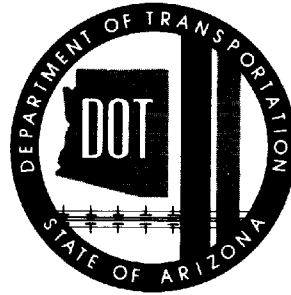


STATE OF ARIZONA

**DEPARTMENT OF TRANSPORTATION
CONSTRUCTION**

JUNE



1986

**DIVISION OF HIGHWAYS
STANDARD DRAWINGS**

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	Pen Size	NEW	Pen Size	EXISTING		Pen Size	NEW	Pen Size	EXISTING
City Limits (Zip-a-Tone No.113, Shade inside) — — — — —			1		Curb, Single with Depressed Area — — — — —	1		00	
County Line — — — — —			2	----	Pavement & Sidewalk Edge — — — — —	1	----	00	----
Forest or Reservation Boundry (Line-Shading, Shade inside)			2		Turnout (Indicate width & surface material) — — — — —	1		00	
Property Line — — — — —	1	—P/L—P/L—	00	—P/L—P/L—	Cut — — — — —	0	—C—C—		
Quarter Section Line — — — — —			1	— —	Fill — — — — —	0	—F—F—		
Right-Of-Way Line — — — — —	1	New R/W	00	Existing R/W	Transition; Cut to Fill — — — — —	0	—C—o—F—		
Section Line — — — — —			1	- - -	Railroad Track (1" = 20') — — — — —			00	
Sixteenth Section Line — — — — —			1	— —	Railroad Track (1" = 100') — — — — —			00	
State or National Boundry — — — — —			4	----	Bank Protection — — — — —	1	XXXXXXXXXX	00	XXXXXXXXXX
Township or Range Line — — — — —			2	----	Bridge — — — — —	1		00	
Mile Post — — — — —	1	MP	00	MP	Building — — — — —	1		00	
Right-Of-Way Marker — — — — —	1		00		Catch Basin, Curb & Gutter — — — — —	1		00	
Survey Monument — — — — —	1		00		Catch Basin, Median Di ke — — — — —			00	
Angle Point — — — — —	1		00		Catch Basin, Off Roadway, Flush — — — — —	1		00	
Construction C, Station Marks — — — — —	3-0		0-0		Catch Basin, Single Curb — — — — —	1		00	
Quarter Corners — — — — —			00		Cattle Guard — — — — —	1		00	
Section Corners — — — — —			00		Concrete Box Culvert — — — — —	1		00	
Survey Control Point — — — — —	1		00		Dike — — — — —	1		00	
Access Control (Chart Pak 256 TAA $\frac{1}{8}$ " wide, Shade outside) —	1	New	00	Existing	Downdrain, one way — — — — —	0		00	
Curb & Gutter with Depressed Curb (1" = 20') — — — — —	1		00						
Curb & Gutter with Depressed Curb (1" = 100') — — — — —	1		00						

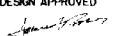
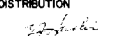
	Pen Size	NEW	Pen Size	EXISTING		Pen Size	NEW	Pen Size	EXISTING
Downdrain, two way— — — — —	0		00		Aggregate Base— — — — —	1		00	AGGREGATE
Manhole— — — — —	1		00		Select Material— — — — —	1		00	SELECT
Manhole Frame & Cover, Reset— — — — —	1				Subgrade Seal— — — — —	1		00	SUBGRADE
Retaining Wall— — — — —	1		00		Ground Line Profile— — — — —			0	
Rock Riprap— — — — —	1		00		Ground Line Section— — — — —	0		00	
Spillway, one way— — — — —	0		00		Barbed Wire Fence & Gate— — — — —	0		00	
Spillway, two way— — — — —	0		00		Chain Link Fence & Gate— — — — —	0		00	
Straight Headwall with End Section (1"=20')— — — — —	1		00		Guard Rail & Breakaway Cable Terminal— — — — —	1		00	
Straight Headwall with End Section (1"=100')— — — — —	1		00		Gas Line— — — — —	0		00	
"U" Headwall with End Section (1"=20')— — — — —	1		00		Irrigation Ditch, Concrete— — — — —	0		00	
"U" Headwall with End Section (1"=100')— — — — —	1		00		Irrigation Ditch, Earth— — — — —	0		00	
Wing Headwall with End Section (1"=20')— — — — —	1		00		Irrigation Line (1"=20')— — — — —	0		00	
Wing Headwall with End Section (1"=100')— — — — —	1		00		Irrigation Line (1"=100')— — — — —	0		00	
Plan, Aggregate Surface (Zip-a-Tone No. 275-20)— — — — —	1		00	1W AGGREGATE	Power or Joint Use Line— — — — —	1		00	
Bituminous Pavement (Zip-a-Tone No. 309)— — — — —	1		00	1W BITUMINOUS	Sanitary Sewer (1"=20')— — — — —	0		00	
Concrete Pavement (Zip-a-Tone No. 340)— — — — —	1		00	1W CONCRETE	Sanitary Sewer (1"=100')— — — — —	0		00	
Graded Surface— — — — —	1		00	1W GRADED	Storm Drain (1"=20')— — — — —	0		00	
Obliterate Pavement (Zip-a-Tone No. 438)— — — — —	1				Storm Drain (1"=100')— — — — —	0		00	
Section, Asphaltic Concrete Friction Course— — — — —	1		00	ACFC	Street Light with Mast Arm— — — — —	1		00	
Bituminous Pavement— — — — —	1		00	BITUMINOUS					
Concrete Pavement— — — — —	1		00	CONCRETE					

DESIGN APPROVED 	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION - STANDARD DRAWINGS	REV DATE
APPROVED FOR DISTRIBUTION 	PLANS SYMBOLS	PLAN NO C-01.11

	Pen Size	NEW	Pen Size	EXISTING
Telephone Booth— — — — —	1	■ T	00	□ T
Telephone Line— — — — —	1	—●—●—●—	00	—○—○—○—○—
Utility Pole with Down Guy & Anchor— — — — —	1	←● ←■	00	←○ ←□
Water or Gas Meter Box— — — — —	0	■ W or G	00	□ W or G
Water or Gas Valve— — — — —	0	◀ W or G	00	◀ W or G
Water Line— — — — —	0	—W—6"	00	—W—6"
Drainage Channel— — — — —	1	—	00	—
Drainage Ditch— — — — —	1	—	00	—
Major Wash— — — — —			00	—Name—
Minor Wash— — — — —			00	—
Hedge— — — — —	0	—	00	—
Palm Tree— — — — —	0	—	00	—
Shrubby— — — — —	0	—	00	—
Unclassified Tree— — — — —	0	—	00	—
Advertising Sign, Large— — — — —			00	△ △
Advertising Sign, Small— — — — —			00	△
Traffic Sign, Single Post— — — — —	1	—	00	—
Traffic Sign, Two or More Posts— — — — —	1	—●—●—	00	—○—○—
℄ Grade, Profile— — — — —	2	—	00	—
Dimensions— — — — —	00	—		
Visible Outlines, Sections, etc.— — — — —	1	—		

	Pen Size	NEW	Pen Size	EXISTING
Ugnd Tel/ Telegraph— — — — —	1	—T—T—	00	—T—T—
Ugnd Power/Joint Use— — — — —	1	—P—P—	00	—P—P—

NOTE
 ALL LINES AND SYMBOLS NOT
 SHOWN WILL CONFORM TO;
 American National Standard Lines for
 Engineering Drawings (ANSI Y14.2-1973)
 American National Standard Symbols for
 Section Lining (ANSI Y14.2-1973)

DESIGN APPROVED 	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION—STANDARD DRAWINGS	REV. DATE
APPROVED FOR DISTRIBUTION 	PLANS SYMBOLS	PLAN NO. C-0112

<u>WORDS</u>	<u>TITLE</u>	<u>TEXT</u>
Abutment	ABT.	abt
Acceleration	ACC.	acc
Acres	AC.	ac
Aggregate	AGG.	agg
Aggregate Base	AB	AB
Ahead	AHD.	ahd
Aluminum	AL.	Al
American Association of State Highway and Transportation Officials	AASHTO	AASHTO
American Concrete Institute	ACI	ACI
American Institute of Steel Construction	AISC	AISC
American National Standards Institute	ANSI	ANSI
American Road and Transportation Builders Association	ARTBA	ARTBA
American Society for Testing Materials	ASTM	ASTM
Amount	AMT.	amt
And Husband	ET VIR.	et vir
And Others	ET AL.	et al
And Wife	ET UX.	et ux
Approximate	APX.	apx
Asphalt	ASPH.	asph
Asphaltic Concrete	AC	AC
Asphaltic Concrete Friction Course	ACFC	ACFC
Asphaltic Concrete Surface Course	ACSC	ACSC
Avenue	AVE.	ave
Average Daily Traffic	ADT	ADT
Back	BK.	bk
Backfill	BKFL.	bkfl
Balance	BAL.	bal
Balance Point	BP	BP
Bank Protection	BANK PRT.	bank prt
Barbed Wire	BW	BW
Bearing	BRG.	brg
Begin	BGN.	bgn
Begin Full Super	BFS	BFS
Bench Mark	BM	BM
Bevel or Beveled	BEV.	bev
Bituminous	BIT.	bit.
Bituminous Mixture	BIT. MIX	bit. mix
Bituminous Surface Treatment	BST	BST
Bituminous Treated Base	BTB	BTB
Black Steel Pipe	BSP	BSP
Borrow	BOR.	bor
Boulevard	BLVD.	blvd
Boundary	BDY.	bdy

<u>WORDS</u>	<u>TITLE</u>	<u>TEXT</u>
Brass Cap	BC	BC
Breakaway Cable Terminal	BCT	BCT
Bridge	BR.	br
Building	BLDG.	bldg
Calculated	CALC.	calc
Cast-In-Place	C-I-P	C-I-P
Cast Iron	CI	CI
Cast Iron Pipe	CIP	CIP
Catch Basin	CB	CB
Cattle Guard	CG	CG
Cattle Pass	CP	CP
Cement	CEM.	cem
Cement Treated Base	CTB	CTB
Center	CTR.	ctr
Center Line	CL	cl
Center To Center	C.T.O.C.	c to c
Channel	CHAN.	chan
Class	CL.	cl
Compact or Compaction	COMP.	comp
Complete In Place	C. IN P.	C. IN P.
Concrete	CONC.	conc
Concrete Box Culvert	CBC	CBC
Connection	CONN.	conn
Construct or Construction	CST.	est
Continuous	CONT.	cont
Corner	COR.	cor
Correction	CORR.	corr
Corrugated Aluminum Pipe	CAP	CAP
Corrugated Aluminum Pipe Arch	CAPA	CAPA
Corrugated Steel Pipe	CSP	CSP
Corrugated Steel Pipe Arch	CSPA	CSPA
County	CO.	co
Crossing	X-ING	x-ing
Cross Section	X-SCT.	x-sct
Crown	CR.	cr
Cubic	CU.	cu
Cubic Feet Per Second	CFS	cfs
Cubic Yard or Cubic Yards	CY	cy

<u>WORDS</u>	<u>TITLE</u>	<u>TEXT</u>
Culvert	CLV.	clv
Curb And Gutter	C & G	C & G
Curve To Spiral	C.S.	C.S.
Deceleration	DCL.	dcl
Deflection	DEF.	def
Deflection Of Total Curve	I	I
Degree Of Curve	D	D
Delineator	DEL.	del
Delta	Δ	Δ
Depressed Curb	DC	DC
Detail	DTL.	dtl
Diameter	DIA.	dia
Dike	DK.	dk
Distance	DST.	dst
Ditch	DT.	dt
Division	DIV.	div
Double	DBL.	dbl
Drain or Drainage	DRN.	drn
Drainage Area	DA	DA
Drawing	DWG.	dwg
Drive	DR.	dr
Each	EA.	ea
Easement	ESM.	esm
East	E	E
Eastbound	EB	EB
Elevation	ELEV.	elev
Elongated	ELG.	elg
Embankment	EMB.	emb
End Full Super	EFS	EFS
Engineer	ENGR.	engr

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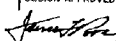
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GENERAL ABBREVIATIONS

DRAWING NO.
C-01.30

WORDS	TITLE	TEXT	WORDS	TITLE	TEXT	WORDS	TITLE	TEXT
Equation	EQ.	eq	Highway	HWY.	hwy	Minimum	MIN	min
Estimate	EST.	est	Horizontal	HOR.	hor	Miscellaneous	MISC.	misc
Excavation	EX.	ex	Horizontal Elliptical Reinforced Concrete Pipe	HERCP	HERCP	Modify or Modified	MOD.	mod.
Existing	EXST.	exst	House	HSE.	hse	Monument	MN.	mn
Extend or Extension	EXT.	ext				Mountain	MT.	mt
Federal	FED.	fed.	Improvement	IMPR.	impr	National	NATL.	natl
Feet or Foot	FT.	ft	Inch or Inches	IN.	in.	Non-Reinforced Cast-In-Place Concrete Pipe	NRCIPCP	NRCIPCP
Feet Per Second	FPS	fps	Include, Included or Inclusive	INCL.	incl	Non-Reinforced Concrete Pipe	NRCP	NRCP
Fence	FC.	fc	Inside Diameter	ID	ID	North	N	N
Figure	FG.	fg	Iron Pipe	IP	IP	Northbound	NB	NB
Finish	FN.	fn	Irrigation	IRR.	irr	Number	NO.	no.
Floor	FL.	fl				Obliterate	OBL.	obl
Flowage Easement	FE	FE	Joint	JT.	jt	Original	ORIG.	orig
Flow Line	F.L.	F.L.	Junction	JCT.	jct	Outside Diameter	OD	OD
Forest	FST.	fst				Overpass	O.P.	O.P.
Found	FND.	fnd	Laboratory	LAB.	lab	Parcel	PRC.	prc
Frame	FR.	fr	Lateral	LAT.	lat	Parkway	PKWY.	pkwy
Freeway	FWY.	fwy	Left	LT.	lt	Pavement	PVMT.	pvmt
Frontage	FRT.	frt	Length or Length of Curve	L	L	Piece	PC.	pc
Furnish or Furnished	FURN.	furn	Line	LN.	ln	Place	PL.	pl
Future	FUT.	fut	Linear or Lineal	LIN.	lin	Plasticity Index	PI	PI
Galvanize or Galvanized	GALV.	galv	Location	LOC.	loc	Point	PT.	pt
Gauge	GA.	ga				Point Of Compound Curvature	P.C.C.	P.C.C.
Government	GOVT.	govt	Manhole	MH	MH	Point Of Curvature	P.C.	P.C.
Grade	GR.	gr	Material	MTL.	mtl	Point Of Intersection	P.I.	P.I.
Grader	GDR.	gdr	Maximum	MAX	max	Point Of Reverse Curvature	P.R.C.	P.R.C.
Grade Separation	GS	GS	Median	MED.	med	Point Of Tangency	P.T.	P.T.
Ground	GND.	gnd	Mile or Miles	MI.	mi	Point On Curve	P.O.C.	P.O.C.
Grubbing	GRB.	grb	Mile Post	MP	MP			
Guard	GRD.	grd	Miles Per Hour	MPH	mph			
Guard Rail	GR	GR	Mineral Aggregate	MA	MA			
Headwall	HDWL.	hdwl						
Height	HT.	ht						
High Water	HW	HW						

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GENERAL ABBREVIATIONS

DRAWING NO.

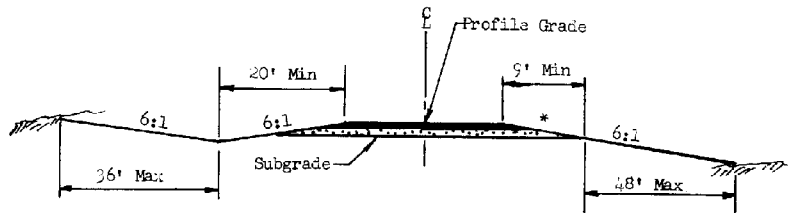
C-01.31

WORDS	TITLE	TEXT	WORDS	TITLE	TEXT	WORDS	TITLE	TEXT
Point On Semi-Tangent	P.O.S.T.	P.O.S.T.	Right	RT.	rt	Tangent	TAN.	tan.
Point On Spiral	P.O.S.	P.O.S.	Right Of Way	R/W	R/W	Tangent Length	T	T
Point On Tangent	P.O.T.	P.O.T.	Road	RD.	rd	Tangent To Spiral	T.S.	T.S.
Poly (Vinyl Chloride)	PVC	PVC	Roadway	RDWY.	rdwy	Telegraph	TIG.	tlg
Portland Cement Concrete	PCC	PCC				Telephone	TEL.	tel
Portland Cement Concrete Pavement	PCCP	PCCP				Temporary	TEMP.	temp
Pounds	LBS.	lbs				Temporary Construction Easement	TCE	TCE
Pounds Per Square Inch	PSI	psi				Topography	TOPO.	topo
Preliminary	PRIM.	prlm	Section	SCT.	sc	Township	T.	T.
Prestress, Prestressed or Prestressing	PS.	ps	Select Material	SM	SM	Traffic Interchange	TI	TI
Project	PRJ.	prj	Sheet	SH.	sh	Transition	TRNS.	trns
Property Line	P/L	P/L	Shrinkage	SHR.	shr	Turnout	T.O.	T.O.
Protection	PRT.	prt	Sidewalk	SWLK.	swlk	Typical	TYP.	typ
Provision or Provide	PRV.	prv	Sight Distance-Intersection	SD _I	SD _I			
			Sight Distance-Passing	SD _P	SD _P	Underground	UGND.	ugnd
Quadrant	QUAD.	quad.	Sight Distance-Stopping	SD _S	SD _S	Underpass	U.P.	U.P.
Quantity or Quantities	QUAN.	quan	Single	SGL.	sgl			
Quantity Of Drainage Runoff	Q	Q	Skew	SK.	sk	Variable	VAR.	var
			South	S	S	Vertical	VERT.	vert.
			Southbound	SB	SB	Vertical Curve	VC	VC
Radius	R	R	Special	SPCL.	spel	Vertical Elliptical Reinforced Concrete Pipe	VERCP	VERCP
Railroad	RR	RR	Specification	SPEC.	spec	Vitrified Clay Pipe	VCP	VCP
Range	R.	R.	Spiral Rate Of Change	a	a	Volume	VOL.	vol
Reconstruct	RECON.	recon	Spiral To Curve	S.C.	S.C.			
Record	REC.	rec	Spiral To Tangent	S.T.	S.T.	Welded Wire Fabric	WWF	WWF
Reference	REF.	ref	Square	SQ.	sq	West	W	W
Reinforced or Reinforcing	REINF.	reinf	Square Yard	SY	sy	Westbound	WB	WB
Reinforced Concrete	RC	RC	Standard	STD.	std	Western Wood Products Association	WWPA	WWPA
Reinforced Concrete Pipe	RCP	RCP	State Route	SR	SR	Wide or Width	W.	W.
Reinforced Concrete Pipe Arch	RCPA	RCPA	Station	STA.	sta			
Reinforced Concrete Pipe Rubber-Gasketed	RCPRG	RCPRG	Street	ST.	st			
Reinforcing bar	REBAR	rebar	Structure or Structural	STR.	str	Yard	YD.	yd
Relocate, Relocation or Relocated	RELOC.	reloc	Subdivision	SUBDIV.	subdiv			
Required	REQD.	reqd	Subgrade	SG	SG			
Reservation	RESV.	resv	Subgrade Seal	SS	SS			
Residence	RES.	res	Survey	SUR.	sur			
Retain or Retaining	RET.	ret	Swell	SW.	sw			
Revised or Revision	REV.	rev.	Symmetrical	SYM.	sym			

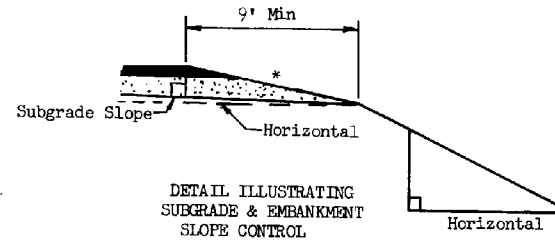
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APPROVED FOR DISTRIBUTION <i>[Signature]</i>	GENERAL ABBREVIATIONS	DRAWING NO. C-01.32

GENERAL NOTES

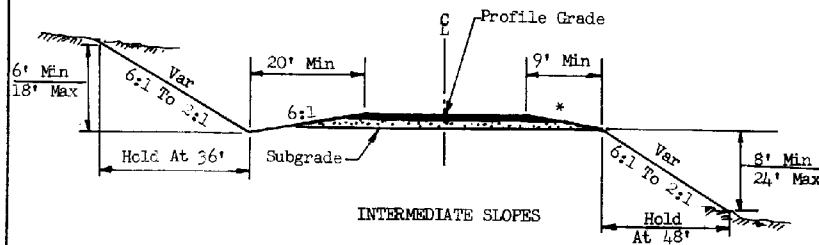
1. Roadway width, cut ditch, superelevation, and type and thickness of roadway surfacing will be shown on project plans.
2. For cuts up to 6' use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum.
3. Wetted perimeter should not extend above subgrade in unpaved ditch.
4. Pavement structure slopes are relative to subgrade slope. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.
5. The desirable maximum embankment slope rate should be 4:1 within interchange and grade separation areas.
6. When median slopes intersect, see project plans.



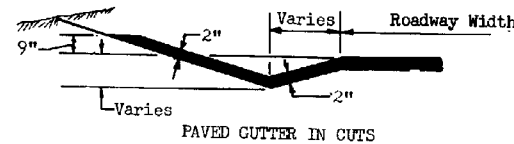
MINIMUM SLOPES



DETAIL ILLUSTRATING
SUBGRADE & EMBANKMENT
SLOPE CONTROL

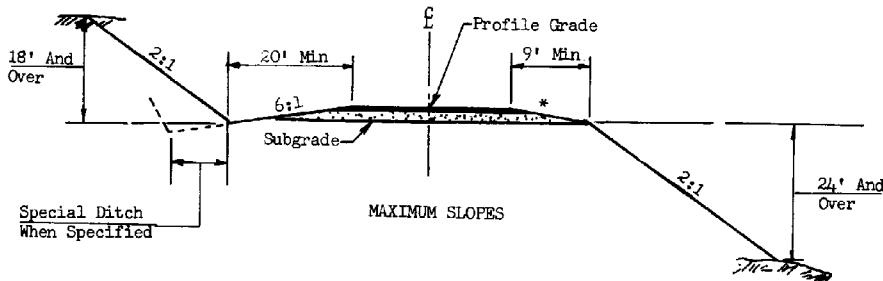


INTERMEDIATE SLOPES

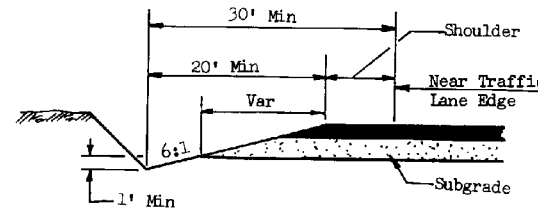


PAVED CUTTER IN CUTS

*Variable to 6:1 maximum



MAXIMUM SLOPES



MINIMUM DITCH CONDITIONS

TYPICAL SECTIONS

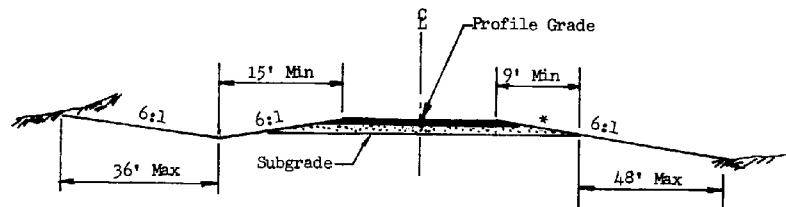
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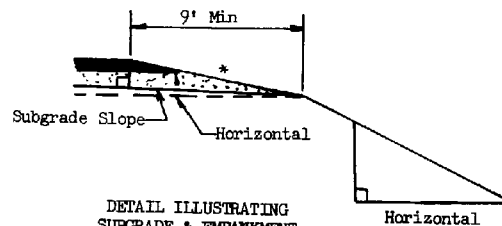
REV
1/83

SLOPES, INTERSTATE & CLASS
A-A ROADWAYS

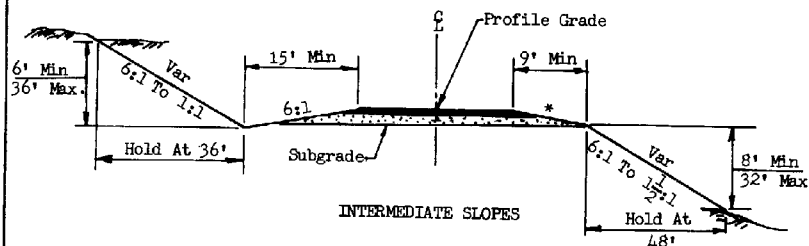
DRAWING NO.
C-02.10



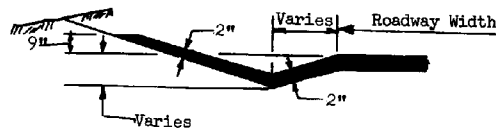
MINIMUM SLOPES



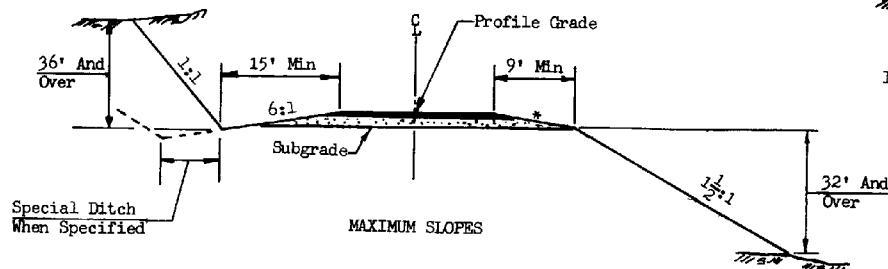
DETAIL ILLUSTRATING
SUBGRADE & EMBANKMENT
SLOPE CONTROL



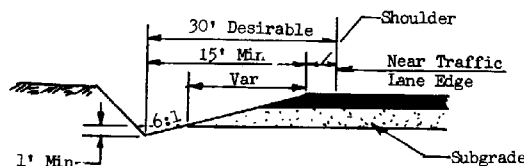
INTERMEDIATE SLOPES



PAVED GUTTER IN CUTS



MAXIMUM SLOPES



MINIMUM DITCH CONDITIONS

GENERAL NOTES

1. Roadway width, cut ditch, superelevation, and type and thickness of roadway surfacing will be shown on project plans.
2. 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.
3. Wetted perimeter should not extend above subgrade in unpaved ditch.
4. Pavement structure slopes are relative to subgrade slope. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.

*Variable to 6:1 maximum

TYPICAL SECTIONS

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SLOPES
CLASS A & B ROADWAYS

DRAWING NO.

C-02.20

GENERAL NOTES

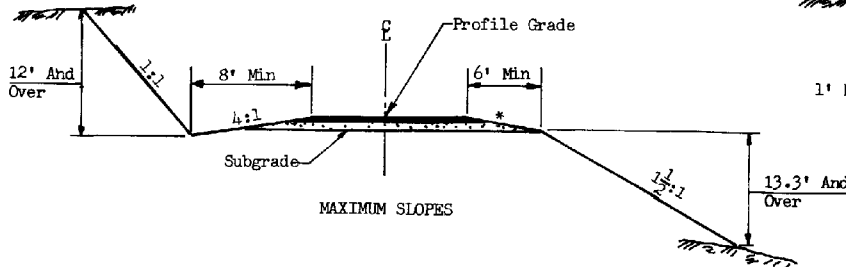
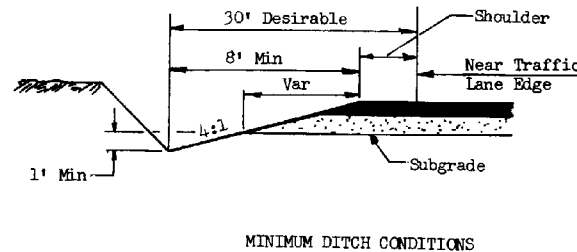
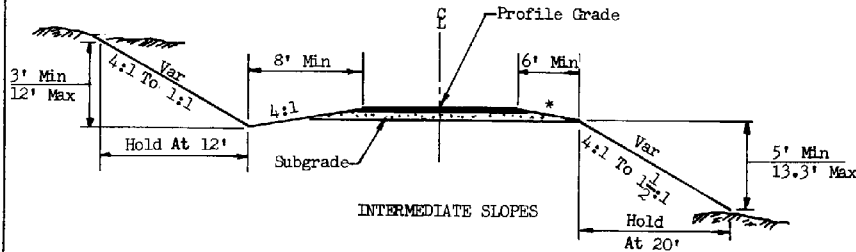
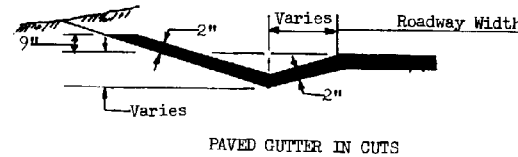
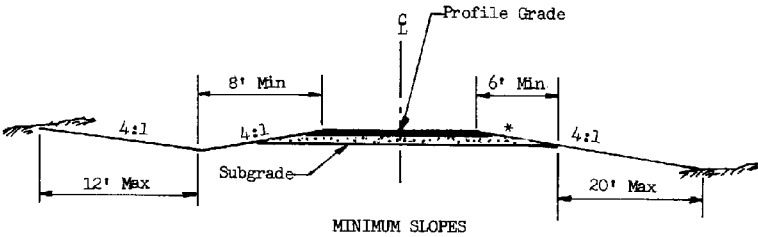
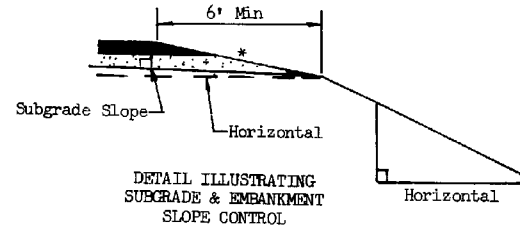
1. Roadway width, cut ditch, superelevation, and type and thickness of roadway surfacing will be shown on project plans.

2. 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.

3. Wetted perimeter should not extend above subgrade in unpaved ditch.

4. Pavement structure slopes are relative to subgrade slope. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.

*Variable to 4:1 maximum



TYPICAL SECTIONS

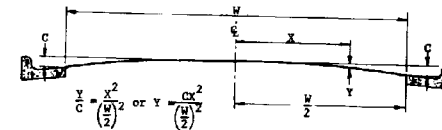
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/83
APPROVED FOR DIST. .10N <i>[Signature]</i>	SLOPES CLASS C & D ROADWAYS	DRAWING NO C-02.30

CUMULATIVE PERCENT OF CROWN "C" FOR EACH FOOT RIGHT OR LEFT OF C

X	2'	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'
90	0.20	0.79	1.78	3.16	4.94	7.11	9.68	12.64	16.00	19.75	23.90	28.44	33.38	38.72	44.44	50.57	57.09	64.00	71.31	79.01	87.11	95.61
88	0.21	0.83	1.86	3.31	5.17	7.44	10.12	13.22	16.74	20.66	25.00	29.75	34.92	40.50	46.49	52.89	59.71	66.94	74.59	82.64	91.12	C
86	0.22	0.87	1.95	3.46	5.41	7.79	10.60	13.85	17.52	21.63	26.18	31.15	36.56	42.40	48.67	55.38	62.52	70.09	78.10	86.53	95.40	C
84	0.23	0.91	2.04	3.63	5.67	8.16	11.11	14.51	18.37	22.68	27.44	32.65	38.32	44.44	51.02	58.05	65.53	73.47	81.86	90.70	C	C
82	0.24	0.95	2.14	3.81	5.95	8.57	11.66	15.23	19.27	23.80	28.79	34.27	40.21	46.64	53.54	60.92	68.77	77.10	85.90	95.18	C	C
80	0.25	1.00	2.25	4.00	6.25	9.00	12.25	16.00	20.25	25.00	30.25	36.00	42.25	49.00	56.25	64.00	72.25	81.00	90.25	C	C	C
78	0.26	1.05	2.37	4.20	6.57	9.47	12.89	16.83	21.30	26.30	31.82	37.87	44.44	51.54	59.17	67.32	76.00	85.21	94.94	C	C	C
76	0.28	1.11	2.49	4.43	6.93	9.97	13.57	17.73	22.44	27.70	33.52	39.89	46.81	54.29	62.33	70.91	80.06	89.75	C	C	C	C
74	0.29	1.17	2.63	4.67	7.30	10.52	14.32	18.70	23.67	29.22	35.35	42.07	49.38	57.27	65.74	74.80	84.44	94.67	C	C	C	C
72	0.31	1.23	2.78	4.94	7.72	11.11	15.12	19.75	25.00	30.86	37.35	44.44	52.16	60.59	69.44	79.01	89.20	C	C	C	C	C
70	0.33	1.31	2.94	5.22	8.16	11.76	16.00	20.90	26.45	32.65	39.51	47.02	55.18	64.00	73.47	83.59	94.37	C	C	C	C	C
68	0.35	1.38	3.11	5.54	8.65	12.46	16.95	22.15	28.03	34.60	41.87	49.83	58.48	67.82	77.85	88.58	C	C	C	C	C	C
66	0.37	1.47	3.30	5.87	9.18	13.21	17.99	23.49	29.73	36.71	44.41	52.86	62.03	71.94	82.59	93.97	C	C	C	C	C	C
64	0.39	1.56	3.52	6.25	9.77	14.06	19.14	25.00	31.64	39.06	47.27	56.25	66.02	76.56	87.89	C	C	C	C	C	C	C
62	0.42	1.66	3.75	6.66	10.61	14.98	20.40	26.64	33.71	41.62	50.36	59.96	70.34	81.58	93.65	C	C	C	C	C	C	C
60	0.44	1.78	4.00	7.11	11.11	16.00	21.78	28.44	36.00	44.44	53.78	64.00	75.11	87.11	C	C	C	C	C	C	C	C
58	0.48	1.90	4.28	7.61	11.89	17.12	23.31	30.44	38.32	47.56	57.55	68.49	80.38	93.22	C	C	C	C	C	C	C	C
56	0.51	2.04	4.59	8.16	12.76	18.37	25.00	32.65	41.33	51.02	61.73	73.47	86.22	C	C	C	C	C	C	C	C	C
54	0.55	2.19	4.94	8.78	13.72	19.75	26.89	35.12	44.44	54.87	66.39	79.01	92.73	C	C	C	C	C	C	C	C	C
52	0.59	2.37	5.33	9.47	14.79	21.30	28.99	37.87	47.93	59.17	71.60	85.21	C	C	C	C	C	C	C	C	C	C
50	0.64	2.56	5.76	10.24	16.00	23.04	31.36	40.96	51.84	64.00	77.44	92.16	C	C	C	C	C	C	C	C	C	C
48	0.69	2.78	6.25	11.11	17.36	25.00	34.03	44.44	56.25	69.44	84.03	C	C	C	C	C	C	C	C	C	C	C
46	0.76	3.02	6.81	12.10	18.90	27.22	37.05	48.39	61.25	75.61	91.49	C	C	C	C	C	C	C	C	C	C	C
44	0.83	3.31	7.44	13.22	20.66	29.75	40.50	52.89	66.94	82.64	C	C	C	C	C	C	C	C	C	C	C	C
42	0.91	3.63	8.16	14.51	22.68	32.65	44.44	58.05	73.47	90.70	C	C	C	C	C	C	C	C	C	C	C	C
40	1.00	4.00	9.00	16.00	25.00	36.00	49.00	64.00	81.00	C	C	C	C	C	C	C	C	C	C	C	C	C
38	1.11	4.43	9.97	17.73	27.70	39.89	54.29	70.91	89.75	C	C	C	C	C	C	C	C	C	C	C	C	C
36	1.23	4.94	11.11	19.75	30.86	44.44	60.49	79.01	C	C	C	C	C	C	C	C	C	C	C	C	C	C
34	1.38	5.50	12.46	22.15	34.60	49.83	67.82	88.58	C	C	C	C	C	C	C	C	C	C	C	C	C	C
32	1.56	6.25	14.06	25.00	39.06	56.25	76.56	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
30	1.78	7.11	16.00	28.44	44.44	64.00	87.11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
28	2.04	8.16	18.37	32.65	51.02	73.47	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
26	2.37	9.47	21.30	37.87	59.17	85.21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
24	2.78	11.11	25.00	44.44	69.44	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	3.31	13.22	29.75	52.89	82.64	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
20	4.00	16.00	36.00	64.00	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
18	4.94	19.75	44.44	79.01	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
16	6.25	25.00	56.25	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
14	8.16	32.65	73.47	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	11.11	44.44	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

W = FULL WIDTH OF ROADWAY - FEET

FORMULA



USE OF TABLE

Example:

Assume W = 40 ft. and C = 0.45 ft.
Find Y for X = 8 ft.

Table shows Y = 16.00% of C,
or 0.16 X 0.45' = 0.072 ft.

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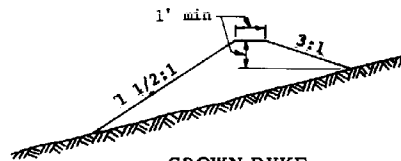
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PAVEMENT CROWN, PARABOLIC

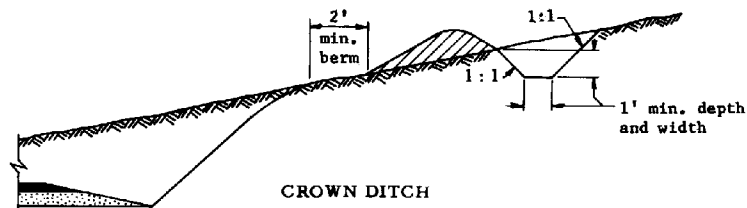
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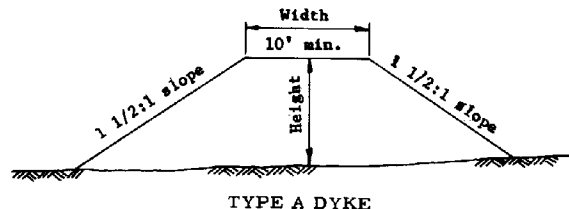
1/83



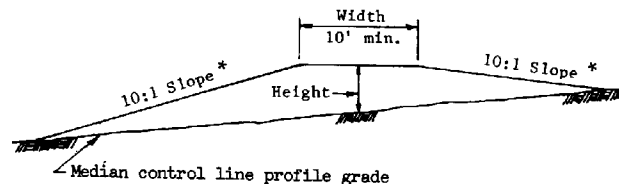
CROWN DYKE



CROWN DITCH

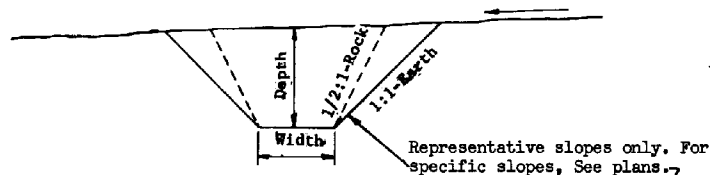


TYPE A DYKE

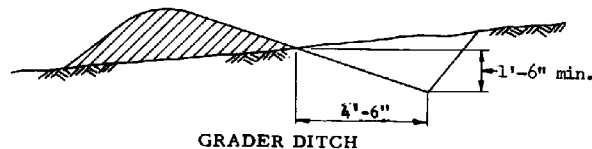


TYPE B TRANSVERSE MEDIAN DYKE

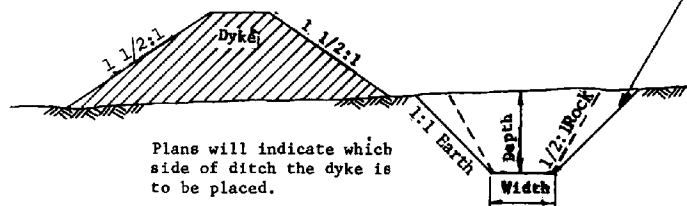
* Slope relative to grade of median at intersection with toe.



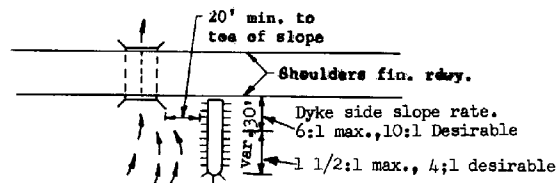
GENERAL CHANNEL SLOPES



GRADER DITCH



DITCH AND DYKE



TYPICAL DYKE INSTALLATION AT STRUCTURE

Place dykes at structures to create a water cushion.

GENERAL NOTES

1. Dimensions of ditches and dykes, as shown on plans, are top width, height and length.
2. Ditches shall be constructed with a minimum grade to prevent erosion. Ditch outlet treatment shall be as provided on plans.
3. See Std. C-03.20 for parallel channel and dyke treatment with respect to recovery area.

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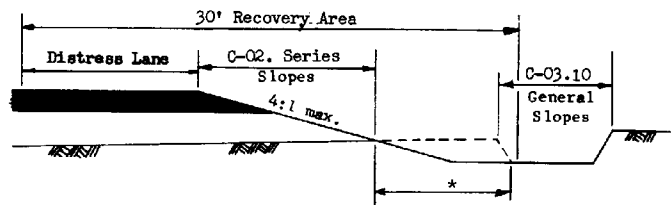
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DITCHES AND DYKES

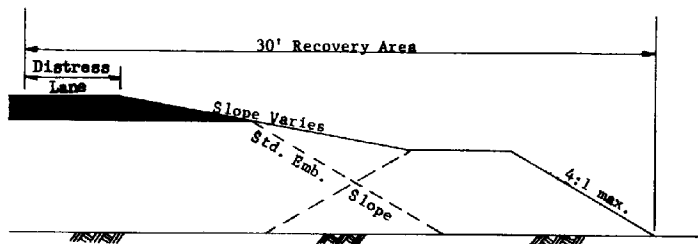
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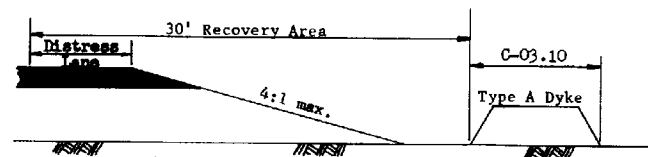


* If channel lies within recovery area, use continuation of emb. slope for inner channel slope and 4:1 slope rate for outer channel slope.

CHANNEL



DYKE WITHIN RECOVERY AREA



DYKE OUTSIDE RECOVERY AREA

GENERAL NOTES

See also Std. C-03.10

DESIGN APPROVED
James T. King

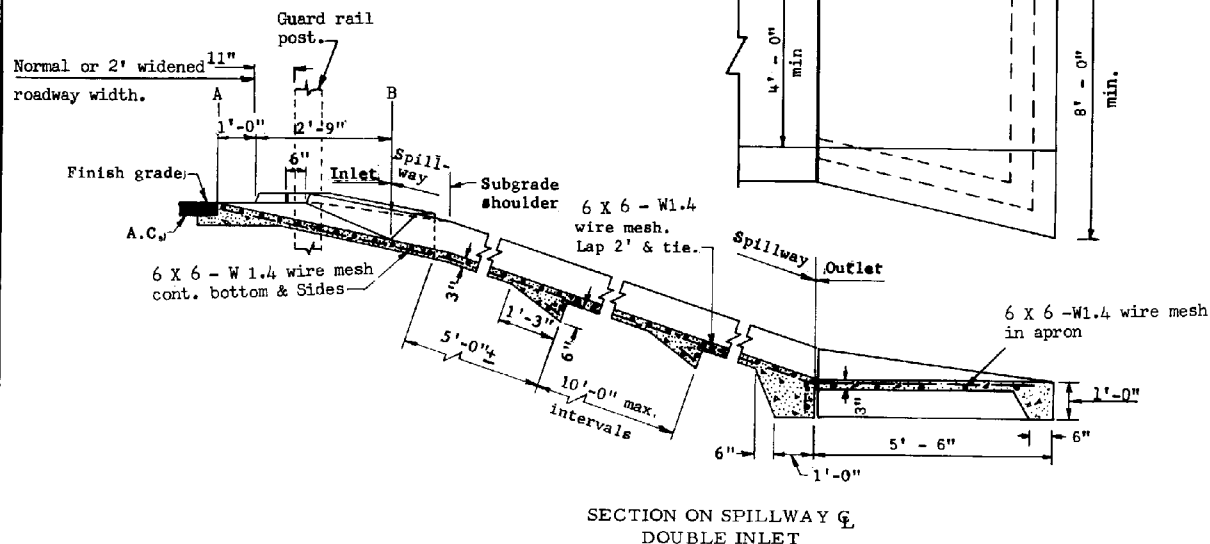
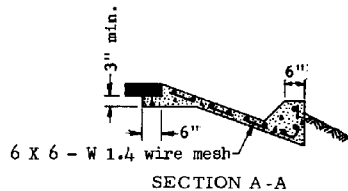
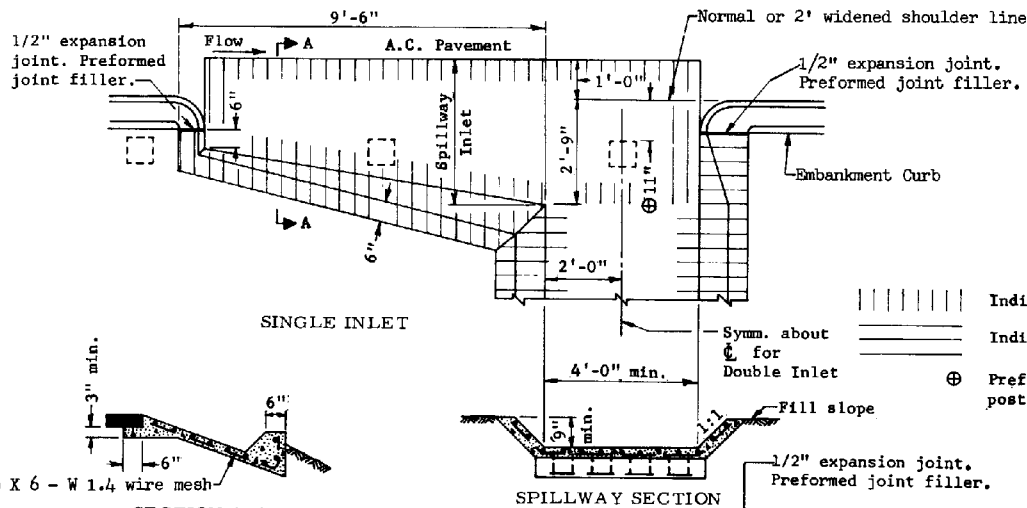
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CHANNELS & DYKES TYP.
PARALLEL INSTALLATIONS

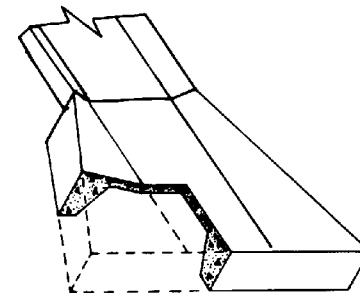
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DRAWING NO.
C-03.20



GENERAL NOTES

1. Concrete for the spillway inlet, spillway and outlet shall be Class B.
2. Where rock is encountered, the outlet may be omitted.
3. When outlet is used, the wire mesh shall extend through the joint into the outlet in lieu of bending into the key.
4. Spillway invert slope shall be uniformly downward from A to B.



OUTLET DETAIL

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STANDARD DRAWINGS

REV. 1/83

SPILLWAY, EMBANKMENT

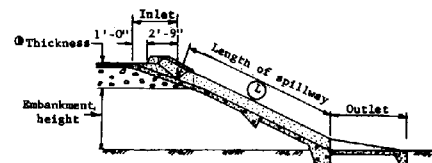
DRAWING NO. C-04.10

GENERAL NOTES

1. For C-02.10 slopes with embankment height over 24', L = L for embankment height from table + 2.24(emb. height - 24).
2. For C-02.20 slopes with embankment height over 32', L = L for 32' embankment height from table + 1.8(emb. height - 32).
3. For C-02.30 slopes with embankment height over 13', L = L for 13' embankment height from table + 1.8(emb. height - 13).

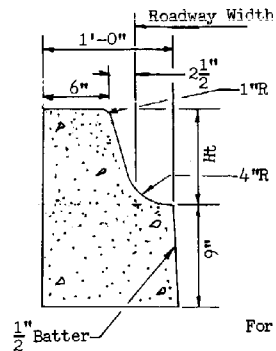
C-02.20 Slopes																																		
C-02.10 Slopes																																		
Embankment Height																																		
	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'	29'	30'	31'	32'						
12"	32	37	43	49	50																													
13"	33	38	44		51	52																												
14"	34	39	45			53	54	55																										
15"	35	40	46				56	57	58	59	60																							
16"	36	41	47					59	60	61	62	63	64	65	66	67	68	69	70	71	72													
17"	37	42	48						60	61	62	63	64	65	66	67	68	69	70	71	72													
18"	38	43	49							61	62	63	64	65	66	67	68	69	70	71	72													
19"	39	44	50								62	63	64	65	66	67	68	69	70	71	72													
20"	40	45	51									63	64	65	66	67	68	69	70	71	72													
21"	41	46	52										64	65	66	67	68	69	70	71	72													
22"	42	47	53											65	66	67	68	69	70	71	72													
23"	43	48	54												66	67	68	69	70	71	72													
24"	44	49	55													67	68	69	70	71	72													
25"																	68	69	70	71	72													
26"																		69	70	71	72													
27"																			70	71	72													
28"																				71	72													
29"																					72													
30"																																		
31"																																		
32"																																		
33"																																		
34"																																		
35"																																		
36"																																		

C-02.30 Slopes												
Embankment Height												
5'	6'	7'	8'	9'	10'	11'	12'	13'				
12"	22											
13"		23										
14"			24									
15"				25								
16"					26							
17"						27						
18"							28					
19"								29				
20"									30			
21"										31		
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36"												



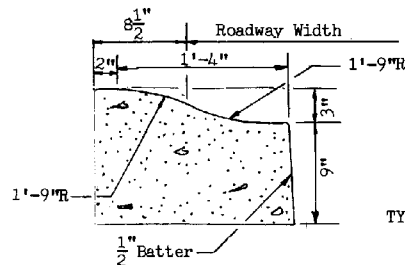
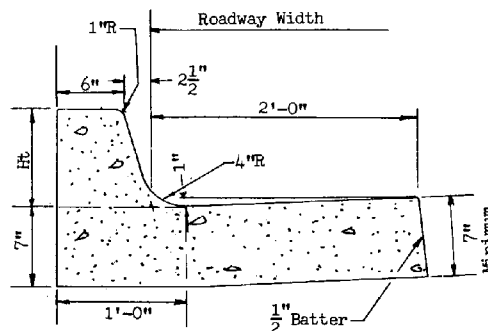
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/83
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	SPILLWAY, EMBANKMENT LENGTH TABLE	DRAWING NO. C-04.30

SINGLE CURB

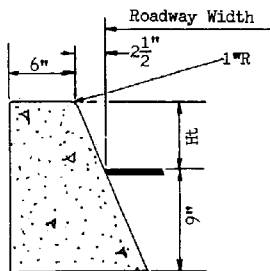
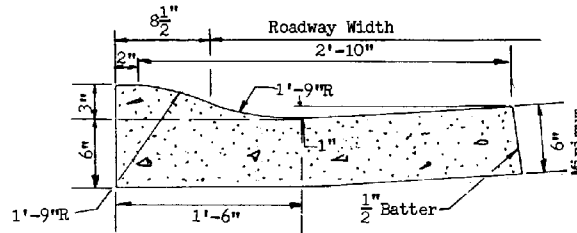


TYPE A
For 6" Curb Height Or Over

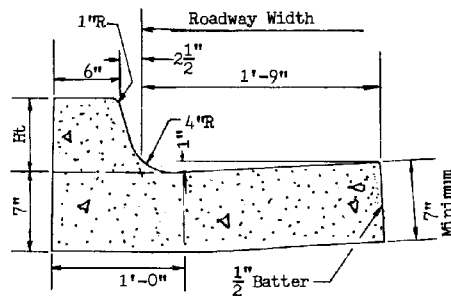
CURB & GUTTER



TYPE F



TYPE G



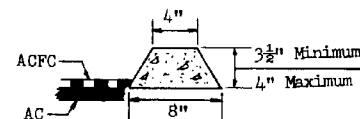
GENERAL NOTES:

SINGLE CURB, AND CURB AND GUTTER:

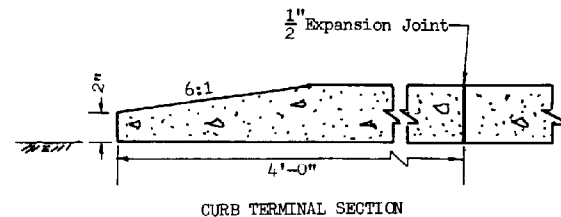
1. Single curb, and curb and gutter may be constructed by the use of forms or the concrete may be extruded.
2. When the roadway section slopes away from the gutter, the slope of the gutter shall match the roadway cross slope.
3. Two inch deep contraction joints shall be placed in the curb and the gutter 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. One half inch thick expansion joints shall be located at tangent points in curb returns, at structures and at maximum 60 foot intervals. The 1/2 inch joint filler shall extend the full depth of 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 1/4 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 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 1/2 inch



EMBANKMENT CURB



CURB TERMINAL SECTION

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DIVISION OF HIGHWAYS
STANDARD DRAWINGS

SINGLE CURB, CURB & GUTTER
EMBANKMENT CURB

REV

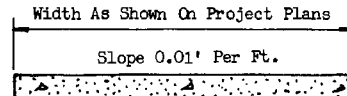
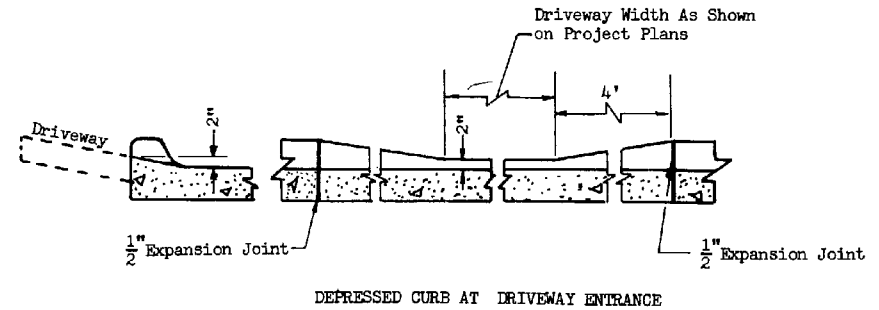
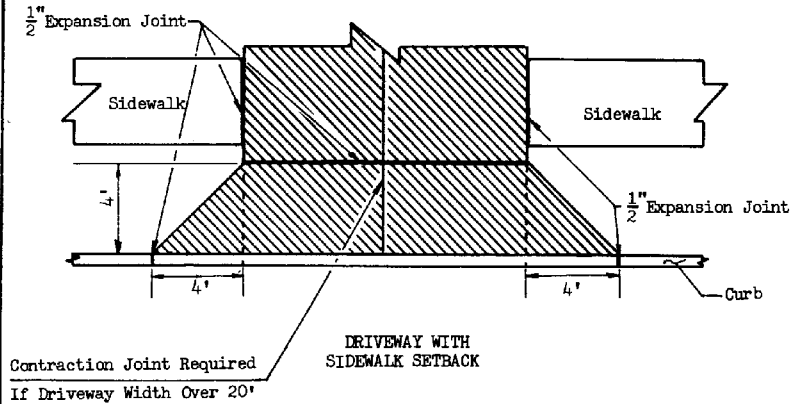
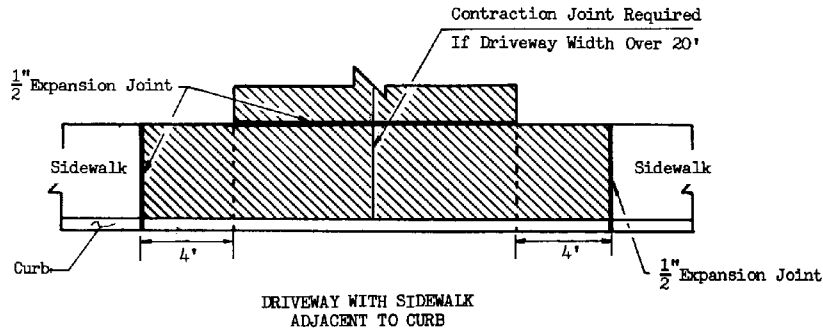
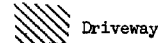
1/83

DRAWING NO.

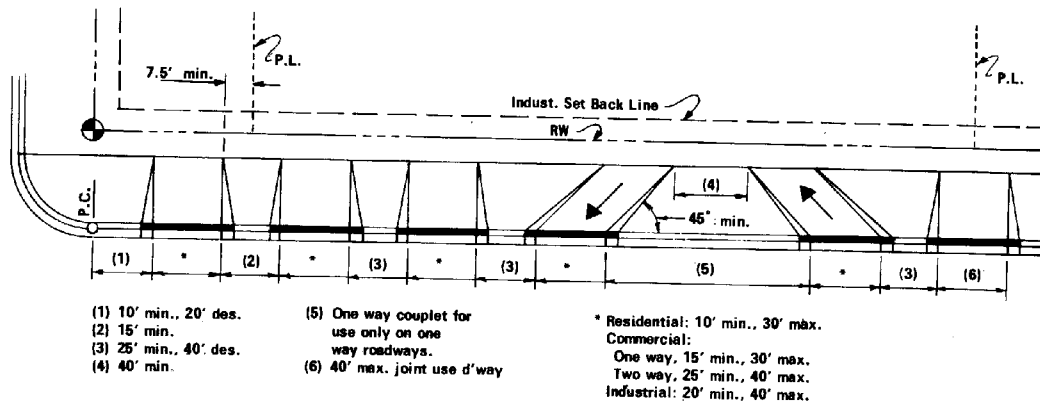
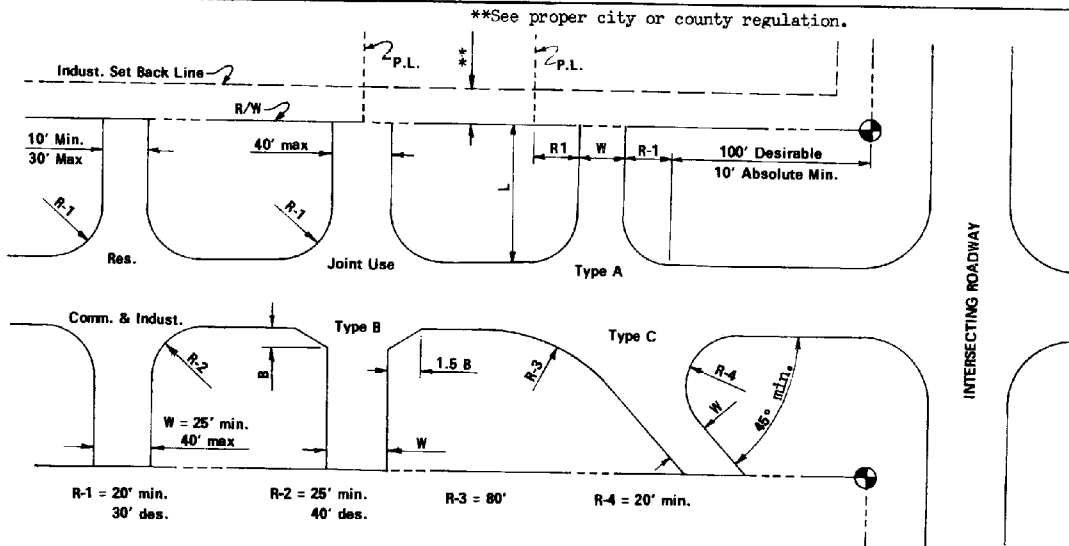
C-05.10

GENERAL NOTES:

1. Unless otherwise specified, sidewalks shall be 4 inches in depth and driveways shall be 6 inches in depth.
2. One inch deep transverse contraction joints shall be placed in sidewalks at intervals of approximately 5 feet. If the sidewalk is over 7 feet in width, a 1 inch deep longitudinal contraction joint shall be placed in the center of the sidewalk. The maximum area of sidewalk without contraction joints shall be approximately 36 square feet. Contraction joints in driveways shall be 1 inch in depth. Joints shall be either formed or sawed. Formed joints shall be finished with a tool having a $\frac{1}{2}$ inch radius.
3. One half inch expansion joints shall be located between sidewalks or driveways and all abutting structures. Maximum length of sidewalk without expansion joint shall be 60 feet. The $\frac{1}{2}$ 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.



