



Arizona Department of Transportation
ROADWAY ENGINEERING GROUP

MEMORANDUM

To: All Users of Construction Standards

Date: August 26, 1999

From: Terry H. Otterness
Design Program Manager
Roadway Engineering Group

Subject: Revisions to Construction Standards -
English Version

Several changes are being made to Construction Standard Drawings and the Construction Standards index. Please update your C-Standards with the attached drawings included in this supplement packet:

- Standard C-05.10 is revised to reflect a new gutter depression depth of 5/8". This is a design change to facilitate increased drainage spread on pavement.
- Standard C-05.11 is deleted because it is not a Construction Standard.
- In order to meet the ADA requirements, **new** details for sidewalk ramp with pedestrian bypass (Type 1) and sidewalk ramp with pedestrian bypass for use with pedestrian push button (Type 6) were added to Standard C-05.30. Minor modifications were made to the original sheets 1 through 4. Designer note: Ramp type numbers have been revised.
- Standard C-06.10 (Sheet 1 of 2), General Note #4 is revised to clarify property line.
- Standard C-08.10 is deleted since ramp geometrics are covered in the "Roadway Design Guidelines".
- Standard C-10.31 is revised to comply with NCHRP 350 requirements.
- Standard C-10.45 is modified to reflect new length of foundation tubes.
- Standard C-10.62 contains minor modifications.
- **New** Standard C-10.63 is developed for 42" 'F' Shape concrete barrier.
- Standards C-10.70 and C-10.71 are revised to type 'F' shape and to comply with NCHRP 350 requirements.
- **New** Standards C-10.72 and C-10.73 are developed for 42" 'F' Shape concrete barrier.
- Standard C-10.75, New Jersey barrier is changed to Type 'F' configuration.

- **New** Standard C-10.86 is developed for 42” ‘F’ Shape concrete barrier.
- Standard C-15.91 is revised to reflect new gutter depression depth of 1 5/8”.

Design Personnel should review the revised drawings and incorporate into their design plans as appropriate. Also, please support any requests from field to implement changes on current construction projects where appropriate. Construction Personnel should review all drawings for possible implementation with on-going construction projects. The updated 1A Sheet (List of Standards) is available at the Roadway Support Desk – 712-8667 or 8671.

Please distribute to all users within your Group or District. Additional copies may be obtained from ADOT Engineering Records at 712-8216. Questions regarding the Drawings may be directed to Tom Scheck (712-8674)), Jeri Pulkinen (712-7735) or me (712-7341).

C: Roadway Group	Statewide Project Management Group
Valley Freeway Group	Traffic Group
Bridge Group	Contracts & Specifications Section
Construction Group	Central Maintenance Group
Local Government Section	District Engineers (10)
FHWA	Engineering Consultant Services
Engineering Records	Regional Traffic Engineers (4)
District Permits Offices (10)	


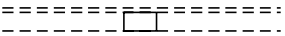
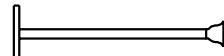
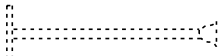

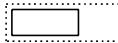
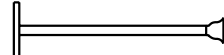
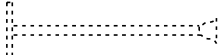


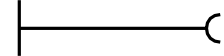
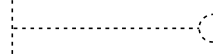


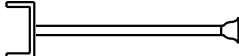
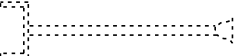


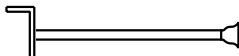
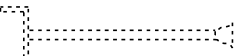
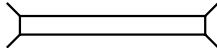
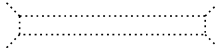
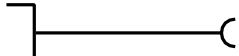

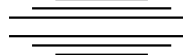
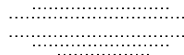
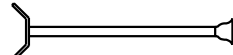
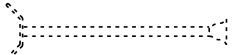
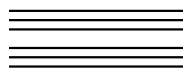
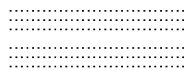
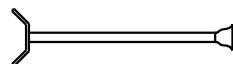

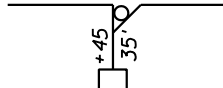
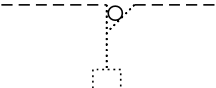
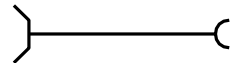
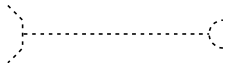
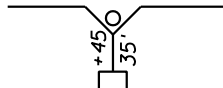
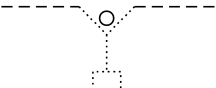
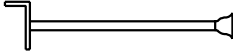
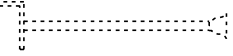


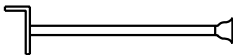
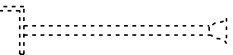


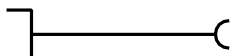
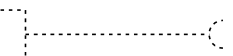








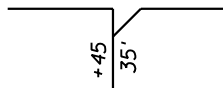
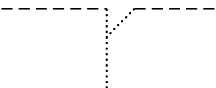
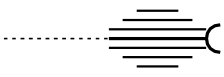

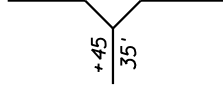

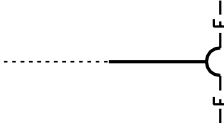

CONSTRUCTION STANDARD DRAWINGS - INDEX

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CONSTRUCTION STANDARD DRAWINGS - INDEX

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		C-23.65	FIRE HYDRANT LOCATIONS

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

	CONSTRUCTION DRAWING SYMBOLS			CONSTRUCTION DRAWING SYMBOLS	
	NEW FEATURES	EXISTING FEATURES		NEW FEATURES	EXISTING FEATURES
Catch Basin, Curb & Gutter -----			Straight Hdwl w/End Sct, Pipe (I"=20') (All Dia) -----		
Catch Basin, Median Dike -----			Straight Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=42" and larger) -----		
Catch Basin, Off Roadway, Flush -----			Straight Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=36" and smaller) -----		
Catch Basin, Single Curb -----			"U" Hdwl w/End Sct, Pipe (I"=20') (All Dia) -----		
Cattle Guard -----			"U" Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=42" and larger) -----		
Concrete Box Culvert -----			"U" Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=36" and smaller) -----		
Dike, Median -----			Wing Hdwl w/End Sct, Pipe (I"=20') (All Dia) -----		
Dike -----			Wing Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=42" and larger) -----		
Downdrain, one way -----			Wing Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=36" and smaller) -----		
Downdrain, two way -----			"L" Hdwl w/End Sct, Pipe (I"=20') (All Dia) -----		
Manhole -----			"L" Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=42" and larger) -----		
Manhole, Frame & Cover, Reset -----			"L" Hdwl w/End Sct, Pipe (I"=50' or smaller) (Dia=36" and smaller) -----		
Retaining Wall -----			Pipe Ext W/End Sct & Berm (I"=20') (All Dia) -----		
Rock Riprap -----			Pipe Ext W/End Sct & Berm (I"=20') (I"=50' or smaller) (Dia=42" and larger) -----		
Spillway, one way -----			Pipe Ext W/End Sct & Berm (I"=20') (I"=50' or smaller) (Dia=36" and smaller) -----		
Spillway, two way -----			Pipe Ext W/End Sct Roadway Widening (I"=20') -----		

			DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
			APPROVED FOR DISTRIBUTION 	① SYMBOL LEGEND	DRAWING NO. C-01.11	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED SYMBOL FOR GUARD RAIL EXTRUDER TERMINAL	PNB	10/95
2			
3			
4			

CONSTRUCTION DRAWING SYMBOLS			CONSTRUCTION DRAWING SYMBOLS		
NEW FEATURES		EXISTING FEATURES	NEW FEATURES		EXISTING FEATURES
Plan View, Bituminous Pavement			Irrigation Ditch, Concrete		
Plan View, Concrete Pavement			Irrigation Ditch, Earth		
Plan View, Graded Surface			Irrigation Line (I"=20')		
Plan View, Obliterate Pavement			Irrigation Line (I"=100')		
Plan View, Wood			Overhead Power/Joint Use Line		
Section, Asphaltic Concrete Friction Course			Overhead Telephone Line		
Section, Bituminous Pavement			Sanitary Sewer (I"=20')		
Section, Concrete			Sanitary Sewer (I"=100')		
Section, Metal			Storm Drain (I"=20') & (I"=50')		
Section, Wood			Storm Drain (I"=100')		
Section, Aggregate Base			Street Light and With Mast Arm		
Section, Ground Line			Telephone/Power Pedestal		
Ground Line Profile			Utility Pole with Down Guy and Anchor		
Barbed Wire Fence & Gate			Underground Power/Joint Use Line		
Chain Link Fence & Gate			Underground Telephone Line		
Guard Rail & Breakaway Cable Terminal			Water/Gas Meter Box		
① Guard Rail & Guard Rail Extruder Terminal			Water/Gas Valve		
Gas Line					

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Henry H. Ottens

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Ronald Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

REV.

10/95

SYMBOL LEGEND

DRAWING NO.

C-01.12

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED SYMBOL	PNB	10/95
2			
3			
4			

	CONSTRUCTION DRAWING SYMBOLS			CONSTRUCTION DRAWING SYMBOLS	
	NEW FEATURES	EXISTING FEATURES		NEW FEATURES	EXISTING FEATURES
Water Line			① Depressed Index Contour Line		
Drainage Channel			Depressed Intermediate Contour Line		
Drainage Ditch			Block Wall (1"=20')		
Major Wash			Median Barrier		
Minor Wash			Fire Hydrant		
℄ Grade, Profile			Standpipe		
Hedge			Transmission Tower		
Palm Tree			Windmill		
Shrubbery			Mail Box		
Unclassified Tree			Flag Pole		
Sign, Single Post			North Arrow		
Sign, Multiple Post					
Dimensions					
Visible Outlines, Sections, etc... ..					
Index Contour Line					
① Intermediate Contour Line					

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STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

REV.
10/95

SYMBOL LEGEND

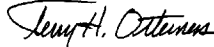
DRAWING NO.
C-01.13


NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CORRECTED SPELLING	PNB	10/95
2	DELETED ABBREVIATION	PNB	10/95
3	REVISED ABBREVIATION	PNB	10/95
4	ADDED ABBREVIATION	PNB	10/95

WORDS		ABBREVIATION		WORDS		ABBREVIATION		WORDS		ABBREVIATION	
A				B (cont)				C (cont)			
Abutment		Abt		Bituminous Surface Treatment		BST		④ Corrugated High Density Polyethylene Plastic Pipe		CHDPEPP	
Acceleration		Acc		Bituminous Treated Base		BTB		Corrugated Steel Pipe		CSP	
Acres		Ac		Black Steel Pipe		BSP		Corrugated Steel Pipe Arch		CSPA	
Aggregate		Agg		Borrow		Bor		County		Co	
Aggregate Base		AB		Boulevard		BLVD, Blvd		Crossing		X-ING	
Ahead		AHD, Ahd		Boundary		③ Bdry		Cross Section		X-SECT	
Alternate		Alt		Brass Cap		BC		Crown		Cr	
Aluminum		Al		Breakaway Cable Terminal		BCT		Cubic		Cu	
American Association of State Highway and Transportation Officials		AASHTO		Bridge		Br		Cubic Feet Per Second		CFS	
American Concrete Institute		ACI		Building		Bldg		Cubic Yard or Cubic Yards		CY, Cu Yd	
American Institute of Steel Construction		AISC		C				Culvert		③ Culv	
① American Road and Transportation Builders Association		ARTBA		Calculated		Calc		Curb and Gutter		C&G	
American Society for Testing Materials		ASTM		Cast-In-Place		C-I-P		Curve to Spiral		CS	
Amount		Amt		Cast Iron		CI		D			
Approach		Appr		Cast Iron Pipe		CIP		Deceleration		Dcl	
Approximate		Approx		Catch Basin		CB		Deflection		Def	
Asphalt		Asph		Cattle Guard		CG		Deflection of Total Curve		I	
Asphalt Rubber		AR		Cement		Cem		Degree of Curve		D	
Asphalt Rubber ACFC		ARACFC		Cement Treated Base		CTB		Delineator		Del	
Asphaltic Concrete		AC		Center		Ctr		Delta		Δ	
Asphaltic Concrete Base		ABC		Center Line		€		Depressed Curb		DC	
Asphaltic Concrete Friction Course		ACFC		Center to Center		C to C		Design Speed		Des Spd	
Asphaltic Concrete Surface Course		ACSC		Channel		Chan		Detail		Dtl	
Avenue		AVE, Ave		Class		Cl		Diameter		Dia	
Average Daily Traffic		ADT		Clear		Clr		Distance		Dist	
B				Column		Col		Division		Div	
Back		BK, Bk		Compact or Compaction		Comp		Double		Dbl	
Backfill		Bkfl		Complete In Place		C in P		Drain or Drainage		Drn	
② Balance		Bal		Concrete		Conc		Drainage Area		DA	
Bank Protection		Bank Prt		Concrete Box Culvert		CBC		Drawing		Dwg	
Barbed Wire		BW		Concrete Treated Base		CTB		Drive		Dr	
Bearing		Brg		Connection		Conn		Driveway		Dwy	
Begin		Bgn		Conduit		Cond		Ductile Iron Pipe		DIP	
Begin Curb Return		BCR		Construct or Construction		Cst		E			
Begin Full Super		BFS		Continous		Cont		Each		Ea	
Bench Mark		BM		Coordinate		Coord		Easement		Esmt	
Bevel or Beveled		Bev		Corner		Cor		East		E	
Bituminous		Bit		Correction		Corr		Eastbound		EB	
Bituminous Mixture		Bit Mix		Corrugated Aluminum Pipe		CAP					
				Corrugated Aluminum Pipe Arch		CAPA					

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED SPELLING	PNB	10/95
2	REVISED ABBREVIATION	PNB	10/95
3	ADDED ABBREVIATION	PNB	10/95
4			

WORDS	ABBREVIATION	WORDS	ABBREVIATION	WORDS	ABBREVIATION
E (cont)		G (cont)		M (cont)	
Edge of Pavement	EP	Ground	Gnd	Mile or Miles	MI
Electric, Electricity	Elec, E	③ Ground Compaction	Gnd Comp	Mile Post	MP
Elevation	Elev	Grubbing	Grb	Miles Per Hour	MPH
Embankment	Emb	Guard	Grd	Mineral Aggregate	MA
End Curb Return	ECR	Guard Rail	GR	Minimum	Min
① End Full Superelevation	EFS	③ Guard Rail Extruder Terminal	GET	Miscellaneous	Misc
Engineer	Engr	H		Modify or Modified	Mod
Entrance	Ent	Headwall	Hdwl	Monument	Mon
Equation	EQ, Eq	Height	Ht, H, h	Mountain	Mt
Estimate	Est	Height of Instrument	HI	N	
Excavation	② Exc	Head Water	HW	National	Natl
Existing	Exst	Highway	Hwy	Non-Reinforced Cast-In-Place	NRCIPCP
Expansion Joint	Exp Jt	Horizontal	② Horz	Concrete Pipe	
Extend or Extension	Ext	Horizontal Elliptical Reinforced	HERCP	Normal Crown	NC
External	Ext	Concrete Pipe		North	N
F		I		Northbound	NB
Federal	Fed	Improvement	Impr	Number	No
Feet or Foot	Ft	Inch or Inches	In	O	
Feet per Foot	$\frac{ft}{ft}$	Include, Included or Inclusive	Incl	Obliterate	Obl
Feet Per Second	FPS	Inside Diameter	ID	Original	Orig
Figure	Fig	Invert	Inv	Outside Diameter	OD
Finish	Fin	Irrigation	Irr	Overhead	OH
Floor	Fl	J		Overpass	OP
Flow Line	FL	Joint	Jt	P	
Footing	Ftg	Junction	Jct	Parkway	Pkwy
Forest	Fst	L		Pavement	Pvmt
Found	Fnd	Laboratory	Lab	Pedestrian	Ped
Frame	Fr	Lateral	Lat	Place	Pl
Freeway	Fwy	Left	Lt	Point	Pt
Frontage	Frt	Length or Length of Curve	L	Point of Compound Curvature	PCC
Furnish or Furnished	Furn	③ Length of Normal Crown Removal	L _C	Point of Curvature	PC
Future	Fut	③ Length of Spiral	L _S	Point of Intersection	PI
G		③ Length of Superelevation Runoff	L _S	Point of Reverse Curvature	PRC
Gas	G	Line	Ln	Point of Tangency	PT
Gas Meter	GM	Linear or Lineal	Lin	Point on Curve	POC
Gas Valve	GV	Linear Feet	Lin Ft	① Point on Semi-Tangent	POST
Galvanize or galvanized	Galv	Location	Loc	Point on Spiral	POS
Gauge	Ga	M		Point on Tangent	POT
Government	② Gov't	Manhole	MH	Polyethylene	PE
Grade	Gr	Material	Mtl		
Grade Separation	GS	Maximum	Max		
		Median	Med		

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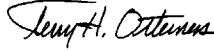
REV.
10/95


GENERAL ABBREVIATIONS

DRAWING NO.
C-01.31

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED SPELLING	PNB	10/95
2	DELETED TWO ABBREVIATIONS	PNB	10/95
3	REVISED ABBREVIATION	PNB	10/95
4			

WORDS	ABBREVIATION	WORDS	ABBREVIATION	WORDS	ABBREVIATION
P (cont)		S		T (cont)	
Polyvinyl Chloride	PVC	Salvage	Salv	Telephone	Tel
Portland Cement Concrete	PCC	Section	Sct	Temporary	Temp
Portland Cement Concrete Pavement	PCCP	Select Material	SM	Temporary Construction Easement	TCE
Pounds	Lbs	Sheet	Sh	Timber	Tbr
Pounds Per Square Inch	PSI	Shoulder	Shldr	Top of Curb	TC
Preliminary	Prelim	Shrinkage	Shr	Topography	Topo
① Prestress, Prestressed or Prestressing	PS	② Sidewalk	Sw pk	Township	T
Project	Prj	Sight Distance-Stopping	SD _s	Traffic Interchange	TI
Property Line	P/L	Single	Sgl	Transition	Trns
Proposed	Prop	Skew	Sk	Turning Point	TP
Protection	Prt	South	S	Turnout	TO
Provision or Provide	Prv	Southbound	SB	Typical	Typ
Q		Special	Spcl	U	
Quadrant	Quad	Specification	Spec	Underground	Ugnd
Quantity or Quantities	Quan	Spiral Rate of Change	a	Underpass	UP
Quantity of Drainage Runoff	Q	Spiral To Curve	SC	V	
R		Spiral To Tangent	ST	Variable	Var
Radius	R	Square	Sq	Vertical	Vert
Railroad	RR	Square Feet	Sq Ft	Vertical Curve	VC
Range	R	Square Yard	Sq Yd	Vertical Elliptical Reinforced	VERCP
Reconstruct	Recst	Standard	Std	Concrete Pipe	
Reference	Ref	State Route	SR	Vertical Point of Intersection	VPI
Reinforced or Reinforcing	Reinf	Station	Sta	Viaduct	Via
Reinforced Concrete	RC	Street	St	Vitrified Clay Pipe	VCP
Reinforced Concrete Pipe	RCP	Structure or Structural	Str	Volume	Vol
Reinforced Concrete Pipe Arch	RCPA	Subdivision	Subdiv	W	
Reinforcing Bar	Rebar	Subgrade	SG	Water	W
Relocate, Relocation or Relocated	Reloc	Subgrade Seal	SS	Water Meter	WM
Remove	Rem	Superelevation	③ e or Super	Water Valve	WV
Required	Reqd	Surface	Surf	Welded Wire Fabric	WWF
Reservation	Resv	Survey	Sur	West	W
Residence	Res	Swell	Sw	Westbound	WB
Retain or Retaining	Ret	① Symmetrical	Sym	Western Wood Products Association	WWPA
Revised or Revision	Rev	T		Wide or Width	W
Right	Rt	Tangent	Tan	Wood	Wd
Right of Way	R/W	Tangent Length	T	Y	
Road	Rd	Tangent to Spiral	TS	Yard	Yd
Roadway	Rdwy	Telegraph	Tig		
Route	Rte				
Rubber Gasket Reinforced Concrete Pipe	RGRCP				

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APPROVED FOR DISTRIBUTION


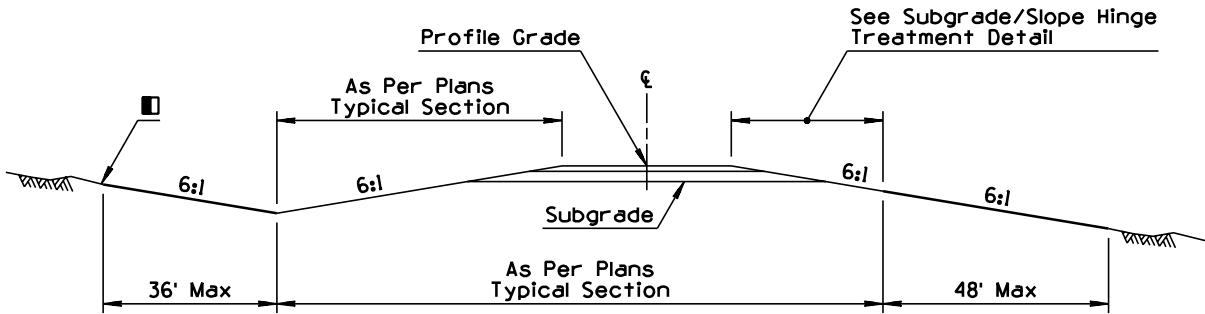
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
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REV.
10/95

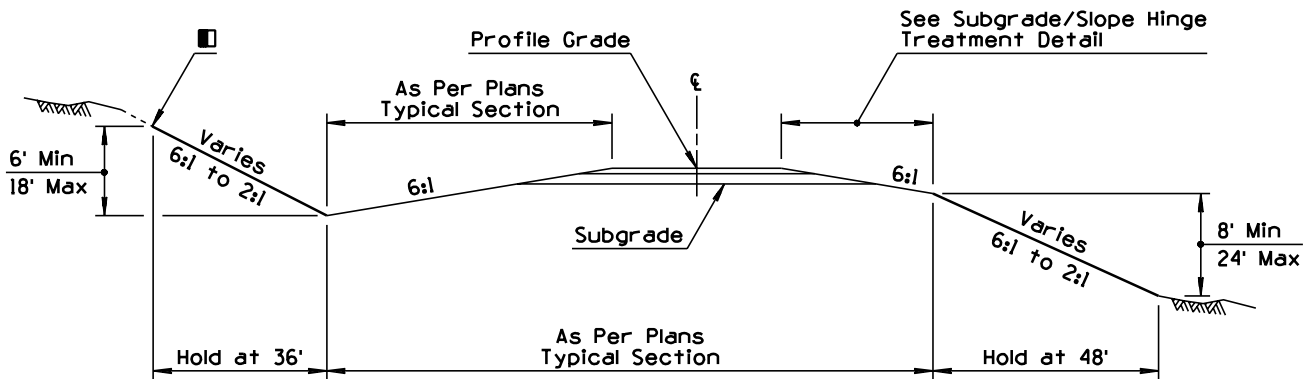
GENERAL ABBREVIATIONS

DRAWING NO.
C-01.32

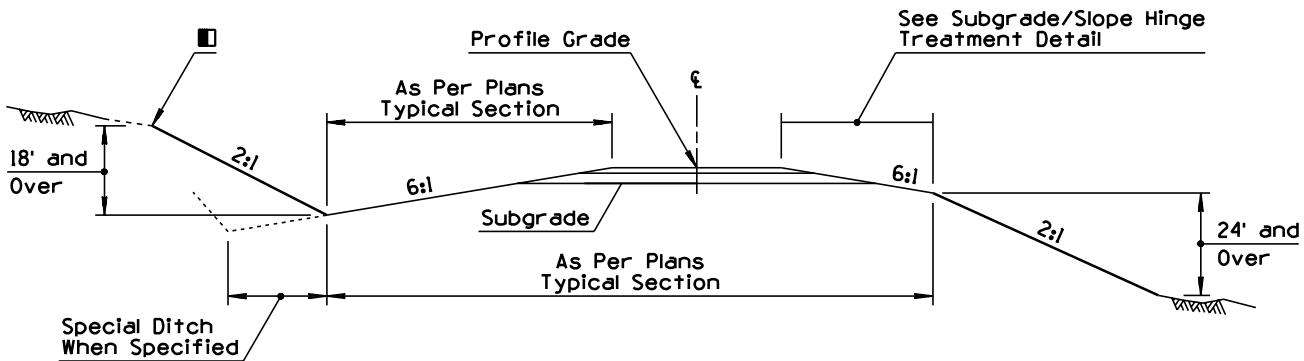
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED SLOPE ROUNDING DETAIL	PNB	1/93
2	MODIFIED SHOULDER WEDGE DETAIL	TC	1/93
3			
4			



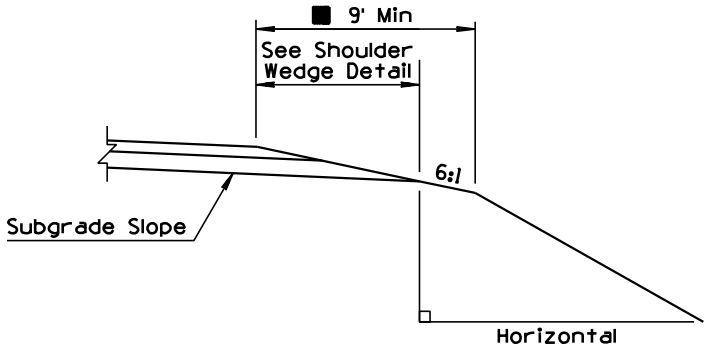
MINIMUM SLOPES



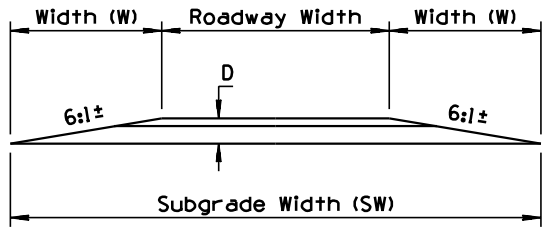
INTERMEDIATE SLOPES



MAXIMUM SLOPES



SUBGRADE/SLOPE HINGE
TREATMENT DETAIL

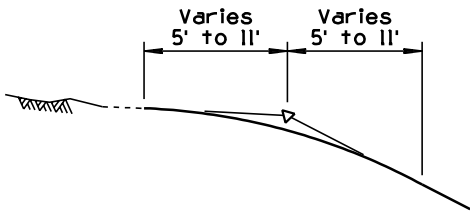


$$W = D \times \text{Slope (6:1)}$$

$$D = \text{Str Sec Depth (ft) excluding ACFC}$$

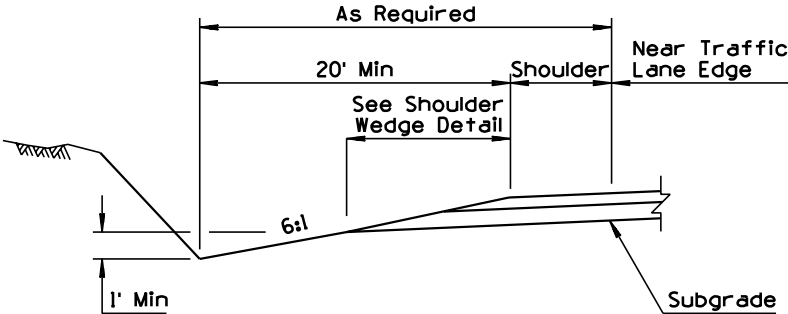
$$SW = 2 \times W + \text{Roadway Width}$$

② SHOULDER WEDGE DETAIL



① SLOPE ROUNDING DETAIL

Except in solid rock, or as directed by the Engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded. For cuts up to 6', use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum.



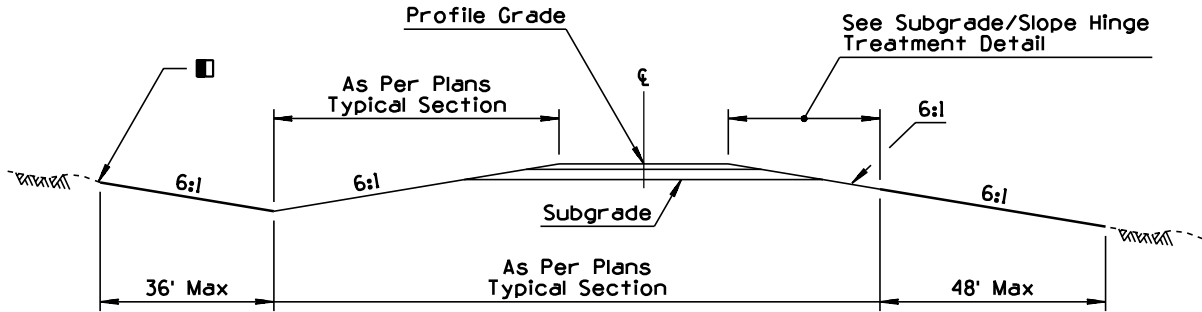
MINIMUM DITCH CONDITIONS DETAIL

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 1/93
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① SLOPES INTERSTATE	DRAWING NO. C-02.10	

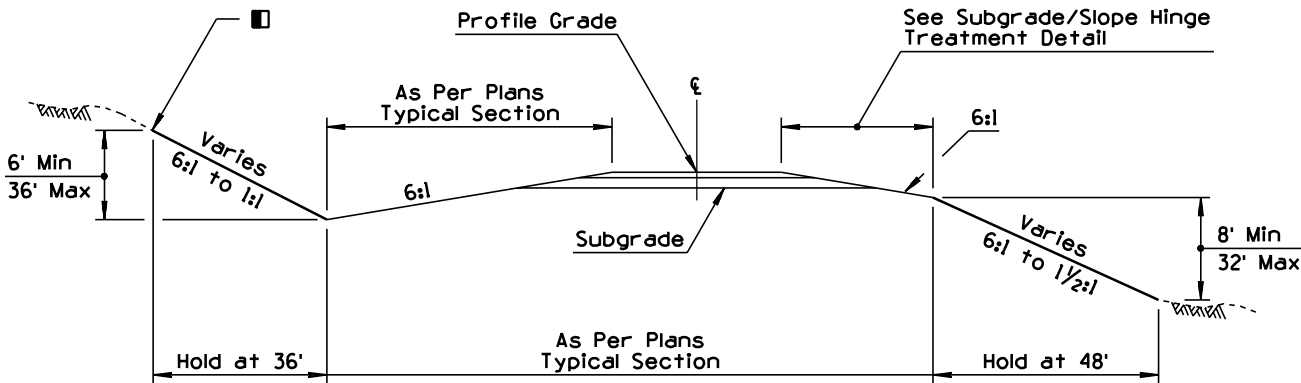
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED SLOPE ROUNDING DETAIL	PNB	1/93
2	CORRECTED FILL HEIGHT CALLOUT	TC	1/93
3	MODIFIED SHOULDER WEDGE DETAIL	TC	1/93
4			

GENERAL NOTES

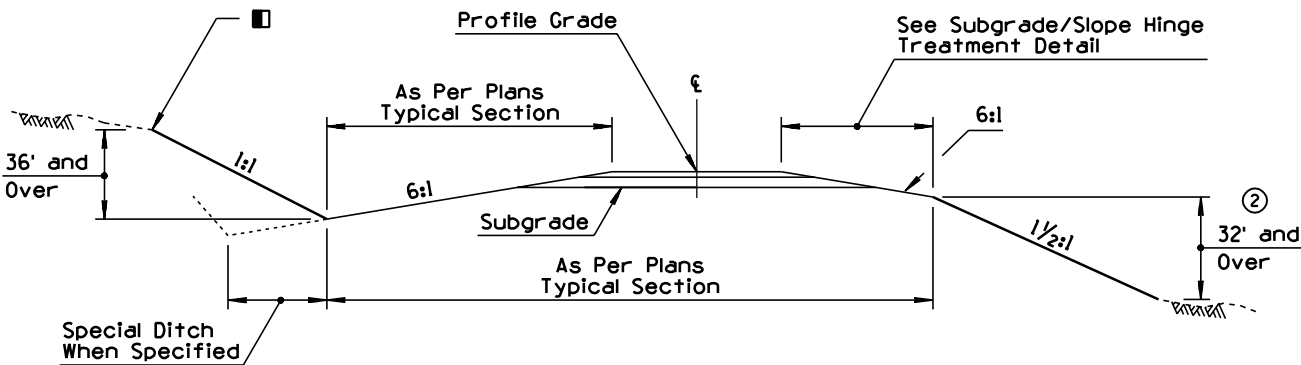
- Roadway width, cut ditch width, cross slope, and pavement structure section will be shown on project plans.
 - Design highwater should not be located above the subgrade in unpaved ditch.
 - Pavement structure slope is nominal. Actual slope is controlled by (D). See Shoulder Wedge Detail.
 - Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.
 - When median slopes intersect, see project plans for controls.
 - These slopes are intended to be used with new or reconstructed roadways.
- The 9' min is required when guard rail is utilized on the project. Treatment shall be uniform throughout the project length. The 9' requirement may be waived under special conditions where guard rail is not utilized. The 9' min shall not be waived when the thickness of structure section has not been finalized.



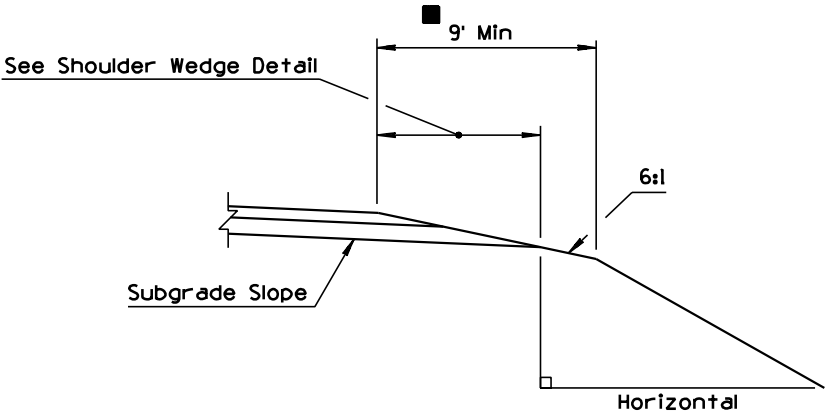
MINIMUM SLOPES



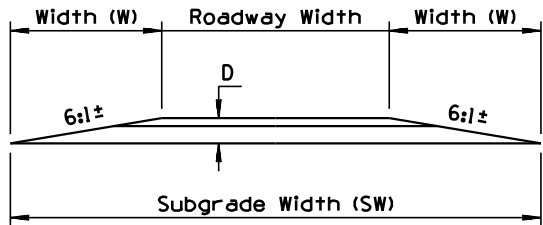
INTERMEDIATE SLOPES



MAXIMUM SLOPES



SUBGRADE/SLOPE HINGE TREATMENT DETAIL

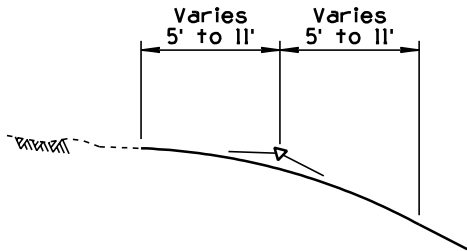


$$W = D \times \text{Slope (6:1)}$$

$$D = \text{Str Sec Depth (ft) excluding ACFC}$$

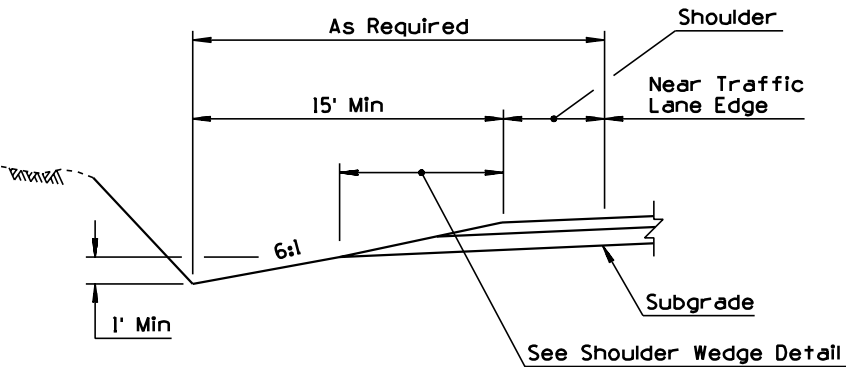
$$SW = 2 \times W + \text{Roadway Width}$$

③ SHOULDER WEDGE DETAIL



① ■ SLOPE ROUNDING DETAIL

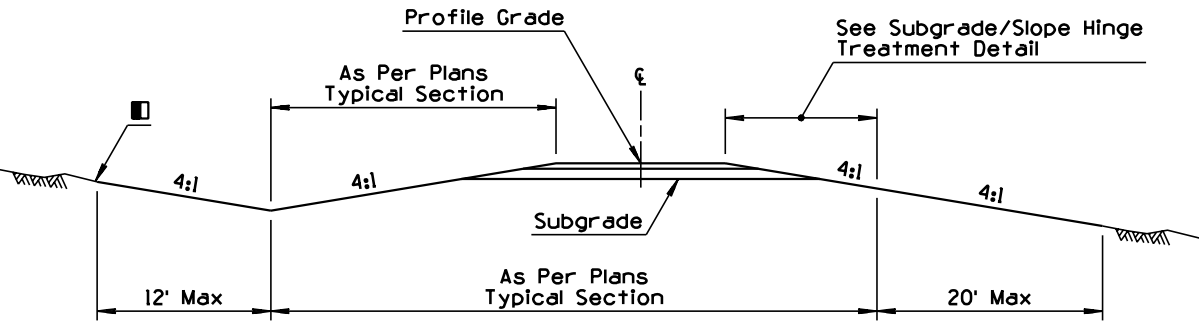
Except in solid rock, or as directed by the Engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded. For cuts up to 6', use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum.



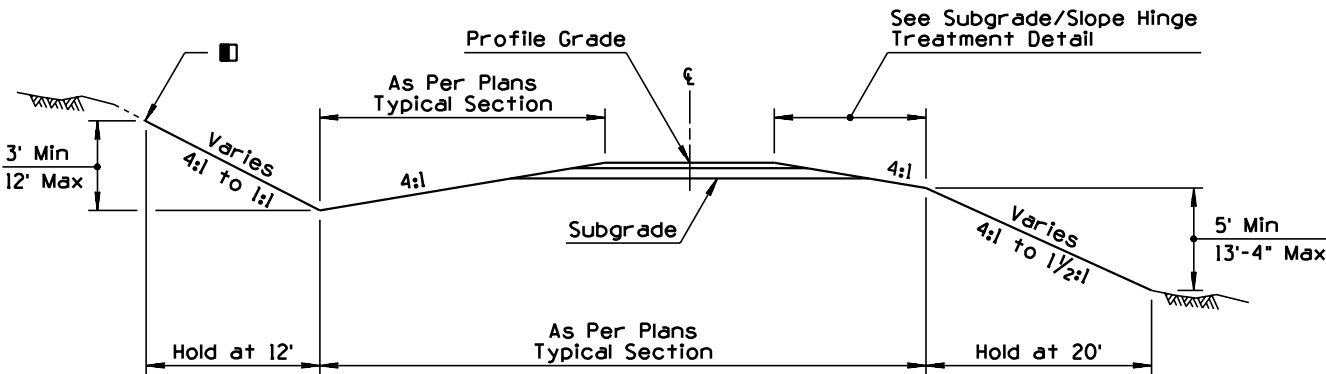
MINIMUM DITCH CONDITIONS DETAIL

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/93
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SLOPES PRIMARY ROADWAYS	DRAWING NO. C-02.20

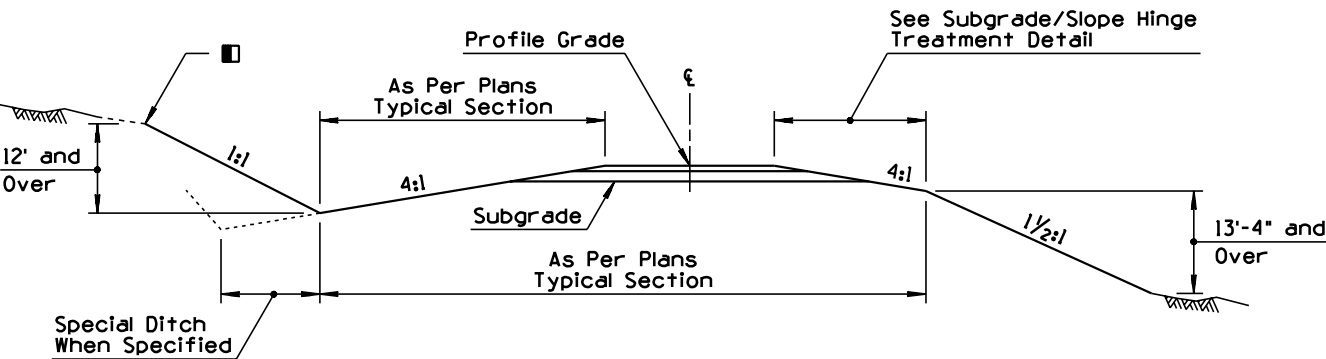
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED 9' DIMENSION TO 6'	PNB	10/95
2			
3			
4			



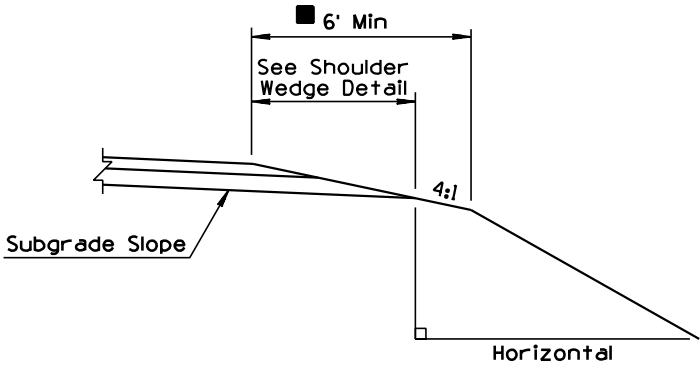
MINIMUM SLOPES



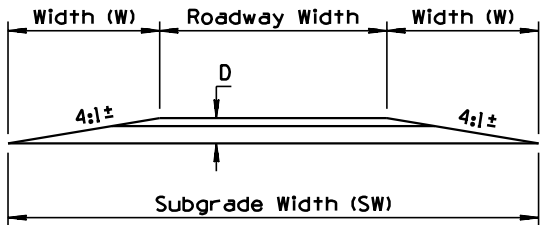
INTERMEDIATE SLOPES



MAXIMUM SLOPES



SUBGRADE/SLOPE HINGE TREATMENT DETAIL

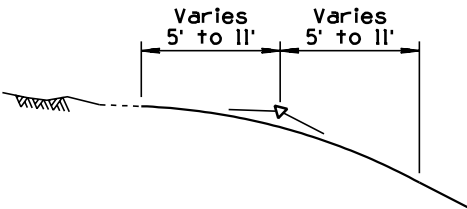


$$W = D \times \text{Slope (4:1)}$$

$$D = \text{Str Sec Depth (ft) excluding ACFC}$$

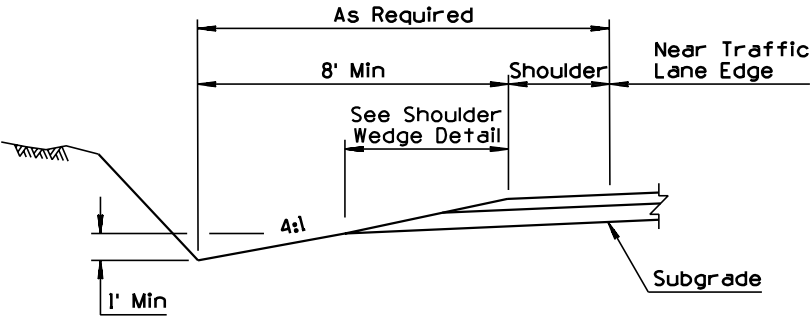
$$SW = 2 \times W + \text{Roadway Width}$$

SHOULDER WEDGE DETAIL



SLOPE ROUNDING DETAIL

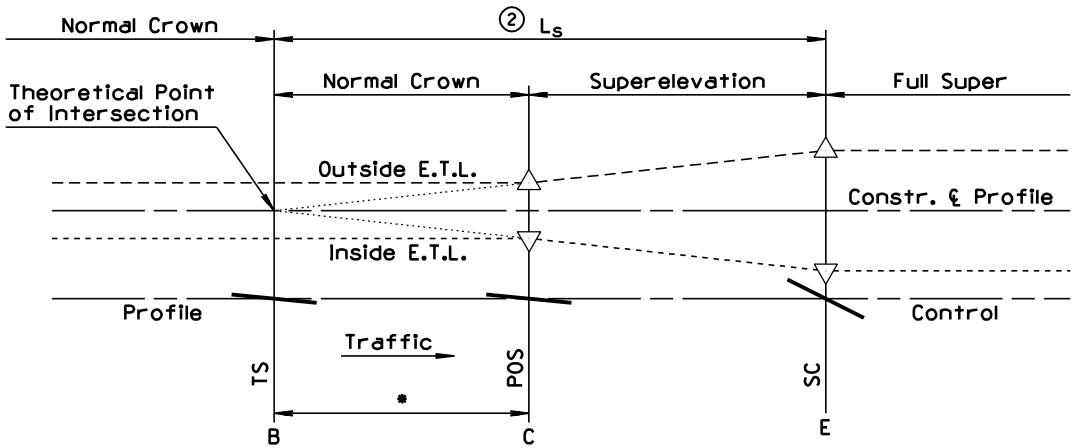
Except in solid rock, or as directed by the Engineer, the intersection of roadway cut slopes with the ground surfaces shall be rounded. For cuts up to 6', use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum.



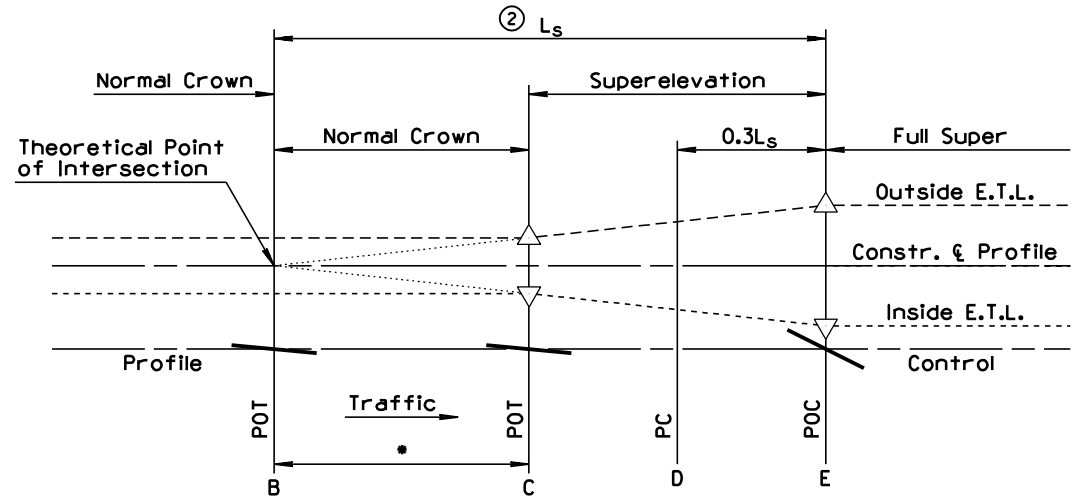
MINIMUM DITCH CONDITIONS DETAIL

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	SLOPES SECONDARY/MISC ROADWAYS	DRAWING NO. C-02.30

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED ABBREVIATION TO LEGEND	PNB	10/95
2	REPLACED TEXT WITH ABBREVIATION	PNB	10/95
3			
4			

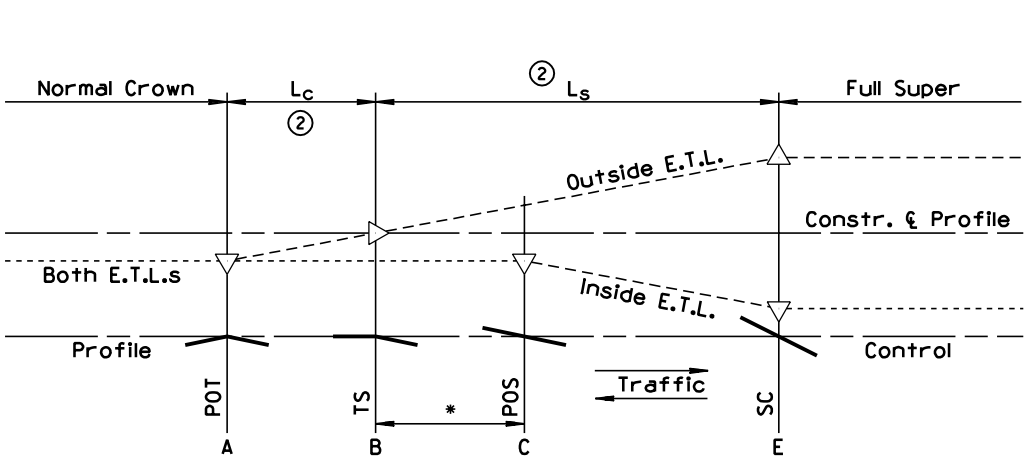


SPIRAL CURVE TRANSITION



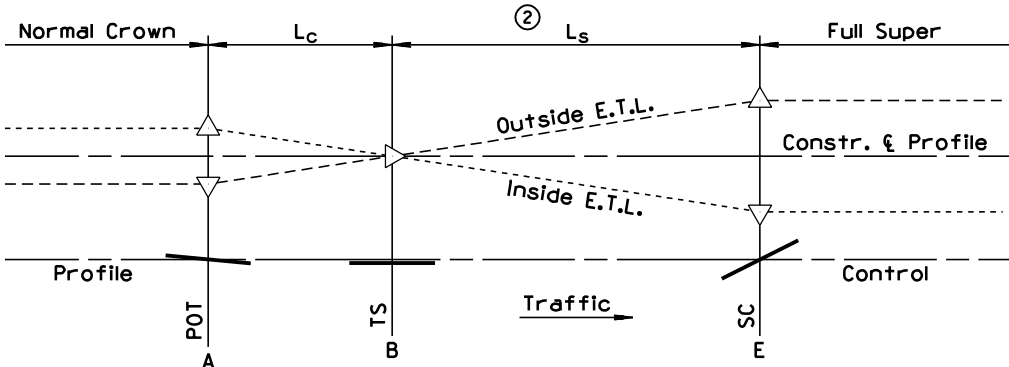
CIRCULAR CURVE TRANSITION

1-WAY ROADWAY-AXIS OF ROTATION AT CONSTR. & HIGH POINT OF NORMAL CROWN ON OUTSIDE OF CURVE RIGHT TURNING ROADWAY

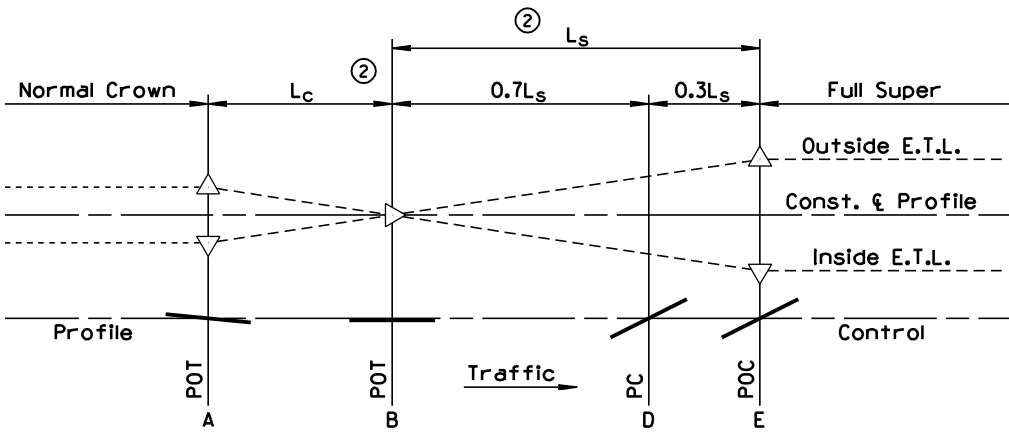


SPIRAL CURVE TRANSITION

2-WAY ROADWAY-AXIS OF ROTATION AT & (FOR OPPOSITE DEFLECTING CURVE, E.T.L. PROFILES ARE REVERSED)

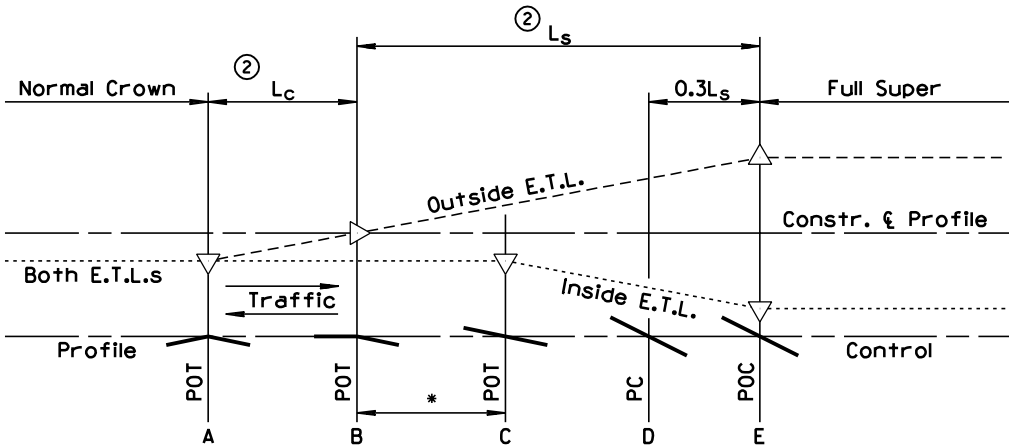


SPIRAL CURVE TRANSITION



CIRCULAR CURVE TRANSITION

1-WAY ROADWAY-AXIS OF ROTATION AT CONSTR. & HIGH POINT OF NORMAL CROWN ON INSIDE OF CURVE LEFT TURNING ROADWAY



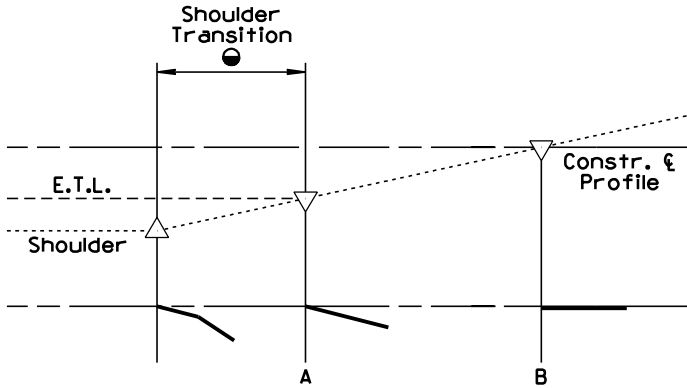
CIRCULAR CURVE TRANSITION

GENERAL NOTES

1. Round edge profile intersections with vertical curves having an approximate length in feet equal to the design speed in m.p.h.
2. For main roadway curves without spirals, L_s is the same as for spiraled curves but with $0.7 L_s$ on tangent and $0.3L_s$ on curve.
3. Shoulders transition with the adjacent travel lane when their normal cross slopes are the same.
4. If shoulders have a normal cross slope steeper than the adjacent lane, the shoulder transition will begin at a different point than that of the adjacent lane. See shoulder transition detail.

LEGEND

- A - Point at which adverse crown removal begins.
- B - Point at which superelevation transition begins.
- C - Point of equality between superelevation and normal crown
- D - P.C. location for circular curve transition.
- E - Point at which full superelevation is reached.
- ① L_c - Length of Normal Crown Removal
- ① L_s - Length of Superelevation Runoff
- E.T.L. - Edge of traveled lane
- * - Distance $BC = (NC) (L_s)/e$
- - Length of Shoulder Transition = $(NC) (L_s)/(NC \text{ of shoulder})$



SHOULDER TRANSITION DETAIL

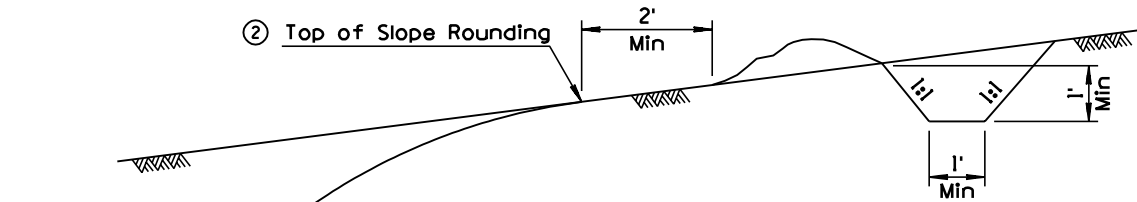
DESIGN APPROVED <i>Henry H. Ottum</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SUPERELEVATION DISTRIBUTION	DRAWING NO. C-02.50

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REMOVED NOTE	PNB	3/94
2	ADDED SLOPE ROUNDING	PNB	3/94
3			
4			

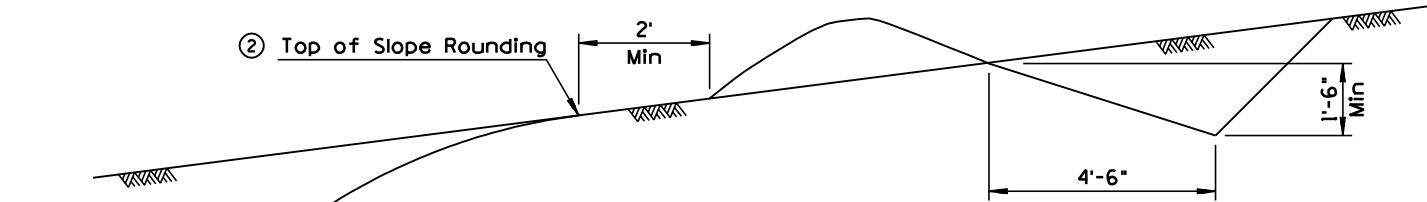
GENERAL NOTES

1. Dimensions of ditches shall be shown on the plans, as bottom width, depth and length.
2. Ditches shall be constructed with a minimum grade to prevent erosion. Ditch outlet treatment shall be as provided on plans.

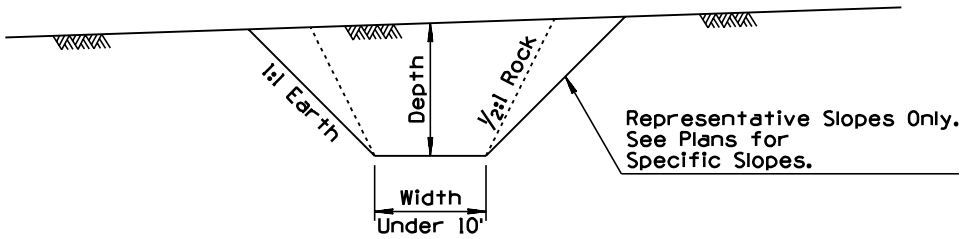
①



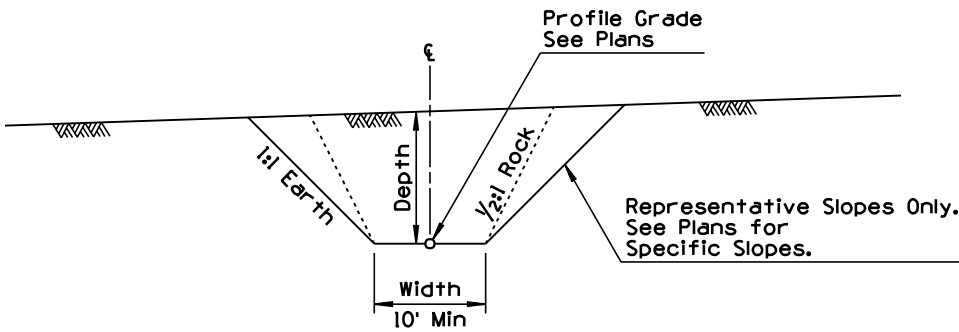
CROWN DITCH



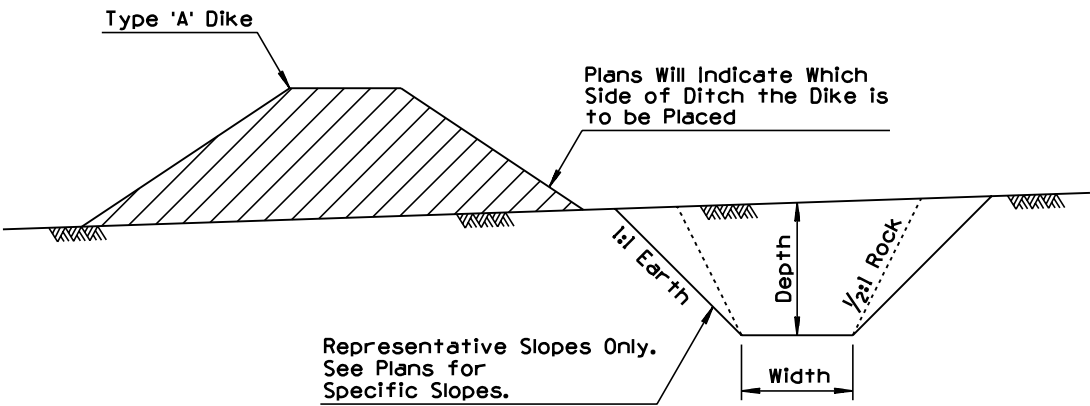
GRADER DITCH



DITCH



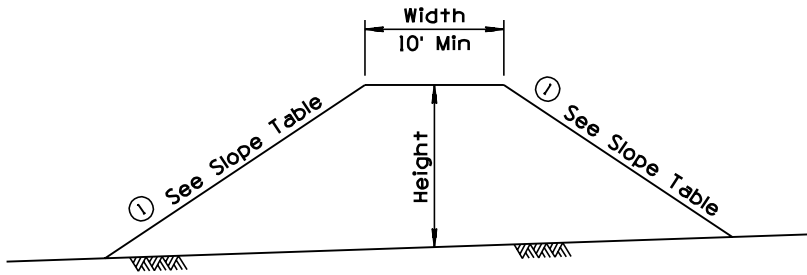
CHANNEL



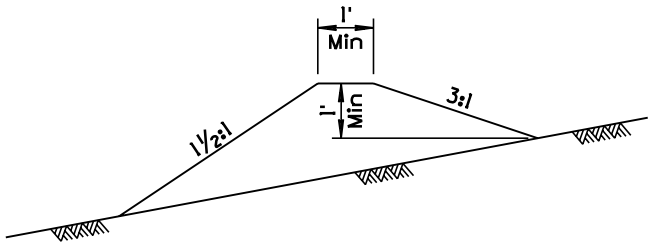
DITCH AND DIKE

DESIGN APPROVED <i>Henry H. Ottum</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	DITCHES, CHANNELS, DIKES AND BERMS DITCHES AND CHANNELS	DRAWING NO. C-03.10 Sheet 1 of 5

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED SLOPE	PNB	3/94
2	MODIFIED INSTALLATION DETAIL	PNB	3/94
3	ADDED PERSPECTIVE VIEW	PNB	3/94
4			

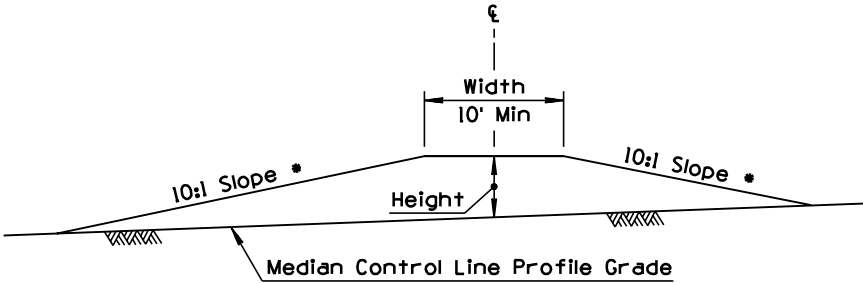


TYPE A DIKE



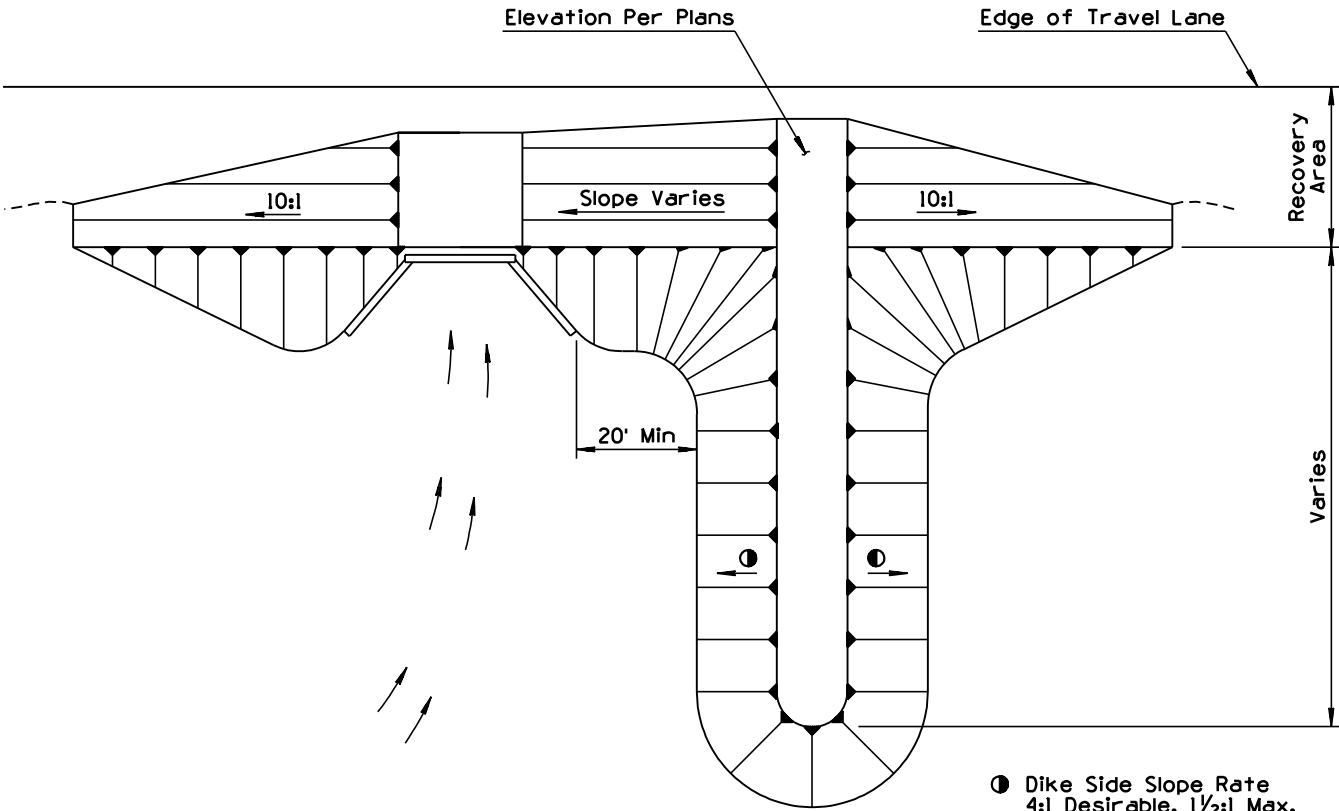
CROWN DIKE

SLOPE TABLE		
Inside Recovery Area	Outside Recovery Area	
	Desirable	Maximum
10:1	4:1	1 1/2:1



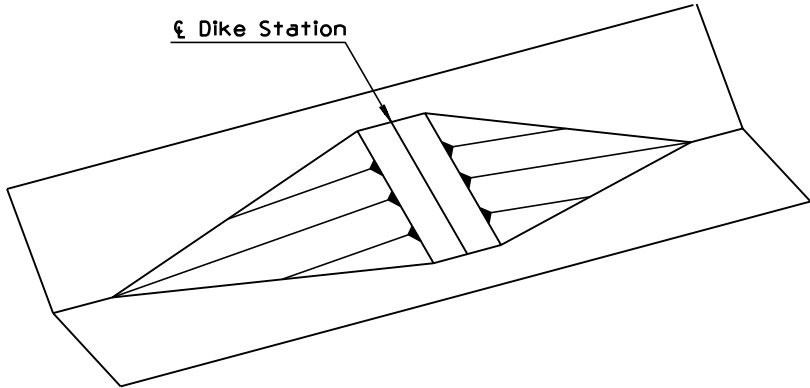
TYPE B TRANSVERSE MEDIAN DIKE

- * Slope relative to grade of median at intersection with toe



2 TYPICAL DIKE INSTALLATION AT STRUCTURE



Place dikes at structures to create water cushion.



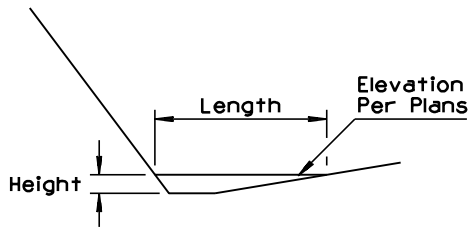
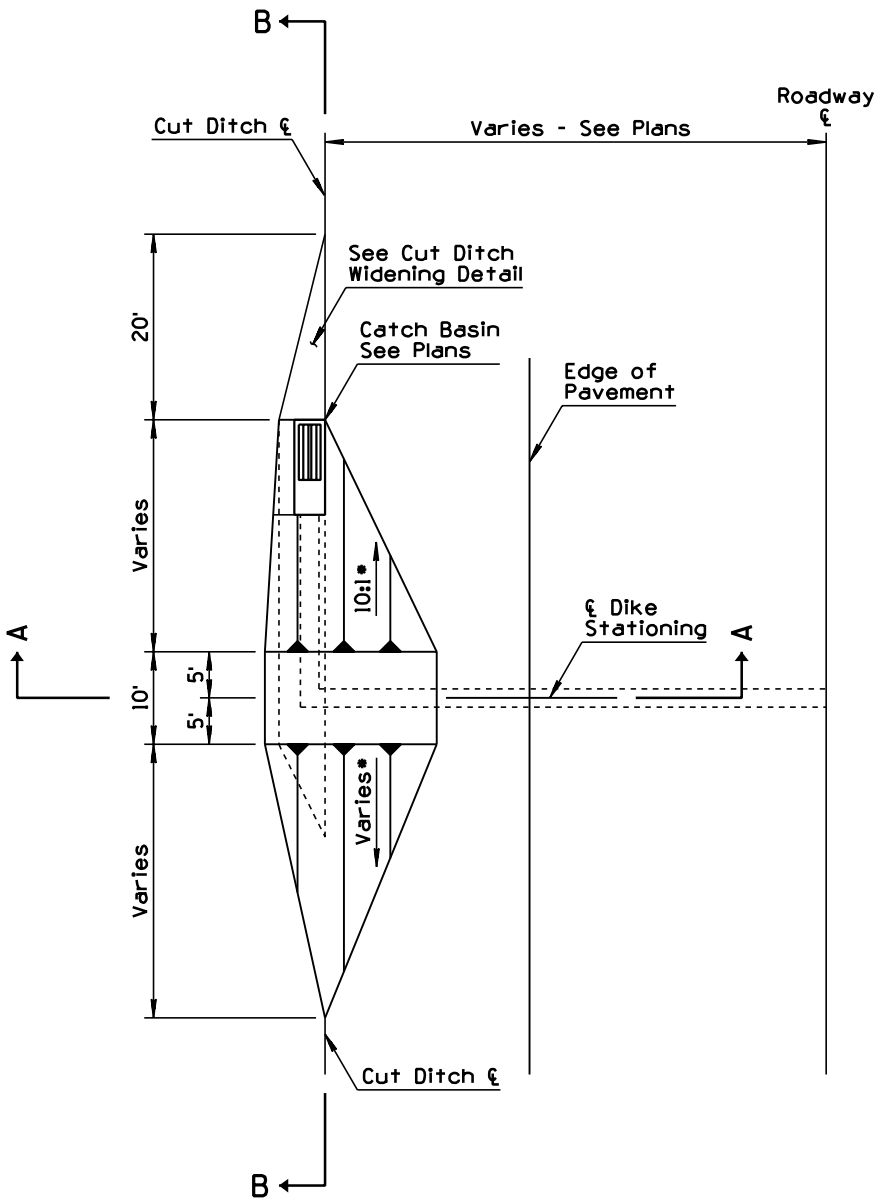
3 TYPICAL TRANSVERSE MEDIAN DIKE INSTALLATION

GENERAL NOTES

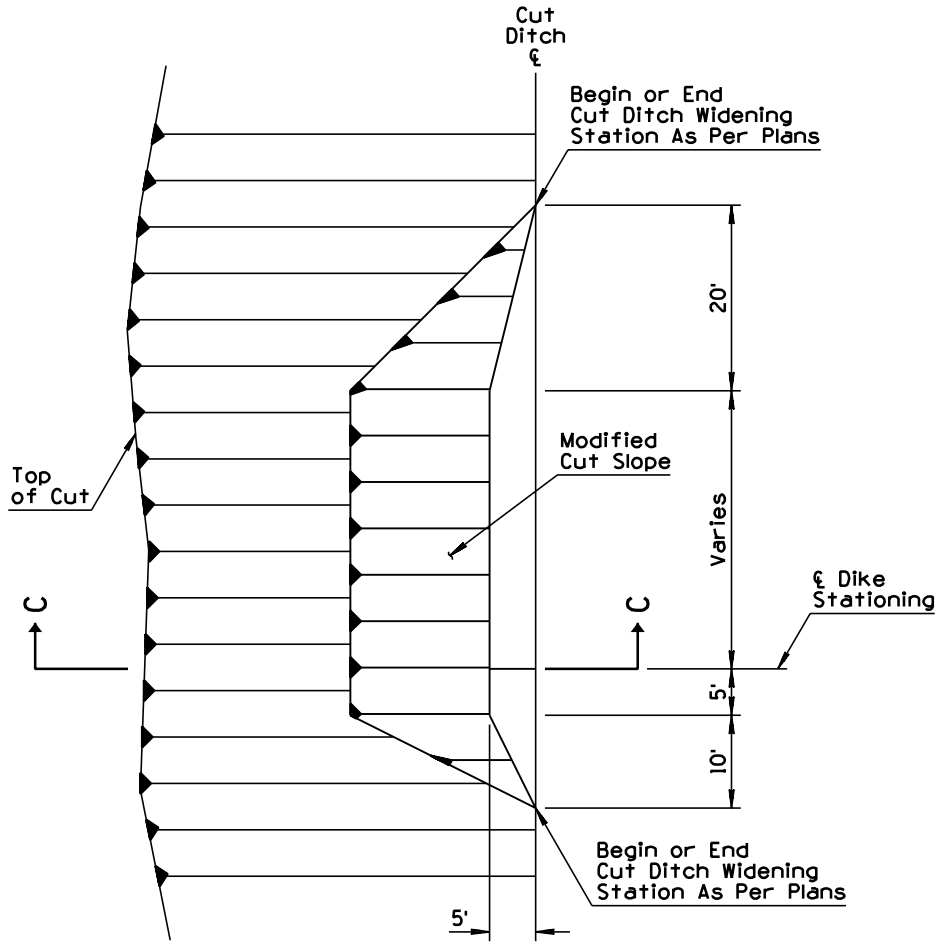
1. Dimensions of dikes shall be shown on the plans as top width, height, length and top of dike elevation.
2. Dike side slopes outside the recovery area shall be shown on the plans.

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 3/94
APPROVED FOR DISTRIBUTION 	DITCHES, CHANNELS, DIKES AND BERMS DIKES		DRAWING NO. C-03.10 Sheet 2 of 5

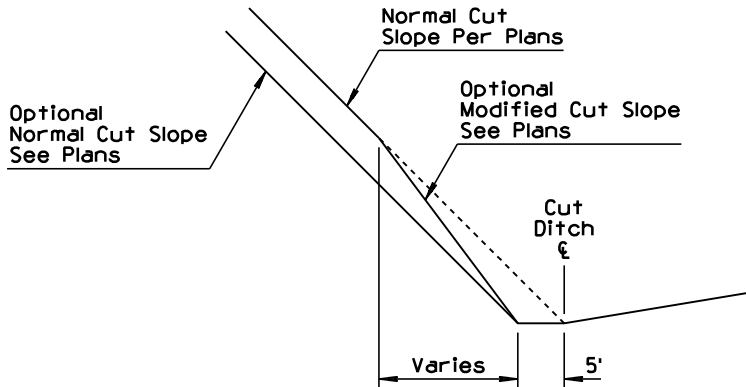
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



SECTION A-A



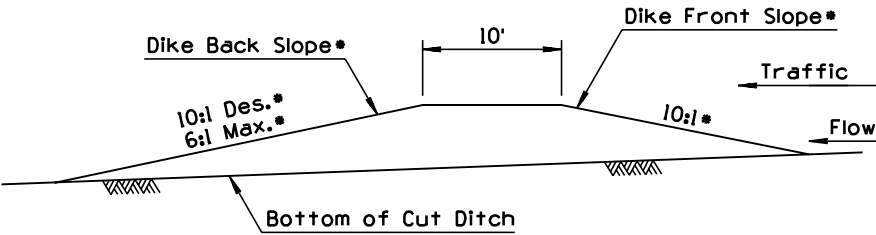
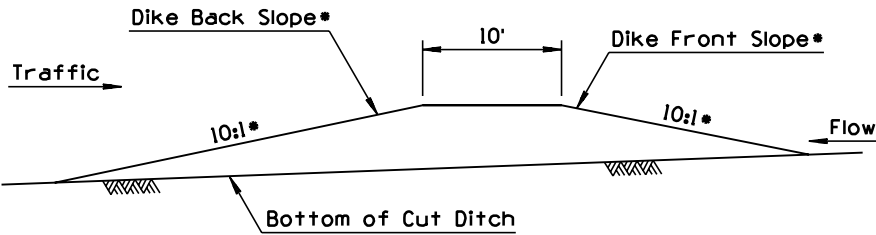
CUT DITCH WIDENING DETAIL



SECTION C-C

GENERAL NOTES

1. Dimensions for ditch dikes shall be shown on the plans as dike stationing, height, length, dike back slope and top of dike elevation.
2. Dimensions for cut ditch widening shall be shown on the plans as beginning and ending stations.

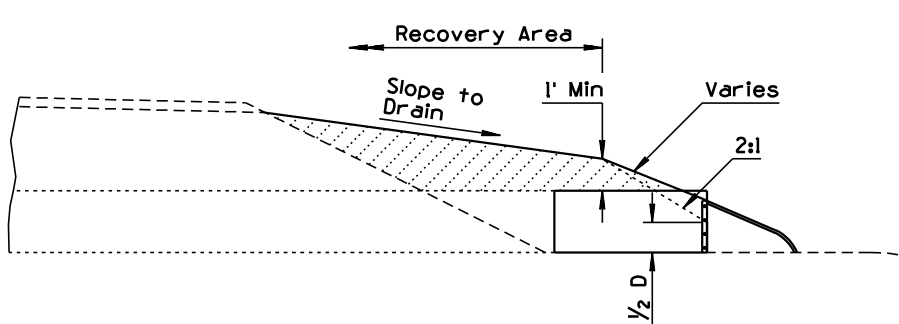


SECTION B-B

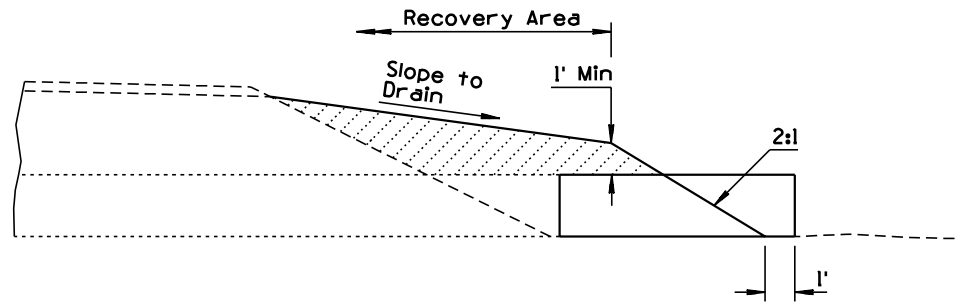
* Slope relative to grade of cut ditch at intersection with toe

DESIGN APPROVED <i>Terry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	3/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	DITCHES, CHANNELS, DIKES AND BERMS DITCH DIKE	DRAWING NO. C-03.10 Sheet 3 of 5

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

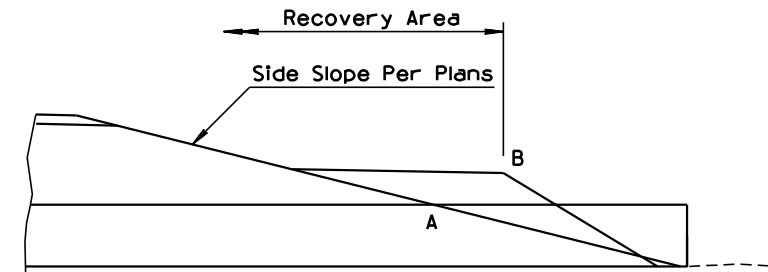


SECTION A-A (WITH END SECTION)

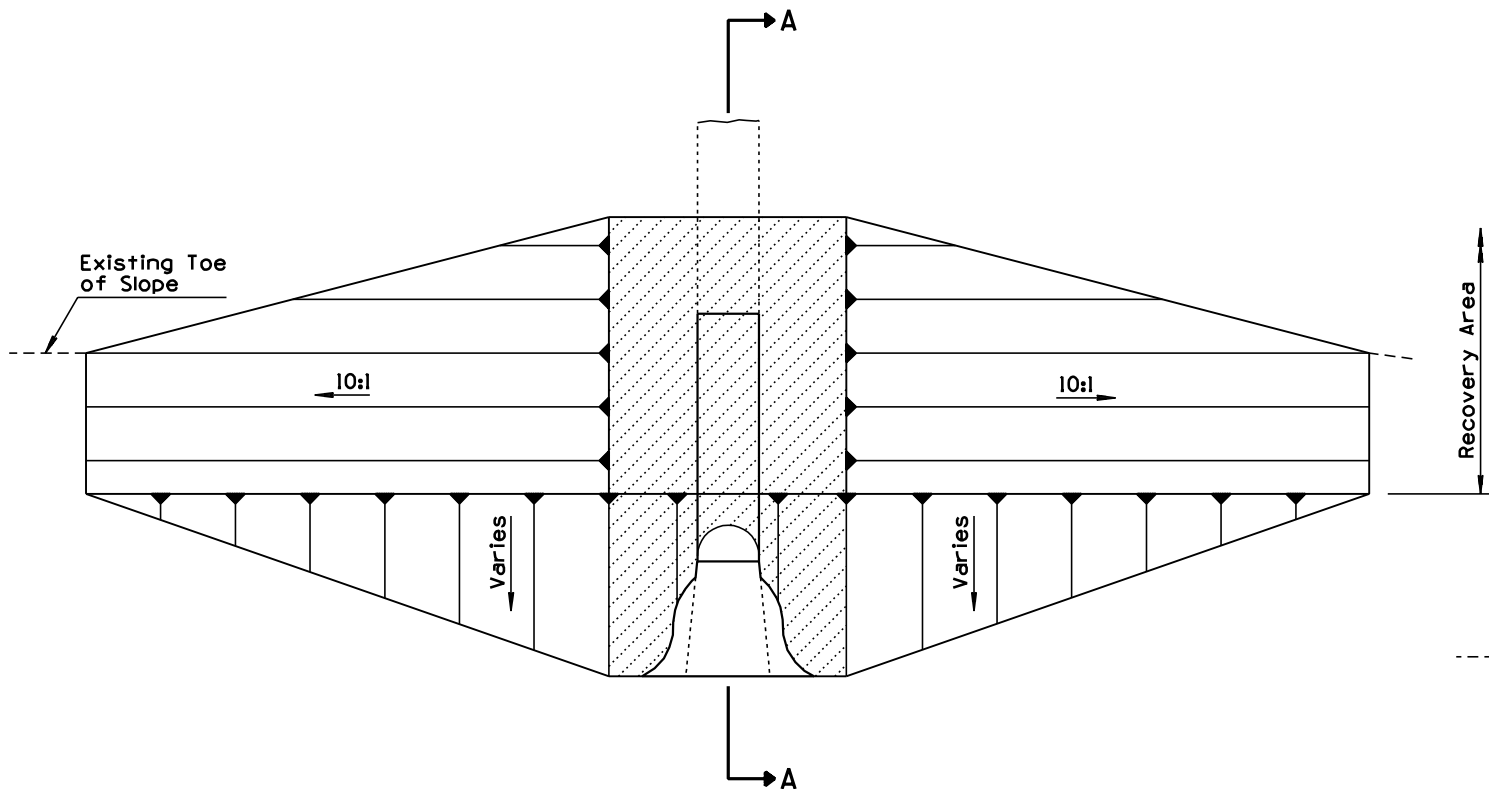


SECTION A-A (WITHOUT END SECTION)

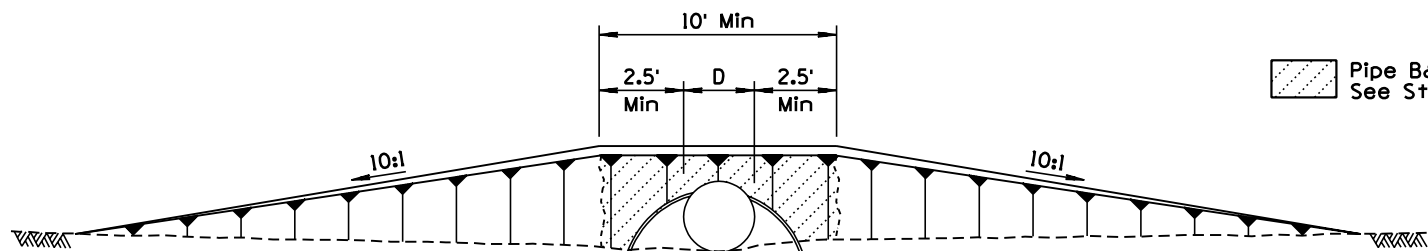
- GENERAL NOTES**
1. Pipe berms not required when pipe projection is protected by guard rail.
 2. Berm construction similar for multiple pipe installation and for pipes without end sections.
 3. Berm construction shown is for pipe extensions. Berm construction similar for new pipe installation. See Pipe Berm Requirement Detail. If Point A is within the recovery area, then a pipe berm is required and Point B is set at the edge of the recovery area.




PIPE BERM REQUIREMENT DETAIL



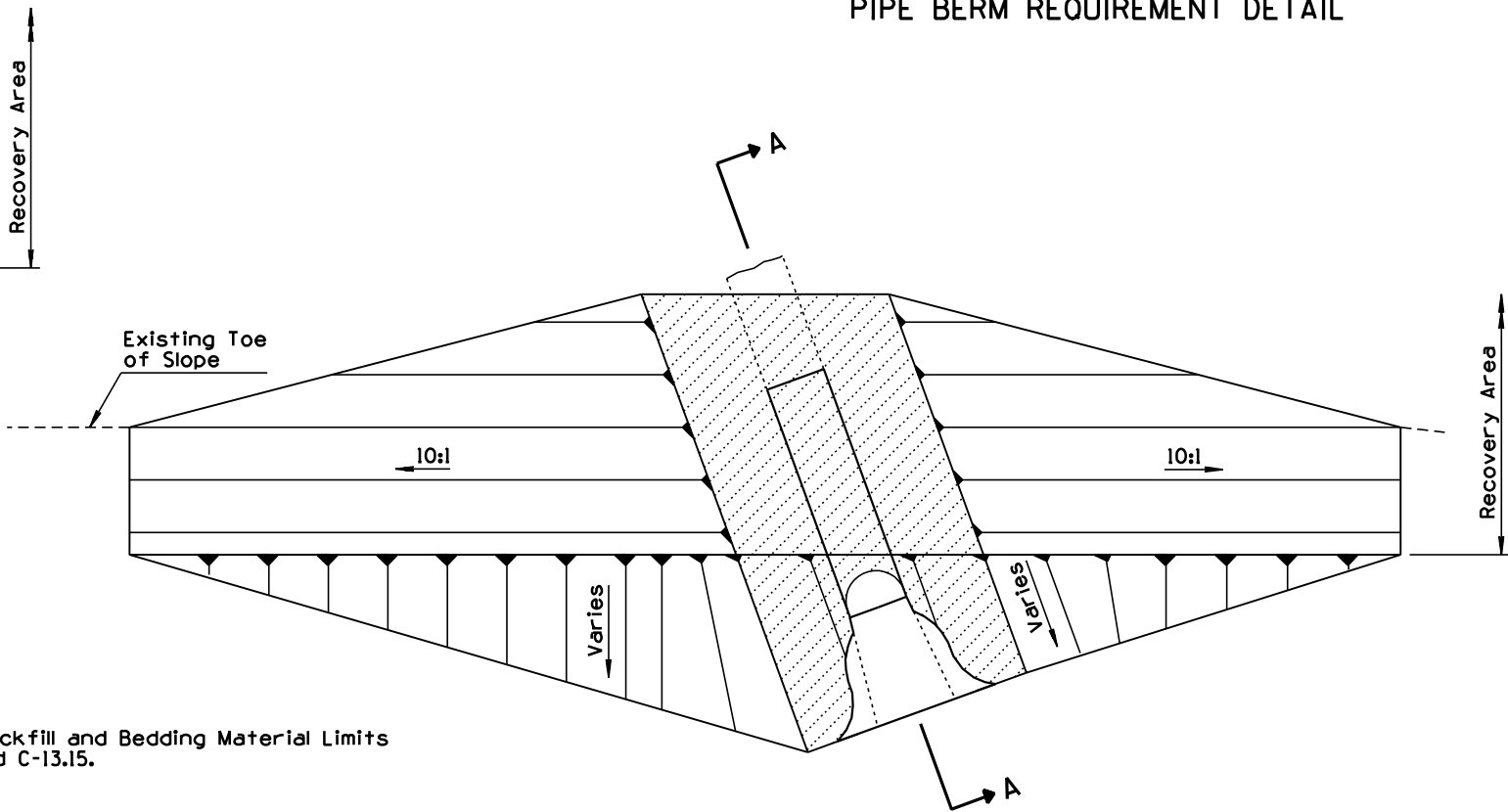
STRAIGHT PIPE PLAN



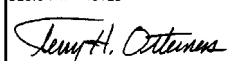
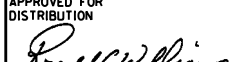
ELEVATION

 Pipe Backfill and Bedding Material Limits
See Std C-13.15.

NOTE:
Single Pipe Installation: D = Outside Diameter of Pipe
Multiple Pipe Installation: D = Outside Edge to Outside Edge of Pipes



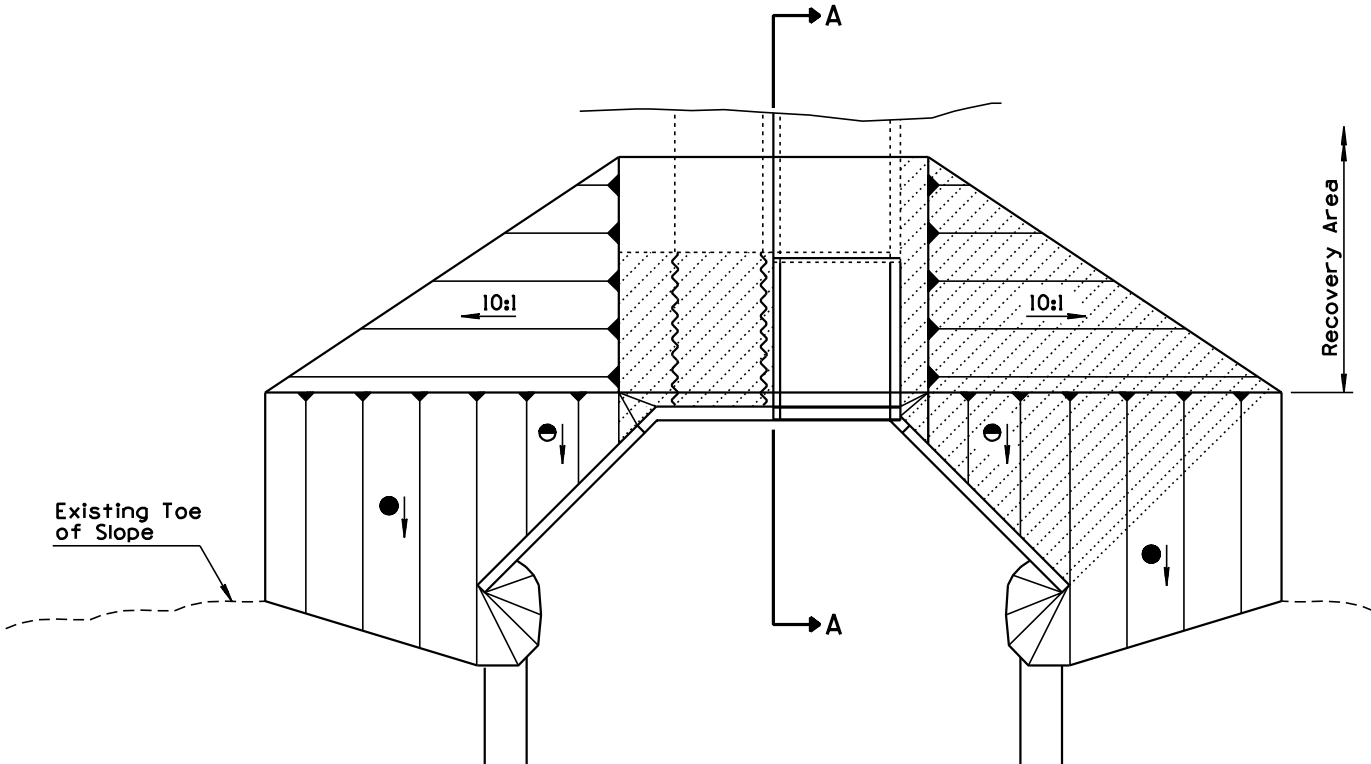
SKEWED PIPE PLAN

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	3/94
APPROVED FOR DISTRIBUTION 	DITCHES, CHANNELS, DIKES AND BERMS PIPE BERMS	DRAWING NO. C-03.10 Sheet 4 of 5

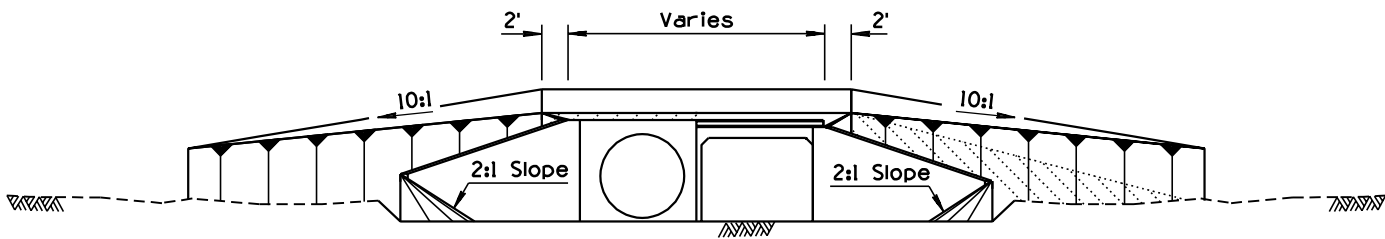
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

GENERAL NOTES

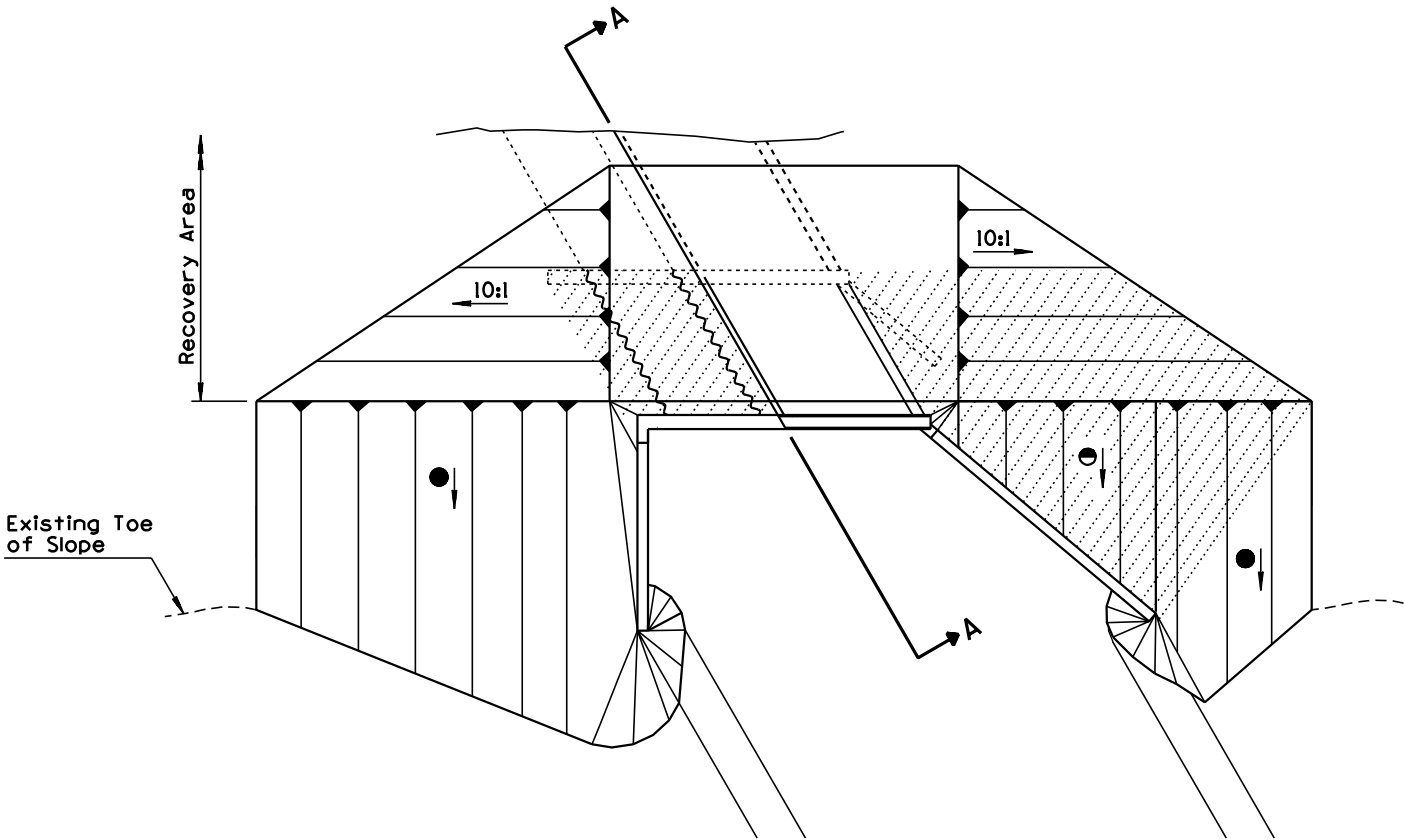
1. Berm construction similar for box culvert and pipe with headwall.
2. Berm construction shown is for extension of existing facilities. Berm construction similar for new facilities.



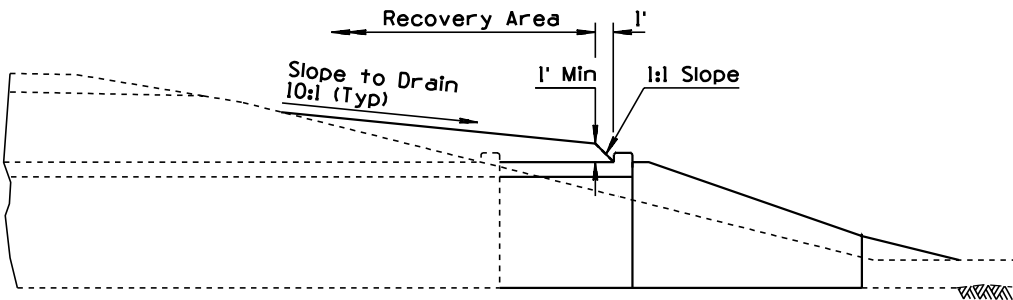
STRAIGHT HEADWALL PLAN



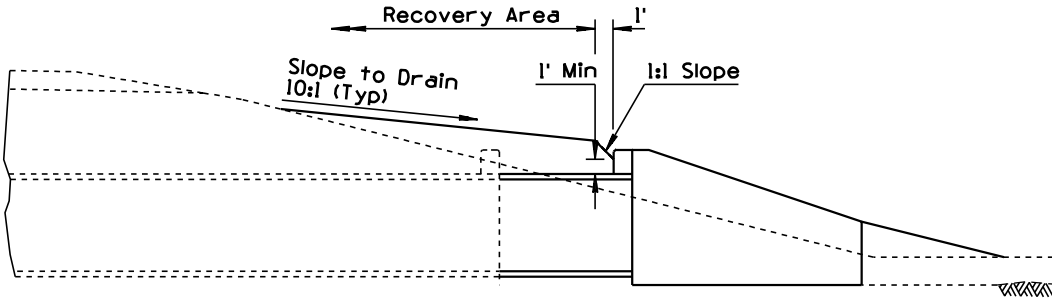
ELEVATION



SKewed HEADWALL PLAN





SECTION A-A (FOR CBC)



SECTION A-A (FOR PIPE WITH HEADWALL)

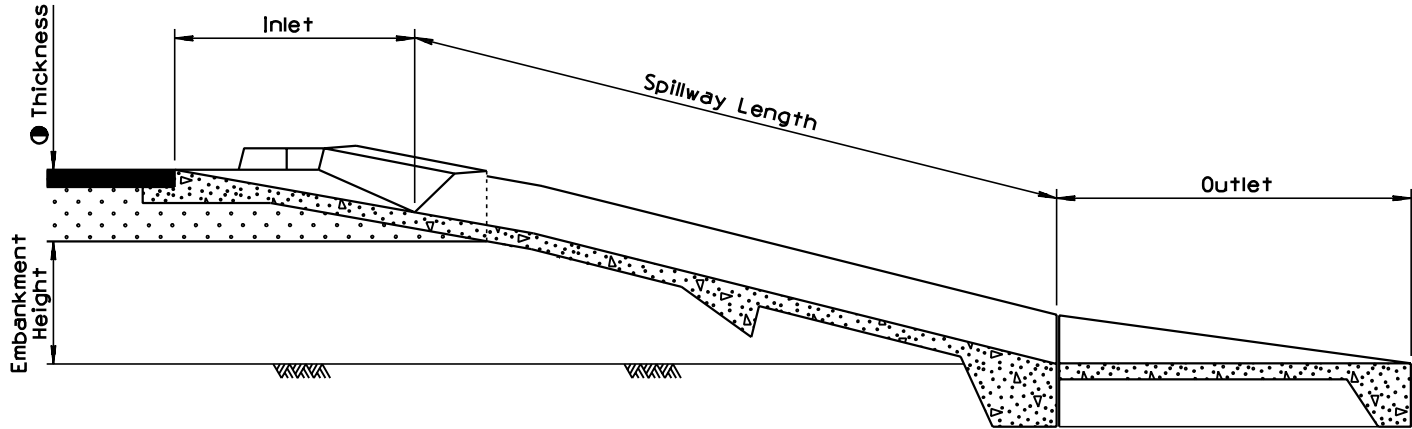
- ① Vary slope. Slope shall match to top of wing wall.
- Slope shall match wing wall design slope (2:1, 4:1, or 6:1).
- ▨ Structure Backfill Limits See Std B-19.50

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		3/94
APPROVED FOR DISTRIBUTION 	DITCHES, CHANNELS, DIKS AND BERMS HEADWALL BERMS		DRAWING NO. C-03.10 Sheet 5 of 5

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

LENGTH OF SPILLWAY																																	
Thickness ●	Embankment 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'					
12"	32'	37'	43'	49'	50'	50'	51'	52'	52'	52'	52'	53'	53'	54'	54'	54'	55'	55'	56'	56'	57'	57'	58'	58'	59'	59'	60'	60'	60'				
13"	33'	38'	44'	50'	50'	51'	51'	52'	52'	52'	53'	53'	53'	54'	54'	55'	55'	56'	56'	57'	57'	58'	58'	59'	59'	60'	60'	60'	61'				
14"	33'	38'	44'	50'	51'	51'	52'	52'	53'	53'	53'	54'	54'	54'	55'	55'	56'	56'	57'	57'	58'	58'	59'	59'	60'	60'	60'	61'	61'				
15"	34'	39'	45'	51'	51'	52'	52'	53'	53'	54'	54'	54'	55'	55'	55'	56'	56'	57'	57'	58'	58'	59'	59'	60'	60'	61'	61'	62'	62'				
16"	34'	39'	45'	51'	52'	52'	53'	53'	54'	54'	54'	55'	55'	56'	56'	56'	57'	57'	58'	58'	59'	59'	60'	60'	61'	61'	62'	62'	62'				
17"	35'	40'	46'	52'	52'	53'	53'	54'	54'	55'	55'	55'	56'	56'	57'	57'	57'	58'	58'	59'	59'	60'	60'	61'	61'	62'	62'	62'	63'				
18"	35'	40'	46'	52'	53'	53'	54'	54'	55'	55'	55'	56'	56'	57'	57'	57'	58'	58'	59'	59'	60'	60'	61'	61'	62'	62'	63'	63'	63'				
19"	36'	41'	47'	53'	53'	54'	54'	55'	55'	56'	56'	56'	57'	57'	58'	58'	58'	59'	59'	60'	60'	61'	61'	62'	62'	63'	63'	63'	64'				
20"	36'	41'	47'	53'	54'	54'	55'	55'	56'	56'	56'	57'	57'	58'	58'	58'	59'	59'	60'	60'	61'	61'	62'	62'	63'	63'	64'	64'	64'				
21"	37'	42'	48'	54'	54'	55'	55'	56'	56'	57'	57'	57'	58'	58'	59'	59'	59'	60'	60'	61'	61'	62'	62'	63'	63'	64'	64'	64'	65'				
22"	37'	42'	48'	54'	55'	55'	56'	56'	57'	57'	57'	58'	58'	59'	59'	59'	60'	60'	61'	61'	62'	62'	63'	63'	64'	64'	65'	65'	65'				
23"	38'	43'	49'	55'	55'	56'	56'	57'	57'	58'	58'	58'	59'	59'	60'	60'	60'	61'	61'	62'	62'	63'	63'	64'	64'	65'	65'	66'	66'				
24"	38'	43'	49'	55'	56'	56'	57'	57'	58'	58'	58'	59'	59'	60'	60'	60'	61'	61'	62'	62'	63'	63'	64'	64'	65'	65'	66'	66'	66'				
25"	39'	44'	50'	56'	56'	57'	57'	58'	58'	59'	59'	59'	60'	60'	61'	61'	61'	62'	62'	63'	63'	64'	64'	65'	65'	66'	66'	67'	67'				
26"	39'	44'	50'	56'	57'	57'	58'	58'	59'	59'	59'	60'	60'	61'	61'	61'	62'	62'	63'	63'	64'	64'	65'	65'	66'	66'	67'	67'	67'				
27"	40'	45'	51'	57'	57'	58'	58'	59'	59'	60'	60'	60'	61'	61'	62'	62'	62'	63'	63'	64'	64'	65'	65'	66'	66'	67'	67'	68'	68'				
28"	40'	45'	51'	57'	58'	58'	59'	59'	60'	60'	60'	61'	61'	62'	62'	62'	63'	63'	64'	64'	65'	65'	66'	66'	67'	67'	68'	68'	68'				
29"	41'	46'	52'	58'	58'	59'	59'	60'	60'	61'	61'	61'	62'	62'	63'	63'	63'	64'	64'	65'	65'	66'	66'	67'	67'	68'	68'	69'	69'				
30"	41'	46'	52'	58'	59'	59'	60'	60'	61'	61'	61'	62'	62'	63'	63'	63'	64'	64'	65'	65'	66'	66'	67'	67'	68'	68'	69'	69'	69'				
31"	42'	47'	53'	59'	59'	60'	60'	61'	61'	62'	62'	62'	63'	63'	64'	64'	64'	65'	65'	66'	66'	67'	67'	68'	68'	69'	69'	70'	70'				
32"	42'	47'	53'	59'	60'	60'	61'	61'	62'	62'	62'	63'	63'	64'	64'	64'	65'	65'	66'	66'	67'	67'	68'	68'	69'	69'	70'	70'	70'				
33"	43'	48'	54'	60'	60'	61'	61'	62'	62'	63'	63'	63'	64'	64'	65'	65'	65'	66'	66'	67'	67'	68'	68'	69'	69'	70'	70'	71'	71'				
34"	43'	48'	54'	60'	61'	61'	62'	62'	63'	63'	63'	64'	64'	65'	65'	65'	66'	66'	67'	67'	68'	68'	69'	69'	70'	70'	71'	71'	71'				
35"	44'	49'	55'	61'	61'	62'	62'	63'	63'	64'	64'	64'	65'	65'	66'	66'	66'	67'	67'	68'	68'	69'	69'	70'	70'	71'	71'	72'	72'				
36"	44'	49'	55'	61'	62'	62'	63'	63'	64'	64'	64'	65'	65'	66'	66'	66'	67'	67'	68'	68'	69'	69'	70'	70'	71'	71'	72'	72'	72'				

C-02.10 AND C-02.20 SLOPES



LENGTH OF SPILLWAY												
Thickness ●	Embankment Height											
	5'	6'	7'	8'	9'	10'	11'	12'	13'			
12"	22'	22'	22'	23'	23'	24'	24'	24'	25'			
13"	22'	22'	23'	23'	23'	24'	24'	25'	25'			
14"	22'	23'	23'	23'	24'	24'	25'	25'	26'			
15"	23'	23'	23'	24'	24'	25'	25'	25'	26'			
16"	23'	23'	24'	24'	24'	25'	25'	26'	26'			
17"	23'	24'	24'	24'	25'	25'	26'	26'	27'			
18"	24'	24'	25'	25'	25'	26'	26'	27'	27'			
19"	24'	24'	25'	25'	25'	26'	26'	27'	27'			
20"	25'	25'	25'	25'	26'	26'	27'	27'	28'			
21"	25'	25'	25'	26'	26'	27'	27'	28'	28'			
22"	25'	25'	26'	26'	27'	27'	27'	28'	28'			
23"	26'	26'	26'	26'	27'	27'	28'	28'	29'			
24"	26'	26'	26'	27'	27'	28'	28'	29'	29'			
25"	26'	27'	27'	27'	28'	28'	28'	29'	29'			
26"	27'	27'	27'	28'	28'	28'	29'	29'	30'			
27"	27'	27'	28'	28'	28'	29'	29'	30'	30'			
28"	27'	28'	28'	28'	29'	29'	29'	30'	30'			
29"	28'	28'	28'	29'	29'	29'	30'	30'	31'			
30"	28'	28'	29'	29'	29'	30'	30'	31'	31'			
31"	28'	29'	29'	29'	30'	30'	31'	31'	32'			
32"	29'	29'	29'	30'	30'	30'	31'	31'	32'			
33"	29'	29'	30'	30'	30'	31'	31'	32'	32'			
34"	29'	30'	30'	30'	31'	31'	32'	32'	33'			
35"	30'	30'	30'	31'	31'	31'	32'	32'	33'			
36"	30'	30'	31'	31'	31'	32'	32'	33'	33'			

C-02.30 SLOPES

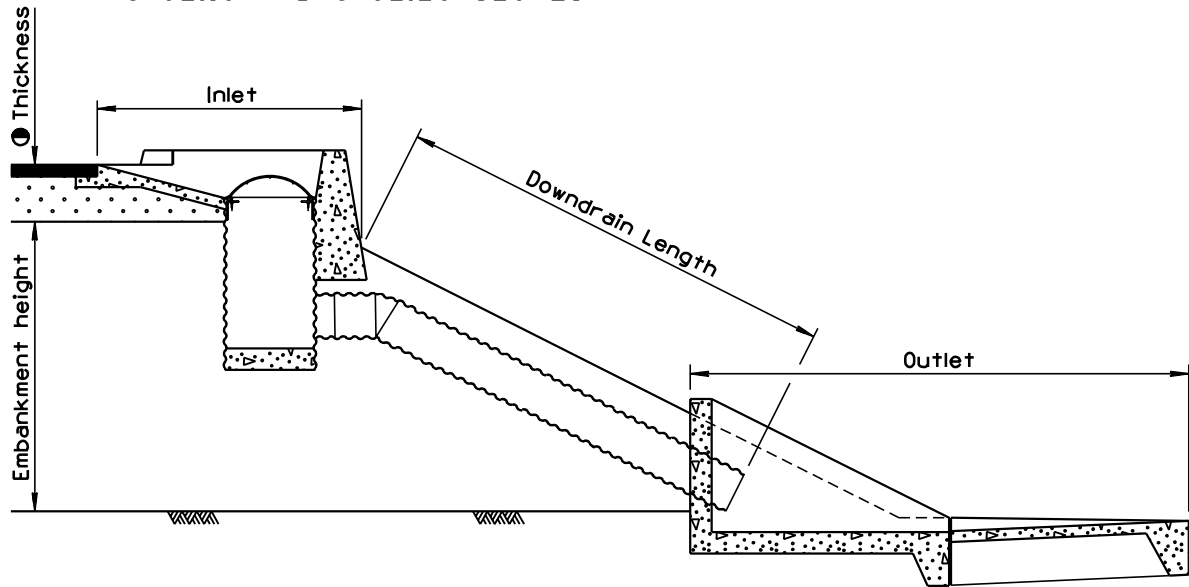
GENERAL NOTES

1. For C-02.10 slopes with embankment height over 24', use length for 24' embankment height from table + 2.24.
2. For C-02.20 slopes with embankment height over 32', use length for 32' embankment height from table + 1.8.
3. For C-02.30 slopes with embankment height over 13', use length for 13' embankment height from table + 1.8.
4. For spillway details, see Std C-04.10.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

LENGTH OF DOWNDRAIN																																	
Thickness ●	Embankment Height																																
	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'							
12"	32'	38'	46'	46'	46'	46'	48'	48'	48'	50'	50'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	58'	58'	58'	58'
13"	32'	40'	46'	46'	48'	48'	48'	48'	50'	50'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	58'	58'	58'	58'	58'
14"	34'	40'	46'	46'	48'	48'	50'	50'	50'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	58'	58'	58'	58'	58'	58'
15"	34'	40'	46'	46'	48'	48'	50'	50'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	58'	58'	58'	58'	58'	58'	58'
16"	34'	40'	48'	48'	48'	48'	50'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	60'	60'	60'	60'
17"	34'	42'	48'	48'	50'	50'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	60'	60'	60'	60'	60'
18"	36'	42'	48'	48'	50'	50'	52'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	60'	60'	60'	60'	60'	60'
19"	36'	42'	48'	48'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	60'	60'	60'	60'	60'	60'	60'
20"	36'	42'	50'	50'	50'	50'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	62'	62'	62'	62'
21"	36'	44'	50'	50'	52'	52'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	62'	62'	62'	62'	62'
22"	38'	44'	50'	50'	52'	52'	54'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	62'	62'	62'	62'	62'	62'
23"	38'	44'	50'	50'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	62'	62'	62'	62'	62'	62'	64'
24"	38'	44'	52'	52'	52'	52'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	62'	62'	62'	62'	62'	62'	64'	64'
25"	38'	46'	52'	52'	54'	54'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	64'	64'	64'	64'	64'
26"	40'	46'	52'	52'	54'	54'	56'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	64'	64'	64'	64'	64'	64'
27"	40'	46'	52'	52'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	64'	64'	64'	64'	64'	64'	66'
28"	40'	46'	54'	54'	54'	54'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	66'	66'	66'
29"	40'	48'	54'	54'	56'	56'	56'	56'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	66'	66'	66'	66'	66'
30"	42'	48'	54'	54'	56'	56'	58'	58'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	66'	66'	66'	66'	66'	66'
31"	42'	48'	54'	54'	56'	56'	58'	58'	58'	60'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	66'	66'	66'	66'	66'	66'	68'
32"	42'	48'	56'	56'	56'	56'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	68'	68'	68'	68'	68'	68'	68'	68'
33"	42'	50'	56'	56'	58'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	68'	68'	68'	68'	68'	68'	68'	68'	68'	68'
34"	44'	50'	56'	56'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	68'	68'	68'	68'	68'	68'	68'	68'	68'	68'	70'
35"	44'	50'	58'	58'	58'	58'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	68'	68'	68'	68'	68'	68'	68'	68'	68'	68'	68'	70'
36"	44'	50'	58'	58'	60'	60'	60'	60'	62'	62'	62'	62'	64'	64'	64'	64'	66'	66'	66'	66'	68'	68'	68'	68'	68'	68'	68'	68'	68'	68'	68'	68'	70'

C-02.10 AND C-02.20 SLOPES



LENGTH OF DOWNDRAIN													
Thickness ①	Embankment Height												
	5'	6'	7'	8'	9'	10'	11'	12'	13'				
12"	14'	16'	16'	16'	20'	20'	20'	20'	20'				
13"	14'	16'	16'	18'	20'	20'	20'	20'	22'				
14"	14'	16'	18'	18'	20'	20'	20'	20'	22'				
15"	14'	18'	18'	18'	20'	20'	20'	22'	22'				
16"	16'	18'	18'	18'	20'	20'	22'	22'	22'				
17"	16'	18'	18'	18'	20'	22'	22'	22'	22'				
18"	16'	18'	18'	18'	22'	22'	22'	22'	22'				
19"	16'	18'	18'	20'	22'	22'	22'	22'	24'				
20"	16'	18'	20'	20'	22'	22'	22'	24'	24'				
21"	16'	20'	20'	20'	22'	22'	24'	24'	24'				
22"	18'	20'	20'	20'	22'	22'	24'	24'	24'				
23"	18'	20'	20'	20'	22'	24'	24'	24'	24'				
24"	18'	20'	20'	20'	24'	24'	24'	24'	26'				
25"	18'	20'	20'	22'	24'	24'	24'	24'	26'				
26"	18'	20'	22'	22'	24'	24'	24'	26'	26'				
27"	18'	22'	22'	22'	24'	24'	26'	26'	26'				
28"	20'	22'	22'	22'	24'	26'	26'	26'	26'				
29"	20'	22'	22'	22'	26'	26'	26'	26'	26'				
30"	20'	22'	22'	24'	26'	26'	26'	26'	28'				
31"	20'	22'	24'	24'	26'	26'	26'	28'	28'				
32"	20'	24'	24'	24'	26'	26'	26'	28'	28'				
33"	22'	24'	24'	24'	26'	26'	28'	28'	28'				
34"	22'	24'	24'	24'	26'	28'	28'	28'	28'				
35"	22'	24'	24'	24'	28'	28'	28'	28'	28'				
36"	22'	24'	24'	26'	28'	28'	28'	28'	30'				

C-02.30 SLOPES

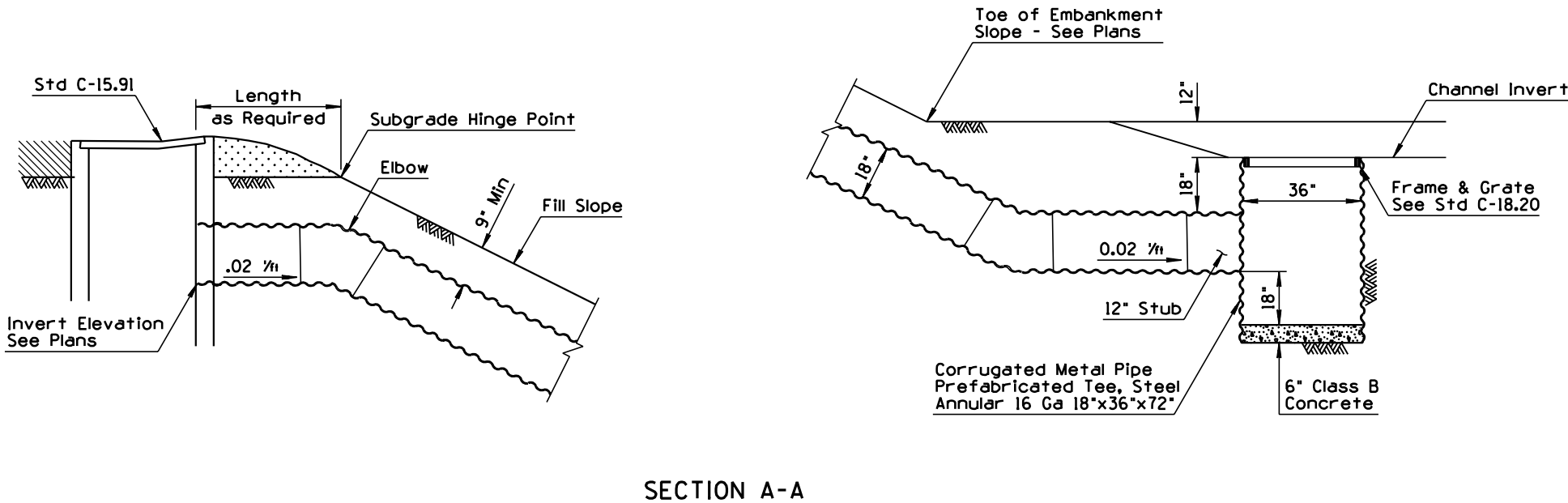
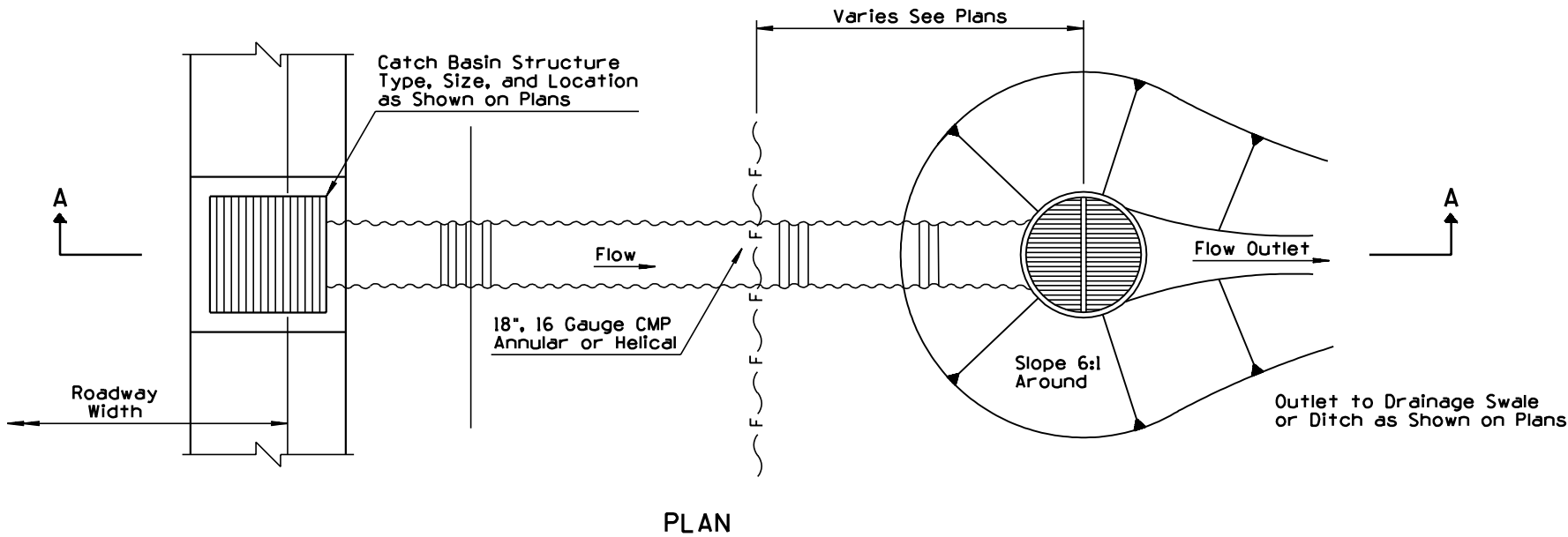
GENERAL NOTES

1. For C-02.10 slopes with embankment height over 24', use length for 24' embankment height from table + 2.24.
2. For C-02.20 slopes with embankment height over 32', use length for 32' embankment height from table + 1.8.
3. For C-02.30 slopes with embankment height over 13', use length for 13' embankment height from table +1.8.
4. For down drain details, see Std C-04.20.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

GENERAL NOTES

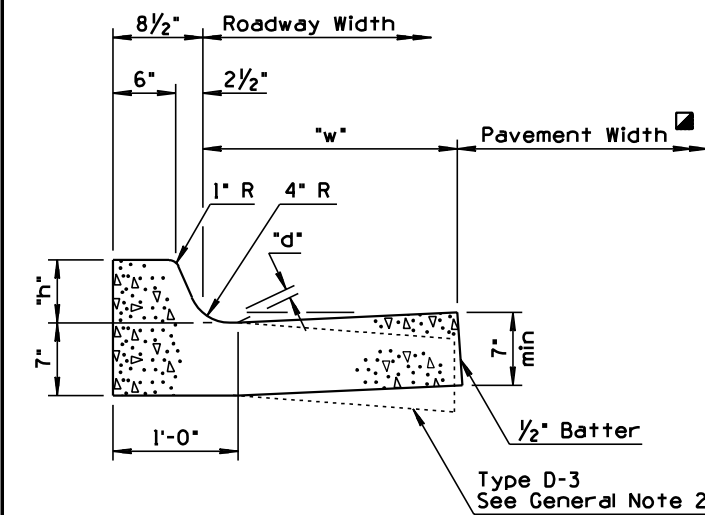
- Stub shall have annular corrugation. Downdrain piping beyond stub may be either annular or helical.
- Couplings shall be mechanical heat-shrinkable polyolafin sheet; one piece lap type neoprene sheet or slip seam; all 12": min width and 18 ga min.
- Maximum Q Allowable = 8 cfs
Minimum V Allowable = 1 fps



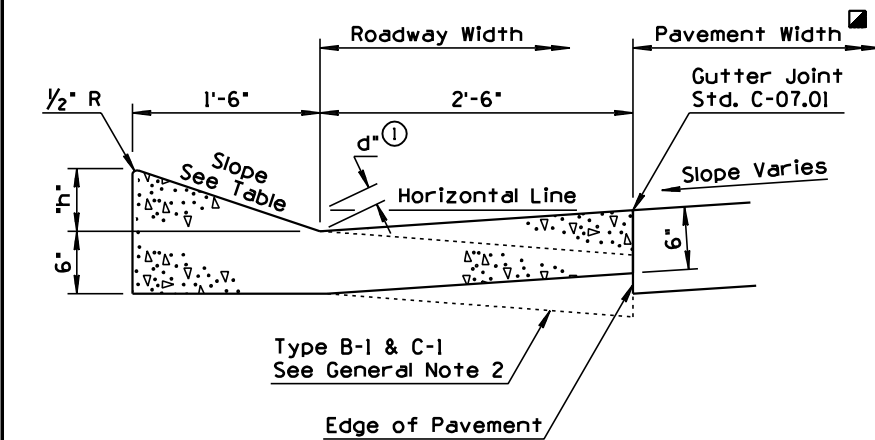
DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-04.50

① DOWNDRAIN
ENERGY DISSIPATOR

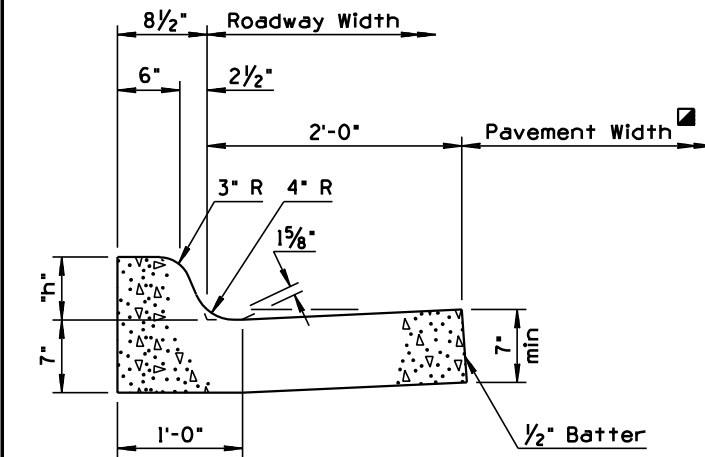
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED TYPE C GUTTER DEPRESSION TO $\frac{5}{8}"$	JNP	8/99
2			
3			
4			



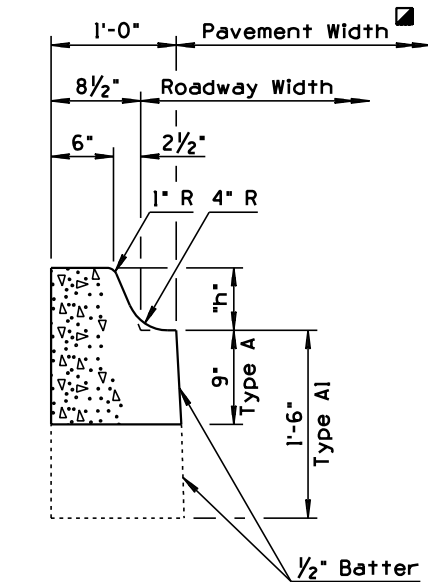
CURB AND GUTTER
TYPE D, D-1, D-2 & D-3



CURB AND GUTTER
TYPE B, C, B-1 & C-1

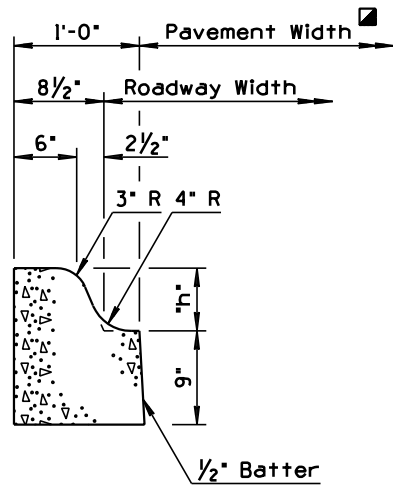


CURB AND GUTTER
TYPE G



SINGLE CURB
TYPE A & A1

FREEWAY CURB & GUTTER			
C & G TYPE	CURB HEIGHT "h"	SLOPE	GUTTER DEPRESSION "d"
B	6"	3:1	2"
B-1	6"	3:1	N/A
C	3"	6:1	$\frac{5}{8}"$ ①
C-1	3"	6:1	N/A

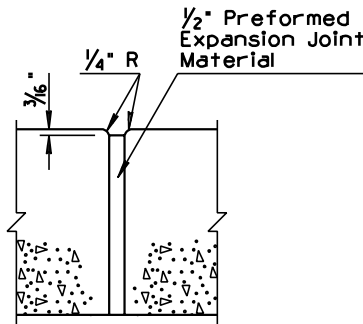


SINGLE CURB
TYPE G

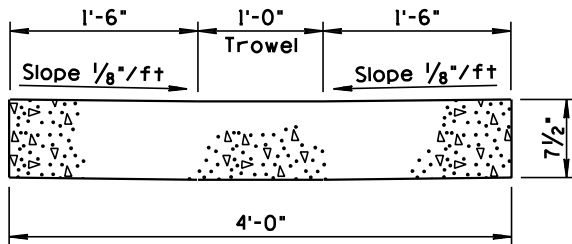
C & G TYPE	CURB HEIGHT "h"	GUTTER WIDTH "w"	GUTTER DEPRESSION "d"
A	①	N/A	N/A
A-1	①	N/A	N/A
D	①	2'-0"	$1\frac{5}{8}"$
D-1	①	2'-6"	$1\frac{3}{4}"$
D-2	①	4'-6"	$1\frac{3}{4}"$
D-3	①	2'-0"	N/A
G	①	2'-0"	N/A

■ See Plans

① See Plans (6 or 7 Inch Typical)



EXPANSION JOINT DETAIL



VALLEY GUTTER

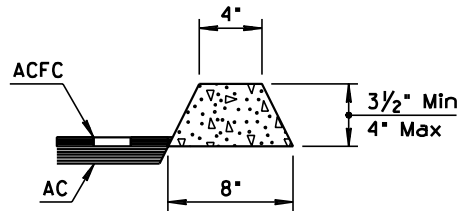
GENERAL NOTES

SINGLE CURB AND CURB AND GUTTER

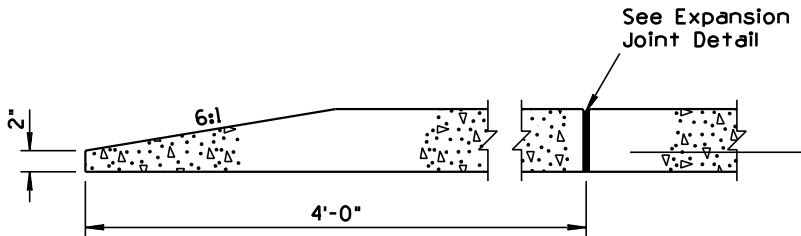
1. Single curb, and curb and gutter may be constructed by the use of forms or the concrete may be extruded.
2. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the gutter depression is not applicable.
3. Two inch deep contraction joints shall be placed in the curb and the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.
4. Expansion joints shall be located at tangent points in curb returns, at structures and at maximum 60 foot intervals. The one-half inch joint filler shall extend the full depth at the concrete.
5. Concrete shall be finished with a steel trowel followed by brushing with a fine brush along the length of the curb and gutter.
6. All exposed edges and hand tooled joints shall be finished with a tool having a one-fourth inch radius unless a larger radius is indicated.

EMBANKMENT CURB

1. No additional finishing will be required after extrusion or removal of the forms when the curb presents a neat appearance and the surface is uniform in texture and color.
2. The curb shall conform to the cross section as shown except that the horizontal dimensions shall not vary more than one-half inch.



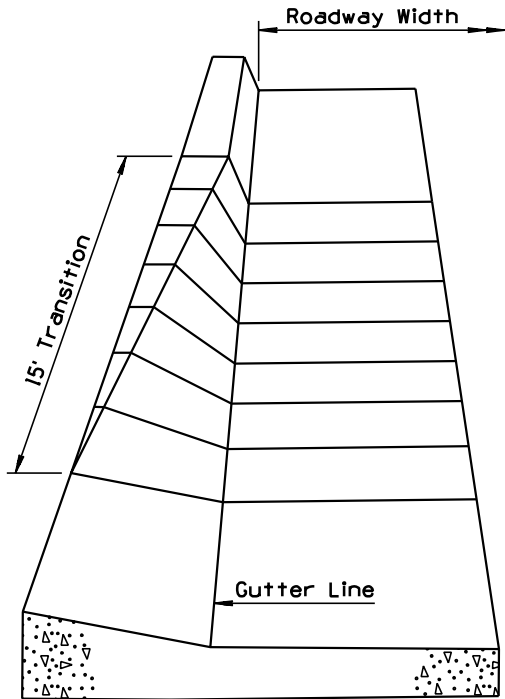
EMBANKMENT CURB



CURB TERMINAL SECTION

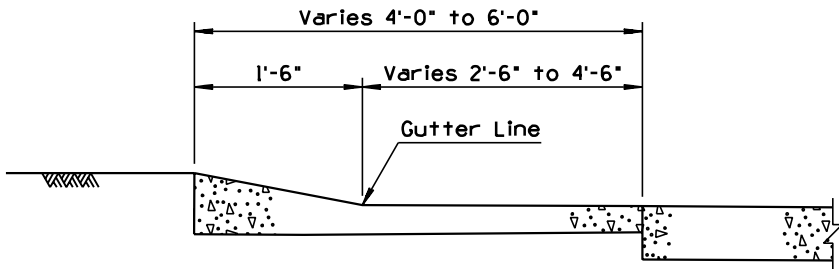
DESIGN APPROVED <i>Sam H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SINGLE CURB, CURB & GUTTER, EMBANKMENT CURB	DRAWING NO. C-05.10

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED VIEW	PNB	7/94
2	ADDED NOTE	PNB	7/94
3	REVISED NOTE	PNB	7/94
4			

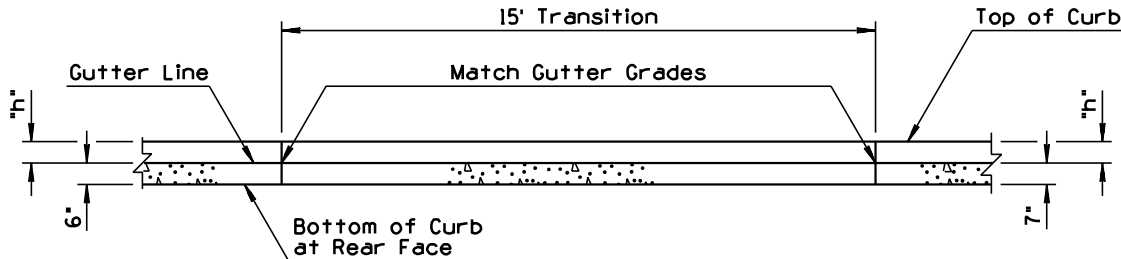


- ③
- All gutter flow lines shall be constructed to an accurate grade.
 - See Slotted Drain Stds., C-13.60 and C-15.91, for curb and gutter with slotted drain.
 - See Std. C-05.10 for additional general notes and dimensions.

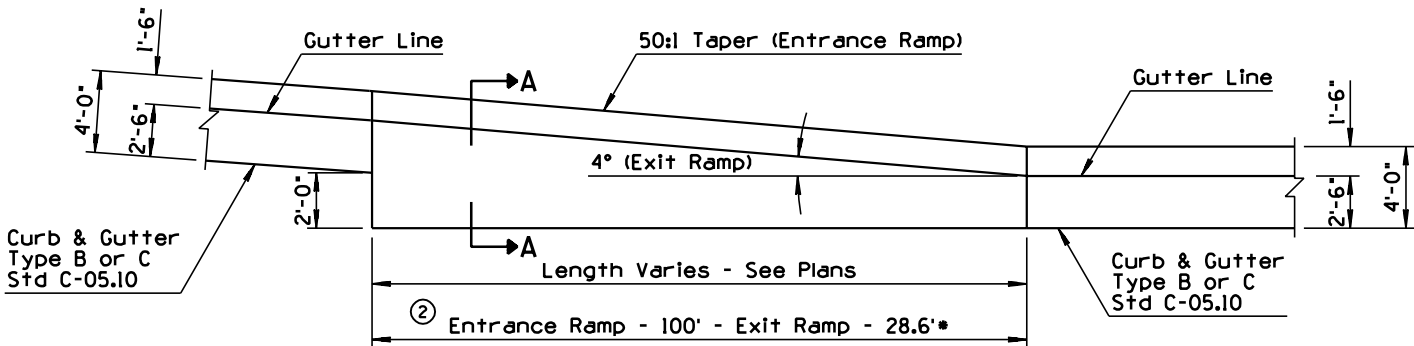
① PERSPECTIVE VIEW



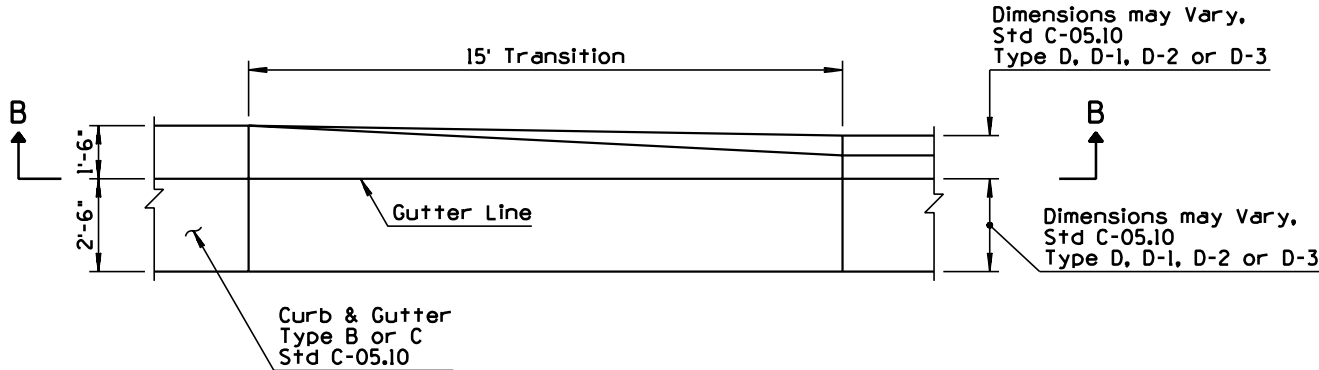
SECTION A-A



SECTION B-B



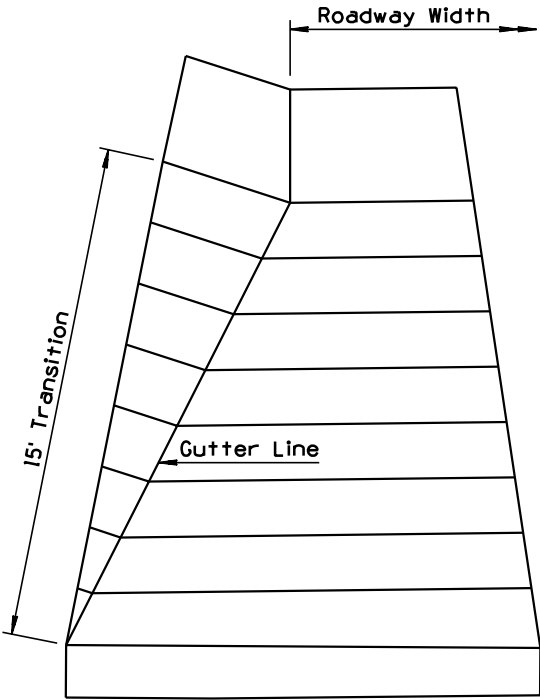
TYPE 1 - CURB & GUTTER TRANSITION - AT RAMP TAPERS
* Dimension may vary where exit occurs on curves, see plans



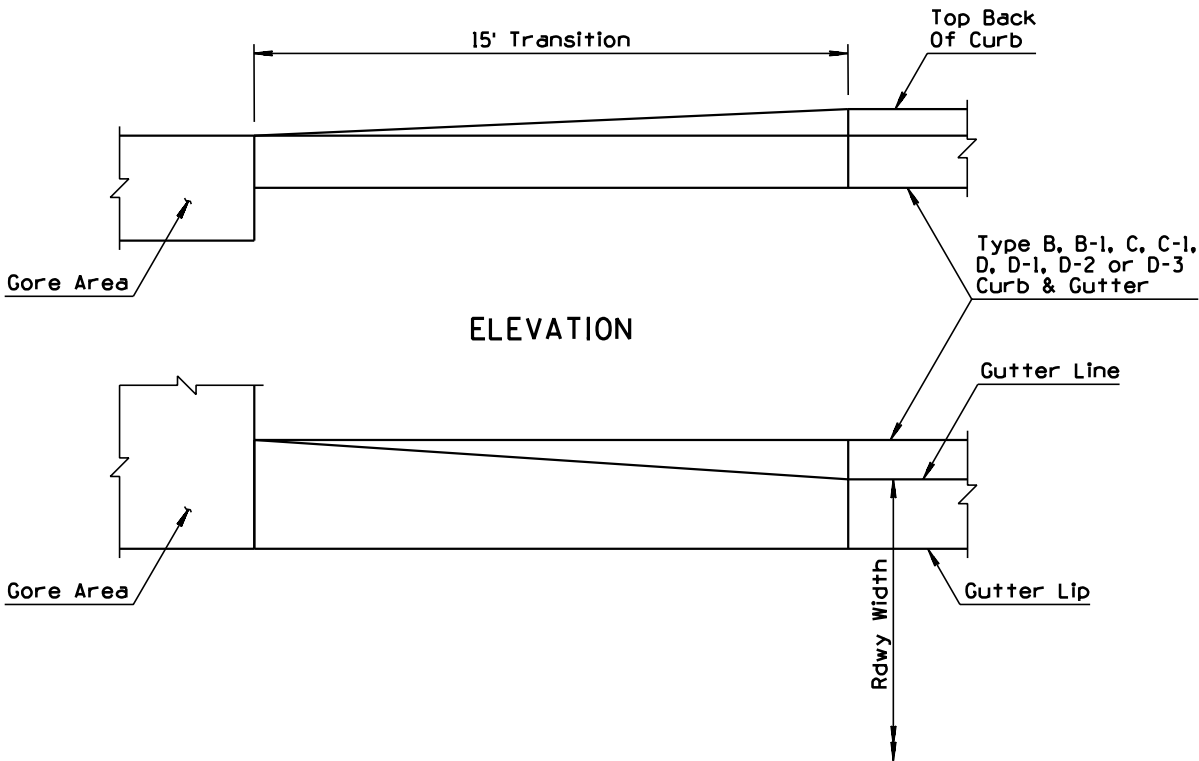
TYPE 2 - CURB & GUTTER TRANSITION

DESIGN APPROVED <i>Terry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CURB & GUTTER TRANSITIONS	DRAWING NO. C-05.12 Sheet 1 of 3

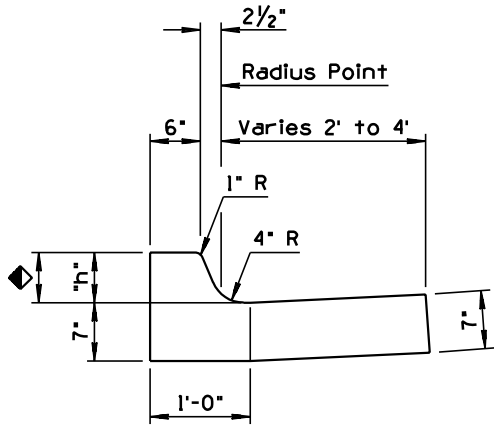
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED PERSPECTIVE VIEW	PNB	7/94
2	ADDED TYPE 4 TRANSITION	PNB	7/94
3			
4			



① PERSPECTIVE VIEW

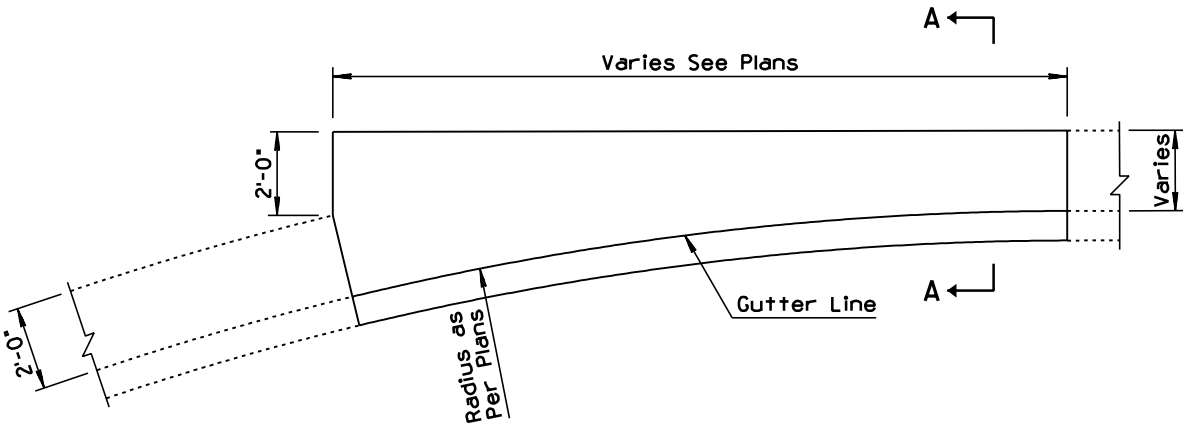


PLAN VIEW
TYPE 3 - CURB & GUTTER TRANSITION AT PAVED GORE



◆ Curb height varies 0" to 7" max in depressed curb area beyond the end of barrier. See Plans for curb height.

