



# DESIGN STANDARDS

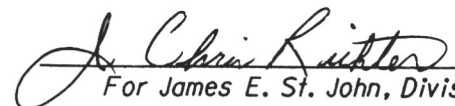
FOR DESIGN, CONSTRUCTION, MAINTENANCE AND UTILITY  
OPERATIONS ON THE STATE HIGHWAY SYSTEM


**JANUARY 2002**

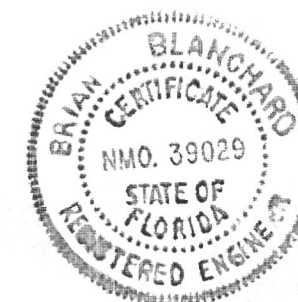
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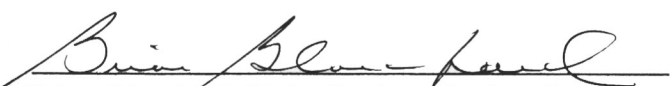
**ENGLISH UNITS**

Approved For Use On Federal Aid Projects

  
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**Revisions  
Design Standards  
2002**

**TABULATED CHANGES**

The changes tabulated below principally address functional changes in the standard drawings (indexes) since publication of the 2000 English Roadway and Traffic Design Standards booklet. The items below are keyed to what is shown on the index sheets of this 2002 booklet. This approach is taken to diminish complexities that can arise when trying to compare line items of the two booklets and those of the multiple issues of special provisions and interim indexes that were produced to update the 2000 booklet.

Where a change has been applied to a feature that is common on more than one of the sheets within the same index, or within a series of indexes with a common function, the change will not be repeated in most cases; however, such sheets will indicate a 2002 revision date.

Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
102	1 thru 3 of 3	Title revised.	400	29 of 32	Footnote regarding rail attachment revised.
	3 of 3	'JOINING TWO SILT FENCES' - detail added.	Cont.	30 of 32	Flare rate revised and standard guardrail panel downstream realigned. Restriction for limiting use to one-way and divided multilane facilities removed. 'SECTION BB' - Rail attachment notation revised. 'FLEAT-350 NOTES' - Note 4 revised.
104	1 & 2 of 2	Title revised.		32 of 32	New Sheet (SRT/HBA 6 Post System)
201	3 of 6	Table - 'Minimum Value For h', dimensions corrected to 3'-6" & 4'-0".	401	1 thru 9 of 9	Index removed. All former SCHEMES voided. For former SCHEME 1 replacement see Structures Index No. 780.
205	2 of 5	'MAXIMUM COVER HEIGHTS CONCRETE PIPE', Table 'ROUND PIPE INSTALLATIONS' - D-Load values revised.	415	1 of 4	'General Notes' - Note 5 revised. 'WALL UNIT' - 'SIDE VIEW' and 'PICTORIAL VIEW' - Double Drain Slots deleted.
216	1 thru 3 of 3	Revised to accommodate 'Multiple Port Flumes'.		3 of 4	'NOTES FOR TEMPORARY CONCRETE BARRIER WALL END SHIELDING' - Note 3 revised.
220	1 of 1	Table 'RECOMMENDED MAXIMUM PIPE SIZES' - Pipe size for 4'-0" wall changed from 36" to 30".	417	1 of 1	'NOTES FOR TEMPORARY CONCRETE BARRIER WALL END SHIELDING' - Note 1 revised.
221	1 of 1	Reference note at bottom of sheet - Pipe size for 4'-0" wall changed from 36" to 30".	435	2 of 6	Foundation redesigned.
230	1 of 1	Table 'RECOMMENDED MAXIMUM PIPE SIZES' - Pipe size for 3'-1" wall modified by notation.	440	1 thru 5 of 5	This index expanded to include low and high speed modules.
232	1 of 5	'INLETS' - 'TYPE C' - Pipe size for 3'-1" wall changed from 24" to 18"; 'TYPE E' - Pipe size 4'-6" wall changed from 42" to 36". 'GENERAL NOTES' - Notes 6 and 7 revised.	451	1 of 2	'GENERAL NOTES' - Note '5 (C) (c)', and Note '6 (E)' revised.
234	1 of 1	Table 'RECOMMENDED MAXIMUM PIPE SIZES' - Pipe size for 4'-1" wall changed from 36" to 30".	452	1 of 2	'GENERAL NOTES' - Note 4.D.(3) and notes 6 and 7 revised.
272	1 thru 4 of 6	Dimension "H" added.	453	1 of 1	'GENERAL NOTES' - Note 1 revised.
273	1 thru 4 of 6	Dimension "H" added.	500	1 of 2	Note 5 revised. 'FM 1T267' deleted and 'AASHTO T 267' replaced.
282	1 of 1	'YARD DRAINS', 'Notes' - Note 3 revised. 'YARD DRAIN ITEM INCLUDES:' - Items 1 and 3 revised to allow use of PVC.	501	6 of 8	Table 'TABLE OF WOVEN GEOGRID VALUES' - Tabulations expanded to include "Raugrid" values.
286	2 of 2	Coarse Aggregate notation - Stone size deleted.	505	1 of 3	Note 4 revised. 'FM 1T267' deleted and 'AASHTO T 267' replaced.
287	2 of 3	'METHOD OF PAYMENT', 'FOR REHABILITATION:' - Note 1, paragraph 1 - revised. 'REHABILITATION' sectional view - pavement type changed to 'Type SP (Traffic-C) Asphaltic Concrete'.	515	1 of 6	Table 'SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS', 'CONNECTION WIDTH W' - star super script an accompanying notation added.
	3 of 3	'TREATED PERMEABLE BASE SUBDRAINAGE', Both details, - Notations '3/4" Type S-III' changed to '1" Type SP'. 'METHOD OF PAYMENT', 'NEW CONSTRUCTION', Note 1, paragraph 1 - Text 'and barricades' deleted.	518	2 of 2	'LOCATION ALONG SHOULDER (FLEXIBLE PAVEMENT)' - Rumble strip moved four inches (4") closer to edge of travel lanes. Friction course width on shoulder reduced to eight inches (8"). 'GENERAL NOTES...' - Notes 1 and 4 revised.
302	1 of 1	'TYPE IV CONCRETE TRAFFIC SEPARATOR', 'OPTION II', and 'TYPE I CONCRETE TRAFFIC SEPARATOR', 'OPTION II' Payment for pavement notation revised.	520	1 of 1	Sheet title revised and Note 2 added.
304	1 of 5	'GENERAL NOTES', - Notes 3 and 5 revised.	520	1 of 1	New Index. Extracted from former 520.
	2 of 5	'PAVEMENT RELIEF AT LIP OF CURB' detail added.	560	1 of 5	'TYPICAL FLEXIBLE PAVEMENT REPLACEMENT AT RR CROSSINGS' - Notations 'Type S (500 lbs/Sy)' deleted and 'Type SP (Traffic) Asphaltic Concrete Pavt.' substituted.
400	1 of 32	'GENERAL NOTES' - Note 20 added.		4 of 5	'TYPE RS' - Notations 'Type S (500 lbs/Sy)' deleted and 'Type SP (Traffic) Asphaltic Concrete Pavt.' substituted. 'NOTES', - Note 7 deleted.
	4 thru 6 of 32	Footnotes 'Notes for details _ & _' - Text 'When divided roadways are designated evacuation routes, approach end anchorage assemblies should be used for trailing end anchorage.' - deleted.	600	1 thru 10 of 10	Sheets reformatted for grouping by subject. Transitions for freeway facilities transferred to New Index 642.
	16 of 32	'STEEL MODIFIED THRIE-BEAM OFFSET BLOCK', block dimensions modified. Table - 'PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS', references to Steel Modified Thrie-Beam offset block - 22" changed to 17". Note 1 revised. 'PEDESTRIAN SAFETY TREATMENTS' replaced 'SPECIAL SAFETY PIPE RAIL', 'NOTES' - Note 3 revised.		1 of 10	'CONTENTS', 'ABBREVIATIONS' and 'SYMBOLS' expanded.
	19 of 32	Notes describing component application on specific end anchorage assemblies deleted.		2 of 10	'Detour, Lane Shift and Diversion' - Revised heading 'TEMPORARY TRAFFIC CONTROL DEVICES' - New 'PEDESTRIANS AND BICYCLIST' - Expanded 'OVERHEAD WORK' - New 'OVERWEIGHT/OVERSIZE VEHICLES' - New 'LANE WIDTHS' - Modified
	23 of 32	'FRONT VIEW', soil plate sizes added.		3 of 10	'FLAGGER CONTROL' - Replaced 'FLAGGER OPERATIONS' and 'NIGHTTIME FLAGGING'.
	24 of 32	Note 1 revised.		4 of 10	'SIGN PLACEMENT' - New 'WORK ZONE SIGN SUPPORTS' - Text added. 'SIGNING FOR DETOURS, LANE SHIFTS AND DIVERSIONS' - Revised heading.
	25 of 32	Extruder head modified.	600	5 of 10	'SIGNALS' - Revised
	26 of 32	'SLOTGUARD', Symbol footnote - Text 'With Plain Round Washer Under Nuts' deleted, i.e. no washer under nuts.	Cont.		
	28 of 32	Extruder head modified.			