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APPROVED FOR DISTRIBUTION <i>W. J. Smith</i>	CONCRETE SIDEWALK & DRIVEWAY	DRAWING NO. C-05.20



GENERAL NOTES

Paved Turnouts: Plans notation will be WxL, surface material, type and standard. Example: 20' X 30' A.C.T.O., Type A, Standard C-06.10 Show R graphically.

Base material shall be the same as what shown for main roadway, unless otherwise noted. Excavation or embankment for turnouts shall be included in quantities for main roadways. Dimensions indicated as minimum shall be avoided whenever possible in favor of those indicated as desirable.

Driveways and depressed curbs shall be located as noted on plans or as directed by the Engineer.

The Type 'A' turnout is the preferable turnout design. Type 'B' and 'C' shall only be used when absolutely necessary.

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.

Driveways for high volume traffic generators shall be approved individually by Traffic Engineering Section.

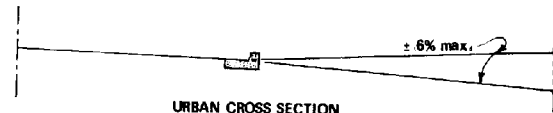
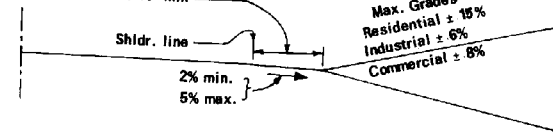
Driveways with curb returns in urban areas shall be installed only with the approval of Traffic Engineering Section.

Joint Use Driveways - it may become desirable for landowners of adjacent properties to require a joint driveway 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.

Construction of curb, gutter and sidewalk 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.

Drainage structures shall be provided under driveways where necessary.

Commercial & Industrial:
20' min., 40' desirable.
Residential: 10' min.



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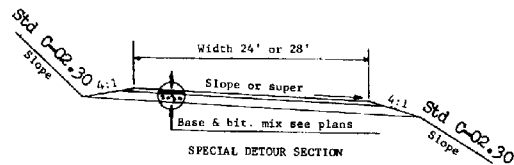
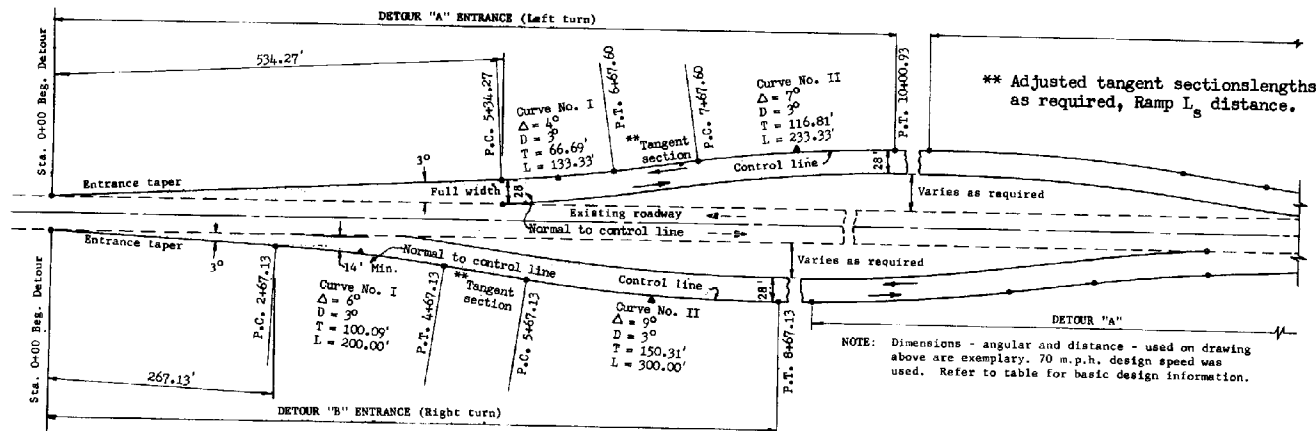
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STANDARD DRAWINGS

TURNOUT & DRIVEWAY LAYOUT

REV.
1/83

DRAWING NO.
C-06.10



GENERAL NOTES

Detour "A" entrance shall be used where approaching vehicle must turn left. Detour "B" shall be used where approaching vehicle must turn right.

Detour from a horizontal curve: On the inside of the curve the detour take off shall be a curve, see table. On the outside a tangent take off shall be used. A vertical curve may be required to effect a smooth grade change. The design speed shall be comparable between vertical and horizontal alignment.

The entrance design speed of a detour shall not be less than the normal posted speed of the existing roadway. The design speed for the remainder of the detour may be 20 m.p.h. less than the normal posted speed.

Any intermediate detour entrance may be designed on the basis of normal posted speed less 20 m.p.h. where visible construction activity has slowed traffic for the preceding 1/4 mile.

The minimum width of the detour shall be 28' for existing roadways 34' or wider and a minimum of 24' for existing roadways less than 34' in width.

The entrance taper for Detour "A" shall be extended until full detour width is attained. For Detour "B" the entrance taper shall be extended until a minimum of 14' is attained beyond the edge of existing roadway.

Any deviation from this standard must be approved by the Plans Engineer and Traffic Engineer and the Engineer shall submit the alignment and profile of the proposed change for their review.

Native material used in constructing the detour embankment will be considered suitable for backfill around pipe; however, it shall be reasonably free of rocks and debris.

Tangent Roadway		Curved Roadway		Entrance Design Speed	Max. Horizontal Curvature	
Entrance Design Speed	Entr. Taper Def'l. Angle	Exist. Horiz. Curve	Detour "A" Take off Curve		Curve No. I	Curve No. II*
70	1°	1°	2°	70	1° .09'/ft.	1° .06'/ft.
60	1°	1°	2°	60	1° .08'/ft.	1° .05'/ft.
50	1°	1°	2°	50	1° .07'/ft.	1° .05'/ft.
40	1°	1°	2°	40	1° .07'/ft.	1° .05'/ft.
30	1°	1°	2°	30	1° .07'/ft.	1° .05'/ft.

* Curve No. II superelevations are for a design speed 20 mph less than entrance speed.

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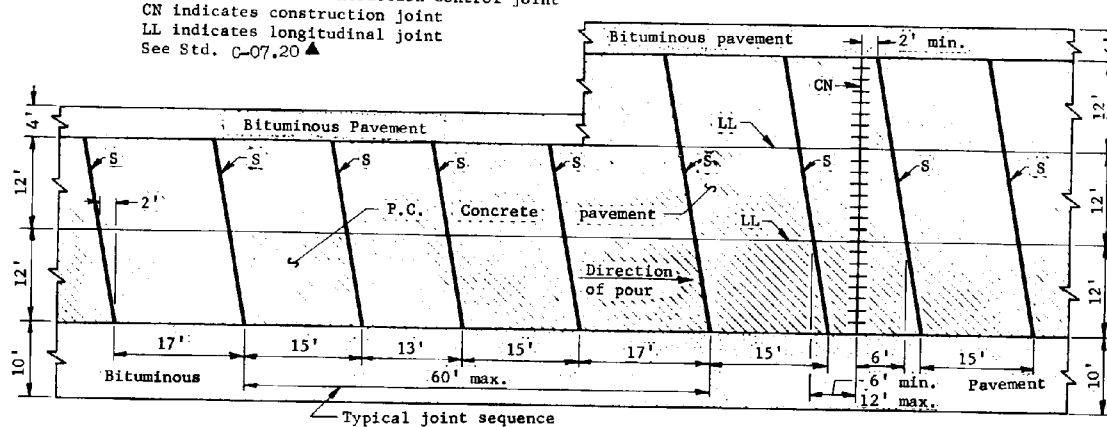
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GEOMETRICS, DETOUR

DRAWING NO.

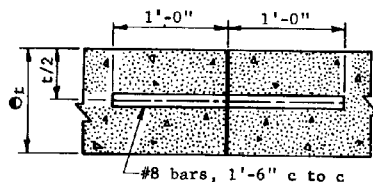
G-6.20

S indicates sawed contraction control joint
 CN indicates construction joint
 LL indicates longitudinal joint
 See Std. C-07.20 ▲



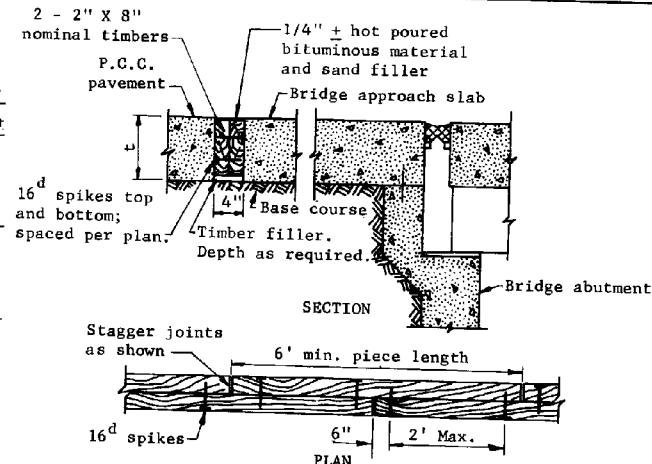
Typical joint sequence

PLAN
 See General Notes

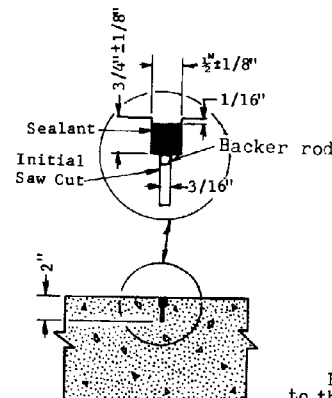


● Indicates P.C.C. thickness

CONSTRUCTION JOINT CN
 To be used at end of pour



TRANSVERSE EXPANSION JOINT AT
 BRIDGE APPROACH SLAB



SAWED TYPE S
 CONTRACTION CONTROL JOINT

GENERAL NOTES

All transverse joints shall be in line with joints in adjacent slabs.

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.

Timbers used in transverse expansion joint shall be rough redwood and conform to commercial grade.

Backer Rod - (Expanded cellular rubber) Shall conform to the requirements of ASTM D 1056 Grade # SEE 41.

DESIGN APPROVED

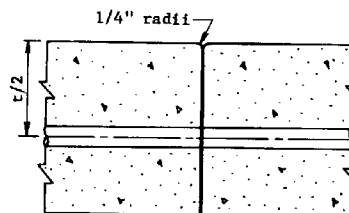
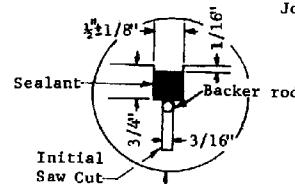
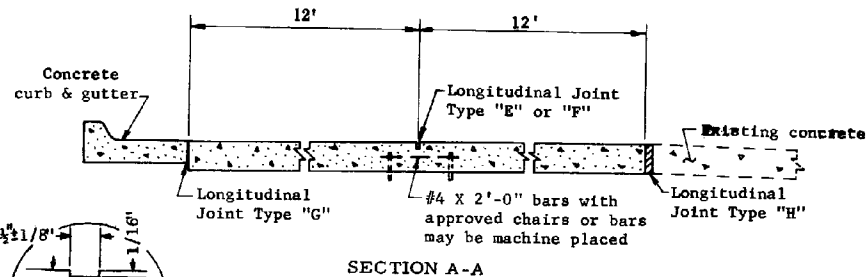
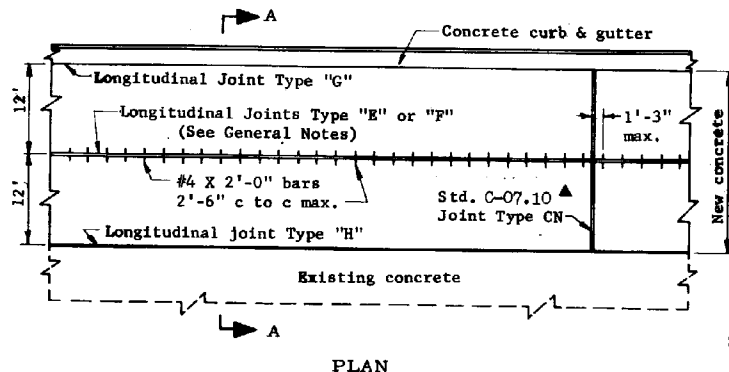
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 STANDARD DRAWINGS

PAVEMENT, CONCRETE,
 TRANSVERSE JOINTS

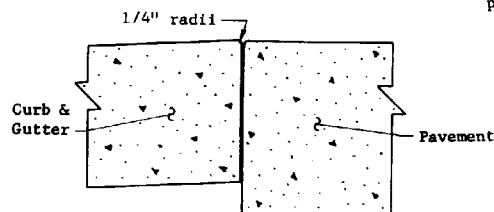
REV
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DRAWING NO
 C-07.10

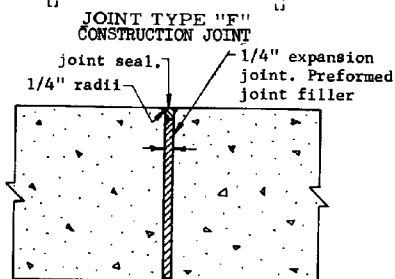
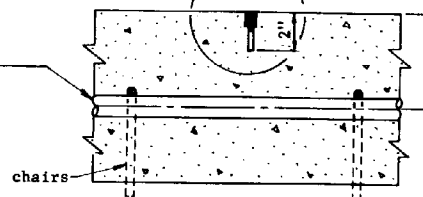


JOINT TYPE "E"
CONSTRUCTION JOINT

Note:
"t" indicates
pavement thickness



JOINT TYPE "G"



GENERAL NOTES

In slip form type pavement construction, Longitudinal Joint Type "F" shall be used. In fixed form type construction either Longitudinal Joint Type "E" or "F" may be used.

Backer Rod - (Expanded cellular rubber) Shall conform to the requirements of ASTM D 1056 Grade # SEE 41.

LONGITUDINAL JOINT DETAILS

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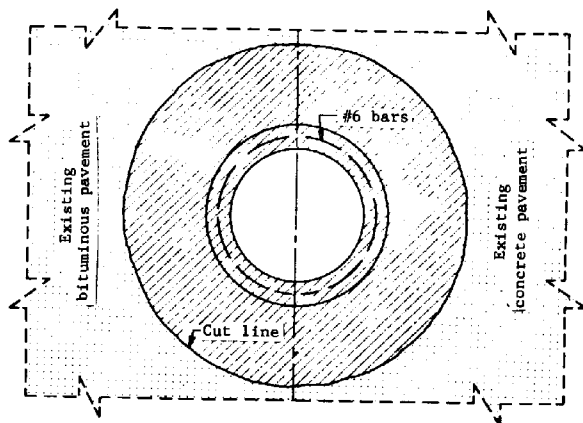
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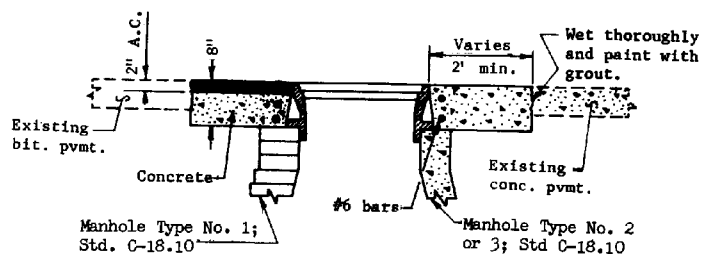
PAVEMENT, CONCRETE,
LONGITUDINAL JOINTS

DRAWING NO.
C-07.20

REV
11/83

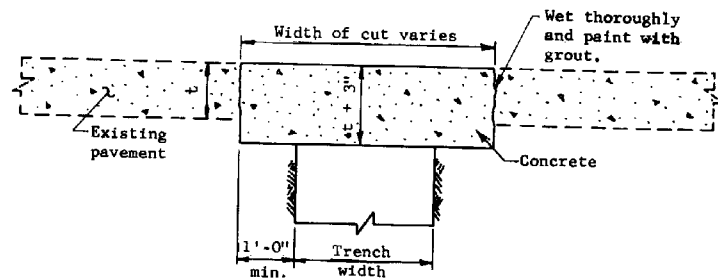


PLAN

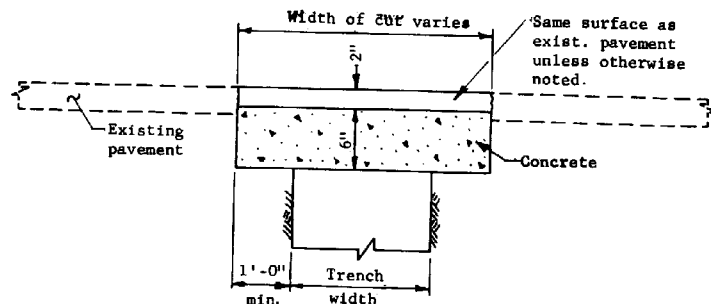


SECTION

PAVEMENT CUT REPLACEMENT FOR MANHOLE



CUT IN CONCRETE PAVEMENT



CUT IN BITUMINOUS PAVEMENT

GENERAL NOTES

All concrete shall be Class S, 2000 lbs. psi

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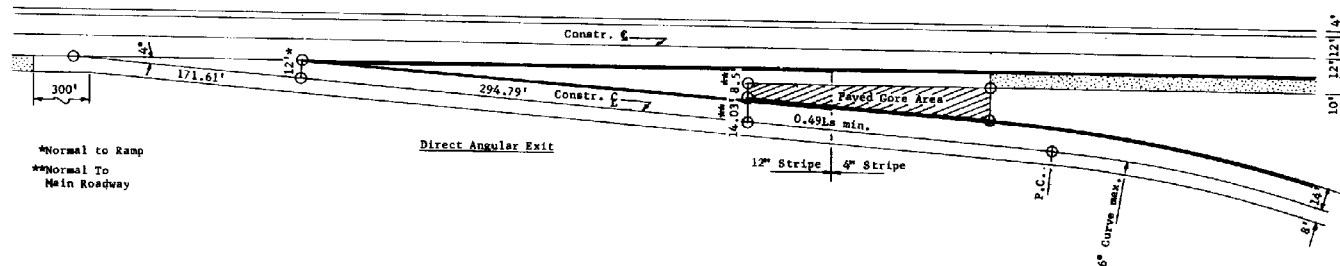
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PAVEMENT, CUT & REPLACEMENT

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 C-07.30

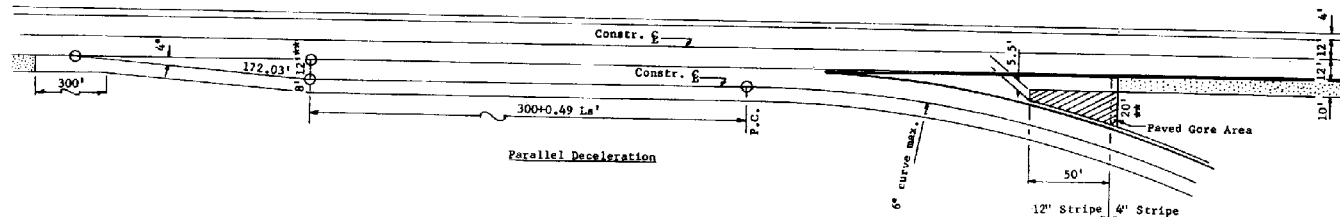
GENERAL NOTES

1. For ramp cross section details, see Std. C-8.20.
2. For gore area paving details, see Std. C-8.20.
3. Shaded areas indicate differential shoulder delineation.
4. Parallel deceleration is to be used only under special conditions necessitating ramp curvature ahead of nose.



*Normal to Ramp
**Normal To
Main Roadway

Direct Angular Exit

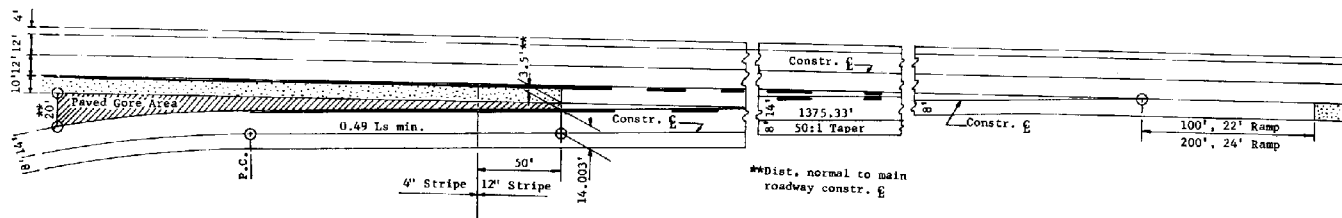


Parallel Deceleration

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APPROVED BY DISTRICT ENGINEER <i>[Signature]</i>	GEOMETRICS, EXIT RAMP	DRAWING NO. C-8.10

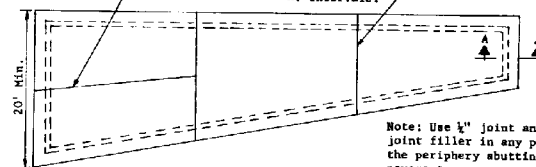
GENERAL NOTES

1. The 50:1 taper and corresponding offsets shall also apply when the main roadway has curvature or combined tangent and curvature.
2. Core area paving joints and scores shall be edged with a $\frac{1}{4}$ " R. Tool.
3. Shaded areas indicate differential shoulder delineation.
4. Min. nose paving length shall be that required to attain a width of 20'.



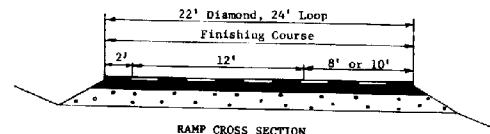
1" deep longitudinal scores
in sections averaging over
15' in width.

1" deep lateral scores
at 15' max. intervals.

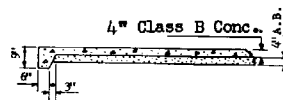


Plan

Note: Use $\frac{1}{4}$ " joint and preformed
joint filler in any portion of
the periphery abutting P.C.C.
pavement.



RAMP CROSS SECTION



Section A-A

CORE AREA PAVING

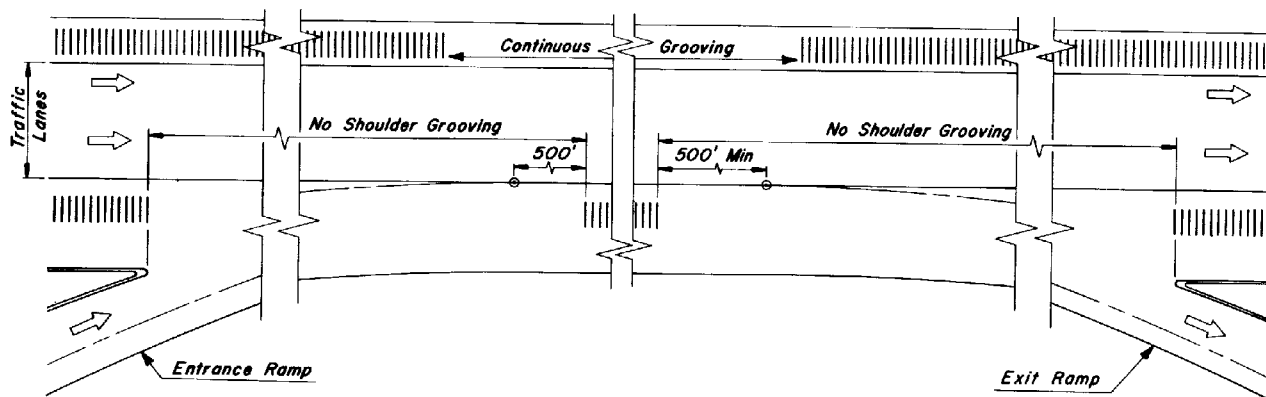
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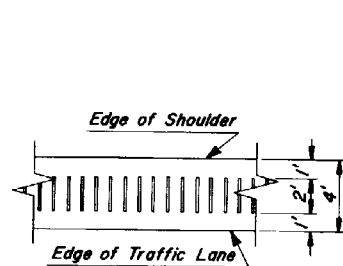
REV.
1/83

GEOMETRICS, ENTRANCE RAMP

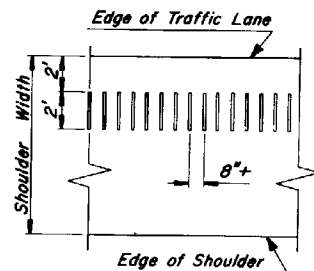
DRAWING NO.
C-8.20



PLAN

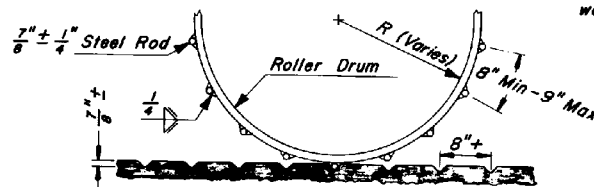


LEFT SHOULDER-DIVIDED ROADWAY



RIGHT SHOULDER-DIVIDED ROADWAY
BOTH SHOULDERS-UNDIVIDED ROADWAY

SHOULDER GROOVING DETAIL



STEEL DRUM DETAIL

GENERAL NOTES

Where shown on the plans rumble strips shall be constructed on the highway shoulders by making indentations approximately $\frac{7}{8}''$ deep in the asphalt concrete surfacing.

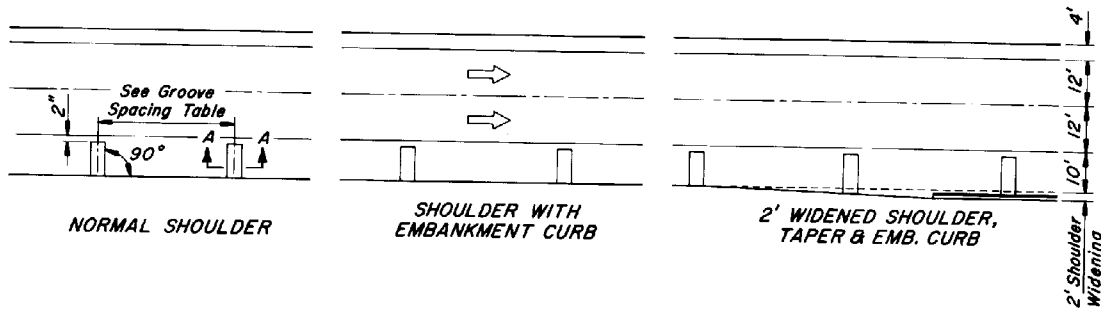
The indentations shall be formed by rolling the asphalt concrete while still hot with a roller to which segments of $\frac{7}{8}'' \pm \frac{1}{4}''$ steel rods have been welded to the drum.

The rod segments shall be 2' long and be fully welded to the roller drum at approximately 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.

Use on interstate and primary roadways 40' and wider.

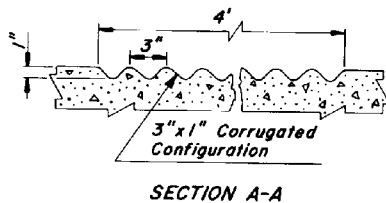
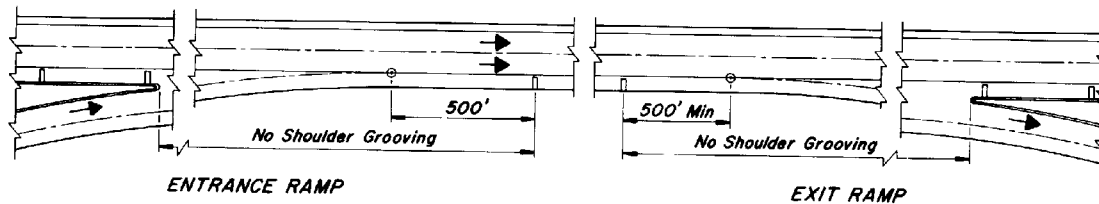
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NORMAL SHOULDER

SHOULDER WITH EMBANKMENT CURB

2' WIDENED SHOULDER, TAPER & EMB. CURB

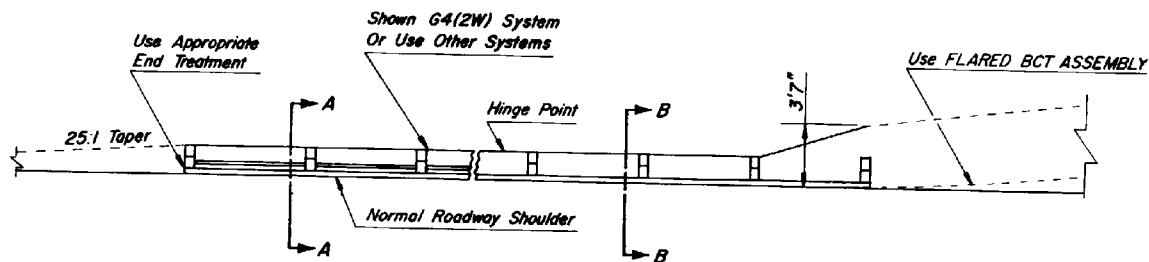


GROOVE SPACING	
Design Speed Per Plans M.P.H.	Spacing Ft.
80	60
70	50
60	45
55	40
50	35
40	30

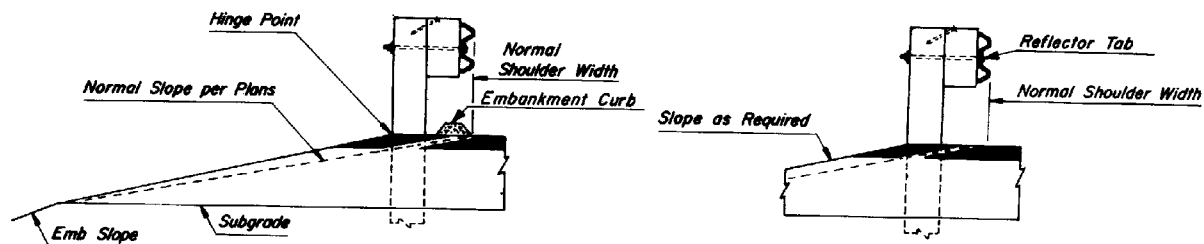
GENERAL NOTES

1. Grooves in curbed shoulders shall terminate at the face of the single curb or at the edge of the gutter.
2. Grooves shall extend through pavement edge of shoulders with no curb.

DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR CONSTRUCTION	GROOVING FOR CONCRETE SHOULDERS	DRAWING NO. C-9.20



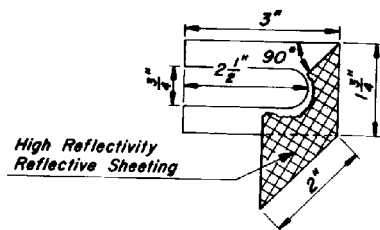
PLAN



With Embankment Curb
SECTION A-A

Without Embankment Curb
SECTION B-B

TYPE A GUARD RAIL INSTALLATION



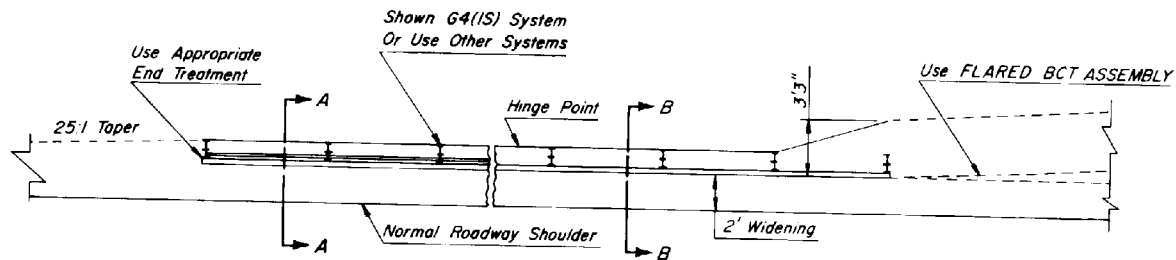
REFLECTOR TAB DETAIL

GENERAL NOTES

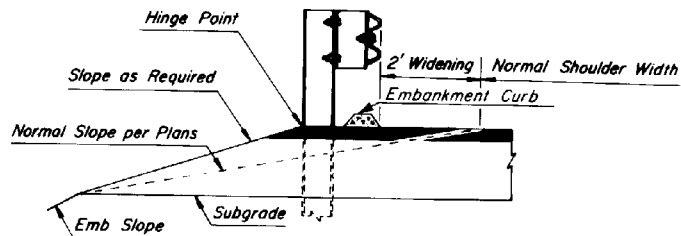
All embankment curb shall be protected by guard rail.

Guard rail, exclusive of flares, shall not begin or end within embankment curb.

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/83
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TYPE A GUARD RAIL INSTALLATION, REFLECTOR TAB	DRAWING No. C-10.01

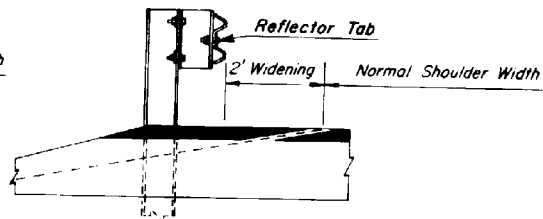


PLAN



With Embankment Curb

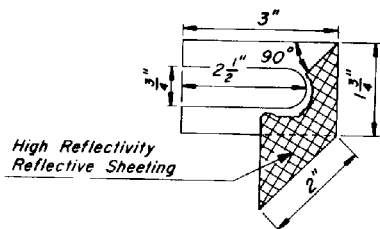
SECTION A-A



Without Embankment Curb

SECTION B-B

TYPE B GUARD RAIL INSTALLATION



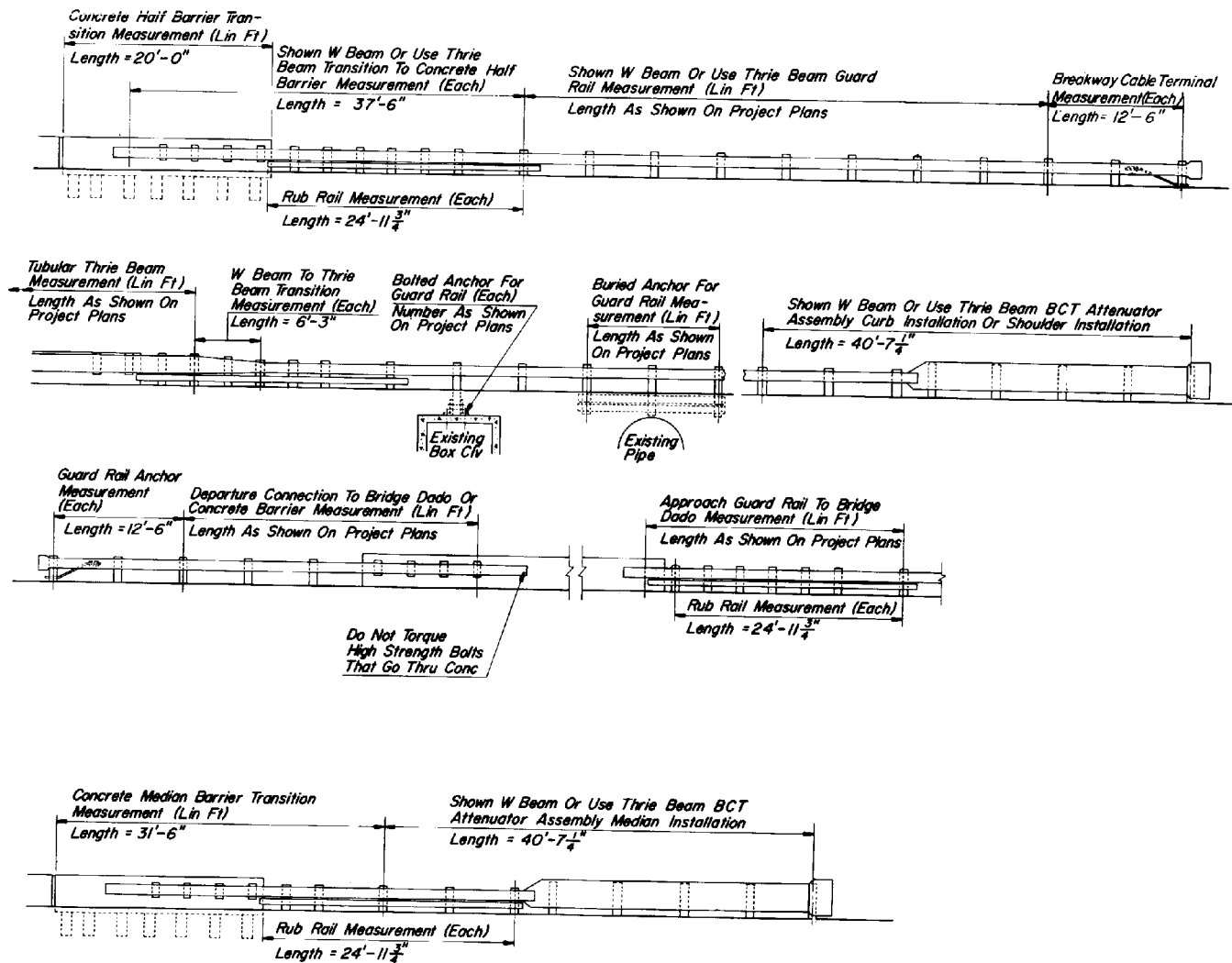
REFLECTOR TAB DETAIL

GENERAL NOTES

All embankment curb shall be protected by guard rail.

Guard rail, exclusive of flares, shall not begin or end within embankment curb.

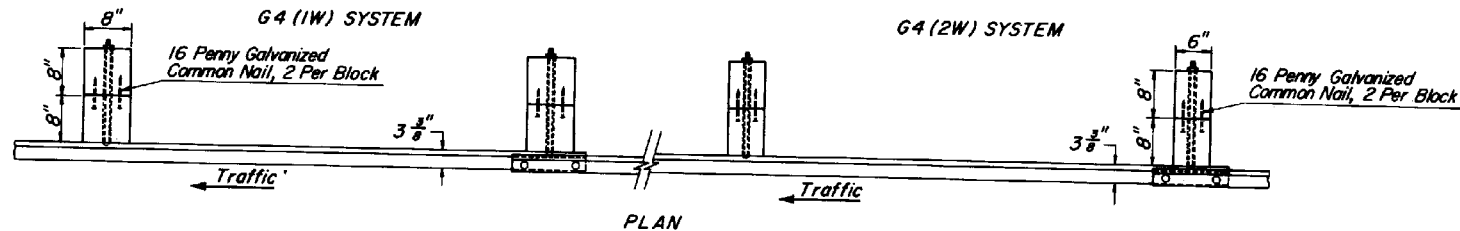
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TYPE B GUARD RAIL INSTALLATION, REFLECTOR TAB	DRAWING No. C-10.02



GENERAL NOTES

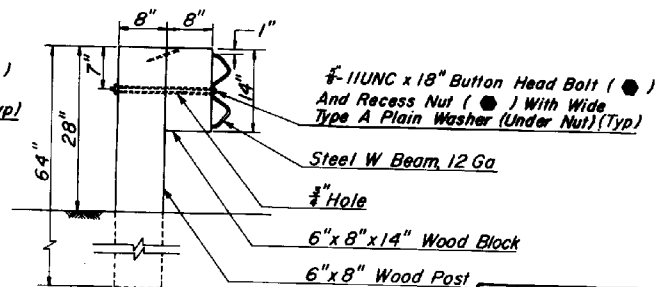
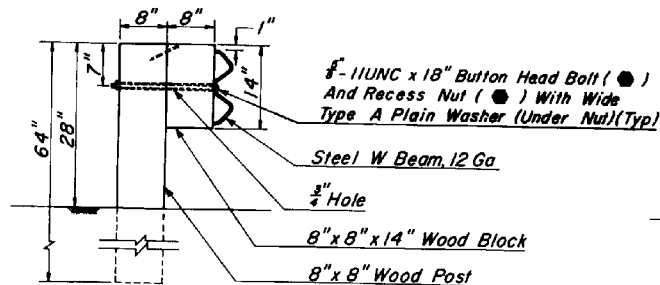
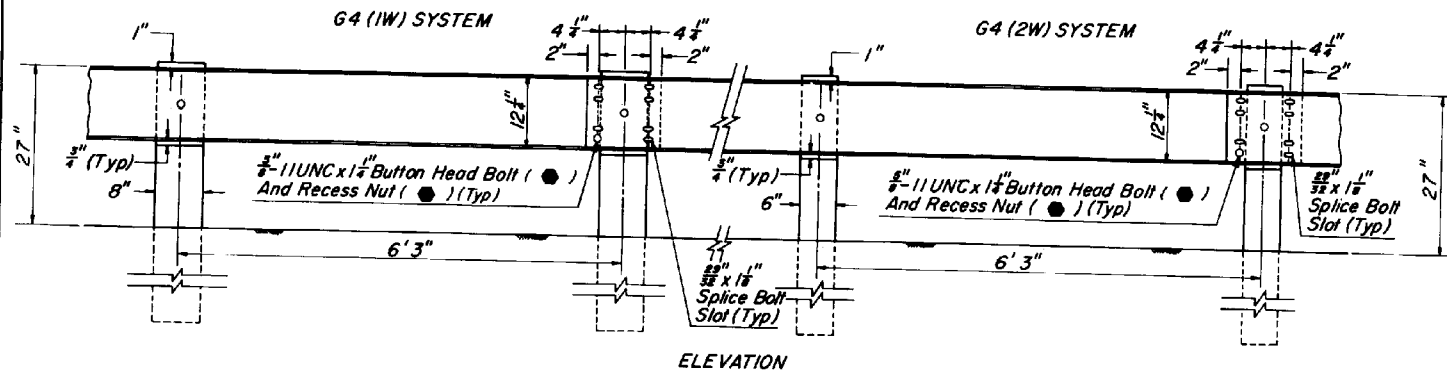
Length shall be as shown unless otherwise indicated on the project plans.

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRICT ENGINEER 	MEASUREMENT LIMITS FOR W BEAM AND THRIE BEAM SYSTEM	DRAWING NO. C-10.03



GENERAL NOTES

● - Indicates ARTBA designation.



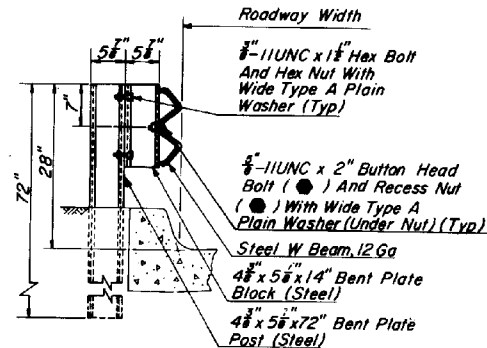
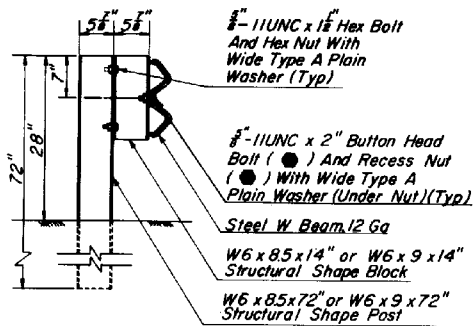
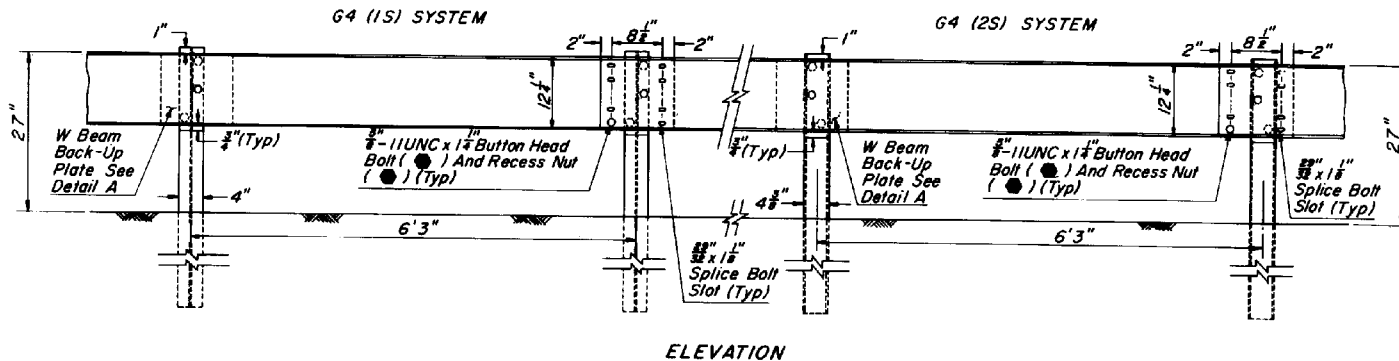
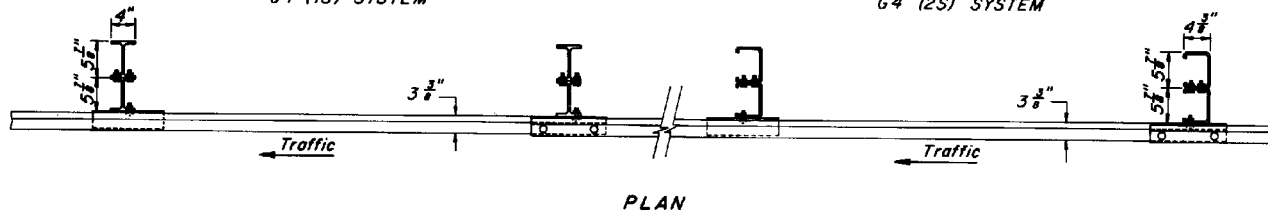
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	G4(1W) AND G4(2W) BLOCKED OUT W BEAM (TIMBER POST)	DRAWING No. C-10.04

G4 (1S) SYSTEM

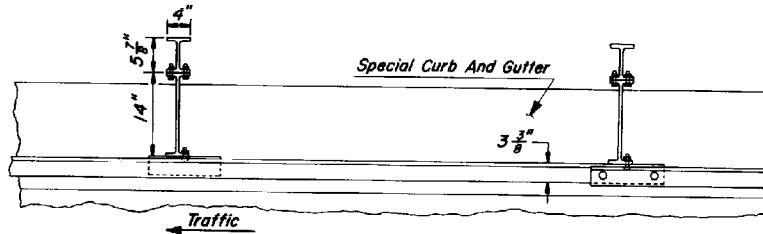
G4 (2S) SYSTEM

GENERAL NOTES

●—Indicates ARTBA designation.

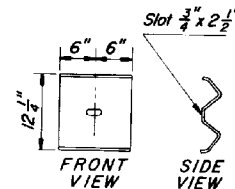
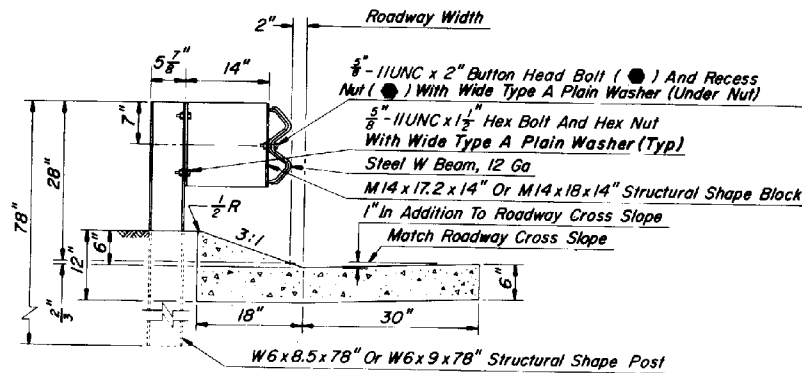
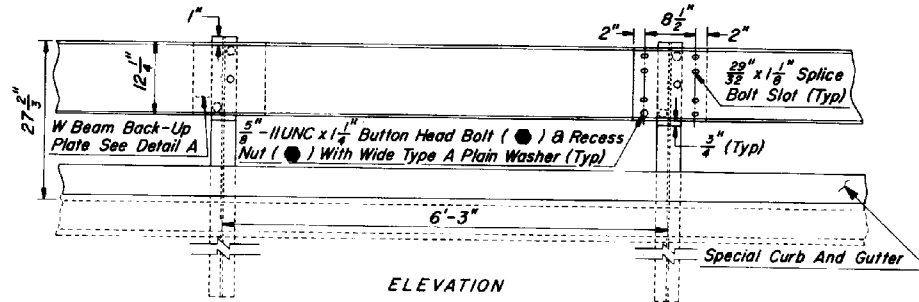


DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION	G4 (1S) AND G4 (2S) BLOCKED OUT W BEAM (STEEL POST)	DRAWING No. C-10.05



GENERAL NOTES

● - Indicates ARTBA designation.



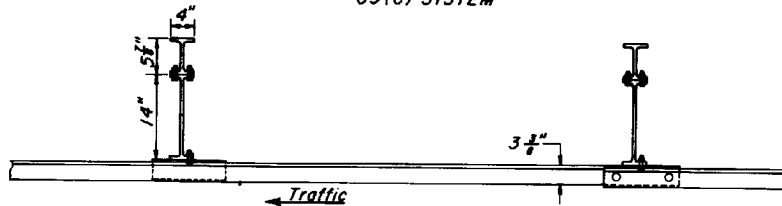
DETAIL A
(W BEAM BACK-UP PLATE)

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR CONSTRUCTION <i>[Signature]</i>	G4 (IS-MODIFIED) BLOCKED OUT W BEAM (STEEL POST) WITH SPECIAL CURB AND GUTTER	DRAWING NO. C-10.06

G9(C) SYSTEM

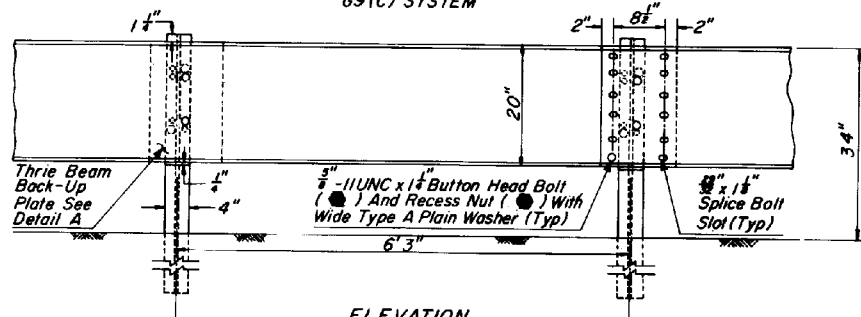
GENERAL NOTES

● - Indicates ARTBA designation.