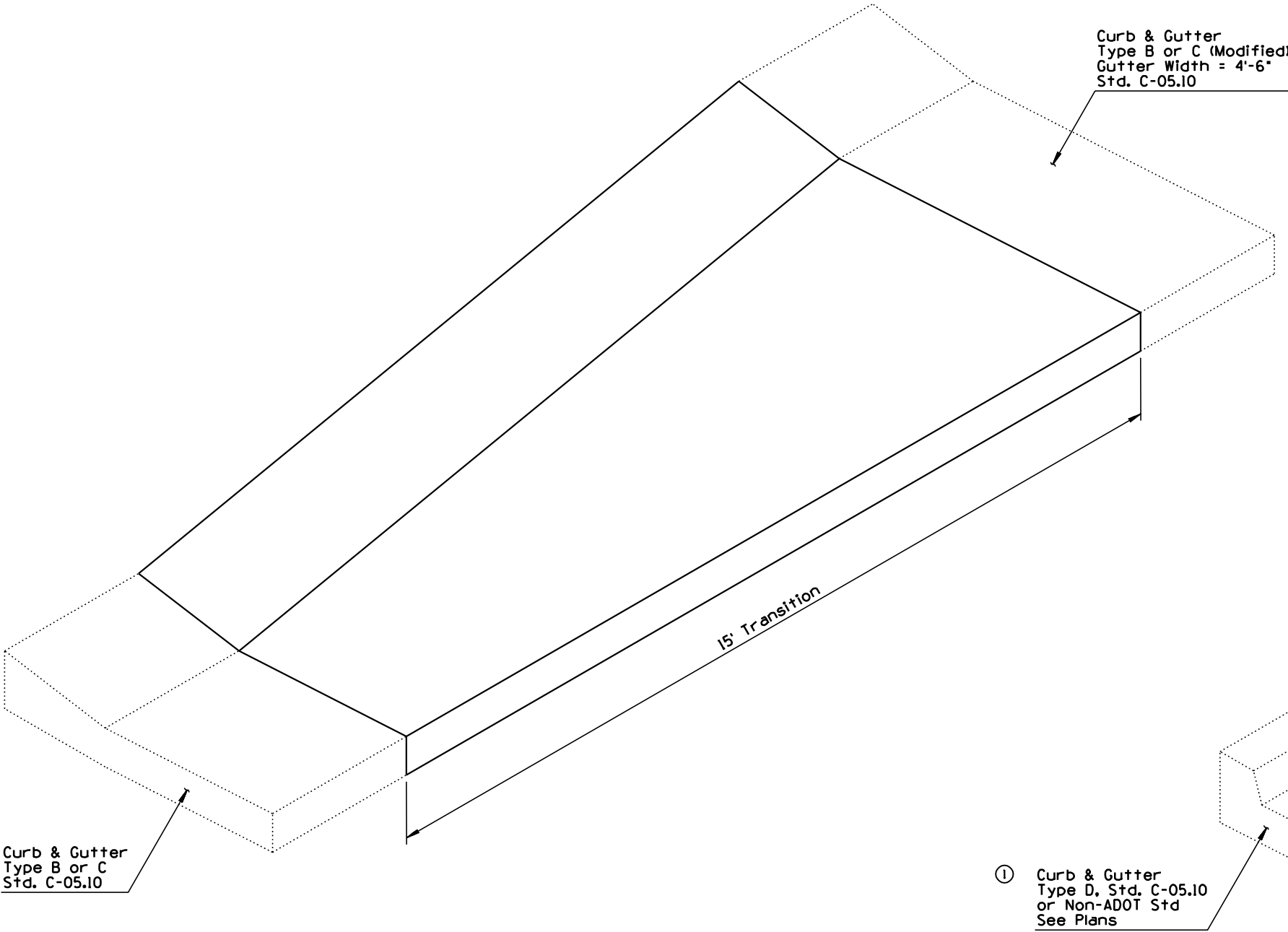
SECTION A-A



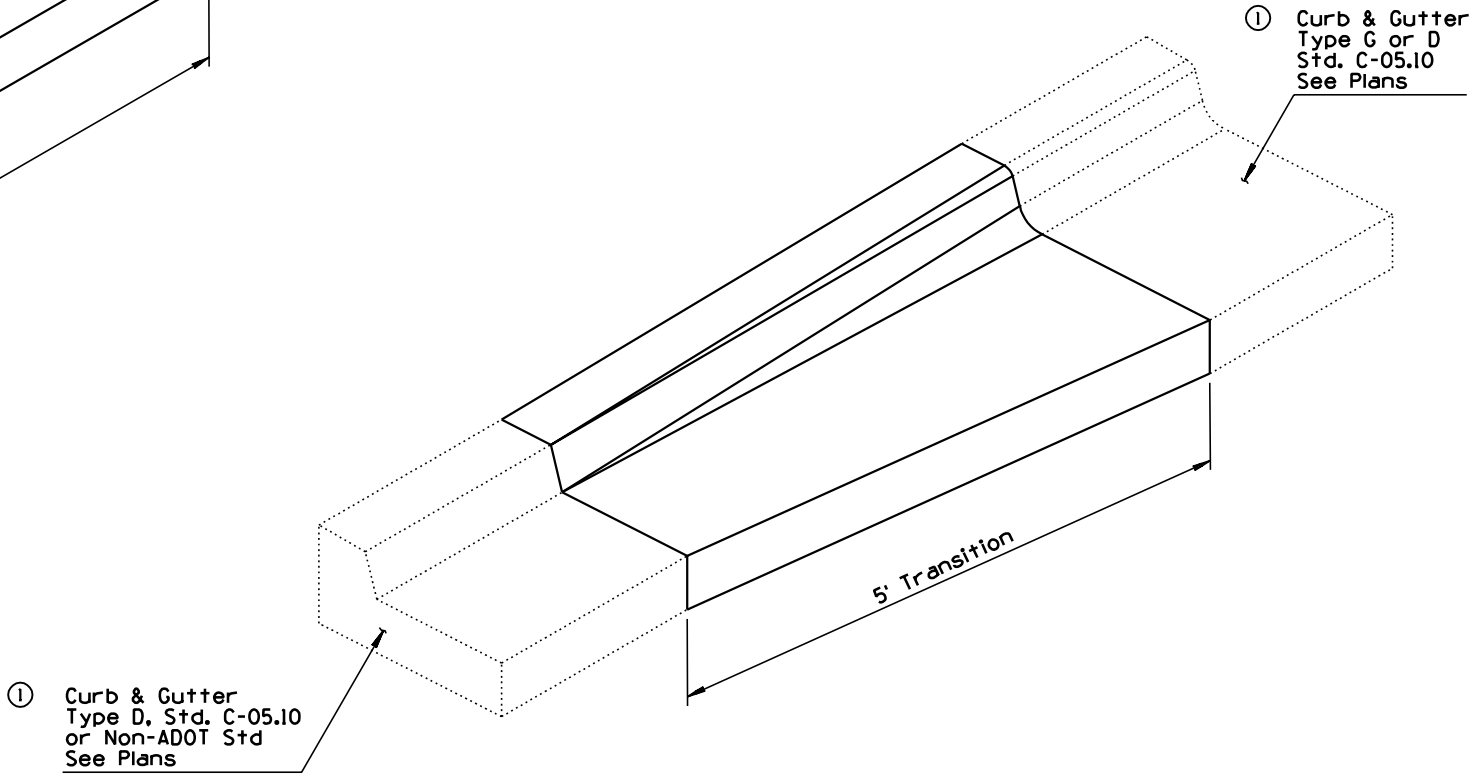
② TYPE 4 - CURB & GUTTER TRANSITION

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. CURB & GUTTER TRANSITIONS C-05.12 Sheet 2 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CHANGED TYPE A C&G TO TYPE D C&G	PNB	10/95
2			
3			
4			



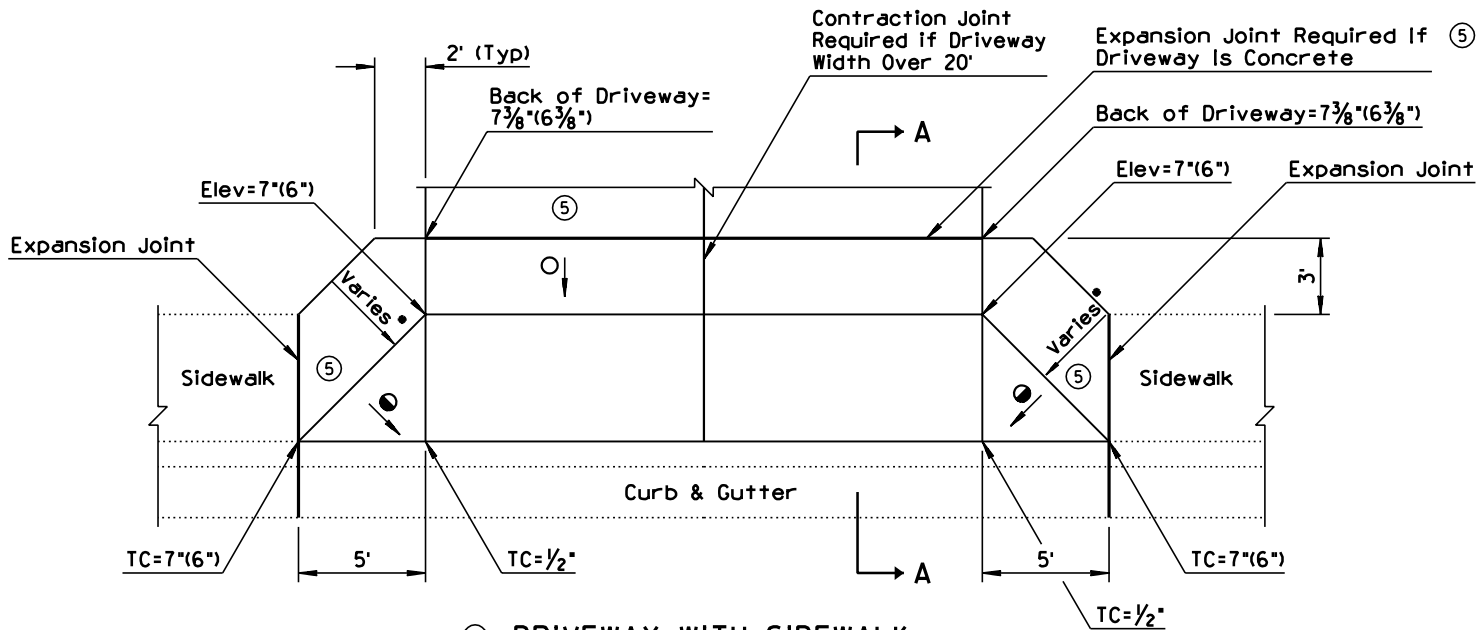
TYPE 5 - CURB & GUTTER TRANSITION



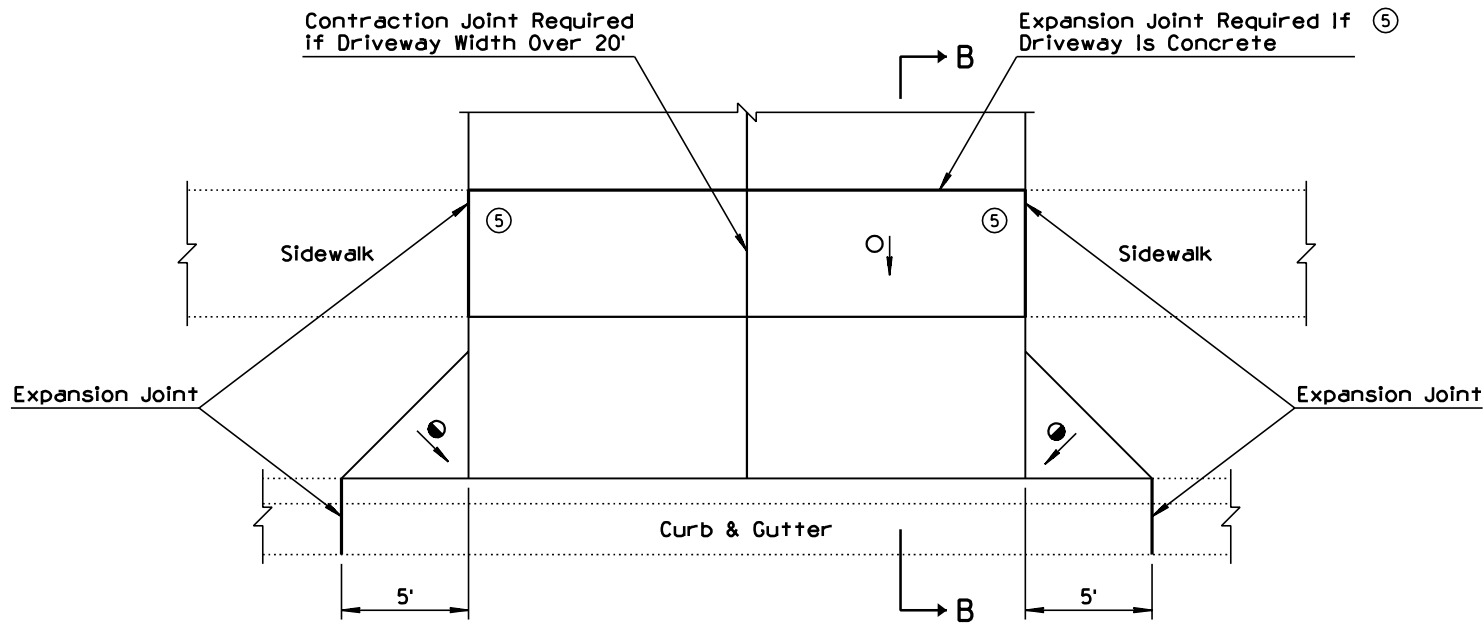
TYPE 6 - CURB & GUTTER TRANSITION

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-05.12 Sheet 3 of 3

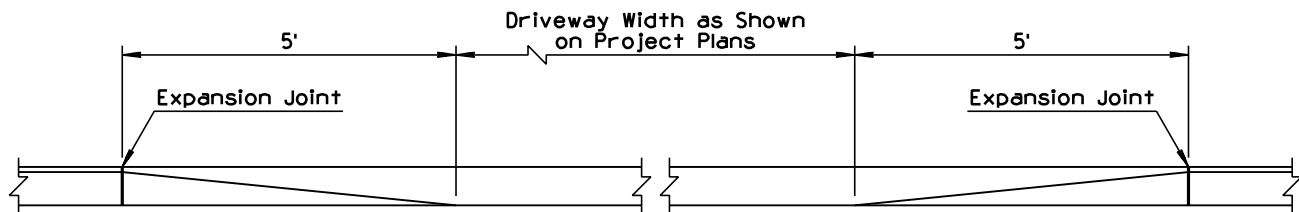
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE	NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED NOTE	PNB	7/94	5	ALTERED EXPANSION JOINT PLACEMENT AND NOTE	BAF	7/97
2	REVISED SECTION	PNB	7/94	6			
3	REVISED DETAIL	PNB	7/94	7			
4	ADDED NOTE	PNB	7/94	8			



③ DRIVEWAY WITH SIDEWALK
ADJACENT TO CURB



DRIVEWAY WITH SIDEWALK SETBACK



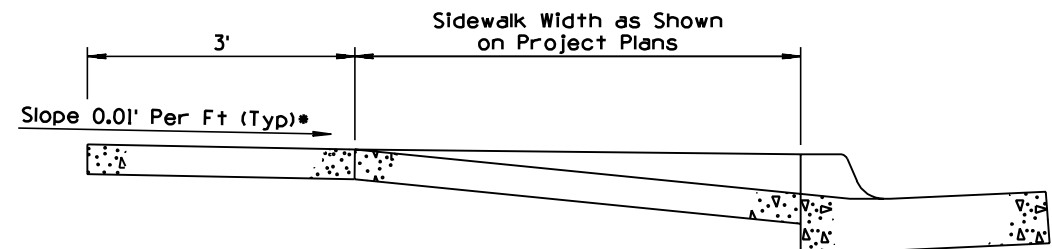
DEPRESSED CURB AT DRIVEWAY ENTRANCE

GENERAL NOTES

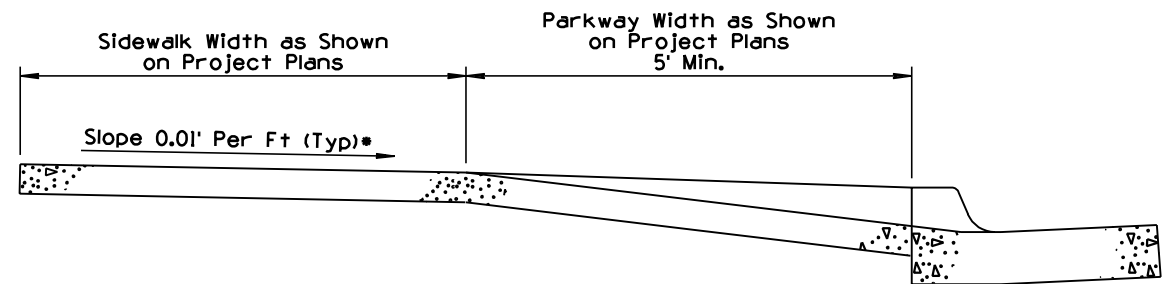
1. Unless otherwise specified, driveways shall be 6 inches in depth.
- ① 2. Two inch deep transverse contraction joints shall be placed in driveways if the driveway width is over 20 feet. If the driveway thickness is greater than 6 inches, then the contraction joint depth shall be $T/3$, where T is the thickness of the driveway. Joints shall be either formed or sawed. Formed joints shall be finished with a tool having a $1/4$ " radius. See sheet 2 of 2 for the Contraction Joint Detail.
- ① 3. Expansion joints shall be located between driveways and sidewalks and all abutting structures. The one-half inch joint filler shall extend the full depth of the concrete. See sheet 2 of 2 for the Expansion Joint Detail.
4. Concrete shall be finished by means of a float, then steel trowelled and then broomed with a fine brush in a transverse direction.
- ④ 5. Top of curb (TC) and driveway elevations shown are in relation to the gutter. Gutter=0'.
- ④ 6. When curb heights of 6' or less are shown on plans, use dimensions shown in ()'s.
- ④ 7. When curb heights of 7' or more are shown on plans, see plans.

LEGEND

- → Cross slope (0.01' Per Ft (Typ))*
- → Straight grade with downward slope.
- * Maximum slope = 0.02' Per Ft.



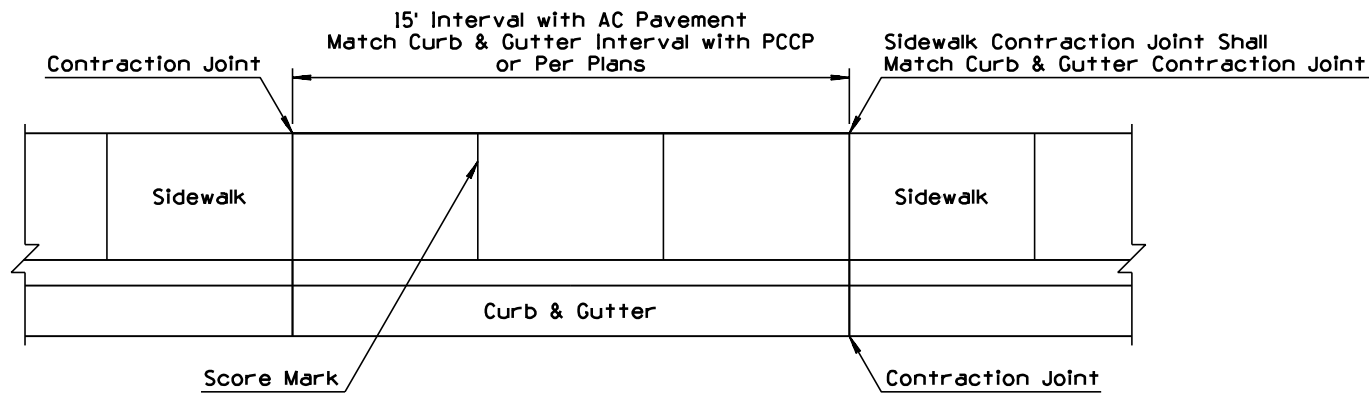
② SECTION A-A



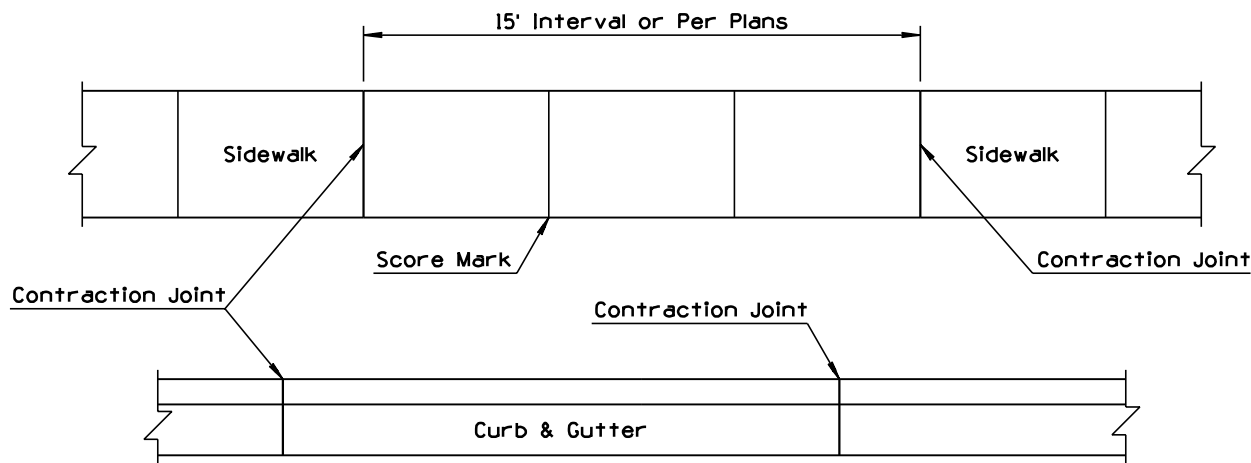
② SECTION B-B

DESIGN APPROVED <i>Henry H. Cotten</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE DRIVEWAYS & SIDEWALKS DRIVEWAYS	DRAWING NO. C-05.20 Sheet 1 of 2

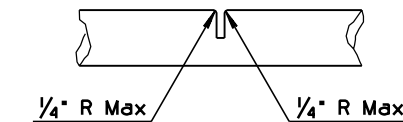
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



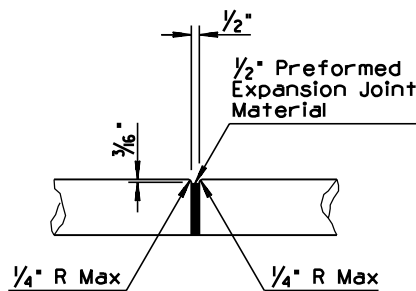
SIDEWALK ADJACENT TO CURB



SIDEWALK SETBACK FROM CURB



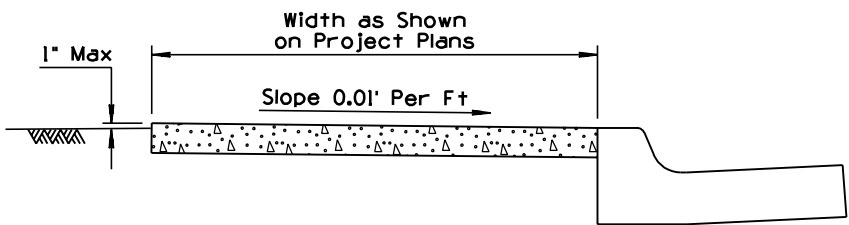
CONTRACTION JOINT DETAIL



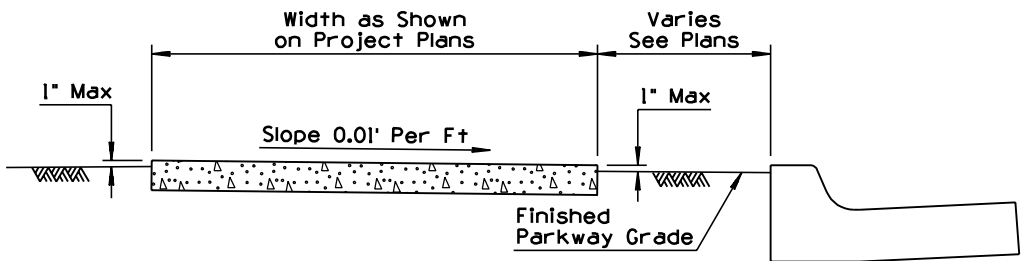
EXPANSION JOINT DETAIL

GENERAL NOTES

1. Unless otherwise specified, sidewalks shall be 4 inches in depth.
2. One inch deep transverse contraction joints shall be placed in sidewalks at intervals of approximately 15 feet or at a spacing that matches adjacent curb and gutter. If the sidewalk is over 7 feet in width, a 2 inch deep longitudinal contraction joint shall be placed in the center of the sidewalk. The maximum area of sidewalk without contraction joints or scoring lines shall be approximately 36 square feet. Joints shall be either formed or sawed. Formed joints shall be finished with a tool having a 1/4" radius.
3. Expansion joints shall be located between sidewalks and driveways and all abutting structures. Expansion joints shall match the joints in the adjacent concrete pavement or existing concrete curb and sidewalk. Maximum length of sidewalk without an expansion joint shall be 60 transverse feet. The one-half inch joint filler shall extend the full depth of the concrete.
4. Concrete shall be finished by means of a float, then steel trowelled and then broomed with a fine brush in a transverse direction.
5. Sidewalks shall be constructed to a desirable width of 5 feet on major streets, a minimum width of 4 feet on residential streets or as shown on the plans.
6. Scoring lines shall be 1/4 inch in depth. They shall be placed at 5 foot spacing when the contraction joint interval is 15 feet and at 6 foot spacing when the contraction joint interval is 12 feet.



CONCRETE SIDEWALK ADJACENT TO CURB

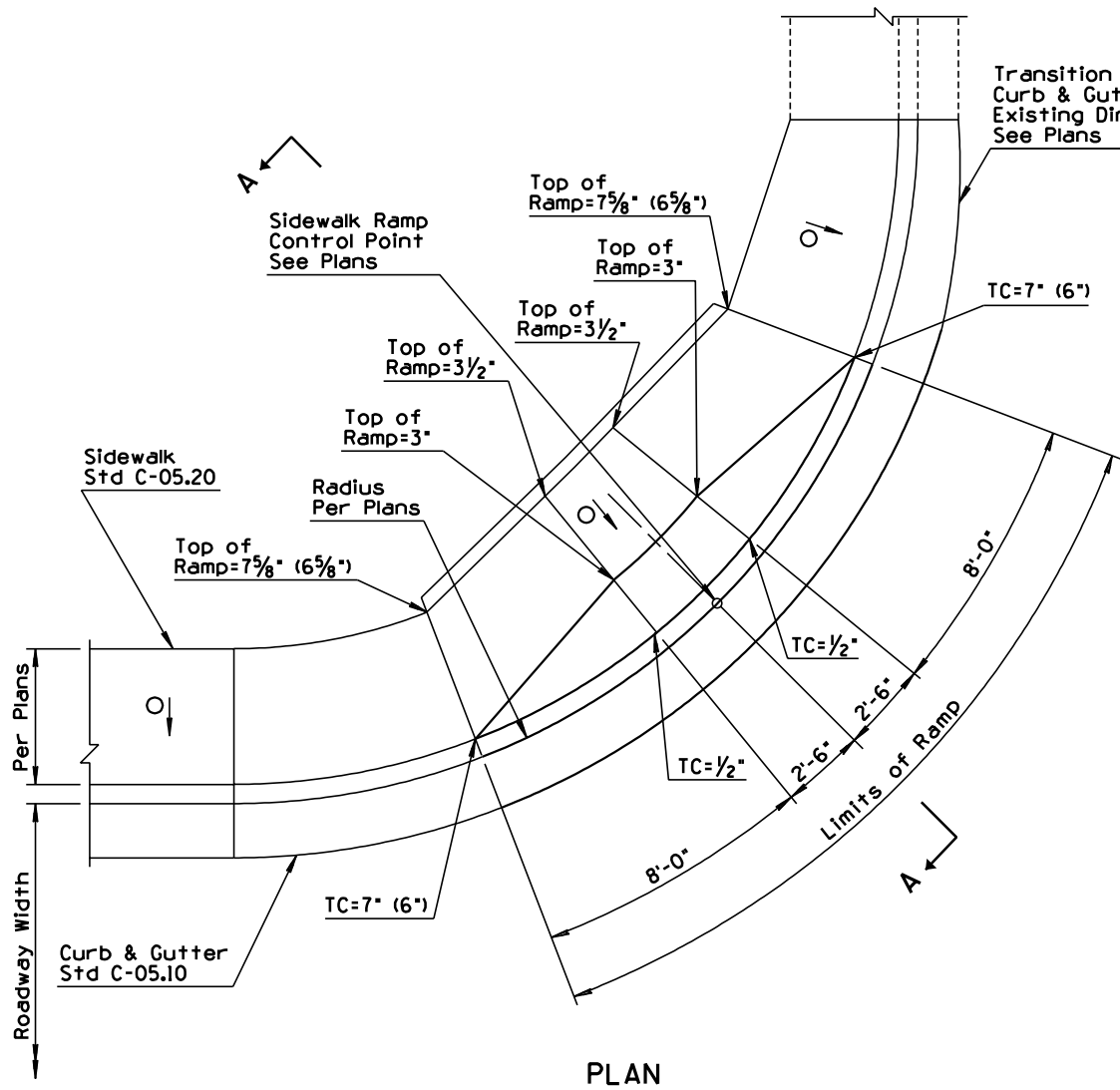


CONCRETE SIDEWALK SETBACK FROM CURB

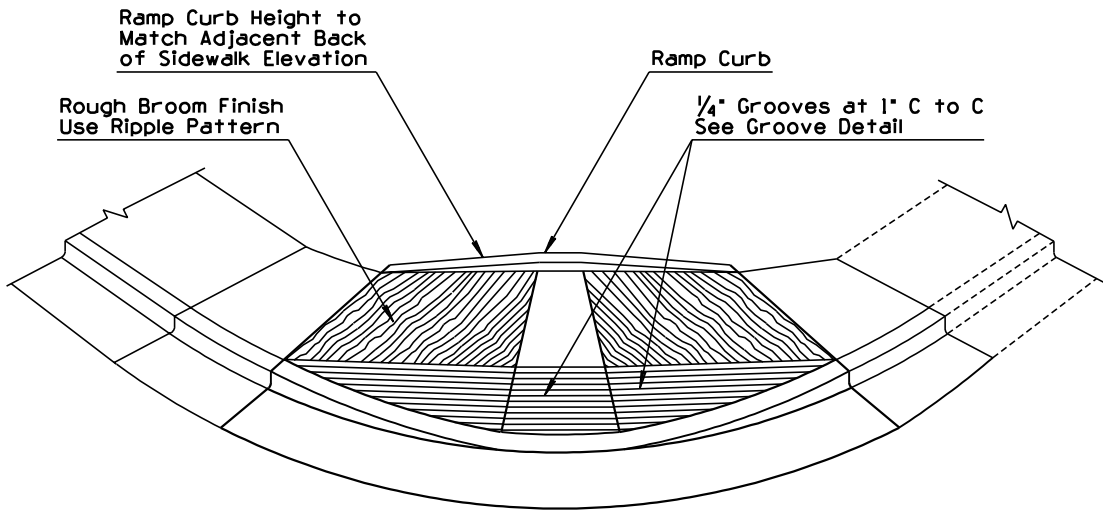
DESIGN APPROVED <i>Terry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE DRIVEWAYS & SIDEWALKS SIDEWALKS	DRAWING NO. C-05.20 Sheet 2 of 2

Note to Designer: The sidewalk standard drawing series C-05.30 has been developed for new construction. Where retrofits to existing sidewalks are needed or other special site conditions apply such that these standards cannot be used, separate plans details considering the ADA guidelines shall be provided.

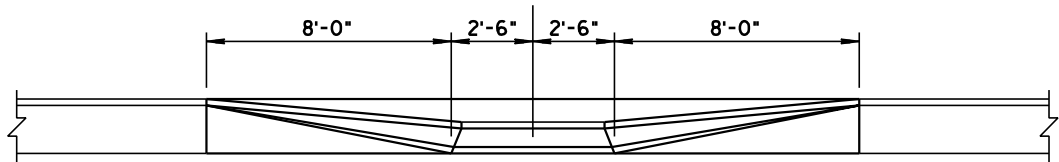
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW RAMP WITH LANDING FOR BYPASS	JNP	8/99
2			
3			
4			



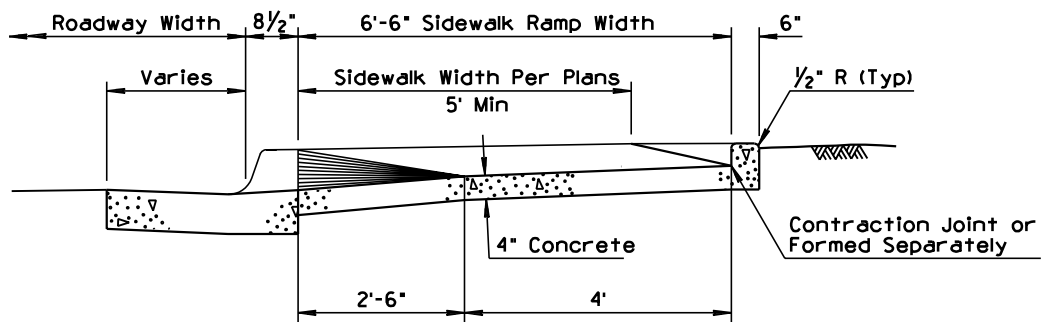
PLAN



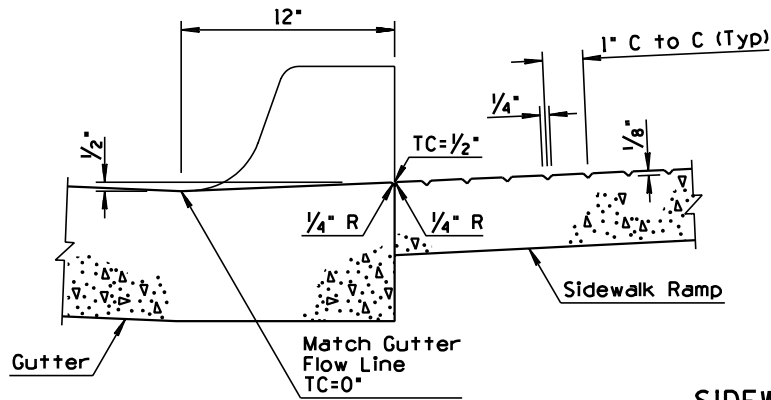
PERSPECTIVE



ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



SECTION A-A



GROOVE DETAIL

GENERAL NOTES

1. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter and are located radially. Gutter=0".
2. See Std C-05.10 and C-05.20 for joint requirements.
3. When curb heights of 6" or less are shown on plans, use dimensions shown in ()'s.
4. When curb heights of greater than 7" are shown on plans, see plans and ADA requirements.

LEGEND

- → Cross slope (0.01' Per Ft + (Typ))•
- Maximum slope = 0.02' Per Ft.

SIDEWALK RAMP WITH PEDESTRIAN BYPASS

DESIGN APPROVED
Henry H. Cortinas
APPROVED FOR DISTRIBUTION
Ronald Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

REV.
8/99

SIDEWALK RAMP
TYPE I

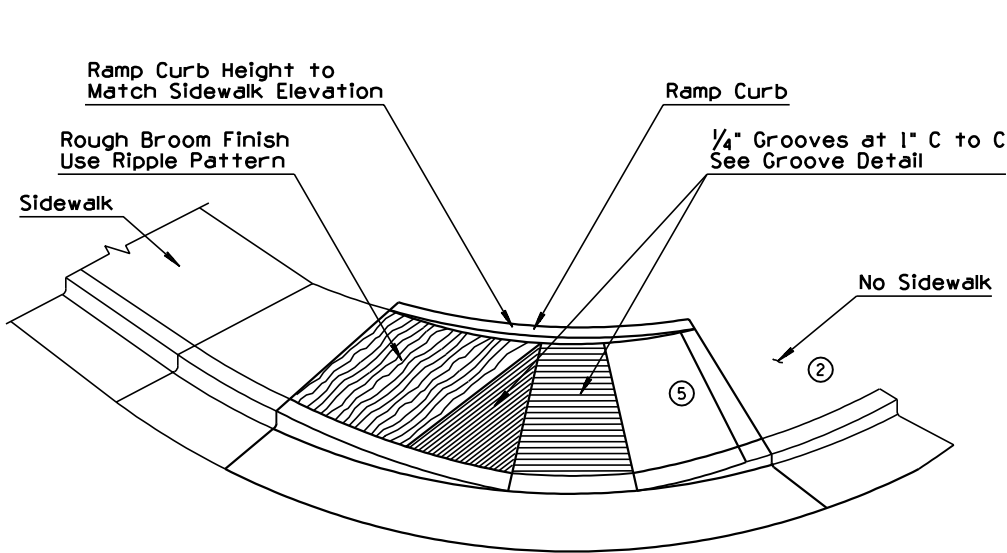
①

DRAWING NO.
C-05.30
Sheet 1 of 6

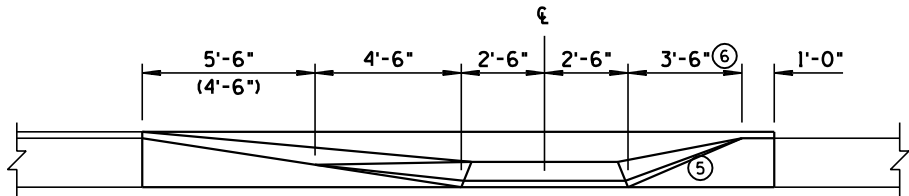
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1	REVISED SHEET NUMBER	JNP	8/99	5	REVISED DRAWING	JNP	8/99
2	REVISED TO SHOW THAT SIDEWALK IS NOT CONTINUED	JNP	8/99	6	REVISED DIMENSION	JNP	8/99
3	ADDED TITLE	JNP	8/99	7			
4	ADDED NOTE	JNP	8/99	8			

GENERAL NOTES

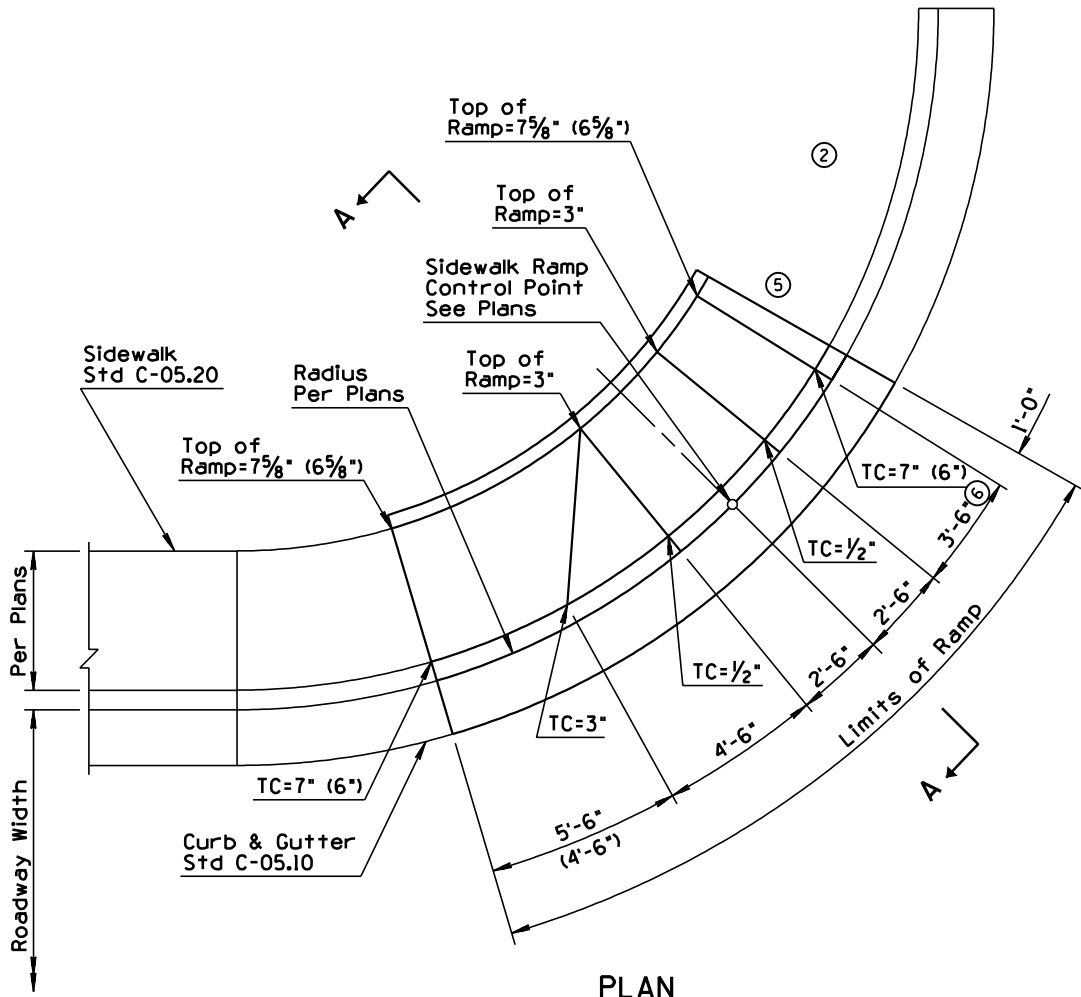
- For use when sidewalk is not continuous both sides. If sidewalk is anticipated in the future, utilize Type 1 or Type 6 Ramp.
- Top of curb (TC) and top of ramp elevations shown are in relation to the gutter and are located radially. Gutter=0".
- See Std C-05.10 and C-05.20 for joint requirements.
- When curb heights of 6" or less are shown on plans, use dimensions shown in ()'s.
- When curb heights of greater than 7" are shown on plans, see plans and ADA requirements.



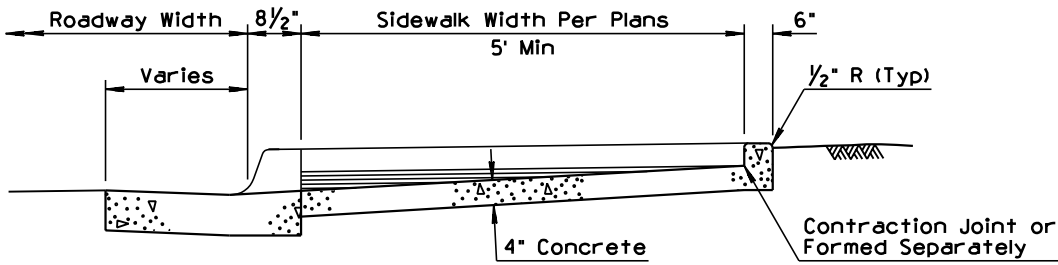
PERSPECTIVE



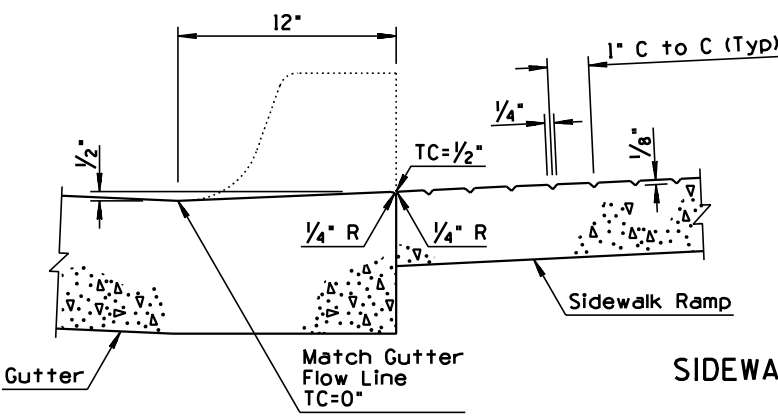
ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



PLAN



SECTION A-A



GROOVE DETAIL

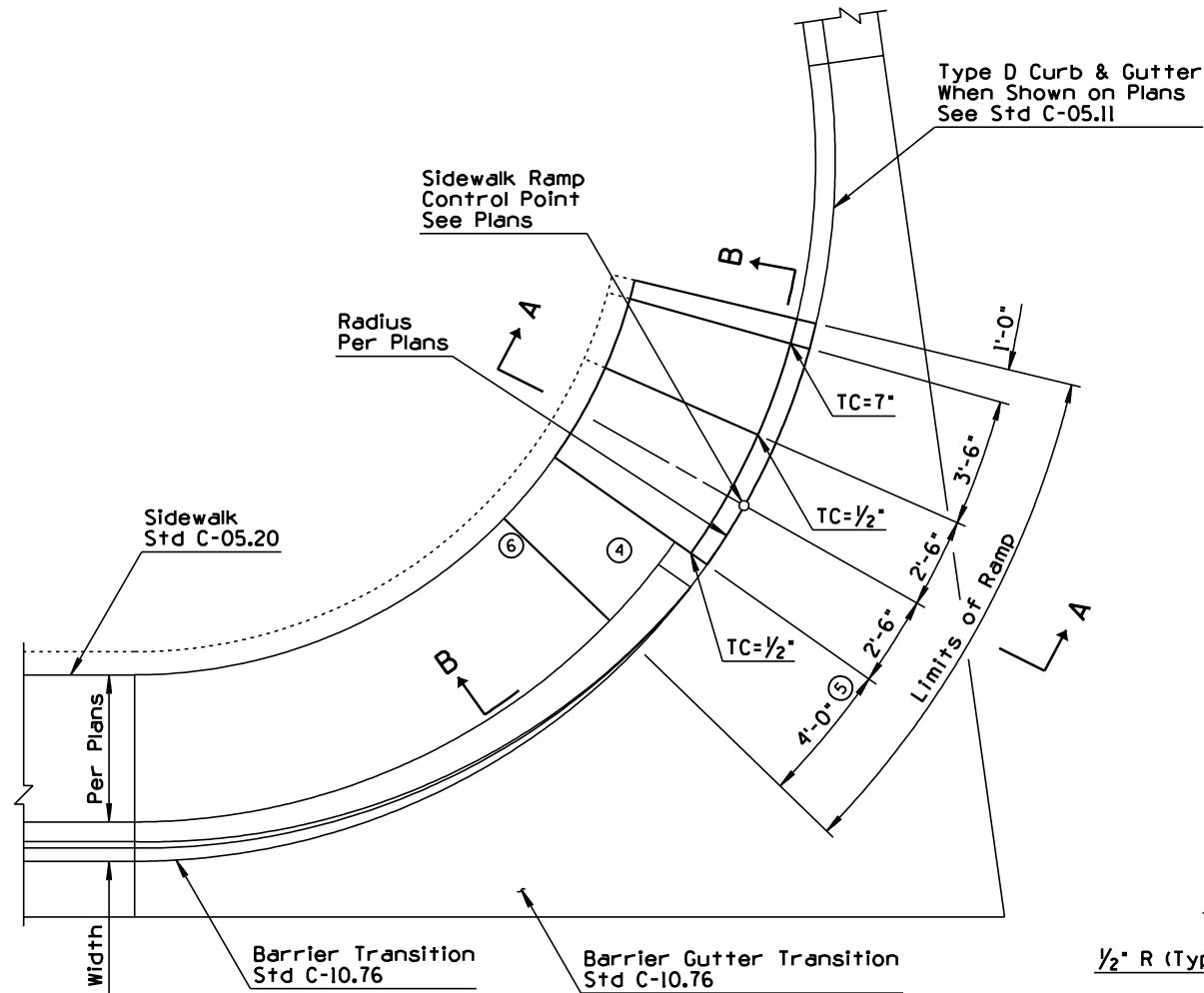
SIDEWALK RAMP WITHOUT PEDESTRIAN BYPASS ③

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SIDEWALK RAMP TYPE 2	DRAWING NO. C-05.30 ① Sheet 2 of 6

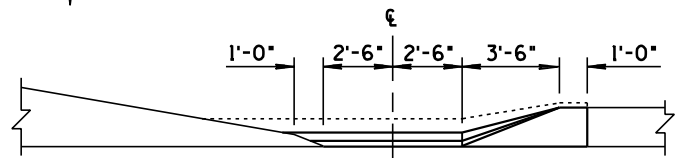
④ Note to Designer: The sidewalk standard drawing series C-05.30 has been developed for new construction. Where retrofits to existing sidewalks are needed or other special site conditions apply such that these standards cannot be used, separate plans detailing the ADA guidelines shall be provided.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE	NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED SHEET NUMBER	JNP	8/99	5	REVISED DIMENSION	JNP	8/99
2	ADDED TITLE	JNP	8/99	6	REVISED DRAWING	JNP	8/99
3	ADDED NOTE	JNP	8/99	7			
4	DELETED NOTE	JNP	8/99	8			

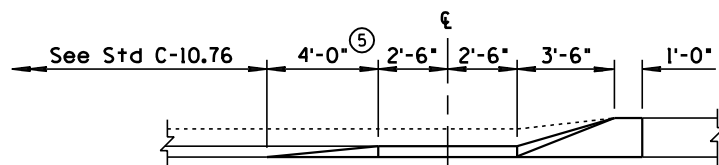
3 Note to Designer: The sidewalk standard drawing series C-05.30 has been developed for new construction. Where retrofits to existing sidewalks are needed or other special site conditions apply such that these standards cannot be used, separate plans detailing the ADA guidelines shall be provided.



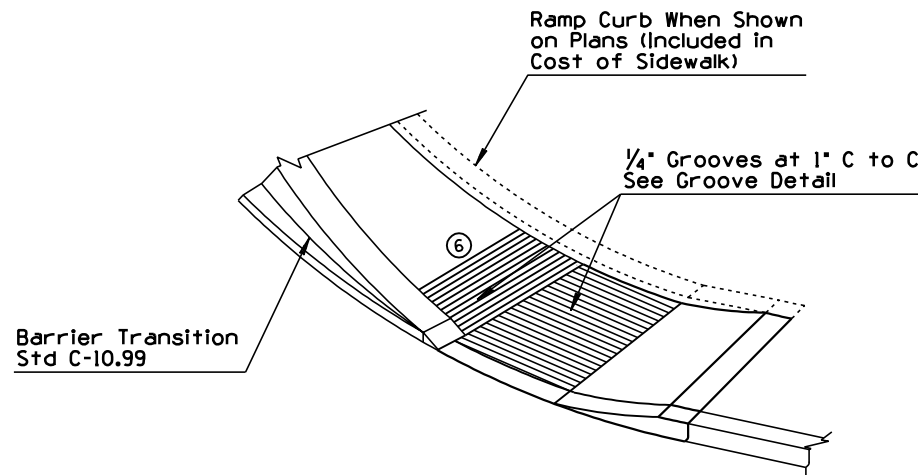
PLAN



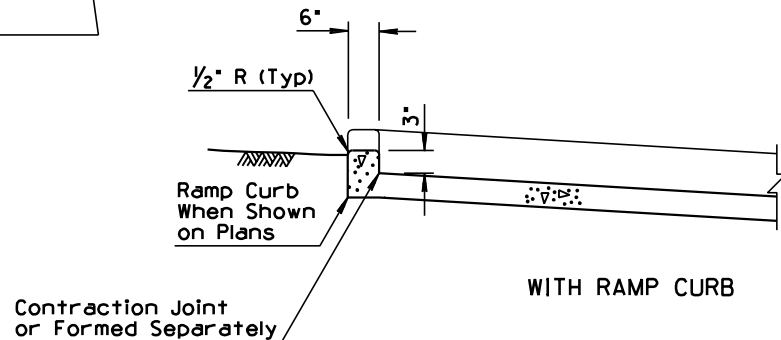
ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



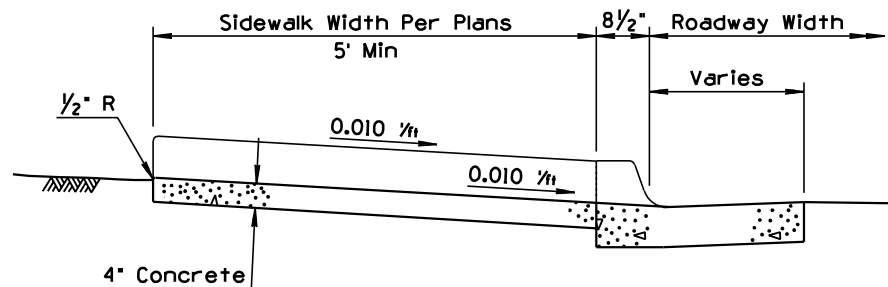
SECTION B-B



PERSPECTIVE



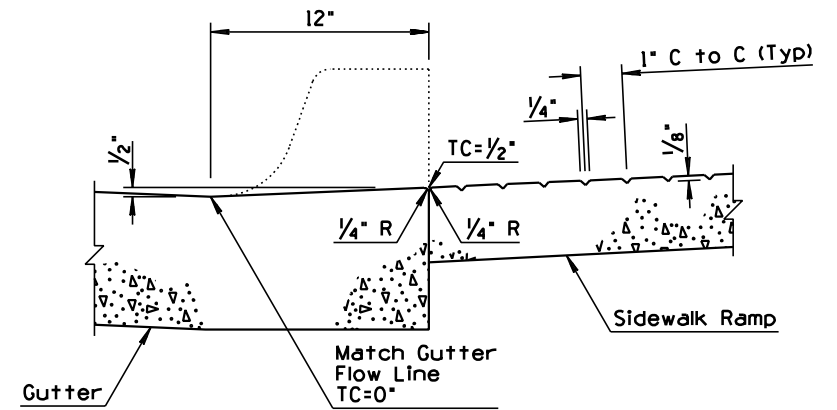
WITH RAMP CURB



WITHOUT RAMP CURB

SECTION A-A

- GENERAL NOTES
1. Top of curb (TC) elevations shown are in relation to the gutter and are located radially. Gutter=0".
 2. See Std C-05.10 and C-05.20 for joint requirements.
- ④



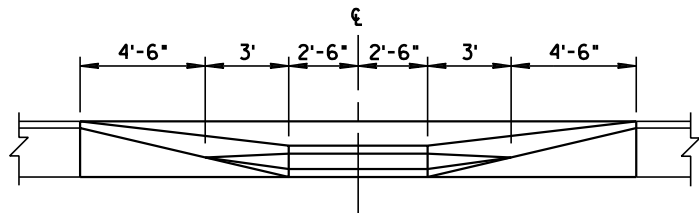
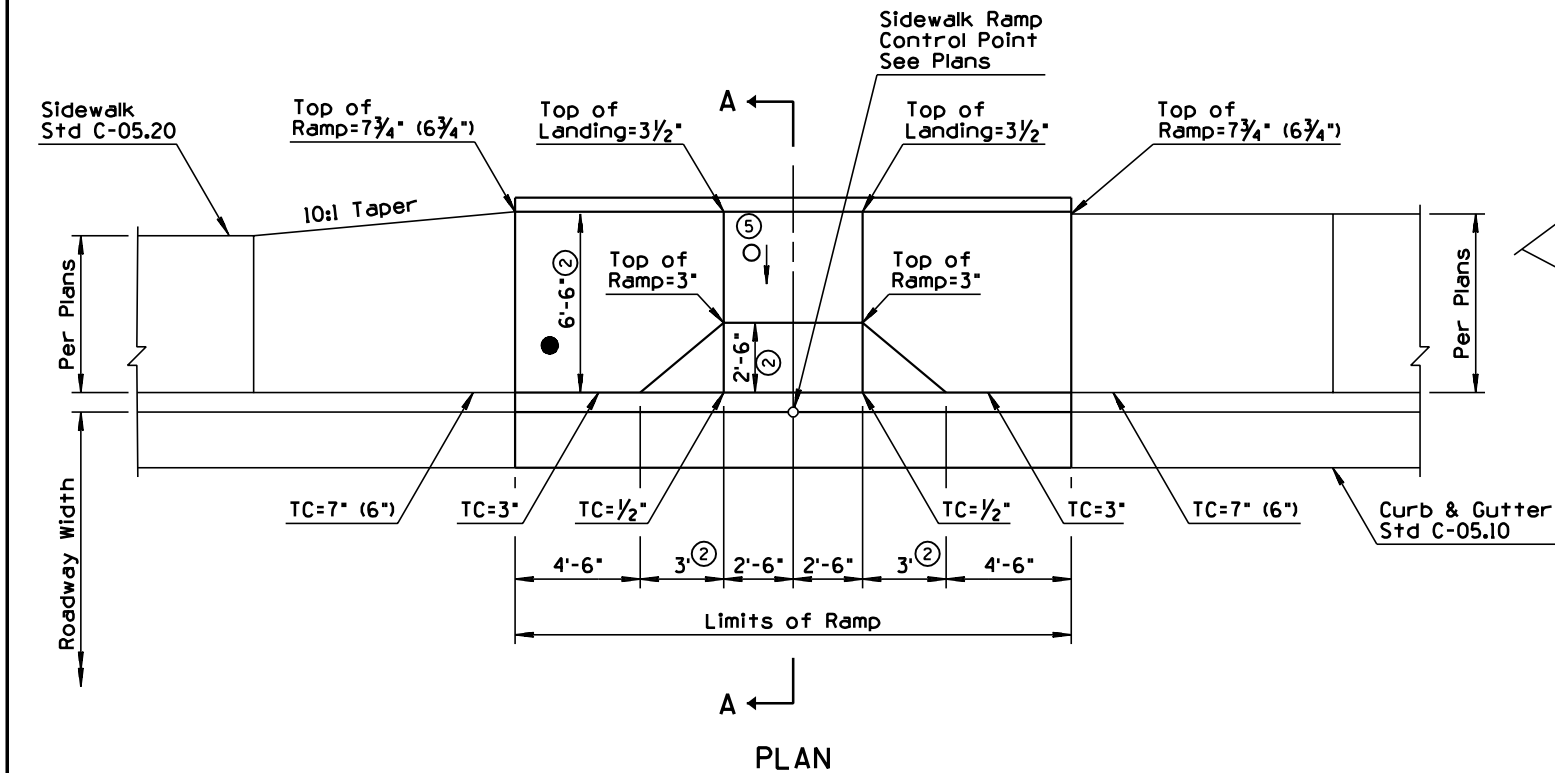
GROOVE DETAIL

SIDEWALK RAMP AT BARRIER TERMINUS ②
SIDEWALK BEHIND BARRIER

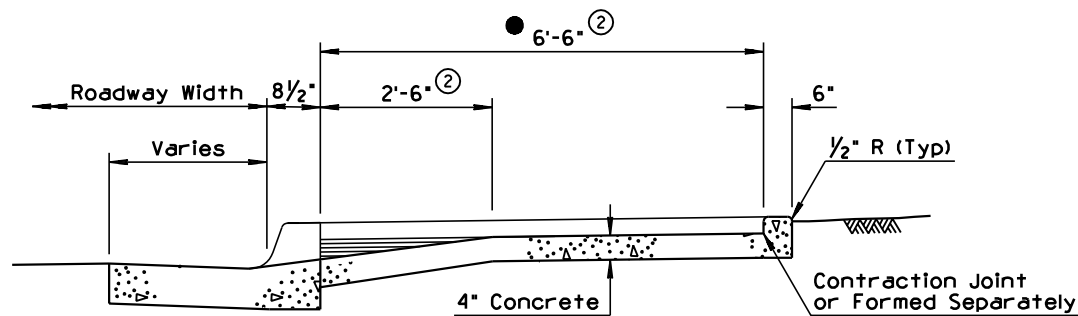
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SIDEWALK RAMP TYPE 3	DRAWING NO. C-05.30 ① Sheet 3 of 6

4) Note to Designer: The sidewalk standard drawing series C-05.30 has been developed for new construction. Where retrofits to existing sidewalks are needed or other special site conditions apply such that these standards cannot be used, separate plans details considering the ADA guidelines shall be provided.

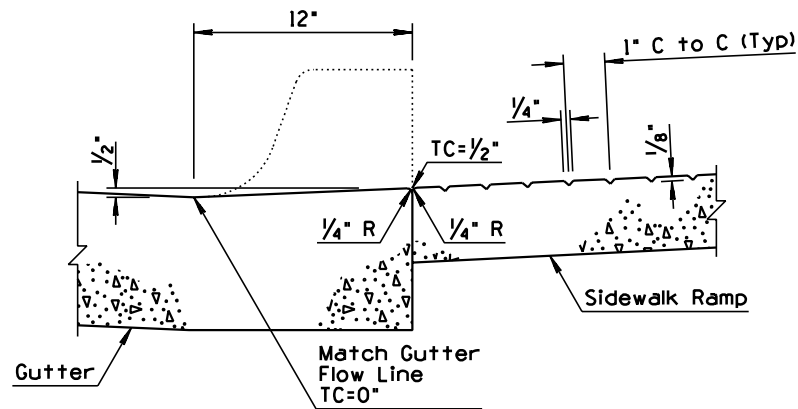
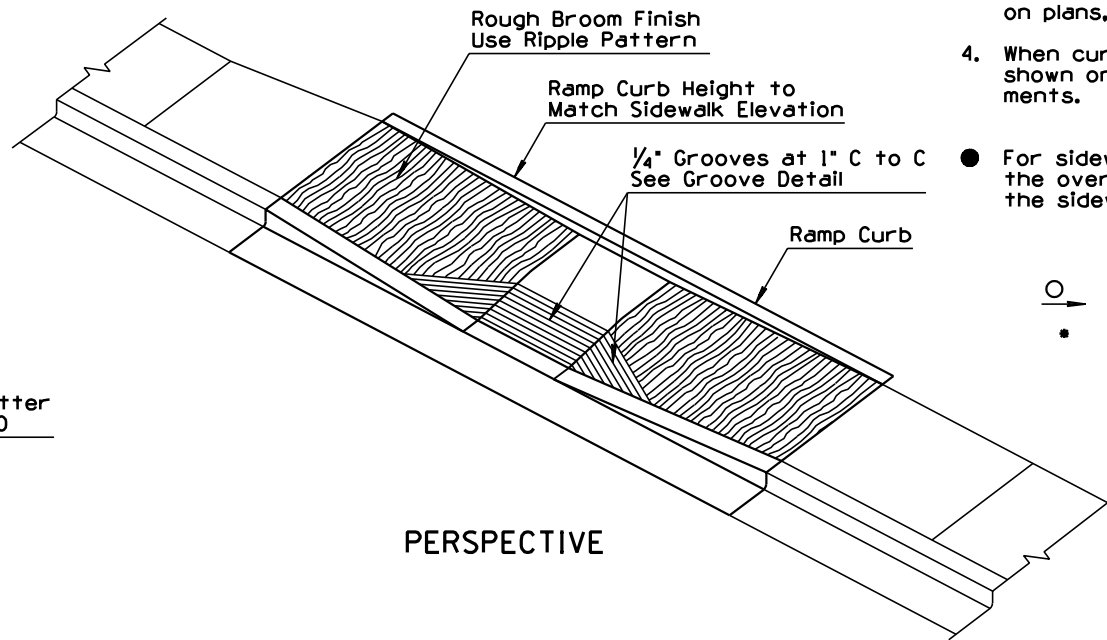
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE	NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
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2	REVISED DIMENSION	JNP	8/99	6			
3	ADDED TITLE	JNP	8/99	7			
4	ADDED NOTE	JNP	8/99	8			



ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



SECTION A-A



SIDEWALK RAMP AT MIDBLOCK ③

GENERAL NOTES

- Top of curb (TC) and top of ramp elevations shown are in relation to the gutter. Gutter=0".
 - See Std C-05.10 and C-05.20 for joint requirements
 - When curb heights of 6" or less are shown on plans, use dimensions shown in ()'s.
 - When curb heights of greater than 7" are shown on plans, see plans and ADA requirements.
- For sidewalk widths greater than 6'-6" ②, the overall sidewalk ramp width shall match the sidewalk width.

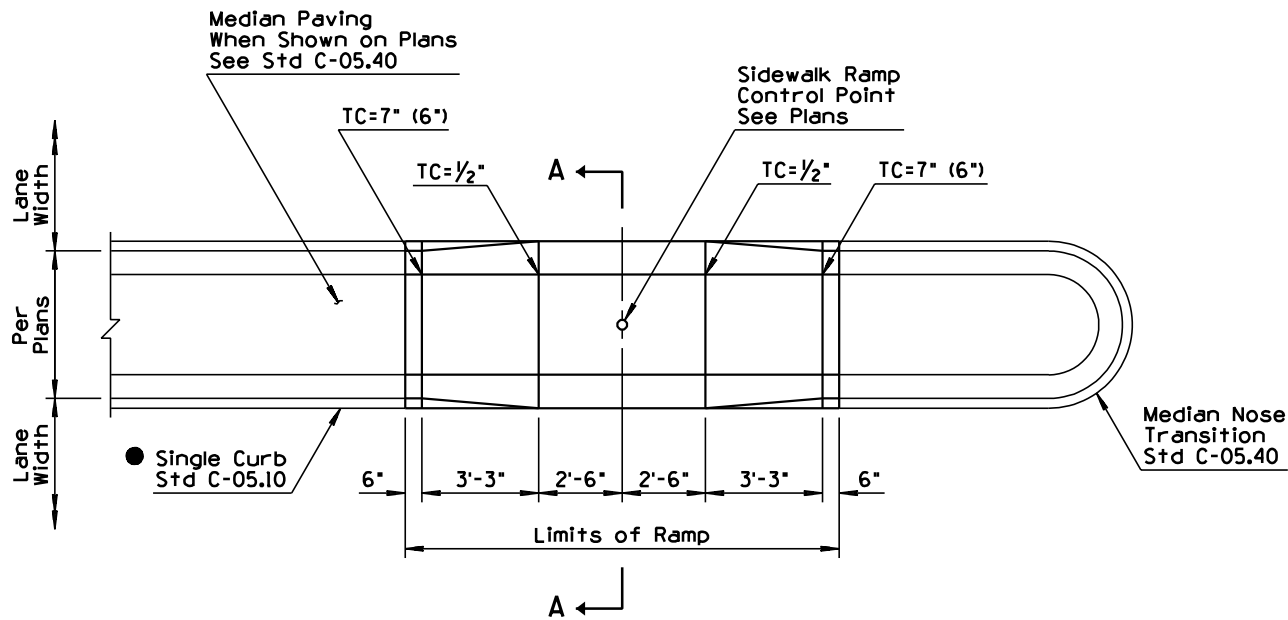
④ LEGEND

- → Cross slope (0.01' Per Ft (Typ))*
- Maximum slope = 0.02' Per Ft.

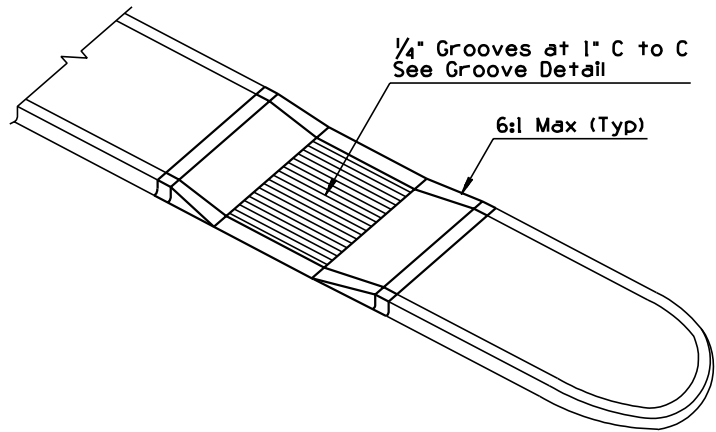
DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SIDEWALK RAMP TYPE 4	DRAWING NO. C-05.30 ① Sheet 4 of 6

4) Note to Designer: The sidewalk standard drawing series C-05.30 has been developed for new construction. Where retrofits to existing sidewalks are needed or other special site conditions apply such that these standards cannot be used, separate plans details considering the ADA guidelines shall be provided.

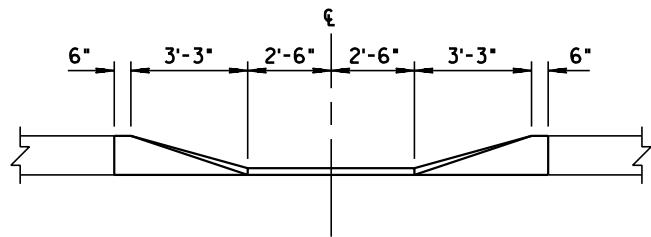
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED SHEET NUMBER; CHANGED TO TYPE 5 FROM TYPE 1	JNP	8/99
2	REVISED TITLE	JNP	8/99
3	ADDED TITLE	JNP	8/99
4	ADDED NOTE	JNP	8/99



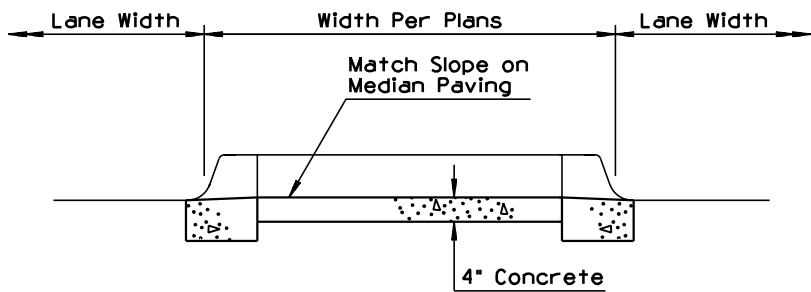
PLAN



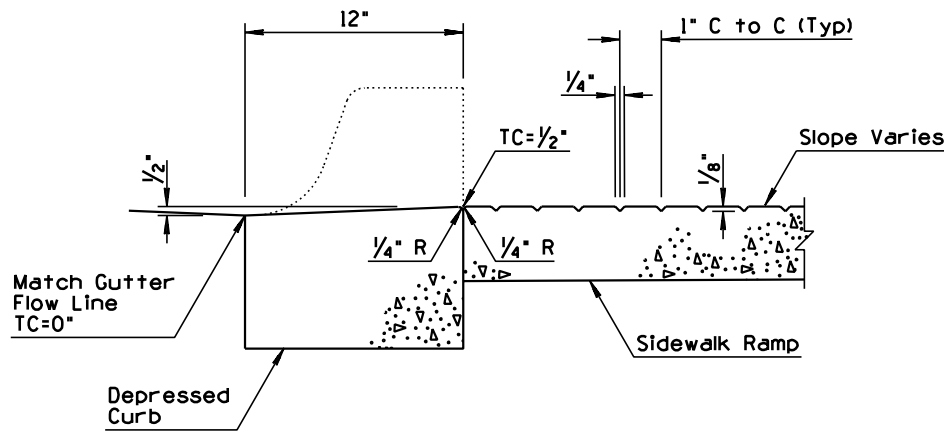
PERSPECTIVE



ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



SECTION A-A



GROOVE DETAIL

SIDEWALK RAMP AT MEDIAN ISLAND CROSSING ③

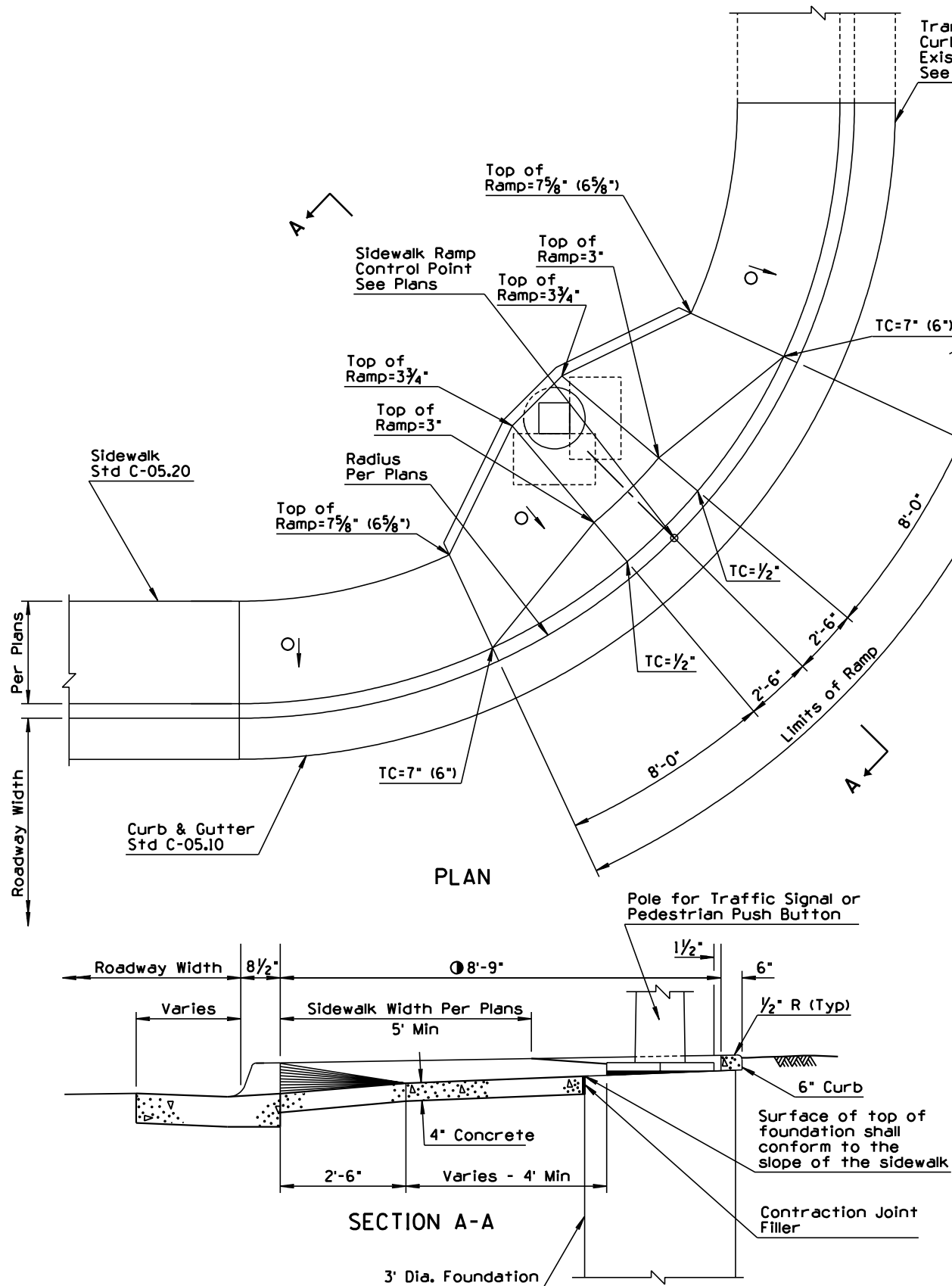
DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SIDEWALK RAMP TYPE 5 ②	DRAWING NO. C-05.30 ① Sheet 5 of 6

GENERAL NOTES

1. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter. Gutter=0".
 2. See Std C-05.10 and C-05.20 for joint requirements.
 3. When curb heights of 6" are shown on plans, use dimensions shown in ()'s.
 4. If field modification is required, bottom width shall be 4' minimum, as per ADA requirements.
- Use type A1 curb if median is to be landscaped.

Note to Designer:
The sidewalk standard drawing series C-05.30 has been developed for new construction. Where retrofits to existing sidewalks are needed or other special site conditions apply such that these standards cannot be used, separate plans details considering the ADA guidelines shall be provided.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW RAMP WITH LANDING FOR BYPASS AND TRAFFIC SIGNAL POST	JNP	8/99
2			
3			
4			



Transition to Match Exst
Curb & Gutter and Sidewalk
Existing Dimensions May Vary
See Plans

Ramp Curb Height to
Match Adjacent Back
of Sidewalk Elevation

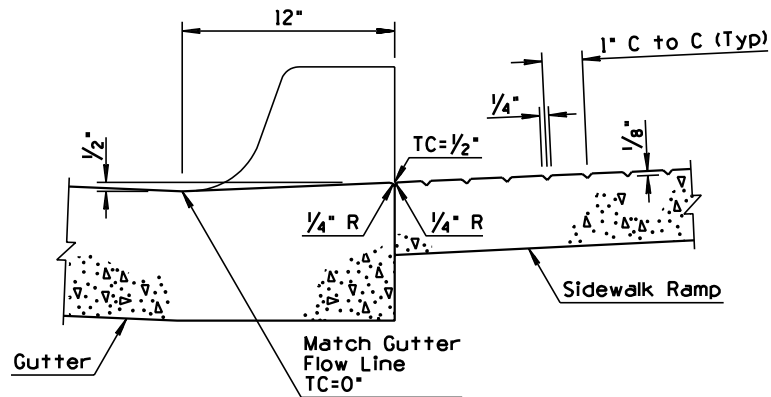
Rough Broom Finish
Use Ripple Pattern

Ramp Curb

1/4" Grooves at 1" C to C
See Groove Detail

PERSPECTIVE

ELEVATION
DEPRESSED CURB AT SIDEWALK RAMP



GROOVE DETAIL

GENERAL NOTES

1. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter and are located radially. Gutter=0".
2. See Std C-05.10 and C-05.20 for joint requirements.
3. When curb heights of 6" or less are shown on plans, use dimensions shown in ()'s.
4. When curb heights of greater than 7" are shown on plans, see plans and ADA requirements.

LEGEND

- Cross slope (0.01' Per Ft (Typ))*
- Maximum slope = 0.02' Per Ft.
- 30" x 48" access area for Pedestrian Push Button
- Control for Field Layout

SIDEWALK RAMP WITH PEDESTRAIN BYPASS
(FOR USE WITH PEDESTRIAN PUSH BUTTON)

DESIGN APPROVED
Henry H. Ostrander
APPROVED FOR
DISTRIBUTION
Robert Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

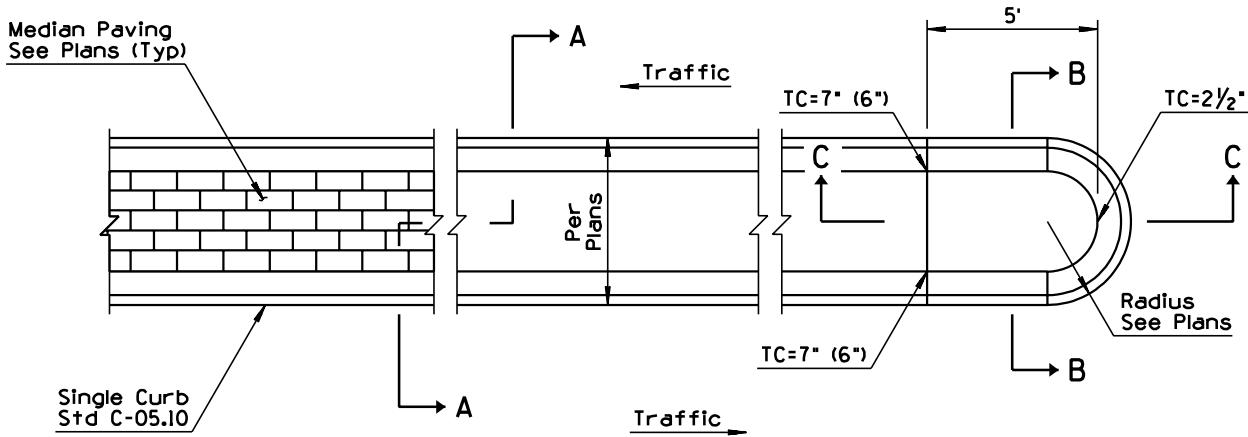
REV.
8/99

SIDEWALK RAMP
TYPE 6

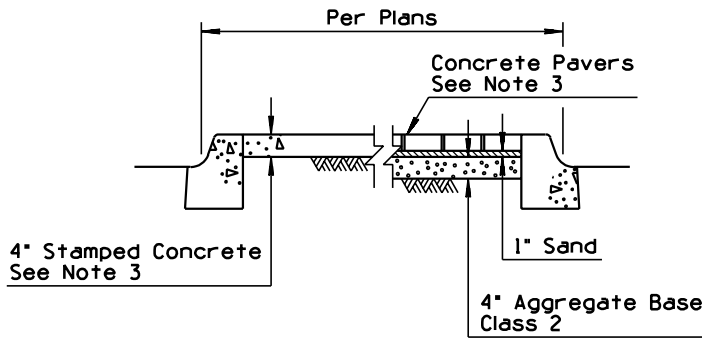
①

DRAWING NO.
C-05.30
Sheet 6 of 6

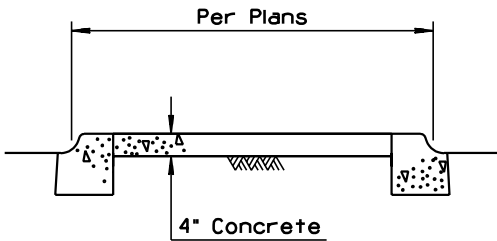
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
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2			
3			
4			



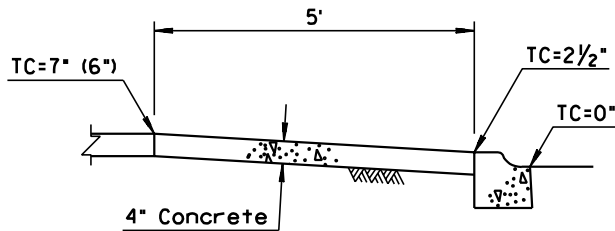
PLAN



SECTION A-A



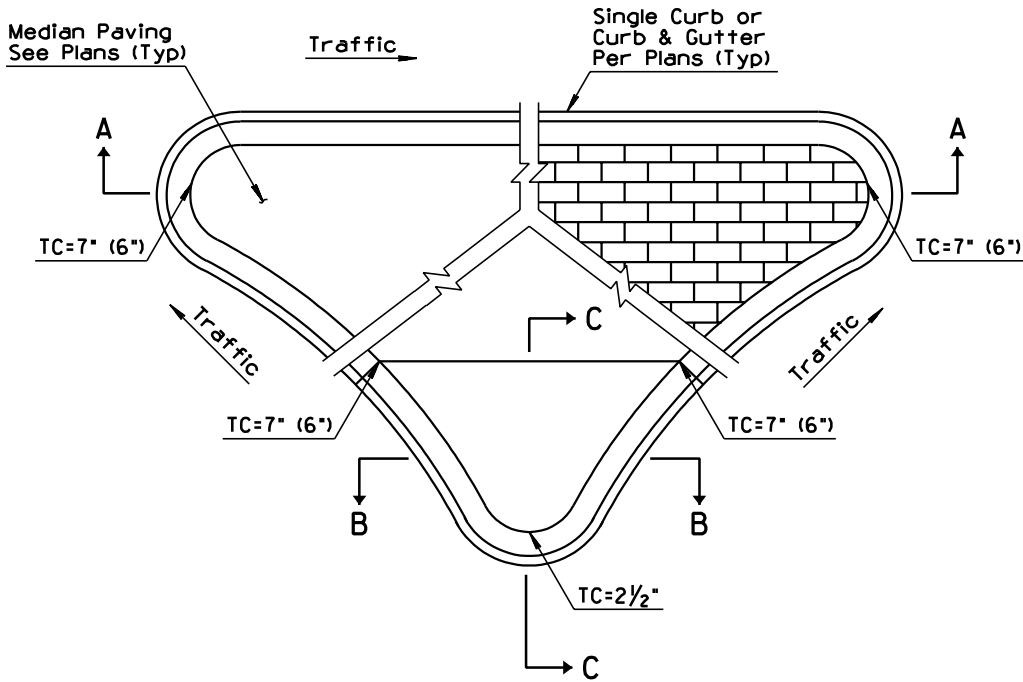
SECTION B-B



SECTION C-C

GENERAL NOTES

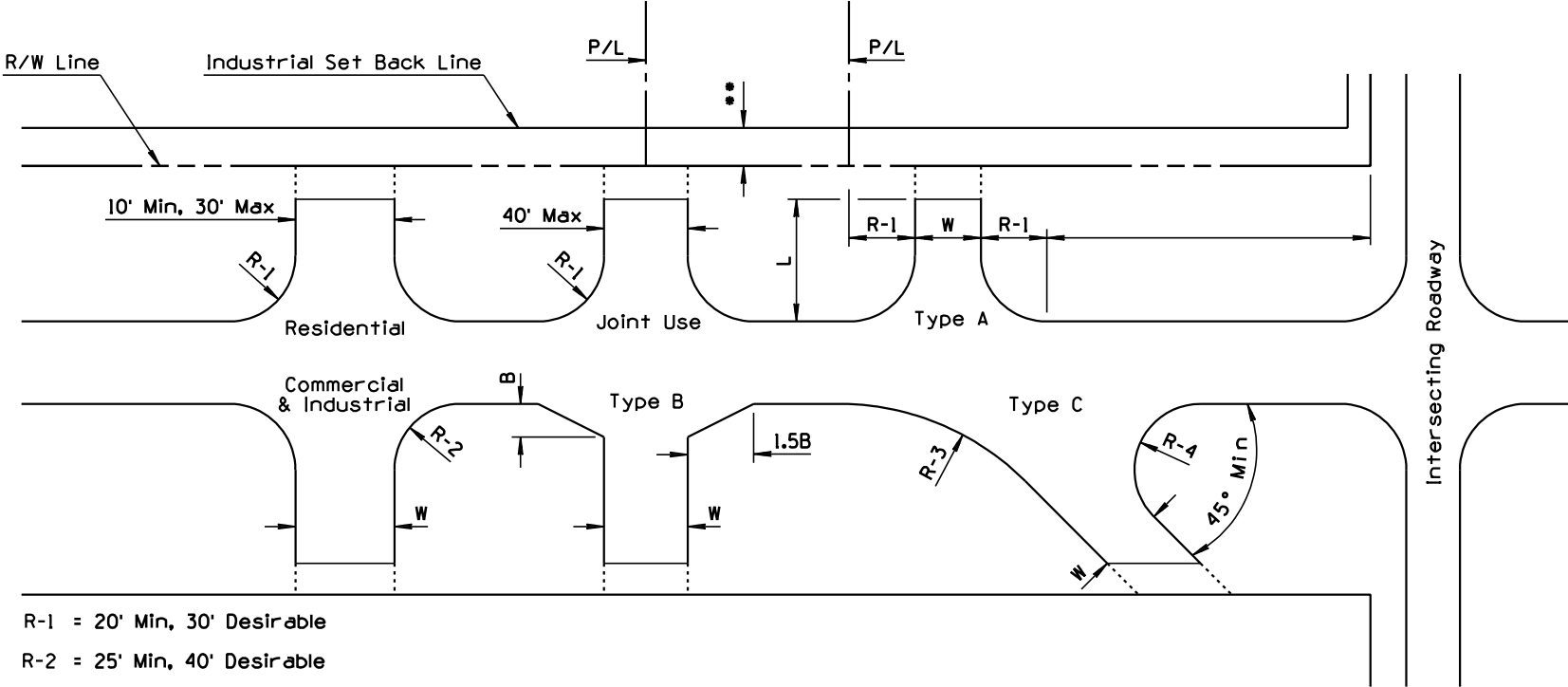
1. Traffic signal foundations, traffic sign foundations and pull boxes for traffic signs and traffic signals shall be installed prior to placement of median paving.
2. See Std C-05.10, C-05.11 and C-05.20 for joint requirements.
3. Decorative median paving shall be stamped concrete, concrete pavers or as specified on the project plans.
4. Decorative median paving shall not be placed on a median nose transition or on a median island on a structure.
5. A 4" x 6" concrete header shall be used to end decorative paving at locations when concrete sidewalk ramps are not present.
6. Median nose transitions shall not be placed on departure ends of raised medians.
7. Top of curb (TC) and top of ramp elevations shown are in relation to the gutter. Gutter=0".
8. When curb heights of 6" are shown on plans, use dimensions shown in ()'s.
9. See Structure Plans for raised median on structures.



NOSE TRANSITION LAYOUT

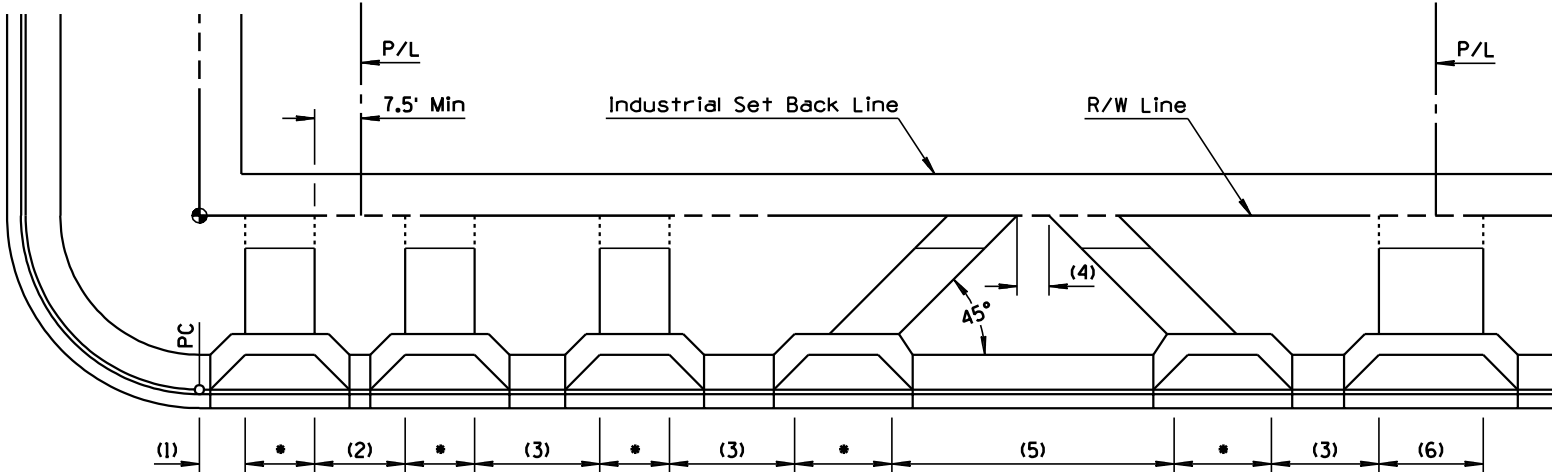
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/93
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	MEDIAN PAVING AND NOSE TRANSITION	DRAWING NO. C-05.40

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED NOTE	JNP	8/99
2			
3			
4			



R-1 = 20' Min, 30' Desirable
R-2 = 25' Min, 40' Desirable
R-3 = 80'
R-4 = 20' Min
W = 25' Min, 40' Max
** - See Proper City or County Regulation

RURAL DEVELOPMENTS



(1) 10' Min, 20' Desirable
(2) 15' Min
(3) 25' Min, 40' Desirable
(4) 40' Min
(5) One Way Couplet for Use Only on One Way Roadways
(6) 40' Max Joint Use Driveways
Residential - 10' Min, 30' Max
Commercial - One Way: 15' Min, 30' Max
Two Way: 25' Min, 40' Max
Industrial - 20' Min, 40' Max

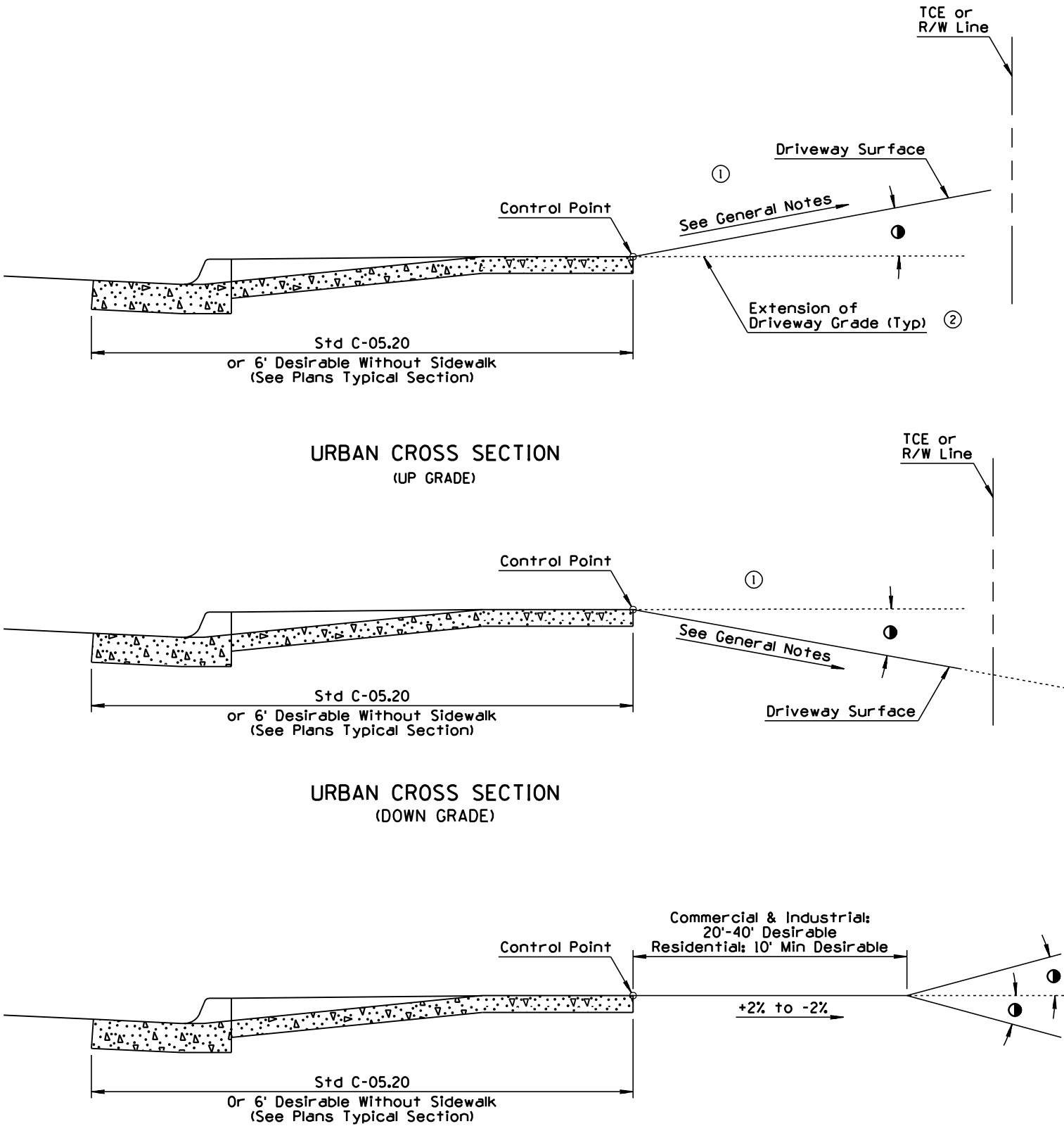
URBAN DEVELOPMENTS

GENERAL NOTES

1. Driveway types:
Residential - one providing access to a single family residence, to a duplex, or to an apartment building containing five or fewer dwelling units.
Commercial - one providing access to an office, retail or institutional building or to an apartment building having more than five dwelling units.
Industrial - one directly serving a substantial number of truck movements to and from loading docks of an industrial facility, warehouse or truck terminal.
2. Joint use driveways may become desirable for landowners of adjacent properties to service both properties. If this is the case, only one of the two adjacent landowners need apply for the access permit, but a notarized written mutual agreement, signed by all parties involved, must accompany the application form. The property line can be located anywhere, in reference to the driveway, depending on mutual agreement.
3. Driveways for high volume traffic generators shall be approved individually by Traffic Engineering section.
4. Driveways with curb returns in urban areas shall be installed only with the approval of Traffic Engineering section.
5. Driveways and depressed curbs shall be located as noted on plans or as directed by the Engineer.
6. Drainage structures shall be provided under driveways where necessary.
7. Dimensions indicated as minimum shall be avoided whenever possible in favor of those indicated as desirable.
8. The Type "A" turnout is the preferable turnout design. Type "B" and "C" shall only be used when absolutely necessary.
9. Paved turnouts, plans notation, will be W X L, surface material, type and standard. Example: 20' X 30' ACTO, Type A, Std C-06.10. Show radius (R) graphically.
10. Construction of curb, gutter, sidewalk and drainage facilities in urban areas by the permittee along that portion of the highway frontage under permit application, may be a stipulation of the permit approval if there appears to be reasonable need.
11. Excavation or embankment for turnouts shall be included in quantities for main roadways.
12. Base material shall be the same as that shown for main roadway, unless otherwise noted.
13. Desirable sideslope rates for rural turnouts are 6:1.

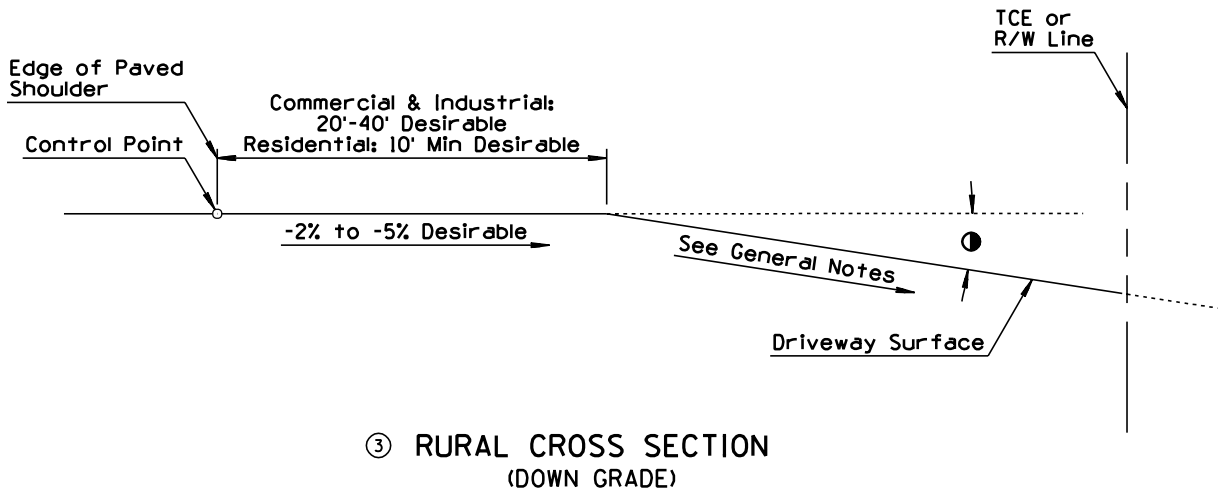
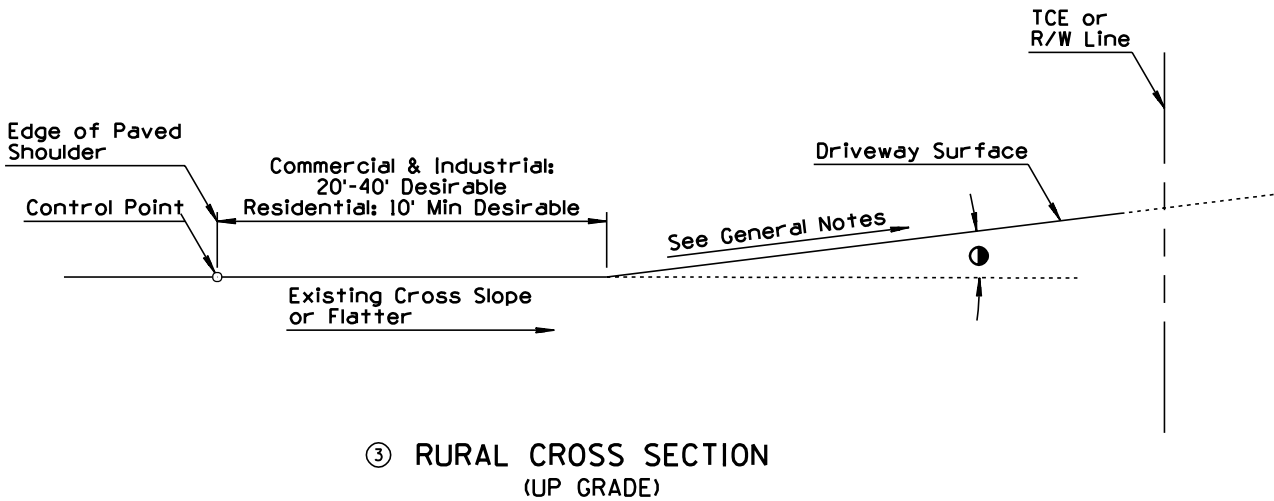
DESIGN APPROVED <i>Henry H. Ottum</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	DRIVEWAY & TURNOUT LAYOUTS	DRAWING NO. C-06.10 Sheet 1 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ROTATED DRIVEWAY BEYOND SIDEWALK	PNB	10/95
2	ADDED NOTE	PNB	10/95
3	MODIFIED TITLE	BAF	8/98
4			



GENERAL NOTES

- Grade as shown on plans or as negotiated between Property Owner and Engineer.
 - When field conditions require modifications to plans, contact Design Engineer for assistance.
 - See Sheet 1 of 2 for all other General Notes.
- ① Breakangle greater than 6% requires a vertical curve, L=(10' Min). Vertical curve shall not encroach on roadway or sidewalk.

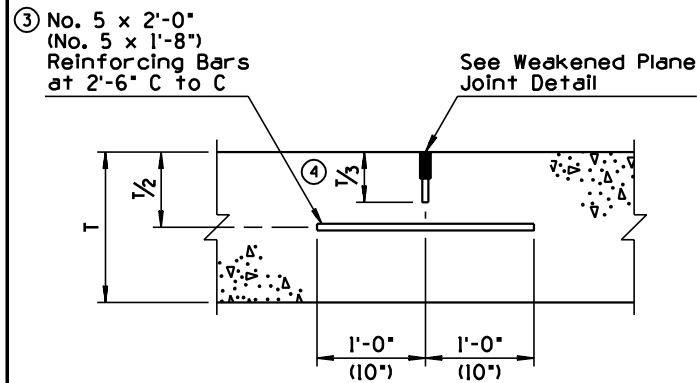


DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	DRIVEWAY & TURNOUT LAYOUTS	DRAWING NO. C-06.10 Sheet 2 of 2

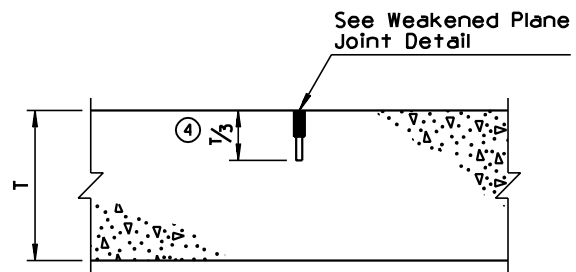
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2	MODIFIED JOINT WIDTH	DCS	1/93
3	MODIFIED NOTE	TC	1/93
4	MODIFIED JOINT DEPTH	TC	1/93

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
5	MODIFIED RECESS OF JOINT SEALANT	TC	1/93
6	MODIFIED DETAIL	TC	1/93
7	MODIFIED DIMENSION	TC	1/93
8	MODIFIED SUB TITLE	BAF	6/98

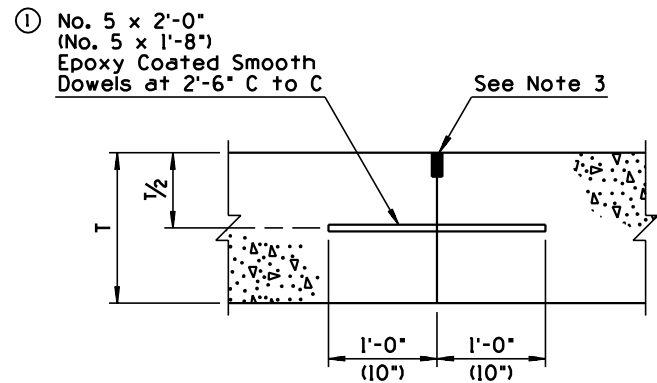
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
9	DELETED DETAIL	BAF	6/98
10			
11			
12			



LONGITUDINAL WEAKENED PLANE JOINT
LWP Joint



TRANSVERSE WEAKENED PLANE JOINT
TWP Joint
w/o Load Transfer Dowel Assemblies

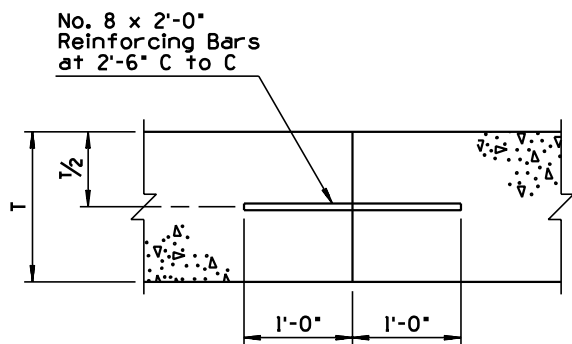


LONGITUDINAL CONSTRUCTION JOINT
LC Joint

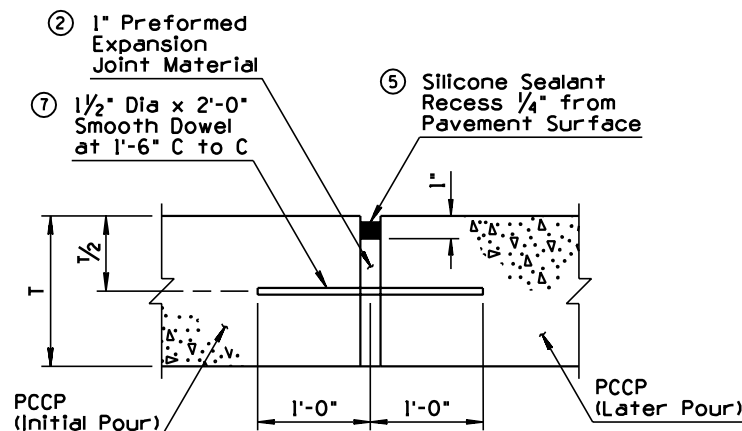
- GENERAL NOTES
- When load transfer dowel assemblies are required, use dimensions shown in ()'s. See Assembly Placement and Edge Clearance Detail, Std C-07.02.
 - In slip form type pavement construction, LWP joints shall be used. In fixed form construction either LWP or LC joints may be used.
 - Same as weakened plane joint detail, except initial saw cut will not be required.

JOINT ABBREVIATIONS

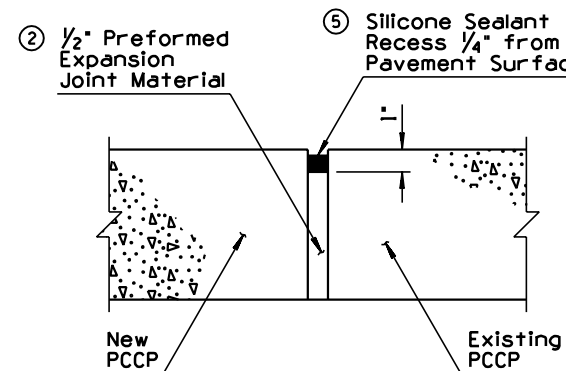
- LWP - Longitudinal Weakened Plane Joint
TWP - Transverse Weakened Plane Joint
LC - Longitudinal Construction Joint
TC - Transverse Construction Joint
E, H - Expansion Joints
S - AC/PCC Pavement Edge Seal Joint
T - PCCP Thickness



TRANSVERSE CONSTRUCTION JOINT
TC Joint
⑧ Non-Skewed & Skewed Joints

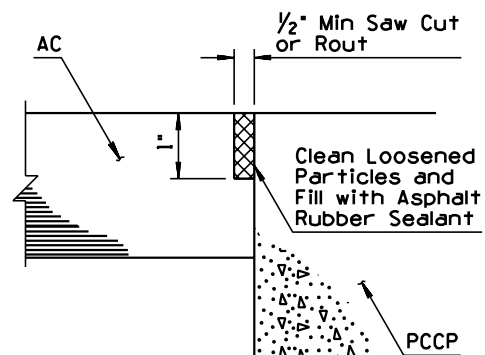


EXPANSION JOINT
E Joint

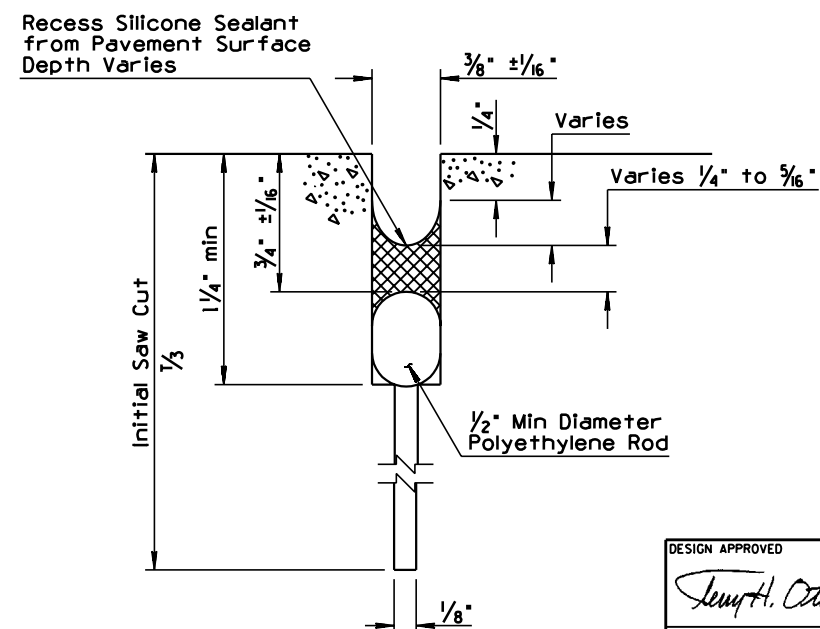


EXPANSION JOINT
H Joint

⑨



AC/PCCP EDGE SEAL JOINT
S Joint



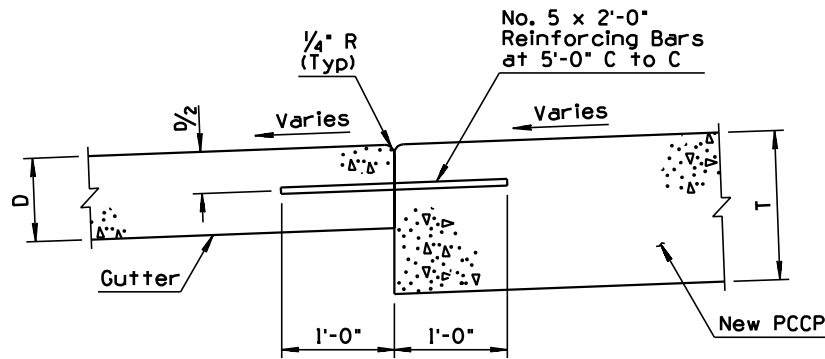
⑥ WEAKENED PLANE JOINT DETAIL

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	PCCP JOINTS	DRAWING NO. C-07.01 Sheet 1 of 2

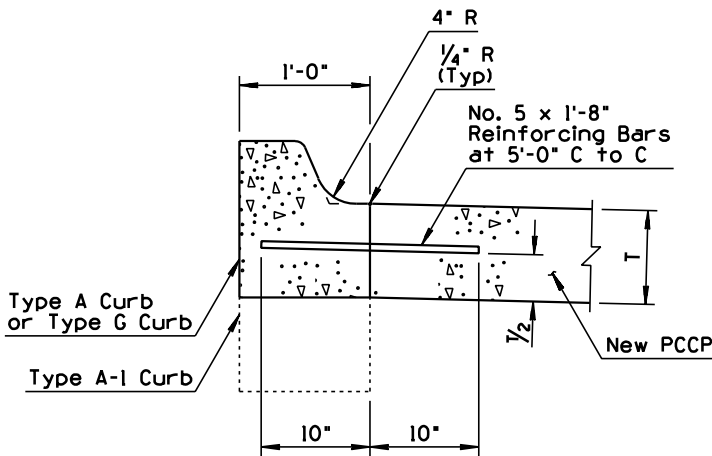
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1	REVISED DETAIL TO SHOW ALL PCCP	PNB	3/94	5	ADDED DETAIL	BAF	8/98
2	REVISED DETAIL TO SHOW AC & PCCP	PNB	3/94	6	ADDED NOTE	BAF	8/98
3	DELETED EXPANSION MATERIAL	PNB	3/94	7	MODIFIED NOTE	BAF	8/98
4	ADDED NOTE ON PAVEMENT SLOPE	PNB	3/94	8			

GENERAL NOTES

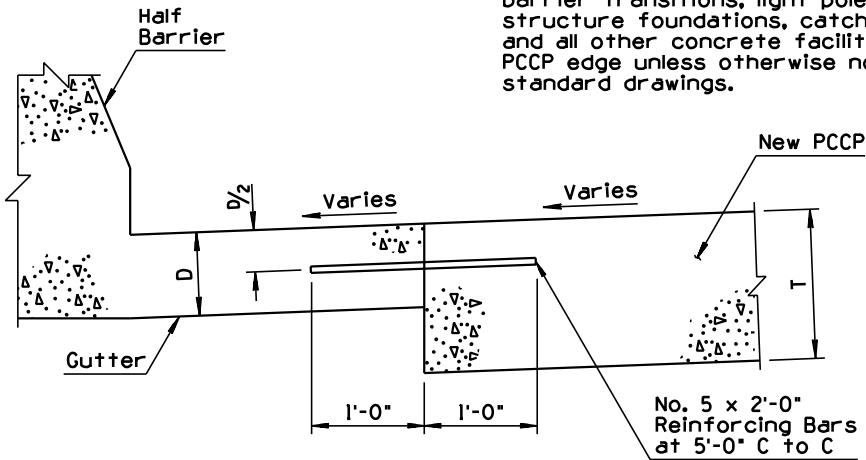
- ④ 1. Joints are generally shown with pavement sloping toward the joint. Joints are similar with pavement sloping away from the joint.
- ⑥ 2. A "B" joint shall be placed where piers, abutments, barrier transitions, light pole foundations, sign structure foundations, catch basins, slotted drains and all other concrete facilities abut up against the PCCP edge unless otherwise noted in the plans or the standard drawings.



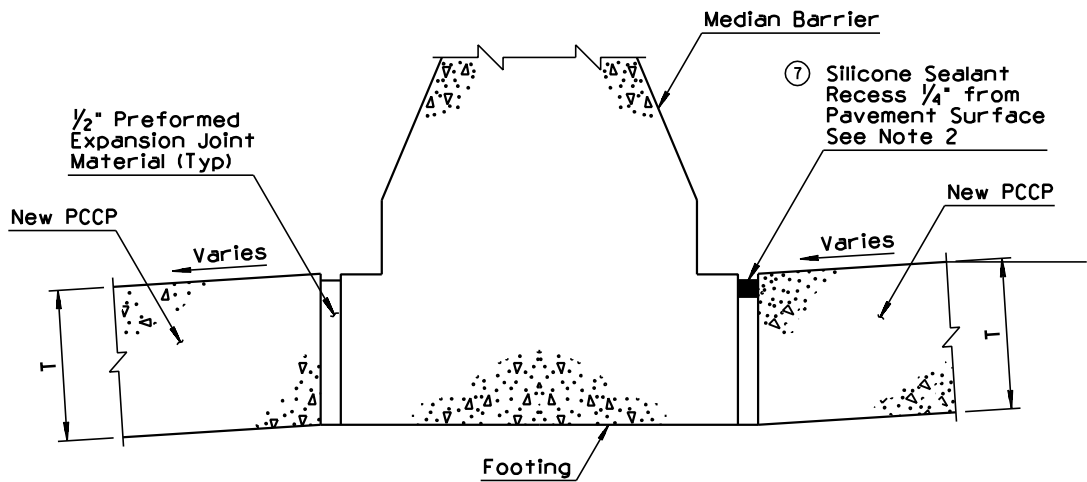
CURB & GUTTER JOINT
G Joint



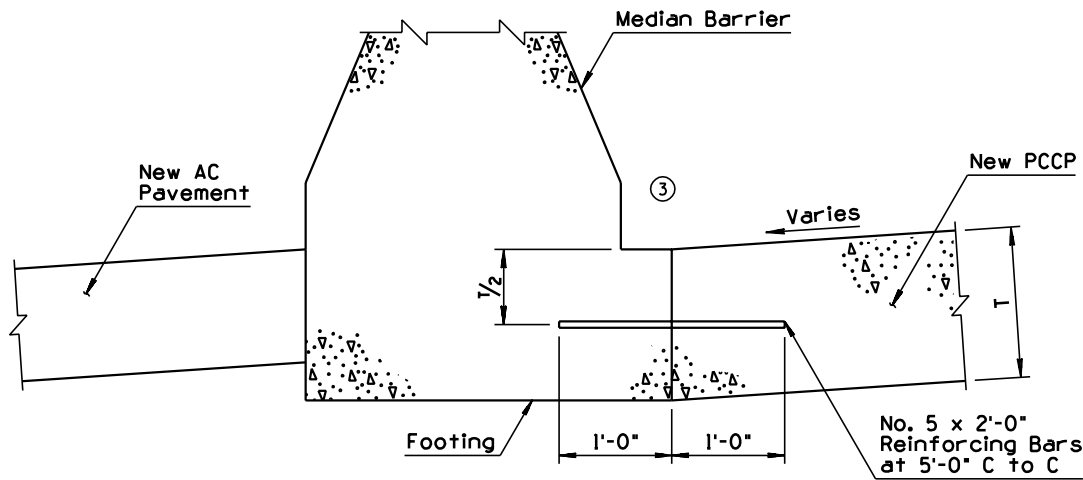
⑤ SINGLE CURB JOINT
A Joint



HALF BARRIER JOINT
B Joint



① MEDIAN BARRIER JOINT
B Joint
PCCP On Both Sides of Barrier



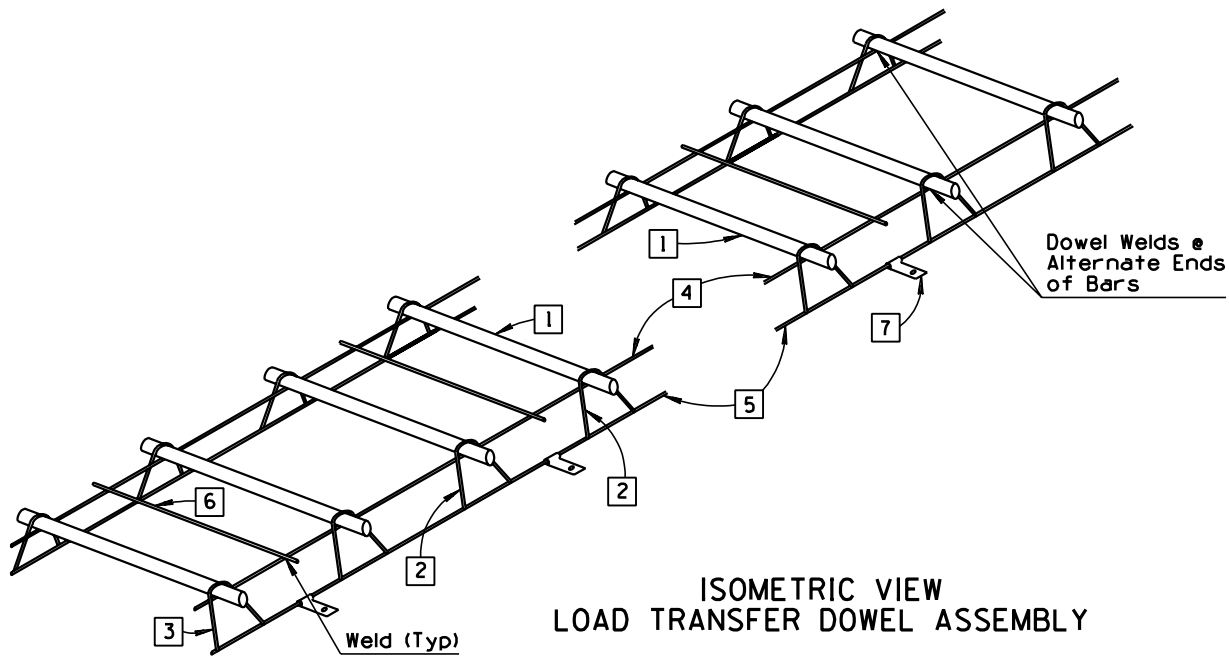
② MEDIAN BARRIER JOINT
B Joint
AC Pavement On Back Side of Barrier

JOINT ABBREVIATIONS

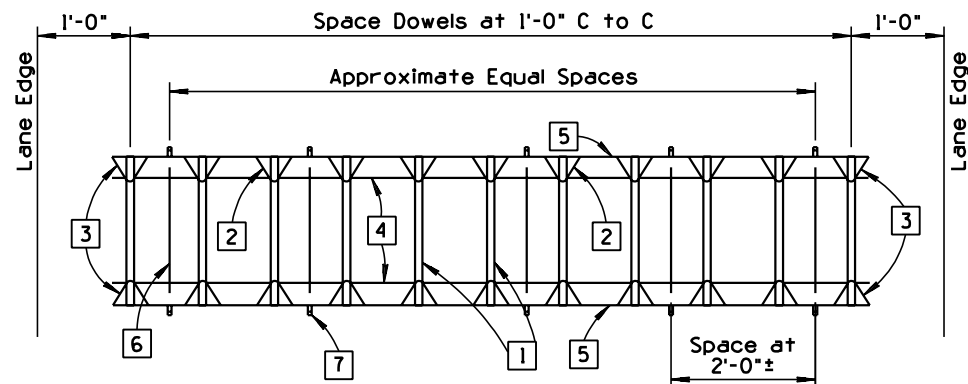
- G - Gutter Joint
T - PCCP Thickness
D - Gutter Thickness
B - Barrier Joint

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APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	PCCP JOINTS	DRAWING NO. C-07.01 Sheet 2 of 2

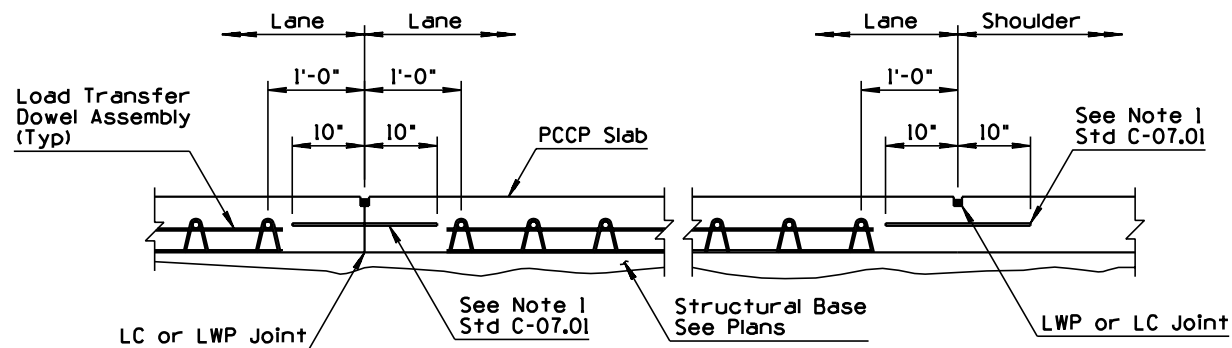
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2	MODIFIED DIMENSIONS/CREATED QUANTITY TABLE	TC	1/93
3	MODIFIED DIMENSION	TC	1/93
4			



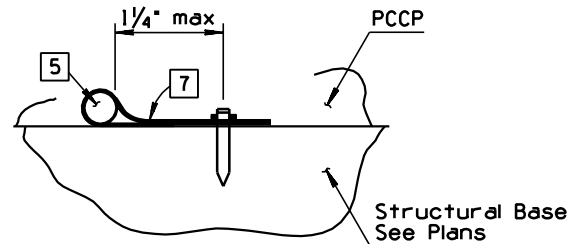
ISOMETRIC VIEW
LOAD TRANSFER DOWEL ASSEMBLY



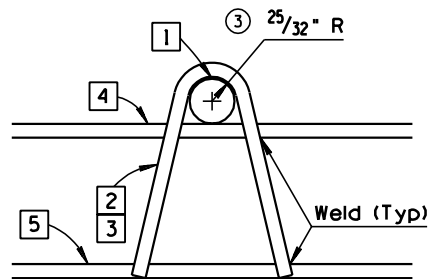
PLAN VIEW
① LOAD TRANSFER DOWEL ASSEMBLY



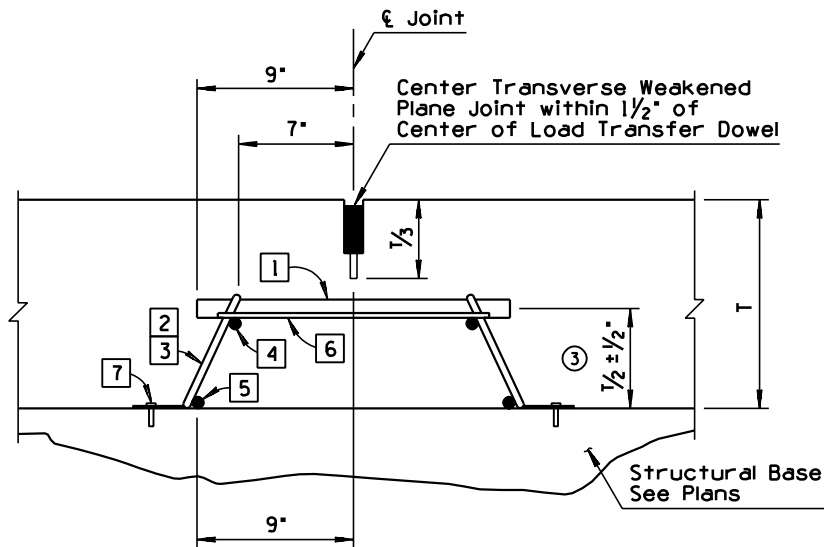
ASSEMBLY PLACEMENT AND EDGE CLEARANCE DETAIL



ANCHOR STRAP DETAIL



END AND INTERMEDIATE LEG DETAIL



TRANSVERSE WEAKENED PLANE JOINT WITH
LOAD TRANSFER DOWEL ASSEMBLY

	Lane Width		
	12'	14'	16'
①	10'-4"	12'-4"	14'-4"

GENERAL NOTES

- Load transfer dowel assemblies shall be used with non-skewed PCCP joints.
- Load transfer dowel assemblies are to be placed at each transverse weakened plane joint on the traveled lanes as shown on the plans.
- See Std C-07.01 thru C-07.05 for additional information.
- See plans or Std C-07.03 thru C-07.05 for transverse joint spacing.
- See plans for pavement thickness less than 12" or greater than 14".

Load transfer dowel assembly shall be assembled from the following materials.
(See Quantity Table)

- Dowel bars - 1/2" dia x 1'-6" plain round bars w/coating. See Special Provisions.
- Intermediate legs - 2 Ga or W-5.5 wire.
- End legs - 2 Ga or W-5.5 wire.
- Upper space bar - 2 Ga or W-5.5 wire x ①. (See Dimension Table)
- Lower space bar - 2 Ga or W-5.5 wire x ①. (See Dimension Table)
- Tie bars - W-1.5 wire x 16".
- Anchor straps - 1"x3" steel strap, 0.079 thick. Place with 1-1/2" min steel nail for LCB, 4" min steel nail for ACB or AB, 0.145 dia ASTM A227 Class I w/1/4" head or washer to be power driven.

②

Item No.	Lane Width		
	12'	14'	16'
①	11	13	15
②	18	22	26
③	4	4	4
④	2	2	2
⑤	2	2	2
⑥	5	6	7
⑦	10	12	14

DESIGN APPROVED

Henry H. Ottens

APPROVED FOR
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Ronald Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

LOAD TRANSFER DOWEL ASSEMBLY

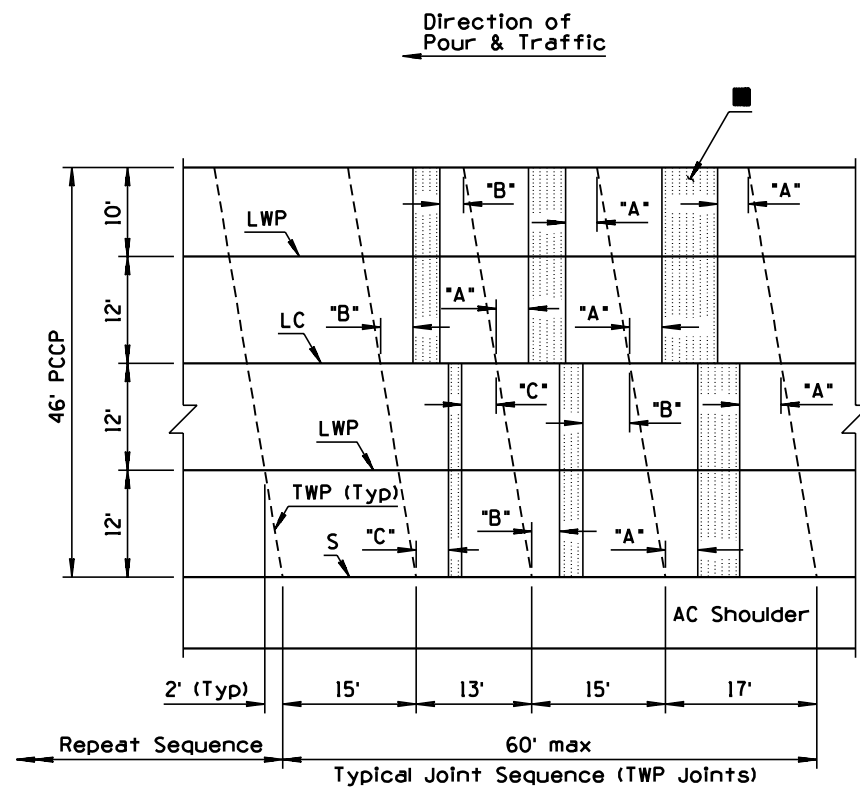
REV.

1/93

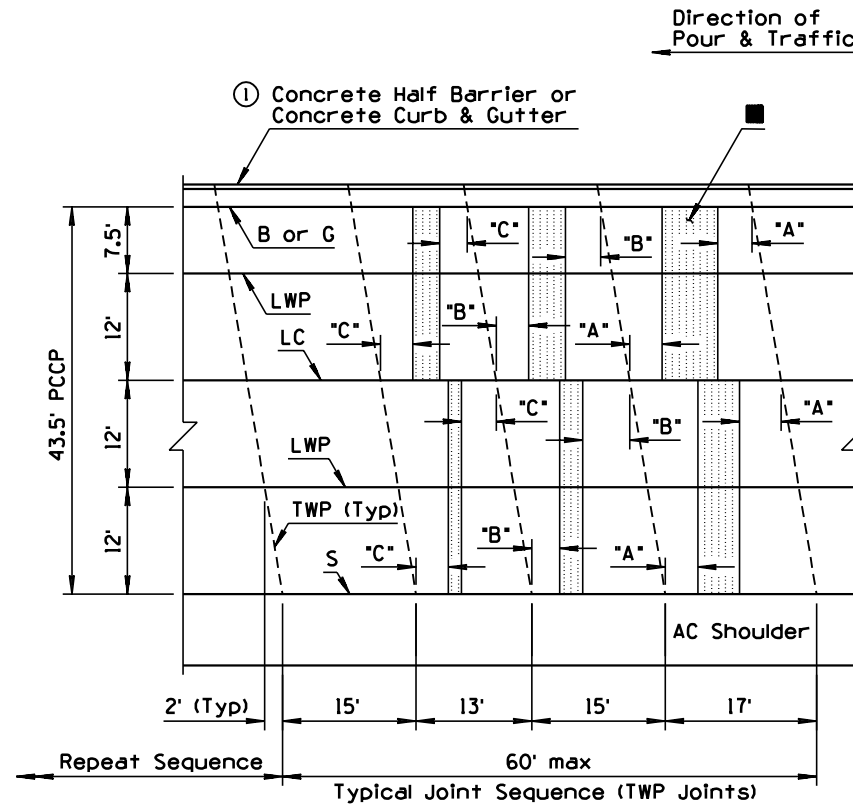
DRAWING NO.

C-07.02

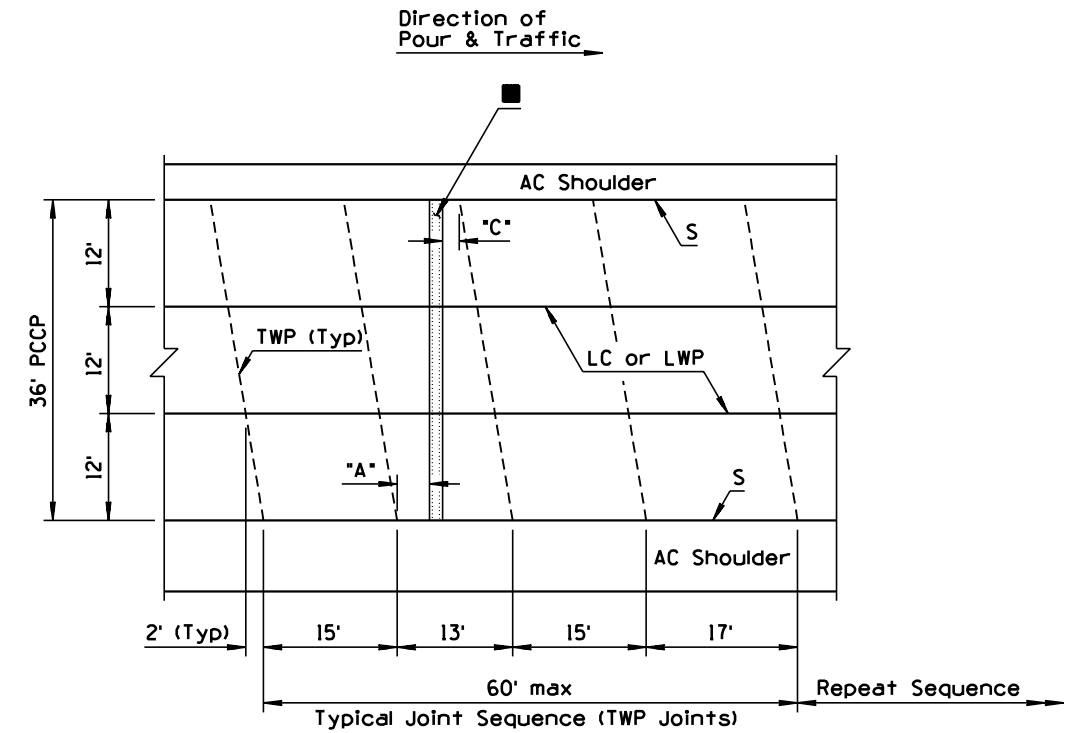
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1	MODIFIED NOTE	TC	1/93
2	ADDED NOTE	TC	1/93
3			
4			



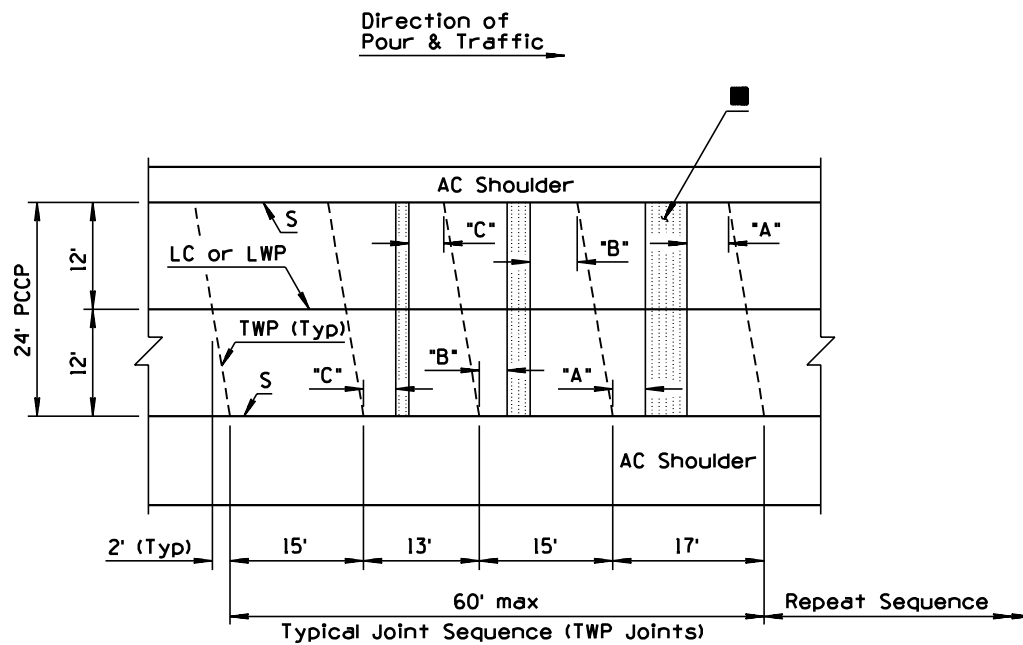
PLAN
46' PCCP



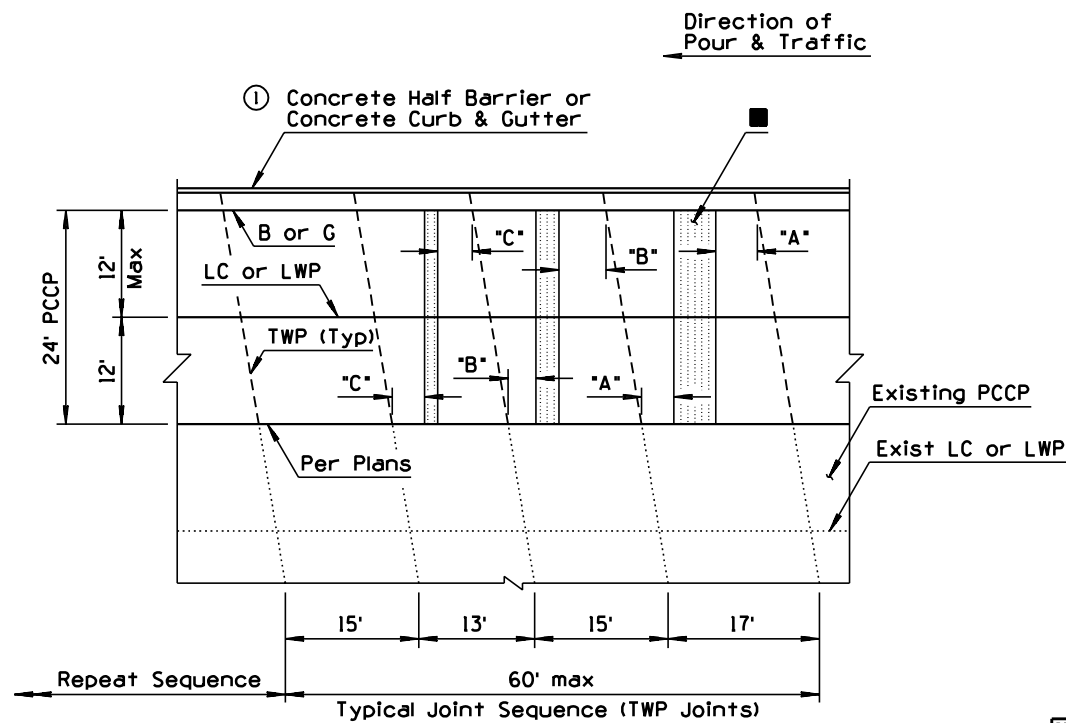
PLAN
43.5' PCCP



PLAN
36' PCCP



PLAN
24' PCCP



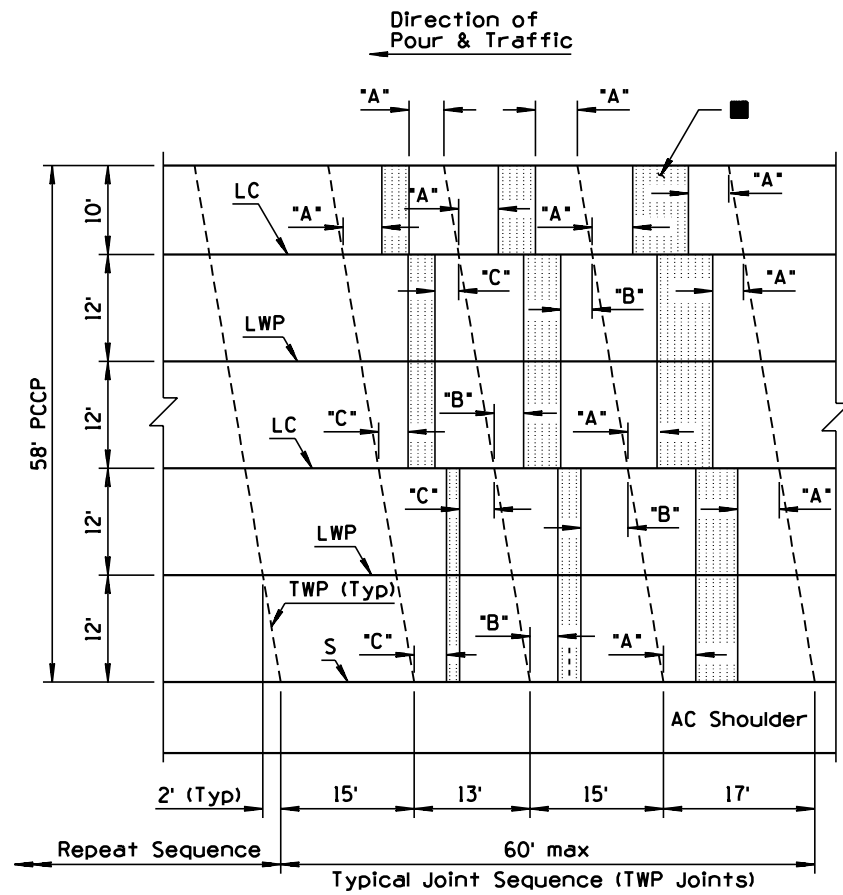
PLAN
24' PCCP
(Widening)

GENERAL NOTES

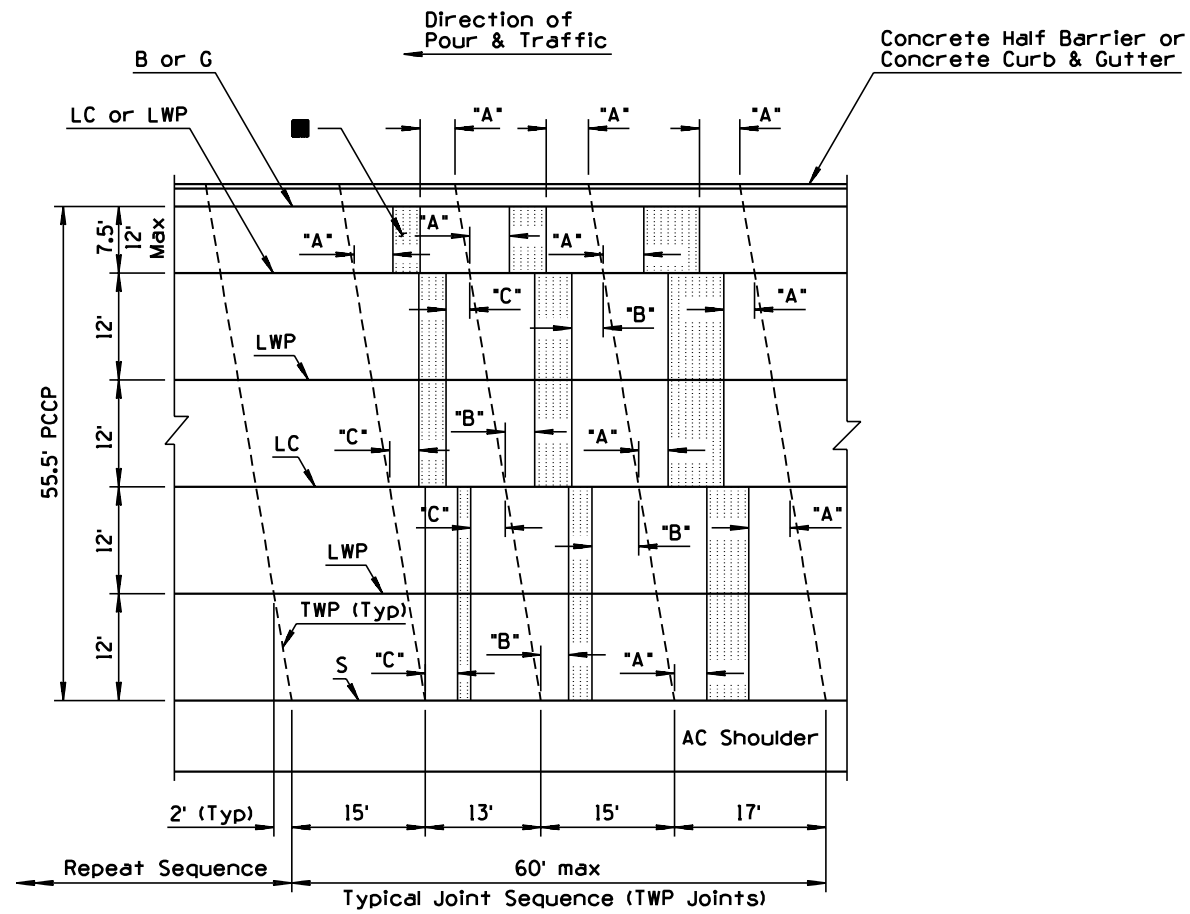
1. Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.
 2. "A" shall equal 4' minimum (typical).
"B" shall equal 3' minimum (typical).
"C" shall equal 2' minimum (typical).
 3. See Std C-07.01 for PCCP joints and additional notes.
 4. All transverse joints shall be in line with joints in adjacent slabs.
 5. See Std C-05.10 for curb and gutter joint requirements.
 6. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
 7. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.
- Transverse Construction Joint (TC) allowable limits (Typ).

DESIGN APPROVED <i>Terry H. Ottum</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/93
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	MAINLINE PCCP JOINT LOCATIONS SKEWED JOINTS	DRAWING NO. C-07.03 Sheet 1 of 8

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



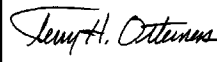

PLAN
58' PCCP



PLAN
55.5' PCCP

GENERAL NOTES

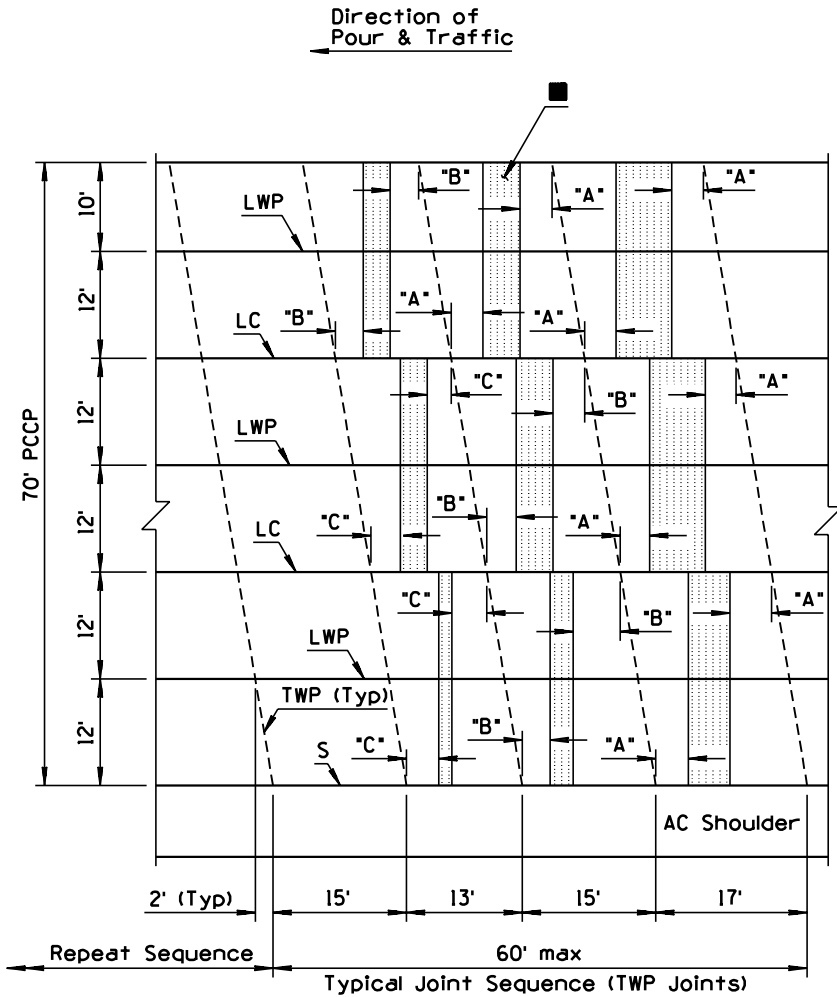
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 7. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.
- Transverse Construction Joint (TC) allowable limits (Typ).

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	1/93
APPROVED FOR DISTRIBUTION 	MAINLINE PCCP JOINT LOCATIONS SKEWED JOINTS	DRAWING NO. C-07.03 Sheet 2 of 8

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
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2			
3			
4			

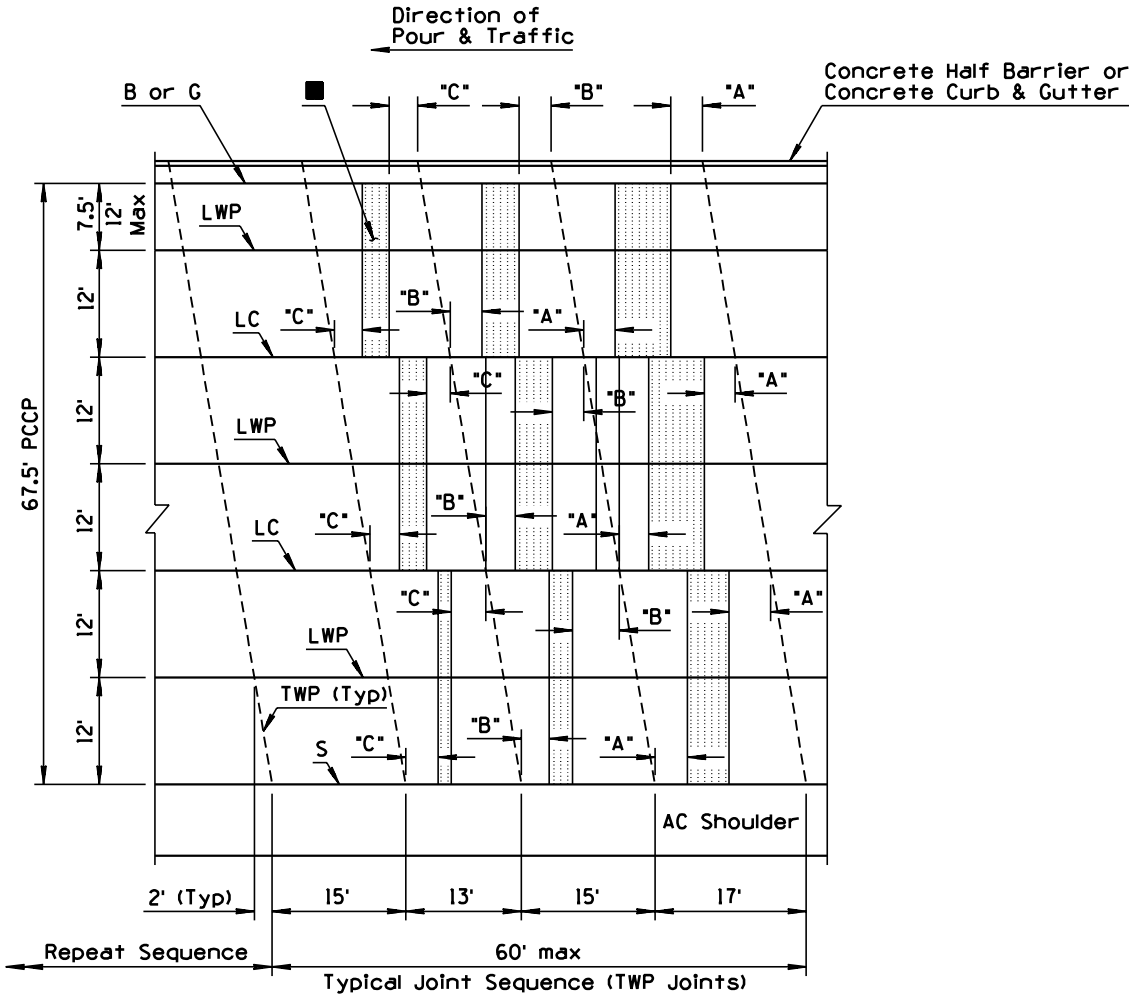
- GENERAL NOTES
- Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.
 - "A" shall equal 4' minimum (typical).
"B" shall equal 3' minimum (typical)
"C" shall equal 2' minimum (typical)
 - See Std C-07.01 for PCCP joints and additional notes.
 - All transverse joints shall be in line with joints in adjacent slabs.
 - See Std C-05.10 for curb and gutter joint requirements.
 - At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
 - The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.

Transverse Construction Joint (TC) allowable limits (Typ).