Revisions  
Design Standards  
2002

Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
600 cont.	6 of 10	'DROPOFF CONDITION' - Note 1 revised. 'Shoulder Treatment' note 1 revised.	17346 Cont.	10 of 13	'PAVEMENT MARKING FOR PUBLIC SIDEWALK CURB RAMPS IN REST AREAS' - Parking space width changed to 12' and Isle width changed to 5'.
	7 of 10	'TEMPORARY CURB' notes - Note 4 revised. Flag 'NOTICE' added.		11 of 13 thru 13 of 13	New Sheets- Bicycle Markings.
	8 of 10	Notes - Note 9 added. 'CONES' - Footnote deleted. Advance warning arrow panel - 'Warning Mode' deleted.	17355	1 thru 14 of 14	Sheets renumbered 1-14
	9 of 10	'Note:' Note 1 added.		8 of 14	Signs FTP-63-67 added.
	10 of 10	'PLACEMENT OF PAINT OR TAPE PAVEMENT MARKINGS' - Detail added. Application and notes headings revised.		9 of 14	New Sheets - Signs FTP-68 thru 78.
605	1 of 1	'ROAD WORK 1500 FT' signs replace with 'ROAD WORK AHEAD'.		10 of 14	New Sheet - Signs FTP 79 & 80.
607	1 of 1	'ROAD WORK 1500 FT' signs replace with 'ROAD WORK AHEAD'.		12 of 14	Signs MOT-17, MOT-18 and MOT-19 added.
611	1 of 1	'REDUCED SPEED AHEAD WHEN FLASHING' and 'SPEED LIMIT XX WHEN FLASHING' signs deleted. Conditions for period of less than 60 minutes deleted.	17357	1 of 1	Reformatted.
614	1 of 2	'GENERAL NOTE' - Note 12 revised and Note 13 added.	17500	1 of 3	'NOTES:' - Note 2 added. 'METAL POLE WIRING DETAIL' - Ground rod lengths changed to 20' and resistance note deleted.
630	1 of 2	Sign legend group deleted and legends added to plan view. 'GENERAL NOTES' - Notes 5 and 6 added.	17501	1 of 1	Note 1 revised.
	2 of 2	Sign legends added to plan views; move signs to crossover ahead notation deleted and reference to GENERAL NOTE 6 substituted.	17502	2 of 4	'ALTERNATE POLE' information added.
642	1 of 1	New Index - 'TRANSITIONS FOR TEMPORARY CONCRETE BARRIER WALL ON FREEWAY FACILITIES'. Previously a part of Index 600.		3 of 4	'Sectional View' - Ground rod length notations changed to '20' and 'resistance note deleted.
650	2 of 2	'GENERAL NOTES' - Note No. 7 revised.	17504	1 of 1	'DETAIL A' - Ground rod length changed to '40'.
670	1 of 1	New Index.	17505	1 of 2	Ground rod length changed '20' and resistance note deleted.
9535	1 of 3	'TYPICAL ELEVATION' - Dimension '7'-0" (Min.)', revised to be 7'-0" (Min.) to edge of pavement. 'PARTIAL REAR ELEVATION' Sign thickness notation '0.125"' deleted and '1/8"' substituted. Table - 'SIZE OF WIND BEAMS' - '23x2.69x2.33' deleted and '23x2.69x3.38' substituted.	17515	1 thru 7 of 7	New Index
11860	1 of 3	Table 'Sign Identification Number', Number '88' - Notation 'See Note' added. 'Notes:' - Note 5 revised and 6 added.	17600	1 of 2	'CALL BOX DETAIL BEHIND GUARDRAIL' - 'PLAN VIEW' and 'SIDE VIEW' details revised.
	2 of 3	'GENERAL NOTE', 'SIGN PANEL', - thickness changed to 0.08 inches.	17723	1 thru 3 of 3	New Index.
11861	1 of 2	'NOTES', Note 4, line 2 - column wall thickness changed to 3/16".	17725	1 of 1	POLE TYPE VIII added.
	2 of 2	Table, 'Sign Identification Number', Number '88' - Notation 'See Note Index No. 11860' added.	17727	1 & 2 of 2	Vertical clearance to signal head notations revised.
11862	1 of 2	'NOTES', Note 4, line 2 - column wall thickness changed to 3/16".	17740	1 & 2 of 2	New Index.
	2 of 2	Table, 'Sign Identification Number', Number '88' - Notation 'See Note Index No. 11860' added.	17742	1 of 1	New Index.
11863	1 of 2	'NOTES', Note 4, line 2 - column size changed.	17744	1 thru 5 of 5	New Index.
	2 of 2	Table - 'Sign Identification Number', Number '88' - Notation 'See Note Index No. 11860' added.	17746	1 thru 4 of 4	New Index.
11864	1 of 2	'NOTES', Note 4, line 2 - column wall thickness changed to 3/16".	17748	1 of 1	New Index.
	2 of 2	Table - 'Sign Identification Number', Number '88' - Notation 'See Note Index No. 11860' added.	17764	1 of 1	Walk, Don't Walk displays changed to International Symbols.
11865	1 of 2	Table - 'Sign Identification Number', Number '88' - Notation 'See Note Index No. 11860' added.	17781	1 of 2	Reformatted; Splicing details deleted; General Notes No 6 revised and No 7 and No 8 added.
	2 of 2	'SIGN POST IN CONCRETE' detail added.	17784	1 & 2 of 2	FTP-49 sign changed to International Symbols.
13417	1 of 1	'ELEVATION', Sign thickness notation - Changed to 1/8" .	17841	1 of 1	Ground rod length changed to 40' in Base Mounted Interconnect Junction Box Detail.
17344	1 thru 3 of 6	School Crosswalk Signs revised, all S2-1 Signs changed to SI-1 Signs with W16-7 Arrow Panel or W16-9P Ahead Panel.	17870	1 of 2	'SIGNAL CLEARANCE TABLE' - revised.
17345	3 of 4	'TYPICAL LANE DROP MARKING AT EXIT RAMPS' -detail added.	17900	3 of 9	Note at bottom left revised.
17346	2 of 13	Completely Revised.		4 of 9	Receptacle and Plug notations revised.
	4 of 13	Moved One Way signs to Median.		5 of 9	Title at top left revised, Bonding Agent replaces Epoxy in END VIEW Detail.
	5 of 13	Merge Signs (W4-2) deleted, W9-2 substituted.		7 of 9	'SOLAR POWER POLE', both details - 'Type N-III pole' modified for ground wire. Both details - Ground rod length changed to 40'.
	8 of 13	New Sheet.		8 of 9	Detail 'E' modified. Note in upper left corner deleted.
17346 Cont.	9 of 13	'DETAIL OF BIKE LANE MARKINGS'- Notations revised, pavement marking specification deleted and diamond marking removed.		9 of 9	Note in upper left corner deleted.

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## MISCELLANEOUS

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A Area or Amperes  
AAA American Automobile Association  
AASHO American Association Of State Highway Officials  
AASHTO American Association Of State Highway And Transportation Officials  
ABC Asphalt Base Course  
Abd. Abandoned  
ABS Acrylonitrile-Butadiene-Styrene Pipe  
AC, Ac. Acre  
AC or Asph. Conc. Asphaltic Concrete  
Accel. Acceleration  
Act. Actuated  
ADA The Americans With Disabilities Act  
Adh. Adhesive  
Adj. Adjust  
ADT Average Daily Traffic  
AADT Annual Average Daily Traffic  
Agg. Aggregate  
Ah. Ahead  
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AM 12:00 Midnight Until 11:59 Noon  
ANSI American National Standards Institute  
AOS Apparent Opening Size  
Appl. Applied, Application  
Apprh. Approach  
Approx. Approximate  
ARTBA American Road & Transportation Builders Association  
Artf. Artificial  
Asph. Asphalt  
Assem. Assembly  
Assn. Association  
Assoc. Associate, Association  
ASTM American Society For Testing Materials  
Attn. Attention  
Attuatr. Attenuator  
Aux. or Auxil. Auxiliary  
Ave. Avenue  
AWG American Wire Gauge  
AWS American Welding Society  
AZ Azimuth