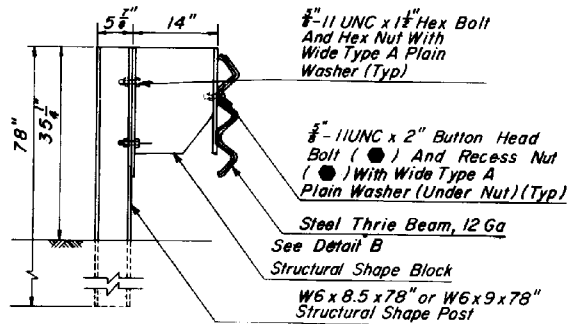


PLAN

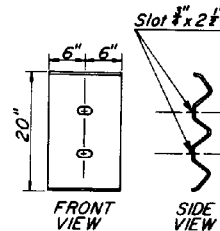
G9(C) SYSTEM



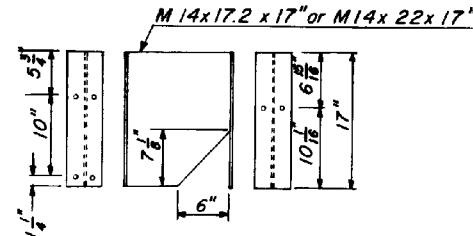
ELEVATION



SECTION G9(C)

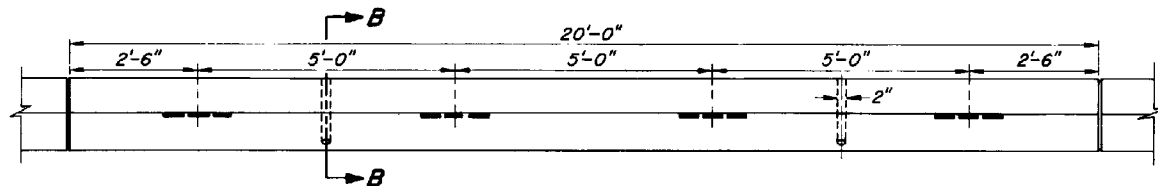


DETAIL A
(THRIE BEAM
BACK-UP PLATE)

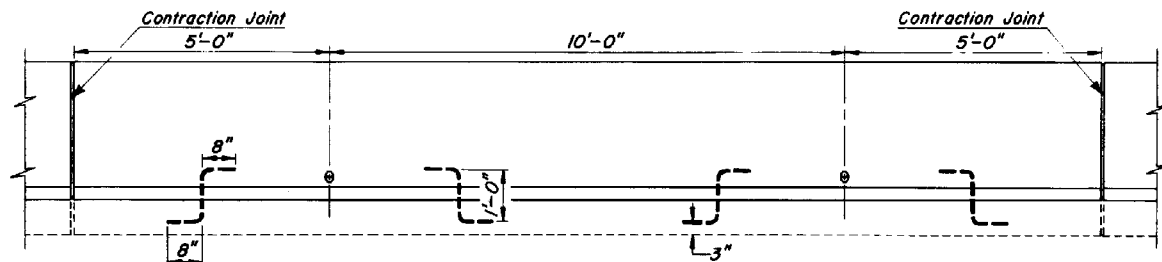


DETAIL B
(MODIFIED STRUCTURAL
SHAPE BLOCK)

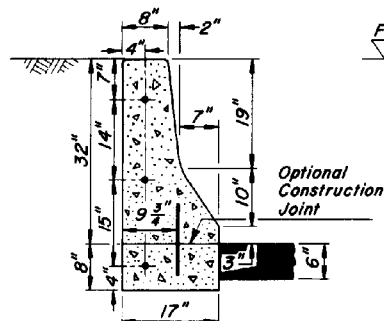
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	G9(C) BLOCKED OUT THRIE BEAM (STEEL POST)	DRAWING No. C-10.08



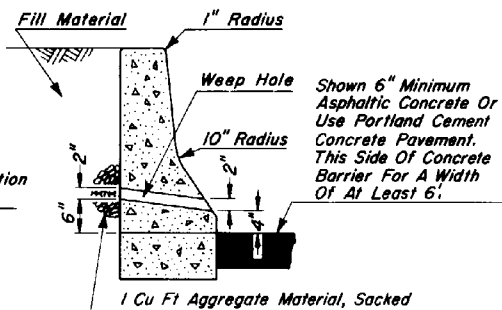
PLAN



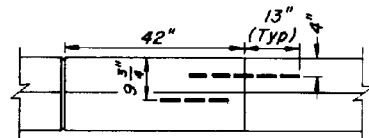
ELEVATION



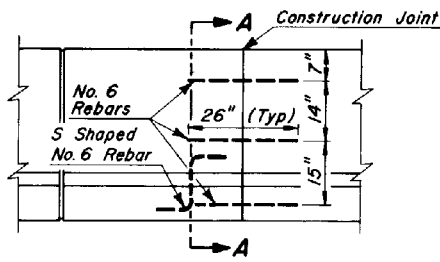
SECTION A-A



SECTION B-B



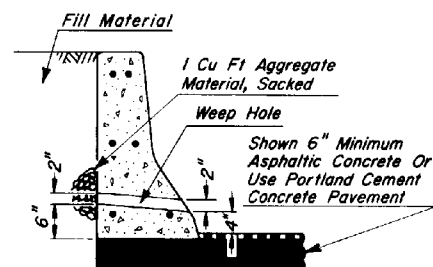
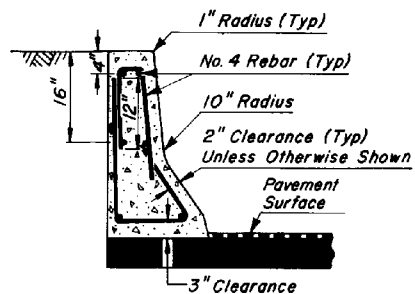
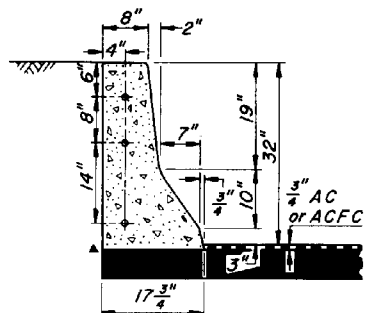
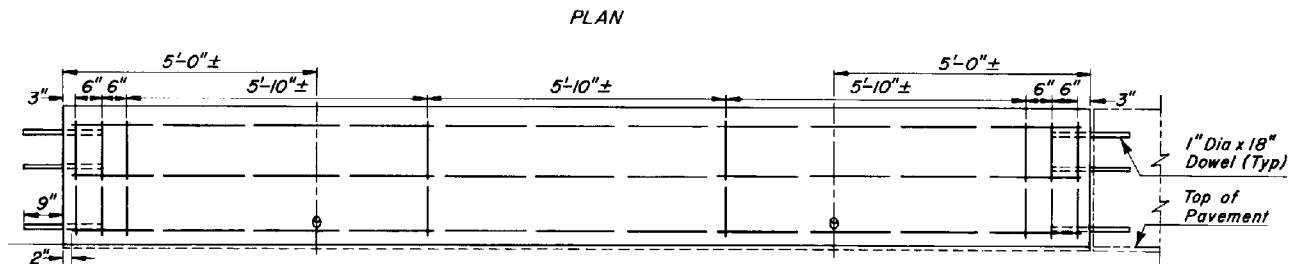
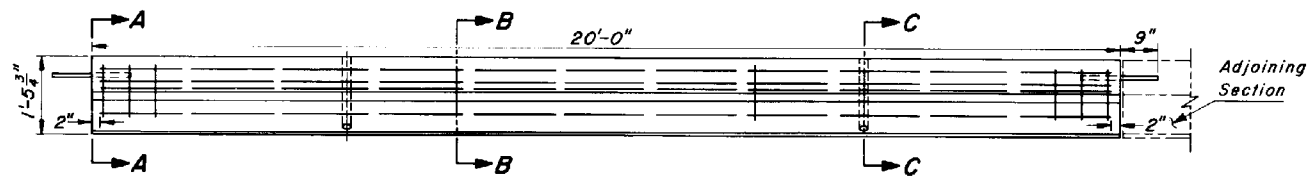
PLAN



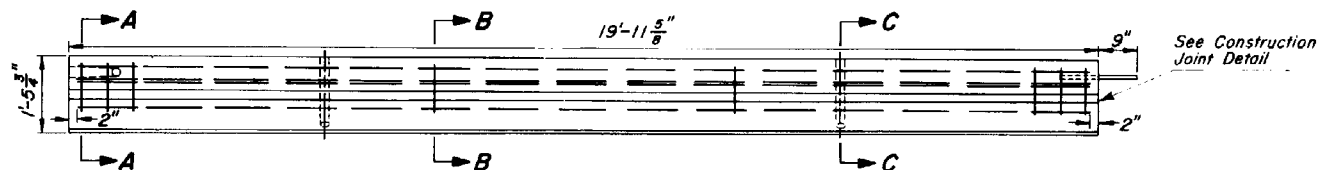
ELEVATION

CONSTRUCTION JOINT DETAIL

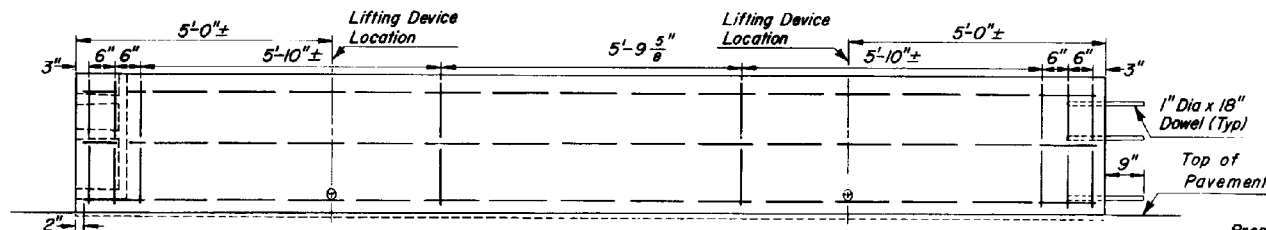
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	HALF BARRIER, CAST IN PLACE, SLIP FORM	DRAWING NO. C-10.09



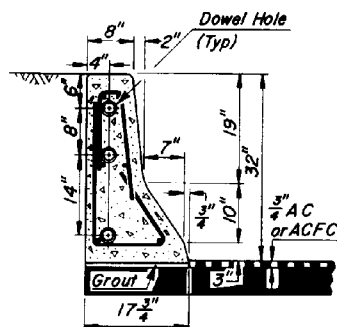
DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 11/83
APPROVED FOR DISTRIBUTION	HALF BARRIER, CAST IN PLACE, FIXED FORM	DRAWING NO. C-10.10



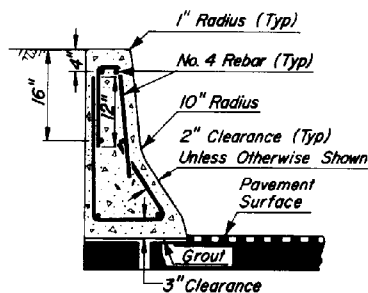
PLAN



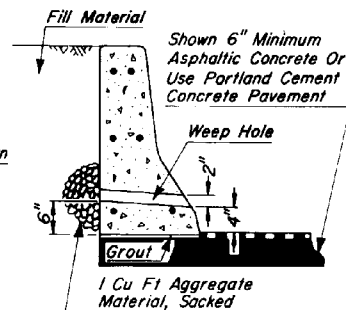
ELEVATION



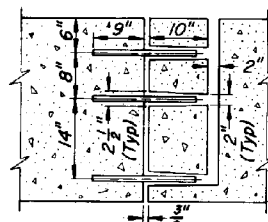
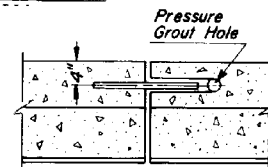
SECTION A-A



SECTION B-B

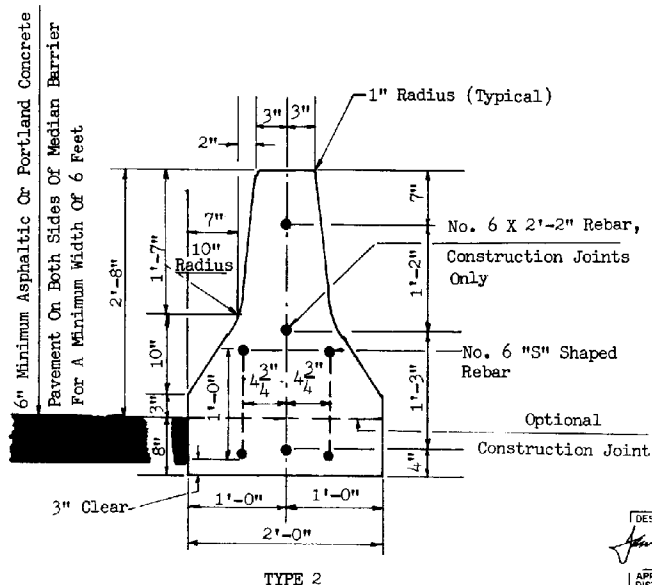
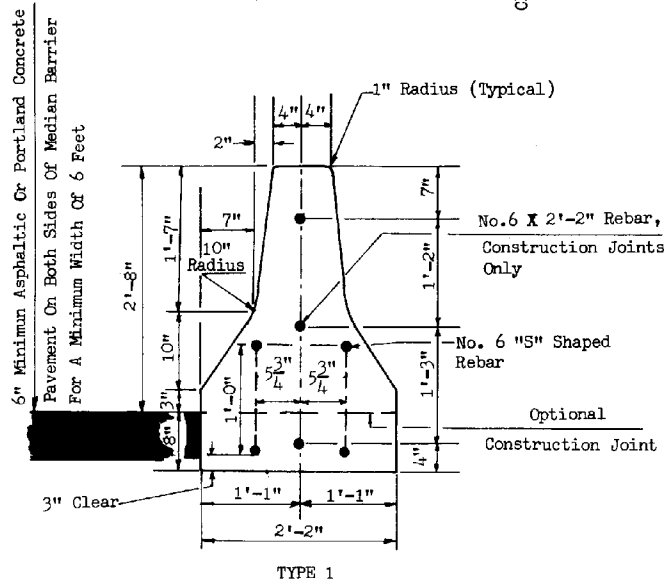
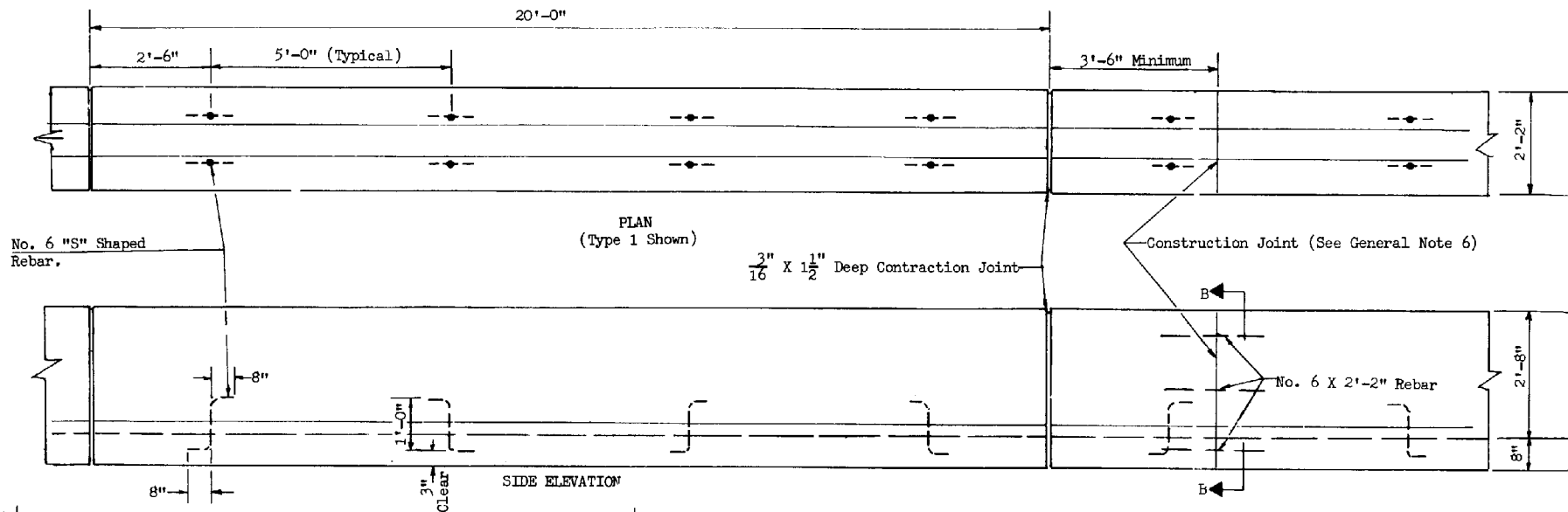


SECTION C-C



CONSTRUCTION JOINT DETAIL

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR DISTRIBUTION 	HALF BARRIER, PRECAST	DRAWING NO. C-10.11



GENERAL NOTES:

- Median Barrier shall be constructed by the slip form or extrusion method.
- When obstacles are encountered which prevent the use of slip form equipment, the closure shall be accomplished by the use of stationary forms.
- Unless otherwise specified on project plans, the Type 1 Median Barrier shall be constructed.
- Concrete shall be Class S, design strength $f'_c = 3000$ p.s.i.
- If the footing and barrier are cast monolithically No. 6 "S" shaped rebars and optional construction joint will not be required.
- Construction joints shall be kept to a minimum. Joints shall be finished with tool having a 1/4 inch radius.
- Contraction joints shall be sealed with an approved joint sealant.

DESIGN APPROVED

John J. Smith

APPROVED FOR DISTRIBUTION

John J. Smith

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

MEDIAN BARRIER, CAST IN PLACE, SLIP FORM

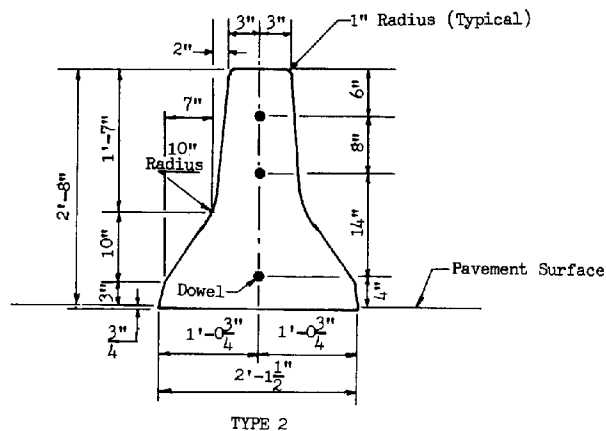
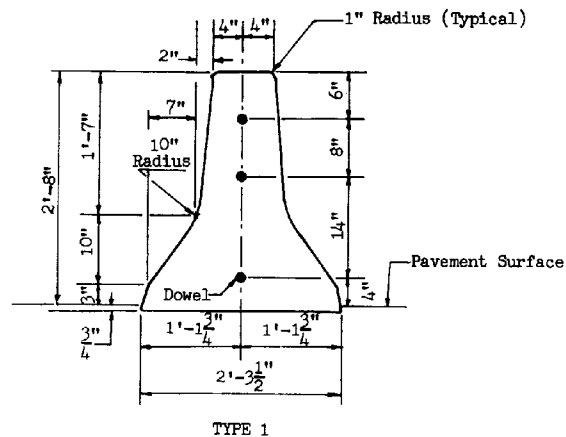
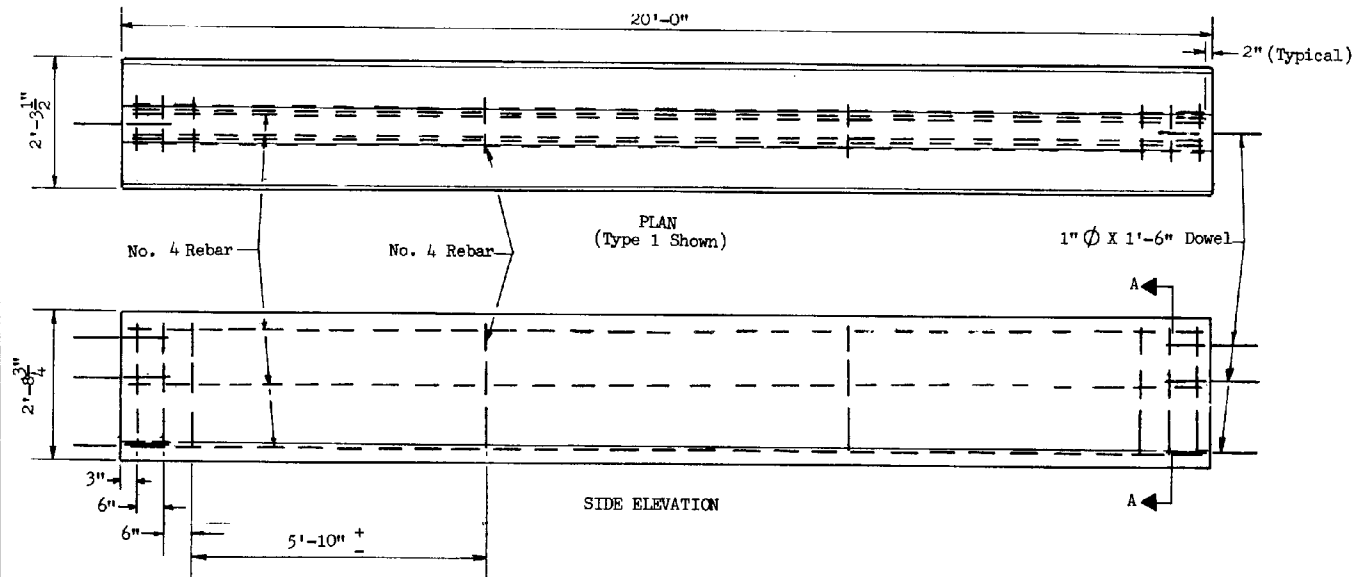
REV

1/83

DRAWING NO

C-10.12

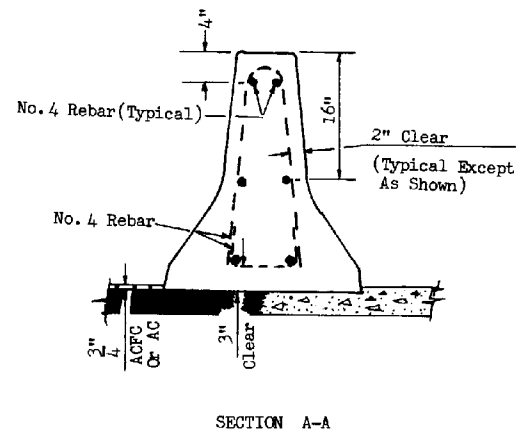
SECTION B-B



END ELEVATION

GENERAL NOTES:

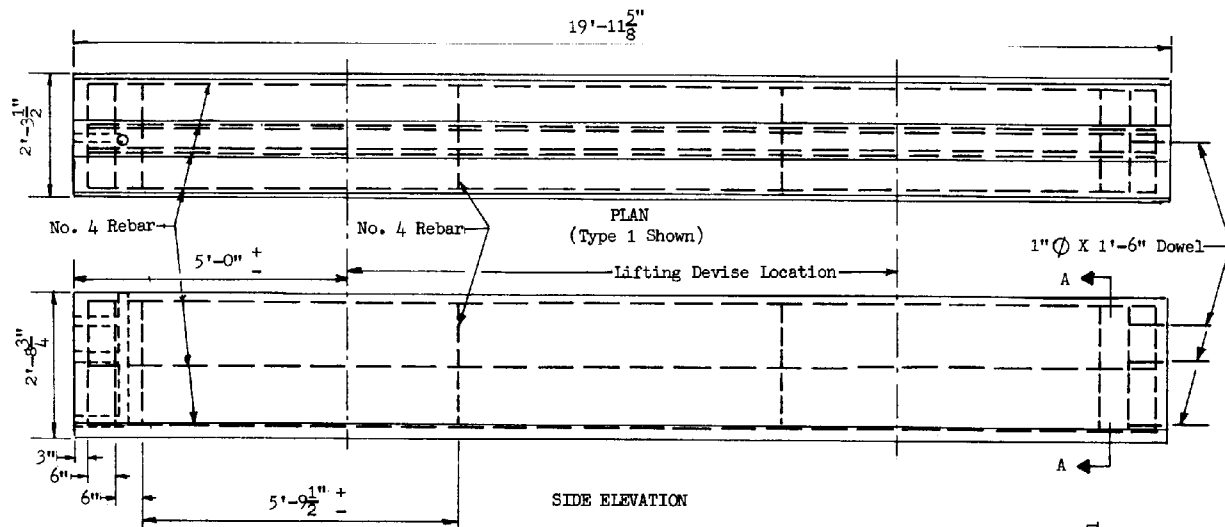
1. Concrete shall be Class S, design strength $f'_c = 3000$ p.s.i.
2. Unless otherwise specified on project plans, the Type 1 Median Barrier shall be constructed.
3. Median Barrier shall be placed upon either Asphaltic or Portland Cement Concrete Pavement.
4. Pavement thickness adjacent to Median Barrier shall be 3/4 inch minimum.
5. Joints shall be finished with a tool having a 1/4 inch radius.
6. This standard shall not be used when an individual run consists of less than five 20 foot sections.



DESIGN APPROVED
James H. Ray
APPROVED FOR
DISTRIBUTION
W. J. Martin

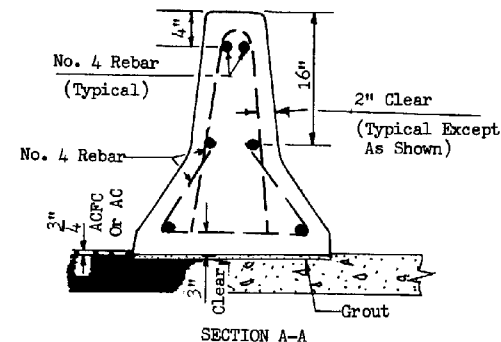
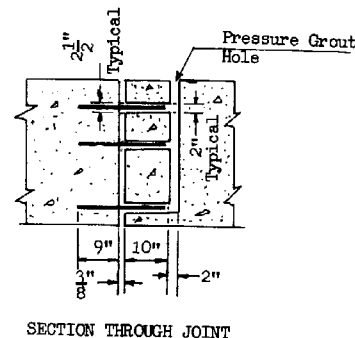
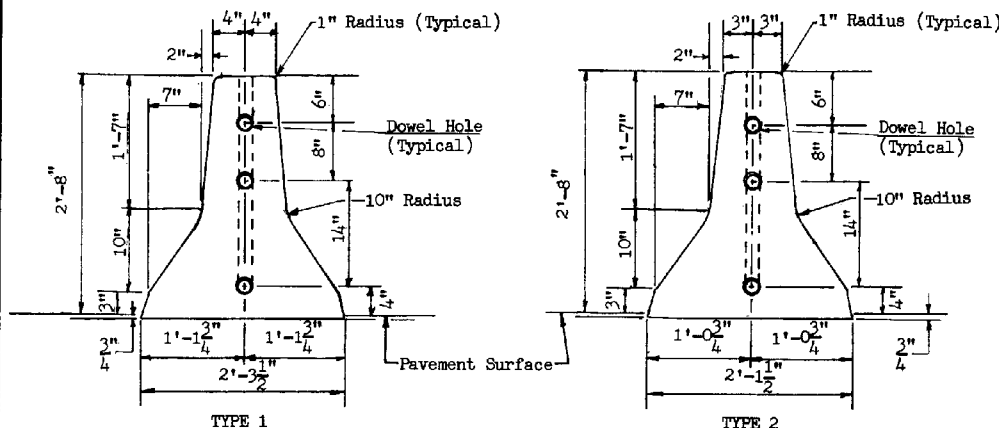
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS
MEDIAN BARRIER, CAST IN
PLACE, FIXED FORM

REV
1/83
DRAWING NO.
C-10.13



GENERAL NOTES:

- Concrete shall be Class S, design strength $f'_c = 3000$ p.s.i.
- Unless otherwise specified on the project plans, the Type 1 Median Barrier shall be constructed.
- Median Barrier shall be placed upon either Asphaltic or Portland Cement Concrete Pavement.
- Pavement thickness adjacent to Median Barrier shall be $\frac{3}{4}$ inch minimum.
- The Median Barrier shall be placed upon a bed of grout in order to provide a uniform bearing.
- Doweled joints shall be grouted under pressure until all of the openings and the joint are filled.
- This standard shall not be used when an individual run consists of less than five 20 foot sections.

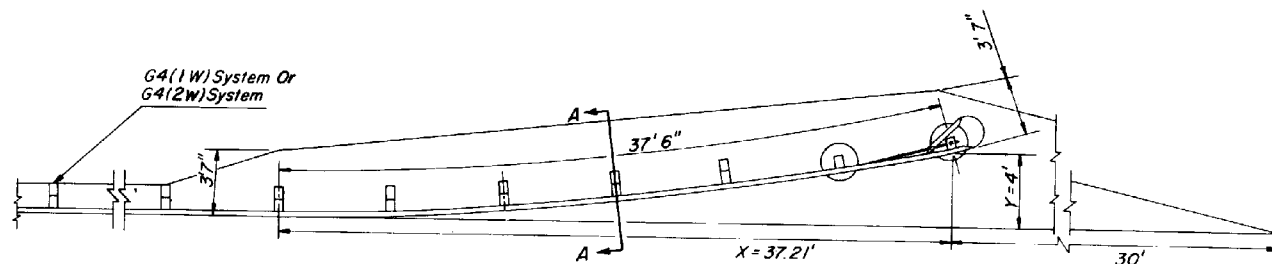


END ELEVATION

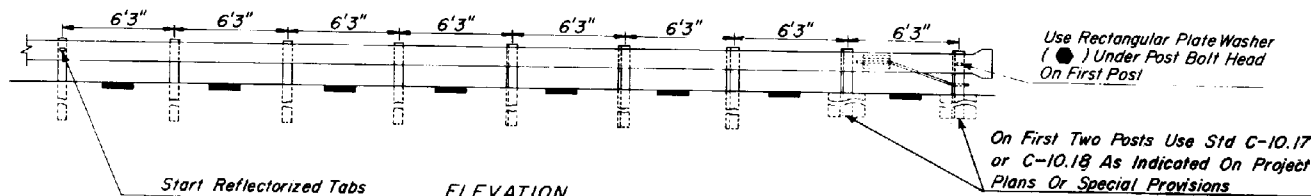
DESIGN APPROVED <i>James P. Ray</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR CONSTRUCTION <i>John J. Smith</i>	MEDIAN BARRIER, PRECAST	DRAWING NO. C-10-14

GENERAL NOTES

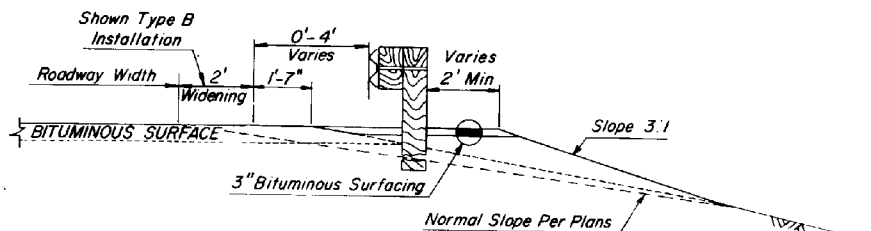
● - Indicates ARTBA designation.



PLAN



ELEVATION



SECTION A-A

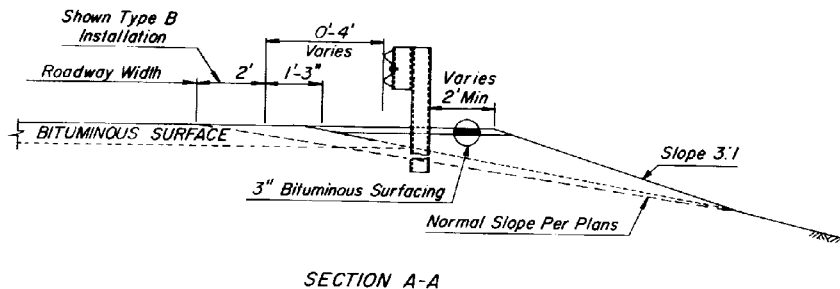
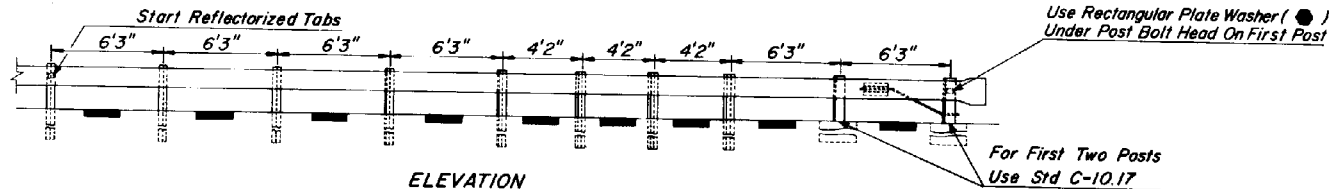
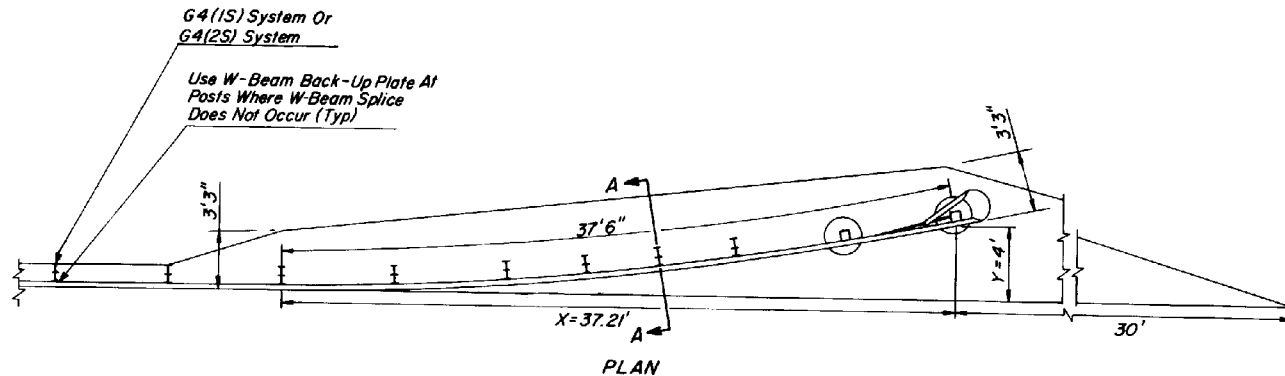
LAYOUT AND DETAILS OF THE FLARE

FLARED GEOMETRICS		
Dst Along 37'6" Parabolic Curve	Dst Along X Axis	Dst Along Y Axis To Face Of Guard Rail
6' 3"	6.25'	0.11'
12' 6"	12.49'	0.45'
18' 9"	18.71'	1.01'
25' 0"	24.92'	1.79'
31' 3"	31.08'	2.79'
37' 6"	37.21'	4.00'

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	FLARED BREAKAWAY CABLE TERMINAL ASSEMBLY (TIMBER POST)	DRAWING NO. C 10.15

GENERAL NOTES

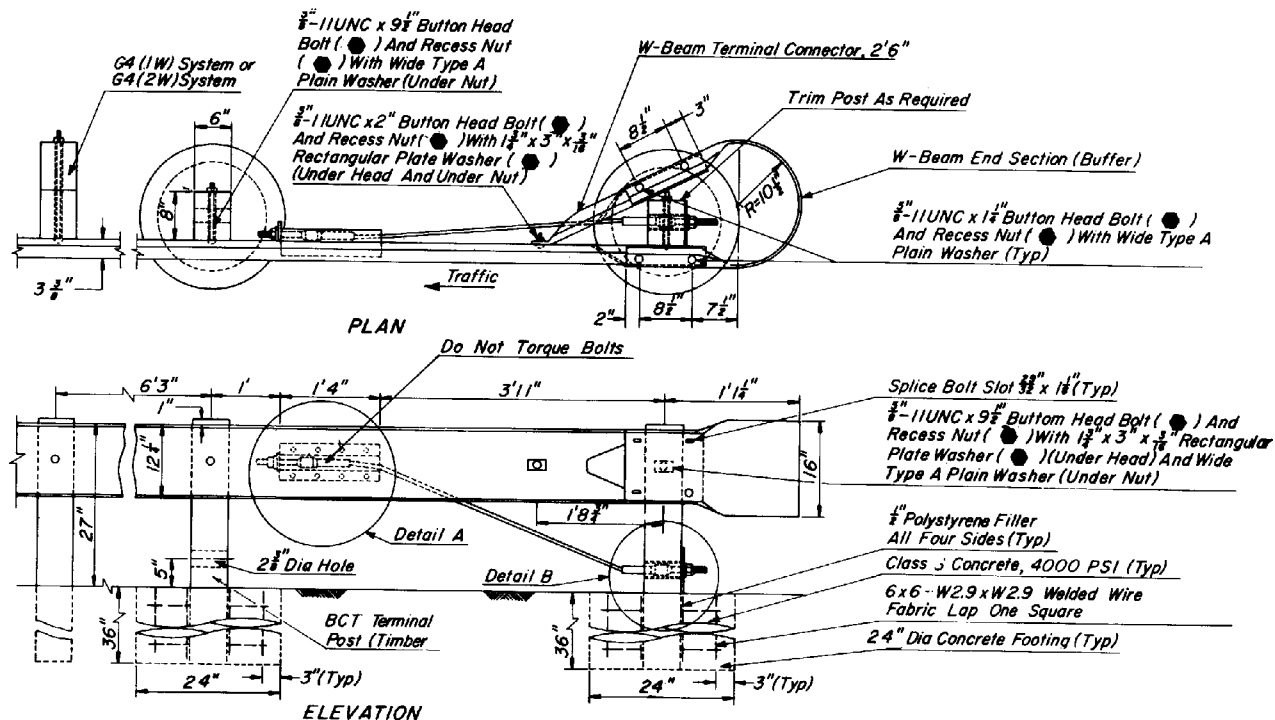
● - Indicates ARTBA designation.



FLARED GEOMETRICS		
Dst Along 37'6" Parabolic Curve	Dst Along X Axis	Dst Along Y Axis To Face Of Guard Rail
6'3"	6.25'	0.11'
12'6"	12.49'	0.44'
16'8"	16.64'	0.79'
20'10"	20.78'	1.23'
25'0"	24.92'	1.78'
31'3"	31.08'	2.78'
37'6"	37.21'	4.00'

LAYOUT AND DETAILS OF THE FLARE

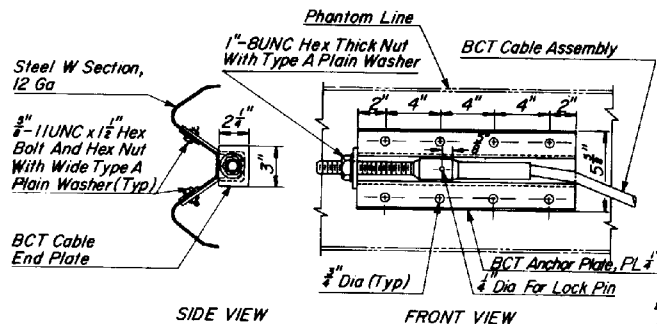
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	FLARED BREAKAWAY CABLE TERMINAL ASSEMBLY (STEEL POST)	DRAWING NO. C 10.16



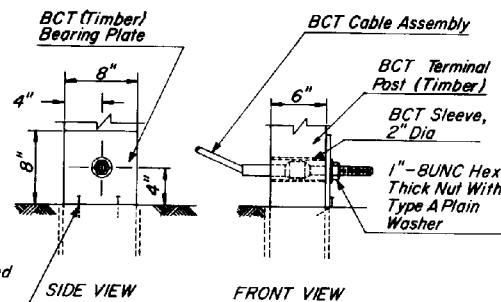
GENERAL NOTES

1. BCT Cable Assembly shall be tightened to remove slack.
2. To ensure that the BCT (Timber) Bearing Plate remains in position, Two eightpenny galvanized steel nails shall be driven into the BCT Terminal Post (Timber) and bent over the plate.

● Indicates ARTBA designation.



DETAIL A



DETAIL B

DESIGN APPROVED <i>W.B. Holfield</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>James A. ...</i>	BCT ASSEMBLY TIMBER	DRAWING NO. C-10.18

$\frac{3}{8}$ "-11UNC x 9 $\frac{1}{2}$ " Button Head Bolt (●) And Recess Nut (●) With Rectangular Plate Washer (●) (Under Head)

G4(1S) System
G4(2S) System
G4(1W) System or
G4(2W) System

16 Penny Galvanized Common Nail, 2 Per Block

W Beam End Section Flared

PLAN

$\frac{3}{8}$ "-11UNC x 1 $\frac{1}{2}$ " Button Head Bolt (●) And Recess Nut (●) With Wide Type A Plain Washer (Typ)

BCT Terminal Post (Steel)

Class S Concrete, 4000 PSI

6x6-W2.9 x W2.9 Welded Wire Fabric Lap One Square

24" Dia Concrete Footing

Do Not Torque Bolts

Splice Bolt Slot
 $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " (Typ)

Detail B

Detail A

ELEVATION

One Wrap 14 Gauge Galvanized Steel Wire

$\frac{3}{8}$ " Wide Type A Plain Washer

$\frac{3}{8}$ "-11UNC x 3 $\frac{1}{2}$ " Heavy Hex Screw And Heavy Hex Nut With Flat Plate Washer (●) (Top and Bottom)

BCT Cable Assembly

$\frac{1}{8}$ " 10 @ 2
0+ $\frac{1}{2}$ " 10 @ 2

BCT (Steel) Bearing Plate

BCT (Steel) Tapered Washer

1"-8UNC Hex Thick Nut With Type A Plain Washer

BCT (Steel) Foundation Plates

$\frac{3}{8}$ "-10UNC x 16" High Strength Anchor Bolt (●) With Heavy Hex Nut (Typ)

FRONT VIEW

DETAIL A

SIDE VIEW

BCT Cable Assembly

Phantom Line

1"-8UNC Hex Nut With Type A Plain Washer

Steel W Section, 12 Ga

$\frac{3}{8}$ "-11UNC x 1 $\frac{1}{2}$ " Hex Bolt And Hex Nut With Wide Type A Plain Washer (Typ)

BCT Cable End Plate

BCT Anchor Plate, PL

$\frac{1}{2}$ " Dia For Lock Pin

$\frac{3}{8}$ " Dia (Typ)

FRONT VIEW

DETAIL B

SIDE VIEW

GENERAL NOTES

1. BCT Cable Assembly shall be tightened to remove slack.
2. $\frac{5}{8}$ "-11UNC x 3 $\frac{1}{2}$ " Heavy Hex Screw, connecting BCT Terminal Post (Steel) and BCT (Steel) Foundation Plates, shall be torqued to 170 ft. lbs.
3. To ensure that the BCT (Steel) Bearing Plate remains in position, one wrap of 14 Gauge Galvanized Steel Wire shall be wrapped around the BCT Terminal Post (Steel) and near the top of the plate.

●-Indicates ARTBA designation.

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APPROVED FOR DISTRIBUTION <i>[Signature]</i>	GUARDRAIL ANCHOR ASSEMBLY STEEL TERMINAL POST	DRAWING NO. C-10.21

$\frac{5}{8}$ "-11UNC x $9\frac{1}{2}$ " Button Head Bolt (●) And Recess Nut (●) With Rectangular Plate Washer (●) (Under Head) And Wide Type A Plain Washer (Under Nut)

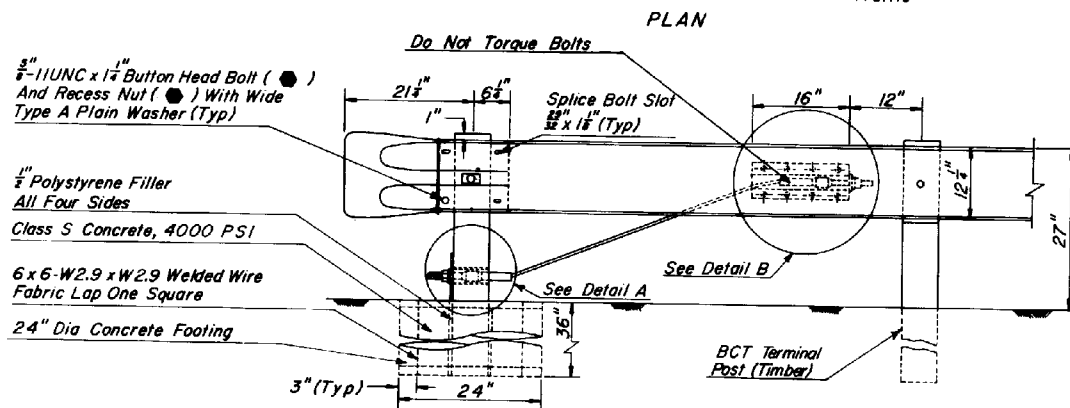
W-Beam End Section Flared

G4 (1W) System or G4 (2W) System
16 Penny Galvanized Common Nail, 2 Per Block

GENERAL NOTES

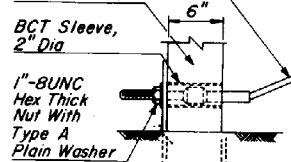
1. BCT Cable Assembly shall be tightened to remove slack.

● Indicates ARTBA designation.



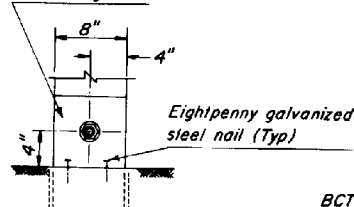
ELEVATION

BCT Cable Assembly
BCT Terminal Post (Timber)



FRONT VIEW

BCT (Timber) Bearing Plate

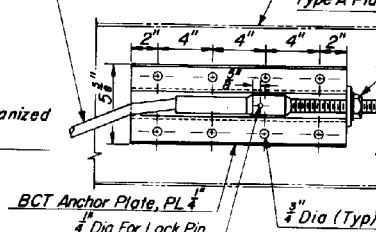


DETAIL A

BCT Cable Assembly

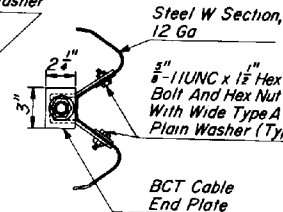
Phantom Line

1"-BUNC Hex Nut With Type A Plain Washer



FRONT VIEW

DETAIL B

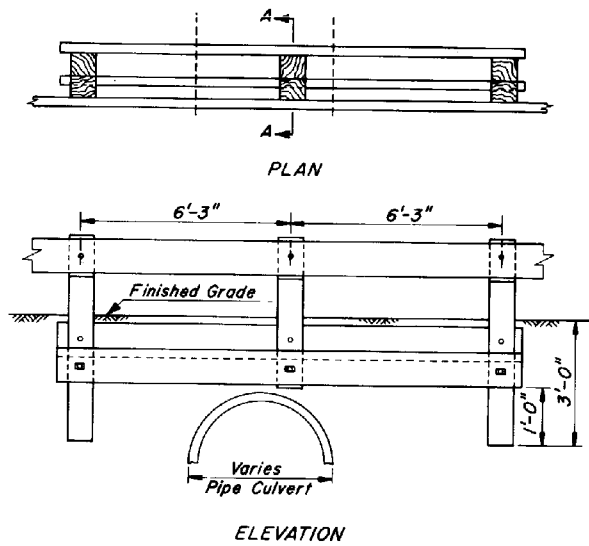


SIDE VIEW

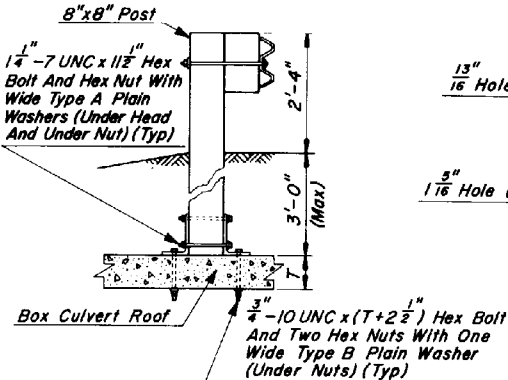
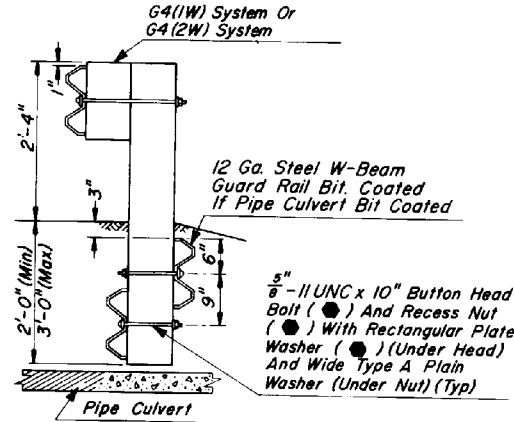
DESIGN APPROVED
H.R. [Signature]
APPROVED FOR
DISTRIBUTION
James A. [Signature]

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS
GUARD RAIL ANCHOR ASSEMBLY
TIMBER TERMINAL POST

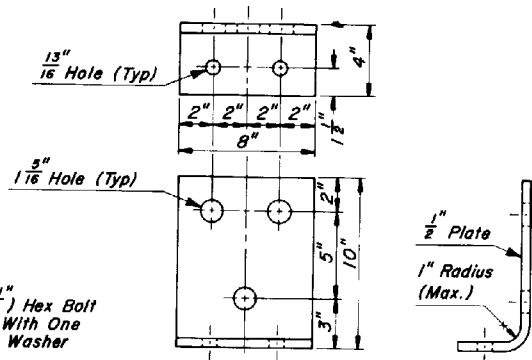
REV 6/86
DRAWING No. C-10.22



BURIED ANCHOR
PIPE CULVERT INSTALLATION



BOLTED ANCHOR
BOX CULVERT INSTALLATION

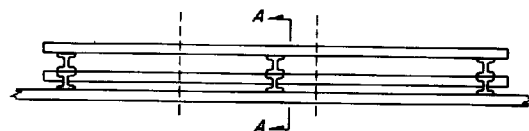


GENERAL NOTES

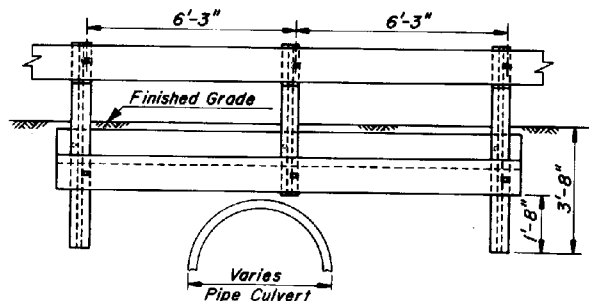
1. Extend buried W-Beam 6'-3" past last short post.
2. Drill through top of box culvert with rotary drill.
3. Bracket may be made of one piece hot bent, or two pieces welded together.
4. Short posts anchored to box culvert; roof shall be 8" x 8" only.
5. Rectangular Plate Washer (●) shall be used only at below ground connections

● - Indicates ARTBA designation.

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	BURIED & BOLTED ANCHOR TIMBER POST	DRAWING No. C-10.23

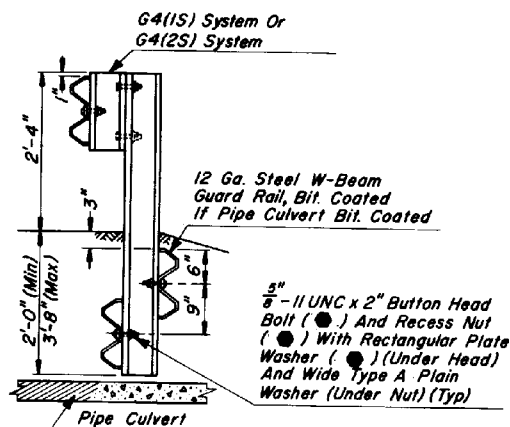


PLAN



ELEVATION

BURIED ANCHOR
PIPE CULVERT INSTALLATION

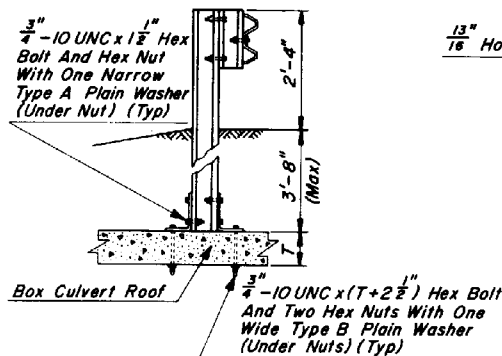


SECTION A-A

GENERAL NOTES

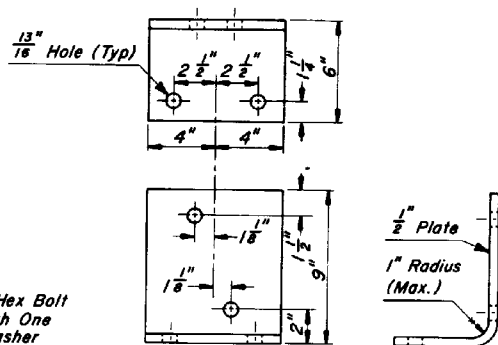
1. Extend buried W-Beam 6'-3" past last short post.
2. Drill through top of box culvert with rotary drill.
3. Bracket may be made of one piece hot bent, or two pieces welded together.
4. Rectangular Plate Washer (●) shall be used only at below ground connections.

● - Indicates ARTBA designation.



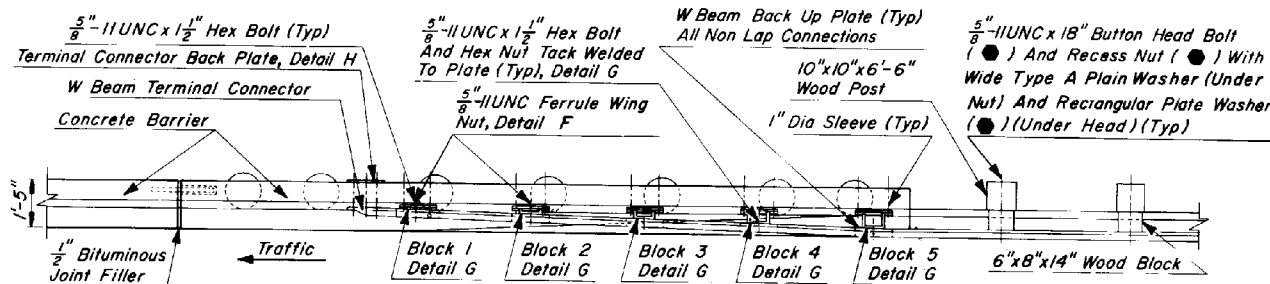
INSTALLATION DETAIL

BOLTED ANCHOR
BOX CULVERT INSTALLATION

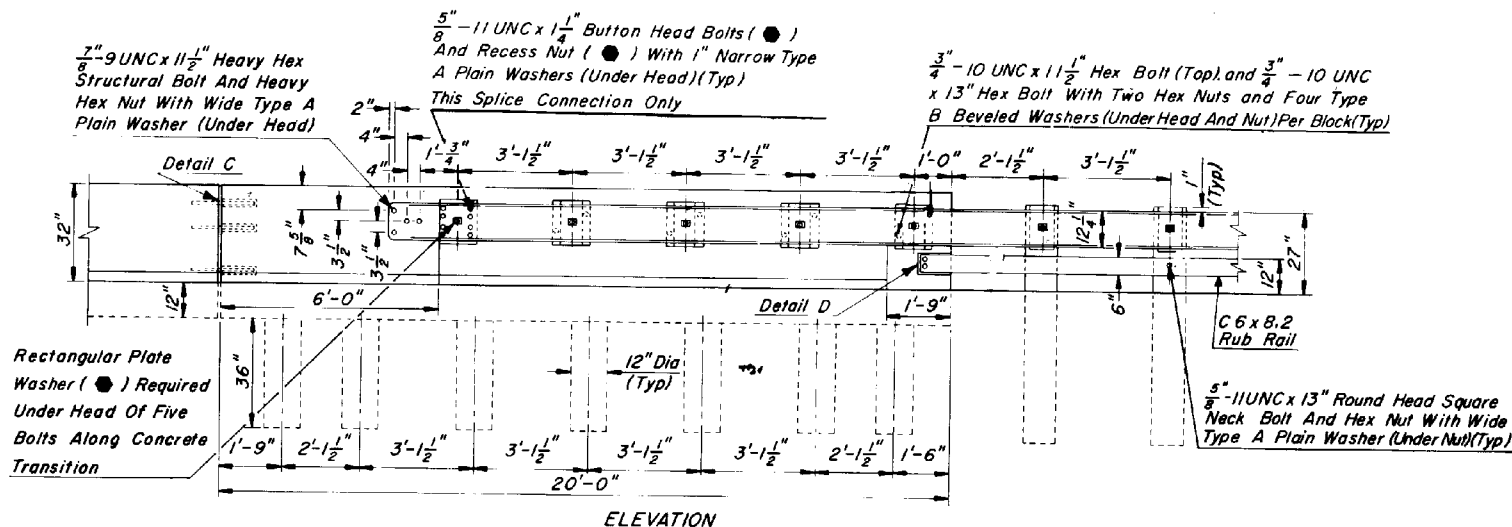


BRACKET DETAIL

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	BURIED & BOLTED ANCHOR STEEL POST	DRAWING No. C 1024



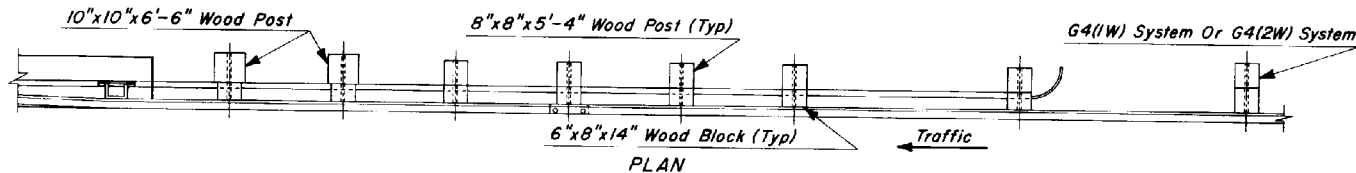
PLAN



GENERAL NOTES

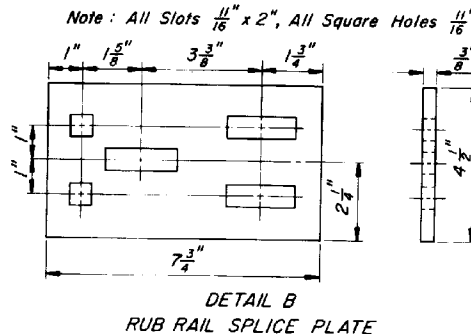
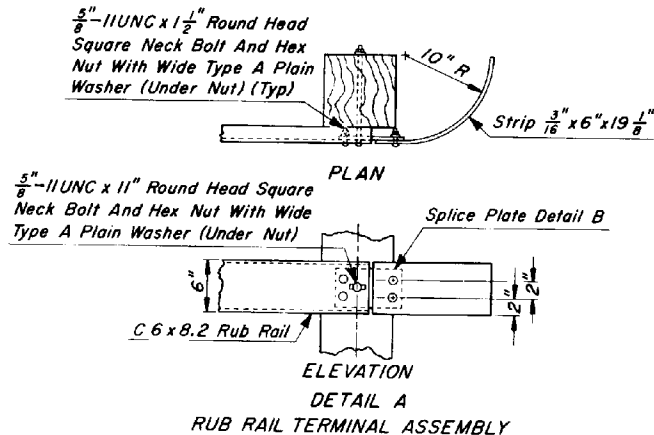
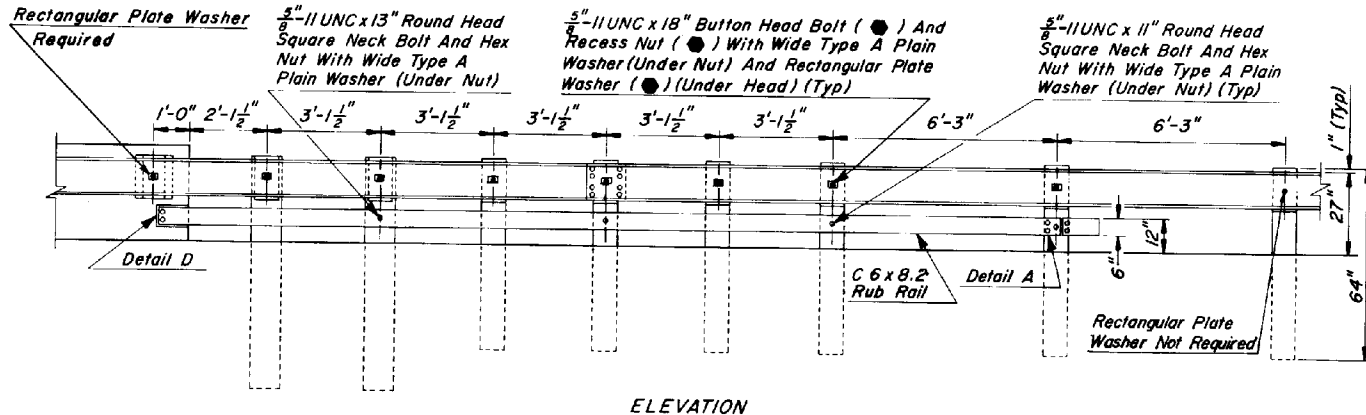
●-Indicates ARTBA designation.

DESIGN APPROVED <i>W.R. Wakefield</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 6/86
APPROVED FOR DISTRIBUTION <i>James A. Miller</i>	TRANSITION W BEAM (TIMBER POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.25 Sheet 1 of 5

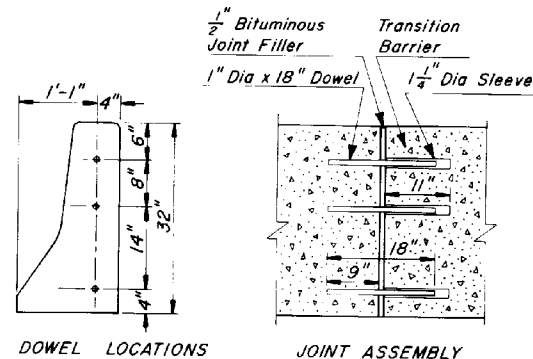
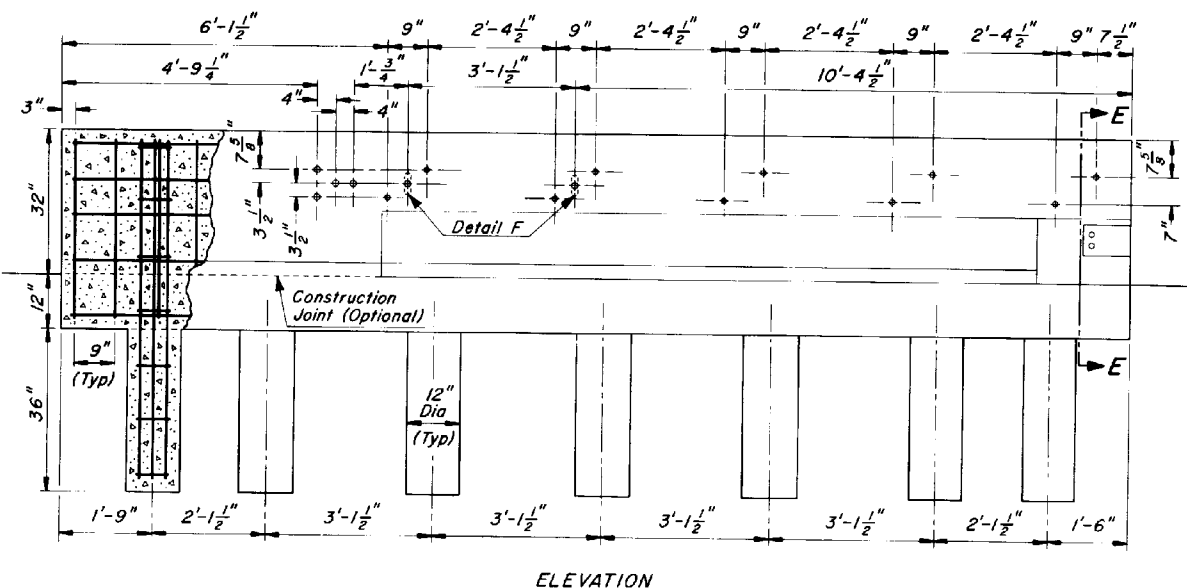
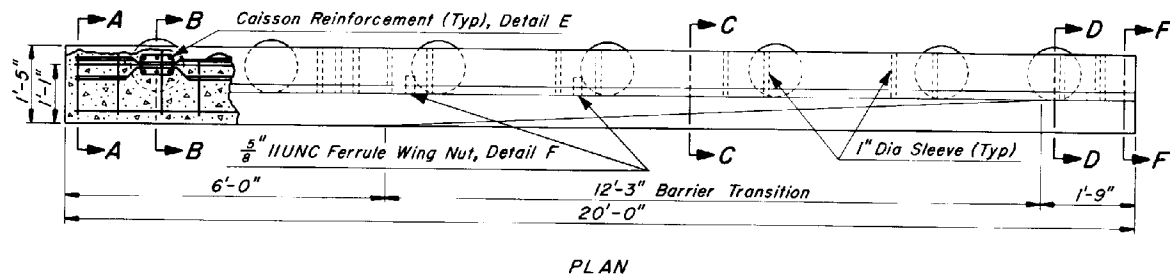


GENERAL NOTES

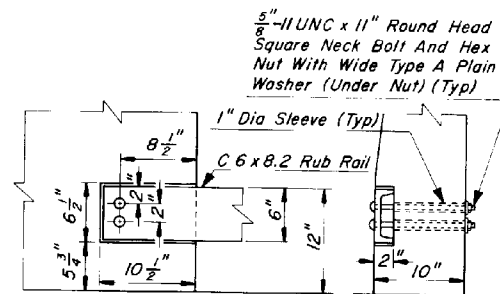
● - Indicates ARTBA designation.