PLAN

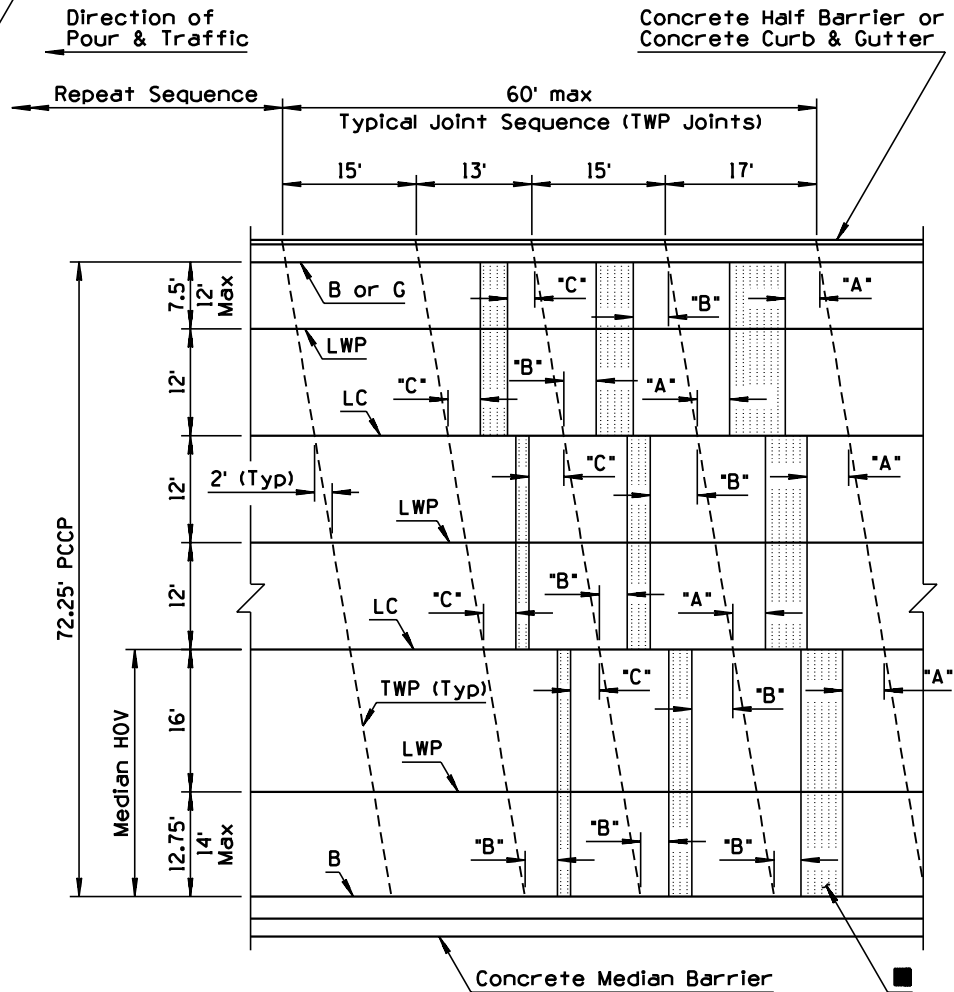
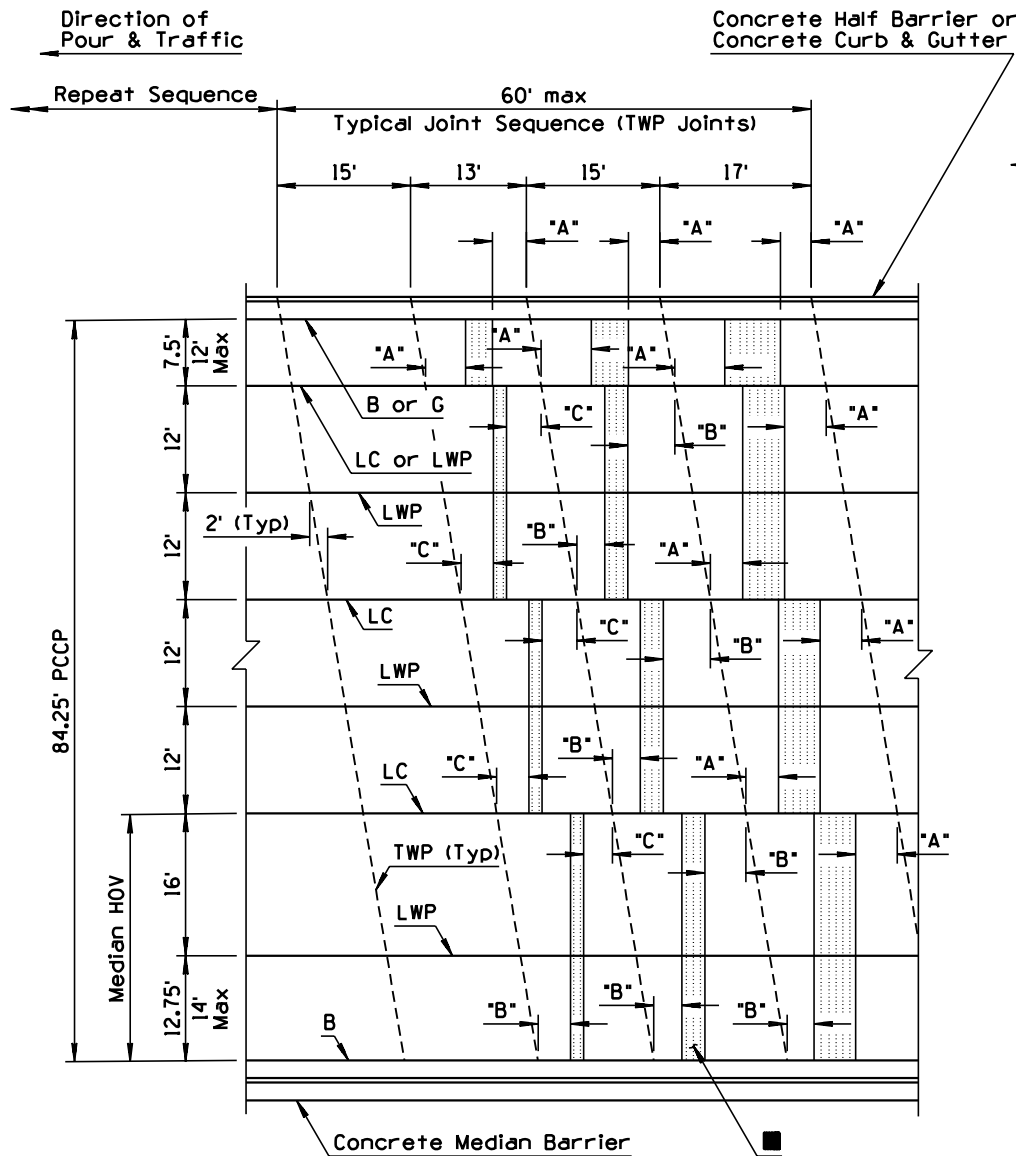
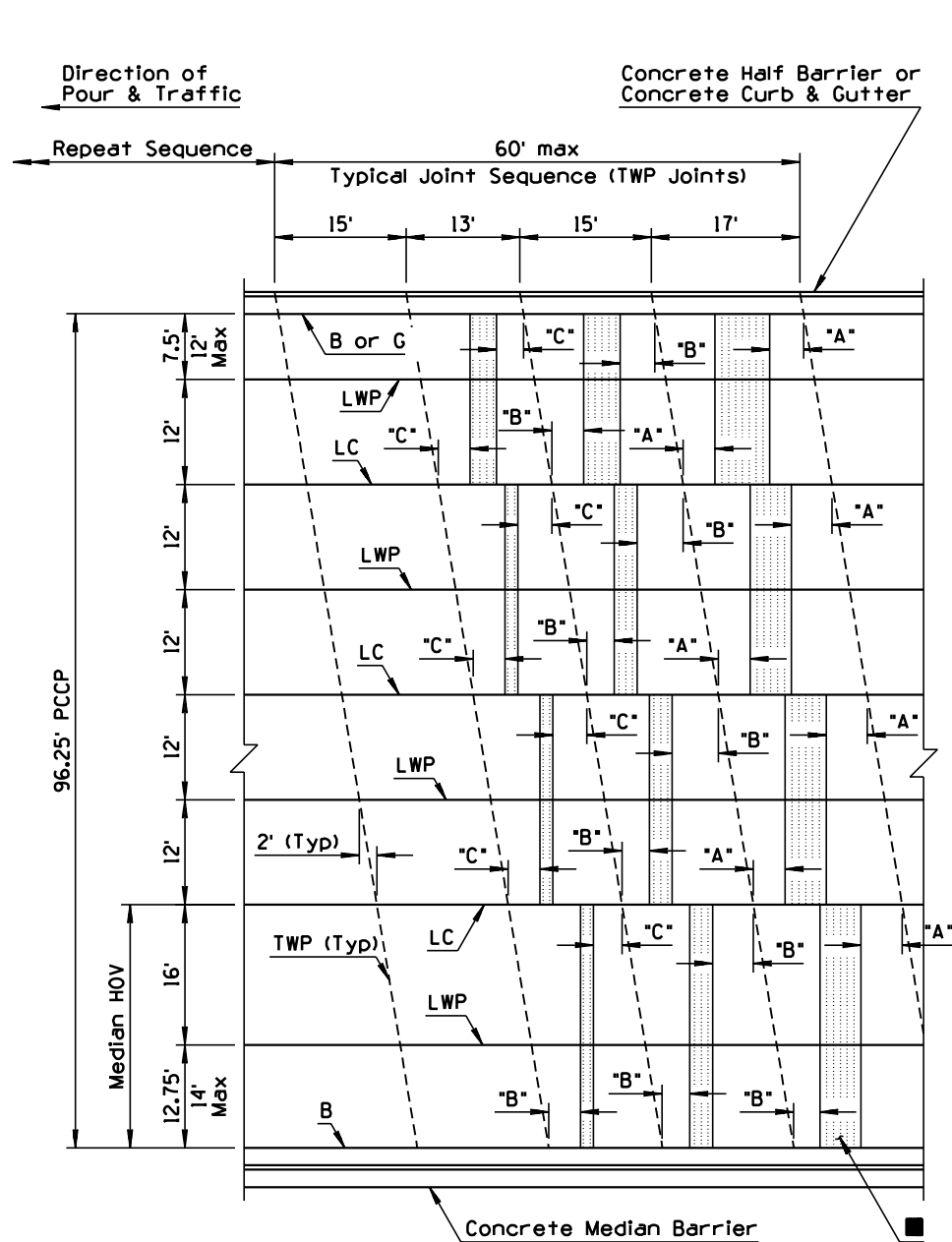
70' PCCP



PLAN

67.5' PCCP

NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



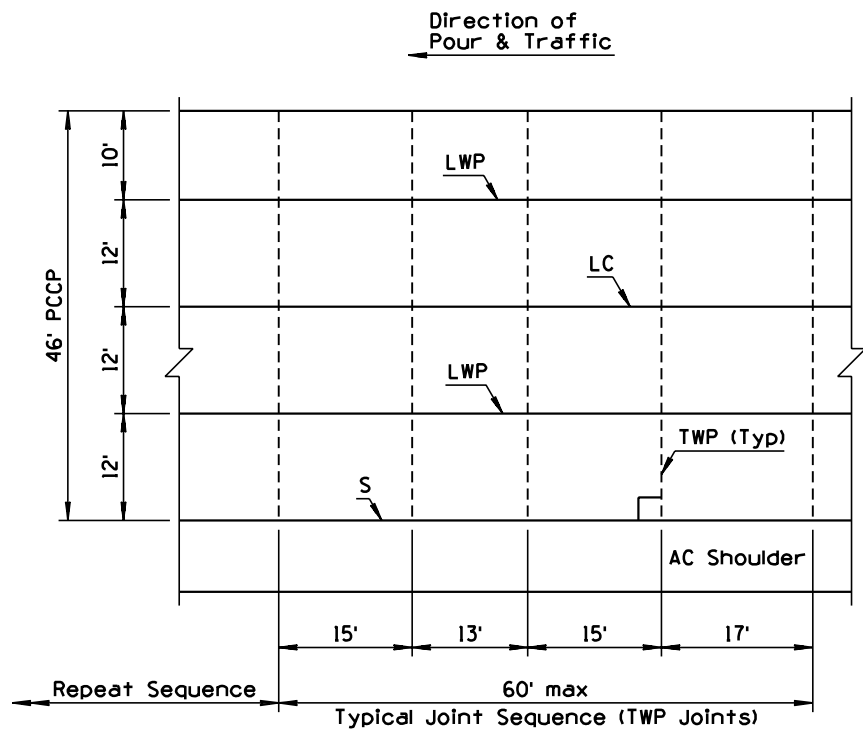
GENERAL NOTES

- Skewed PCCP joints shall be used when load transfer dowel assemblies are not required.
- "A" shall equal 4' minimum (typical).
"B" shall equal 3' minimum (typical)
"C" shall equal 2' minimum (typical)
- See Std C-07.01 for PCCP joints and additional notes.
- All transverse joints shall be in line with joints in adjacent slabs.
- See Std C-05.10 for curb and gutter joint requirements.
- At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
- The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.

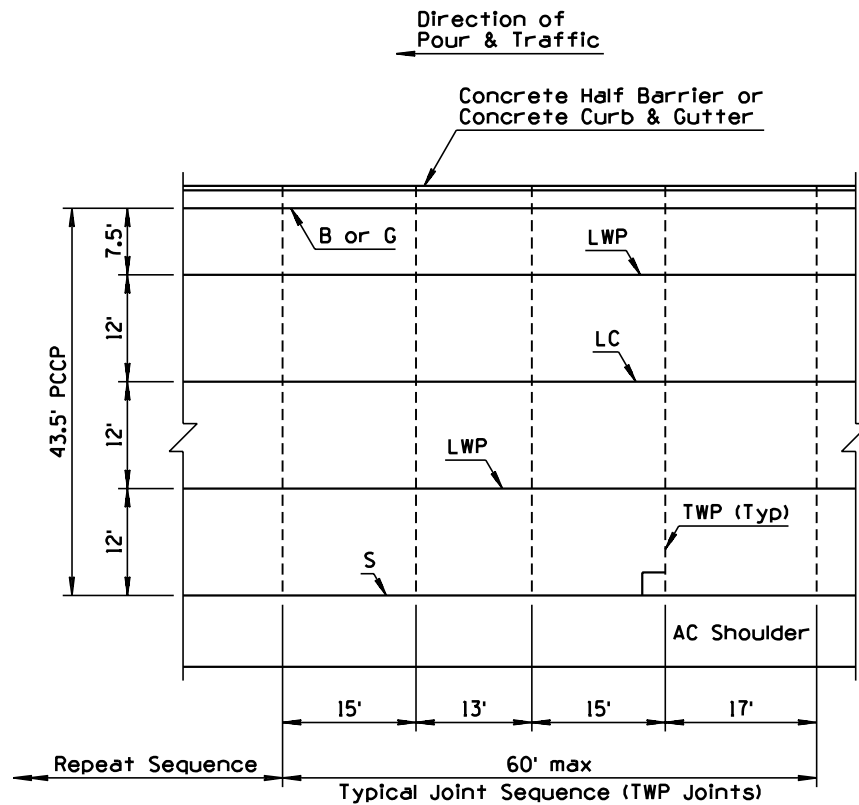
■ Transverse Construction Joint (TC) allowable limits (Typ).

DESIGN APPROVED <i>Terry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	1/93
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	MAINLINE PCCP JOINT LOCATIONS SKEWED JOINTS	DRAWING NO. C-07.03 Sheet 4 of 8

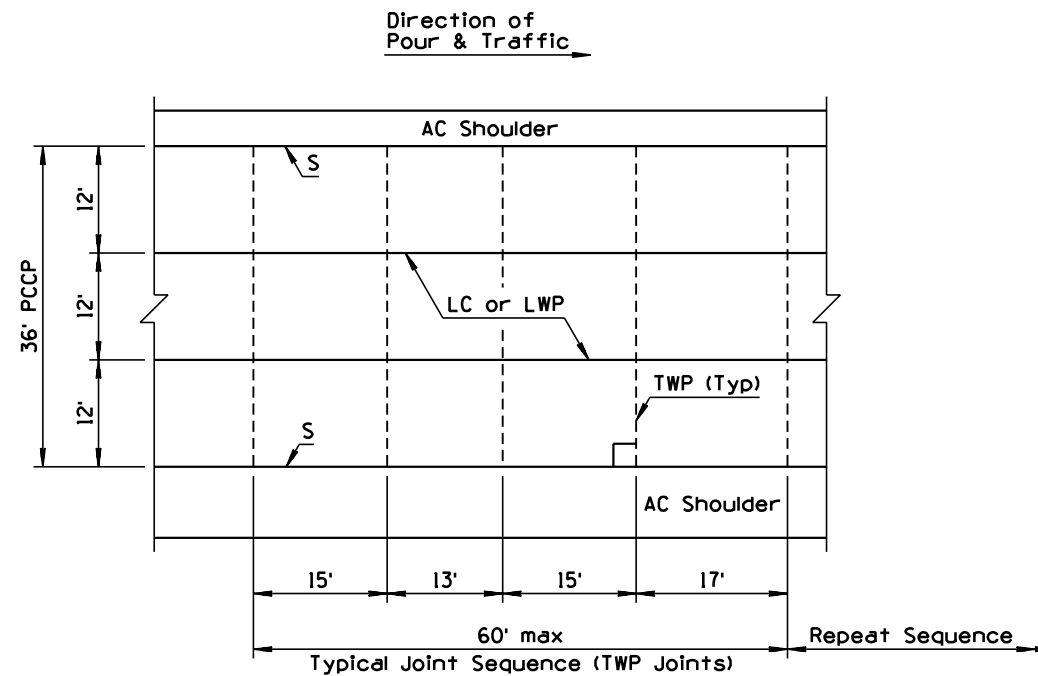
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



PLAN
46' PCCP



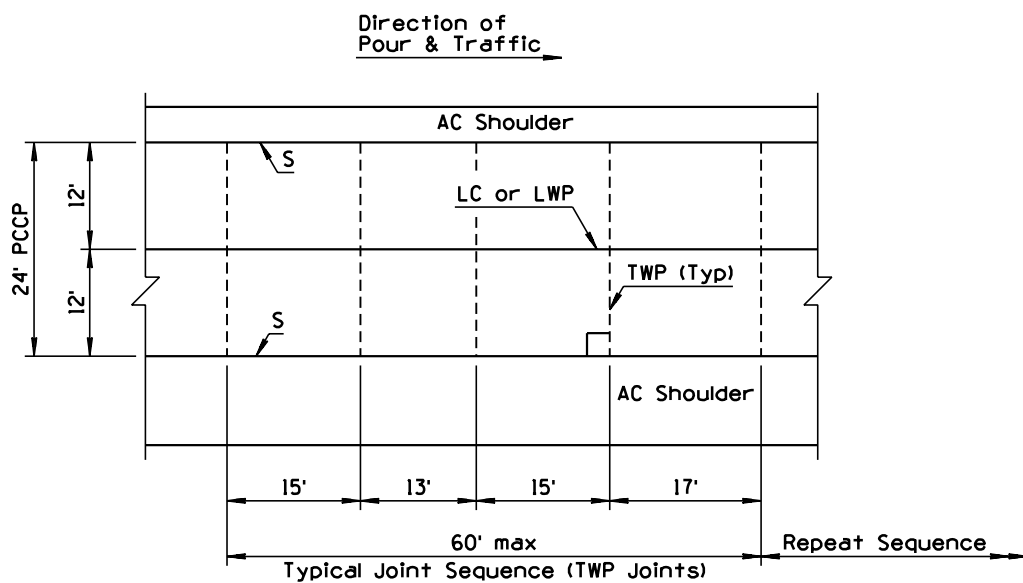
PLAN
43.5' PCCP



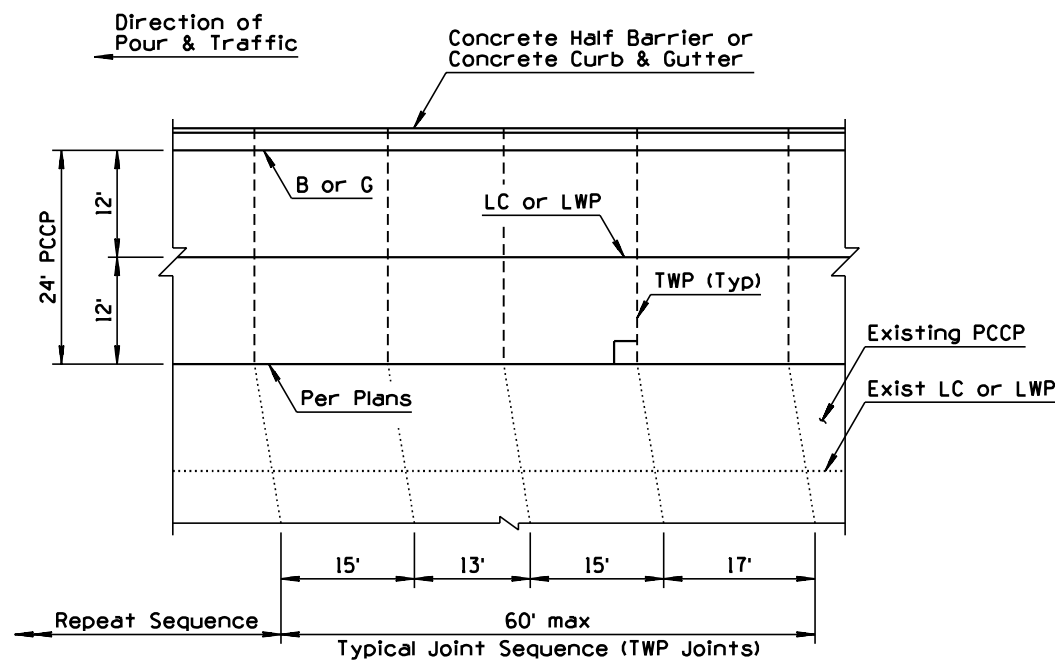
PLAN
36' PCCP

GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.
2. See Std C-07.01 for PCCP joints and additional notes.
3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular (90°) to the longitudinal joints.
4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
5. See Std C-05.10 for curb and gutter joint requirements.
6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.
7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.



PLAN
24' PCCP



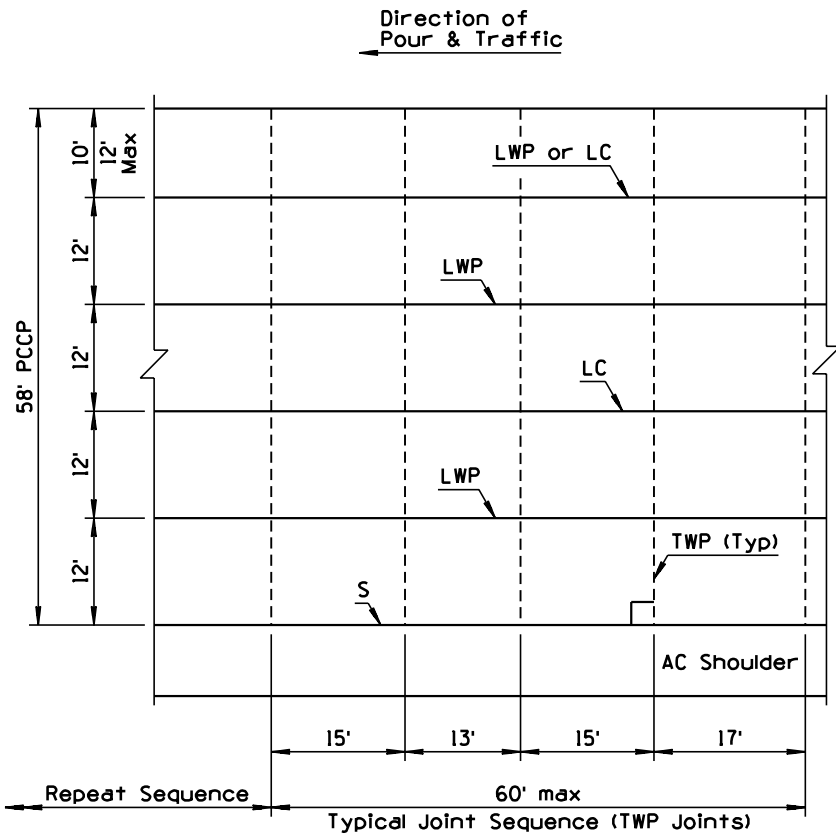
PLAN
24' PCCP
(Widening)

DESIGN APPROVED <i>Terry H. Ottum</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	1/93
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	MAINLINE PCCP JOINT LOCATIONS NON-SKEWED JOINTS	DRAWING NO. C-07.03 Sheet 5 of 8

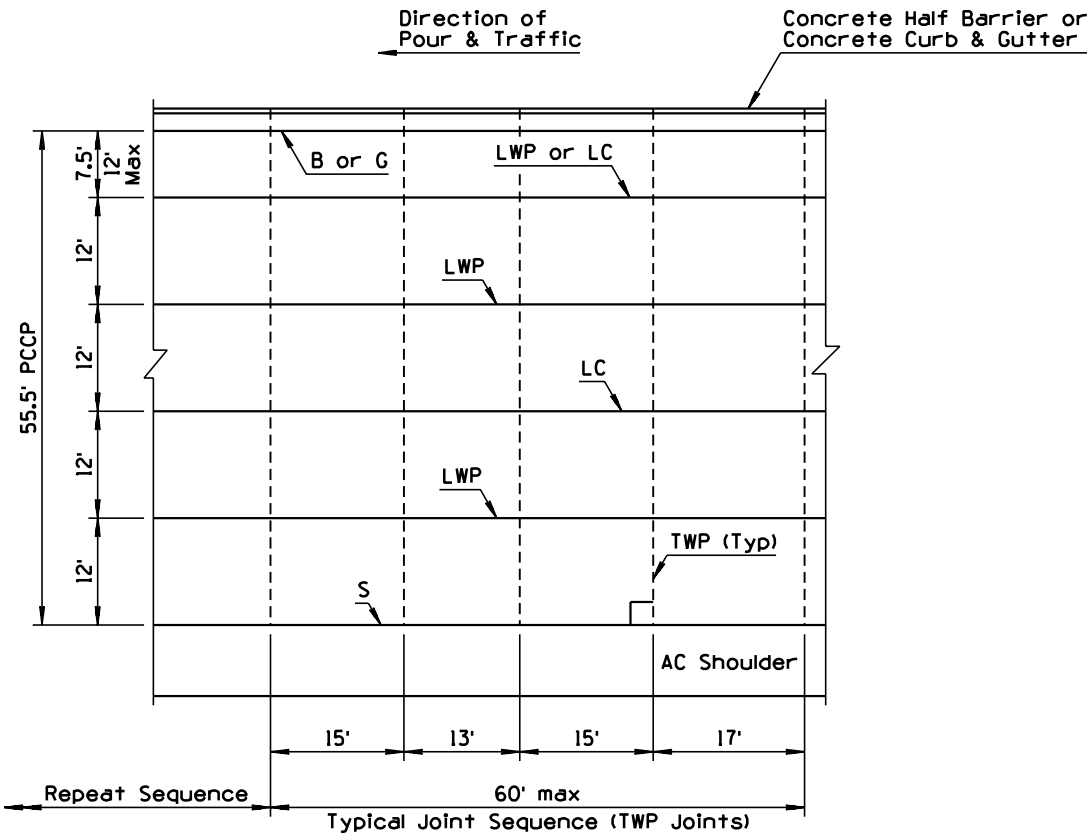
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.
2. See Std C-07.01 for PCCP joints and additional notes.
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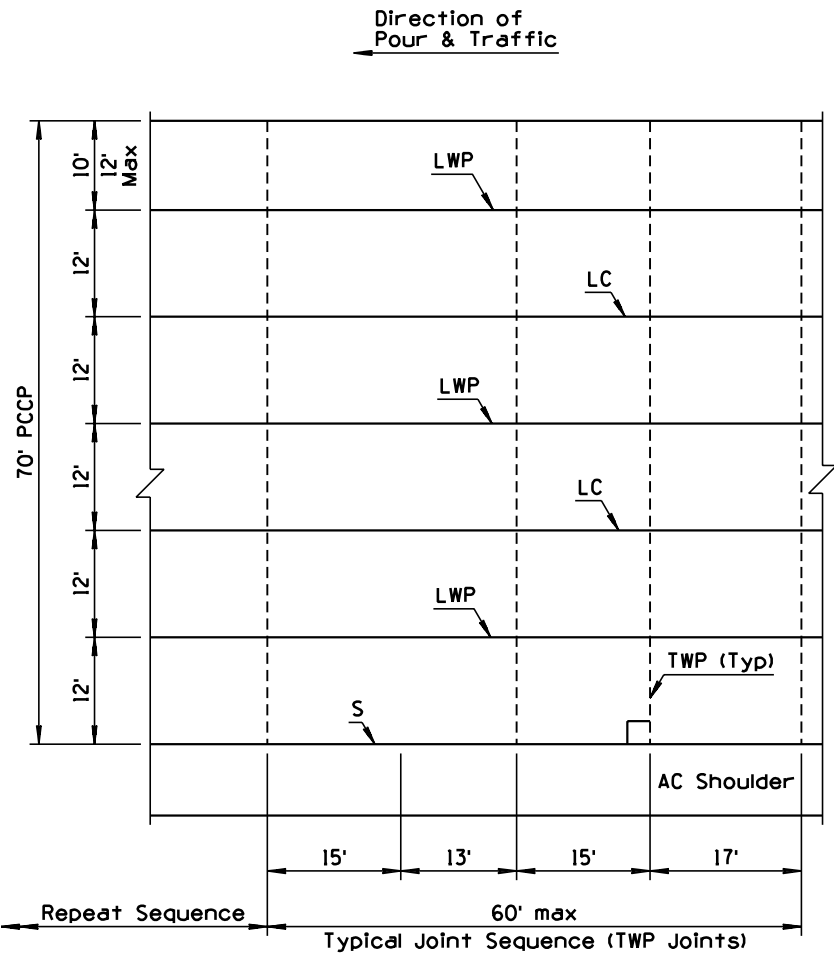


PLAN
58' PCCP

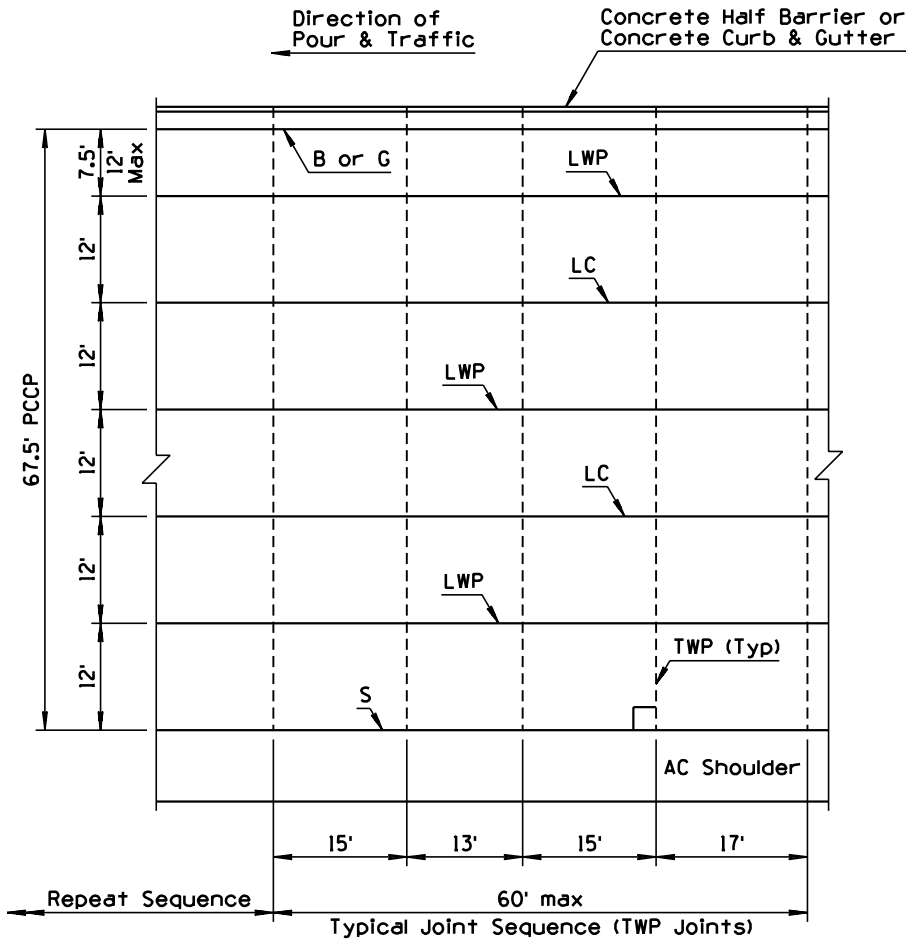


PLAN
55.5' PCCP

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



PLAN
70' PCCP



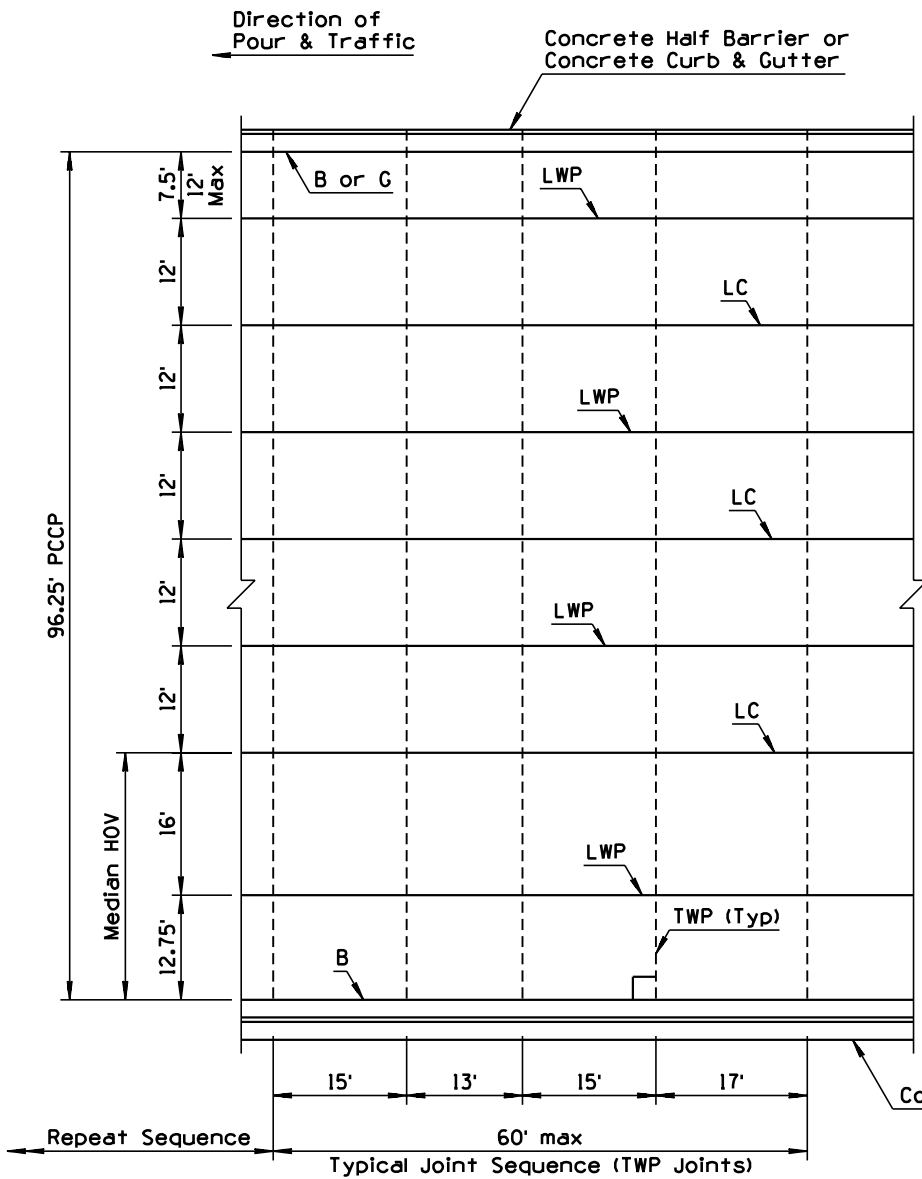
PLAN
67.5' PCCP

GENERAL NOTES

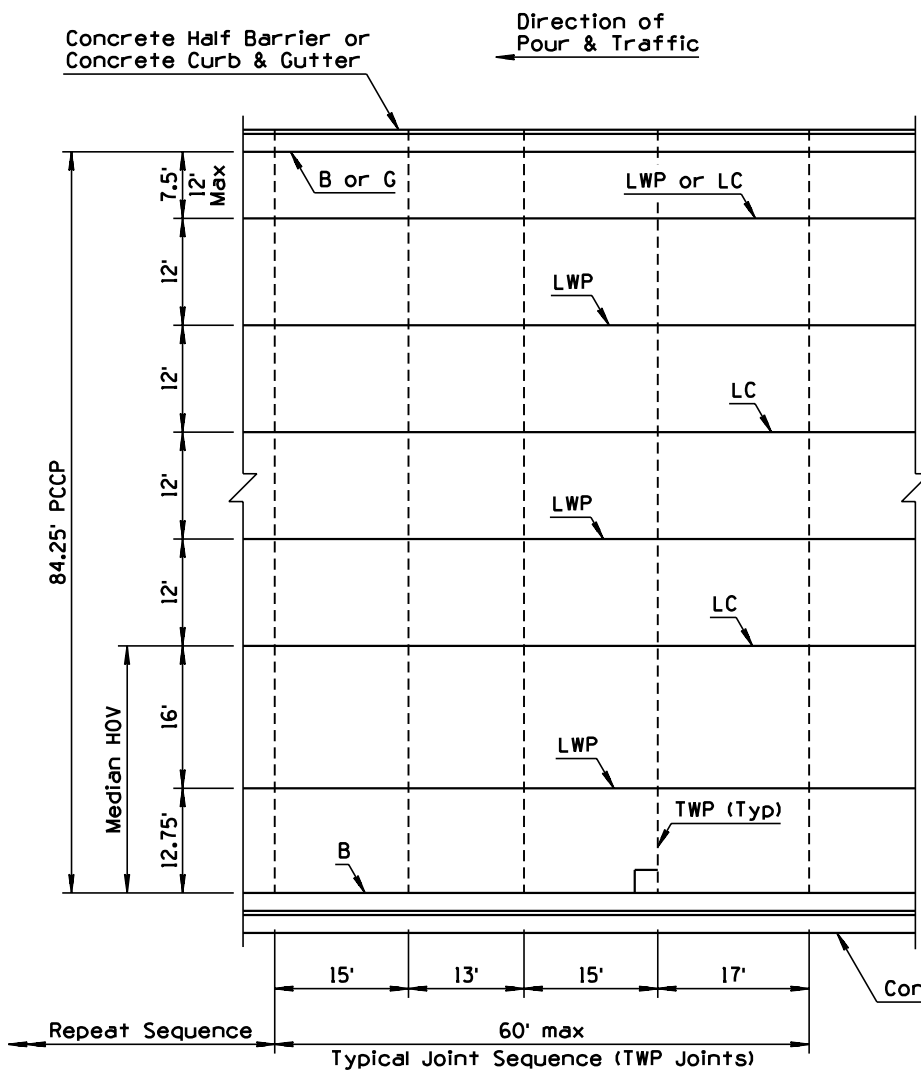
1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.
2. See Std C-07.01 for PCCP joints and additional notes.
3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular (90°) to the longitudinal joints.
4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
5. See Std C-05.10 for curb and gutter joint requirements.
6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.
7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.

DESIGN APPROVED <i>Terry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	1/93
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	MAINLINE PCCP JOINT LOCATIONS NON-SKEWED JOINTS	DRAWING NO. C-07.03 Sheet 7 of 8

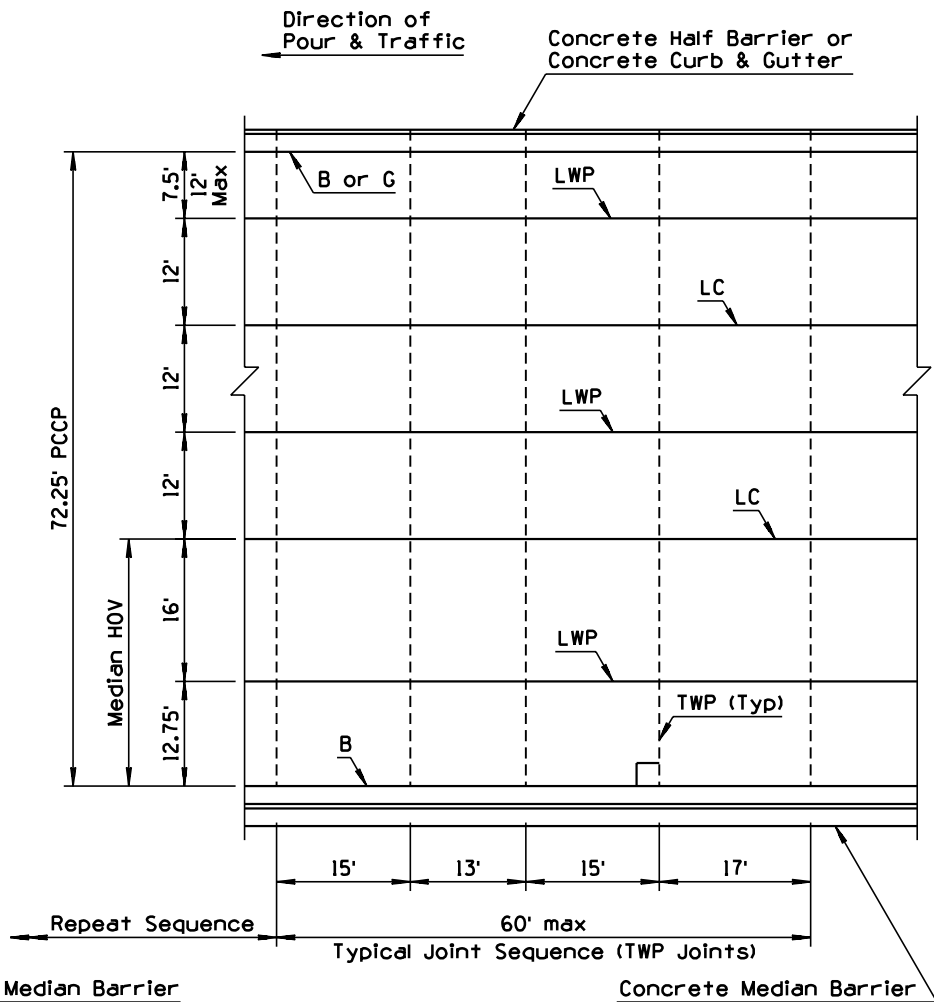
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



PLAN
96.25' PCCP



PLAN
84.25' PCCP



PLAN
72.25' PCCP

GENERAL NOTES

1. Non-skewed PCCP joints shall be used with load transfer dowel assemblies.


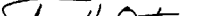
2. See Std C-07.01 for PCCP joints and additional notes.

3. All transverse joints shall be in line with joints in adjacent slabs and are perpendicular (90°) to the longitudinal joints.

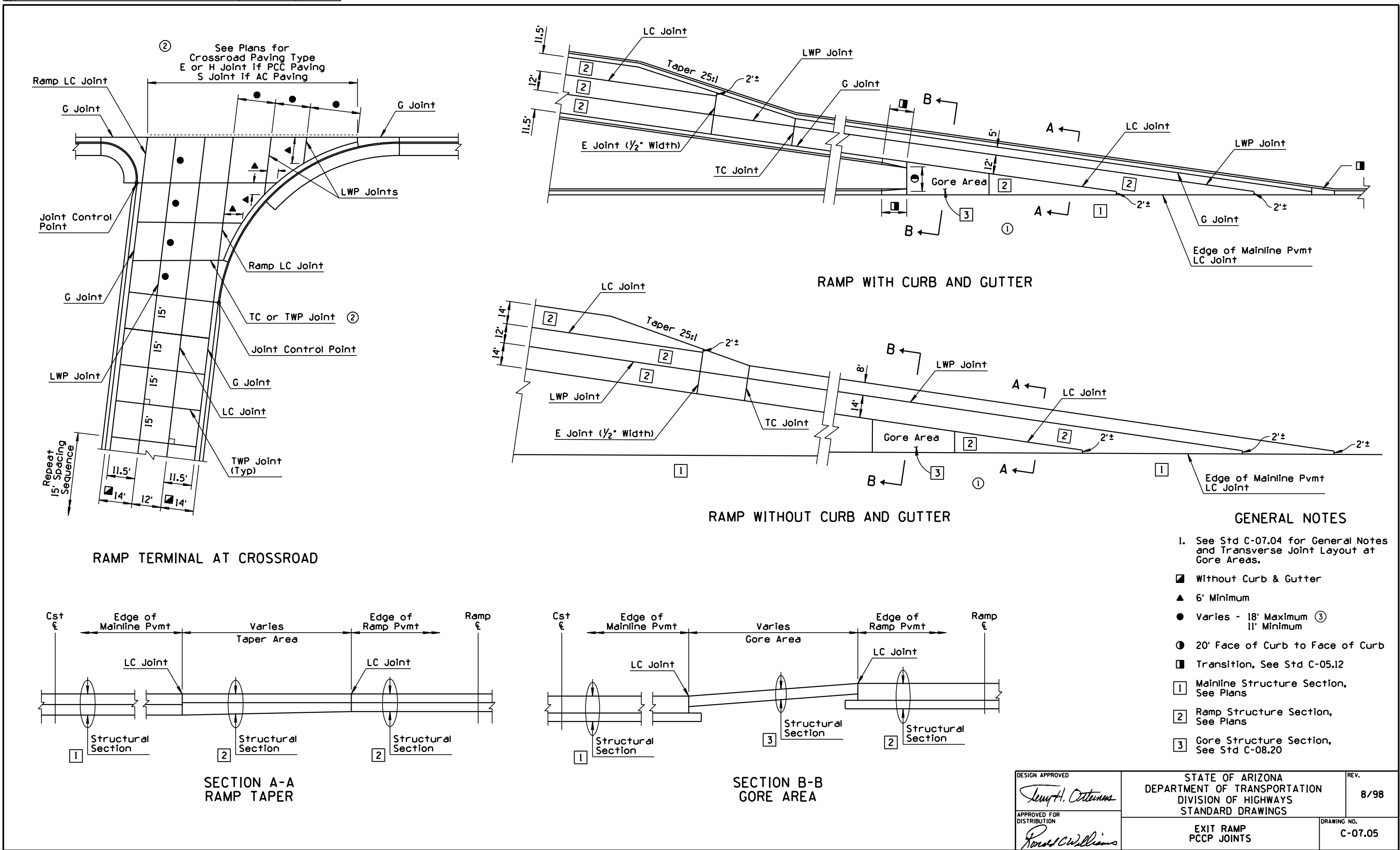
4. At intersection of side roads or streets, joints shall be placed to give the intersection a symmetrical appearance while conforming to the cross section of the intersecting road or street.
5. See Std C-05.10 for curb and gutter joint requirements.

6. The reinforcing bars in the LWP & LC joints shall be placed no greater than 1'-3" from the TC joint.

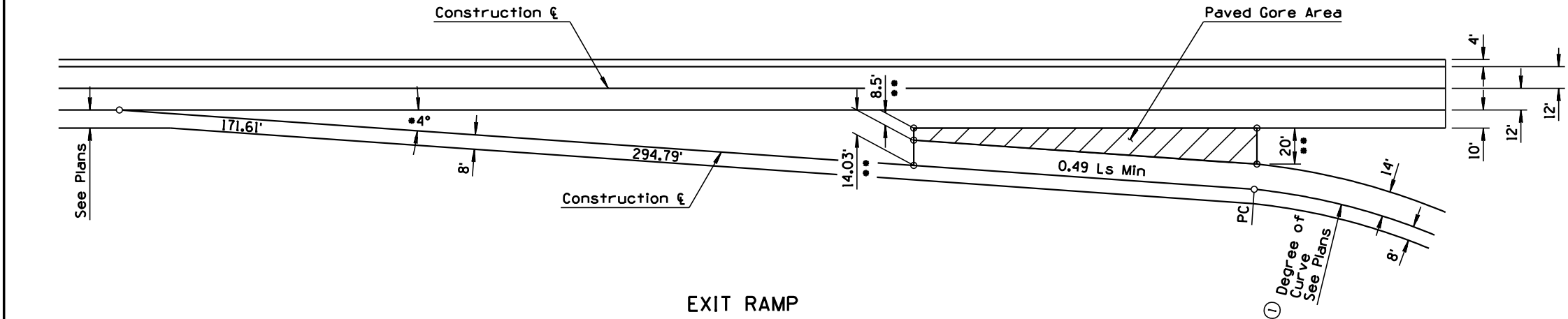
7. Transverse weakened plane joint shall be constructed at least 6'-0" from a transverse construction joint.

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		1/93
APPROVED FOR DISTRIBUTION 	MAINLINE PCCP JOINT LOCATIONS NON-SKEWED JOINTS		DRAWING NO. C-07.03 Sheet 8 of 8

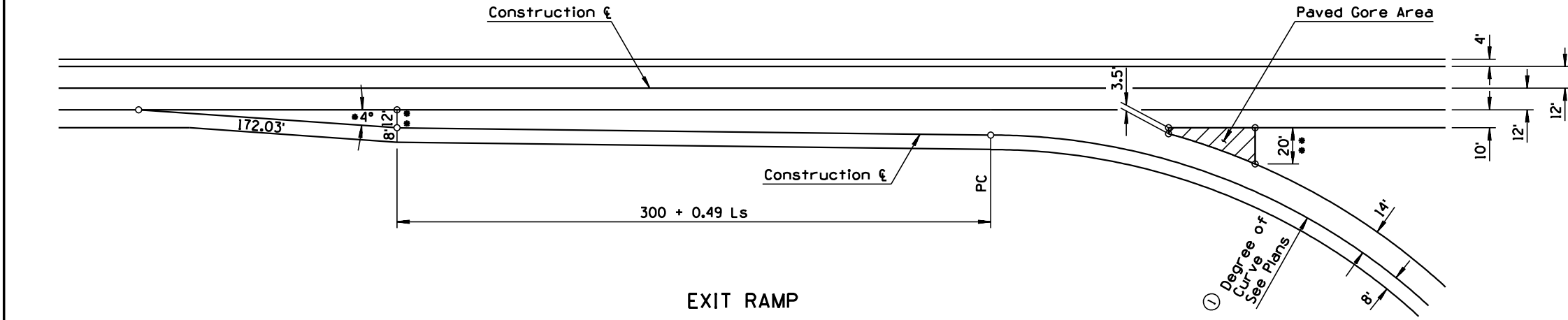
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	DELETED REFERENCE TO RAMP CONTROL POINT	PNB	10/95
2	MODIFIED NOTE	PNB	10/95
3	MODIFIED NOTE	BAF	7/97
4			



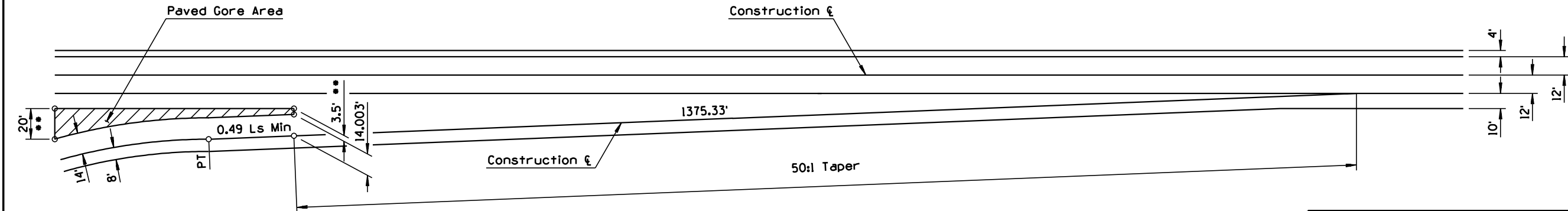
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED CURVE CALLOUT	PNB	7/94
2			
3			
4			



EXIT RAMP



EXIT RAMP



ENTRANCE RAMP

GENERAL NOTES

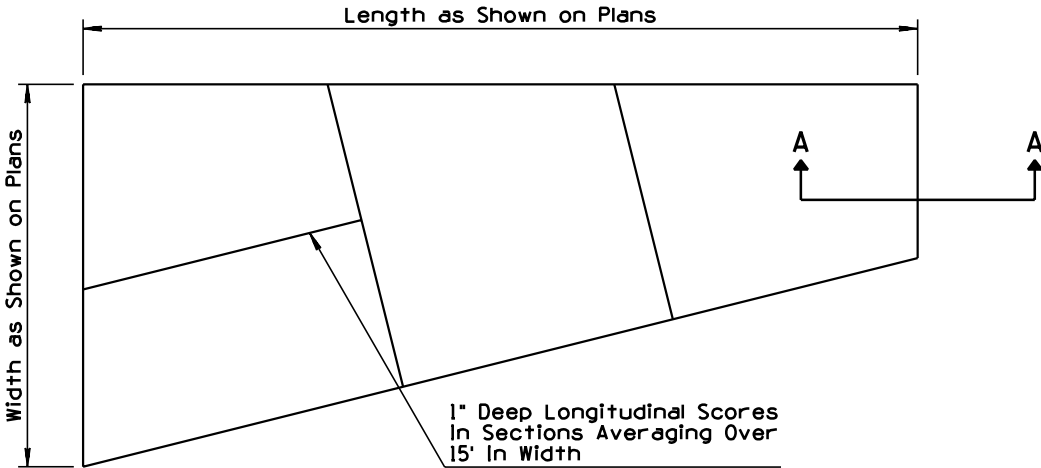
- For paved gore area details, see Std C-08.20.
 - Parallel deceleration is to be used only under special conditions necessitating ramp curvature ahead of nose.
 - The 50:1 taper and corresponding offsets shall also apply when the main roadway has curvature or combined tangent and curvature.
- Normal to ramp.
 - Distance normal to main roadway construction centerline.

DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION	RAMP GEOMETRICS		DRAWING NO. C-08.10

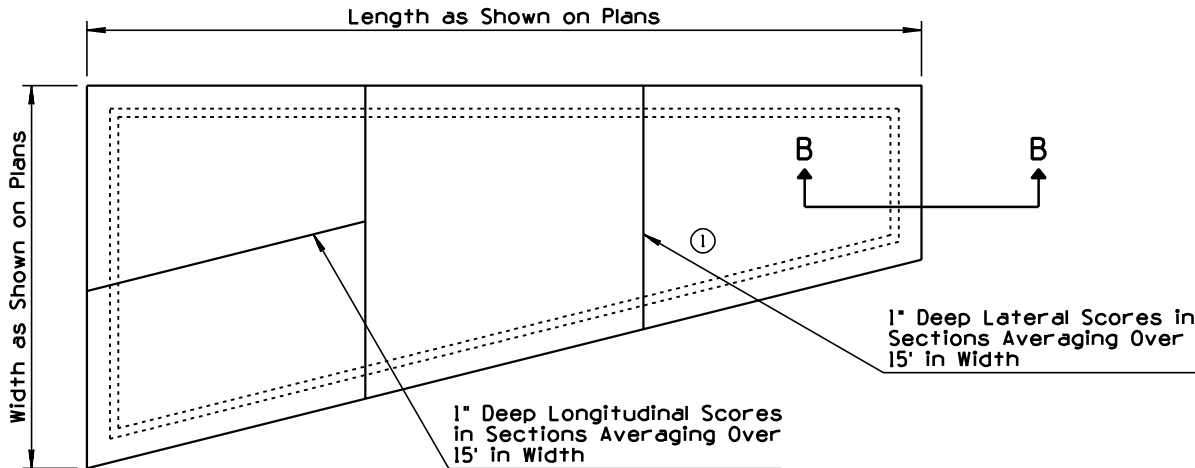
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CORRECTED LEADER LINE	PNB	10/95
2			
3			
4			

GENERAL NOTES

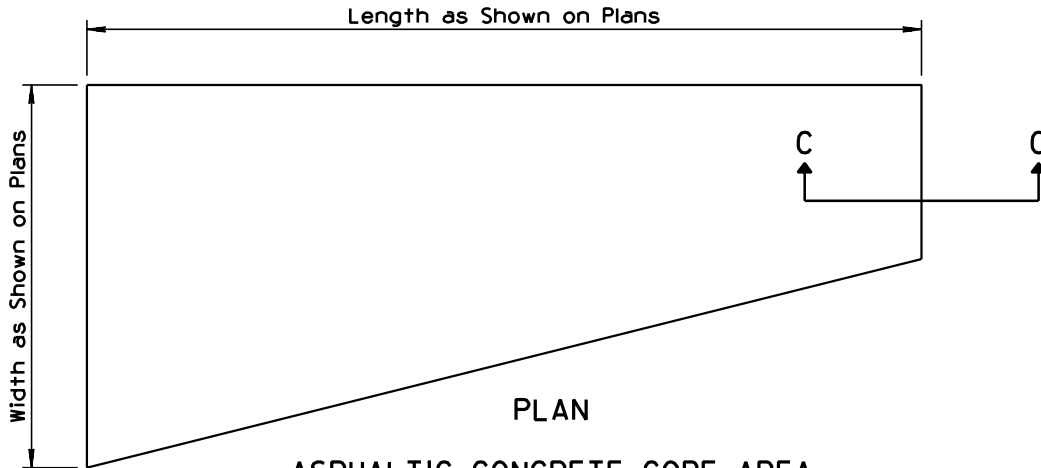
- Paved gore area shall be Class S Concrete, $f'_c = 4000$ psi or asphaltic concrete as called for on plans.
- See Std. C-07.01 and C-07.04 for joint layout and details.



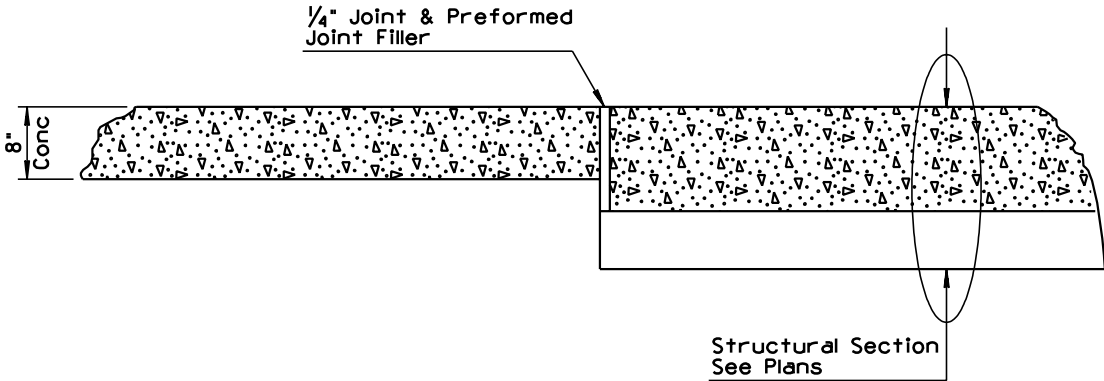
PLAN
CONCRETE GORE AREA
WITH ABUTTING CONCRETE PAVEMENT



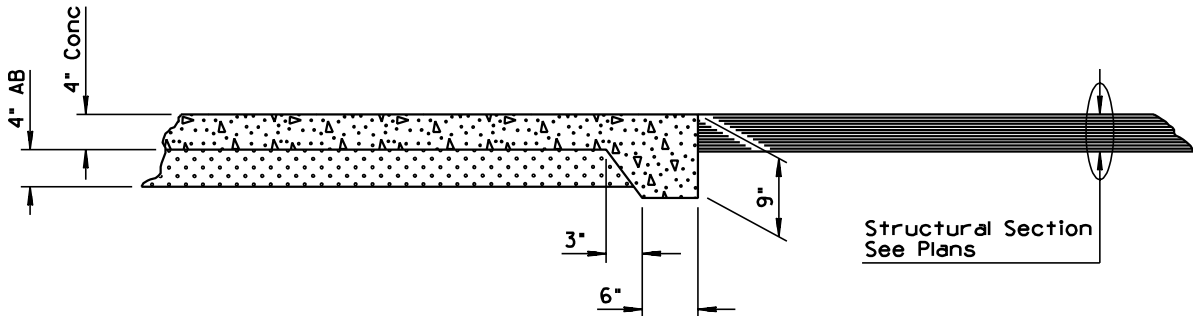
PLAN
CONCRETE GORE AREA
WITH ABUTTING AC PAVEMENT



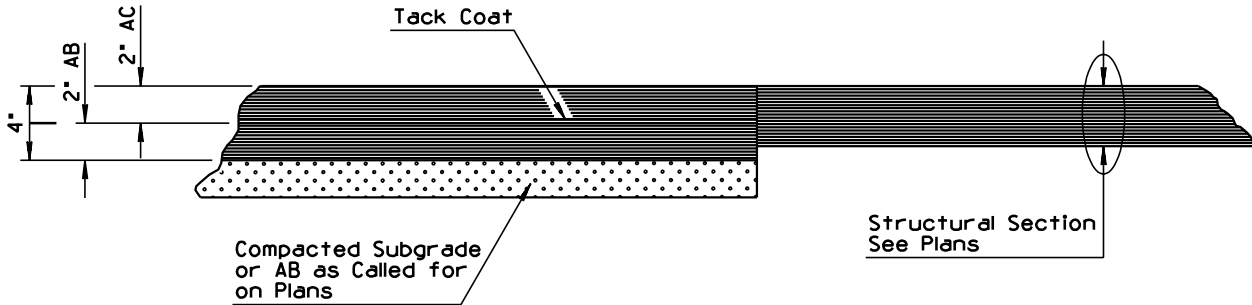
PLAN
ASPHALTIC CONCRETE GORE AREA
WITH ABUTTING AC PAVEMENT



SECTION A-A



SECTION B-B

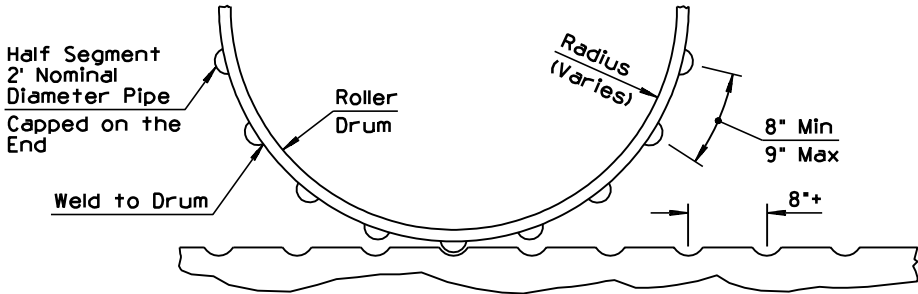


SECTION C-C

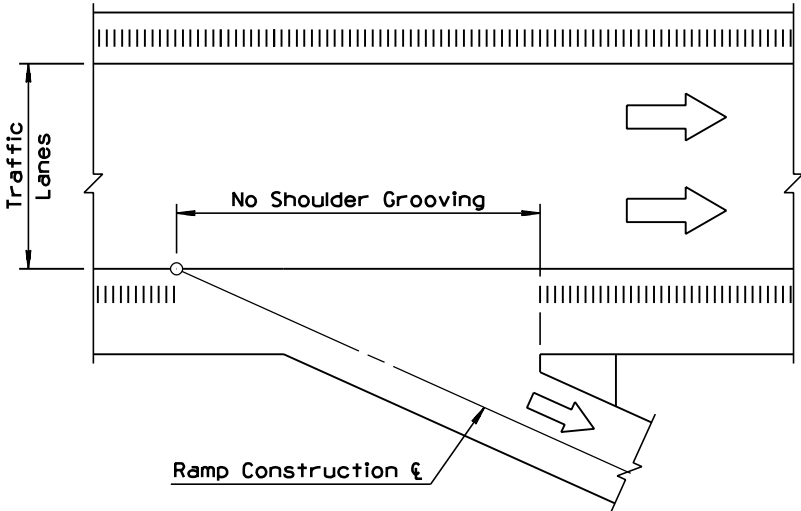
DESIGN APPROVED <i>Terry H. Ottum</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>		DRAWING NO. C-08.20

PAVED GORE AREA

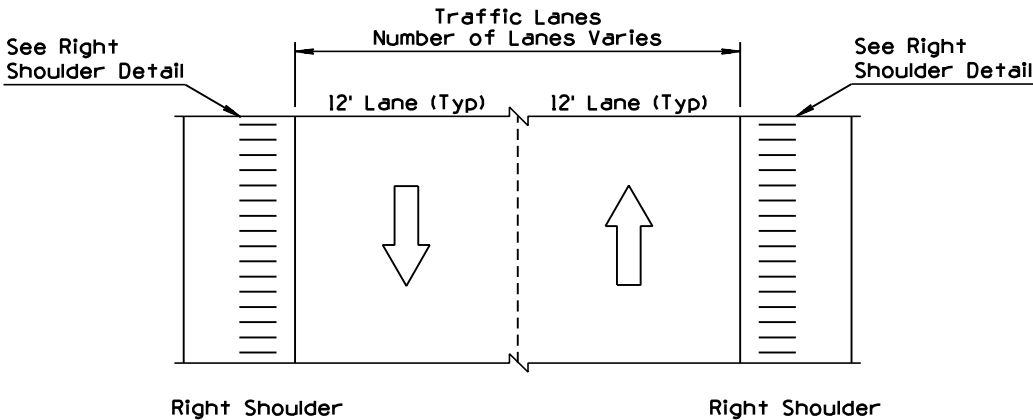
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED DETAIL	PNB	3/95
2	ADDED DETAIL	PNB	3/95
3	REVISED NOTE	PNB	3/95
4	REVISED PIPE TO 2' INSIDE DIAMETER	PNB	3/95



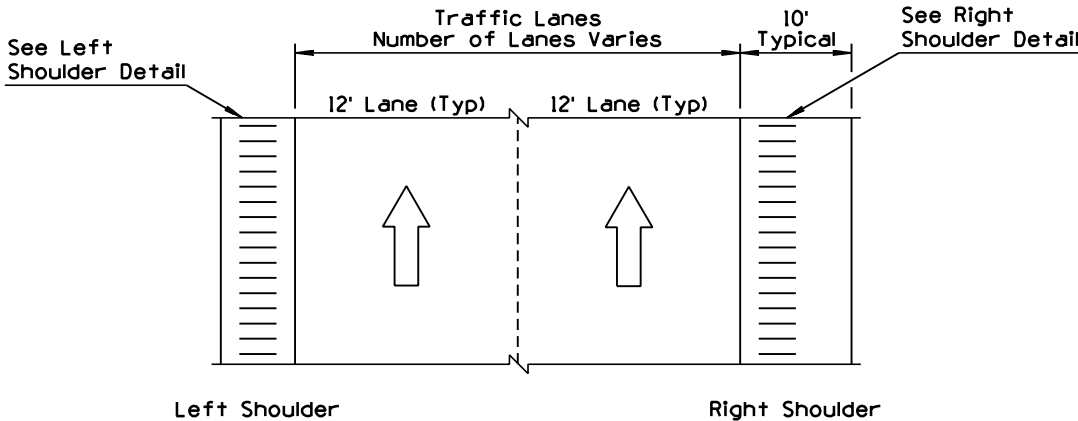
STEEL DRUM DETAIL



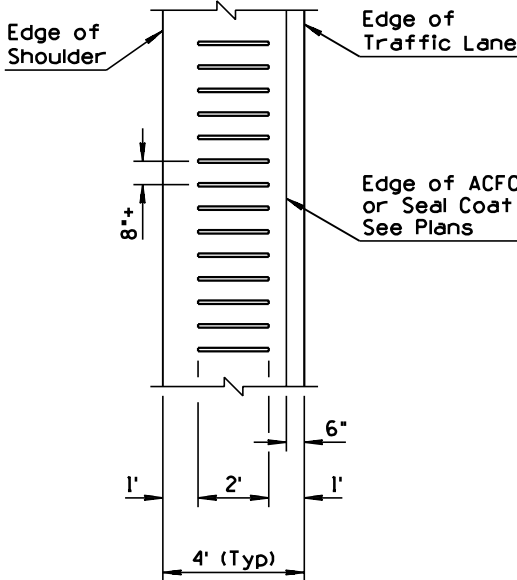
RAMP EXCEPTION DETAIL
ENTRANCE RAMP SIMILAR



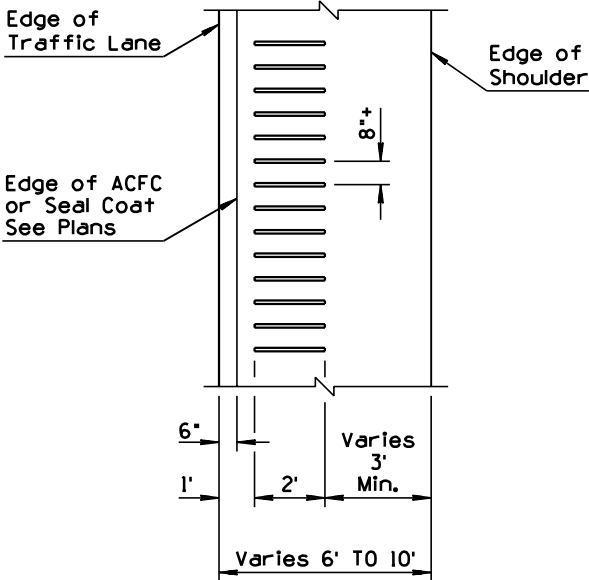
TYPICAL SHOULDER GROOVING PLAN
FOR UNDIVIDED HIGHWAYS



TYPICAL SHOULDER GROOVING PLAN
FOR DIVIDED HIGHWAYS



LEFT SHOULDER GROOVING DETAIL
FOR DIVIDED HIGHWAYS
TYPICALLY 4' WIDE



RIGHT SHOULDER GROOVING DETAIL
SHOULDERS 6' AND WIDER

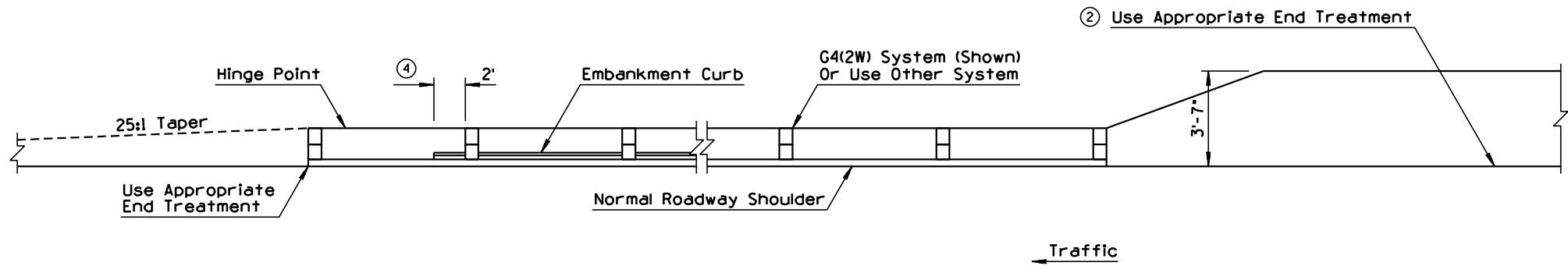
GENERAL NOTES

- Shoulder Grooving shall be applied to the shoulders of rural highways when called for on the Plans in accordance with the following shoulder widths:
Undivided Highways - Shoulders 6' and greater
Divided Highways - Right shoulders 6' and greater
Left shoulders 4' and greater
- Shoulder Grooving shall be omitted across principal intersecting roadways or other interruptions in normal shoulder width as directed by the Engineer.
- Shoulder Grooving shall be constructed by making indentations in the asphaltic concrete.

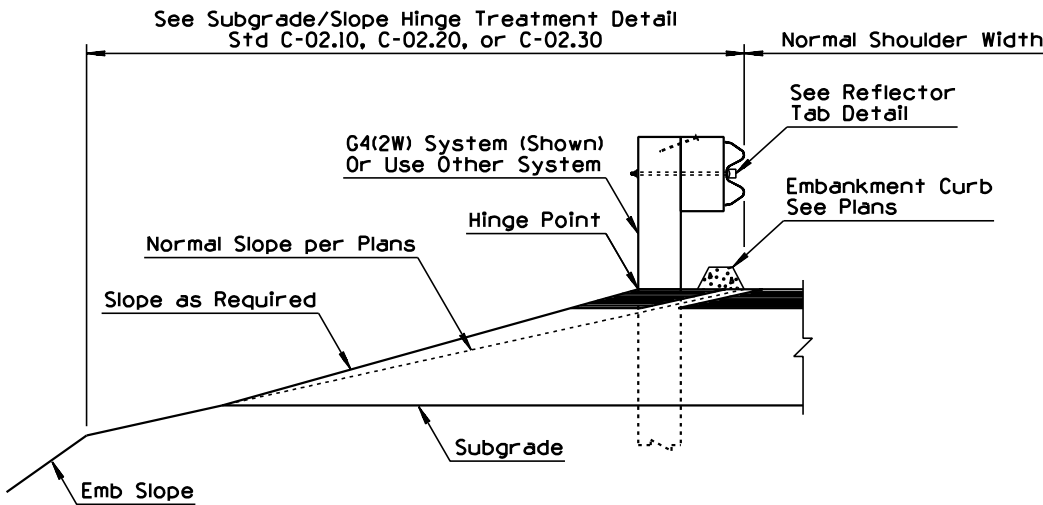
The indentations may be formed by rolling the hot asphalt concrete with a roller to which half segments of 2" inside diameter pipe have been welded to the drum. The pipe segments shall be 2' long and spaced at approximate 8" centers.
- Each roller shall be equipped with an acceptable guide that extends in front of the roller and is clearly visible to the operator in order that proper alignment of the completed scored shoulder is obtained.
- The contractor may utilize other equipment or methods to construct the shoulder grooving if approved by the Engineer.

DESIGN APPROVED <i>Henry H. Ottum</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	ISSUE 6/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GROOVING FOR BITUMINOUS SHOULDERS	DRAWING NO. C-09.10

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	COMBINED & REVISED SECTIONS	PNB	7/94
2	REVISED NOTE	PNB	7/94
3	ADDED NOTE	PNB	7/94
4	REVISED END OF CURB	PNB	7/94



PLAN

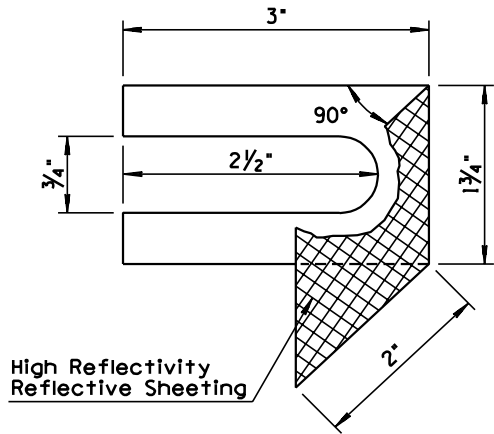


SECTION

TYPE A GUARD RAIL INSTALLATION

GENERAL NOTES

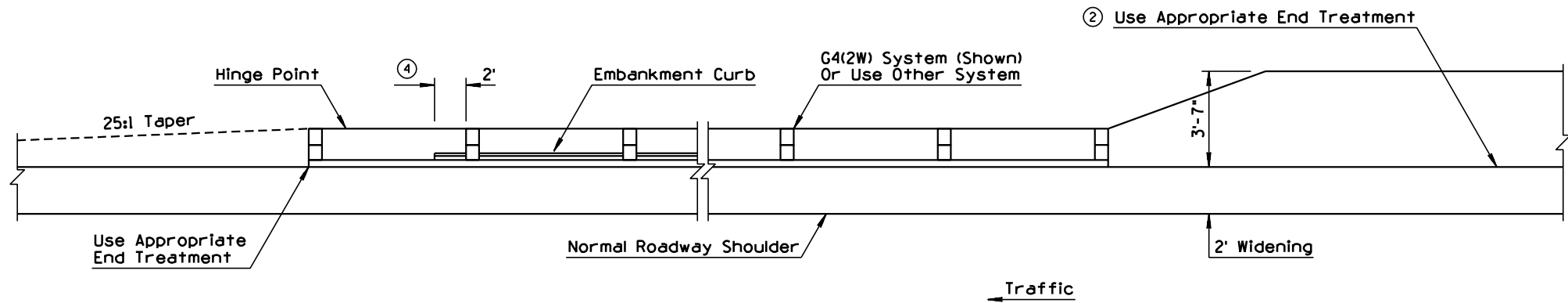
1. All embankment curb shall be protected by guard rail.
2. Guard rail shall extend beyond the limits of embankment curb.
3. See Std. C-10.03 for measurement limits.
4. See Standard Specifications for spacing of reflector tabs.



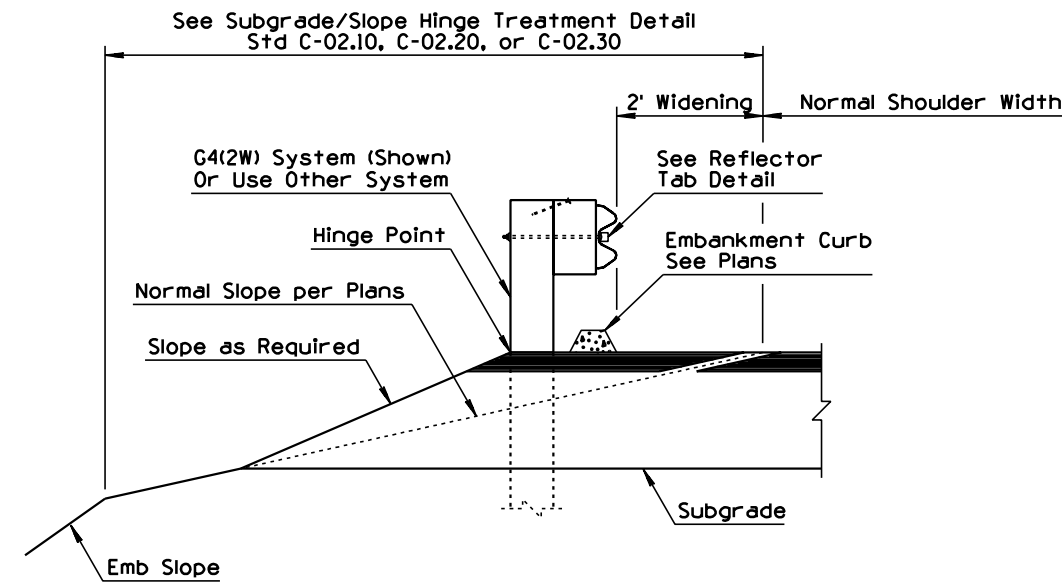
REFLECTOR TAB DETAIL

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TYPE A GUARD RAIL INSTALLATION, REFLECTOR TAB	DRAWING NO. C-10.01

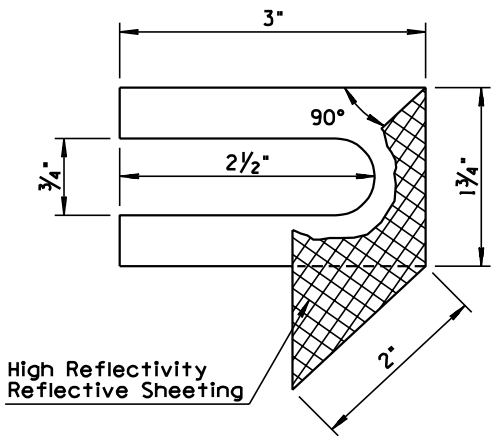
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	COMBINED & REVISED SECTIONS	PNB	7/94
2	REVISED NOTE	PNB	7/94
3	ADDED NOTE	PNB	7/94
4	REVISED END OF CURB	PNB	7/94



PLAN



① SECTION



REFLECTOR TAB DETAIL

GENERAL NOTES

1. All embankment curb shall be protected by guard rail.
- ② 2. Guard rail shall extend beyond the limits of embankment curb.
- ③ 3. See Std. C-10.03 for measurement limits.
- ③ 4. See Standard Specifications for spacing of reflector tabs.

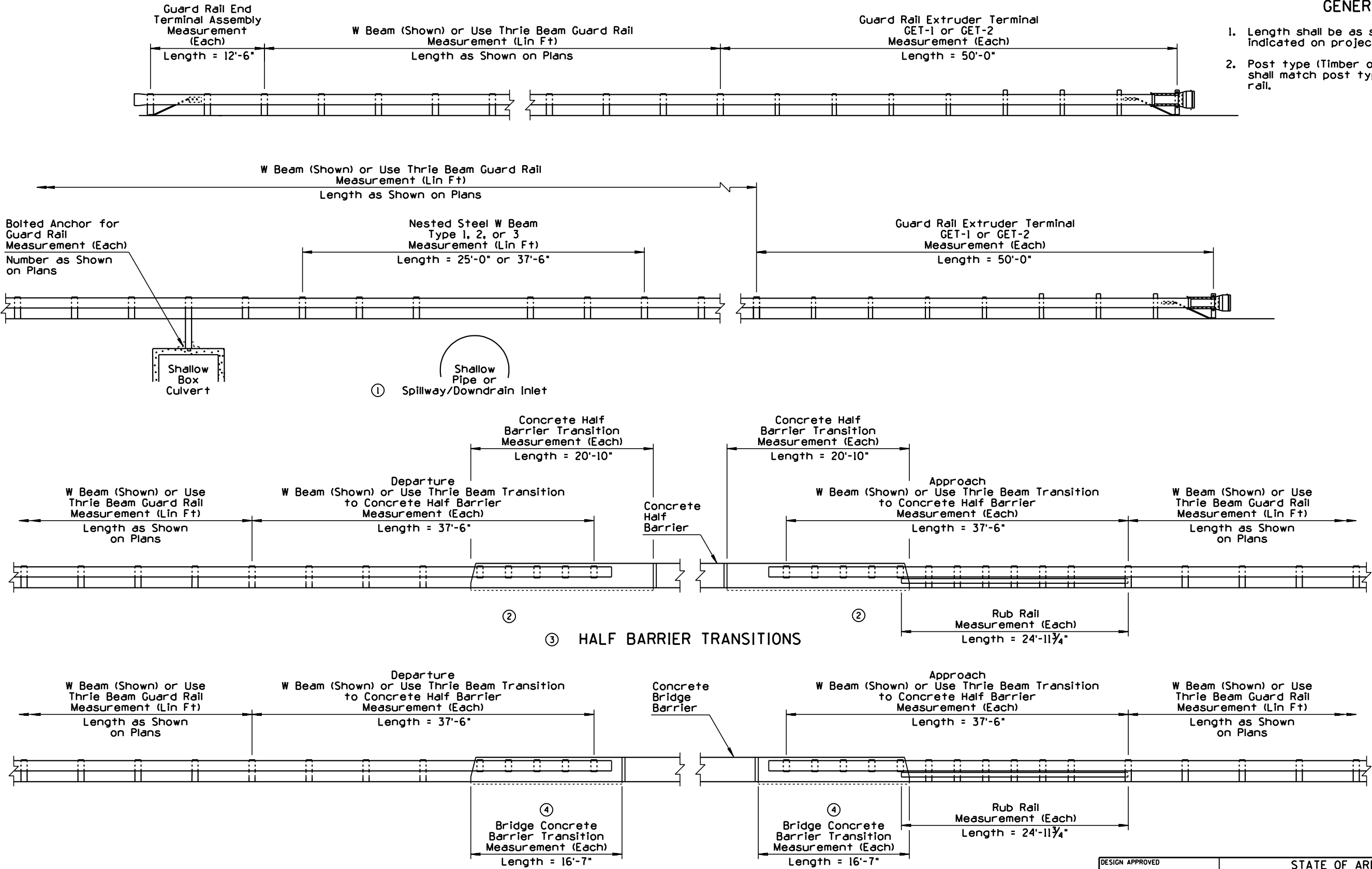
TYPE B GUARD RAIL INSTALLATION

DESIGN APPROVED <i>Terry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	TYPE B GUARD RAIL INSTALLATION, REFLECTOR TAB	DRAWING NO. C-10.02

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CHANGED TEXT	PNB	10/95
2	DELETED CAISSONS	PNB	10/95
3	ADDED TITLES	PNB	10/95
4	ADDED CALLOUTS	PNB	10/95

GENERAL NOTES

1. Length shall be as shown unless otherwise indicated on project plans.
2. Post type (Timber or Steel) for transitions shall match post type of adjoining guard rail.



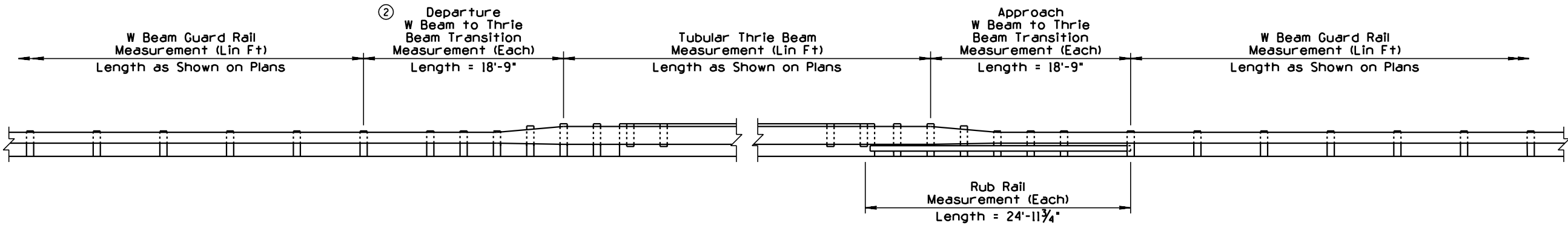
③ HALF BARRIER TRANSITIONS

④ BRIDGE BARRIER TRANSITIONS
With Concrete Barrier Transitions
Constructed on Top of Wingwalls

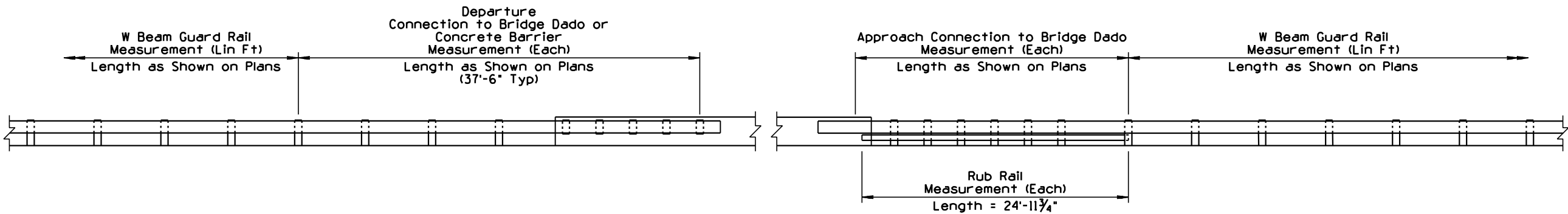
DESIGN APPROVED <i>Terry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	MEASUREMENT LIMITS FOR W BEAM AND THRIE BEAM SYSTEM	DRAWING NO. C-10.03 Sheet 1 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	DELETED MEDIAN BARRIER TRANSITION	PNB	7/94
2	ADDED DEPARTURE	PNB	7/94
3			
4			

①



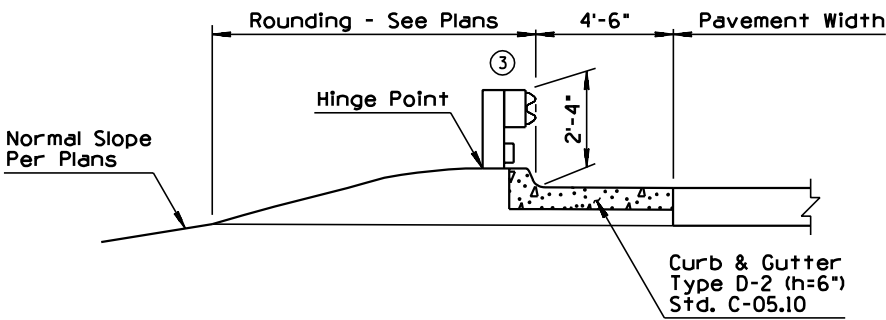
THRIE BEAM BRIDGE RETROFIT



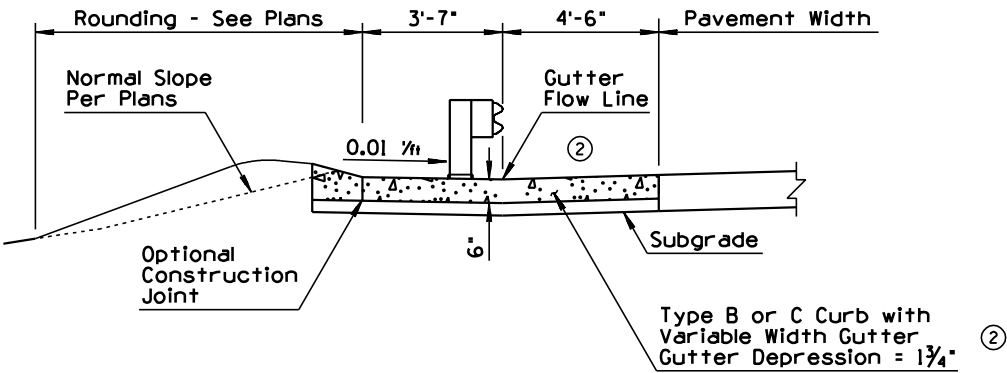
BRIDGE DADO RETROFIT

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	MEASUREMENT LIMITS FOR W BEAM AND THRIE BEAM SYSTEM	DRAWING NO. C-10.03 Sheet 2 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED CALLOUT FORMAT	PNB	10/95
2	REVISED GUTTER DEPRESSION	PNB	10/95
3	ADDED RUB RAIL	PNB	10/95
4	MOVED LOCATION OF CURB & GUTTER TRANSITION	PNB	10/95



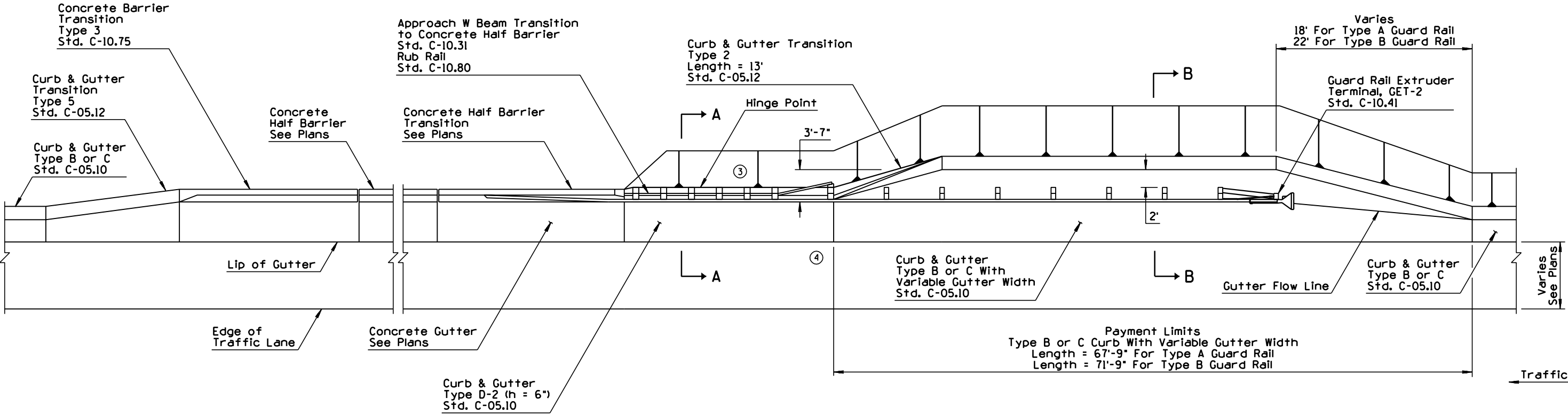
SECTION A-A



SECTION B-B

GENERAL NOTES

- See plans and barrier summary sheets for location and type of guardrail. Timber post installation shown.
- See Construction Standard Drawings C-05.10, 05.12, 10.01, and 10.02 for dimensions and details not shown.
- Type B guard rail installation shown. For Type A guard rail installation, use Type D-1 Curb and Gutter instead of the Type D-2 Curb and Gutter shown. For Type A guard rail installation, flare the Guard Rail Extruder Terminal as per Standard Drawing C-10.41.
- See Plans for type and location of drainage facilities.
- Bituminous joint filler (1/2") shall be placed where the curb & gutter or concrete widening abuts slotted drains, catch basins, dados, barrier, etc. Scored joints, 2 inches in depth, shall be placed to match adjacent joints in PCCP or at 15 ft intervals where adjacent to AC or continuously reinforced concrete pavement.



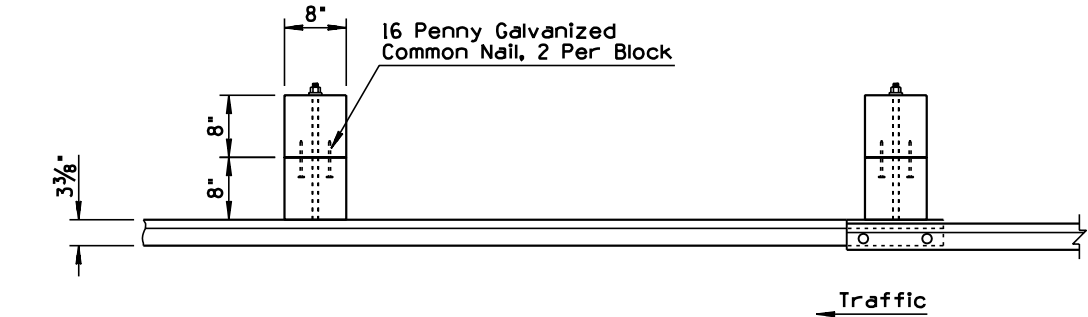
PLAN

① TYPICAL HALF BARRIER TERMINAL
W/TYPE B OR C CURB & GUTTER

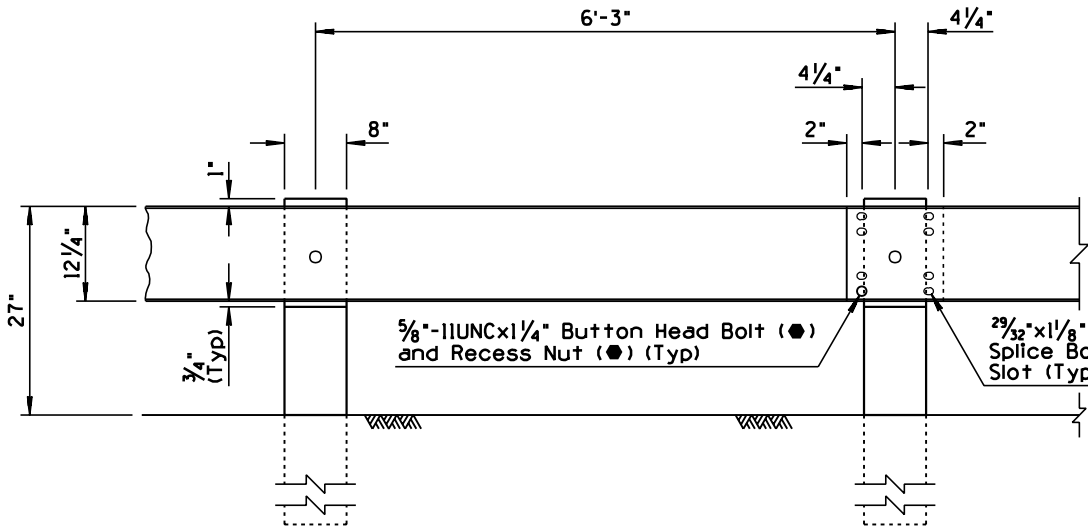
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	HALF BARRIER TERMINAL W/TYPE B OR C CURB & GUTTER	DRAWING NO. C-10.06

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISD NUMBER FROM C-10.04	PNB	7/94
2			
3			
4			

G4 (1W) SYSTEM

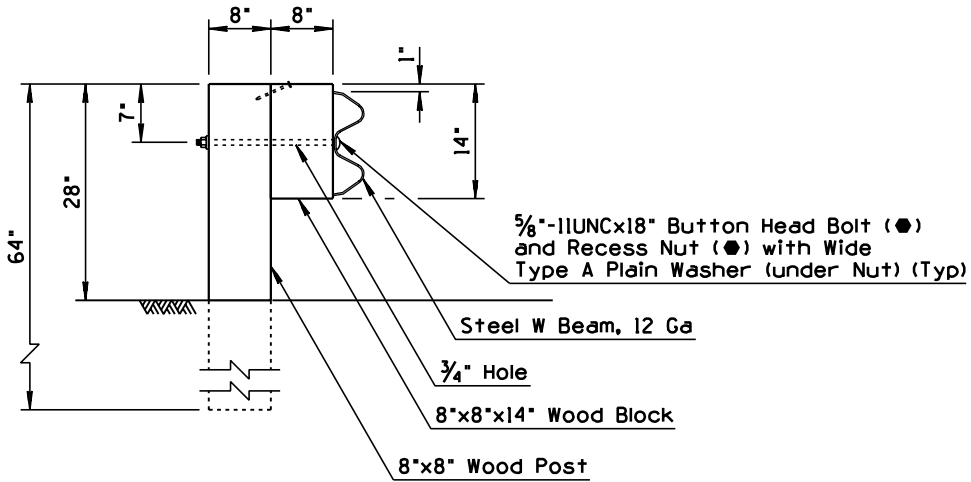


PLAN



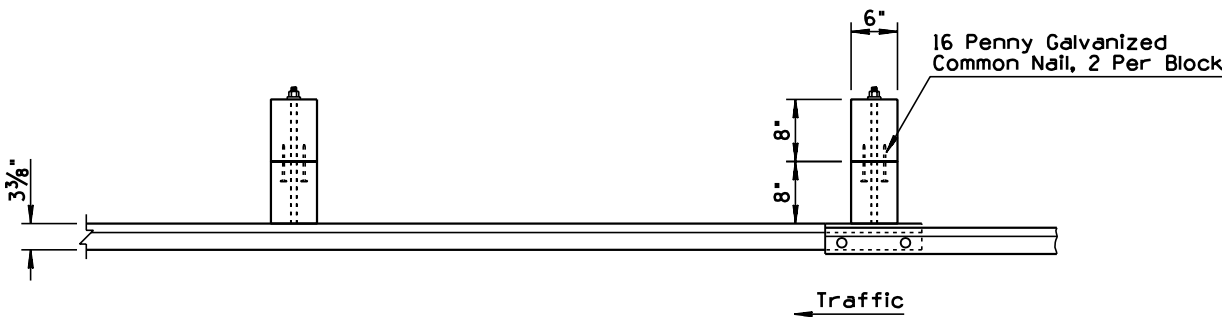
ELEVATION

G4 (1W) SYSTEM

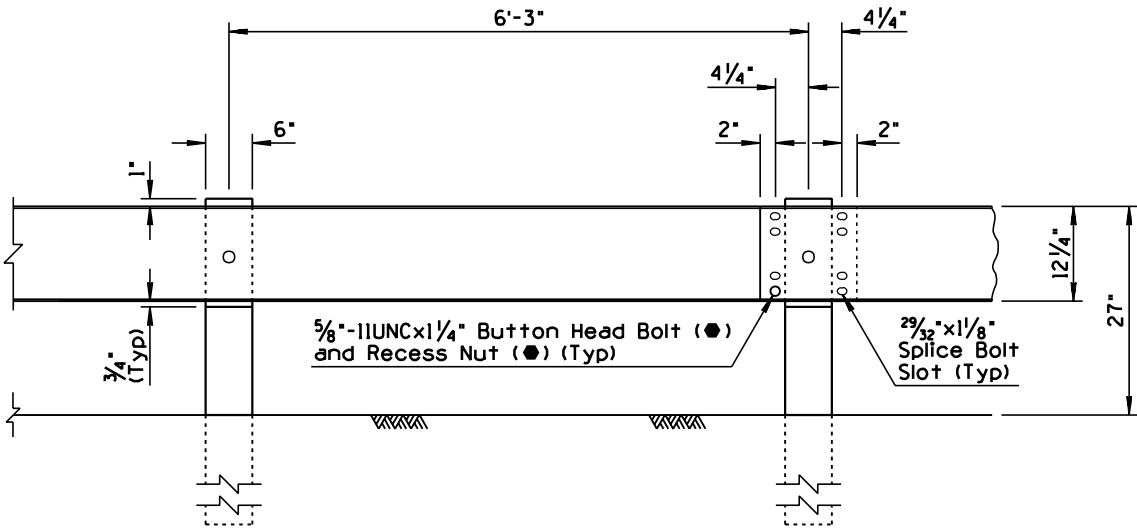


SECTION G4(1W)

G4 (2W) SYSTEM

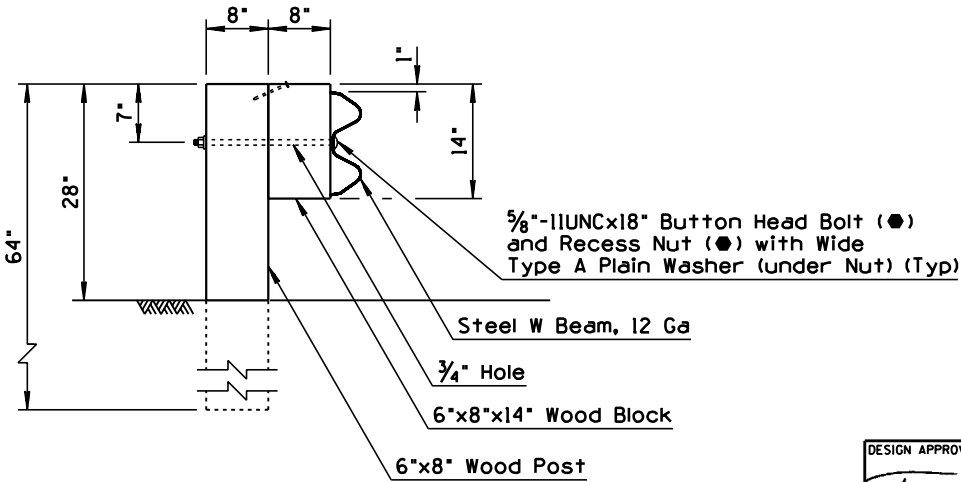


PLAN



ELEVATION

G4 (2W) SYSTEM



SECTION G4(2W)

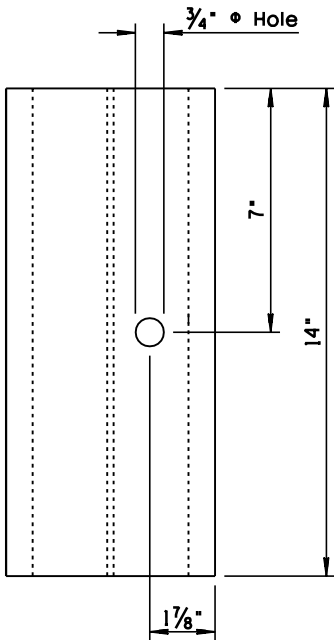
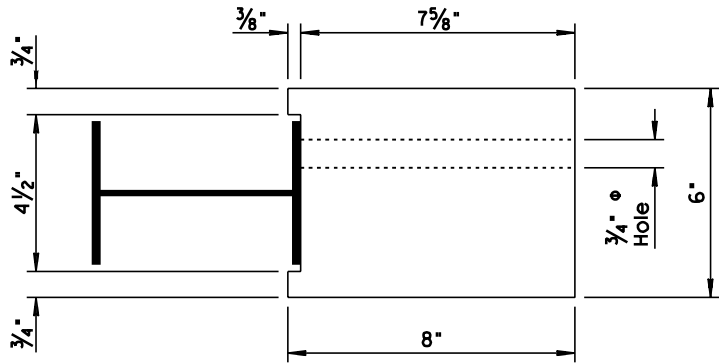
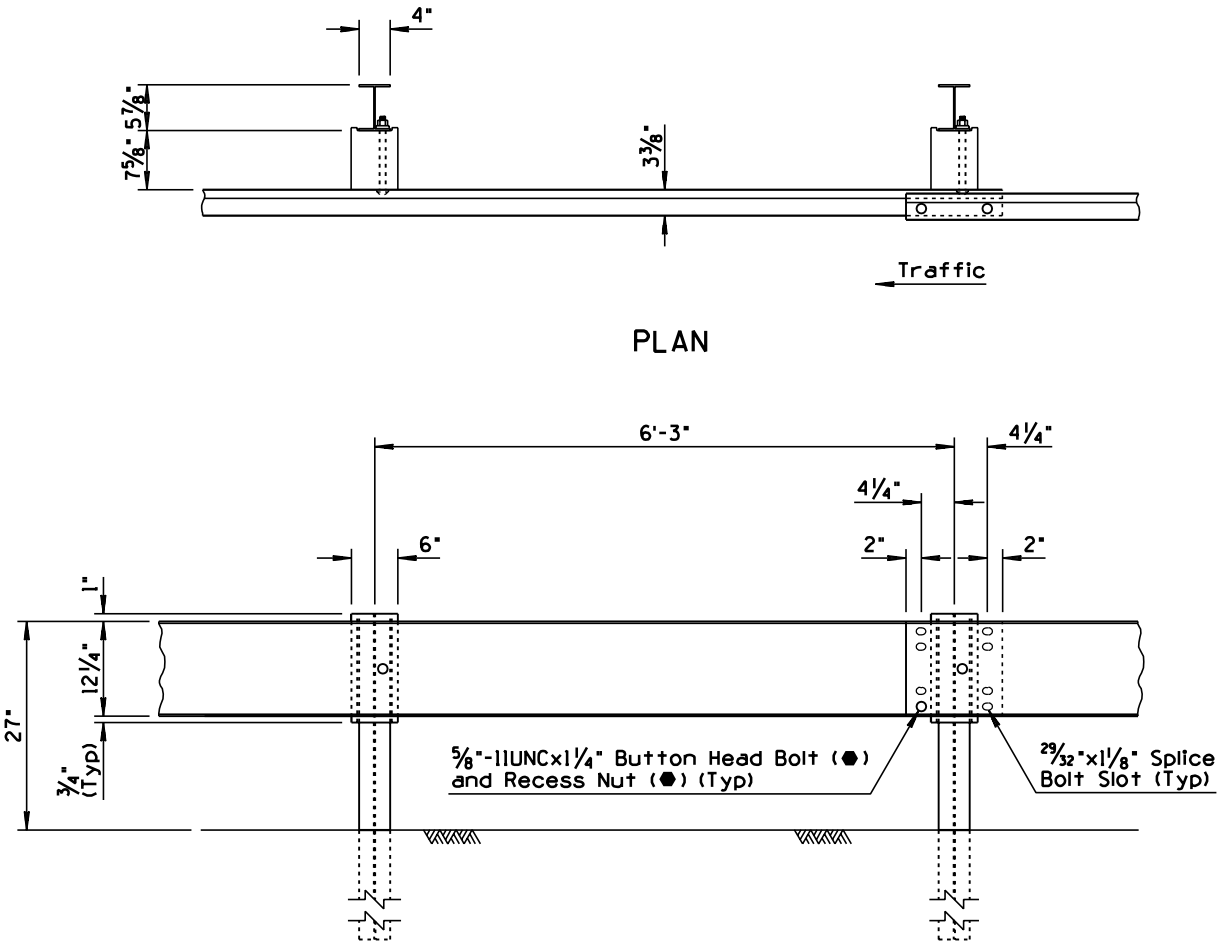
GENERAL NOTES

● - Indicates ARTBA designation

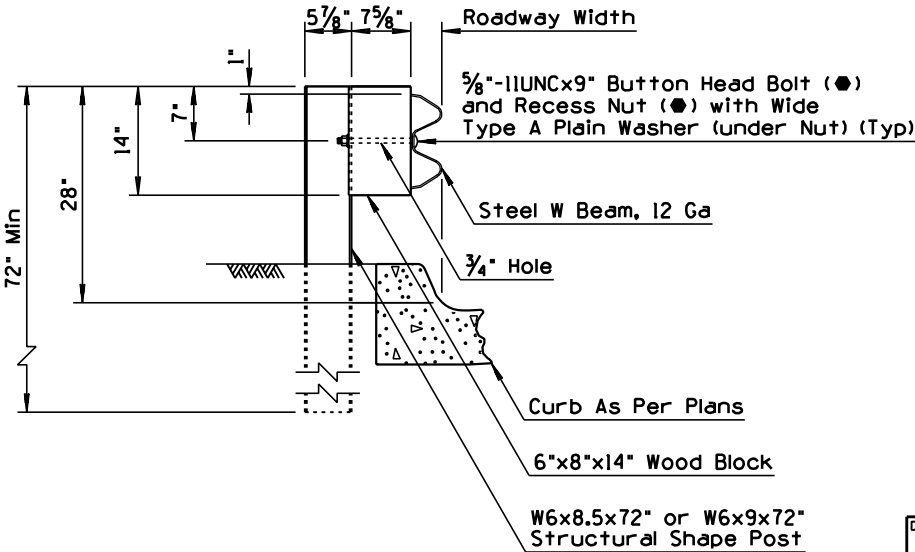
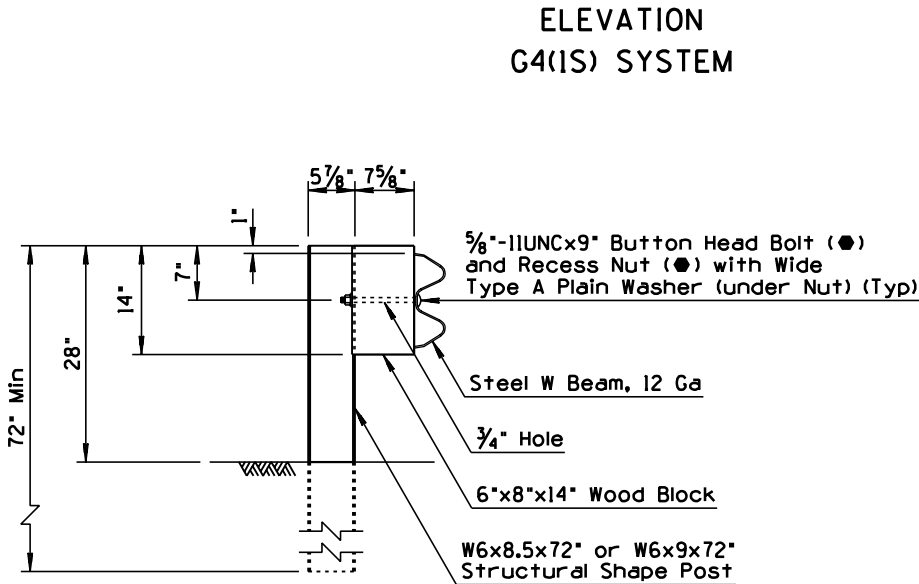
DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	G4(1W) AND G4(2W) BLOCKED OUT W BEAM (TIMBER POST)	DRAWING NO. ① C-10.20

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REPLACED STEEL BLOCK WITH WOOD BLOCK	BAF	5/96
2			
3			
4			

G4(1S) SYSTEM



① WOODEN BLOCK DETAIL



GENERAL NOTES

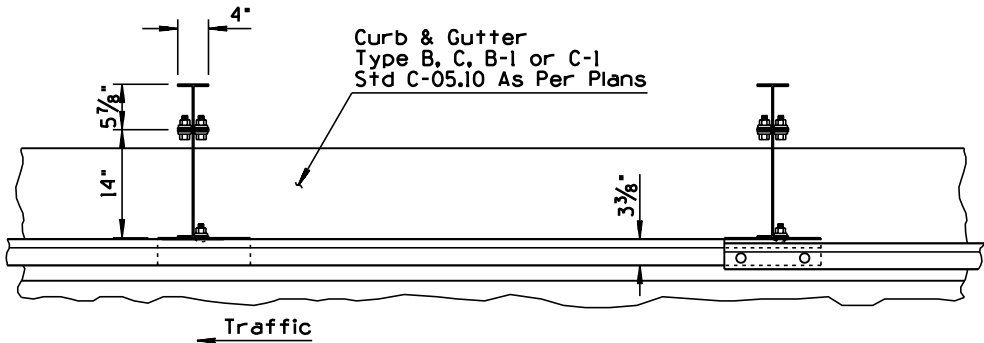
● - Indicates ARTBA designation

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	G4(1S) BLOCKED OUT W BEAM (STEEL POST)	DRAWING NO. C-10.21

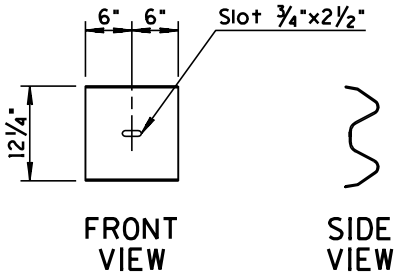
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED TIMBER POST OPTION ON SHEET 2	PNB	10/95
2	DELETED REFERENCES TO GUTTER CROSS SLOPE	PNB	10/95
3	MODIFIED NOTE	BAF	7/97
4			

GENERAL NOTES

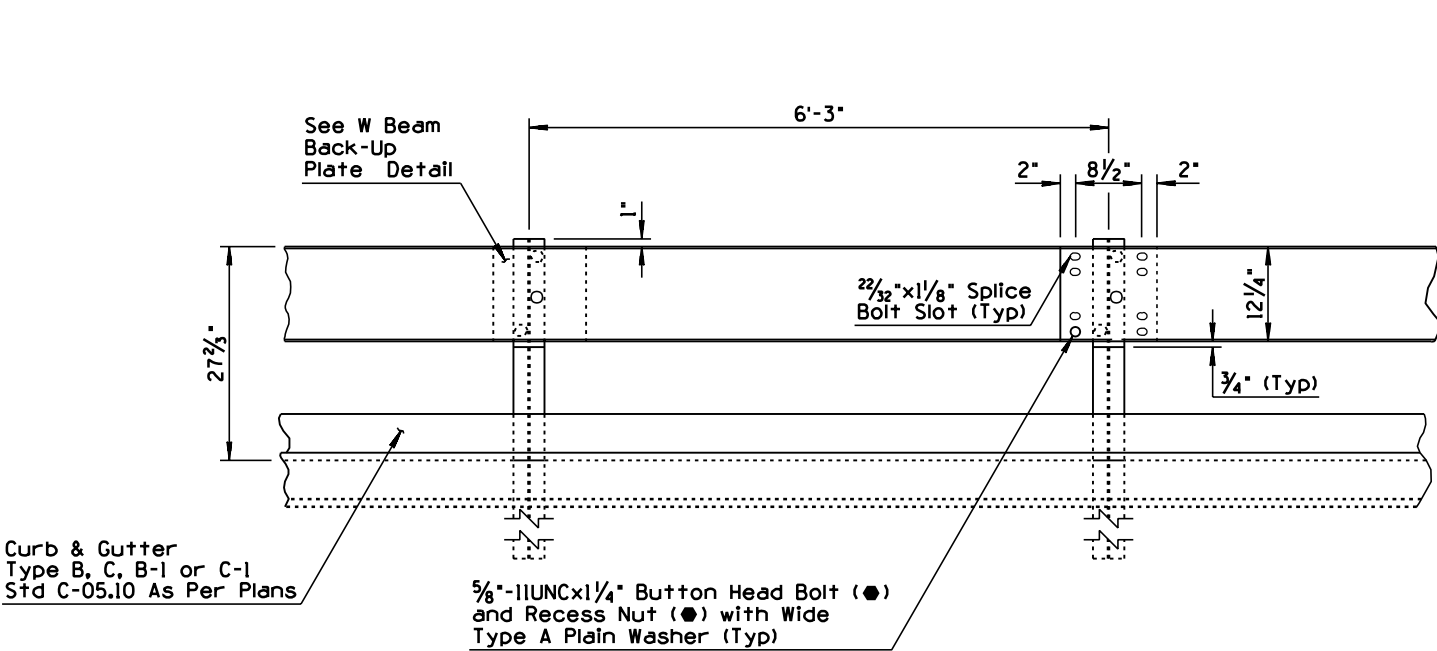
- Height of curb shall not exceed 4 inches.
- Indicates ARTBA designation



PLAN

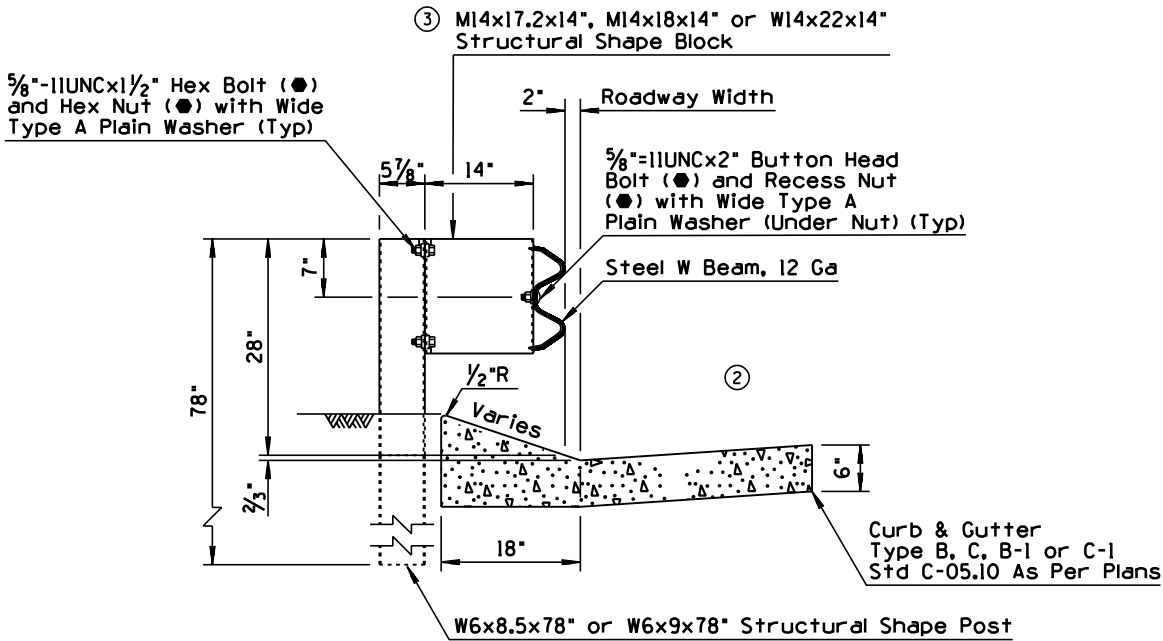


W BEAM BACK-UP PLATE DETAIL



ELEVATION

G4(1S-MODIFIED)



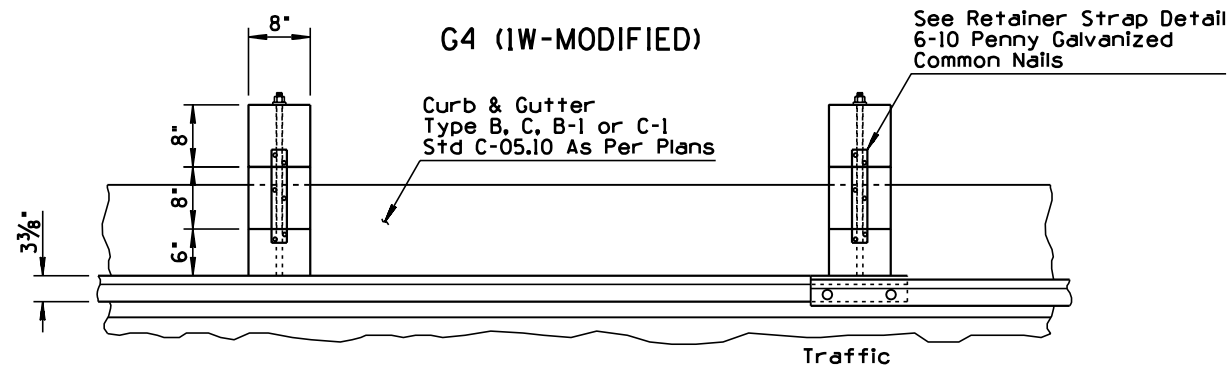
SECTION

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	G4(MODIFIED) BLOCKED OUT W BEAM WITH SPECIAL CURB AND GUTTER G4(1S-MODIFIED) (STEEL POST)	DRAWING NO. C-10.22 Sheet 1 of 2

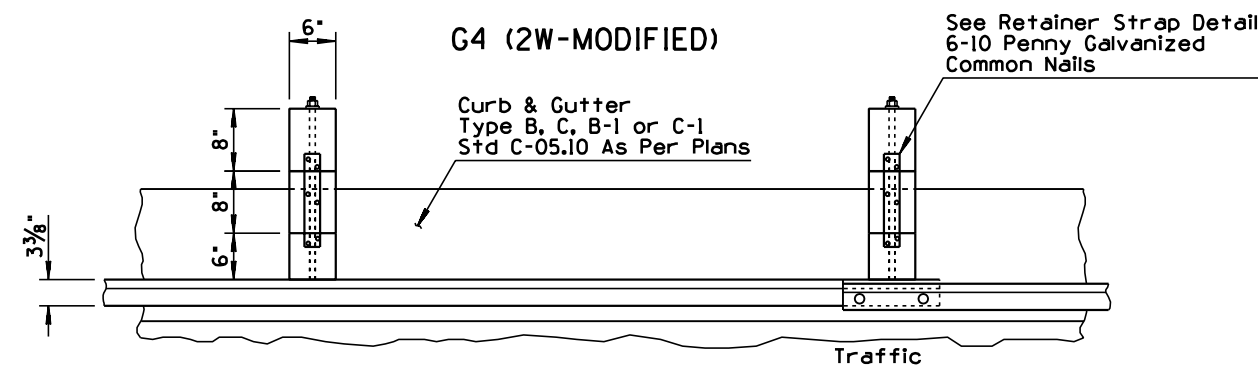
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

GENERAL NOTES

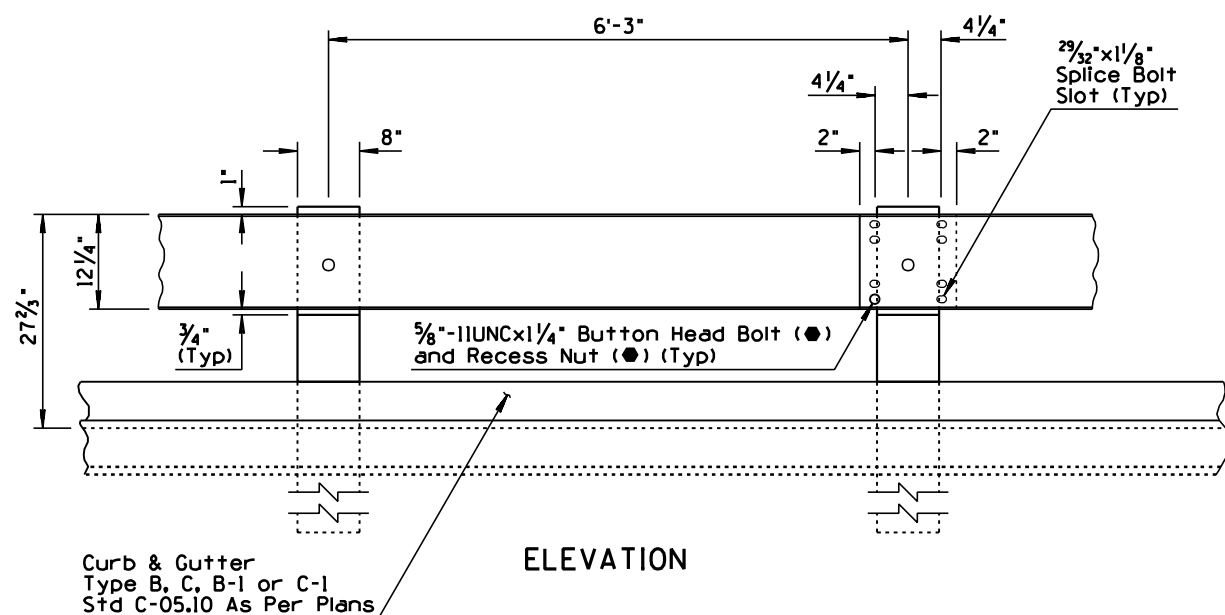
● - Indicates ARTBA designation



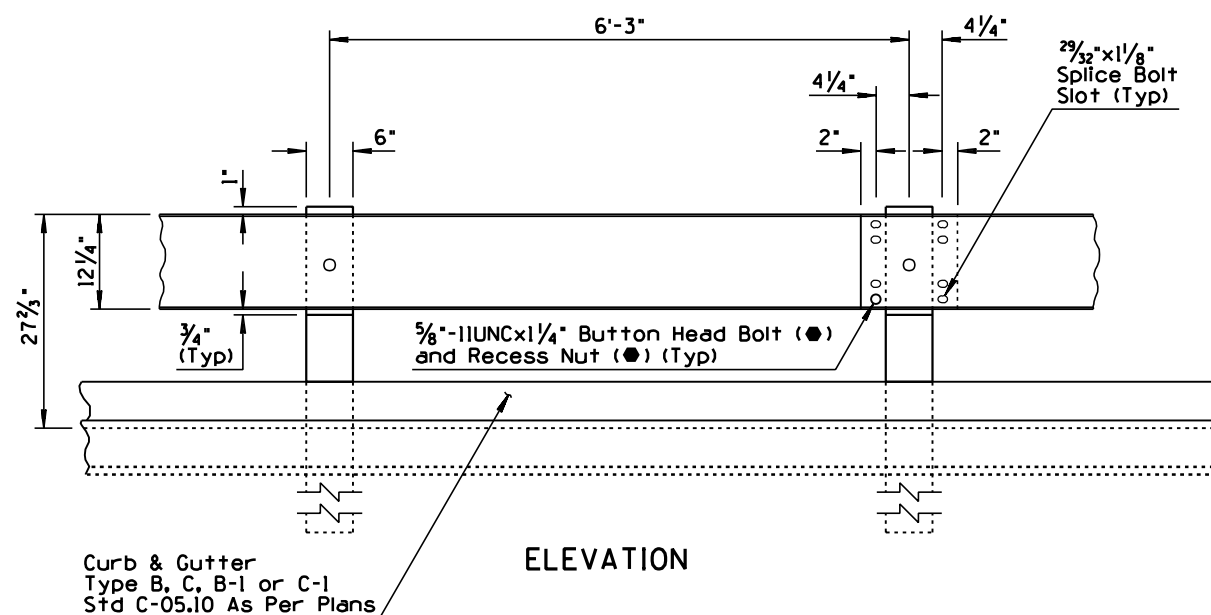
PLAN



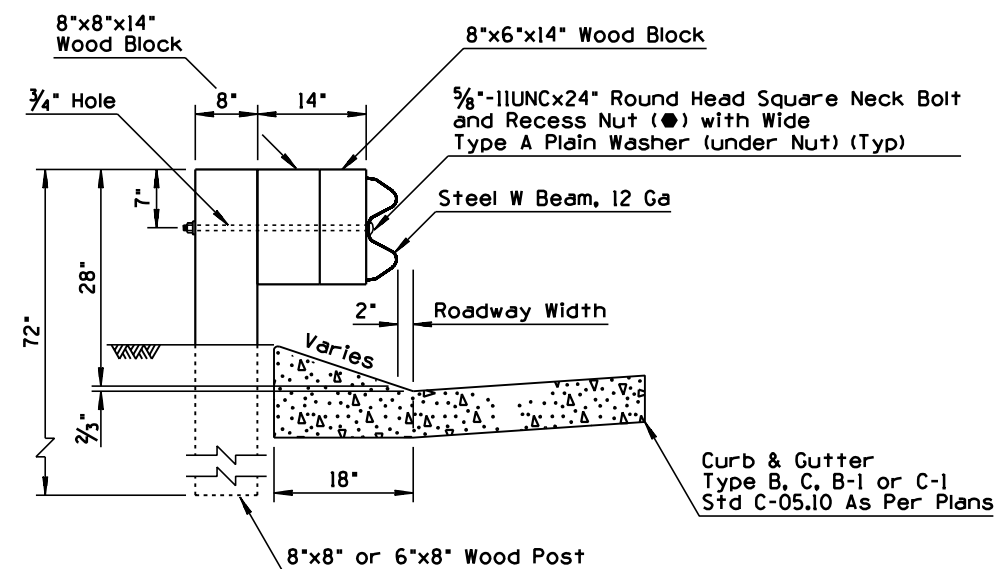
PLAN



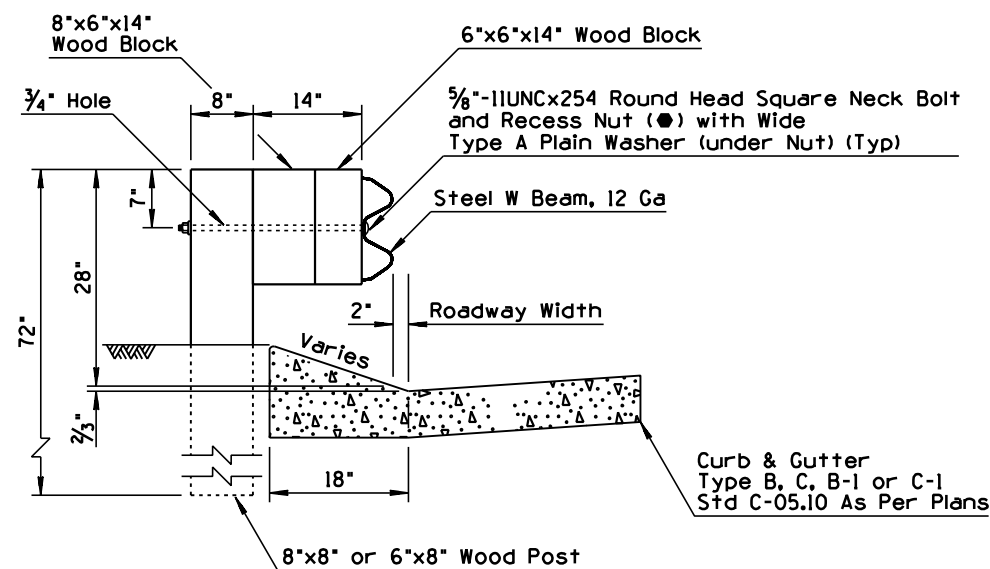
ELEVATION



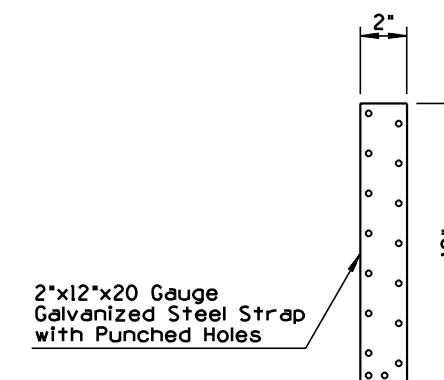
ELEVATION



SECTION G4(1W-MODIFIED)



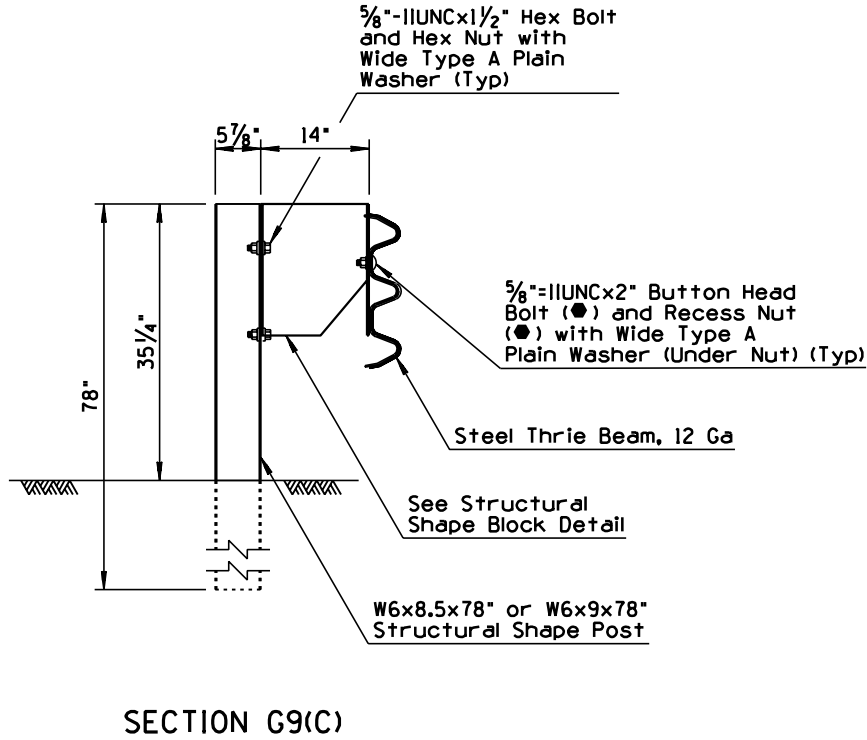
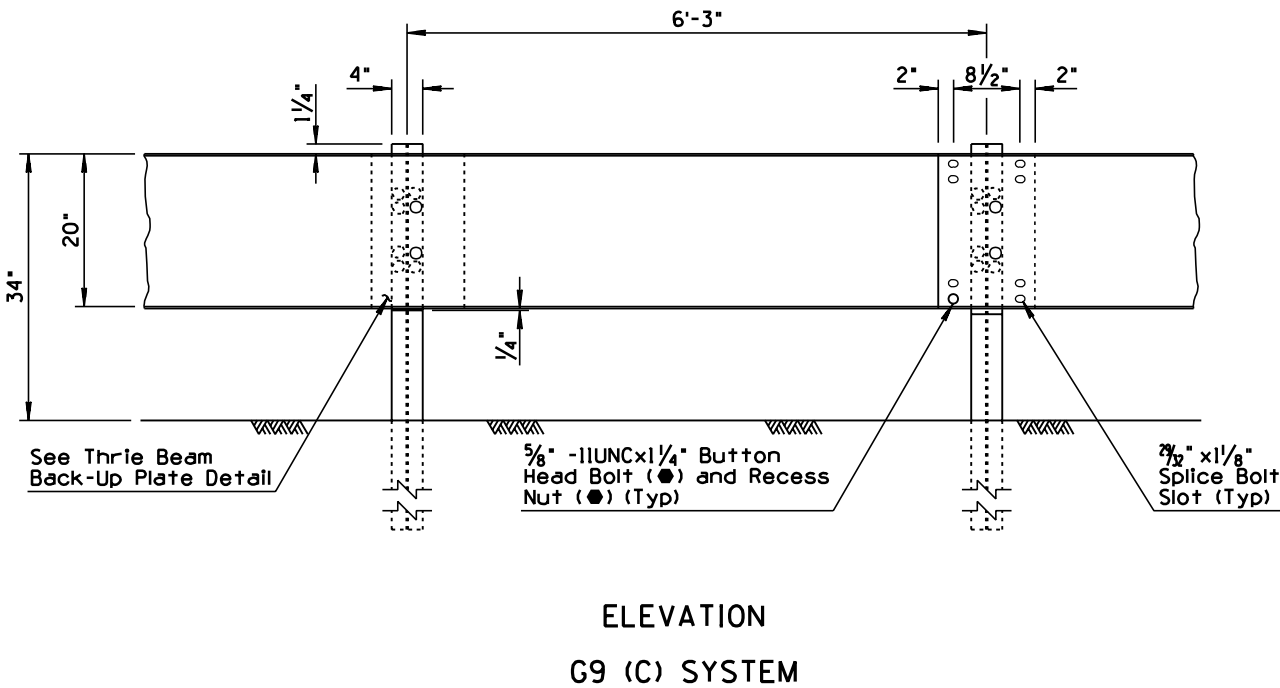
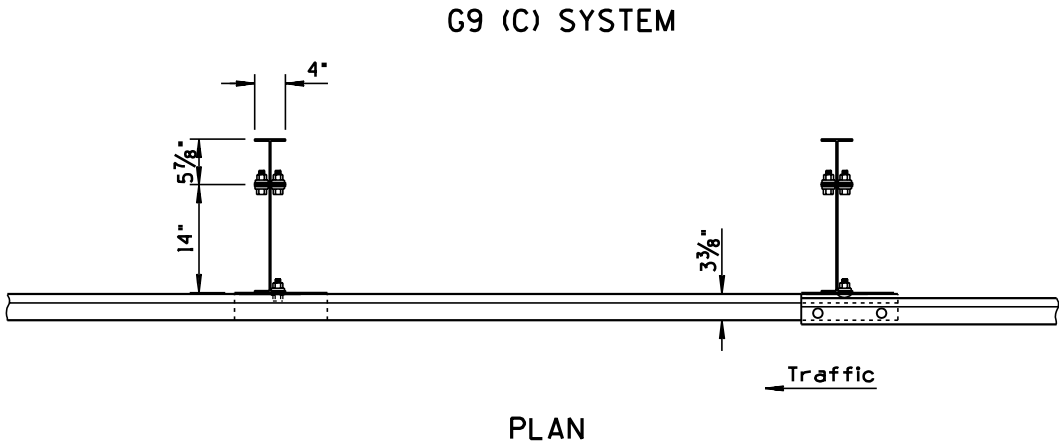
SECTION G4(2W-MODIFIED)



RETAINER STRAP DETAIL

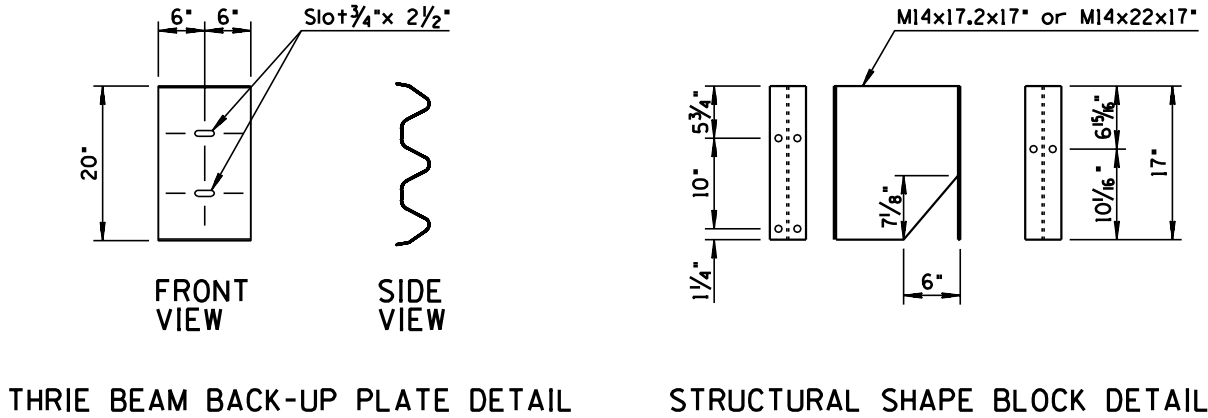
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	ISSUE 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	G4(MODIFIED) BLOCKED OUT W BEAM WITH SPECIAL CURB AND GUTTER G4(1W) AND G4(2W) (TIMBER POST)	DRAWING NO. C-10.22 Sheet 2 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED NUMBER FROM C-10.08	PNB	7/94
2			
3			
4			



GENERAL NOTES

● - Indicates ARTBA designation

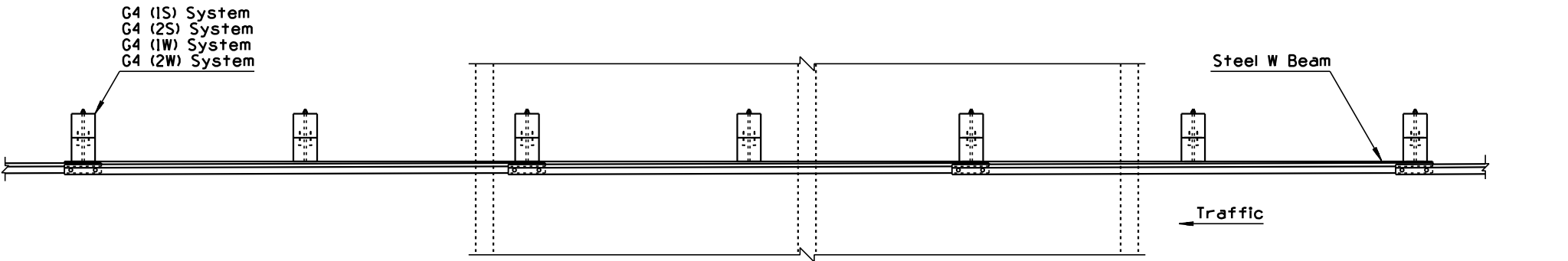


DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	G9(C) BLOCKED OUT THRIE BEAM (STEEL POST)	DRAWING NO. ① C-10.24

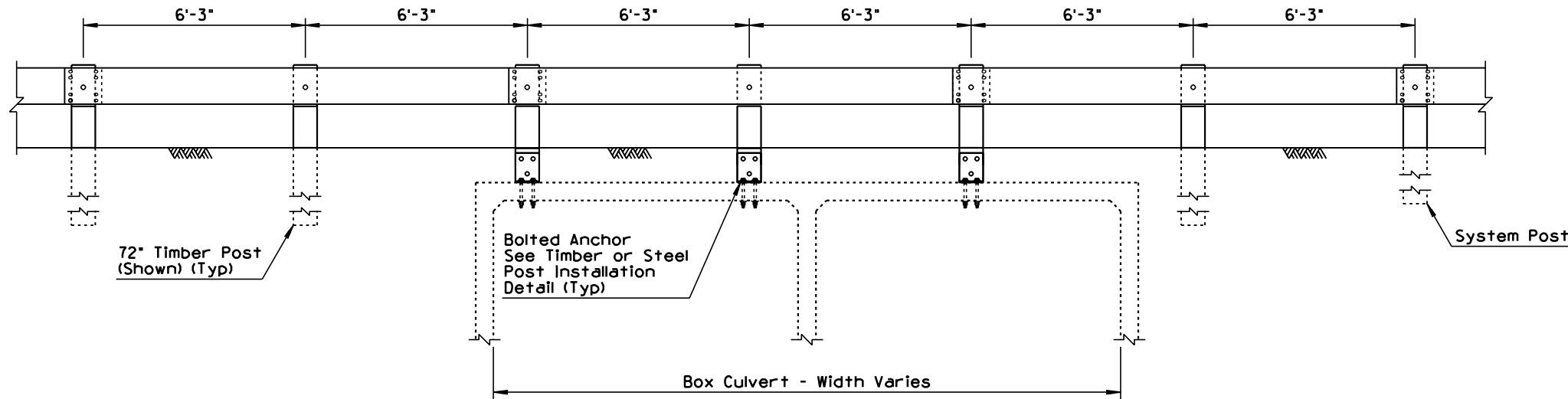
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED C-STANDARD CALLOUTS	PNB	10/95
2			
3			
4			

GENERAL NOTES

- ① 1. See Std C-10.20 and C-10.21 for additional information and dimensions.



PLAN



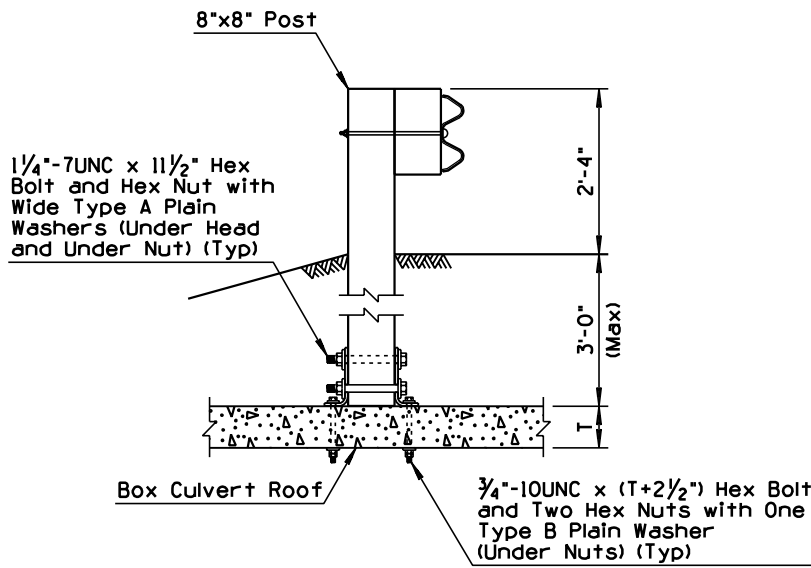
ELEVATION
BOLTED ANCHOR
BOX CULVERT INSTALLATION

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	BOLTED ANCHOR GUARD RAIL	DRAWING NO. C-10.29 Sheet 1 of 2

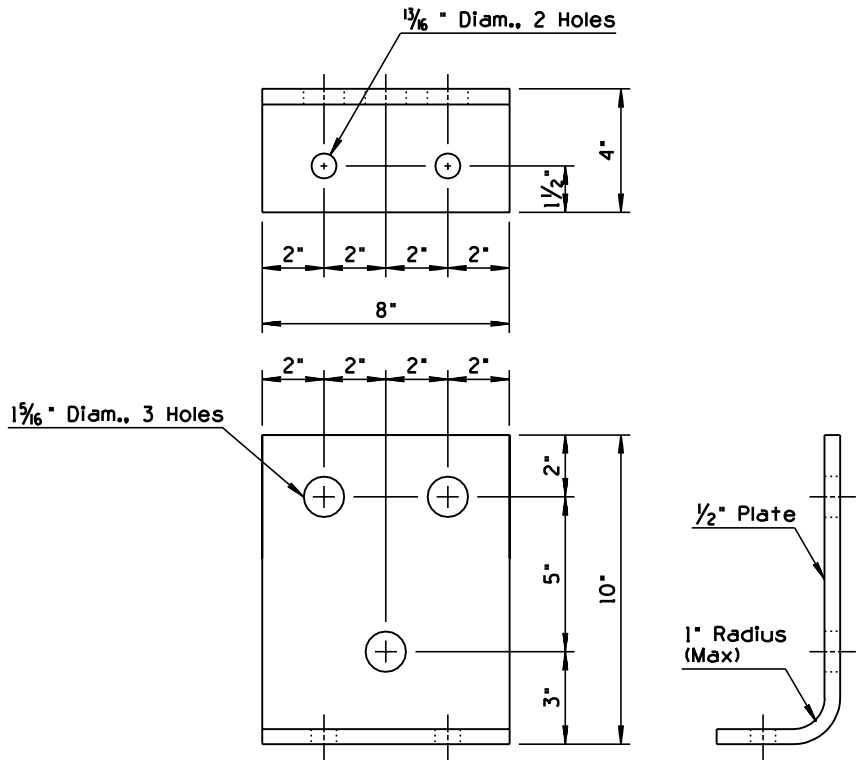
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STD FROM C-10.23 & C-10.24	PNB	3/94
2			
3			
4			

GENERAL NOTES

1. Drill through top of box culvert with rotary drill.
2. Bracket may be made of one piece hot bent, or two pieces welded together.
3. Short timber posts anchored to box culvert roof shall be 8" x 8" only.