B to B Back to Back  
Basc. Bascule  
Bbl. Barrel  
Bd. or Bnd. Bond or Bonded  
BC Bottle Cap or Bolt Circle  
B/C, B.C. Back Of Curb  
BCCMP Bituminous Coated Corrugated Metal Pipe Culvert  
BCPA Bituminous Coated Pipe Arch Culvert  
BCPCMP Bituminous Coated And Paved Corrugated Metal Pipe Culvert  
BCPPA Bituminous Coated And Paved Pipe Arch Culvert  
BCT Breakaway Cable Terminal  
BE Buried Electric  
Beg. Begin  
Bit. Bituminous  
Bk. Back  
BL, BLC Base Line, Base Line Control  
Bldg. Building  
Bkhd. Bulkhead  
Blvd. Boulevard  
BM Bench Mark  
Bndry. Boundary  
Bdr. Border  
Bot. Bottom  
BP Borrow Pit  
Bq. Bequerel  
Br. Bridge  
Brg. Bearing  
Brkwy. Breakaway  
BT Buried Telephone Cable or Duct  
Btfly. Butterfly  
BW Barbed Wire, Bottom Width or Both Ways  
BO Basin Outlet

C Cantilever Length, Cut, Colorless, Coulomb or Cycle Length  
°C Degree Celsius  
C & G Curb And Gutter  
CA Coarse Aggregate  
Cap. Capacity  
CAP Corrugated Aluminum Pipe  
Caps. Capital Letters  
CASP Corrugated Aluminized Steel Pipe  
CATV Cable Television  
CB Catch Basin  
CBC Concrete Box Culvert  
CBS Concrete Box Structure  
CC, C/C, or C to C Center to Center  
CCEW Center to Center Each Way  
CD Cross Drain  
cd Candela  
Cem. Cement or Cemetery  
Cem'd. Cemented  
CFS Cubic Feet Per Second  
Ch. Channel  
Chchg. Channel Change  
Chg. Changeable  
CI Cast Iron  
CIP Cast Iron Pipe  
CIPL Cast In Place  
cir. or circ. Circle or Circular  
circ. Circumference

Ckt. Circuit  
Cl. or Clear Clearance  
CL, C/L or £ Center Line  
CM Concrete Monument  
CMB Concrete Median Barrier  
CMP Corrugated Metal Pipe  
CMPA Corrugated Metal Pipe Arch  
Co. County or Company  
Col. Column  
Com. Commercial or Common  
COMM Committee or By Committee  
Comp. Composite  
Con. Connect or Connection  
Conc. Concrete  
Const. Construct or Construction  
Contrl. Controller  
Cont. Continuation  
Contr. Contractor  
Coord. Coordinate  
Cor. Corner  
Corr. Corrugated  
CP Concrete Pipe  
CPE Corrugated Polyethylene Pipe  
CR Control Radius or County Road  
CRA Clear Recovery Area  
Crs. or Cse. Course  
CS Curve To Spiral  
CSP Corrugated Steel Pipe  
CT Clear Trunk  
Ctivr. Cantilever  
Ctr. Center  
CU or Cu Copper  
Culv. Culvert  
Cwt. Hundredweight  
CY Cubic Yard  
Cyl. Cylindrical  
CZ Clear Zone

D Degree Of Curvature, Depth, Density, Distance, Diameter or Directional Distribution  
DA Drainage Area or Deflection Angle  
DBH Diameter At Breast Height  
DBI Ditch Bottom Inlet  
Dbl. Double  
DCS Degree Of Curvature (Spiral)  
DD Dry Density  
DDHV Directional Design Hour Traffic  
Decel. Deceleration  
Deg. Degree  
Delin. Delineators  
Demobl. Demobilization  
Dept. Department  
Det. Detour, Detection, Detectable  
DGN or Dgn. Design  
DHV Design Hourly Volume  
DHW Design High Water  
DT Ditch  
DI Drop Inlet  
Dia. or D Diameter  
Dim. Dimension  
Dist. Distance  
Disp. Disposal  
DLS District Location Surveyor  
DMM Domestic Mail Manual  
DOT Department Of Transportation  
DPI Ditch Point Intersection  
Dr. or DR. Drain, Drive or Design Review  
DR Design Review  
Driv. Driven  
Drwy. Driveway  
DS Design Speed  
DSL Design Service Life  
Dwg. Drawing

E East or External Distance  
e Rate Of Superelevation  
E to E End to End  
EA or Ea. Each  
EB Eastbound  
El. or Elev. Elevation  
Elast. Elastomeric  
Elec. Electric  
Ellip. Elliptical  
Embk. Embankment  
Emul. Emulsified  
Encl. Enclosure  
Engr. Engineer  
EOS End Of Survey or Equivalent Opening Size  
Eq. Equation or Equal  
Equip. Equipment  
Esmf. Easement  
Est. or Estm. Estimate  
Est. Establish or Established  
Etc. or etc. Et Cetera (And So Forth)  
EW Endwall  
Ex. Except, Example  
Exc. or Excov. Excavation  
Exist. Existing  
Exp. Expansion  
Ext. Extension  
Exwy. Expressway

F Fill, Farad  
F or Final Final Quantity  
F & I Furnish & Install  
F to F Face to Face  
FA Federal Aid or Fine Aggregate  
FAC Florida Administrative Code  
FAP Federal Aid Project  
FC Friction Course  
FD French Drain  
Fdn. Foundation  
FDOT Florida Department Of Transportation  
FE Floor Elevation  
Fed. Federal  
Fert. Fertilizer  
FES Flared End Section  
FETS Flared End Terminal Section  
FH Fire Hydrant  
FHWA Federal Highway Administration  
Fig. Figure  
Fin. Finish  
F.L. Flow Line  
FL, Fl. or Fla. Florida  
Flex. Flexible  
FNQ Fuse (Type Slow Burn)  
FOC Fiber Optics Cable  
FPM or fpm Feet Per Minute  
FRP Fiber Reinforced Pipe  
FPS or fps Feet Per Second  
FR or Fr. Frame  
Frang. Frangible  
Freq. Frequency  
FS Far Side  
Ft. Foot or Feet  
FTB Floating Turbidity Barrier  
FTBA Florida Transportation Builder Association  
Furn. Furnish  
Fut. Future

G Giga or Gauss  
g Gram or Gravity  
Galv. Galvanized  
Ga. Gauge or Gage  
Ga. or Gal. Gallon  
Gar. Garage  
GD Gutter Drain  
GIP Galvanized Iron Pipe  
GM Gas Main  
GP Grade Point  
Gr. Grade, Guardrail or Grate  
Gr. or Gro. Gress  
GRC Galvanized Rigid Steel Conduit  
Grd. Ground  
gross km Gross Kilometer  
Gr. Wt. or gr. wt. Gross Weight  
Gtrr. Gutter  
Gy Gray

H Henry  
h Hour or Hecto  
ha Hectare  
HAR Highway Advisory Radio  
HB Hay Bales  
HC Horizontal Clearance  
HD High Density or Heavy Duty  
HD or Hd. Head  
Hdwl. Headwall  
HH Heavy Hex  
Hndrl. Handrail  
HOA Hand/Off/Automatic  
Horiz. or Hor. Horizontal  
HP High Pressure or Horsepower  
Hr. Hour  
HS High Strength  
Hse. House  
Ht. Height  
HW High Water or Hot Water  
Hwy. Highway  
Hyd. Hydrant or Hydraulic  
Hz Hertz

I External Angle (Delta), Interstate  
Intchg. or Ichg. Interchange  
IES Illuminating Engineering Society  
ID Inside Diameter or Identification  
IMC Intermediate Metal Conduit  
In. Inch  
Inc. Incorporated or Including  
Incl. or Inc. Included  
Ind. Industry or Industrial  
IP Iron Pipe  
Install. Installed  
Isect. Intersection  
Isl. Island  
ITE Institute Of Transportation Engineers

J Joule  
JB Junction Box  
Jct. Junction  
Jt. Joint

K Design Hour Factor or Kelvin  
k Kilo (prefix)  
kg Kilogram  
kg/m Kilogram Per Meter  
kg/m<sup>2</sup> Kilogram Per Square Meter  
kg/m<sup>3</sup> Kilogram Per Cubic Meter  
Kilo One Thousand  
Kip 1000 Pounds  
km Kilometer  
km/h Kilometer Per Hour  
kn Knot  
kPa Kilopascal  
ksi Kips Per Square Inch  
kV Kilovolt  
kVA Kilovolt Ampere  
kWh Kilowatt-hour