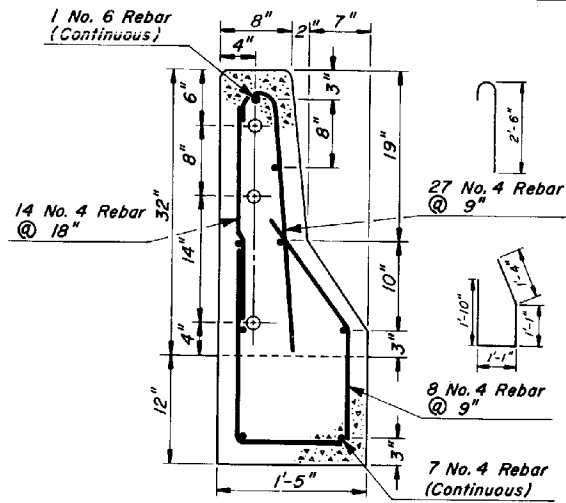
DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 6/86
APPROVED FOR DISTRIBUTION	TRANSITION W BEAM (TIMBER POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.25 Sheet 2 of 5



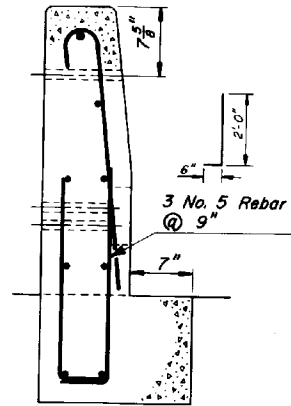
DOWEL INSTALLATION AND CONSTRUCTION JOINT



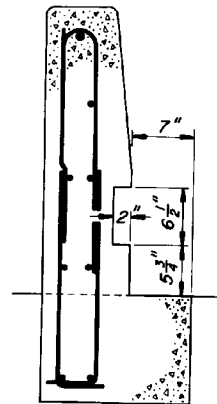
DESIGN APPROVED <i>W.R. Henshaw</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>James A. Henshaw</i>	TRANSITION W BEAM (TIMBER POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.25 Sheet 3 of 5



SECTION A-A

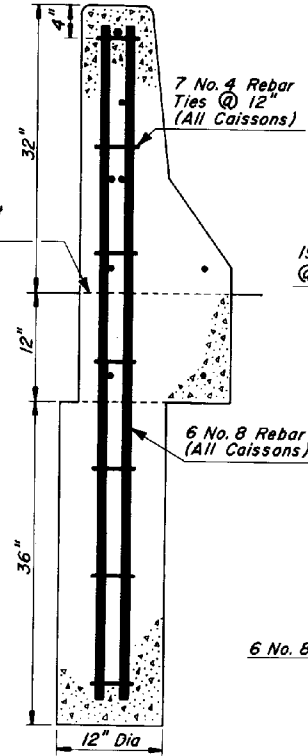


SECTION E-E

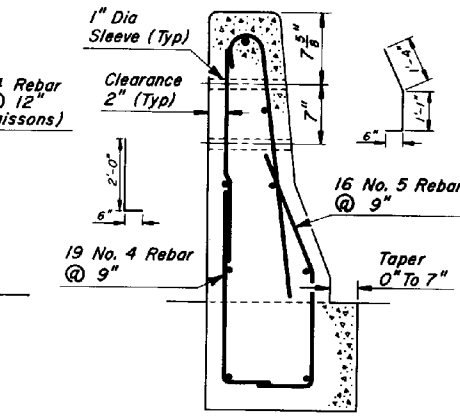


SECTION F-F

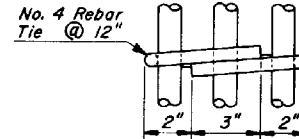
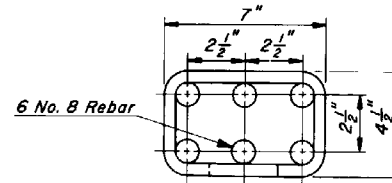
Construction Joint (Optional)



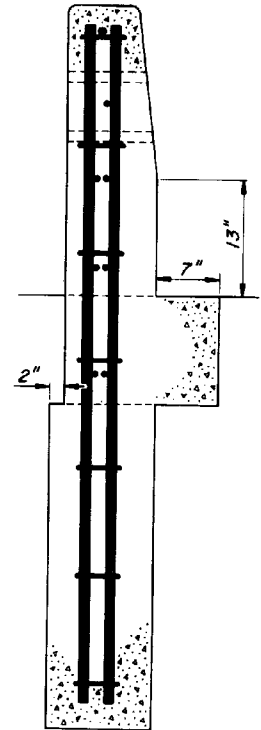
SECTION B-B



SECTION C-C



DETAIL E
CAISSON REINFORCEMENT

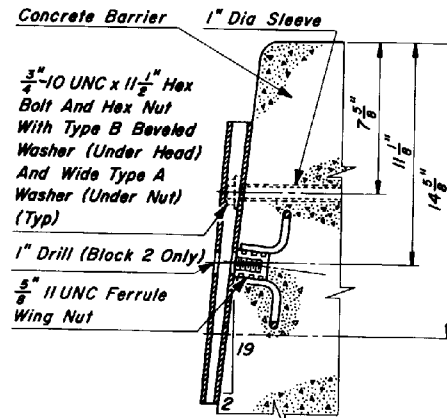
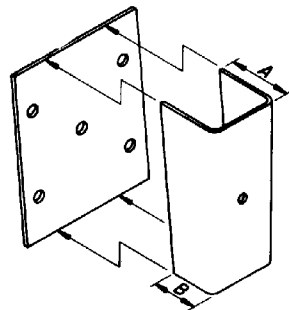


SECTION D-D

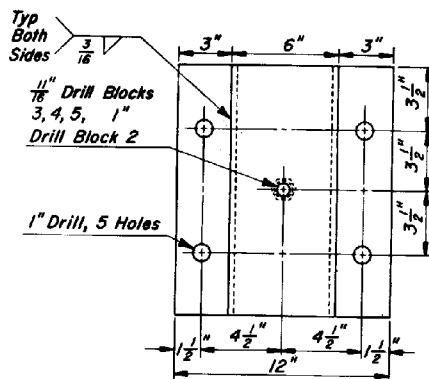
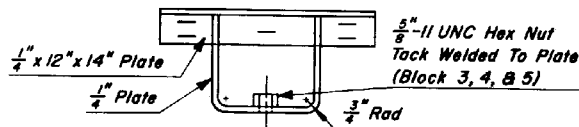
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM (TIMBER POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.25 Sheet 4 of 5

	DIMENSION	
BLOCK	A	B
1	0"	0"
2	1 $\frac{1}{4}$ "	7 $\frac{7}{8}$ "
3	2 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "
4	3 $\frac{11}{16}$ "	2 $\frac{5}{8}$ "
5	4 $\frac{13}{16}$ "	3 $\frac{7}{16}$ "

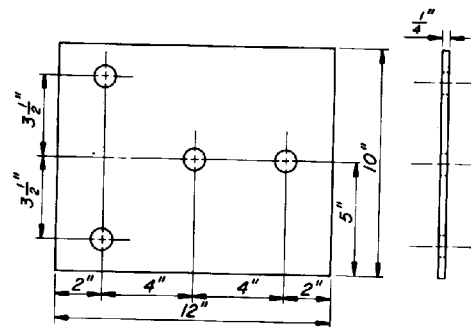
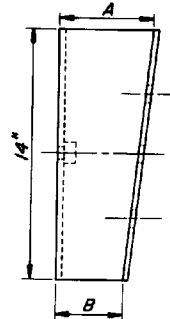
NOTE: Block 1 Is A $\frac{1}{4}$ " x 12" x 14" Plate
Block 2 May Be A Solid 6" x 14" Plate Tapered In Thickness From $\frac{1}{4}$ " To $\frac{5}{8}$ " Welded To $\frac{1}{4}$ " x 12" x 14" Plate



DETAIL F
SECTION THRU BLOCK AND ANCHORAGE



DETAIL G
BLOCK DETAILS

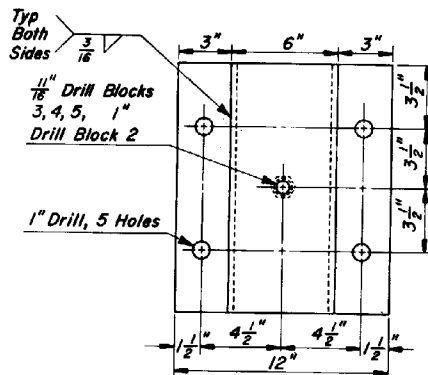
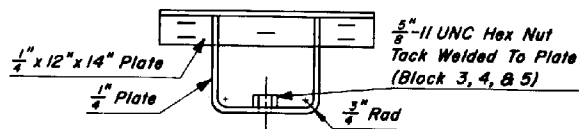
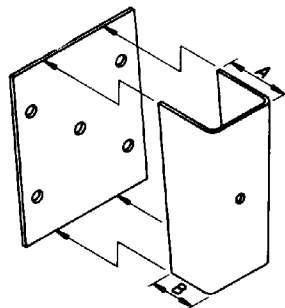


DETAIL H
TERMINAL CONNECTOR BACK PLATE

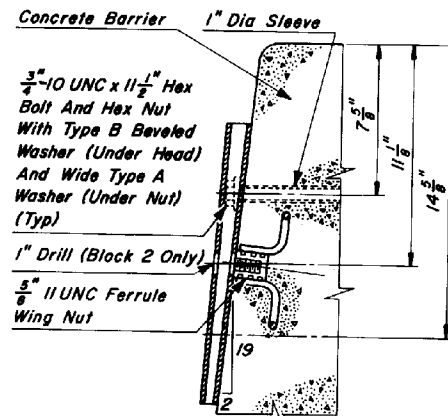
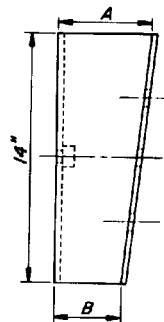
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM (TIMBER POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.25 Sheet 5 of 5

BLOCK	DIMENSION	
	A	B
1	0"	0"
2	1 $\frac{1}{4}$ "	7 $\frac{7}{8}$ "
3	2 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "
4	3 $\frac{11}{16}$ "	2 $\frac{5}{8}$ "
5	4 $\frac{15}{16}$ "	3 $\frac{7}{16}$ "

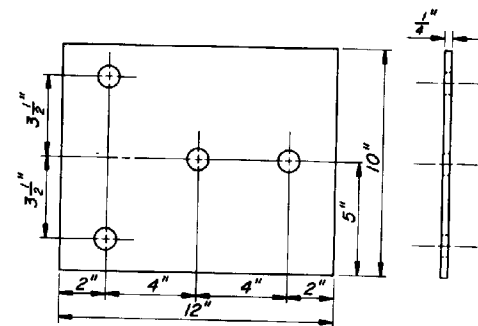
NOTE: Block 1 Is A $\frac{1}{4}$ " x 12" x 14" Plate
 Block 2 May Be A Solid 6" x 14" Plate Tapered In Thickness From $\frac{1}{4}$ " To $\frac{5}{8}$ " Welded To $\frac{1}{4}$ " x 12" x 14" Plate



DETAIL G
 BLOCK DETAILS



DETAIL F
 SECTION THRU BLOCK AND ANCHORAGE



DETAIL H
 TERMINAL CONNECTOR BACK PLATE

DESIGN APPROVED 	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION 	TRANSITION W BEAM (TIMBER POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.25 Sheet 5 of 5

$\frac{5}{8}$ "-11UNC x $1\frac{1}{2}$ " Hex Bolt And Hex Nut
With One Wide Type A Washer (Typ)

W8x21x8'-0" Structural Shape Post

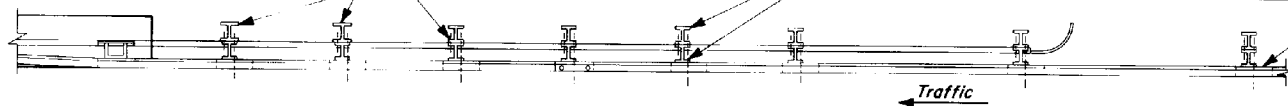
W6x8.5x6'-0" or W6x9x6'-0"
Structural Shape Post (Typ)

W6x8.5x14" or W6x9x14"
Structural Shape Block (Typ)

G4(1S) System Or
G4(2S) System

GENERAL NOTES

●-Indicates ARTBA designation.

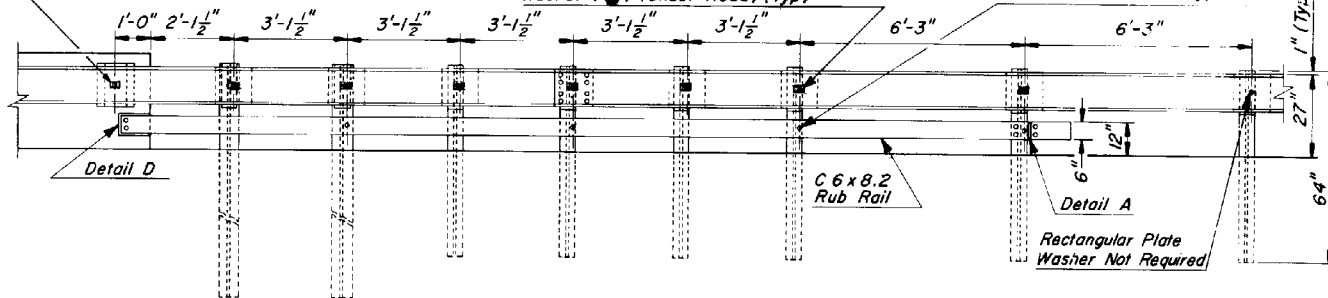


PLAN

Rectangular Plate Washer Required

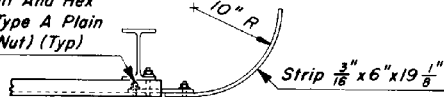
$\frac{5}{8}$ "-11UNC x $1\frac{1}{4}$ " Button Head Bolt (●) And
Recess Nut (●) With Wide Type A Plain
Washer (Under Nut) And Rectangular Plate
Washer (●) (Under Head) (Typ)

$\frac{5}{8}$ "-11UNC x 3" Round Head
Square Neck Bolt And Hex
Nut With Wide Type A Plain
Washer (Under Nut) (Typ)



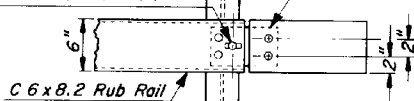
ELEVATION

$\frac{5}{8}$ "-11UNC x $1\frac{1}{2}$ " Round Head
Square Neck Bolt And Hex
Nut With Wide Type A Plain
Washer (Under Nut) (Typ)



PLAN

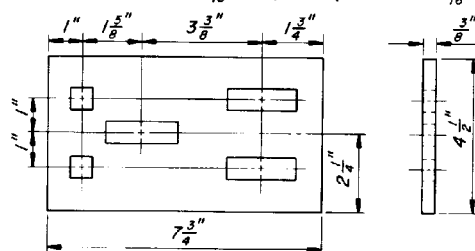
$\frac{5}{8}$ "-11UNC x 3" Round Head Square
Neck Bolt And Hex Nut With Wide
Type A Plain Washer (Under Nut)



ELEVATION

DETAIL A
RUB RAIL TERMINAL ASSEMBLY

Note: All Slots $\frac{11}{16}$ " x 2", All Square Holes $\frac{11}{16}$ "



DETAIL B
RUB RAIL SPLICE PLATE

DESIGN APPROVED

W. R. Hefner

APPROVED FOR
DISTRIBUTION

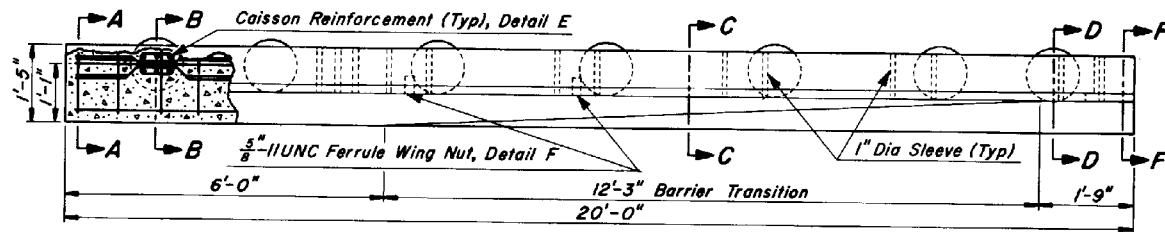
James R. Hefner

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

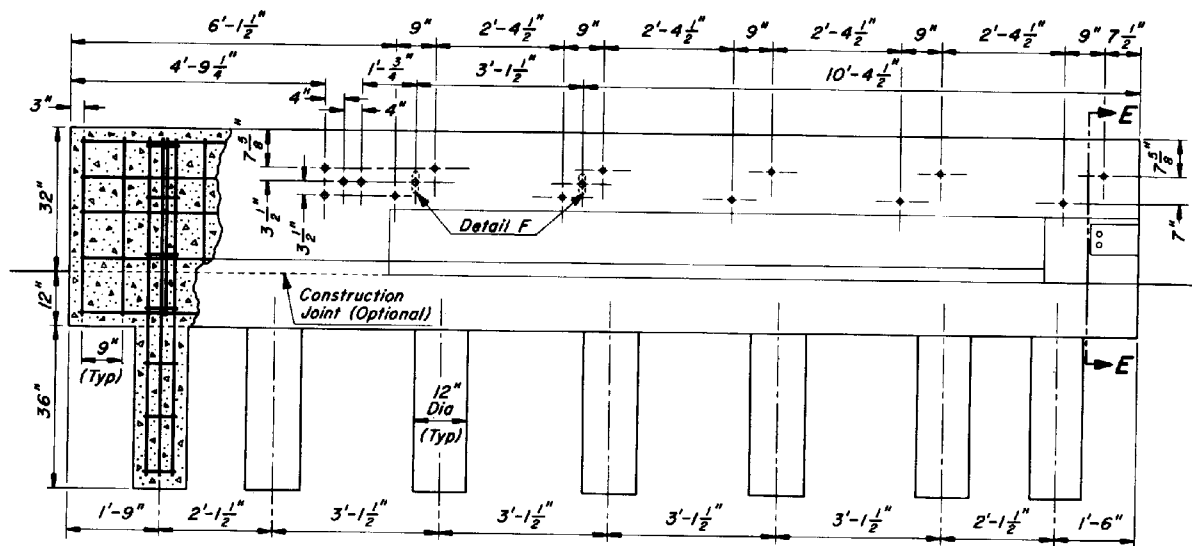
TRANSITION W BEAM
(STEEL POST) TO CONCRETE
HALF BARRIER

REV
6/86

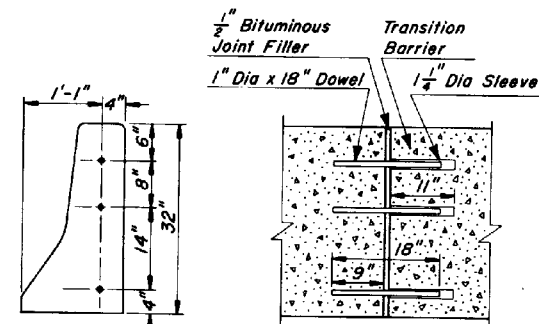
DRAWING NO.
C-10.30
Sheet 2 of 5



PLAN



ELEVATION

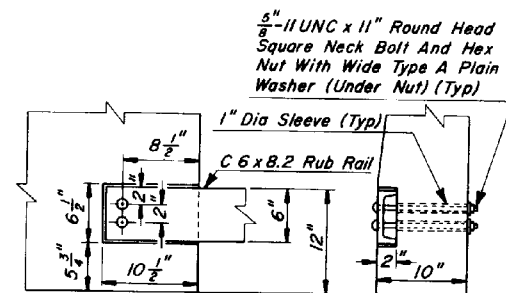


DOWEL LOCATIONS

JOINT ASSEMBLY

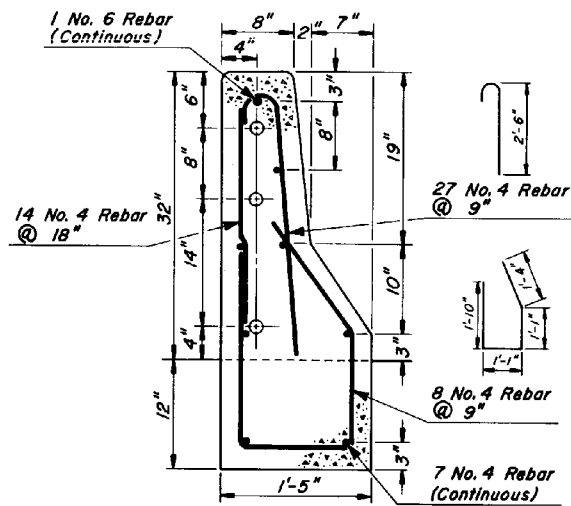
DETAIL C

DOWEL INSTALLATION AND CONSTRUCTION JOINT

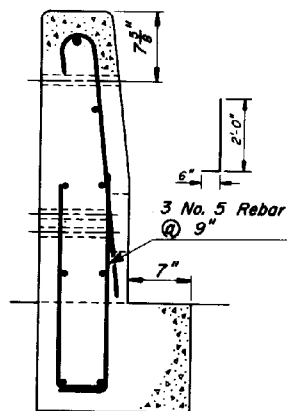


DETAIL D
RUB RAIL ANCHOR

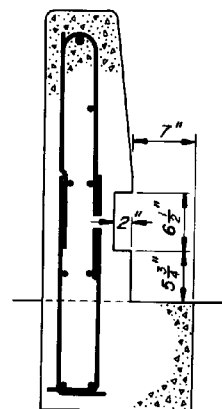
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM (STEEL POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.3.0 Sheet 3 of 5



SECTION A-A

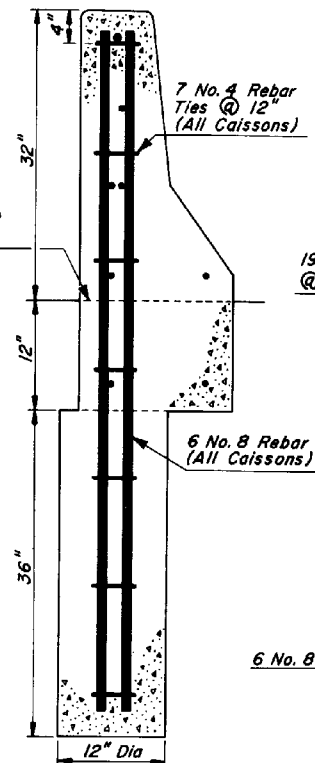


SECTION E-E

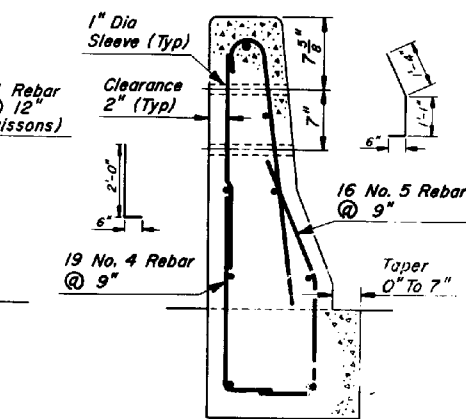


SECTION F-F

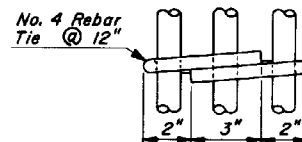
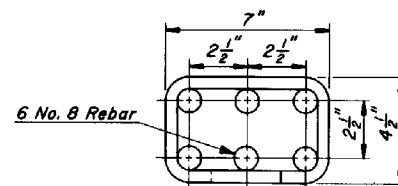
Construction Joint (Optional)



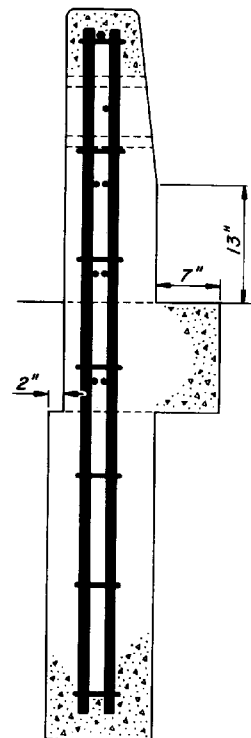
SECTION B-B



SECTION C-C



DETAIL E
CAISSON REINFORCEMENT

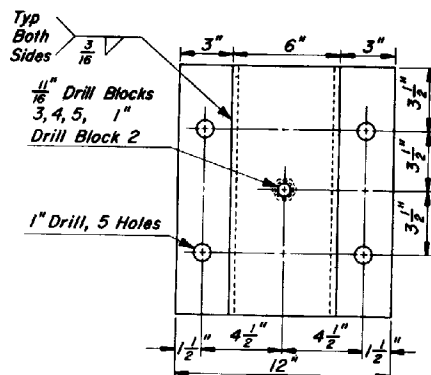
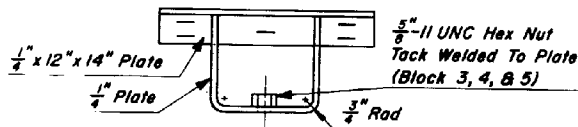
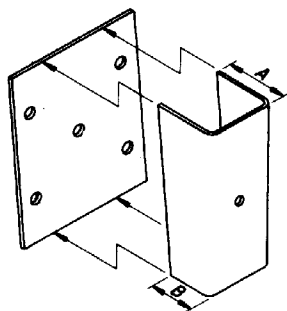


SECTION D-D

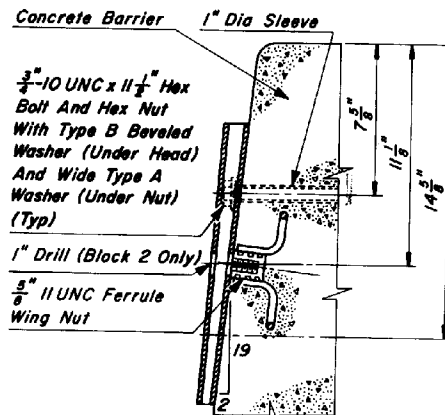
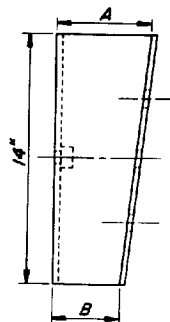
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM (STEEL POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.30 Sheet 4 of 5

BLOCK	DIMENSION	
	A	B
1	0"	0"
2	1 $\frac{1}{4}$ "	$\frac{7}{8}$ "
3	2 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "
4	3 $\frac{11}{16}$ "	2 $\frac{5}{8}$ "
5	4 $\frac{15}{16}$ "	3 $\frac{7}{16}$ "

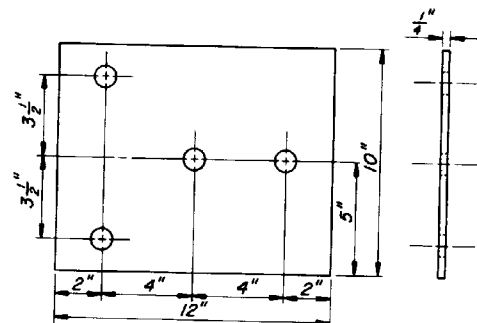
NOTE: Block 1 Is A $\frac{1}{4}$ " x 12" x 14" Plate
 Block 2 May Be A Solid 6" x 14" Plate Tapered In Thickness From $\frac{1}{4}$ " To $\frac{5}{16}$ " Welded To $\frac{1}{4}$ " x 12" x 14" Plate



DETAIL G
 BLOCK DETAILS



DETAIL F
 SECTION THRU BLOCK AND ANCHORAGE

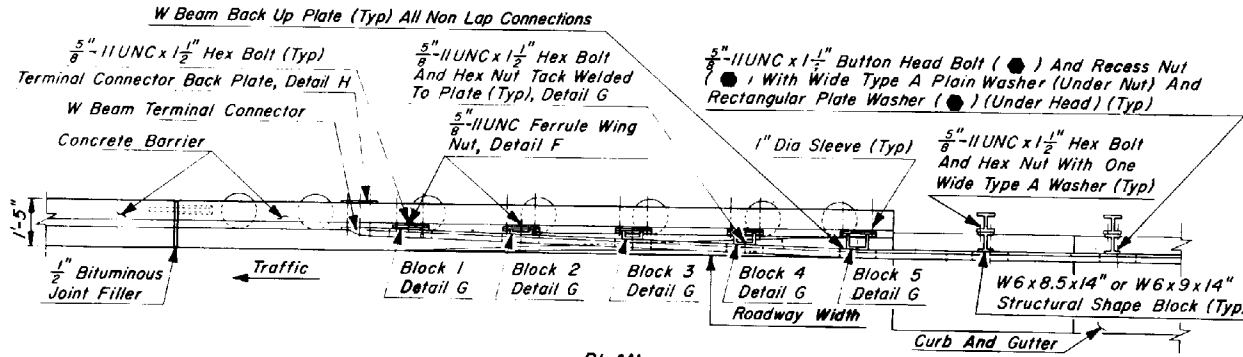


DETAIL H
 TERMINAL CONNECTOR BACK PLATE

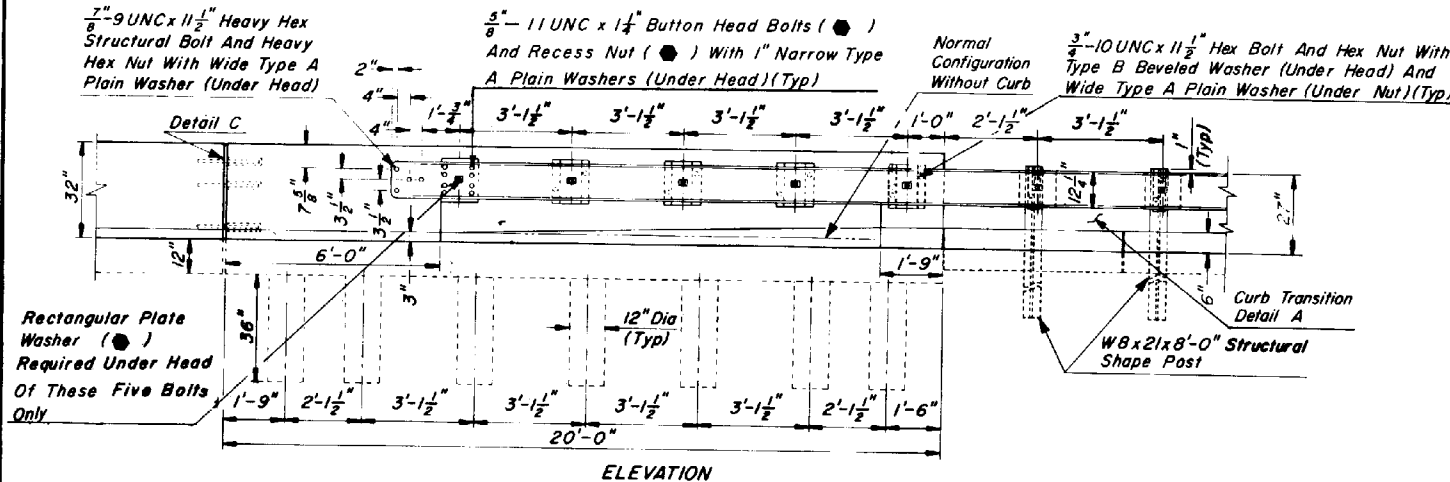
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM (STEEL POST) TO CONCRETE HALF BARRIER	DRAWING NO. C-10.30 Sheet 5 of 5

GENERAL NOTES

● - Indicates ARTBA designation.



PLAN



DESIGN APPROVED <i>H. J. H. H.</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>James A. H.</i>	TRANSITION W BEAM (STEEL POST) TO CONCRETE HALF BARRIER CURB INSTALLATION	DRAWING NO. C-10.35 Sheet 1 of 5

$\frac{5}{8}$ "-11UNC x $1\frac{1}{2}$ " Hex Bolt And Hex Nut
With One Wide Type A Washer (Typ)

W8x21x8'-0" Structural Shape Post

W6x8.5x6'-0" or W6x9x6'-0"
Structural Shape Post (Typ)

W6x8.5x14" or W6x9x14"
Structural Shape Block (Typ)

G4(1S) System Or
G4(2S) System

Curb And Gutter

Roadway Width

Traffic

PLAN

GENERAL NOTES

● - Indicates ARTBA designation.

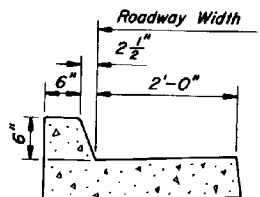
Rectangular Plate Washer Required

$\frac{3}{4}$ "-11UNC x $1\frac{1}{2}$ " Button Head Bolt (●) And
Recess Nut (●) With Wide Type A Plain
Washer (Under Nut) And Rectangular Plate
Washer (●) (Under Head) (Typ)

Curb Transition
Detail A

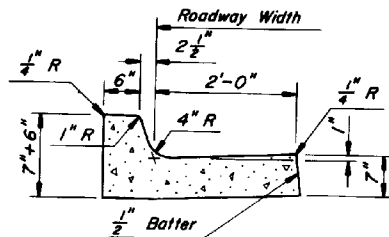
Rectangular Plate
Washer Not Required

ELEVATION



For Dimensions Not Shown
See Curb End Section

BARRIER END



CURB END

CURB TRANSITION

DETAIL A

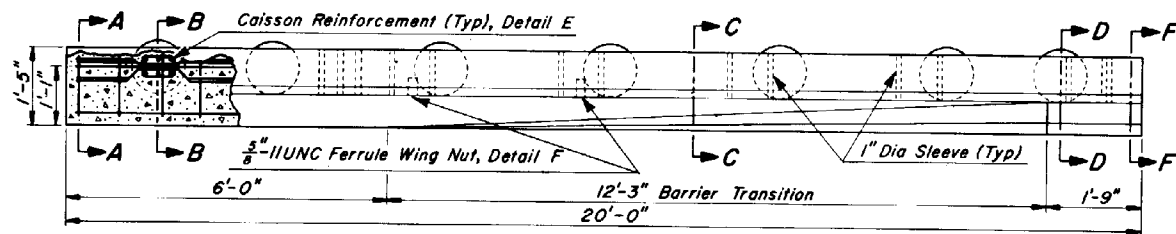
DESIGN APPROVED
[Signature]
APPROVED FOR
DISTRIBUTION
[Signature]

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

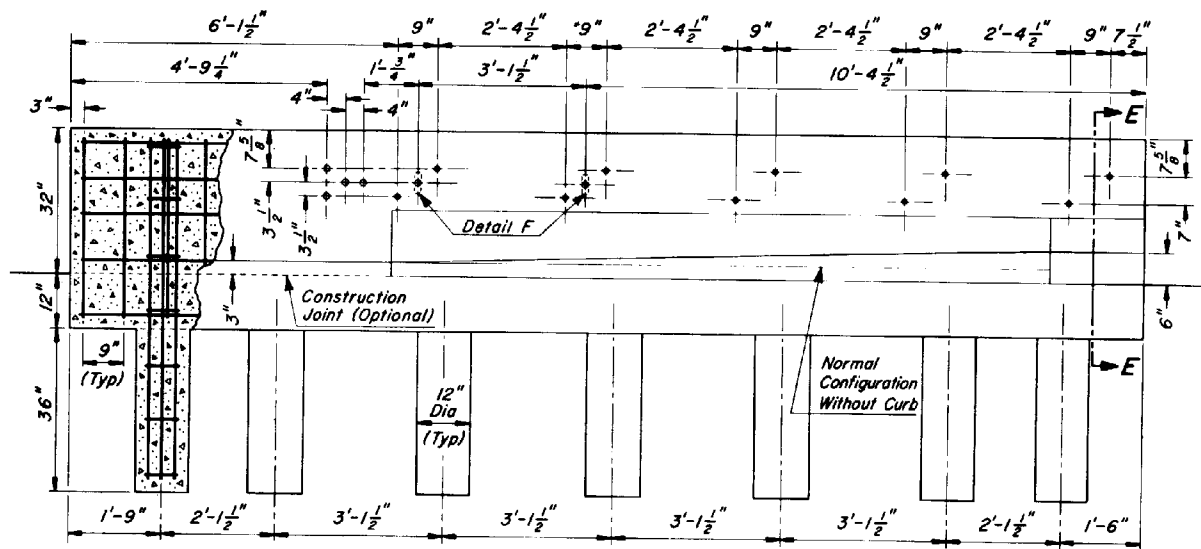
REV
6/86

TRANSITION W BEAM (STEEL
POST) TO CONCRETE HALF
BARRIER, CURB INSTALLATION

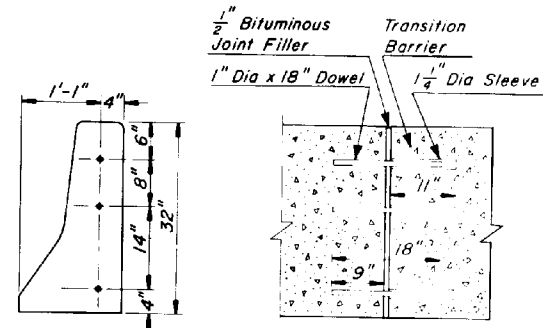
DRAWING NO.
C-10.35
Sheet 2 of 5



PLAN



ELEVATION



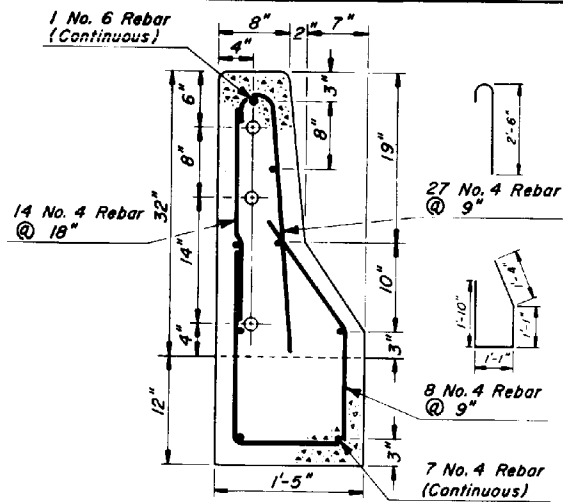
DOWEL LOCATIONS

JOINT ASSEMBLY

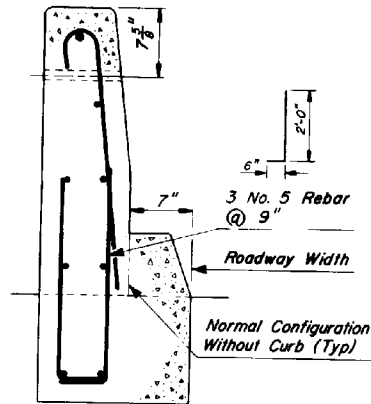
DETAIL C

DOWEL INSTALLATION AND CONSTRUCTION JOINT

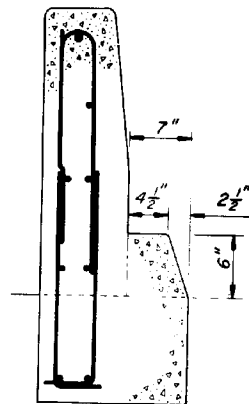
DESIGN APPROVED <i>W. H. H. H.</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>James A. H. H.</i>	TRANSITION W BEAM (STEEL POST) TO CONCRETE HALF BARRIER CURB INSTALLATION	DRAWING NO. C-10.35 Sheet 3 of 5



SECTION A-A

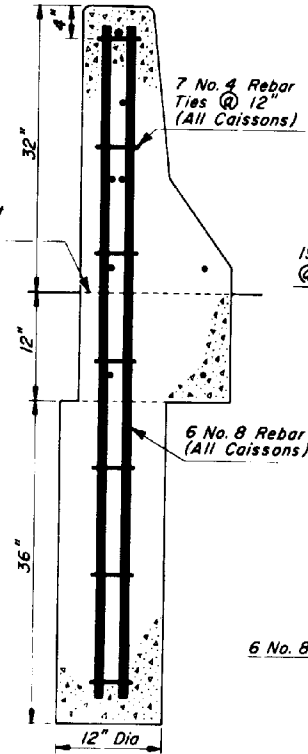


SECTION E-E

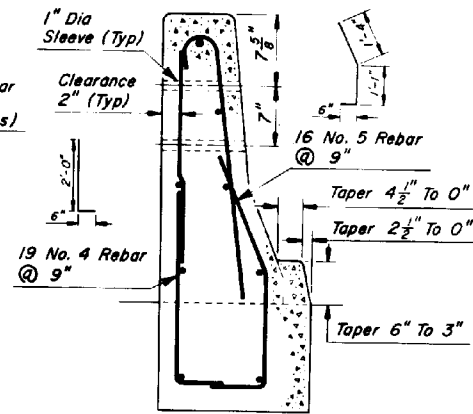


SECTION F-F

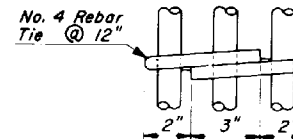
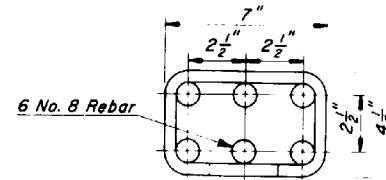
Construction Joint
(Optional)



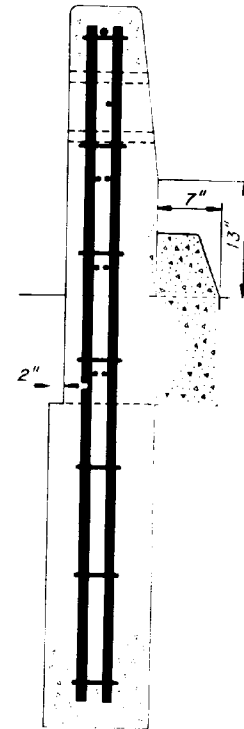
SECTION B-B



SECTION C-C



DETAIL E
CAISSON REINFORCEMENT

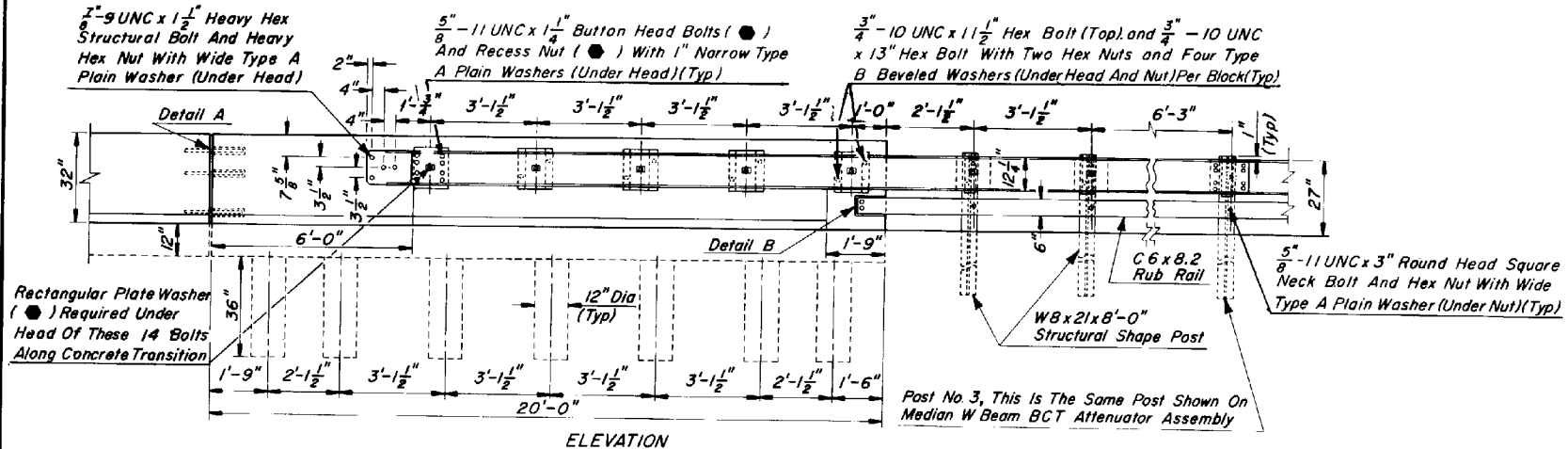
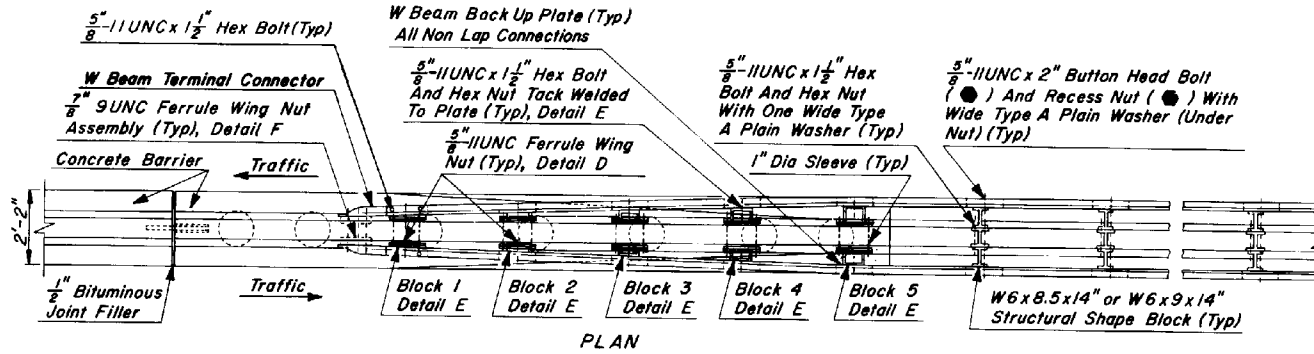


SECTION D-D

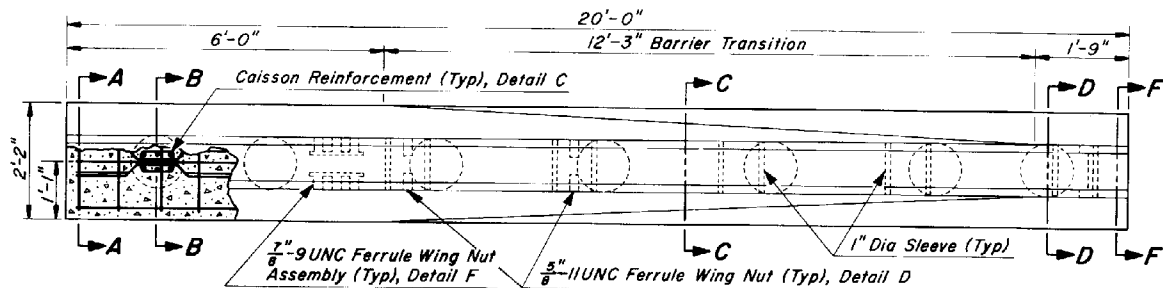
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM (STEEL POST) TO CONCRETE HALF BARRIER CURB INSTALLATION	DRAWING NO. C-10.35 Sheet 4 of 5

GENERAL NOTES

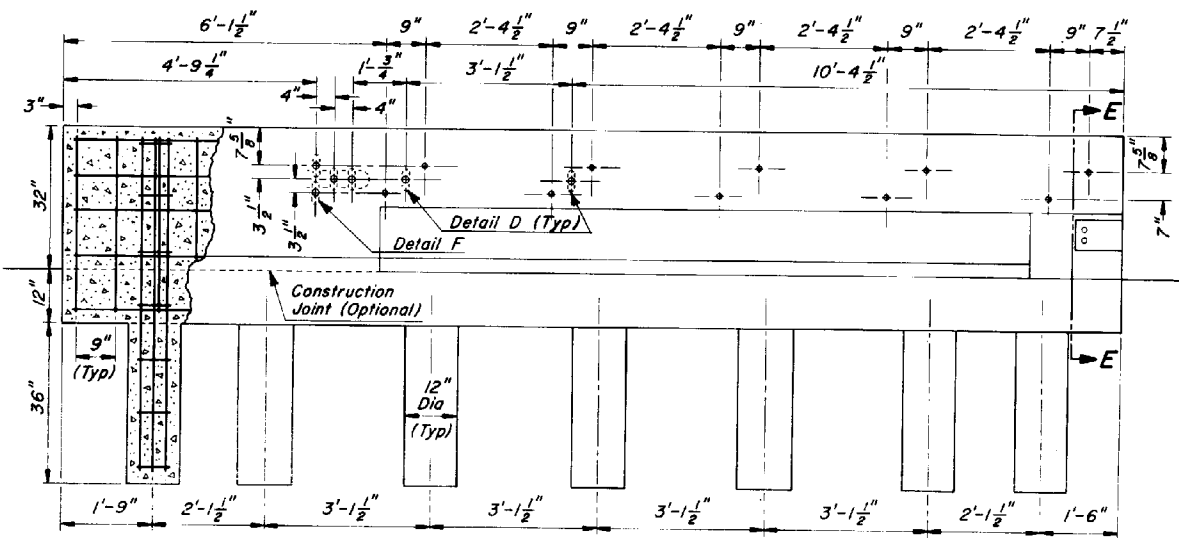
● - Indicates ARTBA designation.



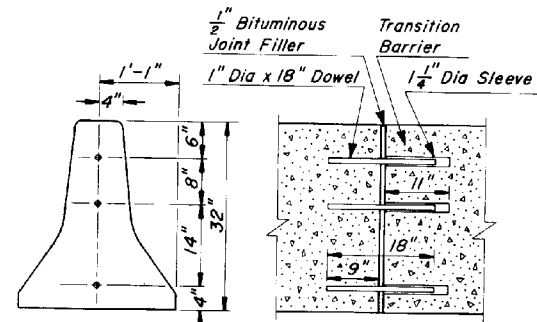
DESIGN APPROVED <i>W. B. H. H. H.</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>James R. H. H.</i>	TRANSITION W BEAM TO CONCRETE MEDIAN BARRIER	DRAWING NO. C-10.40 Sheet 1 of 4



PLAN



ELEVATION

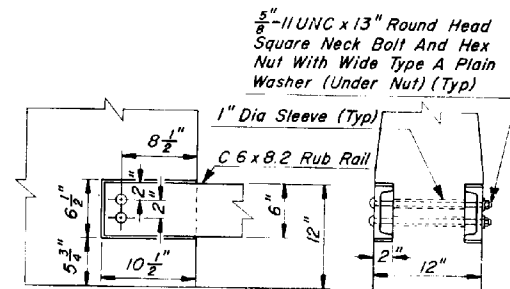


DOWEL LOCATIONS

JOINT ASSEMBLY

DETAIL A

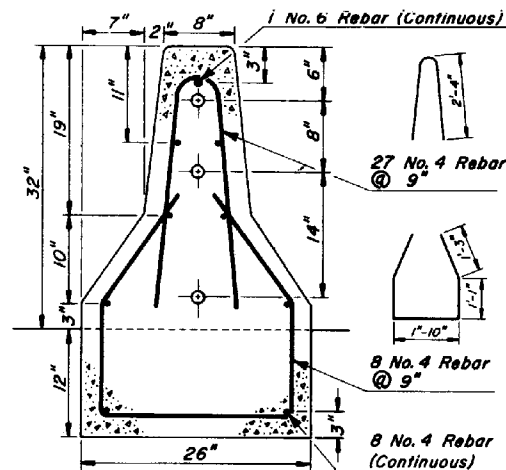
DOWEL INSTALLATION AND CONSTRUCTION JOINT



DETAIL B

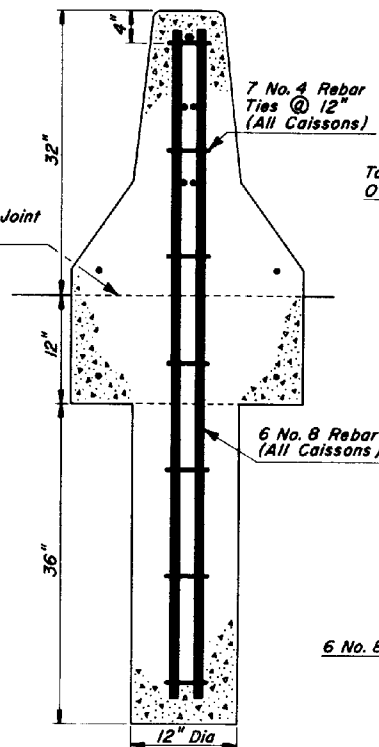
RUB RAIL ANCHOR

DESIGN APPROVED <i>H. R. H. H.</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 6/86
APPROVED FOR DISTRIBUTION <i>James A. H. H.</i>	TRANSITION W BEAM TO CONCRETE MEDIAN BARRIER	DRAWING NO. C-10.40 Sheet 2 of 4

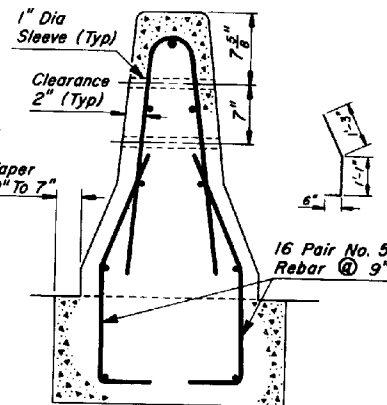


SECTION A-A

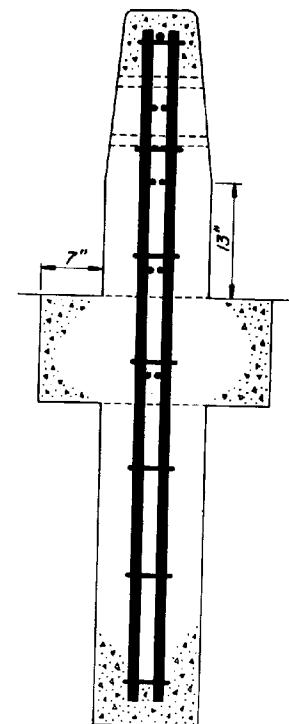
Construction Joint (Optional)



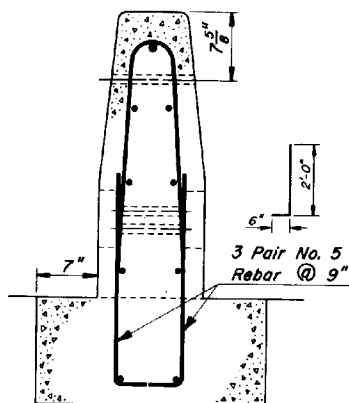
SECTION B-B



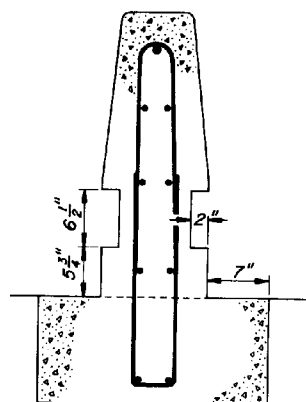
SECTION C-C



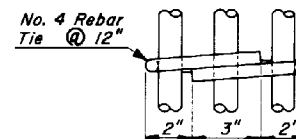
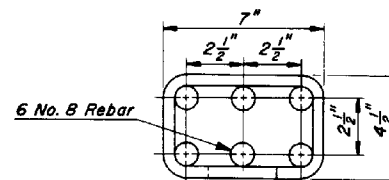
SECTION D-D



SECTION E-E



SECTION F-F

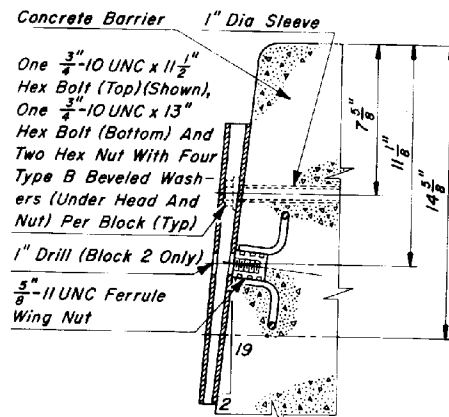
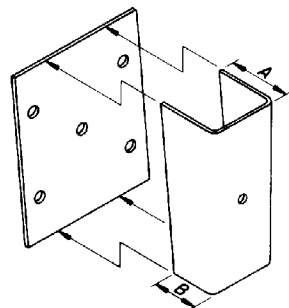


DETAIL C
CAISSON REINFORCEMENT

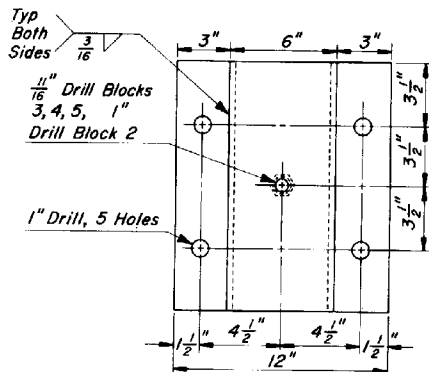
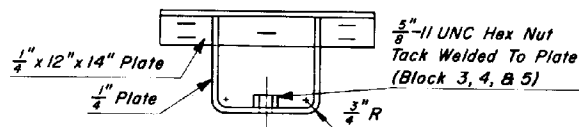
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM TO CONCRETE MEDIAN BARRIER	DRAWING NO. C-10.40 Sheet 3 of 4

BLOCK	DIMENSION	
	A	B
1	0"	0"
2	1 $\frac{1}{4}$ "	7 $\frac{7}{8}$ "
3	2 $\frac{1}{2}$ "	1 $\frac{3}{4}$ "
4	3 $\frac{11}{16}$ "	2 $\frac{5}{8}$ "
5	4 $\frac{15}{16}$ "	3 $\frac{7}{16}$ "

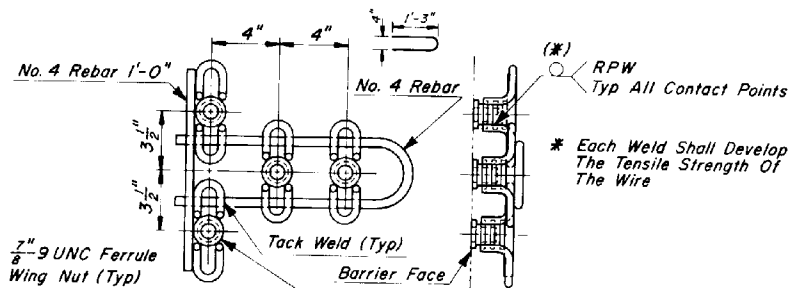
NOTE: Block 1 Is A $\frac{1}{4}$ " x 12" x 14" Plate
 Block 2 May Be A Solid 6" x 14" Plate Tapered In Thickness From $\frac{1}{4}$ " To $\frac{7}{8}$ " Welded To $\frac{1}{4}$ " x 12" x 14" Plate



DETAIL D
 SECTION THRU BLOCK AND ANCHORAGE

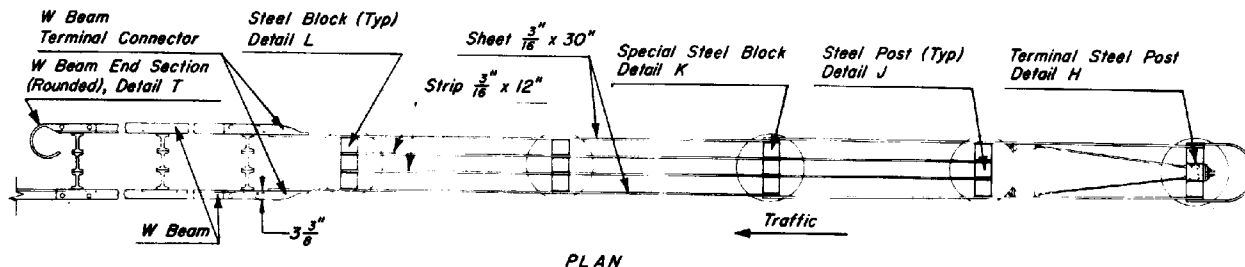


DETAIL E
 BLOCK DETAILS



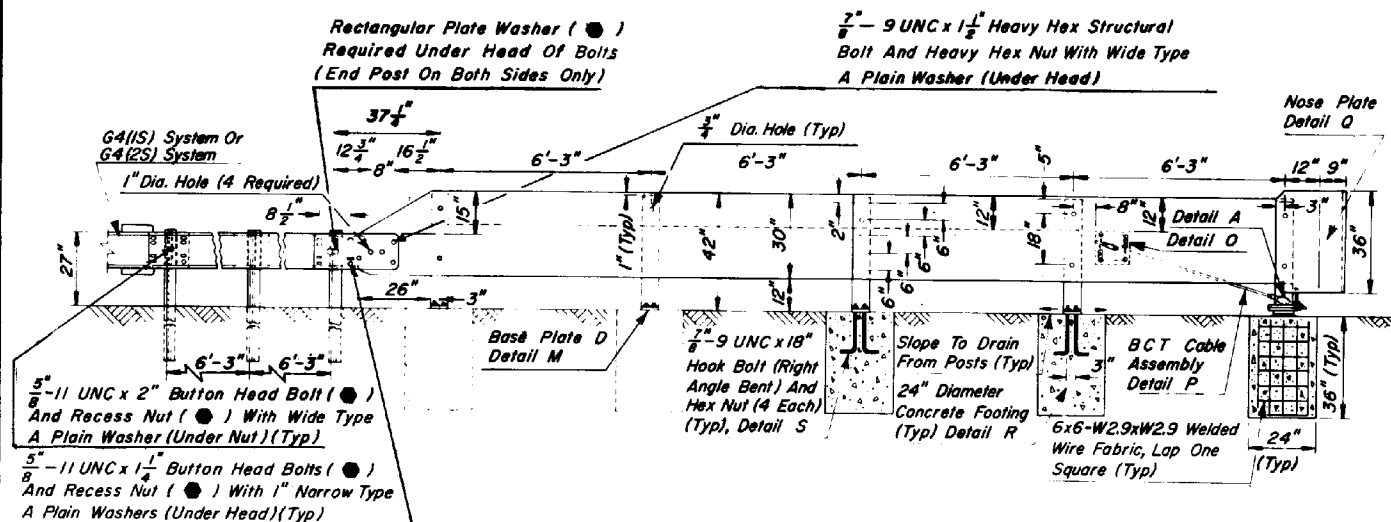
DETAIL F
 TERMINAL CONNECTOR ANCHOR

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	TRANSITION W BEAM TO CONCRETE MEDIAN BARRIER	DRAWING NO. C-1040 Sheet 4 of 4



GENERAL NOTES

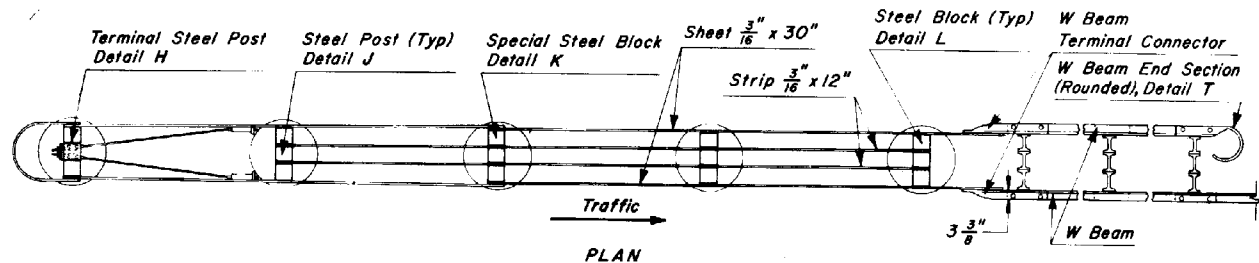
● - Indicates ARTBA designation.