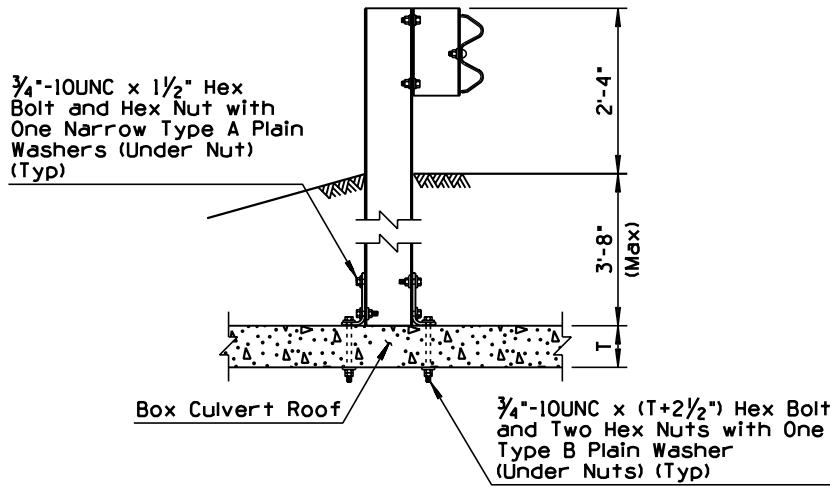


INSTALLATION DETAIL

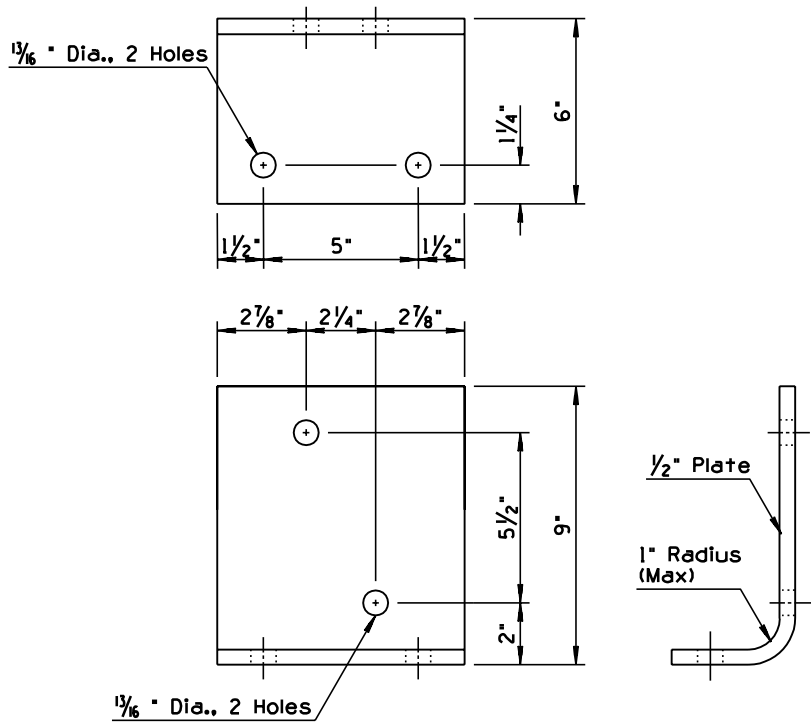


BRACKET DETAIL

BOLTED ANCHOR
TIMBER POST INSTALLATION DETAIL



INSTALLATION DETAIL



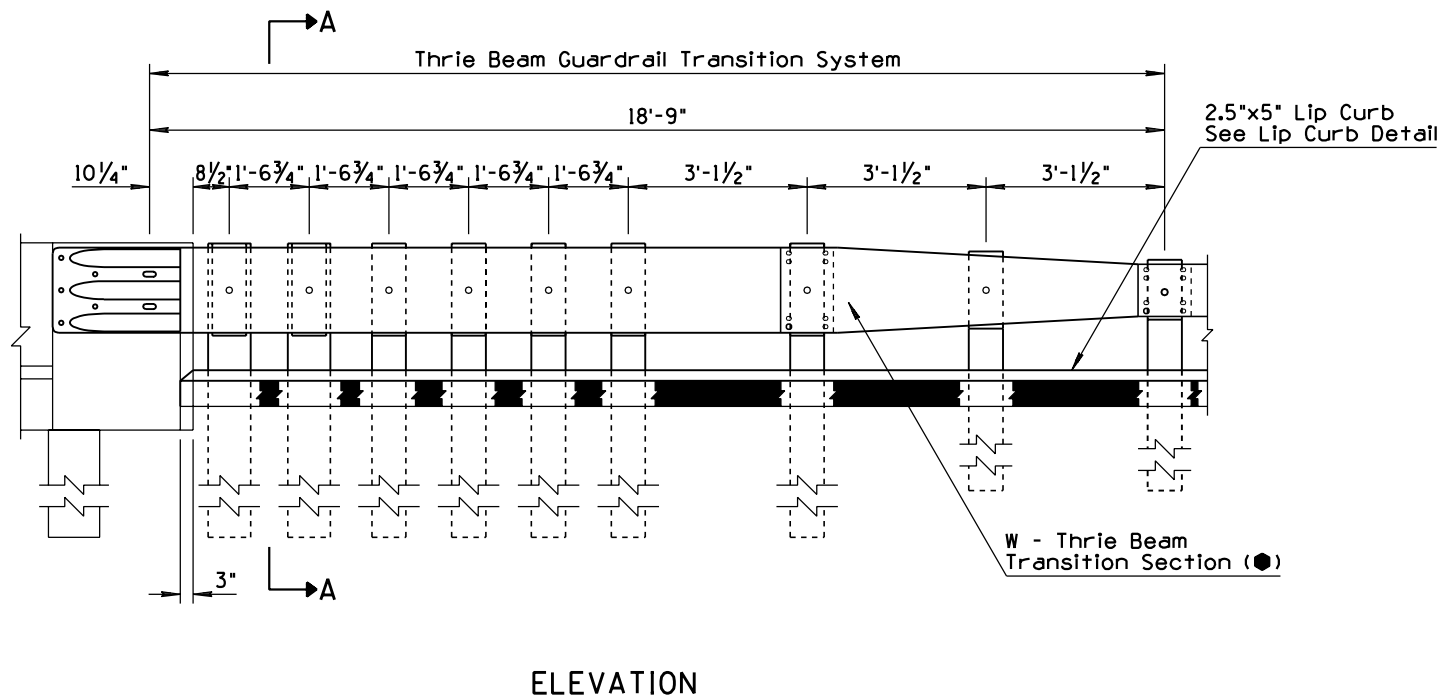
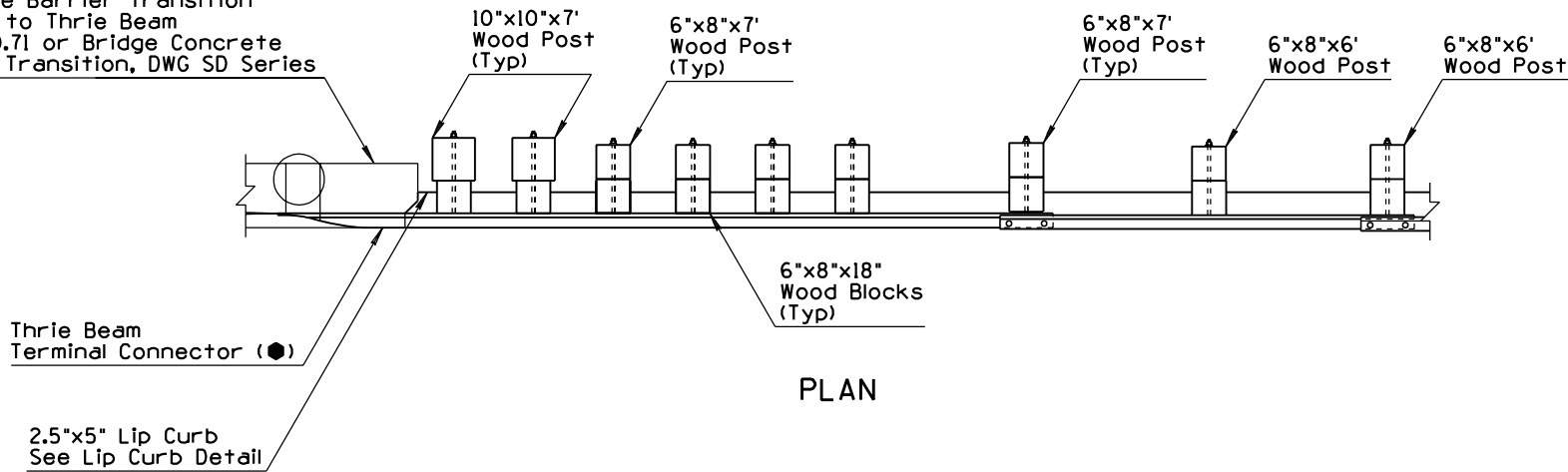
BRACKET DETAIL

BOLTED ANCHOR
STEEL POST INSTALLATION DETAIL

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	3/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① BOLTED ANCHOR GUARD RAIL	DRAWING NO. C-10.29 Sheet 2 of 2

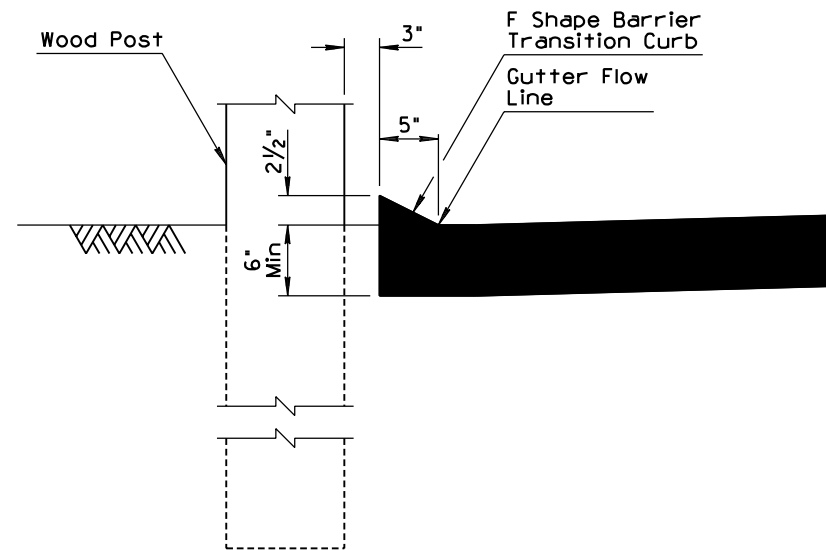
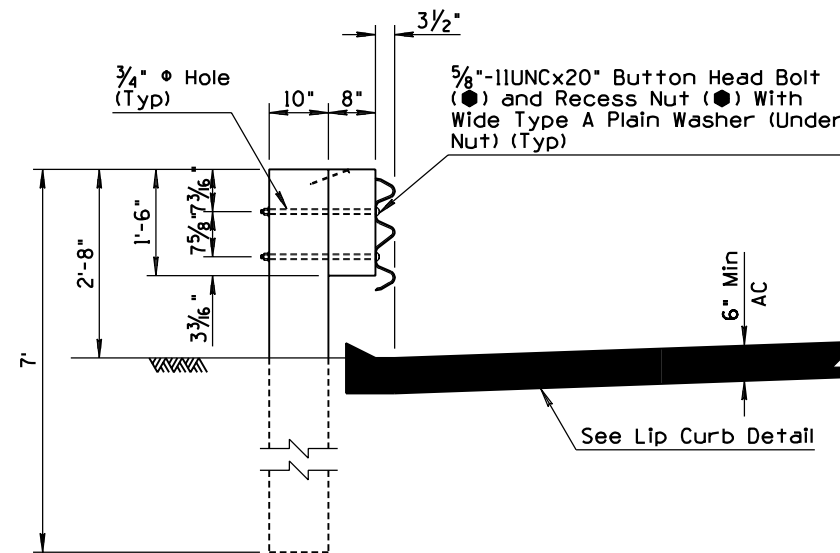
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED STANDARD	JNP	4/00
2			
3			
4			

Concrete Barrier Transition
Type 'F' to Thrie Beam
Std C-10.71 or Bridge Concrete
Barrier Transition, DWG SD Series



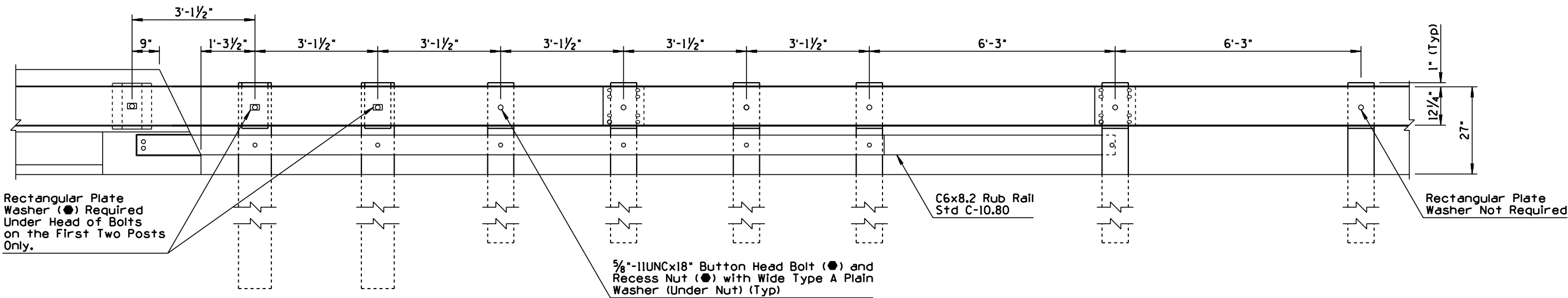
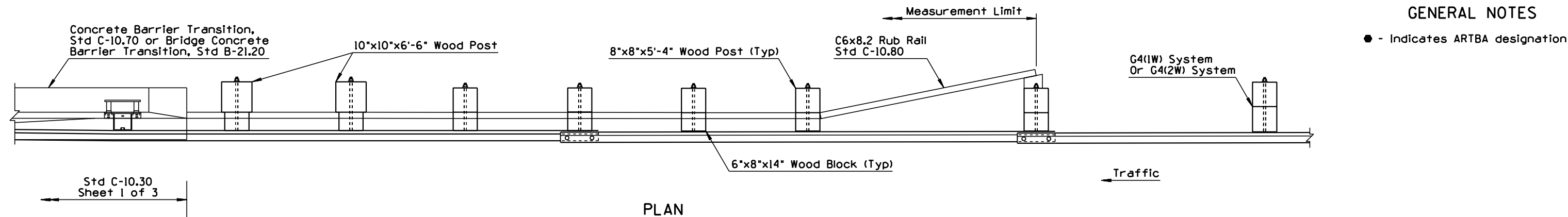
GENERAL NOTES

1. Curb not required when drainage flows transversely away from barrier.
 2. Treatment at back of lip curb modified for constructability purposes. Front slope and height of lip curb shall not be exceeded.
- - Indicate ARTBA designation.

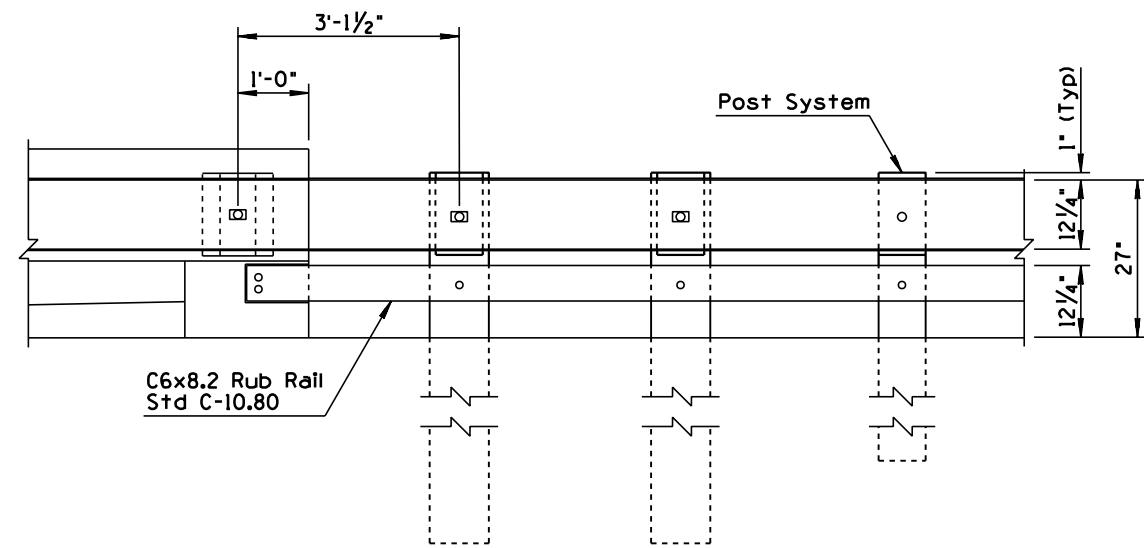


DESIGN APPROVED <i>Henry H. Ottaviano</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 4/00
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GUARD RAIL TRANSITION THRIE BEAM TO CONCRETE HALF BARRIER 32" ① TYPE 'F' (APPROACH) (AC PAVEMENT)	DRAWING NO. C-10.30

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



Guard Rail Transition (Timber Post)



Note:
For Notes and Dimensions Not Shown,
See Guard Rail Transition Above.

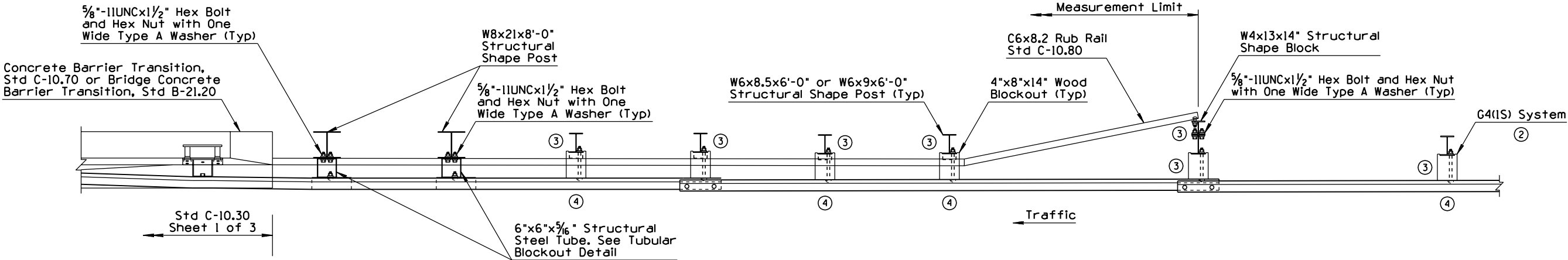
Guard Rail Transition To Existing Concrete Barrier Transition

DESIGN APPROVED <i>Joseph H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GUARD RAIL TRANSITION W BEAM TO CONCRETE HALF BARRIER (APPROACH)	DRAWING NO. C-10.30 Sheet 2 of 3

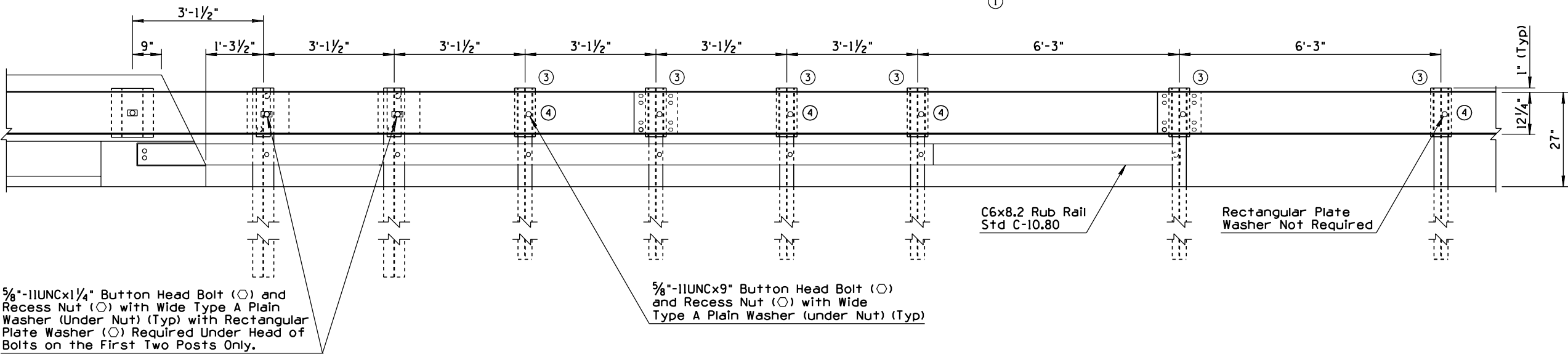
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	DELETED NOTE	BAF	7/98
2	MODIFIED NOTE	BAF	7/98
3	CHANGED BLOCK-OUT	BAF	7/98
4	DELETED BACK-UP PLATE	BAF	7/98

GENERAL NOTES

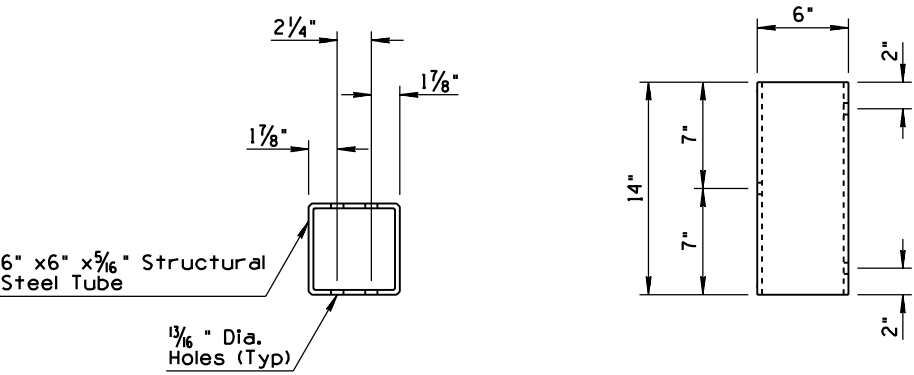
○ - Indicates ARTBA designation



PLAN



ELEVATION



TUBULAR BLOCKOUT DETAIL

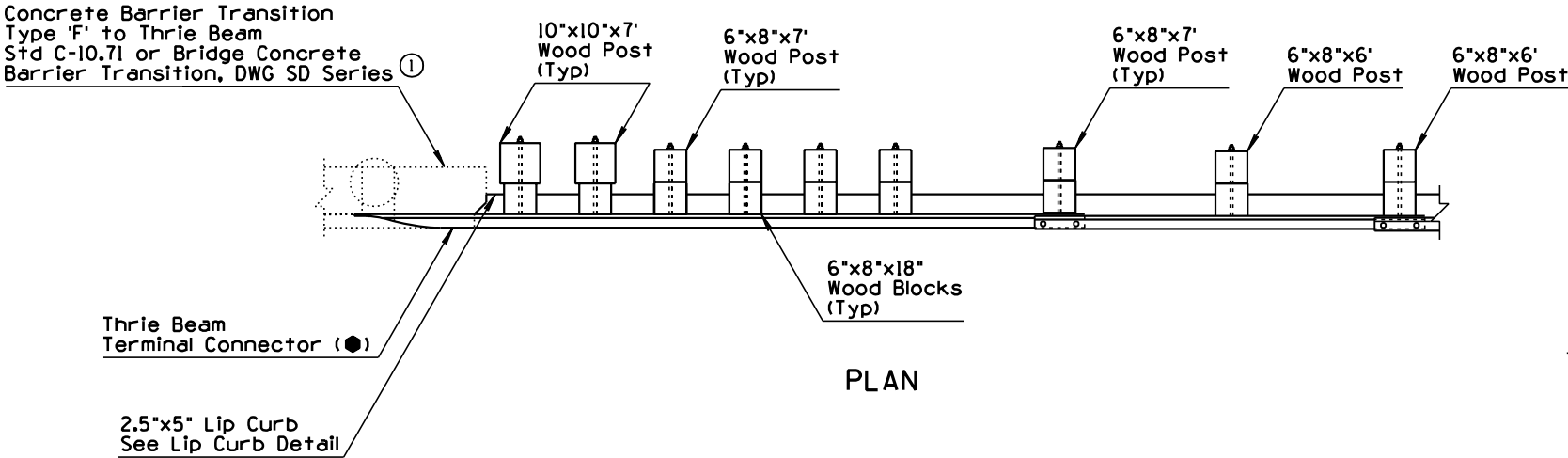
Guard Rail Transition
(Steel Post)

DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	8/98
APPROVED FOR DISTRIBUTION	GUARD RAIL TRANSITION, W BEAM TO CONCRETE HALF BARRIER (APPROACH)	DRAWING NO. C-10.30 Sheet 3 of 3

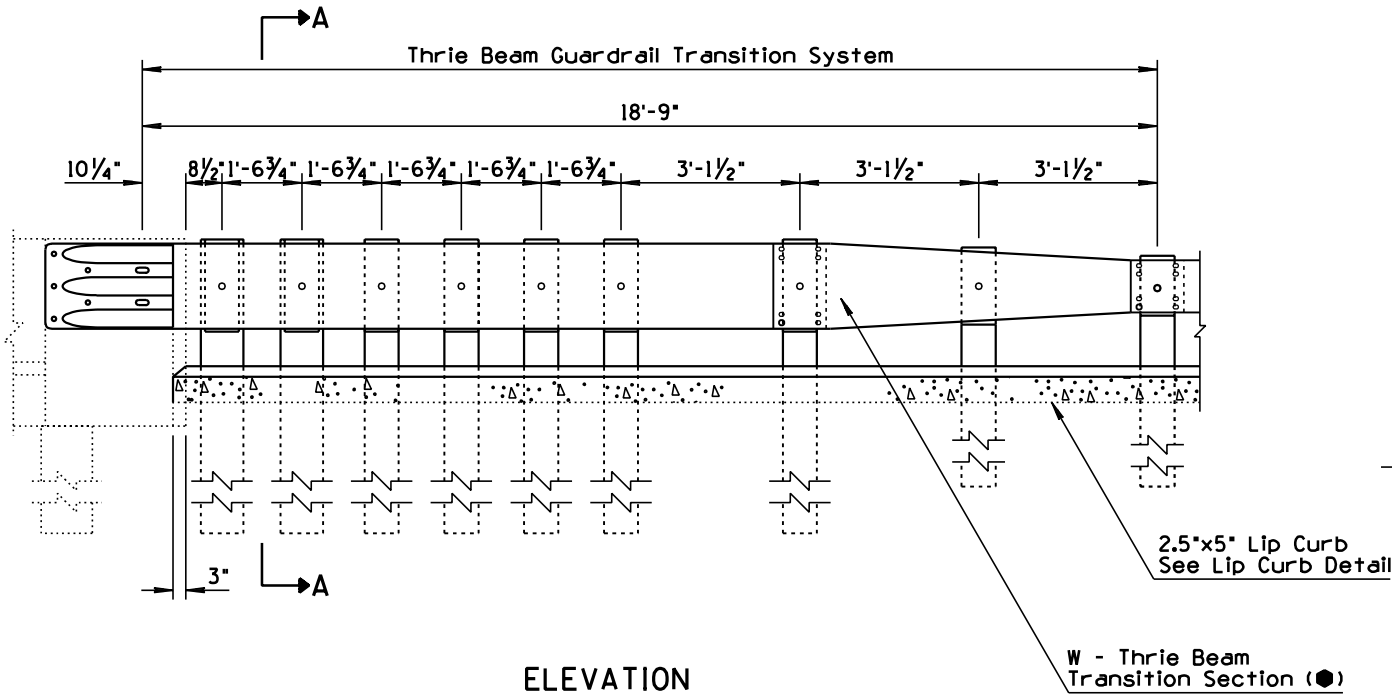
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED NOTE	JNP	4/00
2			
3			
4			

GENERAL NOTES

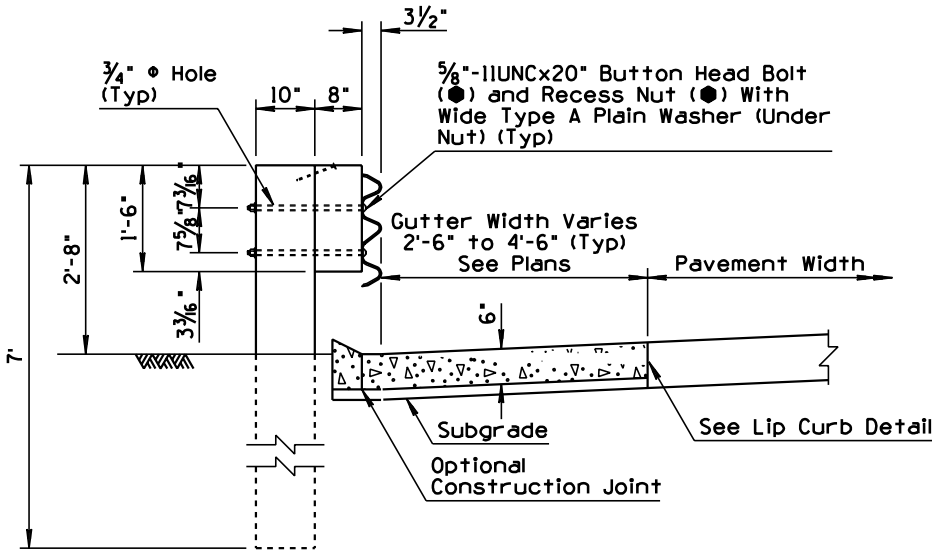
- Two inch deep contraction joints shall be placed in the curb and the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.
 - Curb not required when drainage flows transversely away from barrier.
- - Indicate ARTBA designation.



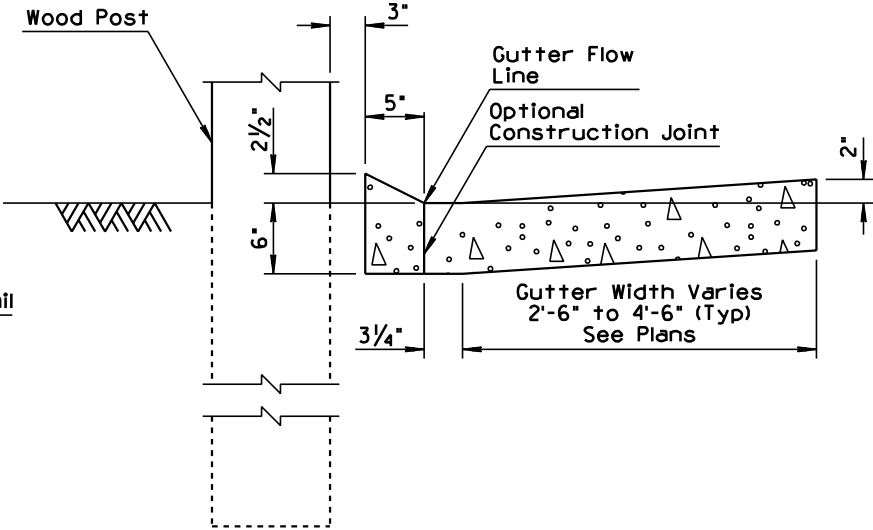
PLAN



ELEVATION



SECTION A-A



LIP CURB DETAIL

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 4/00
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GUARD RAIL TRANSITION THRIE BEAM TO CONCRETE HALF BARRIER 32" TYPE 'F' (APPROACH)		DRAWING NO. C-10.31

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

Concrete Barrier Transition,
Std C-10.70 or Bridge Concrete
Barrier Transition, Std B-21.19

Terminal Connector
Anchor Assembly
Std C-10.70 & C-10.74

Measurement Limit

Ferrule Wing
Nut Block Anchor
Std C-10.70 & C-10.74

Block Anchor
Assembly (Typ)
Std C-10.70 & C-10.74

W Beam Back Up Plate
All Non Lap Connections

C6x8.2 Rub Rail
Std C-10.80

W Beam Terminal
Connector (○)

Traffic

Block 1
Std C-10.39

Block 2
Std C-10.39

Block 3
Std C-10.39

Block 4
Std C-10.39

Block 5
Std C-10.39

PLAN

Std C-10.31
Sheet 2 of 3 or
Sheet 3 of 3

7/8"-9UNCx3" Bolt
With 7/8" Narrow
Type B Plain Washer
(Under Head)

25' Nested W Beam

7 5/8"

3 1/2"

3 1/2"

4"

2"

1'-3/4"

3'-1 1/2"

3'-1 1/2"

3'-1 1/2"

3'-1 1/2"

9"

5/8"-11UNCx1 1/2" Hex Bolt (Typ)

C6x8.2 Rub Rail
Std C-10.80

5/8"-11UNCx1 1/4" Button Head Bolts (○)
and Recess Nut (○) with 1" Narrow
Type A Plain Washer (Under Head) (Typ)
This Splice Connection Only

3/4"-10UNCx3" Hex Bolt with
3/4" Narrow Type A Plain Washer
(Under Head). Anchor with 2 Bolts
(At opposite corners) (Typ)

Rectangular Plate Washer (○)
Required Under Head of Five
Bolts Along Concrete Transition

ELEVATION

Guard Rail Transition

Note:
For Notes and Dimensions Not Shown,
See Guard Rail Transition Above

Existing Concrete
Barrier Transition

1'-0"

12 1/4"

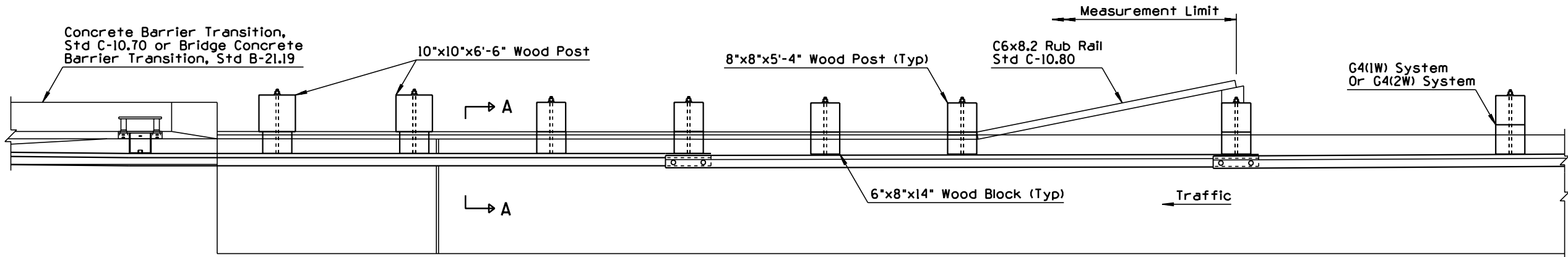
27"

ELEVATION

Guard Rail Transition
To Existing Concrete
Barrier Transition

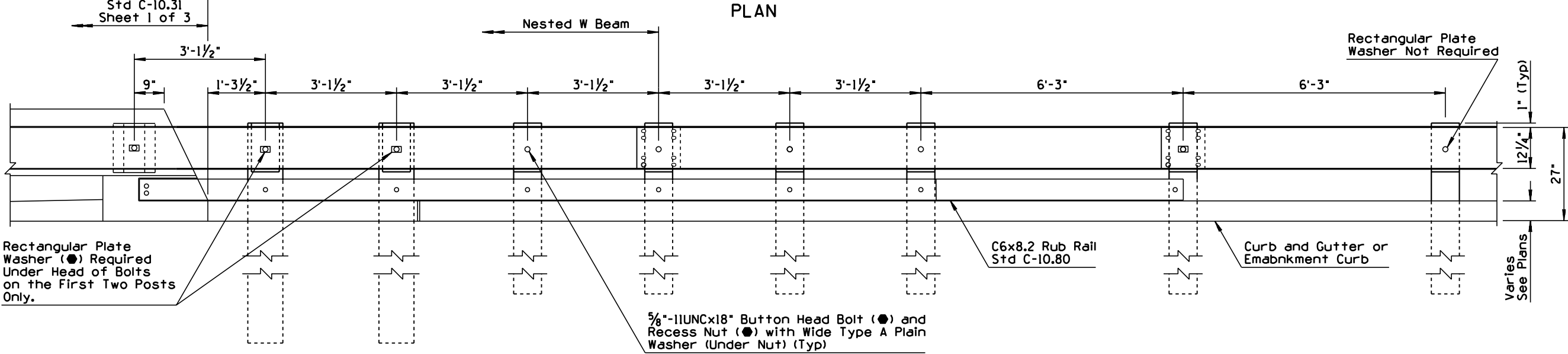
DESIGN APPROVED <i>Terry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GUARD RAIL TRANSITION W BEAM TO CONCRETE HALF BARRIER (APPROACH)(WITH CURB)	DRAWING NO. C-10.31 Sheet 1 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



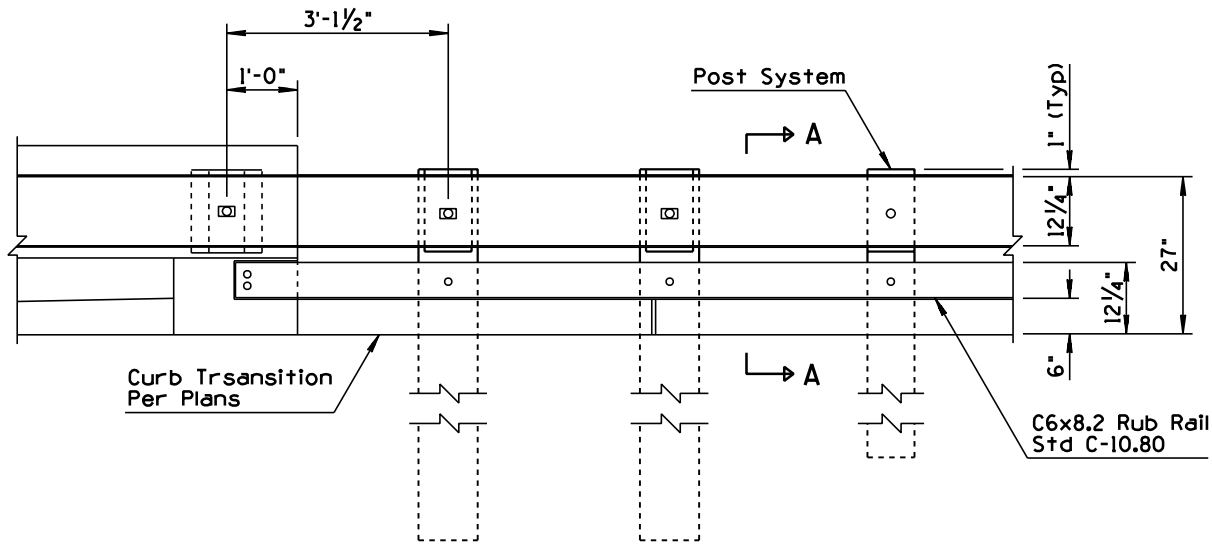
GENERAL NOTES

○ - Indicates ARTBA designation



ELEVATION

Guard Rail Transition (Timber Post)

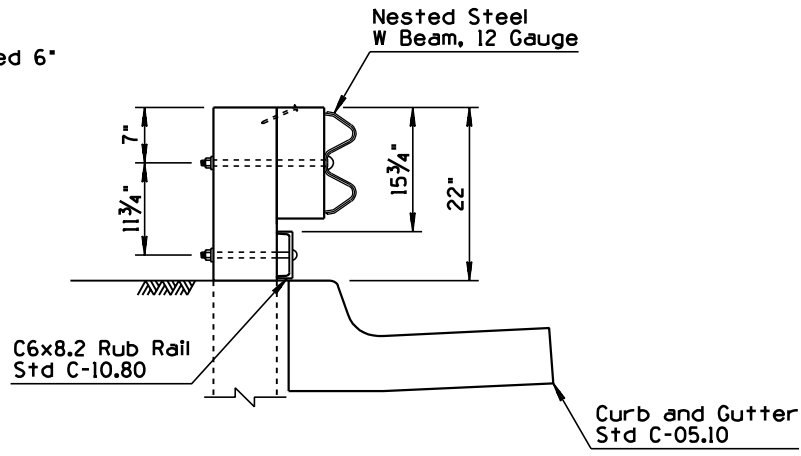


ELEVATION

Note:
For Notes and Dimensions Not Shown,
See Guard Rail Transition Above.

Guard Rail Transition To Existing Concrete Barrier Transition

Note:
Curb Height Shall Not Exceed 6"
When Adjacent to Rub Rail.



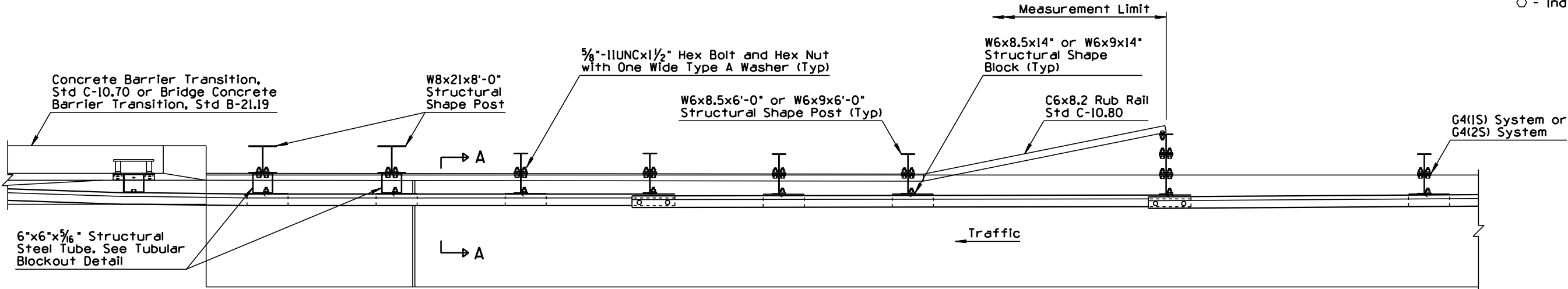
SECTION A-A

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GUARD RAIL TRANSITION W BEAM TO CONCRETE HALF BARRIER (APPROACH) (WITH CURB)	DRAWING NO. C-10.31 Sheet 2 of 3

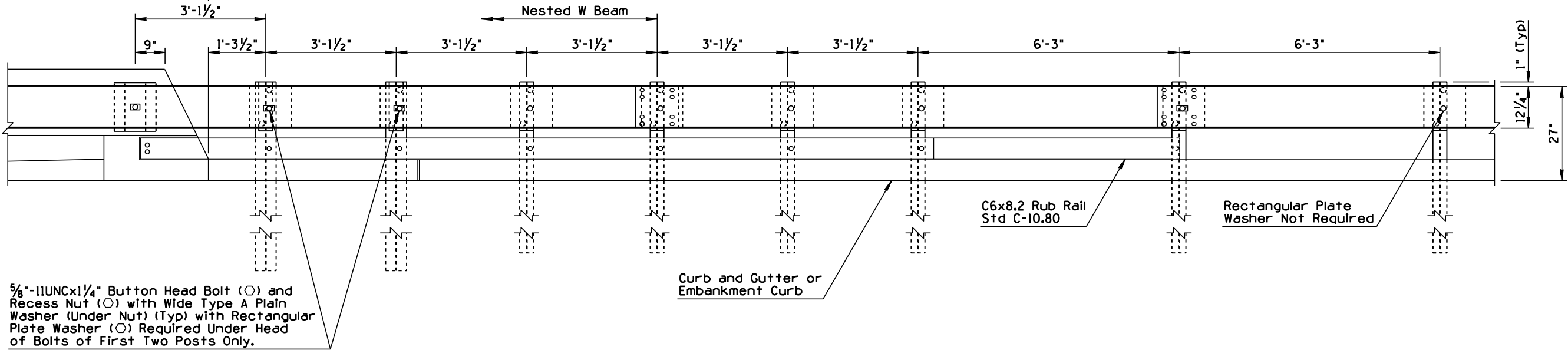
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

GENERAL NOTES

○ - Indicates ARTBA designation

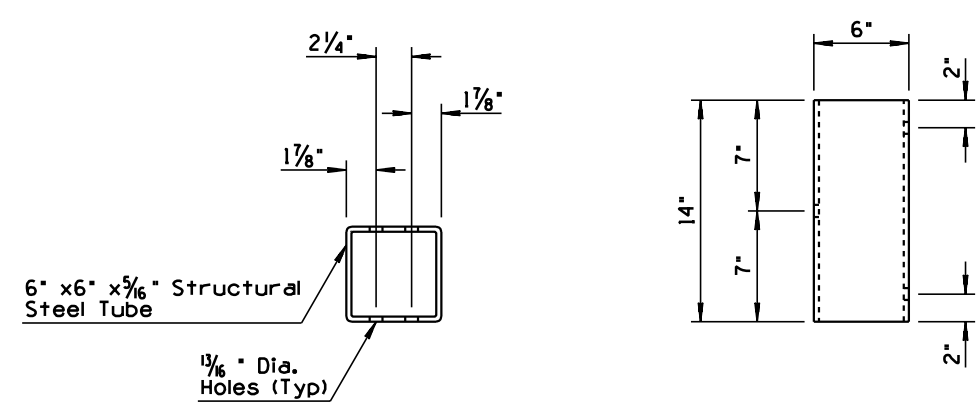


PLAN

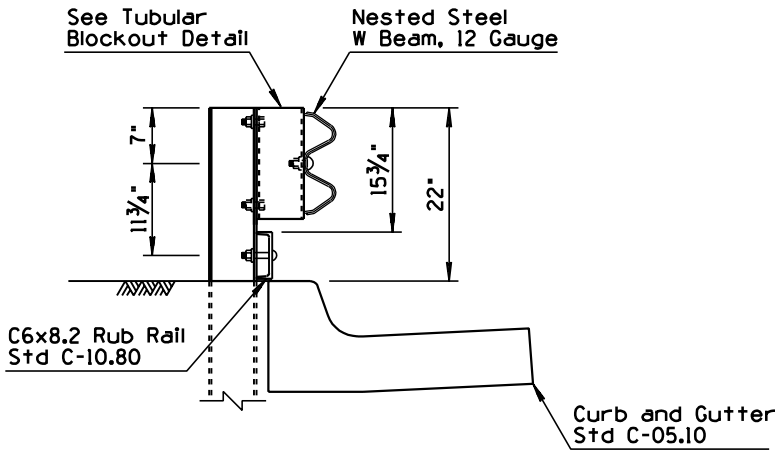


ELEVATION

Guard Rail Transition (Steel Post)



TUBULAR BLOCKOUT DETAIL

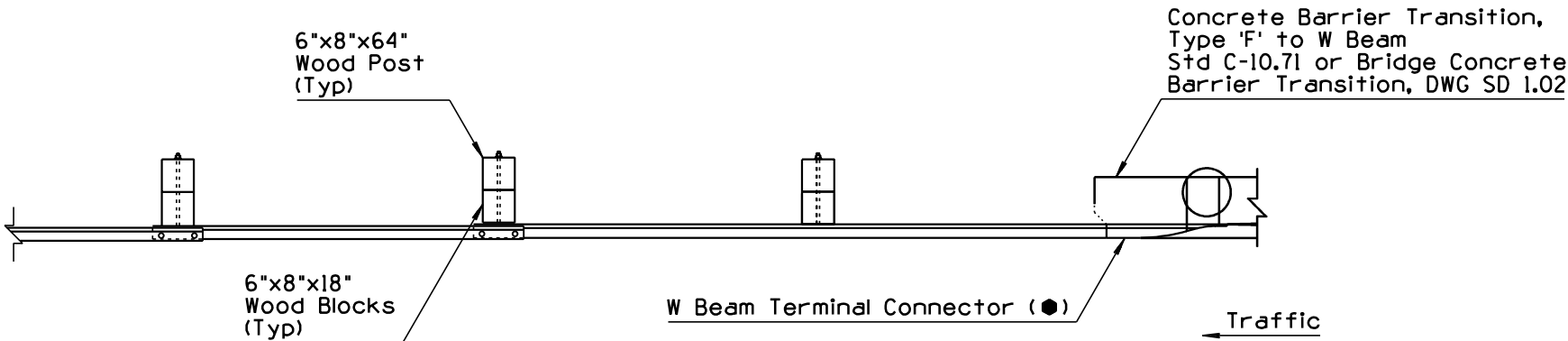


SECTION A-A

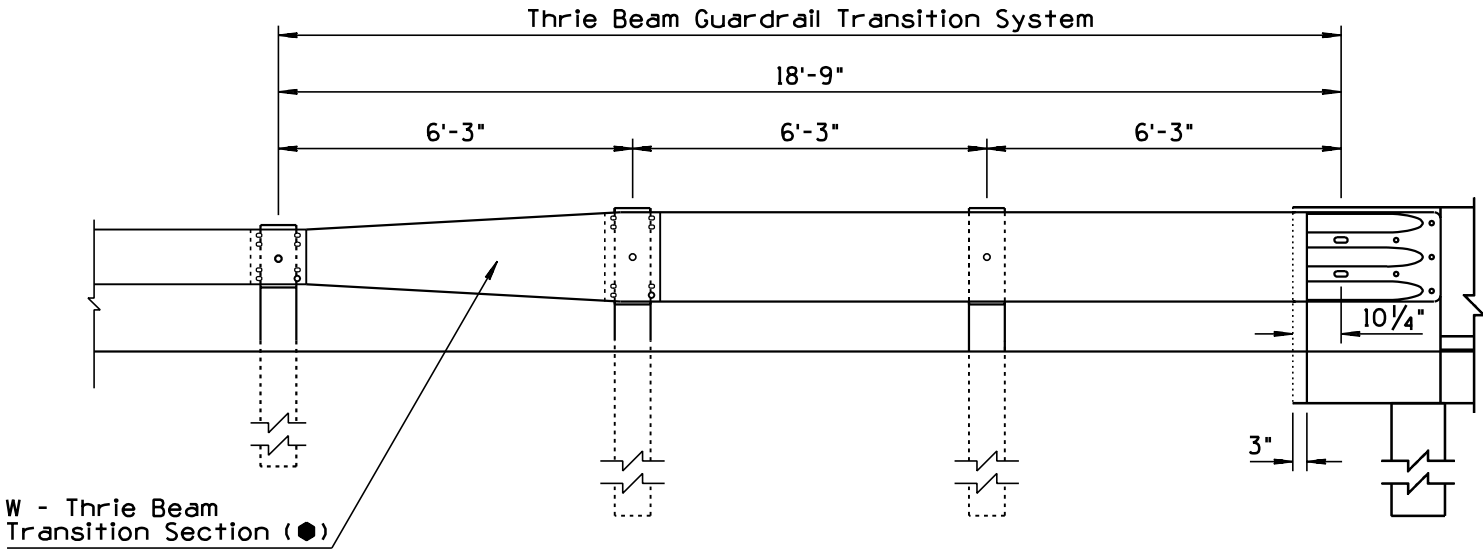
Note:
Curb Height Shall Not Exceed 6"
When Adjacent to Rub Rail.

DESIGN APPROVED <i>Joseph H. Ottaviano</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GUARD RAIL TRANSITION, W BEAM TO CONCRETE HALF BARRIER (APPROACH) (WITH CURB)		DRAWING NO. C-10.31 Sheet 3 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED REFERENCE TO STD C-10.71	PNB	10/95
2	REVISED FOR DEPARTURE GUARD RAIL TRANSITION	KB	04/00
3			
4			

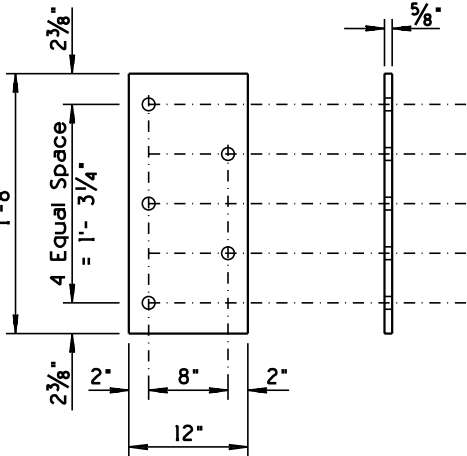
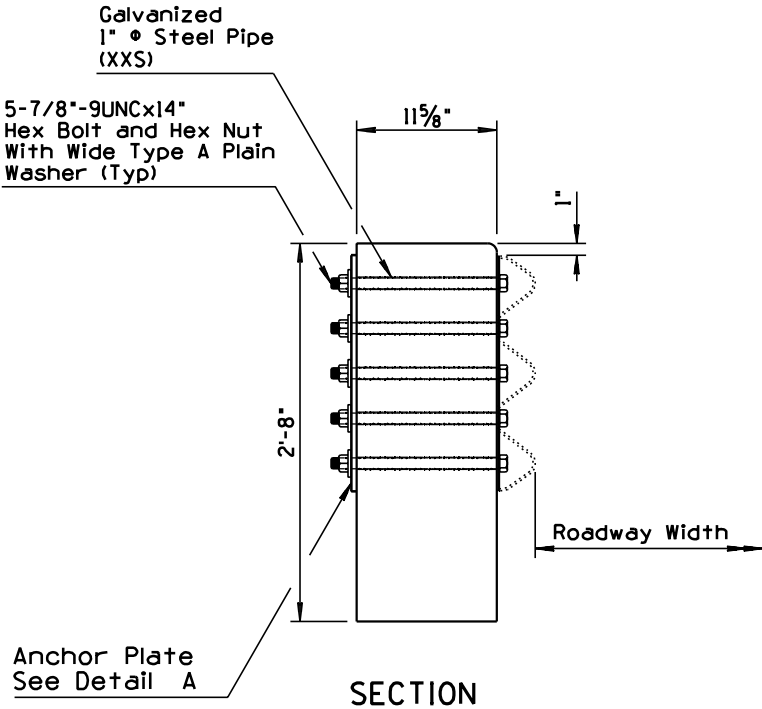


PLAN



ELEVATION

- GENERAL NOTES
- For use with one-way traffic or with two-way traffic outside the clear zone.
 - - Indicate ARTBA designation.



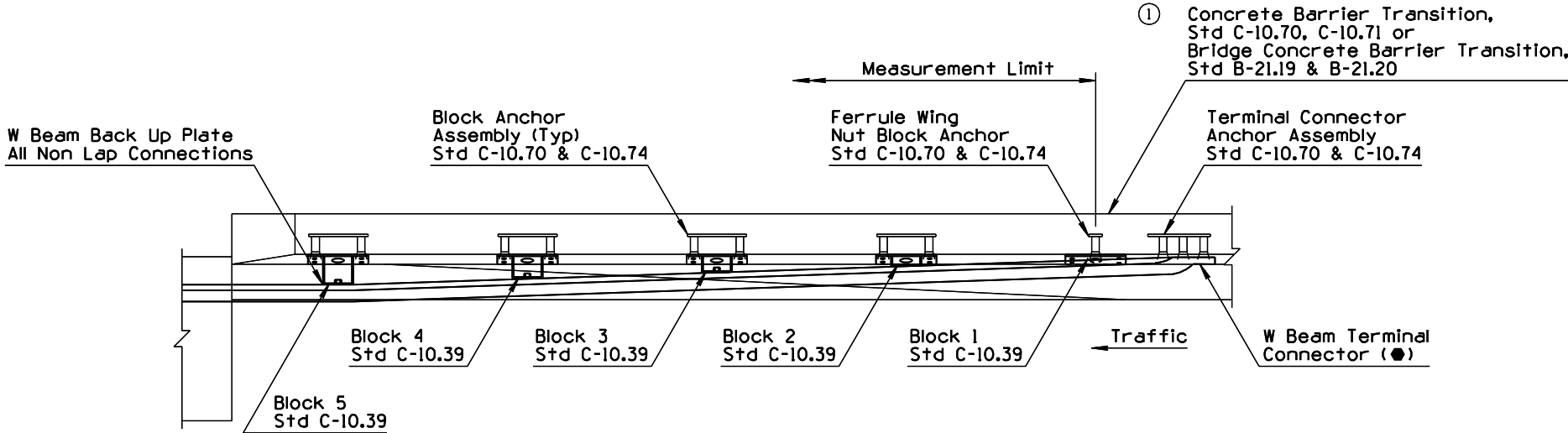
ANCHOR PLATE - DETAIL A

DESIGN APPROVED <i>Terry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 4/00
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	GUARD RAIL TRANSITION W BEAM TO 'F' SHAPED CONCRETE HALF BARRIER 32" (DEPARTURE) ②	DRAWING NO. C-10.32

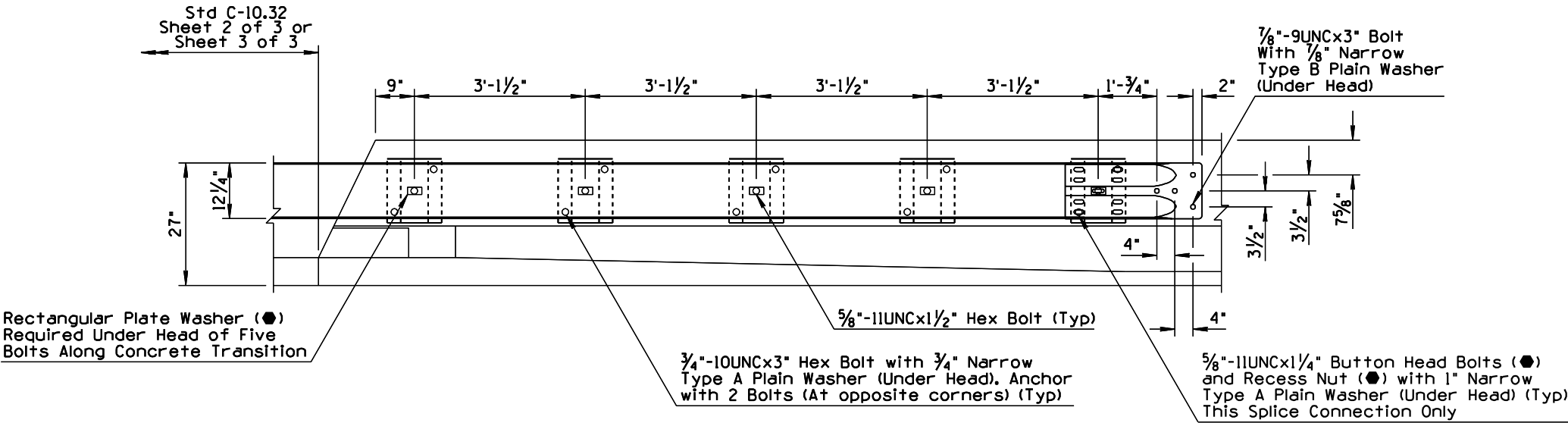
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED REFERENCE TO STD C-10.71	PNB	10/95
2			
3			
4			

GENERAL NOTES

1. For use with one-way traffic or with two-way traffic outside the clear zone.
- - Indicates ARTBA designation



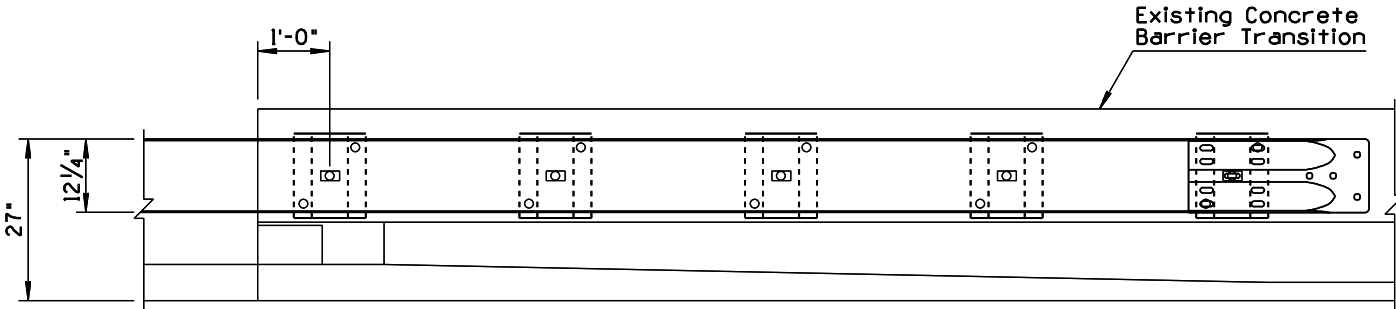
PLAN



ELEVATION

Guard Rail Transition

Note:
For Notes and Dimensions Not Shown,
See Guard Rail Transition Above

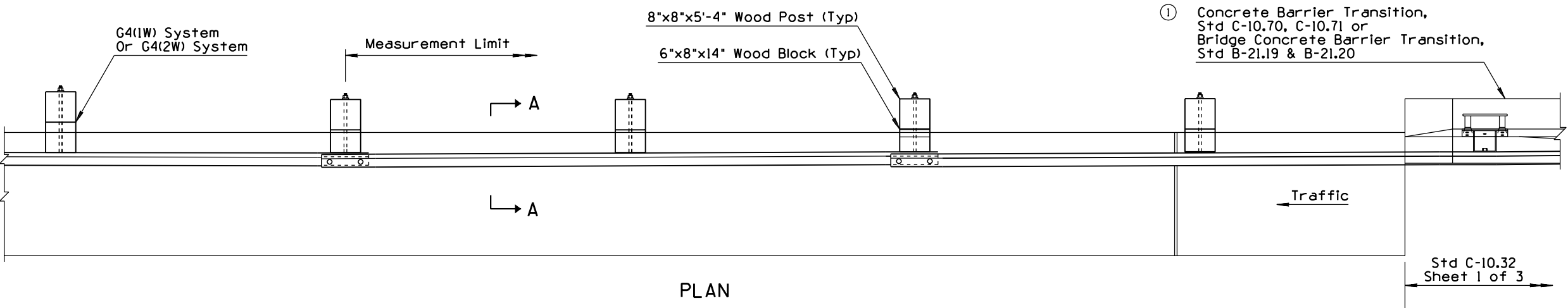


ELEVATION

Guard Rail Transition
To Existing Concrete
Barrier Transition

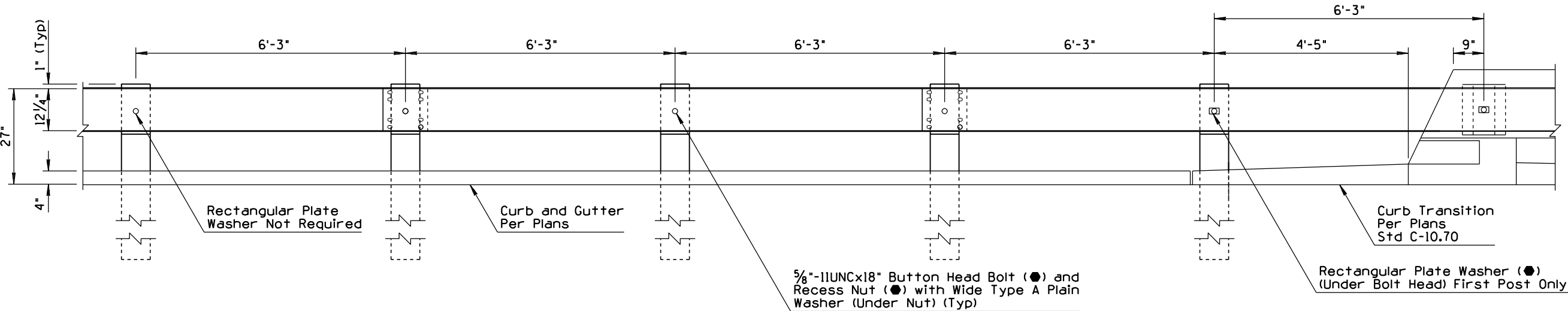
DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION		DRAWING NO. C-10.32 Sheet 1 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED REFERENCE TO STD C-10.71	PNB	10/95
2			
3			
4			



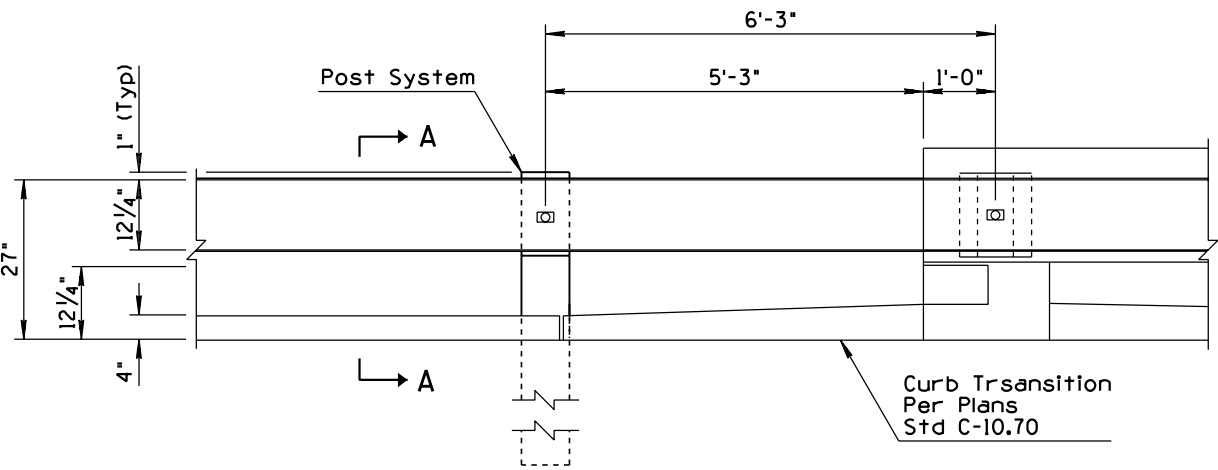
GENERAL NOTES

● - Indicates ARTBA designation



Guard Rail Transition
(Timber Post)

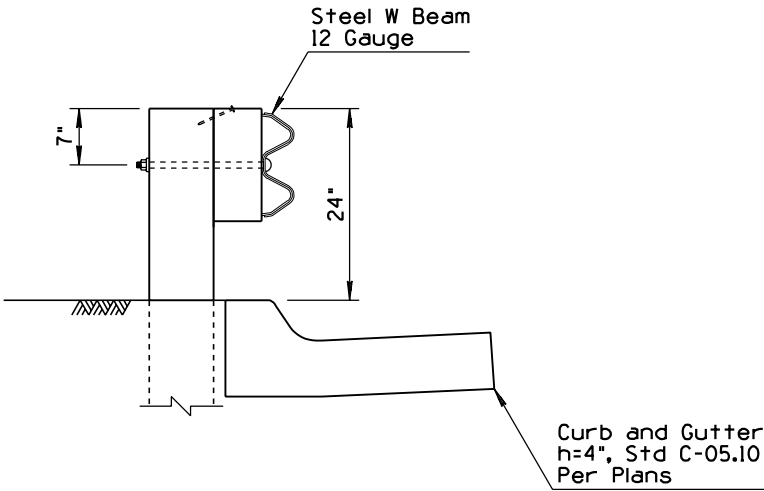
ELEVATION



Note:
For Notes and Dimensions Not Shown,
See Guard Rail Transition Above.

Guard Rail Transition
To Existing Concrete
Barrier Transition

ELEVATION



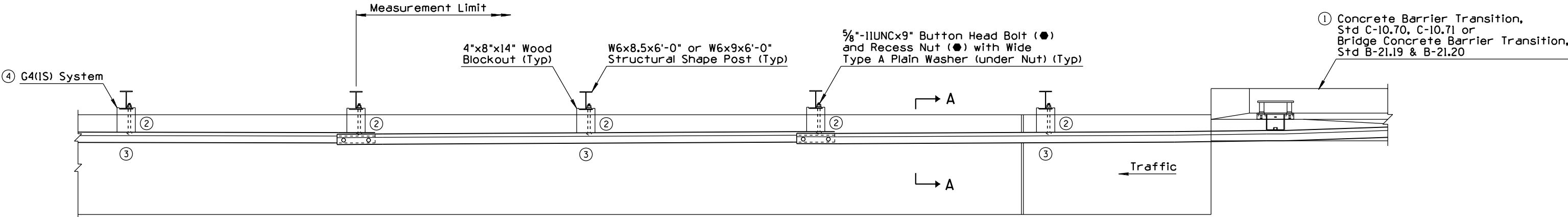
SECTION A-A

DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION	GUARD RAIL TRANSITION W BEAM TO CONCRETE HALF BARRIER (DEPARTURE)	DRAWING NO. C-10.32 Sheet 2 of 3

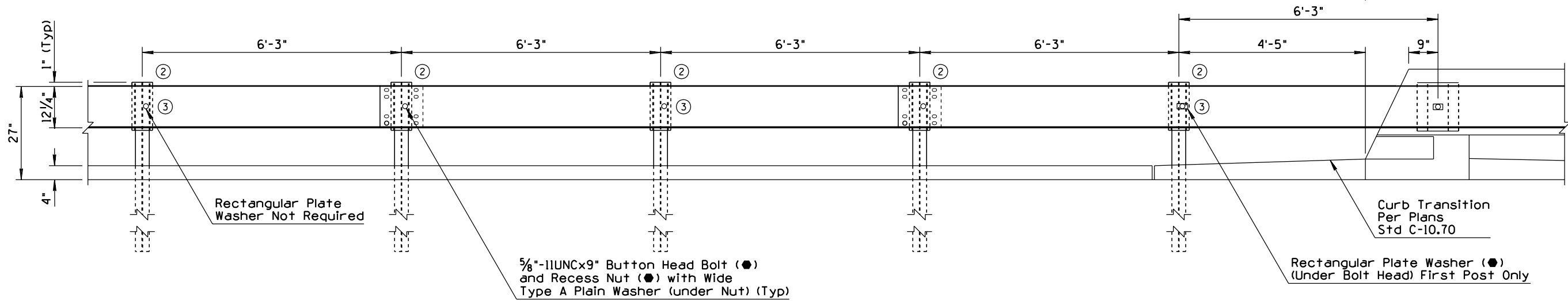
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED REFERENCE TO STD C-10.71	PNB	10/95
2	CHANGED BLOCK-OUT	BAF	07/98
3	DELETED BACK-UP PLATE	BAF	07/98
4	MODIFIED NOTE	BAF	07/98

GENERAL NOTES

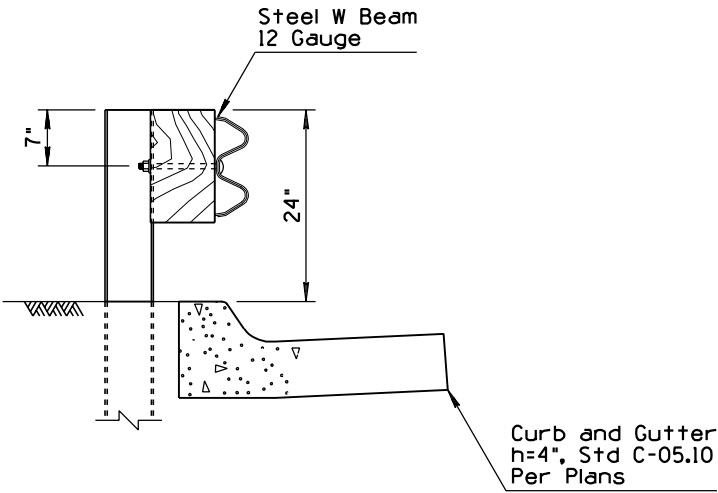
● - Indicates ARTBA designation



PLAN



ELEVATION

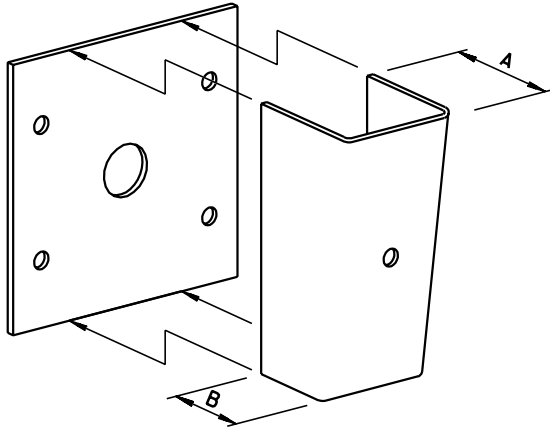


SECTION A-A

Guard Rail Transition (Steel Post)

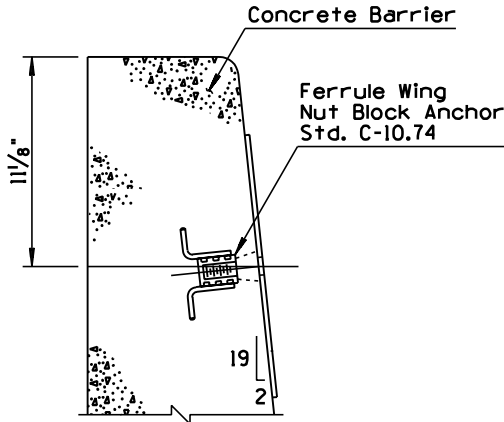
DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION		DRAWING NO. C-10.32 Sheet 3 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

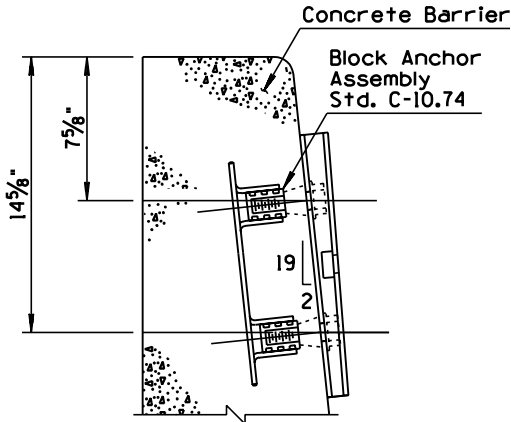


BLOCK	DIMENSION	
	A	B
2	1 1/4"	7/8"
3	2 1/2"	1 3/4"
4	3 11/16"	2 5/8"
5	4 15/16"	3 7/16"

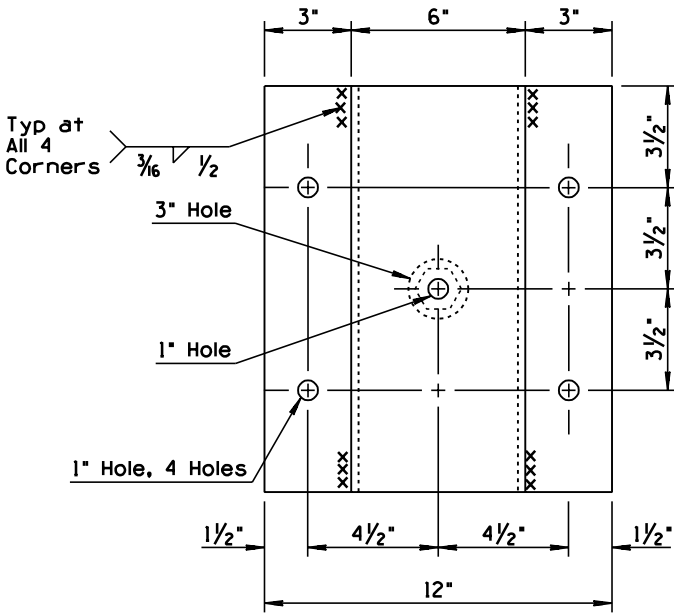
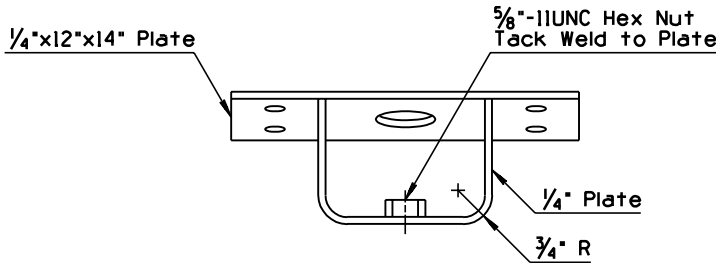
Note:
Block 1 is a 1/4"x12"x14" Plate



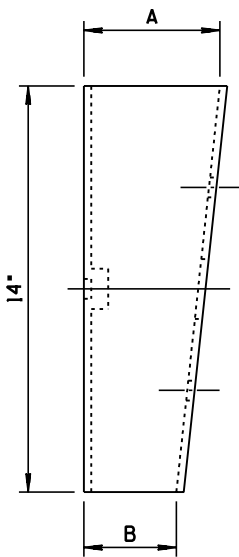
HALF BARRIER
(BLOCK 1 SHOWN)



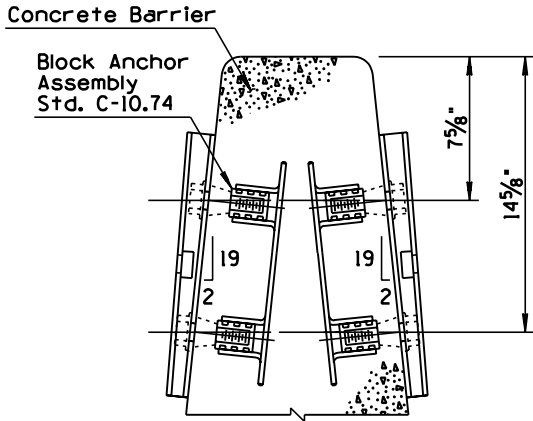
HALF BARRIER
(BLOCK 2 SHOWN)



BLOCK DETAILS



Blocks 2,3,4 and 5

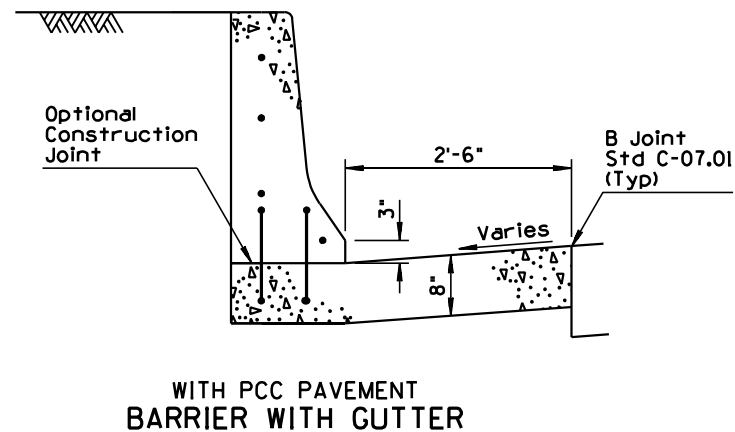
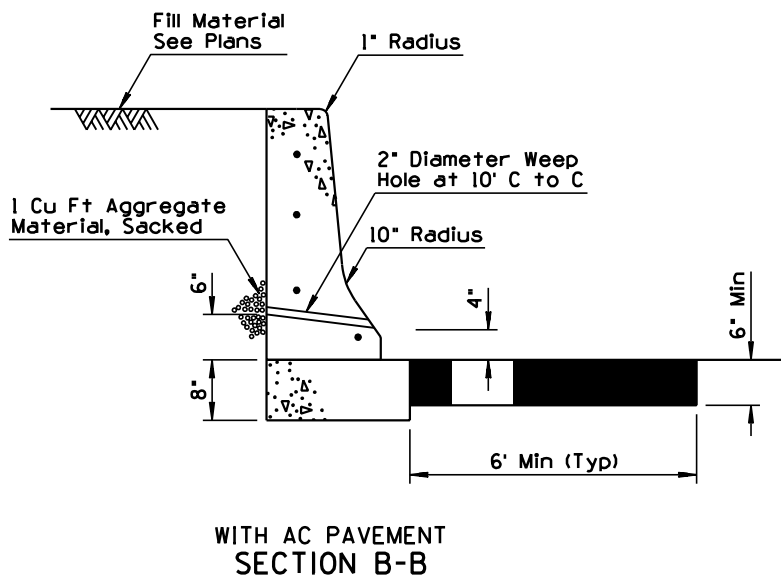
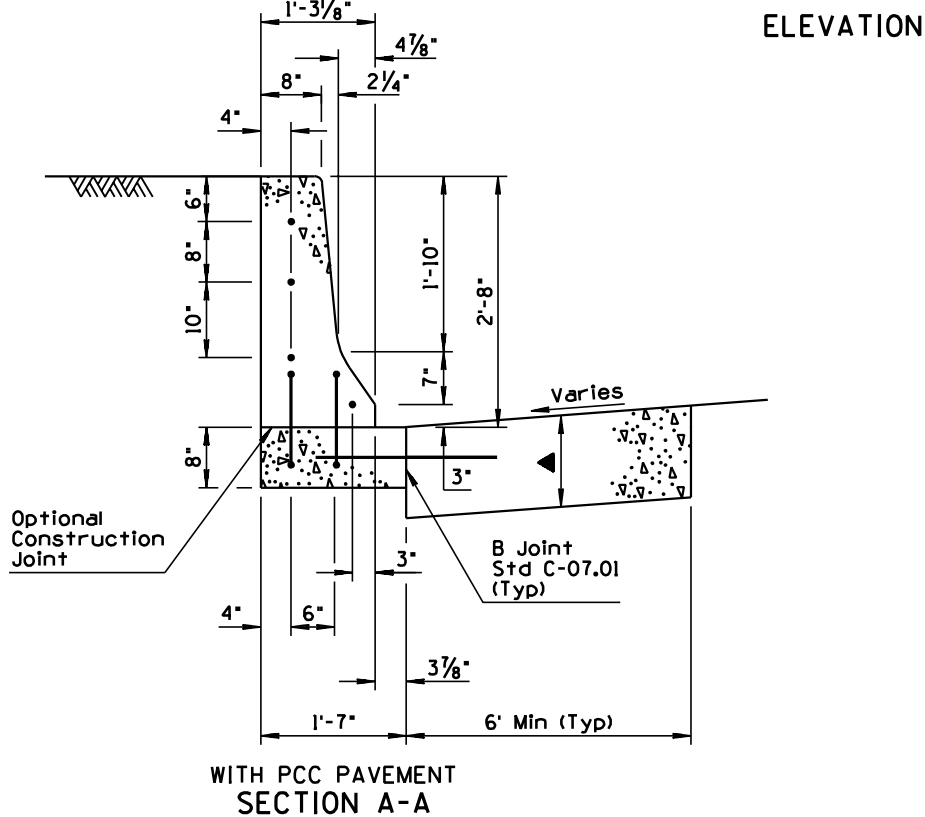
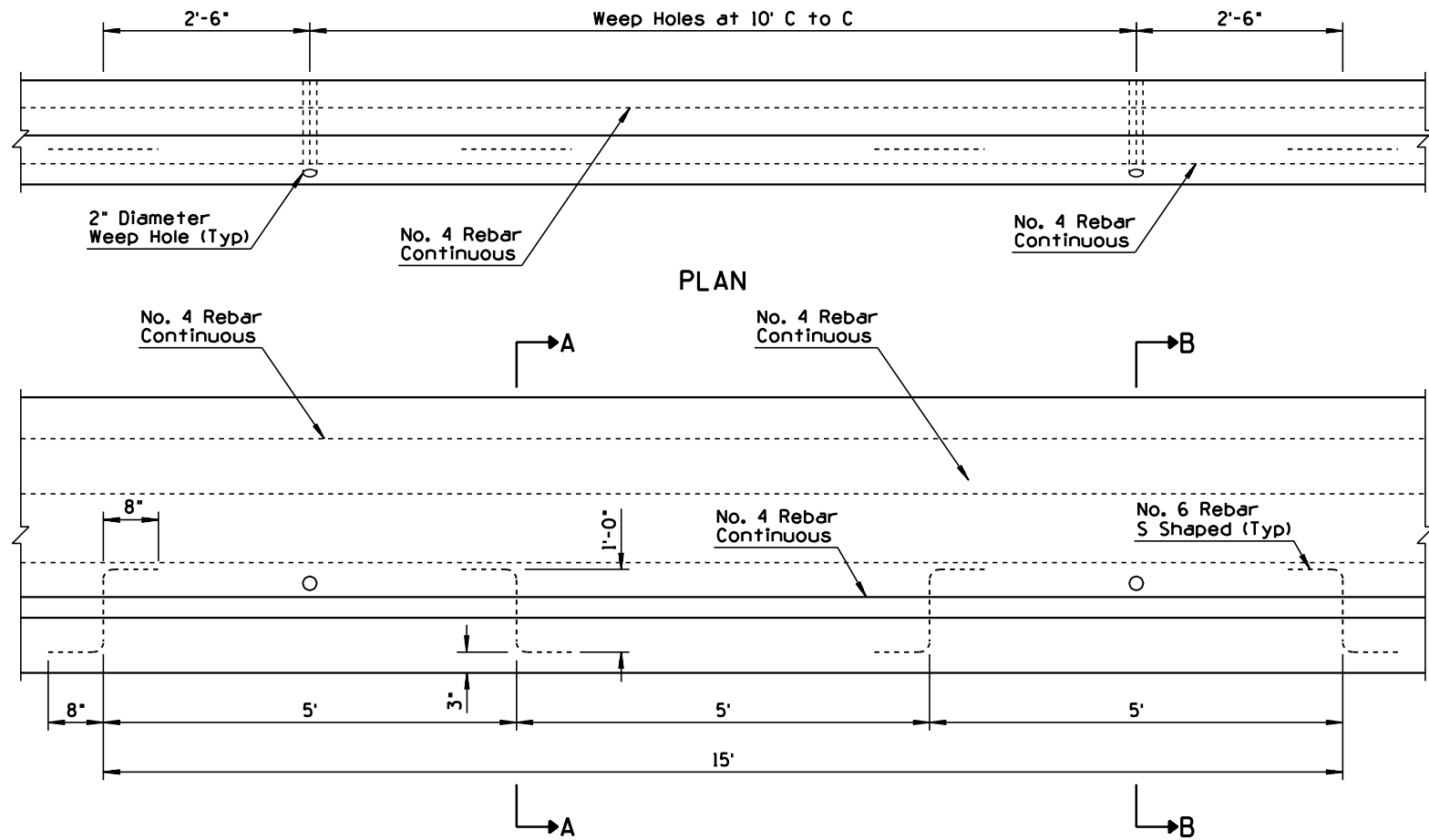


MEDIAN BARRIER
(BLOCK 2 SHOWN)

BLOCK AND ANCHORAGE DETAILS

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	HARDWARE FOR W BEAM TRANSITION TO CONCRETE BARRIER	DRAWING NO. C-10.39
		3/94

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE	NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED NUMBER FROM C-10.09	PNB	7/94	5	CHANGED TO BOTH SLIP & FIXED FORM	PNB	7/94
2	WIDENED BASE	PNB	7/94	6			
3	ADDED DETAIL	PNB	7/94	7			
4	REVISED JOINT	PNB	7/94	8			



GENERAL NOTES

1. Half Barrier shall be constructed by the slip form or formed Cast-in-Place method.
2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
3. Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
4. If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.
5. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
6. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

▲ Depth to match adjacent PCCP thickness (8" Min).

DESIGN APPROVED

Henry H. Ottensm

APPROVED FOR DISTRIBUTION

Ronald Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

HALF BARRIER
CAST IN PLACE
SLIP FORM & FIXED FORM

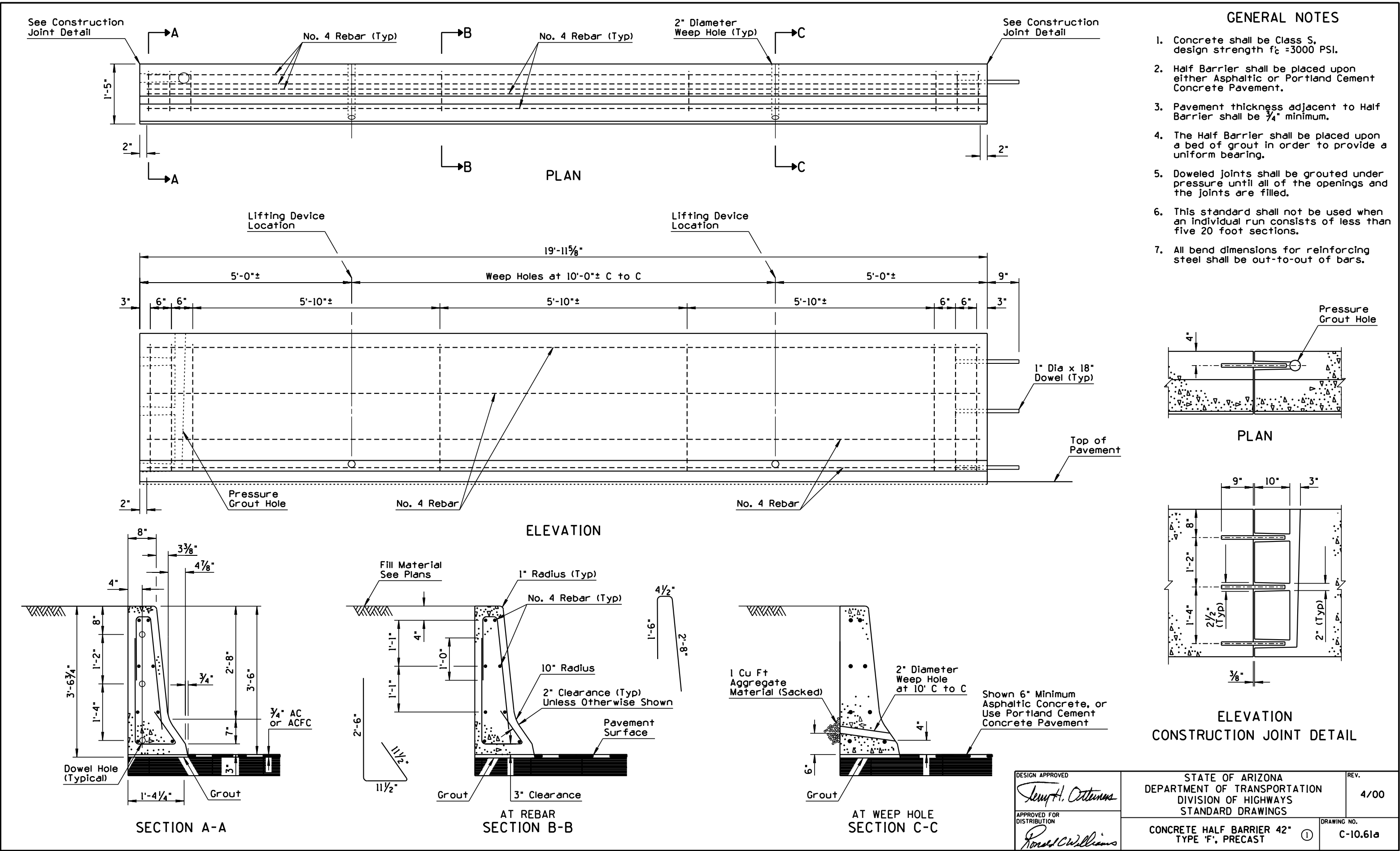
REV.

7/94

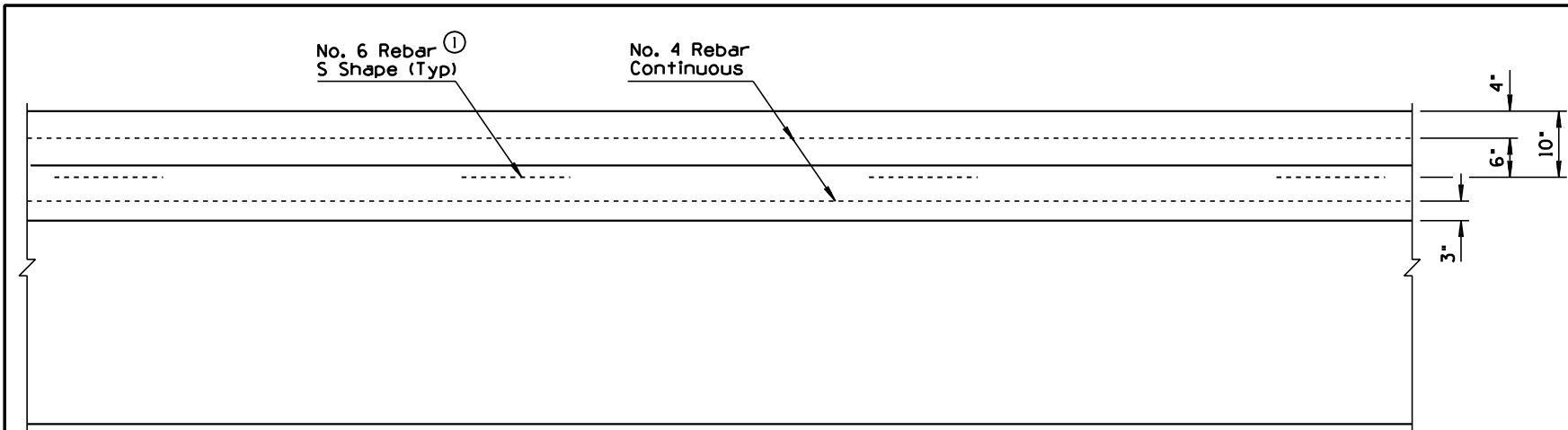
DRAWING NO.

C-10.60

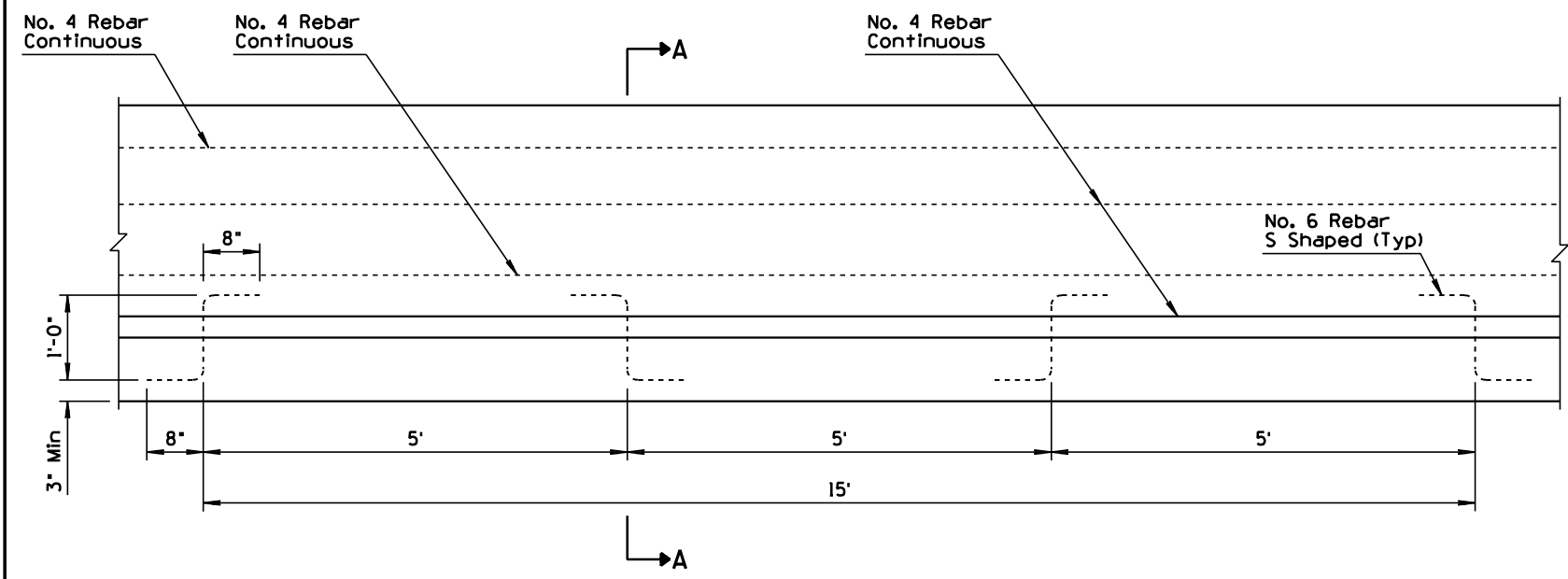
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STANDARD DEVELOPED	JNP	4/00
2			
3			
4			



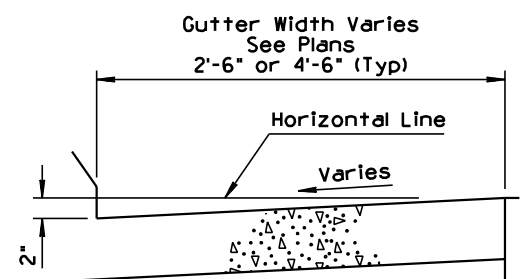
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED NOTE	JNP	8/99
2	MODIFIED TITLE	JNP	8/99
3			
4			



PLAN



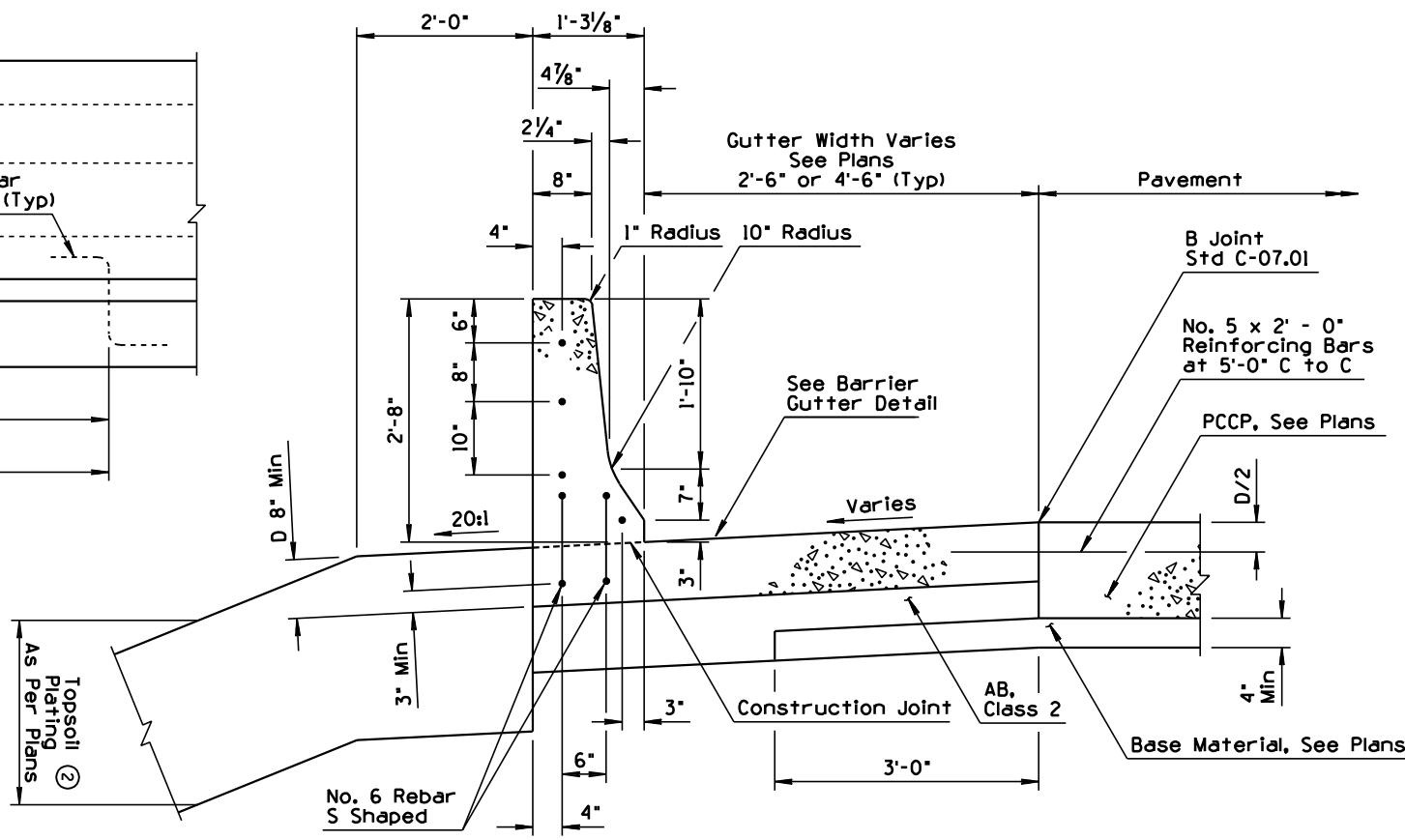
ELEVATION



BARRIER GUTTER DETAIL

GENERAL NOTES

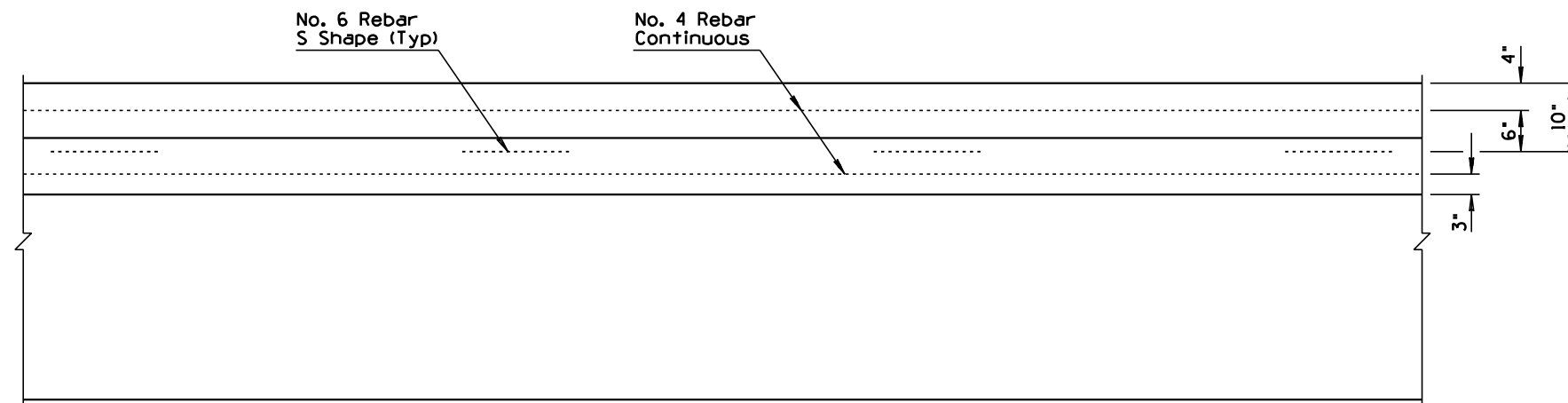
1. Half Barrier shall be constructed by the slip form or formed Cast-In-Place method.
2. When obstacles are encountered which prevents the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
3. Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
5. Thickness of footing, "D" can be adjusted to match the PCCP thickness, as approved by the Engineer.
6. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the 2" gutter depression is not applicable.
7. When bridges are encountered, the cross slope of the gutter shall be transitioned to match the cross slope of the bridge. Length of the transition is 15 feet.
8. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.



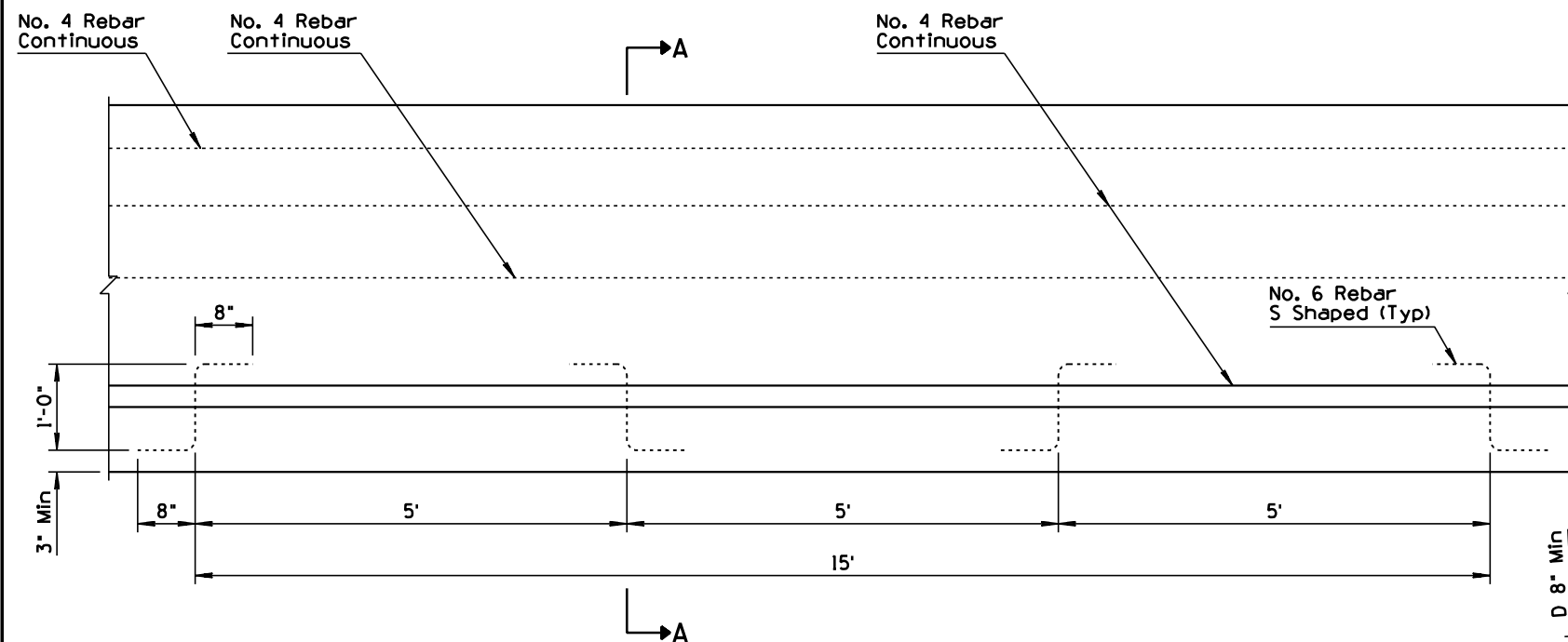
SECTION A-A

DESIGN APPROVED <i>Terry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER 32" ② TYPE 'F' WITH GUTTER	DRAWING NO. C-10.62

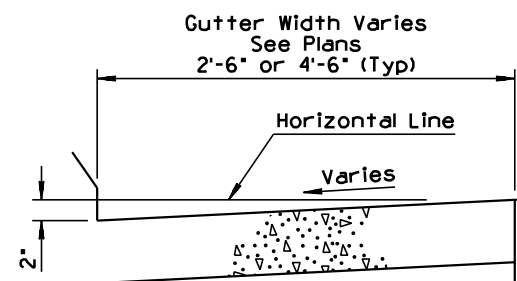
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STANDARD DEVELOPED	JNP	8/99
2			
3			
4			



PLAN



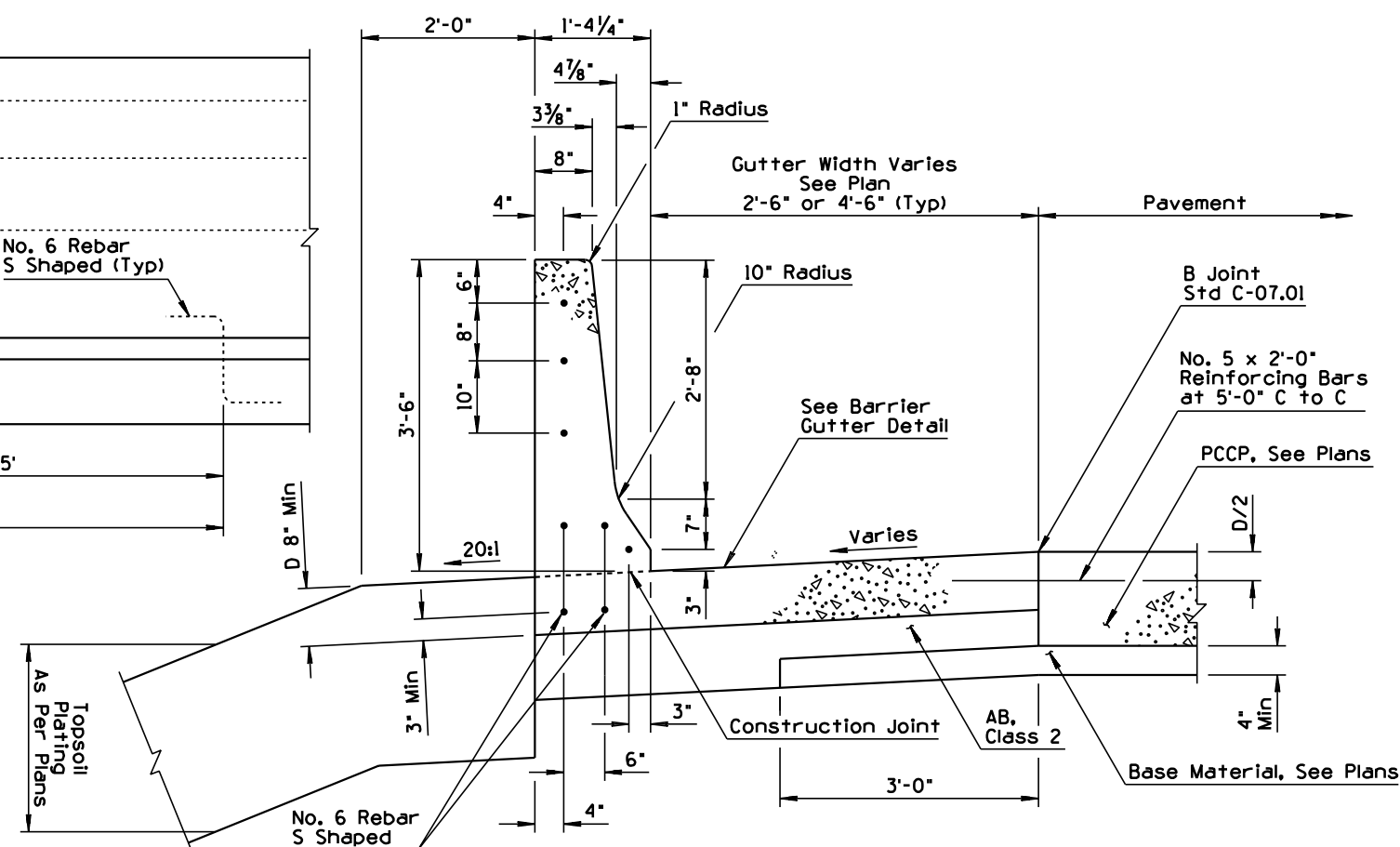
ELEVATION



BARRIER GUTTER DETAIL

- ## GENERAL NOTES

1. Half Barrier shall be constructed by the slip form or formed Cast-In-Place method.
2. When obstacles are encountered which prevents the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
3. Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
4. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
5. Thickness of footing, "D" can be adjusted to match the PCCP thickness, as approved by the Engineer.
6. When the pavement section slopes away from the gutter, the slope of the gutter shall match the pavement cross slope. Therefore, the 2" gutter depression is not applicable.
7. When bridges are encountered, the cross slope of the gutter shall be transitioned to match the cross slope of the bridge. Length of the transition is 15 feet.
8. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.



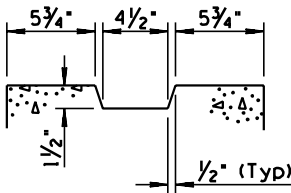
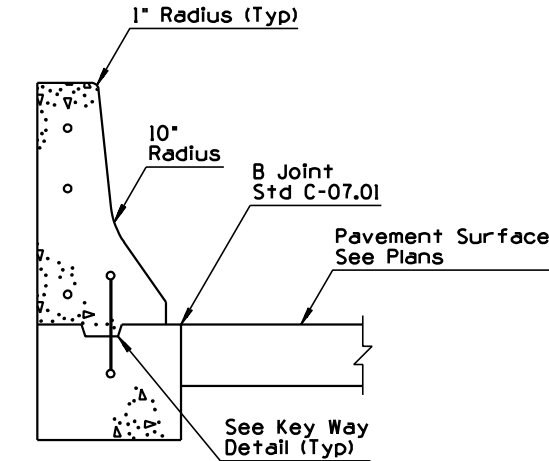
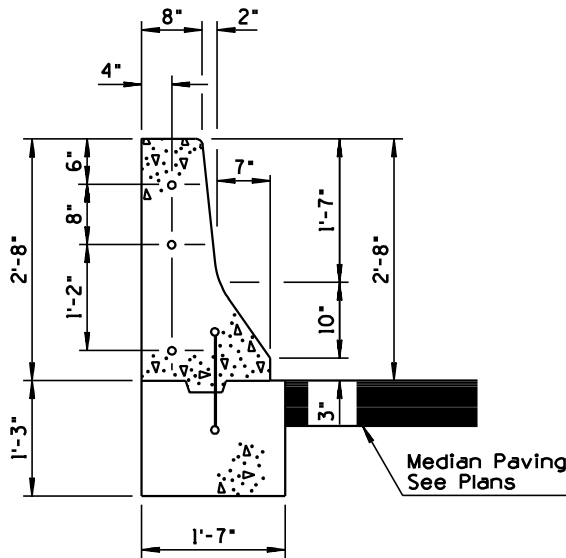
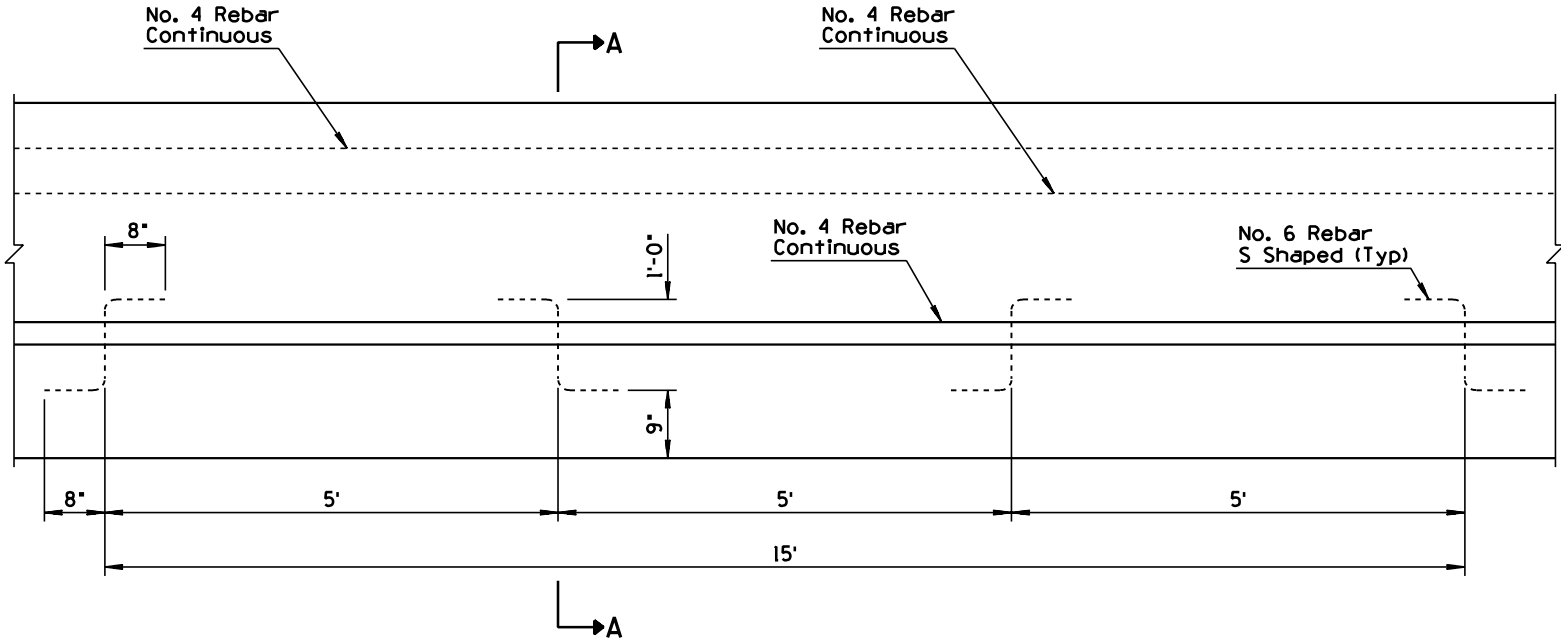
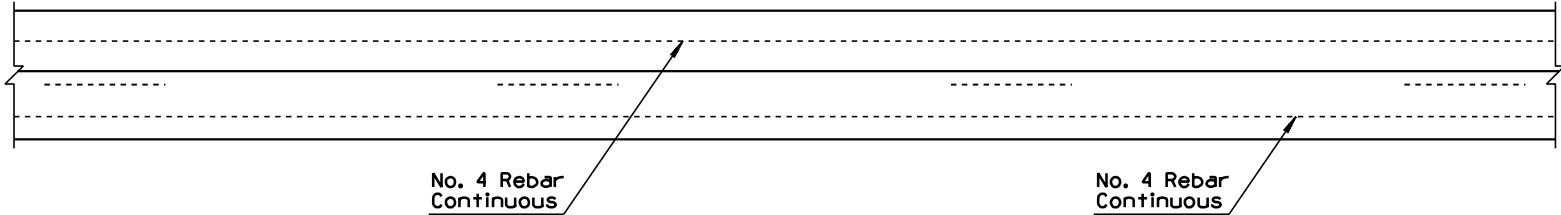
SECTION A-A

DESIGN APPROVED <i>Sam H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER 42" TYPE 'F' WITH GUTTER (1)	DRAWING NO. C-10.63

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

GENERAL NOTES

- Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
- If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.
- In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
- No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

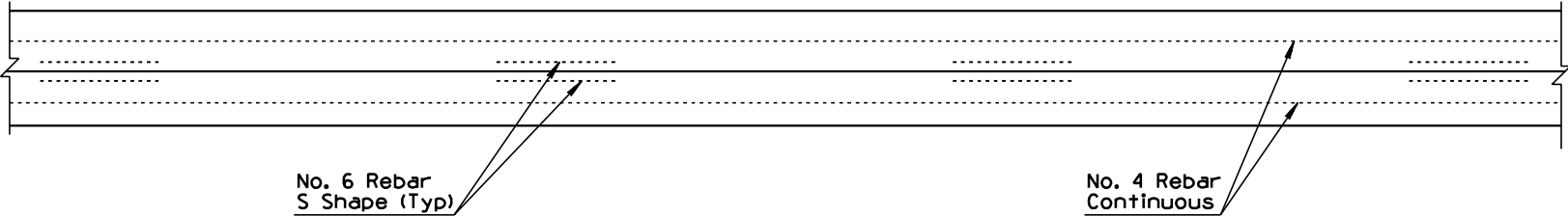


DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	7/94
APPROVED FOR DISTRIBUTION		
	HALF BARRIER (AT PIERS) CAST IN PLACE, FIXED FORM	DRAWING NO. C-10.64 Sheet 1 of 2

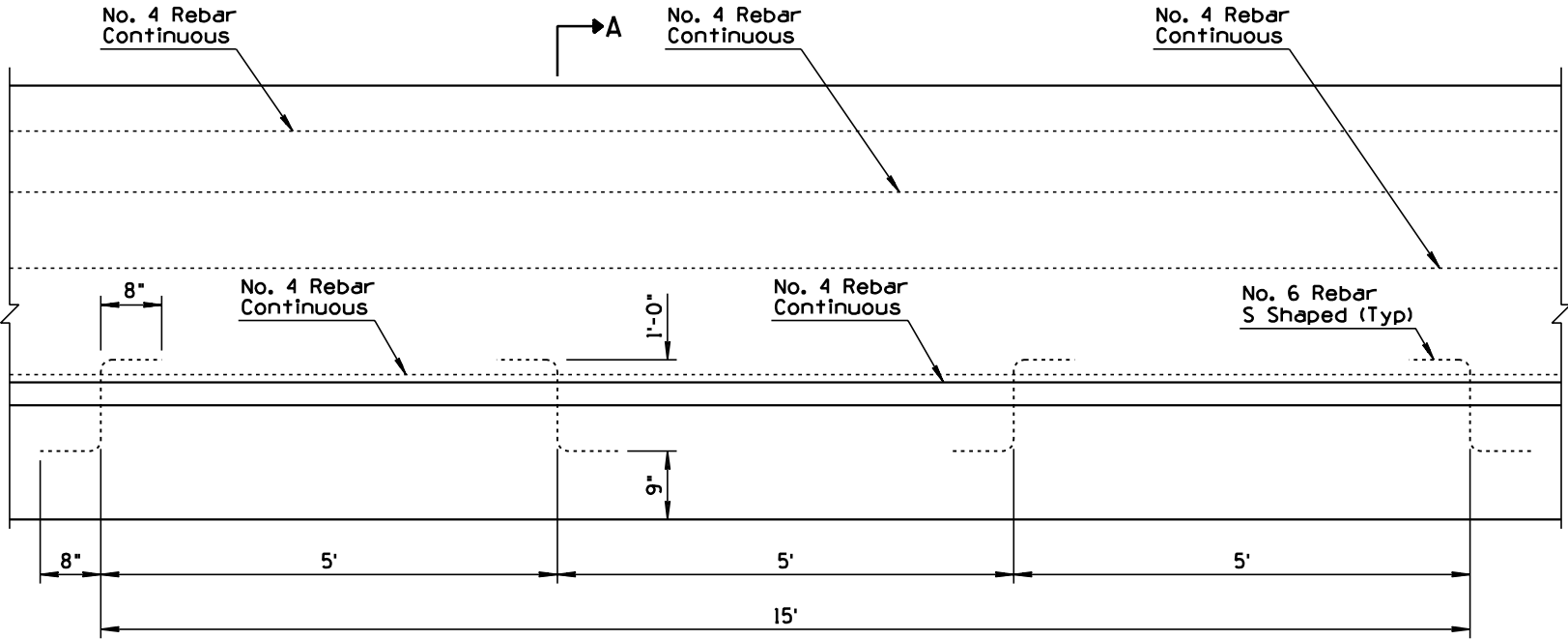
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STANDARD DEVELOPED	JNP	4/00
2			
3			
4			

GENERAL NOTES

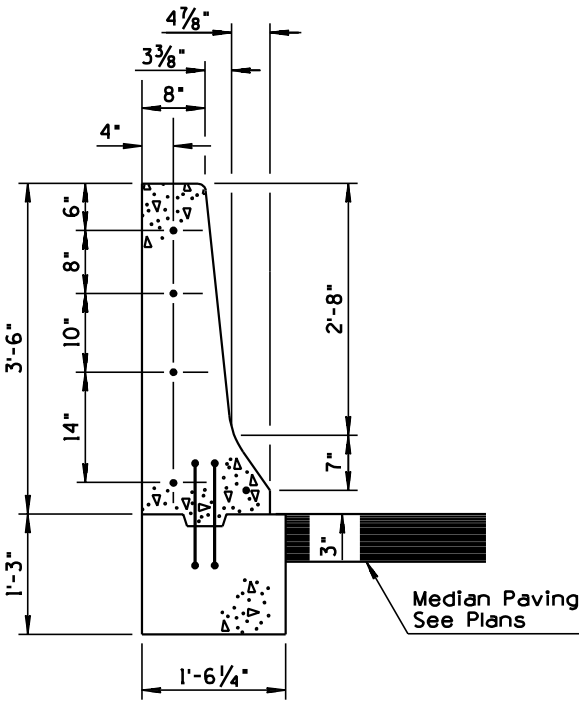
- Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
- If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.
- In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
- No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.



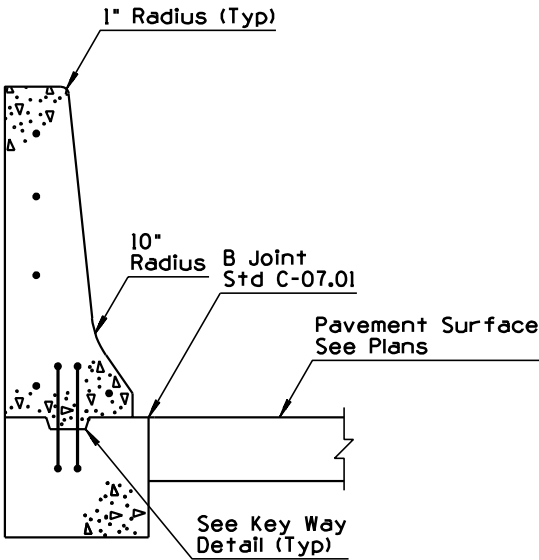
PLAN



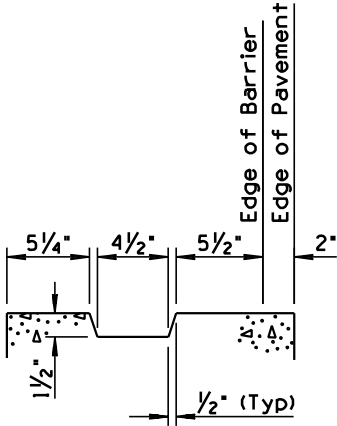
ELEVATION



WITH AC
SECTION A-A



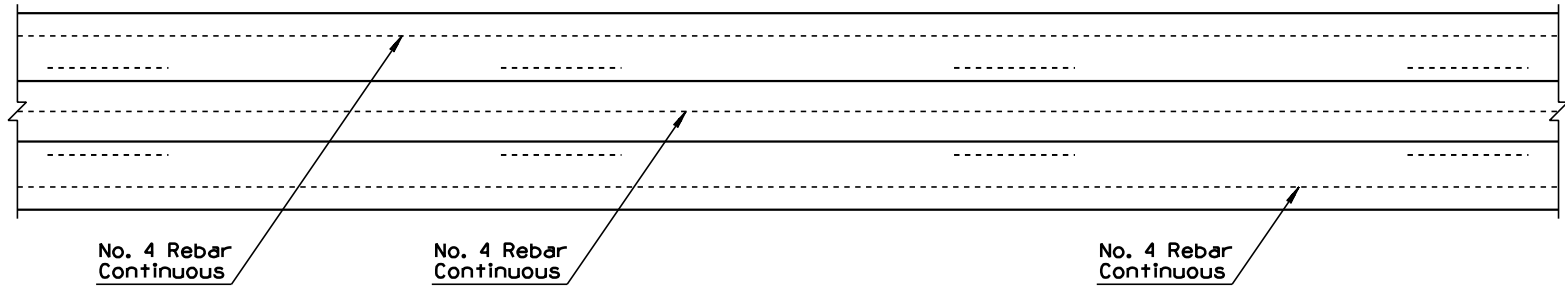
WITH PCCP
SECTION A-A



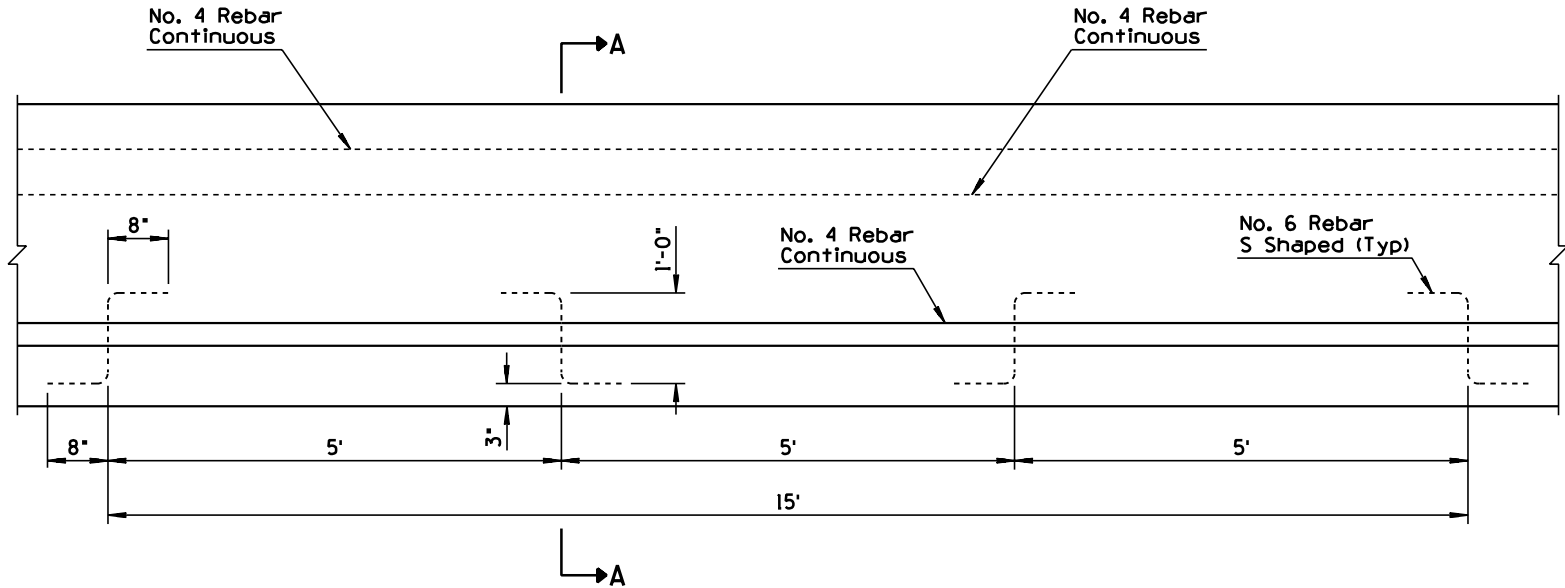
KEY WAY DETAIL

DESIGN APPROVED <i>Joseph H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 4/00
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER (AT PIERS) 42" TYPE 'F' CAST IN PLACE, FIXED FORM ①	DRAWING NO. C-10.64a Sheet 1 of 2

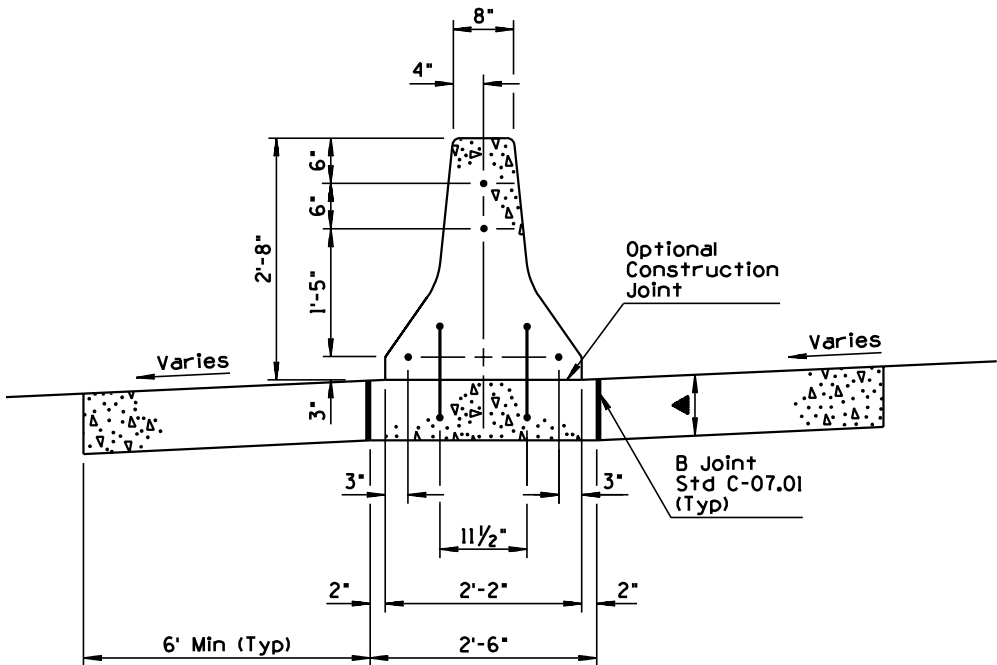
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED NUMBER FROM C-10.12	PNB	7/94
2	CHANGED TO BOTH SLIP & FIXED FORM	PNB	7/94
3	MODIFIED NOTE	BAF	7/97
4			



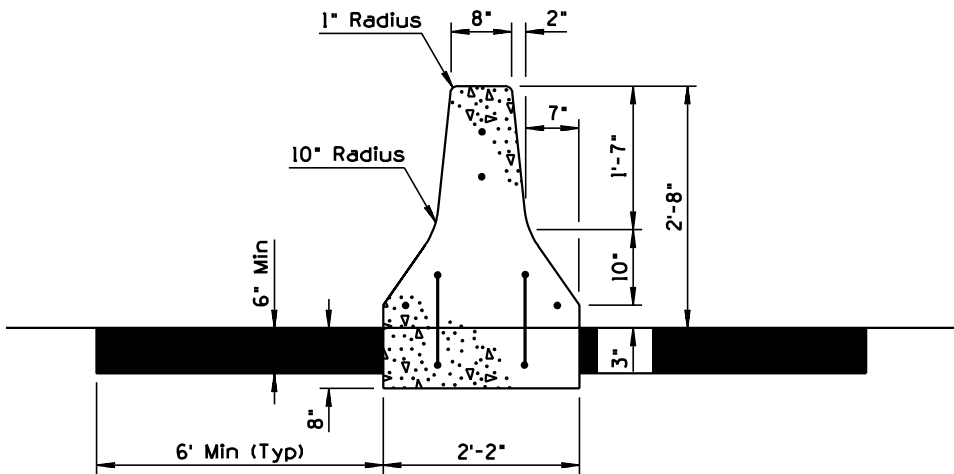
PLAN



ELEVATION



WITH PCC PAVEMENT



WITH AC PAVEMENT

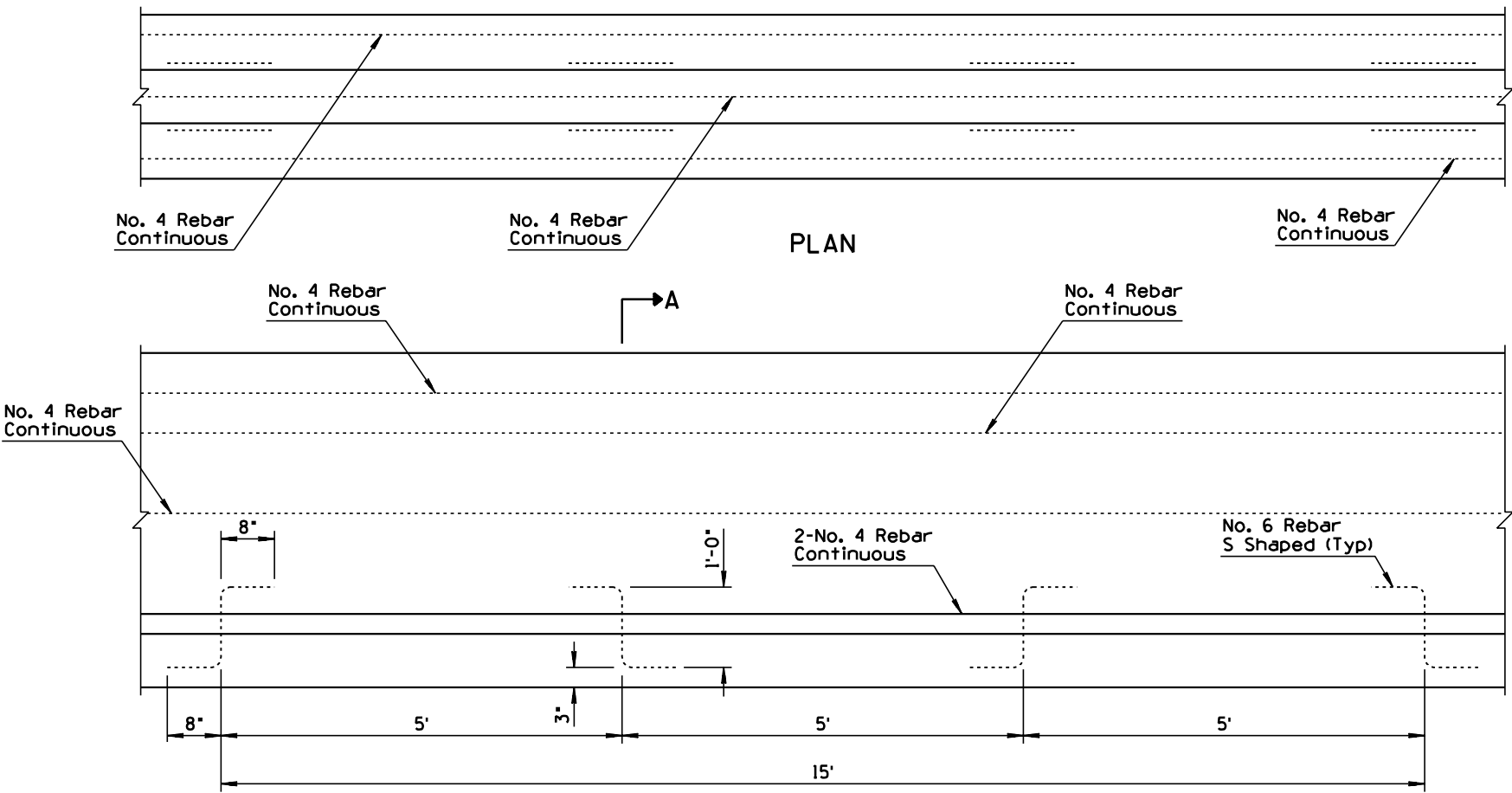
GENERAL NOTES

- Median Barrier shall be constructed by the slip form or formed Cast-in-Place method.
 - When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
 - Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
 - If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.
 - In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
 - No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
- ▲ Depth to match adjacent PCCP thickness (8" Min).

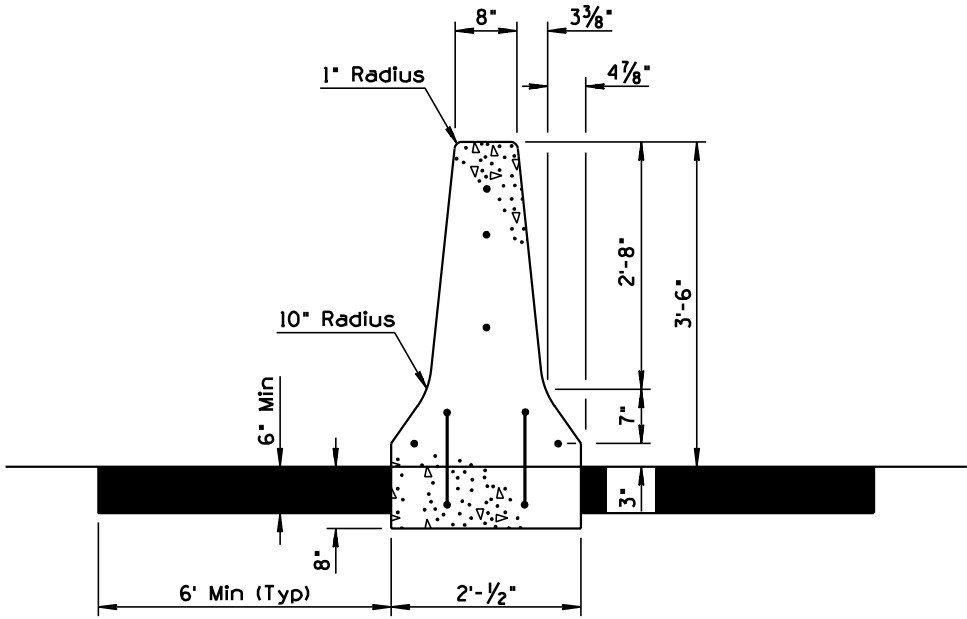
DESIGN APPROVED <i>Sam H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	② MEDIAN BARRIER CAST IN PLACE SLIP FORM & FIXED FORM	DRAWING NO. ① C-10.66

SECTION A-A

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



ELEVATION

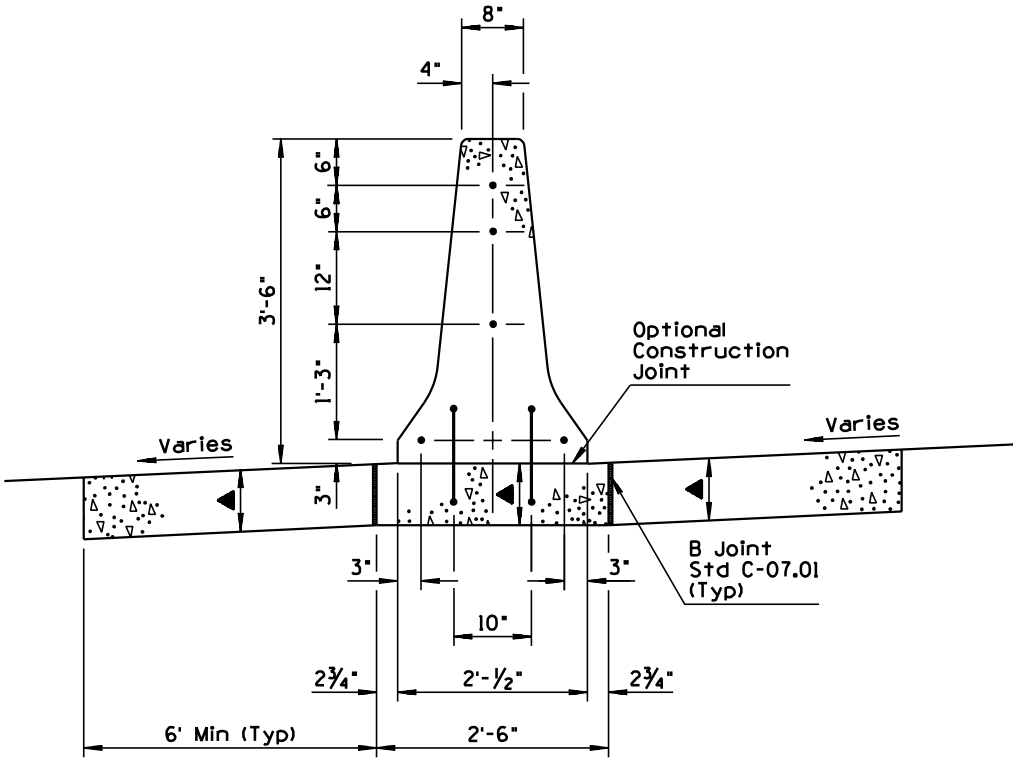


WITH AC PAVEMENT
SECTION A-A

GENERAL NOTES

1. Median Barrier shall be constructed by the slip form or by the formed Cast-in-Place method.
2. When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
3. Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
4. If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.
5. In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
6. No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.

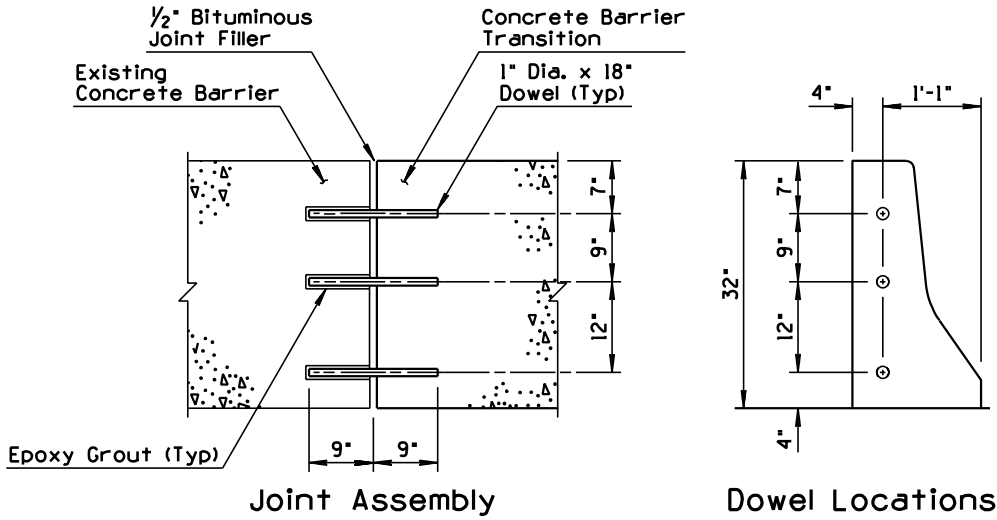
▲ Depth to match adjacent PCCP thickness (8" Min).



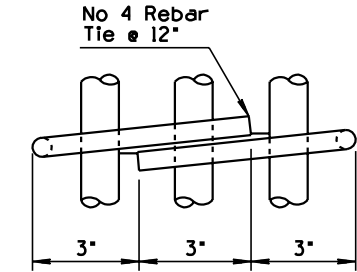
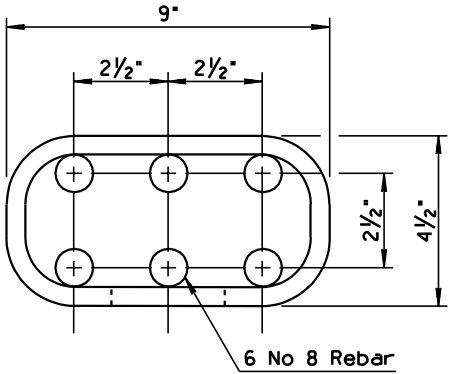
WITH PCC PAVEMENT
SECTION A-A

DESIGN APPROVED <i>Larry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	ISSUE 5/97
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	CONCRETE MEDIAN BARRIER TALL TYPE 'F' CAST IN PLACE	DRAWING NO. C-10.67

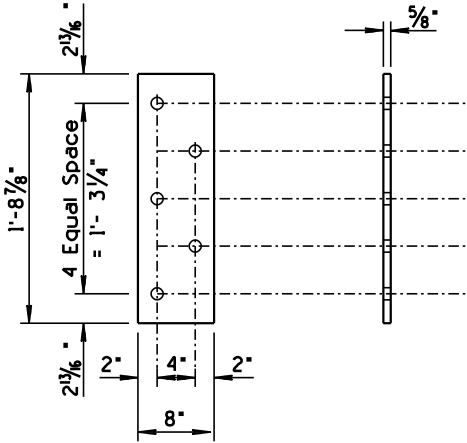
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED TO MEET NCHRP 350 REQUIREMENTS	JNP	8/99
2			
3			
4			



CONSTRUCTION JOINT DETAIL
(OPTIONAL)

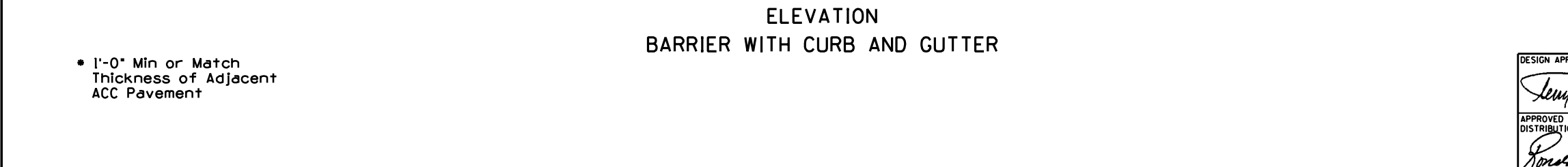
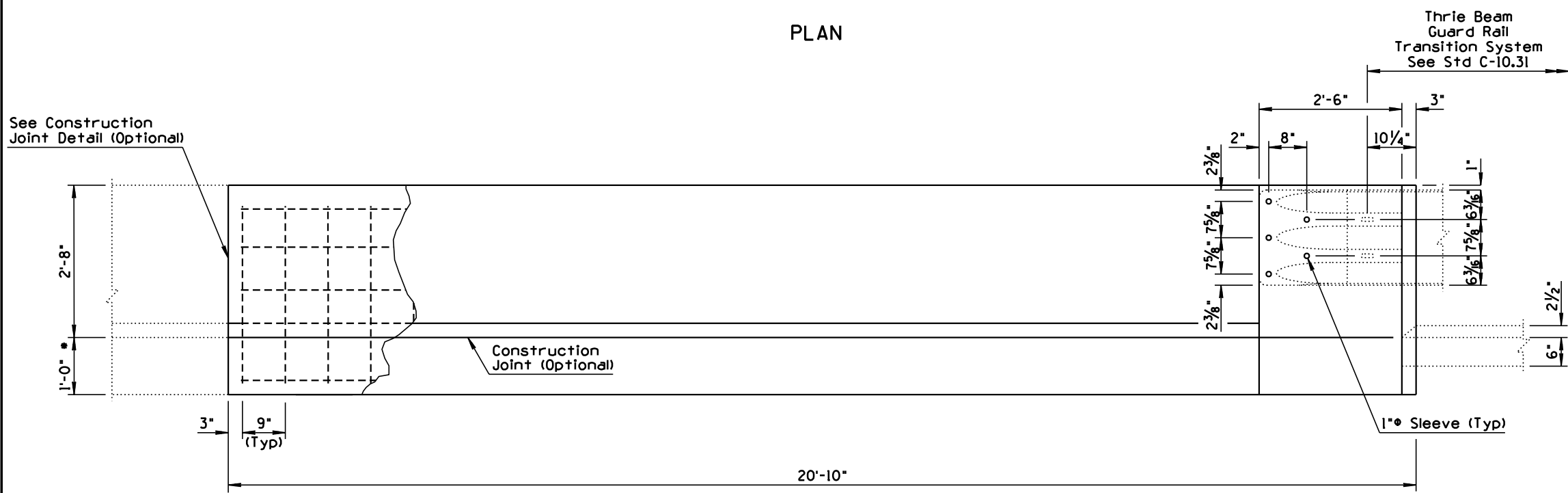
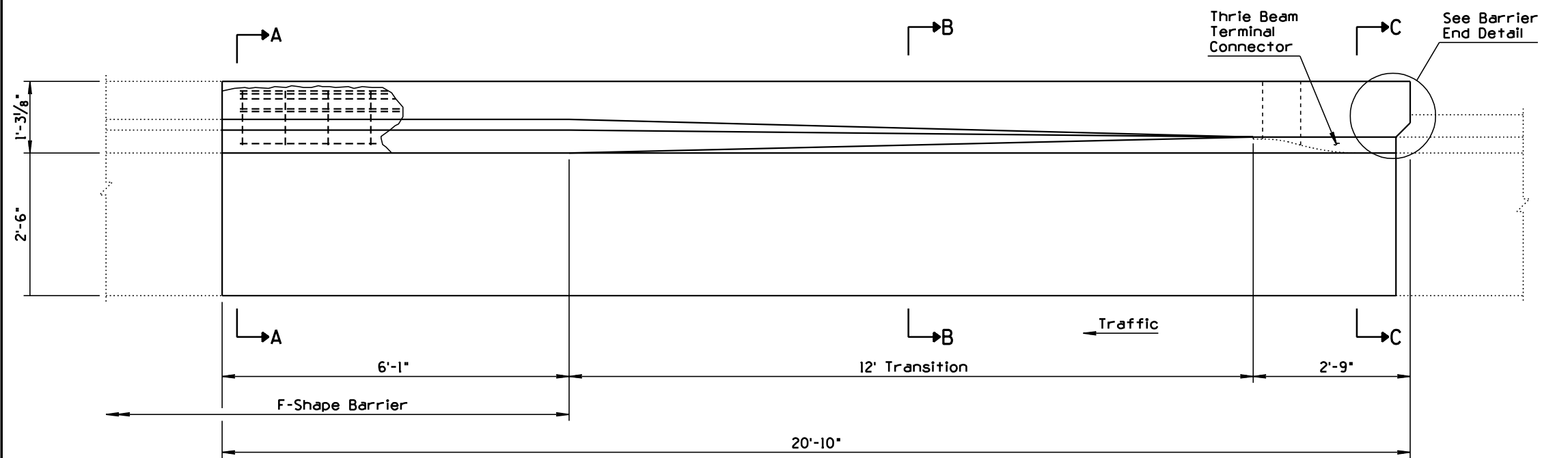


CAISSON REINFORCEMENT



Anchor Plate

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED TO MEET NCHRP 350 REQUIREMENTS	JNP	8/99
2			
3			
4			



GENERAL NOTES

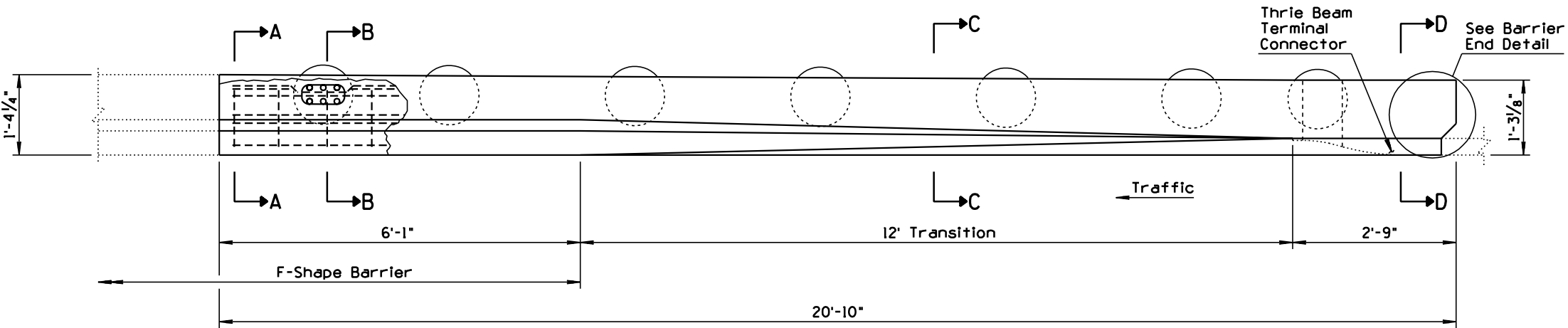
1. Concrete shall be constructed by the Fixed Form Cast-In-Place method.
2. Concrete shall be Class S, design strength $f'_c = 3000$ psi.
3. All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
4. All bend dimensions for reinforcing steel shall out-to-out of bars.
5. Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.

* 1'-0" Min or Match
Thickness of Adjacent
ACC Pavement

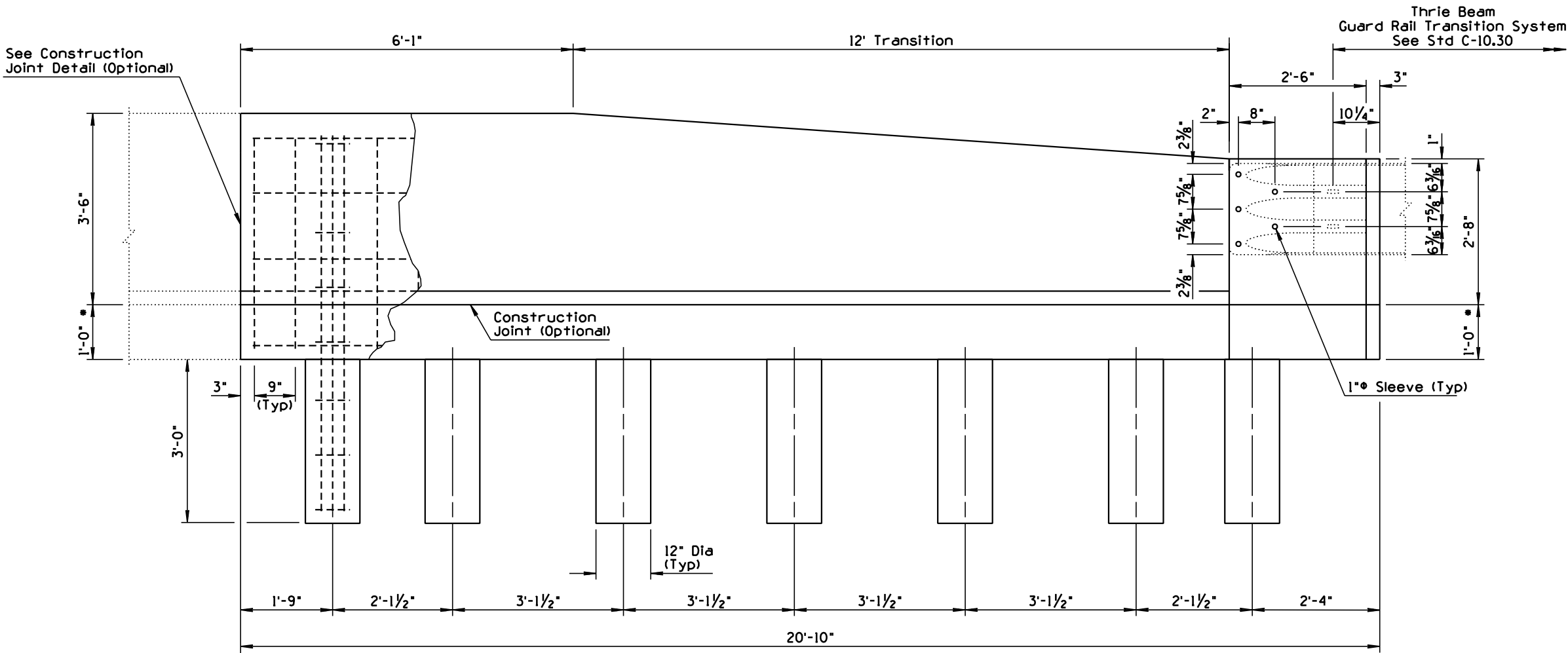
ELEVATION
BARRIER WITH CURB AND GUTTER

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER TRANSITION TO VERTICAL 32" TYPE 'F' WITH GUTTER ①	DRAWING NO. C-10.71 Sheet 1 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STANDARD DEVELOPED	JNP	8/99
2			
3			
4			



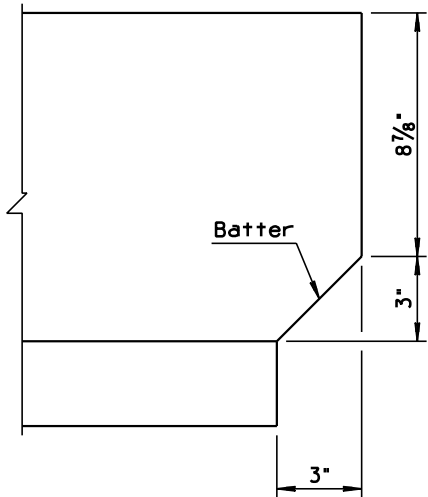
PLAN



ELEVATION
BARRIER WITHOUT CURB

GENERAL NOTES

- Concrete shall be constructed by the Fixed Form Cast-In-Place method.
- Concrete shall be Class S, design strength $f'_c = 3000$ psi.
- All reinforcing steel shall have 2" minimum clear cover unless otherwise noted.
- All bend dimensions for reinforcing steel shall out-to-out of bars.



