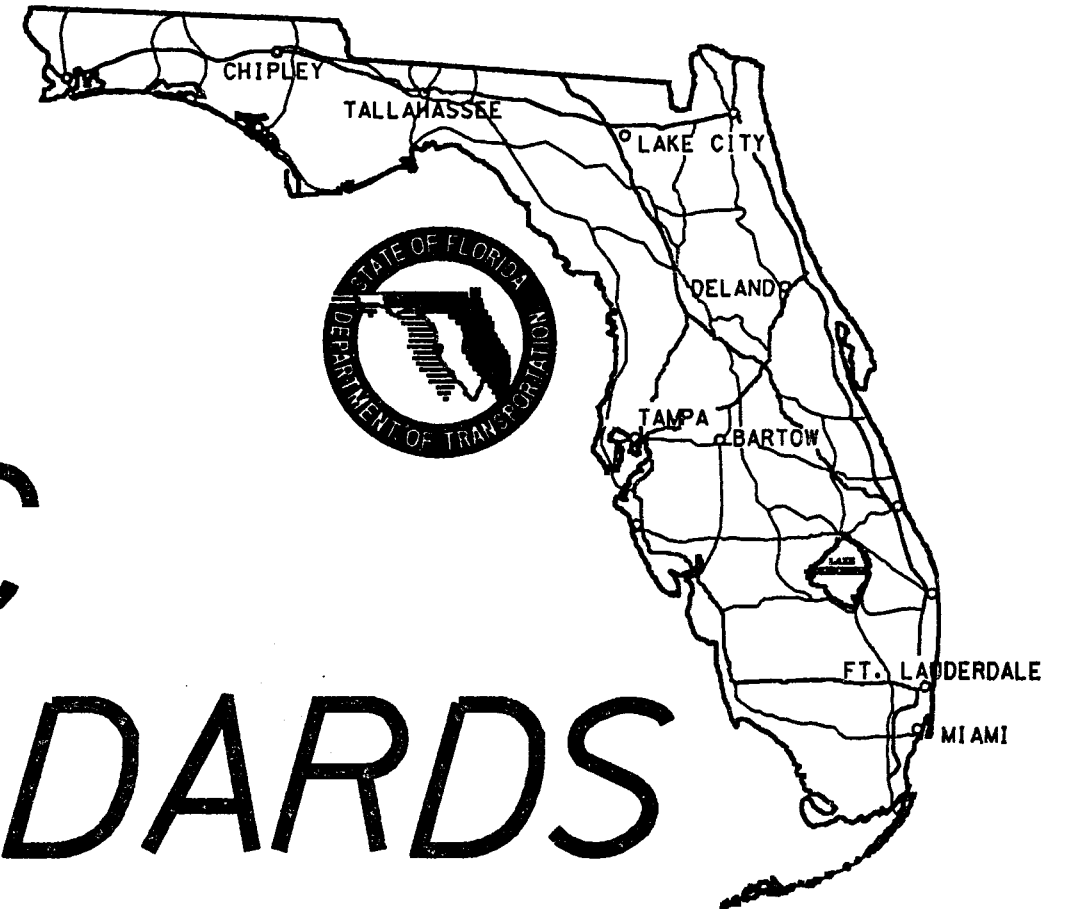


ROADWAY AND TRAFFIC DESIGN STANDARDS

*FOR DESIGN, CONSTRUCTION, MAINTENANCE AND UTILITY OPERATIONS FOR
STREETS AND HIGHWAYS ON STATE MAINTAINED SYSTEMS*



APPROVED BY JC Pugh

JANUARY 1988

This document was promulgated at an annual cost of \$ 20.74 per copy to provide standards and criteria for the design, construction and maintenance of highway transportation facilities by governmental agencies, consultants, contractors and the citizens of the State of Florida.

TABLE OF CONTENTS ROADWAY DESIGN STANDARDS

ABBREVIATIONS AND SYMBOLS

- 001 Standard Abbreviations
- 002 Standard Symbols (3 Sheets)

EROSION CONTROL AND WATER QUALITY

- 100 Temporary Slope Drain And Sod Flume
- 101 Trash Retainer And Sediment Basin
- 102 Baled Hay Or Straw Barriers And Silt Fences (3 Sheets)
- 103 Turbidity Barriers
- 104 Erosion Control For Permanent Construction
- 105 Shoulder Sodding And Reworking On Existing Facilities

DRAINAGE

- 200 Structure Bottoms - Type J And P
- 201 Supplementary Details For Manholes And Inlets (5 Sheets)
- 205 Cover Height (4 Sheets)
- 209 Curb Inlet And Gutter Inlet Selection Guide
- 210 Curb Inlet Tops - Types 1,2,3, And 4
- 211 Curb Inlet Tops - Types 5 and 6 (2 Sheets)
- 212 Curb Inlet - Type 7
- 213 Curb Inlet - Type 8
- 214 Curb Inlet Top - Inlet Type 9
- 215 Curb Inlet Top - Inlet Type 10
- 217 Median Barrier Inlets Types 1,2,3,4 And 5
- 218 Barrier Wall Inlet (2 Sheets)
- 220 Gutter Inlet - Type S
- 221 Gutter Inlet - Type V
- 229 Ditch Bottom And Median Inlet Selection Guide
- 230 Ditch Bottom Inlet - Type A
- 231 Ditch Bottom Inlet - Type B
- 232 Ditch Bottom Inlets - Types C,D,E, And H (4 Sheets)
- 233 Ditch Bottom Inlets - Types F And G
- 234 Ditch Bottom Inlet - Type J
- 235 Ditch Bottom Inlet - Type K
- 245 Underdrain Inspection Box
- 249 Pipe End Treatment Selection Guide
- 250 Straight Concrete Endwalls - Single And Multiple Pipe (2 Sheets)
- 251 Straight Concrete Endwalls - Single And Double 60" Concrete Pipe (2 Sheets)
- 252 Straight Concrete Endwalls - Single And Double 66" Concrete Pipe (2 Sheets)
- 253 Straight Concrete Endwalls - Single And Double 72" Concrete Pipe (2 Sheet)
- 255 Straight Concrete Endwall - Single 84" Concrete Pipe
- 258 Straight Sand - Cement Endwalls

DRAINAGE (CONT.)

- 260 U - Type Concrete Endwalls With Grates - 15" To 30" Pipe
- 261 U - Type Concrete Endwalls Baffles And Grate Optional - 15" To 30" Pipe (3 Sheets)
- 264 U - Type Concrete Endwall - Energy Dissipator - 30" To 72" Pipe
- 266 Winged Concrete Endwalls - Single Round Pipe
- 268 U - Type Sand - Cement Endwalls
- 270 Flared End Section
- 272 Cross Drain Mitered End Section (6 Sheets)
- 273 Side Drain Mitered End Section (6 Sheet)
- 274 Side Drain Mitered End Section
- 280 Miscellaneous Drainage Details (3 Sheets)
- 281 Ditch Pavement And Sodding (2 Sheet)
- 282 Back Of Sidewalk Drainage
- 283 Median Opening Flume
- 284 Concrete Spillways (2 Sheets)
- 285 French Drain
- 286 Underdrain (2 Sheets)
- 290 Concrete Box Culvert - Single, Double, Triple And Quadruple Barrels (5 Sheets)
- 293 Safety Modifications For Inlets In Box Culverts
- 295 Safety Modifications For Endwalls

CURBS AND PAVEMENT JOINTS

- 300 Curb, Curb And Gutter
- 301 Median Storage Lanes
- 302 Traffic Separators
- 303 Curb Return Profiles
- 304 Curb Cut Ramps (2 Sheets)
- 305 Concrete Pavement Joints (4 Sheets)
- 306 Bridge Approach Expansion Joint - Concrete Pavement

BARRIERS AND FENCES

- 400 Guardrail (14 Sheets)
- 401 Guardrail Anchorage And Continuous Barrier For Existing Bridges (9 Sheets)
- 410 Concrete Barrier Wall (8 Sheets)
- 415 Precast Concrete Temporary Barrier Wall (2 Sheets)
- 450 Fence Location
- 451 Fence - Type A
- 452 Fence - Type B
- 453 Cantilever Slide Gate - Type B Fence
- 460 Glare Screen
- 461 Opaque Visual Barrier

TABLE OF CONTENTS ROADWAY DESIGN STANDARDS

GENERAL

500	Excavation, Embankment And Grading
505	Embankment Utilization
510	Superelevation (2 Sheets)
511	Superelevation - Municipal Construction (2 Sheets)
513	Flexible Pavement - Layer Thickness For Structural Courses
514	Optional Base Groups And Structural Numbers
515	Turnouts (2 Sheets)
516	Turnouts - Resurfacing Projects
517	Temporary Crossover - Construction - Rural
518	Rumble Strips
520	Walls, Handrails And Steps
525	Ramp Terminals (5 Sheets)
530	Rest Area Equipment
532	Mailboxes (3 Sheets)
535	Tractor Crossings
540	Settlement Plate
545	Shrubbery - Back Of Guardrail Application
560	Railroad Crossing (8 Sheets)

TRAFFIC CONTROL THROUGH WORK ZONES

600	General Information For Traffic Control Through Work Zones (6 Sheets)
601	Two - Lane, Two - Way Rural Day Or Night Operations
602	Two - Lane, Two - Way Rural Day Or Night Operations
603	Two - Lane, Two - Way Rural Operations One Daylight Period Or Less
604	Two - Lane, Two - Way Rural Night Operations Exceeding One Daylight Period
605	Two - Lane, Two - Way Rural Moving Operations - Daylight Only
606	Moving Operations Rural Two - Lane, Two - Way Daylight Only
607	Two - Lane, Two - Way Rural Shorttime Day Or Night Operations
608	Two - Lane, Two - Way Lane Closure On Bridge Deck Day Or Night Operations
609	Two - Lane, Two - Way Rural Temporary Detour Day Or Night Operations
610	Multilane, Divided Or Undivided Rural Day Operations
611	Multilane, Divided Or Undivided Rural Day Operations
612	Multilane, Divided And Undivided Rural One Daylight Period Or Less
613	Multilane, Divided And Undivided Rural Night Operations Or Operations Exceeding One Daylight Period
614	Multilane Divided Rural Day Or Night Operations (2 Sheets)
615	Multilane Undivided Rural Day Or Night Operations
616	Multilane Divided Rural
617	Multilane Divided Rural

TRAFFIC CONTROL THROUGH WORK ZONES (CONT.)

620	Two - Lane, Two - Way Urban Day Or Night Operations
621	Two - Lane, Two - Way Urban Day Or Night Operations
622	Multilane, Two - Way Urban Divided Or Undivided Day Or Night Operations
623	Multilane, Two - Way Urban Divided Or Undivided Day Or Night Operations (2 Sheets)
624	Multilane Divided With Traversable Median Or Undivided Urban Day Or Night Operations
625	Multilane One - Way Or Multilane Divided With Non - Traversable Median Urban Day Or Night Operations (2 Sheets)
626	Multilane One - Way Or Multilane Divided With Non - Traversable Median Urban Day Or Night Operations
627	Use And Operating Modes For Vehicle Mounted (2 Sheets)
630	Temporary Crossover For Paving Train Operations Rural (2 Sheets)
640	Converting Two - Lanes To Four - Lanes Divided Rural (2 Sheets)
641	Converting Two - Lanes To Four - Lanes Divided Urban (2 Sheets)
650	Two - Lane, Two - Way Rural Structure Replacement (2 Sheets)

DESIGN CRITERIA

700	Design Criteria Related To Highway Safety (2 Sheets)
-----	--

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
		<p>PREFACE</p> <p>Every standard drawing sheet in the 1988 Roadway and Traffic Design Standards has been produced by computer drafting. Future Standards will also be produced by computerized design and drafting (CADD).</p> <p>In taking advantage of verification, registering and other features of CADD, and due to certain restraints of CADD, changes appear on the sheets that are not listed in the tabulated Revisions. These changes may include reformatting, typographical corrections, alignment of views and details, scale, rotation, skew, abbreviation, grouping, shape, proportion and other non-functional changes.</p> <p>Revisions to the standards that reflect function, intent and purpose are tabulated below.</p>
001	1 of 1	ABS, CMPA, CPE, CSP, FES, MES, PCBC added.
102	3 of 3	Height from 3'-0" to 2'-10" for Type IV Silt Fence.
104	1 of 4	Seeding Rate table added.
200	1 of 1	General Notes Nos. 1 thru 4 revised. Notations changed on Type P, Alternate A. Type J completely redrawn & table expanded.
201	2 of 5	Channelization detail deleted. Invert detail renamed.
	3 of 5	General Notes Nos. 6 & 7 added. Rebar straight embedment and peripheral reinforcement details expanded.
	4 of 5	General Note No. 4, last paragraph, revised.
209	1 of 1	Index No. 218 added. Bicycle Safe/Pedestrian Safe column revised for Index No. 217 & 220.
211	1 of 2	Frame detail transferred to sheet 2 of 2. Section PP added.
	2 of 2	Frame Sections DD and EE expanded to include steel cover.
212	1 of 1	Maximum depth added to Section AA.
213	1 of 1	Maximum depth added to Section AA.
217	1 of 1	Depth dimension added to Section AA.
220	1 of 1	Sections CC and DD changed to EE and FF on Steel Grate detail. Front and back of grate seat lowered 1/4", Section BB.

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
232	1 of 4	Depth dimensions with notations added to Types C, D, E & H sections. Cast iron grate note under Type D revised and flagged.
	3 of 4	Flagged notation added to Non-Traversable Slots detail.
235	1 of 1	General Note No. 3 revised.
250	2 of 2	CM changed to "Metal".
251	1 of 2	Section BB, Optional Entrance, Metal Pipe data and General Note No. 5 added.
	2 of 2	Section BB and Metal Pipe data added.
252	1 of 2	Section BB, Optional Entrance, Metal Pipe data and General Note No. 5 added. General Note No. 1 revised.
	2 of 2	Section BB, Optional Entrance and Metal Pipe data added.
253	1 of 2	Section BB, Optional Entrance, Metal Pipe data and General Note No. 5 added. General Note No. 1 revised.
	2 of 2	Section BB, Optional Entrance and Metal Pipe data added.
255	1 of 2	Section BB, Optional Entrance, Metal Pipe data and General Note No. 5 added. General Note No. 1 revised.
258	1 of 1	Dimension 'D' added; replacing 1'-6" dimension.
260	1 of 1	General Notes Nos. 1, 3 and 6 revised.
261	1 of 3	General Note No. 6 added. Construction joint added.
	2 of 3	Construction joint added.
270	1 of 1	General Note No. 1 revised.
272	6 of 6	Hole option note added to Anchor Detail.
273	2 of 6	Dimensions & Quantities tables combined.
	5 of 6	Hole option note added to Anchor Detail.
	6 of 6	General Note No. 10 revised.
280	3 of 3	Schedule of Bell Reinforcement (Design) changed.

REVISIONS
ROAD DESIGN STANDARDS
1988

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
281	1 of 2	Tabulated data for Items Nos. 530-2, 530-72-1, 530-81-1b and 530-70-1b revised.
282	1 of 1	Riprap data added to Special Concrete Endwall.
284	1 of 2	General Note No. 1 added.
285	1 of 1	Slot inset dimension changed on Side View, Option B. Slot tolerances added.
286	1 of 2	Title changed. Design Note No. 6, F.A.C. For F.S.. General Note No. 8, paragraph 3, II changed to III.
	2 of 2	Title changed. General Note No. 9, paragraph 1, pay item changed.
290	1 of 5	'Note', for computerized design, top center of sheet, changed.
	3 of 5	Bars N (Typ.) added to End Elevation. FK and B400 designations corrected.
295	1 of 1	Construction joint added.
301	1 of 1	General Notes and Design Notes added. Alternates for medians redesignated Option 1 and Option 2. Median and Lane corrected to Separator in Opening detail. Primary Construction replaced by Rural Highways under Option details.
304	1 of 2	Diagonal and Intermediate Ramp details completely revised. Pictorial View revised for crosswalk changes.
	2 of 2	Revised to reflect the deletion of Sheets 3 of 4 and 4 of 4.
305	2 of 4	Footnote in Joint Dimension Table revised.
306	1 of 1	Plan showing joint skew completely revised.
400	1 of 14	General Note No. 1 revised and expanded. General Notes Nos. 2 & 3 revised.
	3 of 14	Cross references for sheet numbers updated. Approach transition sections revised.
	4 of 14	Approach transition section revised.
	5 of 14	Approach transition section revised.
	7 of 14	Cross references for sheet numbers updated.
	8 of 14	Lateral Placement table added to Detail K.

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
400	9 of 14	New sheet.
	10 of 14	Transition section revised. Section BB added. Offset block table and notation added.
	11 of 14	Post and Offset Block table revised. Frontslopes data added to Single Faced Guardrail detail.
	13 of 14	Cross reference for sheet numbers updated.
401	1 of 9	General Note No. 9 revised.
	9 of 9	Last paragraph under Note, Scheme 29 revised.
410	1 of 8	General Note No. 1 revised. Finish Coat notation deleted from Standard Barrier Wall Section.
	2 of 8	Free End Reinforcement detail added. Light Pole Mounting In Median Barrier Wall detail revised to suit Index No. 17503. Dimensions table for Detail I revised.
	3 of 8	Plain Concrete Barrier Wall (Shoulder) added. Reinforced Concrete Barrier Wall (Shoulder) modified.
415	1 of 2	Head Of Wall Tie Bolt changed. Wall Alignment and Temporary Inertial Attenuator details revised. General Note 3 revised.
453	1 of 1	Size and weight data added to gate posts and frame. General Note No. 1 replaced.
461	1 of 1	New Index.
500	1 of 1	Outside Roadway notations revised in two top center details.
510	1 of 2	Flagged 'Note' under Shoulder Construction with Superelevation revised.
513	1 of 1	General Notes reduced.
514	1 of 1	Sand-Clay LBR corrected. Limit of 18 Kip Load > 1,000,000 notation extended.
515	1 of 2	Minimum distance between radius point for returns and driveway curb transition reduced.
	2 of 2	Transition Lengths table expanded.
516	1 of 1	Connection pavement type notation added to plan. ABC thickness reduced to 3" and Note 3 revised under tabulated values.
517	1 of 1	Formerly Index No. 631. Mitered end sections added to culvert.

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
518	1 of 1	New index.
525	2 of 5	General Note No. 4 added.
	5 of 5	Deceleration To Stop distance for Left Turn Control revised.
532	1 of 3	New index (sheet).
	2 of 3	New index (sheet).
	3 of 3	New index (sheet).
560	1 of 8	25' Min. dimension moved to short side of shoulder pavement in Rural Half Plan.
600	1 of 6	New index (sheet).
	2 of 6	New index (sheet).
	3 of 6	New index (sheet).
	4 of 6	New index (sheet).
	5 of 6	New index (sheet).
	6 of 6	New index (sheet).
		Note; Former Index No. 600 now new Index No. 650.
601	1 of 1	New index.
602	1 of 1	New index.
603	1 of 1	New index.
604	1 of 1	New index.
605	1 of 1	New index.
606	1 of 1	New index.

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
607	1 of 1	New index.
608	1 of 1	New index.
609	1 of 1	New index.
610	1 of 1	New index.
611	1 of 1	New index.
612	1 of 1	New index.
613	1 of 1	New index.
614	1 of 2	New index (sheet).
	2 of 2	New index (sheet).
615	1 of 1	New index.
616	1 of 1	New index.
617	1 of 1	New index.
620	1 of 1	New index.
621	1 of 1	New index.
622	1 of 1	New index.
623	1 of 2	New index (sheet).
	2 of 2	New index (sheet).
624	1 of 1	New index.

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
625	1 of 2	New index (sheet).
	2 of 2	New index (sheet).
626	1 of 1	New index.
627	1 of 2	New index (sheet).
	2 of 2	New index (sheet).
630	1 of 2	New index (sheet).
	2 of 2	New index (sheet).
640	1 of 2	Updated for current Traffic Control Through Work Zones standards.
	2 of 2	Updated for current Traffic Control Through Work Zones standards.
641	1 of 2	Updated for current Traffic Control Through Work Zones standards.
	2 of 2	Updated for current Traffic Control Through Work Zones standards.
650	1 of 2	Updated for current Traffic Control Through Work Zones standards.
	2 of 2	Updated for current Traffic Control Through Work Zones standards.
700	1 of 2	Completely revised.
	2 of 2	New sheet.

A	AREA	D	DEGREE OF CURVATURE	HDWL	HEADWALL	PAVT	PAVEMENT	T	TANGENT LENGTH OF CURVE
AASHO	AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS	DA	DRAINAGE AREA	HDRL	HANDRAIL	PC	POINT OF CURVATURE	TBM	TEMPORARY BENCH MARK
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS	DBL	DOUBLE	HORIZ	HORIZONTAL	PCB	PRECAST CONCRETE BOX CULVERT	TC	TANGENT TO CURVE
ABC	ASPHALT BASE COURSE	DCSE	DOUBLE COURSE	HR	HOUR	PCC	POINT OF COMPOUND CURVATURE OR PLAIN CEMENT CONCRETE	TCE	TEMPORARY CONSTRUCTION EASEMENT
ABD	ABANDONED	D-POST	DOUBLE POST	HSE	HOUSE	PCE	PERMANENT CONSTRUCTION EASEMENT	TCP	TERRA COTTA PIPE
ABS	ACRYLONITRILE-BUTADIENE-STYRENE PIPE	DOS	DEGREE OF CURVATURE (SPIRAL)	HWH	HIGH WATER	PEDES	PEDESTRIAN	TEL	TELEPHONE
AC	ACTUATED	DELIN	DELINEATORS	HYD	HIGHWAY	PEN	PENETRATION	TEMP	TEMPERATURE
ACT	ADJUST	DEMOB	DEMOLITION		HYDRANT	PG	PROFILE GRADE	THRMPLSTC	THERMOPLASTIC
ADJ	ANNUAL AVERAGE DAILY TRAFFIC	DEPT	DEPARTMENT			PH	PHASE	TN	TON
ADT	AGGREGATE	DETUR	DETOUR	I	EXTERNAL ANGLE (DELTA)	PI	POINT OF INTERSECTION	TRAF	TRAFFIC
AGG	ALTERNATE	DIV	DESIGN HOURLY VOLUME	LD	LOAD	PK	PER CAP	TREAT	TREATMENT
AH	ALTERNATE	DTCH	DITCH	IN	INSIDE DIAMETER	PL	PROPERTY LINE	TS	TANGENT TO SPIRAL
ALT	ALTERNATE	DI	DROP INLET	INC	INCORPORATED	PCC	POINT ON CURVE	TSC	TANGENT TO SPIRAL
ALUN	ALUMINUM	DIA	DIAMETER	INC	INCORPORATED	POST	POINT ON SEAM-TANGENT	TWP	TOWNSHIP
APPRH	APPROACH	DM	DIMENSION	INCL	INCLUDED	POT	POINT ON TANGENT	TYP	TYPICAL
APPROX	APPROXIMATE	DSP	DISPOSAL	IP	IRON PIPE	PP	POWER POLE	T-CSE	TRIPLE COURSE
ARTF	ARTIFICIAL	DOT	DEPARTMENT OF TRANSPORTATION	ISTL	INSTALL	PRC	POINT OF REVERSE CURVATURE		
ASPH	ASPHALT	DR	DITCH POINT INTERSECTION	ITCH	INTERCHANGE	PRCST	PRECAST	U PASS	UNDERPASS
ASPH CONC	ASPHALTIC CONCRETE	DRH	DRAWN			PRG	PRESTRESSED	UNDFD	UNDERGROUND
OR AC	ASPHALTIC CONCRETE	DRW	DRIVEN			PRGJ	PROGRAMMED	UNDFR	UNDERGROUND
ASSEM	ASSEMBLY	DS	DESIGN SPEED	JB	JUNCTION BOX	PRM	PERMANENT REFERENCE MONUMENT	UNDRWY	UNDERROADWAY
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS	DWG	DRAWING	JCT	JUNCTION	PRV	PROVISIONS	UNL	UNLOADED
ATTNTR	ATTENUATOR					PRSE	PRESSURE	UNTR	UNTREATED
AVE	AVENUE					PSAE	PLANS, SPECIFICATIONS AND ESTIMATES	USC&GS	U.S. COAST AND GEODETIC SURVEY (NON NATIONAL GEODETIC SURVEY)
						PT	POINT OF TANGENCY	USGS	U.S. GEOLOGICAL SURVEY
						P-TIME	PRE-TIME		
						Q	PEAK DISCHARGE		
B TO B	BACK TO BACK	E	EAST	L	LENGTH OF CURVE	R	RADIUS	VAR	VARIABLE
BASC	BASCULE	E	RATE OF SUPERELEVATION	LA	LIMITED ACCESS	RANGE	RANGE	VC	VERTICAL CURVE
BBL	BARRREL	E TO E	END TO END	LB	POUND	RDAC	ROCK BASE ASPHALTIC CONCRETE	VF	VERTICAL FOOT
BC	BOTTLE CAP	E-*	EXTERNAL DISTANCE	LBR	LINEAR BEARING RATIO	RST	ROCK BASE SURFACE TREATMENT	VCP	VENTILATED CURB PIPE
BCOMP	BITUMINOUS COATED CORRUGATED METAL PIPE CULVERT	EA	EASTBOUND	LC	LONG CHORD	RCP	REINFORCED CONCRETE PIPE	VEN	VERTICAL
BCPA	BITUMINOUS COATED PIPE ARCH CULVERT	EB	EASTBOUND ELEVATION	LGTH	LENGTH	RD	REINFORCED CONCRETE PIPE ARCH	VERT	VERTICAL
BCPCMP	BITUMINOUS COATED AND PAVED CORRUGATED METAL PIPE CULVERT	EL OR ELEV	ELEVATION	LN	LINEAR	RD-SD	ROADSIDE	W	WEST
BCPPA	BITUMINOUS COATED AND PAVED PIPE ARCH CULVERT	ELAS	ELASTOMERIC	LNK	LINEAR	REF	REFERENCE	WB	WESTBOUND
BEG	BEAM	ELEC	ELECTRIC	LNK	LINEAR	REFL	REFLECTIVE	WM	WATER MAIN
BGT	BITUMINOUS	ELLIP	ELLIPTICAL	LS	LENGTH OF SPIRAL	REIN	REINFORCED	WT	WATER TABLE OR WEIGHT
OK	BACK	EMBK	EMBANKMENT	LT	LEFT	RELUC	RELOCATED		
BL	BASE LINE	EMUL	EMULSIFIED	LTD	LIGHTED	REPL	REPLACE	X	COORDINATE DISTANCE (EAST-WEST)
BLDG	BUILDING	ENCL	ENCLOSURE	LW	LIGHTWEIGHT	RES	RESIDENCE	X NO	CROSS ROAD
BLUHD	BLUEHEAD	ENGR	ENGINEER	M	MIDDLE ORIGINATE DISTANCE	RES	REFERENCE MONUMENT	X-SEC	CROSS SECTION
BLVD	BOULEVARD	EOS	END OF SURVEY	MAINT	MAINTENANCE	RP	REFERENCE POINT	Y	COORDINATE DISTANCE (NORTH-SOUTH)
BM	BENCH MARK	EQ	EQUATION OR EQUAL	MATL	MATERIAL	RSP	RESURFACE	ZL	TWO LANE
BDT	BOTTOM	EQUIP	EQUIPMENT	MAX	MAXIMUM	RT	RIGHT		
BDR	BORROW PIT	ESMT	EASEMENT	MED	MEDIUM	R/W	RIGHT OF WAY		
BNG	BEARING	EST	ESTIMATE	MES	METRIC	S	SOUTH		
BNGWY	BENCHWY	ESTABL	ESTABLISHMENT	MESS	MESSAGE	SAHW	SAND-ASPHALT HOT MIX		
BTFY	BUTTERFLY	EW	ENDWALL	MH	MANHOLE	SAN	SANITARY		
BN	BARRIED WIRE	EW	ENCLOSURE	MHW	MEAN HIGH WATER	SB	SOUTHBOUND		
		EW	ENCLOSURE	M	MILE	SBAC	SHELL BASE ASPHALTIC CONCRETE		
		EW	ENCLOSURE	M	MILE	SBIN	SAND BITUMINOUS ROAD MIX		
		EW	ENCLOSURE	M	MILE	SBST	SHELL BASE SURFACE TREATMENT		
		EW	ENCLOSURE	M	MILE	SC	SEAL COAT		
		EW	ENCLOSURE	M	MILE	SCST	SAND/CLAY SURFACE TREATMENT		
		EW	ENCLOSURE	M	MILE	SE	SEAL COAT		
		EW	ENCLOSURE	M	MILE	SECT	SECTION		
		EW	ENCLOSURE	M	MILE	SED	SEDIMENT		
		EW	ENCLOSURE	M	MILE	SEP	SEPARATOR		
		EW	ENCLOSURE	M	MILE	SEQ	SEQUENTIAL		
		EW	ENCLOSURE	M	MILE	SF	SHRIMPAGE FACTOR		
		EW	ENCLOSURE	M	MILE	SG	SUBGRADE		
		EW	ENCLOSURE	M	MILE	SHDR	SHOULDER		
		EW	ENCLOSURE	M	MILE	SPEC	SPECIFICATION		
		EW	ENCLOSURE	M	MILE	SQ	SQUARE		
		EW	ENCLOSURE	M	MILE	SQ IN	SQUARE INCH		
		EW	ENCLOSURE	M	MILE	SQ YD OR SQ	SQUARE YARD		
		EW	ENCLOSURE	M	MILE	SR	STATE ROAD		
		EW	ENCLOSURE	M	MILE	SS	STONE		
		EW	ENCLOSURE	M	MILE	SSMO	SOLID STATE MODULAR DESIGN		
		EW	ENCLOSURE	M	MILE	ST	SURFACE TREATMENT OR STREET		
		EW	ENCLOSURE	M	MILE	STA	STATION		
		EW	ENCLOSURE	M	MILE	STAB	STABILITY		
		EW	ENCLOSURE	M	MILE	STD	STANDARD		
		EW	ENCLOSURE	M	MILE	STL	STEEL		
		EW	ENCLOSURE	M	MILE	STR	STRUCTURE		
		EW	ENCLOSURE	M	MILE	SUBDR	SUBGRADE		
		EW	ENCLOSURE	M	MILE	SUPPTS	SUPPORTS		
		EW	ENCLOSURE	M	MILE	SURF	SURFACE		
		EW	ENCLOSURE	M	MILE	SW	SOUTHWEST OR SIDEWALK		
		EW	ENCLOSURE	M	MILE	SYST	SYSTEM		
		EW	ENCLOSURE	M	MILE	S-POST	SINGLE POST		

UNITS OF MEASURE

AC	ACRE	LU	PER LUMINAIRE
AS	ASSEMBLY	MG	THOUSAND GALLONS
BA	BARRREL	MM	NET MILE
BU	BUSHEL	MB	PER BUILDING
CF	CUBIC FT.	PC	PER CLUSTER
CD	PER CLEAROUT	PE	PER
CY	CUBIC YARD	PI	PER INTERSECTION
CH	CHIT	PJ	PER JOINT
DA	DAYS	PL	PLANT
EA	EACH	PD	POST
MB	(1000) 1000 BOARD MEASURE	PP	PER POLE
FT	FOOT	PS	PER WELL
GA	GALLON	RM	ROAD MILE
GN	GROSS MILE	SF	SQUARE FOOT
LB	POUND	SP	SPAN
LF	LINEAL FT.	SY	SQUARE YARD
LS	LUMP SUM	TN	TON
ED	PER EACH PER DAY	VF	VERTICAL FOOT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STANDARD ABBREVIATIONS

Designed By	Drawn By	Checked By	Approved By
			<i>J. C. Hill</i>
Revised By	Revised By	Revised By	Revised By
F. H. W. A. Approved	88	1 of 1	001

STANDARD SYMBOLS FOR KEY MAP

	Highway With Full Control of Access
	Highway With Frontage Roads
	Highway Interchange
	Proposed Controlled Access Highway
	Divided Highway
	Hard Surfaced Road
	Soil, Gravel Or Shell Surfaced Road
	Graded And Drained Road
	Unimproved Road
	Primitive Road
	Private Road
	Streets In Inset Or Delimited Areas
	Extension Of Local Roads Within Cities
	Federal Aid Interstate Highway
	Federal Aid Urban Highway
	Federal Aid Primary Highway
	Federal Aid Secondary Highway
	National Forest Road
	State Forest Road
	State Park Road
	Interstate Highway
	US Numbered Highway
	State Highway
	County Road

	Railroad
	Double Track Railroad
	Abandoned Railroad
	Railroad Station
	Grade Crossing
	Railroad Above
	Railroad Below
	Military Field
	Commercial Or Municipal Airport
	Landing Area Or Strip
	Runways

	Free Ferry
	Toll Ferry
	Canal Or Drainage Ditch
	Intracoastal Waterway
	Narrow Stream
	Wide Stream
	Dam
	Dam Or Spillway With Lock
	Dam With Road
	Flood Control Structure
	Lake, Reservoir Or Pond
	Intermittent Pond
	Meandered Lake
	Marsh Or Swamp
	Mangroves
	Levee Or Dike
	Levee Or Dike With Road
	Highway Bridge
	Small Bridges Closely Spaced
	Drawbridge
	Highway Grade Separation
	Tunnel
	State Boundary Line
	County Boundary Line
	Civil Township Boundary
	Extended Township Line
	Land Grant Line
	Land Section Line
	State Survey Section Line
	Survey By Others
	Location Of Inset Boundary Within Map
	Military Reservation Boundary
	College Or University Boundary
	Corporate Limits
	Delimited Area, Population Est.
	Reservation, Forest Or Park Boundary
	Wildlife Refuge Boundary

	Residential Area Under Development
	Lighthouse
	State Capital
	County Seat
	Other City Or Village
	Seminole Indian Village
	Welcome Station
	Wayside Park Or Small Park
	Park With Boat Ramp
	Boat Ramp
	Museum
	Recreational Area Or Historic Site
	Scenic Site
	Post Office
	School
	Church
	Cemetery
	Church And Cemetery
	Hospital, Health Center Or Rest Home
	Toll House, Port Of Entry Or Weight Station
	Fair Grounds, Race Course Or Rodeo Arena
	Mine Or Strip Mine
	Governmental Research Station

	Agricultural Inspection Station
	Farmers Market
	Game Preserve
	Game Checking Station
	Bird Sanctuary
	Fire Control Headquarters
	Lookout Tower
	Fire Station
	Patrol Or Police Station
	Correctional Institution Or Road Camp
	Department of Transportation Facility
	Coast Guard Station
	Armory
	Junkyard
	Sanitary Fill
	Sewage Disposal Plant
	Incinerator
	Power Plant
	Power Substation
	Communications Facility
	Locked Gate Or Fence
	Triangulation Station

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STANDARD SYMBOLS					
Designed By	Notes	Revised	Approved By		
Drawn By				State Design Engineer, Road Design	
Checked By			Revision No.	Sheet No.	Index No.
F. H. W. A. Approved	83	1 of 3	002		

STANDARD SYMBOLS FOR PLAN SHEETS

GENERAL SYMBOLS	
	STATE LINE
	COUNTY LINE
	TOWNSHIP LINE
	SECTION LINE
	CITY LINE
	BASE OR SURVEY LINE
	RIGHT-OF-WAY LINE
	EASEMENT LINE
	LIMITED ACCESS LINE
	FENCE LINE
	NATIONAL OR STATE PARK OR FOREST
	GRANT LINE
	RAILROAD (DRAINAGE MAPS)
	RAILROAD (DETAIL PLANS)
	FENCE (LIMITED ACCESS)
	BOX CULVERT
	BRIDGE
	SIDE DRAIN PIPE
	STORM SEWER
	INLET
	MANHOLE
	TIED LONGITUDINAL JOINT
	KEYED LONGITUDINAL JOINT
	DOWELED TRANSVERSE EXPANSION JOINT
	DOWELED TRANSVERSE CONTRACTION JOINT
	TRANSVERSE CONTRACTION JOINT WITHOUT DOWELS
	TRIANGULATION STATION
	BENCH MARK
	POINT OF INTERSECTION
	NORTH POINT
	EDGES OF EXISTING PAVEMENT AND SIDEWALK
	BASE LINE
	CENTERLINE
	PROPERTY LINE
	DELTA ANGLE
	APPROXIMATE
	ROUND
	CURB
	CURB AND GUTTER
	WATER WELL, SPRING
	LEVEE
	RAILROAD MILE POST
	GATE
	PUMP ISLAND
	STORAGE TANK (SURFACE)
	STORAGE TANK (UNDERGROUND)

GENERAL SYMBOLS	
	MINE OR QUARRY
	BORROW PIT
	CHURCH
	STORE
	RESIDENCE
	BARN
	SCHOOL
	STREAM
	SHORE LINE
	MARSH
	HEDGE
	TREES
	EDGE OF WOODED AREA
	SHRUBBERY
	GROVE OR ORCHARD
	DEFINITION OF SKEW FOR CROSS DRAINS AND BARRELS OF CONCRETE BOX CULVERTS
	CONCRETE
	WOOD
	RATE OF SUPERELEVATION

UTILITY ADJUSTMENT SYMBOLS		
	EXISTING	PROPOSED
POWER POLE		
OVERHEAD POWER CABLE		
TELEPHONE POLE		
OVERHEAD TELEPHONE CABLE		
COMBINATION POLE		
GUY WIRE AND ANCHOR PIN		
BURIED POWER CABLE		
ELECTRIC DUCT		
BURIED TELEPHONE CABLE		
TELEPHONE DUCT		
TOWER		
LIGHT POLE		
GAS MAIN		
WATER MAIN		
SANITARY SEWER		
MANHOLE		
WATER METER		
VALVE		
FIRE HYDRANT		
UNDERGROUND CABLE TELEVISION		
OVERHEAD CABLE TELEVISION		

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STANDARD SYMBOLS			
Designed By	Drawn	Checked	Approved By
CDP	CDP	CDP	<i>[Signature]</i>
08/72	08/72	08/72	State Design Engineer, Roadways
Checked By	CDP	08/72	Revision No.
F.H.W.A. Approved: 07/07/75	86	2 of 3	002

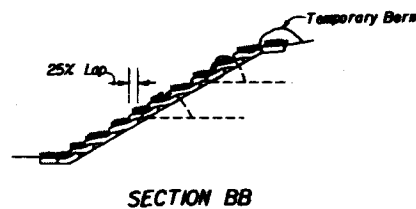
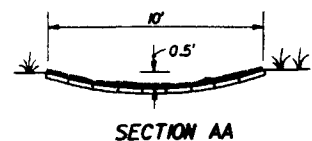
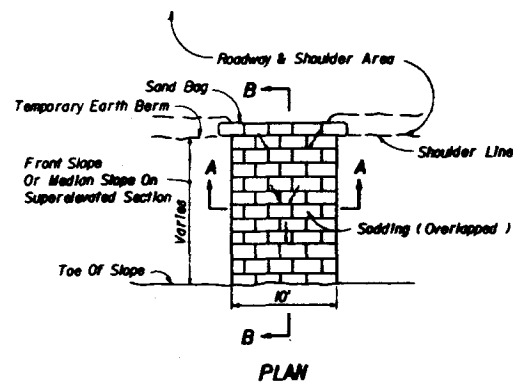
STANDARD SYMBOLS FOR PLAN SHEETS

TRAFFIC SIGNALS SYMBOLS		
	EXISTING	PROPOSED
TRAFFIC SIGNAL HEAD (SPAN WIRE MOUNTED)		
TRAFFIC SIGNAL HEAD (PEDESTAL MOUNTED)		
TRAFFIC SIGNAL HEAD (MAST ARM MOUNTED)		
TRAFFIC SIGNAL POLE (CONCRETE, WOOD, METAL)		
VEHICLE DETECTOR (LOOP)		
SIGNAL CABLE (ON MESSENGER WIRE)		
CONDUIT		
VEHICLE DETECTOR (OTHERS)		
PEDESTRIAN DETECTOR (PUSHBUTTON)		
PEDESTRIAN SIGNAL HEAD (POLE OR PEDESTAL MOUNTED)		
CONTROLLER CABINET (BASE MOUNTED)		
CONTROLLER CABINET (POLE MOUNTED)		
WALK - DON'T WALK FLASH		
SIGNAL FACE NUMBER		
ITEM NUMBER		
SIGNAL LENS		
PROGRAMMED SIGNAL HEAD		
MESSENGER WIRE		
POLE TABULATION CROSS REFERENCE		
POLE TABULATION CROSS REFERENCE (JOINT USE POLE)		
SIGNAL PHASE		

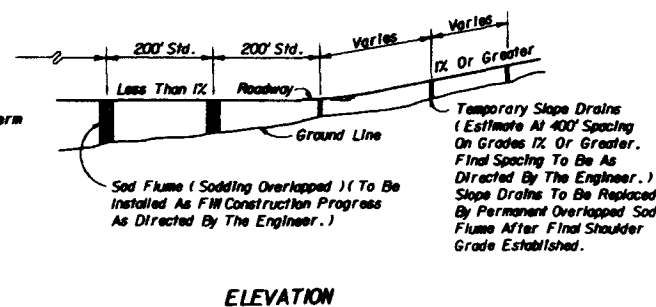
LIGHTING SYMBOLS	
	NEW POLE & LUMINAIRE
	EXISTING POLE & LUMINAIRE
	EXISTING POLE & LUMINAIRE TO BE REMOVED
	FINAL POSITION OF RELOCATED OR ADJUSTED POLE & LUMINAIRE
	NEW HIGH MAST LIGHTING TOWER
	CITY OR UTILITY OWNED LUMINAIRE & POLE
	PVC (POLYVINYL CHLORIDE) LIGHTING CONDUIT AND CONDUCTORS
	RIGID GALVANIZED LIGHTING CONDUIT AND CONDUCTORS
	CONCRETE LIGHTING PULL-BOX
	WATERPROOF LIGHTING PULL-BOX
	LIGHTING DISTRIBUTION POINT
	NEW JOINT USE POLE
	EXISTING USE POLE
	UNDER DECK LIGHTING FIXTURE

SIGNING AND PAVEMENT MARKING SYMBOLS	
PAVEMENT ARROW	
SINGLE SOLID LINE	
DOUBLE SOLID LINE	
SKIP LINE	
STOP BAR	
TRAFFIC SIGN (POST MOUNTED)	
TRAFFIC SIGN (OVERHEAD)	
SIGN NUMBER	
SIGN ITEM NUMBER	
TRAFFIC FLOW ARROW	

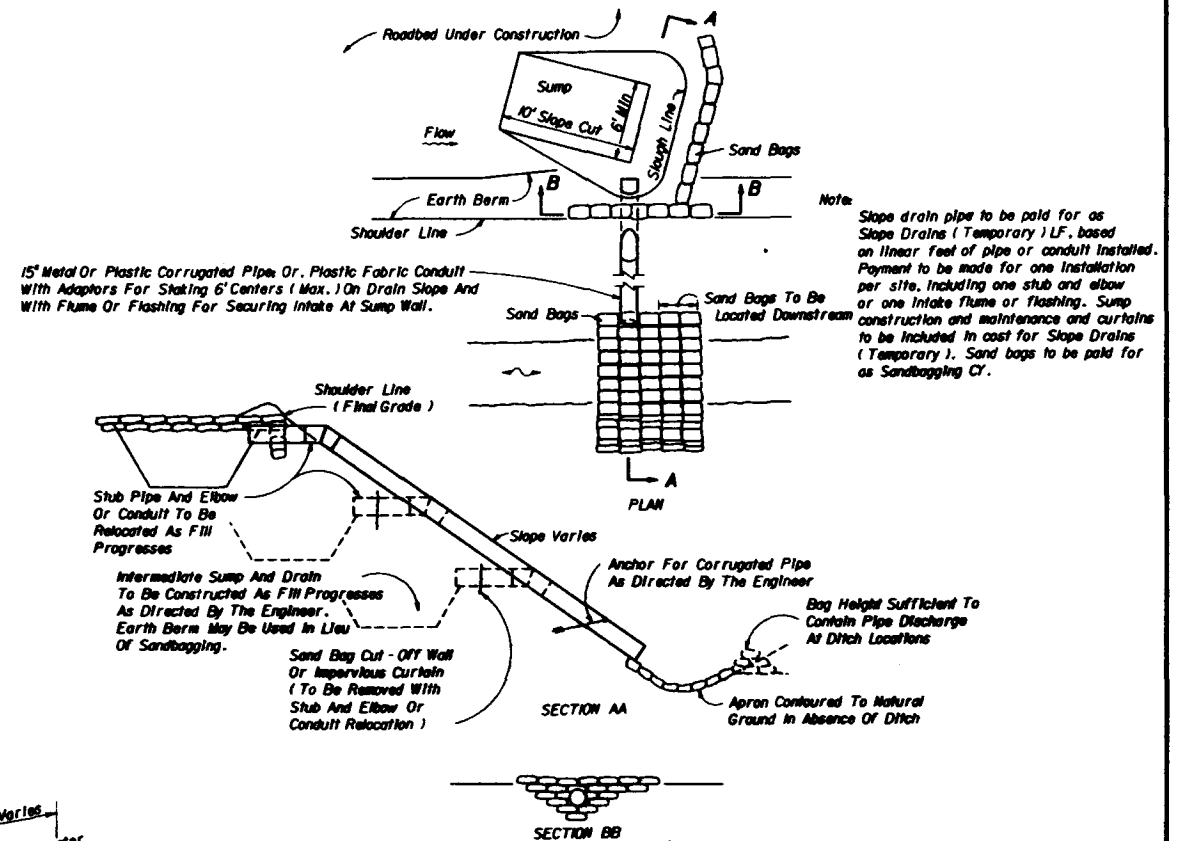
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STANDARD SYMBOLS					
Designed By	WMA	Date	Approved By		
Drawn By	CDP	08/72	State Design Engineer, Seals		
Checked By	CDP	08/72	Revision No.	Sheet No.	Issue No.
F.H.W.A. Approved: 07/07/75			86	3 of 3	002



SOD FLUME (SODDING OVERLAPPED)

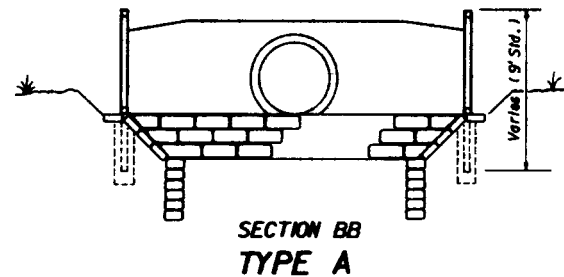
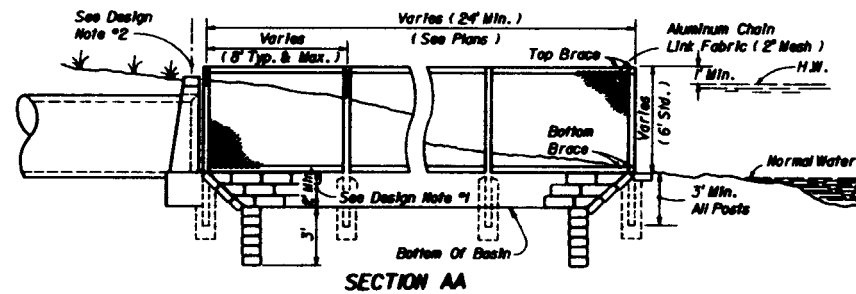
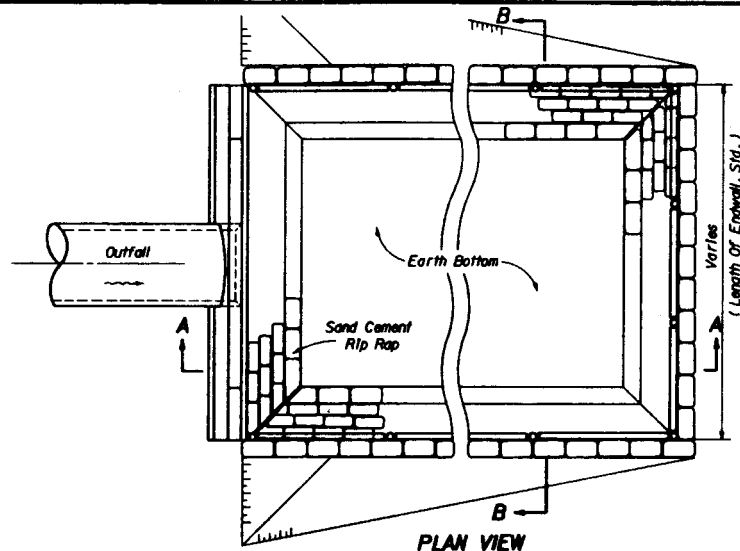


SLOPE DRAIN APPLICATION



TEMPORARY SLOPE DRAIN

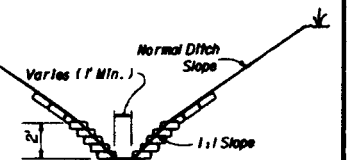
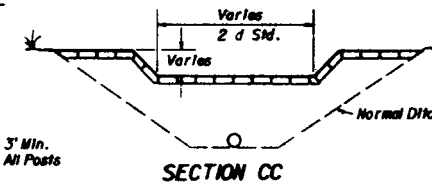
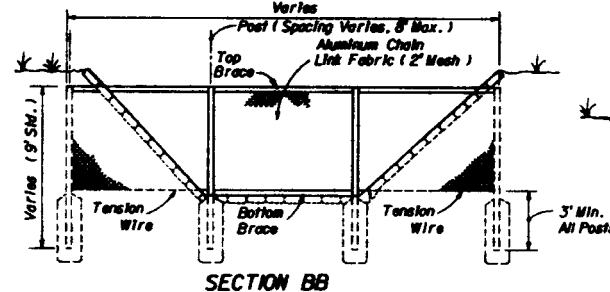
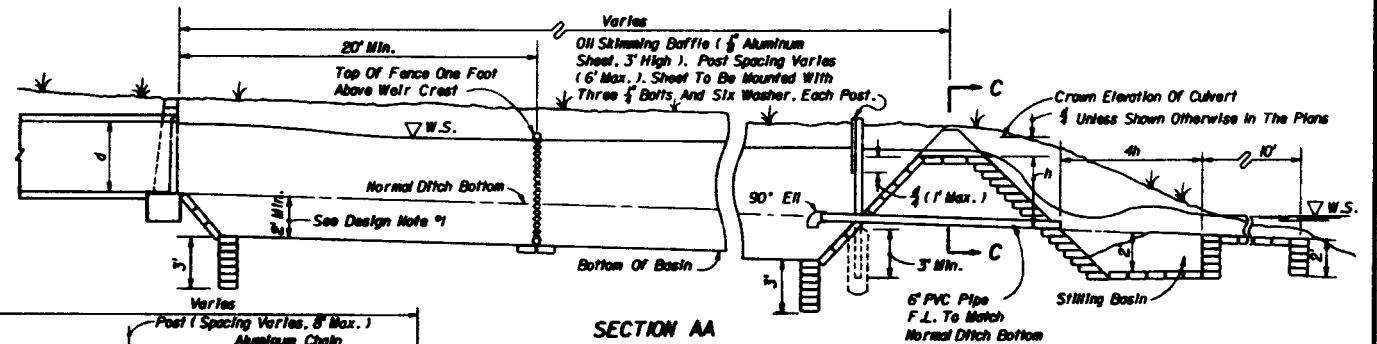
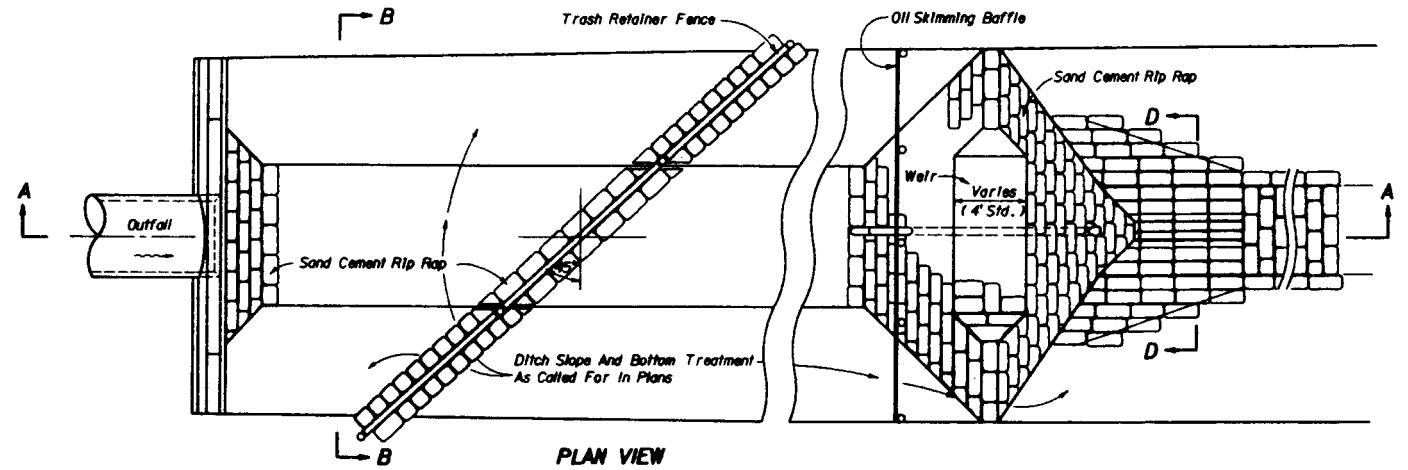
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TEMPORARY SLOPE DRAIN AND SOD FLUME			
Designed By	Drawn By	Checked By	Approved By
			<i>[Signature]</i>
F.H.R.A. Approved		83	100



INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS ADJACENT TO A SHORE LINE

GENERAL DESIGN NOTES

1. Basins should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of endwall is below high water, fence also will be required along the top of the endwall.
3. In Type B, the weir shall be located as far from the endwall as practical. On steep ditch grades two or more weirs may be required. Intermediate weirs shall be constructed without stilling basins.
4. In Type B, the 6" PVC pipe shall be constructed unless shown otherwise in the plans.



INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS IN AN OPEN DITCH

GENERAL CONSTRUCTION NOTES

1. Fence materials shall be aluminum or concrete only.
2. Aluminum posts shall be 3" diameter minimum. Aluminum rail braces shall be in accordance with Index 452. Concrete posts and rail braces shall be in accordance with Index 451. All posts to be set in concrete.
3. Fabric shall be installed to inside of posts and rail braces, and tied to posts and braces at 6' centers.
4. For additional details on fencing, see Index Nos. 451 and 452.
5. All basin slopes to be 1:1 unless detailed otherwise in the plans.
6. Sediment basins to be constructed prior to commencement of upland construction. Maintenance and clean out to be by the Contractor until acceptance of project by the Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRASH RETAINER AND SEDIMENT BASIN			
Designed By WJR	Drawn By HLB	Checked By HLB	Approved By <i>[Signature]</i>
Date 05/74	Date 05/74	Date 05/74	Date 05/74
F.H.A. Approved 10/07/80		Scale 80	Sheet No. 1 of 1

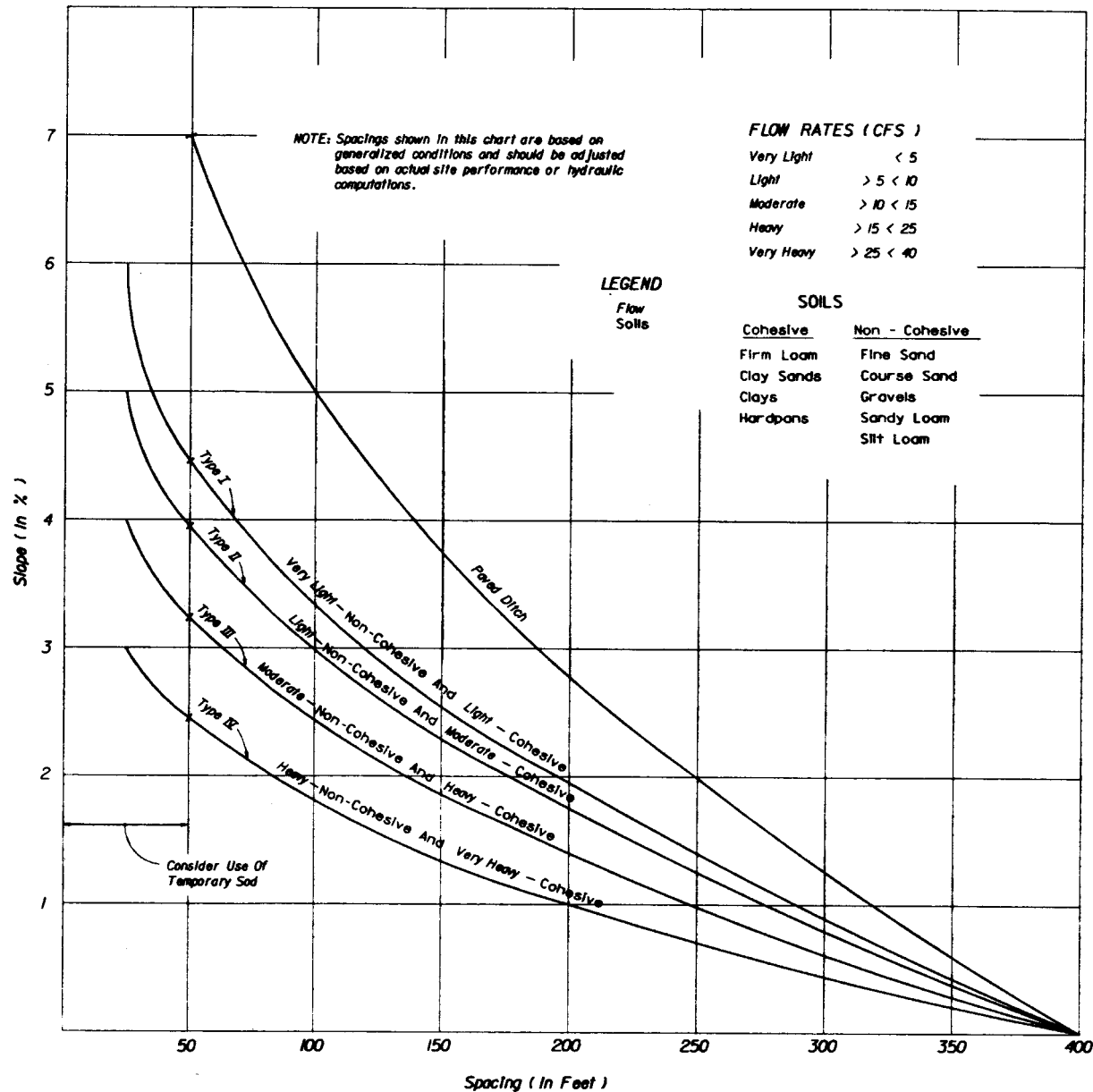
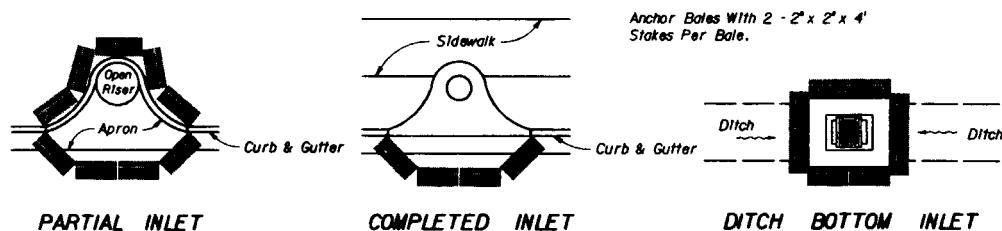


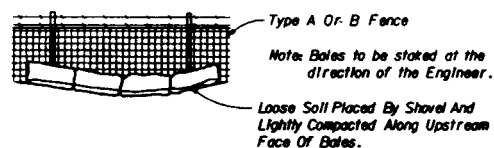
CHART I

RECOMMENDED SPACING FOR TYPE I AND TYPE II HAY BALE BARRIERS, TYPE III AND TYPE IV SILT FENCES AND PAVED DITCH HAY BALE BARRIERS

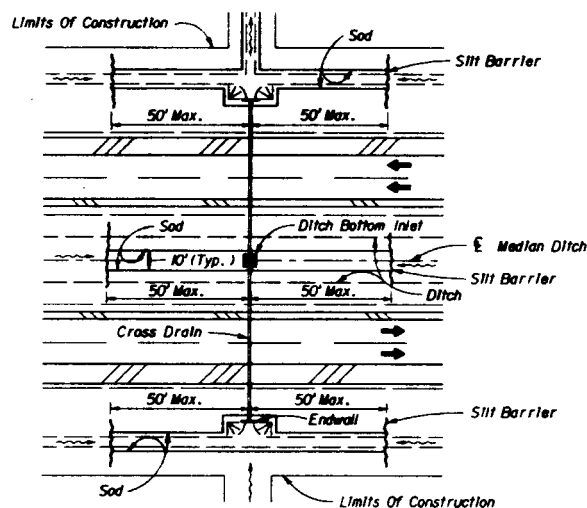
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
BALED HAY OR STRAW BARRIERS AND SILT FENCES					
Designed By	ESP	Date	02/80	Approved By	<i>[Signature]</i>
Drawn By	HSD	Date	08/82	State Design Engineer, Roadways	
Checked By	JNS	Date	08/82	Revision No.	Sheet No.
F.J.R.A. Approved: 08/23/82				85	1 of 3
					102



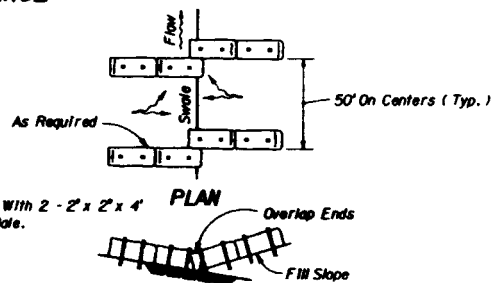
PROTECTION AROUND INLETS OR SIMILAR STRUCTURES



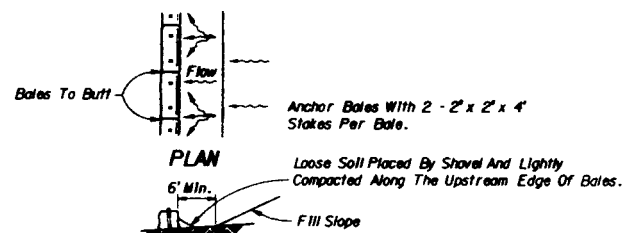
BALES BACKED BY FENCE



DITCH INSTALLATIONS AT DRAINAGE STRUCTURES

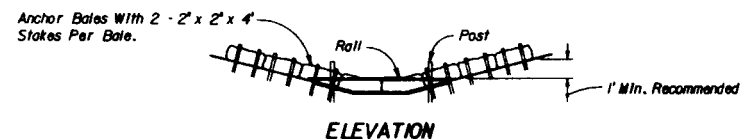
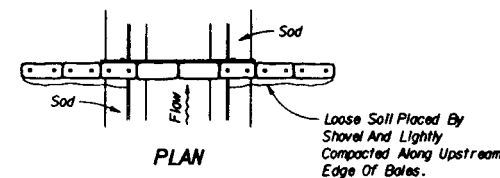


TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES TOWARD THE TOE OF SLOPE



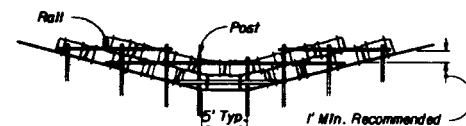
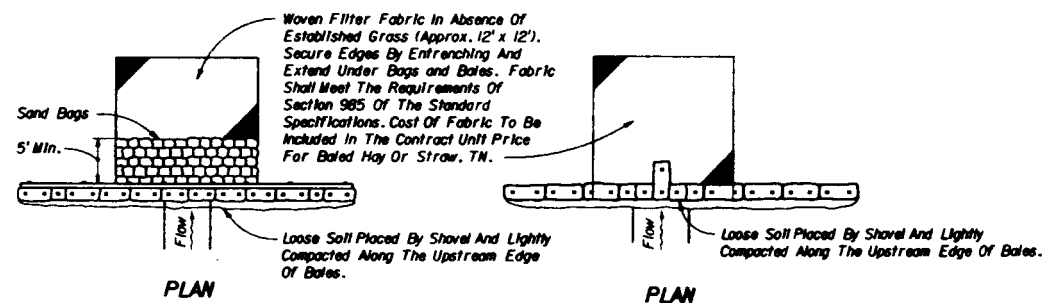
TO BE USED AT SELECTED SITES WHERE THE NATURAL GROUND SLOPES AWAY FROM THE TOE OF SLOPE

BARRIERS FOR FILL SLOPES



Spacing: Bale barriers for paved ditches should be spaced in accordance with Chart I, Sheet 1 of 3, Index No. 102

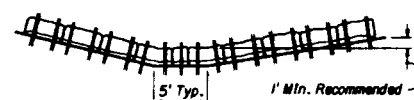
BARRIER FOR PAVED DITCH



Anchor Lower Bales With 2 - 2" x 2" x 4" Stakes Per Bale.
Anchor Top Bales To Lower Bales With 2 - 2" x 2" x 4" Stakes Per Bale.

TYPE II

BARRIER FOR UNPAVED DITCHES

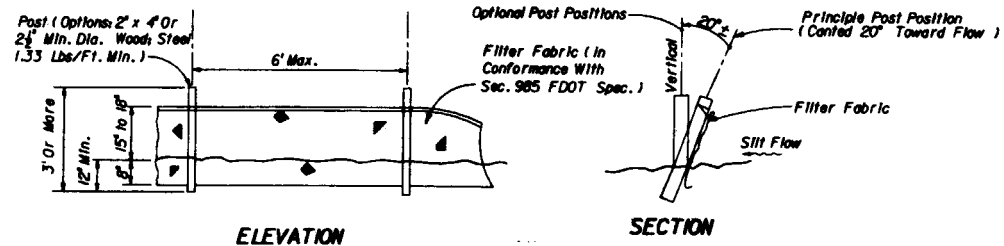


Anchor Bales With 2 - 2" x 2" x 4" Stakes Per Bale

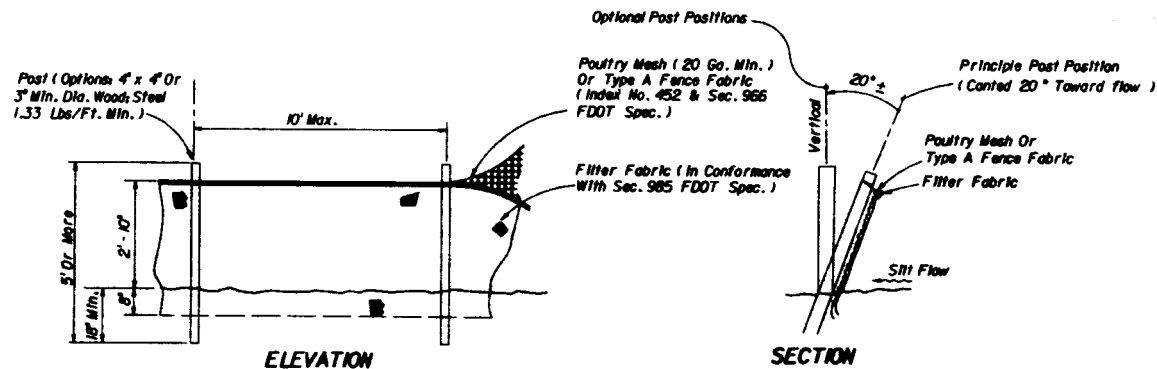
TYPE I

Application and Spacing: The use of Types I & II bale barriers should be limited to the conditions outlined in Chart I, Sheet 1 of 3, Index No. 102

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
BALED HAY OR STRAW BARRIERS AND SILT FENCES					
Designed By	WJR	Date	5/74	Approved By	<i>[Signature]</i>
Drawn By					State Design Engineer, Roadways
Checked By	HLB	Date	6/74	Revised No.	
F.H.W.A. Approved		Date	10/07/80	Sheet No.	2 of 3
				Index No.	102

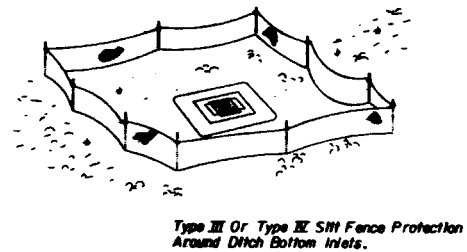
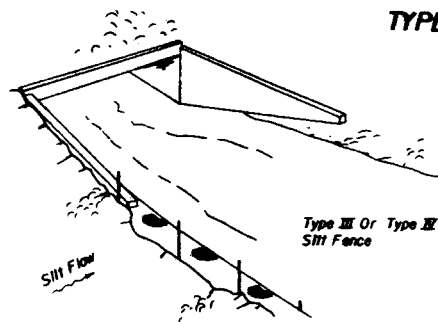


TYPE III SILT FENCE



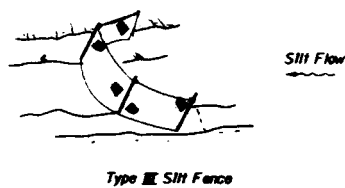
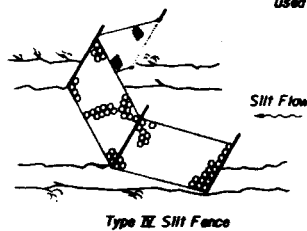
Note: Silt Fence to be paid for under the contract unit price for Staked Silt Fence (LF)

TYPE IV SILT FENCE



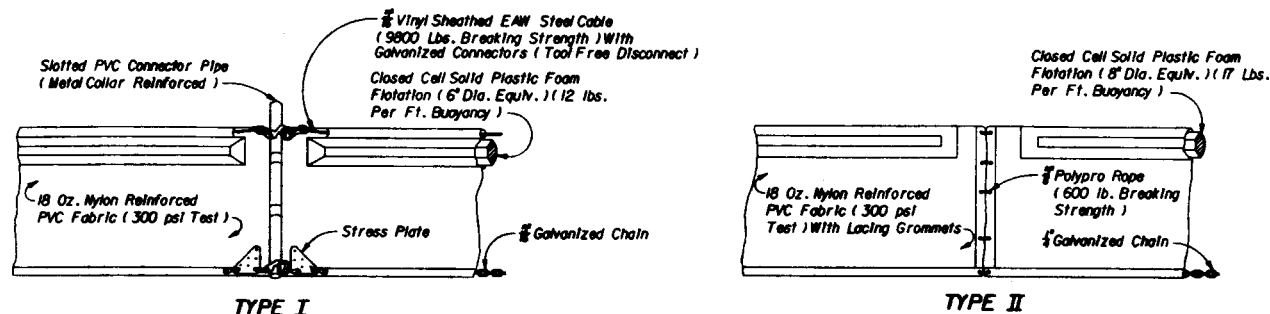
SILT FENCE APPLICATIONS

Do not deploy in a manner that silt fences will act as a dam across permanent flowing watercourses. Silt fences are to be used at upland locations and turbidity barriers used at permanent bodies of water.

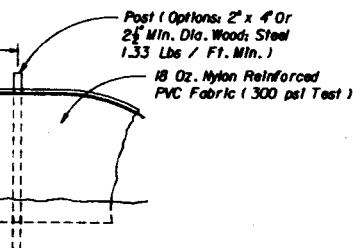


Note: Spacing for Type III and Type IV Fences to be in accordance with Chart I, Sheet 1 of 3 and ditch installations at drainage structures Sheet 2 of 3.

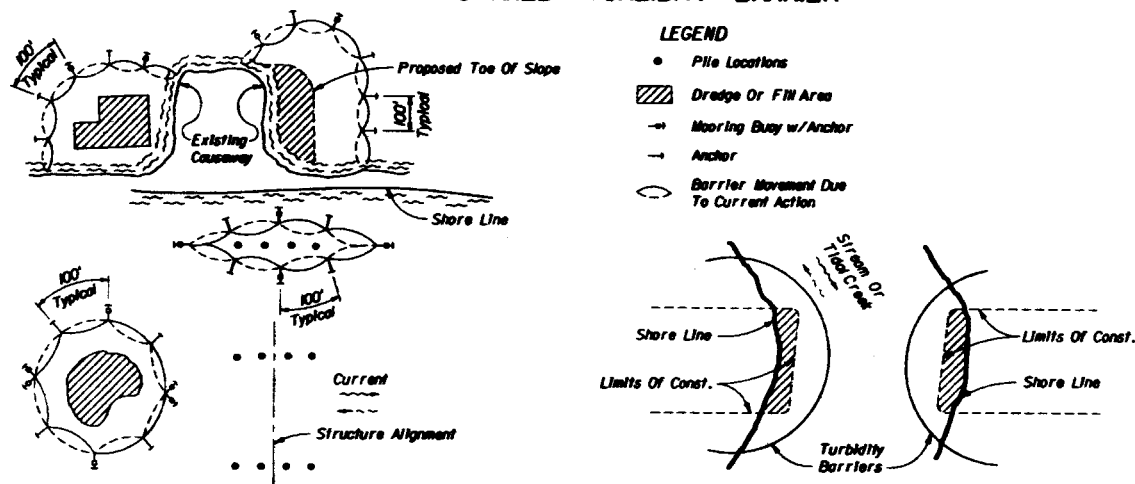
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
BALED HAY OR STRAW BARRIERS AND SILT FENCES			
Designed By	RAA/CAN	Date	03/95
Drawn By	LNE	Date	03/95
Checked By	RAA	Date	03/95
F.J.R.A. Approved		88	3 of 3
		102	



TYPE I
FLOATING TURBIDITY BARRIERS



STAKED TURBIDITY BARRIER



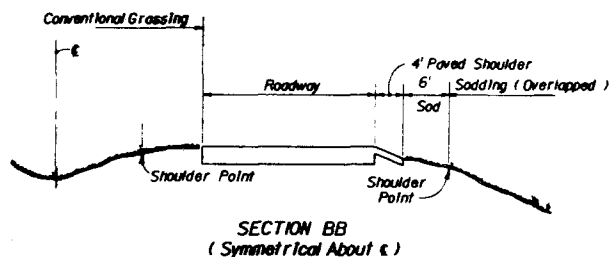
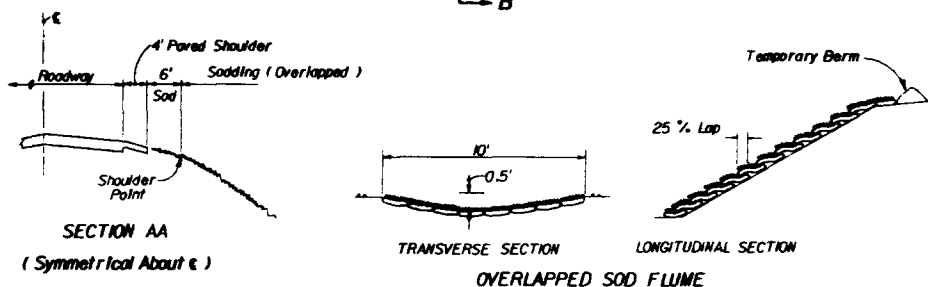
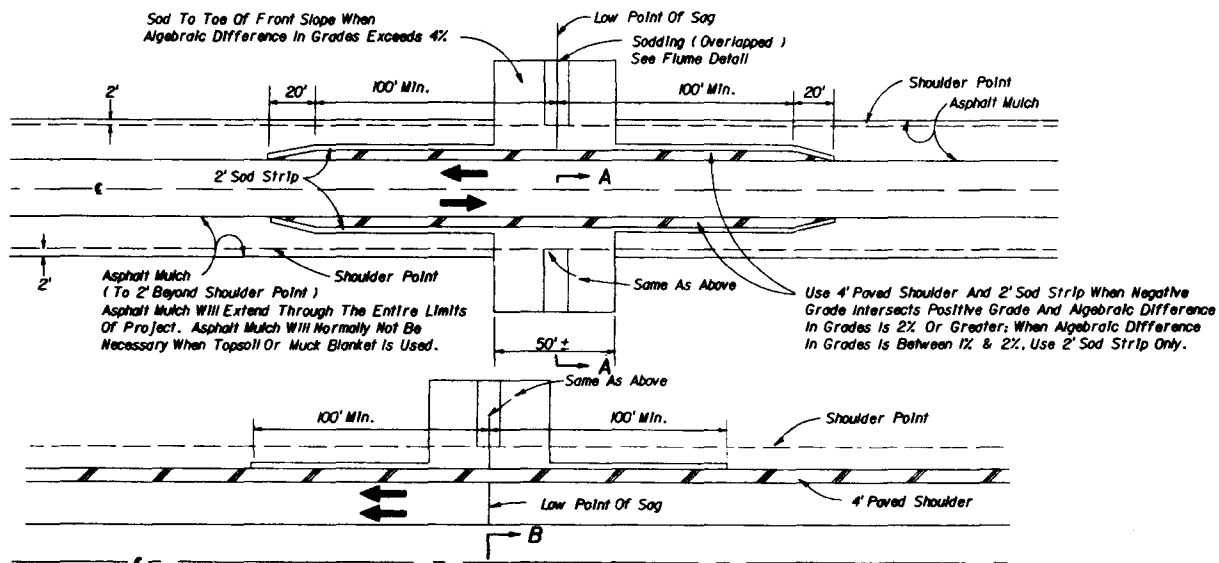
NOTES:

1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
2. Number and spacing of anchors dependent on current velocities.
3. Deployment of barrier around pile locations may vary to accommodate construction operations.
4. Navigation may require segmenting barrier during construction operations.
5. The above applications indicate Type I Floating Turbidity Barrier since anchors are shown, however, if conditions warrant, Type II Floating Turbidity Barrier may be used. For additional information see Standard Specifications.

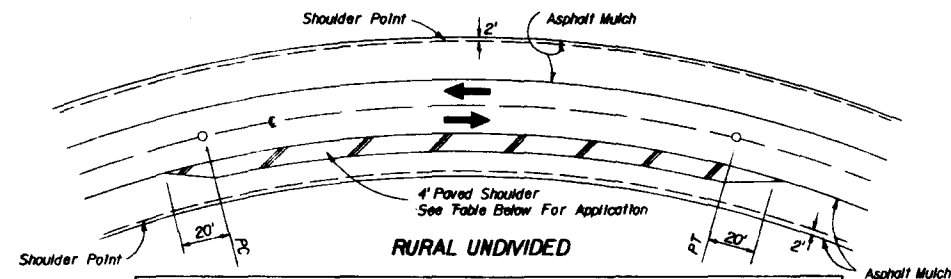
Note:
Turbidity barriers for flowing streams and tidal creeks may be either floating, or staked types or any combinations of types that will suit site conditions and meet erosion control and water quality requirements. The barrier type(s) will be at the Contractor's option unless otherwise specified in the plans, however payment will be under the pay item(s) established in the plans for Floating Turbidity Barrier and/or Staked Turbidity Barrier. Posts in staked turbidity barriers to be installed in vertical position unless otherwise directed by the Engineer.

TURBIDITY BARRIER APPLICATIONS

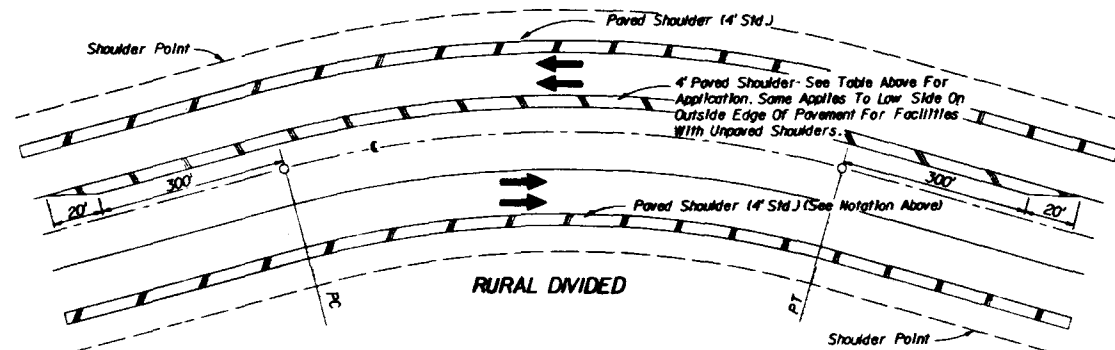
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TURBIDITY BARRIERS					
Designed By	RAM/CM	Date	5/85	Approved By	<i>J. Pelt</i>
Drawn By	L/E	Date	5/85	State Design Engineer, Roadways	
Checked By	RAA	Date	12/85	Revision No.	Sheet No.
F.H.B.A. Approved				67	103



SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES



CRITERIA FOR PAVING SHOULDER ON DIVIDED AND UNDIVIDED FACILITIES		
Design Speed	Degree Of Curve	Note: Paved shoulders are required on all curves meeting the criteria tabulated. For curves not meeting the criteria, shoulders are to be paved where erosion of the shoulder is evident or anticipated.
30	7" Or Greater	
40	5" Or Greater	
50	4" Or Greater	
60	3" Or Greater	
65	3" Or Greater	
70	2" Or Greater	



SHOULDER AND SLOPE TREATMENT FOR SUPERELEVATED ROADWAYS

SEEDING RATES (Lbs/Ac) FOR NEW SHOULDERS AND SLOPES *								
TYPE OF SEED	ZONE I				ZONE II			
	COASTAL		INLAND		COASTAL		INLAND	
	Mar. to Oct.	Nov. to Mar.	Mar. to Oct.	Nov. to Mar.	Feb. to Nov.	Dec. to Feb.	Feb. to Nov.	Dec. to Feb.
PERMANENT GRASS								
Unhulled Bermuda	20	20	20	20	20	20	20	20
Bahia Argentina Or Pensacola			80	80			80	80
QUICK GROWING								
Brown Top Millet	20		20		20		20	
Annual Rye Grass		20		20		20		20
TOTAL POUNDS PER ACRE	40	40	120	120	40	40	120	120

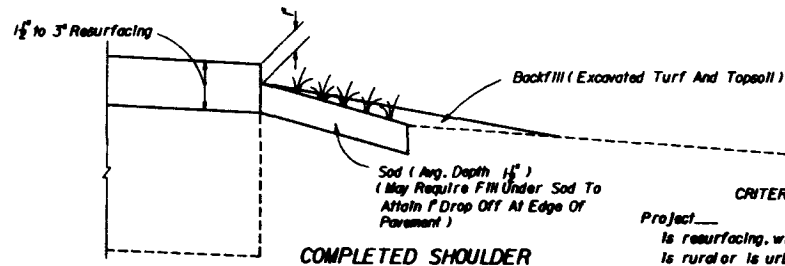
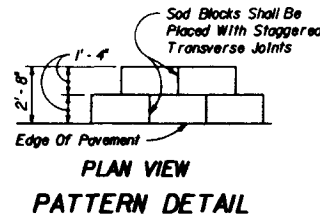
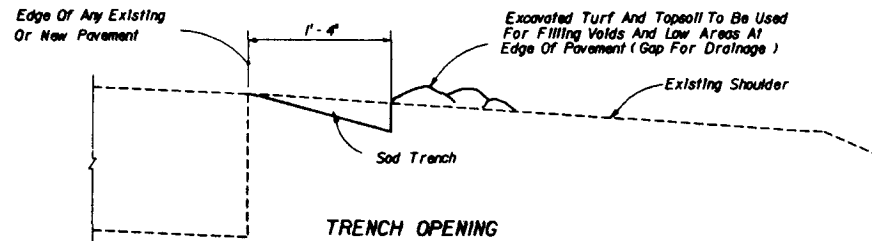
Note: The seeding rates shown in this table apply only when seed is spread by an approved mechanical spreader meeting the requirements of Section 570 and 577 of the Standard Specifications.

* See Index No. 105 for zone boundaries and seeding rates for shoulder reworking.

GENERAL NOTES

- Erosion control details are applicable to new construction, reconstruction and RRR projects.
- For sodding adjacent to ditches and at headwalls, see Index No. 281.
- All front slopes steeper than 3:1 are to be sodded.

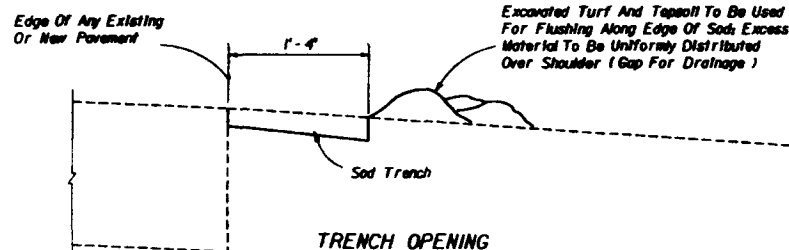
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
EROSION CONTROL DETAILS FOR PERMANENT CONSTRUCTION				
Designed By	HEB	Date	04/75	Approved By
Drawn By				State Design Engineer, Roadways
Checked By	DCB	Date	04/75	Revision No.
F.H.R.A. Approved	02/08/80		88	1 of 1
				104



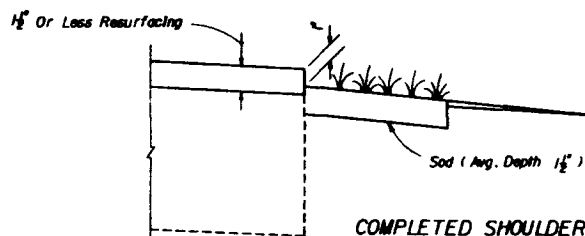
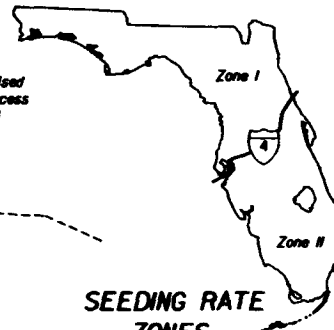
CRITERIA FOR USING TREATMENT TYPE R-1

Project—
Is resurfacing, widening and resurfacing or construction of shoulder pavement is rural or is urban without curb and gutter has good existing soil and turf with no significant shoulder erosion (isolated areas of significant erosion will require additional special treatment. Where poor soil and/or turf conditions exist shoulder reworking, Type R-2, should be applied.)
resurfacing build-up is $1\frac{1}{2}$ to 3"

TYPE R-1



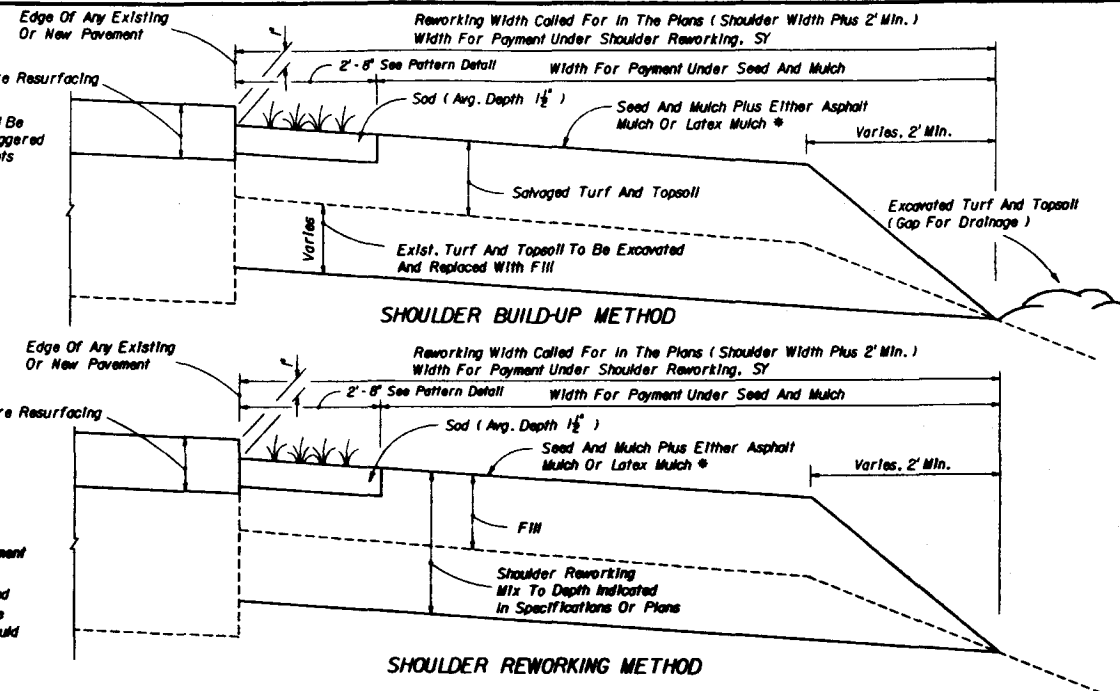
SEEDING RATE ZONES



CRITERIA FOR USING TREATMENT TYPE R-3

Project—
Is resurfacing, widening and resurfacing or construction of shldr. part. is rural or is urban without curb and gutter has good existing soil and turf with no significant shoulder erosion (isolated areas of significant erosion will require additional special treatment. Where poor soil and/or turf conditions exist shoulder reworking, Type R-2, should be applied.)
resurfacing build-up is $1\frac{1}{2}$ or less

TYPE R-3



* Asphalt Mulch Or Latex Mulch May Be Deleted For Low Volume Roadways (ADT Less Than 1600) Or Where Shoulder Pavement Is Constructed.

CRITERIA FOR USING TREATMENT TYPE R-2

Project—
Is resurfacing or construction of shoulder pavement is rural or is urban without curb and gutter has good existing soil and turf
resurfacing build-up is 3" or more

A SIMILAR TREATMENT MAY BE USED FOR PROJECTS THAT REQUIRE SHOULDER WIDENING. DETAILS ARE TO BE SHOWN IN THE PLANS.

TYPE R-2

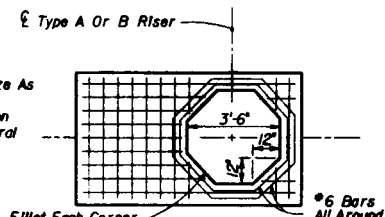
GENERAL NOTES

1. Special attention is to be directed to the construction of the required f' drop-off at edge of pavement.
2. Fertilize entire unpaved shoulder and front slope to toe of slope or bottom of ditch.
3. Topsoil obtained from borrow pits or other sources may be used in lieu of excavated turf and topsoil when economically feasible. No additional payment will be made for substituting topsoil for excavated turf or topsoil.
4. Payment for excavation of turf and topsoil and for backfill of this material (Details R-1 and R-3) is to be included in the contract unit price for Sodding, SY.

TYPE OF SEED	SEEDING RATES (Lbs / Ac)							
	ZONE I				ZONE II			
	COASTAL		INLAND		COASTAL		INLAND	
	Mar. to Oct.	Nov. to Mar.	Mar. to Oct.	Oct. to Mar.	Feb. to Nov.	Dec. to Feb.	Feb. to Nov.	Dec. to Feb.
PERMANENT GRASS								
Unhulled Bermuda	15	15	10	15	15	15	10	15
Bahia Argentina Or Pensacola			30	30			30	30
QUICK GROWING								
Brown Top Millet	20		20		20		20	
Annual Ryegrass		20		20		20		20
TOTAL POUNDS PER ACRE	35	35	60	65	35	35	60	65

Note: The seeding rates shown in this table apply only when seed is spread by an approved mechanical spreader meeting the requirements of Section 570 and 577 of the Standard Specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SHOULDER SODDING AND REWORKING ON EXISTING FACILITIES					
Designed By	ESR	Date	08/07/94	Approved By	J. J. J.
Drawn By	HSD	Date	08/07/94	State Design Engineer, Roadways	
Checked By	ESR	Date	08/07/94	Revision No.	Sheet No.
F.H.S.A. Approved	08/24/94	67	1 of 1	105	

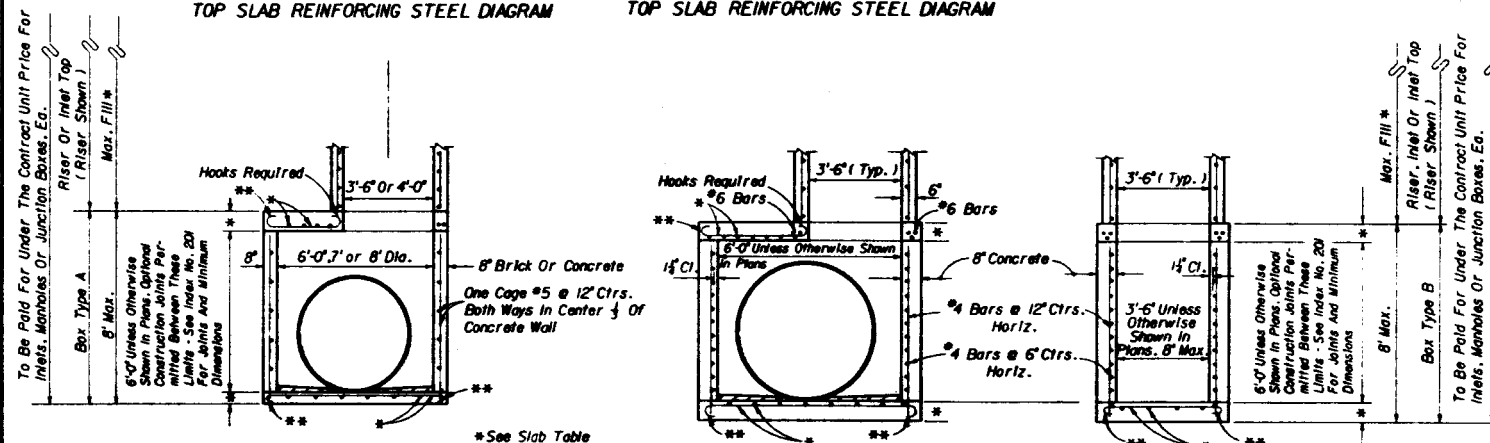


TOP SLAB REINFORCING STEEL DIAGRAM

TOP SLAB REINFORCING STEEL DIAGRAM

ALT. A I.D.	ALT. B		SLAB THICKNESS	ALLOWABLE FILL OVER TOP SLAB		REINFORCING TOP & FLOOR SLABS
	WIDTH	MAX. LENGTH		Min.	Max.	
	3'-6"	Unlimited	8"	2'	29'	*6 @ 6" CTRS. B.W.
	4'-0"	Unlimited	8"	2'	25'	*6 @ 6" CTRS. B.W.
	5'-0"	6'-0"	10"	2'	27'	*7 @ 6" CTRS. B.W.
6'	5'-0"	6'-0"	8"	2'	20'	*6 @ 6" CTRS. B.W.
6'	6'-0"	6'-0"	10"	2'	25'	*7 @ 6" CTRS. B.W.
7' or 8'	6'-0"	6'-0"	10"	2'	11'	*7 @ 6" CTRS. B.W.
	5'-0" 5'-0" 7'-0"	7'-0"	10"	2'	25'	*7 @ 4½" CTRS. B.W.
	5'-0" 6'-0" 8'-0"	8'-0"	10"	2'	15'	*7 @ 4½" CTRS. B.W.

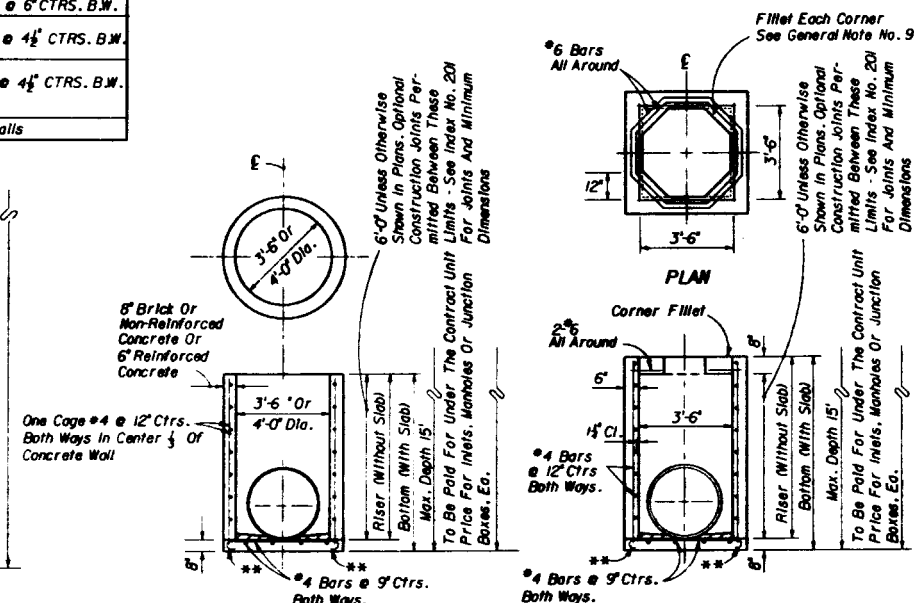
Larger Boxes Require Special Design Details



ALTERNATE A

ALTERNATE B

TYPE J
FOR INLETS, MANHOLES AND JUNCTION BOXES



ALTERNATE A

ALTERNATE B

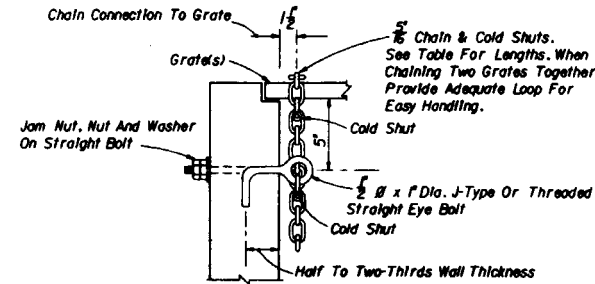
TYPE P
FOR INLETS, MANHOLES AND JUNCTION BOXES

GENERAL NOTES

1. Walls of circular structures (Alternate A) constructed in place may be of non-reinforced concrete or brick or reinforced concrete. Precast and rectangular structures (Alternate B) shall be constructed of reinforced concrete only.
2. Wall thickness and reinforcement are for either reinforced cast-in-place or precast concrete units except that precast circular units may be furnished with walls in accordance with either A.S.T.M. C-478 (up to 96" diameter) or A.S.T.M. C-76, Class III. B Wall, modified where the elliptical steel cage area is placed in the center one-third of the wall.
3. Top and floor slab thickness and reinforcement are for all types of construction. Top and floor slabs for Type J units shall be of Class II concrete. Concrete as specified in A.S.T.M. C-478 (4000 psi) may be used in lieu of Class I and Class II concrete in precast items manufactured in plants which are under the 'Standard Operating Procedures' for the inspection of precast drainage products.
4. Reinforcement is based on Grade 40, Grade 60 or welded wire fabric, either smooth or deformed, may be used as permitted by Note 4, Index 20I. Sheet 4 of 5.
5. Structure bottoms Types J and P may be used in conjunction with curb inlet tops Types 1, 2, 3, 4, 5, 6, 9, and 10, and any manhole or junction box unless otherwise shown in the plans or other standard drawings. Structure bottoms Type J, Alt. B may be used in conjunction with curb inlet Types 7 & 8, or any ditch bottom inlet unless otherwise shown in the plans or other standard drawings.
6. Rectangular structures may be related as directed by the Engineer in order to facilitate connections between the structure walls and storm sewer pipes.
7. Except when A.C.I. hooks are specifically required, embedment hooks in the top and bottom slabs may be replaced with straight embedments or peripheral reinforcement in accordance with the reinforcement detail shown under 'Rebar Straight End Embedment Or Peripheral Reinforcement in Lieu Of A.C.I. Standard Hooks For Top And Bottom Slabs', Index No. 20I, Sheet 3 of 5.
8. All steel bars shall have 1 1/2" minimum cover unless otherwise shown. Horizontal steel in rectangular structures shall be lapped a minimum of 24 bar diameters at corners.
9. The corner fillets shown are necessary for rectangular structures used with circular risers and inlet throats and used on skew with rectangular risers, inlet and inlet throats. Fillets will be required in the lower end of the Alt. B riser when used with the Alt. A box.
10. Inlet throats, riser or manhole tops shall be secured to structures as shown on Index No. 20I.
11. Structures with depths over 14' are to be checked for floatation by designer of project drainage.
12. Larger than specified standard units may be substituted at the contractor's option when these units will not cause or increase the severity of utility conflicts. Such larger units shall be furnished at no additional cost to the Department. Larger Alternate A units cannot replace Alternate B units without approval of the Engineer. This note applies to this Index only.
13. For manhole and junction box tops, for frames and covers, and, for supplementary details see Index No. 20I.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
STRUCTURE BOTTOMS TYPES J AND P			
Designed By	Stamp	Series	Approved By <i>[Signature]</i>
Drawn By			State Bridge Engineer
Checked By			Revision No. Sheet No.
F.H.W.A. Approved	05/02/73		RR 1 of 1
			Index No. 200

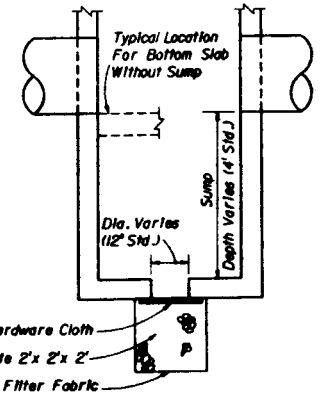
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS			
Designed By	Revised	Series	Approved By
Drawn By	HSD	06/82	<i>E. G. Rouse</i>
Checked by	SR	06/82	State Highway Engineer
F.H.S.A. Approval	08/23/82	Revision No.	Sheet No.
		86	10f 5
			201



Note: When Alternate G grate is specified, the chain, bolt, nuts, washer and cold shuts shall be galvanized in accordance with the specifications for the grate.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

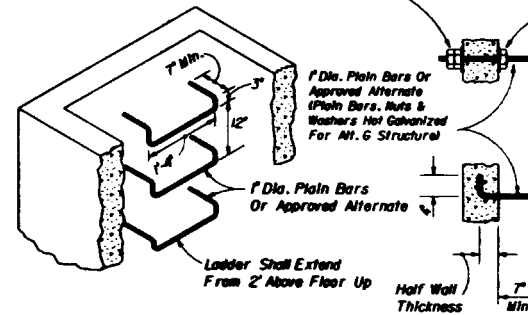
EYE BOLT AND CHAIN REQUIREMENTS					
Index Number	Inlet Type	Eye Bolts	Length Of Chain	Handling & Remarks	
217	(MB) 1	1	4'-0"	Slide & Spin	
	(MB) 2	1	4'-0"	Slide & Spin	
	(MB) 3	2	2@4'-0"	Slide & Spin	
	(MB) 4	2	2@4'-0"	Slide & Spin	
	(MB) 5	2	2@4'-0"	Slide & Spin	
220	S	1	4'-0"	Slide & Spin	
221	V	1	4'-0"	Slide & Spin	
230	A	1	3'-0"	Slide	
232	B	1	5'-0"	Slide & Spin	
	C	1	2'-6"	Slide & Spin	
	D	1	2'-6"	Slide & Spin	
	E	2	2@2'-6"	Slide & Spin	
	H	2	2@2'-6"	Flip Ctr. Grate and Slide & Spin Single Free Grate	
233	F	1	3'-6"	Flip Or Slide & Spin	
	G	1	6'-0"	Slide	
			2'-0"	Lifting Loop	
	J	1	4'-0"	Slide & Spin	
234	B W	1	3'-6"	Slide Or Slide & Spin	



NOTE: Sump bottom appropriate for all manhole and inlet types. Cost for sump bottom to be included in the contract unit price for inlet or manhole.

SUMP BOTTOM

Jam Nut Or Spot Weld With Single Nut & Washer For Standard Structures;
Jam Nut With Single Nut & Washer For Alternate G Structures



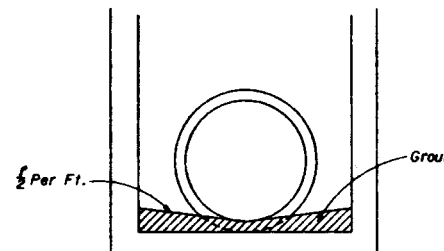
Washer Welded To Smooth Bar Or Nut & Washer On Threaded Bar For Standard Structures; Nut & Washer For Alternate G Structures

Note: Ladder bars are required only when called for in the plans. Other types of ladder bars appearing on the Department's "Qualified Products List" may be used. Installation shall be in accordance with the ladder bar manufacturers recommendations.

PICTORIAL VIEW

OPTIONAL BAR TYPES

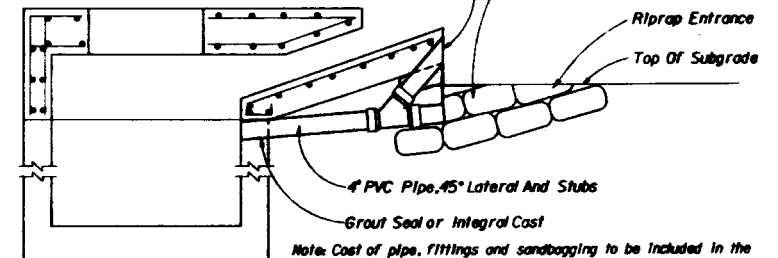
LADDER BARS FOR STRUCTURES OVER 10' IN DEPTH



FOR ALL STRUCTURES UNLESS EXCLUDED BY SPECIAL DETAIL
DRAINAGE STRUCTURE INVERT

Barrel Cut Upper Stub To Match Forming For Apron Face. Capping Or Plugging Of Upper Stub Not Required (Friable base material at stub opening shall be removed to permit covering of opening with structural course material.)

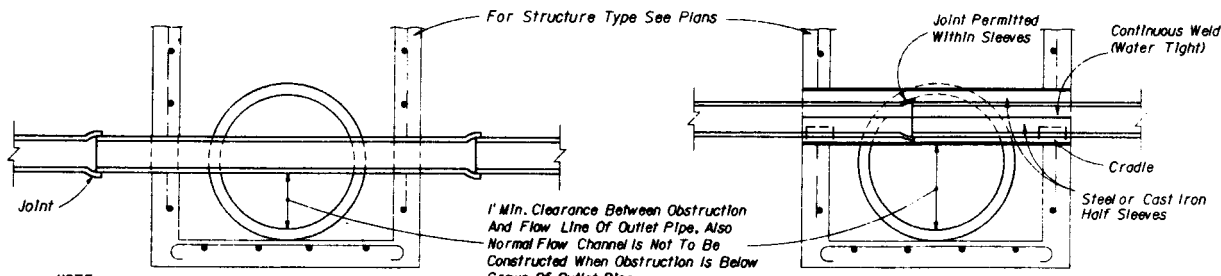
Prior To Placing Base Material Remove Riprap, Cement PVC Cap On Lower Stub And Place Compacted Fill In Entrance.



Note: Cost of pipe, fittings and sandbagging to be included in the contract unit price for inlets. See index No. 102 for bale barrier protection at inlet.

TEMPORARY DRAINS FOR SUBGRADE AND BASE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS					
Designed By	HEB	Date	06/75	Approved By	<i>B.G. Rouse</i>
Drawn By					State Drainage Engineer
Checked By	LIF	Date	06/75	Revision No.	Sheet No.
F.A.R.A. Approved	10/07/80	BB	2 of 5	201	



- NOTE:
1. No joints allowed inside the Condition I structure.
 2. Only cast iron or steel water mains or cast iron sanitary sewer will be allowed to pass directly through structure.

CONDITION I

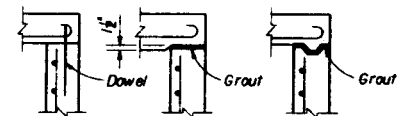
DESIGNERS NOTE

"Sumped" conflict manholes shall not be used unless the system is hydraulically designed to take in account the headloss generated if the sump is completely blocked. "Sumped" conflict manholes must be larger than those normally provided.

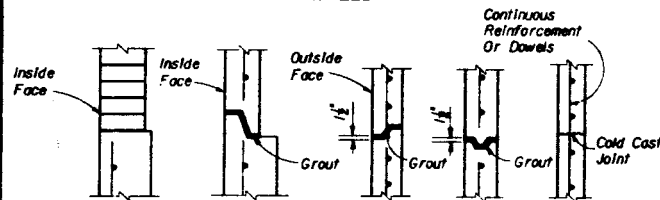
- NOTE:
1. Only water mains will be allowed to pass through a Condition II structure.

CONDITION II

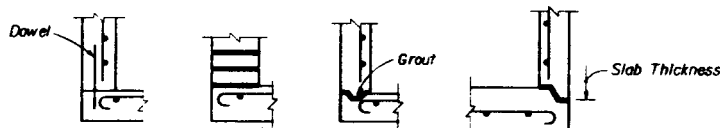
UTILITY PIPES THRU STORM SEWER STRUCTURES



TOP SLABS TO WALLS



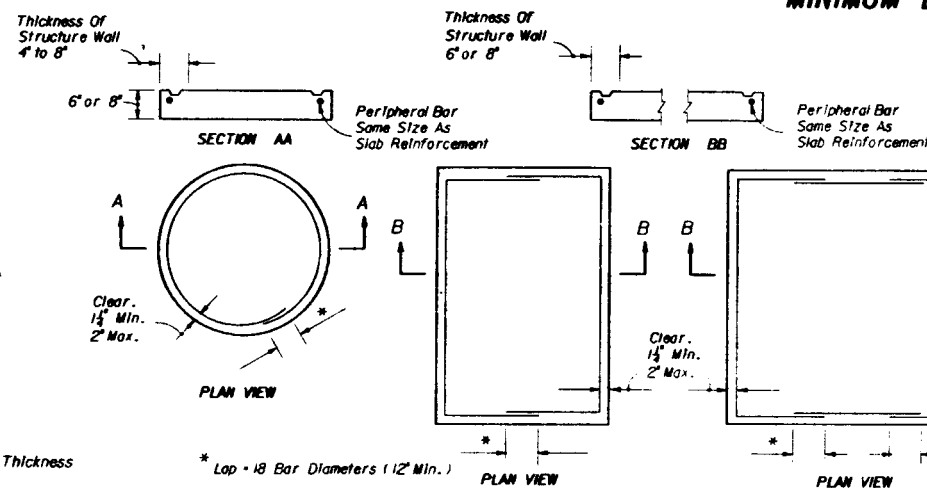
WALL JOINTS



BOTTOM SLABS TO WALLS

1. One or more types of joints may be used in a single structure, except brick wall structure. Brick wall construction is permitted on circular units only.
2. All grouted joints are to have a maximum thickness of 1".
3. Keyways are to be a minimum of 1 1/2" deep.
4. Joint dowels are to be #4 bars, 12" long with a minimum of 6 bars per joint for circular structures approximately evenly spaced, and 2 bars per side at approximate quarter points for rectangular structures.
5. Minimum cover on reinforcing bars is 1 1/2".
6. Joints between wall segments and between wall segments and top or bottom slabs may be sealed either by preformed plastic gasket material using the procedures given in Section 430-7.3 or by grout.
7. Approved product inserts may be used in lieu of dowel embedment.

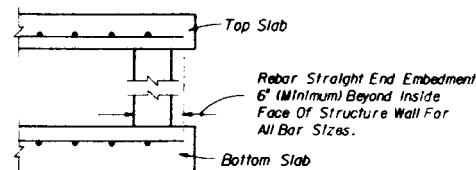
OPTIONAL CONSTRUCTION JOINTS



CIRCULAR BOXES 3'-6", 4'-0", 6'-0", 7'-0" & 8'-0" DIAMETER

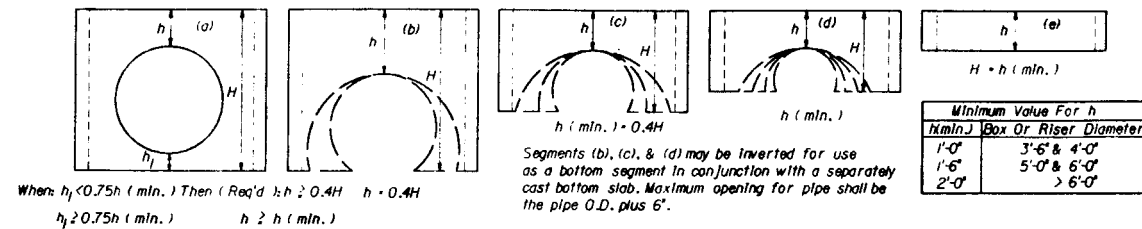
SQUARE AND RECTANGULAR BOXES TO 8'-0" x 8'-0"

PERIPHERAL REINFORCEMENT

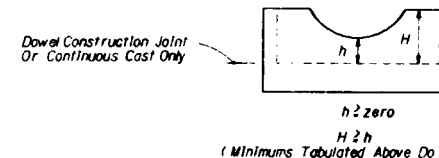


STRAIGHT END EMBEDMENT

(NOTE: NOT APPLICABLE AROUND MANHOLE AND RISER OPENINGS)
**REBAR STRAIGHT END EMBEDMENT OR PERIPHERAL REINFORCEMENT
 IN LIEU OF ACI STANDARD HOOKS FOR TOP AND BOTTOM SLABS**



TOP OR BOTTOM SEGMENTS WITH CONSTRUCTION JOINTS OTHER THAN DOWEL OPTION



TOP OR BOTTOM SEGMENT FOR DOWEL CONSTRUCTION JOINTS OR CONTINUOUS CAST SEGMENTS

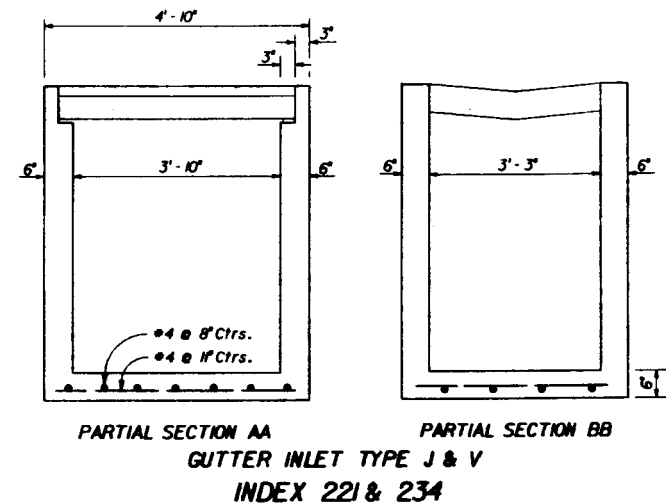
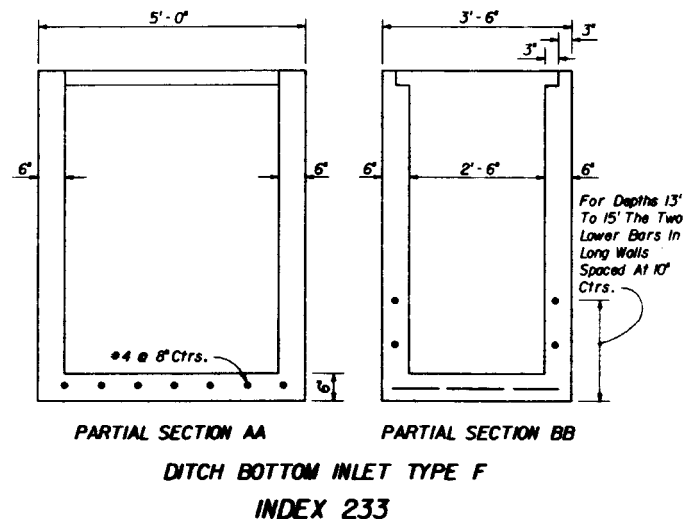
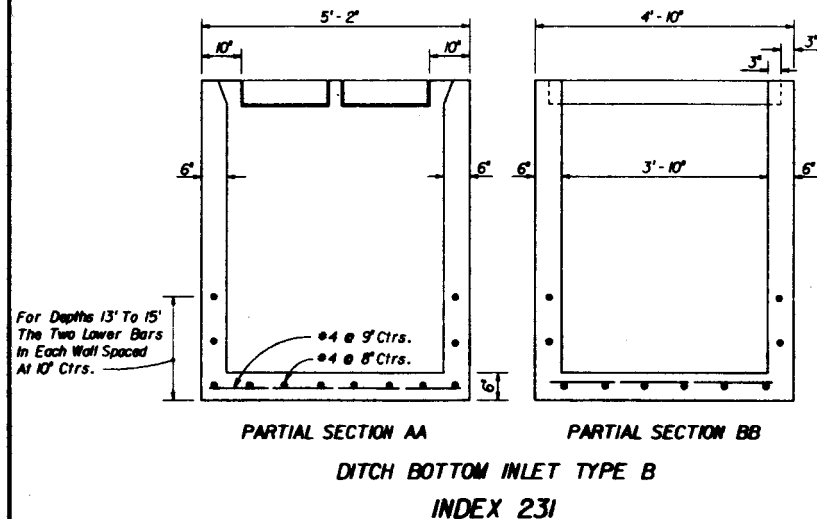
COMPARATIVE SIDE VIEWS

MINIMUM DIMENSIONS FOR BOX AND RISER SEGMENTS

GENERAL NOTES

1. For square or rectangular precast drainage structures, either deformed or smooth welded wire fabric may be used provided:
 - a) The smooth welded wire fabric shall comply with ASTM A-185, and deformed welded wire fabric shall comply with ASTM A-497.
 - b) Width and length of the unit is four times the spacing of the cross wires.
 - c) Wire fabric shall be continuous around the box, spliced at quarter points with overlap of not less than the spacing of the cross wires plus two inches.
2. For equivalent steel areas for precast drainage structures, see Sheet 4 of 5.
3. Horizontal steel in the walls of rectangular structures shall be lapped a minimum of 24 bar diameter at corners.
4. Welding of splices and laps is permitted. The requirements and restrictions placed on welding in AASHTO M-259 shall apply.
5. Rebar straight end embedment or peripheral reinforcement may be used in lieu of ACI standard hooks for top and bottom slabs except when hooks are specifically called for in plans or standard drawings.
6. Concrete as specified in ASTM C-478 (4000 psi) may be used in lieu of Class I and Class II concrete in precast items manufactured in plants which are under the 'Standard Operating Procedures For The Inspection Of Precast Drainage Products'.
7. Maximum opening for pipe shall be the pipe o.d. plus 6". Mortar used to seal the pipe into the opening will be of such a mix that shrinkage will not cause leakage into or out of the structure.
8. For pay item purposes, the height used to determine if a drainage structure is less than or greater than 10 feet shall be computed using (a) the elevation of the top of the manhole lid, (b) the grate elevation or the theoretical gutter grade elevation of an inlet, or (c) the outside top elevation of a junction box less the flow line elevation of the lowest pipe.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS			
Designed By	HLB	Date	04/75
Drawn By		Checked By	LMF
Reviewed By		Revision No.	04/75
F.L.B.A. Approved		10/07/80	88
Signature of State Drainage Engineer		Sheet No.	3 of 5
		Index No.	201



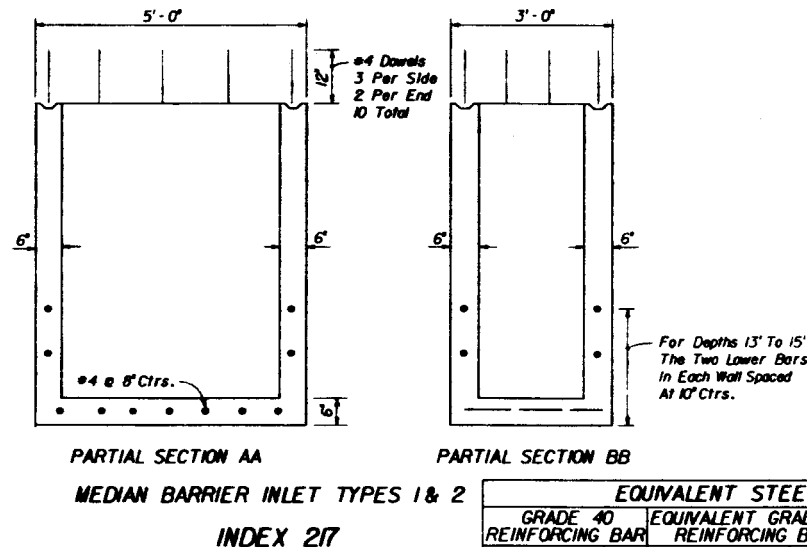
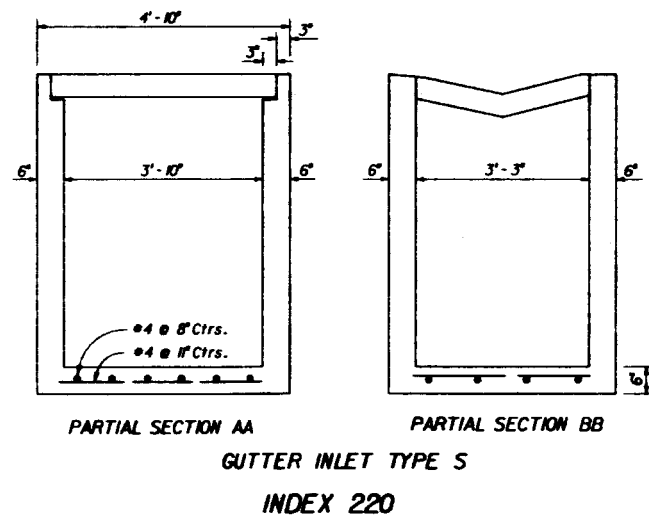
NOTES FOR THIN-WALL PRECAST OPTIONS

- The details on Sheets 4 & 5 are optional for precast construction only, including inlets used with Bottom Type "J". Alt. "B". Cast-in-place construction must adhere to the details contained on the referenced indexes.
- Only the dimensions and reinforcement changes or other modifications are indicated. For all other dimensions and details, the referenced index drawings apply. The width of Bottom Type "J", Alt. "B" can be adjusted to reflect the appropriate precast unit dimension.
- Concrete which meets the requirements of ASTM C-478 shall be used for structures constructed to these details.
- Reinforcement can be either deformed bar reinforcement or welded wire fabric. Bar reinforcement other than 40 KSI may be used, however only two grades are recognized; Grade 40 and Grade 60. Welded wire fabric, including deformed welded wire fabric, will be recognized as having a design strength of 65 KSI. The area of reinforcement required may be reduced in accordance with the Equivalent Steel Area Table provided. For bars and spacings not given, the steel area required can be determined by the following equations:

$$\text{Grade 60 Steel Area} = A_s \cdot 60 \cdot \frac{8}{100} \times A_s \cdot 40$$

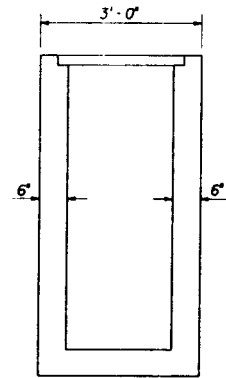
$$\text{Welded Wire Fabric Steel Area} = A_s \cdot 65 \cdot \frac{8}{100} \times A_s \cdot 40$$

In no case will fabric with wires smaller than W 3 J or spacings greater than 8" be permitted. Bar reinforcement shall show the minimum yield designation grade mark of either the number 60 or one (1) grade mark line to be acceptable at the higher value. Maximum bar spacing shall not be greater than two (2) times the slab thickness with a maximum spacing of 12" or three (3) times the wall thickness, with a maximum spacing of 18".

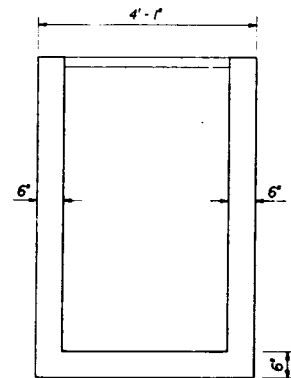


EQUIVALENT STEEL AREA TABLE					
GRADE 40 REINFORCING BAR		EQUIVALENT GRADE 60 REINFORCING BAR		EQUIVALENT 65 KSI WELDED WIRE FABRIC	
Bar Size & Spacing	Steel Area	Bar Size & Spacing	Min. Steel Area	Bar Size & Spacing	Min. Steel Area
#4 @ 12" CCEW	0.20	#3 @ 9 1/2" CCEW	.1333	3' x 3'-W3J x W3J or 4' x 4'-W4.5 x W4.5 or 6' x 6'-W6.5 x W6.5	.1230
#4 @ 9" CCEW	0.267	#4 @ 13 1/8" CCEW or #3 @ 7" CCEW	.1778	3' x 3'-W4.5 x W4.5 or 4' x 4'-W5.5 x W5.5 or 6' x 6'-W8.5 x W8.5	.1641
#4 @ 6" CCEW	0.88	#5 @ 6" CCEW or #6 @ 9" CCEW	.5867	4' x 4'-W20 x W20 or 6' x 6'-W30 x W30	.5415
#4 @ 6" CCEW	1.20	#6 @ 6 1/2" CCEW or #7 @ 9" CCEW	.80	4' x 4'-W26 x W26	.7385

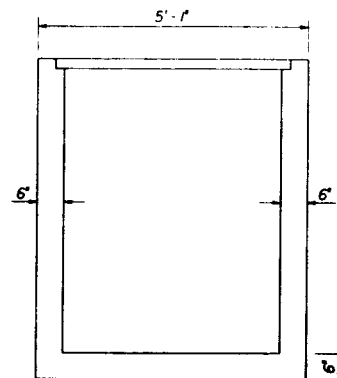
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS					
Designed By	EDW/BB	Check By	BB	Approved By	<i>[Signature]</i>
Drawn By	SPW/BB	Check By	BB	Reviewed By	201
Checked By	EDW	Check By	BB	Revised By	
F.J.H.A. Approved				8/07/85	4 of 5



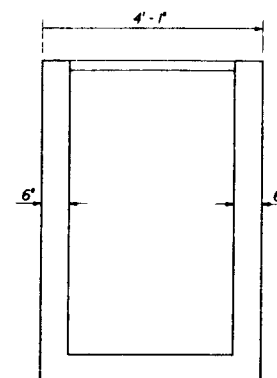
PARTIAL SECTION BB



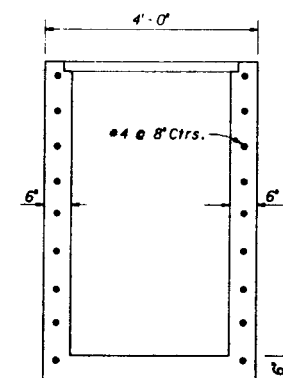
PARTIAL SECTION CC



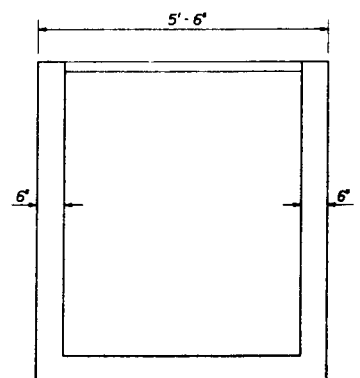
PARTIAL SECTION BB



PARTIAL SECTION CC



PARTIAL SECTION BB

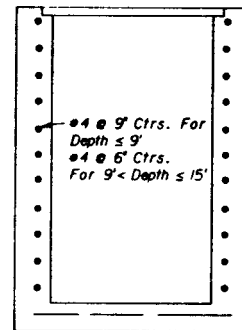


PARTIAL SECTION CC

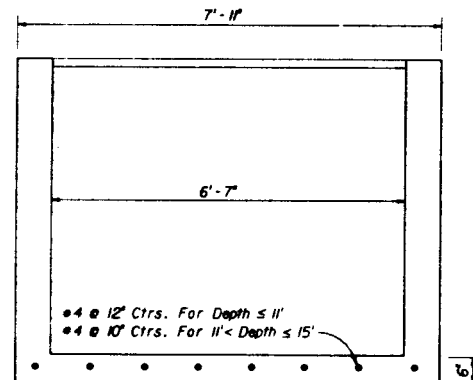
DITCH BOTTOM INLET C
INDEX 232

DITCH BOTTOM INLET D
INDEX 232

DITCH BOTTOM INLET E
INDEX 232

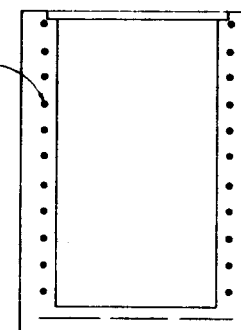


PARTIAL SECTION BB

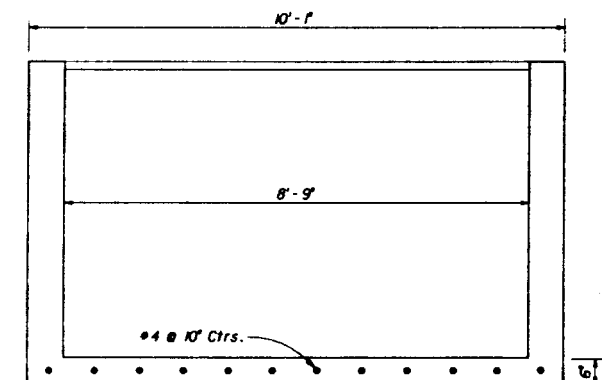


PARTIAL SECTION CC

#5 @ 9' Ctrs. For Depth ≤ 9'
#5 @ 6' Ctrs. For 9' < Depth ≤ 15'



PARTIAL SECTION BB

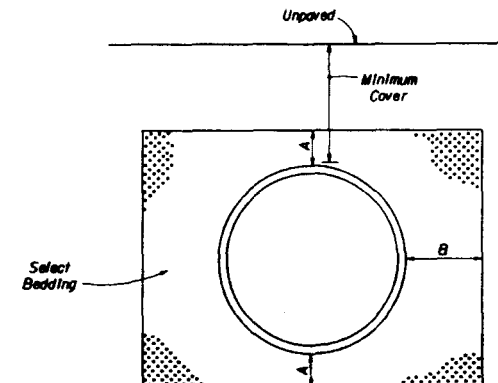
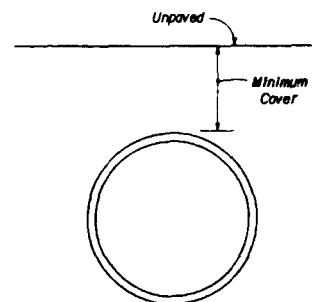
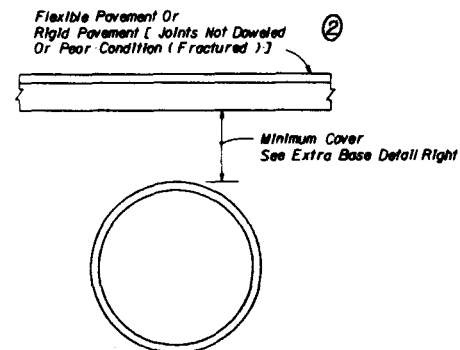
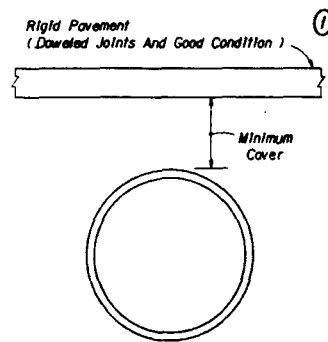


PARTIAL SECTION CC

DITCH BOTTOM INLET H (3 - GRATE)
INDEX 232

DITCH BOTTOM INLET H (4 - GRATE)
INDEX 232

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS					
Designed By	ESP/AM	Date	08/85	Approved By	<i>E. G. Rupp</i>
Drawn By	WPH/dde	Date	08/85	Reviewed By	<i>E. G. Rupp</i>
Checked By	EDR	Date	08/85	Revision No.	Sheet No.
F.J.W.A. Approved	11/07/85	87	5 of 5	201	



Extra Base When This Dimension Is Less Than 12" For Concrete Pipe, 15" For Corrugated Steel Pipe And 18" For Corrugated Aluminum Pipe And Corrugated Polyethylene Pipes. See Application Note Below.

Note: Extra base is required when cross culverts are located on facilities subject to high speed traffic (> 45 m.p.h.) or high traffic volumes (> 1600 ADT) and the cover is within the ranges specified in the notation above.

Extra base material to be paid for as equivalent square yard base, except when material is called for on cubic yard or tonnage basis.

EXTRA BASE FOR CROSS CULVERTS UNDER FLEXIBLE PAVEMENTS

PIPE TYPE	A	B
Concrete	3'	12"
Corrugated Steel	6'	12"
Corrugated Aluminum	6'	12"
Corrugated Polyethylene	6'	12"

GENERAL NOTES

- The tabulated values are recommended minimum dimensions to withstand anticipated highway traffic loads. Additional cover may be required to support construction equipment loads or highway traffic loads before pavement is completed.
- Less than the tabulated minimum cover may be used provided suitable methods are detailed in the plans. These features may include but are not limited to extra strength pipe, select bedding, select backfill, encasement and etc.
- Values shown in parentheses are for 3' x 1' corrugations which must be specified to utilize the lesser cover.
- Commercial and noncommercial refers to typical vehicular utilization of unpaved roads and drives where rutting and cover displacement may occur.

RIGID PAVEMENT ①

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER
CONCRETE	
All Round & Elliptical	6'
CORRUGATED STEEL	
15" - 72" Round & Arch Equiv.	9'
78" & Larger Round & Arch Eq.	15'
CORRUGATED ALUMINUM	
15" - 72" Round & Arch Equiv.	9'
78" - 102" Round & Arch Equiv.	15'
108" & Larger Round	18'
CORRUGATED POLYETHYLENE	
15" - 24" Round	9'

FLEXIBLE PAVEMENT ②

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER
CONCRETE	
All Round & Elliptical	6'
CORRUGATED STEEL	
15" - 48" Round	12'
54" & Larger Round	18'
15" - 48" Arch Equivalent	24" (12')
54" - 102" Arch Equivalent	30" (18')
108" & Larger Arch Equivalent	36" (24')
CORRUGATED ALUMINUM	
15" - 48" Round	12'
54" - 72" Round	18'
78" - 108" Round	24'
108" - 120" Round	30'
15" - 30" Arch Equivalent	24"
36" - 48" Arch Equivalent	27" (15')
54" - 66" Arch Equivalent	30" (18')
72" - 90" Arch Equivalent	36" (24')
96" - 102" Arch Equivalent	42" (30')
CORRUGATED POLYETHYLENE	
15" - 24" Round	12'

UNPAVED W/O SELECT BEDDING

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER	
	COMM	NON COMM
CONCRETE		
All Round & Elliptical	15'	9'
CORRUGATED STEEL		
15" - 72" Round	24'	18'
78" - 120" Round	30'	24'
15" - 84" Arch Equivalent	24'	18'
90" - 102" Arch Equivalent	30'	24'
108" - 120" Arch Equivalent	36'	30'
CORRUGATED ALUMINUM		
15" - 48" Round	24'	18'
54" - 72" Round	30'	24'
78" - 102" Round	36'	30'
108" - 120" Round	42'	36'
15" - 30" Arch Equivalent	24'	18'
36" - 48" Arch Equivalent	27'	21'
54" - 66" Arch Equivalent	30'	24'
72" - 90" Arch Equivalent	36'	30'
96" - 102" Arch Equivalent	42'	36'
CORRUGATED POLYETHYLENE		
15" - 24" Round	24'	18'

UNPAVED WITH SELECT BEDDING

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER	
	COMM	NON COMM
CONCRETE		
All Round & Elliptical	9'	6'
CORRUGATED STEEL		
15" - 72" Round	18'	12'
78" - 120" Round	24'	18'
15" - 84" Arch Equivalent	18'	12'
90" - 102" Arch Equivalent	24'	18'
108" - 120" Arch Equivalent	30'	24'
CORRUGATED ALUMINUM		
15" - 48" Round	18'	12'
54" - 72" Round	24'	18'
78" - 102" Round	30'	24'
108" - 120" Round	36'	30'
15" - 30" Arch Equivalent	18'	12'
36" - 48" Arch Equivalent	21'	15'
54" - 66" Arch Equivalent	24'	18'
72" - 90" Arch Equivalent	30'	24'
96" - 102" Arch Equivalent	36'	30'
CORRUGATED POLYETHYLENE		
15" - 24" Round	18'	12'

MINIMUM COVER FOR CONCRETE, STEEL, ALUMINUM AND POLYETHYLENE PIPE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
COVER HEIGHT					
Designed By	Checked By	Drawn By	Reviewed By	Approved By	Stamp No.
EPR	DB/SH	DB/SH	DB/SH	<i>[Signature]</i>	100
Drawn By	Checked By	Drawn By	Reviewed By	Approved By	Stamp No.
EPR	DB/SH	DB/SH	DB/SH	<i>[Signature]</i>	100
F.H.W.A. Approved: 08/28/94				86	1 of 4

ROUND PIPE DIMENSIONS

Equiv. Dia. (In.)	Area (Sq.Ft.)	Wall Thickness (In.) Classes III, IV, V		
		A WALL	B WALL	C WALL
12	0.8	1 1/2	2	NA
15	1.2	1 7/8	2 1/2	NA
18	1.8	2	2 1/2	NA
24	3.1	2 1/2	3	3 1/2
30	4.9	2 3/4	3 1/2	4 1/2
36	7.1	3	4	4 3/4
42	9.6	3 1/2	4 1/2	5 1/4
48	12.6	4	5	5 3/4
54	15.9	4 1/2	5 1/2	6 1/4
60	19.6	5	6	6 3/4
66	23.8	5 1/2	6 1/2	7 1/4
72	28.3	6	7	7 3/4
78	33.2	6 1/2	7 1/2	8 1/4
84	38.5	7	8	8 3/4
90	44.4	7 1/2	8 1/2	9 1/4
96	50.3	8	9	9 3/4
102	56.7	8 1/2	9 1/2	10 1/4
108	63.7	9	10	10 3/4
114	70.9	9 1/2	—	—
120	78.5	10	—	—

ROUND PIPE INSTALLATIONS (All Sizes)

Design	Height Of Fill (Ft.)	Pipe Class	Bedding Class	Projection Condition
Standard	1 - 14	III	C	Positive
	15 - 22	IV	C	Positive
	23 - 26	V	C	Positive
Modified Bedding	27 - 32	V	B	Positive
Modified Trench	33 - 43	V	B	Zero
	44 - 70	V	B	Negative
	71 +	V	B	Imperfect
Pipe Class III D - Load = 1350 Lbs/Ft/Ft (.01" Crack) D - Load = 2000 Lbs/Ft/Ft (Ultimate)				
Pipe Class IV D - Load = 2000 Lbs/Ft/Ft (.01" Crack) D - Load = 3000 Lbs/Ft/Ft (Ultimate)				
Pipe Class V D - Load = 3000 Lbs/Ft/Ft (.01" Crack) D - Load = 3750 Lbs/Ft/Ft (Ultimate)				

ELLIPTICAL PIPE DIMENSIONS

Nominal Dimensions				Equiv. Dia. (In.)	Area (Sq.Ft.)	Wall Thickness (In.)	
Horiz.		Vert.				Classes	
Rise (In.)	Span (In.)	Rise (In.)	Span (In.)			HE VE	III III
NA	NA	NA	NA	12	NA	NA	
12	18	18	12	15	1.3	2½	
14	23	23	14	18	1.8	2¾	
19	30	30	19	24	3.3	3¼	
24	38	38	24	30	5.1	3¾	
29	45	45	29	36	7.4	4½	
34	53	53	34	42	10.2	5	
38	60	60	38	48	12.9	5½	
43	68	68	43	54	16.6	6	
48	76	76	48	60	20.5	6½	
53	83	83	53	66	24.8	7	
58	91	91	58	72	29.5	7½	
63	98	98	63	78	34.6	8	
68	106	106	68	84	40.1	8½	
72	113	113	72	90	46.1	9	
77	121	121	77	96	52.4	9½	
82	128	128	82	102	59.2	10	
87	136	136	87	108	66.4	10½	
92	143	143	92	114	74.0	11	
97	151	151	97	120	82.0	11½	

ELLIPTICAL PIPE INSTALLATIONS (All Sizes)

Installation	Height Of Fill (Ft.)	Pipe Class	Bedding Class
Horizontal	1 - 13	HE III	C
	14 - 21	HE IV	C
	22 +	By Special Design	Modified
Vertical	1 - 13	VE III	C
	14 - 21	VE IV	C
	22 +	By Special Design	Modified
Pipe Class HE III D - Load = 1350 Lbs/Ft/Ft (.01" Crack) D - Load = 2000 Lbs/Ft/Ft (Ultimate)			
Pipe Class HE IV D - Load = 2000 Lbs/Ft/Ft (.01" Crack) D - Load = 3000 Lbs/Ft/Ft (Ultimate)			
Pipe Class VE III D - Load = 1350 Lbs/Ft/Ft (.01" Crack) D - Load = 2000 Lbs/Ft/Ft (Ultimate)			
Pipe Class VE IV D - Load = 2000 Lbs/Ft/Ft (.01" Crack) D - Load = 3000 Lbs/Ft/Ft (Ultimate)			

MAXIMUM COVER FOR REINFORCED
CONCRETE PIPE ROUND AND ELLIPTICAL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
COVER HEIGHT					
Designed By EGP	Drawn By MSD	Checked By EGP	Approved By <i>E. K. R. Jr.</i>	Revision No. 08/85	Sheet No. 2 of 4
F.M.W.A. Approved:			86		
			205		

ROUND PIPE - 2 $\frac{3}{8}$ x $\frac{1}{2}$ CORRUGATION							
D (In.)	Area (Sq.Ft.)	Maximum Height Of Cover (Ft.)					Min. Height Of Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.064 (16)	0.079 (14)	0.109 (12)	0.138 (10)	0.168 (8)	
12	.79	100+	100+	NA	NA	NA	See Sheet 1 of 4
15	1.23	100+	100+	NA	NA	NA	
18	1.77	100+	100+	100+	NA	NA	
21	2.40	100+	100+	100+	NA	NA	
24	3.14	100+	100+	100+	NA	NA	
30	4.91	85	100+	100+	NA	NA	
36	7.1	71+	88	100+	100+	NA	
42	9.6	60+	76	100+	100+	NA	
48	12.6	53	66	93	100+	100+*	
54	16.0	NS	59	82	100+	100+*	
60	19.6	NS	NS	74	95	100+*	
66	23.8	NS	NS	NS	87	100+*	
72	28.3	NS	NS	NS	79	97 *	
78	33.2	NS	NS	NS	NS	90 *	
84	38.5	NS	NS	NS	NS	83 *	

ROUND PIPE - 3" x 1" CORRUGATION							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Cover (Ft.)					Min. Height Of Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.064 (16)	0.079 (14)	0.109 (12)	0.138 (10)	0.168 (8)	
36	7.1	81	100+	100+	NA	NA	See Sheet 1 of 4
42	9.6	70	87	100+	NA	NA	
48	12.6	61	76	100+	100+	NA	
54	16.0	54	68	95	100+	NA	
60	19.6	48	61	85	100+	NA	
66	23.8	44	55	78	100	100+*	
72	28.3	40	51	71	91	100+*	
78	33.2	37	47	66	84	100+*	
84	38.5	35	43	61	78	100+*	
90	44.2	32	40	57	73	90*	
96	50.3	NS	38	53	68	84*	
102	56.7	NS	36	50	64	79*	
108	63.6	NS	NS	47	61	75*	
114	70.9	NS	NS	45	58	71*	
120	78.5	NS	NS	42	55	67*	
132	95.0	NS	NS	NS	50	61*	

ROUND PIPE - 5" x 1" CORRUGATION							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Cover (Ft.)					Min. Height Of Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.064 (16)	0.079 (14)	0.109 (12)	0.138 (10)	0.168 (8)	
36	7.1	72	90	100+	NA	NA	See Sheet 1 of 4
42	9.6	62	77	100+	NA	NA	
48	12.6	54	68	95	100+	NA	
54	16.0	48	60	84	100+	NA	
60	19.6	43	54	76	98	NA	
66	23.8	39	49	69	89	100+*	
72	28.3	36	45	63	81	100*	
78	33.2	33	41	58	75	92*	
84	38.5	31	38	54	70	85*	
90	44.2	29	36	50	65	80*	
96	50.3	NS	34	47	61	75*	
102	56.7	NS	32	44	57	70*	
108	63.6	NS	NS	42	54	66*	
114	70.9	NS	NS	40	51	63*	
120	78.5	NS	NS	38	49	60*	
132	95.0	NS	NS	NS	44	54*	

PIPE ARCH - 2 3/8 x 1/2 CORRUGATION							
Span (In)	Rise (In)	Equiv. Round Pipe (In)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In) (Ga)	Maximum Height Of Cover (Ft.)		Min. Height Of Cover (Ft.)
					Maximum Corner Pressure Lbs/Sq. Ft.		
					4000	6000	
17	13	15	1.1	.064 (16)	12	14	See Sheet 1 of 4
21	15	18	1.6	.064 (16)	10	14	
24	18	21	2.2	.064 (16)	7	13	
28	20	24	2.9	.064 (16)	5	11	
35	24	30	4.5	.064 (16)	NS	7	
42	29	36	6.5	.064 (16)	NS	7	
49	33	42	8.9	.079 (14)	NS	6	
57	38	48	11.6	.109 (12)	NS	8	
64	43	54	14.7	.109 (12)	NS	9	
71	47	60	18.1	.138 (10)	NS	10	
77	52	66	21.9	.168 (8) *	5	10	
83	57	72	26.0	.168 (8) *	5	10	

PIPE ARCH - 3" x 1" and 5" x 1" CORRUGATION							
Span (In)	Rise (In)	Equiv. Round Pipe (In)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In) (Ga)	Maximum Height Of Cover (Ft.)		Min. Height Of Cover (Ft.)
					Maximum Corner Pressure Lbs/Sq.Ft.		
					4000	6000	
40	31	36	7.0	.079 (14)	8	12	See Sheet 1 of 4
46	36	42	9.4	.079 (14)	8	13	
53	41	48	12.3	.079 (14)	8	13	
60	46	54	15.6	.079 (14)	8	13	
66	51	60	19.3	.079 (14)	9	13	
73	55	66	23.2	.079 (14)	11	16	
81	59	72	27.4	.079 (14)	11	17	
87	63	78	32.1	.079 (14)	10	16	
95	67	84	37.0	.079 (14)	11	17	
103	71	90	42.4	.109 (12)	10	15	
112	75	96	48.0	.109 (12)	10	16	
117	79	102	54.2	.109 (12)	10	15	
128	83	108	60.5	.138 (10)	9	14	
137	87	114	67.4	.138 (10)	8	13	
142	91	120	74.5	.168 (8)	7	12	

* Recorrugated end not available. May be considered for cross drain and side drain applications only.

NA - Not Available

LA - Limited Availability

NS - Not Suitable (For Highway H-20 Loadings)

MAXIMUM COVER FOR CORRUGATED STEEL PIPE ROUND AND PIPE ARCH

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
COVER HEIGHT					
Designed By EGR	Revised EGR	Drawn By ASD	Checked By EGR	Approved By <i>[Signature]</i> State Bridge Engineer	Issue No. 205
F.H.W.A. Approved				86	3 of 4

ROUND PIPE - 2 $\frac{3}{8}$ " x $\frac{1}{2}$ " CORRUGATION

D (In.)	Area (Sq. Ft.)	Maximum Height Of Cover (Ft.)					Min. Height Of Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.060 (16)	0.075 (14)	0.105 (12)	0.135 (10)	0.164 (8)	
12	0.8	90	100 +	NA	NA	NA	See Sheet 1 of 4
15	1.2	72	90	NA	NA	NA	
18	1.8	59	75	100 +	NA	NA	
21	2.4	52	65	92	NA	NA	
24	3.1	44	56	79	NA	NA	
30	4.9	35 DR	44	63	NA	NA	
36	7.1	NS	36 DR	52	68	NA	
42	9.6	NS	NS	44 DR	58	NA	
48	12.6	NS	NS	38 DR	50 DR	61	
54	15.9	NS	NS	34 DR	45 DR	54 DR	
60	19.6	NS	NS	NS	39 DR	49 DR	
66	23.8	NS	NS	NS	NS	44 DR	
72	28.3	NS	NS	NS	NS	40 DR	

ROUND PIPE - 3" x 1" CORRUGATION

D (In.)	Area (Sq. Ft.)	Maximum Height Of Cover (Ft.)					Min. Height Of Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.060 (16)	0.075 (14)	0.105 (12)	0.135 (10)	0.164 (8)	
36	7.1	33	42	60	NA	NA	See Sheet 1 of 4
42	9.6	28	36	51	NA	NA	
48	12.6	24	31	45	58	NA	
54	15.9	21	28	39	51	NA	
60	19.6	19	24	35	46	NA	
66	23.8	15 DR	22	32	42	51	
72	28.3	NS	20 DR	29	38	47	
78	33.2	NS	15 DR	27	35	43	
84	38.5	NS	NS	24 DR	32	40	
90	44.2	NS	NS	23 DR	30	37	
96	50.3	NS	NS	21 DR	28 DR	34	
102	56.7	NS	NS	NS	26 DR	32	
108	63.6	NS	NS	NS	24 DR	30 DR	
114	70.9	NS	NS	NS	NS	28 DR	
120	78.5	NS	NS	NS	NS	27 DR	

PIPE ARCH - 2 $\frac{3}{8}$ " x $\frac{1}{2}$ " CORRUGATION

Span (In)	Rise (In)	Equiv. Round Pipe (In)	Area Sq. Ft.	Minimum Sheet Thickness Required (In) (Gage)	Maximum Height Of Cover (Ft.)		Min. Height Of Cover (Ft.)
					Maximum Corner Pressure-Lbs/Sq.Ft.		
					4000	6000	
17	13	15	1.1	.060 (16)	12	15	See Sheet 1 of 4
21	15	18	1.6	.060 (16)	10	14	
24	18	21	2.2	.060 (16)	7	13	
28	20	24	2.9	.075 (14)	5	11	
35	24	30	4.5	.075 (14)	NS	7	
42	29	36	6.5	.105 (12)	NS	7	
49	33	42	8.9	.105 (12)	NS	6	
57	38	48	11.6	.135 (10)	NS	8	
64	43	54	14.7	.135 (10)	NS	9	
71	47	60	18.1	.164 (8)	NS	10	
77	52	66	21.9	.164 (8)	NS	10	
83	57	72	26.0	.164 (8)	NS	10	

PIPE ARCH - 3" x 1" CORRUGATION

Span (In)	Rise (In)	Equiv. Round Pipe (In)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In) (Gg)	Maximum Height Of Cover (Ft.)		Min. Height Of Cover (Ft.)
					Maximum Corner Pressure-Lbs/Sq.Ft.		
					4000	6000	
40	31	36	7.0	.060 (16)	8	12	See Sheet 1 of 4
46	36	42	9.4	.060 (16)	8	13	
53	41	48	12.3	.060 (16)	8	13	
60	46	54	15.6	.075 (14)	8	13	
66	51	60	19.3	.075 (14)	8	13	
73	55	66	23.2	.105 (12)	11	16	
81	59	72	27.4	.105 (12)	11	17	
87	63	78	32.1	.105 (12)	10	16	
95	67	84	37.0	.105 (12)	11	17	
103	71	90	42.4	.135 (10)	10	15	
112	75	96	48.0	.135 (10)	10	16	
117 LA	79	102	54.2	.164 (8)	10	15	

NA - Not Available

LA - Limited Availability

NS - Not Suitable (For Highway H-20 Loadings)

DR - Design Review Is recommended for each specific application. The review should identify any special handling, installation, backfill procedures, and construction load restrictions which may be required. See FDOT Drainage Manual, Chapter 19, Section 19.4, Vol. II, 1987. The specification of the next thicker culvert in lieu of this review is not appropriate. (The review performed by the designer does not relieve the contractor from analyzing and taking any necessary precautions required to protect partially or completely constructed pipe from the equipment used during construction.)

CORRUGATED ALUMINUM ALLOY ROUND PIPE AND PIPE ARCH

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
COVER HEIGHT					
Designed By	ESR	Date	02/95	Approved By	<i>[Signature]</i>
Drawn By	HSD	Date	02/95	Checked By	ESR
Checked By	ESR	Date	02/95	Revision No.	01
F.H.W.A. Approved				Sheet No.	4 of 4
				Index No.	205

APPLICATION AND SELECTION GUIDE TO CURB INLETS AND GUTTER INLETS

INDEX NO.	INLET TYPE	TYPE CURB/GUTTER	GRADE CONSIDERATION	HYDRAULIC INTAKE (CFS) ^①	BICYCLE SAFE / PEDESTRIAN SAFE	UTILITY LOCATION FROM CURB	MAXIMUM PIPE SIZE WITH STANDARD BOTTOMS ^⑤	COMMENTS
210	② 1	E & F	Continuous	4.1	Yes / Limited	Inside	30"	
	2 ③	E & F	Sag	9.0	Yes / Limited	Inside	30"	
	3	E & F	Continuous	1.9	Yes / Limited	Inside	30"	
	4 ③	E & F	Sag	6.5	Yes / Limited	Inside	30"	
211	② 5	E & F	Continuous	3.1	Yes / Limited	Outside	30"	
	6 ③	E & F	Sag	7.5	Yes / Limited	Outside	30"	
212 ②	7	Separator I & II	Continuous or Sag	4.4	Yes / Limited	Inside	24" Longitudinal 30" Transverse	
213 ②	8	Separator III & IV	Continuous or Sag	4.4	Yes / Limited	Inside	24" Longitudinal 30" Transverse	
214 ②	9	F	Continuous or Sag	0.5	Yes / Yes	Outside	30"	To be used only where flows are light to moderate and R/W does not permit the use of throated curb inlets. Vanes to be directed to major flow direction.
215 ②	10	F	Continuous or Sag	0.3	Yes / Yes	Outside	30"	To be used only where flows are light and R/W does not permit the use of throated curb inlets.
217	1	Median Barrier Wall	Continuous	4.0	No / Yes ④	NA	15" Longitudinal 30" Transverse	
	2	Median Barrier Wall	Sag	5.0	No / No ④	NA	15" Longitudinal 30" Transverse	
	3 ③	Median Barrier Wall	Double Inlet Continuous	4.0	No / Yes ④	NA	42" Longitudinal 30" Transverse	
	4 ③	Median Barrier Wall	Double Inlet Sag	5.0	No / Yes ④	NA	42" Longitudinal 30" Transverse	
	5 ③	Median Barrier Wall	Double Inlet Sag & Continuous	5.0	No / Yes ④	NA	42" Longitudinal 30" Transverse	
218	—	Barrier Wall	Continuous or Sag	5.2	Yes / Yes	NA	30"	
220	S	Shoulder	Continuous	4.0	No / Yes ④	NA	30" Transverse	
221	V	Valley	Continuous or Sag	5.0	Yes / Yes	NA	30" Transverse	

① Hydraulic Intake values do not represent hydraulic capacity but are shown to compare inlets based on a 0.2% longitudinal slope, 0.2% cross slope and a 90% efficiency factor. For other conditions the values shown should be adjusted for bypass flow or debris blockage. Sag Inlet Intake value is based on flooding the outside lane or shoulder, where spread rather than hydraulic Intake may dictate inlet selection or spacing. Full design data and additional information is available in "A Study of Stormwater Inlet Capacities" by U.S.F., and the Department's 1987 Drainage Manual Vol. 2, Chapter 12 and Vol. 3, Chapter 2.

② Curb inlets and transitions should be located outside pedestrian cross walk areas, preferably upgrade from these locations.

③ Double throated inlets are usually not warranted unless the minor flow is in excess of 50 feet distance or 0.5 cfs.

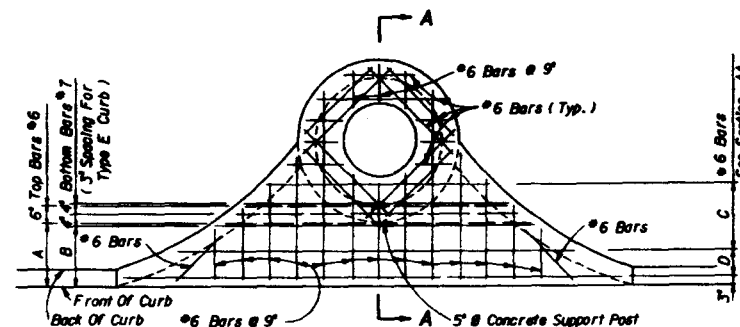
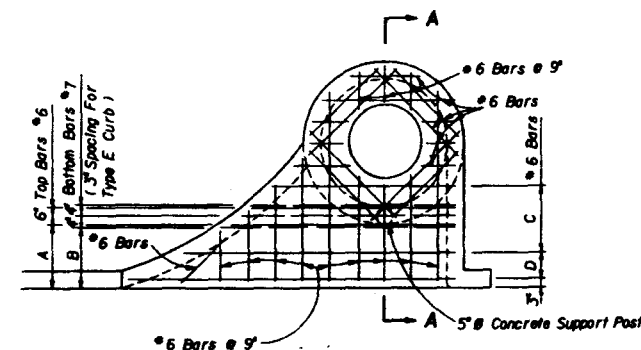
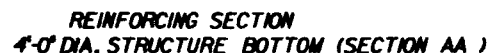
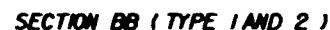
④ Median Barrier Inlets Types 1, 2, 3, 4, 5 & Shoulder Inlet Type S can be made bicycle safe by specifying the rebar grate.

⑤ Pipe sizes are circular, Class III B Wall, concrete pipe. Elliptical pipe and corrugated pipe are to be checked for fit in accordance with Index No. 201; metal pipe sizes should be reviewed using 2 1/2" x 1/2" corrugation up to 30" and 3" x 1/2" corrugation for larger sizes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

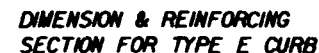
CURB INLET & GUTTER INLET SELECTION GUIDE

Designed By	Checked By	Revised By	Approved By	Sheet No.	Index No.
E E R	D A E	E E R	<i>[Signature]</i>	1 of 1	209
08/05/94	08/05/94	08/05/94	08/28/94	BB	

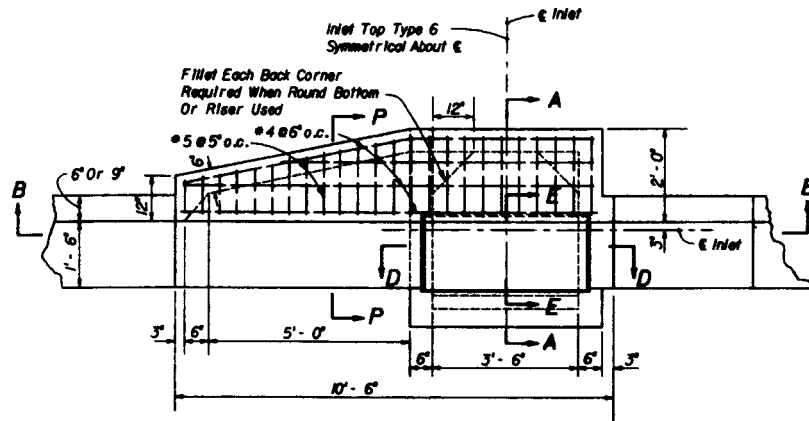


DIMENSION	3'-6"	4'-0"
A	1'-9"	1'-6"
B	1'-8"	1'-5"
C	1'-9"	1'-10 1/2"
D	9"	7 1/2"

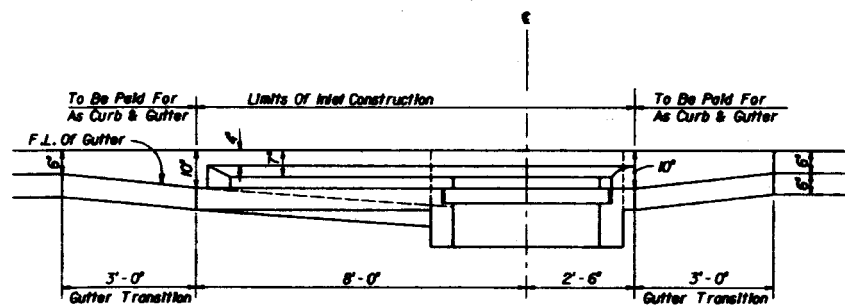
SLAB REINFORCING INLETS 1, 2, 3 and 4



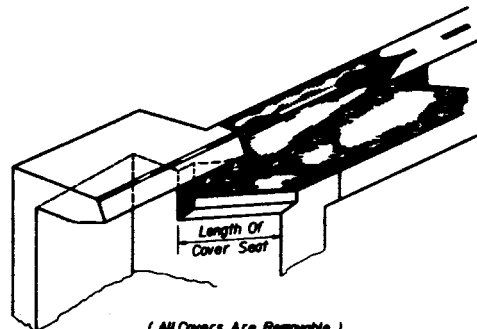
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
CURB INLET TOPS TYPES 1, 2, 3, & 4			
Designed By	Revised	Checked	Approved By <i>[Signature]</i> State Bridge Engineer
Drawn By			
Checked By			
F.A.R.S. Approved	05/02/75	Scale 1/4" = 1' 0"	Index No. 210



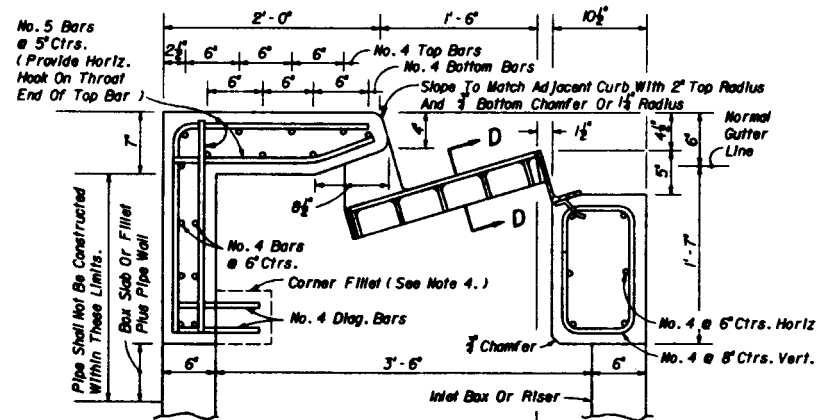
TOP VIEW
INLET TYPE 5
(Curb Inlet Top Type 6 Symmetrical With Left Half)



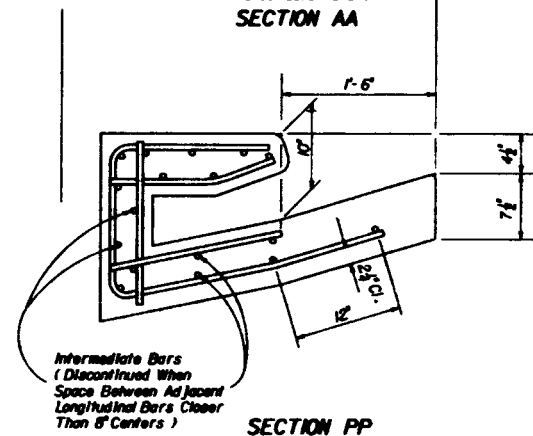
SECTION BB



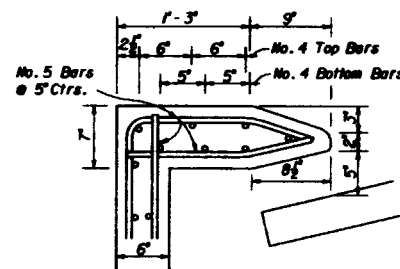
SKETCH SHOWING FRAME SEAT AND THROAT RECESS



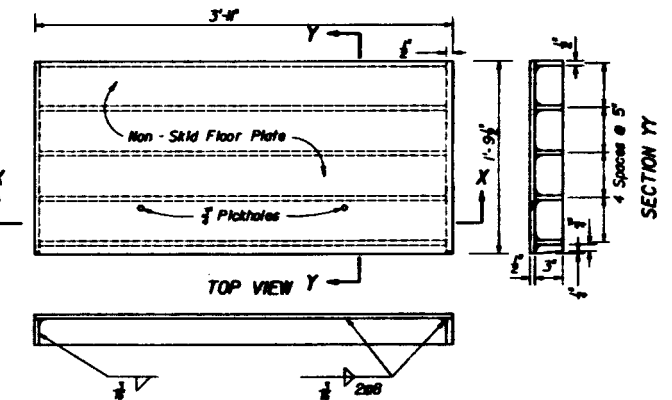
(Steel Cover Shown)
SECTION AA



SECTION PP



TOP MODIFICATION FOR TYPE E CURB



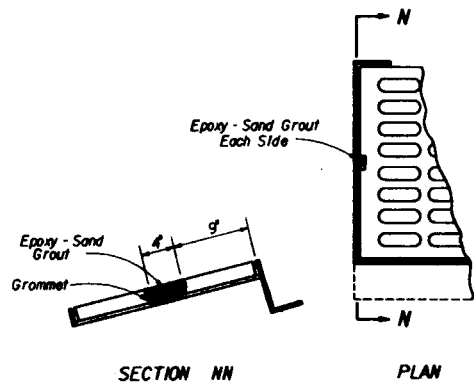
SECTION XX
STEEL COVER

(See Sheet 2 of 2 For Frame And For Cast Iron Cover)

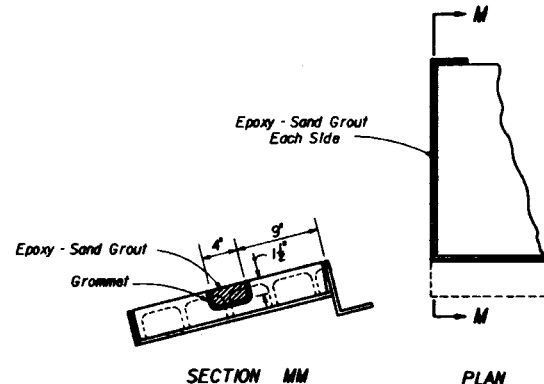
GENERAL NOTES

1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or parkway.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All reinforcing steel shall have 1/4" minimum cover unless otherwise shown. Inlet tops shall be either cast-in-place or precast concrete.
4. Precasting of this inlet top will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the State Drainage Engineer.
5. Concrete meeting the requirements of A.S.T.M. C 478 (4,000 P.S.I.) may be used in lieu of Class I concrete for precast units, manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.
6. The corner fillets shown for rectangular throats are necessary only when throats are to be used in conjunction with circular inlet bottoms or when used on skew with rectangular inlet boxes.
7. For inlet bottoms see Index No. 200.
8. These inlet tops are designed for use with standard curb and gutter Type E and Type F. Locate outside of pedestrian crosswalk where practical.
9. See Index 201 for supplemental details.
10. All steel used for frame and cover shall meet the requirements of ASTM A - 36.
11. Either cast iron covers or steel covers may be used. Iron covers shall be Class No. 30 castings in accordance with ASTM A - 48.
12. When Alternate "G" Cover is specified in plans either the cast iron cover and galvanized steel frame or the galvanized steel cover and frame must be used. Covers are to be grouted in accordance with the grouting detail shown on sheet 2 of 2, in lieu of hot welding.
13. Tack weld cover to frame with back-up bars or clips.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CURB INLET TOPS TYPES 5 & 6					
Designed By	Drawn By	Checked By	Approved By	66 [Signature]	
Revised By	Revised No.	Sheet No.	211		
F.A.S.A. Approved			88	1 of 2	

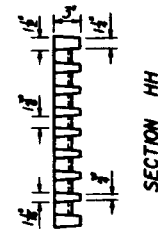
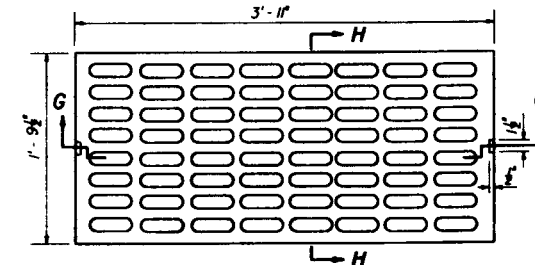
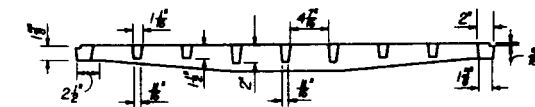
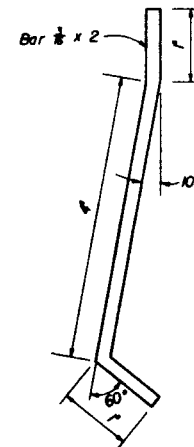


CAST IRON COVER AND GALVANIZED STEEL FRAME

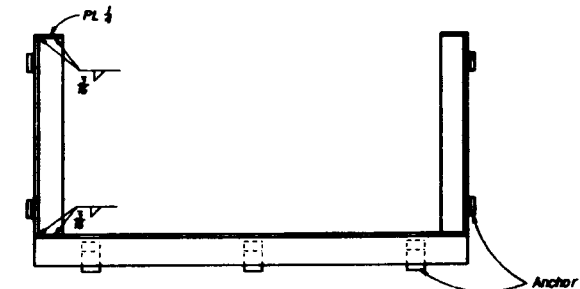


GALVANIZED STEEL COVER AND FRAME

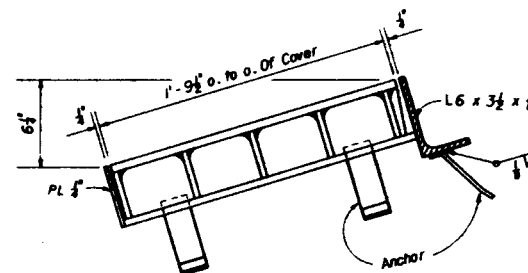
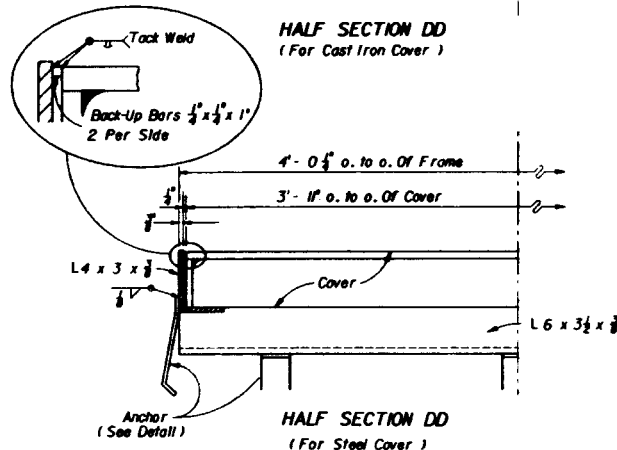
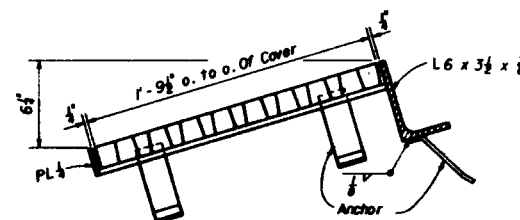
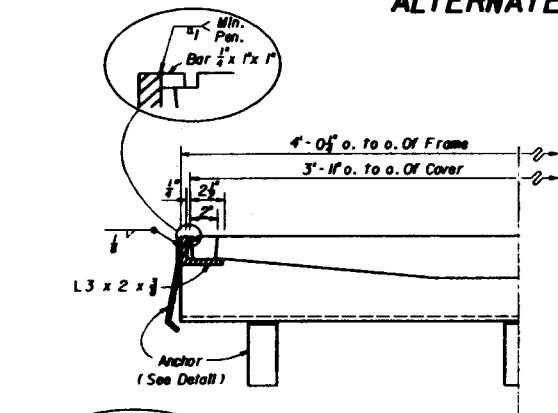
ALTERNATE G DETAIL



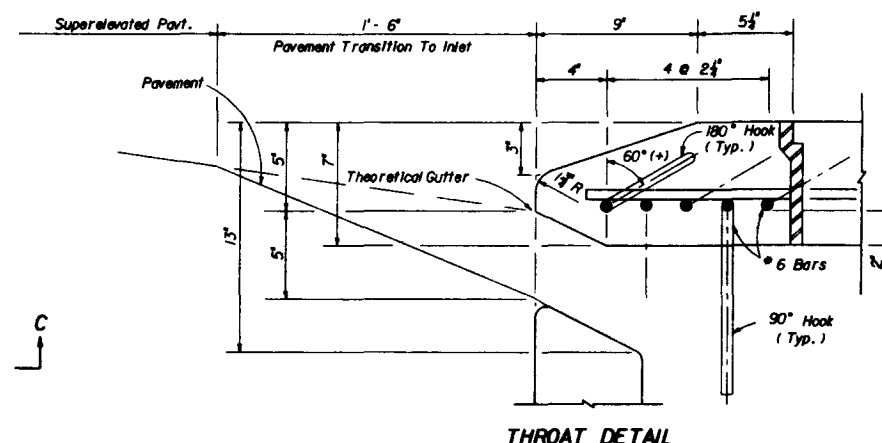
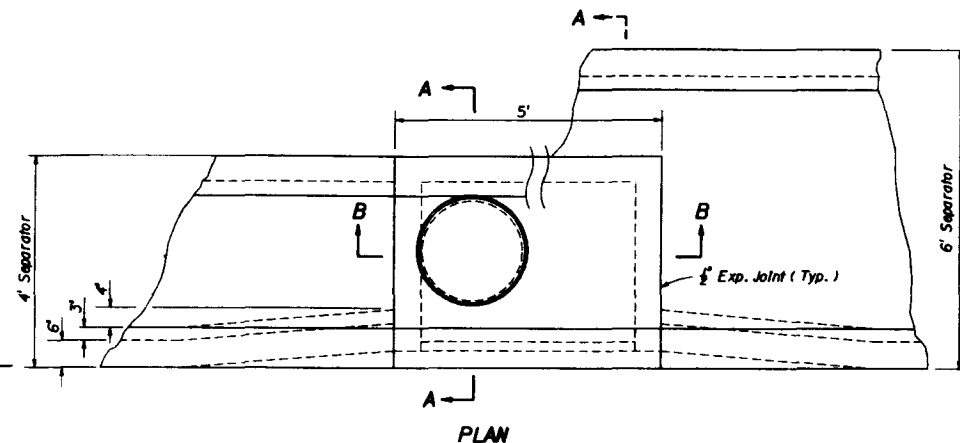
TOP VIEW
CAST IRON COVER



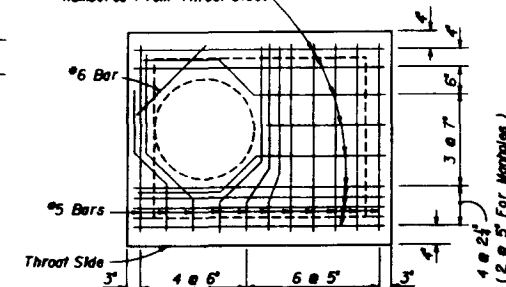
TOP VIEW
FRAME
(For Steel And Cast Iron Covers)



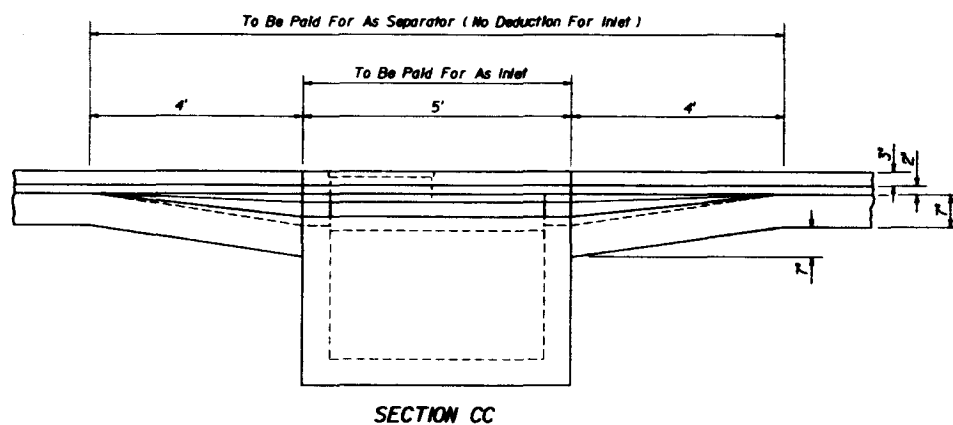
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB INLET TOPS TYPES 5 & 6			
Designed By	Drawn By	Checked By	Approved By
			<i>[Signature]</i>
F.A.R.A. Approved		2 of 2	211



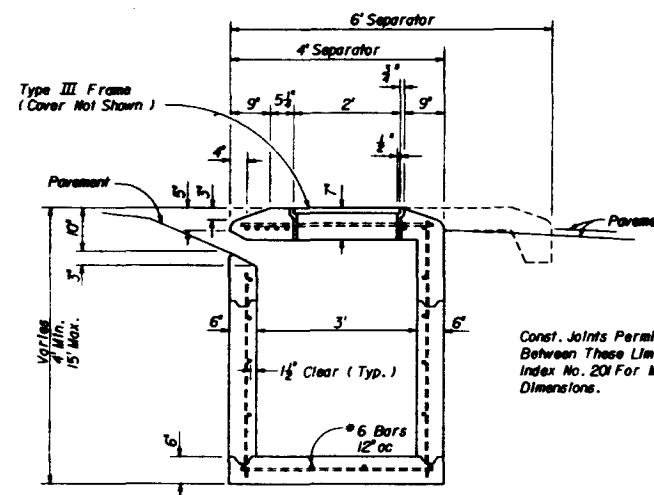
*6 Bars
ACI Std. Hooks Required Each End Of
Straight Bars And Right End Of Bent
Bars. 180° Hooks, Canted 60° (+), On Odd
Bars; 90° Hooks, Down, On Even Bars
Numbered From Throat Side.



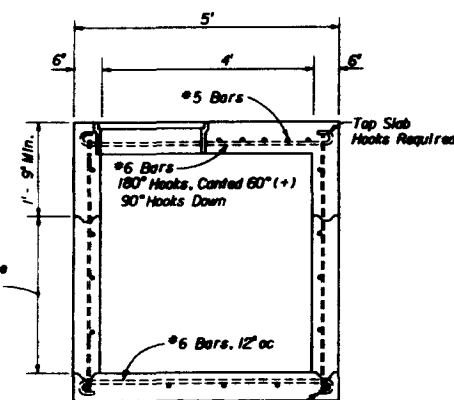
REINFORCING STEEL DIAGRAM
TOP SLAB OF INLETS



SECTION CC

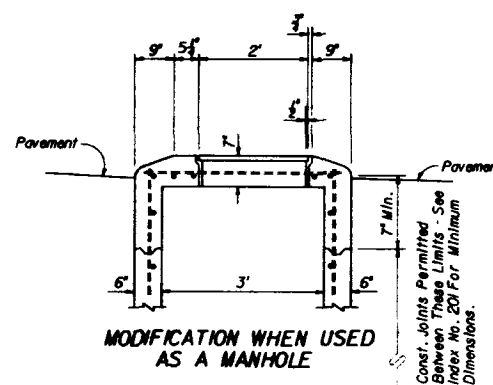
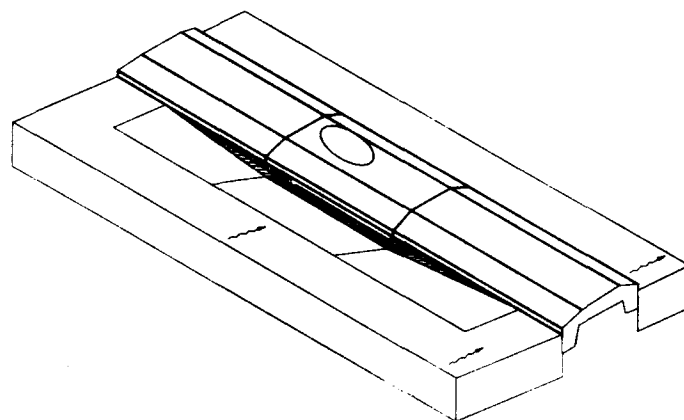


SECTION AA



SECTION BB

For Bottom Slab
Rebar Embedment
Options See Optional
Construction Details,
Index No. 201.

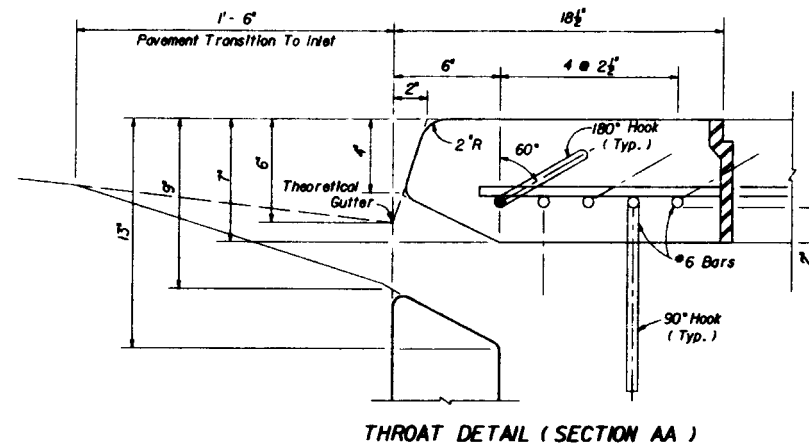
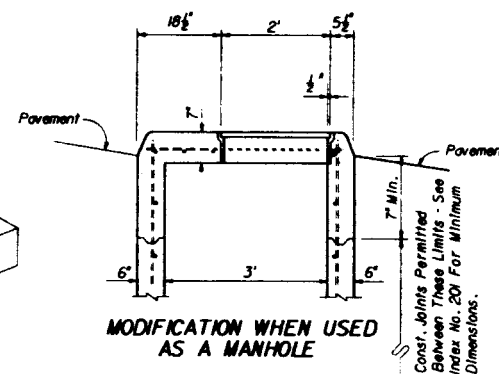
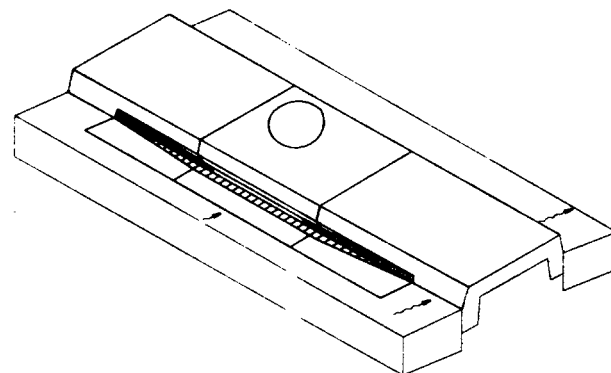
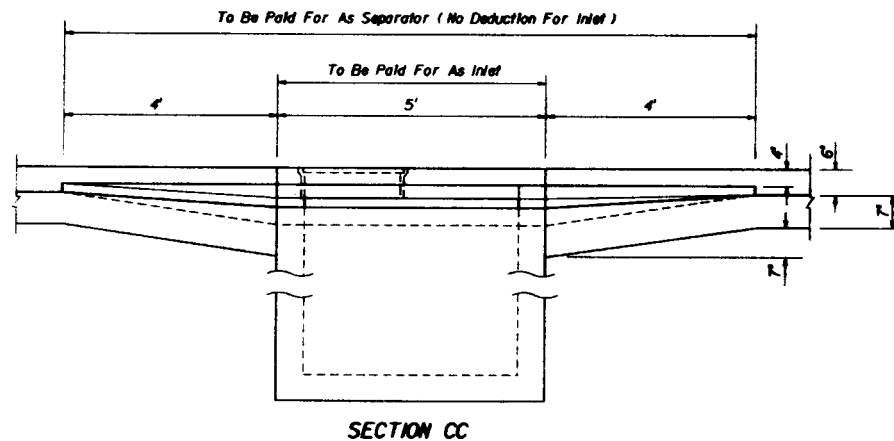
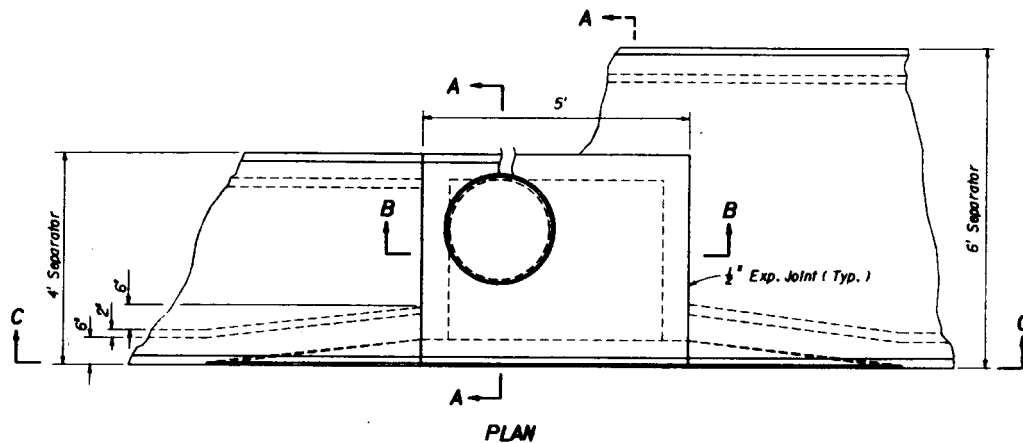


MODIFICATION WHEN USED
AS A MANHOLE

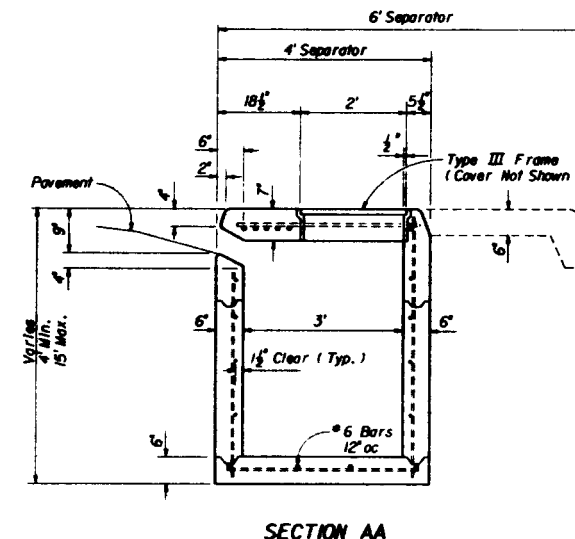
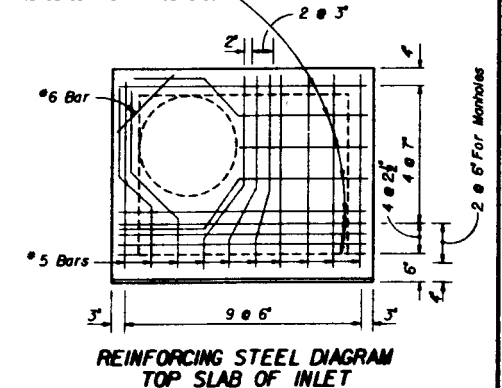
GENERAL NOTES

1. This Inlet is used in Traffic Separators Types I and II that are located in medians constructed with Curbs Types A, B and E. Use of this Inlet on through traffic side of the separator is not permitted in medians with Curbs Types A and B. Locate Inlet outside of pedestrian cross traffic.
2. Reinforcing - No. 4 bars @ 12" centers unless otherwise noted. Cut or bend bars out of way of pipe when necessary. Bars to clear pipe by 1/2".
3. Recommended maximum pipe sizes are 24" longitudinal and 30" transverse. For larger pipe, inlets with bottoms Type J, A1, B, Index No. 200 are recommended.
4. For supplementary details see Index No. 201.

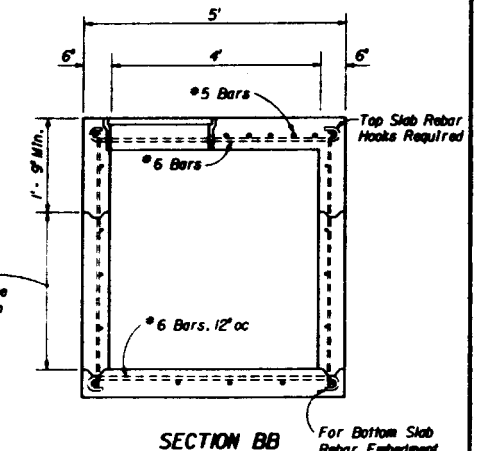
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CURB INLET TYPE 7					
Designed By	ESB	Date	06/88	Approved By	6/6/88
Drawn By	HSD	Date	06/88	Checked By	6/6/88
Checked By	JE	Date	06/88	Revised By	6/6/88
F.H.W.A. Approved	12/08/88	Sheet No.	88	Index No.	212



*6 Bars
ACI Std. Hooks Required Each End Of
Straight Bars And Right End Of Bent
Bars. 180° Hooks, Cantd 60° (+), On Odd
Bars. 90° Hooks, Down, On Even Bars
Numbered From Throat Side.



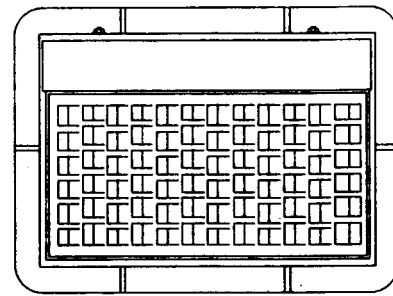
Const. Joints Permitted
Between These Limits - See
Index No. 201 For Minimum
Dimensions.



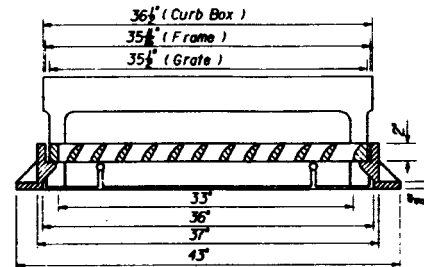
GENERAL NOTES

1. This Inlet is to be used only in Traffic Separators Types IV and V that are located in medians constructed with Curbs Types D and F. Use of this Inlet on the through traffic side of the separator should be avoided in medians constructed with Curb Type D (Curb Inlets Types 9 or 10 are recommended). Locate Inlet outside of pedestrian cross traffic.
2. Reinforcing - No. 4 bars @ 12" centers unless otherwise noted. Cut or bend bars out of way of pipe when necessary. Bars to clear pipe by 1 1/2".
3. Recommended maximum pipe sizes are 24" longitudinal and 30" transverse. For larger pipe, Inlets with bottoms Type J, A1, B, Index No. 200 are recommended.
4. For supplemental details see Index No. 201.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CURB INLET TYPE 8					
Designed By	EGH	Date	07/78	Approved By	<i>[Signature]</i>
Drawn By	HSD	Date	07/78	Reviewed By	<i>[Signature]</i>
Checked By	JS	Date	07/78	Revision No.	00
F.H.W.A. Approved: 10/08/78				Sheet No.	1 of 1
					213

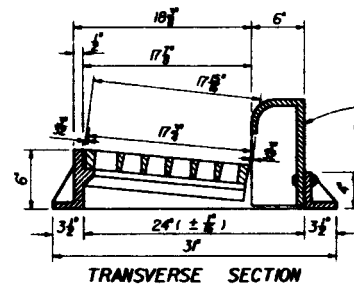
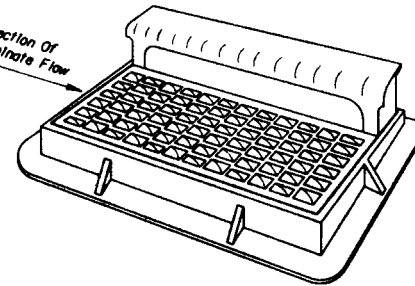


TOP VIEW

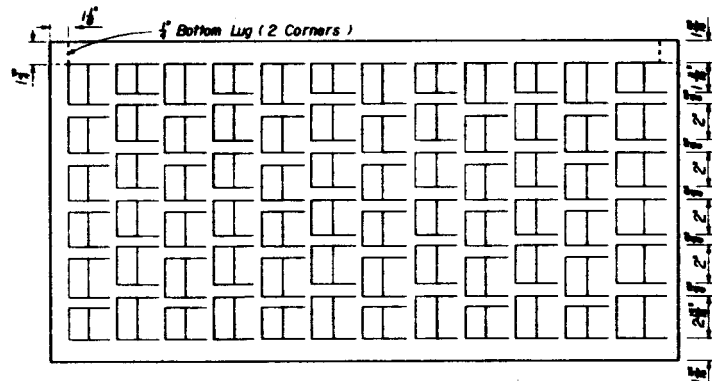


LONGITUDINAL SECTION

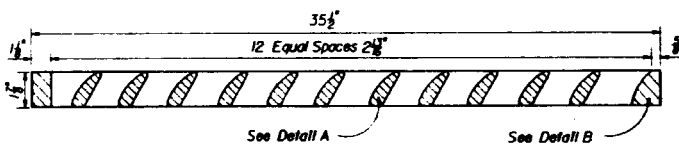
FRAME AND GRATE



TRANSVERSE SECTION

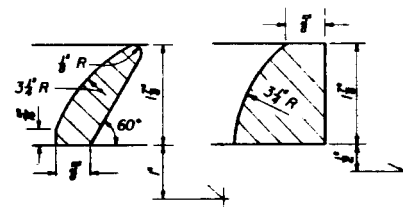


TOP VIEW



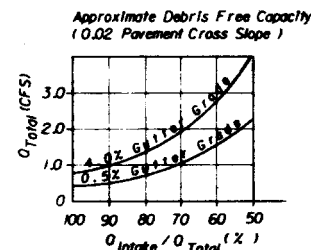
SECTION

GRATE DETAIL

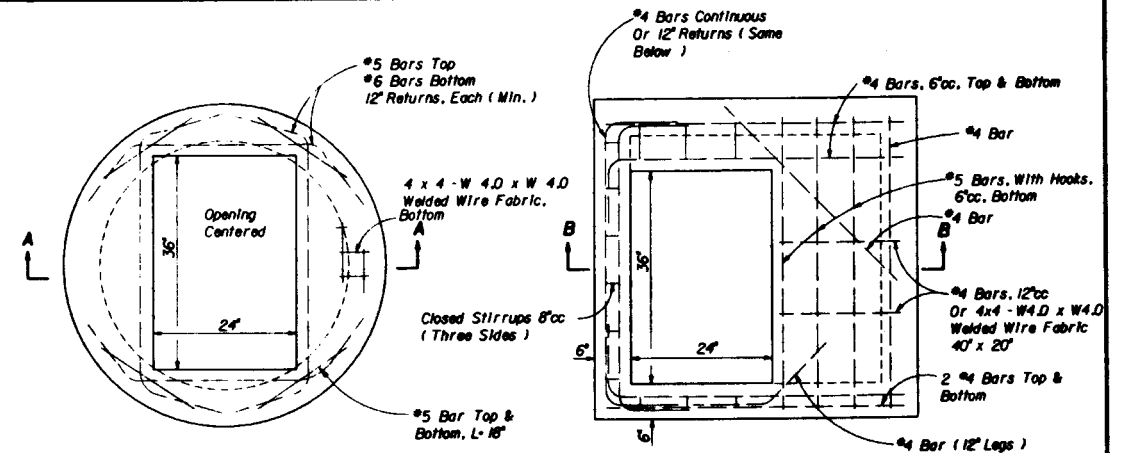


DETAIL A

DETAIL B



EFFICIENCY CURVE



SECTION AA

SECTION BB

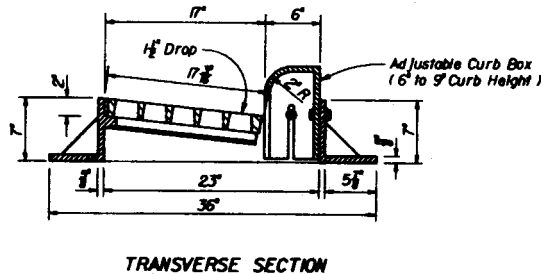
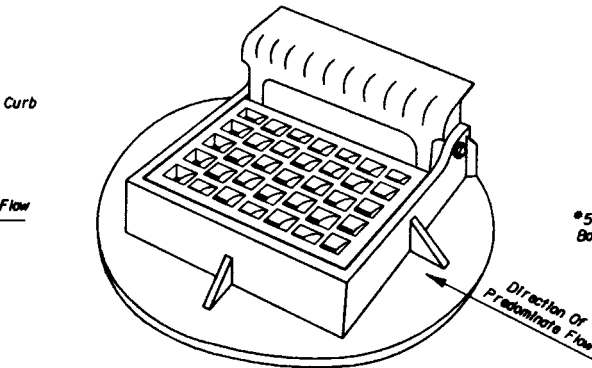
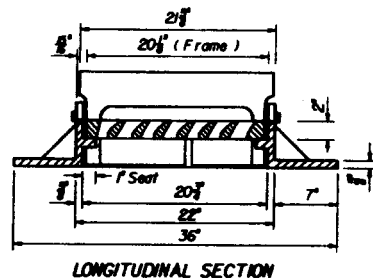
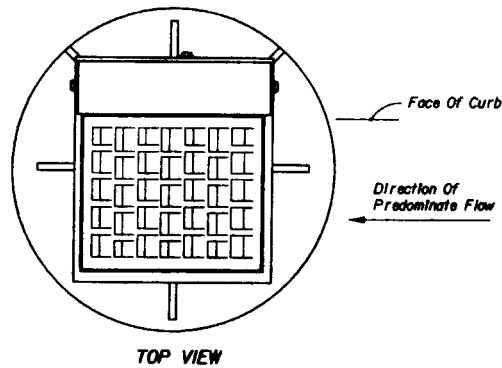
FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES A) FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES B)

TOP SLABS

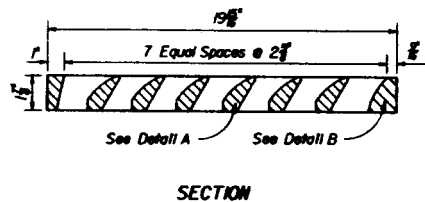
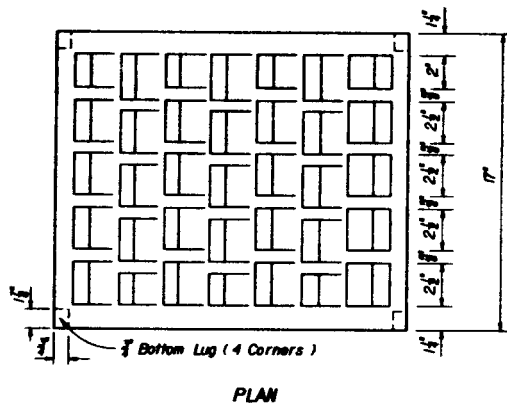
GENERAL NOTES

1. This inlet is primarily intended for locations with light to moderate flows where right of way does not permit the use of throated curb inlet Types 1 through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This inlet to be located in vertical faced curbs such as Curb and Gutter Type F. Grate shall be oriented with vanes directed toward predominate flow. Inlet to be located outside pedestrian crosswalk where practical.
3. For structure bottoms see Index No. 200. For supplemental details see Index No. 201.
4. All steel in slab tops shall have 1/2" minimum cover unless otherwise shown. Tops shall be either cast-in-place or precast concrete.
5. For Alternate B applications, top slab openings shall be placed such that 2 edges of inlet frame will be located directly above bottom wall or riser wall.
6. For bottom Type J applications without riser use top Type 7-T Index No. 200. Form opening in top slab as detailed above.
7. Frame may be adjusted with one to six courses of brick.
8. Inlet and grate detail shown is Neenah R-3067-L. Vaned grates with approximately equal openings will be permitted that satisfy AASHTO H-20 loading. Inlet and grate shall be Class 30 castings in accordance with ASTM A 48. Grates shall be reversible, right or left.

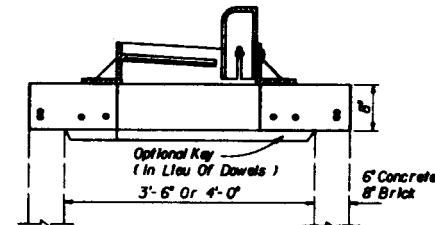
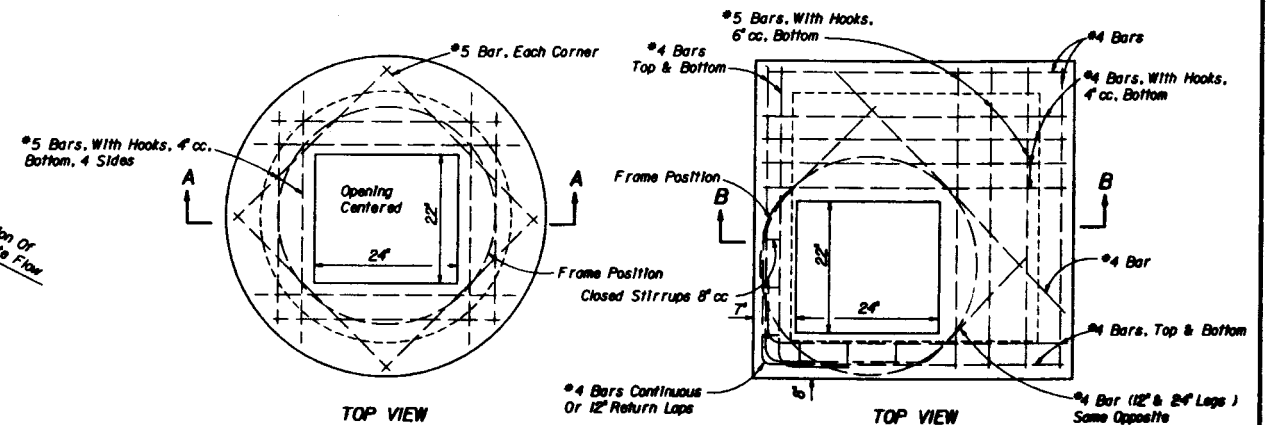
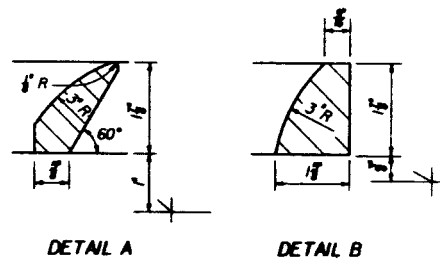
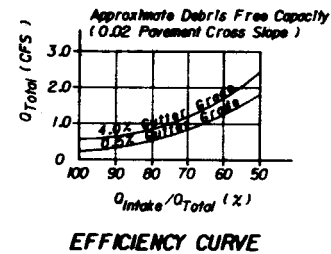
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB INLET TOP TYPE 9			
Designed By EJR	Drawn By HSD	Checked By JAC	Approved By [Signature] District Engineer
Revision No. 85	Sheet No. 1 of 1	Index No. 214	



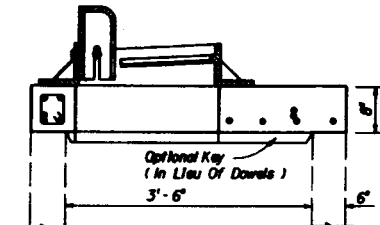
FRAME AND GRATE



GRATE DETAIL



FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES A)



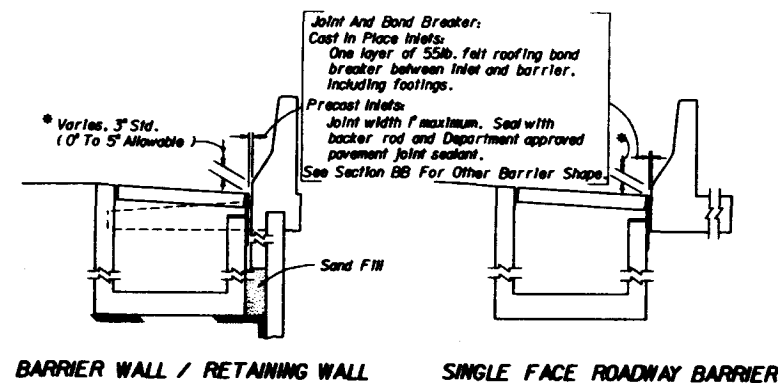
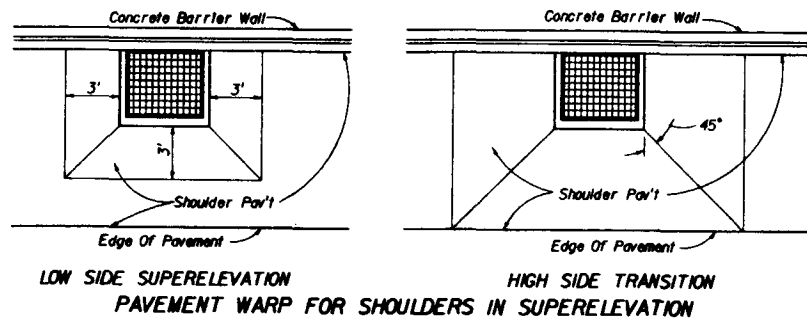
FOR BOTTOM TYPE P & RISER TYPE J (ALTERNATES B)

TOP SLABS

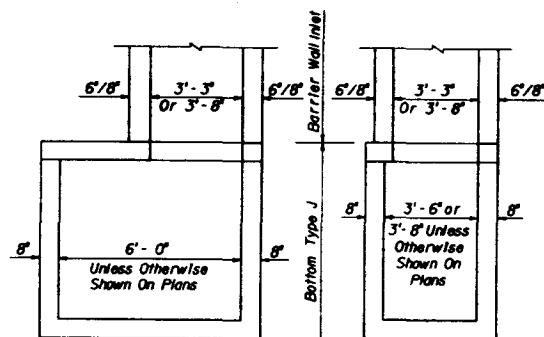
GENERAL NOTES

1. This Inlet is primarily intended for locations with light flows where right of way does not permit the use of throated Curb Inlets Types 1 through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This Inlet is to be located in vertical faced curbs such as Curb and Gutter Type F. Grate shall be oriented with vanes directed toward predominate flow. Inlet to be located outside pedestrian crosswalk where practical.
3. For structure bottoms see Index No. 200. For supplemental details see Index No. 201.
4. All steel in slab tops shall have 1 1/2" minimum cover unless otherwise shown. Tops shall be either cast-in-place or precast concrete.
5. For Alternate B applications, top slab openings shall be placed such that 2 edges of Inlet frame will be located directly above bottom or riser walls.
6. For bottom Type J applications without riser use top Type 7-T Index No. 200. Form opening in top slab as detailed above.
7. Frame may be adjusted with one to six courses of brick.
8. Inlet and grate detail shown is Neenah R-3065-L. Vaned grates with approximately equal openings will be permitted that satisfy AASHTO H-20 loading. Inlet and grate shall be Class 30 castings in accordance with ASTM A 48. Grates shall be reversible, left or right.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB INLET TOP TYPE 10			
Designed By EOP	Drawn By HSD	Checked By JWS	Approved By [Signature]
Scale 1/8"	Scale 1/8"	Scale 1/8"	Scale 1/8"
Revision No. 1	Sheet No. 1 of 1	Project No. 215	Drawn By HSD

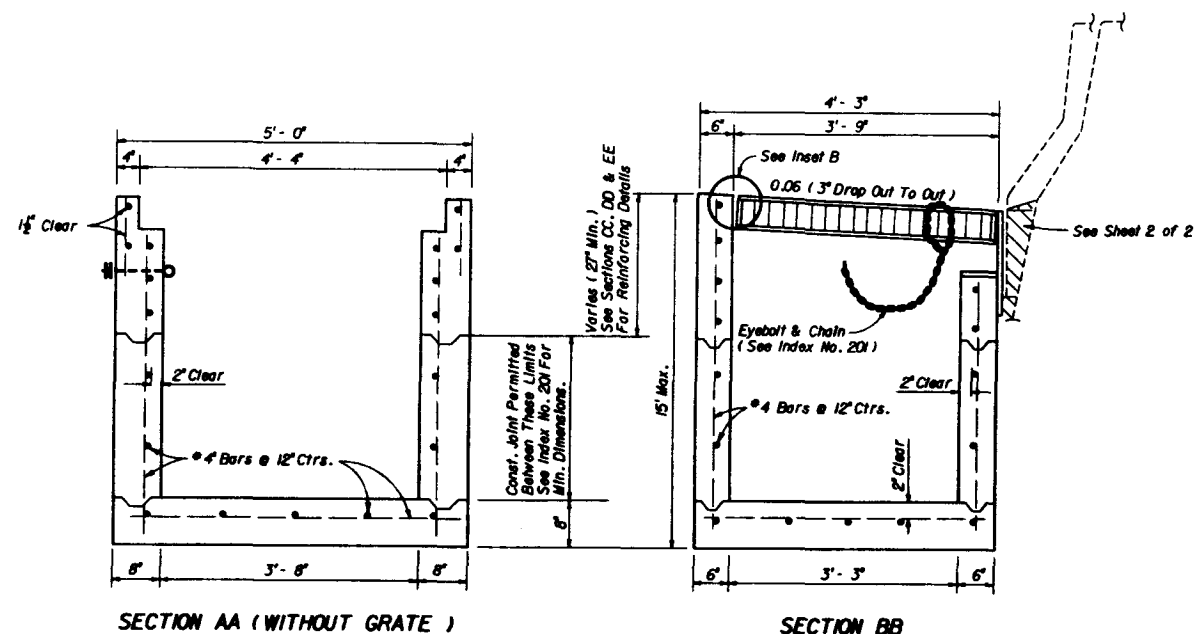


INLET SECTION AT WALLS



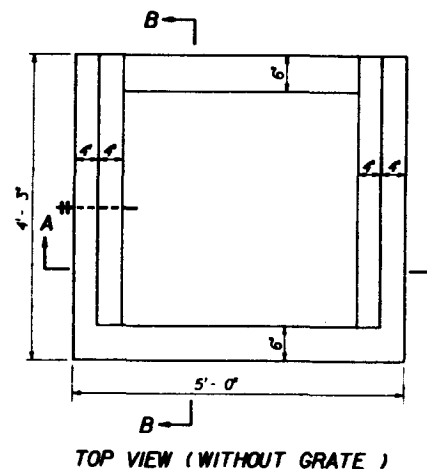
Note: Structure Bottom Type J, All B Only. See Index No. 200.

INLET WITH BOTTOM TYPE J

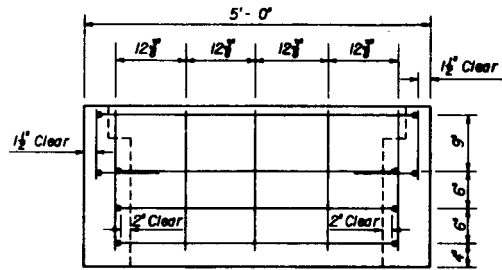


GENERAL NOTES

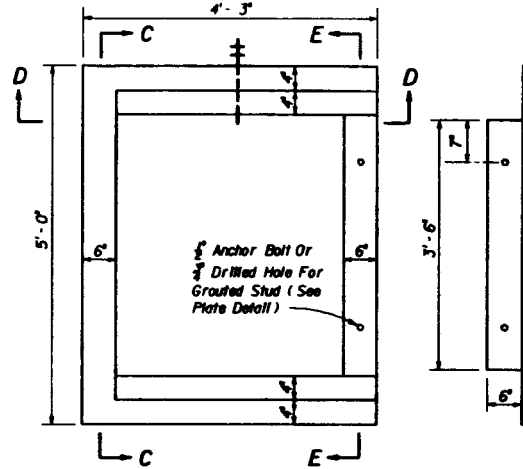
1. This Inlet is primarily intended for use adjacent to concrete barrier walls on paved shoulders. Use of the Inlet adjacent to other wall types shall be approved by the Drainage Engineer. The Inlet is suitable for bicycle and occasional pedestrian traffic. It is not intended for use in curb and gutter or other areas where throated inlets are required, nor areas subject to high debris.
2. Inlets located in embankments constructed with earth anchored retaining wall shall be designed with minimum depths to reduce adverse impact on the anchorage system. Runs of pipe parallel to and near anchored wall shall be avoided wherever practical. Special coordination must be exercised during the design and construction of storm water systems within anchored wall systems.
3. Inlet bottoms and/or tops may be either precast or cast-in-place. Whether cast as a single unit or as multiple segments, and whether precast or cast-in-place, the upper 2'-3" of the Inlet shall be reinforced in accordance with sections CC, DD and EE.
4. Exposed edges shall be chamfered 3/8".
5. When Alternate G grate is specified in the plans, the grate is to be hot dipped galvanized after fabrication. Field installation of the filler bar called for in Inset B will not be permitted, thereby requiring tolerance adjustment during fabrication and/or casting, or, matching grate to structure prior to galvanizing.
6. For supplemental details see Index Nos. 200 and 201.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
BARRIER WALL INLET					
Designed By	WSD	05/95	Approved By	6.6.95	
Drawn By	WSD	05/95	Checked By	6.6.95	
Checked By	WSD	05/95	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved:	8/07/95	87	1 of 2	218	

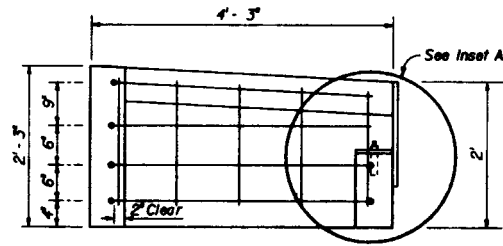


SECTION CC

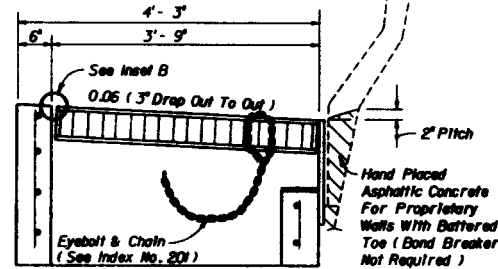


TOP VIEW OF INLET
WITHOUT GRATE

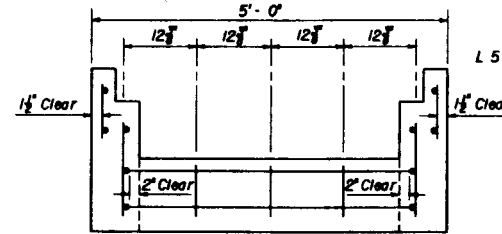
TOP VIEW OF
METAL PLATE



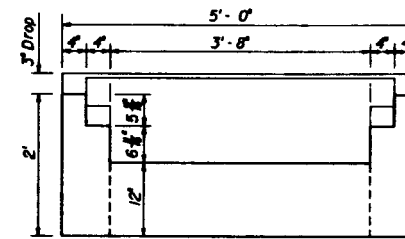
SECTION DD



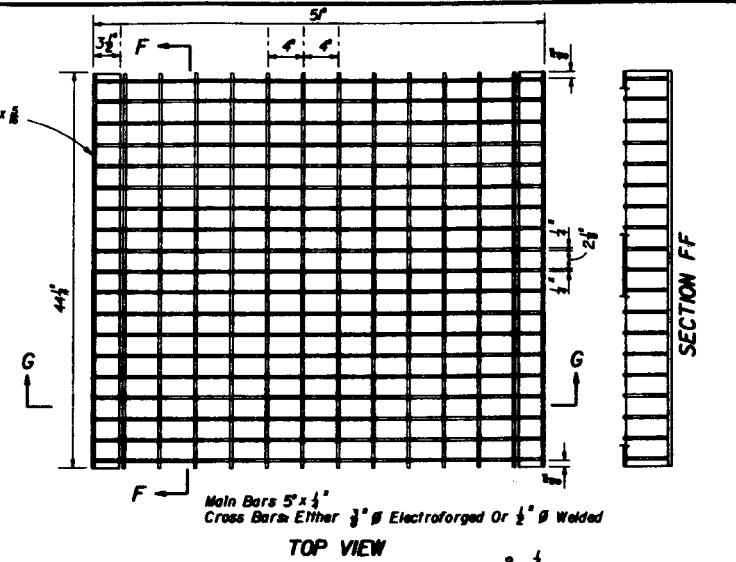
TRANSVERSE SECTION
WITH GRATE & PLATE



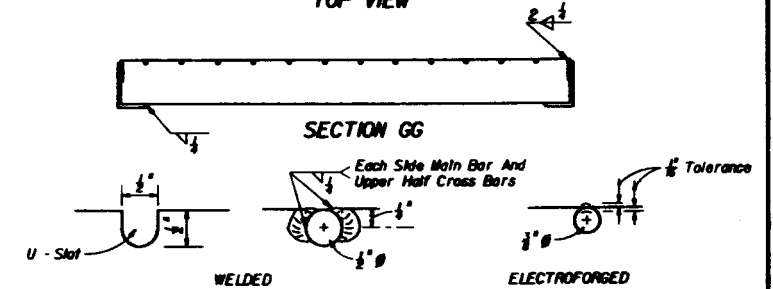
SECTION EE



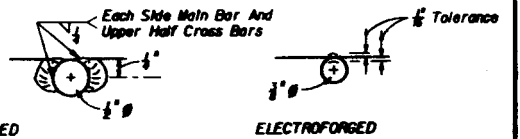
BACK VIEW
WITHOUT BACK PLATE



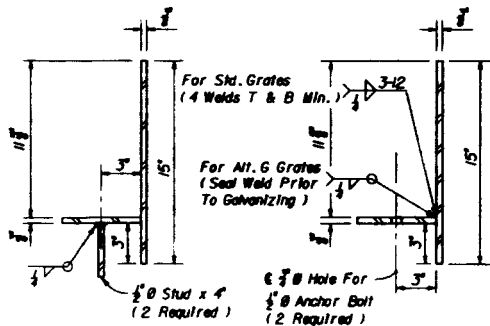
TOP VIEW



SECTION GG



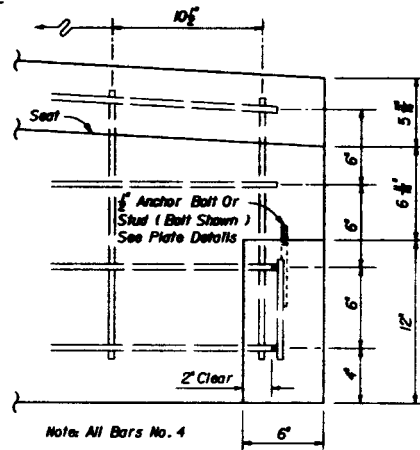
CROSS BAR OPTIONS
STEEL GRATE



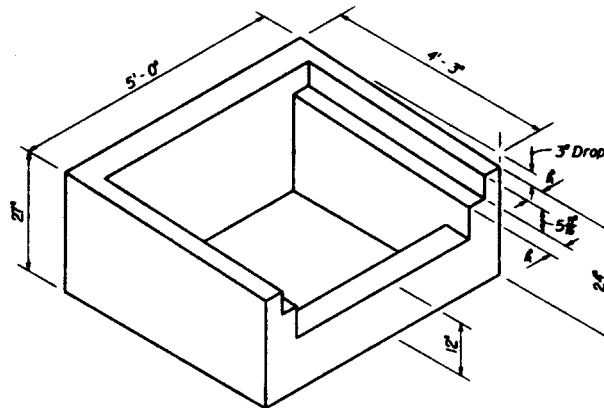
OPTION FOR
GROUT STUD

OPTION FOR
IMBEDDED ANCHOR

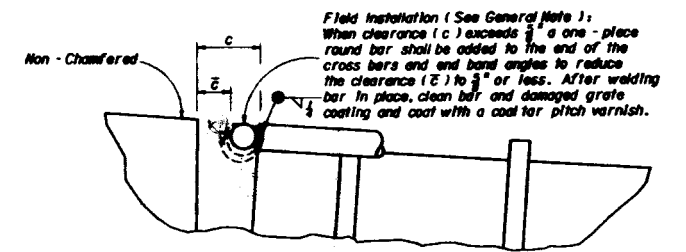
TRANSVERSE SECTIONS
THRU BACKWALL PLATE



INSERT A

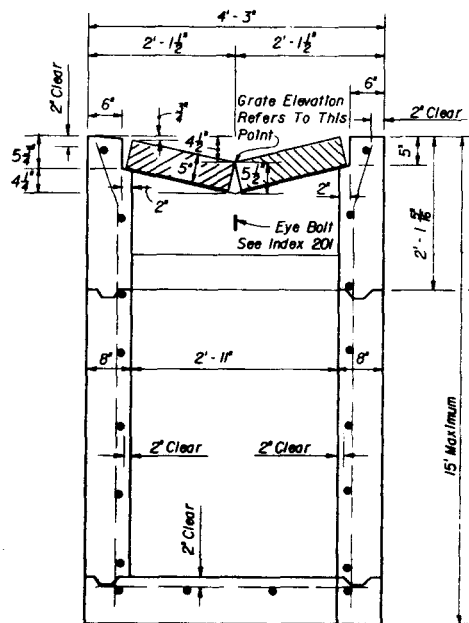
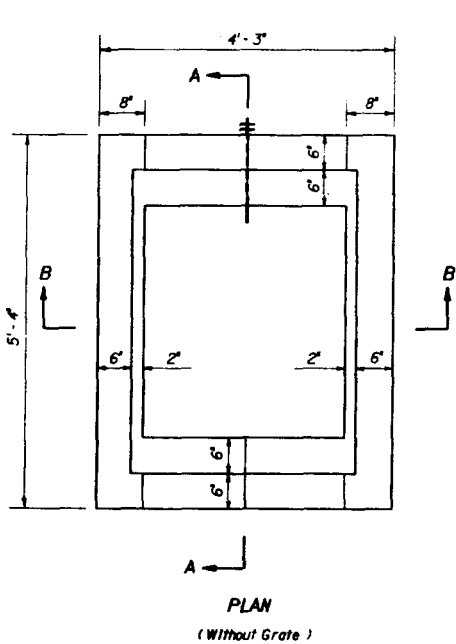


PICTORIAL VIEW

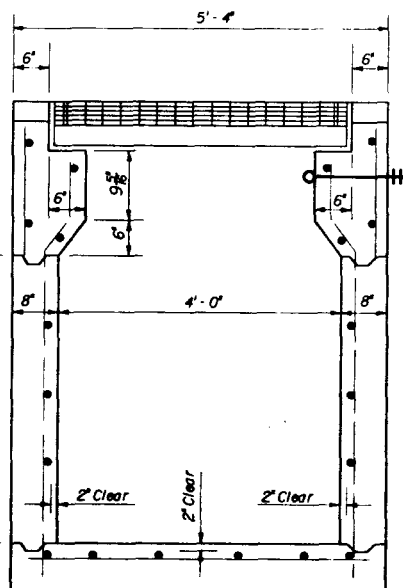


INSET B

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
BARRIER WALL INLET					
Designed By	RD	Date	08/05	Approved By	
Drawn By	RD	Date	08/05	Checked By	
Checked By	JH	Date	08/05	Revision No.	1
F.A.B.A. Approved				08/07/05	2 of 2
				Sheet No.	218

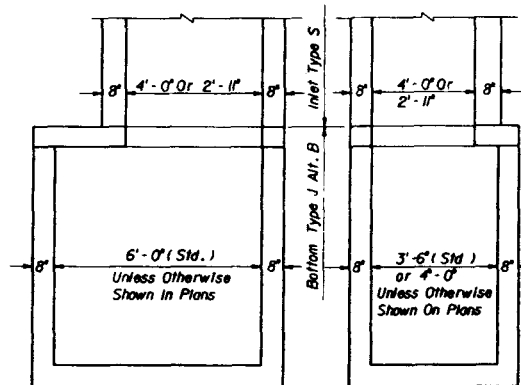


Construction Joints Permitted Between These Limits - See Index No. 201 For Minimum Dimensions

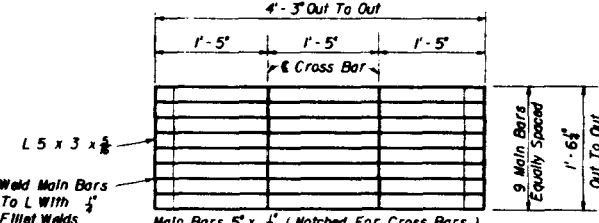
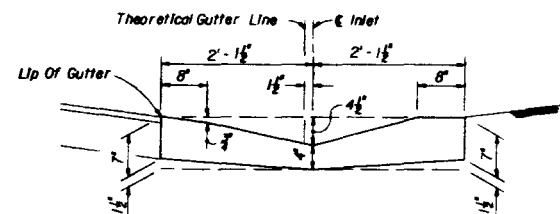
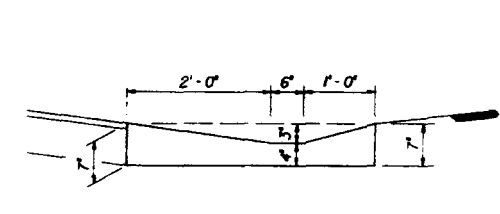


RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
2'-11"	24"
4'-0"	36"

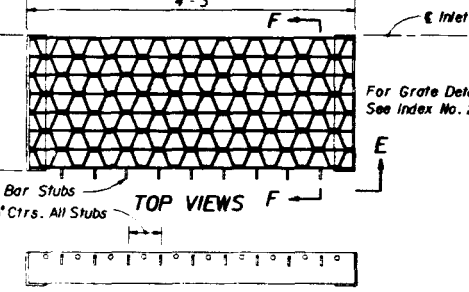
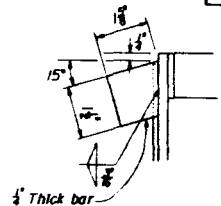
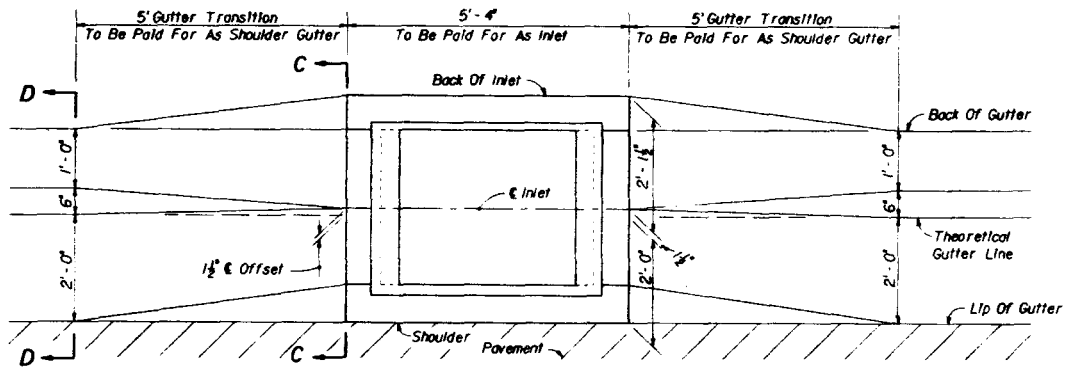
Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom Type J detail right and Index No. 200.



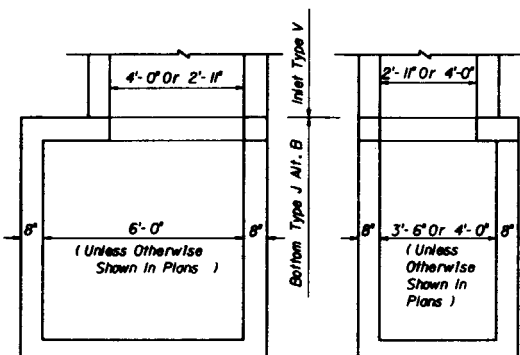
See Index No. 200



1. This Inlet with parallel bar grate shall be used for limited access facilities and other bicycle restricted facilities subject to heavy loads; and, may be used in locations where Inlets Type A and B, with wide grate opening, are unacceptable. On limited access facilities with designated bicycle access and on all other facilities, including roads overpassing limited access highways, the reticulate grate shall be used.
2. Reinforcing steel all No. 4 bars at 12" centers both ways with 2" clearance to inside of walls and bottom. Bars to be cut or bent for 1/4" minimum clearance around pipe.
3. All exposed edges and corners shall be tool to 3/8" radius.
4. When Alternate G grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
5. For supplementary details see Index Nos. 200 and 201.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUTTER INLET TYPE S			
Designed By	Checked By	Approved By	State Engineer
Drawn By	Reviewed By	Signature	
Checked By	Reviewed By	Signature	
F.H.W.A. Approved	05/07/75	88	101 1 220



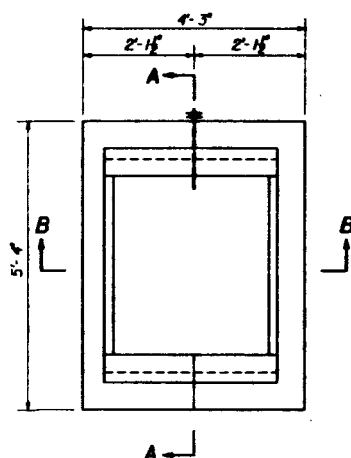
Note: Structure Bottom Type J, Alt. B Only. See Index No. 200.

INLET WITH BOTTOM TYPE J

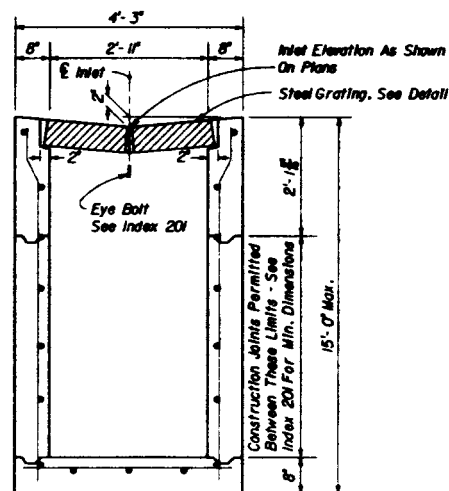
(For Pipes 30" Dia. And Larger)

GENERAL NOTES

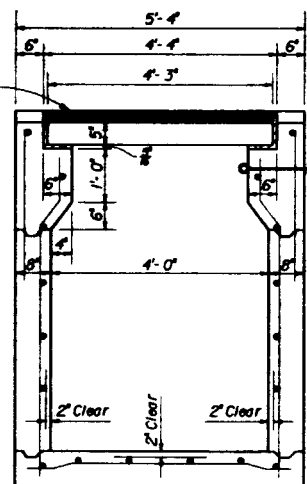
1. This inlet is designed for village swales, ditches, or other areas subject to heavy wheel loads, minimum debris and subject to pedestrian and/or bicycle traffic.
2. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
3. Reinforcing - No. 4 bars at 12" ctrs. both ways. Cut or bend bars out of way of pipe to clear pipe $1\frac{1}{2}$ ".
4. All exposed edges and corners shall be tool to $\frac{1}{8}$ " radius.
5. For supplementary details see Index No. 201.



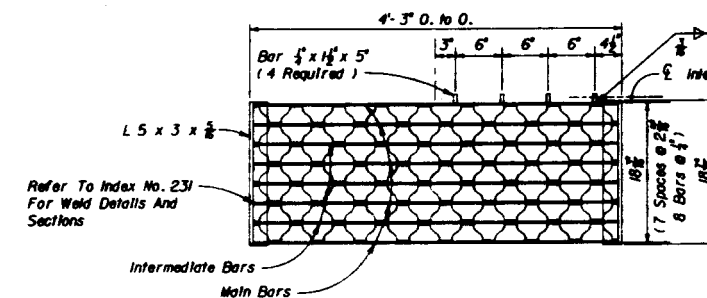
PLAN



SECTION BB
(For Pipes 24" Dia. And Under)



SECTION AA



STEEL GRATE

TWO REQUIRED PER INLET

5" Steel Grate Main Bars 5" x $\frac{1}{2}$ "
Intermediate Bars 1 1/2" x $\frac{1}{2}$ " Rebar Bars 1 1/2" x $\frac{3}{8}$ "

Steel Grate: Manufactured By Borden, Florida Steel, U.S. Foundry
Irving, Reliance, Graulich (Or Equal).

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUTTER INLET TYPE V					
Designed By	Checked By	Drawn By	Approved By	Revision No.	Sheet No.
WBR	WBR	WBR	<i>[Signature]</i>		
Checked By	WBR	4/57	Revision No.	Sheet No.	Index No.
F.H.R.A. Approved	5/1/75	84	1 of 1	221	

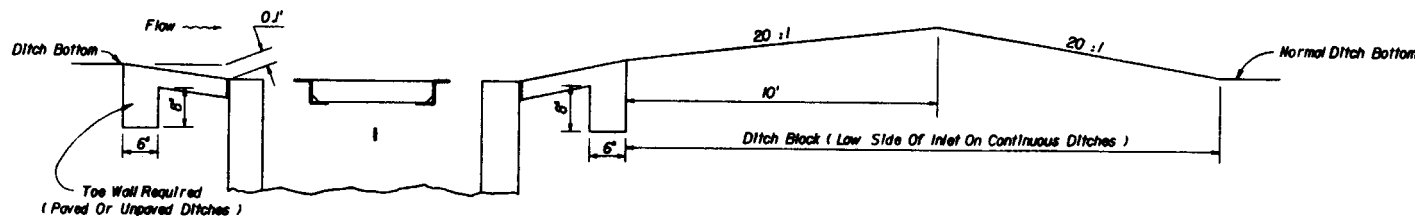
APPLICATION AND SELECTION GUIDE FOR DITCH BOTTOM AND MEDIAN INLETS

INDEX NO.	TYPE	LOCATION	CAPACITY (CFS)			SAFETY			DEBRIS TOLERANCE	PIPE SIZE LIMITATION		OTHER DESIGN CONSIDERATIONS
			GRATE ONLY	GRATE WITH SINGLE STD. SLOT	GRATE WITH SINGLE TRAV. SLOT	TRAFFIC	PEDESTRIAN	BICYCLE		INLET INSIDE WIDTH	MAXIMUM PIPE SIZE	
230	A	Limited Access Facilities	5	—	—	Heavy Wheel Loads	No	No	Good	2'-0" 3'-1"	18" 24"	
231	B	Limited Access Facilities	16	—	—	Heavy Wheel Loads	No	No	Excellent	3'-8" 4'-2"	30" 36"	
232	C	Outside CZ	6	** 15	** 10	Infrequent Traffic	Yes	Yes	Poor	2'-0" 3'-1"	18" 24"	* See Note 4. ** See Note 8.
	D	Outside CZ	12	** 31	** 20	Infrequent Traffic	Yes	Yes	Poor	3'-1" 4'-1"	24" 36"	* See Note 4. ** See Note 8.
	E	Outside CZ	13	** 27	** 19	Infrequent Traffic	Yes	Yes	Poor	3'-0" 4'-6"	24" 42"	* See Note 4. ** See Note 8.
	H	Outside CZ	19	** 33	—	Infrequent Traffic	Yes	Yes	Poor	3'-0" 7'-8"	24" 66" Or 2'-30"	* See Note 4. ** See Note 8.
233	F	Inside CZ	** 8	—	—	Heavy Wheel Loads	Yes	Yes	Poor	2'-0" 4'-0"	18" 36"	** See Note 8.
	G	Inside CZ	21	—	—	Heavy Wheel Loads	Yes	Yes	Poor	4'-4" 5'-0"	36" 42"	
234	J	Inside CZ	10	—	—	Heavy Wheel Loads	Yes	No	Fair	2'-11" 4'-0"	24" 36"	
235	K	Outside CZ	—	—	—	NA	NA	NA	Good	3'-8" See Index	36"	Debris buildup may occur on Type B fencing.