ELEVATION

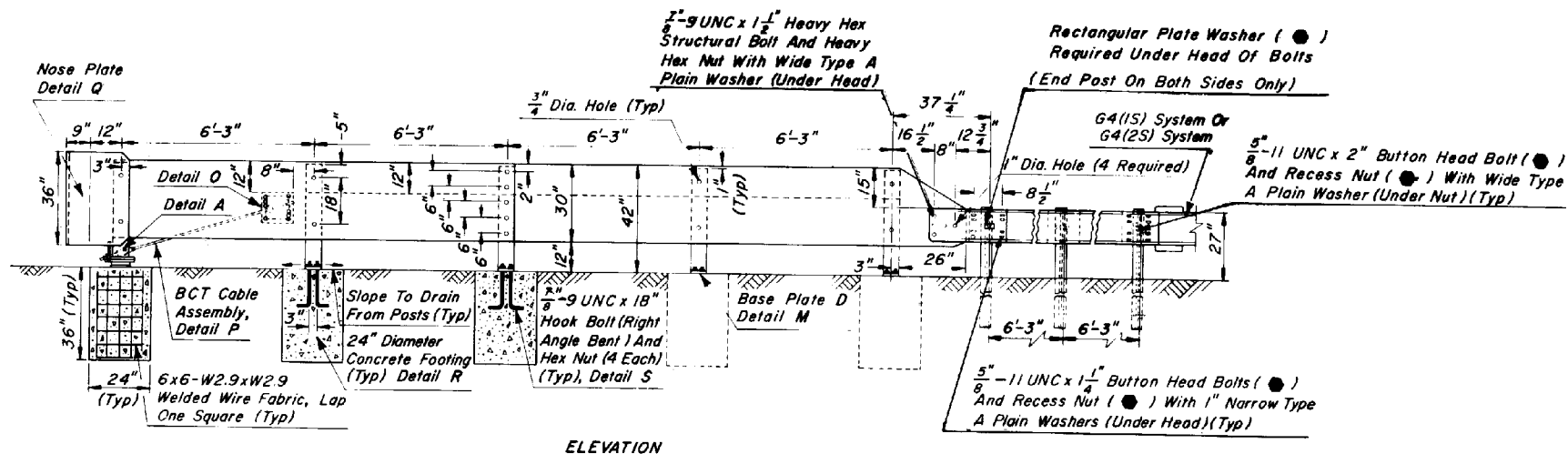
ONE WAY TRAFFIC - RIGHT SIDE OF ROADWAY
OR TWO WAY TRAFFIC

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	W BEAM BCT ATTENUATOR ASSEMBLY	DRAWING NO. C-10.45 Sheet 1 of 5



GENERAL NOTES

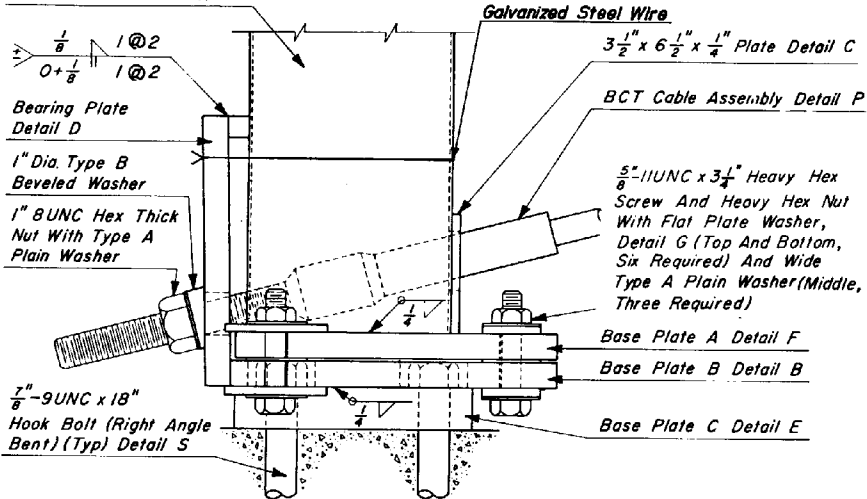
●-Indicates ARTBA designation.



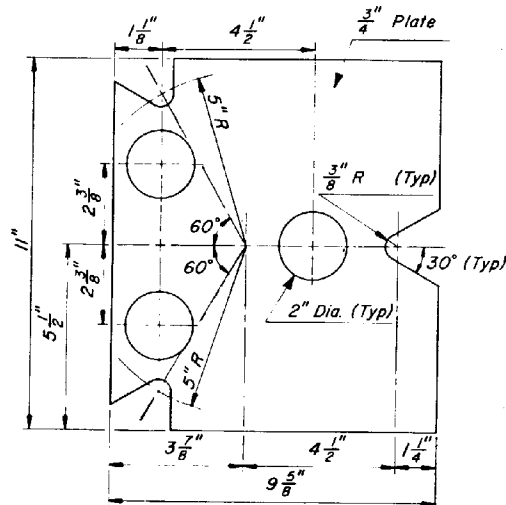
ONE WAY TRAFFIC-LEFT SIDE OF ROADWAY

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 7/85
APPROVED FOR CDS THIRD YEAR <i>[Signature]</i>	W BEAM BCT ATTENUATOR ASSEMBLY	DRAWING NO. C-10.45 Sheet 2 of 5

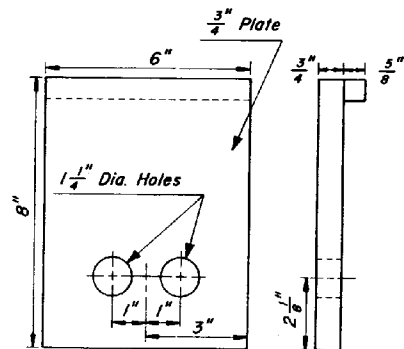
Terminal Post Detail H



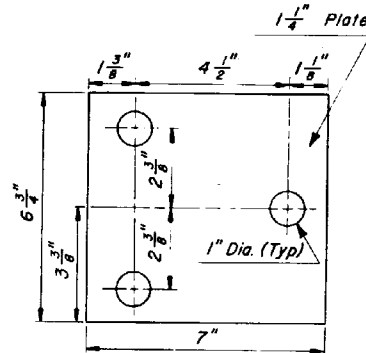
DETAIL A



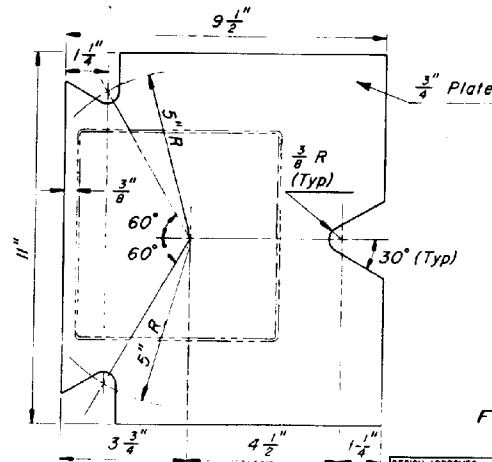
DETAIL B (BASE PLATE B)



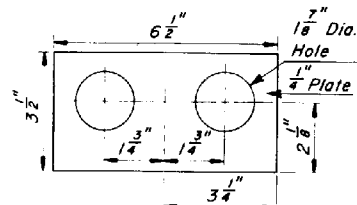
DETAIL D
(BEARING PLATE)



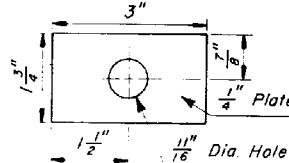
DETAIL E
(BASE PLATE C)



DETAIL F (BASE PLATE A)



DETAIL C

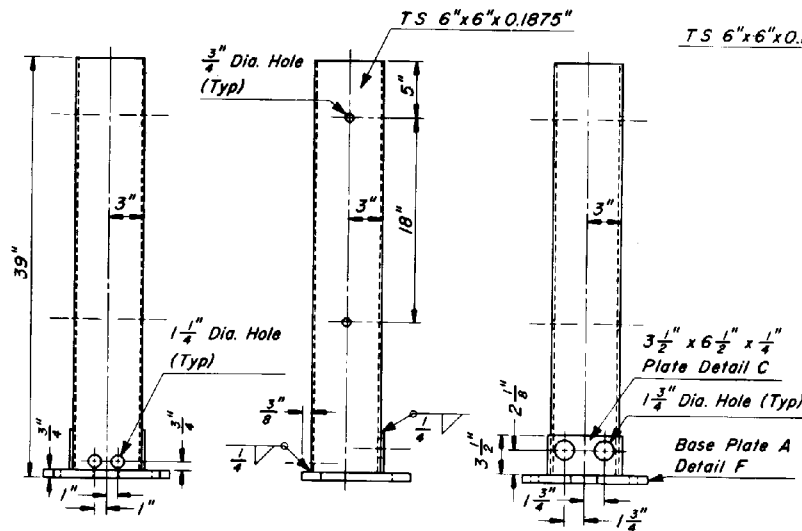


DETAIL G
FLAT PLATE WASHER

GENERAL NOTES

1. BCT Cable Assembly shall be tightened to remove slack.
2. $\frac{5}{8}''$ -11UNC x $3\frac{1}{4}''$ Heavy Hex Screw, connecting Base Plate A to Base Plate B, shall be torqued to 170 ft. lbs.
3. To ensure that the BCT (Steel) Bearing Plate remains in position one wrap of 14 Gauge Galvanized Steel Wire shall be wrapped around the BCT Terminal Post (Steel) and near the top of the plate.

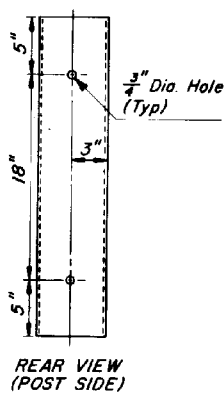
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	W BEAM BCT ATTENUATOR ASSEMBLY	DRAWING NO. C-10.45 Sheet 3 of 5



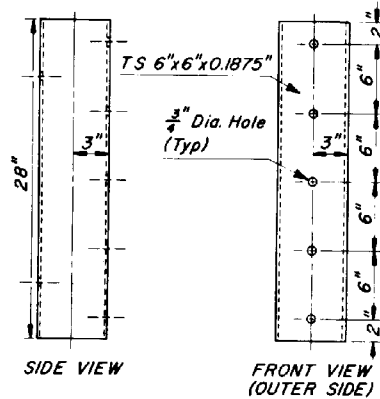
LEFT SIDE VIEW

FRONT VIEW
DETAIL H
(TERMINAL STEEL POST)

RIGHT SIDE VIEW

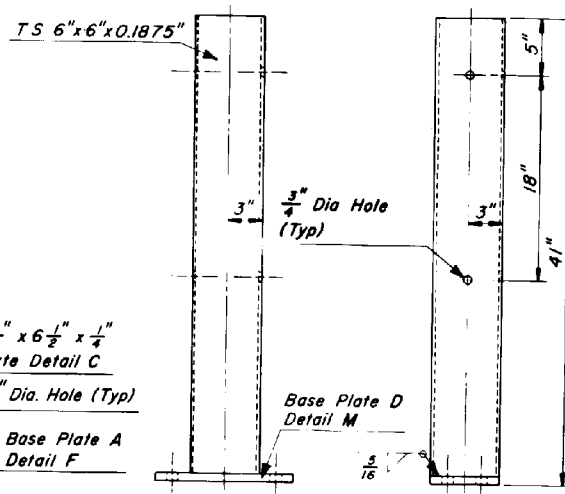


REAR VIEW
(POST SIDE)



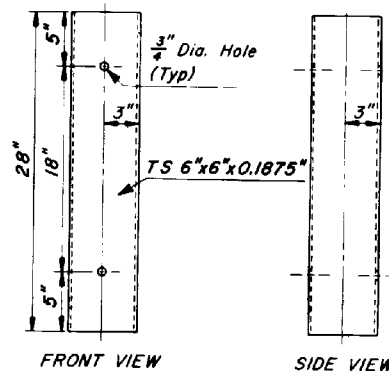
DETAIL K
(SPECIAL STEEL BLOCK)

FRONT VIEW
(OUTER SIDE)



SIDE VIEW

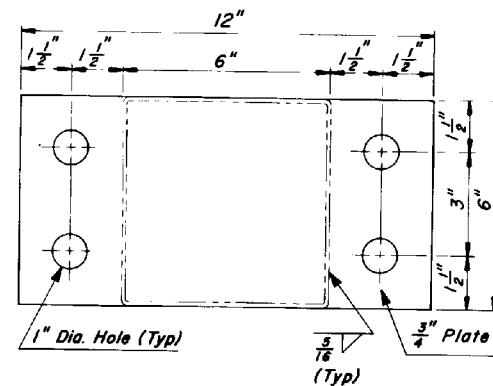
FRONT VIEW
DETAIL J
(STEEL POST)



FRONT VIEW

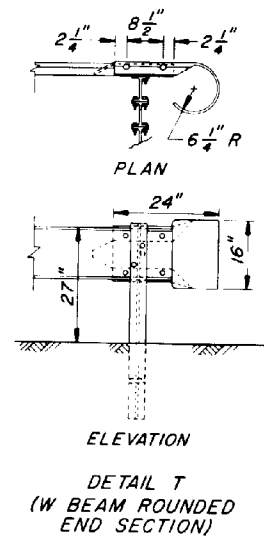
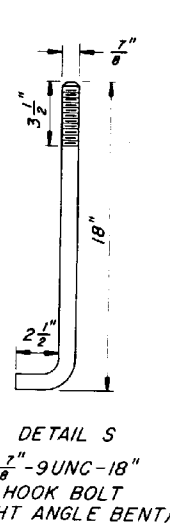
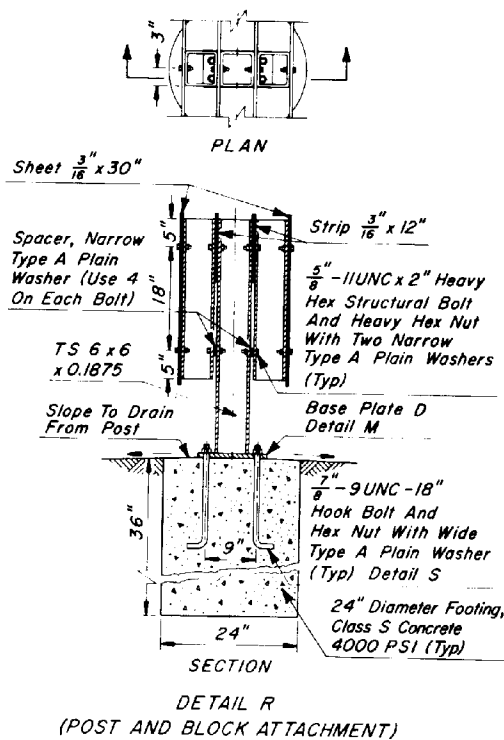
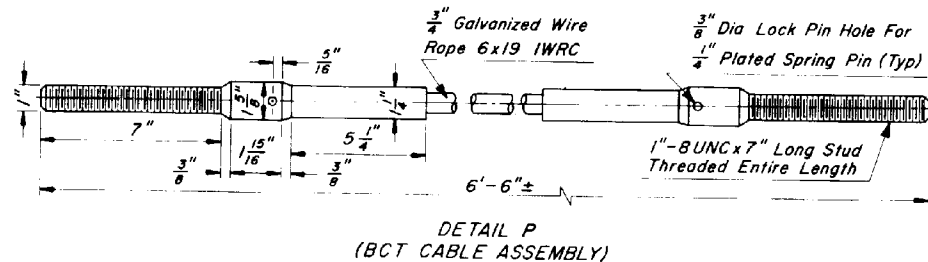
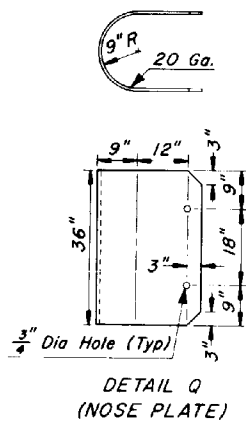
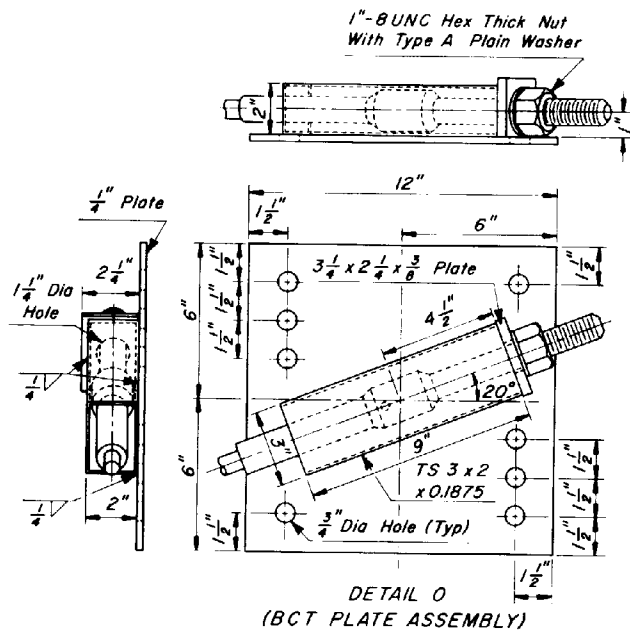
DETAIL L
(STEEL BLOCK)

SIDE VIEW



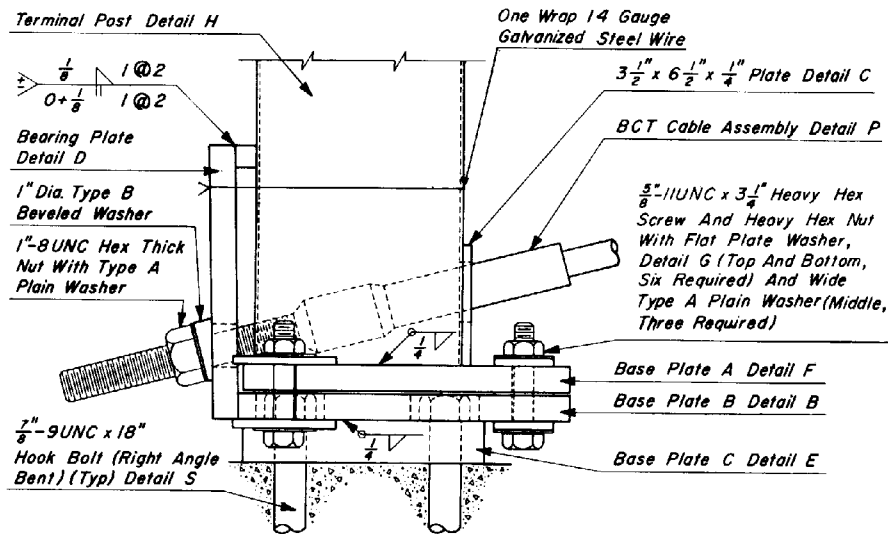
DETAIL M
(BASE PLATE D)

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APPROVED FOR CONSTRUCTION <i>[Signature]</i>	W BEAM BCT ATTENUATOR ASSEMBLY	ORDINANCE NO. C-10.45 Sheet 4 of 5

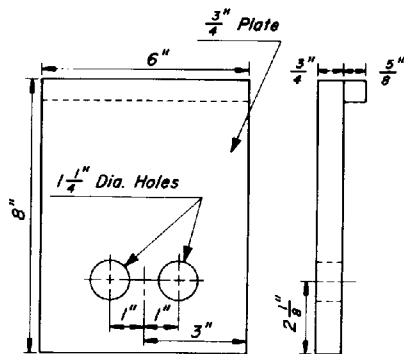
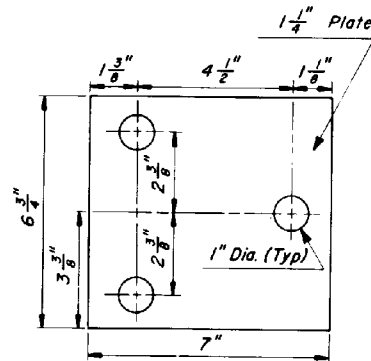
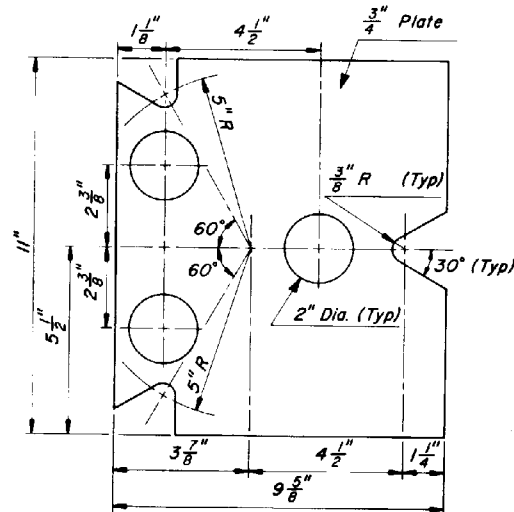


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APPROVED FOR CONSTRUCTION <i>[Signature]</i>	W BEAM BCT ATTENUATOR ASSEMBLY	DRAWING NO. C-10.45 Sheet 5 of 5

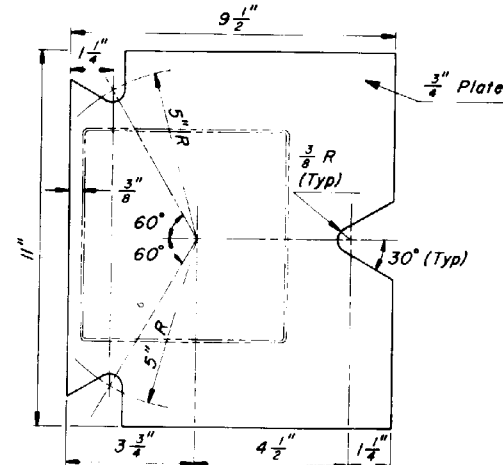
Terminal Post Detail H



DETAIL A

DETAIL D
(BEARING PLATE)DETAIL E
(BASE PLATE C)

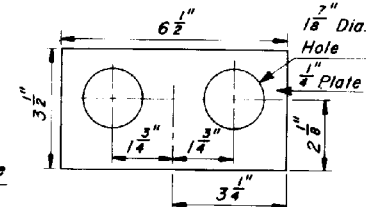
DETAIL B (BASE PLATE B)



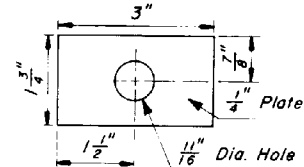
DETAIL F (BASE PLATE A)

GENERAL NOTES

1. BCT Cable Assembly shall be tightened to remove slack.
2. $\frac{5}{8}''$ -11UNC \times $3\frac{1}{4}''$ Heavy Hex Screw, connecting Base Plate A to Base Plate B, shall be torqued to 170 ft. lbs.
3. To ensure that the BCT (Steel) Bearing Plate remains in position one wrap of 14 Gauge Galvanized Steel Wire shall be wrapped around the BCT Terminal Post (Steel) and near the top of the plate.



DETAIL C

DETAIL G
FLAT PLATE WASHER

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JUNE 1986

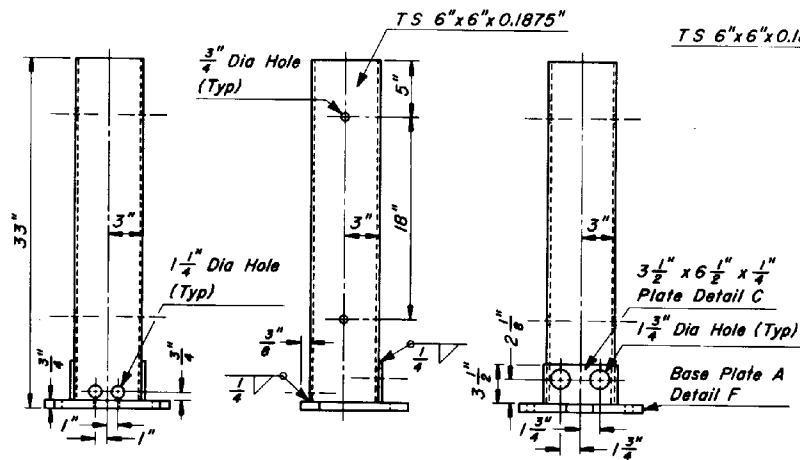
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

W BEAM BCT
ATTENUATOR ASSEMBLY
CURB INSTALLATION

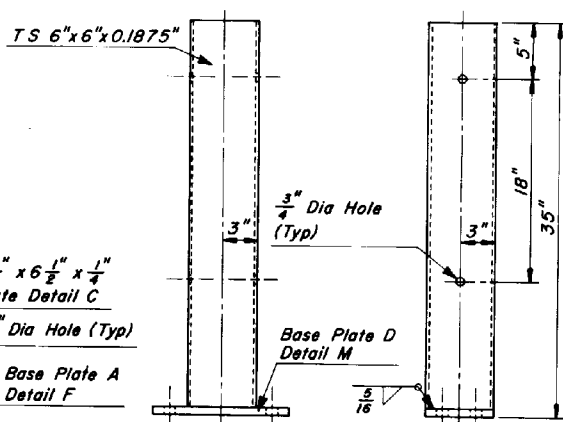
REV 6/86

DRAWING NO. C-10.50

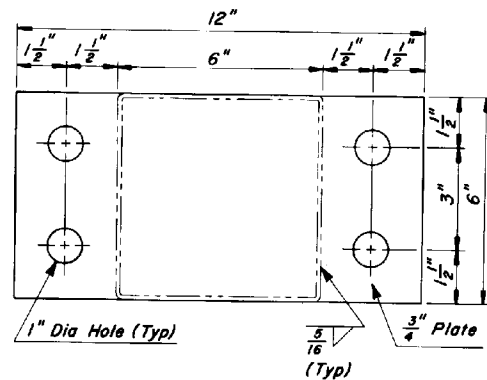
Sheet 3 of 5



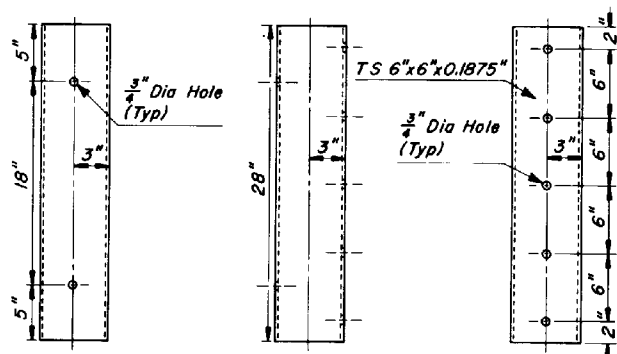
LEFT SIDE VIEW
FRONT VIEW
DETAIL H
(TERMINAL STEEL POST)



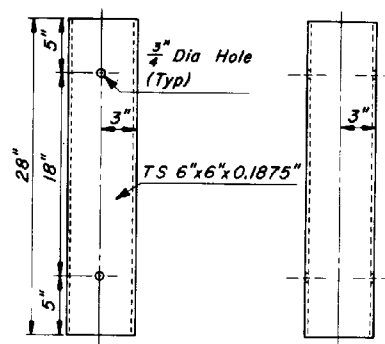
SIDE VIEW
FRONT VIEW
DETAIL J
(STEEL POST)



DETAIL M
(BASE PLATE D)

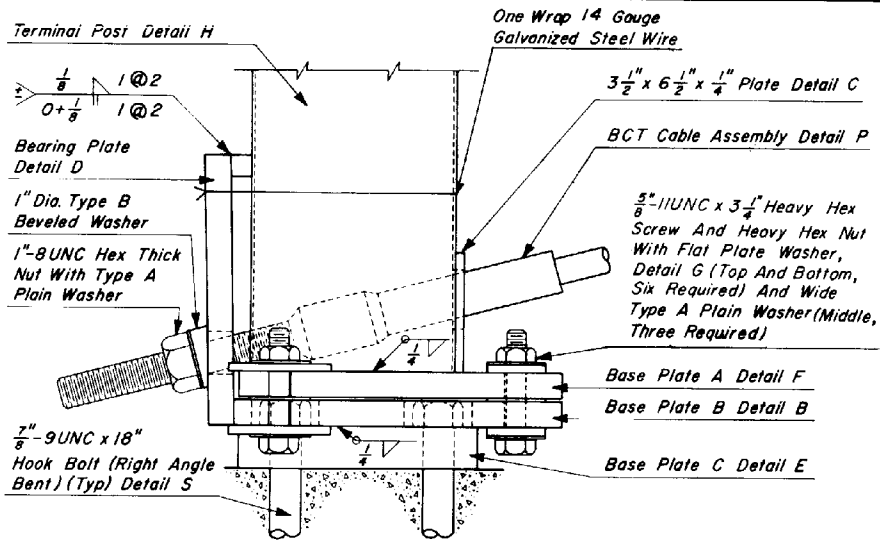


REAR VIEW
(POST SIDE)
SIDE VIEW
FRONT VIEW
(OUTER SIDE)
DETAIL K
(SPECIAL STEEL BLOCK)

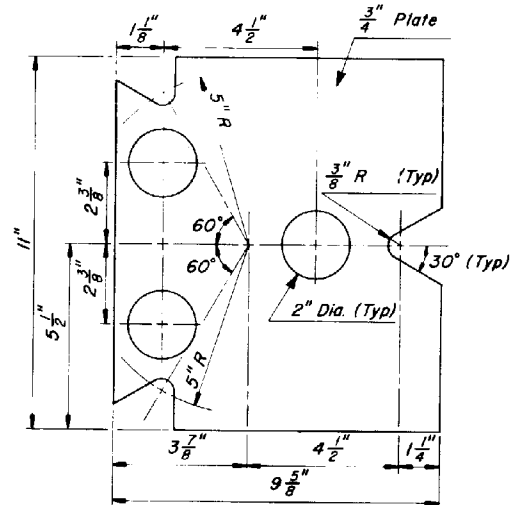


FRONT VIEW
SIDE VIEW
DETAIL L
(STEEL BLOCK)

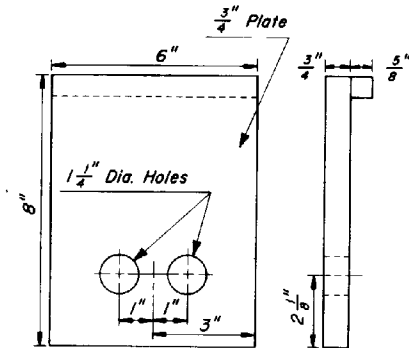
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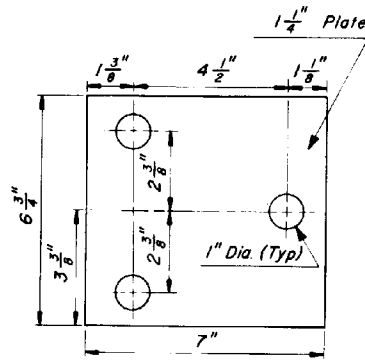
DETAIL A



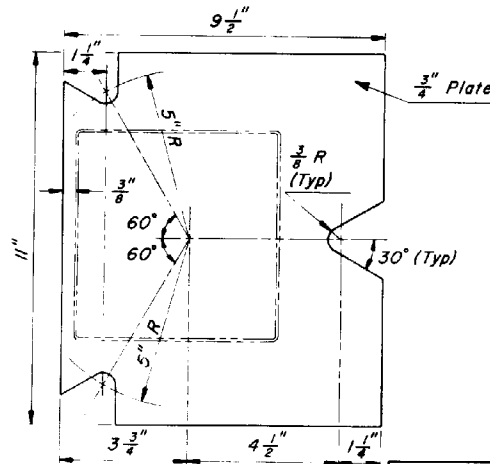
DETAIL B (BASE PLATE B)



DETAIL D
(BEARING PLATE)



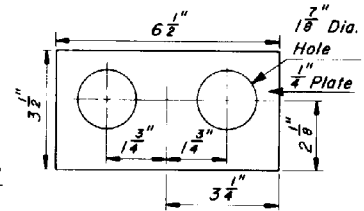
DETAIL E
(BASE PLATE C)



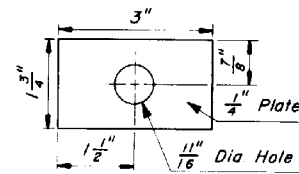
DETAIL F (BASE PLATE A)

GENERAL NOTES

1. BCT Cable Assembly shall be tightened to remove slack.
2. $\frac{5}{8}''$ -11UNC x $3\frac{1}{4}''$ Heavy Hex Screw, connecting Base Plate A to Base Plate B, shall be torqued to 170 ft. lbs.
3. To ensure that the BCT (Steel) Bearing Plate remains in position one wrap of 14 Gauge Galvanized Steel Wire shall be wrapped around the BCT Terminal Post (Steel) and near the top of the plate.

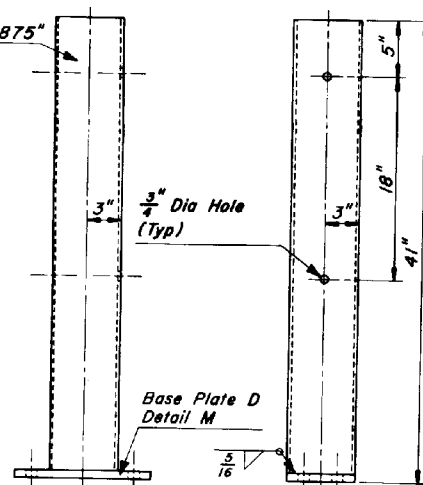


DETAIL C



DETAIL G
FLAT PLATE WASHER

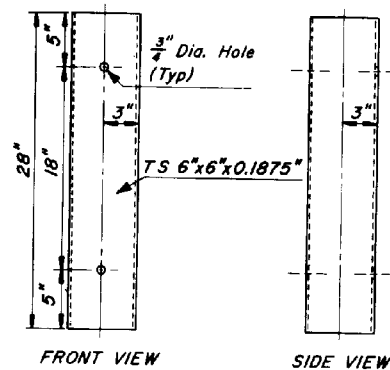
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APPROVED FOR DISTRIBUTION <i>[Signature]</i>	MEDIAN W BEAM BCT ATTENUATOR ASSEMBLY	DRAWING NO. C-10.55 Sheet 2 of 4



Technical drawing of a rectangular plate with the following dimensions and specifications:

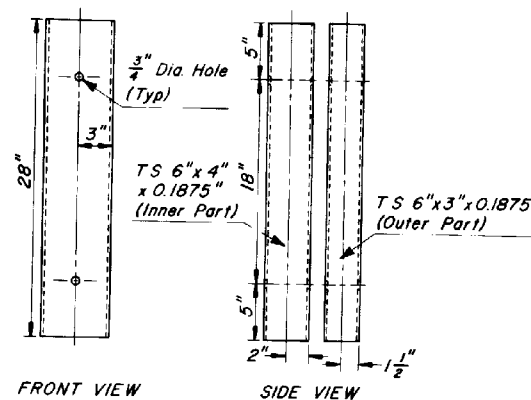
- Overall width: 12"
- Overall height: 6"
- Distance between hole centers (horizontal): 6"
- Distance from side edge to hole center (horizontal): $1\frac{1}{2}"$
- Distance between hole centers (vertical): 3"
- Distance from top edge to hole center (vertical): $1\frac{1}{2}"$
- Distance from bottom edge to hole center (vertical): $1\frac{1}{2}"$
- Hole diameter: 1" Dia. Hole (Typ)
- Plate thickness: $\frac{5}{16}"$ (Typ)
- Material: $\frac{3}{4}"$ Plate

DETAIL M
(BASE PLATE D)





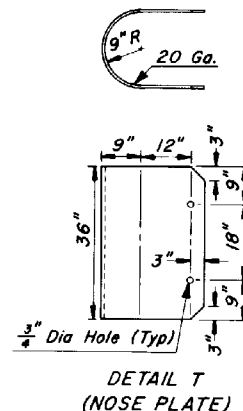
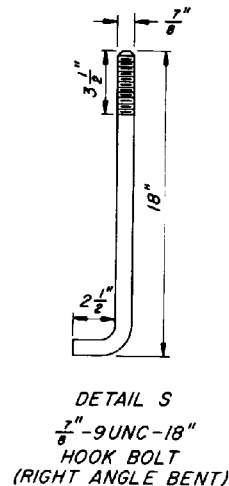
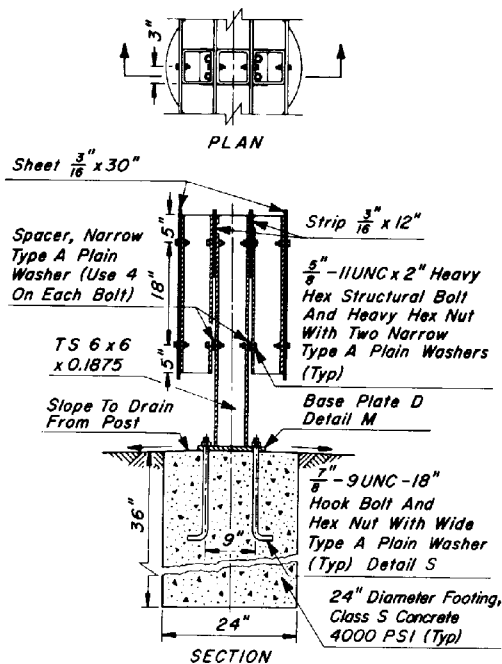
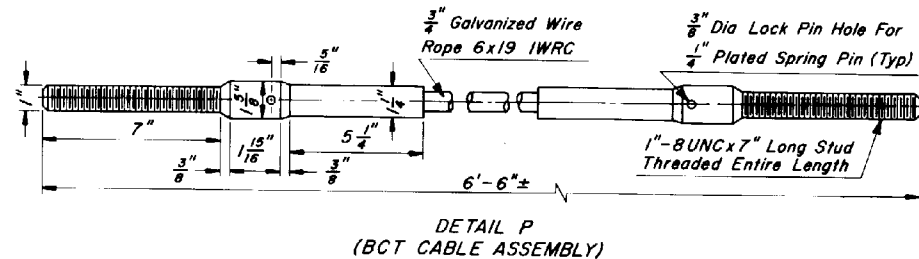
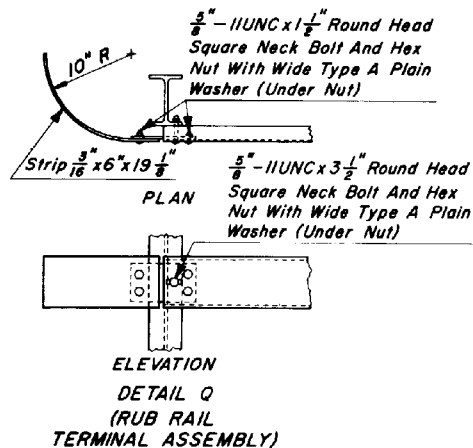
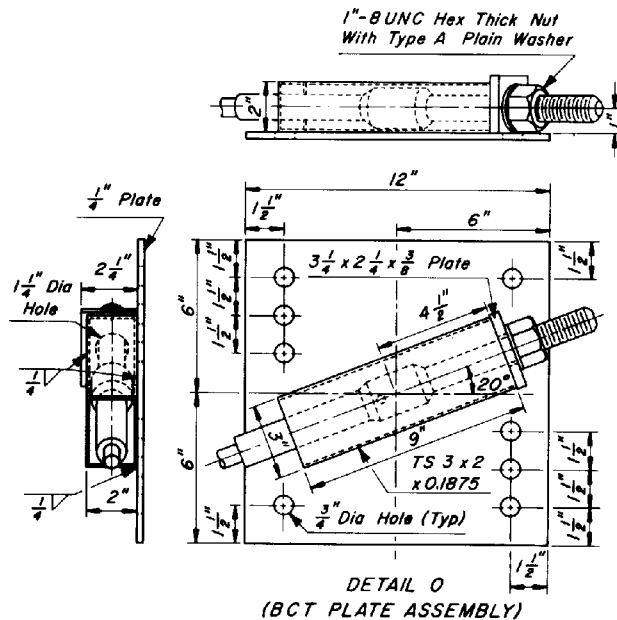
SIDE VIEW

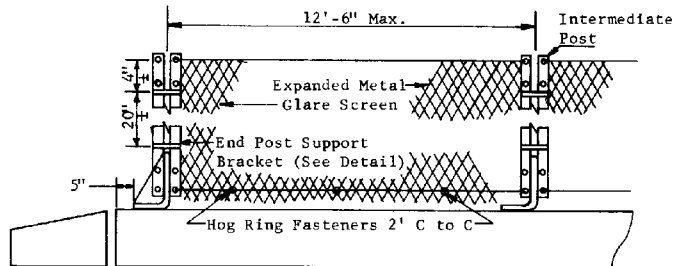
DETAIL L
(STEEL BLOCK)



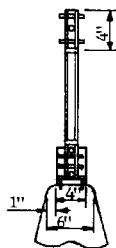
FRONT VIEW SIDE VIEW
DETAIL N
(DOUBLE STEEL BLOCK)

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APPROVED FOR CONSTRUCTION 	MEDIAN W BEAM BCT ATTENUATOR ASSEMBLY	DRAWING NO. C-10.55 Sheet 3 of 4

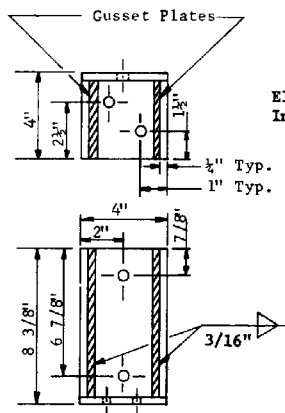




MEDIAN BARRIER GLARE SCREEN

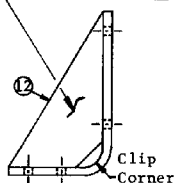


SECTION THRU
BARRIER*

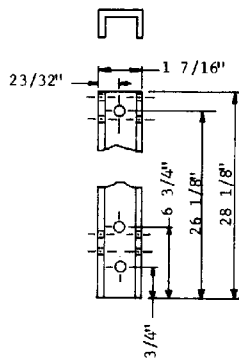


POST SUPPORT BRACKET

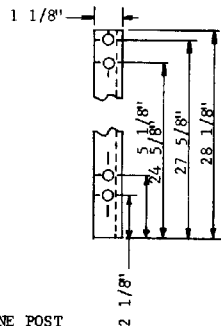
Eliminate Gusset Plates on
Intermediate Post Support Brackets



*Note: Contractor may drill holes or cast holes to set anchor bolt required to anchor plate of glare screen post assembly to the median barrier. If cast hole is used, seat bolt in sulfur, epoxy or other material approved by the Engineer.



LINE POST



TYPICAL GLARE SCREEN INSTALLATION

- ① Tension wire: AWG No. 9 (0.148") galv. to conform to ASTM-A-116 Class 2. Wind wire approximately 3 times around ferrule.
- ② 1/2" Support bracket: (0.250") ASTM-A-569, Galv. ASTM-A-123 (after fabrication)
- ③ Ferrule for tension take-up: ASTM-A-569, 9/16" ID x 1-3/16" long x 0.0747" with 3/16" notch in ends. Galv. ASTM-A-153 Class B-3 (after fabrication)
- ④ Hog ring: AWC No. 12 (0.105") Galv. ASTM-A-116 Class 2. Fasten glare barrier to bottom tension wire spaced approximately 2' apart.
- ⑤ 1/2" Drilled-in expansion anchors: 5/8" dia. hole-1/2" hex bolt ASTM-A-307, Galv. ASTM-153 Class C (Phillips Red Head or equal). (See note for alternate).
- ⑥ 1/2" x 1" Hex head bolt with hex nut: ASTM-A-307, Galv. ASTM-A-153 Class C.
- ⑦ 1/2" x 1" Plate round or square spacer: 9/16" Dia. hole, ASTM-A-36, Galv. ASTM-A-153 Class C.
- ⑧ Stainless steel strap & seal shall conform to ASTM-A-176 Type 430. Straps 0.020" x 0.125" (single crimp)
- ⑨ Line post: 1-7/16" x 1-1/8" x 0.1196" channel, ASTM-A-569 (2 req'd) Galv. ASTM-A-123 (after fab.)
- ⑩ Glare screen: 18 Ga. steel, ASTM-A-526, Galv. ASTM-A-525/G235, expanded to the following dimensions; 1.33" shortway of diamond and 4.0" longway of diamond (C to C of bridges) with a strand width of 0.250" angled at approx. 20° to plane of orig. sheet. Top edge to be shop curled, and crimped on 12" centers. After expansion, galv. steel shall be prepared according to Mil. Spec. TT-C-490 and primed with baked on Zinc Chromate Epoxy min. 0.2 Mil. dry film. Finish coat shall be Polyester Enamel min. 1.0 Mil. by the electrostatic spray method. Color shall be indicated on plans.
- ⑪ 1/2" x 2" Hex head cap screw and hex nut with 3/16" hole drilled through stem ASTM-A-307, Galv. ASTM-A-153, Class C.
- ⑫ 0.1793" Gusset ASTM-A-569 Galv. ASTM-A-123.
- ⑬ All intermediate post support brackets shall face in same direction. End panel support brackets shall face as shown.

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James P. King

APPROVED FOR
DIST. ION

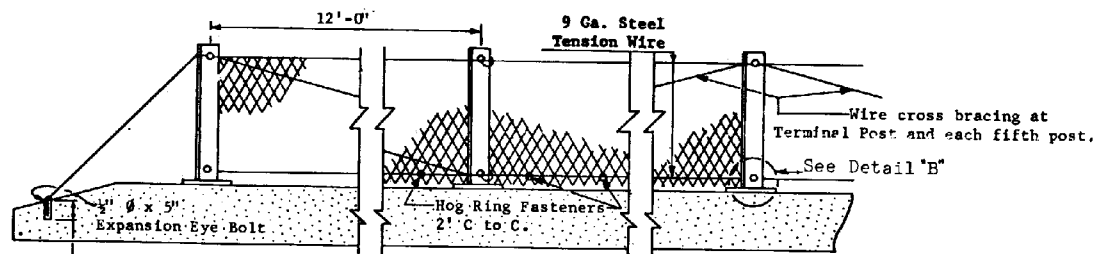
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

REV.

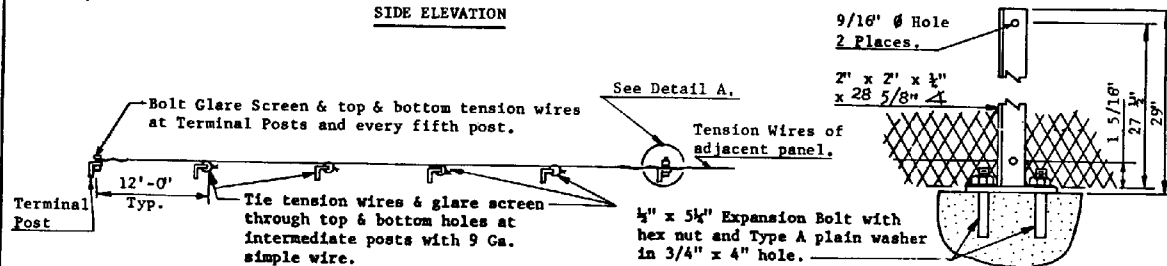
1/83

GLARE SCREEN, TYPE "PH",
CONC. MEDIAN BARRIER

DRAWING NO.
C-10.96

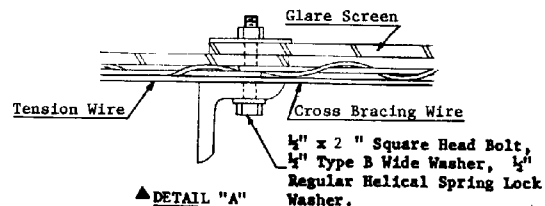


SIDE ELEVATION

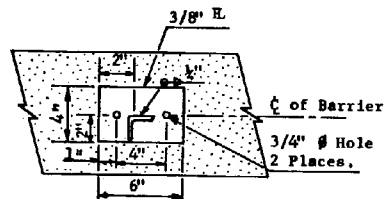


FASTENER LOCATIONS ▲

DETAIL "B"
Elevation



▲ DETAIL "A"



DETAIL "B"
Plan

Splices allowed in glare screen at posts only, with 1-full diamond overlap.

GENERAL NOTES

Posts shall be 12'-0" C to C. Structural steel shall conform to ASTM-A-36, Galv. ASTM-A-123.

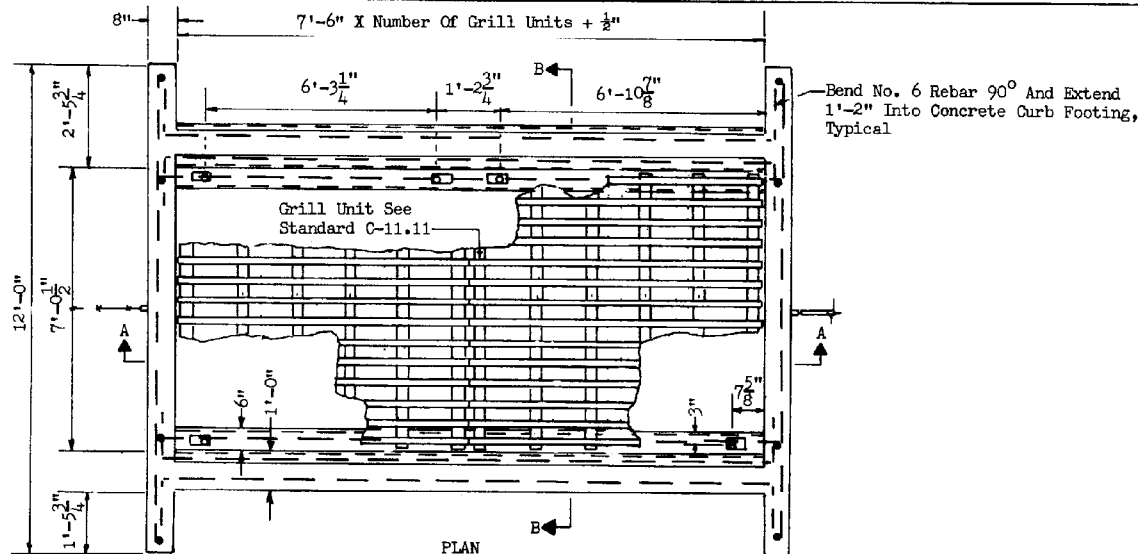
Square head bolt shall conform to ASTM-A-307, Galv. ASTM-A-153 Class C.

Type B washer shall conform to ASTM-F-436, Galv. ASTM-A-153 Class C.

Helical spring lock washer shall conform to ASTM-A-313, Galv. ASTM-A-153 Class C.

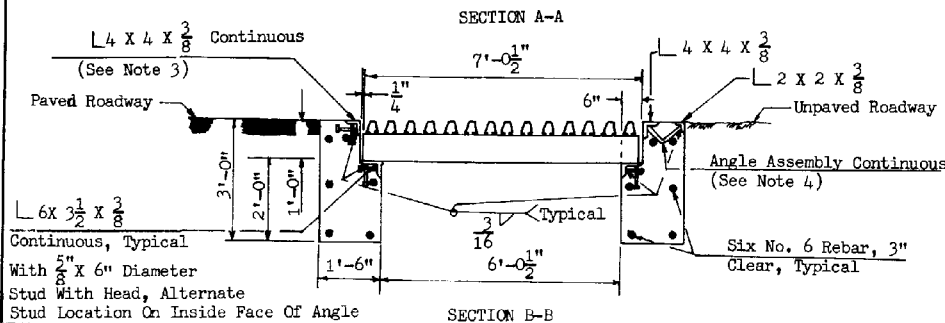
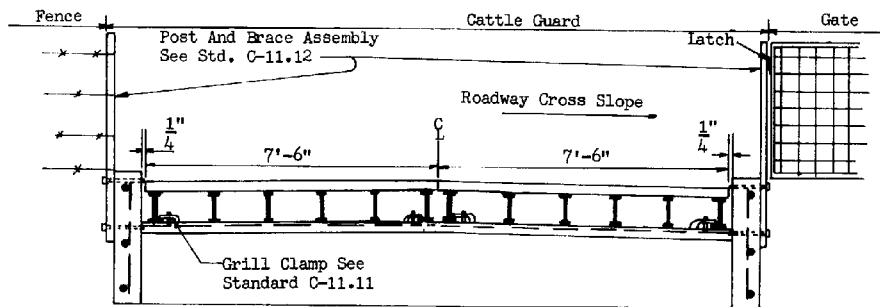
For other Glare Screen dimensions and specifications, see Standard C-10.96.

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APPROVED FOR DISTRIBUTION		11/83
GLARE SCREEN, TYPE "O" CONC. MEDIAN BARRIER		DRAWING NO. C-10.97

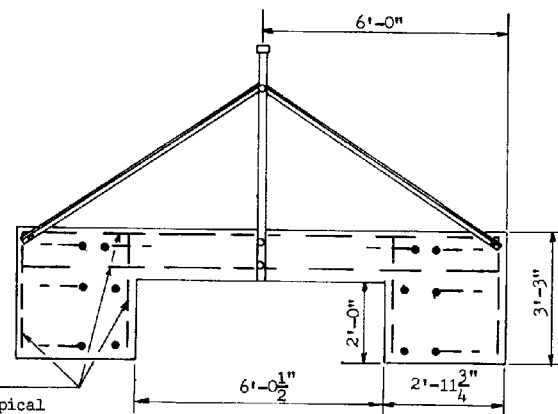


GENERAL NOTES:

1. Standard Plans for Cattle Guard, Footing Type, consists of Standards C-11.10, C-11.11, and C-11.12.
2. Cattle guard shall be sloped to conform to the roadway cross section, except that where an odd number of grill units is specified in a crowned roadway, the center grill unit shall be installed level.
3. Where the adjacent roadway is paved, an angle 4" X 4" X 3/8" with 5/8" diameter stud with head, 1'-0" alternate center to center is required.
4. Where the adjacent roadway is unpaved, an angle assembly is required. An angle assembly consists of one 4" X 4" X 3/8" angle and one 2" X 2" X 3/8" angle connected with 5/8" diameter studs. The studs shall be bent 90° and placed on 1'-0" centers.
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.