L Length, Length Of Curve, Liter, Left  
2-L Two-Lane  
2LW Two-Lane One-Way  
2L2W Two-Lane Two-Way  
LA or L/A Limited Access  
lane km Lane Kilometer  
Lat. Lateral or Latitude  
Lb. Pound  
lb/sy Pounds Per Square Yard  
LBR Limerock Bearing Ratio  
LC Long Chord  
LEO Law Enforcement With Flashing Lights And Radar  
Lgth. Length  
Ln. Linear  
lm Lumen  
Lmrk. Limerock  
Loc., LO Location  
LS Length Of Spiral  
LT Left Turn  
Lt. Left  
Ltd. Lighted or Limited  
Lum. Luminaire  
L/W Lightweight  
Lux Lux

M Mass, Middle Ordinate Length or Mega  
m Meter or Milli  
m<sup>2</sup> Square Meter or Meter Square  
m<sup>3</sup> Cubic Meter or Meter Cubed  
m<sup>3</sup>/m Cubic Meter Per Meter  
m/s Meters Per Second  
Mach. Machine  
Maint. Maintenance  
Matl. Material  
Max. Maximum  
MB Median Barrier  
MBM Thousand (Feet) Board Measure  
Med. Median  
Mega One Million  
Memb. Member  
MES Mitered End Section  
Mess. Message  
Mfg. Manufactured or Manufacturer  
MG 1000 Gallons  
MH Manhole  
MHW Mean High Water  
μ Micro  
Mi. Mile  
Micro One-Millionth  
Mid. Middle  
Mil One-Thousandth Of An Inch  
Mil. Military  
Milli One-Thousandth  
Min. Minimum or Minute  
Misc. Miscellaneous  
mL Milliliter  
MLW Mean Low Water  
mm Millimeter  
Mobl. Mobilization  
Mod. Modify or Modified  
Mol Mole  
Mon. Monument  
MOT Maintenance Of Traffic  
MP Mile Post

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

## STANDARD ABBREVIATIONS

Names	Dates	Approved By
Designed By		<i>Ben Blankenship</i> State Roadway Design Engineer
Drawn By		Revision      Sheet No.      Index No.
Checked By		02      1 of 2      001

# UNITS OF MEASURE

MPa Megapascal  
 MPH or mph Miles Per Hour  
 MSL Mean Sea Level  
 Mtd. Mounted  
 MUTCD Manual On Uniform Traffic Control Device  
 MUTS Manual On Uniform Traffic Studies

N North or Newton  
 N/m Newtons Per Meter  
 N/m<sup>2</sup> Newtons Per Square Meter  
 N/m<sup>3</sup> Newtons Per Cubic Meter  
 N/mm<sup>2</sup> Newtons Per Square Millimeter  
 NA or N/A Not Available or Not Applicable  
 N & C Nail & Cap  
 NB Northbound  
 NC National Coarse  
 NDCBU Neighborhood Delivery And Collection Box Unit  
 NE Northeast  
 net km Net Kilometer  
 NEMA National Electrical Manufacturers Association  
 NGVD National Geodetic Vertical Datum of 1929  
 NGS National Geodetic Survey  
 NHW Normal High Water  
 NIC Not In Contract  
 NJ New Jersey  
 N-m Newton Meter  
 No. Number  
 Nom. Nominal  
 Norm. Normal  
 NS Non Stress, Not Suitable or Near Side  
 NT, N&T Non Traffic, Nail & Tin  
 NTS Not To Scale  
 NW Northwest

Opass Overpass  
 O to O or o to o Out to Out  
 OA Overall  
 O.B.G. Optional Base Group  
 OC On Center  
 OD Outside Diameter  
 OE Overhead Electric  
 OH, OHD or Ohd. Overhead  
 Opt. Option, Optional or Optically  
 OT Overhead Telephone  
 Oz. Ounce  
 Ω Ohm

P Passenger Car & Light Delivery Truck  
 P or Plan Plan Quantity  
 Pa Pascal  
 Par. Parallel  
 Pa\*s Pascal Second  
 Part. Participation or Partition  
 Pavt. Pavement  
 PC Point Of Curvature  
 PCBC Precast Concrete Box Culvert  
 PCC Point Of Compound Curvature or Plain Cement Concrete  
 PCE Permanent Construction Easement  
 PE Professional Engineer  
 Ped Pedestrian or Pedestal  
 Pen. Penetration  
 PG Profile Grade  
 PGL Profile Grade Line  
 Ph. Phase  
 pH Measure Of Acidity or Alkalinity  
 PI Point Of Intersection  
 Pkg. Parking  
 Pkwy. Parkway  
 PL or Pl Property Line or Plate  
 PM 12:00 Noon Until 11:59 Midnight  
 POC Point On Curve  
 POST Point On Semi-Tangent  
 POT Point On Tangent  
 PP Power Pole  
 Pr. Pair  
 PRC Point Of Reverse Curvature  
 Prcast Precast  
 Prest. Prestressed  
 Prob. Probability  
 Prod. Product, Production, Producer or Produced  
 Prog. Program or Progression  
 Proj. Project or Projection  
 PRM Permanent Reference Monument  
 Prov. Provisions  
 PRS Portable Regulatory Sign  
 PS & E Plans, Specifications And Estimates  
 PSF or psf Pounds Per Square Foot  
 PSI or psi Pounds Per Square Inch  
 PT Point Of Tangency or Pressure Treated  
 PVC Polyvinyl Chloride  
 PW Pressure Water

Q Peak Discharge or Flow Volume

Pr. Pair  
 PRC Point Of Reverse Curvature  
 Prcast Precast  
 Prest. Prestressed  
 Prob. Probability  
 Prod. Product, Production, Producer or Produced  
 Prog. Program or Progression  
 Proj. Project or Projection  
 PRM Permanent Reference Monument  
 Prov. Provisions  
 PS & E Plans, Specifications And Estimates  
 PSF or psf Pounds Per Square Foot  
 PSI or psi Pounds Per Square Inch  
 PT Point Of Tangency or Pressure Treated  
 PVC Polyvinyl Chloride  
 PW Pressure Water

Q Peak Discharge or Flow Volume

R or Rad. Radius  
 R or Rng. Range  
 rad Radian  
 rad/s Radian Per Second  
 RBAC Rock Base Asphaltic Concrete  
 RBST Rock Base Surface Treatment  
 RCP Reinforced Concrete Pipe  
 RCPA Reinforced Concrete Pipe Arch  
 Rd. Road or Round  
 Rdsd. Roadside  
 Rdwy. Roadway  
 Rec. Recovery  
 Rect. Rectiline or Rectangular  
 Ref. Reference  
 Refl. Reflective  
 Reg. Region, Regular, Registered or Regulation  
 Reinf. Reinforced or Reinforcing  
 Rejuv. Rejuvenation  
 Reloc. Relocated  
 Rem. Removal  
 Repl. Replace  
 Req. or Reqd. Required  
 Res. Residence or Residential  
 RHW Insulation (Moisture & Heat Resistant Rubber)  
 RM Reference Monument  
 r/min Revolution Per Minute  
 RP Reference Point  
 rpm Revolution Per Minute  
 RPM Raised Reflective Pavement Markers  
 r/s Revolution Per Second  
 RR Railroad  
 RSDU Radar Speed Display Unit  
 Rsf. Resurface  
 Rt. Right  
 R/W, ROW Right Of Way

S or s Speed, South, Seimens, Or Second  
 SAHM Sand-Asphalt Hot Mix  
 SAN or San. Sanitary  
 SB Southbound  
 SBAC Shell Base Asphaltic Concrete  
 SBRM Sand Bituminous Road Mix  
 SBST Shell Base Surface Treatment  
 SC Seal Coat or Spiral To Curve  
 Sch. Schedule  
 SCST Sand-Clay Surface Treatment  
 SD Side Drain, Storm Drain  
 SE Southeast  
 Sec. Second  
 Sect. Section  
 Sed. Sediment  
 Sep. Separator  
 Seq. Sequential  
 Serv. Service  
 SF Adjustment Factor In Percent, Slit Fence  
 SG Subgrade  
 SG or Sp.Gr. Specific Gravity  
 Sheet Sheet  
 Shldr. Shoulder  
 SHW Seasonal High Water  
 Spa. Space  
 Spag. or Sp. Spacing  
 Spec. Specification  
 Sq. Ft. or SF Square Foot  
 Sq. In. Square Inch  
 Sq. Yd. or SY Square Yard  
 SR or S.R. State Road  
 SRAP Spiral Rib Aluminum Pipe  
 SRASP Spiral Rib Aluminized Steel Pipe  
 SRSP Spiral Rib Steel Pipe  
 SS Sanitary Sewer  
 SSMD Solid State Modular Design  
 ST Surface Treatment or Spiral To Tangent  
 St. or ST. Street  
 Sta. Station  
 Stab. Stability or Stabilization  
 STB Staked Turbidity Barrier  
 Std. Standard