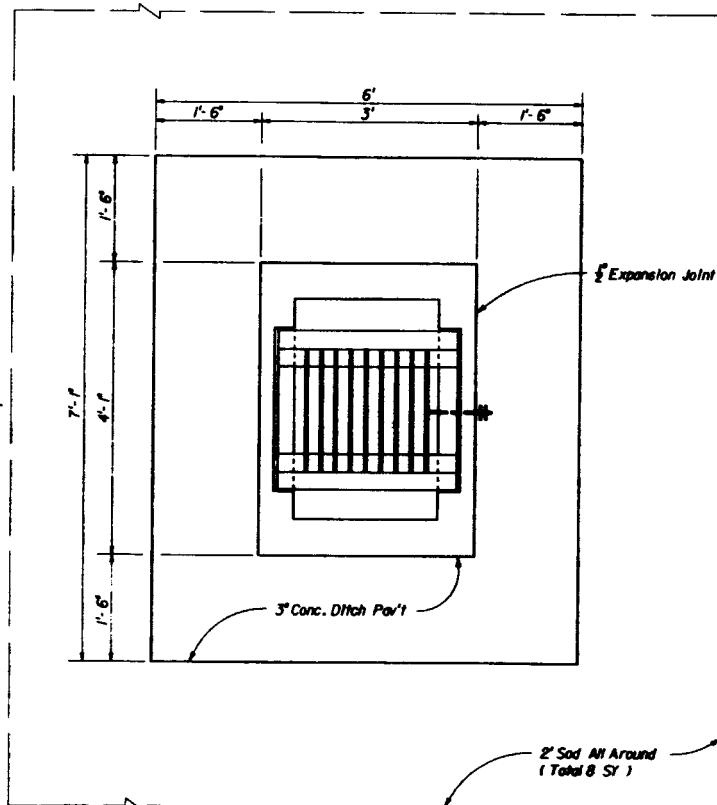
GENERAL NOTES

- All Inlets must be selected to satisfy hydraulic suitability, with proper consideration given to safety and economics.
- CZ denotes clear zone, formerly CRA denoting clear recovery area.
- Alternate G grates should be specified when in salt water environment.
- Inlets C, D and E capacity may be increased by the addition of a slot. Slotted Inlets located within roadway clear zones and in areas accessible to pedestrians shall have traversable slots. Traversable slots are not adaptable to Inlet Type H.
- Special ditch blocks require plan details.
- Pipe size limitations are based on circular Class III, B Wall, Concrete Pipe. Elliptical pipe and corrugated pipe are to be checked for fit in accordance with Index No. 201; metal pipe sizes should be reviewed using 25' X 1/2 corrugation up through 30' and 3' x 1' corrugation for larger sizes.
- The figures shown for capacity are approximate, and are intended as a guide to assist in describing relative performance:
(a) Inlets with grates only are considered to be 50% blocked with 3' of ponding.
(b) Standard 12' slots and traversable slots are calculated assuming a 25% blockage and 3' of ponding above the grate.
- The capacity values assume Inlet control. The designer must verify the outlet conditions and design assumptions before accepting the capacity values shown; outlet constraints are likely to control with minimum pipe sizes.

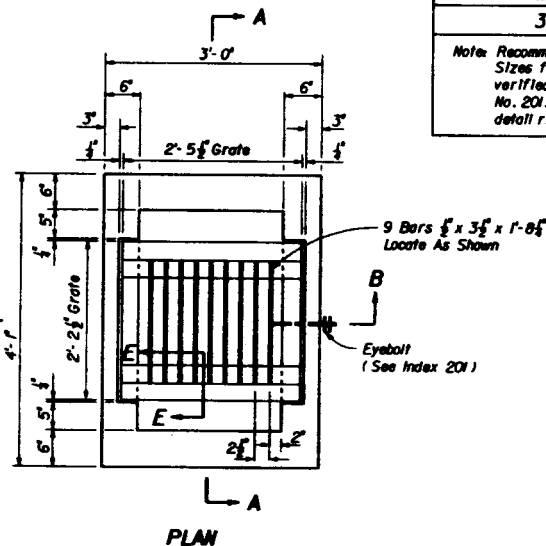
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM AND MEDIAN INLET SELECTION GUIDE			
Designed By EOR	Date 08/05/94	Checked By EOR	Approved By <i>E.L. Page</i> State Bridge Engineer
Drawn By HSD	Date 08/05/94	Revision No.	Sheet No. 229
F.H.W.A. Approved: 08/25/94		86	1 of 1



SECTION DD



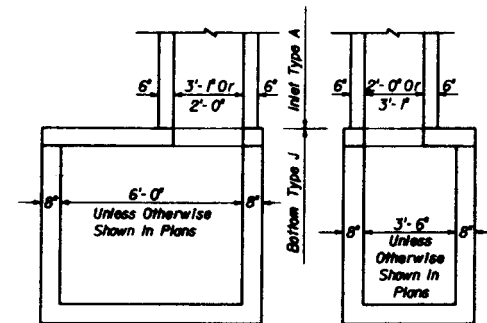
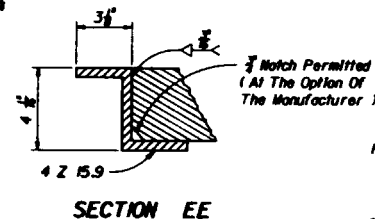
Predominate Flow



RECOMMENDED MAXIMUM PIPE SIZES

INLET INSIDE WIDTH	PIPE SIZE
2'-0"	18"
3'-1"	24"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with index No. 201. For larger pipe see bottom Type J detail right and index No. 200.

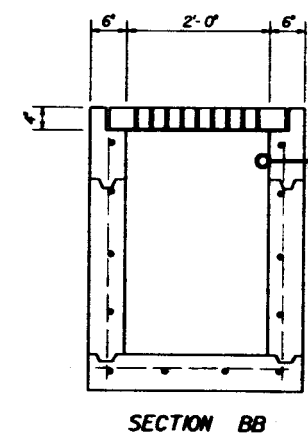
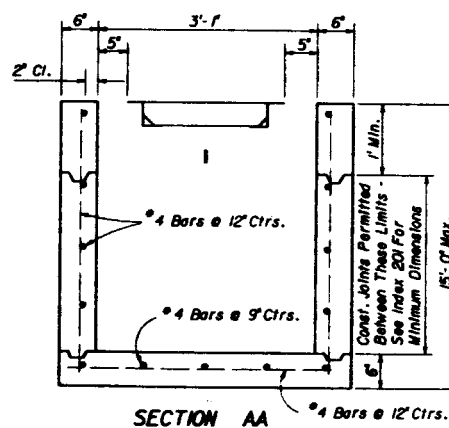
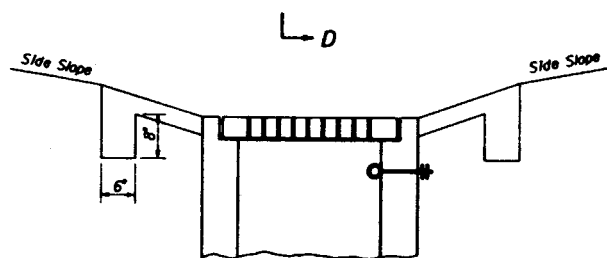


Note: Structure Bottom Type J, Alt. B only. See Index No. 200.

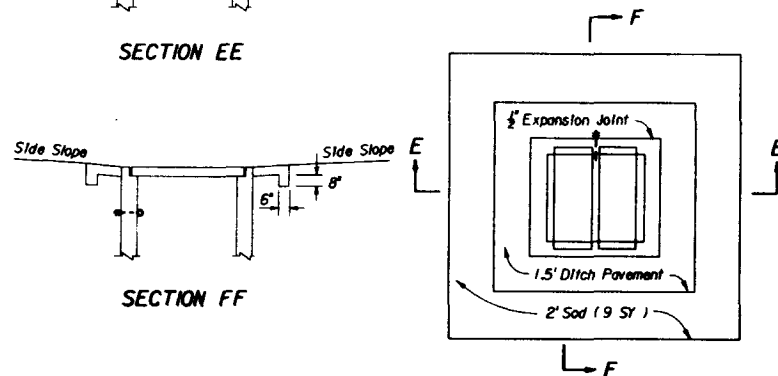
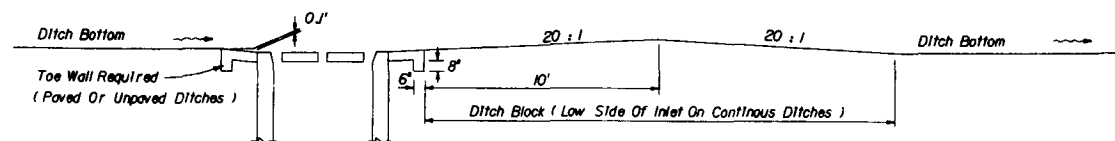
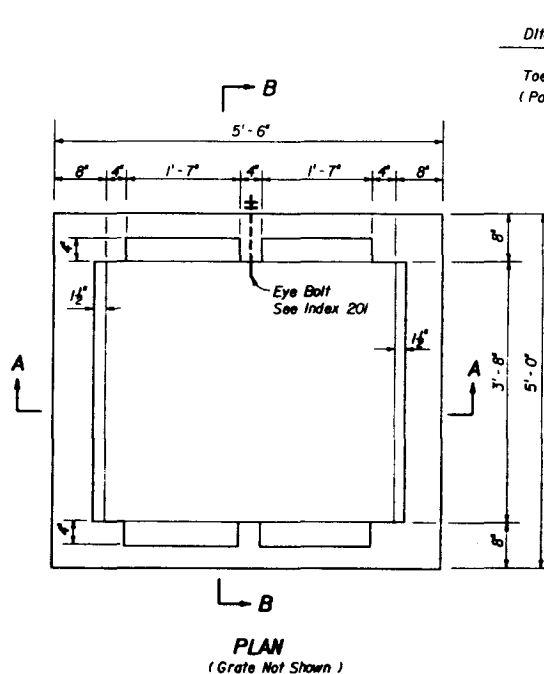
INLET WITH BOTTOM TYPE J

GENERAL NOTES

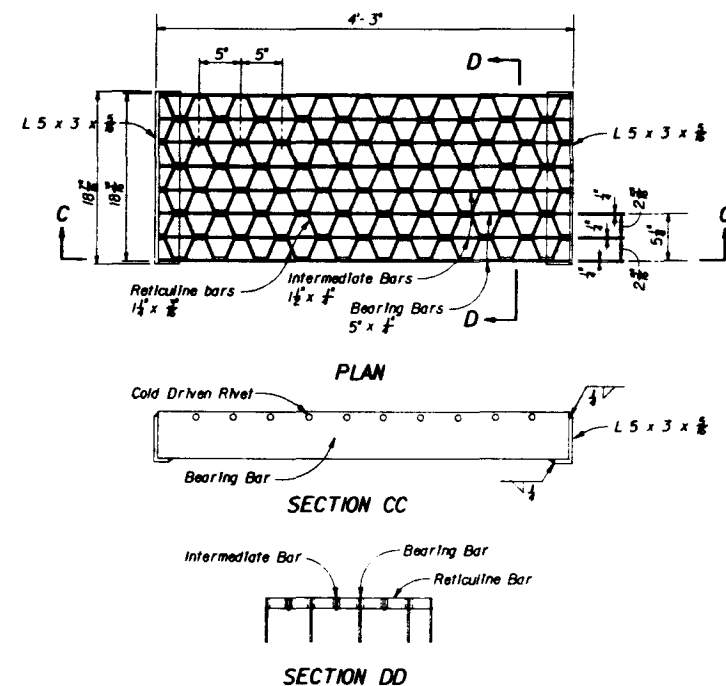
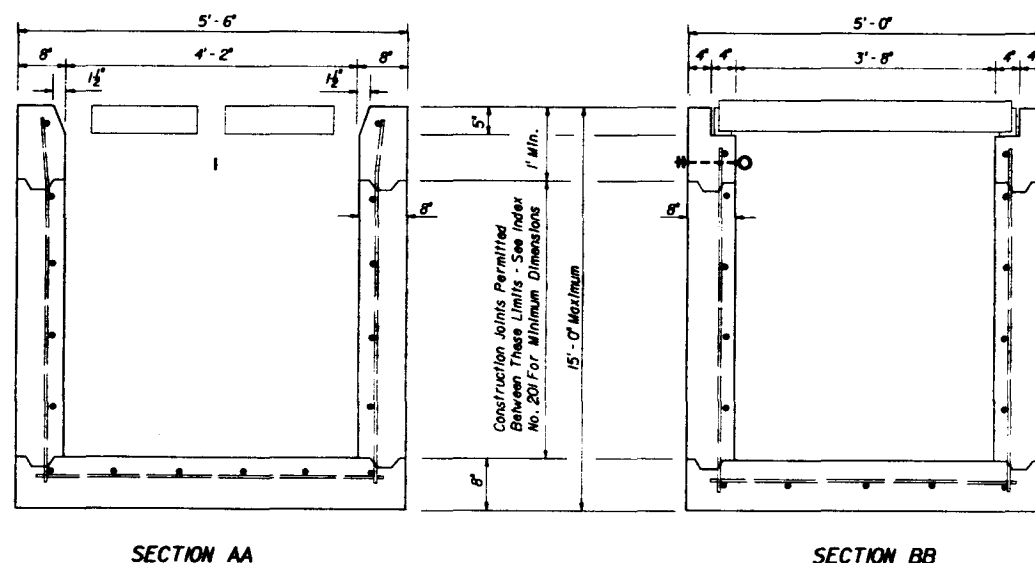
1. This Inlet is designed for ditches, medians, or other areas subject to heavy wheel loads on limited access facilities where debris may be a problem and flow through this grate is less than 7 cfs. NOTICE: This Inlet is not for use in areas subject to pedestrian and/or bicycle traffic.
2. Reinforcing - 2" clearance to inside face. Cut or bend bars out of way of pipe to clear pipe by 1/2".
3. Chamfer exposed edges (3/4" Chamfer).
4. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
5. Cost of ditch paving to be included in the cost of Inlet. Sadding to be paid for under contract unit price for Sadding, SY.
6. For supplemental details see Index No. 201.



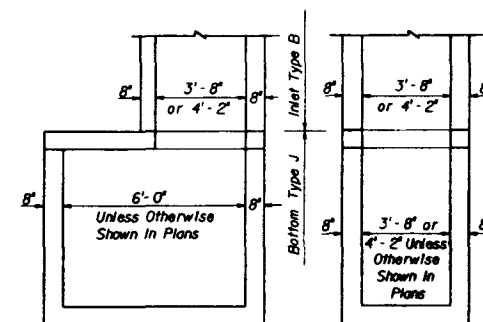
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM INLET TYPE A			
Designed By	Checked By	Approved By	
Drawn By	Reviewed By	Date	
Created By	Revised By	Sheet No.	Index No.
F.J.M.A. Approved: 7/18/75		87	1 of 1
		230	



SODDING, PAVEMENT AND DITCH BLOCK



STEEL GRATE



Note: Structure Bottom Type J, Alt. B Only. See Index No. 200.

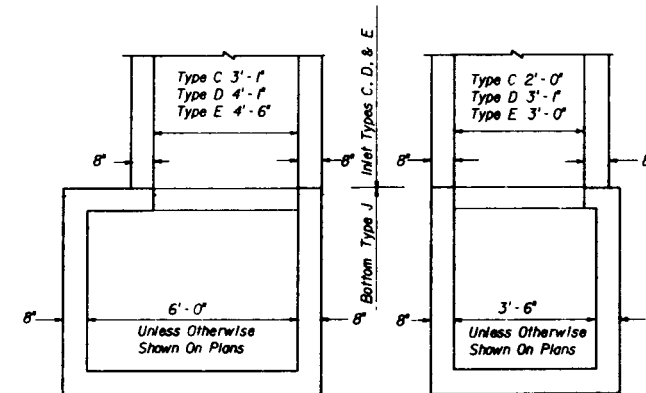
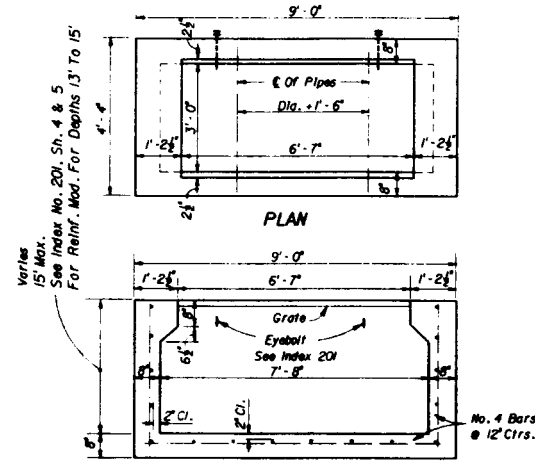
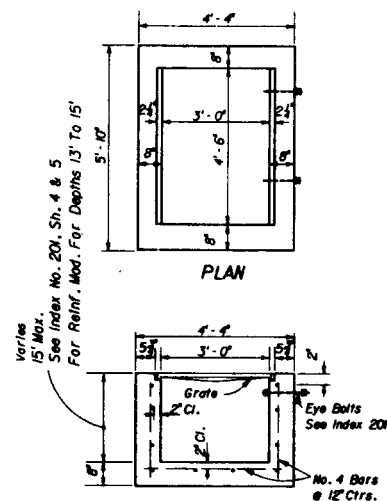
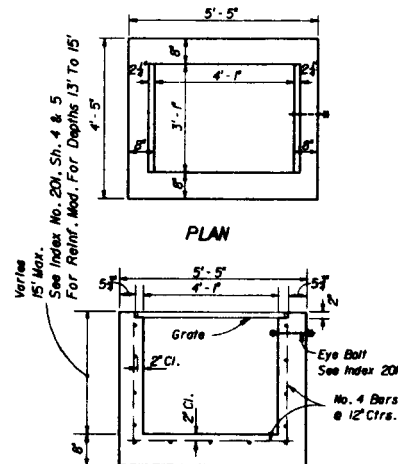
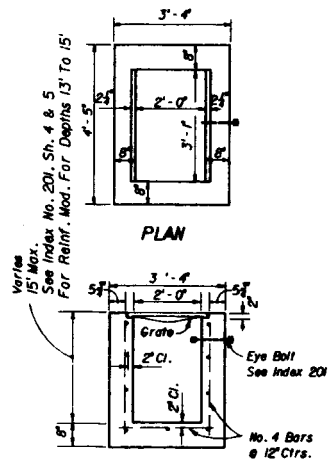
RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
3'-8"	30"
4'-2"	36"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom Type J detail above and Index No. 200.

GENERAL NOTES

- NOTICE: Inlet Intended for use only on that portion of limited access facilities not subject to pedestrian and / or bicycle traffic.
- Inlet designed for ditches, medians or other areas subject to heavy wheel loads, where debris may be a problem, and Inlet Intake is 7 cfs or more.
- Reinforcing steel all No. 4 bars at 12" centers both ways with 2" clearance to inside of walls and bottom. Bars to be cut or bent for 1/2" minimum clearance around pipe.
- When alternate G grates are specified in the plans, the grates are to be hot dipped galvanized after fabrication.
- Ditch paving to be included in cost of Inlet. Sodding to be paid for under the contract unit price for Sodding St.
- For supplementary details see Index No. 201.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
DITCH BOTTOM INLET TYPE B					
Designed By	HAB	Date	06/87	Approved By	
Drawn By	RBR	Date	05/88	Checked By	
Checked By	JAC	Date	05/88	Revision No.	
F.J.L.B.A. Approved		Date	07/18/72	Sheet No.	87
			08/23/78	1 of 1	231

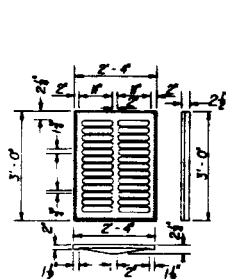


Note: Structure Bottom Type J, Alt. B only: See Index No. 200.

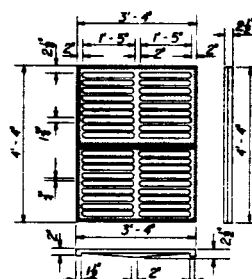
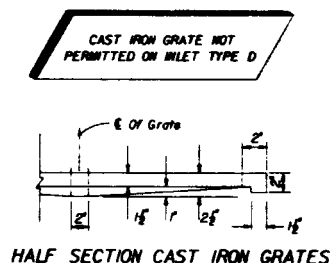
GENERAL NOTES

- These inlets are suitable for bicycle and pedestrian areas and are to be used in ditches, medians and other areas subject to infrequent traffic loadings but are not to be placed in areas subject to any heavy wheel loads.
- Inlets subject to minimal debris should be constructed without slots. Where debris is a problem inlets should be constructed with slots. Slotted inlets located within roadway clear zones and in areas accessible to pedestrians shall have traversable slots. The traversable slot modification is not adaptable to Inlet Type H. Slots may be constructed at either or both ends as shown on plans.
- Either cast iron or steel grates may be used on inlets without slots and on inlets with non-traversable slots. Steel grates are required on inlets with traversable slots and on inlets where bicycle traffic is anticipated. When Alternate G grate is specified in the plans, either the steel grate, hot dipped galvanized after fabrication, or the cast iron grate may be used, unless the plans stipulate the particular type.
- Recommended maximum pipe sizes shown are for concrete pipe. Pipe sizes larger than those recommended must be checked for fit.
- All exposed corners and edges of concrete are to be chamfered $\frac{3}{4}$ ".
- Pavement to be used on inlets without slots and inlets with non-traversable slots only when called for in the plans, but required on all traversable slot inlets. Cost to be included in contract unit price for inlets. Quantities shown are for information only.
- Traversable slots constructed in existing inlets shall be paid for as inlets partial, and shall include the cost for slot openings, paving and any required replacement grates.
- Sodding to be used on all inlets not located in paved areas and paid for under contract unit price for Sodding SY.
- For supplementary details see Index No. 201.

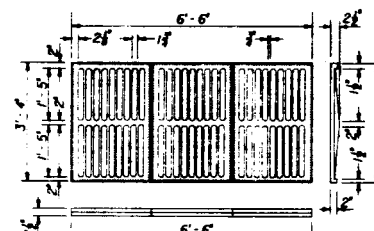
INLETS



Approx. Weight 235 Lbs.

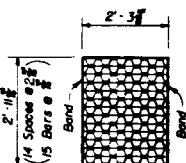


Approx. Weight 465 Lbs.

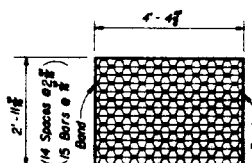


Approx. Weight 725 Lbs.

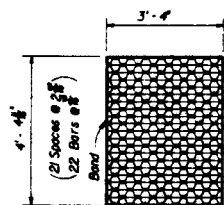
CAST IRON GRATES



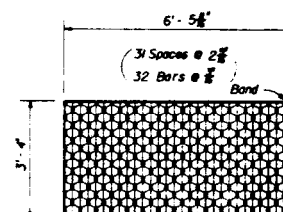
Straight Bars 2" x $\frac{3}{8}$ "
Reinforcing Bars 1 1/2" x $\frac{3}{8}$ "
Bands 1 1/2" x $\frac{3}{8}$ "
Approx. Weight 100 Lbs.



Straight Bars 2" x $\frac{3}{8}$ "
Reinforcing Bars 1 1/2" x $\frac{3}{8}$ "
Bands 1 1/2" x $\frac{3}{8}$ "
Approx. Weight 180 Lbs.



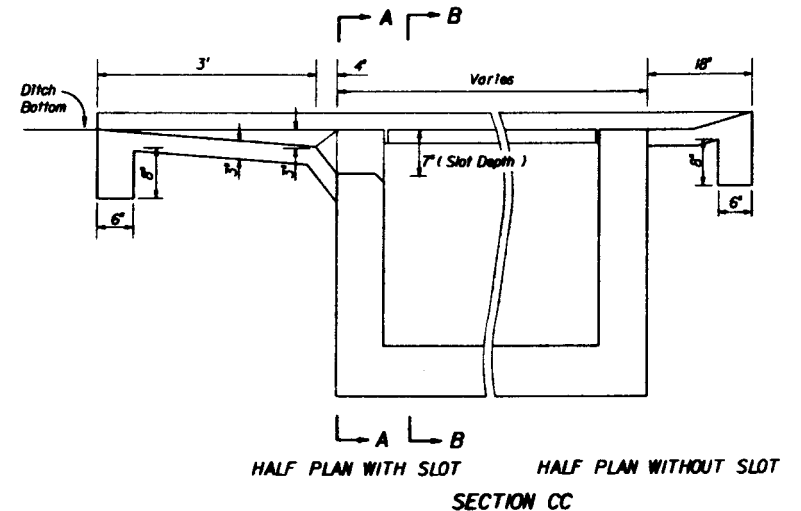
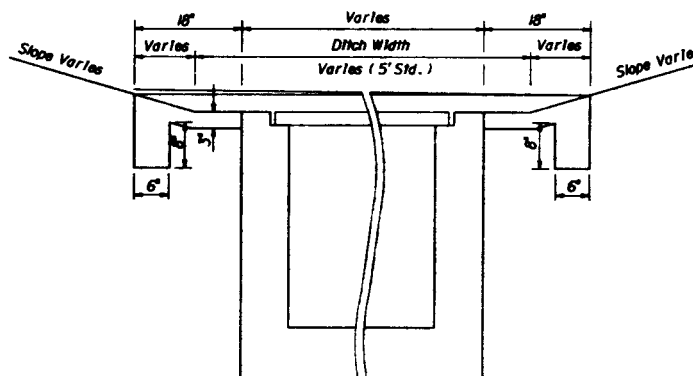
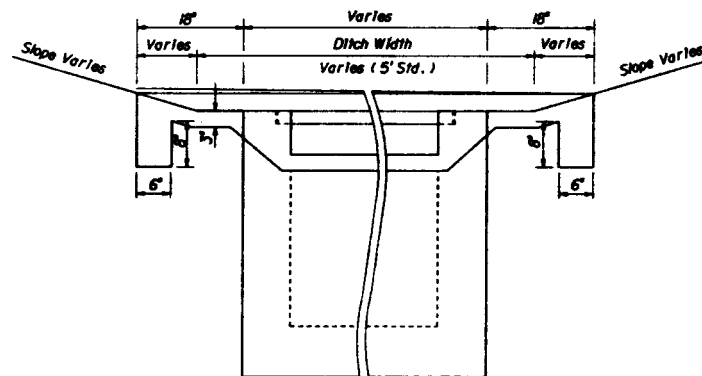
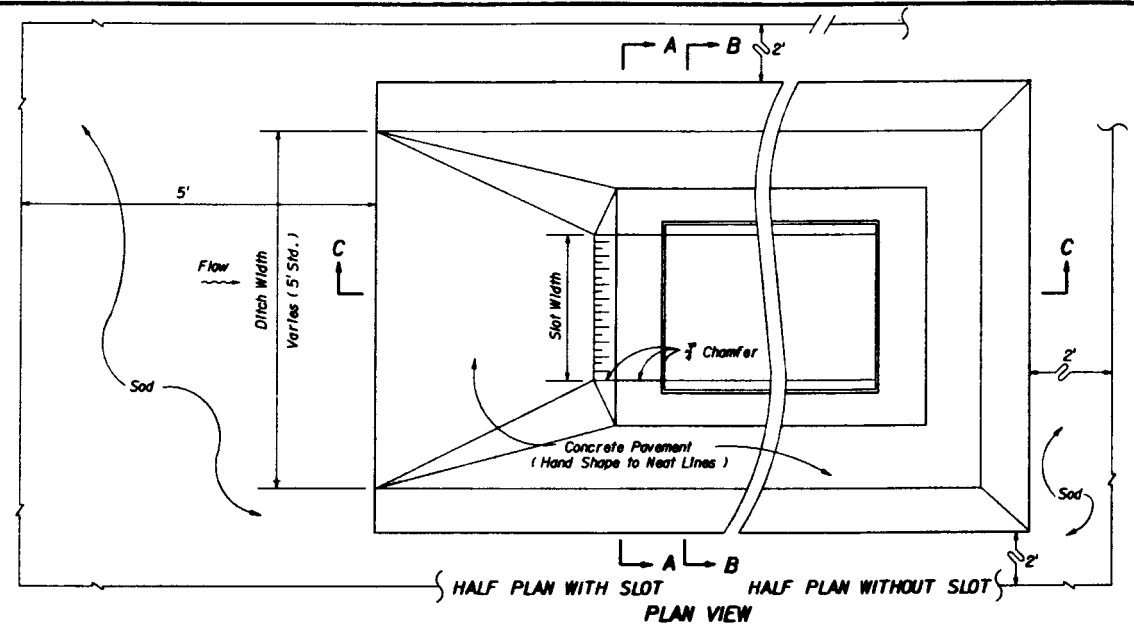
Straight Bars 2" x $\frac{3}{8}$ "
Reinforcing Bars 1 1/2" x $\frac{3}{8}$ "
Bands 1 1/2" x $\frac{3}{8}$ "
Approx. Weight 215 Lbs.



Straight Bars 2" x $\frac{3}{8}$ "
Reinforcing Bars 1 1/2" x $\frac{3}{8}$ "
Bands 1 1/2" x $\frac{3}{8}$ "
Approx. Weight 315 Lbs.

STEEL GRATES

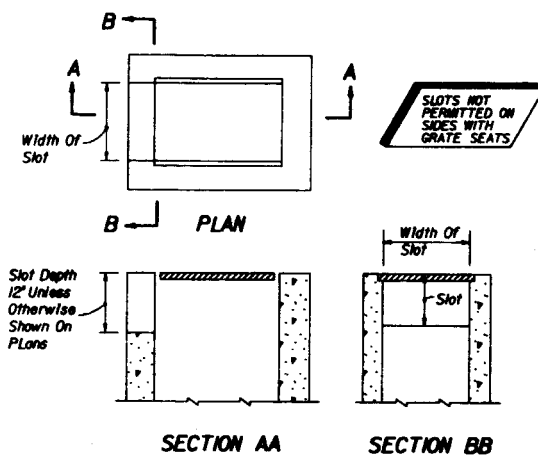
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
DITCH BOTTOM INLETS TYPES C, D, E & H					
Designed By	Drawn By	Checked By	Reviewed By	Approved By	Scale
F.J.W.A. Approved			10/07/80	88	1 of 4
					232



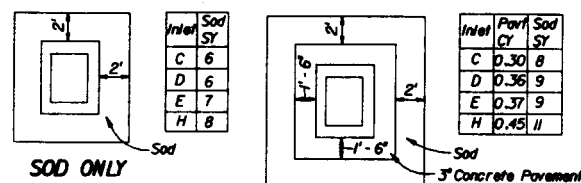
Inlet	Pavement				Sod	
	Single Slot		Double Slot		Single Slot	Double Slot
	SY	CY	SY	CY	SY	SY
C	4.87	0.77	6.36	0.93	12	16
D	5.99	0.91	7.70	1.10	14	19
E	5.88	0.91	7.37	1.08	14	18

TRAVERSABLE SLOTS

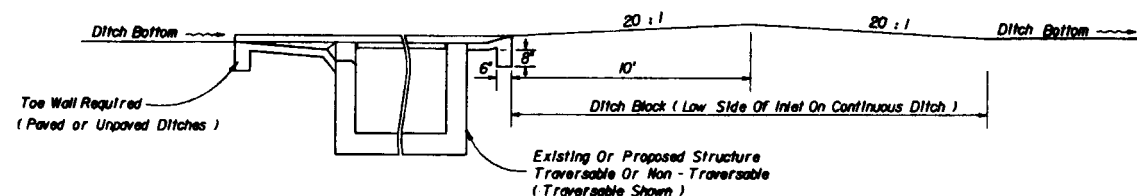
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
DITCH BOTTOM INLETS TYPES C, D, E, & H					
Designed By	EDR	Date	02/10	Approved By	<i>[Signature]</i>
Drawn By	JH	Date	02/10	Checked By	JAG
Checked By	JAG	Date	02/10	Revision No.	01
F.H.S.A. Approved				12/17/10	2 of 4
					232



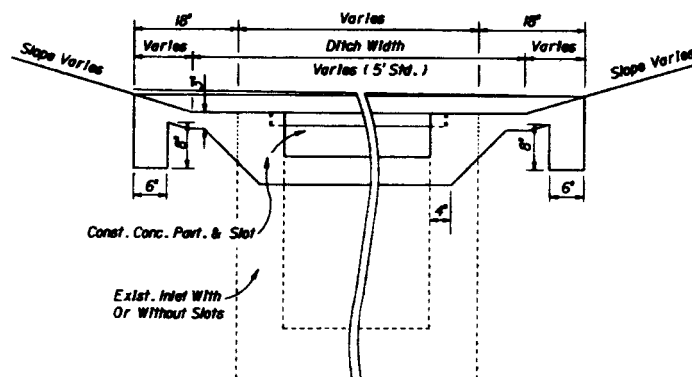
NON - TRAVERSABLE SLOTS



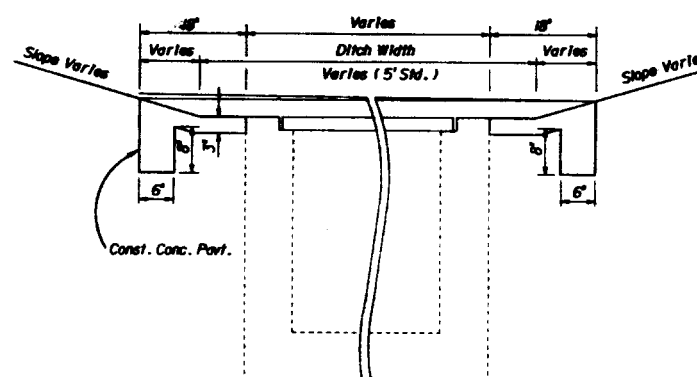
NOTE : See General Notes Nos. 6 and 7
**SODDING AND PAVEMENT
 FOR INLETS WITHOUT
 SLOTS AND INLETS WITH
 NON - TRAVERSABLE SLOTS**



DITCH BLOCK FOR INLETS WITH OR WITHOUT SLOTS



SECTION AA

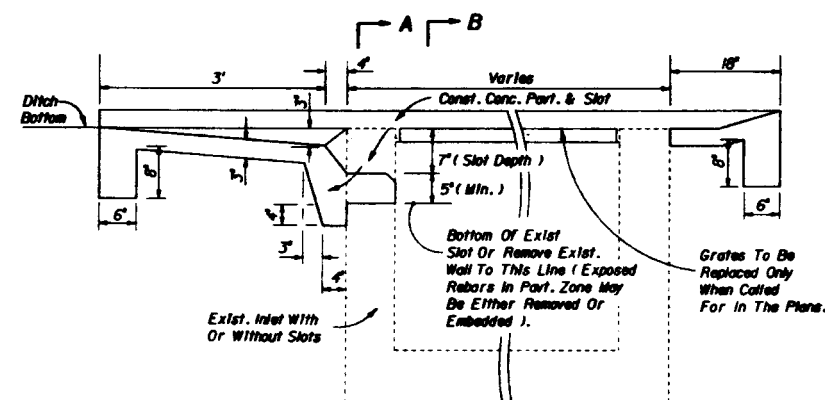


SECTION BB

Inlet	Pavement				Sod	
	Single Slot	Double Slot	Single Slot	Double Slot	Single Slot	Double Slot
	SY	CY	SY	CY	SY	SY
C	4.87	0.83	6.16	1.05	12	16
D	5.99	1.01	7.70	1.30	14	19
E	5.88	0.99	7.37	1.24	14	18

NOTE : For plan view and additional details see sheet 2 of 4.
 For payment see General Notes Nos. 6 and 7.

TRAVERSABLE SLOTS FOR EXISTING INLETS



SECTION CC (CASE 1)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
DITCH BOTTOM INLETS TYPES C, D, E & H					
Designed By	EDR	Date	07/04	Approved By	<i>[Signature]</i>
Drawn By	DNE	Date	07/04	Scale	As Shown
Checked By	JBR/AB	Date	07/04	Revision No.	Sheet No.
F.H.A. Approved				08/25/04	232

DESIGN NOTES:

1. The general purpose of these conversions is to remove the hazard of the protruding inlet top, while not creating a hazard by depressing the top too deeply.
2. The corrective procedure depends on the approach ditch grade and hydraulic requirements of the site. The selection of the appropriate case depends on the relationship between inlet top and ditch elevation, and, on the vertical clearance between the top of the uppermost pipe(s) and the grate. The purpose for the Case 1 conversion is to add the traversable slot to an existing inlet where top removal, change in grate elevation and ditch transitions are not required. Case 2 will normally be applicable to ditches with flatter grades adjoining the inlet. Case 3 will normally be applicable to ditches with steeper grades adjoining the inlet where buildup of the existing ditch is acceptable.

3. The designer shall stipulate in the plans which case is to be constructed at each individual inlet location.

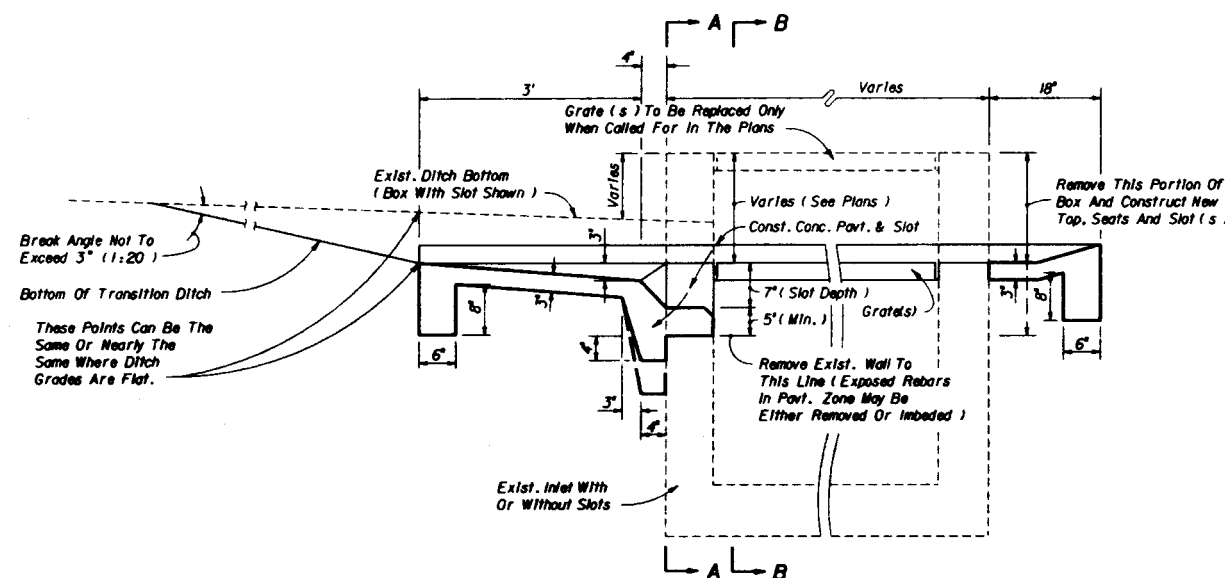
Where the existing inlet top is above the existing ditch (Case 2) but borrow material will be required to adjust the ditch (Case 3), and vertical clearance or other conditions do not prevent removal of the inlet top, the designer should call for Case 2. The designer shall determine if ditch reconstruction is required more than 35 feet beyond any traversable slot side and shall include separate pay items in the plans to cover the cost for that portion of required ditch reconstruction exceeding the 35 foot limit. The designer shall also determine whether ditch pavement is required for ditch restoration within the 35 foot limit and include that pavement under a pay item separate from the inlets partial.

When the detention ditch concept is to be used with Case 3, the designer shall stipulate "Case 3 (Detention)" in the plans.

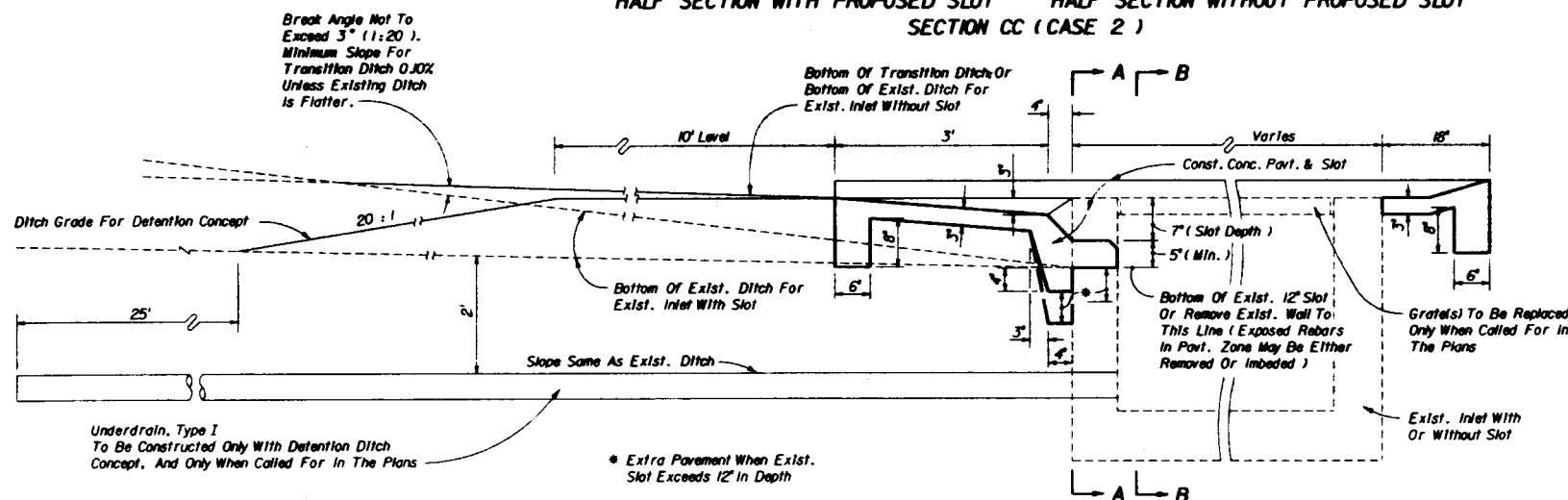
The designer shall determine whether tight soil or other conditions at each individual inlet indicates the need for underdrain in Case 3 conversions and shall call for Underdrain, Type 1 in the plans.

METHOD OF PAYMENT

1. Existing inlets converted to traversable slot tops under Cases 1, 2 and 3 shall be paid for as inlets partial, each. Case shall not be included in the pay item description.
 2. All ditch reconstruction work within 35 feet of each traversable slot conversion, whether required by these details or as a direct result of the conversion, shall be included as a part of the partial cost. Reconstruction work shall include excavation and removal of surplus materials or borrow materials in place, grading, compaction, shaping and seeding and mulching. Sodding, ditch pavement and underdrain are not included as part of the inlet partial cost and are to be paid for separately.
 3. Inlet pavement and sodding shall be in accordance with the sections on this detail and with the Plan on Sheet 2 of 4 and Sections AA, BB and CC (as Case 1) and tabular quantities on Sheet 3 of 4.
 4. Unit price and payment shall constitute full compensation for inlet conversion, replacement grates where called for in the plans, ditch reconstruction, seeding and mulching, and shall be paid for under the contract unit price for inlets (DT Bot) (Type ___) (Partial), each.
- Sodding shall be paid for under the contract unit price for Sodding, SY.
- Ditch pavement shall be paid for separate from the inlet by pavement type(s) and unit(s) as called for in the plans.
- Underdrain called for in the plans for Case 3 conversions shall be paid for as Underdrain, Type 1, LF.



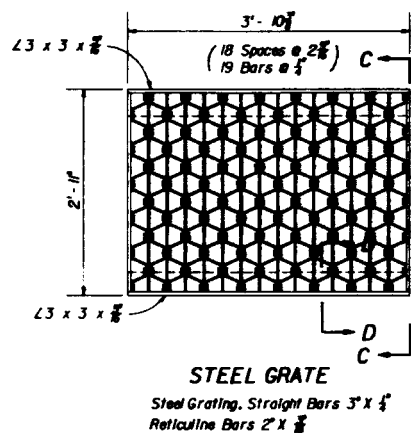
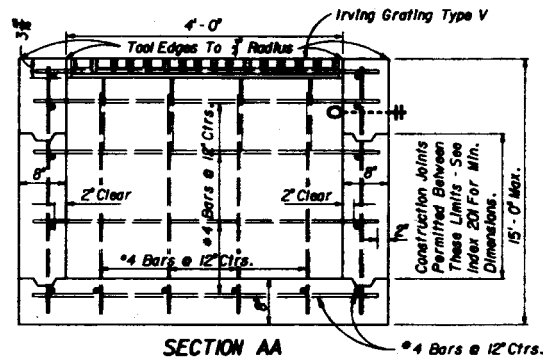
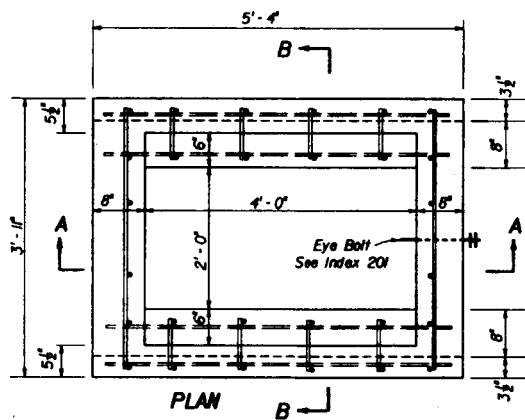
HALF SECTION WITH PROPOSED SLOT HALF SECTION WITHOUT PROPOSED SLOT
SECTION CC (CASE 2)



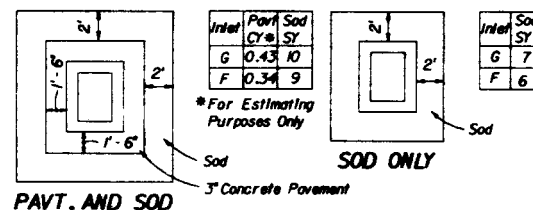
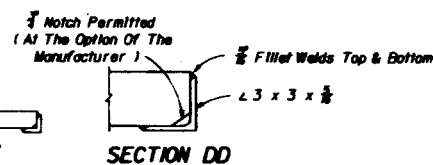
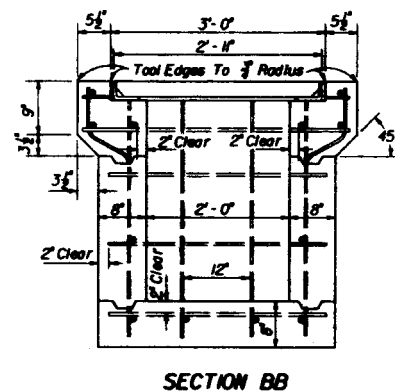
HALF SECTION WITH PROPOSED SLOT HALF SECTION WITHOUT PROPOSED SLOT
SECTION CC (CASE 3)

TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM INLETS TYPES C, D, E & H			
Designed By JAB/ESR	Date 03/10/06	Reviewed By [Signature]	Date 03/10/06
Drawn By HSD/ada	Date 05/20/06	Checked By JAB/ESR	Date 05/22/06
Project No. FJLRJ.A	Approved 11/07/06	Revision No. 87	Sheet No. 4 of 4
			232

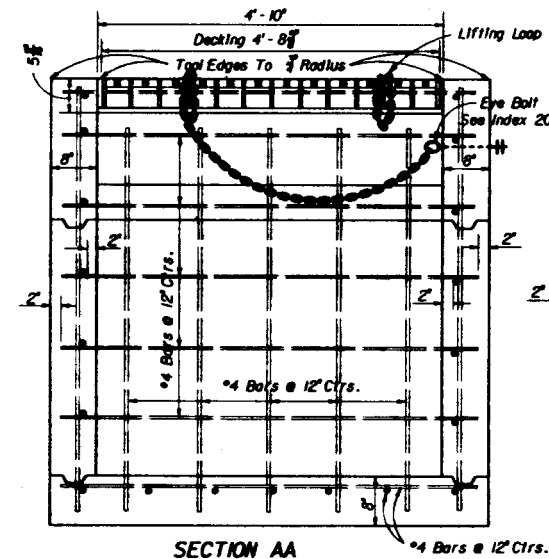
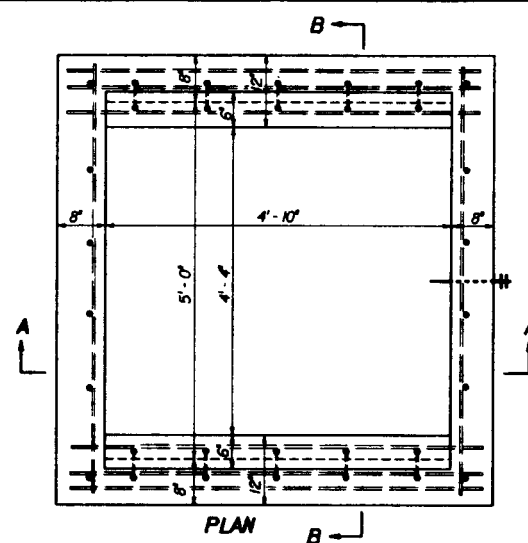


TYPE F

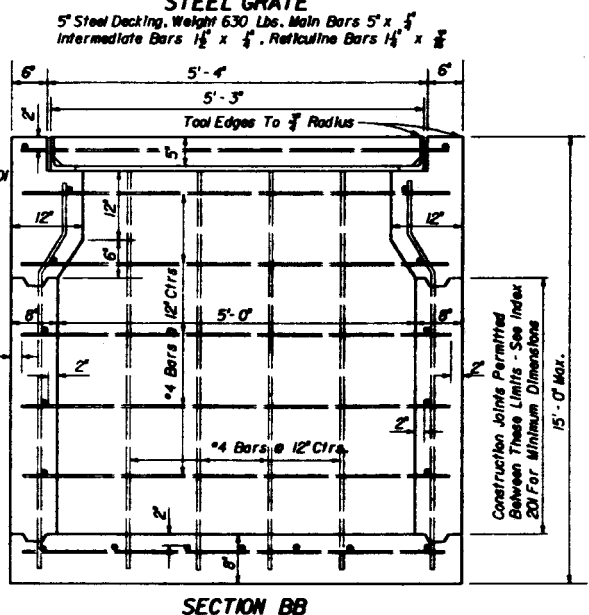
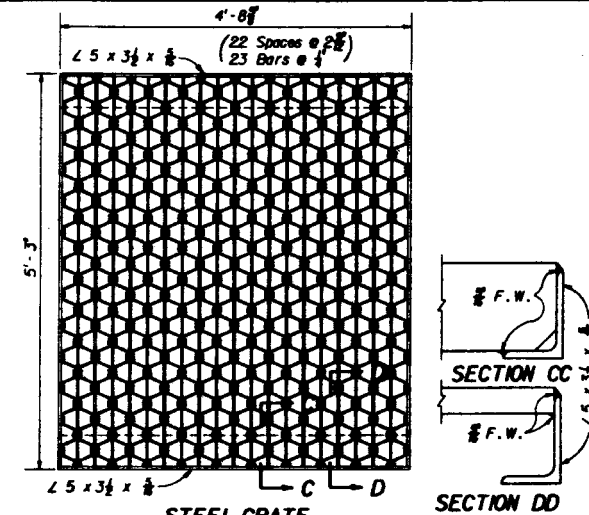


Notes: 1. Pavement and / or sod to be used only where called for in the plans.
2. Cost of paving to be included in cost of inlet.

PAVEMENT AND SODDING



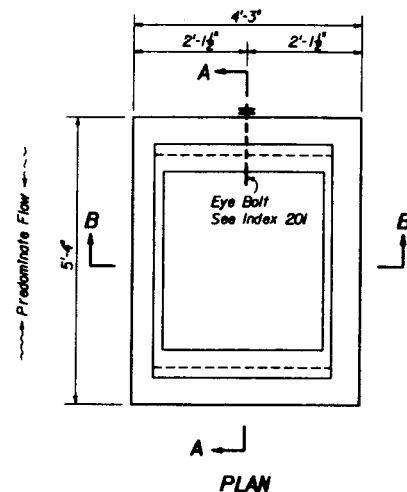
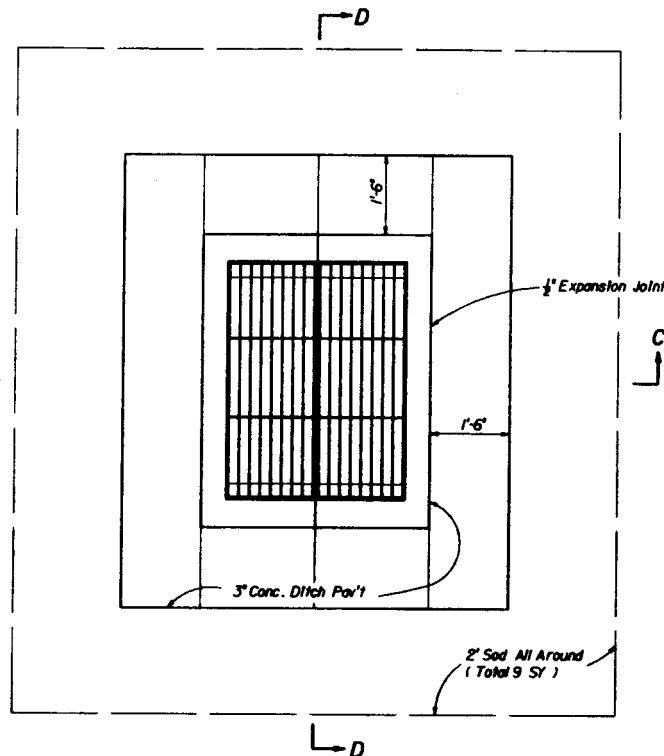
TYPE G



GENERAL NOTES

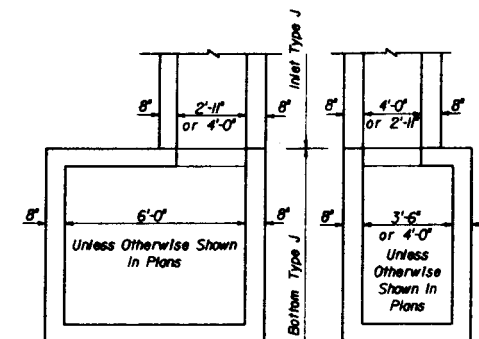
- These inlets are designed for use in ditches, medians, pavement areas, or other areas subject to heavy wheel loads where debris is minimal and is subject to pedestrian and / or bicycle traffic.
- When alternate G grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
- These inlets may be used with structure bottoms Type J, Alt. B, the inlet and bottom combinations are to be paid for under the contract unit price for inlets (DT Bot) (Type F (or G)) (J Bot, Depth), E.g.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM INLETS TYPES F & G			
Designed By	TRJ	Date	03/90
Drawn By	MEF	Date	03/90
Checked By	BNW	Date	03/90
F.J.A.R.A. Approved	05/09/95	Sheet No.	87
1 of 1		Index No.	
233			



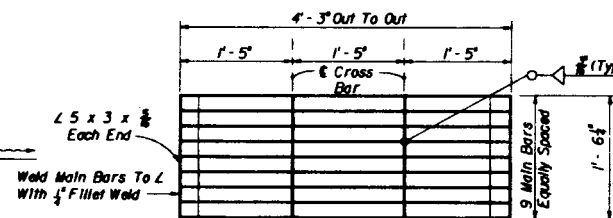
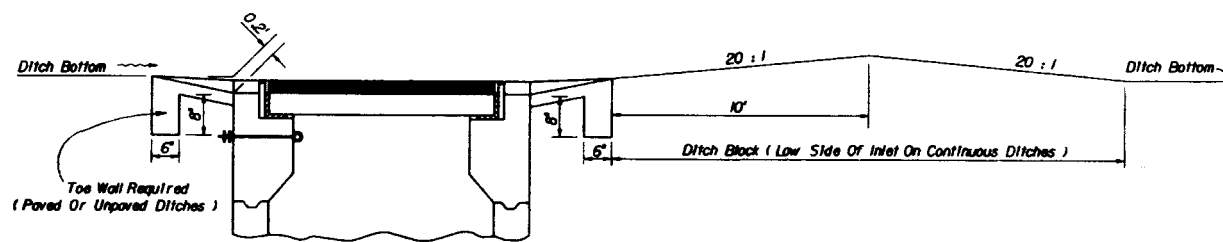
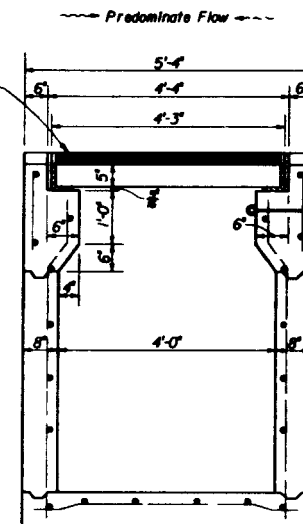
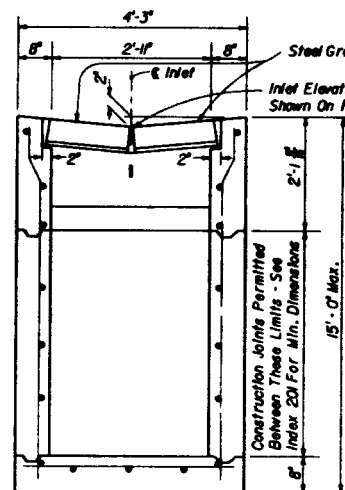
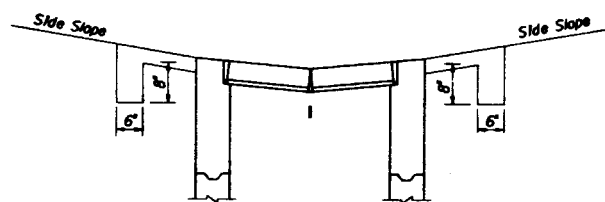
RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
2'-1 1/2"	24"
4'-0"	36"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom Type J detail right and Index No. 200.



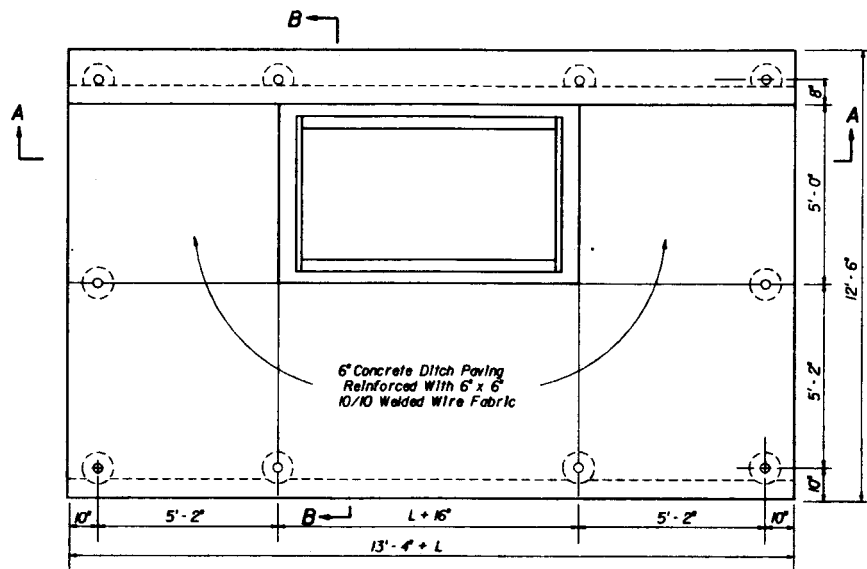
GENERAL NOTES

- This Inlet is designed for ditches, medians or other areas subject to heavy wheel loads, where only light debris is expected and pedestrian traffic is anticipated. NOTICE: Inlet not for use in areas subject to bicycle traffic.
- Reinforcing - No. 4 bars at 12" centers both ways with 2" clearance to inside face. Cut or bend bars out of way of pipe when necessary; bars to clear pipe by 1/2".
- When alternate G grate is specified in plans the grate is to be hot dipped galvanized after fabrication.
- For supplemental details, see Index 201.
- Cost of ditch paving to be included in cost of Inlet. Sodding to be paid for under contract unit price for Sodding, SY.



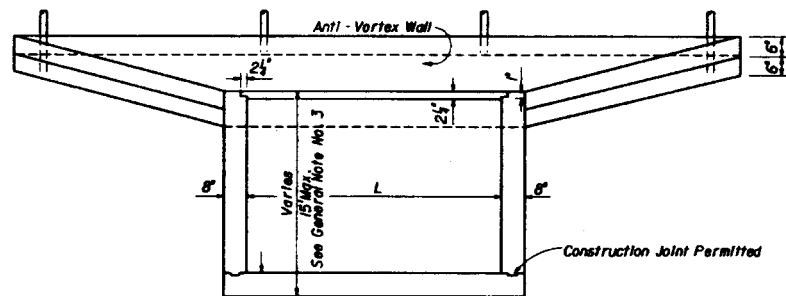
Note: Two Required Per Inlet
Main Bars 5" X 1/4" (Notched For Cross Bars).
Cross Bars 1 1/2" X 1/4" (Continuously Welded At Main Bar Notches).
Main Bars And Cross Bars Flush On Top.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH BOTTOM INLET TYPE J			
Designed By LWF	Check 08/76	Approved By <i>[Signature]</i>	Station 234
Drawn By SRL	Check 08/76	Revision No. 87	Sheet No. 1 of 1
F.H.B.A. Approved 08/03/76			



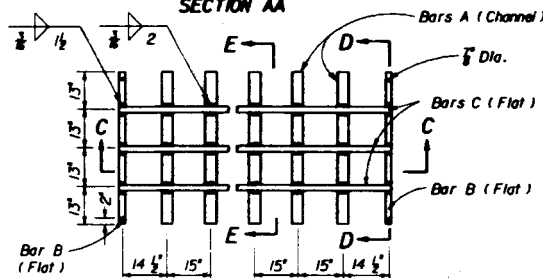
(Grate Not Shown)

PLAN

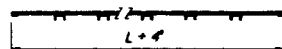


(Grate Not Shown)

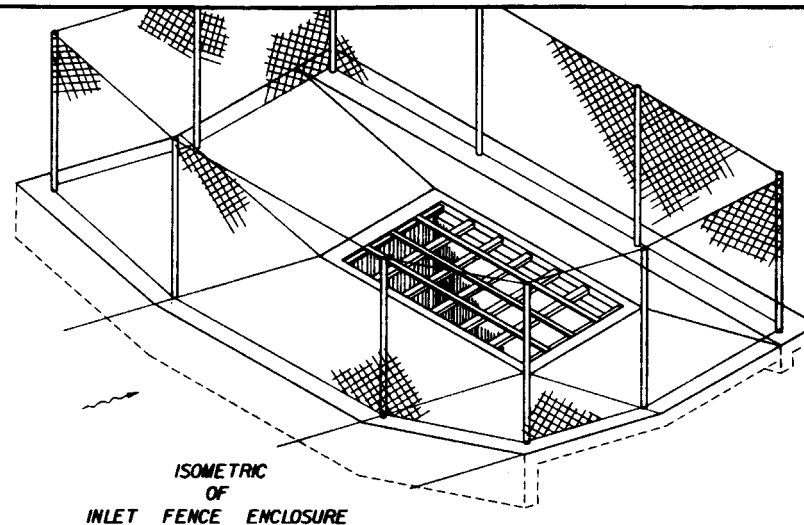
SECTION AA



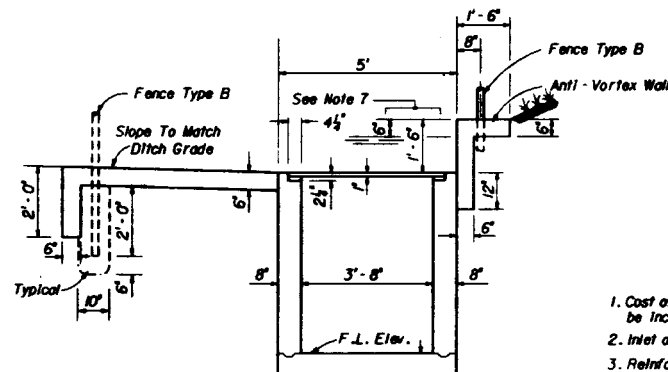
STEEL GRATE



SECTION CC

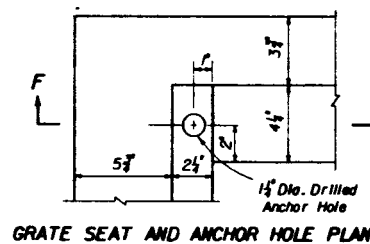


ISOMETRIC
OF
INLET FENCE ENCLOSURE

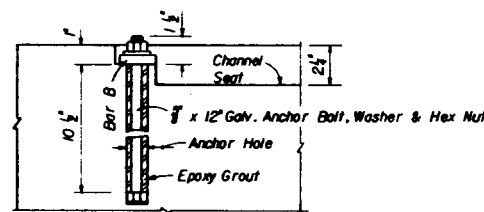


(Grate Not Shown)

SECTION BB



GRATE SEAT AND ANCHOR HOLE PLAN



(With Bar B And Anchor Bolt)

SECTION FF

GRATE QUANTITIES						
PIPE SIZE	L	BILL OF STEEL			STEEL WEIGHT	
		BAR	No. REQ'D.	LENGTH	CHANNEL 4"x5.4"	FLAT 2"x1/4" (3.4)
30" & 36"	4'-9"	A	3	4'-4"	70	30
		B	2	4'-4"		52
		C	3	5'-7"		
42" & 48"	6'-0"	A	4	4'-4"	94	30
		B	2	4'-4"		65
		C	3	6'-4"		
54" & 60"	7'-3"	A	5	4'-4"	117	30
		B	2	4'-4"		77
		C	3	7'-7"		
66" & 72"	8'-6"	A	6	4'-4"	140	30
		B	2	4'-4"		90
		C	3	8'-10"		
SPECIAL	9'-9"	A	7	4'-4"	164	30
		B	2	4'-4"		103
		C	3	10'-1"		
SPECIAL	11'-0"	A	8	4'-4"	187	30
		B	2	4'-4"		116
		C	3	11'-4"		
SPECIAL	12'-3"	A	9	4'-4"	211	30
		B	2	4'-4"		128
		C	3	12'-7"		
SPECIAL	13'-6"	A	10	4'-4"	234	30
		B	2	4'-4"		141
		C	3	13'-10"		
SPECIAL	14'-9"	A	11	4'-4"	257	30
		B	2	4'-4"		154
		C	3	15'-1"		
SPECIAL	16'-0"	A	12	4'-4"	281	30
		B	2	4'-4"		167
		C	3	16'-4"		
SPECIAL	17'-3"	A	13	4'-4"	304	30
		B	2	4'-4"		179
		C	3	17'-7"		
SPECIAL	18'-6"	A	14	4'-4"	328	30
		B	2	4'-4"		192
		C	3	18'-10"		

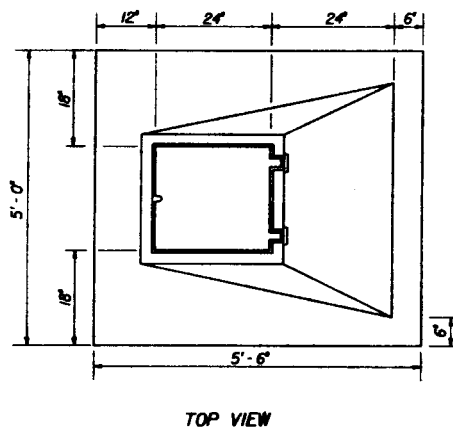
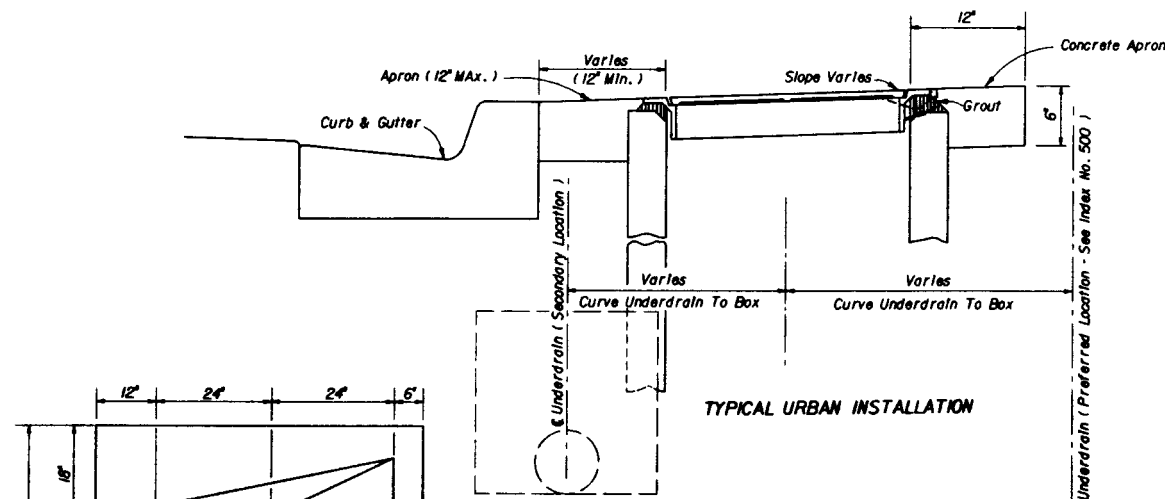
GENERAL NOTES

- Cost of ditch paving, anti-vortex wall, grate, concrete, reinforcing steel and fence enclosure to be included in the cost of inlet.
- Inlet and anti-vortex wall to be Class I Concrete.
- Reinforcing - No. 4 bars at 12" centers both ways for pipe sizes up to 72" diameter; 1/2" clearance to inside face and bottom of inlet. See Index No. 201, Sh. 4 & 5 for reinf. steel modification for depths 13' to 15'. Bend top and corner bars to clear anchor holes. Inlets for special size pipe require special reinforcement design and design approval by the project design engineer.
- Channel section C 3 x 6 may be used as an alternate for the C 4 x 5.4 channel.
- Channels and bars to be ASTM A 588 or A 242, Grade 50, weathering steel, except grates exposed to salt water shall be ASTM A 242, A 441, A 572 or A 588, Grade 50 steel, and galvanized in accordance with Section 962 - 7 of the Standard Specifications, and shall be designated in the plans as Alternate G.
- Fence enclosure shall be Fence Type B (Index No. 452). All posts to be set in concrete. A minimum of 10 posts required. Corner and approach side posts to be 3" nominal.
- Inlet length (L) shall be set by the designer for the greater of either culvert requirement or inlet pool not to exceed 12' depth. Structures over 6' in depth are to be checked for flotation by the designer of project drainage.
- This inlet is to be used at locations having high flow rates, usually where an endwall could not be utilized without hazardous intake.
- This inlet is not intended for use with structure bottoms Type J, Alternate B.

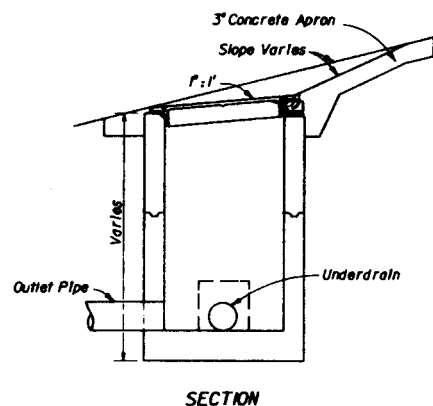
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DITCH BOTTOM INLET TYPE K

Designed By	Drawn By	Checked By	Reviewed By	Approved By
FHWA	SH	JE	6/79	6/79
Revision No.	Sheet No.	Project No.	10 of 1	235
F.H.W.A. Approved:				

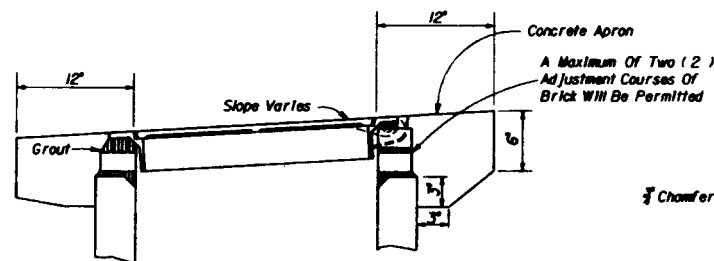


TOP VIEW

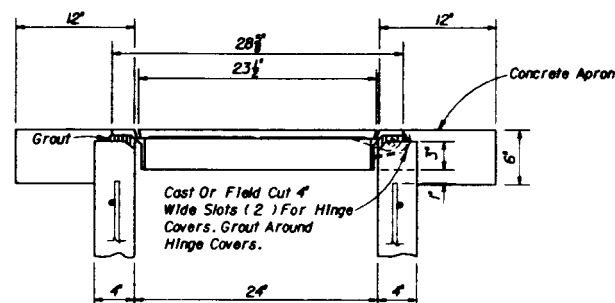


SECTION

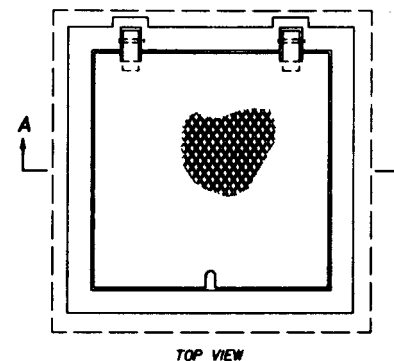
TYPICAL INSTALLATION ON SLOPES



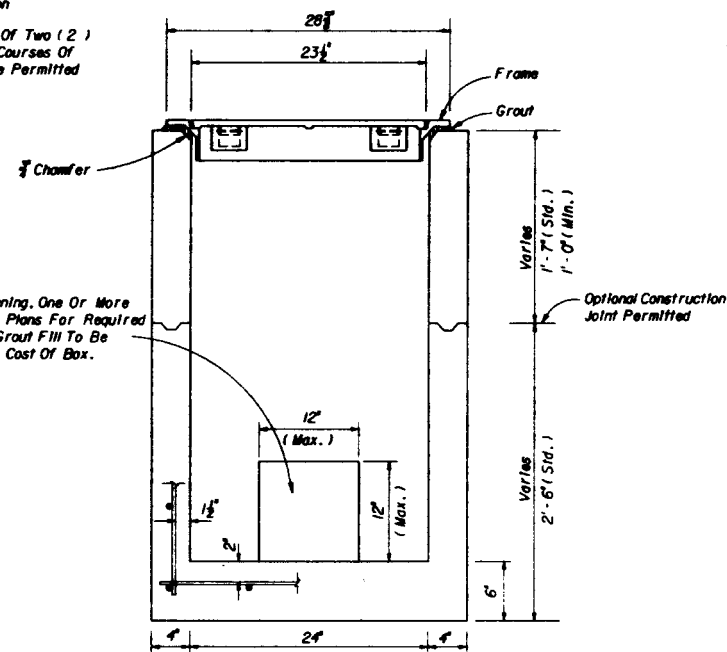
PERMISSIBLE TOP ADJUSTMENT



TYPICAL TOP AND APRON

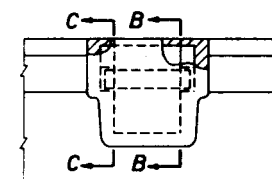


TOP VIEW

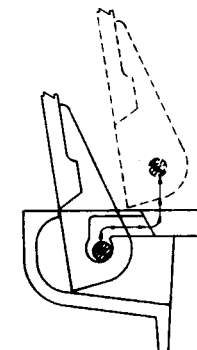


SECTION AA

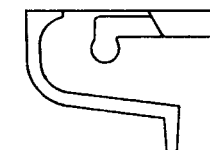
BOX AND TOP



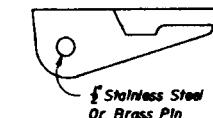
BACK VIEW



COVER REMOVAL



SECTION CC



SECTION BB

HINGE DETAIL

GENERAL NOTES

1. Cast Iron cover and frame to be Neenah Foundry Company R-6660-JH, U.S. Foundry Manufacturing Corporation No. A-632 or equal. Neenah R-6660-JH detailed this Index.
2. Box to be Class I Concrete, reinforced with No. 3 bars on 8" centers both ways, sides and bottom.
3. Concrete apron to be included in the contract unit price for Underdrain Inspection Box.
4. All covers shall be furnished with pick holes. Fitted lifts or handles are not permitted.
5. Manhole Type P Alternate A, Index 200, with Type I Frame and Cover, Index 201, may be used in lieu of the box detailed on this sheet, and is recommended when high ADT increases chance of the repeated vehicle loadings.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

UNDERDRAIN INSPECTION BOX

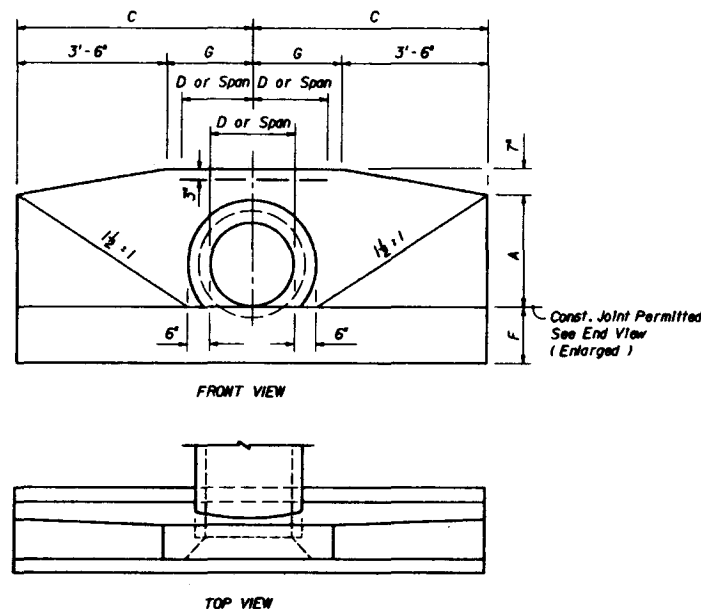
Designed By	Checked By	Approved By	Index No.
WFS	JH	<i>[Signature]</i>	245
Drawn By	Revised By	Sheet No.	
JH	JH	82	1 of 1
Checked By	Reviewed By	Index No.	
JH	JH	245	
F.J.W.A. Approved 12/08/98			

APPLICATION AND SELECTION GUIDE FOR PIPE END TREATMENTS

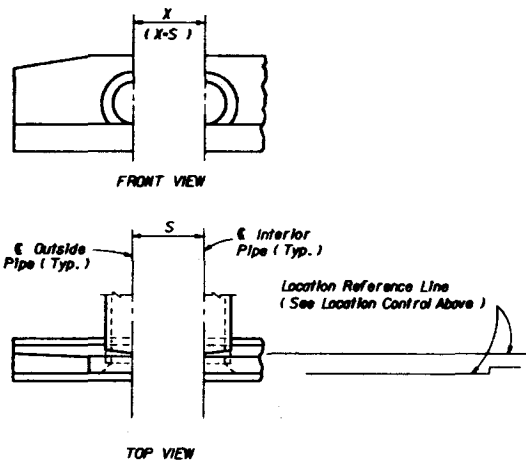
INDEX NO.	DESCRIPTION		APPLICATION			INLET END			OUTLET END		SAFETY		ECONOMIC RATING	
	TYPE	PIPE SIZE	CROSSDRAIN	SIDEDRAIN	MEDIAN	APPLICABLE	HYDRAULIC PERFORMANCE	K ₉	APPLICABLE	EROSION TOLERANT	PERMITTED LOCATION	TRAFFIC-SAFE GRATE AVAILABLE		
250	Straight Concrete	Single and Multiple 15" Thru 54"	Yes	No	Limited	Yes	Excellent	0.2	Limited	Good	Outside CZ	No	Fair	
251	Straight Concrete	Single and Double 60"	Yes	No	Limited	Yes	Excellent	0.2	Limited	Good	Outside CZ	No	Fair	
252	Straight Concrete	Single and Double 66"	Yes	No	Limited	Yes	Excellent	0.2	Limited	Good	Outside CZ	No	Fair	
253	Straight Concrete	Single and Double 72"	Yes	No	Limited	Yes	Excellent	0.2	Limited	Good	Outside CZ	No	Fair	
255	Straight Concrete	Single 84"	Yes	No	Limited	Yes	Excellent	0.2	Limited	Good	Outside CZ	No	Fair	
258	Straight Sand Cement	Single & Multiple 18" Thru 84"	Limited	No	Limited	Yes	Very Good	0.3	Yes	Good	Outside CZ	No	Good	* For temporary construction or use on a minor facility
260	U Type With Grate Concrete	Single 15" Thru 30"	Limited	No	Yes	Yes	Fair	0.7	Yes	Very Good	Inside CZ	Required	Good	
261	U Type Concrete	Single 15" Thru 30"	Limited	No	Yes	Limited	Good	0.5-0.7	Yes	Good	Grate Required Inside CZ	Yes	Fair	
264	Concrete Energy Dissipator	Single 30" Thru 72"	Limited	No	No	No	NA	NA	Yes	Excellent	Outside CZ	No	NA	
266	Winged Concrete	Single 12" Thru 48"	Yes	No	Yes	Yes	Very Good	0.3	Yes	Good	Outside CZ	No	Good	
268	U Type Sand Cement	Single & Multiple 15" Thru 60"	Limited	No	Limited	Yes	Good	0.5	Yes	Very Good	Outside CZ	No	Good	* For temporary construction or use on a minor facility.
270	Flared End Section Concrete	Single 12" Thru 72"	Yes	No	Yes	Yes	Good	0.5	Yes	Very Good	Outside CZ	No	Very Good	* Construction of optional towall and concrete jacket may be necessary. Flared end sections sizes 12" and 15" may be located as close as 8' beyond the outside edge of the shoulder.
272	Cross Drain Mitered End Section	Single & Multiple 15" Thru 72"	Yes	No	Yes	Yes	Fair	0.7	Yes	Good	Outside CZ	No	Very Good	* Mitered end sections sizes 15", 18" and 24" may be located as close as 8' beyond the outside edge of the shoulder.
273	Side Drain Mitered End Section	Single & Multiple 15" Thru 60"	No	Yes	No	Yes	Fair	0.7 (w/o grate) 1.0 (with grate)	Yes	Good	Inside CZ	Yes	Good	* Mitered end section size 30" and larger require use of grate. Grate may be deleted if pipe is located outside CZ and is offset from approach ditch alignment.
274	Side Drain Mitered End Section	Single 15" Thru 24"	No	Yes	No	Yes	Fair	0.7	Yes	Good	Inside CZ	No	Good	* For sidedrain installations constructed by FDOT maintenance forces or constructed under FDOT maintenance permit only.

1. All end treatments must be selected to satisfy hydraulic suitabilities with proper consideration given to safety and economics.
2. CZ denotes clear zone, formerly CRA denoting clear recovery area.
3. Grates should not be placed on outlet ends unless positive debris protection is provided at inlet end.
4. Additional notes concerning application restrictions may be shown on individual indexes.
5. Economic ratings are based on statewide average costs.
6. End treatments with a K₉ of 0.5 or greater should be used only in areas of low design velocities and negligible debris.
7. Pipe sizes are circular, Class III B Wall, concrete pipe. Elliptical pipe and corrugated pipe are to be checked for fit in accordance with Index No. 20; metal pipe sizes should be reviewed using 24" x 1/2" corrugation up to 30" and 3" x 1/2" corrugation for larger sizes.

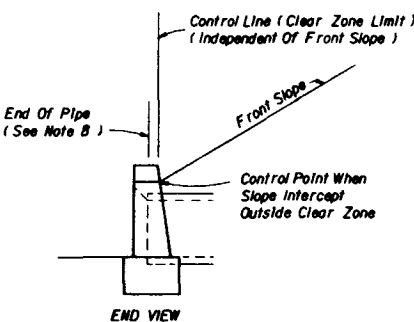
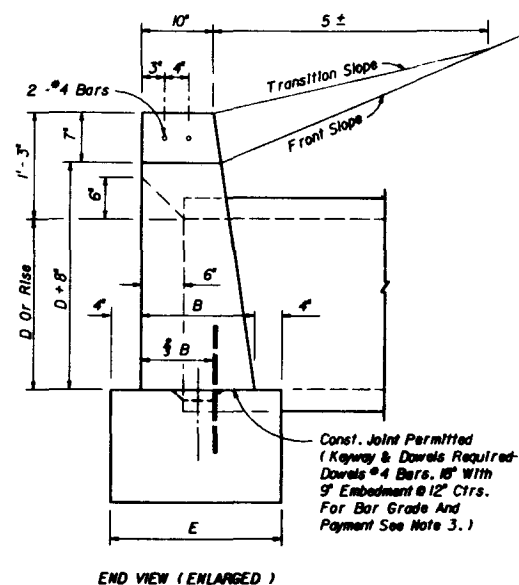
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
PIPE END TREATMENT SELECTION GUIDE					
Designed By	EDR	Date	08/05/04		
Drawn By	DAE	Date	08/05/04		
Checked By	EDR	Date	08/05/04		
F.H.W.A. Approved: 08/25/04			Revision No.	Sheet No.	Index No.
			85	1 of 1	249



ENDWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)



NORMAL PIPE



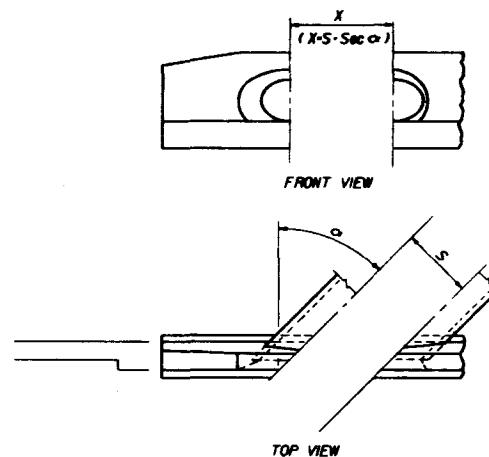
STANDARD LOCATION CONTROL

GENERAL NOTES

- Endwall dimensions, locations and positions are for round and elliptical concrete pipe and for round and pipe - arch corrugated metal pipe. Round concrete pipe shown.
- Front slope and ditch transitions shall be in accordance with Index No. 280.
- Endwalls may be cast in place or precast concrete. Reinforcing steel shall be Grades 40 or 60. Additional reinforcement necessary for handling precast units shall be determined by the Contractor or the supplier. Cost of reinforcement shall be included in the contract unit price for concrete (roadway).
- Concrete meeting the requirements of ASTM C-478 (4000 psi) may be used in lieu of Class I concrete in precast items manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.
- On outfall ditches with side slopes flatter than $1\frac{1}{2} : 1$, provide 20' transitions from the endwall to the flatter side slopes, right of way permitting.
- For seating around endwalls see Index No. 281.
- Payment for concrete quantities for endwalls skewed to the pipe shall be made on the following basis:

Endwall Skew To Pipe	Use Tabulated Value
0° to 5°	0°
6° to 15°	15°
16° to 30°	30°
31° or over	45°

- Pipe length plan quantities shall be based on the pipe and locations shown in the standard location control end view, or lengths based on special endwall locations called for in the plans.
- Payment for pipe in pipe culverts shall be based on plan quantities, adjusted for endwall locations subsequently established by the Engineer.



SKewed PIPE

LEGEND

- α Pipe Skew
- S Center To Center Pipe Spacing
- X Centerline To Centerline Dimension At Face Of Headwall

ENDWALL POSITIONS FOR SINGLE AND MULTIPLE PIPE AND SPACING FOR MULTIPLE PIPE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRAIGHT CONCRETE ENDWALLS SINGLE AND MULTIPLE PIPE			
Designed By	Checked By	Drawn By	Revised By
MMB/EDR	JBL/HIS	MMB/EDR	JBL/HIS
Date	Date	Date	Date
7/3/83	8/3	7/3/83	8/3
F.J.M.B.A. Approved		10/05/83	
85		1 of 2	
250			

DATA AND ESTIMATED QUANTITIES FOR ONE ENDWALL

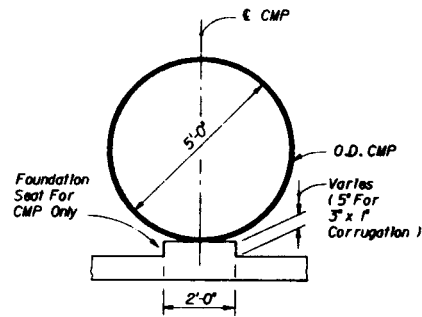
ROUND CONCRETE AND CORRUGATED METAL PIPE																																												
D	Opening Area (SF)				Dimensions																Class I Concrete (CY)																				D			
																					Number And Type Of Pipe And Skew Angle Of Pipe																							
																					Single				Double								Triple									Quadruple		
	Concrete				Metal				Concrete				Metal				Concrete				Metal				Concrete				Metal															
	1	2	3	4	A	B	C	E	F	G	S	X				0°	0°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°							
15"	1.23	2.46	3.69	4.92	1'-11"	1'-2"	4'-0"	1'-10"	1'-2"	0'-6"	2'-7"	2'-7"	2'-8"	3'-0"	3'-8"	1.23	1.24	1.59	1.60	1.65	1.74	1.62	1.63	1.68	1.78	1.94	1.96	2.05	2.23	1.99	2.02	2.11	2.30	2.30	2.34	2.47	2.74	2.37	2.41	2.75	2.84	15"		
18"	1.77	3.54	5.31	7.08	2'-2"	1'-3"	4'-6"	1'-11"	1'-3"	1'-0"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.56	1.59	1.99	2.01	2.06	2.17	2.04	2.06	2.11	2.23	2.43	2.46	2.56	2.79	2.51	2.54	2.65	2.89	2.86	2.91	3.06	3.40	2.96	3.01	3.17	3.53	18"		
21"	2.41	4.82	7.23	9.64	2'-5"	1'-4"	5'-0"	2'-0"	1'-4"	1'-6"	3'-2"	3'-2"	3'-3"	3'-8"	4'-6"	1.97																										21"		
24"	3.14	6.28	9.42	12.56	2'-8"	1'-4"	5'-6"	2'-0"	1'-4"	2'-0"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"	2.24	2.29	2.82	2.84	2.91	3.06	2.91	2.93	3.01	3.17	3.39	3.43	3.57	3.87	3.52	3.56	3.71	4.03	3.97	4.03	4.24	4.69	4.14	4.20	4.43	4.91	24"		
27"	3.98	7.96	11.94	15.92	2'-11"	1'-5"	6'-0"	2'-1"	1'-5"	2'-6"	3'-10"	3'-10"	4'-0"	4'-5"	5'-5"	2.73																										27"		
30"	4.91	9.82	14.73	19.64	3'-2"	1'-6"	6'-6"	2'-2"	1'-6"	3'-0"	4'-3"	4'-3"	4'-5"	4'-11"	6'-0"	3.26	3.34	4.13	4.16	4.26	4.49	4.28	4.31	4.43	4.67	4.98	5.04	5.25	5.69	5.20	5.27	5.49	5.97	5.84	5.93	6.24	6.91	6.13	6.23	6.56	7.29	30"		
36"	7.07	14.14	21.21	28.28	3'-8"	1'-8"	7'-6"	2'-4"	1'-8"	4'-0"	5'-1"	5'-4"	5'-3"	5'-10"	7'-2"	4.53	4.64	5.73	5.77	5.92	6.23	5.95	6.00	6.15	6.49	6.92	7.00	7.29	7.91	7.25	7.34	7.65	8.33	8.13	8.26	8.69	9.62	8.57	8.71	9.18	10.20	36"		
42"	9.62	19.24	28.86	38.48	4'-2"	1'-10"	8'-6"	2'-6"	2'-0"	5'-0"	6'-0"	6'-0"	6'-3"	6'-11"	8'-6"	6.33	6.49	8.11	8.17	8.39	8.85	8.43	8.50	8.73	9.23	9.90	10.02	10.45	11.38	10.38	10.52	10.96	11.99	11.68	11.87	12.51	13.89	12.32	12.52	13.22	14.73	42"		
48"	12.57	25.14	37.71	50.28	4'-8"	2'-4"	9'-6"	2'-9"	2'-0"	6'-0"	6'-9"	6'-9"	7'-0"	7'-10"	9'-7"	8.15	8.38	10.40	10.48	10.75	11.33	10.85	10.94	11.23	11.87	12.64	12.80	13.34	14.50	13.34	13.51	14.11	15.39	14.89	15.13	15.93	17.68	15.82	16.08	16.97	18.90	48"		
54"	15.90	31.80	47.70	63.60	5'-2"	2'-6"	10'-6"	3'-2"	2'-3"	7'-0"	7'-8"	7'-8"	7'-11"	8'-10"	10'-0"	11.71	11.77	15.23	15.35	15.78	16.69							18.77	19.02	19.86	21.69						22.29	22.66	23.93	26.67				54"

CORRUGATED METAL PIPE ARCH																																								
Span	Rise	Opening Area (SF)				Dimensions																Class I Concrete (CY)																Span	Rise	Appro. Equiv. Round Pipe
																						Number Of Pipe And Skew Angle Of Pipe																		
		Number Of Pipes				A	B	C	E	F	G	S	X				Single	Double				Triple				Quadruple														
1	2	3	4									0°	15°	30°	45°	0°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°												
11"	13"	1.1	2.2	3.3	4.4	1'-9"	1'-2"	3'-0"	1'-10"	1'-2"	0'-4"	2'-6"	2'-6"	2'-7"	2'-4"	3'-6"	1.16	1.47	1.48	1.52	1.60	1.78	1.80	1.88	2.04	2.09	2.12	2.23	2.48	11"	13"	15"								
21"	15"	1.6	3.2	4.8	6.4	1'-10"	1'-2"	4'-3"	1'-10"	1'-2"	0'-9"	2'-10"	2'-10"	2'-7"	2'-4"	4'-0"	1.33	1.69	1.70	1.75	1.84	2.04	2.06	2.15	2.33	2.40	2.44	2.57	2.84	21"	15"	18"								
28"	20"	2.8	5.6	8.4	11.2	2'-4"	1'-3"	5'-2"	1'-4"	1'-3"	1'-8"	3'-5"	3'-5"	3'-6"	3'-4"	4'-10"	1.78	2.34	2.33	2.39	2.53	2.83	2.88	2.99	3.26	3.36	3.42	3.60	4.04	28"	20"	24"								
35"	24"	4.3	8.6	12.9	17.2	2'-8"	1'-4"	5'-11"	2'-0"	1'-4"	2'-5"	4'-0"	4'-0"	4'-2"	4'-7"	5'-8"	2.34	3.03	3.05	3.14	3.32	3.72	3.77	3.93	4.29	4.40	4.47	4.72	5.25	35"	24"	30"								
42"	29"	5.9	11.8	17.7	23.6	3'-1"	1'-5"	6'-10"	2'-1"	1'-5"	3'-4"	4'-9"	4'-9"	4'-8"	5'-6"	6'-9"	3.13	4.06	4.09	4.20	4.46	4.99	5.06	5.28	5.76	5.93	6.03	6.36	7.09	42"	29"	36"								
49"	33"	8.4	16.8	25.2	33.6	3'-5"	1'-6"	7'-8"	2'-2"	1'-6"	4'-2"	5'-6"	5'-6"	5'-8"	6'-4"	7'-9"	3.83	5.00	5.04	5.18	5.48	6.16	6.24	6.52	7.12	7.32	7.44	7.86	8.76	49"	33"	42"								
57"	38"	10.6	21.2	31.8	42.4	3'-10"	1'-7"	8'-7"	2'-3"	1'-7"	5'-11"	6'-4"	6'-4"	6'-7"	7'-4"	8'-4"	4.87	6.31	6.36	6.53	6.91	7.74	7.84	8.18	8.93	9.18	9.33	9.85	10.96	57"	38"	48"								
64"	43"	13.2	26.4	39.6	52.8	4'-3"	1'-8"	9'-6"	2'-4"	1'-8"	6'-0"	7'-1"	7'-1"	7'-4"	8'-2"	10'-0"	5.88	7.64	7.70	7.91	8.37	9.40	9.52	9.94	10.86	11.15	11.33	11.97	13.33	64"	43"	54"								
71"	47"	16.9	33.8	50.7	67.6	4'-7"	1'-10"	10'-4"	2'-6"	2'-0"	6'-10"	7'-10"	7'-10"	8'-1"	9'-1"	11'-1"	7.80	10.15	10.23	10.51	11.12	12.49	12.65	13.22	14.43	14.85	15.10	15.94	17.77	71"	47"	60"								

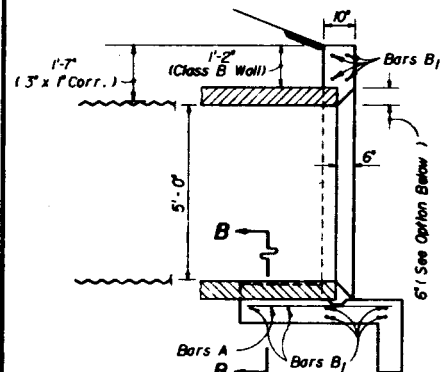
Note : Use the guidelines of General Note No.7 for selecting tabular quantities.

CONCRETE ELLIPTICAL PIPE																																		
Rise	Span	Opening Area (SF)				Dimensions										Class I Concrete (CY)																Rise	Span	Approx Equiv. Round Pipe
																Number Of Pipe And Skew Angle Of Pipe																		
		Number Of Pipes				A	B	C	E	F	G	S	X				Single	Double				Triple				Quadruple								
		1	2	3	4								0°	15°	30°	45°		0°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°				
12"	18"	1.3	2.6	3.9	5.2	1'-8"	1'-2"	3'-9"	1'-10"	1'-2"	0'-3"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.09	1.45	1.46	1.51	1.60	1.80	1.82	1.91	2.09	2.25	2.20	2.33	2.60	12'	18'	15"		
14"	23"	1.8	3.6	5.4	7.2	1'-10"	1'-3"	4'-8"	1'-11"	1'-3"	0"	3'-5"	3'-5"	3'-6"	3'-11"	4'-0"	1.36	1.62	1.64	1.89	2.01	2.29	2.32	2.43	2.68	2.75	2.80	2.97	3.33	14'	23'	18"		
19"	30"	3.3	6.6	9.9	13.2	2'-3"	1'-4"	5'-11"	2'-0"	1'-4"	1'-7 1/2"	4'-2"	4'-2"	4'-4"	4'-10"	5'-11"	1.89	2.55	2.57	2.65	2.82	3.22	3.27	3.43	3.77	3.88	3.95	4.19	4.70	19'	30'	24"		
24"	38"	5.1	10.2	15.3	20.4	2'-8"	1'-5"	6'-3"	2'-1"	1'-5"	2'-9"	5'-2"	5'-2"	5'-4"	6'-0"	7'-4"	2.64	3.55	3.58	3.69	3.93	4.48	4.54	4.77	5.24	5.39	5.49	5.82	6.53	24'	38'	30"		
29"	45"	7.4	14.8	22.2	29.6	3'-1"	1'-6"	7'-0"	2'-2"	1'-6"	3'-6"	6'-0"	6'-0"	6'-3"	8'-1"	8'-6"	3.32	4.48	4.52	4.66	4.96	5.64	5.72	6.00	6.60	6.80	6.92	7.34	8.20	29'	45'	36"		
34"	53"	10.2	20.4	30.6	40.8	3'-6"	1'-7"	7'-11 1/2"	2'-3"	1'-7"	4'-5 1/2"	7'-1"	7'-1"	7'-4"	8'-10"	10'-0"	4.24	5.76	5.81	6.00	6.39	7.29	7.40	7.76	8.55	8.81	8.97	9.52	10.70	34'	53'	42"		
38"	60"	12.9	25.8	38.7	51.6	3'-10"	1'-8"	8'-9"	2'-4"	1'-8"	5'-3"	7'-11"	7'-11"	8'-2"	9'-2"	11'-2"	5.22	7.16	7.23	7.46	7.96	9.10	9.24	9.70	10.71	11.05	11.25	11.95	13.46	38'	60'	48"		
43"	68"	16.6	33.2	49.8	66.4	4'-3"	1'-10"	9'-8 1/2"	2'-6"	1'-10"	6'-2 1/2"	8'-10"	8'-10"	9'-2"	10'-2"	12'-6"	6.63	9.01	9.09	9.38	10.00	11.39	11.56	12.13	13.36	13.77	14.02	14.88	16.73	43'	68'	54"		
48"	76"	20.5	41.0	61.5	82.0	4'-8"	2'-1"	10'-8"	2'-9"	2'-0"	7'-2"	9'-9"	9'-9"	10'-1"	11'-3"	13'-9"	8.66	11.74	11.85	12.22	13.02	14.82	15.04	15.77	17.37	17.91	18.23	19.34	21.74	48'	76'	60"		
53"	83"	24.8	49.6	74.4	99.2	5'-1"	2'-6"	11'-7"	3'-2"	2'-6"	8'-1"	10'-7"	10'-7"	10'-11"	12'-3"	15'-0"	12.50	16.98	16.98	17.67	18.83	21.47	21.78	22.86	25.18	25.97	26.44	28.06	31.56	53'	83'	66"		
58"	91"	29.5	59.0	88.5	118.0	5'-6"	2'-10"	12'-6 1/2"	3'-6"	2'-10"	9'-0 1/2"	11'-4"	11'-4"	11'-9"	13'-1"	16'-0"	16.46	22.26	22.46	23.16	24.66	28.06	28.46	29.85	32.85	33.85	34.46	36.55	41.05	58'	91'	72"		

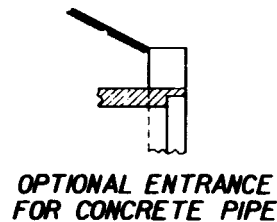
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
STRAIGHT CONCRETE ENDWALLS SINGLE AND MULTIPLE PIPE				
Name		Series		Approved By <i>Joe R. [Signature]</i> State Bridge Engineer
Designed By	NHB/EBP	73/63		
Drawn By	RWB/HSD	63		
Designed By	JBB/JAS	63	Revision No.	Sheet No.
F.A.I.L.A. Approved	10/05/63		88	2 of 2
			250	



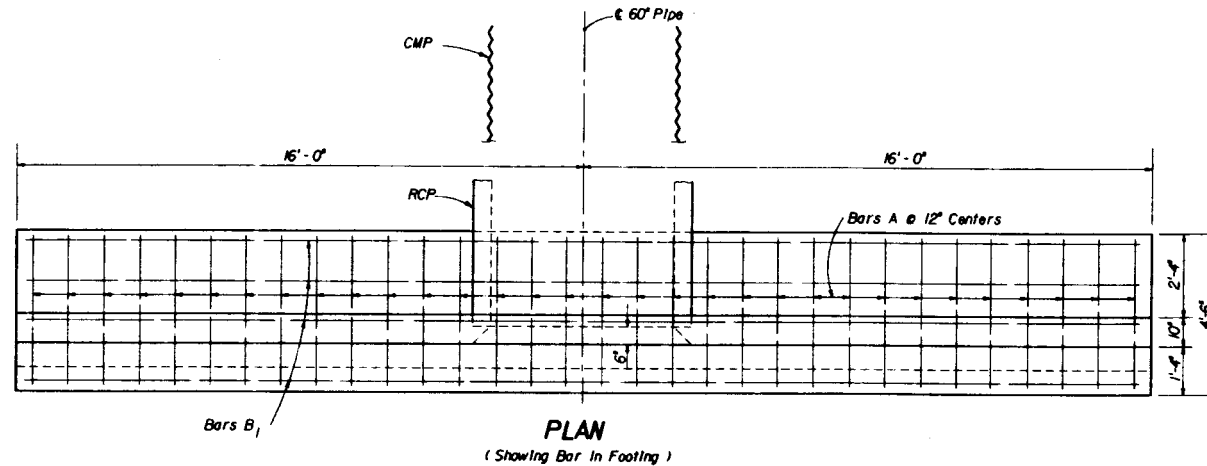
SECTION BB



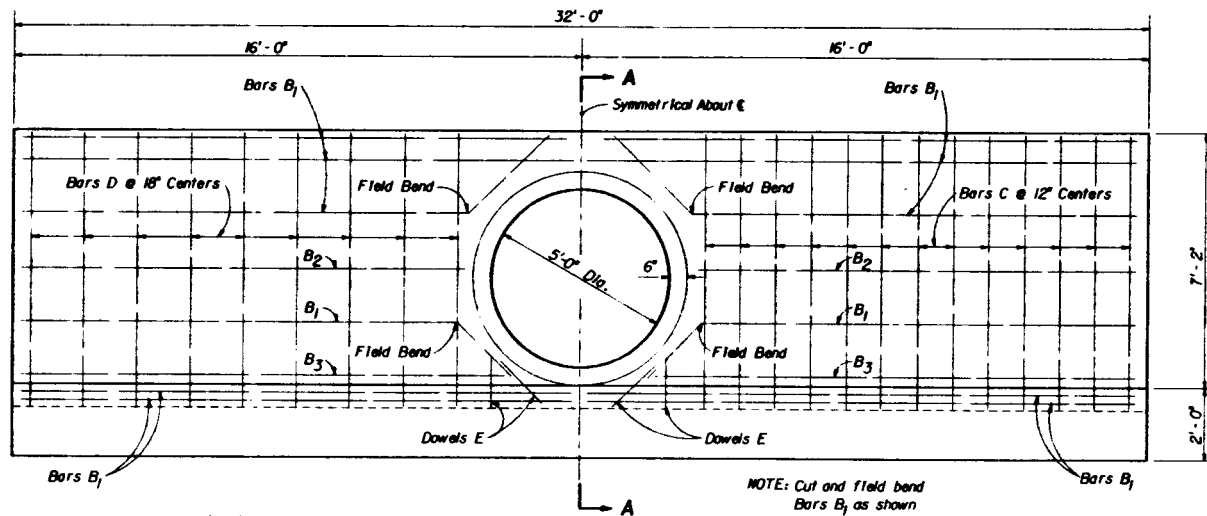
SECTION AA



OPTIONAL ENTRANCE FOR CONCRETE PIPE



PLAN
(Showing Bar In Footing)



HALF ELEVATION
(Showing Bars In Front Face Of Wall)

HALF ELEVATION
(Showing Bars In Back Face Of Wall)

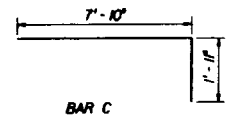
GENERAL NOTES

1. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1977. Precast construction which adheres to this index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
2. Reinforcing steel shall be either Grade 40 or 60.
3. Concrete shall be Class II except concrete meeting the requirements of ASTM C 478 (4000 PSI) may be used in lieu of Class II concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the Inspection of precast drainage products.

4. Chamfer: All exposed edges and corners to be chamfered $\frac{1}{4}$ unless otherwise shown.
5. Metal pipe shall be bituminous coated on all surfaces in contact with concrete and 12" beyond the boundary of contact. Any suitable bituminous material may be field applied.
6. Sadding shall be in accordance with Index No. 281 and paid for under the contract unit price for Sadding, SY.
7. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls) CY and Reinforcing Steel (Roadway) LB.

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	No. 4	32	4' - 2"	Footings	Straight
B ₁	No. 4	13	31' - 6"	Footings And Wall	Straight
B ₂	No. 4	4	12' - 4"	Wall	Straight
B ₃	No. 4	4	13' - 9"	Wall	Straight
C	No. 4	26	9' - 9"	Wall	Bend
D	No. 4	18	7' - 10"	Wall	Straight
E	No. 4	8	1' - 8"	Footings And Wall	Straight

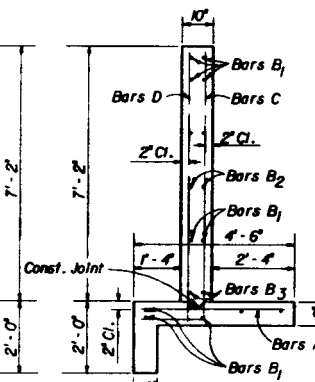
BENDING DIAGRAM



NOTE: All bar dimensions are out to out

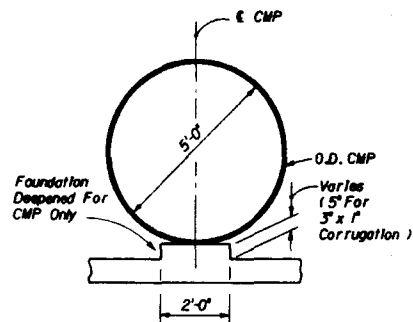
ESTIMATED QUANTITIES

ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	10.88	10.99
Reinforcing Steel	Lb.	705	705

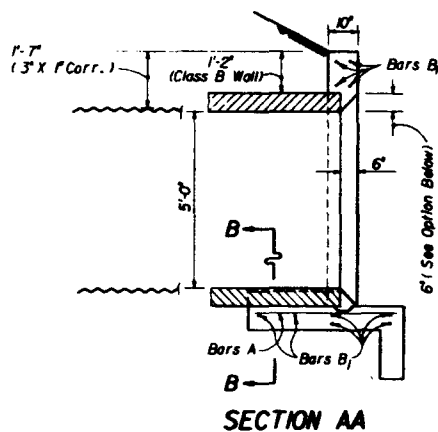


TYPICAL SECTION
THRU ENDWALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 60" PIPE			
Designed By	Drawn By	Checked By	Approved By
TBL	WBL	WBL	<i>[Signature]</i> State Drainage Engineer
Revision No.	Sheet No.	F.A.R.A. Approved: 03/20/75	
88	1 of 2	251	

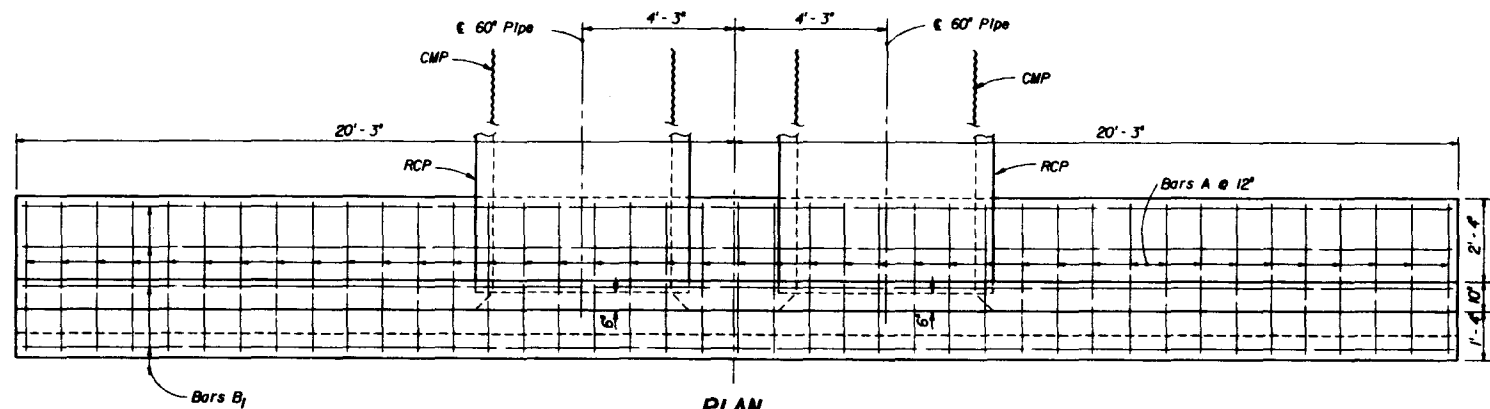


SECTION BB

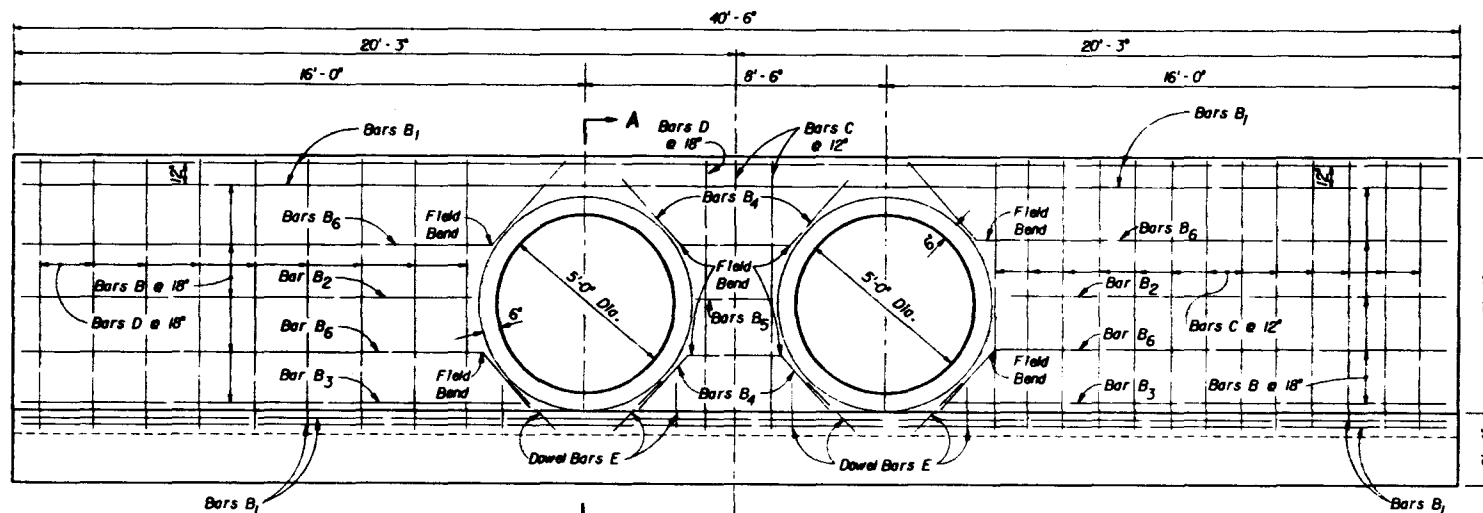


SECTION AA

OPTIONAL ENTRANCE
FOR CONCRETE PIPE



PLAN
(Showing Bar In Footing)

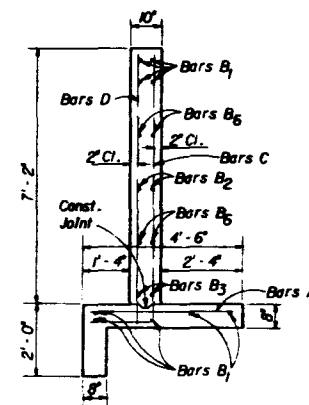


HALF ELEVATION
(Showing Bars In Front Face Of Wall)

A

Symmetrical About C

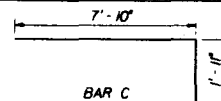
HALF ELEVATION
(Showing Bars In Back Face Of Wall)



TYPICAL SECTION
THRU ENDWALL

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	4	41	4'-2"	Footing	Straight
B ₁	4	9	40'-2"	Footing & Wall	Straight
B ₂	4	4	12'-6"	Wall	Straight
B ₃	4	4	13'-9"	Wall	Straight
B ₄	4	4	6'-0"	Wall	Field Bend
B ₅	4	2	2'-2"	Wall	Straight
B ₆	4	8	15'-0"	Wall	Field Bend
C	4	29	9'-9"	Footing & Wall	Bend
D	4	20	7'-10"	Footing & Wall	Straight
E	4	16	1'-8"	Footing & Wall	Straight

BENDING DIAGRAM



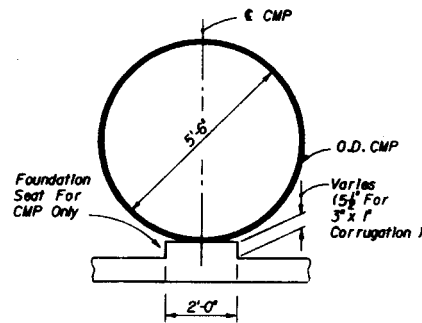
NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

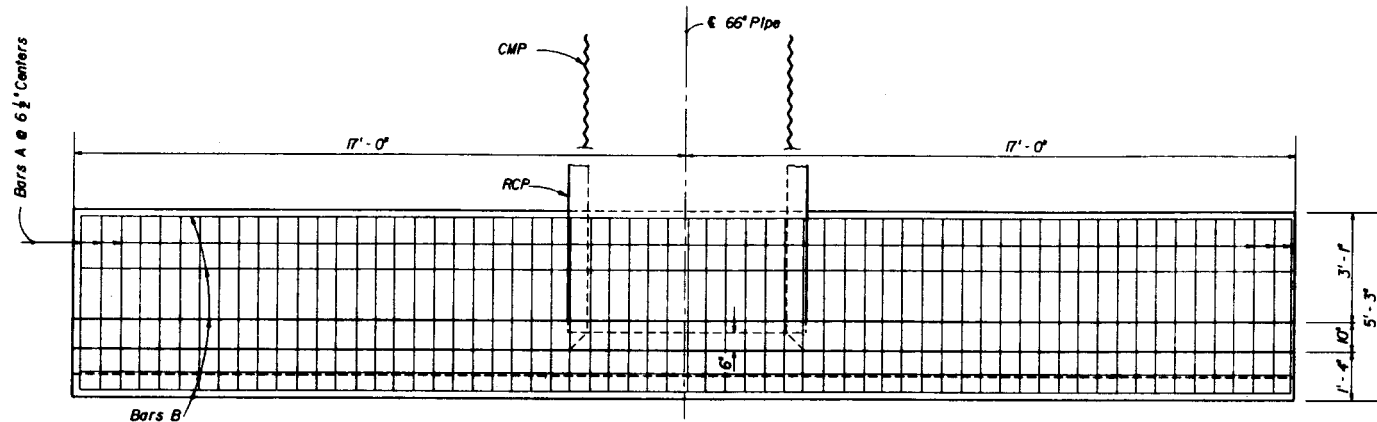
ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	13.77	13.38
Reinforcing Steel	Lb.	834	834

NOTE : See Sheet 1 of 2 For General Notes.

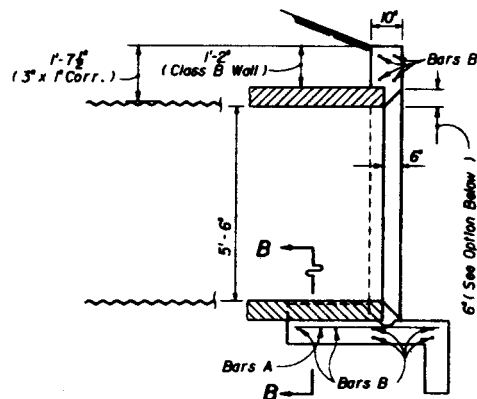
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 60" PIPE			
Designed By	THJ	Date	8/48
Drawn By	THJ	Date	8/48
Checked By	THJ	Date	8/48
F.H.B.A. Approved	03/20/75	88	2 of 2
			251



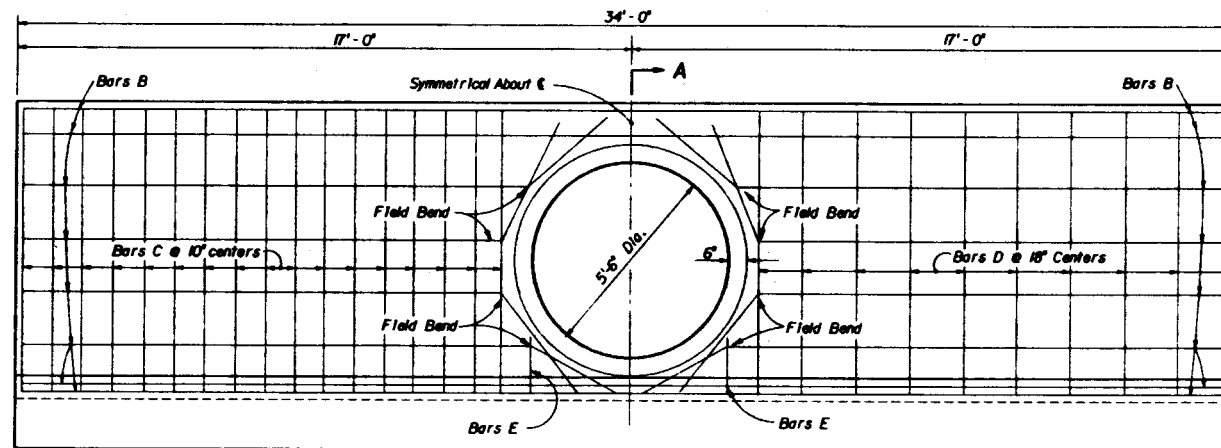
SECTION BB



PLAN
(Showing Bars in Footing)



SECTION AA



HALF ELEVATION
(Showing Bars in Back Face Of Wall)

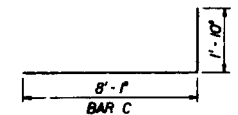
HALF ELEVATION
(Showing Bars in Front Face Of Wall)

GENERAL NOTES

- Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this Index, design specifications AASHTO 1977. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
- Reinforcing steel shall be either Grade 40 or 60.
- Concrete shall be Class II except concrete meeting the requirements of ASTM C 478 (4000 PSI) may be used in lieu of Class II concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the Inspection of precast drainage products.
- Chamfer: All exposed edges and corners to be chamfered unless otherwise shown.
- Metal pipe shall be bituminous coated on all surfaces in contact with concrete and 12" beyond the boundary of contact. Any suitable bituminous material may be field applied.
- Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Sodding, SY.
- Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls) CY and Reinforcing Steel (Roadway) LB.

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	5	63	4'-11"	Footings	Straight
B	4	17	33'-8"	Footings & Wall	Straight
C	5	34	9'-10"	Wall	Bend
D	4	20	8'-1"	Wall	Straight
E	4	4	1'-8"	Wall	Straight

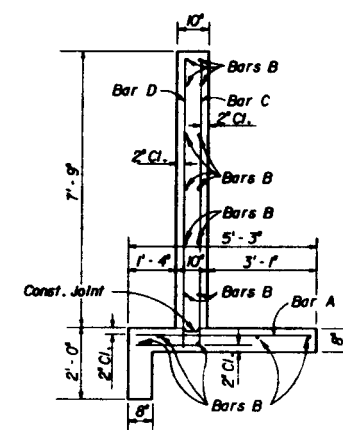
BENDING DIAGRAM



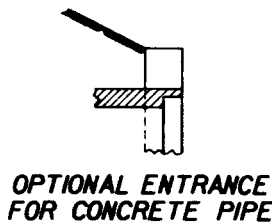
NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	12.59	12.72
Reinforcing Steel	Lb.	1167	1167

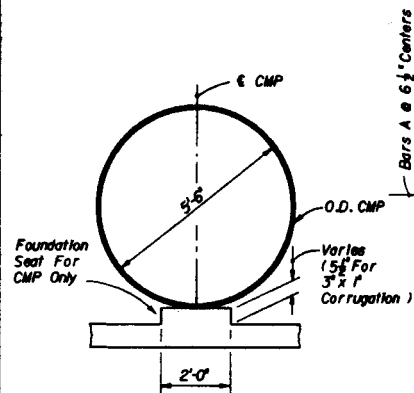


TYPICAL SECTION
THRU ENDWALL

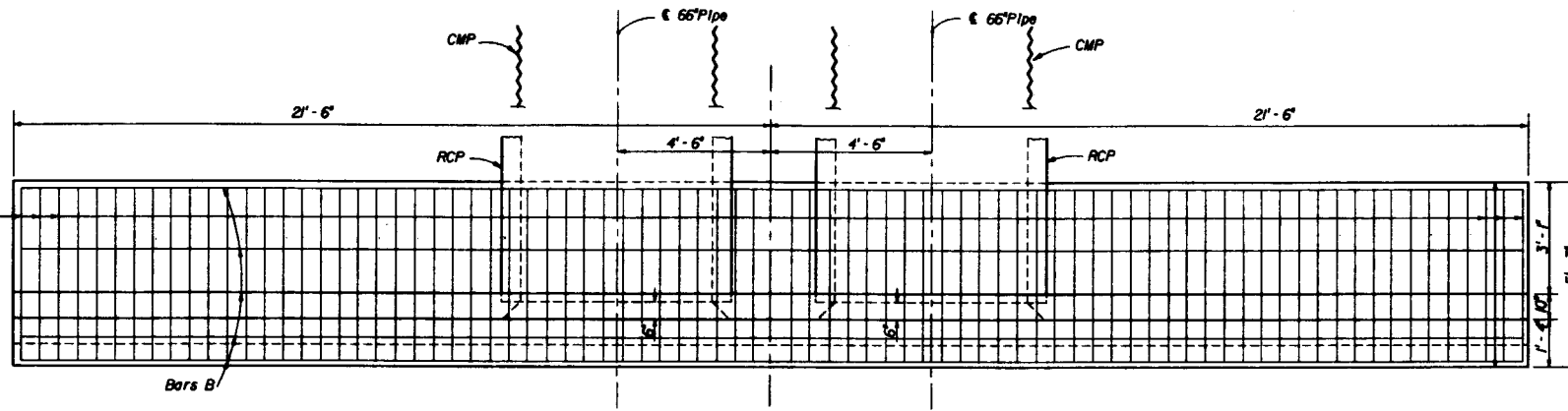


OPTIONAL ENTRANCE
FOR CONCRETE PIPE

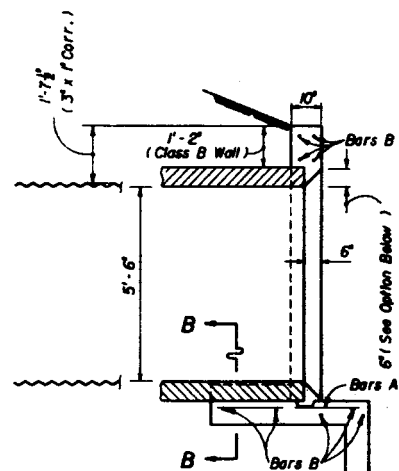
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 66" PIPE			
Designed By	AP	Date	03/94
Drawn By	AP	Checkd By	RCB
Revised By	RCB	Revision No.	03/94
F.H.S.A. Approved	10/07/90	88	1 of 2
			252



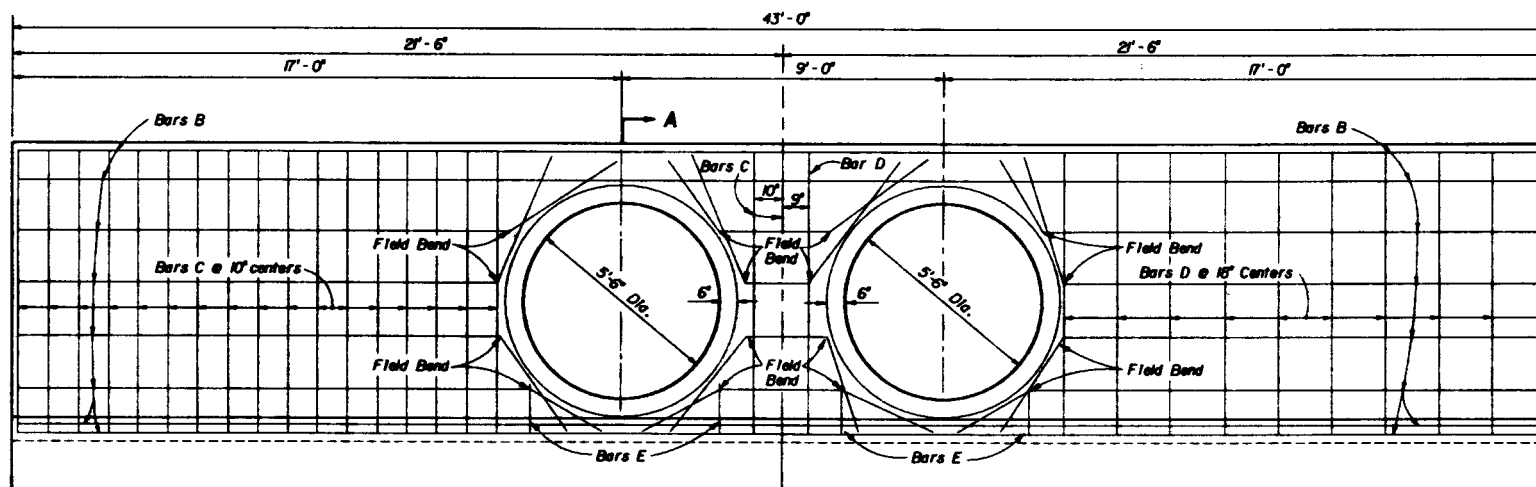
SECTION BB



PLAN
(Showing Bars in Footing)

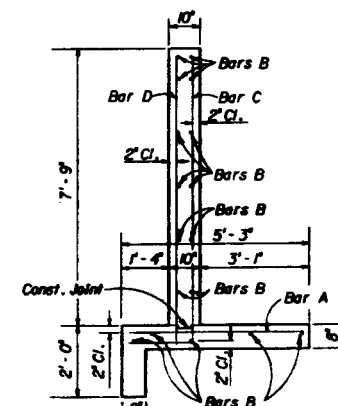


SECTION AA

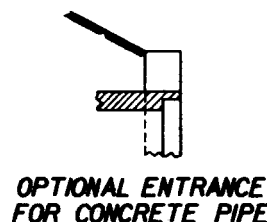


HALF ELEVATION
(Showing Bars in Back Face Of Wall)

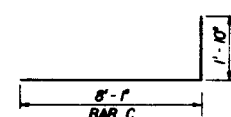
HALF ELEVATION
(Showing Bars in Front Face Of Wall)



TYPICAL SECTION THRU ENDWALL

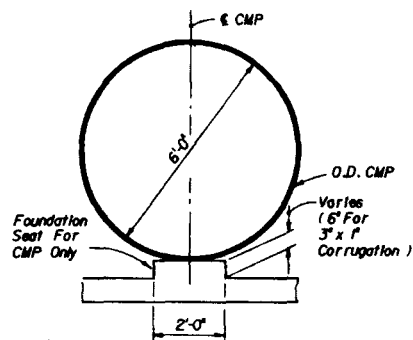


OPTIONAL ENTRANCE
FOR CONCRETE PIPE

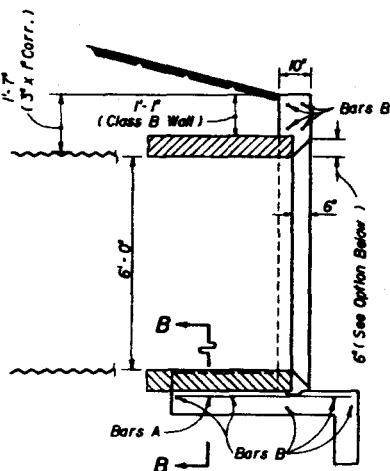
BILL OF REINFORCING STEEL						BENDING DIAGRAMS		ESTIMATED QUANTITIES			
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING			ITEM	UNIT	RCP	CMP
A	5	80	4'-11"	Footing	Straight	 <p>NOTE: All bar dimensions are out to out</p>		Concrete Class II	Cu. Yd.	15.33	15.58
B	4	17	42'-8"	Footing & Wall	Straight			Reinforcing Steel	Lb.	1,406	1,406
C	5	37	9'-11"	Wall	Bend						
D	4	22	8'-1"	Wall	Straight						
E	4	8	1'-8"	Wall	Straight						

NOTE: See Sheet 1 of 2 for General Notes.

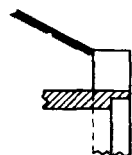
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 66" PIPE			
Designed By JEP	Drawn By FMT	Checked By [Signature]	Approved By [Signature]
Revision No. [Blank]	Sheet No. [Blank]	Project No. 252	
F.H.R.A. Approved 12/17/80			



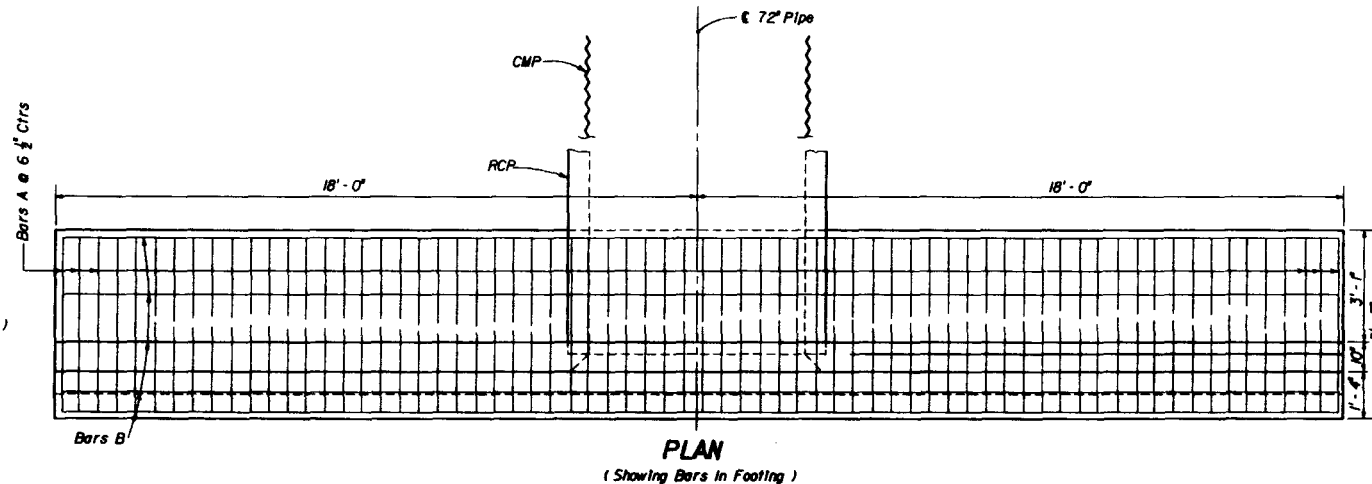
SECTION BB



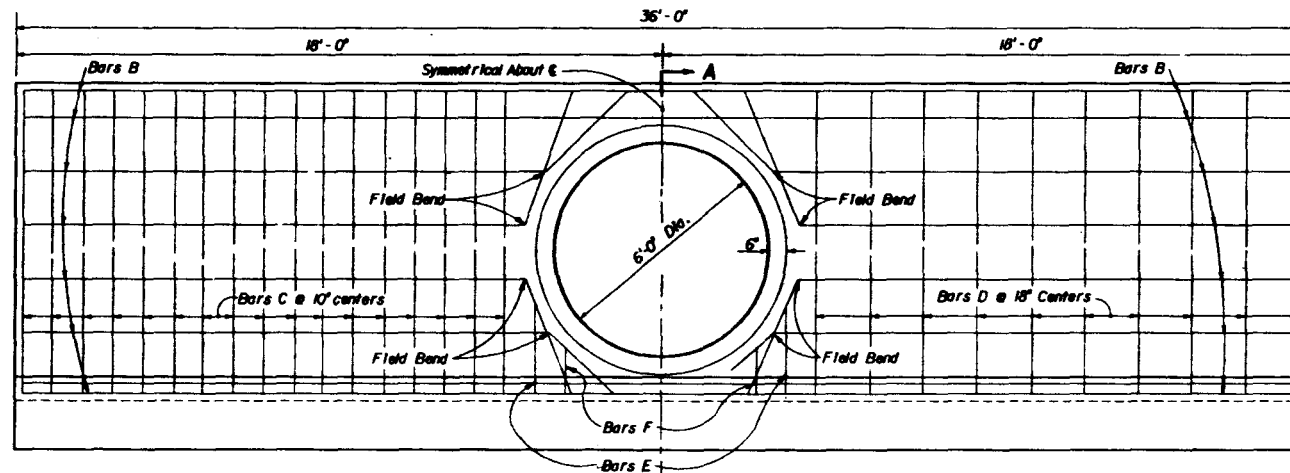
SECTION AA



OPTIONAL ENTRANCE FOR CONCRETE PIPE



PLAN
(Showing Bars in Footing)



HALF ELEVATION

(Showing Bars in Back Face Of Wall)

NOTE: Cut and field bend Bars B as shown

HALF ELEVATION

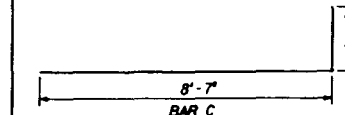
(Showing Bars in Front Face Of Wall)

GENERAL NOTES

1. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this Index, design specifications AASHTO 1977. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
2. Reinforcing steel shall be either Grade 40 or 60.
3. Concrete shall be Class II except concrete meeting the requirements of ASTM C 478 (4000 PSI) may be used in lieu of Class II concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.
4. Chamfer: All exposed edges and corners to be chamfered $\frac{3}{4}$ unless otherwise shown.
5. Metal pipe shall be bituminous coated on all surfaces in contact with concrete and 12" beyond the boundary of contact. Any suitable bituminous material may be field applied.
6. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Sodding, SY.
7. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls) CY and Reinforcing Steel (Roadway) LB.

BILL OF REINFORCING STEEL						
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING	
A	5	68	4'-11"	Footing	Straight	
B	4	17	35'-8"	Footing & Wall	Straight	
C	5	34	10'-5"	Wall	Bend	
D	4	20	8'-7"	Wall	Straight	
E	4	4	2'-6"	Wall	Straight	
F	4	4	1'-6"	Wall	Straight	

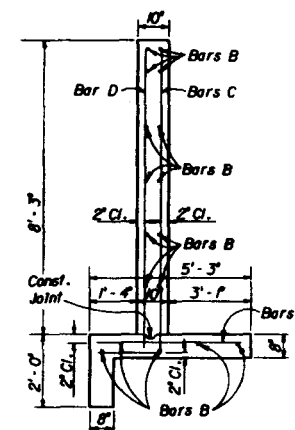
BENDING DIAGRAM



NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES


ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	13.75	13.90
Reinforcing Steel	Lb.	1249	1249

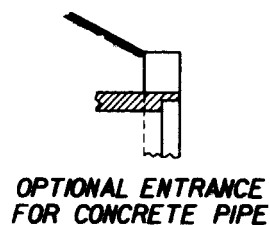
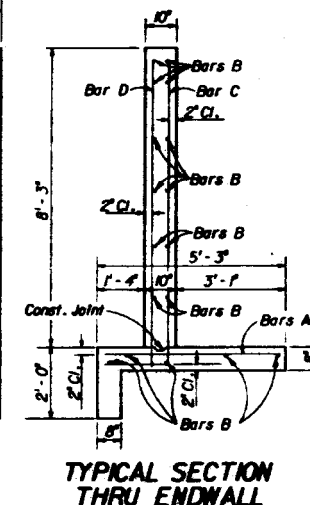
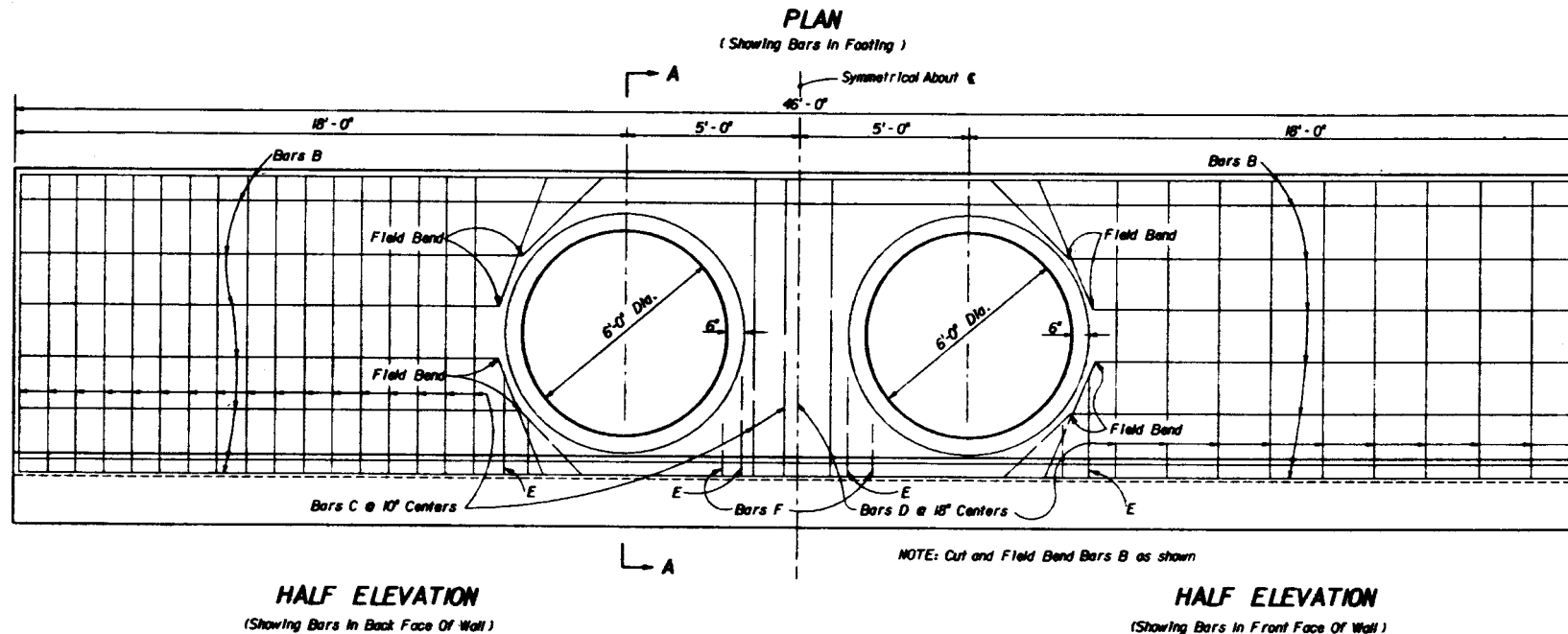
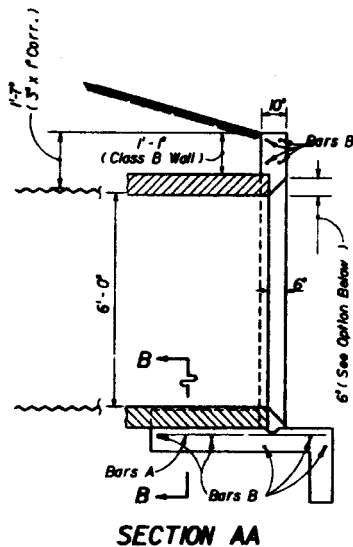
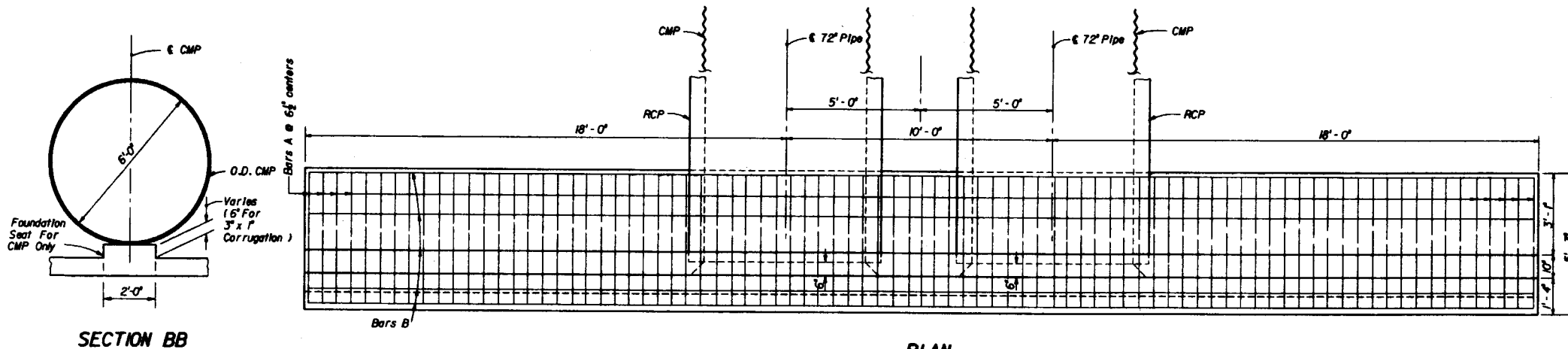


TYPICAL SECTION THRU ENDWALL

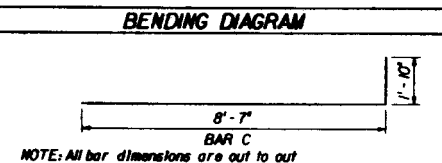
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 72" PIPE

	Name	Date	Approved by		
Designed by	ENC	03/95			
Drawn by					
Checked by	ENC	03/95	Reviewed by	Sheet No.	Index No.
F.A.R.A. Approved	03/20/75		88	1 of 2	253



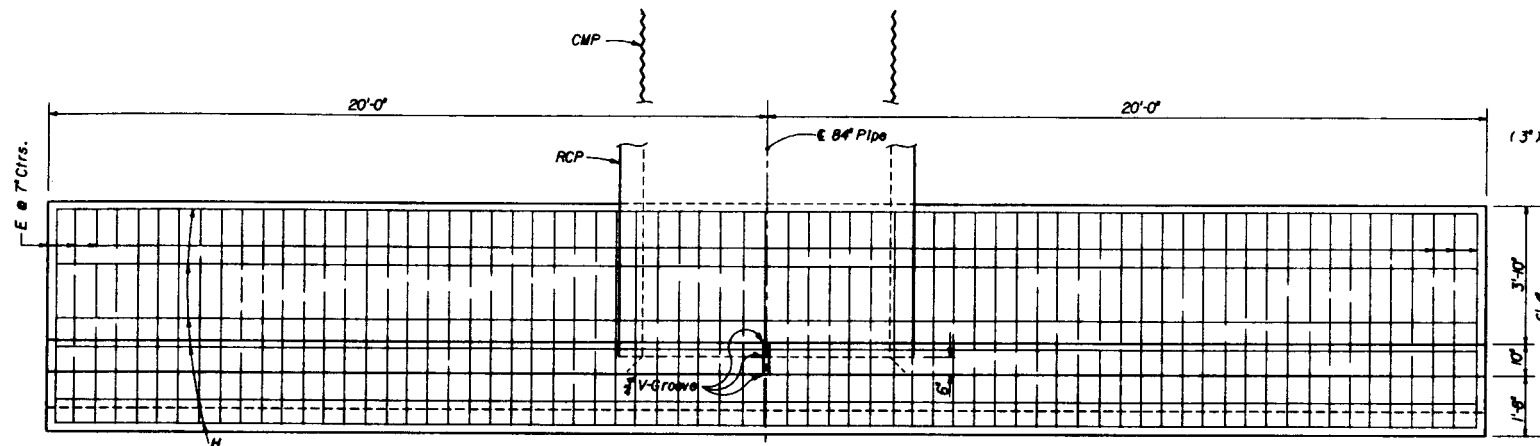
BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	5	85	4'-11"	Footing	Straight
B	4	17	45'-8"	Footing & Wall	Straight
C	5	38	10'-5"	Wall	Bend
D	4	23	8'-7"	Wall	Straight
E	4	8	2'-6"	Wall	Straight
F	4	8	1'-6"	Wall	Straight



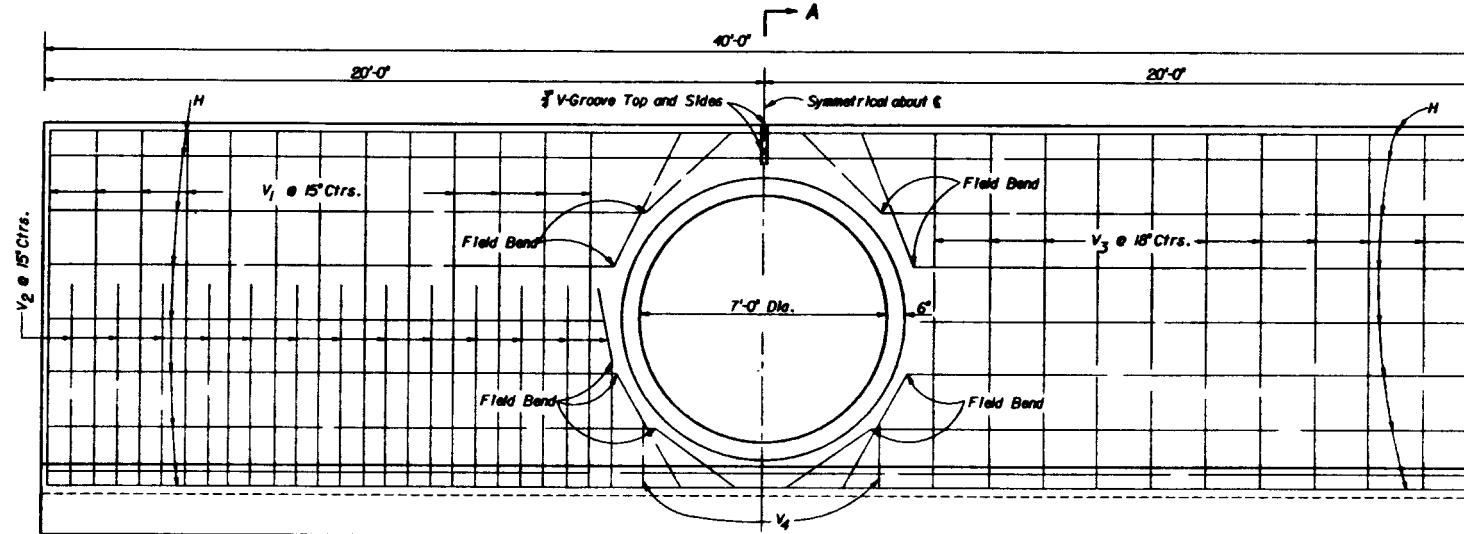
ESTIMATED QUANTITIES			
ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	16.72	17.02
Reinforcing Steel	Lb.	159	159

NOTE: See Sheet 1 of 2 for General Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STRAIGHT CONCRETE ENDWALLS SINGLE AND DOUBLE 72" PIPE			
Designed By	Checked By	Approved By	Index No.
EVC	10/55	6/6	253
Drawn By	Revision No.	Sheet No.	
10/55	10/55	2 of 2	
F.L.B.A. Approved: 07/07/75			



PLAN
(Showing Bars in Footing)

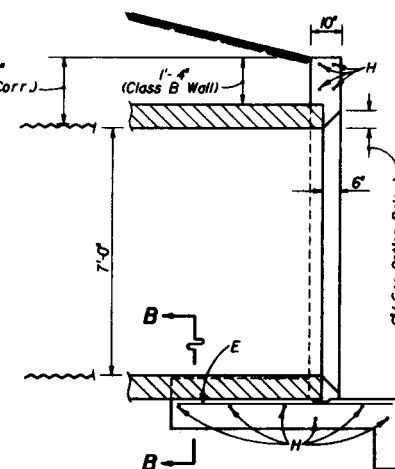


HALF ELEVATION
(Showing Bars in Back Face Of Wall)

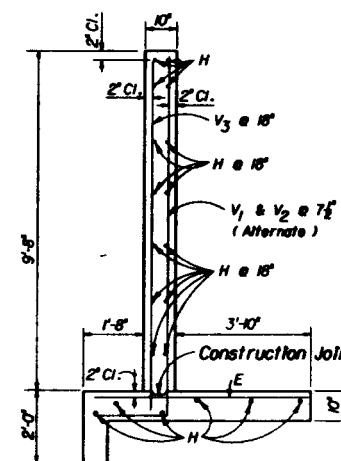
GENERAL NOTES

1. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this Index, design specifications AASHTO 1977. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
2. Reinforcing steel shall be either Grade 40 or 60.
3. Concrete shall be Class II except concrete meeting the requirements of ASTM C 478 (4000 PSI) may be used in lieu of Class II concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.

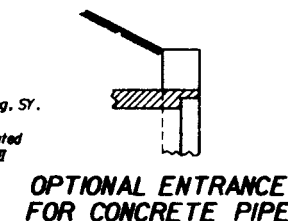
4. Chamfer: All exposed edges and corners to be chamfered $\frac{3}{4}$ unless otherwise shown.
5. Metal pipe shall be bituminous coated on all surfaces in contact with concrete and 12" beyond the boundary of contact. Any suitable bituminous material may be field applied.
6. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Sodding, SY.
7. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls) CY and Reinforcing Steel (Roadway) LB.



SECTION AA



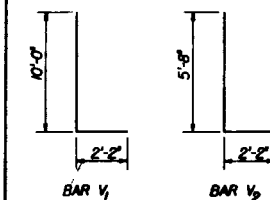
TYPICAL SECTION
THRU ENDWALL



OPTIONAL ENTRANCE
FOR CONCRETE PIPE

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
E	6	69	6'-0"
H	4	20	39'-8"
V1	6	26	12'-2"
V2	6	26	7'-10"
V3	4	22	10'-0"
V4	4	4	2'-0"

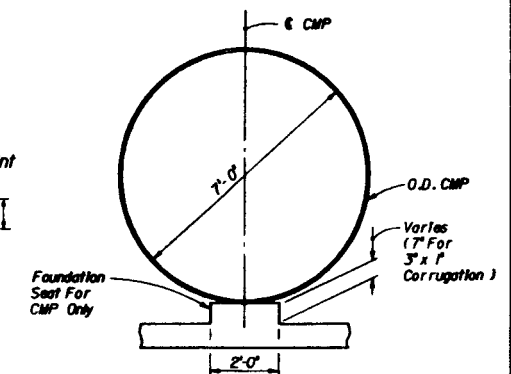
BENDING DIAGRAM



NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	19.29	19.49
Reinforcing Steel	Lb.	2,085	2,085

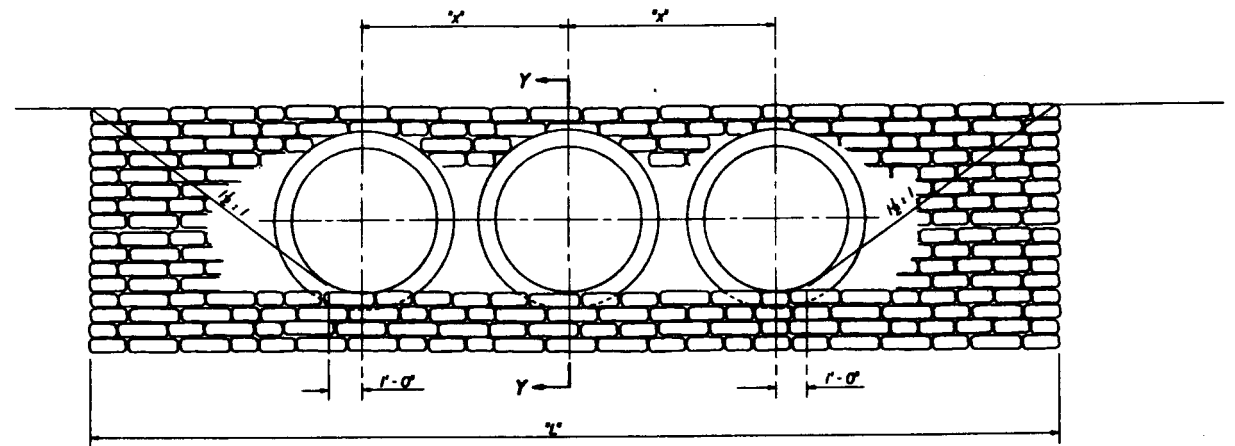
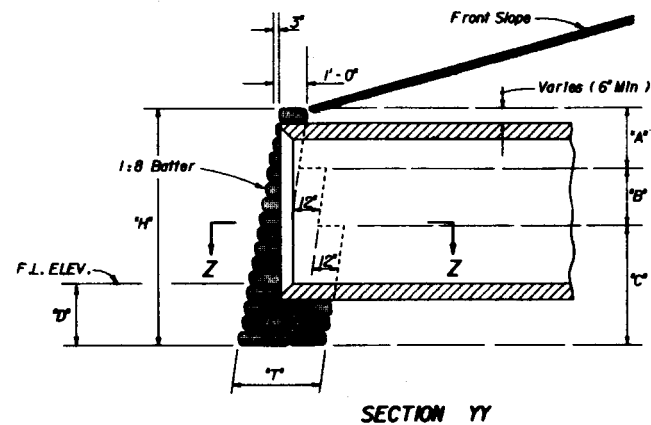


SECTION BB

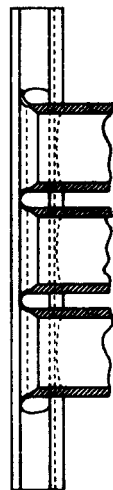
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STRAIGHT CONCRETE ENDWALL SINGLE 8" PIPE

Designed By	Checked By	Approved By	Index No.
SWB	HCB	6/1/78	255
Drawn By	Checked By	Revision No.	Sheet No.
SWB	HCB	07/78	1 of 1
F.A.R.A. Approved		03/20/75	88



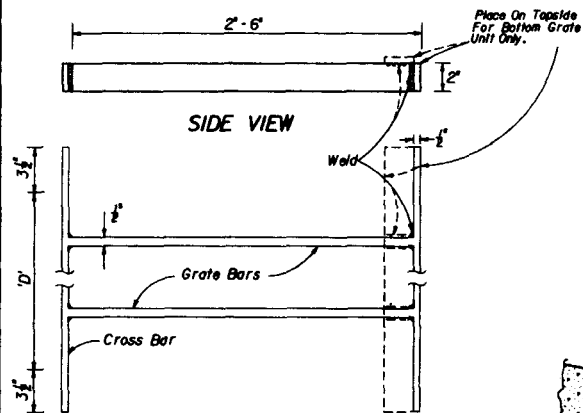
Note: For concrete and corrugated metal pipes. Concrete pipe shown.



SECTION ZZ

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE ENDWALL																
SIZE OF PIPE	H	T	A	B	C	D	X	ONE PIPE CULVERTS		TWO PIPE CULVERTS		THREE PIPE CULVERTS		FOUR PIPE CULVERTS		
								L	RIPRAP CY	L	RIPRAP CY	L	RIPRAP CY	L	RIPRAP CY	
									CP	CMP		CP	CMP		CP	CMP
18"	3'-8"	1'-0"	3'-8"	0'-0"	0'-0"	2'-3"	2'-10"	8'-7 1/2"	1.1	1.2	11'-5 1/2"	1.5	1.6	14'-3 1/2"	1.8	1.9
24"	4'-6"	2'-0"	2'-0"	2'-6"	0'-0"	2'-3"	3'-5"	10'-3"	2.4	2.5	13'-8"	3.1	3.2	17'-1"	3.7	3.9
30"	5'-1"	2'-0"	2'-0"	3'-1"	0'-0"	2'-2"	4'-3"	11'-10 1/2"	3.2	3.3	16'-1 1/2"	4.1	4.3	20'-4 1/2"	4.9	5.3
36"	5'-8"	2'-0"	2'-0"	3'-8"	0'-0"	2'-2"	5'-1"	13'-6"	4.1	4.2	18'-7"	5.2	5.5	23'-8"	6.3	6.8
42"	6'-3"	3'-0"	2'-0"	2'-0"	2'-3"	2'-1"	6'-0"	15'-1 1/2"	6.2	6.4	21'-1 1/2"	8.1	8.6	27'-1 1/2"	10.0	10.7
48"	6'-10"	3'-0"	2'-0"	2'-0"	2'-10"	2'-1"	6'-9"	16'-9"	7.7	8.0	23'-6"	10.0	10.6	30'-5"	12.3	13.2
54"	7'-5"	3'-0"	2'-0"	2'-0"	3'-5"	2'-0"	7'-8"	18'-4 1/2"	9.3	9.7	26'-0 1/2"	12.1	12.9	33'-8 1/2"	15.0	16.2
60"	8'-0"	3'-0"	2'-0"	2'-0"	4'-0"	2'-0"	8'-6"	20'-0"	11.0	11.6	28'-6"	14.4	15.5	37'-0"	17.8	19.3
66"	8'-7"	3'-0"	2'-0"	2'-0"	4'-7"	2'-0"	9'-3"	21'-7 1/2"	12.9	13.6	30'-10 1/2"	16.8	18.1	40'-1 1/2"	20.7	22.6
72"	9'-2"	3'-0"	2'-0"	2'-0"	5'-2"	1'-11"	10'-0"	23'-3"	15.0	15.8	33'-3"	19.4	21.0	43'-3"	23.9	26.2
78"	9'-9"	3'-0"	2'-0"	2'-0"	5'-9"	1'-11"	10'-9"	24'-10 1/2"	17.2	18.1	35'-7 1/2"	22.2	24.1	46'-4 1/2"	27.2	30.1
84"	10'-4"	3'-0"	2'-0"	2'-0"	6'-4"	1'-10"	11'-8"	26'-6"	19.5	20.7	38'-2"	25.3	27.6	49'-10"	31.1	34.5

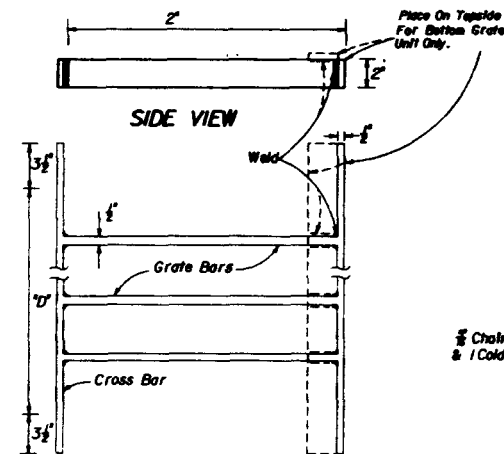
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
STRAIGHT SAND - CEMENT ENDWALLS					
Designed By	Drawn By	Checked By	Reviewed By	Approved By	Index No.
	ED	GD/MS		<i>[Signature]</i>	258
Reviewed By	MS	GD/MS	Division No.	Sheet No.	Index No.
			88	1 of 1	258
F.H.R.A. Approved 12/05/76					



TOP VIEW
GRATE TYPE NO. 1

Pipe Size	Grate Bars Req'd.	Grate Wt.
15"	2	28.33
24"	4	43.63
30"	5	53.55

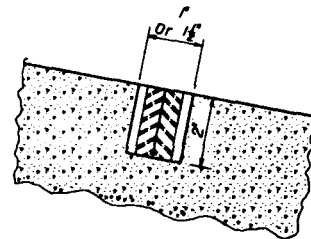
Bars to be evenly spaced across dimension 'D'.
All bars 1/2" x 2".



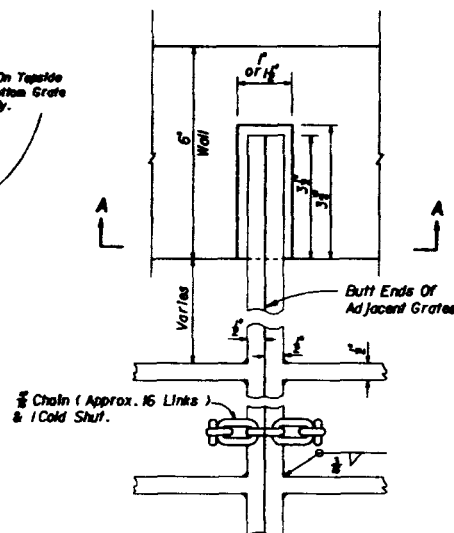
TOP VIEW
GRATE TYPE NO. 2

Pipe Size	Grate Bars Req'd.	Grate Wt.
15"	3	33.69
24"	4	43.63
30"	5	53.55

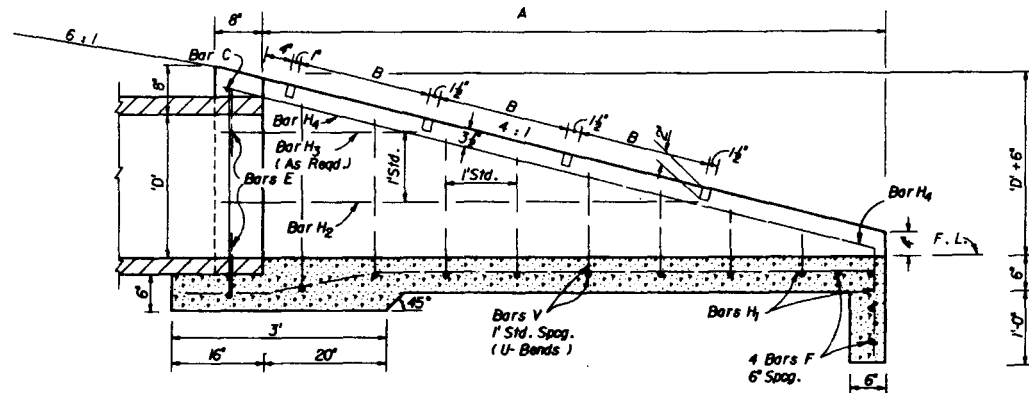
Bars to be evenly spaced across dimension 'D'.
All bars 1/2" x 2".



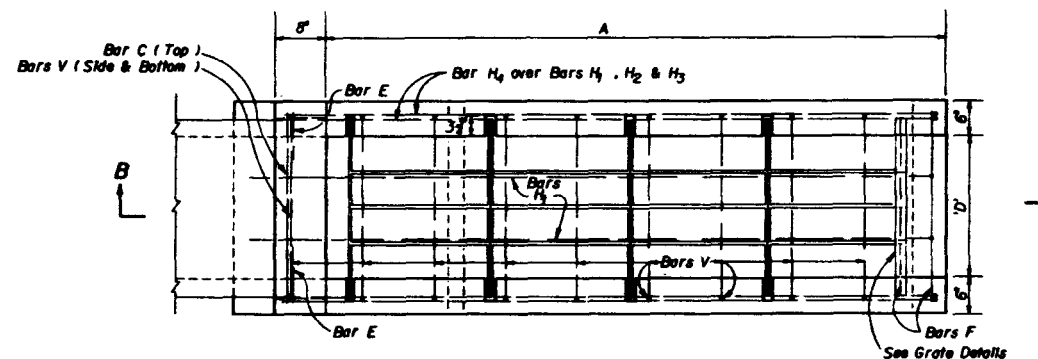
SECTION AA



TOP VIEW
GRATE, SEAT, WELD & CHAIN DETAIL



SECTION BB

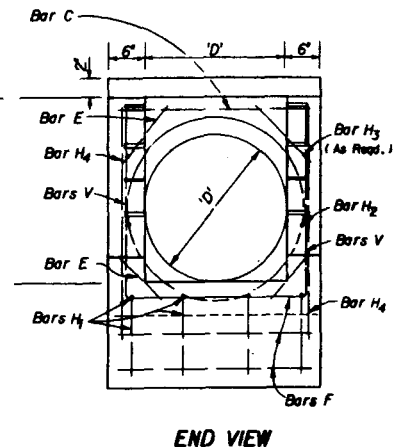


TOP VIEW

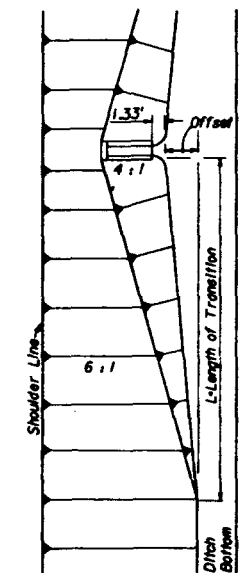
TABLE OF DIMENSIONS AND QUANTITIES										
Slope	Pipe Size	A	B	Conc. Class (C.Y.)	Reinf. Steel (Lbs.)	Number of Grate Bars (Type No. 1)	Number of Grate Bars (Type No. 2)	Total Grate Wt. (Lbs.)	Sodding (Sq. Ft.)	Slope Transition
4:1	15"	5.67	2.38	0.85	26	2	0	57.06	15	4.2
	24"	6.67	1.875	1.01	73	0	3	101.09	16	4.8
	30"	8.67	1.875	1.65	97	0	4	174.52	19	5.8
	36"	10.67	1.875	2.33	129	0	5	267.75	21	6.9

GENERAL NOTES

1. This endwall is to be used only in the clear zone for the drainage of medians and other areas having low design velocities and negligible debris. Grates exposed to salt water shall be designated in the plan as Alternate G.
2. Reinforcing steel: All bars are size #4. Spacings shown are center to center. Laps to be 12" minimum. Clearance is 2" except as noted. Square welded wire fabric (two cages max.) having an equivalent cross sectional area (0.20 sq. in.) may be substituted for bar reinforcement.
3. Grates to be ASTM A 588 or A 242, Grade 50, weathering steel, except grates designated as Alternate G shall be ASTM A 242, A 44, A 572 or A 588, Grade 50 steel, and galvanized in accordance with Section 952 - 7 of the Standard Specifications.
4. Endwall to be paid for per each. Payment shall include cost of concrete, reinforcing steel, grate, and accessories. Quantities shown are for estimating purposes only.
5. Sod slopes 5' each side and above endwall. Sodding to be paid for under contract unit price for sodding.
6. Precasting of this endwall will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the State Drainage Engineer. Use Index No. 201 for opening and grouting details.
7. Concrete meeting the requirements of A.S.T.M. C 478 (4,000 P.S.I.) may be used in lieu of Class I concrete for precast units manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.

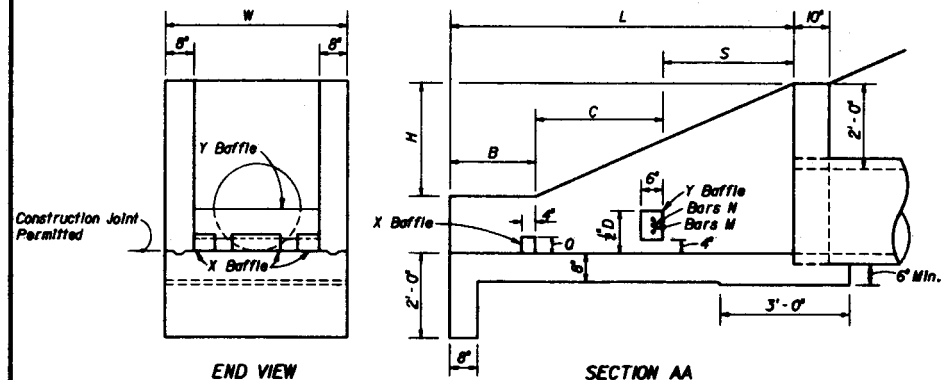


END VIEW

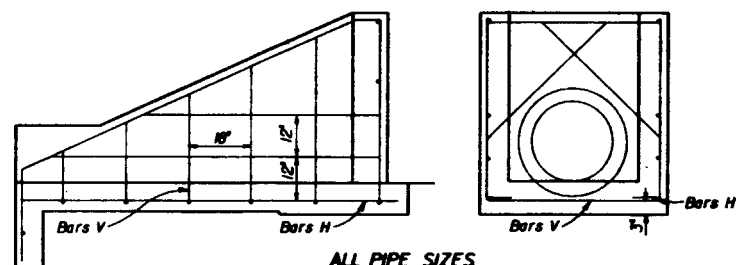


FRONT SLOPE TRANSITION AT ENDWALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
U-TYPE CONCRETE ENDWALLS WITH GRATES 15" TO 30" PIPE			
Designed By	ESR	06/77	Approved By
Drawn By	HSB	06/77	State Drainage Engineer
Checked By	JMG	06/77	Revision No.
F.H.S.A. Approved		07/15/77	Sheet No.
		08	1 of 1
		260	



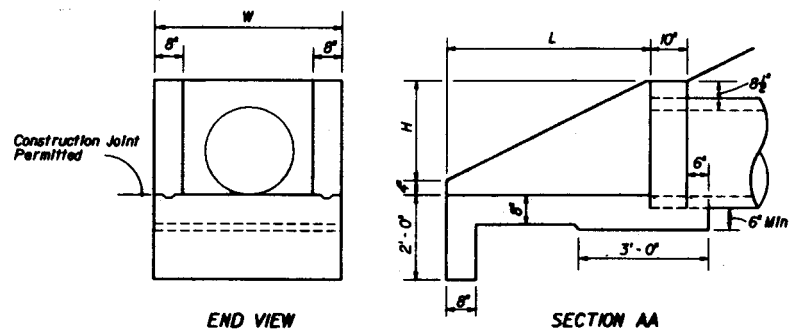
END VIEW
SECTION AA
PLAN
DIMENSIONAL DETAILS



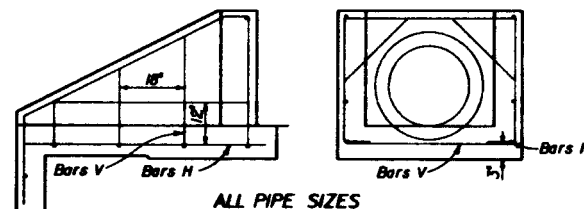
ALL PIPE SIZES
SIDE VIEW AND BACKWALL SECTION
REINFORCING DETAIL

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL														
Pipe Size		L	H	W	S	B	C	X Baffle			Y Baffle Reinf. Steel		Concrete Class I Cu. Yd.	Reinf. Steel Lbs.
D	Area Sq. Ft.							P	O	R	Bar M	Bar N		
15"	1.23	5'-9"	2'-3 1/2"	3'-7"	2'-3"	1'-3"	2'-3"	4"	4"	4"	2 # 4	1 # 4	1.61	72
18"	1.77	6'-6"	2'-5"	3'-10"	2'-6"	1'-6"	2'-6"	4"	4"	5"	3 # 4	2 # 4	1.89	86
24"	3.14	8'-0"	2'-8"	4'-4"	3'-0"	2'-0"	3'-0"	5"	5"	6"	4 # 4	3 # 4	2.52	108
30"	4.91	9'-6"	2'-11"	4'-10"	3'-6"	2'-6"	3'-6"	5"	5"	7"	4 # 4	4 # 4	3.34	131

WITH BAFFLES



END VIEW
SECTION AA
PLAN
DIMENSIONAL DETAILS



ALL PIPE SIZES
SIDE VIEW AND BACKWALL SECTION
REINFORCING DETAIL

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL									
Pipe Size	Area Sq. Ft.	L	H	W	Concrete Class I Cu. Yd.	Reinf. Steel Lbs.			
D									
15"	1.23	3'-3"	1'-7 1/2"	3'-7"	0.89	39			
18"	1.77	3'-9"	1'-10"	3'-10"	1.05	43			
24"	3.14	4'-9"	2'-4"	4'-4"	1.40	55			
30"	4.91	5'-9"	2'-10"	4'-10"	1.88	64			

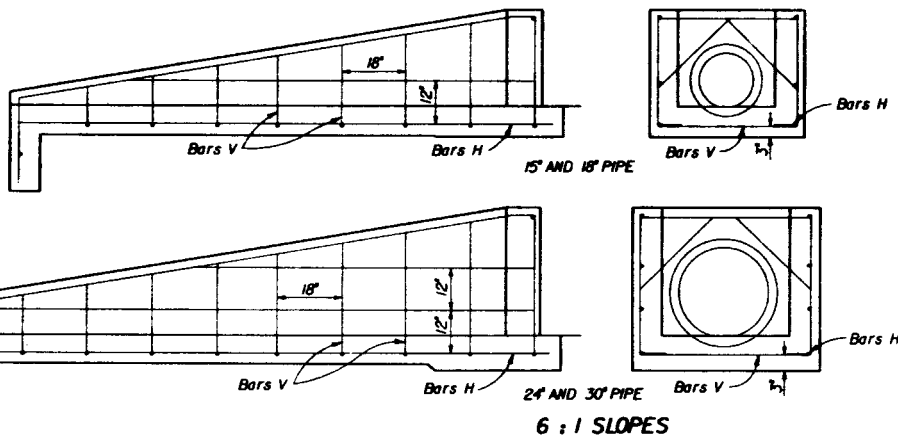
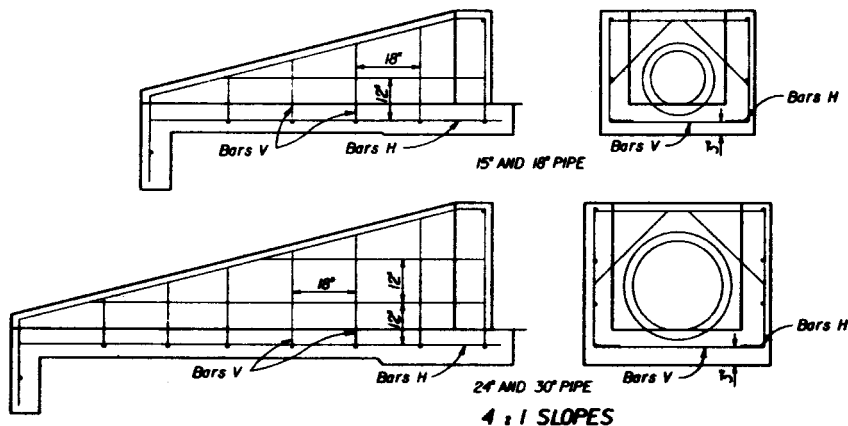
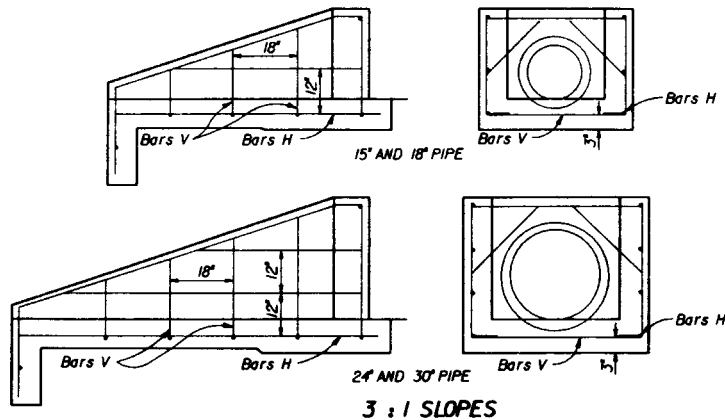
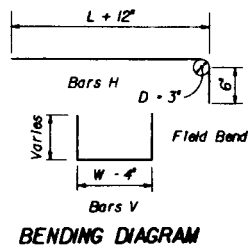
WITHOUT BAFFLES

ENDWALLS FOR 2 : 1 SLOPES

GENERAL NOTES

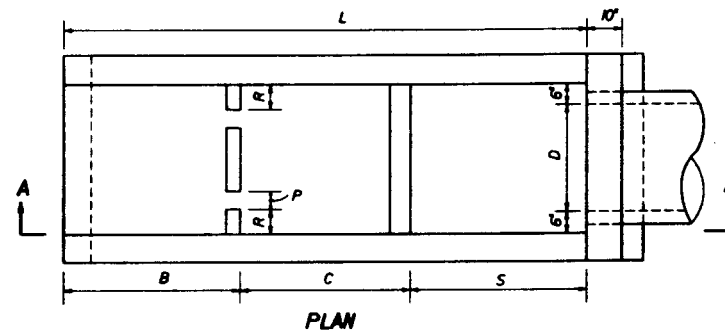
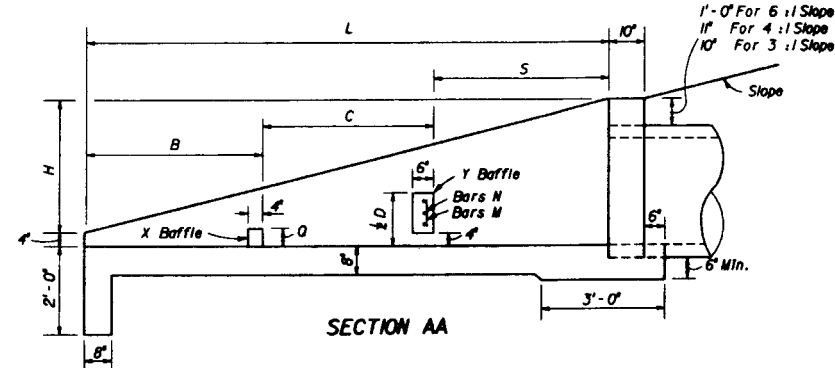
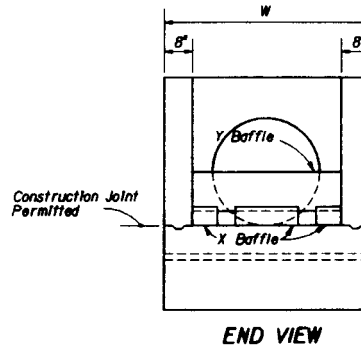
1. Baffles to be constructed only when called for in plans.
2. When steel grating is required on endwall see Sheet 3 of 3 for details.
3. All reinforcing No. 4 bars with 2" clearance except as noted.
4. All angles, channels and bars to be ASTM A 588 or A 242, Grade 50, weathering steel, except grates exposed to salt water shall be ASTM A 242, A 44, A 572 or A 588, Grade 50 steel, and galvanized in accordance with Section 962-7 of the Standard Specifications, and shall be designated in the plans as Alternate 6.
5. Channel section C3 x 6 may be substituted for C4 x 5.4 channel.
6. Precasting of this endwall will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the State Drainage Engineer. Use Index No. 201 for opening and grouting details.
7. Concrete meeting the requirements of ASTM C-478 (4000 psi) may be used in lieu of Class I concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.
8. Sodding shall be in accordance with Index No. 201, and paid for under the contract unit price for Sodding SY.
9. Endwall to be paid for under the contract unit price for Class I Concrete (Endwalls) CY and Reinforcing Steel (Roadway) LB. Cost of grates to be paid for under the contract unit price for Endwall Grate LB, plan quantity. Cost of galvanized bolts and nuts to be included in the bid price for the grate.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
U-TYPE CONCRETE ENDWALLS BAFFLES AND GRATE OPTIONAL 15" TO 30" PIPE			
Designed by	Drawn by	Checked by	Approved by
	db		<i>[Signature]</i>
Scale	Date	Revision No.	Sheet No.
	05/25/75	00	1 of 3
F.L.S.A. Approved			261



**SIDE VIEWS AND BACKWALL SECTIONS
REINFORCING DETAILS**

ENDWALLS WITH AND WITHOUT BAFFLES FOR 3 : 1, 4 : 1 AND 6 : 1 SLOPES

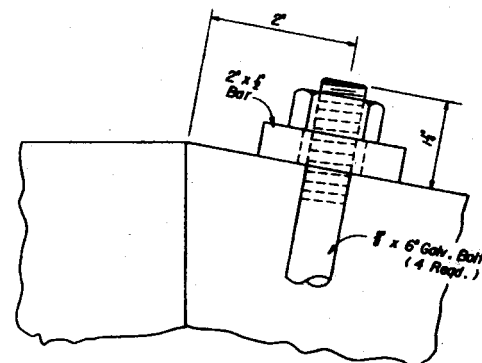
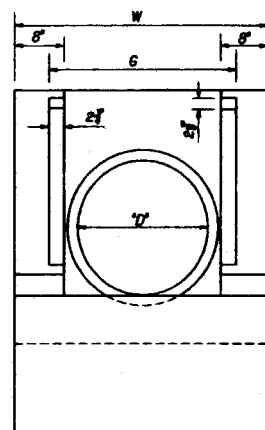
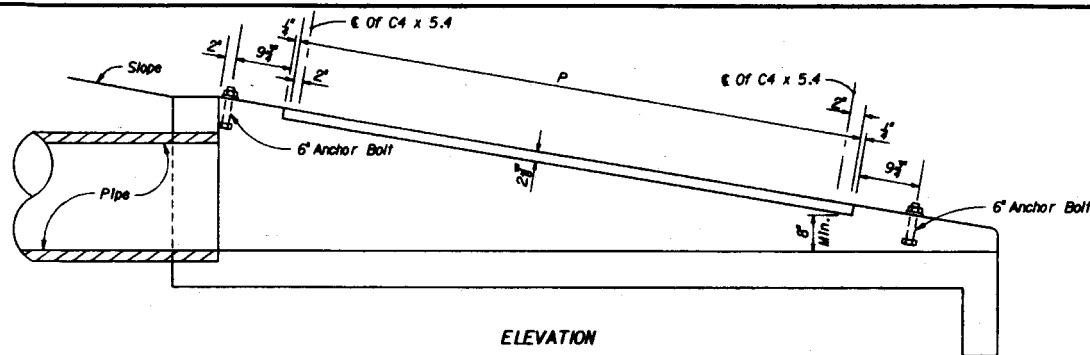


DIMENSIONAL DETAILS

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL									
Rate Of Slope	Pipe Size			Baffle Locations (When Required)	Concrete Class I Cu. Yd.	Reinf. Steel Lbs.	S	B	C
	D	Area Sq. Ft.	L	H	W				
3 : 1	15'	1.23	5'-3"	1'-9"	3'-7"	1'-9"	1'-9"	1'-9"	1.19
	18'	1.77	6'-0"	2'-0"	3'-10"	2'-0"	2'-0"	2'-0"	1.42
	24'	3.14	7'-6"	2'-6"	4'-4"	2'-6"	2'-6"	2'-6"	1.94
	30'	4.91	9'-0"	3'-0"	4'-10"	3'-0"	3'-0"	3'-0"	2.54
4 : 1	15'	1.23	7'-4"	1'-10"	3'-7"	2'-6"	2'-6"	2'-4"	1.54
	18'	1.77	8'-4"	2'-4"	3'-10"	2'-10"	2'-10"	2'-8"	1.84
	24'	3.14	10'-4"	2'-7"	4'-4"	3'-6"	3'-6"	3'-4"	2.53
	30'	4.91	12'-4"	3'-1"	4'-10"	4'-2"	4'-2"	4'-0"	3.34
6 : 1	15'	1.23	11'-6"	1'-11"	3'-7"	3'-10"	3'-10"	3'-10"	2.19
	18'	1.77	13'-0"	2'-2"	3'-10"	4'-4"	4'-4"	4'-4"	2.63
	24'	3.14	15'-0"	2'-8"	4'-4"	5'-4"	5'-4"	5'-4"	3.59
	30'	4.91	19'-0"	3'-2"	4'-10"	6'-4"	6'-4"	6'-4"	4.81

DIMENSIONS AND QUANTITIES FOR BAFFLES						
Pipe Size D	X Baffle			Y Baffle Reinf. Steel		Concrete Class I Cu. Yd.
	P Width	Q Height	R Length	Bar M	Bar N	
15'	4'	4'	4'	2-#4	1-#4	4
18'	4'	4'	5'	3-#4	2-#4	8
24'	5'	5'	6'	4-#4	3-#4	12
30'	5'	5'	7'	4-#4	4-#4	16

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
U-TYPE CONCRETE ENDWALLS BAFFLES AND GRATE OPTIONAL 15' TO 30' PIPE			
Designed By	Drawn By	Checked By	Approved By
Drawn By	chk	S/S	6/6/88
Checked By			State Bridge Engineer
F.H.R.A. Approved	88	2 of 3	261

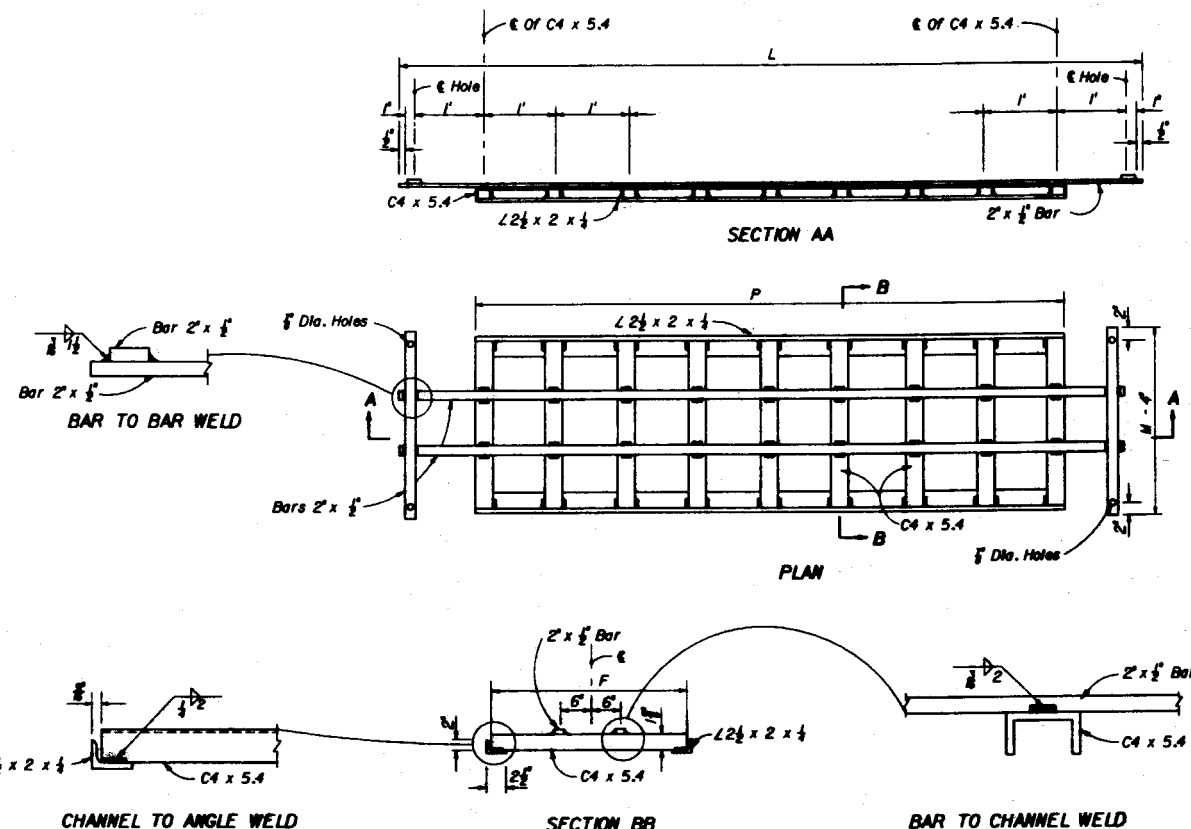


MOUNTING FOR STEEL GRATE

STEEL GRATING USE CRITERIA

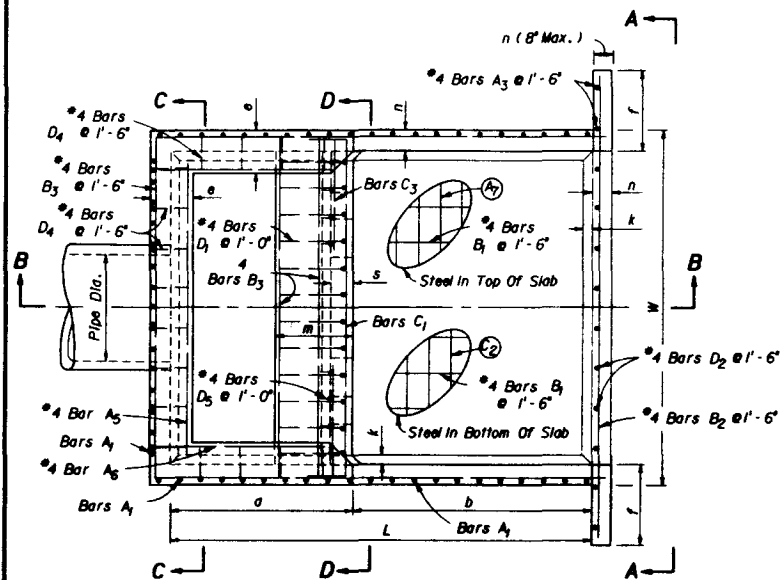
- Grated headwall and/or endwall to be used on pipe culverts when in the designated clear zone and when any of the following conditions exist:
 - Drainage area to culvert consists of median or infield areas or areas where debris and/or drift is negligible.
 - Runoff to culvert is by sheet flow or in such ill defined channels that debris transport is not considered a major problem.
 - Runoff to culvert is minor except on an infrequent basis (10 to 15 year frequency), for example a drainage basin in flat sandy terrain with normally low ground water table.
 - Areas where culvert blockage with resultant backwater would not seriously affect roadway embankment, traffic operation or upland property.
- Steel grating to be used only where called for in plans and only on headwalls and/or endwalls having either 4:1 or 6:1 rates of slope.

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE											
Rate Of Slope	Size Pipe "D"	G	2 Each Bars @ 3.4 Lbs./L.F.			(X) Channels @ 5.4 Lbs./L.F.			2 Angles @ 3.62 Lbs./L.F.		Total Weight Lbs.
			L	W - 4"	Lbs.	(X)	F	Lbs.	P	Lbs.	
6:1	15"	2'-8½"	9'-3"	3'-3"	85	8	2'-6½"	11	7'-4"	53	249
	18"	2'-11½"	10'-3"	3'-6"	94	9	2'-9½"	137	8'-4"	62	292
	24"	3'-5½"	13'-3"	4'-0"	117	12	3'-3½"	215	11'-4"	82	444
	30"	3'-11½"	16'-3"	4'-6"	141	15	3'-9½"	310	14'-4"	104	555
4:1	15"	2'-8½"	6'-3"	3'-3"	65	5	2'-6½"	70	4'-4"	32	167
	18"	2'-11½"	7'-3"	3'-6"	73	6	2'-9½"	92	5'-4"	39	204
	24"	3'-5½"	9'-3"	4'-0"	90	8	3'-3½"	144	7'-4"	53	287
	30"	3'-11½"	11'-3"	4'-6"	107	10	3'-9½"	206	9'-4"	68	381
3:1	15"	2'-8½"	4'-3"	3'-3"	51	3	2'-6½"	42	2'-4"	17	110
	18"	2'-11½"	5'-3"	3'-6"	60	4	2'-9½"	61	3'-4"	24	145
	24"	3'-5½"	6'-3"	4'-0"	70	5	3'-3½"	90	4'-4"	31	191
	30"	3'-11½"	8'-3"	4'-6"	87	7	3'-9½"	145	6'-4"	46	278

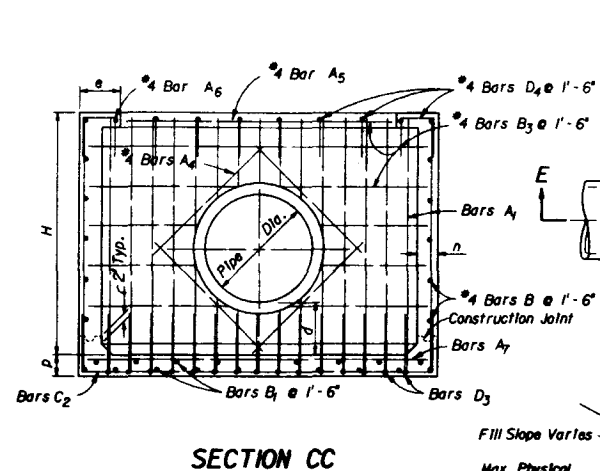


STEEL GRATE

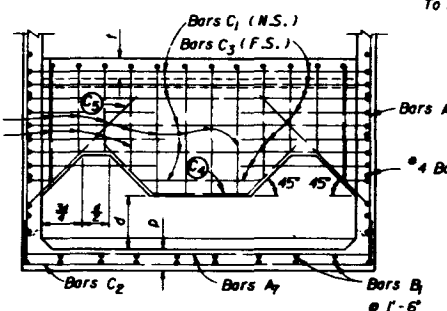
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
U - TYPE CONCRETE ENDWALLS BAFFLES AND GRATE OPTIONAL 15" TO 30" PIPE			
Designed By	Checked	Reviewed	Approved
Drawn By	CDP	07/11	
Checked By			
F.J.R.A. Approved		03/20/75	86
3 of 3		261	



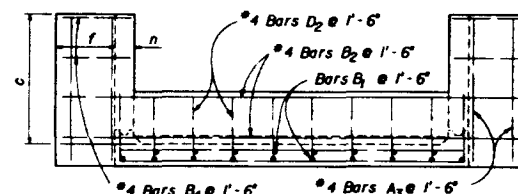
PLAN



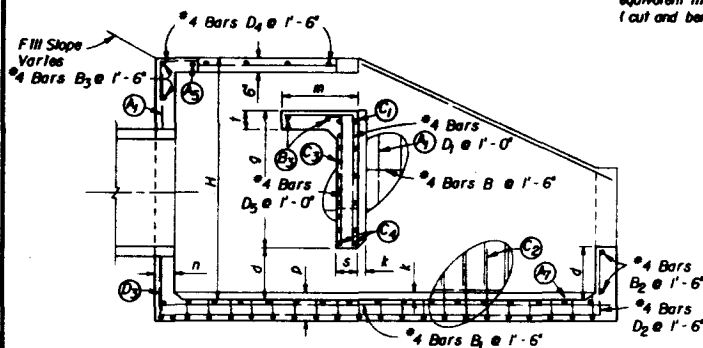
SECTION CC



SECTION DD

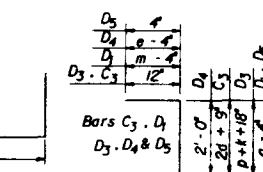


VIEW AA



SECTION BB

BARS												
	A ₁		A ₇		C ₁		C ₂		C ₃		D ₃	
Pipe Size	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)
30"	4	0 - 9½	4	1 - 6	5	0 - 11	4	0 - 9½	5	0 - 5½	4	0 - 9½
36"	5	1 - 0	4	1 - 6	5	0 - 10	5	1 - 0	5	0 - 5	5	1 - 0
42"	5	0 - 11	4	1 - 6	6	1 - 1	5	0 - 11	6	0 - 6½	5	0 - 11
48"	5	0 - 9½	4	1 - 0	6	1 - 0	5	0 - 9½	6	0 - 6	5	0 - 9½
54"	5	0 - 8½	4	0 - 10	7	1 - 1	5	0 - 8½	7	0 - 6½	5	0 - 8½
60"	6	0 - 10	5	1 - 1	7	1 - 0	6	0 - 10	7	0 - 6	6	0 - 10
66"	6	0 - 8½	5	0 - 11½	7	0 - 11	6	0 - 8½	7	0 - 5½	6	0 - 8½
72"	6	0 - 7½	5	0 - 10	7	0 - 10	6	0 - 7½	7	0 - 5	6	0 - 7½



Note: All bar dimensions are out to out.

BENDING DIAGRAM

Pipe Size		Q (Max.) (csf)	Dimensions															Concrete Class I C.Y.	Reinf. Steel Lbs.	Sand Cement Riprap C.Y./Nom.			
Dia. In.	Area S.F.		Ft. - In.																				
			Inches																				
			W	H	L	a	b	c	d	e	f	g	m	n	p	s	t	k					
30	4.91	59	9-0	6-3	10-8	4-7	6-1	3-4	1-4	1-2	2-6	3-0	1-11	6-6	4-7	7-7	3		6.72	736	10.6		
36	7.07	85	10-5	7-3	12-4	5-3	7-1	3-10	1-7	1-3	3-0	3-6	2-3	7-7	4-8	8-8	3		10.34	1,072	13.6		
42	9.62	115	11-10	8-0	14-0	6-0	8-0	4-5	1-9	1-6	3-0	3-11	2-6	8-8	4-9	9-8	4		14.82	1,429	17.5		
48	12.57	151	13-3	9-0	15-8	6-9	8-11	4-11	2-0	1-7	3-0	4-5	2-10	9-9	4-10	10-8	4		20.36	2,000	22.1		
54	15.90	191	14-8	9-9	17-4	7-4	10-0	5-5	2-2	1-10	3-0	4-11	3-0	10-10	4-10	10-8	4		27.19	2,659	27.2		
60	19.63	236	16-1	10-9	19-0	8-0	11-0	5-11	2-5	1-11	3-0	5-4	3-4	11-11	4-11	11-8	6		34.49	3,552	32.5		
66	23.76	285	17-3	11-6	20-6	8-8	11-10	6-5	2-7	2-1	3-0	5-9	3-7	12-12	4-12	12-8	6		42.82	4,472	38.3		
72	28.27	339	18-6	12-3	22-0	9-3	12-9	6-11	2-9	2-3	3-0	6-2	3-9	12-12	4-12	12-8	6		50.68	5,426	44.5		

GENERAL NOTES

- Chamfer all exposed edges.
- Concrete meeting the requirements of ASTM C-478 (4000 psi) may be used in lieu of Class I Concrete in precast items manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.
- Endwall to be paid for under the contract unit price for Class I Concrete (Endwalls) CY and Reinforcing Steel (Roadway) LB. Riprap to be paid for under the contract unit price for Riprap (Sand-Cement) (Roadway) CY. Cost of plastic filter fabric to be included in the contract unit price for riprap.
- Fencing, when called for in the plans, to be paid for under the contract unit price for Fencing, Type B LF. Corner posts and pull end posts to be paid for under the contract unit price for Corner Post Assembly (Type B Fence) EA, and Pull & End Post Assembly (Type B Fence) EA, respectively. See Index No. 452 for details of Type B Fencing.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

U-TYPE CONCRETE ENDWALL ENERGY DISSIPATOR 30" TO 72" PIPE

Designed By	Drawn By	Checked By	Reviewed By	Approved By
HMB	RWR	JHG		
10/88	02/94	02/94		
Revision No.	Sheet No.	Index No.		
85	1 of 1	264		

F.J.W.A. approved: 03/20/75

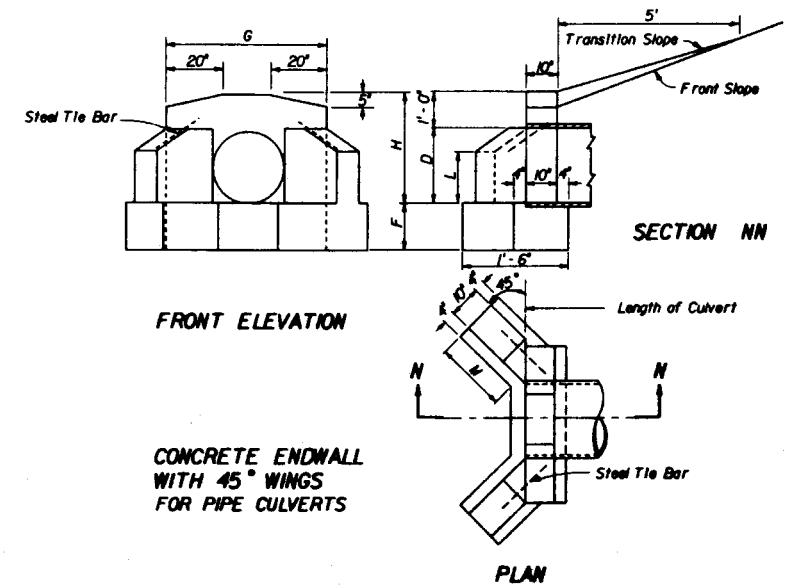
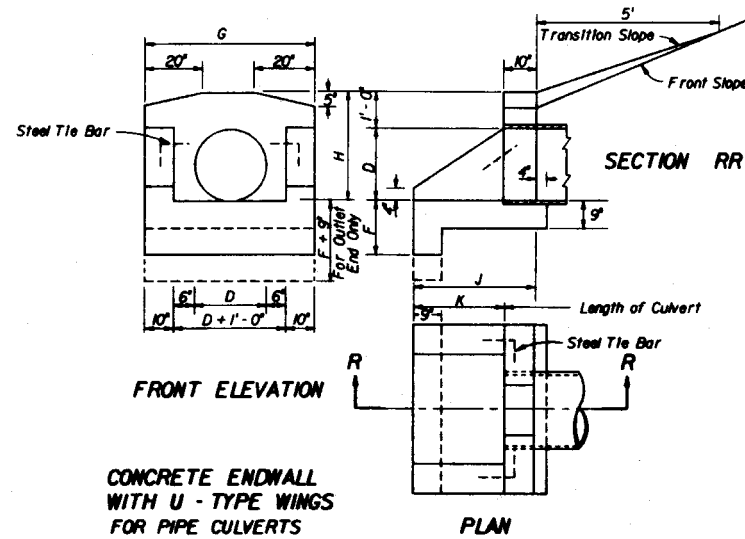


TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH U - TYPE WINGS

DIMENSIONS							QUANTITIES IN ONE ENDWALL									
Opening		Wall			Footing		Total Cu. Yds. Concrete, Class I						Steel Tie Bars			
		G	H	K	F	J	Conc. Pipe		C.M. Pipe		C.J. Pipe					
D	Area Sq.Ft.						Inlet	Outlet	Inlet	Outlet	Inlet	Outlet				
12"	0.8	3'-6"	2'-0"	1'-0"	1'-3"	2'-2"	0.46	0.55	0.49	0.57	0.49	0.57	none			
15"	1.2	3'-11"	2'-3"	1'-5"	1'-3"	2'-7"	0.59	0.67	0.62	0.70	0.61	0.70	none			
18"	1.8	4'-2"	2'-6"	1'-9"	1'-3"	2'-11"	0.70	0.79	0.74	0.82	0.74	0.82	none			
24"	3.1	4'-8"	3'-0"	2'-6"	1'-6"	3'-8"	1.01	1.11	1.06	1.16	1.06	1.16	2 - 1/8" x 2'-0"			
30"	4.9	5'-2"	3'-6"	3'-3"	1'-6"	4'-5"	1.33	1.44	1.41	1.51	1.40	1.51	2 - 1/8" x 2'-0"			
36"	7.1	5'-8"	4'-0"	4'-0"	1'-9"	5'-2"	1.73	1.85	1.84	1.96	1.82	1.94	2 - 1/8" x 2'-6"			
42"	9.6	6'-2"	4'-6"	4'-9"	2'-0"	5'-11"	2.19	2.32	2.32	2.45			2 - 1/8" x 2'-6"			
48"	12.6	6'-8"	5'-0"	5'-6"	2'-0"	6'-8"	2.64	2.78	2.81	2.95			2 - 1/8" x 3'-0"			

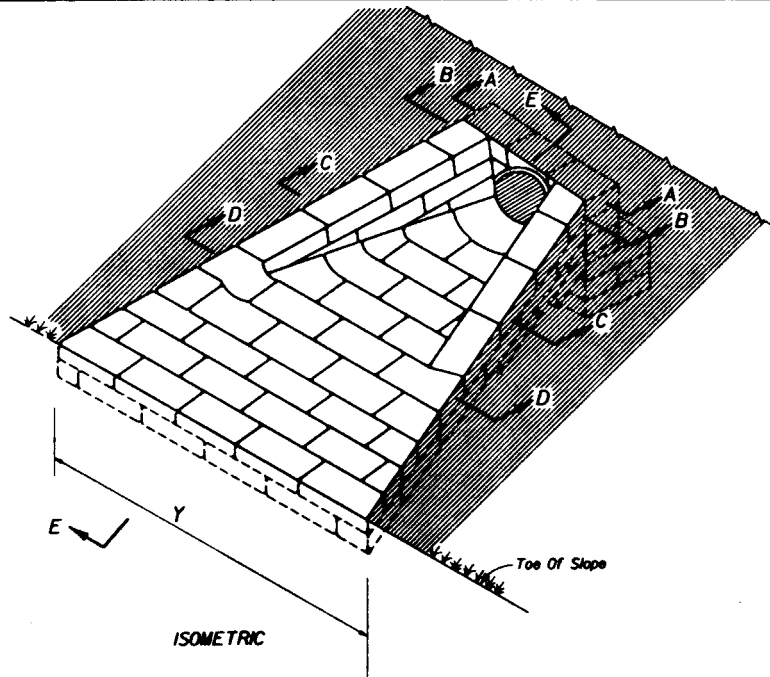
TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH 45° WINGS

DIMENSIONS							QUANTITIES IN ONE ENDWALL				
Opening		Wall				Footings	Concrete, Class I			Steel Tie Bars	
D	Area Sq.Ft.	H	G	L	M	F	Total Cu. Yds.				
							Conc. Pipe	C.M. Pipe	C.J. Pipe		
18"	1.8	2'-6"	3'-10"	1'-2"	1'-7"	1'-3"	0.74	0.77	0.77	none	
24"	3.1	3'-0"	4'-4"	1'-5"	2'-1"	1'-4"	1.01	1.06	1.06	2 - 1/8" x 2'-0"	
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	1'-6"	1.32	1.40	1.39	2 - 1/8" x 2'-0"	
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	1'-8"	1.72	1.83	1.82	2 - 1/8" x 3'-0"	
42"	9.6	4'-6"	5'-10"	2'-3"	3'-6"	2'-0"	2.34	2.47		2 - 1/8" x 3'-0"	
48"	12.6	5'-0"	6'-4"	2'-6"	4'-0"	2'-0"	2.74	2.90		2 - 1/8" x 3'-0"	
15"	1.2	2'-3"	3'-7"	1'-0"	1'-3"	1'-3"	0.56	0.59	0.59	none	

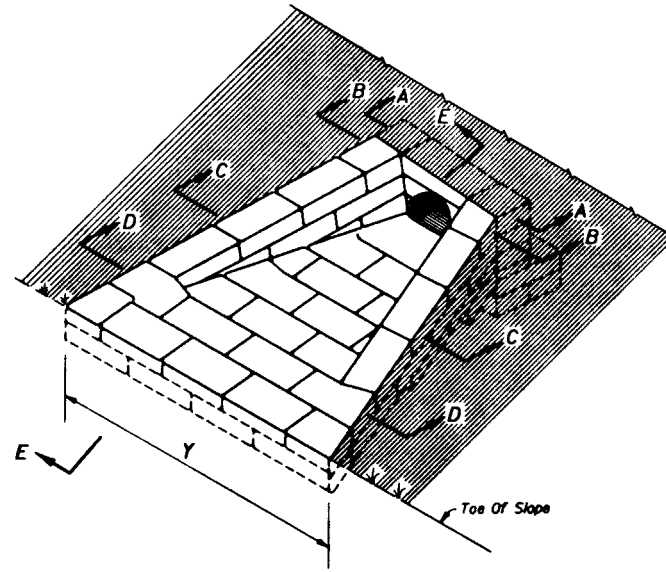
GENERAL NOTES

1. Chamfer all exposed edges $\frac{3}{8}$ "
2. Concrete meeting the requirements of ASTM C-478 (4000 psi) may be used in lieu of Class concrete in precast units manufactured in plants which are under the Standard Operating Procedures for the Inspection of precast drainage products.
3. Endwall to be paid for under the contract unit price for Class I Concrete (Endwalls) CY. Cost of steel tie bars to be included in the contract unit price for Class I Concrete.
4. Sodding to be in accordance with Index No. 281, and paid for under the contract unit price for Sodding Sy.

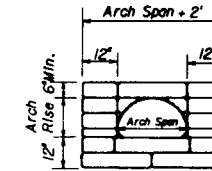
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
WINGED CONCRETE ENDWALLS SINGLE ROUND PIPE			
Designed By	Checked By	Approved By	Scale
Drawn By	T.M.	12/3	
Checked By	607	05/32	
F.A.S.A. Approved	03/20/75	86	1071
			266



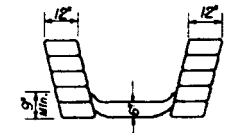
ISOMETRIC



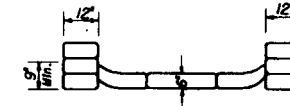
ISOMETRIC



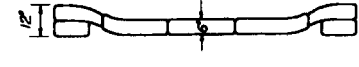
SECTION AA



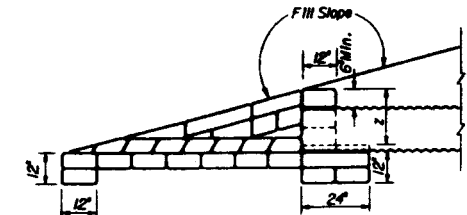
SECTION BB



SECTION CC



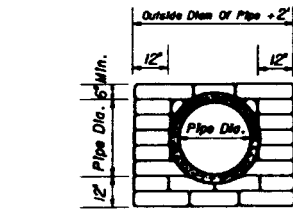
SECTION DD



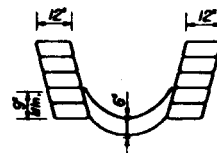
SECTION EE

DETAILS FOR SINGLE METAL PIPE ARCH CULVERTS

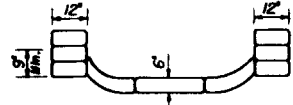
NOTE: For multiple metal pipe arch culvert spacing between arch centers - X



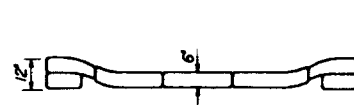
SECTION AA



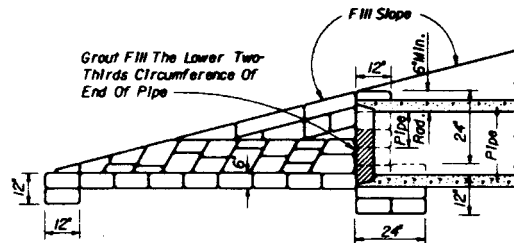
SECTION BB



SECTION CC



SECTION DD



SECTION EE

DETAIL FOR SINGLE PIPE CULVERT

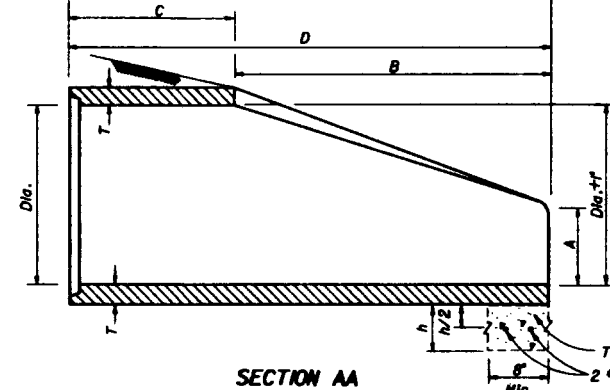
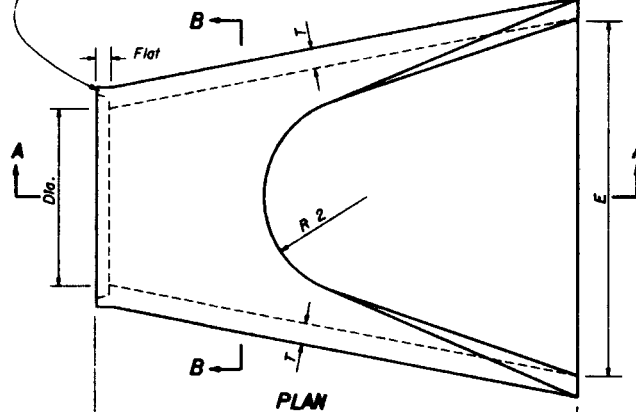
Note: For multiple pipe culvert spacing between pipe centers - X

DIMENSIONS AND QUANTITIES FOR METAL PIPE ARCH CULVERTS																			
Span	Rise	Dimensions						Quantity of Sand-Cement Riprap In Cu. Yds. for One Endwall											
		X	Y				Z	For 2 : 1 Slopes				For 4 : 1 Slopes				For 6 : 1 Slopes			
			1-Arch	2-Arch	3-Arch	4-Arch		1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch
11"	13"	2'-6"	6'-6"	9'-0"	11'-6"	14'-0"	1'-7"	1.0	1.5	2.0	2.5	1.5	2.2	2.9	3.6				
21"	15"	2'-10"	7'-6"	10'-4"	13'-2"	16'-0"	1'-9"	1.2	1.8	2.4	3.0	1.9	2.7	3.5	4.3				
28"	20"	3'-5"	9'-3"	12'-8"	16'-1"	19'-6"	2'-0"	1.7	2.5	3.3	4.1	2.6	3.7	4.8	5.9				
35"	24"	4'-0"	11'-0"	15'-0"	19'-0"	23'-0"	2'-0"	2.2	3.1	4.0	4.9	3.4	4.7	6.0	7.3				
42"	28"	4'-9"	12'-9"	17'-6"	22'-3"	27'-0"	2'-0"	2.9	4.1	5.3	6.5	4.5	6.1	7.7	9.3				
48"	33"	5'-6"	14'-6"	20'-0"	25'-6"	31'-0"	2'-0"	3.5	4.9	6.3	7.7	5.5	7.4	9.3	11.2				
54"	36"	6'-4"	16'-6"	22'-10"	29'-2"	35'-6"	2'-0"	4.4	6.1	7.8	9.5	6.9	9.2	11.5	13.8				
64"	43"	7'-1"	18'-3"	25'-4"	32'-5"	39'-6"	2'-0"	5.1	7.0	8.9	10.8	8.1	10.7	13.3	15.9				
71"	47"	7'-10"	20'-0"	27'-10"	35'-8"	43'-6"	2'-0"	5.9	8.1	10.3	12.5	9.5	12.4	15.3	18.2				

Pipe Diam		DIMENSIONS AND QUANTITIES FOR ROUND PIPE CULVERTS											
		Dimensions				Quantity of Sand-Cement Riprap In Cu. Yds. for One Endwall							
		X		Y		For 2 : 1 Slopes		For 4 : 1 Slopes		For 6 : 1 Slopes			
		1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes
15"	2'-7"	7'-0"	9'-7"	12'-2"	14'-9"	1.2	1.6	2.1	2.6	1.7	2.4	3.0	3.6
18"	2'-10"	8'-0"	10'-7"	13'-8"	16'-6"	1.4	2.0	2.6	3.1	2.1	2.9	3.7	4.4
24"	3'-5"	10'-0"	13'-5"	16'-10"	20'-3"	1.9	2.7	3.5	4.3	2.9	4.0	5.1	6.3
30"	4'-3"	12'-0"	16'-3"	20'-6"	24'-9"	2.5	3.6	4.8	5.9	3.8	5.4	7.0	8.6
36"	5'-1"	14'-0"	19'-1"	24'-2"	29'-3"	3.1	4.6	6.2	7.7	4.8	7.0	9.2	11.4
42"	6'-0"	16'-0"	22'-0"	28'-0"	34'-0"	3.8	5.8	7.7	9.7	6.0	8.8	11.7	14.5
48"	6'-9"	18'-0"	24'-9"	31'-6"	38'-3"	4.5	7.0	9.4	11.8	7.2	10.8	14.3	17.9
54"	7'-8"	20'-0"	27'-8"	35'-4"	43'-0"	5.3	8.3	11.3	14.2	8.5	12.9	17.3	21.7
60"	8'-6"	22'-0"	30'-6"	39'-0"	47'-6"	6.2	9.7	13.3	16.9	10.0	15.3	20.6	25.9

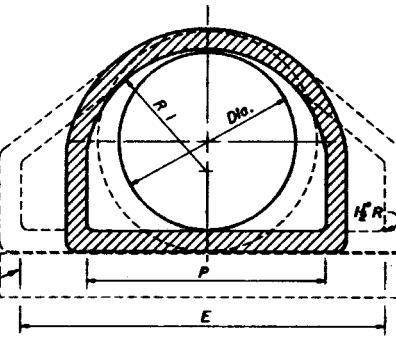
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
U-TYPE SAND-CEMENT ENDWALLS			
Designed By	REB	Drawn By	REB
Checked By	REB	Station No.	03/54
Drawn By	REB	Sheet No.	1 of 1
Checked By	REB	Index No.	268
F.A.R.A. Approved		08/30/77	

Spigot On Inlet Section
Bell On Outlet Section
(Outlet Section Shown)



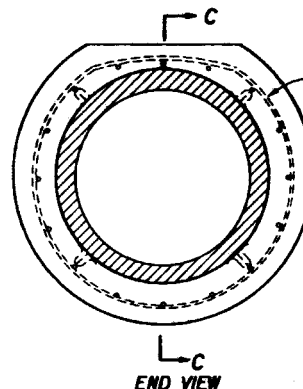
SECTION AA

FLARED END SECTION

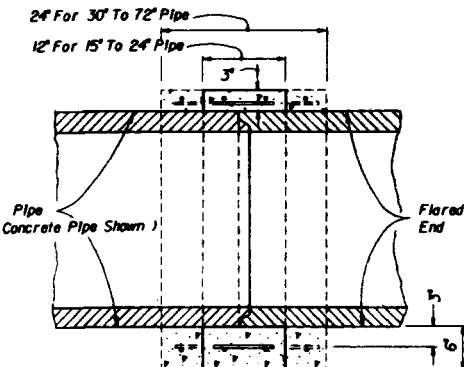


SECTION BB

Any Wire Mesh Arrangement Which Provides
0.225 Square Inches Of Steel Area Per Linear
Foot Both Ways May Be Used, Provided The
Wires Are Spaced A Minimum Of 2" And / Or
A Maximum Of 6" On Centers.



END VIEW



SECTION CC

REINFORCED CONCRETE JACKET DETAIL

DIA.	T	REINF. Sq. In. / Lin. Ft.	BELL Or SPIGOT	A	B	C	D	E	P	R 1	R 2	FLAT	WEIGHT (LBS.)	TOE WALL h	CLASS I CONC (Min. 1 CY)
12"	2"	0.07	18"	4"	2'-0"	4'-0"	6'-0"	2'-0"	19 1/2"	10 1/2"	9"	3 1/2"	530	12"	.06
15"	2 1/4"	0.07	2"	6"	2'-3"	3'-10"	6'-1"	2'-6"	24 1/2"	12 1/2"	11"	3 1/2"	740	12"	.07
18"	2 1/4"	0.07	2 1/4"	9"	2'-3"	3'-10"	6'-1"	2'-6"	29"	15 1/2"	12"	4"	990	15"	.11
24"	2 1/4"	0.07	2 1/4"	9"	2'-11"	3'-2"	6'-1"	3'-6"	31 1/2"	16 1/2"	13"	4"	1280	15"	.12
24"	3"	0.07	2 1/4"	9 1/2"	3'-7 1/2"	2'-6"	6'-1"	4'-0"	33 1/2"	16 1/2"	14"	4 1/2"	1520	18"	.17
27"	3 1/4"	0.148	2 1/4"	10 1/2"	4'-0"	2'-11"	6'-1"	4'-6"	36"	18 1/2"	14 1/2"	4 1/2"	1930	18"	.19
30"	3 1/4"	0.148	3"	1'-0"	4'-6"	1'-7 1/2"	6'-1"	5'-0"	37"	18 1/2"	15"	5"	2190	24"	.24
36"	4"	0.148	3 1/4"	1'-3"	5'-3"	2'-10 1/2"	6'-1"	6'-0"	47 1/2"	24 1/2"	20"	5 1/2"	400	24"	.29
42"	4 1/4"	0.148	3 1/4"	1'-9"	5'-3"	2'-11"	6'-2"	6'-6"	53 1/2"	27 1/2"	22"	5 1/2"	5380	24"	.36
48"	5"	0.148	4 1/4"	2'-0"	6'-0"	2'-2"	6'-2"	7'-0"	56 1/2"	28 1/2"	22"	5 1/2"	6550	24"	.39
54"	5 1/4"	0.174	4 1/4"	2'-3"	5'-5"	2'-11"	6'-4"	7'-6"	65 1/2"	33 1/2"	24"	6 1/2"	8040	24"	.42
60"	6"	0.174	5"	2'-6"	5'-0"	3'-3"	6'-3"	8'-0"	72 1/2"	36 1/2"	24"	6 1/2"	8750	24"	.44
66"	6 1/4"	0.174	5 1/4"	2'-0"	6'-6"	1'-9"	6'-3"	8'-6"	72"	36 1/2"	24"	7 1/4"	10630	24"	.47
72"	7"	0.174	6"	2'-0"	6'-6"	1'-9"	6'-3"	9'-0"	77 1/2"	38 1/2"	24"	7 1/4"	12520	24"	.50

GENERAL NOTES

- Flared end sections shall conform to the requirements of ASTM C - 76 with the exception that dimensions and reinforcement shall be as prescribed in the table above. Circumferential reinforcement may consist of either one cage or two cages of steel. Compressive strength of concrete shall be 4000 psi. Shop drawings for flared end sections having dimensions other than above must be submitted for approval to the State Drainage Engineer.
- Connections between the flared end section and the pipe culvert may be any of the following types unless otherwise shown on the plans.
 - Joints meeting the requirements of Section 941-1.5 of the Standard Specifications.
The manufacturer of the flared end section shall identify the manufacturer of the pipe culvert and certify that the flared end section is suited to joining the pipe culvert.
 - Joints sealed with preformed plastic gaskets.
The gaskets shall meet the requirements of Section 942 - 2 of the Standard Specifications and the minimum sizes for gaskets shall be as that specified for equivalent sizes of elliptical pipe.
 - Reinforced concrete jackets, as detailed on this drawing.
Cost of the reinforced concrete jacket to be included in the contract unit price for the flared end section.
When non-coated corrugated metal pipe is called for in the plans, the pipe shall be bituminous coated in the jacketed area as specified on Index No. 280. Bituminous coating to be included in the contract unit price for the pipe culvert.
- Toe walls shall be constructed when shown on the plans or at locations designated by the Engineer. Toe walls are to be cast - in - place with Class I Concrete and paid for under the contract unit price for Class I Concrete (Miscellaneous) CY. Reinforcing steel to be included in cost of toe wall.
- On skewed pipe culverts the flared end sections shall be placed in line with the pipe culvert. Side slopes shall be warped as required to fit the flared end sections.
- Flared End Section to be paid for under the contract unit price for Flared End Section (Concrete), Each. Sadding shall be in accordance with Index No. 281, and paid for under the contract unit price for Sadding, SY.

DESIGN NOTES

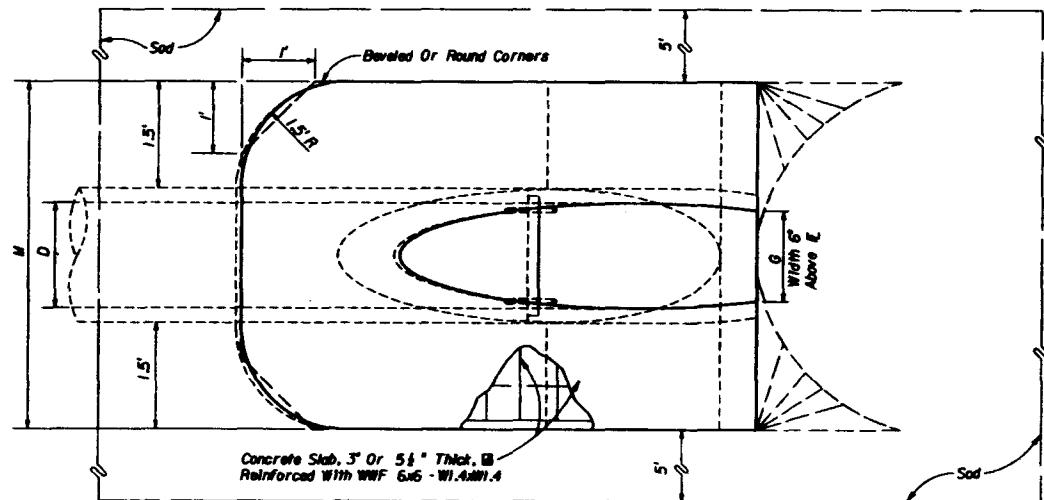
- Flared end sections are intended for use outside the clear zone on median drain and cross drain installation, except that flared end sections for pipe sizes 12" and 15" are permitted within the clear zone. When the slope intersection permits, these flared end sections may be located with the culvert opening as close as 8' beyond the outside edge of the shoulder.
Flared end sections are not intended for side drain installations.
- Reinforced concrete jackets shall be used at all locations where high velocities and / or highly erosive soils may cause disjuncting. These locations are to be shown on the plans.
- Toe walls shall be used whenever the anticipated velocity of discharge and soil type are such that erosive action would occur. Toe walls are not required where ditch pavement is provided, except when disjuncting would occur if the ditch pavement should fail.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
FLARED END SECTION					
Designed By	ENR	Checked By	ENR	Approved By	ENR
Drawn By	ENR	Reviewed By	ENR	State Drainage Engineer	
Revised By	JAB	Revised By	JAB	Sheet No.	1 of 1
F.A.R.A. Approved	02/23/77	02		Index No.	270

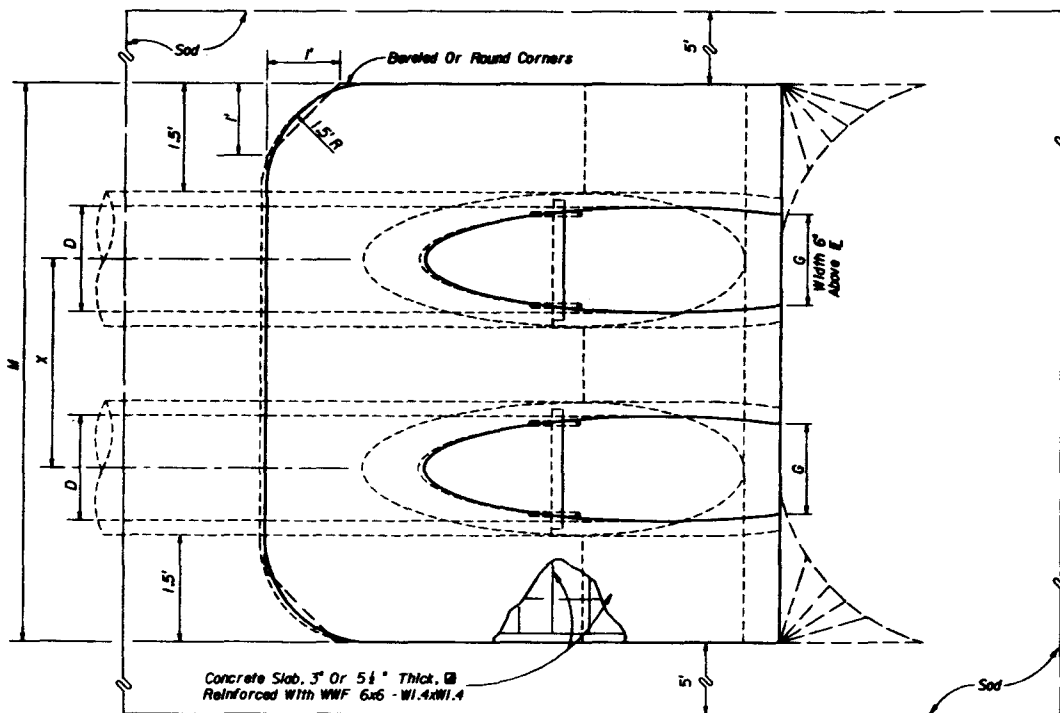
DIMENSIONS AND QUANTITIES																						
	D	X	A	B	C	E	F	G	M				N	3" CONCRETE SLAB (CY) ▢				SODDING (SQ. YDS.)				
									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	
2 : 1 Slope	15'	2'-7"	1.92'	2.18'	4.10'	2.06'	5'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'	0.27	0.41	0.54	0.67	21	24	27	30	
	18'	2'-10"	1.97'	2.74'	4.71'	2.56'	6'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'	0.31	0.45	0.60	0.75	22	25	28	31	
	24'	3'-5"	2.06'	3.85'	5.94'	3.56'	7'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'	0.39	0.59	0.79	1.00	24	28	32	35	
	30'	4'-3"	2.15'	4.95'	7.40'	4.56'	8'	2.00'	6.08'	10.33'	14.58'	18.83'	1.29'	0.46	0.76	1.04	1.32	26	31	35	40	
	36'	5'-7"	2.25'	6.08'	8.33'	5.56'	9'	2.24'	6.61'	11.75'	16.83'	21.92'	1.33'	0.55	0.94	1.33	1.71	28	34	39	45	
	42'	6'-0"	2.34'	7.21'	9.55'	6.56'	10'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	0.66	1.15	1.66	2.15	30	37	43	50	
	48'	6'-9"	2.43'	8.33'	10.76'	7.56'	11'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	0.76	1.37	1.96	2.57	32	39	47	54	
	54'	7'-8"	2.52'	9.44'	11.96'	8.56'	12'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	0.87	1.62	2.38	3.14	34	42	51	59	
	60'	8'-6"	2.62'	10.56'	13.18'	9.56'	14'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	0.99	1.90	2.81	3.73	36	45	55	64	
4 : 1 Slope	15'	2'-7"	2.27'	4.08'	6.36'	4.03'	8'	1.22'	4.63'	7.21'	9.79'	12.37'	1.19'	0.40	0.61	0.80	1.00	23	26	29	32	
	18'	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'	0.47	0.69	0.91	1.14	25	28	31	35	
	24'	3'-5"	2.53'	7.18' Δ	9.71' Δ	7.03' Δ	11'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'	0.60	0.90	1.21	1.52	28	32	36	40	
	30'	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	6.08'	10.33'	14.58'	18.83'	1.29'	0.76	1.19	1.63	2.07	31	36	41	46	
	36'	5'-7"	2.87'	11.31' ◇	14.48'	11.03' ◇	15'	2.24'	6.61'	11.75'	16.83'	21.92'	1.33'	0.89	1.48	2.05	2.63	34	40	46	52	
	42'	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	1.05	1.82	2.57	3.34	38	44	51	58	
	48'	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	1.21	2.15	3.02	4.00	41	48	56	63	
	54'	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	1.39	2.55	3.72	4.88	44	52	61	69	
	60'	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	1.59	3.02	4.44	5.86	47	56	66	75	
	66'	9'-2"	3.73'	21.62'	25.35'	21.03'	25'	3.18'	9.58'	18.75'	27.58'	37.08'	1.54'	1.79	3.66	5.40	7.15	49	59	69	80	
	72'	10'-0"	3.91'	23.68'	28.59'	23.03'	27'	3.30'	10.16'	20.16'	30.16'	40.16'	1.58'	2.12	4.18	6.24	8.30	52	63	74	85	

See General Note No. 3.
See Sheet 5 of 6 For 5 1/2' Slab Quantities

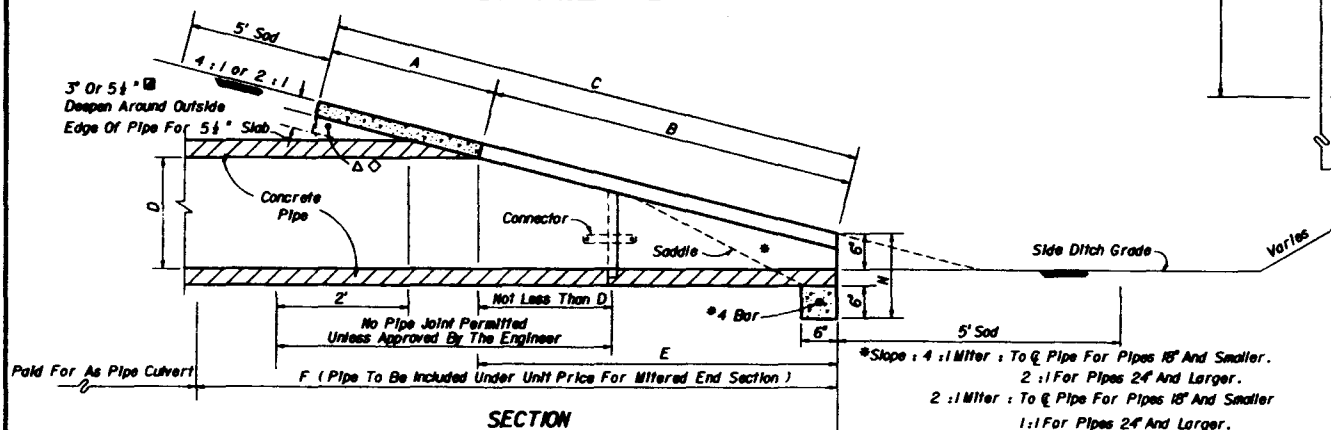
B E
Δ 6.42' Δ 6.25' Dimensions permitted to allow use of 8' standard pipe lengths.
◇ 10.40' ◇ 10.10' Dimensions permitted to allow use of 12' standard pipe lengths.
Δ ◇ Concrete slab shall be deepened to form bridge across crown of pipe. See section below.



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



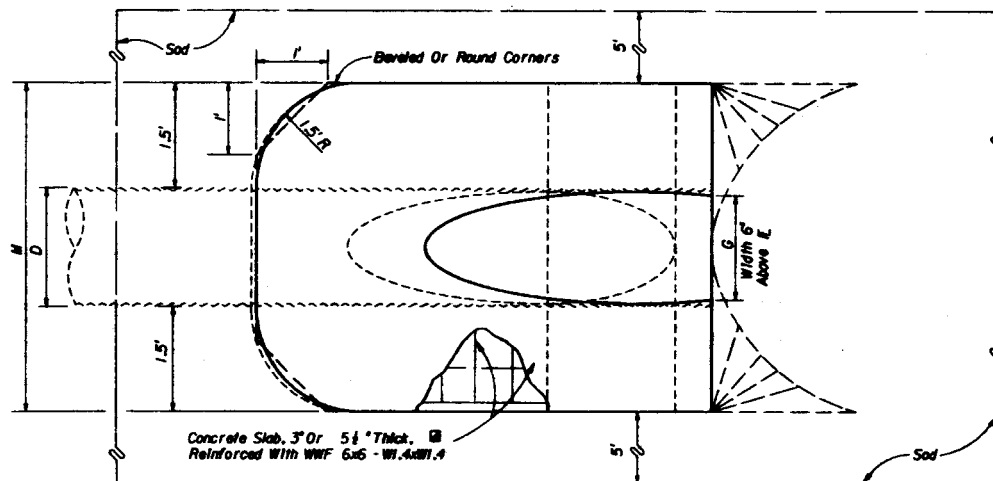
SECTION

Note: See sheet 6 for details and notes.