BARRIER END DETAIL

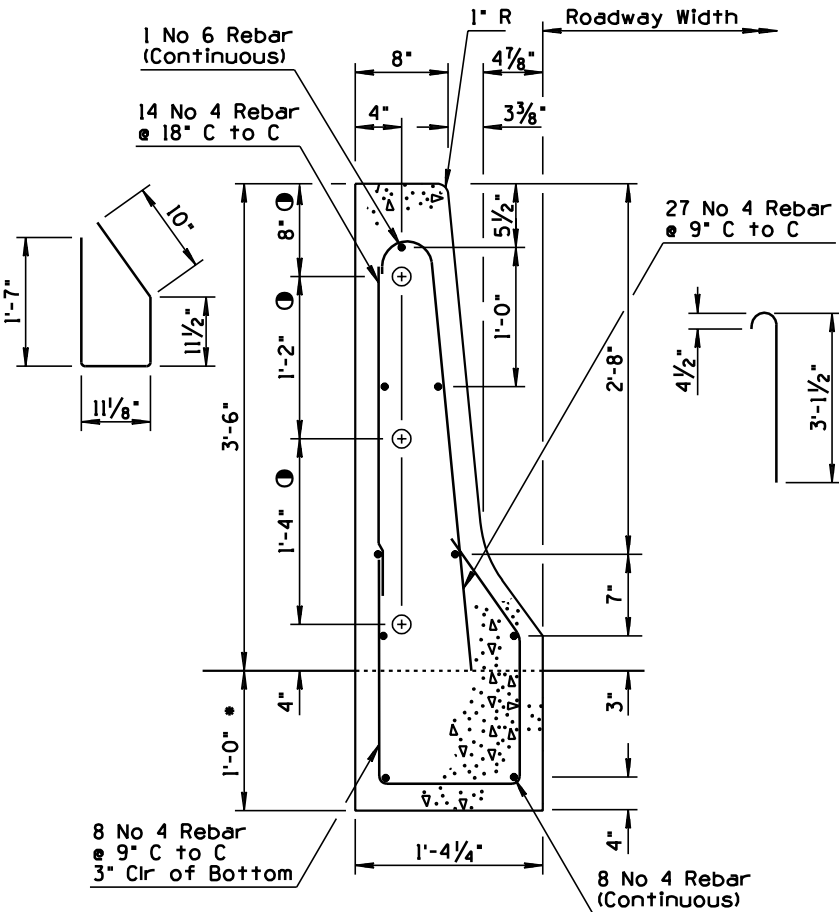
* 1'-0" Min or Match
Thickness of Adjacent
PCC Pavement

DESIGN APPROVED <i>Sam H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER TRANSITION TO VERTICAL 42" TO 32" TYPE 'F' WITH CAISSONS	DRAWING NO. C-10.72 Sheet 1 of 3

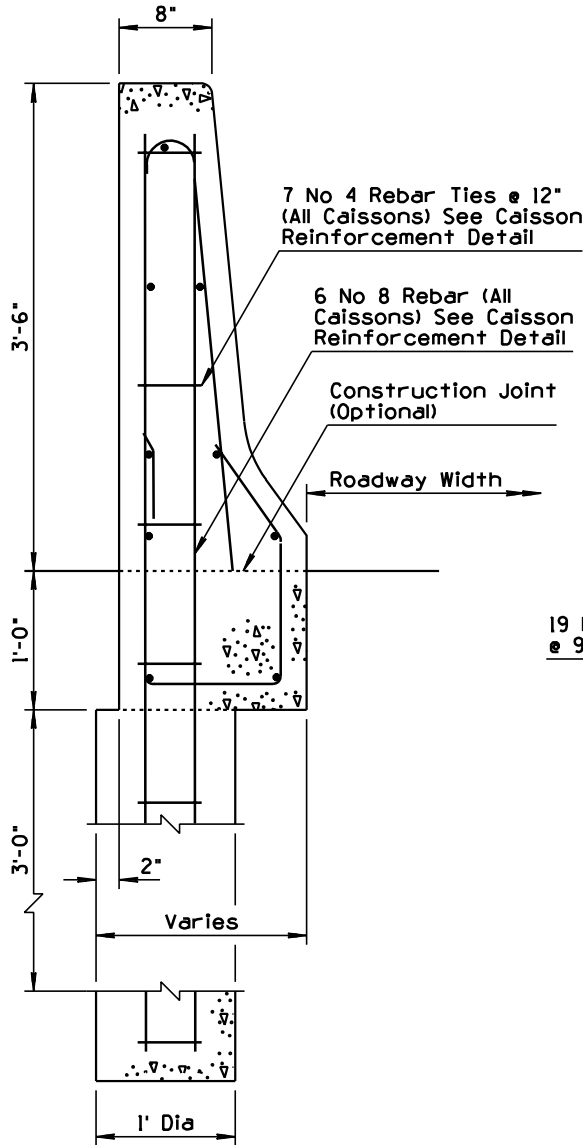
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STANDARD DEVELOPED	JNP	8/99
2			
3			
4			

GENERAL NOTES

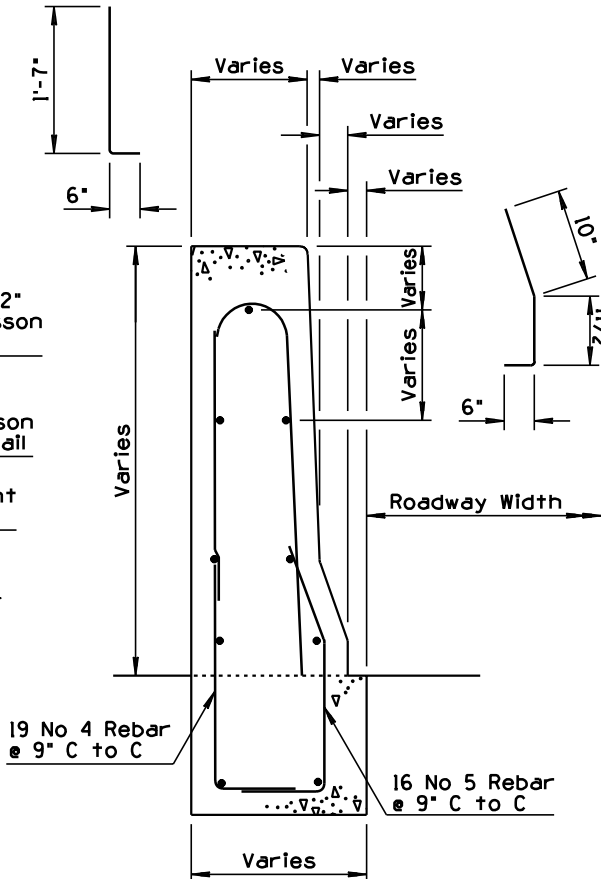
1. See section B-B for caisson reinforcement.



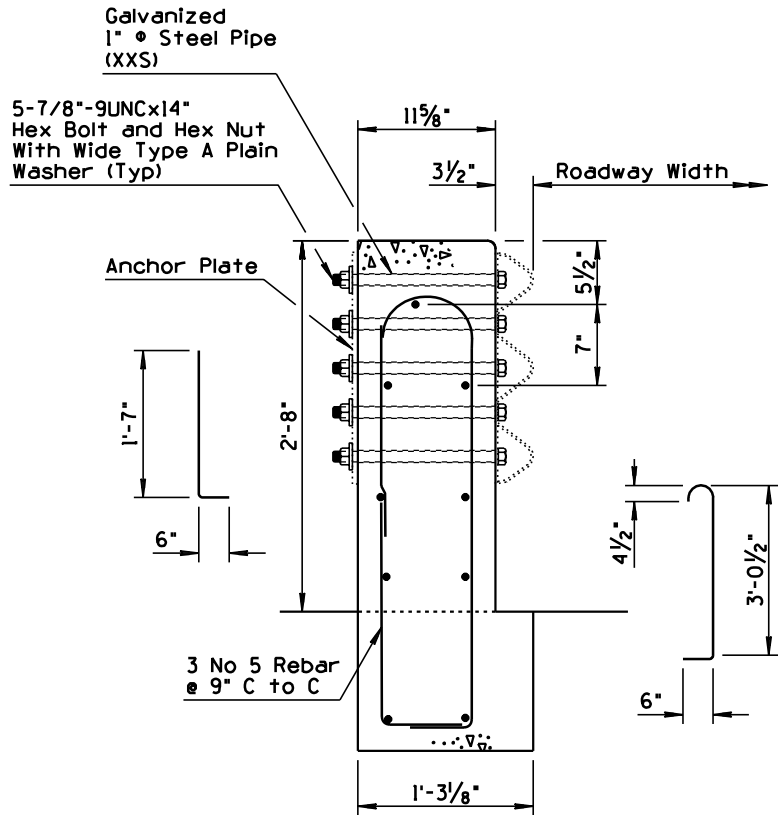
WITHOUT CURB
SECTION A-A



WITHOUT CURB
SECTION B-B



WITHOUT CURB



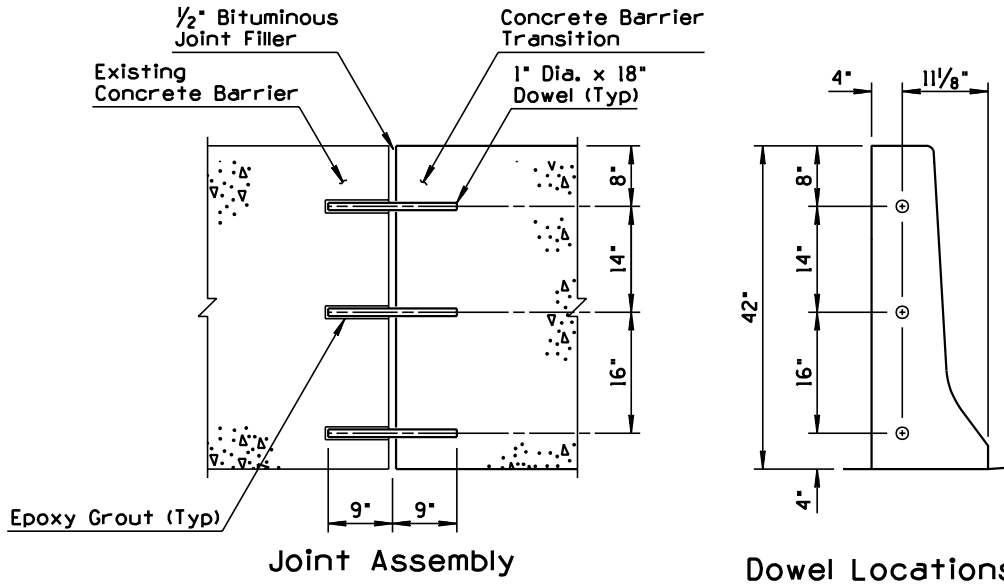
WITHOUT CURB
SECTION D-D

* 1'-0" Min or Match
Thickness of Adjacent
PCC Pavement

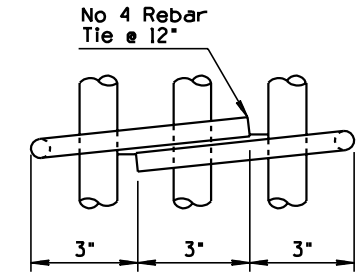
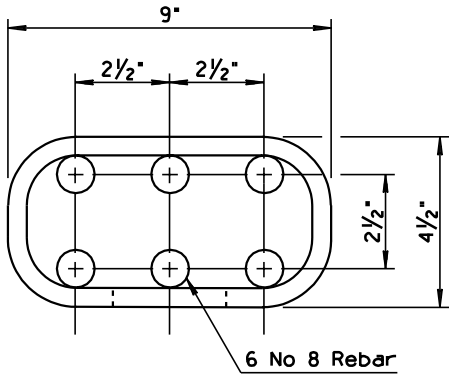
① See Optional Construction
Joint Detail, Sheet 3

DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER TRANSITION TO VERTICAL 42" TO 32" TYPE 'F' WITH CAISSONS	DRAWING NO. C-10.72 Sheet 2 of 3

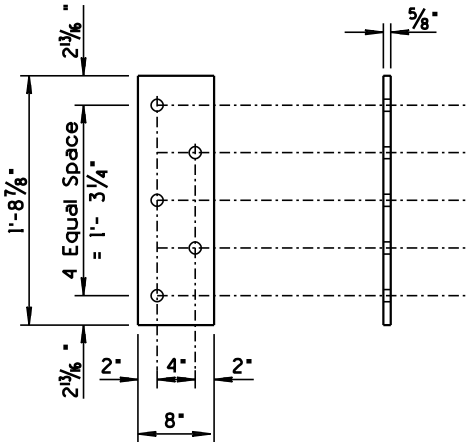
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
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2			
3			
4			



CONSTRUCTION JOINT DETAIL
(OPTIONAL)



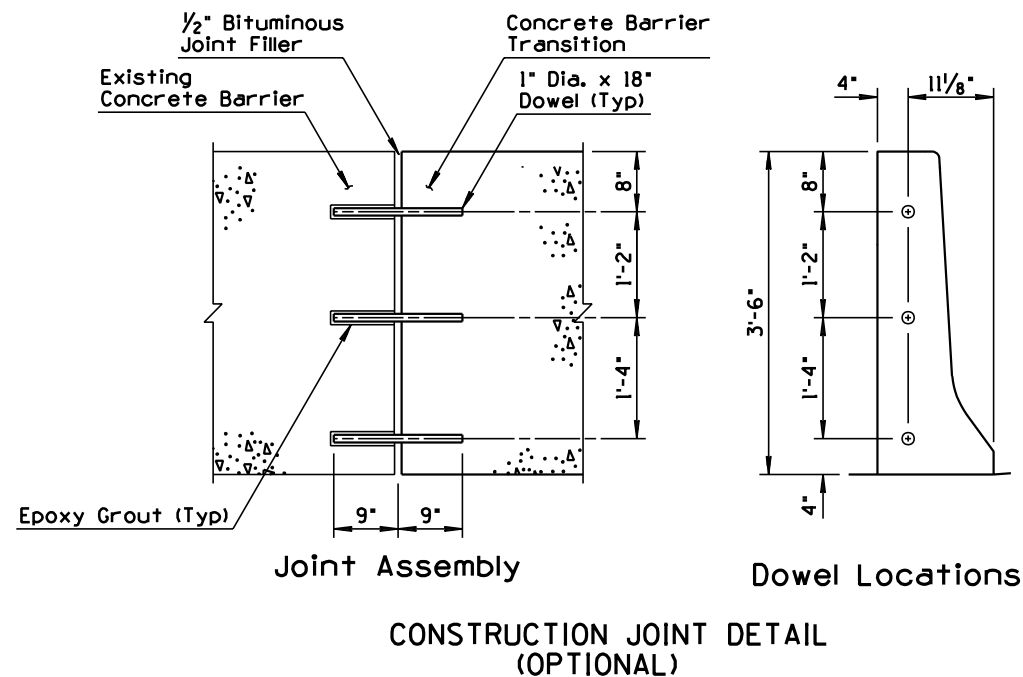
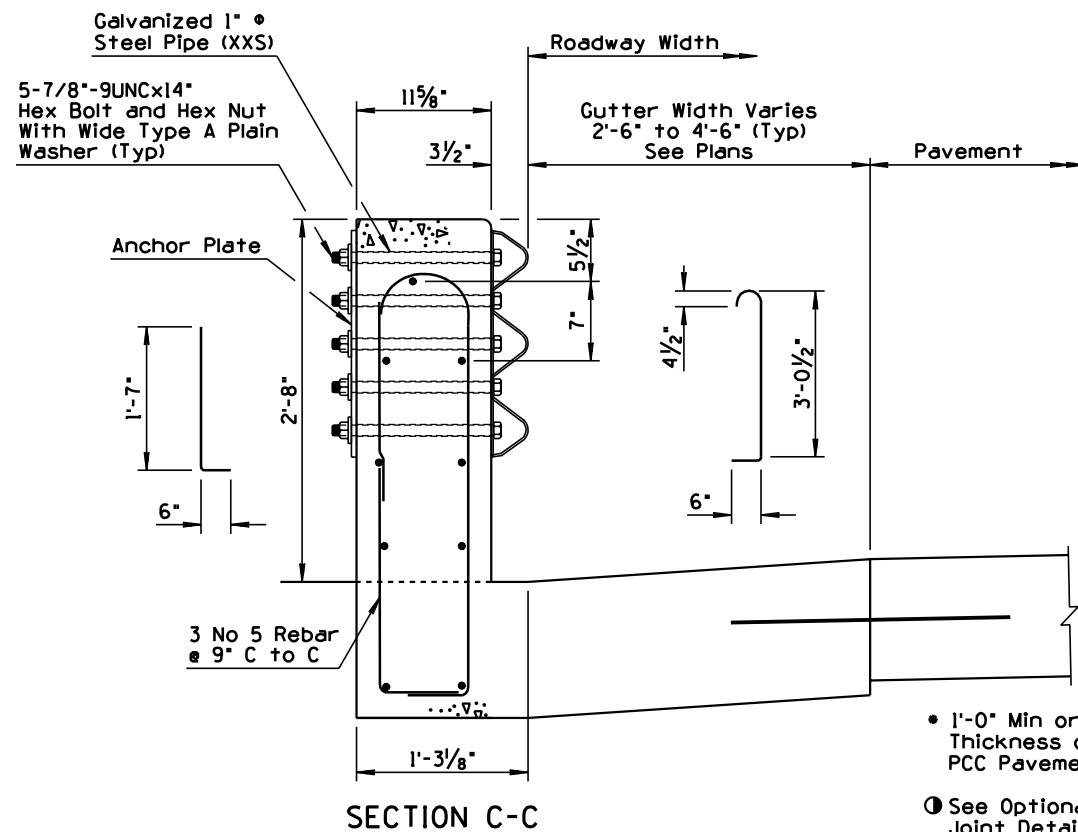
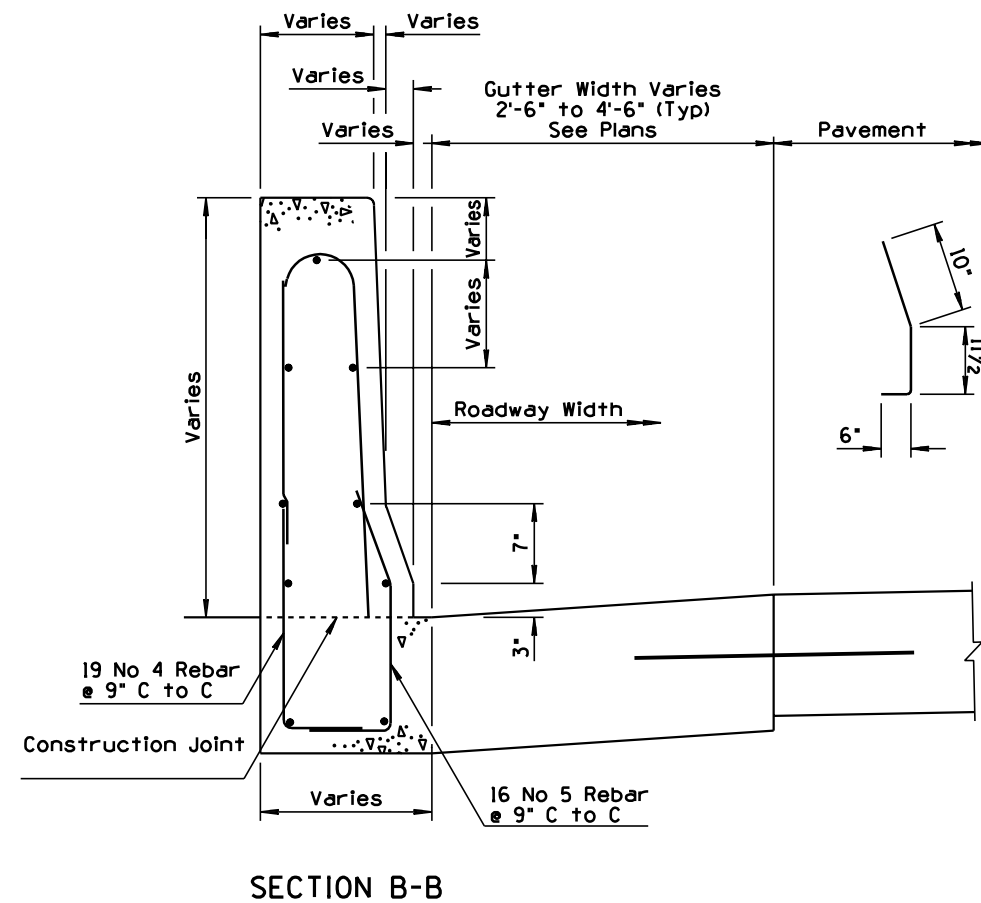
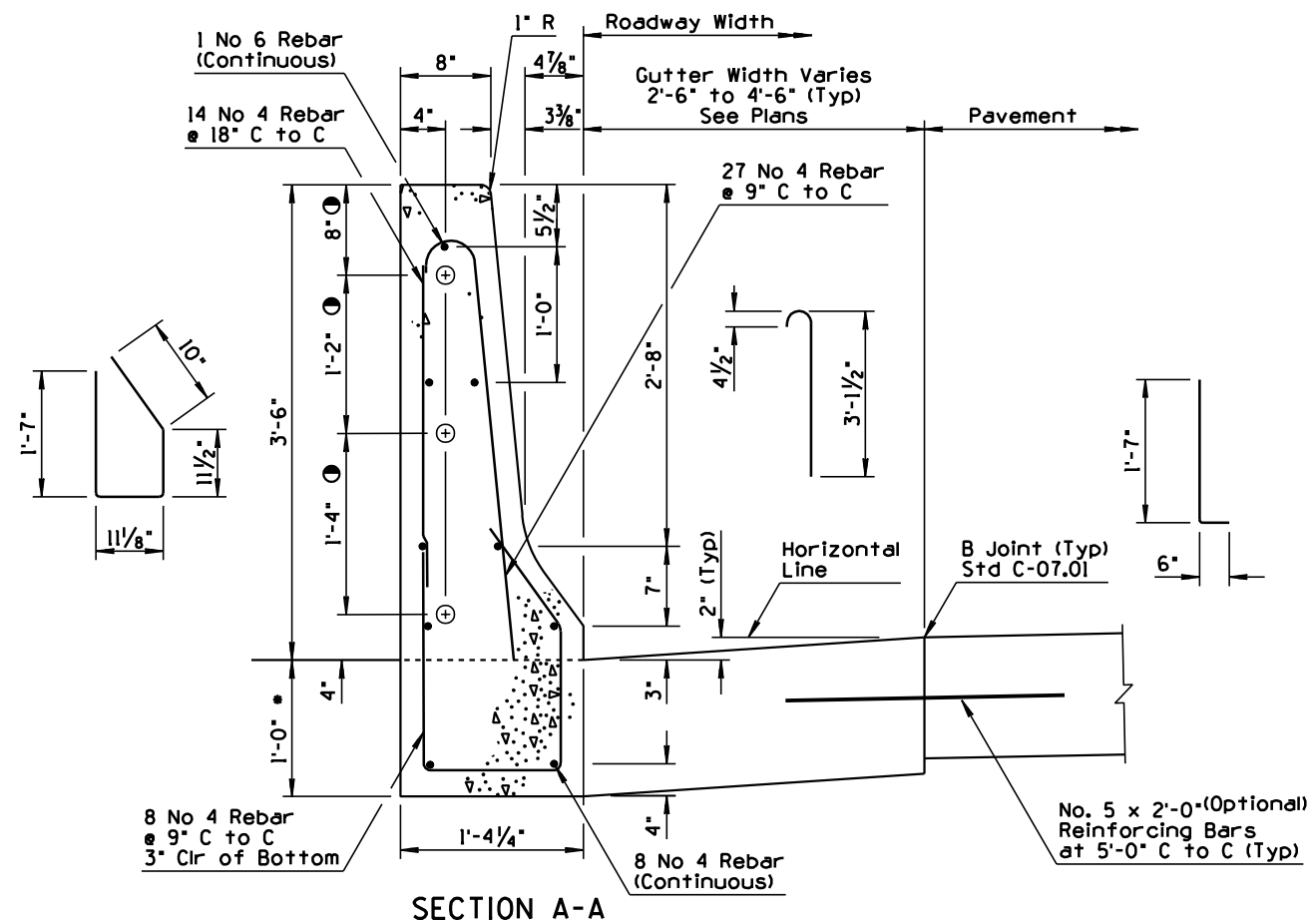
CAISSON REINFORCEMENT



Anchor Plate

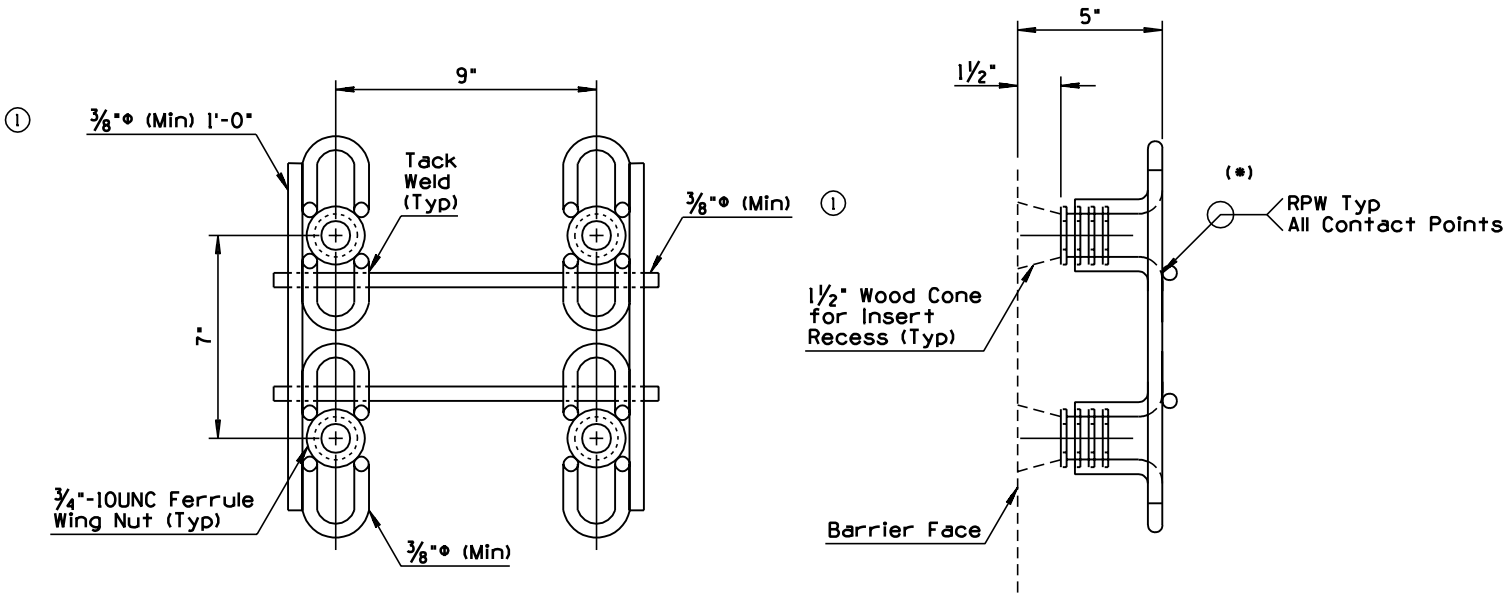
DESIGN APPROVED <i>Tommy H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	CONCRETE HALF BARRIER TRANSITION TO VERTICAL 42" TO 32" TYPE 'F' WITH CAISSONS	DRAWING NO. C-10.72 Sheet 3 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STANDARD DEVELOPED	JNP	8/99
2			
3			
4			

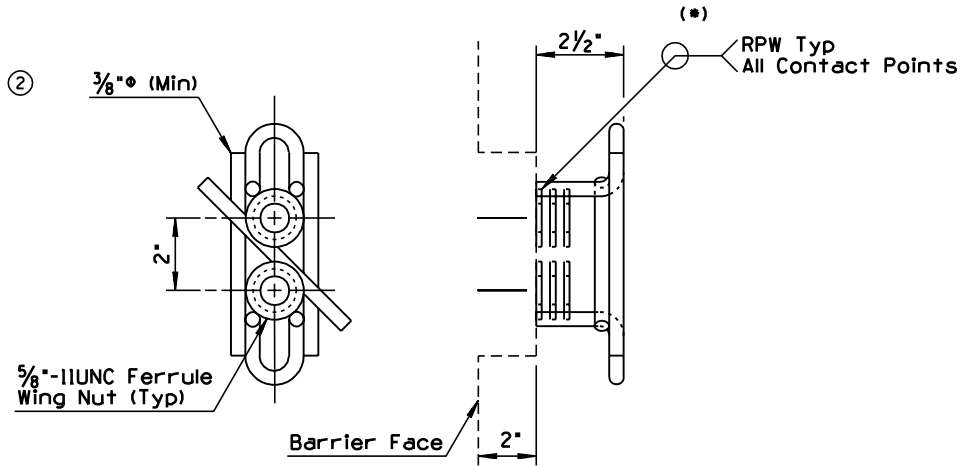


DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER TRANSITION TO VERTICAL 42" TO 32" TYPE 'F' WITH GUTTER	DRAWING NO. C-10.73 Sheet 2 of 2

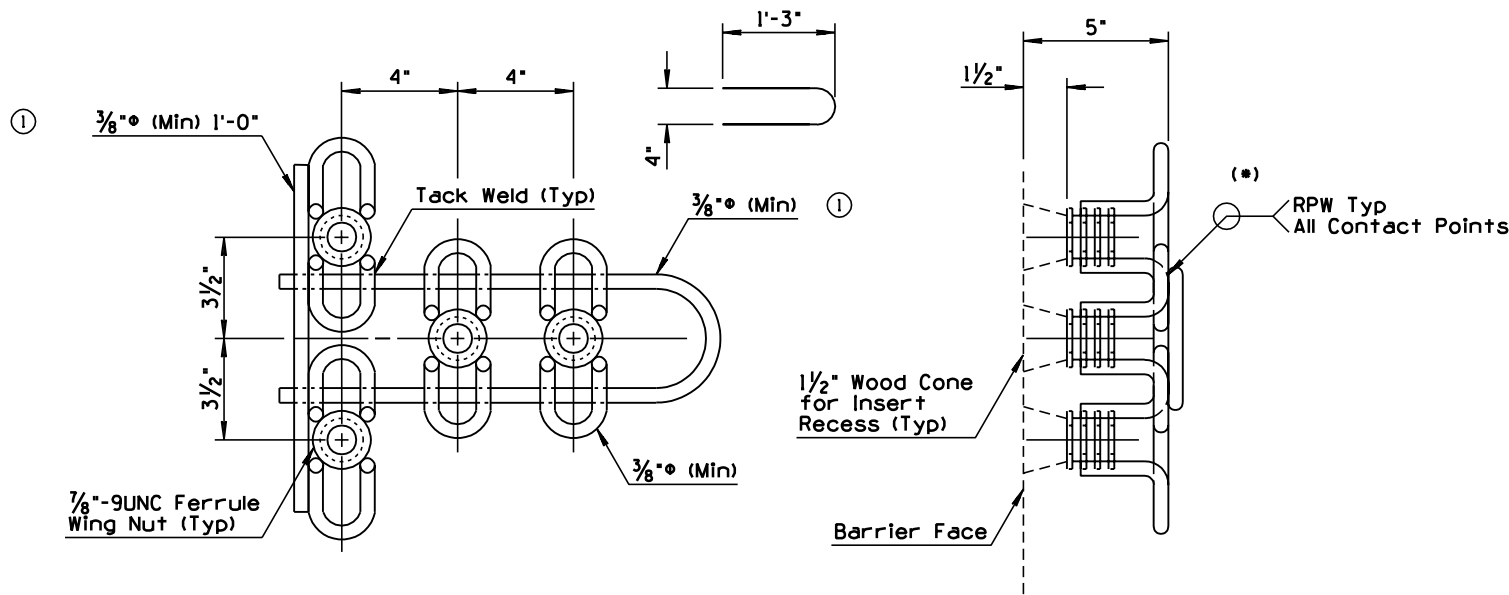
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED STEEL	PNB	10/95
2	ADDED NOTE	PNB	10/95
3			
4			



BLOCK ANCHOR ASSEMBLY

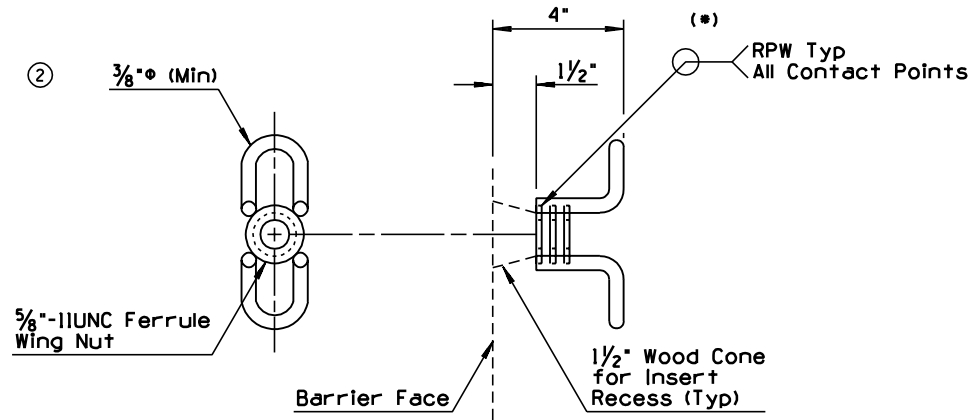


RUB RAIL TERMINAL ANCHOR



TERMINAL CONNECTOR ANCHOR ASSEMBLY

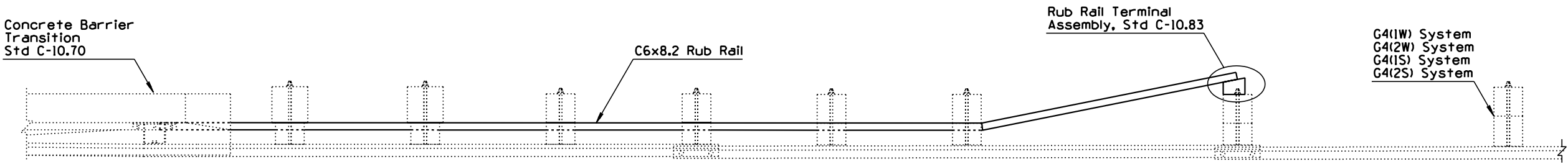
* Each Weld Shall Develop
The Tensile Strength Of
The Wire



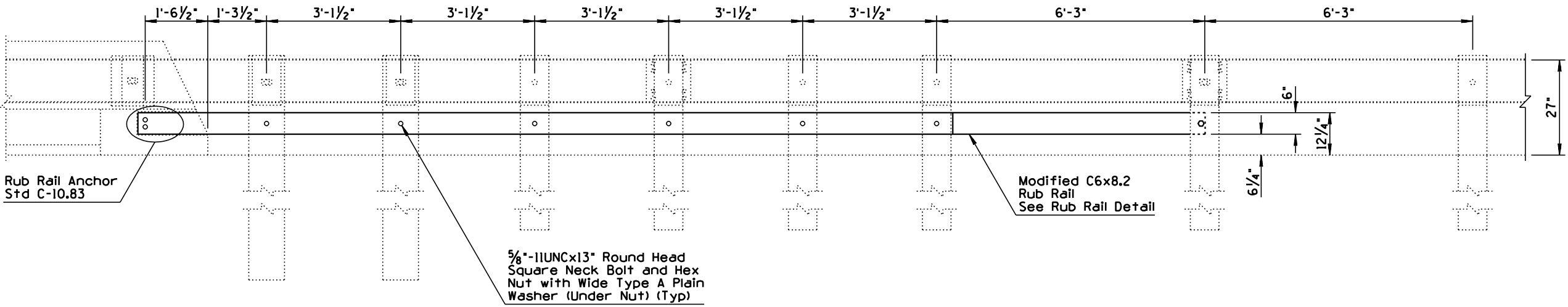
FERRULE WING NUT BLOCK ANCHOR

DESIGN APPROVED <i>Larry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-10.74

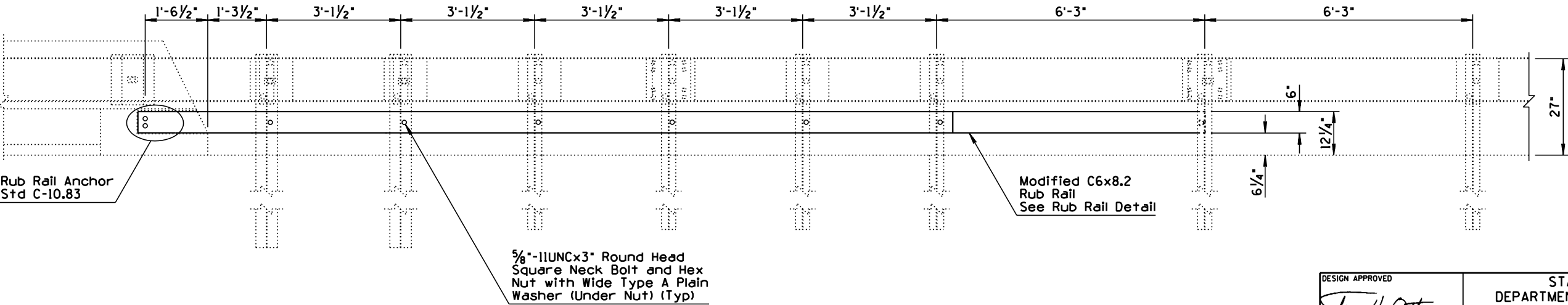
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



PLAN



ELEVATION - TIMBER POST



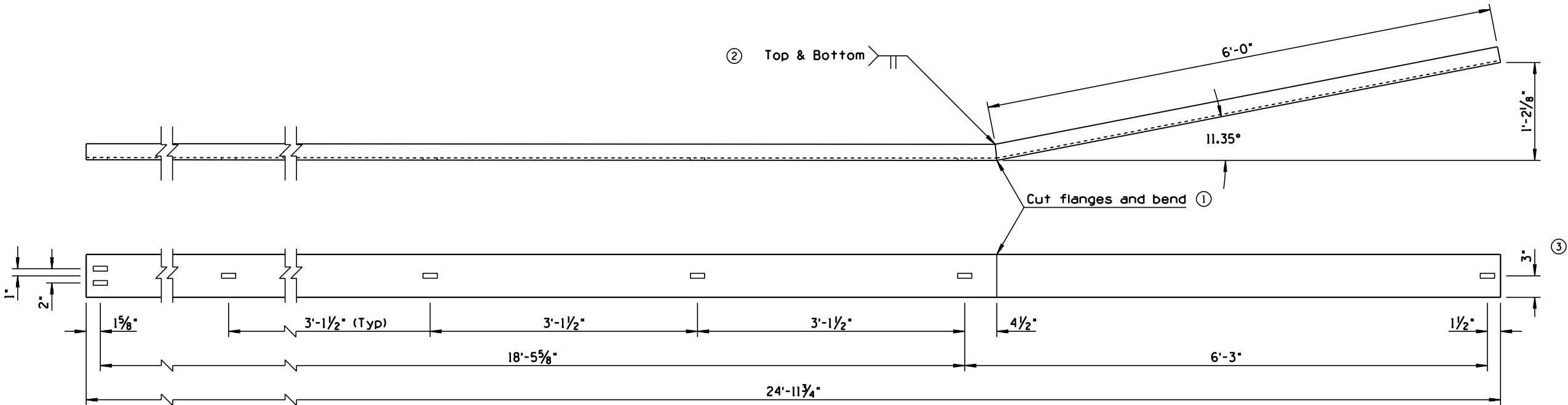
ELEVATION - STEEL POST

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	RUB RAIL	DRAWING NO. C-10.80 Sheet 1 of 2	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED CALLOUT	PNB	10/95
2	ADDED WELDING CALLOUT	PNB	10/95
3	CORRECTED DIMENSION	PNB	10/95
4			

GENERAL NOTES

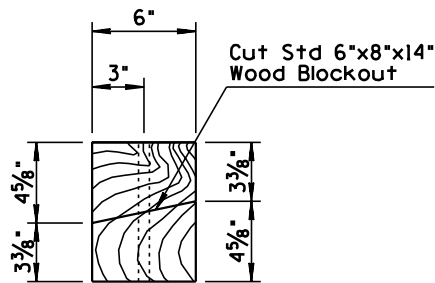
1. All slots in rub rail are 1/16" x 2".
All square holes are 1/16".



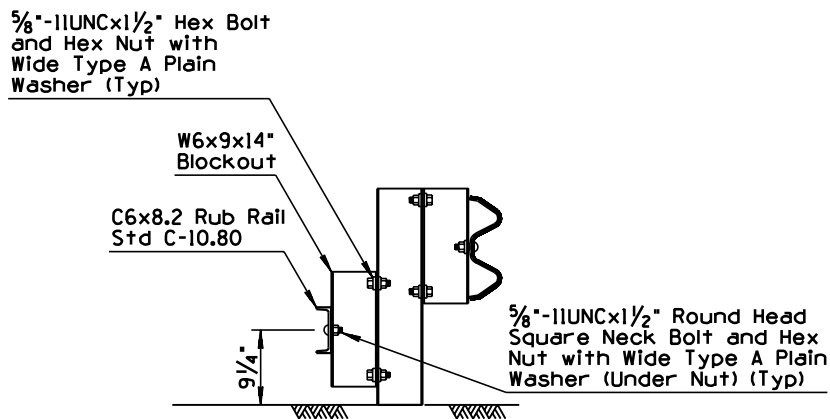
MODIFIED C6X8.2 RUB RAIL DETAIL

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	RUB RAIL	DRAWING NO. C-10.80 Sheet 2 of 2

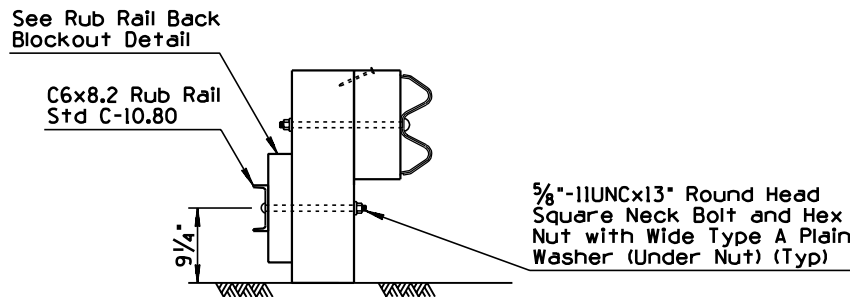
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			



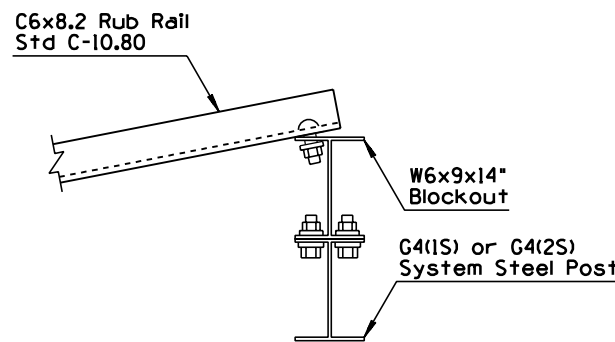
PLAN
RUB RAIL BACK BLOCKOUT DETAIL



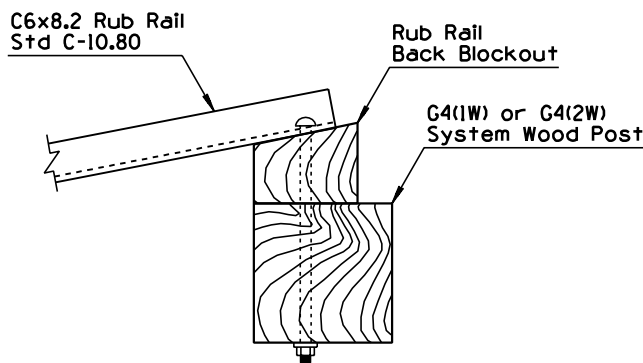
SECTION



SECTION

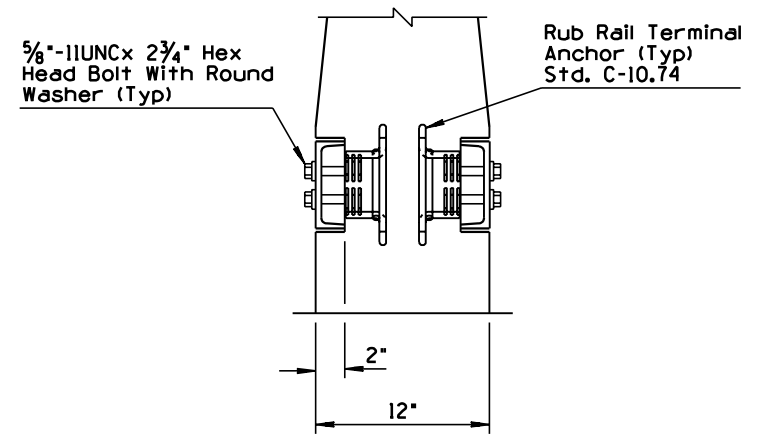


PLAN
STEEL POST

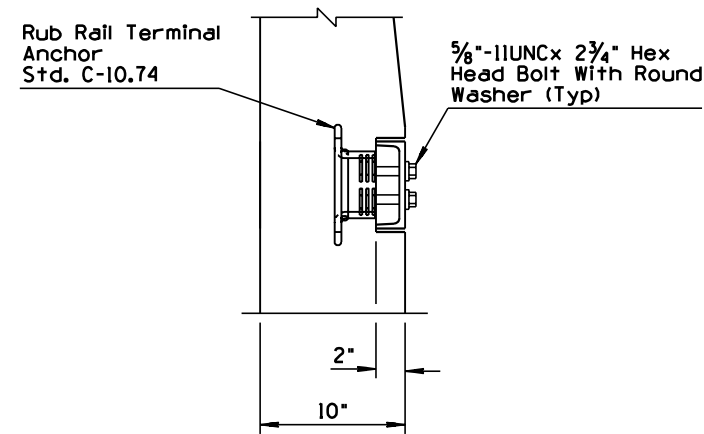


PLAN
TIMBER POST

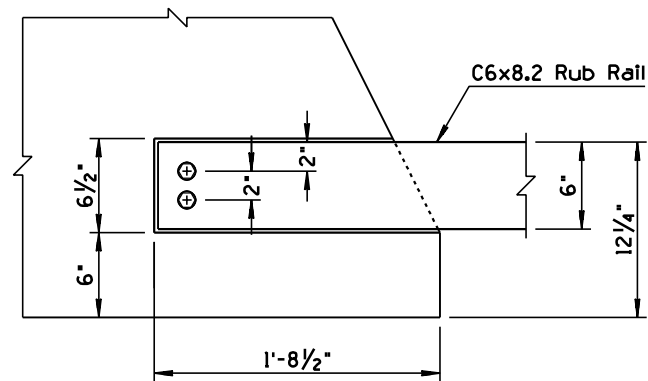
RUB RAIL TERMINAL ASSEMBLY



Median Barrier



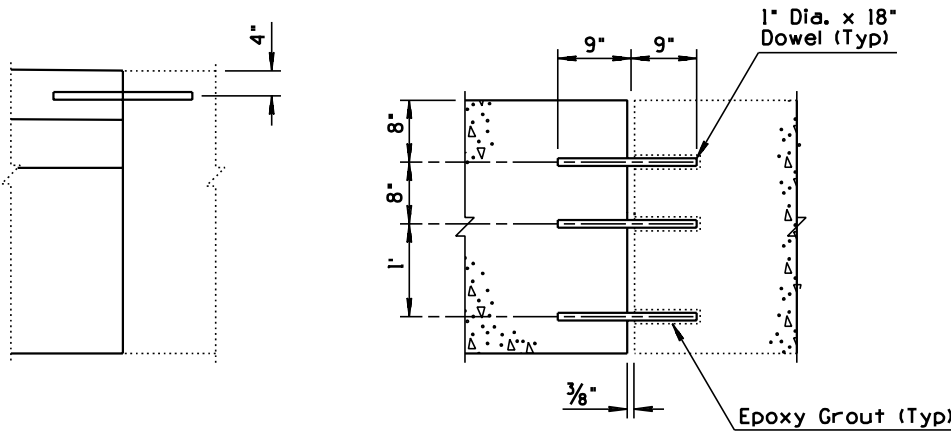
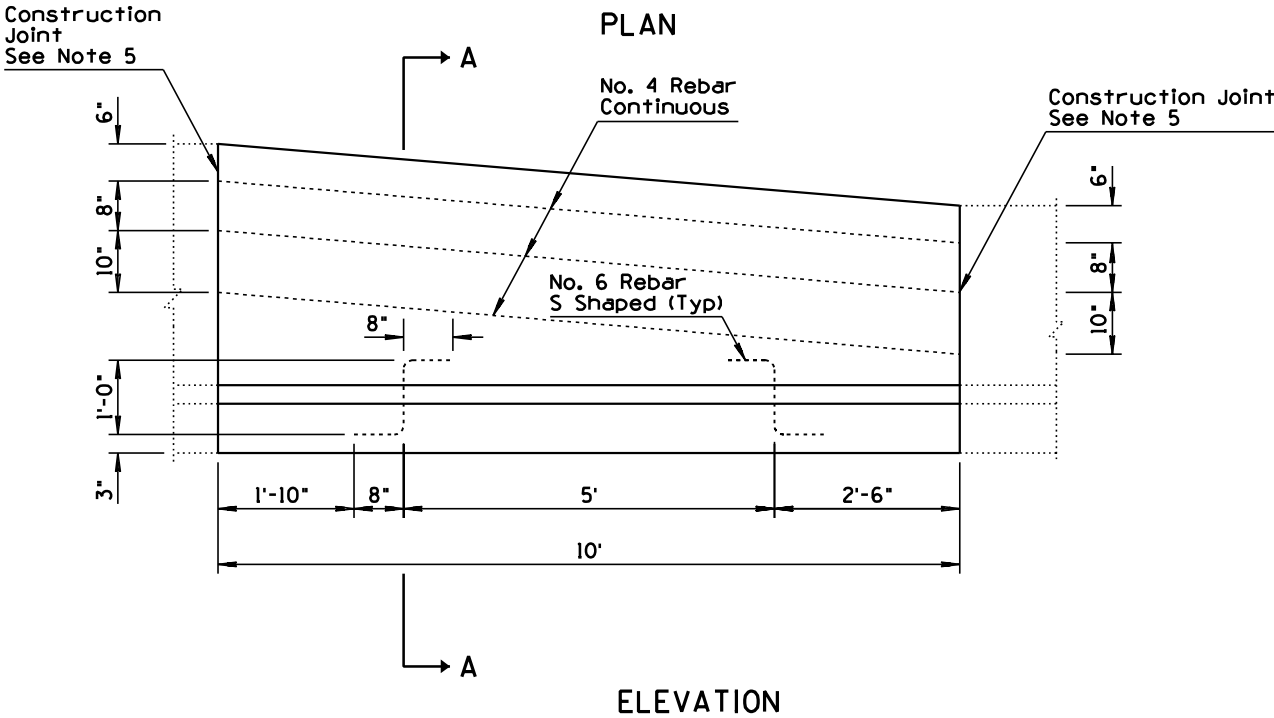
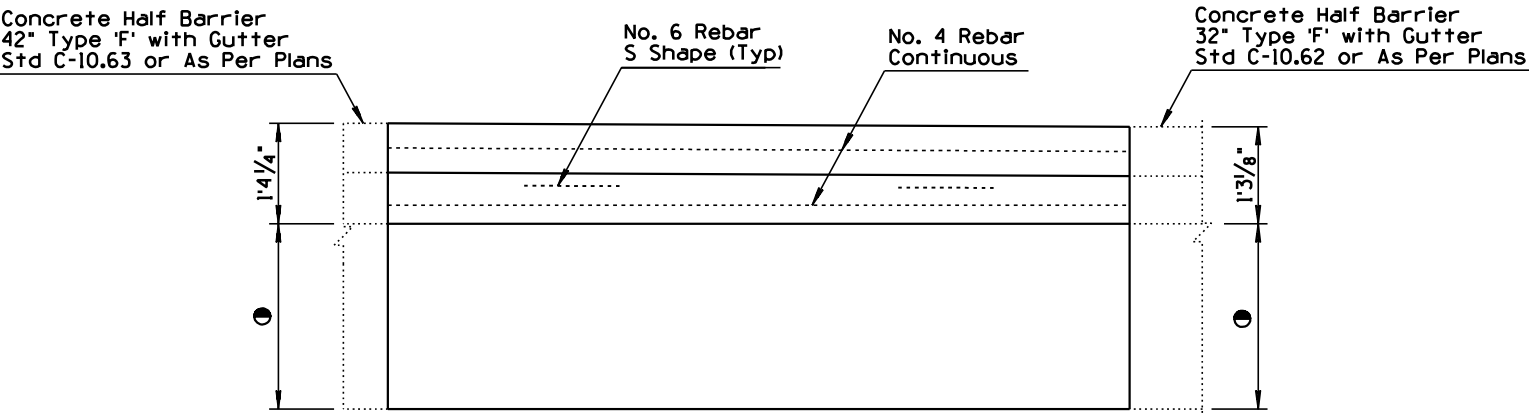
Half Barrier



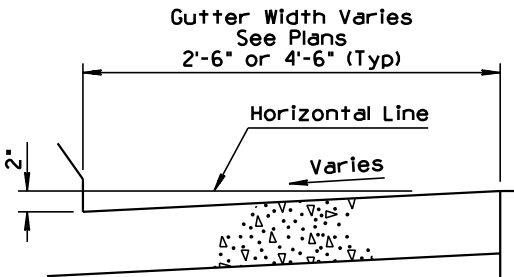
Elevation
RUB RAIL ANCHOR

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	3/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	HARDWARE FOR RUB RAIL	DRAWING NO. C-10.83

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	NEW STANDARD DEVELOPED	JNP	8/99
2			
3			
4			



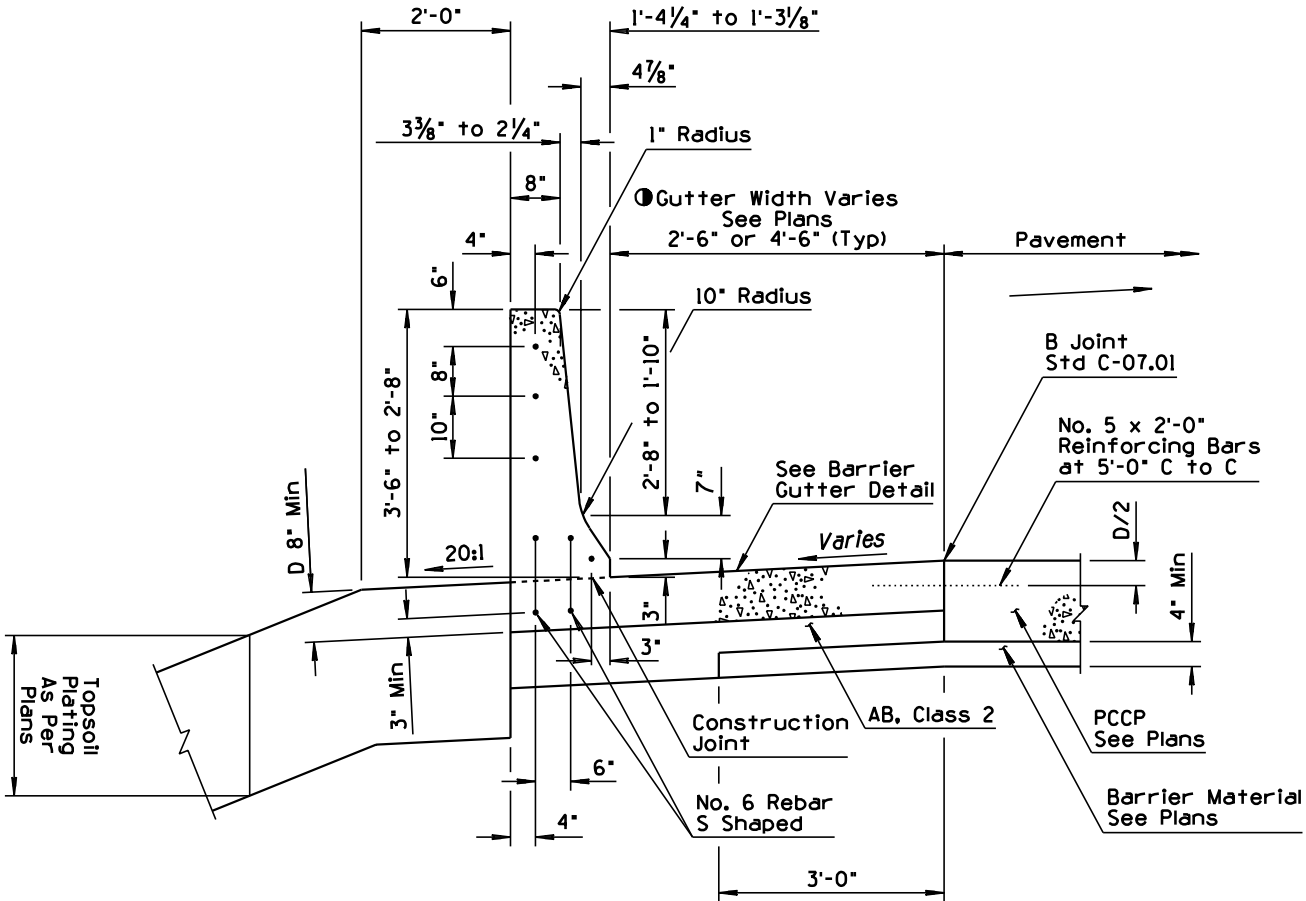
CONSTRUCTION JOINT DETAIL
(OPTIONAL)



BARRIER GUTTER DETAIL

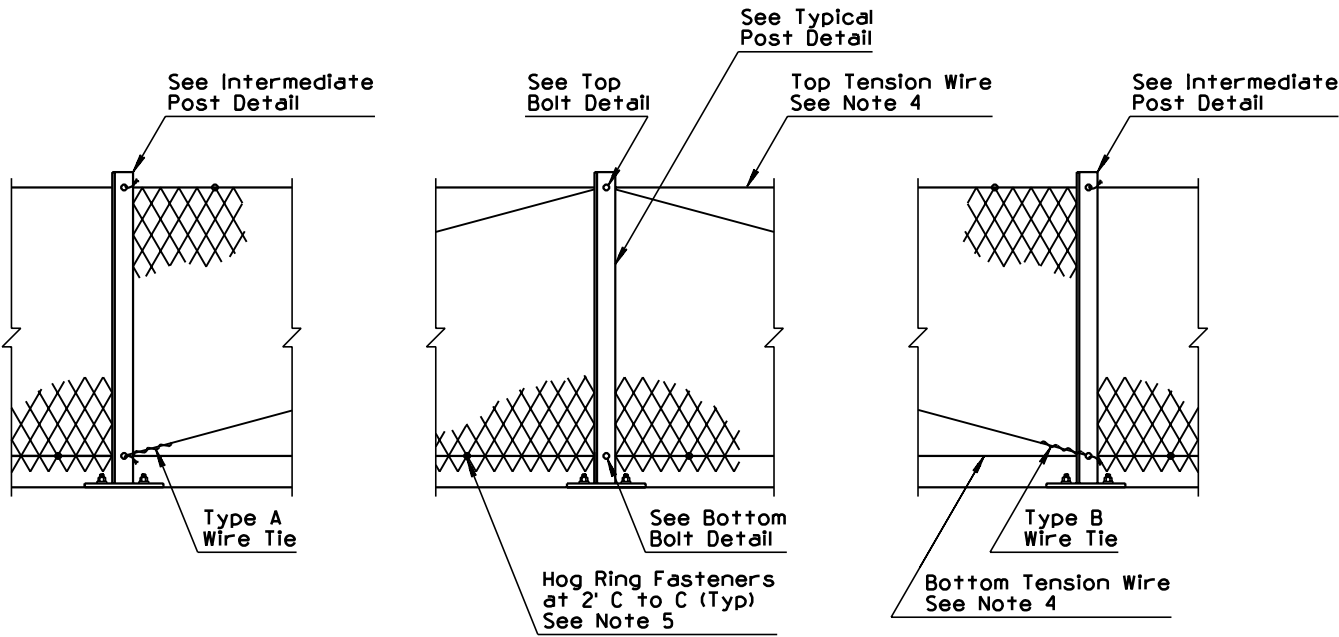
GENERAL NOTES

- Half Barrier Transition shall be constructed by the formed Cast-In-Place method.
- Concrete shall be Class S, design strength $f'_c = 3000$ PSI.
- If the footing and barrier are cast monolithically, No. 6 S shaped rebars will not be required.
- In no case shall the width of barrier exceed the width of the barrier footing or overhang the adjacent pavement.
- No. 4 Rebar shall extend 12" past the construction joint at the completion of the day's pour.
- Thickness of footing, "D" can be adjusted to match the PCCP thickness, as approved by the Engineer.
- Two inch deep contraction joints shall be placed in the gutter at locations which match the joints in adjacent portland cement concrete pavement and at approximate 15 foot centers when adjacent to asphaltic concrete pavement. Joints shall be either hand tooled or sawed.

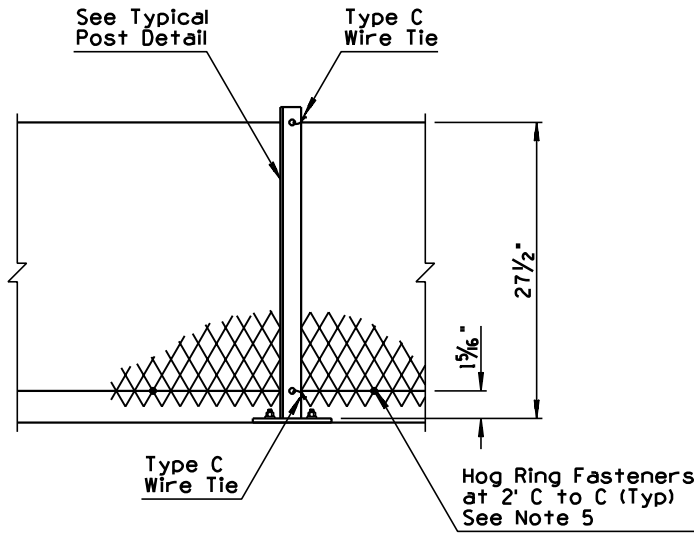


DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CONCRETE HALF BARRIER TRANSITION TYPE 'F' TO TYPE 'F' 42" TO 32"	DRAWING NO. C-10.86

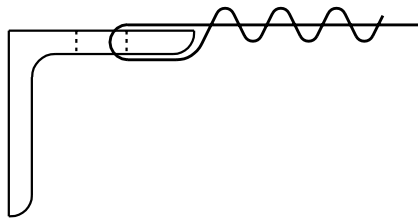
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED STANDARD & ADDED SHT 2	PNB	3/94
2			
3			
4			



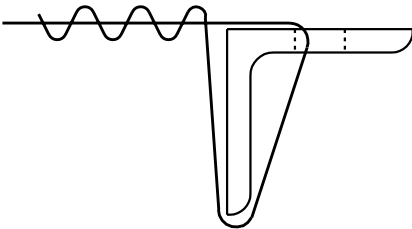
CROSS BRACE POST DETAIL



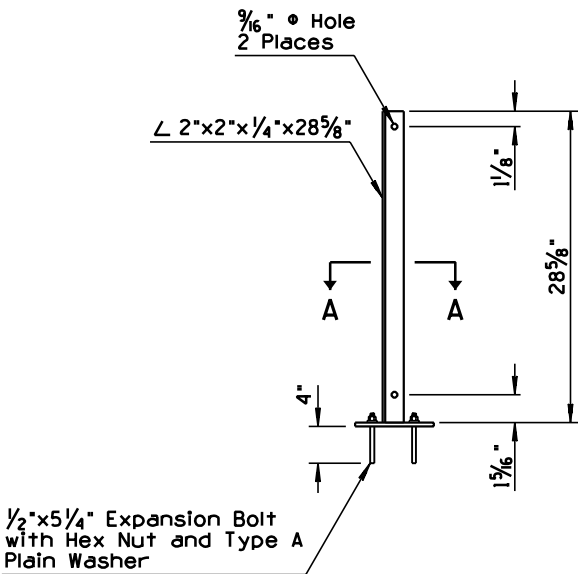
INTERMEDIATE POST DETAIL



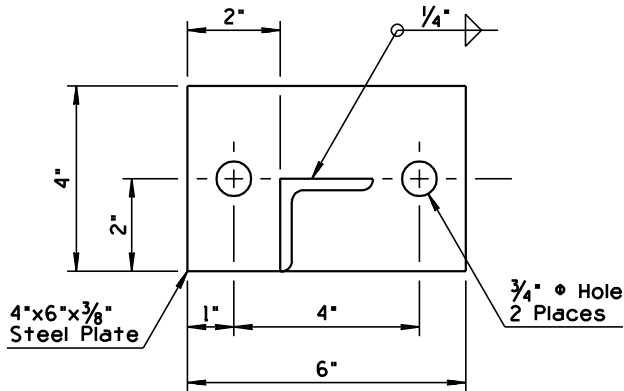
TYPE A WIRE TIE



TYPE B WIRE TIE



TYPICAL POST DETAIL

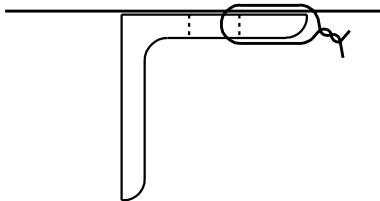


SECTION A-A



Elevation

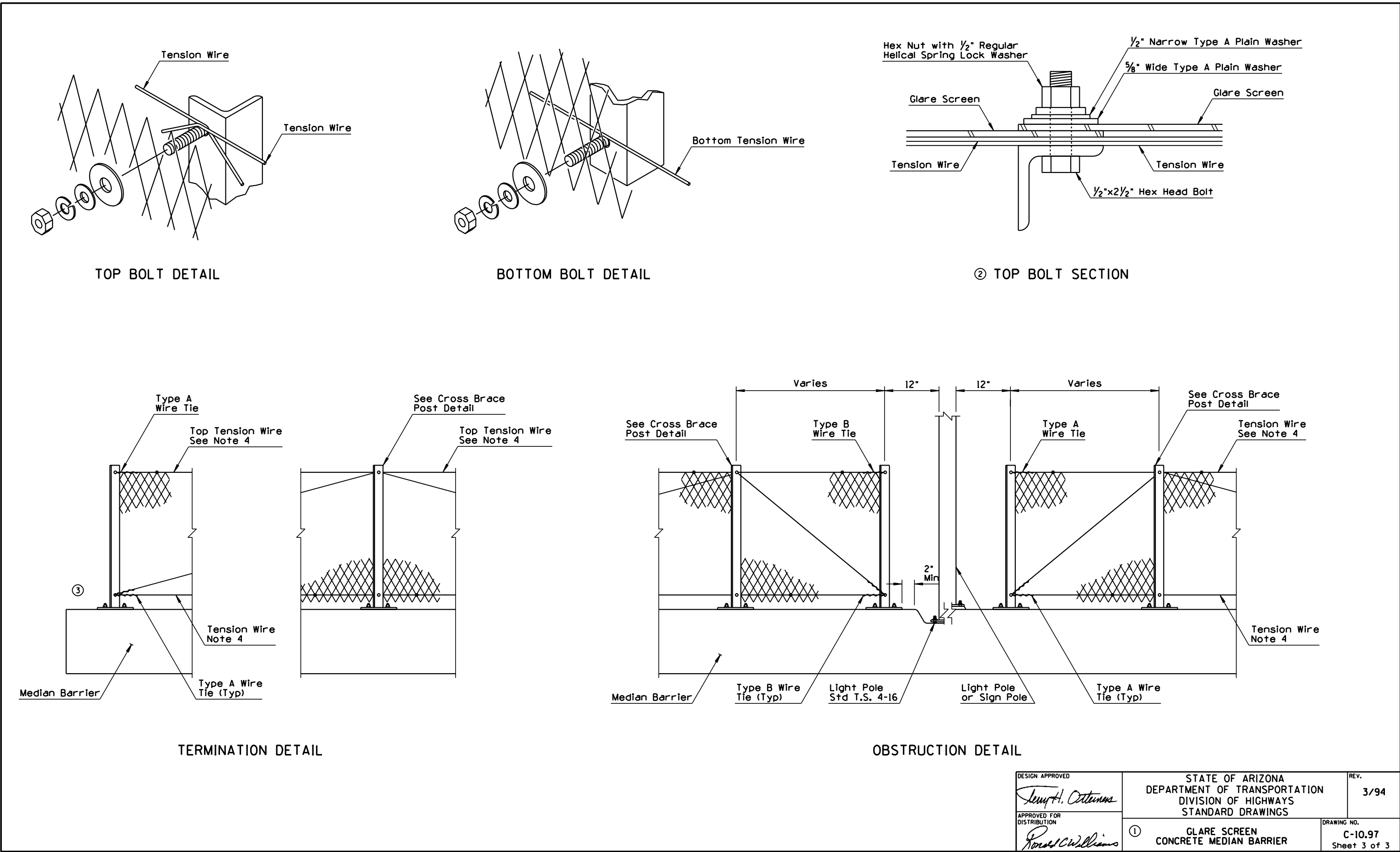
DIRECTION DETAIL



TYPE C WIRE TIE

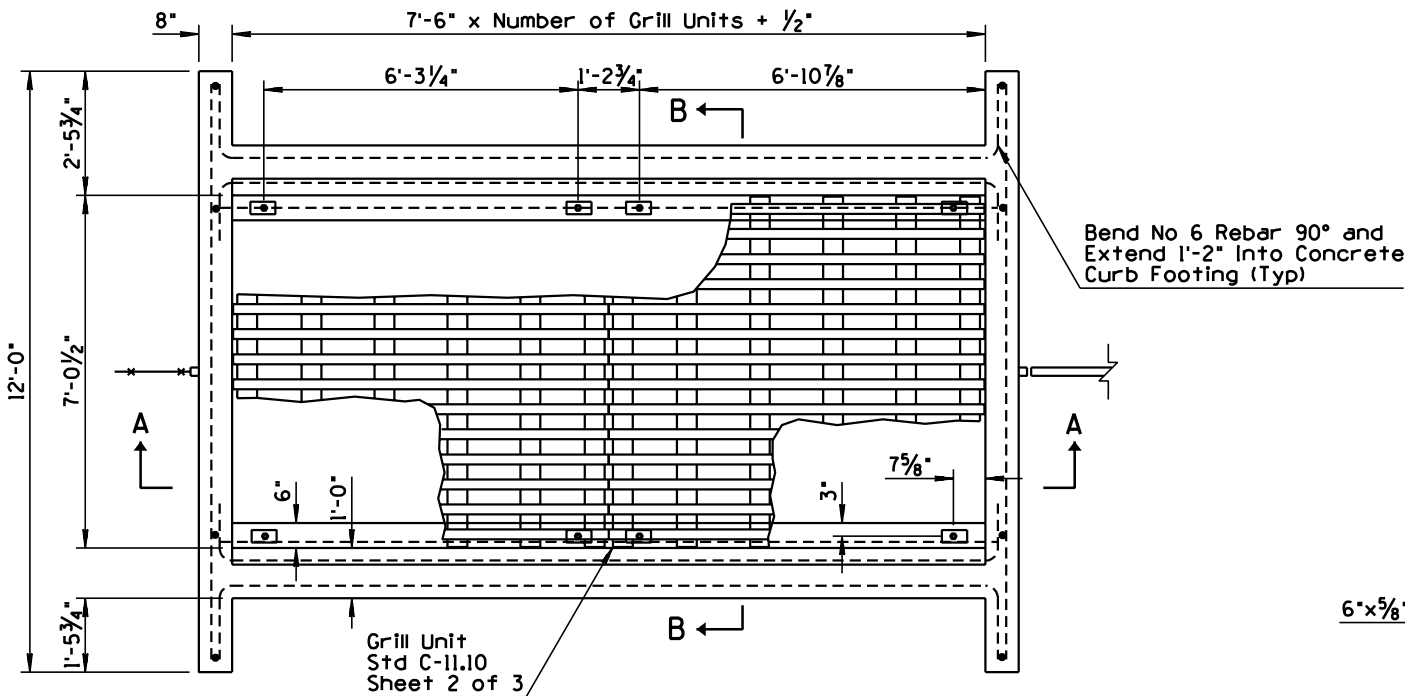
DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 3/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① GLARE SCREEN CONCRETE MEDIAN BARRIER	DRAWING NO. C-10.97 Sheet 2 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED STANDARD & ADDED SHT 3	PNB	3/94
2	REVERSED BOLT	PNB	3/94
3	MOVED END GUY WIRE	PNB	3/94
4			

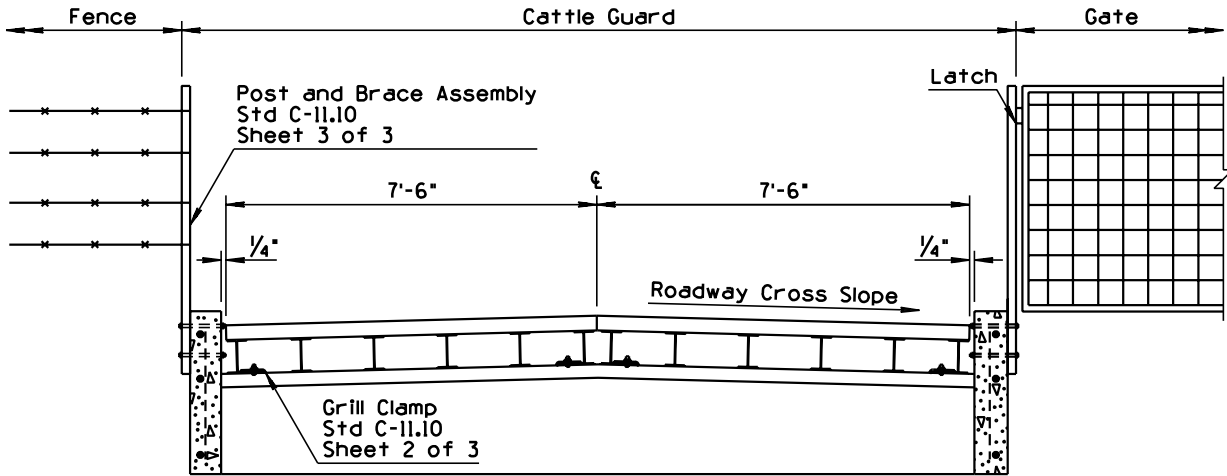


DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① GLARE SCREEN CONCRETE MEDIAN BARRIER	DRAWING NO. C-10.97 Sheet 3 of 3

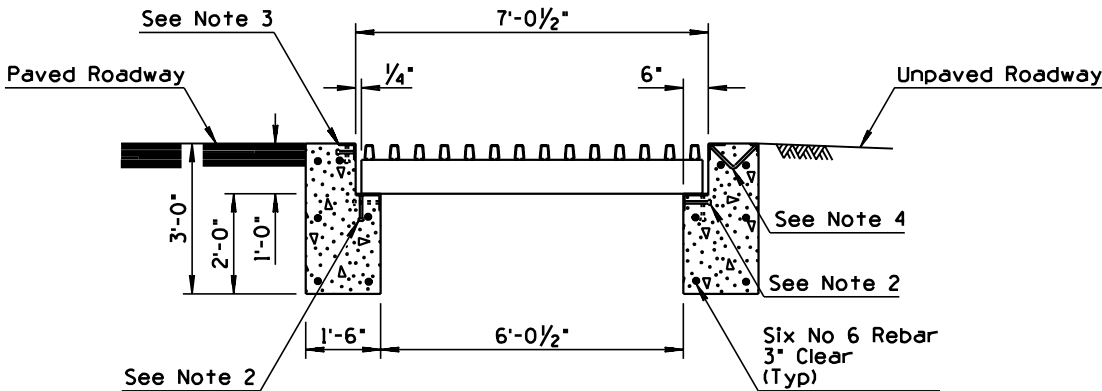
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
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2	DELETED NOTE	PNB	7/94
3	ADDED NOTE	PNB	7/94
4			



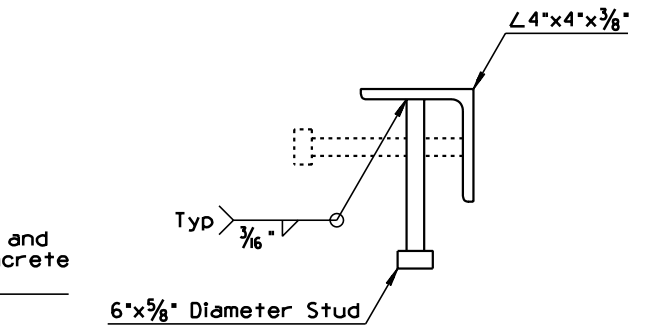
PLAN



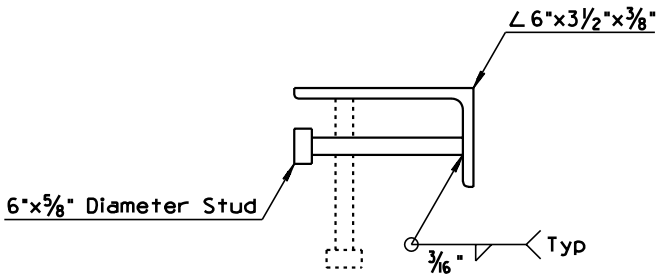
SECTION A-A



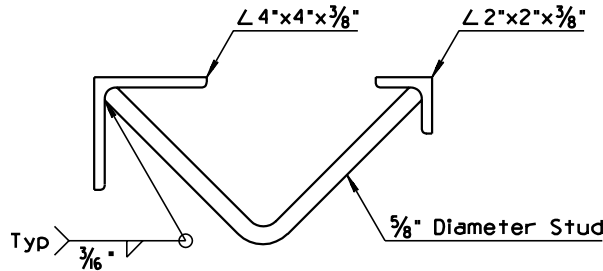
SECTION B-B



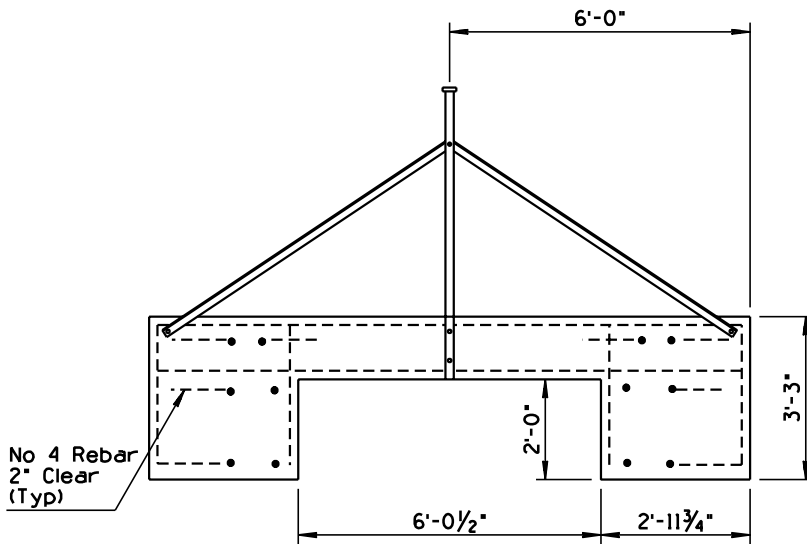
ANGLE ASSEMBLY DETAIL NO. 1



ANGLE ASSEMBLY DETAIL NO. 2



ANGLE ASSEMBLY DETAIL NO. 3



END VIEW

GENERAL NOTES

1. Cattle guard shall be sloped to conform to the roadway grade and cross section, except that where an odd number of grill units is specified in a crowned roadway, the center grill unit shall have a level cross slope.
2. Grill units shall be set on an angle assembly consisting of one 6"x3 1/2"x3/8" angle and 5/8" diameter studs with head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail No. 2.
3. Where the adjacent roadway is paved, an angle assembly shall consist of one 4"x4"x3/8" angle and 5/8" diameter studs with head. The studs shall be placed on 1'-0" alternate centers. See Angle Assembly Detail No. 1.
4. Where the adjacent roadway is unpaved, an angle assembly shall consist of one 4"x4"x3/8" angle and one 2"x2"x3/8" angle and connected with 5/8" diameter studs. The assembly shall be crowned at the centerline and constructed with a bevel cut and welded. The studs shall be bent 90° and placed on 1'-0" centers. See Angle Assembly Detail No. 3.
5. Each angle and angle assembly shall be fabricated to form a single piece for the full length of the cattle guard.
6. Quantities shown for concrete and reinforcing bars are to be considered approximations for informational purposes only.
7. When guard rail is to be used at the cattle guard, it may be possible to reduce the number of grill units required.

UNIT TABLE

Roadway Width (Feet)	Grill Units Required	Concrete Cubic Yards	Rebar Lbs
12	2	5.8	173.3
16	3	8.0	240.9
20	4	10.3	308.5
28	5	12.5	376.1
34	6	14.7	443.7
36	6	14.7	443.7
38	7	16.9	511.2
40	7	16.9	511.2

DESIGN APPROVED

Henry H. Osterman

APPROVED FOR DISTRIBUTION

Ronald Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

ROADWAY CATTLE GUARD

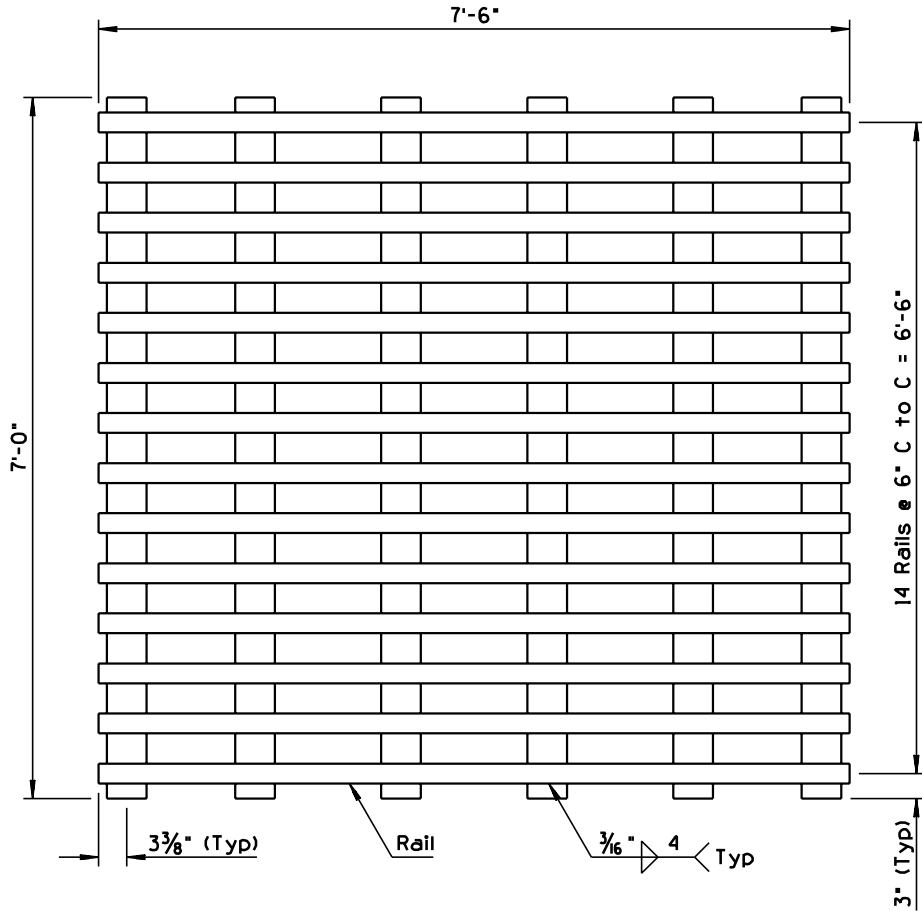
REV.

7/94

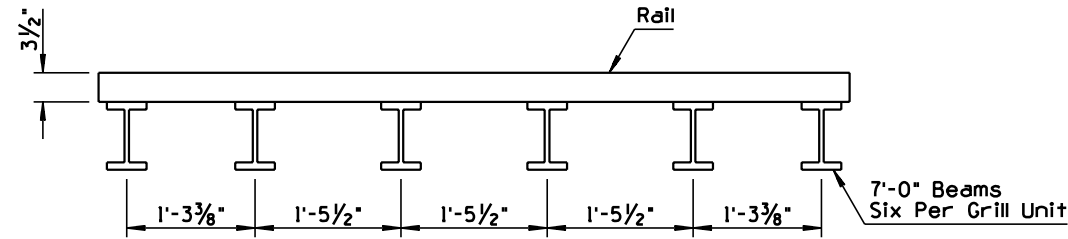
DRAWING NO.

C-11.10
Sheet 1 of 3

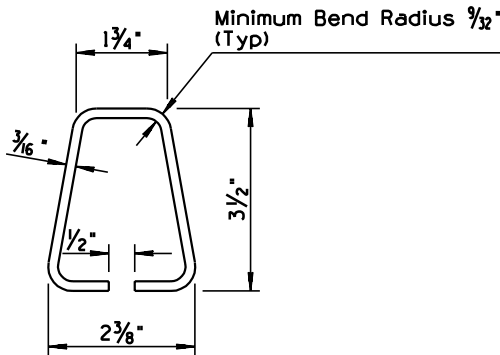
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	FROM OLD STD C-11.11	PNB	7/94
2			
3			
4			



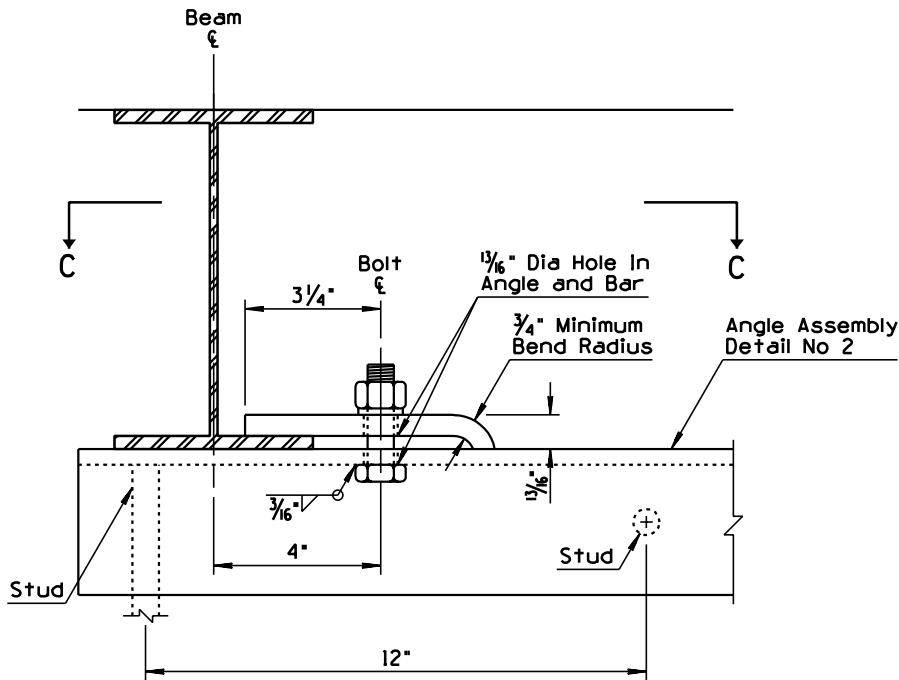
PLAN



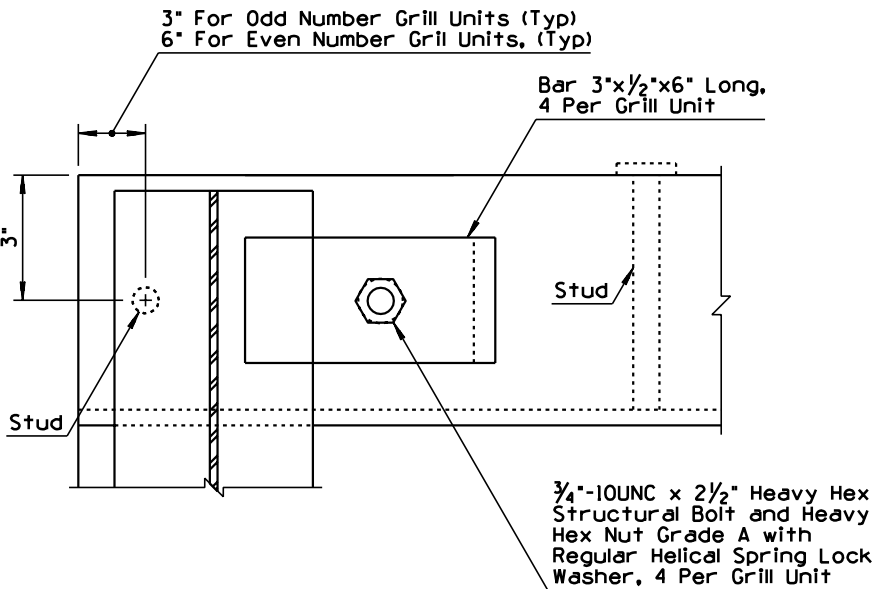
ELEVATION



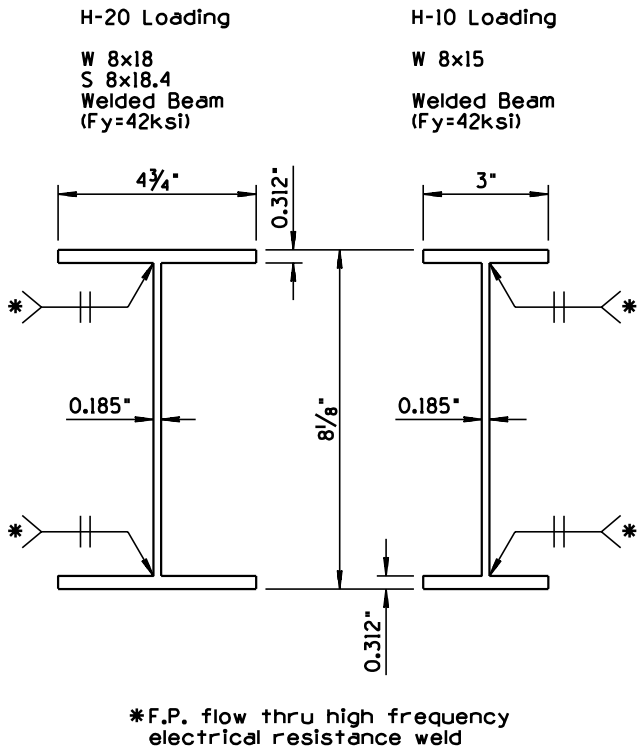
RAIL
GRILL UNIT



GRILL CLAMP



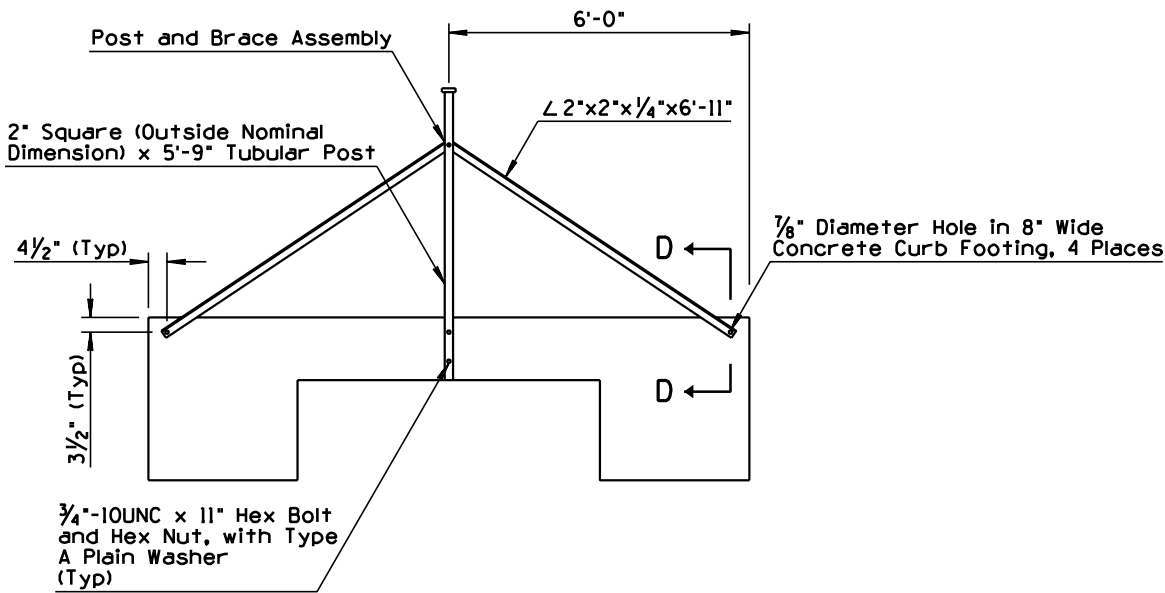
SECTION C-C



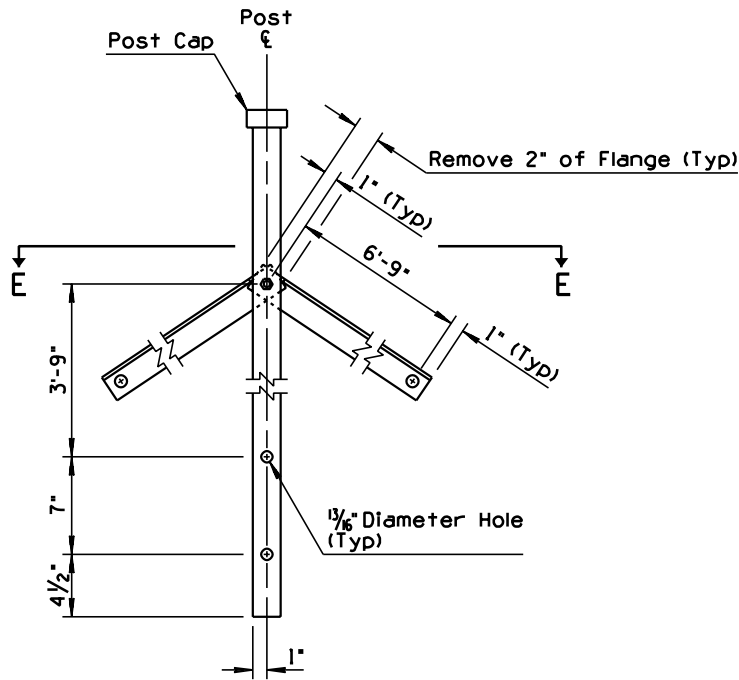
BEAMS

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① ROADWAY CATTLE GUARD	DRAWING NO. C-11.10 Sheet 2 of 3

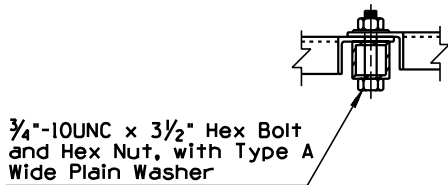
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1	CORRECTED SPELLING OF "SUBBASE"	PNB	10/95
2			
3			
4			



END VIEW



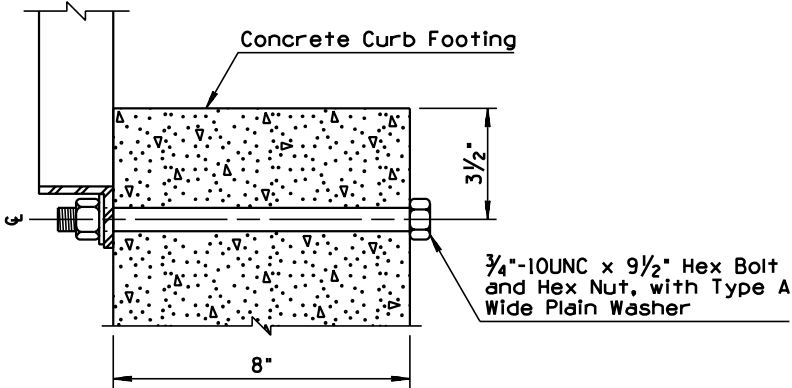
POST AND BRACE ASSEMBLY



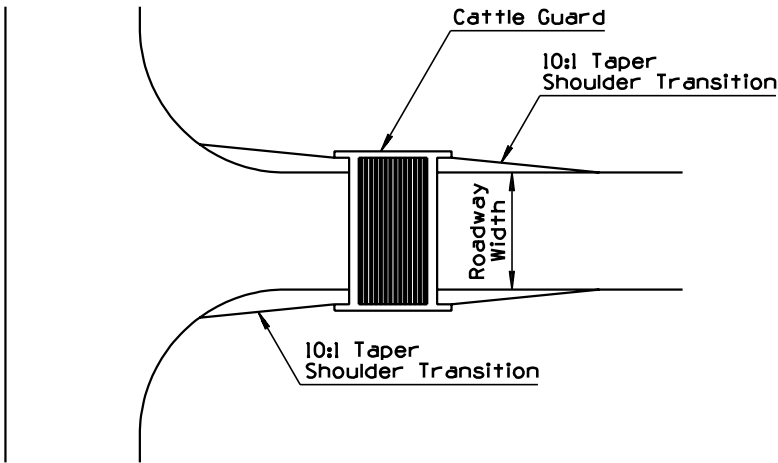
SECTION E-E

GENERAL NOTES

1. Material for shoulder transition shall be placed to the finished roadway elevation for the entire length of the transition. When the roadway is paved, Aggregate Subbase or Aggregate Base shall be used. When Roadway is unpaved, a material equivalent to the existing roadway shall be used.



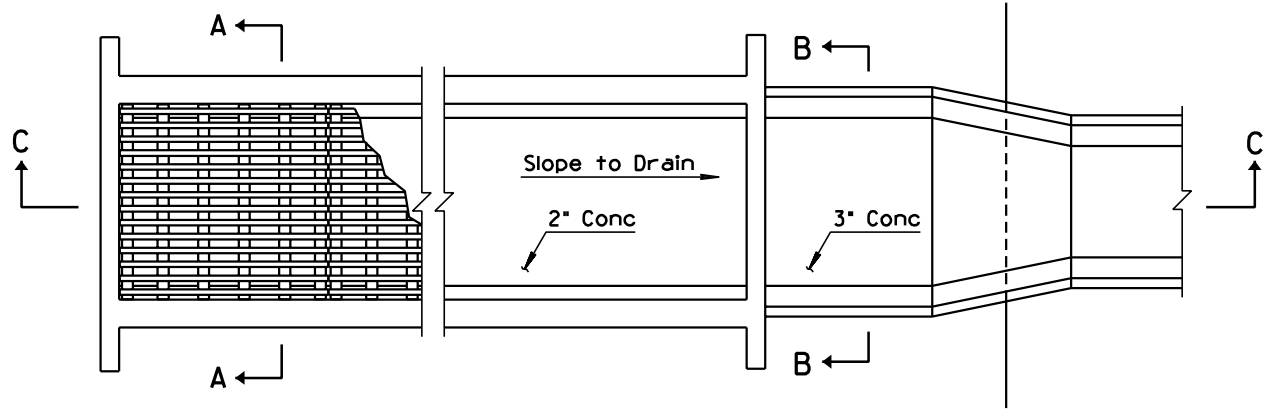
SECTION D-D



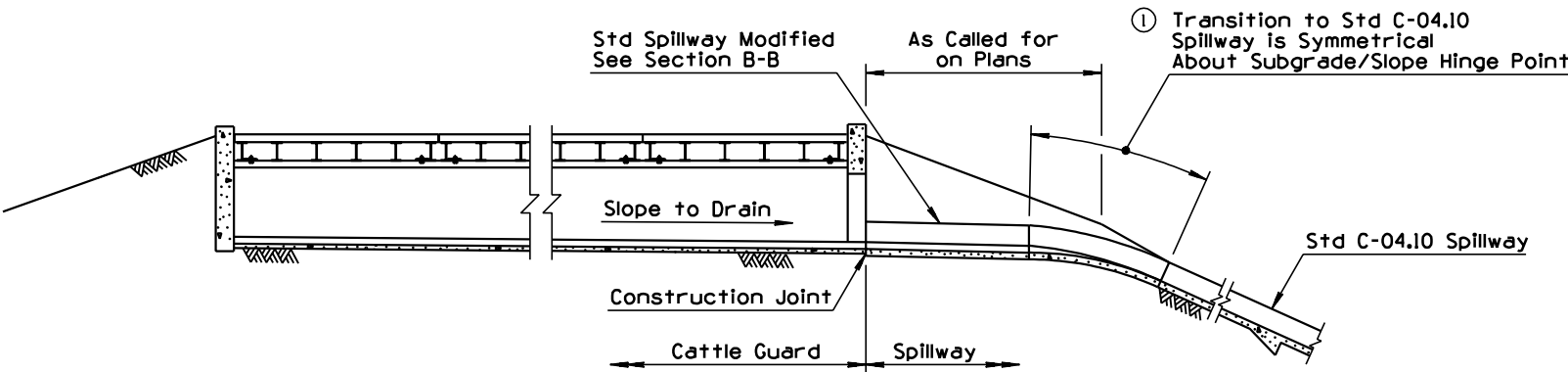
SHOULDER TRANSITION AT CATTLE GUARDS

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	ROADWAY CATTLE GUARD	DRAWING NO. C-11.10 Sheet 3 of 3

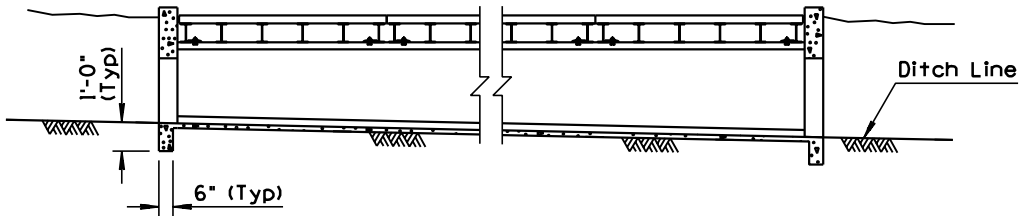
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1	MODIFIED NOTE	PNB	7/94
2			
3			
4			



PLAN



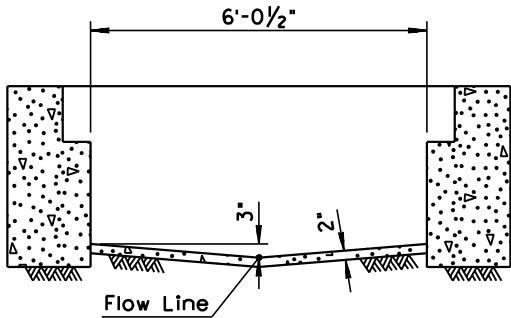
SECTION C-C
IN EMBANKMENT



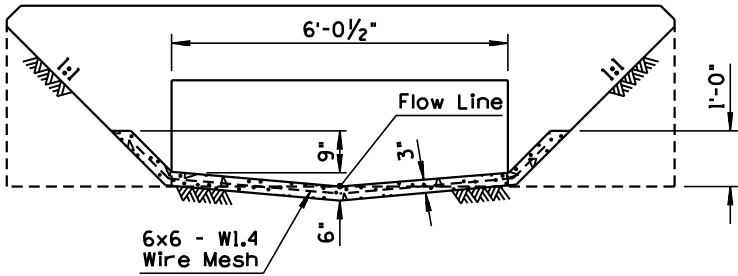
SECTION C-C
WHERE USED FOR THRU DRAINAGE-
CATTLE GUARD OPEN BOTH ENDS

GENERAL NOTES



- See Std C-11.10 for all other Cattle Guard details.
- This standard shall be used in embankment or where highly erodable soil is found.
- All concrete shall be Class B.



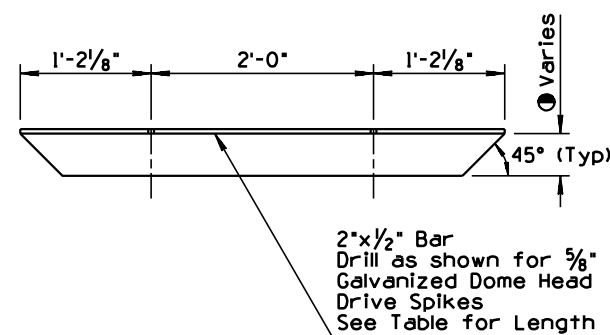
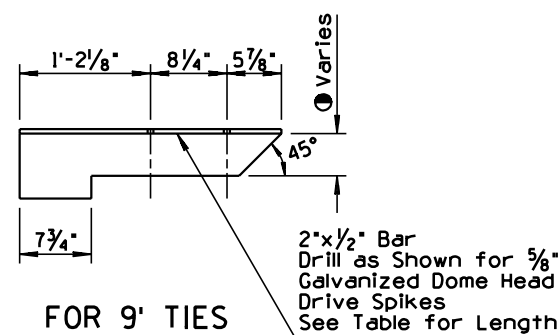
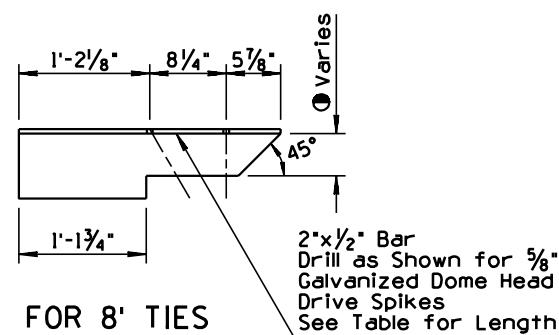
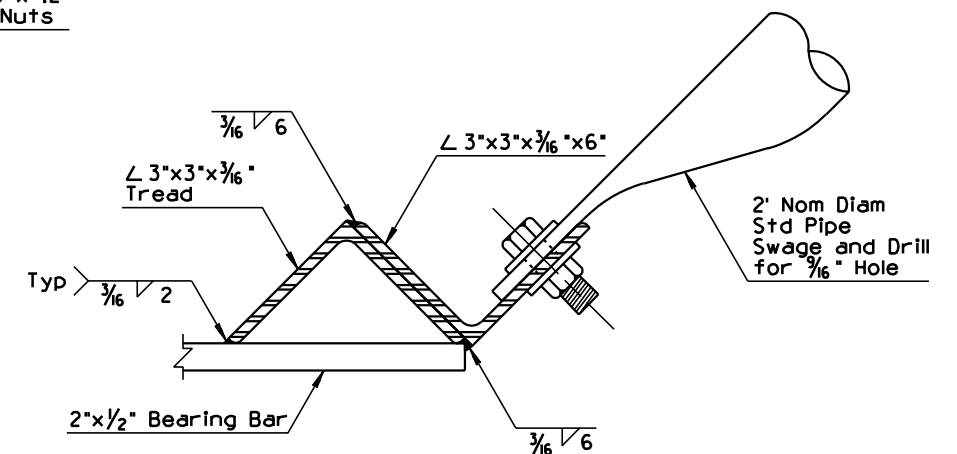
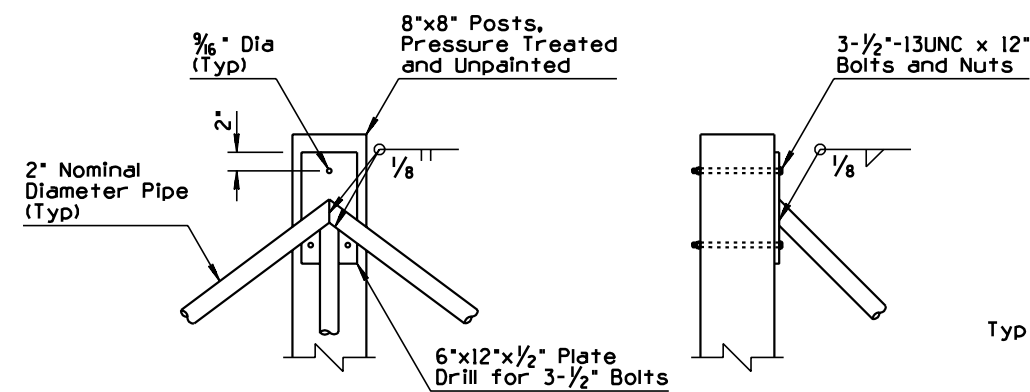
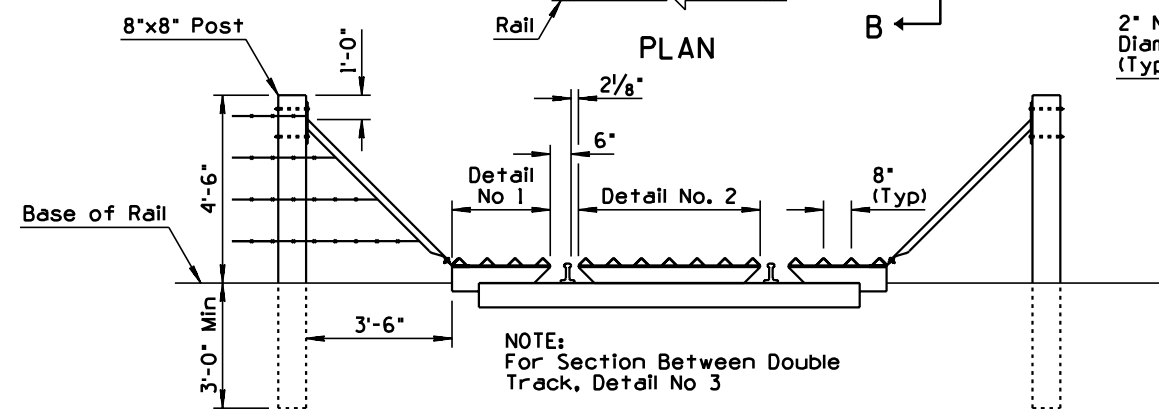
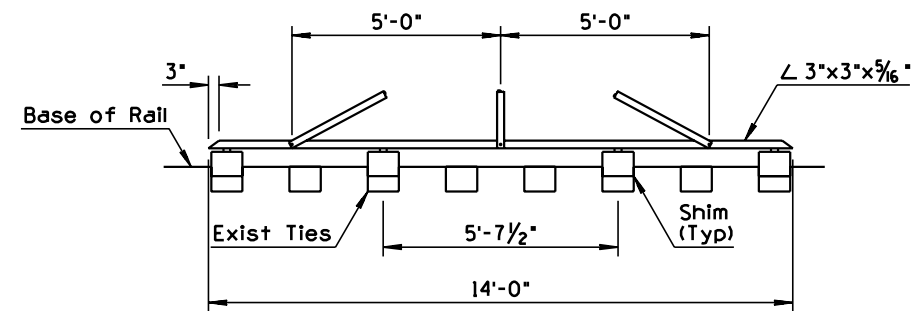
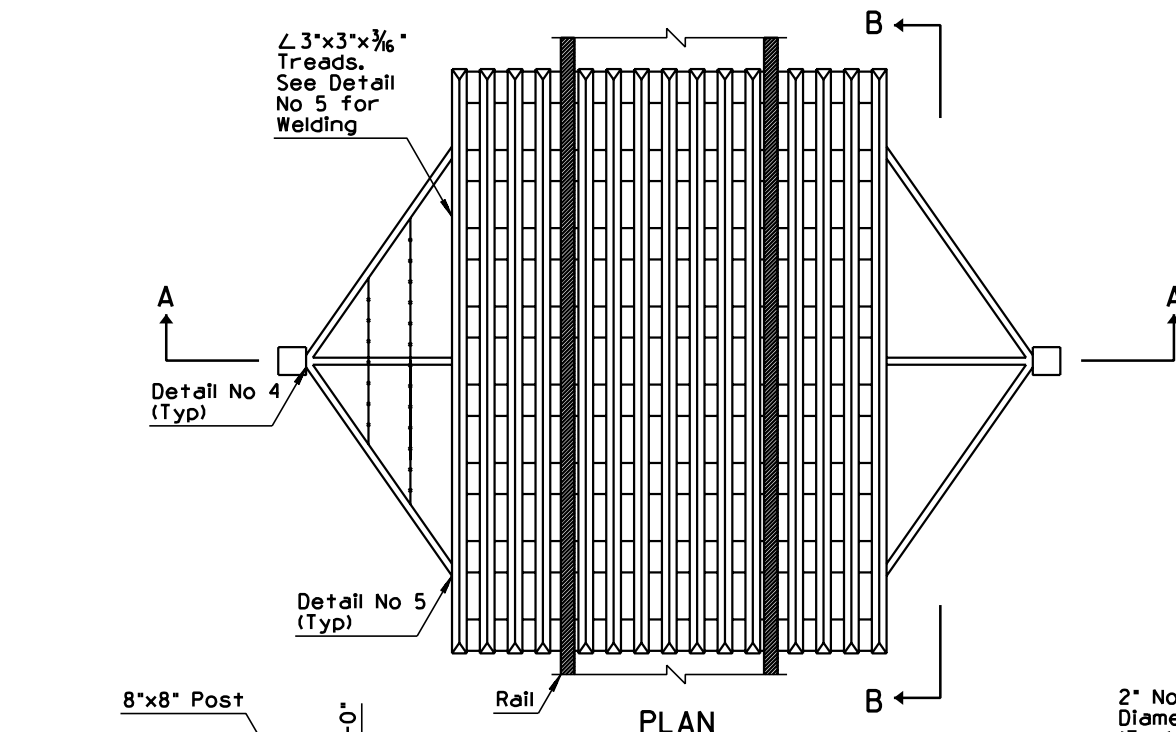
SECTION A-A



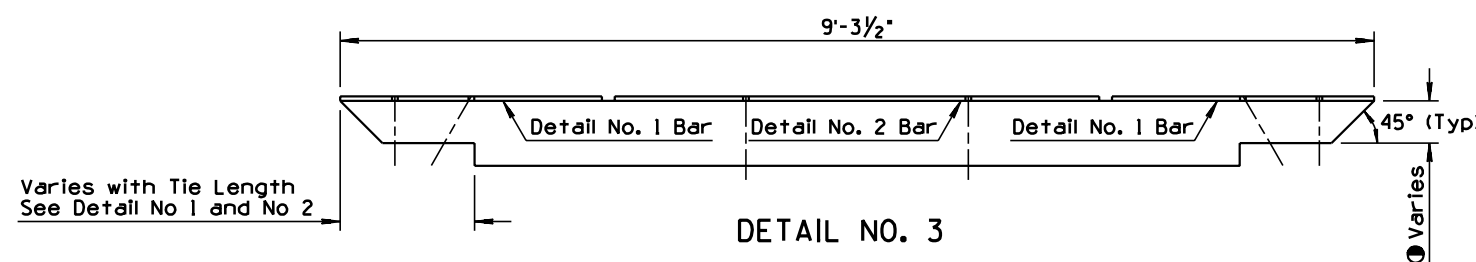
SECTION B-B

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION 	CATTLE GUARD, DRAINAGE	DRAWING NO. C-11.20	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
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2			
3			
4			

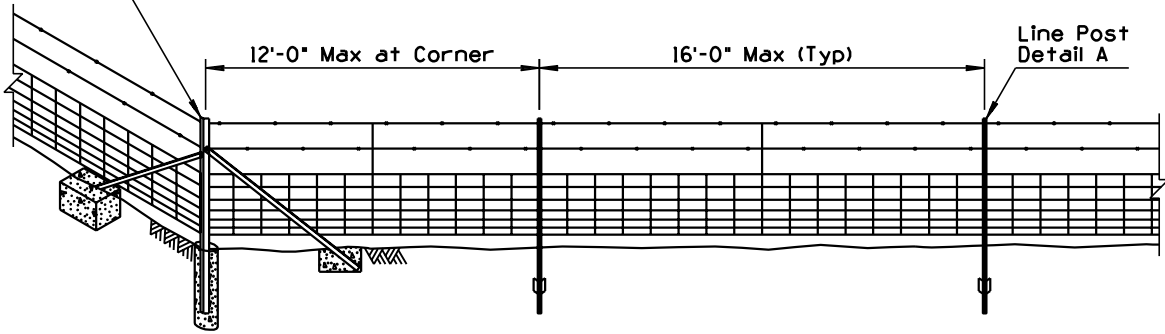


● SHIM HEIGHT						
RAIL LBS/YD						
80	90	110	115	119	131	150
2¼"	2⅞"	3½"	3⅞"	4⅞"	4⅞"	4⅞"
⅝" DIAMETER GALVANIZED DOME HEAD SPIKE LENGTH						
11"	11"	11"	11"	13"	13"	13"



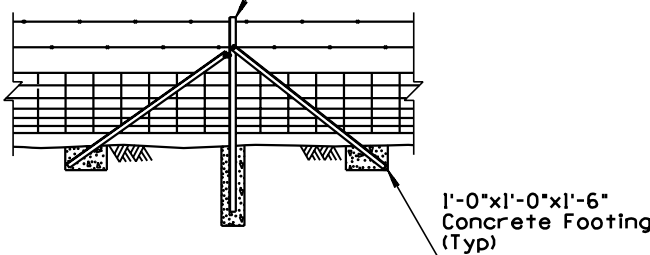
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED ASTM CALLOUT	PNB	7/94
2			
3			
4			

Corner Post Assembly
Detail D



Line Post
Detail A

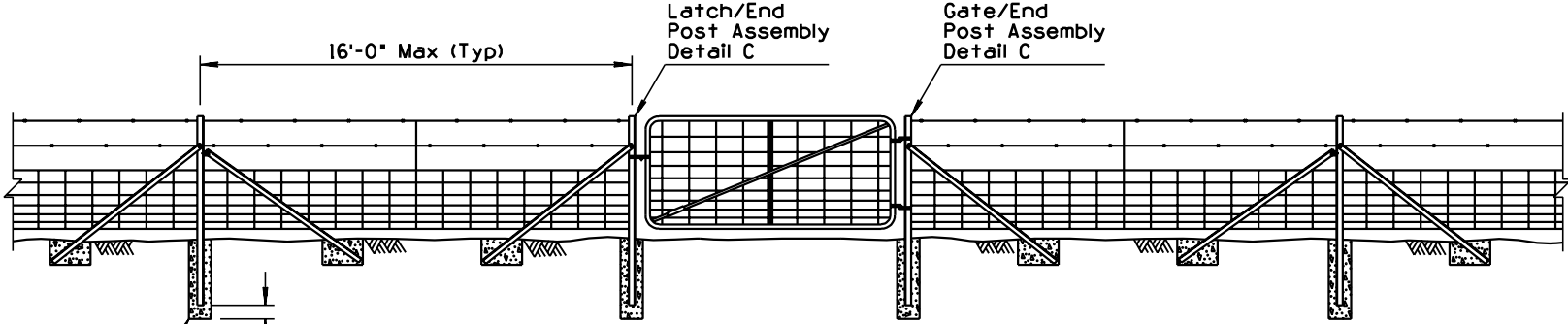
Intermediate
Post Assembly
Detail B



1'-0"x1'-0"x1'-6"
Concrete Footing
(Typ)

Latch/End
Post Assembly
Detail C

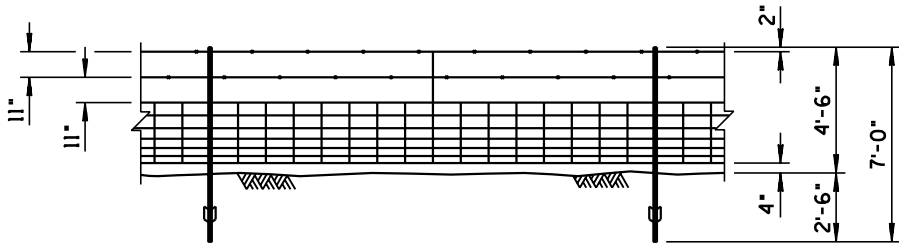
Gate/End
Post Assembly
Detail C



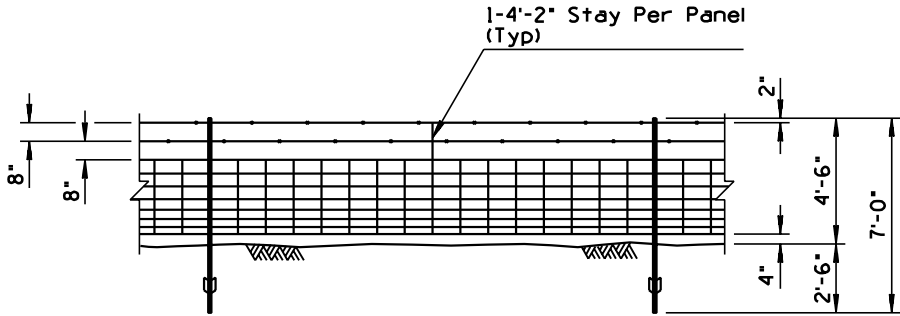
10" Diameter x 3'-0"
Concrete Footing
(Typ)

6" Typ

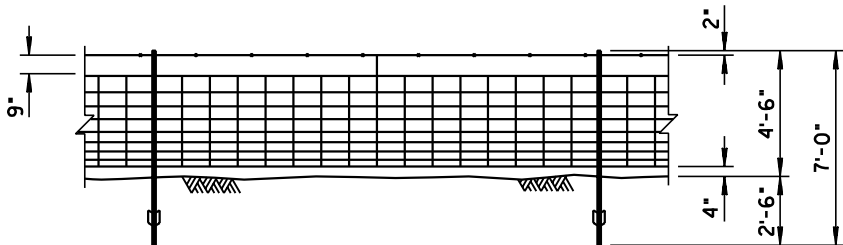
TYPICAL WOVEN WIRE FENCE INSTALLATION-TYPE 1 WW SHOWN



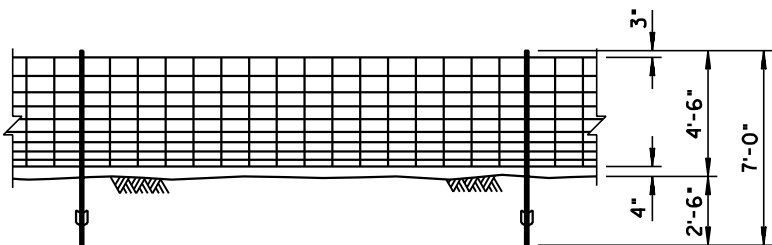
TYPE 1 WOVEN WIRE (WW)



TYPE 2 WOVEN WIRE (WW)



TYPE 3 WOVEN WIRE (WW)

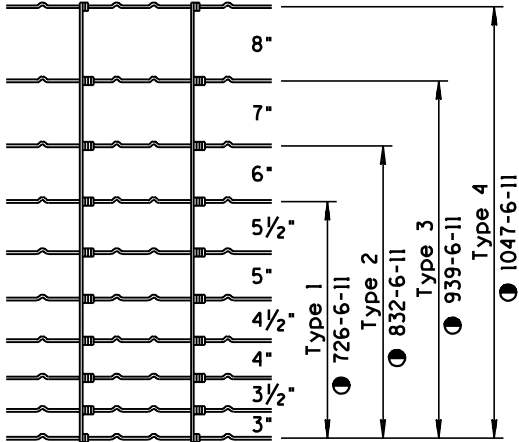


TYPE 4 WOVEN WIRE (WW)

GENERAL NOTES

- Length of post and braces shall not be less than 7'-0".
- Woven wire fence fabric shall be attached to the post at the top, bottom, and intermediate wires.
- Intermediate Post Assemblies shall be located as shown and at intervals to utilize standard rolls to minimize cutting and waste.
- A twisted wire stay shall be centered between posts.

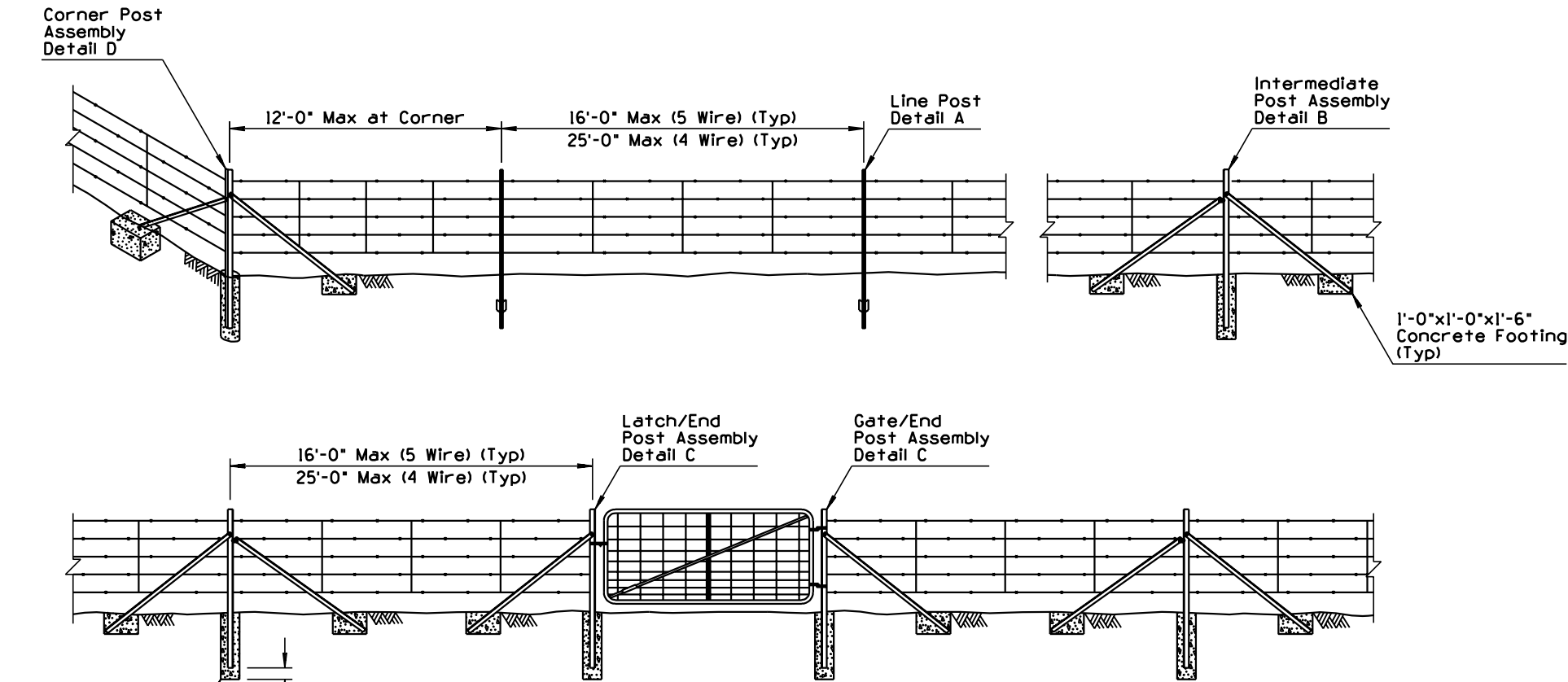
① ● ASTM design number



FENCE FABRIC DIMENSIONS AND DESIGN NUMBERS

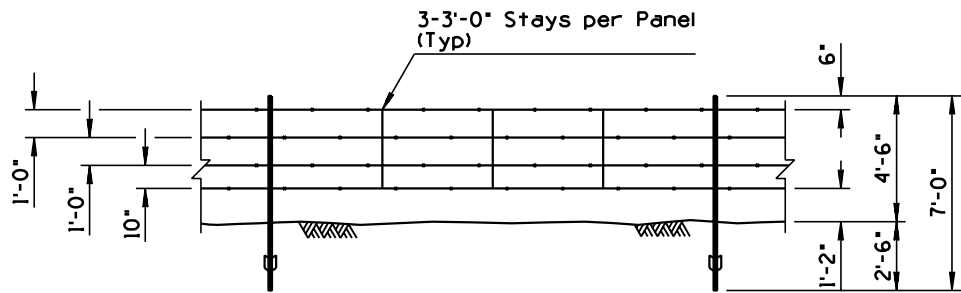
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	FENCE, WOVEN WIRE	DRAWING NO. C-12.10 Sheet 1 of 5

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

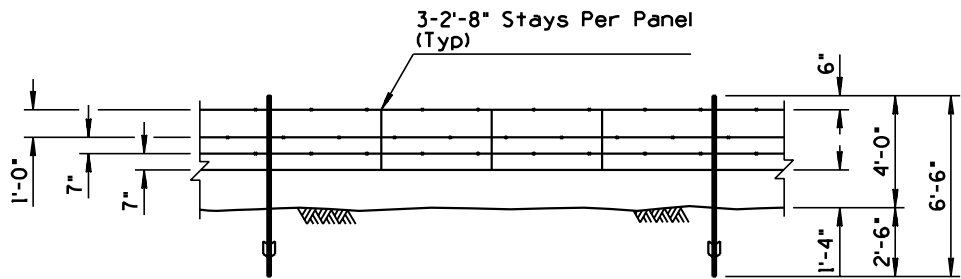


10" Diameter x 3'-0" Concrete Footing (Typ)

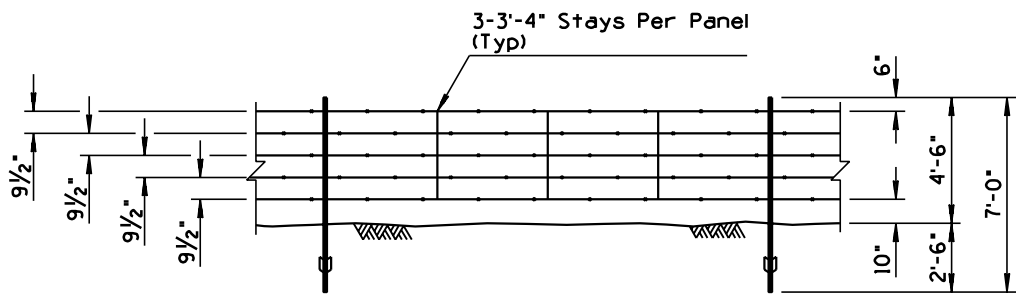
TYPICAL BARBED WIRE FENCE INSTALLATION-TYPE 2 BW SHOWN



TYPE 1 BARBED WIRE (BW) (4 WIRE)



BARBED WIRE GAME FENCE (GF)



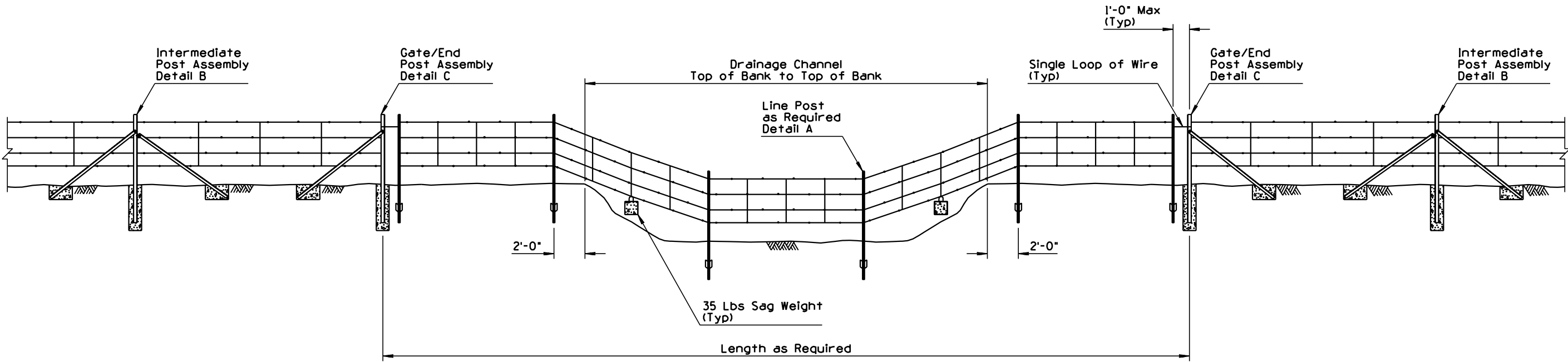
TYPE 2 BARBED WIRE (BW) (5 WIRE)

GENERAL NOTES

- Intermediate Post Assemblies shall be located as shown and at intervals not to exceed 650', or midway between all braced posts.
- For game fence the bottom wire shall be barbless.
- The stays on game fence shall have their ends turned up, to prevent injuries to game.

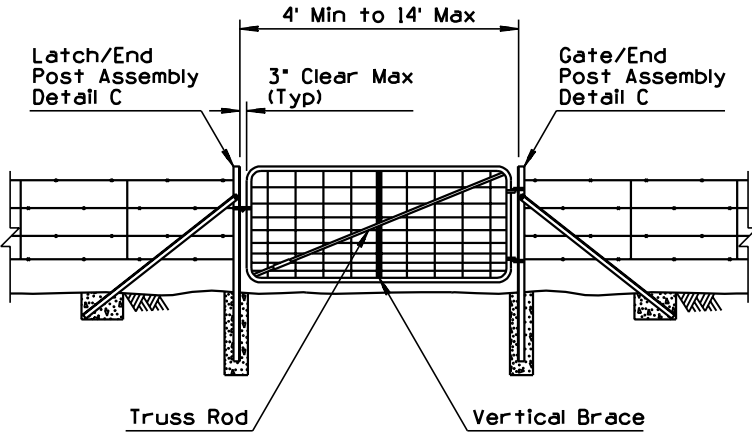
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① FENCE, BARBED WIRE	DRAWING NO. C-12.10 Sheet 2 of 5

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

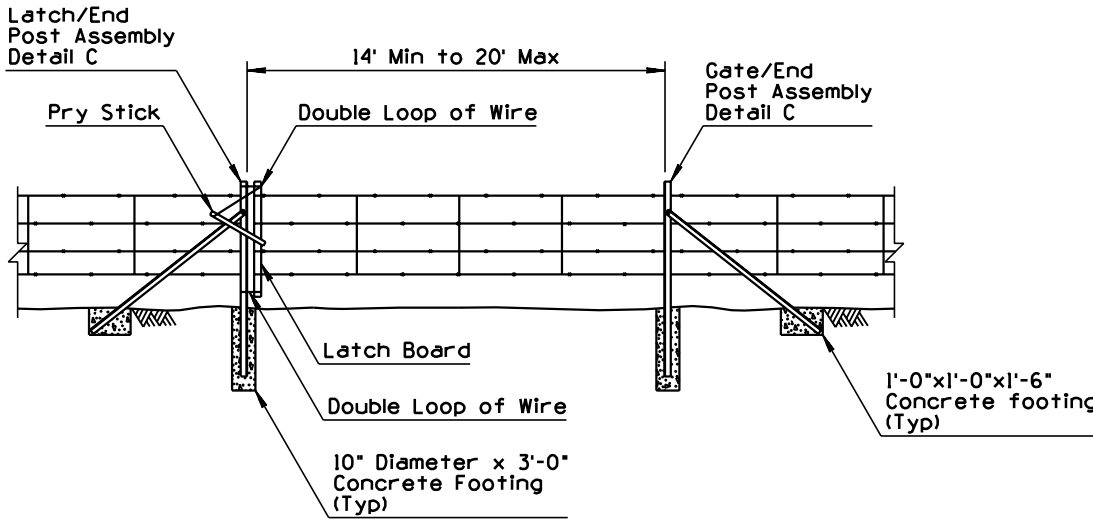
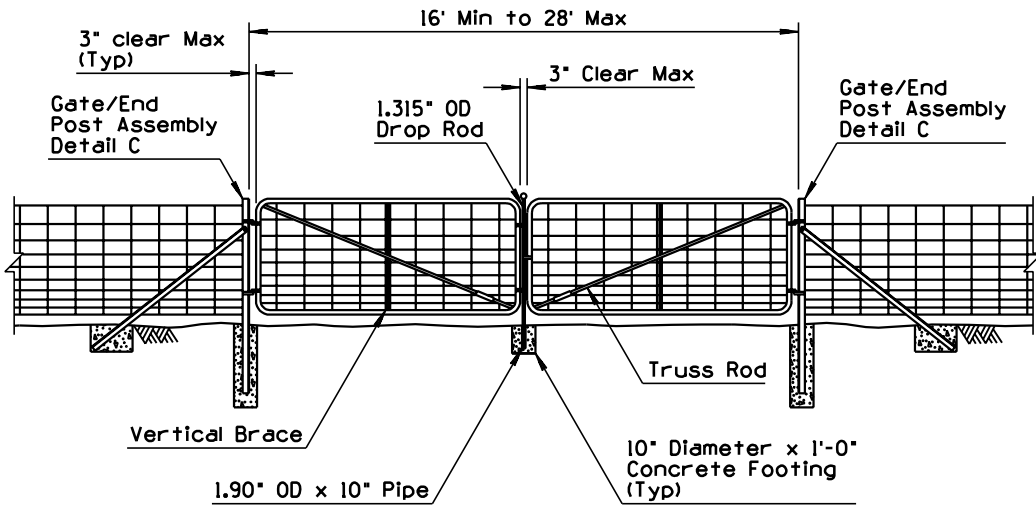


TYPE 1 DOUBLE GATE

FLOOD GATE



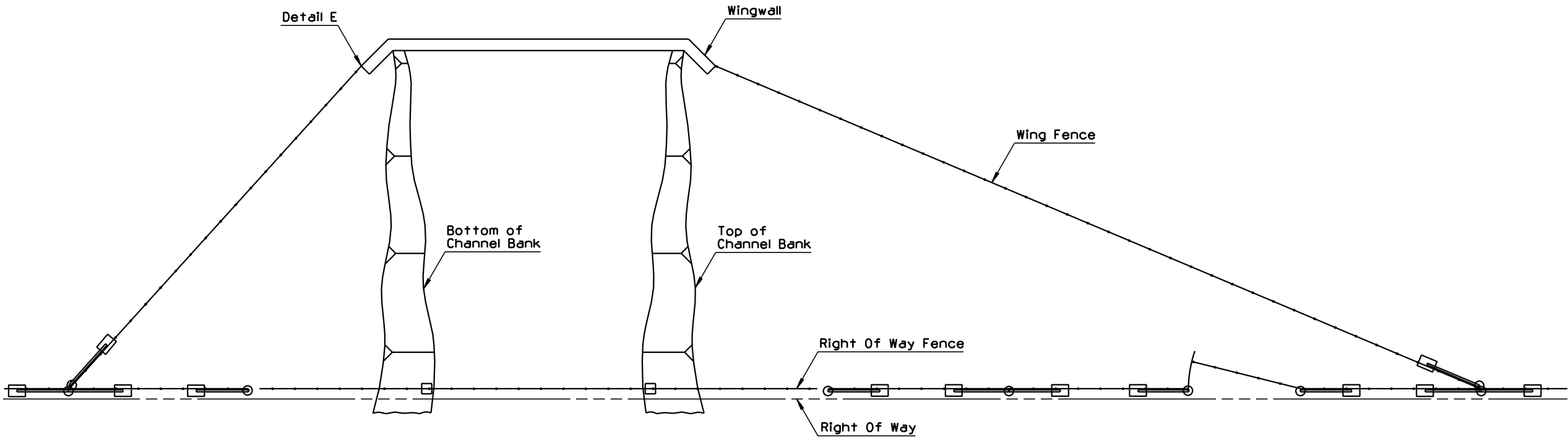
TYPE 1 SINGLE GATE



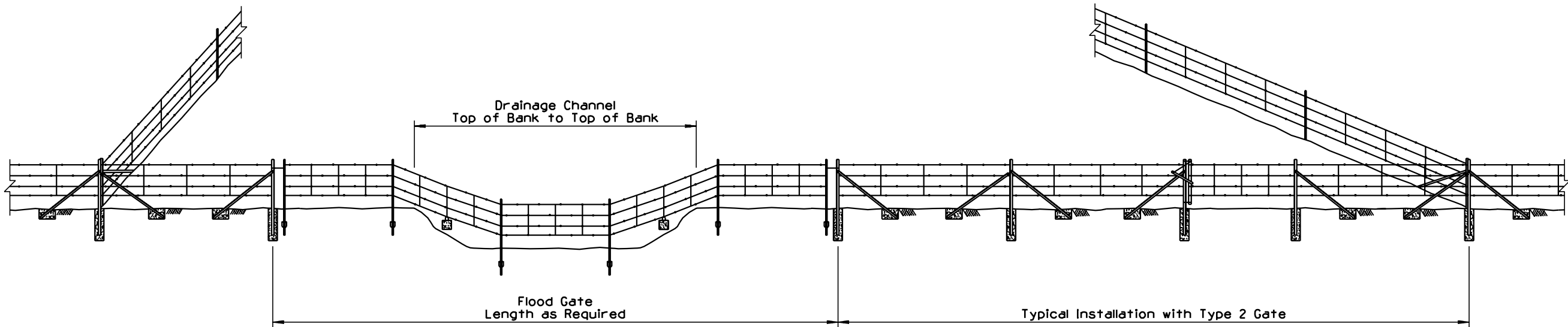
TYPE 2 GATE

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① FENCE, GATE, TYPE 1 AND 2 FLOOD GATE	DRAWING NO. C-12.10 Sheet 3 of 5

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			



PLAN

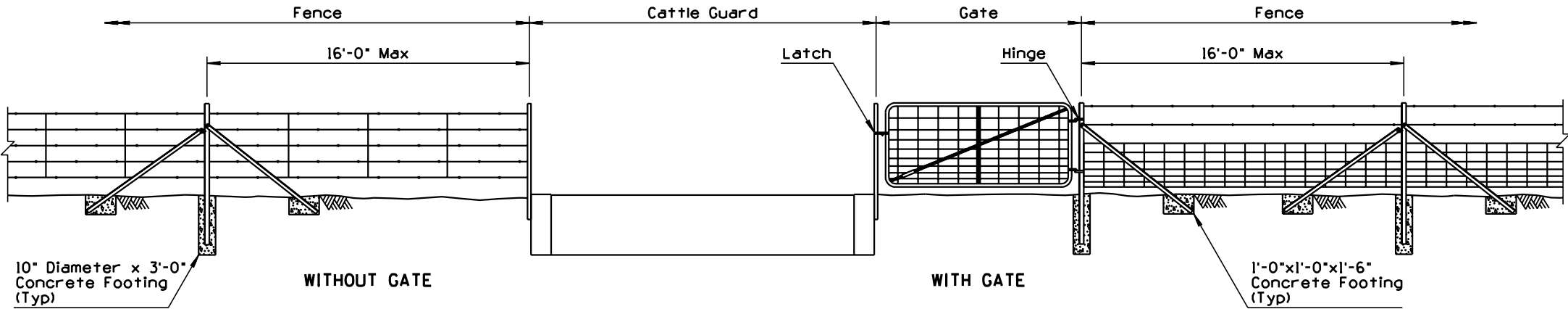


ELEVATION
TYPICAL FLOOD GATE INSTALLATION

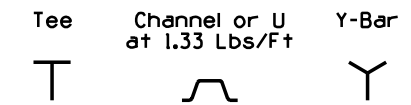
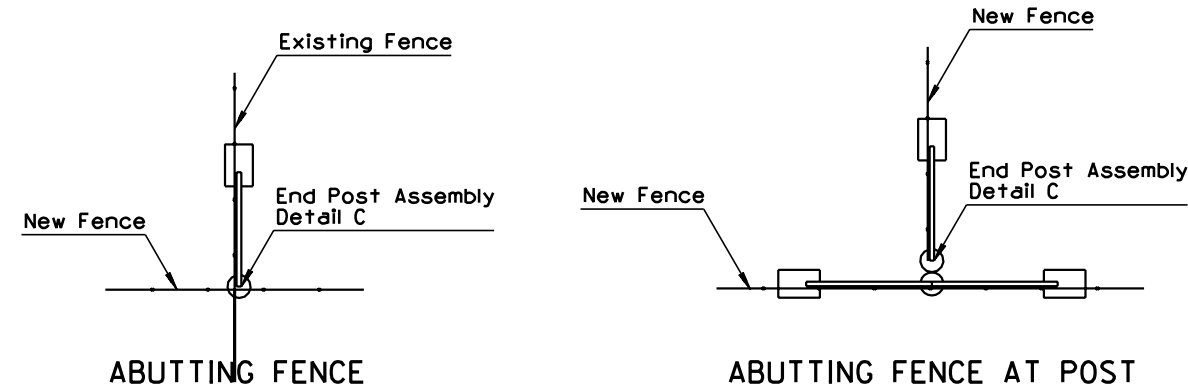
DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-12.10 Sheet 4 of 5

① FENCE, FLOOD GATE
INSTALLATION

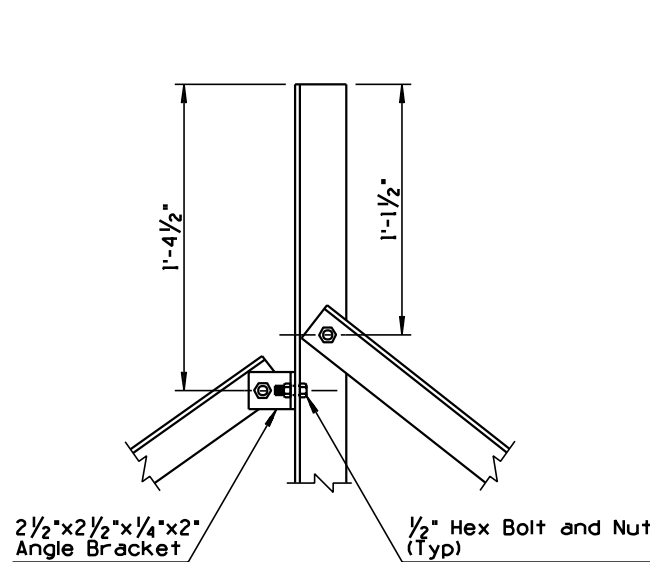
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			



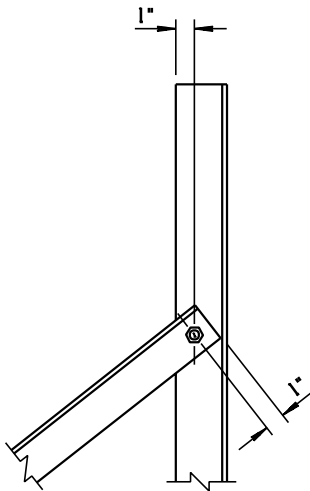
TYPICAL FENCE LOCATION AT CATTLE GUARD



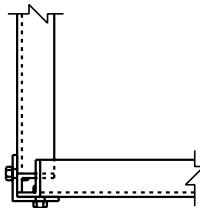
DETAIL A
TYPICAL CROSS SECTIONS
OF LINE POST SHAPES



DETAIL B
INTERMEDIATE POST ASSEMBLY

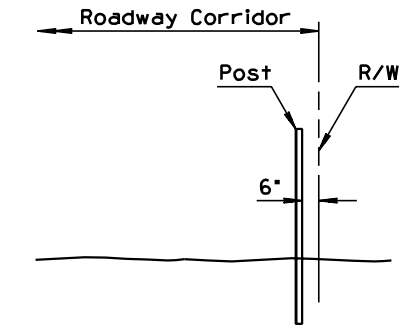


DETAIL C
END POST ASSEMBLY

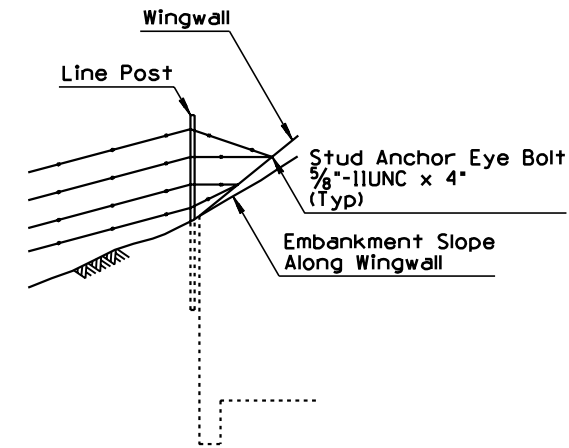


DETAIL D
CORNER POST ASSEMBLY

- GENERAL NOTES
- Post assemblies shall consist of an upright angle 2 1/2x2 1/2x1/4 at 4.10 lbs/ft, and brace angles 2x2x1/4 at 3.19 lbs/ft.