Stg. Storage  
 Stl. Steel  
 Str. Structure  
 Sty. Story  
 SU Single Unit Trucks  
 Sub. or Subs. Subsoil  
 Sub. or Subst. Substitute  
 Subgr. Subgrade  
 Suppts. Supports  
 SUR or Sur. Survey  
 Surf. Surface  
 SW Southwest  
 SW or Swk. Sidewalk  
 Sys. or Syst. System  
 Sv. Sievert

T Tangent, Length Of Curve, Percent Trucks, Tesla,  
 T, TWP or Twp. Township  
 t Metric Ton  
 Tan. Tangent  
 TBM Temporary Bench Mark  
 TC Tangent To Curve  
 TCB Temporary Concrete Barrier  
 TCE Temporary Construction Easement  
 TCP Terra Cotta Pipe  
 TCZ Traffic Control Zone  
 Tel. Telephone  
 Temp. Temperature or Temporary  
 Traf. Traffic  
 Theo. Theoretical  
 THRMPLSTC Thermoplastic  
 THW or THWN Insulation (Flame Retardant, Moisture And Heat Resistant Thermoplastic)  
 Thick. Thickness  
 Tk. Thick, Thickness or Truck  
 Tn. Ton  
 Trans. Transition, Transverse, Translate or Transportation  
 Treat. Treatment  
 TS Tangent To Spiral  
 TSC Length Of Tangent (Spiral Curve)  
 Typ. Typical

Upass. Underpass  
 UG Underground  
 UL Underwriters Laboratories  
 Ult. Ultimate  
 Unltd. Unlimited  
 Unddr. Underdrains  
 Undrdwy. Underroadway  
 UNL or Unld. Unloaded  
 Untr. Untreated  
 USC & GS US Coast and Geodetic Survey (now National Geodetic Survey)  
 USGS US Geological Survey  
 USPS United States Postal Service  
 Util. Utilities  
 UV Ultraviolet

V Volt, Velocity, Volume or Hourly Volume  
 Var. Varies, Variable or Variance  
 VC Vertical Curve  
 VCP Vitrified Clay Pipe  
 VECP Value Engineering Change Proposal  
 Veh. Vehicle  
 Vert. Vertical  
 VF Vertical Foot  
 Vh Verified Horizontal Location  
 VMS Variable Message Sign  
 Vol. Volume  
 VP Vertical Panel  
 VPD or Vpd. Vehicles Per Day  
 VPH or Vph. Vehicles Per Hour  
 VPHPL or Vphpl. Vehicles Per Hour Per Lane  
 VRMS Volts Root Mean Square  
 Vv Verified Vertical Elevation  
 Vvh Verified Vertical Elevation And Horizontal Location  
 VW Variable Width

W Width, Wide, West or Watt  
 W/C Water-Cement Ratio  
 WB Westbound  
 Wb. Weber  
 WB40 Intermediate Semi Trailer  
 WB50 Large Semi Trailer  
 WB60 Tandem Semi Trailer  
 WM Water Main  
 W.P.I. Work Program Item  
 WT Water Table Or Weight  
 WWF Welded Wire Fabric

X Coordinate Value (East-West Direction) or Extra  
 X Rd. Cross Road  
 Xing. Crossing  
 Xsec. Cross Section

Y Coordinate Value (North-South Direction)  
 Yr. Year

## US MEASUREMENT

AC Acre  
 AS Assembly  
 BU Bushel  
 CF Cubic Foot  
 CO Cleanout  
 CY Cubic Yard  
 EA Each  
 ED Each Day  
 GA Gallon  
 GM Gross Mile  
 LB Pound  
 LF Linear Foot  
 LM Lane Mile  
 LO Per Location  
 LS Lump Sum  
 LU Luminaire  
 MB Thousand Board Measure  
 MG Thousand Gallons  
 MH Man Hour  
 NM Net Mile  
 PA Per Analysis  
 PB Per Building  
 PE Pile  
 PI Per Intersection  
 PL Plant  
 PM Per Mile  
 PS Per Set  
 PW Per Well  
 SF Square Foot  
 SY Square Yard  
 TN Ton

## METRIC MEASUREMENT

AS Assembly  
 CO Cleanout  
 DA Day  
 EA Each  
 ED Each Day  
 GK Gross Kilometer  
 HA Hectare  
 HR Hour  
 KG Kilogram  
 KL Kiloliter  
 KM Kilometer  
 LI Liter  
 LK Lane Kilometer  
 LO Per Location  
 LS Lump Sum  
 LS/AS Lump Sum Per Assembly  
 LS/DA Lump Sum Per Day  
 LS/EA Lump Sum Per Each  
 LS/HA Lump Sum Per Hectare  
 LS/KG Lump Sum Per Kilogram  
 LS/LS Lump Sum Per Lump Sum  
 LS/MT Lump Sum Per Metric Ton  
 LS/MI Lump Sum Per Linear Meter  
 LS/M2 Lump Sum Per Square Meter  
 LU Luminaire  
 MH Man Hour  
 MO Month  
 MT Metric Ton  
 MI Meter  
 M2 Square Meter  
 M3 Cubic Meter  
 NK Net Kilometer  
 PA Per Analysis  
 PB Per Building  
 PI Per Intersection  
 PL Plant  
 PW Per Well




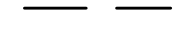


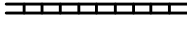
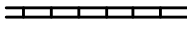
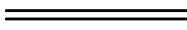
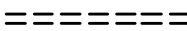
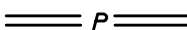


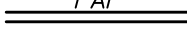










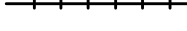
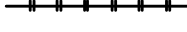
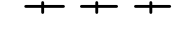










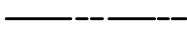





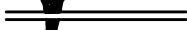


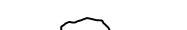

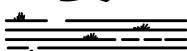
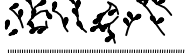









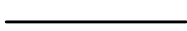

























































STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

# STANDARD ABBREVIATIONS

Names	Dates	Approved By
Designed By		<i>Jim Blundell</i> State Roadway Design Engineer
Drawn By		Revision Sheet No. Index No.
Checked By		02 2 of 2 001




## 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
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### GENERAL NOTE

1. Symbols on this Index are intended for use on all Roadway, Signing And Marking, Signalization, and Lighting projects. For work zone traffic control symbols refer to Index 600. When additional or similar symbols are used, legends or notations may be required for clarity.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
STANDARD SYMBOLS				
	Names	Dates	Approved By	
Designed By			 State Roadway Design Engineer	
Drawn By			Revision	Sheet No.
Checked By			00	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
	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
	Pipe Culvert-Mitered End Section
	Pipe Culvert-Straight Endwall
	Pipe Culvert-U-Type Endwall
	Pipe Culvert-Median Drain
	Pipe Culvert-Other End Treatments
	18" SD Storm Drain
	18" SD Storm Drain
	Inlet
	Manhole
	Tied Longitudinal Joint
	Keyed Longitudinal Joint
	Doweled Transverse Expansion Joint
	Doweled Transverse Contraction Joint
	Transverse Contraction Joint Without Dowels
	Survey Reference Point
	Triangulation Station
	Bench Mark
	Point Of Intersection
	North Arrow
	Edges Of Existing Pavement And Sidewalk
	Guardrail
	Crash Cushion (Attenuator)
	Piling Pier Column
	Concrete Monument
	Base Line
	Centerline
	Property Line
	Delta Angle
	Approximate
	Round Or Diameter

	Curb
	Curb And Gutter
	Water Well, Spring
	Levee
	Railroad Mile Post
	Railroad Signal With Gate
	Railroad Switch
	Gate
	Pump Island
	Storage Tank (Surface)
	Storage Tank (Underground)
	Mine Or Quarry
	Borrow Pit
	Church
	Store
	Residence
	Barn
	School
	Hay Bales
	Silt Fence
	Floating Turbidity Barrier
	Staked Turbidity Barrier
	Stream
	Shore Line
	Marsh
	Wetland Boundary
	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		EXISTING	PROPOSED	
			Manhole			Power Pole
			Fire Hydrant			Telephone Pole
			Meter (Type)			Combination Pole
			Valve (Type)			Guy Wire And Anchor Pin
			Valve Box (Type)			Guy Pole Deadman
			Valve Cover (Type)			Tower
			Vent (Type)			Light Pole
			Pump Station			Transformer
			Sewage Pump Station			
			Cleanout			
			Cable TV Service Box			
			Gas			Overhead Electric
			Water Main			Overhead Telephone
			Sanitary Sewer			Overhead Cable Television
			Buried Electric			Overhead Fiber Optic
			Buried Telephone			
			Buried Cable Television			
			Buried Fiber Optic			
			Casing			
			Duct			
			Non Potable Water			
			Petroleum			
			Roof Drain			
			Steam			

