 55,000 psi
  - Unit Stresses (Reinforced Concrete):
    - a. f'c = 3,600 psi
    - b. fy = 60,000 psi
  - Verify all controlling field dimension before ordering of fabricating any material.
  - When no barriers are used, the NEMA 3R enclosure shall be located on the downstream side and perpendicular to the roadway.
  - 1'-3" (Max) for sloped finished grade.
  - Bottom of base plate.
  - Handhole. ES-7M (ES-7M Det B) (ES-7M Det A)
  - Top plate. Install a blank flange on the top plate when closed circuit television is not used.
  - ES-70 Elev B
  - U-channel with bracket.
  - Use the manufacturer's Effective Projected Area (EPA) for attachments. Assign attachments to nearest level and sum each level, see Table D for limitations.

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS  
(CLOSED CIRCUIT TELEVISION WITH  
VEHICLE DETECTION SYSTEM,  
30' TO 40' POLE)**

NO SCALE

ES-16D

2015 STANDARD PLAN ES-16D



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