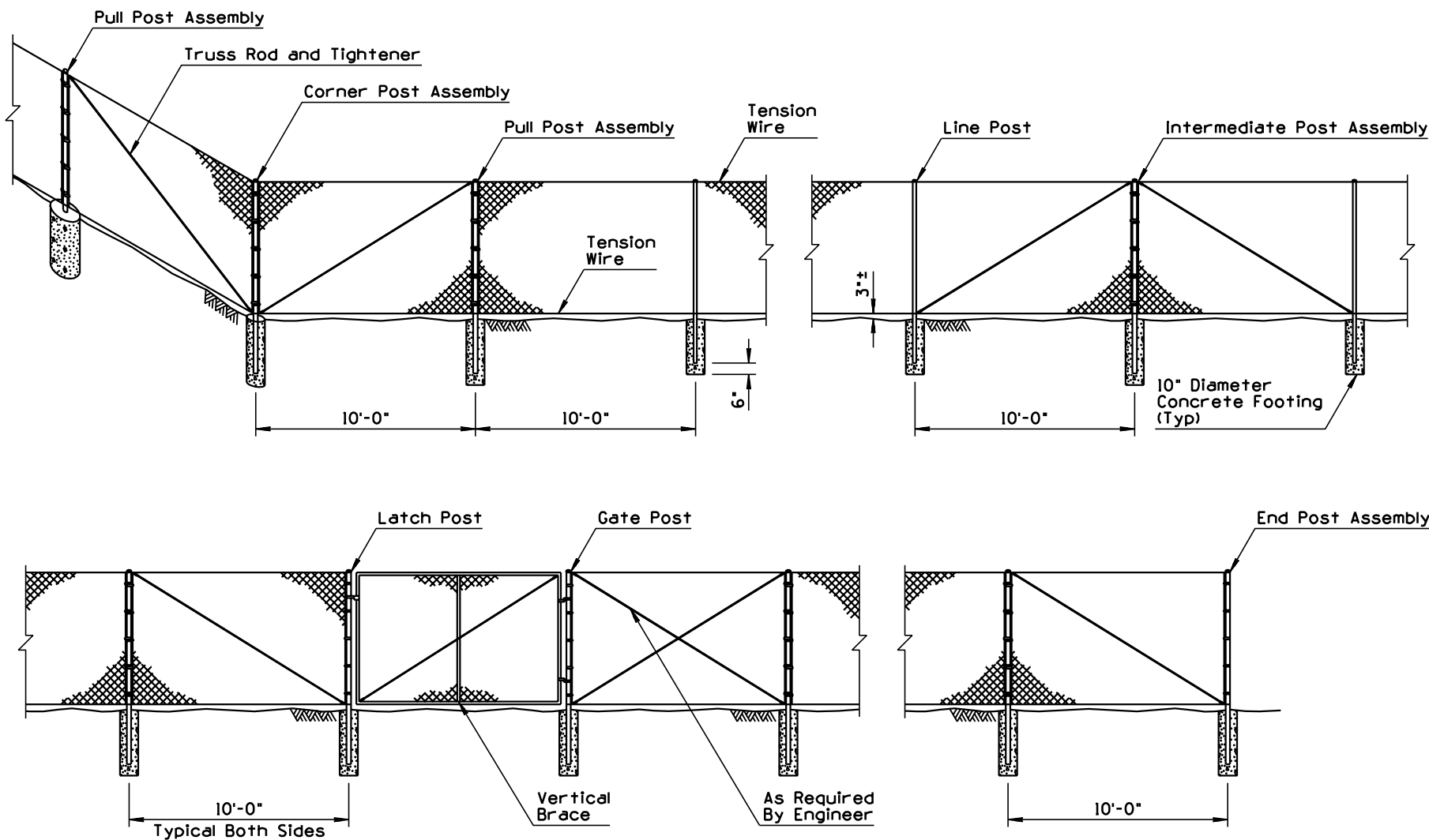
TYPICAL FENCE LOCATION



DETAIL E
FENCE CONNECTION TO WINGWALL

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① FENCE, MISCELLANEOUS DETAILS	DRAWING NO. C-12.10 Sheet 5 of 5

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED DIMENSION	PNB	3/94
2			
3			
4			



TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE 1 SHOWN

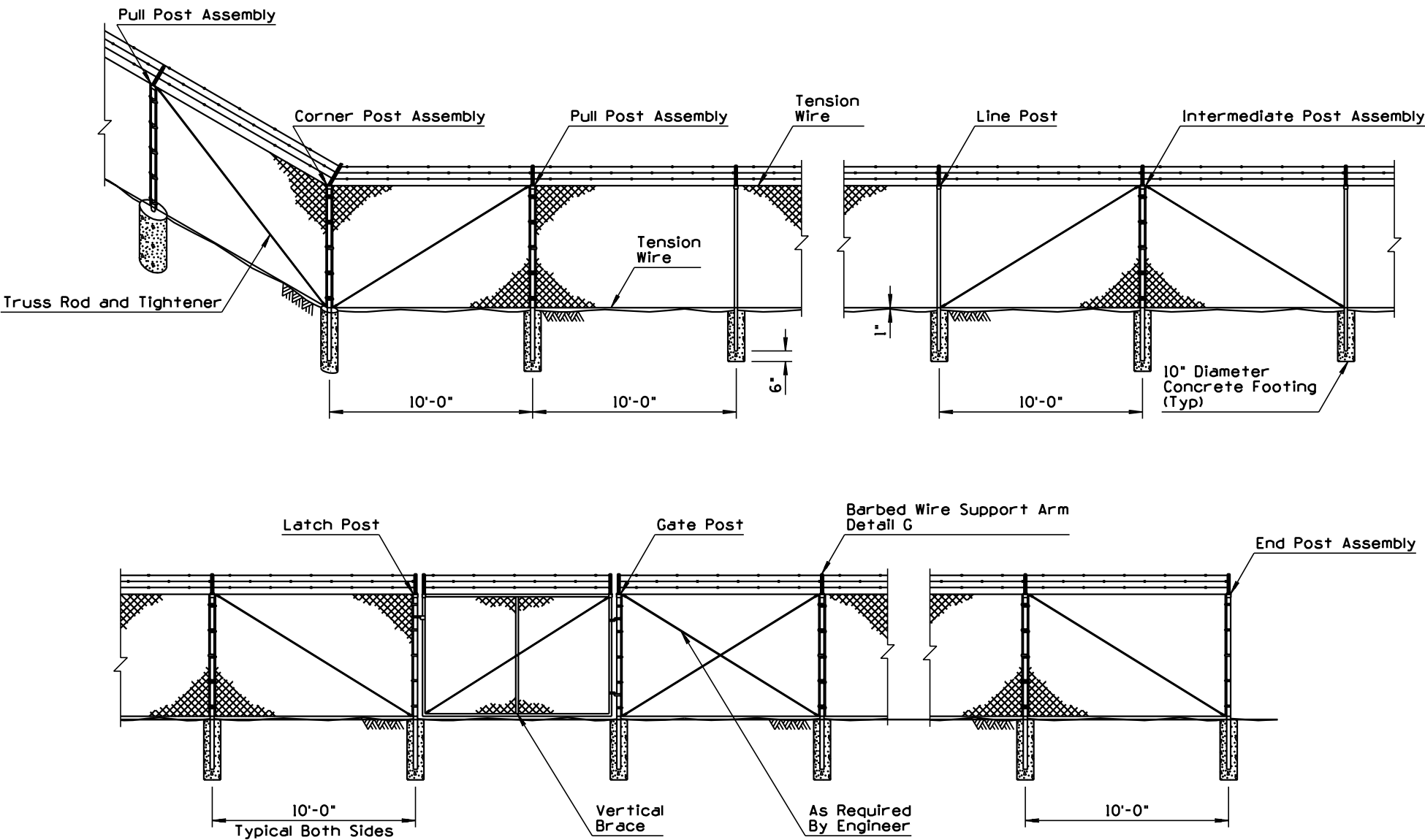
TYPICAL POST DIMENSIONS								
Fabric Height	Corner, End, Intermediate, Gate, Latch and Pull Posts					Line Posts		
	Length	Round	Roll Formed		Length	Round	Roll Formed	
		(OD)	L	□		(OD)	H-Section	□
36"	6'-0"	2.375"	3.50"x3.50"	2.25"x1.70"	5'-6"	1.900"	1.875"x1.625"	1.875"x1.625"
48"	7'-0"	2.375"	3.50"x3.50"	2.25"x1.70"	6'-6"	1.900"	1.875"x1.625"	1.875"x1.625"
60"	8'-0"	2.375"	3.50"x3.50"	2.25"x1.70"	7'-6"	1.900"	1.875"x1.625"	1.875"x1.625"
72"	9'-0"	2.375"	3.50"x3.50"	2.25"x1.70"	8'-6"	1.900"	1.875"x1.625"	1.875"x1.625"
Over 72"	Height +3'-0"	2.875"	3.50"x3.50"	2.50"x2.50"	Height +2'-6"	2.375"	2.250"x2.000"	1.875"x1.625"

GENERAL NOTES

1. Posts shall be round, H-section, or roll-formed and shall conform to the nominal dimensional requirements shown on the plans. Dimensional tolerances for all shapes shall be according to ASTM A-500. In addition, the material of which posts are fabricated shall have a nominal thickness, before galvanizing, of not less than 0.111" for line posts and 0.130" for terminal posts.
2. Chain link fabric shall be either zinc-coated or aluminum-coated steel wire fence fabric. Zinc-coated steel fabric shall conform to the requirements of ASTM A392, Class 1 coating. Aluminum-coated steel fabric shall conform to the requirements of ASTM A491, with a minimum weight of coating of 0.40 ounce per square foot of wire surface area. Fabric shall be 11 guage for all fence fabric 60 inches or less in height and shall be 9 guage for fabrics greater than 60 inches in height.
3. Tension wires shall be 7 guage (0.177 inch diameter) coil spring steel wire with a minimum tensile strength of 75,000 pounds per square inch and shall be zinc-coated or aluminum-coated.
4. Truss rods shall be $\frac{3}{8}$ inch diameter adjustable rods. Truss tighteners shall have a strap thickness of not less than $\frac{1}{4}$ inch.
5. Stretcher bars shall be $\frac{3}{16}$ inch by $\frac{3}{4}$ inch steel flat bars. Stretcher bar bands shall be $\frac{1}{8}$ inch by one inch preformed steel bands.
- ① 6. Bottom tension wire shall be 3 inches from top of crown on concrete footings.
7. Intermediate post assemblies shall be spaced at 500 foot intervals or midway between pull posts when the distance between such posts is less than 1,000 feet and more than 500 feet.
8. See sheet 3 of 3 for typical fence location.

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	FENCE, CHAIN LINK TYPE 1	DRAWING NO. C-12.20 Sheet 1 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED DIMENSION	PNB	3/94
2			
3			
4			

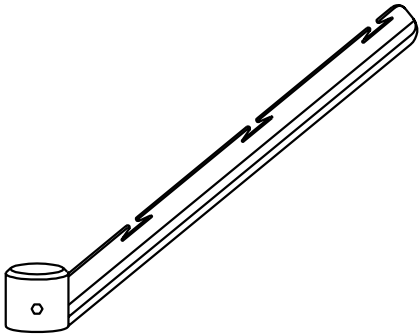


TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE 2 SHOWN

TYPICAL POST DIMENSIONS								
Fabric Height	Corner, End, Intermediate, Gate, Latch and Pull Posts				Line Posts			
		Round	Roll Formed			Round	Roll Formed	
	Length	(OD)	⌒	□	Length	(OD)	H-Section	□
72"	① 8'-6"	2.375"	3.50"x3.50"	2.50"x2.50"	8'-0"	1.900"	1.875"x1.625"	1.875"x1.625"

GENERAL NOTES

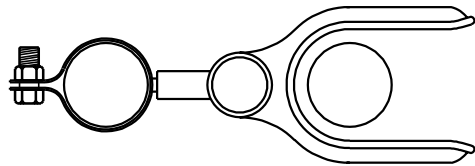
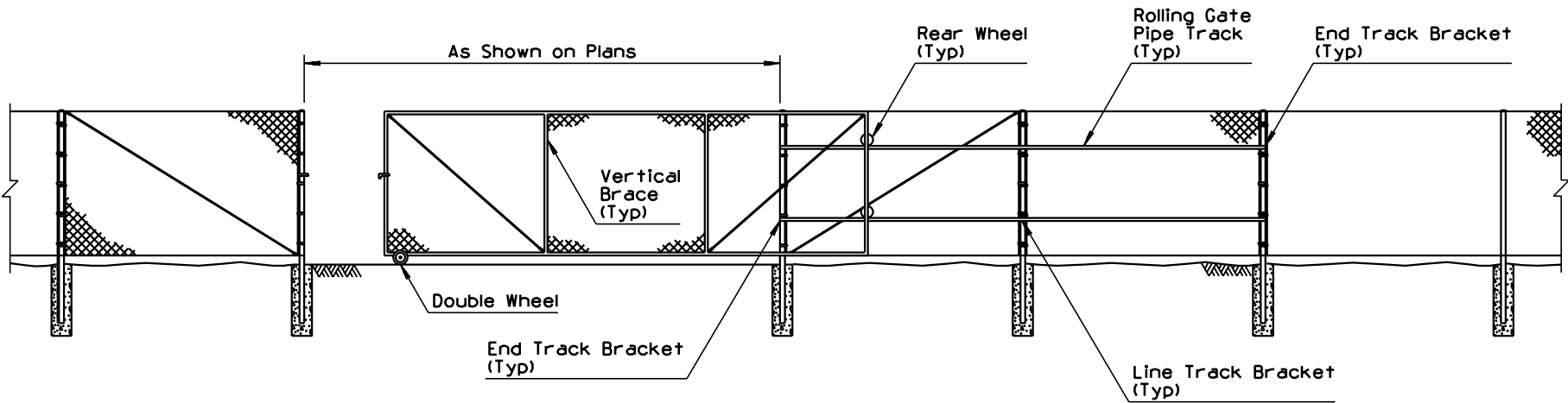
1. Barbed wire for use with Type 2 chain link fence shall be 12 guage steel wire with 4 point 14 guage barbs spaced five inches apart and shall be either zinc-coated or aluminum-coated. Zinc-coated steel wire shall conform to the requirements of ASTM A121, Class 1 coating. Aluminum-coated steel wire shall conform to the requirements of ASTM 1585, Type 1, Class 1 coating.
2. Barbed wire support arm shall be of the type shown on the plans, shall be fabricated from commercial quality steel, and shall be zinc-coated in accordance with the requirements of AASHTO M111.
3. Bottom tension wire shall just clear top of crown on concrete footings.
4. For details and notes not shown - see chain link fence Type 1, sheet 1 of 3.
5. See sheet 3 of 3 for typical fence location.



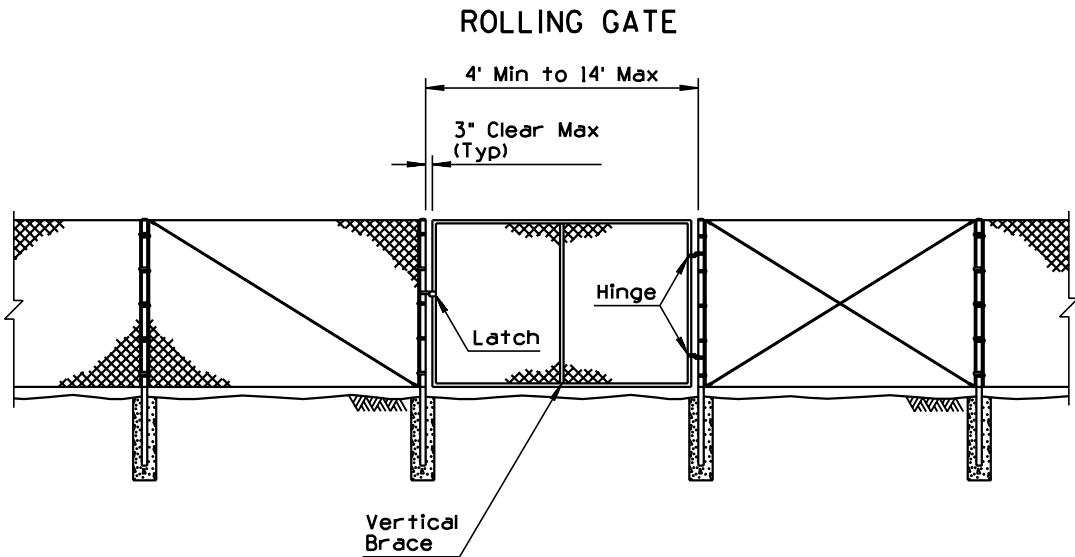
DETAIL G
BARBED WIRE SUPPORT ARM

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. FENCE, CHAIN LINK TYPE 2 C-12.20 Sheet 2 of 3

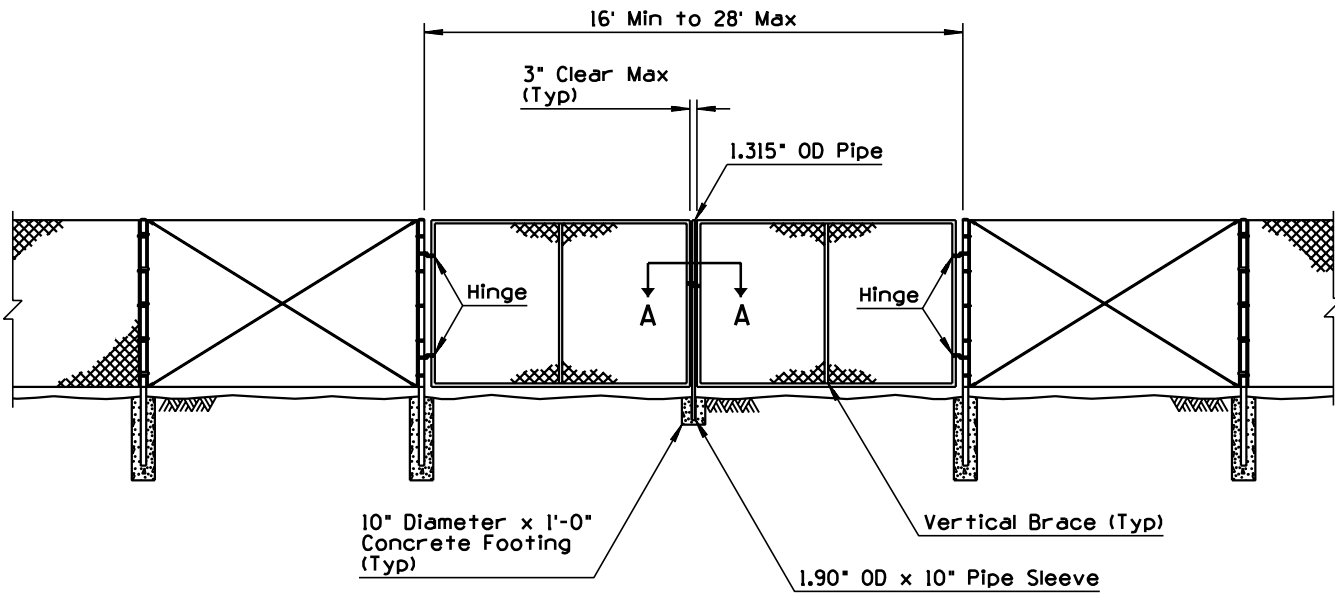
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED DRAWING	PNB	3/94
2			
3			
4			



SECTION A-A
DOUBLE GATE LATCH ASSEMBLY



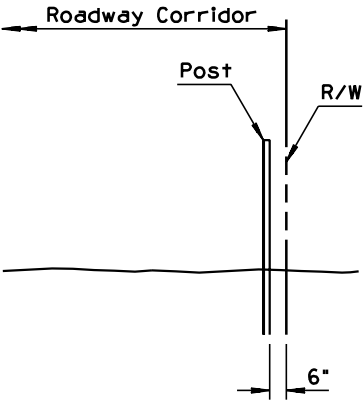
SINGLE GATE



DOUBLE GATE

TYPICAL GATE DIMENSIONS									
SINGLE AND DOUBLE SWING GATES						ROLLING GATES			
Gate Leaf Width	Vertical Braces	Gate Post Size	Gate Leaf Width	Vertical Braces	Gate Post Size	Gate Leaf Width	No of Equally Spaced Vertical Braces	Tension Rods Per Braced Panel	Gate Post Size
6' H or Less		OD	Over 6' H		OD				OD
3' to 8'	0	2.8750"	3' to 8'	0	2.8750"	6' to 13'	1	0	2.8750"
8' to 16'	1	4.0000"	8' to 16'	1	4.0000"	13' to 16'	1	1	2.8750"
16' to 18'	2	4.0000"				16' to 21'	2	1	2.8750"
						21' to 27'	2	1	2.8750"
						28' and Larger	3	1	2.8750"

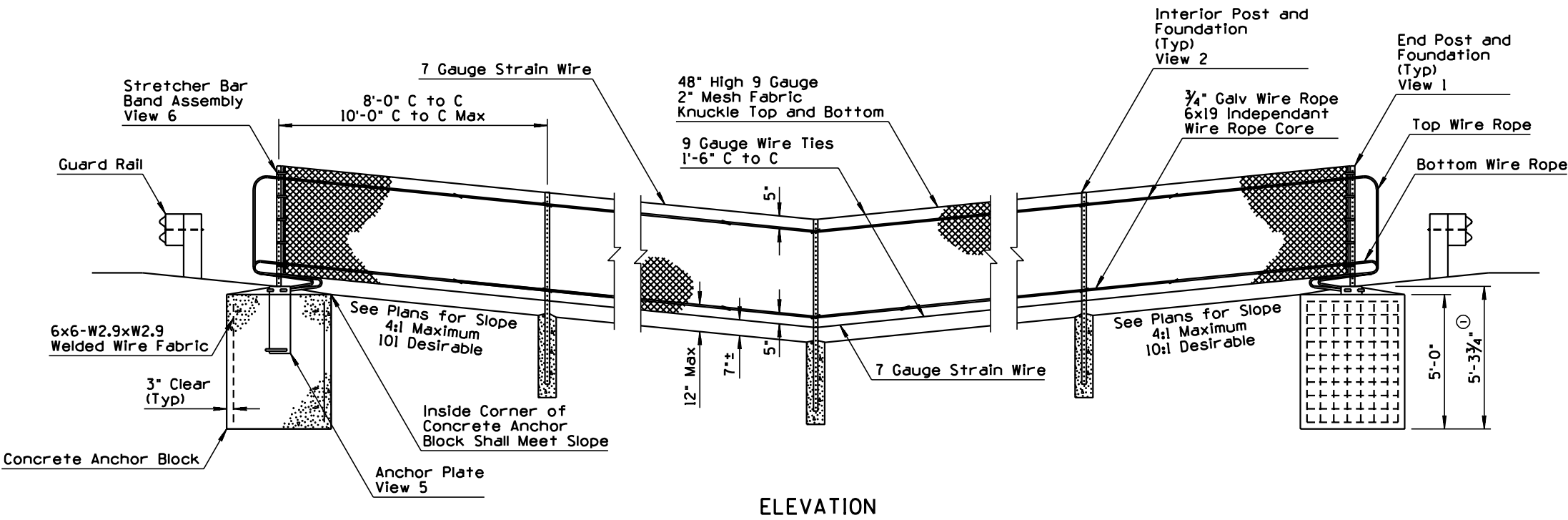
GATES FOR CHAIN LINK FENCE - TYPE 1 SHOWN
(Type 2, With Barbed Wire Typical)



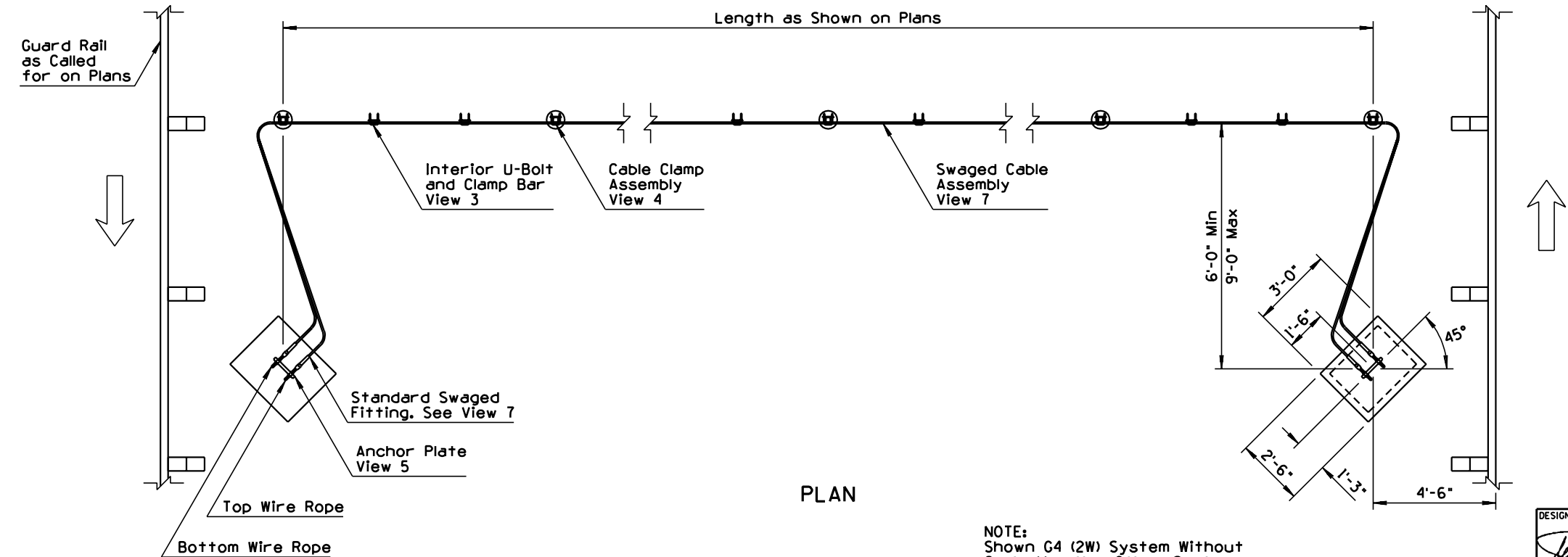
① TYPICAL FENCE LOCATION

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 3/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	FENCE, CHAIN LINK GATES	DRAWING NO. C-12.20 Sheet 3 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED SPECIFICATION REFERENCE	PNB	10/95
2			
3			
4			



ELEVATION



PLAN

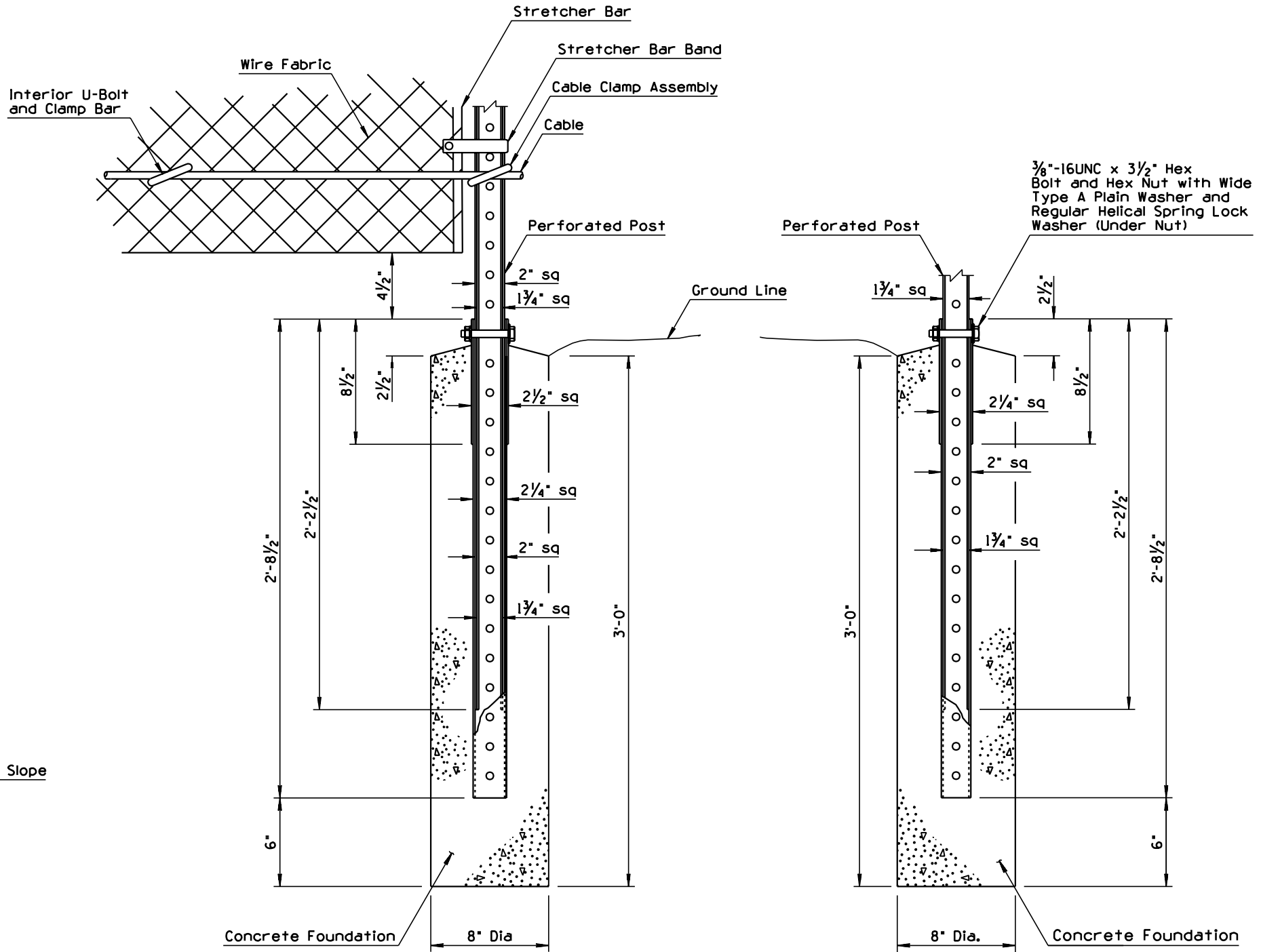
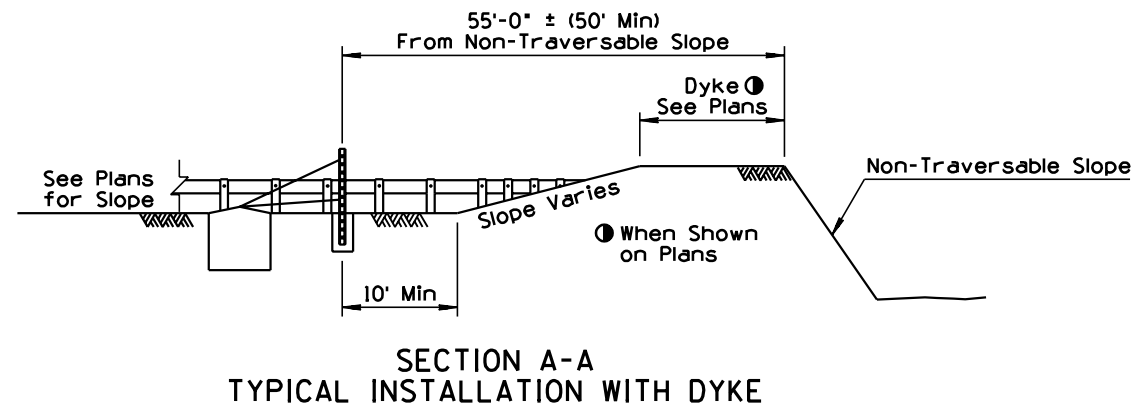
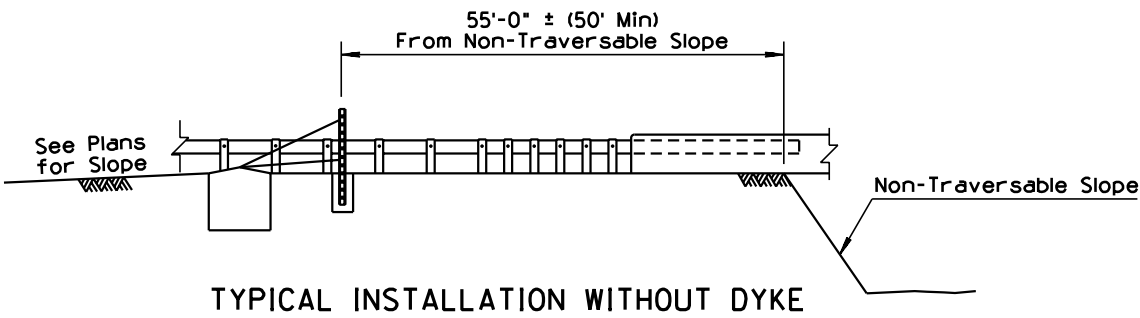
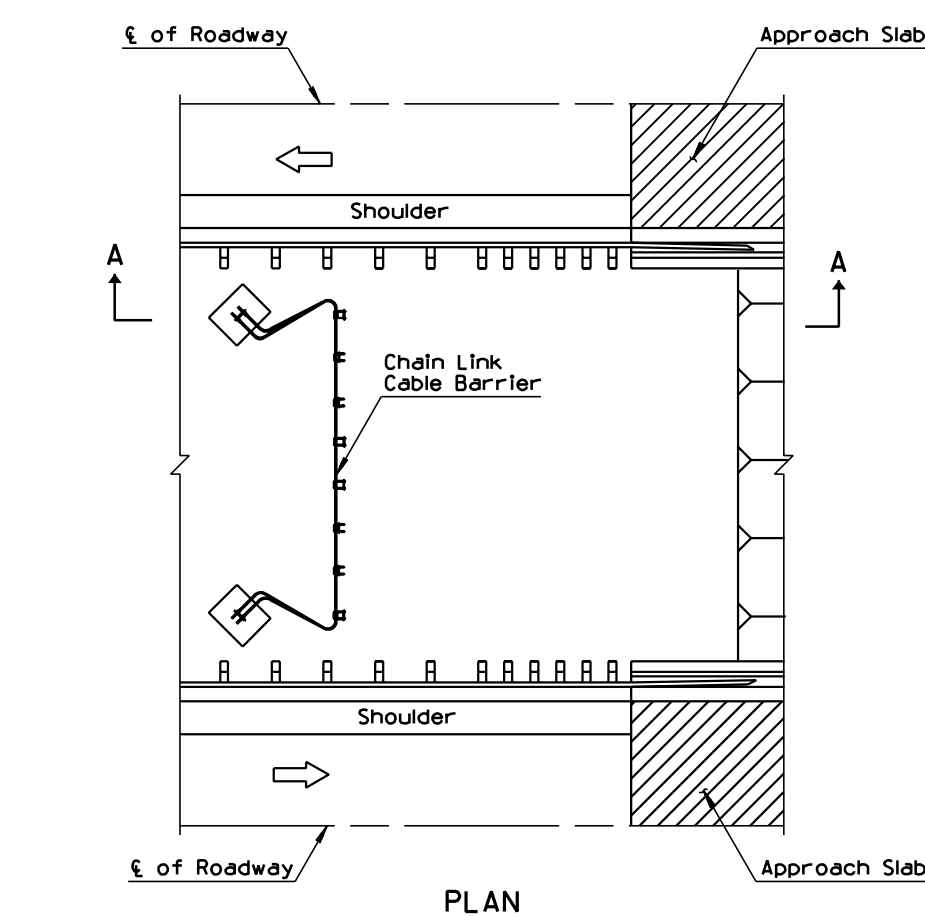
NOTE:
Shown G4 (2W) System Without
Curb. May Use Other Systems
With or Without Curb.

GENERAL NOTES

- All concrete shall be Class S, 4000 psi.
- All bolts, nuts, washers and fittings shall meet the dimensional requirements of the American National Standards Insittute, unless otherwise designated and shall be galvanized in accordance with ASTM A153.
- Galvanized swaged fitting and U-Bolt shall conform to ASTM A449.
- The 3/4" galvanized wire rope shall conform to AASHTO M30 Class B, Type 2.
- The wire fabric, ties, bands, stretcher bars, and other fittings and hardware shall conform to AASHTO M181.
- The wire fabric fence shall follow contour of the graded median.
- The excavation for the concrete anchor blocks shall be to neat lines. Maximum excess shall be 3".
- ① Perforated posts shall be square tube formed from 0.105" USS guage ASTM A 366/A 366M cold rolled carbon steel. The square tubes shall be welded directly in the corner by high frequency resistance welding or equal. The posts to be externally scarfed to agree with standard corner radii of 5/32" ± 1/16".
- ① Perforated posts shall be galvanized to the requirements of ASTM A 653/A 653M. Coating Designator shall be Z275.
- The cables shall have enough tension to prevent sagging. The location of the concrete anchor blocks may also be varied to provide enough tension to help prevent sagging.
- Two interior U-bolt and clamp bars shall be spaced at 1/3 of the distance between posts.
- See Standard C-12.20 for 48" fabric details.
- An alternate to rectangular concrete anchor block shall be a 36" diameter round footing with an additional depth of 4".
- The median approach grade within 100'± of the Chain Link Cable Barrier should not exceed a grade break of 10 percent.

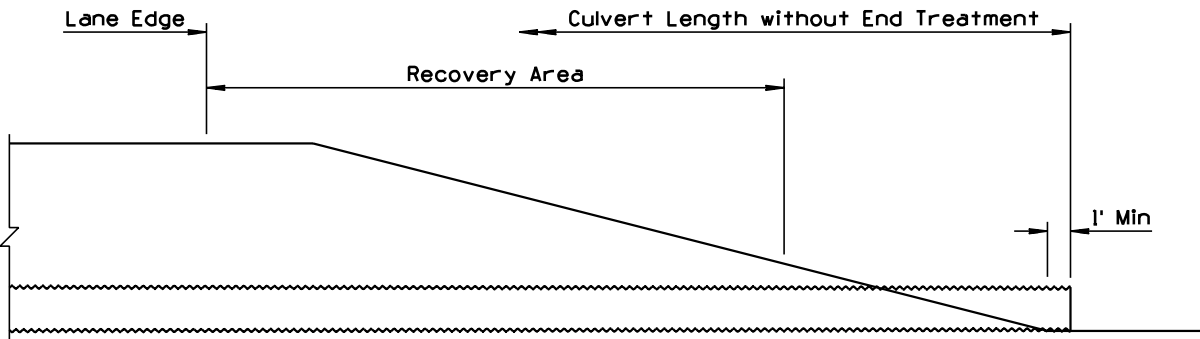
DESIGN APPROVED <i>Henry H. Ottewill</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	CHAIN LINK CABLE BARRIER	DRAWING NO. C-12.30 Sheet 1 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

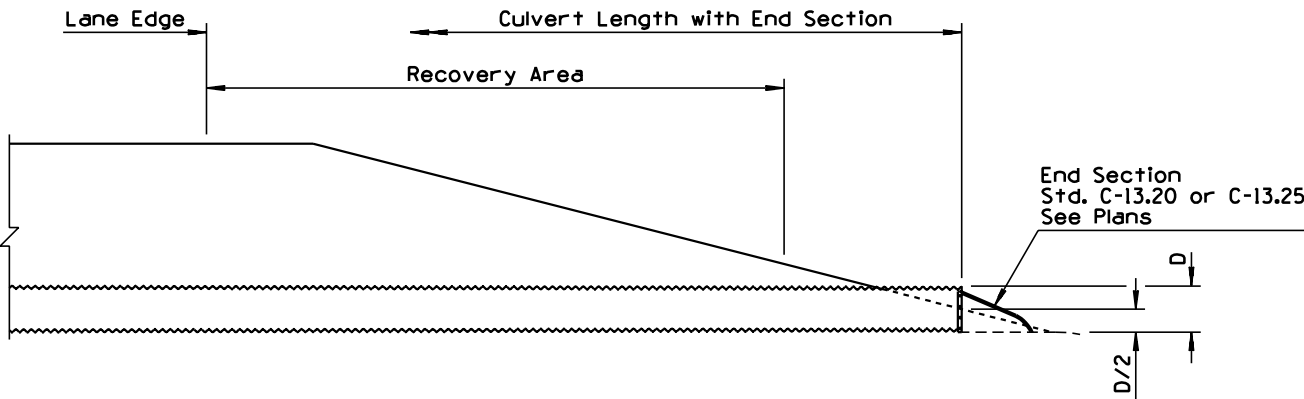


DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① CHAIN LINK CABLE BARRIER	DRAWING NO. C-12.30 Sheet 2 of 3

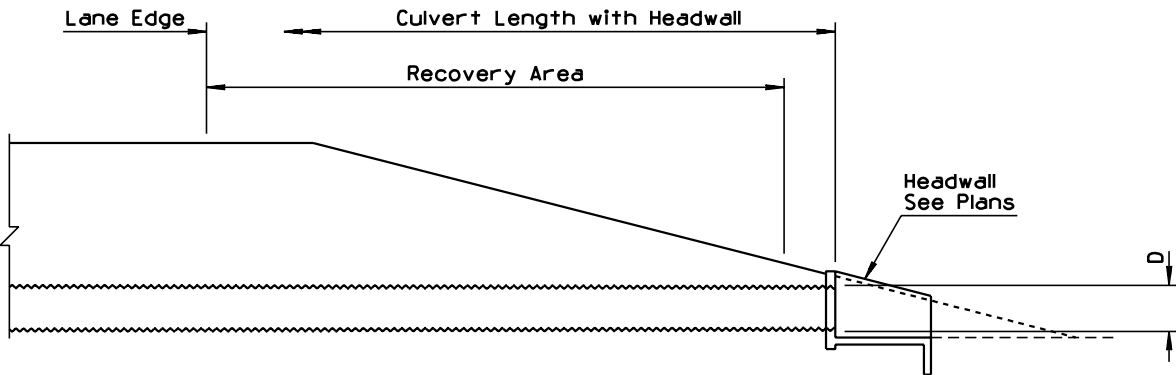
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED NOTE	PNB	10/95
2			
3			
4			



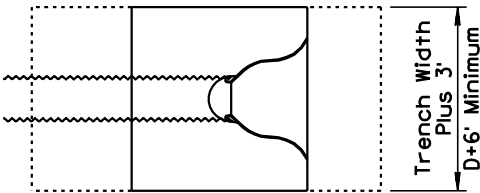
CULVERT INSTALLATION WITHOUT END TREATMENT



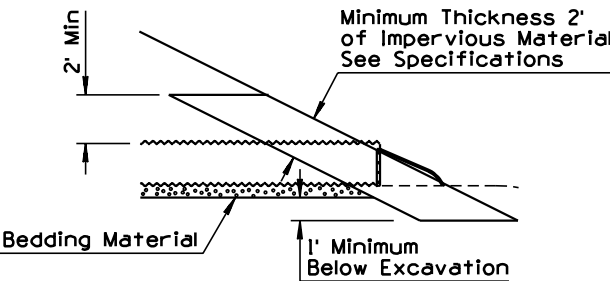
CULVERT INSTALLATION WITH END SECTION



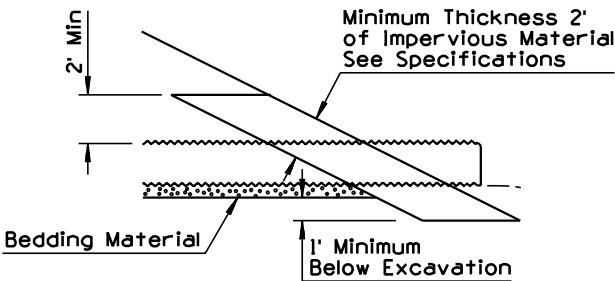
CULVERT INSTALLATION WITH HEADWALL



PLAN

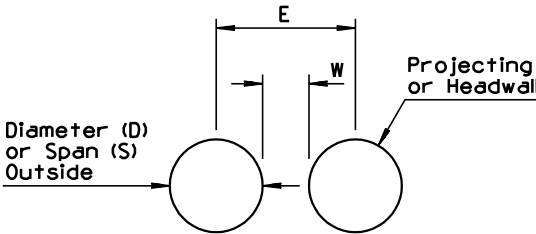


ELEVATION WITH END SECTION



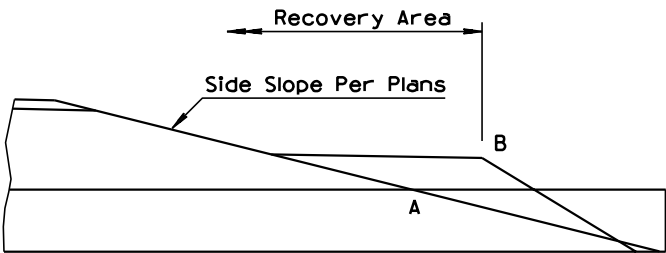
ELEVATION

PLATING SLOPES AT PIPE LOCATIONS

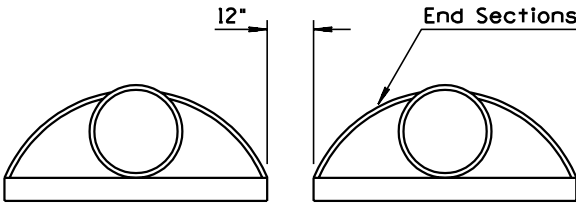


MINIMUM SPACING FOR MULTIPLE INSTALLATIONS		
Diameter or Span	Installation Type	
	Projecting (W)	Headwall (E)
18"	12"	2'-6"
24"	12"	3'-0"
30"	15"	3'-9"
36"	18"	4'-6"
42"	21"	5'-3"
48" to 66"	(D or S)/2	D + 36"
72" and Over	36"	D + 36"

MULTIPLE INSTALLATIONS WITHOUT END SECTIONS



PIPE BERM REQUIREMENT DETAIL



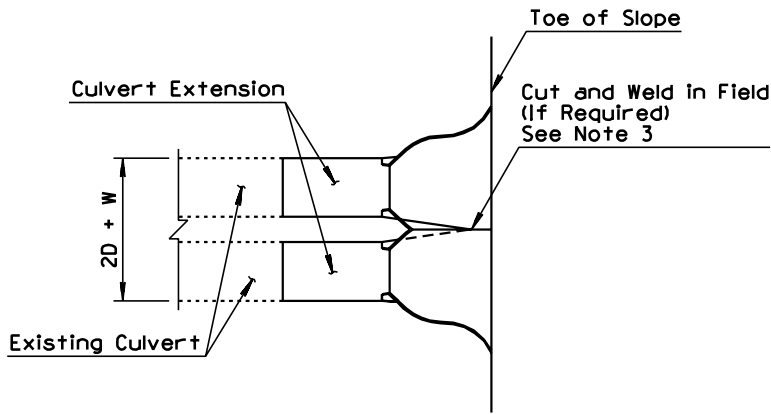
MULTIPLE INSTALLATIONS WITH END SECTIONS

GENERAL NOTES

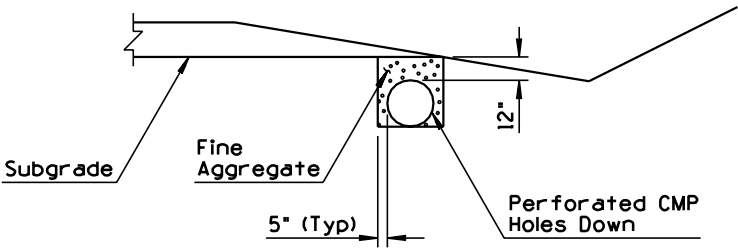
- See plans for any required inlet and/or outlet protection.
- See remaining C-13 Series standards, Std B-11.11 and Std B-11.14.
- Dimensions W and E apply to both non-trench and trench conditions.
- Minimum cover over pipe culverts shall be 12", measured from the top of pipe.
- See Pipe Berm Requirement Detail for pipe berm requirements and Std C-03.10 for installation. If Point A is within the recovery area, then a pipe berm is required and Point B is set at the edge of the recovery area.
- Plating of slopes at pipe locations similar for pipes without end sections and for multiple pipe installations.

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	PIPE CULVERT INSTALLATION	DRAWING NO. C-13.10 Sheet 1 of 2

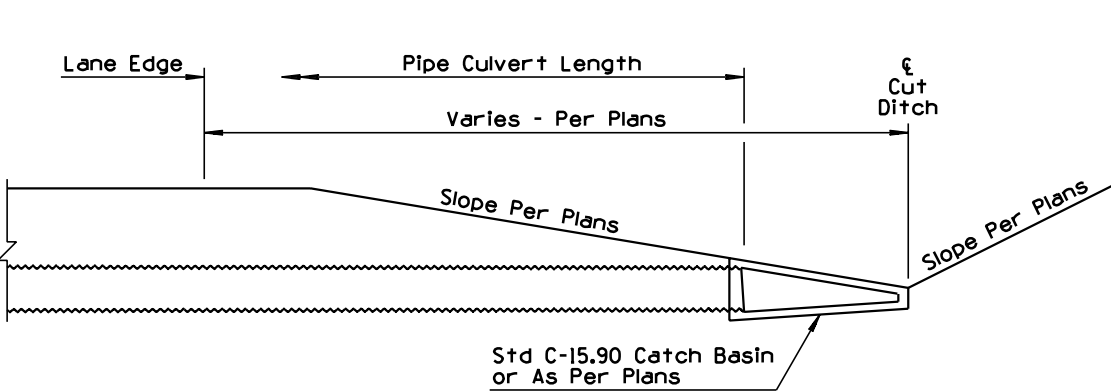
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MODIFIED DETAIL	PNB	7/94
2	ADDED DETAIL	PNB	7/94
3	ADDED NOTE	PNB	7/94
4	MODIFIED NOTE	BAF	7/97



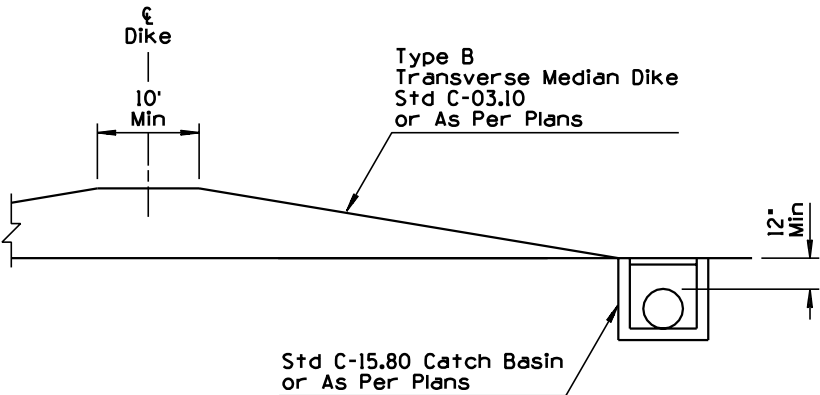
② SPECIAL MULTIPLE PIPE END SECTION DETAIL FOR PIPE CULVERT EXTENSIONS ONLY



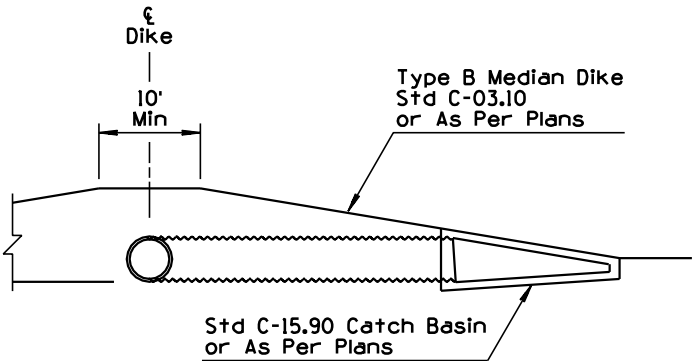
① PERFORATED CMP INSTALLATION



① PIPE AND CATCH BASIN INSTALLATION AT SAG CONDITION OF CUT DITCH



① PIPE AND CATCH BASIN INSTALLATION AT BASE OF TRANSVERSE DIKE



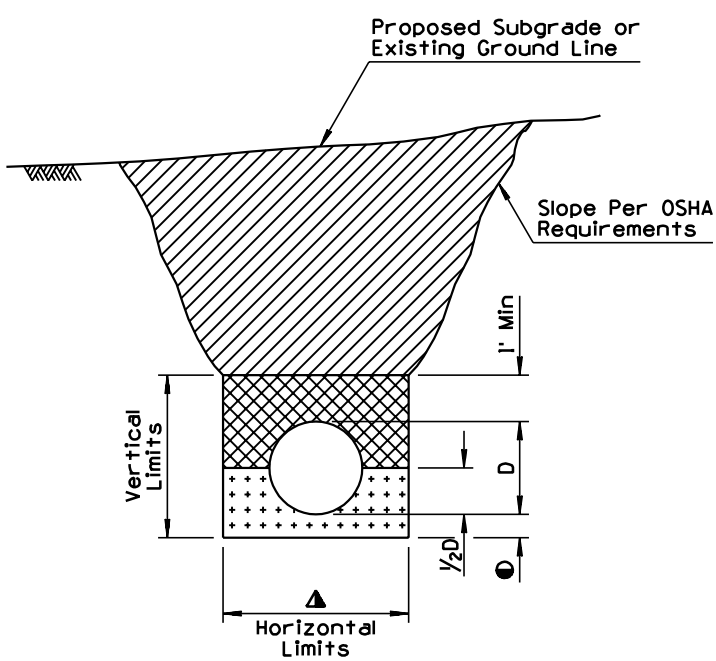
① PIPE AND CATCH BASIN INSTALLATION AT FACE OF TRANSVERSE DIKE

GENERAL NOTES

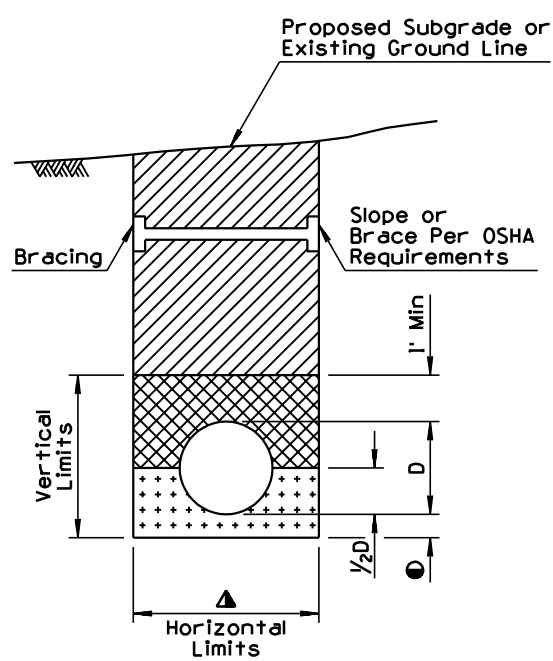
- ④ 1. Minimum cover over pipe culverts shall be 12", measured from the top of pipe.
2. See remaining C-13 Series standards for other pipe details.
- ③ 3. After welding, the damaged coating shall be cleaned by a wire brush and painted with at least one full coat of Paint No. 4, or given two coats of an approved hot asphalt paint, as directed by the Engineer.

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	PIPE CULVERT INSTALLATION	DRAWING NO. C-13.10 Sheet 2 of 2

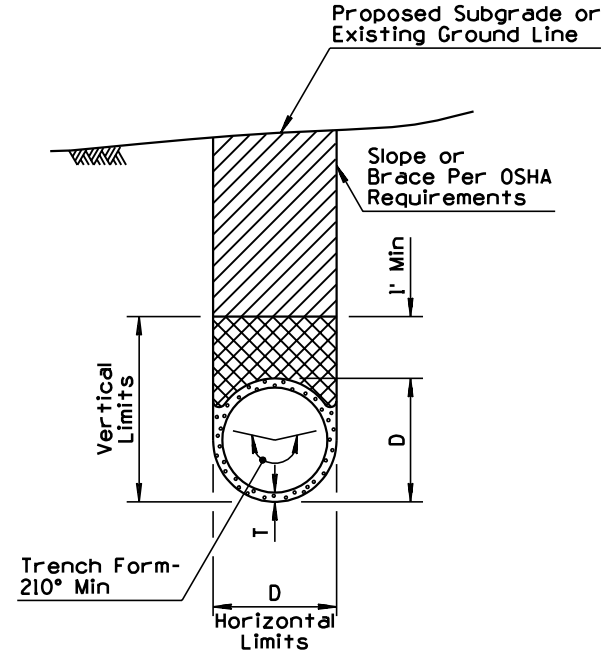
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED NOTE	PNB	7/94
2	REARRANGED STD	PNB	7/94
3	MODIFIED NOTE	BAF	8/98
4			



TRENCH CONDITION
IN NATURAL GROUND OR IN EMBANKMENT
WITHOUT BRACING






TRENCH CONDITION
IN NATURAL GROUND OR IN EMBANKMENT
WITH BRACING SHOWN

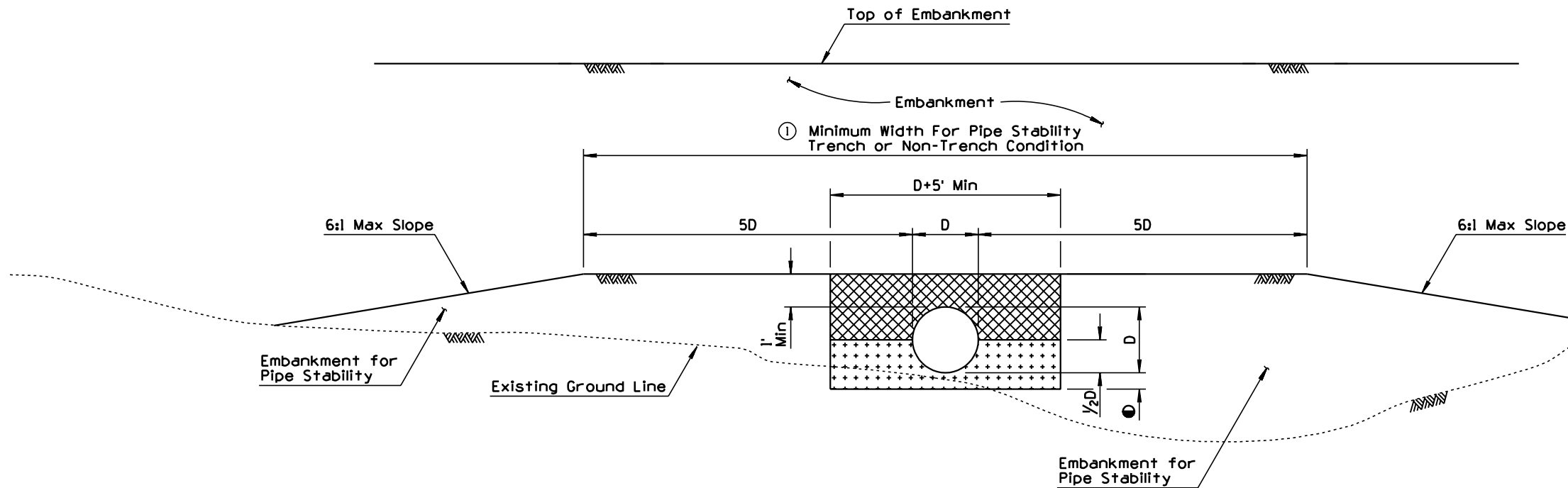


TRENCH CONDITION
NRCIPCP IN NATURAL GROUND
OR IN EMBANKMENT

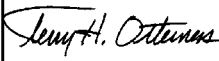

GENERAL NOTES

- Pipes shall be installed either in a trench condition or in a non-trench condition in natural ground or in embankment.
 - In a trench condition, the vertical and horizontal limits shall be maintained. If horizontal limits are exceeded or the vertical limits are not maintained, a non-trench condition exists.
 - Bracing and sloping shall conform to OSHA requirements.
 - Pipe backfill may be bedding material.
 - In a non-trench condition, the embankment for pipe stability shall be constructed in lifts to the limits shown in the detail simultaneously with the bedding material and pipe backfill. If the contractor chooses to construct it as a trench condition, the embankment shall be constructed before excavating the trench.
- D - Outside diameter of full circle pipe or outside dimension (span or rise) of arch, arch pipe, elliptical pipe.
- T - Minimum wall thickness for NRCIPCP. See Plans.
- ③ Δ - D+6 inches each side minimum for diameters less than 4 feet.
D+2 feet maximum for diameters up to 4 feet.
D+1 foot each side minimum for diameters equal to or over 4 feet.
D+3 feet maximum for diameters 4 feet or over.
- ① - 6 inches except when on unyielding or unstable material. See standard specifications.

-  TRENCH BACKFILL
-  PIPE BACKFILL
-  BEDDING



NON-TRENCH CONDITION

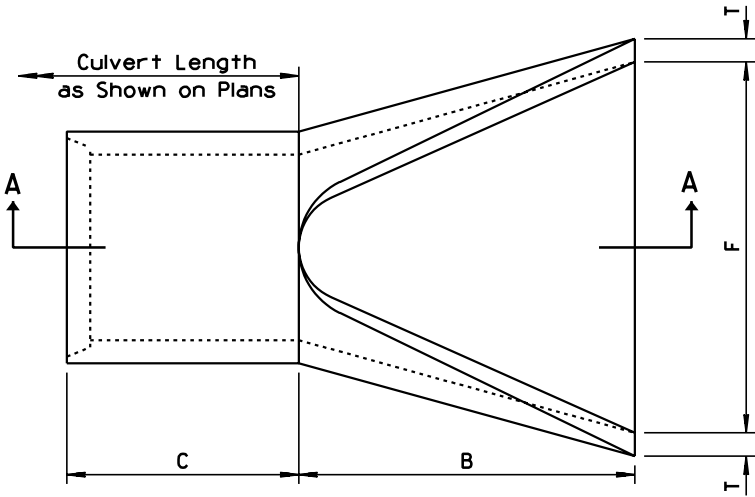
DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION 	② TYPICAL PIPE INSTALLATION	DRAWING NO. C-13.15

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

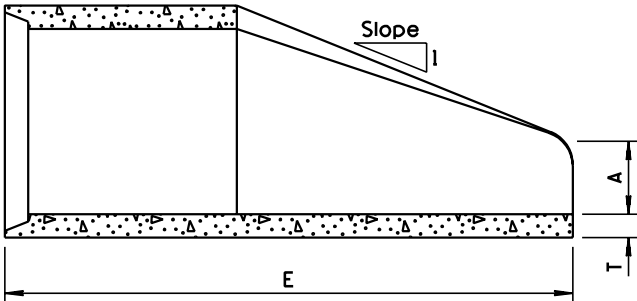
GENERAL NOTES

1. Design of end section shall conform to standards.
2. End section joint conformation shall match the pipe joints.
3. Embankment slope shall be warped to match slope of end section.

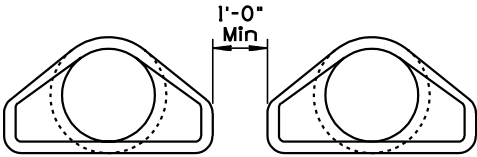
Pipe Dia	Approx Weight	Dimensions - Inches						Approx Slope
		T	A	B	C	E	F	
24"	1520*	3	9½	43½	30	73½	48	3
27"	1930*	3¼	10½	49½	24	73½	54	3
30"	2190*	3½	12	54	19¾	73¾	60	3
36"	4100*	4	15	63	34¾	97¾	72	3
42"	5380*	4½	21	63	35	98	78	3



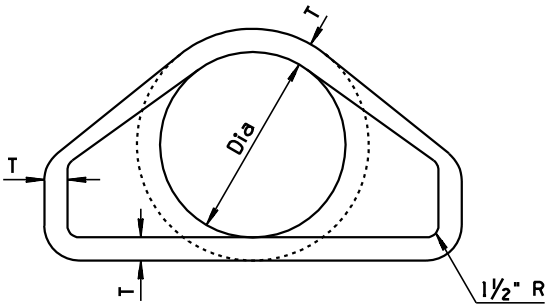
PLAN



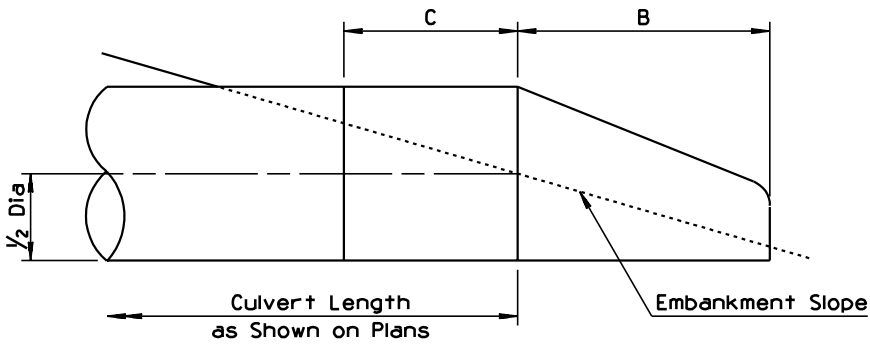
SECTION A-A



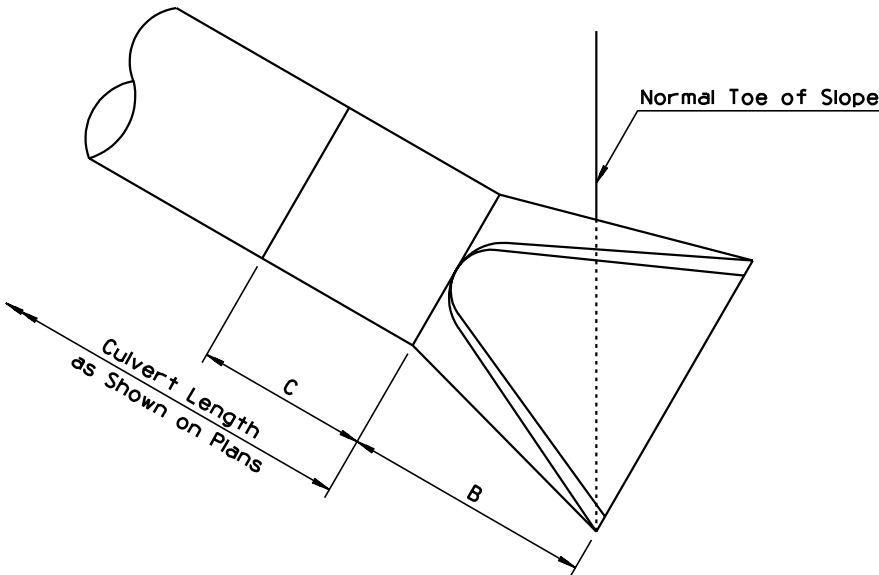
SPACING FOR MULTIPLE INSTALLATION



FRONT ELEVATION



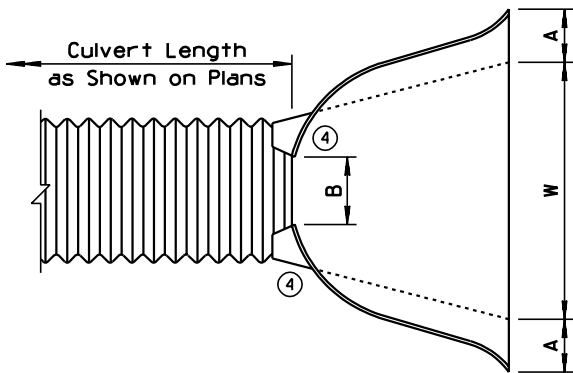
RIGHT ANGLE CULVERT



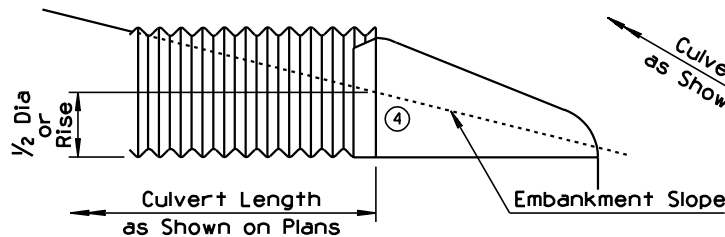
SKewed CULVERT

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① PIPE, REINFORCED CONCRETE END SECTION	DRAWING NO. C-13.20	

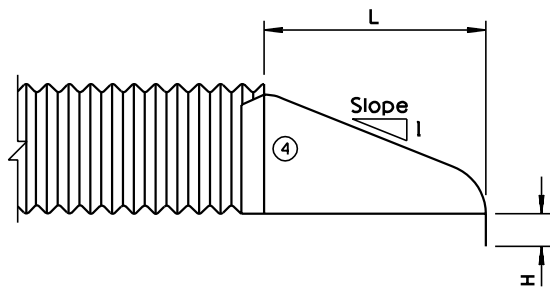
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE	NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CORRECTED SPELLING OF "EMBANKMENT"	PNB	10/95	5	MODIFIED DATA TABLE	BAF	6/98
2	DELETED DETAIL	BAF	7/97	6			
3	DELETED TITLE AND SUBTITLE	BAF	7/97	7			
4	DELETED RIVETS	BAF	7/97	8			



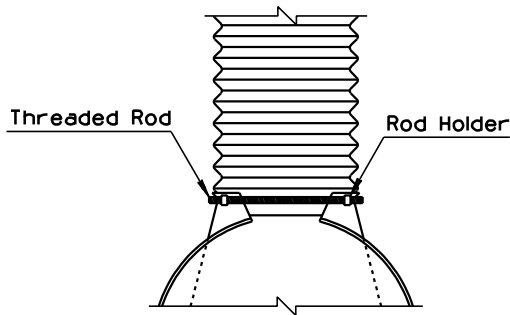
RIGHT ANGLE CULVERT



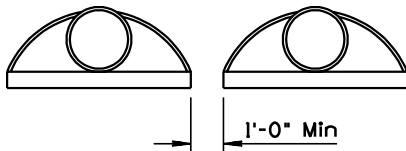
SKewed CULVERT



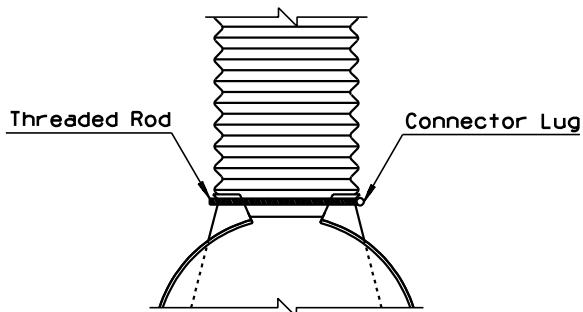
③



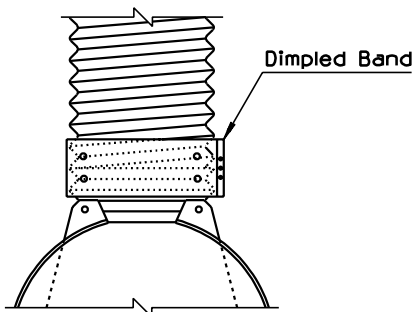
TYPE 2
THREADED ROD CONNECTIONS



SPACING FOR MULTIPLE
INSTALLATION



TYPE 3
THREADED ROD CONNECTIONS



TYPE 4
DIMPLED BAND CONNECTIONS

GENERAL NOTES

1. The end section may be jointed to the pipe or connector section by bolts, rivets, dimpled bands, slip-seam bands or threaded rod type fasteners. For allowable connector types, see table.
2. The type 1 connector is by means of bolts or rivets. Maximum circumferential fastener spacing shall be 12" and with a minimum of 8 fasteners per joint. The type 1 joint may be used with either annular or helical corrugations.
3. Type 2 and 3 connectors shall be used only with annular or helical pipe with a requisite number of annular corrugations.
4. Type 4 and 5 connectors shall be only used with helical pipe.
5. All steel end section components shall be galvanized.
- ① 6. Toe of embankment shall be warped to match toe of skewed end section.
7. A berm shall be added to abnormal projections per Std C-13.10.
8. The foregoing applies to all cross section configurations.

		Dimensions - Inches						
Pipe Dia	Ga	A ±1	B Max	H ±1	L ±1½	W ±2	Approx Slope	Connection Type
18"	16	8	8	6	31	36	2½	2, 3, 4
24"	16	10	13	6	41	48	2½	2, 3, 4
30"	14	12¼	12½	8	51	57	2½	2, 4
36"	14	14½	12	9	60	72	2½	2, 4
42"	12	17	11	10½	69	84	2½	3

⑤

⑤

⑤

⑤

⑤

		Dimensions - Inches							
Pipe Arch		Ga	A ±1	B Max	H ±1	L ±1½	W ±2	Approx Slope	Connection Type
Span	Rise								
21"	15"	16	7½	11	6	24	36	2½	2, 3, 4
28"	20"	16	8	16	6	32	48	2½	2, 3, 4
35"	24"	14	10	16	6	39	60	2½	2, 4
42"	29"	14	12	12	7½	46	75	2½	2, 4
49"	33"	12	13½	20	9	53	84	2½	3

⑤

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⑤

DESIGN APPROVED

Henry H. Ottens

APPROVED FOR DISTRIBUTION

Ronald Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

PIPE, CORRUGATED METAL
END SECTION

REV.

8/98

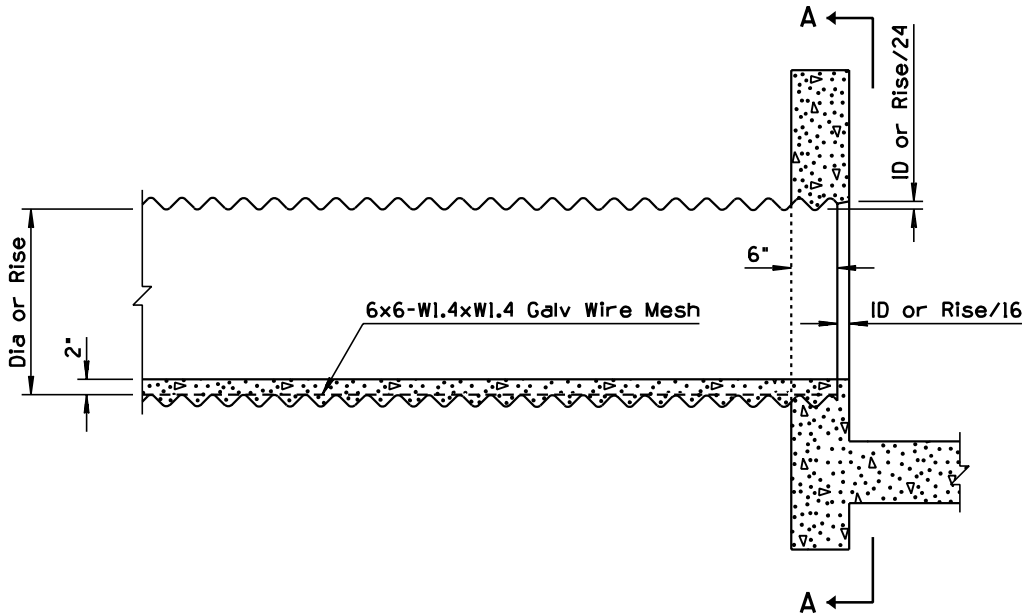
DRAWING NO.

C-13.25

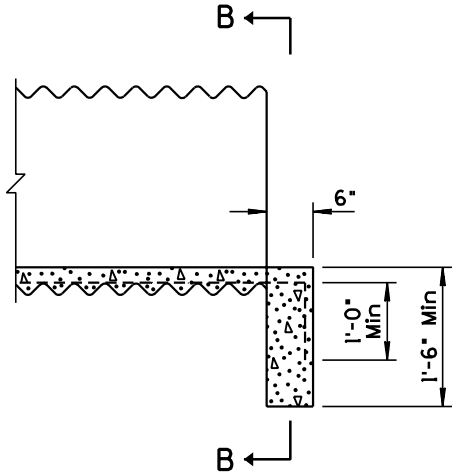
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED GENERAL NOTE	PNB	10/95
2	REVISED GENERAL NOTE	BAF	7/97
3			
4			

GENERAL NOTES

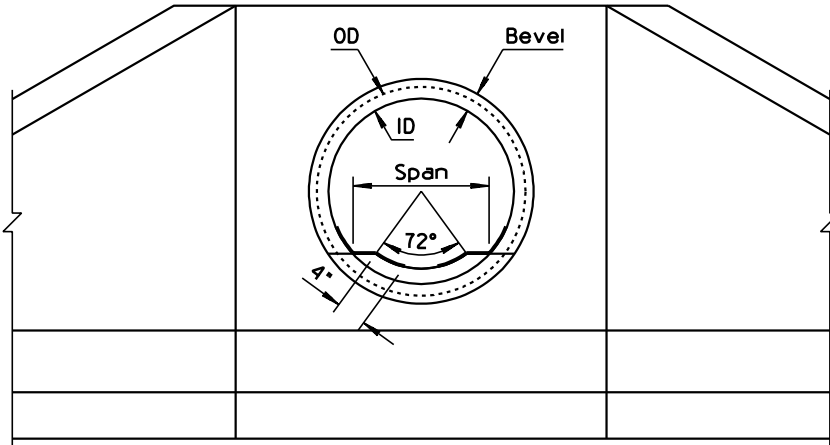
- For lateral dimensions of invert paving, use 72° control for CMP and span for CMPA.
- Paving shall be scored laterally at 1'-6" minimum intervals along the length of the pipe.
- Use bevel on inlet headwall only.
- Wire mesh shall be fastened or welded to corrugation crests at intervals and in a manner approved by the Engineer. Laps shall be 6" minimum.
- Paving shall not be placed untill backfilling is completed.
- Concrete shall be Class B.
- See Std B-11.12 for headwall and bevel dimensions not shown.



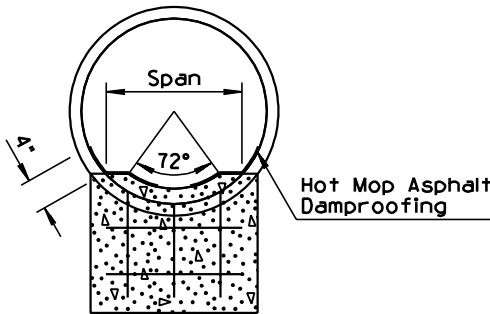
HEADWALL INSTALLATION



PROJECTING INSTALLATION



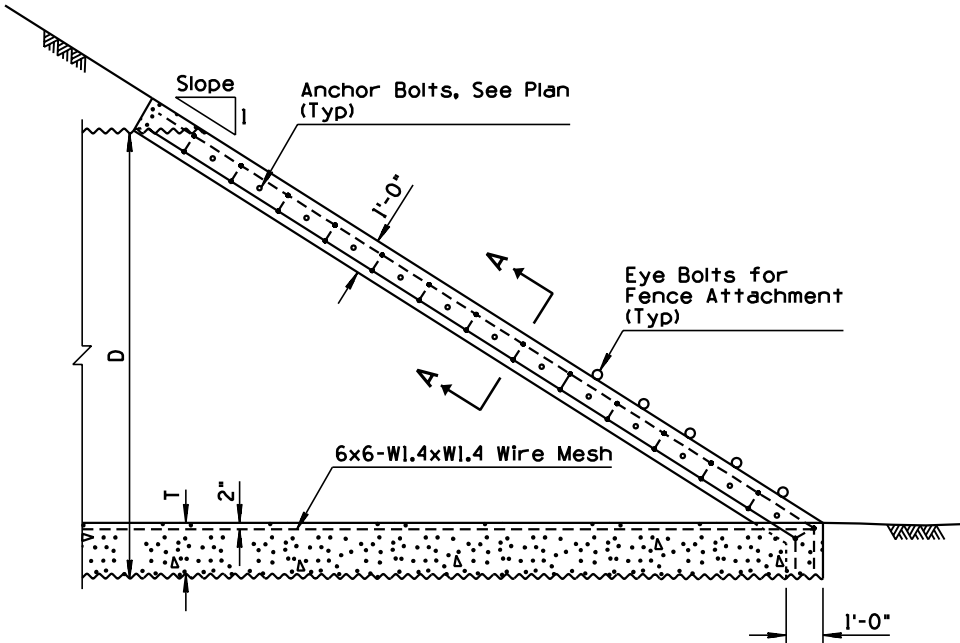
SECTION A-A



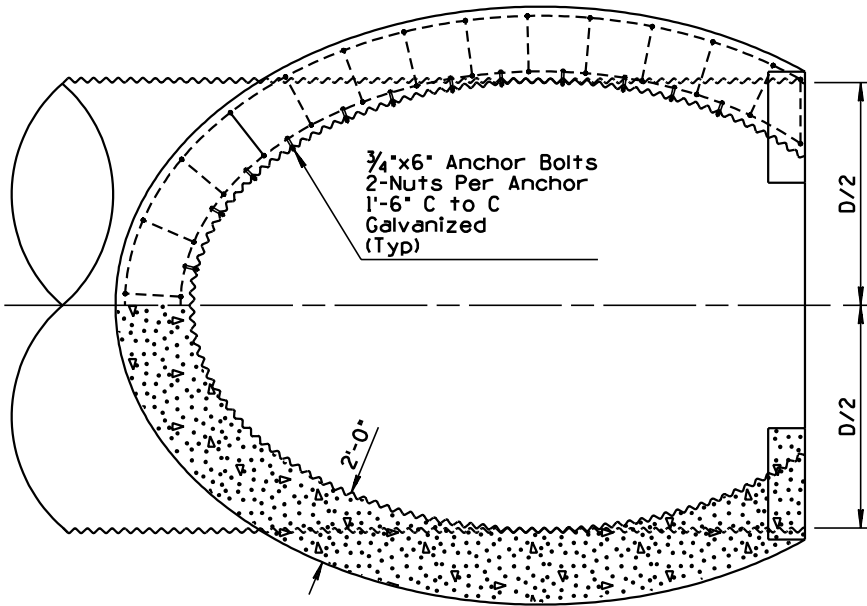
SECTION B-B

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	PIPE AND PIPE ARCH, CORRUGATED METAL CONCRETE INVERT PAVING	DRAWING NO. C-13.30

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			

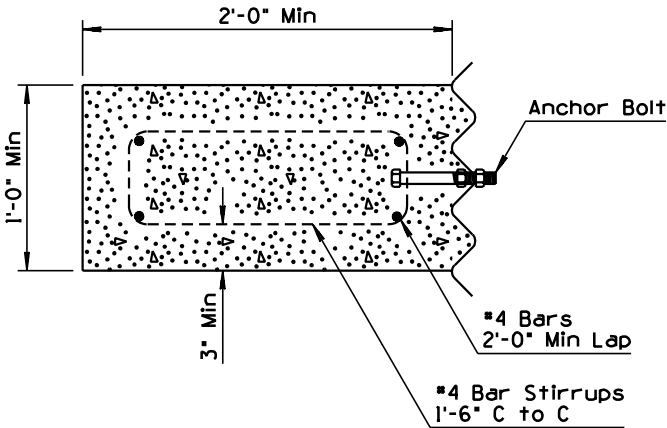


LONGITUDINAL SECTION

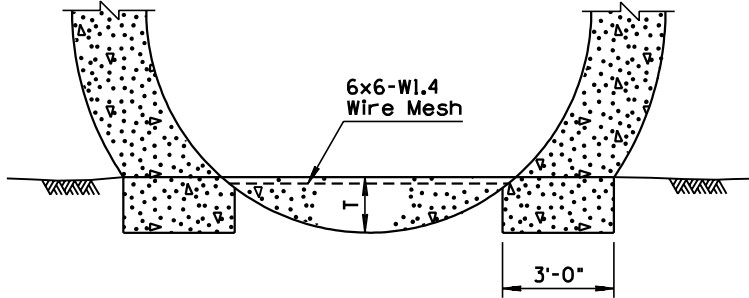


PLAN NORMAL TO SLOPE

	D	T	S
Combination Vehicle and Cattle Pass	144"	1'-6"	Varies
Cattle Pass Only	120"	6"	Varies



SECTION A-A



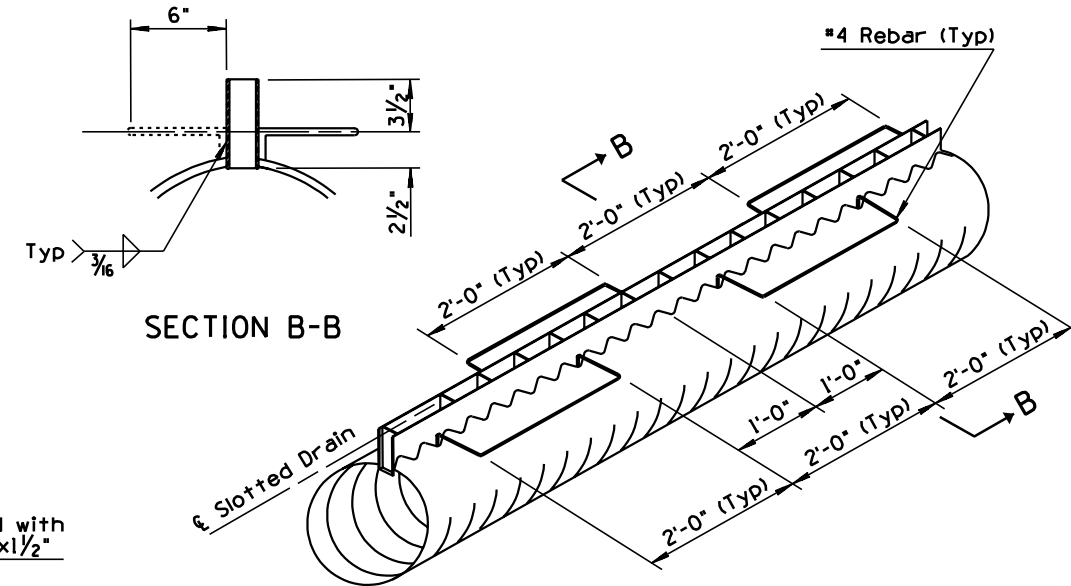
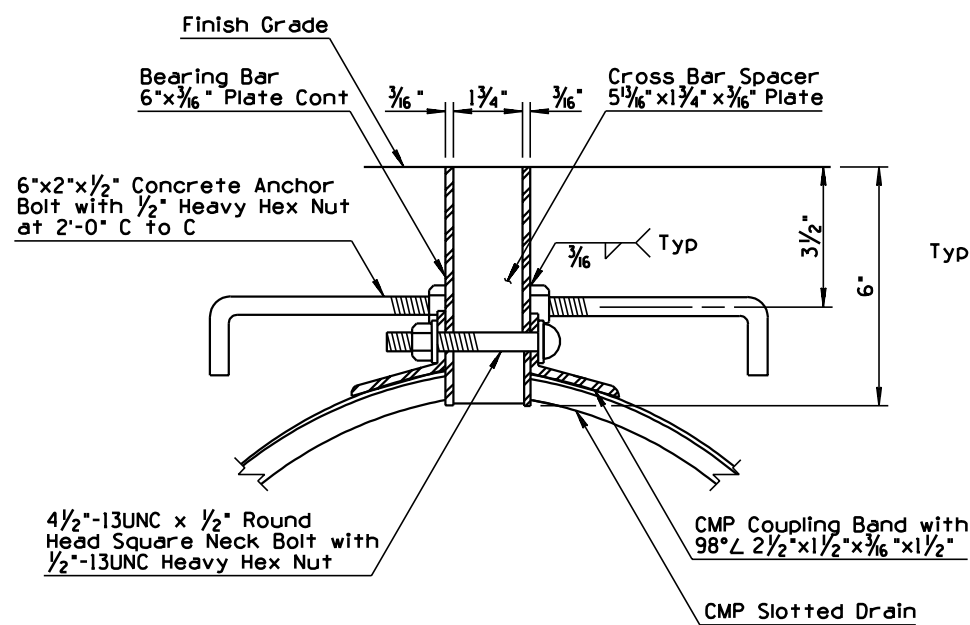
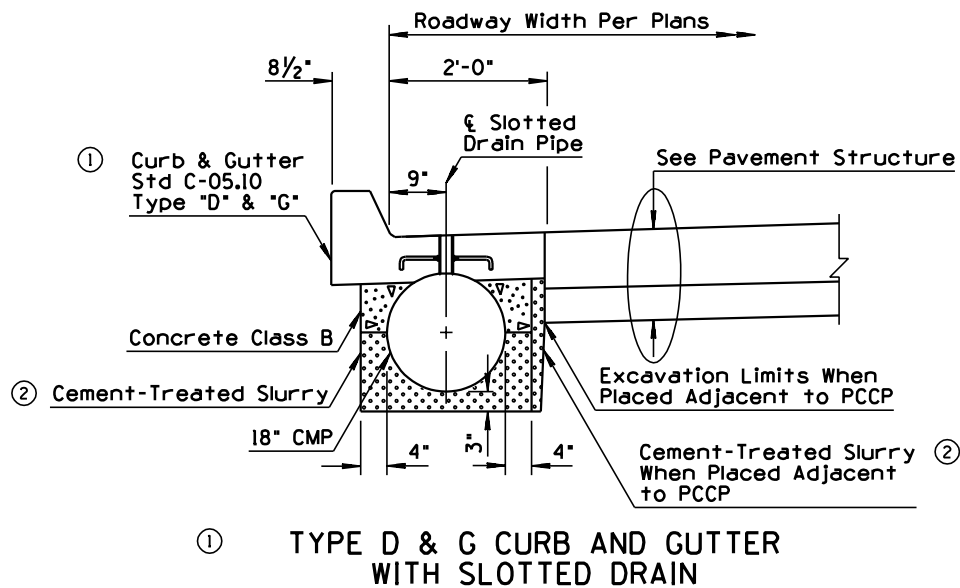
END ELEVATION

GENERAL NOTES

1. This end treatment is to be used only for those cattle and/or vehicle passes not used for drainage.
2. All concrete shall be Class B. An optional 12" AB invert paving base course and 6" of concrete may be used in the 144" diameter pipe.
3. Anchor bolts shall be retained in a horizontal position during pour with final tightening a minimum of 7 days after pour.
4. Pipe shall be backfilled before concrete bond beam is constructed. Minimum forming may be used.
5. Edges of wire mesh shall be fastened or welded to corrugation crests at intervals and in a manner approved by the Engineer. Laps shall be a minimum of 6".
6. For installation normal to roadway centerline only.

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APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① PIPE, CATTLE-VEHICLE PASS, MITERED END TREATMENT	DRAWING NO. C-13.55	

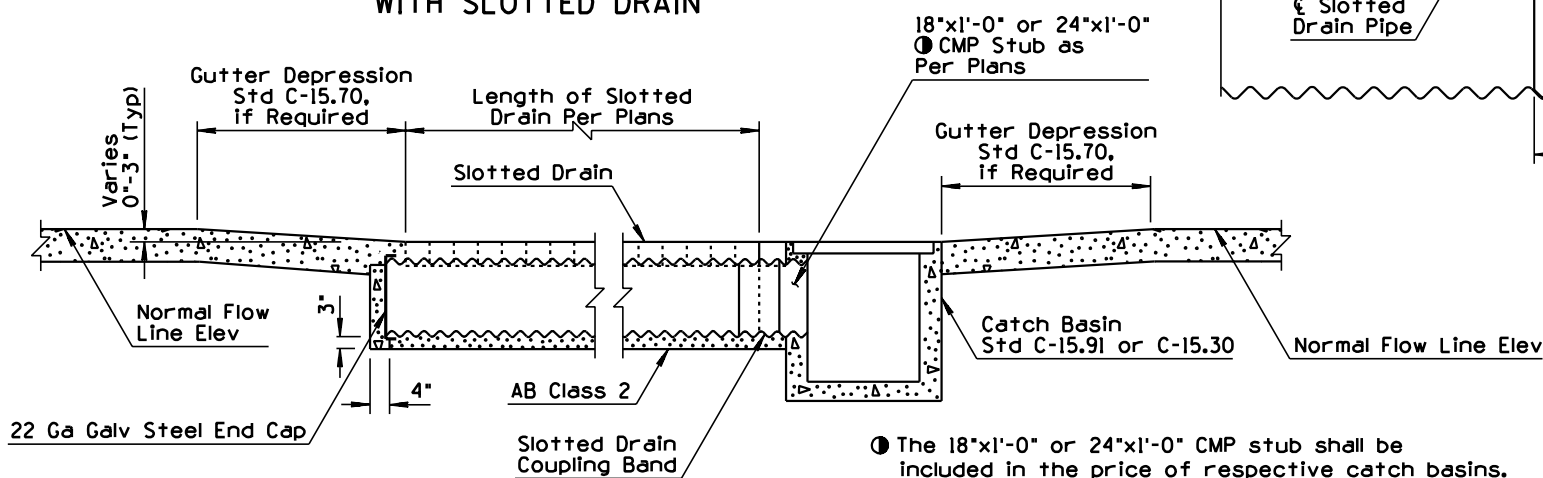
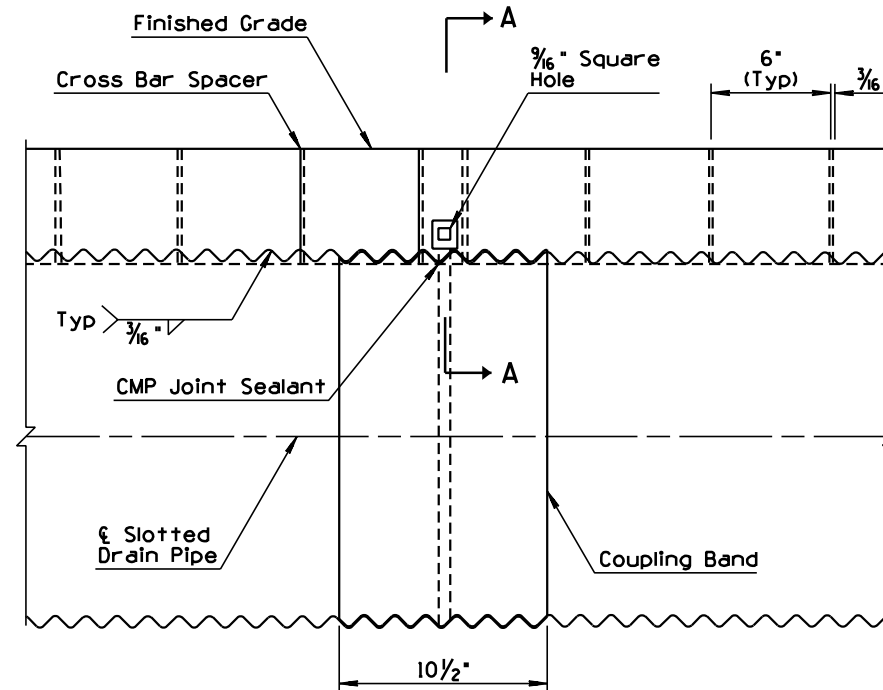
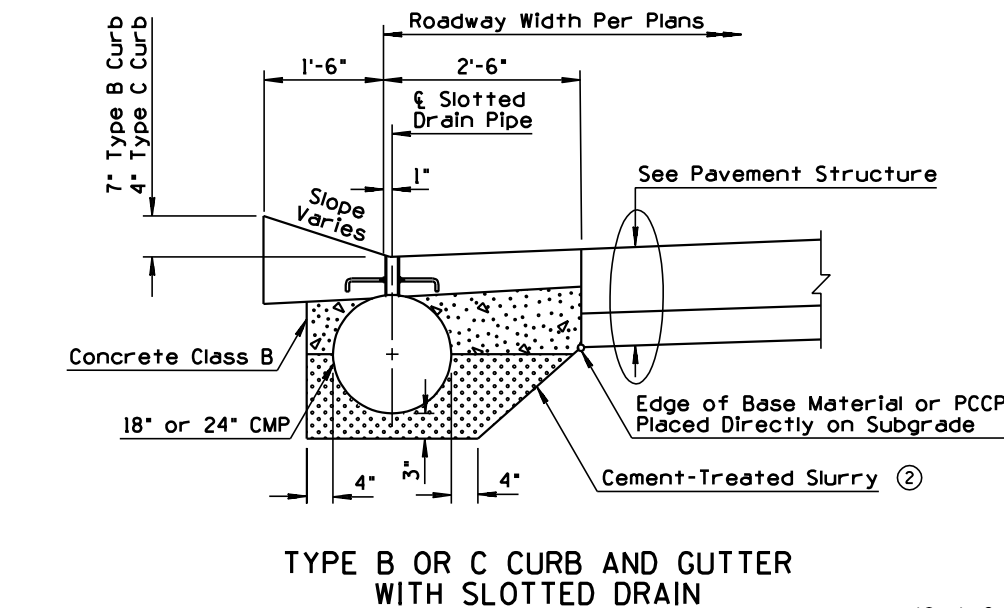
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	DELETED TYPE A CURB AND GUTTER	PNB	10/95
2	REVISED NOTE	BAF	7/97
3			
4			



SECTION A-A

GENERAL NOTES

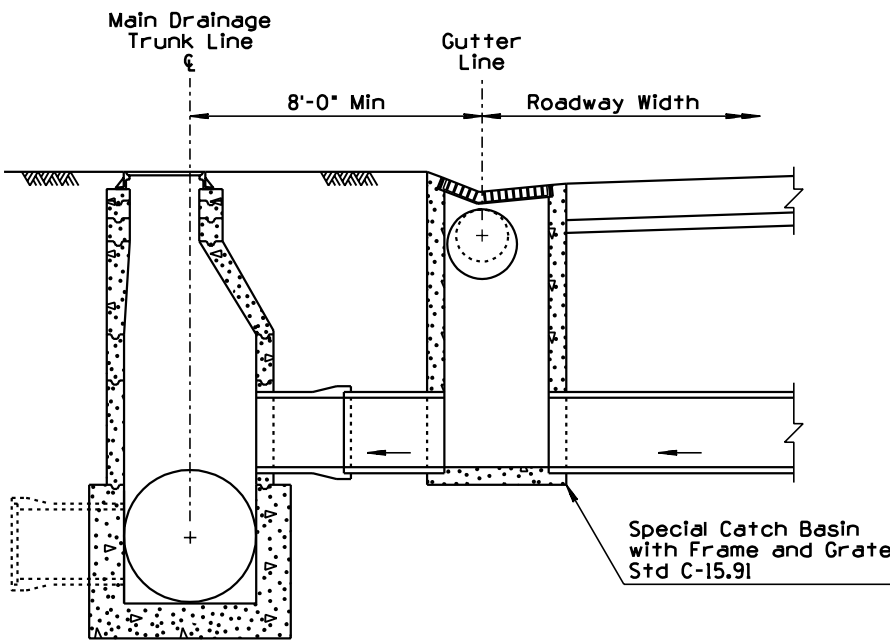
- Slotted drain pipe shall be 2 2/3"x1/2" corrugated steel pipe with a minimum wall thickness of 0.064" and shall conform to the requirements of AASHTO M36.
- All concrete shall be Class B.
- Reinforcing steel shall conform to 1003-1, 2, Grade 40.
- Structural steel shall conform to ASTM A36.
- Concrete anchors shall conform to ASTM A307 and hex nuts shall conform to ASTM A563 Grade A.
- All slotted drain pipe hardware except anchor bolts and reinforcing steel shall be given two coats of #1 paint.
- When annular pipe is used, apply water proof sealer before attaching coupling band.
- When helical pipe is used, it shall be formed with at least one annular corrugation at each end of each pipe section. Water proof sealer shall be applied to the annular corrugation prior to attachment of coupling band.
- Cover slot during construction with removable tape or other acceptable substitute.
- Slotted drain pipe shall be clean at the time of final acceptance.
- Concrete curb and gutter thru the slotted drains shall be paid for under the respective curb and gutter items.
- Refer to curb and gutter details for dimensions and details not shown.
- Joints in concrete curb & gutter shall match adjoining PCCP and slotted drain bands.



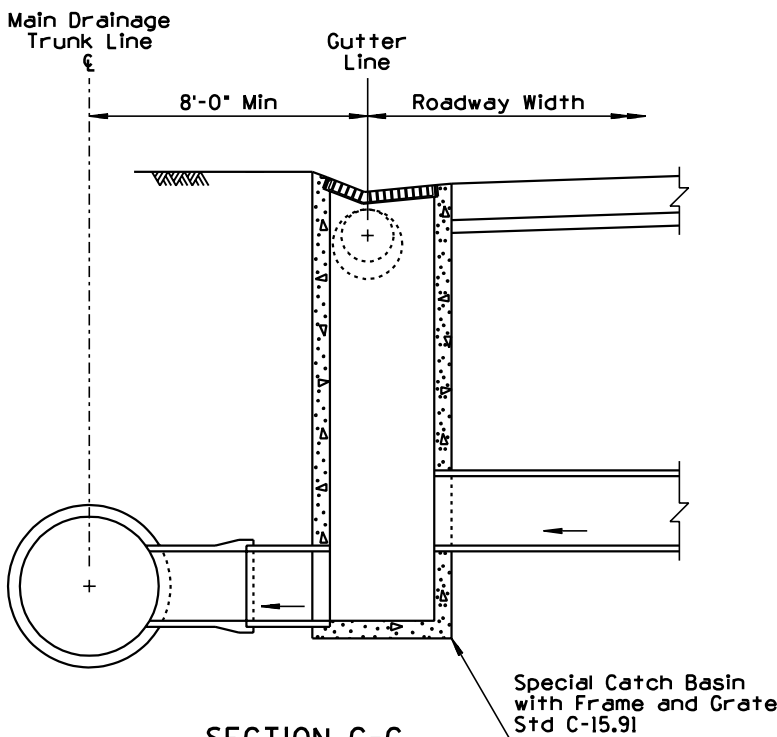
CONNECTION OF SLOTTED DRAIN TO CATCH BASIN AND SLOTTED DRAIN END CAP

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/98
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SLOTTED DRAIN DETAILS	DRAWING NO. C-13.60

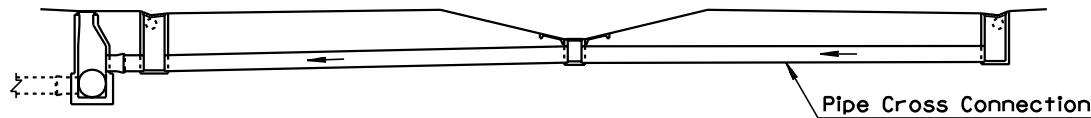
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2			
3			
4			



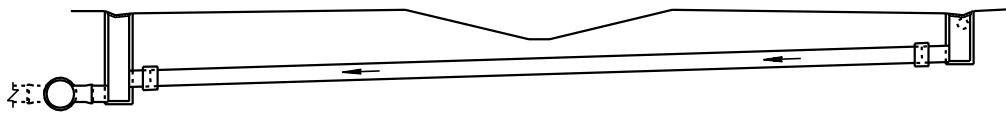
SECTION A-A
TYPICAL CONNECTION BETWEEN
CATCH BASIN AND MANHOLE



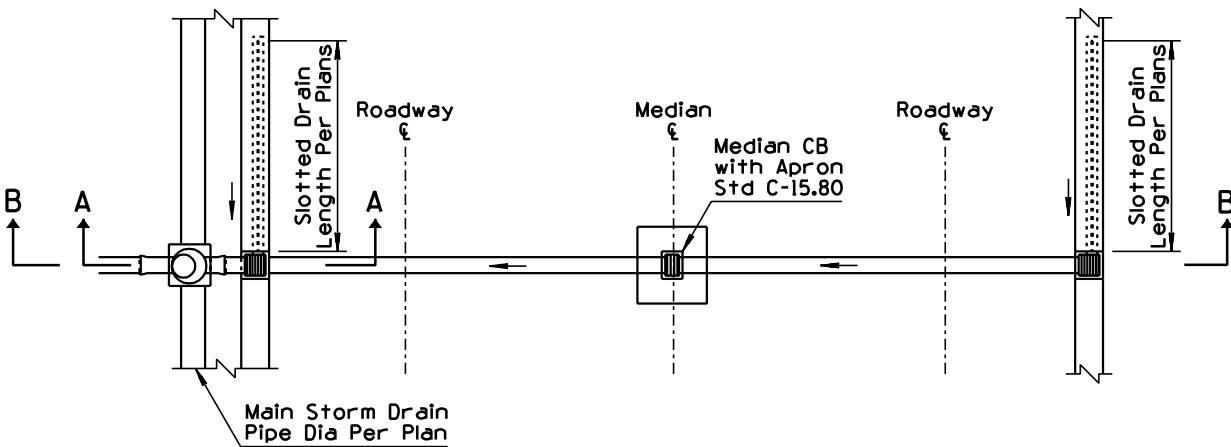
SECTION C-C
TYPICAL CONNECTION BETWEEN
CATCH BASIN AND MAIN STORM DRAIN



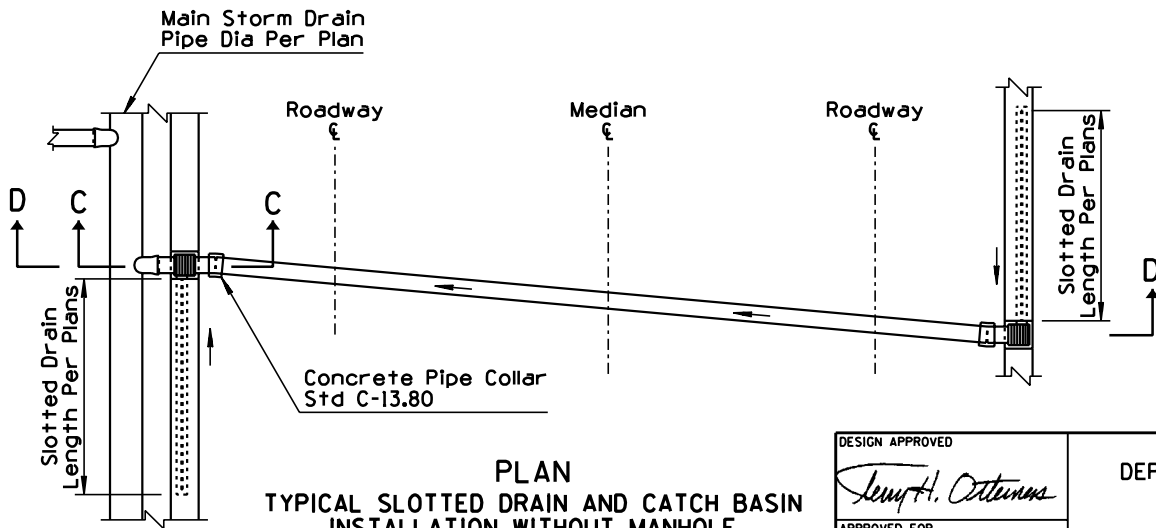
SECTION B-B



SECTION D-D



PLAN
TYPICAL SLOTTED DRAIN AND CATCH BASIN
INSTALLATION WITH MANHOLE



PLAN
TYPICAL SLOTTED DRAIN AND CATCH BASIN
INSTALLATION WITHOUT MANHOLE

GENERAL NOTES

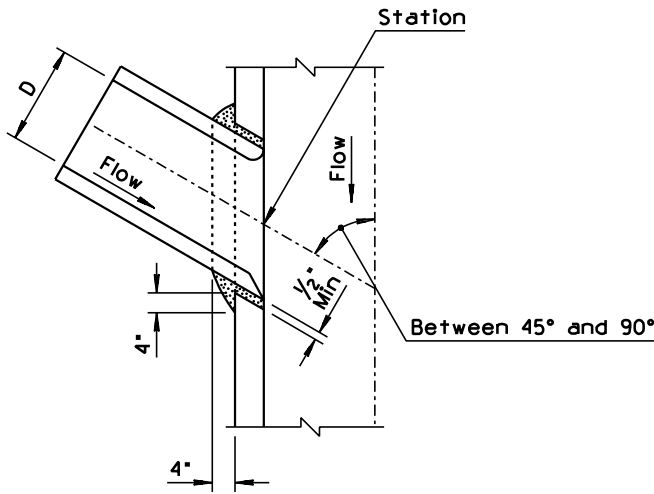
1. Pipe collars not required where direct catch basins connections can be made within 7° of a normal 90° installation, either horizontally or vertically.
2. "T" connections direct to the main drainage trunk line should be avoided and used only where manhole connections are impractical.

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APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	①	SLOTTED DRAIN INSTALLATION DETAILS	DRAWING NO. C-13.65

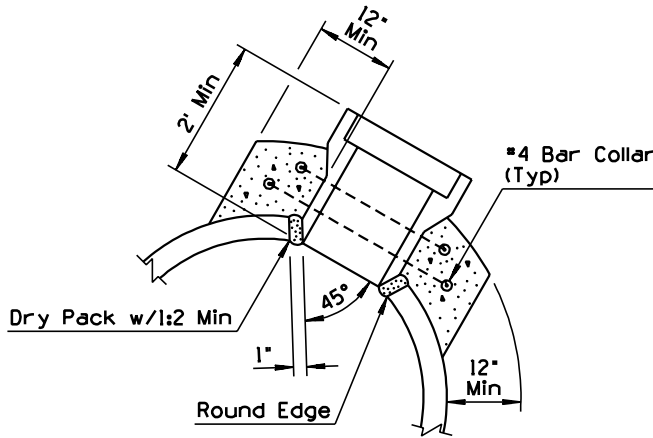
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			

GENERAL NOTES

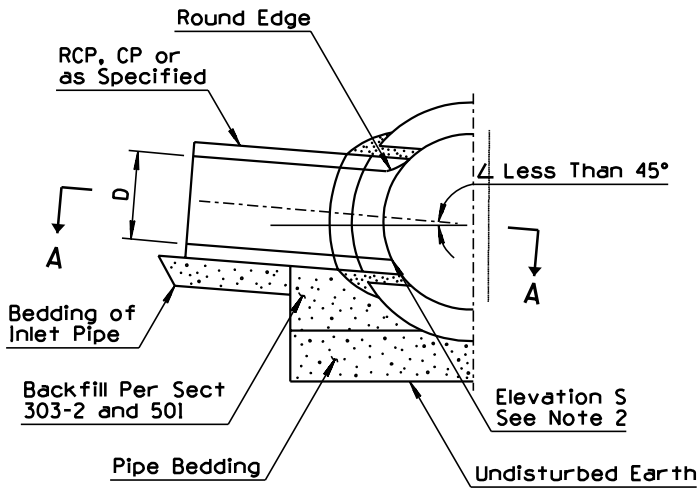
- Prefabricated tees shall be used when the outside diameter of the inlet pipe exceeds one half of the inside diameter of the main storm drain, except when the manholes are shown on plans.
- Centerline of the inlet pipe shall intersect the centerline of the main storm drain except when elevation "S" is shown on plans.
- If \angle is 45° or less, type 1 shall be used.
- All concrete shall be class B.
- All reinforcing steel shall conform to 1003-1, 2, grade 40.
- Reinforcing steel shall have 2" minimum cover.



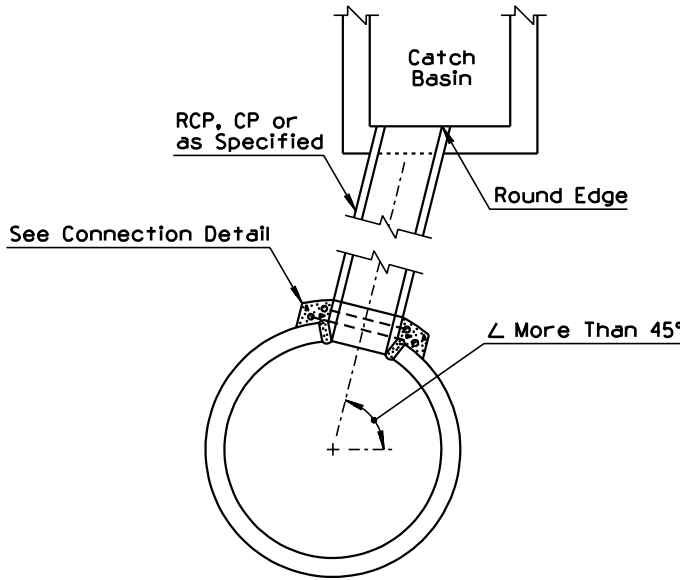
SECTION A-A



CONNECTION DETAIL
TYPE 2



SIDE INLET
TYPE 1

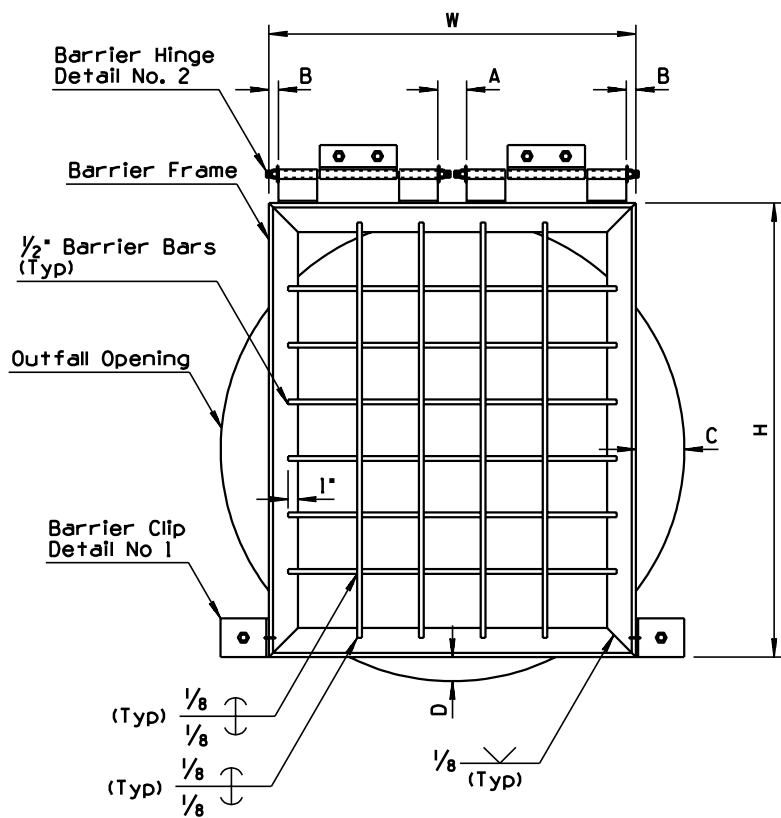


CATCH BASIN ABOVE STORM DRAIN
TYPE 2

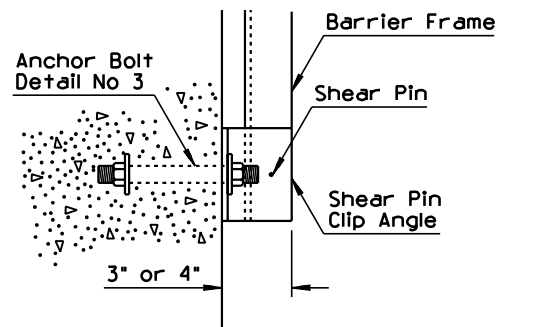
DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>		DRAWING NO. C-13.70

① STORM DRAIN
CONNECTION DETAILS

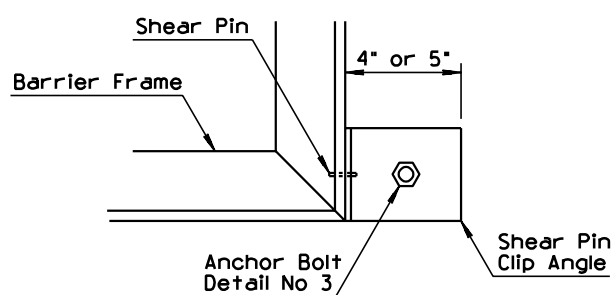
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
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2	DELETED NOTE	PNB	7/94
3	ADDED NOTE	PNB	7/94
4	ADDED DIMENSION	PNB	7/94



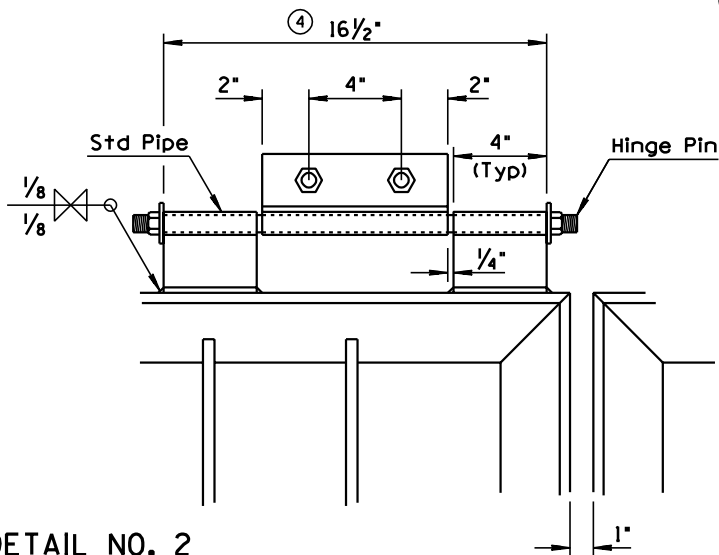
PIPE ACCESS BARRIER FRONT ELEVATION



DETAIL NO. 1

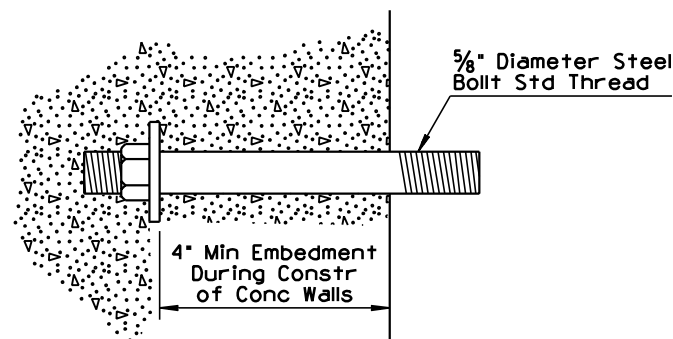


DETAIL NO. 2



GENERAL NOTES

1. All Shear pin angles shall fit snug and true to face. Cover with waterproof grease prior to installation of pin.
2. Shear pin holes in the angle shall be drilled for a tight fit of the pins.
3. Both ends of the shear pins shall be peened after installation.
4. Shear pin material shall be commercially pure aluminum wire alloy 1100, Temper 0, Federal Spec. 00-A-411.
5. Galvanize all ferrous parts after fabrication.
6. Frame and hinge angles shall have the outstanding legs out.
7. All steel shall be in accordance with ASTM A36.
8. Barrier bars shall be equally spaced.
9. Hinge pin material shall be bolt stock and threaded on both ends so nut and lock washer are flush with the lower angle. Cover pin with waterproof grease prior to installation. Upset or damage exposed threads after installation.

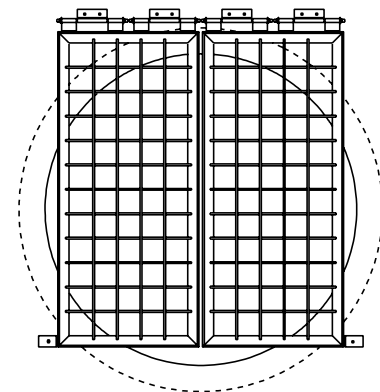


DETAIL NO. 3

①

ACCESS BARRIER GATE DIMENSION SCHEDULE																
Size of Outfall Pipe	No. of Barrier Gates	Frame Angles	Shear Pin Clip Angles	Shear Pins	Hinge Pins	Hinge Angles	Hinge Standard Pipe	No. & Length Of Vert. Bars	No. & Length Of Horz. Bars	H (Out to Out of Frame Angles)	W (Out to Out of Frame Angles)	A	B	C	D	Str. Steel (lbs)
30"	1	2"x2"x ¼"	4"x4"x ¼"	2-⅛"	½"	2"x2"x ¼"	¾"	4-31"	4-34"	33"	36"	3"	0"	-3"	2"	78.0
36"	1	2"x2"x ¼"	4"x4"x ¼"	2-⅛"	½"	2"x2"x ¼"	¾"	4-31"	4-34"	33"	36"	3"	0"	0"	3.5"	78.0
42"	1	2"x2"x ¼"	4"x4"x ¼"	2-⅛"	½"	2"x2"x ¼"	¾"	4-41"	5-34"	43"	36"	3"	0"	3"	0.5"	88.6
48"	1	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	4-46"	6-34"	50"	38"	3"	1"	5"	1"	179.2
54"	1	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	5-52"	7-40"	56"	44"	5"	3"	5"	2"	206.5
60"	1	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	6-58"	8-46"	62"	50"	9"	4"	5"	3"	235.6
66"	1	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	7-64"	9-52"	68"	56"	11"	6"	5"	4"	266.4
72"	2	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	4-69"	9-34"	73"	38"	3"	1"	-2.5"	5"	443.6
78"	2	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	4-75"	10-34"	79"	38"	3"	1"	0.5"	5"	468.4
84"	2	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	4-81"	11-34"	85"	38"	3"	1"	3.5"	5"	493.2
90"	2	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	4-87"	12-36"	91"	40"	3"	2"	4.5"	5"	527.0
96"	2	3"x3"x ⅙"	5"x3"x ¼"	2-⅛"	¾"	2½"x2½"x ¼"	1"	5-93"	13-39"	97"	43"	4"	3"	4.5"	5"	579.0

* Per Gate



INSTALLATION DETAIL FOR DOUBLE GATES

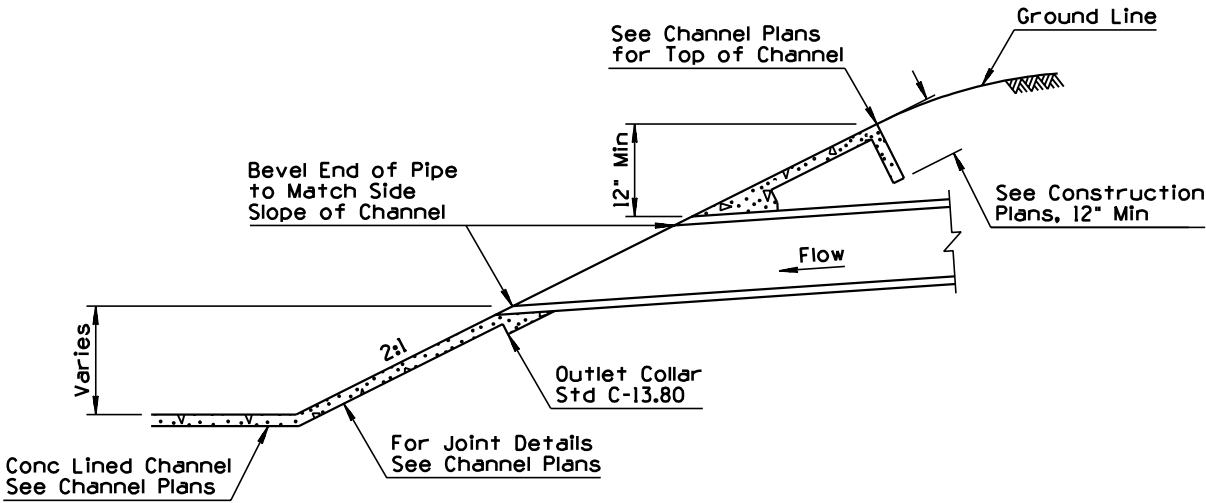
DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	STORM DRAIN OUTLET DETAILS	DRAWING NO. C-13.75 Sheet 1 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	DELETED NOTE	PNB	7/94
2	DELETED DETAIL	PNB	7/94
3			
4			

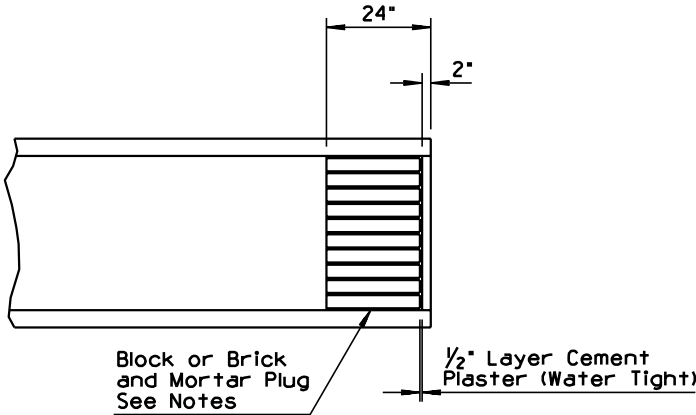
GENERAL NOTES

1. Compact soil at end of pipe plug to 95% of maximum density.
2. If depth of cover is less than 5' or greater than 10', increase plug thickness a minimum of 4".

①
①
①



DRAINAGE OUTLET INTO CHANNEL



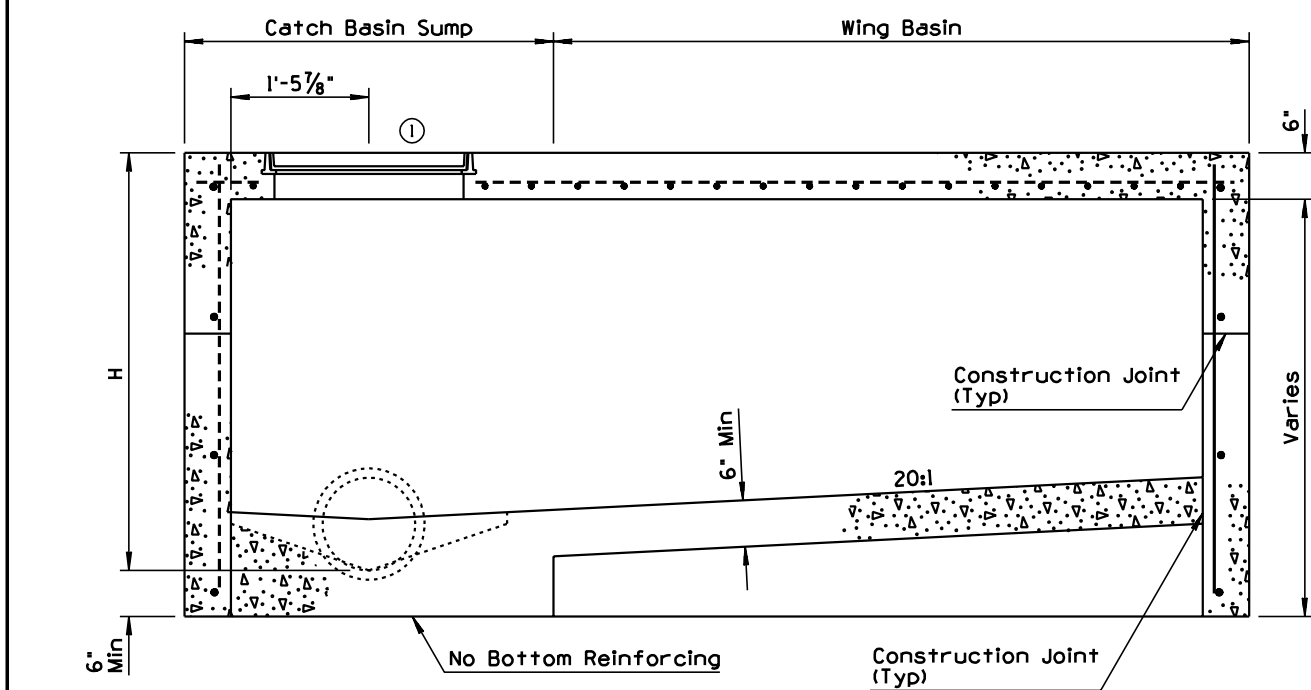
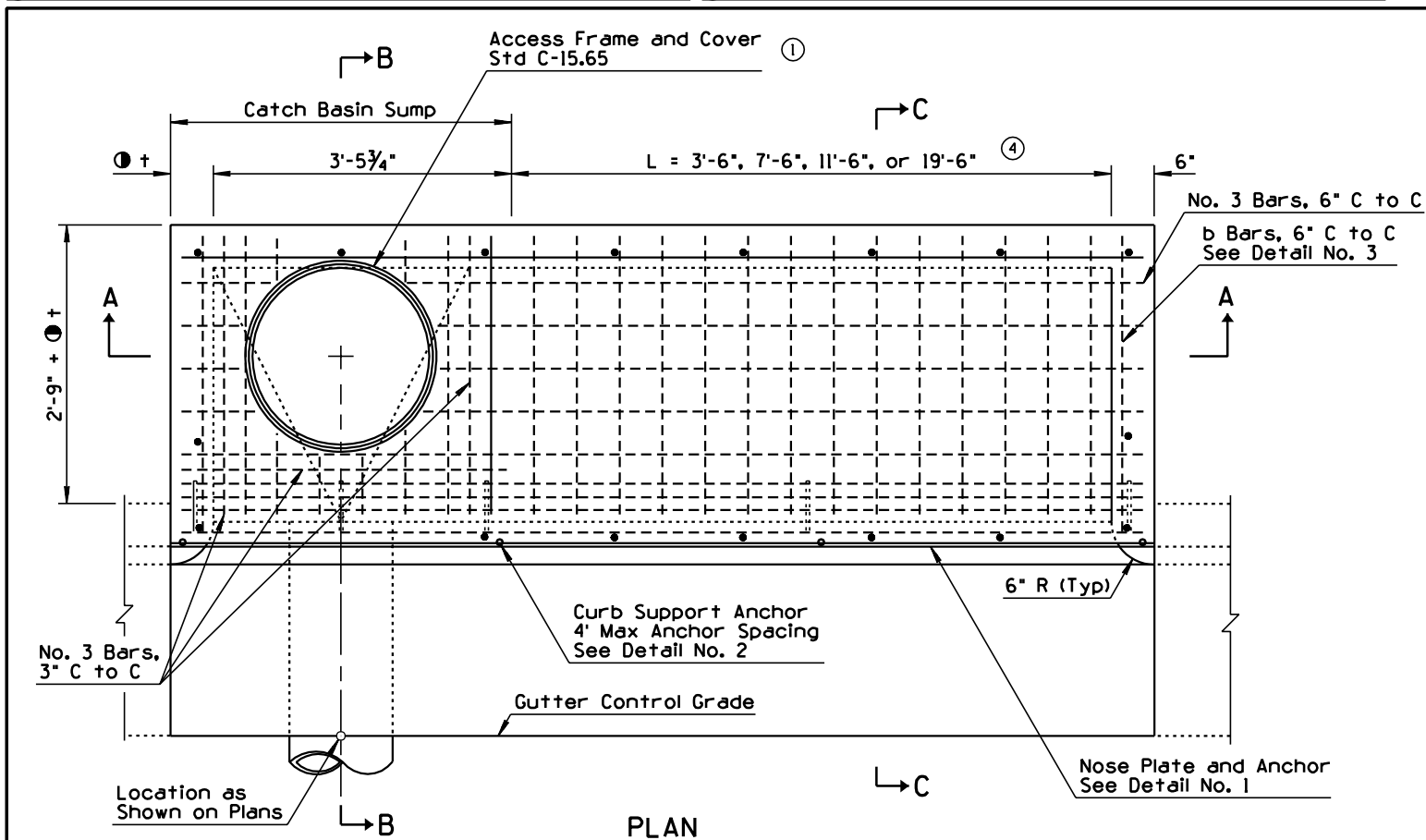
STORM DRAIN PLUG

②

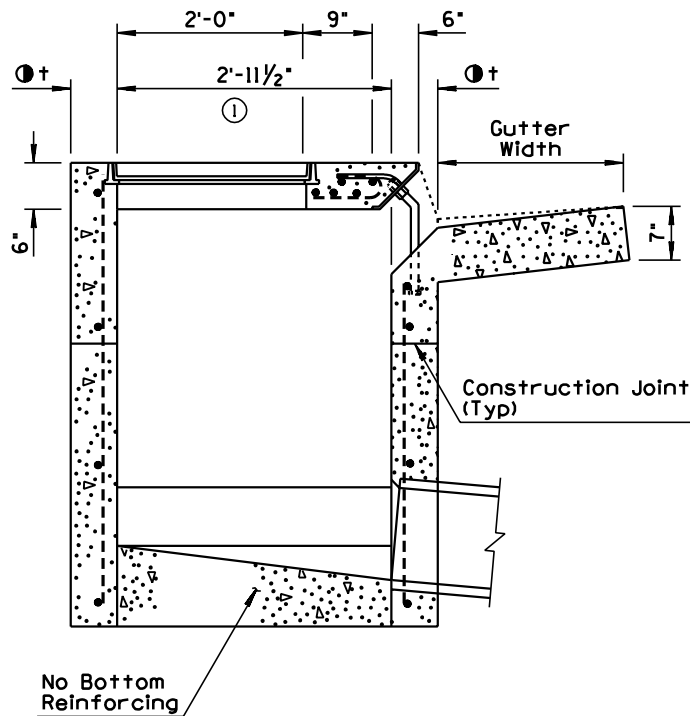
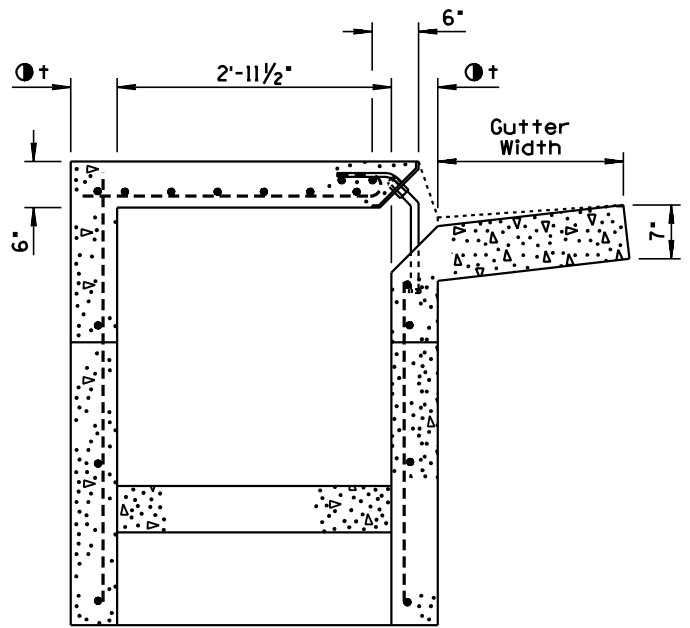
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>[Signature]</i>		DRAWING NO. C-13.75 Sheet 2 of 2

STORM DRAIN
OUTLET DETAILS

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE	NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED STD FOR NEW ACCESS FRAME AND COVER	PNB	5/97	5	ADDED SECTION	PNB	5/97
2	ADDED SHEETS FOR REVISED DETAILS	PNB	5/97	6	CONSOLIDATED NOTES	PNB	5/97
3	REVISED SECTION	PNB	5/97	7	ADDED NOTE	PNB	5/97
4	REVISED LENGTHS OF WINGS	PNB	5/97	8			



USE THIS SECTION WHEN H=5' OR LESS ③

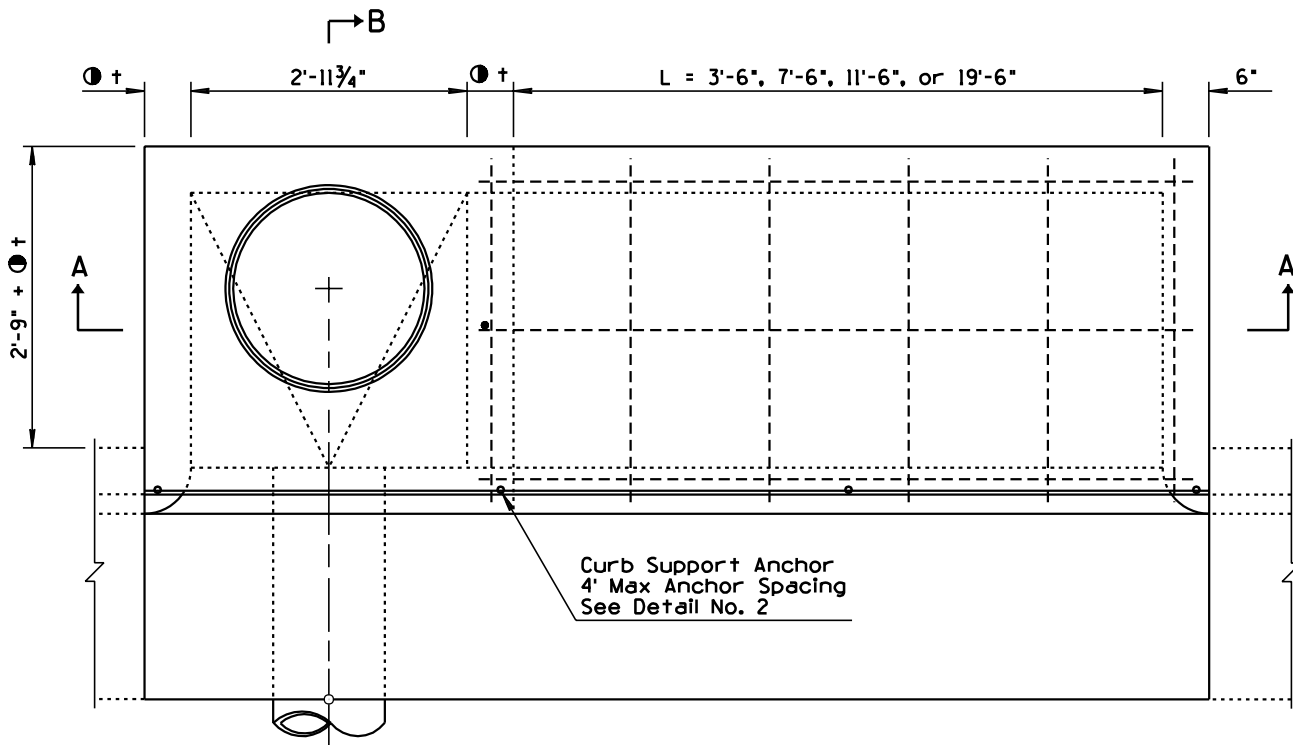


GENERAL NOTES

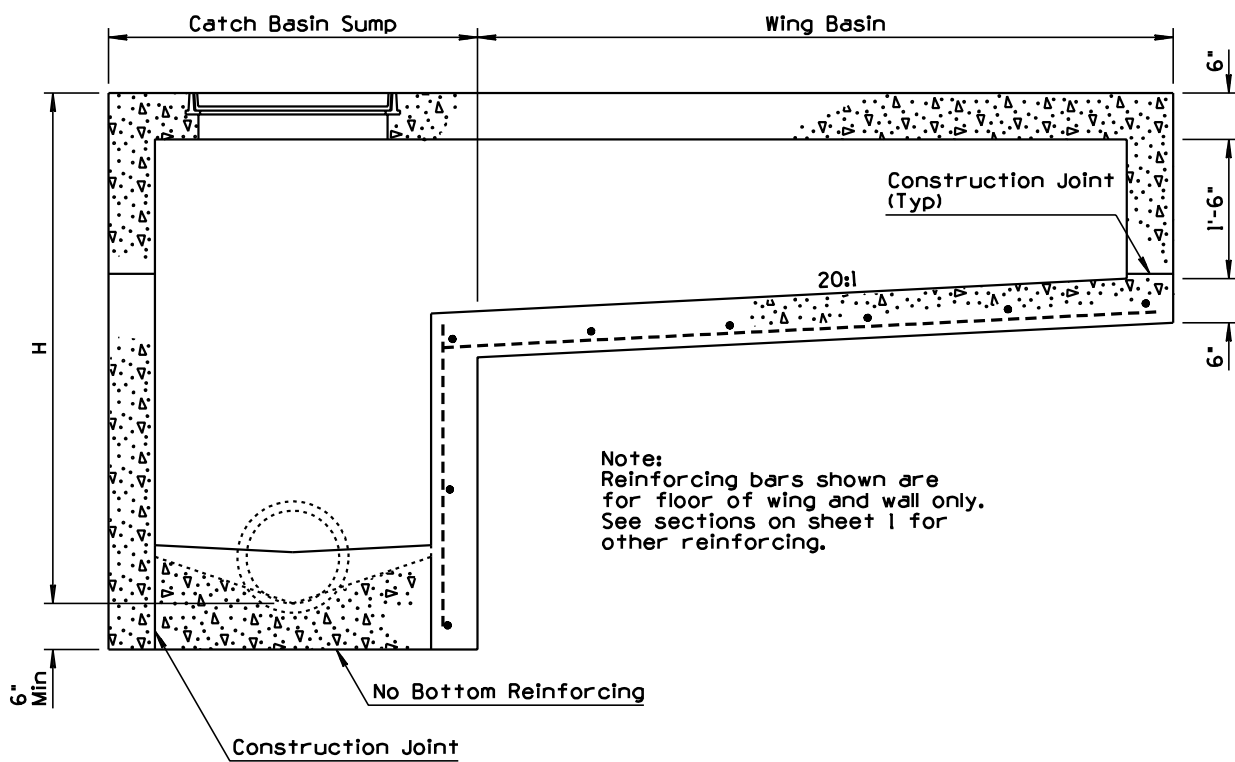
- Catch basin can be used on grade or at roadway sag.
- Catch basin has three configurations:
Sump Only-Sump portion of catch basin (See Detail No. 4).
Single Wing (Illustrated)-Sump with wing basin upstream.
Double Wing-Sump with symmetrical wing basins each side.
- Pipes can be placed in any wall except wall adjacent to wing basin.
- Floor shall have a wood trowel finish. Slope of the sump portion of the catch basin along the axis of the pipe shall be 4:1.
- Any specified inlet depression shall be warped to opening according to Std C-15.70.
- All structural steel shall be ASTM A36.
- Nose plate, access frame and cover shall be given one shop coat of No. 1 paint.
- All concrete shall be Class B.
- All reinforcing bars shall be #4, 1'-6" C to C both ways and 1 1/2" clear to inside of walls and outside of wing basin floor except as shown.
- Curb opening area (sq ft) per inch of curb "h" + gutter depression = curb opening length (ft) x 0.0833.
- Welding shall be in accordance with Standard Welding Specifications.
- Construction joints and drains shall be placed to meet field conditions. See Std C-15.70.
- ① = 6" when H is 8' or less.
8" when H is greater than 8'.

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APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① ② CATCH BASIN, TYPE 3	DRAWING NO. C-15.20 Sheet 1 of 2

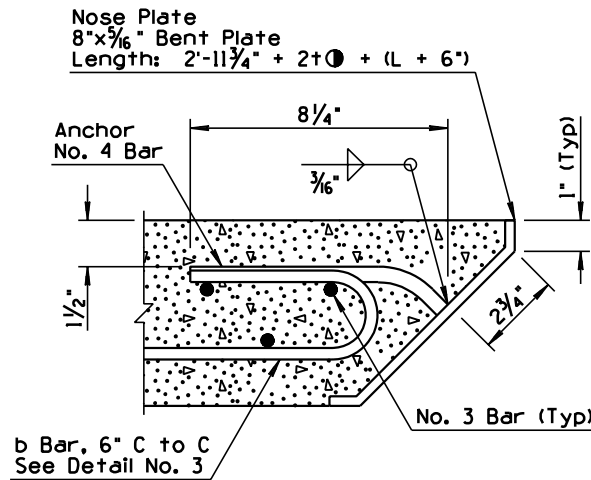
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
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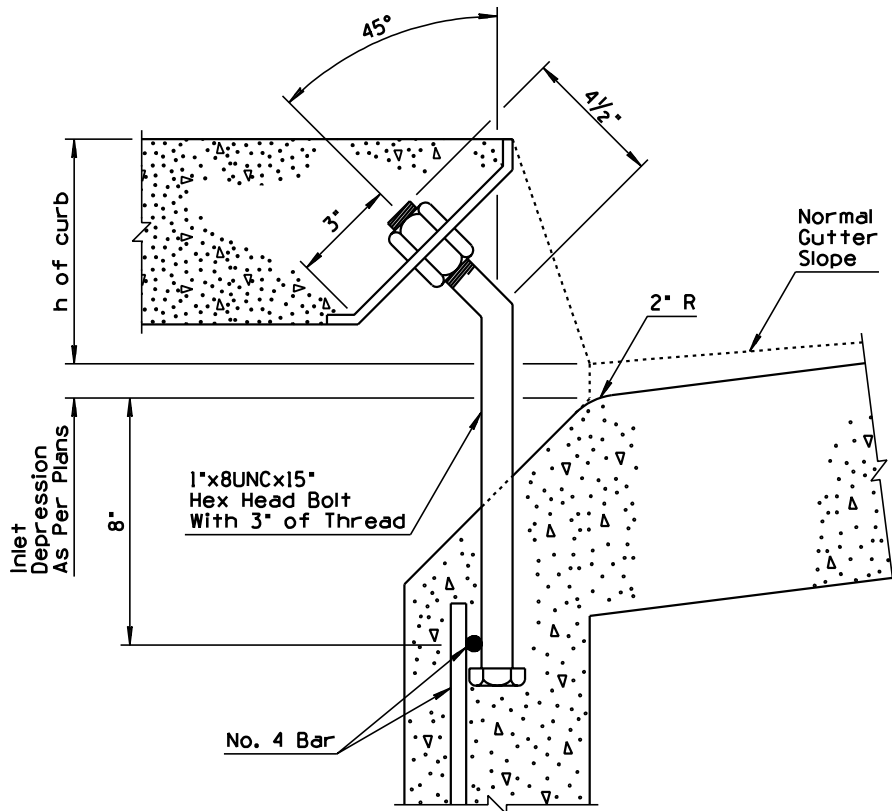
PLAN



SECTION A-A
USE THIS SECTION WHEN H IS GREATER THAN 5'

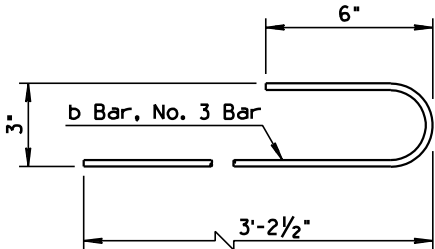


DETAIL NO. 1

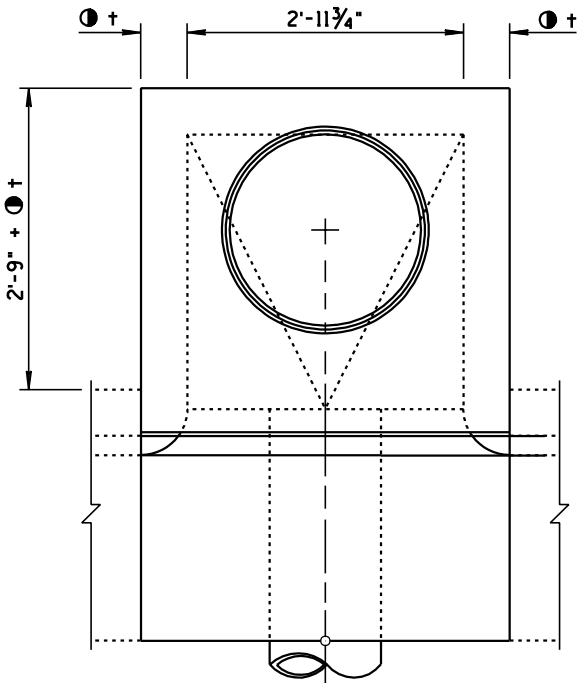


DETAIL NO. 2
CURB SUPPORT ANCHOR

- GENERAL NOTES**
- See sheet 1 of 2 for other dimensions, notes and reinforcing steel.
 - $\textcircled{1} + = 6"$ when H is 8' or less.
 $8"$ when H is greater than 8'.



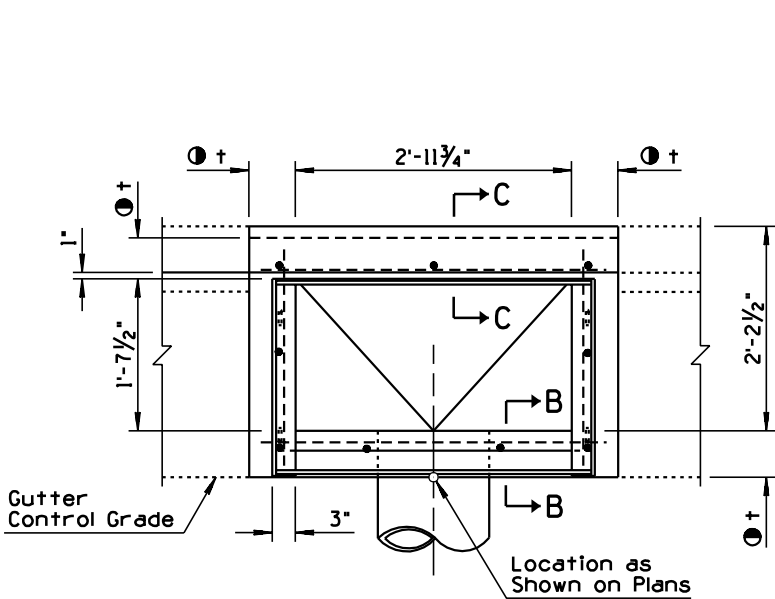
DETAIL NO. 3



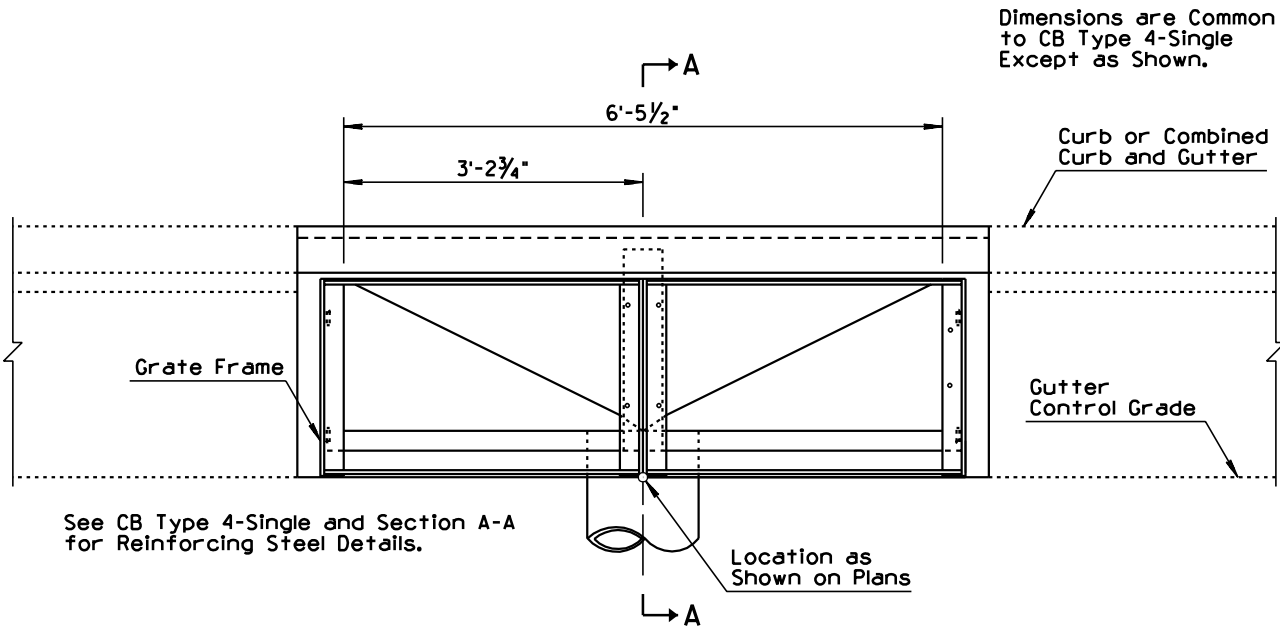
DETAIL NO. 4

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APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	CATCH BASIN, TYPE 3	DRAWING NO. C-15.20 Sheet 2 of 2

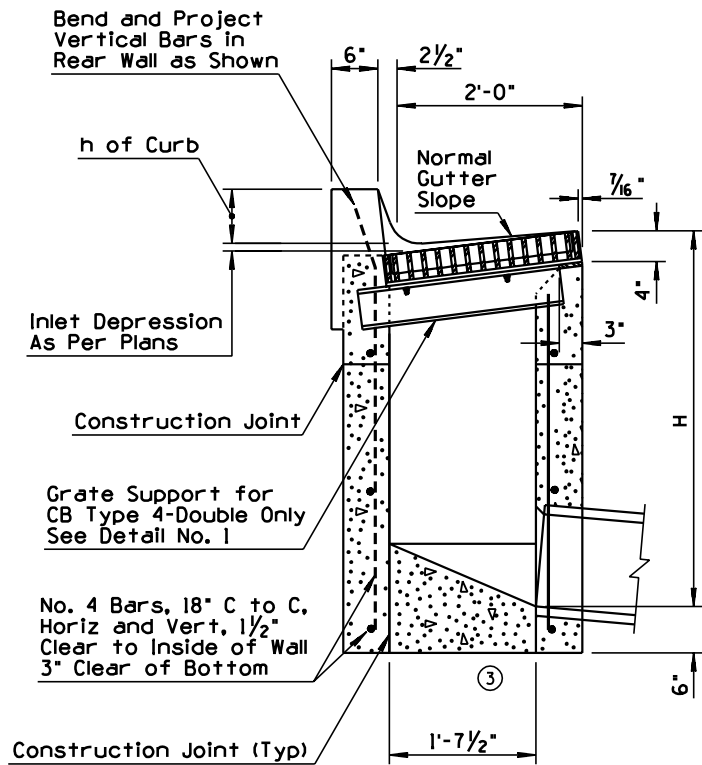
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1	REVISED STD FOR NEW FRAME	PNB	5/97	5	REVISED NOTE	PNB	5/97
2	REVISED DETAIL	PNB	5/97	6	ADDED NOTE	PNB	5/97
3	REVISED FLOOR FOR POURING AFTER WALLS	PNB	5/97	7			
4	ADDED SECTION OR DETAIL	PNB	5/97	8			



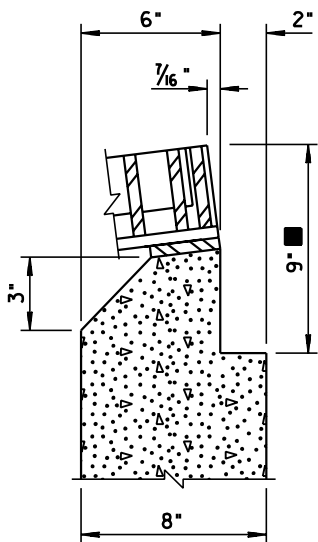
PLAN - CATCH BASIN TYPE 4 - SINGLE



PLAN - CATCH BASIN TYPE 4 - DOUBLE

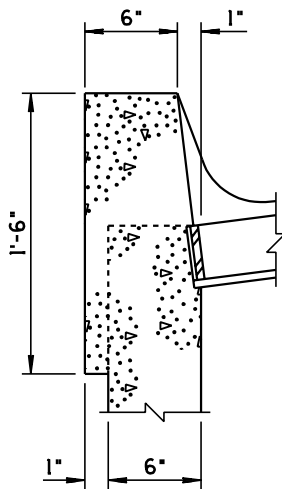


SECTION A-A

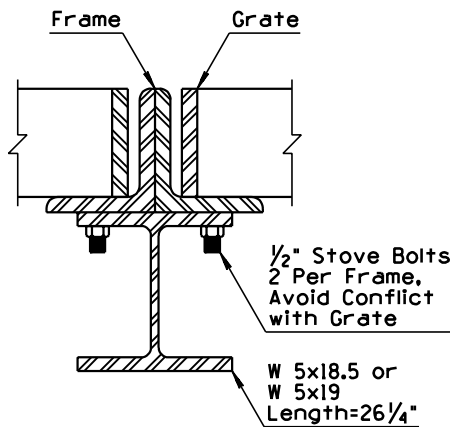


USE THIS SECTION
WHEN t=8"

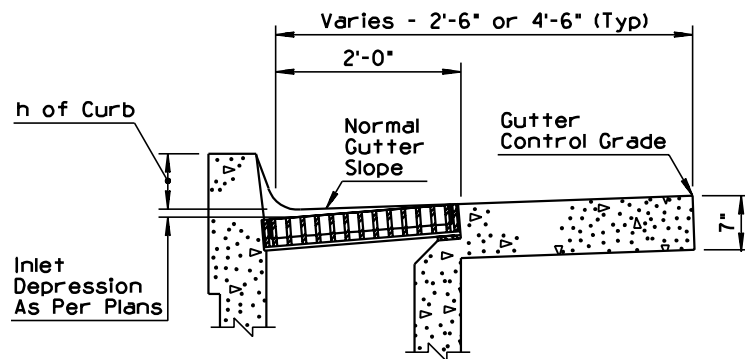
SECTION B-B ②



SECTION C-C ④



DETAIL NO. 1



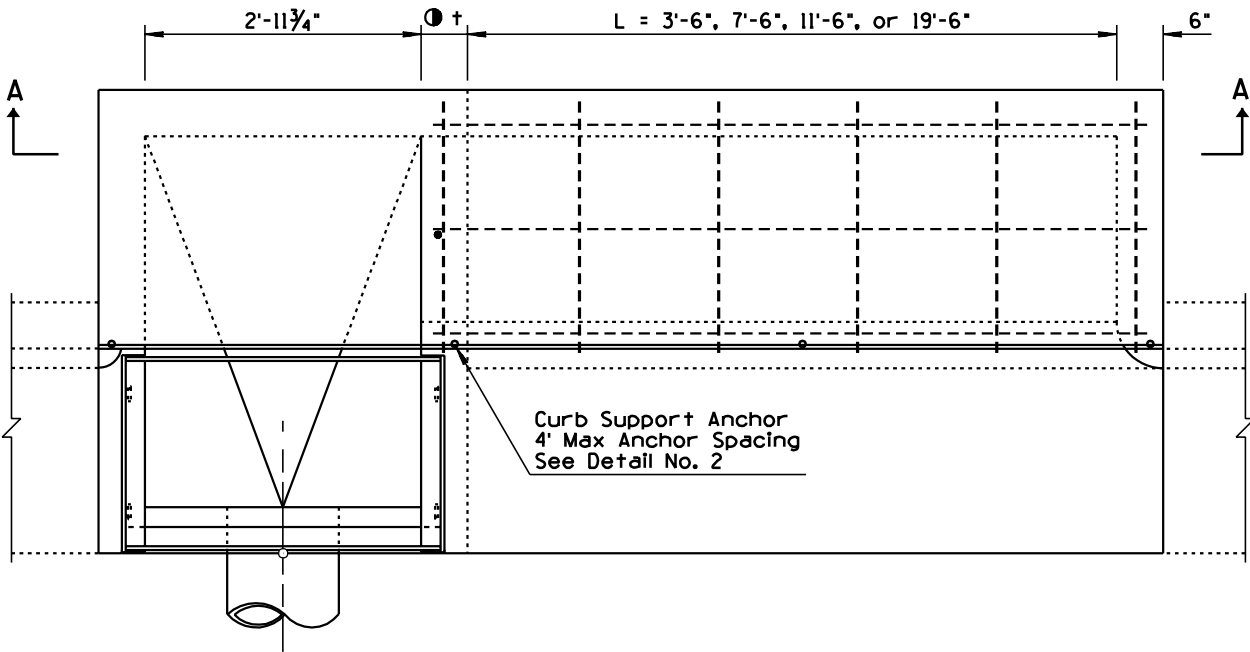
DETAIL NO. 2 ④

GENERAL NOTES

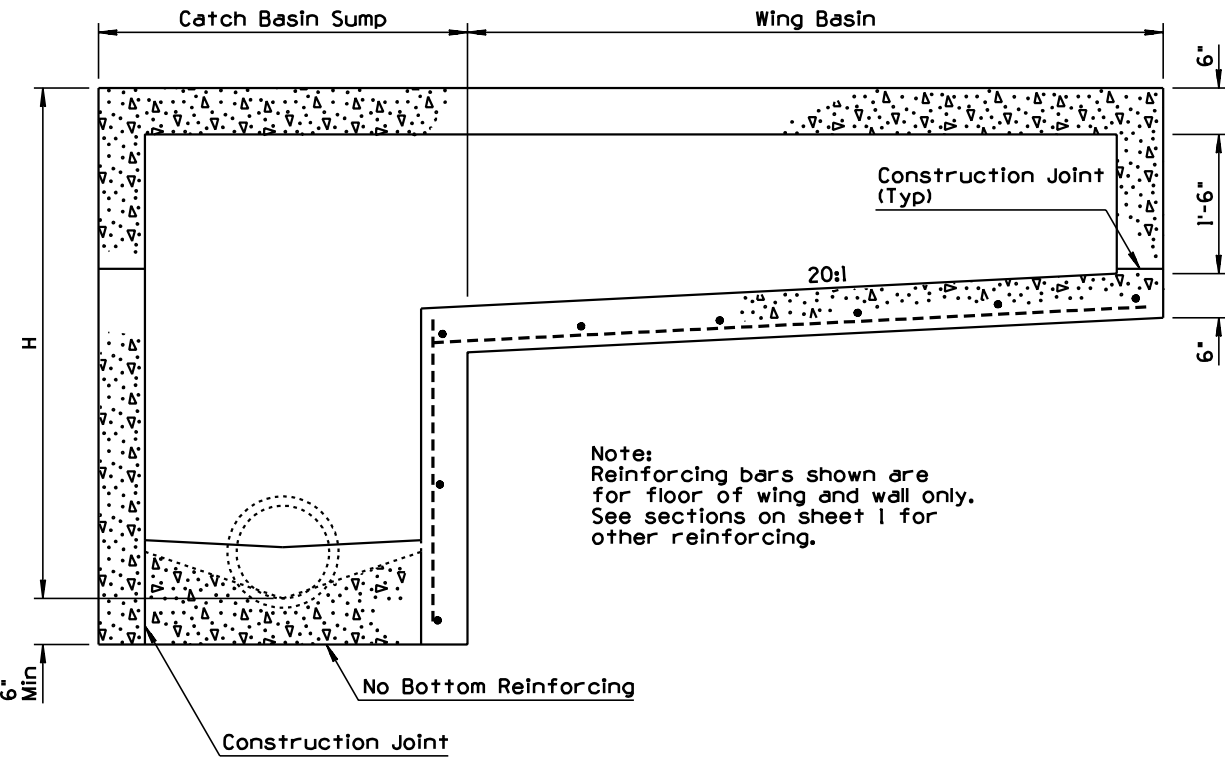
- ⑥ 1. Catch basin can be used on grade or at roadway sag.
2. Pipes can be placed in any wall.
- ⑤ 3. Floor shall have a wood trowel finish and a minimum 4:l slope along the axis of the pipe toward the pipe.
4. Curb over catch basin shall not be constructed until catch basin concrete has set for a minimum of 24 hours.
- ⑥ 5. Catch basin can be used with curb and gutter (as shown) or without.
6. See Stds C-15.50 for grate and frame details and opening areas.
7. Any specified inlet depression shall be warped to opening according to Std C-15.70.
8. All structural steel shall be ASTM A36.
9. Grate, frame and beam shall be given one shop coat of No. 1 paint.
10. All concrete shall be Class B.
11. Construction joints and drains shall be placed to meet field conditions. See Std C-15.70.
- ⑥ 12. Silicone sealant shall be placed between the grate frame and PCCP, recessed 1/4" from the pavement surface.
- ⑥ 13. See Detail No. 2 for catch basin with wide gutter.
14. t = 6" when H is 8' or less.
8" when H is greater than 8'.
See Section B-B.
■ 9" when pavement is AC.
Match pavement thickness
when pavement is PCCP.