See General Note Sheet 1 Of 3.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>STANDARD SYMBOLS</b>					
	Names	Dates	Approved By		
Designed By					
Drawn By	CDP	08/72	Revision	Sheet No.	Index No.
Checked By	COR	08/72	00	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 (Points)
		Pedestrian Detector
		Pedestrian Signal Head (Pole Or Pedestal Mounted)
		Controller Cabinet (Base Mounted)
		Controller Cabinet (Pole Mounted)
		Walk - Dont Walk
		Flashing Dont Walk
		Signal Face Number
		Signal Lens
		Programmed Signal Head
		Messenger Wire
		Pole Tabulation Cross Reference
		Pole Tabulation Cross Reference (Joint Use Pole)
		Signal Phase

## LIGHTING SYMBOLS

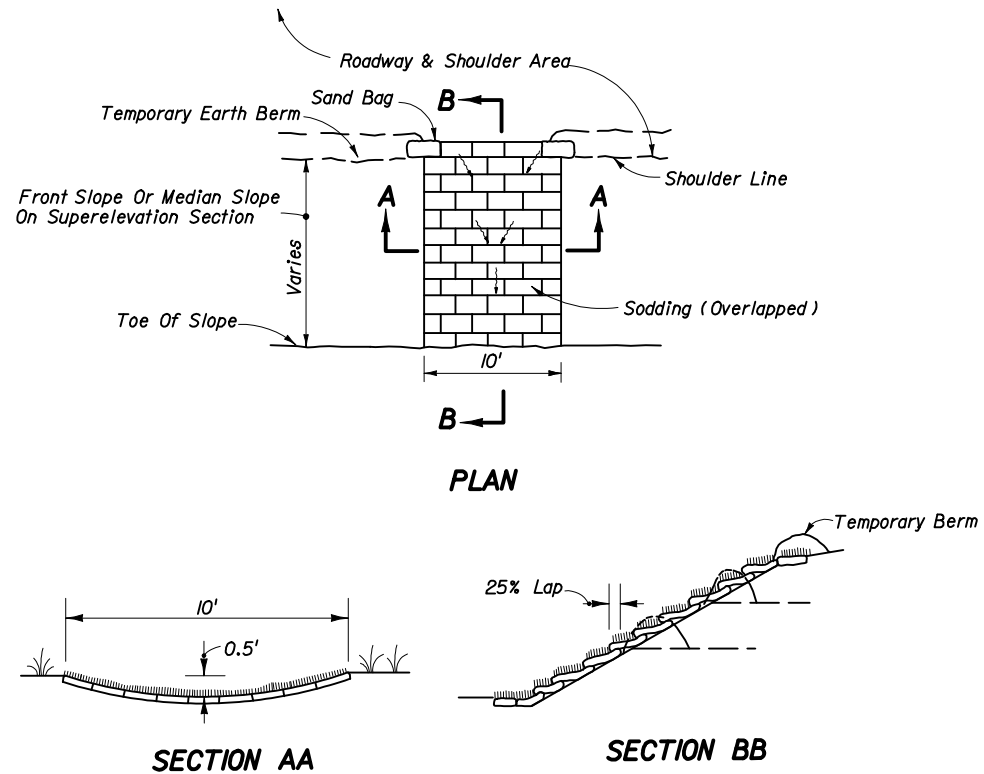
EXISTING	PROPOSED	
		Pole & Luminaire
		Existing Pole & Luminaire To Be Removed
		Final Position Of Relocated Or Adjusted Pole & Luminaire
		High Mast Lighting Tower
		City Or Utility Owned Luminaire & Pole
		PVC (Polyvinyl Chloride) Lighting Conduit And Conductors
		Rigid Galvanized Lighting Conduit And Conductors
		Lighting Pull-Box
		Light Distribution Point
		Joint Use Pole
		Pier Cap Underdeck Luminaire
		Pendant Hung Underdeck Luminaire

## SIGNING AND PAVEMENT MARKING SYMBOLS

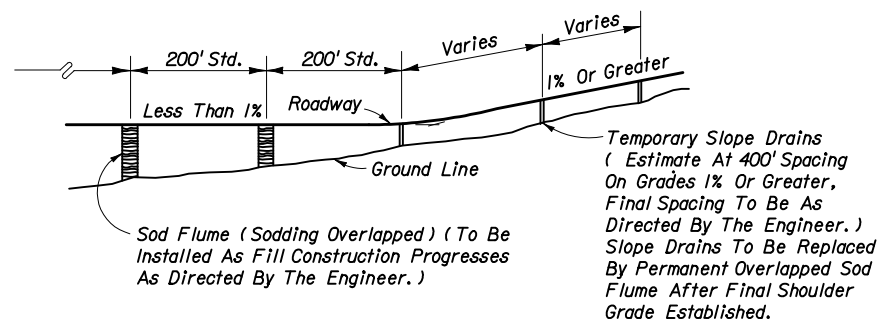
	Pavement Arrow
	Single Solid Line
	Double Solid Line
	Skip Line
	Stop Bar
	Traffic Sign (Post Mounted)
	Traffic Sign (Overhead)
	Sign Number
	Sign Item Number
	Traffic Flow Arrow

See General Notes, Sheet 1 of 3

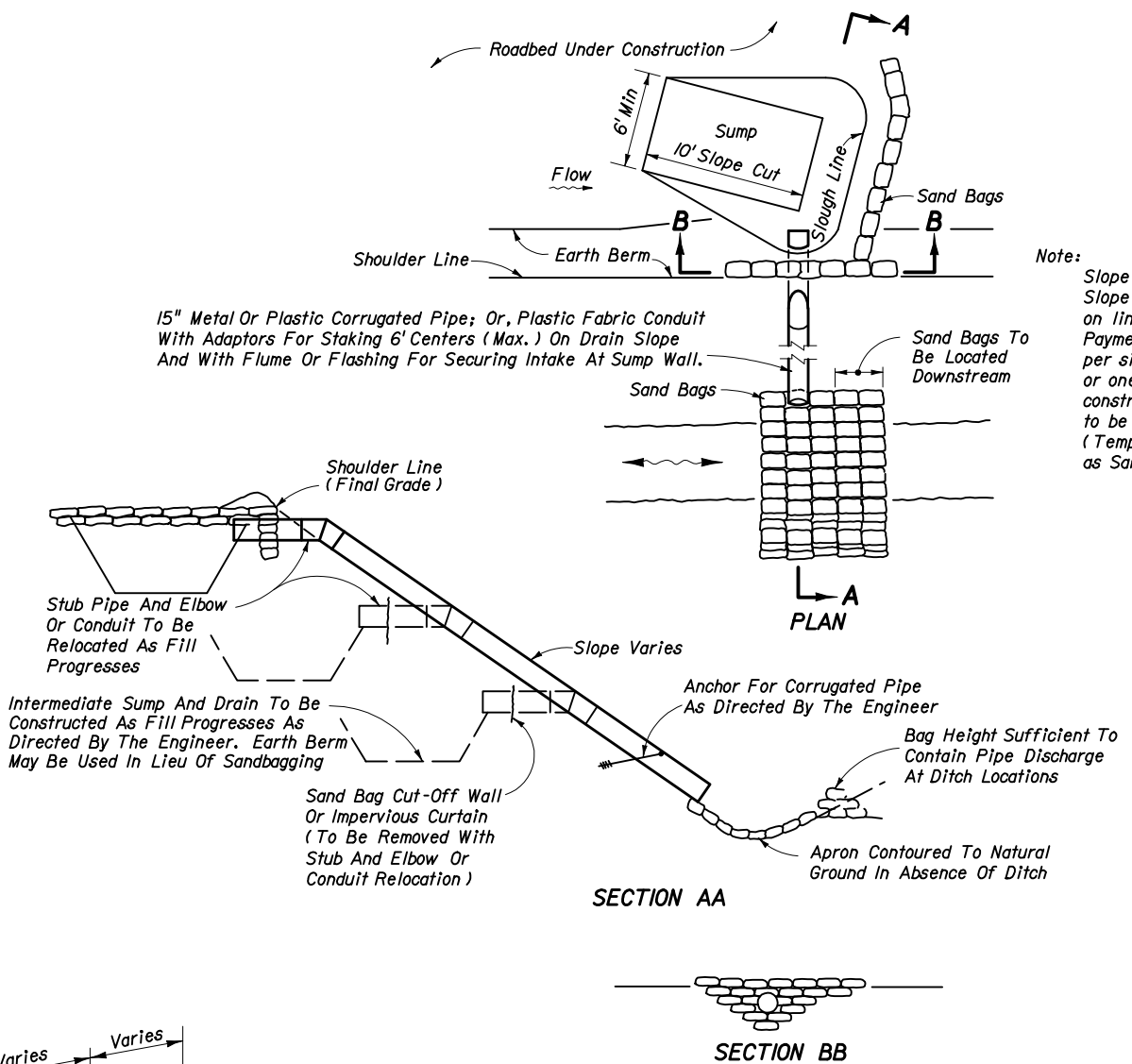
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>STANDARD SYMBOLS</b>					
	Names	Dates	Approved By		
Designed By					
Drawn By	CDP	08/72	Revision	Sheet No.	Index No.
Checked By	COR	08/72	00	3 of 3	002