No. 4 Rebar
2" Clear, Typical



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

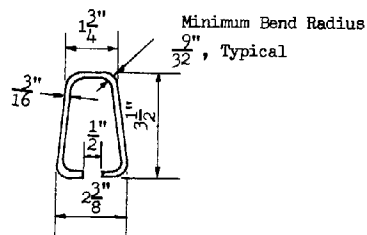
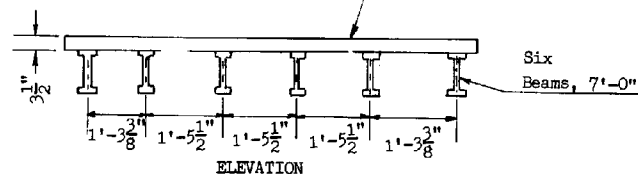
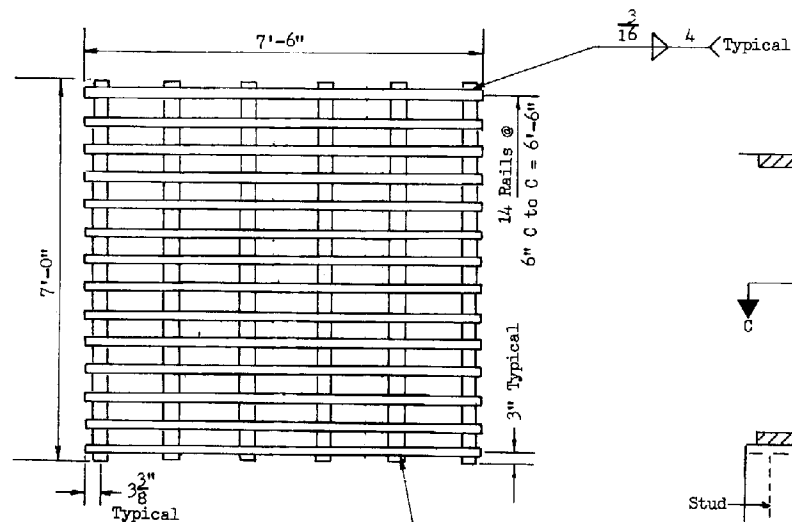
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DIVISION OF HIGHWAYS
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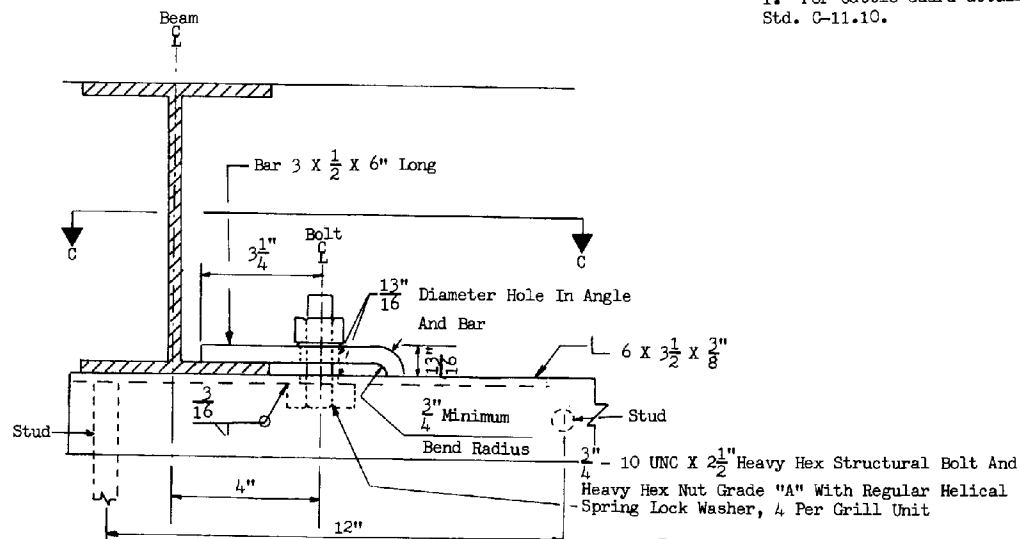
REV.
1/83

ROADWAY CATTLE GUARD-
FOOTING TYPE

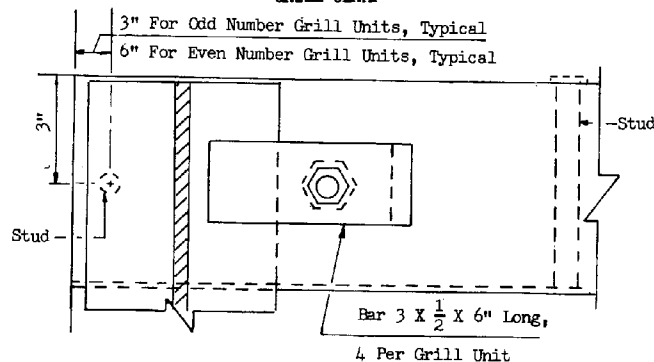
DRAWING NO.
C-11.10



GRILL UNIT



GRILL CLAMP



SECTION C-C

GENERAL NOTES:

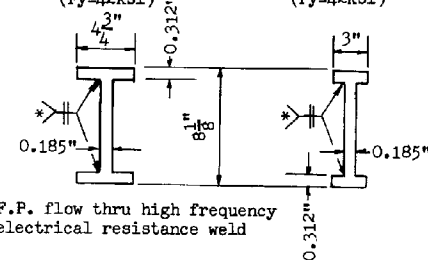
1. For Cattle Guard details see Std. C-11.10.

H-20 Loading

W 8 x 18
S 8 x 18.4
Welded Beam
(Fy=42ksi)

H-10 Loading

W 8 x 15
Welded Beam
(Fy=42ksi)



*F.P. flow thru high frequency electrical resistance weld

BEAMS

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STANDARD DRAWINGS

ROADWAY CATTLE GUARD -
GRILL & GRILL CLAMP DETAIL

DRAWING NO.
C-11.11

REV.

1/83

2" Square (Outside Nominal Dimension) Tubular Post, 5'-9"

L 2 X 2 X $\frac{1}{4}$ X 6'-11"

$\frac{7}{8}$ " Diameter Hole In 8" Wide Concrete Curb Footing, 4 Places

$\frac{1}{2}$ " Typical

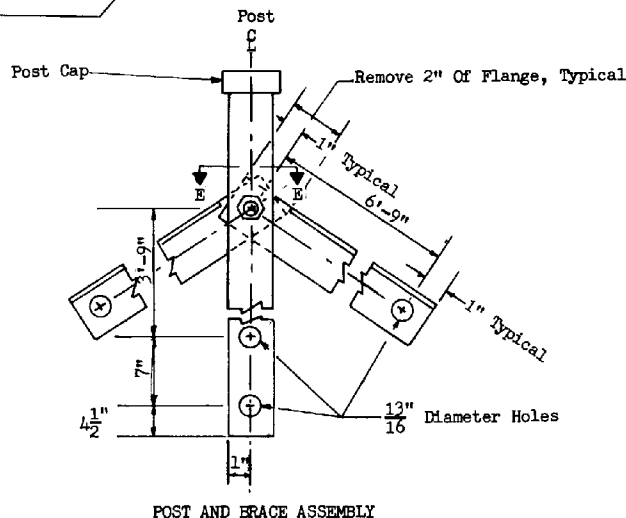
$\frac{3}{4}$ " Typical

6'-0"

Post And Brace Assembly

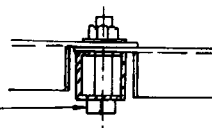
END VIEW

$\frac{3}{4}$ " - 10 UNC X 11" Hex Bolt And Hex Nut, With 1 Type "A" Plain Washer



POST AND BRACE ASSEMBLY

$\frac{3}{4}$ " - 10 UNC X $\frac{3}{2}$ " Hex Bolt And Hex Nut, With 1 Type "A" Wide Plain Washer

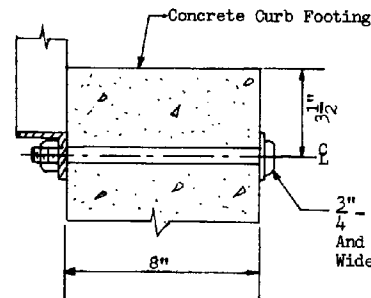


SECTION E-E

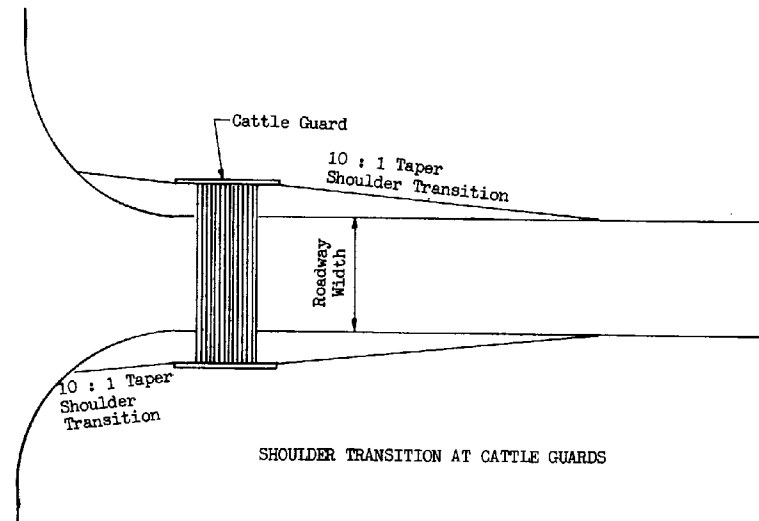
GENERAL NOTES:

1. For Cattle Guard details see Std. C-11.10.

2. 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

James H. King

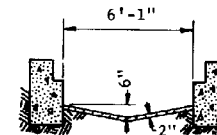
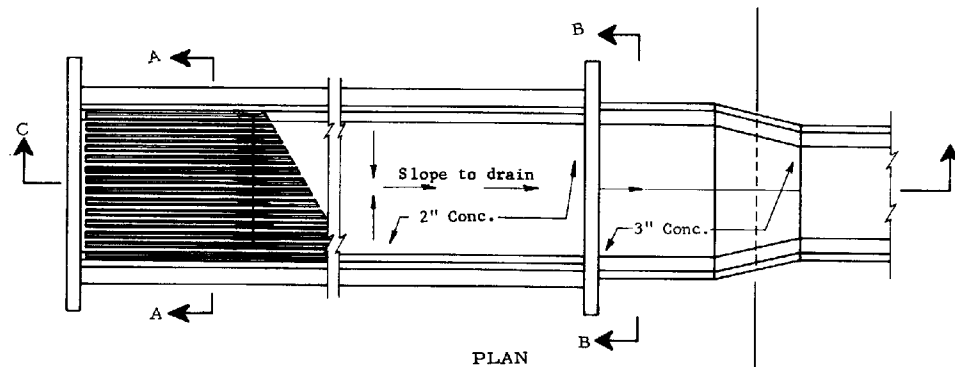
APPROVED FOR DIST.

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

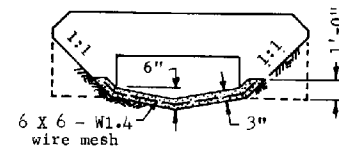
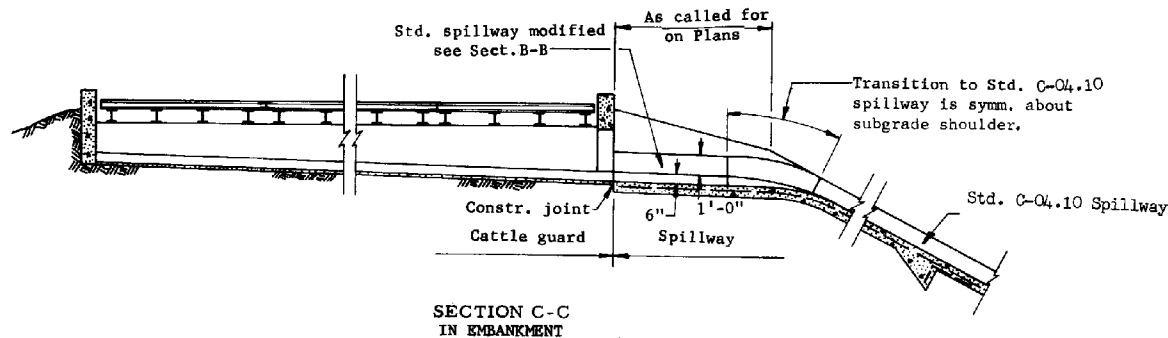
ROADWAY CATTLE GUARD -
FOOTING TYPE, MISC. DETAILS

REV
1/83

DRAWING NO.
C-11.12



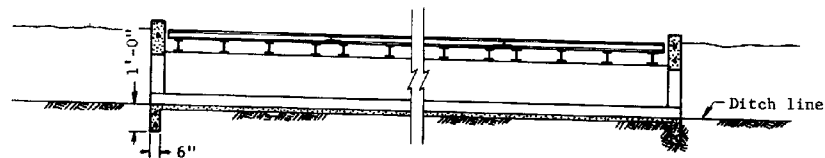
SECTION A-A



SECTION B-B

GENERAL NOTES

1. For all other cattle guard details, See Stds. C-11.10, 11.11 & 11.12.
2. This standards shall be used in embankment or where highly erodable soil is found
3. All concrete shall be Class B.



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

DESIGN APPROVED

James E. [Signature]

APPROVED FOR
DISTRICT ENGINEER

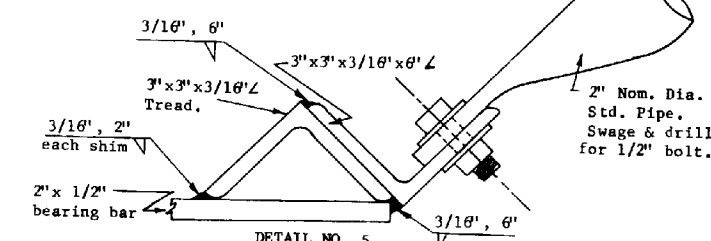
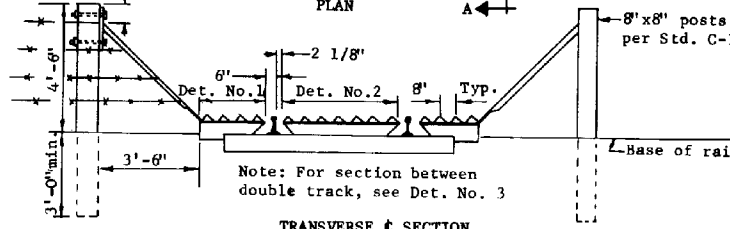
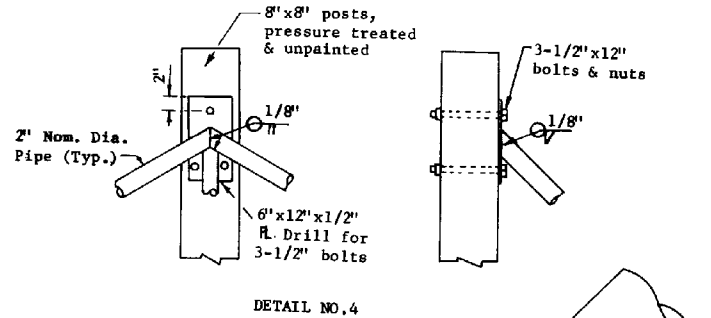
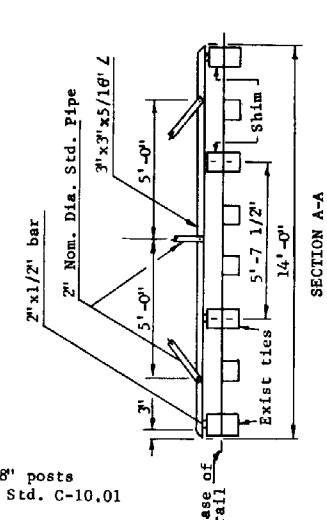
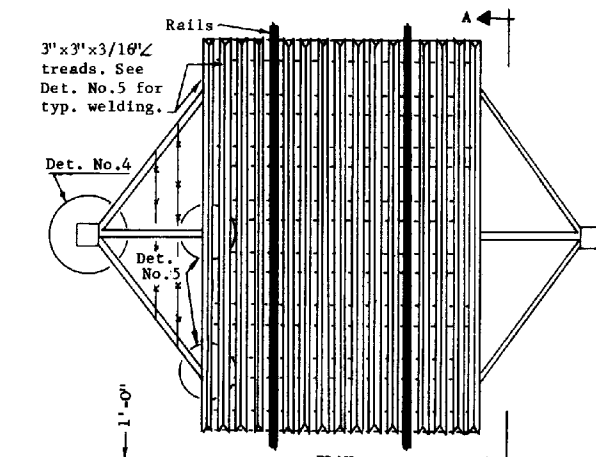
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

REV.

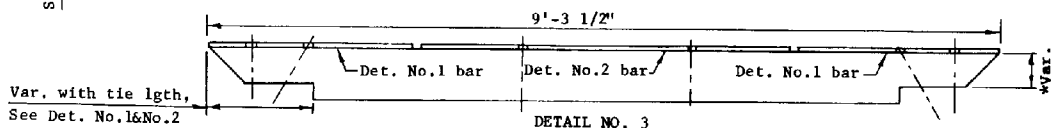
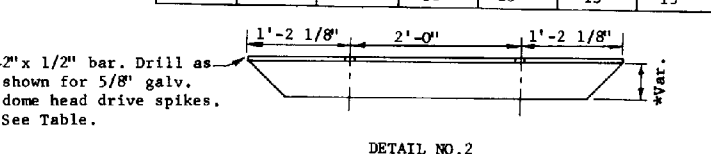
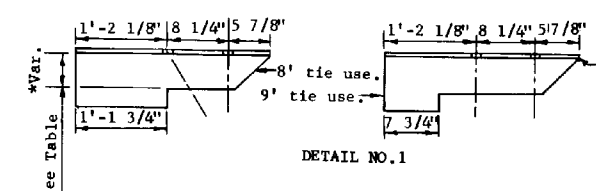
1/83

CATTLE GUARD, DRAINAGE

DRAWING NO.
C-11.20



*SHIM HEIGHT						
RAIL LBS./YD.						
80	90	110	115	119	131	150
2 1/4"	2 7/8"	3 1/2"	3 7/8"	4 1/16"	4 3/8"	4 9/16"
5/8" DIA. GALV. DOME HEAD SPIKE LENGTH						
11"	11"	11"	11"	13"	13"	13"



CENTER SECTION FOR DOUBLE TRACKS ON 15' CENTERS

GENERAL NOTES

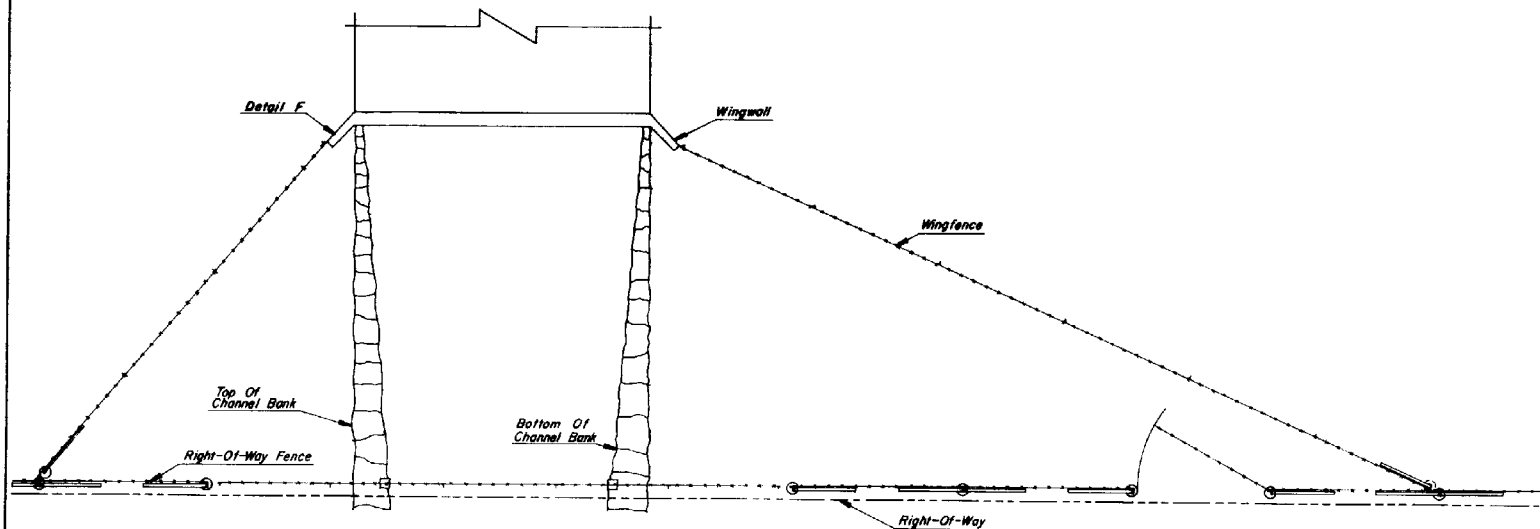
1. This design applicable only to wood tie track construction. Wood shims shall be unpainted and cut from material meeting the specifications of the existing ties.
2. 3"x3"x3/16" treads, 2"x1/2" bearing bars and 2" nom. dia. pipe wing assemblies shall be primed with one coat on No. 1 paint and finished with two coats of yellow enamel paint.

Var. with tie lgth, See Det. No. 1 & No. 2

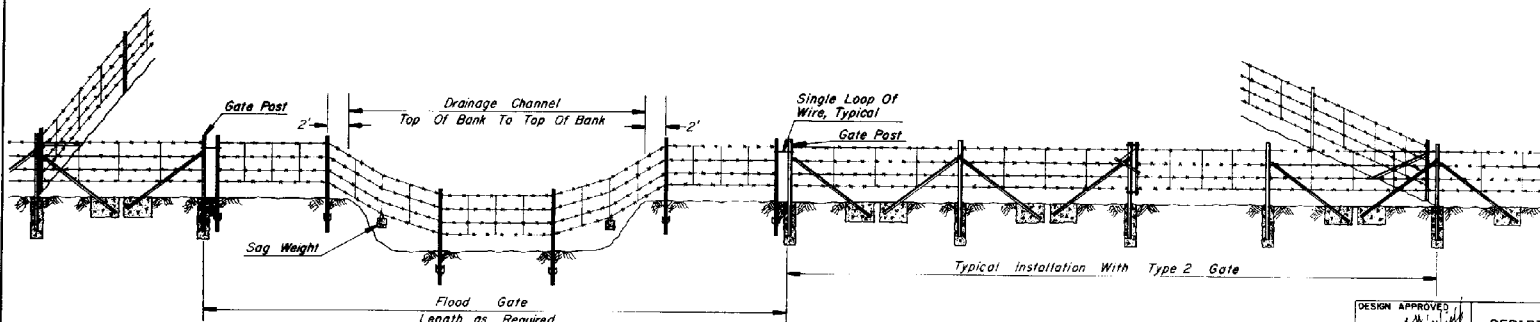
DESIGN APPROVED <i>James H. King</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/83
APPROVED FOR DISTRIBUTION <i>G. J. Sullivan</i>	CATTLE GUARD, RAILROAD	DRAWING NO. C-11.30



DESIGN APPROVED <i>William R. Shaffer</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 5/85
APPROVED FOR DISTRIBUTION <i>A. E. Hurd</i>	Fence, Gate, Type 1 & 2, Flood Gate	DRAWING NO. C-12.10 Sheet 3 of 5



PLAN



ELEVATION

TYPICAL FLOOD GATE INSTALLATION

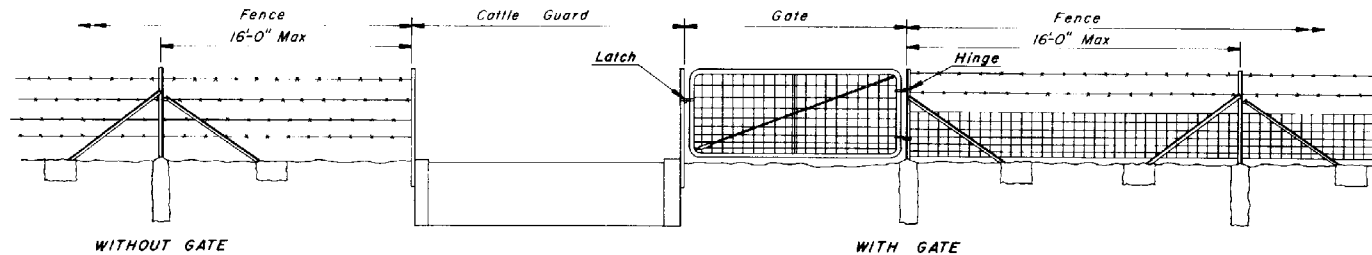
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5/95

Fence, Flood Gate
Installation

DRAWING NO.
C-12.10
Sheet 4 of 5

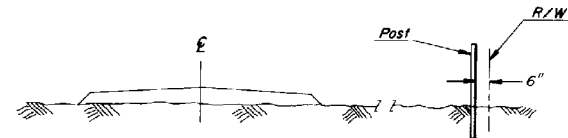


TYPICAL FENCE INSTALLATION AT CATTLE GUARD

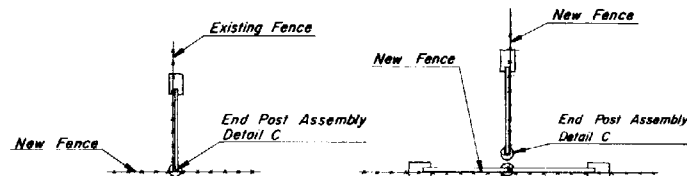
TEE CHANNEL OR U Y-BAR
AT 1.33 LBS. / FT.



DETAIL A
TYPICAL CROSS SECTIONS
OF LINE POST SHAPES

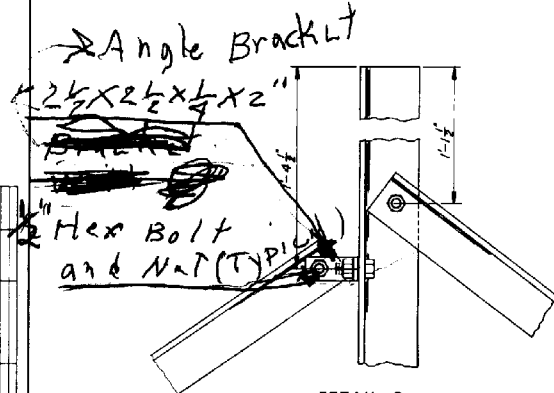


TYPICAL FENCE LOCATION

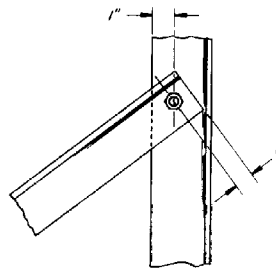


ABUTTING FENCE

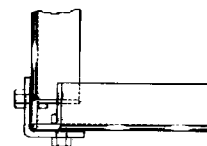
ABUTTING FENCE AT POST



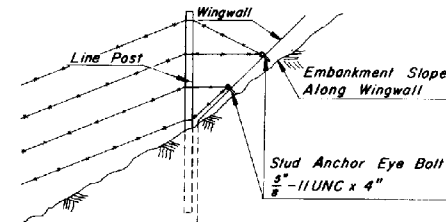
DETAIL B
INTERMEDIATE POST ASSEMBLY



DETAIL C
END POST ASSEMBLY



DETAIL E
CORNER POST ASSEMBLY



DETAIL F
FENCE CONNECTION TO WINGWALL

POST ASSEMBLIES:
UPRIGHT ANGLES $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{4}$ AT 4.10 LBS./FT., BRACE ANGLES $2 \times 2 \times \frac{1}{4}$ AT 3.19 LBS./FT.

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[Signature]
APPROVED FOR
DISTRIBUTION
[Signature]

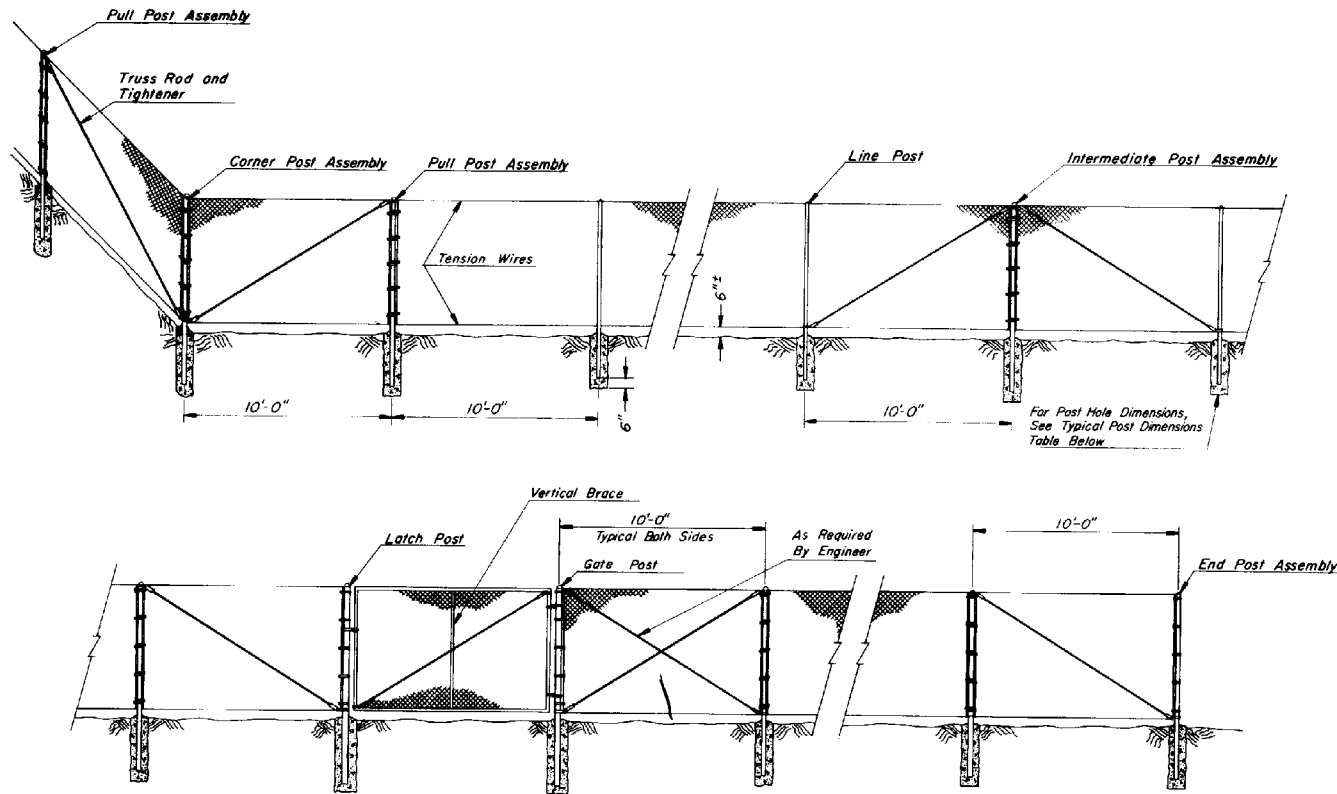
STATE OF ARIZONA
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STANDARD DRAWINGS

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5/85

Fence, Misc. Details

DRAWING NO.
C-12.10

Sheet 5 of 5



TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE I SHOWN

TYPICAL POST DIMENSIONS

CORNER, END, INTERMEDIATE, GATE, LATCH AND PULL POSTS									
FABRIC HEIGHT	LENGTH	POST HOLE DIA. x DEPTH (I.D.)	ROLL	FORMED	POST HOLE DIA. x DEPTH (I.D.)	H-SECTION	ROLL FORMED		
36"	6'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	5'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"
48"	7'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	6'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"
60"	8'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	7'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"
72"	9'-0"	10" x 3'-0"	2.00"	3.50" x 3.50"	2.00" x 1.75"	8'-6"	10" x 2'-6"	1.50"	1.875" x 1.625"
OVER 72"	+ 3'-0"	12" x 3'-0"	2.50"	3.50" x 3.50"	2.50" x 2.50"	HEIGHT + 2'-6"	12" x 2'-6"	2.00"	2.25" x 2.00"

GENERAL NOTES

- Posts shall be round pipe, H-section or roll-formed and shall conform to the nominal dimensional requirements shown on the plans. In addition the material of which posts are fabricated shall have a nominal thickness, before galvanizing, of not less than 0.111 inch.
- 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 gauge for all fence fabric 60 inches or less in height and shall be 9 gauge for fabrics greater than 60 inches in height.
- Tension wires shall be 7 gauge (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.
- 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.
- Stretcher bars shall be $\frac{3}{8}$ inch by $\frac{3}{4}$ inch steel flat bars. Stretcher bar bands shall be $\frac{1}{8}$ inch by One inch preformed steel bands.
- Bottom tension wire shall be 5 inches from top of crown on concrete footings.
- 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.

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

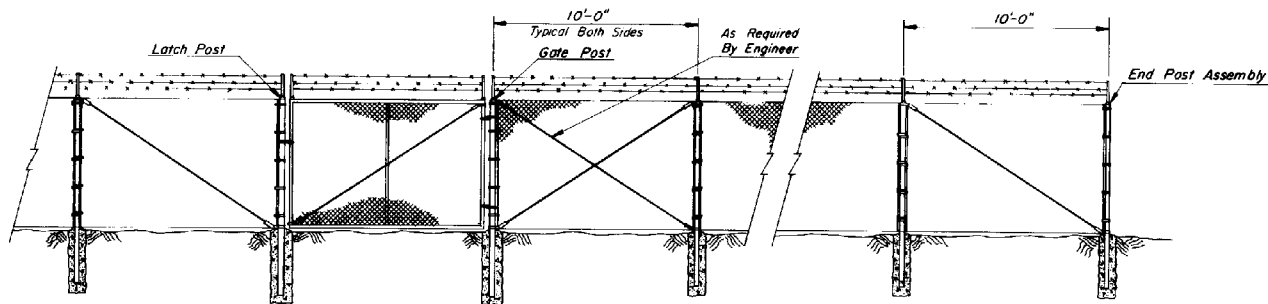
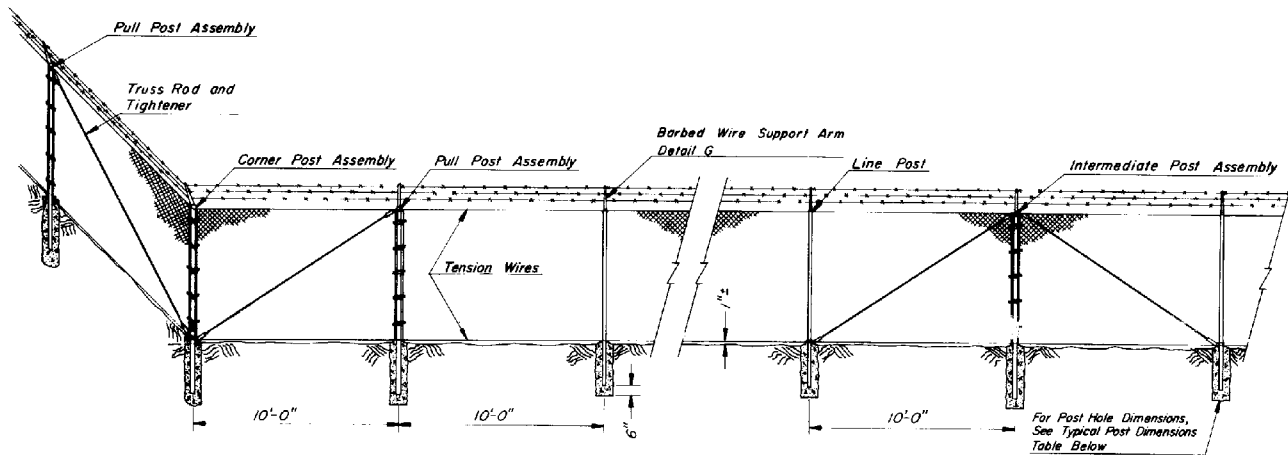
STATE OF ARIZONA
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DIVISION OF HIGHWAYS
STANDARD DRAWINGS

REV. 9/85

Fence, Chain Link Type I

DRAWING NO. C-12.20

Sheet 1 of 3

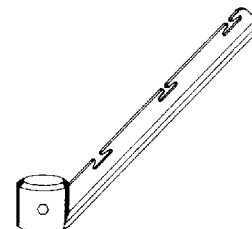


TYPICAL CHAIN LINK FENCE INSTALLATION - TYPE 2 SHOWN

TYPICAL POST DIMENSIONS												
CORNER, END, INTERMEDIATE, GATE, LATCH AND PULL POSTS					LINE POSTS							
FABRIC	POST HOLE		ROUND	ROLL	FORMED	POST HOLE		ROUND	H-SECTION	ROLL	FORMED	
HEIGHT	LENGTH	DIA x DEPTH (I.D.)		Ø	Ø	LENGTH	DIA x DEPTH (I.D.)		Ø	Ø	Ø	
72"	9'-0"	10" x 3'-0"		2.00"	3.50" x 3.50"	2.00" x 1.75"	8'-6"	10" x 2'-6"		1.50"	1.875" x 1.625"	2.00" x 1.75"

GENERAL NOTES

1. Barbed wire for use with Type 2 chain link fence shall be 12-gauge steel wire with 4 point 14 gauge 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 A585, 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.



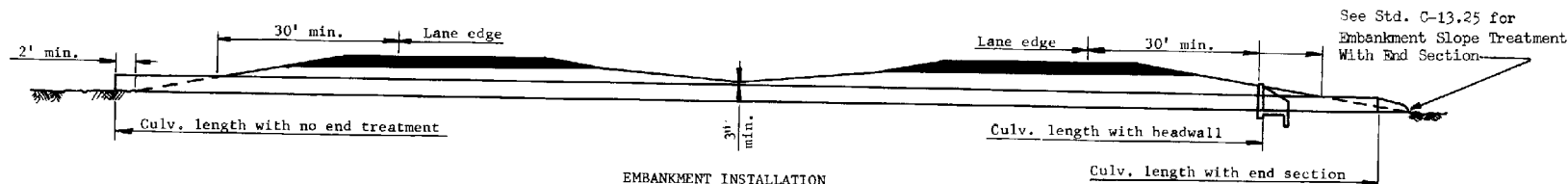
DETAIL G

BARBED WIRE SUPPORT ARM

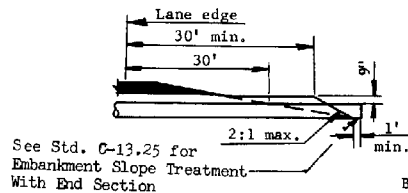
DATE	LOCATION	REVISION	BY	CHK

DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 5/85
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	Fence, Chain Link Type 2	DRAWING NO. C-12.20 Sheet 2 of 3

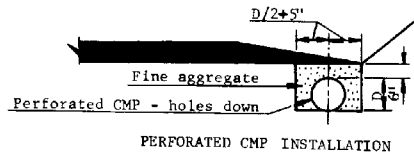
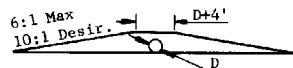
DRAWING NO.
C-12.20
Sheet 3 of 3



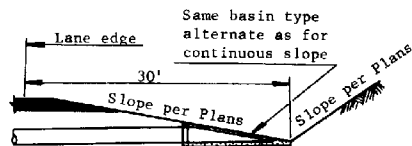
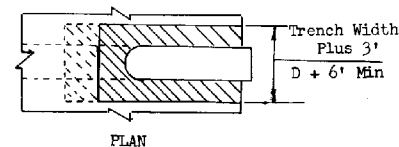
EMBANKMENT INSTALLATION
Divided Hwy. - 2 Way Rdwy. Similar



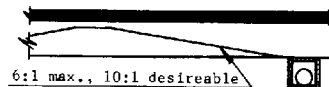
BERM
Not required when pipe projection is protected by guard rail



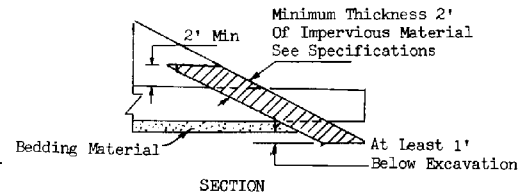
PERFORATED CMP INSTALLATION



Sag Location

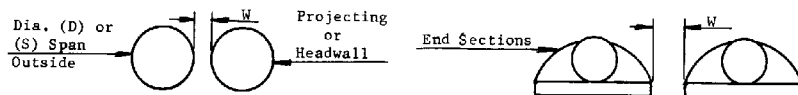


Continuous Slope Location



PLATING SLOPES AT PIPE LOCATIONS

TRAFFIC - SAFE CUT DITCH INSTALLATION



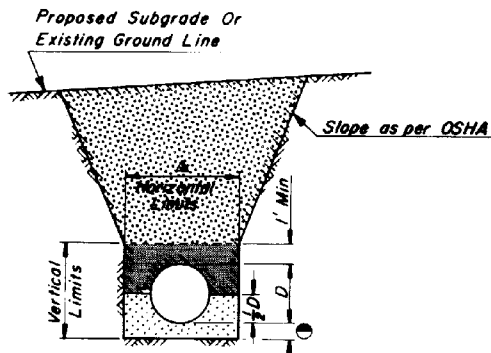
Dia. or Span	W		
	Installation Type		
	Projecting	Headwall	End Sections
Less than 30"	12"	12"	12"
30" - 66'	(D or S)/2	(D or S)/2	12"
72" & Over	36"	36"	12"

MINIMUM SPACING FOR MULTIPLE INSTALLATIONS

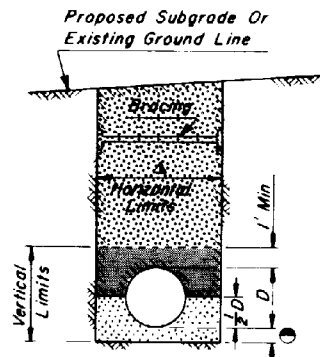
GENERAL NOTES

1. Any required inlet and/or outlet protection shall be as called for on plans.
2. See also; C-14.00 and remaining C-13.00 series standards.
3. W Dimension applies to trench condition also.

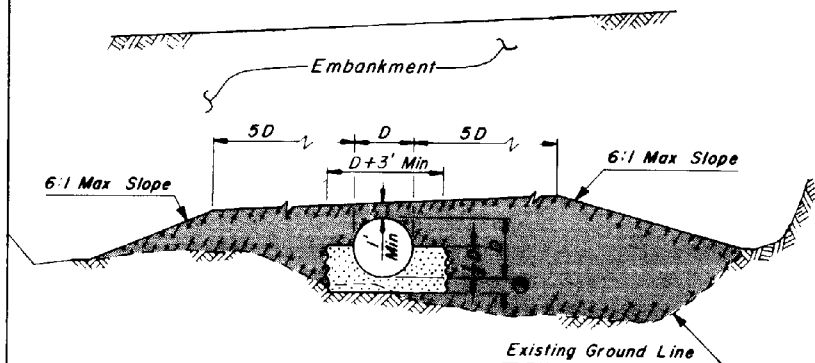
DESIGN APPROVED <i>P. J. Kelly</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 11/83
APPROVED FOR DISTRIBUTION <i>E. J. Smith</i>	PIPE CULVERT INSTALLATION	DRAWING NO. C-13.10



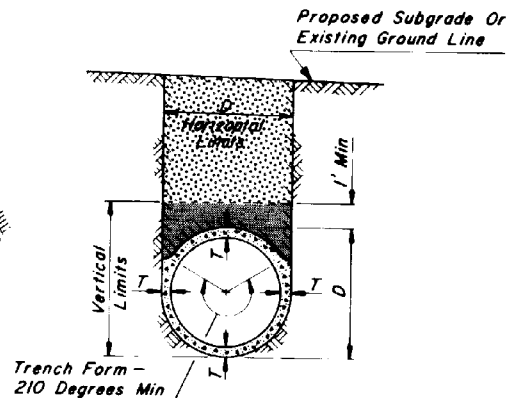
TRENCH CONDITION
IN NATURAL GROUND OR IN EMBANKMENT
WITHOUT BRACING



TRENCH CONDITION
IN NATURAL GROUND OR IN EMBANKMENT
WITH BRACING SHOWN



NON-TRENCH CONDITION



TRENCH CONDITION
NRCIPCP IN NATURAL GROUND
OR IN EMBANKMENT

GENERAL NOTES

1. Pipes shall be installed either in a trench condition or in a non-trench condition in natural ground or in an embankment.

2. 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.

3. Bracing and sloping shall conform to OSHA requirements.

4. Pipe backfill may be bedding material.

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, as per project plans.

▲ - D+2 feet maximum for diameters up to 4 feet and D+3 feet maximum for diameters 4 feet and over.

● - 6 inches except when on unyielding or unstable material, then as per the standard specifications.

- NON-TRENCH CONDITION
- TRENCH CONDITION
- BEDDING
- PIPE BACKFILL
- TRENCH BACKFILL

DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 5/85
APPROVED FOR DISTRIBUTION	TYPICAL PIPE INSTALLATION	DRAWING NO. C-13.15

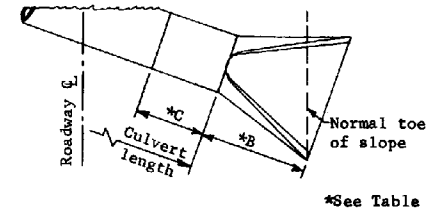
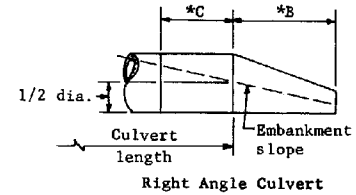
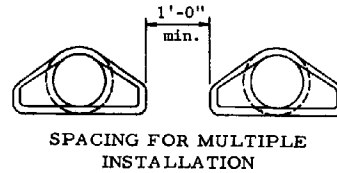
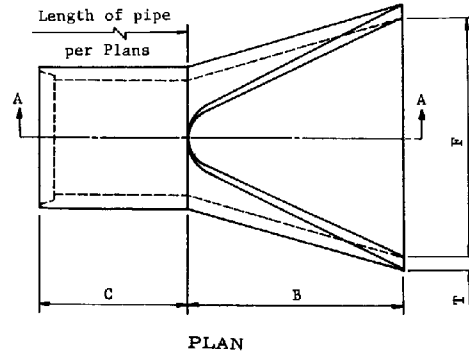
GENERAL NOTES

Design of end section shall conform to standards for reinforced concrete pipe.

End section joint conformation shall match the pipe joints.

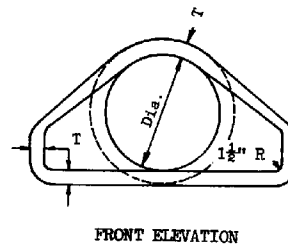
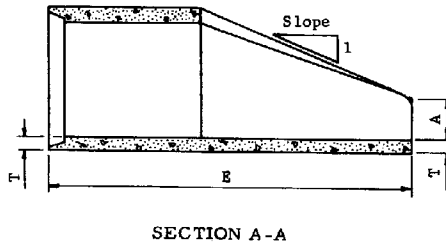
Embankment slope shall be warped to match slope of end section.

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#	3½	10½	49½	24	73½	54	3
30	2190#	3½	12	54	19½	73½	60	3
36	4100#	4	15	63	34½	97½	72	3
42	5380#	4½	21	63	35	98	78	3
48	6550#	5	24	72	26	98	84	3
54	8240#	5½	27	65	33½	98½	90	2½

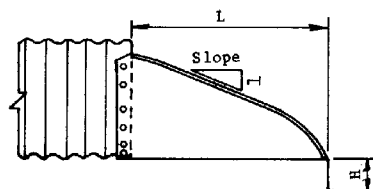
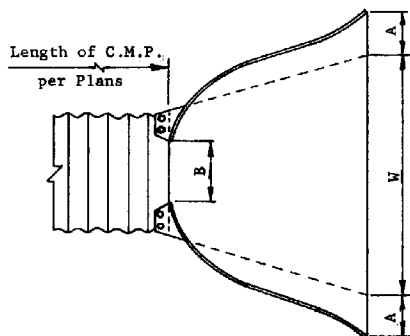


Skewed Culvert

CULVERT LENGTH AS SHOWN ON PLANS

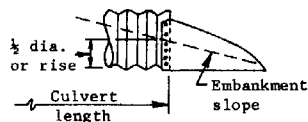


DESIGN APPROVED <i>James P. Ray</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR DIST. / TION <i>E. J. ...</i>	PIPE, REINFORCED CONCRETE END SECTION	DRAWING NO. C-13.20



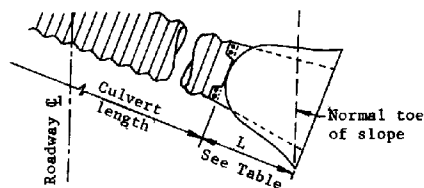
END SECTION DIMENSIONS
Riveted or Bolted Connections

TYPE 1

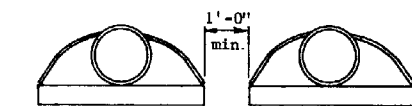


Right Angle Culvert

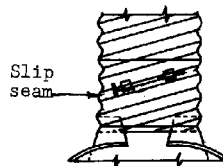
CULVERT LENGTH AS SHOWN ON PLANS



Skewed Culvert



MULTIPLE INSTALLATION
SPACING



TYPE 5

PIPE DIA.	GA.	DIMENSIONS - INCHES					APPROX. SLOPE	CONNECTION TYPE
		A	B	H	L	W		
		±1	Max.	±1	±1½	±2		
18"	16	8	10	6	31	36	2 1/2	1,2,3,4,5
24"	16	10	13	6	41	48	2 1/2	1,2,3,4,5
30"	14	12	16	8	51	60	2 1/2	1,2,4,5
36"	14	14	19	9	60	72	2 1/2	1,2,4,5
42"	12	16	22	11	69	84	2 1/2	1
48"	12	18	27	12	78	90	2 1/4	1
54"	12	18	30	12	84	102	2	1
60"	12,10	18	33	12	87	114	1 3/4	1
66"	12,10	18	36	12	87	120	1 1/2	1
72"	12,10	18	39	12	87	126	1 1/3	1
78"	12,10	18	42	12	87	132	1 1/4	1
84"	12,10	18	45	12	87	138	1 1/6	1

PIPE ARCH		GA.	DIMENSIONS - INCHES					APPROX. SLOPE	CONNECTION TYPE
			A	B	H	L	W		
SPAN	RISE		±1	Max.	±1	±1½	±2		
29"	18"	16	9	14	6	32	48	2 1/2	1,2,3,4,5
36"	22"	14	10	16	6	39	60	2 1/2	1,2,4,5
43"	27"	14	12	18	8	46	75	2 1/2	1,2,4,5
50"	31"	12	13	21	9	53	85	2 1/2	1
58"	36"	12	18	26	12	63	90	2 1/2	1
65"	40"	12	18	30	12	70	102	2 1/2	1
72"	44"	12	18	33	12	77	114	2 1/4	1

GENERAL NOTES

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.

The type 1 connector (far left) 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.

Type 2 and 3 connectors shall be used only with annular pipe or helical pipe with a requisite number of annular corrugations.

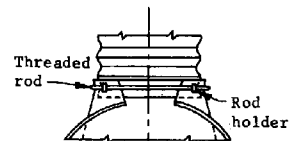
Type 4 and 5 connectors shall be used only with helical pipe.

All steel end section components shall be galvanized.

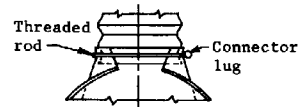
Toe of embankment shall be warped to match toe of skewed end sections.

A berm shall be added to abnormal projections per Std. C-13.10

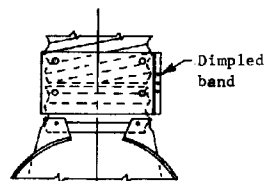
The foregoing applies to all cross section configurations.



TYPE 2



TYPE 3



TYPE 4

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Signature

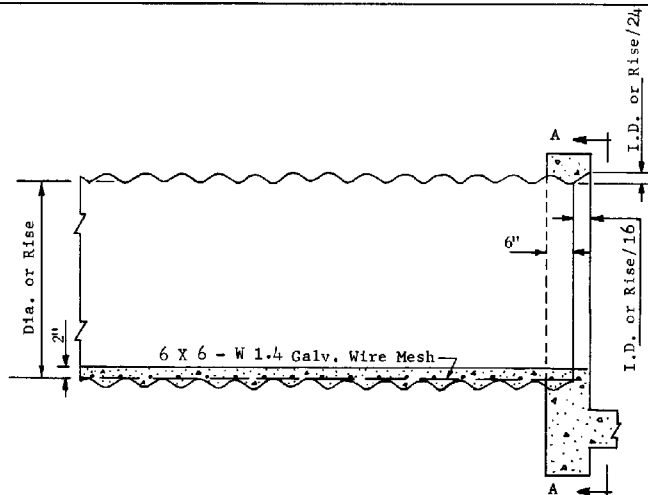
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DIVISION OF HIGHWAYS
STANDARD DRAWINGS

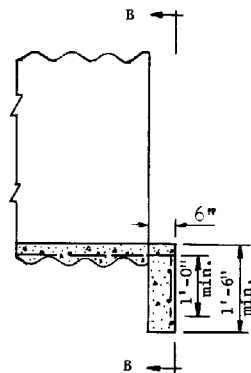
PIPE, CORRUGATED METAL,
END SECTION

REV.
1/83

DRAWING NO.
C-13.25



HEADWALL INSTALLATION



PROJECTING INSTALLATION

GENERAL NOTES

For lateral dimension of invert paving, use 72° control for CMP and span for CMPA.

Paving shall be scored longitudinally at 1'-6" min. lateral intervals.

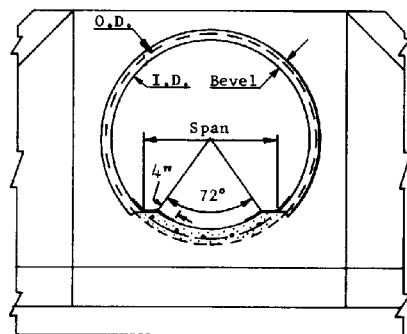
Use bevel on inlet headwall only.

Wire mesh shall be fastened or welded to corrugation crests at intervals and in a manner approved by the Engineer. Laps shall be 6' min.

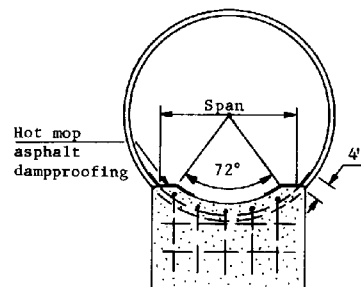
Paving shall not be placed until backfilling is completed.

Concrete shall be Class "B".

See Std. C-14.20 for headwall and bevel dimensions not shown.