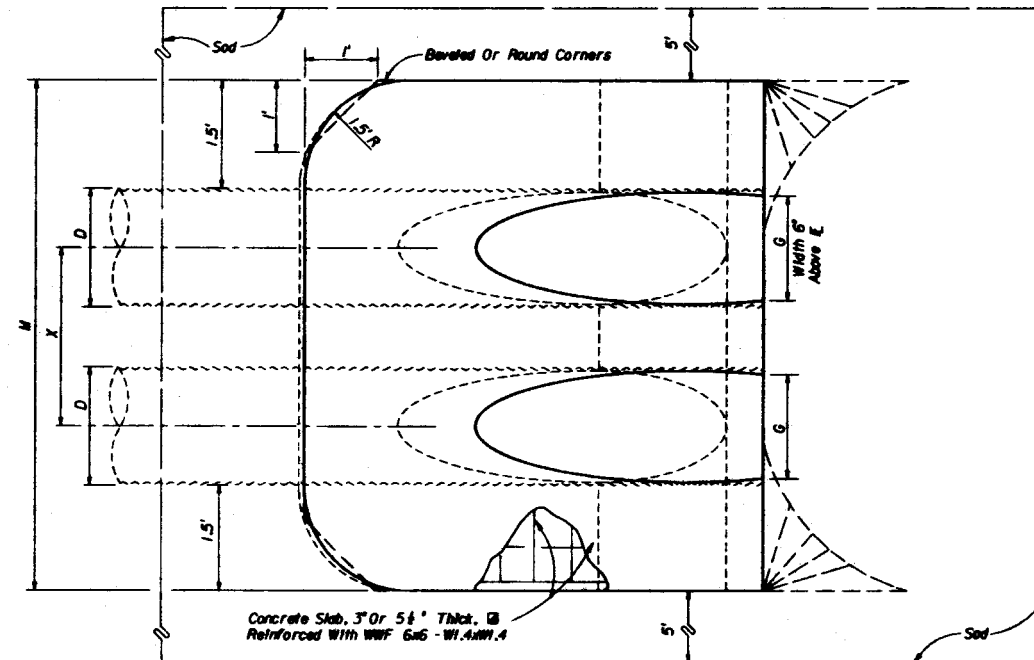
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CROSS DRAIN MITERED END SECTION SINGLE AND MULTIPLE ROUND CONCRETE PIPE			
Designed By	ECB	Checked By	ECB
Drawn By	ECB	Checked By	ECB
Scale	1" = 10'	Scale	1" = 10'
Project No.	77	Sheet No.	1 of 6
F.L.R.A. Approved	07/20/78	By	272

DIMENSIONS AND QUANTITIES																					
	D	X	A	B	C	E	F	G	M				N	3" CONCRETE SLAB (CY) @				SODDING (50. YDS.)			
									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
2 1/2 Slope	15"	2'-7"	2.5'	1.68'	4.18'	1.50'	5'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'	0.24	0.37	0.51	0.64	21	24	27	29
	18"	2'-10"	2.5'	2.24'	4.74'	2.00'	6'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'	0.26	0.43	0.61	0.78	22	25	28	31
	24"	3'-5"	2.5'	3.35'	5.85'	3.00'	7'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'	0.32	0.52	0.72	0.91	23	27	31	35
	30"	4'-3"	2.5'	4.41'	6.91'	4.00'	8'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'	0.38	0.64	0.91	1.18	25	30	35	39
	36"	5'-1"	2.5'	5.59'	8.09'	5.00'	9'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	0.44	0.78	1.13	1.48	27	33	38	44
	42"	6'-0"	2.5'	6.71'	9.21'	6.00'	10'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	0.51	0.96	1.41	1.87	29	36	42	49
	48"	6'-9"	2.5'	7.83'	10.33'	7.00'	11'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	0.57	1.09	1.63	2.15	31	38	46	53
	54"	7'-8"	2.5'	8.94'	11.44'	8.00'	12'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	0.65	1.32	1.99	2.66	33	41	50	58
	60"	8'-6"	2.5'	10.06'	12.56'	9.00'	13'	3.00'	8.08'	16.58'	25.08'	33.58'	1.04'	0.71	1.49	2.28	3.07	34	44	53	63
4 Slope	15"	2'-7"	2.5'	3.08'	5.59'	3.0'	7.0'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'	0.31	0.47	0.63	0.79	22	25	28	31
	18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'	0.34	0.53	0.71	0.90	24	27	30	33
	24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'	0.44	0.69	0.92	1.18	27	30	34	38
	30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'	0.53	0.88	1.25	1.60	29	34	39	44
	36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	0.62	1.07	1.53	2.00	32	38	44	49
	42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	0.71	1.30	1.92	2.52	35	42	48	55
	48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	0.80	1.54	2.29	3.02	38	46	53	60
	54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	0.91	1.83	2.74	3.62	41	49	58	66
	60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	8.08'	16.58'	25.08'	33.58'	1.04'	1.02	2.15	3.27	4.39	44	53	63	72

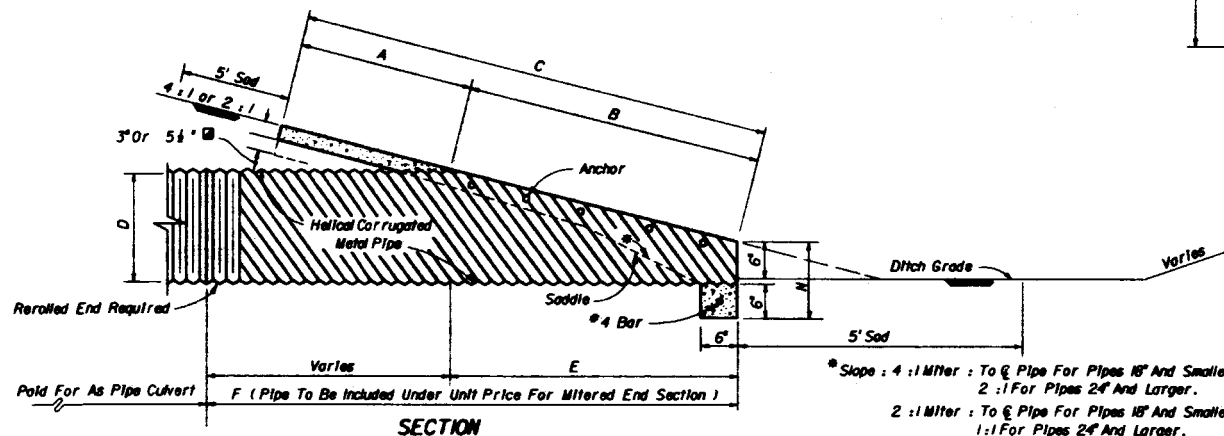
See General Note No. 3.
See Sheet 5 Of 6 For 5 1/2" Slab Quantities



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



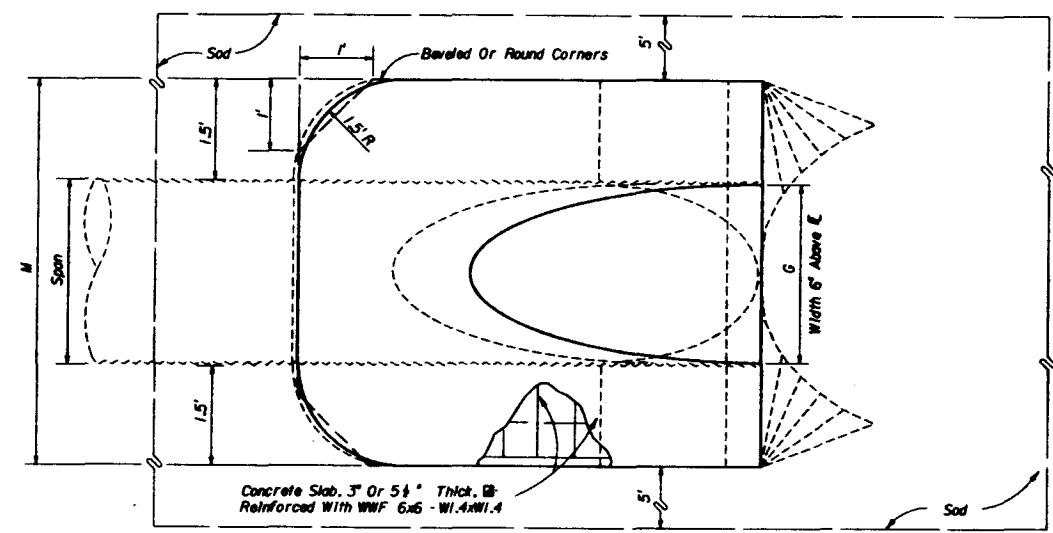
SECTION

NOTE: See Sheet 6 For Details And Notes.

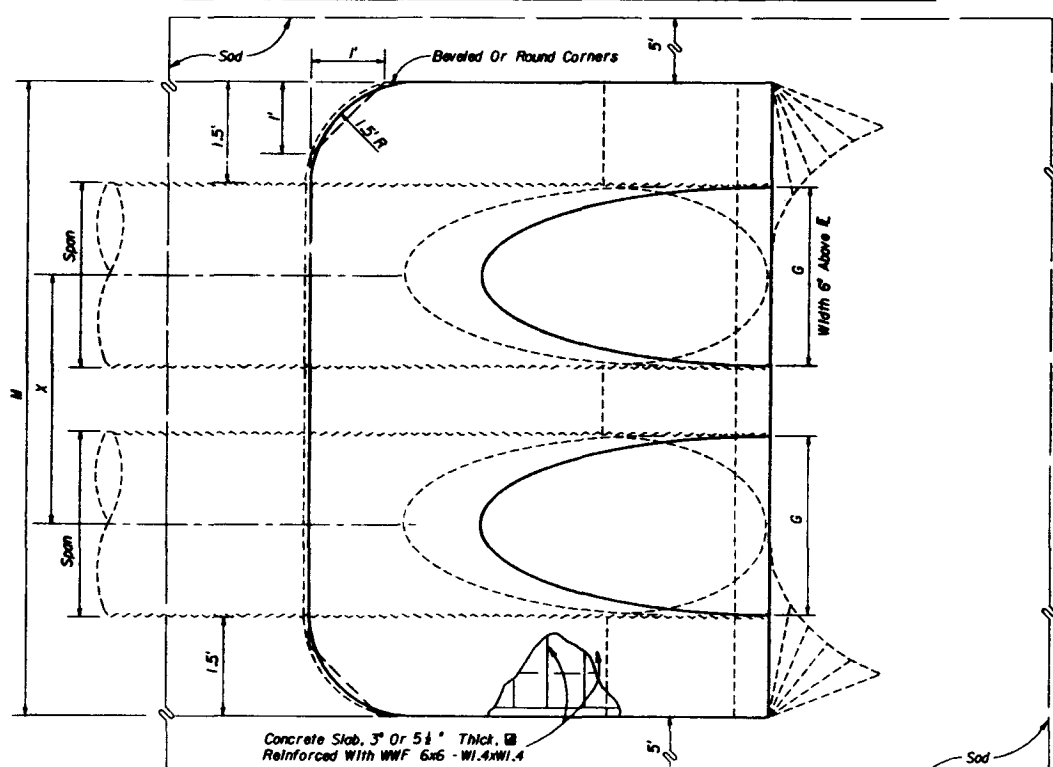
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CROSS DRAIN MITERED END SECTION			
SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE			
Designed By	DCB	05/78	Approved By <i>E. J. R. A.</i> State Bridge Engineer
Drawn By	MSB	05/78	
Checked By	MSB	05/78	Reviewed By
F.J.R.A. Approved	07/08/78	08	2 of 6
			272

1974 AASHTO			DIMENSIONS AND QUANTITIES																			
	SPAN	RISE	X	A	B	C	E	F	G	CONCRETE SLAB (CY.)				N	SODDING (SQ. YDS.)							
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe				
2 : 1 Slope	1'	13"	2'-6"	2.5'	1.30'	3.80'	1.17'	4'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'	0.33	0.49	0.65	0.81	21	23	26	29
	2'	15"	2'-10"	2.5'	1.68'	4.77'	1.50'	5'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'	0.33	0.50	0.67	0.83	22	25	28	31
	3'	20"	3'-5"	2.5'	2.61'	5.11'	2.33'	6'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'	0.37	0.62	0.76	0.95	23	27	30	34
	4'	24"	4'-0"	2.5'	3.35'	5.85'	3.00'	7'	2.55'	6.00'	10.00'	14.00'	18.00'	1.04'	0.40	0.62	0.84	1.07	24	29	33	38
	5'	28"	4'-9"	2.5'	4.29'	6.79'	3.83'	8'	2.99'	6.58'	11.33'	16.08'	20.83'	1.04'	0.43	0.70	0.98	1.25	25	31	37	42
	6'	33"	5'-6"	2.5'	5.03'	7.53'	4.50'	9'	3.34'	7.17'	12.67'	18.17'	23.67'	1.04'	0.49	0.82	1.15	1.48	26	34	40	46
	7'	38"	6'-4"	2.5'	5.96'	8.46'	5.33'	10'	3.65'	7.83'	14.17'	20.50'	26.83'	1.04'	0.55	0.95	1.35	1.75	27	36	44	51
	8'	43"	7'-1"	2.5'	6.89'	9.39'	6.17'	11'	3.89'	8.42'	15.50'	22.58'	29.67'	1.04'	0.62	1.10	1.57	2.05	31	39	47	55
	9'	47"	7'-10"	2.5'	7.64'	10.14'	6.83'	12'	4.14'	9.00'	16.83'	24.67'	32.50'	1.04'	0.69	1.24	1.80	2.35	33	41	50	59
4 : 1 Slope	1'	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'	0.38	0.56	0.74	0.92	22	25	27	30
	2'	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'	0.39	0.59	0.80	0.95	23	26	29	32
	3'	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'	0.43	0.64	0.88	1.10	24	28	32	36
	4'	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	10'	2.55'	6.00'	10.00'	14.00'	18.00'	1.04'	0.49	0.77	1.05	1.33	28	32	37	41
	5'	28"	4'-9"	2.5'	7.90'	10.40'	7.67'	11'	2.99'	6.58'	11.33'	16.08'	20.83'	1.04'	0.57	0.92	1.27	1.62	30	35	41	46
	6'	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	7.17'	12.67'	18.17'	23.67'	1.04'	0.65	1.08	1.50	1.93	32	38	45	51
	7'	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	7.83'	14.17'	20.50'	26.83'	1.04'	0.76	1.30	1.83	2.37	35	42	49	56
	8'	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	8.42'	15.50'	22.58'	29.67'	1.04'	0.87	1.55	2.18	2.83	38	45	53	61
	9'	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	9.00'	16.83'	24.67'	32.50'	1.04'	0.95	1.68	2.43	3.17	40	48	57	66

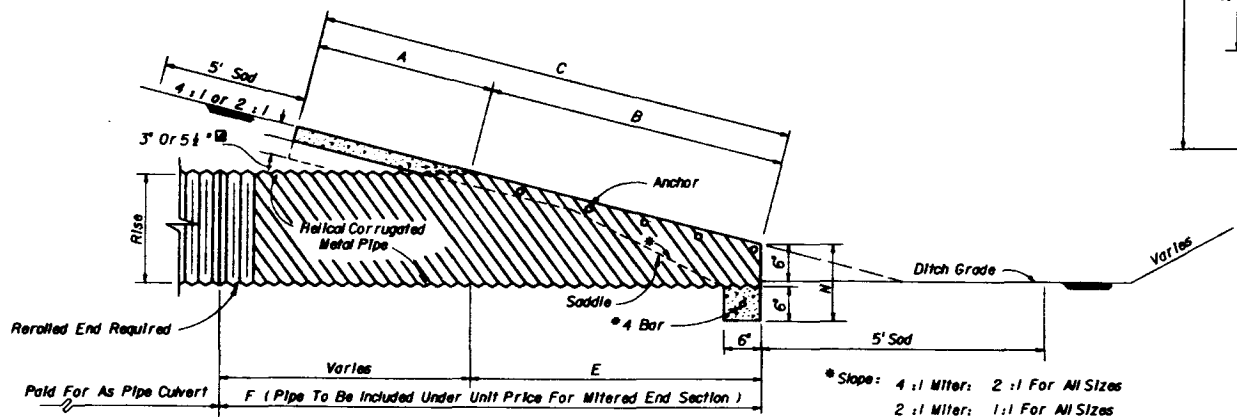
See General Note No. 3.
See Sheet 5 Of 6 For 5 1/2" Slab Quantities



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

* Slope: 4 : 1 Miter: 2 : 1 For All Sizes
2 : 1 Miter: 1 : 1 For All Sizes

NOTE: See Sheet 6 For Details And Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CROSS DRAIN MITERED END SECTION SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH			
Designed By DCB	Date 06/78	Approved By <i>[Signature]</i>	Index No. 272
Drawn By		Revision No.	Sheet No. 3 of 6
Checked By KMB	Date 06/78	F.H.W.A. Approved 07/28/78	

DIMENSIONS & QUANTITIES																						
	Rise R	Span S	X	A	B	C	E	F	G	M				N	3" CONC. SLAB (CY) □				SOODING (SQ. YDS.)			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe				
2 : 1 Slope	12"	18"	2'-0"	1.91	1.69	1.59	1.58	4'	1.50	4.38	7.75	10.58	13.42	1.31	0.79	0.45	0.51	23	26	29	32	
	14"	21"	2'-0"	2.01	1.76	1.65	1.65	5'	1.50	5.38	8.71	12.04	15.38	1.31	0.79	0.45	0.51	24	28	31	34	
	16"	24"	2'-0"	2.11	1.83	1.72	1.72	6'	1.50	6.38	9.64	13.42	16.79	1.31	0.79	0.45	0.51	25	29	32	35	
	18"	27"	2'-0"	2.20	1.90	1.79	1.79	7'	1.50	7.38	10.58	14.42	18.19	1.31	0.79	0.45	0.51	26	30	33	36	
	20"	30"	2'-0"	2.29	1.97	1.86	1.86	8'	1.50	8.38	11.51	15.38	19.58	1.31	0.79	0.45	0.51	27	31	34	37	
	22"	33"	2'-0"	2.38	2.04	1.93	1.93	9'	1.50	9.38	12.42	16.79	20.98	1.31	0.79	0.45	0.51	28	32	35	38	
	24"	36"	2'-0"	2.47	2.11	2.00	2.00	10'	1.50	10.38	13.42	18.19	22.38	1.31	0.79	0.45	0.51	29	33	36	39	
	26"	39"	2'-0"	2.56	2.18	2.07	2.07	11'	1.50	11.38	14.42	19.58	23.79	1.31	0.79	0.45	0.51	30	34	37	40	
	28"	42"	2'-0"	2.65	2.25	2.14	2.14	12'	1.50	12.38	15.38	20.98	25.19	1.31	0.79	0.45	0.51	31	35	38	41	
	30"	45"	2'-0"	2.74	2.32	2.21	2.21	13'	1.50	13.38	16.79	22.38	26.58	1.31	0.79	0.45	0.51	32	36	39	42	
4 : 1 Slope	12"	18"	2'-0"	2.36	2.36	2.36	3.04	5'	1.50	4.38	7.75	10.58	13.42	1.31	0.79	0.45	0.76	23	26	29	32	
	14"	21"	2'-0"	2.44	2.44	2.44	3.19	6'	1.50	5.38	8.71	12.04	15.38	1.31	0.79	0.45	0.76	24	28	31	34	
	16"	24"	2'-0"	2.56	2.56	2.56	3.36	8'	1.50	6.38	10.04	14.04	18.04	1.31	0.79	0.45	0.76	25	30	33	36	
	18"	27"	2'-0"	2.70	2.70	2.70	3.54	10'	1.50	7.38	11.79	16.14	20.14	1.31	0.79	0.45	0.76	26	32	35	38	
	20"	30"	2'-0"	2.85	2.85	2.85	3.73	12'	1.50	8.38	13.42	18.14	22.14	1.31	0.79	0.45	0.76	27	34	37	40	
	22"	33"	2'-0"	3.02	3.02	3.02	3.93	14'	1.50	9.38	15.38	20.14	24.14	1.31	0.79	0.45	0.76	28	36	39	42	
	24"	36"	2'-0"	3.20	3.20	3.20	4.14	16'	1.50	10.38	17.71	22.14	26.14	1.31	0.79	0.45	0.76	29	38	41	44	
	26"	39"	2'-0"	3.39	3.39	3.39	4.36	18'	1.50	11.38	19.58	24.14	28.14	1.31	0.79	0.45	0.76	30	40	43	46	
	28"	42"	2'-0"	3.59	3.59	3.59	4.59	20'	1.50	12.38	21.42	26.14	30.14	1.31	0.79	0.45	0.76	31	42	45	48	
	30"	45"	2'-0"	3.80	3.80	3.80	4.83	22'	1.50	13.38	23.31	28.14	32.14	1.31	0.79	0.45	0.76	32	44	47	50	

QUANTITIES FOR 5½" THICK CONCRETE SLABS (CY)

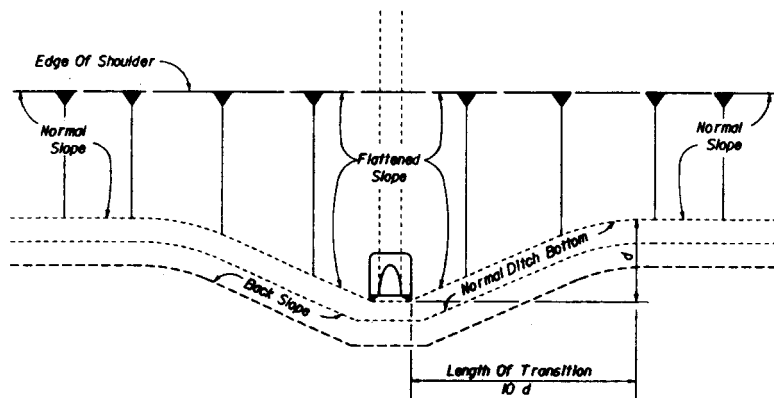
	D	ROUND - CONCRETE			
		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
2 : 1 Slope	15'	0.38	0.58	0.77	0.96
	18'	0.44	0.65	0.87	1.09
	24'	0.54	0.83	1.12	1.42
	30'	0.66	1.09	1.50	1.91
	36'	0.81	1.38	1.95	2.51
	42'	0.97	1.70	2.45	3.19
	48'	1.13	2.04	2.93	3.84
	54'	1.31	2.44	3.58	4.72
	60'	1.51	2.89	4.28	5.68
	66'	1.68	3.25	4.84	6.43
4 : 1 Slope	15'	0.57	0.87	1.15	1.44
	18'	0.66	0.99	1.31	1.65
	24'	0.85	1.30	1.75	2.20
	30'	1.10	1.74	2.39	3.05
	36'	1.32	2.21	3.08	3.96
	42'	1.58	2.76	3.91	5.09
	48'	1.85	3.30	4.73	6.17
	54'	2.14	3.95	5.77	7.58
	60'	2.45	4.66	6.87	9.07
	66'	2.88	5.54	8.18	10.84
	72'	3.18	6.27	9.36	12.45

	D	ROUND - CMP			
		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
2 : 1 Slope	15'	0.35	0.54	0.74	0.94
	18'	0.38	0.62	0.87	1.12
	24'	0.47	0.76	1.05	1.34
	30'	0.57	0.96	1.37	1.77
	36'	0.67	1.19	1.72	2.26
	42'	0.78	1.48	2.17	2.87
	48'	0.89	1.71	2.54	3.36
	54'	1.02	2.06	3.10	4.14
	60'	1.14	2.38	3.63	4.89
4 : 1 Slope	15'	0.44	0.68	0.91	1.15
	18'	0.49	0.77	1.03	1.31
	24'	0.65	1.09	1.38	1.77
	30'	0.81	1.34	1.90	2.44
	36'	0.97	1.68	2.41	3.14
	42'	1.13	2.08	3.06	4.02
	48'	1.29	2.49	3.69	4.88
	54'	1.48	2.98	4.47	5.98
	60'	1.66	3.49	5.31	7.13

	Span	Rise	CMP - ARCH			
			Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
2 : 1 Slope	17'	13'	0.41	0.61	0.81	1.02
	21'	15'	0.43	0.66	0.88	1.10
	28'	20'	0.51	0.78	1.06	1.33
	35'	24'	0.57	0.90	1.22	1.55
	42'	29'	0.64	1.04	1.46	1.87
	49'	33'	0.73	1.23	1.72	2.22
	57'	38'	0.83	1.44	2.04	2.64
	64'	43'	0.95	1.67	2.39	3.11
	71'	47'	1.05	1.89	2.74	3.57
4 : 1 Slope	17'	13'	0.48	0.71	0.95	1.18
	21'	15'	0.52	0.80	1.09	1.31
	28'	20'	0.61	0.92	1.27	1.59
	35'	24'	0.73	1.14	1.55	1.97
	42'	29'	0.87	1.39	1.92	2.45
	49'	33'	1.00	1.66	2.30	2.96
	57'	38'	1.18	2.00	2.82	3.64
	64'	43'	1.36	2.39	3.38	4.38
	71'	47'	1.50	2.65	3.81	4.97

	Rise	Span	ELLIPTICAL - CONCRETE			
			Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
2 : 1 Slope	12'	18'	0.30	0.49	0.67	0.85
	14'	23'	0.37	0.59	0.81	1.02
	19'	30'	0.50	0.80	1.09	1.39
	24'	38'	0.62	1.03	1.45	1.86
	29'	45'	0.75	1.30	1.84	2.39
	34'	53'	0.90	1.61	2.32	3.03
	38'	60'	1.03	1.89	2.74	3.60
	43'	68'	1.19	2.26	3.33	4.40
	48'	76'	1.38	2.65	3.93	5.21
	53'	83'	1.55	3.03	4.50	5.96
4 : 1 Slope	58'	91'	1.75	3.47	5.20	6.93
	12'	18'	0.45	0.68	0.92	1.14
	14'	23'	0.53	0.83	1.13	1.42
	19'	30'	0.74	1.15	1.57	1.98
	24'	38'	0.97	1.57	2.19	2.81
	29'	45'	1.22	2.07	2.92	3.77
	34'	53'	1.48	2.62	3.77	4.92
	38'	60'	1.72	3.12	4.53	5.92
	43'	68'	2.02	3.78	5.56	7.32
	48'	76'	2.34	4.49	6.64	8.79
	53'	83'	2.66	5.17	7.66	10.16
	58'	91'	3.02	5.98	8.95	11.90

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CROSS DRAIN MITERED END SECTION					
Designed By	Drawn By	Checked By	Approved By	Date	
ddr	ddr	ddr	<i>[Signature]</i>	05/98	
05/98	05/98	05/98	05/98	05/98	05/98
F.J.R.A. Approved			8/17/98	5 of 6	272

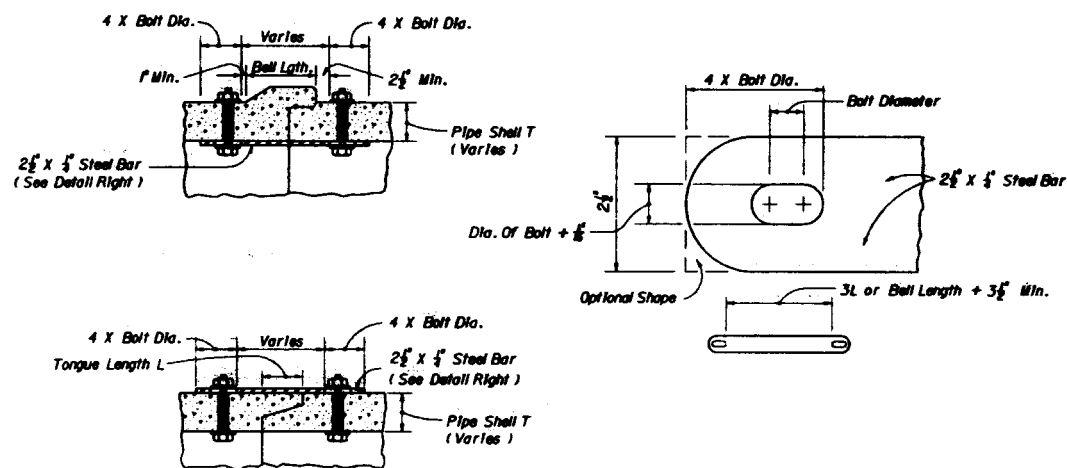


PLAN

SLOPE AND DITCH TRANSITIONS

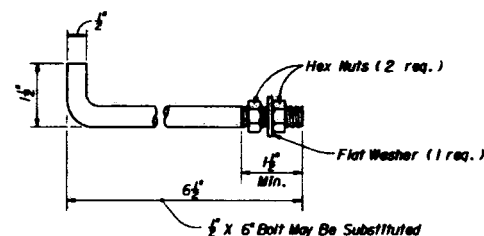
GENERAL NOTES

1. Mitered end sections shall be paid for as mitered end section, each, based on each independent pipe end.
2. The cost of all pipe (s), fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets, and coupling bands shall be included in the contract unit prices for mitered end section, each. Sodding not included.
3. The reinforced concrete slab shall be constructed for all sizes of cross drain pipe and cast in place with Class I concrete. Slabs shall be 5 1/2" thick unless 3" thickness called for in plans.
4. Concrete pipe used in the assembly of mitered end sections shall be selective lengths to avoid excessive connections.
5. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
6. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
7. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of cross drain pipe; corrugated steel pipe mitered end sections may be used with any type of cross drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of cross drain pipe except steel pipe. When bituminous coated metal pipe is specified for cross drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe.
8. When the mitered end section pipe is dissimilar to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 280.
9. When existing multiple cross drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each based on each independent pipe end.
10. Mitered end sections for pipe sizes 15", 18" and 24" round or equivalent pipe arch or elliptical pipe are permitted within the clear zone. When the slope intersection permits, the mitered end section may be located with the culvert opening as close as 8' beyond the outside edge of the shoulder.
11. Slope and ditch transitions shall be used when the normal roadway slope must be flattened to place end section outside clear zone. See detail left.



All bars, bolts, nuts and washers are to be galvanized steel.
Bolts diameters shall be 3/8" for 15" to 36" pipe and 1/2" for 42" to 72" pipe.
Two connectors required per joint, located 60° right and left of bottom center of pipe.
Bolt holes in pipe shell are to be drilled.

CONCRETE PIPE CONNECTOR



Anchors required for CMP only.

Anchor, washer and nuts to be galvanized steel.

Bend anchor where required to center in concrete slab. Damaged surfaces to be repaired after bending. Anchors are to be spaced a distance equal to four (4) corrugations. Place the anchors in the outside crest of corrugation.

Flat washers to be placed on inside wall of pipe.

Holes in the mitered end pipe are to be drilled or punched; burning not permitted.

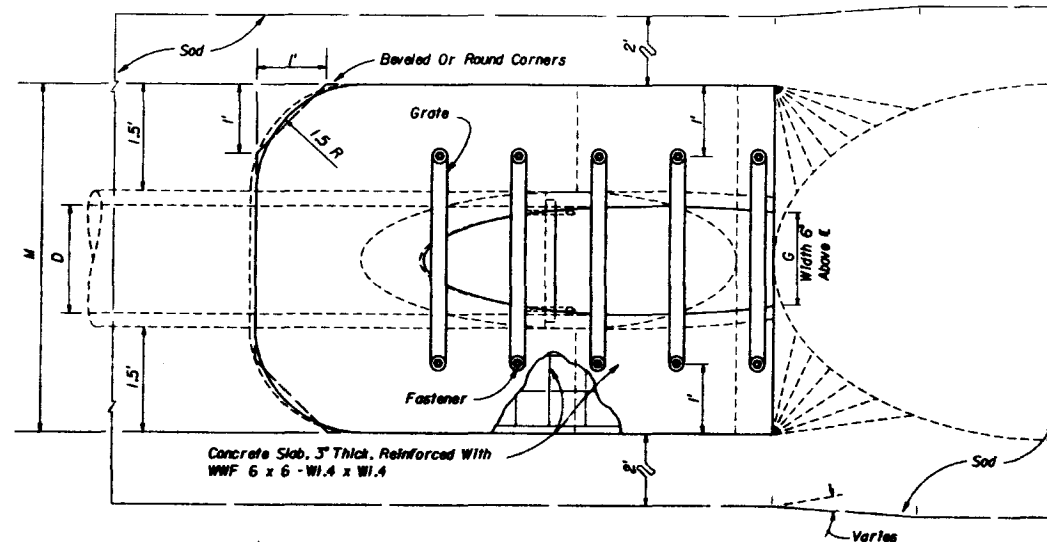
ANCHOR DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CROSS DRAIN MITERED END SECTION SPECIAL DETAILS AND NOTES					
Designed By	DCB	Date	05/78	Approved By	<i>John B. Smith</i>
Drawn By				Scale: 1/2" = 1'-0"	
Checked By	ABH	05/78	Revision No.	Sheet No.	Index No.
F.J.M.A. Approved: 07/25/78			08	6 of 6	272

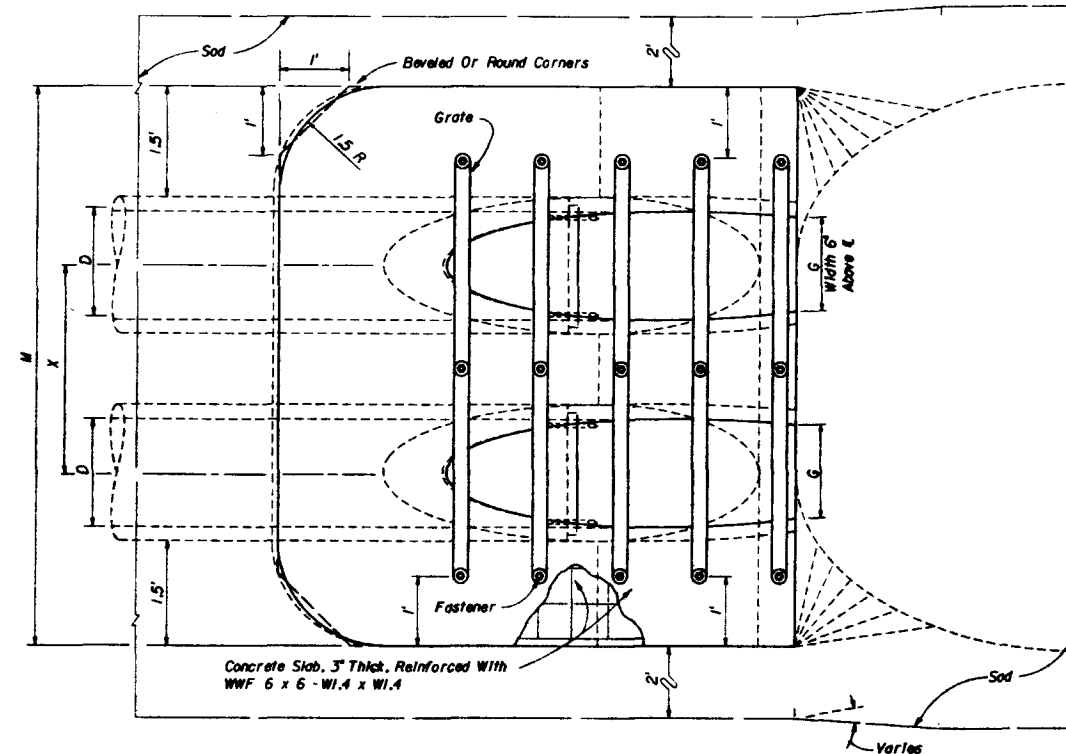
DIMENSIONS & QUANTITIES

D	X	A	B	C	E	F	G	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
								Single Pipe	Double Pipe	Triple Pipe	Quad Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad Pipe
15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.63'	7.21'	9.29'	12.37'	1.19'			0.40	0.61	0.80	1.00	9	11	12	14
18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.92'	7.75'	10.58'	13.42'	1.21'			0.47	0.69	0.91	1.14	10	11	13	15
24"	3'-5"	2.53'	7.18'	9.71'	7.03'	11'	1.73'	5.50'	8.92'	12.33'	15.75'	1.25'			0.60	0.90	1.21	1.52	11	13	16	18
30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	6.08'	10.33'	14.58'	18.83'	1.29'	2 1/2"	3"	0.76	1.19	1.63	2.07	12	15	18	21
36"	5'-1"	2.87'	11.31'	14.18'	11.03'	15'	2.24'	6.67'	11.75'	16.83'	21.92'	1.33'	2 1/2"	3"	0.89	1.48	2.05	2.63	14	17	21	24
42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	7.25'	13.25'	19.25'	25.25'	1.38'	2 1/2"	3"	1.05	1.82	2.57	3.34	15	19	23	27
48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	7.83'	14.58'	21.33'	28.08'	1.42'	2 1/2"	3"	1.21	2.15	3.07	4.00	16	21	27	30
54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	8.42'	16.08'	23.75'	31.42'	1.46'	3"	4"	1.39	2.55	3.72	4.88	18	23	28	33
60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	9.00'	17.50'	26.00'	34.50'	1.50'	3"	4"	1.59	3.02	4.44	5.86	19	25	31	36

Δ 6.42' Δ 6.25' Dimensions permitted to allow use of 8' standard pipe lengths.
 ◇ 10.40' ◇ 10.10' Dimensions permitted to allow use of 12' standard pipe lengths.
 Δ ◇ Concrete slab shall be deepened to form bridge across crown of pipe. See section below.

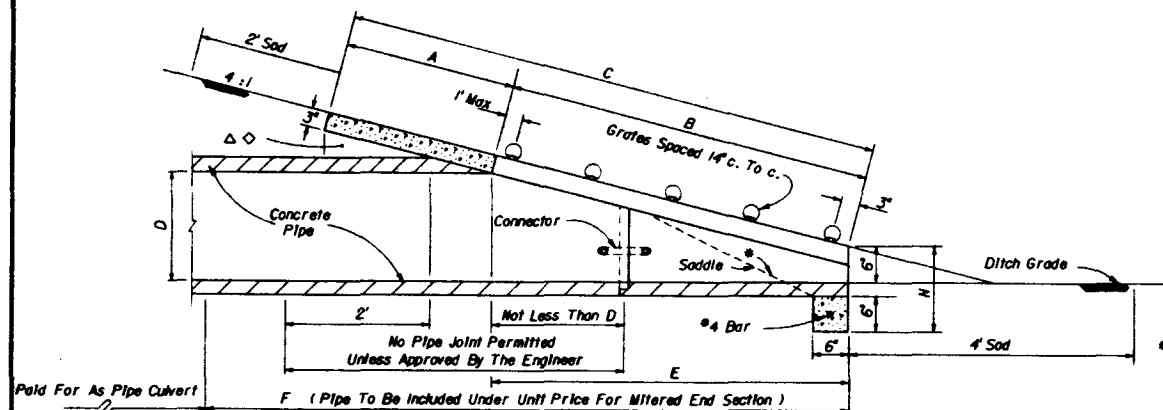


TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE

Note:
 See Sheet 5 for details and 6 for notes.



SECTION

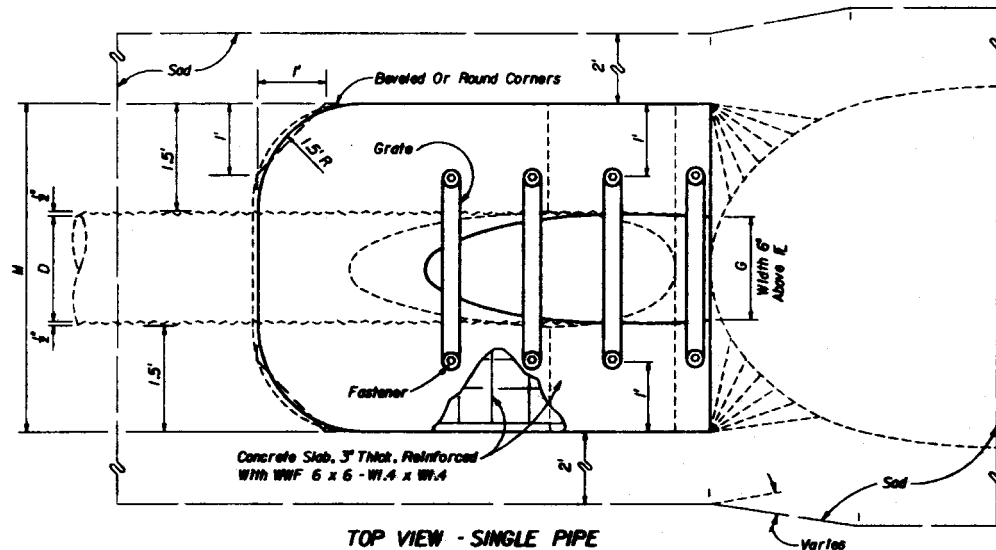
* Slope:
 To 6 Pipe For Pipes 18" And Smaller
 2:1 For Pipes 24" And Larger.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SIDE DRAIN MITERED END SECTION SINGLE AND MULTIPLE ROUND CONCRETE PIPE					
Designed By	ESR	Date	05/78	Approved By	<i>[Signature]</i>
Drawn By	HDI	Date	05/78	Reviewed By	<i>[Signature]</i>
Checked By	JAC	Date	05/78	Reviewed By	<i>[Signature]</i>
F.A.R.A. Approved	05/28/77	86	1 of 6	273	

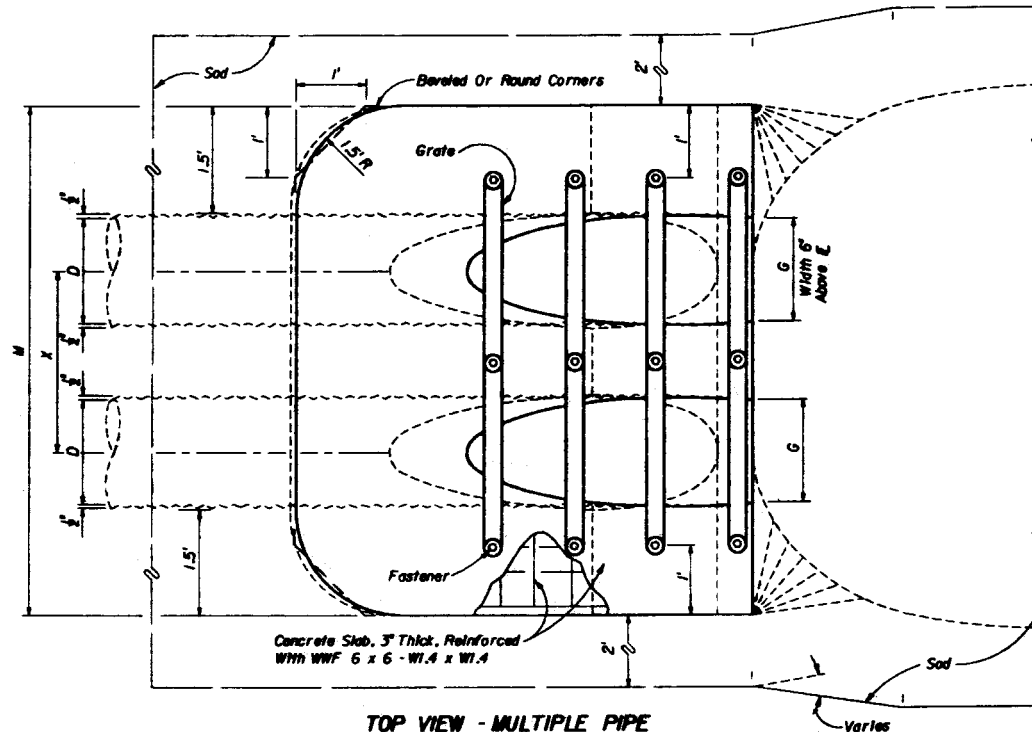
DIMENSIONS & QUANTITIES

D	X	A	B	C	E	F	G	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
								Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
8"	2'-0"	2.5'	0.72'	3.22'	0.7'	4.0'	0.58'	3.75'	5.75'	7.75'	9.75'	1.04'			0.16	0.25	0.34	0.43	7	8	9	11
10"	2'-2"	2.5'	1.34'	3.84'	1.3'	5.0'	0.81'	3.92'	6.08'	8.25'	10.41'	1.04'			0.19	0.30	0.40	0.52	7	9	10	11
12"	2'-4"	2.5'	2.06'	4.56'	2.0'	6.0'	1.00'	4.08'	6.42'	8.75'	11.08'	1.04'			0.22	0.36	0.49	0.63	7	9	11	12
15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4.33'	6.92'	9.50'	12.08'	1.04'			0.31	0.47	0.63	0.79	8	10	12	14
18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.58'	7.42'	10.25'	13.08'	1.04'			0.34	0.53	0.71	0.90	9	11	13	15
24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	5.08'	8.50'	11.92'	15.33'	1.04'			0.44	0.69	0.92	1.18	10	13	15	17
30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	5.58'	9.83'	14.08'	18.33'	1.04'	2 1/2"	3"	0.53	0.88	1.25	1.60	11	14	17	20
36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	6.08'	11.17'	16.25'	21.33'	1.04'	2 1/2"	3"	0.62	1.07	1.53	2.00	13	16	20	23
42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	6.58'	12.58'	18.58'	24.58'	1.04'	2 1/2"	3 1/4"	0.70	1.30	1.92	2.52	14	18	22	26
48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	7.08'	13.83'	20.58'	27.33'	1.04'	2 1/2"	3 1/4"	0.80	1.54	2.29	3.02	15	20	24	29
54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	7.58'	15.25'	22.92'	30.58'	1.04'	3"	4"	0.90	1.83	2.74	3.67	16	22	27	32
60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	8.08'	16.58'	25.08'	33.58'	1.04'	3"	4"	1.02	2.15	3.27	4.39	18	23	29	35

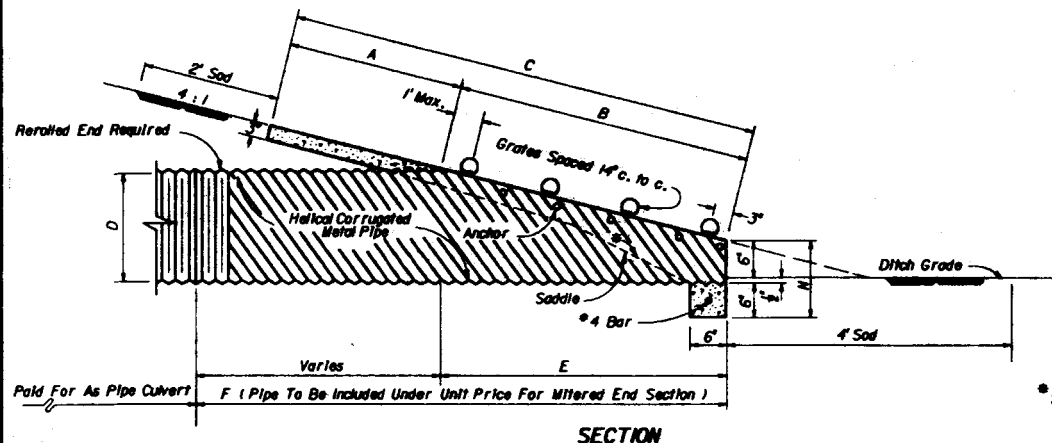
REMARKS
These sizes are restricted to inlet and outlet treatment for water management systems or similar applications.



TOP VIEW - SINGLE PIPE



TOP VIEW - MULTIPLE PIPE



SECTION

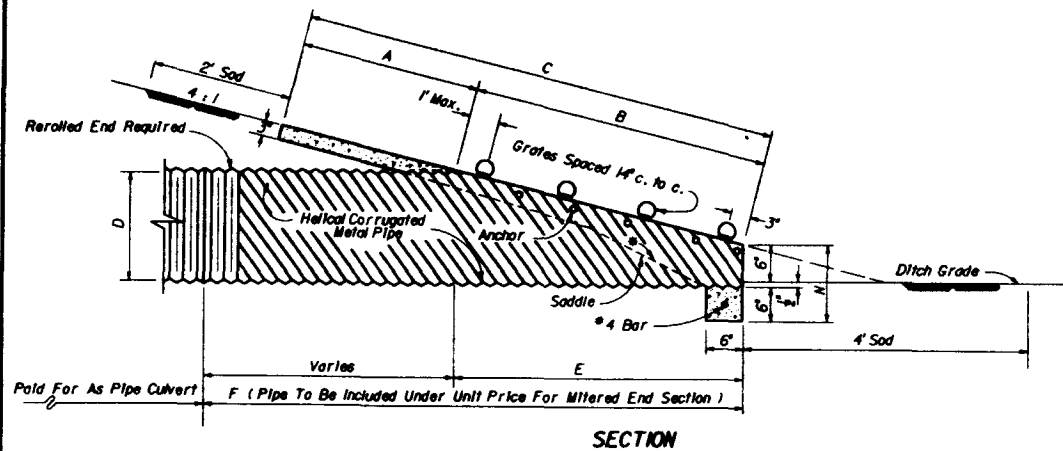
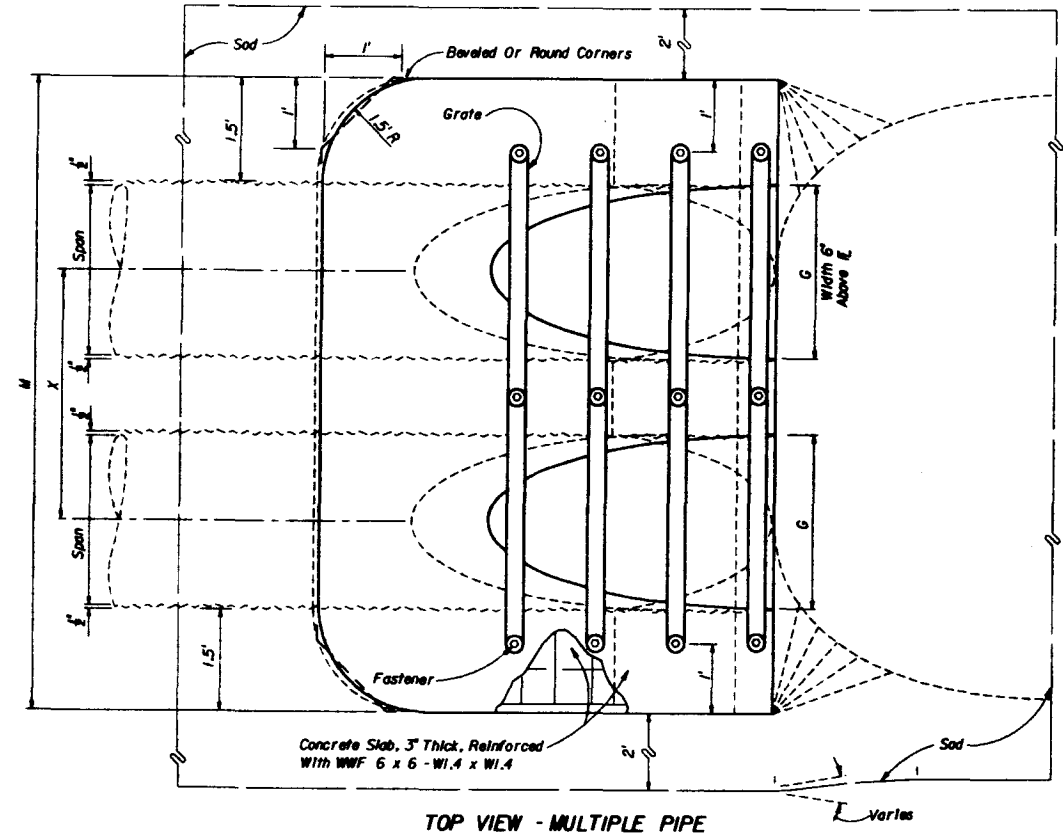
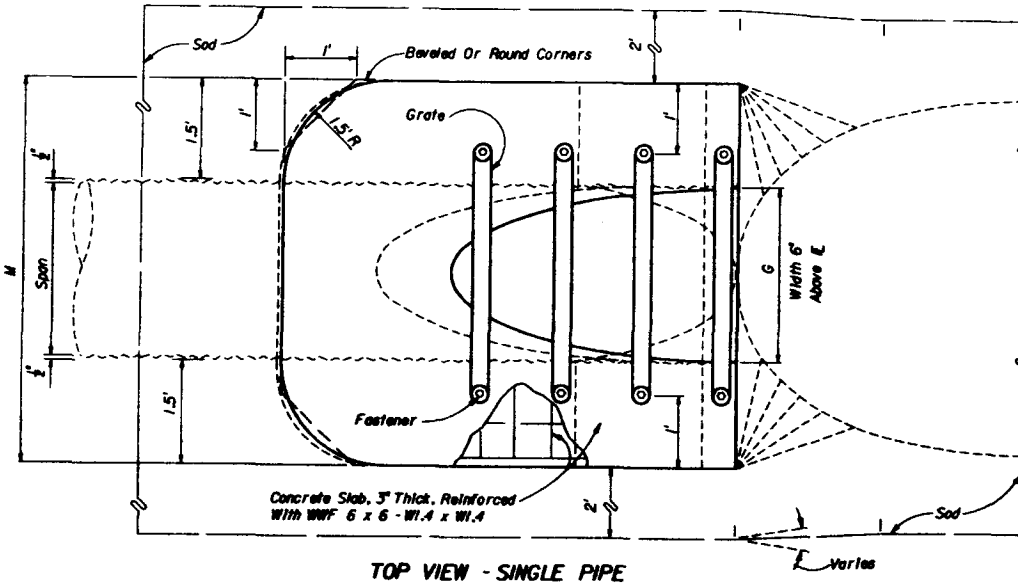
Note: See Sheet 5 for details and Sheet 6 for notes.

* Slope:
To 6 Pipe For Pipe 18" And Smaller
2 : 1 For Pipe 24" And Larger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SIDE DRAIN MITERED END SECTION			
SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE			
Designed By	ENR	Date	08/77
Drawn By	ROH	Date	08/77
Checked By	JMB	Date	08/77
Approved By	[Signature]		
Revision No.	00	Sheet No.	2 of 6
F.H.W.A. Approved	02/28/77	00	273

DIMENSIONS & QUANTITIES

1974 AASHTO		X	A	B	C	E	F	G	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
Span	Rise								Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
17"	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.50'	7.00'	9.50'	12.00'	1.04'			.28	.42	.56	.70	8	10	11	13
21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	4.83'	7.67'	10.50'	13.33'	1.04'			.32	.49	.66	.78	9	11	12	14
28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	5.42'	8.83'	12.25'	15.67'	1.04'			.40	.60	.82	1.03	10	12	14	17
35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	6.00'	10.00'	14.00'	18.00'	1.04'	2 1/2"	3"	.49	.77	1.05	1.33	11	14	16	19
42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	6.58'	11.33'	16.08'	20.83'	1.04'	2 1/2"	3 1/2"	.57	.92	1.27	1.62	12	15	18	21
49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	7.17'	12.67'	18.17'	23.67'	1.04'	2 1/2"	3 1/2"	.65	1.08	1.50	1.93	13	17	20	24
57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	7.83'	14.17'	20.50'	26.83'	1.04'	3"	4"	.76	1.30	1.83	2.37	14	18	23	27
64"	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	8.42'	15.50'	22.58'	29.67'	1.04'	3"	4"	.87	1.55	2.18	2.83	15	20	25	30
71"	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	9.00'	16.83'	24.67'	32.50'	1.04'	3"	4"	.95	1.68	2.43	3.17	16	22	27	32



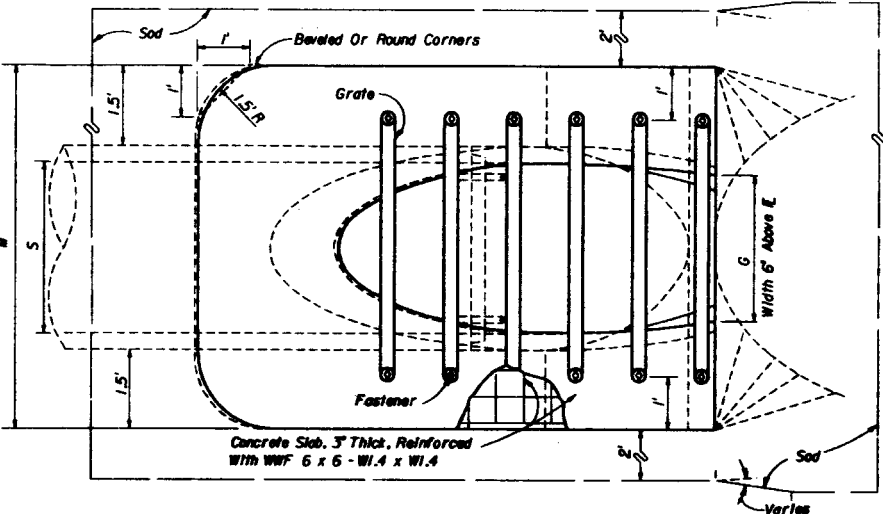
Note: See Sheet 5 for details and Sheet 6 for notes.

* Slope :
To Span Line For Pipe Arch 28" X 20" And Smaller
2 : 1 For Pipe Arch 35" X 24" And Larger

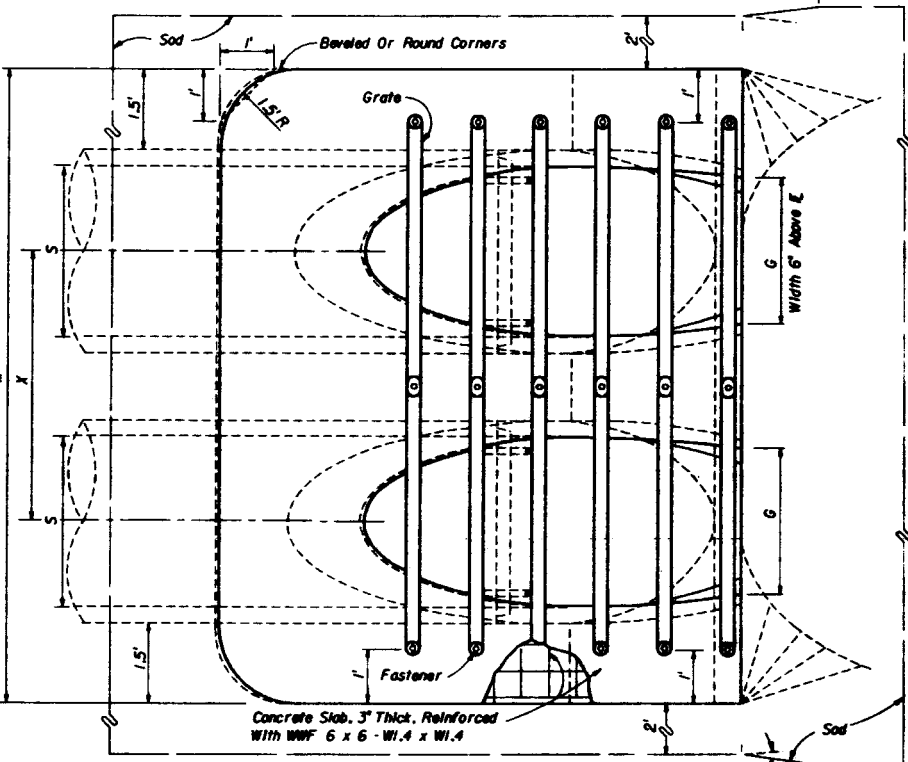
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SIDE DRAIN MITERED END SECTION			
SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH			
Designed By	EGH	08/77	Approved By
Drawn By	MDH	08/77	Checked By
Checked By	JAG	08/77	Revised By
F.J.M.A. Approved	10/28/77	08	3 of 6
			273

DIMENSIONS & QUANTITIES

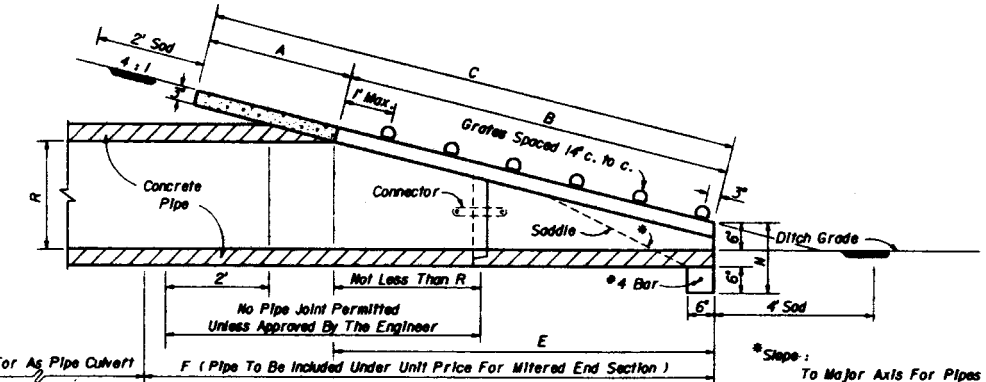
Rise R	Span S	X	A	B	C	E	F	G	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
12"	18"	2'-10"	2.36'	3.06'	5.42'	3.03'	5'	1.50'	4.92'	7.75'	10.58'	13.42'	1.21'			0.30	0.45	0.61	0.76	9	11	12	14
14"	23"	3'-4"	2.44'	3.75'	6.19'	3.70'	6'	1.90'	5.38'	8.71'	12.04'	15.38'	1.23'			0.36	0.56	0.76	0.95	9	12	14	16
18"	30"	4'-0"	2.62'	5.47'	8.09'	5.36'	8'	2.37'	6.04'	10.04'	14.04'	18.04'	1.27'	2 1/2"	3"	0.51	0.79	1.08	1.36	11	13	16	19
24"	38"	5'-0"	2.79'	7.18'	9.97'	7.03'	10'	2.85'	6.79'	11.79'	16.79'	21.79'	1.31'	2 1/2"	3"	0.68	1.00	1.53	1.96	12	15	19	22
29"	45"	5'-11"	3.05'	8.90'	11.95'	8.70'	12'	3.19'	7.50'	13.42'	19.33'	25.25'	1.38'	2 1/2"	3 1/4"	0.86	1.45	2.04	2.63	13	17	21	25
34"	53"	7'-0"	3.22'	10.62'	13.84'	10.36'	13'	3.57'	8.25'	15.25'	22.25'	29.25'	1.42'	3"	3 1/2"	1.02	1.81	2.60	3.39	15	19	24	29
38"	60"	7'-10"	3.39'	11.99'	15.38'	11.70'	15'	3.95'	8.92'	16.75'	24.58'	32.42'	1.46'	3"	4"	1.18	2.14	3.10	4.05	16	21	26	31
43"	68"	8'-11"	3.56'	13.71'	17.27'	13.36'	17'	4.28'	9.67'	18.58'	27.50'	36.42'	1.50'	3"	4"	1.38	2.58	3.79	4.99	17	23	29	35
48"	76"	9'-11"	3.73'	15.43'	19.16'	15.03'	19'	4.59'	10.42'	20.33'	30.25'	40.17'	1.54'	Special	Special	1.59	3.05	4.51	5.97	18	25	32	38
53"	83"	10'-8"	3.91'	17.15'	21.06'	16.70'	20'	4.77'	11.08'	21.75'	32.42'	43.08'	1.58'	Special	Special	1.80	3.50	5.19	6.88	20	27	34	41
58"	91"	11'-8"	4.08'	18.87'	22.95'	18.36'	22'	5.01'	11.83'	23.50'	35.17'	46.83'	1.63'	Special	Special	2.04	4.04	6.05	8.05	21	29	37	44



TOP VIEW - SINGLE PIPE



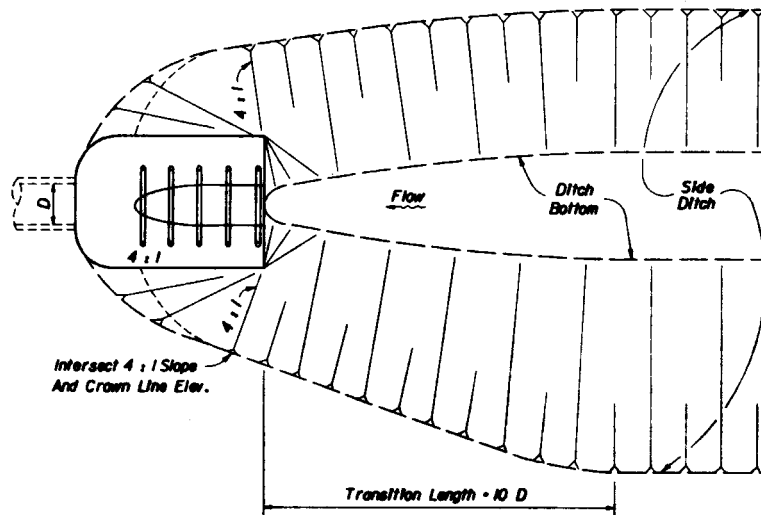
TOP VIEW - MULTIPLE PIPE



SECTION

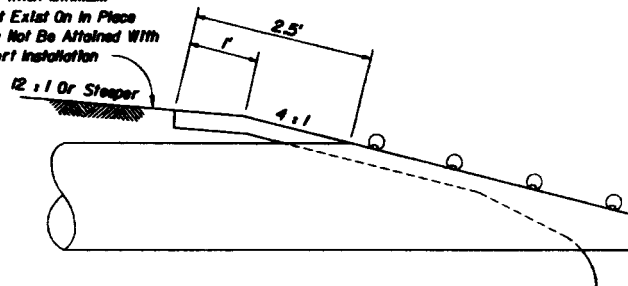
Note: See Sheet 5 for details and Sheet 6 for notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SIDE DRAIN MITERED END SECTION SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE			
Designed By	ESR	Date	05/18
Drawn By	HSD	Date	05/18
Checked By	JHL/JSB	Date	05/18
F.A.B.A. Approved	02/08/18	Sheet No.	86
Approved By	[Signature]		Index No.
4 of 6		273	



PLAN
DITCH TRANSITION

Modified Slope When Minimum
Cover Does Not Exist On In Place
Culvert Or Can Not Be Attained With
Proposed Culvert Installation



PERMISSIBLE PAVEMENT MODIFICATION
FOR CLASS I TURNOUTS

GENERAL NOTES

1. Mitered end sections shall be paid for as mitered end section, each, based on each independent pipe end.
2. The cost of all pipe (s), grates, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bands shall be included in the contract unit price for mitered end section, each. Sodding not included.
3. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cast in place with Class I concrete.
4. Round pipe size 30" or greater, pipe - arch size 35" X 24" or greater and elliptical pipe 19" X 30" or greater shall be grouted unless excepted in the plans. Smaller sizes of pipe shall be grouted only when called for in plans. The lower grate on trailing downstream ends on divided highways shall be omitted.
5. Grates are to be fabricated from steel ASTM A 53, Grade B, pipe. The lower grate on all traffic approach ends shall be Schedule 80 and all remaining grates shall be Schedule 40.
Grates subject to salt free and corrosive free environment may be fabricated from galvanized pipe, with base metal exposed during fabrication repaired as specified in Section 562, Standard Specifications (or, fabricated from black pipe and hot dipped galvanized after fabrication in accordance with ASTM A 123. Grates subject to salt water or highly corrosive environment shall be hot dipped galvanized after fabrication in accordance with ASTM A 123.
6. Concrete pipe used in the assembly of mitered end sections shall be of selective lengths to avoid excessive connections.
7. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
8. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
9. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of side drain pipe; corrugated steel pipe mitered end sections may be used with any type of side drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of side drain pipe except steel pipe. When bituminous coated metal pipe is specified for side drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe. When the mitered end section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Index No. 280.
10. Corrugated polyethylene pipe (CPE) for side drain application of 15", 18" or 24" diameter shall utilize either corrugated metal or concrete mitered end sections. When used in conjunction with corrugated metal mitered end sections, connection shall be by either a formed metal band specifically designated to join CPE pipe and metal pipe or other coupler approved by the State Drainage Engineer. When used in conjunction with a concrete mitered end section, connection shall be by concrete jacket constructed in accordance with Index No. 280.
11. When existing multiple side drain pipes are spaced other than the dimensions shown in this detail, or have non - parallel axes, or have non - uniform sections, the mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each, based on each independent pipe end.
12. In addition to the requirements of Section 430 - 4, side drain culverts shall comply with the bedding and backfill requirements shown on Index No. 280.
13. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.
14. The project engineer shall contact the District Drainage Engineer for possible alternate treatment prior to constructing side drain mitered end sections where a minimum spacing of 30' will not result between the toe points of the mitered end sections.

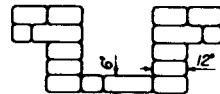
DESIGN NOTES

1. In critical hydraulic locations, grates shall not be used until potential debris transport has been evaluated by the drainage engineer and appropriate adjustments made. Ditch grades in excess of 3% or pipe with less than 1.5' of cover and grades in excess of 1% will require such an evaluation (General Note 4).
2. The design engineer shall determine highly corrosive locations and specify in the plans when the grates shall be hot - dipped galvanized after fabrication (General Note 5).
3. The design engineer shall determine and designate in the plans which alternate types of mitered end section will not be permitted. The restriction shall be based on corrosive or structural requirements.

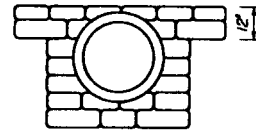
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SIDE DRAIN MITERED END SECTION NOTES & INFORMATION					
Designed By	EDR	Date	08/77	Approved By	<i>[Signature]</i>
Drawn By	MSH	Date	08/77	Checked By	JMK
Reviewed By	JMK	Date	08/77	Revision No.	00
F.H.B.A. Approved	10/21/77	66	6 of 6	Index No.	273



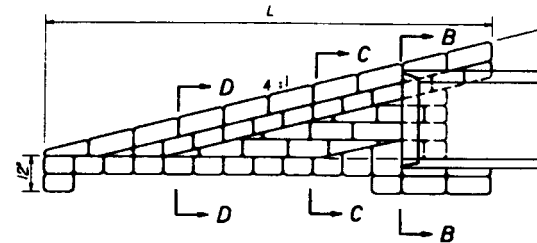
SECTION DD



SECTION CC

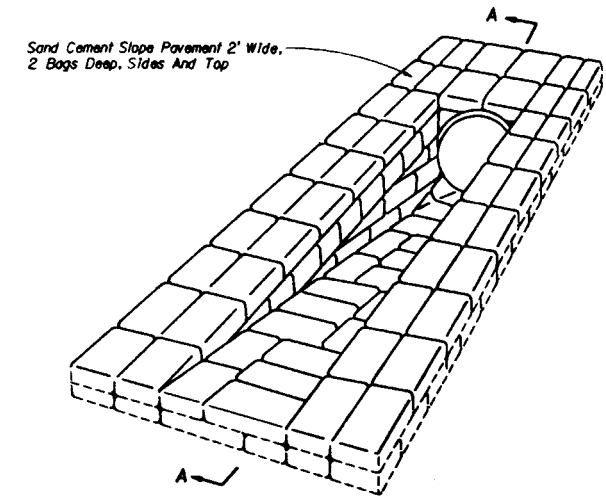


SECTION BB

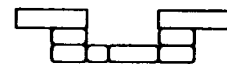


SECTION AA

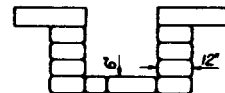
ESTIMATED QUANTITIES & DIMENSIONS					
PIPE SIZE	L CMP	L Conc. Pipe	SAND - CEMENT RIPRAP (Cu. Yd.)	Bags (Jute)	SOD (Sq. Yd.)
15"	8'-2"	8'-9"	2.2	90	8.40
18"	9'-2"	9'-10"	2.5	100	9.10
24"	11'-2"	12'-0"	3.5	140	10.40



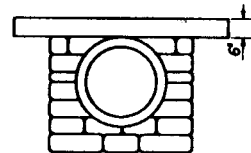
PICTORIAL VIEW



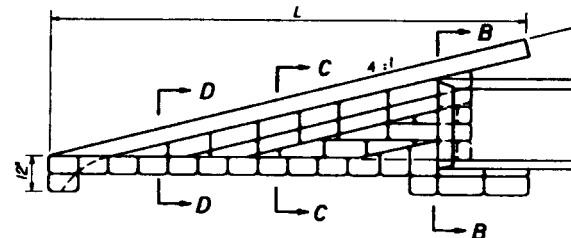
SECTION DD



SECTION CC

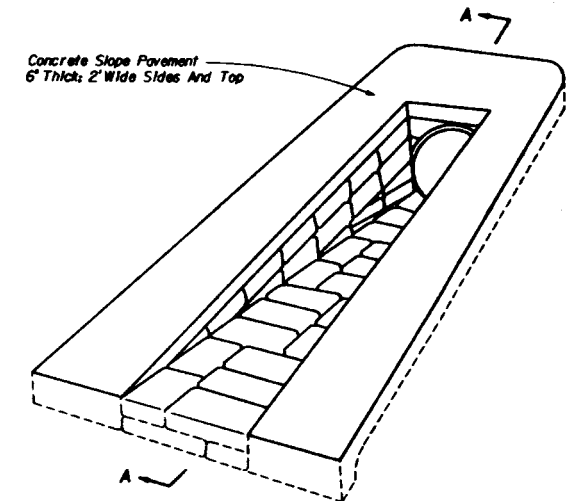


SECTION BB



SECTION AA

ESTIMATED QUANTITIES & DIMENSIONS						
PIPE SIZE	L CMP	L Conc. Pipe	SAND-CEMENT RIPRAP (Cu. Yd.)	Bags (Jute)	CONCRETE (Cu. Yd.)	SOD (Sq. Yd.)
15"	8'-2"	8'-9"	1.0	40	0.78	9
18"	9'-2"	9'-10"	1.4	60	0.89	10
24"	11'-2"	12'-0"	2.0	80	1.08	11

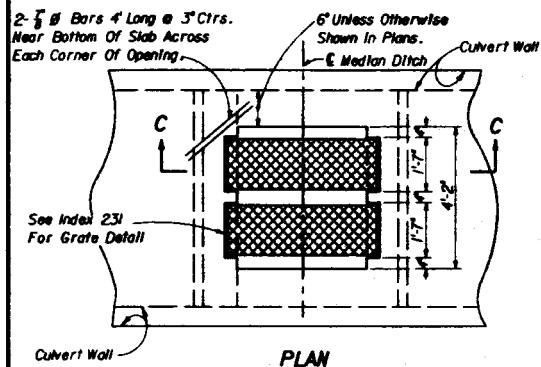
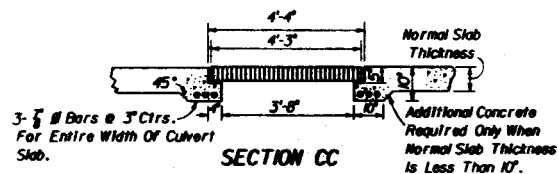
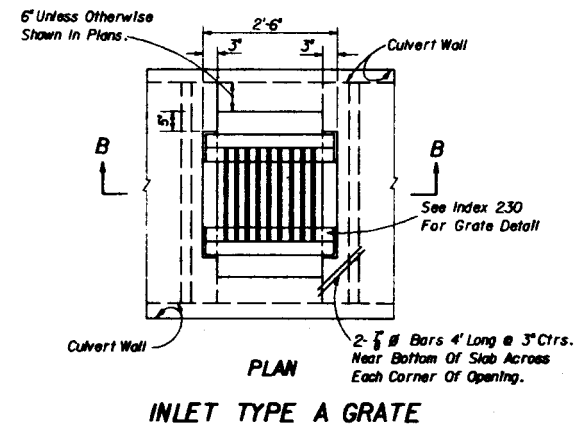
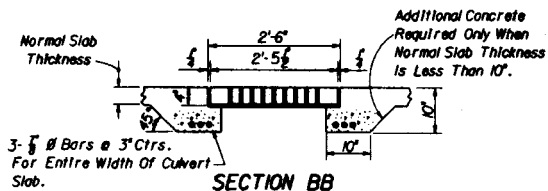


PICTORIAL VIEW

GENERAL NOTE

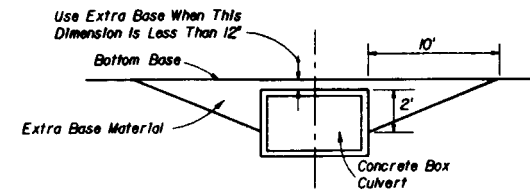
1. Details for concrete and round corrugated metal pipe, concrete pipe shown.
2. Sod slopes 2' each side and top and ditch 4' beyond toe.
3. These mitered end sections are intended for side drain installations by FDOT Maintenance forces and for side drain installations constructed under FDOT Maintenance permit.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SIDE DRAIN MITERED END SECTION					
SINGLE ROUND CONCRETE & CORRUGATED METAL PIPE					
Designed By	ESR	Date	10/77	Approved By	<i>E. G. King</i>
Drawn By	NSH	Date	10/77	Revision No.	
Checked By	JWS	Date	10/77	Sheet No.	
F. H. W. A. Approved: 10/25/78				85	1 of 1
					274



INLET TYPE B GRATE INLET IN TOP OF BOX CULVERT

- NOTE:
1. Cost of Steel Grating to be Included In cost of Box Culvert.
 2. All steel shall be 1/4" clear.

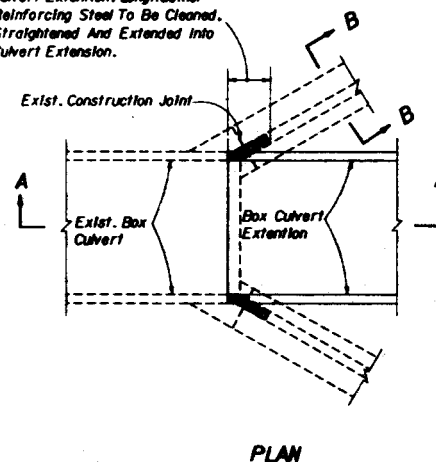


NOTE: Extra base is required when cross box culverts are located on facilities subject to high speed traffic (>45 m.p.h.) or high traffic volumes (>1600 ADT) and the cover is within the range specified in the notation above.

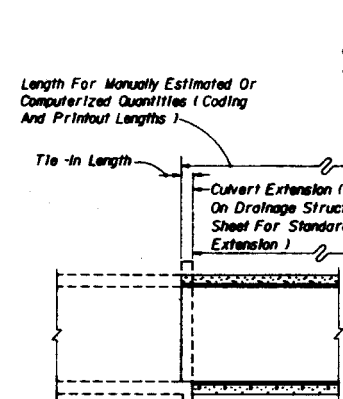
Extra base material to be paid for as equivalent square yard base, except when material is called for on cubic yard or tonnage basis.

EXTRA BASE FOR CROSS BOX CULVERTS UNDER FLEXIBLE PAVEMENT

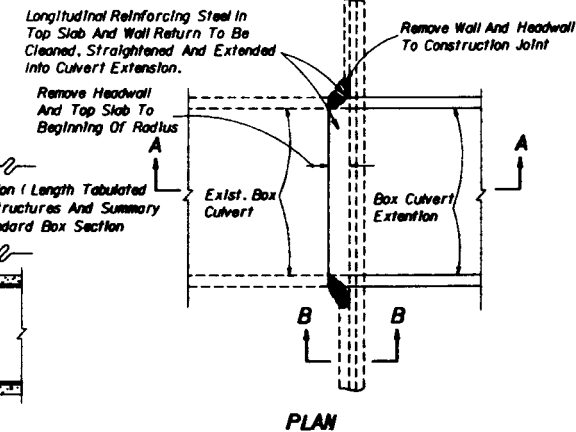
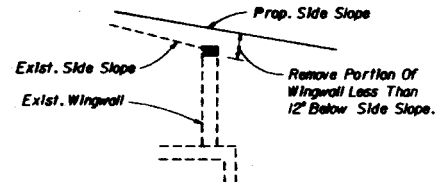
Remove Headwall, Outside Wall And Wingwall From Inside Face Of Headwall Sufficient To Construct Culvert Extension. Longitudinal Reinforcing Steel To Be Cleaned, Straightened And Extended Into Culvert Extension.



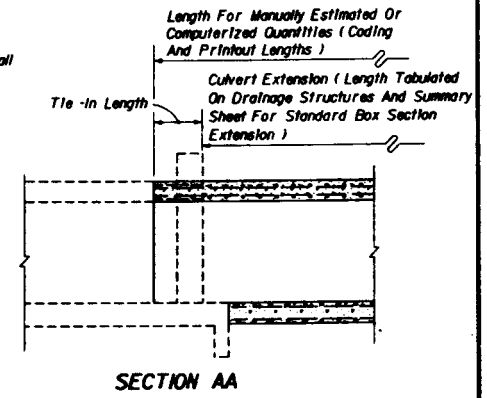
FLARED ENDWALL



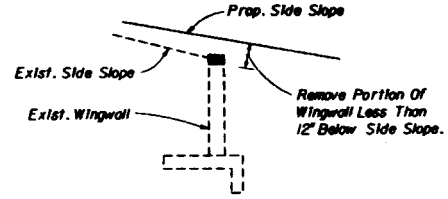
SECTION BB



STRAIGHT ENDWALL



SECTION BB



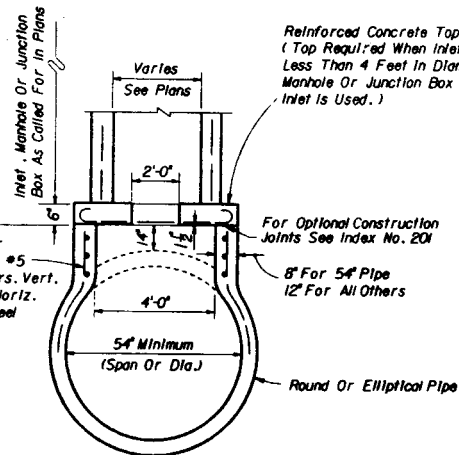
NOTE: Cost for removal and disposal of material from existing headwall, wingwall and top slab, and cost of cleaning, straightening and extending longitudinal reinforcing steel shall be included in the contract unit prices for Class II Concrete (Culverts) CR and Reinforcing Steel (Roadway) LB.

CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS

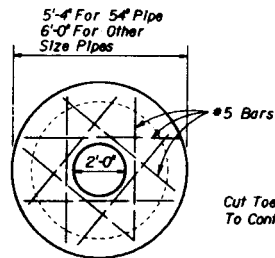
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
MISCELLANEOUS DRAINAGE DETAILS			
Designed By	Checked By	Approved By	Scale
Drawn By			
Reviewed By			
F.H.R.A. Approved	4/15/78	85	1 of 3
			280

To Be Paid For At The Contract Unit Price For Inlets, Manholes Or Junction Boxes, Etc.

Cost To Be Included In Cost Of Pipe

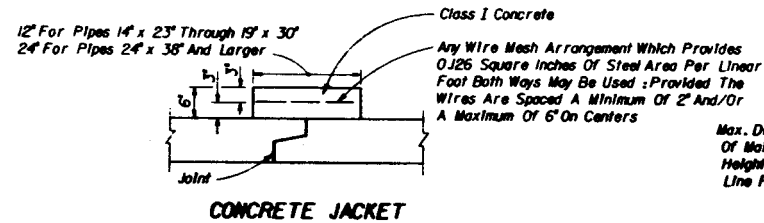


SECTION

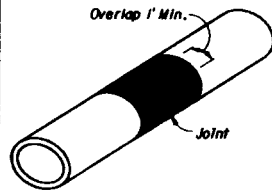


PLAN OF TOP

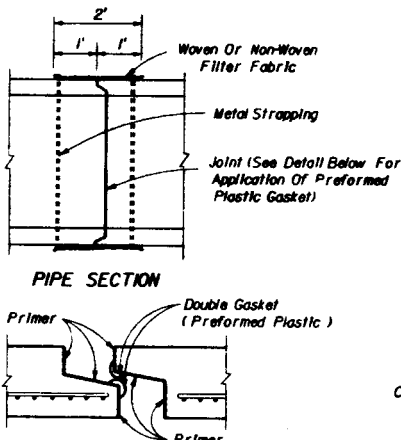
INLETS, MANHOLES OR JUNCTION BOXES ON INTEGRAL PRECAST CONCRETE RISER FOR CONCRETE PIPE



CONCRETE JACKET



ISOMETRIC VIEW



PIPE SECTION

JOINT SECTION (BEFORE PULL-UP)

FILTER FABRIC JACKET

Cost of concrete jacket or filter fabric jacket to be included in cost of elliptical concrete pipe culverts.

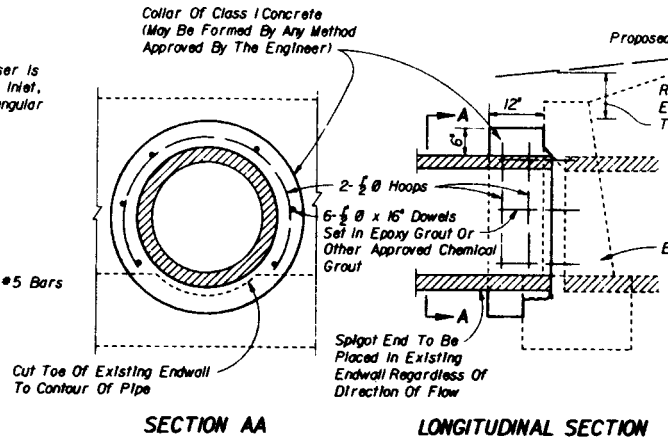
ELLIPTICAL CONCRETE PIPE JOINTS

Reinforced Concrete Top (Top Required When Inlet, Manhole Or Junction Box Riser Is Less Than 4 Feet In Diameter; Or When Type P, A1, B Inlet, Manhole Or Junction Box Riser Is Used; Or When Rectangular Inlet Is Used.)

For Optional Construction Joints See Index No. 201

8" For 54" Pipe 12" For All Others

Round Or Elliptical Pipe

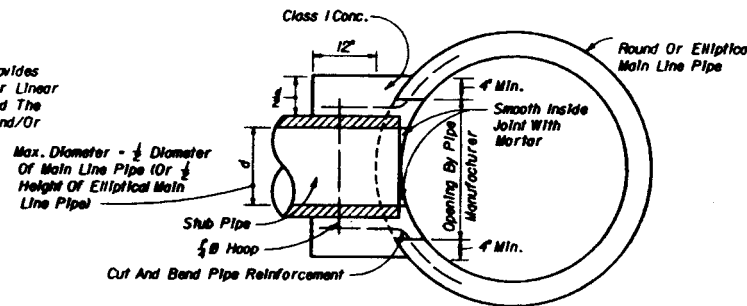


SECTION AA

LONGITUDINAL SECTION

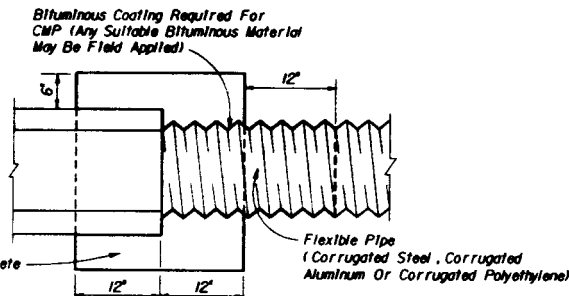
Note: Cost for removal and disposal of portions of top and toe of existing endwall and cost of concrete, reinforcing steel and construction of collar to be included in the contract unit price for pipe culvert.

CONCRETE COLLAR FOR EXTENSION OF EXISTING PIPE CULVERTS



Cost of concrete and steel to be included in contract unit price for pipe culvert.

CONCRETE COLLAR FOR JOINING MAINLINE PIPE AND STUB PIPE



Note: Cost of concrete and bituminous coating to be included in contract unit price for either new pipe or Mitered End Section. A concrete jacket shall not be used to join:

- metal pipe of dissimilar materials
- flexible pipe when the minimum cover required in accordance with Index No. 205 cannot be obtained.

CONCRETE JACKET FOR CONNECTING DISSIMILAR TYPES OF PIPE AND CONCRETE PIPES WITH DISSIMILAR JOINTS

12" X 2" X 1/2"
2'-4" For 18" Pipe
3'-0" For 24" & 30" Pipe
3'-8" For 36" Pipe
4'-4" For 42" Pipe

SECTION - STEEL PLATE

6" Std.
1/4" x 1/4" Hole
L6 x 4 x 1/2" x 4"
1/4" Hole
Steel Plate
CLIP DETAIL

Remove Portion Of Existing Endwall Less Than 1' Below Grade

Bars 8" Ctrs. Each Way
1/2" Bars, Pipes < 30" Ø
3/4" Bars, Pipes ≥ 30" Ø

Existing Endwall
Clip Angle See detail

Steel Plate
3'-6" For 18" Pipe
4'-0" For 24" Pipe
4'-6" For 30" Pipe
5'-0" For 36" Pipe
5'-6" For 42" Pipe

Vert Bars & Plate Holes Symmetrical About & Pipe:
4 For 18" Pipe
5 For 24" & 30" Pipe
6 For 36" Pipe
7 For 42" Pipe

1/2" PVC Pipe Sleeve
1/2" x 1/4" American Std. Bolt With Nut

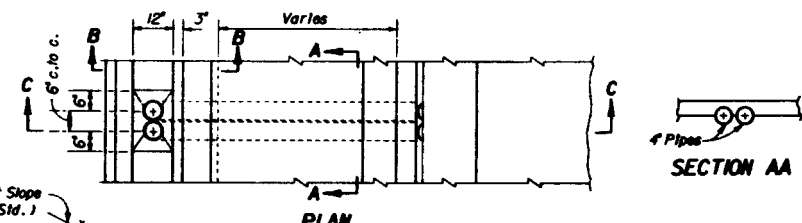
6" Minimum Imbedment
Standard Hex Bolt
Cast In Or Epoxy Grout In 1/4" Hole
Chemical Anchor:
Installed In Accordance With Manufacturers Recommendations

Front View

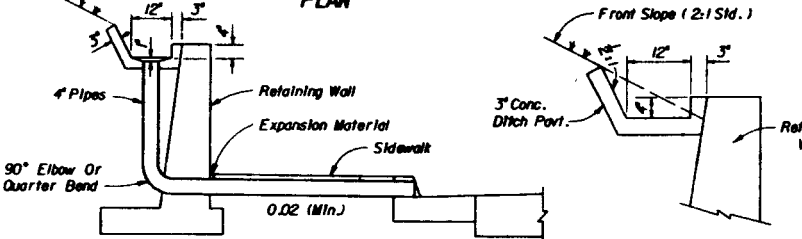
Side View

Note: Guards to be constructed only at locations specifically called for in plans. Guard, plate & clips, bolts, nuts and sleeves to be included in the contract unit price for Endwall Grate, LB.

GUARD AT PIPE ENDS



SECTION AA

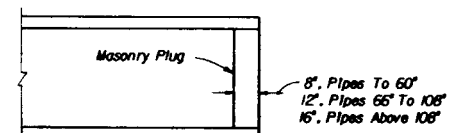


SECTION CC

SECTION BB

Note: Either cast iron pipe or PVC pipe, Schedule 40, may be used. Pipe to be paid for under the contract unit price for either Cast Iron Pipe For Roof Drains (4"), LF, or Polyvinyl Chloride Pipe Culvert (4"), LF.

CONCRETE GUTTER AND DRAINS AT RETAINING WALLS

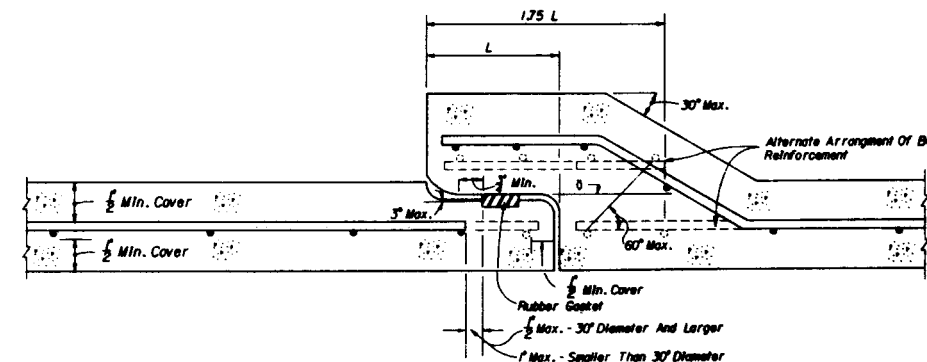


Note: Unless otherwise called for in the plans, the cost of plugging pipes to be included in contract unit price for new pipe.

PIPE PLUG

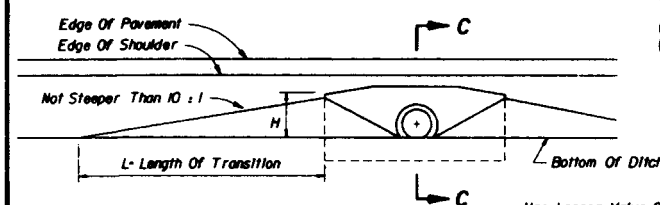
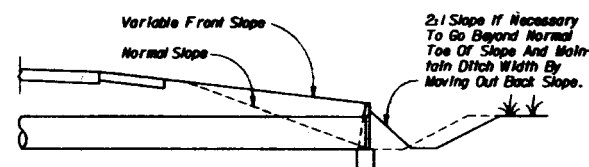
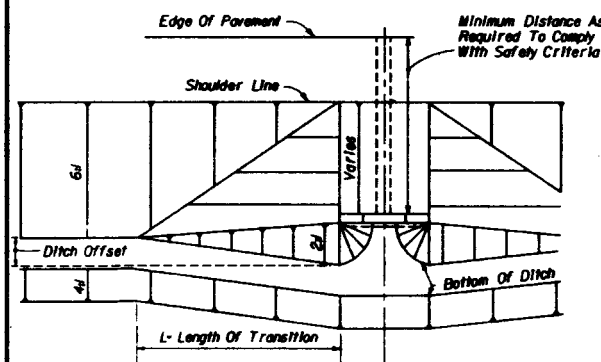
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
MISCELLANEOUS DRAINAGE DETAILS			
Designed By	Checked By	Approved By	Scale
Drawn By	Reviewed By	Revision No.	Sheet No.
Checked By	Reviewed By	Revision No.	Sheet No.
F.L.R.A. Approved		87	2 of 3
		280	

SCHEDULE OF BELL REINFORCEMENT Classes III, IV, V; Wall A,B,C		
Nominal Pipe Diameter	Design Bell Reinforcement Sq. In. Per Foot	Maximum Reinforcement Under Tolerance Sq. In. Per Foot
15"	0.07	0.010
18"	0.07	0.010
24"	0.09	0.010
30"	0.12	0.010
36"	0.14	0.010
42"	0.16	0.010
48"	0.19	0.011
54"	0.21	0.012
60"	0.23	0.0135
66"	0.26	0.015
72"	0.28	0.0165
78"	0.30	0.018
84"	0.33	0.0195
90"	0.35	0.021
96"	0.37	0.0225
102"	0.40	0.024
108"	0.42	0.0255



All circumferential steel located above this line within 1.75 L is defined as bell reinforcement

**DETAIL OF BELL & SPIGOT CONCRETE PIPE JOINT
USING ROUND RUBBER GASKET**



Use Larger Value Of Either:

1. $L - 10 \times H$ (No Maximum)
2. $L - 10 \times \text{Ditch Offset}$ (Maximum $L - 100'$)

METHOD FOR SETTING LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES

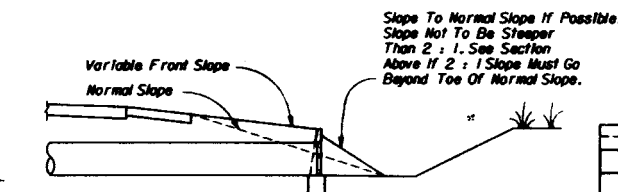


**SECTION THRU RECESSED V-GROOVE
TO FORM INSCRIBED FIGURES**

The number is to be placed in the center of the top surface of all bridge culvert headwalls.

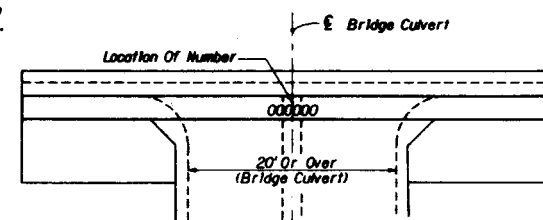
Black Plastic Figures 3" in height as approved by the Engineer may be used in lieu of Figures formed by V-Grooves.

V-Grooves shall be formed by preformed Figures.



NOTE: Filling or excavation of variable slopes to be done during normal grading operations.

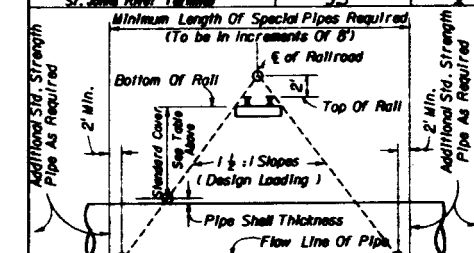
SECTION CC



**TOP VIEW OF HEADWALL
BRIDGE CULVERT NUMBER LOCATION**

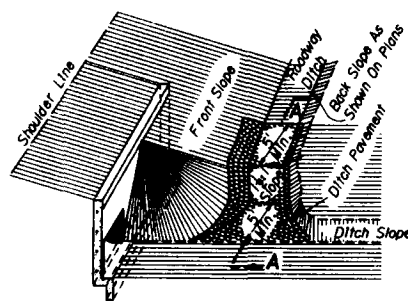
For Bridge Number See Plan - Profile Sheet(s).

RAILROAD COMPANY	CLEARANCE BELOW BOTTOM OF RAIL (FEET)	STRENGTH ASTM (C76) CLASS
Apalachicola Northern	4.0	10
Atlanta And St. Andrews Bay	4.0	10
Florida East Coast	5.5*	10
Burlington Northern Railroad	5.75	10
CSX Transportation, Inc.	5.5	10
Southern Railway System	5.5	10
Georgia Southern And Florida	5.5	10
Live Oak Railway And South Georgia	5.5	10
St. Johns River Terminal	5.5	10



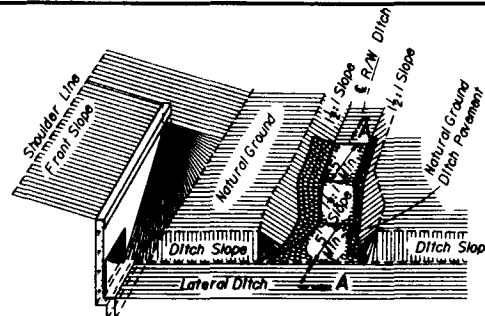
* Clearance is for casing pipe. All subgrade carrier pipelines and wires/cables will be installed within a casing pipe which will extend from Right-of-Way line to Right-of-Way line.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
MISCELLANEOUS DRAINAGE DETAILS			
Designed By	Checked By	Approved By	Scale
Drawn By	Reviewed By	Project No.	Sheet No.
Checked By	Field No.	Station No.	Notes No.
F.L.R.A. Approved	8/15/78	88	3 of 3
			280

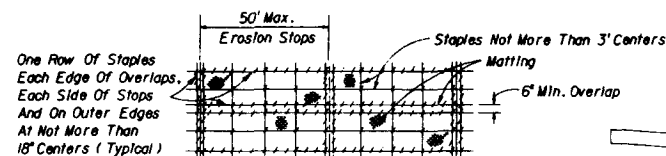


JUNCTION OF ROADWAY DITCH* AND LATERAL DITCH

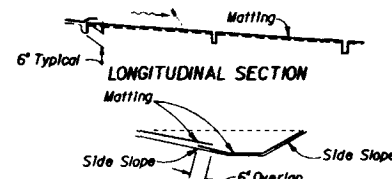
*Silt cement or misc. asphalt will not be permitted for this type of construction



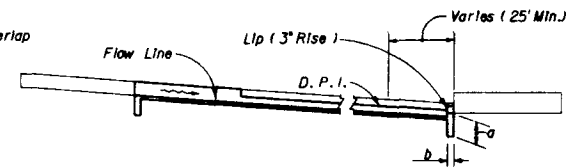
JUNCTION OF R/W DITCH* AND LATERAL DITCH



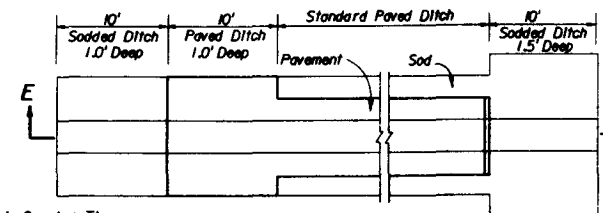
PLAN



LONGITUDINAL SECTION
SECTION
MATTING FOR DITCH



SECTION EE

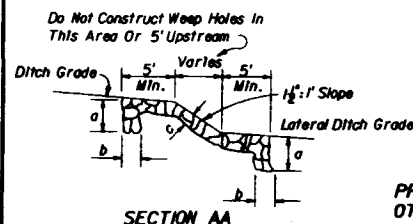


PLAN

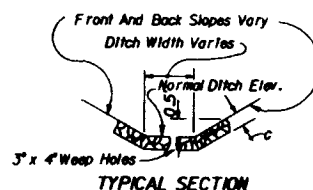
PAVED DITCH END TREATMENT

GENERAL NOTES

1. Type of ditch pavement shall be as shown on plans.
2. In concrete ditch pavement, contraction joints are to be spaced at 25' maximum intervals, or as directed by the Engineer. Contraction joints may be either formed (construction joint) or tooled. No open joints will be permitted.
3. Lip at end of ditch pavement shall normally be located downstream of D.P.I. or on flatter grades where there is a decrease in ditch velocity.
4. Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
5. When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
6. For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
7. For ditch pavements requiring filter fabric the fabric shall be placed directly beneath the pavement for the entire length and width of the pavement. When weep holes with aggregate are used the filter fabric shall be placed below the aggregate to form a mat continuous with or underlapping the pavement fabric.
8. Cost of plastic filter fabric to be included in the contract unit price for ditch pavement.

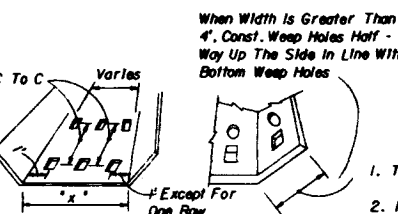


PROFILE OF DITCH PAV'T AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH



TYPICAL SECTION

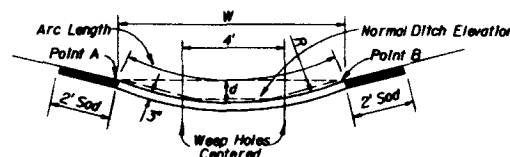
Item ID	Pavement Type	Dimensions			Payment Unit	Basis Of Estimate	Filter Fabric Type	Velocity Range	References & Remarks
		a	b	c					
524 - 1 - 1	Concrete	24"	6"	3"	SY	SY	Subsurface Drainage	Low - High	Section 524 of the Standard Specifications.
339 - 1	Miscellaneous Asphalt	24"	12"	4"	TY	0.2 TN/SY	None	Low - Moderate	Section 339.
170 - 1	Soil - Cement	24"	12"	4"	SY	SY	None	Low	Section 170. Cement to be paid for under item No. 170 - 2.
530 - 1 - 1	Riprap (Sand - Cement)	24"	12"	4"	CY	0.11 CY/SY	Subsurface Drainage	Low - Moderate	Subsection 530. Grouting of joints required.
530 - 2	Riprap (Concrete Block)	24"	12"	4"	CY	0.22 CY/SY	Riprap Filter	Low	Subsection 530 - 2.2. Hole side up, closed staggered joints (no gravel), sealed section only.
530 - 72 - 1	Riprap (Broken Concrete Or Stone) + Slurry	24"	12"	9"	SY	SY	Riprap Filter	Moderate - High	Section 530 (Expanded).
530 - 81 - 1b	Riprap (Rubble)	Broken Stone	24"	12"	SY	SY	Riprap Filter	Moderate	Section 530. Design in accordance with FHWA HEC No. 15. Use standard FDOT grades of rubble riprap.
530 - 70 - 1b		Broken Concrete	24"	12"	SY	SY	Riprap Filter	Moderate	Section 530. Design in accordance with FHWA HEC No. 15.



When "x" - 1' To 4' Const. 1 Row (Centered)
 "x" - 5' To 7' Const. 2 Rows
 "x" - 8' To 12' Const. 3 Rows
 "x" - 13' To 17' Const. 4 Rows
 "x" - 18' To 22' Const. 5 Rows

Notes: All weep holes to be 3' x 4' rectangle or 4" or 5" Dia. circular hole. 1/2 Cu. ft. (12" x 12" x 6") of No. 6 aggregate to be placed under each hole. 1 Sq. ft. of galvanized wire mesh (1/2" openings) shall be placed between the aggregate and the concrete. Cost of holes, aggregate and wire mesh to be included in the cost of ditch pavement.

WEEP HOLE ARRANGEMENT



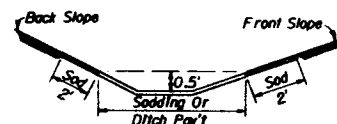
TO REPLACE :

	W	d	R	No. Of Rows Of Weep Holes	Arc Length
6' Median Swale	6'	24"	19'	0	6.0
6 : 1 Front Slopes; 4 : 1 Back Slope					
5' B.W. Ditch	10'	.67'	19'	2	10.1
4' B.W. Ditch	9'	.54'	19'	2	9.1
4 : 1 Front Slopes & Back Slope					
5' B.W. Ditch	9'	.74'	14'	2	9.2
4' B.W. Ditch	8'	.58'	14'	1	8.1

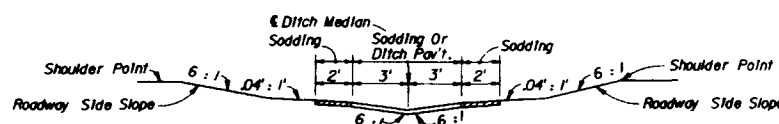
In center

ALTERNATE DITCH PAVEMENT

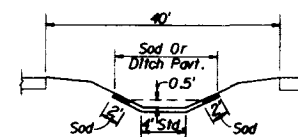
For use only where side slopes are 4:1 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.



ROADWAY SIDE DITCH

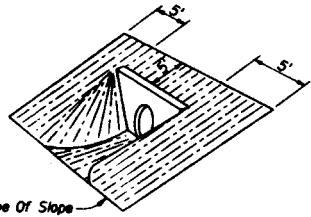


SWALED MEDIAN (No Weep Holes)



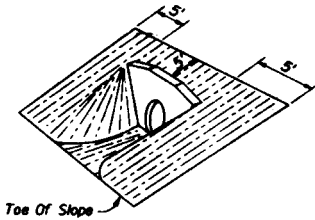
40' MEDIAN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DITCH PAVEMENT & SODDING			
Designed By	Drawn By	Checked By	Approved By
			6/8/75
Revised By	Revised No.	Sheet No.	Index No.
		88	281
F.H.W.A. Approved		05/01/75	



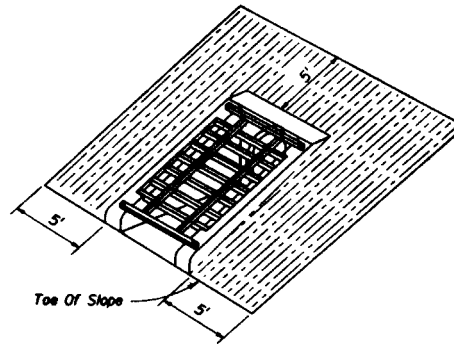
Toe Of Slope
Note: Sodding quantities for each endwall to be determined by the designer from this detail.

(EXCEPT INDEX 250)
STRAIGHT ENDWALL



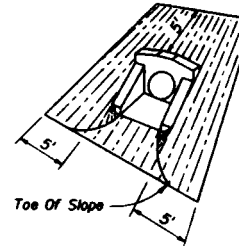
Toe Of Slope

STRAIGHT ENDWALL
INDEX 250



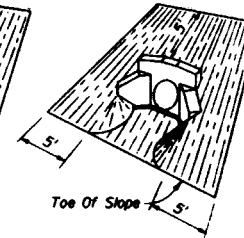
Toe Of Slope

U - TYPE ENDWALL
INDEX 261



Toe Of Slope

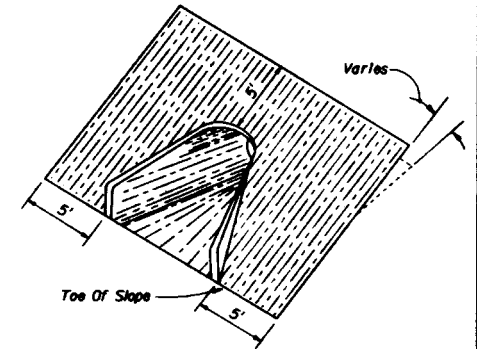
U - TYPE WINGS



Toe Of Slope

45° WINGS

WINGED ENDWALLS
INDEX 266



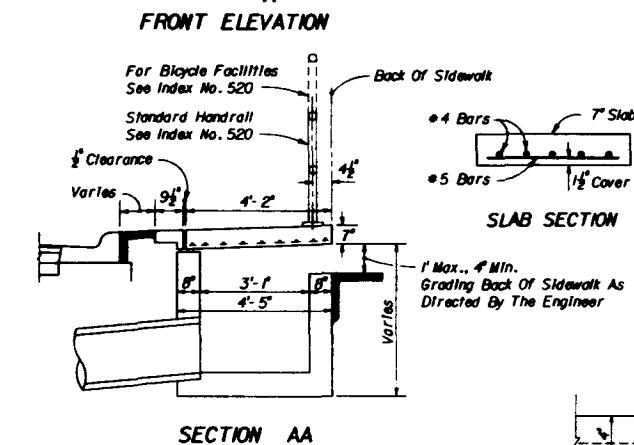
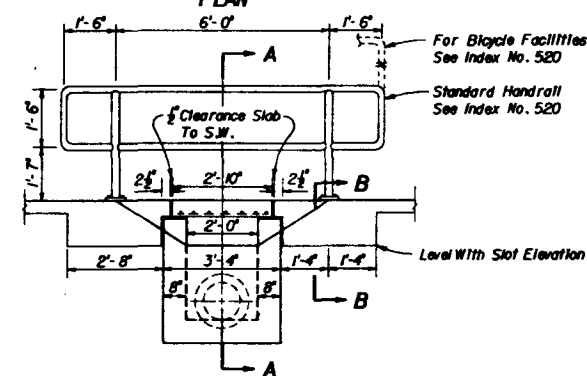
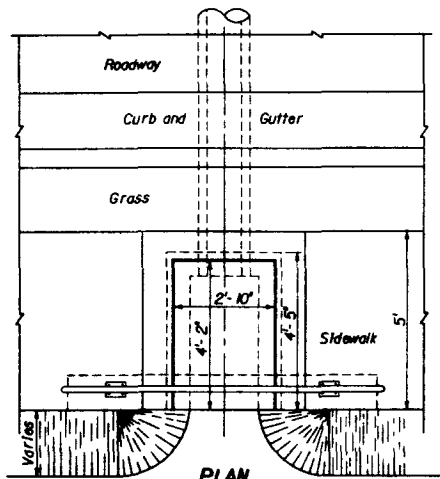
Toe Of Slope

FLARED END SECTION
INDEX 270

SODDING QUANTITIES (S.Y.)																							
PIPE SIZE	INDEX 250												INDEX 261				INDEX 266				INDEX 270		
	SLOPE												SLOPE				SLOPE				ALL SLOPES		
	2 : 1			3 : 1			4 : 1			6 : 1			2 : 1	3 : 1	4 : 1	6 : 1	2 : 1	3 : 1	4 : 1	6 : 1			
	PIPES												PIPES				PIPES				PIPES		
	1	2	3	1	2	3	1	2	3	1	2	3	1	1	1	1	1	1	1	1	1	1	
12"																							
15"	19	21	24	22	26	29	26	30	33	34	38	43	13 (15)	16	17	23	14	15	18	22	10		
18"	21	24	27	25	29	33	30	34	38	39	44	50	14 (16)	17	19	25	16	18	22	28	11		
21"																					12		
24"	26	30	34	32	37	42	38	44	50	50	58	66	15 (17)	19	21	28	19	22	26	34	14		
27"																					15		
30"	31	37	42	39	46	53	46	55	63	62	74	85	17 (18)	21	24	32	21	25	30	40	16		
36"	37	44	52	46	56	65	56	67	79	76	91	107					24	29	35	47	18		
42"	43	53	62	55	67	79	67	82	96	91	111	132					27	32	39	54	19		
48"	50	62	73	64	79	93	78	97	115	108	133	158					30	36	44	61	21		
54"	57	71	85	74	92	110	91	113	136	126	157	188									21		
60"																					22		
66"																					25		
72"																					26		
													(1) Endwall With Baffles										

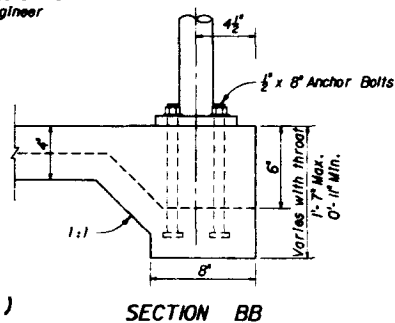
(1) Endwall With Baffles

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
DITCH PAVEMENT & SODDING					
Designed By	Index	Date	Approved By		
Drawn By	150	08/85	<i>[Signature]</i>	State Drainage Engineer	
Checked By	JBB/AB	09/85	Revision No.	Sheet No.	Index No.
F.J.W.A. Approved			07/07/75	85	2 of 2
					281

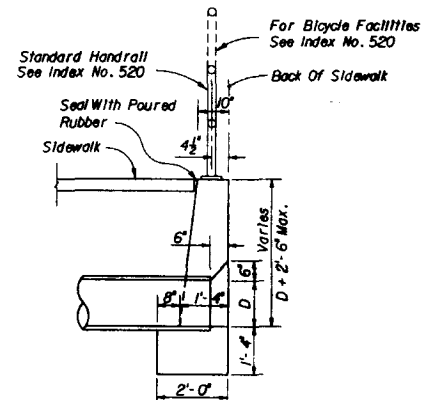
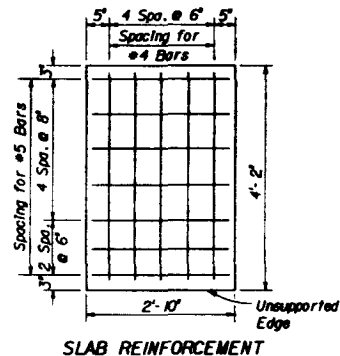


- Notes:
- For additional details see Index No. 232.
 - Inlet to be paid for under the contract unit price for Inlets (Ditch Bottom) (Type C Modified), Ea.

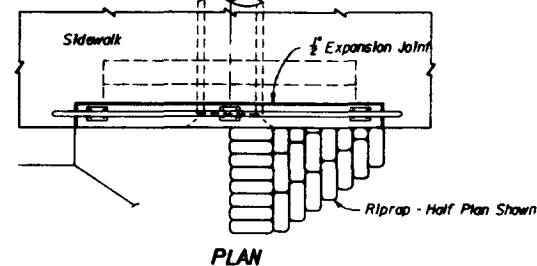
INLET TYPE C (MODIFIED)



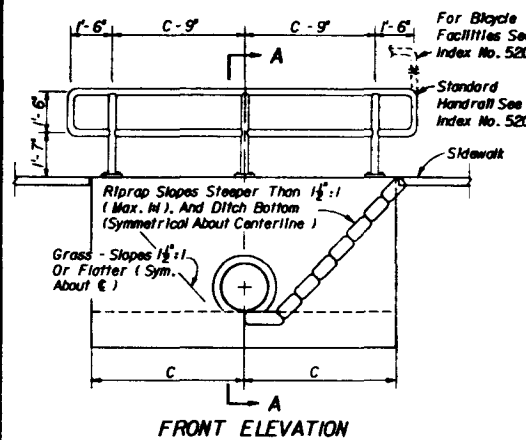
SECTION BB



SECTION AA



PLAN

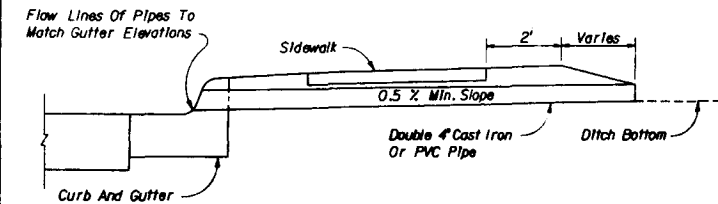


FRONT ELEVATION

Pipe Size	C	Conc. - CY	Riprap - CY (Sand - Cement)
15"	4'-9"	2.27	1.1
18"	5'-3"	2.59	1.3
24"	6'-3"	3.26	1.8

- Notes:
- Maximum pipe size shall be 24" diameter.
 - Grading back of sidewalk varies and shall be done as directed by the Engineer.
 - Concrete quantities shown are for maximum wall heights, and shall be basis for estimate and payment.
 - Riprap quantities shown are for estimate purposes only. Cost of riprap to be included in cost of the endwall.
 - Endwalls to be paid for under the contract unit price for Class I Concrete (Endwalls), CY. Handrail to be paid for under the contract unit price for Pipe Handrail, LF.

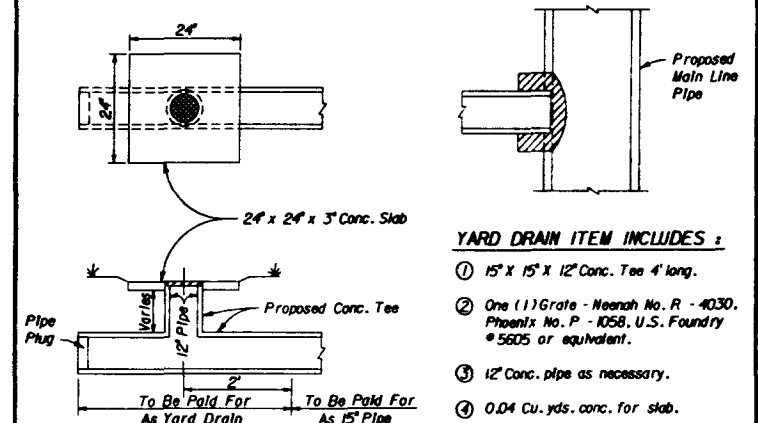
SPECIAL CONCRETE ENDWALL



contract unit price for either Cast Iron Pipe Culvert (Standard) (4"), LF or Polyvinyl Chloride

- Notes:
- To be constructed at locations as directed by the Engineer.
 - Either cast iron pipe or PVC pipe, Schedule 40, may be used. Pipe to be paid for under the contract unit price for either Cast Iron Soil Pipe (Standard) (4"), LF or Polyvinyl Chloride Pipe Culvert (4"), LF.

SHALLOW DITCHES



YARD DRAIN ITEM INCLUDES :

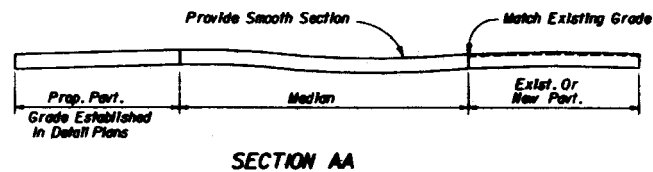
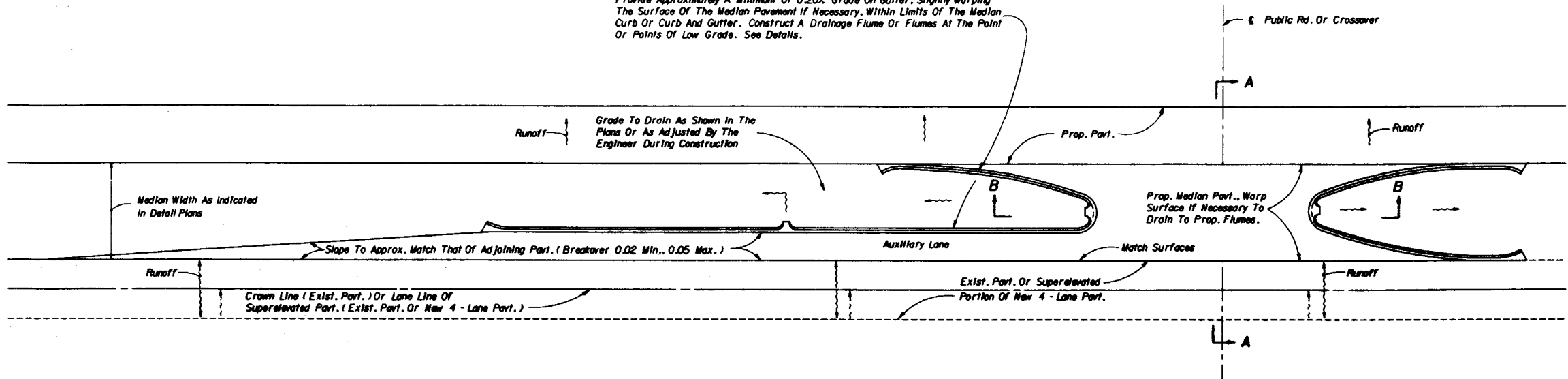
- 15" x 15" x 12" Conc. Tee 4' long.
- One (1) Grate - Neenah No. R - 4030, Phoenix No. P - 1058, U.S. Foundry #5605 or equivalent.
- 12" Conc. pipe as necessary.
- 0.04 Cu. yds. conc. for slab.

- Notes:
- Yard drains may be constructed at the option of the property owner as shown on the plans.
 - Cost of plugs and collars to be included in the cost for 15" concrete pipe. For collar and plug details see Index No. 280.
 - Yard drains to be paid for under the contract unit price for Yard Drains, Each.

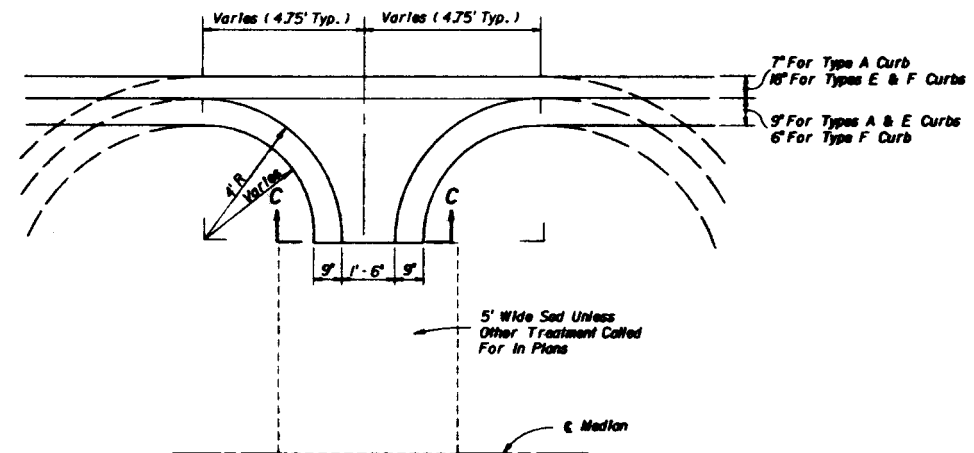
YARD DRAINS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
BACK OF SIDEWALK DRAINAGE			
Designed By	Checked By	Approved By	Drawn By
Reviewed By	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved	05/02/75	88	1 of 1
			282

Provide Approximately A Minimum Of 0.20% Grade On Gutter, Slightly Warping The Surface Of The Median Pavement If Necessary, Within Limits Of The Median Curb Or Curb And Gutter. Construct A Drainage Flume Or Flumes At The Point Or Points Of Low Grade. See Details.

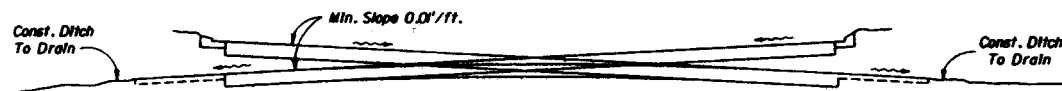


SECTION AA



FLUME DETAIL

SECTION CC



SECTION BB

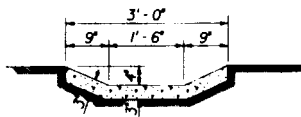
(May Drain From Any Point Designated In The Plans Or As Adjusted By The Engineer During Construction)

GENERAL NOTES

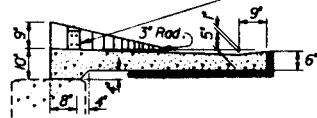
- These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for super-elevated sections of new 4-lane divided highways. Layout above is illustration only. Cost of flumes to be included in the contract price for Curb or Curb and Gutter. Sod to be paid for under the contract unit price for Sodding, ST.
- Flumes to be located in low point of noses and at other points as designated in the plans. The locations may be adjusted by the Engineer during construction.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
MEDIAN OPENING FLUME					
Designed By	CHP	Date	03/78	Approved By	<i>J. P. Hill</i>
Drawn By				Check Design Engineer/Engineer	
Checked By	GGD	03/78	Revision No.	Sheet No.	
F.A.R.A. Approved	03/20/78	83	1 of 1		283

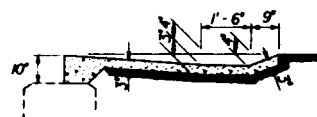
Note: Set reflector plates on right hand curb at bridge ends as shown. Plates to be furnished by D.D.T. and installed by the contractor. Cost of installing plates to be included in the contract unit price for concrete ditch pavement (3" thick).



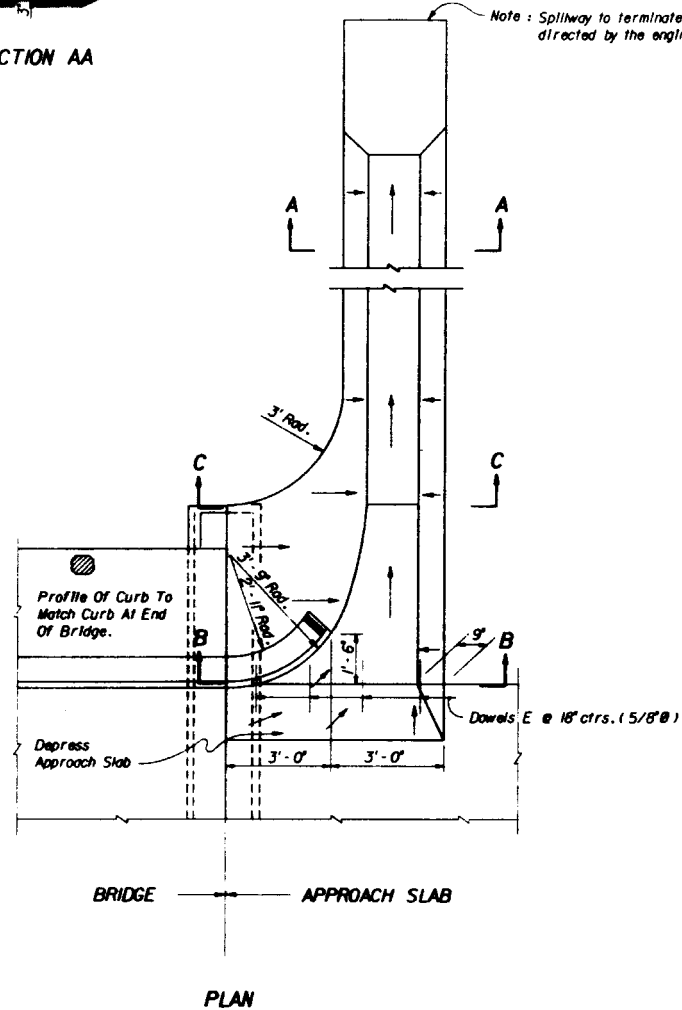
SECTION AA



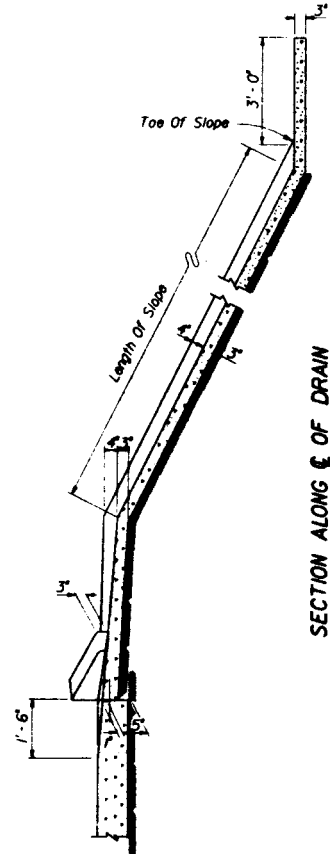
SECTION BB



SECTION CC



Note: Spillway to terminate as directed by the engineer.



SECTION ALONG C OF DRAIN

Dowels to be included in the contract unit price for concrete ditch pavement (3" thick).

GENERAL NOTES

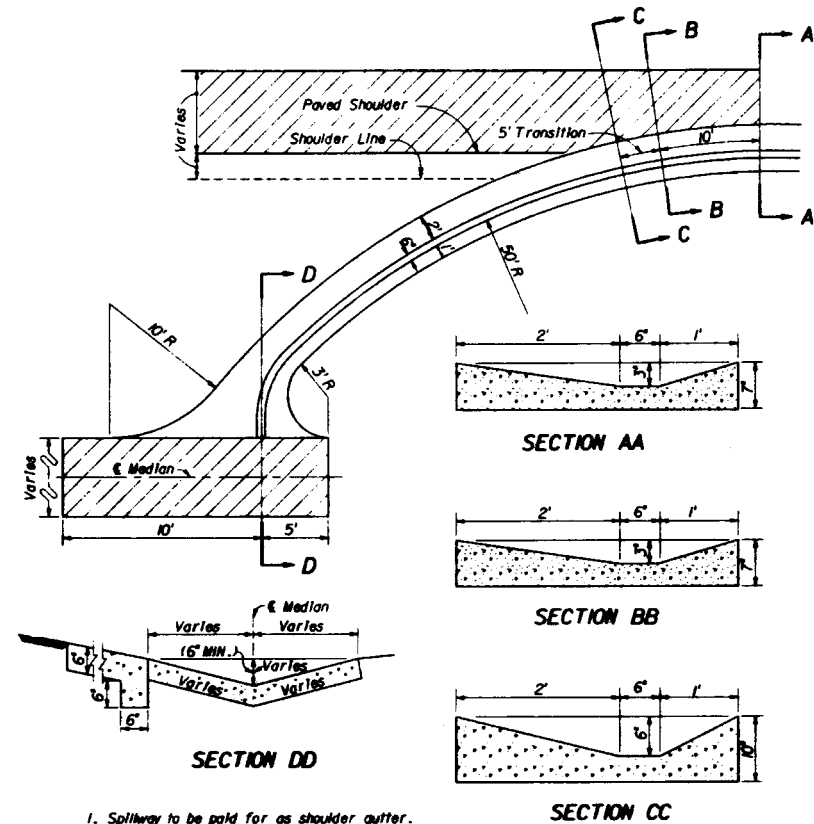
1. This detail not recommended for grades greater than 0.5% or discharges exceeding 0.5 cfs.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Concrete Ditch Pavement (3" Thick)	Sq. yd.	* 10.87

* Quantity shown above includes pavement for 10 ft. "Length of Slope". For each additional foot of slope length add 0.349 sq. yds.

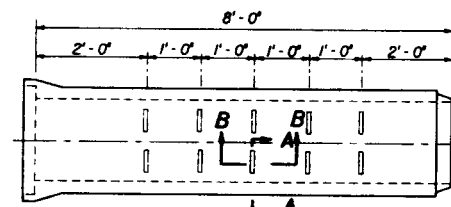
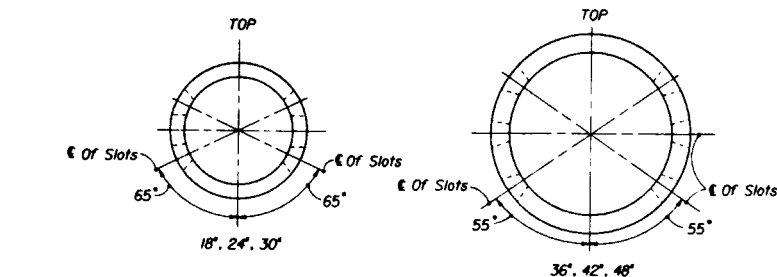
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CONCRETE SPILLWAYS BRIDGE END SPILLWAY					
Designed By	Checked By	Drawn By	Revision No.	Sheet No.	Order No.
CES	MLF	MLF	12/5	1 of 2	284
F.J.R.A. Approved: 03/20/75			88		



1. Spillway to be paid for as shoulder gutter.
2. If spillway empties into a shallow or median ditch, the detail should be modified as necessary.

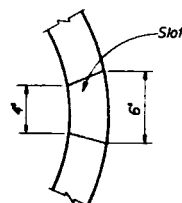
DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER
(TO BE USED WHERE INLETS, PIPES & ENDWALLS ARE IMPRACTICAL)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE SPILLWAYS SHOULDER GUTTER SPILLWAY			
Designed By	Revised	Series	Approved By
Drawn By			<i>[Signature]</i> State Drainage Engineer
Checked By			Revision No.
F.H.W.A. Approved		1/15/78	Sheet No.
		BI	2 of 2
			284

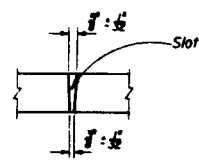


SIDE VIEW

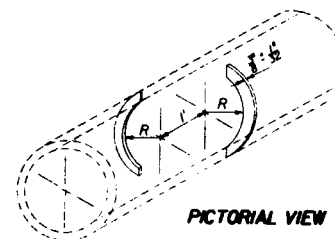
OPTION A



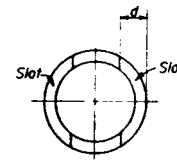
SECTION AA



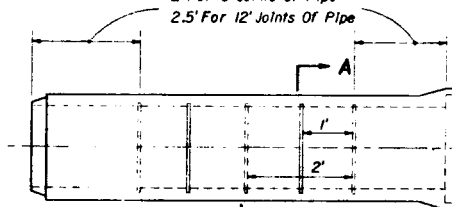
SECTION BB



PICTORIAL VIEW



SECTION AA



SIDE VIEW

OPTION B

Pipe Size	Depth Of Cut (d)
18"	5 1/8"
24"	5 3/8"
30"	5 7/8"
36"	7 1/8"
42"	7 3/8"
48"	7 7/8"

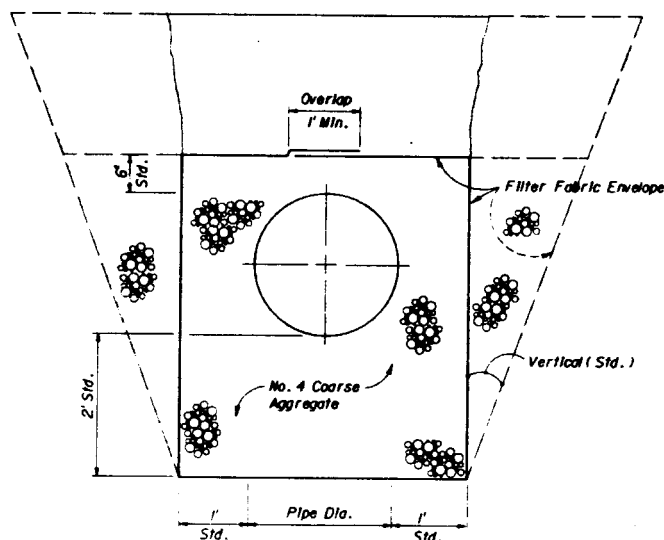
- GENERAL NOTES**
- Pipe shall be any of the optional types permitted in Section 443 of the Specifications unless otherwise restricted in the plans. Dissimilar types of pipe will not be permitted in a continuous run of pipe.
 - Concrete pipe shall be placed with the slots positioned on sides. Clay pipe shall be placed with the perforations positioned downward symmetrically about the bottom centerline.
 - Alignment joints are standard (gaskets not required).
 - The contractor may submit other methods of providing slots having equal or greater area of opening for approval by the Engineer.
 - Filter fabric shall be Subsurface Drainage type meeting the requirements of Section 985. All filter fabric joints shall lap a minimum of one (1) foot.
 - The standard cross section shall be constructed unless other section(s) described or detailed in the plans.
 - For supplemental details see Index No. 280.
 - The contractor shall take the necessary precautions to prevent contamination of the trench by sand, silt and foreign materials.
 - The 12" diameter weep hole shall be eliminated when the bottom of the inlet is below the normal water table, unless otherwise shown in the plans.
 - French drains following the typical cross section shall be paid for under the contract unit price for French Drains, LF. The unit price shall include the cost for pipe, pipe plugs, pipe fittings, coarse aggregate and filter fabric in place, and the cost for trench excavation, backfill and compaction. The unit price shall also include the cost for disposal of surplus excavated materials and cost for restoration of pavement removed or damaged by french drain construction, but shall not include payments for items paid for elsewhere.

French drains with a significantly different cross section shall be paid for under the contract unit prices for separate items as follows:

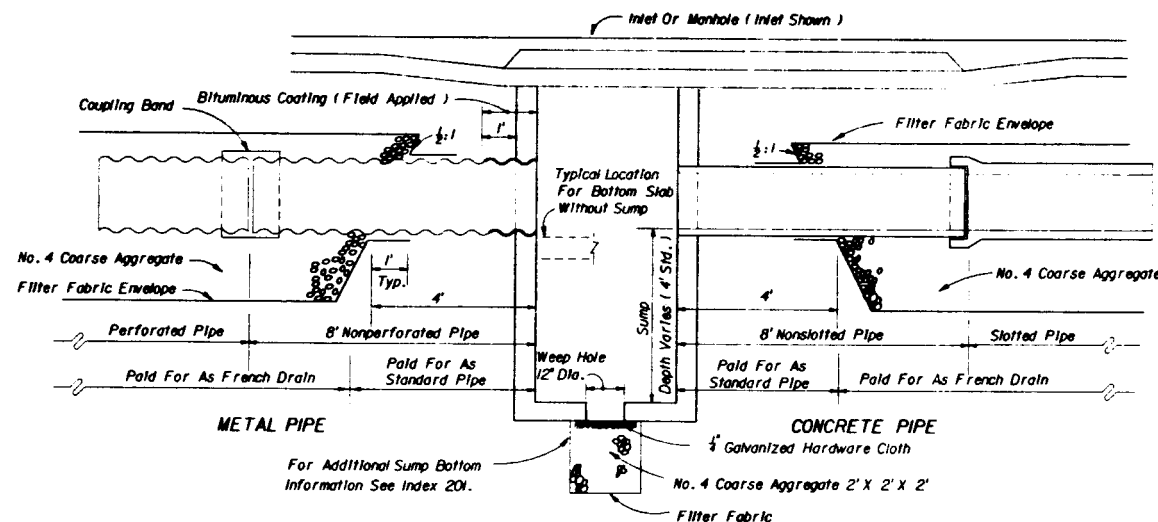
- Slotted or Perforated Pipe Culvert, LF. Unit price shall include cost for pipe, pipe plugs and fittings in place.
- French Drain Aggregate, CY. Unit price shall include cost for coarse aggregate in place, and cost for trench excavation, backfill and compaction. The unit price shall also include the cost for disposal of surplus excavated materials and cost for restoration of pavement removed or damaged by french drain construction, but shall not include payment for items paid for elsewhere.
- Plastic Filter Fabric, SY. Unit price shall be for cost of fabric in place. Quantity shall be determined by plan neat dimensions of the fabric envelope.

DESIGN NOTES

- Pipe Invert should be at or above the water table whenever possible.
 - French drains with minor dimensional changes or otherwise different from the standard cross-section shall be either described or detailed in the plans.
- French drains with significantly different cross-sections shall be detailed in the plans.



STANDARD CROSS SECTION (ENLARGED)



LONGITUDINAL SECTION

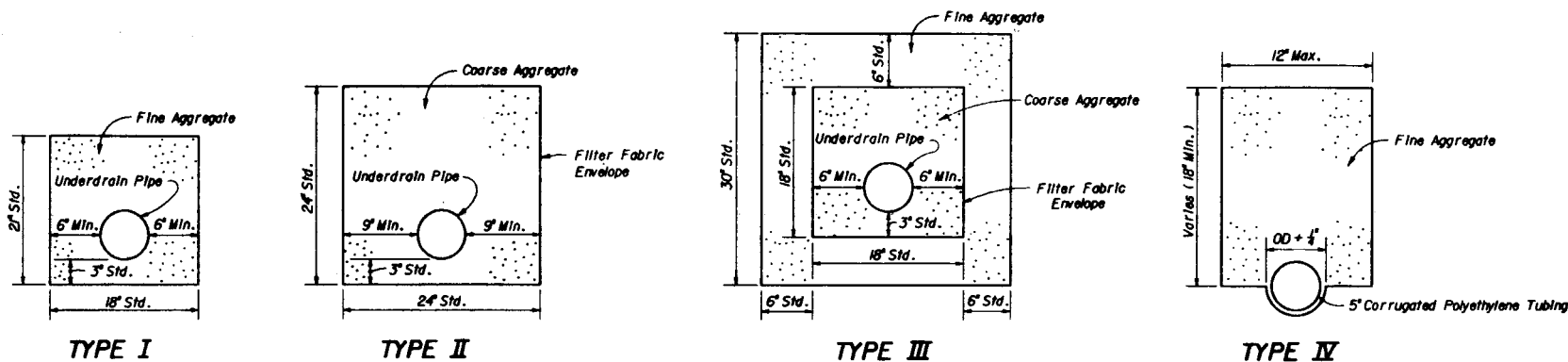
FRENCH DRAIN SYSTEM

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FRENCH DRAIN

Designed By	Checked By	Reviewed By	Approved By
WPS	WPS	WPS	WPS
Drawn By	WPS	WPS	State Drainage Engineer
Checked By	WPS	WPS	
F.H.W.A. Approved:	10/06/83	88	1 of 1

285



DESIGN NOTES

1. The type of underdrain should be selected to meet design water removal rate and soil conditions. Caution is prescribed in the use of these typical sections since special designs may be required to satisfy project conditions.
2. Type I underdrain is intended for minimum water removal conditions.
3. Type II underdrain is intended for moderate water removal conditions. Where reactive conditions may create chemical clogging, the use of an inert material and/or elimination of the filter fabric may be necessary.
4. Type III underdrain is intended for maximum water removal conditions. The filter fabric separation is required between the coarse aggregate or fine aggregate including those described in general notes 2 and 3. Design note 3 applies for reactive conditions.
5. Type IV underdrain is intended for minimum water removal edgedrain and underdrain applications.
6. Type V underdrain is intended for use in detention basins and other locations which require a filtration system. Type Va is recommended and Type Vb should be used only when Type Va is inappropriate. The standard fine aggregate specified for Type V underdrain conforms to filtration gradation requirements of Chapter 17-25.025 F.A.C.
7. The designer should evaluate whether a filter fabric envelope is required around underdrain Types I, II, III and Va. When required, fabric shall be specified in the plans. Fabric to be paid for separately.

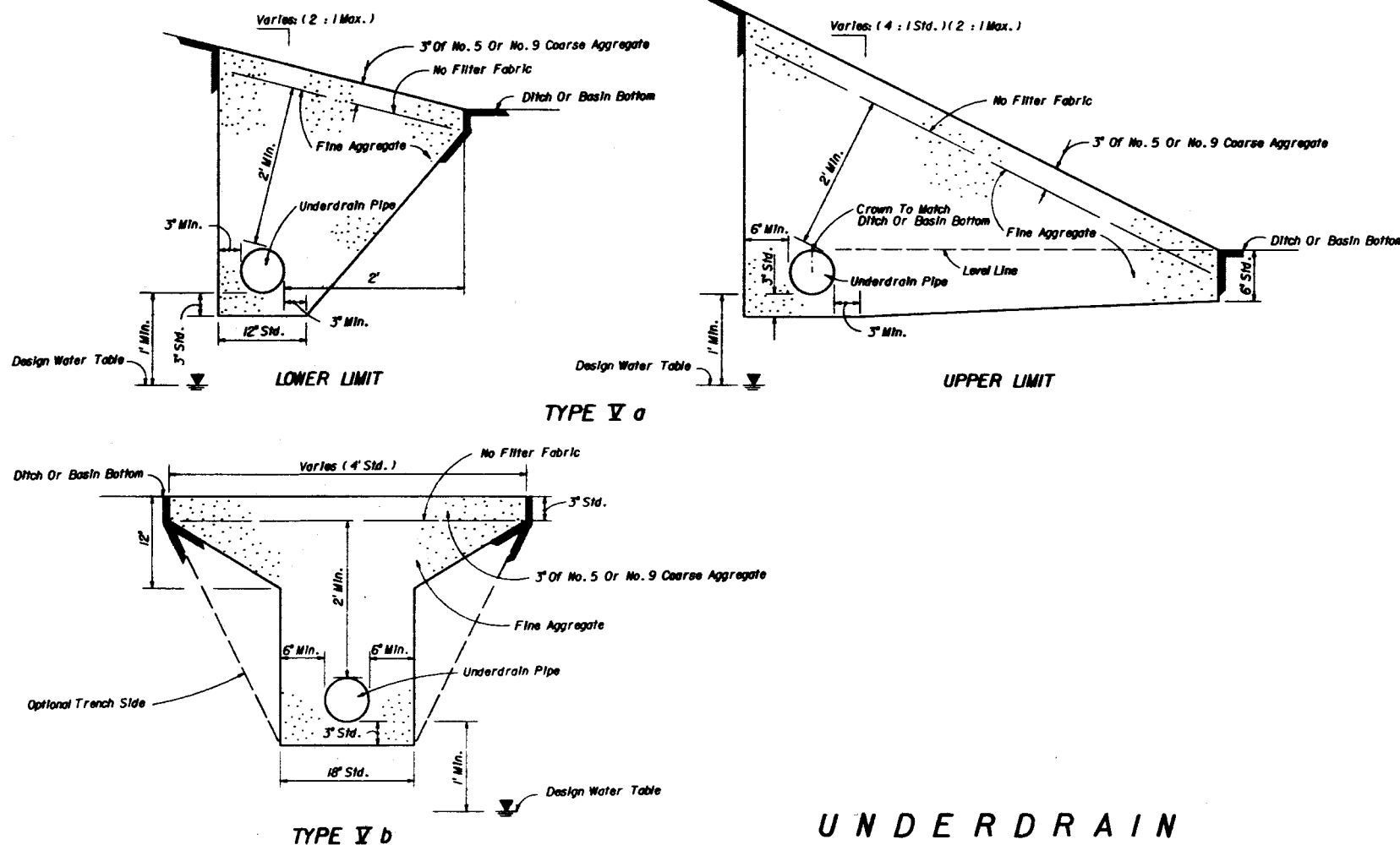
GENERAL NOTES

1. The underdrain pipe shall be either 4" smooth or 5" corrugated tubing unless otherwise shown in the plans.
2. Fine aggregate shall be quartz sand meeting the requirements of Section 902 - 4 of the Standard Specifications.
3. Coarse aggregate shall be gravel or stone meeting the requirements of Sections 901-2 or 901-3 respectively. The gradation shall meet Section 901-6, Grades 4, 467, 5, 56 or 57 stone unless restricted in the plans.
4. Underdrain Type I, II, III and V shall be in accordance with Section 440 and Underdrain Type IV (Edgedrain) in accordance with Section 441.
5. Filter fabric meeting Section 985 shall be a subsurface drainage type.
6. When corrugated polyethylene tubing with slots or 360° perforations is used in conjunction with fine aggregate, a filter fabric sock meeting Section 948-5 is required.
7. For standard location details, see Index 500. Special locations require location details in the plans.
8. The contract unit price for Underdrain, LF, shall include the following components for each underdrain type as follows:
 Type I: Pipe, sock and aggregate.
 Type II: Pipe, aggregate and filter fabric envelope.
 Type III: Pipe, aggregate and internal filter fabric envelope.
 Type Va & Vb: Pipe, sock and aggregates.

Underdrain Type IV is to be paid for under the contract unit price Corrugated Polyethylene Tubing Edgedrain, LF, and shall include the cost for tubing, sock and aggregate.

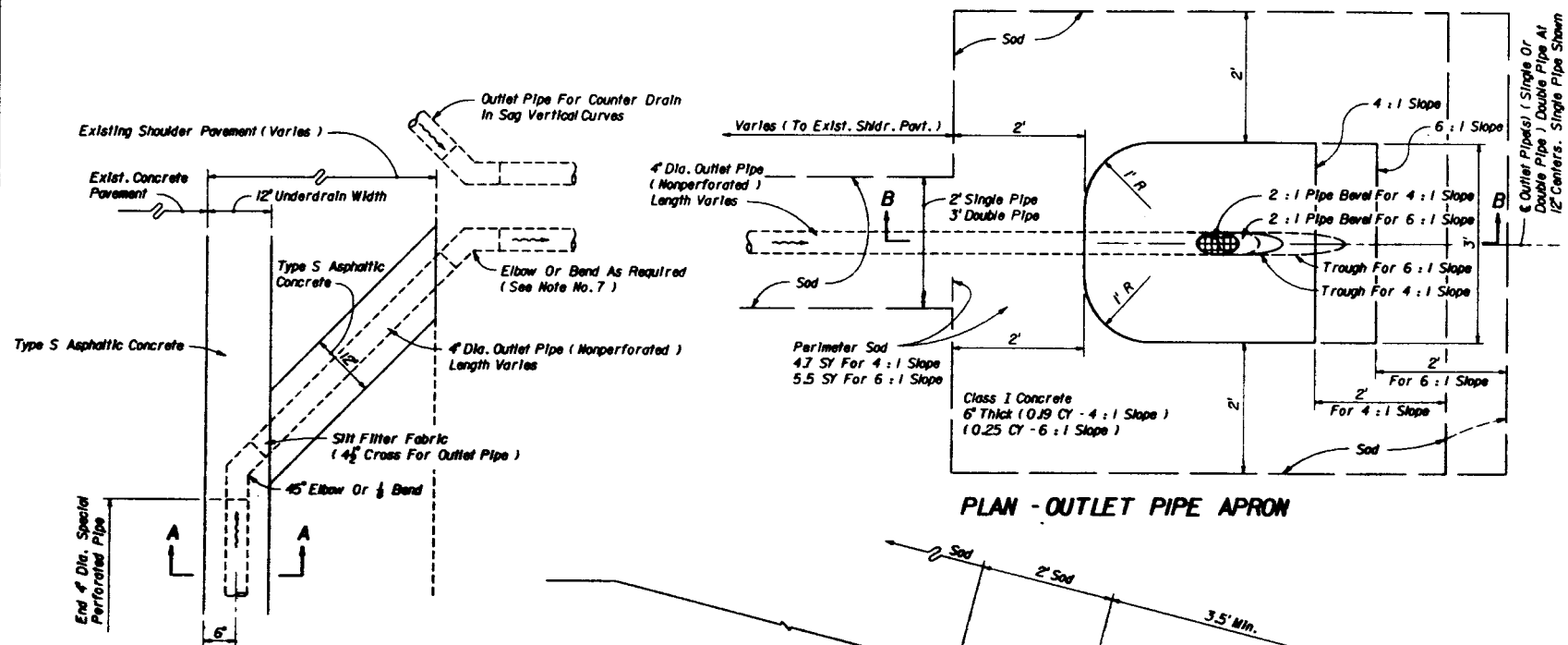
External filter fabric envelopes, when specified for underdrain Types I, II, III and Va, shall be paid for separately under the contract unit price for Plastic Filter Fabric (___) SF.

9. All filter fabric joints shall overlap a minimum of one (1) foot.

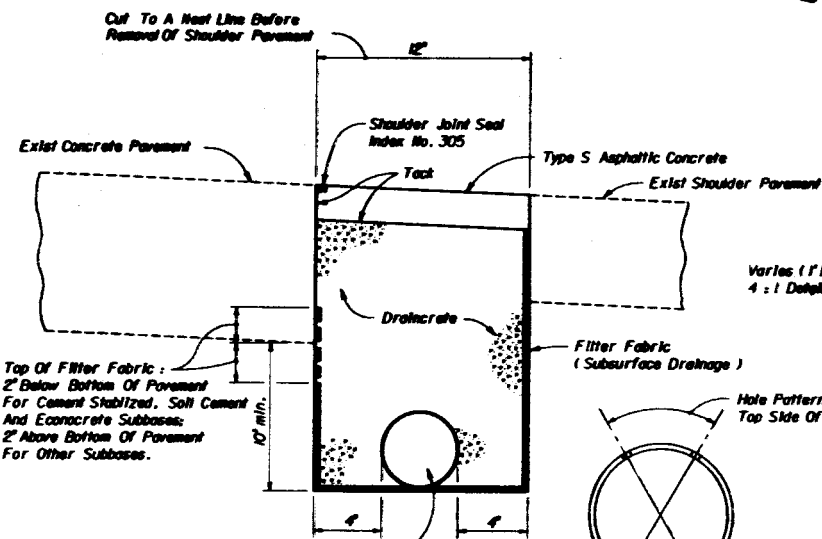


UNDERDRAIN

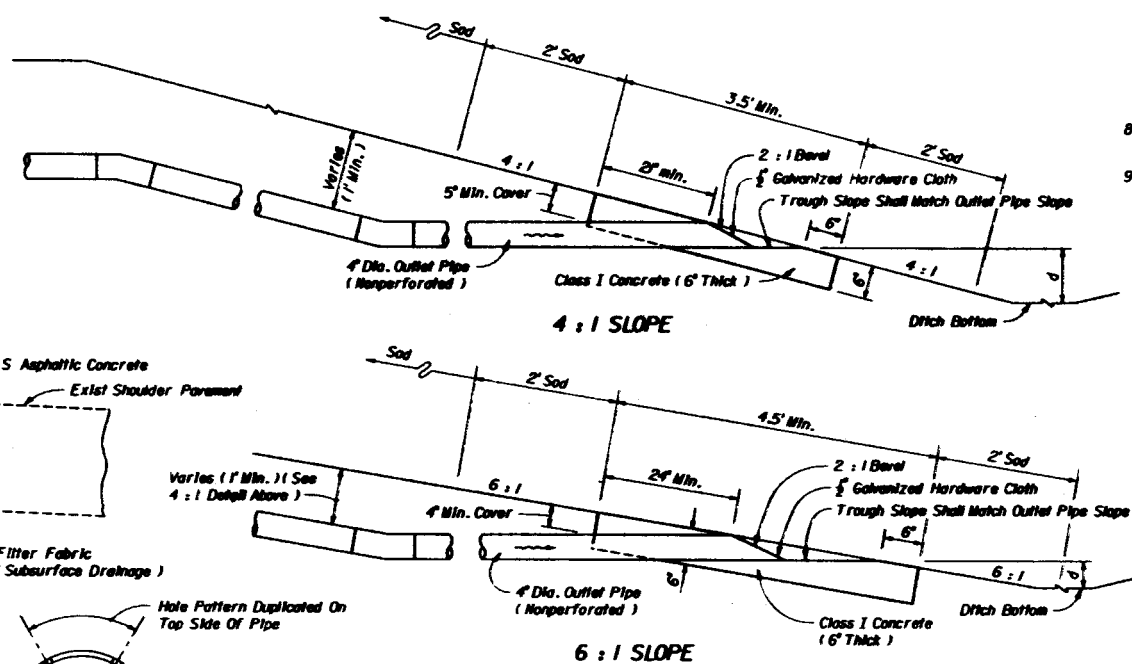
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
UNDERDRAIN AND EDGEDRAIN			
Designed By	ESR	12/95	Approved By
Drawn By	HSD	12/95	Checked By
Checked By	ESR	12/95	Station No.
F.A.B.A. Approved:	08	Sheet No.	286



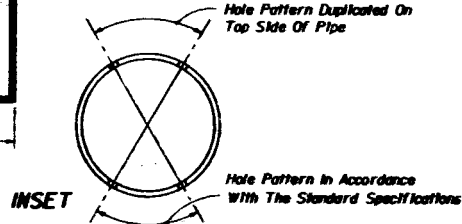
ALIGNMENT OF OUTLET PIPE



SECTION AA



SECTION BB



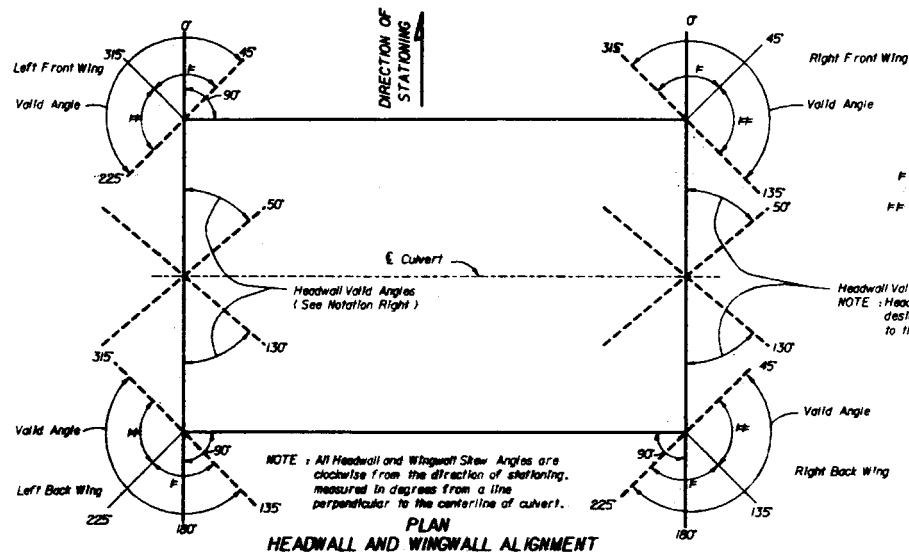
4" EDGEDRAIN

DRAINCRETE EDGEDRAIN ON RURAL FACILITIES

GENERAL NOTES

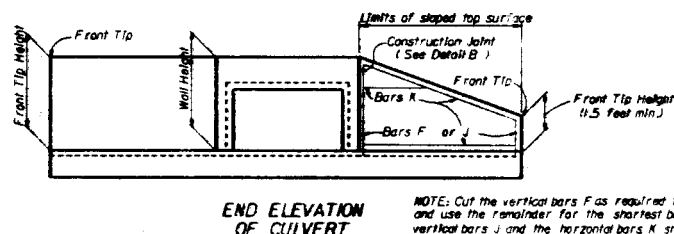
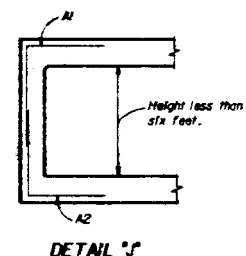
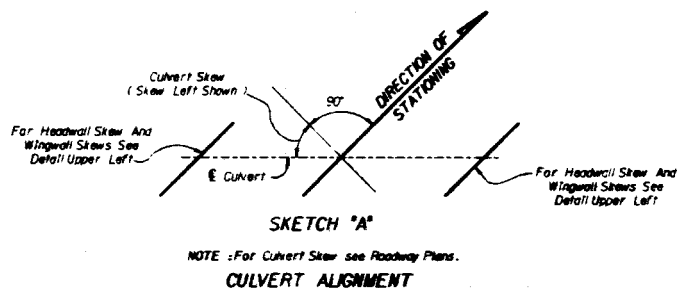
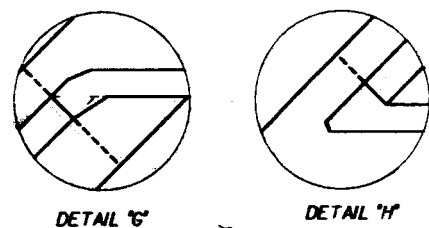
- The contractor shall confine the construction of underdrain to an area in which the entire operation can be carried out in five (5) work days, unless another construction period is called for in the plans, with sufficient time allowed for the draincrete to set before placement of the Type S asphaltic concrete pavement. No trench greater than 2' in depth will be allowed overnight. Trenches shall be barricaded at all times.
- Underdrain shall be constructed adjacent to the low edge of the roadway pavement. When the low edge shifts between outside and inside edges of pavement the underdrain shall extend 50' beyond and begin 50' before the flat point (100' overlap). Underdrain shall be placed on the low side of ramps or crossroad terminals.
- Underdrain shall be constructed on a grade parallel with the edge of pavement profile, except on profiles flatter than one-tenth percent (0.10%). The underdrain shall be constructed on a grade of one-tenth percent (0.10%).
- Immediately prior to placing the filter fabric the entire vertical face of the concrete pavement shall be cleaned to remove adhering base material and soil.
- The Contractor shall devise a procedure for holding the filter fabric in position on the vertical face of the trench. The procedure must be approved by the Engineer prior to placement of the draincrete.
- The upper end of each separate run of underdrain pipe shall be capped.
- Underdrain outlet pipes shall be constructed at a maximum of 500' intervals. Elbows or 1/2 bends shall be used to connect the outlet pipe to the underdrain pipe. The elbows or bands shall be of the same material as the outlet pipe but compatible with the underdrain pipe. When directed by the Engineer, outlet pipes shall be stubbed into existing inlets or into existing ditch pavements at an elevation 0.5' above the inlet flowline or ditch bottom. Concrete apron and bordering sod are not required for stubbed outlets, but replacement sodding will be required at trenches for pipes stubbed into paved ditches. In sag vertical curves separate outlet pipes for underdrains from opposite directions shall use a single apron unless otherwise shown in the plans or otherwise directed by the Engineer. Backfill around outlet pipes shall be of cohesive soils, draincrete will not be permitted.
- Existing paved shoulder that is removed for the construction of outlet pipes shall be replaced with Type S asphaltic concrete at the rate of 500 lbs. per square yard.
- The contract unit price for Edgedrain (Draincrete) (4" LF. Pay Item No. 44-H) shall be full compensation for removal of existing shoulder pavement, trench excavation, disposal of excess materials, filter fabric, pipe and fittings, draincrete, and, barricades necessary for underdrain construction. The contract unit price for Underdrain Outlet Pipes (4" LF) shall be full compensation for removal of existing shoulder pavement, trench excavation, pipe and fittings, hardware cloth, stubbing into existing inlets and paved ditches, restoration of ditch pavement, backfill in place, and, disposal of excess materials. Concrete apron shall be paid for under the contract unit price for Class I Concrete (Miscellaneous) CY. Sodding shall be paid for under the contract unit price for Sodding SY. Shoulder pavement shall be paid for under the contract unit price for Type S Asphaltic Concrete (Inc Bit) TW. Tack coat shall be paid for under the contract unit price for Bit Mat (Tack Coat) GA. Shoulder joint seal shall be paid for under the contract unit price for Shoulder Joint Seal LF.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
UNDERDRAIN AND EDGEDRAIN			
Designed By	Drawn By	Checked By	Approved By
Drawn By	DESIGNED	05/05	
Reviewed By	05/05	05/05	
F.D.B.A. Approved	05/05	05/05	
2 of 2		286	



F Within these limits the top surface of the Wingwalls shall be level.
 FF Within these limits the top surface of the Wingwalls shall be sloped.

NOTE: Headwalls with skew angles between 5° and 129° require special designs. Requests for such special designs are to be submitted to the State Drainage Engineer for development.



NOTE: Designs for box culverts under this index are to be produced only by computer analysis, utilizing the program named PSTDN55. Designs under this index are to be limited to the live loads and dimensional restraints shown in the General Notes of this index and to the fill on the barrels as shown in the roadway plans. It is the construction Contractor's responsibility to provide for supporting construction loads that exceed the above loadings.

GENERAL NOTES

DESIGN SPECIFICATIONS: A.A.S.H.T.O. 1983.

LOADING: HS20-44, Modified for Military Loading as Required

SURFACE FINISH: The Class Surface finish for all concrete surfaces shall be a general surface finish.

SKewed CONSTRUCTION JOINTS: Construction joints in barrels of culverts with skewed wingwalls may be placed parallel to the headwalls and the reinforcing steel in the slabs may be cut provided that the cut reinforcing steel extends beyond the construction joint enough for splices to be made in accordance with the labeler's right this sheet. The cost of construction joints shall be at the expense of the contractor.

* REINFORCING BAR SCHEDULE:

- When the depth is less than or equal to 2.0 feet, Bars C2 are utilized in the bottom of the top slab. In all other cases, Bars C2 are replaced with Bars C1 spaced at 18 inches on centers.
- When the skew angle for a headwall equals 0 degrees plus or minus 11 degrees the respective S Bars S2 or S3 will not be utilized.
- When the barrel height is less than 6 feet, Bars B2 will be eliminated as shown in Detail J.
- If the span is less than five feet, Bars A1 and A2 will be Type II Bars.
- The portions of Bars "H" that extend thru construction joints into wingwalls above footings shall be wrapped with one layer of 55 lb smooth roofing.

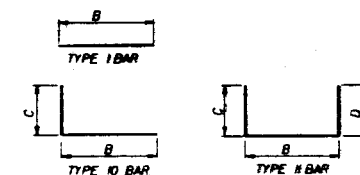


TABLE OF MINIMUM BAR SPLICE LENGTHS

BAR SIZE	SPLICE	BAR SIZE	SPLICE
4	1'- 0"	8	3'- 10"
5	2'- 2"	9	4'- 10"
6	2'- 7"	10	6'- 0"
7	3'- 0"	11	7'- 6"

NOTE: Construction joints in wingwalls and footings are located as follows: For non-skewed wingwalls they are located adjacent to the exterior face of the exterior barrel wall, when the % of wingwall and % of exterior barrel wall results in an acute angle see Left Front Wingwall above and when the angle is obtuse see Left Back Wingwall above.

PART PLAN SHOWING WINGWALLS AND THE LOCATION OF CONSTRUCTION JOINTS

NOTE: Cut the vertical bars F as required for the longest bar and use the remainder for the shortest bar in the wingwall. The vertical bars J and the horizontal bars K shall be constructed likewise. The lengths shown in the reinforcing steel bar schedule for bars F, J and K require cutting for sloped top wingwalls only.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CONCRETE BOX CULVERT CULVERT DETAILS

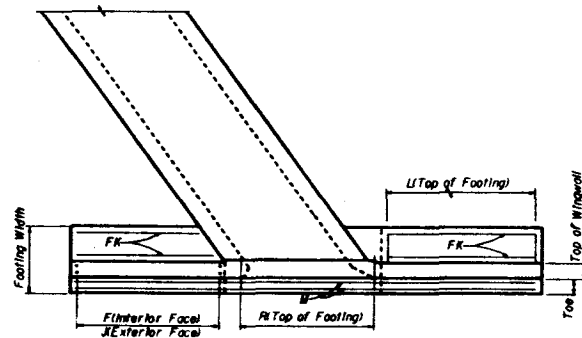
Designed By	Drawn By	Checked By	Approved By	Revision No.	Sheet No.
GPC	GPC	GPC	GPC	1-01	1 of 5
Checked By	GPC	GPC	GPC	1-01	1 of 5

F.A.S.A. Approved

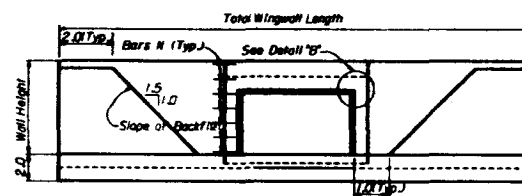
88

1 of 5

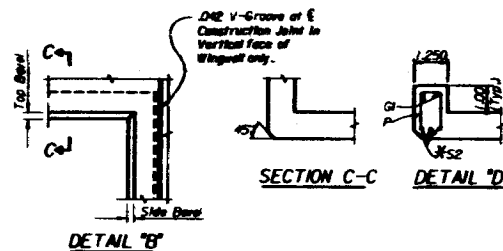
290



PART PLAN AT END OF CULVERT

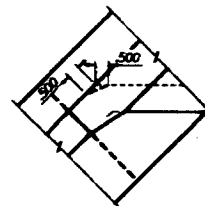


END ELEVATION

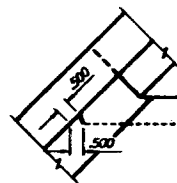


SECTION C-C

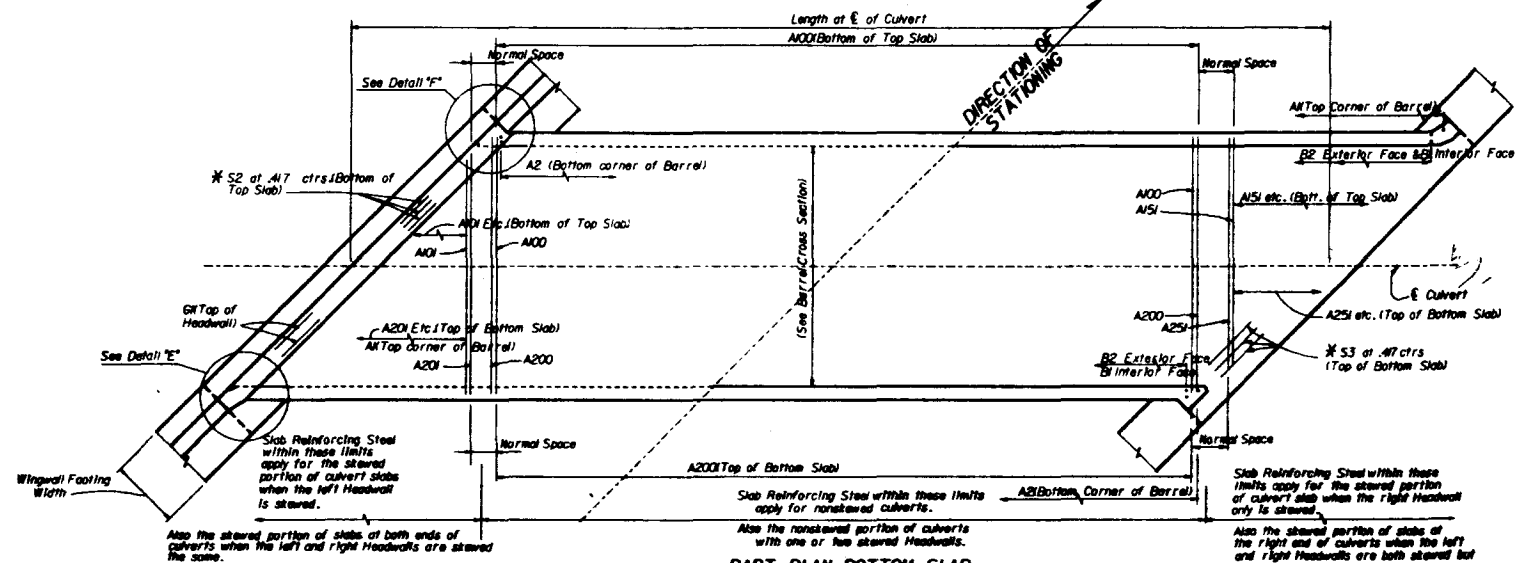
DETAIL 'D'



DETAIL 'E'

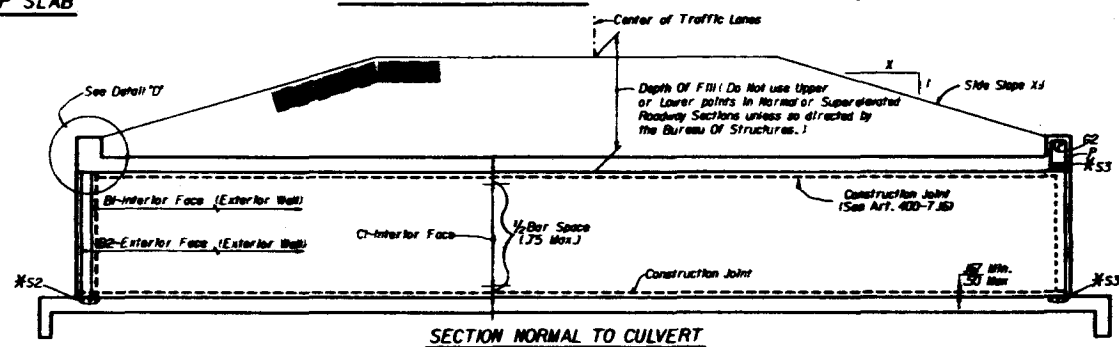


DETAIL 'F'

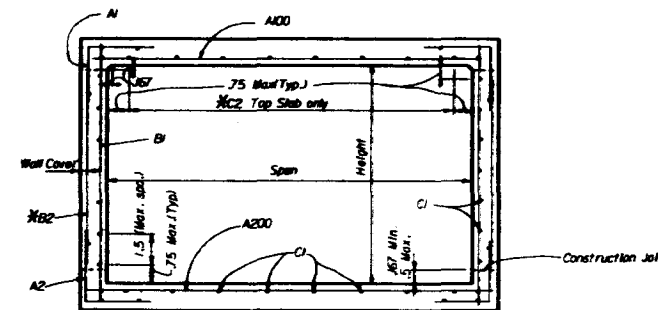


PART PLAN TOP SLAB

PART PLAN BOTTOM SLAB



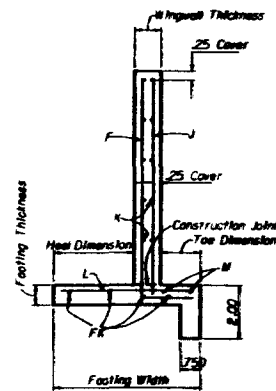
SECTION NORMAL TO CULVERT



SECTION THRU BARREL

NOTE: The location of the first bar from the ends of the culvert shall not be less than .25, but not greater than one half the bar spacing.

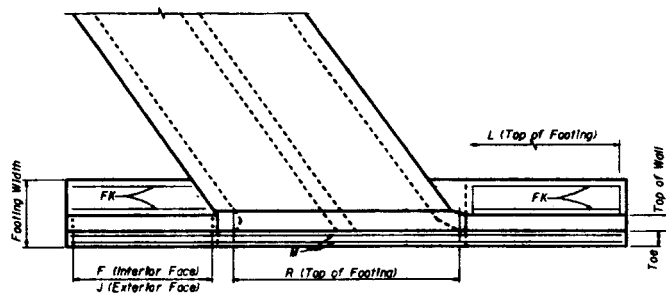
* See Sheet Of Culvert Details



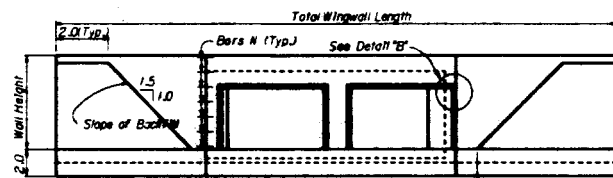
SECTION THRU WINGWALL

NOTE: For Bars F, J, K, L and or FR in the Wingwalls, the subscripts 1 thru 4 apply as follows:
1-Left Front
2-Left Back
3-Right Front
4-Right Back

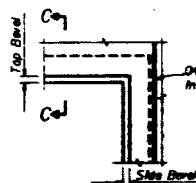
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BOX CULVERT SINGLE BARREL			
Designed By	Drawn By	Checked By	Approved By
Drawn By	QC	QC	QC
Reviewed By	QC	QC	QC
FAIRBANKS, Approved	QC	QC	QC
2 of 5		290	



PART PLAN AT END OF CULVERT



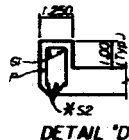
END ELEVATION



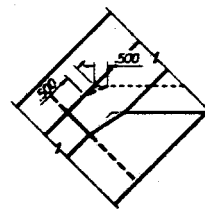
DETAIL 'B'



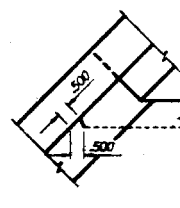
SECTION C-C



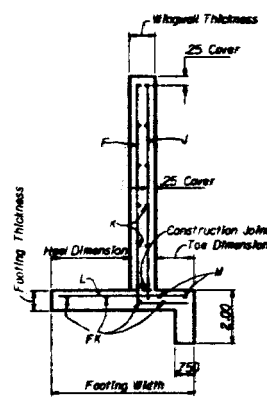
DETAIL 'D'



DETAIL 'E'

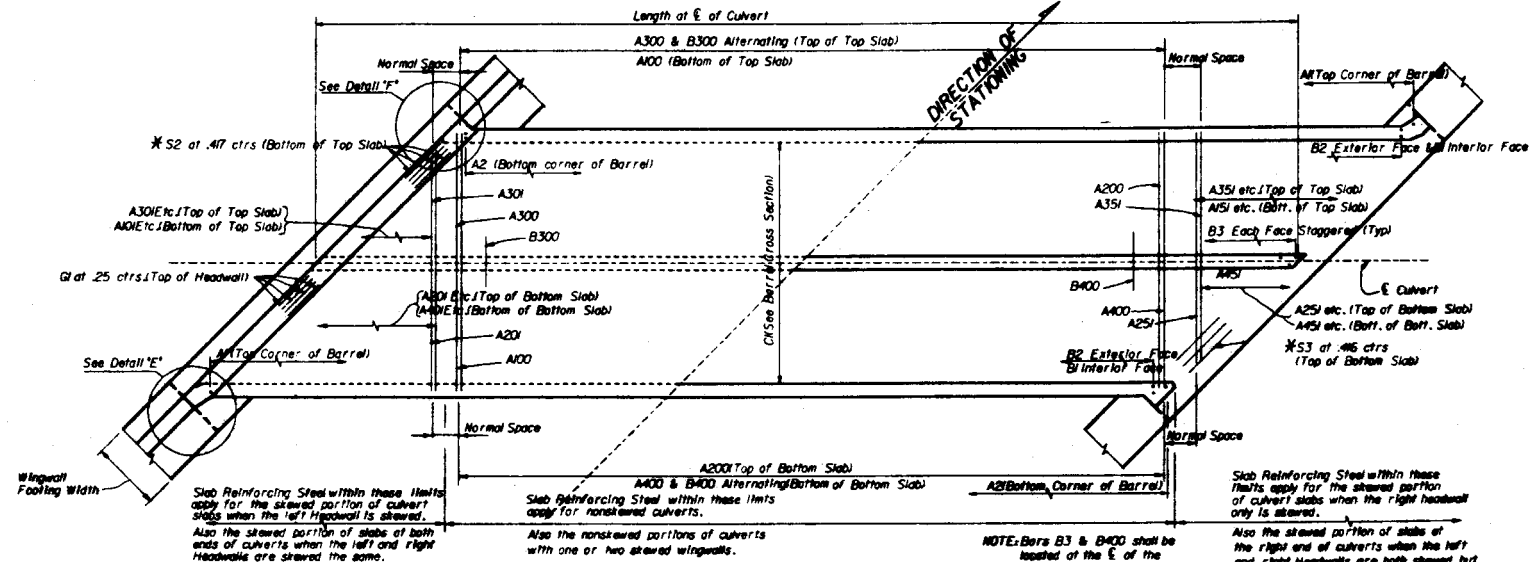


DETAIL 'F'



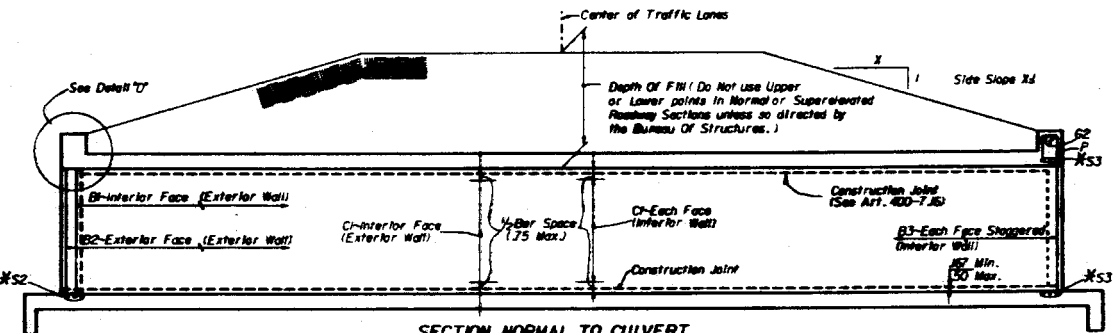
SECTION THRU WINGWALL

NOTE: For Bars F, J, K, L and/or FK in the Wingwalls, the subscripts 1 thru 4 apply as follows:
1-Left Front
2-Left Back
3-Right Front
4-Right Back

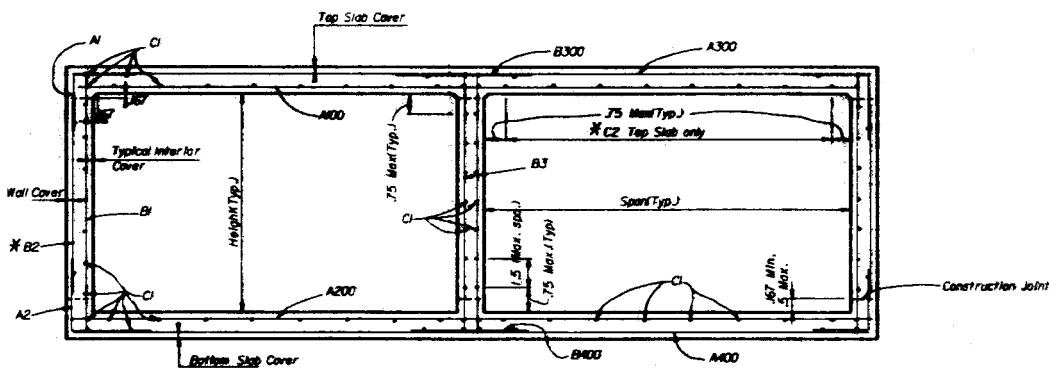


PART PLAN TOP SLAB

PART PLAN BOTTOM SLAB



SECTION NORMAL TO CULVERT



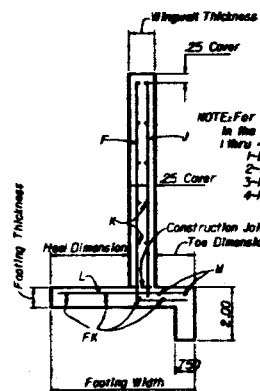
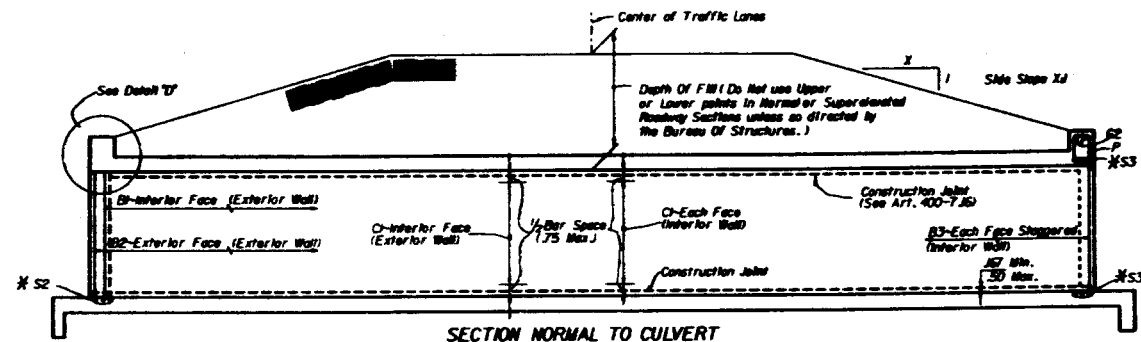
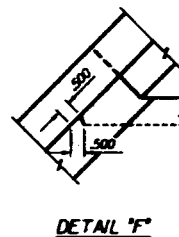
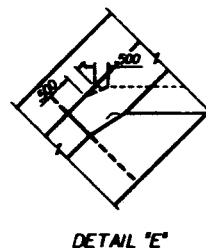
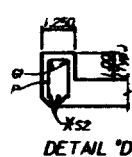
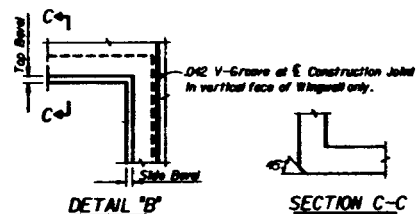
SECTION THRU BARREL

NOTE: The location of the first bar from the ends of the culvert shall not be less than .25, but not greater than one half the bar spacing.

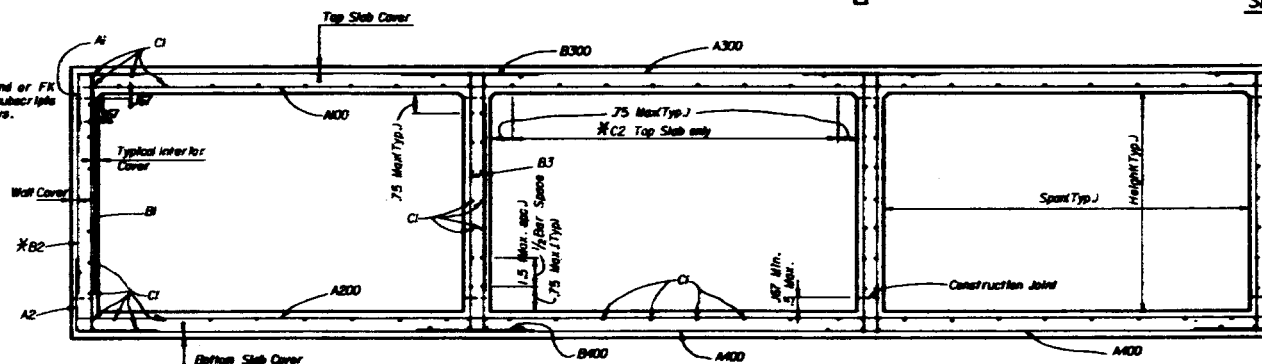
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BOX CULVERT DOUBLE BARREL			
Designed By	Checked	Approved By	
Drawn By	GPB	1-65	
Reviewed By	ACB	1-65	
F.A.R.A. Approved		88	3 of 5
		290	

PART PLAN AT END OF CULVERT

END ELEVATION



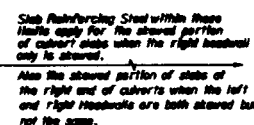
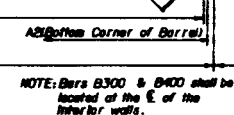
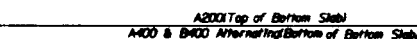
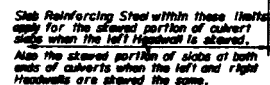
SECTION THRU WINGWALL




SECTION THRU BARREL

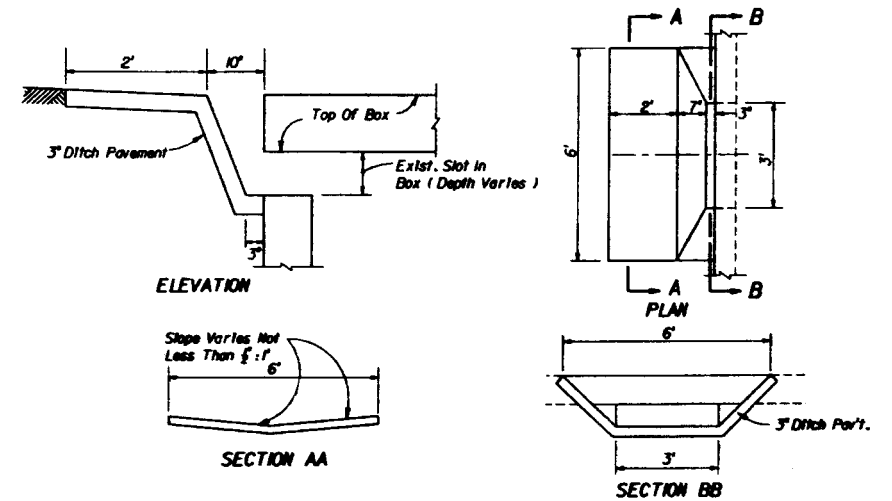
NOTE: The location of the first bar from the ends of the culvert shall not be less than .25, but not greater than one half the bar spacing.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BOX CULVERT TRIPLE BARREL			
Designed By	Notes	Revised	Approved By <i>J. P. Hall</i>
Drawn By	SPS	1-65	State Bridge Engineer, Roadways
Checked By	RCB	1-65	Revision No. Sheet No. 290
F.B.S.A. Approved			



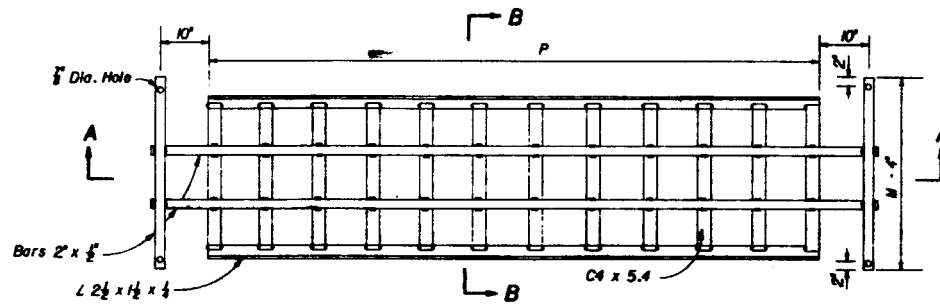
NOTE: The location of the first bar from the ends of the culvert shall not be less than .25, but not greater than one half the bar spacing.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
<h1 style="text-align: center;">CONCRETE BOX CULVERT</h1> <h2 style="text-align: center;">QUADRUPLE BARREL</h2>			
Designed By	Notes	Revised	Approved By
Drawn By	SPB	1-65	 State Bridge Engineer, Roadways
Checked By	ACB	1-65	
F.A.R.A. Approved			Sheet No. 5 of 5 Index No. 290

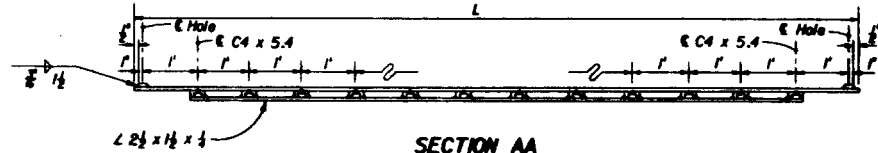


**SAFETY MODIFICATION FOR
INLETS IN BOX CULVERTS**

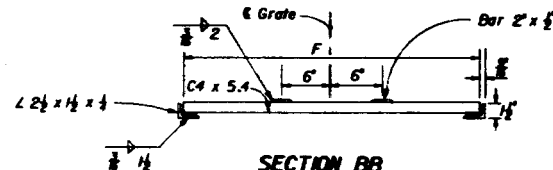
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SAFETY MODIFICATIONS FOR INLETS IN BOX CULVERTS					
Designed By	MD	Date	07/10	Approved By	<i>[Signature]</i>
Drawn By	BJT	Date	07/10	Scale Bridge Engineer	
Checked By	BBS	Date	07/10	Revision No.	Sheet No.
F.A.R.A. Approved: 03/28/75				10	1 of 1
					293



PLAN

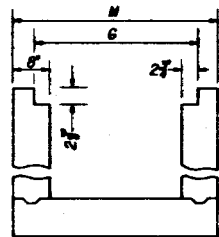


SECTION AA

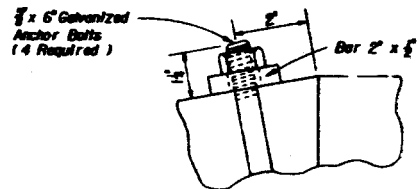


SECTION BB

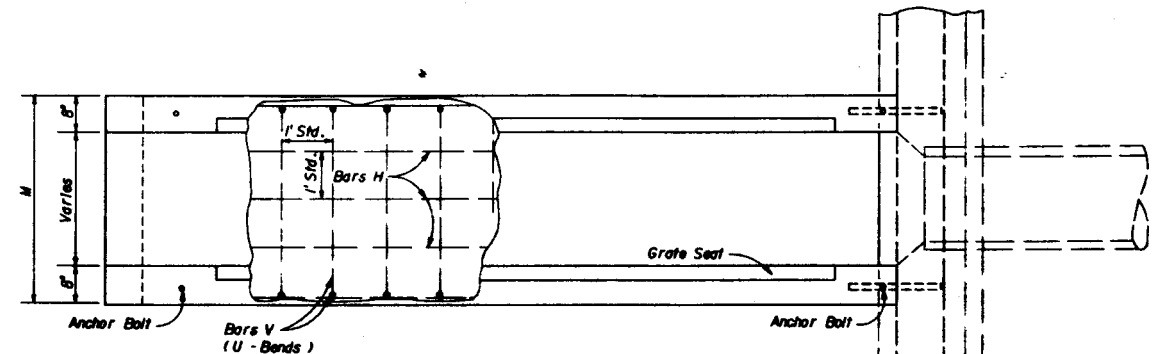
GRATE DETAIL



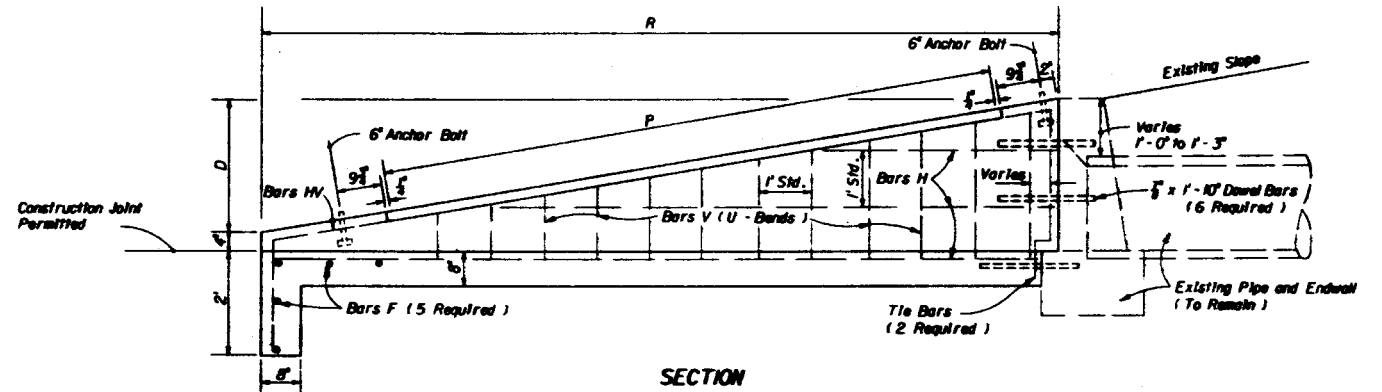
GRATE SEAT DETAIL



ANCHOR BOLT DETAIL



PLAN



SECTION

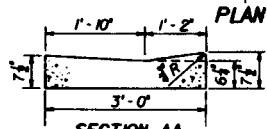
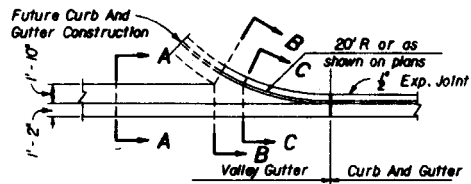
GENERAL NOTES

1. For use criteria see "Steel Grating Use Criteria" Index No. 251.
2. Grates to be ASTM A 588 or A 242, Grade 50, weathering steel, except grates exposed to salt water shall be ASTM A 242, A 44, A 572 or A 588, Grade 50 steel, and galvanized in accordance with Section 962-7 of the Standard Specifications, and shall be designated in the plans as Alternate G.
3. Channel section C3 x 6.0 may be substituted for the C4 x 5.4 channel.
4. All reinforcing No. 4 bars with 2' clearance except as noted. Spacings shown are center to center. Laps to be 12" minimum. Welded wire fabric (two cages max.) having an equivalent cross section area (0.20 sq. in.) may be substituted for bar reinforcement.
5. Drill 1/2" holes 8" deep with a rotary drill in existing endwall for dowel bars. Holes shall be thoroughly cleaned prior to placing dowel bars and epoxy.
6. Endwall to be paid for under the contract unit price for Class I Concrete (Endwalls) CI and Reinforcing Steel (Roadway) LB. Cost of dowel bars and epoxy mortar to be included in the contract unit price for reinforcing steel. Cost of grates to be paid for under the contract unit price for Endwall Grate LB., plan quantity. Cost of galvanized bolts and nuts to be included in the contract unit price for the grate.
7. Sod slopes 5' each side and above endwall. Sodding to be paid for under the contract unit price for Sodding SI.

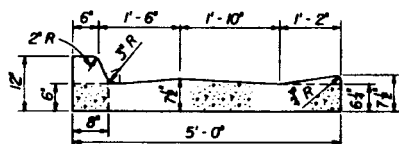
DIMENSIONS AND QUANTITIES PER GRATE									
Slope	Pipe Size	Channels @ 5.4 Lbs./L.F.		Bars @ 3.4 Lbs./L.F. (12 sq. ft.)		Angles @ 3.2 Lbs./L.F. (12 sq. ft.)		Total Weight - Lbs.	
		Quantity	Lbs.	Quantity	Lbs.	Quantity	Lbs.		
6:1	10"	10	54	10	34	10	32	100	
	12"	12	65	12	41	12	39	120	
	14"	14	76	14	48	14	46	140	
	16"	16	87	16	55	16	53	160	
4:1	10"	6	32	6	20	6	19	60	
	12"	7	38	7	25	7	23	70	
	14"	8	43	8	29	8	27	80	
	16"	9	49	9	33	9	31	90	

DIMENSIONS AND QUANTITIES PER U - ENDWALL									
Pipe Size	G	M	D	R	P	Class I Concrete - C.Y.	Reinforcing Steel - Lbs.	Sodding S.Y.	
10"	2'-0"	3'-7"	4'-0"	15'-0"	9'-4"	2.8	87	23	
12"	2'-0"	3'-10"	4'-3"	14'-6"	10'-4"	2.53	73	20	
14"	2'-0"	4'-4"	4'-6"	14'-0"	11'-4"	2.36	69	18	
16"	2'-0"	4'-10"	5'-0"	13'-6"	12'-4"	2.19	65	16	
18"	2'-0"	5'-7"	5'-6"	13'-0"	13'-4"	1.91	50	14	
20"	2'-0"	6'-4"	6'-0"	12'-6"	14'-4"	1.72	43	12	
22"	2'-0"	7'-1"	6'-6"	12'-0"	15'-4"	1.55	37	10	
24"	2'-0"	7'-8"	7'-0"	11'-6"	16'-4"	1.38	31	8	
26"	2'-0"	8'-5"	7'-6"	11'-0"	17'-4"	1.21	25	7	
28"	2'-0"	9'-2"	8'-0"	10'-6"	18'-4"	1.04	19	6	
30"	2'-0"	9'-9"	8'-6"	10'-0"	19'-4"	0.87	13	5	

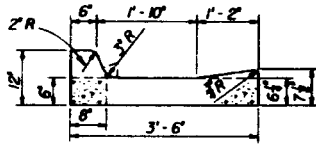
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SAFETY MODIFICATIONS FOR ENDWALLS			
Designed By	Checked By	Approved By	Stamp
Drawn By			
Reviewed By			
F.A.R.A. Approved	08	1 of 1	295



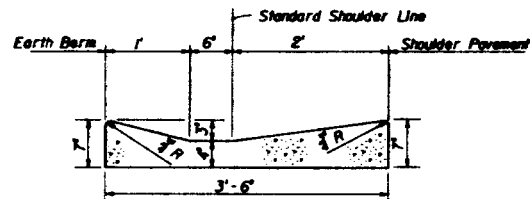
SECTION AA



SECTION BB

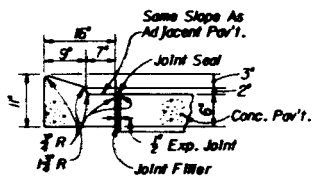


SECTION CC
VALLEY GUTTER

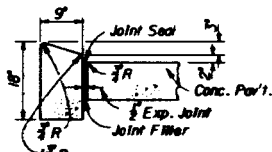


SHOULDER GUTTER

CONCRETE CURB AND GUTTER

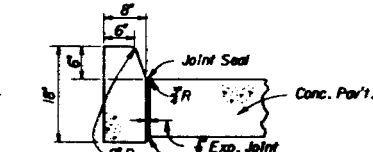


TYPE A



TYPE B

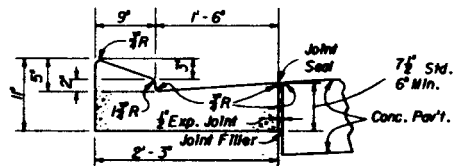
CONCRETE CURB



TYPE D

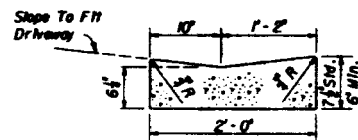
* Note (1): When used on high side of roadways, the cross slope of the gutter shall match the cross slope of the adjacent pavement and the thickness of the lip shall be 6", unless otherwise shown on plans.

TYPE F



TYPE E

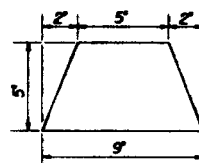
* See Note (1) Above.



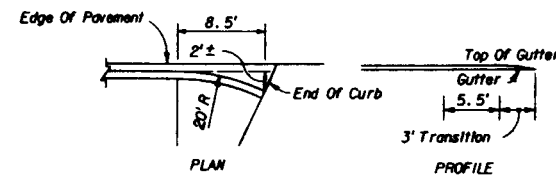
DROP CURB

* See Note (1) Above.

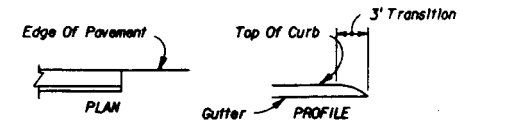
ASPHALTIC CONCRETE CURB



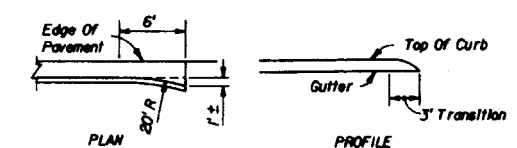
STRAIGHT END



FLARED END
CURB TYPE A



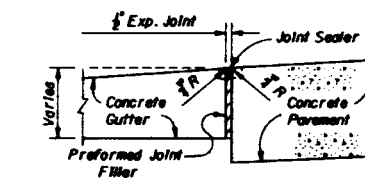
STRAIGHT END



FLARED END

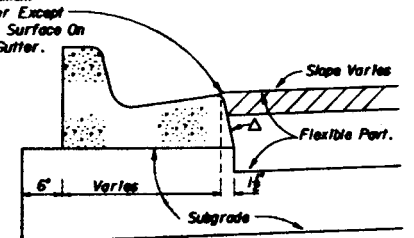
CURB AND GUTTER TYPES E & F

MEDIAN CURB AND GUTTER ENDINGS



EXPANSION JOINT BETWEEN GUTTER
AND CONCRETE PAVEMENT

Surface On Low Side Of Pavement To Be 1/4" Above Lip Of Gutter Except FC - 2 To Be 3/4" Above Lip. Surface On High Side To Be Flush With Gutter.



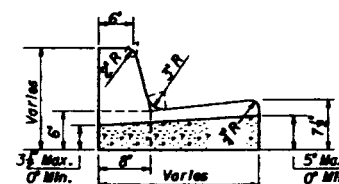
Δ When curb and gutter, shoulder gutter, valley gutter and drop curb are constructed adjacent to flexible pavement, the face at the lip of the gutter shall be sloped as shown in this detail.

CURB AND GUTTER ADJACENT TO FLEXIBLE PAVEMENT

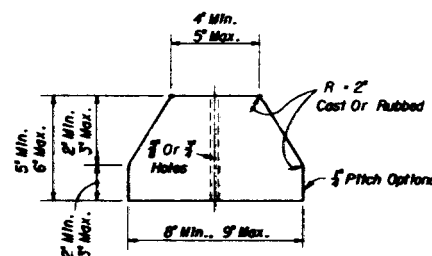
GENERAL NOTES

1. The curb and gutter details shown are for construction adjacent to concrete pavement, except as noted.
2. For curb, gutter and curb and gutter constructed adjacent to flexible pavement, the 1/2" expansion joint shown will not be used.
3. For curb, gutter, curb and gutter and traffic separators provide 1/2" contraction joints at 10' centers (max.). Contraction joints adjacent to PCC pavement on tangents and flat curves are to match the pavement joints, with intermediate joints not to exceed 10' centers.
4. Ends of Curb Types B and D shall transition from full to zero heights in 3 feet.

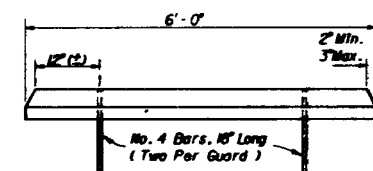
CONTRACTION JOINT IN CURB OR CURB AND GUTTER



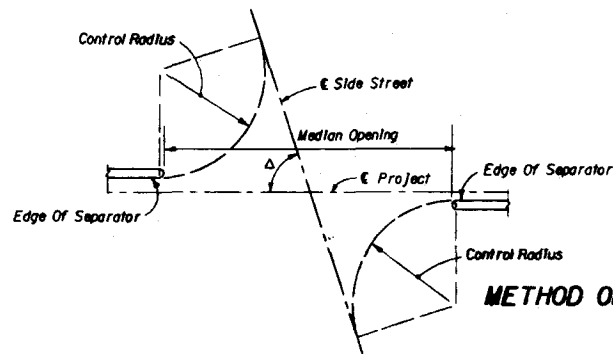
Note: See general note No. 3



CONCRETE BUMPER GUARD

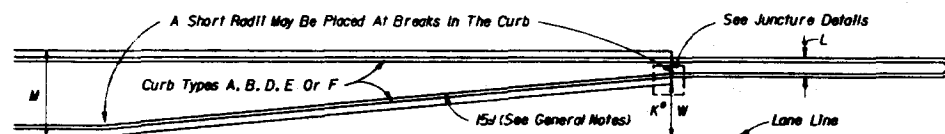


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB & CURB AND GUTTER			
Designed By	Checked	Approved By	
Drawn By		Scale	1/4" = 1'-0"
Revised By		Sheet No.	1 of 1
F.A.R.A. Approved		Date	07/07/75
		Sheet No.	300

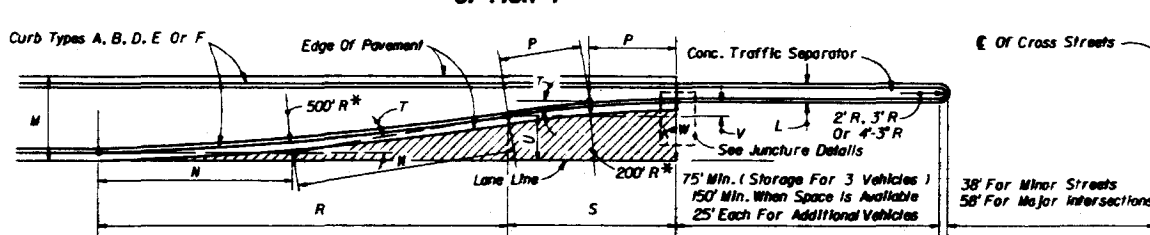


DESIGN VEHICLE	MEDIAN OPENING For $\Delta = 90^\circ$	CONTROL RADIUS Edge Of Separator
P	76'	40'
SU	96'	50'
WB - 40 & WB - 50	146'	75'

METHOD OF DETERMINING MEDIAN OPENINGS AT SKEWED SIDE STREETS



OPTION 1



* Radii are measured from face of curb, regardless of the curb type. These radii are minimums recommended for urban construction. For rural highways, the radii are to be in conformity with the design speed of the highway where practicable.

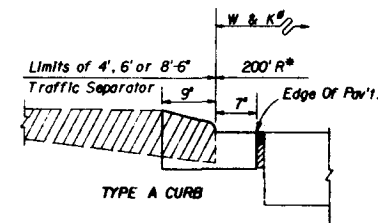
• Dimensions K and W are identical except when median curb is type D or curb and gutter type F. Dimension K is from lane line to the face of curb. Dimension W is from lane line to traffic separator.

NOTE: Hatched portion indicates area given in table below.

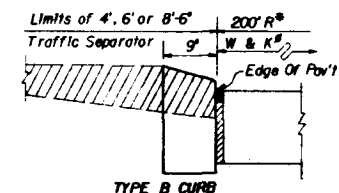
OPTION 2

TABLE OF DIMENSIONS AND QUANTITIES FOR MEDIAN STORAGE LANES													
L	M	CURB TYPE	N	P	R	S	T	U	V	K ^a	W	AREA SQ. FT.	
4'	15'-6"	A	43.42	11.25	85.80	34.24	08' 51"	25.3'	7.98	2.35	10'-8"	10'-8"	529.8
		B	43.50	11.20	90.25	36.01	10' 24"	00.1'	8.21	3.29	8'-6"	8'-6"	622.1
		D	43.50	11.20	90.25	36.01	10' 24"	00.1'	8.21	3.29	8'-6"	8'-6"	622.0
		E	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	386.2
		F	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	488.6
		F	44.85	11.66	87.63	35.05	10' 05"	35.7'	9.24	2.93	12'-4"	12'-2"	568.0
4'	17'-6"	A	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.5
		B	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		D	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		E	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	44.85	11.66	87.63	35.05	10' 05"	35.7'	9.24	2.93	12'-4"	12'-2"	568.0
6'	17'-6"	A	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.5
		B	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		D	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		E	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	44.85	11.66	87.63	35.05	10' 05"	35.7'	9.24	2.93	12'-4"	12'-2"	568.0
6'	19'-6"	A	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.5
		B	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		D	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		E	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	44.85	11.66	87.63	35.05	10' 05"	35.7'	9.24	2.93	12'-4"	12'-2"	568.0
8'-6"	22'-0"	A	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.5
		B	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		D	43.34	11.23	87.72	35.08	10' 15"	15.0'	9.64	3.85	13'-6"	13'-6"	790.4
		E	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	39.08	15.63	77.68	31.07	08' 56"	16.7'	7.50	2.43	10'-0"	10'-0"	542.1
		F	44.85	11.66	87.63	35.05	10' 05"	35.7'	9.24	2.93	12'-4"	12'-2"	568.0

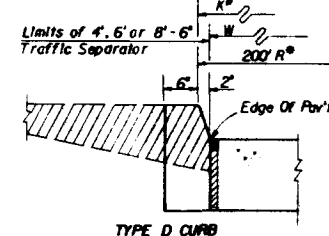
Note: Tabulated values are applicable only where median storage lanes occur on tangent construction.



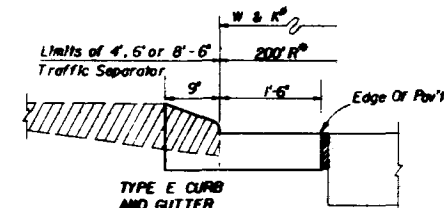
TYPE A CURB



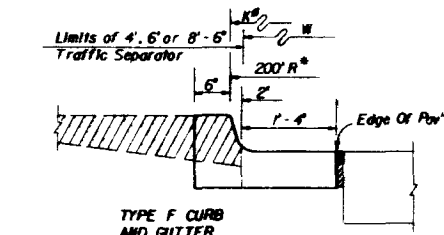
TYPE B CURB



TYPE D CURB



TYPE E CURB AND GUTTER



TYPE F CURB AND GUTTER

JUNCTION DETAILS MEDIAN CURBS AND TRAFFIC SEPARATORS

GENERAL NOTES

1. Reverse curve treatment may be used for design speeds of 40 mph or less.

Taper treatment may be used for all design speeds, but, is to be used in lieu of reverse curves for design speeds of 45 mph or greater.

2. For single lane storage, a taper rate of 15:1 is to be used for design speeds up to 50 mph. For design speeds greater than 50 mph tapers shall conform to the lengths shown in Table III-15 of the 'Manual of Uniform Standards For Design, Construction And Maintenance For Streets And Highways'.

For dual lane storage, tapers shall conform to the following rates:

Design Speed (mph)	Taper Rate (Length To Width)
30	8:1
35	10:1
40	12:1
45 or greater	15:1

DESIGN NOTES

1. Any variation from the treatment described in the General Notes shall be detailed in the plans.

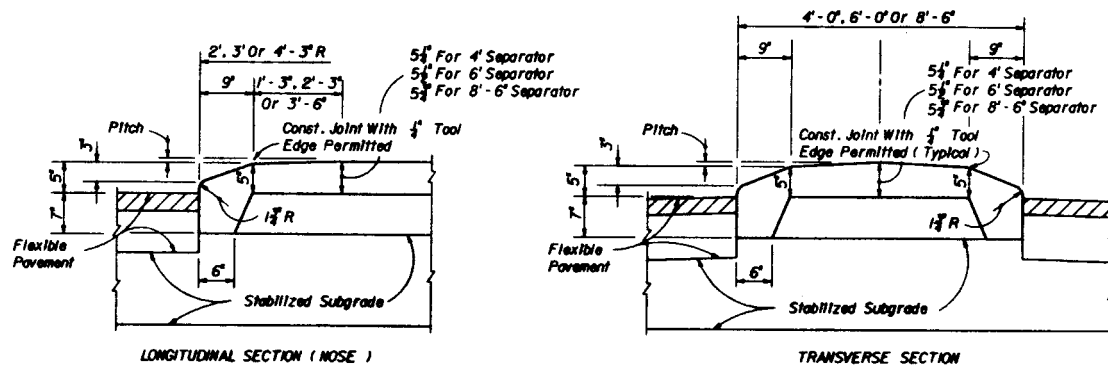
2. When space is limited and single lane storage is used, the length to width ratio (taper rate) may be as follows:

Design Speed (mph)	Taper Rate
30	8:1 (100' Min. Length For 12' Lane, 80' Min. Length For 10' Lane)
35	10:1
40	12:1
45 or greater	15:1

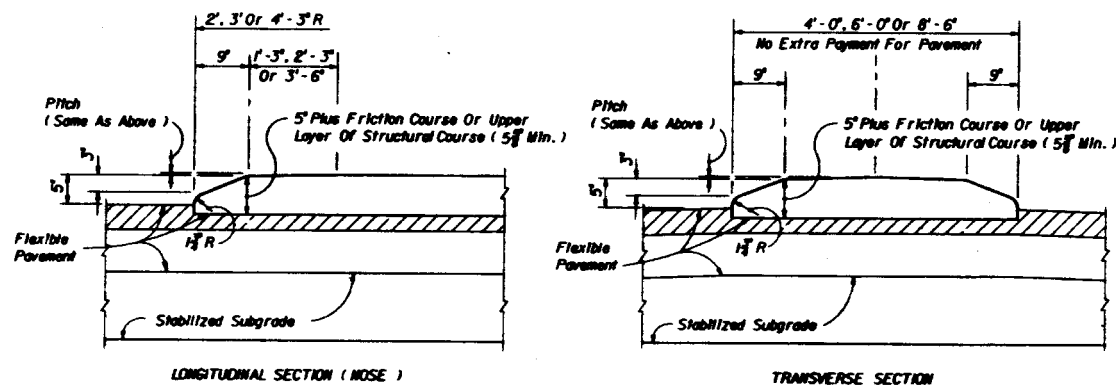
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MEDIAN STORAGE LANES

Designed By	Drawn By	Checked By	Approved By
SHS	SHS	SHS	SHS
06/73	06/73	06/73	06/73
06/73	06/73	06/73	06/73
06/73	06/73	06/73	06/73

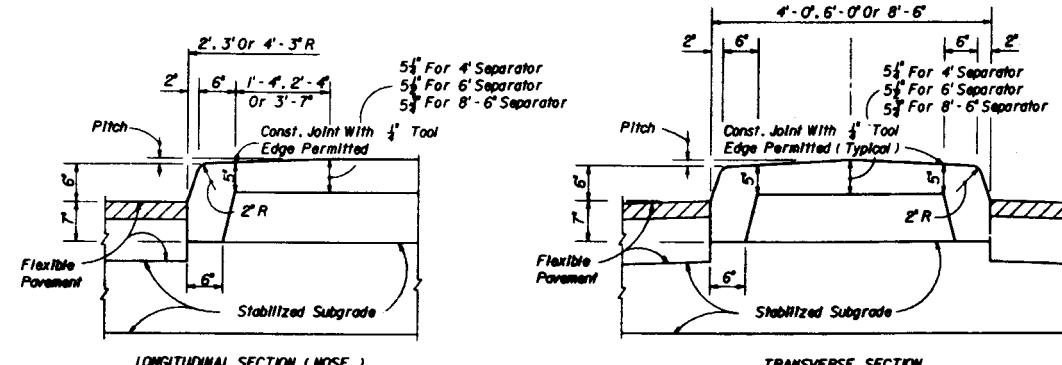


OPTION I

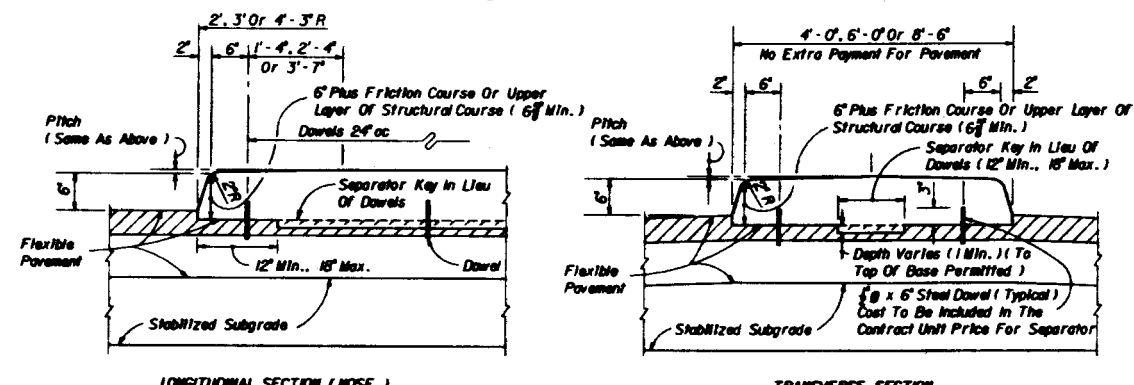


OPTION II

TYPE I CONCRETE TRAFFIC SEPARATOR

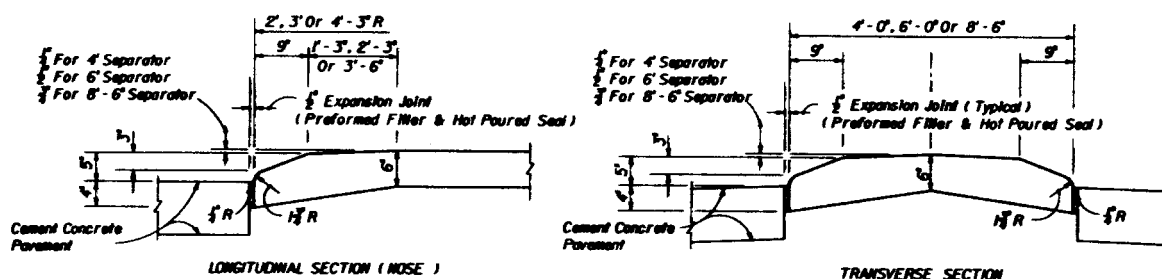


OPTION I

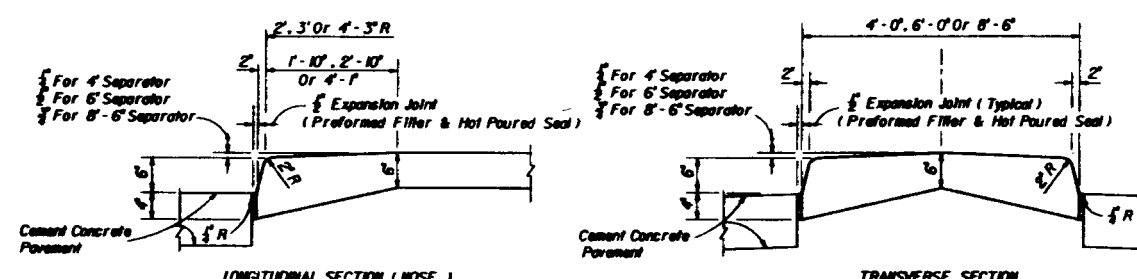


OPTION II

TYPE II CONCRETE TRAFFIC SEPARATOR



TYPE II CONCRETE TRAFFIC SEPARATOR

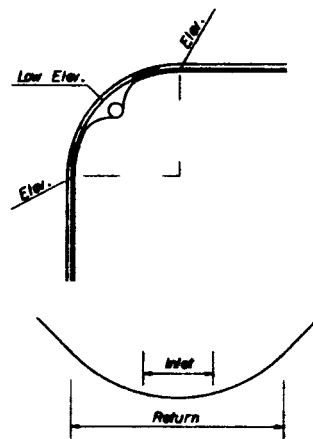
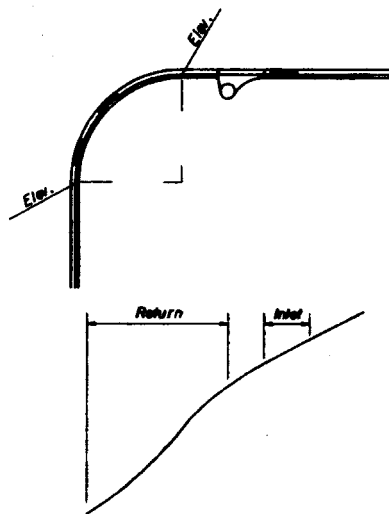


TYPE III CONCRETE TRAFFIC SEPARATOR

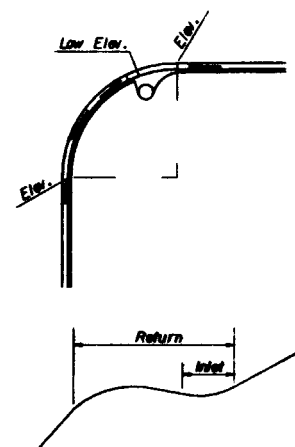
NOTES

1. Separators Type I and II are to be used with flexible pavement. Separators Type III and IV are to be used with rigid pavement.
2. Either Option I or Option II may be used for Types I and II separators except when a specific option is called for in the plans.
3. Separators having widths other than 4'-6" or 8'-6" shall be detailed in the plans as special separators and paid for under the contract unit price for other Concrete Traffic Separator (Special) (1' Wide) LF or (Special) (1' Wide) SY.

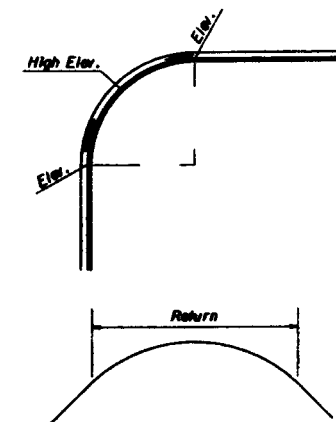
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC SEPARATORS			
Designed By	Checked By	Approved By	Scale
Drawn By	Reviewed By	Signature	100%
Estimated By	Quantity	Sheet No.	10 of 1
Estimated By	Quantity	Sheet No.	10 of 1



Note : See General Note No. 3



Note : See General Note No. 3

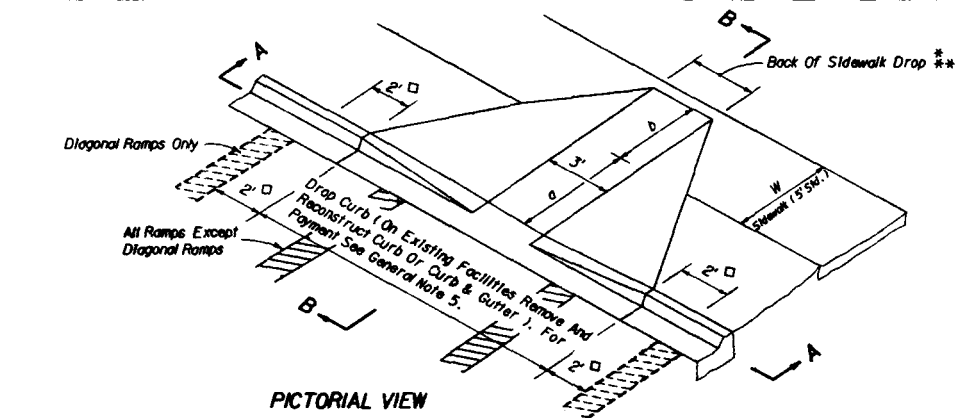


TYPICAL RETURN PROFILES INCLUDING DETAIL SHOWING LOCATION OF INLETS ON RETURN

Note :

1. On normal intersections, profiles need not be included in the plans as the above typicals adequately present the desired configuration.
2. For major intersections, where extreme grades are involved or where it is deemed necessary to include profiles in order to present adequate design data, return profiles may be included in the plans.
3. Profile grades should be established that will allow inlets to be located outside the return whenever practical. Inlets should be located to avoid conflict with pedestrian movement. Special care must be exercised to prevent conflict with curb cut ramps for the physically handicapped. For information on curb cut ramps refer to Index No. 304.
4. Grades of 0.2% or greater should be maintained on sag profiles outside the inlet limits.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB RETURN PROFILES			
Designed By	Checked By	Approved By	
		<i>J. Paul</i>	
Drawn By	Reviewed By	Scale	Sheet No.
F.A.R.A. Approved		07/07/75	303



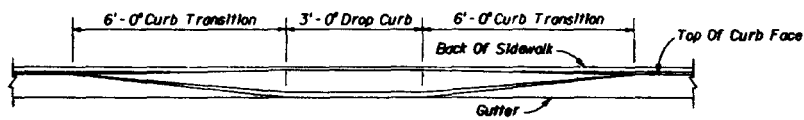
W	a	W+a+10'	x	b
5' 0"	0'	5.8'	5.8'	5.0' *
6' 0"	0'	6.8'	6.8'	6.0' **
7' 0"	0'	7.8'	7.3'	6.5' **
8' 0"	0'	8.8'	7.3'	6.5' **
5' 2.0"	2.5'	7.8'	7.8'	5.0'
5' 2.5"	2.5'	8.3'	8.1'	4.8'
5' 3.0"	3.0'	8.8'	8.3'	4.4'
5' 3.5"	3.5'	9.3'	8.4'	4.1'
5' 4.0"	4.0'	9.8'	8.6'	3.8'
5' 4.5"	4.5'	10.3'	8.7'	3.4'
5' 5.0"	5.0'	10.8'	8.9'	3.1'

$$b = x - (a + 10')$$

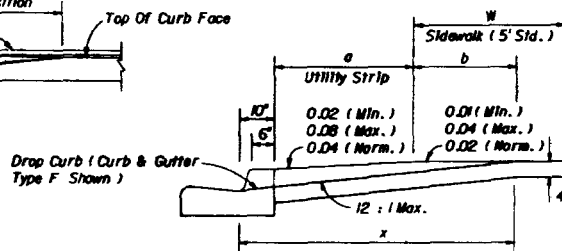
b - Distance from front edge of sidewalk to back point of 12 : 1 slope.

* Back of sidewalk drop required for all sidewalk slopes.

** Back of sidewalk drop required for sidewalk slopes 0.04 and part 0.02.



SECTION AA



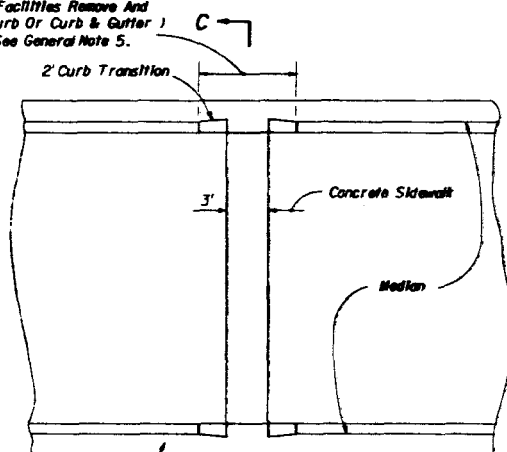
SECTION BB

◇ Not less than 2' of full height curb adjacent to diagonal ramp and within crosswalk limits

□ Crosswalk widths and configuration vary; must conform to Traffic Design Standards.

INTRABLOCK RAMPS AND DIMENSIONAL FEATURES FOR RAMPS TRANSVERSE TO SIDEWALKS

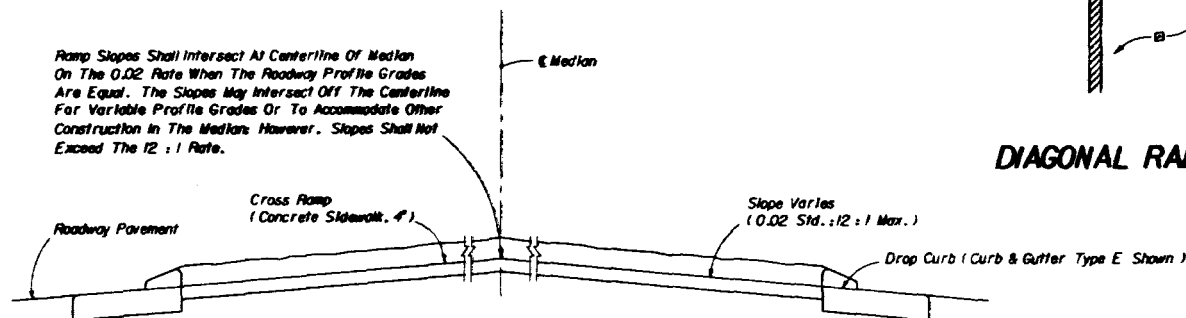
Drop Curb (On Existing Facilities Remove And Reconstruct Curb Or Curb & Gutter) For Payment See General Note 5.



Curb Types A Or B Or Curb & Gutter Type E (Curb & Gutter Type E Shown)

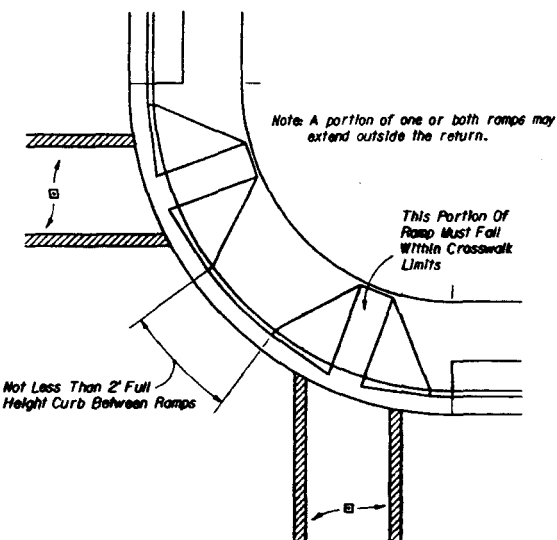
PLAN

Ramp Slopes Shall Intersect At Centerline Of Median On The 0.02 Rate When The Roadway Profile Grades Are Equal. The Slopes May Intersect Off The Centerline For Variable Profile Grades Or To Accommodate Other Construction In The Median. However, Slopes Shall Not Exceed The 12 : 1 Rate.

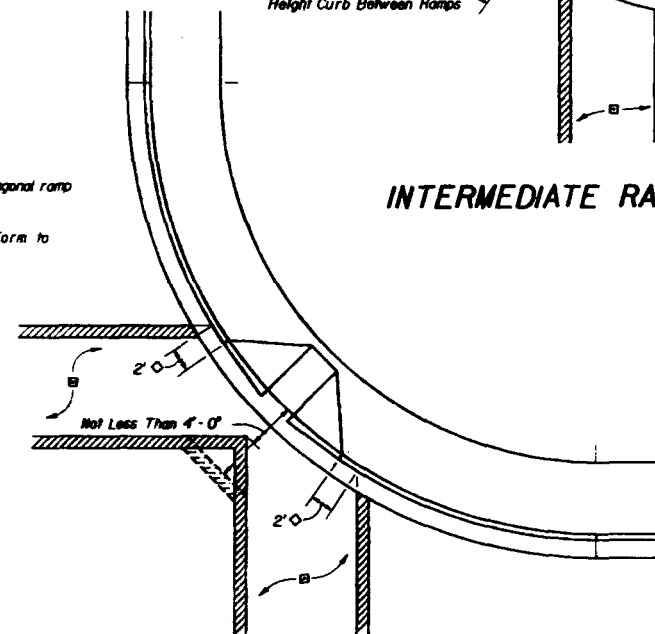


SECTION CC

MEDIAN CROSS RAMP



INTERMEDIATE RAMPS



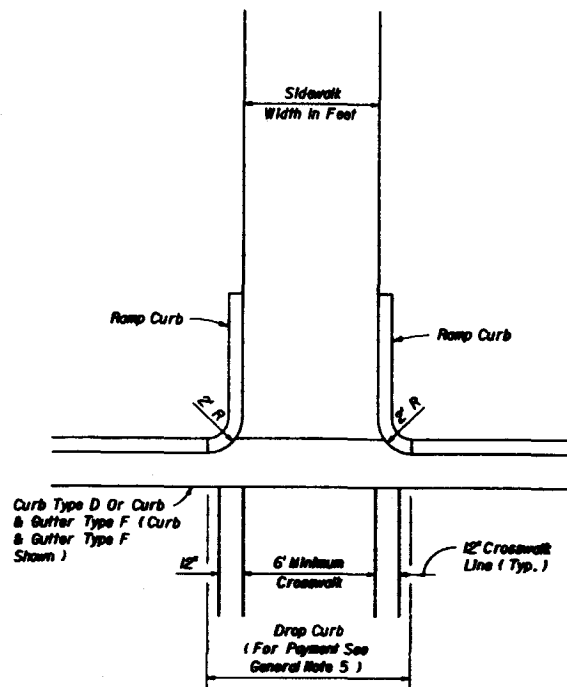
DIAGONAL RAMPS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

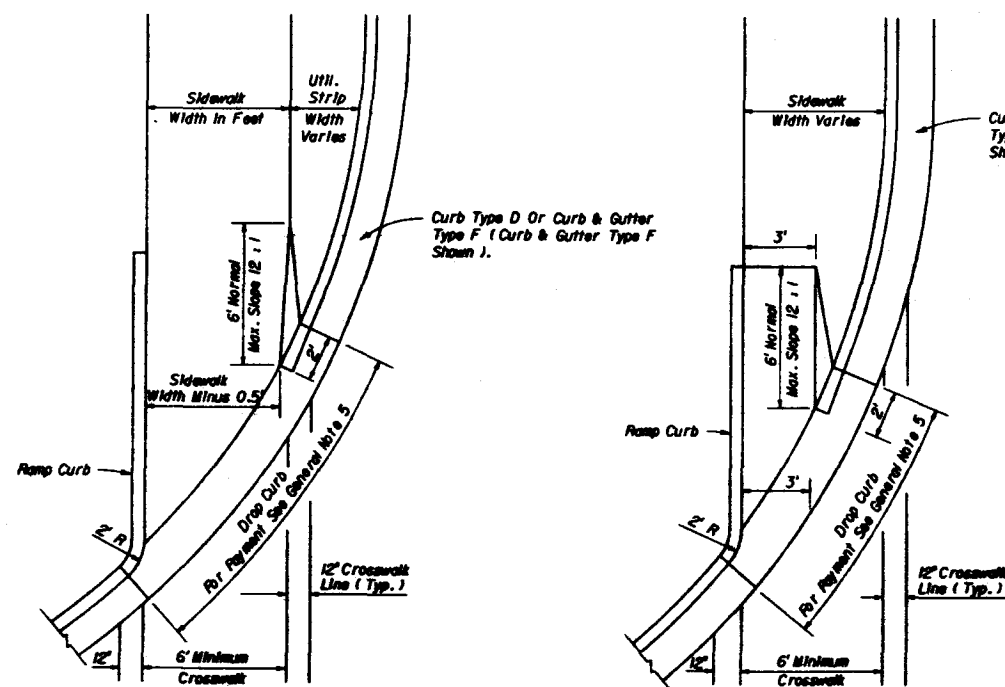
CURB CUT RAMPS PHYSICALLY HANDICAPPED

Designed By	Checked By	Date	Approved By	Drawn By	Scale	Sheet No.	Total No.
MM	JAG	04/83	<i>Keith H. McLeod</i>	MM	04/83	08	1 of 2
Checked By	JAG	04/83	Revision No.	Sheet No.	Scale		

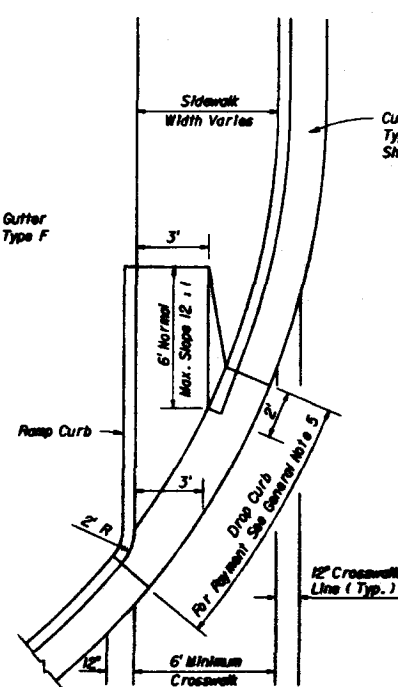
F.A.R.A. Approved 10/05/83



PLAN VIEW



PLAN VIEW



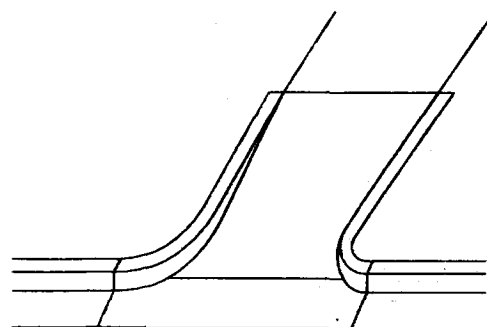
PLAN VIEW

RAMP WITH INTEGRAL CAST CURB

RAMP WITH SEPARATELY CAST CURB
OPTIONAL RAMP CURB

GENERAL NOTES

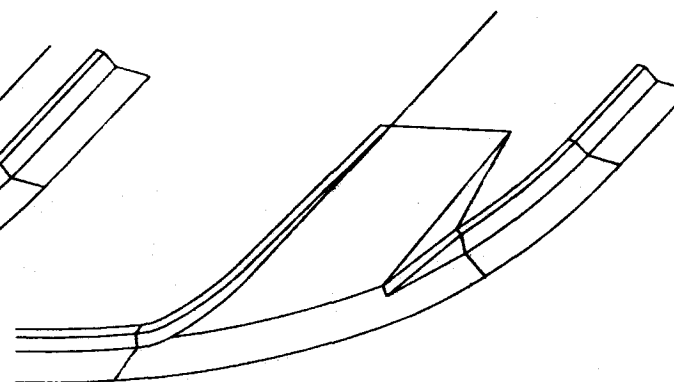
1. Ramps locations are to be coordinated with and in conformance with crosswalk marking details as shown in the plans.
2. If a curb ramp is located where pedestrians must walk across the ramp, then it shall have flared sides; the maximum slope of the flare shall be 12 : 1. See sheet 1 of 2. Curb ramps with returned curbs may be used where pedestrians would not normally walk across the ramp.
3. Ramps shall have a tactile surface, textured to a depth not exceeding $\frac{5}{8}$ by use of a tamp or roller fabricated with an imprinting surface of either 1 inch 0.250 wire cloth (plain weave, conventional crimp), 1 $\frac{1}{2}$ inch 6 expanded metal (standard) or 3 lb. expanded metal grating.
4. Ramps to be constructed at all locations shown in the plans even when sidewalk is not constructed concurrently.
5. Ramps to be paid for as follows:
Drop curb to be paid for under the contract unit price for Conc. Curb (Type —), LF. or Conc. Curb and Gutter (Type —), LF. (On existing facilities removal of curb or curb and gutter to be included in the cost of curb or curb and gutter.).
Ramp to be paid for under the contract unit price for Concrete Sidewalk (—), SF. (On existing facilities removal of sidewalk to be included in the cost of concrete sidewalk.).