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APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① CATCH BASIN, TYPE 4	DRAWING NO. C-15.30

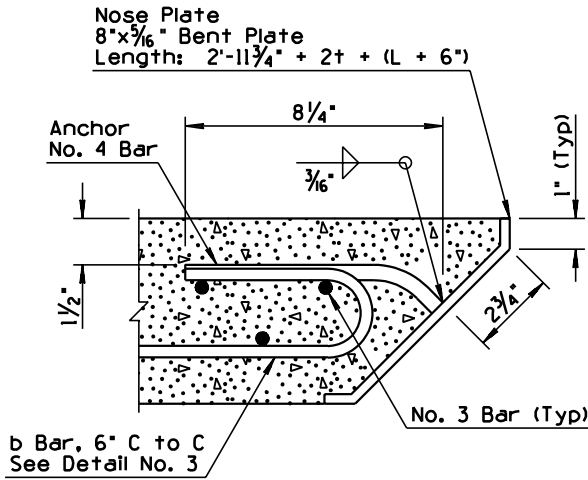
NO.	DESCRIPTION OF REVISIONS	MADE BY	DATE
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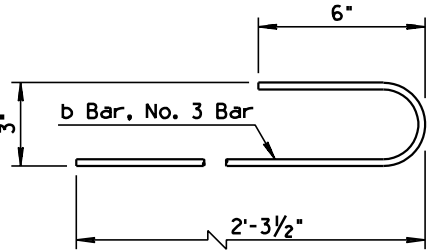
PLAN



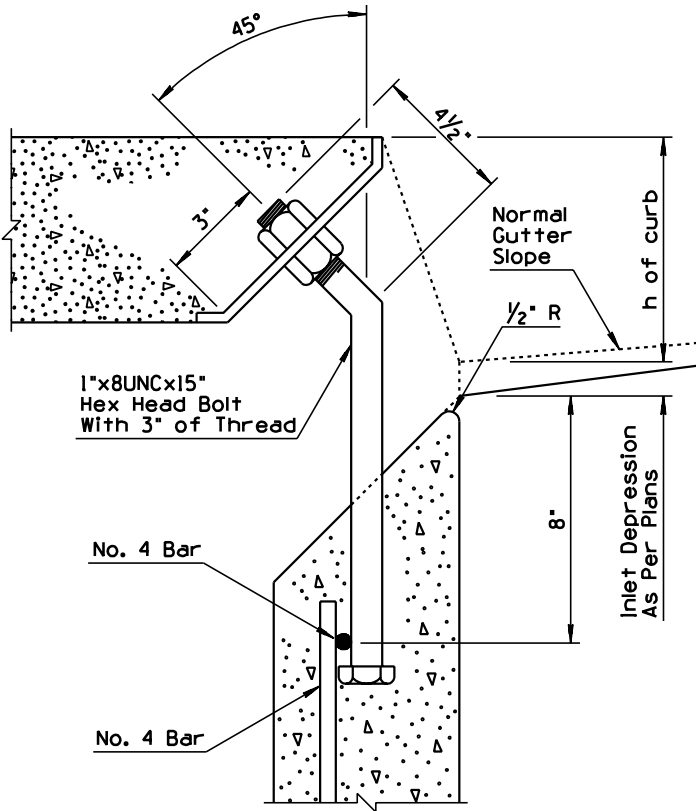
SECTION A-A
USE THIS SECTION WHEN H IS GREATER THAN 5'



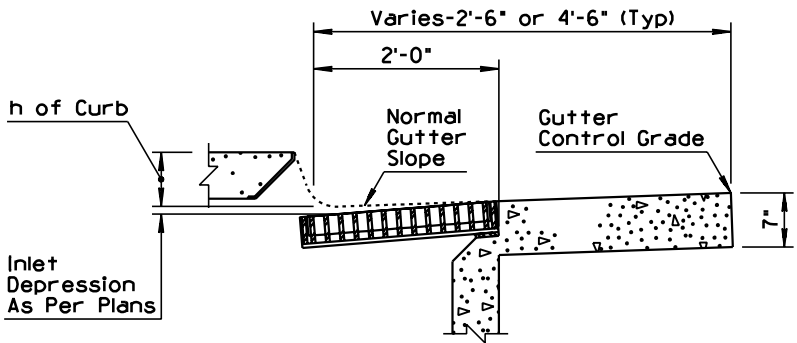
DETAIL NO. 1



DETAIL NO. 3



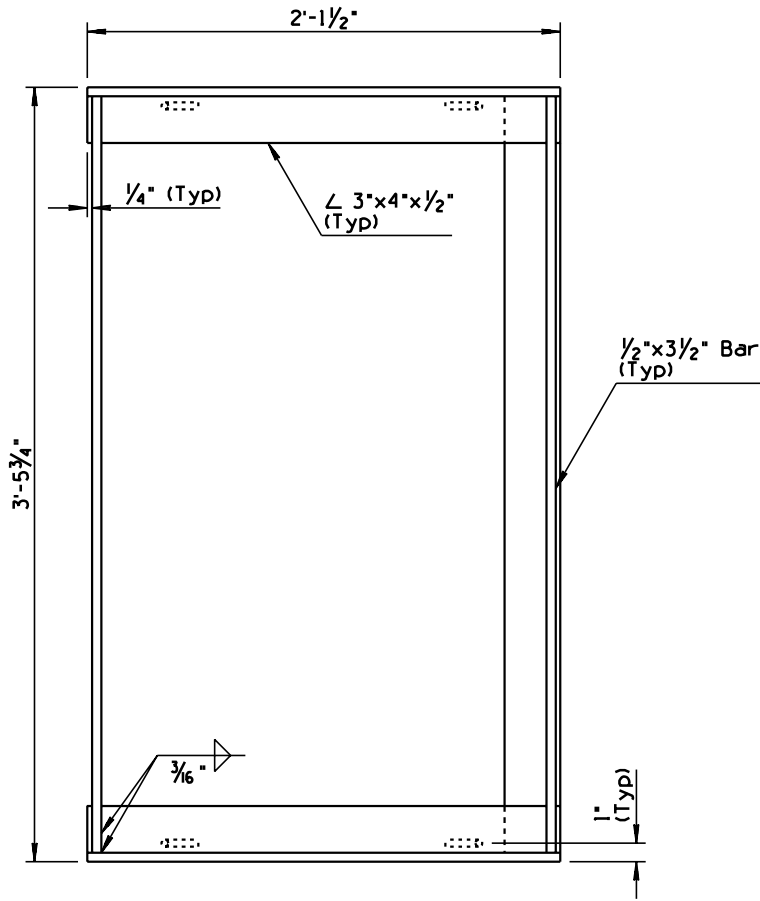
DETAIL NO. 2
CURB SUPPORT ANCHOR



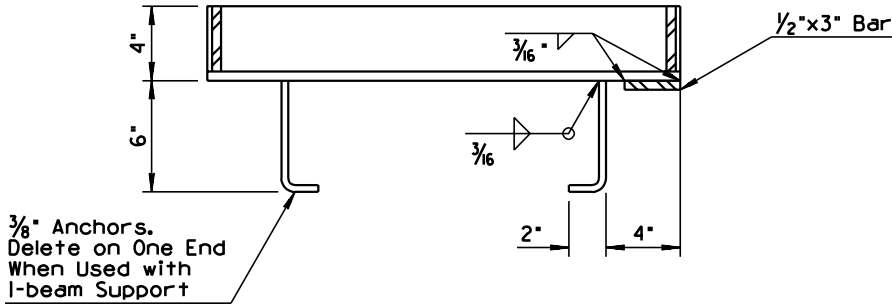
DETAIL NO. 4

DESIGN APPROVED <i>Henry H. Ottewill</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	ISSUE 5/97
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	CATCH BASIN, TYPE 5	DRAWING NO. C-15.40 Sheet 2 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	DELETED ALL GRATES EXCEPT WIDE EF-1	PNB	1/96
2	DELETED NARROW FRAME	PNB	1/96
3	DELETED THREE GENERAL NOTES	PNB	1/96
4	ADDED GENERAL NOTE	PNB	1/96

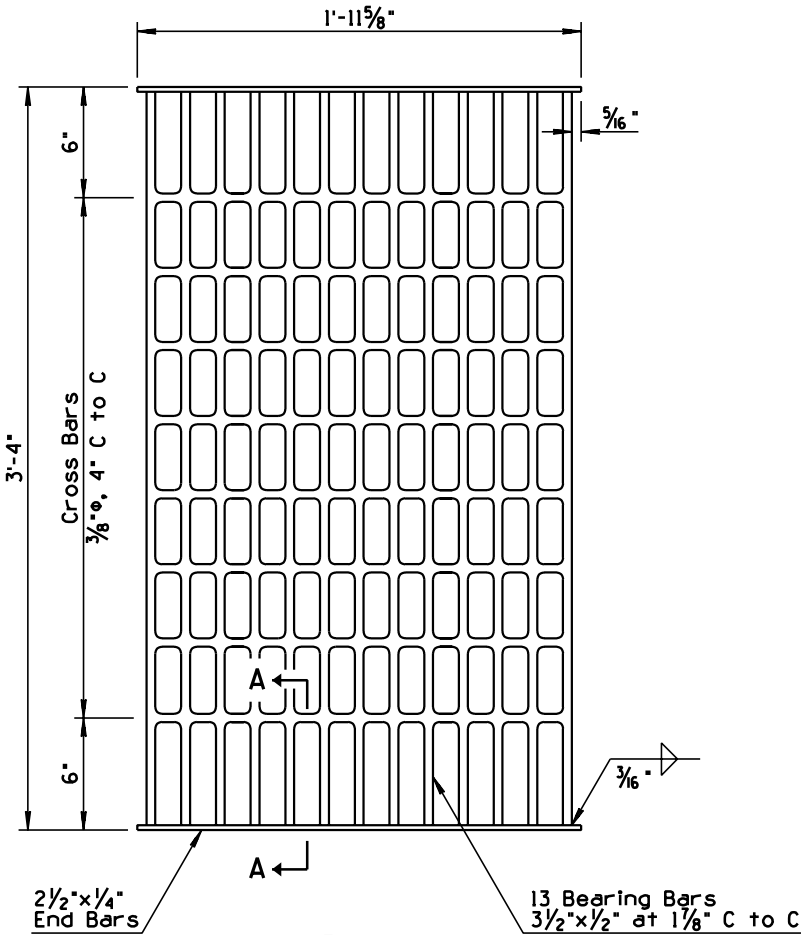


PLAN

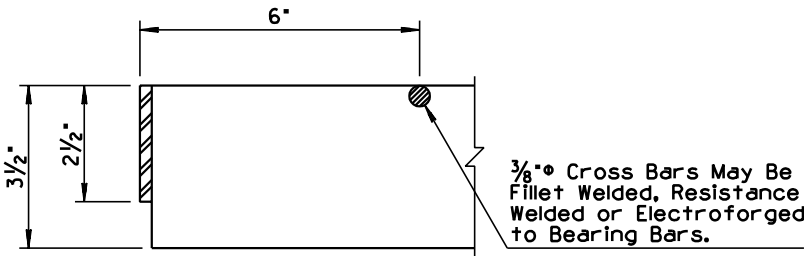


SECTION

FRAME ②



PLAN



SECTION A-A

GRATE ①

GENERAL NOTES

- Grating units and frames shall be fabricated from structural steel ASTM A36 except as noted.
- All welding shall be in accordance with Standard Welding Specifications.
- The completed assembly shall be given one shop coat of No. 1 paint.
- Frames and grates shall fit to a maximum rock of 0.093" at any point.
- Grate opening is 3.97 Sq. Ft.

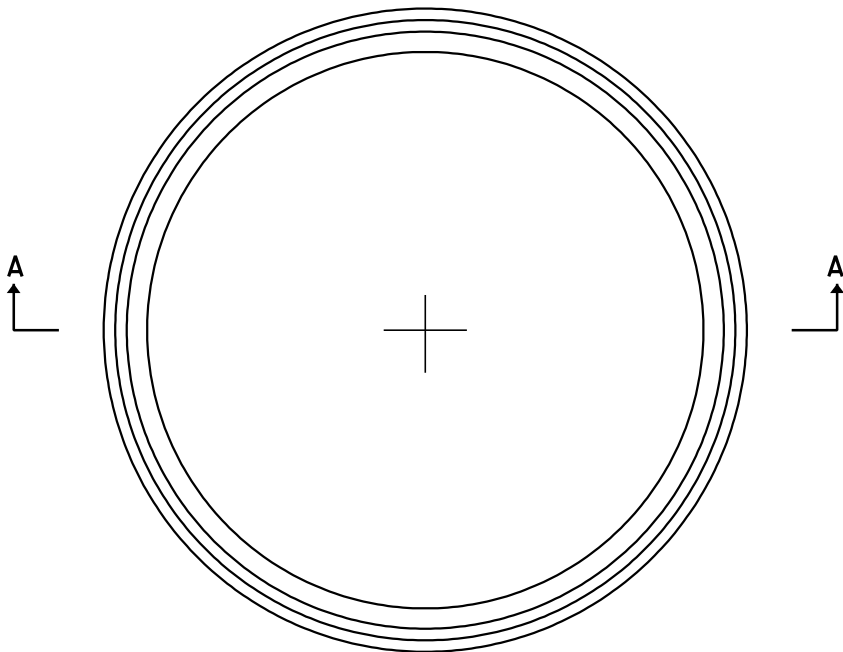
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 5/97
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-15.50

CATCH BASIN, GRATES

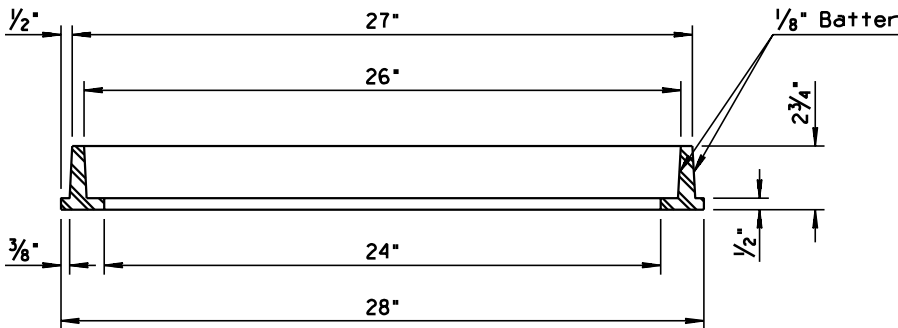
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

GENERAL NOTES

- Cover shall be non-locking.
- Frame and cover shall be cast iron or structural steel.
- Catch basin access frame and cover is for use in sidewalk area only.
- Cover shall be filled with concrete and broom finished.

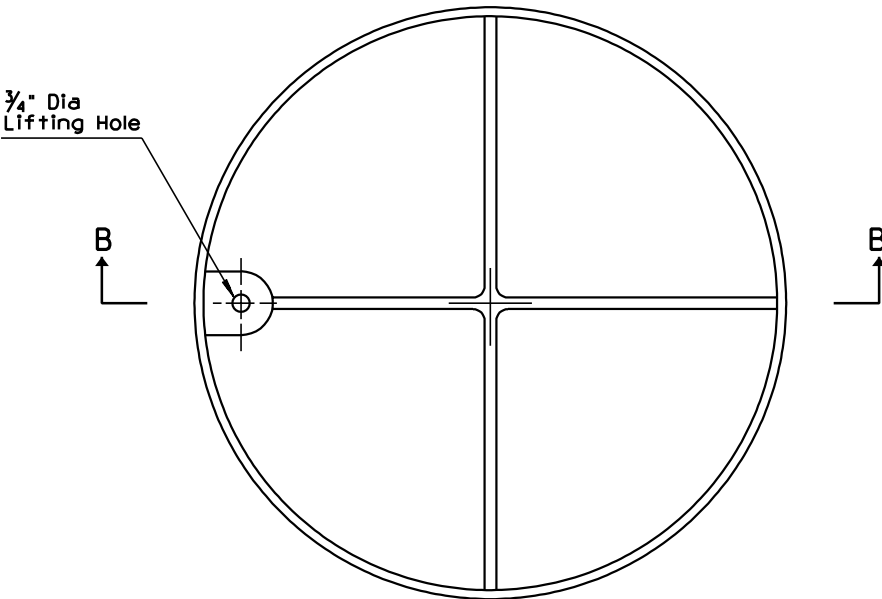


PLAN

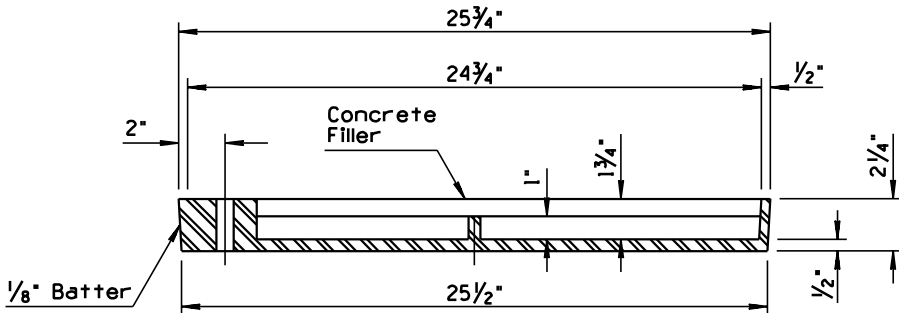


SECTION A-A

FRAME



PLAN



SECTION B-B

COVER

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	ISSUE 5/97
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CATCH BASIN ACCESS FRAME AND COVER DETAILS	DRAWING NO. C-15.65

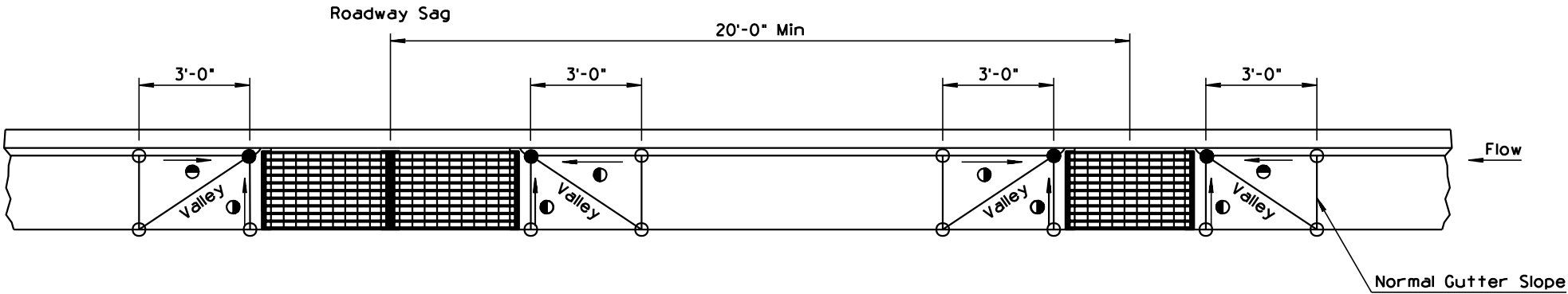
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED STD FOR NEW FRAME	PNB	5/97
2	ADDED DETAIL TO SHOW WIDE GUTTER	PNB	5/97
3	REVISED NOTE	PNB	5/97
4			

GENERAL NOTES

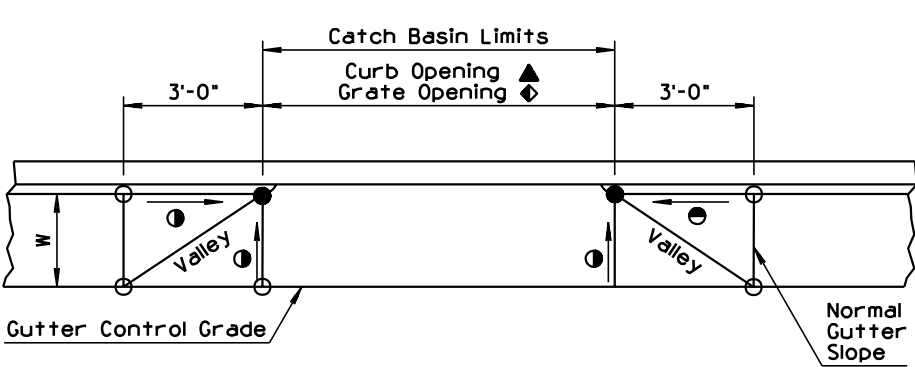
1. No inlet depression shall extend into a traffic lane.
2. Maximum combined inlet and gutter depression is 3 inches. See Detail No. 1.
3. Maximum distance along curb between catch basins where full gutter depression is used is 10 feet.
4. See Std. C-15.80 for aprons used with C-15.80 Catch Basin.
5. See Detail No. 2 for grate type catch basins with wide gutter.

LEGEND

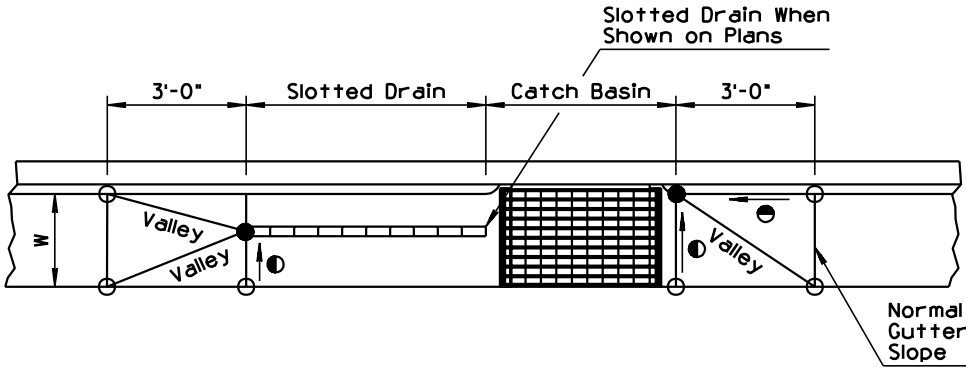
- - Normal pavement or gutter flow line elevation.
- - Depressed elevation.
- ◐ - Straight grade with downward slope.
- W - Normal gutter width per Std. C-05.10.
- ▲ - Types 1, 3, & 5.
- ◆ - Type 4 & C-15.91.



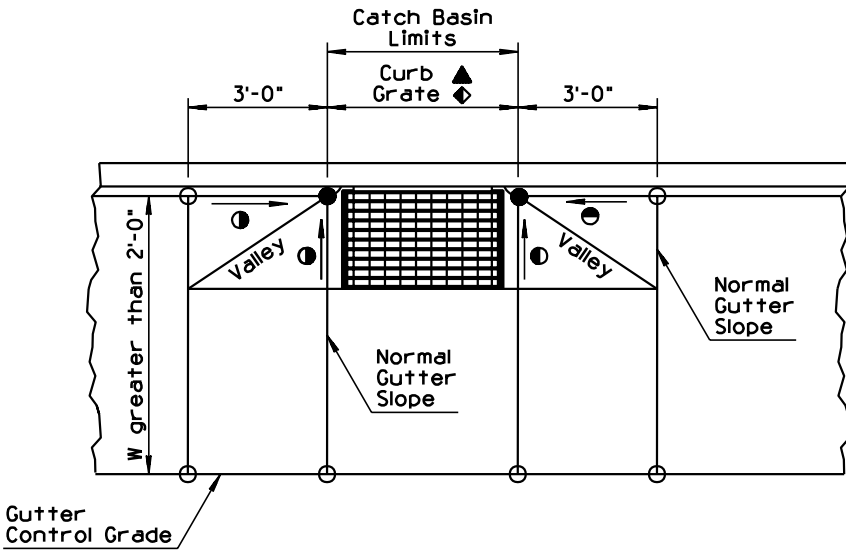
CATCH BASIN SPACING AT ROADWAY SAG CONDITION



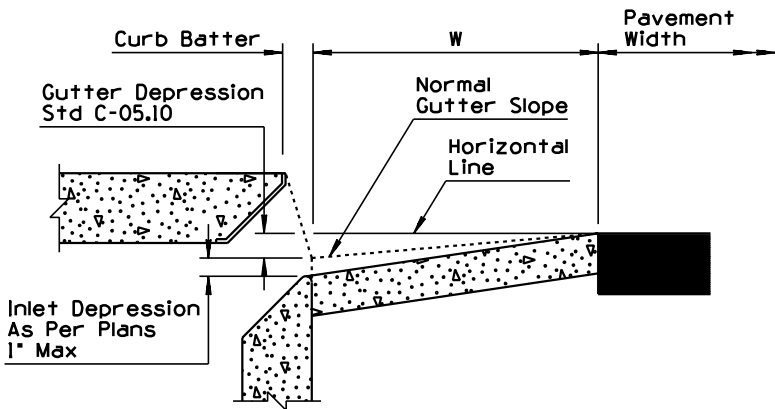
INLET DEPRESSION



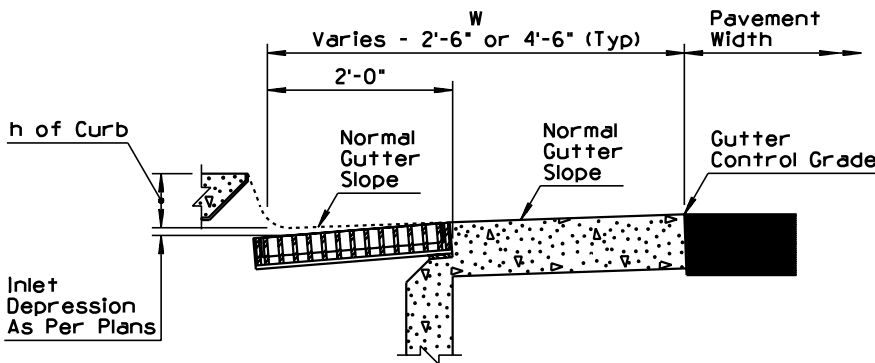
INLET DEPRESSION
CATCH BASIN WITH SLOTTED DRAIN



INLET DEPRESSION
CATCH BASIN WITH WIDE GUTTER



DETAIL NO. 1



DETAIL NO. 2

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 5/97
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① CATCH BASIN MISC. DETAILS	DRAWING NO. C-15.70 Sheet 1 of 2

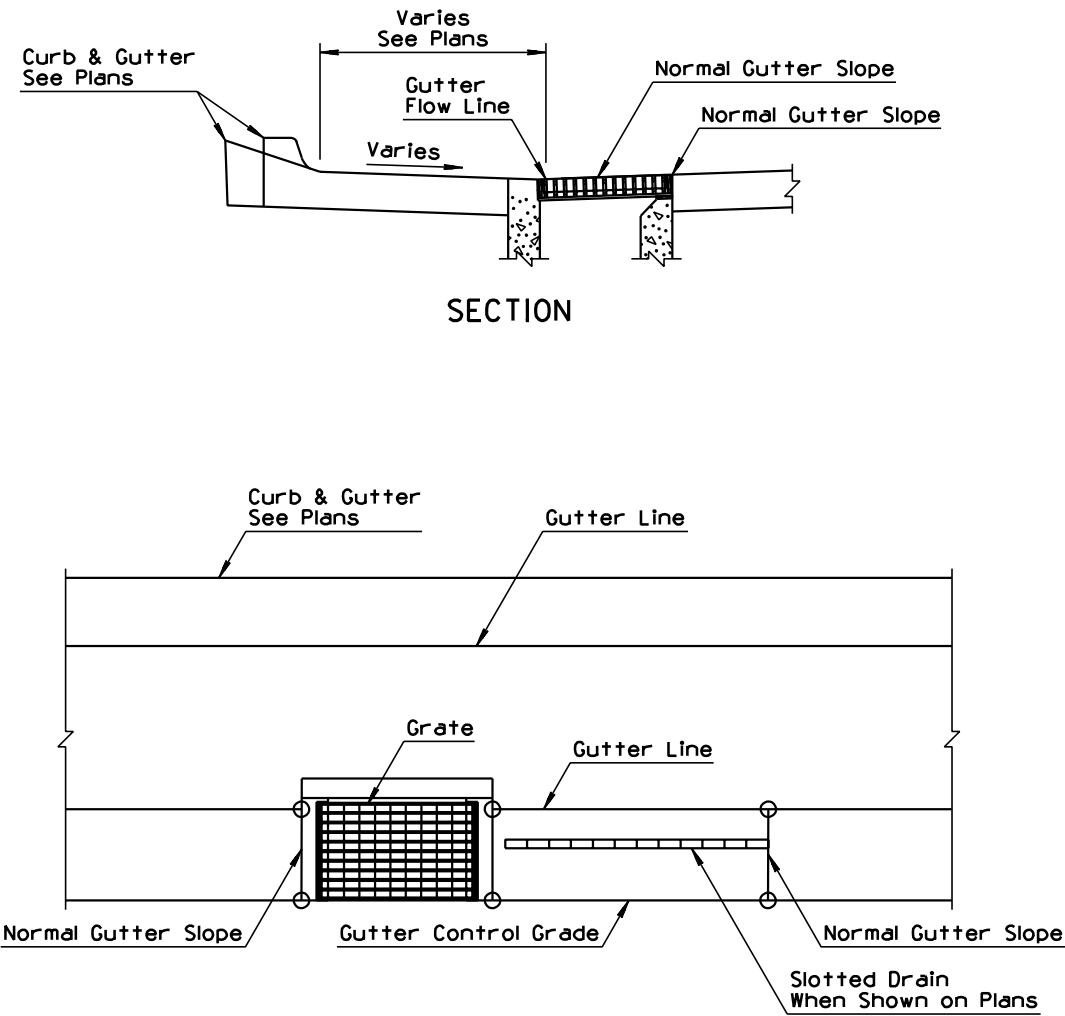
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1			
2			
3			
4			

GENERAL NOTES

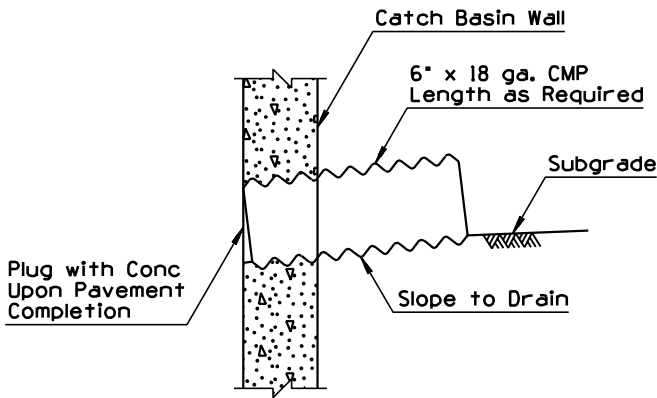
- Construction drain may be deleted at the option of the Engineer.

LEGEND

○ - Normal pavement or gutter flow line elevation.



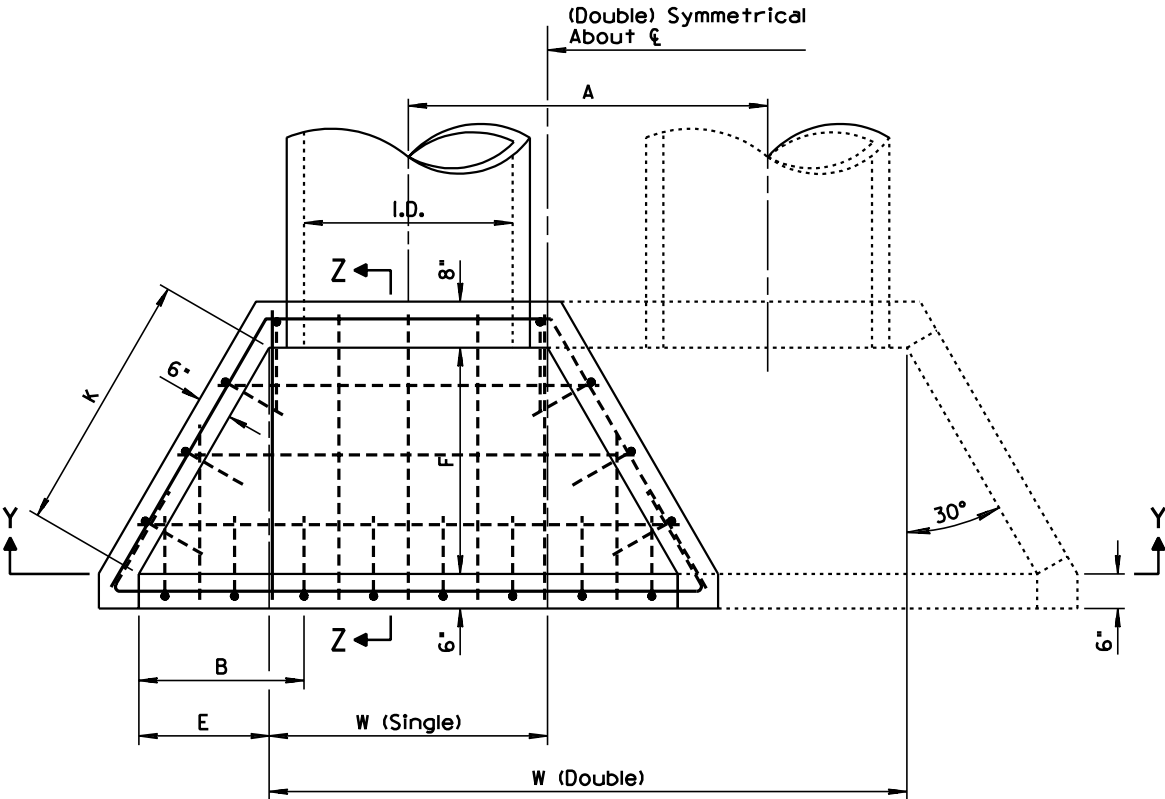
TYPE 4 CATCH BASIN WITHOUT CURB



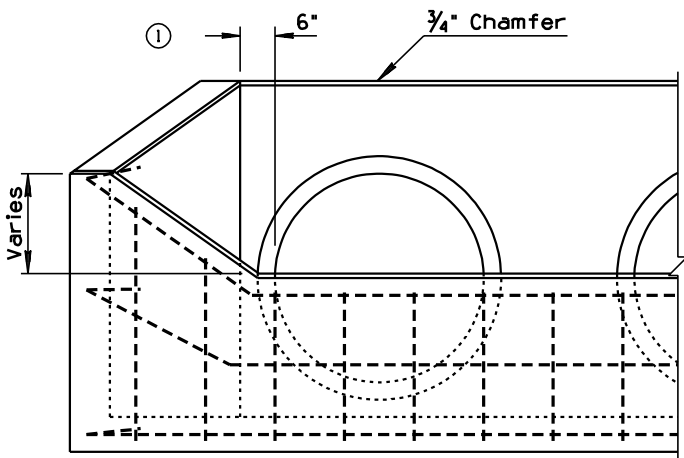
CATCH BASIN CONSTRUCTION DRAIN

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	ISSUE 5/97
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① CATCH BASIN MISC. DETAILS	DRAWING NO. C-15.70 Sheet 2 of 2

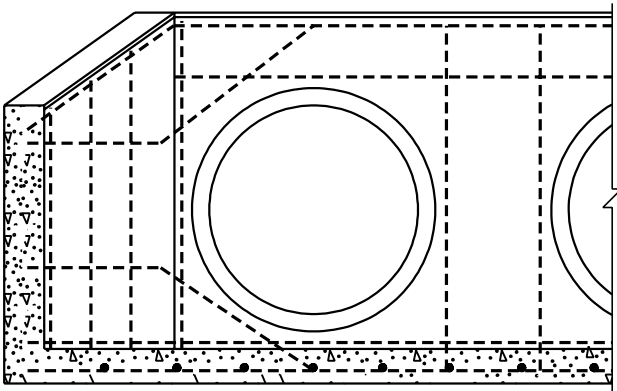
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MOVED DIMENSION FROM PLAN VIEW	PNB	10/95
2			
3			
4			



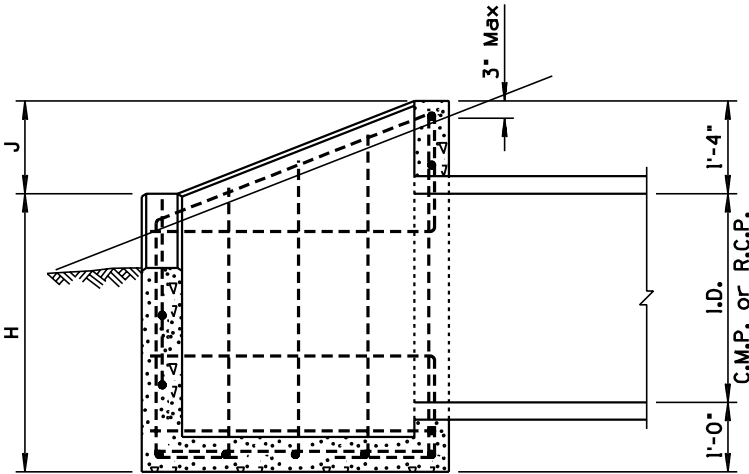
PLAN



ELEVATION



SECTION Y-Y



SECTION Z-Z

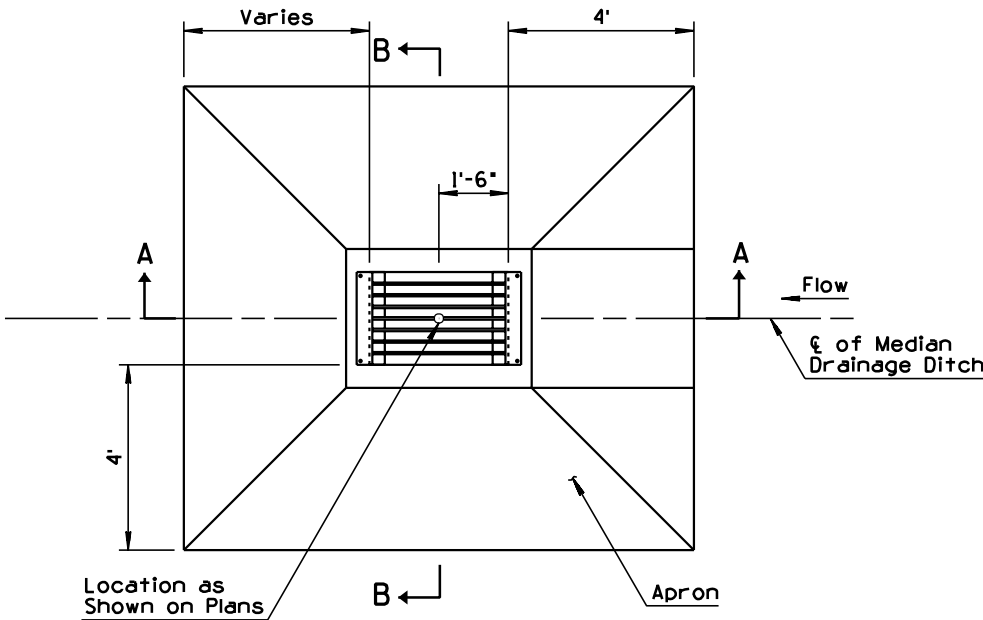
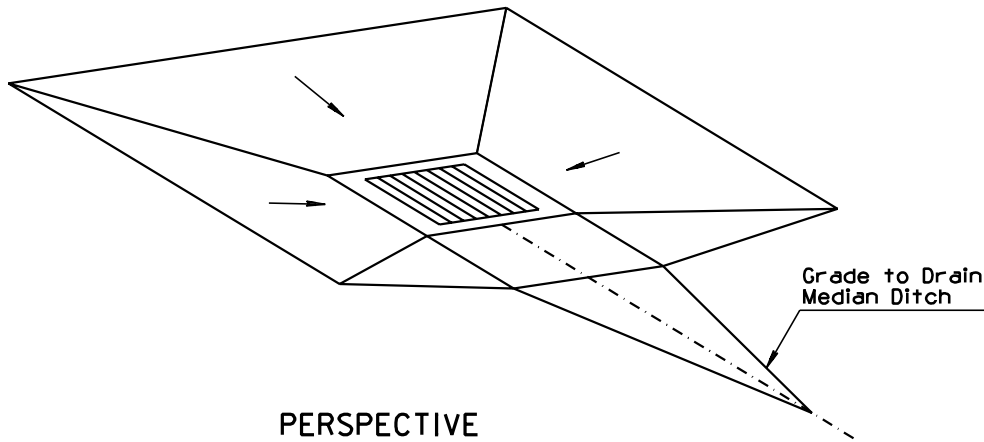
PIPE	DIMENSIONS									QUANTITIES					
	W		A	B	E	F	H	J	K	Concrete C.Y.				Reinforcing Steel	
										Single		Double		Lbs.	
	I.D.									C.M.P.	For Concrete Pipe Deduct	C.M.P.	For Concrete Pipe Deduct	Single	Double
18"	2'-6"	5'-2"	2'-8"	1'-3"	9"	1'-3 5/8"	3'-1"	9"	1'-6"	0.76	0.03	1.12	0.06	75	107
24"	3'-0"	6'-6"	3'-6"	1'-7 1/2"	1'-1 1/2"	1'-11 3/8"	3'-5"	11"	2'-3"	1.00	0.04	1.55	0.09	92	136
30"	3'-6"	7'-10"	4'-4"	2'-0"	1'-6"	2'-7 1/4"	3'-9"	1'-1"	3'-0"	1.50	0.06	2.29	0.13	112	166
36"	4'-0"	9'-2"	5'-2"	2'-4 1/2"	1'-10 1/2"	3'-3"	4'-0"	1'-4"	3'-9"	1.96	0.09	3.01	0.17	145	214
42"	4'-6"	10'-6"	6'-0"	2'-9"	2'-3"	3'-10 3/4"	4'-4"	1'-6"	4'-6"	2.49	0.11	3.85	0.23	189	279

GENERAL NOTES

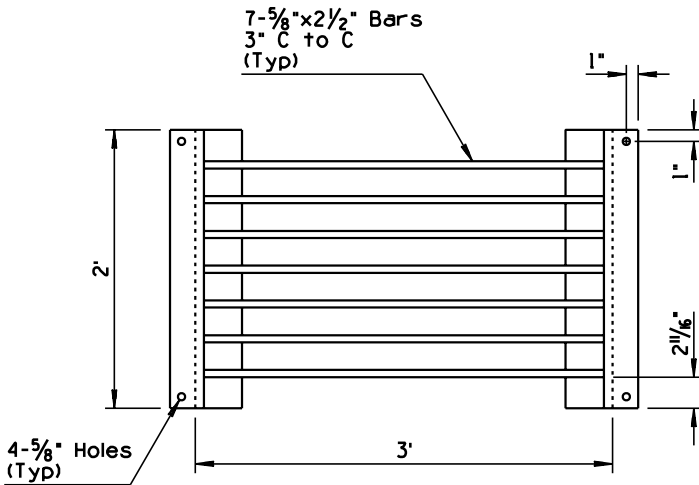
- See also Std. C-13.10.
- High point of headwall shall not project more than 3" above slope.
- All concrete shall be Class B.
- All reinforcing bars shall be Number 4, 1'-0" C to C and 3" clear to inside of walls and floor.

DESIGN APPROVED <i>[Signature]</i> APPROVED FOR DISTRIBUTION <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 10/95
	CATCH BASIN, DROP INLET		DRAWING NO. C-15.75

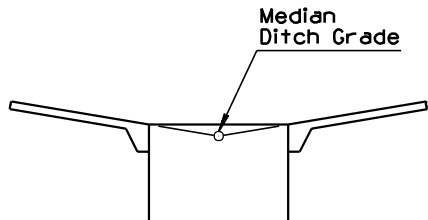
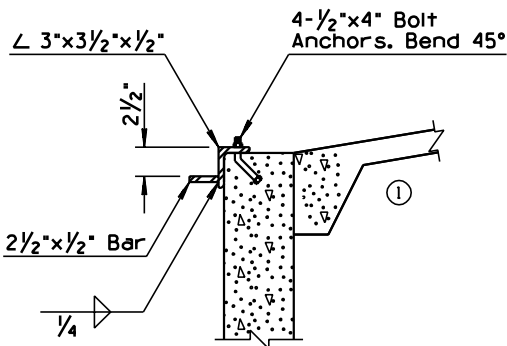
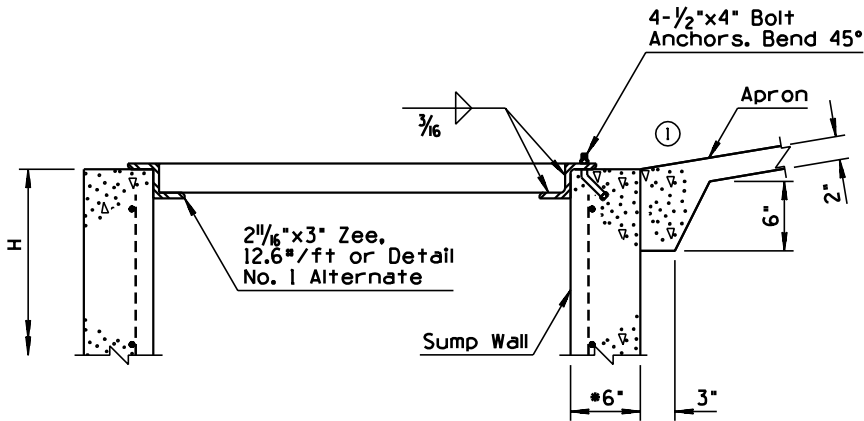
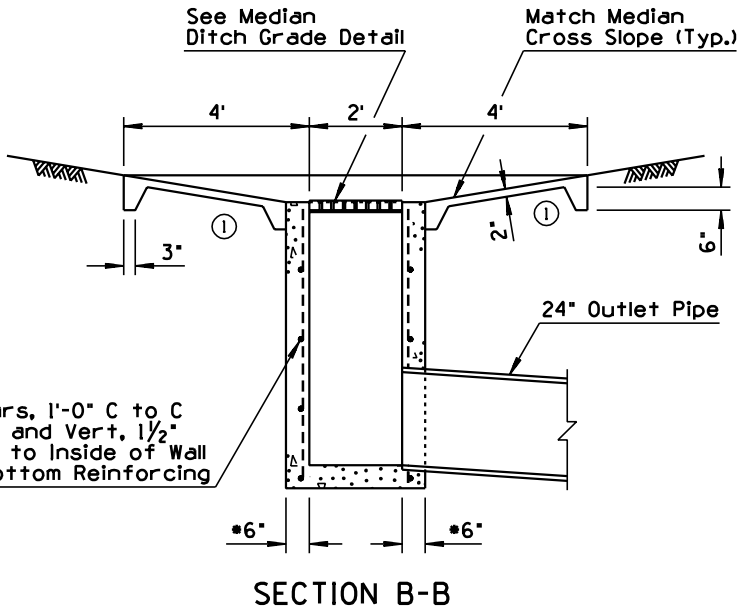
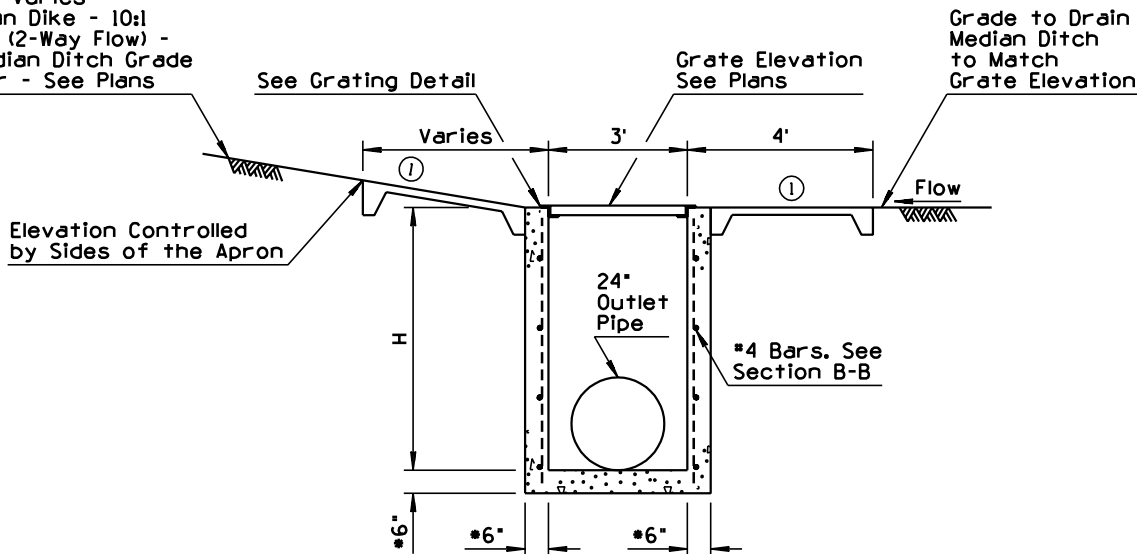
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CHANGED APRON TO PORTLAND CEMENT CONCRETE ONLY	PNB	5/97
2	REVISED SLOPE	PNB	5/97
3			
4			



- GENERAL NOTES
1. Apron shall be portland cement concrete.
 2. All concrete shall be Class B.
 3. Grating shall be fabricated of structural steel.
 4. Structural steel shall be in accordance with ASTM A36.
 5. Welding shall be in accordance with Standard Welding Specifications.
 6. Grating assembly shall be given one shop coat of No. 1 paint.
 7. 'H' indicated on plans.
 - 8" When Wall Height Exceeds 8'

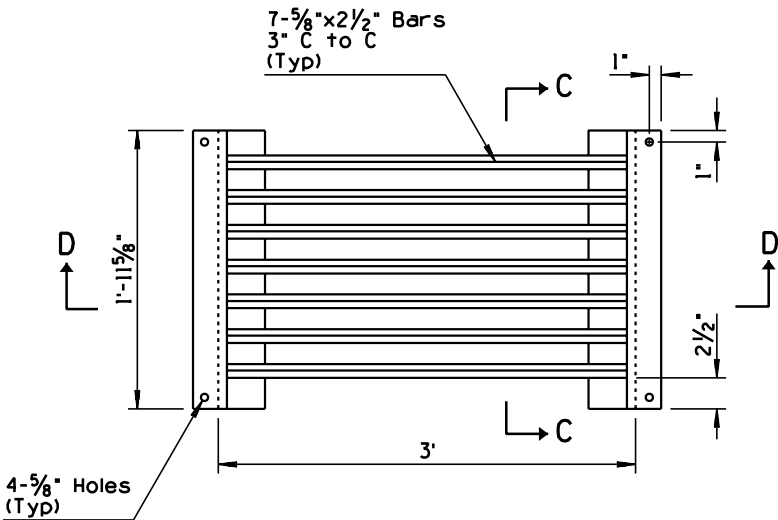


- ② Slope Varies
Median Dike - 10:1
Sump (2-Way Flow) -
Median Ditch Grade
Other - See Plans

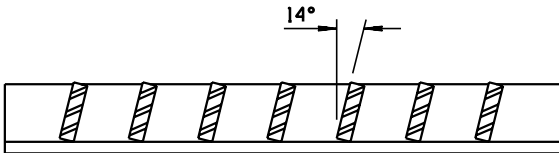


DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 5/97
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CATCH BASIN, MEDIAN FLUSH	DRAWING NO. C-15.80

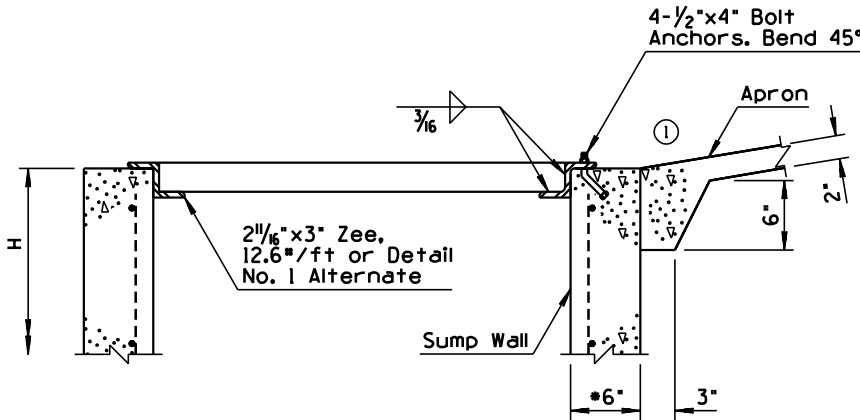
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CHANGED APRON TO PORTLAND CEMENT CONCRETE ONLY	PNB	5/97
2	REVISED SLOPE	PNB	5/97
3			
4			



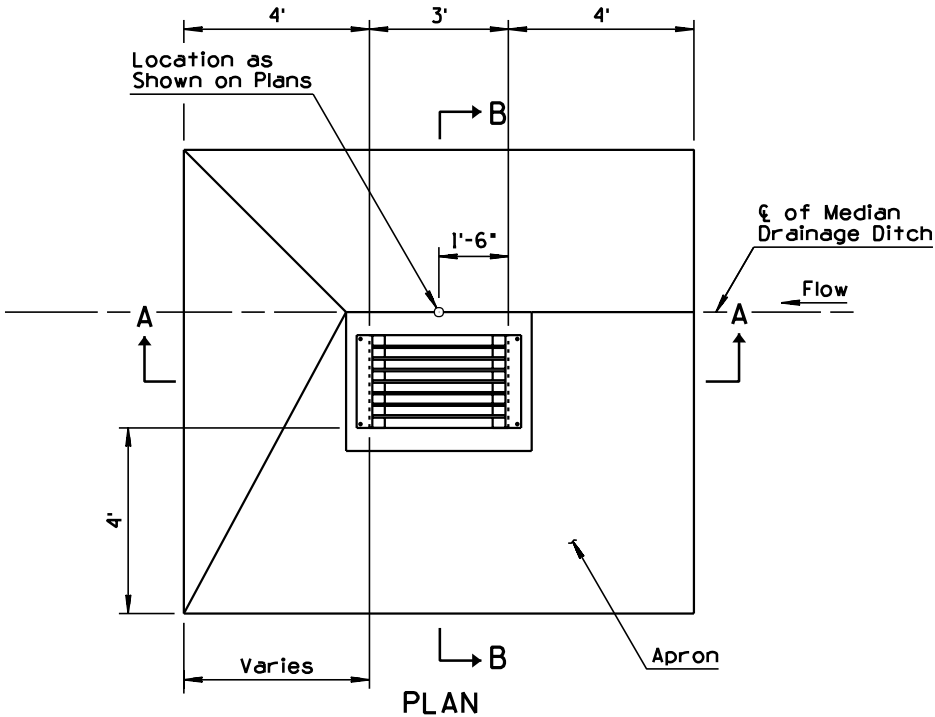
GRATING DETAIL



SECTION C-C

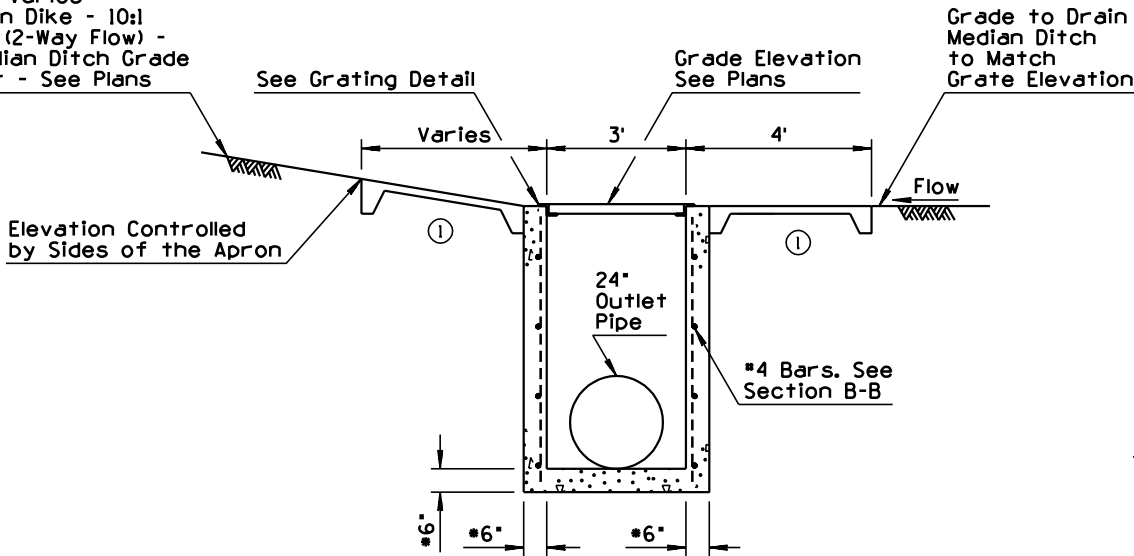


SECTION D-D

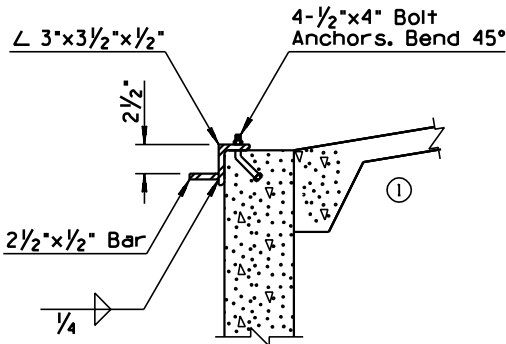


PLAN

② Slope Varies
Median Dike - 10:1
Sump (2-Way Flow) -
Median Ditch Grade
Other - See Plans



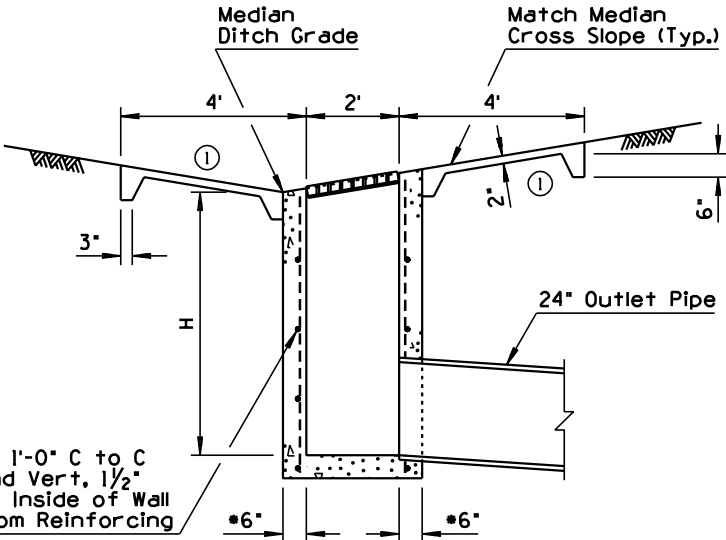
SECTION A-A



DETAIL NO. 1

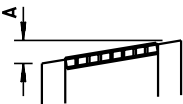
GENERAL NOTES

1. Apron shall be portland cement concrete, Class B.
2. All concrete shall be Class B.
3. Grating shall be fabricated of structural steel.
4. Structural steel shall be in accordance with ASTM A36.
5. Welding shall be in accordance with Standard Welding Specifications.
6. Grating assembly shall be given one shop coat of No. 1 paint.
7. 'H' indicated on plans.
 - 8" When Wall Height Exceeds 8'



SECTION B-B

DIMENSION TABLE	
Slope	A
6:1	0.50'
4:1	0.75'
3:1	1.00'
2:1	1.50'



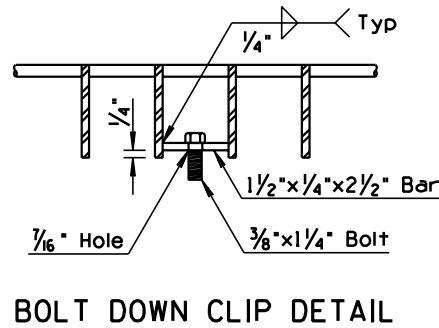
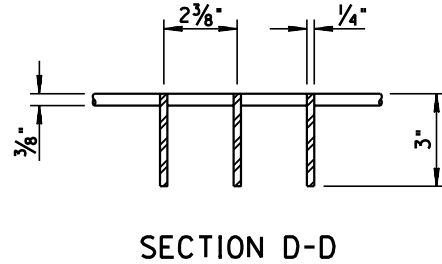
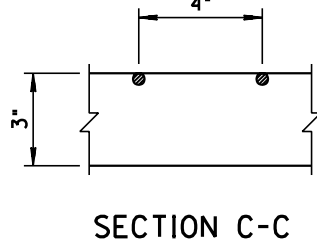
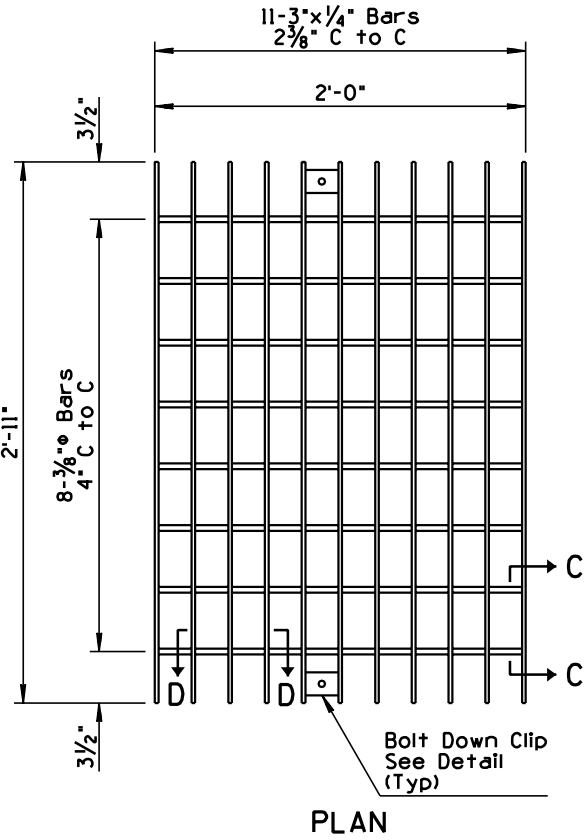
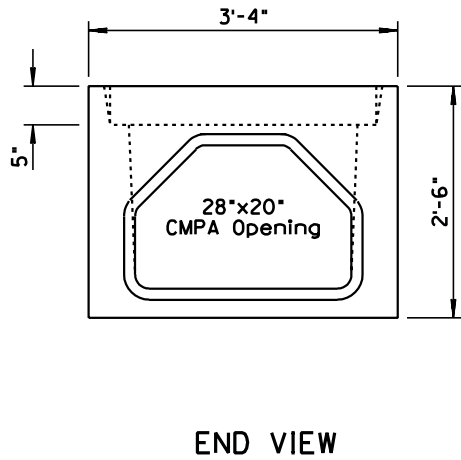
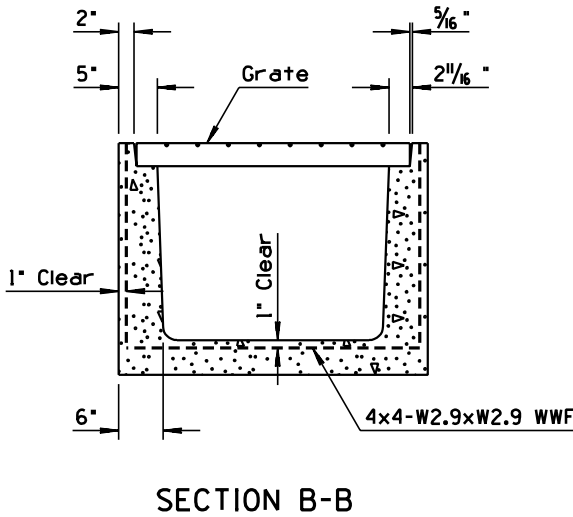
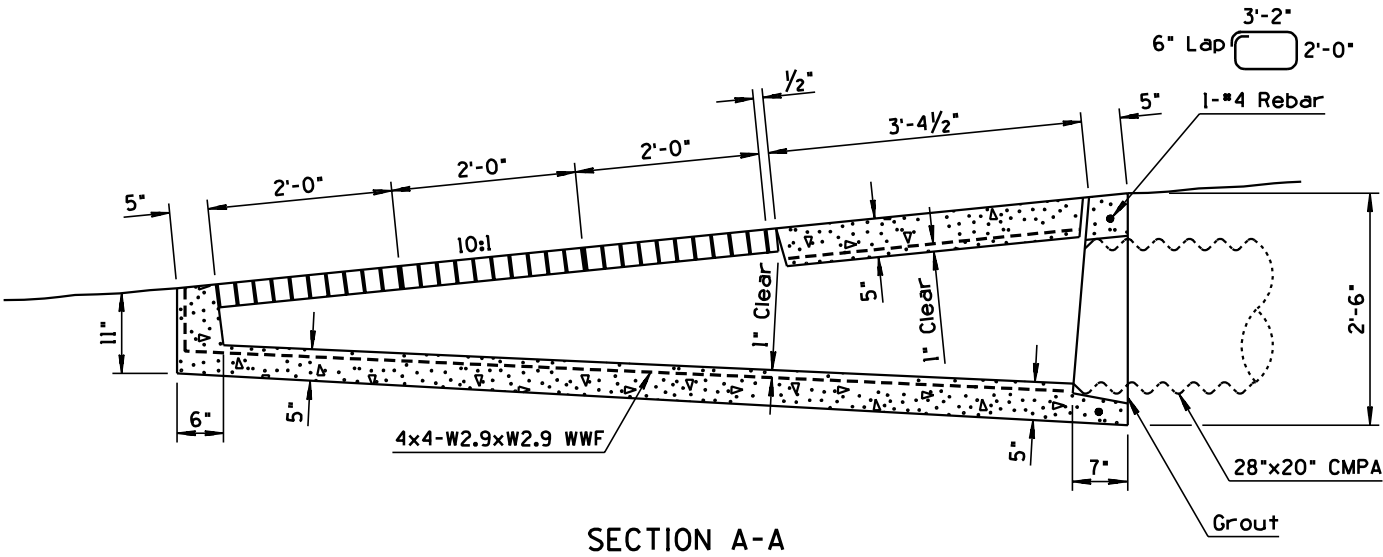
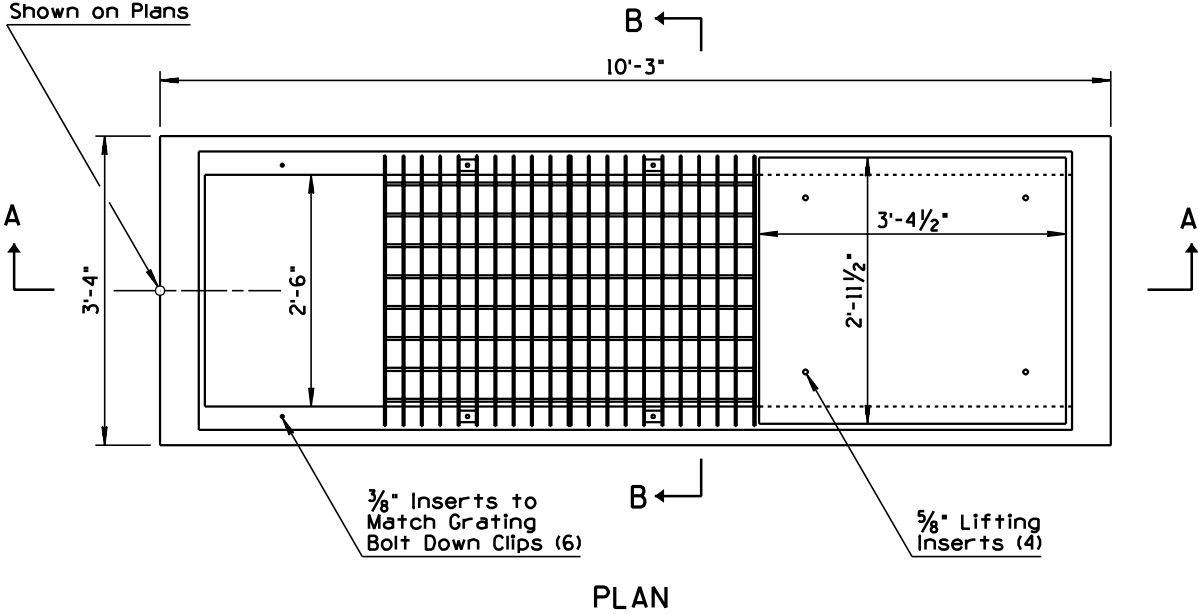
WALL HEIGHT DETAIL

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 5/97
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-15.81

CATCH BASIN, MEDIAN
SIDE SLOPE

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED GENERAL NOTE	PNB	10/95
2			
3			
4			

Location as
Shown on Plans

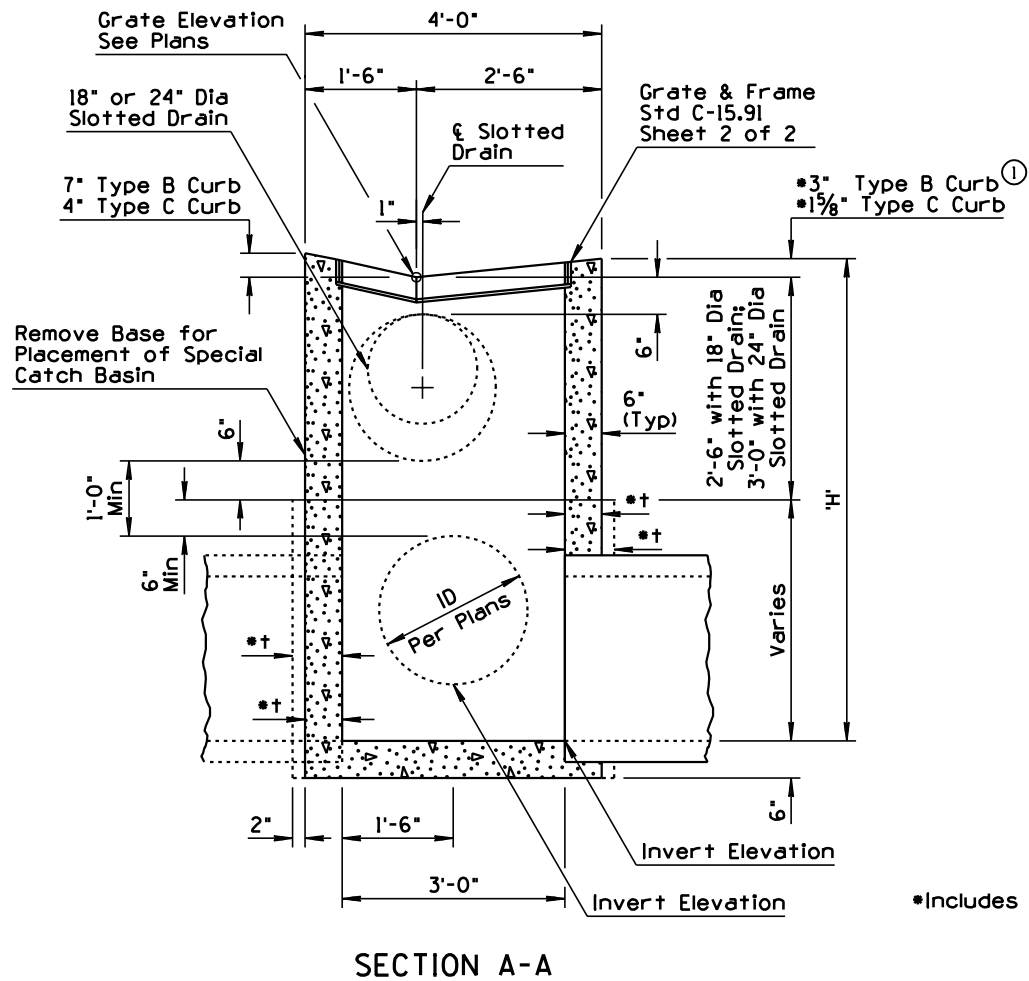
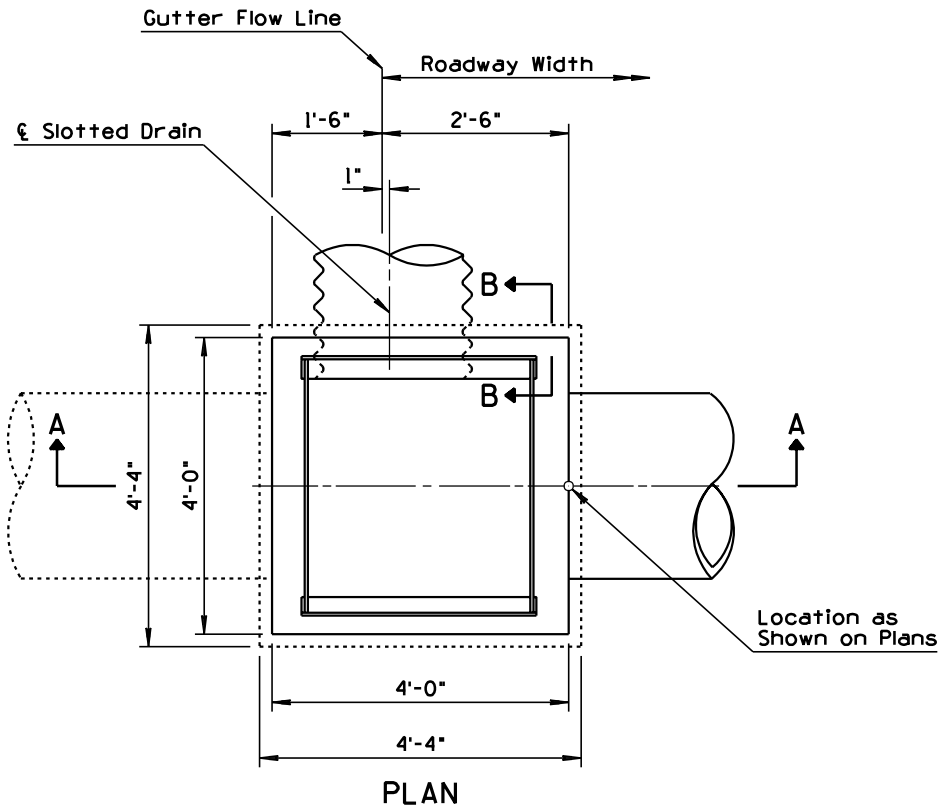


GENERAL NOTES

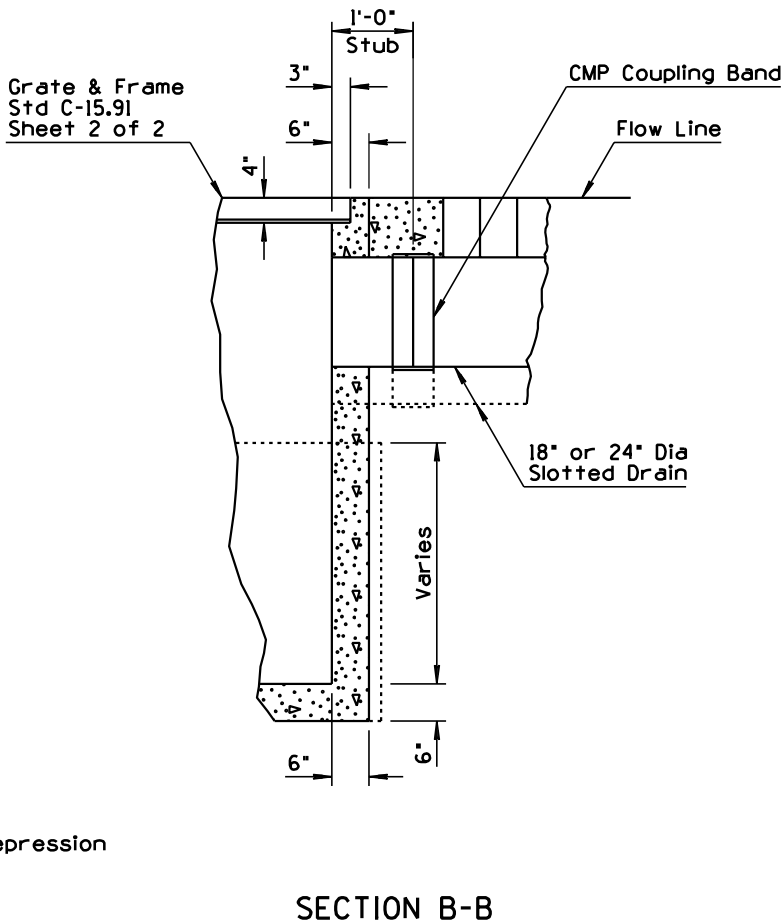
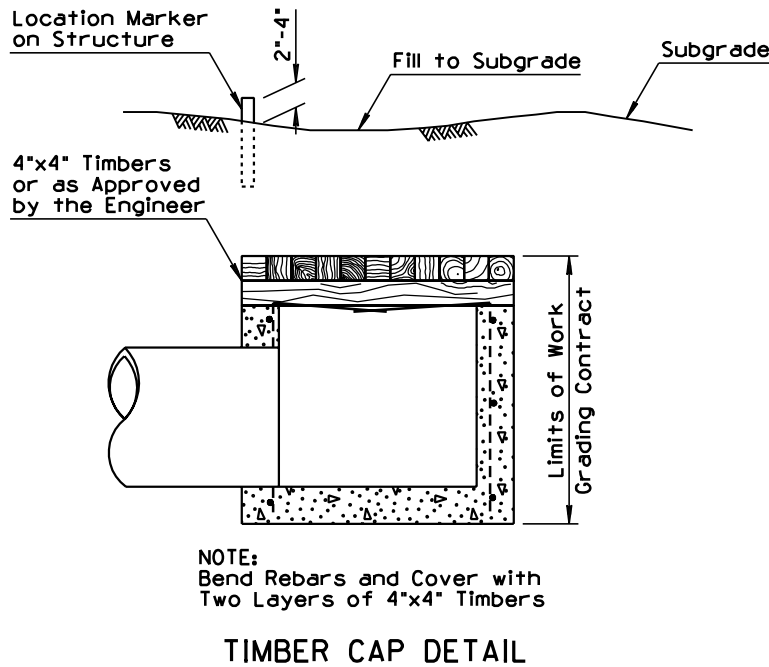
1. Concrete shall conform to the requirements for Class S Concrete. The minimum strength shall be 4000 psi.
2. Grout shall be in accordance with Standard Specifications except water content shall be such that the consistency is proper for smooth trowling.
3. Grate cross rods shall be resistance welded, fillet welded or electro-forged to bearing bars.
4. The completed grate shall be given one shop coat of No. 1 paint.
- ① 5. Foundation soil and backfill shall be in accordance with Section 203-5 of the Standard Specifications.

DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	CATCH BASIN, MEDIAN DIKE PRECAST	DRAWING NO. C-15.90

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED TYPE C GUTTER DEPRESSION TO 1 1/2"	JNP	8/99
2			
3			
4			



•Includes 1" Inlet Depression

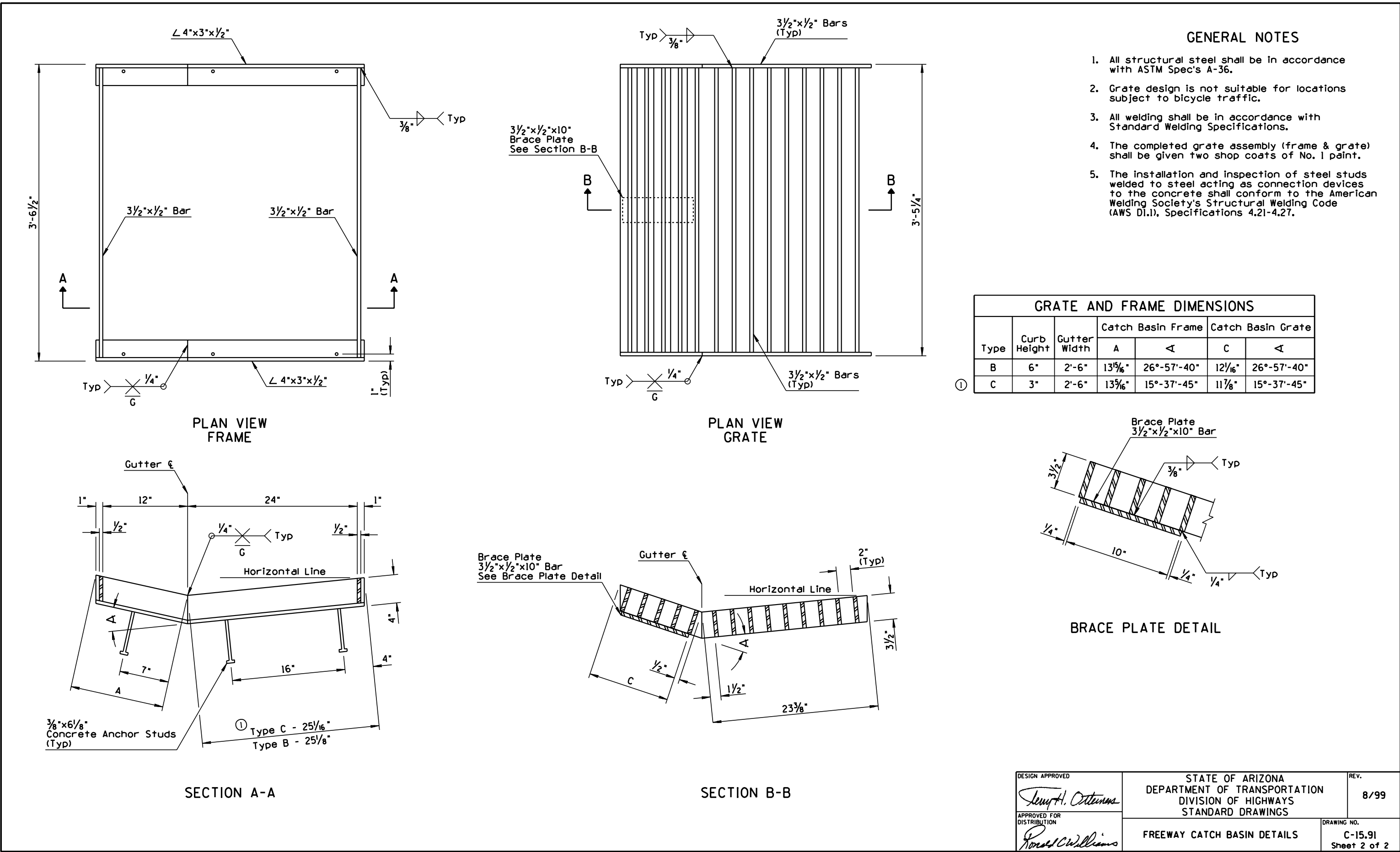


GENERAL NOTES

1. All concrete shall be Class B.
2. All reinforcing steel shall conform to 1003-1, 1003-2, Grade 40.
3. All reinforcing steel shall have 2" min clear cover unless otherwise noted.
4. Reinforcing steel shall be No. 4 rebar, 12" C to C horizontal & vertical in walls.
5. Pipe can be placed in any wall.
6. See Std C-13.60 and C-13.65 for more information and dimensions of slotted drains.
7. *t = 6" when H is less than 8'.
= 8" when H is greater than 8'.

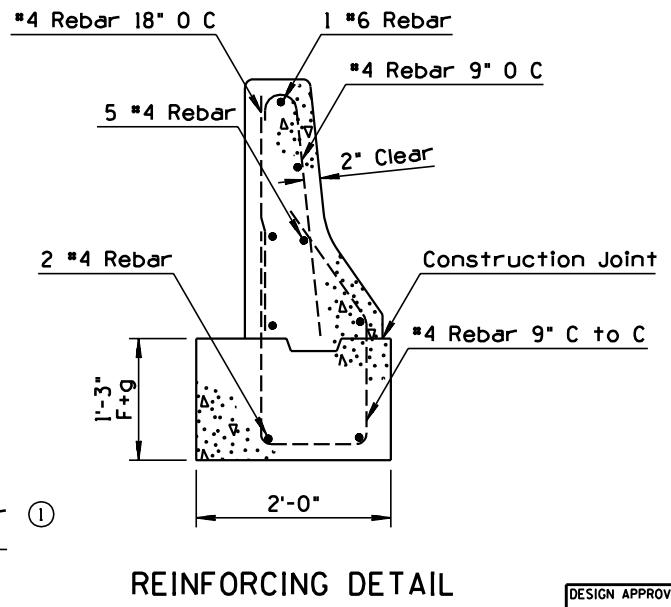
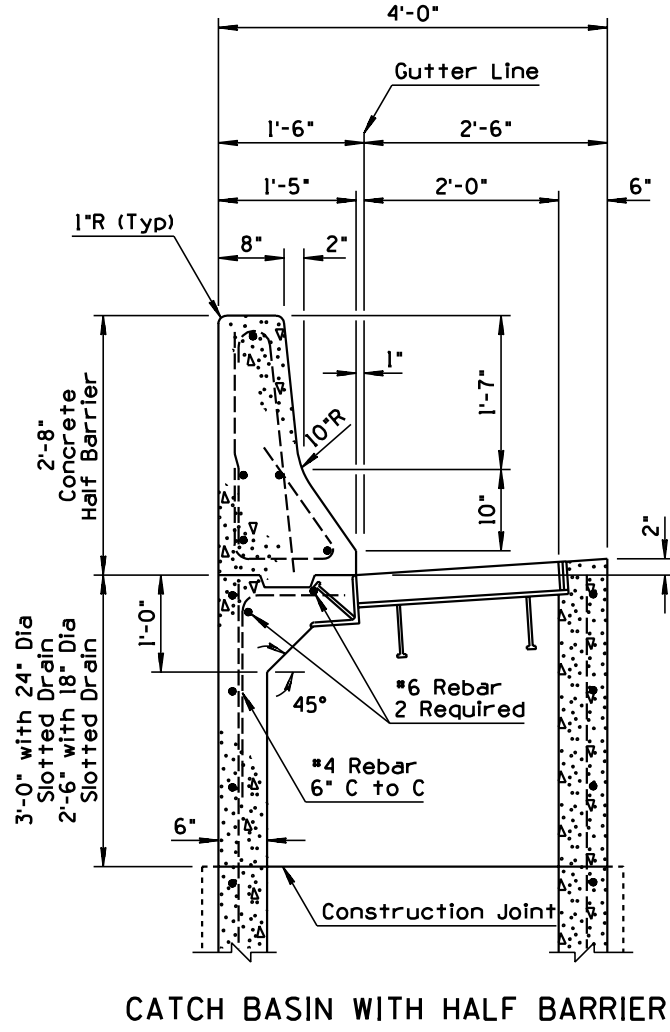
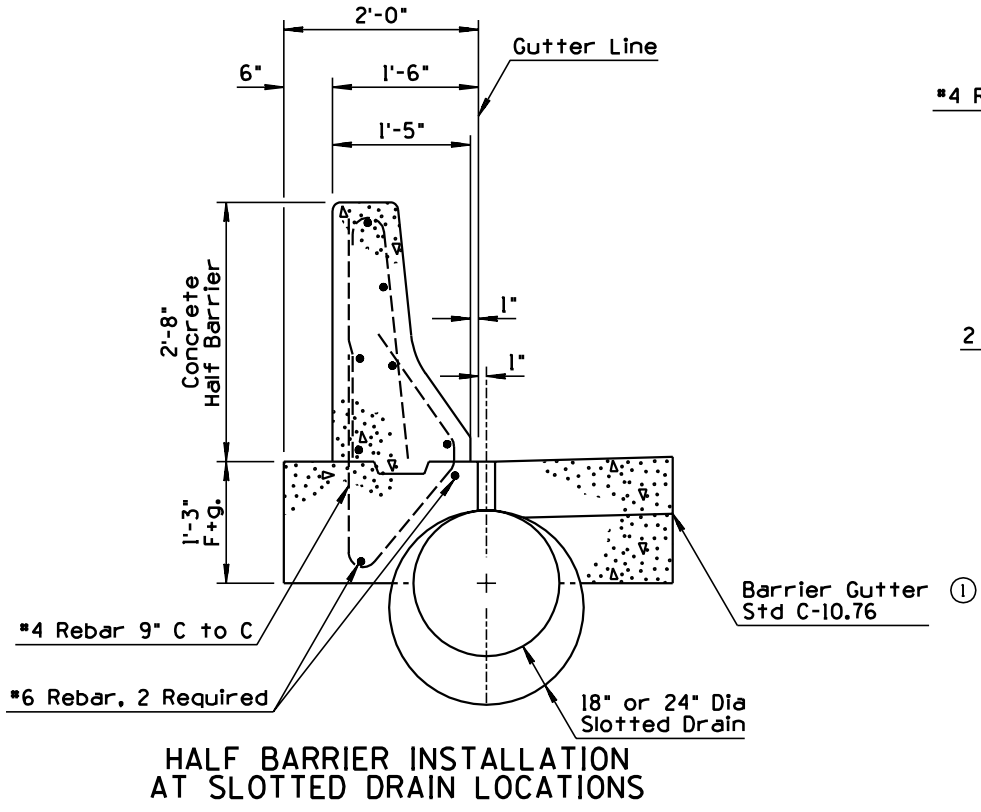
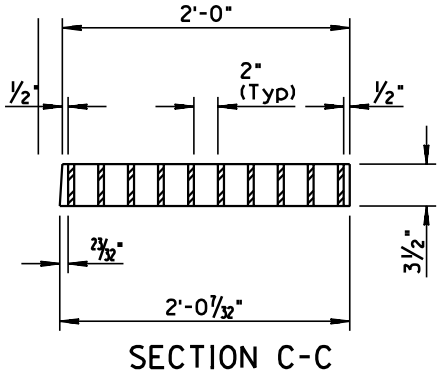
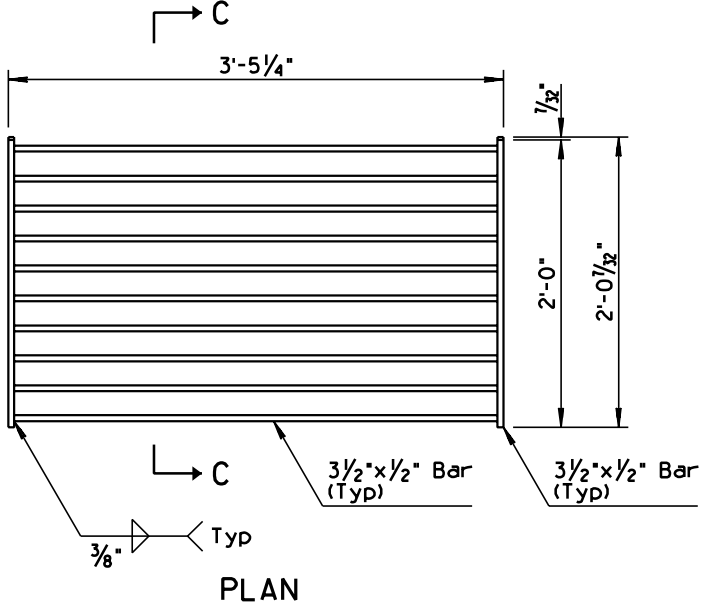
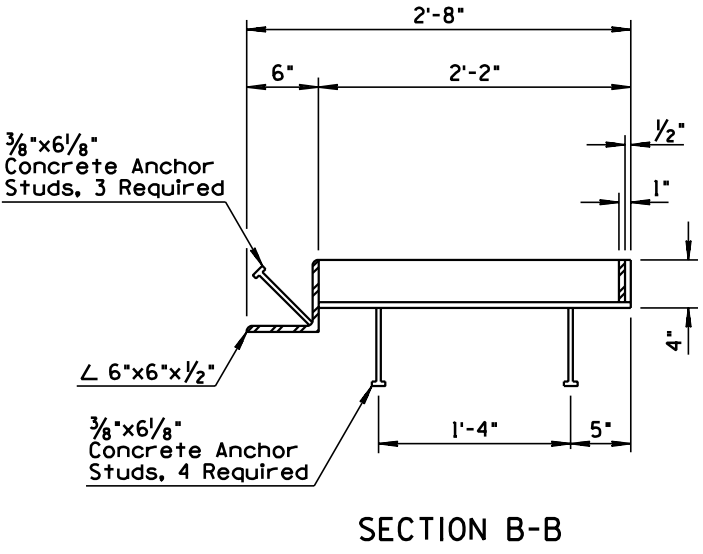
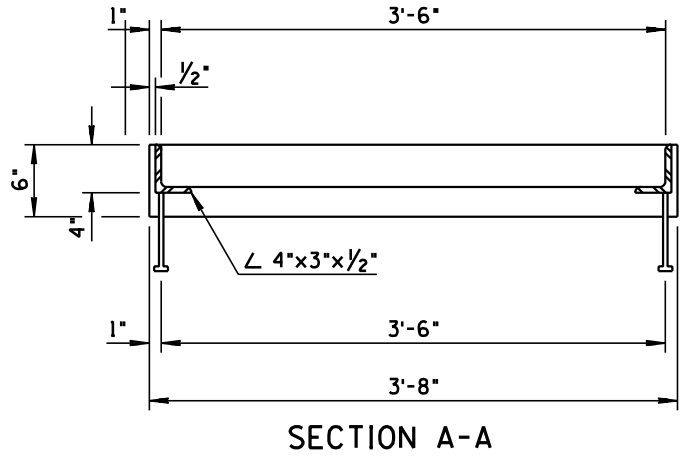
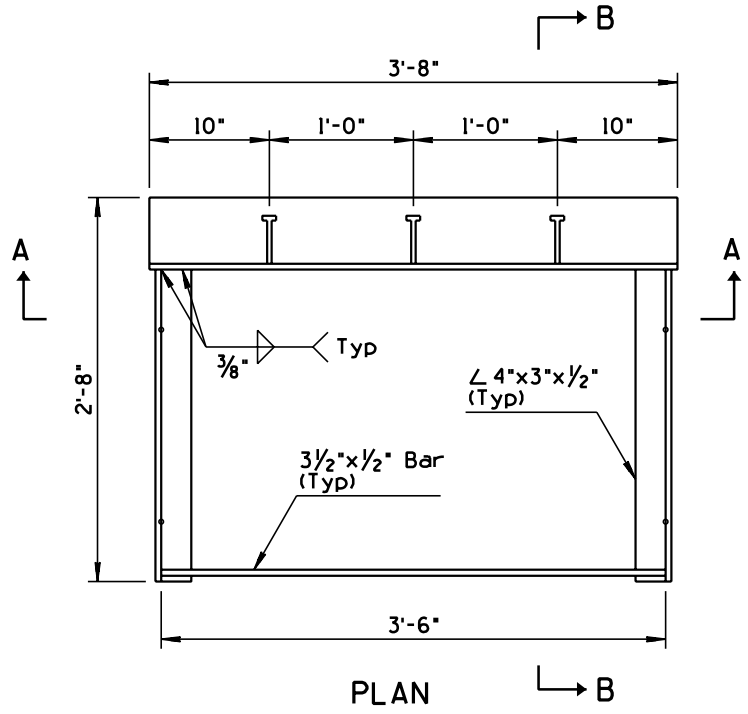
DESIGN APPROVED <i>James H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	FREeway CATCH BASIN DETAILS	DRAWING NO. C-15.91 Sheet 1 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED TYPE C FRAME & GRATE FOR 1 3/8" GUTTER DEPRESSION	JNP	8/99
2			
3			
4			



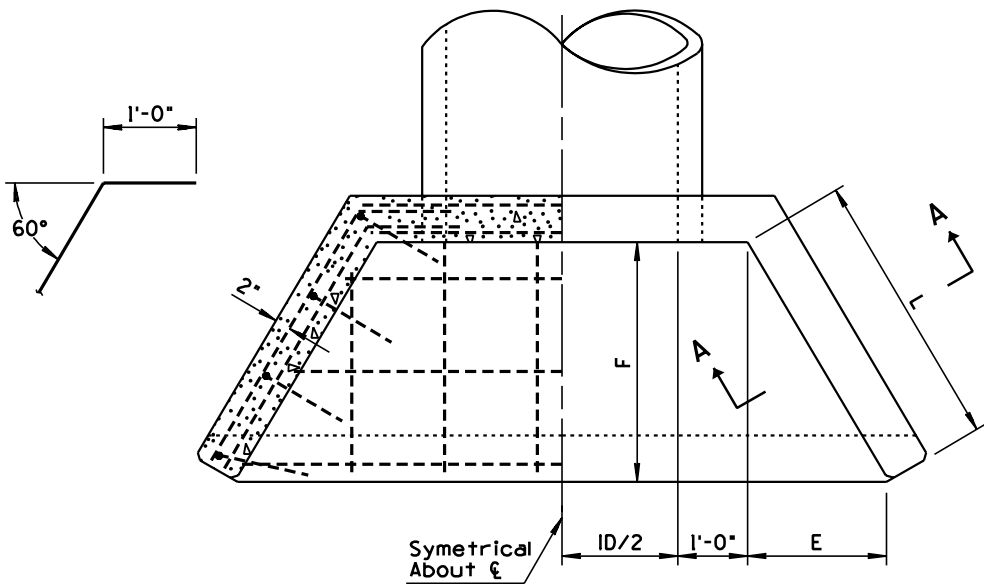
DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 8/99
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	FREeway CATCH BASIN DETAILS	DRAWING NO. C-15.91 Sheet 2 of 2

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
①	MODIFIED C-STANDARD CALLOUT	PNB	10/95
②	DELETED C-STANDARD CALLOUT	PNB	10/95
③			
④			

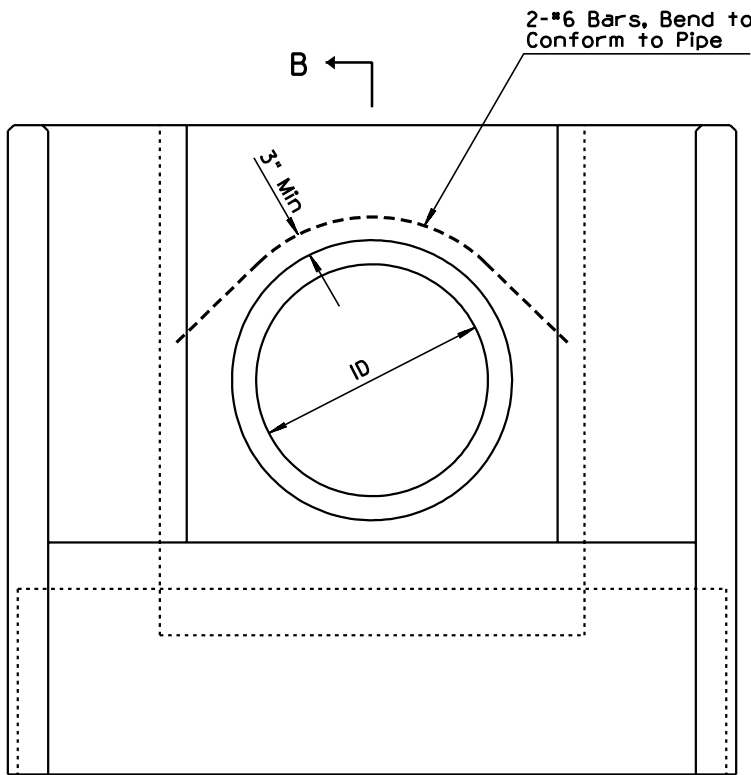


1. See Std C-15.91 for dimensions, sizes and details not shown for installation of catch basin and half barrier.
2. See Std C-13.60 for dimensions, sizes and details not shown for installation of slotted drain.
3. Unless otherwise noted, reinforcement steel in half barrier for installation with catch basin and slotted drain, shall conform to sizes and number specified.
4. The installation and inspection of steel studs welded to steel acting as a connection device to the concrete shall conform to AWS D1.1 and specifications 4.21 - 4.27.
- ① 5. Where applicable, see Std C-10.60 for weep hole placement.
- ① 6. See Std C-10.65 for additional general notes.
- ② 7. Grate design is not suitable for locations subject to bicycle traffic.

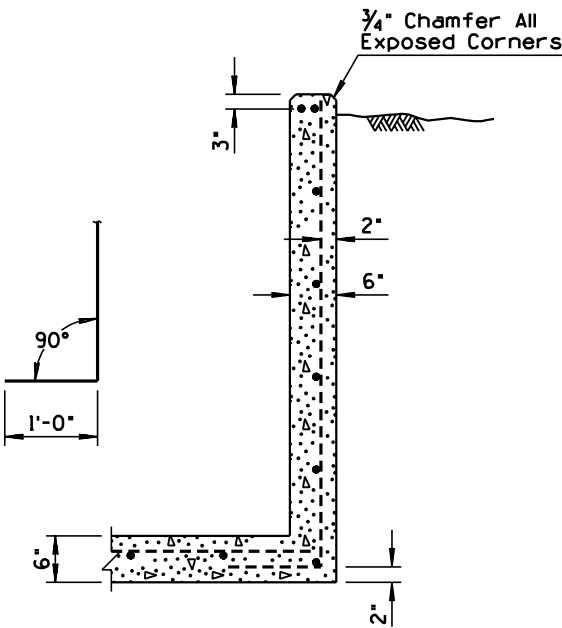
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CHANGED "DIVISIONS" TO "SECTIONS"	PNB	10/95
2			
3			
4			



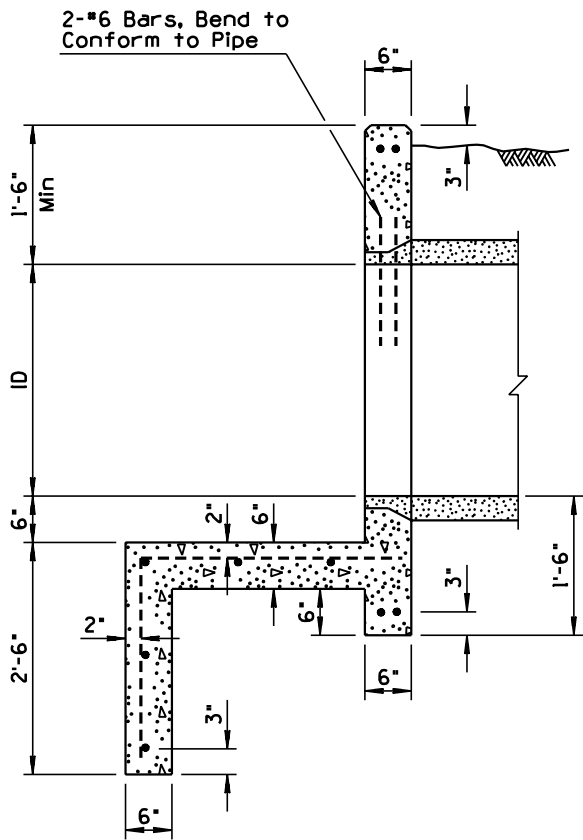
PLAN



ELEVATION



SECTION A-A



SECTION B-B

GENERAL NOTES

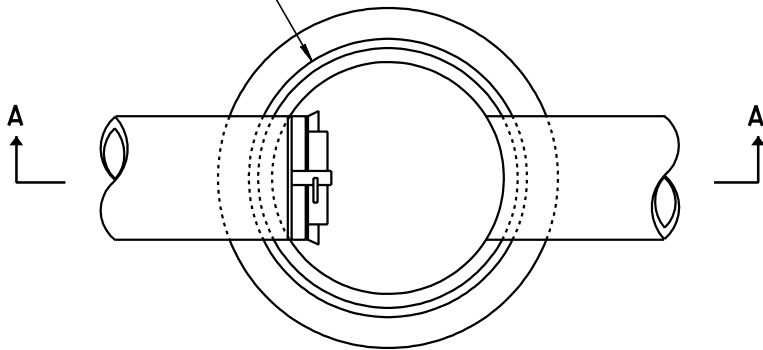
- All concrete shall be Class B.
- All reinforcing bars shall be #4 except two #6 bars over pipe. Bar spacing approximately 1'-0" center to center unless otherwise noted.
- 30° wing wall flare shown; 45° normally desirable. See Hydraulics and Utility and Railroad Engineering Sections.

PIPE	DIMENSIONS			QUANTITIES		
	ID	L	E	F (Approx)	CY Concrete	Reinf Steel Lbs
18"	2'-0"	1'-0"	1'-9"	0.97	0.96	65
24"	2'-0"	1'-0"	1'-9"	1.11	1.07	78
30"	3'-0"	1'-6"	2'-7"	1.50	1.44	108
36"	4'-0"	2'-0"	3'-6"	2.08	2.01	150
42"	5'-0"	2'-6"	4'-4"	2.71	2.63	205
48"	6'-0"	3'-0"	5'-2"	3.39	3.30	270
54"	7'-0"	3'-6"	6'-1"	4.14	4.02	335
60"	8'-0"	4'-0"	6'-11"	4.96	4.80	410

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	IRRIGATION HEADWALLS 18" TO 60" DIAMETER PIPES		DRAWING NO. C-16.10

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	CHANGED "DIVISION" TO "SECTION"	PNB	10/95
2			
3			
4			

Reinforced Conc Pipe
Size as Shown on Plans

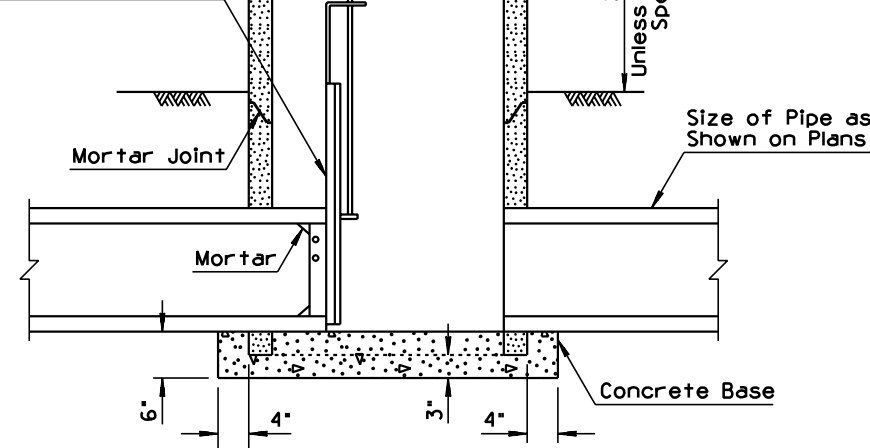


1/4" Locking Staple

PLAN

Cover

Gate as Per Std
C-16.30 Type 2
If Called for on Plans



SECTION A-A

1/4" Steel Tee Hinge
Welded to Cover All
Around with 1/4" Fillet

5/16" Diameter
(Typ)

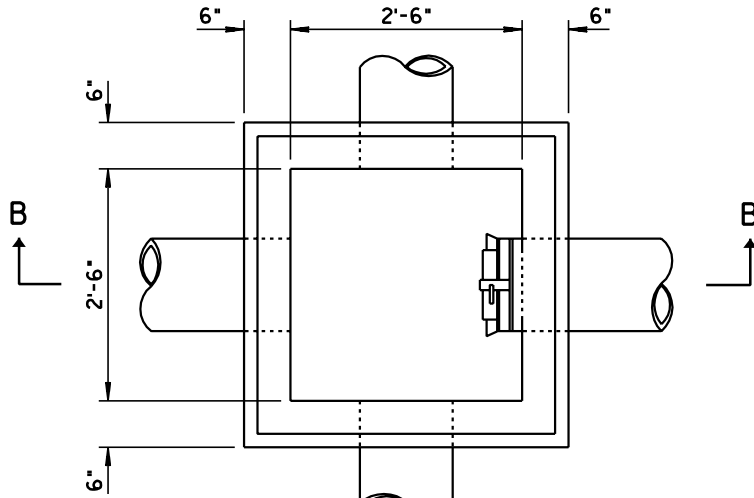
3-1/4" Bolt Size
Self Drilling Type
Concrete Anchors

5/16" Holes

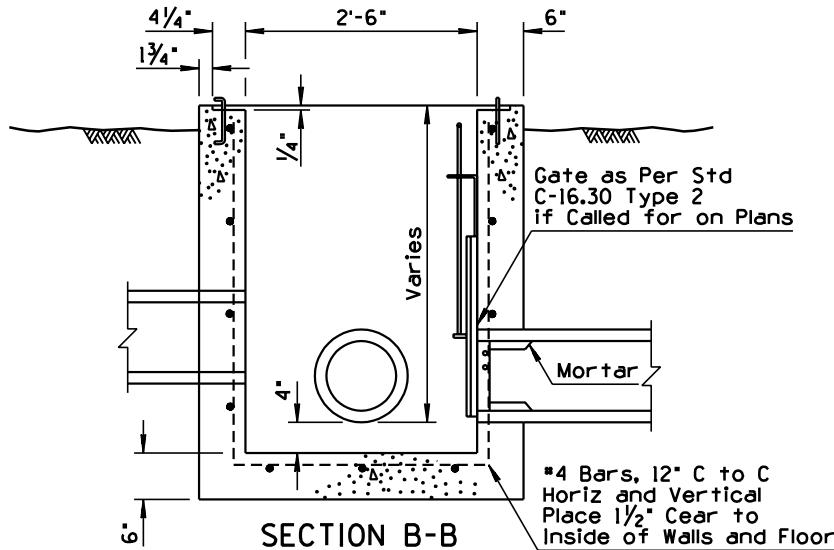
1/2"x1/2" Slot for
Locking Staple

1/4" Steel Plate

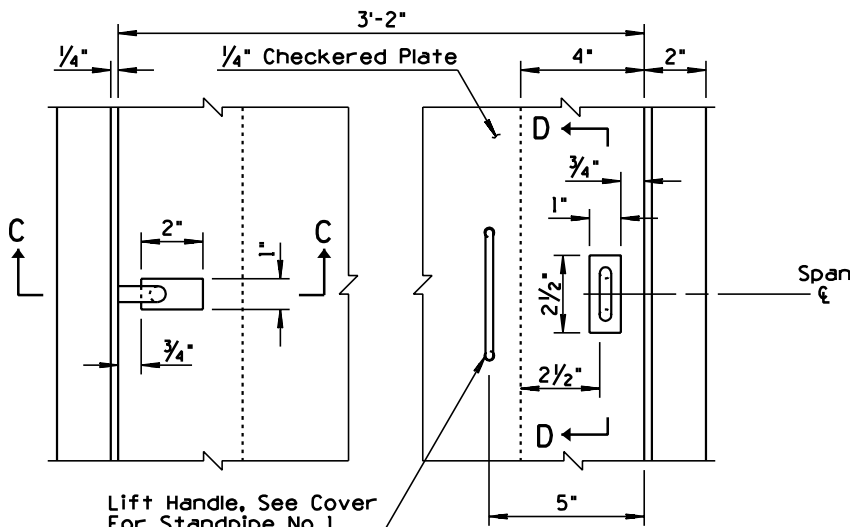
COVER
IRRIGATION STANDPIPE NO. 1



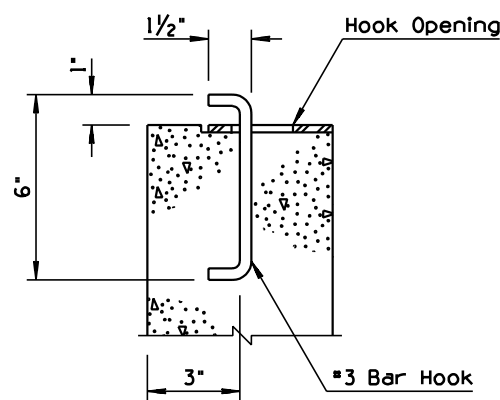
PLAN



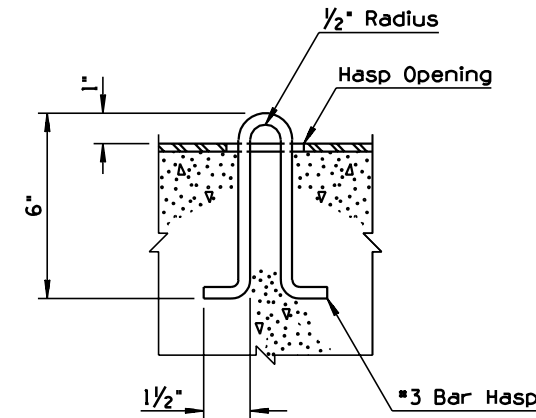
SECTION B-B



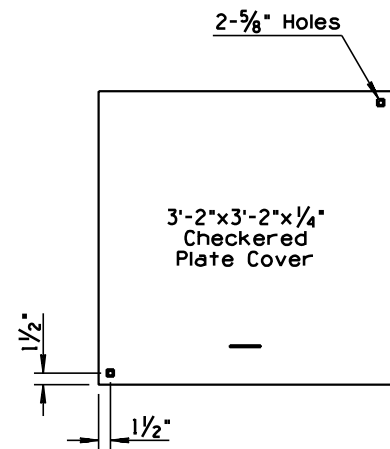
LOCKING COVER
IRRIGATION STANDPIPE NO. 2



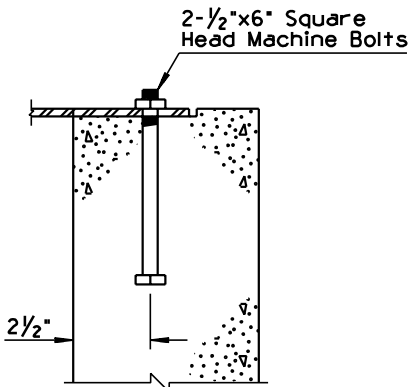
SECTION C-C



SECTION D-D



BOLTED COVER FOR
STANDPIPE NO. 2



GENERAL NOTES

- All concrete shall be Class B.
- Structural steel shall be in accordance with ASTM A36.
- All cover steel and exposed appurtenances shall be given one shop coat of No. 1 paint.
- Plans shall specify locked or bolted cover for standpipe No. 2.
- For specific details of a flush pavement or sidewalk installation, see Utility and Railroad Engineering Section.

DESIGN APPROVED

Henry H. Ottens

APPROVED FOR
DISTRIBUTION

Ronald Williams

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

IRRIGATION STANDPIPES

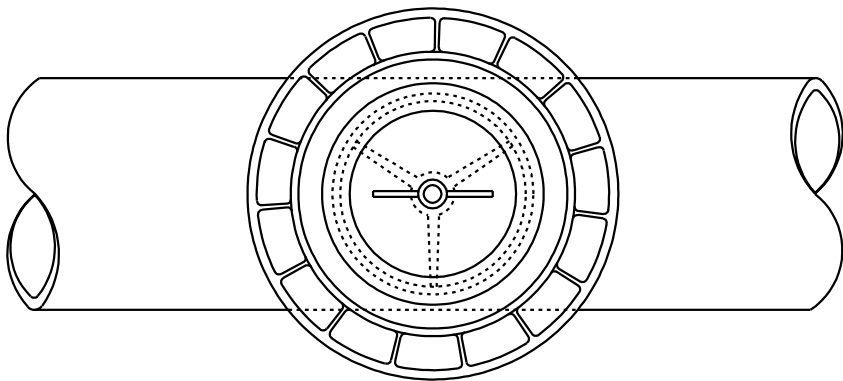
REV.

10/95

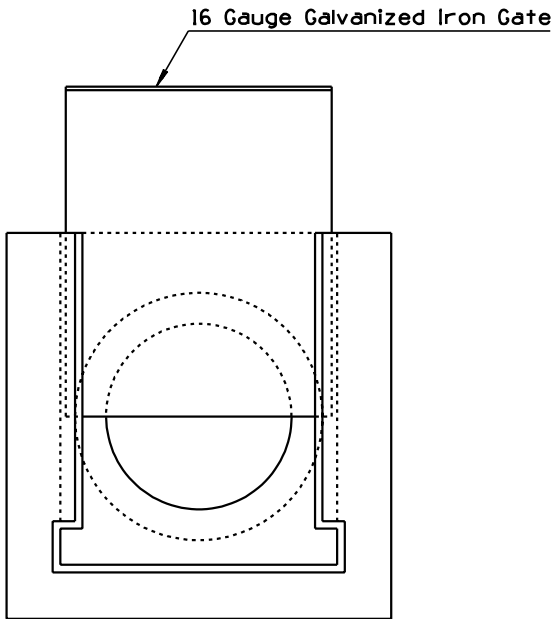
DRAWING NO.

C-16.20

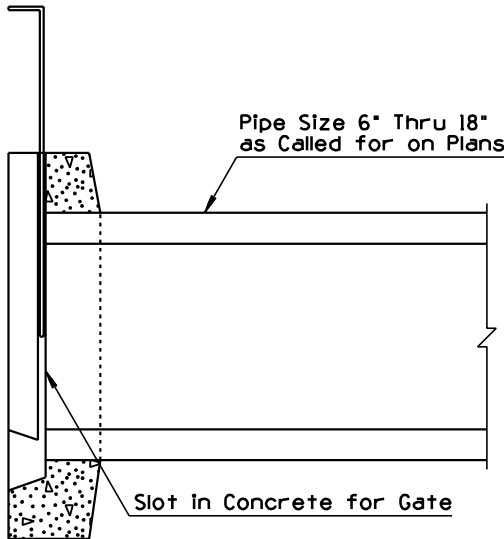
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			



PLAN

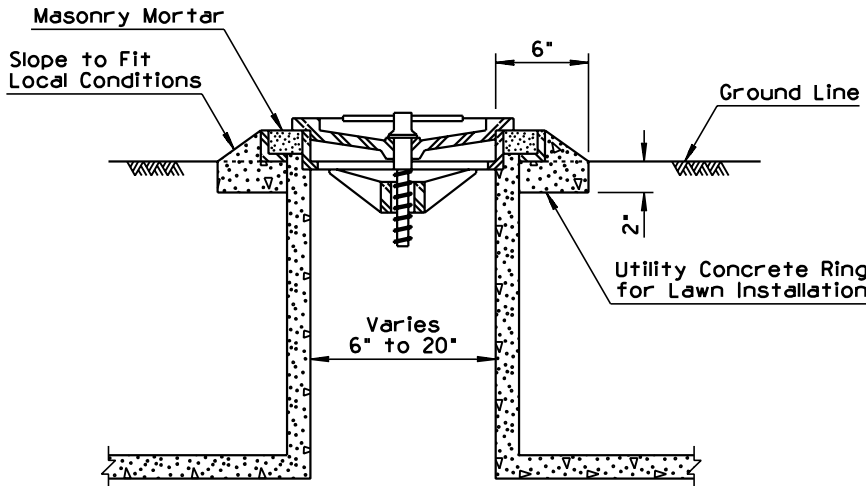


ELEVATION



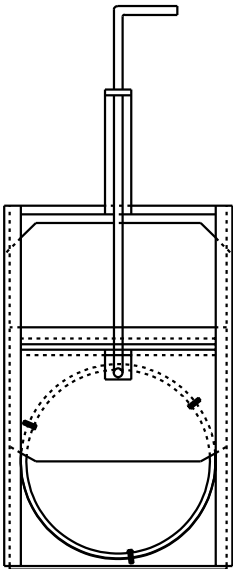
SECTION

PRECAST IRRIGATION GATE
For Open Ditch Installation
TYPE 1

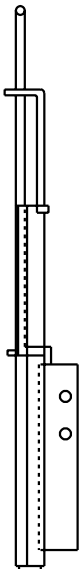


Irrigation Valve Number of Valve
Shall Correspond to the Size of
Pipe in Inches. No 6 to No 20.

PART SECTION
FLUSH IRRIGATION VALVE



ELEVATION





SECTION

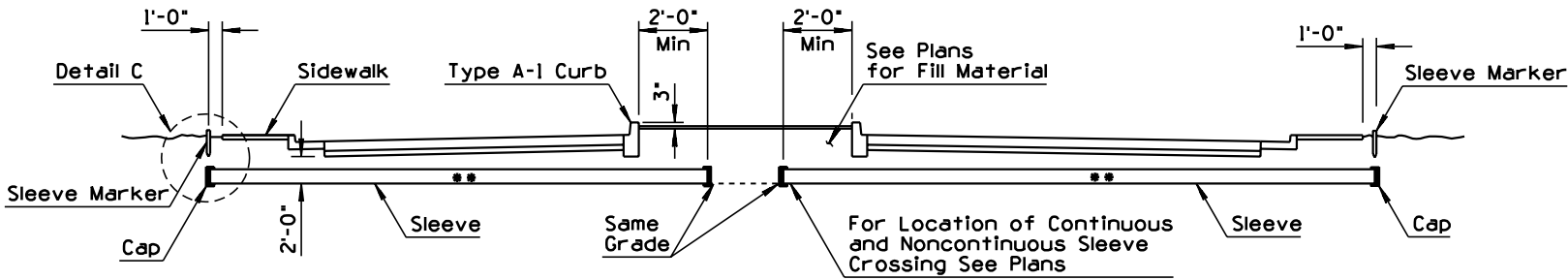
IRRIGATION GATE
For Standpipe Installation
TYPE 2

TYPE 2 IRRIGATION GATE

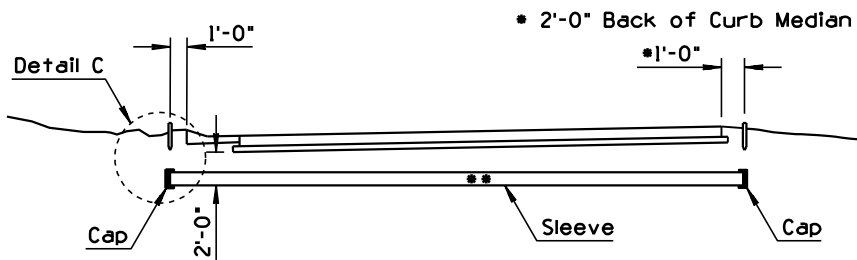
For pipes 6" through 24". Gate and frame shall be
galvanized iron. Type shown is for concrete pipe.
For CMP, external steel adjustable bend shall be used
in place of internal steel ring.

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION 	① IRRIGATION VALVE AND GATE	DRAWING NO. C-16.30	

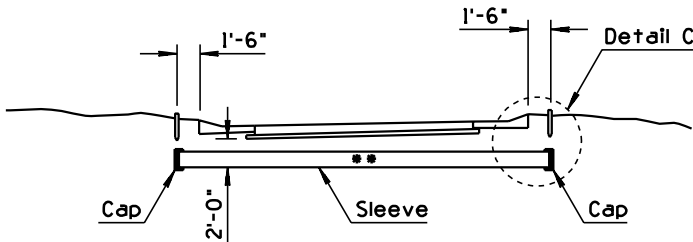
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2	ADDED NOTE	PNB	7/94
3			
4			



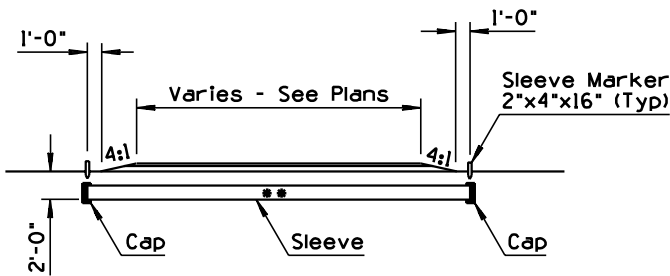
SLEEVE UNDER CROSSROAD



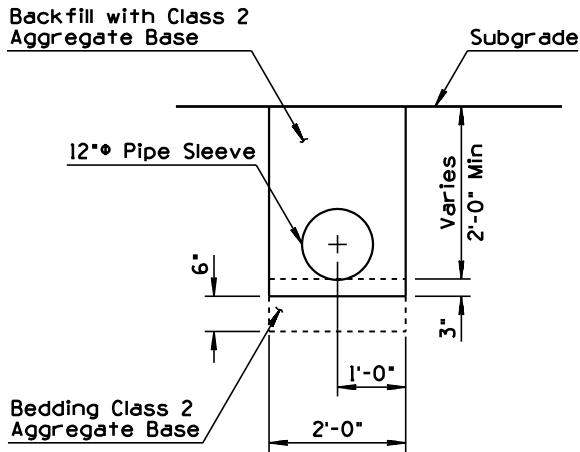
SLEEVE UNDER MAINLINE



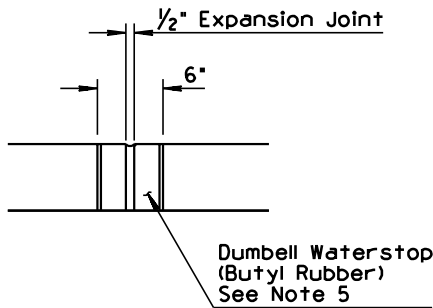
SLEEVE UNDER RAMP



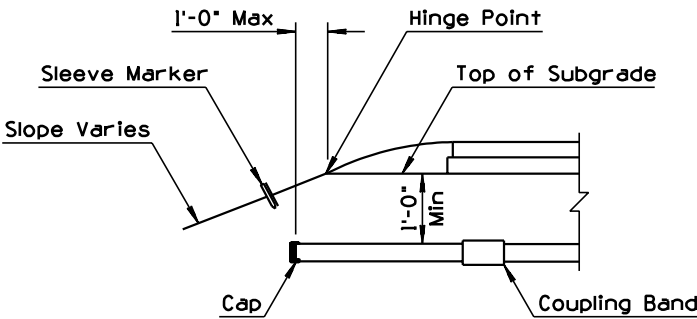
SLEEVE UNDER DRIVEWAYS AND PARKING AREAS



TYPICAL INSTALLATION



DUMBELL WATERSTOP



DETAIL C
SLEEVE TERMINATION
AT ELEVATED ROADWAY

GENERAL NOTES

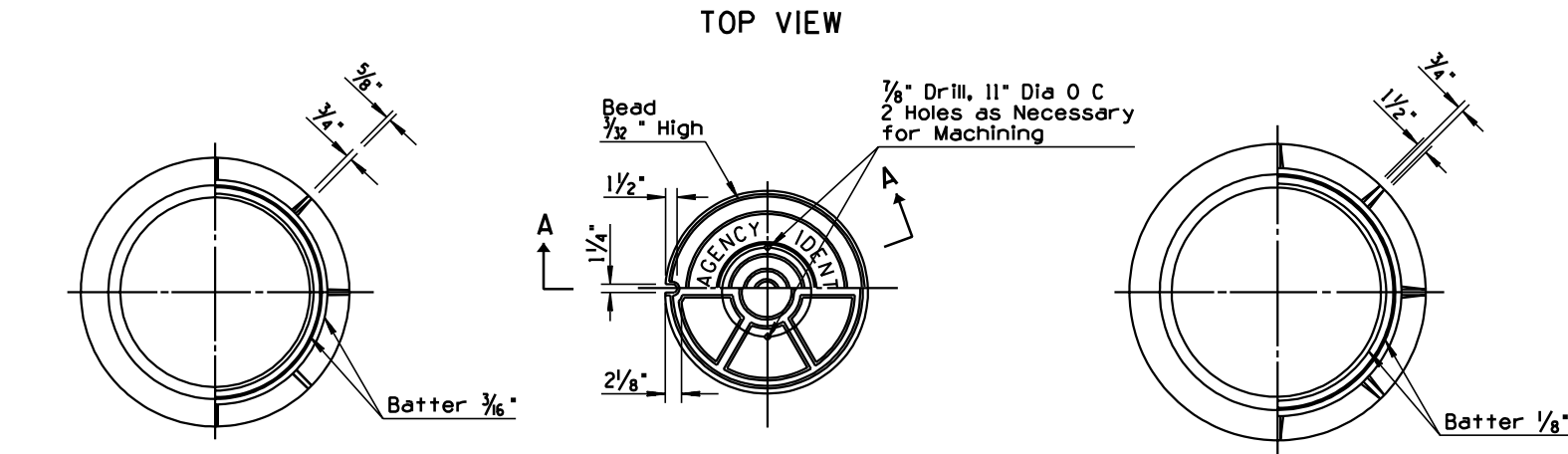
1. Irrigation sleeves shall be installed in a trench condition. See Std C-13.15 and Std C-7.06.
 2. Bedding and backfill material shall be Class 2 Aggregate Base.
 3. Pipe installation shall conform to Section 501 of Standard Specifications.
 4. The Contractor shall imprint a 4"± high letter "S" on the face of all curbs at sleeve locations. The width of the letter shall be 1/2" and shall penetrate the concrete surface 1/2".
 5. For non-continuous sleeves under crossroads, Std C-5.10 Type "A-1" curb shall be required where median is irrigated. See plans for locations. Dumbell waterstop shall be at all expansion joints.
 - ② 6. Materials used for caps or plugs shall be as recommended by the pipe supplier and approved by the Engineer.
- ** Generally, sleeves shall be installed parallel to the roadway subgrade. Slope may vary in superelevated sections. Minimum slope nominal to drain.

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APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① IRRIGATION SLEEVES	DRAWING NO. C-16.40

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED DETAIL	PNB	10/95
2	REVISED SECTION	PNB	10/95
3	REVISED GENERAL NOTE	PNB	10/95
4			

GENERAL NOTES

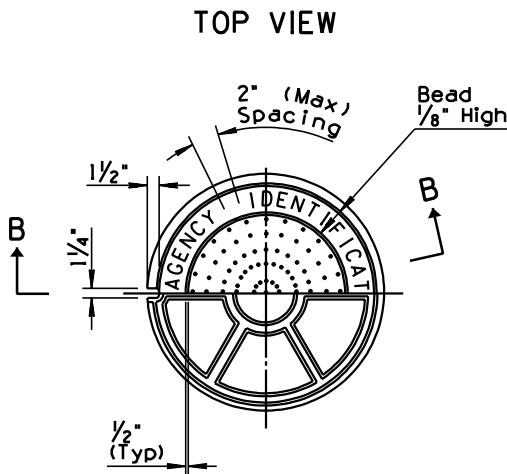
- ③
1. When specified on the plans, the cover (excluding grates) shall include agency identification and conform to the following: Lettering on manhole cover to contain name of agency and utility as directed. Letters and words to be equally spaced. Letters to be 2" in height and raised 1/8" above level of cover. Type of letters and layout to be submitted for approval.
- ③
2. Casting weights shown are minimum weights and are for either cast iron or ductile iron castings. Maximum casting weights shall not exceed 105 percent of weights shown.
3. H20 loading minimum.
4. Details shown are typical.
5. Alternate designs of manhole frame and cover may be utilized with the approval of the engineer as long as minimum loading and weight are equivalent.



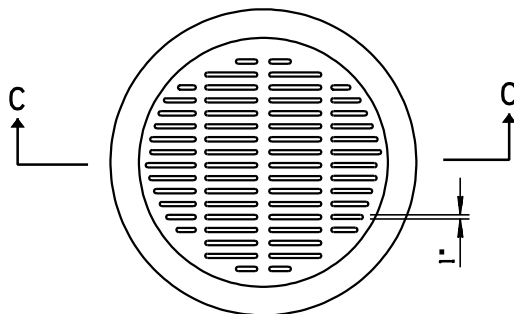
BOTTOM VIEW - TOP VIEW

BOTTOM VIEW

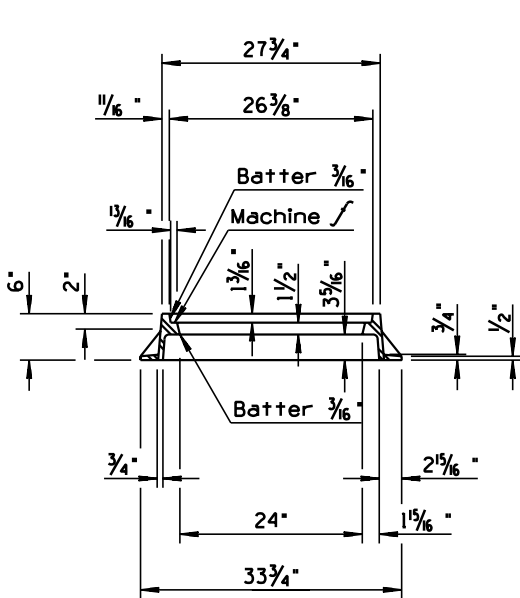
BOTTOM VIEW - TOP VIEW



BOTTOM VIEW ①



PLAN

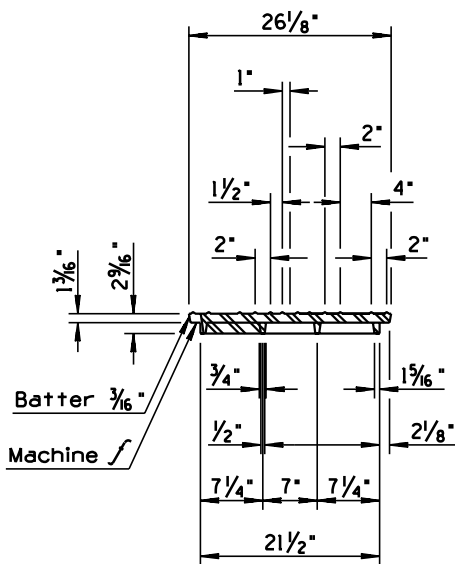


②

SECTION OF FRAME

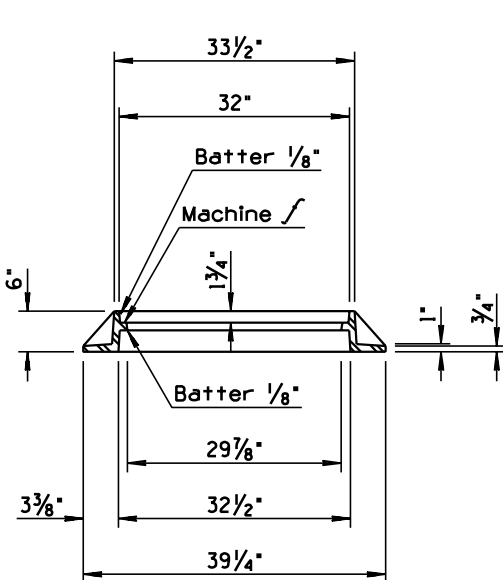
24" MANHOLE FRAME & COVER

Approx Wt: Frame 173 Lbs
Cover 170 Lbs



②

SECTION A-A OF COVER

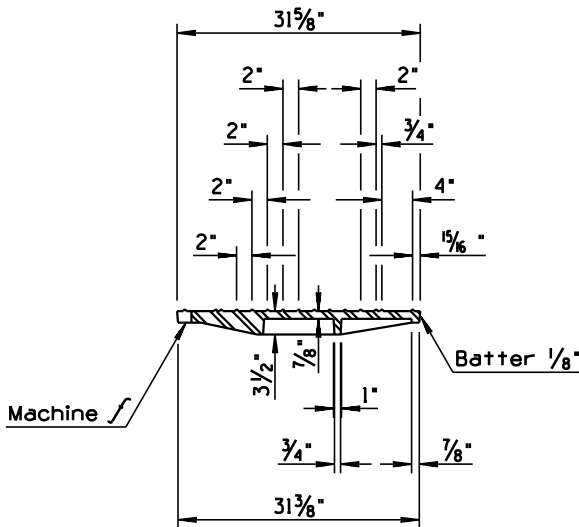


②

SECTION OF FRAME

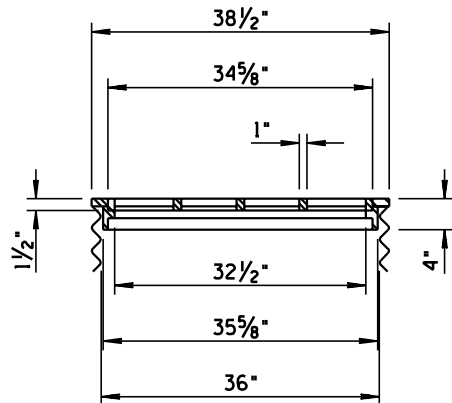
30" MANHOLE FRAME & COVER

Approx Wt: Frame 204 Lbs
Cover 223 Lbs



②

SECTION B-B



SECTION C-C

② 36" NOMINAL CMP FRAME & GRATE

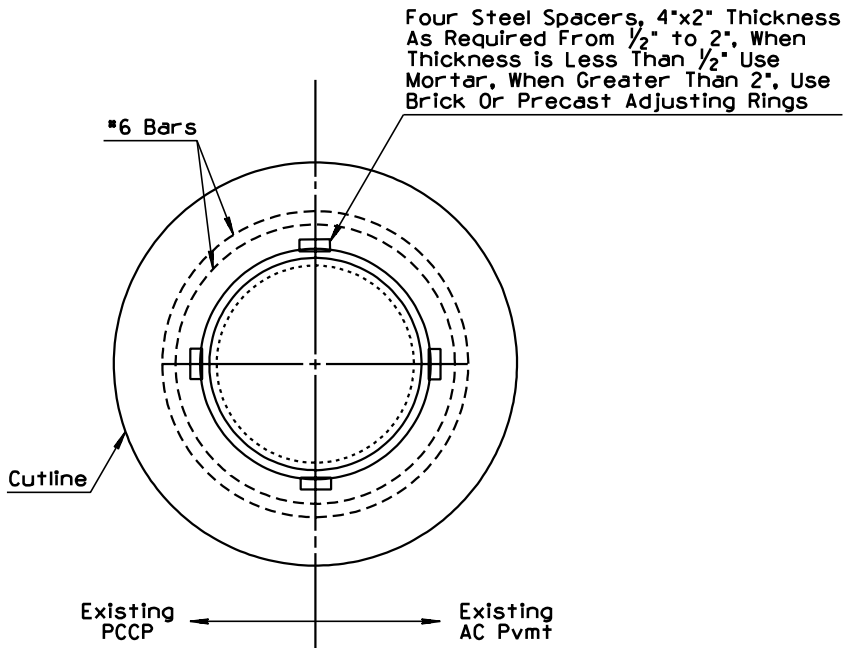
Approx Wt: Frame 125 Lbs
Cover 167 Lbs

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	MANHOLE FRAME AND COVER DETAILS	DRAWING NO. C-18.20

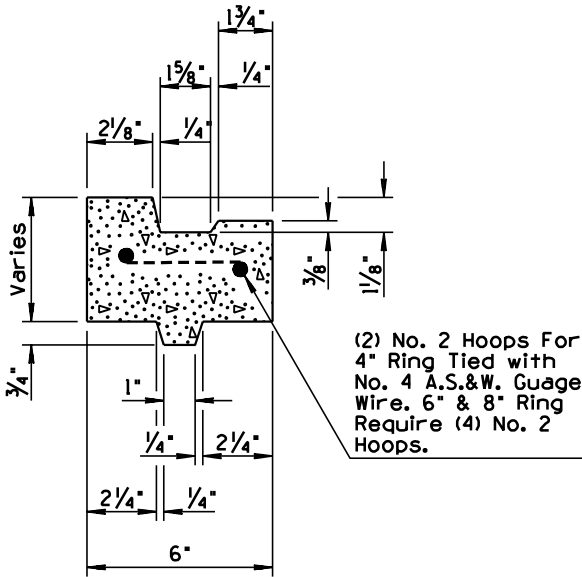
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

GENERAL NOTES

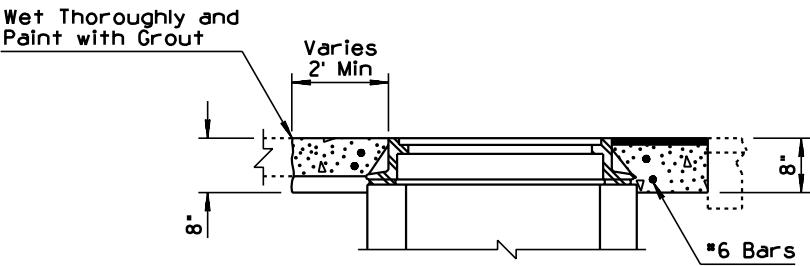
1. All dimensions are minimum except where noted.
2. Location & elevation shown on plans.
3. Compaction to conform to Sect. 303-2 or 501.