**SOD FLUME (SODDING OVERLAPPED)**

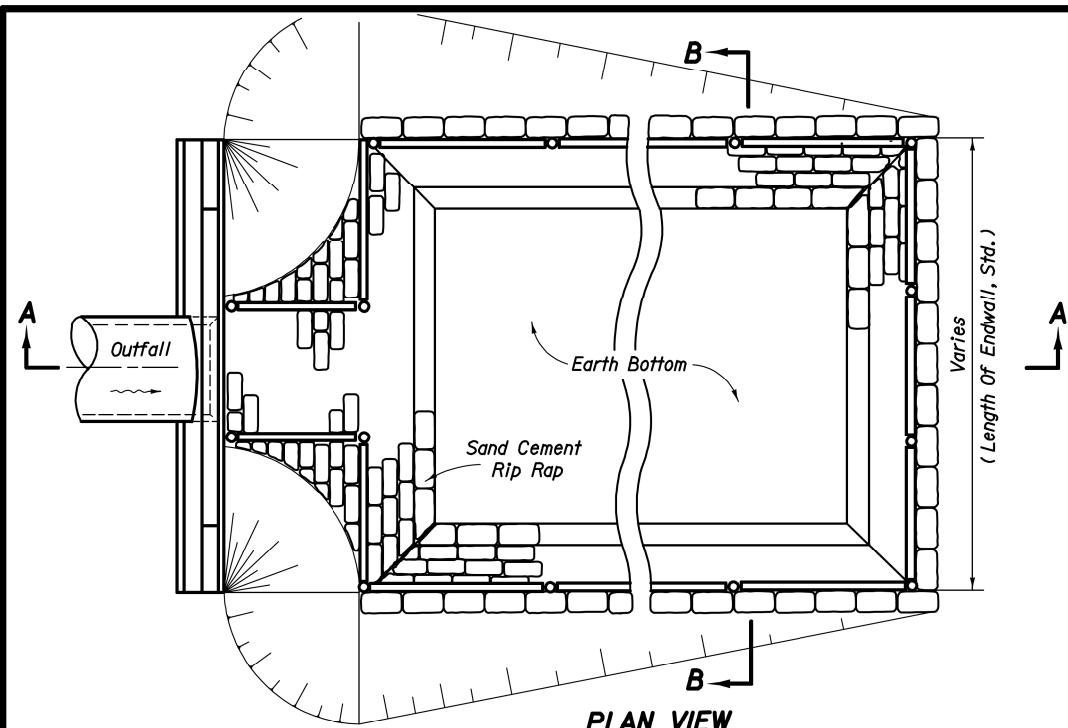


**SLOPE DRAIN APPLICATION**

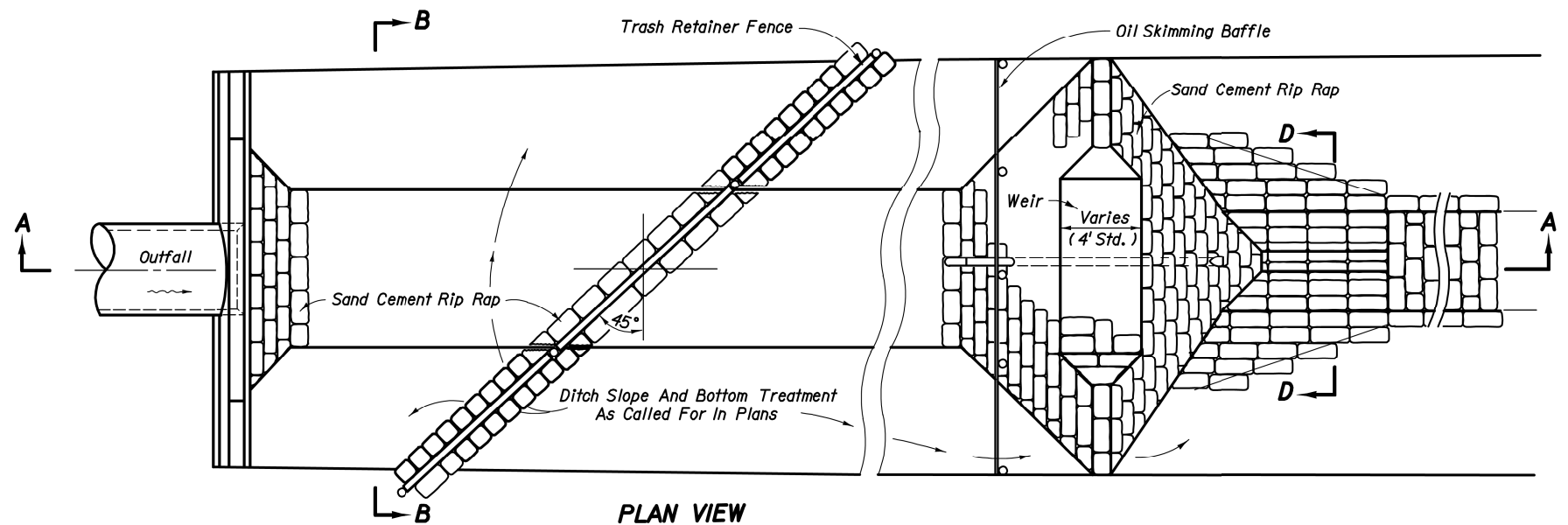


Note:  
Slope drain pipe to be paid for as Slope Drains (Temporary) LF, based on linear feet of pipe or conduit installed. Payment to be made for one installation per site, including one stub and elbow or one intake flume or flashing. Sump construction and maintenance and curtains to be included in cost for Slope Drains (Temporary). Sand bags to be paid for as Sandbagging CY.

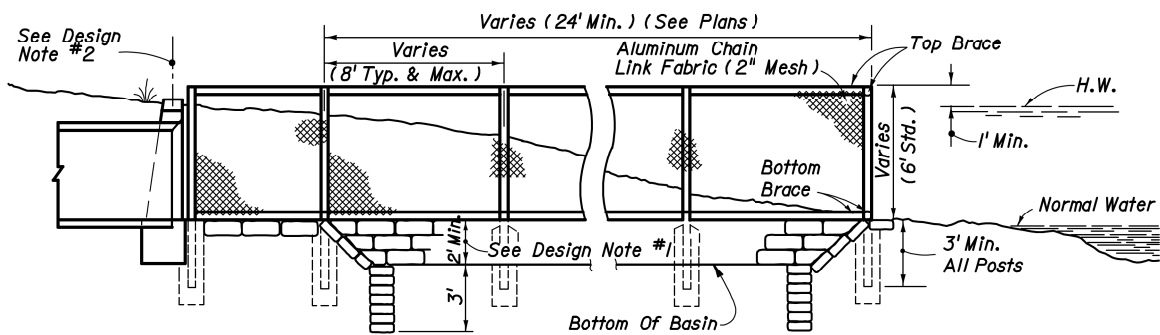
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TEMPORARY SLOPE DRAIN AND SOD FLUME</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By	10/07/80	00	1 of 1	100