PICTORIAL VIEW



PICTORIAL VIEW

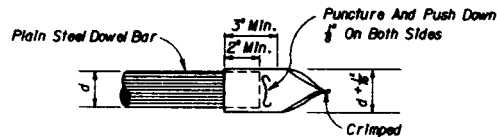


PICTORIAL VIEW

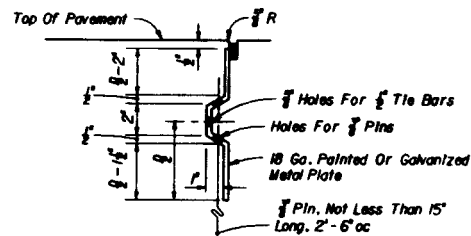
FOR TRANSVERSE PEDESTRIAN TRAFFIC SEE SHEET 1 OF 2

RAMPS FOR LINEAR PEDESTRIAN TRAFFIC

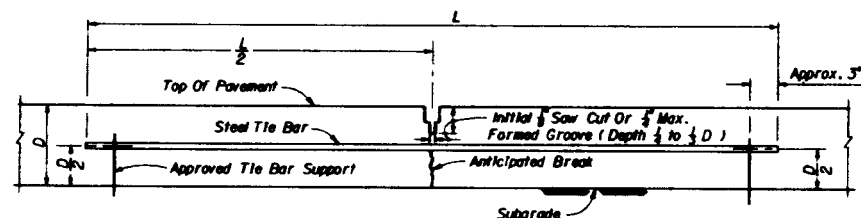
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CURB CUT RAMPS PHYSICALLY HANDICAPPED			
Designed By	Drawn By	Checked By	Approved By
			<i>J. P. Hill</i>
Project No.	Sheet No.	Scale	Notes
F.A.R.A. Approved 02/08/79			304



METAL CAPS FOR DOWEL BARS

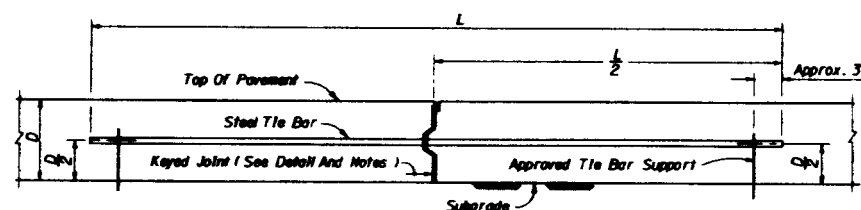


DEFORMED METAL PLATE



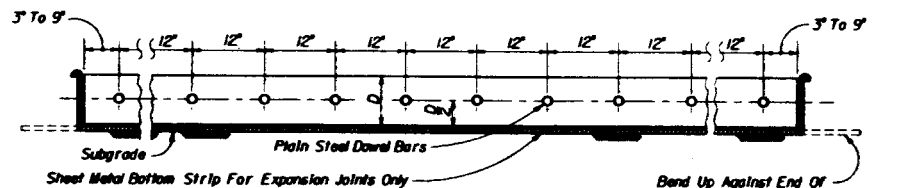
Note: Slabs poured simultaneously. Tie bars may be inserted in the plastic concrete by means approved by the Engineer.

LONGITUDINAL LANE - TIE JOINT



Note: The keyed joint may be formed by either the metal plate detailed above; by bolting shaped timber to the side formwork, by extrusion from slip-form paver. Alternate keyway shape and tie bar details may be approved by the Engineer. Keyway not required when the concrete pavement is placed on an Econcrete Base.

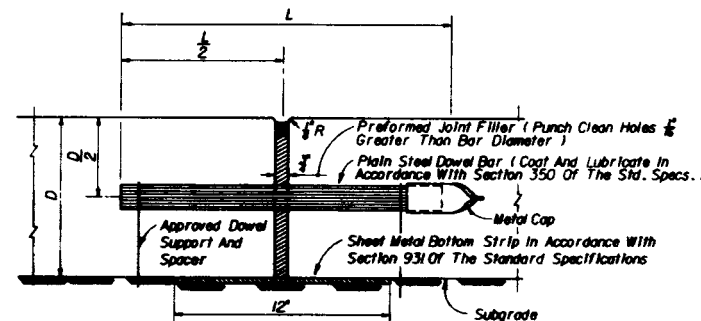
LONGITUDINAL CONSTRUCTION JOINT



DOWEL BAR LAYOUT

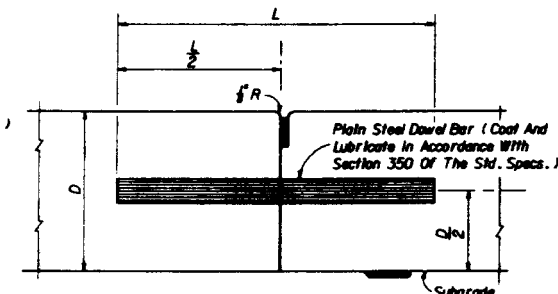
Bend Up Against End Of Pavement After Forms Are Removed

NOTE: For joint dimensions see Sheet 2 of 4

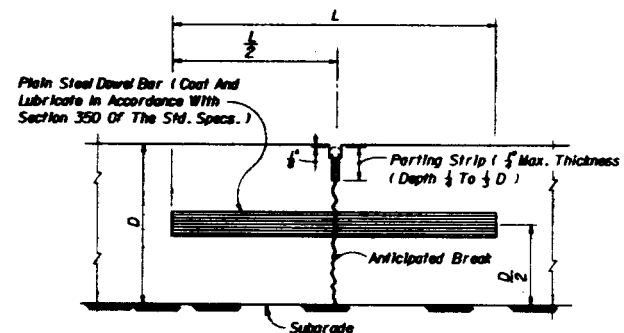


TRANSVERSE EXPANSION JOINT

EXPANSION JOINTS TO BE PLACED AT JUNCTIONS WITH APPROACH SLAB. AT STREET INTERSECTIONS AND OTHER LOCATIONS INDICATED IN DETAIL PLANS.

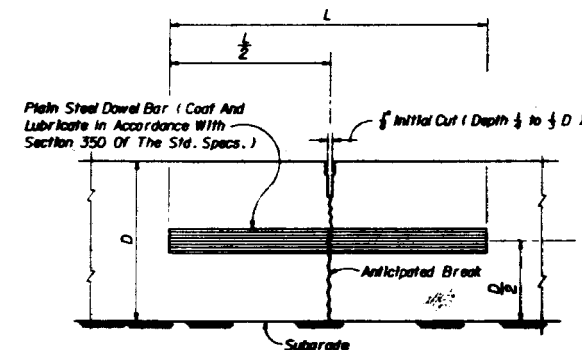


BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUANCES OF WORK



TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD

Transverse Contraction Joints To Be Spaced At Maximum 20' And Dowels Required At All Transverse Contraction Joints Unless Otherwise Noted In Plans.

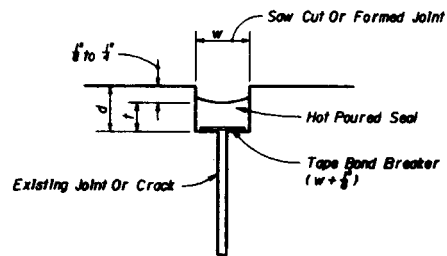


TRANSVERSE CONTRACTION JOINT, SAWED METHOD

TIE BAR SPACING WITH MAXIMUM DISTANCE TO FREE EDGE 12"		
Pavement Thickness "D"	Maximum Spacing	
	No. 4 Bars Length 25"	No. 5 Bars Length 30"
6"	48"	48"
7"	45"	48"
8"	40"	48"
9"	35"	48"
10"	32"	48"
11"	29"	45"
12"	26"	41"

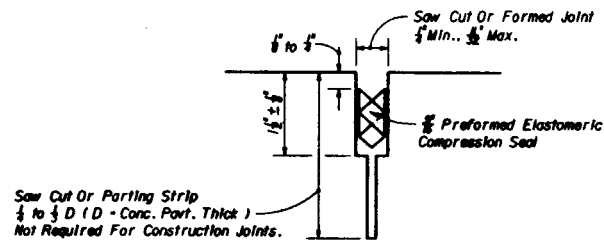
DOWELS (LENGTH 18")	
Pavement Thickness "D"	Diameter
6"	3"
7"	3"
8"	3"
9"	1 1/8"
10"	1 1/8"
11"	1 1/8"
12"	1 1/8"

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CONCRETE PAVEMENT JOINTS					
Designed By	Name	Series	Approved By	Signature	Date
Drawn By	HR	08/97			
Reviewed By	HDC	08/97	Revision No.	Sheet No.	Index No.
F.A.R.A. Approved	12/07/00	85	1 of 4		305

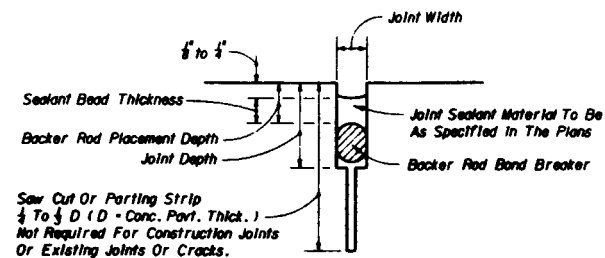


Note: Dimension w will be shown in the plans or established by the Engineer based on field conditions. Dimension d will be constructed so that the shape factor $\frac{d}{w}$ has a maximum value of 2.0 and a minimum value of 1.0.

FOR REHABILITATION PROJECTS
TAPE BOND BREAKER



FOR NEW PROJECTS
PREFORMED ELASTOMERIC COMPRESSION SEAL

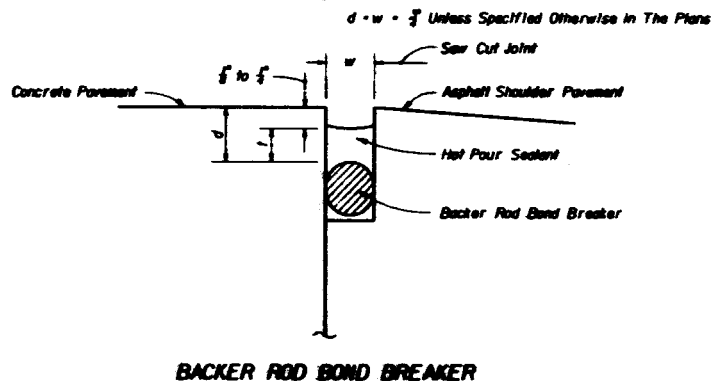


FOR NEW AND REHABILITATION PROJECTS
BACKER ROD BOND BREAKER

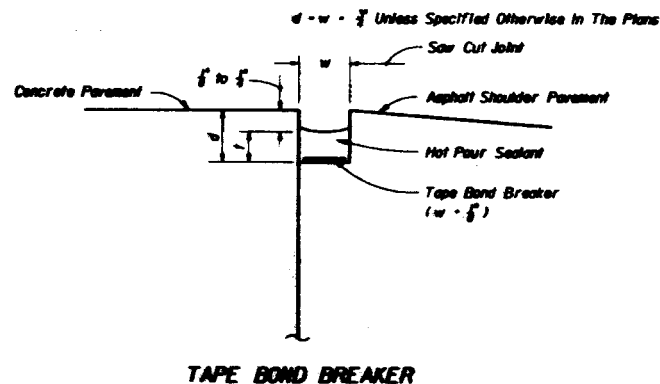
BACKER ROD BOND BREAKER (CONCRETE - CONCRETE JOINTS)				
JOINT DIMENSIONS (INCHES)				
JOINT WIDTH	SEALANT BEAD THICKNESS	BACKER ROD DIAMETER	MINIMUM JOINT DEPTH	BACKER ROD PLACEMENT DEPTH
1/4	1/4	3/8	1	1/2
1/2	1/2	1/2	1 1/2	1/2
3/4	3/4	3/4	1 1/2	1/2
1	1	1	1 1/2	1/2
1 1/2	1 1/2	1 1/2	1 1/2	1/2
2	2	2	2	1/2
3	3	3	3	1/2
4	4	4	4	1/2
5	5	5	5	1/2
6	6	6	6	1/2
7	7	7	7	1/2
8	8	8	8	1/2
9	9	9	9	1/2
10	10	10	10	1/2
11	11	11	11	1/2
12	12	12	12	1/2
13	13	13	13	1/2
14	14	14	14	1/2
15	15	15	15	1/2
16	16	16	16	1/2
17	17	17	17	1/2
18	18	18	18	1/2
19	19	19	19	1/2
20	20	20	20	1/2
21	21	21	21	1/2
22	22	22	22	1/2
23	23	23	23	1/2
24	24	24	24	1/2
25	25	25	25	1/2
26	26	26	26	1/2
27	27	27	27	1/2
28	28	28	28	1/2
29	29	29	29	1/2
30	30	30	30	1/2
31	31	31	31	1/2
32	32	32	32	1/2
33	33	33	33	1/2
34	34	34	34	1/2
35	35	35	35	1/2
36	36	36	36	1/2
37	37	37	37	1/2
38	38	38	38	1/2
39	39	39	39	1/2
40	40	40	40	1/2
41	41	41	41	1/2
42	42	42	42	1/2
43	43	43	43	1/2
44	44	44	44	1/2
45	45	45	45	1/2
46	46	46	46	1/2
47	47	47	47	1/2
48	48	48	48	1/2
49	49	49	49	1/2
50	50	50	50	1/2
51	51	51	51	1/2
52	52	52	52	1/2
53	53	53	53	1/2
54	54	54	54	1/2
55	55	55	55	1/2
56	56	56	56	1/2
57	57	57	57	1/2
58	58	58	58	1/2
59	59	59	59	1/2
60	60	60	60	1/2
61	61	61	61	1/2
62	62	62	62	1/2
63	63	63	63	1/2
64	64	64	64	1/2
65	65	65	65	1/2
66	66	66	66	1/2
67	67	67	67	1/2
68	68	68	68	1/2
69	69	69	69	1/2
70	70	70	70	1/2
71	71	71	71	1/2
72	72	72	72	1/2
73	73	73	73	1/2
74	74	74	74	1/2
75	75	75	75	1/2
76	76	76	76	1/2
77	77	77	77	1/2
78	78	78	78	1/2
79	79	79	79	1/2
80	80	80	80	1/2
81	81	81	81	1/2
82	82	82	82	1/2
83	83	83	83	1/2
84	84	84	84	1/2
85	85	85	85	1/2
86	86	86	86	1/2
87	87	87	87	1/2
88	88	88	88	1/2
89	89	89	89	1/2
90	90	90	90	1/2
91	91	91	91	1/2
92	92	92	92	1/2
93	93	93	93	1/2
94	94	94	94	1/2
95	95	95	95	1/2
96	96	96	96	1/2
97	97	97	97	1/2
98	98	98	98	1/2
99	99	99	99	1/2
100	100	100	100	1/2

Unless otherwise indicated on the plans the joint width for new construction will be 1/2" for construction joints, 3/4" for all other joints.
For rehabilitation projects the joint width will be shown on the plans or established by the Engineer based on field conditions.

CONCRETE-CONCRETE JOINTS



BACKER ROD BOND BREAKER



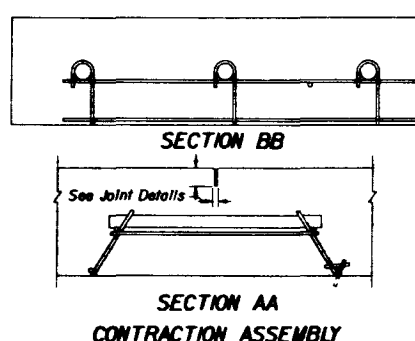
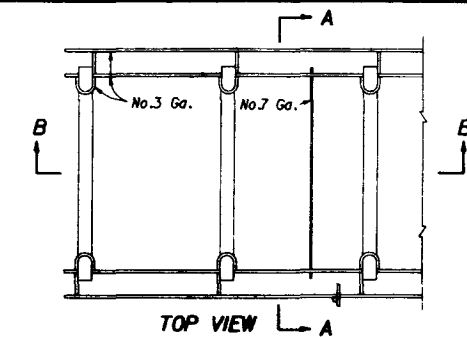
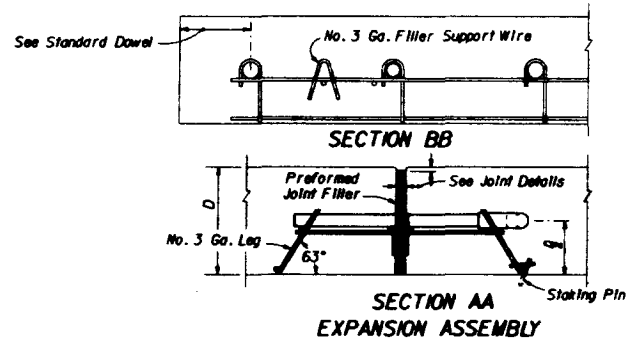
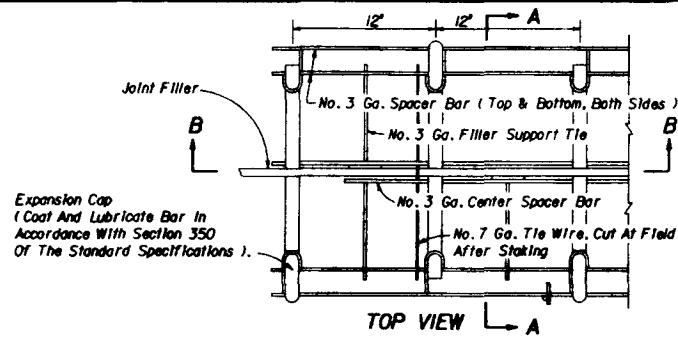
TAPE BOND BREAKER

FOR NEW AND REHABILITATION PROJECTS;
EITHER TAPE OR BACKER ROD BOND BREAKER REQUIRED;
SHOULDER MUST BE REPAIRED IF PROPER JOINT SHAPE
CAN NOT BE ATTAINED

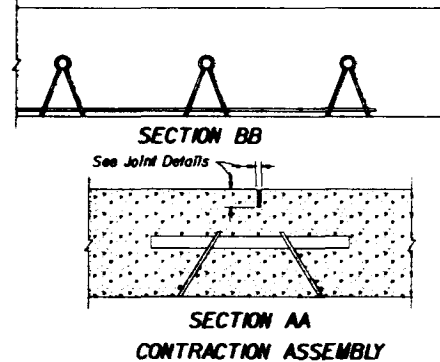
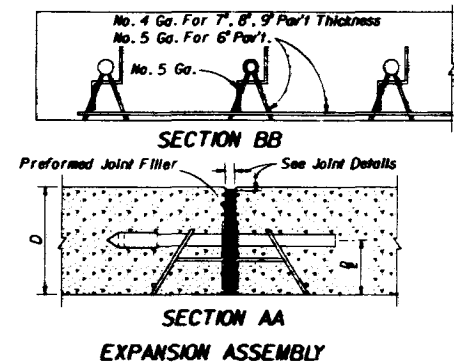
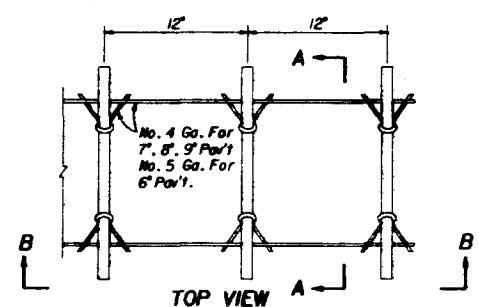
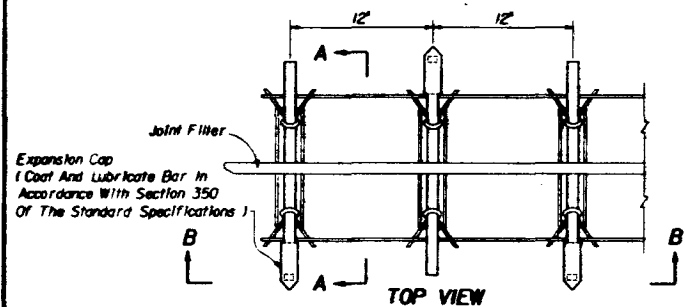
CONCRETE-ASPHALT SHOULDER JOINTS

JOINT SEAL DIMENSIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
CONCRETE PAVEMENT JOINTS				
Designed By	DATE	Scale	Approved By	DATE
Drawn By	DATE	Scale	Checked By	DATE
Revised By	DATE	Scale	Checked By	DATE
F.B.R.A. Approved	DATE	Scale	Checked By	DATE
2 of 4	305			

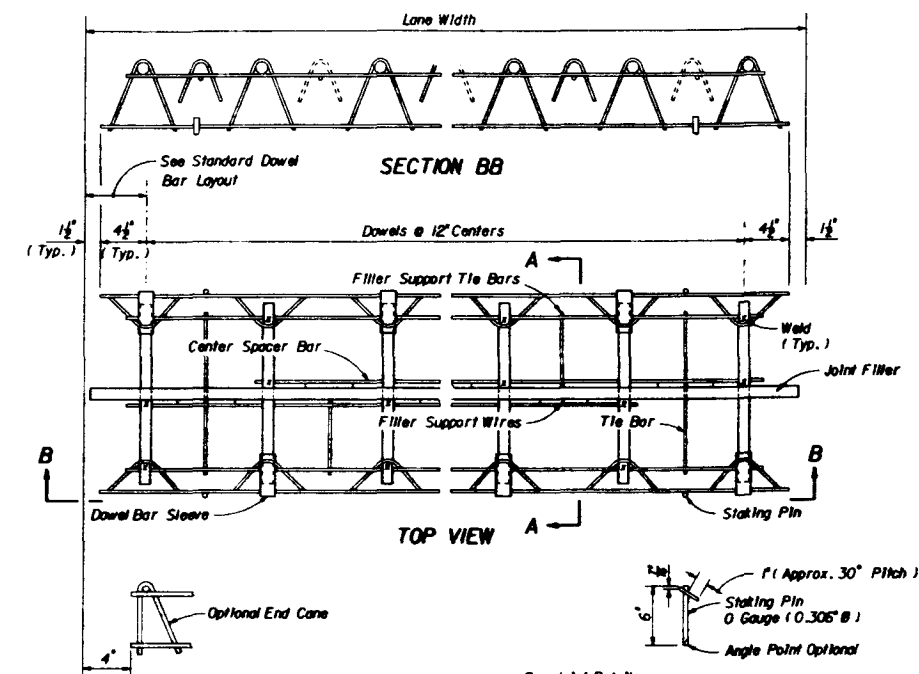


WADY INDUSTRIES, INC.



FLORIDA STEEL CORPORATION

DOWEL ASSEMBLIES FOR EXPANSION AND CONTRACTION JOINTS

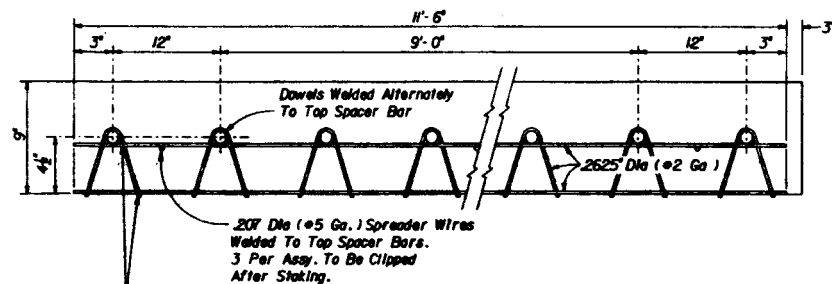


EXPANSION AND CONTRACTION ASSEMBLY *

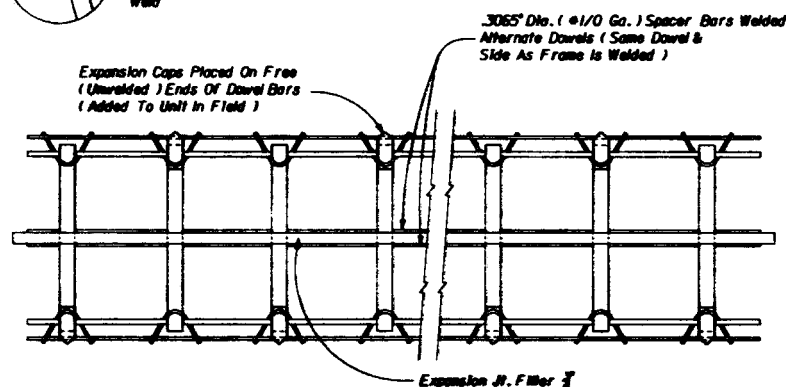
* Expansion assembly is illustrated. For contraction assembly omit expansion joint material, center spacer bars, filler support wires, support tie bars and dowel bar sleeves.

THE DAYTON SURE GRIP AND SHORE COMPANY

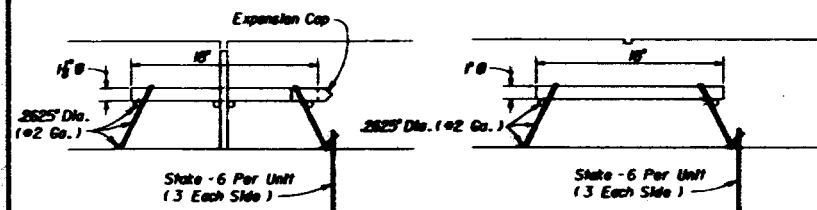
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE PAVEMENT JOINTS			
Designed By	Drawn By	Checked By	Approved By
Drawn By	JAD	CB/B	
Checked By	JAS	CB/B	
FLORIDA Approved	01/07/80	BT	3 of 4
			305



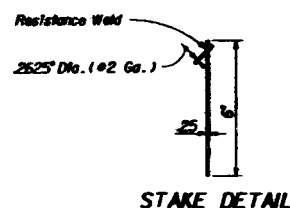
ELEVATION OF CONTRACTION & EXPANSION JOINT
TYPE "B" UNIT



PLAN
TYPE "B" UNIT



SECTION THROUGH EXPANSION JOINT UNIT SECTION THROUGH CONTRACTION JOINT UNIT

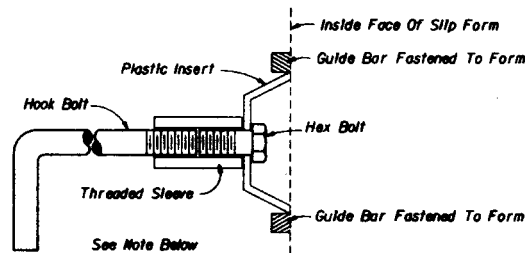


STAKE DETAIL

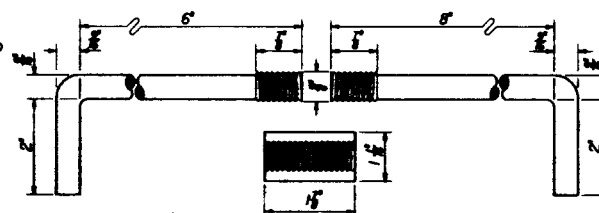
EXPANSION AND CONTRACTION JOINT DOWEL ASSEMBLY ALTERNATE

IRONCO MFG. CO. INC.
HELENA, AL

(Formerly Hugensmith Materials, Inc., Pelham, AL)

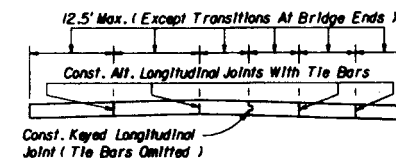


ALTERNATE KEYWAY AND TIE BAR

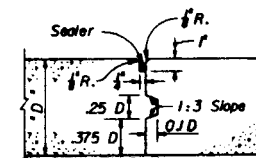


DETAIL FOR STEEL HOOK BOLT ASSEMBLY

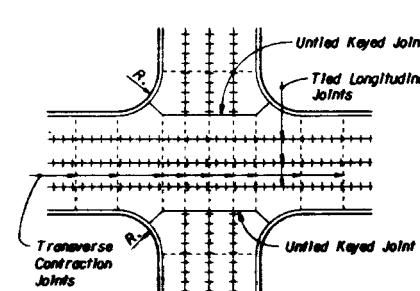
NOTE: After the concrete has cured to the extent that the keyway will retain its shape, the hook bolt and plastic insert shall be removed. The remaining portion of the hook bolt assembly shall be installed immediately prior to placing of concrete in the adjacent lane.



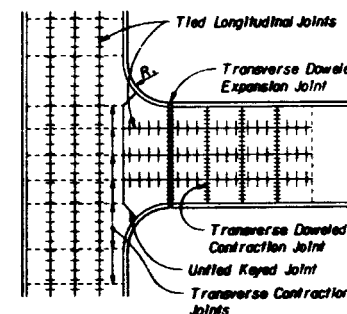
TYPICAL SECTION FOR
MULTI-LANE CONSTRUCTION



DETAIL OF KEYED JOINT



JOINT LAYOUT AT THRU
INTERSECTION



JOINT LAYOUT AT "T" OR
OFFSET INTERSECTION

GENERAL NOTES

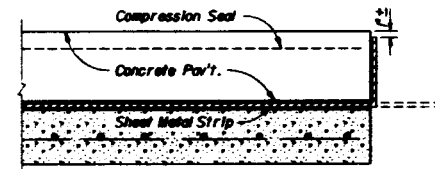
1. Longitudinal joints will not be required for single lane pavement 16' or less in width.
2. When pavement width necessitates five or more longitudinal joints which would normally be tied, provide one or more untied but keyed joints. No joint shall be tied that is more than 24' from a free edge or free joint including tied right shoulders.
3. Arrangement of longitudinal joints not shown on typical section to be as directed by the Engineer.
4. All manholes, meter boxes and other projections into the pavement shall be boxed - in with 1/2" preformed expansion joint material.

DETAIL OF JOINT ARRANGEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CONCRETE PAVEMENT JOINTS					
Designed By	Checked By	Approved By			
Drawn By	UHF	05/75			
Checked By	SFA	05/75			
F.H.R.A. Approved	05/75	05	4 of 4	305	

DETAIL SHOWING RIGID SHOULDER PAVEMENT

NOTE: Rigid shoulder pavement shall be concrete or concrete as called for in the plans.



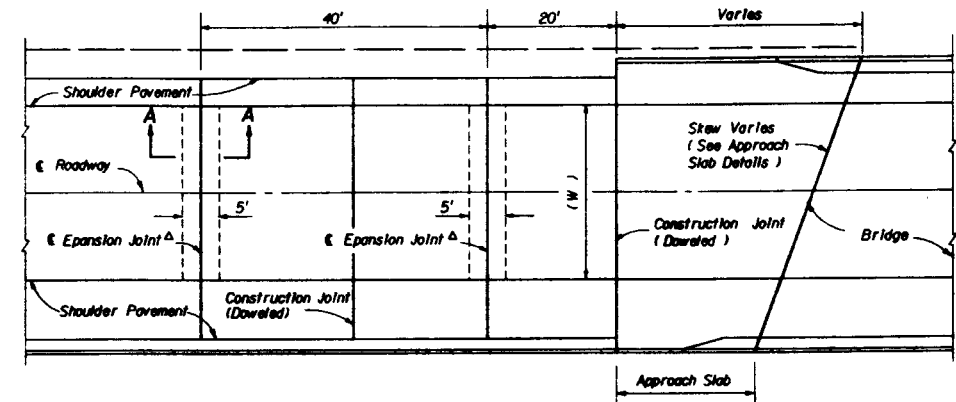
DETAIL SHOWING SHEET METAL STRIP

NOTE: Immediately prior to placing the seal, the joint shall be thoroughly cleaned of all foreign material. Immediately after the seal is placed, sheet metal strip shall be bent up against the pavement edge.

The sheet metal strip shall be a minimum 16 gage steel, 12" wide and shall be galvanized in accordance with ASTM A-585. Coating Designation G90.

GENERAL NOTES

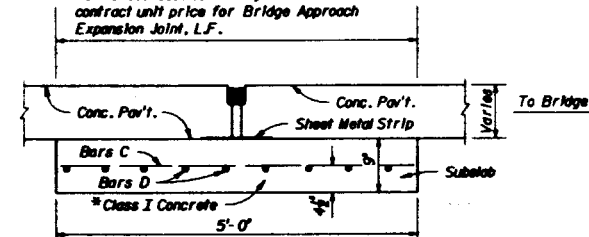
1. Pay quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement. Shoulder pavement joint included.
2. For additional details see Index No. 305.
3. The ϵ of roadway and the ϵ of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the ϵ of the roadway pavement shall be determined.



PLAN

Δ Expansion Joints Shall Be Constructed Parallel To The Existing Transverse Pavement Joints On Rehabilitation Projects, And Parallel To The Standard Transverse Pavement Joints Shown In The Plans For New Construction.

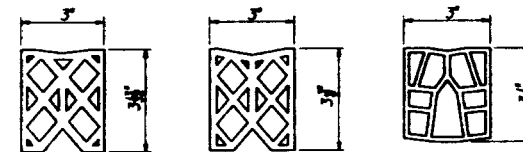
Concrete pavement not deducted from roadway or shoulder pavement quantities. Compression seal, sheet metal strip and reinforced subslab to be paid for under the contract unit price for Bridge Approach Expansion Joint, L.F.



REINFORCING STEEL					
Mark	Size	Spac.	No. Req.	Lgth.	
C	5	6"	Varies	4'-6"	
D	5	6"	9	W-4'	

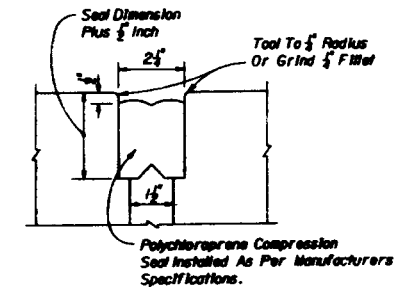
* Finish surface smooth. Cure with heavy coating of wax base white pigmented curing compound. Apply second application immediately prior to placing pavement.

SECTION AA THROUGH EXPANSION JOINT



SECTION THRU SEALS

Either Of The Three Seals Shown May Be Used.



COMPRESSION SEAL DETAIL

NOTE: All contacting surfaces between the compression seal and concrete shall be thoroughly coated with a lubricating adhesive.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

BRIDGE APPROACH EXPANSION CONCRETE PAVEMENT

Designed By	Checked By	Approved By	Design No.	Sheet No.	Index No.
LMF	SFA	[Signature]	06/75	06/75	306
Checked By	Design No.	Sheet No.	Index No.		
SFA	06/75	06/75	06/75		
F.A.R.A. Approved	06/18/77	06	1 of 1		306

GENERAL NOTES

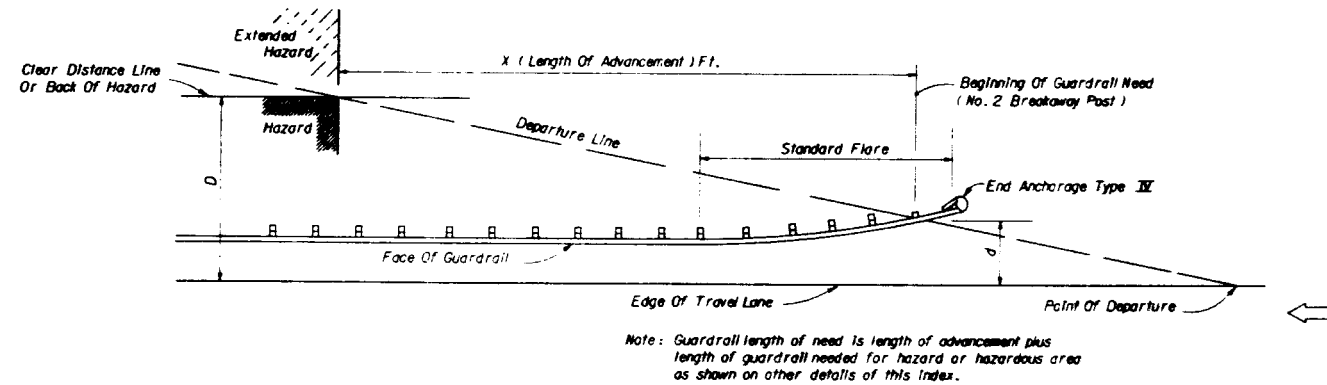
- The illustrated applications for guardrail are standard requirements. Length of advancement shall be established by Figure 1 for all installations incorporating the Standard Flare Detail P; however length of guardrail shall not be less than the minimum lengths shown by detail on this Index.

Bridges generally have associated lateral hazards, whereby the length of advancement is established by the intersect of the hazard boundary and the clear zone limit as shown in Figure 1. For bridge ends, approach slabs and approach structures that are located in advance of the lateral hazard a distance sufficient to shield the lateral hazard, and the ends of their traffic rails or handrails are the only hazards that require shielding, then the length of guardrail will be either 62.5 feet or 87.5 feet in accordance with Details H, I, S & T of this Index; however, when Schemes II, 12, 13 & 14 of Index No. 401 apply these lengths must be increased to achieve the reverse bridge connections in those Schemes.

- One panel equals 12.5 feet. Post spacings shall be 6' - 3" except that reduced spacings shall be used for transitions to anchorages at rigid structures such as bridges (See Detail J).
- At hazards where the face of guardrail is offset from the hazard less than the desirable 4 foot minimum, a 2 foot minimum offset may be used with post spacing of 3' - 1 1/2' extending over the length of the hazard plus one panel of approach rail. For an offset less than 2 feet, a special detail should be submitted to the State Design Engineer, Roadways for approval.
- In addition to use at conventional roadside hazards, guardrail will be required where fill slopes exceed 3:1, except that where fill heights are less than 6 feet guardrail may be omitted (regardless of fill slope) unless in the opinion of the Engineer its use is deemed necessary due to other roadside features.
- Straight rail sections may be used for all radii of 125 feet or greater. For radii less than 125 feet the rail must be fabricated to fit.
- Corrugated sheet steel beams, end sections and back-up plates shall conform to the current requirements of AASHTO M180, Class A (12 ga.), Type 2 (zinc) coating. Aluminum guardrail elements will not be permitted unless specifically called for in the plans.
- Permissible post and offset block combinations are tabulated on sheet II of 14.
- Where necessary to enlarge or add holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 591 of the Standard Specifications. No burning of holes will be permitted.
- Guardrail reflectors shall be the same colors as the pavement striping edge lines.
- Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness at terminals. On high speed facilities (50 mph or greater) crash cushions shall be constructed at Type II end anchorages located in the median within the clear zone.
- Median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:
 - Medians of uniform width that are occupied by other transportation and joint use facilities.
 - Medians of uniform variable widths with independent vertical alignments not suited to normal median guardrail installations.
 - Medians of bifurcated roadways.
- Any guardrail with existing concrete posts that is being reset under a construction contract shall be reset using wood or steel posts.
- All guardrail panels, end sections and special end shoes shall be lapped in the direction of traffic.
- Guardrail mounting height of 1' - 9" to center of W beam and 1' - 6" to lower post bolt in thrie beam is critical and shall be attained in all cases.
- Guardrail connections to existing bridges shall be in accordance with this Index and Index No. 401.

Design Speed (mph)	Length Of Advancement, Ft. (X)
50 - 70	= 13 (D - d)
45 Or Less	= 16 (D - d)

Note: For minimum length of advancement see General Note No. 1.



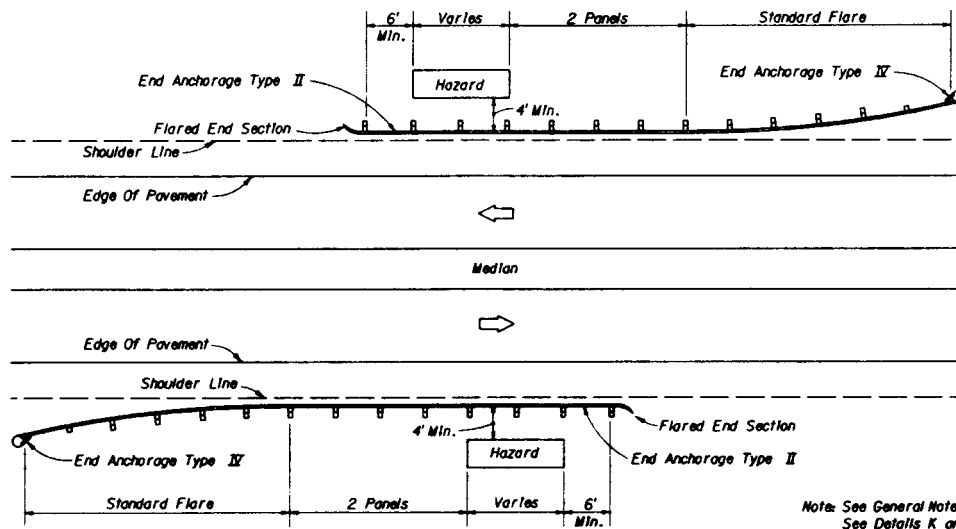
Equation Variables:

- D = Distance in feet from near edge of the near approach travel lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach travel lane.
- d = Distance in feet from the near edge of the near approach travel lane to the face of guardrail at the No. 2 breakaway post. For left side hazards and clear zones on two-way undivided facilities d is measured from the inside edge of the near approach travel lane. See Standard Flare - Detail P for additional information.

LENGTH OF ADVANCEMENT

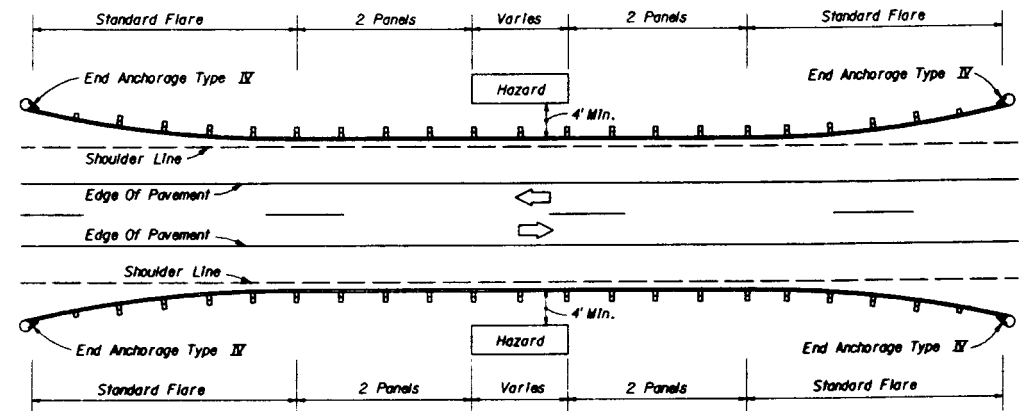
Figure 1

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By	Checked By	Revised	Approved By		
Drawn By	MSD	8/83	State Design Engineer, Roadways		
Checked By	JVE	8/83	Revision No.	Sheet No.	Index No.
F.H.W.S. Approved: 10/06/83			38	1 of 14	400



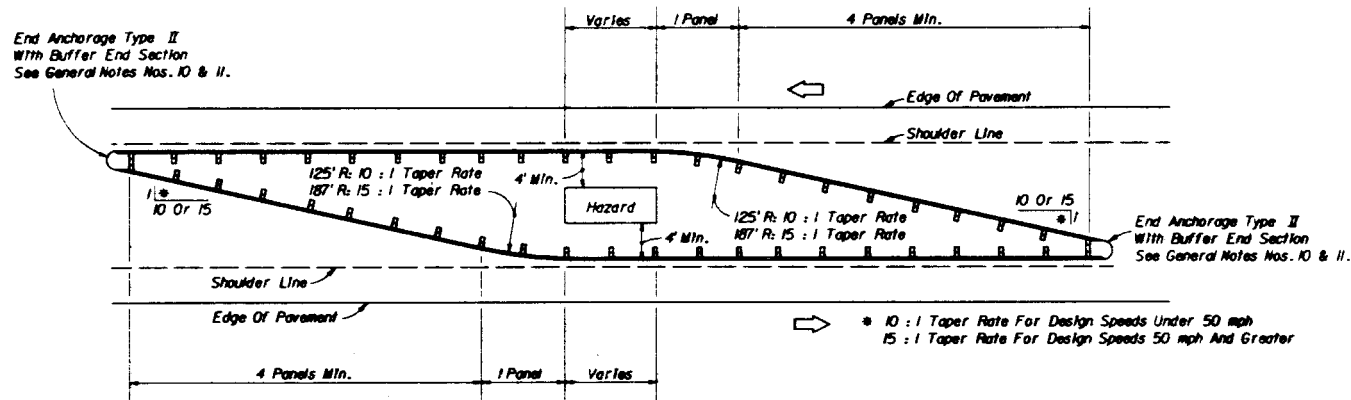
DIVIDED ROADWAY- DETAIL B

Notes: See General Notes Nos. 1, 2, 3, and 4.
See Details K and L for guardrail offsets.
See Detail P for standard flare.
For urban curb and gutter sections that require shielding from hazards see concrete barrier wall index No. 410.



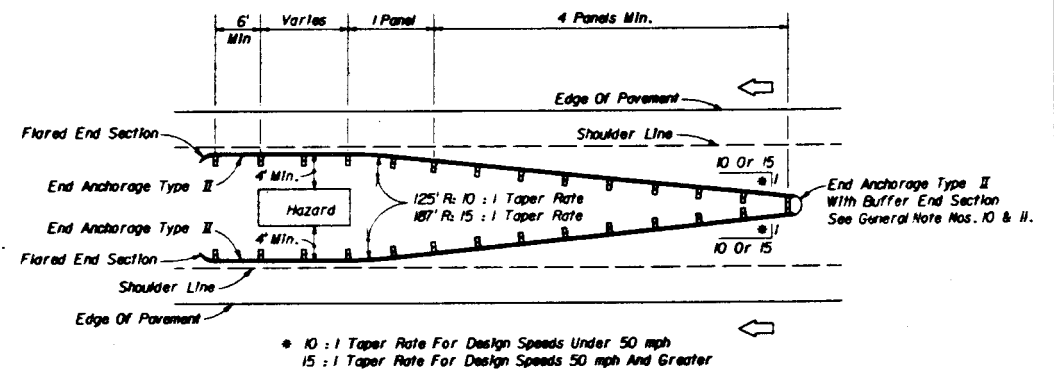
UNDIVIDED ROADWAY- DETAIL C

GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS



OPPOSING TRAFFIC- DETAIL D

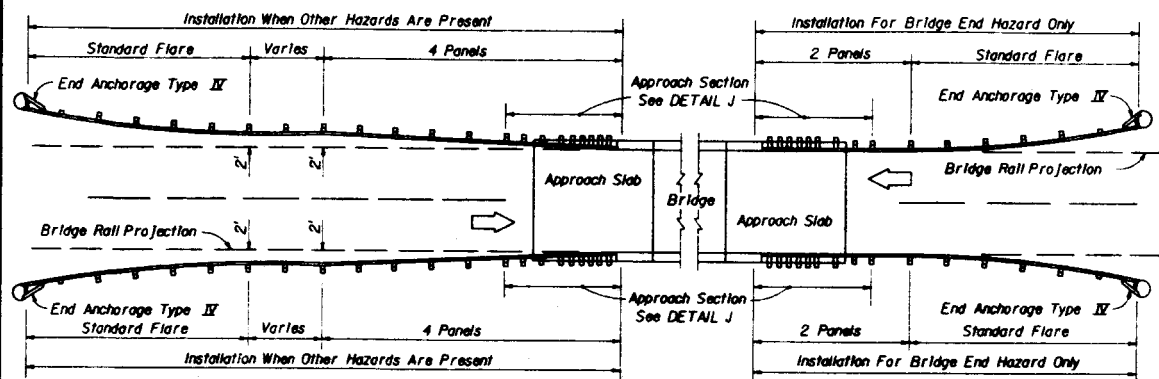
Notes: See General Notes Nos. 1, 2, 3 and 11.
See Details K and L for guardrail offsets.
For urban curb and gutter sections that require shielding from hazards see concrete barrier wall index No. 410.



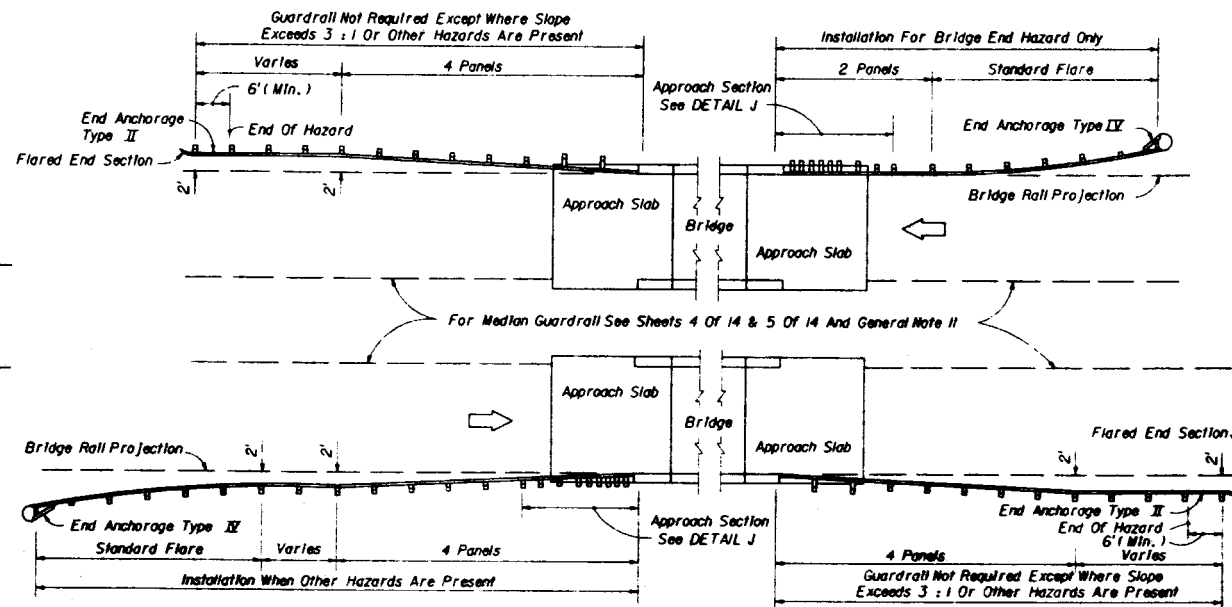
ONE-WAY TRAFFIC- DETAIL G

GUARDRAIL APPLICATION FOR MEDIAN AND GORE HAZARDS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By	Drawn By	Checked By	Approved By
HSD	MSD	MSD	<i>[Signature]</i>
Drawn By	MSD	MSD	State Design Engineer, Roadways
Checked By	MSD	MSD	Revision No.
F.U.R.A. Approved	12/08/0	88	2 of 14
			400

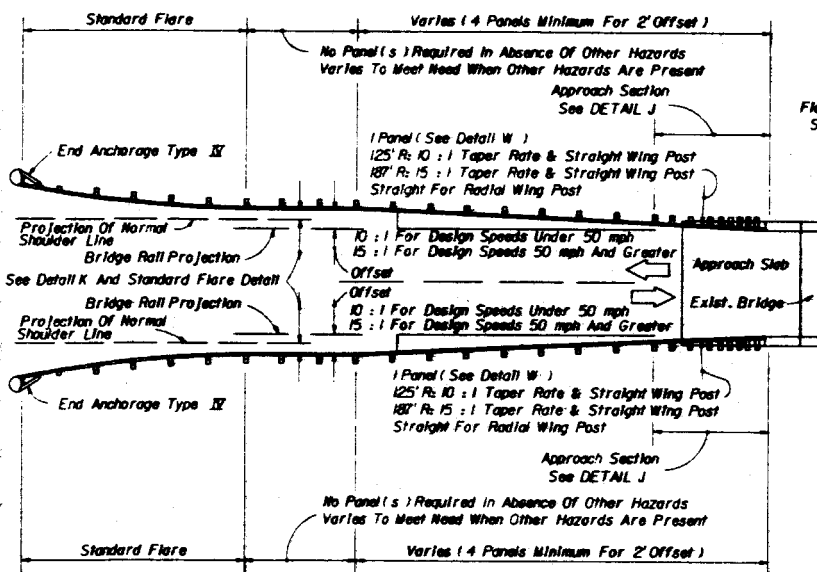


UNDIVIDED ROADWAY - DETAIL H

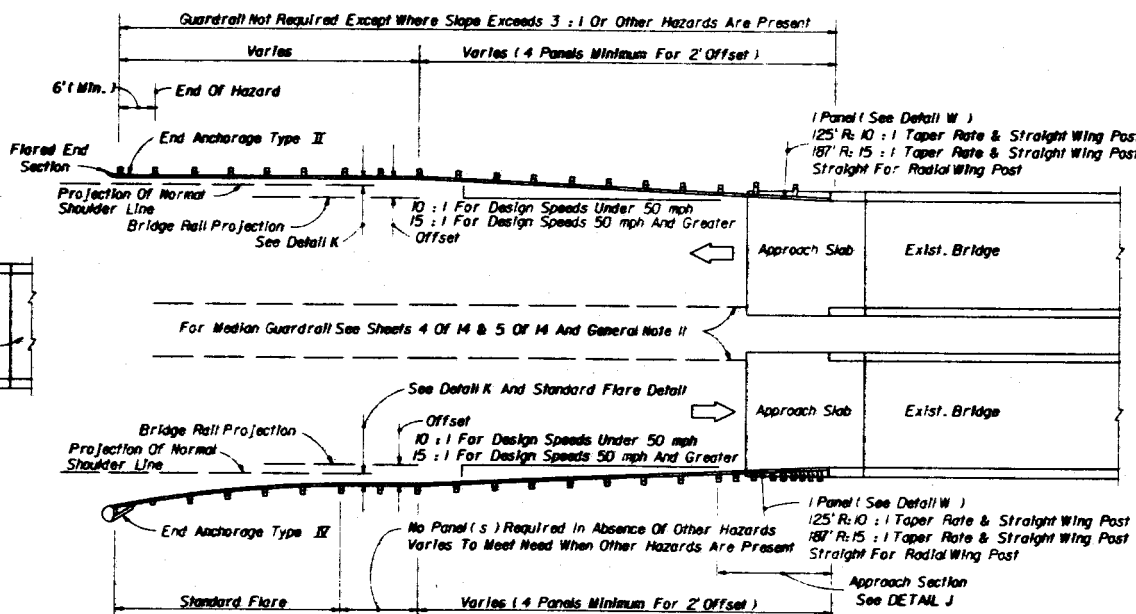


DIVIDED ROADWAY - DETAIL I

Note: See General Notes Nos. 1 and 2. See Details J and M For Connections To Bridges.
GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS

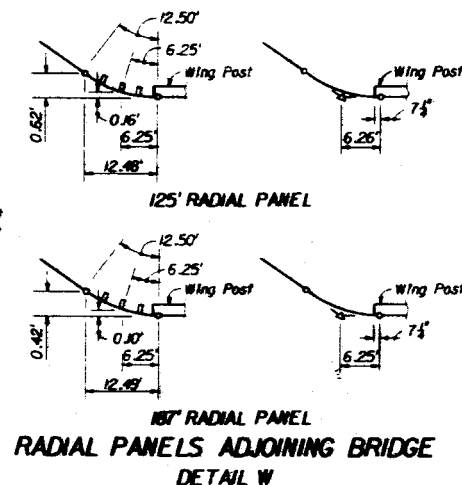


UNDIVIDED ROADWAY - DETAIL S



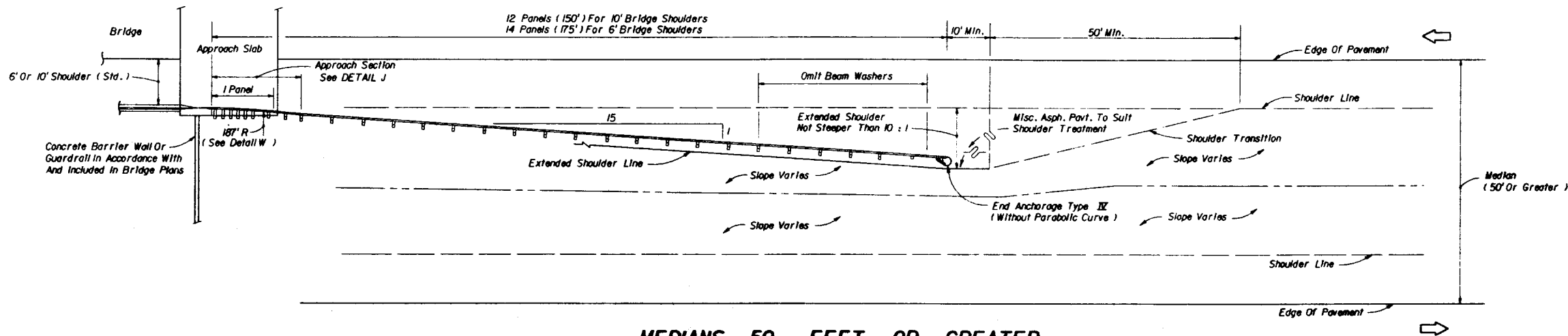
DIVIDED ROADWAY - DETAIL T

Note: See General Note No. 2. See Details J And M And Index No. 401 For Connections To Bridges.
GUARDRAIL APPLICATIONS FOR EXISTING BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS

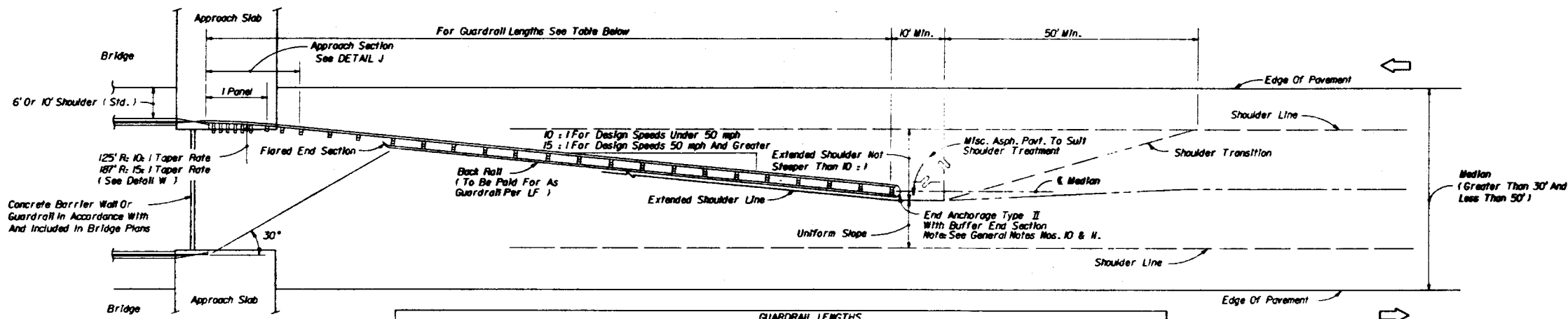


RADIAL PANELS ADJOINING BRIDGE
 DETAIL W

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By	Revised	Series	Approved By
Drawn By	MSD	08/03	State Bridge Engineer, Roadways
Checked By	ABW/MC	08/03	Revision No.
F.A.R.A. Approved	08/08/03	88	3 of 14
			400



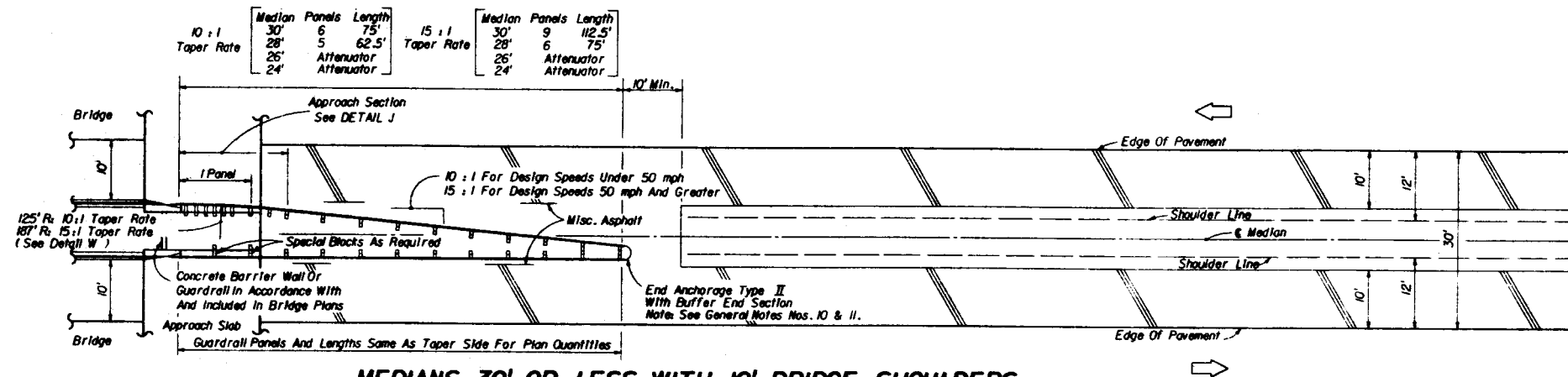
MEDIANS 50 FEET OR GREATER



Median Width (Ft.)	GUARDRAIL LENGTHS															
	10:1 TAPER RATE								15:1 TAPER RATE							
	6' Bridge Shoulder				10' Bridge Shoulder				6' Bridge Shoulder				10' Bridge Shoulder			
	Panels (No.)	Length (Ft.)	Panels (No.)	Length (Ft.)	Panels (No.)	Length (Ft.)	Panels (No.)	Length (Ft.)	Panels (No.)	Length (Ft.)	Panels (No.)	Length (Ft.)	Panels (No.)	Length (Ft.)	Panels (No.)	Length (Ft.)
32	8	6	14	100	75	175	5	4	9	62.5	50	112.5	8	7	15	100
34	8	6	14	100	75	175	5	4	9	62.5	50	112.5	8	7	15	100
36	9	7	16	112.5	87.5	200	6	5	11	75	62.5	137.5	9	8	18	125
38	10	8	18	125	100	225	7	6	13	87.5	75	162.5	10	9	20	137.5
40	11	9	19	137.5	112.5	237.5	8	7	15	100	87.5	187.5	11	10	22	150
42	12	10	20	150	125	262.5	9	8	17	112.5	100	212.5	12	11	24	162.5
44	13	11	21	162.5	137.5	287.5	10	9	18	125	112.5	237.5	13	12	26	175
46	14	12	22	175	150	300	11	10	19	137.5	125	262.5	14	13	28	187.5
48	15	13	23	187.5	162.5	312.5	12	11	20	150	137.5	275	15	14	30	200

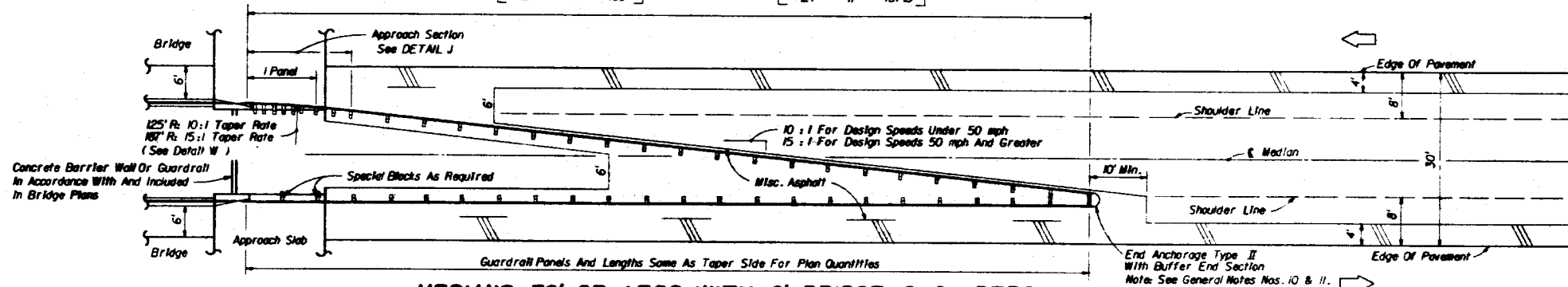
MEDIANS GREATER THAN 30' AND LESS THAN 50'

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By	Drawn By	Checked By	Approved By
HSO	HSO	HSO	State Bridge Engineer, Roadways
Drawn By	Checked By	Reviewed By	Reviewed By
HSO/MS	HSO/MS	HSO/MS	HSO/MS
F.H.W.A. Approved	10/08/87	88	4 of 14
			400



MEDIANS 30' OR LESS WITH 10' BRIDGE SHOULDERS

10 : 1 Taper Rate	Median	Panels	Length	15 : 1 Taper Rate	Median	Panels	Length
	30'	12	150'		30'	18	225'
	28'	11	137.5'		28'	15	187.5'
	26'	9	112.5'		26'	13	162.5'
	24'	8	100'		24'	11	137.5'



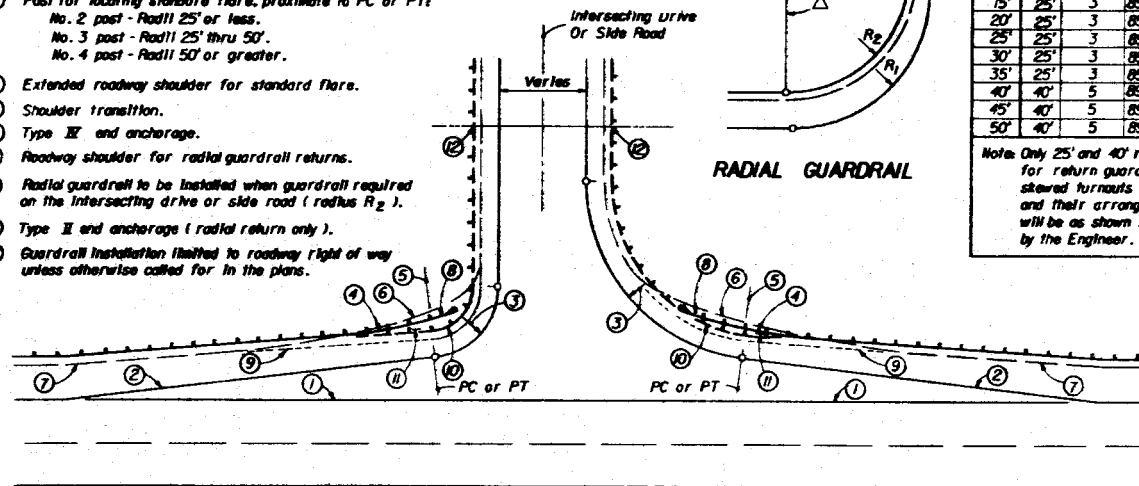
MEDIANS 30' OR LESS WITH 6' BRIDGE SHOULDERS

NOTE: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians 30' or less in width. When medians 30' or less in width are closed by continuous decking between the bridge travelways, traffic separation shall be attained by appropriate treatments such as, but not limited to, raised separators, curbs, guardrail, concrete barrier walls and special barriers.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By	Checked By	Drawn By	Revised By	Scale	Index No.
DR	DR	DR	DR	1" = 10'	400
Approved By			State Design Engineer, Roadways		
F.J.B.A. Approved			08/23/82		

LEGEND

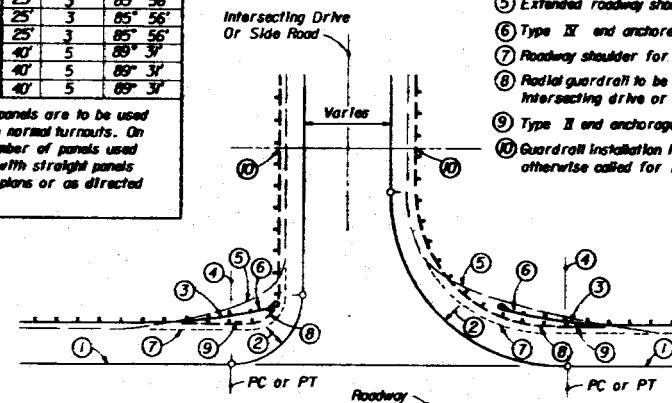
- ① Edge of roadway pavement.
- ② Taper
- ③ Pavement return (radius R_1).
- ④ Standard flare to be installed except when existing guardrail on intersecting drive or side road adjoins the project.
- ⑤ Post for locating standard flare, proximate to PC or PT:
No. 2 post - RadII 25' or less.
No. 3 post - RadII 25' thru 50'.
No. 4 post - RadII 50' or greater.
- ⑥ Extended roadway shoulder for standard flare.
- ⑦ Shoulder transition.
- ⑧ Type III and anchorage.
- ⑨ Roadway shoulder for radial guardrail returns.
- ⑩ Radial guardrail to be installed when guardrail required on the intersecting drive or side road (radius R_2).
- ⑪ Type II and anchorage (radial return only).
- ⑫ Guardrail installation limited to roadway right of way unless otherwise called for in the plans.



TAPER TURNOUTS
INTERSECTING DRIVES AND SIDE ROADS ON RURAL FACILITIES

RADIAL GUARDRAIL						
Normal Turnouts						
Simple Curve			Taper			
R_1	R_2	Panels Required	Δ	R_2	Panels Required	Δ
15'	25'	3	85° 56'	25'	3	85° 56'
20'	25'	3	85° 56'	25'	3	85° 56'
25'	25'	3	85° 56'	25'	3	85° 56'
30'	25'	3	85° 56'	25'	3	85° 56'
35'	25'	3	85° 56'	25'	3	85° 56'
40'	40'	5	89° 31'	40'	5	89° 31'
45'	40'	5	89° 31'	40'	5	89° 31'
50'	40'	5	89° 31'	40'	5	89° 31'

Note: Only 25' and 40' radius panels are to be used for return guardrail on normal turnouts. On skewed turnouts the number of panels used and their arrangement with straight panels will be as shown in the plans or as directed by the Engineer.

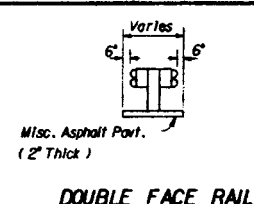
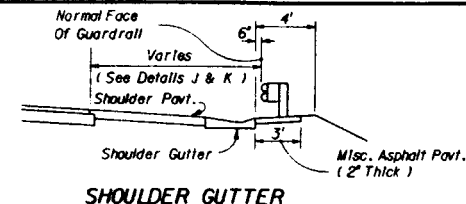
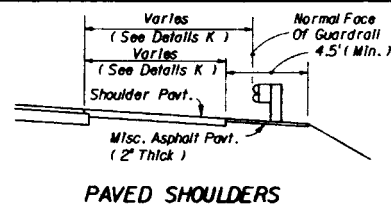
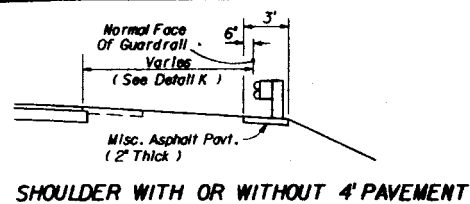


LEGEND

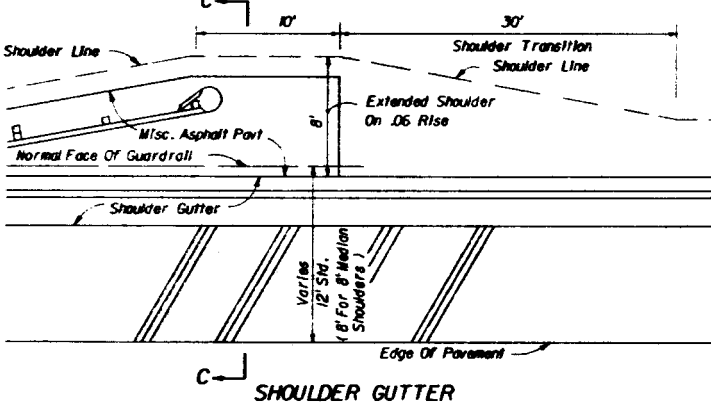
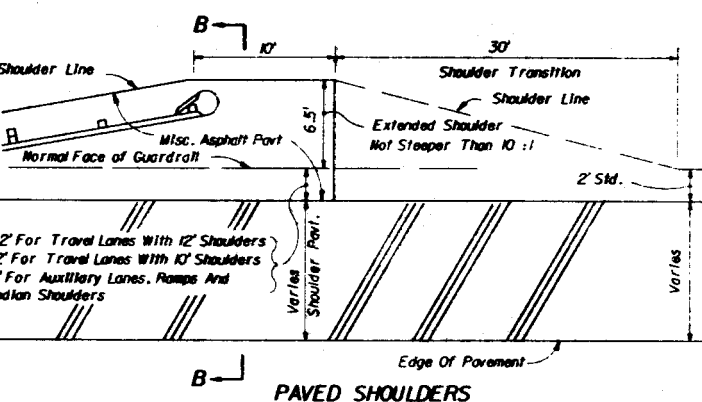
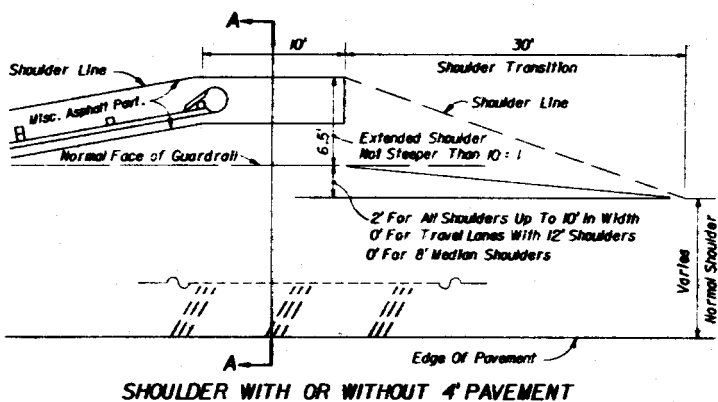
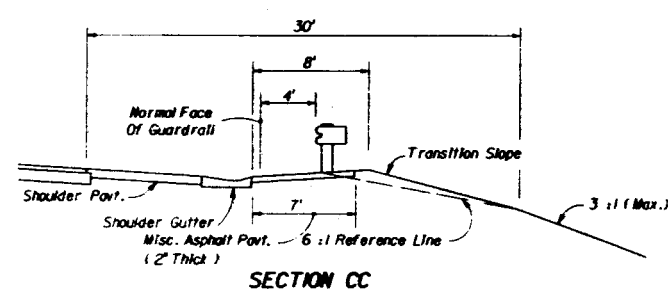
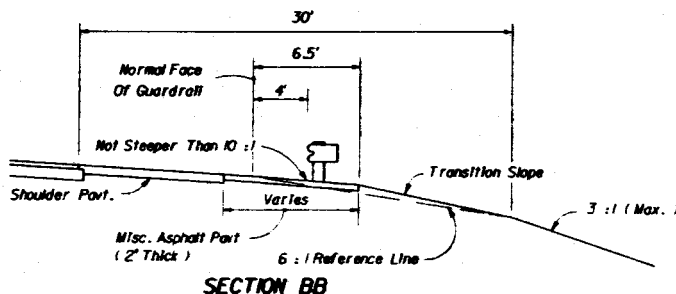
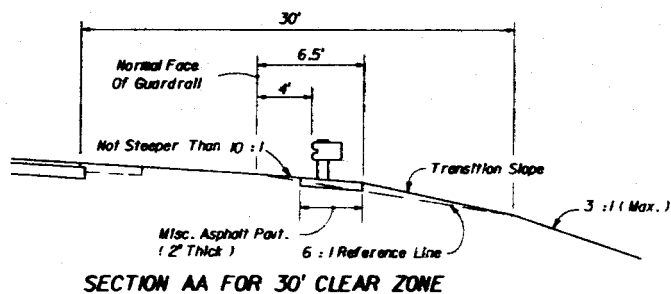
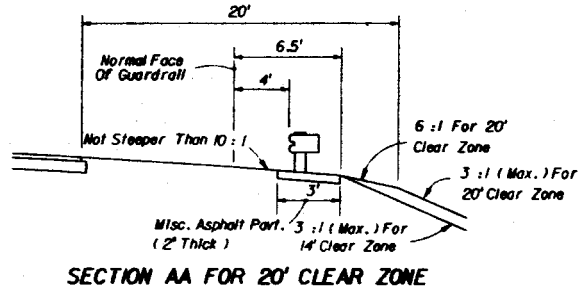
- ① Edge of roadway pavement.
- ② Pavement return (radius R_1).
- ③ Standard flare to be installed except when existing guardrail on intersecting drive or side road adjoins the project.
- ④ Post for locating standard flare, proximate to PC or PT:
No. 3 post - RadII 25' or less.
No. 4 post - RadII greater than 25'.
- ⑤ Extended roadway shoulder for standard flare.
- ⑥ Type III and anchorage.
- ⑦ Roadway shoulder for radial guardrail returns.
- ⑧ Radial guardrail to be installed when guardrail required on the intersecting drive or side road (radius R_2).
- ⑨ Type II and anchorage (radial return only).
- ⑩ Guardrail installation limited to roadway right of way unless otherwise called for in the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By	Revised	Revised	Approved By	J. Hill	
Drawn By	HSD	08/83	State Design Engineer, Roadways		
Checked By	JAB	08/83	Revision No.	Sheet No.	Index No.
F.A.R.A. Approved			08/08/83	85	6 of 14 400

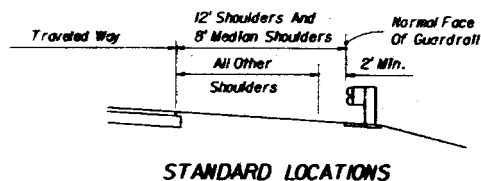
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN															
<h1>GUARDRAIL</h1>															
<table border="1"> <tr> <td>Revised</td> <td>Reason</td> <td>Date</td> </tr> <tr> <td>Designed By</td> <td></td> <td></td> </tr> <tr> <td>Drawn By</td> <td>JS</td> <td>05/92</td> </tr> <tr> <td>Checked By</td> <td>JS</td> <td>05/92</td> </tr> </table>	Revised	Reason	Date	Designed By			Drawn By	JS	05/92	Checked By	JS	05/92	Approved By <i>J. P. Hill</i> State Road Engineer, Roadways		
Revised	Reason	Date													
Designed By															
Drawn By	JS	05/92													
Checked By	JS	05/92													
F.H.S.A. Approved		Section No. 00 Sheet No. 7 of 14	Order No. 400												



MISCELLANEOUS PAVEMENT FOR STANDARD SECTIONS



SHOULDERS, SLOPES AND MISCELLANEOUS PAVING FOR THE STANDARD FLARE



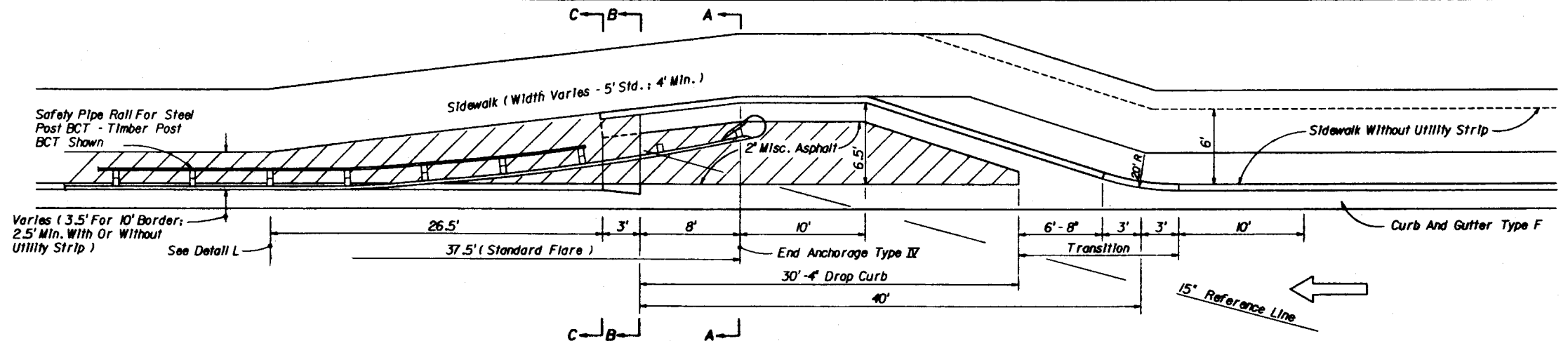
LATERAL PLACEMENT ON FRONTSLOPES (FROM EDGE OF TRAVELED WAY)		
SLOPE	NOT RECOMMENDED	RUBERAIL RECOMMENDED
4:1	14' to 27'	28' to 45'
5:1	15' to 25'	26' to 45'
6:1	17' to 22'	23' to 45'
7:1	21' to 24'	25' to 45'
8:1	Acceptable to 25'	26' to 45'
9:1	Acceptable to 26'	27' to 45'
10:1	Acceptable to 27'	28' to 45'

Note:
For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width.
See sketch to left for normal guardrail location.
Placement of guardrail on front slopes steeper than 4:1 not recommended.

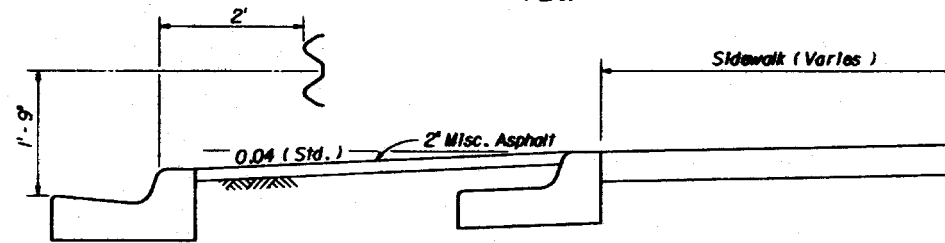
LOCATION ON FRONT SLOPES

GUARDRAIL LOCATION - DETAIL K

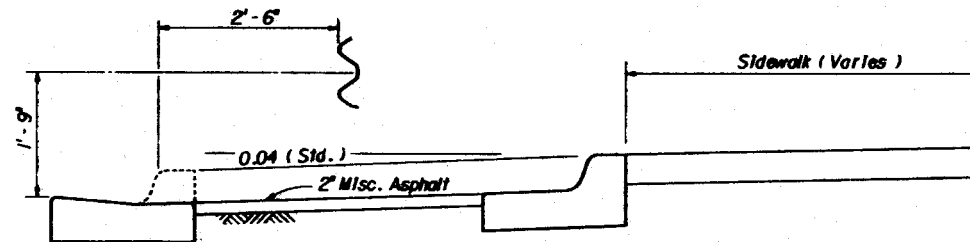
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By	Checked By	Approved By	
Drawn By	Reviewed By	State Bridge Engineer, Roadways	
Checked By	Reviewed By	Sheet No.	Project No.
F.H.R.A. Approved	10/08/78	88	8 of 14
			400



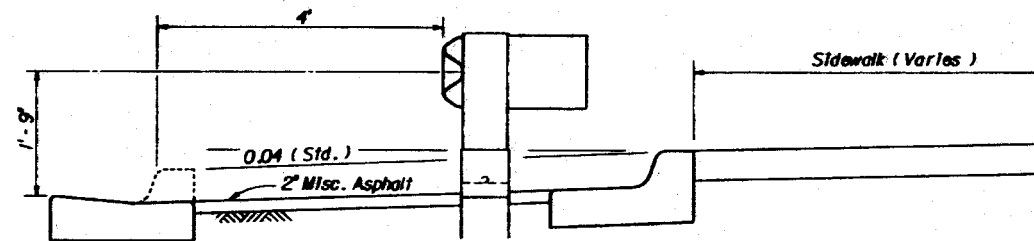
PLAN



SECTION CC



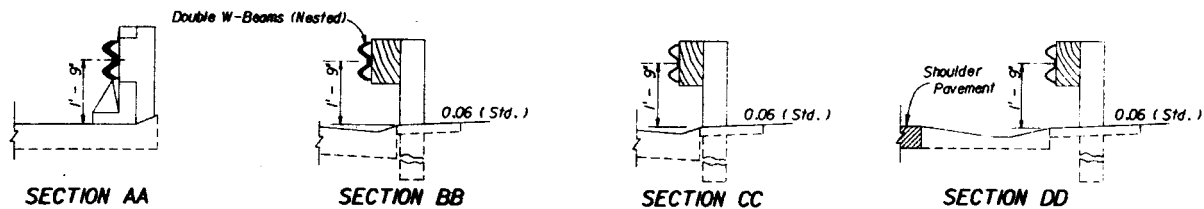
SECTION BB



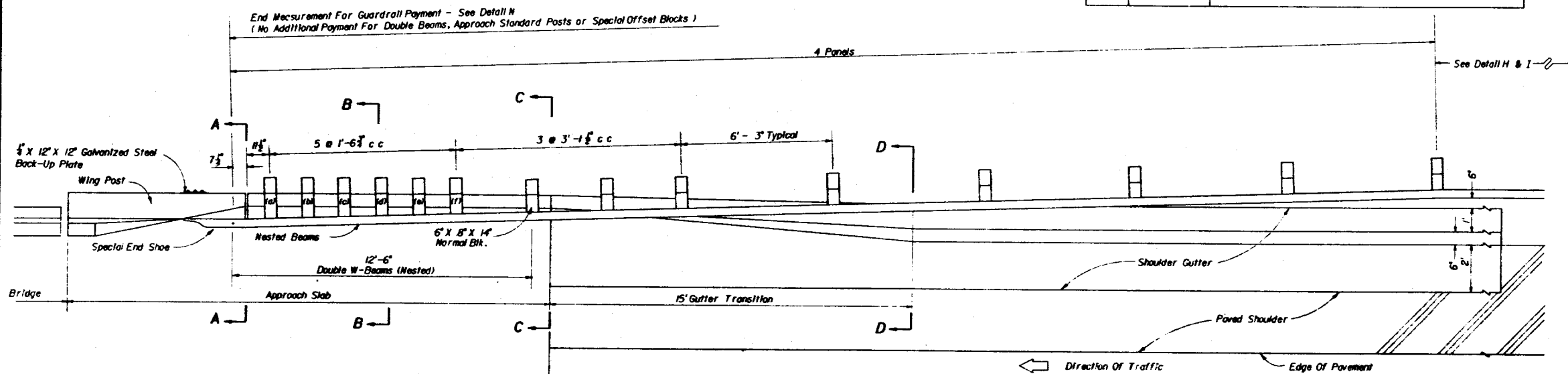
SECTION AA

APPROACH TREATMENT FOR STANDARD FLARE FOR CURB AND GUTTER
DETAIL Q

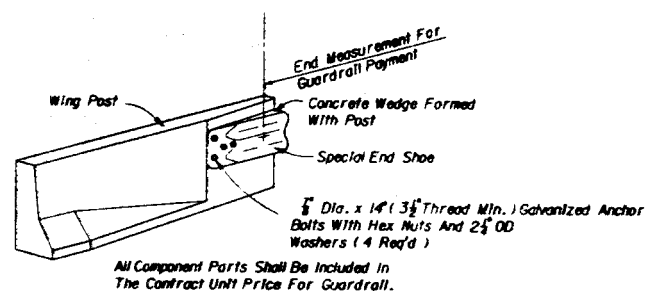
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By	DATE	Revised	Approved By		
Drawn By	DATE	Revised			
Checked By	DATE	Revised	Station No.	Sheet No.	Index No.
F.A.R.A. Approved			88	9 of 14	400



APPROACH POSTS AND SPECIAL OFFSET BLOCKS		
OFFSET BLOCK DIMENSIONS		Dimensions shown are suited to standard approach slabs with parallel curb configurations and typical guardrail lateral transitions. For other approach slab configurations and guardrail alignments, the approach posts are to be adjusted and the depth of the offset blocks adjusted for a snug fit against the back of the rail. Offset blocks can be no deeper than two normal blocks (16" max.). The nested rails shall not be bolted to the blocks and posts at blocks (a), (c) and (e). All posts are standard posts except where approach slab configurations require the use of special steel posts. Where applicable normal offset blocks are to be used with special steel posts. When steel offset blocks are used, rail back-up plates are not to be used at offset blocks (a) through (f).
(a)	6" x 11 1/2" x 14"	
(b)	6" x 11" x 14"	
(c)	6" x 10 1/2" x 14"	
(d)	6" x 10" x 14"	
(e)	6" x 9 1/2" x 14"	
(f)	6" x 9" x 14"	

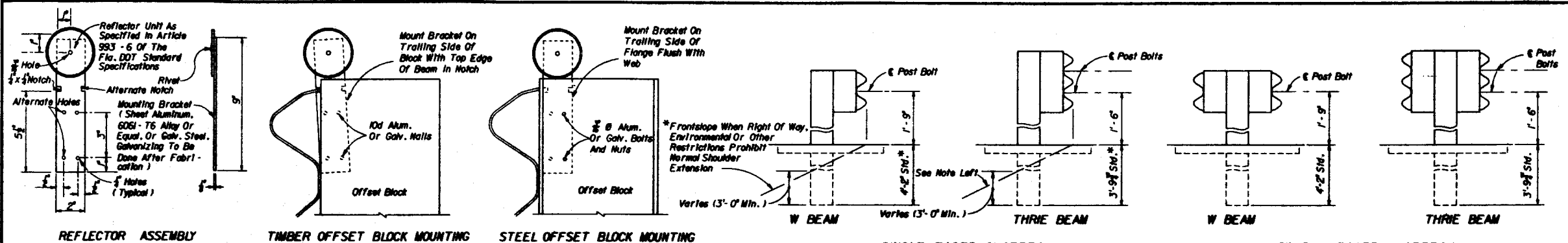


**APPROACH GUARDRAIL DETAILS FOR BRIDGE CONNECTIONS AND
GUARDRAIL & SHOULDER GUTTER TRANSITIONS AT BRIDGE APPROACHES
DETAIL J**

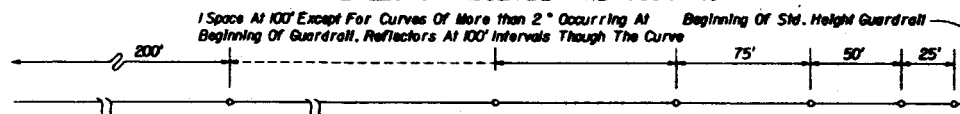


**GUARDRAIL ATTACHMENT AT HANDRAIL BARRIER
DETAIL N**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By	None	Series	Approved By		
Drawn By	JL	08/88	State Design Engineer, Roadways		
Checked By	JHE/JEB	08/88	Revision No.	Sheet No.	Index No.
F.J.L.B.A. Approved		0/08/88	88	10 OF 14	400



REFLECTOR ASSEMBLY AND MOUNTING

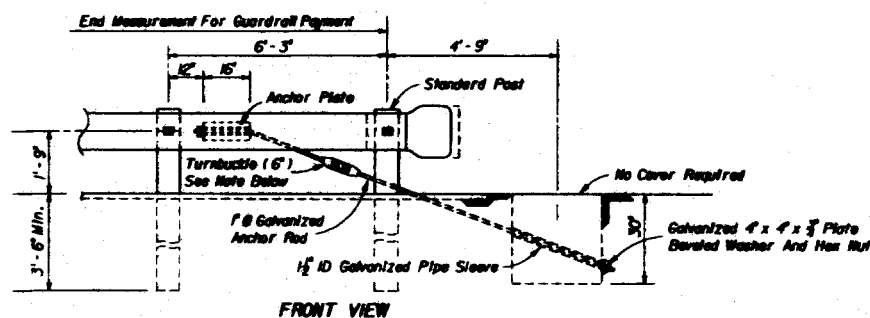
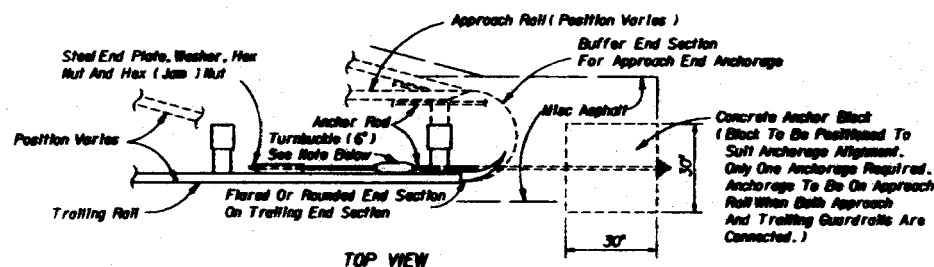


Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer.

For minimum installations (length 62.5') provide one reflector at each end and at approximate center.

REFLECTOR SPACING

REFLECTORS - DETAIL M

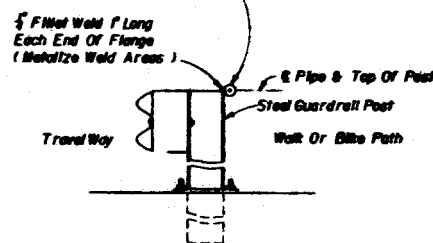


Note: The payment for the items of End Anchorage Assemblies Type II shall include furnishing and installing anchor plate, anchor rod, pipe sleeve, anchor block, either flared, rounded or buffer end section, and the necessary hardware.

Turnbuckle to be used only for guardrail that is reset vertically. The existing anchor rod (1" Dia.) shall be field cut, threaded 4" on each end, and metalized in accordance with Sections 562 and 971 of the Standard Specifications. The cost for cutting, threading, metalizing and the turnbuckle shall be included in the contract unit price for Reset Guardrail, LF.

END ANCHORAGE TYPE II - DETAIL R

2" Galv. Pipe Rail Required For Steel Posts; Begin Pipe 2" Before First Post With Threaded Cap. (Pipe Rail To Be Used With Wood Posts Only When Called For In Plans. See Plans For Mounting Details. Bolts To Be Cut Off Flush With Nut And Metalized.)



Note: Cost of pipe to be included in the contract unit price for guardrail.

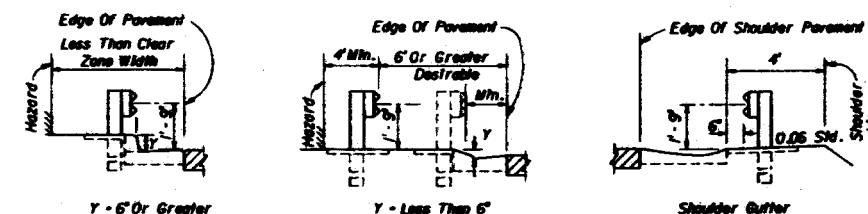
FOR LOCATIONS USED BY SUBSTANTIAL NUMBERS OF PEDESTRIANS, CYCLISTS OR FISHERMEN

SPECIAL SAFETY PIPE RAIL

POST	OFFSET BLOCK	Remarks
Timber	6" x 8" x 5' x 8" (Nominal) x 14" Timber	Post bolt hole in timber block to be centered ($\pm \frac{1}{4}$). All timber off set blocks shall be dressed on all four sides (S4S). See note below.
Steel W6 x 8.5 And 6"C	6" x 8" x 5' x 8" (Nominal) x 14" Timber W6 x 8.5 x 14" & 6"C x 14" Steel To Match Post	Same as above 5/8" x 14" galv. hex head bolts with full length thread and nuts (2 Req'd.) and washers (4 Req'd.) for mounting steel block to post. Bolts are to be installed in opposite holes, top and bottom.

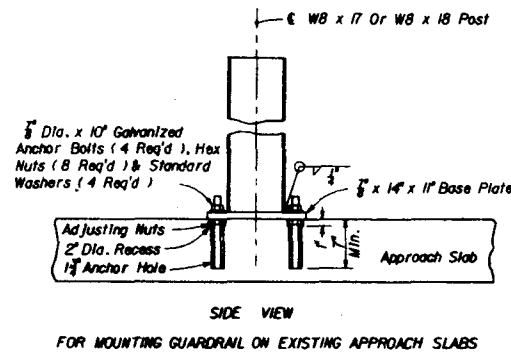
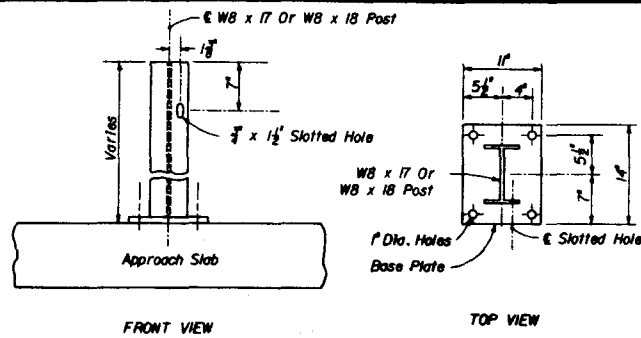
Note: Thrie beam blocks are 22" in length.

PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS

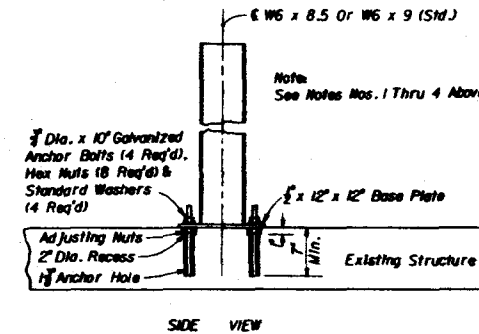
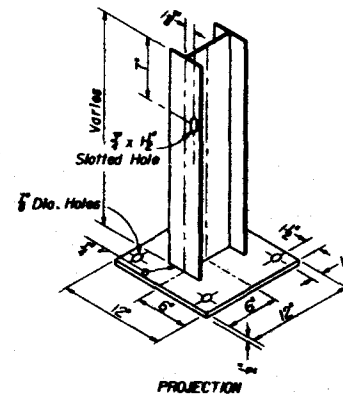


LOCATION AT CURB & GUTTER SECTIONS - DETAIL L

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By	Drawn By	Checked By	Reviewed By	Approved By	Scale
	ASD	ASD	ASD	J. Hill	1" = 40'
Project No.	Sheet No.	Total Sheets			
100-100	00	11 of 14			
400					

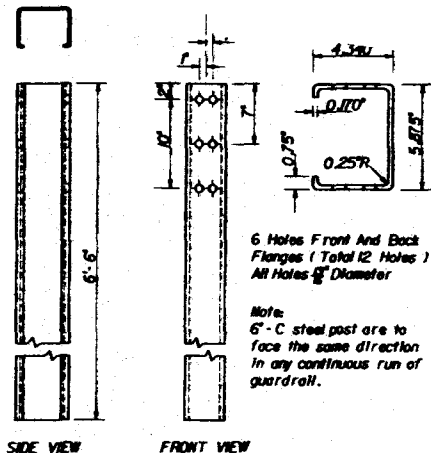


- NOTES: (STEEL POST)
1. Either anchor bolts or concrete wedge anchors may be used. Anchor bolts are to be installed as detailed. Wedge anchors are to be installed in accordance with the manufacturers recommendations, assuming 3000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements: (a) tensile strength 125,000 psi (b) tensile load (approach slabs) 14,000 lbs. each (other structures) 8000 lbs. each (c) shear load (approach slabs) 15,000 lbs. each (other structures) 7800 lbs. each (d) have an electroplated zinc coating, Type LS, applied in accordance with ASTM A - 154. The coated bolts, nuts and washers shall be chrome treated after coating in a water solution containing 0.2% sodium dichromate (3 oz. per 10 gals.)
 2. Anchor holes and recesses are to be drilled. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly cleaned before setting bolts or wedge anchors and dry when setting bolts. Bolts shall be set in epoxy mortar.
 3. Posts are to be plumbed with adjusting nuts when bolts are used and plumbed with mortar seating when wedge anchors are used. All base plates to be grouted with neat finish.
 4. Steel post and plate assembly to be galvanized. Any damaged galvanized areas to be metalized in accordance with Section 562 of the Standard Specifications.

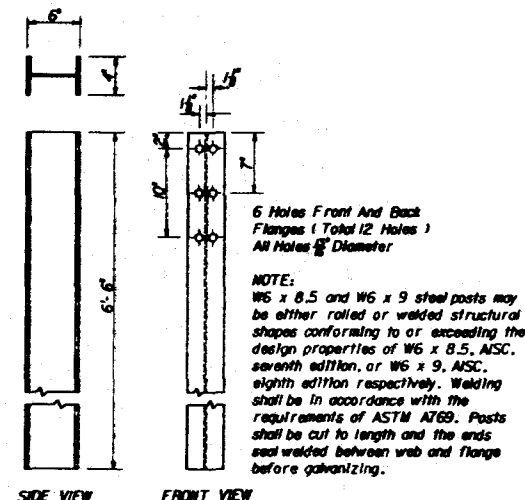


FOR CONSTRUCTION OF GUARDRAIL WHERE CULVERT, PIER FOOTING OR OTHER STRUCTURE PRECLUDES NORMAL POST INSTALLATION

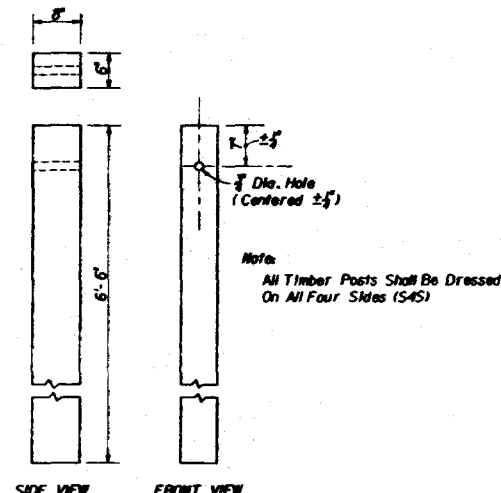
SPECIAL STEEL GUARDRAIL POSTS



6-C STEEL POST



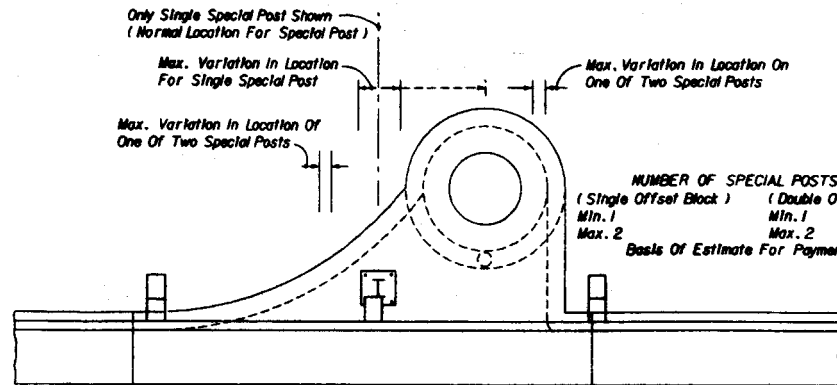
W6 x 8.5 Or W6 x 9 STEEL POST



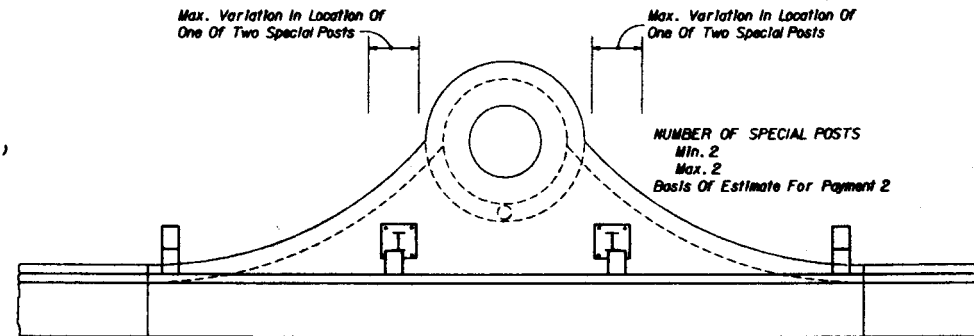
TIMBER POST

STANDARD TIMBER AND STEEL GUARDRAIL POST

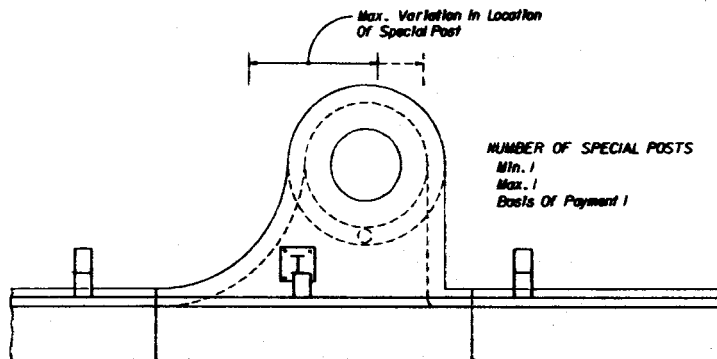
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By	Drawn By	Checked By	Approved By
			<i>[Signature]</i>
Reviewed By	Reviewed By	Reviewed By	Reviewed By
F.H.R.A. Approved	DATE	BY	12 of 14
			400



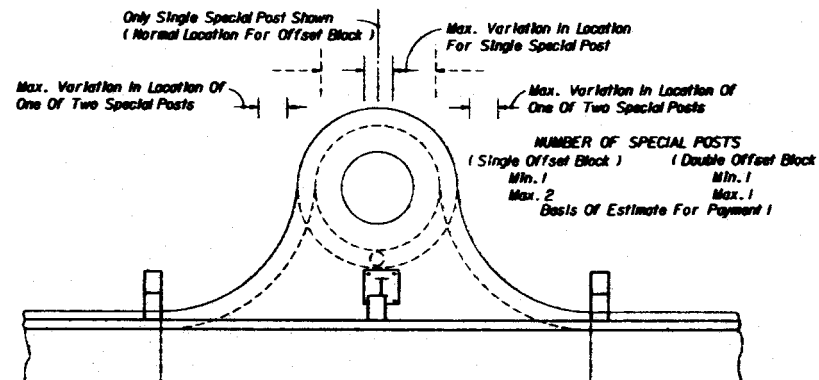
CURB INLET TYPE 1



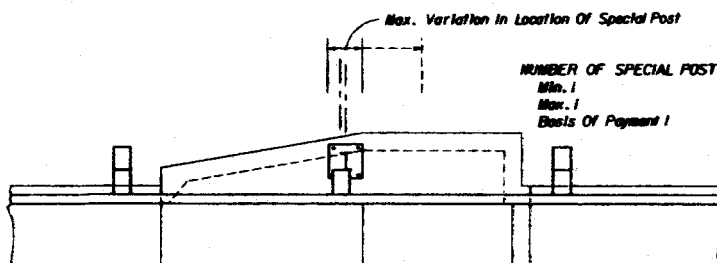
CURB INLET TYPE 2



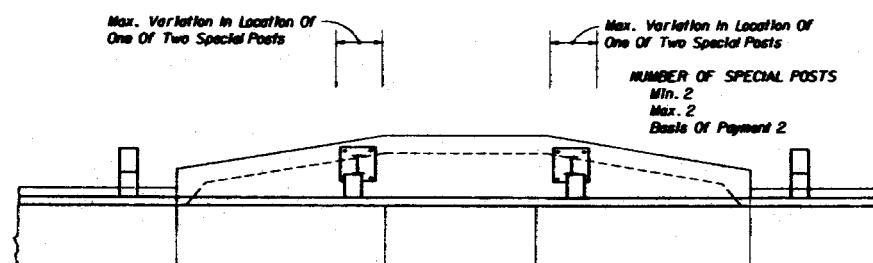
CURB INLET TYPE 3



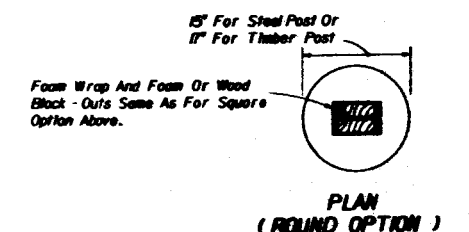
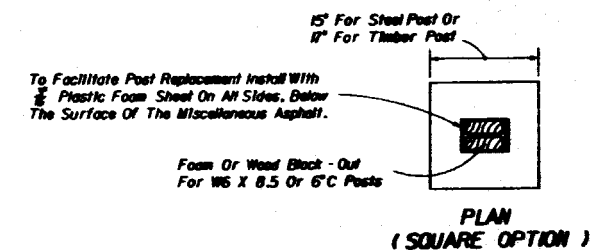
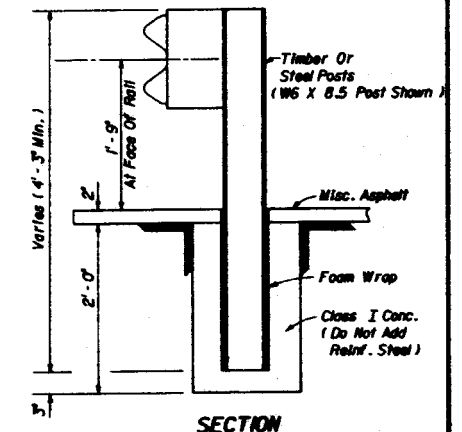
CURB INLET TYPE 4



CURB INLET TYPE 5



CURB INLET TYPE 6



**TO BE USED PRINCIPALLY OVER SHALLOW UTILITIES
ENCASED GUARDRAIL POST**

Notes:

- The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.
- Special posts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 12 of 14, and paid for under the contract unit price for Special Guardrail Post, each.
- Variations shown for the locations of special posts mounted on inlets are established from standard post spacing (6'-3"); clearance of standard posts from inlets (4" min.); use of single and double offset blocks on standard posts adjacent to the inlets; optional flange mountings; and concrete anchor edge distances (2' for grouted and 3' for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of roll panel(s).
- Encased guardrail posts shall conform in section to standard timber and steel posts, and be paid for under the contract unit price for Special Guardrail Post, each. Payment shall include cost of foam wrap and concrete encasement.

SPECIAL POST LOCATIONS ON CURB INLETS

LEGEND

- Variation In Location Of Special Post:
- Single Offset Block (s) On Adjacent Standard Post (s)
 - Expanded Location By Using Double Offset Blocks On Adjacent Standard Post (s)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
Designed By	Drawn By	Checked By	Approved By	Revision No.	Sheet No.
	RSB	08/03	<i>[Signature]</i>		
Reviewed By	08/03	08/03	08/03	08/03	08/03
F.H.R.A. Approved			08/03/03	08	13 of 14
					400

GENERAL NOTES

- Whether an existing bridge handrail is to remain in place, be retrofitted or be replaced, is a determination that must be made independent of any information contained on this index.

Only after it has been established that an existing bridge handrail is to remain in place is this index to be used to analyze guardrail to bridge connections.

- The schemes on this index are not to be used for new bridge construction, bridge widening, bridge barrier wall or handrail replacement, or, for existing bridges that have wing posts for guardrail connection that conform with configurations shown in current Roadway Design Standards and Bridge Design Standards.
- The schemes on this index are divided into two general categories, representing curbed and uncurbed roadway approaches. A scheme selection guide is provided under 'Designer Notes' for curbed and uncurbed roadway approaches. Approach abutments with curbs or wing walls with radial safety curbs will be treated as curbed roadway approaches.

- Existing bridge features shown in these schemes are example configurations only. The principle key to scheme selection is bridge curb or sidewalk width. Location control is keyed to bridge face of curb, except for certain trailing conditions.

- Details that are repetitive on the schemes and features that are detailed on Index No. 400 have been purposely deleted to produce clarity and simplification in the schemes, and to emphasize proper location and positioning of the anchorage and connecting guardrail.

- All schemes are right side or right hand details for traffic flow right to left. Left side applications are opposite hand.

- For undivided two-way bridges 'trailing end', as used in this index, is in relation to the direction of travel of near lane traffic, but it is always considered as an approach for opposing lane traffic.

- All connections of guardrail special and shoes to concrete anchorage posts, panels and walls shall have a $\frac{3}{4}$ x 12' x 12' galvanized steel back-up plate for gang tightening of hex nuts on $\frac{3}{4}$ diameter galvanized anchor bolts. Special and shoe anchor bolts shall have a minimal length equal to the thickness of the concrete anchorage plus 14'.

When thru bolts would penetrate existing bridge rails, $\frac{3}{4}$ diameter bolt clusters and electrical anchor bolts meeting the manufacturer's recommendation may be substituted as approved by the Engineer.

- Unless otherwise called for in the plans exposed concrete surfaces shall have a Class 3 surface finish and Class 5 Applied Finish Coating in accordance with Sections 521 and 400 respectively of the Standard Specifications.

- The guardrail and anchorage schemes on this index do not include cost for payment of guardrail. See Index 400 Detail II for limit of guardrail measurement.

Each independent anchorage described in these schemes shall be paid for as a bridge and anchorage assembly under the contract unit price for Bridge Anchorage Assembly, Each. The unit price shall be full compensation for the following:

- Each concrete anchor post, panel or transition wall including reinforcing steel, existing rail or rail and post removal, metal filling, hand breaker, post handling, drilling, dowsing, grouting, excavation, backfill, special and shoe and accessory items.
- Each guardrail steel terminal post, including tiered end section, anchorage and accessory items (optional use not included).
- Each special and shoe anchored directly to an existing bridge end post or wing post, including back-up plate and accessory items.

Continuous concrete safety barrier (Schemes 1 & 19) shall be paid for as a roadway item under the contract unit price for Concrete Handrail (Retrofit Barrier) (Vert Face), LF.

Continuous guardrail across bridges shall be paid for as a roadway item under the contract unit price for Guardrail (Bridge) LF, and Special Guardrail Post, Each. The unit price for guardrail shall include the cost for all accessories prescribed under Index No. 400 and the unit price for special posts shall include the cost for all accessories and anchorage prescribed in Index 400 and in Scheme 16 of this index.

DESIGN NOTES

- The details in this index are intended to be used for existing bridges that have end and approach slab configurations constructed under former Department standards, and, are not intended to preclude special design details more suited to bridges with unusual handrail or wingpost configurations, or, when there is conflict with drainage structures or other features that can not be adjusted.
- The schemes provide the designer with a convenient method of providing standardized information on the plans. In the selection and assignment of schemes the designer must predetermine existing bridge handrail, curb, sidewalk and approach slab conditions, particularly the location of embedded conduit. Special attention must be directed to the presence or absence of curbed approaches on each independent corner of the bridge.
- Each corner of the bridge that requires a guardrail connection should be labeled independently by scheme number, and, where continuous barrier is required across a bridge the scheme number should be labeled independently on the side(s) of the bridge. When continuous guardrail is called for, bridge end anchorage assemblies will be omitted, but, when continuous concrete safety barrier is called for, one or more bridge end anchorage assemblies will be labeled on the plans.
- The scheme selection guide below is to be used as a quick reference for determining anchorages and continuous barriers that are applicable to specific conditions for existing bridges. When appropriate, special details are to be used in lieu of schemes or to supplement or complement the scheme details. In selecting schemes the width of curb, safety curb and sidewalk is the distance from face of curb to the nearest face of post, rail or parapet.

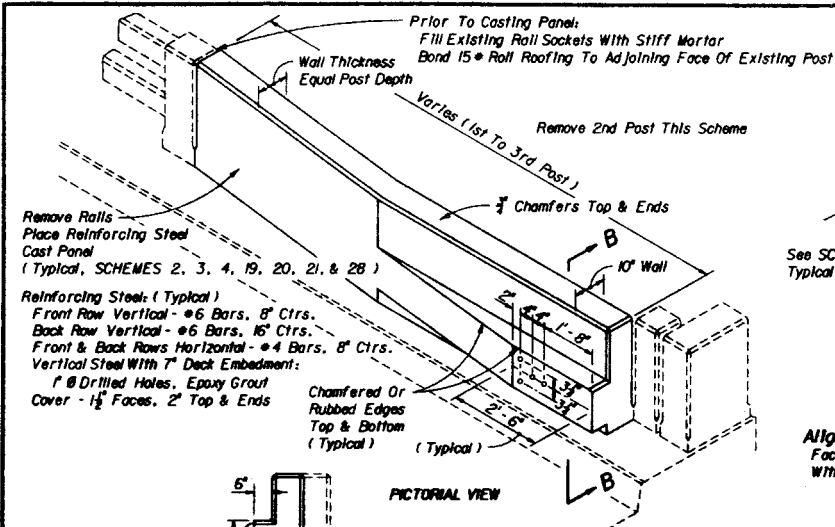
SCHEME SELECTION GUIDE (NUMBERS)

	WITH ROADWAY CURBS APPROACHING BRIDGES Sheets 2 thru 6		WITHOUT ROADWAY CURBS APPROACHING BRIDGES Sheets 7 thru 9	
	ONE-WAY BRIDGES	TWO-WAY BRIDGES	ONE-WAY BRIDGES	TWO-WAY BRIDGES
	APPROACH END	TRAILING END	APPROACH END	TRAILING END
Handrail Curb	3, 4, 18	3, 4, 18	21, 22, 27, 30	23, 27, 30
Narrow Curb	2, 3, 8, 9, 10, 11, 12, 13, 14	2, 3, 8, 15	20, 21, 27, 29	23, 27, 29
Wide Safety Curb	1, 2, 8, 11, 12, 13, 14, 15, 16, 17	1, 2, 8, 11, 12, 13, 14, 15, 16	19, 20, 28, 29	19, 23, 29
Sidewalks	1, 15	1, 15	19	19
	APPROACH AND TRAILING ENDS		APPROACH AND TRAILING ENDS	
Handrail Curb	3, 4, 9, 10, 18		21, 22, 25, 30	
Narrow Curb	2, 3, 6, 7, 9, 10, 11, 12, 13, 14		20, 21, 25, 29	
Wide Safety Curb	1, 2, 5, 6, 9, 10, 11, 12, 13, 14, 16		19, 20, 24, 25, 29	
Sidewalks	1, 15		19	

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

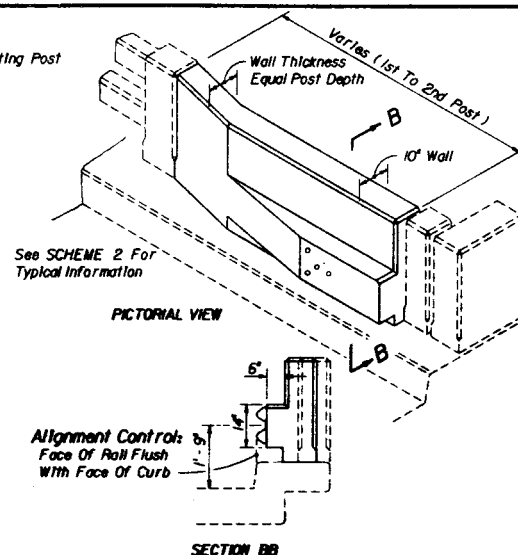
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES

Designed By	210	Date	05/05	Approved By	<i>[Signature]</i>		
Drawn By	210	Date	05/05	Reviewed By	[Signature]		
Checked By	210	Date	05/05	Print No.	1 of 9	Page No.	401
F.A.R.A. Approved				88			



APPLICATIONS
SAFETY CURB 1'-1" TO 2'-0" WIDE
POST AND DISCONTINUOUS BEAM RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

SCHEME 2

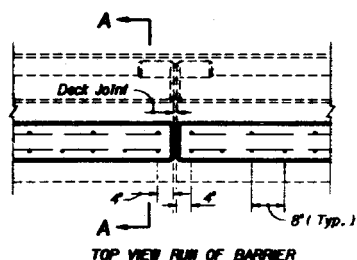


APPLICATIONS
SAFETY CURB LESS THAN 1'-0" WIDE
POST AND DISCONTINUOUS BEAM RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

SCHEME 3

CAST IN PLACE PANELS

Estimated Quantities (Per L.F.)
Class II Concrete 0.06 CY
Reinforcing Steel 15# Per L.F.



Varies (Greater Than 1'-6")

2'-5" No. 6 Bars

No. 4 Bars 8" o.c. Bend Around End

Shoe Bolt Holes

5' Wall Offset Control

Drill 1" Holes And Set No. 6 Bars In Epoxy Grout. Offset And Redrill When Steel Is Encountered. (Typical)

SECTION AA

APPLICATIONS
SAFETY CURB WIDER THAN 1'-6" AND SIDEWALKS
CONTINUOUS BARRIER ACROSS BRIDGE

SCHEME 1

CONCRETE SAFETY BARRIER

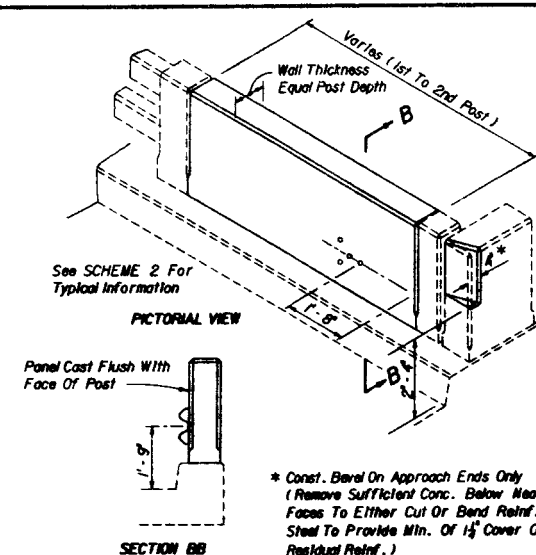
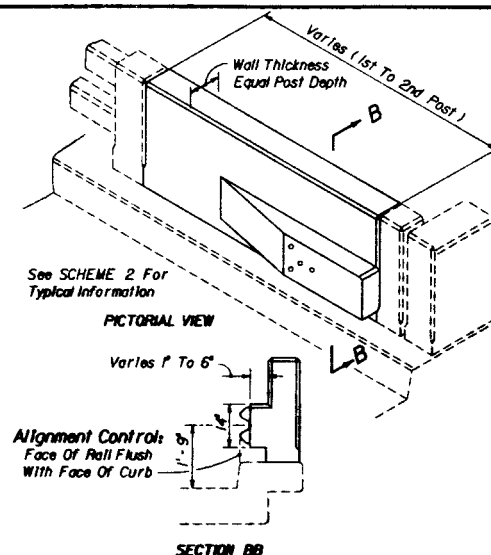
BRIDGES

WITH

APPROACHING

ROADWAY

CURB

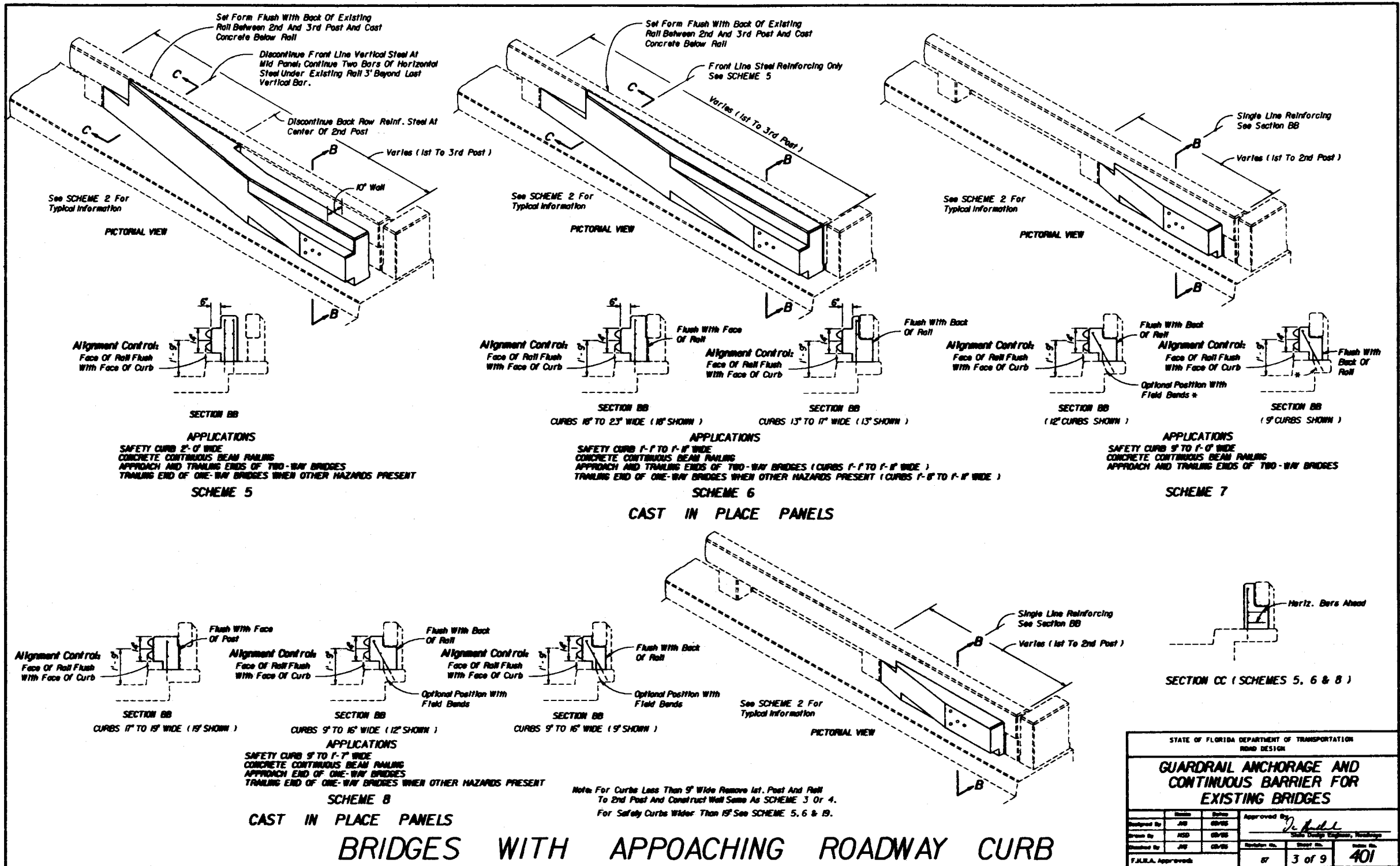


APPLICATIONS

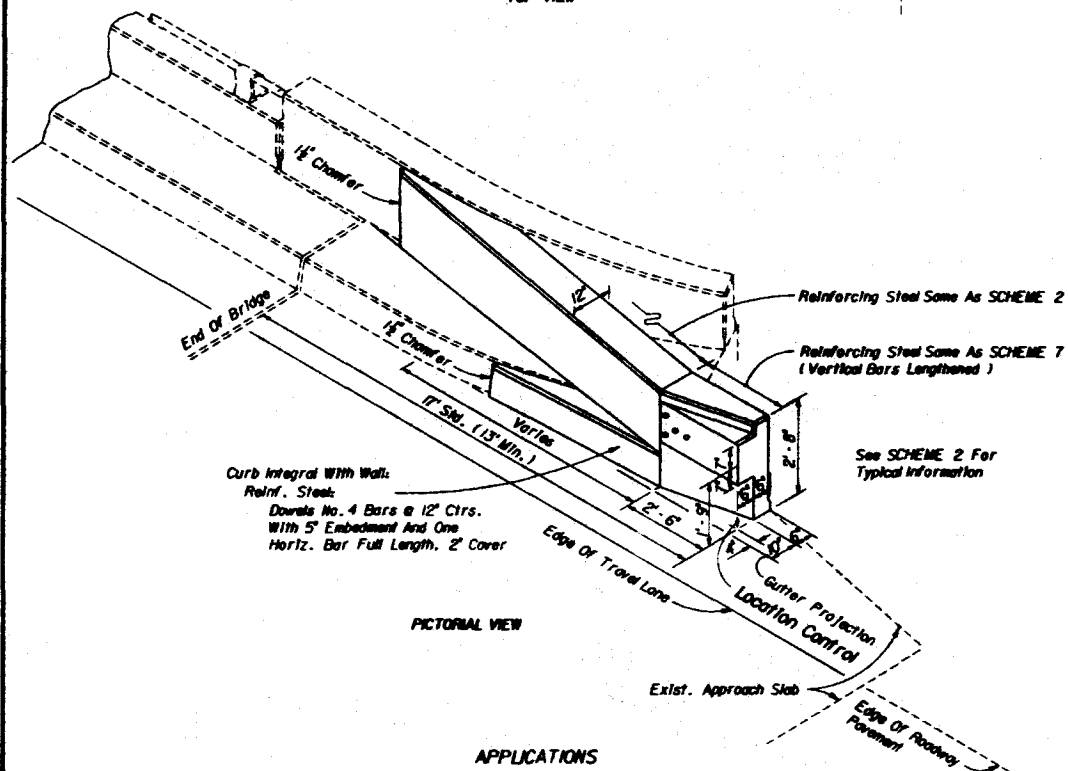
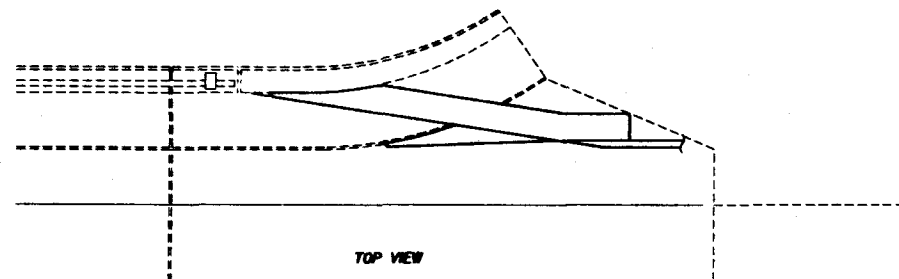
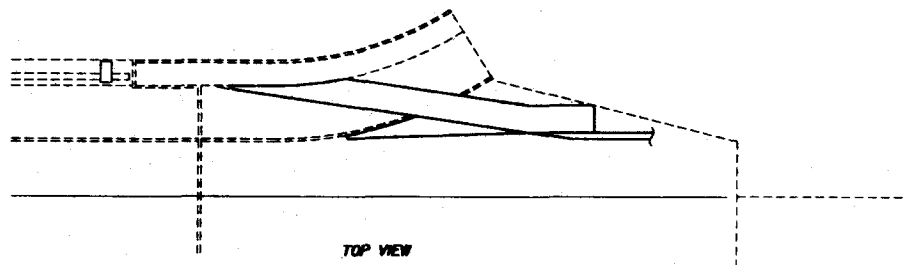
HANDRAIL CURB
POST AND DISCONTINUOUS BEAM RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

SCHEME 4

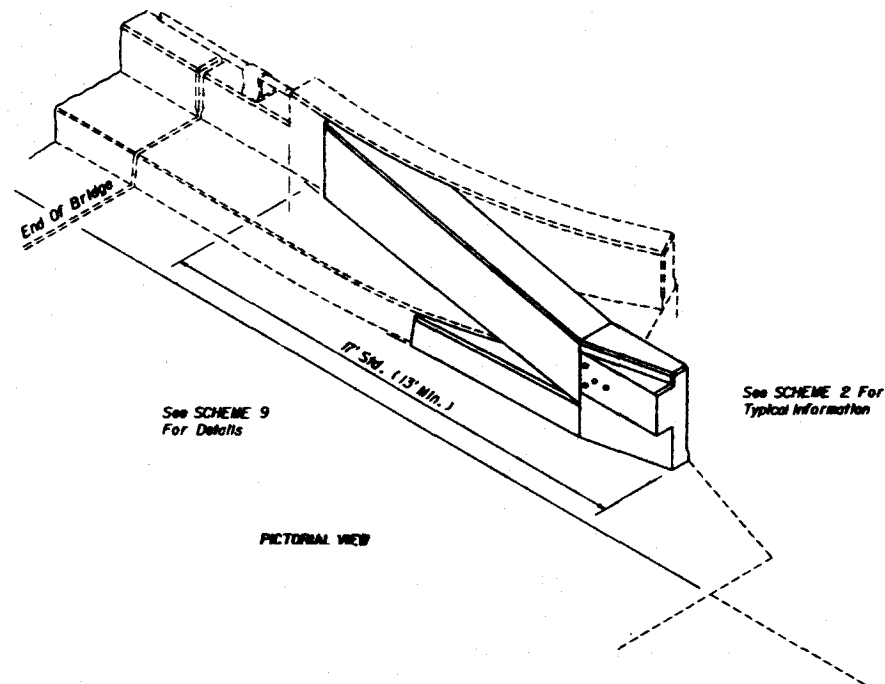
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES			
Designed By	JAC	Date	08/95
Drawn By	RSD	Date	08/95
Checked By	JAC	Date	08/95
F.H.B.A. Approved		87	2 of 9
Approved By		401	



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES					
Designed By	JAB	Checked By	GB/RS	Approved By	
Drawn By	HSD	Reviewed By	GB/RS	State Design Engineer, Roadways	
Revised By	JAB	Revised By	GB/RS	Revision No.	Sheet No.
F.H.A. Approved				87	3 of 9
					401



APPLICATIONS
SAFETY CURBS 2'-0" WIDE OR LESS
CONCRETE PARAPET WITH METAL PIPE RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
APPROACH SLAB FOUNDATION
SCHEME 9

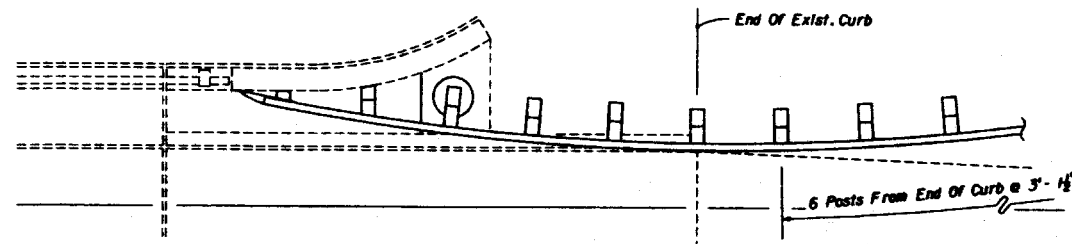


APPLICATIONS
SAFETY CURBS 2'-0" WIDE OR LESS
CONCRETE PARAPET WITH METAL PIPE RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
APPROACH SLAB FOUNDATION
SCHEME 10

CAST IN PLACE TRANSITION WALL

BRIDGE WITH APPROACHING ROADWAY CURB

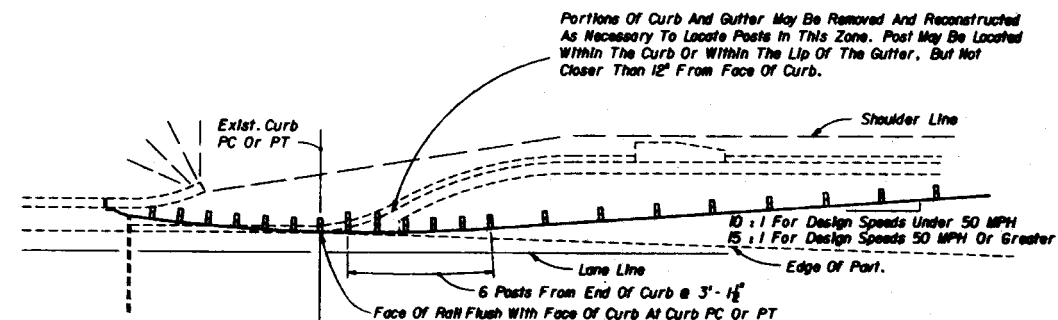
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES					
Designed By	JAC	Date	05/95	Approved By	<i>[Signature]</i>
Drawn By	RSD	Date	05/95	Scale: 1/4" = 1'-0"	
Checked By	JAC	Date	05/95	Revision No.	Sheet No.
F.H.S.A. Approved				4 of 9	401



See SCHEME 11 For Additional Information

APPLICATIONS
SAFETY CURB 2'-0" WIDE OR LESS
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

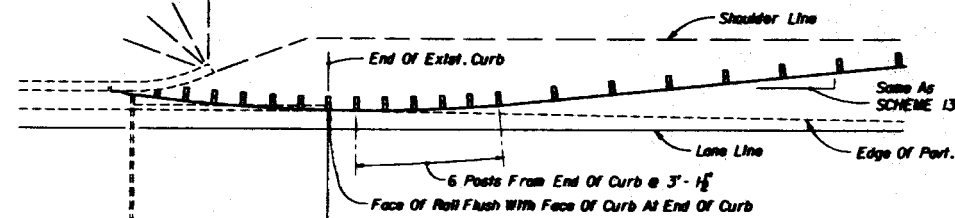
SCHEME 12



See SCHEMES 11 & 12 For Additional Information

APPLICATIONS
SAFETY CURB 2'-0" WIDE OR LESS
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

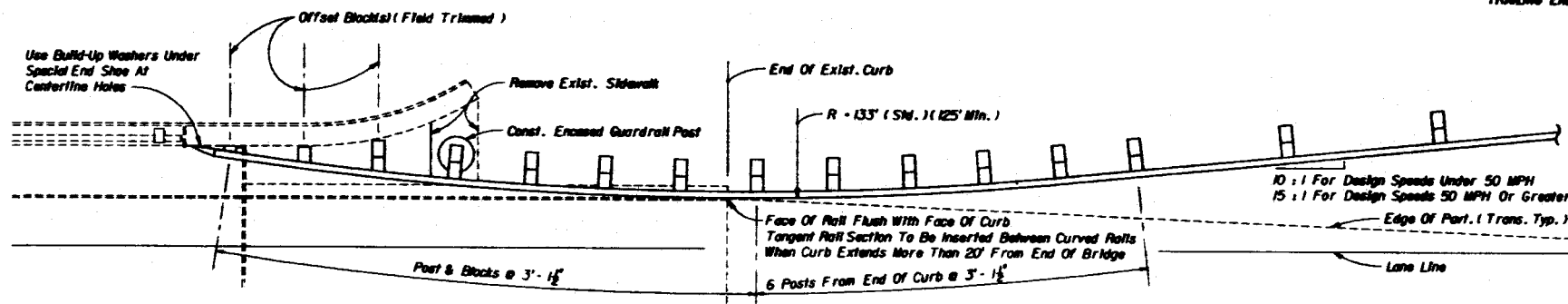
SCHEME 13



See SCHEMES 11 & 12 For Additional Information

APPLICATIONS
SAFETY CURB 2'-0" WIDE OR LESS
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

SCHEME 14



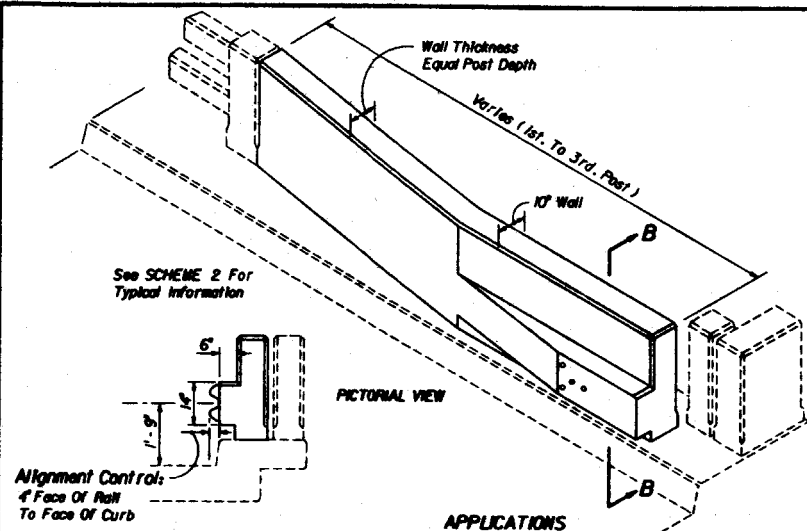
APPLICATIONS
SAFETY CURB 2'-0" WIDE OR LESS
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

SCHEME 11

CURVILINEAR GUARDRAIL

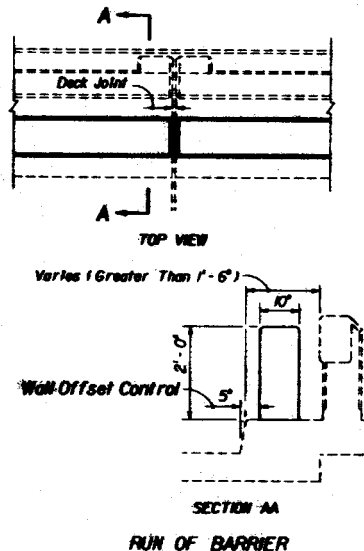
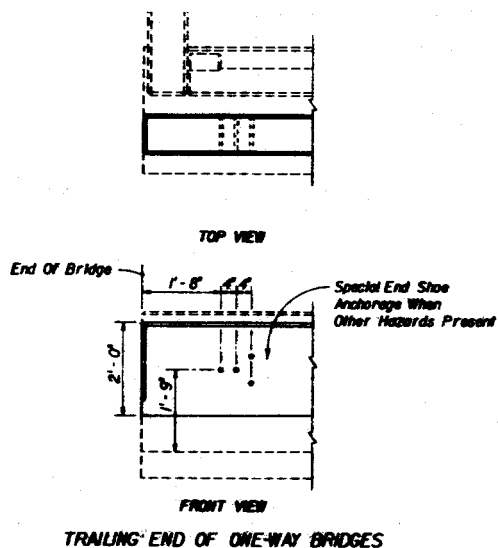
BRIDGES WITH APPROACHING ROADWAY CURB

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES			
Designed By	Reviewed By	Approved By	<i>[Signature]</i> State Design Engineer, Bridge
Drawn By	Checked By	Scale	
Estimated By	Quantity	Sheet No.	5 of 9
F.A.R.A. Approved			401



APPLICATIONS
SAFETY CURB 0'-8" TO 2'-0" WIDE
POST AND DISCONTINUOUS BEAM RAILING
APPROACH ENDS OF ONE-WAY BRIDGES
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES

SCHEME 20



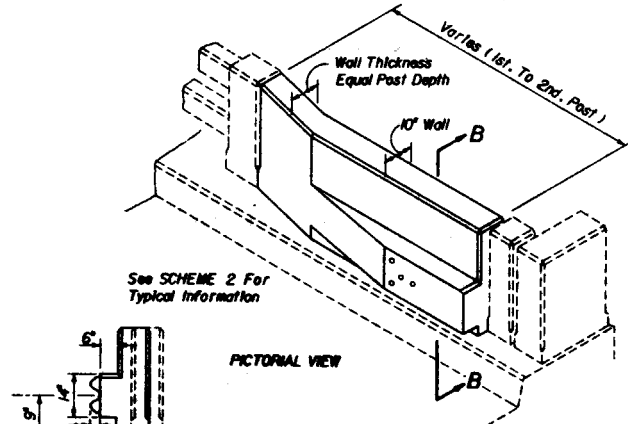
See SCHEME 1 For Reinforcing Details And Estimated Quantities

APPLICATIONS
SAFETY CURB WIDER THAN 1'-6", AND SIDEWALKS
CONTINUOUS BARRIER ACROSS BRIDGE

SCHEME 19

CONCRETE SAFETY BARRIER

BRIDGE WITHOUT APPROACHING ROADWAY CURB



See SCHEME 2 For Typical Information

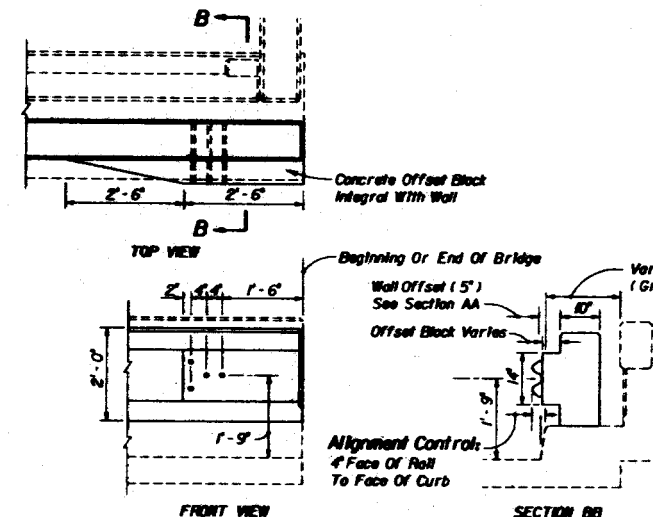
PICTORIAL VIEW

SECTION BB

APPLICATIONS
SAFETY CURB 0'-6" TO 0'-10" WIDE
POST AND DISCONTINUOUS BEAM RAILING
APPROACH ENDS OF ONE-WAY BRIDGES
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES

SCHEME 21

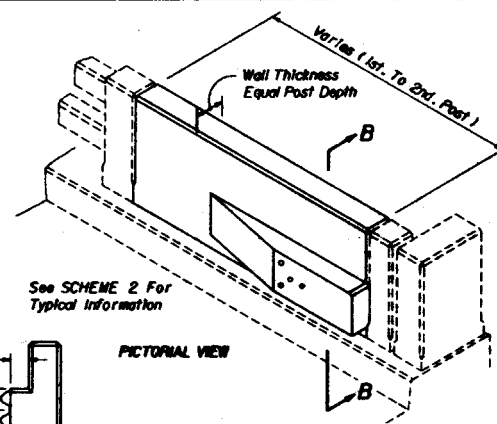
CAST IN PLACE PANELS



APPLICATION
BEGINNING OR END OF BRIDGE
WALL OFFSET (5')
SEE SECTION AA
OFFSET BLOCK VARIES
ALIGNMENT CONTROL:
4' FACE OF RAIL
TO FACE OF CURB

Alignment Control:
4' Face Of Rail
To Face Of Curb

SECTION BB

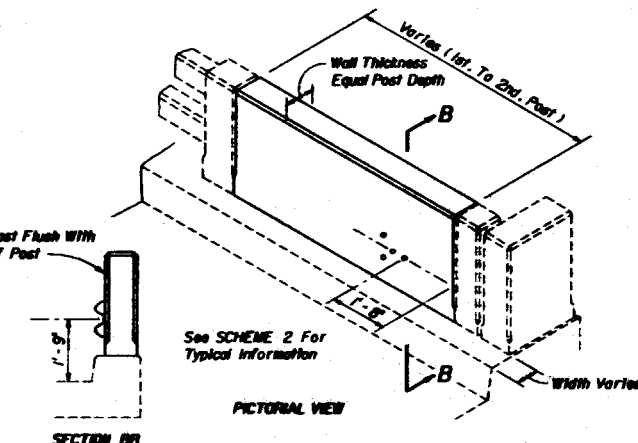


See SCHEME 2 For Typical Information

PICTORIAL VIEW

APPLICATIONS
HANDRAIL CURB
POST AND DISCONTINUOUS BEAM RAILING
APPROACH ENDS OF ONE-WAY BRIDGES
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES

SCHEME 22

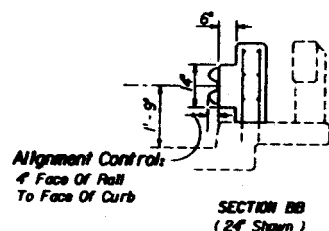
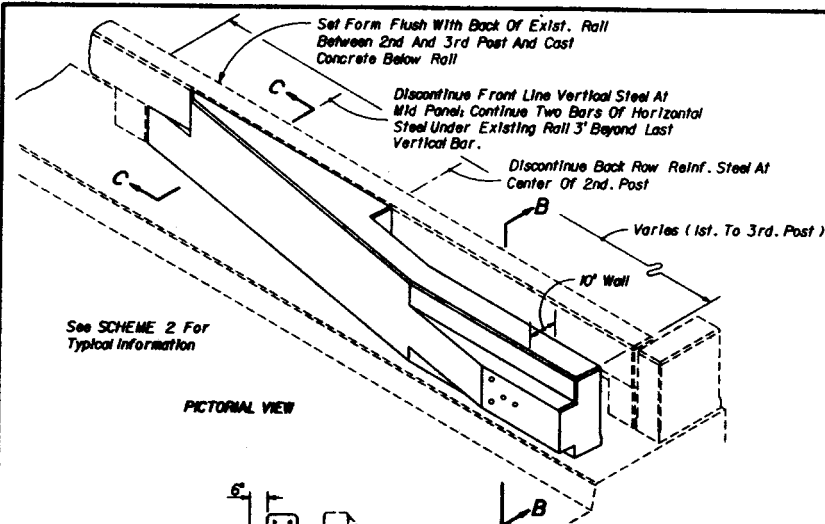


APPLICATION
TRAILING END ON ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

SCHEME 23

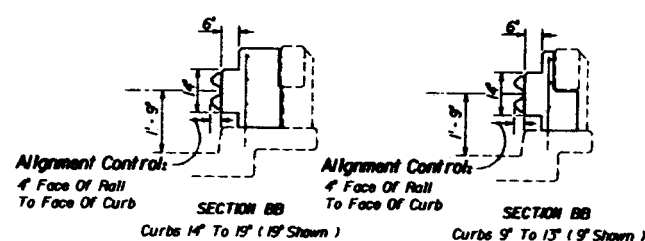
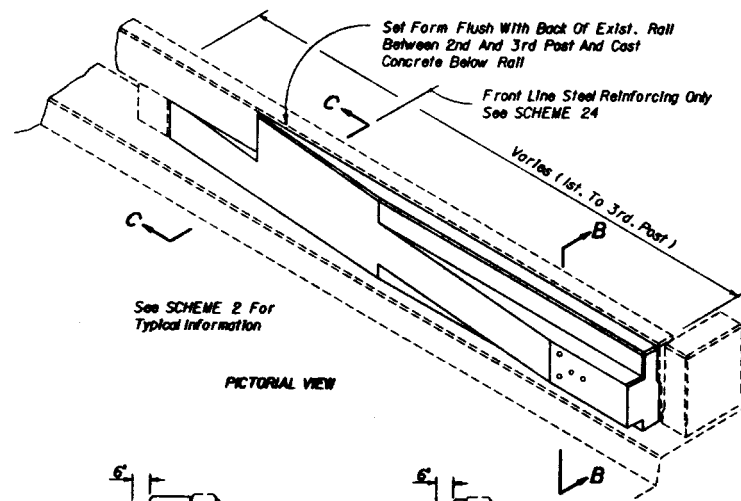
CAST IN PLACE CONCRETE PANEL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES			
Designed By JAG	Checked By JAG	Approved By J. H. Hall State Bridge Engineer, Roadway	Index No. 401
Drawn By HSD	Revised By HSD	Revision No. 1	Sheet No. 7 of 9
F.J.R.A. Approved			



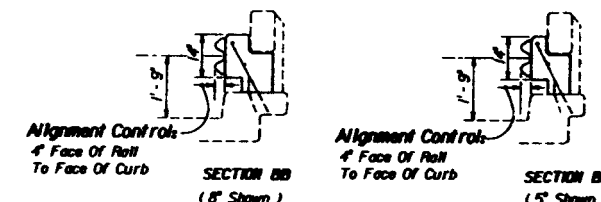
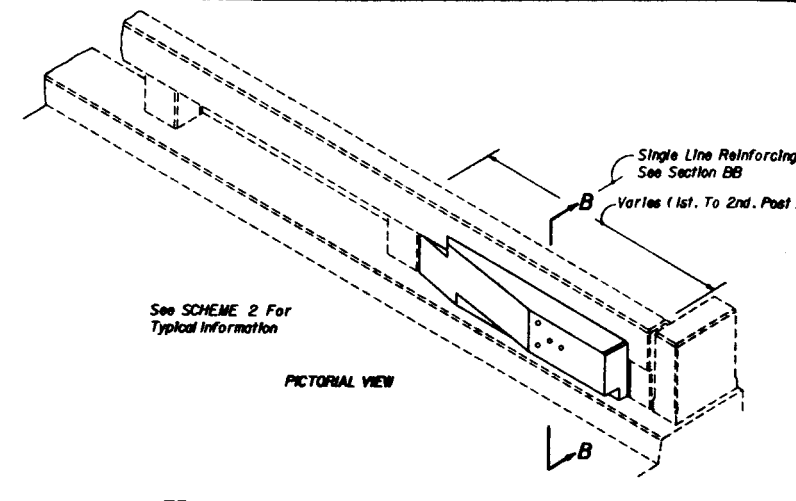
APPLICATIONS
SAFETY CURBS 1'-8" TO 2'-0" WIDE
CONCRETE CONTINUOUS BEAM RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES

SCHEME 24



APPLICATIONS
SAFETY CURBS 9" TO 1'-1" WIDE
CONCRETE CONTINUOUS BEAM RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES

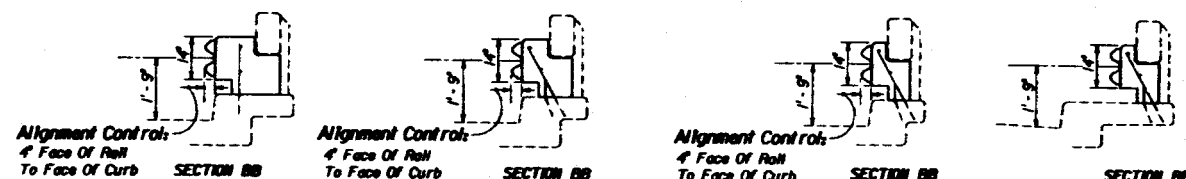
SCHEME 25



APPLICATIONS
SAFETY CURBS 5" TO 8" WIDE
CONCRETE CONTINUOUS BEAM RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES

SCHEME 26

CAST IN PLACE PANELS



CURBS 9" TO 15" WIDE (13' SHOWN)
APPROACH ENDS

CURBS 5" TO 8" WIDE (8' SHOWN)
APPROACH ENDS

CURBS 5" TO 8" WIDE (5' SHOWN)
APPROACH ENDS

CURB WIDTHS VARY
TRAILING END WHEN OTHER HAZARDS PRESENT

Note: For Approach End Curb Less Than 5' Wide See SCHEME 22.

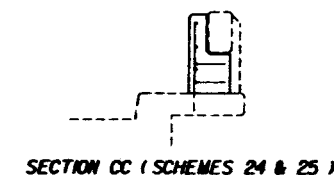
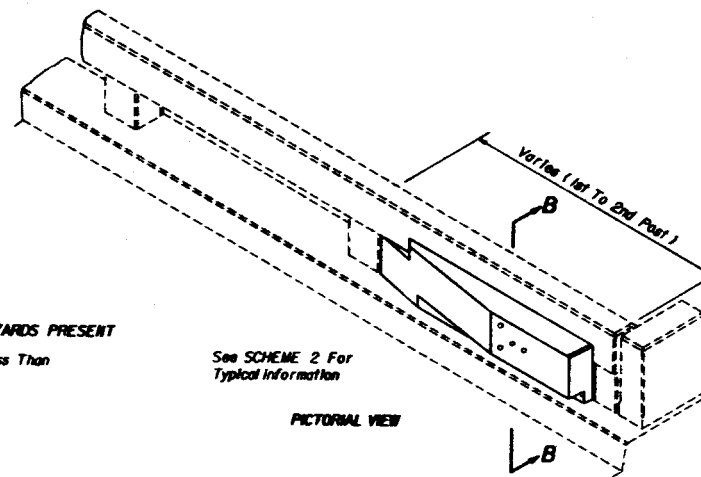
Note: For Trailing End Curb Less Than 5' Wide See SCHEME 23

APPLICATIONS
SAFETY CURB 5" TO 1'-3" WIDE
CONCRETE CONTINUOUS BEAM RAILING
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

SCHEME 27

CAST IN PLACE PANELS

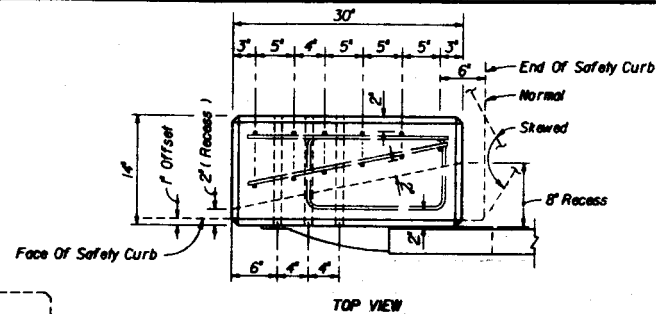
BRIDGES WITHOUT APPROACHING ROADWAY CURB



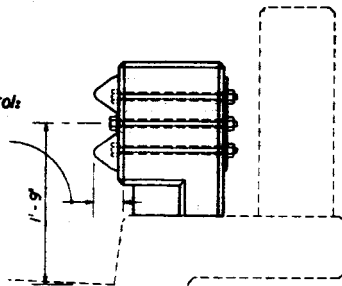
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES				
Designed by	JAC	08/95	Approved by	<i>[Signature]</i>
Drawn by	RSB	08/95	State Design Engineer, Roadways	
Checked by	JAC	08/95	Revision No.	Sheet No.
F.H.R.A. Approved			87	8 of 9
				401

Reinforcing Steel
See SCHEME 17

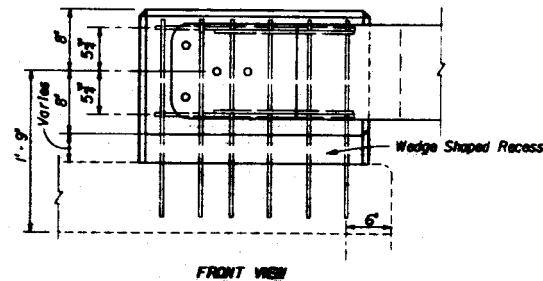
Note: Scheme comparatively enlarged to
facilitate reinforcement detailing.



Alignment Controls:
Face Of Rail
To Face Of Curb



END VIEW



FRONT VIEW

APPLICATIONS SAFETY CURB WIDER THAN 1'-4" AND UP TO 2'-0" APPROACH END OF ONE-WAY BRIDGES ONLY SCHEME 28 CONCRETE ANCHOR POST

Note:

Portions of existing approach slab curbing, wingwalls, shoulder gutter, flumes
and etc. may have to be removed.

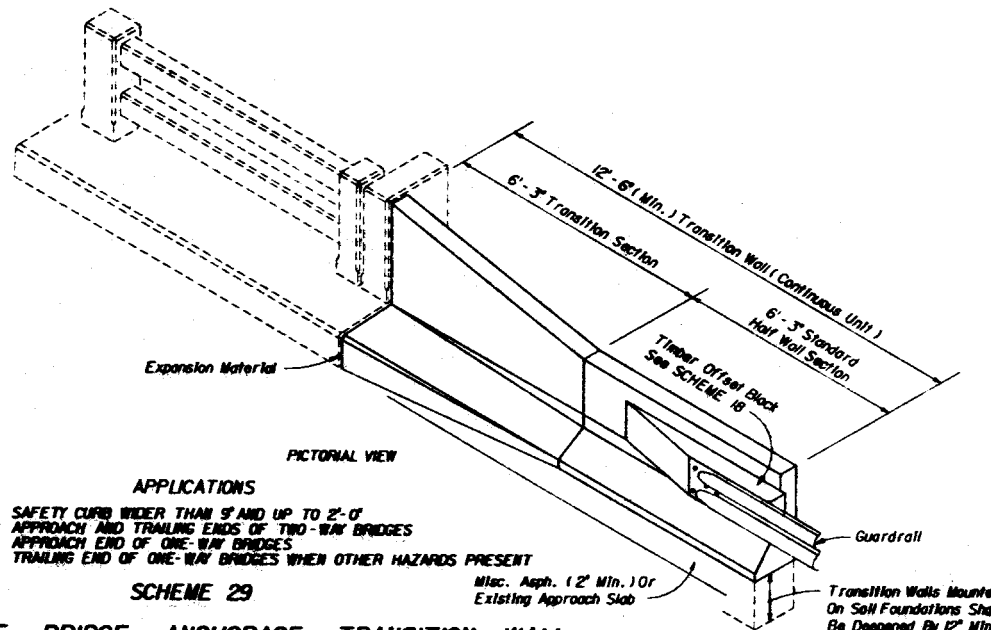
Transition walls mounted on existing approach slabs shall be doweled
into the slabs with a single line of dowels located in the center of the base,
consisting of No. 4 bars 15' long on 18" centers embedded 7" in the slab
using portland cement mortar in accordance with Subsection 460-30 of
the Standard Specifications.

Transition walls mounted on soil foundation shall have footings deepened
a minimum of 12" and the walls doweled into the end of the existing bridge
in the following manner:

Four 1 1/2" diameter holes 6" deep shall be drilled in the
end post of the existing bridge and No. 6 bars 15' long
set in epoxy mortar. The holes shall be located as near
as practical to the vertical center of the end of the
transition wall and equally spaced to provide cover of
3" minimum. The ends of the dowels extending into the
transition wall shall be wrapped with one layer 15#
asphalt felt with the ends crimped.

Transition walls shall be reinforced with WWF 4 x 4 - W4.0 x W4.0 (Min.)
with clearance 2" top, ends and bottom.

Approaching guardrail shall have approach post spacings, offset blocks and
double W-beams in accordance with Detail J, Index No. 400.



APPLICATIONS

SAFETY CURB WIDER THAN 9" AND UP TO 2'-0"
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
TRAILING END OF ONE-WAY BRIDGES WHEN OTHER HAZARDS PRESENT

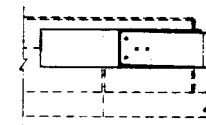
SCHEME 29

CONCRETE BRIDGE ANCHORAGE TRANSITION WALL

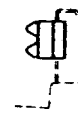
BRIDGES WITHOUT APPROACHING ROADWAY CURB



TOP VIEW



FRONT VIEW



END VIEW

See SCHEME 18 For
Complete Detailing

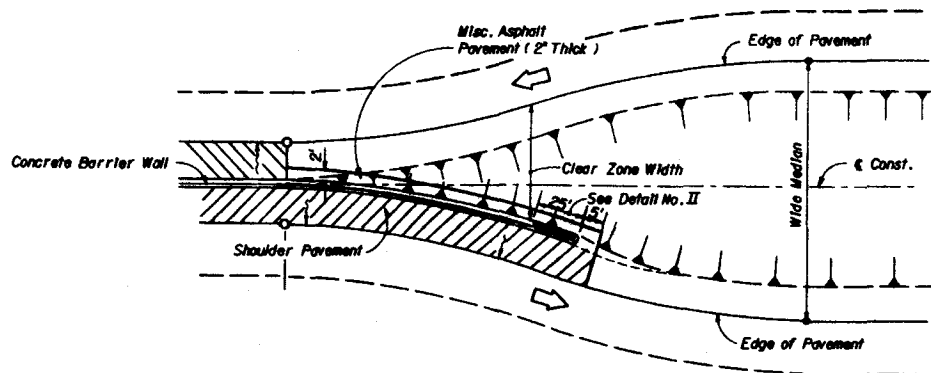
APPLICATIONS

HANDRAIL CURB
SPECIAL END SHOE RECESS (EXISTING)
APPROACH AND TRAILING END OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES (NOTE: SPECIAL END SHOE TO REMAIN
IN THE RECESS ON TRAILING END)

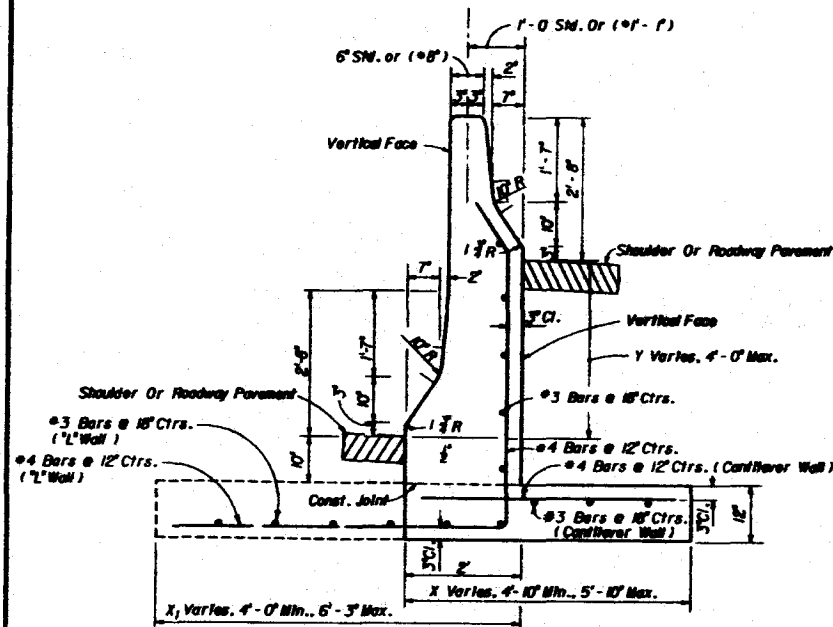
SCHEME 30

END POST WITH SPECIAL END SHOE RECESS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES			
Designed By	AS	Checked By	CB/BS
Drawn By	HSD	Checked By	CB/BS
Reviewed By	AS	Checked By	CB/BS
F.A.N.A. Approved		88	9 of 9
		401	



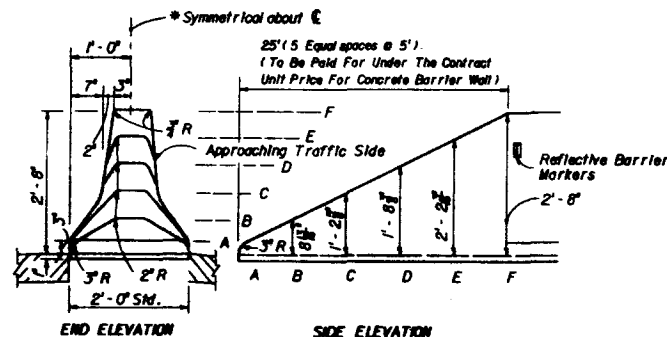
**CONCRETE BARRIER WALL TRANSITION
BETWEEN WIDE AND NARROW MEDIANS
DETAIL A**



Note: Wall segments shall be 20 feet or more in length.
Design Criteria: Vehicle - 4000 lbs., 60 mph, 25°, Avg. Lat. Impact Decel. And Force - 76's & 28 Kips;
Veh. Forces Appl. - 1000 lbs. Vert. At Top of Toe, 28 Kips At 5' Above Point.
Unless the plans stipulate a specific wall type, either the cantilever wall or the 'L' wall may be constructed at the Contractor's option.
Steel not required in cantilever walls of heights 1'-0\"/>

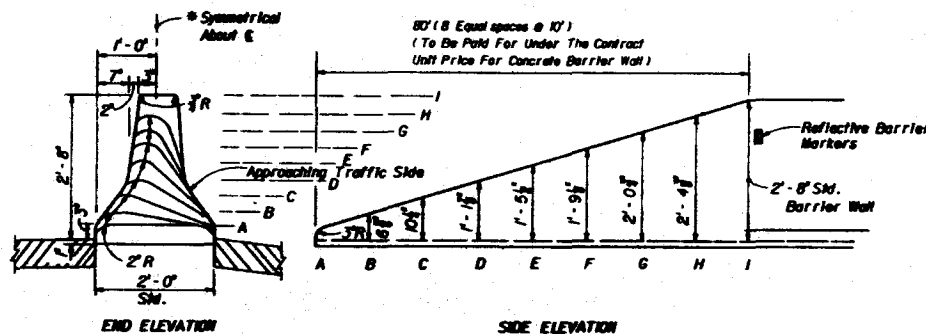
	Height Y	0'-0"	0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
Cantilever Wall	Width X	4'-10"	5'-0"	5'-2"	5'-3"	5'-5"	5'-6"	5'-7"	5'-9"	5'-10"
'L' Wall	Width X ₁	4'-0"	4'-4"	4'-8"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"

**MEDIAN BARRIER WALL FOR SUPERELEVATED SECTION
OR FOR VARIABLE ROADWAY PROFILE GRADES**



TO BE USED ONLY AS A TEMPORARY BARRIER TERMINAL OR WHERE TERMINAL LOCATED
CLEAR ZONE WIDTH FROM EDGE OF THE NEAR APPROACH DRIVING LANE. (SEE DETAIL A.)

**CONCRETE BARRIER WALL TERMINAL
DETAIL II**

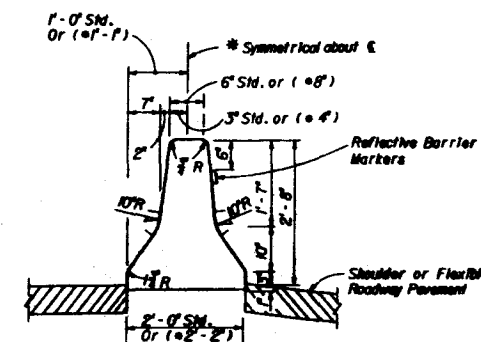


**DESIGN SPEED 45 M.P.H. OR LESS
CONCRETE BARRIER WALL TERMINAL FOR NARROW MEDIAN
DETAIL III**

GENERAL NOTES:

- Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specification, unless other finish called for in the plans. The surfaces shall have a Class 5 Applied Finish Coating in accordance with Section 400 only when called for in the plans.
- Cost of installation of all conduits and utility accessories, reinforcing steel and reflective barrier markers shall be included in the contract unit price for Concrete Barrier Wall, L.F.
- Terminal Barrier Notes for Design Speeds greater than 45 m.p.h.:
 - Terminated in a wide median section outside recovery area of the approach traffic - See Detail A.
 - Terminated from a shielded location.
 - Terminal protection by the use of an impact attenuator system.
 - Terminated in conjunction with a suitably designed transition to another type median barrier that can be introduced more safely.
- Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete slab to match an existing or proposed expansion joint.
- Expansion joints in conduits shall be required only at the expansion joints in the wall.
- When the barrier is installed adjacent to the pavement the top 12\"/>

REFLECTIVE BARRIER MARKER SPACING ON WALL			
Distance - Edge of travel lane to barrier wall.	Spacing	Number per side	REMARKS
1' to < 4'	40'	1	Use amber markers only.
4' to < 8'	80'	1	Hold or clamp reflective barrier markers to wall until dry or set.
> than 8'	none required		Use 10' spacing on terminal ends.



* Use 8\"/>

For concrete median barrier wall details of piers, highway lighting and guardrail connections, see Sheet 2 of 8.

For median barrier and 'special' barrier wall inlet details see Index No. 237.

STANDARD BARRIER WALL SECTION

9. Concrete barrier walls that are continuous over roadway and bridge shall be pin connected at the roadway end of the approach slab. Both cast-in-place and precast roadway barrier walls shall be connected at the approach slab by Option 3 and treatments, and reinforced for a distance of 12 feet from the connection in accordance with Index No. 425. Median and outside barrier walls on the approach slab shall be designed, constructed and paid for as a part of the approach slab. Pins shall remain free but secured from ready removal by spot welding a 1/2\"/>

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BARRIER WALL			
Designed By	Checked By	Approved By <i>[Signature]</i>	
Drawn By	IN	05/73	State Design Engineer, Roadways
Reviewed By	LMF	07/73	Inspector
F. H. S. A. Approved	5/28/77	88	1 of 8 410



* When K² light poles are installed along centerline of barrier wall

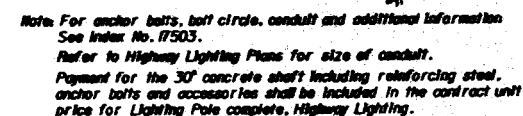


SECTION AA

CONCRETE MEDIAN BARRIER WALL (THIN WALLS, FILL, CAP AND TRANSITION)

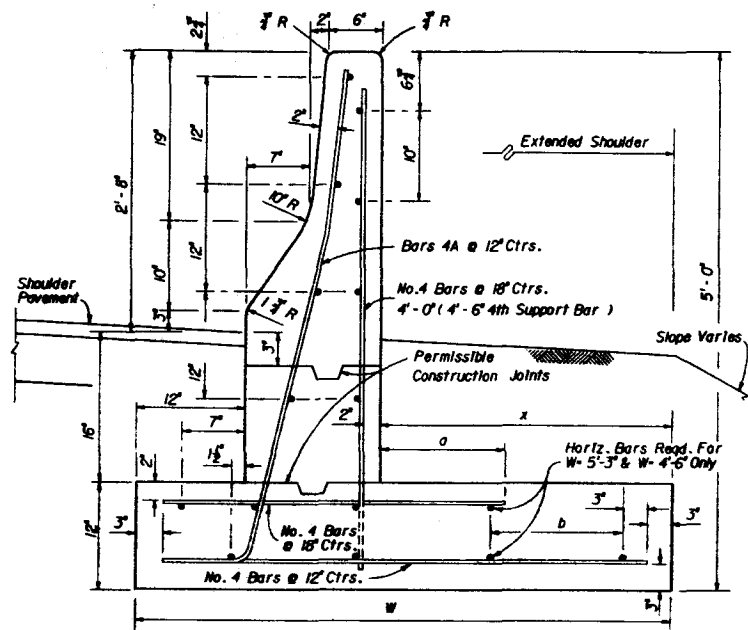
DETAIL I

GUARDRAIL CONNECTION TO STANDARD CONCRETE BARRIER WALL



LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BARRIER WALL			
Designed By	Name	Date	Approved By <i>R. A. Smith</i>
Drawn By	AF	6/73	State Design Engineer, Roadways
Checked By	LSF	7/73	Chief Est.
F.H.D.A. Approved 6-6/73			Revision No. 06 2 of 8
			Trans No. 410



NOTE: All longitudinal reinforcement No. 4 bars.

DIMENSIONS AND QUANTITIES						
Length* Of Barrier Wall	W	X	a	b	Class II Concrete C.Y. Per Lin. Ft.	Reinforcing Steel LBS. Per Lin. Ft.
≥ 40'	3'-3"	1'-0"	6"	NA	0.26	18
35' to 39'	3'-6"	1'-3"	6"	NA	0.27	18
30' to 34'	3'-9"	1'-6"	6"	NA	0.28	18
25' to 29'	4'-0"	1'-9"	9"	NA	0.29	19
20' to 24'	4'-6"	2'-3"	12"	12"	0.30	20
15' to 19'	5'-3"	3'-0"	15"	17"	0.33	21

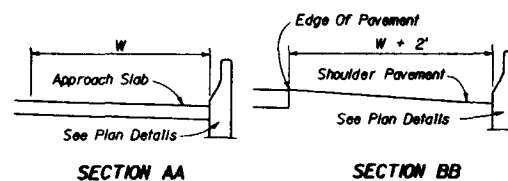
* Any length less than 40' must be a continuous (non-jointed) segment. Walls of 40' or more in length may be made up of segments of 20' or more in length provided the segments are joined by a transverse joint in accordance with Detail B, Sh. 2 of B; segments shall have dimensions same as wall ≥ 40' above.

NOTE: Wall to be paid for under the contract unit price for Concrete Barrier Wall (Rigid - Shoulder), I. F., Pay Item No. 528-72-3.

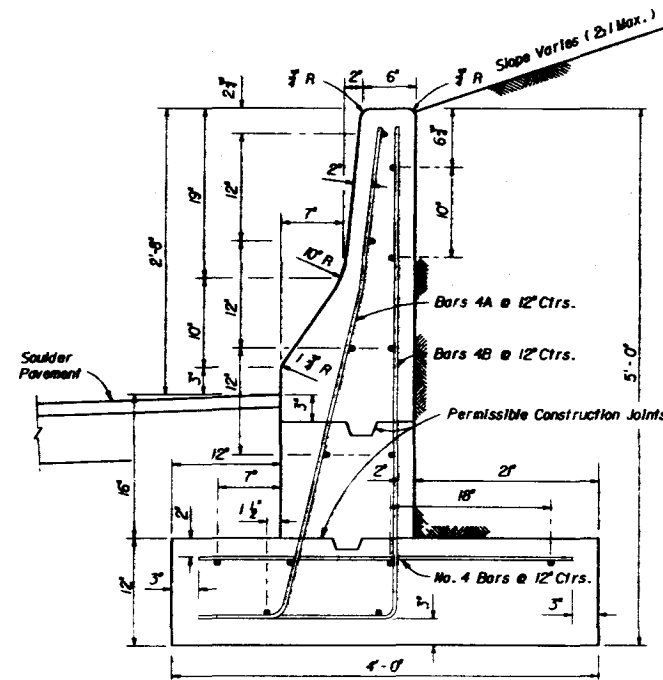
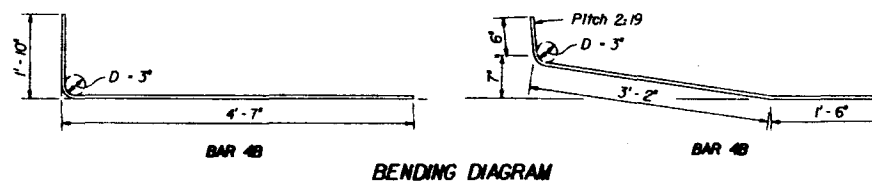
DESIGN NOTES:
Use of this barrier wall should be limited to special applications such as hazard encroachment into the clear zone where barrier wall deflection, rotation or translation cannot be tolerated; example hazards to consider are as follows:

- (a) Structure supporting pier, bent and pylon
- (b) Pumping, metering, control or other similar critical stations
- (c) Quarry
- (d) Intolerable vertical drop
- (e) Historic structures or monuments
- (f) Rail transit
- travelway or passenger station
- (g) Other similar occupancy

REINFORCED CONCRETE BARRIER WALL (SHOULDER)



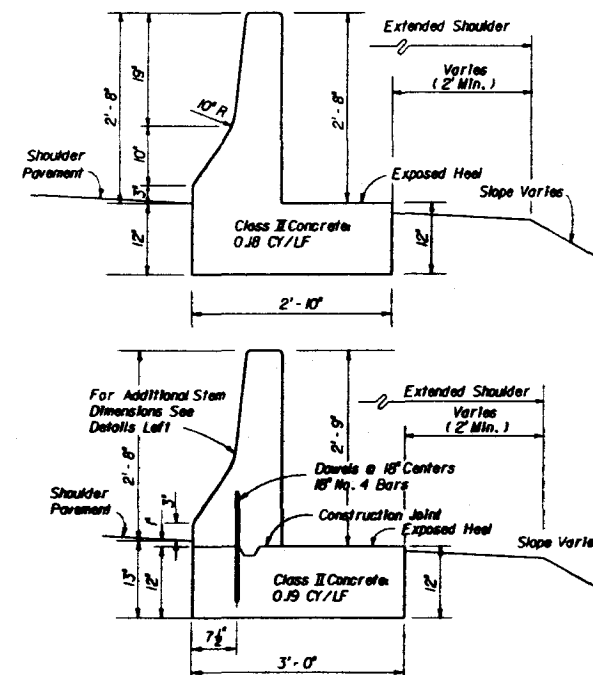
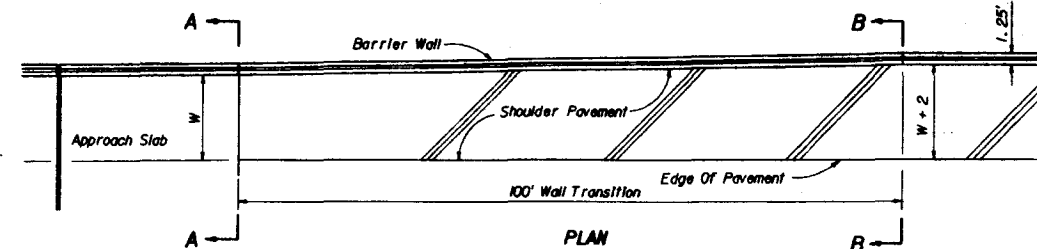
TRANSITIONS AT BRIDGES FOR BARRIER WALL ON RETAINING WALL



NOTE: All longitudinal reinforcement No. 4 bars.
Minimum segment length for this wall is 20 feet.
Wall to be paid for under the contract unit price for Concrete Barrier Wall (Rigid - Retaining), I. F., Pay Item No. 528-72-4.

QUANTITIES: Class II Concrete 0.29 CY/LF
Reinforcing Steel 20 LBS/LF

REINFORCED CONCRETE BARRIER WALL (RETAINING)



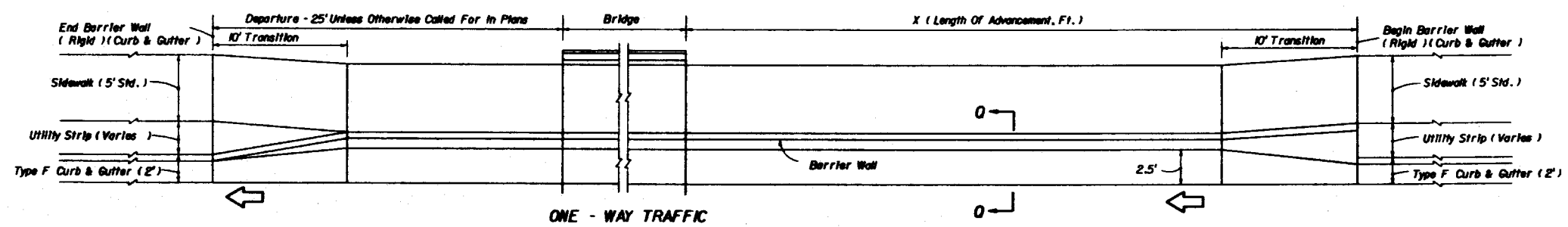
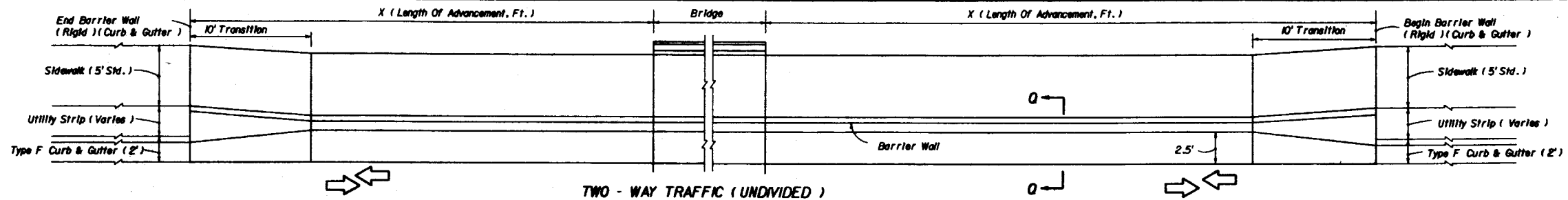
WALL OPTIONS

NOTE: Wall to be paid for under the contract unit price for Concrete Barrier Wall (Plain - Shoulder), I. F., Pay Item No. 528-72-6.

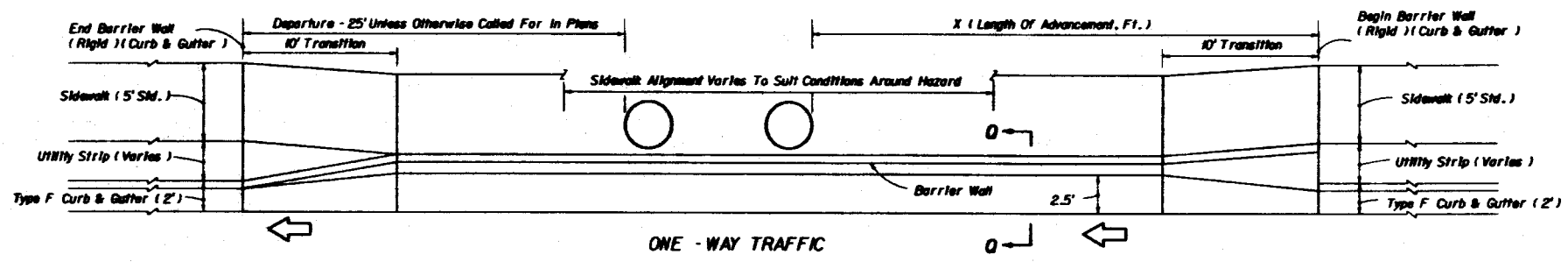
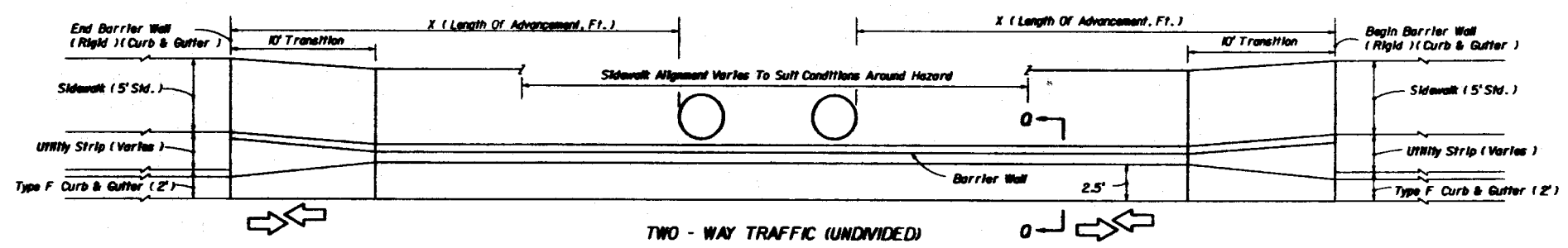
DESIGN NOTE: Wall shall have a length of 40' or greater. Wall of 40' or more in length may be made up of segments of 20' or more in length provided the segments are joined by a transverse joint in accordance with Detail B, Sh. 2 of B; segments shall have dimensions same as wall shown above.

PLAIN CONCRETE BARRIER WALL (SHOULDER)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BARRIER WALL			
Designed By	Drawn By	Checked By	Approved By
HSO	HSO	JHG	[Signature]
Revision No.	Sheet No.	Revision No.	Sheet No.
	410		



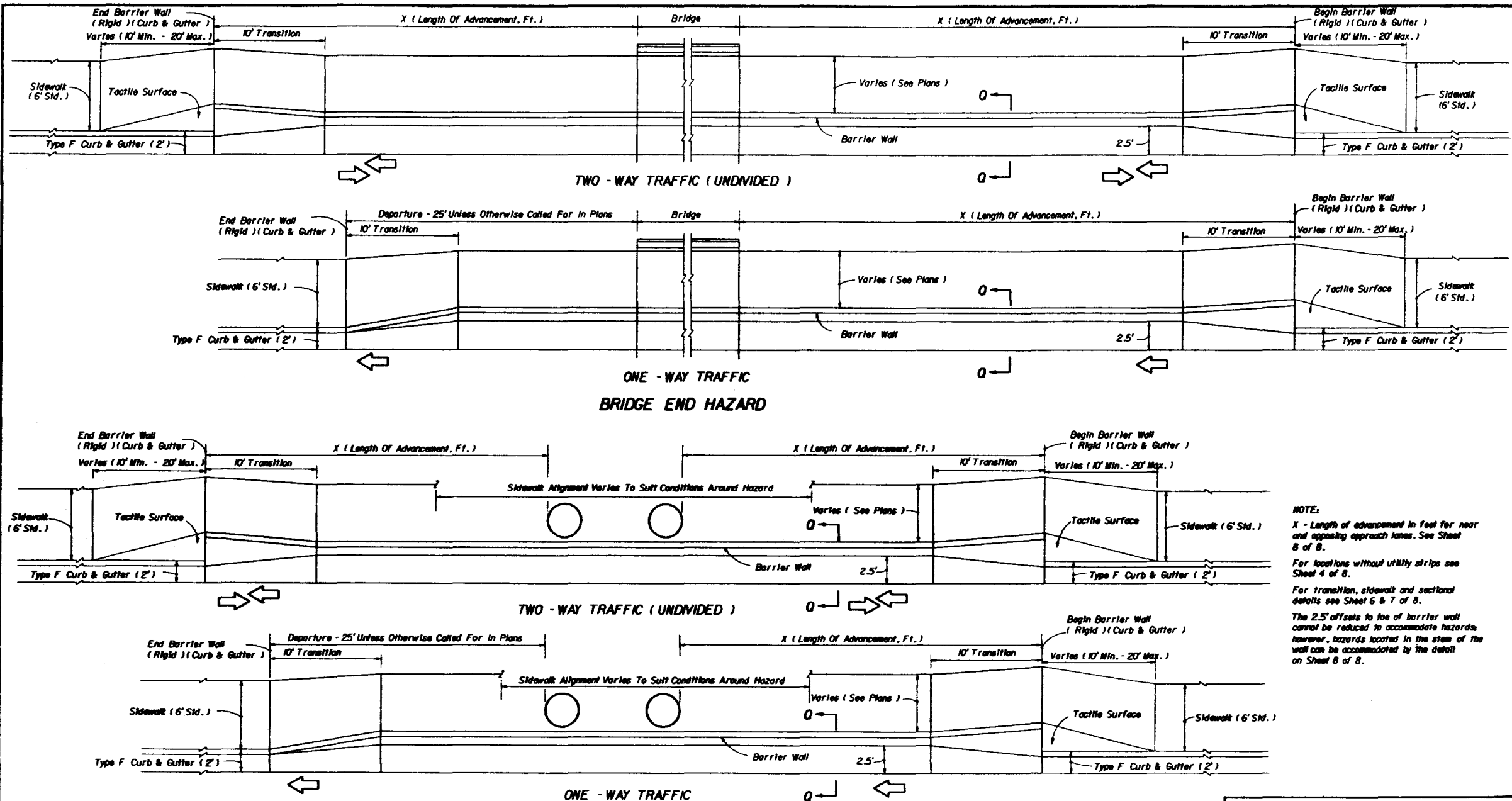
BRIDGE END HAZARD



HAZARD 4' OR LESS FROM FACE OF CURB CURB AND GUTTER WITH UTILITY STRIP

NOTE:
 X - Length of advancement in feet for near and opposing approach lanes. See Sheet 8 of 8.
 For locations without utility strips see Sheet 5 of 8.
 For transition, sidewalk and sectional details see Sheet 6 & 7 of 8.
 The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall can be accommodated by the detail on Sheet 8 of 8.

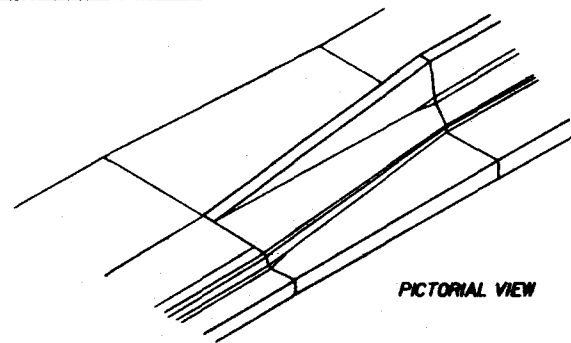
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CONCRETE BARRIER WALL					
Designed By	RD	RD	Approved By	[Signature]	
Drawn By	RD	RD	State Bridge Engineer, Roadways		
Checked By	RD	RD	Revision No.	Sheet No.	Index No.
F.H.S.A. Approved			4 of 8	410	



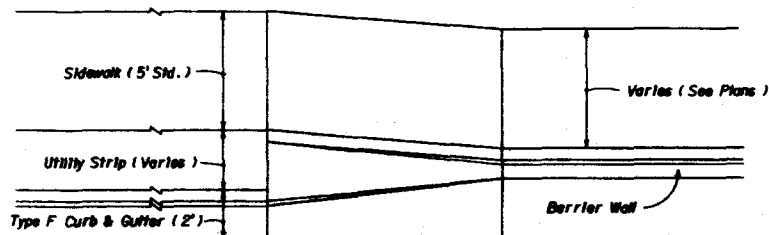
NOTE:
 X - Length of advancement in feet for near and opposing approach lanes. See Sheet 8 of 8.
 For locations without utility strips see Sheet 4 of 8.
 For transition, sidewalk and sectional details see Sheet 6 & 7 of 8.
 The 2.5' offsets to face of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall can be accommodated by the detail on Sheet 8 of 8.

HAZARD 4' OR LESS FROM FACE OF CURB
CURB AND GUTTER WITHOUT UTILITY STRIP

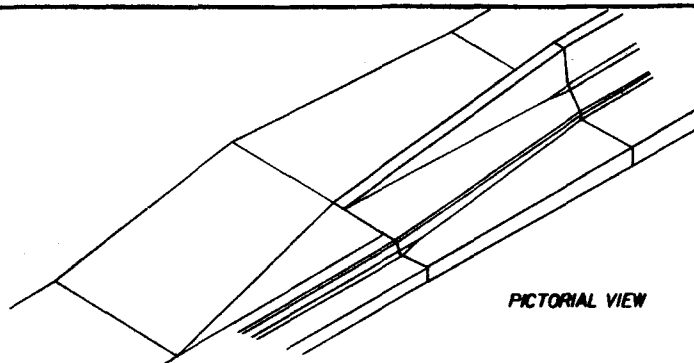
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CONCRETE BARRIER WALL					
Designed By	None	Revised	Approved By <i>[Signature]</i>		
Drawn By	MSD	10/05	State Design Engineer, Roadways		
Checked By	JBW/MS	10/05	Barrier No.	Sheet No.	Index No.
F.H.B.A. Approved			07	5 of 8	410



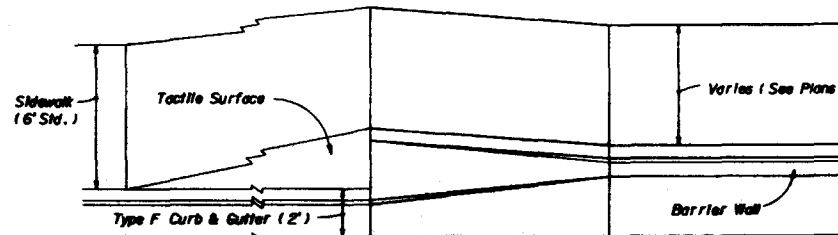
PICTORIAL VIEW



PLAN
WITH UTILITY STRIP

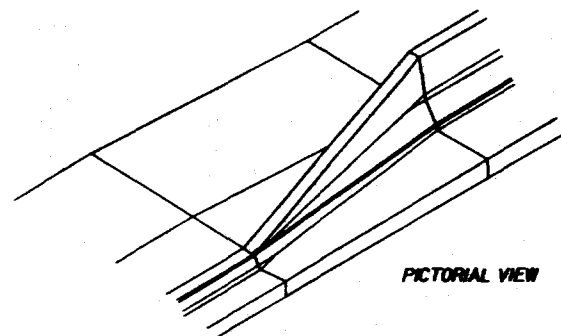


PICTORIAL VIEW

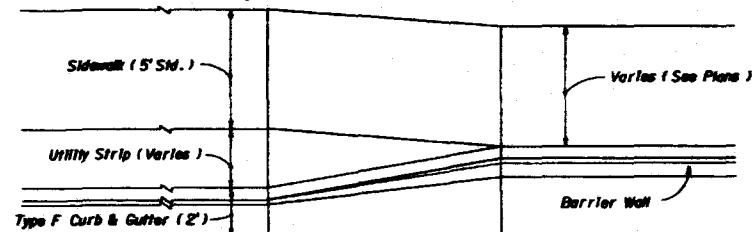


PLAN
WITHOUT UTILITY STRIP

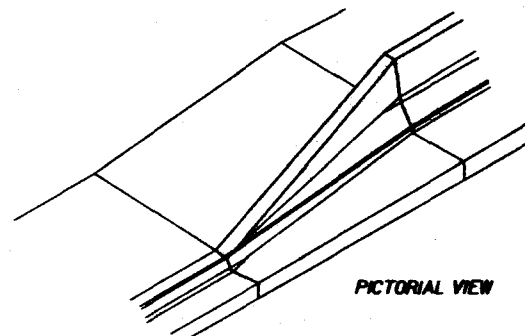
TWO - WAY TRAFFIC (OPPOSING LANE APPROACH)



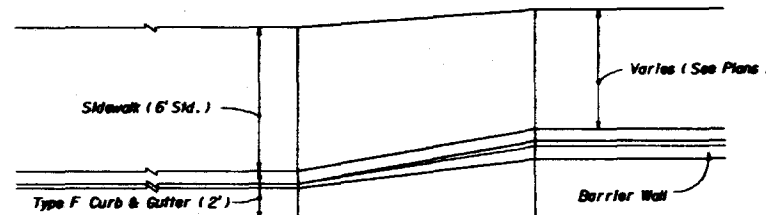
PICTORIAL VIEW



PLAN
WITH UTILITY STRIP



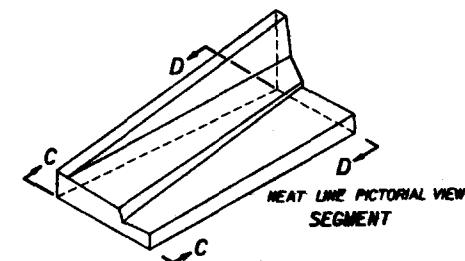
PICTORIAL VIEW



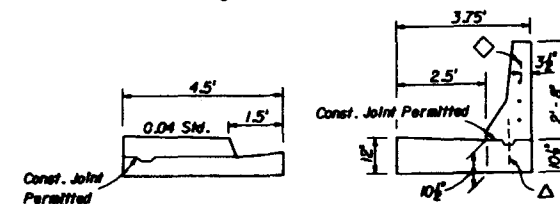
PLAN
WITHOUT UTILITY STRIP

ONE - WAY TRAFFIC (TRAILING END)

TRANSITION SEGMENTS FOR 'CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)'



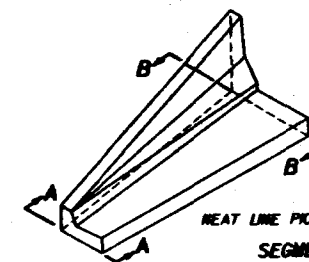
NEAT LINE PICTORIAL VIEW
SEGMENT



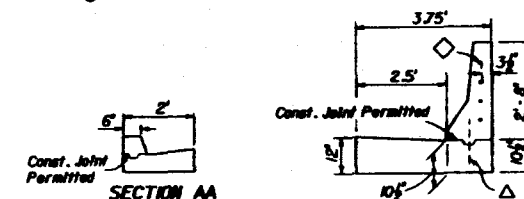
SECTION CC

SECTION DD

◇ See Sheet 7 Of 8
△ See Sheet 7 Of 8



NEAT LINE PICTORIAL VIEW
SEGMENT

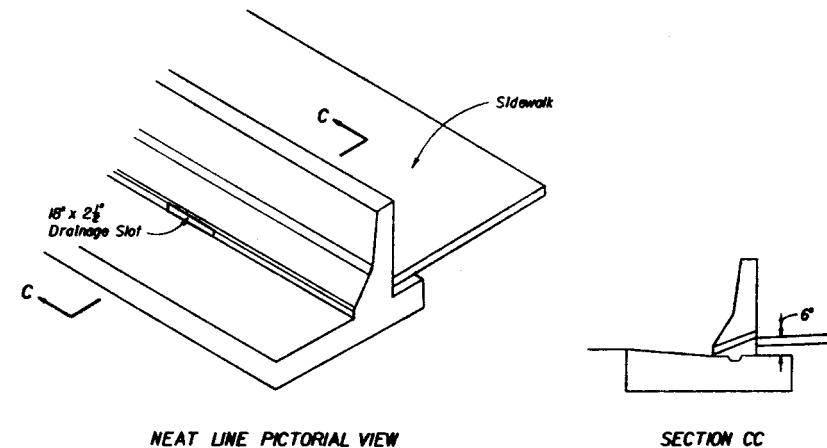
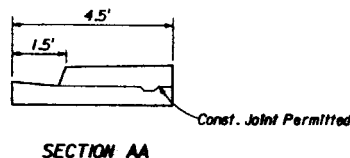
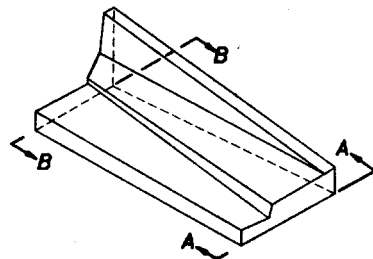
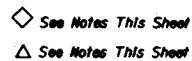


SECTION AA

SECTION BB

◇ See Sheet 7 Of 8
△ See Sheet 7 Of 8

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BARRIER WALL			
Designed By	Drawn By	Checked By	Approved By
Drawn By	10/05	10/05	10/05
Checked By	10/05	10/05	10/05
F.R.D.A. Approved		85	6 of 8
			410



Note: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50 feet in FTM sections and 20 feet in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines of vertical reinforcement.

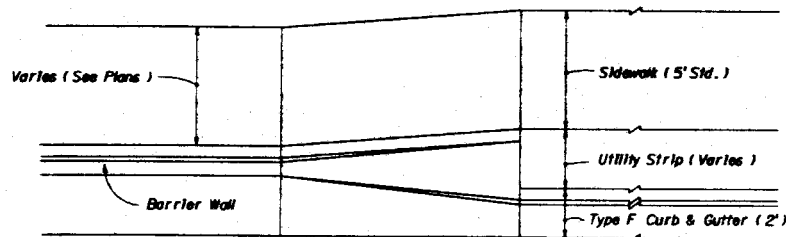
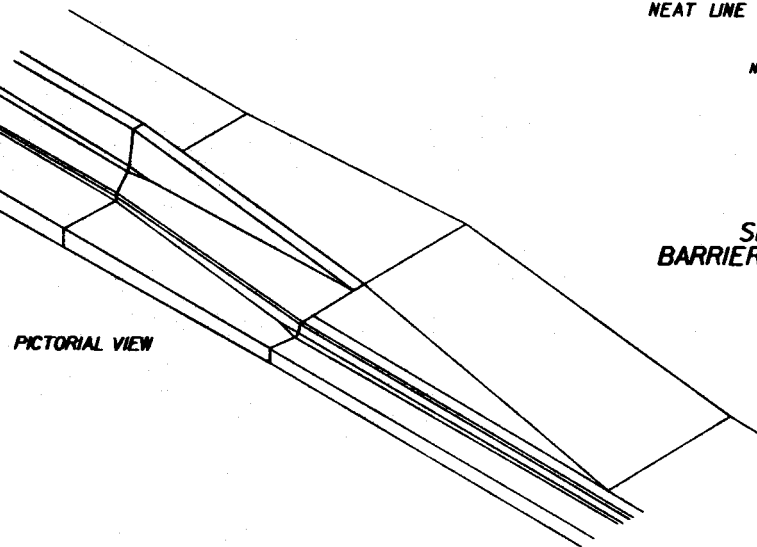
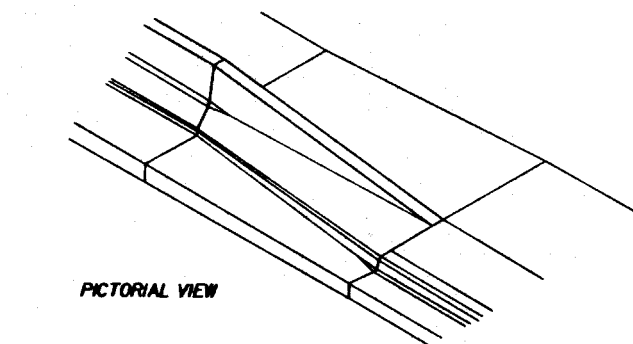


NOTE:

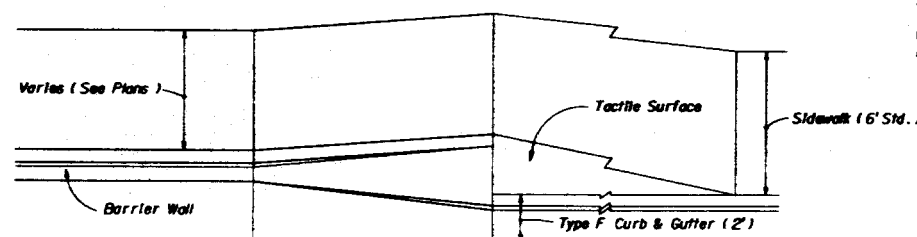
◆ Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner:
Four 1 1/2" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and No. 6 bars 15" long set in epoxy mortar. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. asphalt felt with the ends crimped.

△ When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner:

Five No. 4 bars 15' long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



PLAN
WITH UTILITY STRIP



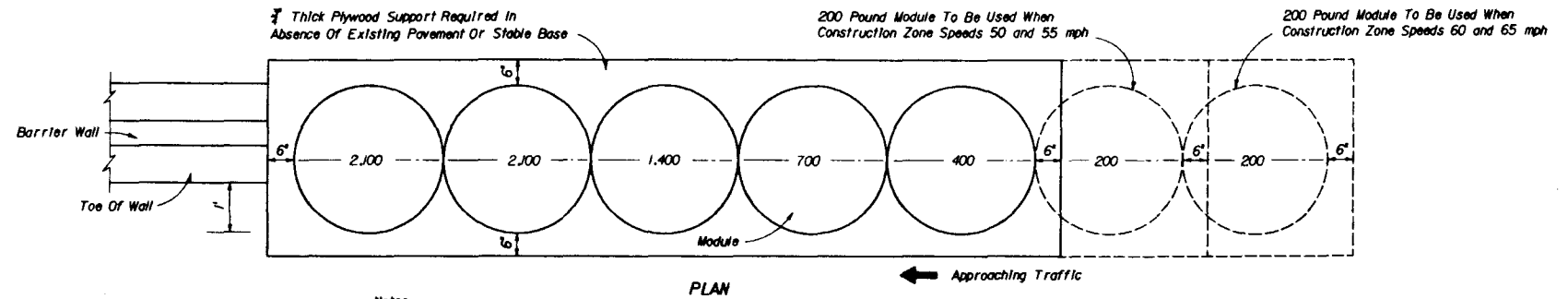
PLAN
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND

ONE - WAY AND TWO - WAY TRAFFIC (NEAR LANE APPROACH)

TRANSITION SEGMENT FOR 'CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)'

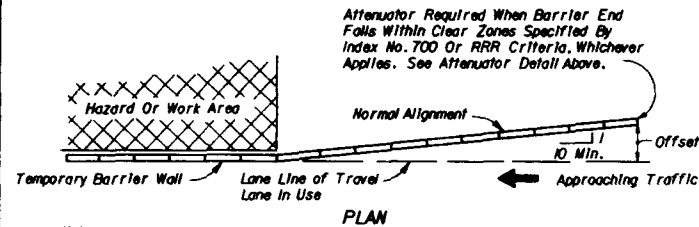
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
CONCRETE BARRIER WALL			
Designed By	Revised	Notes	Approved By <i>J. C. Paul</i>
Drawn By	NSD	4/4/85	State Design Engineer, Roadways
Checked By	<i>JBH/RS</i>	6/4/85	Section No.
F.N.R.A. Approved			Sheet No. 7 of 8
			Station No. 410



Notes:

1. Number shown inside module indicates the weight in pounds of sand. All modules are approximately 36" inches in height and in diameter.
2. Inertial attenuator to be installed in accordance with manufacturers specifications and recommendations.
3. Delinicator panels shall be placed on the approach end module in accordance with Index No. 17353.
4. Inertial attenuators shall be paid for as Vehicular Impact Attenuator (Inertia) (Temp.), Ea. Pay Item No. 102-81. Relocation of attenuators shall be paid for as Relocate Temporary Vehicular Impact Attenuator, Ea. Pay Item No. 102-82.

TEMPORARY INERTIAL ATTENUATOR

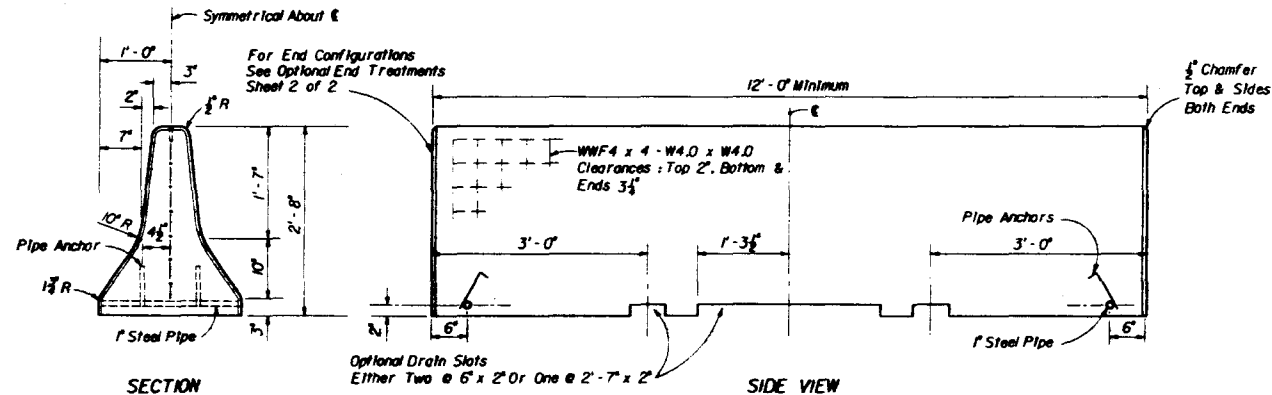
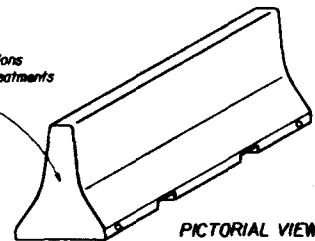


Notes:

1. Temporary barrier to be placed as shown in plans or as directed by the Engineer.
2. For additional information refer to Index No. 600.

WALL ALIGNMENT

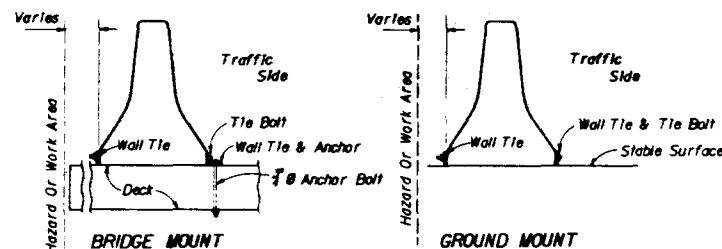
For End Configurations See Optional End Treatments Sheet 2 Of 2



WALL UNIT

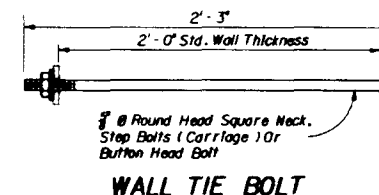
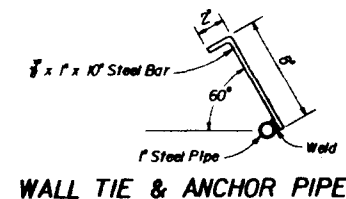
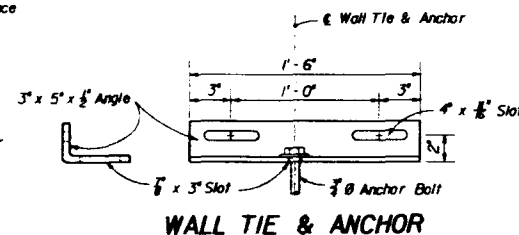
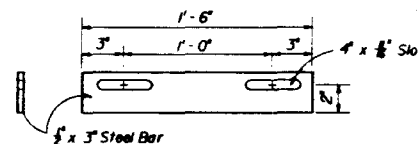
GENERAL NOTES

1. Material and workmanship for the wall shall meet the requirements of Sections 400 and 521 of the Standard Specifications, except the bottom of the unit can be finished to a dense uniform surface by floating in lieu of the Class 3 finish. Concrete shall be Class II.
2. The wall units shall be used for temporary barrier walls unless the plans specify other types of barrier walls.
3. Type C Steady-Burn Lights are to be mounted on top of temporary concrete barrier walls that are used as barriers along travel ways in work zones. The lights are to be spaced at 50' centers. For additional information refer to 'Warning Lights' on Index No. 600.
4. Wall units shall not be used for permanent barrier wall construction regardless of unit length, unless specifically permitted by the plans.
5. Units with any of the optional end treatments may be used for temporary barrier wall installations, subject to the following requirements:
 - (a) The plans may specify the option.
 - (b) Option 1 and Option 2 units may not be mixed with each other or with Option 3 or Option 4.
 - (c) Option 3 and Option 4 units are interchangeable and may be mixed in a single run of wall; however, they may not be mixed with Option 1 or Option 2.
 - (d) Option 1 units cast prior to August 1, 1982 shall be installed in accordance with Option 1 annotations.
6. Units may be reused provided they have the structural integrity and surface qualities of new units.
7. Units shall be furnished by the Contractor except when the plans stipulate the availability of Department owned units. Regardless of unit source the Contractor shall furnish all hardware and shall be responsible for all handling including loading, transport, unloading, stockpiling, installation, removal and return. Department owned units shall have plain ends and wall tie anchor pipes. Units with plain ends from sources other than the Department will not be permitted regardless of end ties or anchorage.
8. Units used for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Concrete Barrier (Temp.), LF, Pay Item No. 102-72.



Anchor bolts shall have a pullout and shear capacity of 14,000 lbs. Wedge or chemical anchor bolts may be used in lieu of bolt, washer and nut assembly shown. Core drills shall be used to construct through bolt holes, and, drills specified by the manufacturer shall be used to construct expansion and chemical anchor bolt holes. After removal of walls, anchors shall be removed to 6 min. below deck surface and holes filled with epoxy grout.

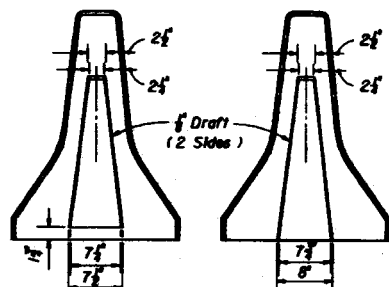
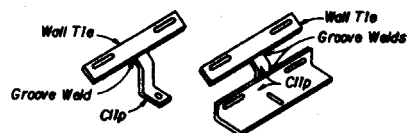
WALL TIES & ANCHORAGE



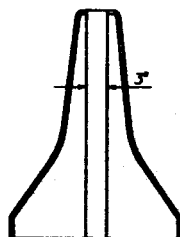
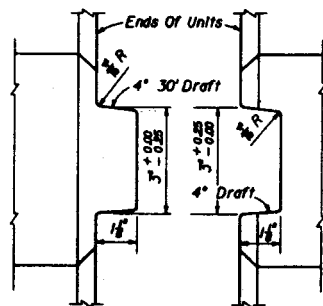
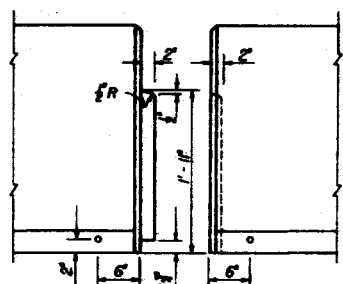
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
PRECAST CONCRETE TEMPORARY BARRIER WALL					
Designed By	Revised	Sheet	Approved By		
Drawn By	HSD	04/82	Steve Bishop, Engineer, Roadways		
Checked By	JG	04/82	Revision No.	Sheet No.	Index No.
F.J.W.A. Approved		04/28/82	88	1 of 2	415

OPTION 1 ANNOTATIONS

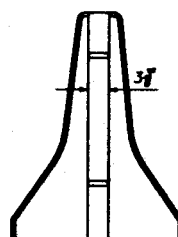
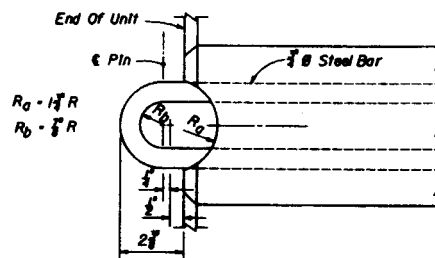
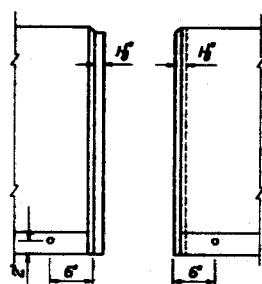
1. Tolerances: Tongue $\pm 1/8"$; Groove $\pm 1/8"$
2. Barrier unit without anchor pipes, with toe heights of not less than 3" nor more than 4" and with or without bottom keyways, produced prior to August 1, 1982 and used on projects let to contract after August 1, 1982 may be used under the following adaptations:
 - (a) Ground Mounted Units shall be tied front and back with wall ties mounted 4" above the top of the toe by anchors located 6" from the end of the unit. Anchor bolts shall be 3/4" diameter providing a minimum pull-out strength of 9000 lbs. and may be either threaded insert, wedge or epoxy grouted sleeve types with 4" minimum imbedment.
 - (b) Bridge Mounted Units shall be tied front and back same as ground mounted units. In addition, an "L" clip shall be welded on center to the bottom edge of the front wall tie to provide deck anchorage using the 3/4" diameter anchor bolt. The clip shall have a 3/4" x 2" minimum cross section and may be fabricated by either method shown in the sketches below. Units with varying toe heights will not be permitted in any single run of wall.



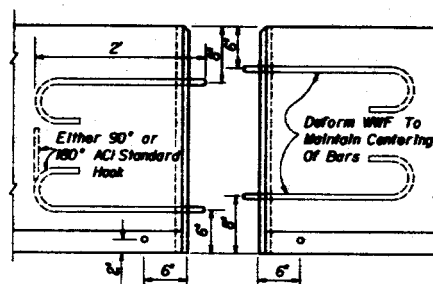
TRAPEZOIDAL TONGUE AND GROOVE
OPTION 1



STRAIGHT TONGUE AND GROOVE
OPTION 2



ROUND BAR CONNECTOR
OPTION 3

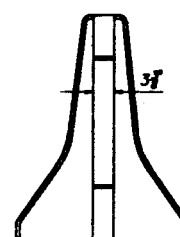
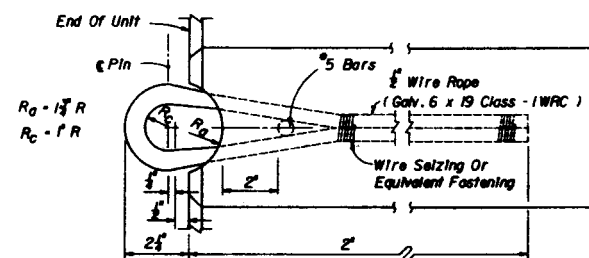


OPTIONAL END TREATMENTS FOR WALL UNITS

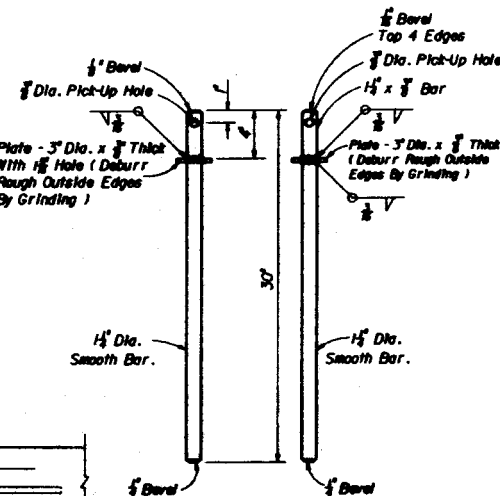
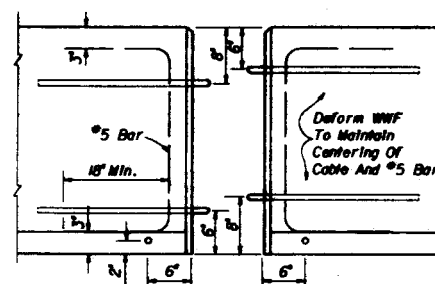
WALL TIE AND ANCHORAGE REQUIREMENTS

END OPTION	GROUND MOUNT	BRIDGE MOUNT
1	Yes	Yes
2	Yes	Yes
3	No	Yes
4	No	Yes

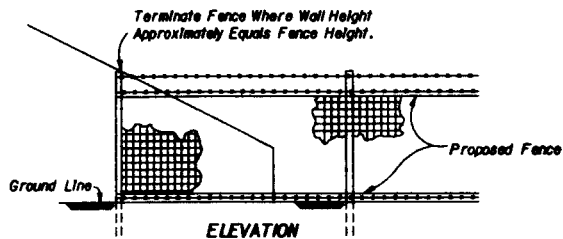
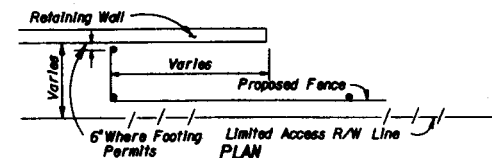
Note: When the plans call for wall units furnished by the Department, ground and bridge mounts will be required. Tie and anchor assemblies shall be furnished by the Contractor.



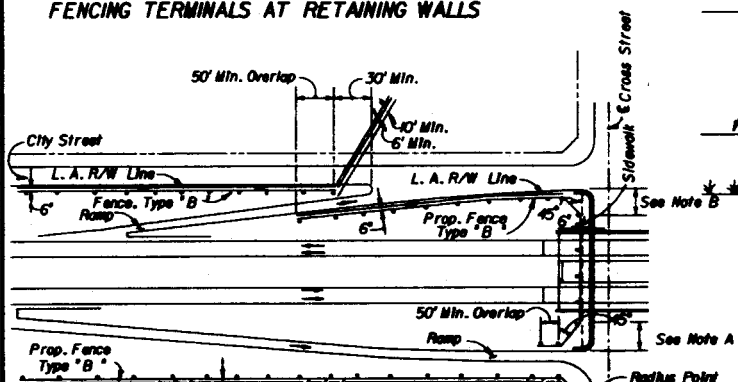
WIRE ROPE CONNECTOR
OPTION 4



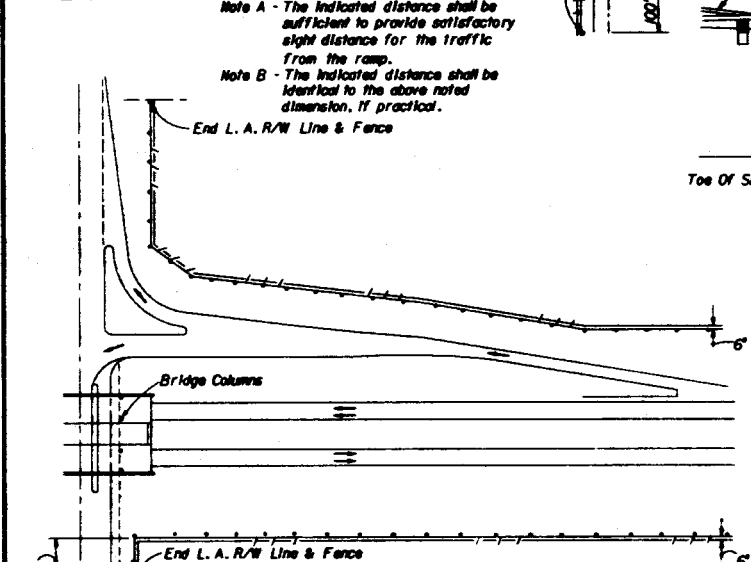
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
PRECAST CONCRETE TEMPORARY BARRIER WALL					
Designed By	Checked By	Approved By			
Drawn By	NSD	04/82			
Revised By	JWS	09/82	Revision No.	Sheet No.	Index No.
F.H.S.A. Approved	04/28/82	83	2 of 2	415	



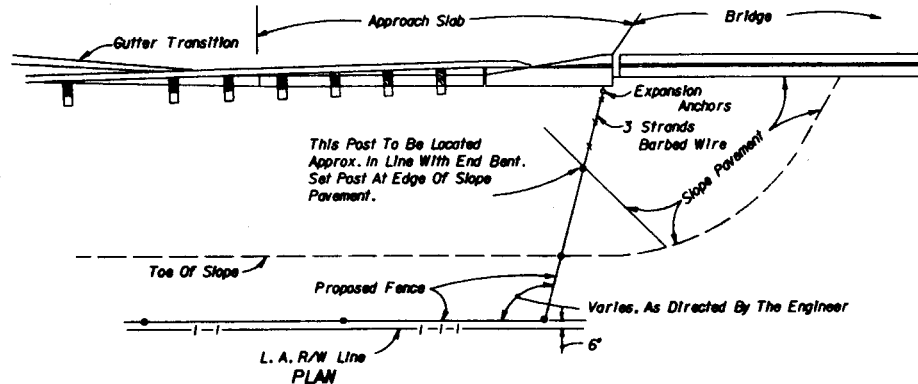
FENCING TERMINALS AT RETAINING WALLS



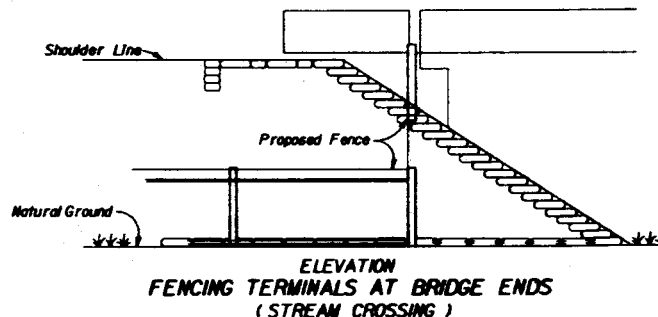
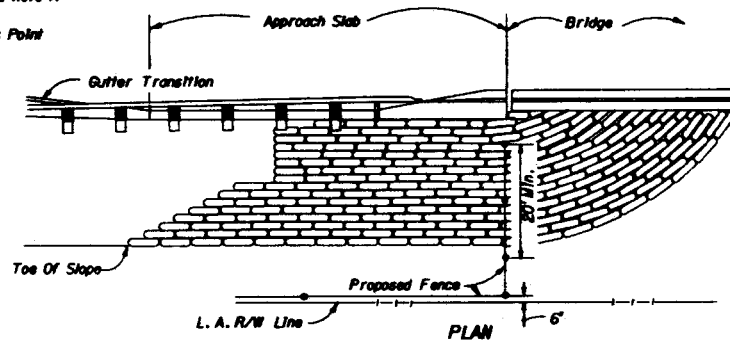
FENCING TERMINALS AT URBAN INTERCHANGES



FENCING TERMINALS AT RURAL INTERCHANGES

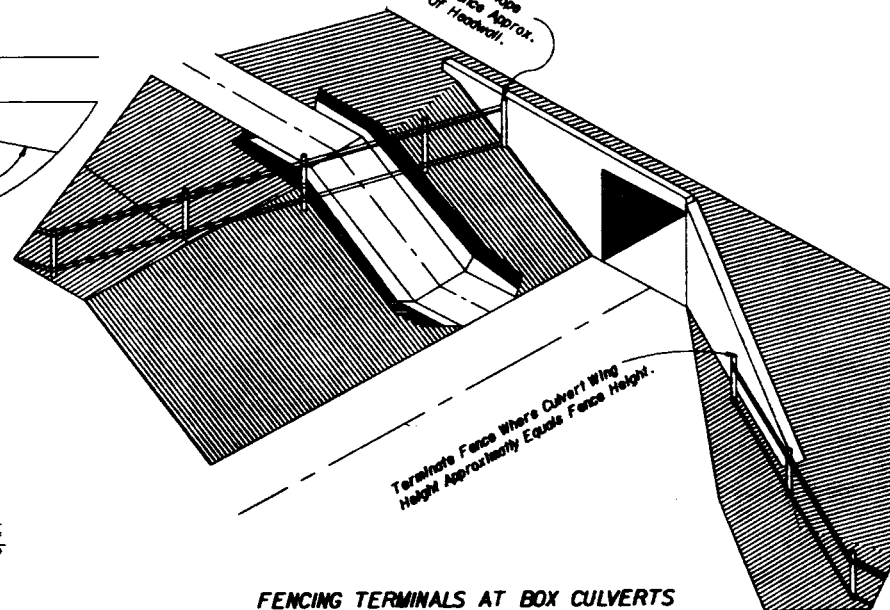
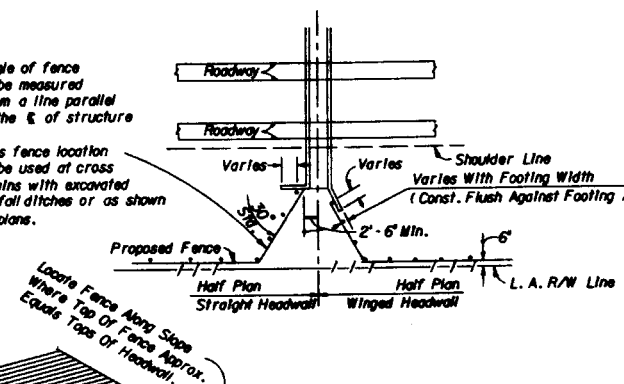


FENCING TERMINALS AT BRIDGE ENDS (ROADWAY)

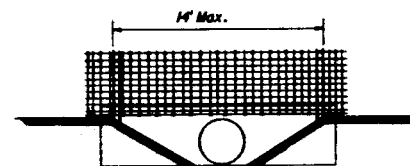


FENCING TERMINALS AT BRIDGE ENDS (STREAM CROSSING)

- Note:
1. Angle of fence to be measured from a line parallel to the $\frac{1}{2}$ of structure
 2. This fence location to be used at cross drains with excavated outfall ditches or as shown in plans.



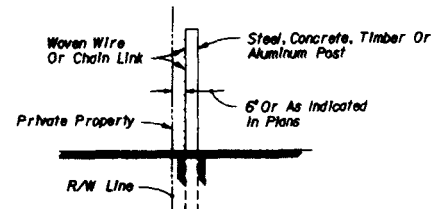
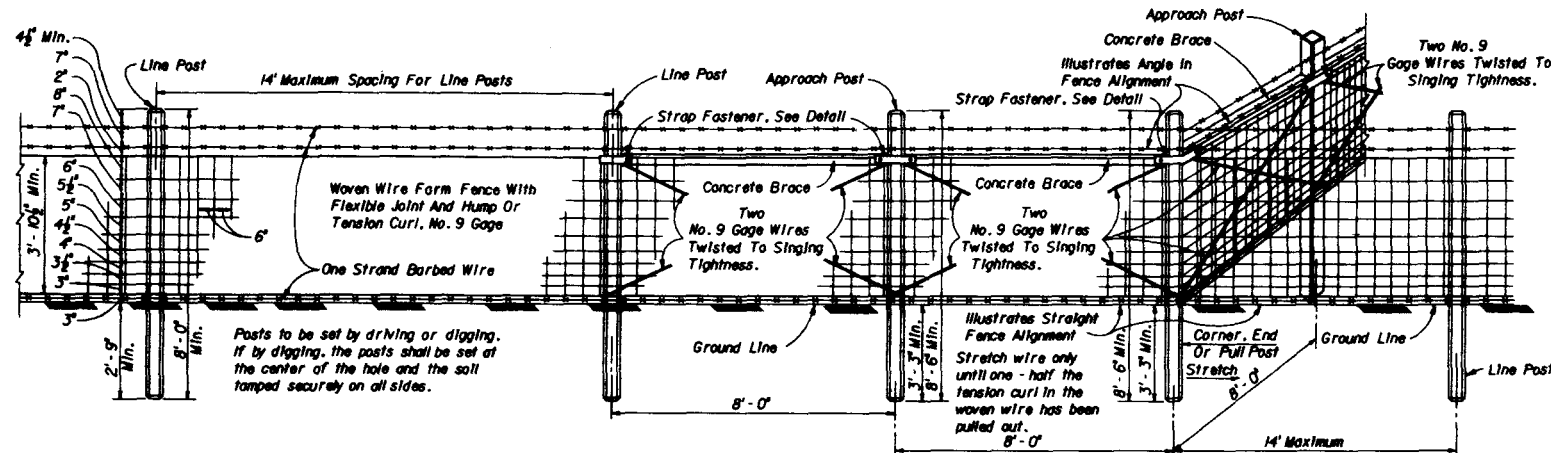
FENCING TERMINALS AT BOX CULVERTS (For Heights Of Headwall Greater Than 4')



FENCING DETAIL AT CULVERT (For Heights Of Headwalls 4' Or Less.)

Note: When height of headwall is 4' or less (pipe culverts 36" or less) the fence shall not be tied to the headwall, but shall span the lateral ditch.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
FENCE LOCATION					
Designed By	WFW	Date	05/85	Approved By	<i>[Signature]</i>
Drawn By	WFW	Date	05/85	Scale Drawing Engineer, Roadways	
Checked By	REP	Date	05/85	Revision No.	Sheet No.
F.J.U.A. Approved			05/10/74	80	1 of 1
					450



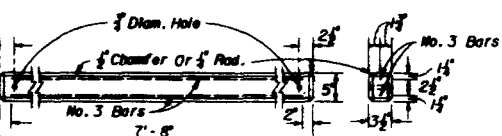
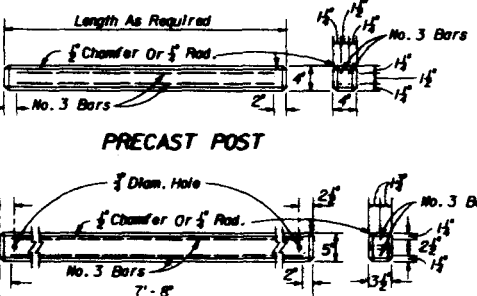
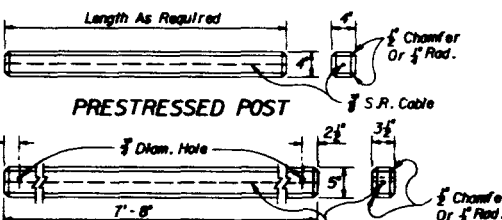
SKETCH INDICATING FENCE LOCATION AT SECTIONS OF NO FRONTAGE ROADS. REFER TO DETAIL PLANS FOR LOCATIONS OF FENCING FOR PROJECTS WITH FRONTAGE ROADS.