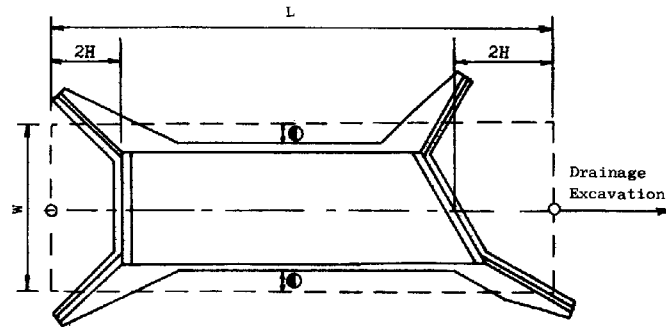


Elevation A-A



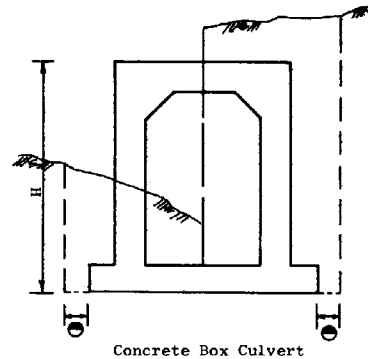
Elevation B-B

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APPROVED FOR DISTRIBUTION <i>[Signature]</i>	STANDARD DRAWINGS PIPE & PIPE ARCH, CORRUGATED METAL CONCRETE INVERT PAVING	DRAWING NO. C-13.30

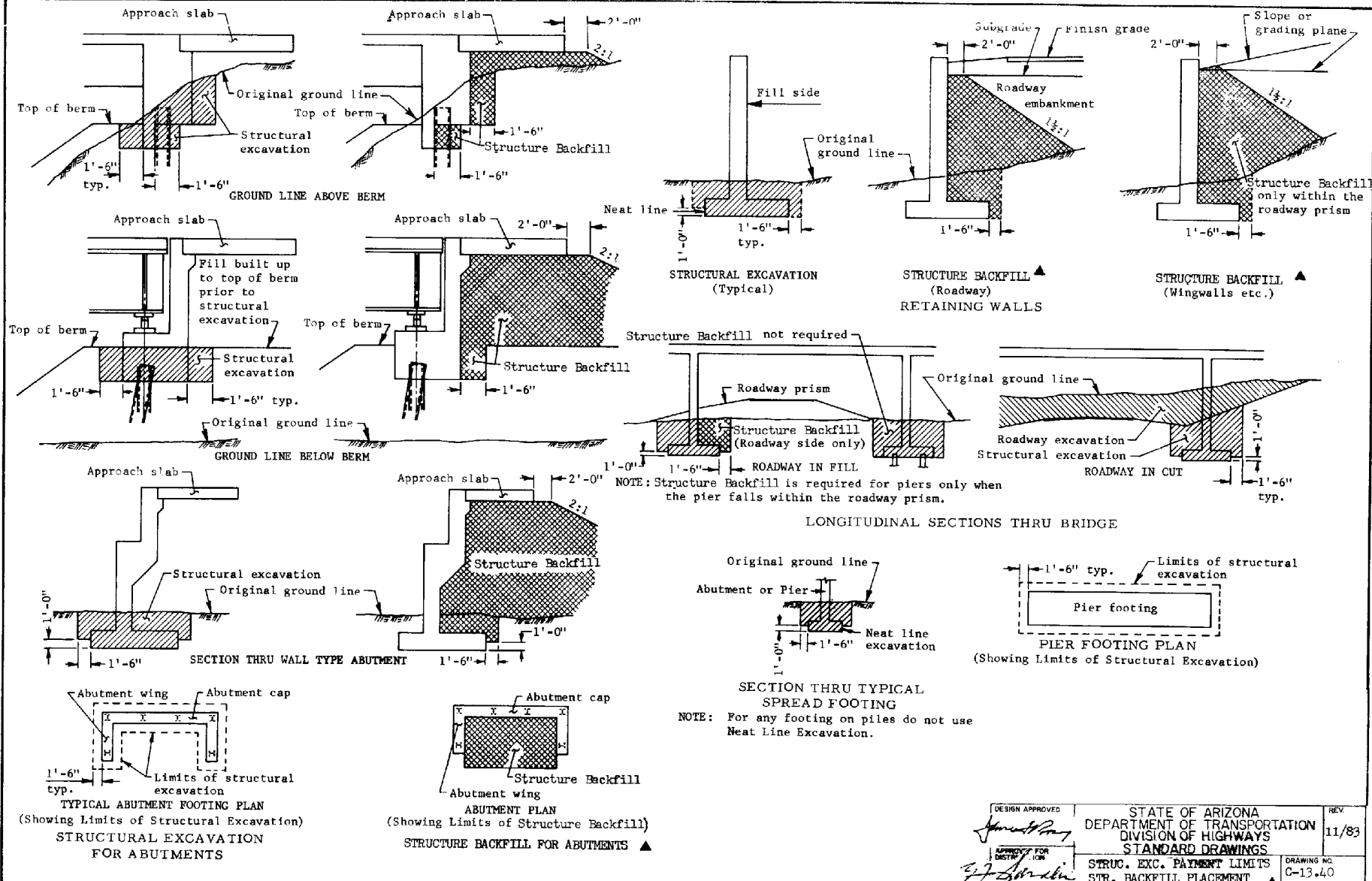


GENERAL NOTES

1. Payment limits shown include structural excavation for headwalls, cutoff walls, wingwalls, end sections, etc.
2. W = Width
L = Length
H = Height of barrel or headwall w/o cutoff wall
3. ● 6" max in rock & trench.
1'-6" max all others

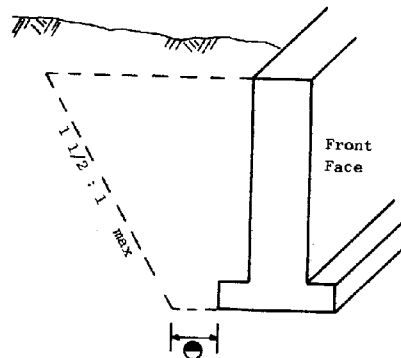
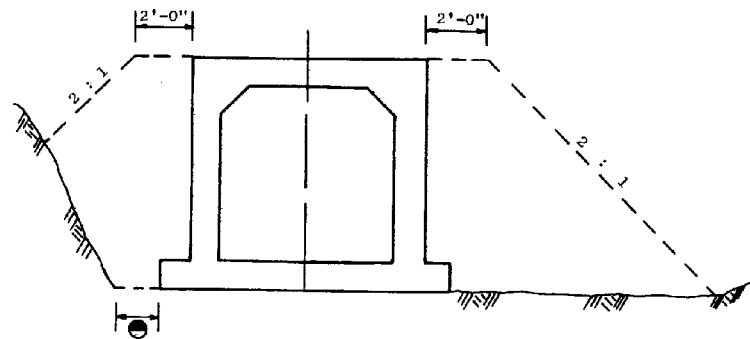
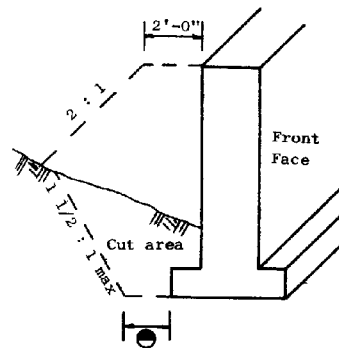
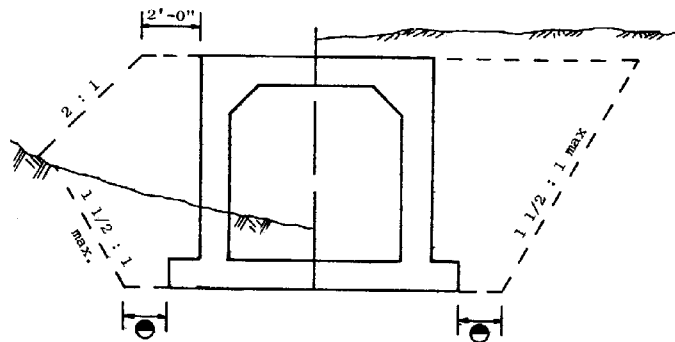


DESIGN APPROVED <i>James H. King</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/83
APPROVE / OR DISTRIB / ION <i>E. J. Austin</i>	STRUCTURAL EXCAVATION PAYMENT LIMITS	DRAWING NO. C-13.35



TYPICAL ABUTMENT FOOTING PLAN
(Showing Limits of Structural Excavation)
STRUCTURAL EXCAVATION
FOR ABUTMENTS

ABUTMENT PLAN
(Showing Limits of Structure Backfill)
STRUCTURE BACKFILL FOR ABUTMENTS ▲



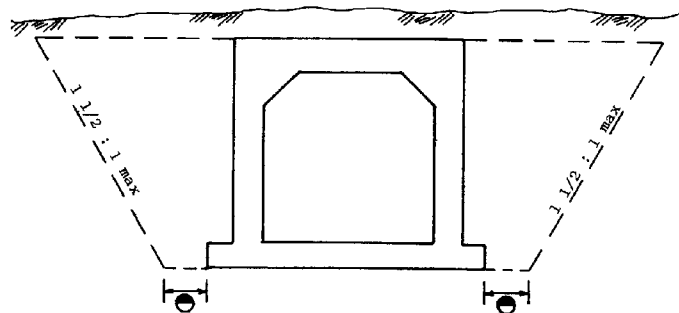
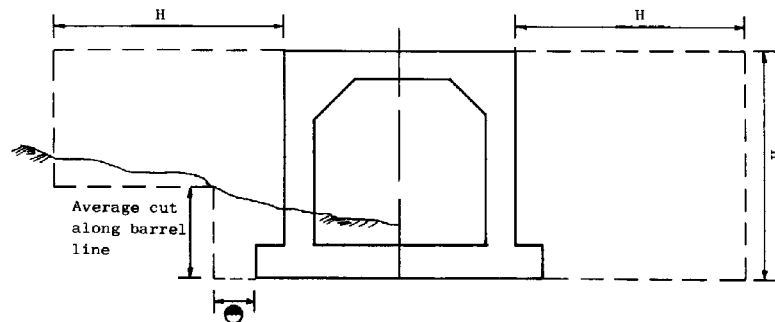
BARREL SECTION

END VIEW WING OF
BOX CULVERT

GENERAL NOTES

1. Placement of structure backfill around headwalls and wingwalls shall be the same as around structures.
2. ● 6" min in rock & trench
1'-6" min all others

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APPROVED FOR DISTRIBUTION <i>[Signature]</i>	STRUCTURE BACKFILL PLACEMENT	DRAWING NO. C-13.45



GENERAL NOTES

1. Computation of Structure Backfill quantities for box culverts is based on the area of a typical installation times (the total length of the structure plus $2H$). No measurement is necessary for wing areas. Use H for box extensions on each end extended.
2. H = Height of barrel or headwall w/o cutoff wall.
3. ● 6" max in rock & trench
1'-6" max all others

DESIGN APPROVED

James J. King

APPROVED FOR
DISTRICT ENGINEER

37 J. J. King

STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

STRUCTURE BACKFILL

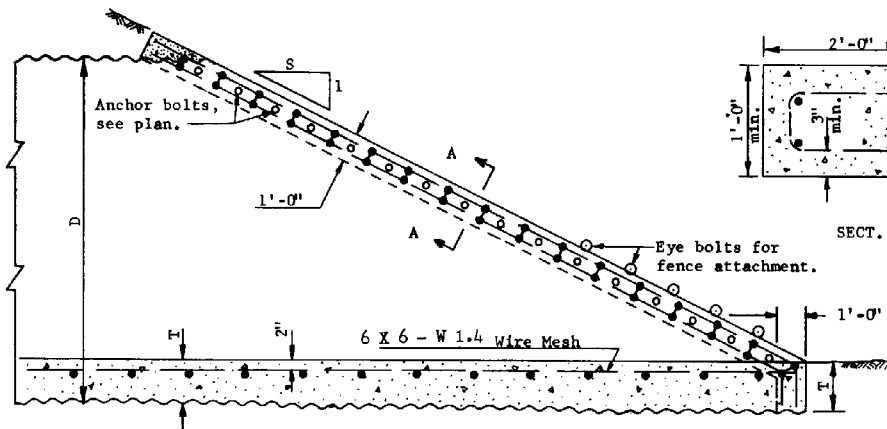
▲ MEASUREMENT

REV

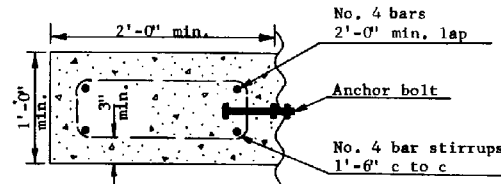
11/83

DRAWING NO.

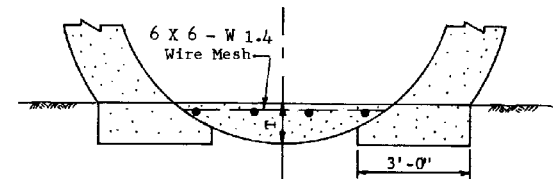
C-13.50



LONGITUDINAL SECTION

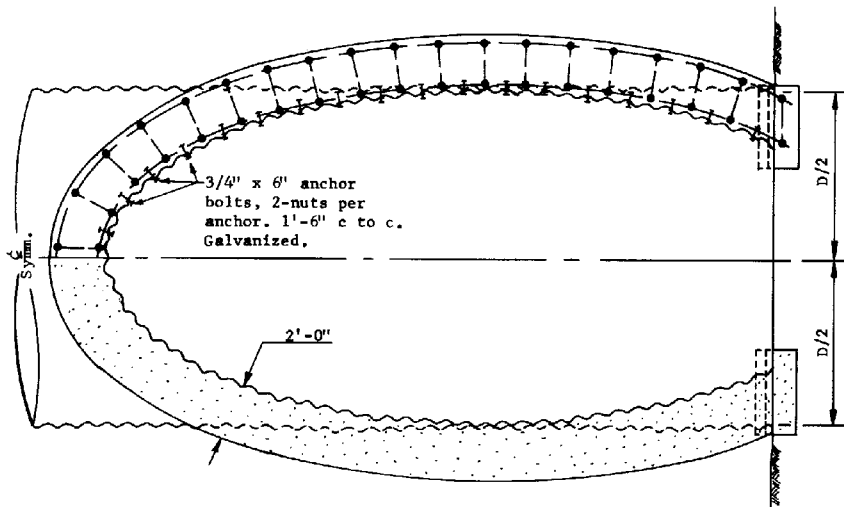


SECT. A-A



END ELEV.

	D	T	S
Combination vehicle and cattle pass	144"	1'-6"	Varies
Cattle pass only	120"	6'	Varies



PLAN NORMAL TO SLOPE

GENERAL NOTES

This end treatment is to be used only for those cattle and/or vehicle passes not used for drainage. All concrete shall be Class B. An optional 12" A.B. invert paving base course and 6" of concrete may be used in the 144" diameter pipe.

Anchor bolts shall be retained in a horizontal position during pour with final tightening a minimum of 7 days after pour.

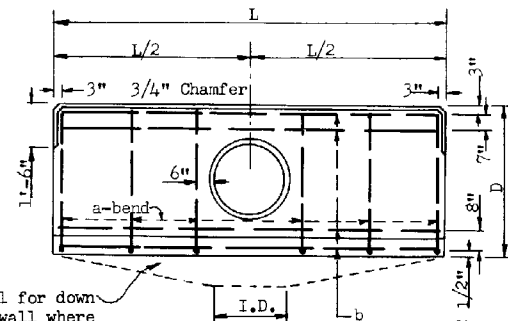
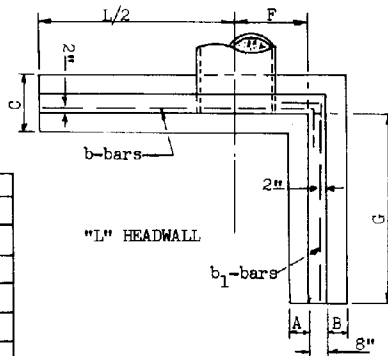
Pipe shall be backfilled before concrete bond beam is constructed. Minimum forming may be used.

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 6" minimum.

For installation normal to roadway centerline only.

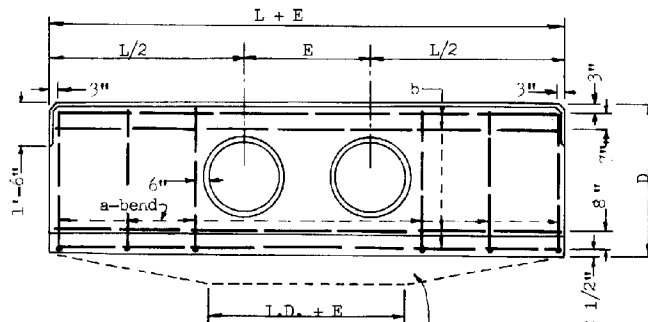
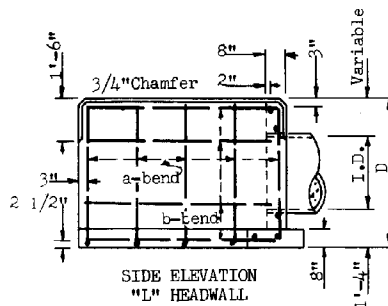
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APPROVED FOR DISTRICT ENGINEER <i>[Signature]</i>	PIPE, CATTLE-VEHICLE PASS, MITERED END TREATMENT	DRAWING NO. C-13.55

DIMENSIONS									
I.D.	A	B	C	D	E	L	L + E	F	G
18"	6"	6"	1'-8"	4'-0"	2'-6"	9'-6"	12'-0"	1'-7"	4'-6"
24"	8"	8"	2'-0"	4'-2"	3'-0"	11'-6"	14'-6"	2'-1"	5'-6"
30"	8"	8"	2'-0"	4'-7"	3'-9"	13'-6"	17'-3"	2'-7"	6'-6"
36"	1'-0"	8"	2'-4"	5'-0"	4'-6"	15'-6"	20'-0"	3'-1"	7'-6"
42"	1'-1"	10"	2'-7"	5'-5"	5'-3"	17'-6"	22'-9"	3'-7"	8'-6"
48"	1'-2"	1'-0"	2'-10"	5'-10"	6'-0"	19'-6"	25'-6"	4'-1"	9'-6"



Cut-off wall for down stream headwall where required.

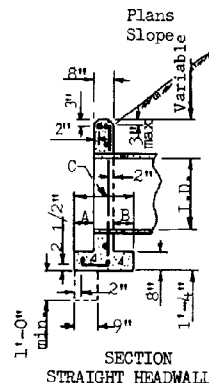
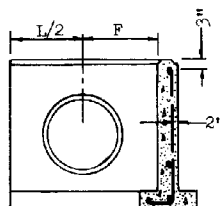
"L" HEADWALL								
I.D.	Conc. C.Y.		Reinf. Steel #4 Bars					
	For C.M.P.	For Conc. Pipe	a		b		lbs.	
			No.	Lgth.	No.	Lgth.	No.	Lgth.
18"	1.42	1.39	10	4'-8"	6	6'-9"	5	5'-8"
24"	2.00	1.96	12	5'-4"	6	8'-3"	6	6'-8"
30"	2.53	2.48	14	5'-10"	6	9'-9"	6	7'-8"
36"	3.27	3.20	16	6'-8"	6	11'-3"	7	8'-8"
42"	4.04	3.95	18	7'-2"	6	12'-9"	7	9'-8"
48"	4.94	4.82	20	7'-8"	6	14'-3"	8	10'-8"



Cut-off wall for down stream headwall where required.

SINGLE PIPE HEADWALL							
I.D.	Conc. C.Y.		Reinf. Steel #4 Bars				lbs.
	For C.M.P.	For Conc. Pipe	a		b		
			No.	Lgth.	No.	Lgth.	
18"	1.17	1.14	8	4'-8 $\frac{1}{2}$ "	5	9'-3"	56
24"	1.64	1.60	10	5'-4"	5	11'-3"	74
30"	2.05	2.00	10	5'-10 $\frac{1}{2}$ "	5	13'-3"	83
36"	2.63	2.56	12	6'-8 $\frac{1}{2}$ "	5	15'-3"	105
42"	3.24	3.15	14	7'-2 $\frac{1}{2}$ "	5	17'-3"	125
48"	3.96	3.84	16	7'-8 $\frac{1}{2}$ "	5	19'-3"	147

DOUBLE PIPE HEADWALL							
I. D.	Conc. CY		Reinf. Steel #4 Bars				lbs.
	for CMP	for Conc. Pipe	a		b		
			No.	Lgth.	No.	Lgth.	
18"	1.45	1.40	9	4'-8"	5	11'-9"	67
24"	2.00	1.93	10	5'-4"	5	14'-3"	83
30"	2.53	2.43	11	5'-10"	5	17'-0"	100
36"	3.28	3.15	13	6'-8"	5	19'-9"	124
42"	4.04	3.86	15	7'-2"	5	22'-6"	147
48"	4.97	4.74	16	7'-8"	5	25'-3"	156



GENERAL NOTES

1. All concrete shall be Class B
2. High point of headwall shall not project more than 3" above slope.

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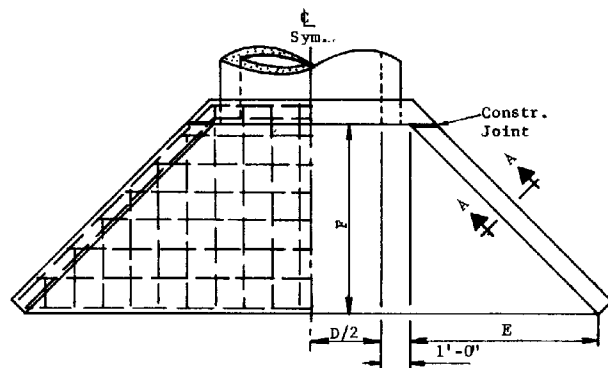
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

HEADWALL, PIPE, STRAIGHT &
"L" TYPES

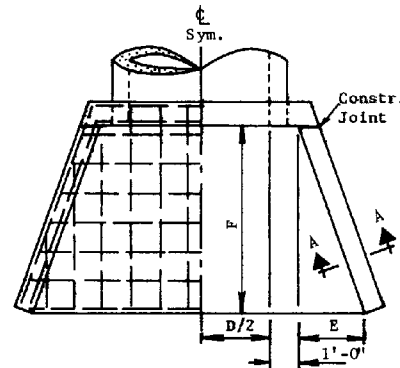
REV

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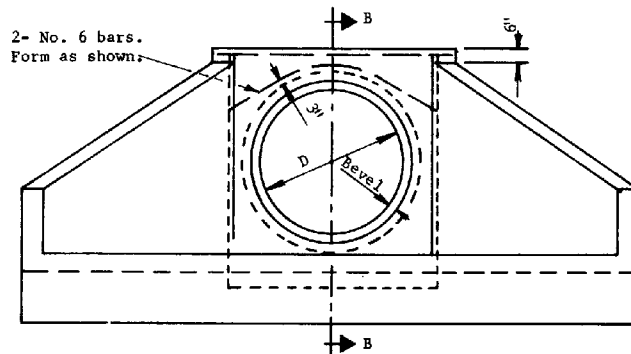
DRAWING NO.
C-14.10



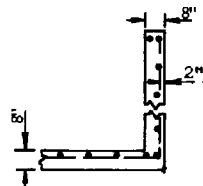
INLET HEADWALL



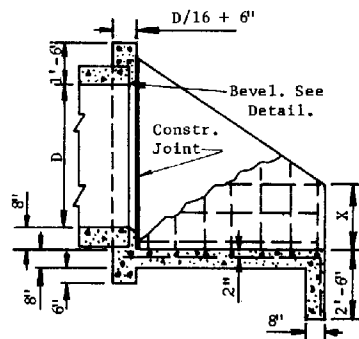
OUTLET HEADWALL



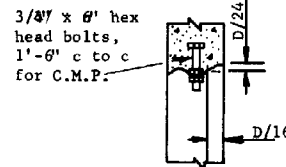
INLET HEADWALL FACE ELEV., -OUTLET SIMILAR



SECTION A-A



SECTION B-B



BEVEL DETAIL

1 1/2:1 Embankment Slope								
D	Type	Dimensions			Conc. (C.Y.)		Reinf. Steel (Lbs.)	
		F	E	X	C.M.P.	R.C.P.		
42"	1(Inlet)	5'-2"	5'-2"	1'-9"	4.55	4.45	275	
	2(Outlet)	5'-2"	1'-11"	1'-9"	3.53	3.45	213	
48"	3(Inlet)	5'-8"	5'-8"	1'-11"	5.32	5.20	321	
	4(Outlet)	5'-8"	2'-1"	1'-11"	4.12	4.03	249	
54"	5(Inlet)	6'-2"	6'-2"	2'-1"	6.14	6.01	370	
	6(Outlet)	6'-2"	2'-3"	2'-1"	4.75	4.65	287	
60"	7(Inlet)	6'-8"	6'-8"	2'-3"	7.03	6.88	424	
	8(Outlet)	6'-8"	2'-5"	2'-3"	5.43	5.31	328	
66"	9(Inlet)	7'-2"	7'-2"	2'-5"	7.98	7.81	481	
	10(Outlet)	7'-2"	2'-7"	2'-5"	6.16	6.02	372	
72"	11(Inlet)	7'-8"	7'-8"	2'-7"	8.99	8.80	542	
	12(Outlet)	7'-8"	2'-9"	2'-7"	6.94	6.78	419	
78"	13(Inlet)	8'-2"	8'-2"	2'-9"	10.07	9.85	608	
	14(Outlet)	8'-2"	3'-0"	2'-9"	7.78	7.61	469	
84"	15(Inlet)	8'-8"	8'-8"	2'-11"	11.20	10.96	676	
	16(Outlet)	8'-8"	3'-2"	2'-11"	8.66	8.47	522	

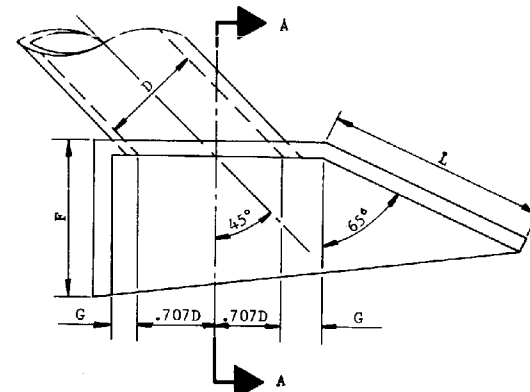
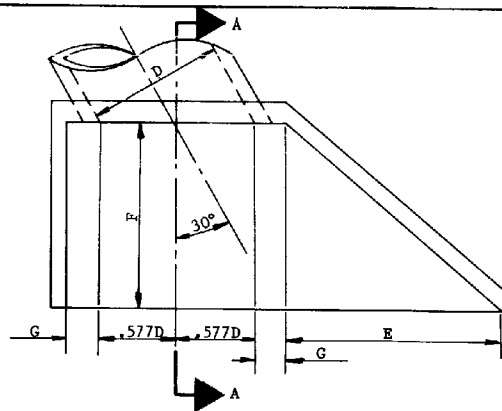
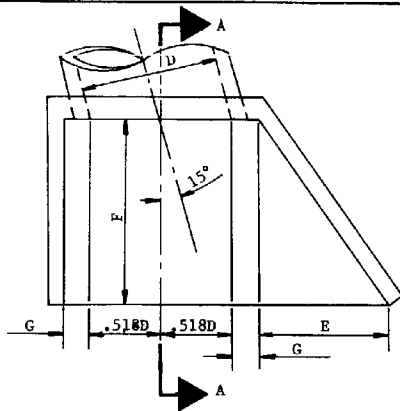
4:1 Embankment Slope

42"	17(Inlet)	8'-8"	8'-8"	3'-0"	7.88	7.70	475	
	18(Outlet)	8'-8"	3'-2"	3'-0"	5.59	5.46	337	
48"	19(Inlet)	8'-8"	8'-8"	3'-6"	8.47	8.28	511	
	20(Outlet)	8'-8"	3'-2"	3'-6"	6.10	5.97	368	
54"	21(Inlet)	8'-8"	8'-8"	4'-0"	9.07	8.87	548	
	22(Outlet)	8'-8"	3'-2"	4'-0"	6.63	6.48	400	
60"	23(Inlet)	9'-4"	9'-4"	4'-4"	10.39	10.16	627	
	24(Outlet)	9'-4"	3'-5"	4'-4"	7.60	7.43	458	
66"	25(Inlet)	9'-8"	9'-8"	4'-9"	11.42	11.17	689	
	26(Outlet)	9'-8"	3'-6"	4'-9"	8.39	8.20	506	
72"	27(Inlet)	9'-8"	9'-8"	5'-3"	12.11	11.84	731	
	28(Outlet)	9'-8"	3'-6"	5'-3"	8.99	8.80	542	
78"	29(Inlet)	10'-0"	10'-0"	5'-8"	13.22	12.93	798	
	30(Outlet)	10'-0"	3'-8"	5'-8"	9.88	9.66	596	
84"	31(Inlet)	10'-8"	10'-8"	6'-0"	14.81	14.48	893	
	32(Outlet)	10'-8"	3'-11"	6'-0"	11.00	10.76	664	

GENERAL NOTES

1. All concrete shall be Class B
2. All rebars shall be No. 4 except 2- formed bars over pipe. Bar spacing shall be 1'-0" c to c.
3. High point of headwall shall not project more than 3" above slope.
4. For skewed pipe dimensions, see Std. C-14.21
5. Bevel is required only on inlet headwalls. Bell end of concrete pipe may replace bevel.

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APPROVED FOR DISTRIBUTION <i>[Signature]</i>	HEADWALL, NORMAL TO PIPE 42" - 84" PIPE	DRAWING NO. C-14.20



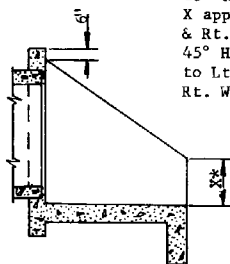
1 1/2:1 Embankment Slope										1 1/2:1 Embankment Slope										1 1/2:1 Embankment Slope									
D	Type	Dimensions				Conc. (CY)		Reinf. Steel (Lbs.)		D	Type	Dimensions				Conc. (CY)		Reinf. Steel (Lbs.)		D	Type	Dimensions				Conc. (CY)		Reinf. Steel (Lbs.)	
		E	F	G	X*	CMP	RCP					E	F	G	X*	CMP	RCP					F	G	L	X*	X'*	CMP	RCP	
42"	1	3'-7"	5'-2"	0'-8"	1'-9"	3.46	3.38	208		42"	17	6'-2"	5'-2"	1'-0"	1'-9"	4.07	3.98	245		42"	33	5'-2"	1'-5"	9'-6"	1'-9"	2'-0"	5.27	5.16	316
48"	2	4'-0"	5'-8"	0'-9"	1'-11"	4.03	3.94	246		48"	18	6'-9"	5'-8"	1'-0"	1'-11"	4.76	4.66	286		48"	34	5'-8"	1'-6"	9'-6"	1'-11"	3'-0"	6.11	5.99	367
54"	3	4'-4"	6'-2"	0'-9"	2'-1"	4.66	4.56	285		54"	19	7'-4"	6'-2"	1'-1"	2'-1"	5.58	5.46	337		54"	35	6'-2"	1'-7"	9'-6"	2'-1"	3'-6"	7.09	6.95	426
60"	4	4'-8"	6'-8"	0'-10"	2'-3"	5.41	5.29	324		60"	20	7'-11"	6'-8"	1'-2"	2'-3"	6.47	6.33	391		60"	36	6'-8"	1'-8"	9'-9"	2'-3"	3'-11"	8.16	8.00	490
66"	5	5'-0"	7'-2"	0'-11"	2'-5"	6.21	6.07	374		66"	21	8'-6"	7'-2"	1'-3"	2'-5"	7.41	7.25	448		66"	37	7'-2"	1'-9"	9'-9"	2'-5"	4'-5"	9.30	9.11	558
72"	6	5'-4"	7'-8"	0'-11"	2'-7"	7.01	6.86	421		72"	22	9'-2"	7'-8"	1'-4"	2'-7"	8.51	8.32	508		72"	38	7'-8"	1'-10"	9'-9"	2'-7"	4'-11"	10.60	10.39	636
78"	7	5'-9"	8'-2"	1'-0"	2'-9"	7.94	7.76	479		78"	23	9'-9"	8'-2"	1'-4"	2'-9"	9.46	9.25	567		78"	39	8'-2"	1'-11"	10'-1"	2'-9"	5'-4"	11.65	11.42	699
84"	8	6'-1"	8'-8"	1'-1"	2'-11"	8.74	8.54	529		84"	24	10'-4"	8'-8"	1'-5"	2'-11"	10.61	10.37	632		84"	40	8'-8"	2'-0"	10'-4"	2'-11"	5'-9"	12.94	12.68	777
4:1 Embankment Slope										4:1 Embankment Slope										4:1 Embankment Slope									
D	Type	E	F	G	X*	CMP	RCP			D	Type	E	F	G	X*	CMP	RCP			D	Type	E	F	G	X*	CMP	RCP		
42"	9	6'-11"	8'-8"	0'-8"	3'-0"	5.32	5.20	338		42"	25	10'-4"	8'-8"	1'-0"	3'-0"	6.70	6.56	415		42"	41	8'-8"	1'-5"	10'-10"	3'-0"	4'-0"	6.98	6.84	419
48"	10	6'-1"	8'-8"	0'-9"	3'-6"	6.01	5.88	369		48"	26	10'-4"	8'-8"	1'-0"	3'-6"	7.29	7.13	451		48"	42	8'-8"	1'-6"	10'-10"	3'-6"	4'-6"	7.61	7.46	457
54"	11	6'-11"	8'-8"	0'-9"	4'-0"	6.55	6.41	400		54"	27	10'-4"	8'-8"	1'-1"	4'-0"	7.97	7.79	481		54"	43	8'-8"	1'-7"	10'-10"	4'-0"	5'-0"	8.29	8.12	498
60"	12	6'-6"	9'-4"	0'-10"	4'-4"	7.55	7.38	453		60"	28	11'-1"	9'-4"	1'-2"	4'-4"	9.21	9.01	559		60"	44	9'-4"	1'-8"	11'-8"	4'-4"	5'-5"	9.62	9.43	577
66"	13	6'-9"	9'-8"	0'-11"	4'-9"	8.48	8.30	512		66"	29	11'-6"	9'-8"	1'-3"	4'-9"	10.25	10.03	619		66"	45	9'-8"	1'-9"	12'-1"	4'-9"	5'-11"	10.68	10.47	641
72"	14	6'-9"	9'-8"	0'-11"	5'-3"	8.90	8.70	552		72"	30	11'-6"	9'-8"	1'-4"	5'-3"	11.04	10.80	666		72"	46	9'-8"	1'-10"	12'-1"	5'-3"	6'-5"	11.53	11.30	692
78"	15	7'-0"	10'-8"	1'-0"	5'-8"	10.08	9.86	608		78"	31	11'-11"	10'-0"	1'-4"	5'-8"	12.11	11.84	734		78"	47	10'-0"	1'-11"	12'-6"	5'-8"	6'-10"	12.69	12.44	762
84"	16	7'-6"	10'-8"	1'-1"	6'-0"	11.38	11.13	687		84"	32	12'-9"	10'-8"	1'-5"	6'-0"	13.65	13.35	826		84"	48	10'-8"	2'-0"	13'-4"	6'-0"	7'-3"	14.15	13.87	849

15° Sk. Headwalls

30° Sk. Headwalls

45° Sk. Headwalls

*15° & 30° Sk. Headwalls,
X applies to both Lt.
& Rt. Wings.
45° Headwalls, X applies
to Lt. Wing and X' to
Rt. Wing.



Section A-A

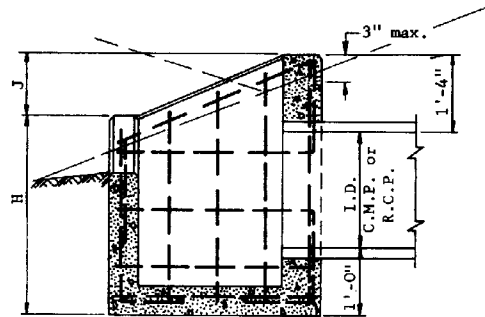
For other headwall dimensions, steel reinforcing, inlet bevel and other details not shown, see Std. C-14.20

For skewed installations, inlet and outlet headwall types are identical for equal embankment slopes.

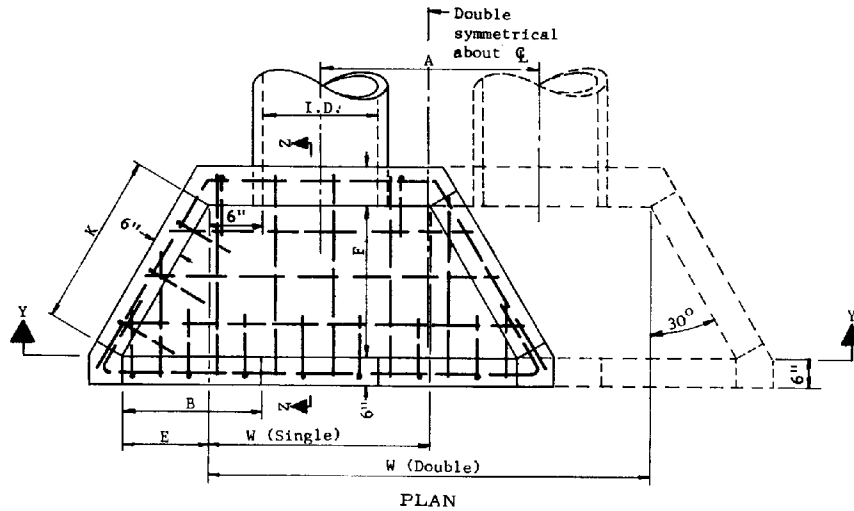
For inlet and outlet wingwall flare differences for headwalls normal to pipe, see Std. C-14.20

See Structures Section Standards for headwall design for pipes over 84" Dia.

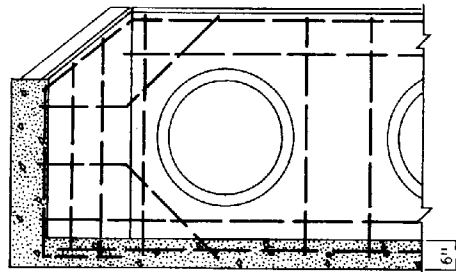
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/83
APPROVED FOR CONSTRUCTION <i>[Signature]</i>	HEADWALLS, 42" - 84" PIPE SKEWED	DRAWING NO. C-14.21



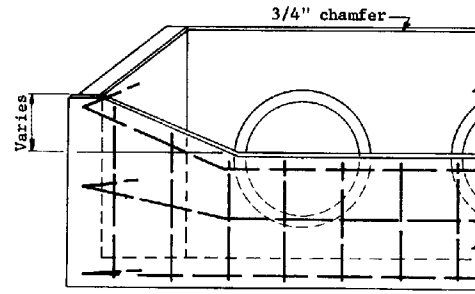
SECTION Z-Z



PLAN



SECTION Y-Y



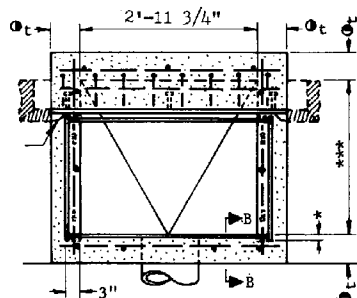
ELEVATION

GENERAL NOTES

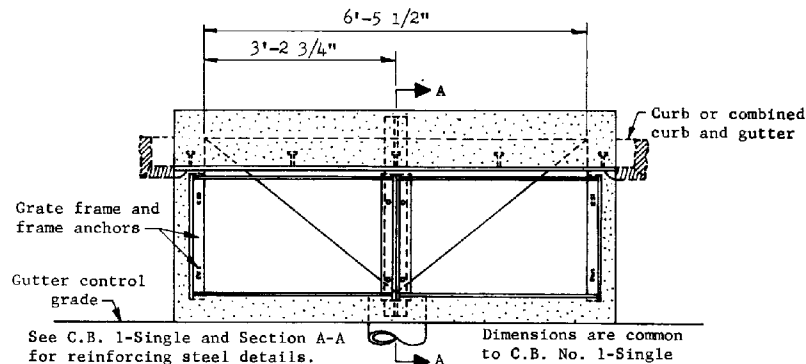
1. See also Std. C-13.10
2. High point of headwall shall not project more than 3" above slope.
3. All concrete shall be Class B
4. All reinforcing bars shall be number 4, 1'-0" c to c and 3" clear to inside of walls and floor.

PIPE I.D.	DIMENSIONS									QUANTITIES					
	W		A	B	E	F	H	J	K	CONC. C.Y.				REINF. STEEL	
	Single	Double								Single		Double		LBS.	
										C.M.P.	For Conc. Pipe Deduct	C.M.P.	For Conc. 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

DESIGN APPROVED	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR DISTRIBUTION	HEADWALL, DROP INLET	DRAWING NO. C-14.30

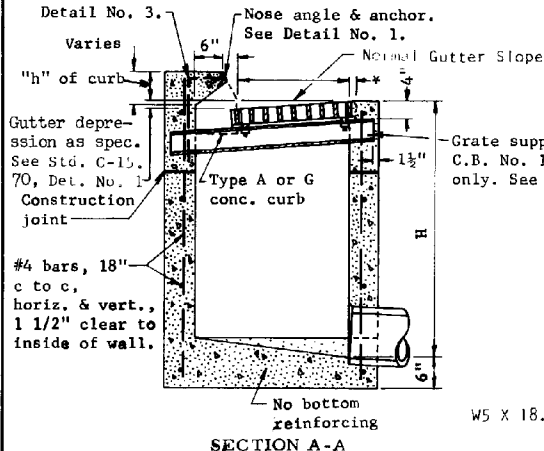


PLAN-CATCH BASIN TYPE 1 - SINGLE

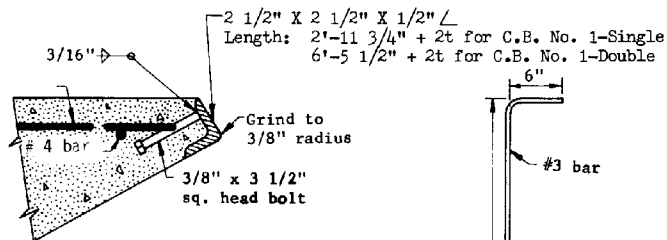


PLAN-CATCH BASIN TYPE 1 - DOUBLE

#3 bars, 6" c to c
1 1/2" clear to top
of nose section and
inside of wall. See
Detail No. 3.

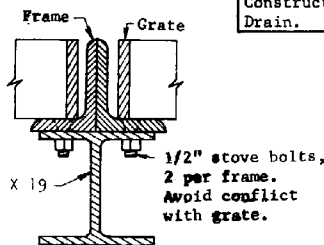


SECTION A-A

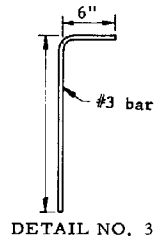


DETAIL NO. 1

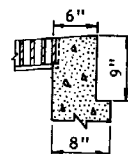
NOTE: Provide
Std. C-15.70
Construction
Drain.



DETAIL NO. 2



DETAIL NO. 3



SECTION B-B

Use this section
when t = 8"

GENERAL NOTES

Pipes can be placed in any wall.
Floor shall have a wood trowel finish and a
minimum 4:1 slope in all directions to outlet.

All structural steel shall be ASTM A 36.

Welding shall be in accordance with Std.
Welding Specifications.

Grate, frame, beam and nose angle shall be given
one shop coat of No. 1 paint.

Concrete shall be Class B

Construction joints and drains shall be placed
to meet field conditions. See Std. C-15.70

Any specified gutter depression shall be warped
to opening according to Std. C-15.70

Curb opening areas, sq. ft., for Type 1-Single
and Type 1-Double equal 0.25 and 0.54, respectively,
for each inch of "h" + gutter depression -2.35".
See Std. C-15.70

For grate and frame details and grate opening
areas, see Stds. C-15.50 & C-15.60

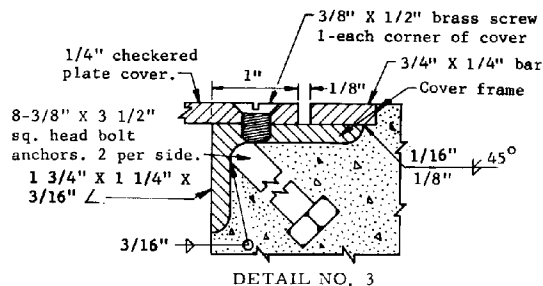
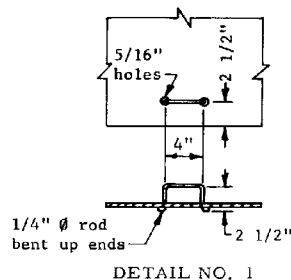
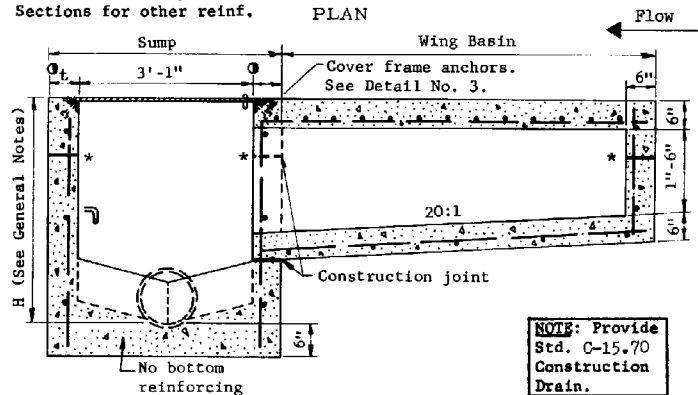
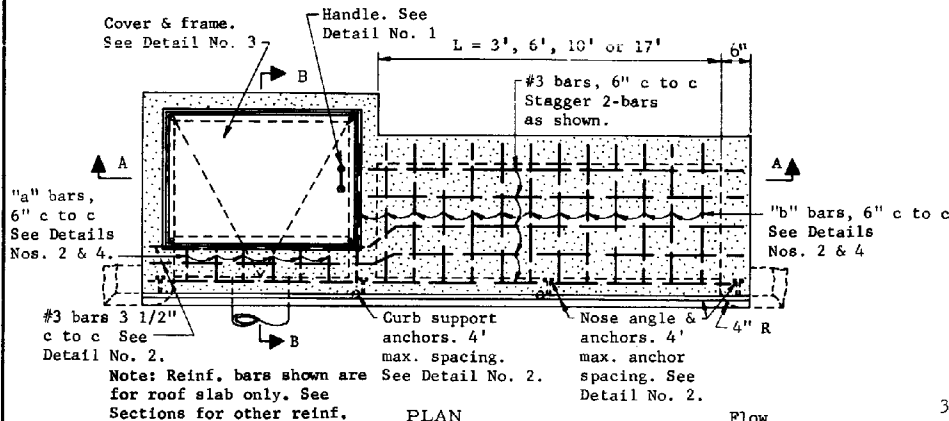
*3/4" for longitudinal and 3" for transverse
bar grates.

** 2'-0" for LW, LB, EF, TW and TB series 1
grates. 1'-6" for LW, LB, EF, TW and TB series 2
grates. Use 1'-6" with combined curb and gutter.

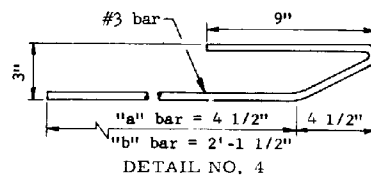
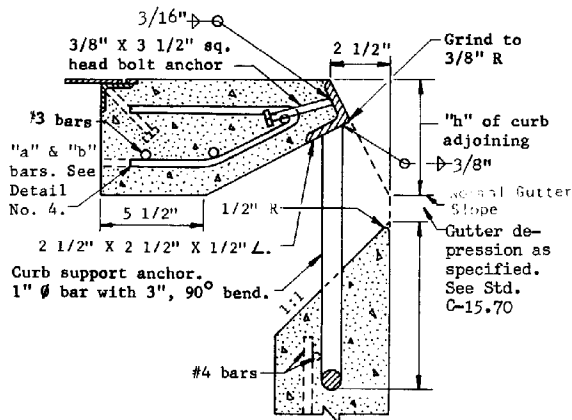
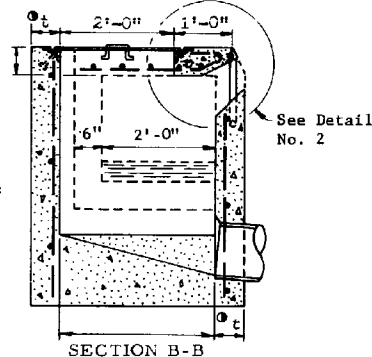
*** 2'-8 1/2" for LW, LB, TW and TB series 1
grates. 2'-2 1/2" for LW, LB, TW and TB series 2
grates.

● t=6" when H is 8' or less; 8" when H is
over 8'. See Sect. B-B.

DESIGN APPROVER: <i>W. A. H. H. H.</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 6/86
APPROVED FOR DISTRIBUTION <i>James A. H. H.</i>	CATCH BASIN, TYPE 1	DRAWING NO. C-15.10



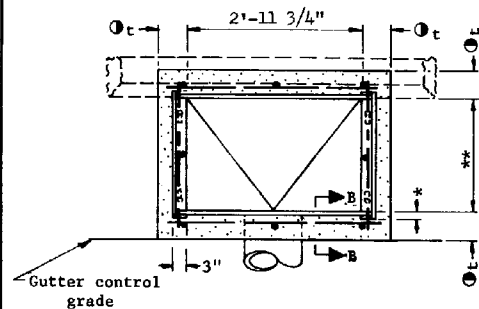
Miter frame sections 45°
butt weld and surface grind.



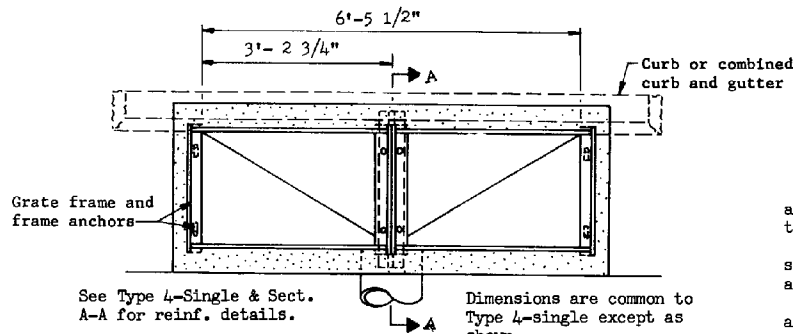
GENERAL NOTES

- Type 3 - Sump Only.
- Type 3-Wing(illustrated), sump with wing
basin upstream.
- Type 3-Double wing, sump with symmetrical
wing basin each side.
- Pipes can be placed in any wall except
wall adjacent to wing basin.
- Sump floor shall have a wood trowel finish
and a minimum slope of 4:1 in all directions
toward outlet pipe.
- Gutter depression shall be warped to open-
ing according to Std. C-15.70
- All structural steel shall be ASTM A 36.
- Nose angle, 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 Stan-
dard Welding Specifications.
- * Construction joints at or below bottom
of curb line. Construction joints and drains
shall be placed to meet field conditions. See
Std. C-15.70
- t = 6" when H = 8' or less
8" when H is greater than 8'.
- See Sect. B-B, Std. C-15.01.
- H = 2'-10" min. when L = 3'
3'-0" min. when L = 6'
3'-2" min. when L = 10'
3'-7" min. when L = 17'

DESIGN APPROVED <i>W. H. H. H.</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	6/86
APPROVED FOR DISTRIBUTION <i>James A. Smith</i>	ATCH BASIN, TYPE 3	DRAWING NO C-15.20

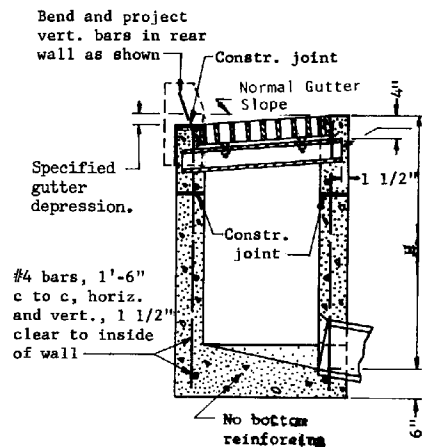


PLAN, CATCH BASIN TYPE 4 - SINGLE

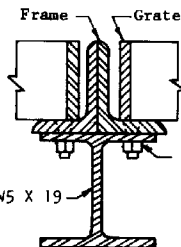


PLAN, CATCH BASIN TYPE 4 - DOUBLE

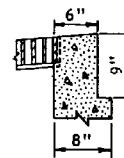
NOTE: Provide
Std. C-15.70
Construction
Drain.



SECTION A-A



DETAIL NO. 1



SECTION B-B
Use this section
when $t = 8"$

GENERAL NOTES

Pipes can be placed in any wall.

Sump floor shall have a wood trowel finish and a minimum slope of 4:1 in all directions toward outlet pipe.

Curb over catch basin shall not be constructed until catch basin concrete has set for a minimum of 24 hours.

For grate and frame details and opening areas, see Stds. C-15.50 & C-15.60.

Any specified gutter depression shall be warped to opening according to Std. C-15.70

All structural steel shall be ASTM A 36.

Grate, frame and beam shall be given one shop coat of No. 1 paint.

All concrete shall be Class B

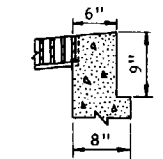
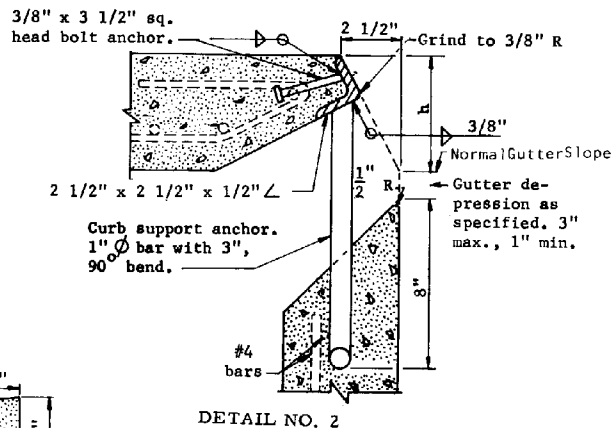
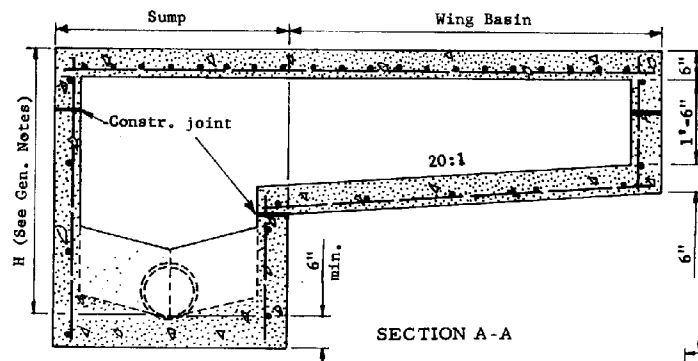
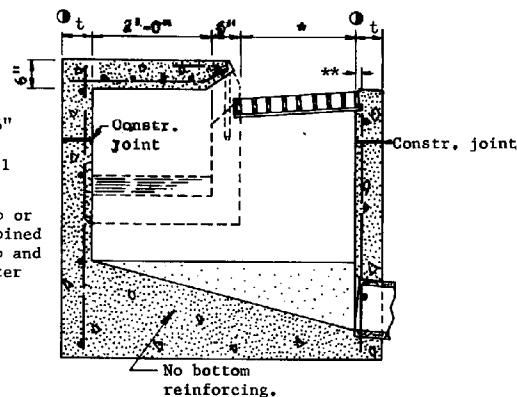
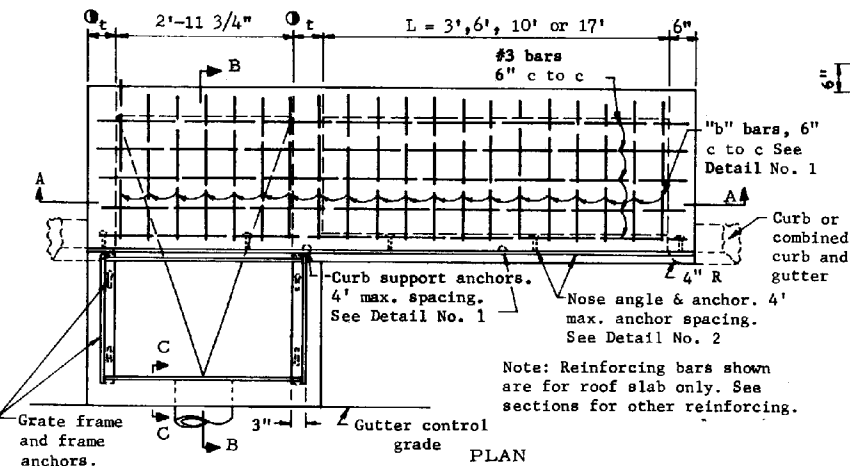
Construction joints & drains shall be placed to meet field conditions. See Std. C-15.70

* 3/4" for longitudinal and 3" for transverse bar grates.

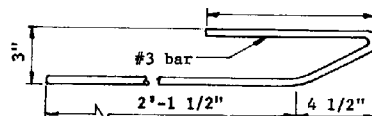
** 2'-0" for LW, LB, EF, TW and TB series 1 grates. 1'-6" for LW, LB, EF, TW and TB series 2 grates. Use 1'-6" with combined curb & gutter.

● $t = 6"$ when $H = 8'$ or less; 8" when H is greater than 8'. See Section B-B.

DESIGN APPROVED <i>H. O. Wakefield</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 6/86
APPROVED FOR DISTRIBUTION <i>James R. H. H.</i>	CATCH BASIN, TYPE 4	DRAWING NO. C-15.30



SECTION C-C
Use this section when t = 8"



GENERAL NOTES

- C.B. 5, sump only.
- C.B. 5 Single, (illustrated), sump with wing basin upstream.
- C.B. 5 Double, sump with symmetrical wing basins each side.
- Pipes can be placed in any wall except wall adjacent to a wing basin.
- Sump floor shall have a wood trowel finish and a minimum slope of 4:1 in all directions toward outlet pipe.
- Welding shall be in accordance with Std. Welding Specifications.
- Gutter depression shall be warped to opening according to Std. C-15.70
- All structural steel shall be in accordance with ASTM A 36.
- Nose angle shall be painted with one No. 1 shop coat.
- All concrete shall be Class B
- All reinforcing bars shall be #4, 18" 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 0.0834.

For grate and frame details and opening areas, see Stds. C-15.50 & C-15.60

Construction joints shall be placed to meet field conditions.

0t = 6" when H = 8' or less; 8" when H is greater than 8'. (See Section C-C)

* 2'-0" for LW, LB, EF, TW and TB series 1 grates. 1'-6" for LW, LB, EF, TW and TB series 2 grates. Use 1'-6" with combined curb and gutter.

** 3/4" for longitudinal and 3" for transverse bar grates.

H=3'-3" min. when L=3'

H=3'-5" min. when L=6'

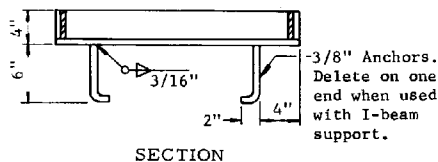
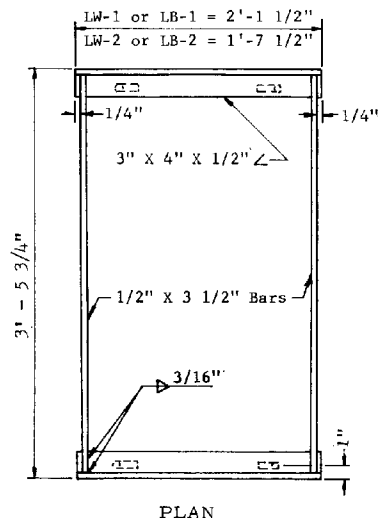
H=3'-7" min. when L=10'

H=4'-0" min. when L=17'

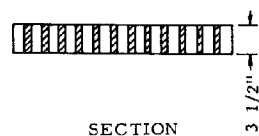
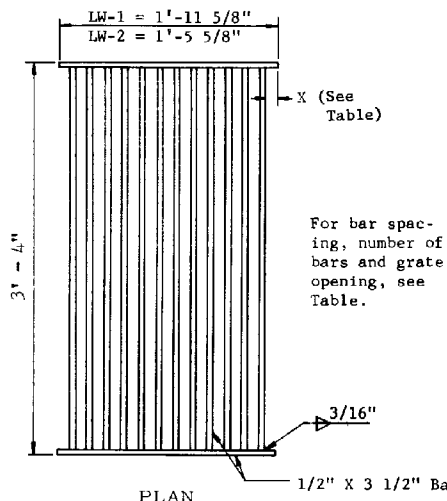
NOTE: Provide Std. C-15.70 Construction Drain.

DESIGN APPROVED <i>W. H. Hefner</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 6/86
APPROVED FOR DISTRIBUTION <i>James A. H.</i>	CATCH BASIN, TYPE 5	DRAWING NO C-15.40

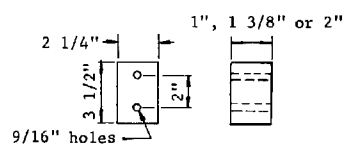
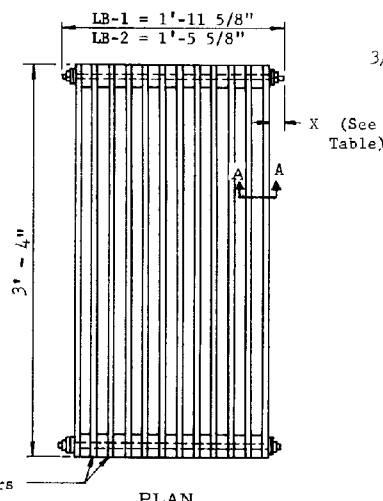
DETAIL NO. 1



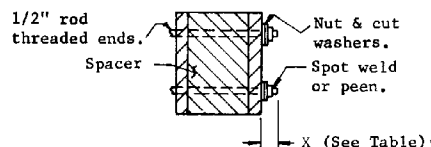
FRAME



GRATES TYPE LW & EF
Restrict to slopes
of 3% or less.

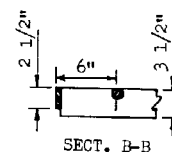
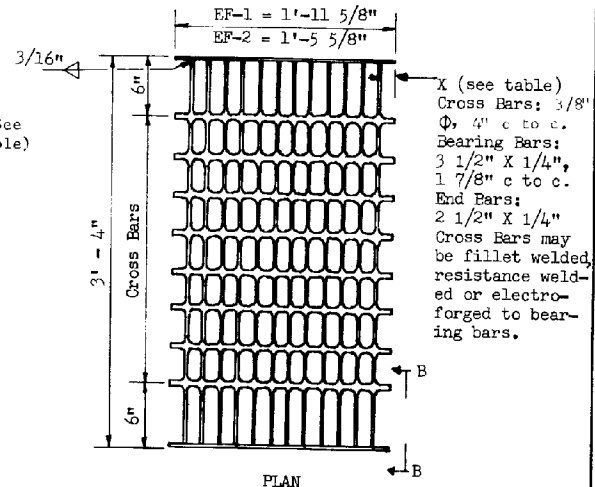


BAR SPACER DETAIL
Cast iron, cast steel or
steel bar stock.



GRATES TYPE LB

Use on longitudinal
grades in excess of 3%
or as an alternate to
Types LW or EF on grades
of 3% or less.



GENERAL NOTES

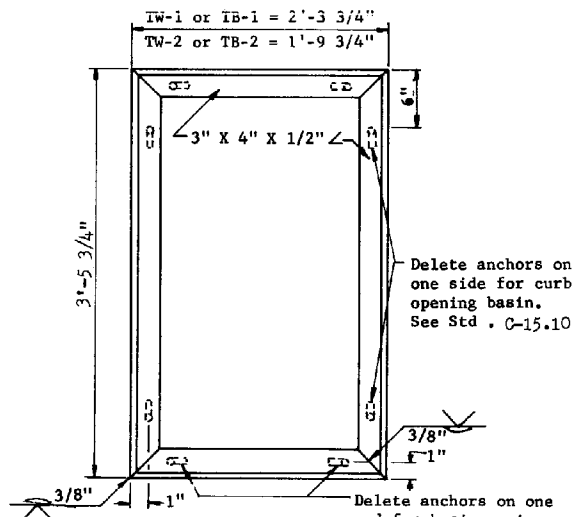
LW indicates longitudinal welded.
LB indicates longitudinal bolted.
EF indicates electroforged.
Grating units and frames shall
be fabricated from structural steel
ASTM A 36 except as noted.
All welding shall be in accordance
with Standard Welding Specifications.
The completed assembly shall be
given one shop coat of No. 1 paint.
Frames and grates shall fit to
a maximum rock of 0.093" at any point.