PLAN



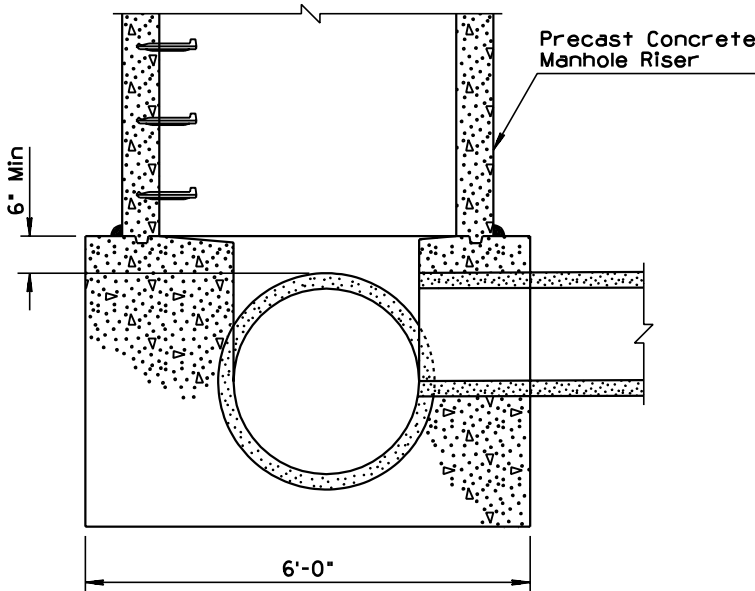
PRECAST ADJUSTING RING DETAIL



SECTION
MANHOLE COVER FRAME
ADJUSTMENT - PAVEMENT
CUT AND REPLACEMENT

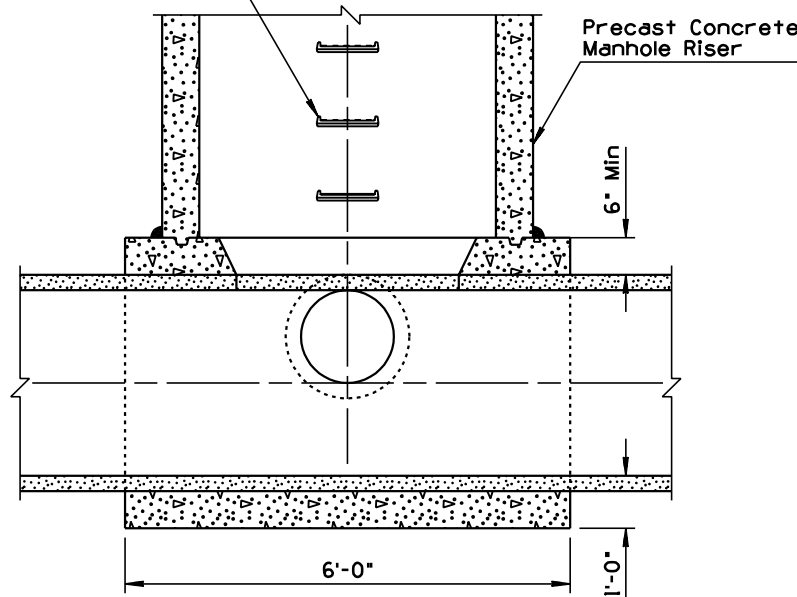
DESIGN APPROVED <i>Sam H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① MISCELLANEOUS MANHOLE DETAILS	DRAWING NO. C-18.30	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

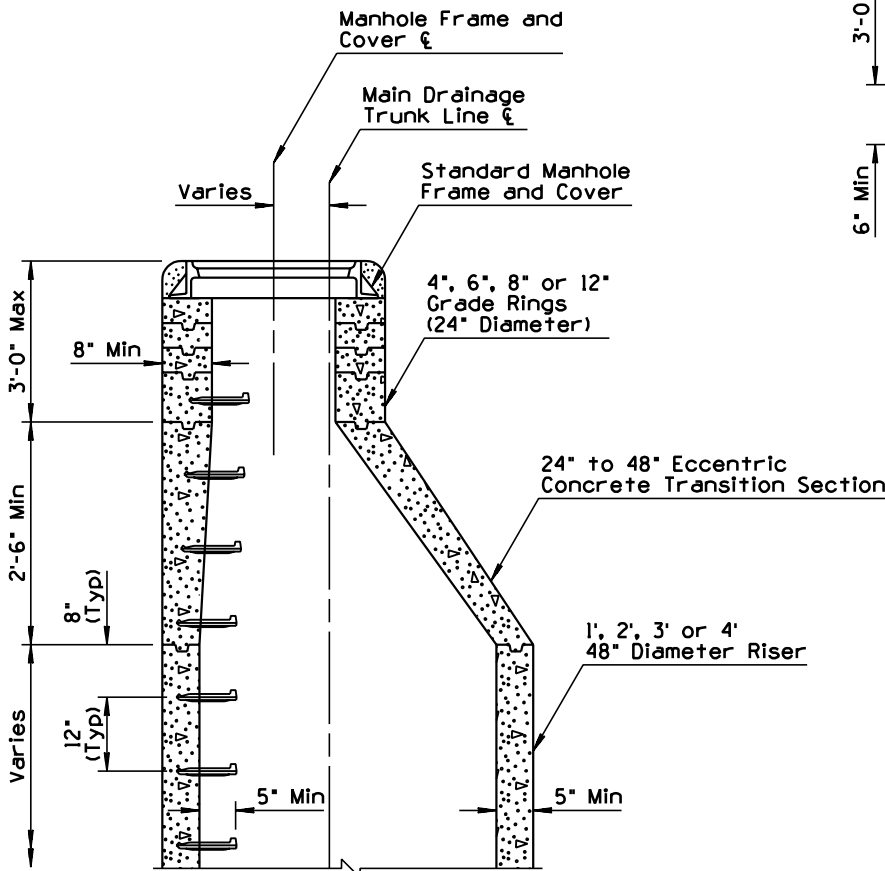


END VIEW

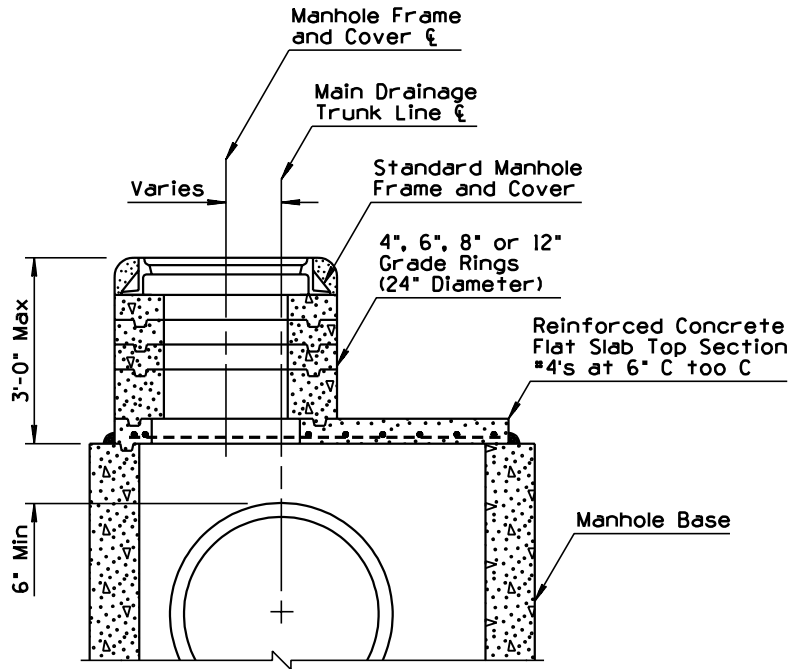
If Steps are Required
They shall Conform to
the Requirements of
AASHTO M199



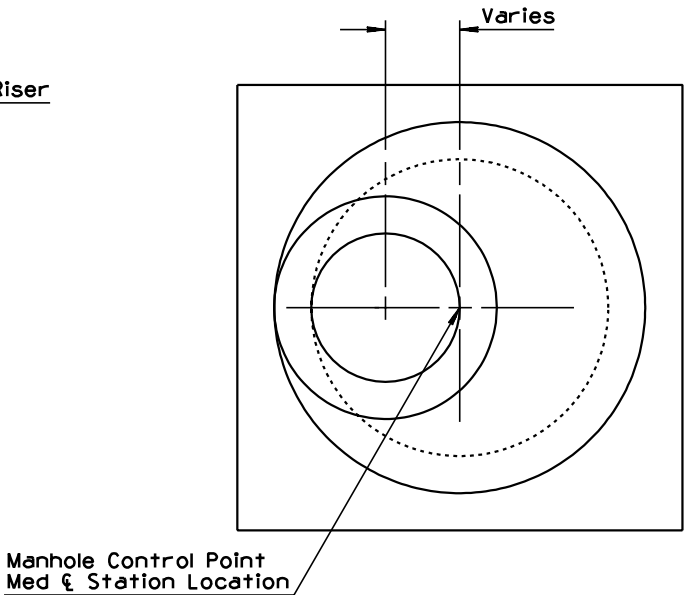
SIDE VIEW





NORMAL INSTALLATION



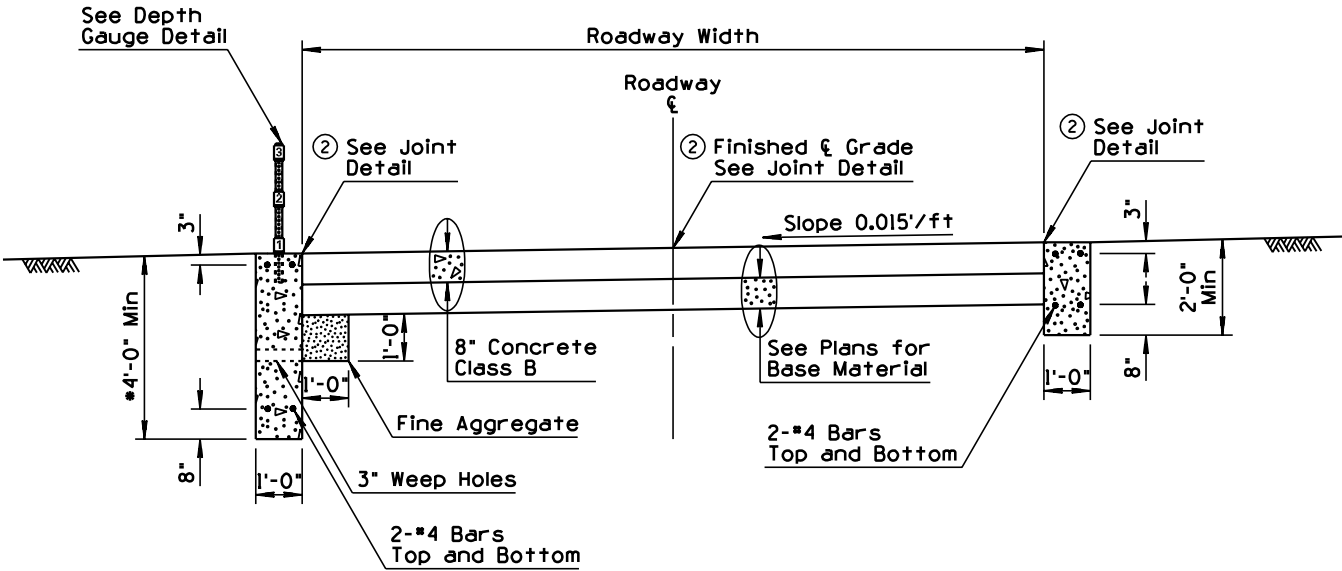
SHALLOW INSTALLATION



TOP VIEW

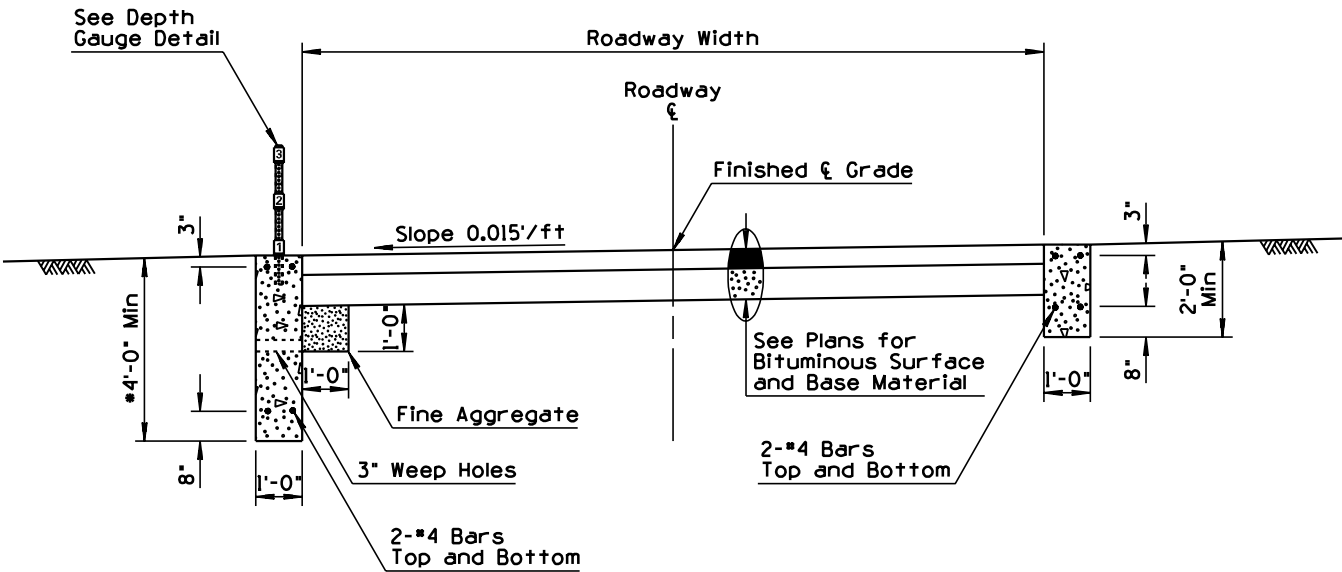
DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION 	① MANHOLE RISER DETAILS	DRAWING NO. C-18.40	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2	REVISED NOTE	PNB	7/94
3	ADDED DETAIL	PNB	7/94
4			

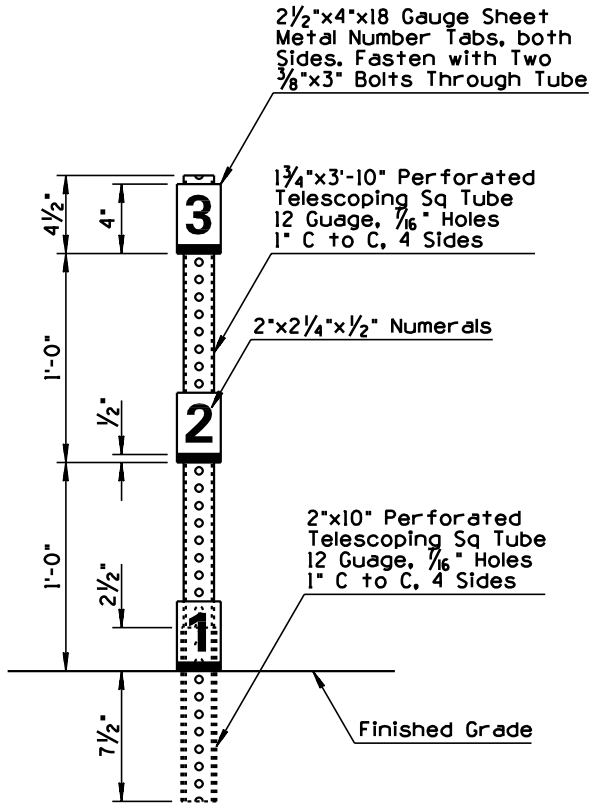


CONCRETE SURFACE ROAD
CONCRETE WALLS

* Min Distance Below Stream Bed



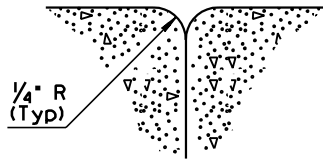
BITUMINOUS SURFACE ROAD
CONCRETE WALLS



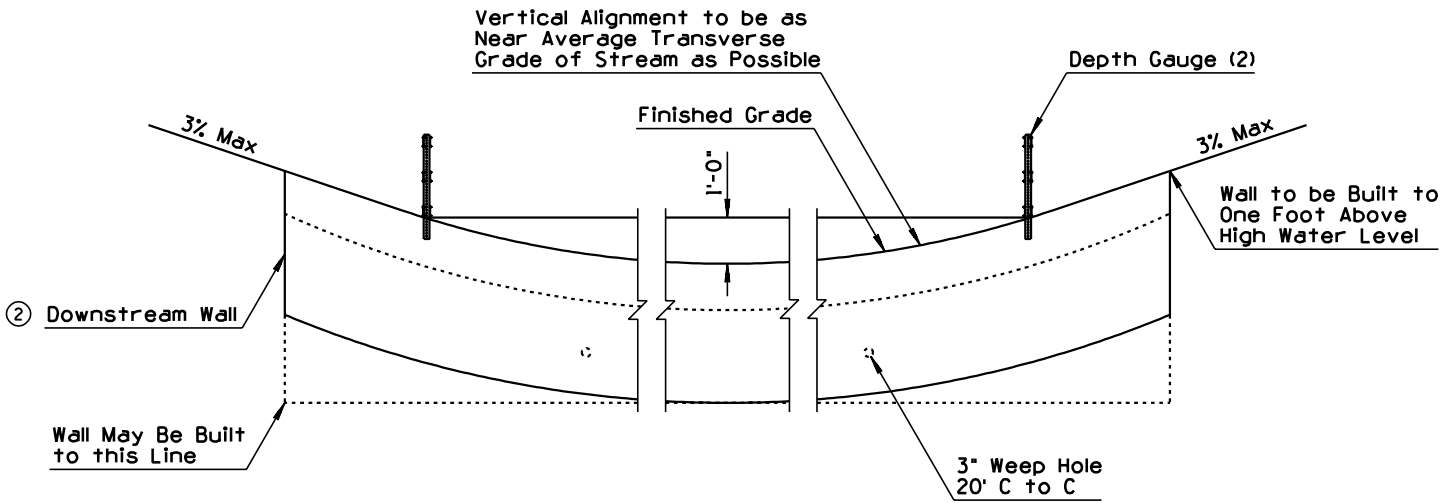
DEPTH GAUGE DETAIL

GENERAL NOTES

1. Ford walls shall be Class B concrete.
2. Depth gauge tubing shall be protected against concrete entering through bottom or perforations.
3. Depth gauge tubing and both sides of numeral tabs shall be painted with two coats of white enamel. Numerals and markers shall be painted with one coat of gloss black enamel.



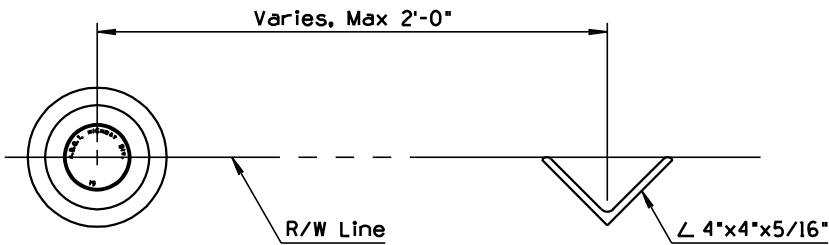
③ JOINT DETAIL



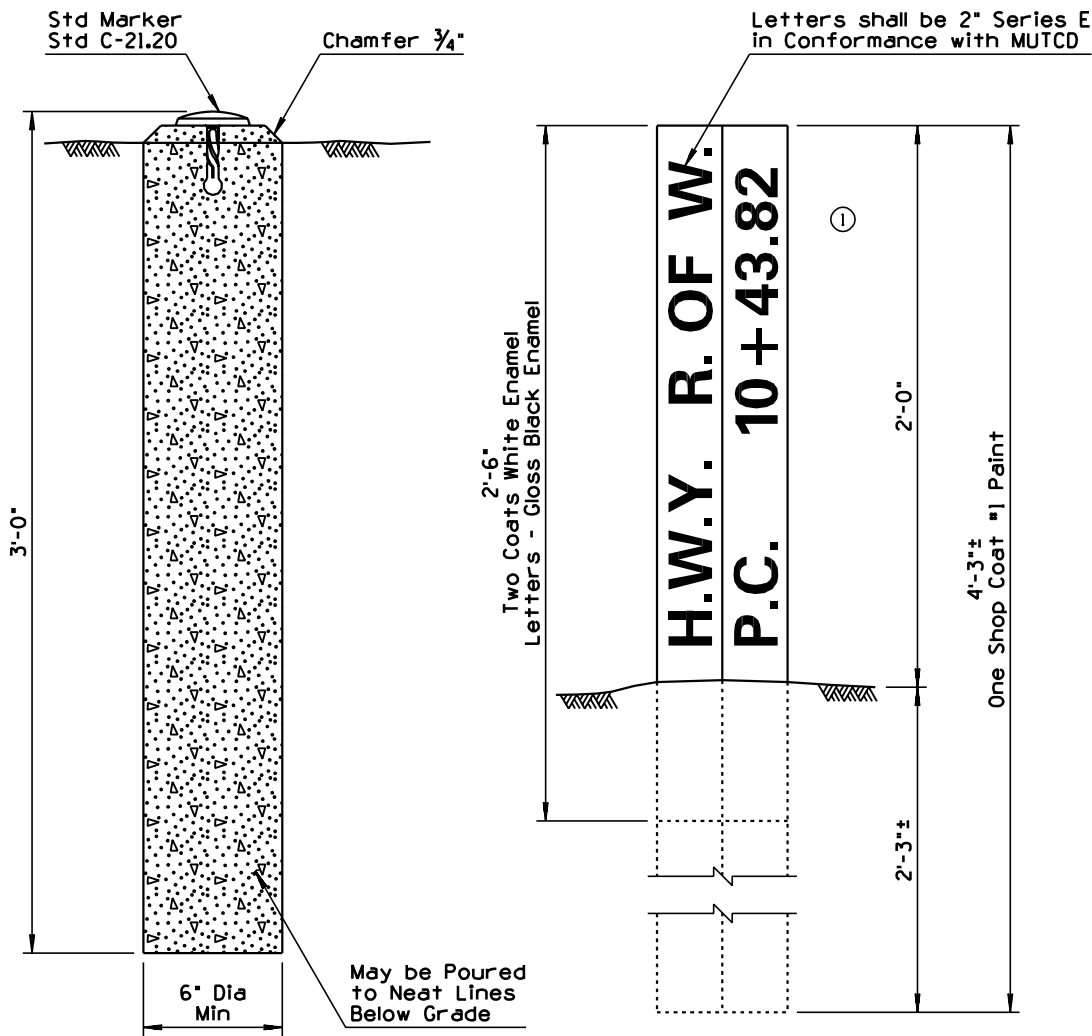
ELEVATION LOOKING UPSTREAM

DESIGN APPROVED <i>Larry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① FORD - CONCRETE WALLS	DRAWING NO. C-19.10	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED STATION TO DECIMAL PLACES	PNB	10/95
2			
3			
4			



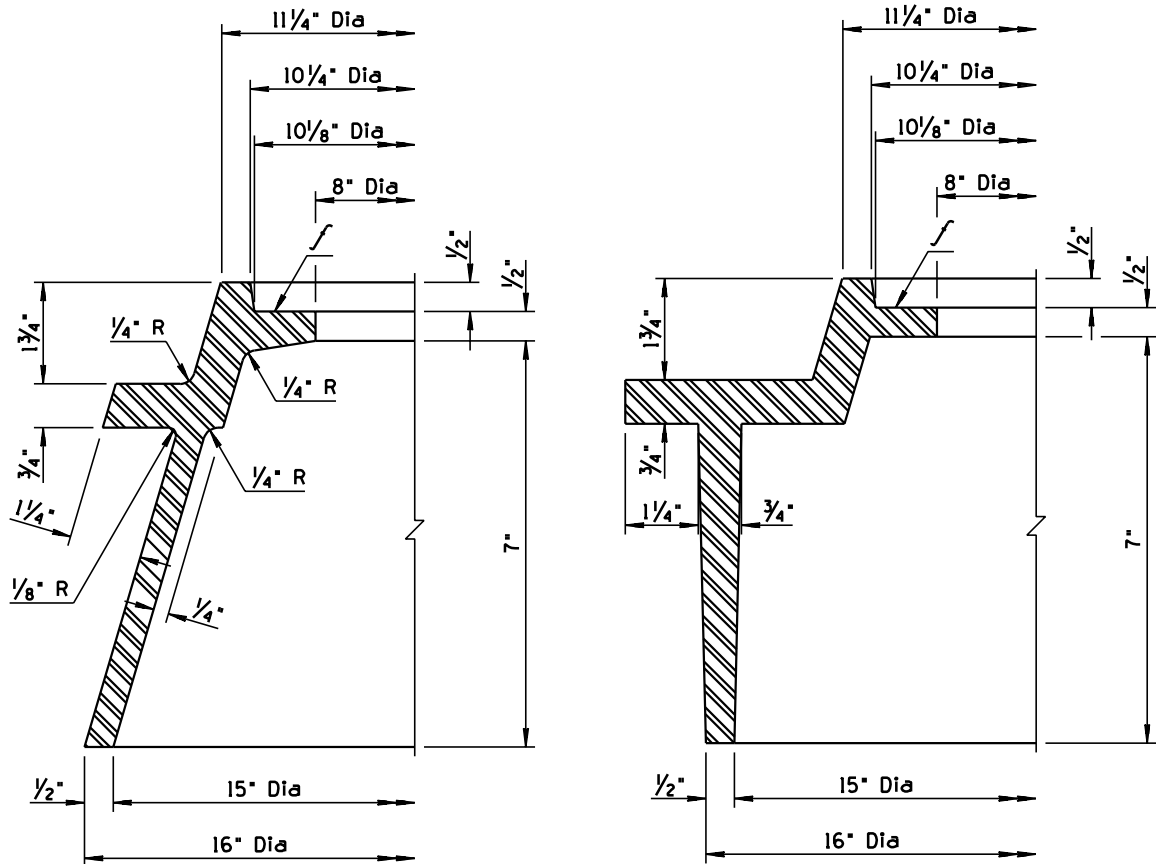
PLAN



ELEVATION
SURVEY MONUMENT

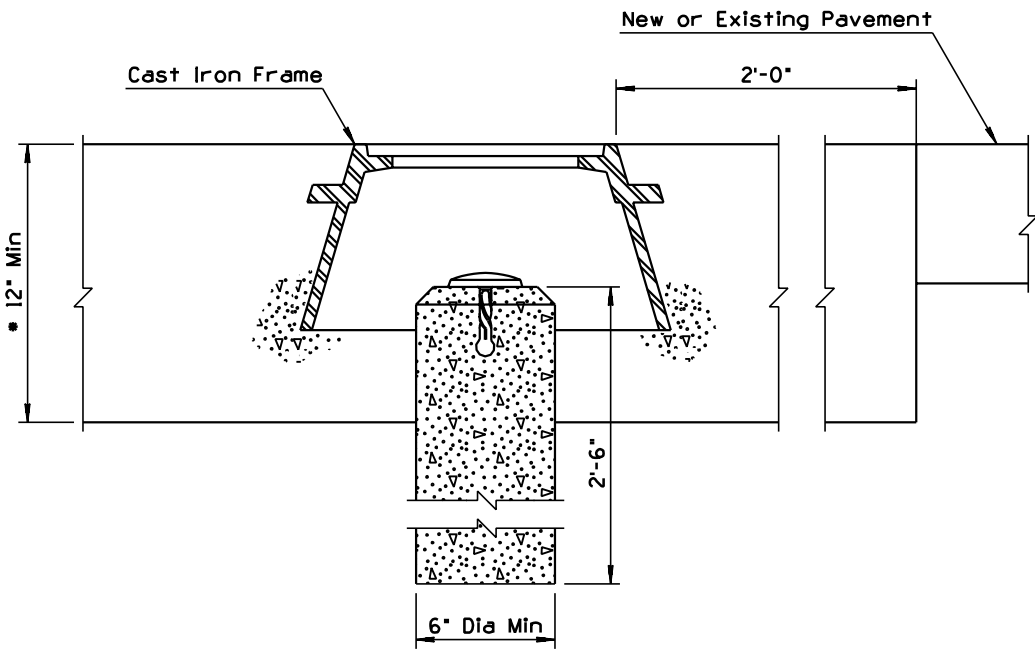
RIGHT OF WAY MARKER

ELEVATION
REFERENCE MARKER



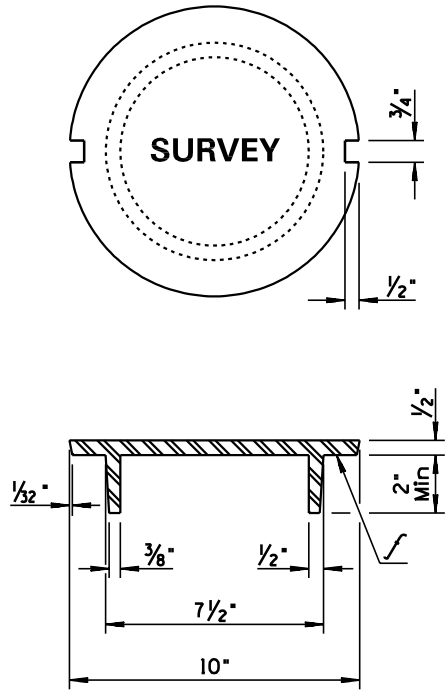
FRAME A

FRAME B



SURVEY MONUMENT
FRAME AND COVER

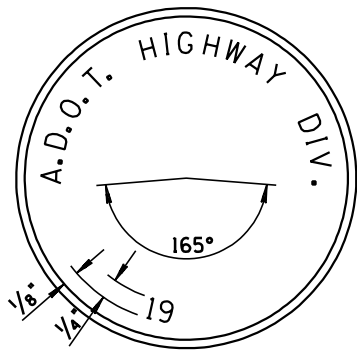
- ### GENERAL NOTES
1. A survey monument, frame and cover, complete in place shall be considered a unit.
 2. A right of way marker, consisting of a survey monument and a reference marker complete in place shall be considered a unit.
 3. All markers shall be placed as shown on the plans or as directed by the engineer.
 4. Frames may be either Type A or Type B.
 5. Frames shall weigh at least 53 pounds.
 6. Covers shall weigh at least 16 pounds.
 7. Portions of the frame and cover to be machined is shown by the symbol "f". The allowable tolerance for machined areas shall be $\pm 1/64$ ". Concrete shall conform to the requirements of the specifications.
 - 12" or pavement structure thickness, whichever is greater.



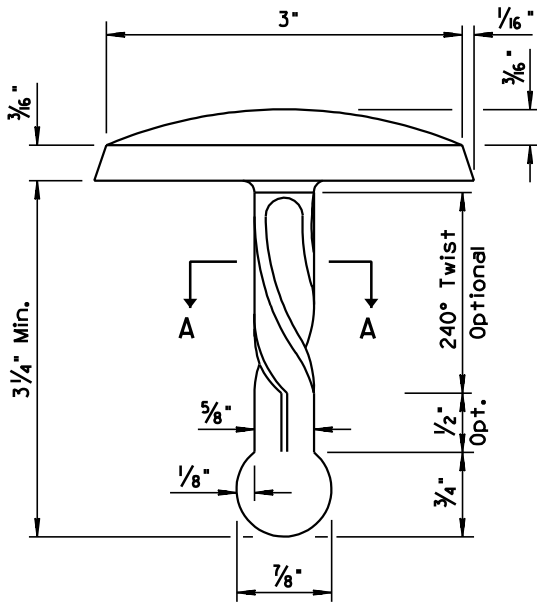
COVER SECTION

DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	SURVEY MONUMENT, FRAME AND COVER, RIGHT OF WAY MARKER	DRAWING NO. C-21.10

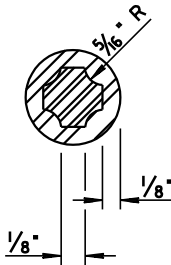
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			



PLAN



ELEVATION
STANDARD MARKER



SECTION A-A

GENERAL NOTES

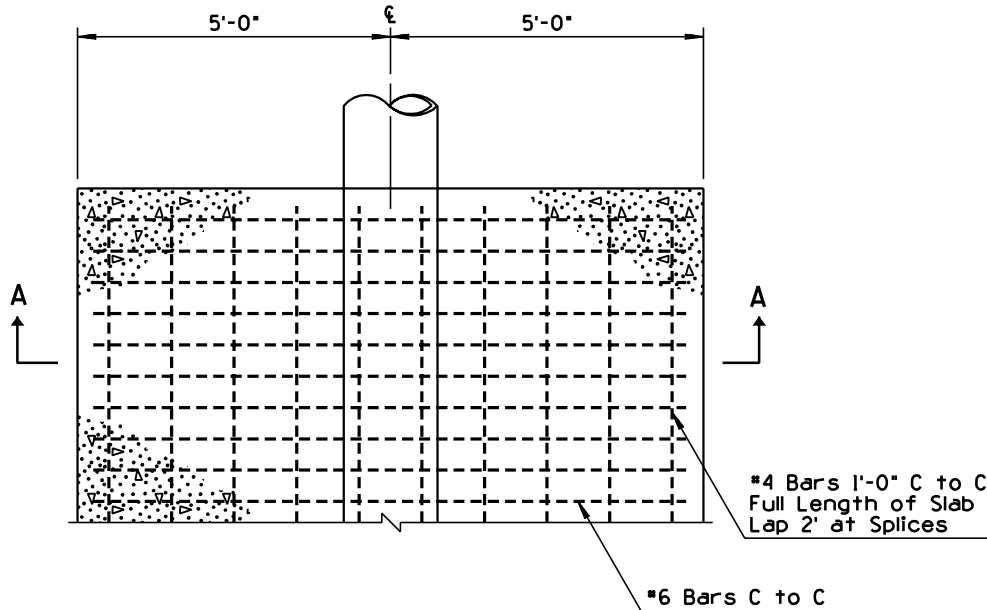
- Standard Marker may be used as bench, survey monument or R/W markers.
- Standard Marker shall be made of brass, bronze or aluminum.
- Standard Marker will be furnished by the Department. Cast-in lettering format may vary.
- Bench Marks shall be established on headwalls, bridge curbs or other permanent structures.
- Surfaces of Aluminum Markers in contact with concrete shall be epoxy coated.
- Fluted shank may be straight or twisted.
- Station, Elevation, Year, or other information shall be hand stamped in field, as approved by the Engineer.

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① STANDARD MARKER	DRAWING NO. C-21.20	

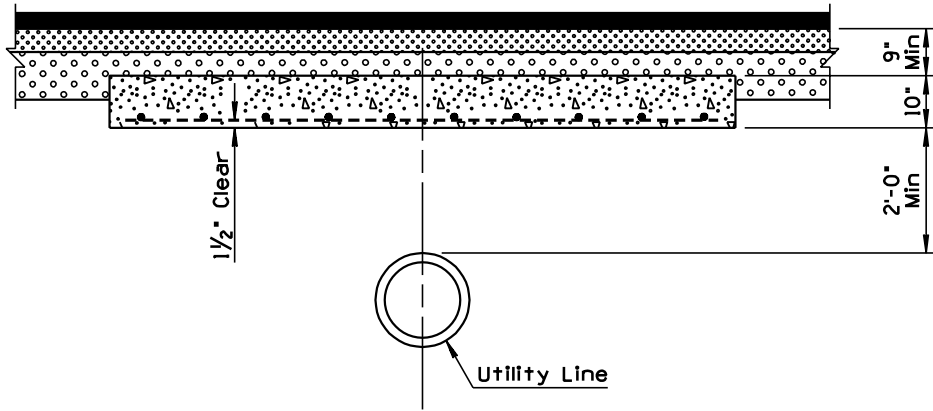
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			

GENERAL NOTES

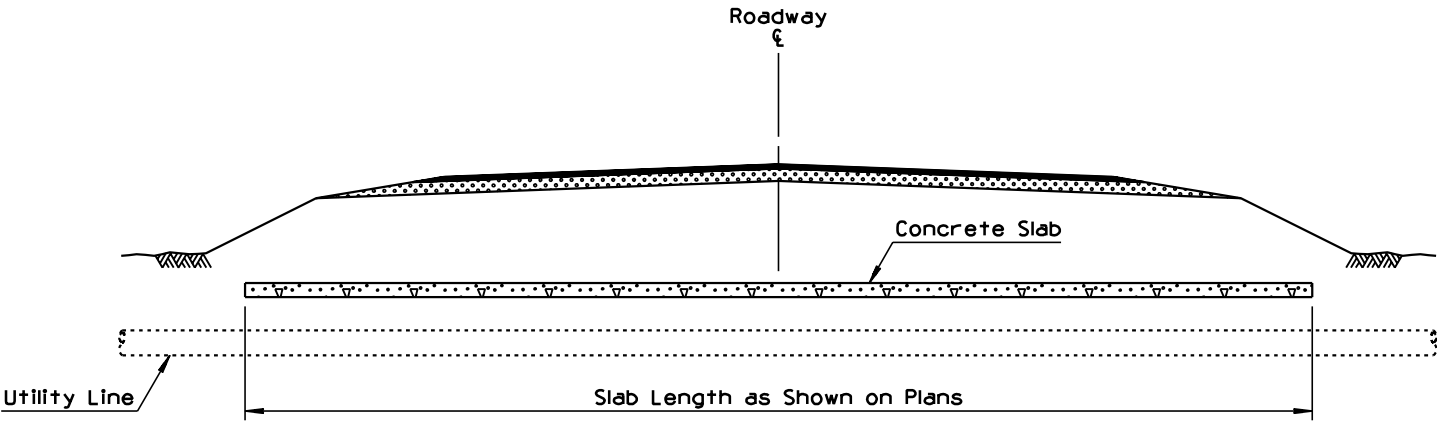
1. All concrete shall be Class B.





FOR SINGLE INSTALLATION	
QUANTITIES PER FT OF SLAB LENGTH	
CONCRETE	REINFORCING STEEL
0.31 CY	35.22 Lbs



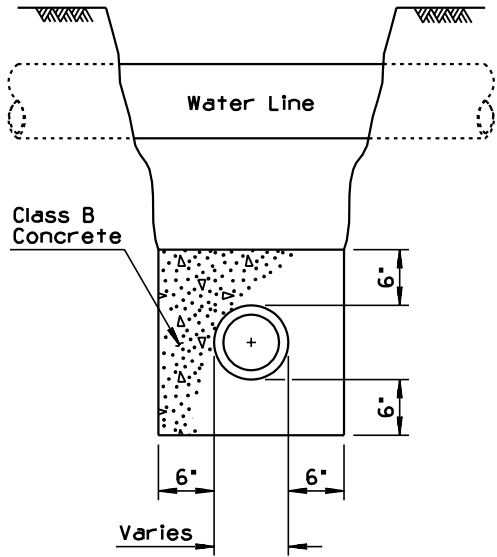
SECTION A-A



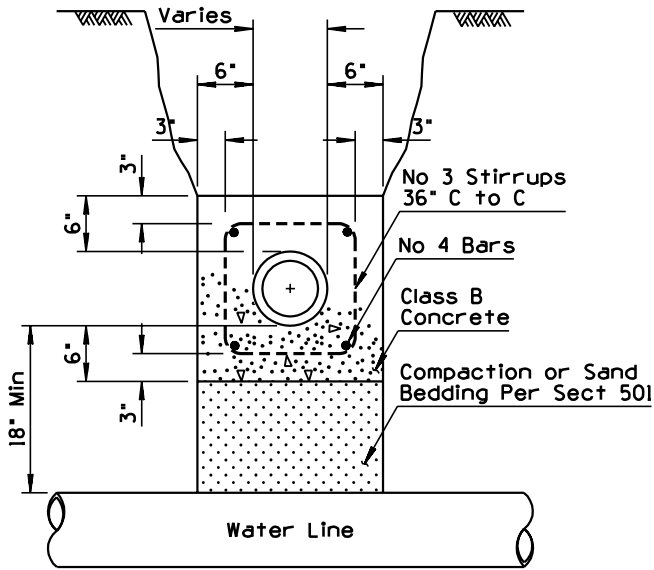
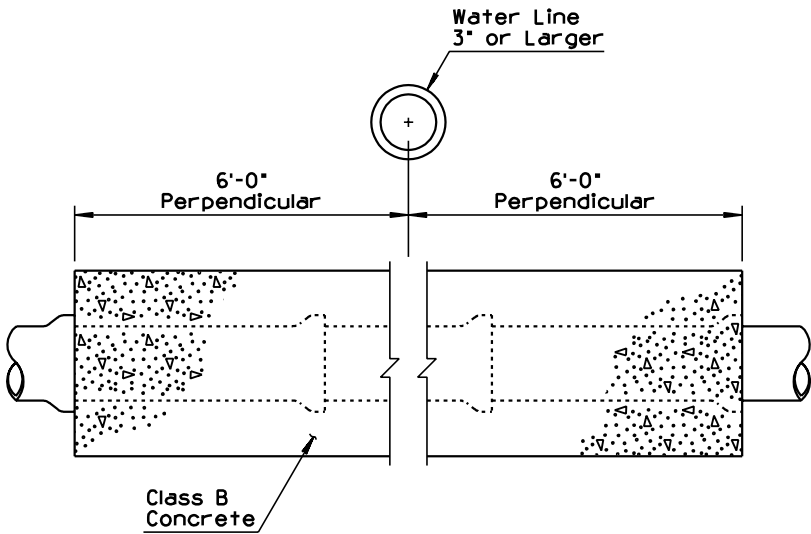
CROSS SECTION

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION 	① UTILITY LINE, PROTECTIVE CONCRETE SLAB	DRAWING NO. C-22.10	

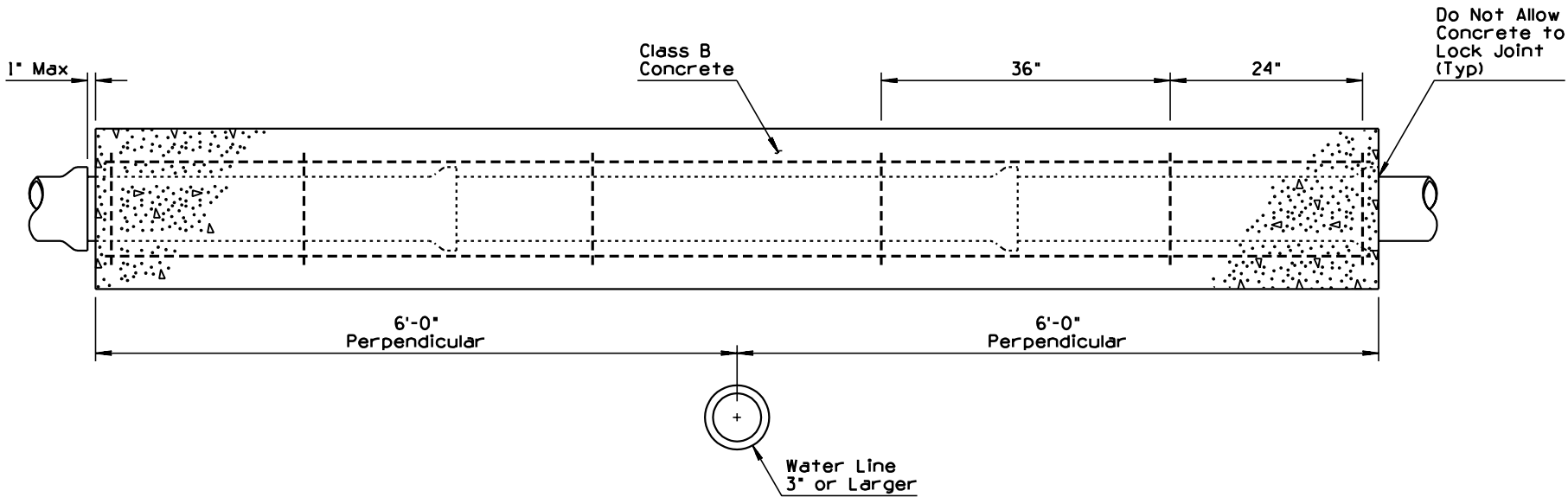
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED REBAR CLEARANCE FROM 2" TO 3"	PNB	10/95
2			
3			
4			



TYPE A ENCASEMENT





TYPE B ENCASEMENT ①

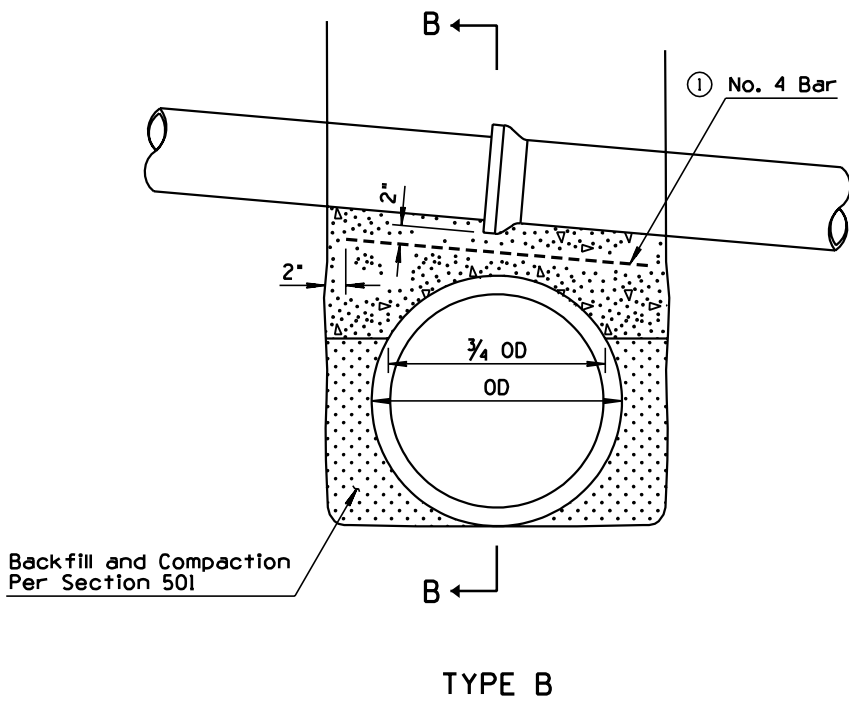
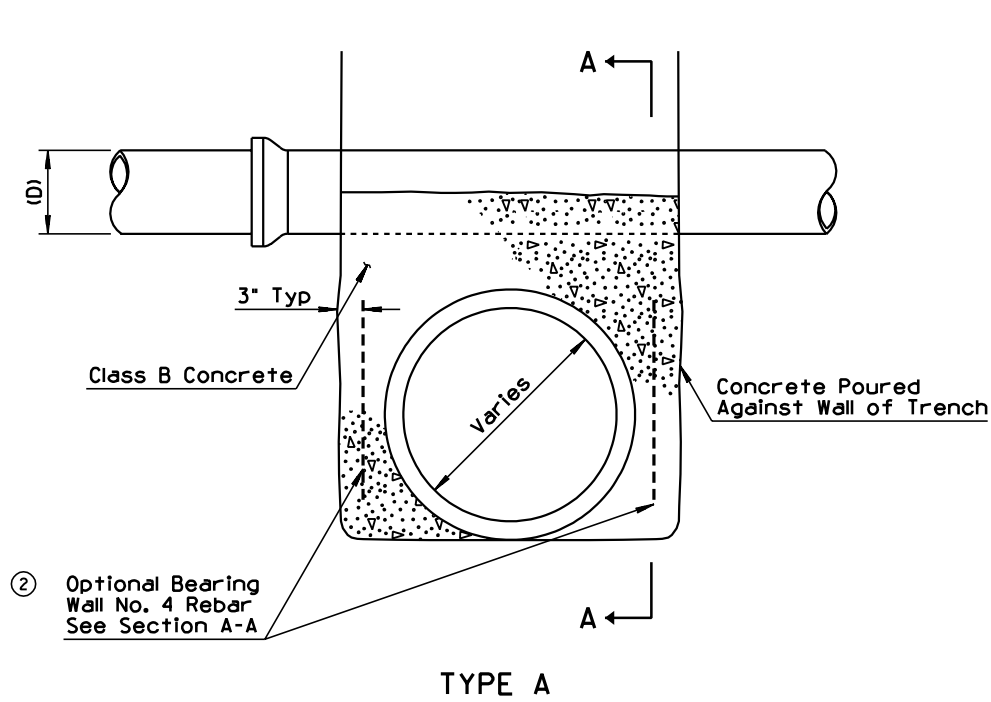


GENERAL NOTES

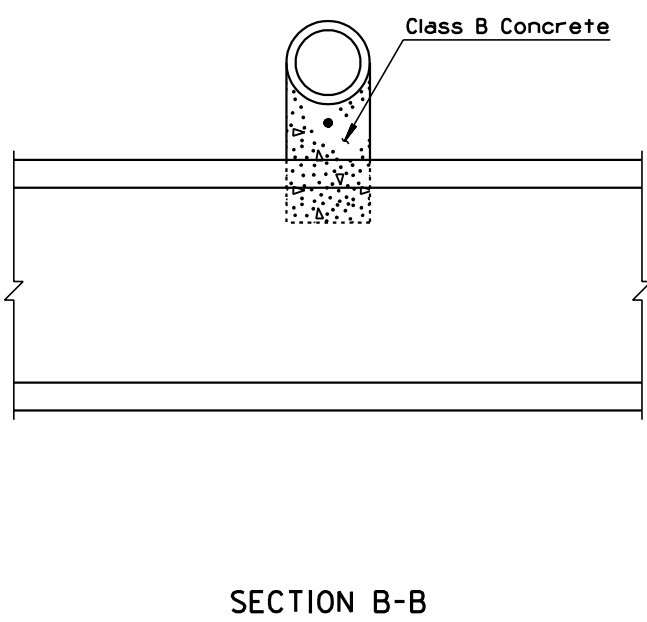
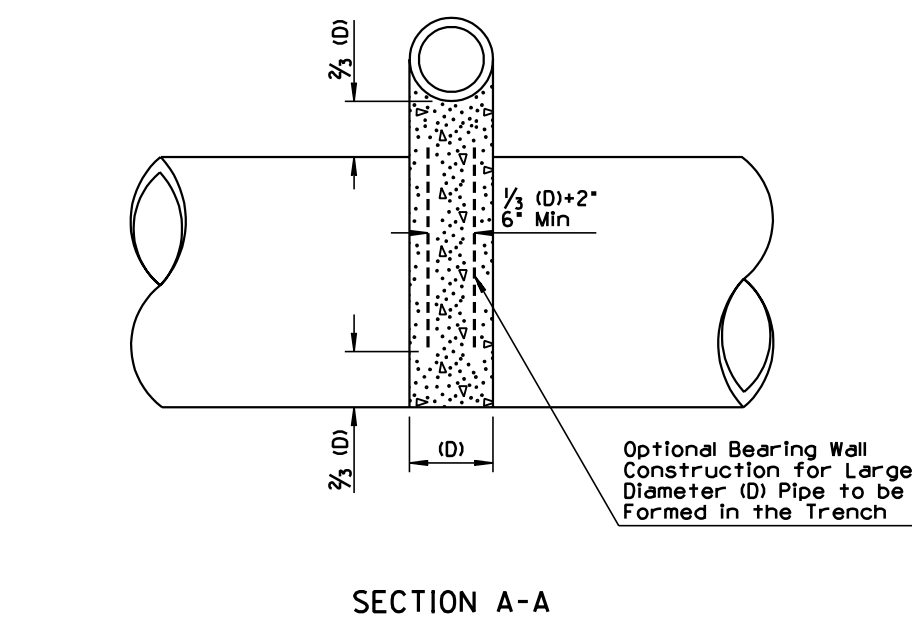
1. Type A encasement to be used for sewer laterals or house connections BELOW water lines.
2. Type B encasement to be used for sewer laterals or house connections ABOVE water lines.
3. The encasement shall extend at least 6' on each side of the water line and must include the nearest joint.
4. Protection for Type A required when distance from bottom of water to top of sewer line is 24" or less. When the sewer is a 4" or 6" house connection no protection is required if distance is more than 12".
5. For Type A crossings, Class 150 C.I.P. or ductile iron pipe may be used as an alternate. For Type B crossing reinforced encasement is always required.

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 10/95
APPROVED FOR DISTRIBUTION 	SANITARY SEWER ENCASEMENT	DRAWING NO. C-22.15	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	ADDED GENERAL NOTE	PNB	10/95
2	ADDED REBAR TO VIEW	PNB	10/95
3			
4			



- GENERAL NOTES**
1. Type A pipe support may be used for any Type crossing condition.
 2. Type C pipe support may be used for crossing pipes with a bell diameter of 18" or less if sufficient clearance over storm sewer is available and total span is less than 34'.
 3. Intermediate pipe support shall be used in conjunction with Type C pipe support if total span exceeds max. W in table.
 4. The contractor shall be responsible for furnishing all supports both permanent and temporary. Temporary supports shall not be a separate pay item.
 5. Permanent pipe supports may be decreased from plan quantities or extended to include some listed below as temporary supports if conditions warrant these changes at the time of construction. Decision shall be made by the engineer.
 6. When Type A pipe support is used and whenever so directed by the engineer, the contractor shall pierce the wall with suitable openings to prevent unequal pressure resulting from flooding of the backfill. The volume of the pierced opening shall not exceed 1/2 the volume of the supporting wall.
 7. Use Type B pipe support instead of Type C when clearance between pipes is less than Y in table.
 - ① 8. Concrete cover for reinforcing steel shall be 3", minimum.



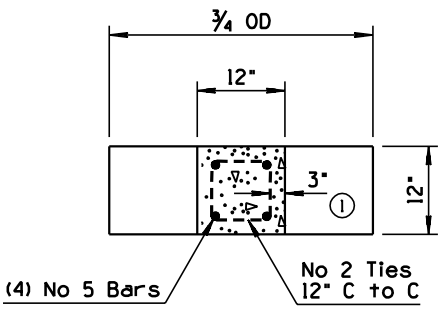
SCHEDULE OF REQUIRED SUPPORTS		
PERMANENT	TEMPORARY	
Sewer Lines	Cast Iron Pipe	Conc Storm Drain
	Conc Irrig Pipe	Conc Box Culvert
	Buried Telco	Traffic Control Conduit
	Gas Pipes	Water and Sewer Lines

NOTE:
Other utilities as noted on the plans or as required by the engineer at time of construction.

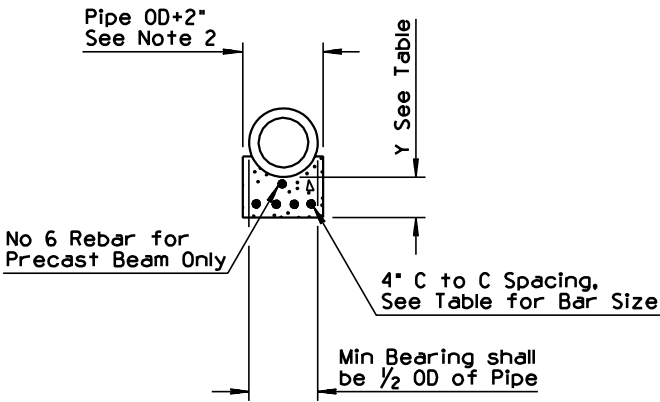
DESIGN APPROVED <i>Henry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>		DRAWING NO. C-22.20 Sheet 1 of 3

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED REBAR CLEARANCE	PNB	10/95
2			
3			
4			

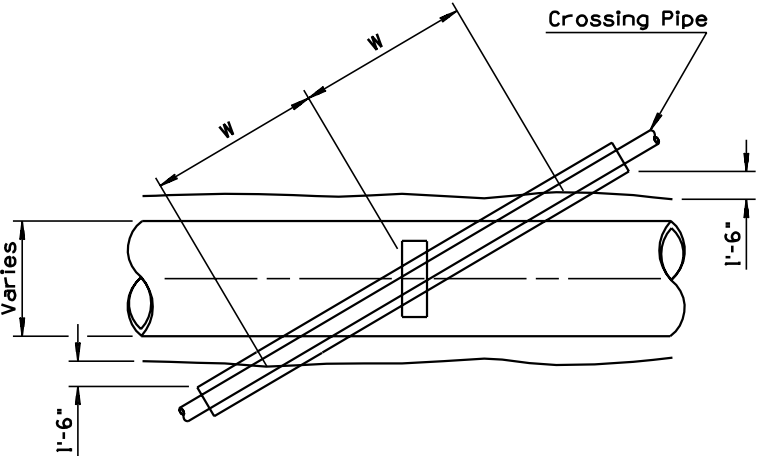
TABLE				
'W'	DEPTH OF COVER ON SUPPORTS			
	0' TO 8'		8' TO 16'	
	BAR NO.	Y	BAR NO.	Y
TO 6'	5	8"	6	11"
7'	5	9"	6	12"
8'	5	10"	6	13"
9'	6	11"	6	14"
10'	6	12"	7	15"
11'	6	13"	7	16"
12'	6	14"	7	17"
13'	7	15"	7	19"
14'	7	16"	8	20"
15'	7	17"	8	21"
16'	7	18"		
17'	8	19"		



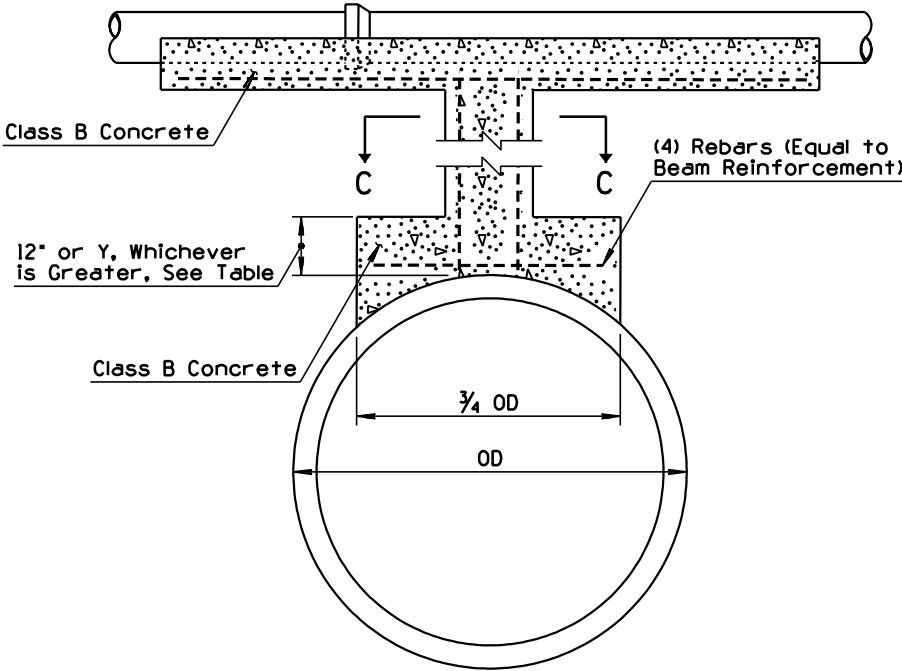
SECTION C-C



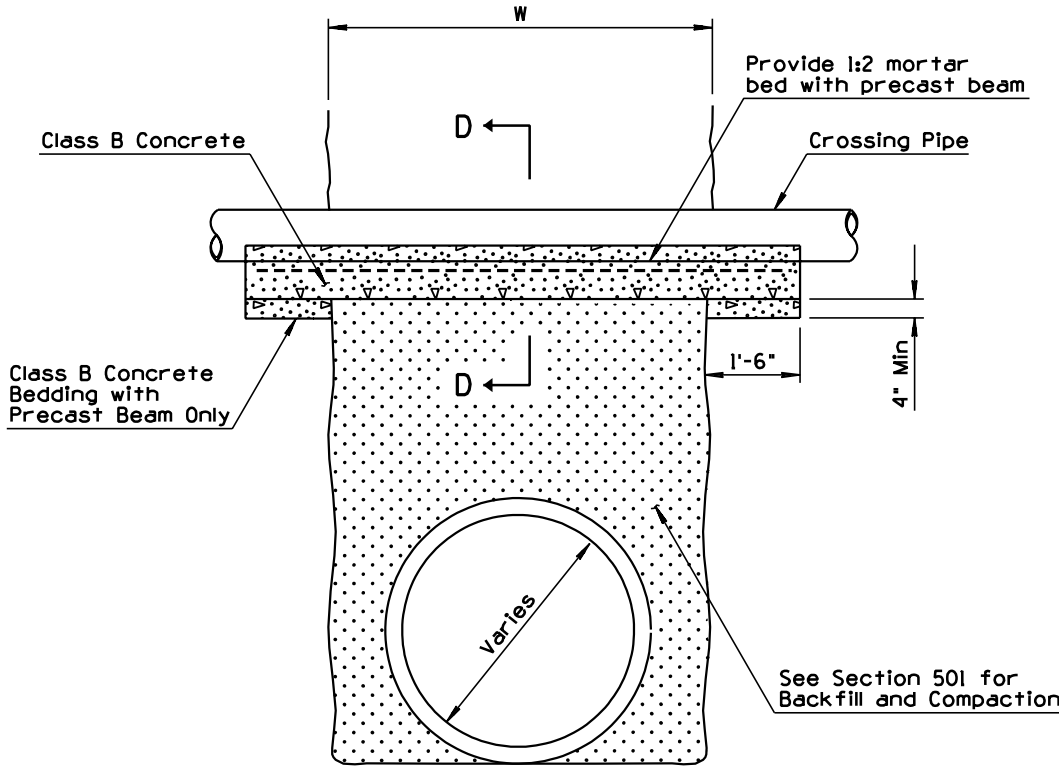
SECTION D-D



PLAN FOR TYPE B SUPPORT

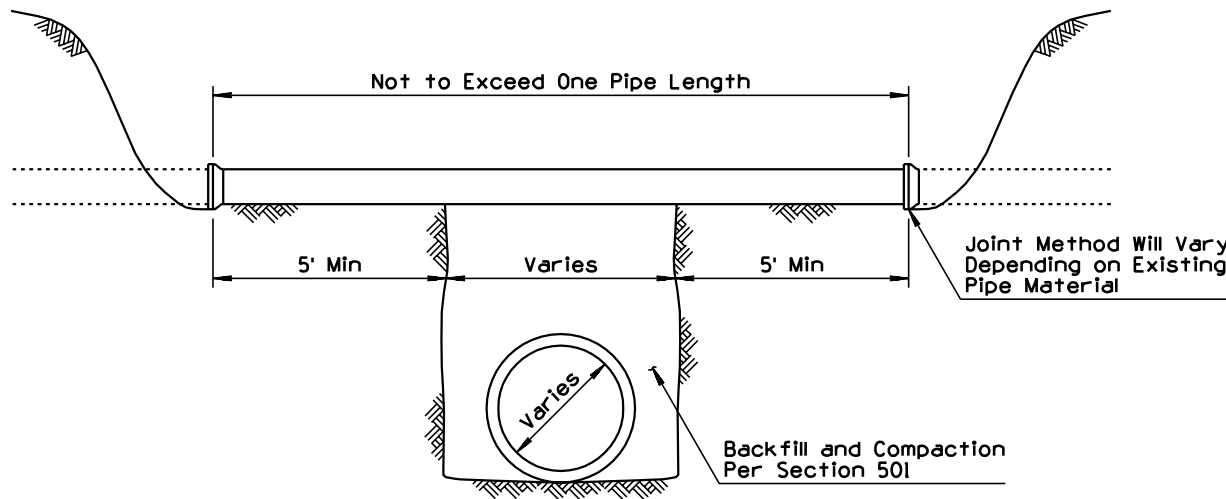
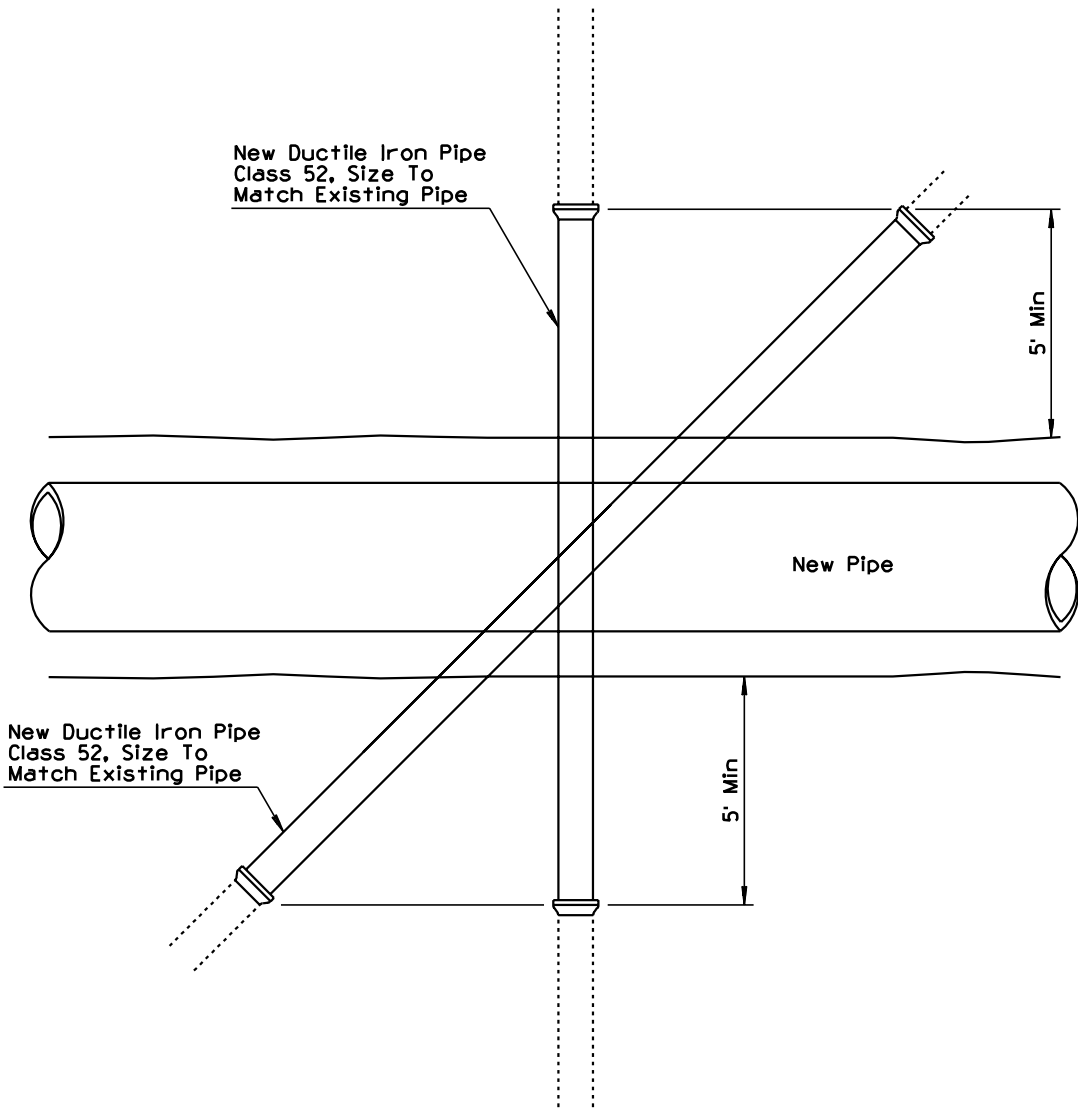


INTERMEDIATE SUPPORT FOR
TYPE B CROSSINGS



TYPE C

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			

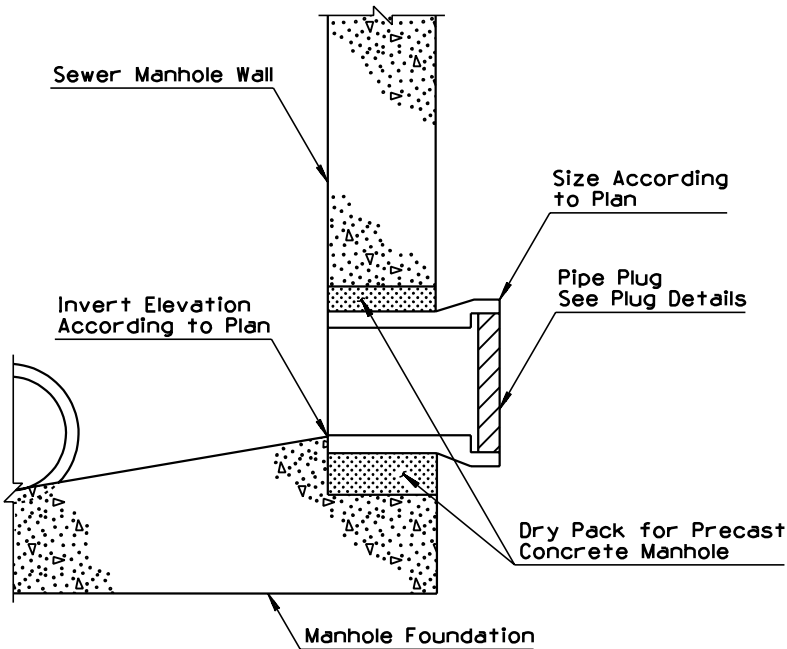


ALTERNATE TO PIPE SUPPORT

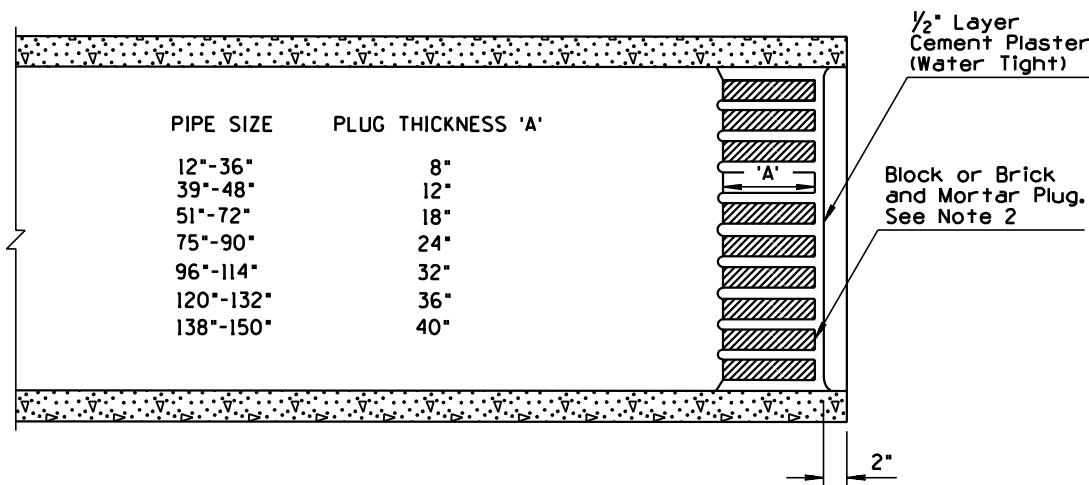
DESIGN APPROVED <i>Henry H. Ottens</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-22.20 Sheet 3 of 3

① PIPE SUPPORT ACROSS TRENCHES

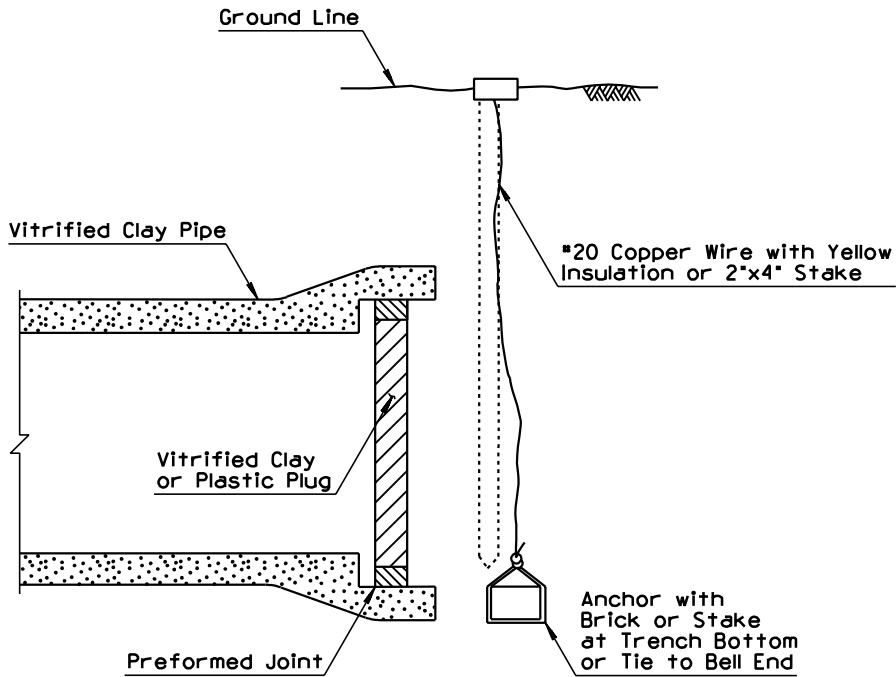
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			



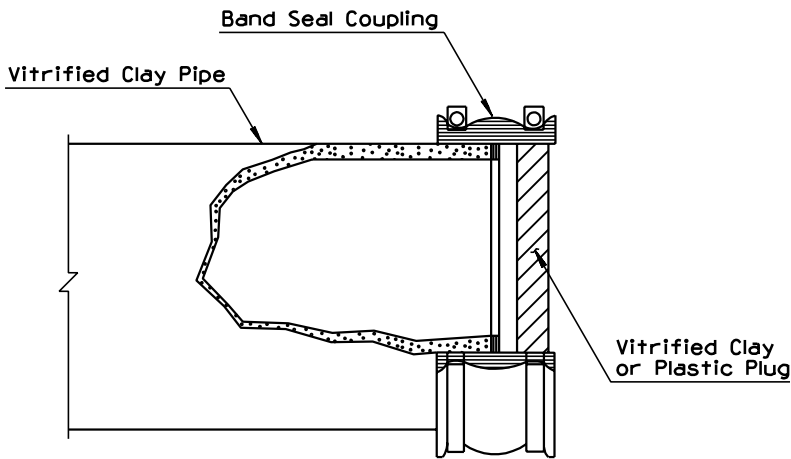
TYPICAL STUB OUT



STORM DRAIN LINE PLUG



PIPE PLUG MARKER



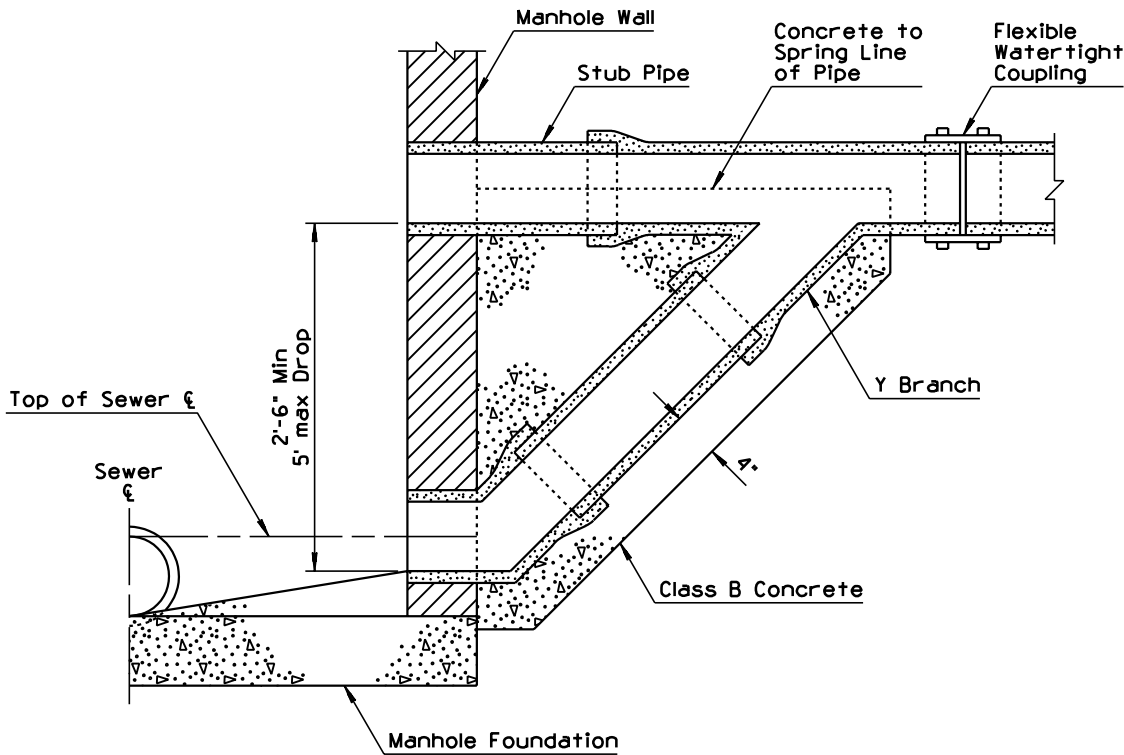
SEWER LINE PLUG

GENERAL NOTES

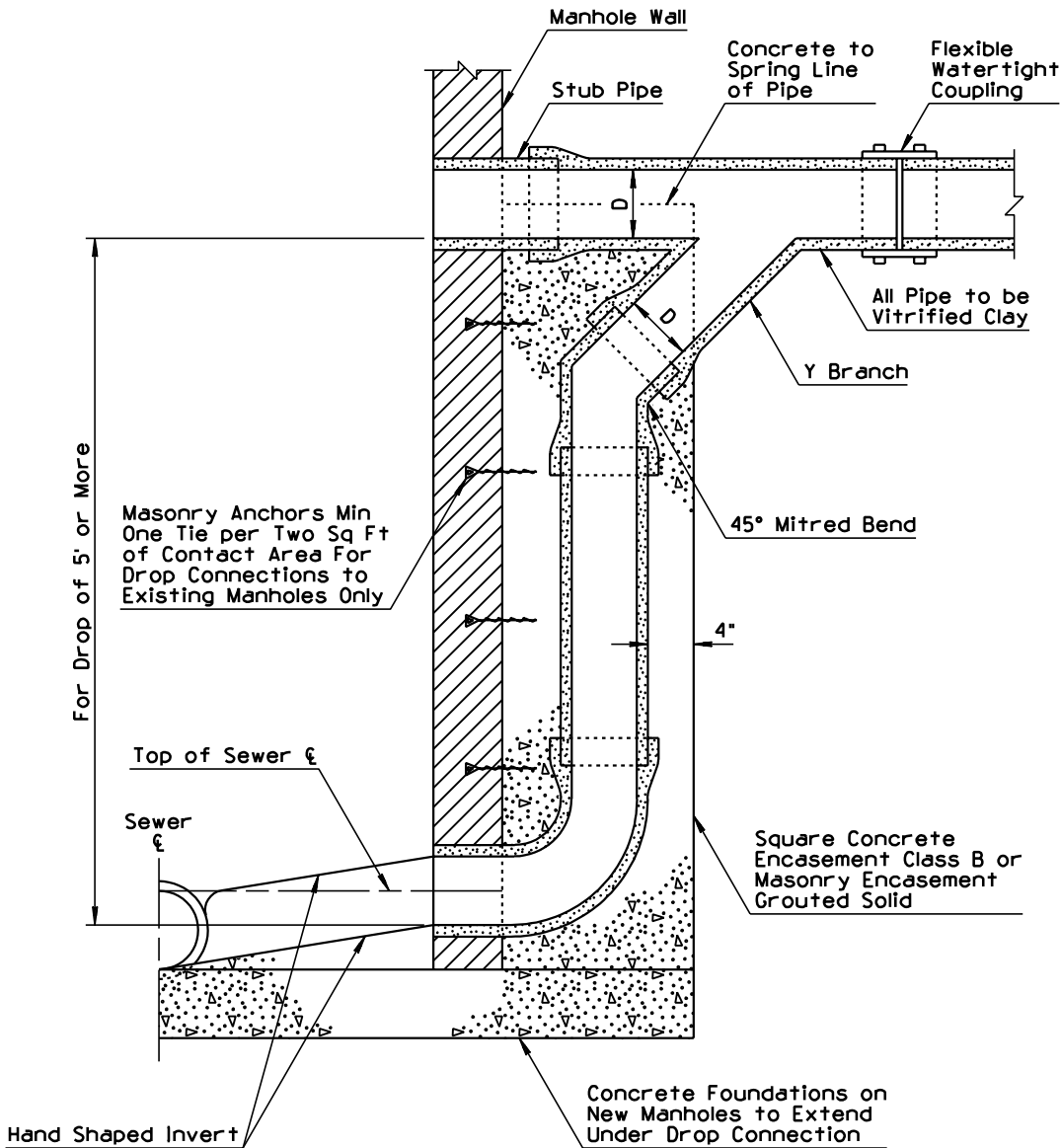
1. Compact soil at end of pipe to 95% of maximum density.
2. If depth of cover is less than 5' or greater than 10', increase plug thickness a minimum of 4".

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-22.30

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			



TYPE A
2.5' TO 5' DROP

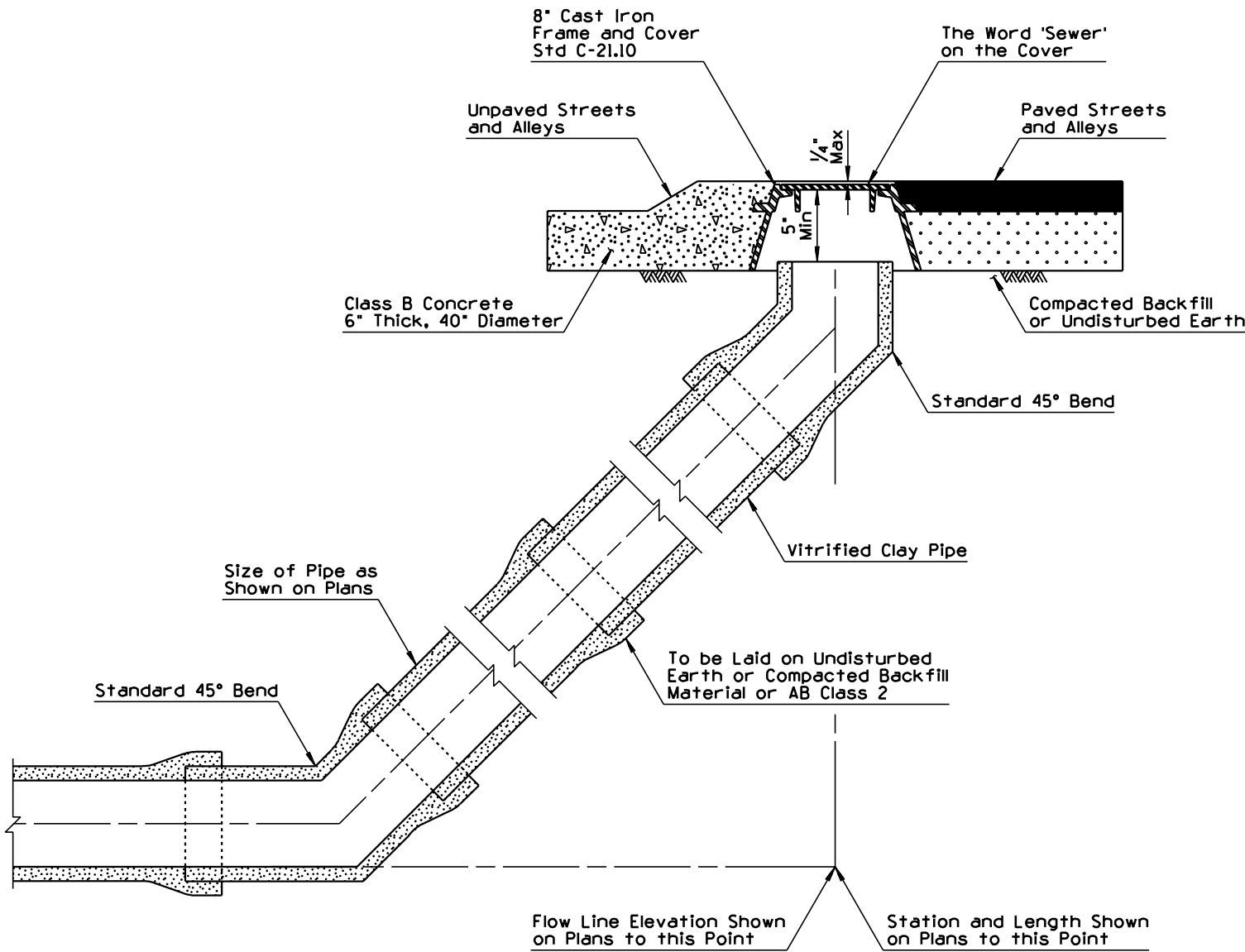


TYPE B
5' OR MORE DROP

NOTE:
D = Same Diameter Pipe

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① DROP SEWER CONNECTIONS	DRAWING NO. C-22.35	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REISSUE STD	PNB	7/94
2			
3			
4			



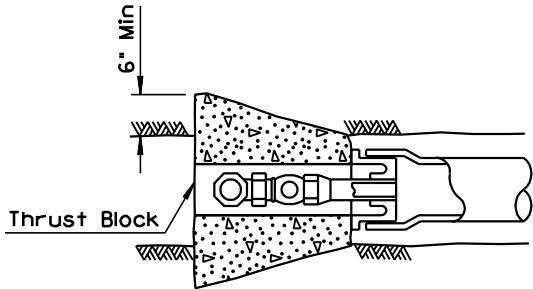
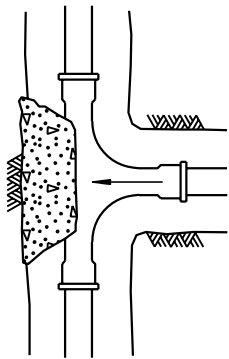
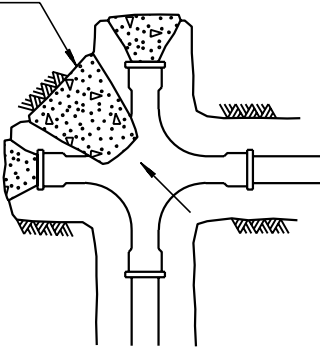
CLEANOUT INSTALLATION

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>[Signature]</i>		DRAWING NO. C-22.40

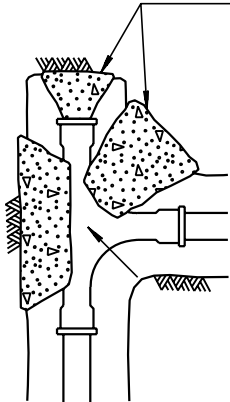
① SEWER CLEANOUT

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			

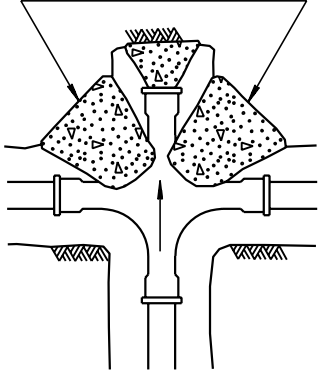
Area required for 90° Bend



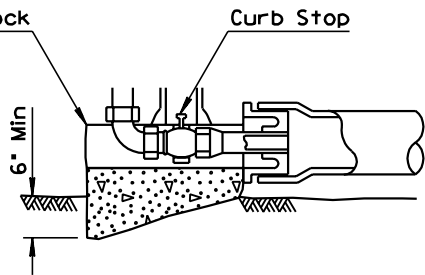
1/2 Area Required for 90° Bend



Total Area Equals Area Required for Tee



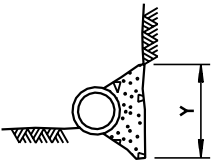
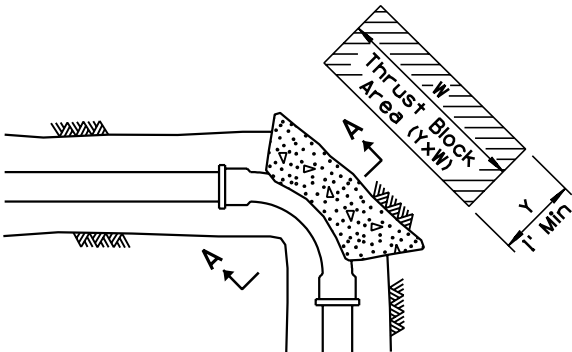
Thrust Block Curb Stop



GENERAL NOTES

1. Thrust blocks are to extend to undisturbed ground.
2. All concrete shall be class B.
3. Table is based on 3000#/sq. ft. soil. If conditions are found to indicate soil bearing less, the areas shall be increased accordingly.
4. Areas for pipe larger than 16" shall be calculated for each project.
5. Form all non bearing vertical surfaces.

MINIMUM THRUST BLOCK AREA REQUIRED (Y x W)		
PIPE SIZE	WATER PIPE	
	TEE, DEAD END, 90° BEND	45° & 22½° BENDS
4" & LESS	3 SQ. FEET	3 SQ. FEET
6"	4 " "	3 " "
8"	6 " "	3 " "
10"	9 " "	5 " "
12"	13 " "	7 " "
16"	23 " "	12 " "

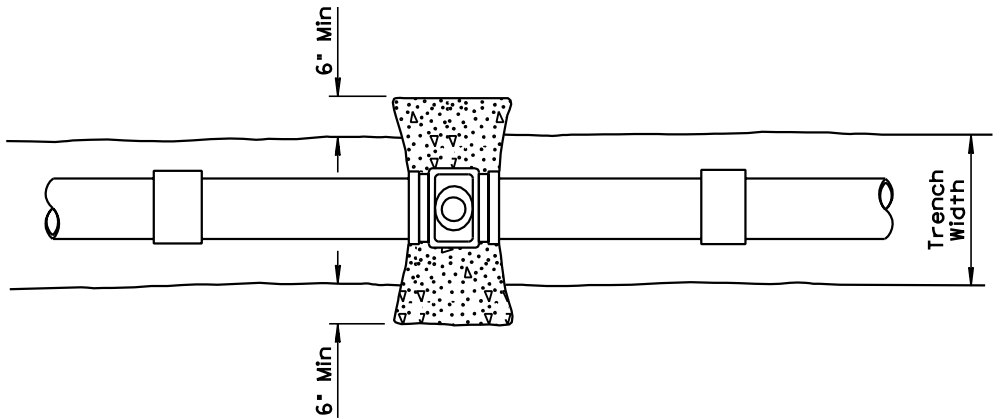


SECTION A-A

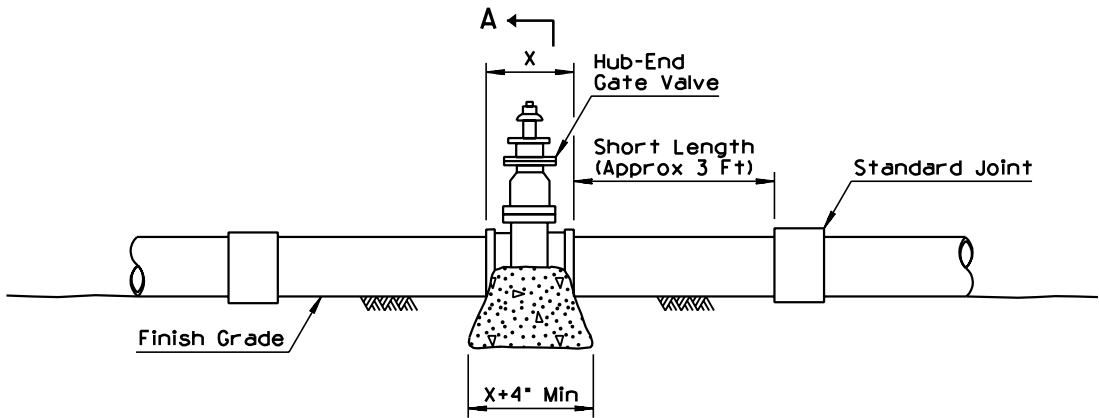
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>[Signature]</i>		DRAWING NO. C-23.10

① THRUST BLOCKS FOR WATER LINES

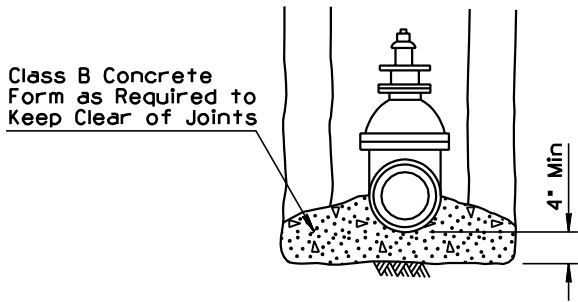
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			



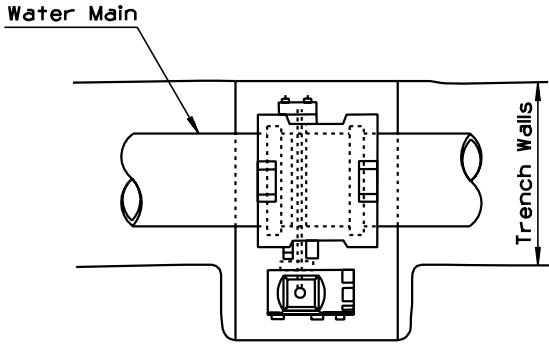
PLAN



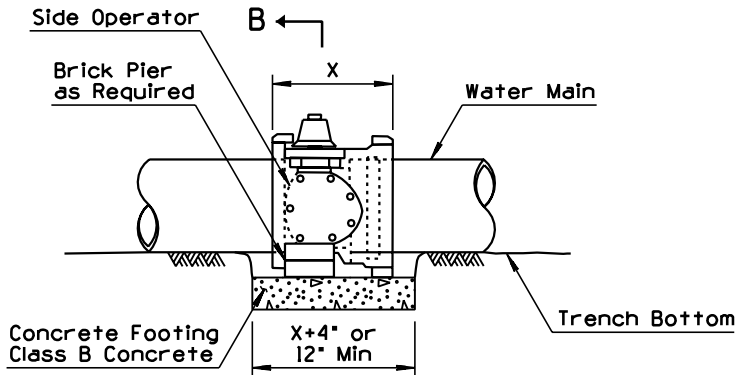
ELEVATION



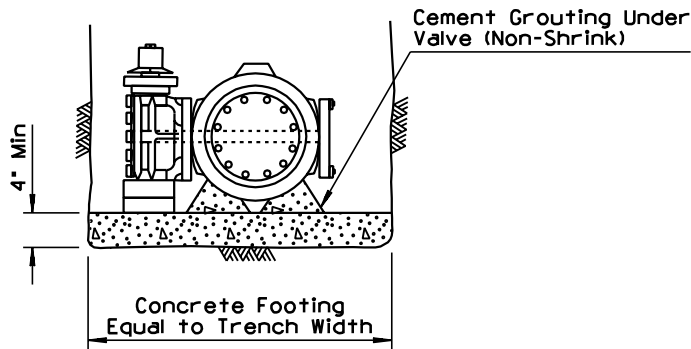
SECTION A-A
GATE VALVE



PLAN



ELEVATION



SECTION B-B
BUTTERFLY VALVE

GENERAL NOTES

1. Gate valves 4" to 16" may be used with any type of pipe.
2. Gate valves larger than 16" to be detailed on plans.
3. Butterfly valves 3" to 12" may be used with any type of pipe.
4. Butterfly valves larger than 12" to be detailed on plans.
5. Valve box and cover required per Std C-23.30.

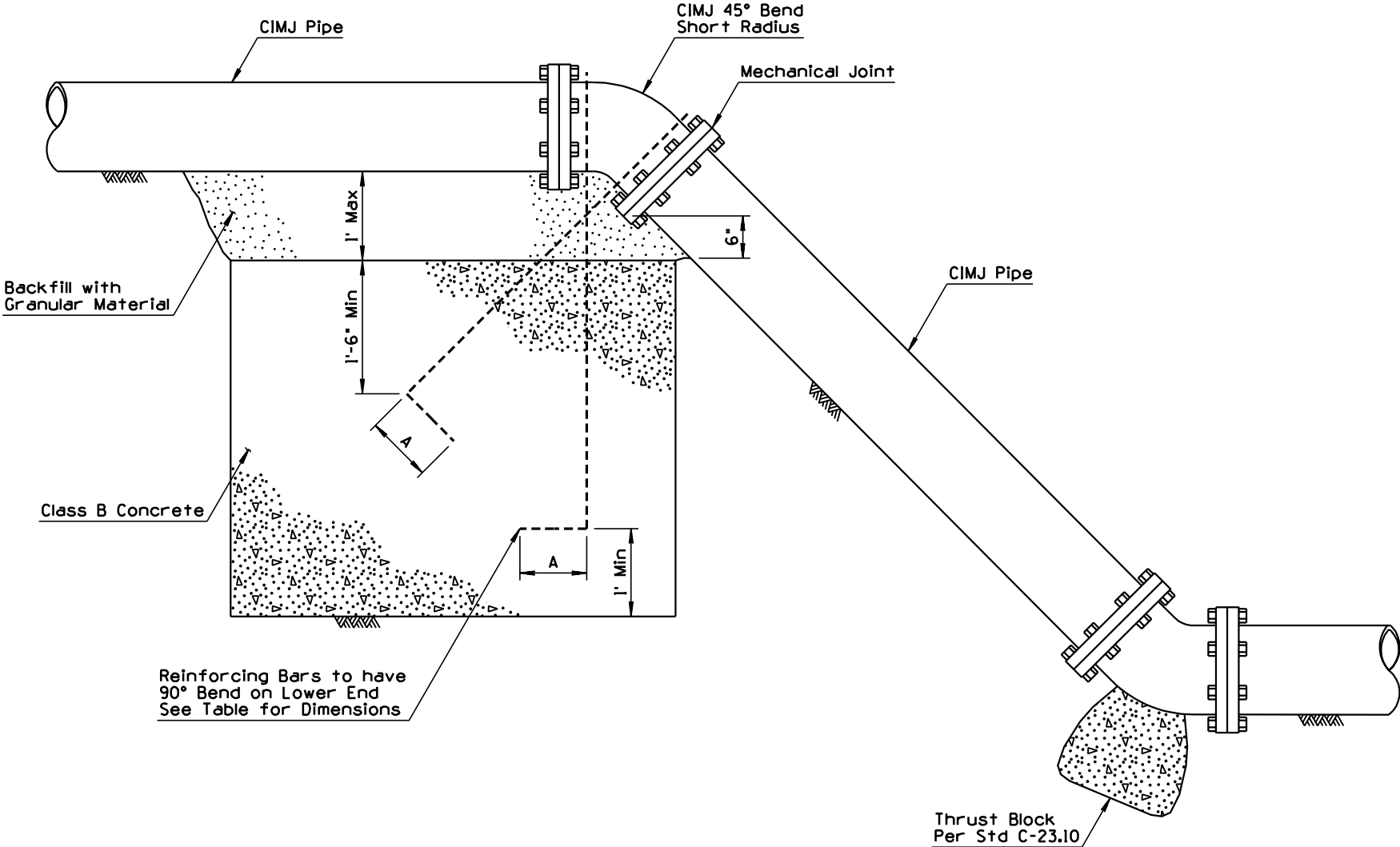
DESIGN APPROVED <i>Henry H. Ottensm</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>		DRAWING NO. C-23.15

① BLOCKING FOR WATER VALVES
GATE AND BUTTERFLY

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			



GENERAL NOTES

1. Either this detail or restraint rods may be used when allowed to relocate a water line upward to cross over a conflict.
2. Ductile iron pipe may be used.
3. Anchor blocks for pipe larger than 12" shall be calculated for each project.
4. Reinforcing bars to be coated with 2 coats of coal tar, epoxy, or by other approved methods.

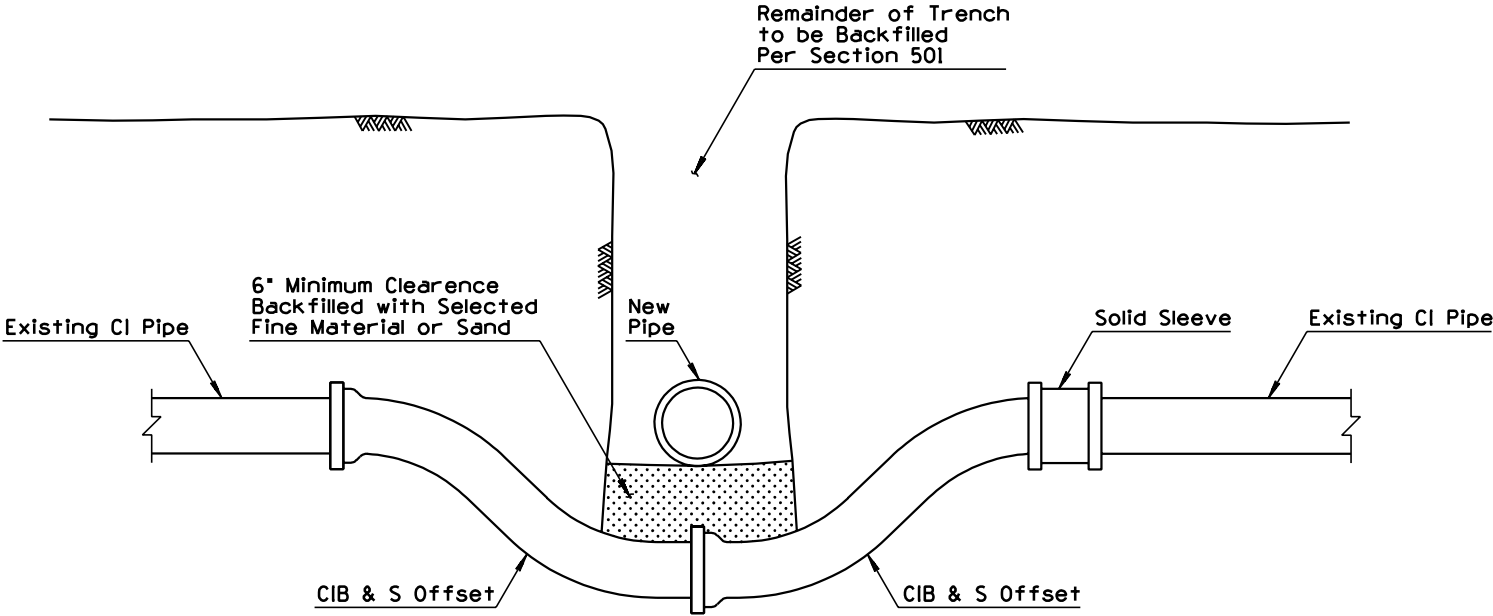


PIPE SIZE	MINIMUM BAR SIZE	A-DIMENSION (HOOK)	MINIMUM # BLOCK DIMENSION
6"	#6	6"	3'x3'x3'
8"	#6	9"	4'x4'x2.5'
12"	#8	9"	4'x5'x5'

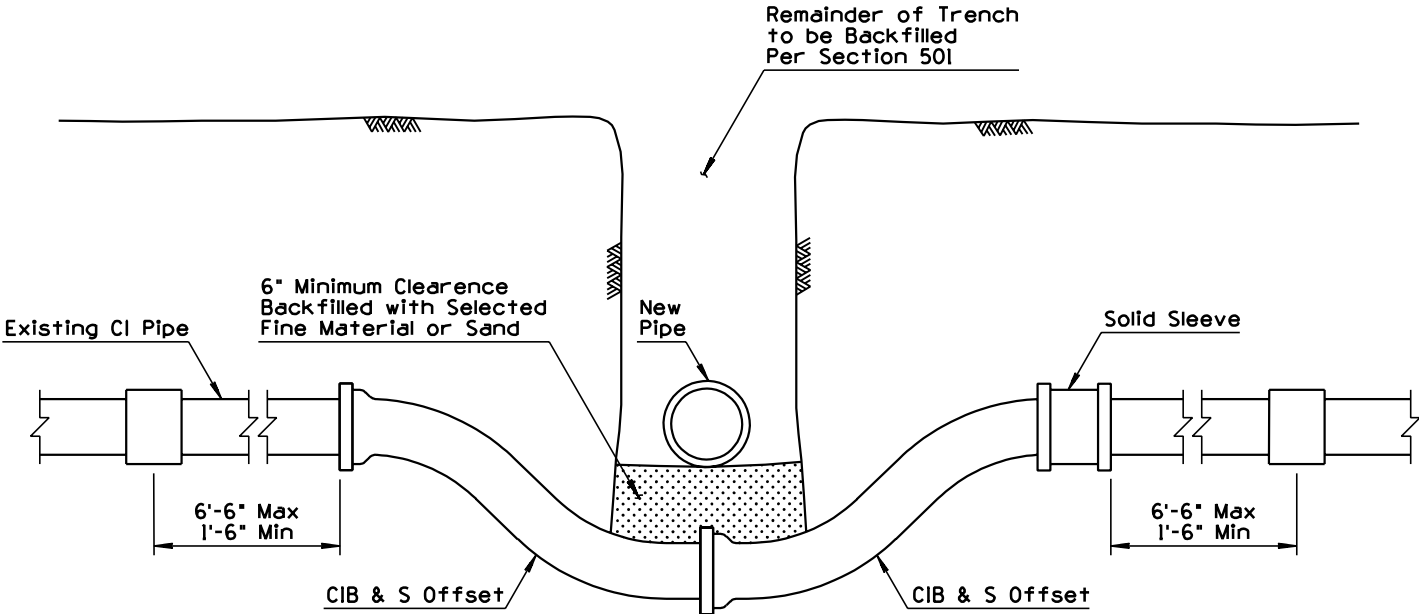
* For 125 psi Working Pressure

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION 	① ANCHOR BLOCK FOR VERTICAL BENDS	DRAWING NO. C-23.20	

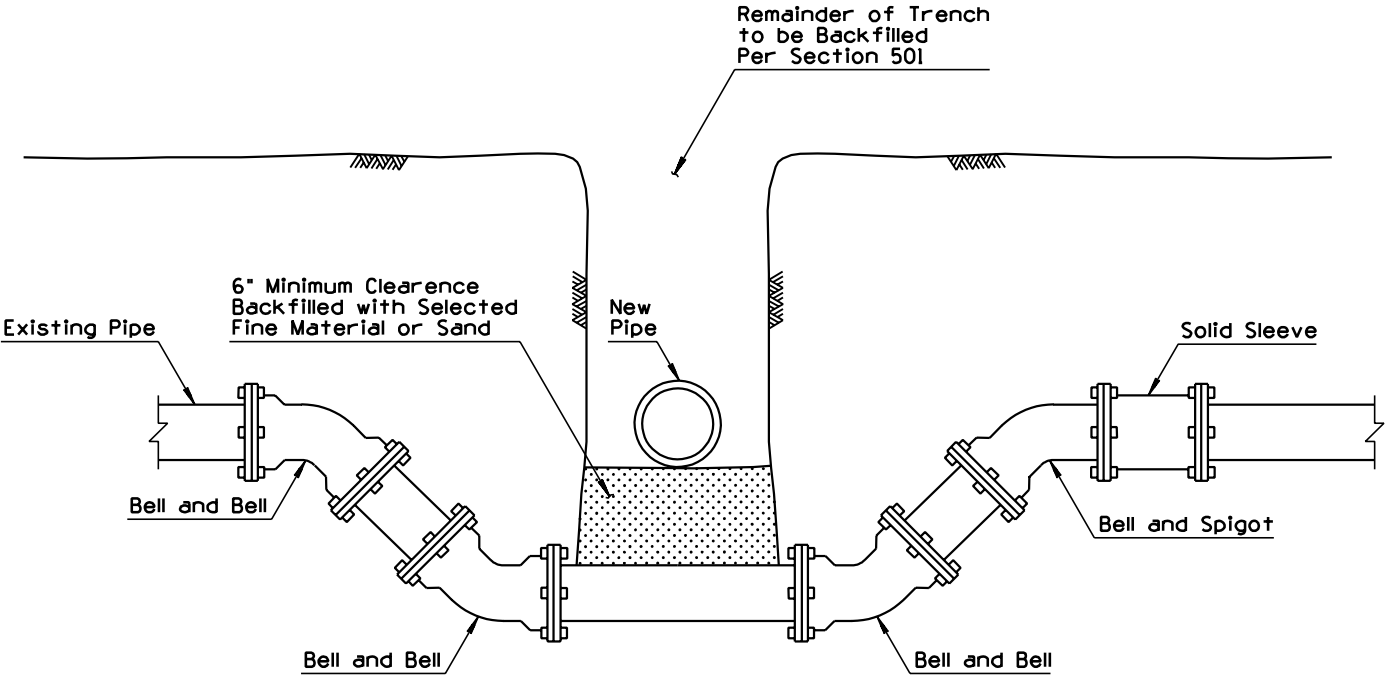
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			



CAST IRON



ASBESTOS CEMENT



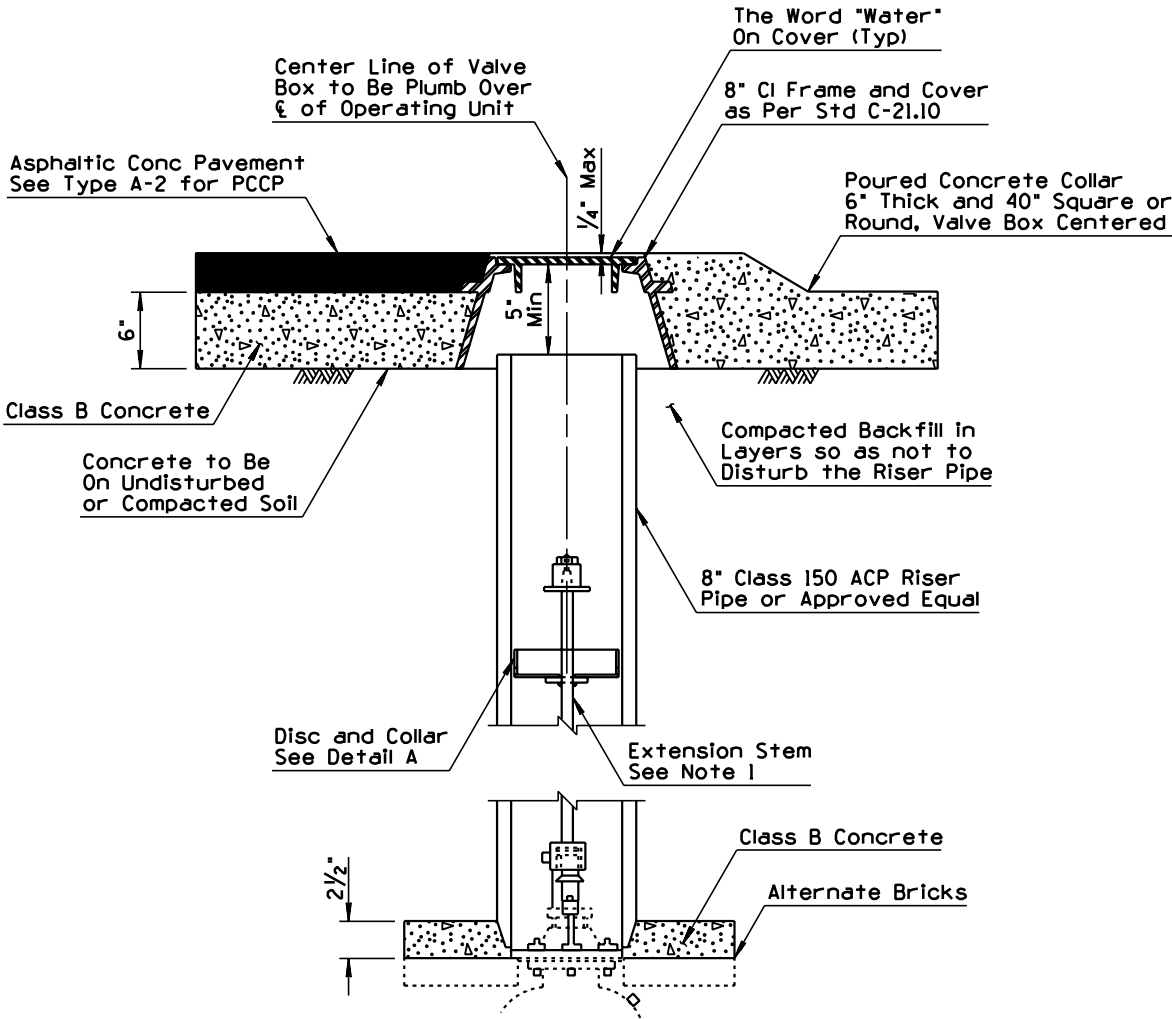
CAST IRON
MECHANICAL JOINT

GENERAL NOTES

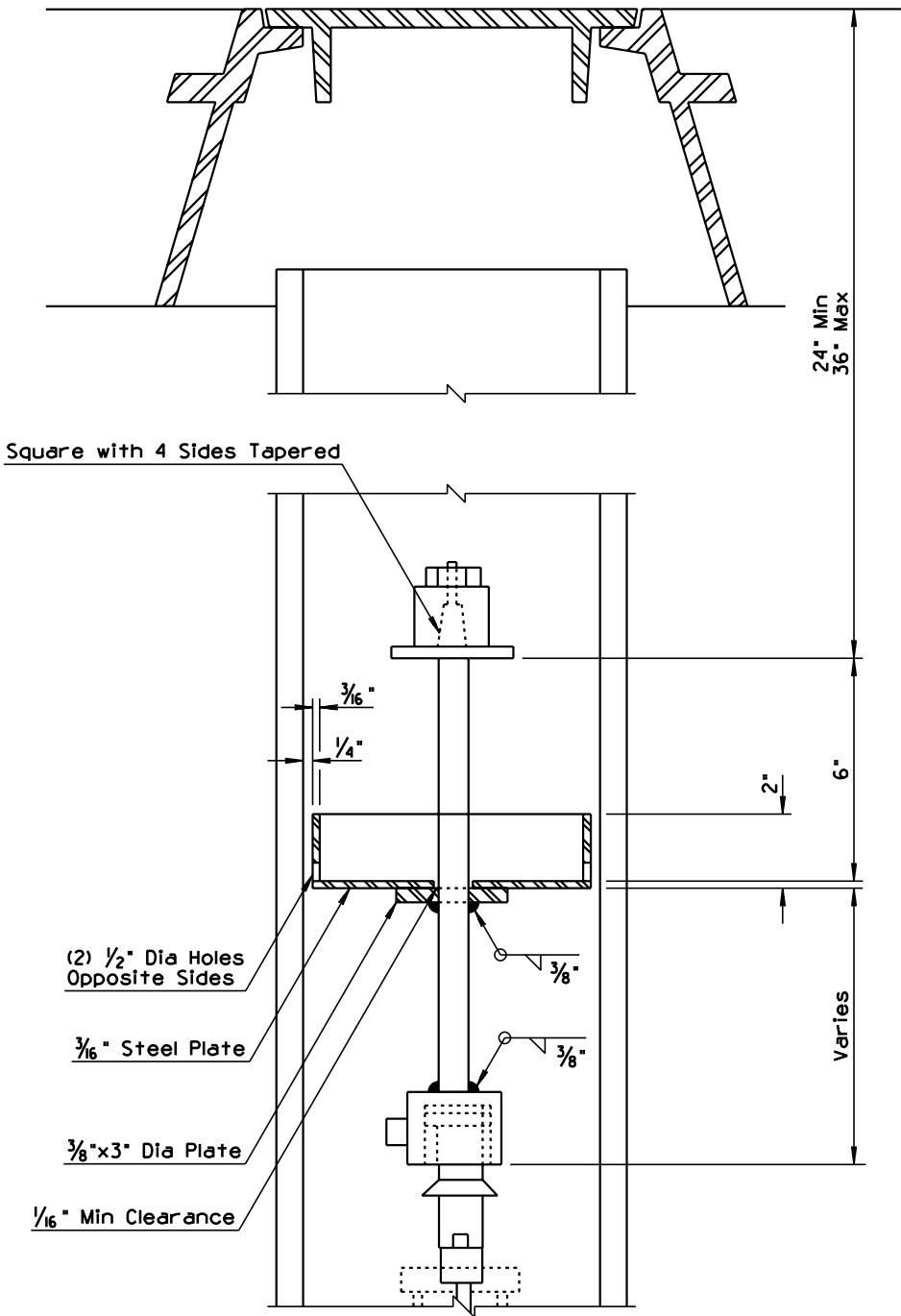
1. This detail covers moving of water mains, 2" to 12" only.
2. Thrust blocking per Std C-23.10 and C-23.20.
3. If offset is to go over obstruction, joint restraints must be used.
4. Pipe is to be cast iron or ductile iron.
5. 45° cast iron bends may be used in place of cast iron offsets.
6. Drop section is to be prefabricated and installed as a single unit for cast iron mechanical joints.

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>		
① VERTICAL REALIGNMENT OF WATER MAINS	DRAWING NO. C-23.25	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED GENERAL NOTE	PNB	10/95
2			
3			
4			



TYPE A-1
TO BE USED IN AREAS SUBJECT TO VEHICULAR TRAFFIC



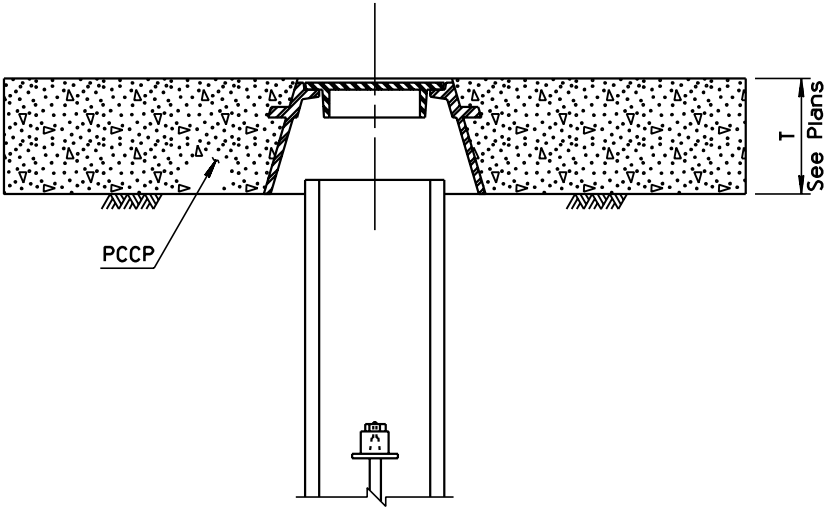
DETAIL A

GENERAL NOTES

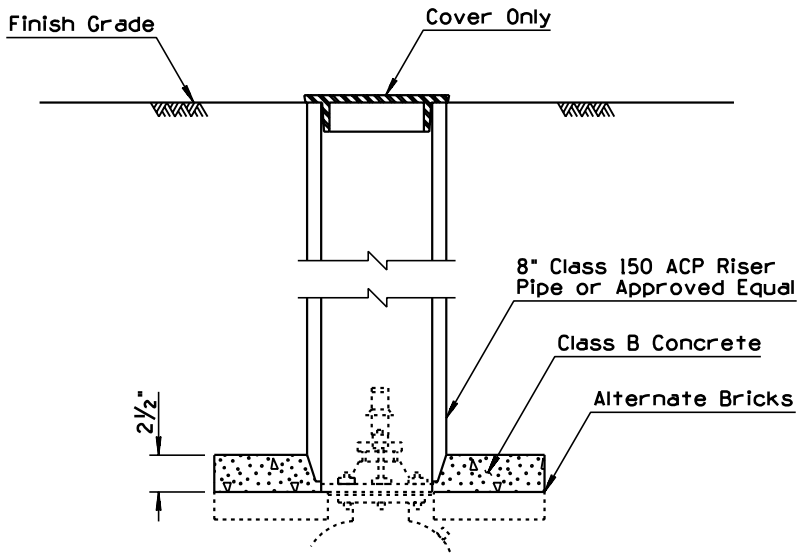
- Extension to valve stems required on all valves where operating nut is over 5' below surface. Extension stem shall be 1/4" minimum diameter steel designation A-15, with square socket on bottom to fit 2" square valve nut. Length to fit each installation. 2" square operating nut to be held on top of the extension stem with stop nut.
- If two or more joints of ACP are used to make riser, use standard AC pipe rubber gasket coupling to join pipe. Where riser pipe length exceeds 10', use 12" AC pipe.
- ① All steel to have prime coat of paint No. 4 and one heavy application (finish coat) of Light Grey Enamel paint as per section 1002-4.06.
- Valve box shall be adjusted to the finished grade prior to the placing of the asphaltic concrete surface or PCCP.
- Ground below the concrete pad or three bricks to be compacted to 95% of the maximum density.
- Use Parkson, Tyler Apco, or equal deep skirted cover (4" or more) type, sliding adjustable cast iron valve box, CI minimum TS 30,000 psi.

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 10/95
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	VALVE BOX INSTALLATION	DRAWING NO. C-23.30 Sheet 1 of 2	

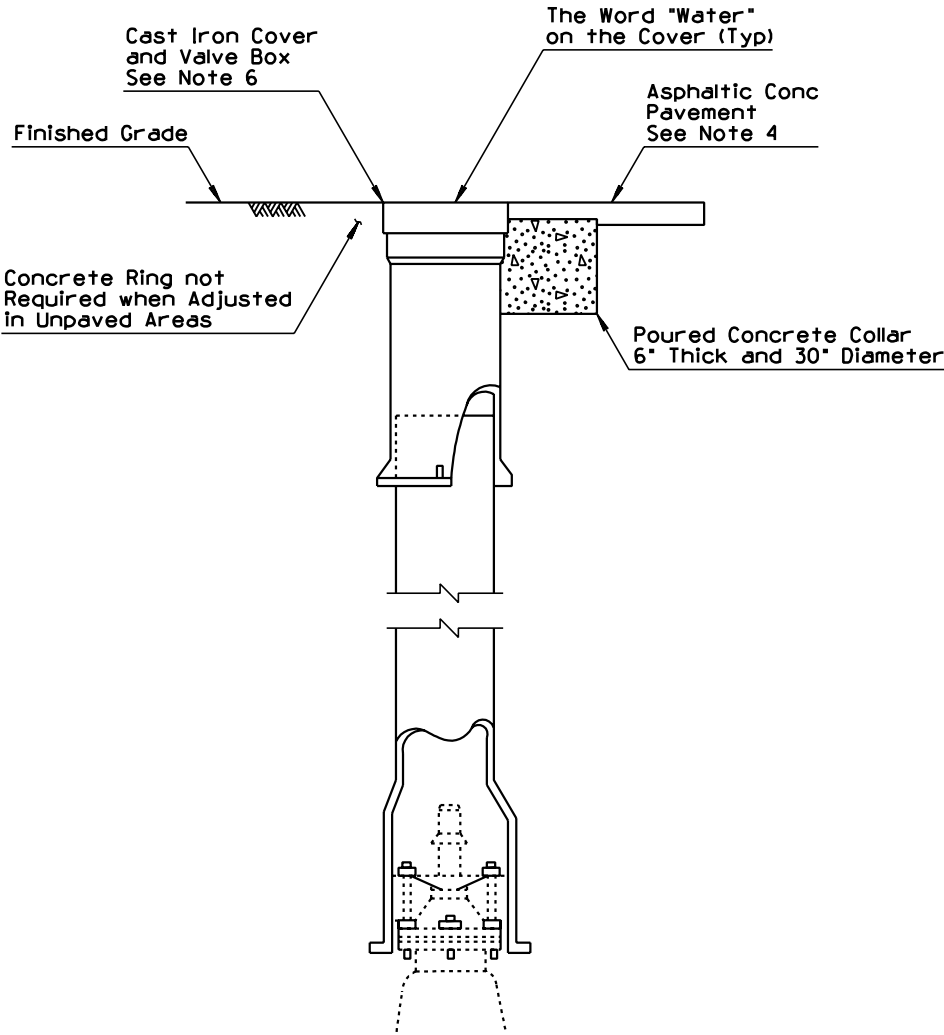
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	MOVED NOTE TO SHT 1	PNB	7/94
2	REARRANGED STD	PNB	7/94
3			
4			



TYPE A-2
TO BE USED WHEN VALVE BOX IS LOCATED WITHIN PCCP PAVEMENT



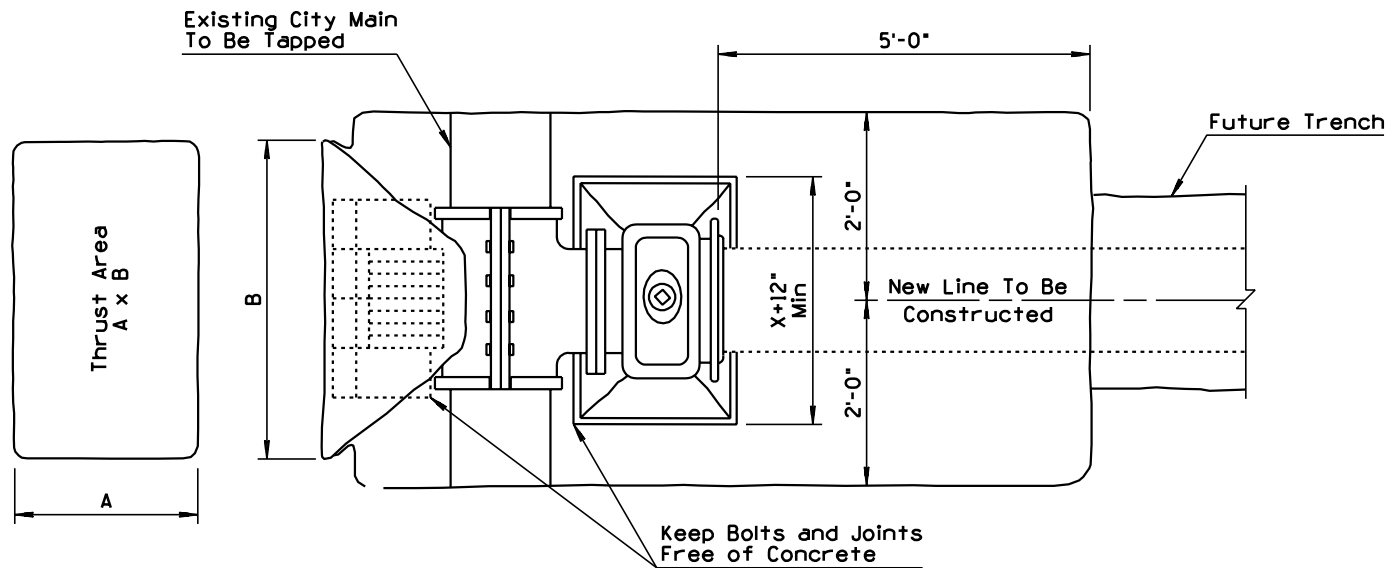
TYPE B
NOT SUBJECT TO VEHICULAR TRAFFIC



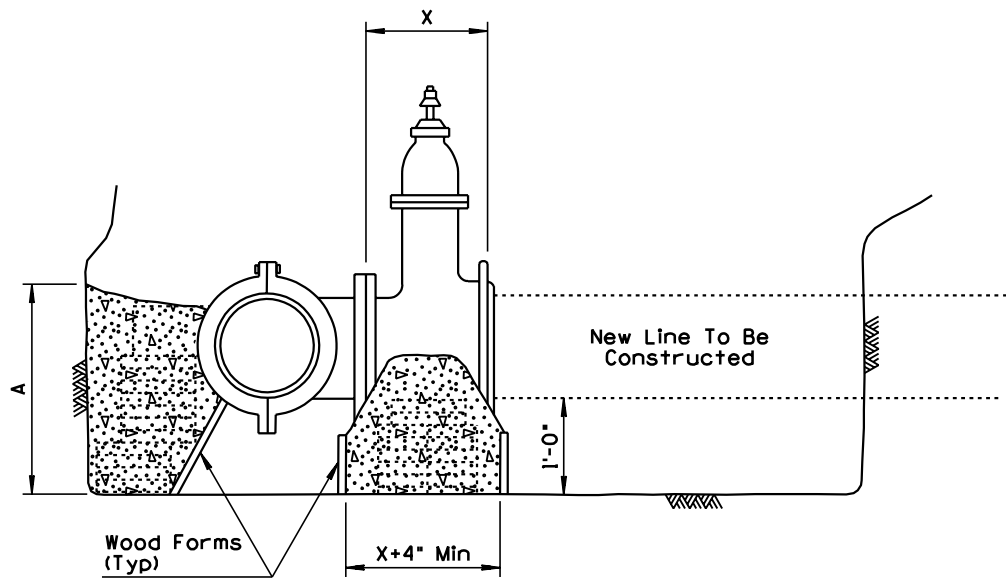
TYPE C

DESIGN APPROVED <i>Larry H. Osterman</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS		REV. 7/94
APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	② VALVE BOX INSTALLATION	DRAWING NO. C-23.30 Sheet 2 of 2	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD. ESP. NOTES	PNB	7/94
2			
3			
4			



PLAN



ELEVATION

GENERAL NOTES

1. Thrust blocks are to extend to undisturbed ground.
2. Optional blocking of 2"x8"x12" solid concrete masonry units may be used as indicated.
3. All concrete shall be class B normally, cure 24 hours before backfilling, or use high, early strength concrete.
4. All taps shall be made by city crews at prevailing rates.
5. Install permanent blocking under valve before tap is made. All flange bolts shall be clear of footing.
6. All tapping sleeves must be pressure tested prior to request for tap by city.
7. Contractor shall excavate as shown and shall set tapping sleeve and valve, and tighten all bolts prior to requesting city to make tap.
8. Tapping sleeve to be placed a minimum of 18" from any bell, coupling, valve, or other obstruction.
9. Areas for pipe larger than 16" shall be calculated for each project.

SIZE OF PIPE BEING CONNECTED	MINIMUM THRUST AREA REQUIRED EQUALS (A x B)
4" & LESS	3 SQUARE FEET
6"	4 SQUARE FEET
8"	6 SQUARE FEET
10"	9 SQUARE FEET
12"	13 SQUARE FEET
16"	23 SQUARE FEET

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APPROVED FOR DISTRIBUTION <i>Ronald Williams</i>	① TAPPING SLEEVE AND VALVE INSTALLATION	DRAWING NO. C-23.35	

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REVISED SPECIFICATION CALLOUT	PNB	10/95
2			
3			
4			

CLAMP DETAIL

NOTE:
Rods are attached to lugs cast on bell of hydrant. If hydrant is not fitted with lugs, rods are attached as shown below by the dashed line.

Hydrant Anchor

GENERAL NOTES

- This detail is for use only on underground installations where the use of concrete thrust blocking per Std C-23.10 cannot be used because of obstructions, or requirements of the specifications.
- Washers may be cast iron or steel, and may be round or square. Holes shall be 1/8 inch larger than the rods.
- All tie rods, rod couplings, turnbuckles, bolts and nuts for these joints shall be of carbon steel equivalent to ASTM A-307, grade B, with cadmium plating in accordance with ASTM B 766, except that the minimum thickness of the plating shall be .0002 of an inch. Cadmium plated bolts shall have class 2A threads and the nuts, rod couplings and turnbuckles shall have 2B threads.
- High strength, heat treated cast iron tee-head bolts with hexagon nuts, all in accordance with the strength requirements of AWWA C-111, may be used in lieu of the cadmium plated bolts and nuts.
- The sketches in this series of figures show acceptable methods of providing anchorage. There is no particular significance to be attached to whether the sketch shows a bell and spigot joint or a standard mechanical joint. The anchoring procedure illustrated applies in most cases to either type of joint. In some cases, dimensions of the particular pipe or hub and space available for working around the particular joint will influence the choice of methods used.
- In certain assemblies of rod and clamps shown, rods run from a lug on the fitting (or a clamp behind the hub of a bell) to a clamp against a face of a bell. Note that this arrangement anchors only one joint. The stability of the joint where the clamp is against the face of the bell depends on having soil above a relatively long piece of pipe on both sides of the joint. Consequently, if the distance between the first and the second joint is less than 12 feet, the second joint shown shall be anchored by a clamp behind the hub of the bell and rods to a clamp at the face of the next bell.
- For pipe larger than 12 inch diameter, restraint details shall be submitted for approval prior to installation.
- All exposed metal shall be coated with asphaltic primer per subsection 907-2.02.
- Bolt holes in clamps shall be 1/16 inch larger than the bolts.

PIPE SIZE	A	B	C	D	CLAMP	ROD	BOLTS	WASHERS	
								CAST IRON	STEEL
4"	12 1/2"	10 7/8"	2 1/2"	1 3/4"	1/2"x2"	3/4"	5/8"	5/8"x3"	1/2"x3"
6"	14 1/2"	12 7/8"	3 9/16"	2 13/16"	1/2"x2"	3/4"	5/8"	5/8"x3"	1/2"x3"
8"	16 3/4"	14 3/8"	4 7/16"	3 7/16"	5/8"x2 1/2"	3/4"	5/8"	5/8"x3"	1/2"x3"
10"	19 1/16"	16 11/16"	5 3/4"	5"	5/8"x2 1/2"	7/8"	3/4"	5/8"x3"	1/2"x3"
12"	22 5/16"	19 3/16"	6 3/4"	5 7/8"	5/8"x3"	7/8"	7/8"	3/4"x3 1/2"	1/2"x3 1/2"

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STANDARD DRAWINGS

DRAWING NO.
C-23.40

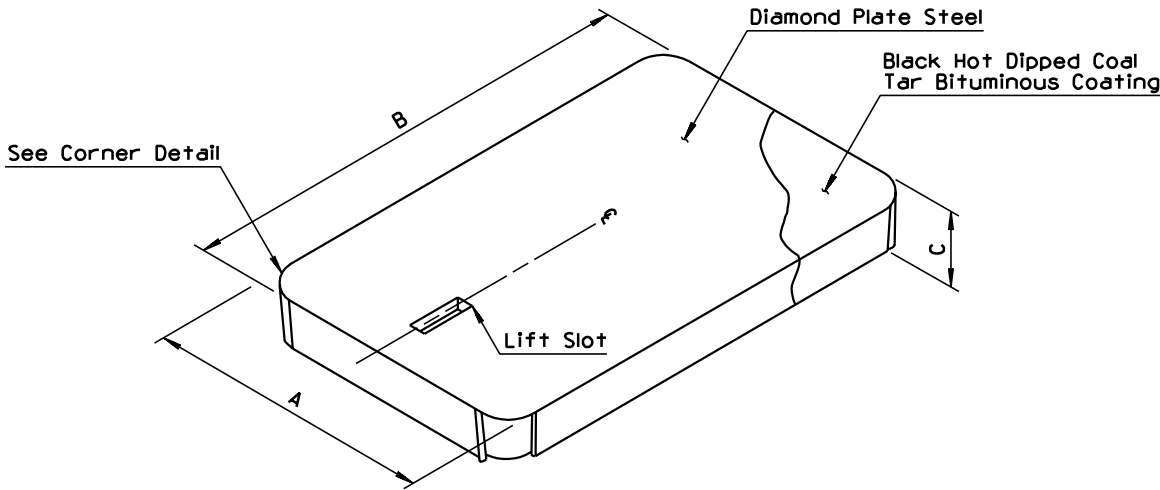
REV. 10/95

JOINT RESTRAINT WITH TIE RODS

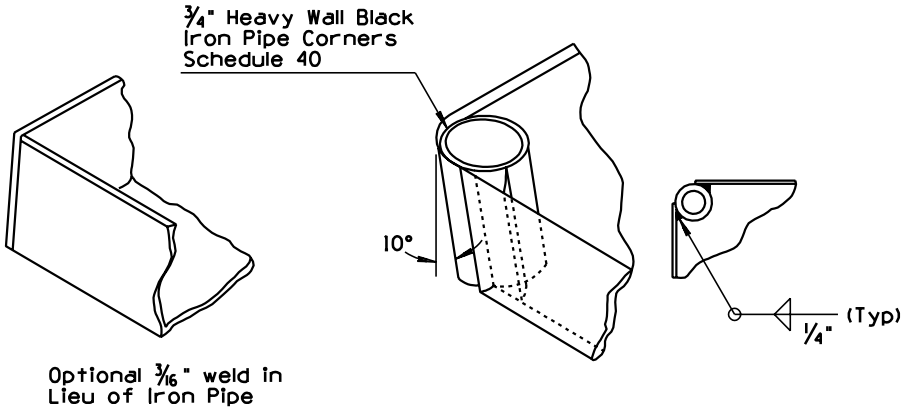
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
2			
3			
4			

GENERAL NOTES

1. All steel per section 1004-1 and 1004-2.



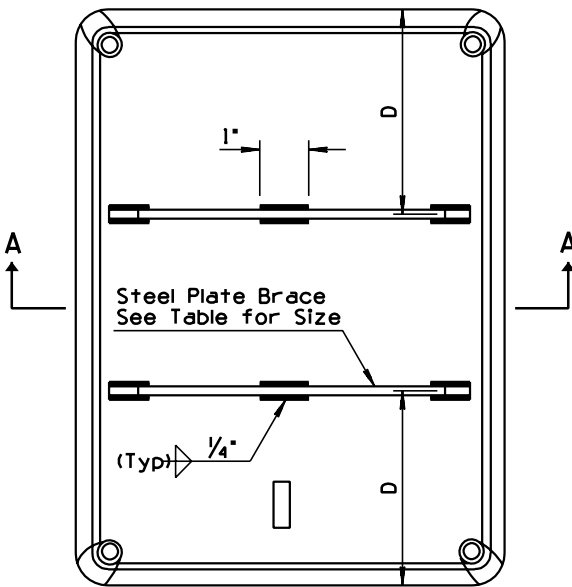
PERSPECTIVE



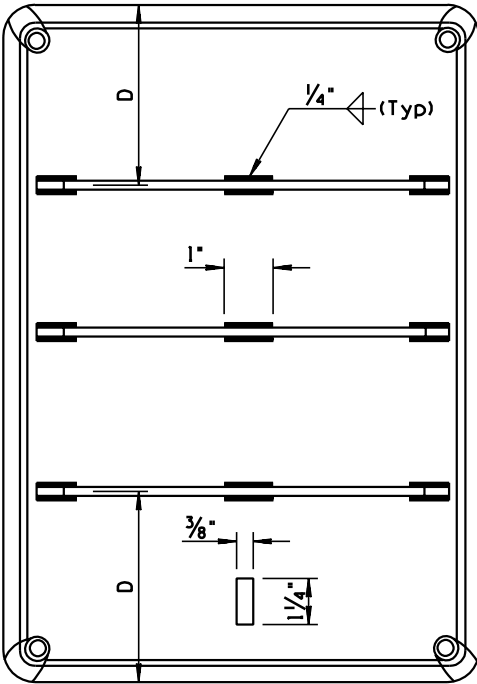
CORNER DETAIL



SECTION A-A



DETAIL 1



DETAIL 2

SPECIFICATIONS

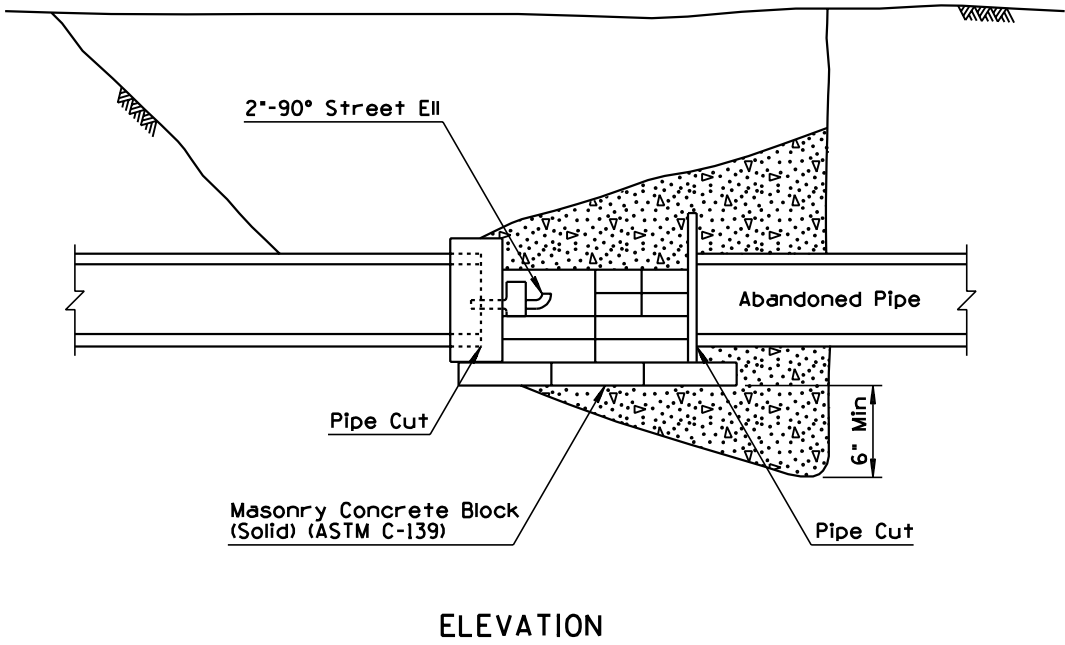
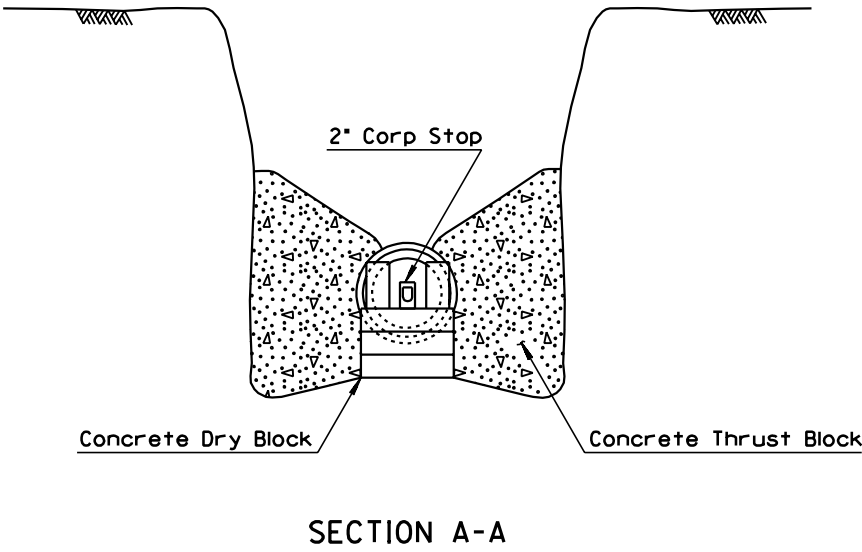
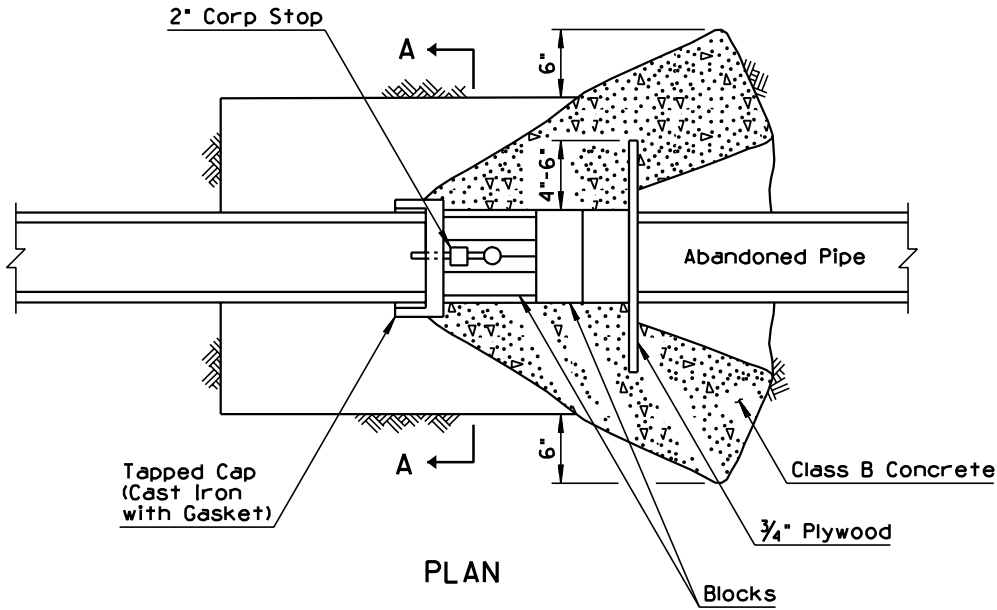
NO	A	B	C	D	STEEL PLATE BRACE		WEIGHT	MATERIAL
1	9"	15 7/8"	1 3/8"	None	None	None	5 1/4 Lbs	14 Gauge
2	14 1/8"	21 3/4"	1 1/2"	6 1/2"	3/16" x 1 1/4" x 13 1/8"	Detail 1	12 3/4 Lbs	12 Gauge
3	15 1/4"	26 1/4"	1 1/2"	8 1/4"	3/16" x 1 1/4" x 14 1/4"	Detail 1	19 1/4 Lbs	12 Gauge
4	19 1/2"	30"	1 1/2"	7 7/8"	3/16" x 1 1/4" x 18 3/4"	Detail 2	33 Lbs	11 Gauge



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APPROVED FOR DISTRIBUTION <i>[Signature]</i>	①	STEEL COVER FOR WATER METER BOX	DRAWING NO. C-23.50

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REMOVED NOTE	PNB	7/94
2			
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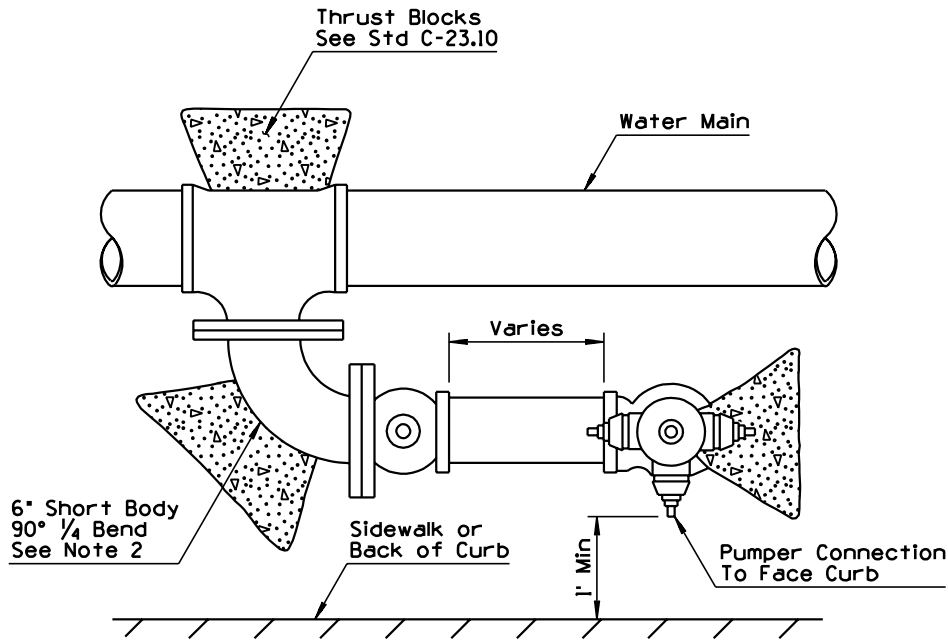
GENERAL NOTES

- Cut and plugs must be adequately "dry blocked".
- Dry blocks shall be standard size solid masonry concrete blocks, (ASTM C-139).
- The quantity and arrangement of the blocking must withstand the line pressure by holding the cap or plug in position.
- Concrete thrust blocks shall not be poured until line pressure is restored and the cap or plug is inspected for leakage.
- Concrete shall not be poured over any portion of the abandoned pipe.
- Minimum thrust block area per Std C-23.10.
- Where a 4" or larger line is specified to be abandoned, the cut and plug should occur at the supply line main to avoid creating an unused deadend line.

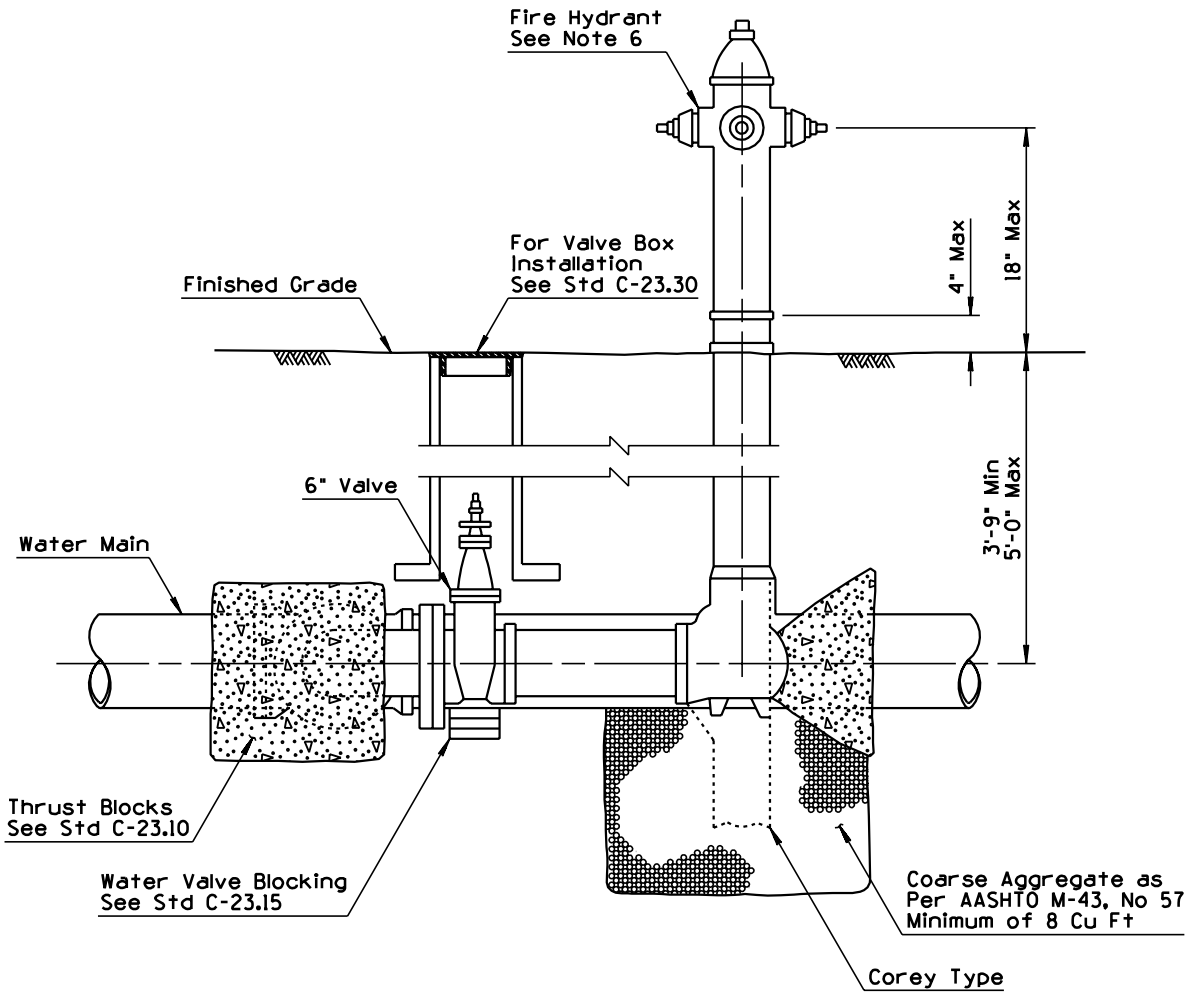


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APPROVED FOR DISTRIBUTION 	WATERLINE CUT AND PLUG FOR 12" DIAMETER MAIN AND SMALLER		DRAWING NO. C-23.55

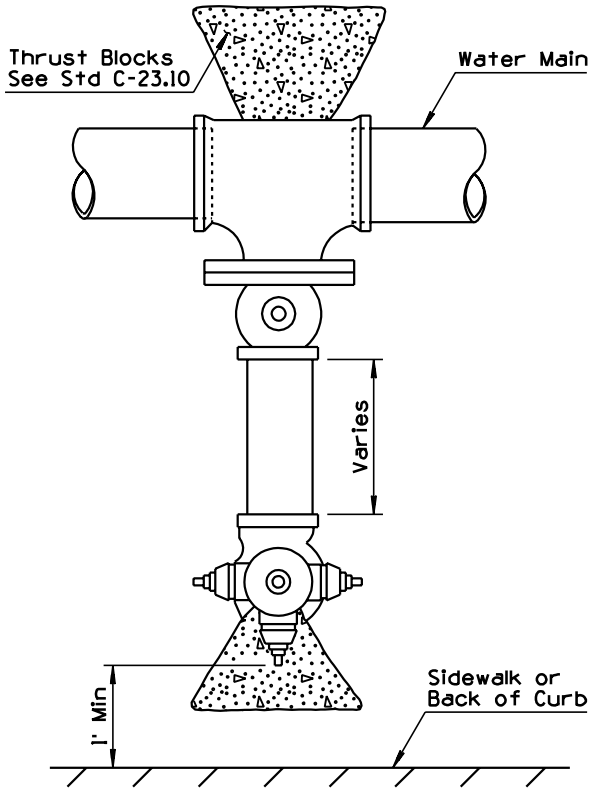
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
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PLAN



ELEVATION



ALTERNATE PLAN
(SEE NOTE 3)

GENERAL NOTES

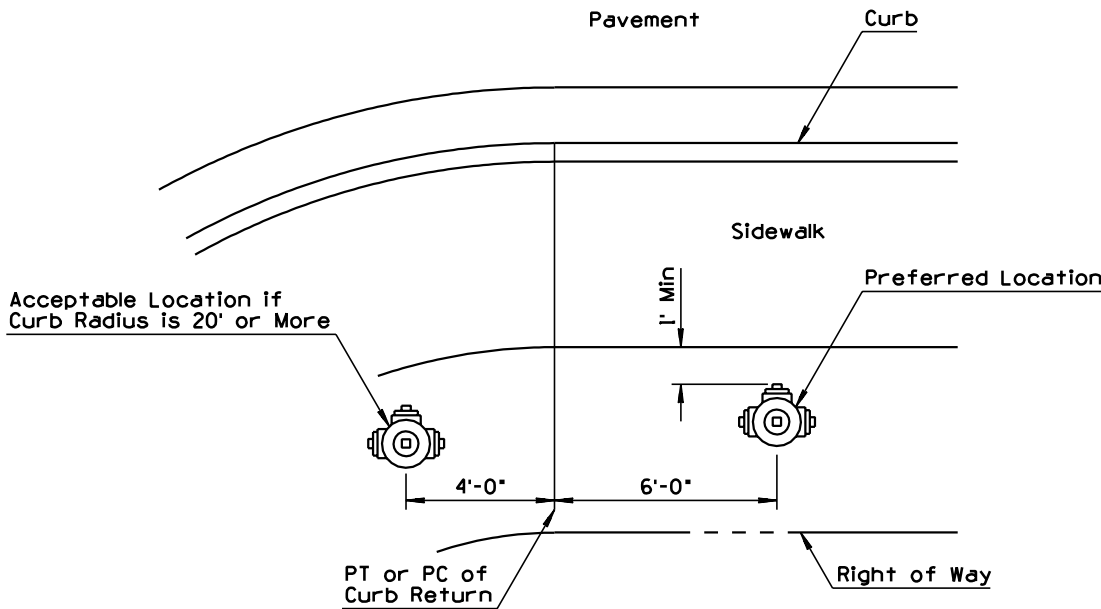
1. All joints in hydrant run-out to be mechanical joints.
2. Hydrant Tee: Clow or approved equal may be used in place of Tee and 90° bend.
3. 90° bend not required if sufficient room for perpendicular installation.
4. See Std C-23.10 and C-23.15 for concrete thrust blocks
5. A flange by mechanical joint shutoff valve, connecting directly to the Tee or below at the main shall be used.
6. Fire hydrant, fire hydrant threads, valve and valve boxes per municipality requirements.

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①	HYDRANT INSTALLATION	DRAWING NO. C-23.60

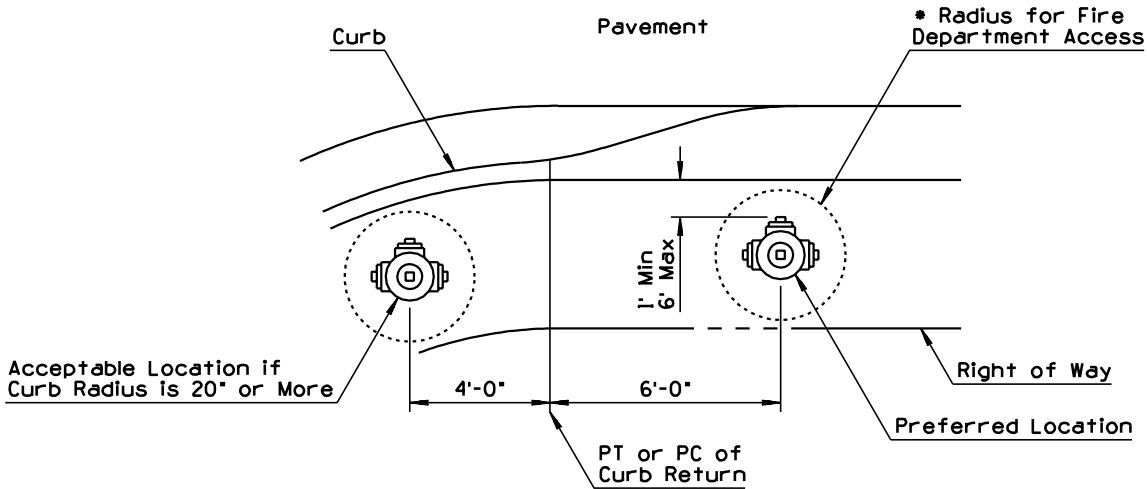
NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	REARRANGED STD	PNB	7/94
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GENERAL NOTES

- Obstructions such as utility poles, street signs, irrigation boxes, fences, etc., must not be placed between curb and hydrant.
- * Radius varies by municipality.
- Dimensions shown on plans supersede locations shown on this detail.
- On locations in midblock, the fire hydrant will be aligned with a property line.



AREA WITH SIDEWALK



PARKWAY AREA OR NO SIDEWALK

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APPROVED FOR DISTRIBUTION <i>Ronald C. Williams</i>	① FIRE HYDRANT LOCATIONS	DRAWING NO. C-23.65	