DETAILS OF TYPE 'A' FENCE (ILLUSTRATED FOR CONC. POSTS AND BRACES)

GENERAL NOTES

- This fence to be provided generally in rural areas.
- Posts and braces may be either steel, aluminum, timber or concrete.
- Steel posts and braces shall be standard steel posts, galvanized at the rate of 2 oz. per sq. ft., together with necessary hardware and wire clamps meeting the following requirements:
 - Line posts: 6' long, 1.33 lbs. per lin. ft. studded; anchor plate attached, with necessary clamps, etc.
 - Approach posts: 2 1/2' x 2 1/2' x 1/4\" angles, 8' long, fabricated for attaching brace with necessary hardware, clamps, etc.
 - Pull, end and corner posts: 2 1/2' x 2 1/2' x 1/4\" angles, 8' long, fabricated for attaching brace with necessary hardware, clamps, etc.
 - Braces: 2' x 2' x 1/4\" angles with necessary hardware and fabricated for attaching to post.
- All timber posts, except corner and pull posts are to be minimum 4\" diameter. Timber corner and pull posts are to be minimum 5\" diameter. Braces are to be 4\" minimum diameter. Lengths of timber posts to be as indicated above for concrete posts.
 - Staples for line posts to be 1 1/2\" minimum length for approach, corner and pull posts, staple every line wire in top half and alternate line wires in bottom half.
 - Adequate connections between timber posts and braces to be provided.
 - Wire to be wrapped around end posts and corner posts (installed as line posts) at vertical breaks of 15\" or more.
- The contractor, at his option, may use any suitable precast or prestressed concrete posts however, approval by the Engineer, of posts not shown on this drawing, will be required prior to construction of the fence. Precast posts shall be Class I concrete. Prestressed posts shall be Class III concrete.
- Longer posts than those indicated above may be required by the plans or for deeper installations.
- Concrete for bases shall be Class I as specified in Section 345 except that the requirements of 345-5J, 10 & 11 shall not apply. Materials for Class I concrete may be proportioned by volume and/or by weight.
- Fence shall be installed with wire side to private property except on horizontal curves greater than 3\" the fence shall be installed so as to pull against all posts.
- For pay purposes assemblies are defined as follows: Pull or end post assemblies shall consist of: One end or pull post, one approach post, two braces and all necessary fittings and hardware as detailed above. Corner post assemblies shall consist of: One corner post, two approach posts, four braces and all necessary fittings and hardware as detailed above.
- The type of fence to be installed shall be shown on plans. Pull posts shall be installed at approximately 330' centers except that this maximum interval may be reduced by the Engineer on curves where the degree of curvature is greater than 3 degrees. (continued)
- Corner posts are to be installed at all horizontal and vertical breaks in fence of 15\" or more.
- A maximum length of 1320' of wire may be installed as a unit.

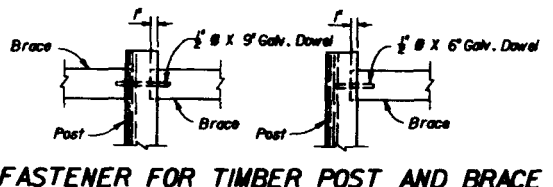
PRESTRESSED POST PRESTRESSED BRACE PRECAST POST PRECAST BRACE ALTERNATE CONCRETE POSTS AND BRACES



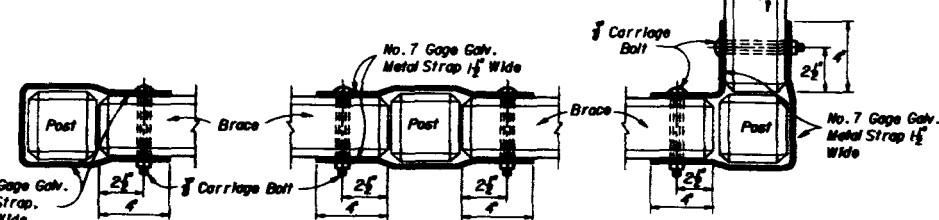
GENERAL NOTES (CONTINUED)

- Unless a specific post material is called for in the plans, the Contractor may elect to use either a single material or a combination of steel, aluminum, timber or concrete materials. Line posts of one material may be used with corner, pull and end post assemblies of a different material. Line posts of only one optional material and pull post assemblies of only one optional material will be permitted between corner and end post assemblies. Within individual corner and end post assemblies only one optional material will be permitted.
- Unless otherwise called for in the plans gates shall be commercially available metal swing gates assembled and installed in accordance with the manufacturers specifications as approved by the Engineer. Chain link swing gates in accordance with Index No. 452 may be substituted for metal swing gates as approved by the Engineer. Payment for gates shall include the gate, single or double, all necessary hardware for installation and any additional length and/or size for posts at the opening. Gates shall be paid for under the contract unit price for Fence Gates, Type A, each.

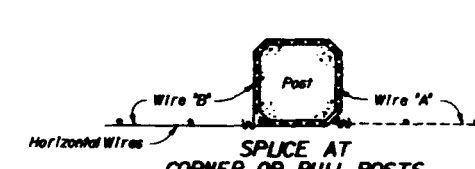
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
FENCE TYPE A		Approved By: <i>[Signature]</i>	
Designed By: _____	Checked By: _____	Revision No. _____	Sheet No. _____
F.L.R.A. Approved: 08/03/76		8'	1 of 1
			451



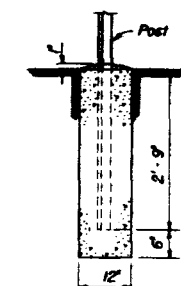
FASTENER FOR TIMBER POST AND BRACE



BRACE AND POST
BRACE TO BRACE ON LINE
BRACE TO BRACE AT CORNER
FASTENER FOR CONCRETE POST AND BRACES

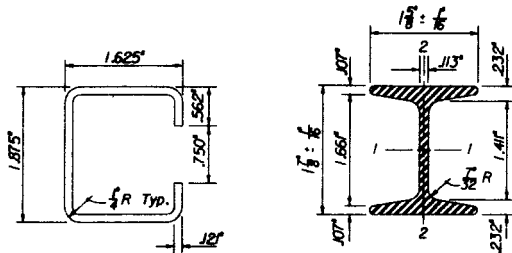


Each horizontal wire to be wrapped completely around pull post and tied to same wire. Conc. post illustrated. This method also applies to steel post installations and timber post installations.



CONCRETE BASE FOR ANGULAR STEEL POST

(Pull, Corner, End And Approach Posts)



Galv. Wt. Per. Ft. = 2.34 @ 5%
Yield Point P.S.I. (Min.) 45,000

OPTIONAL C-LINE POST FOR TYPE B FENCE

1 1/2 x 1 1/2 H-BEAM (STEEL)

Area = 7.24 sq. in.

Galv. Wt. Per. Ft. = 2.72 @ 5%

Axis	H	Ax
Moment of Inertia	428	2-2
Section Modulus	456	124
Rad. of Gyration	779	373
Surface Area = 776" Per Ft.		
Tensile Strength PSI (Min.) 180,000		
Yielding Point PSI (Min.) 148,000		

(ALUM.)

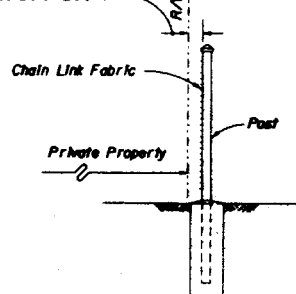
0.91 @ 5%

Ax

Axis	H	Ax
Moment of Inertia	428	2-2
Section Modulus	456	124
Rad. of Gyration	779	373
Surface Area = 776" Per Ft.		
Tensile Strength PSI (Min.) 180,000		
Yielding Point PSI (Min.) 148,000		

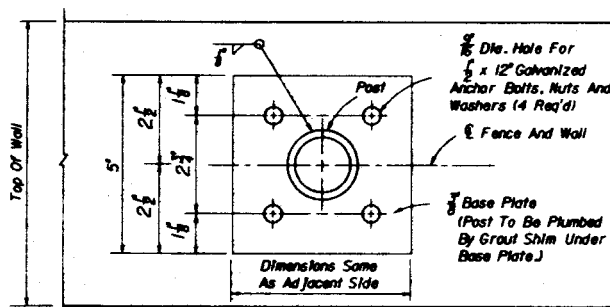
OPTIONAL H-BEAM LINE POST FOR TYPE B FENCE

6" For Fence Without Barb Wire Attachment, 12" For Fence With Barb Wire Attachment, Or, As Indicated In Plans. (See Detail Below.)



FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

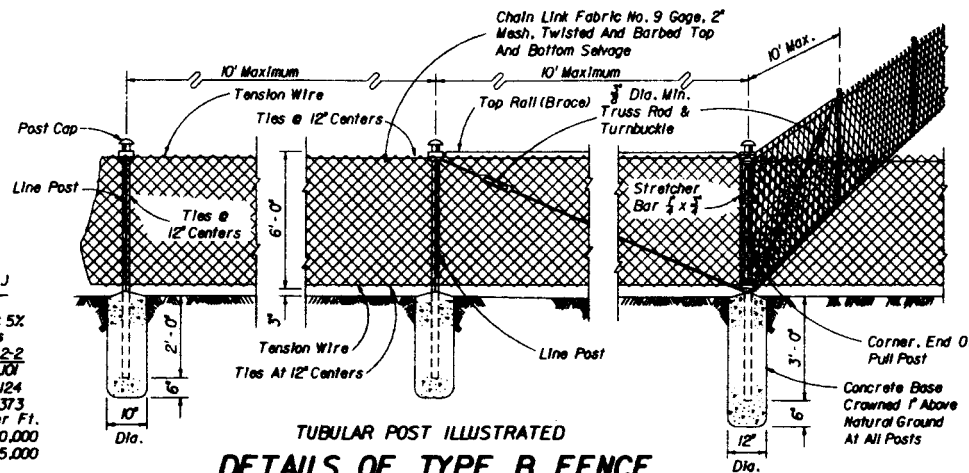
(REFER TO DETAIL PLANS FOR FENCE POSITION AT
LOCATIONS WITH FRONTAGE ROADS)



TOP VIEW

BASE PLATE IDENTICAL FOR LINE, PULL, END AND CORNER POSTS AND SHALL BE
CONSIDERED AN INTEGRAL PART OF THE RESPECTIVE POSTS FOR BASIS OF PAYMENT

FENCE MOUNTING ON CONCRETE ENDWALL AND RETAINING WALLS



TUBULAR POST ILLUSTRATED DETAILS OF TYPE B FENCE

NOTES

- Attachments to be used only when called for in the plans.
- Attachments to extend in direction of restraint, unless otherwise called for in plans, direction of restraint will be as follows:
 - Outward on limited access right of way line.
 - Outward on controlled access right of way line.
 - Outward from utilities and hazardous facilities located within highway right of way.
 - Outward from lateral ditches, outfalls, retention basins, canals, borrow areas and similar support facilities.
 - Inward on pedestrian ways.

The cap-form shall be designed to provide a drive fit over the top of posts and to exclude moisture in posts with tubular sections.

Attachments to be paid for under the contract unit price for Fencing, Type B (With Barb Wire Attachment) LF.

BARB WIRE ATTACHMENT

GENERAL NOTES (CONT.)

- Pull posts shall be used at breaks in vertical grades of 15° or more, or at approximately 330' centers except that this maximum interval may be reduced by the Engineer on curves where the degree of curvature is greater than 3°.
- Corner posts are to be installed at all horizontal breaks in fence at 15° or more and as required at vertical breaks over 15° as determined by the Engineer.
- Unless sliding gates or special gates are called for in the plans, all gates shall be chain link swing gates meeting the material requirements described above as approved by the Engineer. Payment shall include the gates, single or double, all necessary hardware for installation and any additional length and/or size for posts at the opening. Gates shall be paid for under the contract unit price for Fence Gates, Type B, each.
- Line posts, tension wires, chain link fabric, tie wires, all miscellaneous fittings and hardware, and Class I concrete to be paid for under the contract unit price for Fencing Type B, LF. Pull or end post assemblies shall consist of one pull or end post, one brace, one truss rod and all necessary fittings and hardware as detailed above and shall be paid for under the contract unit price for Pull & End Post Assembly (Type B Fence), Each. Corner post assemblies shall consist of one corner post, two braces, two truss rods, and all necessary fittings and hardware as detailed above and shall be paid for under the contract unit price for Corner Post Assembly (Type B Fence), Each.

TYPE II VINYL COATED FABRIC					
Spec. Subarticle 966-1J And AASHTO M181-95I With Table 4 Redefined As Follows					
Specified Dia. Of Metallic Coated Core Wire	Minimum Weight Of Zinc Or Aluminum Coating	Thickness Range Of Extruded Or Extruded And Bonded PVC Coating	Thickness Range Of Bonded PVC Coating		
In. mm gage	oz./ft. ² g/m ²	In. mm	In. mm		
0.148 3.76 9	0.30 92	0.015 0.38 to 0.025 0.64	0.006 0.15 to 0.010 0.25		

GENERAL NOTES

- This fence to be used generally in urban areas.
- This fence shall be in accordance with Section 550 of F.D.O.T. Standard Specifications.
- Chain link fabric, posts, rails, truss rods, tension wires, tie wires, stretcher bars, gates and all miscellaneous fittings and hardware shall meet the requirements of AASHTO M 181, and as specified below. Stipulated AASHTO and ASTM signify current reference.

4. Fence Component Options:

A. Line post options:

- Galvanized steel pipe, Schedule 40-1 1/2 nominal dia. galvanized at the rate of 1.8 oz. per sq. ft.; ASTM A53 Table X2, ASTM A120, and AASHTO M 111.
- Aluminum coated steel pipe - 1 1/2 nominal dia. coated at the rate of 0.40 oz. per sq. ft.; Spec. Subarticle 966 -1.5.
- Aluminum alloy pipe - 2" nominal dia.; ASTM B 241 or B 221, Alloy 6063, T6.
- Steel H-Beam - 1 1/2 x 1 1/2 Galv. 1.8 oz./s.f.; AASHTO M 111 and Detail.
- Aluminum alloy H-Beam - 1 1/2 x 1 1/2 Detail.
- Steel C - 1 1/2 x 1 1/2 Galv. 1.8 oz./s.f.; AASHTO M 111 and Detail.
- Resistance welded steel pipe - 1 1/2 nominal dia. Spec. Subarticle 966 -1.5.

B. Corner, end, and pull post options:

- Galvanized steel pipe, Schedule 40-2" nominal dia. galvanized at the rate of 1.8 oz. per sq. ft.; ASTM A53 Table X2, ASTM A120, and AASHTO M 111.
- Aluminum coated steel pipe - 2" nominal dia. coated at the rate of 0.40 oz. per sq. ft.; Spec. Subarticle 966 -1.5.
- Aluminum alloy pipe - 2 1/2 nominal dia.; ASTM B 241 or B 221, Alloy 6063, T6.
- Resistance welded steel pipe - 2" nominal dia.; Spec. Subarticle 966 -1.5.

C. Rail options:

- Galvanized steel pipe, Schedule 40 - 1 1/2 nominal dia. galvanized at the rate of 1.8 oz. per sq. ft.; ASTM A53 Table X2, ASTM A120, and AASHTO M 111.
- Aluminum coated steel pipe - 1 1/2 nominal dia. coated at the rate of 0.40 oz. per sq. ft.; Spec. Subarticle 966 -1.5.
- Aluminum alloy pipe - 1 1/2 nominal dia.; ASTM B 241 or B 221, Alloy 6063, T6.
- Resistance welded steel pipe - 1 1/2 nominal dia.; Spec. Subarticle 966 -1.5.

D. Chain link fabric options:

- No. 9 gage steel wire (2" mesh) galvanized at the rate of 1.8 oz. per sq. ft.; AASHTO M 181.
- Type II Vinyl Coated Fabric: See Table Below.
- Aluminum coated steel wire: AASHTO M 181.

E. Tension wire options:

- No. 7 gage steel wire galvanized at the rate of 1.8 oz. per sq. ft.; AASHTO M 181.
- Aluminum alloy wire conforming to the requirements of ASTM B 211, Alloy 6061, Temper T89 or T94, with a wire diameter of 0.1875" or larger.
- No. 7 gage aluminum coated steel wire coated at the rate of 0.40 oz. per sq. ft.; AASHTO M 181.

F. Tie wire and hog ring options:

- No. 9 gage steel wire galvanized at the rate of 1.8 oz. per sq. ft.
- Aluminum alloy wire conforming to the requirements of ASTM B 211, Alloy 6061, Temper T89 or T94, with a wire diameter of 0.1443" or larger.
- No. 7 gage aluminum coated steel wire coated at the rate of 0.40 oz. per sq. ft.

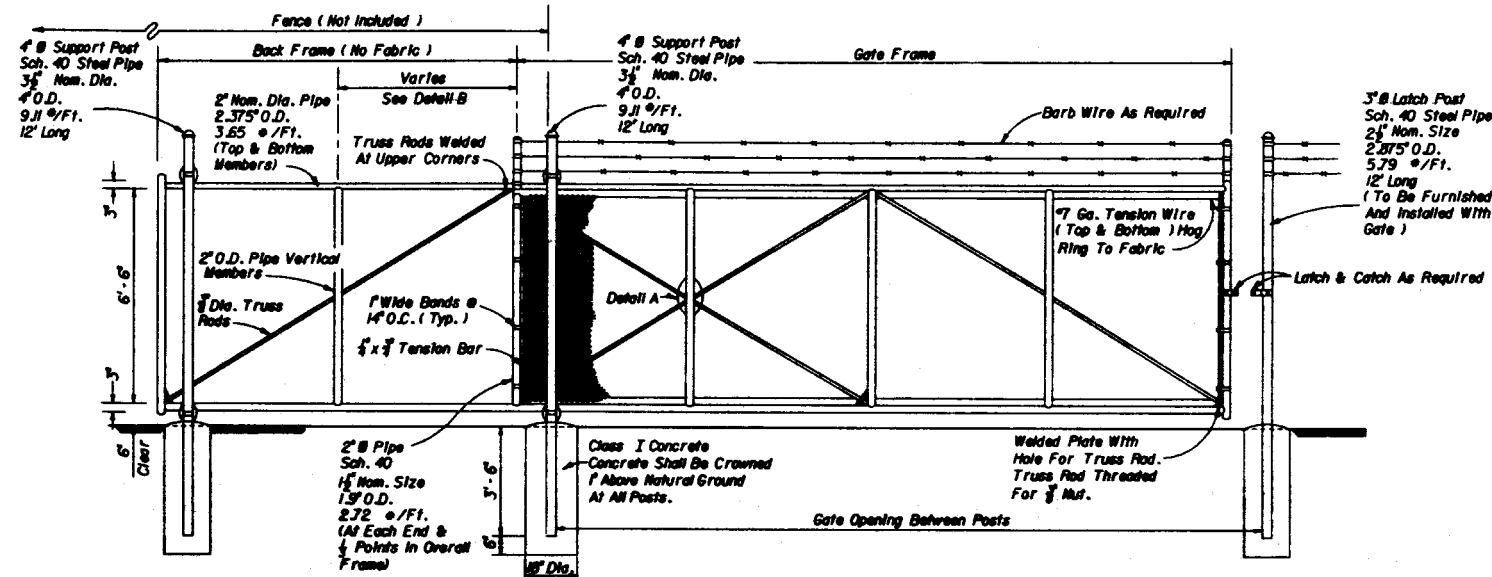
- Unless a specific material is called for in the plans the Contractor may elect to use either a single type of material or a combination of material types from the component options listed above. Combinations of optional materials are restricted as follows: (a) Only one fabric optional material will be permitted between corner and/or end post assemblies. (b) Only one line post optional material will be permitted between corner and/or end post assemblies. (c) Pull post assemblies shall be optional materials identical to either the line post optional material or the corner and end post assembly optional materials; but, pull post assemblies shall be the same optional material between any set of corner and/or end post assemblies.

- Concrete for bases shall be Class I as specified in Section 345 of the Standard Specifications except that the requirements contained in 345-5J, 345-10 and 345-11 shall not apply. Materials for Class I concrete may be proportioned by volume and/or by weight.

- In locations of firm well drained soils that are suitable for full stable embedment, the Contractor may elect to install any of the optional steel line posts by driving to a minimum depth of 3 feet in lieu of using concrete footings. Driving will not be permitted for line posts located in sandy soils, nor permitted for line posts used in conjunction with pull, end or corner posts. Posts shall be protected to prevent damage from driving. Damaged posts shall be repaired or removed and replaced as directed by the Engineer without additional cost to the Department.

continued

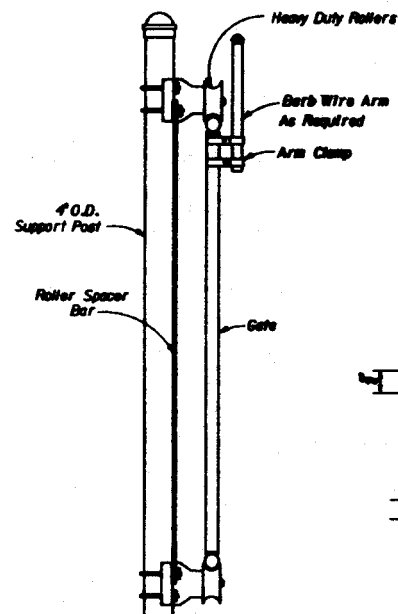
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
FENCE TYPE B					
Designed By	Drawn By	Checked By	Reviewed By	Approved By	Stamp
F.A.R.A. Approved: 10/26/83			Sheet No.	1 of 1	452



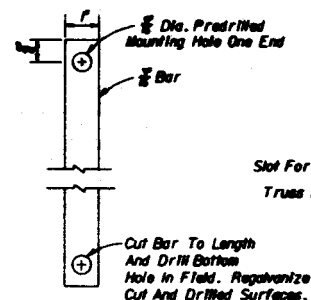
FRONT ELEVATION

GENERAL NOTES

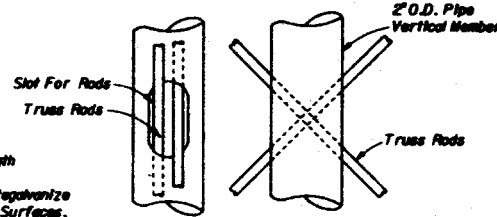
- The Contractor may substitute any equivalent cantilever slide gate approved by the Engineer.
Extruded, rolled or formed components that provide equal strength and stability may be used in lieu of the pipe components shown and, internal rollers may be used in lieu of the external roller units shown.
Gate components shall meet or exceed the material requirements specified on Index No. 452.
- Steel gate frame shall be fabricated prior to galvanizing, except that truss rods and truss rod plates may be fabricated following frame galvanizing provided surfaces damaged during welding are galvanized in accordance with Section 24 of AASHTO M36.
- All fabric shall be knuckled top & bottom selvages.
- Cost of all gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever), Each.



SUPPORT POST
DETAIL

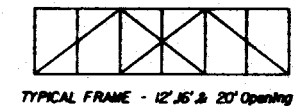


ROLLER SPACER
BAR

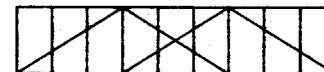


DETAIL A

GATE OPENING	GATE FRAME	BACK FRAME
12'	12' - 3"	6'
16'	16' - 3"	8'
20'	20' - 3"	10'
24'	24' - 3"	12'



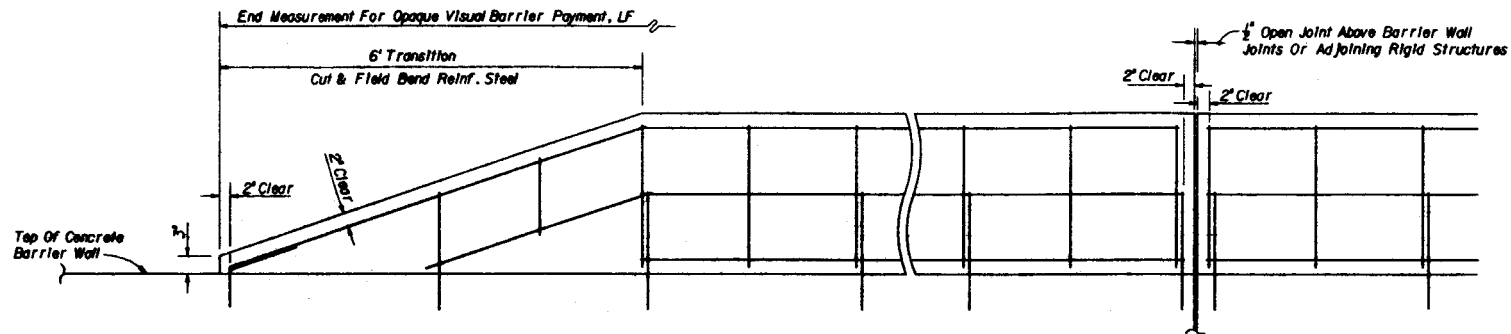
TYPICAL FRAME - 12', 16' & 20' Opening



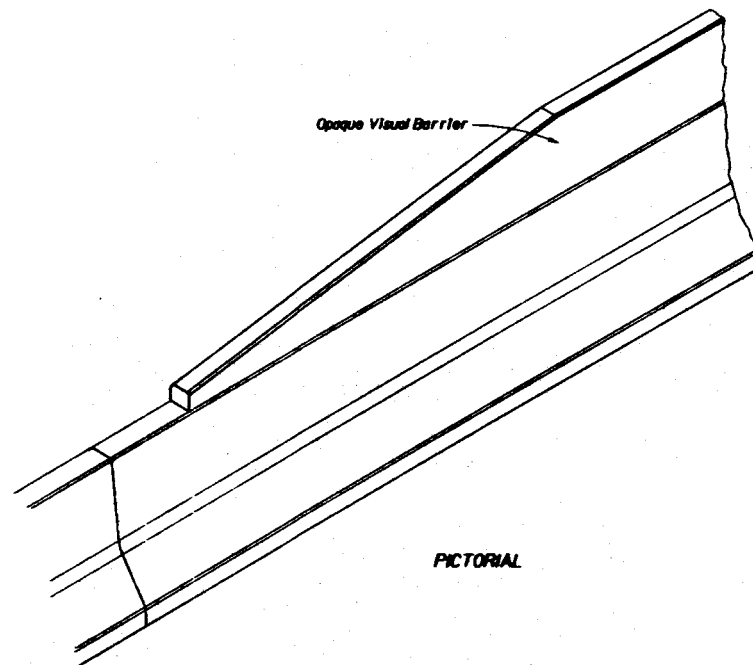
TYPICAL FRAME - 24' Opening

DETAIL B

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
CANTILEVER SLIDE GATE TYPE B FENCE					
Designed By	Checked By	Approved By	1 of 1		
Drawn By	100	05/70	453		
Reviewed By	107	05/70			
F.A.B.A. Approved: 05/05/70					

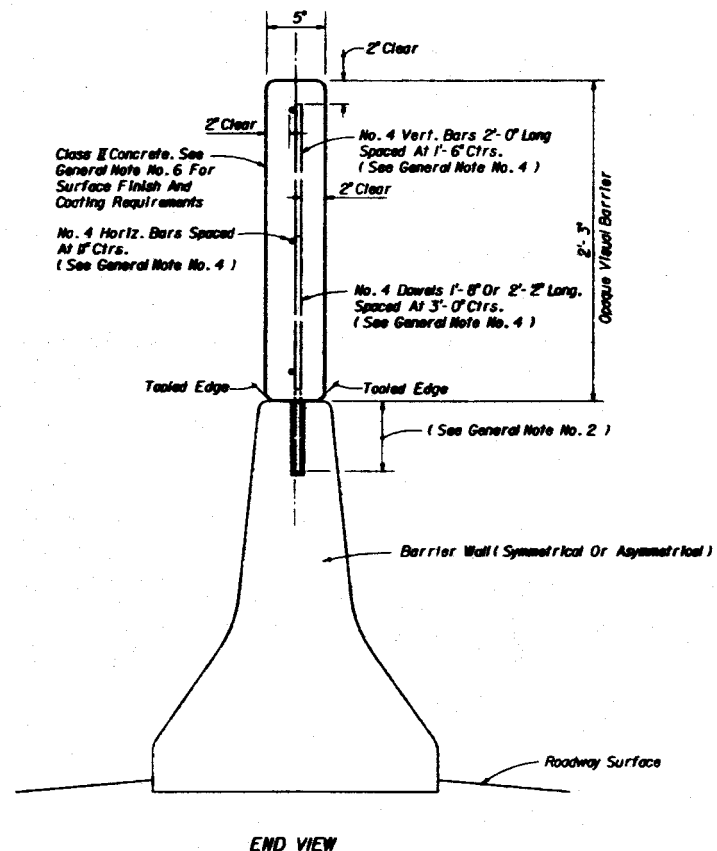


ELEVATION OF REINFORCEMENT AND DOWELING



PICTORIAL

ESTIMATED QUANTITIES, LF	
Concrete	0.042 CY
Reinforcing Steel	3.27 Lbs *
* 3.38 Lbs. With 2'-2" Dowels	



END VIEW

GENERAL NOTES

1. The opaque visual barrier is intended to function as a visual screen, and is not intended to resist vehicle impact loads nor to restrain, contain or redirect vehicles or cargo. The barrier is designed to withstand zone wind loading and strikes by light debris, and, designed to yield to exceptional strikes by vehicles or cargo, and to contain ruptured segments of the screen when yielding to such strikes.

2. When the opaque visual barrier is constructed on an existing barrier wall, dowels shall be 1'-6" in length, embedded 6" into the barrier wall and set with an approved chemical grout. Embedment holes shall be $\frac{3}{4}$ " diameter, drilled to a depth $\frac{3}{4}$ " below the tip of the dowel unless greater depth is required to accept manufactured grout capsules.

When the opaque visual barrier is constructed in conjunction with project concrete barrier walls, dowels may be set as described above, in either the drilled or preformed holes, or, placed when the barrier wall is cast. For dowels that are placed when the wall is cast, the dowel shall be 2'-2" in length and embedded to a depth of 12".

3. For both double and single faced concrete barrier walls the opaque visual barrier is to be located in the center of the top of the wall.

For single faced barrier walls that are constructed around other vertical structure, the opaque visual barrier shall follow the alignment of only one of the walls and be centered atop that wall.

For dual median barrier walls that follow differential profiles, the opaque visual barrier shall be constructed atop the wall with the higher elevation, unless conditions dictate otherwise. Lateral transitions or end overlaps for opaque visual barriers that alternate between dual walls shall be detailed in the plans.

For median barrier walls that are divided when connecting to separated bridges, the opaque visual barrier shall be constructed atop the approach side barrier wall, unless differential profiles dictate locating the opaque visual barrier on the departure side barrier wall.

Opaque visual barriers to be located on capped fills between dual barrier walls shall be detailed in the plans.

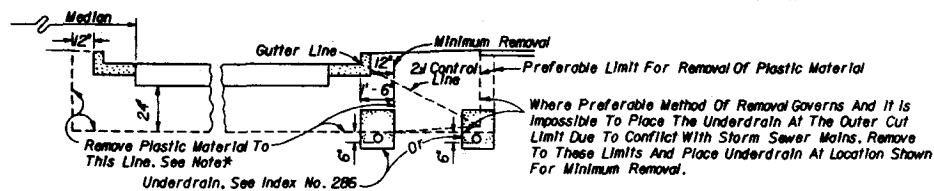
4. In lieu of the reinforcement shown the Contractor may substitute welded wire fabric equal to or better than that shown, when approved by the Engineer. Details shall be submitted with requests for substitution.

5. The Contractor may construct contiguous precast concrete panels in lieu of the cast-in-place opaque screen when approved by the Engineer. Panel design and method for anchorage to the barrier wall shall be detailed by shop drawings when requesting the Engineers approval.

6. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 523 of the Standard Specification, unless other finish called for in the plans. The surfaces shall have a Class 5 Applied Finish Coating in accordance with Section 400 only when called for in the plans.

7. Payment for opaque visual barrier shall be full compensation for concrete, reinforcement, dowels, casting, placement, drilling, grouting, tooling, finishing and work incidental thereto, and shall be paid for under the contract unit price for Opaque Visual Barrier (Concrete) (2'-3" Height), LF.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
OPAQUE VISUAL BARRIER			
Designed By	Checked By	Approved By	 State Bridge Engineer, Road Design
Drawn By	Reviewed By		
Submitted By	Submitted Date	Submitted To	
F.J.S.A. Approved: 10/27/18		88	1 of 1
			461



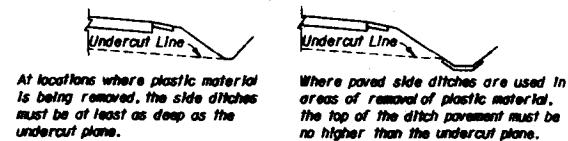
HALF SECTION

NOTES: Refer to roadway cross sections to determine whether minimum or preferable removal is used.

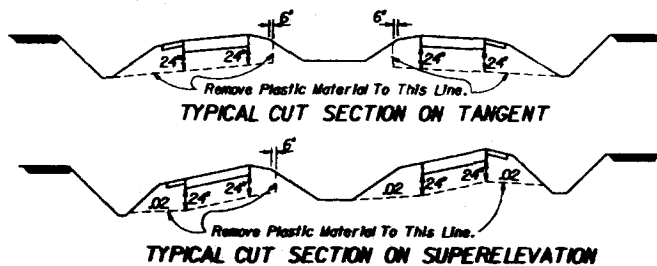
*Where frequency of median breaks indicates that it is impractical to leave plastic material in the median, the designer may elect to indicate total removal of this material.

If during construction it becomes apparent, due to normal required construction procedures, that it is impractical to leave the plastic material in the median, the project engineer may authorize total removal of this material after clearing this change thru the Asst. Dist Engr - Const.

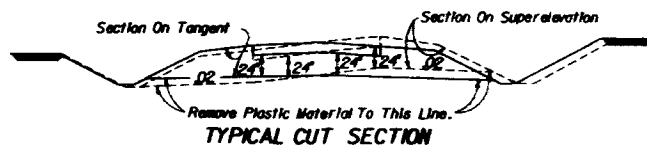
REMOVAL OF PLASTIC MATERIAL® AND LOCATION OF UNDERDRAIN IN MUNICIPAL CONSTRUCTION



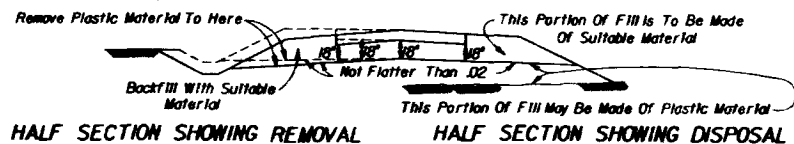
MISCELLANEOUS DETAILS



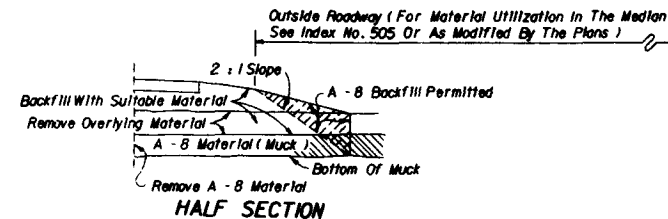
REMOVAL OF PLASTIC MATERIAL® ON INTERSTATE FACILITIES, FREEWAYS, DIVIDED PRINCIPAL AND MINOR ARTERIALS AND MAJOR COLLECTORS HAVING DEPRESSED MEDIANS



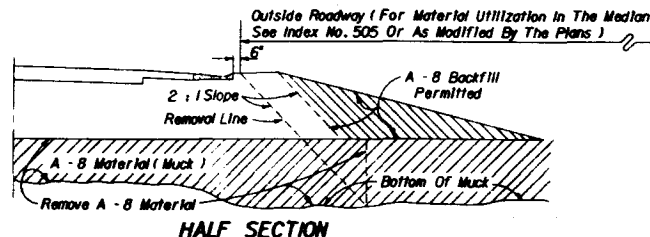
REMOVAL OF PLASTIC MATERIAL® ON DIVIDED FREEWAYS, PRINCIPAL AND MINOR ARTERIALS AND MAJOR COLLECTORS HAVING FLUSH MEDIANS, AND, ON UNDIVIDED PRINCIPAL AND MINOR ARTERIALS AND MAJOR COLLECTORS



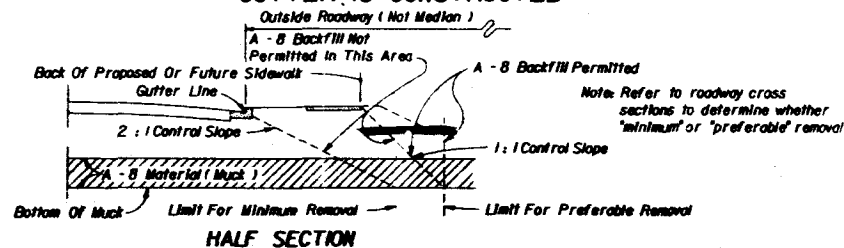
REMOVAL AND UTILIZATION OF PLASTIC MATERIAL® FOR MINOR COLLECTORS AND LOCAL FACILITIES



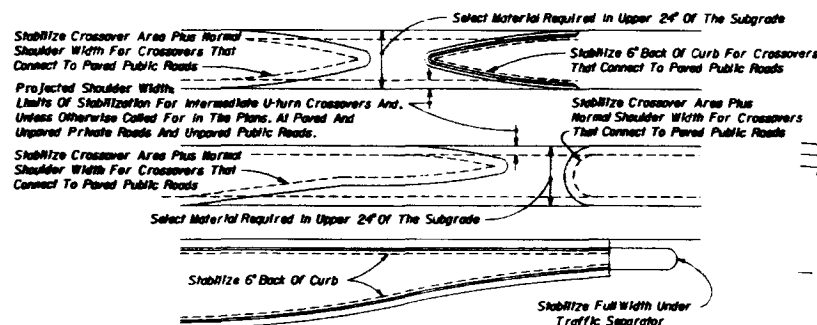
REMOVAL AND DISPOSAL OF A - B MATERIAL IN RURAL CONSTRUCTION



MUCK REMOVAL WHERE SHOULDER GUTTER IS CONSTRUCTED



REMOVAL AND DISPOSAL OF A - B MATERIAL IN MUNICIPAL CONSTRUCTION



MEDIAN STABILIZING DETAILS

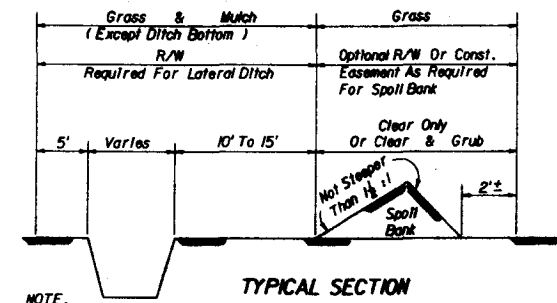
GENERAL STABILIZING NOTES:

- (1) When typical section has curb or curb and gutter in median stabilize 6" back of curb.
- (2) When typical section has shoulder with no curb or curb and gutter in median stabilize to normal shoulder width.
- (3) Stabilize entire area under all paved traffic islands.
- (4) Stabilize full width under all traffic separators.

NOTES:

1. All surplus material in shaded area to be removed.
2. Payment for removal is included in the base item.
3. *Area of base for payment will be calculated using the nominal width (3' Overhang).

REMOVAL OF EXCESS BASE MATERIAL



- NOTE:
1. Where no spoil is anticipated or when a large ditch or canal is involved and spoil is anticipated on both sides, R/W should be adjusted accordingly.
 2. Clearing and grubbing is to extend 200' beyond the end of the ditch if necessary.
 3. The bottom width of lateral ditches is to be 2' wider than the span of the structure they drain or as shown on plans.
 4. No spoil bank will be permitted within 300' of the E of the project, measured at right angles thereto. Waste materials in this section shall be either hauled and deposited in areas approved by the Engineer, or spread on adjacent areas to the depth designated by the Engineer.
 5. All excavation from lateral ditches shall be wasted unless otherwise shown on lateral ditch sheets.

LATERAL DITCH SHOWING SPOIL BANK

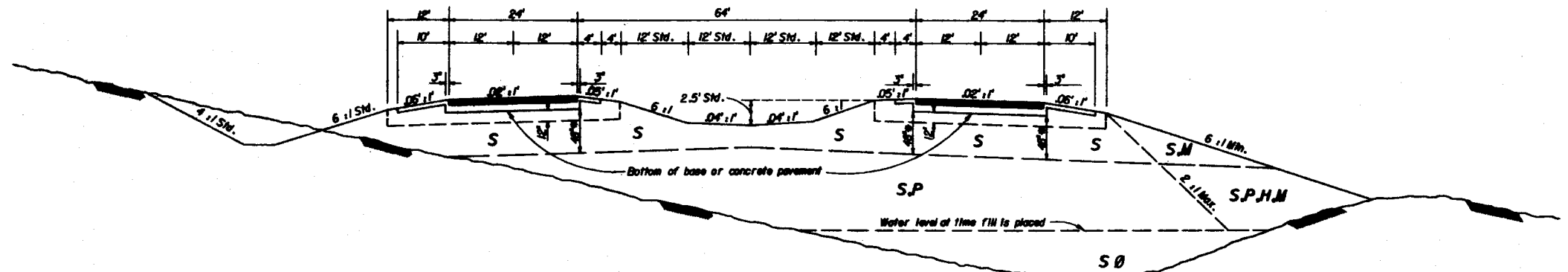
GENERAL NOTES

1. Minimum grade on underdrain pipe shall be 0.2%.
2. Gradation of the filter material shall conform to standard specifications.
3. In rural projects, where underdrain is to be constructed beneath the proposed pavement, the grade of the underdrain is to be such that the underdrain filter material will not extend above the bottom of the stabilized section of the subgrade.
4. All details shown on this sheet for the removal and disposal of unsuitable materials apply unless otherwise shown on the plans.
5. Where plastic material is undercut, backfill shall be made of suitable material.
6. The term "Plastic Material" used in this drawing in conjunction with removal of plastic material is as defined under soil classifications for Plastic (P) and High Plastic (H) on index No. 505.
7. The normal depth of side ditches for Interstate and major Primary System roads shall be 3.5' below the shoulder point except in special cases.
8. On Primary and Interstate highways where plastic material is permitted for use in roadway fill, the material may be placed above the existing water level (at the time of construction) to within 4' of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for short distances.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

EXCAVATION, EMBANKMENT & GRADING

Designed By	Drawn By	Checked By	Reviewed By	Approved By	Scale	Sheet No.	Total No.
						88	1 of 1
F.H.B.A. Approved	07/07/15						500



FOUR LANE ROADWAY

GENERAL NOTES

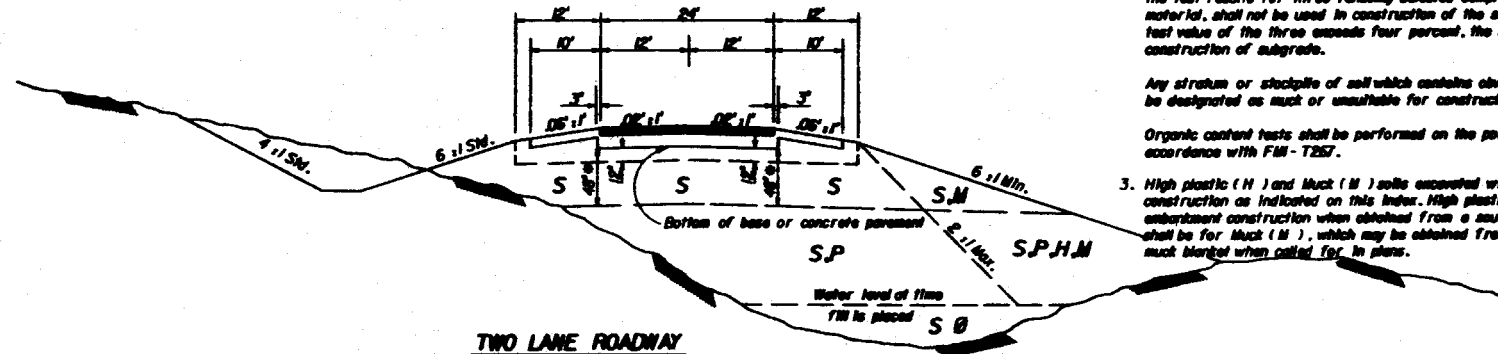
1. All dimensions shown are standard. The details shown on this index drawing do not supersede the details shown on Index No. 500.
2. Soil containing more than five percent by weight of organic material, as determined by averaging the test results for three randomly selected samples from each stratum or stockpile of a particular material, shall be classified as muck. If one test from the three exceeds seven percent, the stratum or stockpile shall be classified as muck.

Soil containing more than 2.5 percent by weight of organic material, as determined by averaging the test results for three randomly selected samples from each stratum or stockpile of a particular material, shall not be used in construction of the subgrade portion of the roadbed. If an individual test value of the three exceeds four percent, the stratum or stockpile shall not be suitable for construction of subgrade.

Any stratum or stockpile of soil which contains obvious pockets of highly organic material may be designated as muck or unsuitable for construction of subgrade.

Organic content tests shall be performed on the portion of a sample passing the No. 4 sieve in accordance with FIM - T257.

3. High plastic (H) and Muck (M) soils excavated within the project limits may be used in embankment construction as indicated on this index. High plastic (H) and Muck (M) soils are not to be used for embankment construction when obtained from a source outside the project limits. The only exception shall be for Muck (M), which may be obtained from an outside source in order to provide a 4' muck blanket when called for in plans.



TWO LANE ROADWAY

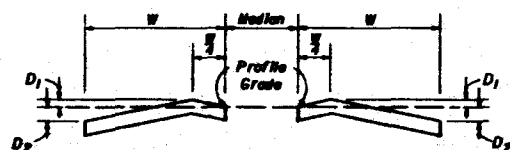
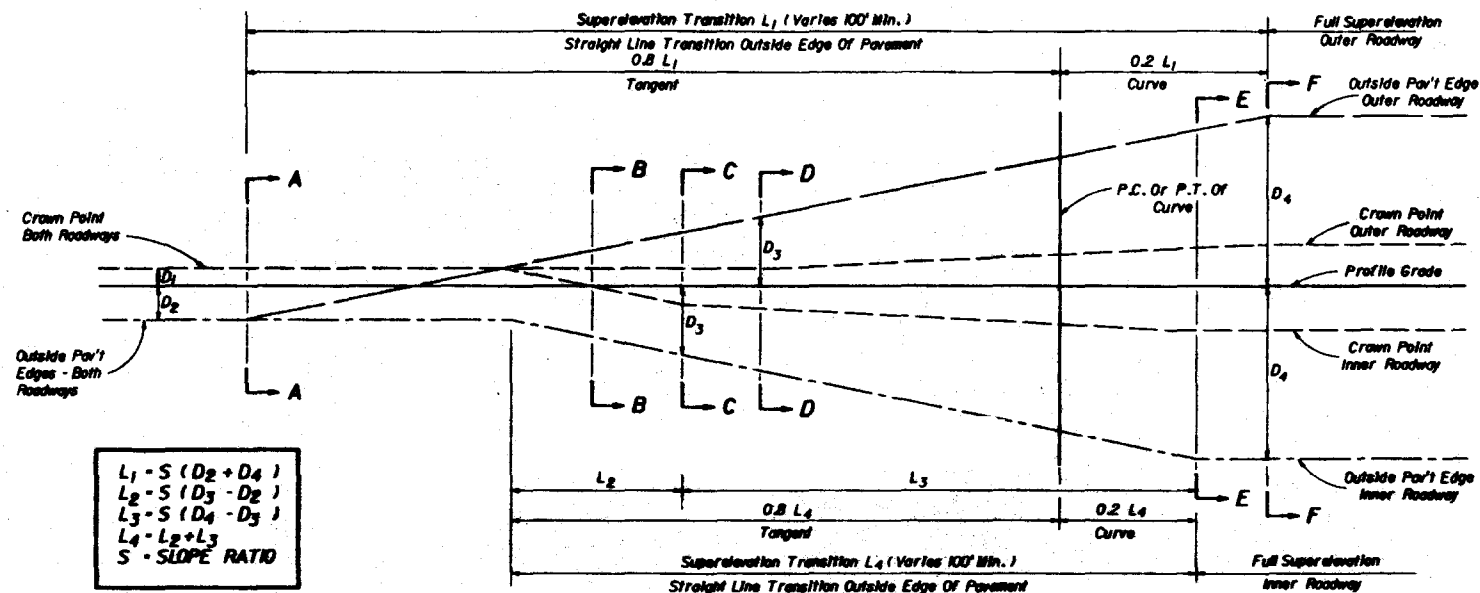
SYMBOL	SOIL	CLASSIFICATION (AASHTO M - MS)
S	Select	A-1, A-3, A-2-4
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Symbols listed left to right in order of preference.

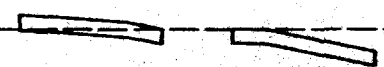
- a. Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and therefore should be used in the embankment above water level existing at time of construction.

- a. When otherwise shown on plans this dimension may be reduced to 24'.

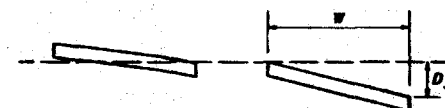
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
EMBANKMENT UTILIZATION			
Designed By	Checked By	Reviewed By	Approved By
Drawn By			
Revised By			
F.A.R.A. Approved 04/25/74		Sheet No.	Job No.
		1 of 1	505



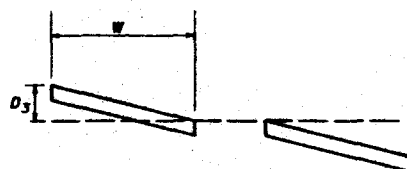
SECTION A - A
NORMAL CROWNED SECTION



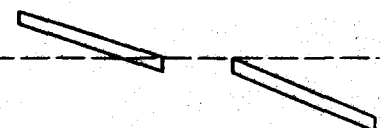
SECTION B - B
SUPERELEVATION SECTION LT. & RT.



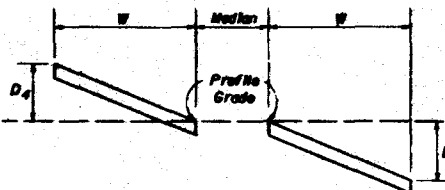
SECTION C - C
SUPERELEVATION SECTION LT.
PLANE INCLINED SECTION RT.



SECTION D - D
PLANE INCLINED SECTION LT.
SUPERELEVATION TRANSITION RT.



SECTION E - E
SUPERELEVATION TRANSITION LT.
FULL SUPERELEVATION RT.



SECTION F - F
FULL SUPERELEVATION LT. & RT.

8 - LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
SUPERELEVATION					
Designed By	WSE	Date	08/77	Approved By	<i>[Signature]</i>
Drawn By	LUF	Date	08/77	State Bridge Engineer, Roadways	
Checked By	WSE	Date	08/77	Section No.	Sheet No.
F.A.R.A. Approved	0/00/77	By	2 of 2	510	

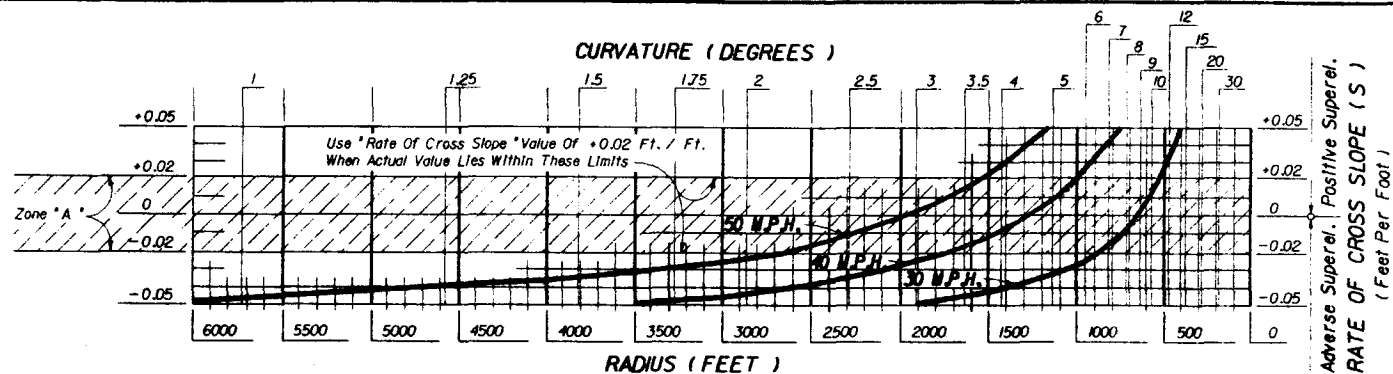
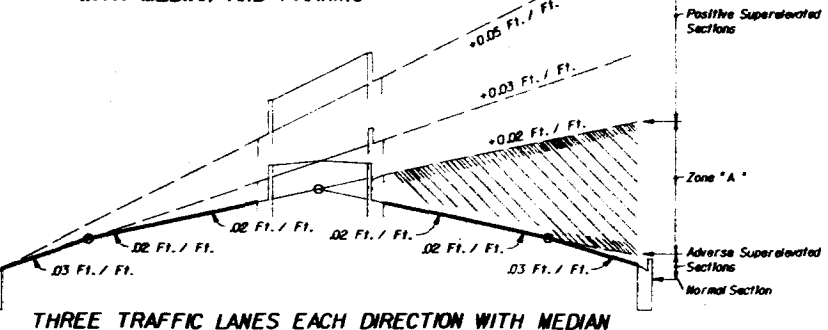
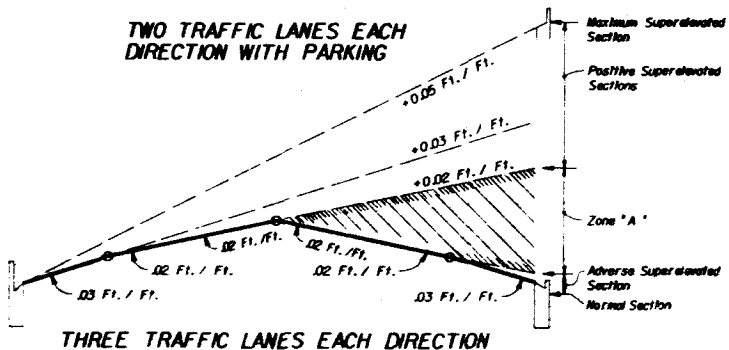
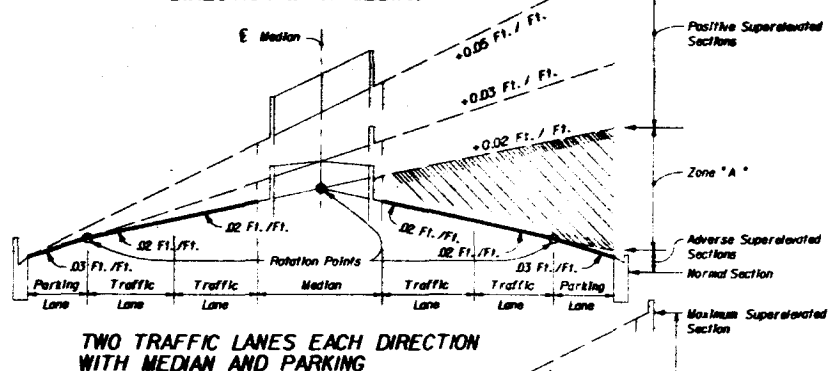
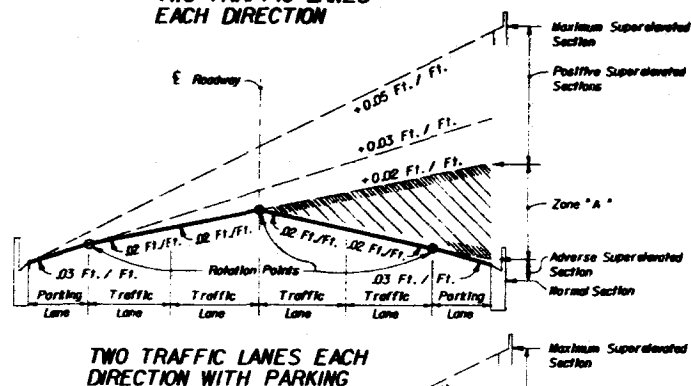
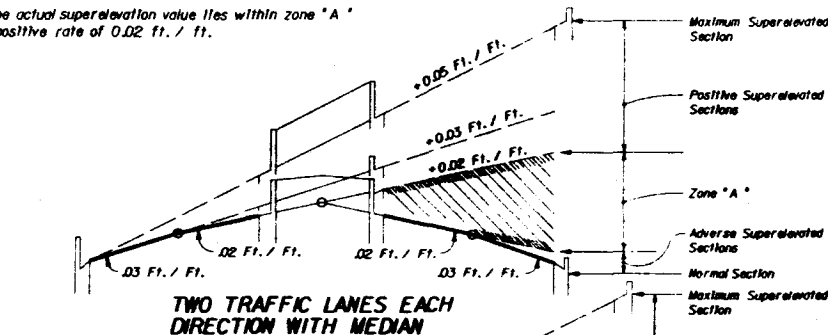
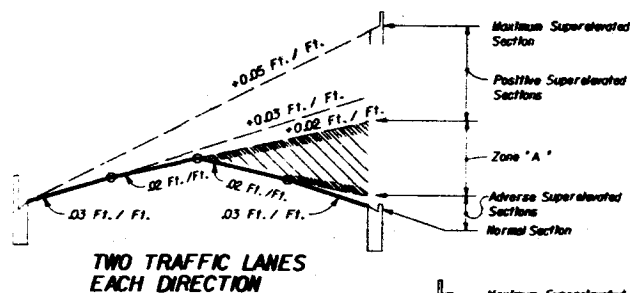


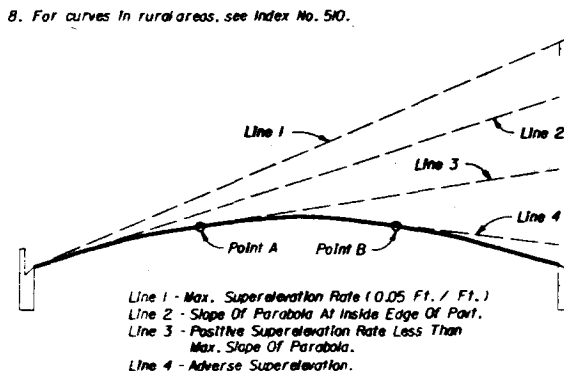
CHART SHOWING REMOVAL OF CROWN AND OR SUPERELEVATION NECESSARY FOR CURVATURE AT VARIOUS DESIGN SPEEDS

Note: When the actual superlevation value lies within zone "A" use a positive rate of 0.02 ft. / ft.



GENERAL NOTES FOR SUPERELEVATION

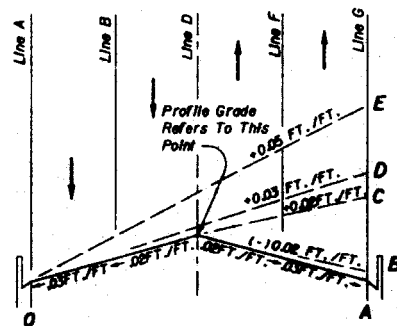
- Maximum rate of superlevation (in Municipal Construction) shall be 0.05 ft./ft.
- Superelevation shall be obtained by rotating the plane successively about the break points of the section until the plane has attained a slope equal to that required by the chart. Should the rotation traverse the entire section and further superlevation be required, the remaining rotation of the plane shall be about the low edge of the inside travel lane.
Adverse superlevation of sections with parking lanes. No superlevation will be required when the maximum adverse superlevation rate is greater than the normal slope of the traffic lane adjacent to the parking lane.
- When positive superlevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the superelevated pavement.
- In construction, short vertical curves shall be placed at all angular profile breaks within the limits of the superlevation transition.
- Minimum gutter grades within the limits of the superlevation transition shall be 0.2 %.
- The variable superlevation transition length "L" shall have a minimum value of 50 feet for design speeds under 40 M.P.H., and 75 feet for design speeds of 40 M.P.H. or greater.
- Municipal sections having lane arrangements different from those shown, but composed of a series of planes, shall be superelevated in a similar manner.
- For curves in rural areas, see Index No. 510.



Values obtained from the chart are also applicable to a parabolic crown section. When this type section is used, superlevation is established by rotating a tangent about the arc of the parabolic crown until the desired slope is attained (points A & B on sketch). The normal parabolic crown will be maintained outside the limits of the plane thus formed.

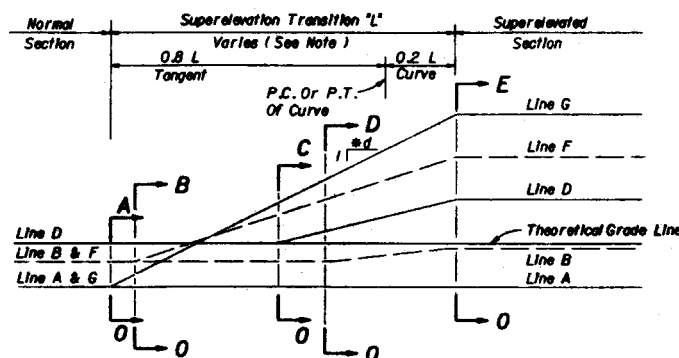
PARABOLIC SECTION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SUPERELEVATION MUNICIPAL CONSTRUCTION			
Designed By	WLB	Date	2/86
Drawn By	CDR	Scale	1/8"
Checked By	RLD	Sheet No.	1 of 2
F.J.U.A. Approved		5/20/77	511



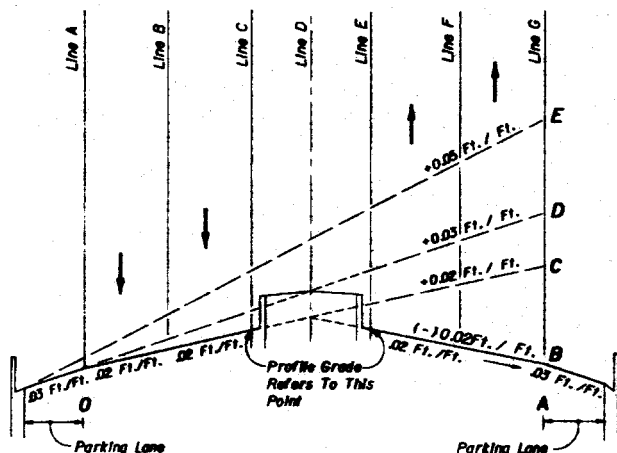
SECTION 0-A TO 0-E

TWO LANES EACH DIRECTION



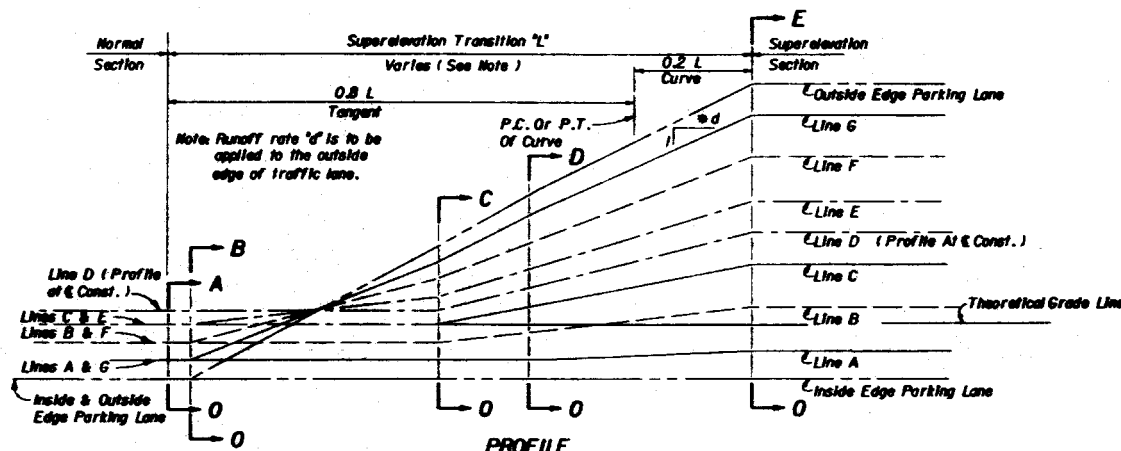
PROFILE

LINE	DESCRIPTION
A	INSIDE TRAFFIC LANE
B	INSIDE LANE LINE
C	INSIDE MEDIAN EDGE PAVEMENT
D	CONSTRUCTION
E	OUTSIDE MEDIAN EDGE PAVEMENT
F	OUTSIDE LANE LINE
G	OUTSIDE TRAFFIC LANE



SECTION 0-A TO 0-E

TWO LANES EACH DIRECTION WITH MEDIAN AND REFUGE LANE



PROFILE

*d (SLOPE RATIO)	
30 MPH	1 : 100
40 MPH	1 : 125
50 MPH	1 : 150

D	R	V - 30mph	V - 40mph	V - 50mph
0° 15'	2298'	NC	NC	NC
0° 30'	1459'	NC	NC	NC
0° 45'	763'	NC	NC	NC
1° 00'	573'	NC	NC	NC
1° 30'	382'	NC	NC	NC
2° 00'	286'	NC	NC	NC
2° 30'	229'	NC	NC	NC
3° 00'	190'	NC	NC	NC
3° 30'	163'	NC	NC	NC
4° 00'	143'	NC	NC	NC
5° 00'	114'	NC	NC	NC
6° 00'	95'	NC	NC	NC
7° 00'	80'	NC	NC	NC
8° 00'	71'	NC	NC	NC
9° 00'	63'	NC	NC	NC
10° 00'	57'	NC	NC	NC
11° 00'	52'	NC	NC	NC
12° 00'	47'	NC	NC	NC
13° 00'	44'	NC	NC	NC
14° 00'	40'	NC	NC	NC
15° 00'	35'	NC	NC	NC
16° 00'	30'	NC	NC	NC
17° 00'	26'	NC	NC	NC
18° 00'	22'	NC	NC	NC
19° 00'	19'	NC	NC	NC
20° 00'	16'	NC	NC	NC

Max. - 0.05

Note: The sections and profiles shown on this sheet are examples of the super-elevation transitions. Shallower schemes should be used for roadways having different section designs.


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SUPERELEVATION MUNICIPAL CONSTRUCTION			
Designed By	Drawn By	Checked By	Approved By
WLB	CDR	GLW	
Drawn By	CDR	GLW	
Checked By	RJD	GLW	
F.J.B.A. Approved	05/20/77	87	2 of 2
			511

The super-elevation rates shown above are to be used for urban (curb & gutter) arterials in suburban areas where development is such that uniform application of these higher rates may be applied on all curves and where sufficient R/W is available to make suitable connections.

[illegible]

1. If combinations other than those shown in the table are used, the thickness must be consistent with the following thickness ranges and the details must be given on the Typical Section Sheet:

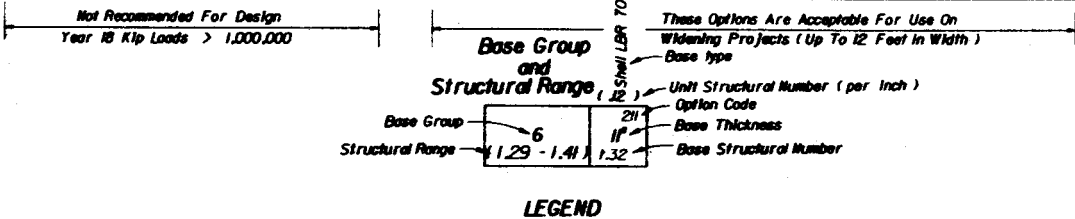
2. When quantities are bid as tonnage items, equivalent tonnage layer thickness will be constructed (i.e., 100^{sq} = one square yard inch)
3. The designer should consider stage construction for course thicknesses greater than 4ⁱⁿ.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
<h1 style="margin: 0;">FLEXIBLE PAVEMENT</h1> <h2 style="margin: 0;">LAYER THICKNESS FOR STRUCTURAL COURSES</h2>			
Designed By	Name	Date	Approved By 
Drawn By	HRL	05/95	George Fournier District Engineer
Checked By	HRL	05/95	
F.H.W.A. approved:			<div style="display: flex; justify-content: space-between;"> 05 1 of 1 513 </div>

OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS

Base Group And Structural Range	Limerock LBR 100 (25) And (18)	Composite Limerock - Asph. Base (Limerock LBR 100) *	Cemented Coquina LBR 100 (25) And (18)	ABC-1 (Min. Marshall Stab. 500) (20)	ABC-2 (Min. Marshall Stab. 750) (25)	ABC-3 (Min. Marshall Stab. 1000) (30)	Bank Run Shell LBR 100 (135)	Soil Cement (300 PSI) (Plant Mixed) (15)	Limerock Stabilized LBR 70 (12)	Sand - Clay LBR 75 (12)	Shell LBR 70 (12)	Shell Stabilized LBR 70 (10)	Soil Cement (300 PSI) (Road Mixed) (15)	SANM (Min. Marshall Stab. 300) □ (15)	Graded Aggregate Base LBR 100 (15)	ABC-1 And 4 Limerock Sub-Base LBR 100 (20) And (18)	ABC-2 And 4 Limerock Sub-Base LBR 100 (25) And (18)	ABC-3 And 4 Limerock Sub-Base LBR 100 (30) And (18)	ABC-1 And 4 Cemented Coquina Sub-Base LBR 100 (20) And (18)	ABC-2 And 4 Cemented Coquina Sub-Base LBR 100 (25) And (18)	ABC-3 And 4 Cemented Coquina Sub-Base LBR 100 (30) And (18)	ABC-1 And 4 Bank Run Shell Sub-Base LBR 100 (20) And (135)	ABC-2 And 4 Bank Run Shell Sub-Base LBR 100 (25) And (135)	ABC-3 And 4 Bank Run Shell Sub-Base LBR 100 (30) And (135)	ABC-1 And 4 Graded Aggregate Sub-Base LBR 100 (20) And (15)	ABC-2 And 4 Graded Aggregate Sub-Base LBR 100 (25) And (15)	ABC-3 And 4 Graded Aggregate Sub-Base LBR 100 (30) And (15)	Soil Cement (500 PSI) (Plant Mixed) (20)	Econcrete (800 PSI) (22)	Econcrete (1000 PSI) (25)		
1 (.58 - .62)	Δ 001 4		Δ 003 4	Δ 005 4	Δ 006 4	Δ 007 4	004 6	008 6	009 5	010 5	011 5	012 6	Δ 013 6	014 6	015 6															Δ 028 4	Δ 029 4	Δ 030 4
2 (.72 - .78)	999 72	Δ 042 4	043 72	Δ 045 4	Δ 046 4	Δ 047 4	044 74	048 75	049 72	050 72	051 72	052 75	Δ 053 6	054 75	055 75															058 80	Δ 059 4	Δ 070 4
3 (.86 - .94)	998 90	082 92	084 90	085 90	Δ 086 4	Δ 087 4	084 88	088 90	089 90	090 90	091 90	092 90	093 90	094 90	095 90															108 90	109 90	Δ 110 4
4 (1.00 - 1.10)	985 108	122 101	123 108	125 100	126 100	Δ 127 4	124 101	128 105	129 108	130 108	131 108	132 105	133 105	135 105	137 105															148 100	149 100	150 100
5 (1.15 - 1.25)	997 117	162 119	163 117	166 125	167 120	168 115	164 120	168 120	169 120	170 120	171 120	172 120	173 120	175 120	177 120															188 110	189 110	190 125
6 (1.29 - 1.41)	201 135	202 137	203 135	205 130	206 138	207 135	204 135	208 132	209 132	210 132	211 132			215 135	Δ 216 4				Δ 219 4			222 134				225 140				228 130	229 132	230 138
7 (1.44 - 1.56)	994 144	242 146	243 144	246 150	247 150	248 149	244 149	248 150	249 144	250 144	251 144			255 150	256 152				259 152			262 144	263 154			265 150			268 150	269 154	270 150	
8 (1.58 - 1.72)	991 162	282 164	283 162	285 160	286 162	287 165	284 162	288 165						295 165	296 162	297 172			298 162	300 172		302 164	303 167			305 160	306 160		308 160	309 165	310 163	
9 (1.73 - 1.87)	990 180	322 173	323 180	325 180	326 175	327 180								335 180	336 182	337 185	338 182	339 185	340 185	341 182	342 174	343 179	344 174	345 180	346 185	347 180			348 176	349 175	350 175	
10 (1.88 - 2.02)	983 189	362 191	363 189	365 190	366 200	367 195	364 195	368 192	369 192	370 192	371 192	372 192	373 192	375 195	376 192	377 197	378 192	379 197	380 192	381 192	382 194	383 189	384 194	385 190	386 195	387 190			388 190	389 195	390 200	
11 (2.03 - 2.17)	987 207	402 209	403 207	405 210	406 212	407 210	404 210	408 207	409 207	410 207	411 210			415 210	416 212	417 210	418 212	419 210	420 210	421 212	422 204	423 204	424 210	425 210	426 210	427 210			428 209	429 213	430 213	
12 (2.18 - 2.32)	441 225	442 218	443 225	445 220	446 225	447 225								449 222	450 222	451 222	452 222	453 222	454 222	455 224	456 229	457 219	458 229	459 225	460 222	461 225			462 220	463 225	464 225	
13 (2.33 - 2.47)	481 234	482 236	483 234	485 238	486 240	487 240								489 242	490 242	491 242	492 242	493 242	494 242	495 242	496 242	497 242	498 242	499 242	500 242	501 242			502 242	503 242	504 242	
14 (2.48 - 2.62)	521 252	522 254	523 252	525 258	526 255	527 255								529 252	530 252	531 252	532 252	533 252	534 252	535 252	536 252	537 252	538 252	539 252	540 252	541 252			542 252	543 252	544 252	
15 (2.63 - 2.77)	556 263			558 275	559 270	560 270								562 272	563 272	564 272	565 272	566 272	567 272	568 272	569 272	570 272	571 272	572 272	573 272	574 272			575 272	576 272	577 272	
16 (2.80 - 2.94)	Δ 581 4	Δ 582 4	Δ 583 4	Δ 584 3	Δ 585 3	Δ 586 3	601 0.61	602 0.60	603 0.60	604 0.60	605 0.60	606 0.60	607 0.60	608 0.60	609 0.60	610 0.60	611 0.60	612 0.60	613 0.60	614 0.60	615 0.60								Δ 628 4	Δ 629 4	Δ 630 4	

- * Top 1/2 consist of ABC Type 2 with structural number of 25.
 - To be used for widening only.
 - Δ Based on minimum practical thickness.
 - Generally restricted to shoulder base construction.
- 900 Series option codes indicate base options which have been revised.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

OPTIONAL BASE GROUPS
AND STRUCTURAL NUMBERS

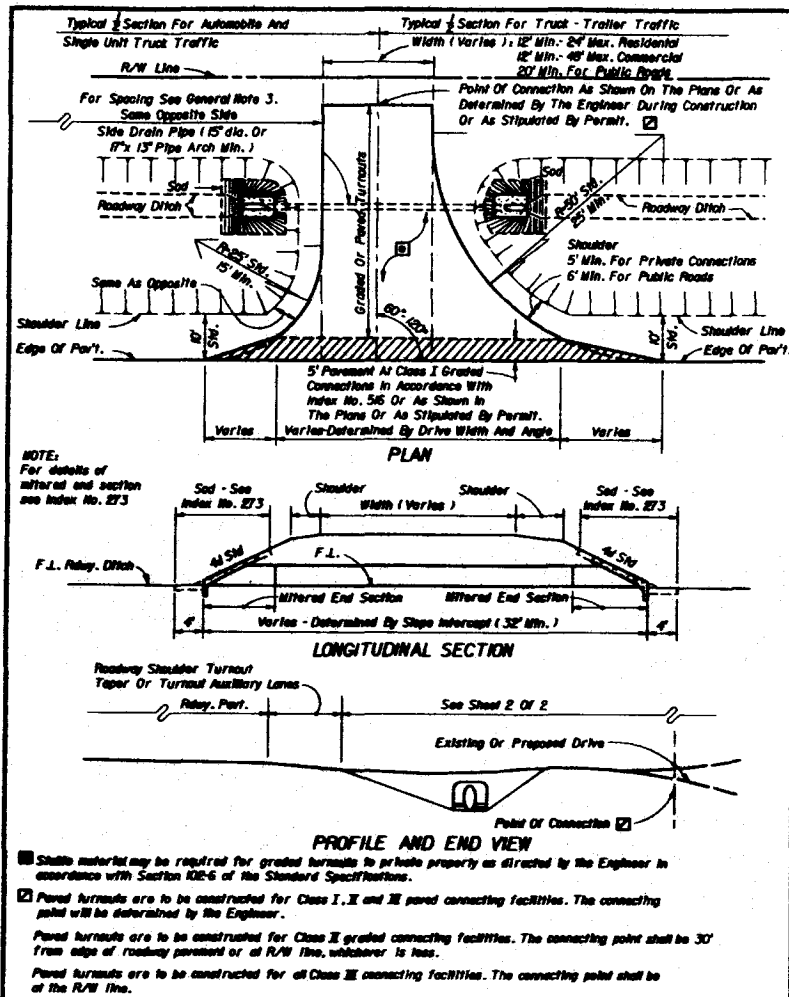
Designed By	Checked By	Drawn By	Reviewed By	Approved By
H.S.B.	H.S.B.	H.S.B.	H.S.B.	H.S.B.
10/79	10/79	10/79	10/79	10/79

F.A.R.A. Approved 10/79

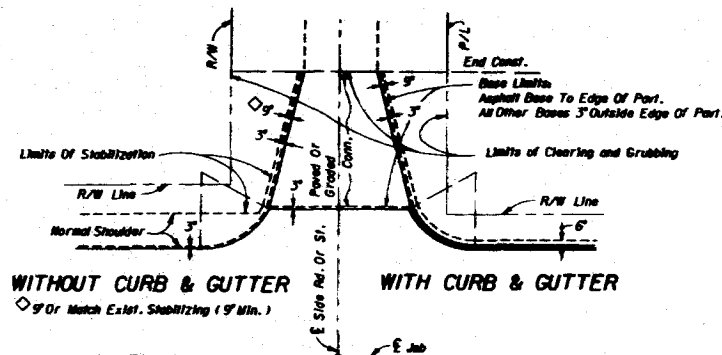
88

1 of 1

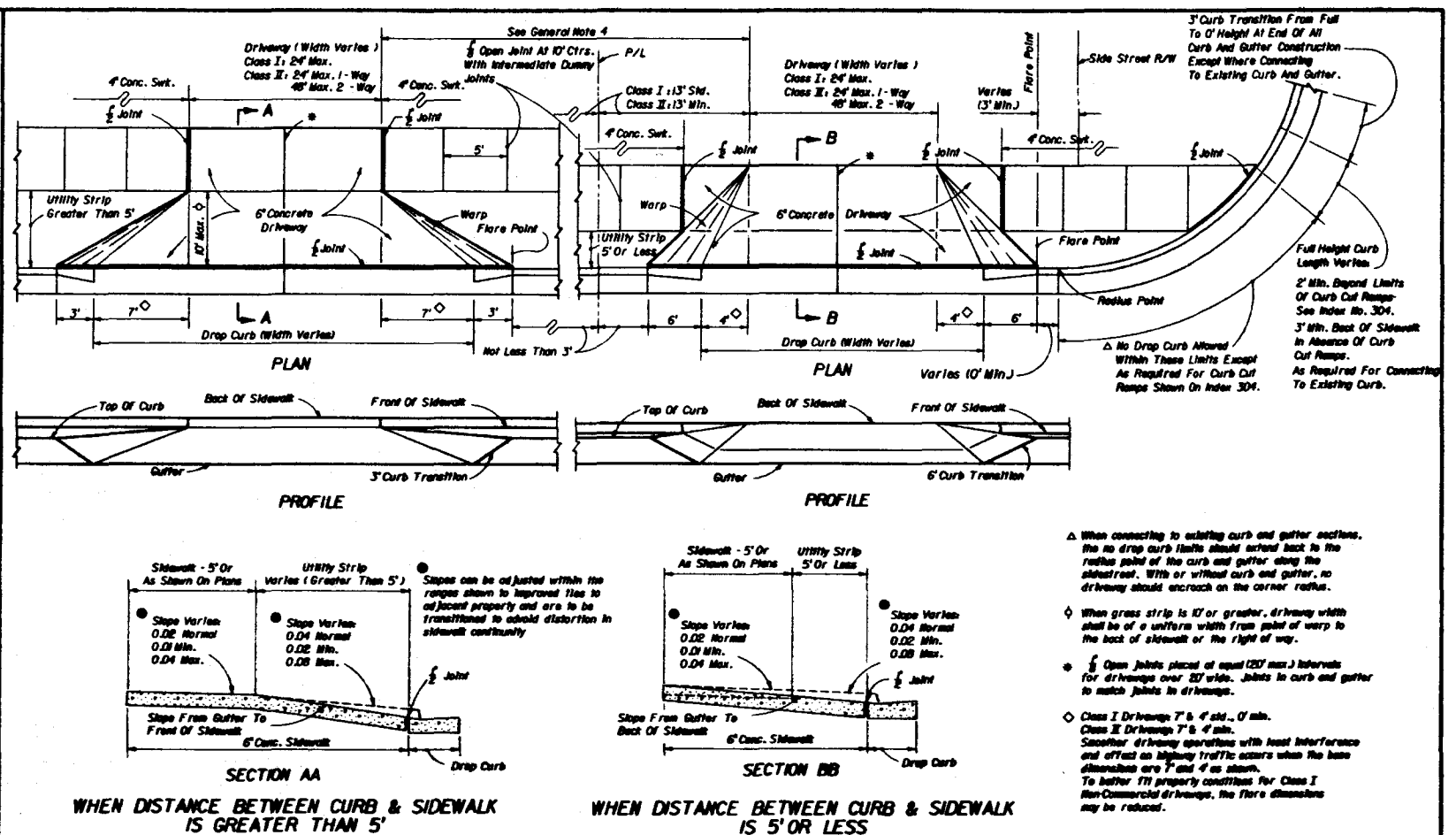
514



RURAL TURNOUT CONSTRUCTION



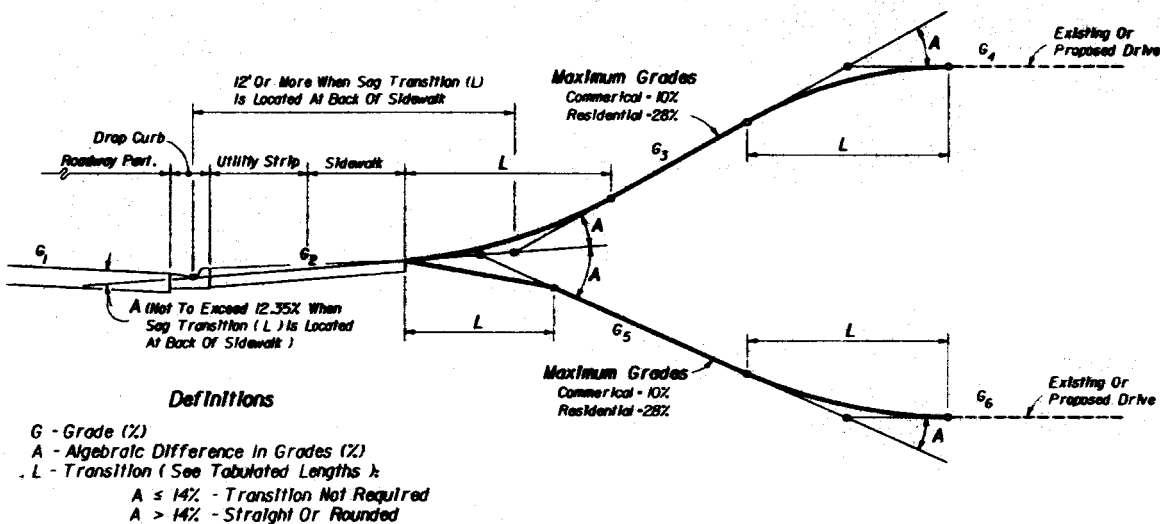
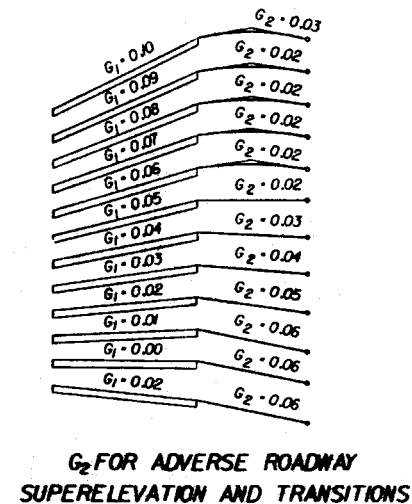
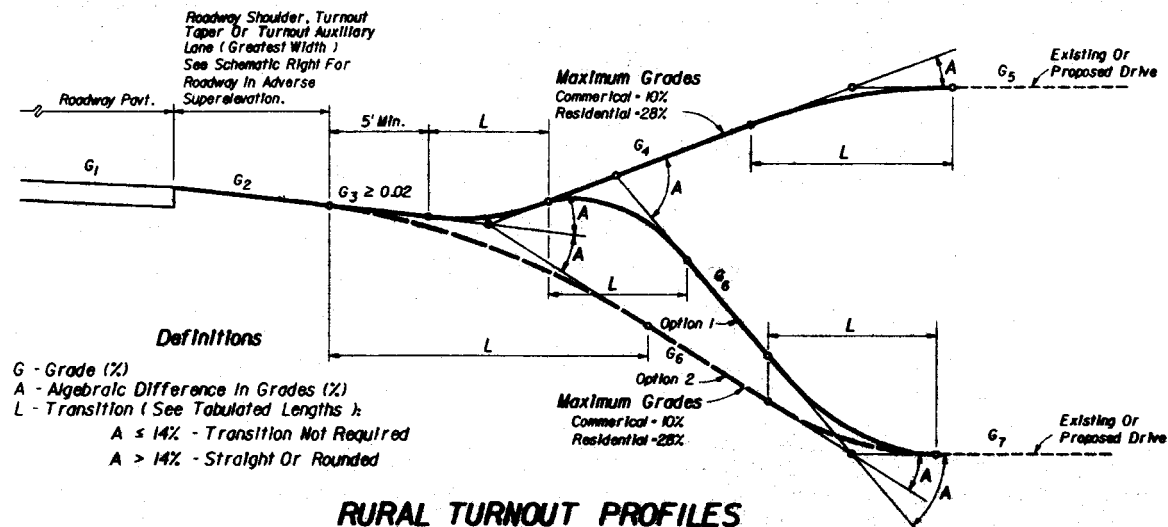
LIMITS OF CLEARING & GRUBBING AND STABILIZING AT INTERSECTIONS



GENERAL NOTES

- For turnout classifications see the manual entitled "Policy And Guidelines For Vehicular Connections To Roads On The State Highway System" date February 1985 and effective August 15, 1985. Information on this Index is in variance with the manual supersedes the information in the manual. The manual should be referred to for special applications, and, for exceptions due to extreme conditions.
- No driveways, turnouts, or side drains are to be constructed without compensation for materials from the owner except for replacement of approved driveways, turnouts, and/or side drains existing at the time of beginning of roadway construction and if desired by the owner. All new or reconstructed driveways, turnouts, and side drains must conform to the size limits indicated above.
- In rural areas where the abutting property owner desires installation of turnouts and provided there is adequate frontage for proper driveway separation, the Department will construct or will allow the construction of a maximum of two 24' (Class I, or 2-Way), two 24' (Class II, or 1-Way) or two 48' (Class II or III, 2-Way) turnouts along the same frontage with a minimum of 25' of space between them. For more desirable width and spacing, flouting conditions and for exceptions see the manual.
- In urban areas, at the request of the abutting property owner or his assignee, and provided there is adequate frontage for proper driveway separation, the Department will construct or will allow the construction of a maximum of two 24' (Class I, or 2-Way), two 24' (Class II, or 1-Way) or two 48' (Class II or III, 2-Way) turnouts along the same frontage with a minimum of 25' of space between them. For more desirable width and spacing, flouting conditions and for exceptions see the manual.
- Class III turnouts in urban areas are to be constructed as intersecting streets with curb and gutter.
- In both urban and rural areas, wherever dual driveways are allowed, that portion of the right-of-way between the drives and outside the pavement limits of the highway shall be maintained as a "No-Parking-Area".
- Stabilized subgrade not required for paved turnouts to private property.
- For details of drop curb see Index No. 300.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TURNOUTS					
Designed By	Checked	Station	Approved By	Date	
Drawn By	ASD/DES	05/85	[Signature]	State Road Engineer, Roadways	
Checked By	ASD/BLR	10/85		Revision No.	Sheet No.
F.J.R.A. Approved			12/01/76	00	1 of 2
					515



RECOMMENDED TRANSITION LENGTHS (L) (FT)								
A	CRESTS				SAGS			
	STRAIGHT		ROUNDED		STRAIGHT		ROUNDED	
	Desirable	Minimum	Desirable	Minimum	Desirable	Minimum	Desirable	Minimum
6-13%	3	0	5	0	3	0	5	0
14%	3	0	10	0	3	0	10	0
15%	3	2.5	10	3	5	3	10	5
16%	5	3	10	4	6	4	10	6
17%	6	3.5	10	5	8	5	10	7
18%	6	4	10	6	9	6	10	8
19%	7	4.5	10	7	11	7	12	9
20%	8	5	11	8	12	8	13	10
21%	9	5.5	12	9	13	8.5	14	11
22%	10	6	13	10	14	9	16	12
23%	10	6.5	14	10.5	14	9.5	16	12.5
24%	11	7	15	11	15	10	17	13
25%	12	7.5	15	11.5	16	10.5	18	13.5
26%	12	8	16	12	17	11	18	14
27%	13	8.5	17	12.5	17	11.5	19	14.5
28%	14	9	17	13	18	12	20	15
29%	NA	NA	22	14	NA	NA	21	17
30-33%	NA	NA	23	15	NA	NA	22	18
34-36%	NA	NA	24	16	NA	NA	23	20
37-38%	NA	NA	26	17	NA	NA	25	21
39-42%	NA	NA	27	18	NA	NA	26	22
42-43%	NA	NA	29	19	NA	NA	28	24
44-46%	NA	NA	30	20	NA	NA	29	25
47-48%	NA	NA	32	21	NA	NA	31	26
49-51%	NA	NA	33	22	NA	NA	32	27
52-54%	NA	NA	34	23	NA	NA	34	28
55-56%	NA	NA	36	24	NA	NA	35	30
57-58%	NA	NA	37	25	NA	NA	36	31

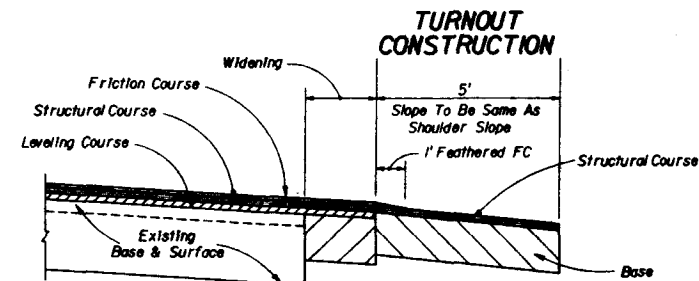
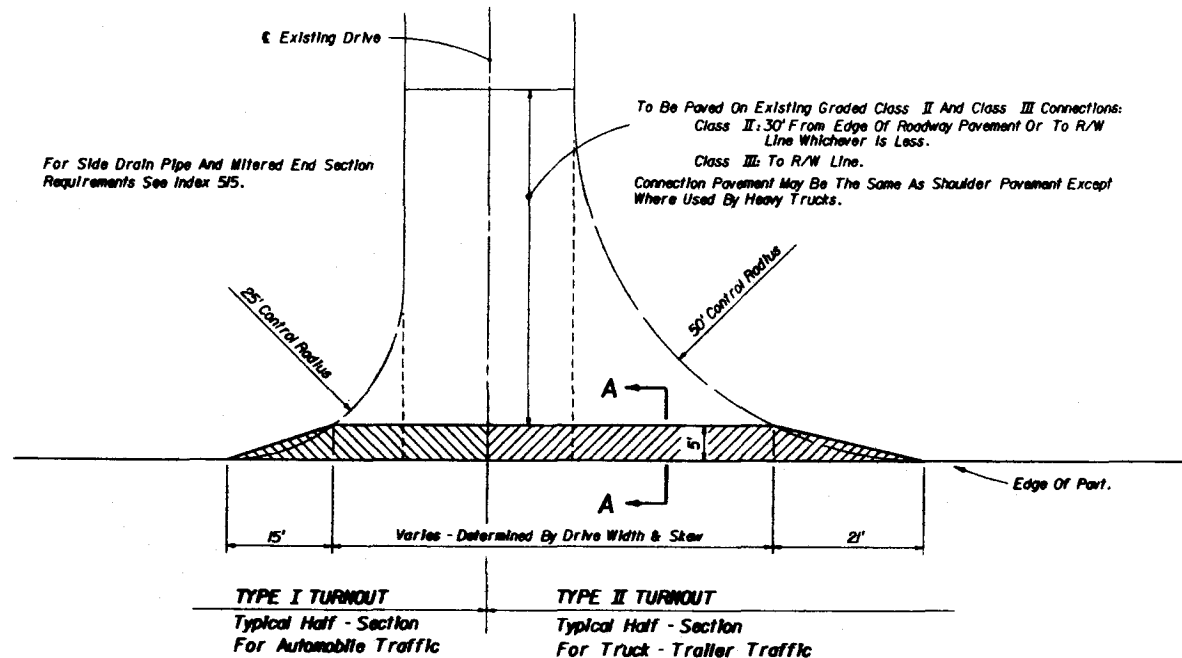
Rounded: Either circular, parabolic or spline curvature. The plans or the Engineer may specify a particular type of curvature.
Desirable: Desirable minimum lengths. Greater lengths than minimum and desirable are recommended where practical for flatter and smoother profile.
Minimum: Absolute minimum lengths.

GENERAL PROFILE AND STORMWATER RUNOFF NOTES

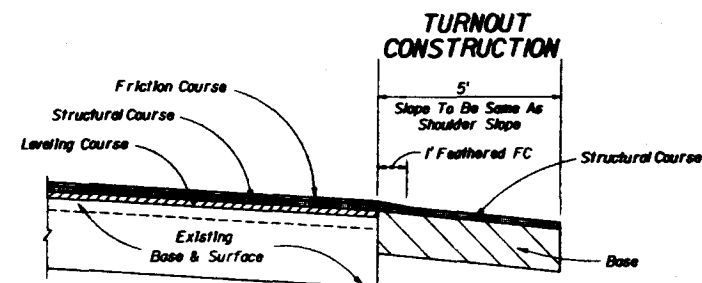
1. Turnout construction shall cause no water to flow on or across the roadway pavement, pond on or cause erosion within the state right-of-way. On all rural turnouts the transition (L) nearest the roadway shall be sloped or crowned to direct stormwater runoff to the roadside ditch. Inlets, flumes or other runoff control devices shall be considered when runoff volumes are sufficient to cause erosion of the turnout shoulder. Urban turnouts also may require similar runoff control features to properly direct and control the stormwater runoff.
2. The Option 1 profile is intended for locations where roadway, turnout taper and auxiliary lane stormwater runoff volumes are relatively large. The Option 2 profile is intended for locations where runoff volumes are relatively small and/or where there is no roadside ditch.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TURNOUTS					
Designed By	Drawn By	Checked By	Approved By		
Drawn By	152	05/02		State Engineer/Inspector/Assistant	
Checked By	JAG	05/02		Revision No.	Sheet No.
F.H.R.A. Approved: 05/25/02			05	2 of 2	515

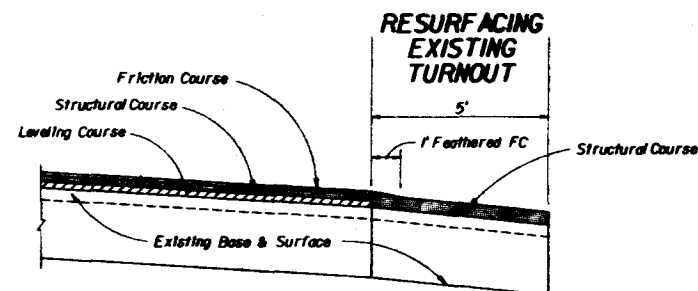
For Side Drain Pipe And Mitered End Section Requirements See Index 515.



SECTION AA WITH WIDENING



SECTION AA



SECTION AA

GENERAL NOTES

1. Turnouts are to be constructed or resurfaced for Class I connections as directed by the Engineer.
2. Turnout construction not required with paved shoulders for Class I connections.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit price, Turnout Construction, to include excavation and base.
5. Payment for structural course to be included in roadway resurfacing pay item.
6. Payment for feathering friction course to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering not required for FC - 2 friction course.
7. For low volume two-lane facilities without a friction course the structural course is replaced by a surface course.

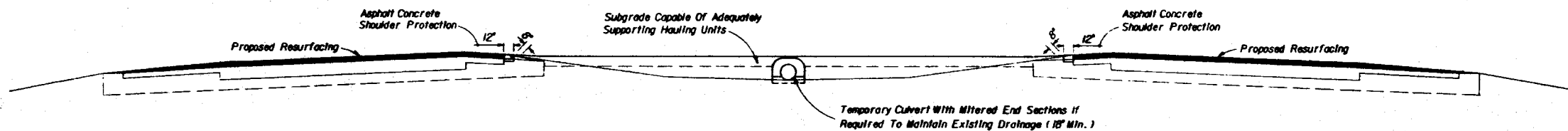
QUANTITIES FOR ONE TURNOUT (Sq.Yd.)				
Drive Width (Ft.)	Intersection			
	Normal Type I	Normal Type II	Skewed Type I	Skewed Type II
12	26	51	31	60
14	27	52	33	61
16	28	53	34	63
18	29	54	35	64
20	31	55	37	65
22	32	56	38	67
24	33	57	39	68
26	34	58	40	69
28	35	59	42	70
30	36	61	43	72
32	37	62	44	73
34	38	63	46	74
36	39	64	47	76
38	41	65	48	77
40	42	66	49	78
42	43	67	51	79
44	44	68	52	81
46	45	69	53	82
48	46	71	55	83
50	47	72	56	85
52	48	73	57	86
54	49	74	58	87
56	51	75	60	88
58	52	76	61	90
60	53	77	62	91

TURNOUT PAVEMENT STRUCTURE MINIMUM REQUIREMENTS		
COURSE	MATERIAL	MINIMUM THICKNESS
Structural	Asphaltic Concrete	1"
Base	Unrock LBR 100	4"
	Cemented Coquina	4"
	ABC - 1 (Marshall 500)	3"
	ABC - 2 (Marshall 750)	3"
	ABC - 3 (Marshall 1000)	3"
	Soil Cement (Plant Mix)	4"
	Bank Run Shell	4"
	Sand - Clay LBR 70	5"
	Shell LBR 70	5"
	Soil Cement (Road Mix)	6"

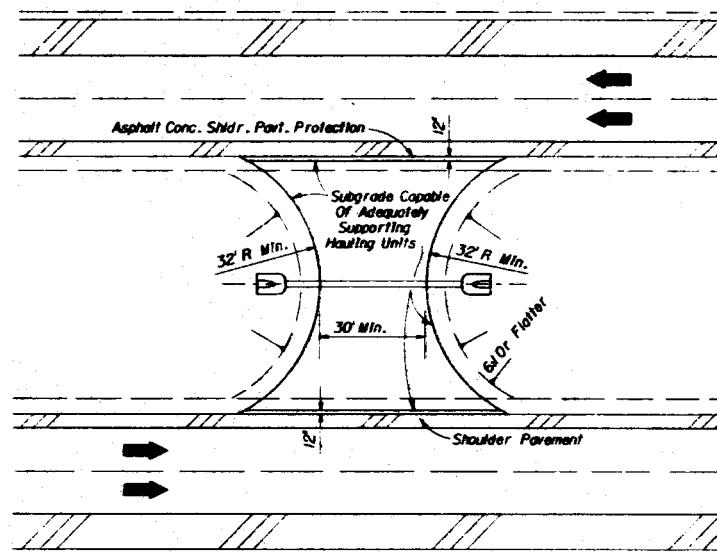
Notes:

1. Turnout structural course to be the same material as roadway leveling or structural course. Structural course not required if asphalt base course is used.
2. Any Department approved pavement structure equivalence may be used at the discretion of the Engineer.
3. Additional structural strength may be required if heavy truck loads are anticipated.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TURNOUTS RESURFACING PROJECTS					
Designed By	DES	DATE	5/77	Approved By	<i>[Signature]</i>
Drawn By	MDI	DATE	5/77	Checked By	<i>[Signature]</i>
Checked By	JAC	DATE	5/77	Revision No.	Sheet No.
F.L.R.A. Approved		05/23/02	88	1 of 1	516



SECTION



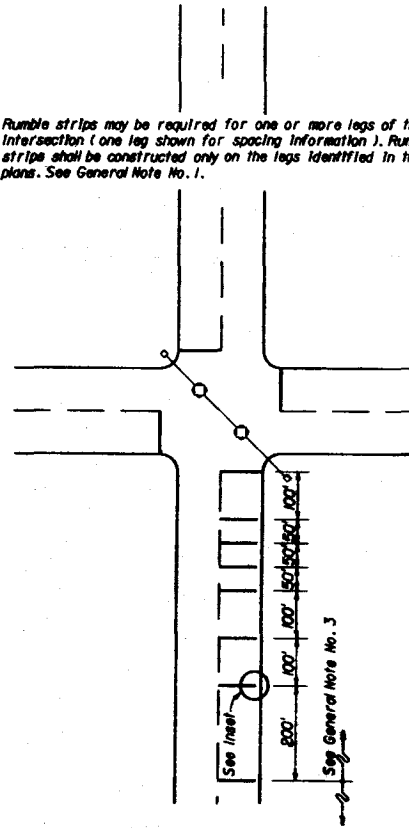
PLAN

NOTES :

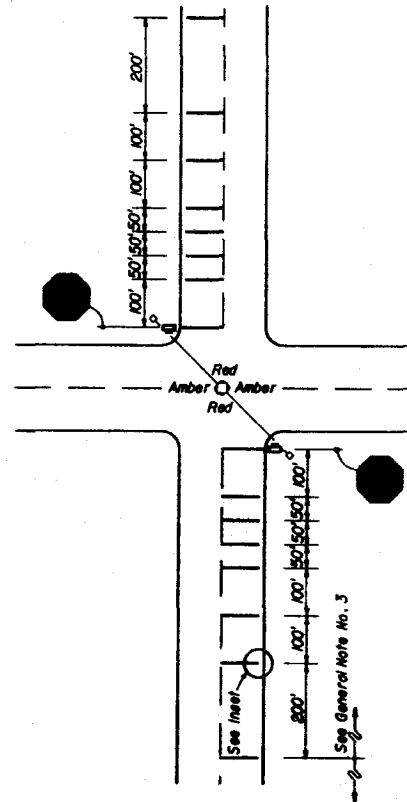
1. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area restored to its original condition.
2. Cost of all construction, maintenance, removal and restoration work related to temporary crossovers shall be included in the contract unit price for Maintenance of Traffic LS.
3. Crossovers to be constructed where sight distance is adequate in both directions as directed by the Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TEMPORARY CROSSOVER CONSTRUCTION DETAILS RURAL			
Designed By	Drawn By	Checked By	Approved By
			State Design Engineer / Signature
Revision No.	Sheet No.	Index No.	
F.J.M.A. Approved: 10/07/80	88	1 of 1	517

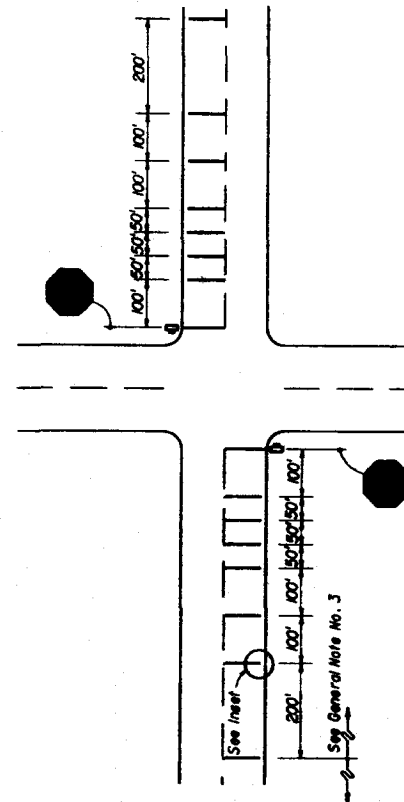
Note: Rumble strips may be required for one or more legs of the intersection (one leg shown for spacing information). Rumble strips shall be constructed only on the legs identified in the plans. See General Note No. 1.



SIGNALIZED



FLASHING BEACON



TWO - WAY STOP

INTERSECTIONS

GENERAL NOTES

1. Rumble strips shall be constructed at all structures with less than full width shoulders. Rumble strips at intersections shall be constructed only when specified in the plans.
2. Rumble strips are to be constructed in accordance with Section 546 of the Specifications.
3. When any portion of a curve falls within the limit of rumble strips shown in these details, additional rumble strip sets spaced at 200' centers shall be constructed beyond those detailed, throughout the approaching curve.
4. Rumble strips shall be paid for under the contract unit price for Rumble Strips, Per Set. Such price and payment shall be full compensation for all work and materials required.

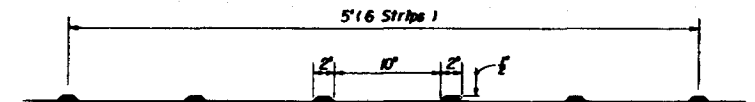
Rumble strips shall be paid for per set without any adjustment due to width of pavement receiving the strips or length of strips.

See Index No. 17359
For ReflectORIZED Strips

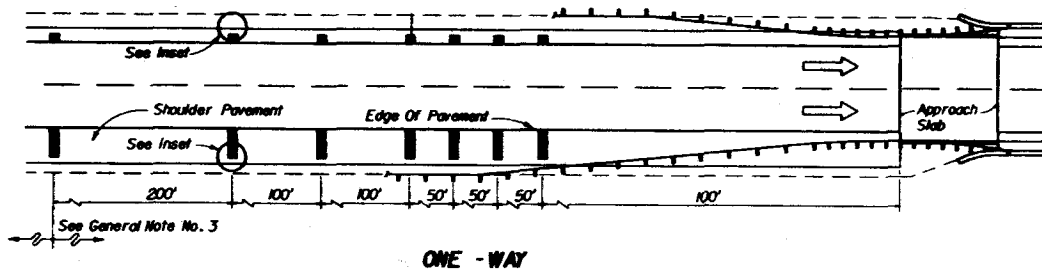
Edge Of Pav't.
Or Paved Shldr.

d=0' For Limited Access Highways, Including Ramps
d=1.5' For Other Highways With Shoulder Pavement 4' Or Wider
d=1.5' For At Grade Intersections

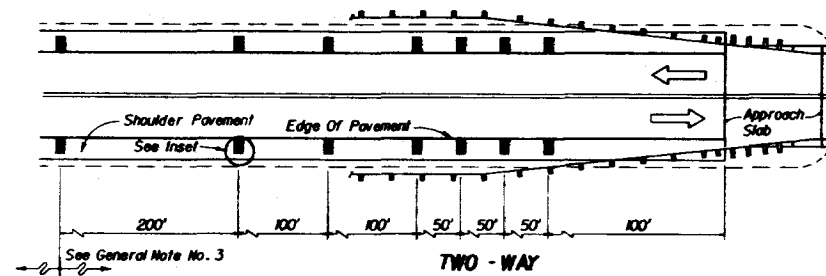
INSET



RUMBLE STRIP SET



ONE - WAY

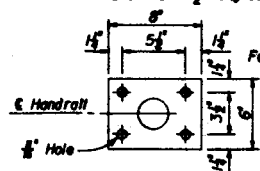


TWO - WAY

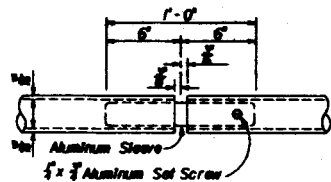
STRUCTURES WITH LESS THAN FULL WIDTH SHOULDERS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RUMBLE STRIPS			
Designed By	REB/CAS	Checked By	12/18
Drawn By	JW	Approved By	12/18
Checked By	12/18	Project No.	518
F.A.R.A. Approved		Sheet No.	1 of 1

Aluminum R. 8" x 6" x 1/2" Alloy 6061-T6



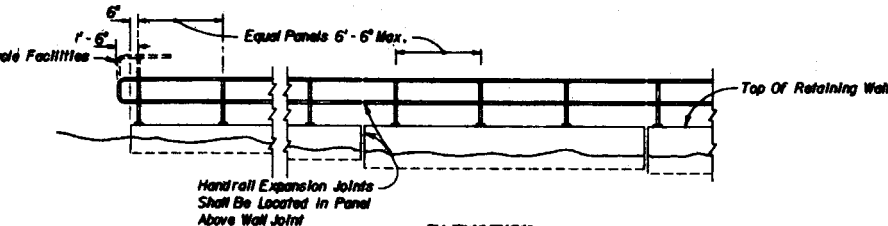
BASE PLATE



EXPANSION JOINT

NOTES

1. All fixed joints to be either welded all around and ground smooth or standard pipe roll fittings at the contractors option. Posts shall be connected to base by weld only. Weld filler to be alloy ER5356, ER5556 or ER5883.
2. Nuts, washer, and bolts to be hot dip galvanized in conformance with ASTM A-153. After the nuts have been tightened, the anchor bolt threads shall be distorted or the nuts and bolts spot welded and coated with zinc compound.

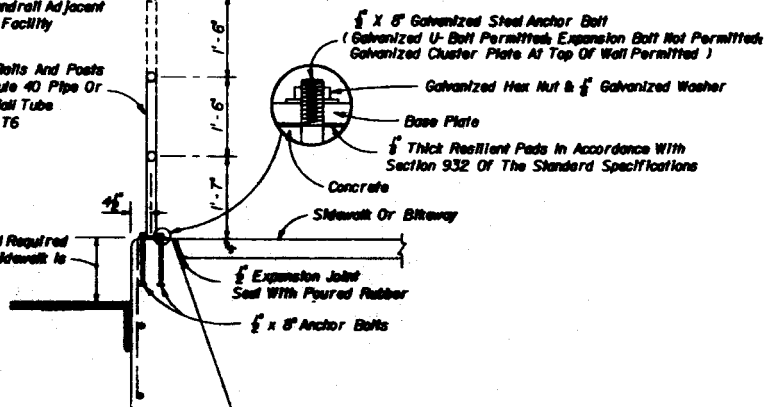


ELEVATION

Additional Post When Plans Indicate Handrail Adjacent To Bicycle Facility

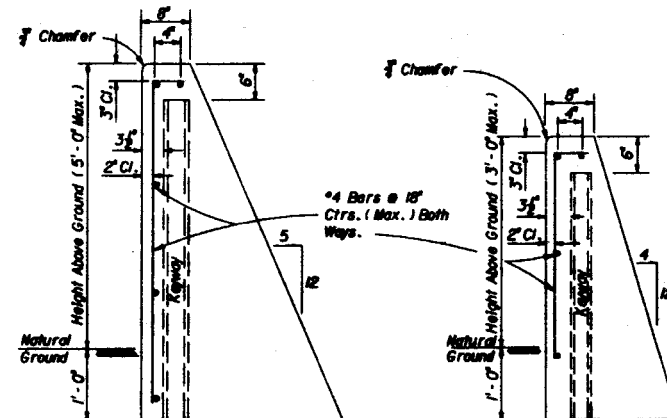
Aluminum Rods And Posts 2" x Schedule 40 Pipe Or 2 1/2" x 1/2" Wall Tube Alloy 6061-T6

Handrail And Gravity Wall Required When Dropoff Back Of Sidewalk Is More Than 10'



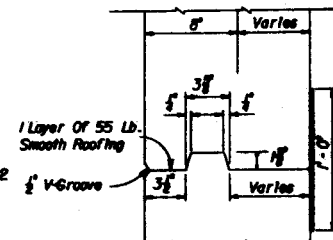
TYPICAL SECTION AT POST

ALUMINUM HANDRAIL ON GRAVITY WALL



SECTION

SECTION



2 - Layers Of 55 lb. Smooth Roofing (Map All Contact Surfaces Of Concrete And Roofing With Cut-Back Asphalt. Stop Roofing Paper 6" Below Top Of Wall.)

KEY DETAIL

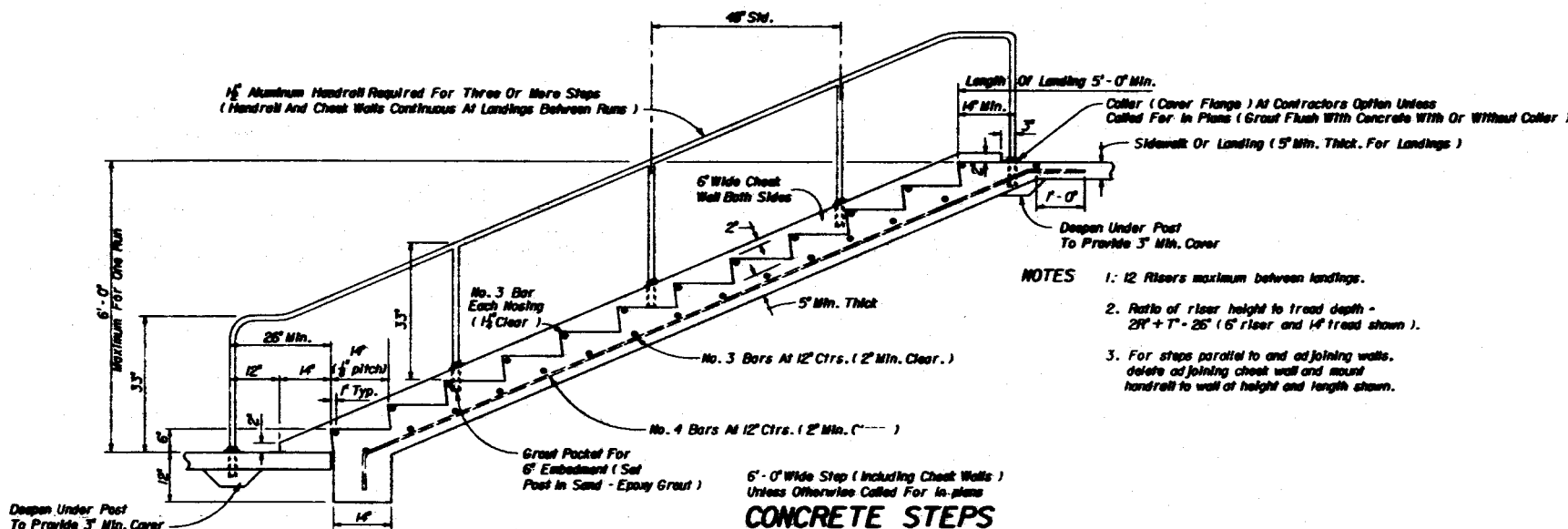
All wall joints to be equally spaced with 30'-0" max. centers. Keying to stop 6" below top of wall.

NOTES

1. Gravity walls constructed as extensions of reinforced concrete retaining walls, except walls of proprietary design, shall have the same face texture and finish as the reinforced concrete retaining wall.
2. Cost of reinforcing steel and face texture and finish to be included in the contract unit price for Class I Concrete (Retaining Walls) C1.

HEIGHT ABOVE GROUND	ESTIMATED QUANTITIES FOR WALL PER LINEAR FOOT OF WALL	
	CLASS I CONCRETE (CY)	STEEL (LB)
2'	13	4
3'	20	5
4'	32	6
5'	43	7

GRAVITY WALL

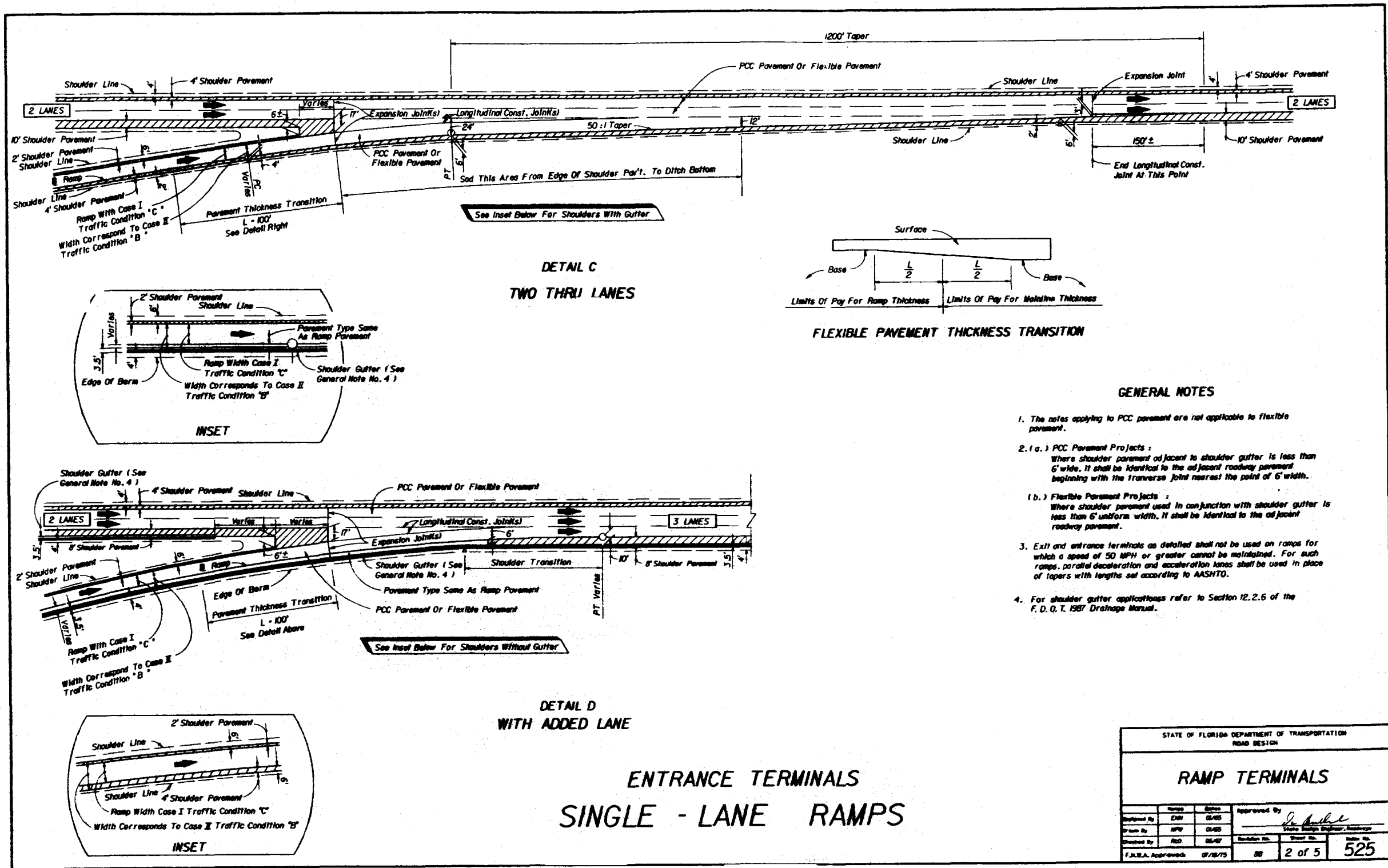


NOTES

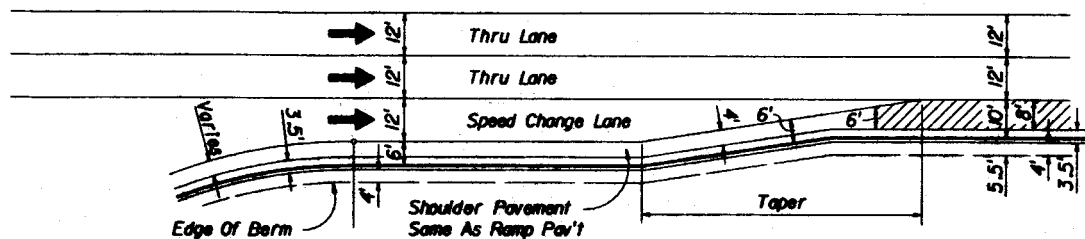
1. 12 Ribs maximum between landings.
2. Ratio of riser height to tread depth - $2R + T = 26$ (6" riser and 14" tread shown).
3. For steps parallel to and adjoining walls, delete adjoining cheek wall and mount handrail to wall of height and length shown.

CONCRETE STEPS

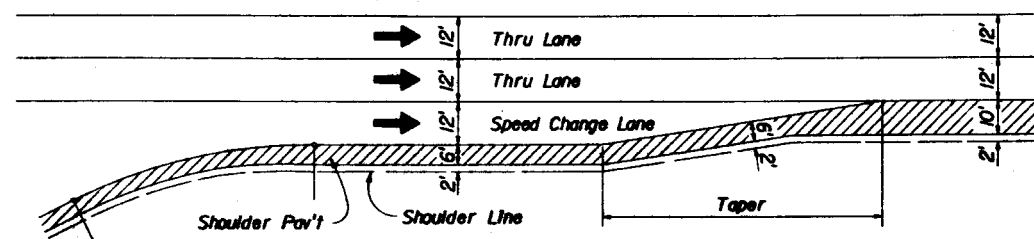
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
WALLS, HANDRAILS & STEPS			
Designed By	Checked By	Approved By	
Drawn By	CR	02/88	
Reviewed By	FWC	02/88	
F.I.R.A. Approved	02/28/75	BY	1 of 1
			520



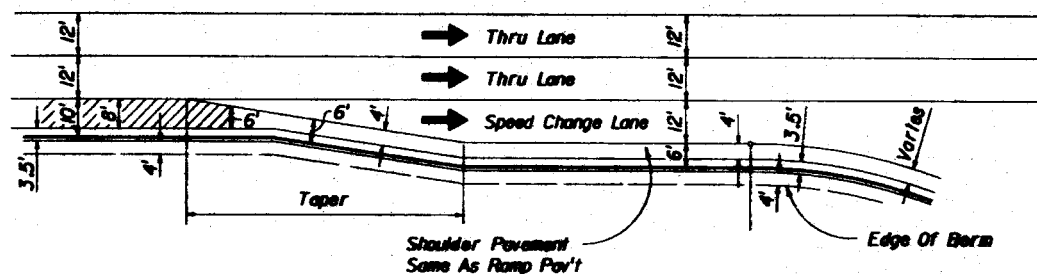
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAMP TERMINALS					
Designed By	ENR	Date	01/85	Approved By	<i>[Signature]</i>
Drawn By	MPV	Date	01/85	Checked By	<i>[Signature]</i>
Checked By	RD	Date	05/87	Revision No.	Sheet No.
F.H.S.A. Approved 07/10/75				BB	2 of 5
					525



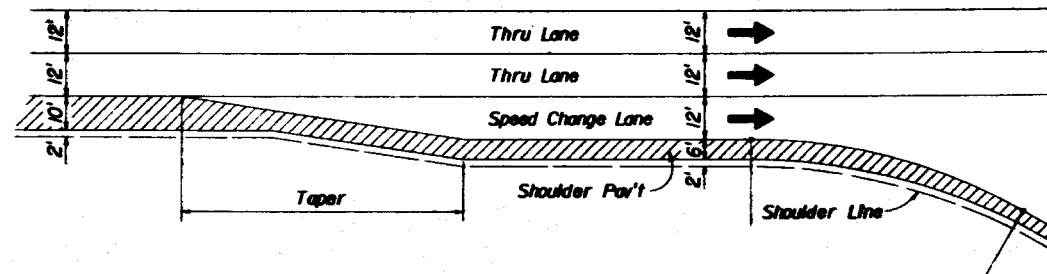
ACCELERATION LANE WITH SHOULDER GUTTER



ACCELERATION LANE WITHOUT SHOULDER GUTTER



DECELERATION LANE WITH SHOULDER GUTTER

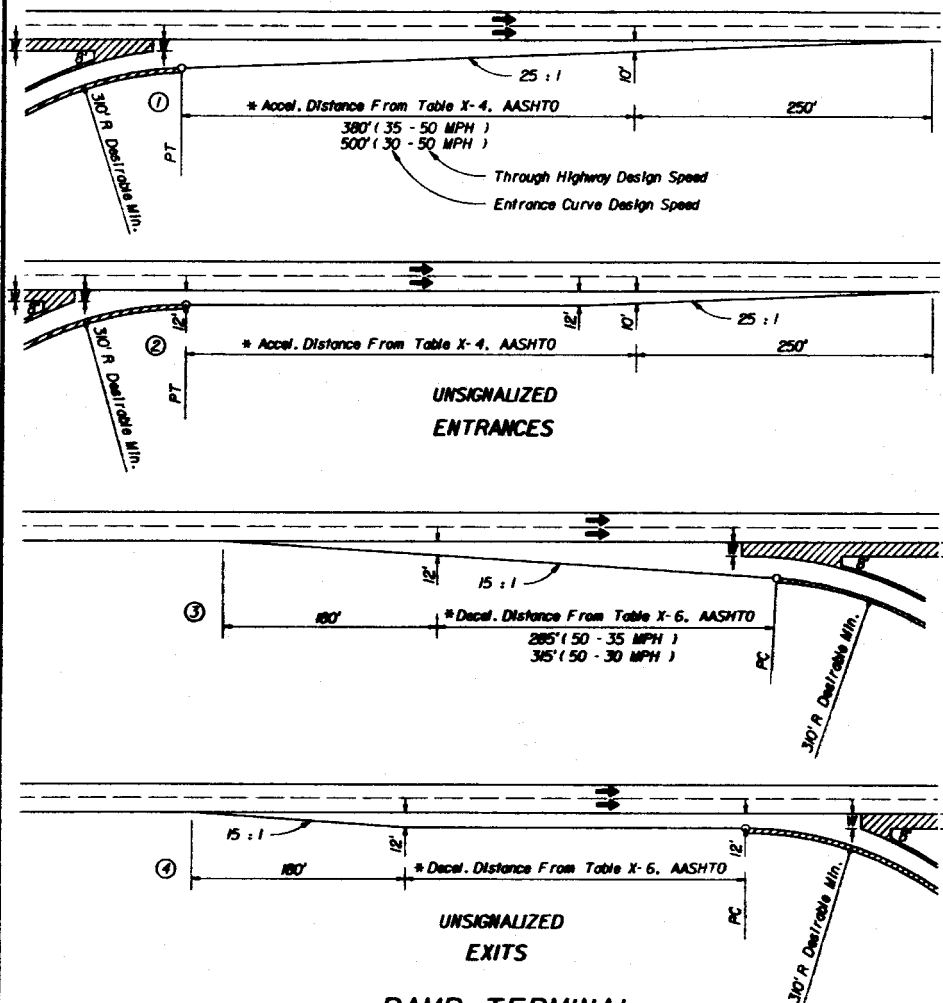


DECELERATION LANE WITHOUT SHOULDER GUTTER

SHOULDER TREATMENT AT SPEED CHANGE LANES AT EXPRESSWAY RAMP TERMINALS

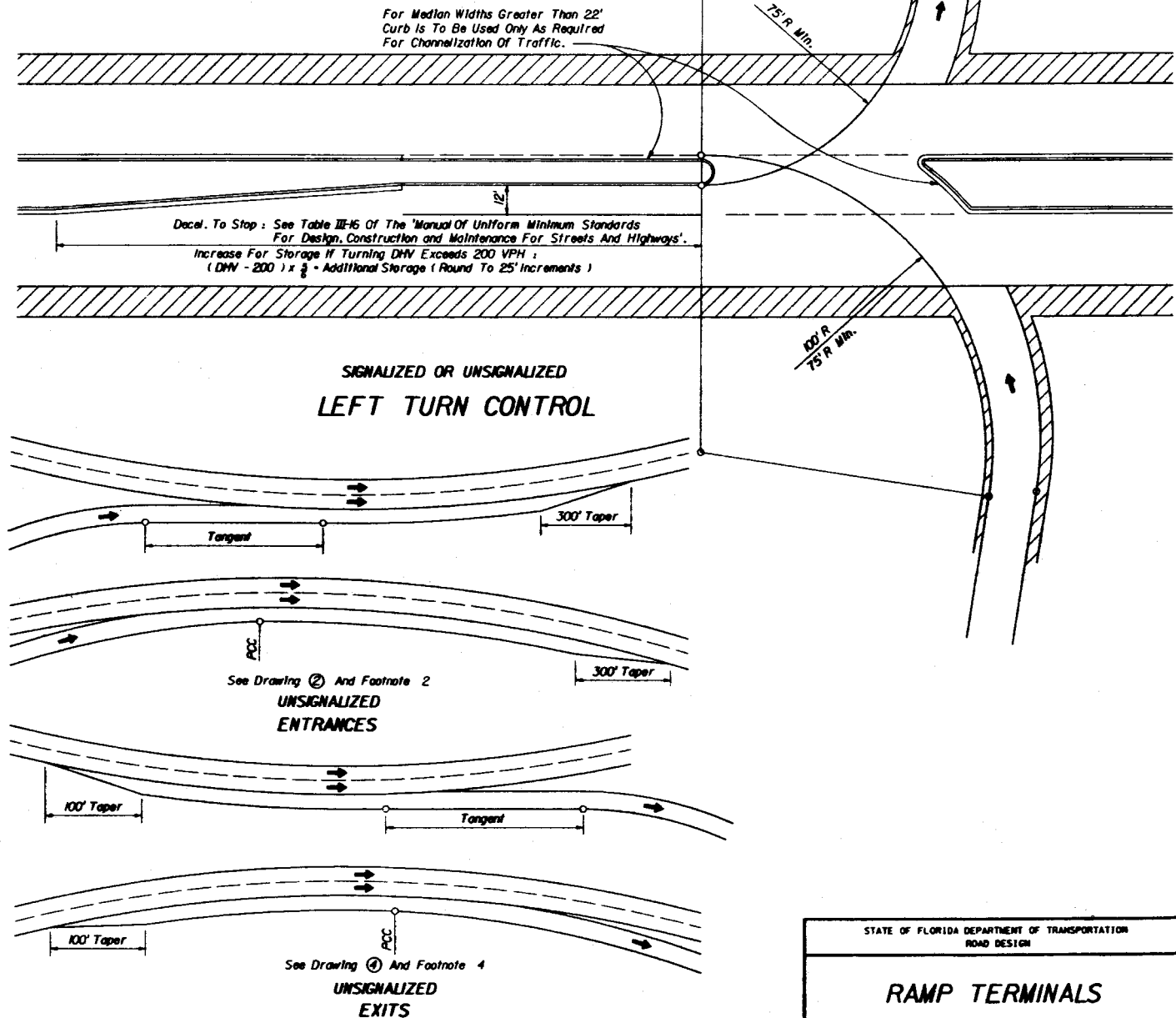
EXPRESSWAY RAMP TERMINALS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAMP TERMINALS			
Designed By	Drawn By	Checked By	Approved By
EDM	HPW	05/85	<i>[Signature]</i>
Drawn By	HPW	05/85	State Design Engineer, Roadway
Checked By	HPW	05/85	State Design Engineer, Roadway
Drawn By	HPW	05/85	State Design Engineer, Roadway
F.A.R.A. Approved	07/18/75	4 of 5	525



FOOTNOTES:

- W Normal shoulder pavement width
- * Adjust for grades if greater than 2% (See Table X-5, AASHTO).
- Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.
 - Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.
 - Standard cross road exit terminal. To be used when roadway alignment is tangent.
 - Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 60% of the thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.

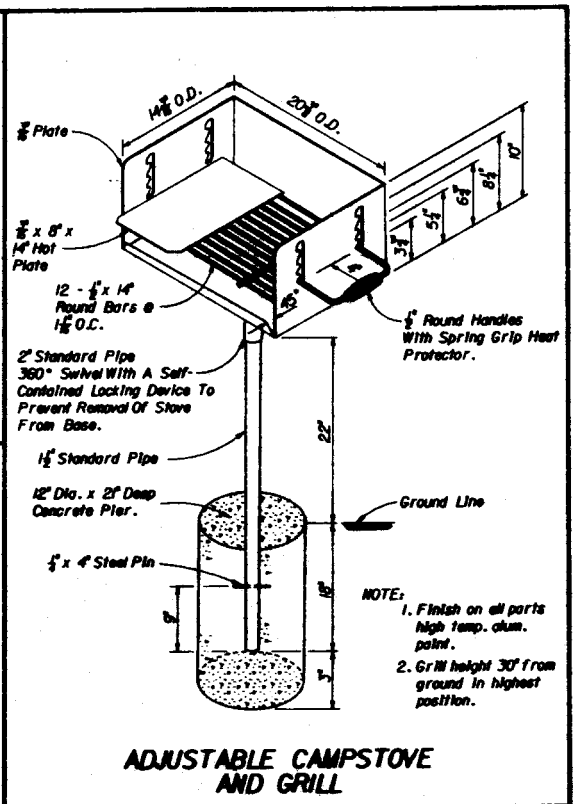
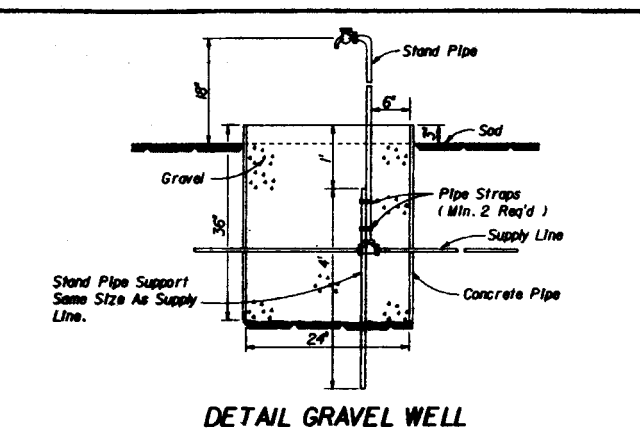
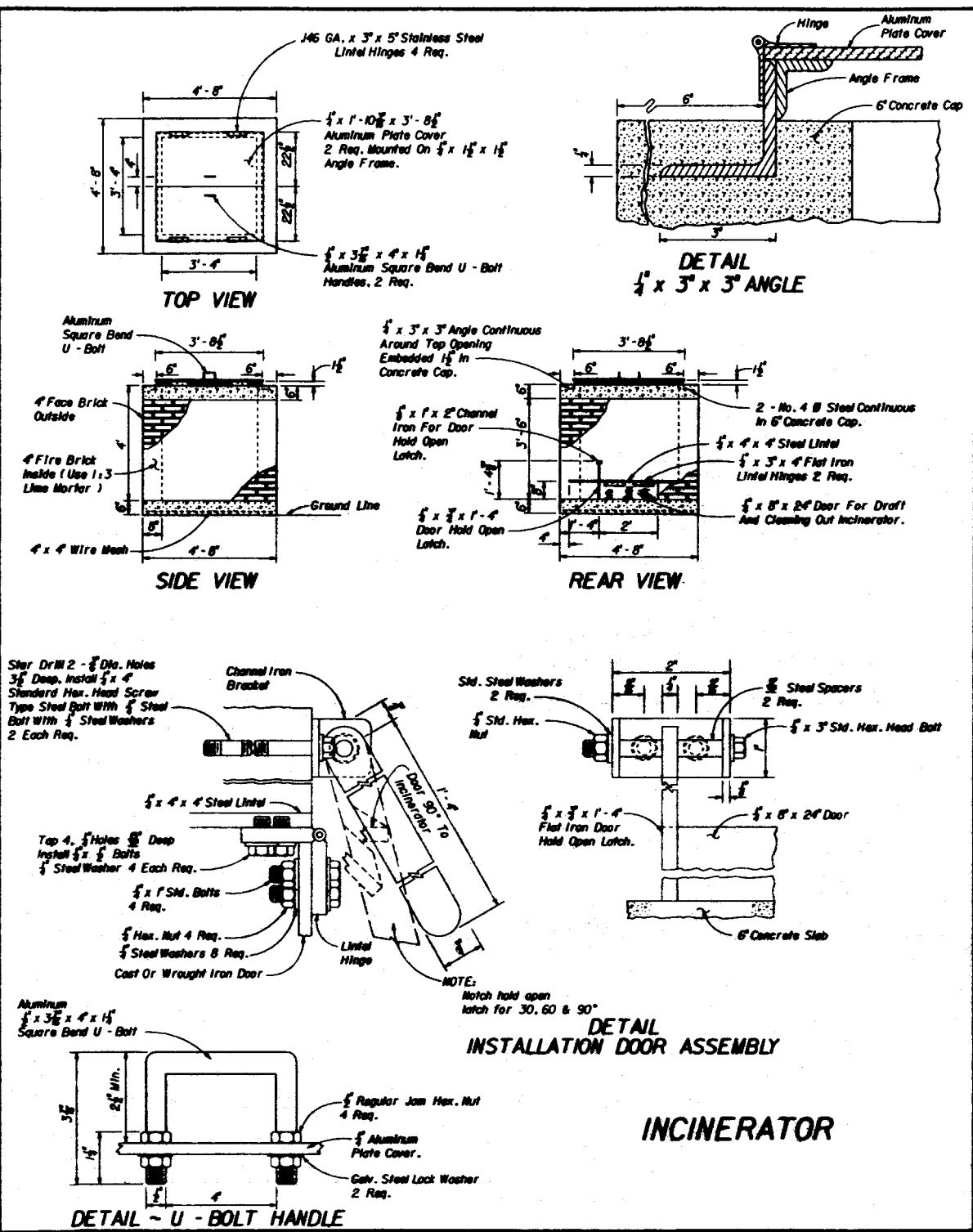


NOTE: Entrances and exits on curves should be avoided when possible.

ENTRANCES AND EXITS ON CURVES

CROSSROAD TERMINALS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAMP TERMINALS			
Designed By ENR	Date 1/85	Approved By <i>[Signature]</i>	
Drawn By APW	Date 1/85	State Bridge Engineer, Roadways	
Checked By RLD	Date 6/87	Revision No.	Sheet No.
F.J.M.L.A. Approved	7/25/75	88	5 of 5
			525



GENERAL NOTES

1. For details of chain link fence at rest area locations see Index No. 452.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
REST AREA EQUIPMENT					
Designed By	Drawn By	Checked By	Approved By	Scale	Sheet No.
AW	AW	AW	J. J. J.	1/4" = 1'	1 of 1
Drawn By	Checked By	Approved By	Scale	Sheet No.	Index No.
AW	AW	J. J. J.	1/4" = 1'	1 of 1	530
F.J.B.A. Approved 05/25/75					

GENERAL NOTES

1. The location and construction of mailboxes shall conform to the rules and regulations of the United States Postal Service as modified by this design standard.

2. Mailboxes will not be permitted on Interstate highways, freeways, or other highways where prohibited by law or regulation.

3. The contractor shall give the Postmaster of the delivery route(s) written notice of project construction 7 days prior to the beginning of work, with Saturdays, Sundays and Holidays excluded.

The Contractor shall furnish and install one mailbox in accordance with this design standard at each mail patron delivery location and maintain the box throughout the contract period. The Contractor shall apply box numbers to each patron box in accordance with Identification specifications of the Domestic Mail Manual of the U. S. Postal Service; where local street names and house numbers are authorized by the Postmaster as a postal address, the Contractor shall inscribe the house number on the box; if the box is located on a different street from the patrons residence, the Contractor shall inscribe the street name and house number on the box.

The Contractor shall coordinate removal of the patrons existing mailboxes. Immediately after installing the new mailboxes the Contractor must notify each "Mail Delivery Patron" by Certified Mail that removal of the existing mailboxes must be accomplished in 21 days after receipt of notices. Patrons shall have the option of removing their existing mailboxes or leaving the mailboxes in place for removal by the Contractor; removal by the Contractor shall be included in the contract unit price for Mailbox, Each. The Contractor shall dispose of mailboxes and supports in areas provided by him.

Reuse of existing mailboxes by the Contractor will not be a requirement under any construction project; however where an existing mailbox meets the design requirements of this standard and is structurally and functionally sound, the Contractor at his option may elect to reuse the existing mailbox in lieu of constructing a new mailbox. Any use of existing mailboxes must be approved by the Engineer.

4. Mailboxes shall be metal construction only, in traditional style only, and only in size as prescribed by the Domestic Mail Manual of the U. S. Postal Service.

Mailbox production standards, approved manufactured boxes, design approval and guidance may be obtained by writing to the Rural Delivery Division, Delivery Service Department, Operations Group, USPS Headquarters, Washington, DC 20260.

5. Mailboxes shall be located on the right-hand side of the roadway in the direction of the delivery route, except on one-way roads and streets where they may be placed on the left-hand side.

Mailboxes on rural highways shall be set with the post at the shoulder point, except for shoulders less than 9' in width the face of the box shall be no closer than 8' from the edge of the driving lane except as noted below.

Mailboxes on low volume (ADT less than 100 vpd), low speed (40 mph or less) rural highways shall be offset with the face of the box at the shoulder point but not closer than 6'-8" from the edge of the driving lane; however, on these low volume low speed highways where shoulders lack sufficient width to accommodate stopped vehicles, mailboxes shall be offset with the face of the box at the shoulder point but not closer than 2'-8" from the driving lane.

When a mailbox is installed within the limits of guardrail it should be placed behind the guardrail whenever practical.

Mailboxes on curbed highways, roads and streets shall be set with the face of the box between 6" and 12" back of the face of curb.

6. Mailboxes shall be set with the bottom of the box between 42" and 48" above the mail stop surface, unless the U.S. Postal Service establishes other height restrictions.

7. No more than two mailboxes may be mounted on a support structure unless the support structure and mailbox arrangements have been shown to be safe by crash testing and approved by the State Design Engineer, Roadways.

Neighborhood Delivery and Collection Box Units (NDCBU) are a specialized multiple mailbox installation that must be located outside the highway and street clear zones. The location of NDCBUs is the sole responsibility of the Postmaster for the delivery route under consideration.

8. Lightweight newspaper receptacles may be mounted below the mailbox on the side of the support post in conformance with the USPS Domestic Mail Manual. The mail patron shall be responsible for newspaper receptacle installation and maintenance.

9. Wood and steel support posts for both single and double mailbox mountings shall be embedded no more than 24" into the ground.

Concrete, block, brick, stone or other rigid foundation structure or encasement, either above or below the shoulder groundline, will not be permitted for mailboxes on rural highways. On urban roads and streets where mailbox support posts are set within rigid pavement back of curb, the support posts shall be separated from the pavement by a minimum of 1" of expansion material.

Support posts shall not be fitted nor installed with base plates.

10. At driveway entrances mailboxes shall be placed on the far side of the driveway in the direction of the delivery route.

At intersecting roads mailboxes shall be located 100' or more from the centerline of the intersecting road on the far side in the direction of the delivery route, with the distance increased to 200' when the route volume exceeds 400 vehicles per day.

11. Wood support posts shall be in conformance with the material and dimensional requirements of Section 952 and the treatment requirements of Section 955 of the Standard Specifications.

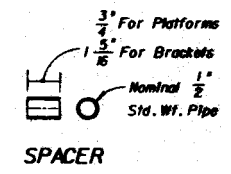
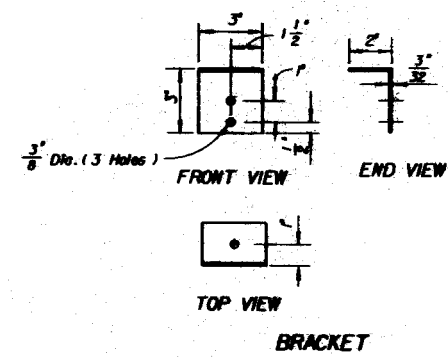
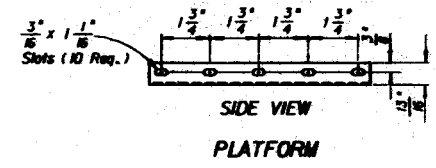
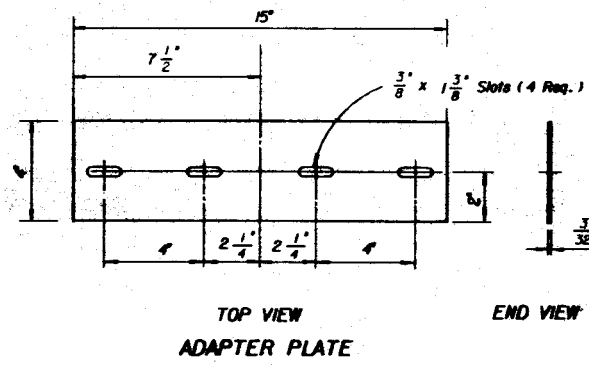
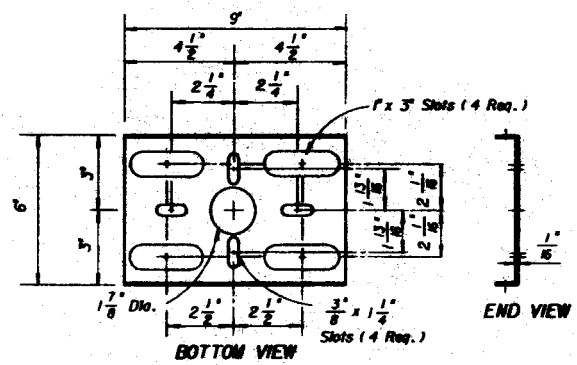
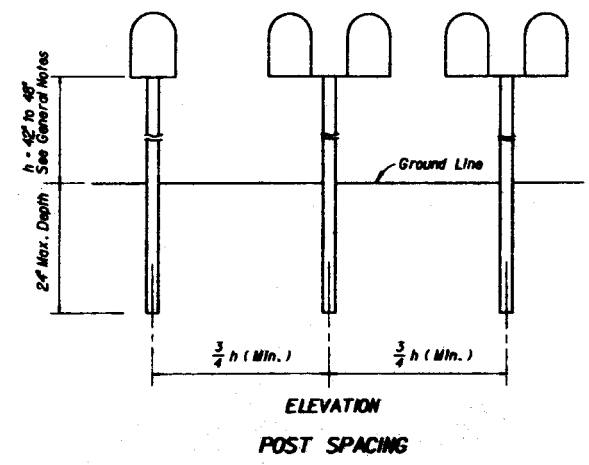
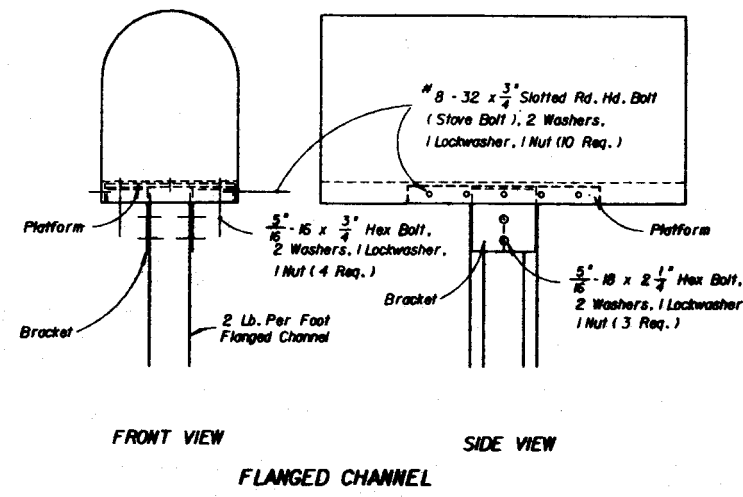
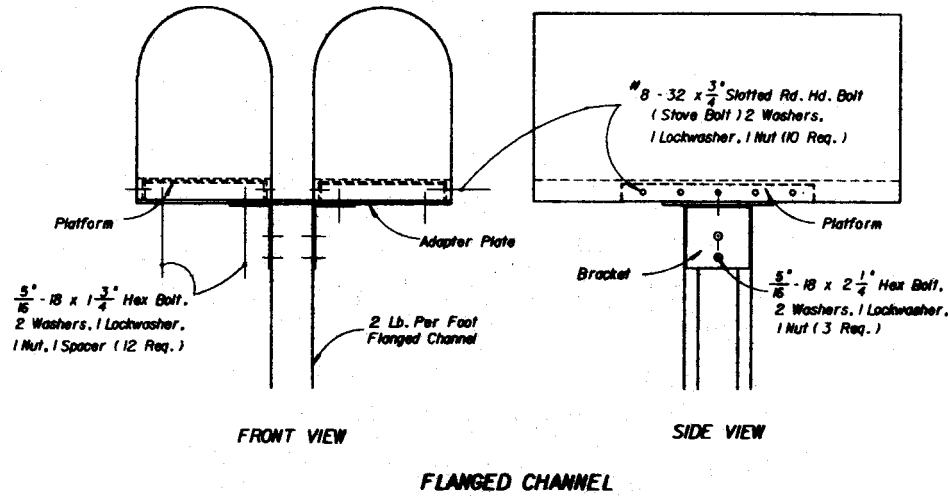
12. Mailboxes shall be paid for under the contract unit price for Mailboxes, Each, Pay Item No. 110-7-1. Payment shall be full compensation for boxes, posts and accessory items essential for installation in accordance with this standard; erection; adjustments to suit construction needs; and, for identification letters and numbers.

Payment shall be limited to one mailbox per patron address whether the mailbox is new, reused, salvaged, reset or relocated. Payment shall be per mailbox regardless of the number of mailboxes per support or grouping arrangement.

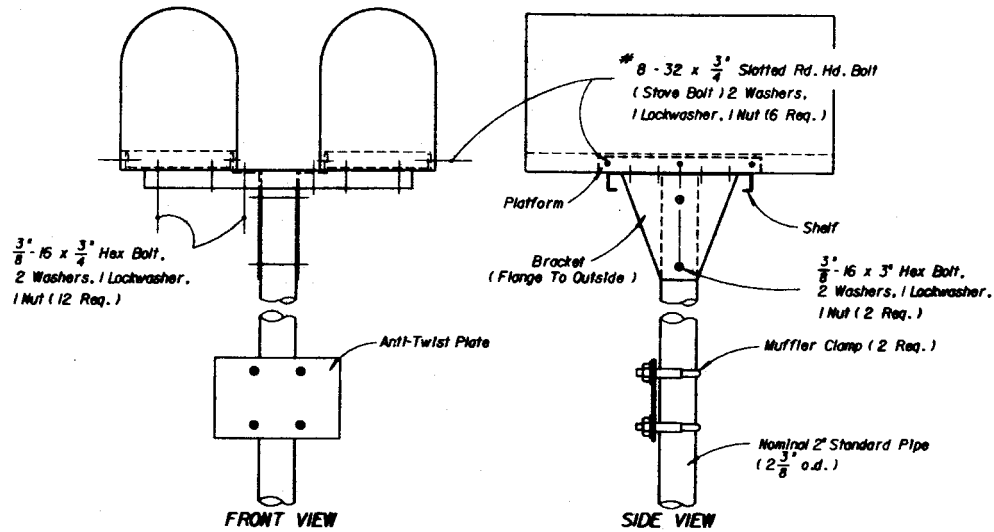
The above compensation shall include any work and cost incurred by the contractor for removal and disposal of existing mailboxes.

There shall be no payment participation for NDCBU furnishing, assembly, installation, resetting or relocation.

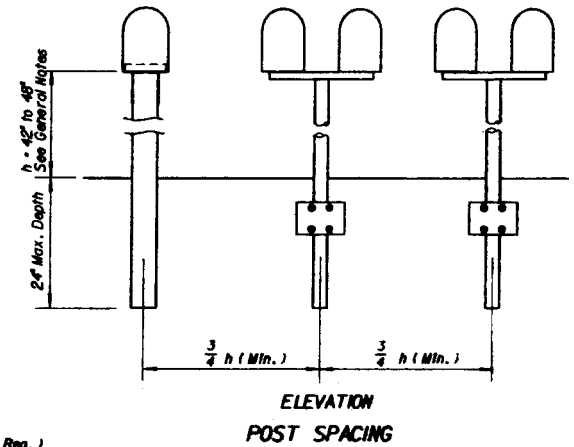
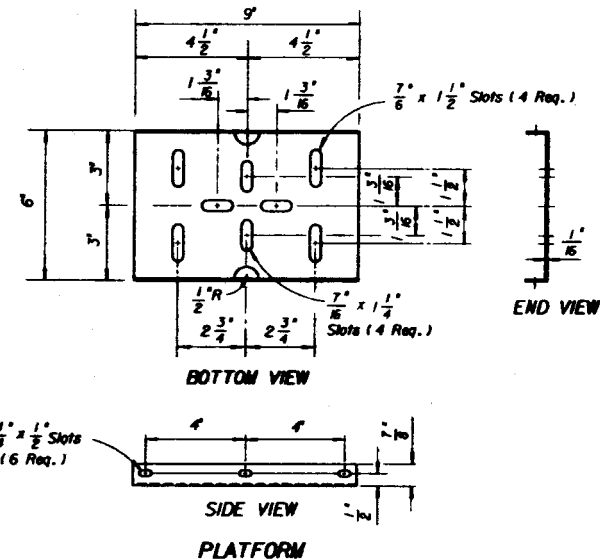
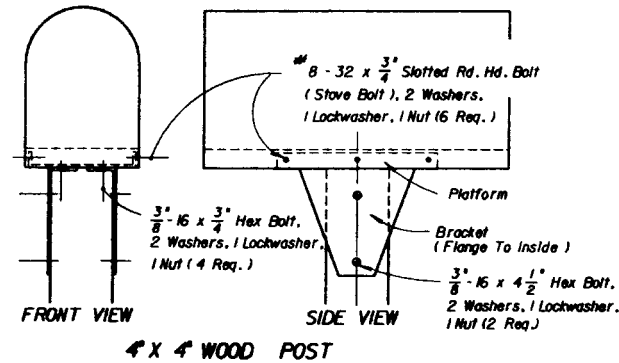
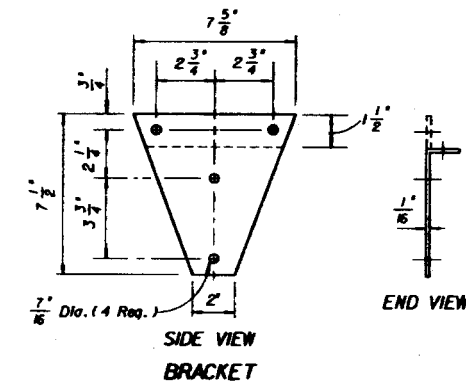
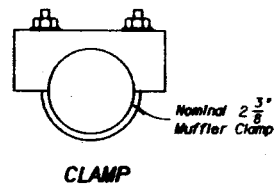
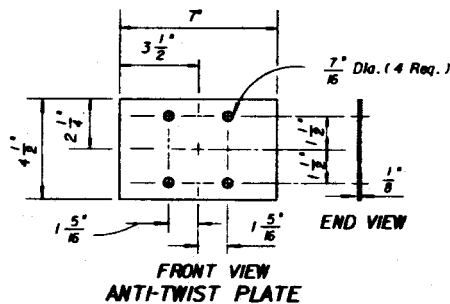
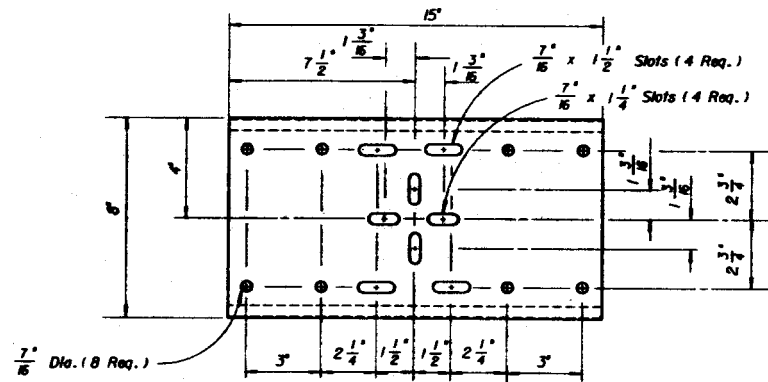
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
MAILBOXES					
<small>Designed By</small>	<small>Revised</small>	<small>Drawn</small>	<small>Checked By</small>	<small>Approved By</small>	
				 <small>Engineer</small>	
<small>Drawn By</small>	<small>HSD</small>	<small>7/88</small>	<small>Checked By</small>	<small>JMS/BJH</small>	<small>7/88</small>
<small>Design No.</small>	<small>Sheet No.</small>	<small>Scale</small>	<small>Revision</small>	<small>1 of 3</small>	<small>532</small>
<small>F.H.W.A. Approved</small>					



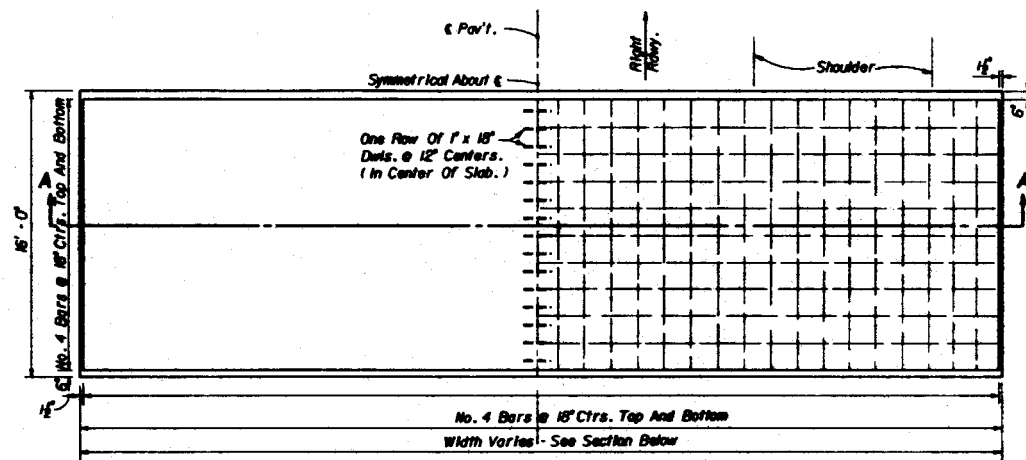
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
MAILBOXES				
Designed By	Drawn By	Checked By	Approved By	 Keith A. Hargrett, District Engineer, District 10
	HSD	JHG/BBH	7/88	
F.H.S.A. Approved			88	2 of 3



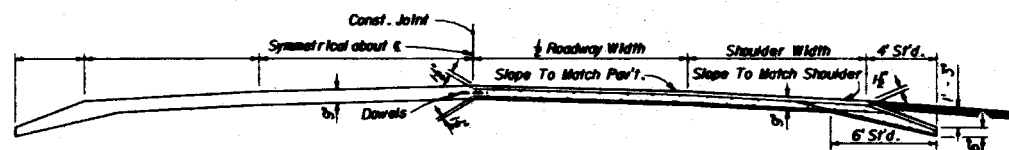
2" PIPE POST



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
MAILBOXES			
Designed By	RD	Date	7/18
Drawn By	JNC/AB	Checkd By	JNC/AB
Checked By	JNC/AB	7/18	
F.A.R.A. Approved	BB	3 of 3	532



PLAN

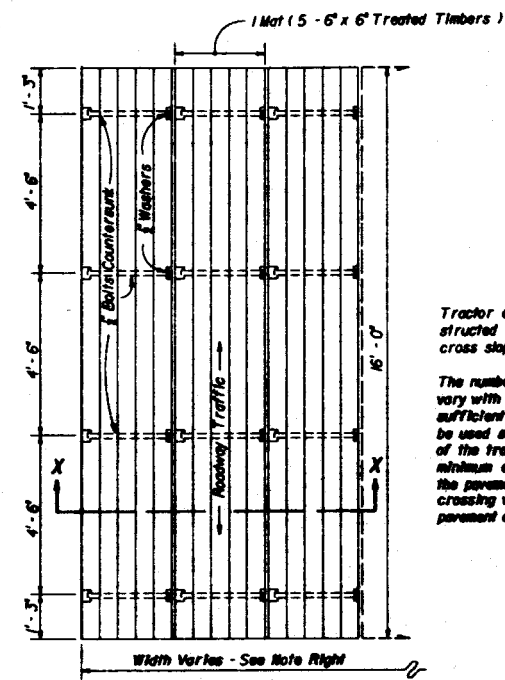


SECTION AA

TYPE A

REINFORCED CONCRETE

Note
Class I concrete is to be used unless otherwise noted in plans or special provisions



PLAN



SECTION XX

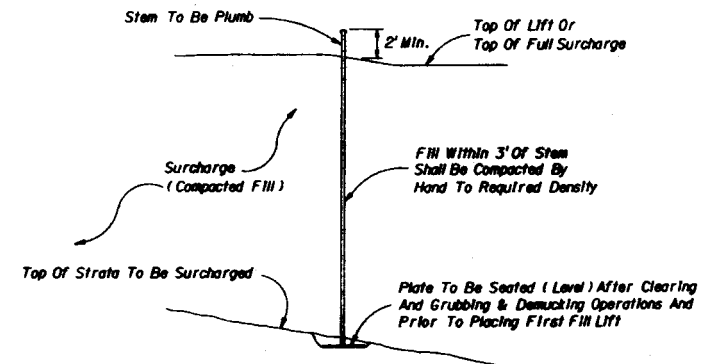
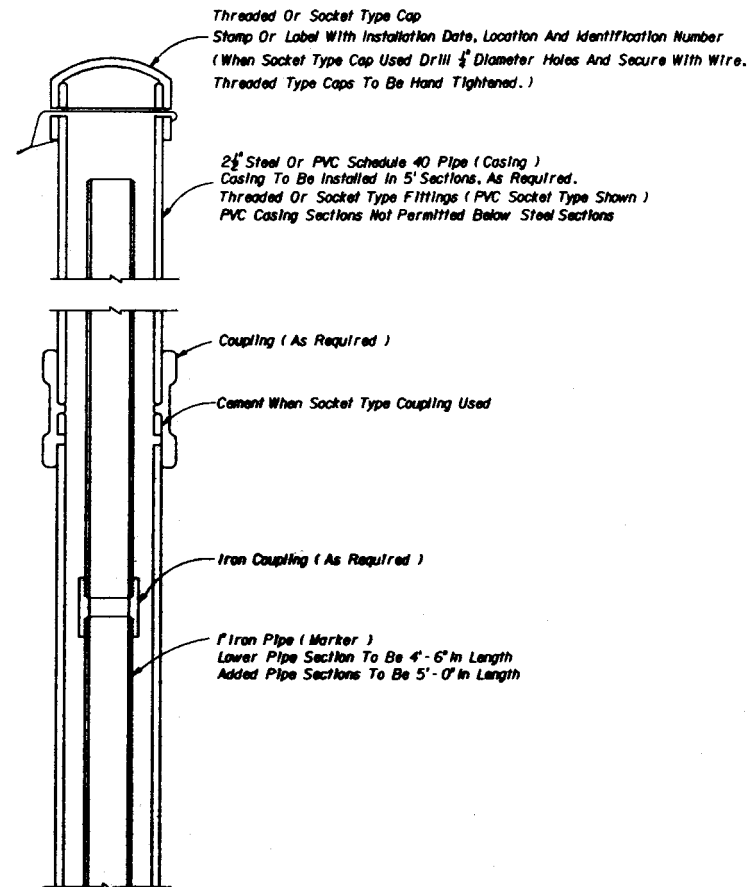
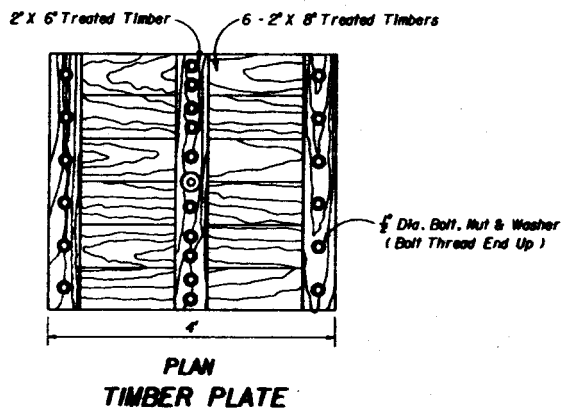
TYPE B

TREATED TIMBER

Note
Tractor crossing to be constructed to match pavement cross slope.

The number of mats required will vary with the pavement width. A sufficient number of mats will be used so that the overall width of the tractor crossing will be a minimum of one foot greater than the pavement width. The tractor crossing will be centered on the pavement centerline.

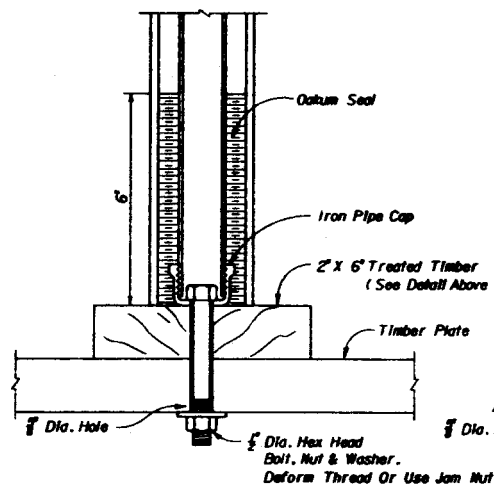
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TRACTOR CROSSINGS					
Designed By	State	Office	Approved By		
Drawn By	LM	01/81	State Design Engineer, Roadways		
Checked By	CRD	01/81	Revision No.	Sheet No.	Index No.
F.A.R.A. Approved 02/22/75			21	1 of 1	535



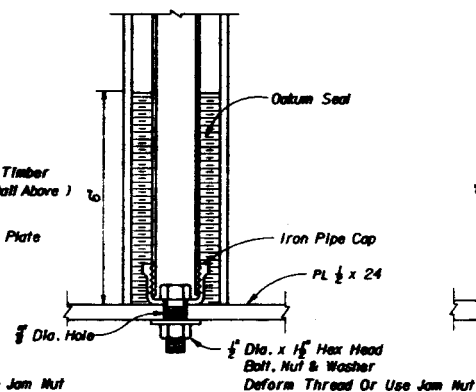
INSTALLATION

NOTES

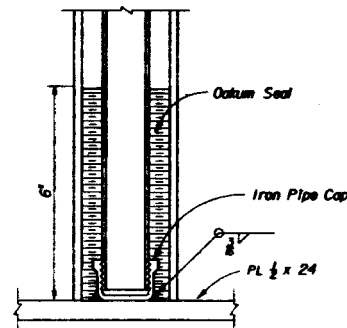
1. Elevation of the top of each length of marker pipe shall be determined as soon as it is installed and also immediately before the next length of marker pipe is added.
2. Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.
3. Oakum used to construct seal should not have a mesh covering (plastic or other synthetic material).



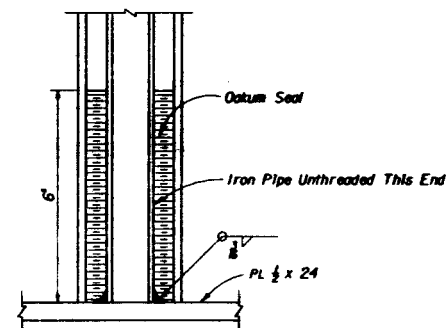
TIMBER PLATE



STEEL PLATE
STEM AND PLATE OPTIONS

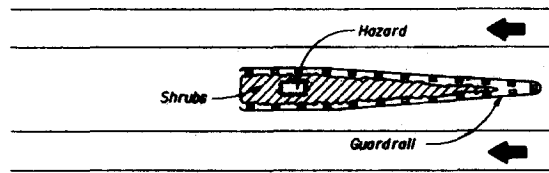


STEEL PLATE

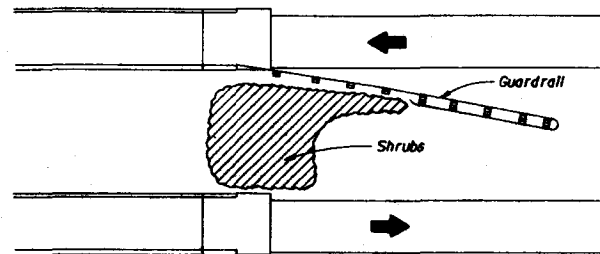


STEEL PLATE

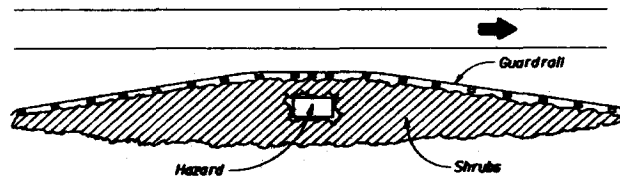
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SETTLEMENT PLATE			
Designed By JAG	Date 10/79	Approved By <i>[Signature]</i> State Design Engineer, Roadways	
Drawn By AGB	Date 10/79	Revision No.	Sheet No.
Checked By JAG	Date 10/79	1 of 1	540
F.H.A. Approved 10/07/80		21	



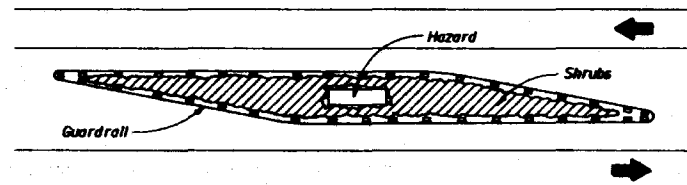
DETAIL A
MEDIAN HAZARD - ONE WAY TRAFFIC



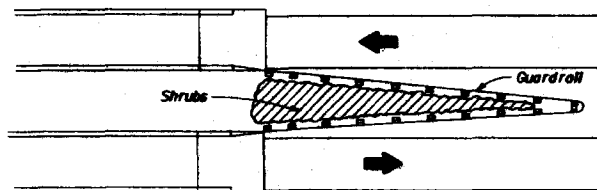
DETAIL C
BRIDGE END - WIDE MEDIAN



DETAIL B
ROADSIDE HAZARD



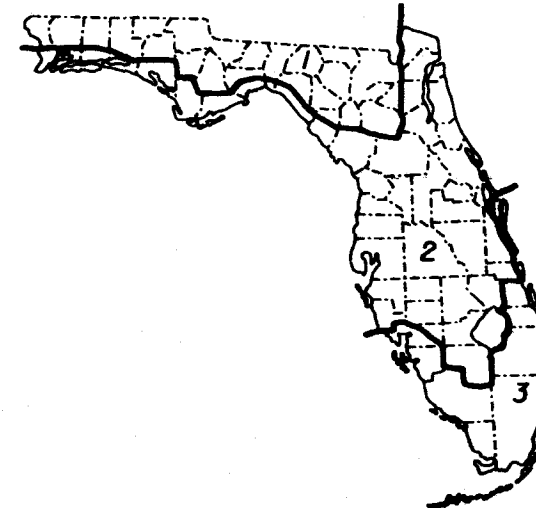
DETAIL D
MEDIAN HAZARD - TWO WAY TRAFFIC



DETAIL E
BRIDGE END - NARROW MEDIAN



CROSS SECTION
BACK TO BACK GUARDRAIL



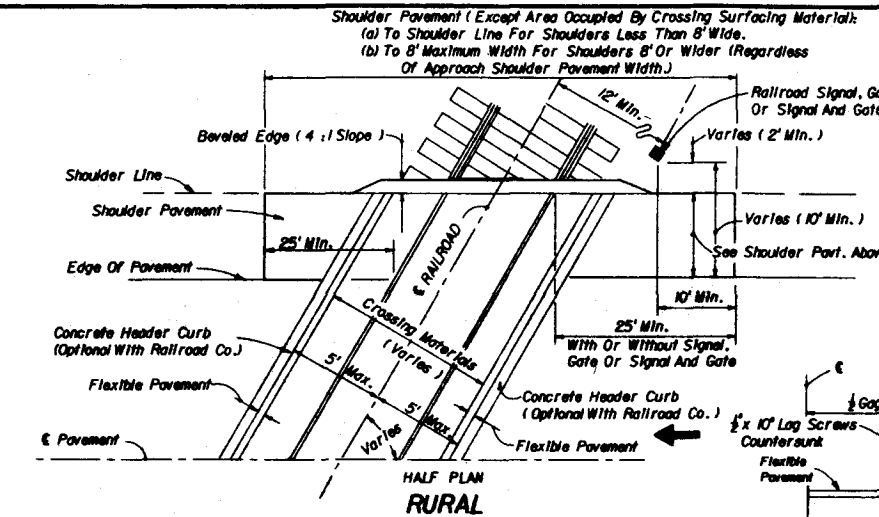
ZONE MAP

ZONE	SHRUB
1.	Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive
2.	Wax Myrtle Pampas Grass Primrose Jasmine Russian Olive Jasmine Shapic Oleander
3.	Pampas Grass Russian Olive Holly Palm Jasmine Shapic Oleander Dwarf Oleander

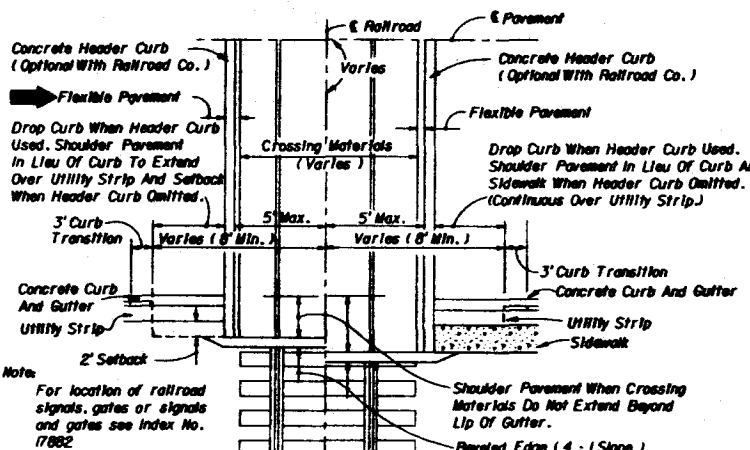
GENERAL NOTES

1. The purpose of shrubs in areas back of guardrail is to eliminate hard maintenance in those areas.
2. Shrubs are to be planted approximately 5' back from guardrail posts and hazards. Narrow plant areas are to have at least one row of shrubs, as directed by the Engineer.
3. Shrubs are to be planted approximately 5' on centers in rows with 5' spacings.
4. Shrubs are to be offset in successive rows to create a zig-zag pattern between any two rows.
5. Shrubs shall be specified in the plans by Landscape Material Master Pay Item List numbers.
6. Only one variety of shrub shall be planted within any given contiguous area and no shrub variety is to be repeated within a distance of one mile.
7. When guardrail paving is constructed in conjunction with shrub planting, soil sterilization shall be in accordance with Section 339 of the Standard Specifications.

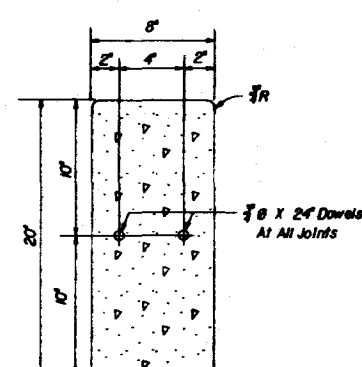
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SHRUBBERY BACK OF GUARDRAIL APPLICATION			
Designed By	Drawn By	Checked By	Approved By
BY			<i>[Signature]</i> State Design Engineer, District
Revision No.	Sheet No.		
80	1 of 1	545	
F.H.S.A. Approved			



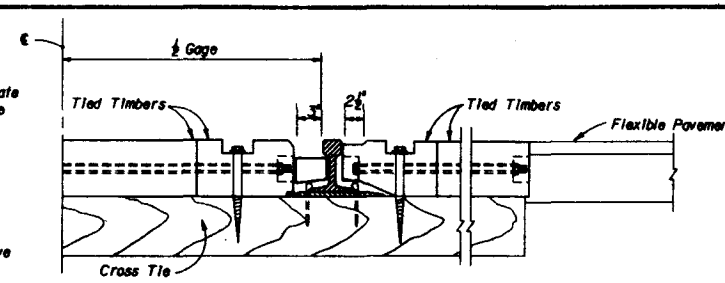
HALF PLAN
RURAL



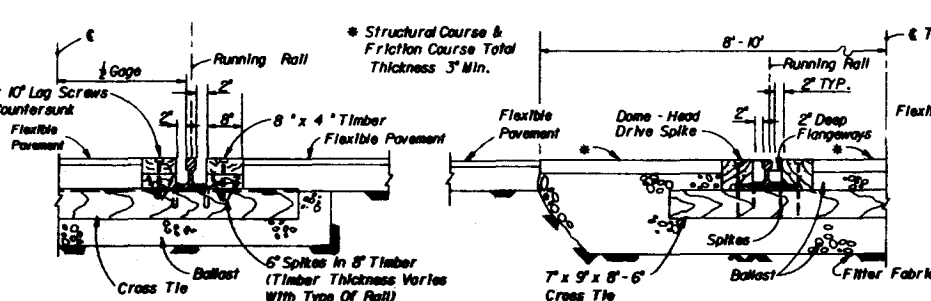
HALF PLAN
MUNICIPAL



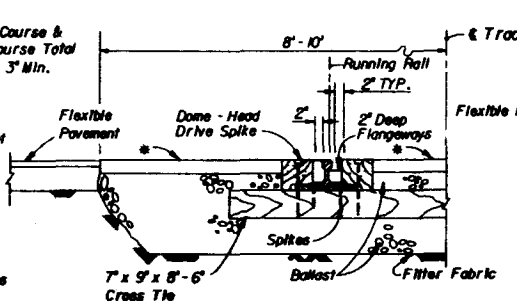
HEADER CURB
(Optional With Railroad Co.)



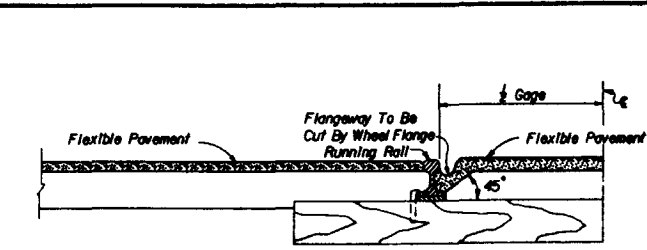
HALF SECTION TYPE D



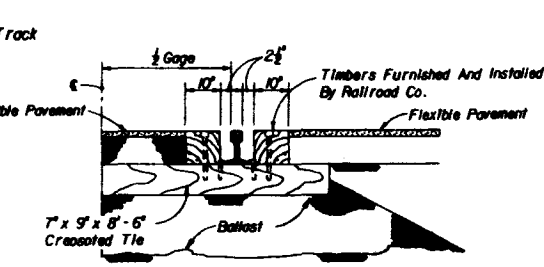
HALF SECTION TYPE G



HALF SECTION TYPE G MODIFIED



HALF SECTION TYPE E



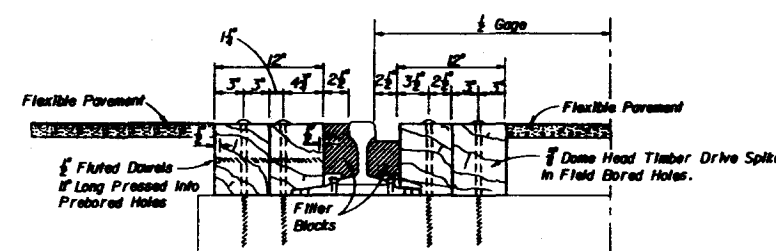
HALF SECTION TYPE H

NOTES

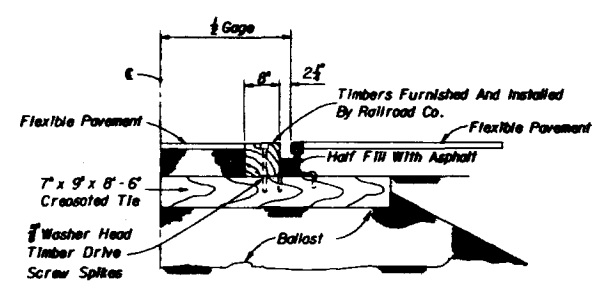
1. The Department will construct header curbs at locations requested by the railroad company, and construct pavement as shown for crossing types E,G,H,L, and S.
2. The Railroad Company will furnish and install all material within 5' of & of tracks, except pavement, for crossing types E,G,H,L, and S.
3. Unless otherwise requested by the railroad company, the various types of crossing will be used as follows:

	TYPE
Appalachian Northern R.R. Co.	L
Atlanta and St. Andrews Bay Railway Co.	L
Florida East Coast Railway Co.	T-MOD. & G-MOD.
Burlington Northern Railroad	L
CSX Transportation, Inc.	L

Norfolk Southern Corporation	
(a) Georgia Southern and Florida Railway Co.	G
(b) Live Oak, Perry and South Georgia Railway Co.	G
(c) St. Johns River Terminal Co.	G
(d) Georgia and Florida Railway Co.	G
(e) Southern Railway System	G

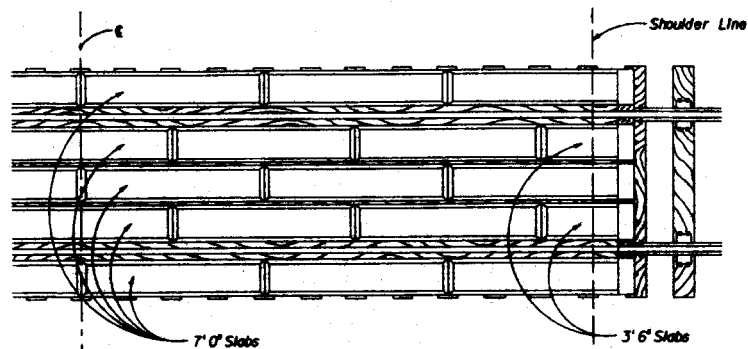


HALF SECTION TYPE L

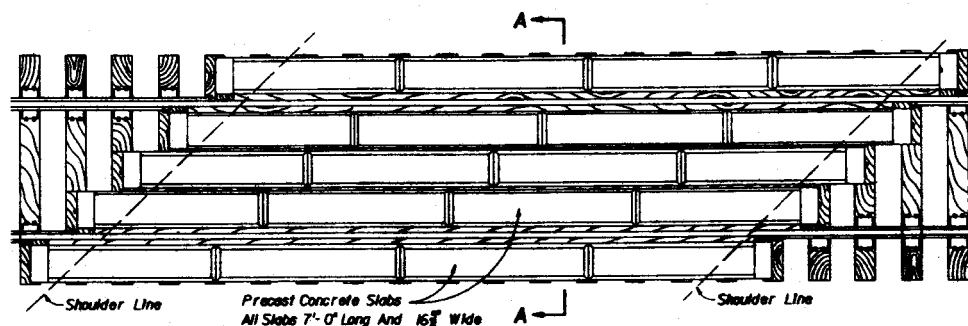


HALF SECTION TYPE S

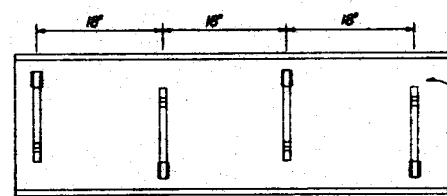
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAILROAD CROSSINGS TYPE D,E,G,G-MOD., L & S					
Designed By	Drawn By	Checked By	Approved By	Scale	Sheet No.
WJC	WJC	WJC	[Signature]	1/8" = 1'-0"	1 of 8
F.H.S.A. Approved			05/28/75	08	560



PLAN - 90° CROSSING



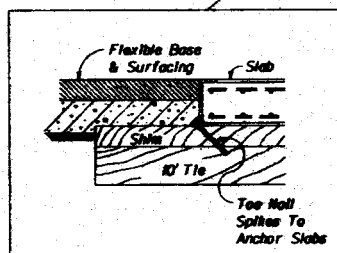
PLAN - SKEW CROSSING



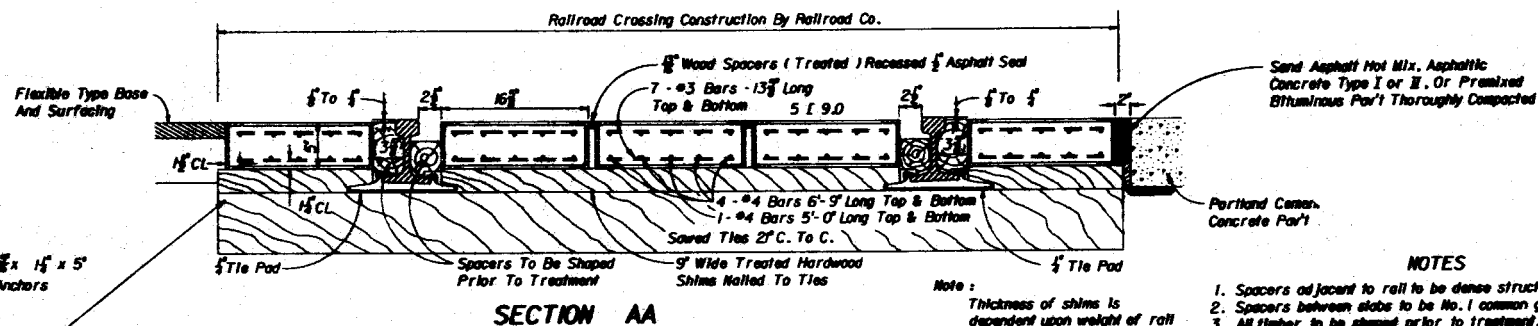
ELEVATION

Detail of $\frac{3}{8} \times 1\frac{1}{2} \times 5$ Anchors
Anchors Staggered 18" C. to C.
Two Anchors Each End Channel
Notes: $\frac{3}{8} \times 5$ Shims May Be Used
In Lieu Of Anchors

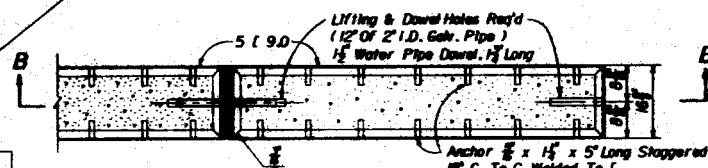
SECTION



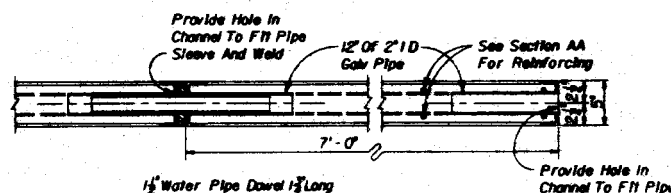
OPTIONAL DETAIL
When 10" Ties Are Used



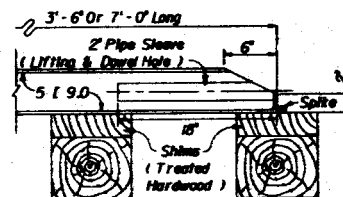
SECTION AA



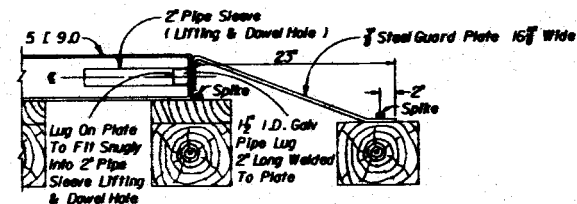
PLAN TYPICAL SLAB



SECTION BB



BEVELED END SECTION



ALTERNATE END SECTION

NOTES

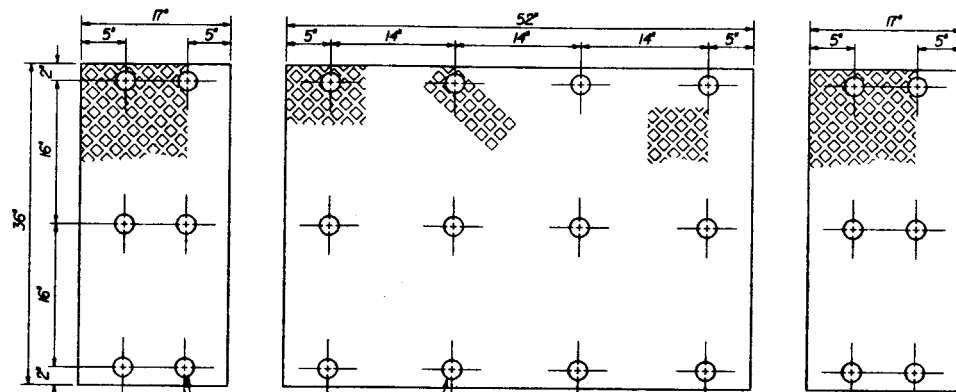
1. Spacers adjacent to rail to be dense structural 65 grade.
2. Spacers between slabs to be No. 1 common grade.
3. All timber to be shaped prior to treatment.
4. Class I concrete to be used in the construction of the precast concrete slabs.
5. All timber shims and spacers and precast concrete slabs will be furnished and installed by the Railroad Co. The track shall be conditioned true to line and grade by the Railroad Co. prior to installation of the crossing elements.
6. Construction of this crossing requests a stable subgrade for a minimum of 2' below the bottom of the ballast. The subgrade shall be constructed to the same requirements as specified for the adjoining roadway.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS TYPE J

Designed By	Drawn By	Checked By	Approved By	Revision No.	Sheet No.	Index No.
NR	JIC	JIC	<i>[Signature]</i>	63	2 of 8	560
Florida Approved	5/25/75					

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAILROAD CROSSINGS TYPE K			
Designed By	Issue	Sheet	Approved By <i>De. Hill</i> _____ District Engineer, Division
Drawn By	HW	05/89	
Checked By	JRC	09/89	
F.H.S.A. Approved: 03/30/75		83	3 of 8
			560

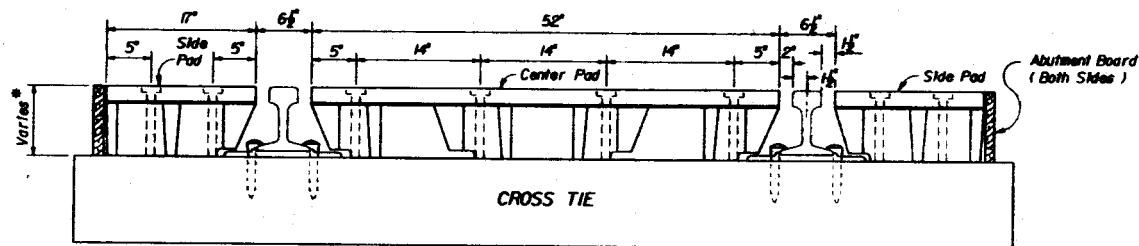


SIDE PAD
2" Dia. x 1/2" Deep Recess
For Washer & Log Screw
(Pre-Drilled At Customer
Option).

CENTER PAD

SIDE PAD

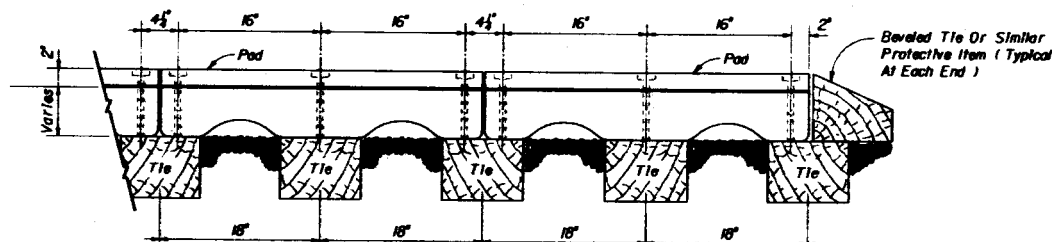
TOP VIEW



CROSS TIE

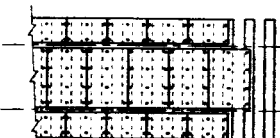
* O.A. Height 6" - Pads Typical For 90-100 Lb Rails.
O.A. Height 7" - Pads Typical For 110-130 Lb Rails.
O.A. Height 7 1/2" - Pads Typical For 131, 133 Or 136 Lb Rails.

SECTION



PARTIAL SECTION PARALLEL TO RAIL

CROSSING TYPE "P & Q"
(POLYETHYLENE)



**PARTIAL PLAN DEPICTING
SUGGESTED PAD PLACEMENT**

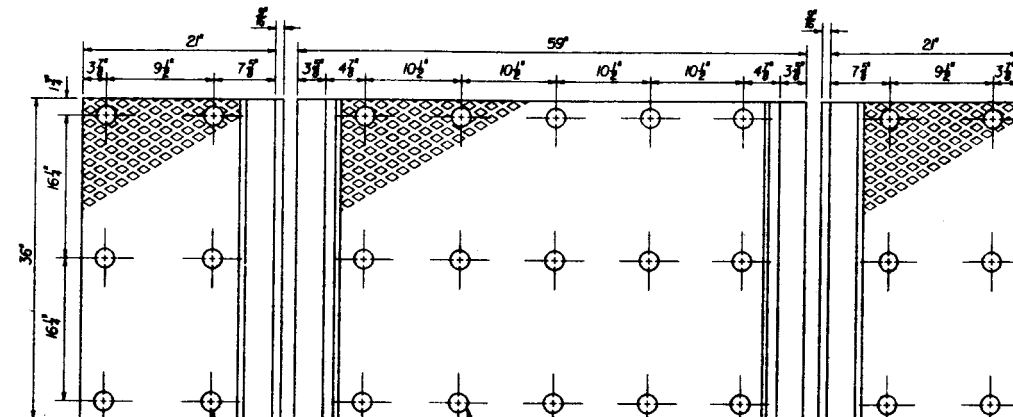
① Experimental - Requires Prior Approval

GENERAL NOTES

1. The crossings shown on this sheet are **NOT** to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.
2. Crossings on this sheet may be used for single track crossings within the zones in the chart unless engineering or safety considerations dictate otherwise.
3. Details shown are for straight track installations. Materials are also available for curved track installations.
4. For additional details, materials required and installation procedures refer to the manufacturers specifications.

STOP ZONE

Design Speed	Zone Length Distance From Stop
45 MPH Or Less	250'
50 - 55	350'
60 - 65	500'
70	600'

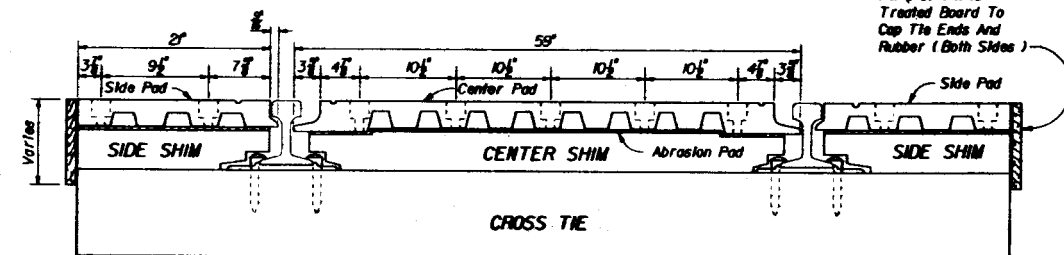


SIDE PAD
2" Dia. x 1 1/4" Deep Recess
For 3/4" Drive Spikes

CENTER PAD

SIDE PAD

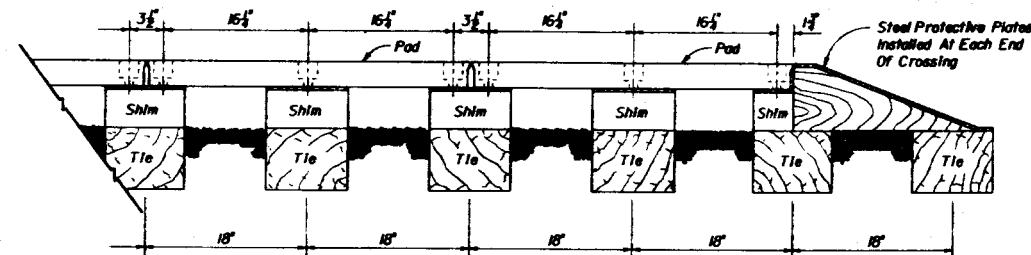
TOP VIEW



CROSS TIE

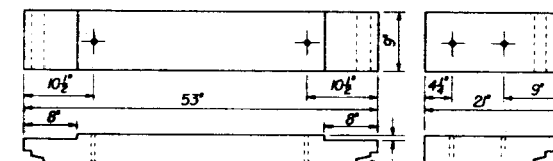
1" x 8" or 1" x 10"
Treated Board To
Cap Tie Ends And
Rubber (Both Sides)

SECTION



PARTIAL SECTION PARALLEL TO RAIL

CROSSING TYPE "R"
(RUBBER)



CENTER SHIM
(Treated Timber)

Shim Thickness Varies With Height Of Rail.

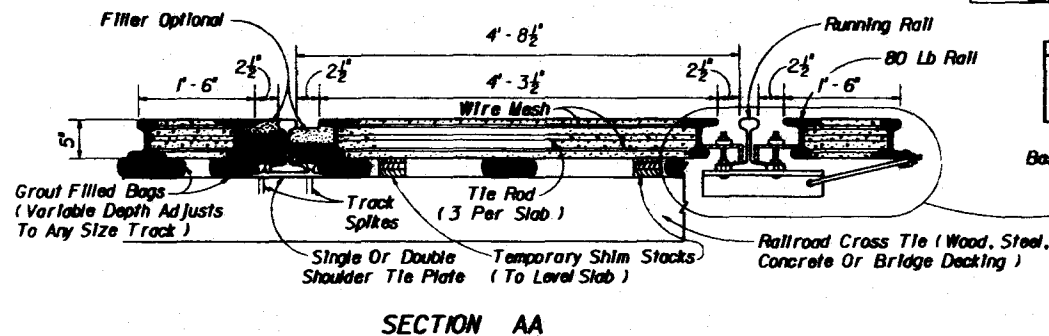
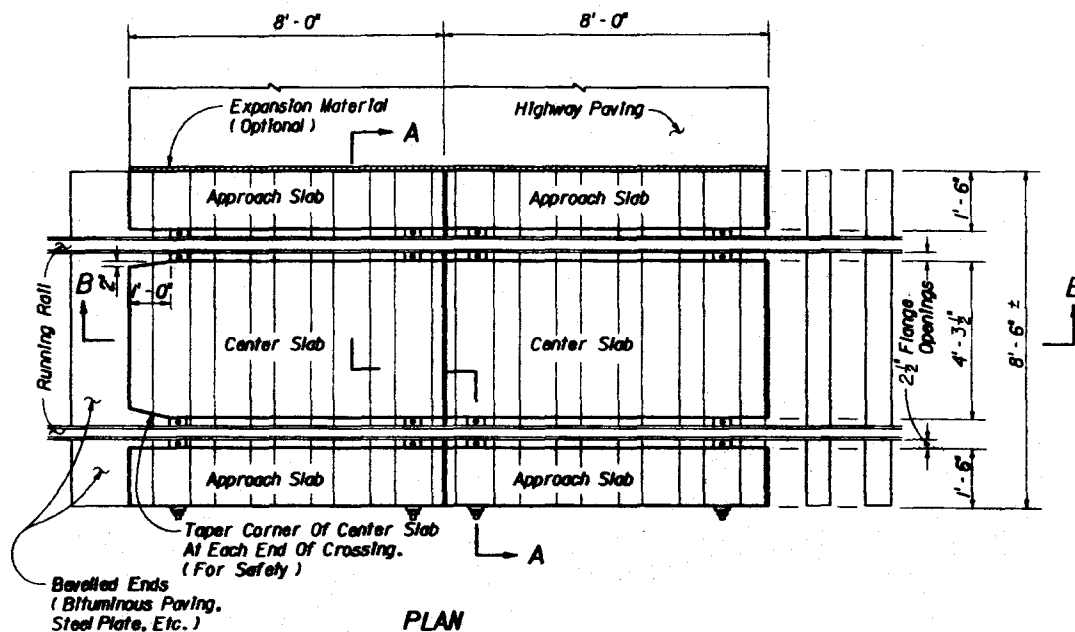
SIDE SHIM
(Treated Timber)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

**RAILROAD CROSSINGS
TYPE P & R**

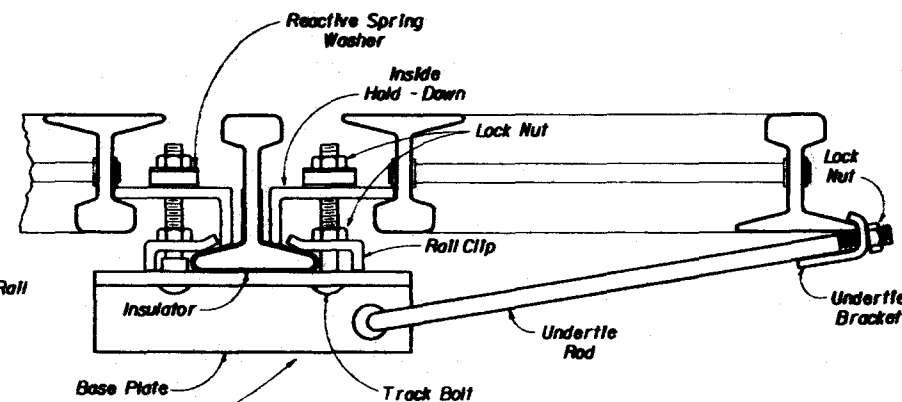
Designed By	Drawn By	Checked By	Approved By
LAF	LAF	LAF	[Signature]
CSB	CSB	CSB	[Signature]
F.A.R.A. Approved	12/1/78	85	5 of 8

560

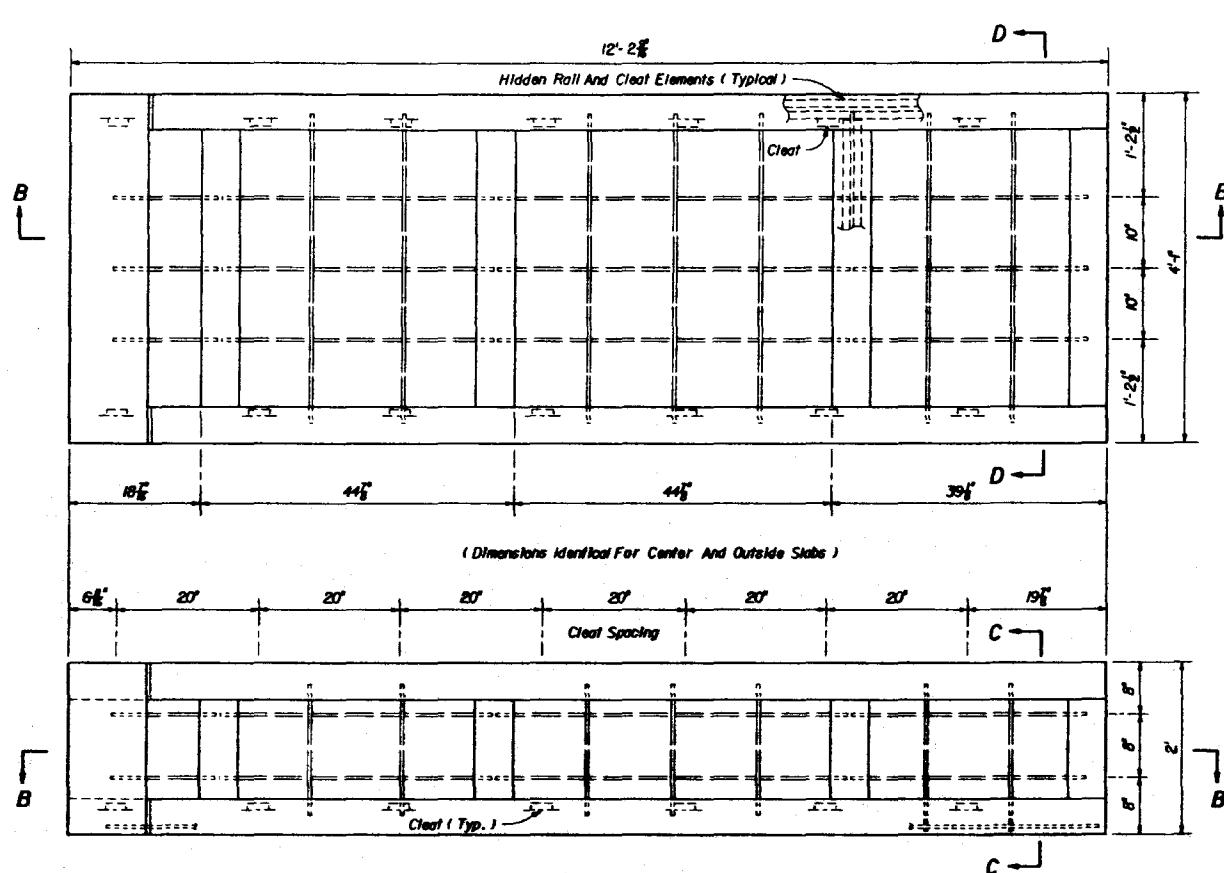


GENERAL NOTES

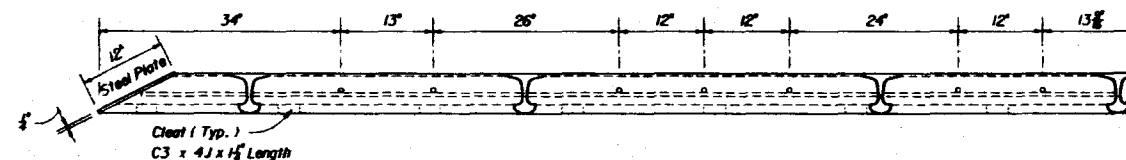
1. The reinforced concrete slabs are manufactured in 8'-0" sections, 5" in depth to fit all rail sections 5 1/4" in height or heavier. Slabs are interchangeable and relocateable.
2. Center slabs are one piece construction allowing for 2 1/2" flange opening, 80 lb. rail is used to encase, armor and reinforce slabs and is held to gage with 3 tie rods per slabs.
3. Slabs are installed by a "floatation" process, supported on non-shrinkable, non-metallic grout positioned on the ties. Slabs can be placed on wood ties, concrete ties, steel ties, bridge decks or any other type of track support. No re-spacing of ties is necessary.
4. Slabs are secured to "running rails" with specially designed hardware. Insulation is to be provided for crossing in signal territory.
5. Curved slabs are fabricated to fit curved track to 22 degrees (262.04' radius). Special slabs are available for diamond crossings, turnouts, multiple tracks, bridge decks and rapid transit systems.
6. For additional details, materials required and installation procedures refer to the manufacturers specifications.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAILROAD CROSSINGS TYPE T			
Designed By	Drawn By	Checked By	Approved By
	LMF	02/77	J. Hill
Created By	020	02/77	State Design Engineer, Roadways
F.I.R.A. approved	05/03/77	83	6 of 8 560

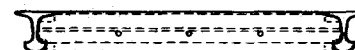


TOP VIEWS - CENTER SLAB AND OUTSIDE SLAB



SECTION BB

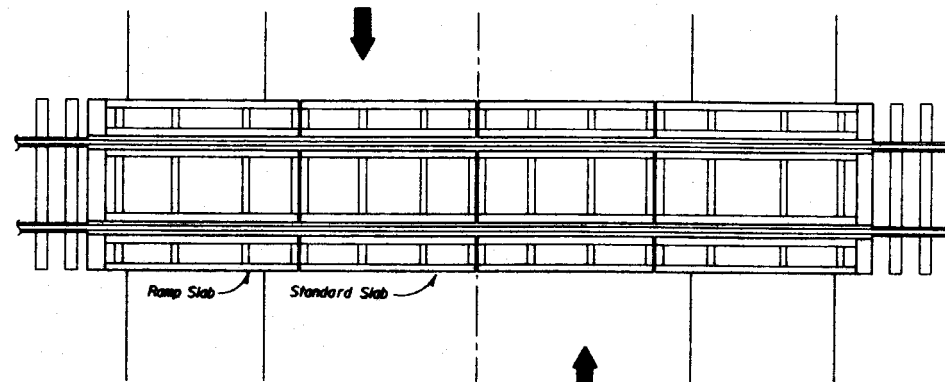
RAMP SLABS (PRECAST CONCRETE)



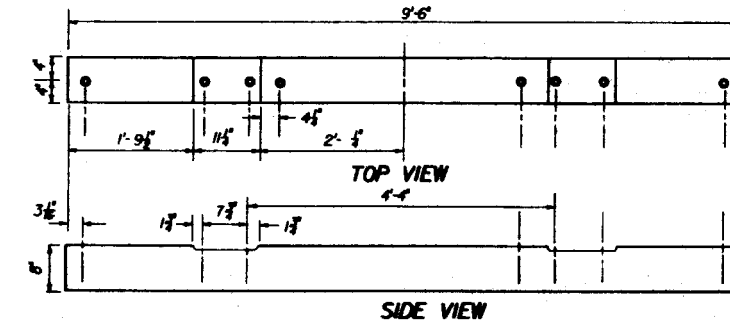
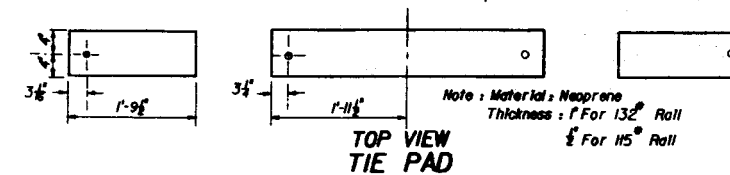
SECTION DD

STANDARD AND RAMP SLAB SECTIONS

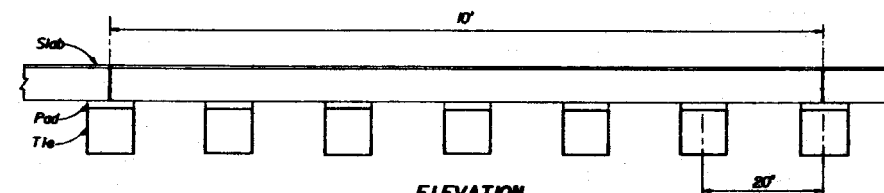
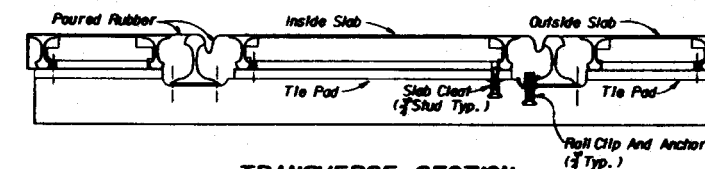
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
RAILROAD CROSSING TYPE T MODIFIED			
Designed By	Name	Date	Approved By
Drawn By	RSB	5/1/82	<i>[Signature]</i> State Design Engineer, Roadways
Checked By	JES/BJF	5/1/82	Revision No.
F.A.R.A. Approved	S/ES/VR		Sheet No.
		83	7 of 8
			Index No. 560



PLAN VIEW
TYPICAL 44' CROSSING



PRECAST CONCRETE (CROSSING TIE)



GENERAL NOTES

1. Slab frames are welded 90 lb. rolls.
2. Slab reinforcement all No. 4 bars.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RAILROAD CROSSING TYPE T MODIFIED					
Designed By	RM	Date	08/02	Approved By	J. L. Hill
Drawn By	RM	Date	08/02	State Design Engineer, Roadways	
Checked By	JMS/JM	Date	08/02	Revision No.	Sheet No.
F.J.R.A. Approved	08/21/02	83	8 of 8	560	

CONTENTS

Preface
Manual On Uniform Traffic Control Devices
Abbreviations
Symbols
Definitions
Above Ground Hazards
Advisory Speed Plate
Adjoining Work Zone Signing
Intersecting Road Signing And Signals
Channelizing And Lighting Devices
Dropoffs In Work Zones
Warning Lights
Sight Distance To Delineation Devices
Pedestrians And Bicyclist
Nighttime Flagging
Reflectorized Raised Pavement Markers
Sign Covering
Removing Pavement Markings
Chart - Dropoffs
Identifications - Channelizing And Lighting Devices
Signing - Commonly Used Signs
Superelevation
Lane Widths
Length of Construction Sign
Detours

PREFACE

All projects and works on highways, roads and streets shall have a traffic control plan. All work shall be executed under the established plan and Department approved procedures. This Index contains information specific to the Federal and State guidelines for the preparation of traffic control plans and for the execution of traffic control in work zones, for construction and maintenance operations and utility work on highways, roads and streets.

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

The Florida Department of Transportation has adopted the "Manual On Uniform Traffic Control Devices For Streets And Highways" (MUTCD) and subsequent revisions and addendums, as published by the U.S. Department of Transportation, Federal Highway Administration, for mandatory use on the State Maintained Highway System whenever there exists the need for construction, maintenance operations or utility work.

























ABBREVIATIONS

Abbreviations assigned to the 600 series Roadway Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

TCP	Traffic control plan(s)
MUTCD	'Manual On Uniform Traffic Control Devices For Streets And Highways'
TCZ	Traffic control through work zones
L	Taper length, buffer length or taper length plus buffer space
W	Width of taper transition in feet, i.e., lateral offset
S	Posted speed or off-peak 85 percentile speed
RPM	Raised reflectorized pavement marker
TMA	Truck mounted attenuator
COMM	Traffic Control Standards Committee

SYMBOLS

Symbols assigned to the 600 series Roadway Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

-  Work Area, Hazard Or Work Phase (Any pattern within a boundary)
-  Sign With 18" x 18" (Min) Orange Flag And Type B Light
-  Type I Or Type II Barricade Or Drum
-  Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
-  Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
-  Type I Or Type II Barricade, Cone Or Drum
-  Type I, Type II Or Type III Barricade Or Drum
-  Type I, Type II Or Type III Barricade Or Drum (With Flashing Light)
-  Type I, Type II Or Type III Barricade Or Drum (With Steady Burning Light)
-  Type III Barricade
-  Type III Barricade (With Flashing Light)
-  Type III Barricade (With Steady Burning Light)
-  Work Zone Sign
-  Flagger
-  Traffic Signal
-  Advance Warning Arrow Panel
-  Portable Signal
-  Crash Cushion
-  Stop Bar
-  Work Vehicle With Flashing Beacon
-  Shadow (S), Work (W) Or Advance (A) Vehicle With Advance Warning Arrow Panel
-  Advance Warning Vehicle With Warning Sign
-  Orange Flag For TCZ Signs
-  Type B Light For TCZ Signs

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES			
Designed By	CHM	Date	12/97
Drawn By	HSD/AB	Date	12/97
Checked By	JVC/KSB	Date	12/97
F.H.R.A. Approved		88	1 of 6
			600

DEFINITIONS

Posted Speed

The maximum permitted travel speed in an area for normal open roadway conditions, as indicated by SPEED LIMIT signs.

Advisory Speed

The maximum permitted travel speed in an area of a traffic control work zone. Where the advisory speed is less than the posted speed, the reduced speed shall be as indicated in MPH on the ADVISORY SPEED plate.

Construction Zone Speed

A particular posted or advisory speed used as a design speed to determine runoff lengths, departure rates, flare rates, lengths of need, clear widths, taper lengths, crash cushion requirements, marker spacings, superelevation and other similar features.

Travel Way

The intended path for vehicular traffic through or around obstructions in construction, maintenance, utility and other work zones on highways, roads and streets. For traffic control through work zones, travel way includes auxiliary lanes, shoulders and any other permanent or temporary surface intended for the path of vehicular traffic.

Detour

A temporary travel way that branches from the direct or regular route of travel, to bypass a section of the route which is closed or blocked by construction, major maintenance, roadway damage or a traffic emergency and that rejoins the direct or regular route beyond that section.

ABOVE GROUND HAZARDS

Shoulders

Shoulder areas are to be kept free from any construction hazard (i.e., materials, equipment, etc.). If present on shoulders, construction hazards are to be considered work areas and treated as required by the appropriate traffic control standard or MUTCD guidelines, or eliminate the hazard.

Outside Edge Of Shoulder To Clear Zone

Construction hazards located between the outside edge of shoulder and clear zone for the highway are to be considered work areas and treated as required by the appropriate traffic control standard or MUTCD guidelines, or eliminate the hazard.

ADVISORY SPEED PLATE

1. Each TCP or phase must be designed for a specific speed, either the posted speed or a reduced speed.
2. If the speed chosen for the design is less than the posted speed, the speed must be noted on the TCP and advisory speed plates specified.
3. Speed may be reduced up to a maximum of 20 mph below the posted speed. This reduction is to be done in increments of 10 mph per 500 feet (minimum distance). Emergency situations or extremely unusual physical constraints requiring greater than 20 mph reduction of the posted speed limit will require approval of the District Traffic Operations Engineer and the appropriate District Director.
4. For in-house and consultant prepared plans the Professional Engineer in responsible charge of the design is to establish the speeds for all TCP's and phases.
5. Advisory speed plates cannot be used alone but must be placed below the construction warning sign for which the advisory speed is required.
6. The advisory speed panel is to be preceded by a "REDUCED SPEED AHEAD" (orange and black) sign, based on the following:

Interstate (rural or urban) — 1000' in advance
Non-Interstate (rural) — 500' in advance
Non-Interstate (urban) — 500' in advance

The distances shown above may be adjusted to fit site conditions.

7. When the conditions return to posted speed conditions an "END REDUCED SPEED" (orange and black) sign is to be placed. This sign is to be omitted when the condition ends within 200' of the end construction point.
8. For projects where the condition exists for greater than one mile in rural (non-Interstate) and on rural or urban Interstate, additional advisory speed plates are to be placed at no more than one mile intervals. Engineering judgement should be used in placement of the additional signs. Locating advisory plates beyond ramp entrances and beyond major intersections are examples of proper placement. The advisory speed plate is to be placed with the construction warning sign depicting the vehicle movement or specific condition for which the advisory speed is required. Examples of appropriate warning signs can be found in Section 6B, Part VI of the MUTCD.
9. For urban conditions (non-Interstate), additional advisory plates are to be placed at a maximum of 1000' apart and attached to construction warning signs and located as noted in 8 above.
10. Whenever possible TCP's should be developed to discourage multiple changes except where the 10 mph transitional increments are required as described above. Projects less than one (1) mile in length are to employ no more than one advisory speed, except for detour conditions. For projects greater than one (1) mile in length and employing more than one work zone advisory speed, an individual work zone advisory speed shall be applied over a length no less than one (1) mile, except for detour conditions.
11. The advisory speed plates are to be removed when conditions requiring plates do not exist. If appropriate, the construction warning sign is also to be removed.
12. Posted speed limit signs are to be removed in areas where they conflict with the advisory speed plate and are to be replaced when the advisory speed plate is removed.
13. All advisory speed plates are to be 24" x 24".

ADJOINING WORK ZONE SIGNING

Adjoining work zones may not have sufficient spacing for standard placement of signs and other traffic control devices in their advance warning areas or in some cases other areas within their traffic control zones. Where such restraints or conflicts occur or are likely to occur, one of the following methods will be employed to avoid conflicts and prevent conditions that could lead to misunderstanding on the part of the traveling public as to the intended travel way by the traffic control procedure applied:

- (a) For scheduled projects the engineer in responsible charge of project design will resolve anticipated work zone conflicts during the development of the project traffic control plan. This may entail revision of plans on preceding projects and coordination of plans on concurrent projects.
- (b) Unanticipated conflicts arising between adjoining in progress highway construction projects will be resolved by the Resident Engineer for projects under his residency, and, by the District Construction Engineer for in progress projects under adjoining residencies.
- (c) The District Maintenance Engineer will resolve anticipated and occurring conflicts under the following work zone conditions.
 1. Within scheduled maintenance operations.
 2. Between scheduled maintenance operations, maintenance construction, permitted works and/or in progress highway construction projects.
- (d) The Unit Maintenance Engineer will resolve conflicts that occur within routine maintenance works; between routine maintenance work, unscheduled work and/or permitted work; and, between unit controlled maintenance works and highway construction projects.

INTERSECTING ROAD SIGNING AND SIGNALS

Signing for the control of traffic entering and leaving work zones by way of intersecting highways, roads and streets shall be adequate to make drivers aware of work zone conditions. Under no condition will intersecting leg signing be less than a ROAD CONSTRUCTION AHEAD sign for approaching vehicles and a END CONSTRUCTION sign for departure vehicles.

Existing traffic signal operations that require modification in order to carry out work zone traffic control shall be as approved by the District Traffic Operations Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
GENERAL INFORMATION FOR			
TRAFFIC CONTROL THROUGH WORK ZONES			
Designed by	CSB	12/97	Approved by
Drawn by	RSB/CSB	12/97	Security State Design Engineer/Inspector
Checked by	JLB/CSB	12/97	Signature No.
F.J.S.A. Approved		CS	2 of 6
			600

CHANNELIZING AND LIGHTING DEVICES

Channelizing and lighting devices for work zone traffic control shall be as prescribed in Part VI of the MUTCD, subject to supplemental revision and certification by the office of the State Traffic Engineer.

Primary work zone traffic control devices are shown on Sheet 5 of 6 for the purpose of ready identification. Specifications for the devices are under the authority of the State Traffic Engineer.

DROPOFFS IN WORK ZONES

Acceptable warning and barrier devices for traffic control at dropoffs in work areas are detailed on Sheet 4 of 6.

WARNING LIGHTS

Warning lights shall be in accordance with Section 6E-5 of the MUTCD except for the application limitations stipulated below.

Flashing

Type A Low Intensity Flashing Warning Lights are to be mounted on barricades, drums, vertical panels or advance warning signs (except as noted below) and are intended to continually warn drivers that they are approaching or proceeding in a hazardous area. Flashing lights shall not be used to delineate the intended path of travel, and not placed with spacings that will form a continuous line to the drivers eye. The Type A light will be used to mark obstructions that are located adjacent to or in the intended travel way, and, to mark the approach to closed or detoured travel lanes. Type A lights shall not be used in conjunction with the first advance warning sign nor the second such sign when used.

Type B High Intensity Flashing Warning Lights shall be mounted on the first advanced warning sign and on the first and second advanced warning sign where two or more signs are used; this applies to all approaches to any work zone.

Steady-Burn

Type C Steady-Burn Lights are to be mounted on barricades, drums, concrete barrier walls or vertical panels and used in combination with those devices to delineate the travel way on lane closures, lane changes, detour curves and other similar conditions. Steady-burn lights are intended to be placed in a line to delineate the traveled way through and around obstructions in the transition, buffer, work and termination areas of the traffic control zone. Their intended purpose is not for warning drivers that they are approaching or proceeding through a hazardous area.

SIGHT DISTANCE TO DELINEATION DEVICES

Transition tapers should be obvious to drivers. If restricted sight distance is a problem (e.g., a sharp vertical or horizontal curve), the taper should begin well in advance of the view obstruction. The beginning of tapers should not be hidden behind curves.

PEDESTRIANS AND BICYCLIST

When an existing pedestrian way or bicycle way is located within a traffic control work zone, accommodation must be maintained.

NIGHTTIME FLAGGING

Nighttime flagging will require proper illumination of the flagger. A well lighted flagging station and/or a reflectorized paddle or reflectorized flag, plus a flashlight, lantern or other lighted signal that will display a red warning light shall be used.

Lights, reflectorized paddles, reflectorized flags and reflectorized vests, shirts or jackets approved by the Department must be used to flag traffic at night. The STOP face of paddles shall be reflectorized red with white reflectorized letters and border, and the SLOW face shall be reflectorized orange with black letters and border. Flagger vests, shirts or jackets shall be reflectorized orange.

The flagger must be clearly visible to approaching traffic for a distance sufficient to permit proper response by the motorist to the flagging instructions, and to permit traffic to reduce speed or to stop as required before entering the work site. Flaggers shall be positioned to maintain maximum color contrast between the flaggers reflective garments and equipment and the work area background.

REFLECTORIZED RAISED PAVEMENT MARKERS

Temporary RPM's shall be installed on the lane lines of all transitions, crossovers and detours within the work zone. The spacing shall be 40 feet on tangent sections and 20 feet on transitions, curves and crossovers. It shall be the contractors responsibility to replace damaged or missing RPM's on a daily basis. This cost shall be included in the cost of the temporary RPM's.

SIGN COVERING

Traffic control signs that require covers when no work is being performed in a work area shall be fully covered with a durable opaque sheet material. Plastic film and woven fabrics including burlap will not be permitted. Covering of only the legend or symbol will not be permitted. Reflective coverings will not be permitted. Hinged signs designed to cover when folded and sign blanks will be permitted.

REMOVING PAVEMENT MARKINGS

Existing pavement markings that conflict with temporary work zone delineation shall be removed by any method approved by the Engineer where operations exceed one daylight period; however, painting over existing pavement markings will not be permitted.

SUPERELEVATION

Horizontal curves constructed in conjunction with work zone traffic control should have the required superelevation applied to the design radii. Under conditions where normal cross slope controls curvature, the minimum radii that can be applied are listed in the table below.

MINIMUM RADII FOR NORMAL CROSS SLOPES		
POSTED SPEED	DETOUR DESIGN SPEED	MINIMUM RADIUS R
MPH	MPH	FEET
55	45	1080
50	40	830
45	35	620
40	30	450
Superelevate When Smaller Radii Used		

LANE WIDTHS

Lane widths of through roadways should be maintained through work zone travel ways wherever practical. The minimum widths for work zone travel lanes shall be 11' for Interstate highways and Freeways and 10' for all other facilities.

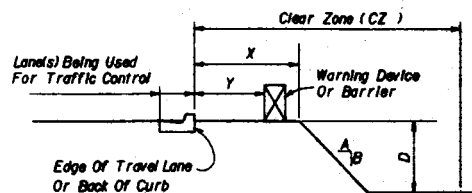
LENGTH OF CONSTRUCTION SIGN

The length of construction sign (G20-1) bearing the legend ROAD CONSTRUCTION NEXT—MILES is required for all projects of more than 2 miles in length. The sign shall be located at begin construction points.

DETOURS

Detours can be located either within the direct or regular route boundary or over highways, roads or streets outside the direct or regular route boundary. Engineering judgement should be used to determine when detour signing is required for minor shift to the direct or regular route.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES			
Designed By	Checked By	Approved By	
CSM	12/87	<i>James H. Wood</i>	
Drawn By	12/87	Florida State Design Engineers	
Checked By	12/87	Revision No.	Sheet No.
JAC/12/87	12/87		
F.A.B.A. Approved	88	3 of 6	600



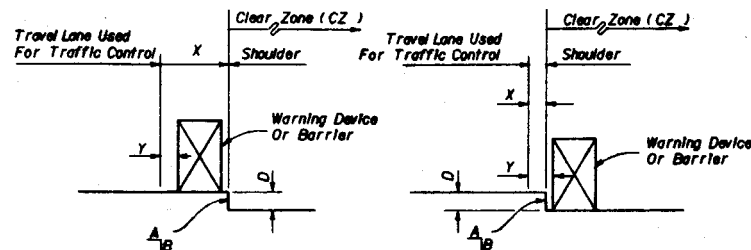
CONDITION I SHOULDER DROPOFF

1. This condition is to be used when excavating adjacent to lane(s) being used for traffic control.
2. Distance X is to be the maximum practical under project conditions.
3. Distance Y should be maximum practical for project conditions. Two (2) feet is desirable.
4. Warning devices or barriers are not to encroach on lane width(s) designated for traffic control.
5. For specific requirements use Chart A or B below, as applicable.

**CHART A
ALL SPEEDS
NO CURB AND GUTTER**

X (Ft.)	D (In.)	A/B	Device Required	
			Day	Night
0 - 4	≤ 2	Any	None	None
0 - 4	> 2 to ≤ 3	Any	Warning Device (b)	Warning Device (b)
0 - 4	> 3	Any	Warning Device (b)	Barrier (b)
> 4 - 10	≤ 3	Any	None	None
> 4 - 10	> 3 to ≤ 12	Any	Warning Device (b)	Warning Device (b)
> 4 - 10	> 12	Any	Warning Device (b)	Barrier (b)
> 10 - CZ (a)	≤ 12	Any	None	None
> 10 - CZ (a)	> 12 to < 24	3:1 Or Flatter	None	None
> 10 - CZ (a)	> 24 to ≤ 24	Steeper Than 3:1	Warning Device (b)	Warning Device (b)
> 10 - CZ (a)	> 24	3:1 Or Flatter	None	None
> 10 - CZ (a)	> 24	Steeper Than 3:1	Warning Device (b)	Barrier (b)

(a) Clear Zone (CZ) is to be determined per Index No. 700.
(b) Optional shoulder treatment allowed.



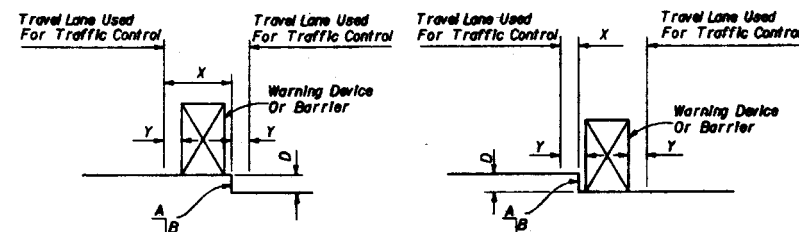
CONDITION II DROPOFF BETWEEN TRAVEL LANE AND SHOULDER

1. This condition is to be used when resurfacing or milling travel lanes and/or adjacent shoulders.
2. Warning device or barrier must not encroach on lane width(s) designated as minimum for traffic control.
3. X and Y should be maximum practical for project conditions. May be zero.
4. For specific requirements use Chart A below.

**CHART B
45 MPH OR LESS (C.D.B.)
CURB AND GUTTER**

X (Ft.)	D (In.)	A/B	Device Required	
			Day	Night
0 - 10	≤ 12	Any	None	None
0 - 10	> 12	Any	Warning Device (d)	Warning Device (d)
> 10	Any	Any	None	None

(c) This chart to be used with Condition I only.
(d) This chart to be used for curb heights ≥ 6". For curb heights < 6" use Chart A.
(e) For requirements of dropoffs behind curb and gutter, when curb and gutter has not been constructed, use Chart A.
(f) Optional shoulder treatment allowed.



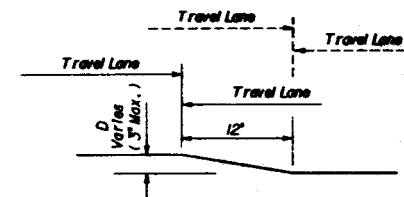
CONDITION III DROPOFF BETWEEN TRAVEL LANES

1. This condition is to be used for resurfacing or milling travel lanes.
2. Warning device or barrier must not encroach on lane width(s) designated as minimum for traffic control.
3. X and Y should be maximum practical for project conditions. May be zero.
4. Sign WB-9A with UNEVEN PAVEMENT plaque required at intervals of 1/4 mile maximum throughout this condition.
5. For specific requirements use Chart C below.

**CHART C
ALL SPEEDS
CURB AND GUTTER OR NO CURB AND GUTTER**

X (Ft.)	D (In.)	A/B	Device Required	
			Day	Night
0 - CZ	≤ 1 1/2	Any	None	None
0 - CZ	> 1 1/2 to ≤ 3	Any	Warning Device (g)	Warning Device (g)
0 - CZ	> 3	Any	Warning Device	Barrier

(g) Optional travel lane treatment allowed.



MILLING OR SURFACING OPTIONAL TRAVEL LANE TREATMENTS

1. This optional method may be used in lieu of warning devices when required by Chart C.
2. Optional treatment allowed only when D is 3" or less.



OPTIONAL SHOULDER TREATMENT

1. This optional method may be used in lieu of warning devices or barriers when required by Charts A or B.

NOTES

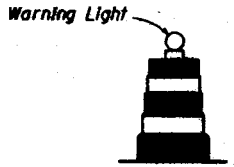
1. These conditions and treatments can be applied only in work areas that fall within a properly signed work zone.
2. The following are defined as acceptable warning devices:
For further details, see Part IX of the MUTCD.
a. Vertical Panel
b. Type I Or Type II Barricades
c. Drum
d. Cone - cones are allowed only for use during daylight hours.
3. Where barrier is specified either of the types below may be used.
a. Temporary barrier wall installed in accordance with Standard Index No. 415 and Standard Specifications.
b. Temporary guardrail installed in accordance with the Standard Specifications and Standard Index No. 400. Materials may be new and/or used, but used material must be structurally and functionally sound as determined by the Engineer. End anchorages per Standard Index No. 400 will also be required.
4. When warning devices are used for a dropoff condition, a minimum number of four devices is required.
5. Warning device spacing shall be as follows:
A. On Taper
Maximum spacing between devices (feet) to be equal to the legal posted speed limit (MPH), but not greater than 25 feet for cones or 50 feet for Type I Or Type II barricades, drums or vertical panels.
B. On Tangents
Maximum spacing for cones is 25 feet. Maximum spacing for Type I Or Type II barricades, drums or vertical panels is 50 feet.