GRATE TYPE	CLEAR BAR SPACING	NO. BARS	X	GRATE OPENING SQ. FT.
LW or LB - 1.0	1"	16	5/16"	3.97
" " - 1.1	1 3/8"	13	5/16"	4.34
" " - 1.2	2"	9	1 9/16"	4.84
EF - 1	1 5/8"	13	7/16"	4.66
LW or LB - 2.0	1"	12	5/16"	2.98
" " - 2.1	1 3/8"	9	1 1/16"	3.35
" " - 2.2	2"	7	1 1/16"	3.60
EF - 2	1 5/8"	10	1/4"	3.48

DESIGN APPROVED
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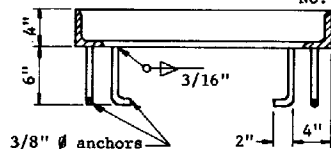
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS
CATCH BASIN, GRATES,
LONGITUDINAL BARS

REV
1/83
DRAWING NO.
C-15.50



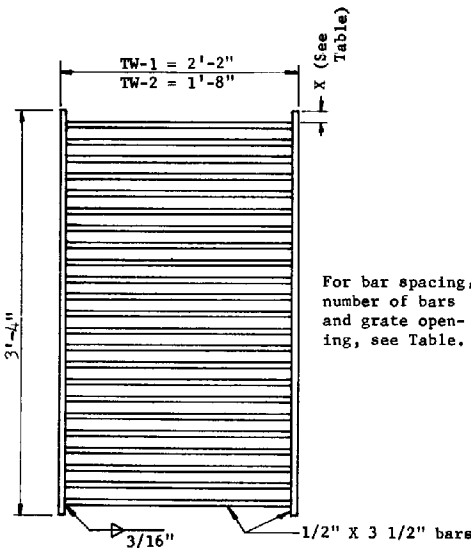
PLAN

Delete anchors on one end for basins using "I" beam grate support. See Std. C-15.10, Detail No. 2.

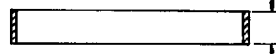


SECTION

FRAME

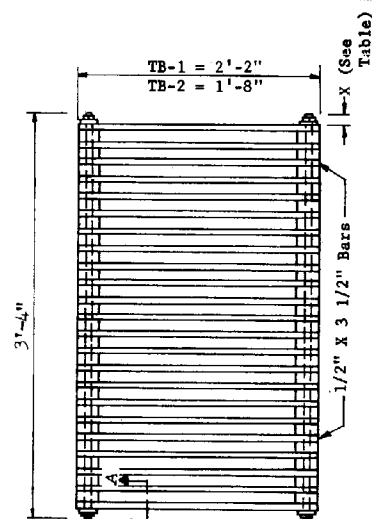


PLAN

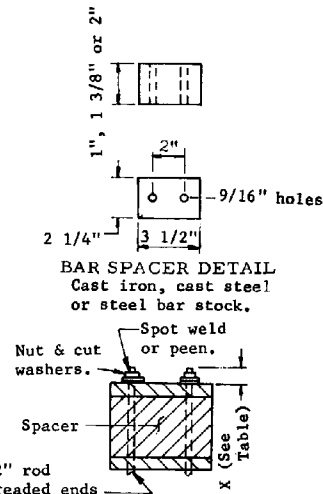


SECTION

GRATE TYPES TW-1 & TW-2



PLAN



SECTION A-A

GRATE TYPES TB-1 & TB-2

NOTE: See also Type EF grates, Std. C-15.50.

GENERAL NOTES

Grating units and frames shall be fabricated from structural steel except as noted. Structural steel shall be in accordance with ASTM A 36.

Welding shall be in accordance with Standard Welding Specifications.

The completed assembly shall be given one shop coat of No. 1 paint.

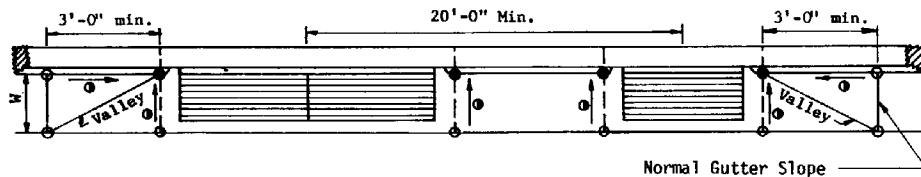
TW indicates transverse welded. TB indicates transverse bolted.

Frame and grate shall fit to a max. rock of 0.093" at any point.

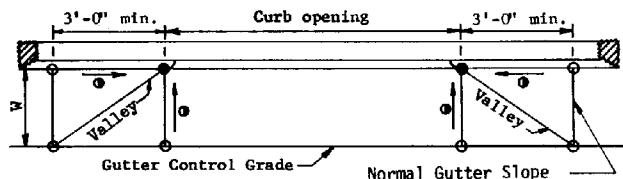
Restrict use to grades of 3% or less.

Type	Clear Spacing	No. Bars	X	Grate Opening Sq. Ft.
TW or TB-1.0	1"	26	1"	3.21
TW or TB-1.1	1 3/8"	21	1"	3.32
TW or TB-1.2	2"	16	1"	4.66
TW or TB-2.0	1"	26	1"	2.32
TW or TB-2.1	1 3/8"	21	1"	2.41
TW or TB-2.2	2"	16	1"	2.65

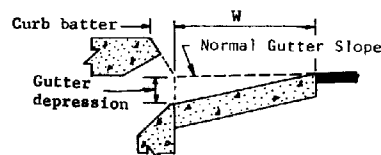
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	CATCH BASIN, GRATES TRANSVERSE BARS	DRAWING NO. C-15.60



GUTTER DEPRESSION AND SPACING
CATCH BASIN TYPES 1, 4 & 5



GUTTER DEPRESSION
CATCH BASIN TYPE 3

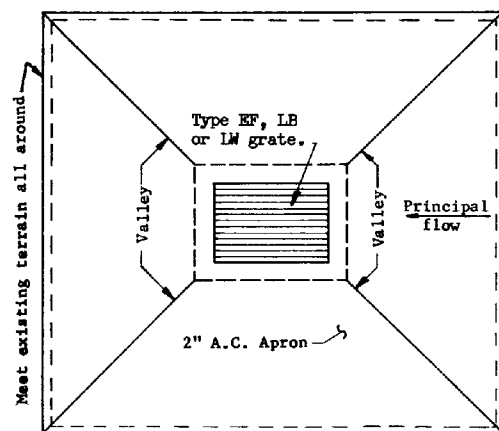


DETAIL NO. 1

LEGEND

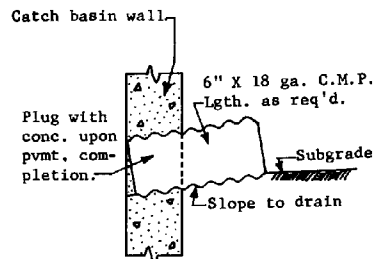
Gutter depression: 3" max. (See Detail No. 1)
○ = Normal pavement or gutter flow line elev.
● = Depressed elevation.

▬ = Straight grade with downward slope.
W = Normal gutter width per Std. C-05.10



CATCH BASIN TYPE 4
(Off roadway location)

Apron shall be shaped to suit local conditions and shall extend a minimum of 4'-0" from edge of grate in all directions. Grate shall be depressed a minimum of 4" below surrounding terrain and bearing bars shall parallel direction of principal flow.

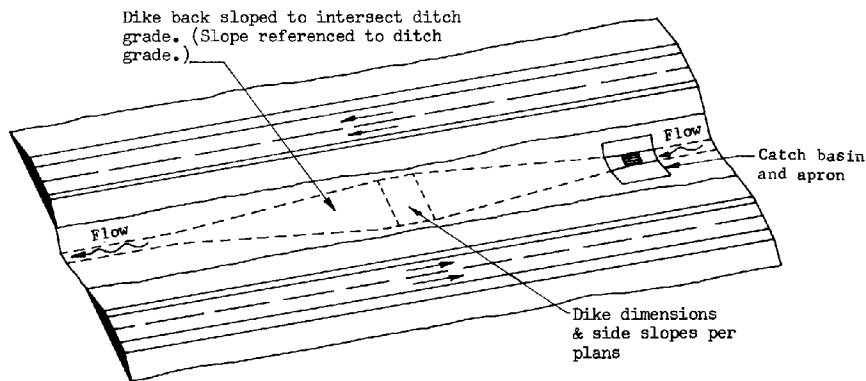


CATCH BASIN
CONSTRUCTION DRAIN
Drain may be deleted at
option of Engineer

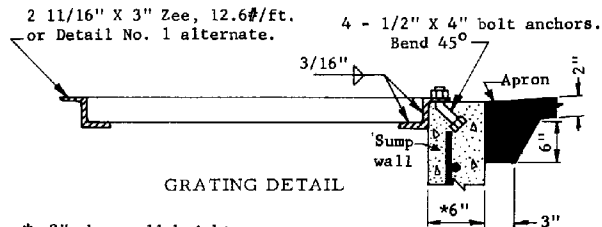
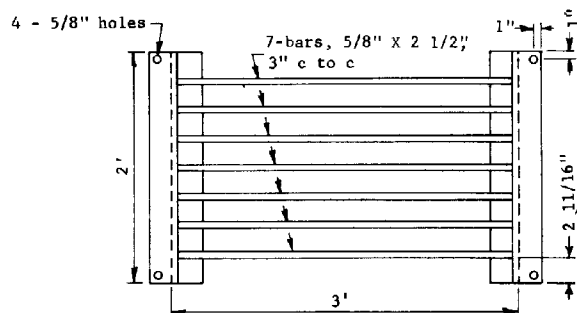
GENERAL NOTES

No gutter depression shall extend into a traffic lane.

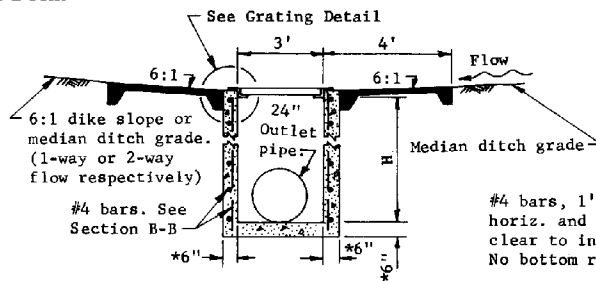
DESIGN APPROVED <i>W. H. H. H.</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 6/86
APPROVED FOR DISTRIBUTION <i>James A. H. H.</i>	CATCH BASIN MISC. DETAILS	DRAWING NO C-15.70



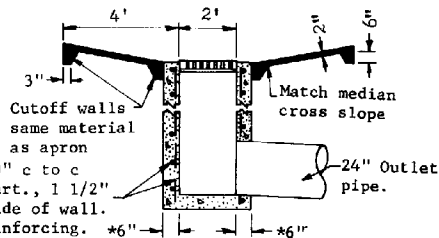
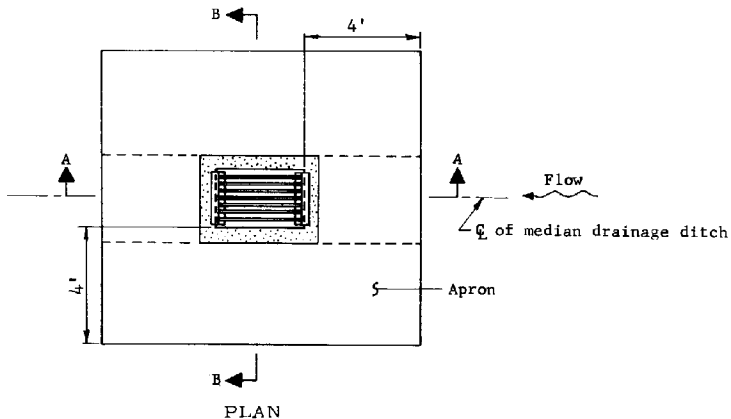
PLAN PERSPECTIVE
ILLUSTRATING 1-WAY FLOW WITH DYKE



GRATING DETAIL



SECTION A-A



SECTION B-B

GENERAL NOTES

Apron shall be A.C. or P.C. concrete as specified on Plans. Concrete shall be Class B.

Grating shall be fabricated of structural steel.

Structural steel shall be in accordance with ASTM A 36.

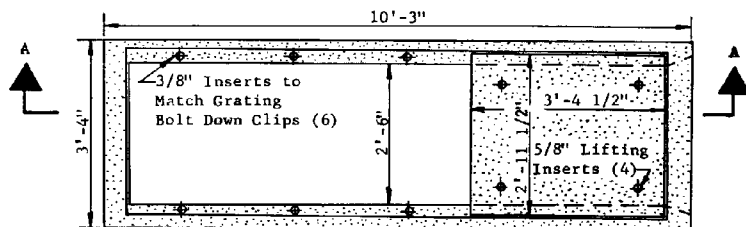
Welding shall be in accordance with Standard Welding Specifications.

Grating assembly shall be given one shop coat of No. 1 paint.

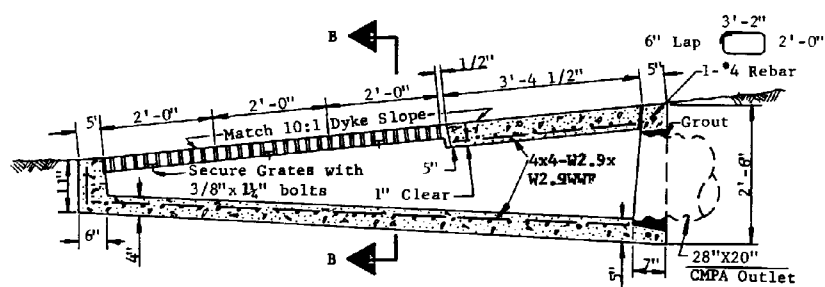
"H" indicated on Plans.

DETAIL NO. 1

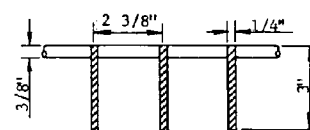
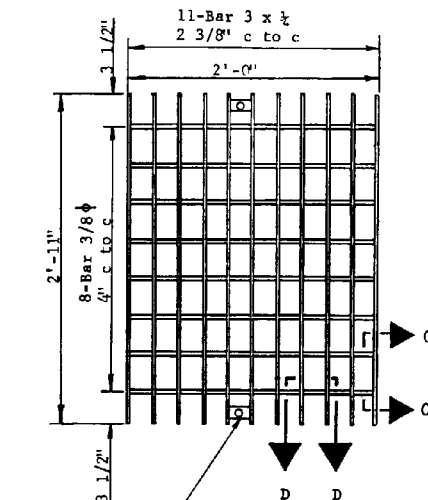
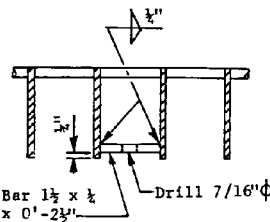
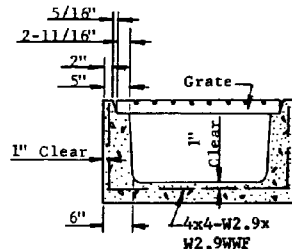
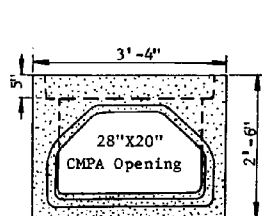
DESIGN APPROVED <i>[Signature]</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV. 1/83
APPROVED FOR DISTRIBUTION <i>[Signature]</i>	CATCH BASIN, MEDIAN FLUSH	DRAWING NO. C-15,80



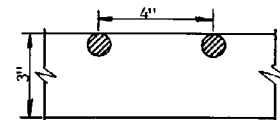
PLAN



SECTION A-A



SECTION D-D



SECTION C-C

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.
5. Foundation soil and backfill shall be compacted to not less than 95% of the maximum density determined in accordance with the requirements of the Materials Testing Manual of the Materials Services.

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DIVISION OF HIGHWAYS
STANDARD DRAWINGS

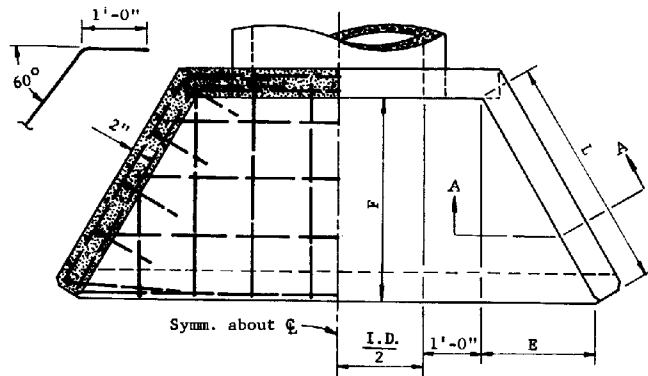
CATCH BASIN, MEDIAN DYKE,
PRECAST

REV

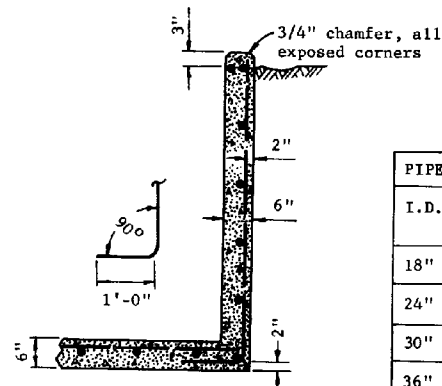
6/86

DRAWING NO

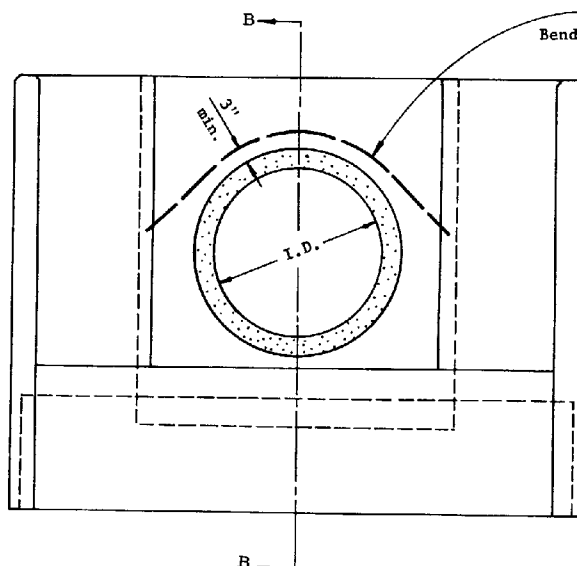
C-15.90



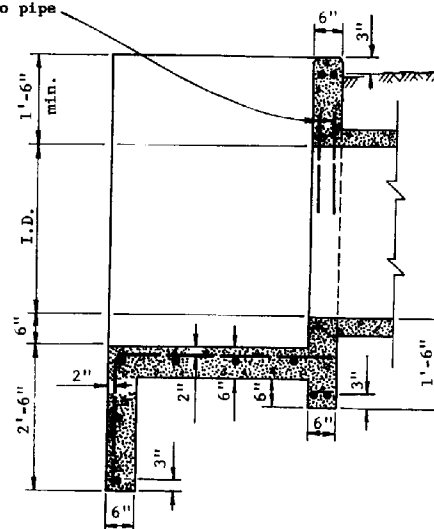
PLAN



SECTION A-A



ELEVATION



SECTION B-B

PIPE I.D.	DIMENSIONS			QUANTITIES		
	L	E	F (Approx)	C.Y. Conc. C.M.P. R.C.P.		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

GENERAL NOTES

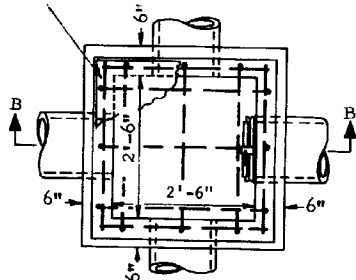
All concrete shall be Class B.

All reinforcing bars shall be #4 except two #6 bars over pipe. Bar spacing approximately 1'-0" c to c unless otherwise noted.

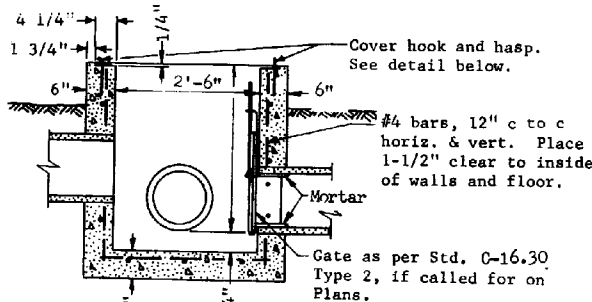
30° wing wall flare shown; 45° normally desirable. See Hydraulics and Utility & R.R. Engr. Divisions.

DESIGN APPROVED <i>James F. King</i>	STATE OF ARIZONA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS STANDARD DRAWINGS	REV 1/83
APPROVED FOR DISTRIBUTION <i>E. J. ...</i>	IRRIGATION HEADWALLS 18" TO 60" DIAMETER PIPES	DRAWING NO. C-16.10

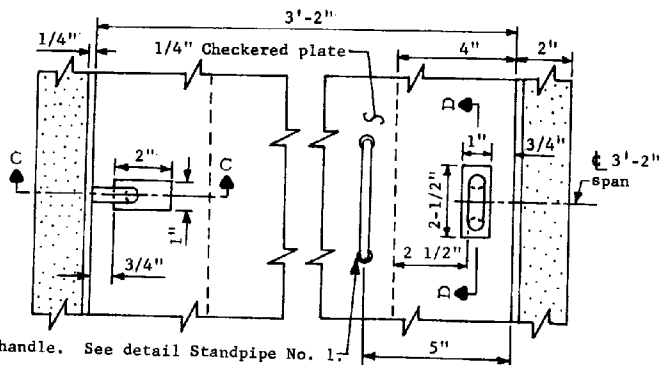
Cover. See detail below.



PLAN

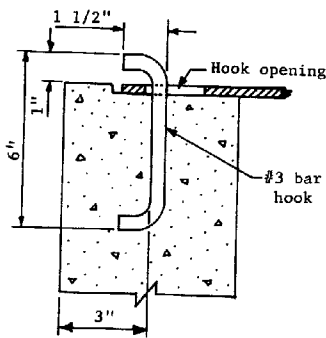


SECTION B-B

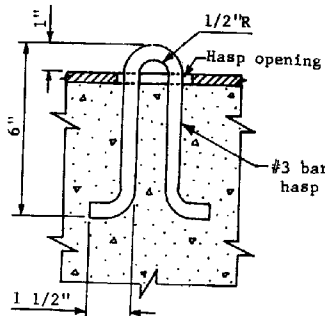


Lift handle. See detail Standpipe No. 1.

PLAN-LOCKING COVER



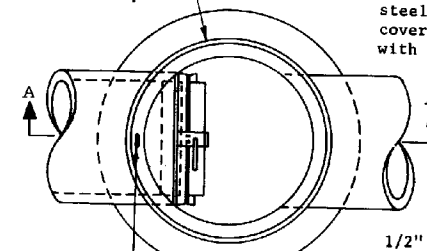
SECTION C-C



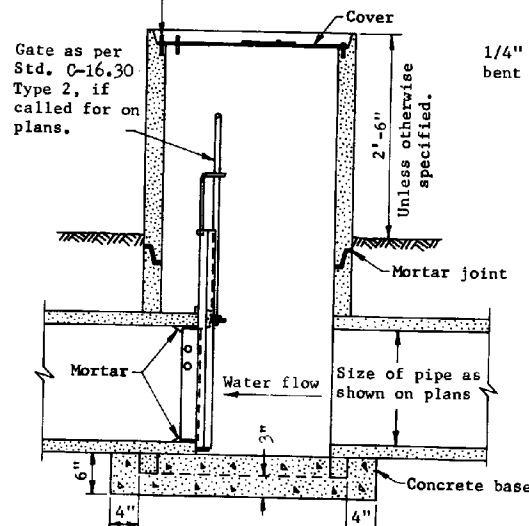
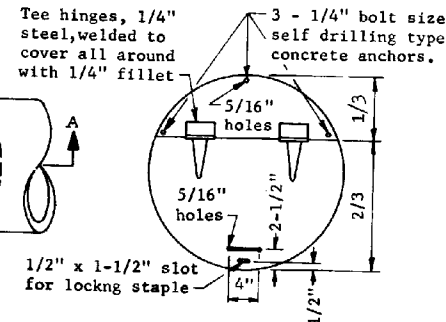
SECTION D-D

IRRIGATION STANDPIPE NO. 2

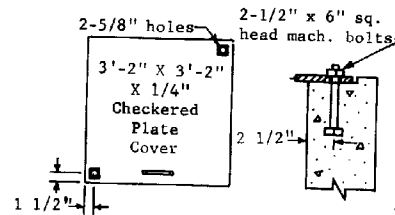
R.C. Pipe; size as shown on plans



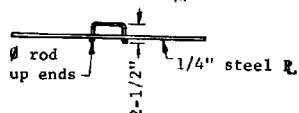
PLAN



SECTION A-A
IRRIGATION STANDPIPE NO. 1



BOLTED COVER FOR
STANDPIPE NO. 2



COVER FOR NO. 1
STANDPIPE

GENERAL NOTES
All concrete shall be Class B.
Structural steel shall be in accordance with ASTM A 36.
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 & Railroad Engineering Div.

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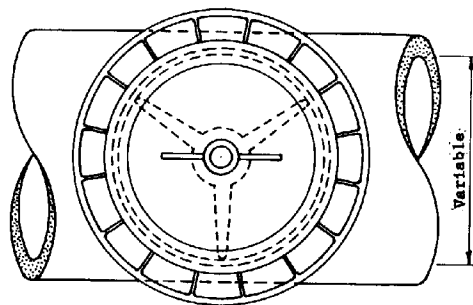
STATE OF ARIZONA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STANDARD DRAWINGS

REV.

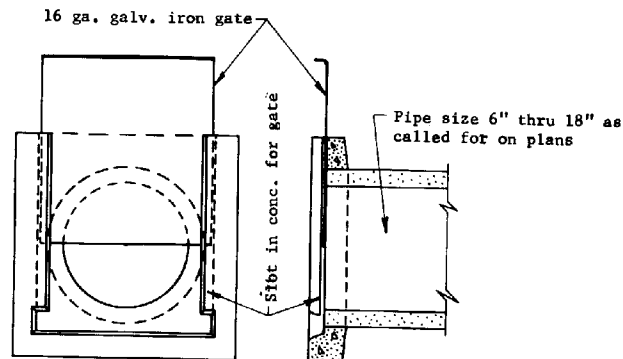
1/83

IRRIGATION STANDPIPES

DRAWING NO
C-16.20



PLAN



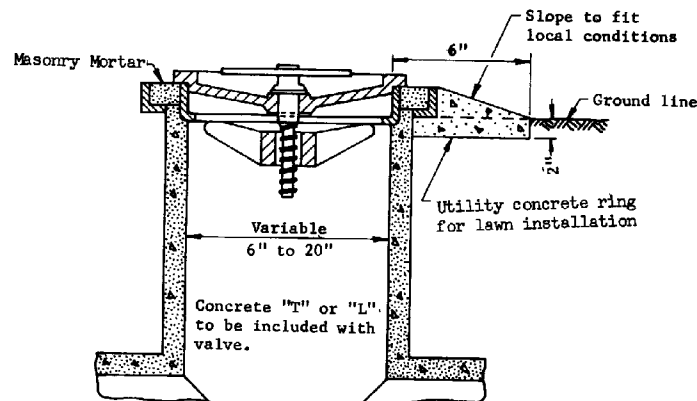
ELEVATION

SECTION

PRECAST IRRIGATION GATE:

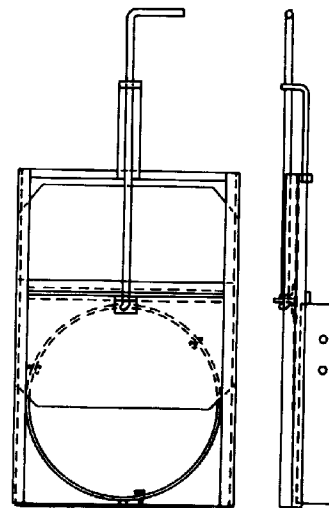
For open ditch installation

TYPE 1



Irrigation Valve Number of valve shall correspond to the size of the pipe in inches. No. 6 to No. 20.

PART SECTION
FLUSH IRRIGATION VALVE



ELEVATION

SECTION

IRRIGATION GATE

For standard installation

TYPE 2

TYPE 2

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

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STANDARD DRAWINGS

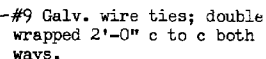
REV.

1/83

DRAWING NO.

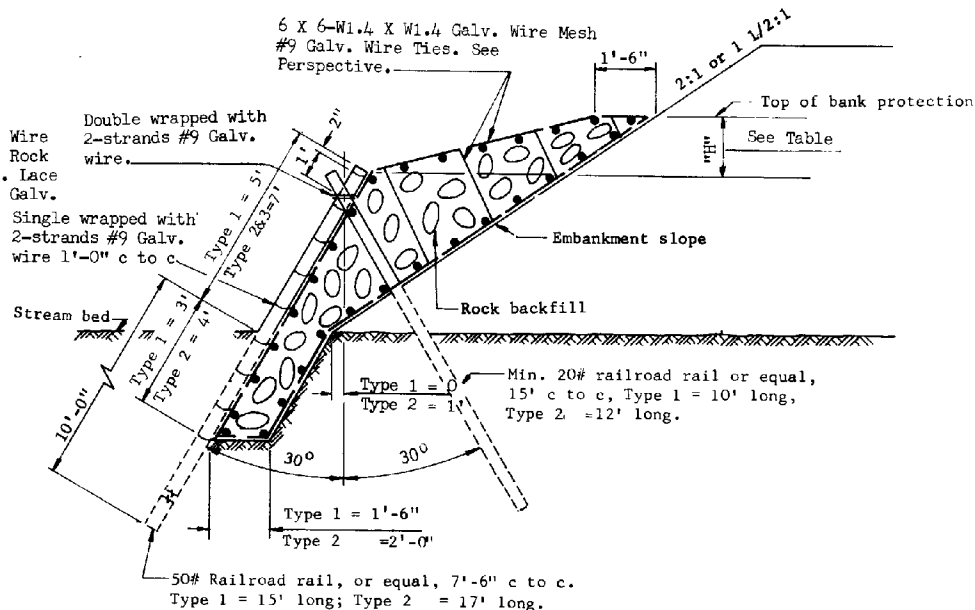
C-16.30

IRRIGATION VALVE & GATE



Drawn For Types 1 & 2. Type 3 Similar

6 X 6-W1.4 X W1.4 Galv. Wire
Mesh #9 Galv. Wire Ties. See
Perspective.



TYPE 1, 2 BANK PROTECTION

GENERAL NOTES

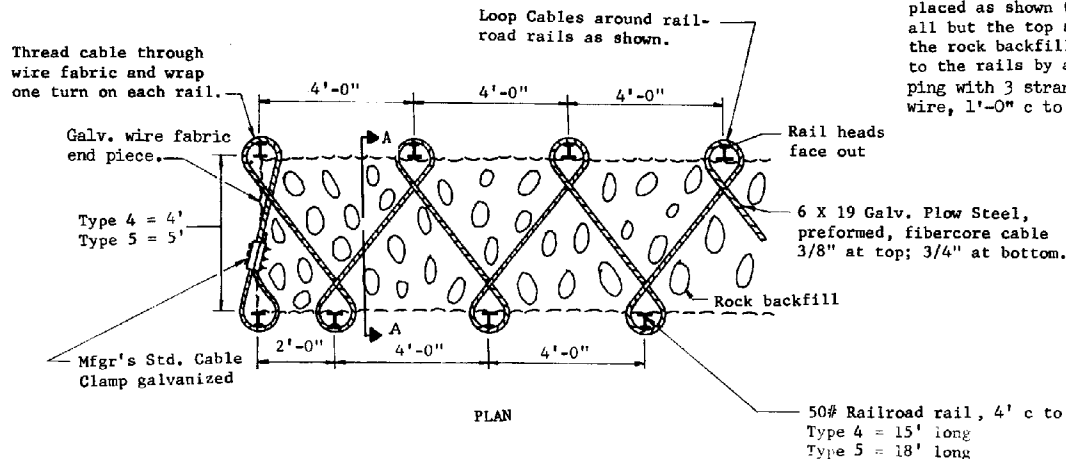
Rock shall be sound and durable, of rounded or angular shape and with a nominal diameter of 8" min. and 12" max. Flat or needle shapes are not acceptable.

Wire mesh splice shall have 6" min.
lap vertically and horizontally.

TYPE	*EMBANKMENT SLOPE RATE	"H"	TOP OF BANK PROTECTION ABOVE STREAM BED
3	2:1 or 1 1/2:1	0' to 2'	2' to 4'
1	2:1 or 1 1/2:1	0' to 3'	4' to 7'
2	2:1 or 1 1/2:1	0' to 6'	6' to 12'

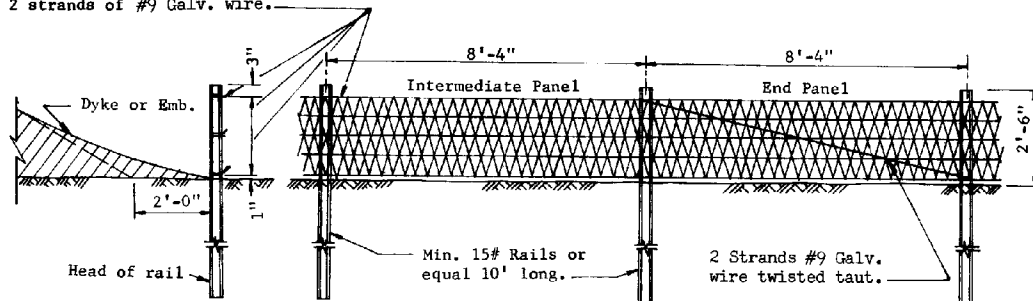
*When other embankment slope rates are encountered, warp to 2:1 or 1 1/2:1; that is warp 1:1 slope to 1 1/2:1.

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APPROVED FOR DISTRIBUTION <i>James E. H. H.</i>	BANK PROTECTION, RAIL TYPES 1, 2 & 3	DRAWING NO. C-17.10	



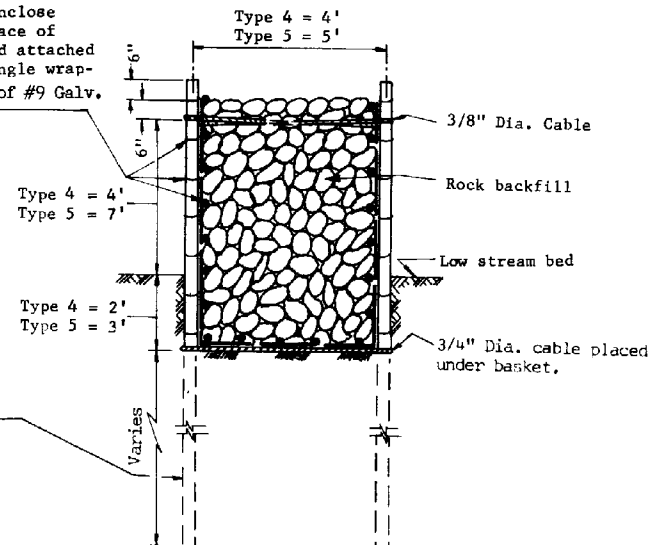
TYPES 4 & 5 BANK PROTECTION

2" X 4" Δ galv. woven wire fabric; horizontal wires shall be 2 strands, twisted, min. 12 1/2 ga; diagonal wires min. 14 ga. Attach to rails as shown by single wrapping with 2 strands of #9 Galv. wire.



TYPE 6 BANK PROTECTION

6 X 6-W1.4 X W1.4 Galv. Wire fabric placed as shown to enclose all but the top surface of the rock backfill and attached to the rails by a single wrapping with 3 strands of #9 Galv. wire, 1'-0" c to c.



SECTION A-A

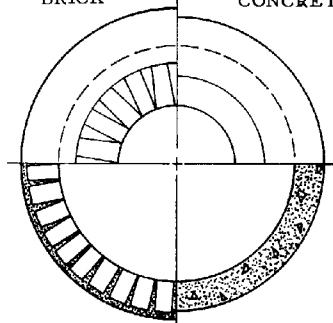
GENERAL NOTES

Rock shall be sound and durable, of rounded or angular shape and with a nominal diameter of 8" min. and 21" max. Flat or needle shapes are not acceptable. Rock shall be comprised of 50% min. 8" to 12" and 5% max. 18" to 21".

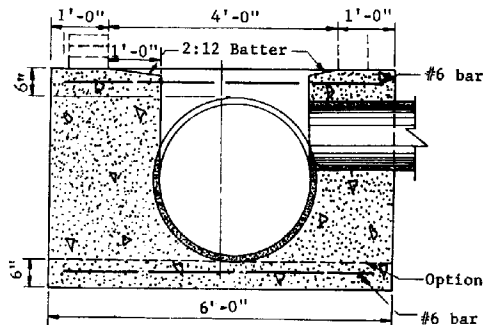
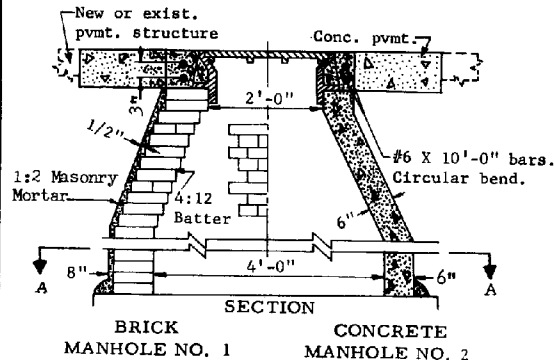
Wire mesh splice shall have 6" min. lap vertically and horizontally.

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APPROVED FOR DISTRIBUTION	BANK PROTECTION, RAIL TYPES 4, 5 & 6	DRAWING NO. C-17.20

HALF PLAN
BRICK CONCRETE

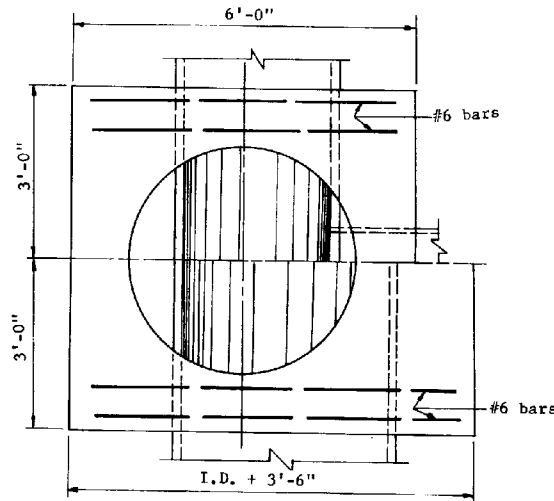


SECTION A-A

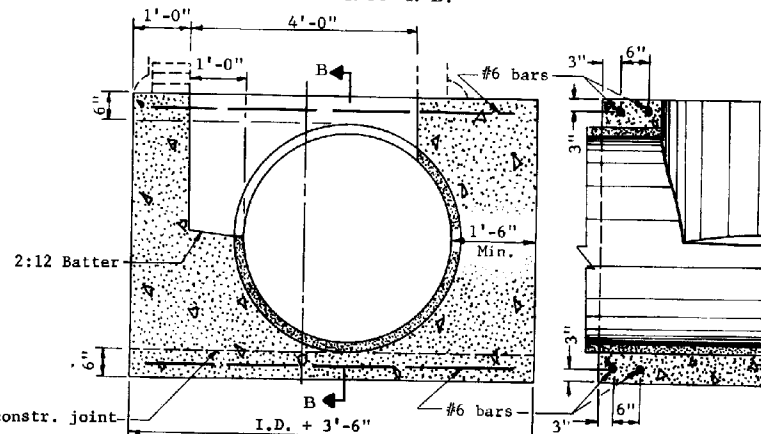


SECTION
STANDARD BASE STRUCTURE
FOR PIPES 6" TO 36" I.D.

HALF PLAN
PIPES 36" I. D. & SMALLER



HALF PLAN
PIPES OVER 36" I. D.

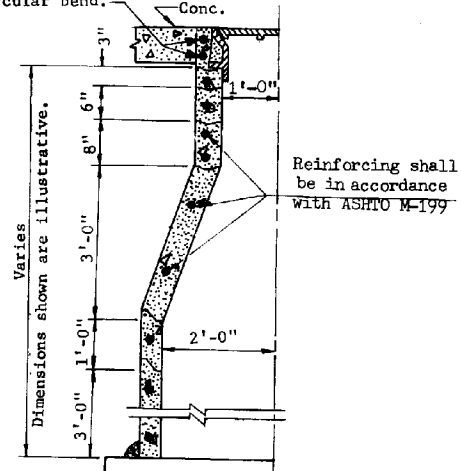


SECTION
STANDARD BASE STRUCTURE
FOR PIPES OVER 36" I. D.

GENERAL NOTES

1. Precast Manholes shall conform to the requirements of AASHTO M 199 except that the compressive strength of each unit will be determined and accepted in accordance with Section 1006.7 of the ADOT Specifications.
2. Concrete for all other manholes shall be Class B.
3. Every fifth course of bricks in Manhole No. 1 shall be laid as stretchers.
4. For manhole cut and replacement of bituminous or concrete pavement see Std. C-7.30.
5. For Std. C-18.20 frame and cover type, see Plans.

#6 X 10'-0" bars.
Circular bend.



HALF SECTION
MANHOLE NO. 3
PRECAST REINFORCED CONCRETE

PART SECTION
B-B

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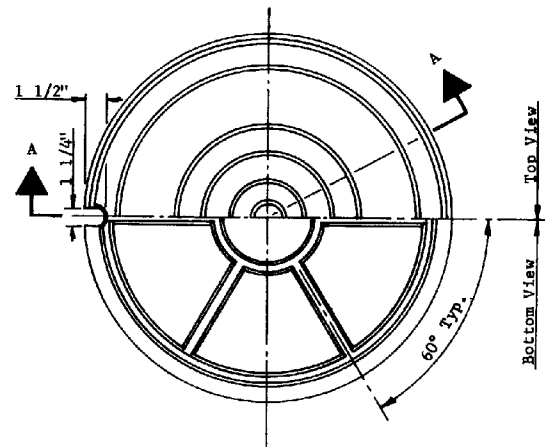
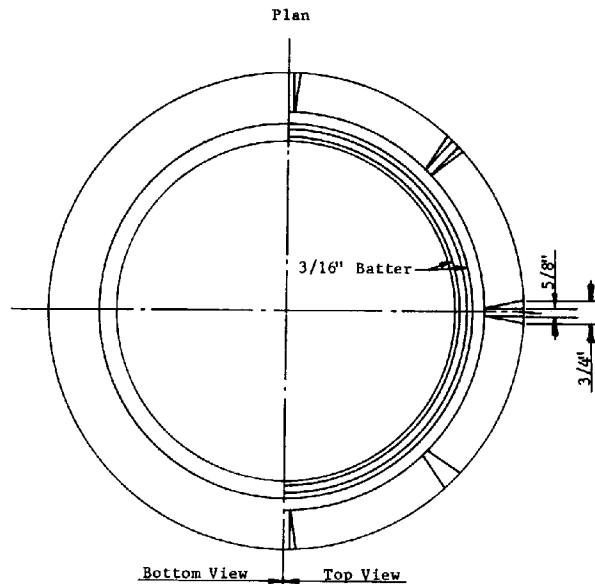
REV.

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MANHOLE DETAILS

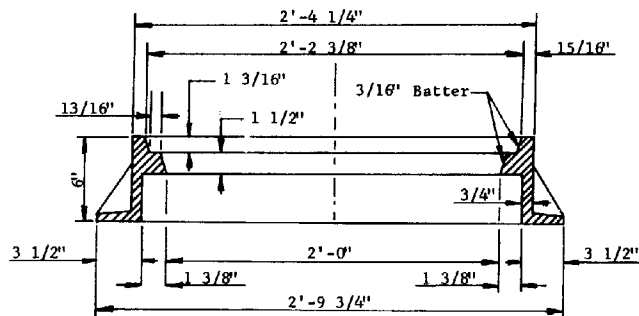
DRAWING NO.

C-18.10



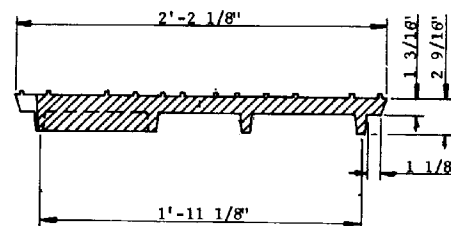
GENERAL NOTES

1. H 20 Loading minimum
2. Detail shown is typical.
3. Alternate design of Manhole frame and cover may be utilized with the approval of the Engineer, as long as minimum loading and weight are equivalent.



Section

FRAME
APPROX. WT. 200 LBS.



Section A-A

COVER
APPROX. WT. 200 LBS.

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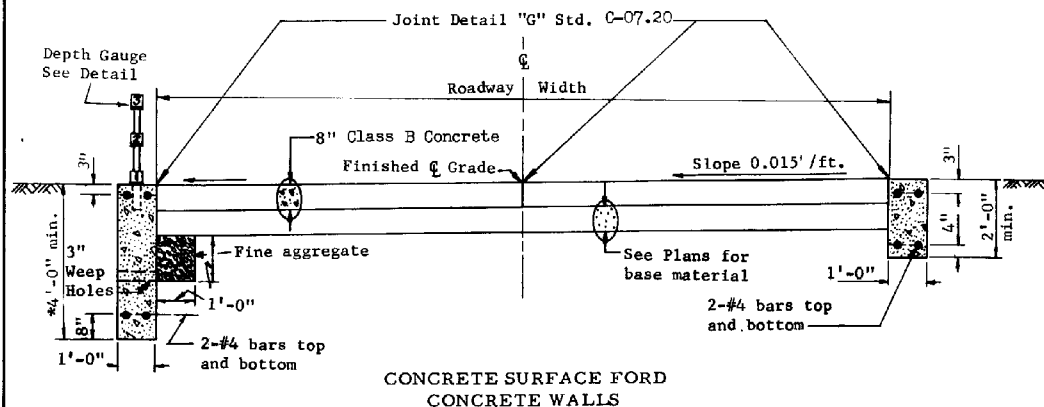
MANHOLE FRAME & COVER

REV.

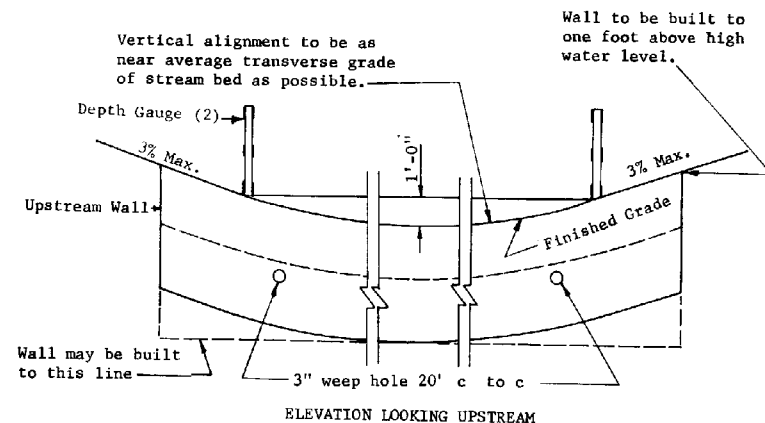
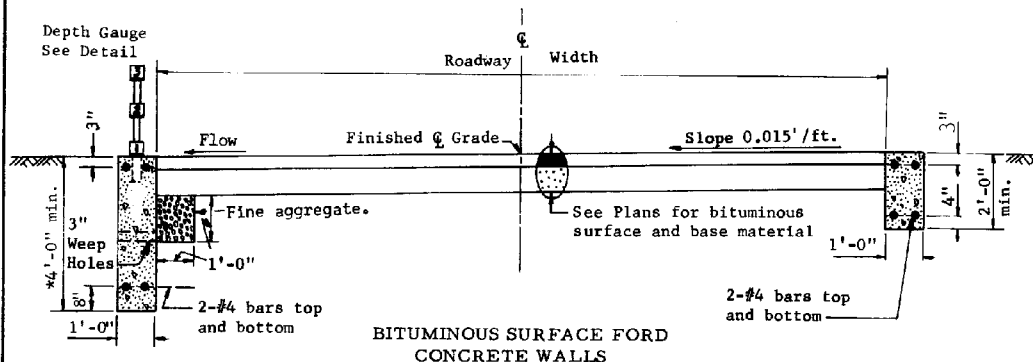
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DRAWING NO.

C-18.20



*Min. Distance
Below Stream Bed

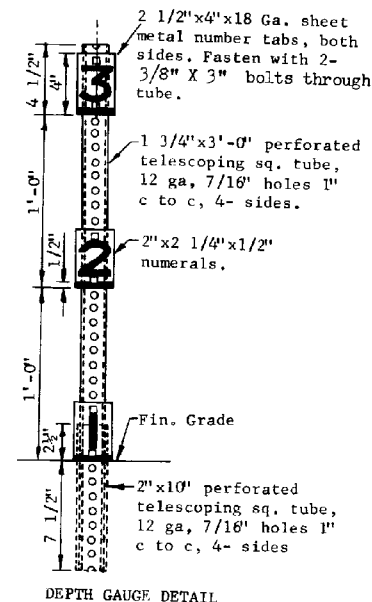


GENERAL NOTES

Ford walls shall be Class B concrete.

Depth Gauge tubing shall be protected against concrete entering through bottom or perforations.

Depth Gauge tubing and both sides of numeral tabs shall be painted 2- coats white enamel. Numerals and markers shall be 1- coat Gloss black enamel



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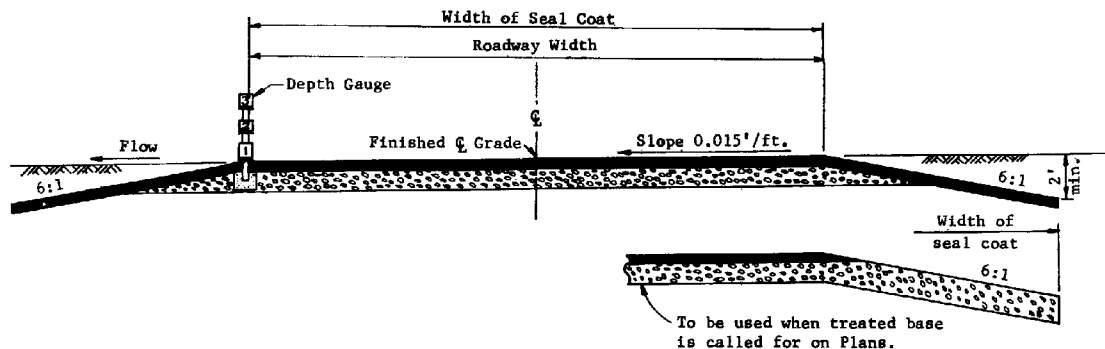
REV

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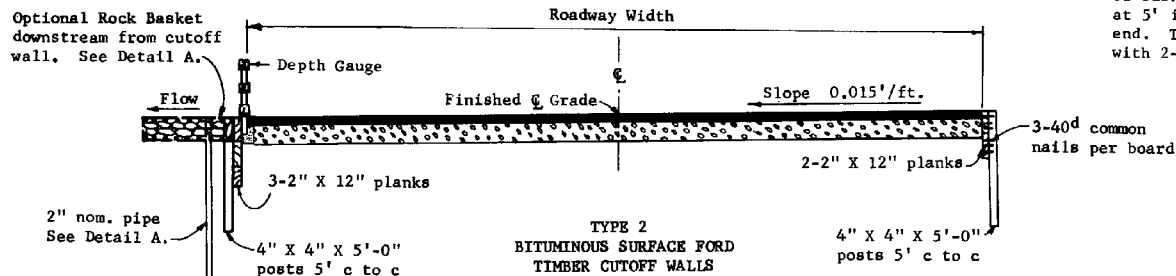
FORD - CONCRETE WALLS

DRAWING NO.

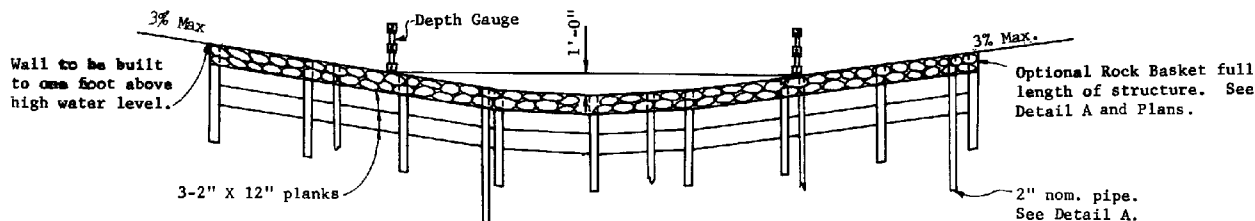
C-19.10



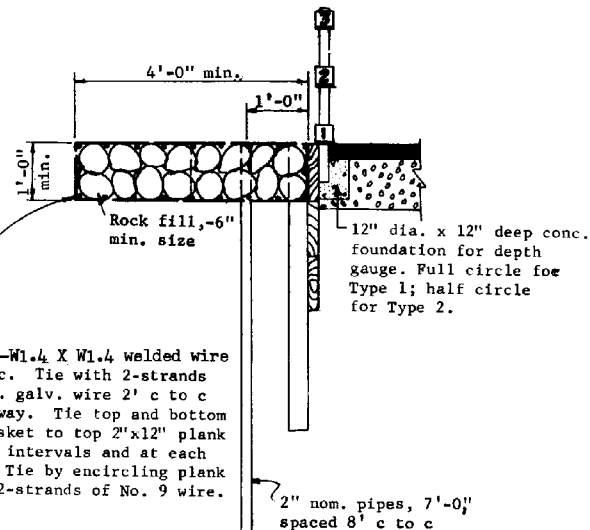
TYPE 1
BITUMINOUS SURFACE FORD



TYPE 2
BITUMINOUS SURFACE FORD
TIMBER CUTOFF WALLS



ELEVATION - TYPE 2



DETAIL A

GENERAL NOTES

All timber shall be rough, pressure treated and unpainted.

Rock basket, full length of structure, shall be included only when called for on Plans.

See Plans for bituminous surface and base material details.

See Std. C-19.10 for Depth Gauge details.

Depth Gauge foundation may be utility concrete.

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James H. Ray

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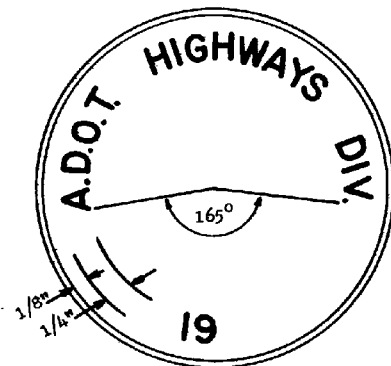
REV

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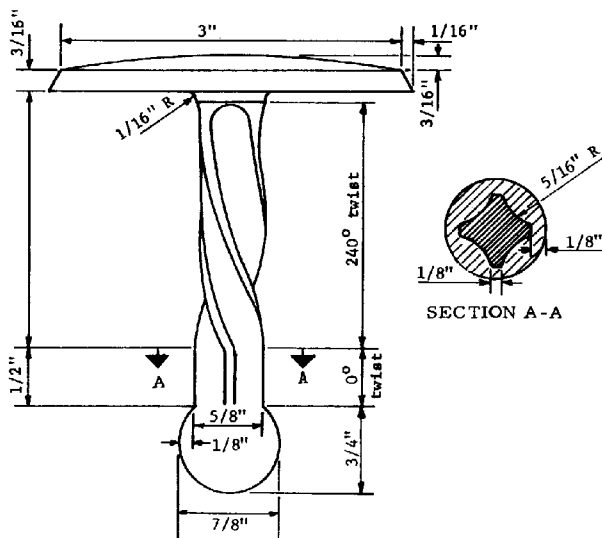
FORDS - TYPES 1 & 2

DRAWING NO.

C-19.20



PLAN



SECTION A-A

ELEVATION
STANDARD MARKER

For use as bench, survey
monument and R/W markers

GENERAL NOTES

Standard marker shall be made of
brass, bronze or aluminum.

Standard marker will be furnished
by the Department.

Bench marks will be established by
the Engineer on headwalls, bridge curbs
or other permanent structures.

Aluminum marker shall not be used
when calcium chloride is used in the
concrete.

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James P. [Signature]

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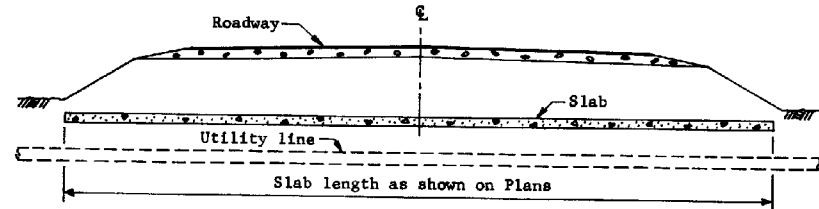
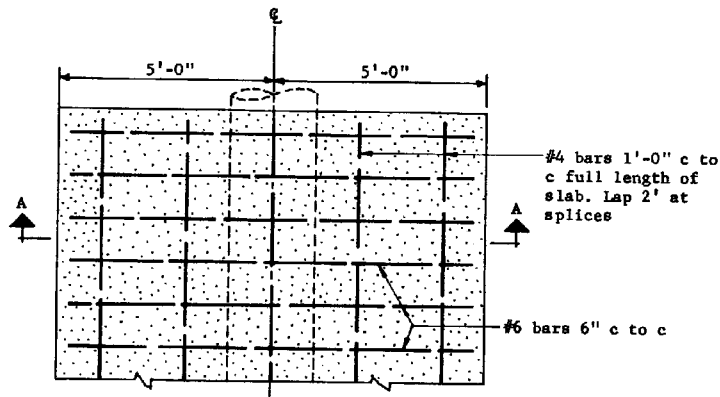
STANDARD MARKER

REV

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DRAWING NO

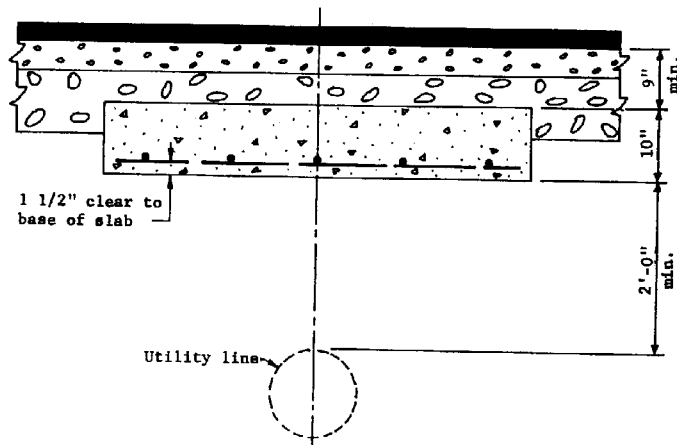
C-21.20



CROSS SECTION

FOR SINGLE INSTALLATION

Quantities per ft. of slab length	
Concrete	Reinforcing Steel
0.31 C.Y.	35.22 lbs.



SECTION A-A

GENERAL NOTES
Concrete shall be Class B

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UTILITY LINE, PROTECTIVE
CONCRETE SLAB

DRAWING NO.
C-22.10