DROPOFFS IN WORK ZONES

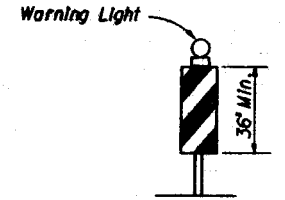
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES			
Revised By	CSM	12/97	 Michael A. Haggard Project Engineer F.H.A. Approved
Drawn By	MSD/AM	12/97	
Checked By	MSD/MSD	12/97	
Reviewed By	MSD/MSD	12/97	
F.H.A. Approved			88 4 of 6 600



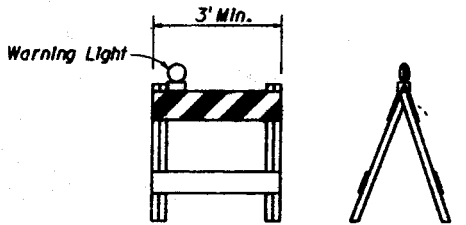
CONES TO BE USED DURING DAYLIGHT ONLY



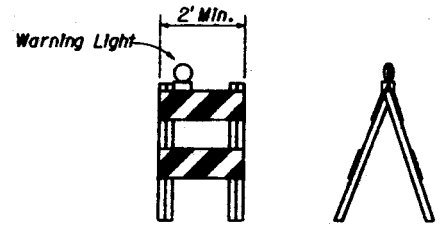
Warning Light
STEEL DRUMS NOT PERMITTED
PLASTIC DRUMS



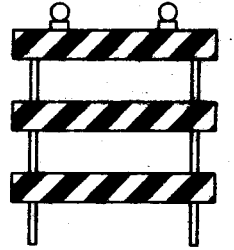
Warning Light
36' Min.
VERTICAL PANEL



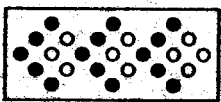
Warning Light
3' Min.
TYPE I BARRICADE



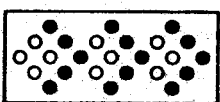
Warning Light
2' Min.
TYPE II BARRICADE



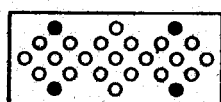
TYPE III BARRICADE



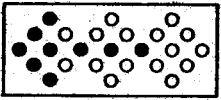
Or



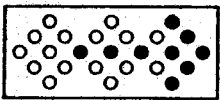
Or



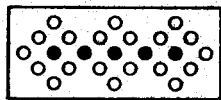
Or



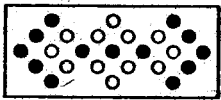
PASS LEFT



PASS RIGHT



WARNING



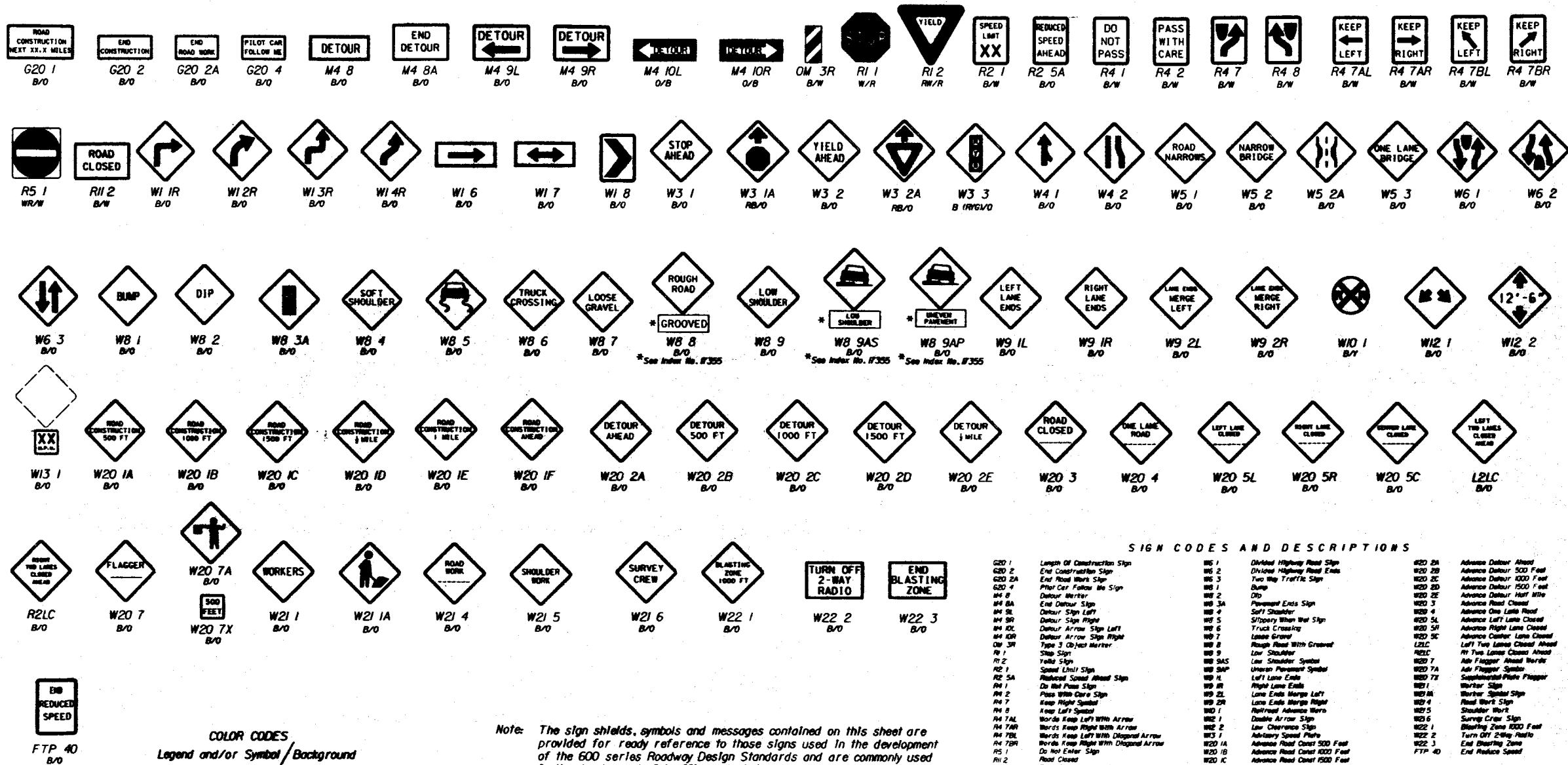
PASS EITHER SIDE

- Minimum Required Lamps
- Additional Lamps Allowed

ADVANCE WARNING ARROW PANELS
MODES

CHANNELIZING AND LIGHTING DEVICES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES			
Designed By	Checked By	Drawn By	Approved By
CSD	JSD	JSD	<i>Handwritten Signature</i>
Checked By	Drawn By	Sheet No.	Index No.
JSD	JSD	5 of 6	600
F.H.R.A. Approved			



COLOR CODES
Legend and/or Symbol/Background

- O Orange (Reflectorized)
- B Black (Non-Reflectorized)
- W White (Reflectorized)
- R Red (Reflectorized)
- Y Yellow (Reflectorized)
- G Green (Reflectorized)

Note: The sign shields, symbols and messages contained on this sheet are provided for ready reference to those signs used in the development of the 600 series Roadway Design Standards and are commonly used in the development of traffic control plans.

For additional signs and sign detail information refer to the STANDARD HIGHWAY SIGNS MANUAL as specified in the MUTCD. Special signs for traffic control plans will be as approved by the State Traffic Plans Engineer.

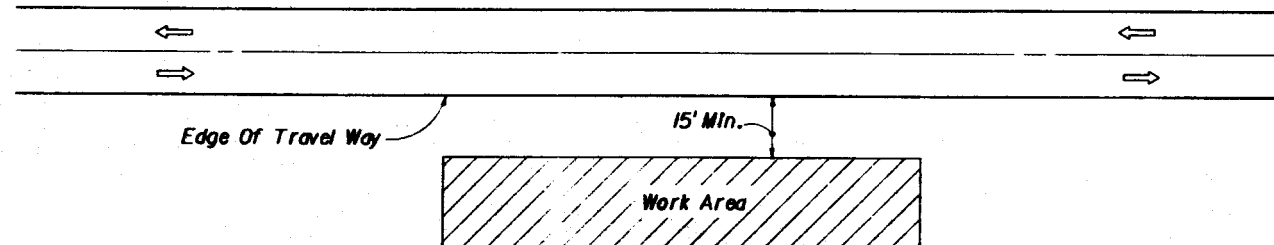
The sign codes shown on this sheet are for the purpose of identifying call names found in the Roadway Design Standards call library on the CADD system. The STANDARD HIGHWAY SIGNS MANUAL should be referenced for the official sign codes for use in the development of traffic control plans.

SIGN CODES AND DESCRIPTIONS

G20 1	Length of Construction Sign	W5 1	Divided Highway Road Sign	W20 2H	Advance Detour Ahead
G20 2	End Construction Sign	W5 2	Divided Highway Road Ends	W20 2B	Advance Detour 500 Feet
G20 2A	End Road Work Sign	W5 3	Two Way Traffic Sign	W20 2C	Advance Detour 1000 Feet
G20 4	Pilot Car Follow Me Sign	W5 4	Bump	W20 2D	Advance Detour 1500 Feet
M4 8	Detour Marker	W5 5	Dip	W20 2E	Advance Detour Half Mile
M4 8A	End Detour Sign	W5 6	Placement Ends Sign	W20 3	Advance Road Closed
M4 9L	Detour Sign Left	W5 7	Soft Shoulder	W20 4	Advance One Lane Road
M4 9R	Detour Sign Right	W5 8	Slippery When Wet Sign	W20 5L	Advance Left Lane Closed
M4 10L	Detour Arrow Sign Left	W5 9	Truck Crossing	W20 5R	Advance Right Lane Closed
M4 10R	Detour Arrow Sign Right	W5 10	Lane Gravel	W20 5C	Advance Center Lane Closed
OM 3R	Type 3 Object Marker	W5 11	Rough Road With Gravel	L2LC	Left Two Lanes Closed Ahead
RI 1	Stop Sign	W5 12	Lane Shoulder	R2LC	Right Two Lanes Closed Ahead
RI 2	Yield Sign	W5 13	Low Shoulder Symbol	W20 7	Adv. Flagger Ahead Words
R2 1	Speed Limit Sign	W5 14	Uneven Pavement Symbol	W20 7A	Adv. Flagger Symbol
R2 5A	Reduced Speed Ahead Sign	W5 15	Left Lane Ends	W20 7X	Supplemental Plate Flagger
R4 1	Do Not Pass Sign	W5 16	Right Lane Ends	W21 1	Worker Sign
R4 2	Pass With Care Sign	W5 17	Lane Ends Merge Left	W21 1A	Road Work Sign
R4 7	Keep Left Sign	W5 18	Lane Ends Merge Right	W21 4	Shoulder Work
R4 8	Keep Right Sign	W5 19	Double Arrow Sign	W21 5	Survey Crew Sign
R4 7AL	Keep Left Sign	W5 20	Advance Speed Plate	W22 1	Blasting Zone
R4 7AR	Keep Right Sign	W5 21	Advance Road Closed 500 Feet	W22 2	Turn Off 2-Way Radio
R4 7BL	Keep Left Sign	W5 22	Advance Road Closed 1000 Feet	W22 3	End Blasting Zone
R4 7BR	Keep Right Sign	W5 23	Advance Road Closed 1500 Feet		
		W5 24	Advance Road Closed Half Mile		
			Advance Road Closed One Mile		
			Road Construction Ahead		

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES			
Designed By	Drawn By	Checked By	Approved By
WSD	WSD	JMS	JMS
Date	Date	Date	Date
12/17	12/17	12/17	12/17
Revision No.	Sheet No.	Total No.	
00	6 of 6	600	
F.A.R.A. Approved			

COMMONLY USED WARNING AND REGULATORY SIGNS IN WORK ZONES



GENERAL NOTES

1. If the work operation requires that two or more work vehicles cross the 15' zone in any one hour, traffic control will be in conformance with Index No. 602.
2. No special signing is required.
3. Arrows denote direction of traffic only and do not reflect pavement markings.
4. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
5. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

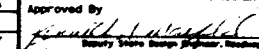
 Work Area

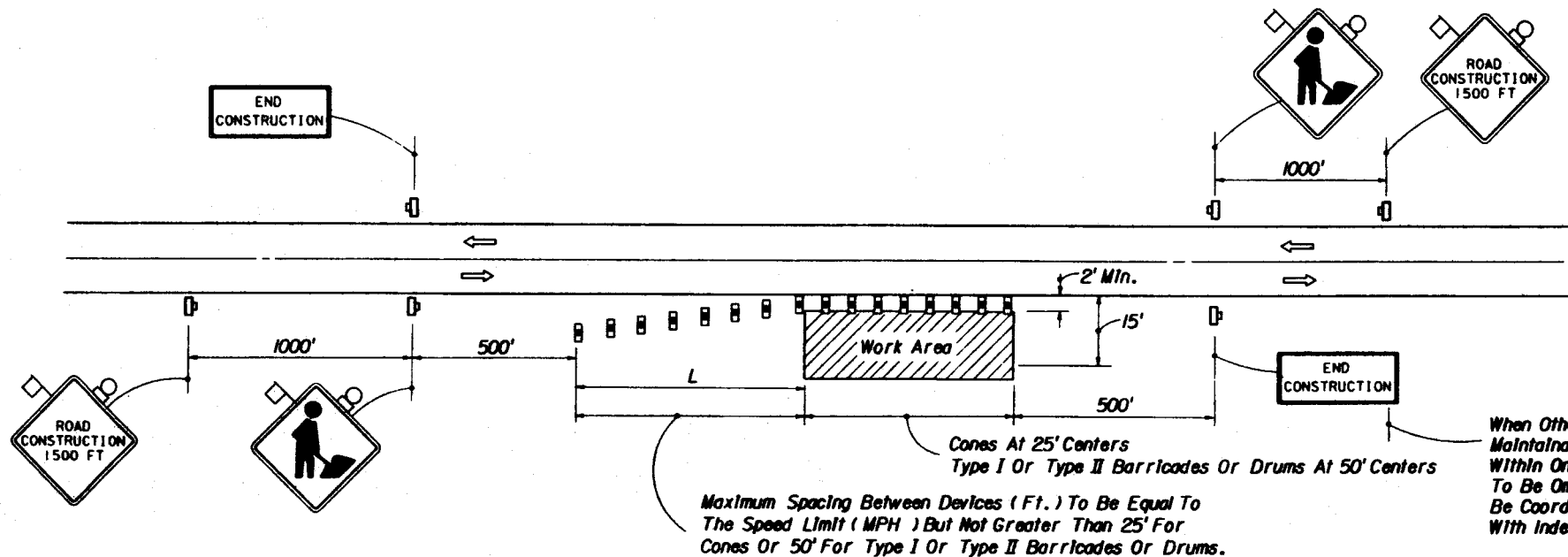
TYPICAL APPLICATIONS

Landscaping Work
Utility Work
Fencing Work
Cleaning Drainage Structures
Reworking Ditches

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT,
WORKERS AND THEIR ACTIVITIES
ARE MORE THAN 15' FROM THE
EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES					
TWO-LANE, TWO-WAY • RURAL					
DAY OR NIGHT OPERATIONS					
Designed By	Drawn By	Checked By	Approved By		
	HSD/BB	12/08		Safety Signs Design Engineer, Roadways	
Checked By	JAC/KBN	12/08	Revision No.	Sheet No.	Index No.
F.J.W.A. Approved			08	1 of 1	601



GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
2. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.
3. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period a flagger shall be provided and the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs see Index No. 603.
4. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
5. The WORKERS legend sign may be substituted for the symbol sign.
6. All signs shall be post mounted if the closure time exceeds 12 hours.
7. $L = \frac{WS}{2}$ for speeds ≥ 45 mph
 $L = \frac{WS^2}{120}$ for speeds ≤ 40 mph
 Where:
 W- Width of shoulder in feet, 8' minimum.
 S- Posted speed limit (MPH) prior to work operation.
8. Barricades, cones and drums shall not be intermixed in the lateral transition.
9. Arrows denote direction of traffic only and do not reflect pavement markings.
10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
11. WORKERS sign to be removed or fully covered when no work is being performed.
12. END CONSTRUCTION signs required only when work exceeds one daylight period.
13. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
14. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Utility Work
 Culvert Extensions
 Side Slope Work
 Guardrail Work
 Landscaping Work
 Cleaning Drainage Structures
 Reworking Ditches
 Sign Installation And Maintenance
 Shoulder Repair

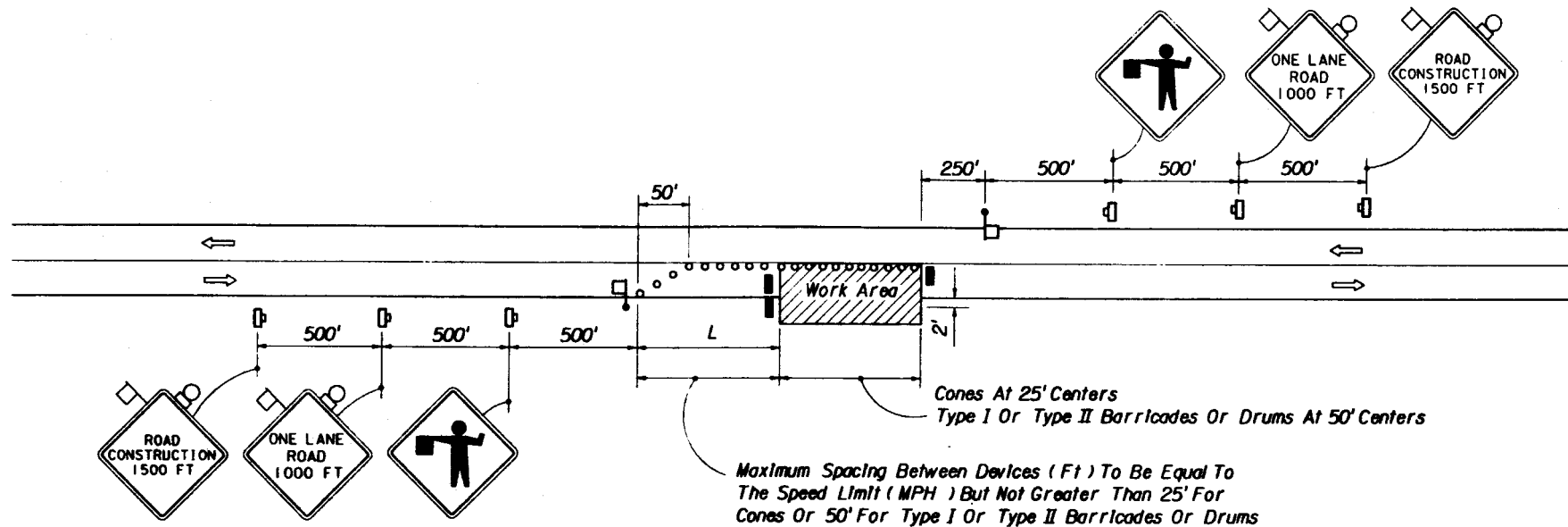
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCR OACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF PAVEMENT

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
TWO-LANE, TWO-WAY • RURAL			
DAY OR NIGHT OPERATIONS			
Designed By	Drawn By	Checked By	Approved By
ASD/MS	ASD/MS	ASD/MS	<i>Michael J. Stapp</i>
Drawn By	ASD/MS	ASD/MS	ASD/MS
Checked By	ASD/MS	ASD/MS	ASD/MS
F.H.R.A. Approved	68	1 of 1	602



GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.
3. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.
4. Additional one-way control may be effected by the following means:
(1) Flag-carrying vehicle (2) Official vehicle (3) Pilot vehicles (4) Traffic signals
When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.
5. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
6. Mesh signs may be used for maintenance and utility operations; Type B lights and orange flags are not required.
7. The FLAGGER legend sign may be substituted for the symbol sign.

8. $L = \frac{WS}{2}$ for speeds ≥ 45 mph
 $L = \frac{WS^2}{120}$ for speeds ≤ 40 mph

Where:

W = Width of lateral transition in feet.

S = Posted speed limit (MPH) prior to work operation.

9. Barricades, cones and drums shall not be intermixed in the lateral transition.
10. The ONE-LANE ROAD signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
13. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
14. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Pavement Resurfacing
Pavement Repair
Utility Work
Bridge Repair
Guardrail Work

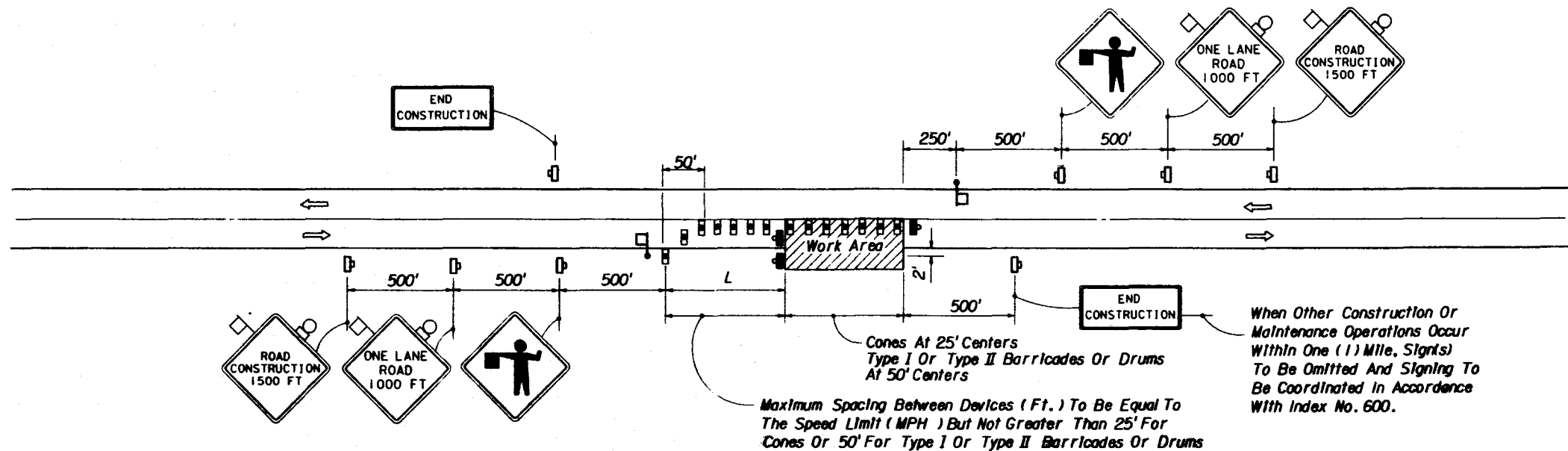
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF PAVEMENT

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I, Type II Or Type III Barricade, Or Drum
- Type I Or Type II Barricade, Cone Or Drum
- Work Zone Sign
- Flagger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES TWO-LANE, TWO-WAY • RURAL OPERATIONS ONE DAYLIGHT PERIOD OR LESS			
Designed By	Checked By	Reviewed By	Approved By
Drawn By	Checked By	Reviewed By	Approved By
Checked By	Checked By	Reviewed By	Approved By
F.J.W.A. Approved		08	1 of 1
		603	



GENERAL NOTES

- Construction operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
- All vehicles, equipment, workers, (except flaggers) and their activities are restricted at all times to one side of the pavement.
- Additional one-way control may be effected by the following means:
(1) Flag-carrying vehicle (2) Official vehicle
(3) Pilot vehicles (4) Traffic signals

When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.
- The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
- The FLAGGER legend sign may be substituted for the symbol sign.
- All signs shall be post mounted if the closure time exceeds 12 hours.
- $L = \frac{WS}{2}$ for speeds ≥ 45 mph
 $L = \frac{WS^2}{120}$ for speeds ≤ 40 mph

Where:
W- Width of lateral transition in feet.
S- Posted speed limit (MPH) prior to work operation.
- Barricades, cones and drums shall not be intermixed in the lateral transition.
- The ONE-LANE ROAD signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.
- Arrows denote direction of traffic only and do not reflect pavement markings.
- Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
- When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
- For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Pavement Repair
Culvert Construction
Utility Work
Bridge Repair

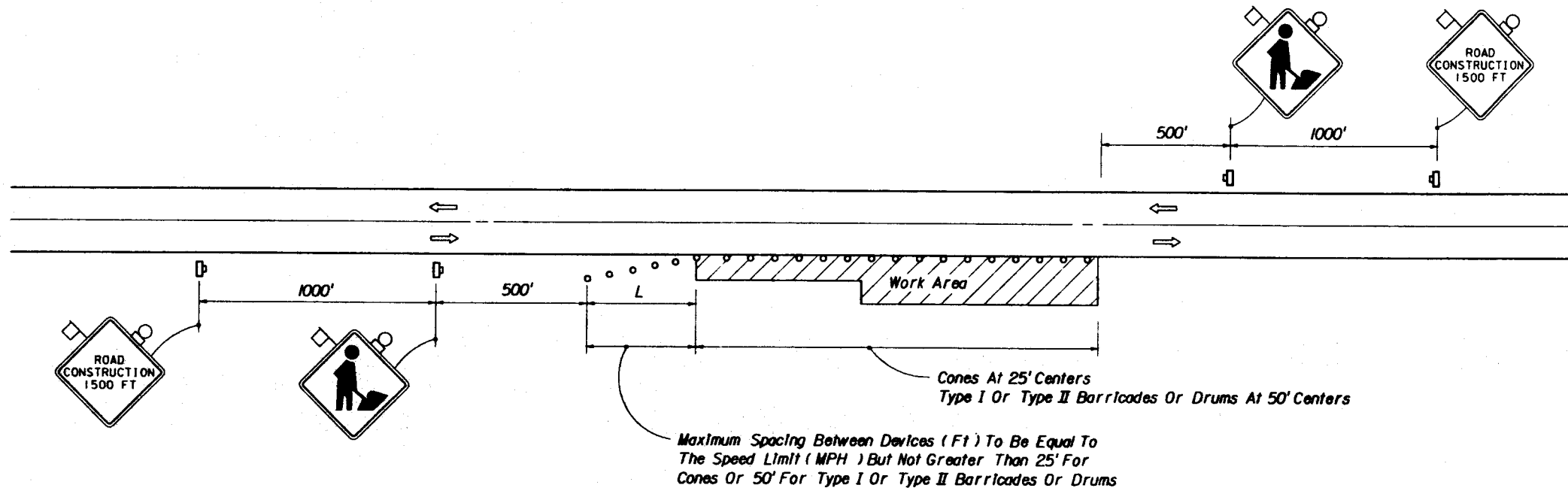
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT
WORKERS OR THEIR ACTIVITIES
ENCROACH THE AREA BETWEEN
THE CENTERLINE AND A LINE 2'
OUTSIDE THE EDGE OF PAVEMENT

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I, Type II Or Type III Barricade Or Drum (With Flashing Light)
- Work Zone Sign
- Flagger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES TWO-LANE, TWO-WAY • RURAL NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD			
Designed By	Date	Approved By	
Drawn By	12/97	[Signature]	
Checked By	12/97	Revision No.	Sheet No.
F.H.R.A. Approved	88	1 of 1	604



GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
2. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.
3. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period flaggers shall be provided and the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs see Index No. 603.
4. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
Mesh signs may be used for maintenance and utility operations; Type B lights and orange flags are not required.
5. The WORKERS legend sign may be substituted for the symbol sign.
6. $L = \frac{WS}{2}$ for speeds ≥ 45 mph
 $L = \frac{WS}{120}$ for speeds ≤ 40 mph
Where:
W- Width of shoulder in feet, 8' minimum.
S- Posted speed limit (MPH) prior to work operation.
7. Barricades, cones and drums shall not be intermixed in the lateral transition.
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
10. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
11. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
 - o Type I Or Type II Barricade, Cone Or Drum
 - Work Zone Sign

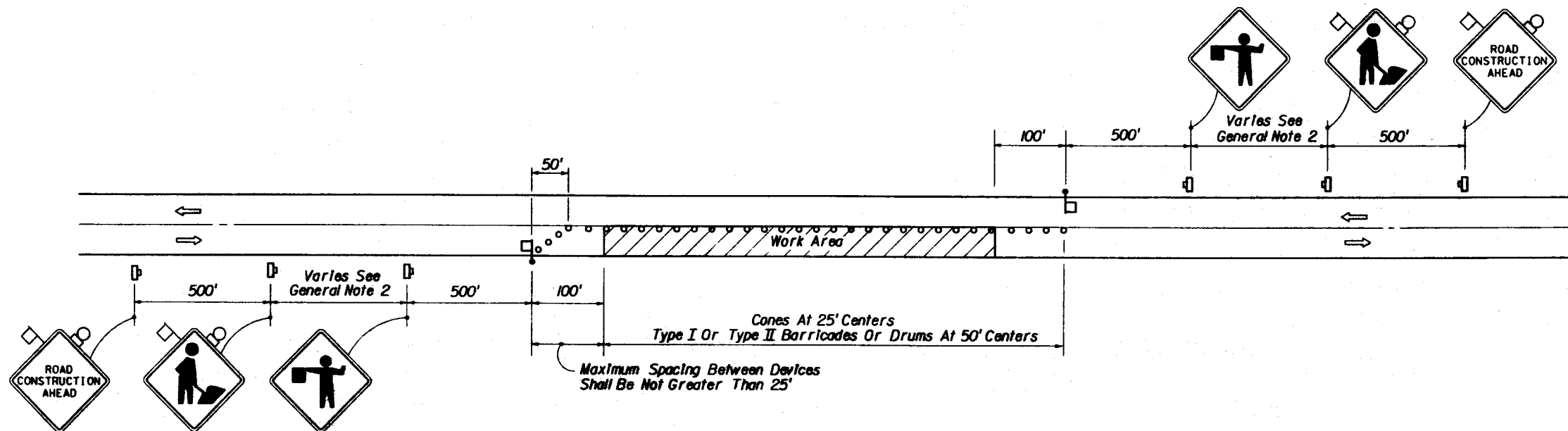
TYPICAL APPLICATIONS

Shoulder And Slope Work
Utility Work
Guardrail Work
Landscape Work
Delinicator Installation And Maintenance

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION ON THE SHOULDER OR SHOULDER AND SLOPES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
TWO-LANE, TWO-WAY • RURAL			
MOVING OPERATIONS-DAYLIGHT ONLY			
Designed By	Name	Date	Approved By
Drawn By	HSD/AB	12/97	
Checked By	JHG/KMB	12/97	County State Road Engineer, Highway
F.H.W.A. Approved:		88	Sheet No. 1 of 1
			Index No. 605



GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.
2. Minimum length of work area is 200 feet. Maximum length to be determined by the Engineer, but in no case to exceed the length of one-half (1/2) days operation or two miles whichever is less.

3. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.

4. Additional one-way control may be effected by the following means:
(1) Flag-carrying vehicle (2) Official vehicle
(3) Pilot vehicles (4) Traffic signals

When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.

5. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

6. Mesh signs may be used for maintenance and utility operations; Type B lights and orange flags are not required.

7. The WORKER and FLAGGER legend signs may be substituted for the symbol signs.

8. The WORKERS signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.

9. Arrows denote direction of traffic only and do not reflect pavement markings.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

11. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.

12. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
 - Type I Or Type II Barricade, Cone Or Drum
- Work Zone Sign
- Flagger

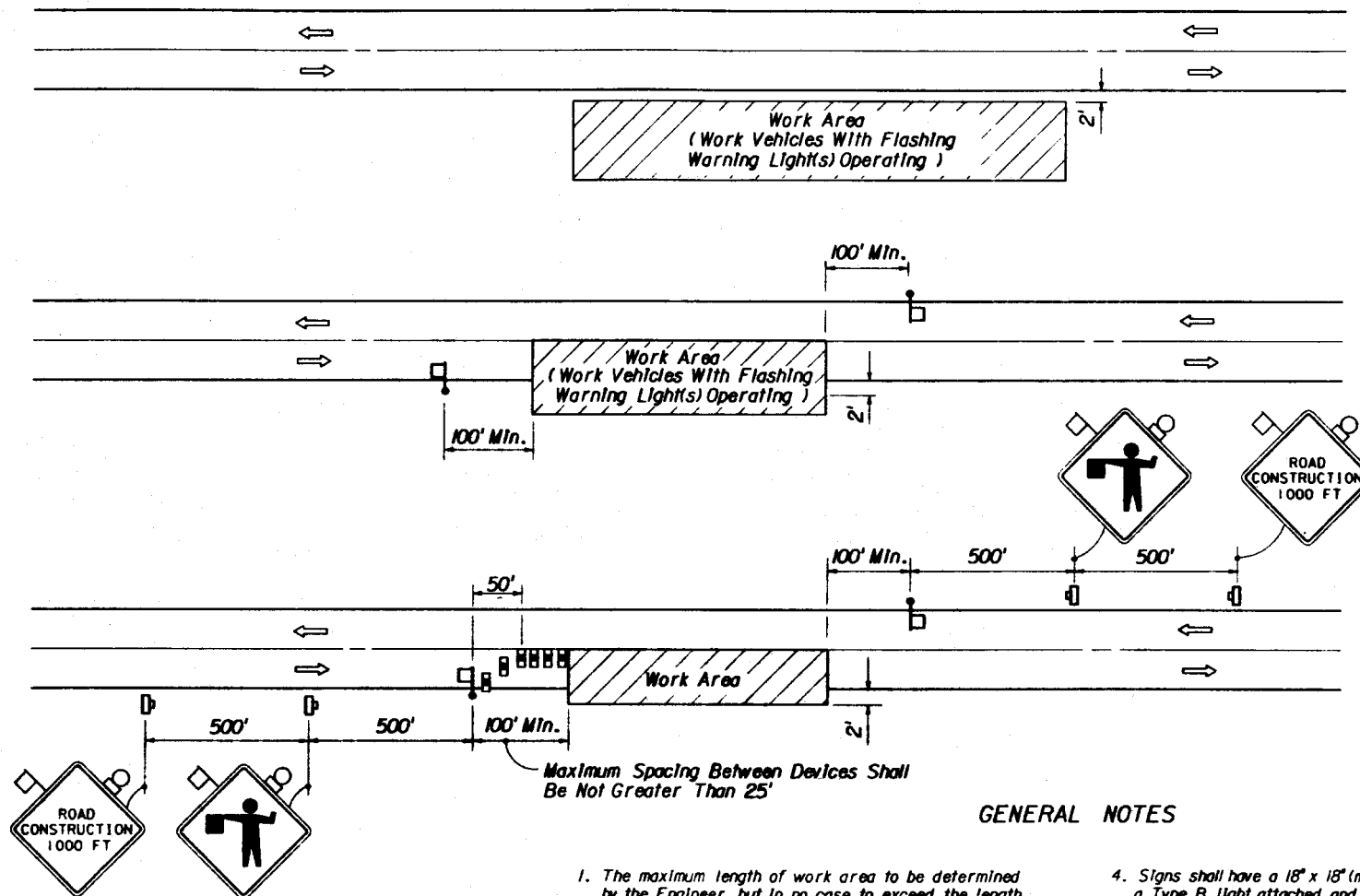
TYPICAL APPLICATIONS

Pavement Repair
Pavement Surfacing
Utility Work
Delineator Maintenance
Crack Sealing
Core Boring

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION ON THE PAVEMENT WHERE THE AVERAGE SPEED OF MOVEMENT IS LESS THAN FOUR MILES PER HOUR

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES MOVING OPERATIONS • RURAL TWO-LANE TWO-WAY DAYLIGHT ONLY			
Reviewed By	DATE	Approved By	DATE
Drawn By	DATE	Checked By	DATE
Created By	DATE	Revision No.	Sheet No.
F.H.W.A. Approved		88	1 of 1
		606	



CONDITIONS

FOR ANY OPERATION THAT IS 2' OR MORE OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD OF LESS THAN 60 MINUTES.

CONDITIONS

FOR ANY OPERATION THAT ENCROACHES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD OF 15 MINUTES OR LESS

CONDITIONS

FOR ANY OPERATION THAT ENCROACHES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD IN EXCESS OF 15 MINUTES BUT LESS THAN 60 MINUTES.

GENERAL NOTES

1. The maximum length of work area to be determined by the Engineer, but in no case to exceed the length of one-half (1/2) days operation or two miles whichever is less.
2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.
3. Additional one-way control may be effected by the following means:
(1) Flag-carrying vehicle (2) Official vehicle (3) Pilot vehicles (4) Traffic signals

When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.

4. Signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.

5. The FLAGGER legend sign may be substituted for the symbol sign.
6. Arrows denote direction of traffic only and do not reflect pavement markings.
7. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
8. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
9. For general TCZ requirements and additional information refer to Index No. 600.

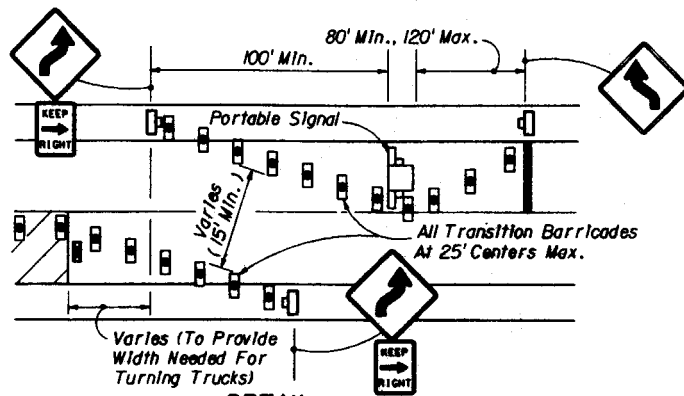
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign
- Flagger

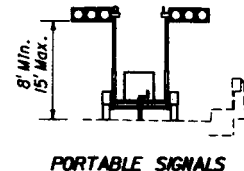
TYPICAL APPLICATIONS

Marking Patches
Field Patches
String Line
Utility Work
Cleaning Up Debris On Pavement

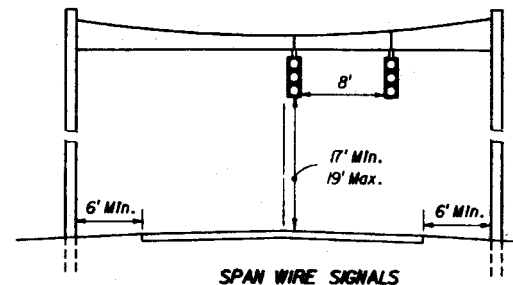
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES TWO-LANE TWO-WAY • RURAL SHORTTIME DAY OR NIGHT OPERATIONS			
Designed By	Checked By	Approved By	
Drawn By	Reviewed By		
Checked By	Revision No.	Sheet No.	Index No.
F.H.W.A. Approved:	58	1 of 1	607



DETAIL
LAYOUT WHEN PORTABLE SIGNAL USED

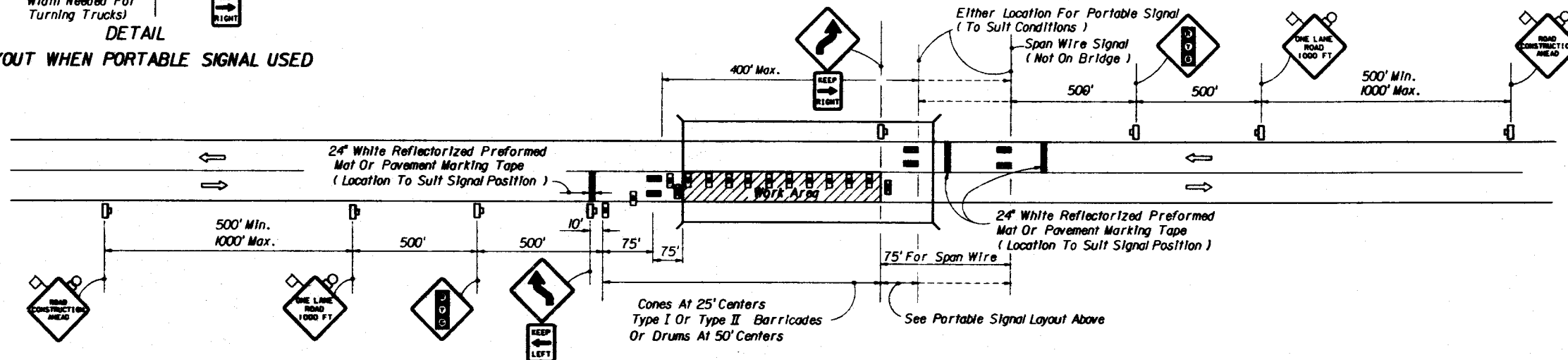


PORTABLE SIGNALS



SPAN WIRE SIGNALS

OPTIONAL SIGNAL MOUNTS



GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.
3. The installation and timing of signals shall be approved by the District Traffic Operations Engineer prior to signals being placed in operation.
Where sight distance to the signal is limited, the signals may be mounted on span wire at the discretion of the Engineer.
4. If flaggers are used instead of signals, the traffic control devices shall conform to Index No. 603 or Index No. 604.
5. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
6. For additional warning, a BRIDGE REPAIRS AHEAD sign may be installed ahead in advance of the ROAD CONSTRUCTION AHEAD sign. The distance between successive signs shall be 500 ft.
7. The SIGNAL AHEAD legend sign may be substituted for the symbol sign.
8. All signs shall be post mounted if the closure time exceeds 12 hours.
9. Barricades, cones and drums shall not be intermixed in the lateral transition.
10. The ONE-LANE ROAD, KEEP LEFT, KEEP RIGHT and SIGNAL signs are to be removed or fully covered when no work is being performed and the highway is open to two-way traffic.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
13. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
14. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign
- Traffic Signal
- Type III Barricade
- Stop Bar

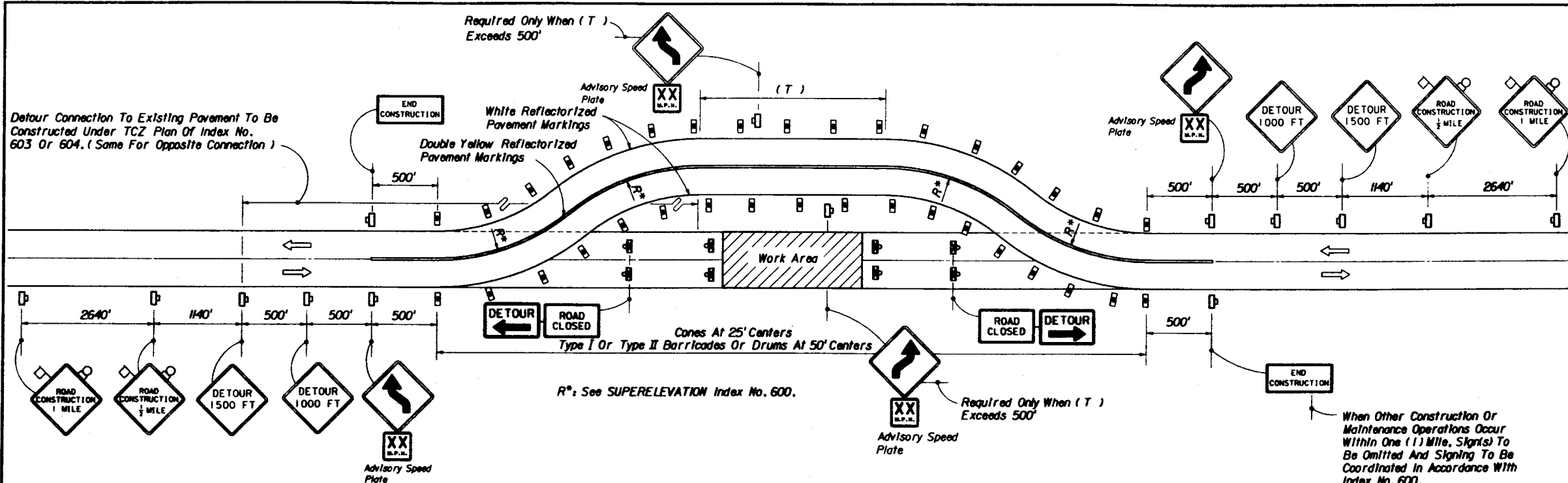
TYPICAL APPLICATION

Bridge Repair

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON ONE LANE OF A BRIDGE DECK AND TRAFFIC SIGNALS ARE REQUIRED

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
TWO-LANE, TWO-WAY LANE CLOSURE ON BRIDGE DECK DAY OR NIGHT OPERATIONS			
Designed By	Checked By	Approved By	
Drawn By	Reviewed By	Signature	
Created By	Revised By	Revision No.	Sheet No.
F.H.R.A. Approved		66	1 of 1
		608	



GENERAL NOTES

1. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
2. For supplemental 'advisory speed plate' application see Index No. 600.
3. Barricades, cones and drums shall not be intermixed within the curved alignment or within the tangent alignment.

Where the tangent distance (T) exceeds 600 feet, spacing between cones may be increased to 50 feet or spacing between Type I or Type II barricades or drums may be increased to 100 feet within limits of the tangent, or, post mounted delineators at 50 foot centers may be substituted for the barricades or drums.

4. On the existing pavement all existing markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking a new centerline and edge lines.
5. Where the tangent distance (T) exceeds 600 feet and no passing or stopping sight distance restrictions exist, the yellow reflectorized markings used to indicate the centerline of the traveled way may be replaced with yellow reflectorized marking in a broken pattern.

Bi-directional reflective amber raised pavement markers shall be placed right of the center stripe in each direction and spaced 40' on centers on tangent roadway and 20' on centers on curves throughout the detour. When passing is permitted on tangent roadway, raised reflective pavement markers shall be mono-directional and/or bi-directional and placed in accordance with Index No. 17352. Mono-directional reflective colorless raised pavement markers shall be placed on the edgelines and spaced 40' on centers on tangent roadway and 20' on centers on curves.

6. Arrows denote direction of traffic only and do not reflect pavement markings.
7. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
8. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
9. If temporary structures are required on the detour traffic control will be in conformance with Index No. 650.
10. For general TCZ requirements and additional information refer to Indexes Nos. 600 and 17352.






TYPICAL APPLICATIONS

Bridge Construction
Subgrade Restoration
Culvert Repair Or Construction

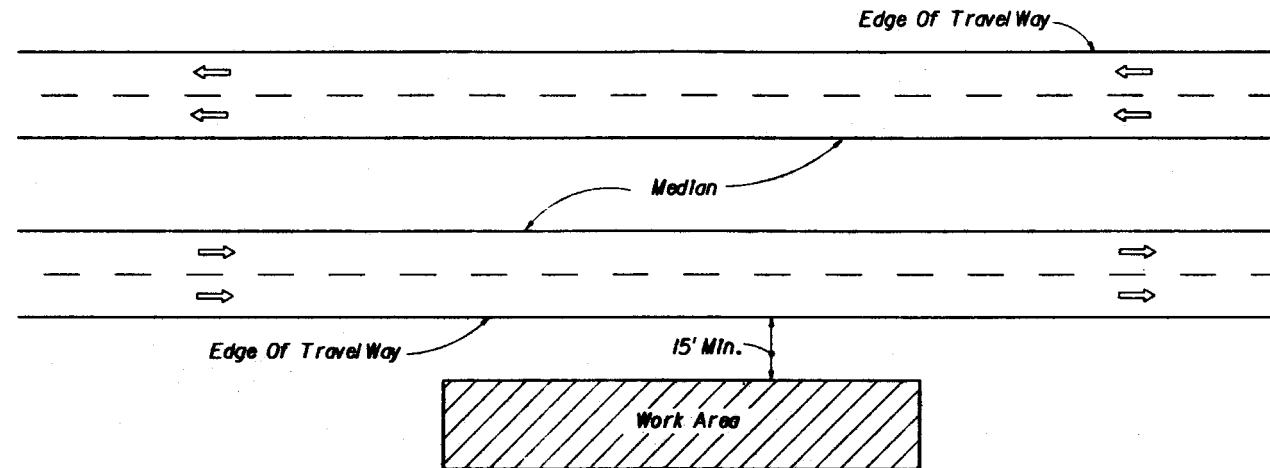
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF BOTH LANES AND A TEMPORARY DETOUR IS CONSTRUCTED

SYMBOLS

-  Work Area
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
-  Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
-  Type III Barricade (With Flashing Light)
-  Work Zone Sign

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES TWO-LANE, TWO-WAY • RURAL TEMPORARY DETOUR DAY OR NIGHT OPERATIONS			
Designed By	Checked By	Drawn By	Field No.
CSM	CSM	HSD/AM	12/87
Checked By	Field No.	Short No.	Index No.
JVC/TOM	12/87		609
F.S.R.A. Approved:		88 1 of 1	



GENERAL NOTES

1. If the work operation requires that two or more work vehicles cross the 15' zone in any one hour, traffic control will be in conformance with Index No. 602.
2. No special signing is required.
3. This Index also applies when work is being performed on a multilane undivided highway.
4. This Index also applies to work performed in the median more than 15 ft. from edge of travel way, both roadways.
5. Arrows denote direction of traffic only and do not reflect pavement markings.
6. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
7. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

 Work Area

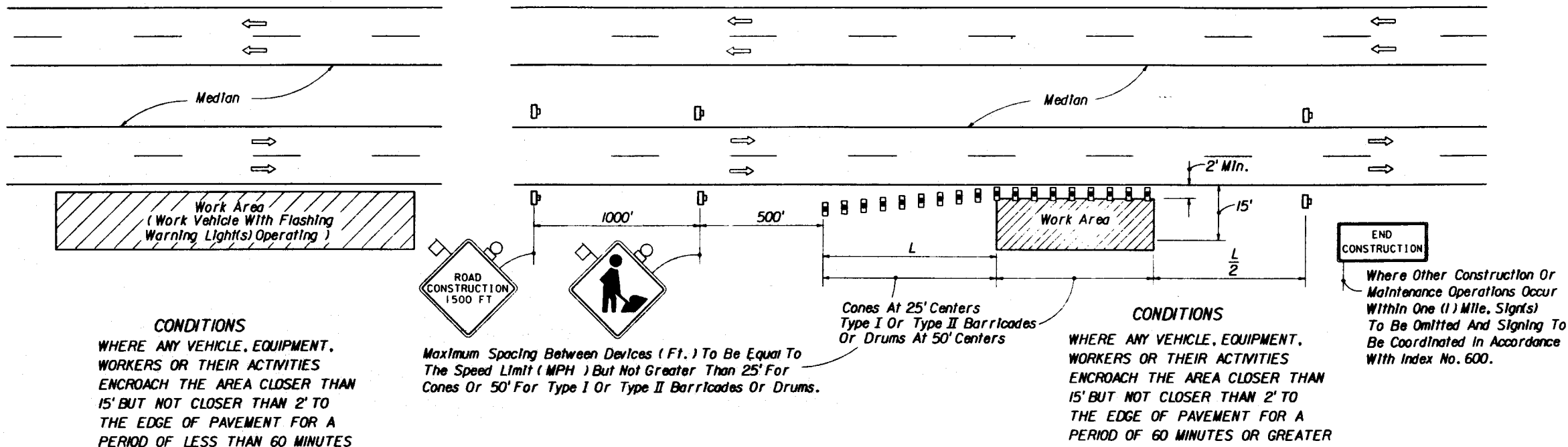
TYPICAL APPLICATIONS

Landscaping Work
Utility Work
Fencing Work
Cleaning Drainage Structures
Reworking Ditches

CONDITIONS

WHERE ALL VEHICLES, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE MORE THAN 15' FROM THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES MULTILANE DIVIDED OR UNDIVIDED RURAL • DAY OR NIGHT OPERATIONS					
Designed By	Checked By	Drawn By	Reviewed By	Approved By	Index No.
CDM	JME/MS	MS/MS	MS/MS	<i>[Signature]</i>	610
Drawn By	Checked By	Reviewed By	Approved By	Index No.	Sheet No.
MS/MS	JME/MS	MS/MS	MS/MS	610	1 of 1
F.A.R.A. Approved					



GENERAL NOTES

- All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
- If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period a flagger shall be provided and a FLAGGER sign shall be substituted for the WORKERS sign. The flagger shall be positioned at the point of vehicle entry or departure from the work area.
- This TCZ plan also applies to work performed in the median more than 2 feet but less than 15 feet from the edge of either pavement.
- The first two signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
- The WORKERS legend sign may be substituted for the symbol sign.
- $L = \frac{WS}{2}$ for speeds ≥ 45 mph
 $L = \frac{WS^2}{120}$ for speeds ≤ 40 mph
Where:
W- Width of lateral transition in feet
S- Posted speed limit (MPH) prior to work operation
- Barricades, cones and drums shall not be intermixed in the lateral transition.
- Arrows denote direction of traffic only and do not reflect pavement markings.
- Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
- When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
- WORKERS signs to be removed or fully covered when no work is being performed.
- END CONSTRUCTION signs required only when work exceeds one daylight period.
- When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
- If the work operation does not exceed 15 minutes, signs, barricades, cones or drums will not be required provided vehicles in the work area have warning light(s) operating.
- For general TCZ requirements and additional information refer to Index No. 600.

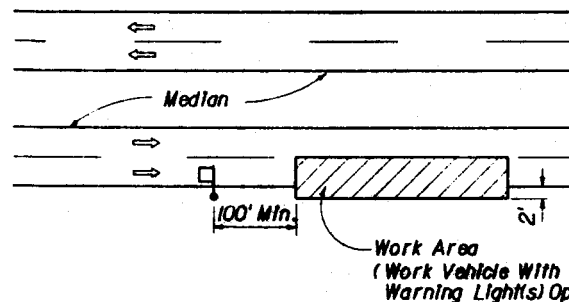
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign

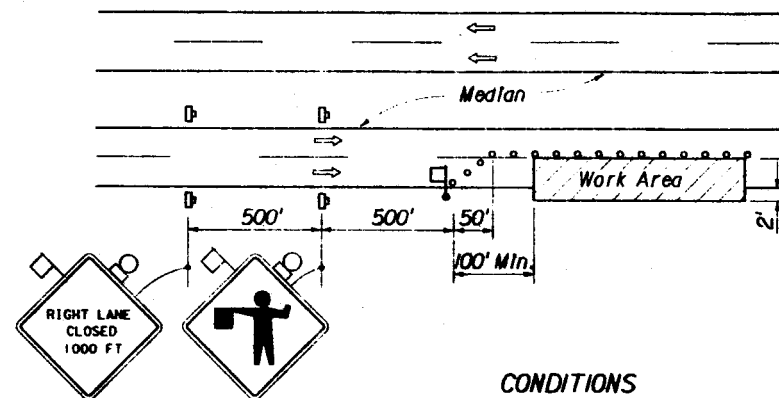
TYPICAL APPLICATIONS

Utility Work
Culvert Extensions
Side Slope Work
Guardrail Work
Landscaping Work
Cleaning Drainage Structures
Reworking Ditches
Sign Installation And Maintenance
Shoulder Repair

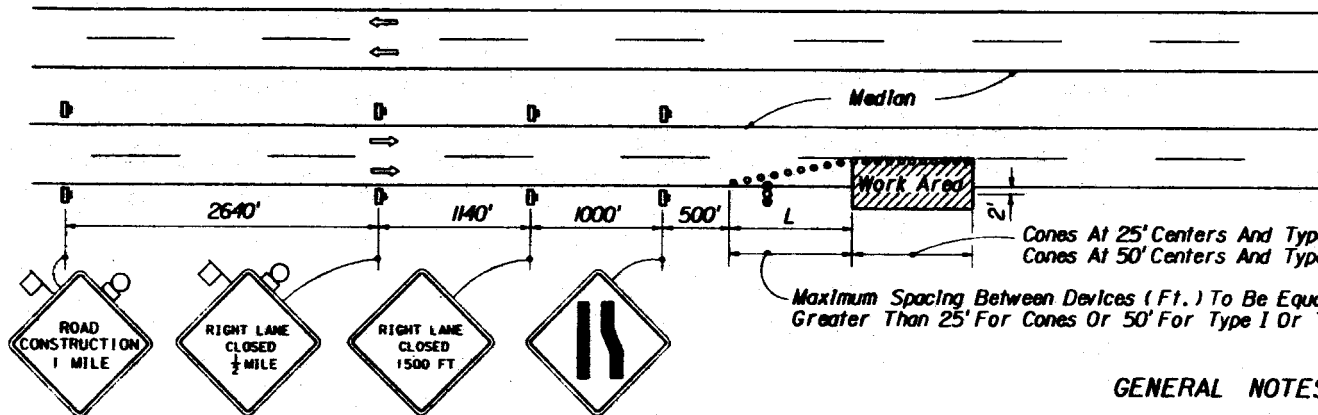
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
MULTILANE DIVIDED OR UNDIVIDED RURAL • DAY OR NIGHT OPERATIONS			
Designed By	Checked By	Approved By	
Drawn By	Reviewed By	Signature	
Created By	Revision No.	Sheet No.	Index No.
F.J.W.A. Approved	08	1 of 1	611



CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT FOR A PERIOD OF 15 MINUTES OR LESS



CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT FOR A PERIOD OF MORE THAN 15 MINUTES BUT LESS THAN 60 MINUTES



Cones At 25' Centers And Type I Or Type II Barricades Or Drums At 50' Centers For 250'. Thereafter Cones At 50' Centers And Type I Or Type II Barricades Or Drums At 100' Centers.

Maximum Spacing Between Devices (Ft.) To Be Equal To The Speed Limit (MPH) But Not Greater Than 25' For Cones Or 50' For Type I Or Type II Barricades Or Drums.

CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT FOR A PERIOD OF 60 MINUTES OR GREATER

GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.
3. The first two signs, each side, shall have a 18" x 18" (min.) orange flag and Type B light attached and operating at all times.
4. Mesh signs may be used for maintenance and utility operations; Type B lights and orange flags are not required.
5. On undivided highways the median signs as shown are to be omitted.
6. When work is performed in the median lane on divided highways the barricading plan is inverted and left lane closed and lane reduction signs substituted for the right lane closed and lane reduction signs.
The same applies to undivided highways with the following exceptions:
(a) Work shall be confined within one median lane. (b) Additional barricades, cones, or drums shall be placed along the centerline abutting the work area and across the trailing end of the work area.
When work on undivided highways occurs across the centerline so as to encroach on both median lanes, the inverted plan is applied to the approach of both roadways.
6. When work is performed in the median lane the barricading plans are inverted and left lane closed and lane reduction signs substituted for the right lane closed and lane reduction signs.
7. The RIGHT (LEFT) LANE CLOSED signs are to be removed or fully covered when no work is being performed and the highway is open to traffic.
8. L- Length of taper in feet:
- WS for speeds ≥ 45 mph
- WS^2 for speeds ≤ 40 mph
60
Where:
W- Width of lateral transition in feet
S- Posted speed limit (MPH) prior work operation
9. Barricades, cones and drums shall not be intermixed in the lateral transition.
10. Arrows denote direction of traffic only and do not reflect pavement markings.
11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
12. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
13. This TCZ plan does not apply when work is being performed in the middle or inside lane(s) of a six or more lane highway. See indexes Nos. 616 and 617.
14. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
15. For general TCZ requirements and additional information refer to Index No. 600.

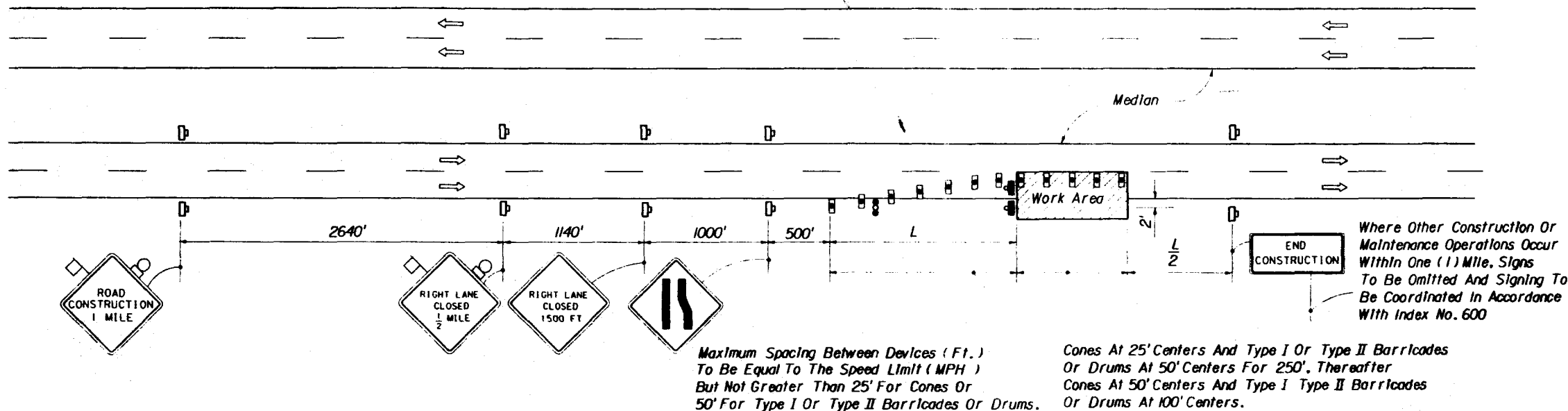
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade, Cone Or Drum
- Work Zone Sign
- Flagger
- Advance Warning Arrow Panel

TYPICAL APPLICATIONS

Pavement Resurfacing
Pavement Repair
Utility Work
Bridge Repair
Guardrail Work

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
MULTILANE, DIVIDED AND UNDIVIDED RURAL • OPERATIONS ONE DAYLIGHT PERIOD OR LESS			
Designed By	Checked By	Approved By	Drawn By
CSM	JMS/KRM	<i>[Signature]</i>	CSM
Drawn By	Checked By	Approved By	Drawn By
JMS/KRM	JMS/KRM	<i>[Signature]</i>	JMS/KRM
Drawn By	Checked By	Approved By	Drawn By
JMS/KRM	JMS/KRM	<i>[Signature]</i>	JMS/KRM
F.H.W.A. Approved		88	1 of 1
			612



GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.
3. The first two signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
4. All signs shall be post mounted if the closure time exceeds 12 hours.
5. On undivided highways the median signs as shown are to be omitted.
6. When work is performed in the median lane on divided highways the barricading plan is inverted and left lane closed and lane reduction signs substituted for the right lane closed and lane reduction signs.
The same applies to undivided highways with the following exceptions:
(a) Work shall be confined within one median lane. (b) Additional barricades, cones, or drums shall be placed along the centerline abutting the work area and across the trailing end of the work area.
When work on undivided highways occurs across the centerline so as to encroach on both median lanes, the inverted plan is applied to the approach of both roadways.
7. The RIGHT (LEFT) LANE CLOSED signs are to be removed or fully covered when no work is being performed and the highway is open to traffic.
8. L- Length of taper in feet:
• WS for speeds ≥ 45 mph
• WS² for speeds ≤ 40 mph
60
Where:
W- Width of lateral transition in feet
S- Posted speed limit (MPH) prior to work operation
9. Barricades, cones and drums shall not be intermixed in the lateral transition.
10. Arrows denote direction of traffic only and do not reflect pavement markings.
11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
12. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
13. When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
14. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I, Type II Or Type III Barricade Or Drum (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel

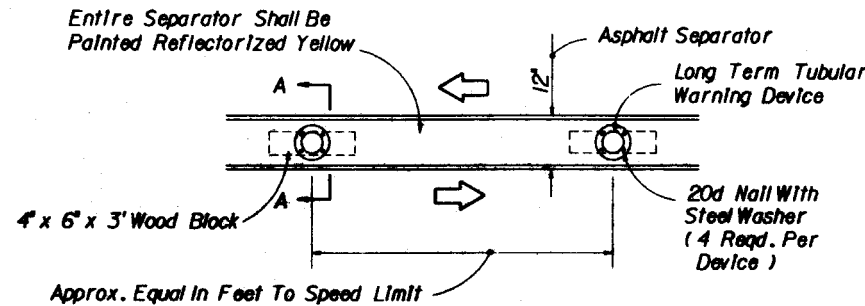
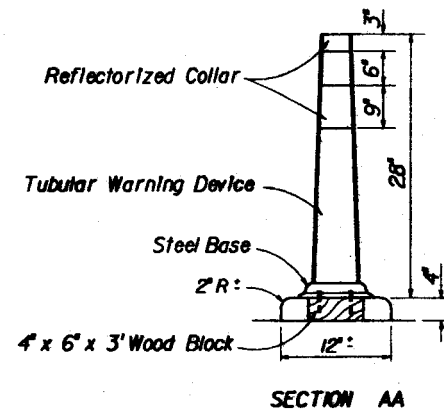
TYPICAL APPLICATIONS

Pavement Resurfacing
Pavement Repair
Utility Work
Bridge Repair
Guardrail Work

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES MULTILANE, DIVIDED AND UNDIVIDED • RURAL NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD			
Designed By	CDM	Date	12/87
Drawn By	HSD/BB	Date	12/87
Checked By	JAG/KMB	Date	12/87
Approved By			
Revision No.	Sheet No.	Index No.	
	88	1 of 1	
F.H.W.A. Approved:		613	



- Notes: (a) The tubular device is to be made of a flexible material or have a flexible joint at the base such that it will not cause damage to vehicles upon impact and will return to its original shape after being struck by a 5000 pound vehicle at a velocity of 75 ft./sec..
- (b) The tubular device shall be orange with two white reflectorized collars.
- (c) Reflectorized materials shall have a smooth sealed outer surface which will display the same approximate color day and night.
- (d) Twelve inch (12") openings for drainage will be constructed in the separator island every 25' in areas of grades of 1% or less or every 50' in areas of grades over 1% as directed by the Engineer.

DETAIL OF TEMPORARY ASPHALT SEPARATOR

GENERAL NOTES

- All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
- The first two signs, each side, shall have a 18" x 18" (min) orange flag and a Type B light attached and operating at all times.
- All signs shall be post mounted.
- TWO-WAY TRAFFIC signs shall be repeated every one-quarter ($\frac{1}{4}$) mile, in each direction, throughout the tangent distance (T).
- L-WS for speeds ≥ 45 mph
- WS² for speeds ≤ 40 mph
60
Where:
W-Width of lateral transition in feet
S-Posted speed limit (MPH) prior to work operation.
- Barricades, cones and drums shall not be intermixed within the lateral transitions, the curved alignment or the tangent alignment.
- All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement marking used for marking new edge lines.
- Arrows denote direction of traffic only and do not reflect pavement markings.
- Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
- When side roads, cross roads or interchanges are located within the limits for work zone traffic control additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
- For general TCZ requirements and additional information refer to Index No. 600.

Where the tangent distance (T) exceeds 600 feet, spacing between cones may be increased to 50 feet or spacing between Type I or Type II barricades or drums may be increased to 100 feet within the limits of the tangent, or post mounted delineators at 50 foot centers may be substituted for the barricades, cones or drums.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign
- Advance Warning Arrow Panel

APPLICATIONS

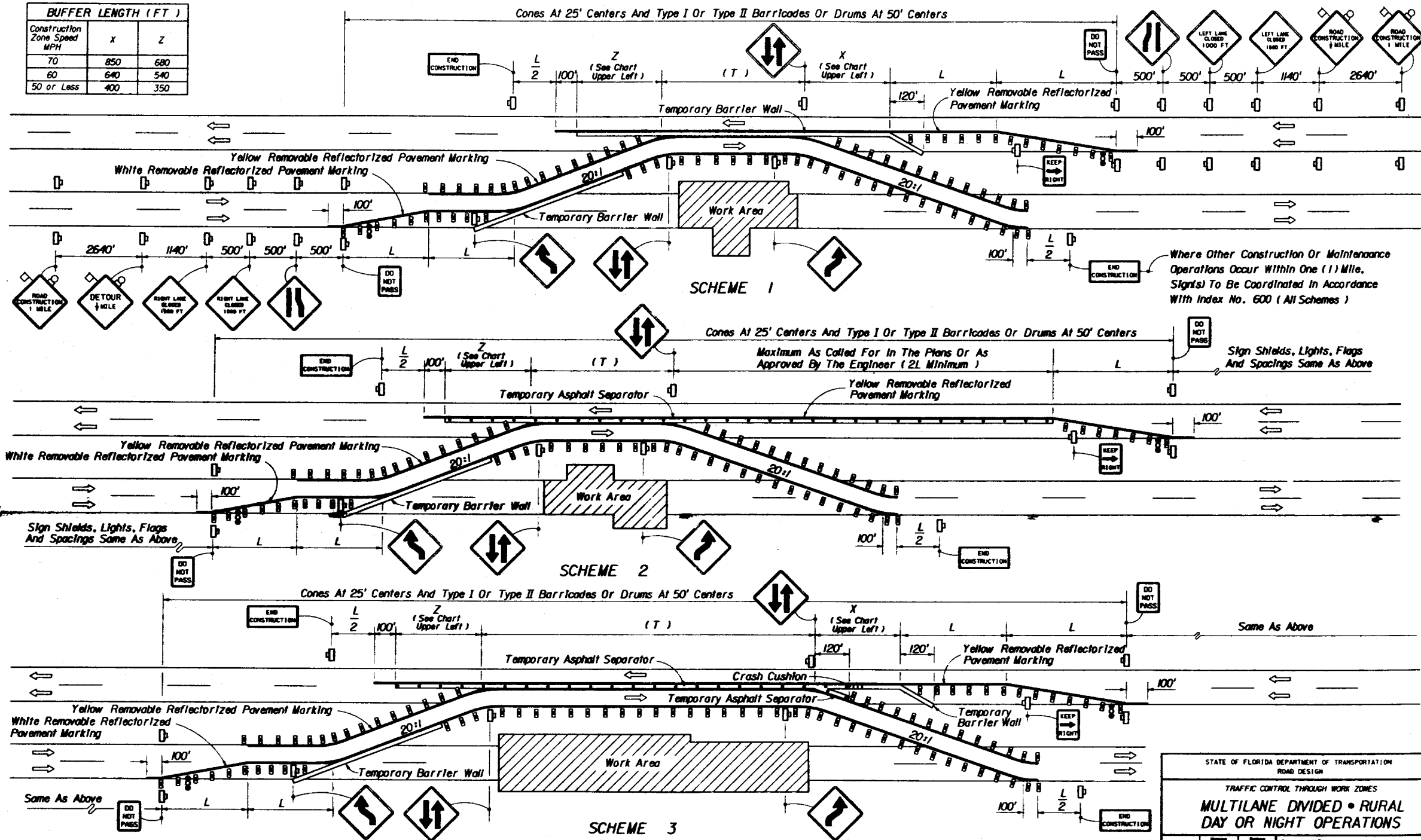
- Scheme 1: Restricted Construction Limits
- Scheme 2: Unrestricted Construction Limits And Light To Moderate Traffic
- Scheme 3: Unrestricted Construction Limits And Moderate To Heavy Traffic
- Where: Construction Limits Are The Outward Beginning Or Ending Of Lane Reductions
- Where: Unless A Specific Scheme Is Called For In The Plans, Scheme Selection Shall Be At The Contractors Option And As Approved By The Engineer

CONDITIONS

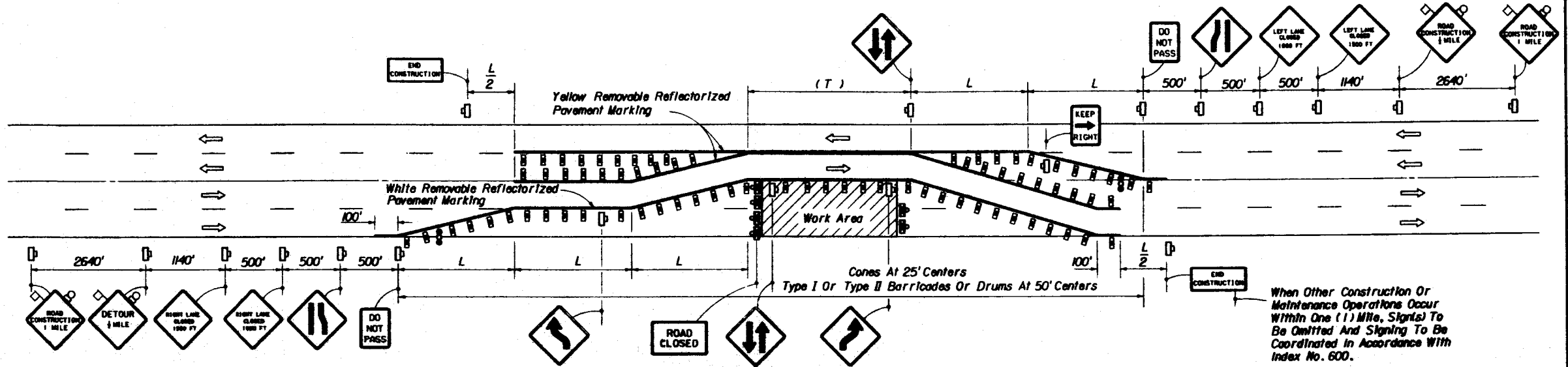
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF ONE ROADWAY AND THE OPPOSING ROADWAY IS CONVERTED TO TEMPORARY TWO-WAY TRAVEL BY WAY OF CROSSOVERS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES					
MULTILANE DIVIDED • RURAL					
DAY OR NIGHT OPERATIONS					
Reviewed By	DESIGN	Date	12/07	Approved By	<i>[Signature]</i>
Drawn By	DESIGN	Date	12/07	Reviewed By	<i>[Signature]</i>
Checked By	JAG/DES	Date	12/07	Reviewed By	<i>[Signature]</i>
F.J.H.A. Approved				88	1 of 2
				614	

BUFFER LENGTH (FT)		
Construction Zone Speed MPH	X	Z
70	850	680
60	640	540
50 or Less	400	350



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			
ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
MULTILANE DIVIDED • RURAL			
DAY OR NIGHT OPERATIONS			
Designed by	Revised	Series	Approved by <i>Joseph H. Murrell</i> Secretary, State Building Inspector, Highway
Drawn by	CSM	12/78	
Graded by	RSD/ABW	12/78	
Checked by	ABW/ROD	12/78	
Construction			
F.H.S.A. Approved		Revision No.	Sheet No.
		00	2 of 2
			614



When Other Construction Or Maintenance Operations Occur Within One (1) Mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.
2. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. All signs, except those required in paved areas, shall be post mounted if the closure time exceeds 12 hours.
4. TWO-WAY TRAFFIC signs shall be repeated every one-quarter (1/4) mile, in each direction, through the tangent distance (T).
5. $L = WS$ for speeds ≥ 45 mph
 $L = \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W- Width of lateral transition in feet.
 S- Posted speed limit (MPH) prior to work operation.
6. Barricades, cones and drums shall not be intermixed within the lateral transitions, or within the tangent alignment.
 Where the tangent distance (T) exceeds 600 feet, spacing between cones may be increased to 50 feet or spacing between Type I or Type II barricades or drums may be increased to 100 feet within the limits of the tangent.
7. This Index does not apply when work is being performed in the middle lane(s) of a six or more lane highway. Special maintenance of traffic details will be required.
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
10. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
11. For general TCZ requirements and additional information refer to Index No. 600.

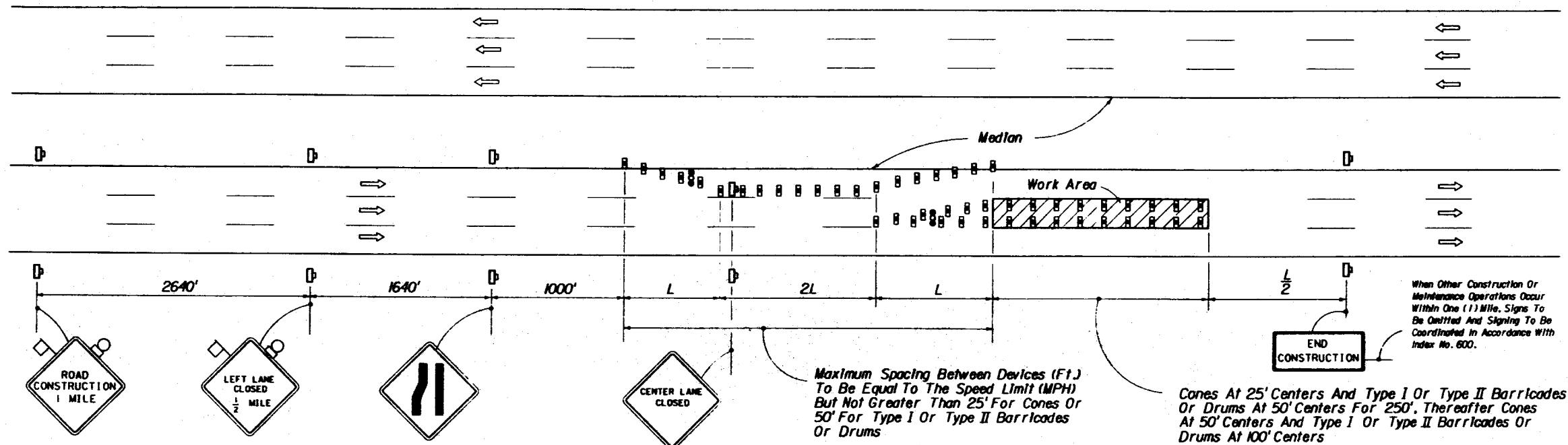
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type III Barricade (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF THE LANES IN ONE DIRECTION AND A DETOUR IS PROVIDED BY UTILIZING ONE LANE OF THE OPPOSING TRAFFIC LANES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
MULTILANE UNDIVIDED • RURAL DAY OR NIGHT OPERATIONS			
Designed By	Drawn By	Checked By	Approved By
HSD/AB	HSD/AB	JAG/DEM	
Revision No.	Sheet No.	F.L.M.A. Approved	
00	1 of 1	615	



GENERAL NOTES

1. All vehicles, equipment, workers, and their activities are restricted at all times to one side of the highway.
2. The first two signs each side shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
4. All signs shall be post mounted if closure time exceeds 12 hours.
5. $L = WS$ for speeds ≥ 45 mph
 $L = WS^2$ for speeds ≤ 40 mph
 Where:
 W = Width of lateral transition in feet.
 S = Posted speed limit (MPH) prior to work operation.
6. Barricades, cones and drums shall not be intermixed in the lateral transition.
7. The CENTER LANE CLOSED signs are to be removed or fully covered when no work is being performed and the center lane is opened to traffic.
8. Flashing arrow board is required for both day and night operations. The arrow board mode shall be double flashing arrow only.
9. Arrows denote direction of traffic only and do not reflect pavement markings.
10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
11. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ Indexes.
12. For work performed in the outside lane refer to Indexes Nos. 612 and 613.
13. For general TCZ requirements and additional information refer to Index No. 600.

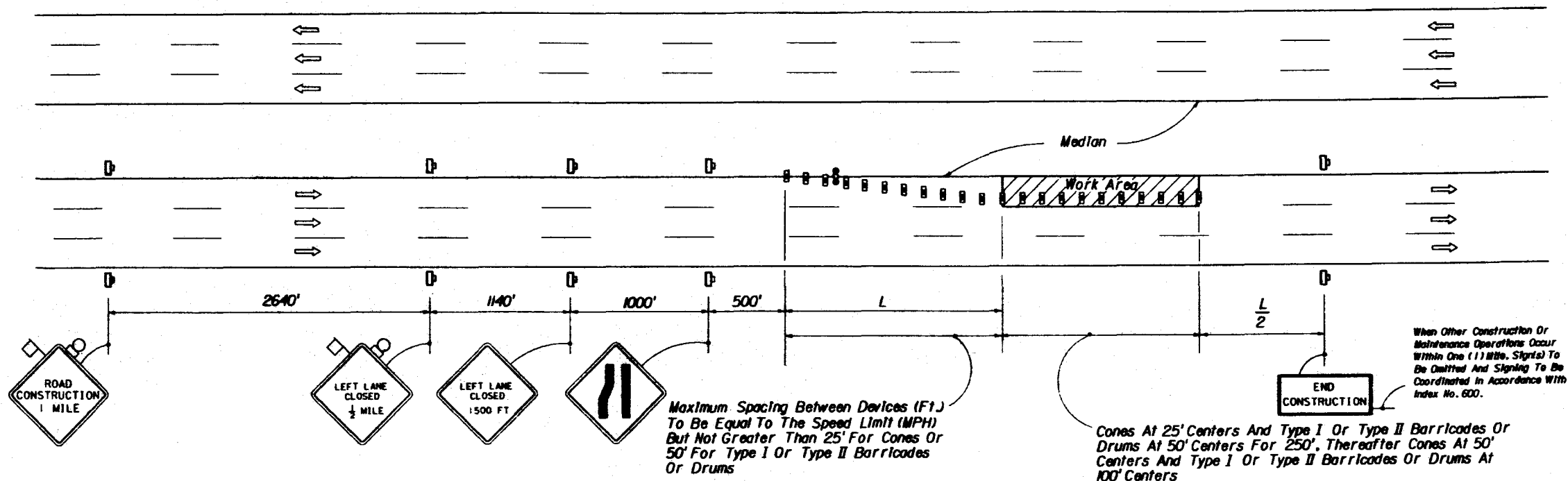
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign
- Advance Warning Arrow Panel

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES					
MULTILANE DIVIDED • RURAL					
Designed By	Checked By	Reviewed By	Approved By	Index No.	
Drawn By	10/2/88	12/88		616	
Checked By	JMG/KRM	12/88	Revision No.	Sheet No.	1 of 1
F.H.S.A. Approved				08	616



GENERAL NOTES

SYMBOLS

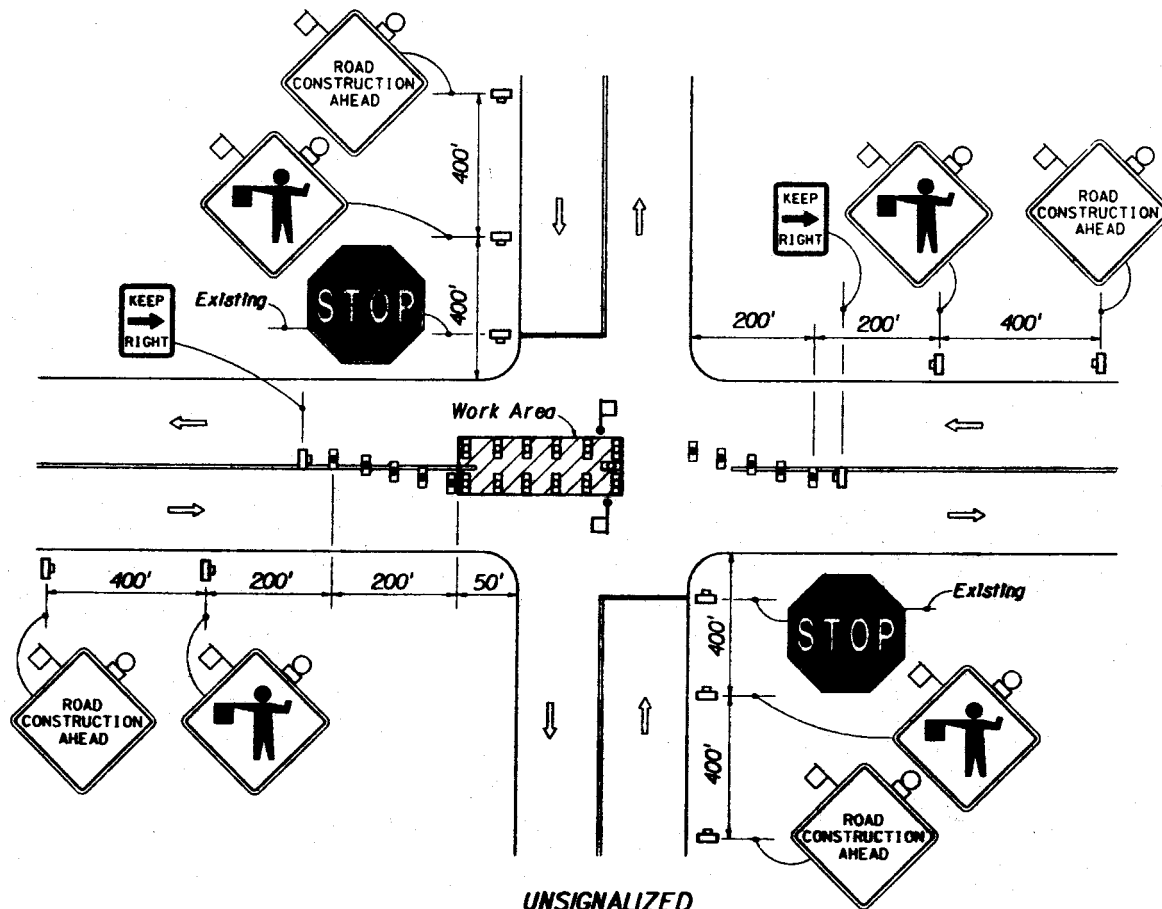
- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign
- Advance Warning Arrow Panel

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
2. The first two signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
4. All signs shall be post mounted if closure time exceeds 12 hours.
5. $L = WS$ for speeds ≤ 45 mph
 $= \frac{WS^2}{60}$ for speeds ≥ 40 mph
 Where:
 W - Width of lateral transition in feet.
 S - Posted speed limit (MPH) prior to work operation.
6. Barricades, cones and drums shall not be intermixed in the lateral transition.
7. The LEFT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the inside lane is open to traffic.
8. Flashing arrow boards are required for both day and night operation. Either the right flashing arrow or the right sequential arrow modes may be used; the caution mode shall not be used.
9. Arrows denote direction of traffic only and do not reflect pavement marking.
10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
11. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
12. For work performed in the outside lane refer to Indexes Nos. 612 and 613.
13. For general TCZ requirements and additional information refer to Index No. 600.

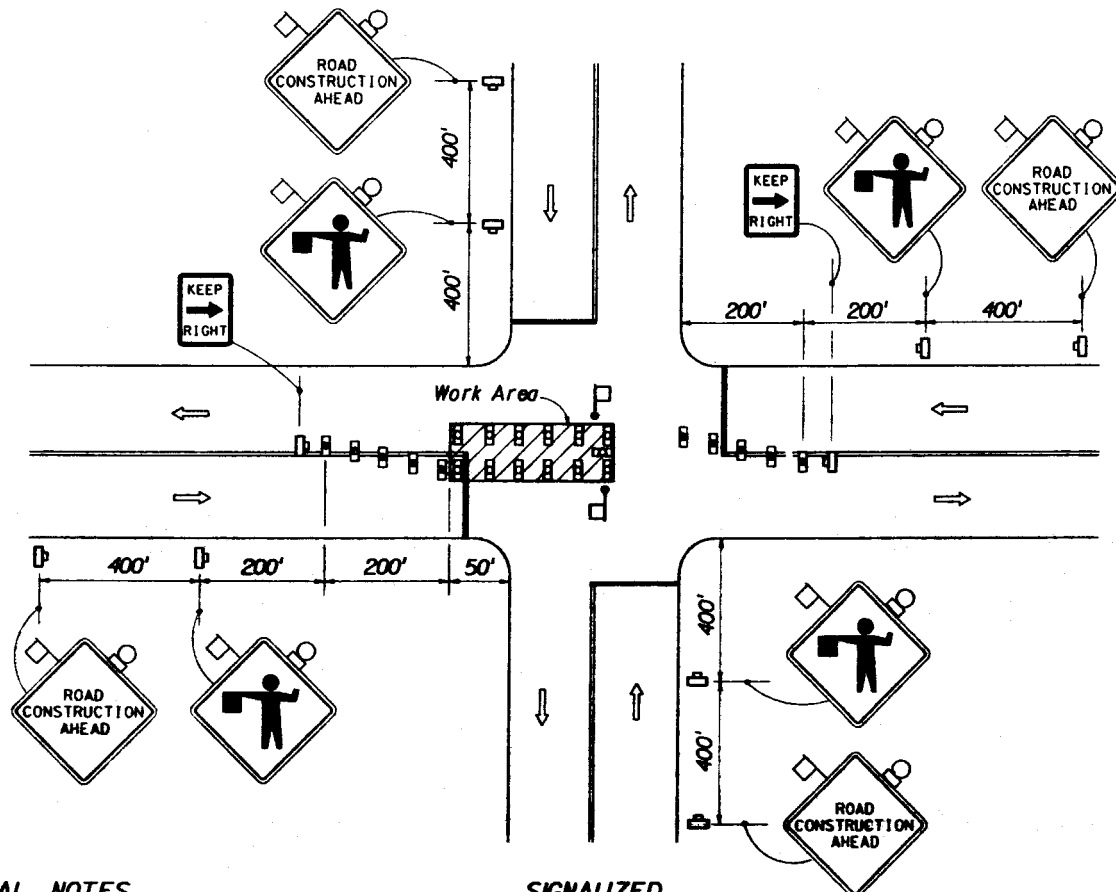
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCRUCH ON ANY PORTION OF THE INSIDE LANE OF A MULTILANE HIGHWAY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES					
MULTILANE DIVIDED • RURAL					
Designed By	Checked By	Drawn By	Reviewed By	Approved By	Index No.
HSD/200	JAB/100	12/01	12/01	<i>[Signature]</i>	617
Checked By	Drawn By	Reviewed By	Approved By		
JAB/100	12/01				
F.A.R.A. Approved				00	1 of 1



UNSIGNALIZED



SIGNALIZED

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Flagger
- Stop Bar

GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are forbidden in lane and intersection areas reserved for traffic.
2. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
3. The FLAGGER legend sign may be substituted for the symbol sign.
4. All signs shall be post mounted if closure time exceeds 12 hours.
5. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
6. Flaggers shall be located where they can control more than one direction of traffic.
Flaggers shall be in sight of each other or in direct communication at all times.
7. Barricades, cones and drums shall not be intermixed within lateral transitions, or within the tangent alignment. Maximum spacing between devices shall be not greater than 25'.
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
10. Temporary signal phasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.
11. Work performed for a period of 60 minutes or less is to be conducted in accordance with Index No. 607 or emergency condition procedures as described in Index No. 600, whichever applies.
12. For general TCZ requirements and additional information refer to Index No. 600.

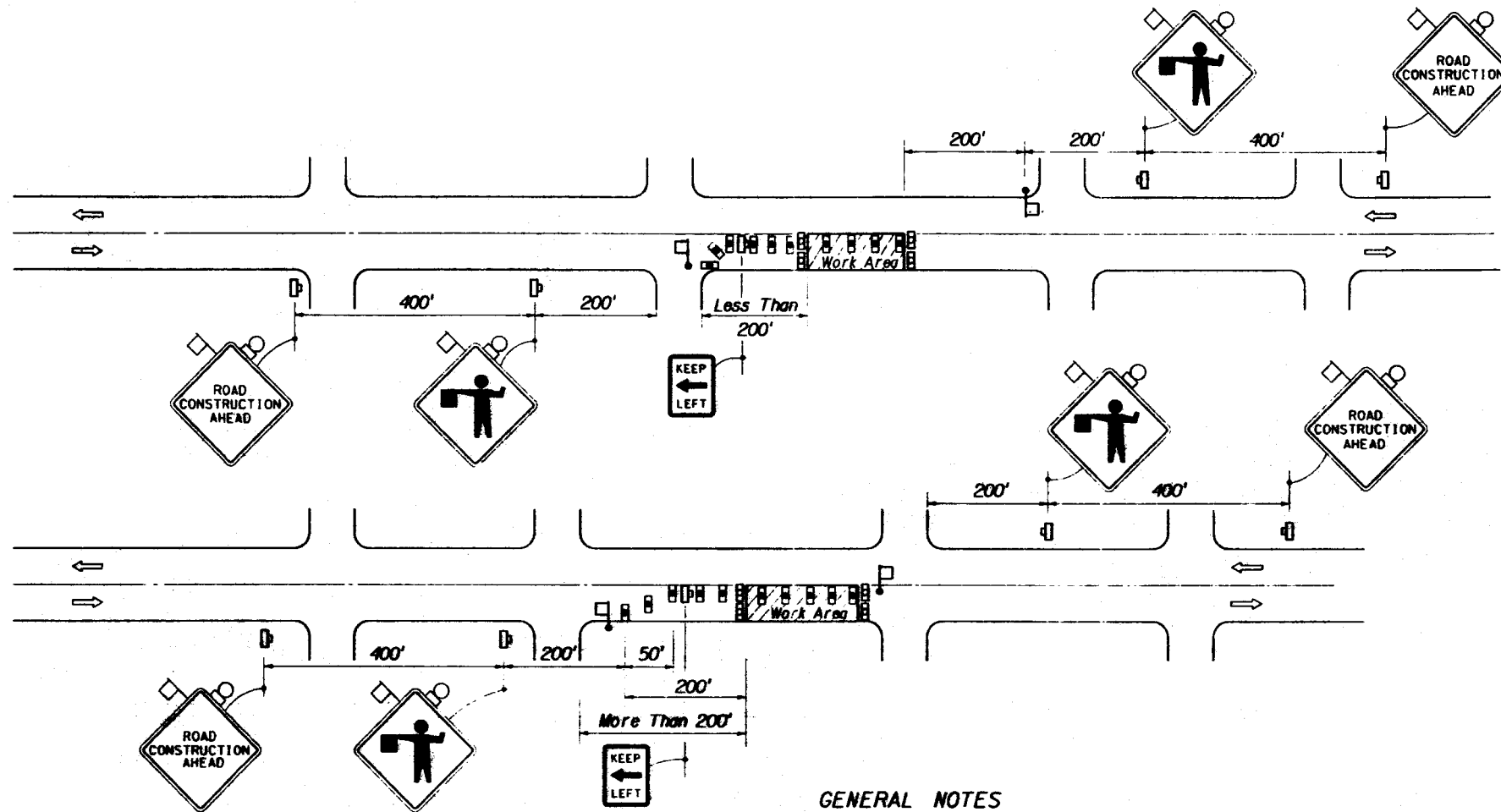
TYPICAL APPLICATIONS

Utility Work
Pavement Repair

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRUCH ON THE PAVEMENT REQUIRING THE CLOSURE OF A PORTION OF ONE OR MORE TRAFFIC LANES IN AN INTERSECTION FOR A PERIOD OF MORE THAN 60 MINUTES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
TWO-LANE, TWO-WAY • URBAN DAY OR NIGHT OPERATIONS			
Designed By	Checked By	Approved By	Drawn By
Drawn By	Checked By	Approved By	Drawn By
Drawn By	Checked By	Approved By	Drawn By
F.J.R.A. Approved	DD	1 of 1	620



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCR OACH ON THE PAVEMENT REQUIRING THE CLOSURE OF ONE TRAFFIC LANE, FOR WORK AREA LESS THAN 200' DOWNSTREAM FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCR OACH ON THE PAVEMENT REQUIRING THE CLOSURE OF ONE TRAFFIC LANE, FOR WORK AREA 200' OR MORE DOWNSTREAM FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

GENERAL NOTES

1. Work operations shall be confined to one travel lane, leaving the opposing travel lane open to traffic.
2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
3. For work operations of 60 minutes or less see Index No. 607
4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
5. If work area is confined to an outside auxiliary lane the work area shall be barricaded and the FLAGGER signs replaced by ROAD CONSTRUCTION AHEAD signs. Flaggers are not required.
6. Flaggers shall be in sight of each other or in direct communication at all times.
7. The ROAD CONSTRUCTION AHEAD and FLAGGER signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
8. The FLAGGER legend sign may be substituted for the symbol sign.
9. All signs shall be post mounted if the closure time exceeds 12 hours.
10. The maximum spacing between devices shall be not greater than 25'.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions See Index No. 600.
13. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS








- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Flagger

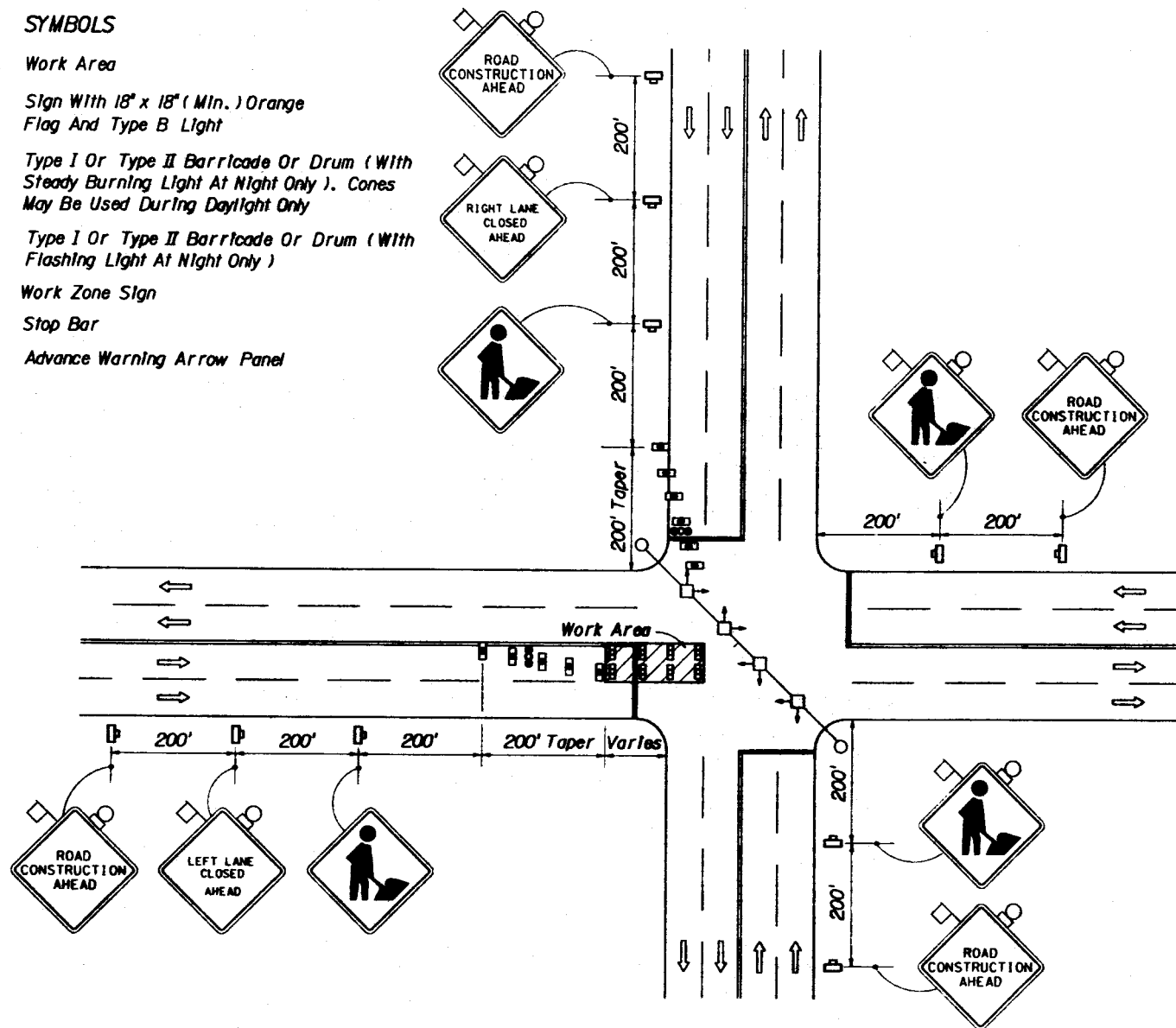
TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
TWO-LANE, TWO-WAY • URBAN DAY OR NIGHT OPERATIONS			
Designed By CDB	Revised 12/18	Approved By 	Project No. 621
Drawn By HSD/AB	12/18	Reviewed By Robert A. M...	Sheet No. 1 of 1
Checked By JAG/KMB	12/18	Revision No.	F.H.R.A. Approved

SYMBOLS

-  Work Area
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
-  Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
-  Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
-  Work Zone Sign
-  Stop Bar
-  Advance Warning Arrow Panel



SIGNALIZED

GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are forbidden in lane and intersection areas reserved for traffic.
2. For work operations of 60 minutes or less see Index No. 607.
3. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
4. All signs shall be post mounted if closure time exceeds 12 hours.
5. The WORKERS legend sign may be substituted for the symbol sign.
6. Dual signs are required for divided roadways.
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Barricades, cones and drums shall not be intermixed within lateral transitions, or within the tangent alignment.
Maximum spacing between devices shall be not greater than 25'.
9. Temporary signal phasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.
10. Work performed for a period of 60 minutes or less is to be conducted in accordance with Index No. 607 or emergency condition procedures as described in Index No. 600, whichever applies.
11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
12. For general TCZ requirements and additional information refer to Index No. 600.

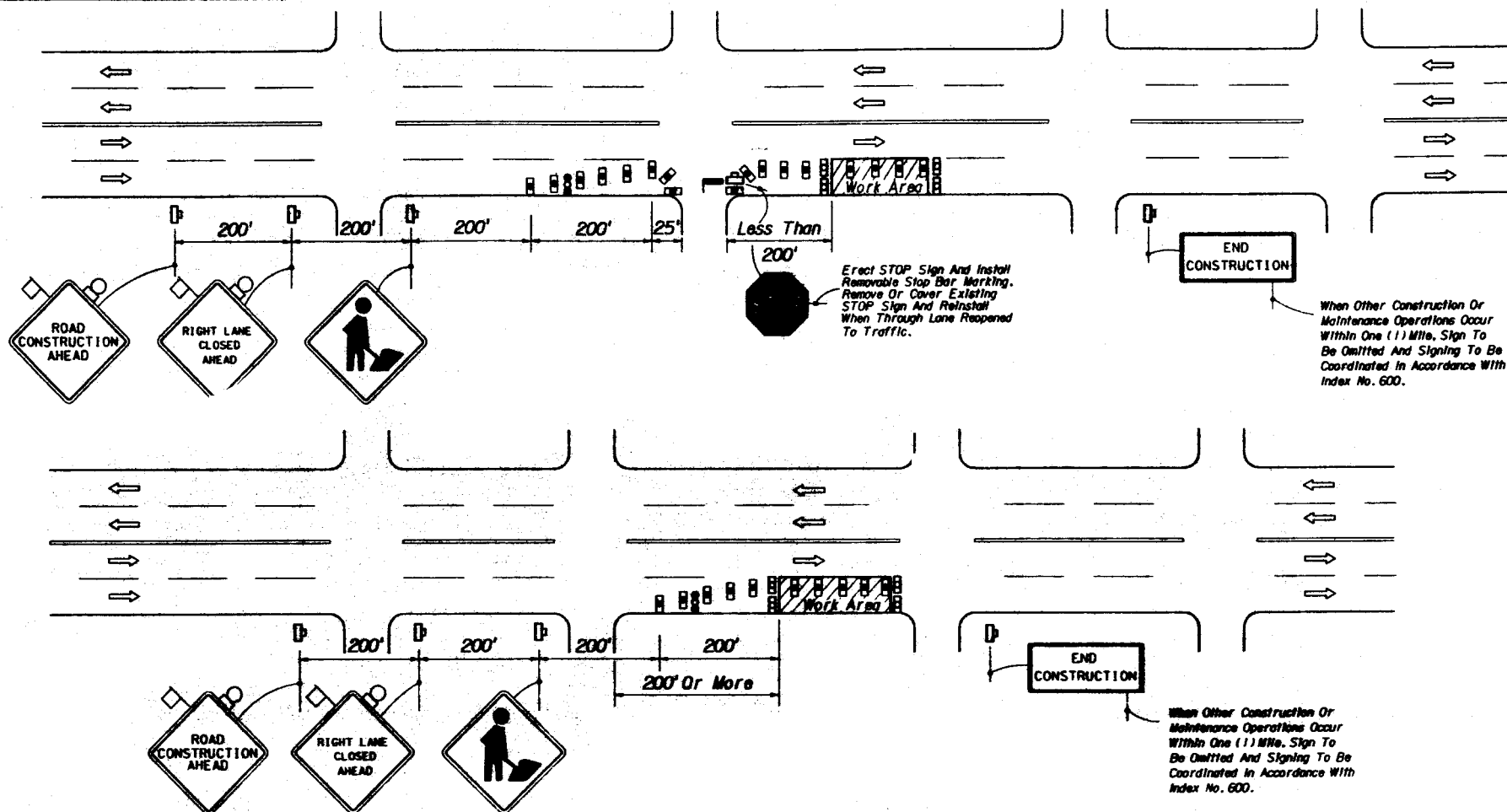
TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF AT LEAST ONE MEDIAN TRAFFIC LANE FOR A PERIOD OF MORE THAN 60 MINUTES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES MULTILANE, TWO-WAY • URBAN DIVIDED OR UNDIVIDED DAY OR NIGHT OPERATION			
Designed By	Drawn By	Checked By	Approved By
	HSD/200	JAC/200	
Revision No.	Sheet No.	Index No.	
		622	
F.H.R.A. Approved		88	1 of 1



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE OUTSIDE TRAVEL LANE, AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE OUTSIDE TRAVEL LANE AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
2. Work operations shall be confined to either one lane or lane combinations as follows:
 - (a) Outside travel lane
 - (b) Outside auxiliary lane
 - (c) Outside travel lane and adjoining auxiliary lane
 - (d) Inside travel lane
 - (e) Inside auxiliary lane
 - (f) Inside travel lane and adjoining auxiliary lane

See Sheet 2 Of 2

If the work area is confined to an auxiliary lane the work area shall be barricaded and the RIGHT (LEFT) LANE CLOSED AHEAD signs replaced by ROAD CONSTRUCTION AHEAD signs.
3. For work operations of 60 minutes or less see Index No. 612.
4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
5. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
6. All signs shall be post mounted if the closure times exceeds 12 hours.
7. The WORKERS legend sign may be substituted for the symbol sign.
8. Dual signs are required for divided roadways.

(Continued)

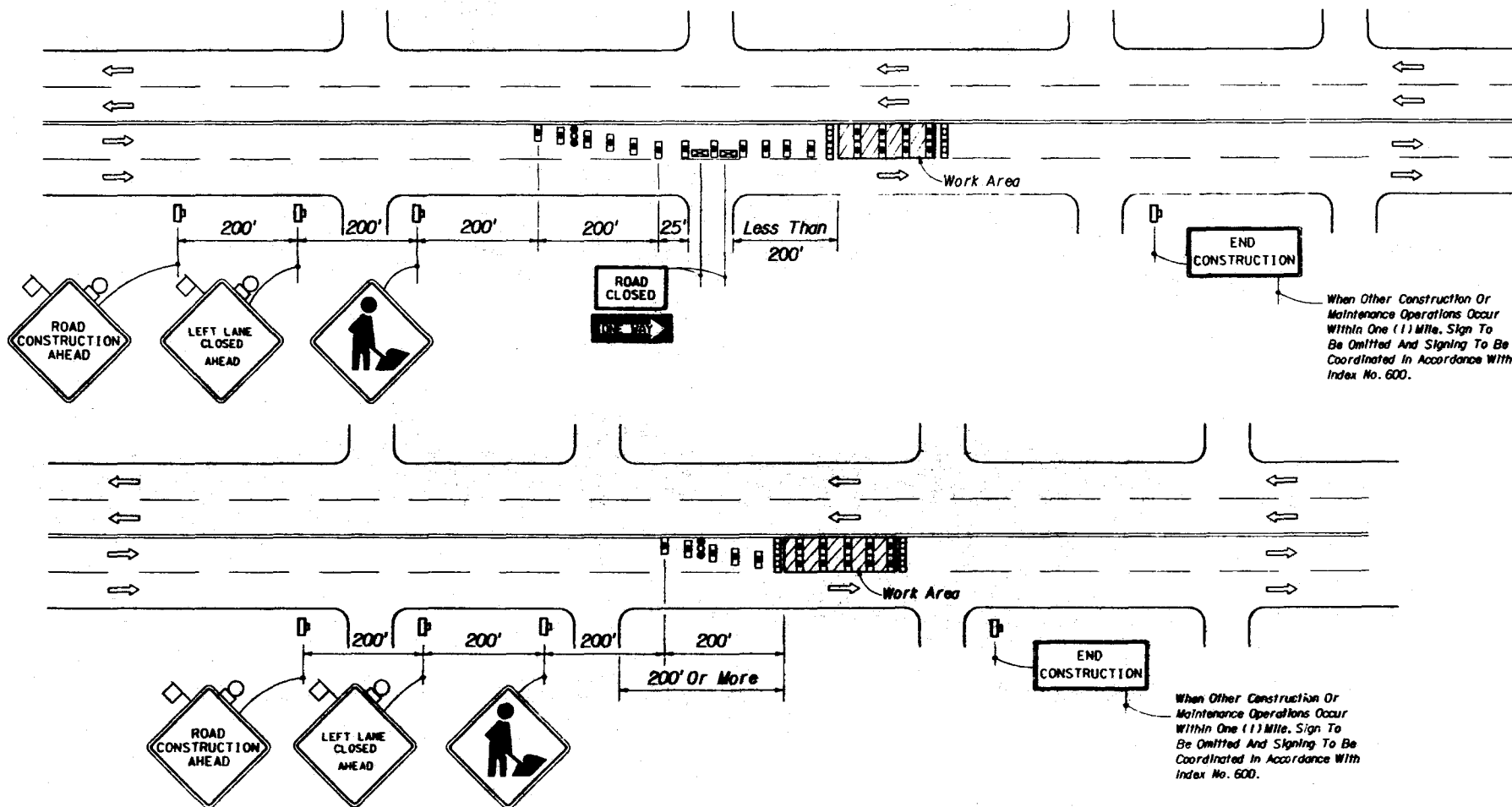
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

TYPICAL APPLICATIONS

Utility Work
Pavement Repairs
Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES MULTILANE, TWO-WAY • URBAN DIVIDED OR UNDIVIDED DAY OR NIGHT OPERATIONS			
Designed By	Drawn By	Checked By	Approved By
HSD/BR	JMS/BR	JMS/BR	<i>David J. MacNeil</i>
Revision No.	Sheet No.	Scale	Index No.
	62	1 of 2	623
F.A.R.A. Approved			



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE INSIDE TRAVEL LANE AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE INSIDE TRAVEL LANE AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Type III Barricade
- Work Zone Sign
- Advance Warning Arrow Panel

GENERAL NOTES (CONT.)

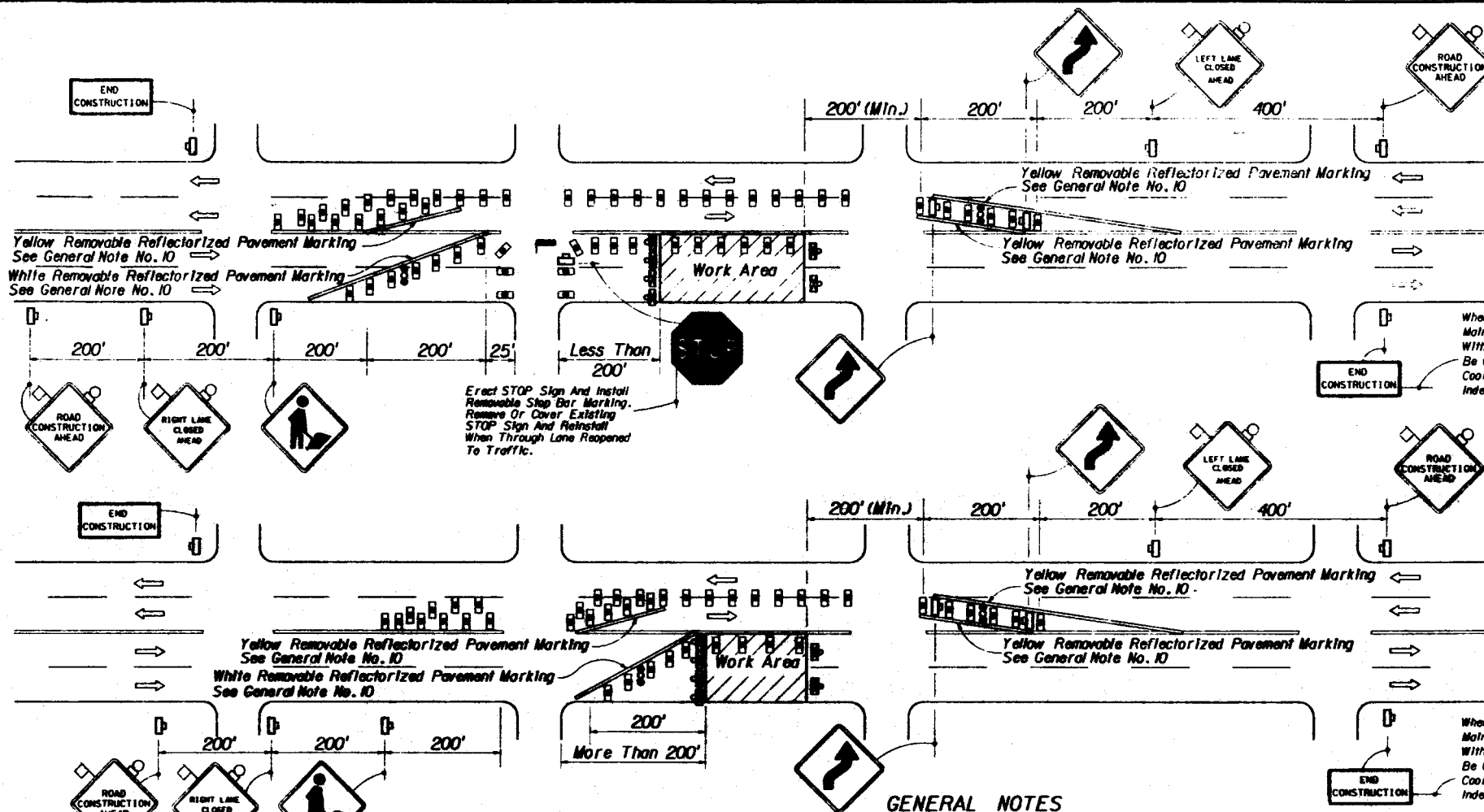
9. The maximum spacing between devices (ft.) within lateral transitions shall be equal to the speed limit (MPH) but no greater than 25' for cones or 50' for Type I or Type II barricades or drums.

Spacing for devices parallel to the travel lanes shall be 25' centers for cones and 50' for Type I or Type II barricades or drums.
10. Barricades, cones and drums shall not be intermixed in lateral transitions.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
13. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

- Utility Work
- Pavement Repairs
- Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES MULTILANE, TWO-WAY • URBAN DIVIDED OR UNDIVIDED DAY OR NIGHT OPERATIONS					
Designed By	CSB	Check By	CSB	Drawn By	CSB
Checked By	JWG/JWB	Revision No.	12/87	Sheet No.	2 of 2
F.H.S.A. Approved				88	623



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.
2. For work operations of 60 minutes or less (daylight only) see Index No. 607.
3. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
4. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
5. All signs shall be post mounted if the closure time exceeds 12 hours.
6. The WORKERS legend sign may be substituted for the symbol sign.
7. Dual signs are required for divided roadways.
8. Channelizing devices are to be spaced with cones at 25' centers and Type I or Type II barricades and drums at 50' centers.
9. Barricades, cones and drums shall not be intermixed within lateral transitions, or within the tangent alignment.
10. Removable reflectorized pavement markings shall be used when closure time exceeds one daylight period.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
13. For general TCZ requirements and additional information refer to Index No. 600.

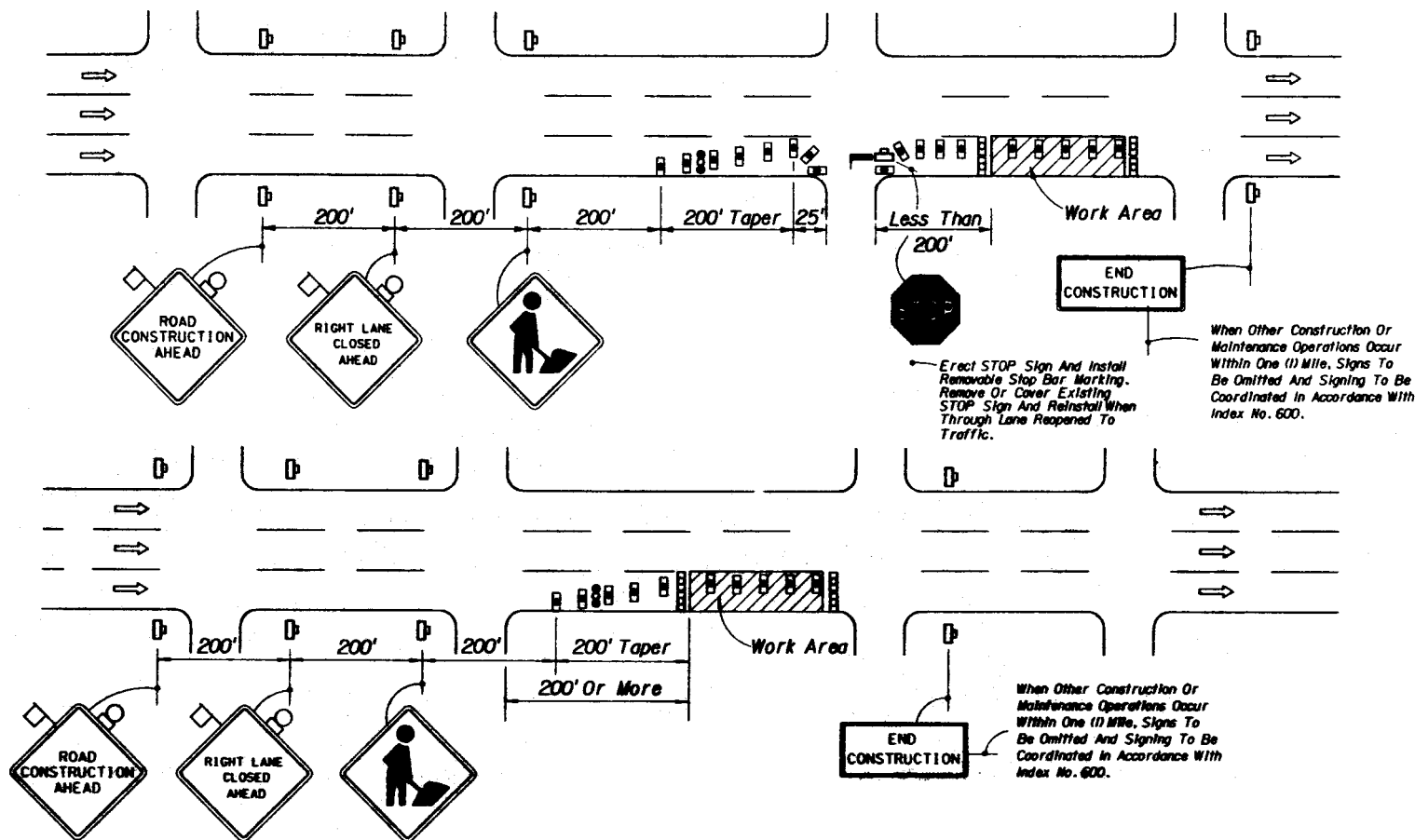
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type III Barricade (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
MULTILANE DIVIDED WITH TRAVERSABLE MEDIAN OR UNDIVIDED • URBAN DAY OR NIGHT OPERATIONS			
Designed By	Checked By	Reviewed By	Approved By
CSM	NSD/AM	JAC/NSM	<i>[Signature]</i>
Drawn By	NSD/AM	NSD/AM	NSD/AM
Checked By	JAC/NSM	JAC/NSM	JAC/NSM
F.J.R.A. approved		68	1 of 1
			624



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCR OACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE OR THE MEDIAN TRAVEL LANE AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCR OACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE OR THE MEDIAN TRAVEL LANE AND/OR ADJOINING AUXILIARY LANE, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

GENERAL NOTES

- All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
- Work operations shall be confined to either one lane or a combination of lanes as follows:
 - Outside travel lane
 - Outside auxiliary lane
 - Outside travel lane and adjoining auxiliary lane
 - Outside travel lane and adjoining center lane
 - Outside travel lane and adjoining auxiliary and center lanes
 - Median travel lane^a
 - Median auxiliary lane^a
 - Median travel lane and adjoining auxiliary lane^a
 - Median travel lane and adjoining center lane^a
 - Median travel lane and adjoining auxiliary and center lanes^a

^a See Sheet 2 Of 2
- For work operations, that require a single lane closure only, of 60 minutes or less see Index No. 612.
- When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
- When work is performed in the median lane or the median and adjoining center lanes the barricading plans are inverted and LEFT LANE CLOSED AHEAD signs shall be substituted for the for the RIGHT LANE CLOSED AHEAD signs.

If work is confined to the median auxiliary lane the work area shall be barricaded and the LEFT LANE CLOSED AHEAD signs replaced by ROAD CONSTRUCTION AHEAD signs.
- The first two signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.

Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.

(Continued)

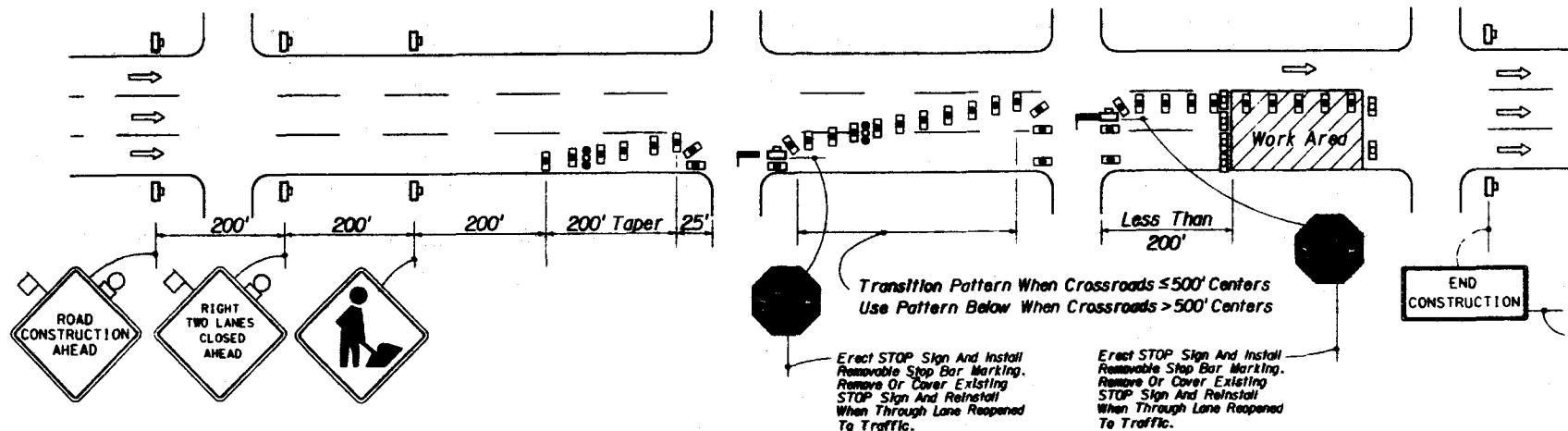
TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

SYMBOLS

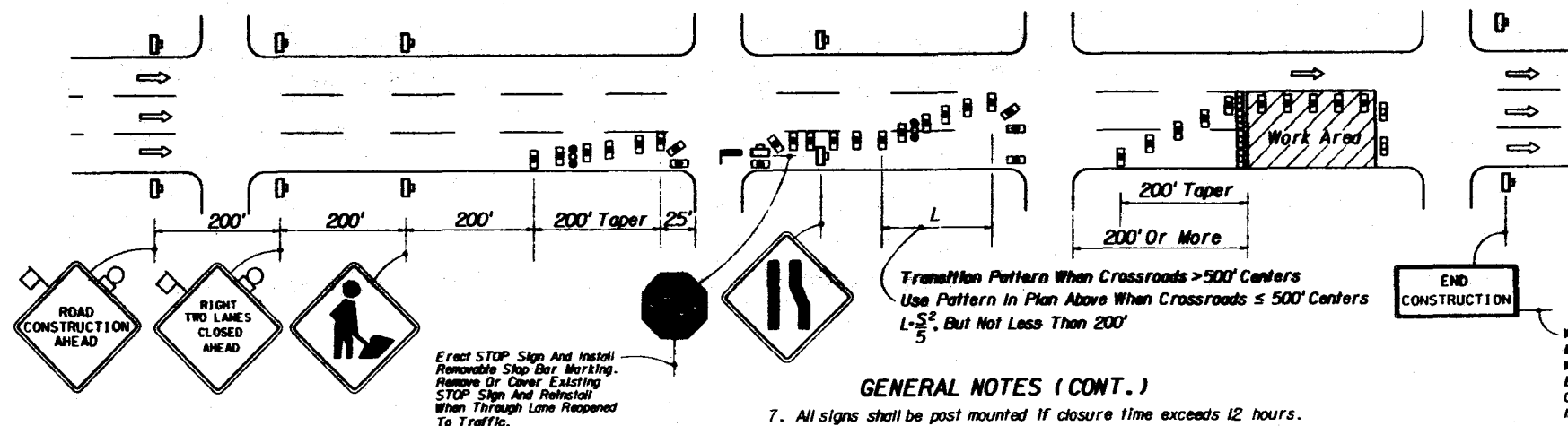
- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES					
MULTILANE ONE-WAY OR MULTILANE DIVIDED					
WITH NON-TRAVERSABLE MEDIAN • URBAN					
DAY OR NIGHT OPERATIONS					
Designed By	Name	Date	Approved By		
Drawn By	HSD/AB	12/97			
Checked By	JAS/KMB	12/97			
F.A.R.A. Approved			Sheet No.	66	1 of 2
			Index No.	625	



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE AND CENTER TRAVEL LANES OR THE MEDIAN AND CENTER TRAVEL LANES, WITH OR WITHOUT CLOSURE OF ADJOINING AUXILIARY LANES, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE AND CENTER TRAVEL LANES OR THE MEDIAN AND CENTER TRAVEL LANES, WITH OR WITHOUT CLOSURE OF ADJOINING AUXILIARY LANES, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

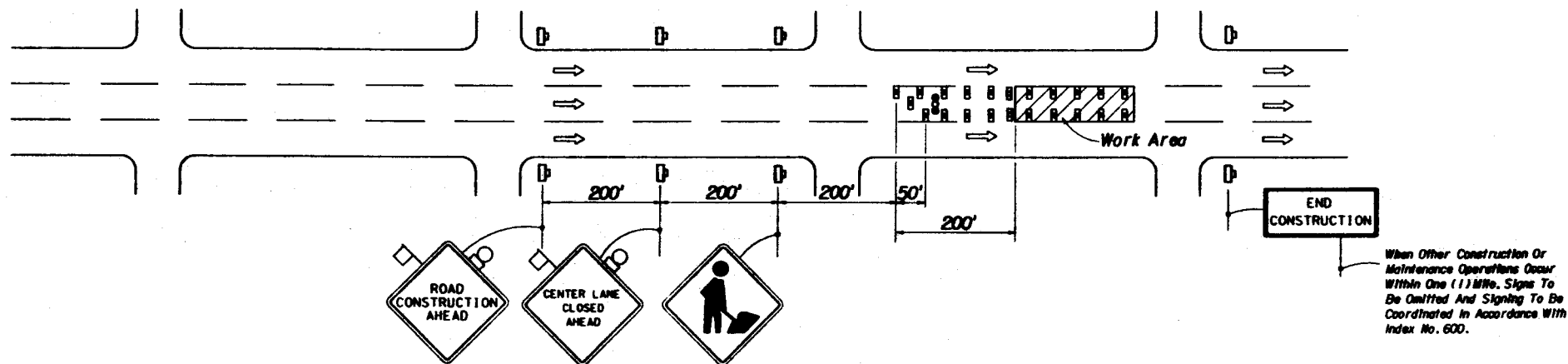
GENERAL NOTES (CONT.)

7. All signs shall be post mounted if closure time exceeds 12 hours.
8. The WORKERS legend sign may be substituted for the symbol sign.
9. The maximum spacing between devices (ft.) within lateral transitions shall be equal to the speed limit (MPH) but not greater than 25' for cones or 50' for Type I or Type II barricades or drums.
Spacing for devices parallel to the travel lanes shall be 25' centers for cones and 50' for Type I or Type II barricades or drums.
10. Barricades, cones and drums shall not be intermixed in lateral transitions.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
13. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES MULTILANE ONE-WAY OR MULTILANE DIVIDED WITH NON-TRAVERSABLE MEDIAN • URBAN DAY OR NIGHT OPERATIONS			
Designed By	Issue	Date	Approved By
Drawn By	NSD/BB	12/97	<i>[Signature]</i>
Checked By	JAS/BB	12/97	Reviewed By
F.J.S.A. Approved:		65	2 of 2
			625



GENERAL NOTES

1. All vehicles, equipment, workers and their activities are prohibited at all times from the lane areas reserved for traffic.
2. Work operations shall be confined to one center travel lane, leaving the adjacent travel lanes open to traffic.
3. For work operations of 60 minutes or less see Index No. 612
4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
5. The first two signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.
6. All signs shall be post mounted if the closure time exceeds 12 hours.
7. The WORKERS legend sign may be substituted for the symbol sign.
8. Advance warning arrow panel is required for both day and night operations.
9. Channelizing devices are to be spaced with cones at 25' centers and Type I or Type II barricades and drums at 50' centers.
10. Arrows denote direction of traffic only and do not reflect pavement markings.
11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
12. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

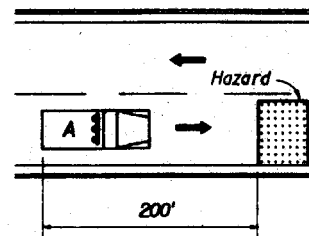
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCR OACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE CENTER LANE.

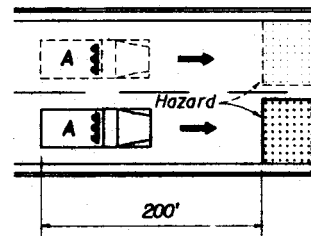
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel

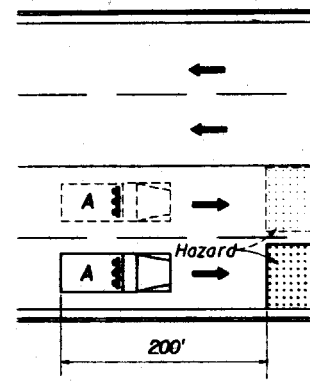
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TRAFFIC CONTROL THROUGH WORK ZONES					
MULTILANE ONE-WAY OR MULTILANE DIVIDED WITH NON-TRAVERSABLE MEDIAN • URBAN DAY OR NIGHT OPERATIONS					
Designed By	Checked	Approved By			
Drawn By	12/18				
Created By	12/18	Revision No.	Sheet No.		
F.J.M.A. Approved			88	1 of 1	626



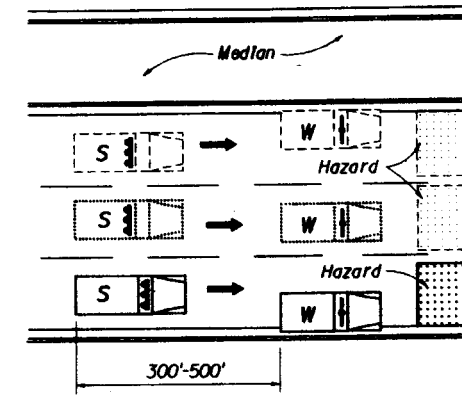
MODE - WARNING



MODE - PASS LEFT RIGHT



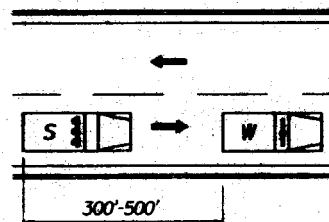
MODE - PASS LEFT RIGHT



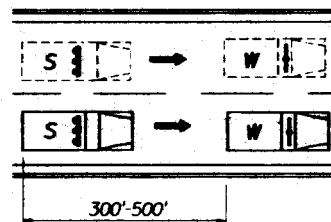
MODE - PASS LEFT RIGHT PASS EITHER SIDE

FIXED

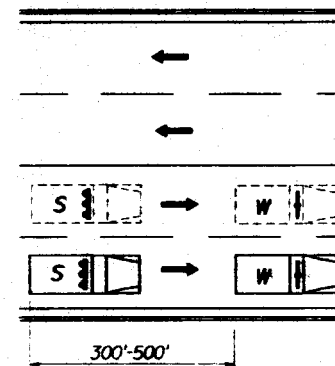
HAZARD



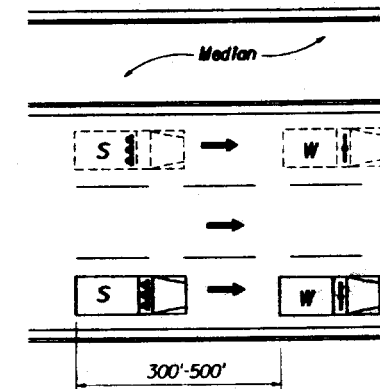
MODE - WARNING



MODE - PASS LEFT RIGHT



MODE - PASS LEFT RIGHT



MODE - PASS LEFT RIGHT

MOVING

OPERATIONS

URBAN

Shadow (S), Work (W) Or Advance (A) Vehicle With Advance Warning Arrow Panel

SYMBOLS

Hazard

Work Vehicle With Flashing Beacon

Shadow (S), Work (W) Or Advance (A) Vehicle With Advance Warning Arrow Panel

Advance Warning Vehicle With Warning Sign

Lane Identification And Direction Of Traffic

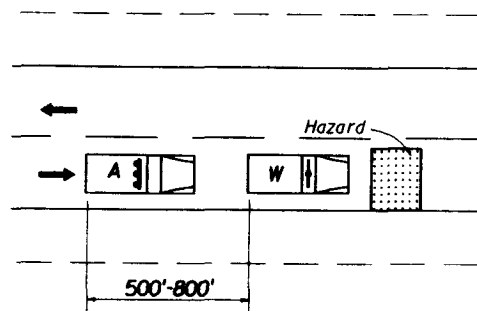
GENERAL NOTES

1. These illustrations are representative of general conditions. Conditions differing from those shown shall be treated as directed by the Engineer.
2. The intensity of light and the position of panels shall be as specified in Index No. 600.
3. The illustrated fixed hazard treatments are examples for emergency conditions where the hazard can be corrected or removed immediately; also, where correction or removal of the hazard requires extended effort, the illustrated treatments shall remain in effect until improved work zone traffic controls can be put into operation.
4. For general TCZ requirements and additional information refer to Index No. 600.

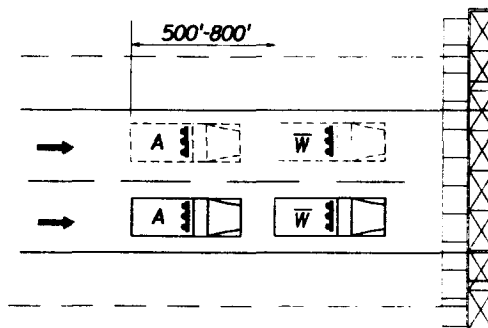
CONDITIONS

MOVING OPERATION; OR, EMERGENCY OPERATION AT FIXED HAZARDS

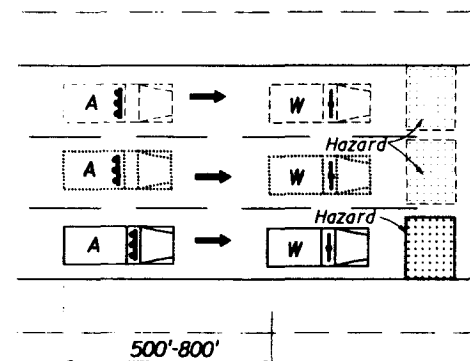
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES USE AND OPERATING MODES FOR VEHICLE MOUNTED ADVANCE WARNING ARROW PANEL			
Designed By	CSM	12/87	Approved By
Drawn By	MSD/BN	12/87	Security State Safety Officer, Roadways
Checked By	JMS/BN	12/87	Revision No.
F.H.S.A. Approved		88	Sheet No. 1 of 2
			Index No. 627



MODE • PASS LEFT

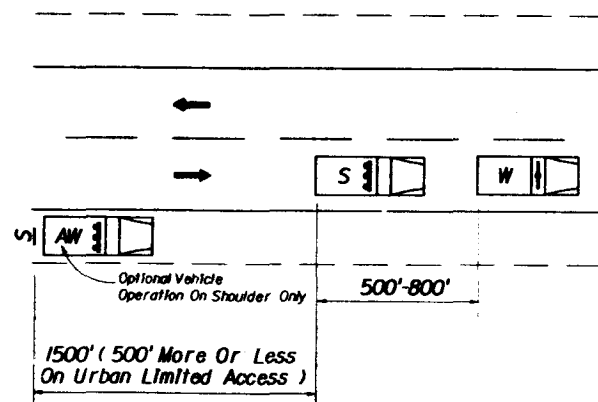


MODE • PASS LEFT RIGHT

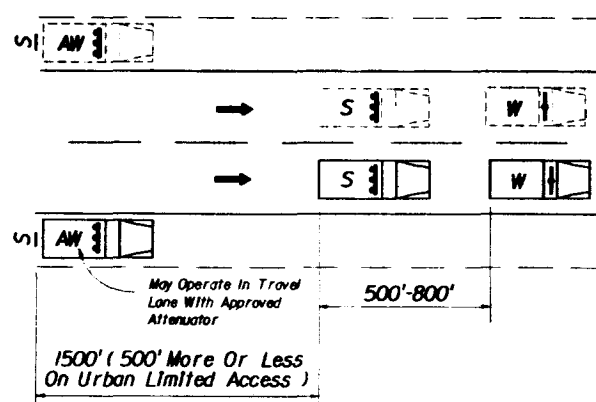


MODE • PASS LEFT RIGHT PASS EITHER SIDE

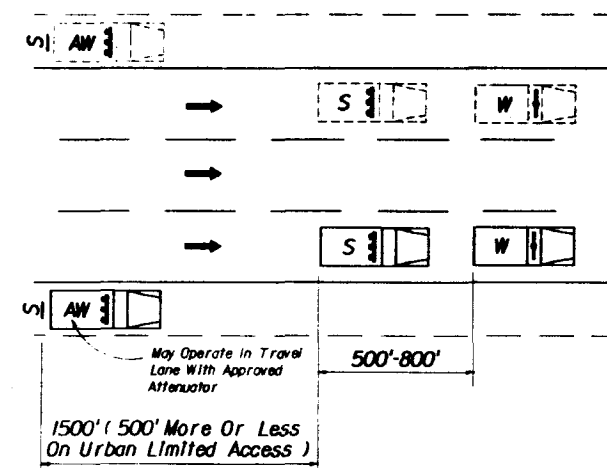
FIXED HAZARD



MODE • WARNING



MODE • PASS LEFT RIGHT

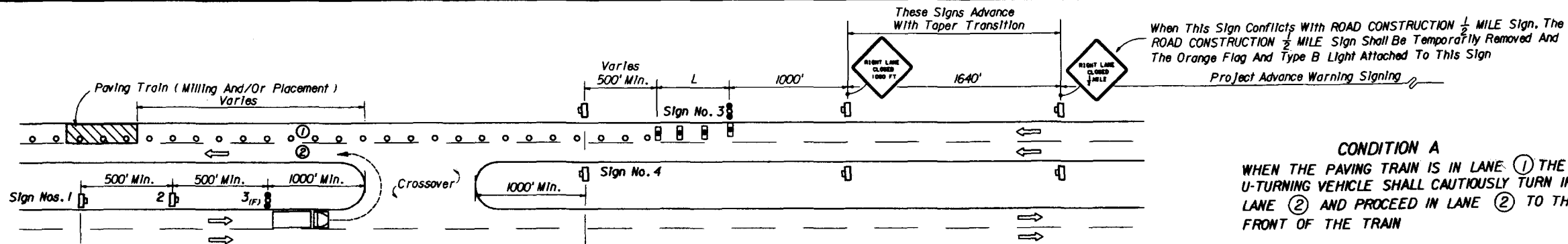


MODE • PASS LEFT RIGHT

MOVING OPERATIONS

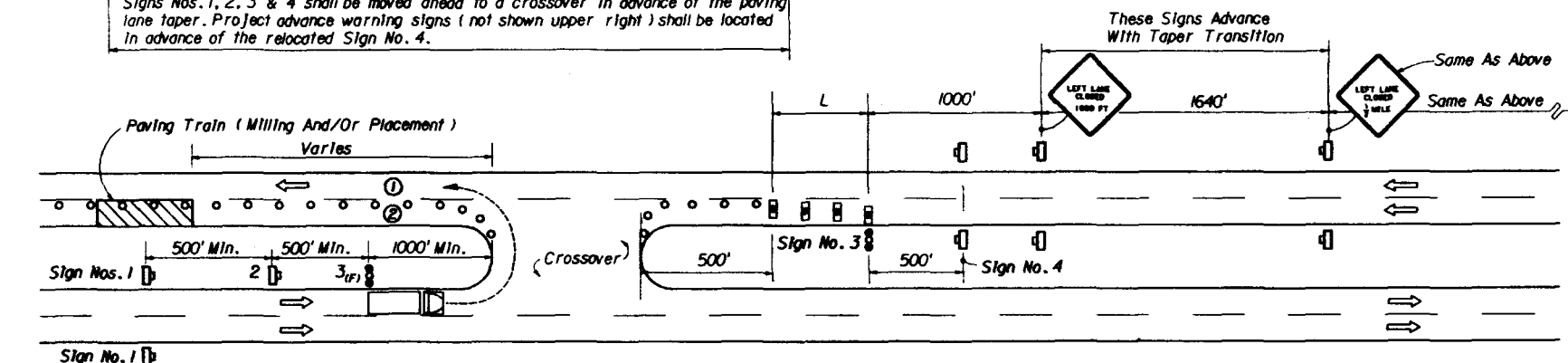
RURAL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES USE AND OPERATING MODES FOR VEHICLE MOUNTED ADVANCE WARNING ARROW PANEL			
Designed By	Issue	Date	Approved By
Drawn By	HSD/EB	12/97	<i>[Signature]</i>
Created By	JAC/EB	12/97	Security State Design Engineer, Inc.
Revision No.		Sheet No.	Index No.
88		2 of 2	627
F.H.W.A. Approved			



Sign No. 1 ▮ When the median width is too narrow for trucks to make turns into Lane No. 2. Signs Nos. 1, 2, 3 & 4 shall be moved ahead to a crossover in advance of the paving lane taper. Project advance warning signs (not shown upper right) shall be located in advance of the relocated Sign No. 4.

CONDITION A



CONDITION B

CONDITION A
WHEN THE PAVING TRAIN IS IN LANE ① THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ② AND PROCEED IN LANE ② TO THE FRONT OF THE TRAIN

CONDITION B
WHEN THE PAVING TRAIN IS IN LANE ② THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ① AND PROCEED IN LANE ① TO THE FRONT OF THE PAVING TRAIN

CONDITION A & B
THE ADVANCE WARNING ARROW PANELS ARE REQUIRED. UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION BE LOCATED WITHIN THE LIMITS OF THE CROSSOVER

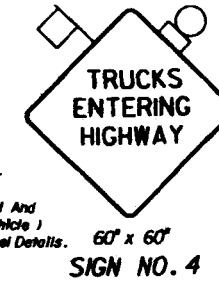
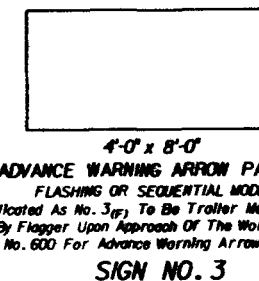
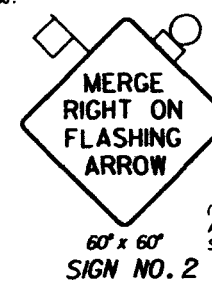
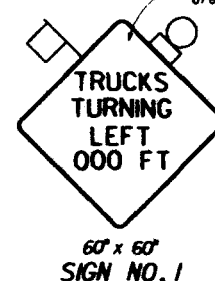
TRAFFIC TRANSITION AREA UPSTREAM FROM CROSSOVER

CASE I

GENERAL NOTES

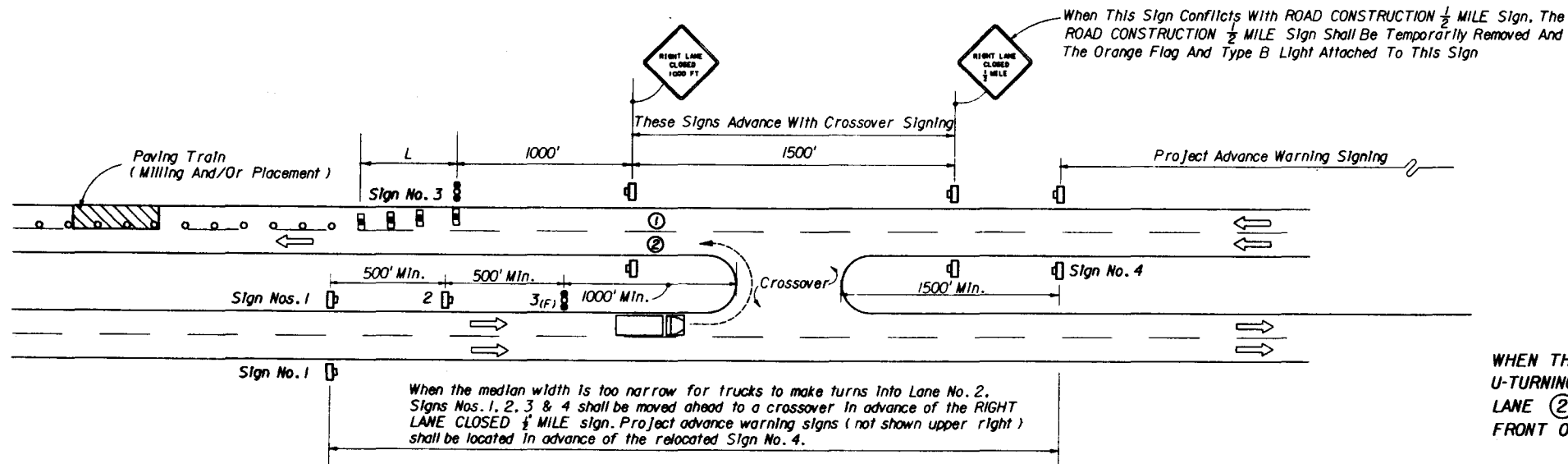
- When crossovers do not exist, the contractor will construct temporary crossovers in accordance with Index No. 517.
- L = Length of taper in feet:
- WS for speeds ≥ 45 mph
- WS* for speeds ≤ 40 mph
60
Where:
W = Width of lateral transition in feet.
S = Posted speed limit (MPH) prior to work operation.
- The maximum spacing between devices (ft.) within the lateral transitions shall be equal to the speed limit (MPH) but not greater than 25' for cones or 50' for Type I or Type II barricades or drums
Spacing for devices parallel to the travel lanes shall be 25' centers for cones and 50' for Type I or Type II barricades or drums
- Arrows denote direction of traffic only and do not reflect pavement markings.

Sign Nos. 1, 2 and 4 Shall Have Orange Reflective Backgrounds With 6" Series D Black Opaque Legends And 1" Black Opaque Borders. Orange flags and Type B lights are required.

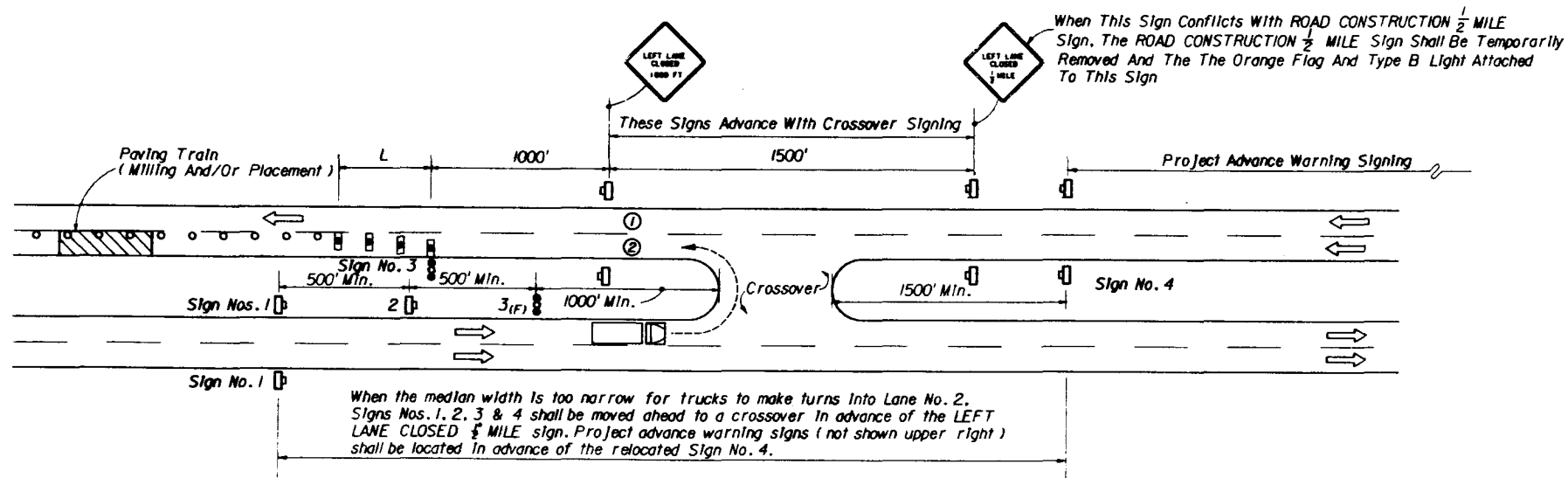


- SYMBOLS**
- ▨ Work Area
 - ▮ Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
 - Type I Or Type II Barricade, Cone Or Drum
 - ▮ Work Zone Sign
 - ☞ Advance Warning Arrow Panel
 - ▮ Work Vehicle
 - ⓧ Lane Number

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
TEMPORARY CROSSOVER FOR PAVING TRAIN OPERATIONS • RURAL			
Designed By	Drawn By	Checked By	Approved By
HSJ/BSJ	12/87	JMS/BSJ	JMS/BSJ
Drawn By	Checked By	Drawn By	Checked By
JMS/BSJ	12/87	JMS/BSJ	12/87
F.A.R.A. Approved		88	1 of 2
			630



CONDITION A



CONDITION B

TRAFFIC TRANSITION AREA DOWNSTREAM FROM CROSSOVER

CASE II

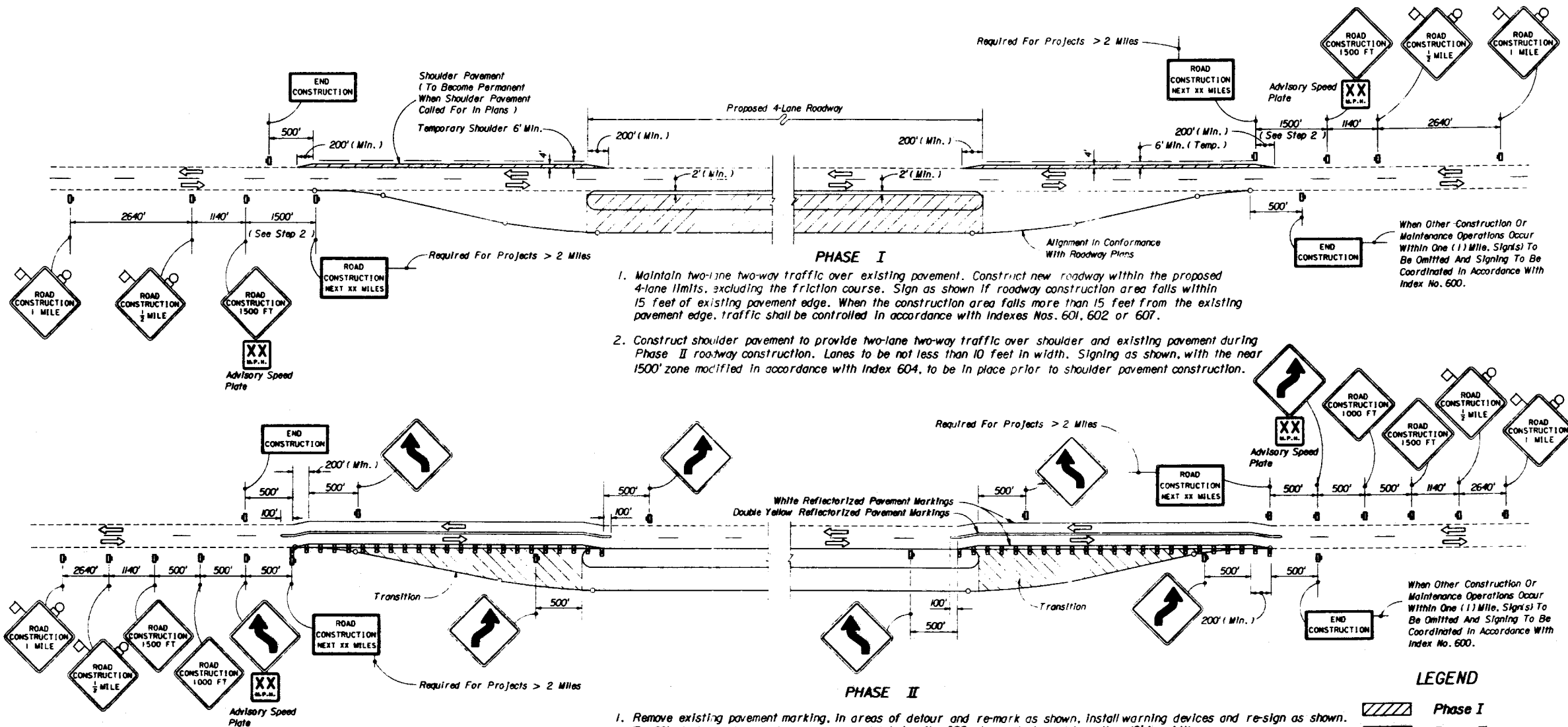
Note: See Sheet 1 of 2 For General Notes, Sign No. Details, And Conditions.

CONDITION A
WHEN THE PAVING TRAIN IS IN LANE ① THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ② AND PROCEED IN LANE ② TO THE FRONT OF THE TRAIN

CONDITION B
WHEN THE PAVING TRAIN IS IN LANE ② THE U-TURNING VEHICLE SHALL TURN INTO LANE ①, CAUTIOUSLY MERGE INTO LANE ① AND PROCEED TO THE FRONT OF THE PAVING TRAIN

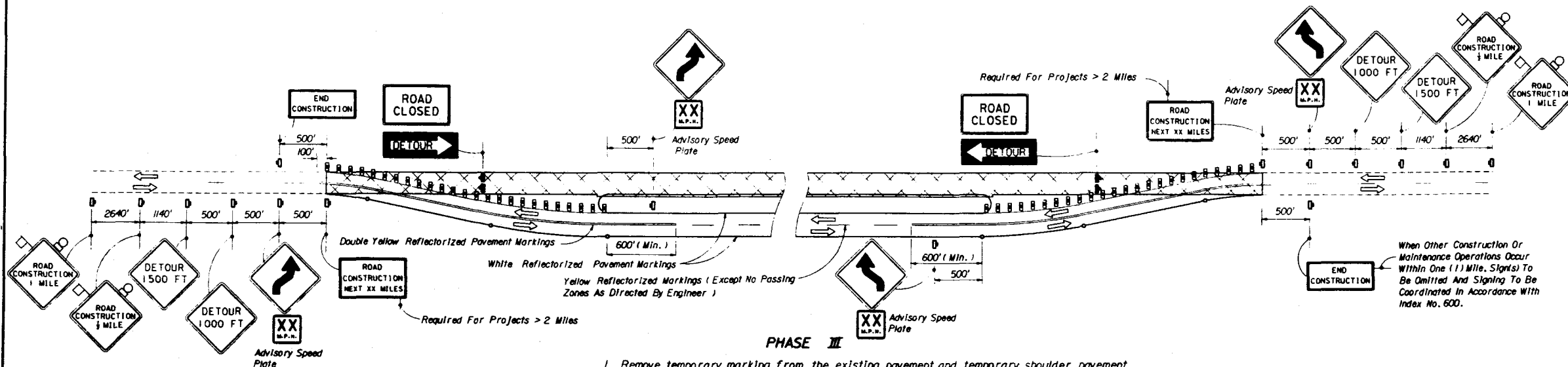
CONDITION A & B
THE ADVANCE WARNING ARROW PANEL IS REQUIRED. UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION BE LOCATED WITHIN THE LIMITS OF THE CROSSOVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
TEMPORARY CROSSOVER FOR PAVING TRAIN OPERATIONS • RURAL			
Designed By	Drawn By	Checked By	Approved By
HSB/BSH	JSC/BSH	JSC/BSH	<i>[Signature]</i>
Date	Date	Date	Date
12/07	12/07	12/07	12/07
F.H.S.A. Approved		BB	2 of 2
			630



Note: See Sheet 2 of 2 for General Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
CONVERTING TWO LANES TO FOUR LANES DIVIDED • RURAL			
Designed By KMB	Drawn By HSD	Checked By JAC	Approved By [Signature]
Revision No.	Sheet No.	Page No.	640
F.H.W.A. Approved: 5/3/80	88	1 of 2	



GENERAL NOTES

- The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
- Existing signs and pavement markings that conflict with construction signing and marking shall be obliterated or removed.
- Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall be not less than 10 feet in width. When one-lane one-way operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with Indexes Nos. 603, 604, 606 and 607. Minimum width for the temporary shoulders is 6 feet.
- The maximum spacing between warning devices within lateral transitions (FT) to be equal to the speed limit (MPH) but not greater than 25' for cones or 50' for Type I or Type II barricades or drums. Barricades, cones and drums shall not be intermixed in lateral transitions.
The maximum spacing between warning devices used for delineation between the travelway and construction area to be 25' for cones and 50' for Type I or Type II barricades or drums.
- Barricading shall be in conformance with 'Protection Requirement For Dropoffs' Index No. 600.
- For supplemental 'advisory speed plate' applications see Index No. 600.
- Mono-directional reflective colorless raised pavement markers shall be placed on the edgelines and spaced 40' on centers on tangent roadway and 20' on centers on curves.
- Additional barricades, signing, lighting or other traffic controls shall be provided for limited work areas in accordance with other applicable TCZ indexes.
- Arrows denote direction of traffic only and do not reflect pavement markings.
- Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 500.
- When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.
- Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
- For general TCZ requirements and additional information refer to Index No. 600.

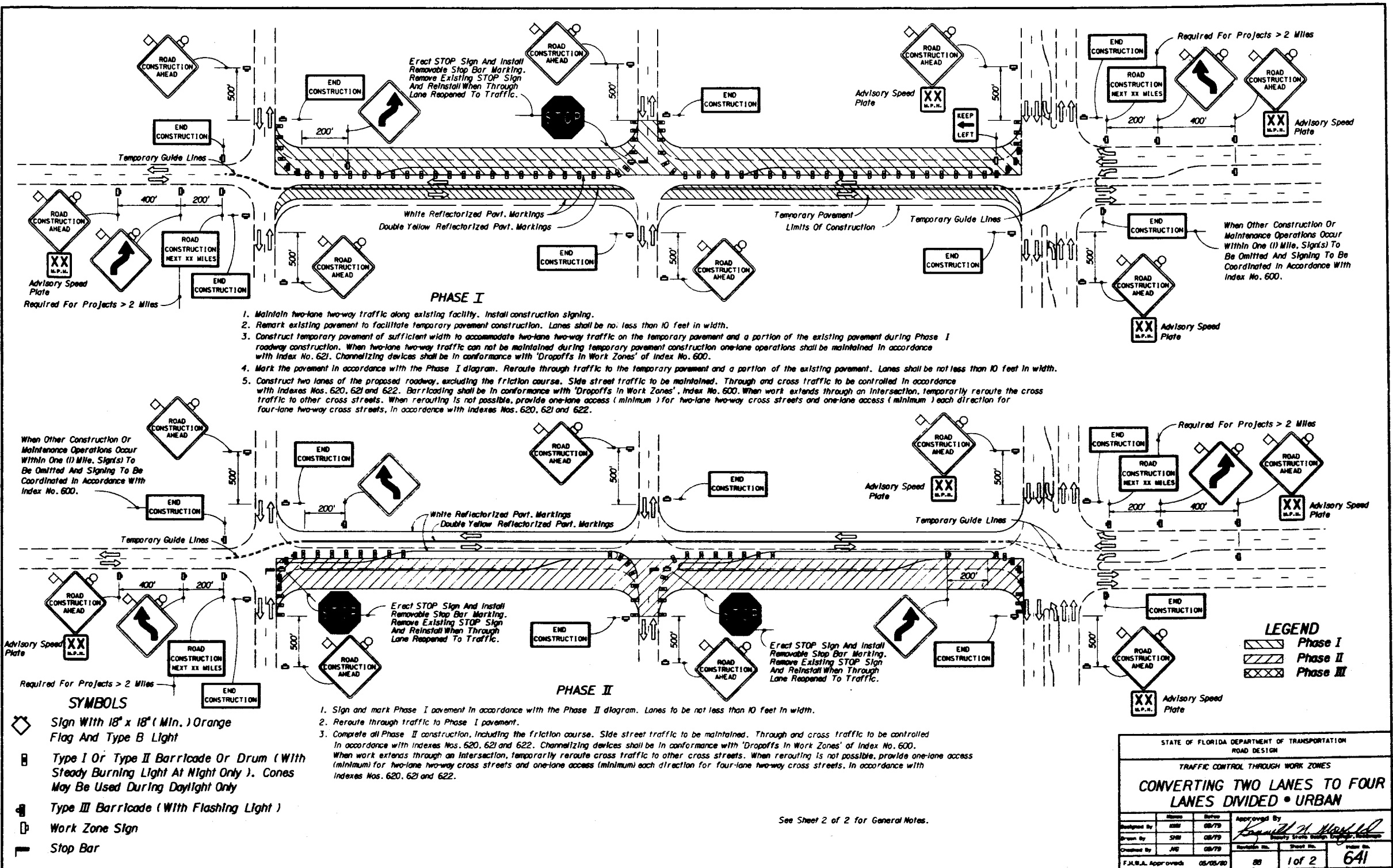
SYMBOLS

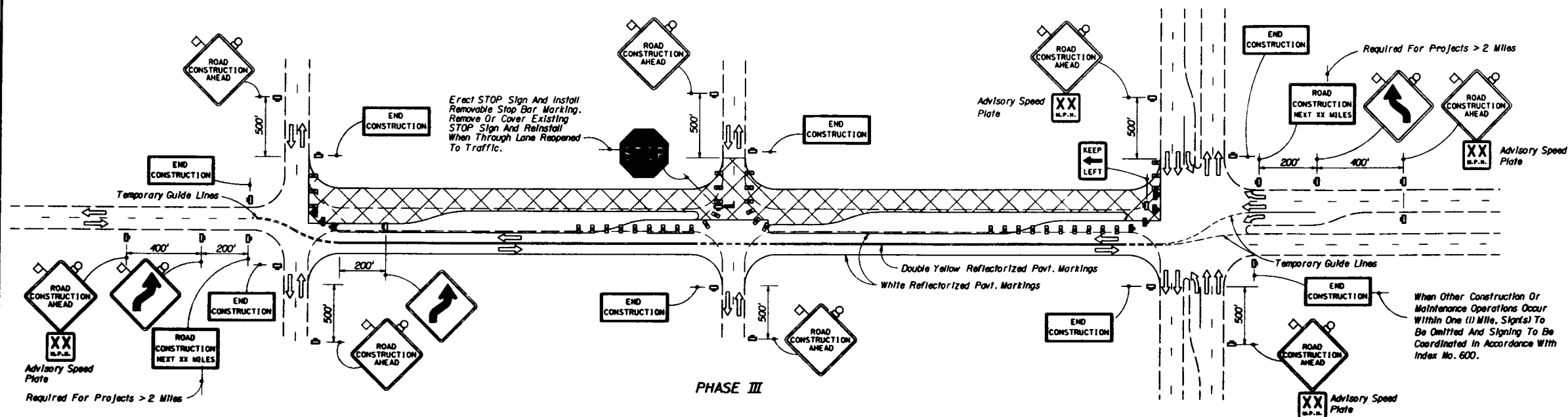
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type III Barricade (With Flashing Light)
- Work Zone Sign

LEGEND

- Phase I
- Phase II
- Phase III

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
CONVERTING TWO LANES TO FOUR LANES DIVIDED • RURAL			
Designed By	KMB	Drawn By	HSD
Checked By	JAG	Reviewed By	[Signature]
Approved By	[Signature]	Project No.	88
Scale	1" = 40'	Sheet No.	2 of 2
F.A.W.A. Approved	05/05/80	Index No.	640





PHASE III

1. Sign and Mark Phase II pavement in accordance with the Phase III diagram.
2. Reroute through traffic to Phase II pavement.
3. Construct friction course over Phase I pavement. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Indexes Nos. 620, 621 or 622. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane access (minimum) each direction for four-lane two-way cross streets.

GENERAL NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. For Supplemental 'advisory speed plate' applications see Index No. 600.
4. Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall not be less than 10 feet in width. When one-lane one-way operations are necessary, a minimum width of 12 feet should be maintained and traffic controlled in accordance with Indexes Nos. 620, 621 or 622.
5. At signalized intersections, signals shall be directed or relocated as required to the center of relocated lanes.
6. Raised pavement markers shall be placed along the center of pavement open to traffic at 20' centers in the transition area where alignment shift is 10 feet or greater.
7. Additional barricades, signing, lighting or other traffic controls for limited work areas shall be provided in accordance with other applicable TCZ indexes as conditions warrant in each phase.
8. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
9. Arrows denote direction of traffic only and do not reflect pavement markings.
10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
11. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type III Barricade (With Flashing Light)
- Work Zone Sign
- Stop Bar

LEGEND

- Phase I
- Phase II
- Phase III

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
TRAFFIC CONTROL THROUGH WORK ZONES			
CONVERTING TWO LANES TO FOUR LANES DIVIDED • URBAN			
Designed By	MM	Date	08/79
Drawn By	SH	Date	08/79
Checked By	JG	Date	08/79
F.J.W.A. Approved		5/5/80	88
Revised By		SH	08/79
Revised Date		08/79	08
Revised Sheet		2 of 2	641

PHASE III

1. Reroute traffic to existing alignment and maintain two-way traffic.
2. Remove all temporary construction items.

GENERAL NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. For supplemental 'advisory speed plate' applications see Index No. 600.
4. The detour pavement should be constructed of width equal to the existing pavement, but lanes shall be not less than 10 feet in width. When one-way one-lane operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with Indexes Nos. 603, 604, 606, 607 or 608. Minimum width for the detour shoulders is 6 feet.
5. Method of attaching temporary guardrail to the detour structure to be approved by the Engineer.
6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
7. Temporary crash cushions shall be the inertial type in accordance with Index No. 415 or others as called for in the plans.
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
10. Where the temporary structure is not required the detour may be constructed in accordance with Index No. 609, unless otherwise stipulated in the plans.
11. Mono-directional reflective colorless raised pavement markers shall be placed on the edge lines and spaced 40' on centers on tangent roadway and 20' on centers on curves.
12. For general TCZ requirements and additional information refer to Index No. 600.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
TRAFFIC CONTROL THROUGH WORK ZONES				
TWO-LANE, TWO-WAY • RURAL STRUCTURE REPLACEMENT				
Designed By	KSM	Date	08/79	Approved By
Drawn By	SHB	Date	08/79	<i>[Signature]</i> Deputy State Design Engineer, Highway
Checked By	JAC	Date	08/88	Revision No.
F.J.R.A. Approved		88	2 of 2	Index No. 650

DESIGN CRITERIA RELATED TO HIGHWAY SAFETY

January 1988

TYPE OF FACILITY	RURAL & URBAN FREEWAYS AND URBAN ARTERIALS & COLLECTORS, DESIGN SPEED OF 45 MPH OR GREATER AND PROJECTED ADT (20 YR) OF 1500 OR GREATER	RURAL COLLECTORS, DESIGN SPEED OF 40 MPH OR LESS AND RURAL LOCALS - ALL SPEEDS (WITHOUT CURB AND GUTTER)	URBAN ARTERIALS & COLLECTORS, DESIGN SPEEDS OF 30 - 50 MPH (WITHOUT CURB AND GUTTER) OR LESS (CURB AND GUTTER)
EMBANKMENT SLOPE	Fill Ht. 0'-5' 6:1 except where R/W is insufficient then 6:1 to edge of CZ & 3:1 will be permitted. 5'-20' 6:1 to edge of CZ & 3:1 except where R/W is insufficient then 2:1 with guardrail will be permitted. Travel lanes plus approach shoulder widths.	Fill Ht. 0'-5' 6:1 except where R/W is insufficient then 6:1 to edge of CZ & 3:1 will be permitted. 5'-20' 6:1 to edge of CZ & 3:1 except where R/W is insufficient then 2:1 with guardrail will be permitted. Travel lanes plus approach shoulder widths.	Fill Ht. 0'-5' 6:1 except where R/W is insufficient then 6:1 to edge of CZ & 3:1 will be permitted. 5'-20' 6:1 to edge of CZ & 3:1 except where R/W is insufficient then 2:1 with guardrail will be permitted. Divided: Travel lanes plus approach shoulder width R/W, 6:1, unless full median section is carried across structure. Undivided: Travel lanes plus approach shoulder widths.
CLEAR WIDTHS FOR BRIDGES	Freeways, divided arterials & collectors (4 or more lanes); Travel lanes plus 10' R/W and 6' L.L.; Undivided arterials & collectors; Travel lanes plus approach shoulder width.		
BACKSLOPES	4:1 (Normal)	4:1 where R/W permits or 3:1.	4:1 where R/W permits or 3:1.
CLEAR ZONE (CZ) ① ② ③	Design Speed MPH 60-70 30' 18' 36' 24' 18' 55 24' 14' 30' 18' 14' 45-50 18' 14' 24' 14' Shoulder width plus 2' to face of guardrail (18' min.). May be desirable to locate on front slopes see Detail K, Index No. 400.	Design Speed MPH 60-70 24' 14' 30' 18' 14' 55 18' 14' 24' 14' 45-50 14' 14' 20' 14' Shoulder width plus 2' to face of guardrail (18' min.). May be desirable to locate on front slopes see Detail K, Index No. 400.	Design Speed MPH 50 18' 10' 24' 14' 45 18' 10' 24' 14' 30-40 14' 10' 18' 10' Shoulder width plus 2' to face of guardrail (18' min.).
SIGNS	Not generally in median except when shielded by barrier. Outside clear zone or frangible base 20' from edge of travel lane and 14' from edge of auxiliary lane or behind approved barrier that is justified for other reasons.	Outside clear zone or behind barrier that is justified for other reasons. Cantilever signs may be located inside clear zone protected by barrier. Frangible single column signs to be located in accordance with Traffic Design Standards Index No. 17302. All supports are breakaway or frangible except overhead cantilever or truss signs.	Outside clear zone or behind barrier that is justified for other reasons. Cantilever signs may be located inside clear zone protected by barrier. Frangible single column signs to be located in accordance with Traffic Design Standards Index No. 17302. All supports are breakaway or frangible except overhead cantilever or truss signs.
LIGHT POLES	Not generally in median except when shielded by barrier. Outside clear zone or frangible base 20' from edge of travel lane and 14' from edge of auxiliary lane or behind approved barrier that is justified for other reasons.	Outside clear zone for both frangible and nonfrangible bases if clear zone 20' or less. Desirably 14' from edge of thru lane and 20' from edge of auxiliary lane or behind approved barrier that is justified for other reasons. Frangible bases may be placed at 20' from thru lane and 14' from auxiliary lane for clear zones greater than 20'.	Outside clear zone or behind approved barrier that is justified for other reasons. Frangible bases may be placed at 20' from thru lane and 14' from auxiliary lane for clear zones greater than 20'.
UTILITY POLES, FIRE HYDRANTS, ETC.	Not in median. Not within R/W of the main travel way of freeways. For other facilities outside the clear zone. Normally 6.5' inside R/W when beyond clear zone otherwise as close as practical to R/W line.	Outside clear zone. Normally 6.5' inside R/W when beyond clear zone otherwise as close as practical to R/W line.	Outside clear zone. Not in median. Normally 6.5' inside R/W when beyond clear zone otherwise as close as practical to R/W line.
RAILROAD CROSSING DEVICES	Not on freeways. 10' min. from top of travel lane or 6' min. from edge of auxiliary lane to near edge of device. No guardrail. ☆	10' min. from edge of travel lane to near edge of device. No guardrail. ☆	Minimum from edge of travel lane to near edge of device: 10' greater than 40 mph - 10' 35 - 40 mph - 8' 30 mph or less - 6' Minimum for auxiliary lanes - 6' No guardrail ☆
MEDIAN WIDTHS	Freeways 60 min. - 60 mph and over 40 min. - under 60 mph Other divided highways 80 min. - 55 mph and over 22 min. - under 35 mph	22' Min.	19.5' min. - 45 - 50 mph 15.5' min. - 40 mph or less (greater widths desirable) For reconstruction projects the min. painted median width with provision for left turn is 10' (greater widths desirable) 4' min. from face of curb where curb height is 6' or greater. □
TREES Δ Existing Or Expected Dia. ≥ 4"	Outside clear zone. Desirable criteria recommended for Freeways. +	Outside clear zone.	Outside clear zone.

Design speed to be established using realistic anticipated operating speed.

Preferred ditch cross sections are shown on pages 25, 26 & 27 of the AASHTO Guide For Selecting, Locating And Designing Traffic Barriers.

Consideration should be given to maintaining greater than the above specified clearances and/or flatter slopes where feasible and practical. Values shown above shall be used on all new construction and on reconstruction projects to the extent that economic and environmental considerations and R/W limitations will allow. For definitions of new construction and reconstruction see "Manual Of Uniform Minimum Standards For Design, Construction And Maintenance For Streets And Highways". The values shown do not apply to RRR projects.

Driving lane is any traffic lane, travel or auxiliary.

An auxiliary lane is the portion of the roadway adjoining the traveled way for parking, speed changes, turning, storage for turning, weaving, truck climbing or for other purposes supplementary to through traffic movement.

Traveled way (Travel lanes) is the portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

On projects where the 4 foot minimum offset cannot be reasonably obtained and other alternatives are deemed impractical, the minimum may be reduced to 2.5'.

* At locations where immediately adjacent development such as buildings, etc. provide less clearance, bridge piers can be placed to provide clearance less than 16'. Adequate sight distance for crossing maneuvers at intersections should be provided.

Δ Offsets shown are for existing or newly planted trees. If existing trees are close to but less than the minimum offset indicated, other factors should be considered to determine adequacy of offset, i.e. ADT, operating speed, accident history, size, age and type of tree, protection by a barrier, etc. Newly planted trees may be placed behind barriers that are provided for other reasons. The minimum setback distance from the back of concrete barriers, walls, abutments or other rigid obstructions is 4' for newly planted trees. For w-beam guardrail the minimum setback is 6' from the face of the rail for newly planted trees. Offsets shown apply to both outside and median for divided highways unless otherwise noted. When trees are placed in median adequate sight distance at intersections, turnouts and median openings, etc. shall be maintained.

□ 10' minimum from driving lane when curb height is less than 6' or when curb height has been reduced by resurfacing.

+ When offset established, care shall be taken to avoid blocking sight distance to roadside signs.

◇ edge of signal device in accordance with Traffic Design Standards Index No. 17882.

☆ Not less than 2' from edge of any shoulder pavement.

Clear Zone Facilities

- ① Desirable values are to be used for all new construction projects. These values may be reduced only where individually justified to mitigate critical social, economic, and environmental impacts or to lessen excessive right-of-way costs. Desirable values are also to be used for reconstruction projects; however, values less than desirable down to minimum may be used where individually justified due to critical social, economic, and environmental impacts and/or excessive right-of-way costs or when existing roadside obstacles are not considered hazardous as evidenced by field review and by accident history or accident potential.
- ② Where accident history indicates need, or where specific site investigation shows definitive accident potential clear zones for rural and urban facilities (without curb) may be adjusted on the outside of horizontal curves in accordance with Table 1 (Shr. 2 of 2).
- ③ The use of barriers or other safety treatment is to be considered if clear zone requirements are not provided.
- ④ 10' in median where median curb Type E is used on rural collectors with a design speed of 45 mph.
- ⑤ May be reduced to low speed condition criteria (30-40 mph) if conditions more nearly approach those for low speed.
- ⑥ May be reduced to 10' for collectors.
- ⑦ 10' in medians where median curb Type E is used; 4' from face of median curb where curb height is 6'.
- ⑧ 4' from face of median curb where curb height is 6'.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DESIGN CRITERIA RELATED TO HIGHWAY SAFETY		Approved By	
Designed By	Drawn By	Checked By	Reviewed By
Reviewed By	DES	06/8	
Checked By	DES	06/8	
F.H.R.A. Approval		2/5/88	88
Sheet No.		1 of 2	700

CLEAR ZONE OF CURVED ALIGNMENT (CZ_C), FEET

Design Speed (Vmph) And Clear Zone (CZ, Feet)

D	Design Speed (Vmph) And Clear Zone (CZ, Feet)																																								
	30				35				40				45				50				55				60				65				70								
Tangent	6	10	14	18	6	10	14	18	6	10	14	18	10	14	18	20	24	10	14	18	20	24	14	18	24	30	14	18	24	30	36	14	18	24	30	36	14	18	24	30	36
0°15'	6	10	14	18	6	10	14	18	6	10	14	18	10	14	18	20	24	10	14	18	20	24	14	18	25	31	14	18	25	31	37	14	19	25	31	37	14	19	25	31	37
0°30'	6	10	14	18	6	10	14	18	6	10	14	18	10	14	19	21	25	10	15	19	21	25	15	19	25	31	15	19	25	31	38	15	19	25	32	38	15	19	26	32	39
0°45'	6	10	14	18	6	10	14	18	6	10	14	19	10	15	19	21	25	10	15	19	21	25	15	19	25	32	15	19	26	32	39	15	20	26	33	39	15	20	27	33	40
1°00'	6	10	14	18	6	10	14	18	6	10	14	19	10	15	19	21	25	11	15	19	21	25	15	19	26	32	15	20	26	33	39	16	20	27	33	40	16	20	27	34	41
1°30'	6	10	14	18	6	10	15	19	6	11	15	19	11	15	19	21	26	11	15	20	22	26	16	20	27	33	16	20	27	34	41	16	21	28	35	42	17	22	29	36	43
2°00'	6	10	15	19	6	11	15	19	6	11	15	19	11	15	20	22	26	11	16	20	22	27	16	21	28	35	17	21	28	36	43	17	22	29	37	44	18	23	30	38	46
2°30'	6	11	15	19	6	11	15	19	7	11	15	20	11	16	20	22	27	12	16	21	23	28	17	21	29	36	17	22	29	37	44	18	23	31	38	46	19	24	32	40	48
3°00'	6	11	15	19	7	11	15	20	7	11	16	20	12	16	21	23	28	12	17	21	24	28	17	22	29	37	18	23	31	38	46	19	24	32	40	48	20	25	33	42	50
3°30	6	11	15	19	7	11	15	20	7	11	16	20	12	16	21	23	28	12	17	22	24	29	18	23	30	38	18	24	32	40	48	19	25	33	42	50	21	26	35	44	53
4°00'	7	11	15	20	7	11	16	20	7	12	16	21	12	17	22	24	29	13	18	23	25	30	18	24	31	39	19	25	33	41	49	20	26	35	43	52					
4°15'																																									
5°00'	7	11	16	20	7	11	16	21	7	12	17	21	12	17	22	25	30	13	18	24	26	31	19	25	33	41	20	26	35	44	52										
5°15'																											21	27	36	44	53										
6°00'	7	11	16	20	7	12	16	21	7	12	17	22	13	18	23	26	31	14	19	24	27	33	20	26	35	43															
6°30'																							21	27	36	45															
7°00'	7	11	16	21	7	12	17	21	8	13	18	23	13	19	24	27	32	14	20	26	28	34																			
8°00'	7	12	16	21	7	12	17	22	8	13	18	24	14	19	25	28	33	15	21	27	30	36																			
8°15'																		15	21	27	30	36																			
9°00'	7	12	17	21	8	13	18	23	8	13	19	24	14	20	26	28	34																								
10°00'	7	12	17	22	8	13	18	23	8	14	19	25	15	21	26	29	35																								
10°15'													15	21	27	30	36																								
11°00'	7	12	17	22	8	13	18	24	8	14	20	25																													
12°00'	8	13	18	23	8	14	19	24	9	15	20	26																													
13°00'	8	13	18	23	8	14	19	24	9	15	21	27																													
13°15'									9	15	21	27																													
14°00'	8	13	18	23	8	14	20	25																																	
16°00'	8	13	19	24	9	14	20	26																																	
17°45'					9	15	21	27																																	
18°00'	8	14	19	25																																					
20°00'	9	14	20	26																																					
22°00'	9	15	20	26																																					
24°00'	9	15	21	27																																					
24°45'	9	15	21	27																																					

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DESIGN CRITERIA RELATED TO HIGHWAY SAFETY

Designed By	Notes	Dates	Approved By
Drawn By	HSD	1/88	State Design Engineer, Roadways
Checked By	JVG	1/88	Revision No.
F.H.R.A. Approved: 2/5/88			88
			2 of 2
			700

TABLE OF CONTENTS TRAFFIC DESIGN STANDARDS

INDEX NO.

DESCRIPTION ROADWAY LIGHTING

17500	Conventional Pole Details
17501	General Notes
17502	Highmast Lighting Details (3 Sheets)
17503	Roadway Lighting Details
17504	Service Point Details
17505	External Lighting For Signs (2 Sheets)
17506	Highway Lighting Pay Items

SIGNING AND MARKINGS

9535	Standard Roadside Sign Break Away Post & Panel Detail (4 Sheets)
10965	Bridge Span Truss For Overhead Signs, Assembly Details For Type A,B Or C Truss
11037	Overhead Sign Structures, Details Of Sign Faces & Truss Connection
11201	Footings For Overhead Sign Trusses, Type A,B Or C Truss (Sheet 1 Of 2)
11201	Footings For Overhead Sign Trusses, Overhead Cantilever (Sheet 2 Of 2)
11226	Trusses For Overhead Signs, Aluminum Cantilever
11860	Type "C" Single Column Ground Signs (Sign Profile & Identification Numbers)
11861	Single Column Ground Signs (60 MPH) (Column Size, Column Height & Column Footings)
11862	Single Column Ground Signs (70 MPH) (Column Size, Column Height & Column Footings)
11863	Single Column Ground Signs (80 MPH) (Column Size, Column Height & Column Footings)
11864	Single Column Ground Signs (90 MPH) (Column Size, Column Height & Column Footings)
11926	Aluminum Bases For Column Supports
13417	Details For Mounting Exit Numbering Panels To Highway Signs
17302	Typical sections For Single Column Sign Placement
17320	Arrow Layouts For Ground & Overhead Signs

INDEX NO.

DESCRIPTION SIGNING AND MARKINGS CONT'D

17328	Signing For Truck Weighing & Inspection Station (3 Sheets)
17344	School Signing & Markings (6 Sheets)
17345	Interchange Markings (4 Sheets)
17346	Special Marking Areas (8 Sheets)
17349	Traffic Control For Street Terminations
17350 A	Signing For Motorist Services
17351	Typical Welcome Center Signing (2 Sheets)
17352	Typical Placement Of Reflective Pavement Markers (2 Sheets)
17353	Markings For Attenuation Systems
17355	Special Sign Details (4 Sheets)
17356	Span Wire Mounting Details
17357	Bridge Weight Restrictions
17358	Parking Restrictions
17359	Narrow Bridge Treatment

TRAFFIC SIGNAL AND EQUIPMENT

17721	Conduit Installation Details (2 Sheets)
17727	Signal Cable And Span Wire Installation Details
17733	Aerial Interconnect
17736	Electric Power Service
17764	Pedestrian Control Signals Installation Details
17781	Vehicle Loop Installation Details (2 Sheets)
17784	Pedestrian Detector Assembly Installation Details
17841	Cabinet Installation Details
17870	Standard Signal Operating Plans (2 Sheets)
17881	Advance Warning For R/R Crossing
17882	Railroad Grade Crossing Traffic Control Devices (4 Sheets)
17890	Traffic Control Devices For Movable Span Bridge Signals (3 Sheets)

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
17328	2 OF 3	REVISED DIMENSION ON FTP 14A, AND ADDED NOTE.
17345	1 OF 4 2 OF 4 3 OF 4	RELOCATED RPM'S ON ALL DETAILS. RELOCATED RPM'S ON DETAIL " D ". RELOCATED RPM'S ON DETAIL " E ". REMOVED 1 (ONE) " WRONG WAY ARROW " DETAIL.
17346	2 OF 8 3 OF 8 4 OF 8 5 OF 8 6 OF 8 7 OF 8	REVISED TYPICAL CROSSWALK MARKINGS FOR WHEELCHAIR RAMPS. REVISED 2 (TWO) NOTES IN FIRST DETAIL. EXTENDED 4" DBL. YELLOW 100' IN LAST DETAIL. RELOCATED RPM'S. CORRECTED 2 (TWO) LANE STRIPING ON " RIGHT ROADWAY CENTERED ON EXISTING ROADWAY REVISED SPEED CHART. ADDED NOTE 5. RELOCATED DETAILS. REVISED SPECIAL EMPHASIS CROSS-WALK DIMENSIONS.
17349	1 OF 1	ADDED NOTES 1 AND 2.
17350A	1 OF 1	REVISED DETAIL B & C.
17352	1 OF 2 2 OF 2	RELOCATED RPM'S . CHANGED TITLE OF "THERMOPLASTIC TRAFFIC LINES" TO TRAFFIC LINES. CHANGED SPACEING FROM 15' TO 20' ON MARKERS. ADDED DETAIL - 1" OFFSET AND REMOVED " PAINTED TRAFFIC LINES " DETAIL.
17355	2 OF 4 4 OF 4	REMOVED SIGN DETAILS FTP-38A AND B, FTP-10, FTP-39 AND 3 (THREE) EDUCATIONAL PLAQUES. REMOVED NOTES REFERRING TO SIGNS. ADDED FTP-40. OLD SHEET WAS VOIDED AND REPLACED WITH NEW SHEET.
17357	1 OF 1	ON SIGN LOCATION TYPICAL "BRIDGE" WAS CHANGED TO "RESTRICTED BRIDGE" . ADDED NOTES. 4, 5, AND 6.
17358	1 OF 1	DIMENSION "C" CHANGED FOR 45° AND 60° LS. CROSS - WALK DIMENSIONS CHANGED.
17359	1 OF 1	RPM'S RELOCATED.
17500	1 OF 1	ADDED JOINT USE NOTES AND TYPE III CONCRETE POLE SPECIFICATION. ADDED "HAND HOLE REQUIRED IN ALL POLES" TO POLE DETAIL.

**REVISIONS
ROAD DESIGN STANDARDS
1988**

INDEX NUMBER	SHEET NUMBER	DESCRIPTION
17501	1 OF 1	REVISED NOTE 6 AND CHANGED A.A.S.H.T.O. DATE. DELETED NOTES 22 AND 23 AND REVISED WORDING ON BREAKAWAY REQUIREMENTS FOR BARRIER WALL MOUNTED POLES.
17502	2 OF 3	DELETED THE ALTERNATE USE OF WEATHERING STEEL POLES.
17503	1 OF 1	REVISED DIMENSIONS ON CONCRETE FOUNDATIONS DETAIL. CHANGED SPECIFICATIONS DATE FROM 1982 TO 1986.
17504	1 OF 1	ADDED NOTE DELETING SHOP DRAWINGS FOR SERVICE EQUIPMENT.
17505	1 OF 2	ADDED NOTE REQUIRING LUMINAIRES TO BE FUSED. CHANGED NOTE REQUIRING 20 AMP DISCONNECT TO READ "30 AMP BREAKER".
17506	1 OF 1	NEW INDEX - HIGHWAY LIGHTING PAY ITEMS.
17781	2 OF 2	ADDED DIMENSION LINES TO "LEAD - IN DETAILS"
17882	1 OF 4	ADDED NOTE ON MINIMUM OFFSET INDEX 700.
	3 OF 4	CHANGED DIMENSION ON PAVEMENT MARKING PLANS. COMBINED NOTES. RELOCATED DETAILS. REVISED SPEED CHART.
	4 OF 4	CHANGED FLASHING LIGHT TO STEADY BURN, AND ADDED HEIGHT TO MINIMUM CURB.
11860	1 OF 1	REVISED A.A.S.H.T.O. DATE.
13417	1 OF 1	REVISED A.A.S.H.T.O. DATE.

JOINT USE POLES

1. The Luminaire And Arm Shall Be Grounded.
2. The Surge Protector And Fuses Shall Be Installed And Located In A Lockable Nema 3R Box (Sized By The Contractor) Attached To The Side Of The Pole.

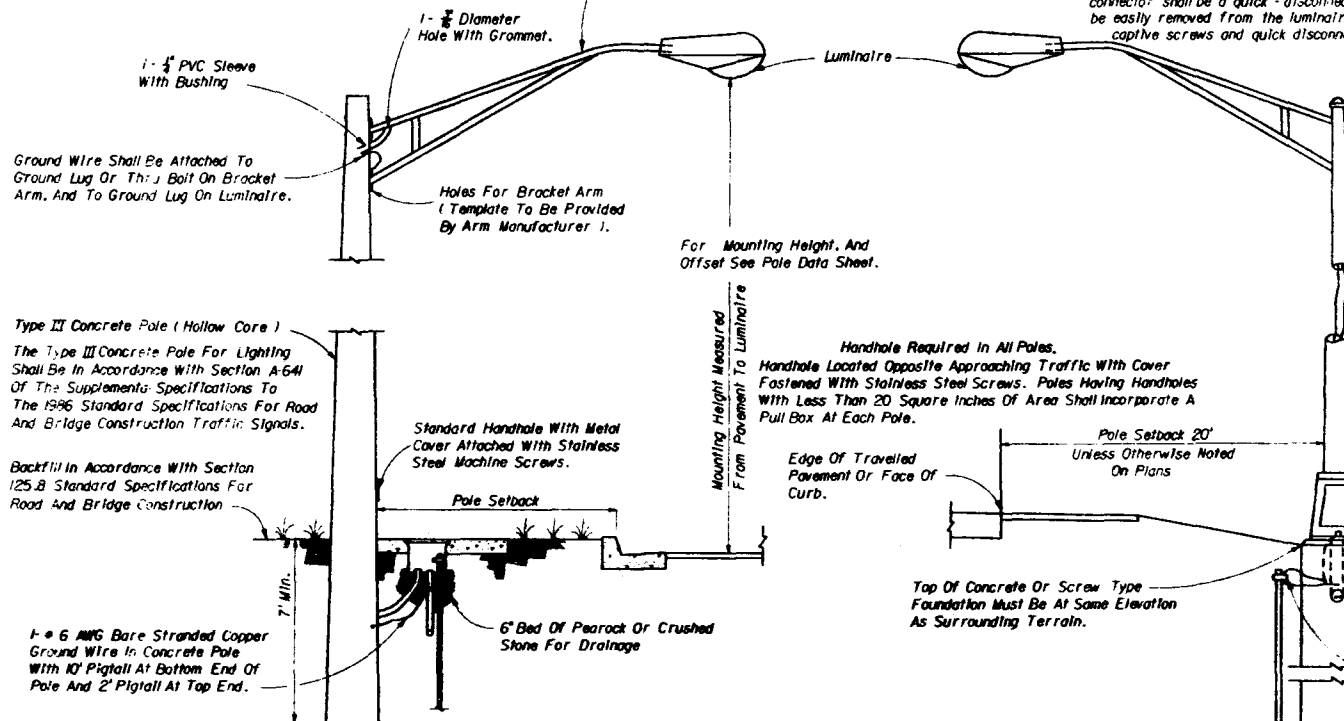
Truss Type Bracket Arm 2" Slipfitter, Compatible With Pole Design, With Strength Adequate For 3 Sq. Ft. Of Projected Area At End Of Pipe For Designed Wind Loading.

Notes:

- (1) Luminaire shall be supplied with a magnetic regulator type ballast.
- (2) The ballast shall be mounted on a hinged door or panel. The unit shall swing open to provide access to the ballast assembly by release of captive screws. The electrical connector shall be a quick-disconnect plug. The unit shall be easily removed from the luminaire after release of the captive screws and quick disconnect plug.

Notes:

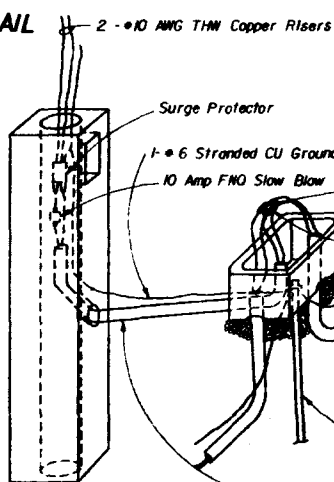
- 1) Allow enough slack in all wires to allow fuse holders, surge protectors and splices to be handled one foot outside pole or pull box.
- 2) A pull box shall be installed at each concrete pole location.
- 3) All mounting heights are $\pm 2 \pm \frac{1}{2}$ ft. unless otherwise noted in plans.



CONCRETE POLE DETAIL

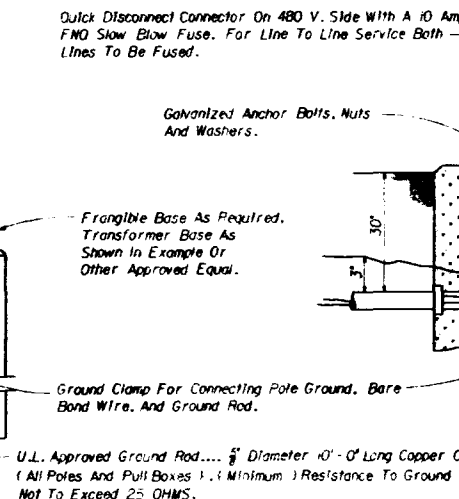
SURGE PROTECTOR SPECIFICATIONS

1. The unit shall withstand a surge current up to 20,000 Amps, and repetitive surges of 200 Amps for a minimum of 10,000 occurrences.
2. The unit shall respond in less than 50 nanoseconds and within this time have a peak clamping voltage better than 1,000 Vrms.
3. The maximum allowable voltage that can pass continuously through the hot leg of the protector must be less than 550 Vrms.
4. The current drain shall be less than 100 microamps.
5. The unit shall be insulated 600 V. to ground and shall be weatherproof.
6. The unit shall not allow holdover current or conduction to ground after the surge ends.
7. Protection shall be achieved for both the 480 V. and neutral conductors with the surges being passed to ground and NOT to neutral.
8. There shall be no discharge lag in the protection of the 480 V. conductor over the neutral conductor.
9. Underwriters laboratory approval not required.



CONCRETE POLE WIRING DETAIL

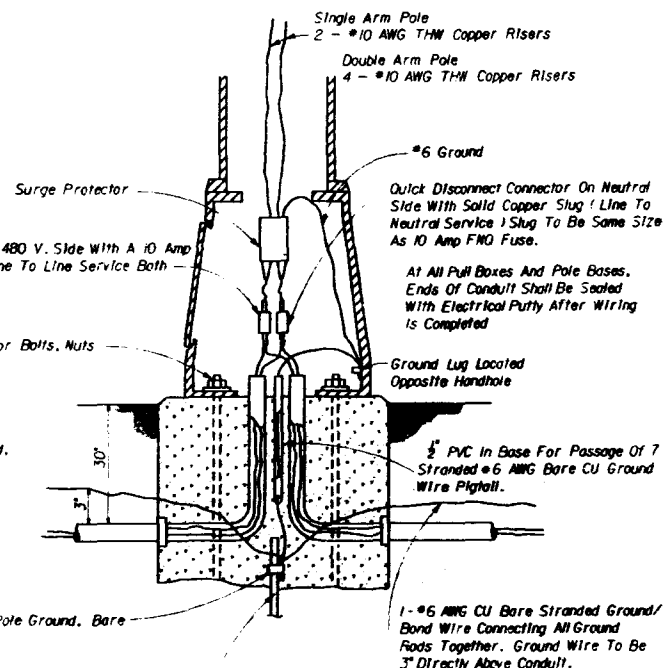
METAL POLE DETAIL



METAL POLE WIRING DETAIL

Note:

Pull boxes should be located 2' max. from concrete pole unless otherwise directed by the project engineer.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
CONVENTIONAL POLE DETAILS					
Designed By	Issue	Date	Approved By	Revision No.	Sheet No.
G.R.	01/78		Robert H. Scott	88	1 of 1
Drawn By					
Checked By					
F.J.R.A. Approved:			17500		

1) Ground rods shall have a resistance to ground not to exceed 25 ohms. Where the resistance is not as low as 25 ohms, two or more ground rods connected in parallel shall be used. Contractor shall have necessary test equipment (current calibration certificate required) at final inspection to insure acceptability of grounding system. Total grounding system not to exceed 10 ohms.

2) The contractor shall be responsible for contacting all utility companies prior to any underground work. The utility company will locate and identify their facilities.

3) Contractor shall determine the service required date for the power company transformer installation at the pre-construction conference.

4) The power company reserves the right to install the riser, switch gear and weatherhead on power company poles at the expense of the contractor. Contact the power company for cost or for authorization for an alternate procedure.

5) Any damaged portions of galvanized steel poles and bracket arms shall be painted in accordance with section 562 of the Standard Specifications.

6) Poles and bracket arms shall be designed in accordance with the design criteria, as indicated in the plans and using the applicable equations found in "Standard Specifications For Structural Supports For Highway Signs, Luminaires And Traffic Signals" published by A.A.S.H.T.O. dated 1985.

7) The luminaire manufacturer shall place a permanent tag on the luminaire housing on which is imprinted the following information: Wattage, ballast type, lamp shown on design plans, lamp setting (position in luminaire), IES light distribution with this lamp in the position specified, input voltage and power factor. Luminaire photometric submittals required.

8) Before final acceptance, contractor shall provide 2 sets of full size as built plans to the maintaining agency.

9) Conduit routing shall be pole to pole, maintaining pole setback distance from edge of pavement. Any cable routing in locations where guardrail is proposed shall be 2'-0" in front of the standard guardrail position.

10) Pole positions and conduit routing may be adjusted, as approved by the engineer, to prevent conflicts with utility and drainage structures not indicated, and prevent guardrail post conflict with underground lighting circuits.

11) Where guardrail is constructed, the poles shall be placed a minimum of 4' behind the face of the guardrail.

12) Pole foundation installations shall be backfilled to the top of the foundation compacted to a firm, stable condition approximately equal to that of the adjacent soil. The fill shall conform to existing grade and be fully soded.

13) The wires at the pole handhole and pullboxes shall be looped up in the pole and pullboxes with sufficient length to completely remove connectors to the outside of handhole and pullboxes to make connectors accessible for changing fuses and trouble shooting the system.

14) Neutral wires to have white insulation. Do not use white or green insulated wires for ungrounded conductors.

15) Unless otherwise specified, all cable shall be single conductor, 98 percent conductivity stranded copper, with THW insulation.

16) All splices shall be made in pullboxes or the pole base. No splices shall be made inside the conduit.

17) All exposed or surfaced mounted conduit shall be rigid or intermediate metal. These exposed runs of conduit shall be provided with either expansion joints or flexible metal conduit sections adequate to take care of vibrations and thermal expansions. All metal conduit shall be grounded. Steel conduit shall be hot dipped galvanized.

18) All conduit that will remain empty as spares shall be mandrel tested, cleaned inside and both ends capped. Leave the corrosion resistant pull/drag wire and place duct markers, or pullboxes to mark the location of the ends of the conduits.

19) Pull boxes shall be located at ends of conduit crossing roadways, and as necessary for the completion of the project.

20) These plans represent minimum acceptable criteria. The inspection per these drawings represent the minimum base of acceptance.

21) All material, unless otherwise specified, shall be underwriters laboratory approved.

BREAKAWAY FEATURE

All conventional mounting height poles shall be mounted on a frangible metal base or system of breakaway couplings. If couplings are used, one coupling shall be provided for each anchor bolt connection. The only continuous connection of the pole to the foundation at each anchor bolt shall be provided by the couplings. The area between the top of the pole foundation and the base of the pole including the couplings shall be enclosed with a non-structural aluminum skirt.

If a frangible metal base is used, it shall be one piece and be designed to breakaway without the aid of any slipping or sliding surfaces.

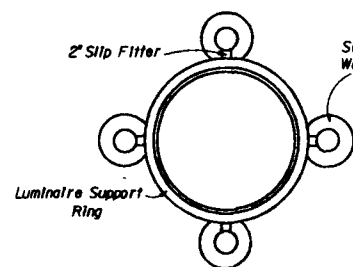
The design of the breakaway feature shall be in accordance with the breakaway performance requirements of Section 7, "Standard Specifications For Structural Supports For Highway Signs, Luminaires And Traffic Signals", A.A.S.H.T.O., copyright 1975. The contractor (supplier) shall submit with equipment submittals, copies of test reports as evidence that the breakaway feature has undergone full scale dynamic testing with a change in momentum of 750 pound-seconds or less and calculations to verify the design will meet A.A.S.H.T.O. wind loadings specified in the contract plans. No poles are to be installed prior to department approval of the submittal data.

Poles Behind Bridge Rail Or Barrier Wall Mounted, Shall Be Non-Frangible.

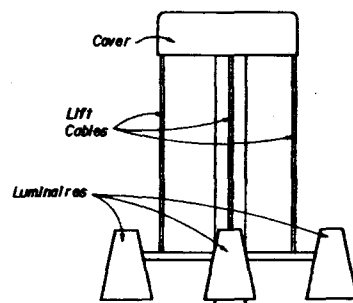
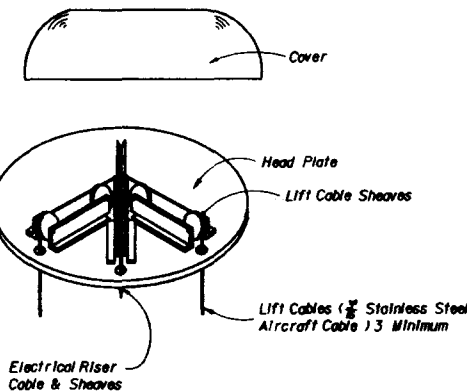
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

HIGHWAY LIGHTING GENERAL NOTES

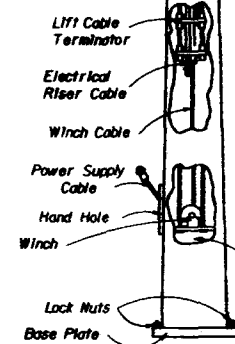
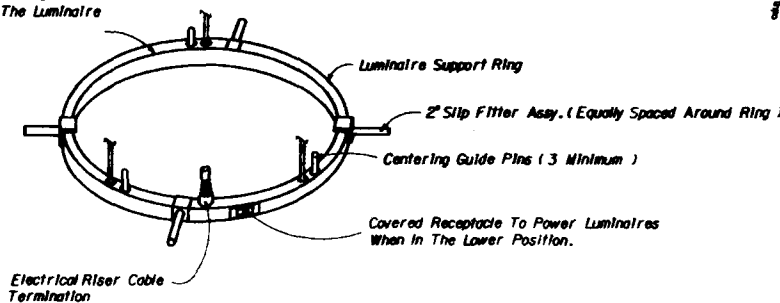
Designed By	Checked By	Approved By		
G.A.	04/25/78	<i>U. G. Smith</i>		
Drawn By			Revision No.	Sheet No.
Checked By				
F.H.R.A. Approved			88	1 of 1
			17501	



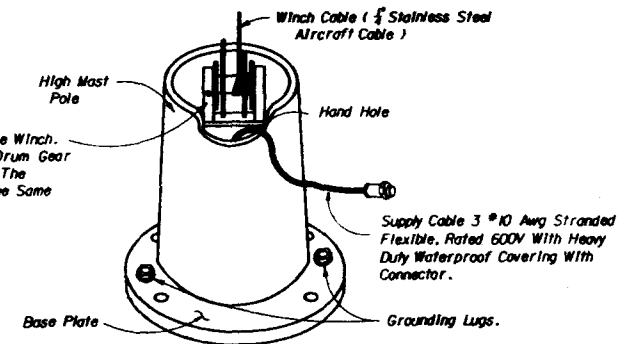
See Legend For Number Of Luminaires, Lamp Wattage And Light Distribution.



Spring Supported Centering Arms Provided To Center The Luminaire Ring.

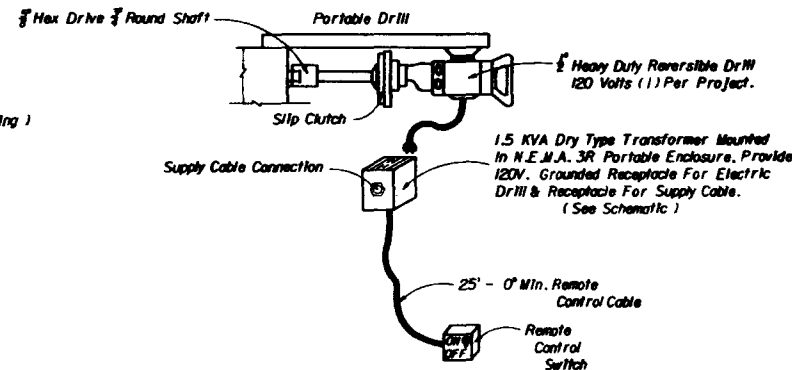
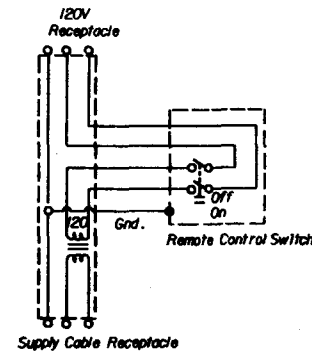


Surge Protector Shall Be Located In Pole With Circuit Breaker.



Positive Drive Reversible Winch. The Complete Enclosed Drum Gear Shall Directly Mesh With The Worm Gear Train, In The Same Enclosure.

SCHEMATIC OF REMOTE AUXILIARY POWER UNIT



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
HIGHMAST LIGHTING DETAILS			
Designed By	Checked By	Drawn By	Approved By
			Charles A. Smith
Revised By	Revised No.	Sheet No.	Index No.
	84	1 of 3	17502
F.J.M.A. Approvals			

LUMINAIRE SPECIFICATIONS

The reflector with its aluminum cover shall be firmly attached to a cast ring. This ring shall have keyhole slots in its upper surface such that the reflector/refractor assembly may be readily attached to, or detached from, the luminaire bracket entry and lamp support assembly without completely removing the support bolts.

Each luminaire shall contain an integral auto-regulator type ballast connected for 480 volts input $\pm 10\%$ and a power factor of more than 90%. The luminaire ballast shall be enclosed within an aluminum housing which integrally attaches to the luminaire bracket entry and lamp support assembly. It shall be readily removable without removing the luminaire from the bracket arm.

The luminaire shall be attached to the bracket arm by means of a bracket entry and lamp support assembly. The assembly shall include a side entry slipfitter designed for two (2) inch pipe with provision for 3" adjustment for leveling the luminaire. An enclosed terminal block shall be included such that all electrical connections shall be protected from exposure to weather.

All electrical connections shall be made waterproof or be made inside a weather resistant enclosure. All luminaires shall be ANSI/IES light distribution as indicated in plans. Each luminaire shall be labeled with a permanent label which states the type of lamp, voltage input, power input, power factor, ballast type, socket position, ANSI/IES light distribution, and such other catalog information that a complete replacement can be readily ordered.

The contractor's attention is directed to those plan sheets detailing the mounting of luminaires at the pole top. Particular attention is directed to alignment of luminaire light distributions. Special attention must be exercised in the physical alignment of these luminaires to insure that the approved photometric layout is physically produced at each lighting standard in the field. A marking shall be placed on the external face of the refractor to implement visual inspection of alignment. The marking shall correspond to the 0° axis of the refractor.

FOOTING

The high mast foundations shall be constructed in accordance with the details shown in the plans.

Anchor bolts per manufacturer Specifications. Submittals shall be supplied to the lighting engineer prior to purchase.

One leveling nut, one hold-down nut, and one locking/jam nut shall be supplied per anchor bolt. All small metal parts, (nuts, screws, washers, etc.) shall be rustproofed either by galvanizing per ASTM A-43 or by the nature of the material used in their fabrication.

LOWERING SYSTEM SPECIFICATIONS

The lowering system shall consist of the following:

- Head frame and cover
- Luminaire ring
- Cables
- Winch
- Portable power unit (1 per project)

The head frame unit shall rigidly mate the top of the pole to the head frame platform. The platform with its associated sheaves, etc., shall be covered and raintight. The head frame structure shall be zinc coated steel, attached to the pole by means of a steel slipfitter. Head frame shall encompass six five (5) inch nominal steel cable sheaves grooved to the exact cable diameter, for 180° cable bearing surface. The sheave shall be zinc electroplated to ASTM A64 and dipped in yellow chromate for corrosion resistance. Bearings and cable keepers shall have permanent lubrication. Three (3) stainless steel 7 x 19 aircraft cables of $\frac{5}{8}$ inch or greater diameter shall be provided.

The power riser cable shall be attached to the luminaire ring with a waterproof connector capable of withstanding the pull of the weight of the power riser cable. Where the wire ropes are required to bend over sheaves or over the winch drum, the maximum working stress in the outer fibers of wire rope shall not exceed one fifth ($\frac{1}{5}$) the wire rope manufacturer's rated ultimate stress. Submittals must be provided to the state lighting engineer which clearly state the wire rope ultimate stress. Drum design shall cause level wind or wire rope. The power cord shall travel on sheave(s) or a combination of rollers providing a radius for the cord of six (6) inches or larger. Each end of the sheave(s) or rollers shall have a keeper to prevent the cable from jumping out of the roller track.

The head frame shall also include three (3) latching devices to support the luminaire ring assembly when the lowering device is not in operation. The latches shall be actuated by alternate raising and lowering of the hoisting cables. Locking of luminaire ring shall be signaled by indicators visible from ground. All moving parts of the latch mechanism shall be serviceable from the ground. Each of the three latches shall be strong enough, by itself, to support twice the weight of the ring and all the luminaires. Latching mechanisms which depend primarily upon spring operation or contain dissimilar metals are not acceptable. The latching mechanism shall not require adjustment after the original installation.

The luminaire ring shall be constructed of a minimum of 6" x 2" x 7 gauge hot dipped galvanized ASTM 306 Class "B" steel channel with the appropriate number of two (2) inch steel pipe mounting arms. The luminaire ring shall be prewired with Type "W" or specially reinforced Type "SO" power cable with suitable conductor quantity and size for proper operation and Type "ST" distribution wiring with insulation suitable for at least 105°C. All power cables should be attached to the aluminum weatherlight wiring chamber with weatherlight cable connectors. A 600 volt terminal block, completely prewired shall be included in the weatherlight wiring chamber. A weather-tight twistlock power inlet shall be provided on the luminaire ring to allow testing of the luminaire while in the lowered position. The power inlet shall face away from the pole for easy access.

The ultimate support of the luminaire ring shall not be dependent upon the lowering and raising cables.

The system shall be provided with circuit-breaker switches and twistlock disconnects in the pole base. Raising speed of luminaire ring shall be a minimum of twelve (12) feet per minute.

The winch shall be a reversible worm gear self locking type with an integral friction drag brake to prevent freespooling. The winch shall be designed for hand operation or for operation by means of a $\frac{1}{2}$ heavy duty reversing electric drill motor, remote controlled to enable the operator to stand twenty five (25) ft. from the pole. Stainless Steel 7 x 19 aircraft cables of $\frac{5}{8}$ inch or greater diameter equal to MIL-W-5424 shall be supplied on the winch. The winch shall be provided with keepers above the drum to force the cable away from the ends of the drum for spooling. The drum shall have a wire guard to prevent the cable from coming off.

The winch shall be mounted in such a way that the cable terminator and the riser cable connector may be reached and worked on by a person with his arm through the handhole.

Roller contact spring-loaded centering arms shall be provided to center the luminaire ring while ascending or descending the pole. The rollers for the centering arm shall be made of a water resistant non-marking composition material. All shafts and washers shall be 304 stainless steel. The spring-loading mechanism shall consist of an oil-tempered steel compression spring over an aluminum rod. The rollers shall be in contact with the pole at all times.

POLE SPECIFICATIONS

The pole shaft may be jointed or single piece, polygon or round, high strength steel having a minimum yield strength of 50 ksi. All material shall be single thickness steel plate with no laminations. Steel shall be as specified.

All poles shall be equipped with a reinforced handhole approximately 10' above the base plate. The handhole shall be ten (10) inches wide by twenty (20) inches high minimum.

All poles and hardware will be adequately packed to assure protection to the finish during shipping and handling, poles shall not be shipped pre-assembled.

Drawings shall be provided with the equipment which show assembly sequence, lift point, and recommended erection procedure. A permanent decal or card shall be fixed on the inside of the handhole cover which describes the sequence for lowering the luminaires and the cautions.

The proportioning of weld details and the operation of welding shall be in accordance with the current edition of the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges, and The Referenced American Welding Society Structural Welding Code.

Shop drill two (2) $\frac{1}{2}$ inch diameter holes 180 degrees apart through total thickness of base plate. Tap top of hole for $\frac{1}{2}$ x $\frac{1}{2}$ NMCZ stainless steel hexhead cap screw.

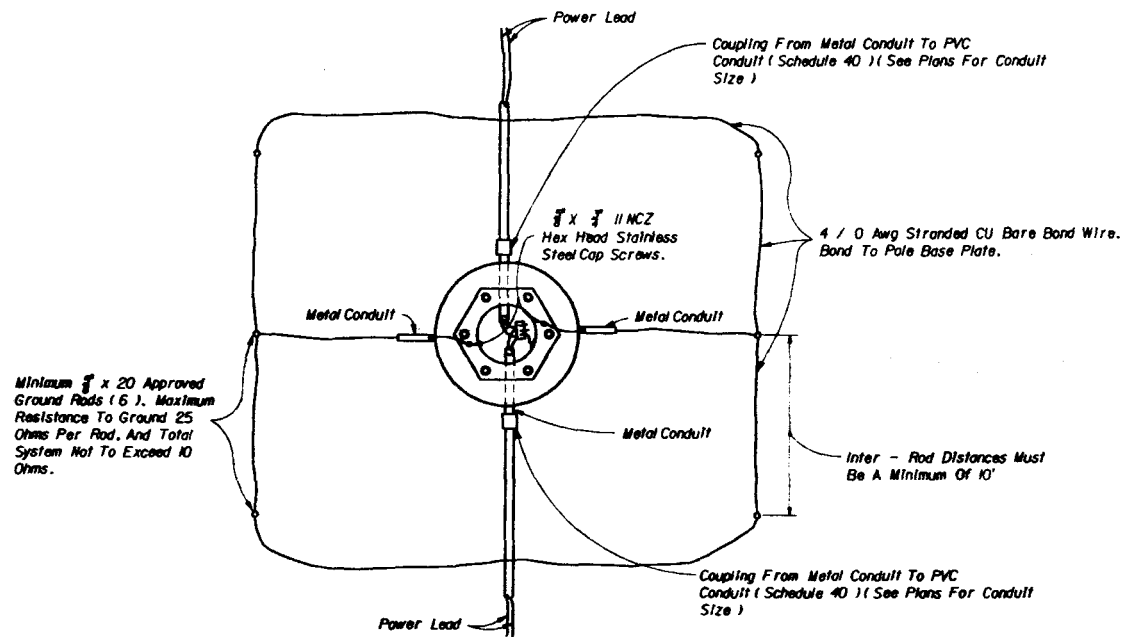
Finished poles shall have a protective coating of hot galvanizing applied in accordance with ASTM - A123.

Note: It is the responsibility of the contractor to coordinate the anchor bolt design with foundation design.

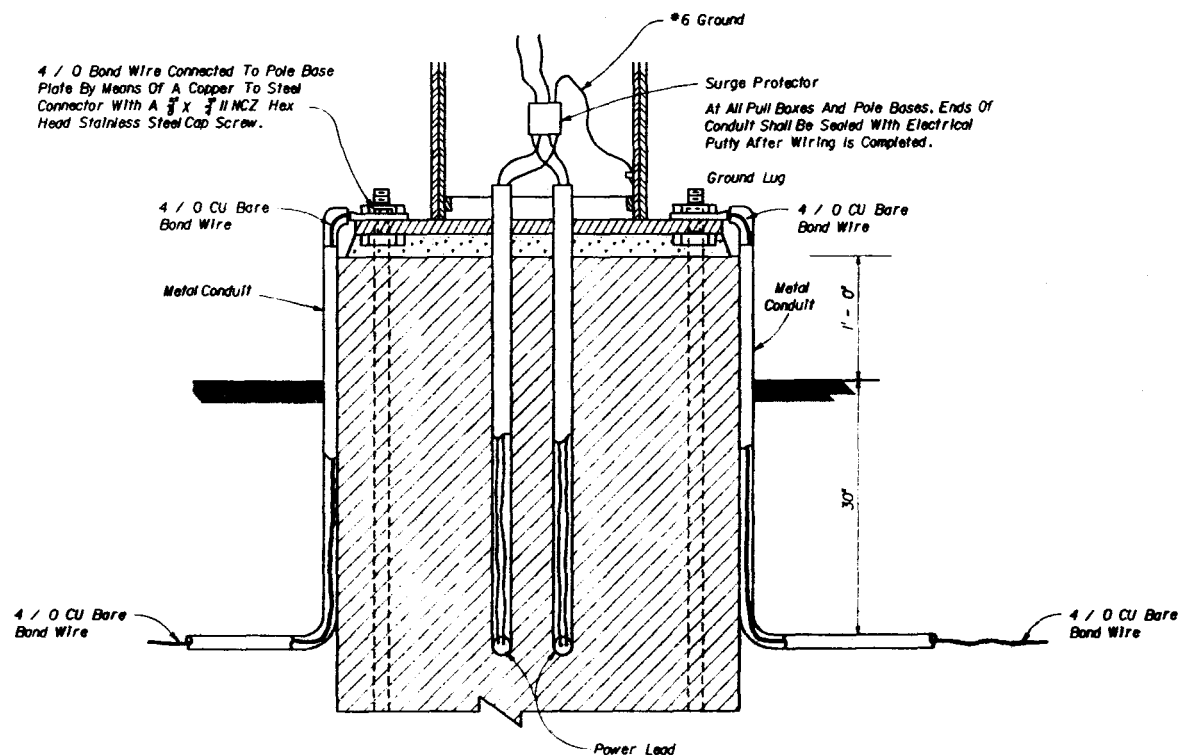
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

HIGHMAST LIGHTING DETAILS

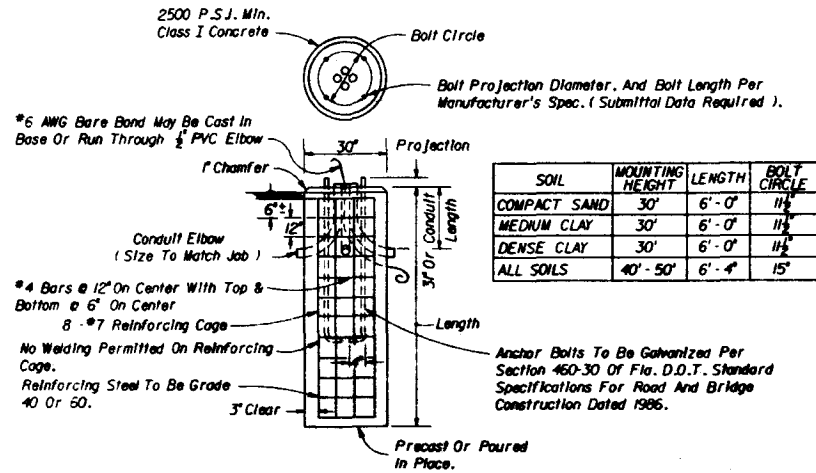
Designed By	S.A.	88/78	Approved By	<i>Charles A. Scott</i>
Drawn By			Revision No.	Sheet No.
Checked By			88	2 of 3
F.A.S.A. Approved				17502



Minimum $\frac{3}{8} \times 20$ Approved Ground Rods (6). Maximum Resistance To Ground 25 Ohms Per Rod, And Total System Not To Exceed 10 Ohms.



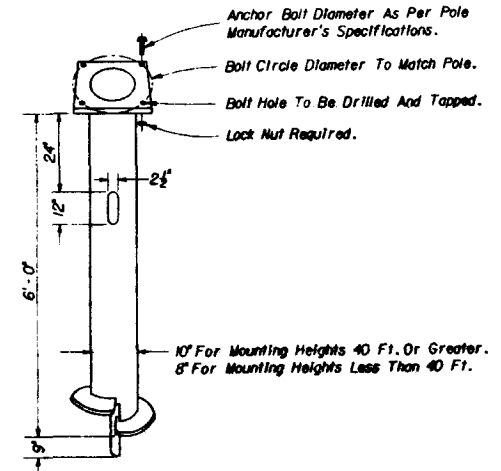
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
HIGHMAST LIGHTING DETAILS			
Designed By S.A.	Drawn By S.A.	Checked By S.A.	Approved By <i>Blackburn</i>
Revision No.		Sheet No.	Project No.
F.A.R.A. Approved		85	3 of 3 17502



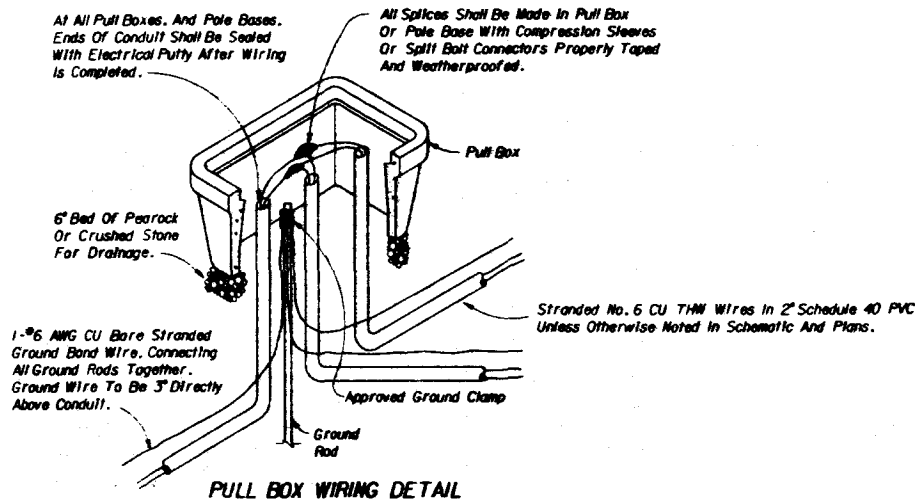
METAL POLE CONCRETE FOUNDATION DETAIL

SCREW TYPE FOUNDATION SPECIFICATIONS

- 1) The foundation shaft and base plate shall be ASTM A-36 structural steel, or better.
- 2) The anchor bolts shall be ASTM A-325, or better.
- 3) All welds shall be sufficient to withstand 10,000 ft.-lbs. of torque, applied about the axis of the foundation.
- 4) The foundation shall have a handhole in the base plate at least 6" in diameter.
- 5) The base plate shall be notched to indicate the orientation of the shaft cableways.
- 6) Drainage shall be provided in the bottom of the foundation by means of an opening of at least 3 square inches.
- 7) The foundation shall be designed for installation using a right hand turning movement with a slight down pressure. The maximum installation torque shall not exceed 10,000 ft.-lbs. or be less than 3,500 ft.-lbs.
- 8) The whole foundation shall be hot dip galvanized after fabrication to ASTM A-123.

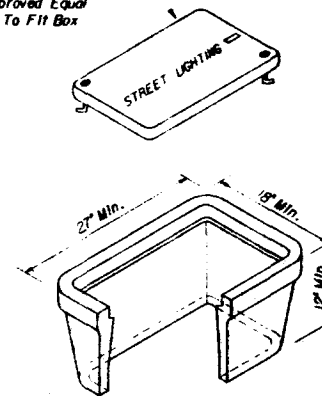


SCREW TYPE FOUNDATION DETAIL



PULL BOX WIRING DETAIL

Cast Iron Traffic Cover
Or Approved Equal
Cover To Fit Box

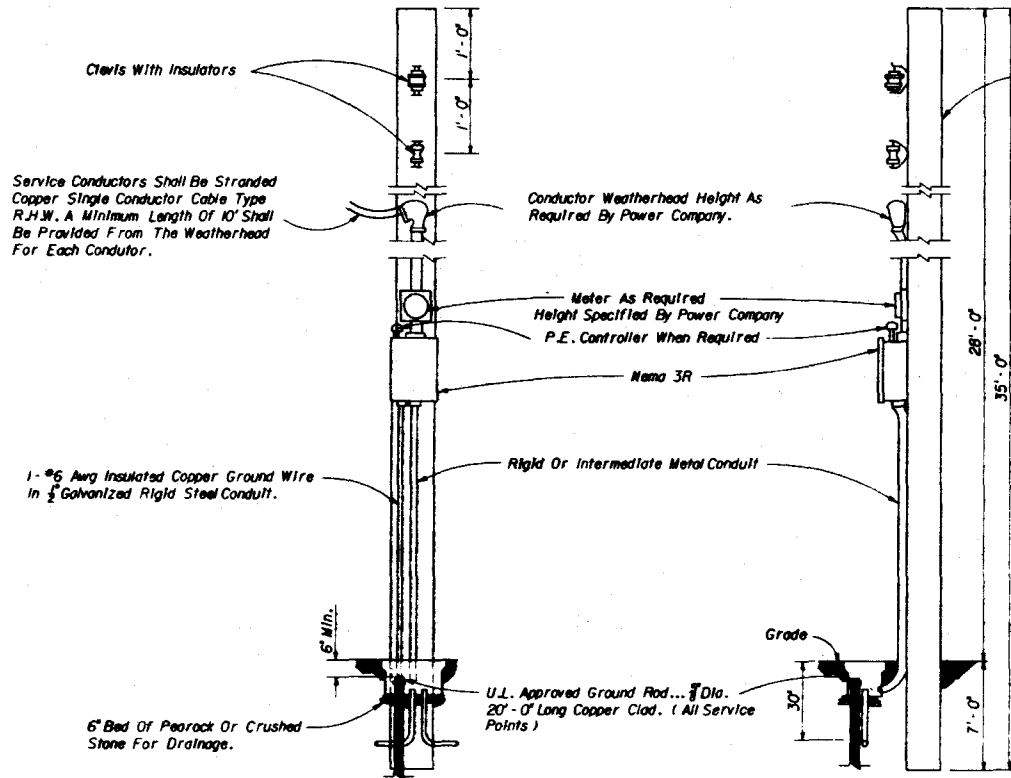


CONCRETE PULL BOX DETAIL

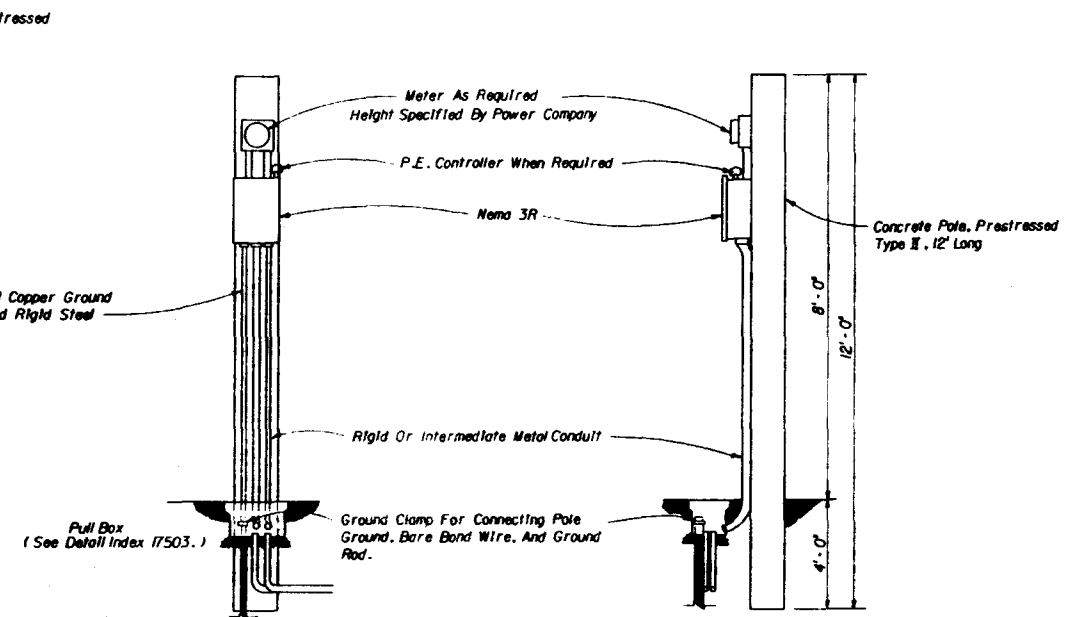
- 1) Pull boxes shall be concrete with cast iron cover or approved equal.
- 2) Pull box shall be designed and tested to meet AASHTO H-10 loading 10,000 + single axle load over any 10' x 10' area cover to be marked street lighting.
- 3) Boxes may be nested for deep conduit and for more working room.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN				
ROADWAY LIGHTING DETAILS				
Designed By G.A.	Date 05/78	Approved By <i>Charles Scott</i>		
Drawn By		Revision No.	Sheet No.	Index No.
Checked By				
F.U.R.A. Approved		88	1 of 1	17503

NOTE :
It Shall Be The Contractors Responsibility To Provide a Complete Service Assembly As Per The Plans And Service Specifications. The Service Installation Shall Meet The Requirements Of The National Electric Code And Applicable Local Codes. Shop Drawings Are Not Required For Service Equipment, Unless Noted In The Plans.



DETAIL 'A'
AERIAL FEED

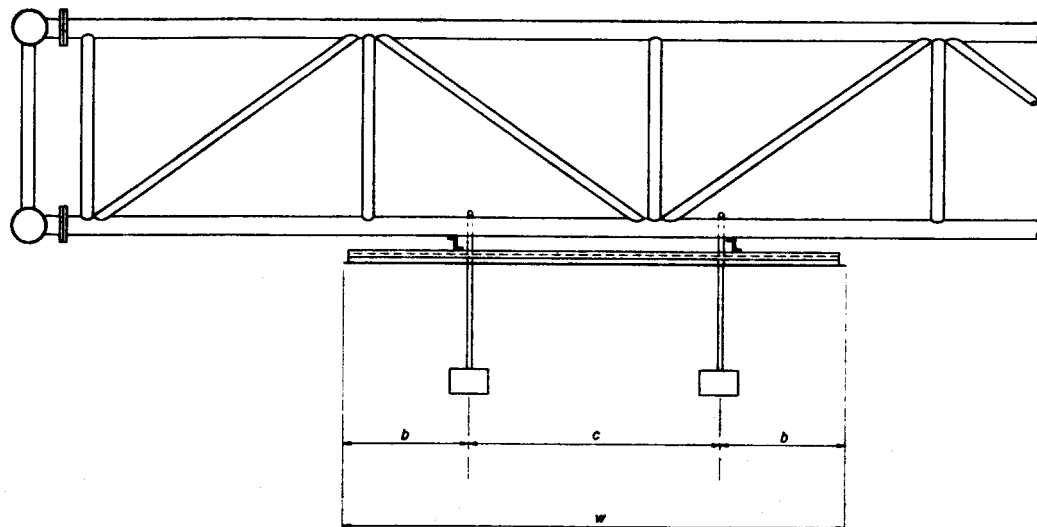


DETAIL 'B'
UNDERGROUND FEED

SERVICE SPECIFICATIONS

1. The enclosure shall be NEMA 3R, pole mounted, rain - tight, rated 480 VAC. Minimum
2. The enclosure door shall be lockable by padlock and four keys provided to the maintaining agency. The door shall have a continuous hinge and draw down latches.
3. 480 V minimum rating bolt-in type breakers shall be used, all components to be interchangeable with major manufacturers.
4. All bus to be copper - 225 A rated. Enclosed copper ground bus included.
5. Locate contactor, transformer, and H.O.A. switch inside enclosure.
6. A 600 V lightning protector shall be wired inside the enclosure.
7. Enclosure to be sized to accommodate as many breakers as called for and other service equipment.
8. Enclosure to be rigidly attached to the pole face.
9. All service equipment shall be U.L. approved.
10. Main breaker required in all service panels with 2 or more feeder breakers.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN				
SERVICE POINT DETAILS				
Designed By	Checked By	Drawn By	Approved By	
G.R.		B-78	[Signature]	
Checked By			Revision No.	Sheet No.
			88	1 of 1
F.H.R.A. Approved			Index No. 17504	



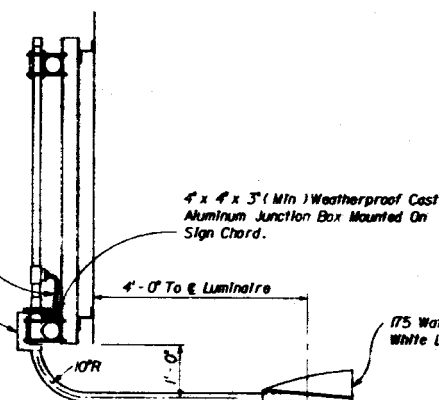
WIDTH OF SIGN FACE	10'-0" OR LESS	10'-0" TO 21'-0"	21'-0" TO 32'-0"	32'-0" TO 43'-0"
NUMBER OF FIXTURES	ONE	TWO	THREE	FOUR
EQUATIONS FOR PLACING FIXTURES ALONG SIGN WIDTH	$W = 2b$ $c = 0$	$W = 2b + c$ $c = 2.2b$	$W = 2b + 2c$ $c = 2.2b$	$W = 2b + 3c$ $c = 2.2b$

PLACEMENT OF SIGN LIGHTS

- 1- Luminaire shall be mounted so that the lamp center is 4'-0" in front of the sign face.
- 2- Luminaire shall be mounted so that the back of the fixture is placed 1'-0" below the bottom edge of the sign face.
- 3- Luminaires from manufacturers who recommended that their fixture be tilted shall be mounted on a bracket which provides this recommended tilt.
- 4- Photometric data for mercury vapor luminaire proposed for sign lighting shall be submitted for approval to the Lighting Engineer, Florida Department Of Transportation.

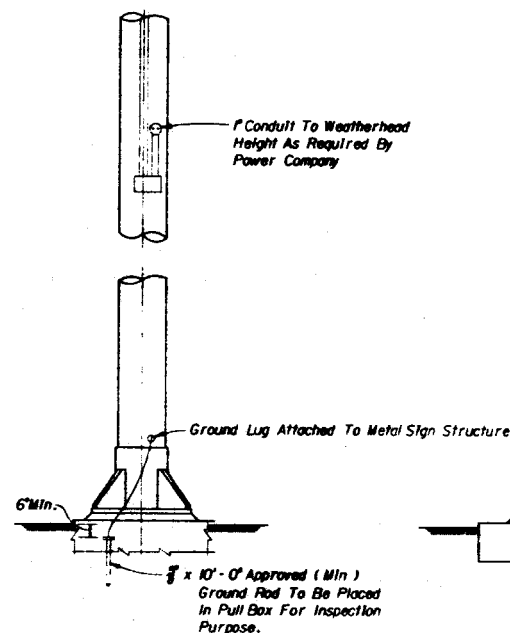
Use 3/4" Liquid Tight Flexible Conduit From Junction Box To Ballast And From Junction Box To Tee In Luminaire Bracket. Conduit Shall Be Of Sufficient Length To Allow Rotation Of Luminaire Bracket 90° In Either Direction.

Ballast Shall Be Mounted To Sign Chord With Stainless Steel Band. Bracket For Ballast To Be Fabricated From Galvanized Steel Plate For Steel Sign Structures And Aluminum Plate For Aluminum Sign Structures. (Submit Data Required)

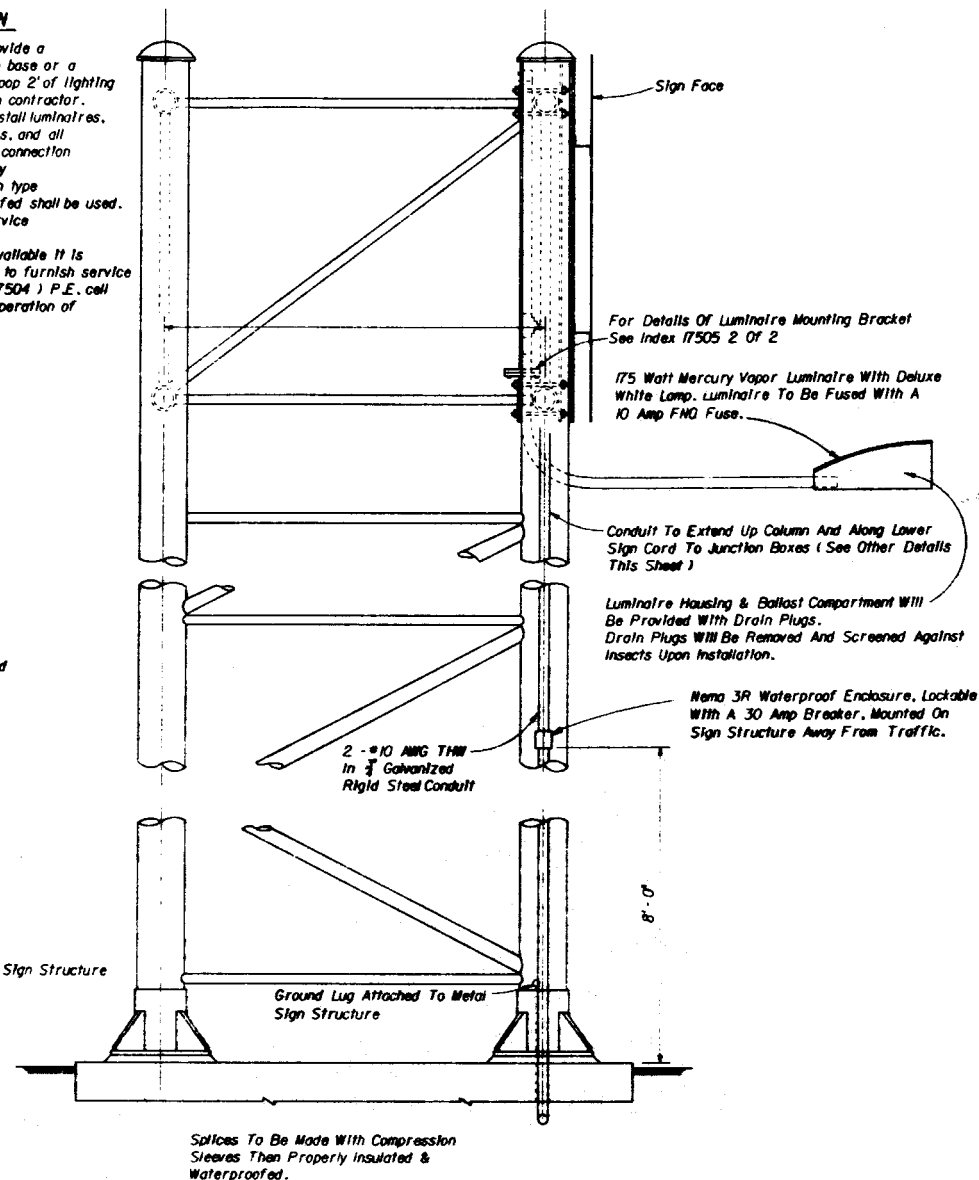


SIGN LIGHTING INSTALLATION

The roadway lighting contractor shall provide a means for sign service entry into a pole base or a pull-box installed in lighting circuit, and loop 2' of lighting circuit conductors for connection by sign contractor. The sign contractor shall furnish and install luminaires, fused safety switches, conduit, conductors, and all other electrical equipment necessary for connection to roadway lighting circuit as provided by roadway lighting contractor. Compression type connectors properly taped and waterproofed shall be used. See Roadway Lighting Plans for sign service locations. When roadway lighting circuits are not available it is the responsibility of the sign contractor to furnish service point equipment, (as specified in Index 17504) P.E. cell and any other equipment necessary for operation of lighted sign.



PLAN OVERHEAD POWER SUPPLY



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
EXTERNAL LIGHTING FOR SIGN (MERCURY VAPOR)			
Designed By	Checked By	Approved By <i>Clark G. Scott</i>	
Drawn By	Reviewed By	Sheet No.	Index No.
Checked By		101 2	17505
T.H.W.A. 100-10-1			

HIGHWAY LIGHTING PAY ITEM NUMBERS

620-I-XXa Grounding Electrode - Linear Foot

- a - Operation To Be Performed
 = 1 (Furnish & Install)
 = 2 (Furnish)
 = 3 (Install)

715-I-abc Conductor - Linear Foot

- a - Operation To Be Performed
 = 1 (Furnish & Install)
 = 2 (Furnish)
 = 3 (Remove) bc = 0

- b - Material Type
 1 (Insulated)
 2 (Bare)

- c - Size
 1 (No. 10) 5 (No. 2)
 2 (No. 8) 6 (No. 1)
 3 (No. 6) 7 (No. 0)
 4 (No. 4) 8 (No. 4/0)

715-2-abc Conduit - Linear Foot

- a - Operation To Be Performed
 = 1 (Furnish & Install Underground)
 = 2 (Furnish & Install Underpavement)
 = 3 (Furnish & Install Surface Mount)
 = 4 (Furnish & Install Jacked Underpavement)

- b - Material Type
 1 (PVC Schedule 40)
 2 (IMC Galvanized)
 3 (Rigid Galvanized Steel)

- c - Size
 1 (3/4") 5 (2")
 2 (1") 6 (3")
 3 (1 1/4") 7 (4")
 4 (1 1/2")

715-4ab-cdd Lighting Pole Complete - Each

- a - Operation To Be Performed
 = 1 (Furnish & Install) 5 (Remove) bdd = 0
 = 2 (Furnish) 6 (Repair & Reinstall)
 = 3 (Install) 7 (Furnish & Install with
 = 4 (Relocate) bdd = 0 Internal vibration damper)

- b - Number Of Arms
 1 (Single Arm Shoulder Mount) 5 (Single Arm Bridge Mount)
 2 (Double Arm Shoulder Mount) 6 (Pole Top Mount)
 3 (Single Arm Wall Mount)
 4 (Double Arm Wall Mount)

- c - Material Type
 1 (Aluminum) 4 (Fiberglass)
 2 (Galvanized Steel) 5 (Wood)
 3 (Concrete)

dd - Mounting Height (In feet)

715-5-Xab Luminaire and Bracket Arm - Each

- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 (Relocate) b = 0
 = 2 (Furnish) 5 (Remove) b = 0
 = 3 (Install)

- b - Material Type
 1 (Aluminum)
 2 (Galvanized Steel)

715-7-Xab Load Center - Each

- a - Operation To Be Performed
 1 (Furnish & Install)
 2 (Rework)
 3 (Relocate)
 4 (Remove)

- b - Type
 1 (Secondary Voltage)
 2 (Primary Voltage)

715-9a-bbb High Mast Lighting Pole Complete - Each

- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 Number Not Used
 = 2 (Furnish) 5 (Remove)
 = 3 (Install) 6 (Rework)

bbb - Mounting Height (In feet)

715-10-XXa Light Pole Foundation - Each

- a - Operation To Be Performed
 1 Number Not Used 5 (Remove)
 = 2 (Furnish & Install) 6 (Relocate)
 = 3 (Repair) = 7 (Furnish)
 = 4 (Strengthen Existing Foundation) 8 (Install)

715-11-abc Luminaire - Each

- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 (Relocate)
 = 2 (Furnish) 5 (Remove)
 = 3 (Install) 6 (Repair & Reinstall)

- b - Classification
 1 (Roadway)
 2 (Underdeck)
 3 (Sign)

- c - Type
 1 (Cobra Head) 5 (Wall Mount)
 2 (High Mast) 6 (Pendant Hung)
 3 (Post Top) 7 (Sign Mount)
 4 (Shoe Box) 8 (Flood)

715-14-Xab Pull Box - Each

- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 (Relocate)
 = 2 (Furnish) 5 (Remove)
 = 3 (Install) = 6 (Furnish & Install Cover Only)
 = 7 (Repair)

- b - Placement
 1 (Roadside) 3 (Embedded)
 2 (Sidewalk)

715-15-abc High Mast Parts - Each

- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 (Relocate)
 = 2 (Furnish) 5 (Remove)
 = 3 (Install) 6 (Repair)

- b - Part Type
 1 (Lowering Cable) 5 (Pully Assembly)
 2 (Power Cable) 6 (Complete Lowering Assembly)
 3 (Winch) 7 (Shield)
 4 (Luminaire Support Ring)

- c - Degree Of Shield (code a for all other parts)
 1 (90) 4 (360)
 2 (120)
 3 (180)

715-36-Xab Frangible Base For Light Pole - Each

- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 (Remove)
 = 2 (Furnish) 5 (Leveling In-Place Pole)
 = 3 (Install)

- b - Type
 1 (Shoe Base) 3 (Frangible Insert)
 2 (Transformer Base)

715-37-XXa Photo-Electric Control Assembly - Each

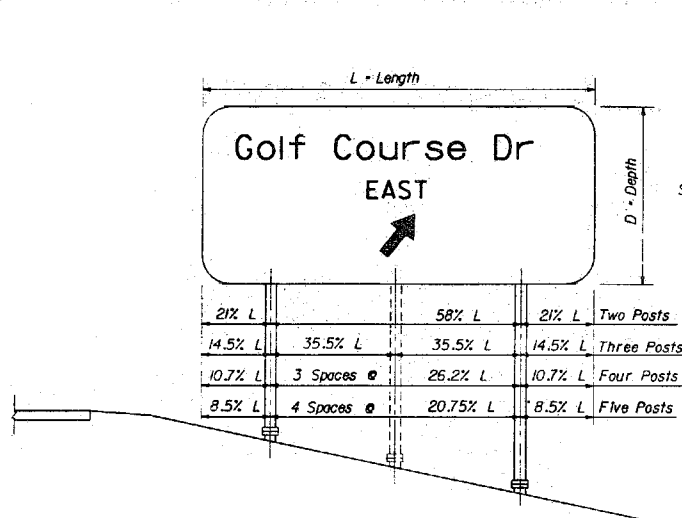
- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 (Remove)
 = 2 (Furnish) 5 (Relocate)
 = 3 (Install)

715-38-XXa Pre-Fab Pilaster - Each

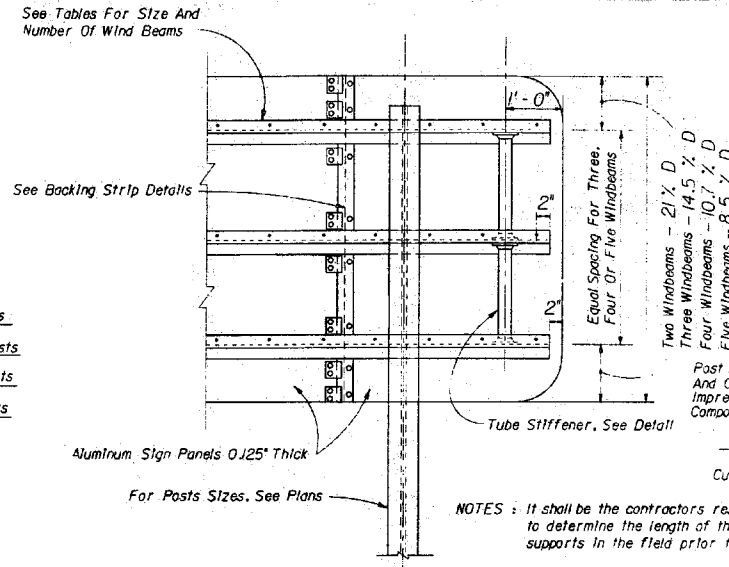
- a - Operation To Be Performed
 = 1 (Furnish & Install) 4 (Remove)
 = 2 (Furnish) 5 (Relocate)
 = 3 (Install)

Note: = Identifies Items Normally Requiring Shop Drawings - Contractor Shall Determine Other Items Requiring Shop Drawings.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
HIGHWAY LIGHTING PAY ITEMS			
Designed By	Checked By	Date	Approved By
L.J.	L.J.	10/87	<i>Charles G. Smith</i>
Drawn By	L.T.B.	10/87	
Checked By	L.J.	10/87	
F.A.B.A. Approved		Sheet No.	Index No.
		1 of 1	17506



TYPICAL ELEVATION
(For Notes And Dimensions Not Shown, See Plans)



PARTIAL REAR ELEVATION

SIDE VIEW

See Detail Right

Post Cut @ Bottom Of Sign ± 1"

See Detail "B" On Base, Foundation & Fuse & Detail Sheet 2 Of 4

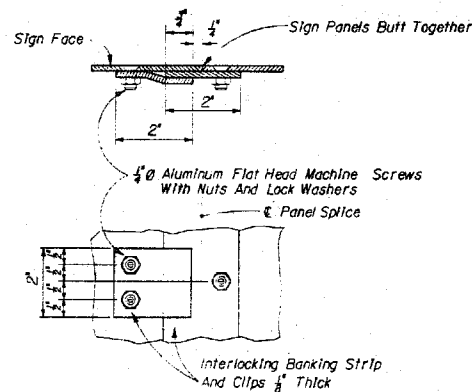
NOTE: As an alternate to this saw cut the contractor may fabricate the column from two pieces providing at this location the fuse plate and the additional hinge plate detailed sheet 2 of 4.

Z TYPE WIND BEAM

4" Aluminum Flat Head Machine Screws With Nuts And Lock Washers. Bolts Shall Be Spaced @ 12" Centers Maximum (Counter Sunk)

Sign Panel 0.125" Thick Aluminum

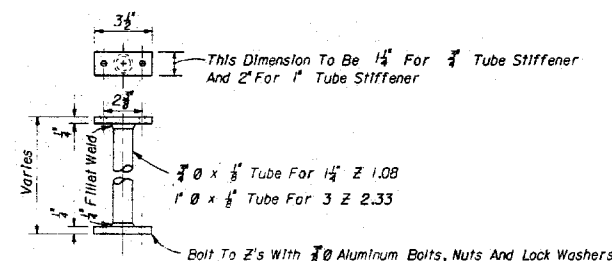
Bolt Zees To Post With 3/8" Aluminum Bolts With Nuts & Lock Washers. Bolt With 2 Bolts @ Each Post. Gage Same As That For Fuse Plate.



BACKING STRIP DETAIL
(Maximum Spacing Of Clips 12")

NUMBER OF WIND BEAMS FOR GIVEN DEPTH & WIND					
WIND	NO. BEAMS	MAX DEPTH	WIND	NO. BEAMS	MAX DEPTH
60	2	10'-3"	80	2	8'-3"
60	3	14'-9"	80	3	11'-9"
60	4	20'-0"	80	4	15'-9"
60	5	25'-3"	80	5	20'-0"
70	2	9'-0"	90	2	7'-3"
70	3	13'-0"	90	3	10'-6"
70	4	17'-6"	90	4	14'-3"
70	5	22'-3"	90	5	18'-0"

SIZE OF WIND BEAMS				
SIZE OF ZEE	LENGTH OF SIGN FOR 2 POSTS	LENGTH OF SIGN FOR 3 POSTS	LENGTH OF SIGN FOR 4 POSTS	LENGTH OF SIGN FOR 5 POSTS
1 1/2" Z 1.08	0'-14'-0"	14'-1'-20'-0"	20'-1'-27'-0"	27'-1'-35'-0"
3" Z 2.33	14'-1'-27'-0"	20'-1'-38'-0"	27'-1'-51'-6"	35'-1'-65'-0"
3" Z 3.38	OVER 27'-0"	OVER 38'-0"	OVER 51'-6"	OVER 65'-0"



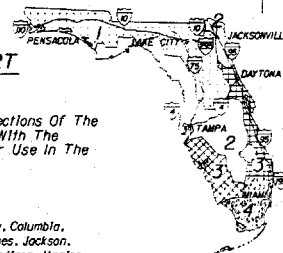
STIFFENER DETAIL

WIND LOADING CHART

BY ZONES

The Following Values For Various Sections Of The Interstate Are In General Agreement With The Isotach Map And Are Appropriate For Use In The Design Of Sign Structures.

ZONE NO. 1 (60 m.p.h.)	
Alachua, Bradford, Baker, Bay, Calhoun, Clay, Columbia, Escambia, Gadsden, Gilchrist, Hamilton, Holmes, Jackson, Jefferson, Lafayette, Lake, Leon, Liberty, Madison, Marion, Okaloosa, Putnam, Santa Rosa, Sumter, Suwannee, Union, Walton And Washington Counties.	
ZONE NO. 2 (70 m.p.h.)	
Citrus, DeSoto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hardee, Hendry, Hernando, Highlands, Hillsborough, Levy, Nassau, Okeechobee, Orange, Osceola, Pasco, Pinellas, Polk, Seminole, St. Johns, Taylor And Wakulla Counties.	
ZONE NO. 3 (80 m.p.h.)	
Brevard, Charlotte, Collier, Indian River, Lee, Manatee, Martin, Palm Beach, Sarasota, St. Lucie And Volusia Counties.	
ZONE NO. 4 (90 m.p.h.)	
Broward, Dade And Monroe Counties.	



DESIGN SPECIFICATION: Standard specification for structural supports for highway signs, luminaires and traffic signals. A.A.S.H.T.O. Latest edition.

SHEET AND PLATES: Material used shall meet the requirements of Aluminum Association Alloy 6061-T6 and A.S.T.M. Specification B-209. Sheets are to be degreased, etched, neutralized and treated with Alodine 1200, Iridite 14-2, Bondrite 721, or equal. No stenciling permitted on sheets.

MATERIALS: All aluminum materials shall meet the requirements of the Aluminum Association Alloy 6061-T6 and also the following A.S.T.M. Specifications for the following: Sheets and Plates B209; Extruded Tube, Bars, Rods & Shapes B221 and Standard Structural Shapes B308.

WELDING: Aluminum Association Alloy No. 5556 Filler Wire.

TOLERANCE: All above materials shall be keeping with the A.S.T.M. Specifications governing.

STEEL BOLTS, NUTS & WASHERS: All steel bolts, nuts and washers shall meet the requirements of the ASTM A235 and shall have an electroplated zinc coating type LS applied in accordance with Standard Specifications 962-7.

ALTERNATE MATERIAL: Material used for sheet and plate shall also meet the requirements of Aluminum Assoc. Alloy 5154-H38 and A.S.T.M. Specifications B209. Material used for Extruded Bars, Rods, Shapes and Tubes shall also meet the requirements of Aluminum Assoc. Alloy 6351-T5 and A.S.T.M. Specification B221.

BASE CONNECTION: High Strength Bolts in the base connection shall be tightened only to the torque shown in the table. Overtightened base connections will not be accepted.

ALUMINUM BOLTS, NUTS & LOCKWASHERS: Aluminum bolts shall meet the requirements of Aluminum Association Alloy 2024-T4 Or 6061-T6 (A.S.T.M. Spec. B-221). The bolts shall have an Anodic Coating of at least 0.0002" thick and be Chromate Sealed. Lock Washers shall meet the requirements of Aluminum Association Alloy 7075-T6 (A.S.T.M. Specification B-221). Nuts shall meet the requirements of Aluminum Association Alloy 6262-T9 Or 6061-T6.

SIGN FACE: All sign face corners shall be rounded. See Sign Layout Sheet.

MATERIAL STRESSES: All allowable stresses are in accordance with the standard specifications for structural supports for highway signs, luminaires and traffic signals. A.A.S.H.T.O. Latest edition for all materials shown in the plans.

DESIGN WIND LOADS: See Wind Loading Chart By Zones for wind in miles per hour on flat sign area. The allowable working stress shall be increased by 40% for combination dead load and wind load.

SHOP DRAWINGS: When ground signs supports are fabricated in accordance with these plans no shop drawings are required. In the event the column length exceeds 2ft. above the length as shown in the plans, shop drawings will be required for those signs only for approval. However, shop drawings for sign panels, messages, lettering and quantities shall be submitted to traffic plans for approval.

FABRICATOR NOTE IMPORTANT

All Stiffened Base Plate Flanges and Fuse Plates shall be bolted to posts using high strength bolts. Bolts shall be tightened in the shop following a method approved by the engineer. Tightening shall be to such a degree so as to obtain the following minimum residual tension in each bolt:

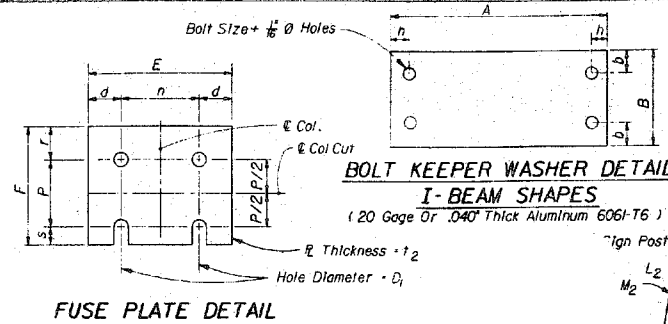
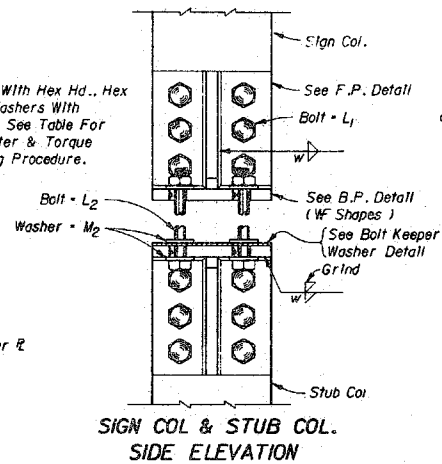
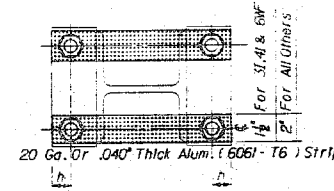
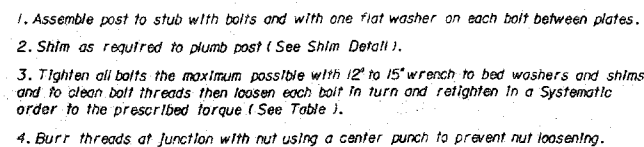
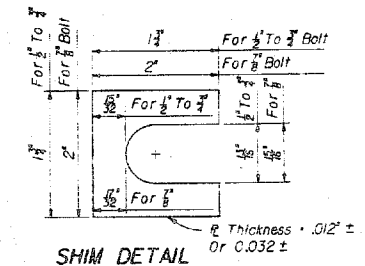
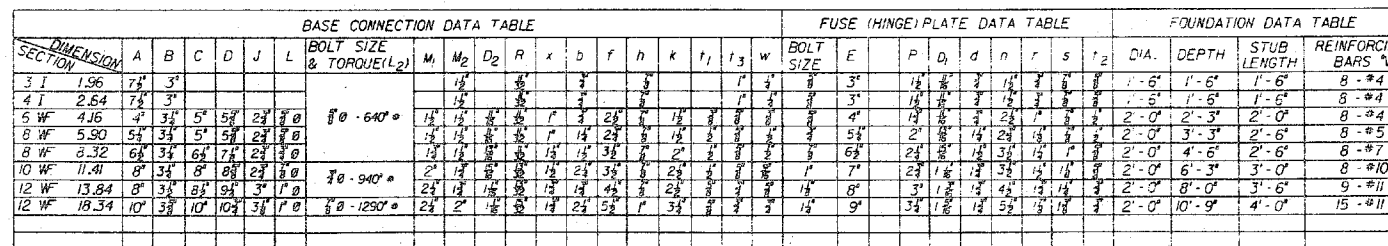
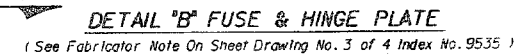
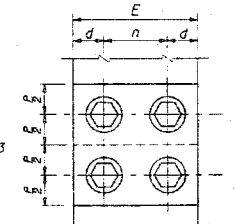
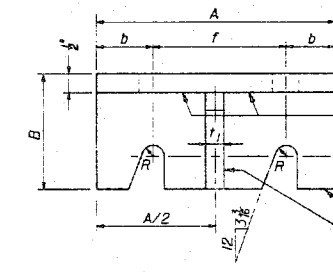
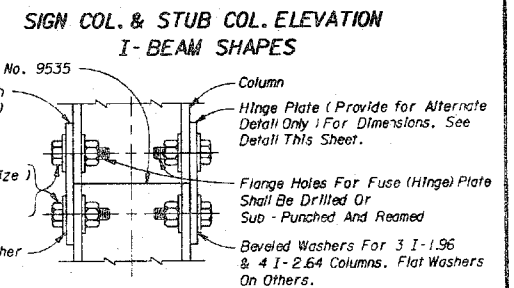
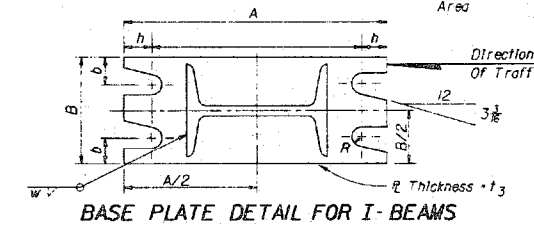
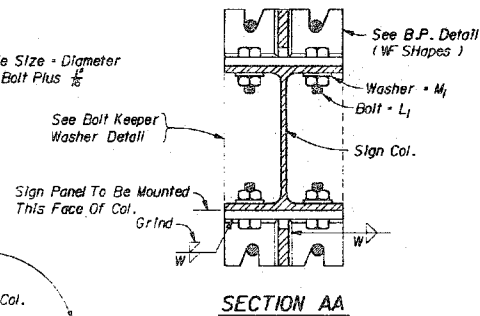
HIGH STRENGTH BOLTS (A-325) MINIMUM RESIDUAL TENSION	
BOLT SIZE	TENSION
1/2"	19,200 Lbs.
3/4"	28,400 Lbs.
1"	36,050 Lbs.
1 1/4"	47,250 Lbs.
1 1/2"	56,450 Lbs.
2"	71,700 Lbs.

ALUMINUM

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN

**STANDARD ROADSIDE SIGN
BREAK-AWAY PANEL DETAIL**

DESIGNED BY	DATE	APPROVED BY
DRAWN BY		
CHECKED BY		
F.H.W.A. APPROVED		
REVISION NO.	SHEET NO.	INDEX NO.
	1 of 4	9535

[illegible]

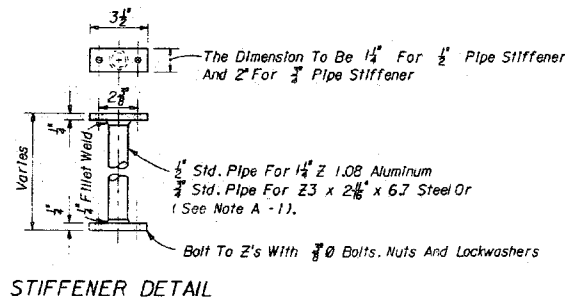
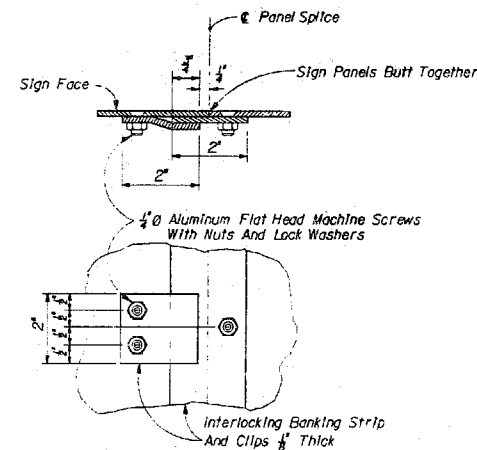
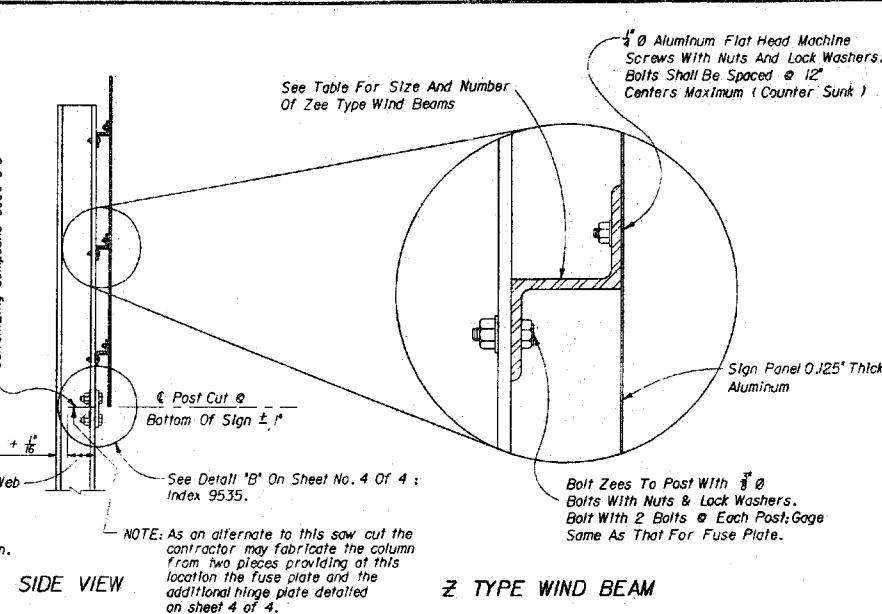
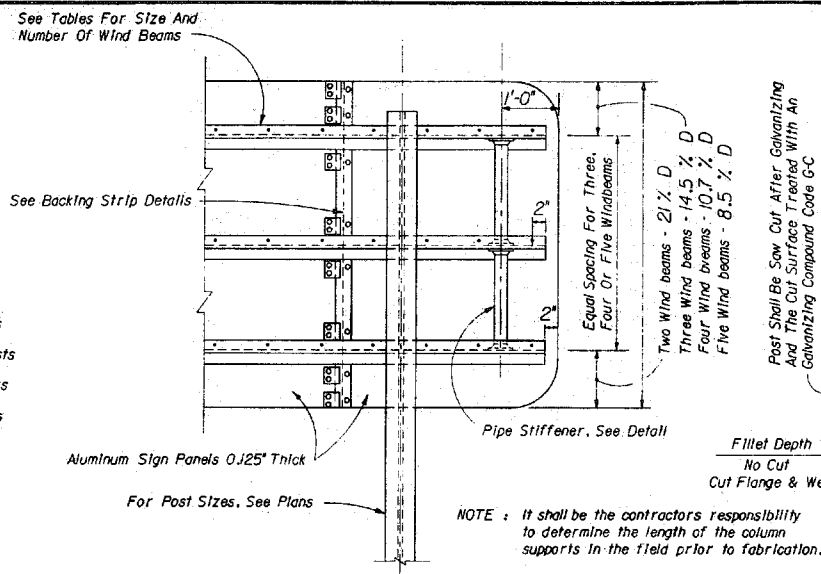
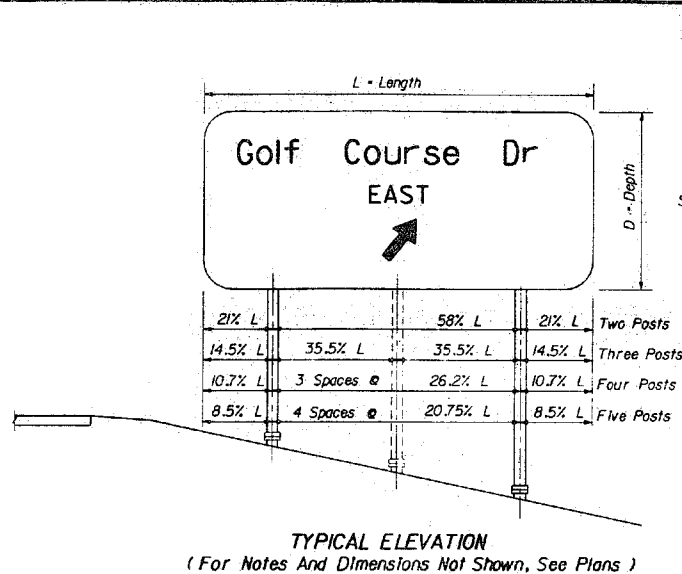
ALUMINUM - BASE, FOUNDATION & FUSE P DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN

STANDARD ROADSIDE SIGN BREAK-AWAY POST DETAILS

Name		Date		Approved By	
Designed By					
Drawn By		H.H.J.		01/67	
Checked By		C.B.B.		01/67	
F.H.W.A. Approved:		Revision No.		Sheet No.	
				Index No.	
		2 of 4		9535	

NOTE: To prevent galvanic corrosion, reinforcing steel shall not be in contact with the aluminum stud column.



WIND LOADING CHART BY ZONES

The Following Values For Various Sections Of The Interstate Are In General Agreement With The Isotach Map And Are Appropriate For Use In The Design Of Sign Structures.

ZONE NO. 1
(60 m.p.h.)
Alachua, Bradford, Baker, Bay, Calhoun, Clay, Columbia, Escambia, Gadsden, Gilchrist, Hamilton, Holmes, Jackson, Jefferson, Lafayette, Lake, Leon, Liberty, Madison, Marion, Okaloosa, Putnam, Santa Rosa, Sumter, Suwannee, Union, Walton And Washington Counties.

ZONE NO. 2
(70 m.p.h.)
Citrus, Desoto, Dixie, Duval, Flagler, Franklin, Glades, Gult, Hardee, Hendry, Hernando, Highlands, Hillsborough, Levy, Nassau, Okechobee, Orange, Osceola, Pasco, Pinellas, Polk, Seminole, St. Johns, Taylor And Wakulla Counties.

ZONE NO. 3
(80 m.p.h.)
Brevard, Charlotte, Collier, Indian River, Lee, Monroe, Martin, Palm Beach, Sarasota, St. Lucie And Volusia Counties.

ZONE NO. 4
(90 m.p.h.)
Broward, Dade And Monroe Counties.

NUMBER OF WIND BEAMS FOR GIVEN DEPTH & WIND					
WIND	NO. BEAMS	MAX DEPTH	WIND	NO. BEAMS	MAX DEPTH
60	2	10' - 3"	80	2	8' - 3"
60	3	14' - 9"	80	3	11' - 9"
60	4	20' - 0"	80	4	15' - 9"
60	5	25' - 3"	80	5	20' - 0"
70	2	9' - 0"	90	2	7' - 3"
70	3	13' - 0"	90	3	10' - 6"
70	4	17' - 6"	90	4	14' - 3"
70	5	22' - 3"	90	5	18' - 0"

* NOTE: Aluminum Zee - No steel equivalent available.

SIZE OF WIND BEAMS				
SIZE OF ZEE	LENGTH OF SIGN FOR 2 POSTS	LENGTH OF SIGN FOR 3 POSTS	LENGTH OF SIGN FOR 4 POSTS	LENGTH OF SIGN FOR 5 POSTS
* 1 1/2" Z 1.08	0' - 14' - 0"	14' - 1' - 20' - 0"	20' - 1' - 27' - 0"	27' - 1' - 35' - 0"
2 1/2" x 2 1/2" x 6.7	14' - 1' - 27' - 0"	20' - 1' - 38' - 0"	27' - 1' - 51' - 6"	35' - 1' - 65' - 0"
2 1/2" x 2 1/2" x 9.8	OVER 27' - 0"	OVER 38' - 0"	OVER 51' - 6"	OVER 65' - 0"

GENERAL NOTES

DESIGN SPECIFICATION: Standard specification for structural supports for highway signs, luminaires and traffic signals, A.A.S.H.T.O. latest edition - Welding - latest edition of A.W.S. structural welding code, latest A.A.S.H.T.O. standard specifications for welding of structural steel highway bridges and FLA. D.D.T. standard specifications with supplement.

DESIGN LOADS: See wind loading chart by zones for wind in miles per hour on flat sign area. The allowable working stress shall be increased by 40% for combination dead load and wind load.

STRUCTURAL STEEL: All structural steel shall meet the requirements of A.S.T.M. A-36.

STEEL BOLTS, NUTS AND LOCK WASHERS: Steel bolts, nuts and lock washers shall meet the following A.S.T.M. requirements: high strength bolts, nuts and washers A.S.T.M. A-325; all other steel bolts, nuts and washers, A.S.T.M. A-307.

GALVANIZING OR METALIZING: All steel shapes, angles, tees, plates, A.S.T.M. A307 bolts, nuts and washers shall be hot dip galvanized or metalized after fabrication, not dip galvanizing shall be in accordance with the requirements of A.S.T.M. A-123 and/or A-153.

SIGN PANELS: The material used shall meet the requirements of the Aluminum Association Alloy 6061-T6 and A.S.T.M. Specification B209. The sheets are to be degreased, etched, neutralized and treated with alodine 1200, iridite 14-2, benderite 721, or equal. No stenciling permitted on sheets.

ALUMINUM BOLTS, NUTS & LOCKWASHERS: Aluminum bolts shall meet the requirements of Aluminum Association Alloy 2024-T4 Or 6061-T6 (A.S.T.M. Spec. B-211). The bolts shall have an Anodic Coating of at least 0.0002" thick and be Chromate Sealed Lock Washers shall meet the requirements of Aluminum Association Alloy 7075-T6 (A.S.T.M. Specification B-221). Nuts shall meet the requirements of Aluminum Association Alloy 6262-T9 Or 6061-T6.

TOLERANCE: All above materials shall be keeping with the A.S.T.M. Specifications governing.

MATERIAL STRESSES: All allowable stresses are in accordance with the standard specifications for structural supports for highway signs, luminaires and traffic signals, A.A.S.H.T.O. latest edition for all materials shown in the plans.

SHOP DRAWINGS: See shop drawing note sheet 1 of 4, 9535.

BASE CONNECTION: High Strength Bolts in the base connection shall be tightened only to the torque shown in the table. Overtightened base connections will not be accepted.

FRICTION FUSE PLATE: Notched steel fuse plates shall conform to the requirements of A.S.T.M. Specification A-36. All holes shall be drilled. All plate cuts shall, preferably, be saw cuts; however, flame cutting will be permitted provided all edges are ground. Metal projecting beyond the plane of the plate face will not be tolerated.

SIGN FACE: All sign face corners shall be rounded. See sign layout sheet.

ALUMINUM MATERIALS: All aluminum materials other than bolts, nuts and lock washers shall meet the requirements of the Aluminum Association Alloy 6061-T6 and also the following A.S.T.M. specifications for the following: Sheet and Plates B209; Extruded Tube, Bars, Rod and Shapes B221 and Standard Structural Shapes B308.

HIGH STRENGTH BOLTS: (A.S.T.M. A325) Shall have an electroplated zinc coating type LS applied in accordance with Standard Specifications 962-7.

FABRICATOR NOTE: IMPORTANT

All friction type bolts shall be tightened in the shop following a method approved by the engineer. Tightening shall be to such a degree as to obtain the following minimum residual tension in each bolt, (see table below).

NOTE A-1: At the contractors option, aluminum zeos and stiffener may be used in lieu of structural steel zeos and stiffeners. See drawing No. 1 of 4, Index No. 9535, for aluminum zee and stiffener.

HIGH STRENGTH BOLTS (A-325) MINIMUM RESIDUAL TENSION

BOLT SIZE	TENSION
3/8"	19,200 Lbs.
1/2"	28,400 Lbs.
3/4"	47,250 Lbs.
1"	56,450 Lbs.
1 1/4"	71,700 Lbs.
1 1/2"	85,450 Lbs.

STEEL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN			
STANDARD ROADSIDE SIGN BREAK-AWAY PANEL DETAIL			
Designed By	Checked By	Approved By	
Drawn By	Checked By	Revised No.	Sheet No.
Checked By	Checked By	Revised No.	Sheet No.
F.H.W.A. Approved		3 of 4	9535

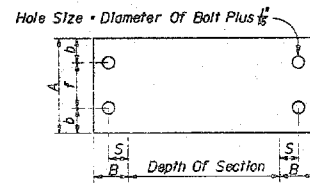
H S Bolt With Hex Head, Hex Nut & 3 Washers With Each Bolt See Table For Bolt Diameter, And Torque. See Bolting Procedure.

Remove All Galvanizing Runs Or Beads In Washer Area

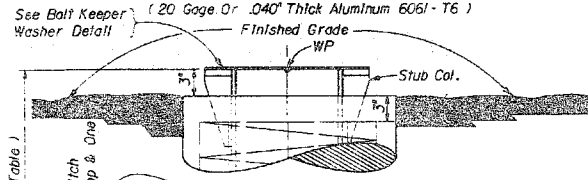
See Bolt Keeper Washer Detail
Top Of Footing See Detail Below

SIGN COL & STUB COL ELEVATION
WF SHAPES

SIGN COL & STUB COL ELEVATION
WF SHAPES



BOLT KEEPER WASHER DETAIL
(20 Gage Or .040" Thick Aluminum 6061-T6)



FOUNDATION DETAIL

See Bolt Keeper Washer Detail

Sign Panel To Be Mounted This Face Of Col.

SECTION AA

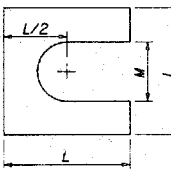
NOTE:

Sections shown are for installation on right shoulder and in gore. Plate slot bevels are opposite hand from that shown for installations in the median.

SHIM DETAIL

Furnish 2 - .012" Thick &
2 - .032" Thick Shims Per Column

BASE PLATE DETAIL
WF SHAPES

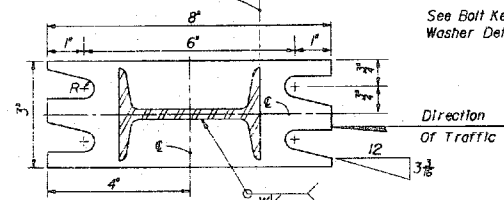


ALTERNATE BOLT KEEPER WASHER
DETAIL FOR I-BEAM AND WF SHAPES

20 Ga. Or .040" Thick Alum. (6061-T6) Strip
1/8" For 3/4" L.B.W.
1/4" For All Others

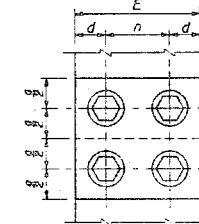
FUSE PLATE DETAIL

Sign Panel To Be Mounted This Face Of Col.



BASE PLATE I BEAMS

NOTE: Two Separate Beams are indicated as Required for Alternate Detail. For the Typical Detail a Sawcut is Required. Extent of this Sawcut is Shown on the Side View Detail on Sheet 3 of 4, Index No. 9535



HINGE PLATE DETAIL

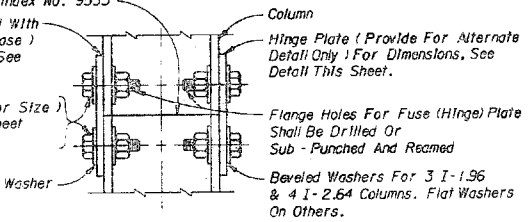
BOLT KEEPER WASHER DETAIL
I-BEAM SHAPES
(20 Gage Or .040" Thick Aluminum 6061-T6)

Sign Column
R Thickness = t₃
Hole Diameter = k

Remove All Galvanizing Runs Or Beads In Washer Area

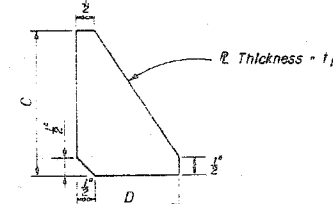
See Bolt Keeper Washer Detail

SIGN COL & STUB COL ELEVATION
I-BEAM SHAPES



DETAIL 'B' FUSE & HINGE PLATE

(See Fabricator Note On Sheet Drawing No. 3 of 4 Index No. 9535)



STIFFENER PLATE DETAIL

STEEL - BASE, FOUNDATION & FUSE & HINGE PLATE DETAILS

SECTION	BASE CONNECTION DATA														FUSE (HINGE) PLATE DATA										FOUNDATION DATA				SHIM	
	A	B	C	D	Bolt Size & Torque	R	b	f	s	t ₁	t ₂	W	E	n	d	g	h	k	t ₃	Bolt Size	Dia.	Depth	Stub Length	Reinf. Bars V	L	M				
3 I 5.7					3/4" - 640 ²⁰	3/4"															3/4"	1'-6"	1'-6"	1'-6"	8 - #4	18"	18"			
4 I 7.7					3/4" - 640 ²⁰	3/4"															3/4"	1'-6"	2'-0"	2'-0"	8 - #4	18"	18"			
6 B 12	4"	2"	4"	2"	3/4" - 640 ²⁰	3/4"	2 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	4"	2 1/2"	4"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	1 1/2"	3/4"	3/4"	2'-0"	2'-9"	2'-3"	8 - #5	18"	18"			
8 WF 17	5 1/2"	2 1/2"	5 1/2"	2 1/2"	3/4" - 640 ²⁰	3/4"	1 1/2"	2 1/2"	1 1/2"	1 1/2"	1 1/2"	5 1/2"	2 1/2"	4"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	1 1/2"	3/4"	3/4"	2'-0"	4'-0"	2'-9"	8 - #7	18"	18"			
8 WF 24	6 1/2"	2 1/2"	6 1/2"	2 1/2"	3/4" - 940 ²⁰	3/4"	1 1/2"	3 1/2"	1 1/2"	1 1/2"	1 1/2"	6 1/2"	3 1/2"	4"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	1 1/2"	3/4"	3/4"	2'-0"	5'-6"	3'-3"	8 - #9	18"	18"			
10 WF 33	8"	2 1/2"	8"	2 1/2"	3/4" - 1290 ²⁰	3/4"	1 1/2"	5 1/2"	1 1/2"	1 1/2"	1 1/2"	8"	4 1/2"	4"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	1 1/2"	3/4"	3/4"	2'-0"	7'-9"	3'-9"	9 - #11	24"	18"			
12 WF 40	8"	2 1/2"	8"	2 1/2"	3/4" - 1580 ²⁰	3/4"	1 1/2"	5 1/2"	1 1/2"	1 1/2"	1 1/2"	8"	4"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	1 1/2"	3/4"	3/4"	2'-0"	10'-0"	4'-6"	14 - #11	24"	18"			
12 WF 45	8"	3"	8"	3"	3/4" - 1580 ²⁰	3/4"	1 1/2"	5 1/2"	1 1/2"	1 1/2"	1 1/2"	8"	4"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	1 1/2"	3/4"	3/4"	2'-0"	10'-0"	4'-6"	14 - #11	24"	18"			

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

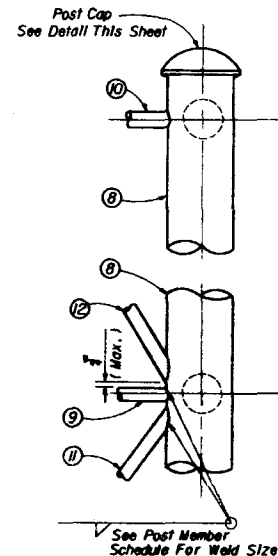
1. Assemble post to stub with bolts and with one flat washer on each end bolt between plates.
2. Shim as required to plumb post (see shim detail).
3. Tighten all bolts the maximum possible with 12" to 15" wrench to bed washers and shims and to clean bolt threads then loosen each bolt in turn and retighten in a systematic order to the prescribed torque (see table).
4. Burr threads at junction with nut using a center punch to prevent nut loosening.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN

STANDARD ROADSIDE SIGN BREAK-AWAY POST DETAILS

Designed By	Checked By	Approved By
Drawn By	Checked By	Approved By
Checked By	Checked By	Approved By
F.H.W.A. Approved	Revision No.	Sheet No.

4 of 4 9535



VIEW A-A

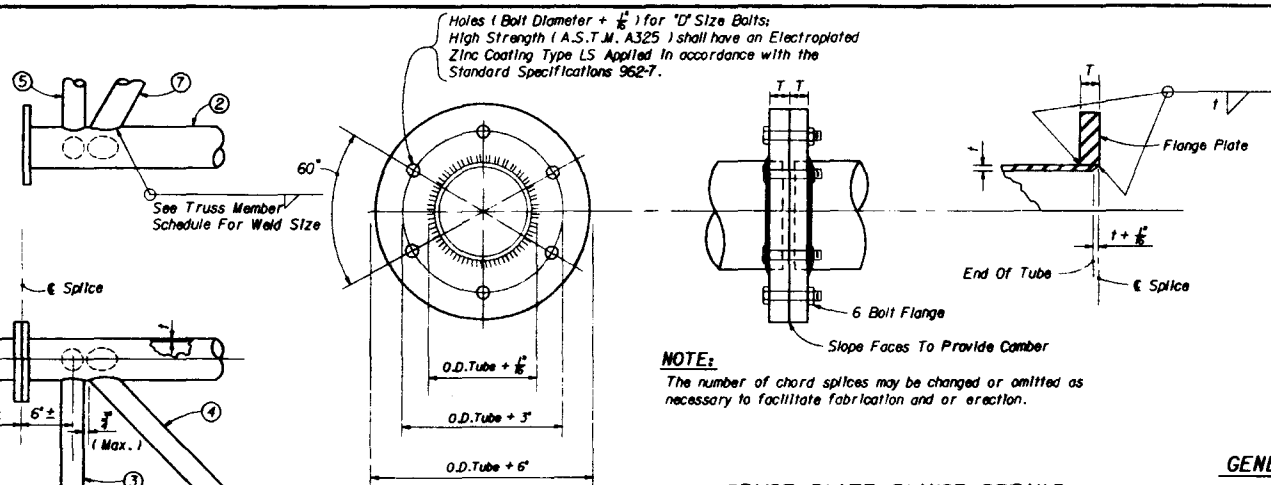
An Alternate Cast Base Of Alloy 356 And Heat Treated To T6 Temper May Be Submitted For Consideration In Lieu Of The Fabricated Base For Approval By The Engineer.

See Drawing 10 of Index No. 11926 For Detail Of Post Base And Anchor Bolts.

Minimum Grout - Height Of Nut

Concrete Footing See Index No. 11201

ELEVATION



NOTE:

The number of chord splices may be changed or omitted as necessary to facilitate fabrication and or erection.

SPLICE PLATE FLANGE DETAILS

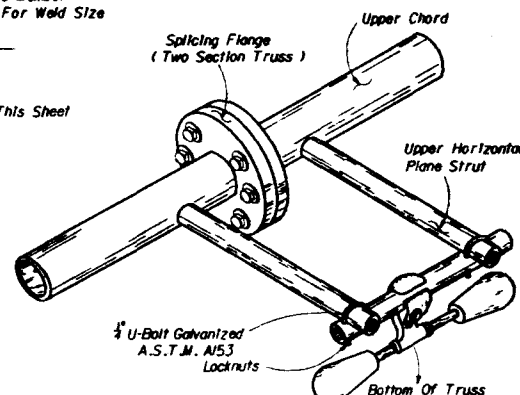
Aluminum Alloy 6061-T6 or 5154-H38 or Alloy 356-T7

SPLICE PLATE FLANGE TABLE

TUBE SIZE	T	BOLT SIZE "O"
2 1/2" x 1/8" to 6 1/2" x 1/8"	1 1/2"	3/8"
7" x 1/8" to 9" x 1/8"	1 1/2"	3/8"
7 1/2" x 1/8" to 9 1/2" x 1/8"	1 1/2"	3/8"

GENERAL NOTES

- (1) For "General Notes" covering specification and materials, see sheet 1 of 4 Index 9535
- (2) SHOP DRAWINGS: Contractor shall submit complete shop drawings before fabrication for approval.
- (3) COLUMN LENGTHS: It shall be the contractor's responsibility to determine the length of column supports.
- (4) Any truss member, steel or aluminum over 1/2" thick must meet the longitudinal choppy v-notch test.
- (5) This dimension has to be adjusted for porcelain enamelled sign panels.



STOCKBRIDGE-TYPE DAMPER

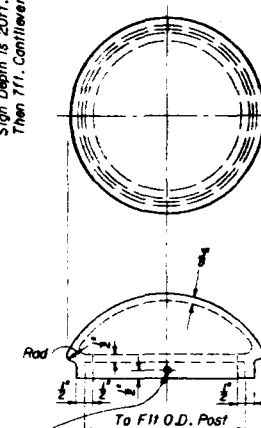
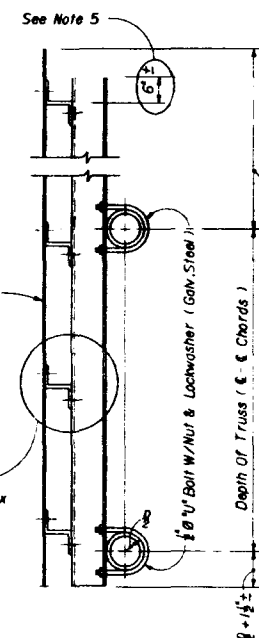
Stockbridge-Type damper Cat. 170B-2001 damper placed at mid span or at the contractor's option in lieu of this stockbridge-type damper sign panels shall be attached at the time the structure is erected, or a temporary sign panel placed at time of erection or the overhead sign truss shall be wrapped in canvas.

SCHEDULE FILLET WELD SIZE			
TRUSS MEMBERS		POST MEMBERS	
THICKNESS	WELD SIZE	THICKNESS	WELD SIZE
1/8"	3/16"	1/8"	3/16"
1/4"	1/4"	1/4"	1/4"
3/8"	3/8"	3/8"	3/8"
1/2"	1/2"	1/2"	1/2"
3/4"	3/4"	3/4"	3/4"
1"	1"	1"	1"

See Detail "A" Drawing 10 of Index No. 11037

DETAIL OF SIGN FACE & TRUSS CONNECTION

See Drawing 10 of Index No. 11037



POST CAP

Aluminum Alloy 356-F

**ALUMINUM TRUSSES
ASSEMBLY DETAILS FOR TYPE A,B OR C TRUSS**

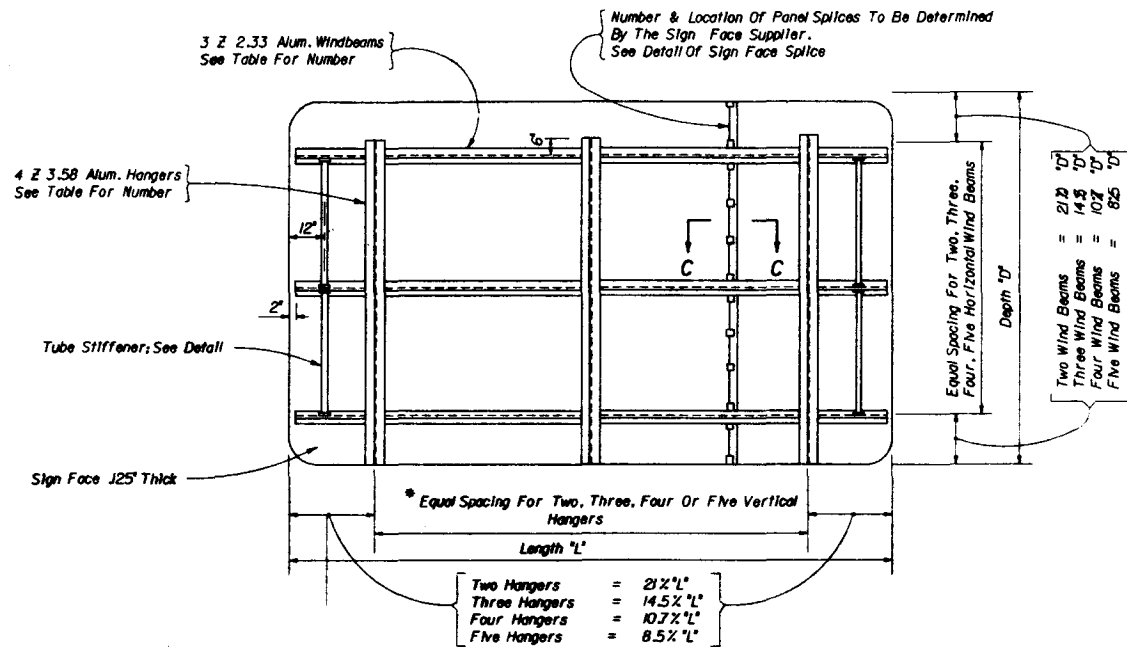
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN

**BRIDGE SPAN TRUSS FOR
OVERHEAD SIGNS**

Designed By	Drawn By	Checked By	Approved By
11/71	8/71	8/71	
11/71	8/71	8/71	
11/71	8/71	8/71	

F.H.B.A. Approved

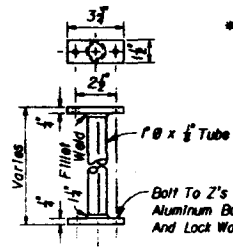
1 of 1
10965



Number Of 3 Z 2.33 Horizontal Wind Beams For Sign Depth And Wind			Number Of 4 Z 3.58 Vertical Hanger Beams For Sign Length			
Wind M.P.H.	NO. BEAMS	MAX. DEPTH	2 HANGERS SIGN LENGTH	3 HANGERS SIGN LENGTH	4 HANGERS SIGN LENGTH	5 HANGERS SIGN LENGTH
110	2	7' - 3"	0 - 15' - 0"	15' - 1' - 30" - 0"	30' - 1' - 45" - 0"	
110	3	10' - 6"	0 - 15' - 0"	15' - 1' - 30" - 0"	30' - 1' - 45" - 0"	
110	4	14' - 3"	0 - 13' - 0"	13' - 1' - 18" - 3"	18' - 4' - 24' - 9"	24' - 10' - 31' - 4"
110	5	18' - 0"	0 - 13' - 0"	13' - 1' - 18" - 3"	18' - 4' - 24' - 9"	24' - 10' - 31' - 4"
100	2	8' - 3"	0 - 15' - 0"	15' - 1' - 30" - 0"	30' - 1' - 45" - 0"	
100	3	11' - 9"	0 - 15' - 0"	15' - 1' - 22' - 3"	22' - 4' - 30' - 0"	30' - 1' - 38' - 0"
100	4	15' - 9"	0 - 15' - 0"	15' - 1' - 22' - 3"	22' - 4' - 30' - 0"	30' - 1' - 38' - 0"
100	5	20' - 0"	0 - 11' - 7"	11' - 8' - 16' - 4"	16' - 5' - 22' - 2"	22' - 3' - 28' - 0"
90	2	9' - 0"	0 - 15' - 0"	15' - 1' - 30" - 0"	30' - 1' - 45" - 0"	
90	3	13' - 0"	0 - 15' - 0"	15' - 1' - 27' - 3"	27' - 4' - 37' - 0"	
90	4	17' - 6"	0 - 15' - 0"	15' - 1' - 27' - 3"	27' - 4' - 37' - 0"	
90	5	22' - 6"	0 - 14' - 3"	14' - 4' - 20' - 0"	20' - 1' - 27' - 0"	21' - 1' - 34' - 3"
80	2	10' - 3"	0 - 15' - 0"	15' - 1' - 30" - 0"	30' - 1' - 45" - 0"	
80	3	14' - 9"	0 - 15' - 0"	15' - 1' - 30" - 0"	30' - 1' - 45" - 0"	
80	4	20' - 0"	0 - 15' - 0"	15' - 1' - 25' - 9"	25' - 10' - 34' - 10"	

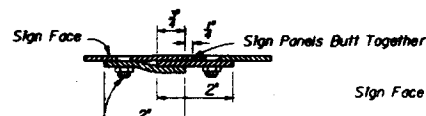
TYPICAL SIGN FACE ELEVATION FOR O.H. TRUSS

* Note: Spacing of vertical hangers may be varied slightly or as necessary to clear the truss struts and diagonals at panel points.

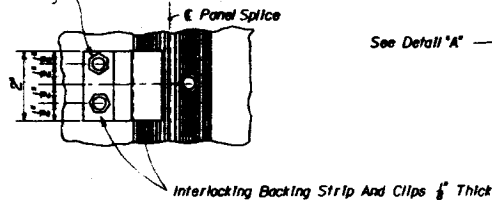


STIFFENER DETAIL

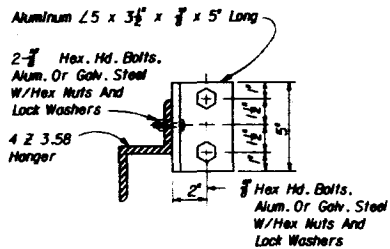
1/2" Aluminum Flat Head Machine Screws With Nuts And Lock Washers



SECTION CC

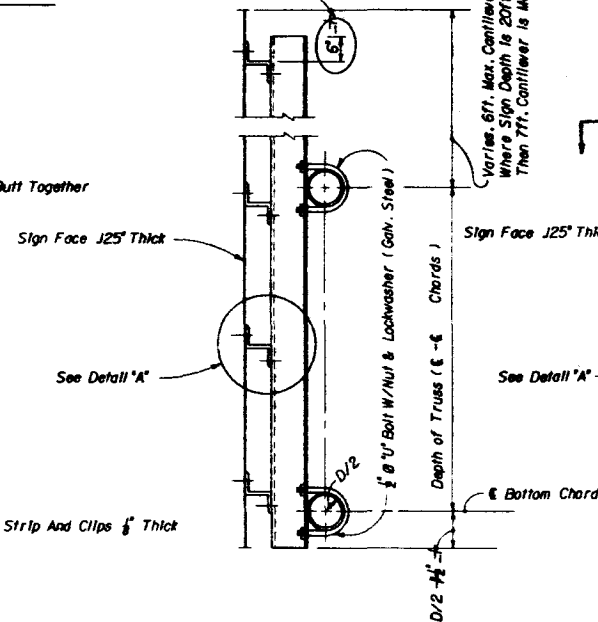


SIGN FACE SPLICE (MAX. SPACING OF CLIPS 12")



SECTION BB

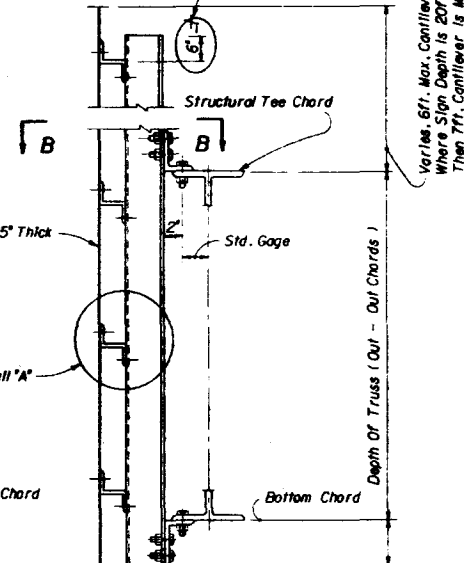
See Note 2



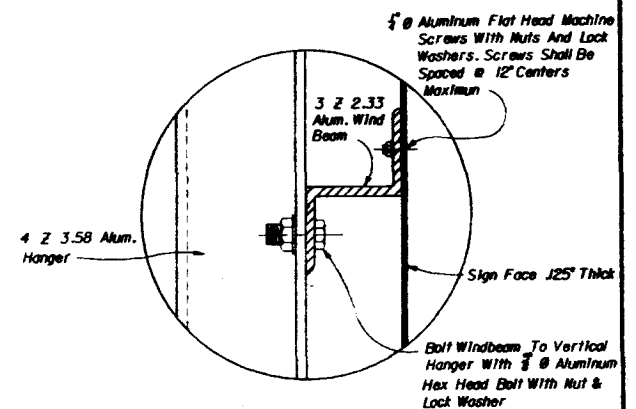
TYPICAL DETAIL OF SIGN & TRUSS CONNECTION FOR ROUND CHORD MEMBERS

(LIGHTING NOT SHOWN)

See Note 2



TYPICAL DETAIL OF SIGN & TRUSS CONNECTION FOR ROLLED STRUCTURAL SHAPES



DETAIL "A"

(SHOWING ATTACHMENT OF SIGN FACE
PANEL TO VERTICAL HANGER SUPPORTS)

DETAILS OF SIGN FACE & TRUSS CONNECTION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN

FOR ALUMINUM & STEEL OVERHEAD SIGN STRUCTURES

Designed By	C.B.B.	Drawn By	A.J.H.	Checked By	A.J.H.	Approved By	
Revision No.		Sheet No.	1 of 1	Index No.	11037		

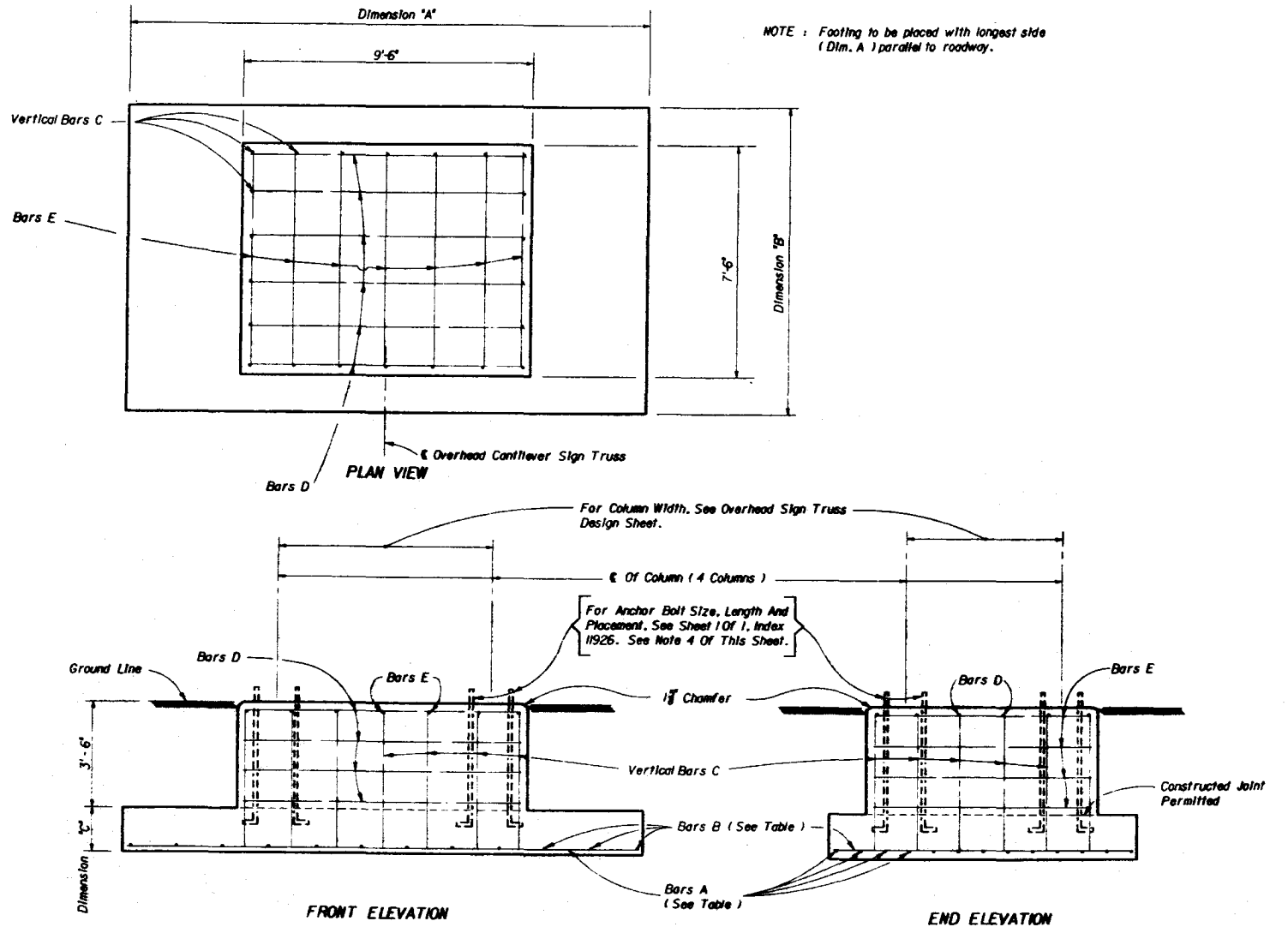
F.L.R.A. approved

GENERAL NOTES

- (1) For "General Notes" covering specification, materials and wind loads; see Sheets 101 of 4 and 3 of 4, Index 9535
- (2) This dimension has to be adjusted for porcelain enameled sign panel.

FOOTING DESIGNATION	FOOTING DIMENSION			BILL OF VARYING REINFORCING							
	DIMENSION			BARS A				BARS B			
	A	B	C	SIZE	LENGTH	SPACING	NO. REQ'D.	SIZE	LENGTH	SPACING	NO. REQ'D.
C-1	10'-0"	8'-6"	1'-6"	5	9'-6"	6"	17	5	8'-0"	9 1/2"	13
C-2	11'-0"	8'-6"	1'-6"	7	10'-6"	12"	9	6	8'-0"	14"	10
C-3	12'-0"	9'-3"	1'-6"	6	11'-6"	8 1/2"	13	5	8'-9"	11 1/2"	13
C-4	13'-0"	9'-9"	1'-6"	6	12'-6"	9 1/2"	13	6	9'-3"	15"	11
C-5	14'-0"	9'-9"	1'-6"	6	13'-6"	9 1/2"	13	6	9'-3"	18"	10
C-6	15'-0"	10'-0"	1'-6"	6	14'-6"	9 1/2"	13	6	9'-6"	14 1/2"	13
C-7	16'-0"	10'-0"	1'-6"	7	15'-6"	9 1/2"	13	5	9'-6"	11 1/8"	17
C-8	17'-0"	9'-9"	1'-6"	8	16'-6"	9 1/2"	13	6	9'-3"	18"	12
C-9	17'-6"	9'-9"	1'-9"	8	17'-0"	9 1/2"	13	5	9'-3"	12"	18
C-10	18'-0"	10'-0"	1'-9"	8	17'-6"	9 1/2"	13	5	9'-6"	10"	22
C-11	19'-0"	10'-0"	1'-9"	7	18'-0"	7 1/2"	17	6	9'-6"	17"	14
C-12	20'-0"	9'-9"	1'-9"	9	19'-6"	9 1/2"	13	6	9'-3"	18"	14
C-13	20'-6"	9'-9"	1'-9"	8	20'-0"	6 1/8"	17	5	9'-3"	12"	21
C-14	21'-0"	10'-0"	1'-9"	8	20'-6"	6"	20	5	9'-6"	10 1/2"	25
C-15	22'-0"	9'-9"	1'-9"	9	21'-6"	6 1/8"	17	5	9'-3"	10 1/2"	25
C-16	22'-6"	10'-0"	1'-9"	9	22'-0"	6"	20	5	9'-6"	12"	23
C-17	23'-0"	10'-0"	1'-9"	9	22'-6"	6"	20	5	9'-6"	10"	28
C-18	24'-0"	9'-9"	2'-0"	10	23'-6"	6 1/8"	17	5	9'-3"	11 1/2"	25
C-19	24'-0"	9'-9"	2'-0"	10	23'-6"	6 1/8"	17	5	9'-3"	11 1/2"	25
C-20	24'-6"	9'-9"	2'-0"	10	24'-0"	6 1/8"	17	5	9'-3"	12"	25
C-21	24'-6"	10'-0"	2'-0"	9	24'-0"	6"	20	5	9'-6"	12"	25
C-22	25'-0"	10'-0"	2'-0"	10	24'-6"	6"	20	6	9'-6"	14"	22
C-23	25'-6"	9'-9"	2'-0"	9	25'-0"	4 1/8"	25	5	9'-3"	12"	26
C-24	25'-6"	10'-0"	2'-0"	10	25'-0"	6"	20	5	9'-6"	12"	26
C-25	26'-0"	9'-9"	2'-0"	9	25'-6"	4 1/8"	25	6	9'-3"	18"	18
C-26	26'-0"	10'-0"	2'-0"	10	25'-6"	6"	20	6	9'-6"	18"	18
C-27	26'-6"	9'-9"	2'-0"	11	26'-0"	6 1/8"	17	5	9'-3"	12"	27
C-28	26'-6"	10'-0"	2'-0"	11	26'-0"	6"	20	5	9'-6"	12"	27
C-29	27'-0"	9'-9"	2'-0"	10	26'-6"	6 1/8"	17	6	9'-3"	16 1/2"	20
C-30	27'-0"	10'-0"	2'-0"	11	26'-6"	6"	20	6	9'-6"	16 1/2"	20
C-31	27'-6"	9'-9"	2'-0"	10	27'-0"	4 1/8"	25	5	9'-3"	12"	28
C-32	27'-6"	10'-0"	2'-0"	11	27'-0"	6"	20	5	9'-6"	12"	28
C-33	28'-0"	9'-9"	2'-0"	10	27'-6"	4 1/8"	25	5	9'-3"	10"	34
C-34	28'-0"	10'-0"	2'-0"	11	27'-6"	6"	20	5	9'-6"	10"	34
C-35	28'-6"	9'-9"	2'-0"	10	28'-0"	4 1/8"	25	5	9'-3"	12"	29
C-36	28'-6"	10'-0"	2'-0"	11	28'-0"	6"	20	5	9'-6"	12"	29
C-37	29'-0"	9'-9"	2'-0"	10	28'-6"	4 1/8"	25	6	9'-3"	18"	20
C-38	29'-0"	10'-0"	2'-0"	10	28'-6"	4 1/8"	25	6	9'-6"	18"	20
C-39	29'-6"	9'-9"	2'-0"	10	29'-0"	4 1/8"	25	5	9'-3"	12"	30
C-40	29'-6"	10'-0"	2'-0"	11	29'-0"	4 1/8"	25	5	9'-6"	12"	30

BILL OF CONSTANT REINFORCING			
MARK	SIZE	LENGTH	NO. REQ'D.
C	4	3'-0" Dim. L	22
D	4	9'-0"	12
E	4	7'-0"	13



NOTES :

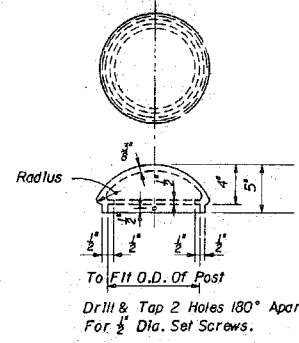
1. All reinforcing steel shall have a 3" minimum of concrete cover and shall be of Grade 60.
2. All exposed edges to be chamfered 1/2" unless otherwise shown.
3. All concrete shall be Class II. The minimum specified compressive strength at 28 days (f'c) shall be 3,400 p.s.i.
4. If contractor elects to furnish a cast base in lieu of D.O.T. Standards Detail, he shall furnish an Anchor Bolt Spacing Plan for field use.

OVERHEAD CANTILEVER TRUSSES

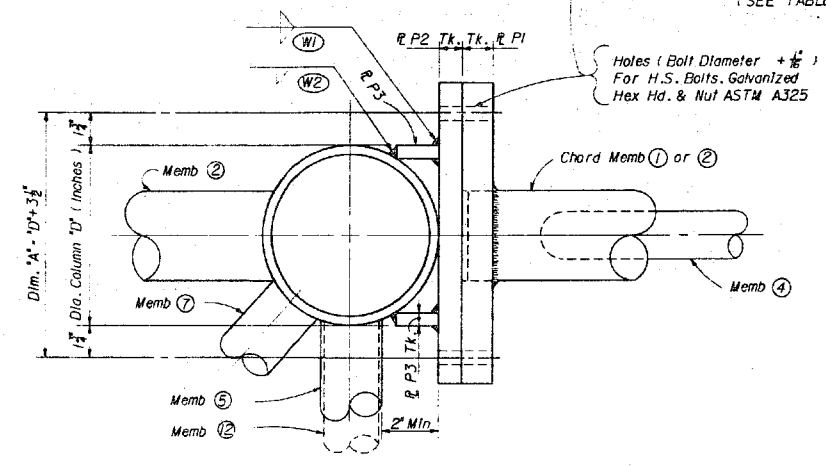
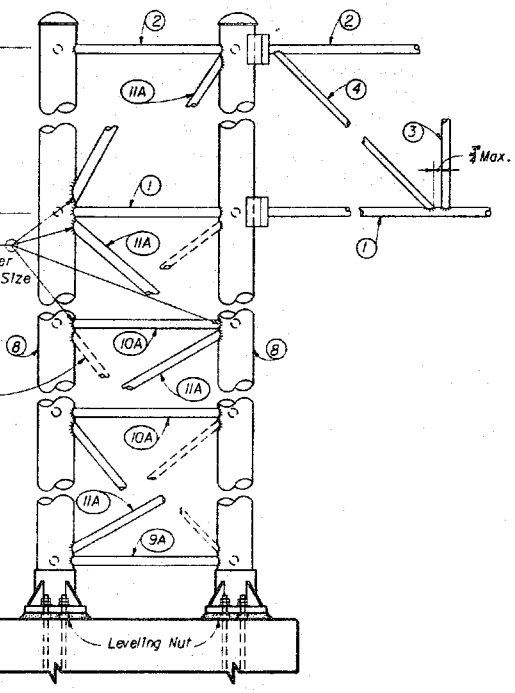
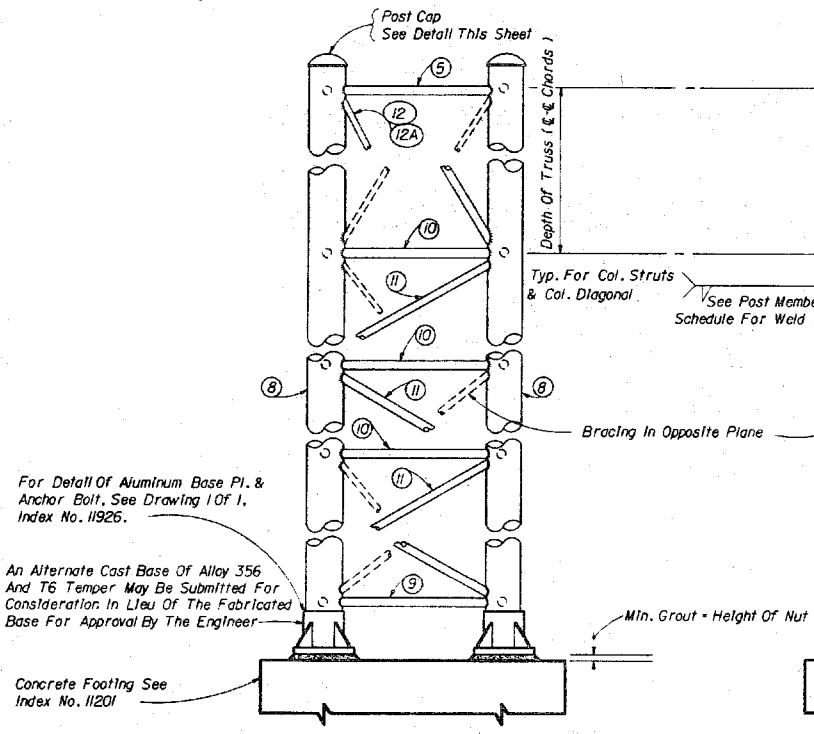
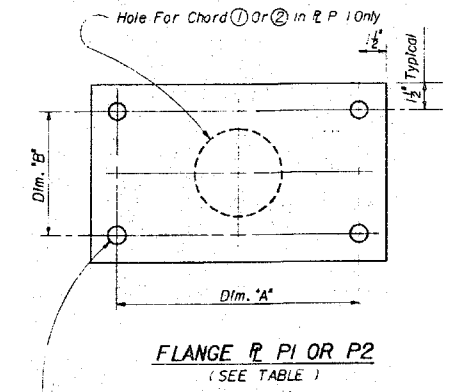
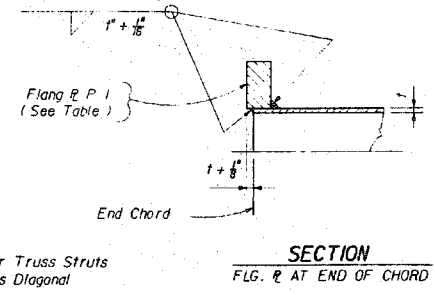
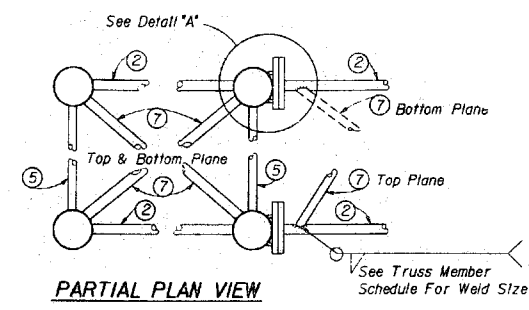
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN

FOOTING FOR OVERHEAD SIGN TRUSSES

Designed By	Checked By	Approved By
D.K.S.	04/73	
Drawn By	Reviewed By	Checked By
C.F.B.	04/73	
F.A.B.A. Approved	AM	2 of 2 11201



SCHEDULE FILLET WELD SIZE			
TRUSS MEMBERS		POST MEMBERS	
THICKNESS	WELD SIZE	THICKNESS	WELD SIZE
1/8"	3/16"	1/8"	1/4"
1/4"	1/4"	1/4"	3/8"
3/8"	3/8"	3/8"	1/2"
1/2"	1/2"	1/2"	5/8"
5/8"	5/8"	5/8"	3/4"
3/4"	3/4"	3/4"	7/8"
7/8"	7/8"	7/8"	1"



For Detail Of Aluminum Base Pl. & Anchor Bolt, See Drawing 1 of 1, Index No. 11926.

An Alternate Cast Base Of Alloy 356 And T6 Temper May Be Submitted For Consideration. In Use Of The Fabricated Base For Approval By The Engineer.





























GENERAL NOTES

- (1) For "General Notes" covering specifications and materials, see sheet 1 of 4 index 9535.
- (2) SHOP DRAWINGS: Contractor shall submit complete shop drawings before fabrication for approval.
- (3) COLUMN LENGTHS: It shall be the contractor's responsibility to determine the length of column supports.
- (4) DETAIL OF SIGN FACE & TRUSS CONNECTION: See drawing 1 of 1 index no. 11037.
- (5) Any Truss member, steel or aluminum over 1/2" thick must meet the longitudinal charpy v-notch test.

TABLE FOR CHORDS TO COLUMN CONNECTION								
CHORD SIZE	R P1	R P2	R P3	R DIM. P1 or P2		WELD SIZE	WELD SIZE	A 325 BOLT DIA.
	TK.	TK.	DEPTH x TK.	"A"	"B"			
2 3/4" x 1/4" Thru 4 1/2" x 1/4"	1 1/2"	1 1/2"	9" x 3/4"	"D" + 3/8"	6"	1/4"	1/2"	3/8"
4 3/4" x 1/4" Thru 5 1/2" x 1/4"	1 1/2"	1 1/2"	10" x 3/4"	"D" + 3/8"	7"	1/4"	1/2"	3/8"
4 3/4" x 1/4" Thru 6" x 1/4"	2"	1 1/2"	10" x 1"	"D" + 3/8"	7"	3/8"	3/4"	7/8"

ALUMINUM CANTILEVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN				
TRUSSES FOR OVERHEAD SIGNS				
Designed By	Names	Dates	Approved By	
Drawn By	C.BENOW	06/83		
Checked By	C.A.K.	06/83	Revision No.	Sheet No.
F.H.N.A. Approved:			10 of 1	11226

Sign Identification Number	SIGN		TYPE OF SIGN BRACKET			
	PROFILE - SIZE	SQ. FT.	WIND ZONE			
			60	70	80	90
BID ITEM NO. 700 - 1-1 FIELD						
1	 24 x 24	1.7	2 - I	2 - I	2 - I	2 - I
2	 30 x 30	2.7	2 - I	2 - I	2 - I	2 - I
3	 36 x 36	3.9	2 - I	2 - I	2 - I	2 - I
4	 48 x 48	6.9	2 - I	2 - II	2 - II	2 - II
5	 60 x 60	10.8	2 - II	2 - II	3 - II	3 - II
BID ITEM NO. 700 - 1-2 RAILROAD						
6	 36" Ø	7.1	2 - I	2 - I	2 - I	2 - I
7	 48" Ø	12.6	2 - I	2 - II	2 - II	2 - II
BID ITEM NO. 700 - 1-3 STOP						
8	 18 x 18	1.9	2 - I	2 - I	2 - I	2 - I
9	 24 x 24	3.3	2 - I	2 - I	2 - I	2 - I
10	 30 x 30	5.2	2 - I	2 - I	2 - I	2 - I
11	 36 x 36	7.5	2 - I	2 - I	2 - I	2 - I
12	 48 x 48	13.3	2 - I	2 - II	2 - II	2 - II
BID ITEM NO. 700 - 1-4 RT. MARKER SINGLE						
13	 12 x 24 24 x 24	5.4	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I
14	 15 x 30 24 x 24	6.5	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I
15	 12 x 24 24 x 30	6.3	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I
16	 15 x 30 24 x 30	7.4	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I
17	 15 x 30 36 x 36	10.8	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - II
18	 15 x 30 36 x 45	12.6	1 - I 2 - I	1 - I 2 - I	1 - I 2 - II	1 - I 2 - II
19	 15 x 30 48 x 48	16.7	1 - I 2 - I	1 - I 2 - II	1 - I 2 - II	1 - I 2 - II
20	 15 x 30 48 x 60	20.1	1 - I 2 - II	1 - I 2 - II	1 - I 2 - II	1 - I 2 - II
21	 12 x 24 24 x 24 15 x 21	7.6	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I
22	 15 x 30 24 x 24 15 x 21	8.7	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I
23	 12 x 24 24 x 30 15 x 21	8.5	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I
24	 15 x 30 24 x 30 15 x 21	9.6	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I	1 - I 2 - I 1 - I
25	 12 x 24 24 x 24	6.0	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I
26	 24 x 24 15 x 21	6.2	2 - I 1 - I	2 - I 1 - I	2 - I 1 - I	2 - I 1 - I
27	 15 x 30 24 x 24	7.1	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I
28	 12 x 24 24 x 30	7.0	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I	1 - I 2 - I

Sign Identification Number	SIGN	TYPE OF SIGN BRACKET	WIND ZONE			
			60 70 80 90			
			60	70	80	90
29	24 x 30	7.2	2-I	2-I	2-I	2-I
30	15 x 30	8.1	1-I	1-I	1-I	1-I
31	15 x 21	9.7	1-I	1-I	1-I	1-I
32	15 x 30	10.6	1-I	1-I	1-I	1-I
33	12 x 24	8.2	1-I	1-I	1-I	1-I
34	15 x 30	9.3	1-I	1-I	1-I	1-I
35	12 x 24	9.2	1-I	1-I	1-I	1-I
36	15 x 30	10.3	1-I	1-I	1-I	1-I
BID ITEM NO. 700 - 1-5 RT. MARKER DOUBLE						
37	24 x 24, 24 x 24	13.6	1-II	1-II	1-II	1-II
38	12 x 24, 12 x 24	15.2	1-II	1-II	1-II	1-II
39	12 x 24, 12 x 24	16.4	1-II	1-II	1-II	1-II
40	12 x 24, 12 x 24	19.2	1-II	1-II	1-II	1-II
41	12 x 24, 12 x 24	20.4	1-II	1-II	1-II	1-II
42	12 x 24, 12 x 24	22.6	1-II	1-II	1-II	1-II
43	12 x 24, 12 x 24	25.6	1-II	1-II	1-II	1-II
BID ITEM NO. 700 - 1-10, 3 SO. FT. OR LESS						
44	18 x 12	1.5	2-I	2-I	2-I	2-I
45	12 x 36	3.0	1-I	1-I	1-I	1-I
46	18 x 24	3.0	2-I	2-I	2-I	2-I
47	24 x 18	3.0	2-I	2-I	2-I	2-I
48	18 x 12	3.0	1-I	1-I	1-I	1-I
BID ITEM NO. 700 - 1-II, 3 + TO 4 SO. FT.						
49	18 x 30	3.8	2-I	2-I	2-I	2-I
50	30 x 40	3.9	2-I	2-I	2-I	2-I
51	24 x 24	4.0	2-I	2-I	2-I	2-I

Sign Identification Number	SIGN	TYPE OF SIGN BRACKET	WIND ZONE			
			60 70 80 90			
			60	70	80	90
52	24 x 24	4.0	2-I	2-I	2-I	2-I
BID ITEM NO. 700 - 1-12, 4 + TO 5 SO. FT.						
53	18 x 36	4.5	2-I	2-I	2-I	2-I
54	30 x 30	4.7	2-I	2-I	2-I	2-I
55	30 x 24	5.0	2-I	2-I	2-I	2-I
BID ITEM NO. 700 - 1-13, 5 + TO 6 SO. FT.						
56	36 x 48	5.6	2-II	3-II	3-II	3-II
57	24 x 36	6.0	2-I	2-I	2-I	2-I
58	36 x 24	6.0	2-I	2-I	2-I	2-I
BID ITEM NO. 700 - 1-14, 6 + TO 6.25 SO. FT.						
59	30 x 30	6.3	2-I	2-I	2-I	2-I
60	30 x 30	6.3	2-I	2-I	2-I	3-II
BID ITEM NO. 700 - 1-15, 6.25 + TO 9 SO. FT.						
61	36 x 36	6.75	2-I	2-I	2-I	2-I
62	30 x 36	7.5	2-I	2-I	2-I	2-I
63	36 x 30	7.5	2-I	2-I	2-I	2-I
64	24 x 48	8.0	2-II	2-II	2-II	2-II
65	12 x 36	8.2	1-I	1-I	1-I	1-I
66	30 x 42	8.8	2-I	2-I	2-I	2-II
67	36 x 36	9.0	2-I	2-I	2-I	2-I
68	36 x 36	9.0	3-II	3-II	3-II	3-II
BID ITEM NO. 700 - 1-16, 9 + TO 12 SO. FT.						
69	12 x 36	9.3	1-I	1-I	1-I	1-I
70	30 x 30	9.3	2-I	2-I	2-I	2-I
71	48 x 64	9.9	3-II	3-II	3-II	3-II
72	30 x 48	10.0	2-I	2-II	2-II	2-II
73	12 x 36	10.5	1-I	1-I	1-I	1-I
74	30 x 54	11.3	2-II	2-II	2-II	2-II
75	36 x 48	12.0	2-I	2-II	2-II	2-II
76	48 x 36	12.0	2-I	2-I	2-I	2-I
77	36 x 36	12.0	3-II	3-II	3-II	3-II
78	48 x 48	12.0	2-I	2-II	2-II	2-II
BID ITEM NO. 700 - 1-17, 12 + TO 16 SO. FT.						
79	30 x 60	12.5	2-II	2-II	2-II	2-II
80	48 x 48	16.0	2-I	2-II	2-II	2-II
81	48 x 48	16.0	3-II	3-II	3-II	3-II
BID ITEM NO. 700 - 1-18, 16 + TO 20 SO. FT.						
82	30 x 78	16.3	2-II	2-II	2-II	2-II
83	30 x 84	17.5	2-II	2-II	2-II	2-II
84	48 x 54	18.0	2-II	2-II	2-II	2-II
85	42 x 66	19.3	2-II	2-II	2-II	2-II
86	60 x 48	20.0	2-II	2-II	3-II	3-II

SHOP DRAWING NOTE: When type "C" ground sign support are furnished and fastened in accordance with these plans, shop drawings will not be required for approval by the Engineer.

Sign Identification Number	SIGN	TYPE OF SIGN BRACKET	WIND ZONE			
			60 70 80 90			
			60	70	80	90
87	66 x 48	22.0	2-II	3-II	3-II	3-II
88	60 x 72	30.0	2-II	2-II	3-II	3-II
89	96 x 48	32.0	3-II	3-II	3-II	3-II
BID ITEM NO. 700 - 1-20 DESTINATION - 1-LINE						
90	24 x 78	13.0	2-II	2-II	2-II	2-II
BID ITEM NO. 700 - 1-21 DESTINATION - 2-LINE						
91	36 x 78	19.5	2-II	2-II	2-II	2-II
DESIGN NOTES						
DESIGN SPECIFICATIONS: Standard Specifications For Structural Supports For Highway Signs, Luminaires And Traffic Signals A.S.S.H.T.O. 1985.						
ALUMINUM: Except as noted, aluminum materials shall meet the requirements of Aluminum Association Alloy 6061-T6 (ASTM B209, B221 or B308).						
1. Sign Brackets - Alloy 6061-T6 (ASTM B221)						
2. Permitted Alternate - Alloy 5054-H38 (ASTM B209)						
3. Permitted Alternate - Alloy 6355-T5 (ASTM B221)						
CONCRETE: All concrete shall be Class I, the specified compressive strength of 28 days (f'c) shall be 3,000 p.s.i., min.						
SIGN PANELS: Sign panels shall be 0.08 in. min. thick aluminum plate with all corners rounded. See Sign Layout Sheet. Panels are to be degreased, etched, neutralized and treated with Alodine 1200, Iriline 14-2, Bonderite 721 or equal. No stenciling permitted on panels.						
ALUMINUM BOLTS, NUTS & LOCKWASHERS: Aluminum bolts shall meet the requirements of Aluminum Association Alloy 2024-T4 or 6061-T6 (ASTM B221). The bolts shall have an anodic coating of at least 0.0002 in. thick and be chromate sealed. Lockwashers shall meet the requirements of Aluminum Association Alloy 7075-T6 (ASTM B221). Nuts shall meet the requirements of Aluminum Association Alloy 6262-T9 or 6061-T6.						
STAINLESS STEEL BOLTS, NUTS & LOCKWASHERS: Stainless steel bolts, nuts & lockwashers conforming to AISI A316 may be provided in lieu of aluminum bolts, nuts & lockwashers.						
GENERAL NOTES						
HOW TO USE THIS TABLE: Select the appropriate sign profile and size to determine the sign identification number. If the exact sign size of all components are not listed, select the appropriate profile and larger component sizes. This table also gives the quantity and type of sign brackets required for each sign for each wind zone. Where the sign size is given as a vertical and horizontal dimension, the vertical dimension (height) is given first and the horizontal dimension (length) is given last. Signs 18" and less in depth will be mounted with one bracket at the g. Signs 18" in depth and over require two sign brackets. For column sizes, heights and footings see appropriate wind zone sheets titled "Column Sizes, Column Heights and Footings." No shop or field splice is allowed in sign panels. All panels shall be furnished in one piece.						
U-Bolt, Nut and Lockwasher shall meet the requirements of ASTM A307 and shall be galvanized in accordance with ASTM A53.						
Alternate type "C" single column ground sign attachment to be used in lieu of sign brackets - Type I and Type II. To be used only on 48" Ø and larger extruded tube columns.						
WIND LOADING						
ZONE NO. 1 (60 M.P.H.)						
Alachua, Bradford, Baker, Bay, Calhoun, Clay, Columbia, Escambia, Gadsden, Gilchrist, Hamilton, Holmes, Jackson, Jefferson, Lafayette, Lake, Leon, Liberty, Madison, Marion, Oklawaha, Polk, Putnam, Santa Rosa, Suwannee, Union, Walton, and Washington Counties.						
ZONE NO. 2 (70 M.P.H.)						
Citrus, De Soto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hardee, Hendry, Hernando, Highlands, Hillsborough, Levy, Nassau, Okechobee, Orange, Osceola, Pasco, Pinellas, Polk, Seminole, St. Johns, Taylor and Volusia Counties.						
ZONE NO. 3 (80 M.P.H.)						
Brevard, Charlotte, Collier, Indian River, Lee, Manatee, Martin, Palm Beach, Sarasota, St. Lucie and Volusia Counties.						
ZONE NO. 4 (90 M.P.H.)						
Brevard, De Soto, Duval, Flagler, Franklin, Glades, Gulf, Hardee, Hendry, Hernando, Highlands, Hillsborough, Levy, Nassau, Okechobee, Orange, Osceola, Pasco, Pinellas, Polk, Seminole, St. Johns, Taylor and Volusia Counties.						

NOTE: "A" - See traffic plans standard linear 7302

TYPICAL SECTION

SIGN CLEARANCE

DETAILS W14-3 PLAQUE

SIGNS BACK TO BACK

SIGNS AT 90°

SIGN BRACKET - TYPE I

SIGN BRACKET - TYPE II

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN

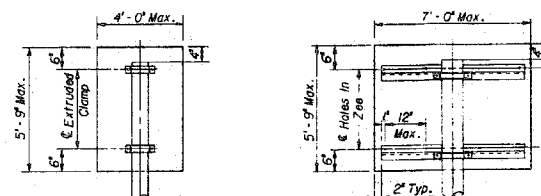
TYPE "C" SINGLE COLUMN
GROUND SIGNS

Designed By	CR	Drawn	03-76	Approved	<i>Ray Ballman</i>
Checked By	CRB	Revision No.	03-76	Sheet No.	1 of 1
F.H.R.A. Approved					11860

COL. SIZE	2 x 1/2	2 1/2 x 1/2	3 x 1/2	3 1/2 x 1/2	4 x 1/2	4 x 1/2	4 1/2 x 1/2	5 x 1/2	5 1/2 x 1/2	6 x 1/2	6 1/2 x 1/2	7 x 1/2	7 1/2 x 1/2	8 x 1/2	COL. SIZE	2 x 1/2	2 1/2 x 1/2	3 x 1/2	3 1/2 x 1/2	4 x 1/2	4 x 1/2	4 1/2 x 1/2	5 x 1/2	5 1/2 x 1/2	6 x 1/2	6 1/2 x 1/2	7 x 1/2	7 1/2 x 1/2	8 x 1/2
FOOTING	0x2-0	0x2-3	0x2-6	0x3-4	0x3-9	1-6x2-1	1-6x2-5	1-6x2-9	1-6x3-3	2-0x3-0	2-0x3-4	2-0x3-6	2-0x4-0		FOOTING	0x2-0	0x2-3	0x2-6	0x3-4	0x3-9	1-6x2-1	1-6x2-5	1-6x2-9	1-6x3-0	1-6x3-3	2-0x3-0	2-0x3-4	2-0x3-6	2-0x4-0
Sign Identification Number	HEIGHT (FT.)														Sign Identification Number	HEIGHT (FT.)													
1	To 14'	14'-19	19'-25												53	To 11'	11'-14	14'-18	18'-25										
2	To 13'	13'-18	18'-22	22'-25											54	To 10'	10'-14	14'-17	17'-25										
3	To 13'	13'-16	16'-21	21'-25											55	To 10'	10'-13	13'-17	17'-25										
4	To 6'	6'-11	11'-13	13'-23	23'-25										56	To 8'	8'-13	13'-15	15'-25										
5	To 6'	6'-10	10'-16	16'-21	21'-25										57	To 8'	8'-13	13'-15	15'-25										
6	To 6'	6'-11	11'-13	13'-23	23'-25										58	To 8'	8'-13	13'-15	15'-25										
7	To 6'	6'-10	10'-16	16'-21	21'-25										59	To 8'	8'-13	13'-15	15'-25										
8	To 15'	15'-20	20'-25												60	To 7'	7'-12	12'-14	14'-24	24'-25									
9	To 14'	14'-18	18'-22	22'-25											61	To 6'	6'-10	10'-13	13'-22	22'-25									
10	To 10'	10'-13	13'-17	17'-25											62	To 6'	6'-10	10'-13	13'-22	22'-25									
11	To 6'	6'-11	11'-13	13'-23	23'-25										63	To 6'	6'-11	11'-13	13'-23	23'-25									
12	To 8'	8'-14	14'-18	18'-23	23'-25										64	To 6'	6'-10	10'-14	14'-21	21'-25									
13	To 9'	9'-13	13'-17	17'-25											65	To 6'	6'-10	10'-13	13'-22	22'-25									
14	To 8'	8'-13	13'-16	16'-25											66	To 9'	9'-13	13'-20	20'-25										
15	To 7'	7'-12	12'-14	14'-24	24'-25										67	To 9'	9'-13	13'-20	20'-25										
16	To 7'	7'-11	11'-14	14'-23	23'-25										68	To 9'	9'-12	12'-21	21'-25										
17	To 7'	7'-10	10'-17	17'-21	21'-25										69	To 8'	8'-13	13'-19	19'-25										
18	To 9'	9'-14	14'-19	19'-23	23'-25										70	To 7'	7'-11	11'-18	18'-23	23'-25									
19	To 7'	7'-12	12'-16	16'-20	20'-25										71	To 8'	8'-12	12'-19	19'-23	23'-25									
20	To 11'	11'-12	12'-16	16'-20	20'-25										72	To 8'	8'-12	12'-18	18'-23	23'-25									
21	To 8'	8'-12	12'-19	19'-25											73	To 7'	7'-11	11'-18	18'-22	22'-25									
22	To 7'	7'-11	11'-17	17'-22	22'-25										74	To 7'	7'-11	11'-17	17'-21	21'-25									
23	To 8'	8'-12	12'-19	19'-25											75	To 6'	6'-10	10'-16	16'-20	20'-24	24'-25								
24	To 7'	7'-11	11'-17	17'-22	22'-25										76	To 6'	6'-10	10'-16	16'-21	21'-25									
25	To 8'	8'-13	13'-15	15'-25											77	To 9'	9'-15	15'-20	20'-25										
26	To 7'	7'-11	11'-14	14'-23	23'-25										78	To 6'	6'-10	10'-16	16'-20	20'-24	24'-25								
27	To 7'	7'-11	11'-14	14'-23	23'-25										79	To 6'	6'-10	10'-15	15'-20	20'-24	24'-25								
28	To 6'	6'-11	11'-13	13'-23	23'-25										80	To 7'	7'-13	13'-16	16'-20	20'-25									
29	To 6'	6'-11	11'-13	13'-22	22'-25										81	To 6'	6'-12	12'-15	15'-19	19'-24	24'-25								
30	To 6'	6'-10	10'-13	13'-22	22'-25										82	To 7'	7'-13	13'-16	16'-20	20'-24	24'-25								
31	To 8'	8'-12	12'-19	19'-23	23'-25										83	To 6'	6'-13	13'-15	15'-19	19'-23	23'-25								
32	To 7'	7'-11	11'-18	18'-22	22'-25										84	To 6'	6'-13	13'-14	14'-18	18'-22	22'-25								
33	To 9'	9'-12	12'-20	20'-25											85	To 12'	12'-13	13'-17	17'-21	21'-25									
34	To 7'	7'-11	11'-18	18'-23	23'-25										86	To 12'	12'-13	13'-17	17'-21	21'-25									
35	To 9'	9'-12	12'-20	20'-25											87	To 10'	10'-12	12'-15	15'-19	19'-24	24'-25								
36	To 7'	7'-11	11'-18	18'-23	23'-25										88	To 7'	7'-10	10'-12	12'-14	14'-17	17'-21	21'-25							
37	To 7'	7'-13	13'-17	17'-21	21'-25										89	To 8'	8'-11	11'-12	12'-16	16'-20	20'-24	24'-25							
38	To 6'	6'-12	12'-16	16'-20	20'-24	24'-25									90	To 6'	6'-9	9'-15	15'-19	19'-23	23'-25								
39	To 6'	6'-12	12'-15	15'-18	18'-23	23'-25									91	To 12'	12'-13	13'-17	17'-21	21'-25									
40	To 11'	11'-12	12'-16	16'-20	20'-25																								
41	To 10'	10'-12	12'-14	14'-18	18'-23	23'-25																							
42	To 9'	9'-11	11'-13	13'-18	18'-22	22'-25																							
43	To 7'	7'-11	11'-12	12'-15	15'-19	19'-23	23'-25																						
44	To 18'	18'-23	23'-25																										
45	To 14'	14'-17	17'-22	22'-25																									
46	To 14'	14'-17	17'-22	22'-25																									
47	To 14'	14'-18	18'-22	22'-25																									
48	To 13'	13'-17	17'-21	21'-25																									
49	To 12'	12'-15	15'-20	20'-25																									
50	To 13'	13'-16	16'-20	20'-25																									
51	To 12'	12'-15	15'-20	20'-25																									
52	To 12'	12'-15	15'-19	19'-25																									

SLIP BASE NOTES

- Inside Diameter (I.D.) of sleeve to be no more than 1/8" larger than outside diameter (O.D.) of column.
- Sleeve bolts to be 1/2" with locknuts, steel A.S.T.M. - A307 galvanized aluminum assoc. alloy 2024 - T4 or 6061 - T6 (ASTM B - 211).
- Base bolts, nuts and washers to be ASTM - A325 high strength electroplated zinc coating type LS applied in accordance with ASTM - A164.
- An alternate cast base of aluminum alloy 356 and T6 temper in lieu of the fabricated base may be submitted for approval by the Engineer. The stub will be the same as the column and will be bolted to the casting.
- Assemble the slip base connection in the following manner: (a) connect column to sleeve using two (2) 1/2" machine bolts; (b) assemble plate using high strength bolts with three (3) hardened washers per bolt. One washer per bolt and two (2) bolt keeper plates go shim stock as required to plumb the column; (c) tighten all bolts the maximum possible with a 12" to 15" wrench to bed the washers & threads. Loosen each bolt in turn and retighten to the prescribed torque (see table). Bolts shall be tightened with properly calibrated supervision of the project engineer; (e) burr threads at junction with nut using a center punch to prevent nut loosening.
- Using galvanized steel shims that are 1/4" (see sleeve & base plate details) minus one inch (1") long, shim a tight fit between the outer face of the sleeve. Place shims in all quadrants between the 1/2" sleeve bolts.



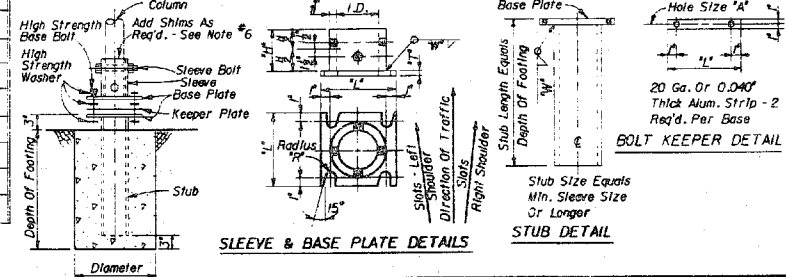
SIGN PANEL DETAILS
TYPE I BRACKET
TYPE II BRACKET

GENERAL NOTES

- For sign identification numbers see sheet titled "Sign Profile and Identification Numbers". Use the sign identification number and the required column height to determine the support column size and footing size. The heights given in the table are the maximum height (from ground to bottom of sign) that a column size can be used for a particular sign profile. If the required column height is not listed in the table, the sign will have to be supported on multiple column type "A" breakaway supports.
 - All columns in the table are aluminum tube, given as outside diameter times the wall thickness. Sizes 2 x 1/2 thru 4 x 1/2 tube are frangible supports and will be driven into the ground. 4 x 1/2 tube is the maximum size frangible support. Size 4 x 1/2 thru 8 x 1/2 are breakaway supports and will have poured concrete footings and slip bases.
 - Footings: Frangible Supports - no concrete footing is required. The supports column shall be driven into the ground to the depth indicated. The portion of the support column which is driven into the ground shall be painted with cutback asphalt - grade RC - 70.
- Breakaway Supports - Footings to be poured concrete, size as shown in table. The first dimension indicates the diameter of the footing and the second dimension the depth of the footing into the ground. In all cases the ground is to be considered as undisturbed earth, road material or properly compacted fill.

SLIP BASE DETAILS

Column Size	Sleeve I.D. (Max)	Sleeve Wall T	Sleeve Height	Weld W	Base Plate LxLxT	Radius R	Base Bolt Size	Base Torque FT - lbs	Hole Size "A"
4 x 1/2	4 1/8	3/16	6"	3/16	8 x 8 x 3/4	1/2	3/8 x 3"	53"	640"
4 1/2 x 1/2	4 7/8	3/16	6"	3/16	8 x 8 x 3/4	1/2	3/8 x 3 1/2"	53"	640"
5 x 1/2	5 1/8	3/16	7"	3/16	8 x 8 x 3/4	1/2	3/8 x 3 1/2"	53"	640"
5 1/2 x 1/2	5 5/8	3/16	7"	3/16	8 1/2 x 8 1/2 x 3/4	1/2	3/8 x 3 1/2"	78"	940"
6 x 1/2	6 1/8	3/16	8"	3/16	9 x 9 x 1	1/2	3/8 x 3 1/2"	78"	940"
6 1/2 x 1/2	6 5/8	3/16	8"	3/16	9 1/2 x 9 1/2 x 1	1/2	3/8 x 3 1/2"	78"	940"
7 x 1/2	7 1/8	3/16	9"	3/16	10 x 10 x 1	1/2	3/8 x 3 1/2"	78"	940"
7 1/2 x 1/2	7 5/8	3/16	9"	3/16	10 1/2 x 10 1/2 x 1	1/2	3/8 x 3 1/2"	108"	1290"
8 x 1/2	8 1/8	3/16	10"	3/16	11 x 11 x 1	1/2	3/8 x 3 1/2"	108"	1290"



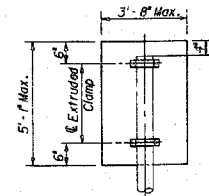
SLIP BASE NOTES

- Inside Diameter (I.D.) of sleeve to be no more than 1/8" larger than outside diameter (O.D.) of column.
- Sleeve bolts to be 1/2" with locknuts, steel A.S.T.M. - A307 galvanized aluminum alloy 2024 - T4 or 6061 - T6 (ASTM B - 211).
- Base bolts, nuts and washers to be ASTM - A325 high strength electroplated zinc coating type LS applied in accordance with ASTM - A164.
- An alternate cast base of aluminum alloy 356 and T6 temper. In lieu of the fabricated base may be submitted for approval by the Engineer. If a cast base is used the stub will be the same as the column and will be bolted to the casting.
- Assemble the slip base connection in the following manner: (a) connect column to sleeve using two (2) 1/2" machine bolts (b) assemble top base plate to stub base plate using high strength bolts with three (3) hardened washers per bolt. One washer per bolt and two (2) bolt keeper plates go between the base

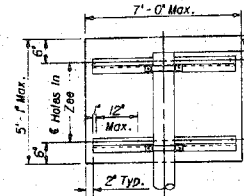
COL. SIZE	2 x 4	2 1/2 x 4	3 x 4	3 1/2 x 4	4 x 4	4 1/2 x 4	5 x 4	5 1/2 x 4	6 x 4	6 1/2 x 4	7 x 4	7 1/2 x 4	8 x 4	COL. SIZE	2 x 4	2 1/2 x 4	3 x 4	3 1/2 x 4	4 x 4	4 1/2 x 4	5 x 4	5 1/2 x 4	6 x 4	6 1/2 x 4	7 x 4	7 1/2 x 4	8 x 4	
FOOTING	0x2-0	0x2-3	0x2-6	0x3-4	0x3-9	1-6x2-1	1-6x2-5	1-6x2-9	1-6x3-0	1-6x3-3	2-0x3-0	2-0x3-4	2-0x3-6	FOOTING	0x2-0	0x2-3	0x2-6	0x3-4	0x3-9	1-6x2-1	1-6x2-5	1-6x2-9	1-6x3-0	1-6x3-3	2-0x3-0	2-0x3-4	2-0x3-6	
Sign Identification Number	HEIGHT (FT.)													Sign Identification Number	HEIGHT (FT.)													
1	To	13'	13'-15	15'-19	19'-25									53	To	8'8"	12'	12'-14	14'-23	23'-25								
2	To	11'	11'-14	14'-18	18'-25									54	To	7'7"	11'	11'-14	14'-22	22'-25								
3	To	10'	10'-13	13'-16	16'-25									55	To	7'7"	11'	11'-13	13'-22	22'-25								
4	To	8'8"	8'-11	11'-18	18'-22	22'-25								56	To	6'6"	10'	10'-13	13'-20	20'-25								
5	To	6'6"	6'-12	12'-15	15'-19	19'-24	24'-25							57	To	6'6"	10'	10'-13	13'-20	20'-25								
6	To	8'8"	8'-12	12'-18	18'-22	22'-25								58	To	6'6"	10'	10'-13	13'-20	20'-25								
7	To	7'7"	7'-13	13'-15	15'-19	19'-25								59	To	6'6"	10'	10'-13	13'-20	20'-25								
8	To	14'	14'-16	16'-20	20'-25									60	To	9'9"	13'	13'-19	19'-23	23'-25								
9	To	11'	11'-14	14'-18	18'-25									61	To	8'8"	11'	11'-17	17'-21	21'-25								
10	To	7'7"	7'-11	11'-13	13'-22	22'-25								62	To	8'8"	11'	11'-17	17'-21	21'-25								
11	To	8'8"	8'-12	12'-18	18'-22	22'-25								63	To	8'8"	12'	12'-18	18'-22	22'-25								
12	To	6'6"	6'-13	13'-14	14'-17	17'-21	21'-25							64	To	7'7"	11'	11'-16	16'-20	20'-25								
13	To	6'6"	6'-11	11'-13	13'-22	22'-25								65	To	7'7"	11'	11'-17	17'-21	21'-25								
14	To	6'6"	6'-10	10'-13	13'-21	21'-25								66	To	6'6"	10'	10'-15	15'-19	19'-23	23'-25							
15	To	9'9"	9'-13	13'-19	19'-23	23'-25								67	To	6'6"	10'	10'-15	15'-19	19'-24	24'-25							
16	To	8'8"	8'-12	12'-18	18'-22	22'-25								68	To	6'6"	10'	10'-16	16'-20	20'-24	24'-25							
17	To	7'7"	7'-12	12'-16	16'-20	20'-24	24'-25							69	To	6'6"	9'9"	9'-15	15'-19	19'-23	23'-25							
18	To	6'6"	6'-12	12'-14	14'-17	17'-22	22'-25							70	To	8'8"	8'-14	14'-17	17'-22	22'-25								
19	To	11'	11'-12	12'-15	15'-19	19'-23	23'-25							71	To	8'8"	8'-14	14'-18	18'-22	22'-25								
20	To	8'8"	8'-11	11'-12	12'-15	15'-18	18'-22	22'-25						72	To	9'9"	9'-14	14'-18	18'-21	21'-25								
21	To	9'9"	9'-14	14'-18	18'-22	22'-25								73	To	8'8"	8'-13	13'-17	17'-21	21'-25								
22	To	7'7"	7'-13	13'-17	17'-21	21'-25								74	To	8'8"	8'-13	13'-16	16'-20	20'-24	24'-25							
23	To	9'9"	9'-14	14'-18	18'-22	22'-25								75	To	7'7"	7'-13	13'-15	15'-19	19'-23	23'-25							
24	To	7'7"	7'-13	13'-17	17'-21	21'-25								76	To	7'7"	7'-13	13'-15	15'-19	19'-24	24'-25							
25	To	6'6"	6'-10	10'-13	13'-20	20'-25								77	To	6'6"	6'-12	12'-15	15'-19	19'-23	23'-25							
26	To	8'8"	8'-12	12'-18	18'-22	22'-25								78	To	7'7"	7'-13	13'-15	15'-19	19'-23	23'-25							
27	To	8'8"	8'-12	12'-18	18'-22	22'-25								79	To	7'7"	7'-13	13'-15	15'-18	18'-22	22'-25							
28	To	8'8"	8'-12	12'-18	18'-22	22'-25								80	To	11'	11'-13	13'-15	15'-19	19'-23	23'-25							
29	To	8'8"	8'-11	11'-17	17'-21	21'-25								81	To	10'	10'-12	12'-14	14'-18	18'-22	22'-25							
30	To	7'7"	7'-11	11'-17	17'-21	21'-25								82	To	11'	11'-13	13'-15	15'-18	18'-22	22'-25							
31	To	8'8"	8'-14	14'-18	18'-22	22'-25								83	To	10'	10'-13	13'-14	14'-17	17'-21	21'-25							
32	To	8'8"	8'-13	13'-17	17'-21	21'-25								84	To	9'9"	9'-12	12'-13	13'-17	17'-20	20'-24	24'-25						
33	To	6'6"	6'-9	9'-15	15'-19	19'-23	23'-25							85	To	9'9"	9'-12	12'-13	13'-16	16'-19	19'-23	23'-25						
34	To	8'8"	8'-14	14'-17	17'-22	22'-25								86	To	8'8"	8'-11	11'-12	12'-16	16'-19	19'-23	23'-25						
35	To	6'6"	6'-9	9'-15	15'-19	19'-23	23'-25							87	To	7'7"	7'-10	10'-12	12'-14	14'-18	18'-21	21'-25						
36	To	8'8"	8'-14	14'-17	17'-22	22'-25								88	To	6'6"	6'-9	9'-12	12'-13	13'-15	15'-19	19'-22	22'-25					
37	To	11'	11'-12	12'-15	15'-20	20'-24	24'-25							89	To	8'8"	8'-11	11'-12	12'-14	14'-17	17'-21	21'-25						
38	To	10'	10'-12	12'-14	14'-18	18'-22	22'-25							90	To	7'7"	7'-13	13'-14	14'-18	18'-22	22'-25							
39	To	9'9"	9'-12	12'-13	13'-17	17'-21	21'-25							91	To	9'9"	9'-12	12'-13	13'-16	16'-19	19'-23	23'-25						
40	To	8'8"	8'-11	11'-12	12'-15	15'-18	18'-22	22'-25																				
41	To	6'6"	6'-9	9'-12	12'-13	13'-17	17'-20	20'-24	24'-25																			
42	To	6'6"	6'-9	9'-11	11'-12	12'-16	16'-20	20'-24	24'-25																			
43	To	7'7"	7'-10	10'-11	11'-13	13'-17	17'-21	21'-24	24'-25																			
44	To	15'	15'-19	19'-23	23'-25																							
45	To	11'	11'-14	14'-18	18'-25																							
46	To	11'	11'-14	14'-18	18'-25																							
47	To	11'	11'-14	14'-18	18'-25																							
48	To	10'	10'-13	13'-17	17'-25																							
49	To	9'9"	9'-14	14'-16	16'-25																							
50	To	9'9"	9'-13	13'-16	16'-25																							
51	To	9'9"	9'-14	14'-16	16'-25																							
52	To	9'9"	9'-13	13'-15	15'-24	24'-25																						

SLIP BASE NOTES

- Inside Diameter (I.D.) of sleeve to be no more than 1/8" larger than outside diameter (O.D.) of column.
- Sleeve bolts to be 1/2" dia with locknuts, steel A.S.T.M. - A307 galvanized aluminum assoc. alloy 2024 - T4 or 6061 - T6 (ASTM B - 211).
- Base bolts, nuts and washers to be ASTM - A325 high strength electroplated zinc coating type LS applied in accordance with ASTM - A164.
- An alternate cast base of aluminum alloy 356 and T6 temper in lieu of the fabricated base may be submitted for approval by the E used the stub will be the same as the column and will be bolted to the casting.
- Assemble the slip base connection in the following manner (a) connect column to sleeve using two (2) 1/2" machine bolts (b) assemble plate using high strength bolts with three (3) hardened washers per bolt. One washer per bolt and two (2) bolt keeper washers (c) shim stock as required to plumb the column (d) tighten all bolts the maximum possible with a 12" to 15" wrench to bed the washers threads. Loosen each bolt in turn and retighten to the prescribed torque (see table 1). Bolts shall be tightened with properly calibrated supervision of the project engineer (e) burr threads at junction with nut using a center punch to prevent nut loosening.
- Using galvanized steel shims that are 1/4" (see sleeve & base plate details) minus one inch (1") long, shim a tight fit between the column face of the sleeve. Place shims in all quadrants between the 1/2" sleeve bolts.



Sign Panel Details
Type I Bracket



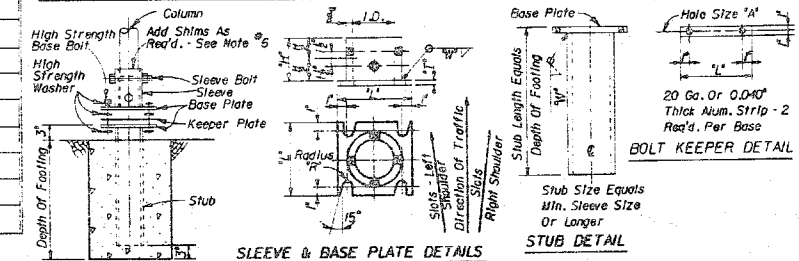
Sign Panel Details
Type II Bracket

GENERAL NOTES

- For sign identification numbers see Sheet titled "Sign Profile and Identification Numbers". Use the sign identification number and the required column height to determine the support column size and footing size. The heights given in the table are the maximum height (from ground to bottom of sign) that a column size can be used for a particular sign profile. If the required column height is not listed in the table, the sign will have to be supported on multiple column type "A" breakaway supports.
 - All columns in the table are aluminum tube, given as outside diameter times the wall thickness. Sizes 2 x 4 thru 4 x 8 tube are frangible supports and will be driven into the ground. 4 x 8 tube is the maximum size frangible support. Size 4 x 4 thru 8 x 4 are breakaway supports and will have poured concrete footings and slip bases.
 - Footings: Frangible Supports - no concrete footing is required. The support column shall be driven into the ground to the depth indicated. The portion of the support column which is driven into the ground shall be painted with cutback asphalt - grade AC - 70.
- Breakaway Supports - Footings to be poured concrete, size as shown in table. The first dimension indicates the diameter of the footing and the second dimension the depth of the footing into the ground. In all cases the ground is to be considered as undisturbed earth, road material or properly compacted fill.

SLIP BASE DETAILS

Column Size	Sleeve I.D. (Max)	Sleeve Wall Thk.	Sleeve Height	Weld "W"	Base Plate LxW	Radius "R"	Base Bolt Size	Base Bolt Torque Ft.-lbs./Inch.-lbs.	Hole Size "A"
4 x 4	4 1/8	3/8	6'	5/16	8 x 8 x 3/4	1/2	3/8 x 3"	53 ⁰⁰	640 ⁰⁰
4 1/2 x 4	4 3/8	3/8	6'	5/16	8 x 8 x 3/4	1/2	3/8 x 3 3/8"	53 ⁰⁰	640 ⁰⁰
5 x 4	5 1/8	3/8	7'	5/16	8 x 8 x 3/4	1/2	3/8 x 3 3/8"	53 ⁰⁰	640 ⁰⁰
5 1/2 x 4	5 3/8	3/8	7'	5/16	8 1/2 x 8 1/2 x 3/4	3/4	3/8 x 3 3/8"	78 ⁰⁰	940 ⁰⁰
6 x 4	6 1/8	3/8	8'	5/16	9 x 9 x 1	3/4	3/8 x 3 3/8"	78 ⁰⁰	940 ⁰⁰
6 1/2 x 4	6 3/8	3/8	8'	5/16	9 1/2 x 9 1/2 x 1	3/4	3/8 x 3 3/8"	78 ⁰⁰	940 ⁰⁰
7 x 4	7 1/8	3/8	9'	5/16	10 x 10 x 1	3/4	3/8 x 3 3/8"	78 ⁰⁰	940 ⁰⁰
7 1/2 x 4	7 3/8	3/8	9'	5/16	10 1/2 x 10 1/2 x 1	3/4	3/8 x 3 3/8"	108 ⁰⁰	1290 ⁰⁰
8 x 4	8 1/8	3/8	10'	5/16	11 x 11 x 1	3/4	3/8 x 3 3/8"	108 ⁰⁰	1290 ⁰⁰



BASE DETAIL

SLIP BASE NOTES

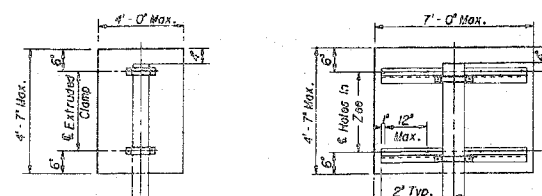
- Inside Diameter (I.D.) of sleeve to be no more than 1/8" larger than outside diameter (O.D.) of column.
- Sleeve bolts to be 1/2" with locknuts, steel A.S.T.M. - A307 galvanized aluminum alloy 2024 - T4 or 6061 - T5 (ASTM B - 211).
- Base bolts, nuts and washers to be ASTM - A325 high strength electroplated zinc coating type LS applied in accordance with ASTM

COL. SIZE	2 x 6	2 1/2 x 6	3 x 6	3 1/2 x 6	4 x 6	4 x 8	4 x 10	5 x 4	5 1/2 x 4	6 x 4	6 1/2 x 4	7 x 4	7 1/2 x 4	8 x 4
FOOTING	0x2-0	0x2-3	0x2-6	0x3-4	0x3-9	1-6x2-1	1-6x2-5	1-6x2-9	1-6x3-0	1-6x3-3	2-0x3-0	2-0x3-4	2-0x3-6	2-0x4-0
Sign Identify footing Number	HEIGHT (FT.)													
1	To	10'	10'-13	13'-16	16'-25									
2	To	8'	8'-15	13'-15	16'-23	23'-25								
3	To	7'	7'-11	11'-13	13'-21	21'-25								
4			To	9'	9'-14	14'-18	18'-21	21'-25						
5				To	11'	11'-12	12'-15	15'-19	19'-23	23'-25				
6		To	6'	6'-9	9'-14	14'-17	17'-21	21'-25						
7				To	11'	11'-13	13'-15	15'-19	19'-23	23'-25				
8	To	11'	11'-14	14'-17	17'-25									
9	To	9'	9'-13	13'-15	15'-23	23'-25								
10		To	9'	9'-12	12'-18	18'-22	22'-25							
11		To	6'	6'-9	9'-14	14'-17	17'-21	21'-25						
12				To	9'	9'-13	13'-14	14'-17	17'-20	20'-24	24'-25			
13		To	8'	8'-12	12'-18	18'-21	21'-25							
14		To	7'	7'-11	11'-17	17'-20	20'-24	24'-25						
15		To	7'	7'-10	10'-15	15'-19	19'-23	23'-25						
16		To	6'	6'-9	9'-15	15'-18	18'-22	22'-25						
17				To	11'	11'-12	12'-16	16'-19	19'-23	23'-25				
18				To	9'	9'-12	12'-13	13'-17	17'-21	21'-25				
19				To	8'	8'-11	11'-12	12'-15	15'-18	18'-22	22'-25			
20					To	8'	8'-10	10'-12	12'-14	14'-17	17'-21	21'-25		
21			To	6'	6'-12	12'-14	14'-18	18'-22	22'-25					
22				To	12'	12'-13	13'-16	16'-20	20'-24	24'-25				
23			To	6'	6'-12	12'-14	14'-18	18'-22	22'-25					
24				To	12'	12'-13	13'-16	16'-20	20'-24	24'-25				
25		To	7'	7'-11	11'-16	16'-20	20'-24	24'-25						
26		To	6'	6'-9	9'-15	15'-18	18'-22	22'-25						
27		To	6'	6'-9	9'-15	15'-18	18'-22	22'-25						
28		To	6'	6'-9	9'-14	14'-17	17'-21	21'-25						
29			To	8'	8'-14	14'-17	17'-21	21'-25						
30			To	8'	8'-13	13'-17	17'-20	20'-24	24'-25					
31			To	6'	6'-13	13'-14	14'-17	17'-21	21'-25					
32			To	6'	6'-12	12'-13	13'-17	17'-20	20'-24	24'-25				
33			To	7'	7'-12	12'-15	15'-19	19'-22	22'-25					
34			To	6'	6'-12	12'-14	14'-17	17'-21	21'-25					
35			To	7'	7'-12	12'-15	15'-19	19'-22	22'-25					
36			To	6'	6'-12	12'-14	14'-17	17'-21	21'-25					
37				To	8'	8'-11	11'-12	12'-15	15'-19	19'-23	23'-25			
38				To	7'	7'-10	10'-13	13'-16	16'-20	20'-24	24'-25			
39				To	7'	7'-10	10'-12	12'-13	13'-16	16'-20	20'-24	24'-25		
40					To	8'	8'-10	10'-12	12'-14	14'-17	17'-21	21'-25		
41					To	7'	7'-9	9'-12	12'-13	13'-16	16'-19	19'-23	23'-25	
42					To	6'	6'-8	8'-11	11'-12	12'-15	15'-18	18'-22	22'-25	
43					To	7'	7'-9	9'-11	11'-13	13'-16	16'-19	19'-22	22'-25	
44	To	13'	13'-16	16'-19	19'-25									
45	To	9'	9'-13	13'-15	15'-22	22'-25								
46	To	9'	9'-13	13'-15	15'-22	22'-25								
47	To	9'	9'-13	13'-15	15'-23	23'-25								
48	To	8'	8'-12	12'-14	14'-22	22'-25								
49	To	7'	7'-11	11'-14	14'-21	21'-25								
50	To	7'	7'-11	11'-13	13'-21	21'-25								
51	To	7'	7'-11	11'-14	14'-20	20'-25								
52	To	6'	6'-10	10'-13	13'-20	20'-25								

COL. SIZE	2 x 1/2	2 1/2 x 1/2	3 x 1/2	3 1/2 x 1/2	4 x 1/2	4 x 1/2	4 1/2 x 1/2	5 x 1/2	5 1/2 x 1/2	6 x 1/2	6 1/2 x 1/2	7 x 1/2	7 1/2 x 1/2	8 x 1/2
FOOTING	0x2-0	0x2-3	0x2-6	0x3-4	0x3-9	1-6x2-1	1-6x2-5	1-6x2-9	1-6x3-0	1-6x3-3	2-0x3-0	2-0x3-4	2-0x3-6	2-0x4-0
Sign Identification Number	HEIGHT (FT.)													
53	To	6'	6'-10"	10'-13"	13'-19"	19'-22"	22'-25"							
54	To	9'9"	9'-12"	12'-18"	18'-21"	21'-25"								
55	To	9'9"	9'-12"	12'-18"	18'-22"	22'-25"								
56	To	7'7"	7'-11"	11'-16"	16'-20"	20'-24"	24'-25"							
57	To	7'7"	7'-10"	10'-16"	16'-19"	19'-23"	23'-25"							
58	To	7'7"	7'-11"	11'-16"	16'-20"	20'-24"	24'-25"							
59	To	7'7"	7'-10"	10'-16"	16'-20"	20'-23"	23'-25"							
60	To	7'7"	7'-10"	10'-15"	15'-19"	19'-23"	23'-25"							
61	To	6'6"	6'-8"	8'-13"	13'-17"	17'-21"	21'-24"	24'-25"						
62	To	6'6"	6'-8"	8'-13"	13'-17"	17'-21"	21'-24"	24'-25"						
63	To	6'6"	6'-9"	9'-14"	14'-17"	17'-21"	21'-25"							
64	To	8'8"	8'-14"	14'-16"	16'-20"	20'-24"	24'-25"							
65	To	8'8"	8'-13"	13'-16"	16'-20"	20'-24"	24'-25"							
66	To	7'7"	7'-13"	13'-15"	15'-19"	19'-23"	23'-25"							
67	To	7'7"	7'-13"	13'-15"	15'-19"	19'-23"	23'-25"							
68	To	7'7"	7'-12"	12'-16"	16'-19"	19'-23"	23'-25"							
69	To	7'7"	7'-13"	13'-15"	15'-18"	18'-22"	22'-25"							
70	To	6'6"	6'-12"	12'-14"	14'-17"	17'-21"	21'-25"							
71	To	6'6"	6'-13"	13'-14"	14'-17"	17'-21"	21'-25"							
72	To	6'6"	6'-13"	13'-14"	14'-17"	17'-21"	21'-25"							
73	To	6'6"	6'-12"	12'-13"	13'-17"	17'-20"	20'-24"	24'-25"						
74	To	12'12"	12'-13"	13'-16"	16'-19"	19'-23"	23'-25"							
75	To	11'11"	11'-13"	13'-15"	15'-18"	18'-22"	22'-25"							
76	To	11'11"	11'-13"	13'-15"	15'-19"	19'-23"	23'-25"							
77	To	10'10"	10'-12"	12'-14"	14'-18"	18'-22"	22'-25"							
78	To	11'11"	11'-13"	13'-15"	15'-18"	18'-22"	22'-25"							
79	To	10'10"	10'-13"	13'-14"	14'-18"	18'-22"	22'-25"							
80	To	8'8"	8'-11"	11'-13"	13'-15"	15'-18"	18'-22"	22'-25"						
81	To	7'7"	7'-10"	10'-12"	12'-14"	14'-17"	17'-21"	21'-25"						
82	To	8'8"	8'-11"	11'-13"	13'-14"	14'-18"	18'-21"	21'-25"						
83	To	7'7"	7'-10"	10'-13"	13'-14"	14'-17"	17'-20"	20'-24"	24'-25"					
84	To	6'6"	6'-9"	9'-12"	12'-13"	13'-16"	16'-19"	19'-23"	23'-25"					
85	To	6'6"	6'-9"	9'-11"	11'-13"	13'-15"	15'-19"	19'-22"	22'-25"					
86	To	6'6"	6'-8"	8'-11"	11'-12"	12'-15"	15'-18"	18'-22"	22'-25"					
87	To	7'7"	7'-10"	10'-12"	12'-13"	13'-17"	17'-20"	20'-24"	24'-25"					
88	To	6'6"	6'-9"	9'-12"	12'-13"	13'-14"	14'-17"	17'-20"	20'-23"	23'-25"				
89	To	7'7"	7'-10"	10'-11"	11'-13"	13'-15"	15'-19"	19'-22"	22'-25"					
90	To	10'10"	10'-13"	13'-14"	14'-17"	17'-21"	21'-25"							
91	To	6'6"	6'-9"	9'-11"	11'-13"	13'-15"	15'-18"	18'-22"	22'-25"					

SLIP BASE NOTES

- 1- Inside Diameter (I.D.) of sleeve to be no more than 1/8" larger than outside diameter (O.D.) of column.
- 2- Sleeve bolts to be 1/2" dia with locknuts, steel A.S.T.M. - A307 galvanized or Aluminum Assoc. Alloy 2024 - T4 or 6061 - T6 (ASTM B - 211).
- 3- Base bolts, nuts and washers to be ASTM - A325 high strength electropolished zinc coating type LS applied in accordance with ASTM - A164.
- 4- An alternate cast base of aluminum alloy 355 and T6 temper in lieu of the fabricated base may be submitted for approval by the Engineer. If a cast base is used the stub will be the same as the column and will be bolted to the casting.
- 5- Assemble the slip base connection in the following manner: (a) connect column to sleeve using two (2) 1/2" Gracoline bolts; (b) assemble top base plate to stub base plate using high strength bolts with three (3) hardened washers per bolt. One washer per bolt and two (2) bolt keeper plates go between the base plates; (c) Use shim stock as required to plumb the column; (d) Tighten all bolts to maximum possible with a 12" to 15" wrench to bed the washers and shims and to clean the bolt threads. Loosen each bolt in turn and retighten to the prescribed torque (see table). Bolts shall be tightened with properly calibrated wrenches under the supervision of the project engineer; (e) burr threads at junction with nut using a center punch to prevent nut loosening.
- 6- Using galvanized steel shims that are 1/4" (see sleeve & base plate details) minus one inch (1") long, shim a tight fit between the column face and the inside face of the sleeve. Place shims in all quadrants between the 1/2" dia sleeve bolts.



SIGN PANEL DETAILS
TYPE I BRACKET

SIGN PANEL DETAILS
TYPE II BRACKET

GENERAL NOTES

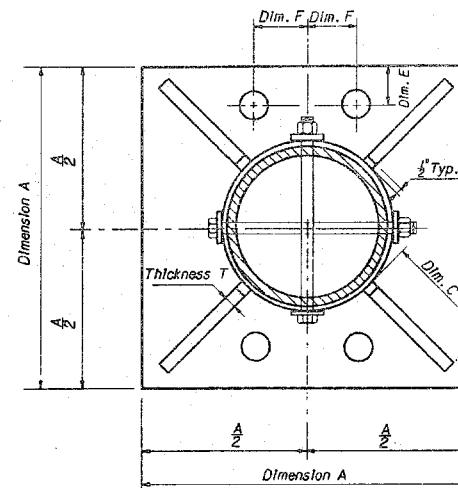
- 1- For sign identification numbers see sheet titled "Sign Profile and Identification Numbers". Use the sign identification number and the required column height to determine the support column size and footing size. The heights given in the table are the maximum height (from ground to bottom of sign) that a column size can be used for a particular sign profile. If the required column height is not listed in the table, the sign will have to be supported on multiple column type "A" breakaway supports.
 - 2- All columns in the table are aluminum tube, given as outside diameter times the wall thickness. Sizes 2 x 1/2 thru 4 x 3/8 tube are frangible supports and will be driven into the ground. 4 x 1/2 tube is the maximum size frangible support. Size 4 x 1/2 are breakaway supports and will have poured concrete footings and slip bases.
 - 3- FOOTINGS: Frangible Supports - no concrete footing is required. The support column shall be driven into the ground to the depth indicated. The portion of the support column which is driven into the ground shall be painted with cutback asphalt - grade RC - 70.
- Breakaway Supports - Footings to be poured concrete, size as shown in table. The first dimension indicates the diameter of the footing and the second dimension the depth of the footing into the ground. In all cases the ground is to be considered as undisturbed earth, road material or properly compacted fill.

SLIP BASE DETAILS

Column Size	Sleeve I.D. (Inch)	Sleeve Wall T	Sleeve Height	Weld W	Base Plate LxLxT	Radius R	Base Bolt Size	Base Bolt Torque (FT - lbs)	Hole Size "
4 x 1/2	4 1/8	1/8	6"	1/4	5 x 8 x 3/8	1/4	5/8 x 3"	53" ¹⁰	640" ¹⁰
4 1/2 x 1/2	4 5/8	1/8	6"	1/4	8 x 8 x 7/8	1/4	5/8 x 3 1/2"	53" ¹⁰	640" ¹⁰
5 x 1/2	5 1/8	1/8	7"	1/4	6 x 8 x 3/8	1/4	5/8 x 3 1/2"	53" ¹⁰	640" ¹⁰
5 1/2 x 1/2	5 5/8	1/8	7"	1/4	8 1/2 x 8 1/2 x 1	1/4	5/8 x 3 1/2"	78" ¹⁰	940" ¹⁰
6 x 1/2	6 1/8	1/8	8"	1/4	9 x 9 x 1	1/4	5/8 x 3 1/2"	78" ¹⁰	940" ¹⁰
6 1/2 x 1/2	6 5/8	1/8	8"	1/4	9 1/2 x 9 1/2 x 1	1/4	5/8 x 3 1/2"	78" ¹⁰	940" ¹⁰
7 x 1/2	7 1/8	1/8	9"	1/4	10 x 10 x 1	1/4	5/8 x 3 1/2"	78" ¹⁰	940" ¹⁰
7 1/2 x 1/2	7 5/8	1/8	9"	1/4	10 1/2 x 10 1/2 x 1	1/4	5/8 x 3 1/2"	108" ¹⁰	1290" ¹⁰
8 x 1/2	8 1/8	1/8	10"	1/4	11 x 11 x 1	1/4	5/8 x 3 1/2"	108" ¹⁰	1290" ¹⁰

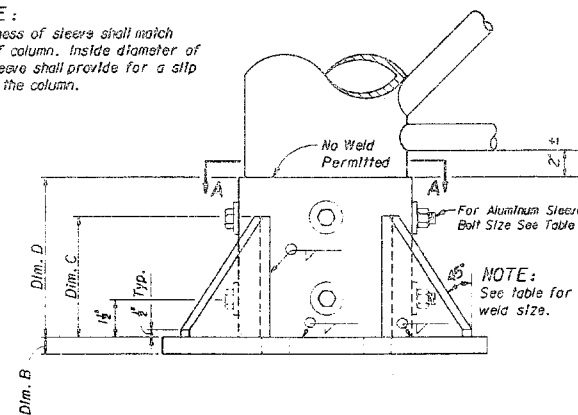
COLUMN SIZE O.D. X WALL	PLATE SIZE A	PLATE THICKNESS B	F I N S		FILLET WELD SIZE	SLEEVE HEIGHT DIMENSION D	ANCHOR BOLT LOCATION		ANCHOR BOLT HOLE DIAMETER	ANCHOR BOLT DIAMETER & LENGTH	DIMENSION M (NOMINAL)	SLEEVE BOLT DIAMETER
			THICKNESS T	DIMENSION C			DIMENSION E	DIMENSION F				
12" Ø x 3/4"	2'-0"	1/8"	1 1/2"	9"	7/16"	1'-0"	3"	3 1/2"	2 5/16"	2 1/2" Ø x 6'-6"	9 3/4"	5/8"
12" Ø x 1/2"	1'-11"	1/8"	1 1/2"	8"	7/16"	1'-0"	3"	3 1/2"	2 5/16"	2" Ø x 5'-10"	9"	3/4"
12" Ø x 3/8"	1'-10"	1/8"	1"	7 1/2"	7/16"	1'-0"	3"	3 1/2"	2 5/16"	2" Ø x 5'-10"	9"	3/4"
12" Ø x 1/4"	1'-9"	1"	1"	7 1/2"	7/16"	1'-0"	2"	3 1/2"	2 5/16"	1 3/4" Ø x 5'-1"	7 3/4"	3/4"
11" Ø x 1/2"	1'-10"	1/8"	1"	8"	7/16"	1'-0"	2"	3 1/2"	2 5/16"	2" Ø x 5'-10"	9"	3/4"
11" Ø x 3/8"	1'-8"	1"	1"	7"	7/16"	1'-0"	2"	3 1/2"	2 5/16"	1 3/4" Ø x 5'-1"	7 3/4"	3/4"
11" Ø x 1/4"	1'-7"	1"	5/8"	6 1/2"	7/16"	1'-0"	2"	3 1/2"	1 5/8"	1 1/2" Ø x 4'-4"	6 1/2"	3/4"
10 1/2" Ø x 1/2"	1'-9"	1"	1"	7 1/2"	7/16"	1'-0"	2"	3 1/2"	2 5/16"	1 3/4" Ø x 5'-1"	7 3/4"	3/4"
10 1/2" Ø x 3/8"	1'-7"	1"	5/8"	6 1/2"	7/16"	1'-0"	2"	3 1/2"	2 5/16"	1 3/4" Ø x 5'-1"	7 3/4"	3/4"
10 1/2" Ø x 1/4"	1'-6"	5/8"	3/4"	6"	7/16"	11"	2"	3"	1 5/8"	1 1/2" Ø x 4'-4"	6 1/2"	3/4"
10" Ø x 1/2"	1'-8"	1"	1"	7"	7/16"	11"	2"	3"	2 5/16"	1 3/4" Ø x 5'-1"	7 3/4"	3/4"
10" Ø x 3/8"	1'-7"	1"	7/8"	7"	7/16"	11"	2"	3"	1 5/8"	1 1/2" Ø x 4'-4"	6 1/2"	3/4"
10" Ø x 1/4"	1'-6"	7/8"	3/4"	6"	7/16"	11"	2"	3"	1 5/8"	1 1/2" Ø x 4'-0"	6 1/2"	3/4"
9 1/2" Ø x 1/2"	1'-7"	1"	5/8"	7"	7/16"	11"	2"	3"	2 5/16"	1 3/4" Ø x 5'-1"	7 3/4"	3/4"
9 1/2" Ø x 3/8"	1'-6"	7/8"	3/4"	6 1/2"	7/16"	11"	2"	3"	1 5/8"	1 1/2" Ø x 4'-4"	6 1/2"	3/4"
9 1/2" Ø x 1/4"	1'-5"	7/8"	3/4"	6"	7/16"	11"	2"	3"	1 5/8"	1 1/2" Ø x 4'-0"	6 1/2"	3/4"
9" Ø x 1/2"	1'-7"	1"	5/8"	7"	7/16"	10"	2"	3"	1 5/8"	1 1/2" Ø x 4'-4"	6 1/2"	3/4"
9" Ø x 3/8"	1'-6"	7/8"	3/4"	6 1/2"	7/16"	10"	2"	3"	1 5/8"	1 1/2" Ø x 4'-0"	6 1/2"	3/4"
9" Ø x 1/4"	1'-5"	7/8"	3/4"	6"	7/16"	10"	2"	3"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
8 1/2" Ø x 1/2"	1'-7"	1"	5/8"	7"	7/16"	10"	2"	3"	1 5/8"	1 1/2" Ø x 4'-4"	6 1/2"	3/4"
8 1/2" Ø x 3/8"	1'-6"	7/8"	3/4"	7"	7/16"	10"	2"	3"	1 5/8"	1 1/2" Ø x 4'-0"	6 1/2"	3/4"
8 1/2" Ø x 1/4"	1'-4"	3/4"	5/8"	5 3/4"	7/16"	10"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
8" Ø x 1/2"	1'-6"	7/8"	3/4"	7"	7/16"	9 1/2"	2"	3"	1 5/8"	1 1/2" Ø x 4'-0"	6 1/2"	3/4"
8" Ø x 3/8"	1'-5"	7/8"	3/4"	6"	7/16"	9 1/2"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
8" Ø x 1/4"	1'-4"	3/4"	5/8"	5 3/4"	7/16"	9 1/2"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
7 1/2" Ø x 1/2"	1'-6"	7/8"	3/4"	7"	7/16"	9"	2"	3"	1 5/8"	1 1/2" Ø x 4'-0"	6 1/2"	3/4"
7 1/2" Ø x 3/8"	1'-5"	7/8"	3/4"	6"	7/16"	9"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
7 1/2" Ø x 1/4"	1'-3"	3/4"	5/8"	5 1/2"	7/16"	9"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-4"	5 1/2"	3/4"
7" Ø x 1/2"	1'-5"	7/8"	3/4"	6"	7/16"	9"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
7" Ø x 3/8"	1'-4"	3/4"	5/8"	5 3/4"	7/16"	9"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
7" Ø x 1/4"	1'-3"	3/4"	5/8"	5 1/2"	7/16"	9"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-4"	5 1/2"	3/4"
6 1/2" Ø x 1/2"	1'-4"	3/4"	5/8"	5 3/4"	7/16"	8"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-8"	5 3/4"	3/4"
6 1/2" Ø x 3/8"	1'-3"	3/4"	5/8"	5 1/2"	7/16"	8"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-4"	5 1/2"	3/4"
6 1/2" Ø x 1/4"	1'-2"	3/4"	5/8"	5 1/2"	7/16"	8"	2"	2"	1 5/8"	1" Ø x 2'-11"	5"	3/4"
6" Ø x 1/2"	1'-3"	3/4"	5/8"	5 1/2"	7/16"	8"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-4"	5 1/2"	3/4"
6" Ø x 3/8"	1'-3"	3/4"	5/8"	5 1/2"	7/16"	8"	2"	2 1/2"	1 5/8"	1 1/2" Ø x 3'-4"	5 1/2"	3/4"
6" Ø x 1/4"	1'-2"	3/4"	5/8"	5 1/2"	7/16"	8"	2"	2"	1 5/8"	1" Ø x 2'-11"	5"	3/4"
5 1/2" Ø x 1/2"	1'-3"	3/4"	5/8"	5 1/2"	7/16"	7"	2"	2"	1 5/8"	1 1/2" Ø x 3'-4"	5 1/2"	3/4"
5 1/2" Ø x 3/8"	1'-1"	3/4"	5/8"	5"	7/16"	7"	1 3/4"	1 3/4"	1 5/8"	5" Ø x 2'-7"	4 3/4"	3/4"
5" Ø x 1/2"	1'-2"	3/4"	5/8"	5 1/2"	7/16"	7"	2"	2"	1 5/8"	1" Ø x 2'-11"	5"	3/4"
5" Ø x 3/8"	1'-1"	3/4"	5/8"	5"	7/16"	7"	1 3/4"	1 3/4"	1 5/8"	5" Ø x 2'-7"	4 3/4"	3/4"
4 1/2" Ø x 1/2"	1'-0"	3/4"	5/8"	4 3/4"	7/16"	7"	1 3/4"	1 3/4"	1 5/8"	5" Ø x 2'-7"	4 3/4"	3/4"
4 1/2" Ø x 3/8"	1'-0"	1/2"	1/2"	4 3/4"	7/16"	7"	1 3/4"	1 3/4"	1 5/8"	3" Ø x 2'-3"	4 1/2"	1/2"
4 1/2" Ø x 1/4"	1'-0"	1/2"	1/2"	4 3/4"	7/16"	7"	1 3/4"	1 3/4"	1 5/8"	3" Ø x 2'-3"	4 1/2"	1/2"
4" Ø x 1/2"	1'-0"	1/2"	1/2"	4 3/4"	7/16"	7"	1 3/4"	1 3/4"	1 5/8"	3" Ø x 2'-3"	4 1/2"	1/2"

NOTE : For column size not fabricated use next larger diameter and wall thickness.

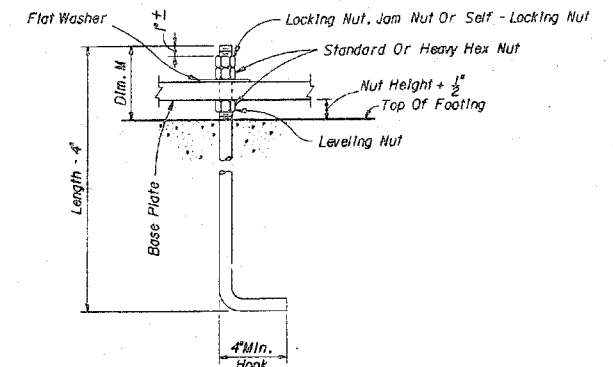


SECTION AA

NOTE :
Thickness of sleeves shall match
that of column. Inside diameter of
the sleeve shall provide for a slip
fit of the column.



ELEVATION



ANCHOR BOLT DETAIL

SPECIFICATIONS

EXTRUDED TUBING : The material used shall meet the requirements of the Aluminum Association Alloy 6061-T6 and also the A.S.T.M. Specification B - 221.

WELDING RODS : Aluminum Association Alloy no. 5556 Filler Wire.

TOLERANCE : All above materials shall be in keeping with the A.S.T.M. Specifications.

ALUMINUM BOLTS, NUTS, AND LOCKWASHERS : Aluminum bolts shall meet the requirements of the Aluminum Association Alloy 2024-T4 or 6061-T6 (A.S.T.M. Specification B - 221). The bolts shall have an anodic coating at least 0.0002" thick chromate sealed. Lockwashers shall meet the requirements of the Aluminum Association Alloy 7075-T6 (A.S.T.M. Specification B - 221). Nuts shall meet the requirements of the Aluminum Association Alloy 6262-T9 or 6061-T6.

MATERIAL STRESSES : All allowable stresses are in accordance with the "standard specifications for structural supports for highway signs, luminaires and traffic signals," A.A.S.H.O., 1975 and approved revisions for all materials shown on the plans.

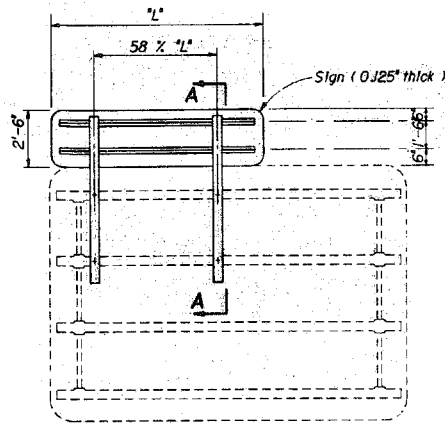
SHEETS AND PLATES : The material used shall meet the requirements of the Aluminum Association Alloy 6061-T6 and also the A.S.T.M. Specifications B - 209.

SHOP DRAWINGS : The contractor shall submit complete shop drawings before fabrication for approval by the engineer.

STEEL BOLTS, NUTS & LOCKWASHERS : All anchor bolts, nuts and lockwashers shall meet the requirements of the A.S.T.M. Specification A - 307 and shall be hot dip galvanized in accordance with the requirements of the A.S.T.M. Specification A - 153.

BASES FOR OVERHEAD BRIDGE TRUSS 4 POST CANTILEVER TRUSS SINGLE POST CANTILEVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN					
ALUMINUM BASES FOR COLUMN SUPPORTS					
Designed By	HAW	Date	05/76	Approved By	R. M. M. M.
Drawn By					
Checked By	CWB	Date	05/76	Revision No.	Sheet No.
F.H.W.A. Approved				1 of 1	11926



ELEVATION

Mounting of Exit Numbering Panels To Highway Signs

NOTE : Exit numbering panel shall be located to the right side for right exit and to the left for left exit.

Bolt Sign to Zee using 1/4" Aluminum Flat Head Nuts and Lock Washers (Typ.)

1 1/2" Z 1.08

3 Z 2.33

Bolt Vertical Zee to Wind Beams with 1/2" Aluminum Hex Head Bolts with Nuts and Lockwashers.

SECTION A-A

GENERAL NOTES

DESIGN SPECIFICATION : Standard specifications for structural supports for highway signs, luminaires and traffic signals. A.A.S.H.T.O., 1985.

SHEETS AND PLATES : Material used shall meet the requirements of Aluminum Association Alloy 6061-T6 and ASTM Specification B - 209. Sheets are to be degreased, etched, neutralized and treated with Alodine 11200 Jridite 14 - 2. Bonderite 721, or equal. No stenciling permitted on sheets.

MATERIALS : All aluminum materials shall meet the requirements of the Aluminum Association Alloy 6061 - T6 and also the following ASTM specifications for the following : Sheet and Plates B - 209 ; Extruded Shapes B - 221 and Standard Structural Shapes B - 308.

ALUMINUM BOLTS, NUTS & LOCKWASHERS : Aluminum bolts shall meet the requirements of the Aluminum Association Alloy 2024 - T4 or 6061 - T6 (ASTM spec. B - 211). The bolts shall have an anodic coating of at least 0.0002" thick and be chromate sealed. Lockwashers shall meet the requirement of Aluminum Association Alloy 7075 - T6 (ASTM specification B - 221). Nuts shall meet the requirement of Aluminum Association Alloy 6262 - T9 or 6061 - T6.

SIGN FACE : All sign face corners shall be rounded. See sign layout sheet for dimension "L" and sign face details.

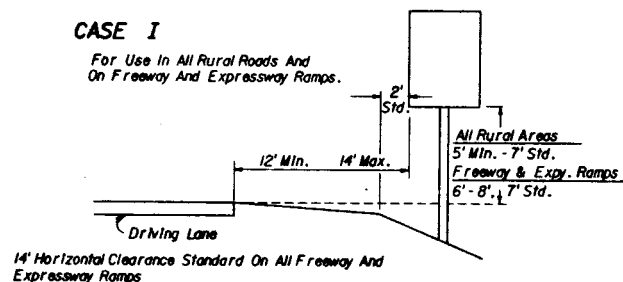
MATERIAL STRESSES : All allowable stresses are in accordance with standard specifications for structural supports for highway signs, luminaires and traffic signals. A.A.S.H.T.O., 1985, for all materials shown in the plans.

FOR MOUNTING DETAILS REFER TO DRAWING NO. 1 OF 1, INDEX 11037.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN					
DETAIL FOR MOUNTING EXIT NUMBERING PANELS TO HIGHWAY SIGNS					
Designed By	CL/CMB	Date	07/82	Approved By <i>William</i>	
Drawn By					
Checked By	CK	Date	07/82	Revision No.	Sheet No. 1 of 1
F.J.W.A. Approved				13417	

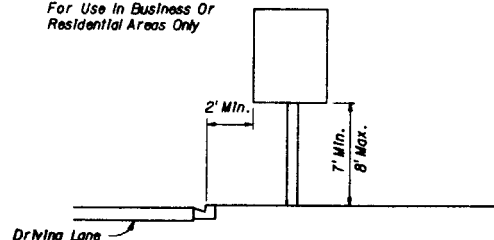
CASE I

For Use In All Rural Roads And On Freeway And Expressway Ramps.



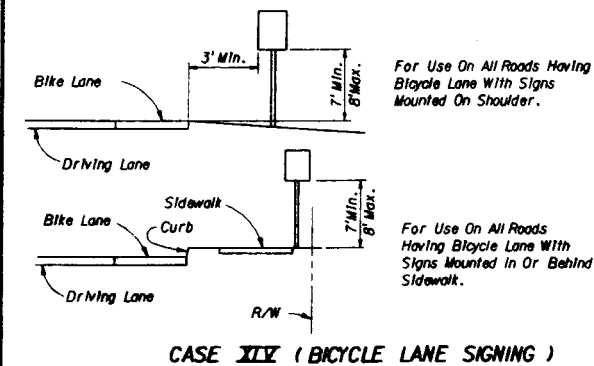
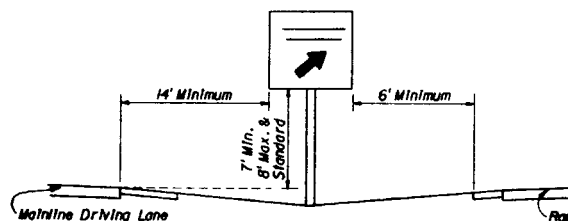
CASE V

For Use In Business Or Residential Areas Only



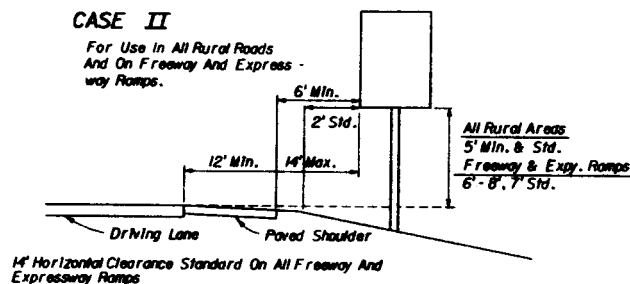
CASE IX (REST AREA & EXIT GORE SIGNS)

For Use On All Freeway And Expressway Systems



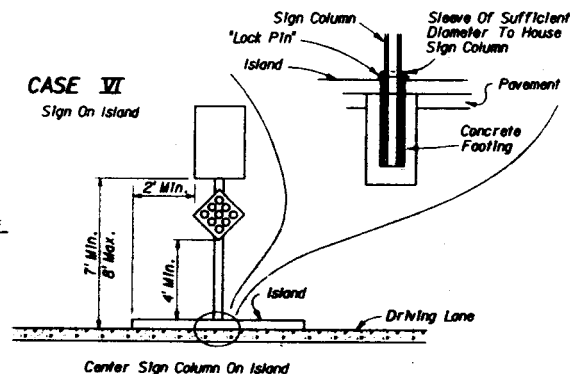
CASE II

For Use In All Rural Roads And On Freeway And Expressway Ramps.



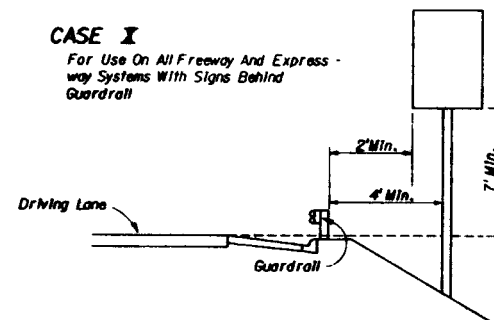
CASE VI

Sign On Island



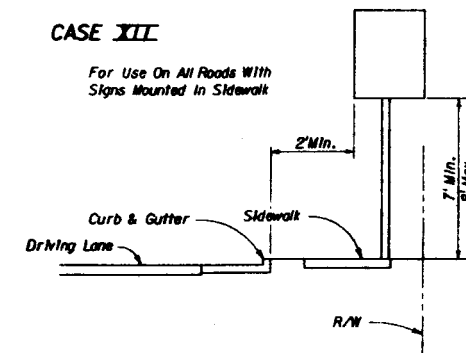
CASE I

For Use On All Freeway And Expressway Systems With Signs Behind Guardrail



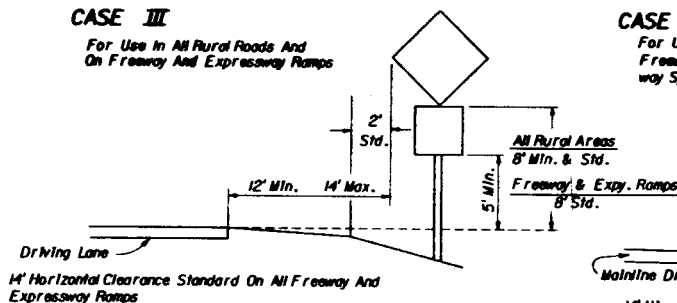
CASE XIII

For Use On All Roads With Signs Mounted In Sidewalk



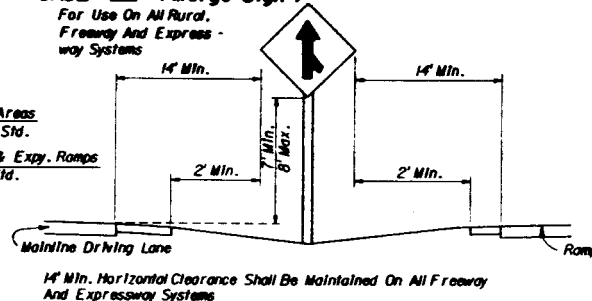
CASE III

For Use In All Rural Roads And On Freeway And Expressway Ramps



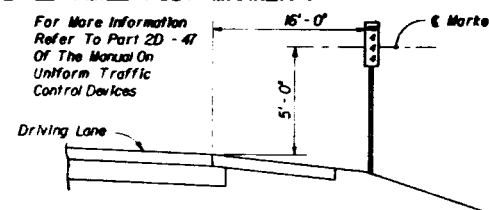
CASE VII (Merge Sign)

For Use On All Rural, Freeway And Expressway Systems



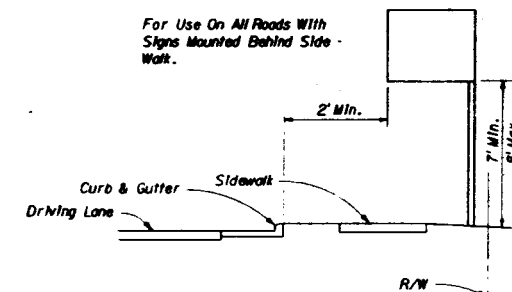
CASE XI (MILE POST MARKER)

For More Information Refer To Part 2D - 4f Of The Manual On Uniform Traffic Control Devices



CASE XIII

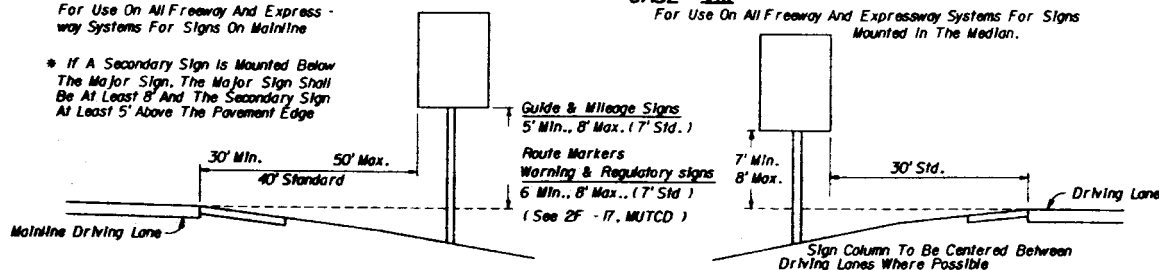
For Use On All Roads With Signs Mounted Behind Side Walk.



CASE IV

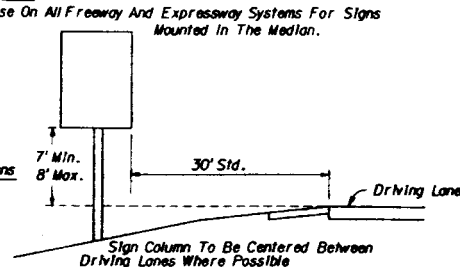
For Use On All Freeway And Expressway Systems For Signs On Mainline

* If A Secondary Sign Is Mounted Below The Major Sign, The Major Sign Shall Be At Least 8' And The Secondary Sign At Least 5' Above The Pavement Edge



CASE VIII

For Use On All Freeway And Expressway Systems For Signs Mounted In The Median.



GENERAL NOTES:

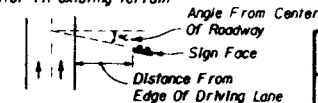
- The typical sections shown hereon serve as a guide for use in locating the traffic signs required under various roadside conditions. For size and details of sign construction and footing, refer to the appropriate standard index drawing for roadside sign.
- It shall be the CONTRACTOR'S responsibility to verify the length of sign supports in the field prior to fabrication.
- SIGN DISTANCE FROM EDGE OF ROADWAY

Sign Distance From Edge Of Roadway	Angle
Less than 20'	0°
≤ 30'	3°
≤ 40'	4°
≤ 50'	5°

(See Illustration)
Where lanes divide or on curves, sign faces shall be oriented so as to be most effective both day and night, and

to avoid the possibility of specular reflection.

- Horizontal clearance may be altered in the field by the PROJECT ENGINEER to better fit existing terrain



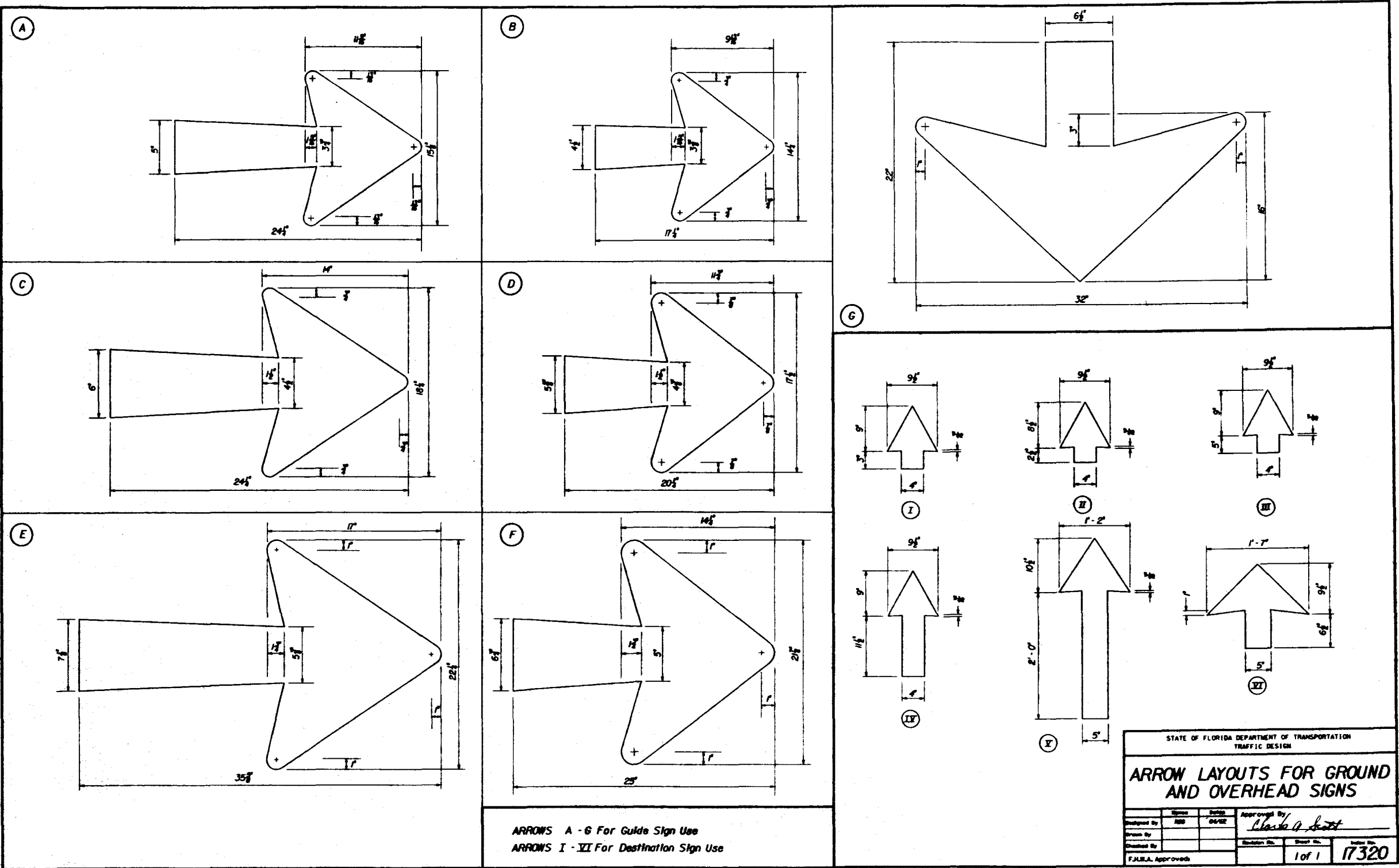
NOTE

Stop & yield If required for visibility stop & yield signs may be set 3' minimum from driving lane in business or residential sections with no curb and speed limit of 30 mph or less.

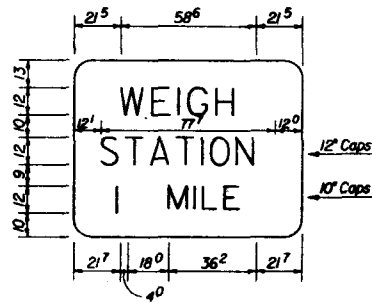
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

TYPICAL SECTIONS FOR ONE COLUMN SIGN PLACEMENT

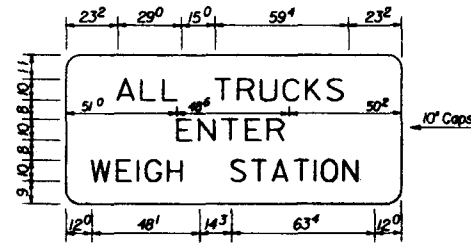
Designed By	Drawn By	Checked By	Approved By
G.M.	05-75		Clark H. Hest
Reviewed By	Reviewed By	Reviewed By	Reviewed By
F.L.R.A. Approved:		10/1	17302



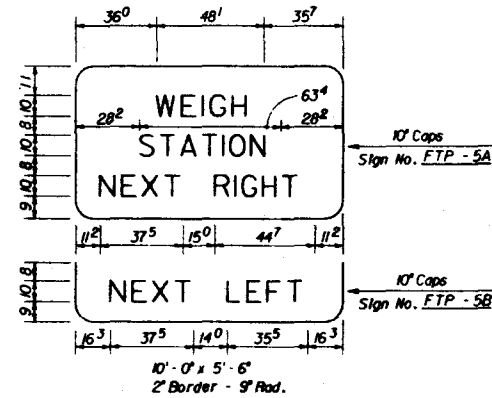
FOR FREEWAY USE



Sign No. FTP - 3
8'-6" x 6'-6"
2" Border - 9" Rad.

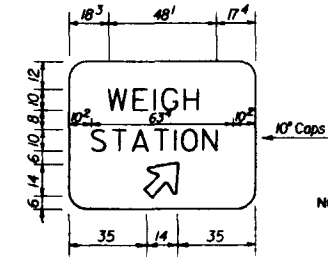


Sign No. FTP - 4
12'-6" x 5'-6"
2" Border - 9" Rad.



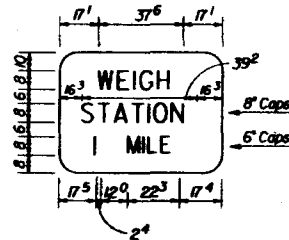
Sign No. FTP - 5A

Sign No. FTP - 5B

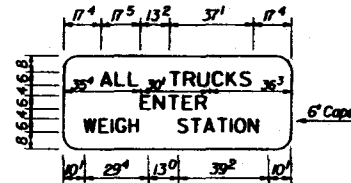


Sign No. FTP - 6
7'-0" x 5'-6"
2" Border - 6" Rad.

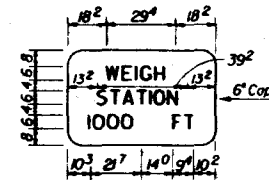
NOTE:
FTP - 6A — Right Arrow
FTP - 6B — Left Arrow



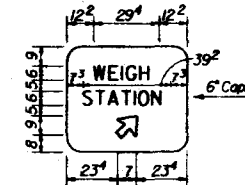
Sign No. FTP - 7
6'-0" x 4'-6"
2" Border - 6" Rad.



Sign No. FTP - 8
8'-6" x 3'-6"
2" Border - 6" Rad.



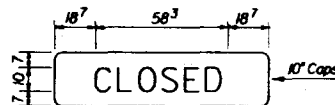
Sign No. FTP - 9
5'-6" x 3'-6"
2" Border - 6" Rad.



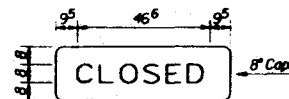
Sign No. FTP - 10
4'-6" x 4'-0"
2" Border - 6" Rad.

NOTE:
FTP - 10A — Right Arrow
FTP - 10B — Left Arrow

FOR OTHER THAN FREEWAY USE



Sign No. FTP - 11
8'-0" x 2'-0"
2" Bor. 3" Rad.



Sign No. FTP - 12
5'-6" x 2'-0"
2" Bor. 3" Rad.

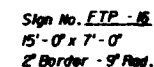
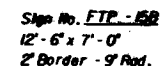
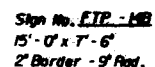
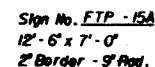
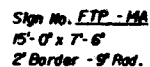
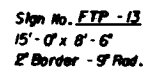
Note:
Sign No. FTP - 11 to be used with signs No. FTP - 5A & B, FTP - 15A & B.

Note:
Sign No. FTP - 12 to be used with sign No. FTP - 9.

NOTE:
All signs to have green reflectorized background with white legend and border, except signs Nos. FTP - 4 & FTP - 8, which shall have white background with black legend and border.

All dimensions shown are in inches and eighths.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS			
Designed By	Checked By	Approved By	17328
Drawn By	Reviewed By	Signature	
Checked By	Reviewed By	Signature	
F.H.R.A. Approved		01/75	1 of 3



NOTE :
FTP - ISA - Right Arrow
FTP - ISB - Left Arrow

NOTE

All signs shall have green reflectorized background with white legend and border, except signs FTP - 4A & B which shall have a white background with black legend and border.

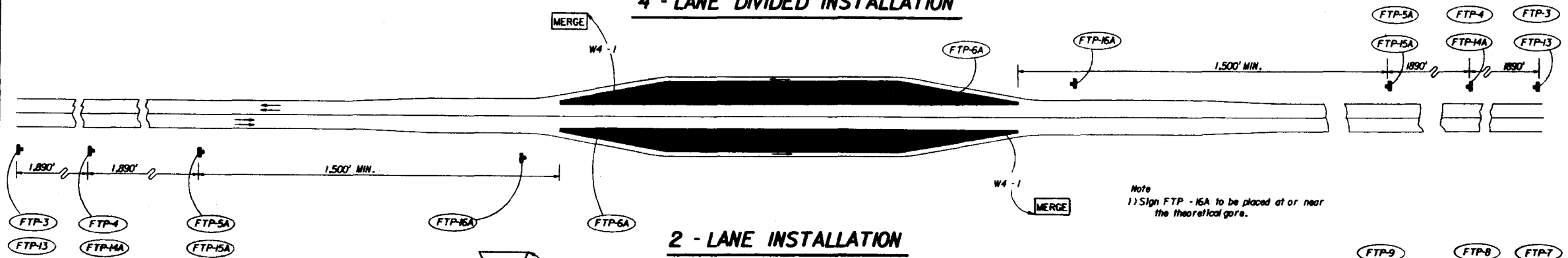
All dimensions shown are in inches and elatts

All guide sign corner radius shall have the outside corners of sign face cut concentric with border. Border to be mounted tangent to and with edge of sign.

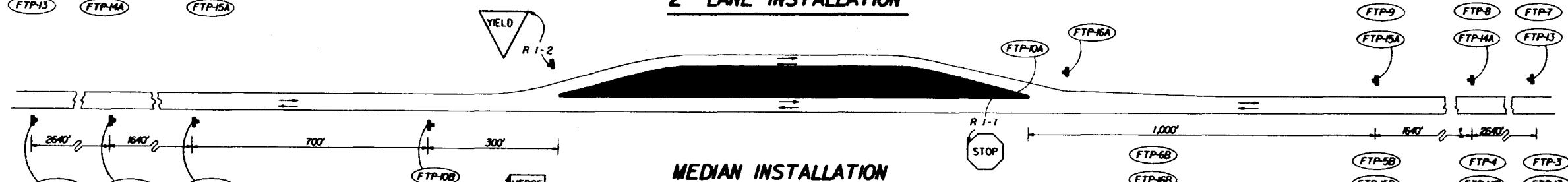
Interstate Station - Delete Pickups - Vans and reduce sign height accordingly.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS			
Designed By	Name	Salary	Approved By <i>Charles A. Tz</i>
Drawn By	G.E.	10/W	
Checked By	G.E.	10/W	
Reviewed By	F.R.	12/W	Revision No.
F.A.R.A. Approved		Sheet No.	Index No.
		88	2 of 3
			17328

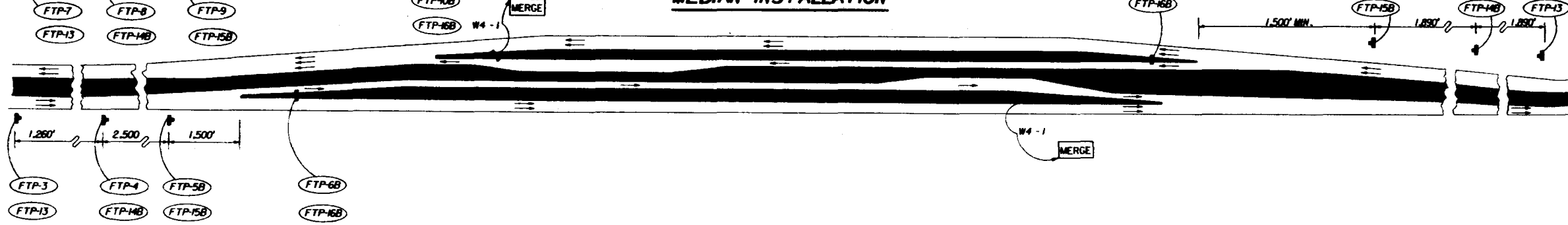
4 - LANE DIVIDED INSTALLATION



2 - LANE INSTALLATION



MEDIAN INSTALLATION

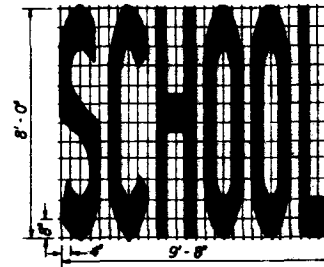
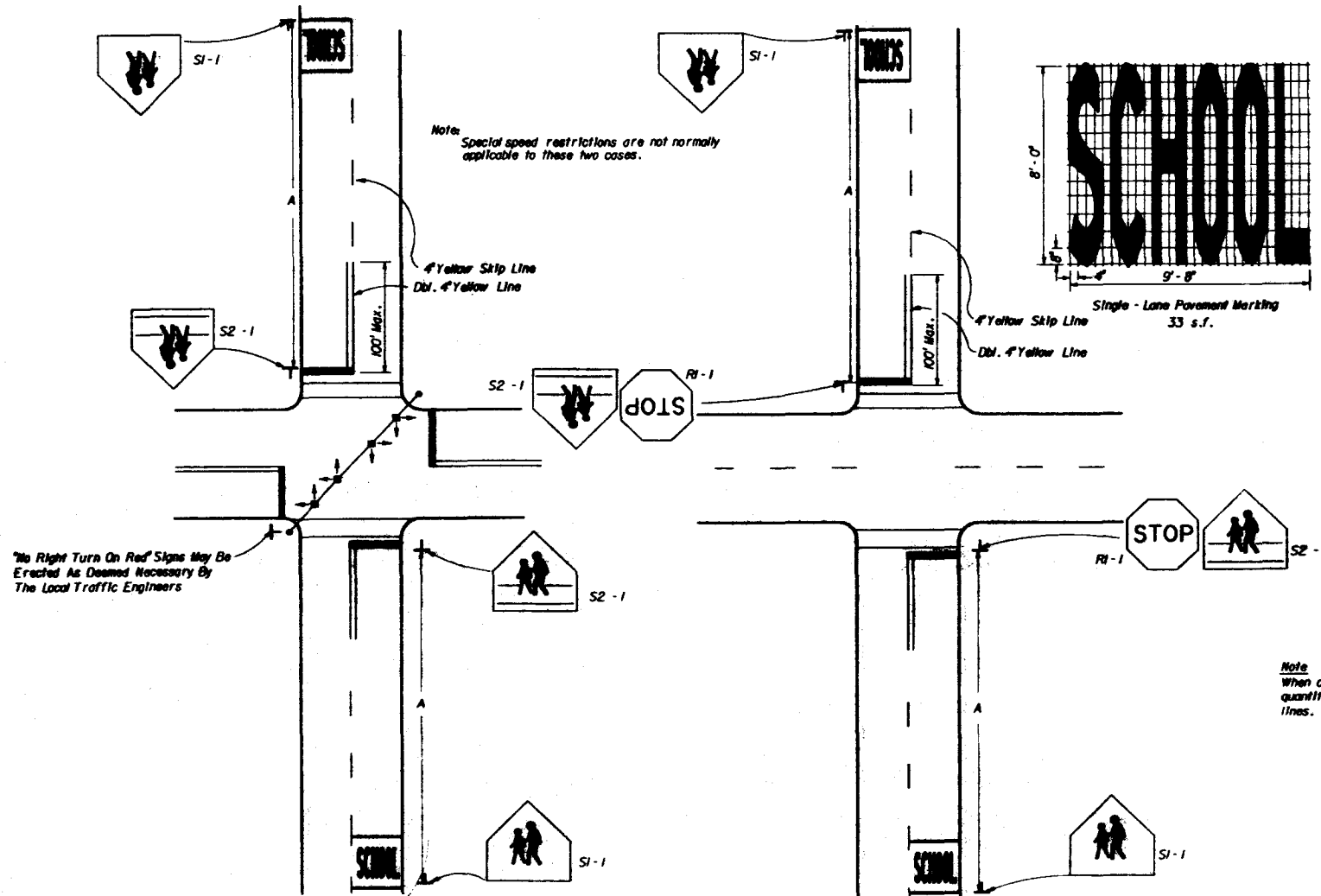


Note
1) Sign FTP-16A to be placed at or near the theoretical gore.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS			
Designed By R.F.B.	Date 01/75	Approved By <i>Charles A. Smith</i>	Signature Secretary, Traffic Engineering, Headquarters
Checked By R.F.B.	Date 01/75	Revision No.	Sheet No. 3 of 3
F.H.R.A. Approved		Index No. 17328	

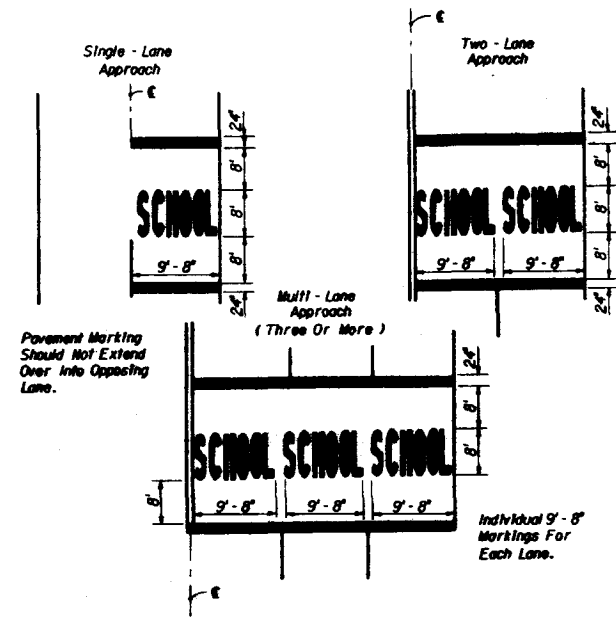
Approach Speed (MPH)	Distance A
25 To 35	275 Ft.
36 To 45	350 Ft.
46 To 55	500 Ft.

Note:
Special speed restrictions are not normally applicable to these two cases.



Note:
When computing pavement message quantities do not include transverse lines.

PAVEMENT MARKINGS



Note:
Signs erected at the side of the road in rural districts shall be mounted at a height of at least 5 feet, measured from the bottom of the sign to the level of the roadway edge. In business, commercial and residential districts where parking and / or pedestrian movement is likely to occur or where there are other obstructions to view, the clearance to the bottom of the sign shall be at least 7 feet.

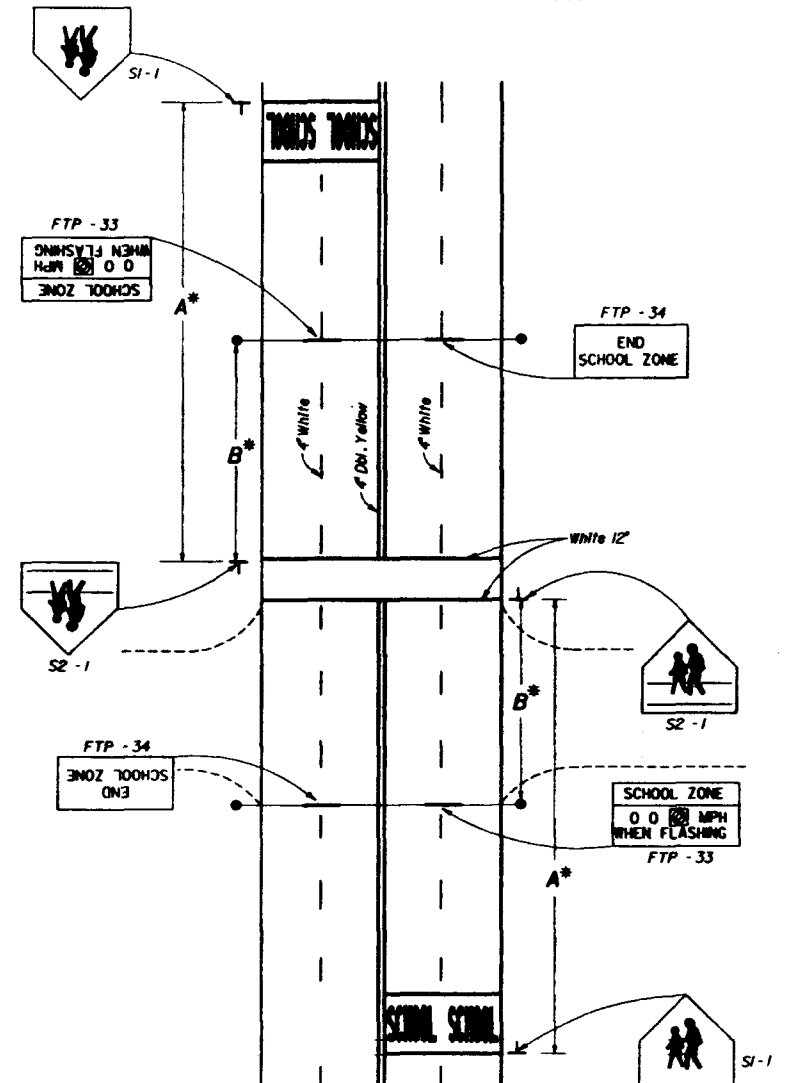
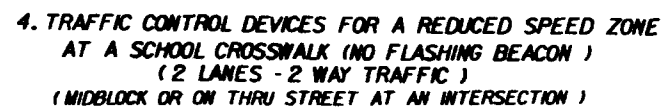
Note:
All school signs shall be reflectorized

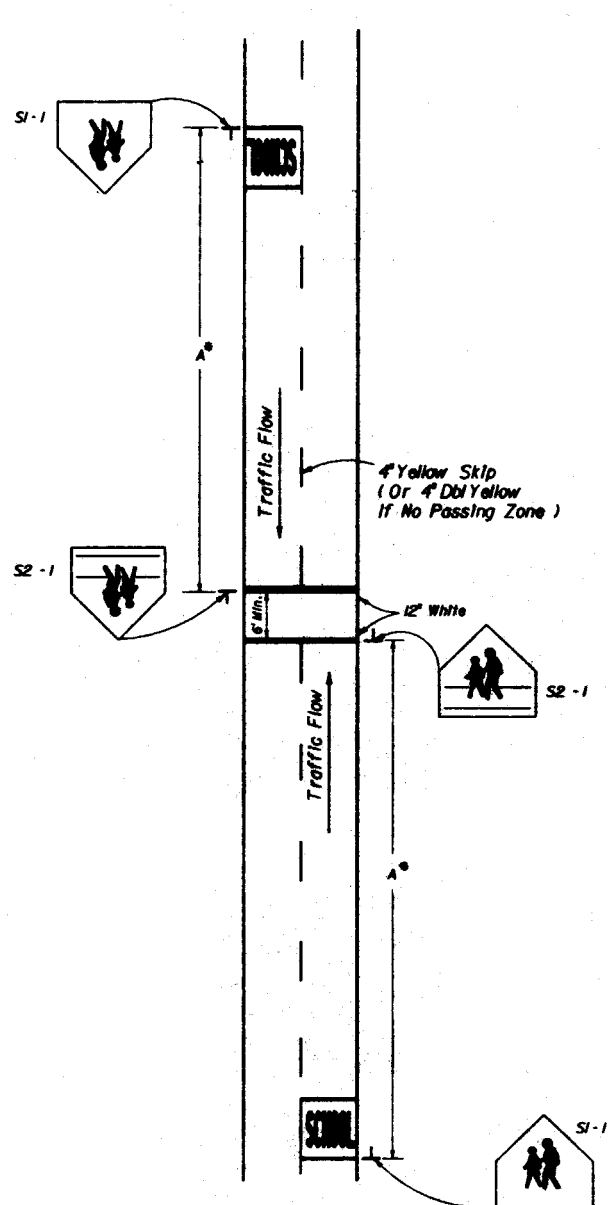
1. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A SIGNALIZED INTERSECTION

2. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A STOP CONTROLLED INTERSECTION

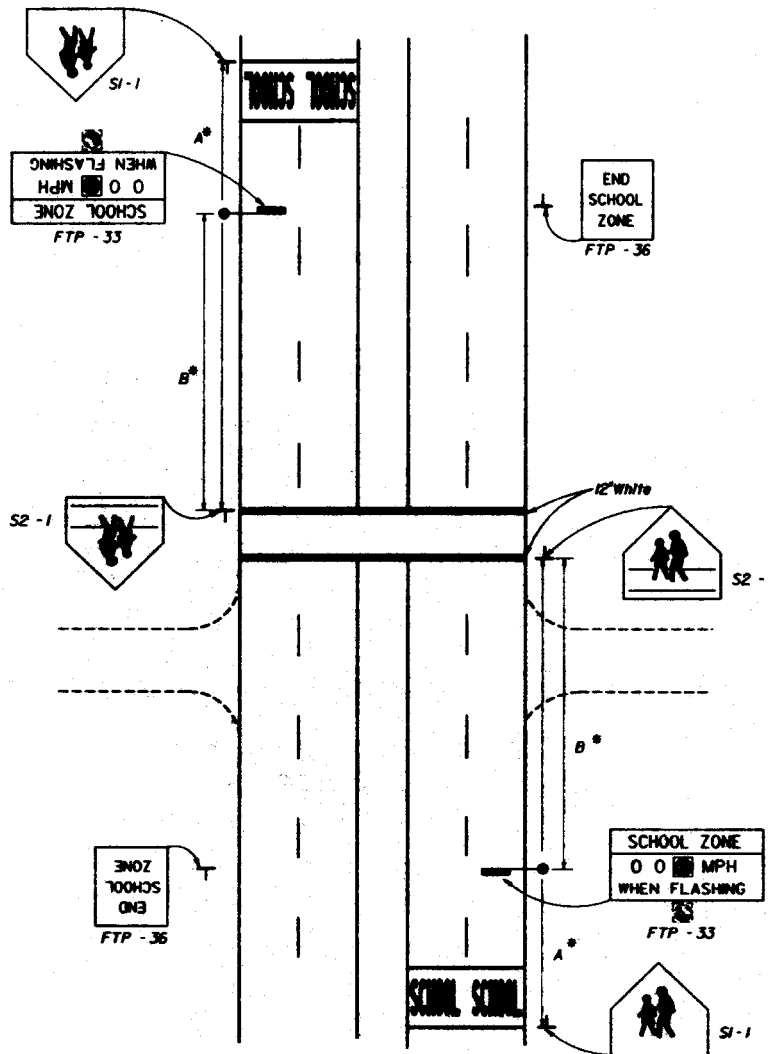
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
SCHOOL SIGNS & MARKINGS			
Designed By	Checked By	Approved By	
CEJ	CEJ	CEJ	
Drawn By	Checked By	Approved By	
RR	RR	RR	
F.A.R.A. Approved		Sheet No.	1 of 6
		Project No.	17344

A & B Distances shall be increased by adding the intersecting street width (curb returns included) to dimensions given in table above.





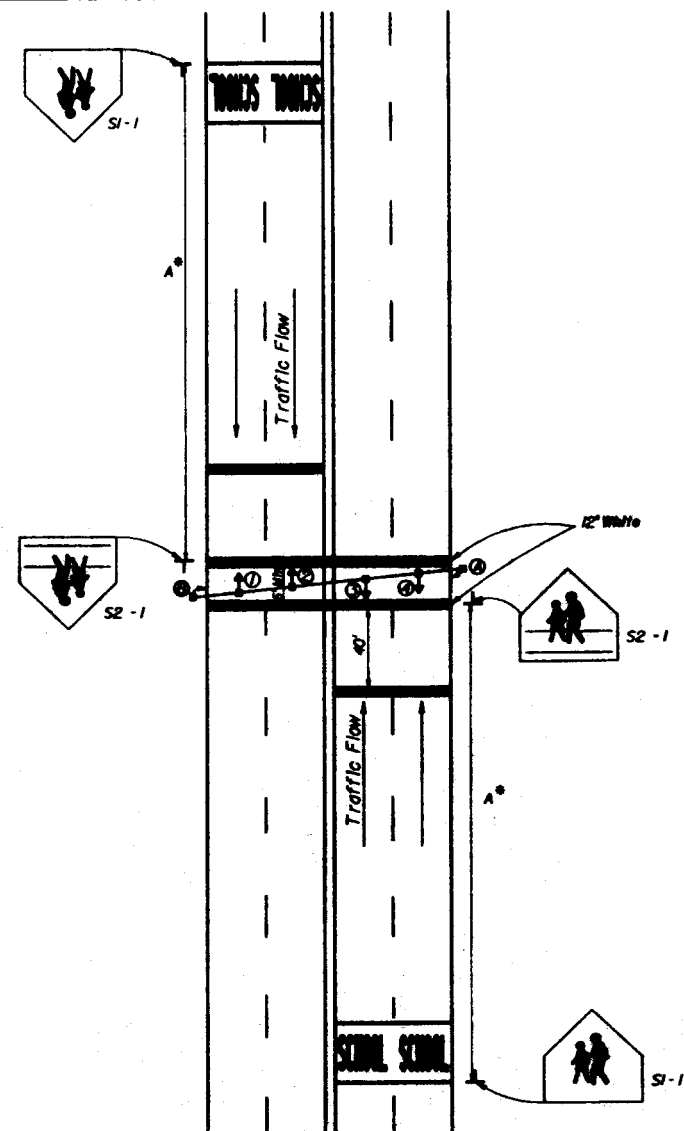
6. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK
WITHOUT A SPEED REDUCTION
(2 LANES - 2 WAY TRAFFIC)



7. TRAFFIC CONTROL DEVICES FOR A REDUCED SPEED ZONE AT A SCHOOL CROSSWALK
WITH OVERHEAD FLASHING BEACON SPEED LIMIT SIGNS
(4 LANES DIVIDED - 2 WAY TRAFFIC)

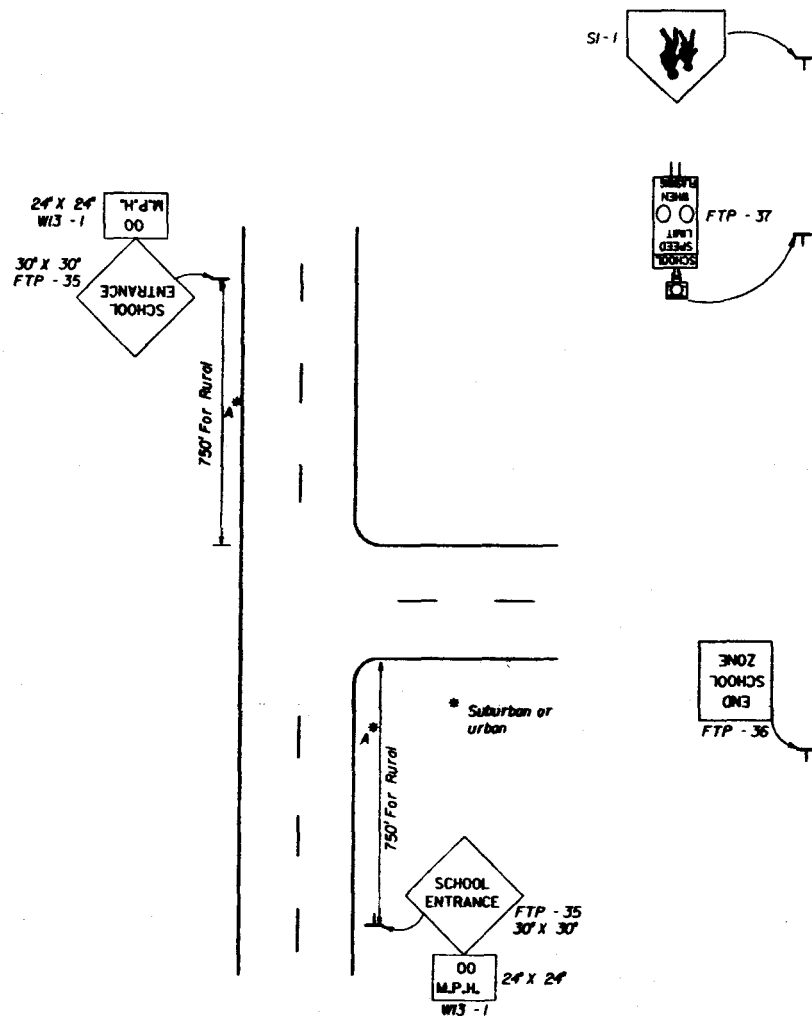
Approach Speed MPH	Suggested Distance In Feet	
	A	B
25 To 35	275	50
36 To 45	350	65
46 To 55	500	80

A* & B* Distances shall be increased by adding the
intersecting street width (curb returns included) to
dimensions given in table.



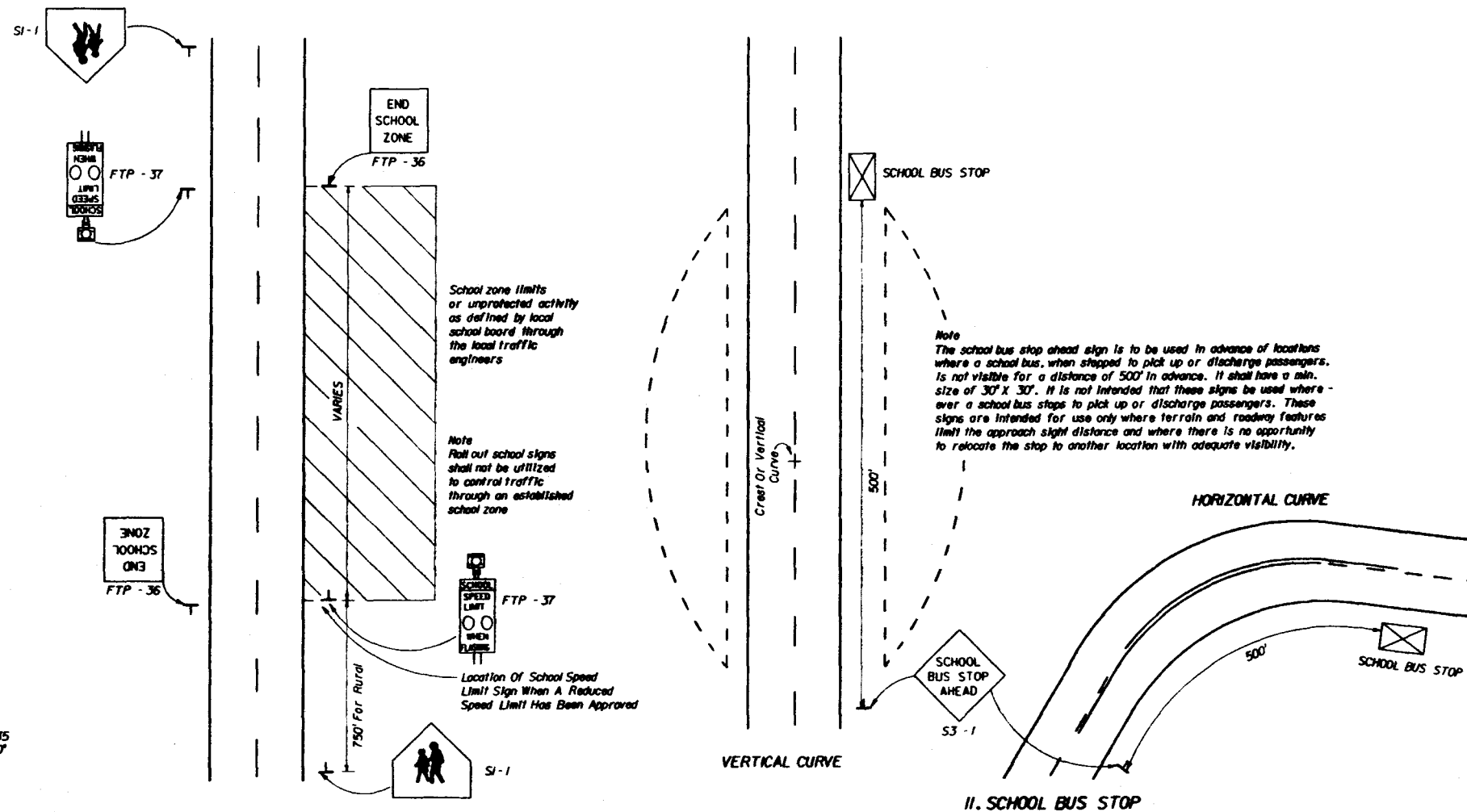
8. TRAFFIC CONTROL DEVICES FOR SIGNALIZED MIDBLOCK
SCHOOL CROSSWALK

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
SCHOOL SIGNS & MARKINGS					
Designed By	CEJ	08/76	Approved By	<i>Charles A. Smith</i>	
Drawn By			Checked By	08/76	
Reviewed By	08/76		Revised By	08/76	
F.H.A. Approved			3 of 6		17344



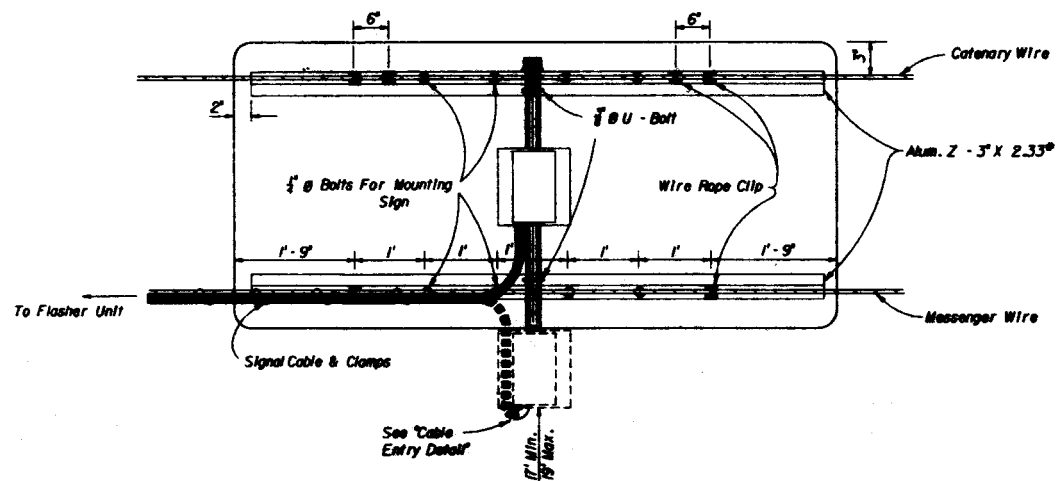
9. TRAFFIC CONTROL DEVICES AT SCHOOL ENTRANCES WHERE THERE ARE LITTLE OR NO WALKING STUDENTS

These signs are intended for use only at those few locations where the school entrance is not evident to the motorist, and must be approved in advance by the responsible traffic engineering authority.

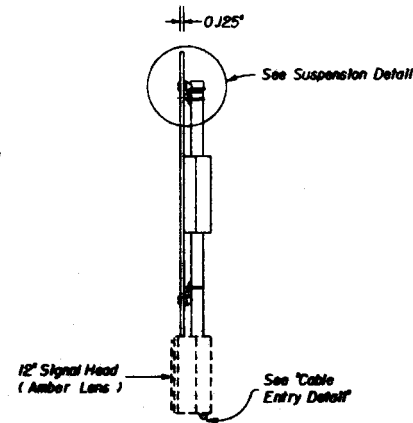


10. TRAFFIC CONTROL DEVICES FOR A TYPICAL SCHOOL ZONE FRONTING THE SCHOOL PROPERTY

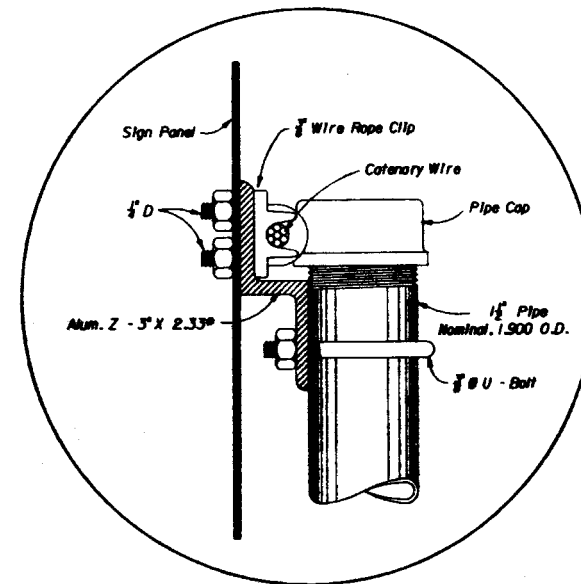
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
SCHOOL SIGNS & MARKINGS					
Designed By	CEJ	Date	07/76	Approved By	Clark A. Scott
Drawn By				Revision No.	Sheet No.
Checked By	KR	Date	07/76	Revision No.	Sheet No.
F.J.M.A. Approved				4 of 6	17344



REAR VIEW

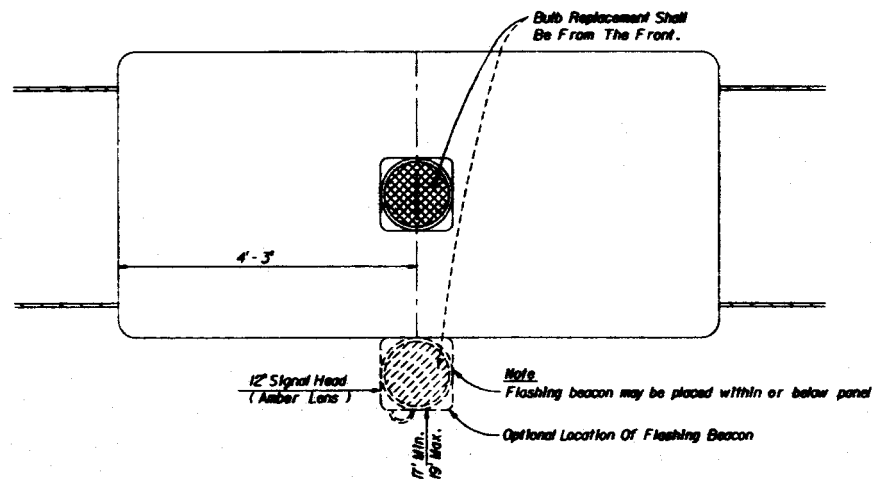


SIDE VIEW

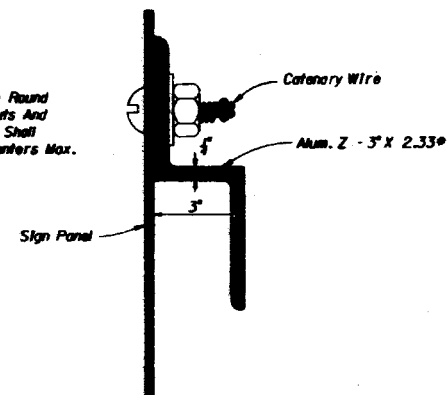


SUSPENSION DETAIL

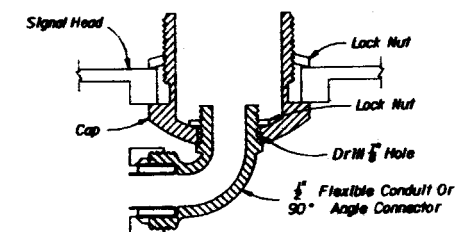
Flasher unit and cabinet to be placed on the strain pole supporting overhead sign assembly or on service pole. The flasher unit not to overhang private property or sidewalk.



FRONT VIEW



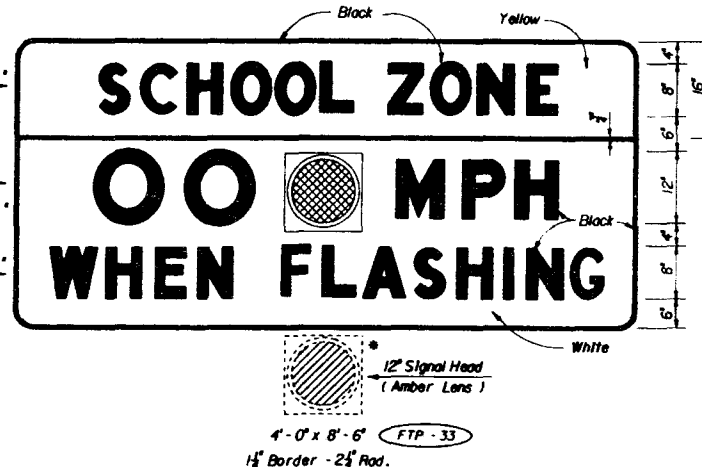
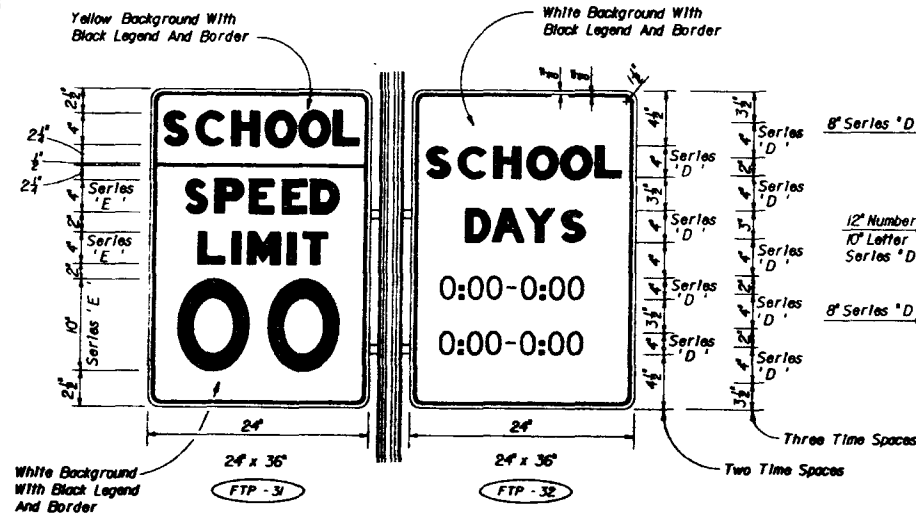
Z SECTION DETAIL



CABLE ENTRY DETAIL

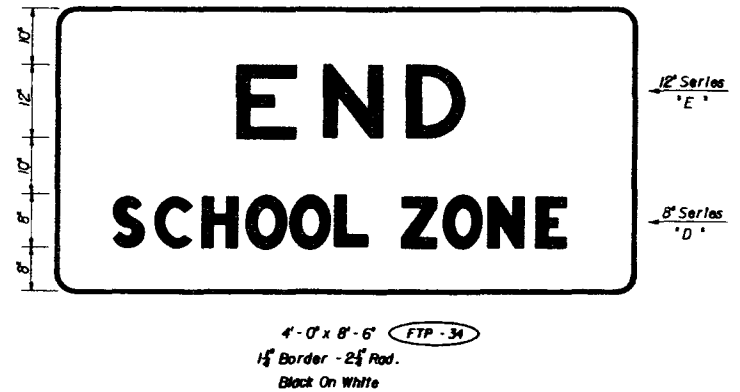
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
SCHOOL SIGNS & MARKINGS					
Designed By	Checked	Drawn	Approved By <i>Charles G. Scott</i>		
Drawn By	CEJ	07/76	Revision No.	Sheet No.	Index No.
Checked By	HR	07/76			
F.A.S.A. Approved				5 of 6	17344

SPEED LIMIT ASSEMBLY



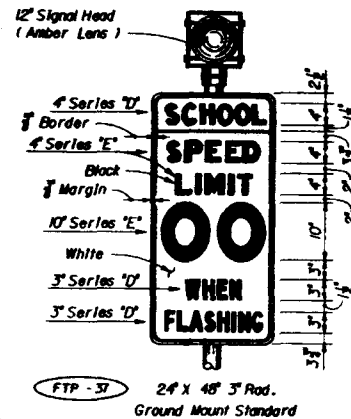
OVERHEAD STANDARD

* Flashing Beacon May Be Placed Within Or Below Panel



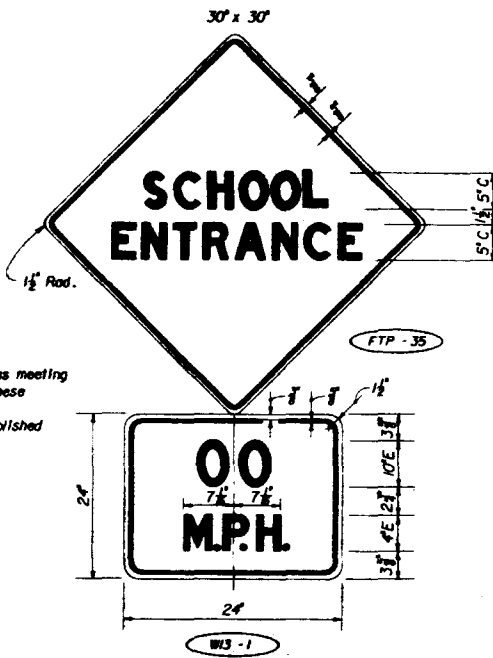
Notes:

1. All signs shall be reflectorized.
2. Standard size signs should be used whenever possible. Minimum sizes may be used only on low volume, low speed (less than 35 m.p.h.) streets. Special sizes should be used on expressway facilities where special emphasis is needed.
3. The value of the actual school zone speed limit shall be determined by the district traffic operations engineer in cooperation with local school superintendents. In no case shall it be less than the 15 m.p.h. min. set by law.

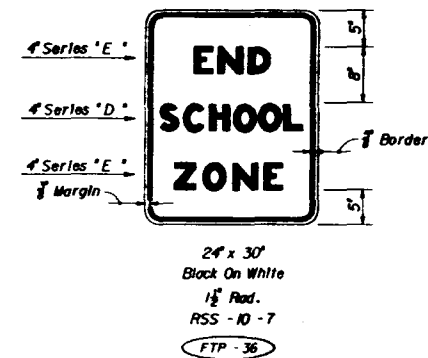


Note:

Existing school speed limit signs (ground mount) utilizing a single 8" min. size beacon or two 6" min. size beacons inside the sign border are considered as meeting the standard. However replacement or upgrading of these school speed limit signs shall conform to the above standard. Numerical speed limit displayed shall be established by appropriate regulatory authorities.



Color - Black on Refl. Yellow Background

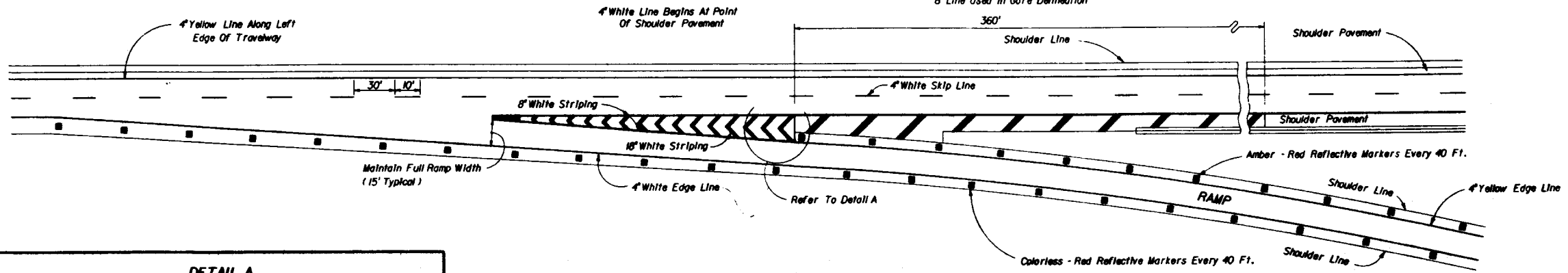


Note

All Signs Shall Be Reflectorized

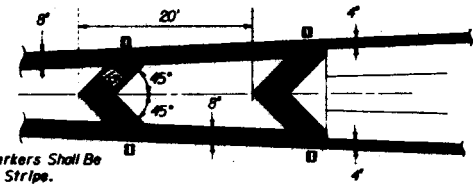
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
SCHOOL SIGNS & MARKINGS			
Designed By	Checked By	Approved By	Signature
CEJ	07/76	Charles G. Scott	
Drawn By	07/76	Revision No.	Sheet No.
KR	07/76	6 of 6	17344
F.J.W.A. Approved			

Markings For Left Off - Ramps
 The Left Edge Line (Yellow) Will Be Continuous From The Main Line Down The Ramp To Cross Road
 The Main Line Left Edge Line (Yellow) Will Start Again At The Physical Gore Which Is The End Of 8' Line Used In Gore Delineation



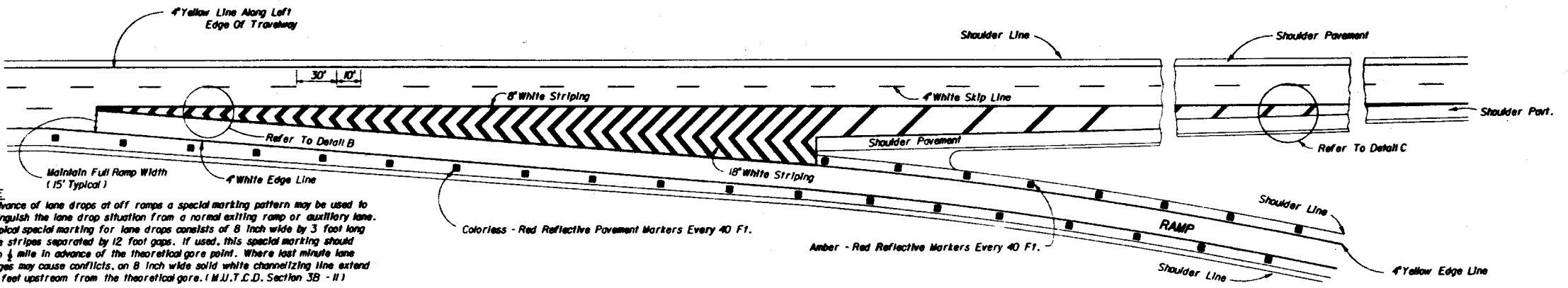
DETAIL A

Colorless - Red Reflective Pavement Markers To Be Placed On Every Stripe Beginning At Nose



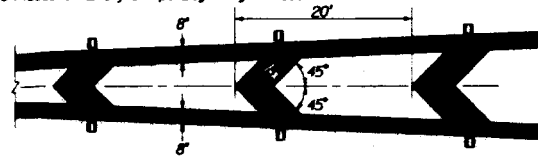
Note:
 Reflective pavement markers are installed adjacent to the thermoplastic edgeline.

**NORMAL TAPERED EXIT
 (TWO THRU LANES)**



DETAIL B

Colorless - Red Reflective Pavement Markers To Be Placed On Every Stripe Beginning At Nose

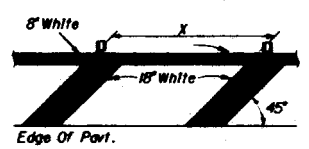


Reflective Pavement Markers Shall Be Placed Outside Of The Stripe.

DETAIL C

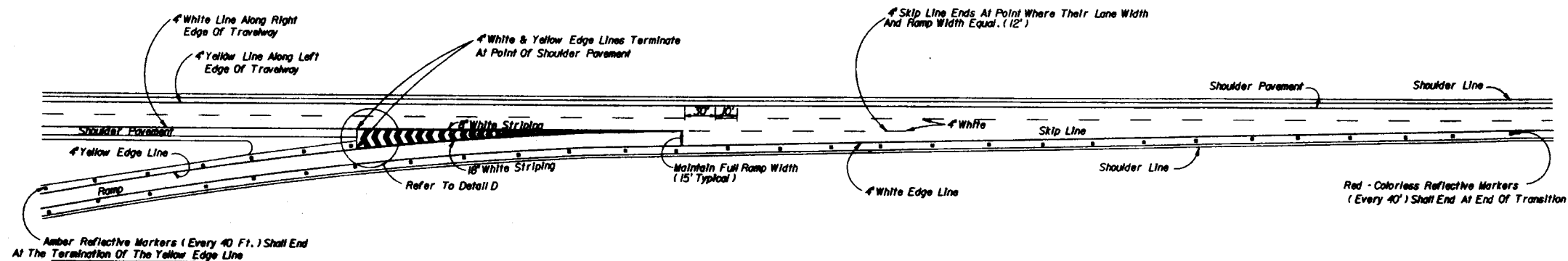
5'	30'	35'	40'	45'	50'	55'
X'	20'	20'	40'	40'	60'	60'

Passenger Car, Daytime, Posted Speeds Or 85th Percentile (Use Higher Value)

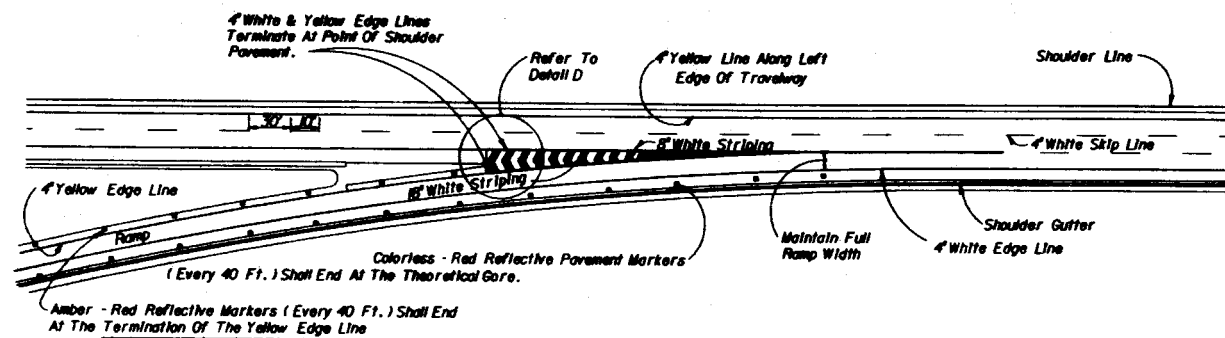


**NORMAL TAPERED EXIT ONLY
 (TWO THRU LANES - THREE APPROACH LANES)**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
INTERCHANGE MARKINGS					
Designed By	PD	78	Approved By	Charles G. Scott	
Drawn By	PD	78	Revision No.	Sheet No.	Index No.
Checked By	AR	78	88	1 of 4	17345
F.H.W.A. Approved					

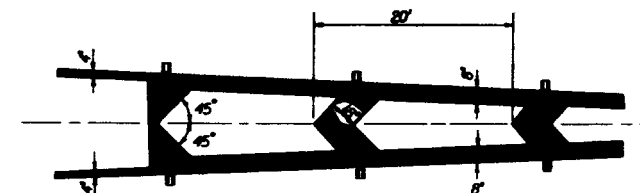


NORMAL TAPERED ENTRANCE



**NORMAL TAPERED ENTRANCE
WITH ADDED LANE**

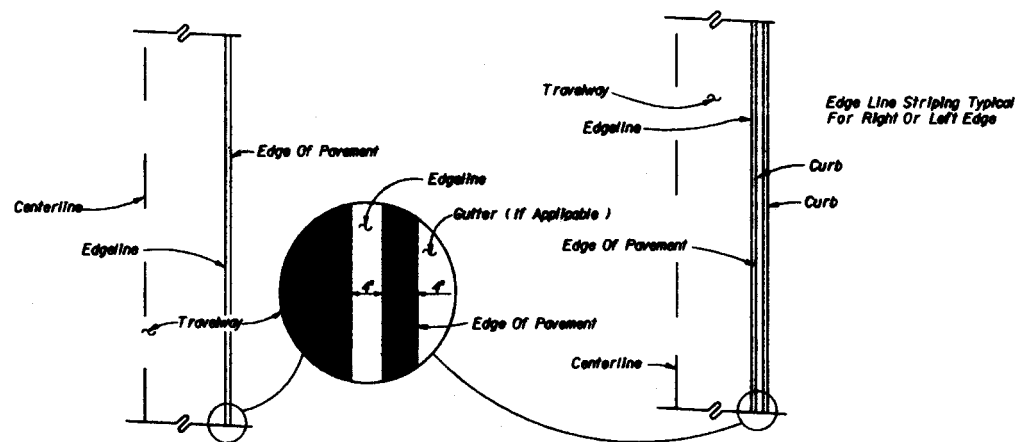
DETAIL D



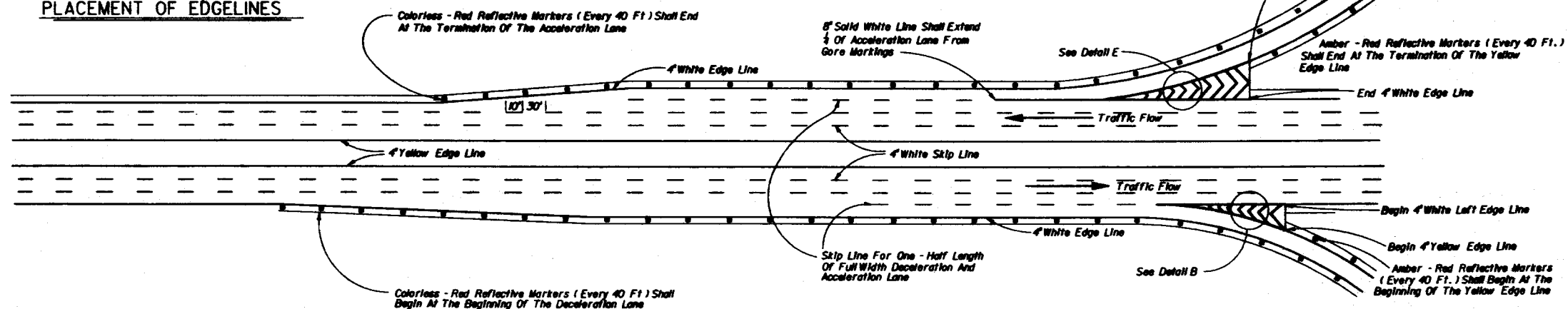
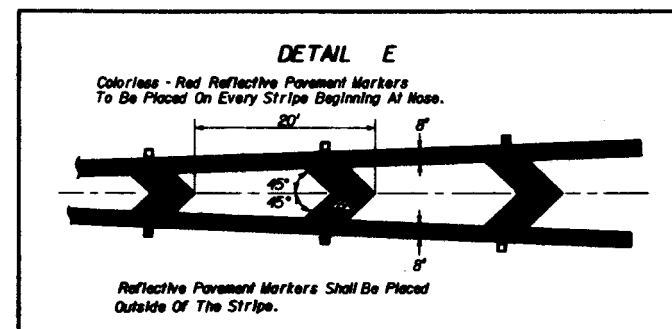
Colorless - Red Reflective Pavement Markers To Be Placed On Every Stripe Beginning At Nose.

Reflective Pavement Markers Shall Be Placed Outside Of The Stripe.

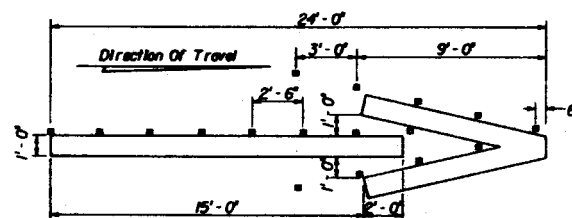
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
INTERCHANGE MARKINGS			
Designed By	EC	Checked By	EC
Drawn By	EC	Reviewed By	EC
Checked By	JR	Project No.	88
F.A.R.A. Approved		Sheet No.	2 of 4
		Index No.	17345



PLACEMENT OF EDGELINES



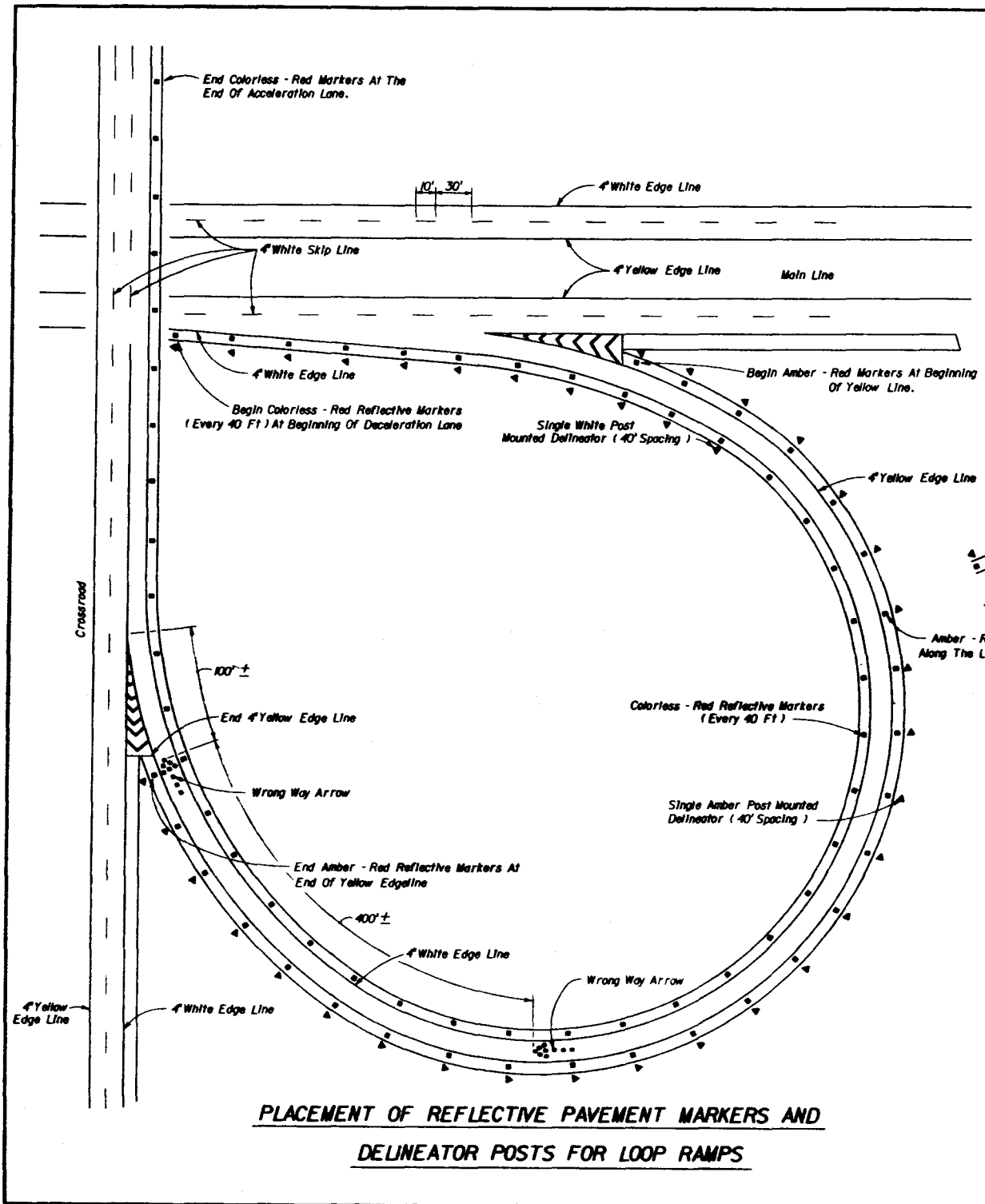
PARALLEL ACCELERATION AND DECELERATION LANE



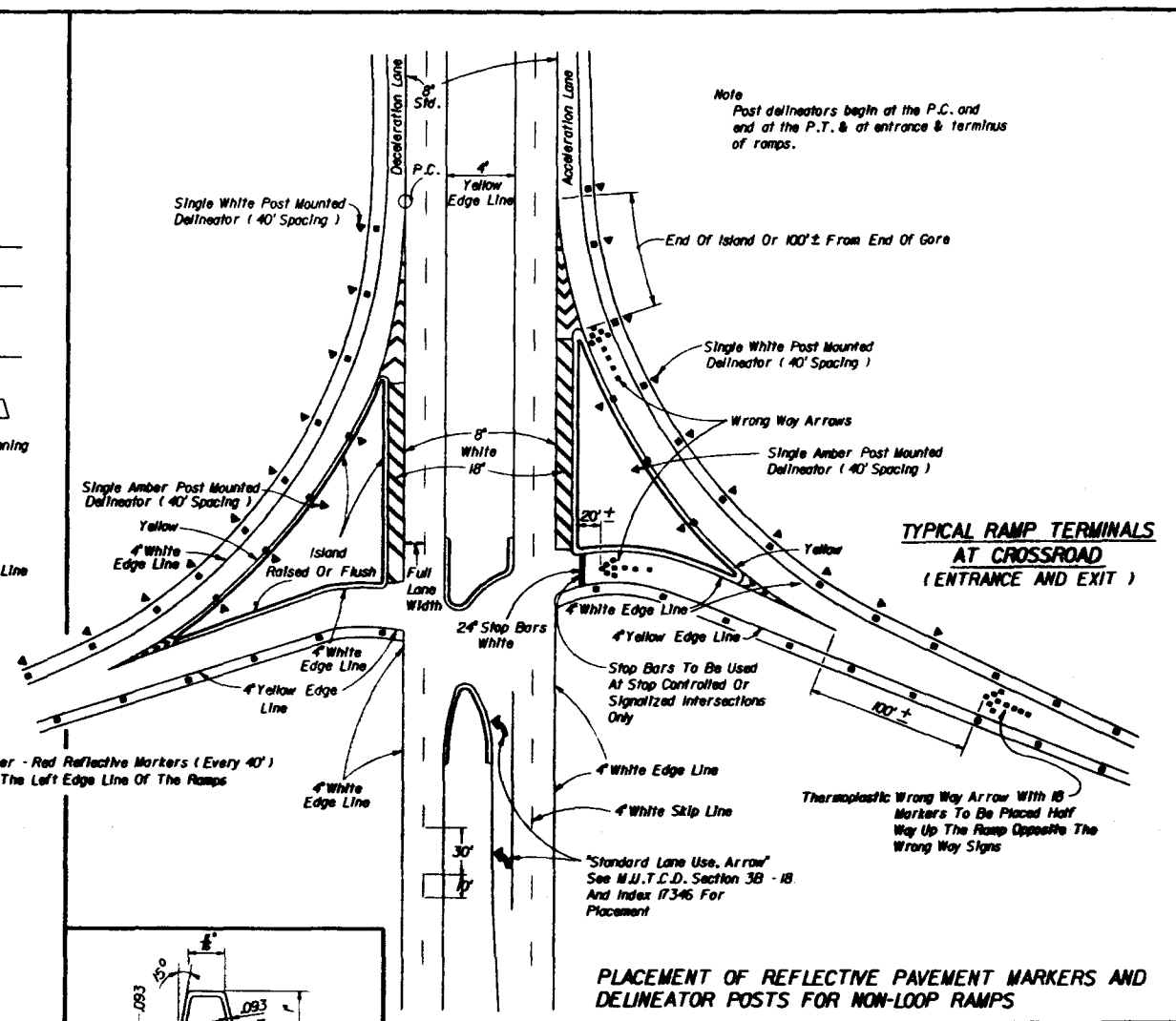
White Arrow With Colorless - Red Reflective Markers To Be Used Only In Areas With Low Traffic Volumes.

WRONG WAY ARROW

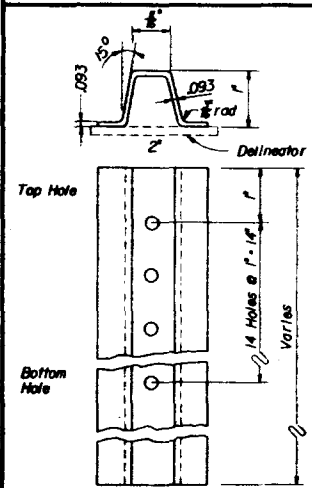
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
INTERCHANGE MARKINGS			
Designed By	W.F.A.	73	Approved By <i>Charles A. Scott</i>
Drawn By	W.F.A.	73	
Checked By	A.R.	73	
F.A.R.A. Approved			Sheet No. 88
			Sheet No. 3 of 4
			Project No. 17345



**PLACEMENT OF REFLECTIVE PAVEMENT MARKERS AND
DELINEATOR POSTS FOR LOOP RAMPs**



**PLACEMENT OF REFLECTIVE PAVEMENT MARKERS AND
DELINEATOR POSTS FOR NON-LOOP RAMPs**



DELINEATOR SUPPORTS

GENERAL NOTES

Material stresses: All allowable stresses are in accordance with standard specifications for structural supports for highway signs, luminaires and traffic signals, A.A.S.H.O. 1975.

Steel: Structural, Intermediate or hard grade, galvanized.
approx. weight per foot - 1.0 LB

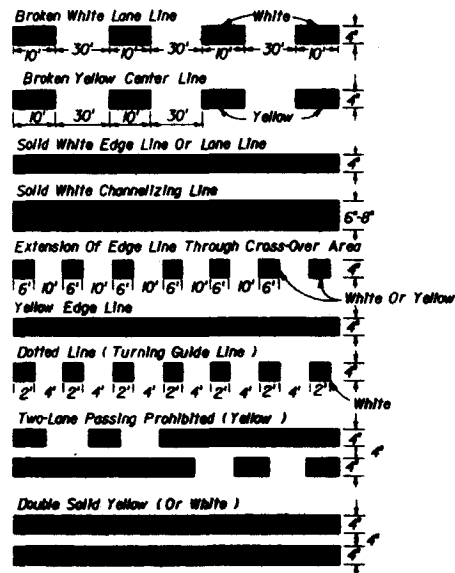
Aluminum: Alloy 6061-T6

Holes: Holes for 1/2 inch diameter bolts on one inch centers.

Tolerances: Thickness, $\pm 5\%$, dimensions $\pm 1/16$

Length: It shall be the contractor's responsibility to determine the length of the delineator supports in the field prior to fabrication.

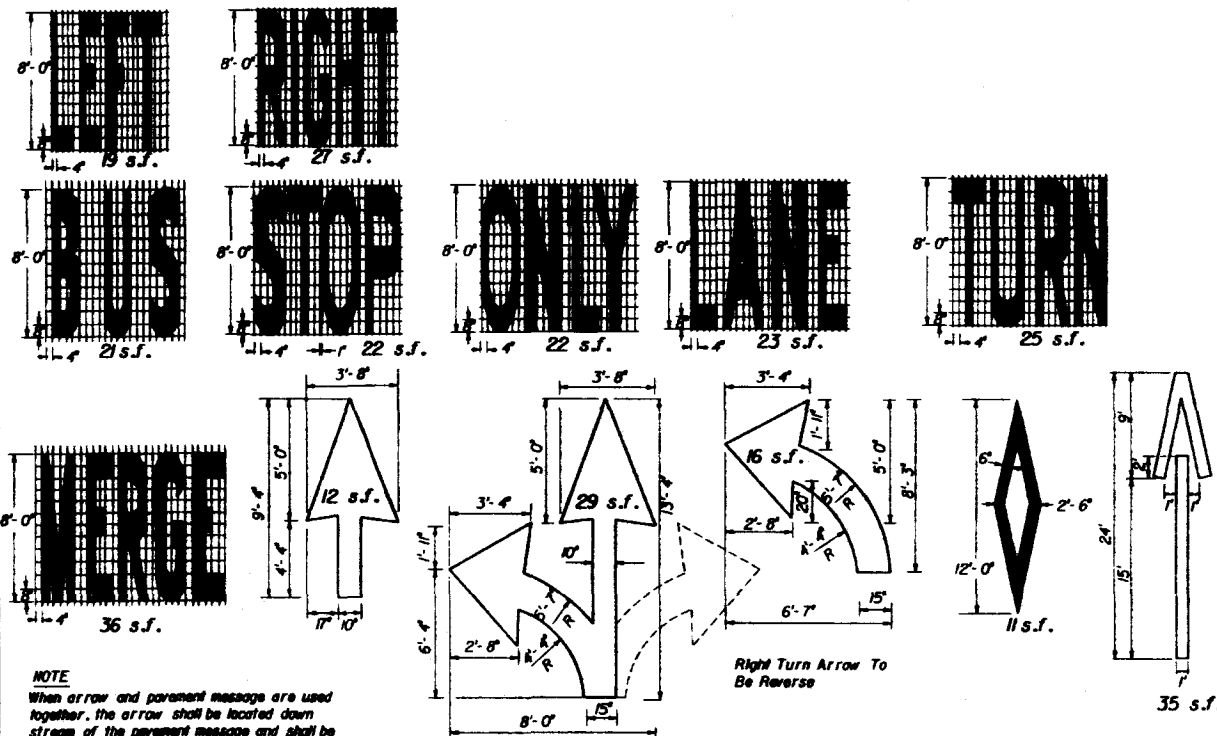
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
INTERCHANGE MARKINGS			
Designed By	WFB	Checked By	08/73
Drawn By		Reviewed By	Charles A. Smith
Quantity	100	Sheet No.	4 of 4
F.A.M.A. Approved		17345	



NOTE
For details on temporary lines see Manual on Traffic Controls and Safe Practices, figure 2.19

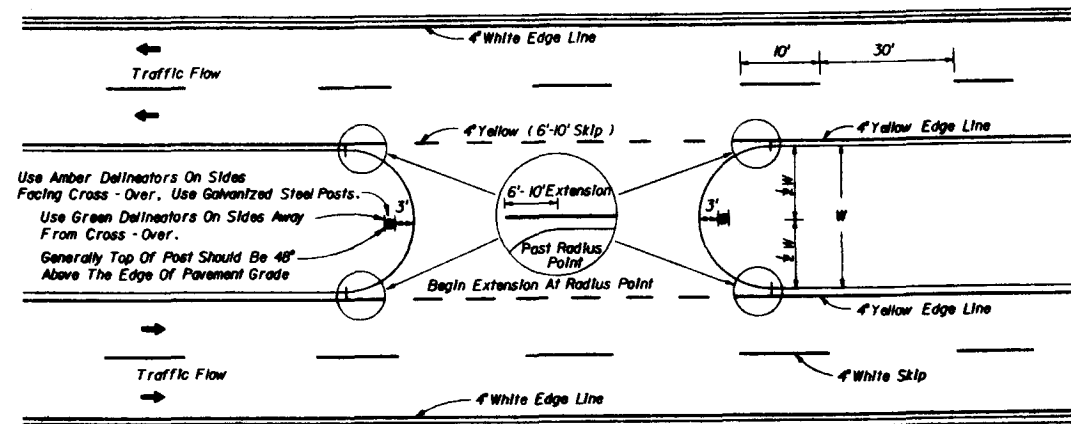
BASIC COLOR RULE
White lines separate flows in the same direction
Yellow lines separate flows in the opposite direction
Yellow dotted lines shall be permitted in special cases

TYPES OF PERMANENT LONGITUDINAL LINES

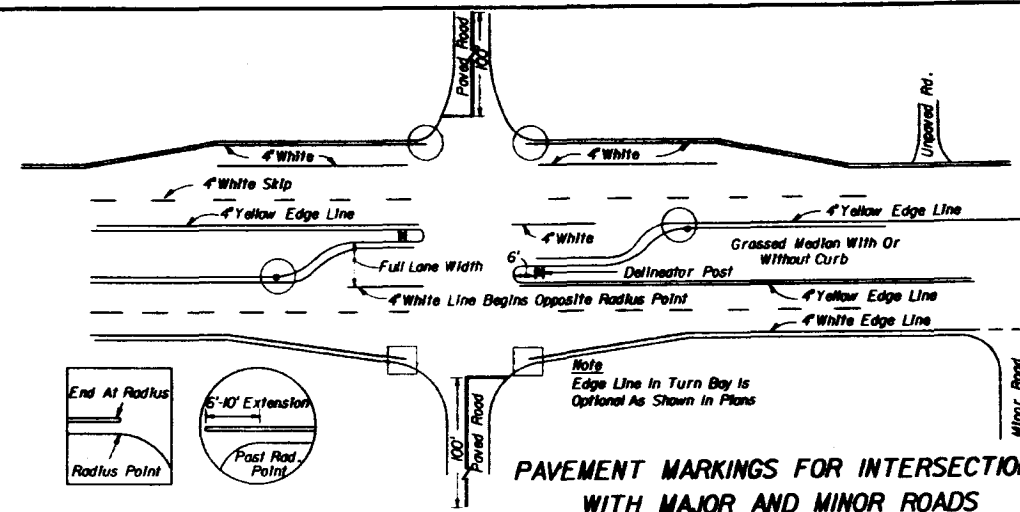


NOTE
When arrow and pavement message are used together, the arrow shall be located down stream of the pavement message and shall be separated from the pavement message by a distance of 25' (Base of the arrow to the base of the message).

PAVEMENT ARROW AND MESSAGE DETAILS

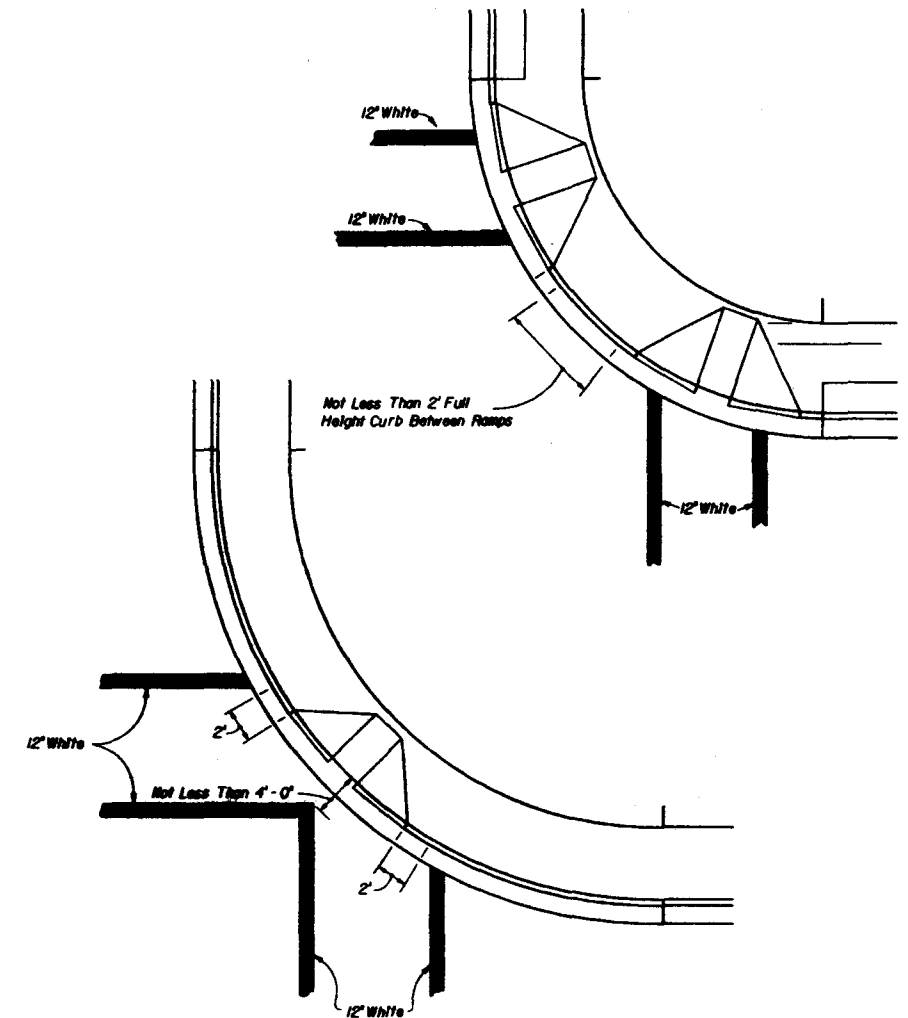
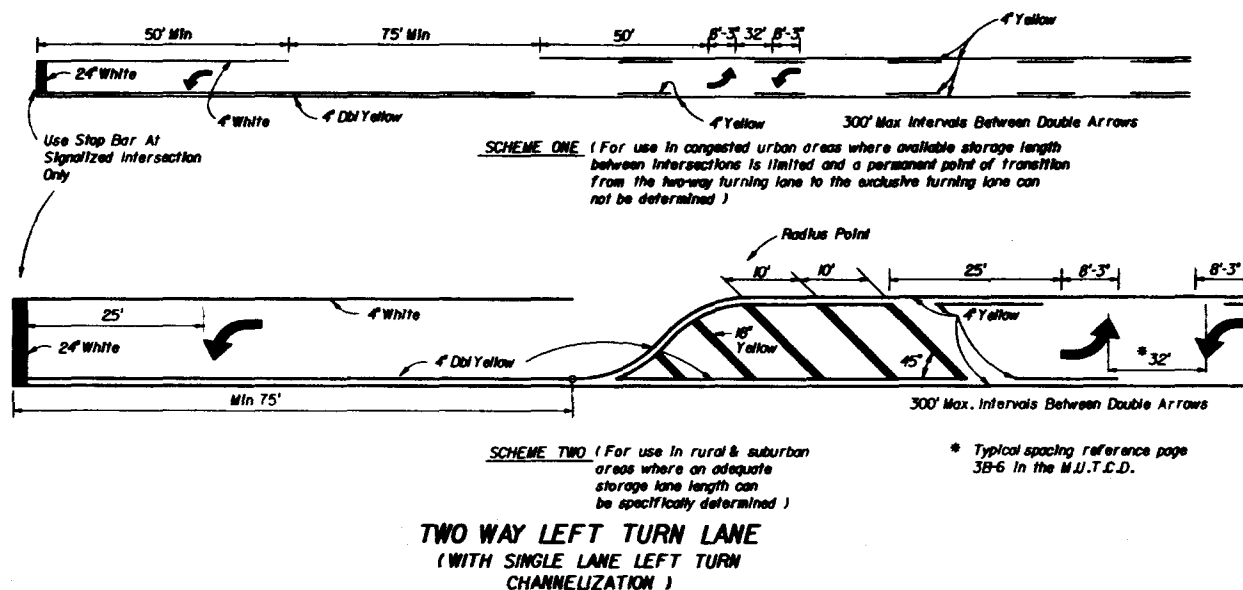
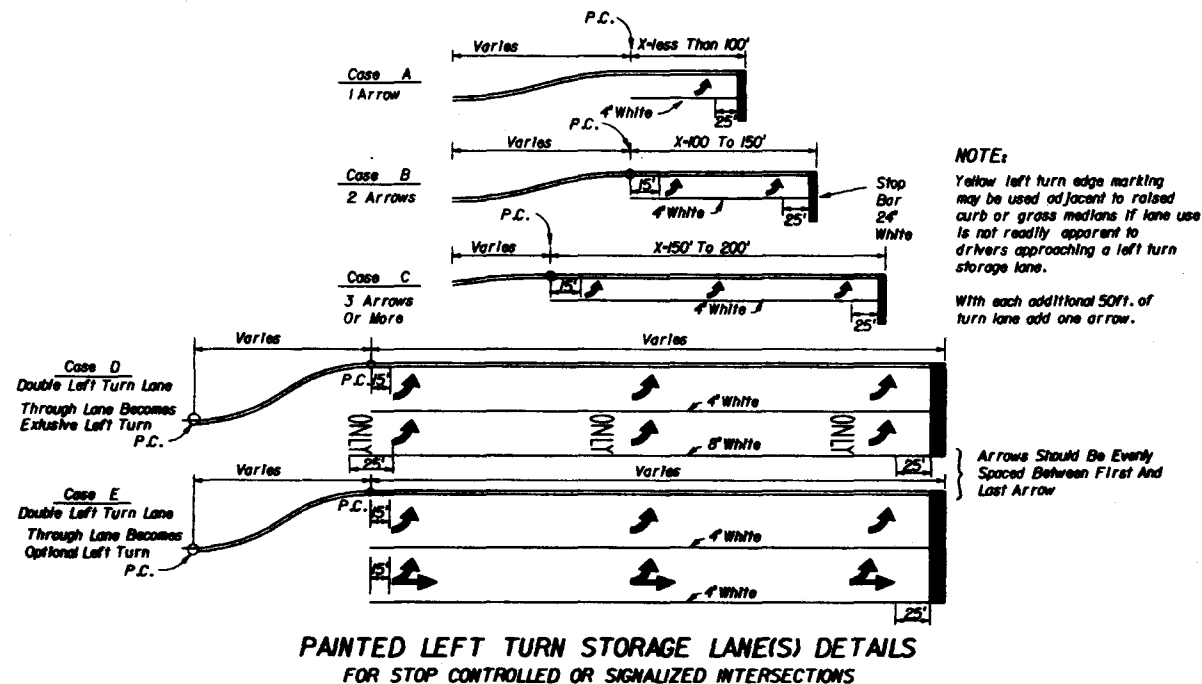


PAVEMENT MARKINGS AND DELINEATORS FOR MEDIAN CROSS-OVER



PAVEMENT MARKINGS FOR INTERSECTIONS WITH MAJOR AND MINOR ROADS

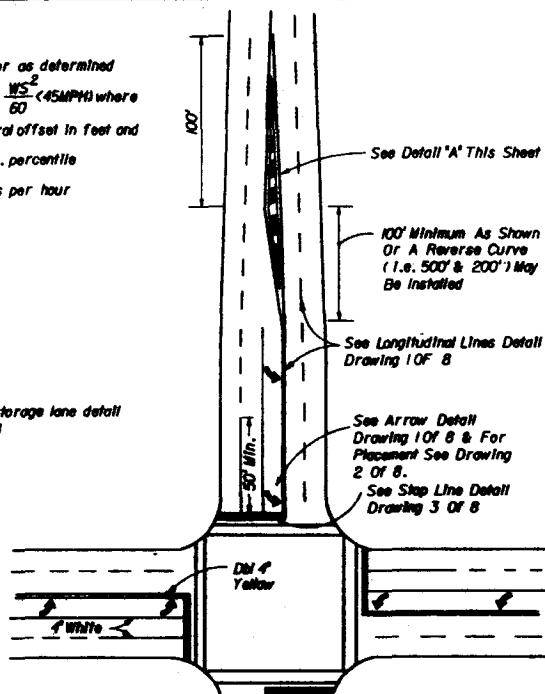
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
SPECIAL MARKING AREAS			
Designed By	Reviewed By	Approved By	
Drawn By	Checked By	Signature	
Revised By	Revised By	Revised By	
F.J.R.A. Approved			1 of 8 17346



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
SPECIAL MARKING AREAS					
Designed By	TL	76	Approved By	Clark G. Smith	
Drawn By	TL	76	Revision No.	Sheet No.	Index No.
Checked By	RT	76	88	2 of 8	17346
F.A.S.A. Approved					

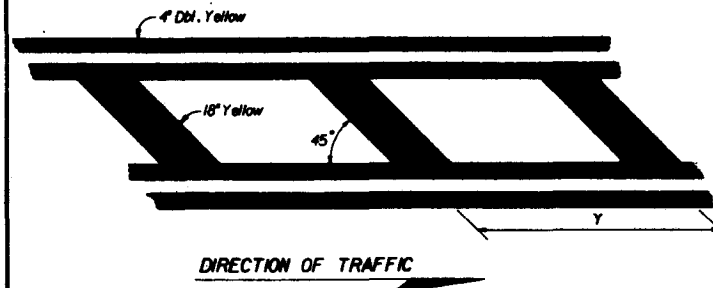
100' Minimum or as determined by $L = WS \left(L = \frac{WS^2}{60} < 45 \text{ MPH} \right)$ where W is the lateral offset in feet and S is the 85th percentile speed in miles per hour (speed limit)

For left turn storage lane detail drawing 2 of 8



TYPICAL INTERSECTION 2 THRU LANES PLUS LEFT TURN LANE WITH CROSSWALK

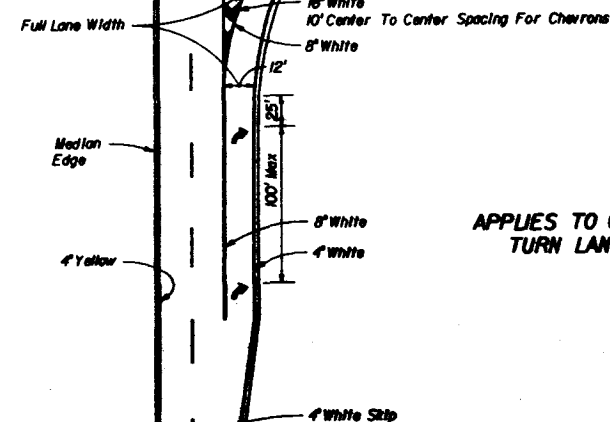
DIRECTION OF TRAFFIC



POSTED (DAY) SPEED LIMIT M.P.H.	"Y" F.T.
30 or LESS	10
35	20
40	20
45	30
50 or MORE	40

DETAIL "A"

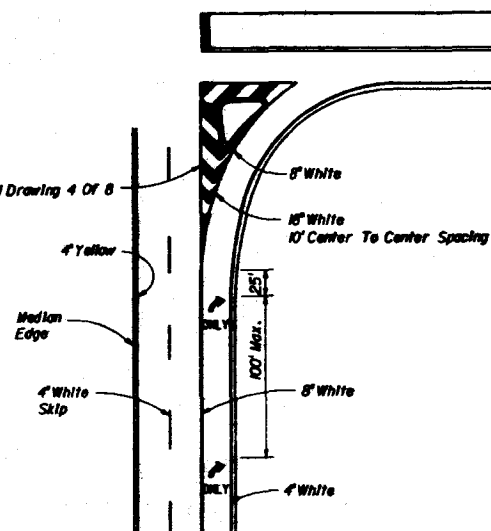
See Detail Drawing 4 Of 8



APPLIES TO ONEWAY LEFT TURN LANE ALSO

RIGHT TURN LANE AND ISLAND DETAILS

See Detail Drawing 4 Of 8



APPLIES TO ONEWAY LEFT TURN LANE DROPS ALSO

RIGHT TURN LANE DROP AND ISLAND DETAILS

24' White Stop Line

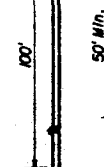
Width Of Crosswalk To Equal Width Of The Adjacent Sidewalk, But Not Less Than 6'

When practical crosswalk location shall avoid conflict with drainage inlets

Varies

12' Recommended (White)

24' White Stop Line



When Specified, "Stop" Message Shall Be Placed 25' Back Of Stop Lines.

P.C.

NOTES:

- When physically handicapped ramps are present, refer to sheet 2 of 8 & 7 of 8 Index 17346 and roadway design Index 304 sheet 1 of 2 for crosswalk widths
- Double yellow longitudinal center lines on all roadway approaches shall be extended back 100' for projects involving intersection improvements only

STOP BARS, CROSSWALKS AND DOUBLE CENTER LINES DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

SPECIAL MARKING AREAS

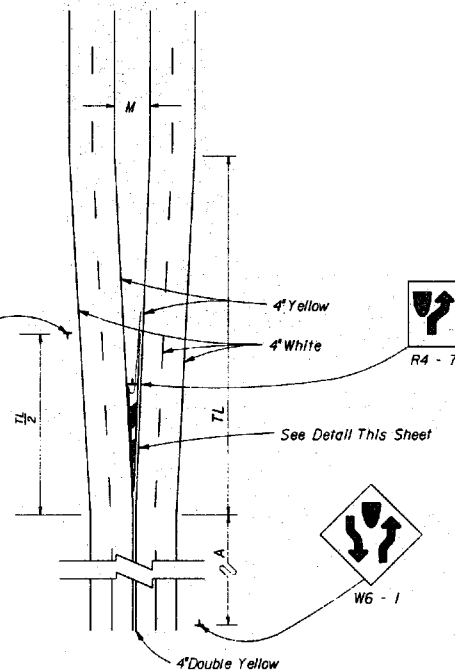
Designed By	TL	70	Approved By	Chuck A. Smith
Drawn By	TL	70	Station No.	
Checked By	TL	70	Sheet No.	3 of 8
FAIRL, Approved			17346	

TAPER LENGTH EQUATION
 $TL = \frac{M}{S} \times 5$
 $TL = \frac{M}{S} \times \frac{5^2}{60} < 45 \text{ M.P.H.}$
 TL-TAPER LENGTH (ft)
 M-MEDIAN WIDTH (ft)
 S-SPEED (m.p.h.)



W6 - 2

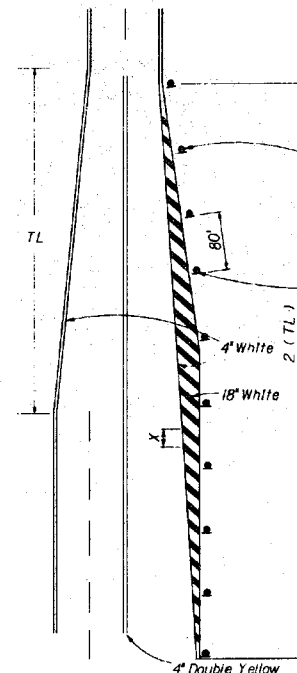
SPEED m.p.h.	A In ft.
55	400
50	350
40	275
30	200
URBAN	50 MIN.



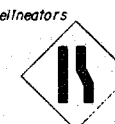
BEGINNING OF A DIVIDED HIGHWAY

POSTED (DAY) SPEED LIMIT M.P.H.	*X* FT.
25 OR LESS	10
30	20
35	20
40	40
45	40
50	60
55	60

TAPER LENGTH EQUATION
 $TL = \frac{25}{60} \times 5$
 $TL = \frac{25}{60} \times \frac{5^2}{60} < 45 \text{ M.P.H.}$
 TL-TAPER LENGTH (ft)
 S-SPEED (m.p.h.)



White Delineators Shall Be Used Throughout The Transition Where 85th Percentile Approach Speeds Are Greater Than 50 M.P.H.



W4 - 2



W9 - 2

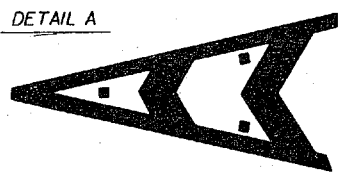


W9 - 1

For Placement Of Sign. No. W9-2, W4-2 And W9-1 See Sheet 5 Of 8.

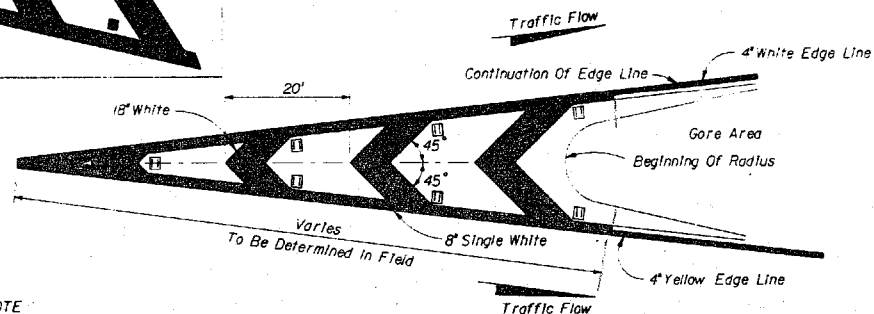
4 - LANE - 2 - LANE TRANSITION - NO MEDIAN

DETAIL A



NOTE

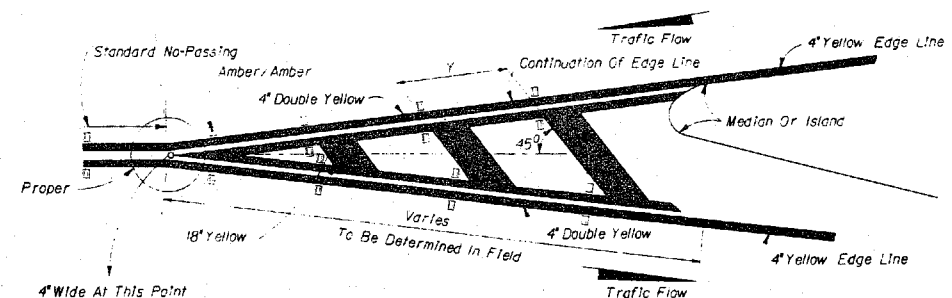
Raised pavement markers shall be set two (2) inches inside thermoplastic as shown below, or set two (2) inches inside painted line as shown in DETAIL A.



NOTE

Raised pavement markers (B-Directional red and colorless) should be used in all gores of this type.

**PAVEMENT MARKINGS FOR TRAFFIC CHANNELIZATION AT GORE
 (TRAFFIC FLOWS IN SAME DIRECTION)**



POSTED (DAY) SPEED LIMIT M.P.H.	*X* FT.
30 OR LESS	10
35	20
40	20
45	30
50 OR MORE	40

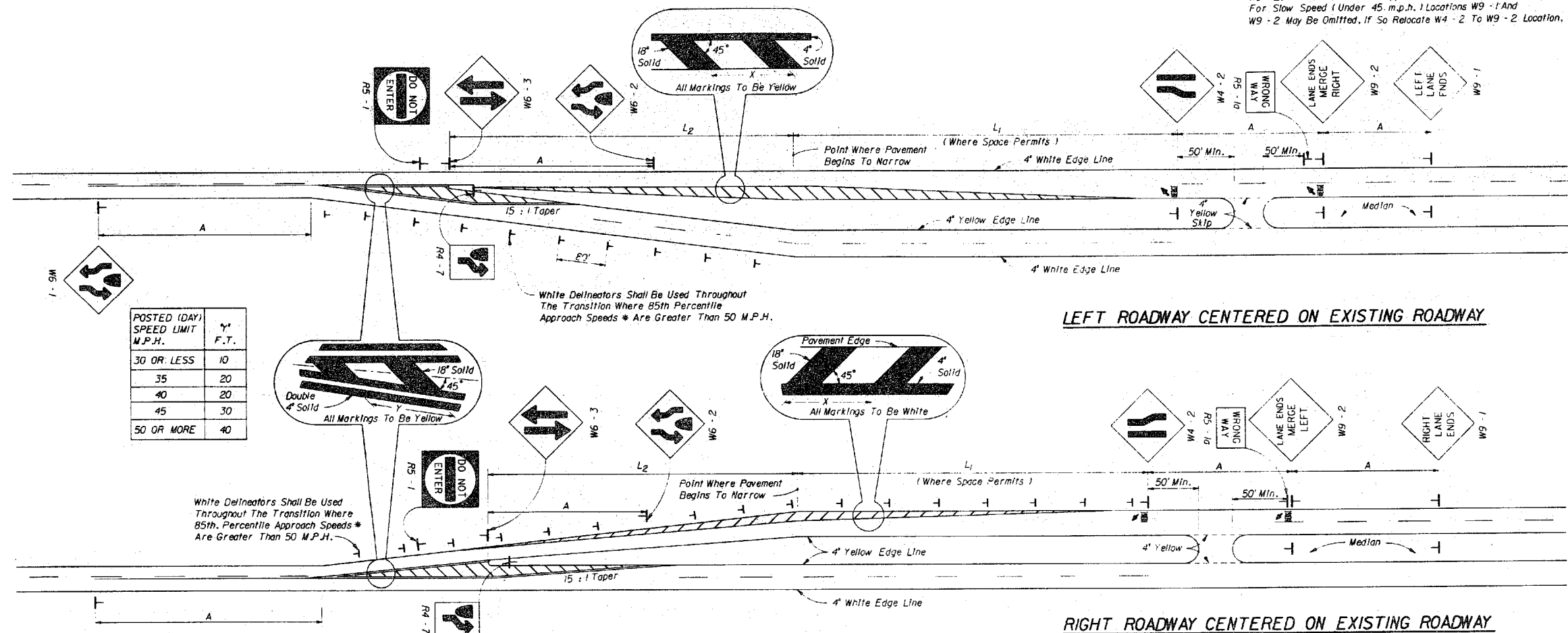
**PAVEMENT MARKING FOR TRAFFIC SEPARATION
 (TRAFFIC FLOWS IN OPPOSITE DIRECTION)**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
 TRAFFIC DESIGN

SPECIAL MARKING AREAS

Names	Dates	Approved By
Designed By: SWR	78	<i>Clay J. Scott</i>
Drawn By: SWR	78	
Checked By: KR	78	
Revision No.	Sheet No.	Index No.
88	4 of 8	17346

Severe Cases May Require Use Of Constant Or Graded
Advisory Speed Signs (W13 - 1) Placed Beneath Signs
W9 - 2, W4 - 2 and W9 - 1. (Applicable To Both Cases Shown)
For Slow Speed (Under 45 m.p.h.) Locations W9 - 1 And
W9 - 2 May Be Omitted, If So Relocate W4 - 2 To W9 - 2 Location.



POSTED (DAY) SPEED LIMIT M.P.H.	'A' F.T.
30 OR LESS	10
35	20
40	20
45	30
50 OR MORE	40

TRANSITION DISTANCE L_1	
LATERAL OFFSET ($L_1 = S \times W$)	
	'X'
30	240 270 300 330 360 390 420 20
35	280 315 350 385 420 455 490 20
40	320 360 400 440 480 520 560 40
45	360 405 450 495 540 585 630 40
50	400 450 500 550 600 650 700 60
55	440 495 550 605 660 715 770 60
60	480 540 600 660 720 780 840 80
65	520 585 650 715 780 845 910 80
70	560 630 700 770 840 910 980 80

* Passenger car, daytime, posted speeds or 85th percentile (Use higher value)
** Lateral offset

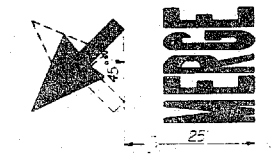
PAVEMENT WIDTH TRANSITION (L_2)

Endpoints of L_2 are the physical nose and point at which paved surface begins to taper to one lane, one newer roads L_2 will usually be similar to L_1 , but on older roads may be much less. For the RIGHT ROADWAY L_2 begins at point where pavement width begins to narrow and continues to point of uniform lane width.

Note
Raised pavement markers on edge lines through transition area are optional.

SPEED (M.P.H.)	'A' (F.T.)
60	775
50	625
40	475
30	325
20	175

* Passenger car, daytime posted speeds or 85th percentile (Use Higher Value)

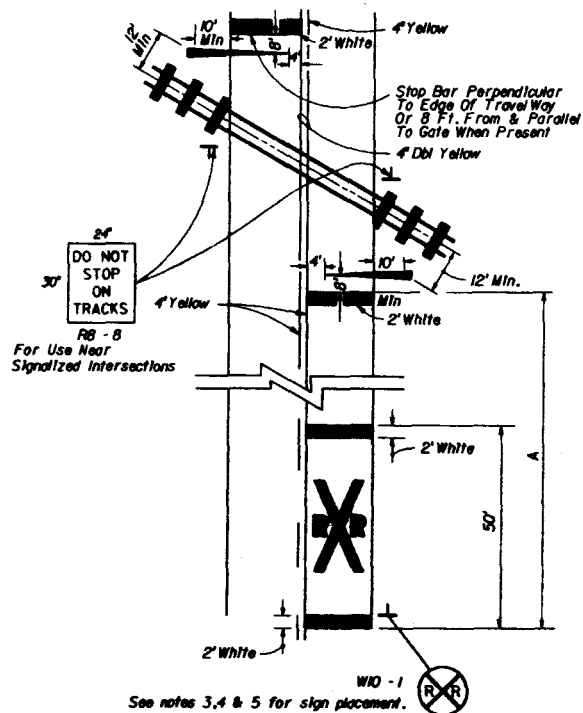


PAVEMENT MARKING DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
SPECIAL MARKING AREAS			
Designed By	Date	Approved By	
Drawn By	78	[Signature]	
Checked By	78	Revision No.	Sheet No.
F.H.W.A. Approved	88	5 of 8	17346

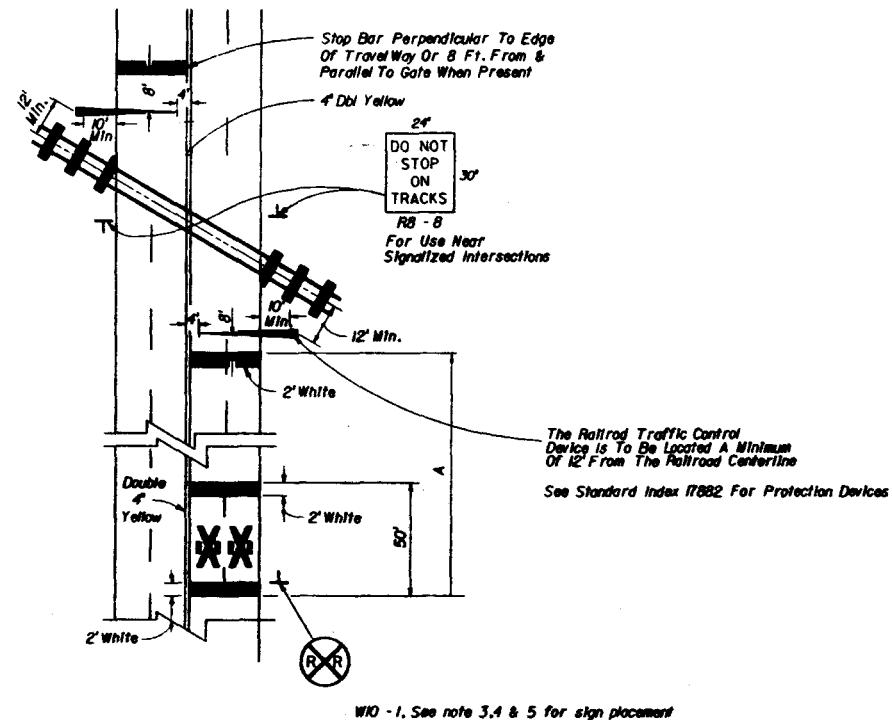
SCHEMES FOR TRANSITION FROM 2 - LANE TO 4 - LANE ROADWAY

SPEED MPH	A In Ft
60	550
55	450
50	375
45	300
40	225
35	150
30	100
Urban	50 Min

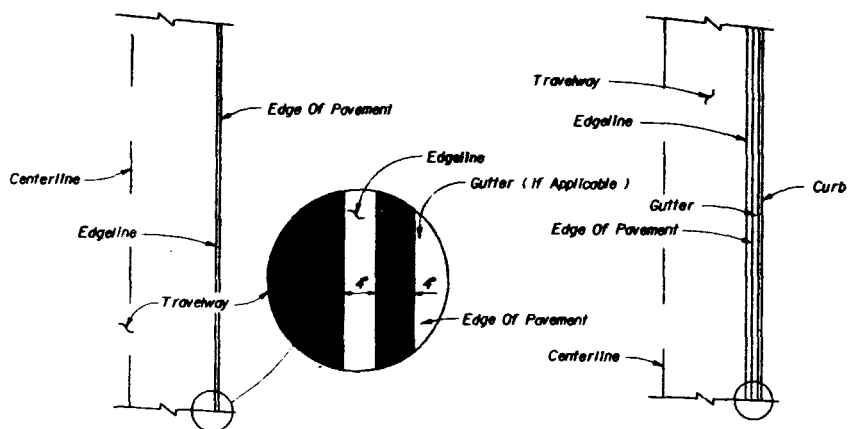


RAILROAD CROSSING AT 2-LANE ROADWAY

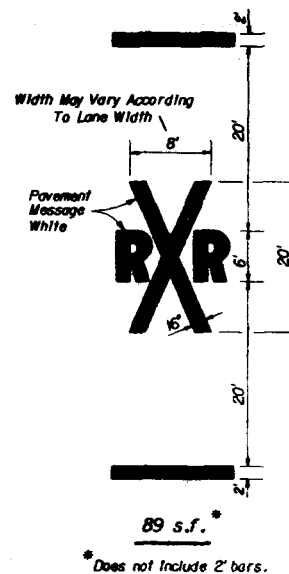
SPEED MPH	A In Ft
60	550
55	450
50	375
45	300
40	225
35	150
30	100
Urban	50 Min



RAILROAD CROSSING AT 4-LANE ROADWAY



**PLACEMENT OF EDGELINES
FOR NON INTERSTATE**

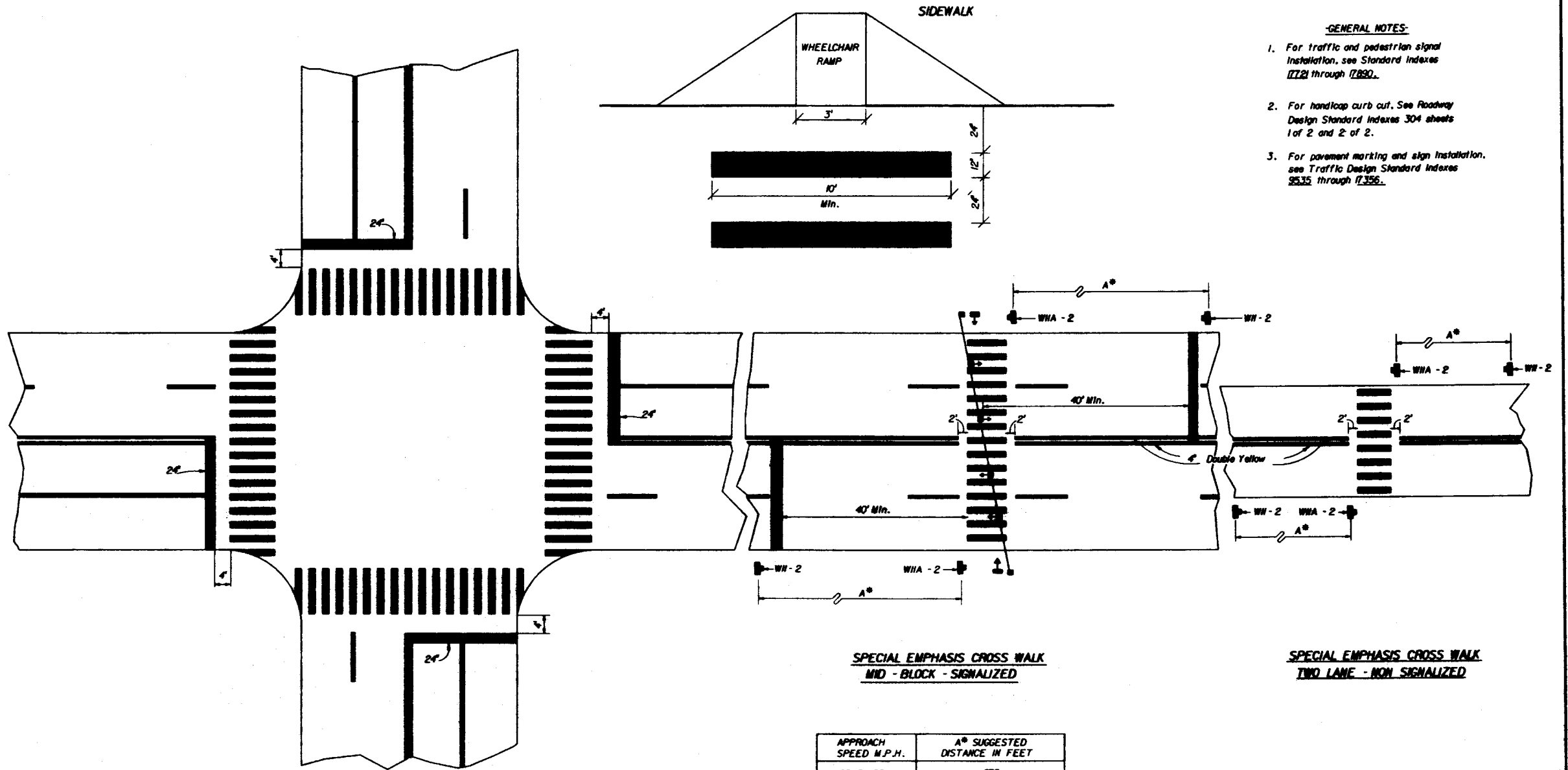


TYPICAL PAVEMENT MARKINGS FOR R/R CROSSING

NOTES:

- When computing pavement messages, quantities do not include transverse lines.
- When dynamic devices are not present or are to be installed, the crossbuck shall be located at the future location of the RR gate or signal and gate in accordance with Index 17882.
- Placement of sign W10-1 in a residential or business district, where low speeds are prevalent, the W10-1 sign may be placed a minimum distance of 100 feet from the crossing. Where street intersection occurs between the R R pavement message and the tracks an additional W10-1 sign & additional pavement message should be used.
- Recommended location for FTP-38 sign, 100ft. urban & 300ft. rural in advance of the crossing.
- A portion of the pavement marking symbol should be directly opposite the W10-1 sign.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
SPECIAL MARKING AREAS			
Designed By	Checked By	Approved By	
TL	76	Clark A. Scott	
Drawn By	TL	76	
Checked By	AR	76	
F.H.N.A. Approved		99	6 of 8 17346



GENERAL NOTES:

1. For traffic and pedestrian signal installation, see Standard Indexes 1722 through 1730.
2. For handicap curb cut, See Roadway Design Standard Indexes 304 sheets 1 of 2 and 2 of 2.
3. For pavement marking and sign installation, see Traffic Design Standard Indexes 9535 through 17356.

SPECIAL EMPHASIS CROSS WALK MID - BLOCK - SIGNALIZED

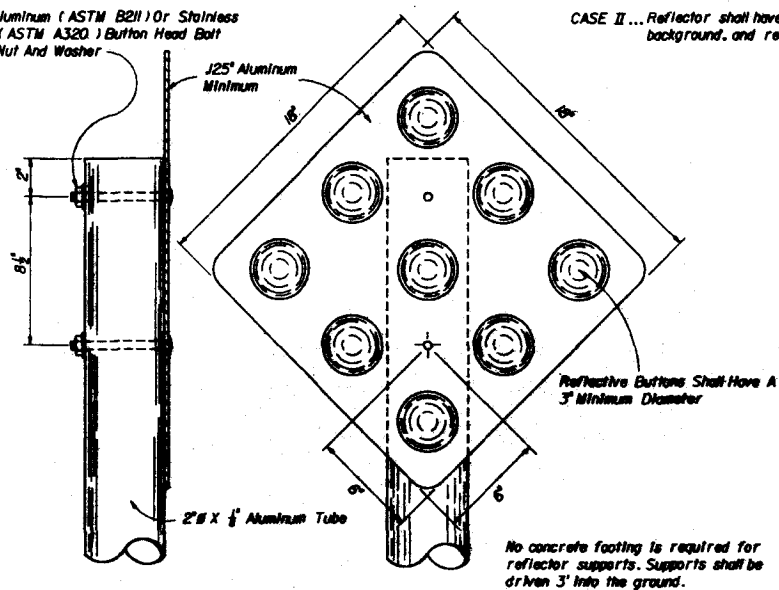
SPECIAL EMPHASIS CROSS WALK TWO LANE - NON SIGNALIZED

SPECIAL EMPHASIS CROSS WALK SIGNALIZED OR STOP SIGN CONTROLLED INTERSECTION

APPROACH SPEED M.P.H.	A* SUGGESTED DISTANCE IN FEET
25 To 35	275
36 To 45	350
46 To 55	500

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
SPECIAL MARKINGS			
Designed By	Drawn By	Checked By	Approved By
MC	MC	MC	<i>Mark A. Keith</i>
Revision No.	Sheet No.	Total No.	
00	7 of 8	17346	
F.L.H.A. Approved			

1/2" Aluminum (ASTM B211) or Stainless Steel (ASTM A320) Button Head Bolt With Nut And Washer



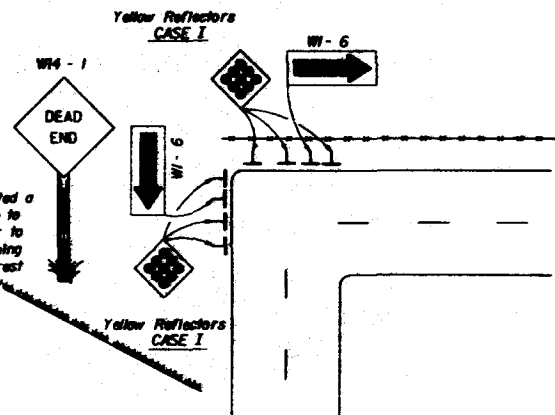
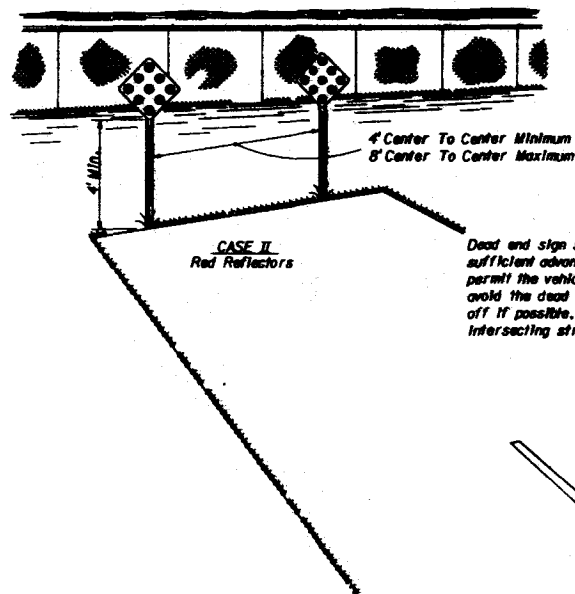
CASE I ... Reflector shall have a yellow reflective background, and yellow reflective buttons. (SIGN SHOP # B12 - 170)

CASE II ... Reflector shall have a red reflective background, and red reflective buttons. (SIGN SHOP # B12 - 171)

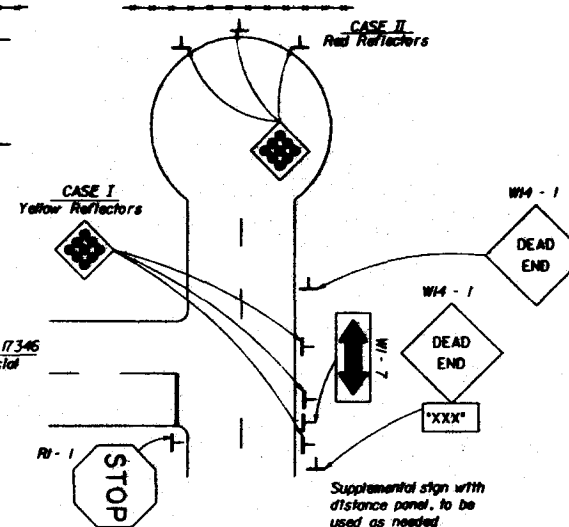
No concrete footing is required for reflector supports. Supports shall be driven 3' into the ground.

NOTE:

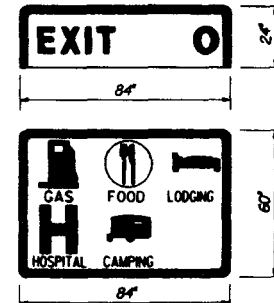
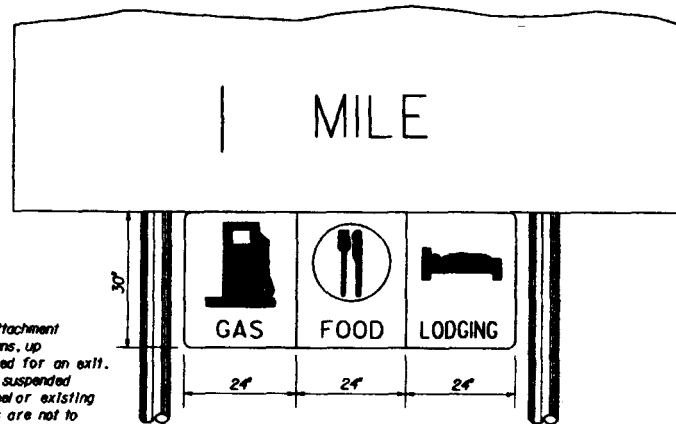
1. THIS INDEX APPLICABLE TO RESIDENTIAL AND MINOR STREETS ONLY - MAJOR STREETS TO BE EVALUATED ON A CASE BY CASE BASIS.
2. "T"-INTERSECTION - TWO-WAY ARROWS AND REFLECTORS OPTIONAL - NEED TO BE DETERMINED BY THE ENGINEER



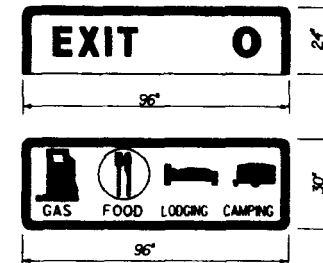
NOTE: For pavement marking see Index no. 17345
No guardrail is required unless special field conditions require its use



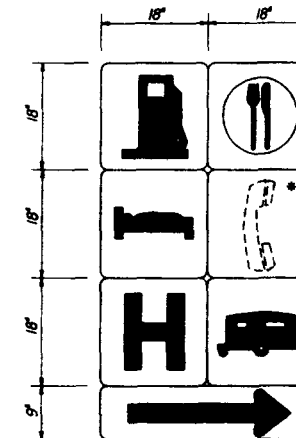
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
TRAFFIC CONTROLS FOR STREET TERMINATIONS					
Designed By	Checked By	Reviewed By	Approved By	Date	
DR	DR	DR	Clark A. Smith	8/74	
Drawn By	Checked By	Reviewed By	Approved By	Date	
DR	DR	DR	Clark A. Smith	8/74	
F.A.M.A. Approved			DR	1 of 1	17349



DETAIL "B"
(4 To 6 Symbols)



DETAIL "C"
(4 Symbols)



DETAIL "D"

Note:
Two assemblies are required; one for each side of the ramp, showing those services in each particular direction from the ramp terminal.

*Ramp mounted signs shall be installed to avoid conflict with existing signs and in no case should they be placed within 100' of another sign.

NOTE

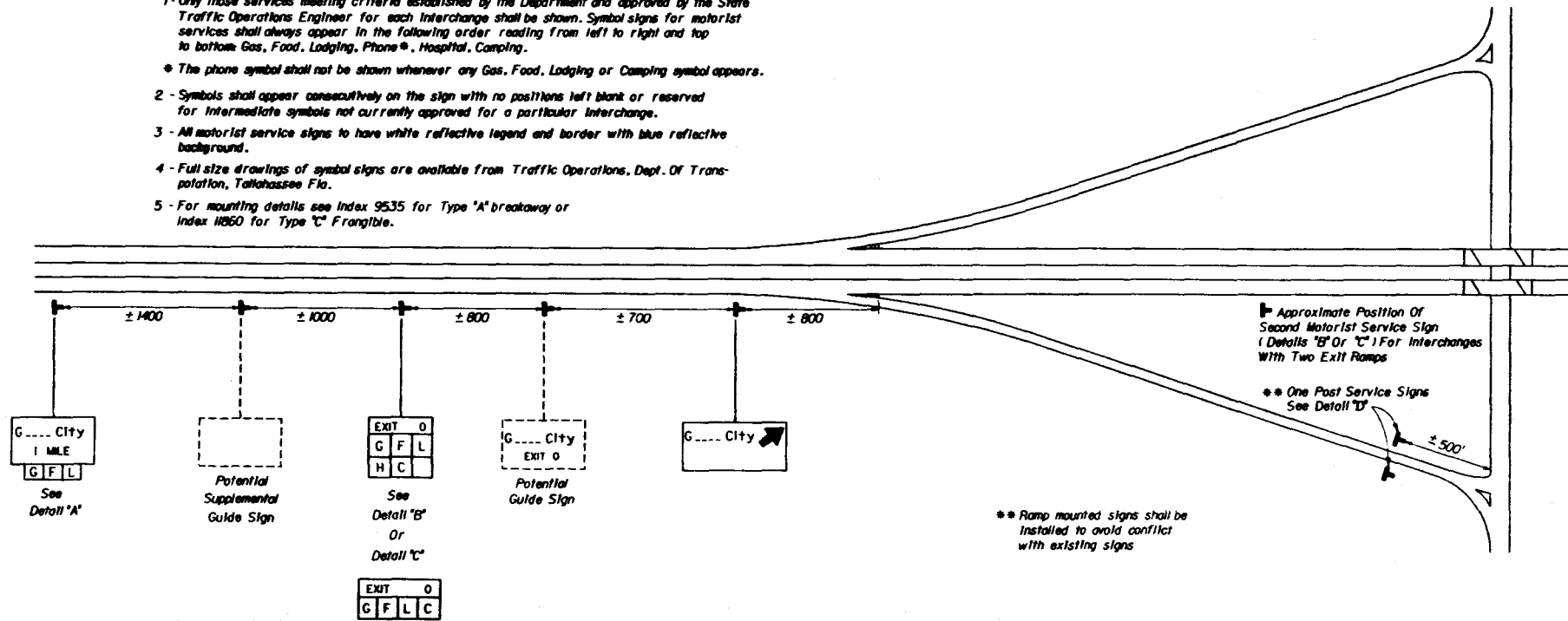
When approved for attachment to the advance guide signs, up to 3 services may be used for an exit. the symbol signs shall be suspended from the guide sign panel or existing wind beams. Symbol signs are not to be connected to existing sign posts.

The mounting height of the advance guide sign shall be increased where necessary to provide 8 feet between the level of the pavement edge and the bottom of the guide sign, prior to mounting the supplementary panel.

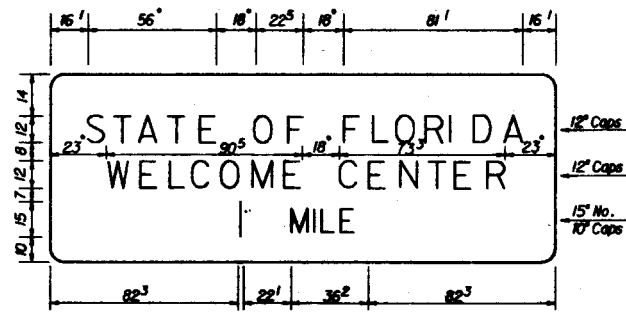
DETAIL "A"
(1 To 3 Symbols)

GENERAL NOTES

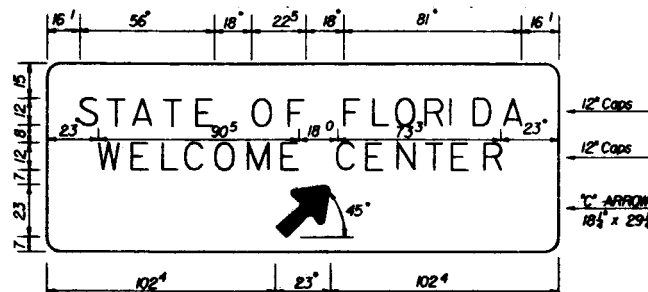
- 1 - Only those services meeting criteria established by the Department and approved by the State Traffic Operations Engineer for each interchange shall be shown. Symbol signs for motorist services shall always appear in the following order reading from left to right and top to bottom: Gas, Food, Lodging, Phone, Hospital, Camping.
- * The phone symbol shall not be shown whenever any Gas, Food, Lodging or Camping symbol appears.
- 2 - Symbols shall appear consecutively on the sign with no positions left blank or reserved for intermediate symbols not currently approved for a particular interchange.
- 3 - All motorist service signs to have white reflective legend and border with blue reflective background.
- 4 - Full size drawings of symbol signs are available from Traffic Operations, Dept. Of Transportation, Tallahassee Fla.
- 5 - For mounting details see Index 9535 for Type "A" breakaway or Index 11860 for Type "C" Frangible.



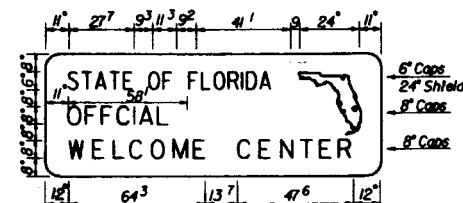
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
SIGNING FOR MOTORIST SERVICES					
Designed By	W.S.	Date	03/76	Approved By	Clark G. Scott
Drawn By					
Checked By	R.R.	03/76		Revision No.	Sheet No.
F.H.W.A. Approved	09/27/76	88	1 of 1	17350A	



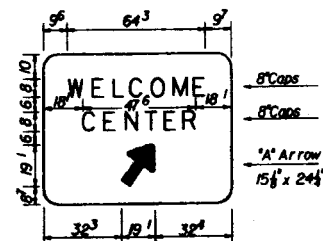
Sign No. FTP - 17
6' - 6" x 19' - 0"
3" Bor. 9" Rad.
Blue Refl. Background
White Refl. Legend & Border



Sign No. FTP - 18
7' - 0" x 19' - 0"
3" Bor. 9" Rad.
Blue Refl. Background
White Refl. Legend & Border



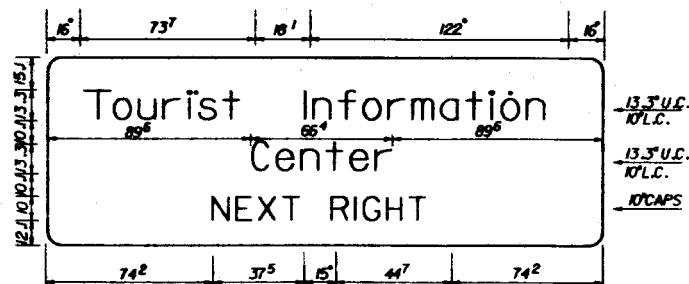
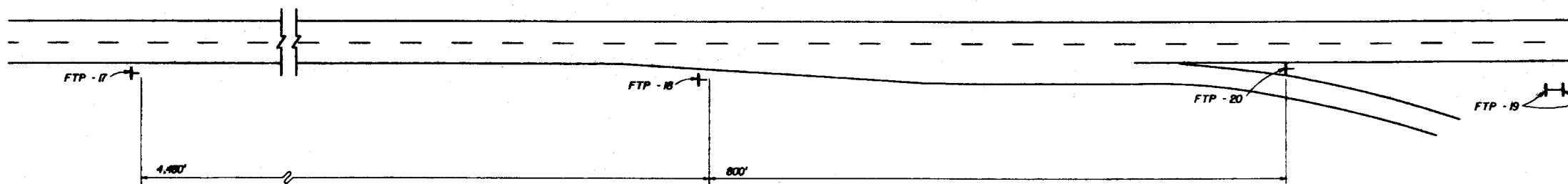
Sign No. FTP - 19
4' - 6" x 12' - 6"
2" Bor. 9" Rad.
Blue Refl. Background
White Refl. Legend & Border
Orange Refl. State Silhouette
(Sign No. FTP - 19 To Be Paid For With Funds
Other Than D.O.T.)



Sign No. FTP - 20
5' - 6" x 7' - 0"
2" Bor. 9" Rad.
Blue Refl. Background
White Refl. Legend & Border

Note:

Distance message of 1/4 mile may be used to keep this sign within the state line.



Sign No. FTP - 21
7' - 0" x 20' - 6"
3" Bor. - 9" Rad.

Note: Sign shall have blue reflectorized background with white reflectorized legend & border. Sign FTP - 21 shall be used as a supplemental guide sign at interchanges which have a tourist information center approved for such signing (locate half-way between normal guide signs)

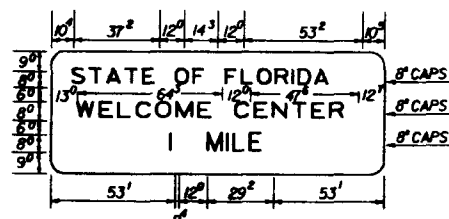
Notes:

1. Signs and sign structures shall be erected in accordance with the details shown on Index 9535.
2. Sign FTP - 19 shall be located on the welcome center grounds in proximity to the building and as far from the main line roadways as possible (2 signs back to back).
3. Sign FTP - 17, 18, 19 shall be located on limited access highways only.
4. Detail of Florida symbol is available on request from traffic operations office of D.O.T.

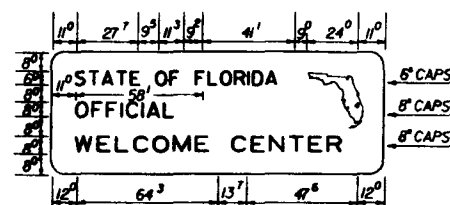
Note:

Roadway not drawn to scale
Distances shown are appropriate for adequate driver communication but may be altered slightly if field conditions require.

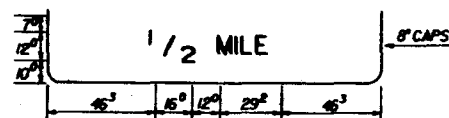
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
WELCOME CENTER SIGNING FOR LIMITED ACCESS HIGHWAYS					
Designed By	W.B.	06/75	Approved By	Charles A. Scott	
Drawn By	J.R.	06/75	Reviewed By	1 of 2	17351
Checked By	J.R.	06/75	Division No.	Sheet No.	Index No.
F.J.W.A. Approved					



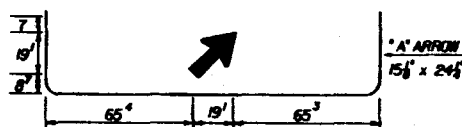
SIGN NO. FTP-22A
 4'-6" x 12'-6"
 2" BOR.-9' RAD.
 BLUE REFL. BACKGROUND
 WHITE REFL. LEGEND & BORDER



SIGN NO. FTP-19
 4'-6" x 12'-6"
 2" BOR.-9' RAD.
 BLUE REFL. BACKGROUND
 WHITE REFL. LEGEND & BORDER
 ORANGE REFL. STATE SILHOUETTE
 (SIGN NO. FTP-19 TO BE PAID FOR WITH FUNDS
 OTHER THAN D.D.T.)



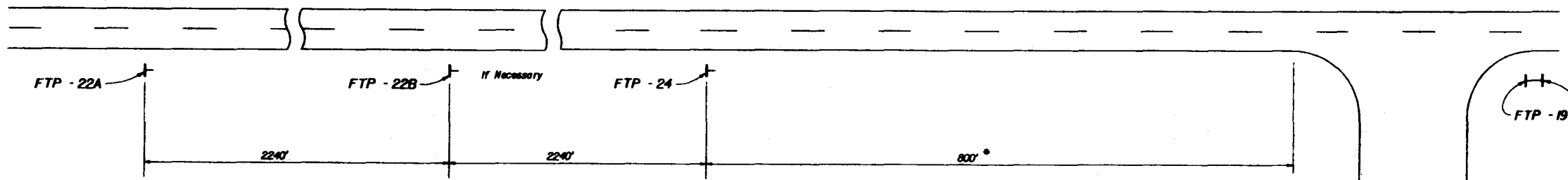
SIGN NO. FTP-22B
 5'-0" x 12'-6"
 2" BOR.-9' RAD.



SIGN NO. FTP-24
 5'-6" x 12'-6"
 2" BOR.-9' RAD.

Notes

- (1) Signs and sign structures shall be erected in accordance with the details shown on Index 95.35.
- (2) Sign FTP-19 shall be located on the welcome center grounds in proximity to the building and as far from the main line roadways as possible (2 signs back to back).
- (3) Detail of Florida symbol is available on request from Traffic Plans & Standards Office of D.D.T.



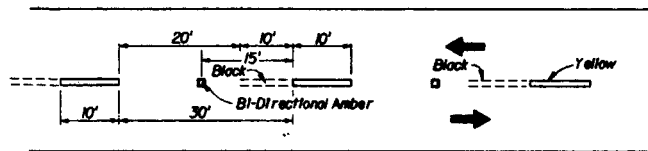
NOTE:
 Roadway not drawn to scale

* 800' Maximum For Rural Conditions
 50' Minimum For Congested Areas

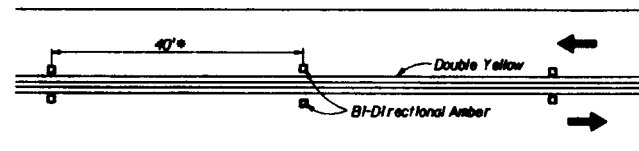
Note:
 Either one but not both of signs FTP-22A or B should be used depending on speed, roadside development & geometric conditions.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
WELCOME CENTER SIGNING FOR PRIMARY HIGHWAYS			
Designed By	Drawn By	Checked By	Approved By <i>Clark A. Scott</i>
Produced By	Reviewed By	Shaded By	Index No. 17351
F.A.R.A. Approved			2 of 2

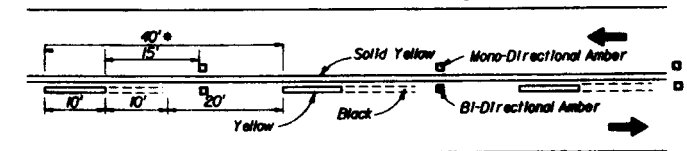
Alternating Skip Line



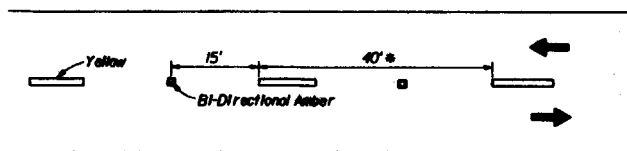
Double Solid Line



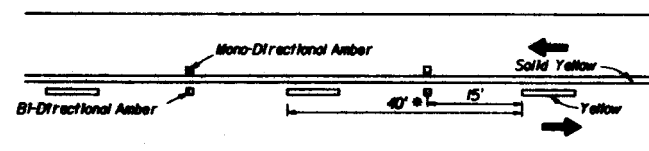
Solid Line With Alternating Skip



Skip Line

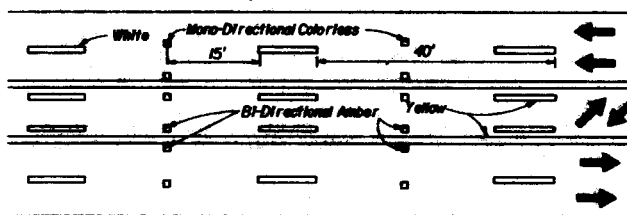


Solid Line With Skip

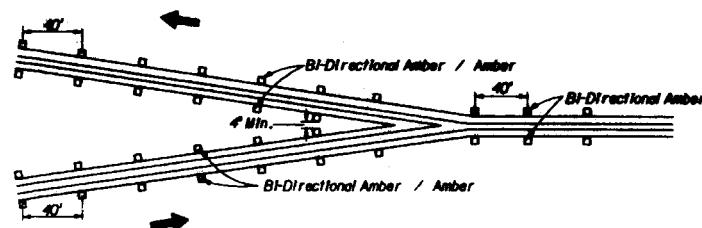
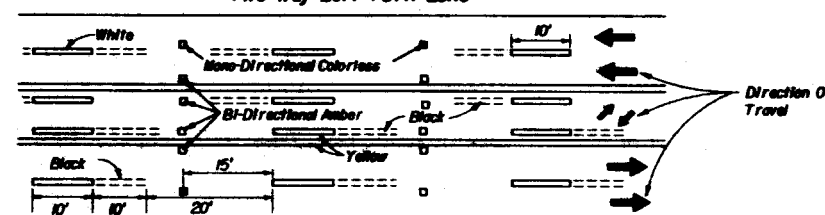


Note: On two-way traffic markers may be installed either on the leading edge or trailing edge of the stripe

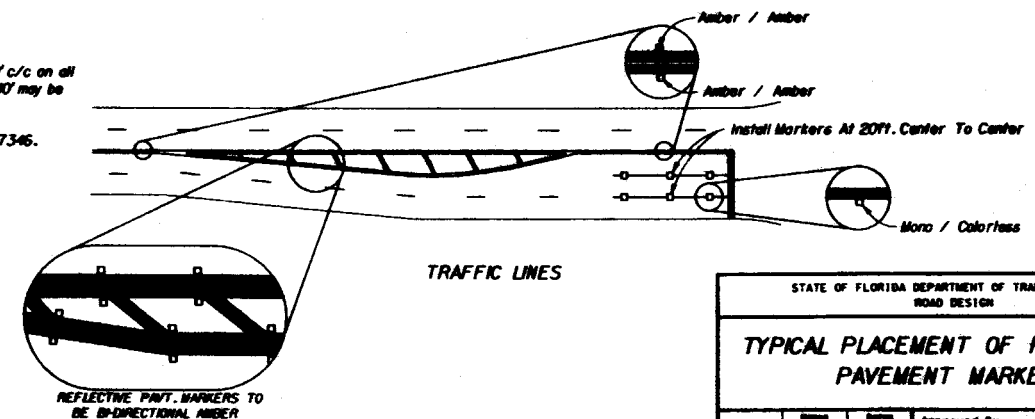
Skip Line With Two Way Left Turn Lane



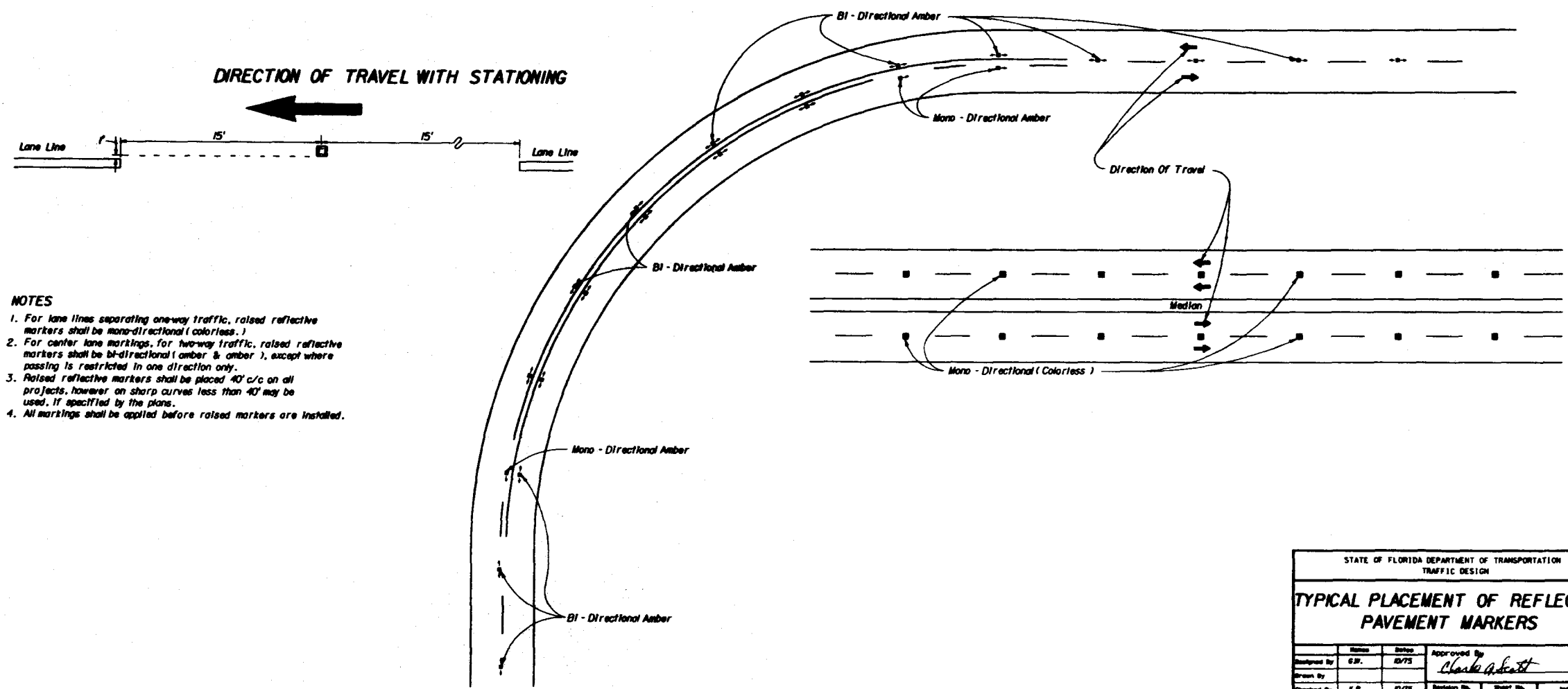
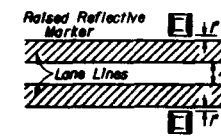
Alternating Skip Line With Two Way Left Turn Lane



* Note: Reflective pavement markers shall be placed 40' c/c on all projects, however on sharp curves less than 40' may be used, if specified by the plans.
For pavement arrow requirements see Index 17346.

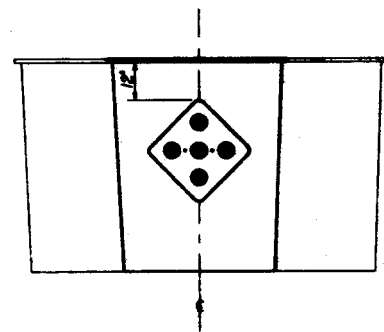
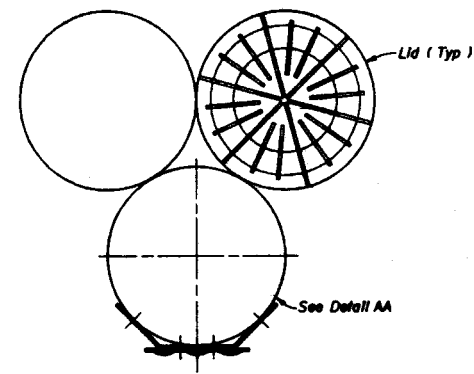


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
TYPICAL PLACEMENT OF REFLECTIVE PAVEMENT MARKERS					
Designed By	SK	10/87	Approved By	<i>Clark G. Smith</i>	
Drawn By	SK	10/87	Reviewed By		
Checked By	RR	10/87	Shed No.		
F.D.R.A. Approved:			88	1 of 2	17352

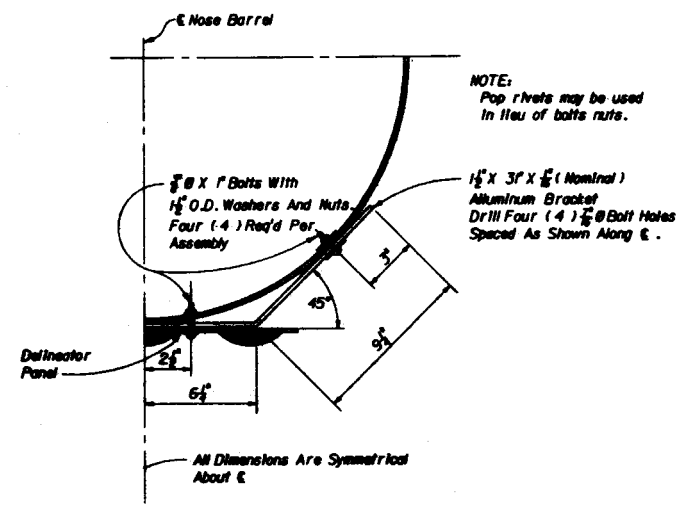


- NOTES**
1. For lane lines separating one-way traffic, raised reflective markers shall be mono-directional (colorless.)
 2. For center lane markings, for two-way traffic, raised reflective markers shall be bi-directional (amber & amber), except where passing is restricted in one direction only.
 3. Raised reflective markers shall be placed 40' c/c on all projects, however on sharp curves less than 40' may be used, if specified by the plans.
 4. All markings shall be applied before raised markers are installed.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
TYPICAL PLACEMENT OF REFLECTIVE PAVEMENT MARKERS					
Designed By	Checked By	Drawn By	Station No.	Sheet No.	Index No.
G.B.	KD/75				
Approved By			17352		
F.H.W.A. Approved			2 of 2		

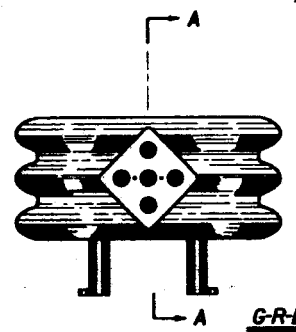
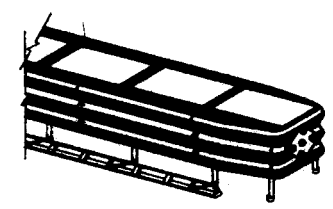


**PLACEMENT OF DELINEATOR
PANEL**

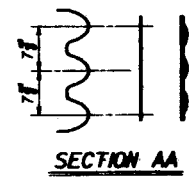


DETAIL AA

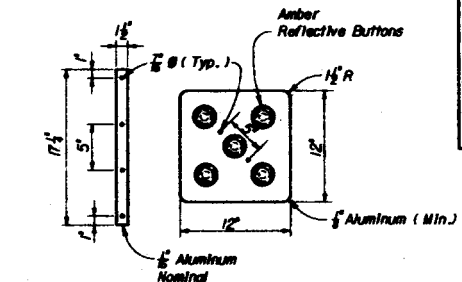
ENERGITE SYSTEM



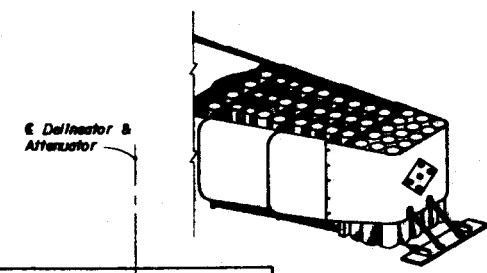
G-R-E-A-T SYSTEM



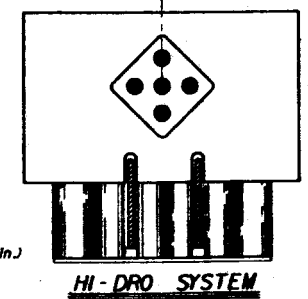
SECTION AA



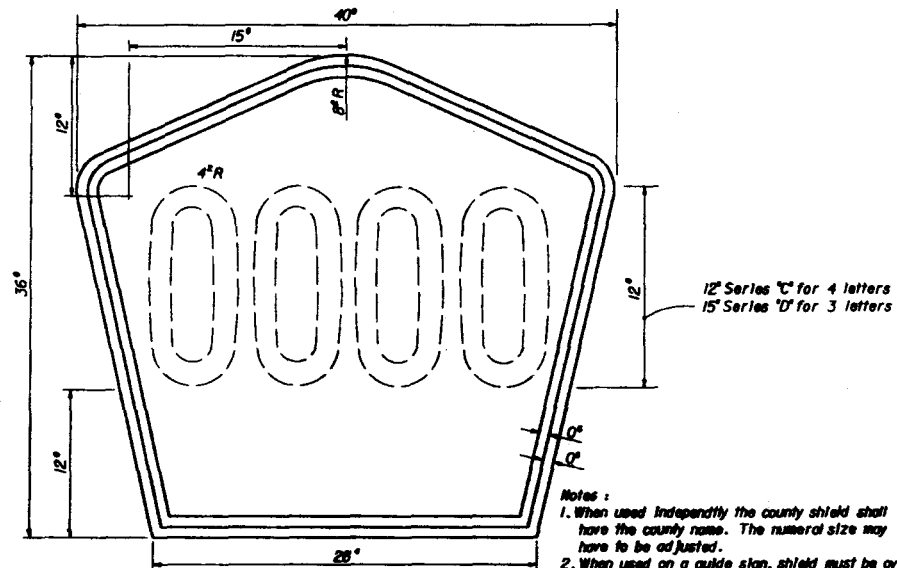
BRACKET AND DELINEATOR DETAIL



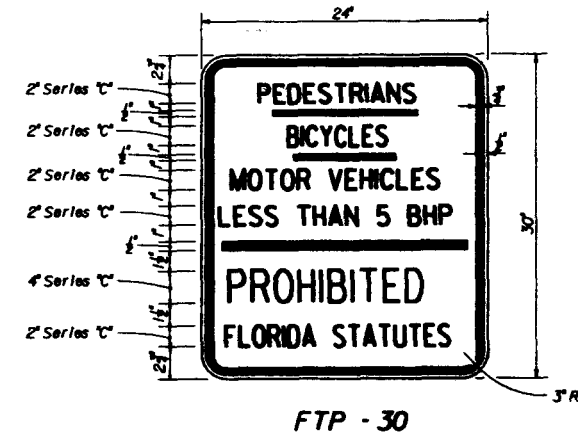
HI-DRO SYSTEM



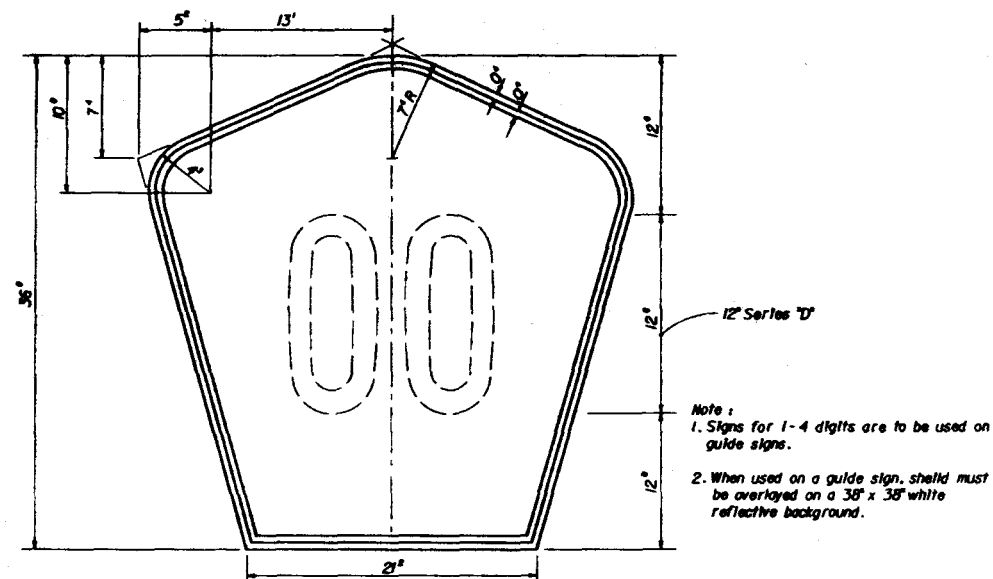
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
MARKINGS FOR ATTENUATION SYSTEMS			
Designed By	Checked By	Approved By	
Drawn By	Reviewed By	Signature	
Checked By	Revision No.	Sheet No.	1 of 1
F.H.R.A. Approved			17353

COUNTY ROUTE MARKER DETAIL
(3 & 4 DIGIT MARKER)

Color : Yellow reflectorized legend and border on blue reflectorized background.



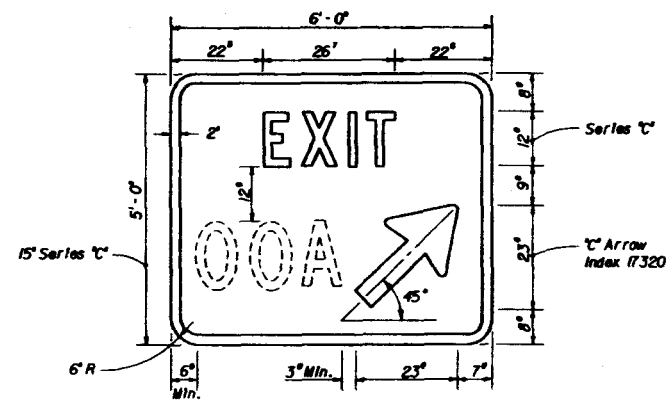
Notes The color of the sign shall be silver - white reflectorized background with black opaque border and legend.



FTP - 29

COUNTY ROUTE MARKER DETAIL
(1 & 2 DIGIT MARKER)

**Color : Yellow Reflectorized Legend And
Border On Blue Reflectorized
Background.**



FTP - 31

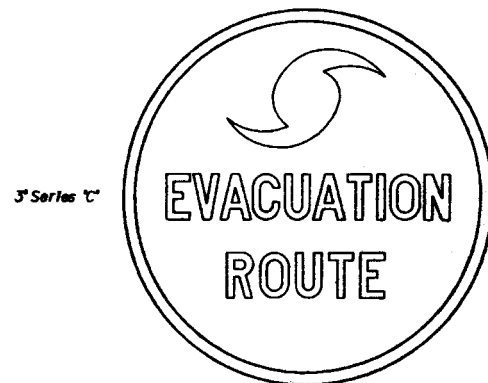
EXIT PANEL
(GORE INSTALLATION)

*The exit number shall be centered
in the space provided on sign panel.*

Color is reflective green background with reflective white legend and border.

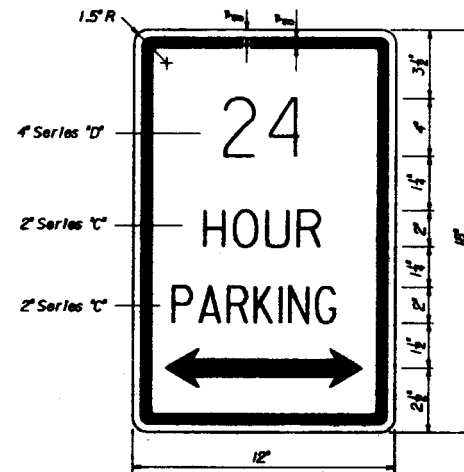
Reduce size of the numbers when 3 or more digits are used. Example 100A.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN				
SPECIAL SIGN DETAILS				
Designed By	Name	Review	Approved By	
			<i>Charles A. Hunt</i>	
Drawn By				
Checked By			Revision No.	Sheet No.
F.A.S.A. Approved			1 of 4	Index No. 17355



FTP - 911

Legend, Border And Symbol Shall Be Reflective White On A Blue Background.



FTP - 24

Color = Green On White

Sign FTP 24 To Be Used In Rest Areas



FTP - 26



FTP - 25

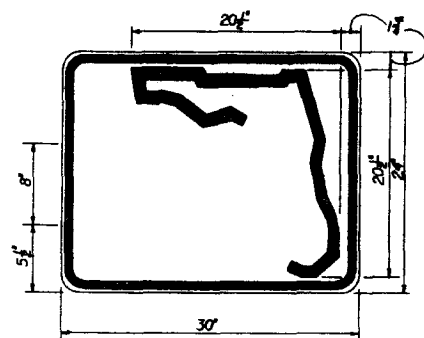
NOTES

1. Top portion of FTP 25 & 26 shall have a reflective blue background with white reflective symbol and border.
2. Bottom portion shall have a reflective white background with black opaque legend and border.
3. FTP 25 & 26 may be fabricated on one panel or two.
4. FTP 25 is for use in areas where space is limited.

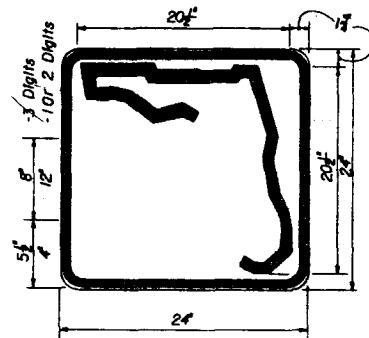
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

SPECIAL SIGN DETAILS

Designed By	Drawn By	Checked By	Approved By	Signature	Date
AL	SC	SC	CL	CL	11/3/55
Drawn By	SC	SC	CL	CL	11/3/55
Checked By	SC	SC	CL	CL	11/3/55
F.J.W.A. Approved			SC	2 of 4	17355



4 OR MORE DIGITS



UP TO 3 DIGITS

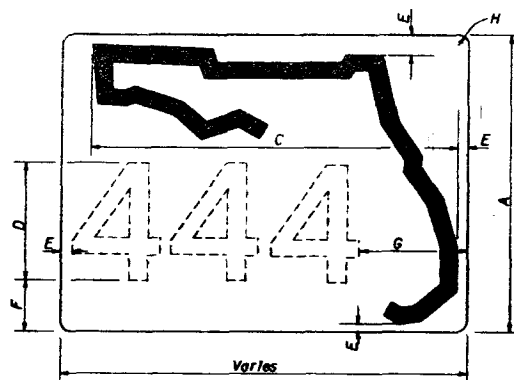
FLORIDA ROUTE MARKER FOR INDEPENDENT USE

FTP - 28

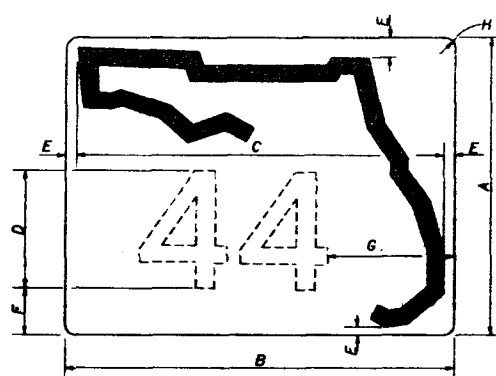
NUMERAL SIZE

1 Or 2 Digits 12" Series "C" - 24" x 24"
3 Digits 8" Series "B" - 24" x 24"
4 Digits 8" Series "B" - 24" x 30"
More Than 4 Digits 8" Series "B" - 24" x 30"

Notes: 1. All state route markers and auxiliaries shall have black opaque legend and border with white reflective background.



3 OR MORE DIGITS



1 OR 2 DIGITS

	A	B	C	D	E	F	G	H
24"	24"	28"	25"	10"	1"	4 1/2"	10"	1 1/2"
30"	30"	38"	36"	12"	1"	5"	11"	1 1/2"
36"	36"	45"	41"	15"	2"	7"	12"	2"

Notes: 1. Florida shield shall have black opaque legend with white reflective background.

FLORIDA SHIELD FOR GUIDE SIGN USE

Notes:

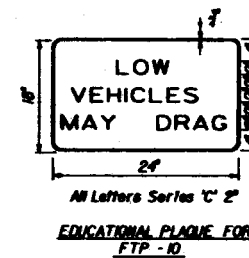
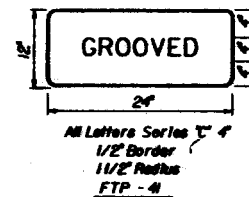
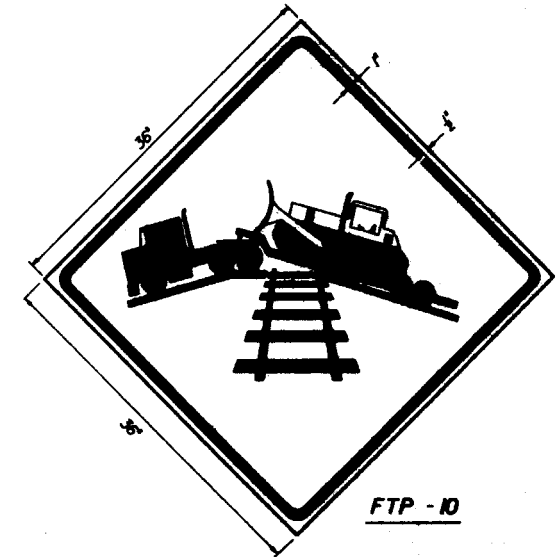
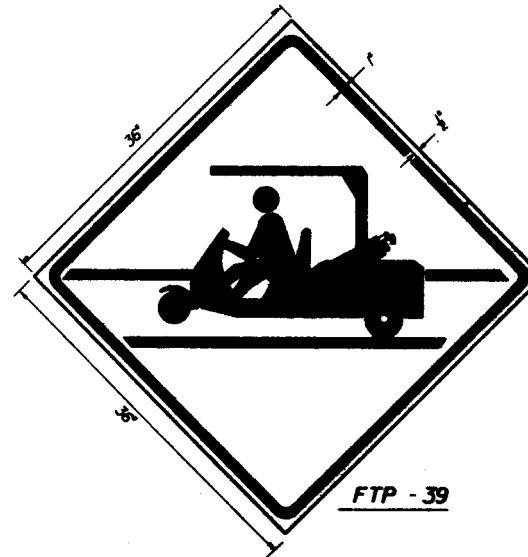
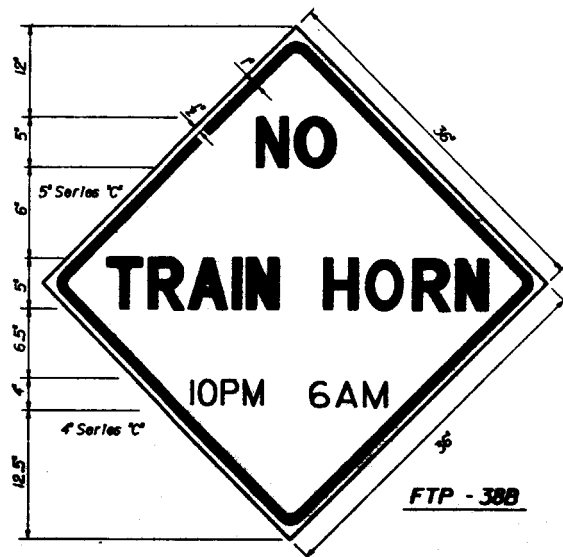
1. Type 'B' arrow to be positioned as indicated on Signing Plans.
2. Green reflectorized background with white reflectorized legend and border.



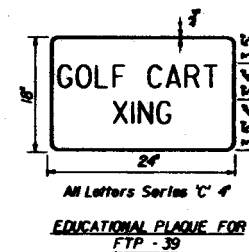
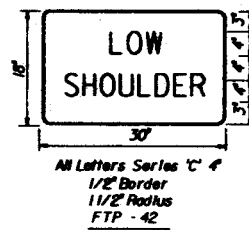
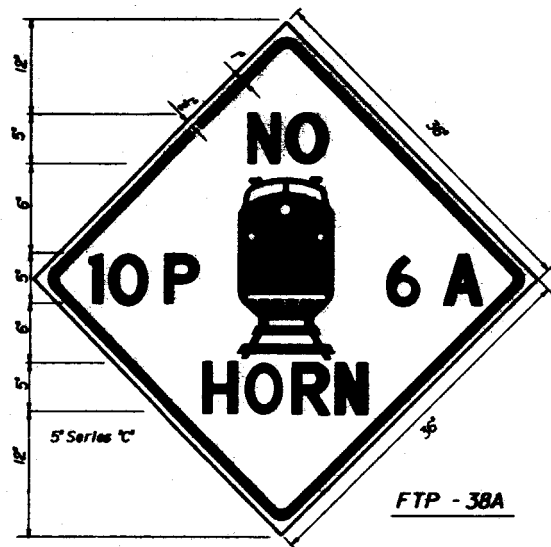
- ↑ Arrow Vertical
- ↖ Arrow 45° Left
- ↗ Arrow 45° Right
- ↔ Arrow Left
- Arrow Right
- No Arrow

DETAIL LAYOUT OF FLORIDA TURNPIKE TRAILBLAZER FTP - 27

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
SPECIAL SIGN DETAILS					
Designed By	Checked By	Drawn By	Reviewed By	Approved By	Scale
				Clark A. Scott	1/16"
Florida Dept. of Transportation	Florida Dept. of Transportation	Florida Dept. of Transportation	Florida Dept. of Transportation	Florida Dept. of Transportation	Florida Dept. of Transportation
F.H.S.A. Approved				3 of 4	17355



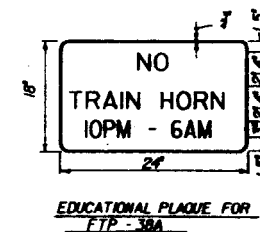
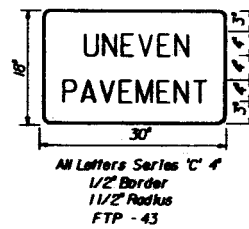
- NOTES**
1. Educational plaques for FTP 38A, 39 & 10 and all diamond shaped warning signs will have a reflective yellow background with black opaque legend & border.
 2. For golf cart warning sign, remove the two cross walk stripes.



SIGNS USED AS PER FLORIDA STATUTES

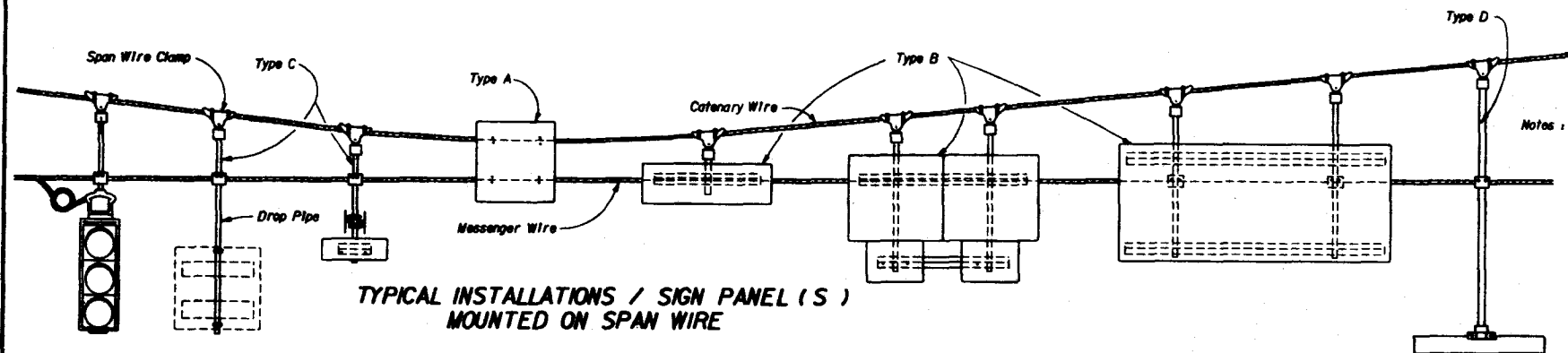
FTP 38A, FTP 38B Per FS 351.03

FTP 39 Per FS 346.202



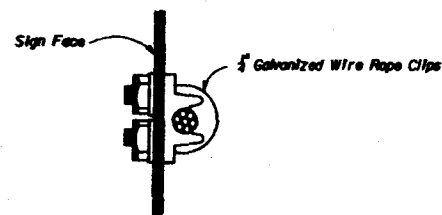
- 4 Series C
- 4 Series C
- 3 Series C

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
SPECIAL SIGN DETAILS					
Designed By	RL	DS	Approved By	<i>Charles A. Scott</i>	
Drawn By	AC	DS	Revision No.	Sheet No.	Index No.
Checked By	DS	DS			
F.A.M.A. Approved			DS	4 of 4	17355

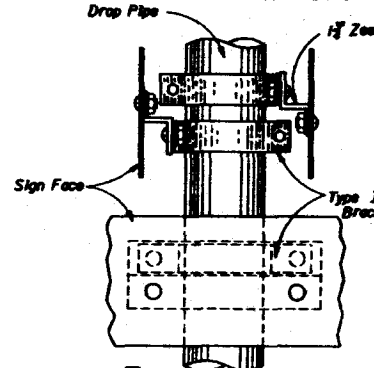


TYPICAL INSTALLATIONS / SIGN PANEL (S) MOUNTED ON SPAN WIRE

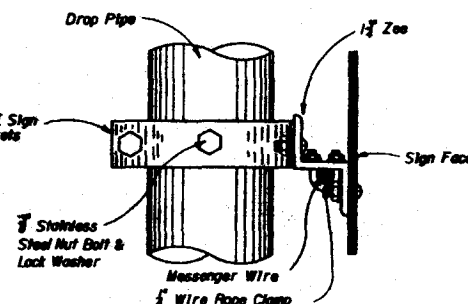
DETAIL / SIGN CLAMP



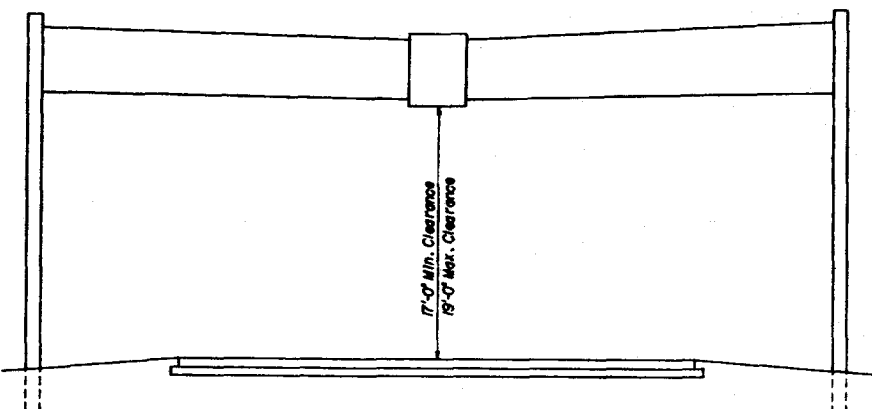
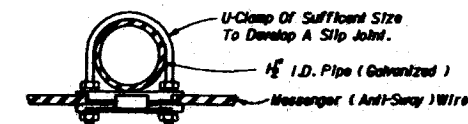
DETAIL / OPPOSING SIGNS ON SINGLE DROP PIPE



DETAIL / SINGLE PANEL ON DROP PIPE AND SPAN WIRE

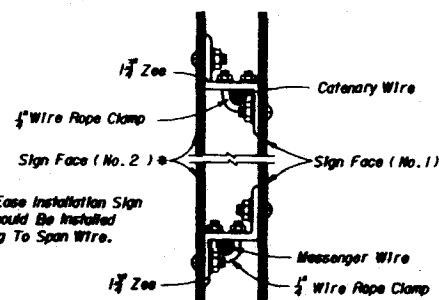


DETAIL / ATTACHMENT OF DROP PIPE TO MESSENGER WIRE



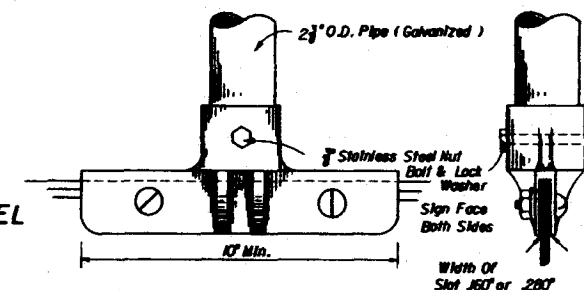
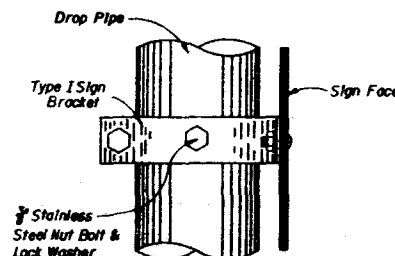
TYPICAL SPAN WIRE INSTALLATION

DETAIL / OPPOSING SIGNS SPAN WIRE MOUNTED



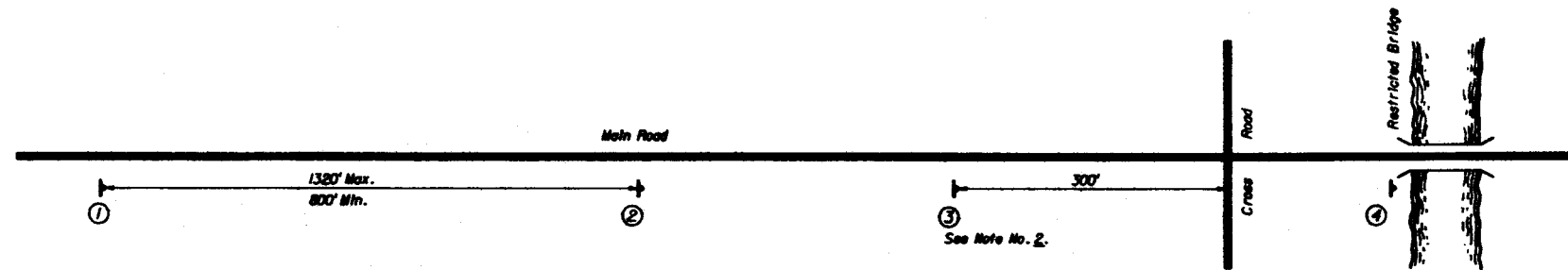
* In Order To Ease Installation Sign Face No. 2 Should Be Installed After Mounting To Span Wire.

DETAIL / SINGLE PANEL ON DROP PIPE

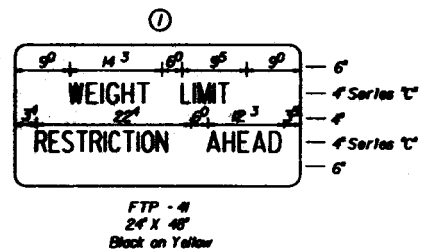


DETAIL / SIGN FACE ON BOTH SIDES OF DROP PIPE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SPAN WIRE MOUNTING DETAILS			
Designed By	Checked By	Approved By <i>Charles A. Scott</i>	
Drawn By	Quantity No.	Sheet No.	Index No.
Revised By			
F.A.R.A. Approved		1 of 1	17356

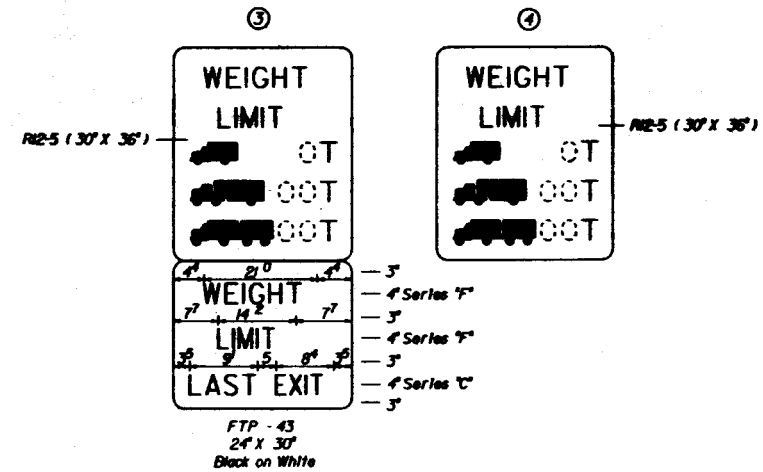
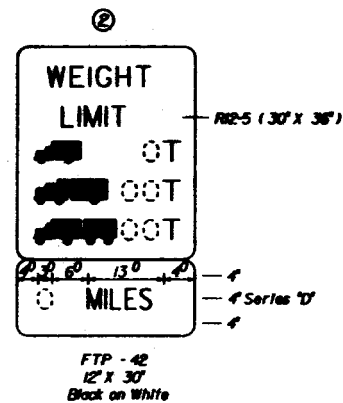


SIGN LOCATIONS TYPICAL



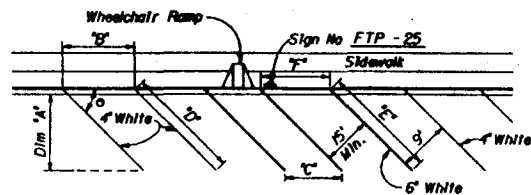
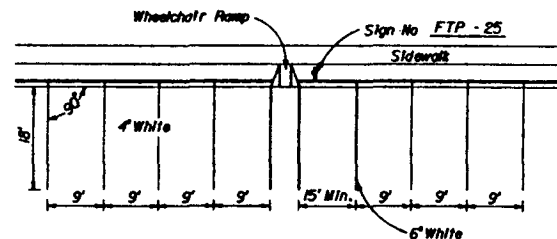
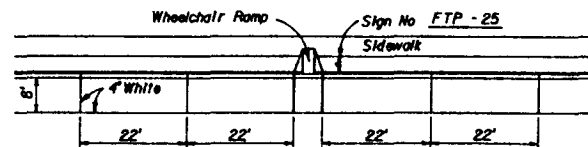
NOTE:

1. See FHWA Standard Highway signs book dated 1979 for sign R2-5 detail.
2. Sign location No. 3 may require some field adjustment.
3. Signs FTP-41, FTP-42 & FTP-43 shall have a 1/2" edge and 3/4" border with a 4" radius.
4. The Cross Road is the last detour around the restricted bridge.
5. Sign location No. 2 should be established from the Crossroad the following approximate distances:
Interstate - 1 mile Noninterstate - 1/2 mile
6. For Interstate application, contact Traffic Plans & standards - Tallahassee for sign sizes 41-45.



SIGN DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
BRIDGE WEIGHT RESTRICTIONS					
Designed By	R.C.	Date	03/85	Approved By	Charles A. Smith
Drawn By	R.C.	Date	03/85		
Checked By	R.C.	Date	03/85		
F.H.W.A. Approved				05	1 of 1
					17357

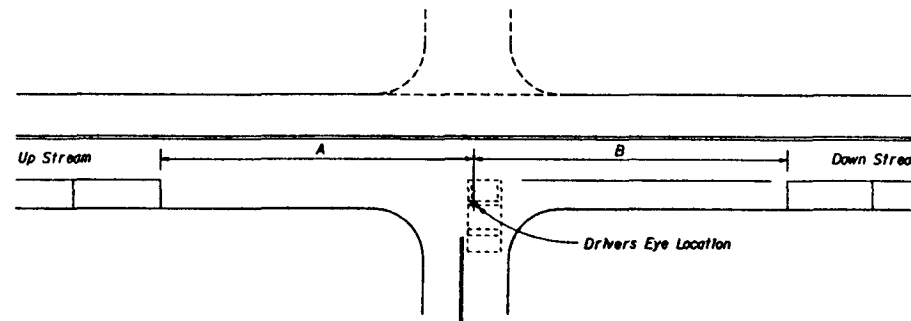


"DIMENSIONS"						
Δθ	"A"	"B"	"C"	"D"	"E"	"F"
45°	19'-4"	12'-9"	14'-2"	27'-0"	33'-0"	21'-3"
60°	20'-4"	10'-5"	11'-7"	23'-2"	26'-8"	17'-4"

NOTE:

Criteria for pavement markings only, not wheelchair ramp locations. For ramp criteria see roadway design Index No. 304.

PAVEMENT MARKING FOR WHEELCHAIR RAMP IN REST AREAS



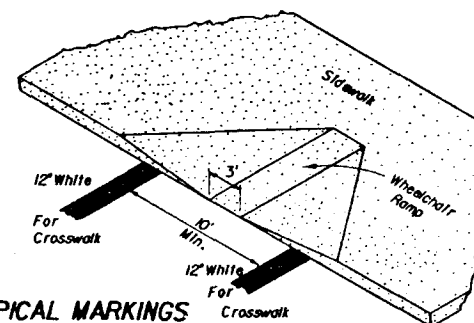
SPEED MPH	UP STREAM (A)	DOWN STREAM (B)
0-30	85'	60'
35	100'	70'

MINIMUM PARKING RESTRICTION (FT.) FOR NON-SIGNALIZED INTERSECTION

NOTES

1. Distances measured longitudinally along the street from driver location of entering vehicle to end of parking restriction.
2. Distances applicable to intersecting street, class III driveways and other driveways to the extent practical.
3. For non-signalized intersections, the value above shall be compared with the value for signalized intersections and the maximum restriction implemented.

MINIMUM PARKING RESTRICTION FOR NON-SIGNALIZED INTERSECTIONS

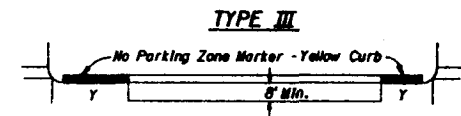
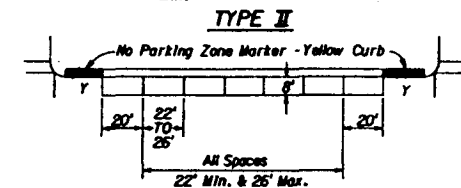
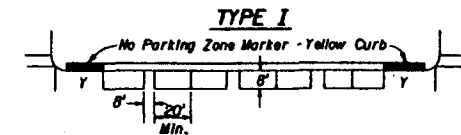


TYPICAL MARKINGS FOR CROSSWALKS

REFER TO INDEX NO. 17346, 2 OF 8

GENERAL NOTES (Signalized & Non-signalized)

1. For entrances to a one-way street, the downstream restriction may be reduced to 20 feet
2. Parking shall not be allowed within 20 feet of a crosswalk
3. All parking lane markings shall be 4' white
4. Parking lane lines shall be broken at driveways
5. Refer to chapter 316, Fla. statutes, for laws governing parking spaces.



SPEED LIMIT MPH	SIGNALIZED INTERSECTIONS
0-30	30'
35	50'

DISTANCE FROM CURB RADIUS (Y)

PARKING RESTRICTION (FT.) FOR SIGNALIZED INTERSECTION

NOTE:

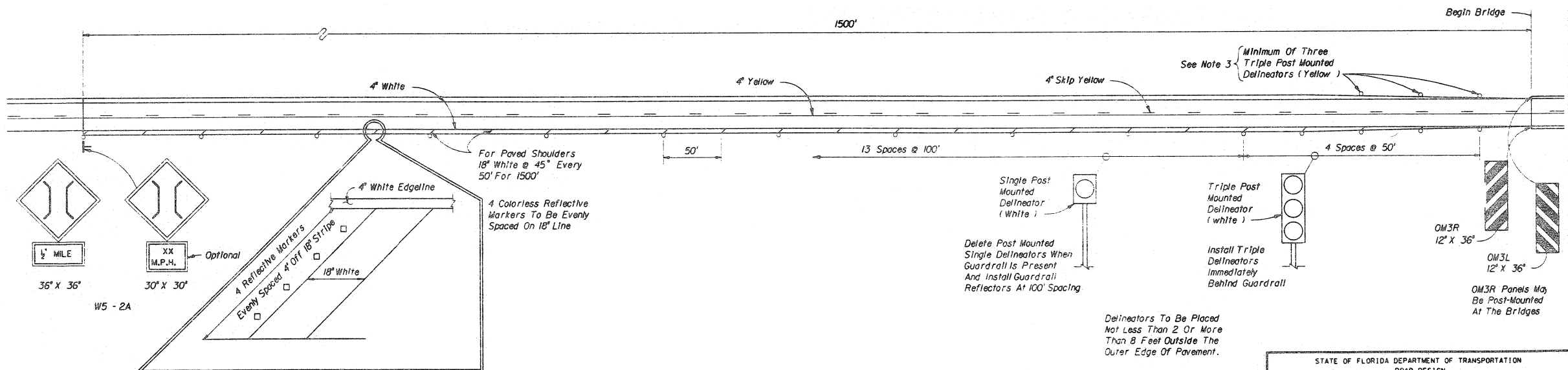
Parking restriction measured from curb radius point

MINIMUM PARKING RESTRICTION FOR SIGNALIZED INTERSECTION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
SPECIAL MARKING AREAS (PARKING)			
Designed By	H.C.	Date	08/95
Drawn By	H.C.	Date	08/95
Checked By	H.R.	Date	08/95
F.J.W.A. Approved		88	1011
		17358	

NOTES:

1. Bridges should be marked as narrow bridges under the following conditions:
 (1) For approach roadways with paved shoulders when the bridge width including shoulders is less than the width of the approach roadway including paved shoulders.
 (2) For approach roadways without paved shoulders when the bridge shoulder width is less than 2'.
2. No passing zone should be extended 1500' in advance of narrow bridge.
3. The post mounted delineators shall be installed on both sides of the roadway (White On Right - Yellow On Left) for a distance of 1500' in advance of a narrow bridge if the bridge or the approach is on a curve.
4. Delineators on both sides of roadway shall face traffic approaching bridge.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
RURAL NARROW BRIDGE TREATMENT					
Designed By	R. LEE	Date	9/85	Approved By	<i>Clark G. Smith</i>
Drawn By	R. LEE	Date	9/85	Revision No.	
Checked By	RAMSON	Date	9/85	Sheet No.	88
F.H.W.A. Approved:				Index No.	17359

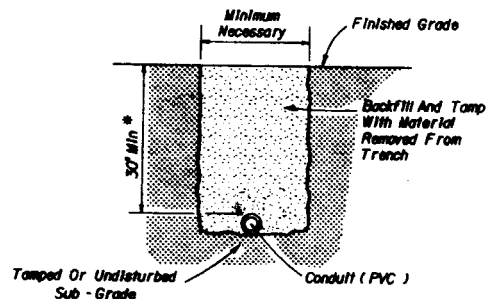


FIGURE A

FOR USE IN AREAS NOT EXPOSED TO VEHICULAR TRAFFIC AND UNDER DRIVEWAYS

* May be adjusted in field due to field conditions upon approval of project engineer.

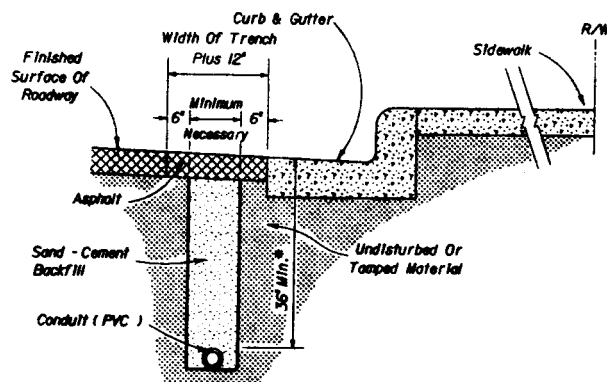


FIGURE B

FOR USE IN ASPHALT ROADWAY ADJACENT TO GUTTER WHEN PLACEMENT OUTSIDE OF THE PAVEMENT IS NOT FEASIBLE.

Note:

1. Trench not to be open more than 250' at a time when construction area is subject to vehicular or pedestrian traffic.
2. Asphalt to be sawcut and removed to leave neat lines on both sides of the 12" pavement cut.
3. See note 3 figure C.

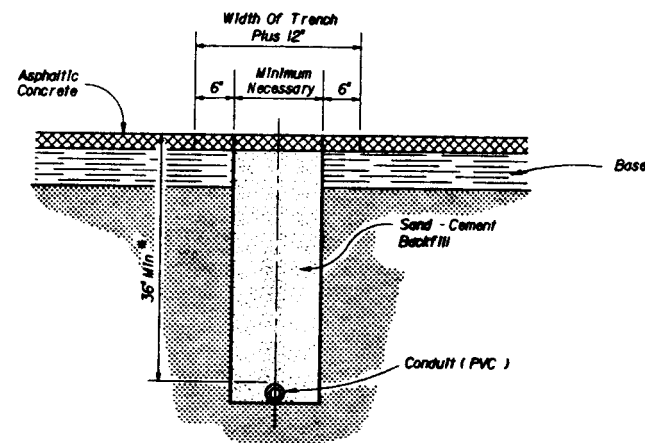


FIGURE C

FOR USE IN INSTALLING CONDUIT UNDER EXISTING ASPHALT PAVEMENT NOT ADJACENT TO GUTTER WHEN JACKING IS NOT FEASIBLE

Note:

1. Rigid conduit must be used when jacking under existing pavement at 3 ft. minimum depth.
2. Asphalt to be sawcut at the edges of the trench.
3. The removal and replacement of the additional pavement width (6") will not be required when the trench can be constructed without disturbing the asphalt surface on either side.

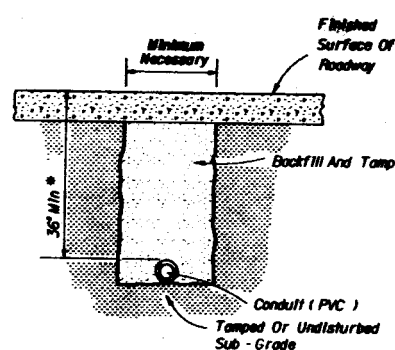


FIGURE D

FOR USE INSTALLING CONDUIT UNDER A NEW ROADWAY PRIOR TO INSTALLATION OF CURBS, BASE AND PAVEMENT

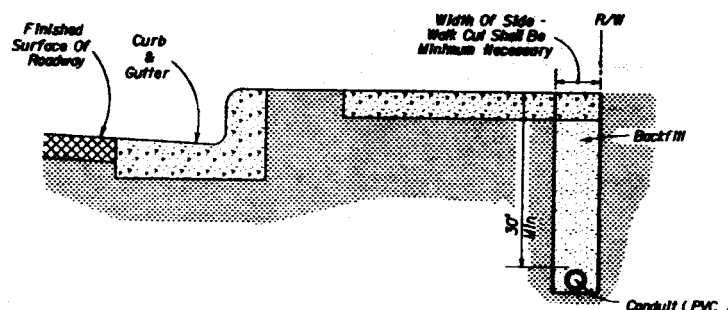


FIGURE E

FOR USE IN INSTALLING CONDUIT UNDER SIDEWALK

Note:

1. Sidewalk patches to match existing joints.
2. Entire sidewalk slab must be replaced when specified in the plans.
3. Backfill and tamp with material from trench except at driveways. At driveways, backfill a length of trench within the driveway entirely with Class I concrete.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
CONDUIT INSTALLATION DETAILS					
Designed By	CF	Date	02/75	Approved By	<i>Charles A. Scott</i>
Drawn By	RM	Date	02/75	Revision No.	Sheet No.
Checked By		Date		Revision No.	Sheet No.
F.I.R.A. Approved				1 of 2	17721

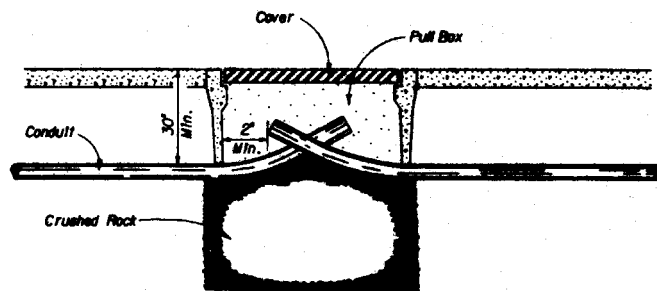


FIGURE A
PULL BOX ENTRY OF CONDUIT UNDER SIDEWALKS

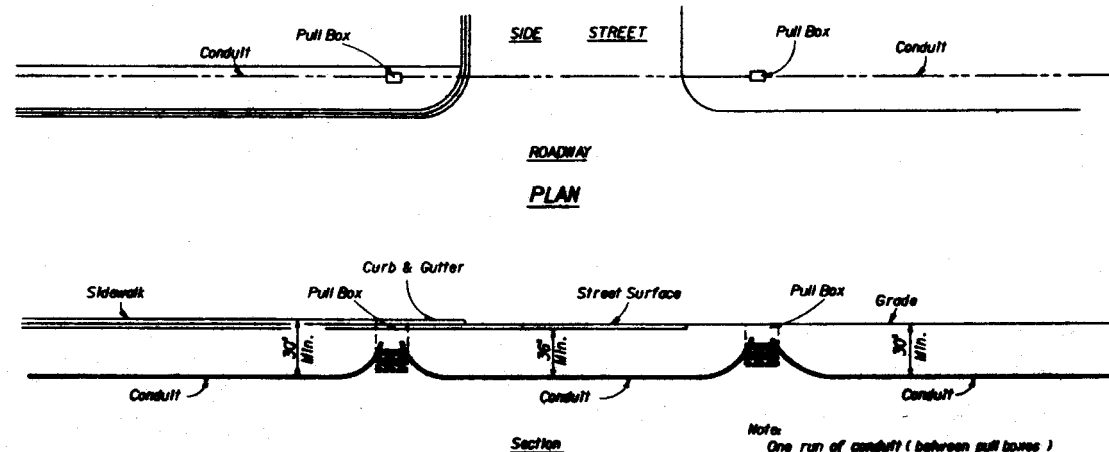


FIGURE B
UNDER SIDEWALK
UNDER ROADWAY
UNDER NON TRAFFIC BEARING SURFACE

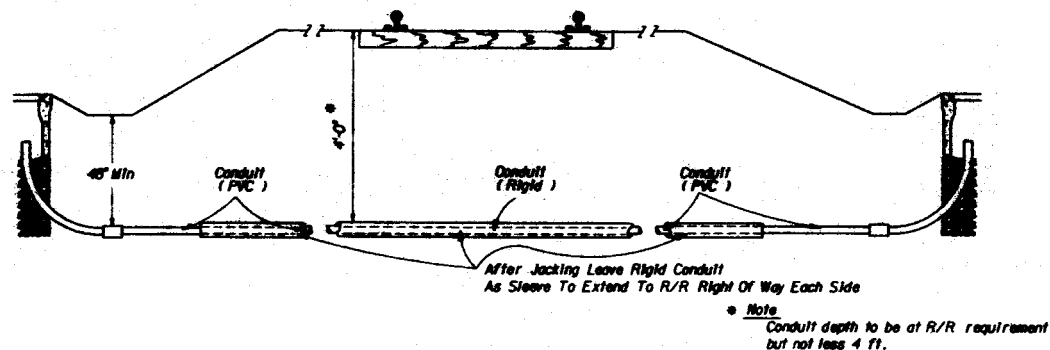
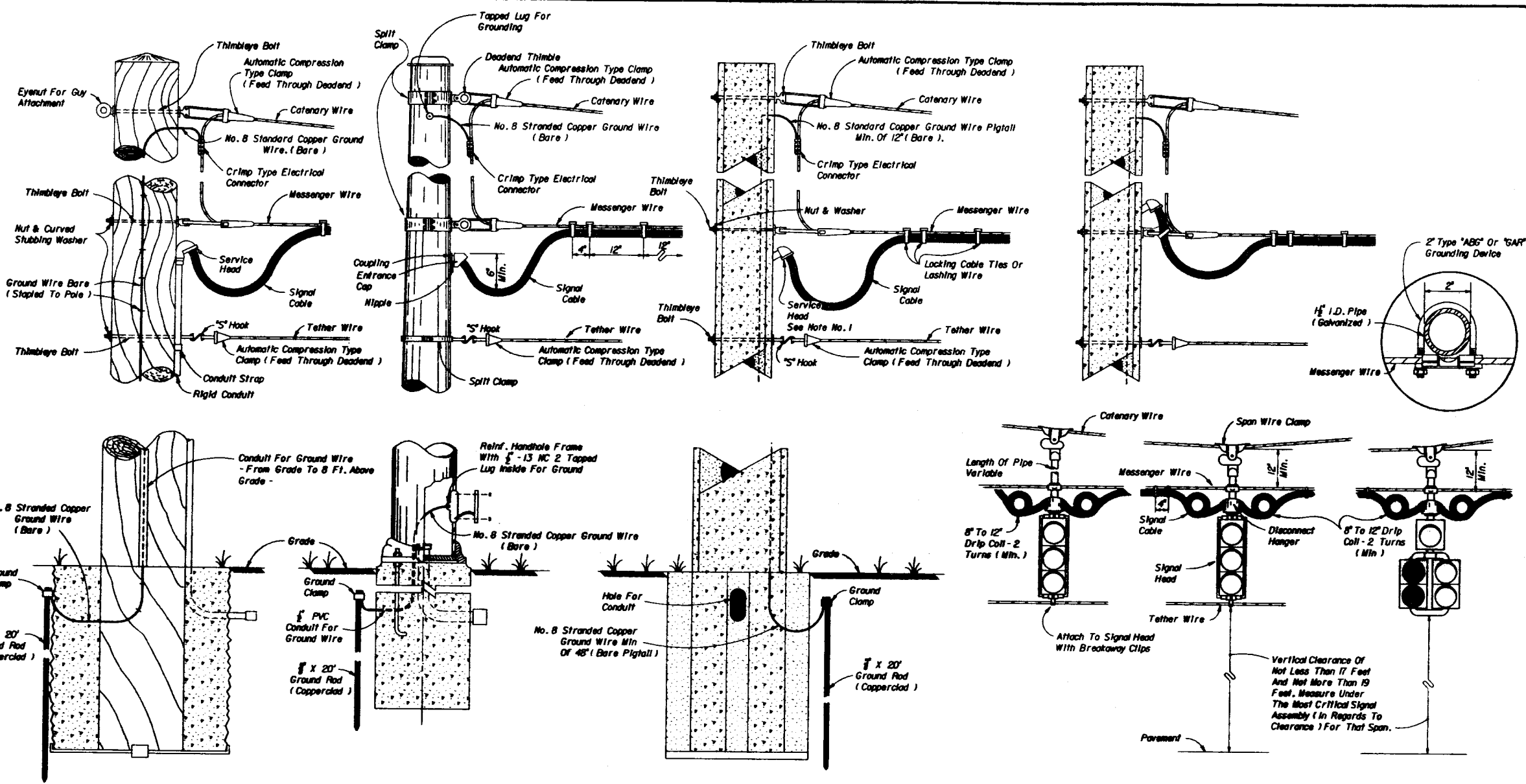
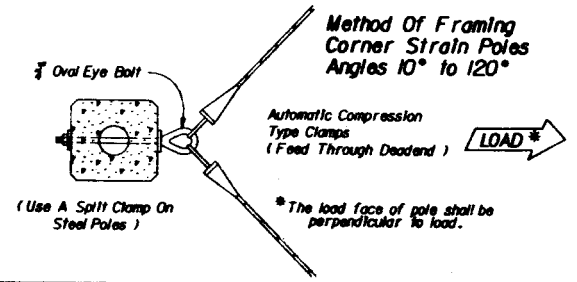


FIGURE C
FOR USE UNDER RAILROADS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
CONDUIT INSTALLATIONS DETAILS			
Designed By	Drawn By	Checked By	Approved By <i>Blasquez</i>
F.S.R.A. Approved		Sheet No. 2 of 2	Index No. 17721



- Notes:
1. The service head hole for joint use poles may be drilled by the utility company at an angle of 90° but not less than 45° to the face of the pole.
 2. Lashing wire should normally be used for distances of 12' feet or greater.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
SIGNAL CABLE & SPAN WIRE INSTALLATION DETAILS			
Designed By	Drawn By	Checked By	Approved By
			<i>Charles A. Scott</i>
Revision No.	Sheet No.	Index No.	
		1 of 1	
F.J.R.A. Approved		17727	

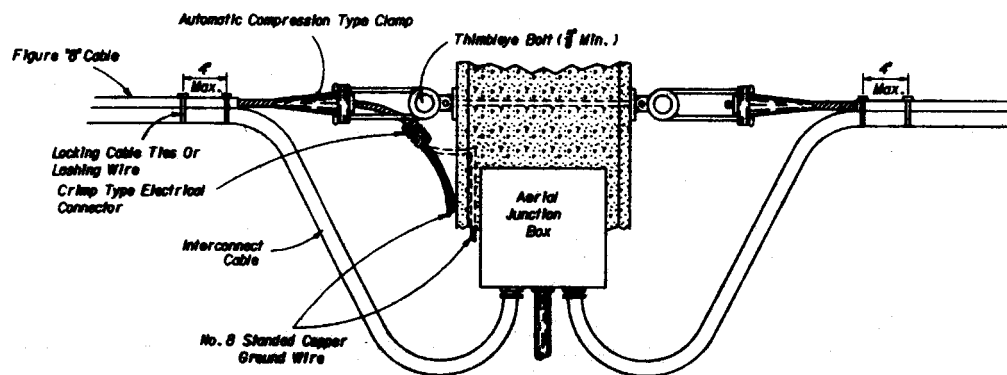


FIGURE A
CABLE DROP AND
TERMINATION DETAIL
AERIAL INTERCONNECT FIGURE "B"

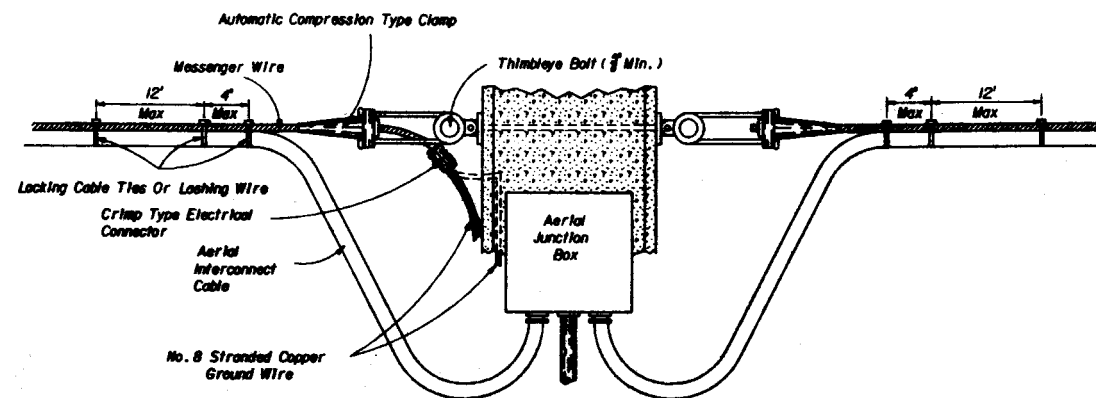


FIGURE B
CABLE DROP AND
TERMINATION DETAIL
AERIAL INTERCONNECT MESSENGER
WIRE WITH CLAMPS

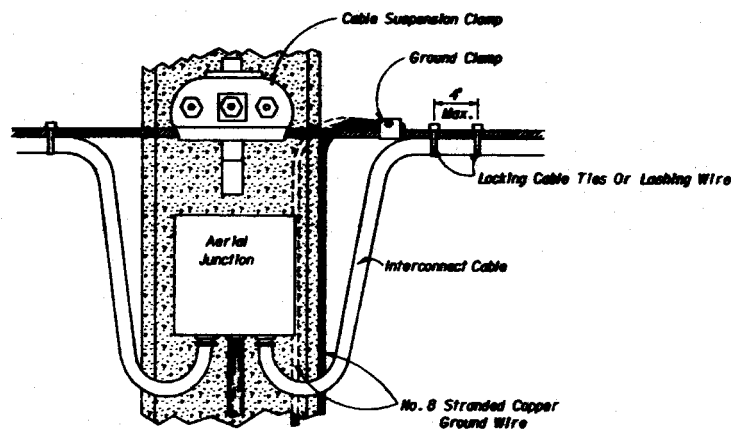


FIGURE C
CABLE DROP DETAIL
AERIAL INTERCONNECT MESSENGER
WIRE WITH CLAMPS

Notes:

1. The messenger wire of the interconnect cables shall be grounded to the copper ground wire of the pole or to the external wire extending down the pole.
2. When utilizing the external ground wire to the pole, a piece of $\frac{1}{2}$ rigid conduit shall extend up the pole externally to a point eight (8) feet above finish grade to protect the ground wire connecting the messenger wire to the ground rod.
3. Lashing cable ties or lashing wire when used shall be placed no further than one (1) foot apart except at the point of cable drop or terminations where one (1) shall be placed at the point where the cables separate from the messenger wire and another placed four (4) inches (max) from that tie. When using Figure "B" interconnect cable only the lashing cable ties shall be used.
4. If accessible the internal ground wire of the support pole may be used to ground the messenger wire.
5. Lashing wire should normally be used for distances of 12 feet or greater.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
AERIAL INTERCONNECT			
Designed By	Checked	Approved By <i>Clark A. Scott</i>	
Drawn By		Station No.	Sheet No.
Reviewed By			Index No.
F.J.W.A. Approved		1 of 1	17733

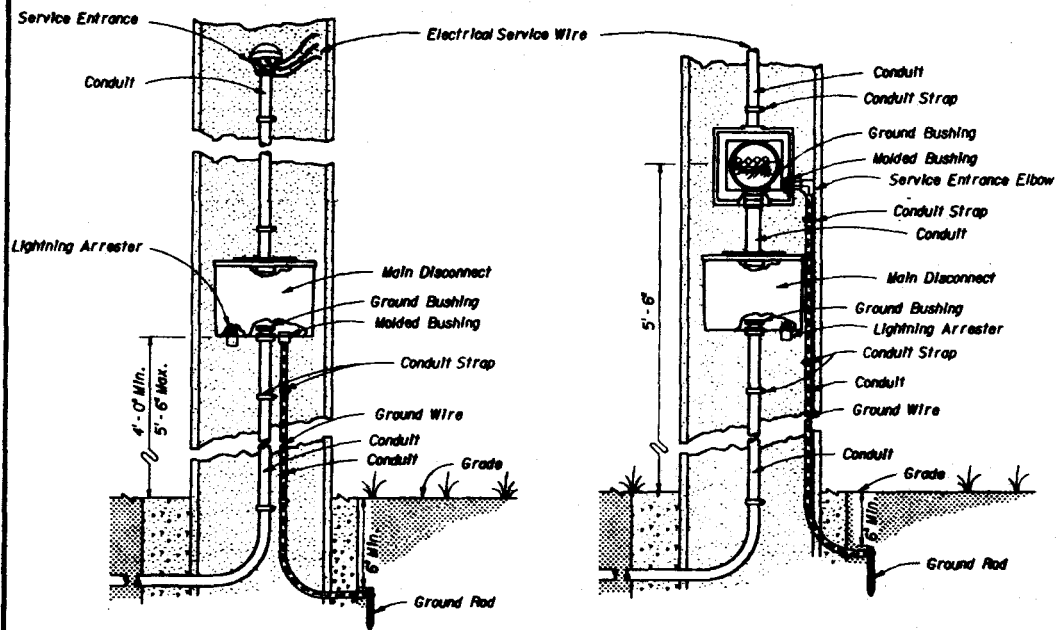


FIGURE A
AERIAL FEED
(NO METER USED)

FIGURE B
AERIAL FEED
(METER USED)

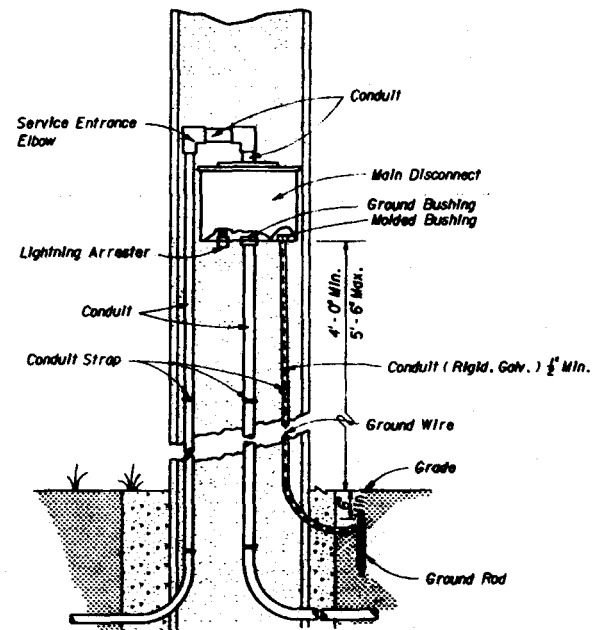


FIGURE C
UNDERGROUND FEED
(NO METER USED)

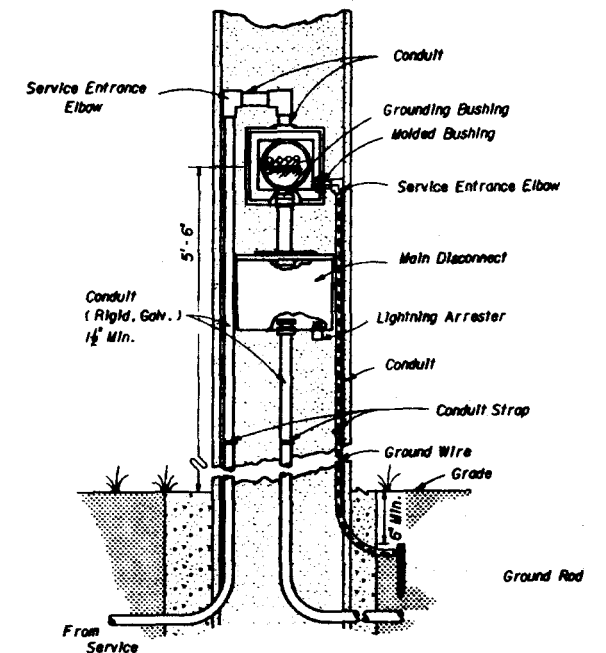


FIGURE D
TYPE "B" UNDERGROUND FEED
(METER USED)

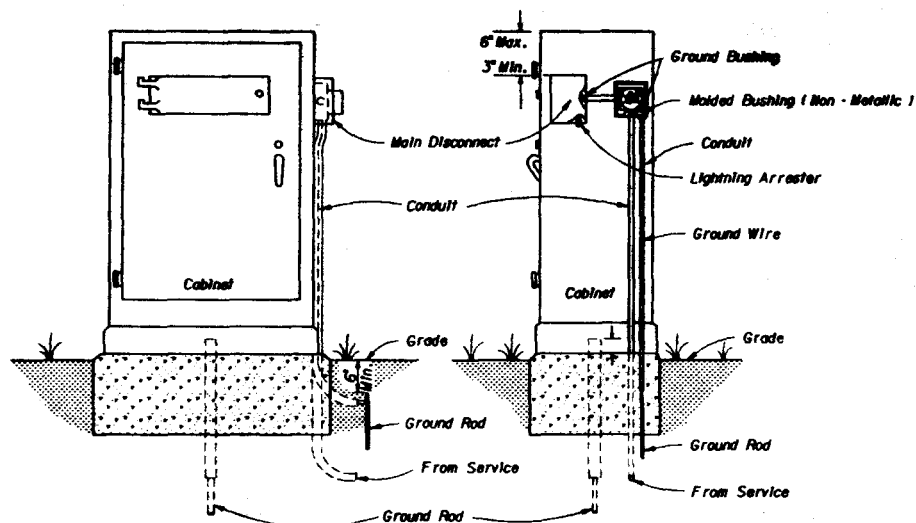


FIGURE E
UNDERGROUND CABINET MOUNT
(METER USED)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
ELECTRIC POWER SERVICE			
Designed By	Checked By	Approved By	<i>Clark G. Scott</i>
Drawn By	Date	02/00	
Checked By	J.R.B.	Sheet No.	1 of 1
F.L.R.A. Approved			17736

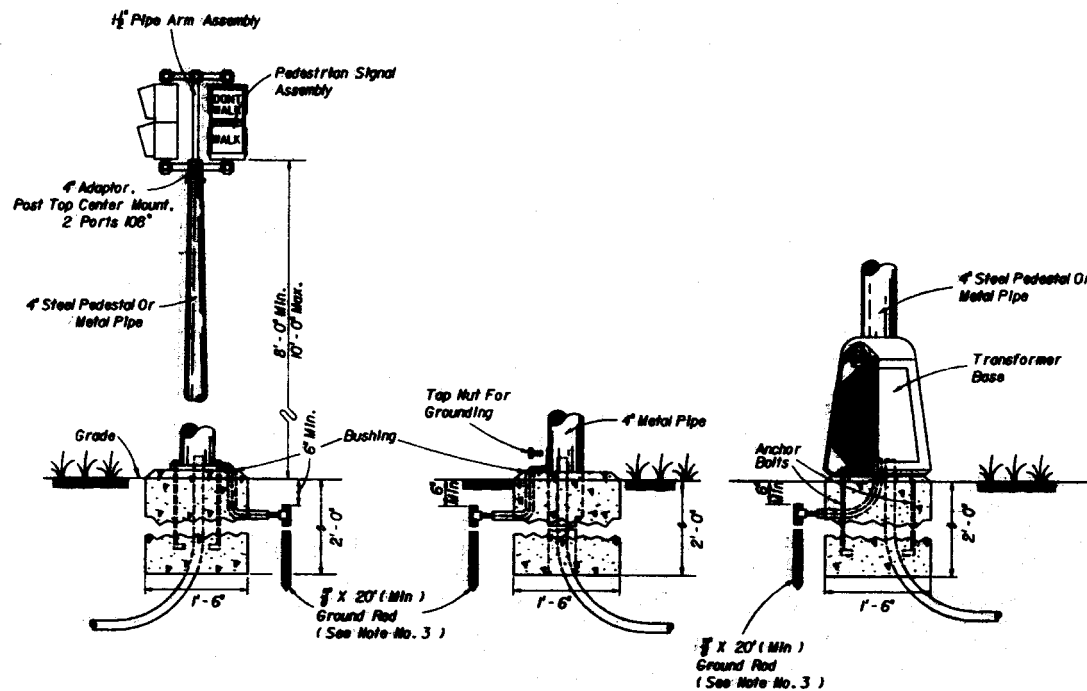


FIGURE A

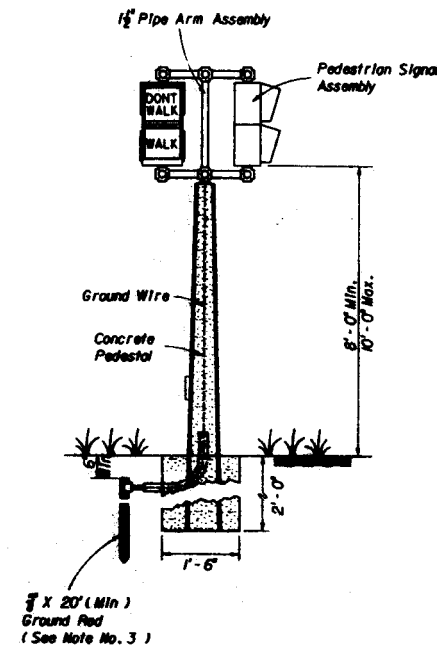


FIGURE B

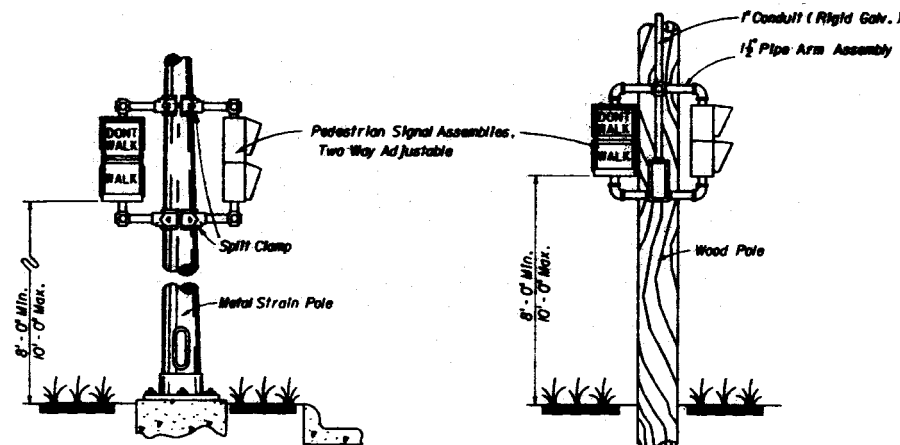


FIGURE C

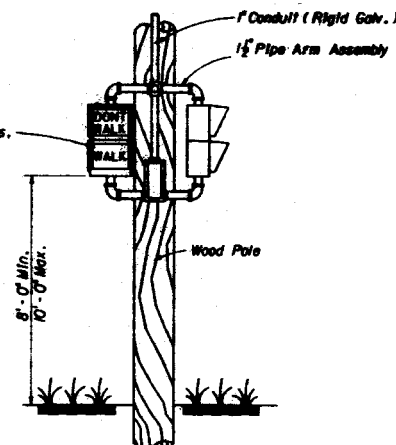


FIGURE D

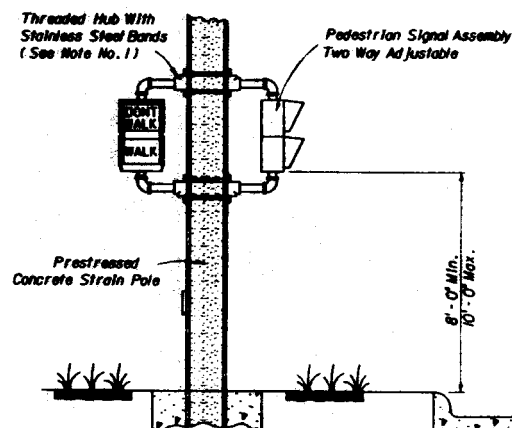


FIGURE E

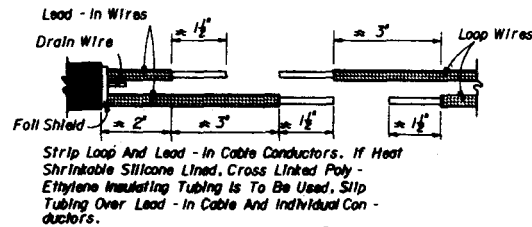
Notes:

1. As an option, the contractor will be allowed to install pedestrian signals on concrete poles and pedestals with the use of lead anchors (two bolts same size per hub.) in lieu of the standard steel bands.
2. Holes drilled or punched in metal poles or pedestals shall be thoroughly reamed, cleaned of all burrs and covered with two (2) coats of zinc rich paint. As specified in the standard specifications for road and bridge constructions. Grommets or bushings shall be installed in holes.
3. Grounding to be in accordance with section 620 of the standard specifications.

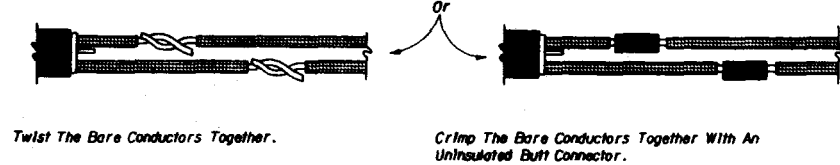
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
PEDESTRIAN CONTROL SIGNAL INSTALLATION DETAIL			
Designed By	Checked	Approved By <i>Charles A. [Signature]</i>	
Drawn By	MR	09/80	
Created By		Revision No.	Sheet No.
F.D.R.A. Approved		1 of 1	17764

DETAILS FOR SPLICING LOOP WIRE TO LEAD-IN WIRE

STEP 1



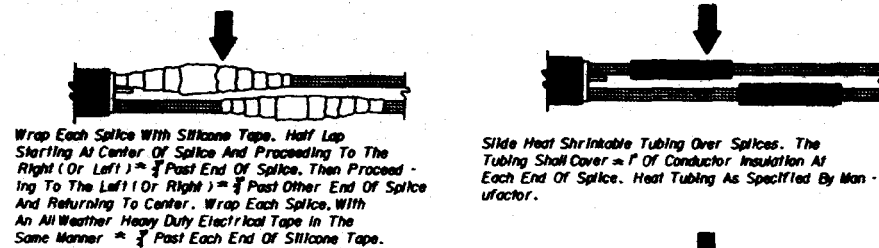
STEP 2



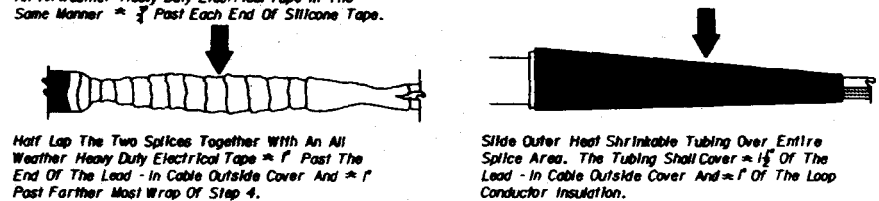
STEP 3



STEP 4



STEP 5



GENERAL NOTES

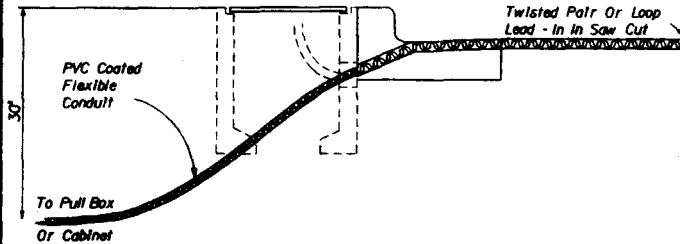
- 1 If the loop lead-in is 75' or less from the edge of the loop to the detector or controller cabinet, continue the twisted pair to the cabinet. If the loop lead-in is greater than 75', continue the twisted pair to the specified pull box, splice to shielded lead-in wire and continue to the detector or controller cabinet. (This note does not apply to Type H).
- 2 The maximum saw cut depth shall be 1 1/2" on resurfacing or new roadway construction projects requiring loop installations, loop and lead-ins may be installed in the asphalt base prior to the placement of the final asphalt wearing surface, provided that the bottom of the loop wire is not greater than 2" below the final wearing surface.
- 3 The width of saw cuts shall be sufficient to allow unforced placement of loop wires or lead-ins into the saw cut but not greater than 3/4".

- 4 A nonmetallic hold down material shall be used to secure loop wires and lead-ins to the bottom of saw cuts. Hold down material shall be placed at approximately one foot intervals around loops and two foot intervals on lead-ins.
- 5 A minimum cover of 3/4" to 1" of sealant material shall be provided in the saw cut between the upper most loop wire or lead-in and the roadway wearing surface excluding the overlay.
- 6 The minimum distance between the twisted pairs of loop lead-in wire is 6" from edge of curb or roadway to loop.

TWISTED PAIR AND LOOP LEAD-IN INSTALLATION WITH CURB & GUTTER

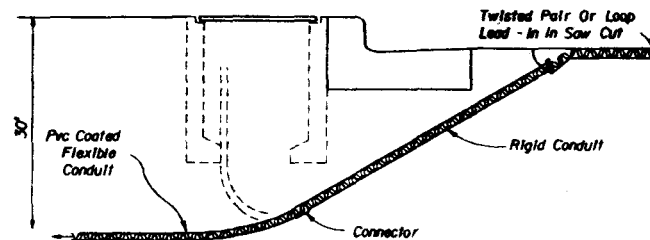
ALTERNATIVE 1

Drill A Hole Through The Curb At The Point Which The Required Saw Cut Depth Is Obtained Just Prior To Cutting The Top Inside Edge Of The Curb. Slide A Section Of Flexible Conduit At Least 6" Into The Hole From The Back Side Of The Curb But Not Within 2" Of The Top Of The Hole. The Conduit Shall Fit Snug Within The Drilled Hole. Fill The Top Of The Hole With Loop Sealant To The Level Of The Curb Surface. A Nonmetallic Material Should Be Used To Prevent Excessive Loop Sealant From Entering The Flexible Conduit.



ALTERNATIVE 2

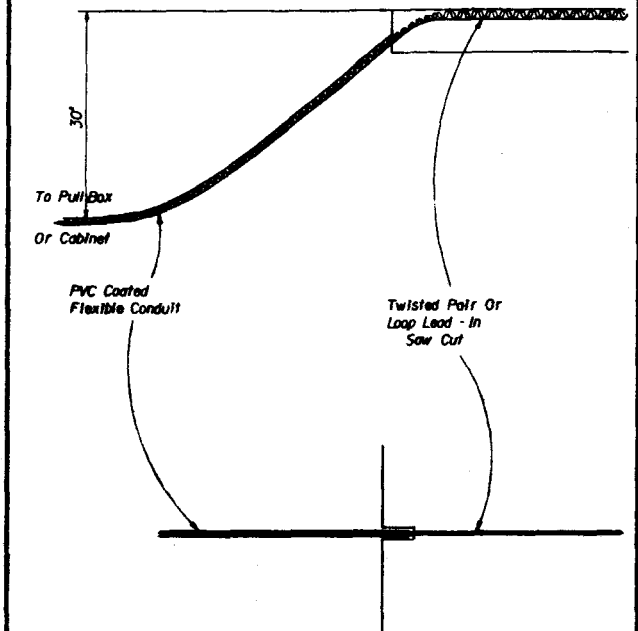
Drill A Hole, 1/2" To 1" Larger In Diameter Than The Rigid Conduit To Be Used, Through The Roadway Asphalt (Or Concrete) Surface And Base At An Appropriate Angle To Intercept The Trench Or Pull Box Hole. Place A Predetermined Length Of Rigid Conduit In The Hole And Drive The Conduit Into The Trench Or Hole. Install A Molded Bushing (Nonmetallic) On The Roadway End Of The Rigid Conduit. The Top Of The Rigid Conduit Shall Be Approximately 2" Below The Roadway Surface. Fill The Hole With Loop Sealant To The Level Of The Roadway Surface. A Nonmetallic Material Should Be Used To Prevent Excessive Loop Sealant From Entering The Rigid Conduit.



Note * Other alternatives may be approved by the state traffic operations engineer.

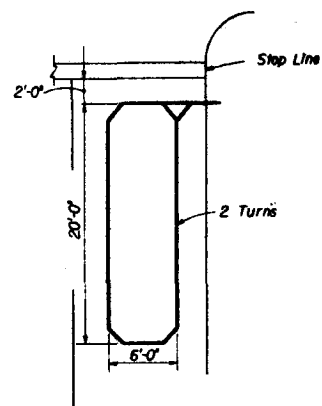
TWISTED PAIR AND LOOP LEAD-IN INSTALLATION WITHOUT CURB & GUTTER

Cut A Slot In The Edge Of The Roadway Of Sufficient Size And Depth To Snugly Place The End Of The Flexible Conduit. The End Of The Conduit Shall Be At Least 6" Into The Roadway And 2" Below The Top Of The Roadway Surface. The Departure Angle Of The Conduit From The Roadway Shall Be 30° To 45°.

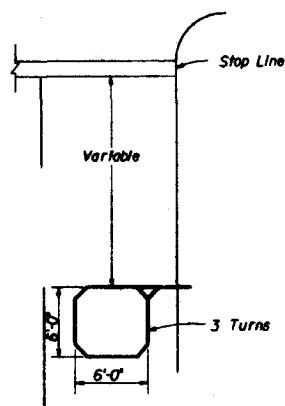


Note * Other alternatives may be approved by the state traffic operations engineer.

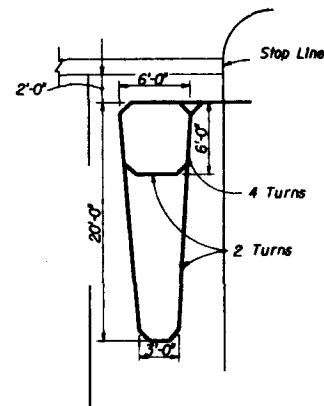
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
VEHICLE LOOP INSTALLATION DETAILS			
Designed By	Drawn By	Checked By	Approved By
			Clark G. Hatt
Revision No.	Sheet No.	Title No.	
		F.J.R.A. Approved	
1 of 2		17781	



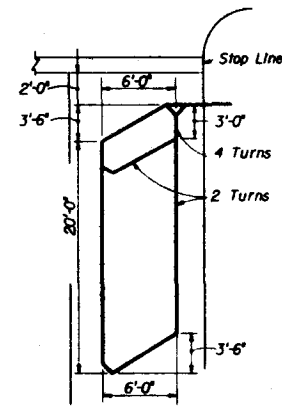
TYPE A



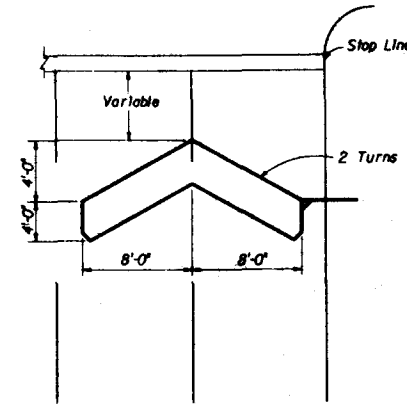
TYPE B



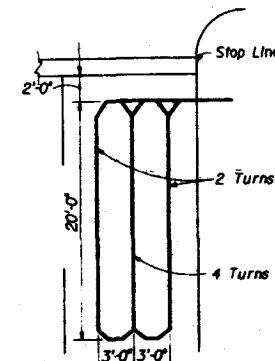
TYPE C



TYPE D

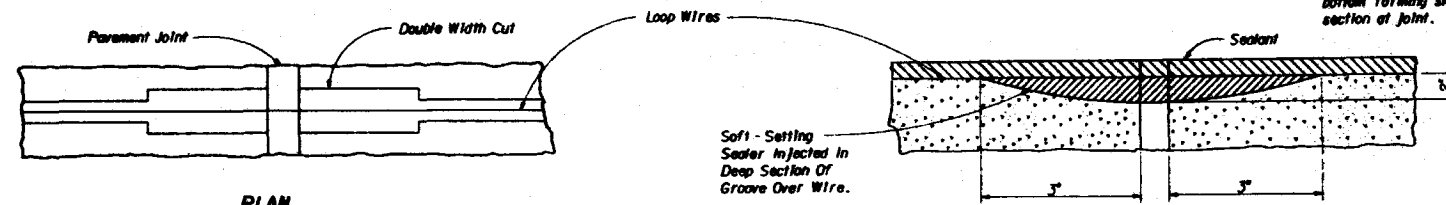


TYPE E



TYPE F

Note: Loop conductors must follow saw cut to bottom forming stock section of joint.



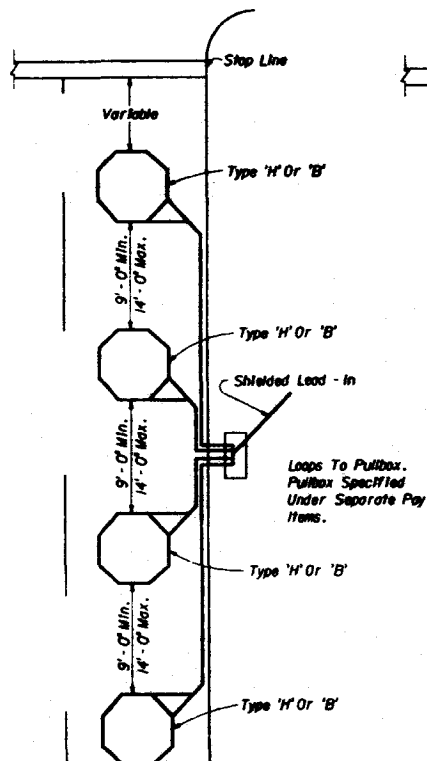
PLAN

CONCRETE PAVEMENT EXPANSION JOINTS

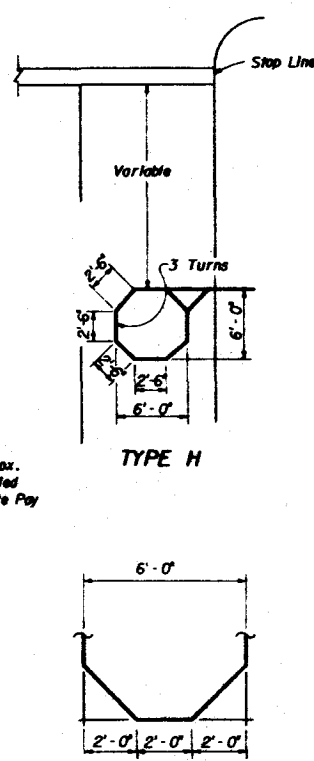
VERTICAL SECTION

Notes:

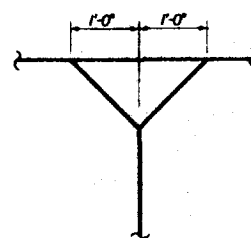
1. The "number of turns" indicated at the specified point on the loop refers to the number of passes of loop wires which are placed in the saw cut in forming the complete loop.
2. Loop types or details not drawn to scale.
3. Loop types are centered in a single lane except type E which is centered in two lanes.
4. The number of individual loops in the type G loop may vary up to a maximum of four (4).



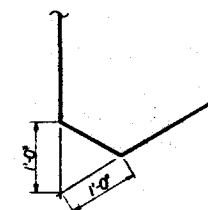
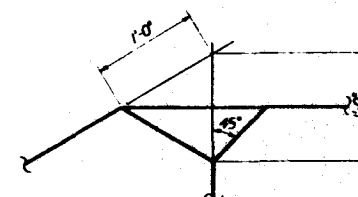
TYPE G



TYPE H



LOOP CORNER AND LEAD-IN DETAILS



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
VEHICLE LOOP INSTALLATION DETAILS			
Designed By	Checked By	Approved By	11/11/11
Drawn By	Reviewed By	Revision No.	2 of 2
Field No.	17781		

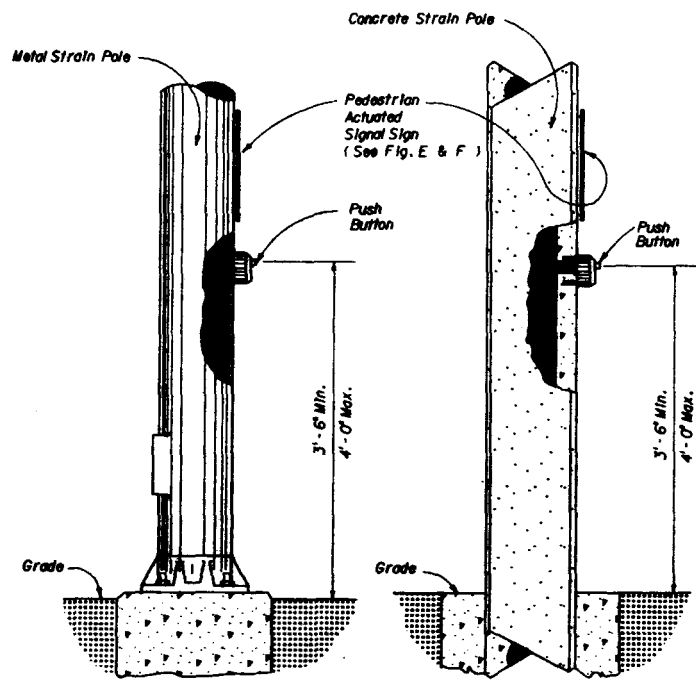


FIGURE A
POLE MOUNTED
DETECTOR STATION

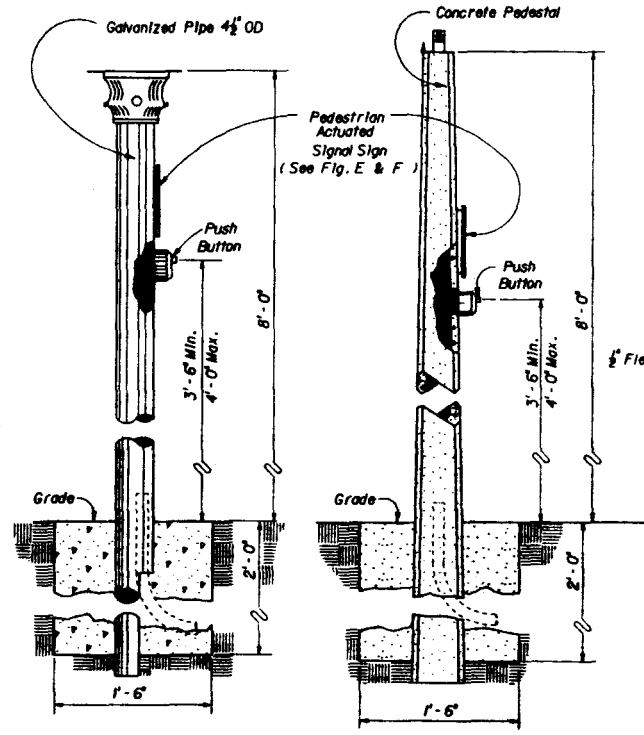


FIGURE B
PEDESTAL STATION
DETECTOR STATION

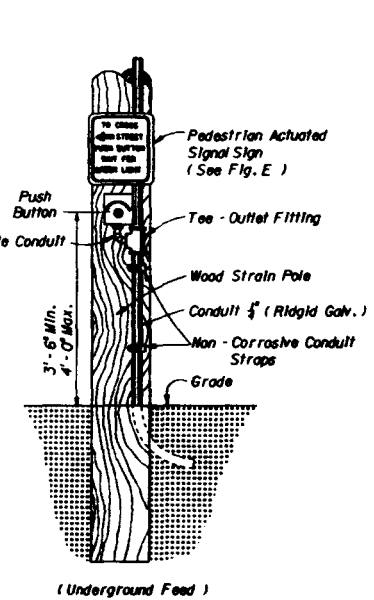


FIGURE C
WOOD POLE MOUNTED
DETECTOR STATION

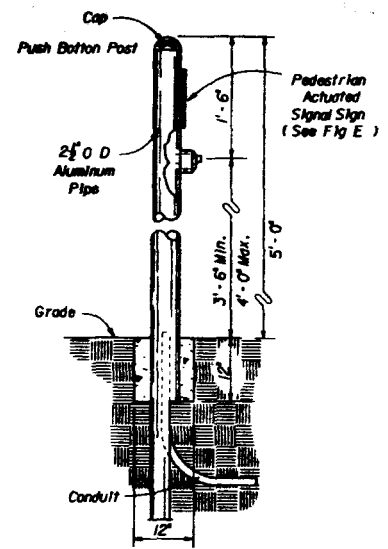
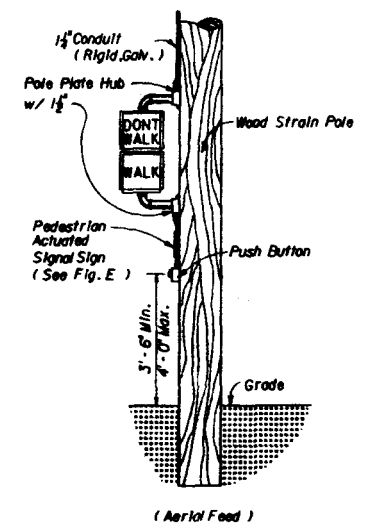


FIGURE D
POST DETECTOR STATION
DETECTOR STATION

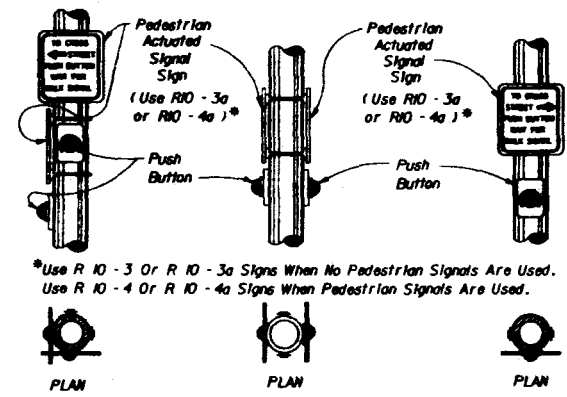


FIGURE E

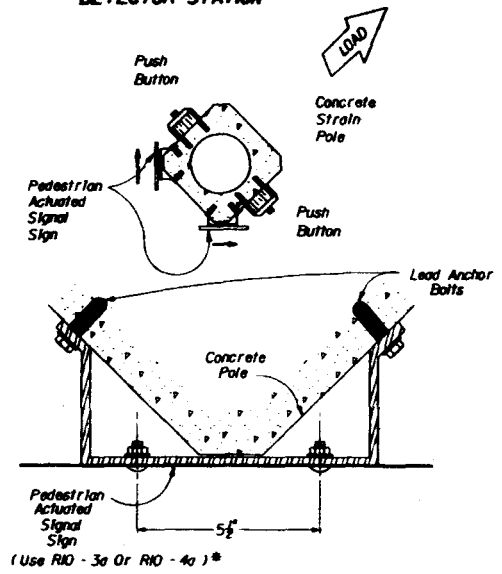
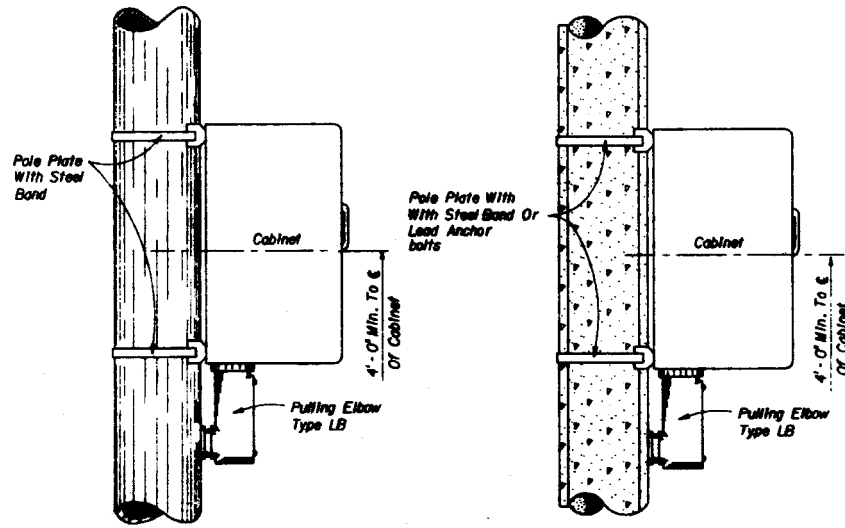


FIGURE F

Notes

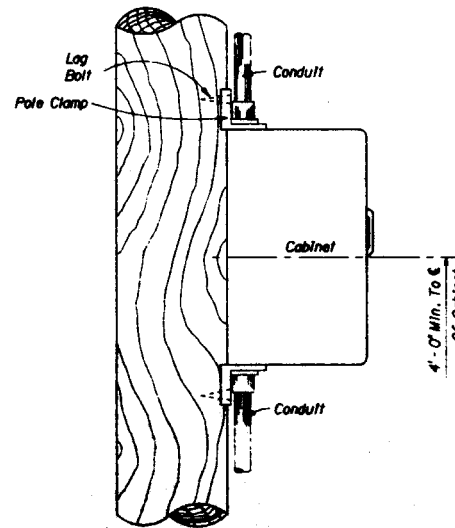
- 1 Signs (RIO - 3a & RIO - 4a) shall be mounted above detectors, explaining their purpose and use.
- 2 The positioning of pedestrian push button should clearly indicate which crosswalk signal is actuated by each push button.
- 3 Push buttons and signs are to be mounted in accordance with standard specifications.
- 4 Ground to be in accordance with section B620 of standard specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
PEDESTRIAN DETECTOR ASSEMBLY INSTALLATION DETAILS			
Designed By J.M.C.	Drawn By	Checked By	Approved By <i>Charles A. Scott</i>
Contract No.	Sheet No.	Sheet No.	Index No.
F.H.S.A. Approved	1 of 1	17784	



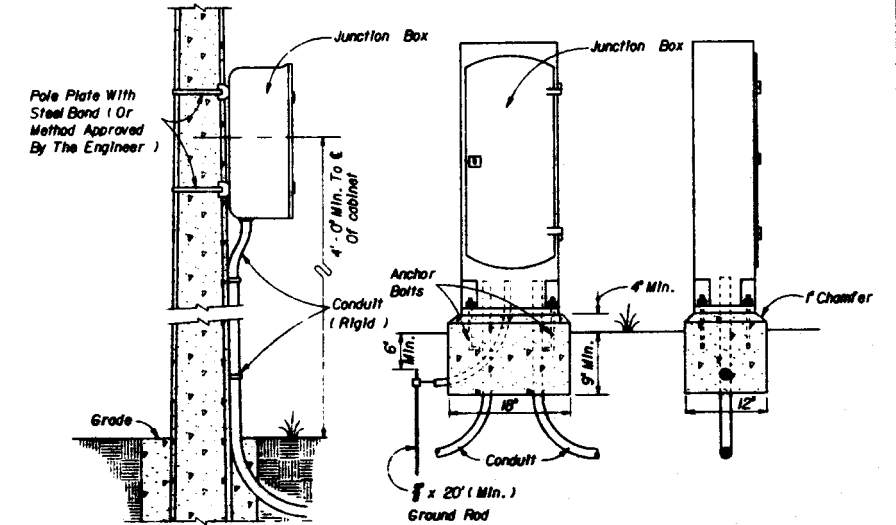
METAL POLE

CONCRETE POLE



WOOD POLE

POLE MOUNTED CABINET



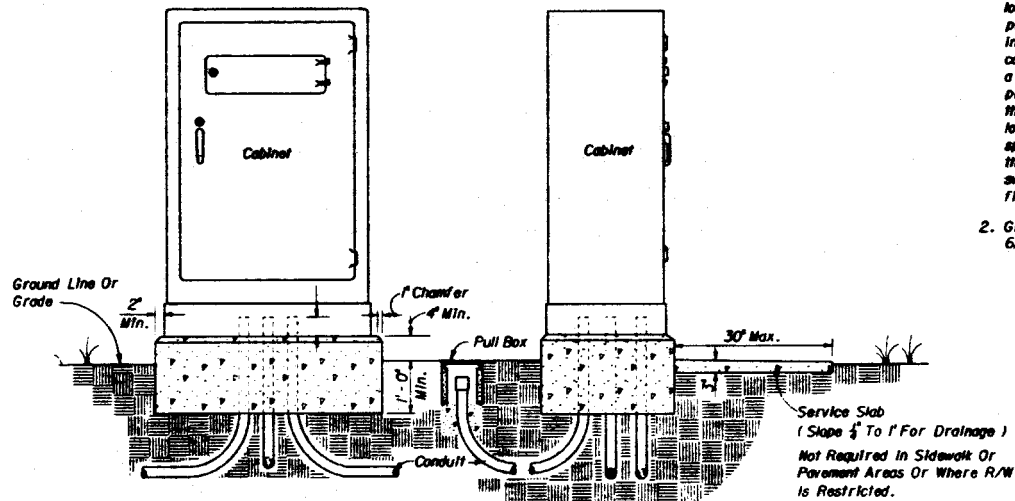
POLE MOUNTED

BASE MOUNTED

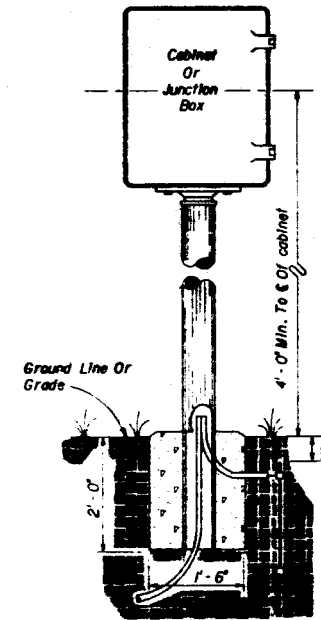
INTERCONNECT JUNCTION BOX

Notes:

1. The number, size and orientation of conduit sweep will vary according to site condition or locations. One spare 2" PVC conduit shall be provided in all bases. The spare shall exit in the direction of the center rear of the cabinet base, into a pull box and capped with a weather tight fitting. If obstructions prevent the spare conduit from exiting to the rear, or the rear of the cabinet is located on the R/W line, a side exit of the spare conduit will have to be approved by the project engineer. All spare conduit sweeps shall be capped with a weather proof fitting.
2. Grounding to be in accordance with section 620 of the Standard Specifications.

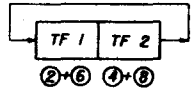
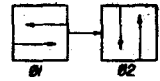


BASE MOUNTED CABINET

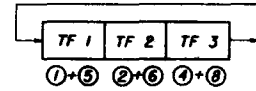
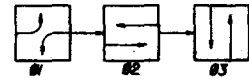


PEDESTAL MOUNTED

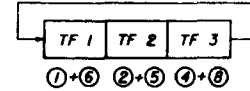
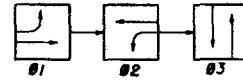
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
CABINET INSTALLATION DETAIL			
Designed By MEK	Date 05/19/82	Approved By <i>Charles A. Best</i>	
Drawn By MEK	Date 05/24/82	Revision No.	Sheet No.
Checked By			1 of 1
F.H.W.A. Approved		17841	



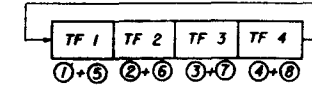
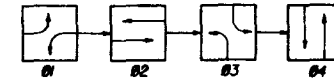
SOP 1



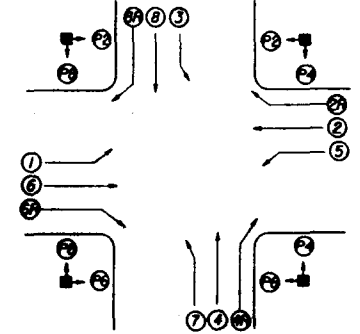
SOP 2



SOP 3

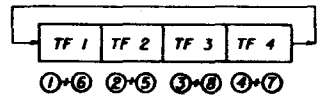
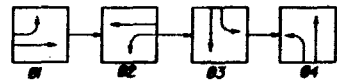


SOP 4

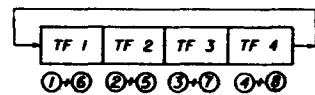
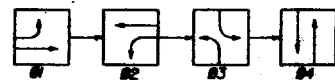


SIGNALIZED INTERSECTION
Vehicle movements & signal head number assignments are not directionally oriented but shall maintain their relative orientation about the intersection (i.e. movements 7 and 4 are always to the right of movements 1 and 6 etc.)

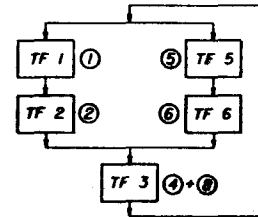
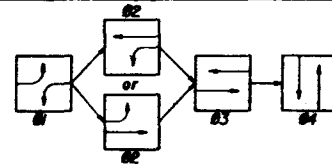
- LEGEND**
- ① Vehicle Movement Number
 - ② Pedestrian Movement Number
 - TF Timing Function Number
 - Phase Number
 - Green Arrow (Left or Right)
 - Red Arrow
 - Yellow Arrow



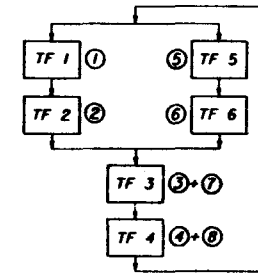
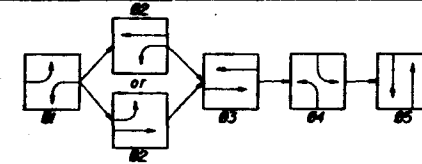
SOP 5



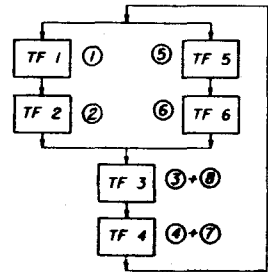
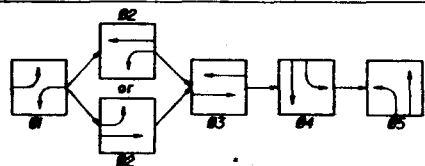
SOP 6



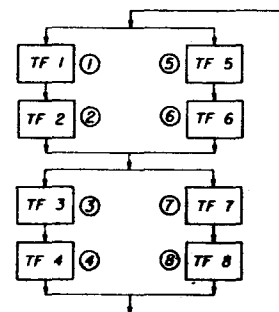
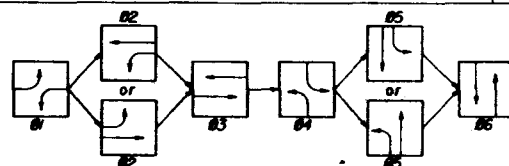
SOP 7



SOP 8



SOP 9



SOP 10

SIGNAL CLEARANCE TABLE

(Blank Indicates No Clearance Required)

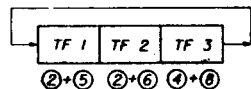
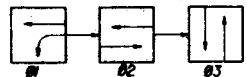
From To	SIGNAL INDICATIONS									
	R	LR	G	GL	GL	WALK	DONT WALK			
R			Y	Y	Y	Y				
LR			Y	Y	Y	Y				
G				Y	Y					
GL					Y					
GL										
WALK										
DONT WALK										

* Clearance Indication When Yellow Arrow is Used.

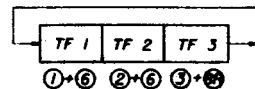
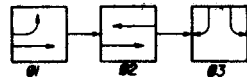
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

STANDARD SIGNAL OPERATING PLANS

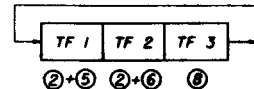
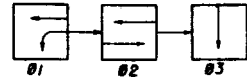
Designed By	Drawn	Revised	Approved By	Checked By	Issue No.
Drawn By	J.B.C.	04/25/79	Checked By	J.B.J.	1 of 2
Checked By	J.B.J.		Revised By		17870
F.U.R.A. Approved					



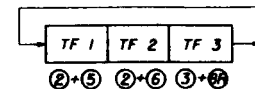
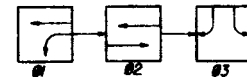
SOP 11



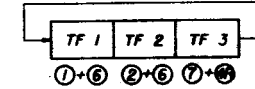
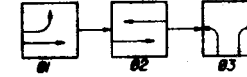
SOP 12



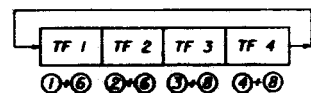
SOP 13
(ONE-WAY STREET INTERSECTION)



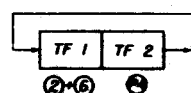
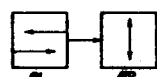
SOP 14
(DIAMOND INTERCHANGE OPERATION)



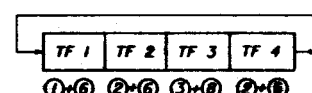
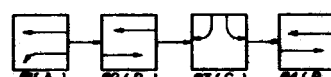
SOP 15
(DIAMOND INTERCHANGE OPERATION)



SOP 16

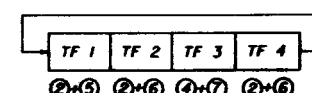
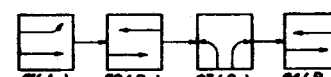


SOP 17
(IND - BLOCK)



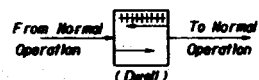
NOTE:
Only 02 Or 04 Used, Not Both To Obtain
ABC, Or ACB Operation.

SOP 18
(DIAMOND INTERCHANGE OPERATIONS)

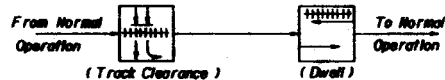


NOTE:
Only 02 Or 04 Used, Not Both To Obtain
ABC, Or ACB Operation.

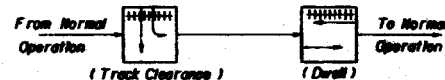
SOP 19
(DIAMOND INTERCHANGE OPERATIONS)



POP 1



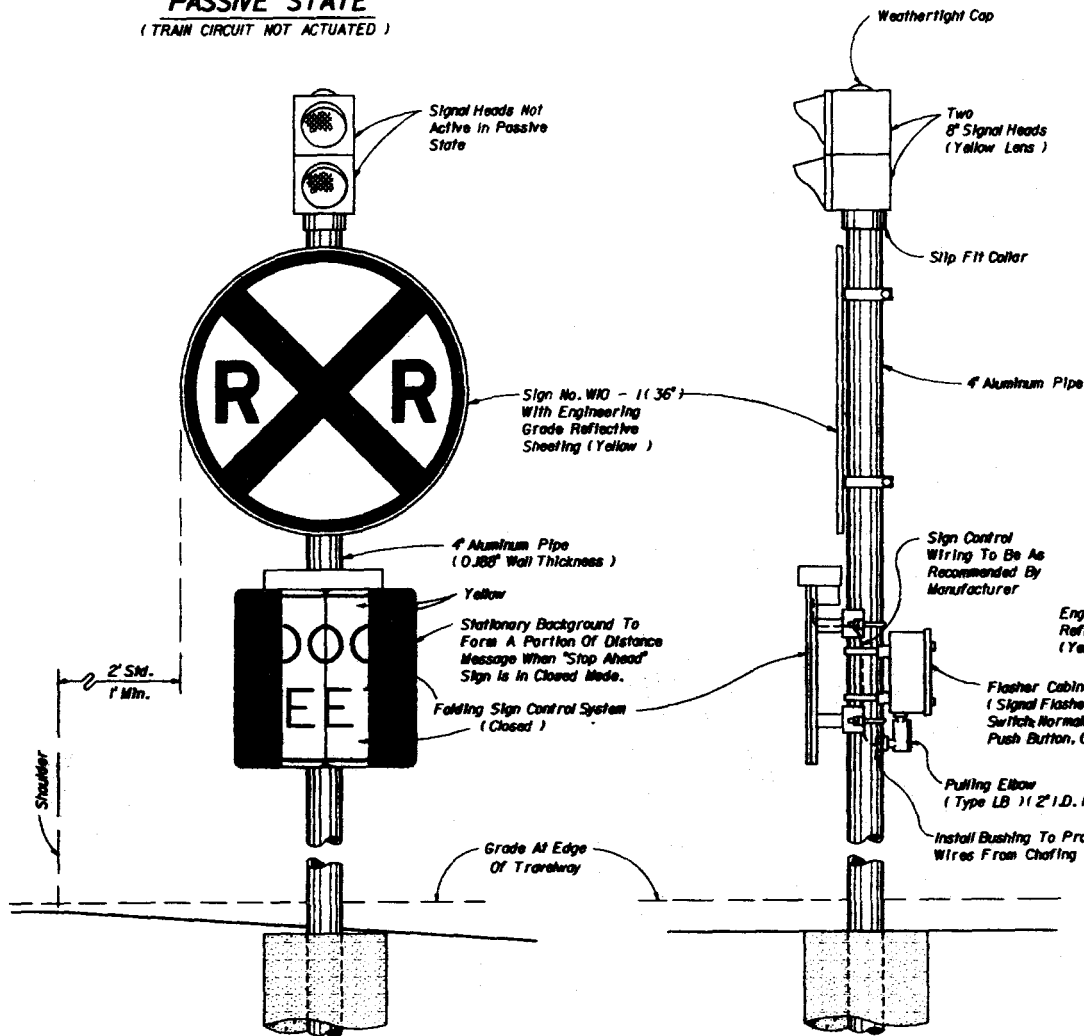
POP 2



POP 3

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
STANDARD SIGNAL OPERATING PLANS			
Designed By	Checked By	Approved By	
Drawn By	J.B.C.	08/28/79	
Checked By	J.B.J.		
F.N.B.A. Approved			
2 of 2		17870	

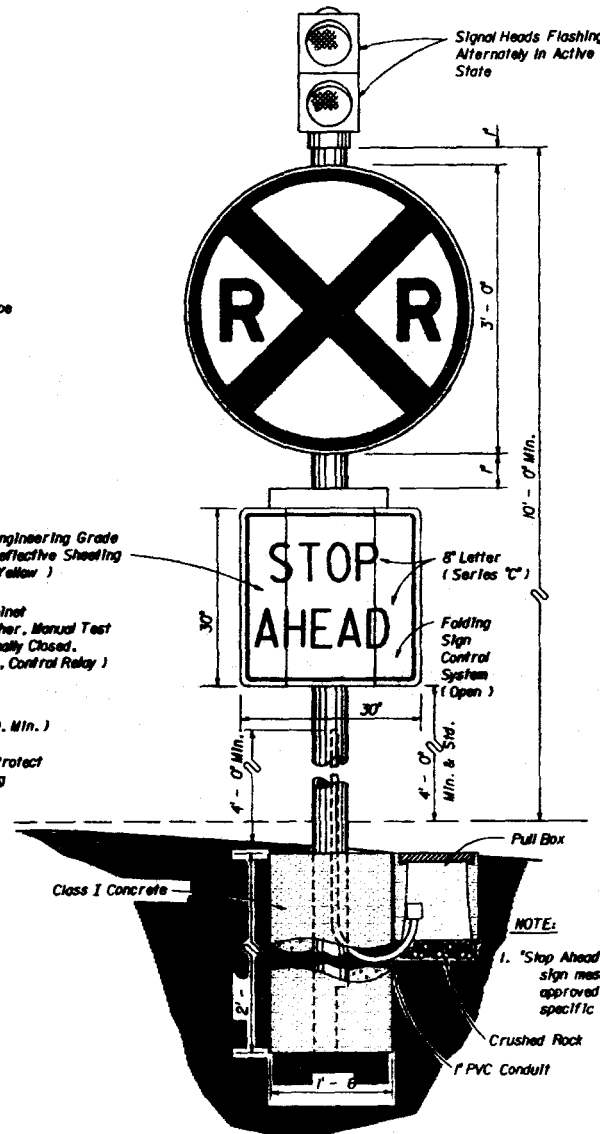
PASSIVE STATE (TRAIN CIRCUIT NOT ACTUATED)



FRONT VIEW

SIDE VIEW

ACTIVE STATE (TRAIN CIRCUIT ACTUATED)

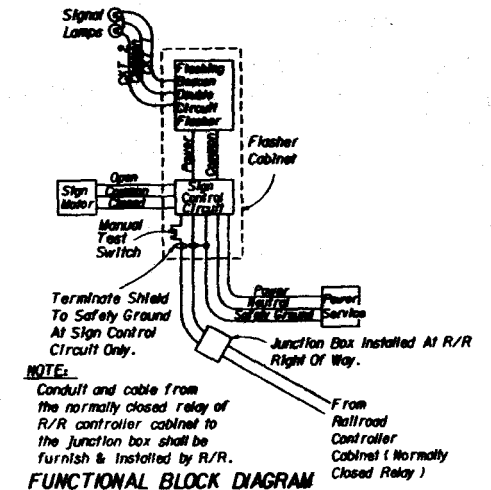
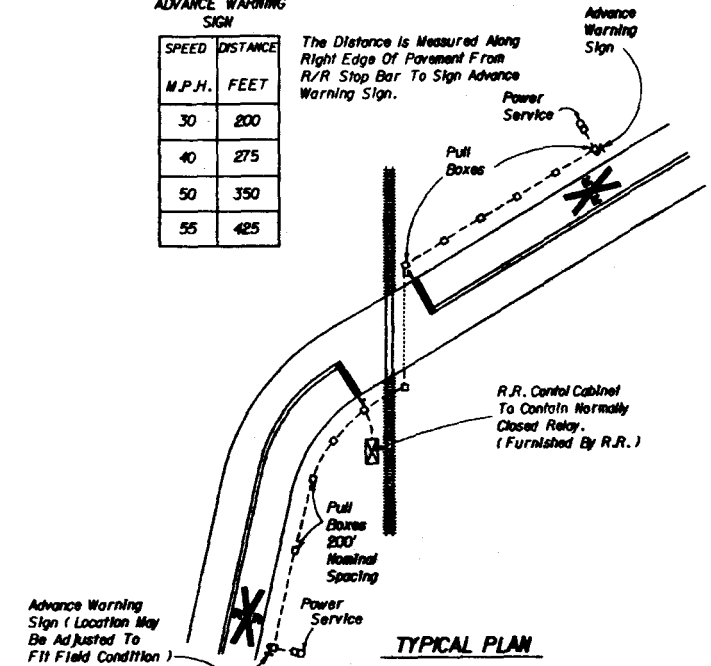


FRONT VIEW

LOCATION OF THE ADVANCE WARNING SIGN

SPEED M.P.H.	DISTANCE FEET
30	200
40	275
50	350
55	425

The Distance Is Measured Along
Right Edge Of Pavement From
R/R Stop Bar To Sign Advance
Warning Sign.

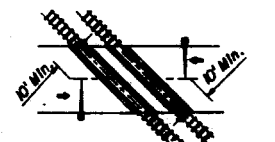
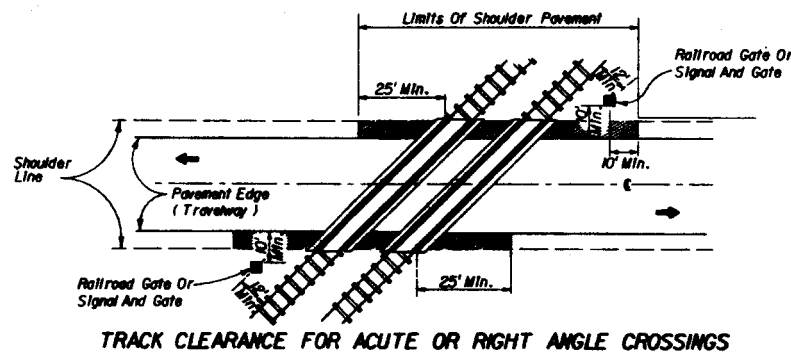


FUNCTIONAL BLOCK DIAGRAM

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

ADVANCE WARNING FOR R.R. CROSSING

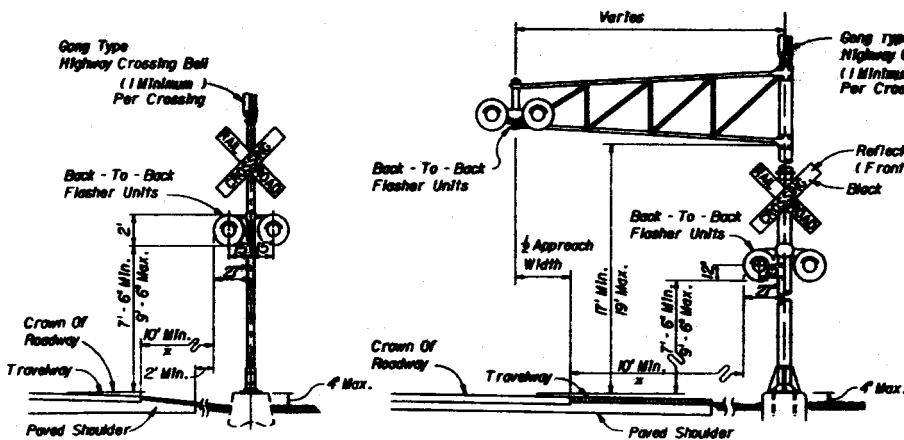
Designed By	CS	Date	8/8/75	Approved By	Charles A. Smith
Drawn By		Date	8/8/75	Revision No.	Sheet No.
Checked By		Date	8/8/75	Revision No.	Sheet No.
F.J.R.A. Approved				1 of 1	17881



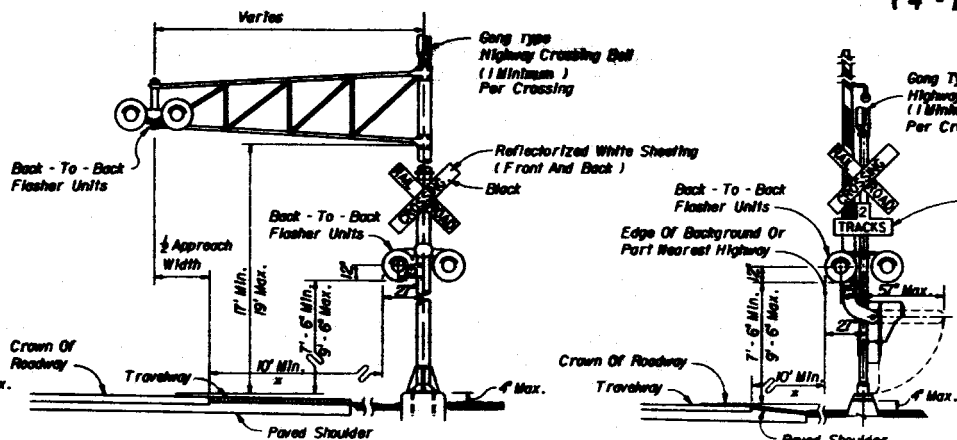
Typical Location Plan For Gate Or Flashing Signal With Gate When Tracks Are At Oblique Angle.

Note:
It is intended that the full shoulder width of the existing roadway be paved, where an existing shoulder is substantially substandard for the facility involved, the shoulder width should be upgraded to meet current standards.

SIGNAL PLACEMENT AT RAILROAD CROSSING (2 - LANE DESIGN)



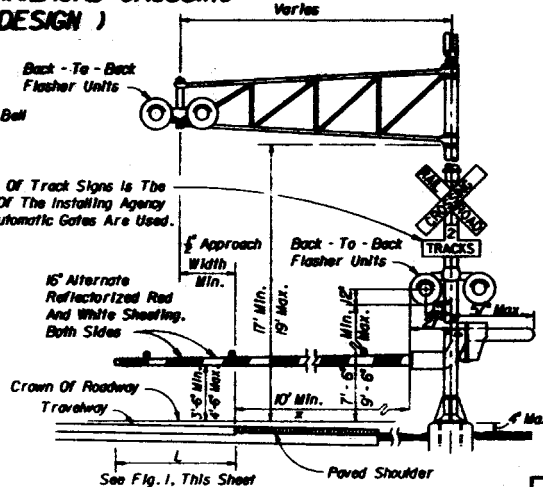
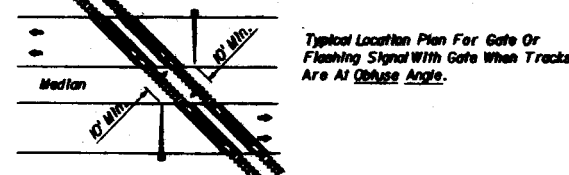
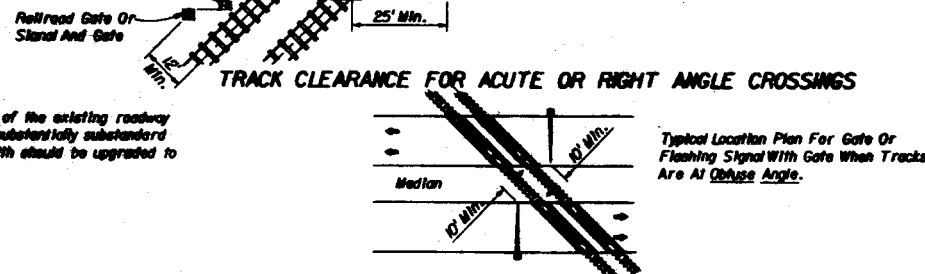
TYPE I



TYPE II

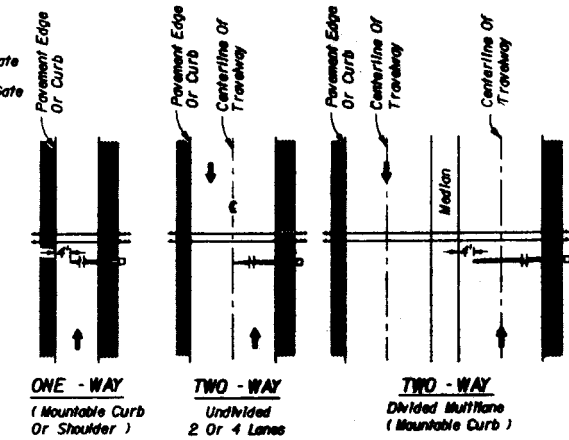
* Desirable minimum - where field conditions dictate absolute minimum may be as per index 700.

SIGNAL PLACEMENT AT RAILROAD CROSSING (4 - LANE DESIGN)



TYPE IV

Note:
Two separate foundations may be required (one for signals, one for gate), depending on type of equipment used.



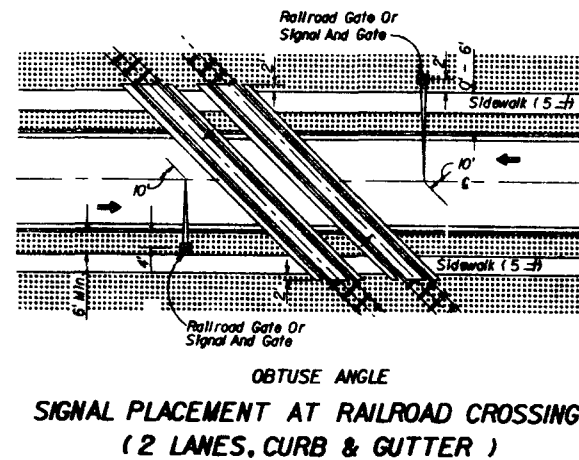
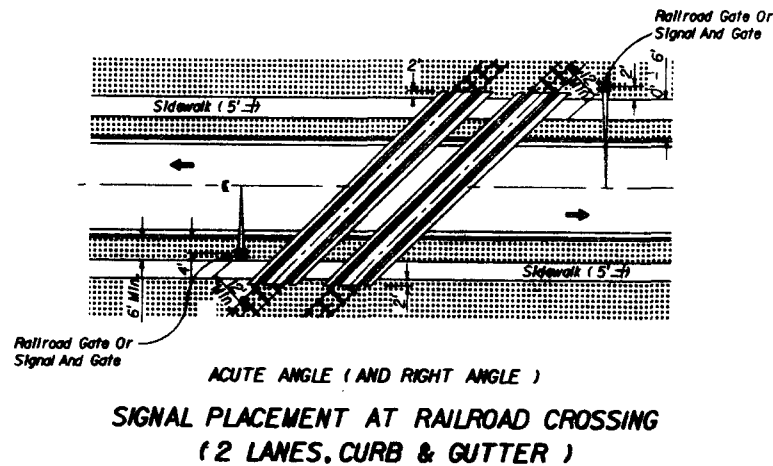
Note:
Arrows denote direction of travel not lane indication

FIGURE 1
Gate Length Requirements

General Notes

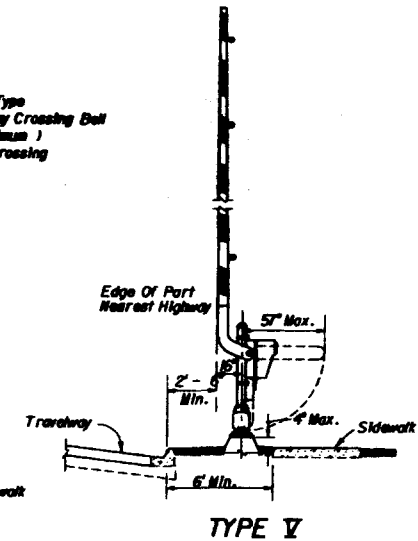
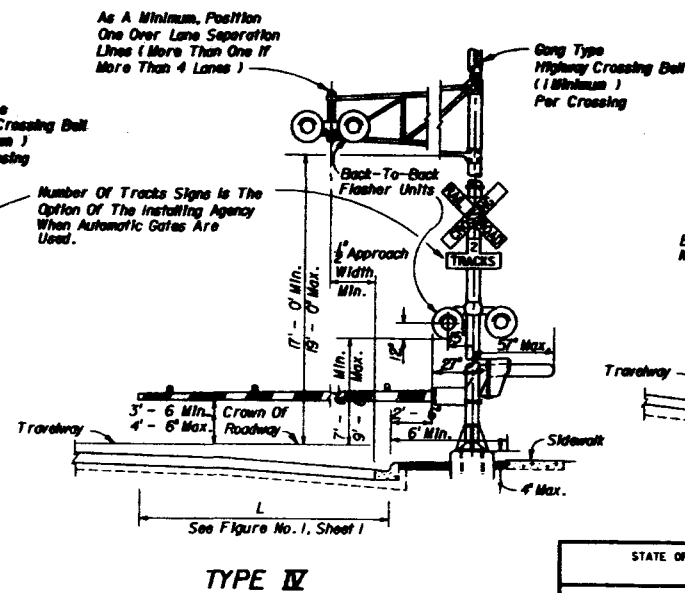
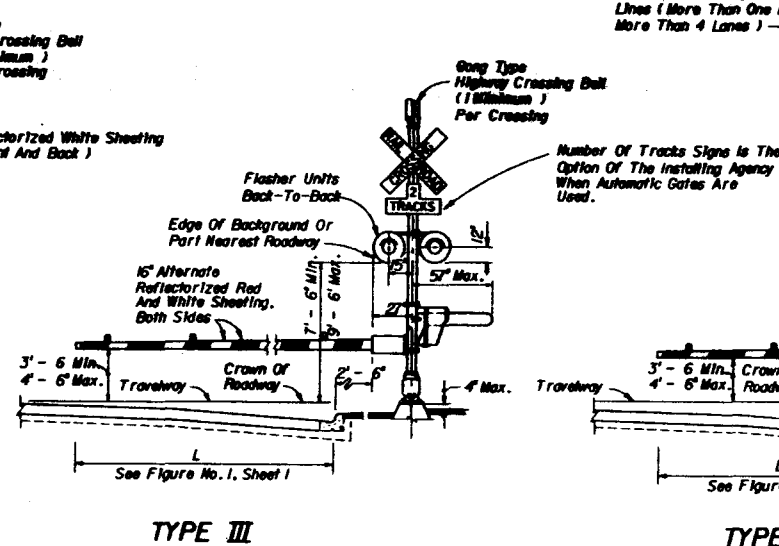
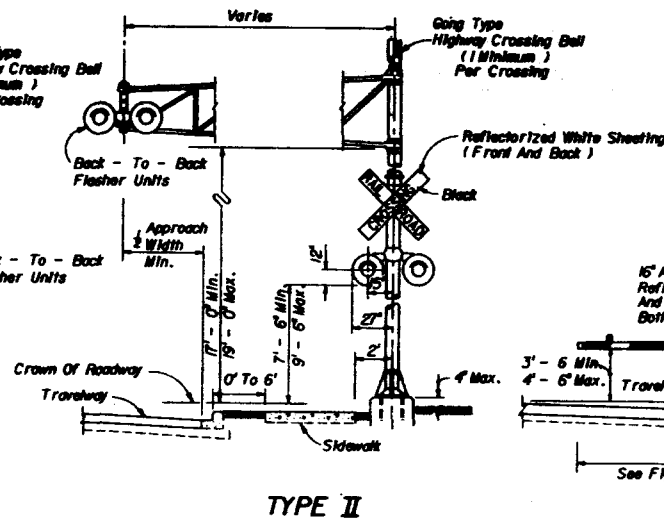
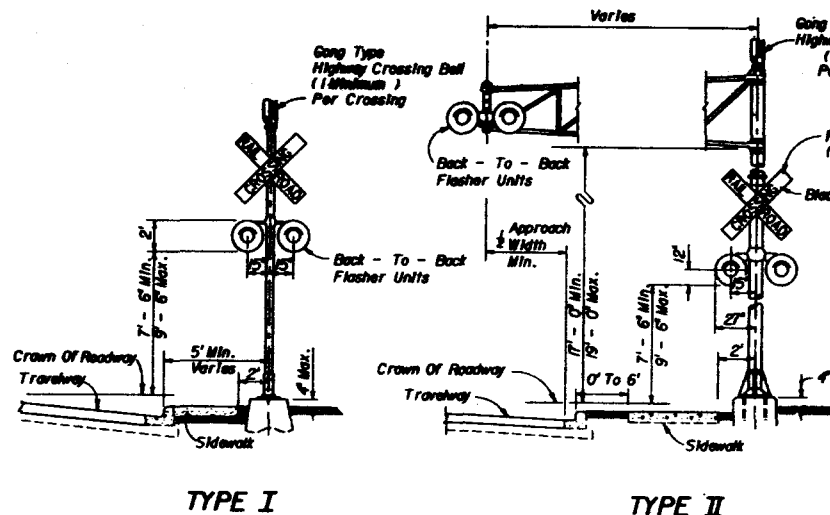
- No guardrail is proposed for signals, however, some form of impact attenuation device may be specified for certain locations.
- Advance flasher to be installed when and if called for in plans or specifications.
- Top of foundation shall be no greater than 4' above finished shoulder grade.
- Type of traffic control device
 - I Flashing signals
 - II Flashing signals with cantilever
 - III Flashing signals with gate
 - IV Flashing signals with cantilever & gate
 - V Gate
- Class of traffic control devices
 - I Flashing signals - one track
 - II Flashing signals - multiple tracks
 - III Flashing signals and gates - one track
 - IV Flashing signals and gates - multiple tracks

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES					
Designed By	CS	Date	04/02/76	Approved By	Clark A. Scott
Drawn By	RM	Check Date	04/02/76	Revision No.	Sheet No.
Checked By	RM	Revision No.	04/02/76	Sheet No.	1 of 4
F.A.R.A. Approved	CS	Index No.	17882		



GENERAL NOTES

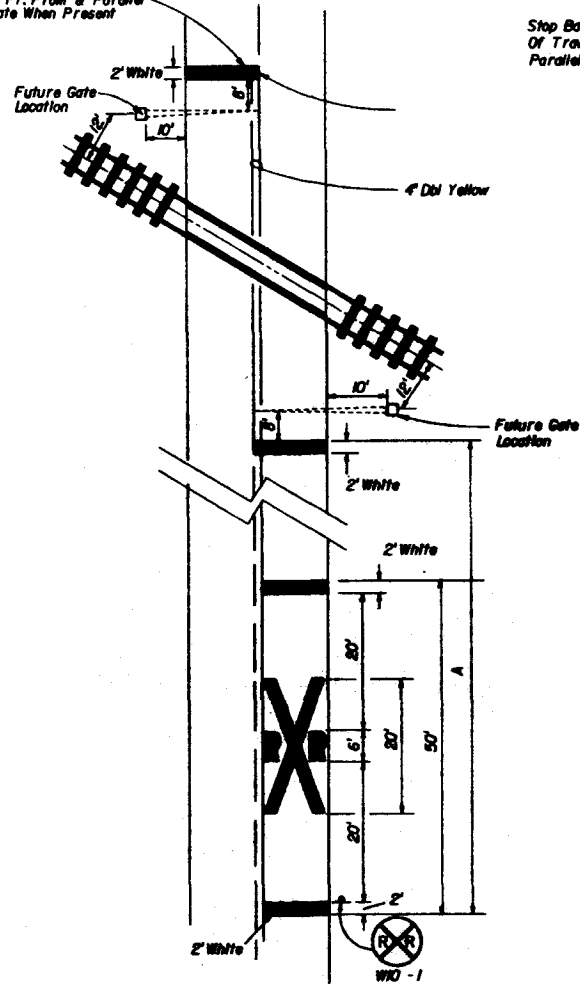
- The location of flashing signals and stop lines shall be established based on future (or present) installation of gate with appropriate track clearances.
- Where plans call for railroad traffic control devices to be installed in curbed medians, the minimum median width shall be 12.5 feet.
- Location of railroad traffic control device is based on the distance available between face of curb & sidewalk.
0' to 6' - Locate device outside sidewalk.
Over 6' - Locate device between face of curb and sidewalk.
- Stop line to be perpendicular to edge of roadway, approx. 15' from nearest rail or 8' from and parallel to gate when present.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES			
Designed By	Checked By	Drawn By	Approved By
CS	CS	CS	<i>Charles A. Scott</i>
Revised By	Revised By	Revised By	Revised By
RS	RS	RS	RS
F.J.S.A. Approved			2 of 4 17882

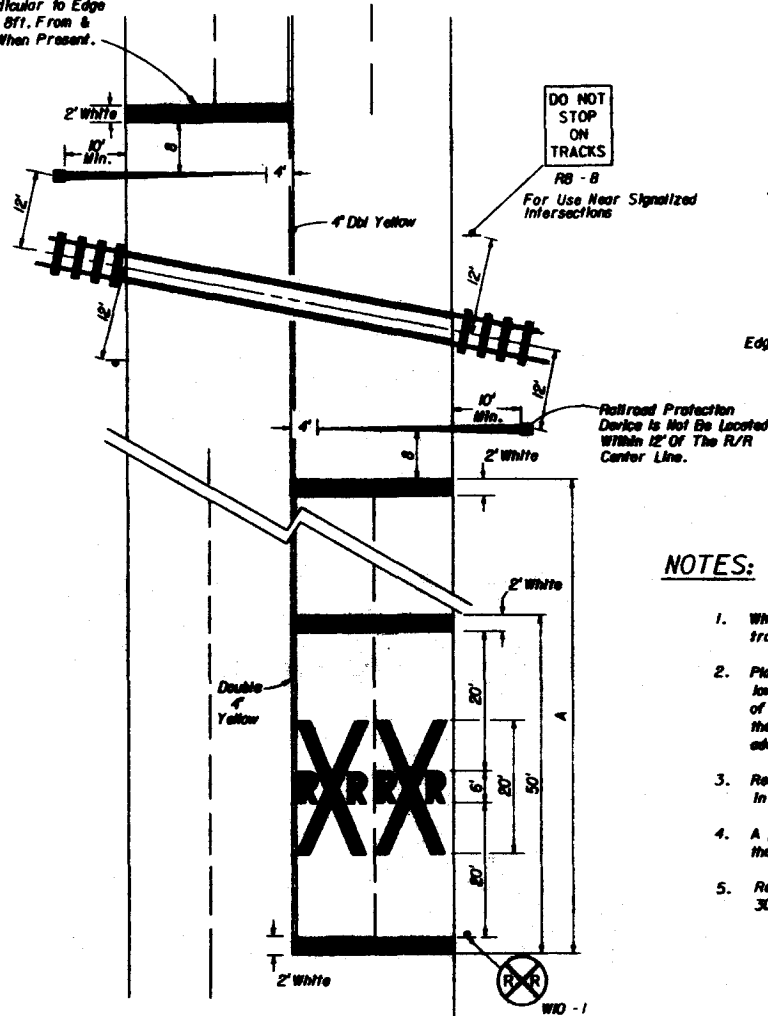
RAILROAD CROSSING AT TWO (2) - LANE ROADWAY

Stop Bar Perpendicular
To Edge Of Travel Way
Or 8 Ft. From & Parallel
To Gate When Present

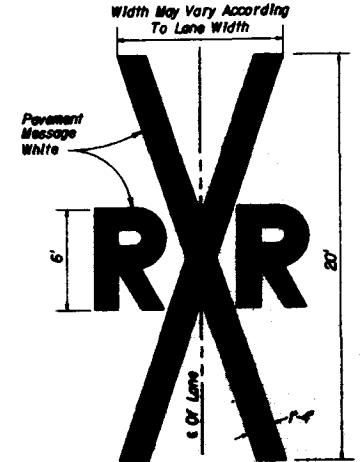
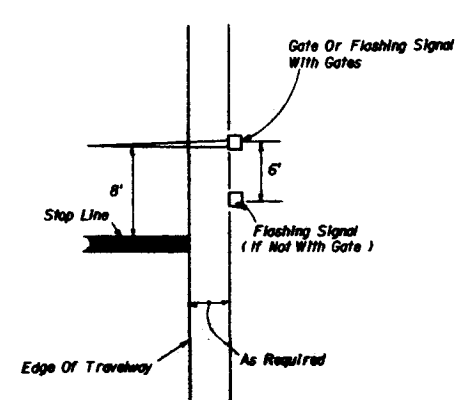


RAILROAD CROSSING AT MULTI-LANE ROADWAY

Stop Bar Perpendicular to Edge
Of Travel Way Or 8 Ft. From &
Parallel To Gate When Present.

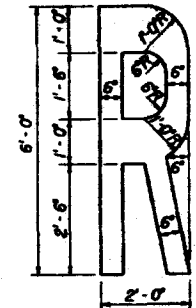


RELATIVE LOCATION OF CROSSING TRAFFIC CONTROL DEVICES



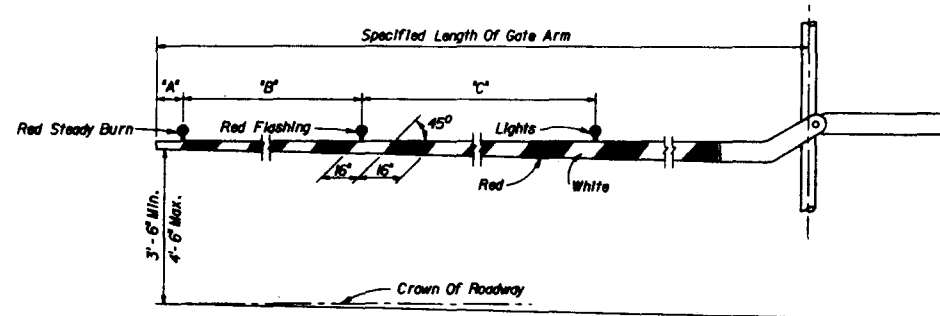
NOTES:

1. When computing pavement message, quantities do not include transverse lines.
2. Placement of sign W10-1 in a residential or business district, where low speeds are prevalent, the W10-1 sign may be placed a minimum distance of 100 feet from the crossing. Where street intersection occur between the R R pavement message and the tracks an additional W10-1 sign and additional pavement message should be used.
3. Recommended location for sign FTP-38, 100 ft. Urban & 300 ft. Rural in advance of the crossing.
4. A portion of the pavement markings symbol should be directly opposite the W10-1 sign.
5. Recommended location for FTP-38 A or B signs, 100' urban and 300' rural. See index 17355 for sign details.



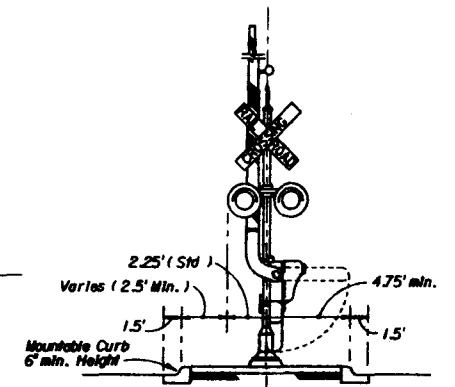
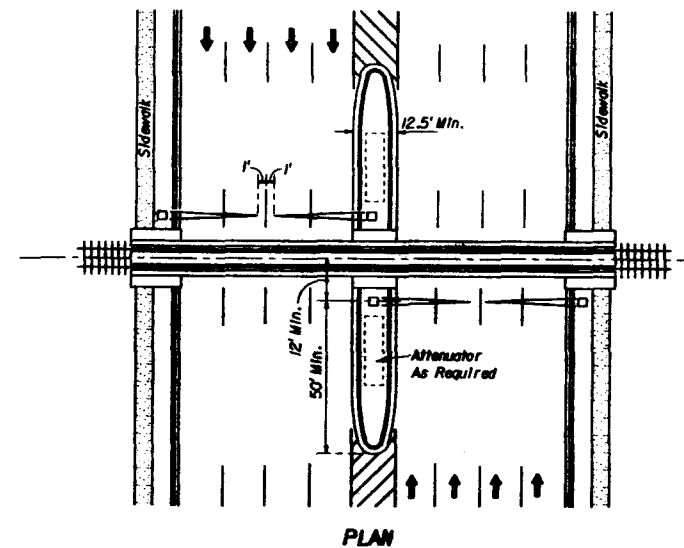
SPEED MPH	'A' IN FT
60	550
55	450
50	375
45	300
40	225
35	150
30	100
URBAN	50 MIN.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES			
Designed By J.B.C.	Date 10/25/77	Approved By <i>Charles A. Smith</i>	
Drawn By		Checked By	
F.A.R.A. Approved		88	3 of 4 17882



RAILROAD GATE ARM LIGHT SPACING

Specified Length Of Gate Arm	Dimension "A"	Dimension "B"	Dimension "C"
14 Ft.	6'	36"	5'-0"
15 Ft.	18"	36"	5'-0"
16 - 17 Ft.	24"	36"	5'-0"
18 - 19 Ft.	28"	4'	5'-0"
20 - 23 Ft.	28"	4'-0"	5'-0"
24 - 28 Ft.	28"	5'-0"	5'-0"
29 - 31 Ft.	36"	6'-0"	6'-0"
32 - 34 Ft.	36"	7'-6"	7'-0"
35 - 37 Ft.	36"	9'-0"	9'-0"
38 And Over	36"	10'-0"	10'-0"



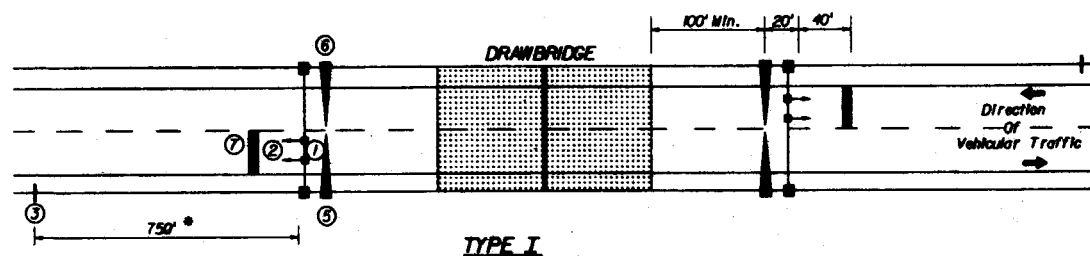
MEDIAN SECTION AT SIGNAL GATES

NOTE:
For additional information see the "Manual On Uniform Traffic Control Devices", Part VIII, The "Traffic Control Devices Handbook", Part VIII, and AASHTO "A Policy On Geometric Design Of Streets And Highways", 1984.

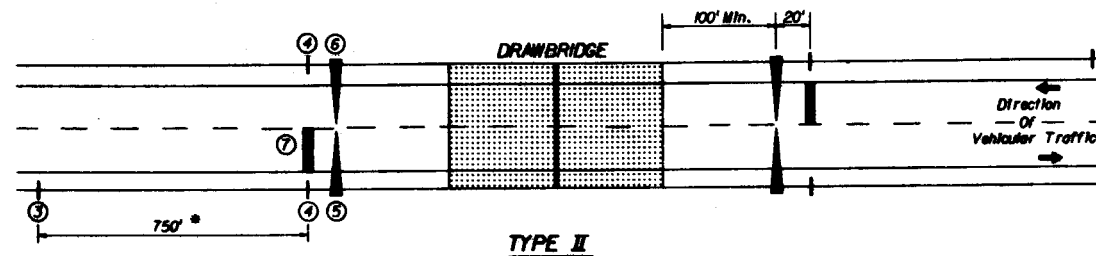
MEDIAN SIGNAL GATES FOR MULTI LANE UNDIVIDED URBAN SECTIONS (FOUR OR MORE DRIVING LANES IN ONE DIRECTION, 45 MPH OR LESS)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN			
RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES			
Designed By	JD	Date	12/15/85
Drawn By	JD	Date	12/15/85
Checked By		Reviewed By	Clark A. Scott
F.A.R.A. Approved		Sheet No.	4 of 4
		Index No.	17882

TYPICAL BRIDGE MOUNTS



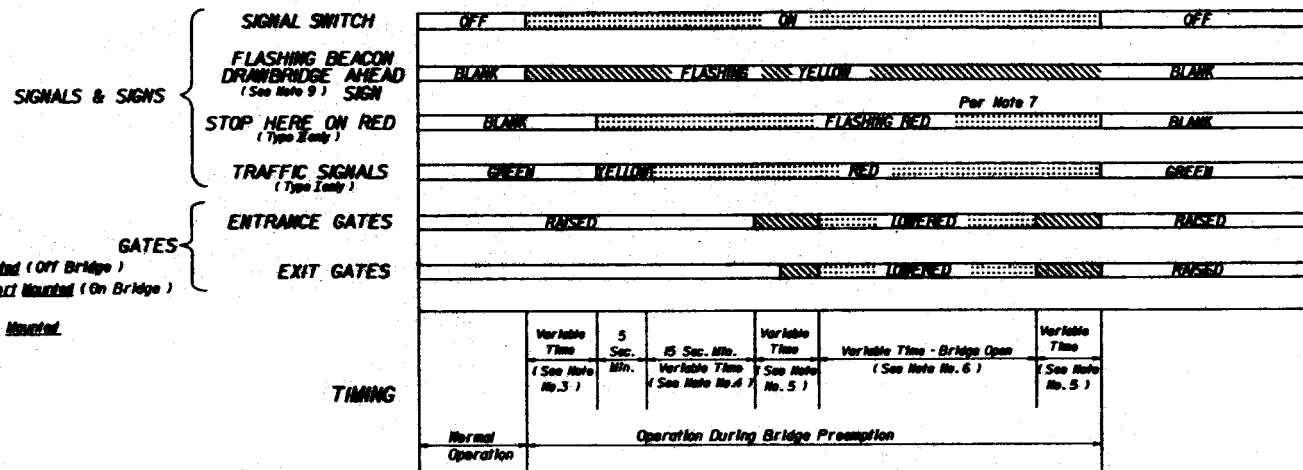
TO BE USED WHERE BRIDGE OPERATORS
ARE FULL TIME OR A DAILY BASIS



TO BE USED WHERE TYPE I IS NOT APPLICABLE
(USUALLY WHEN THE BRIDGE OPERATOR IS "ON CALL")

* Field conditions may require
adjustment of this standard
distance.

SEQUENCE CHART



- LEGEND**
- ① TRAFFIC SIGNALS } Mount Axle Mounted (Off Bridge)
 - ② DRAWBRIDGE SIGN } Masthead Support Mounted (On Bridge)
 - ③ DRAWBRIDGE AHEAD SIGN } Ground Mounted
 - ④ STOP HERE ON RED SIGN } Ground Mounted
 - ⑤ ENTRANCE GATE
 - ⑥ EXIT GATE
 - ⑦ 24" THERMOPLASTIC STOP BAR

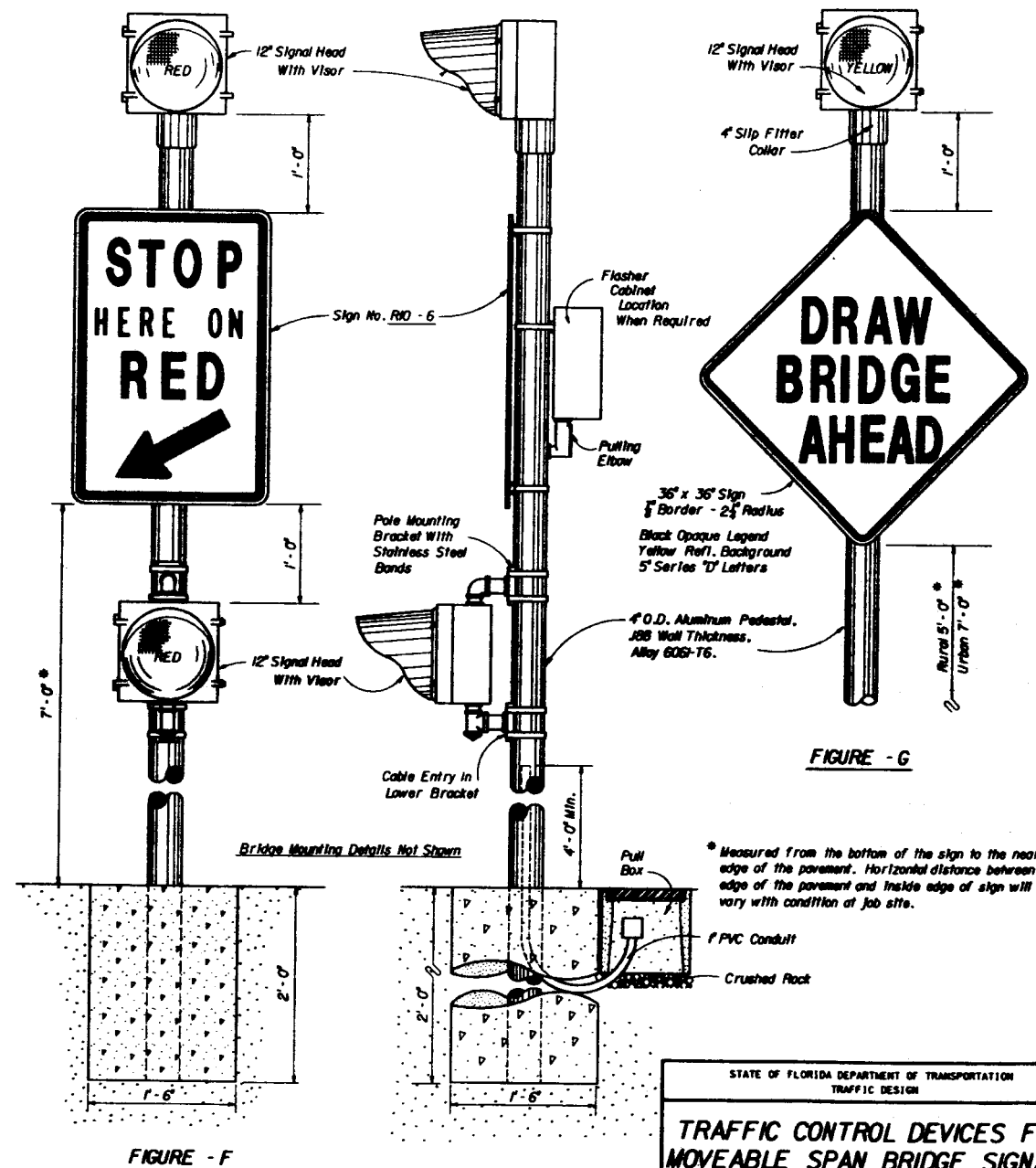
NOTES:

1. A bypass switch shall be installed to override each timing interval in case of a malfunction.
2. "STOP HERE ON RED" is omitted in Type I operation and "TRAFFIC SIGNALS" are omitted in Type II operation.
3. The time between beginning of flashing yellow on "Drawbridge Ahead" sign and the clearance of traffic signal to red, or beginning of flashing red, should not be less than the travel time of a passenger car, from the sign location to the stop line, traveling at the 85 percentile approach speed.
4. Beginning of operation of drawbridge gates shall not be less than 15 seconds after steady red or 20 seconds after flashing red (Actual time may be determined by the bridge tender.)
5. Time of gate lowering and raising is dependent upon gate type.
6. Time of bridge opening is determined by the bridge tender.
7. Each gate shall be operated by a separate switch.
8. On each approach (Type II), all four red signals shall be on the same two circuit flasher, with the two top signals on one circuit, and the two bottom signals on the alternately flashing circuit.
9. A drawbridge ahead sign is required for both types of signal operation. However a flashing beacon shall be added to the sign when physical conditions prevent a driver traveling at the 85% approach speed from having continuous view of at least one signal indication for approximately 10 secs.
10. Requirements on gate installation are contained in Section 4E - 14 through 4E - 17 of the Manual on Uniform Traffic Control Devices as revised by Official rulings, Volume III, ruling 5g 67.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN					
TRAFFIC CONTROL DEVICES FOR MOVEABLE SPAN BRIDGE SIGNALS					
Reviewed By	CS	Date	04/18/75	Approved By	Clark G. Scott
Drawn By	RE	Date	04/18/75	Revision No.	Sheet No.
Checked By					
F.A.B.A. Approved				1 of 3	17890



SIGNAL HEAD MOUNTING ASSEMBLY



* Measured from the bottom of the sign to the near edge of the pavement. Horizontal distance between edge of the pavement and inside edge of sign will vary with condition at job site.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN						
TRAFFIC CONTROL DEVICES FOR MOVEABLE SPAN BRIDGE SIGNALS						
Witness		Index		Approved By <i>Charles A. Holt</i>		
Designed By	GD	04-GF-75				
Drawn By						
Checked By	RE	04-GF-75				
F.A.R.A. Approved:				Revision No.	Sheet No.	Index No.
					2 of 3	17890