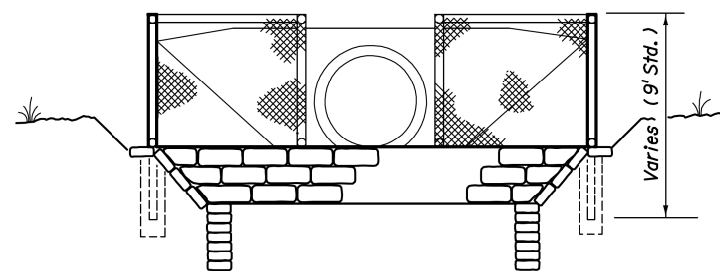
PLAN VIEW



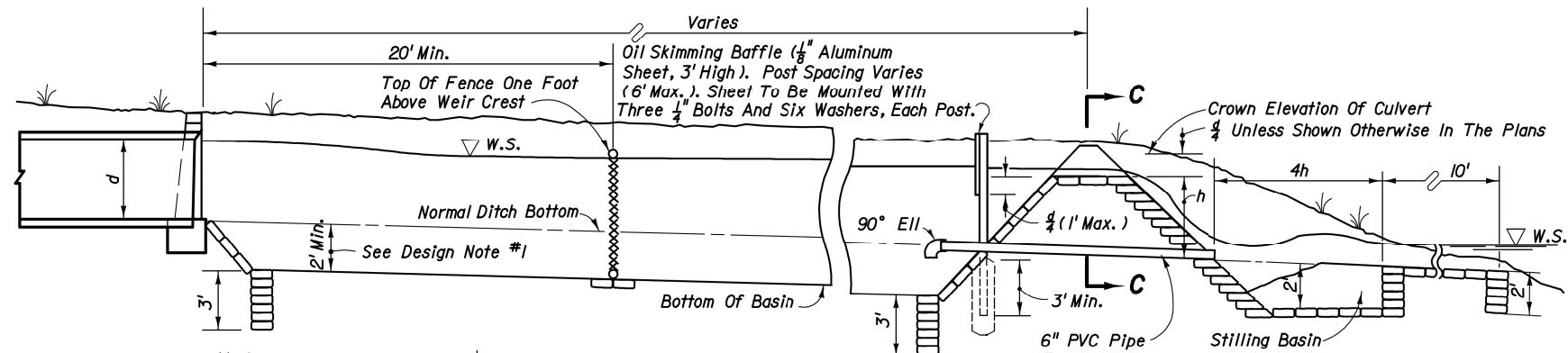
PLAN VIEW



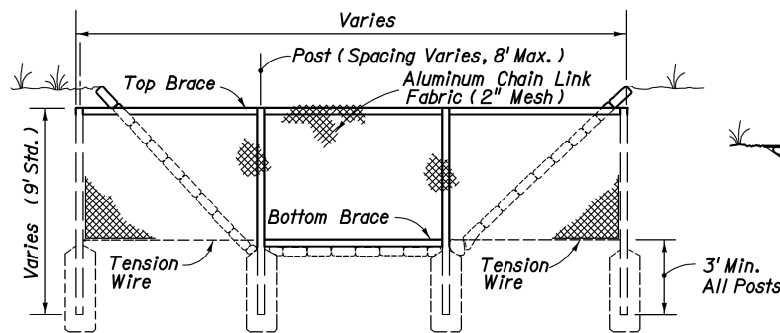
SECTION AA



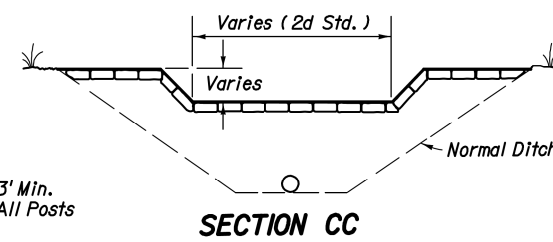
SECTION BB



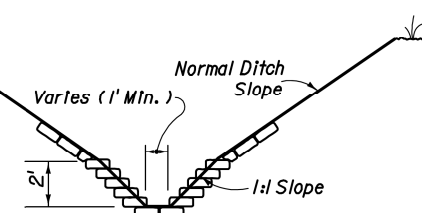
SECTION AA



SECTION BB



SECTION CC



SECTION DD

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

**TYPE A**

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

**TYPE B**

**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.

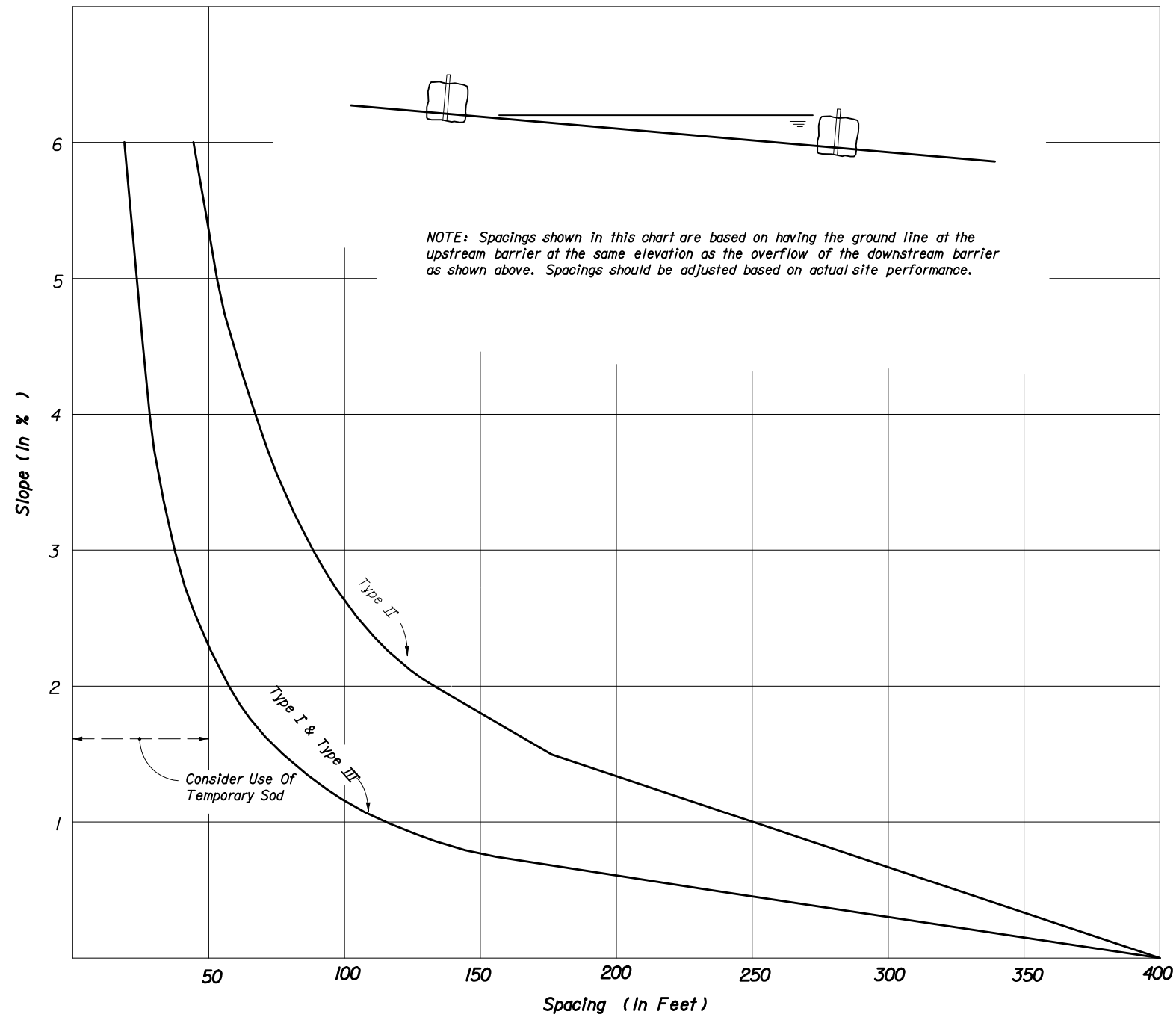
**GENERAL CONSTRUCTION NOTES**

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.

**GENERAL NOTES**

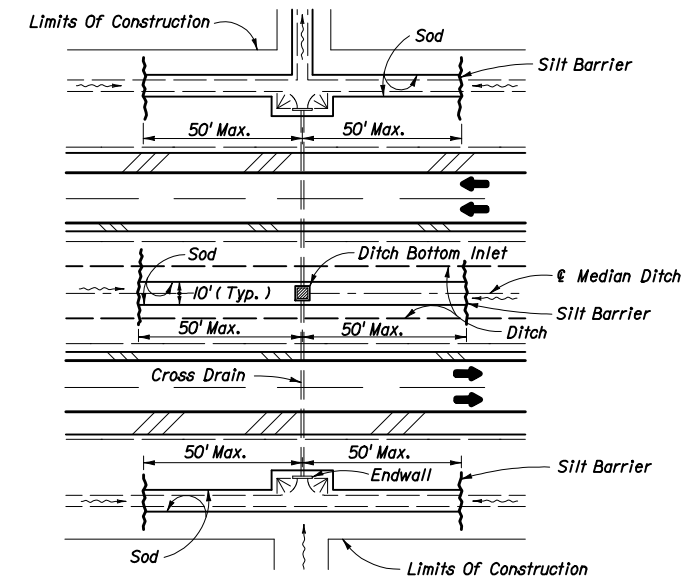
1. The cost for Type A and Type B trash retainer and sediment basins shall include the cost for riprap, fencing, baffles, piping and for sump and weir earthwork over and above ditch excavation called for in the plans. Payment for both Type A Type B shall be under the contract unit price for Sediment Basins, Each. Cleanouts as called for in the plans shall be paid for under the contract unit price for Sediment Basin Cleanouts, CO.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRASH RETAINER AND SEDIMENT BASIN</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By	WJR	05/74	State Drainage Engineer	
Drawn By			Revision	Sheet No.
Checked By	HLB	06/74	00	1 of 1
				101



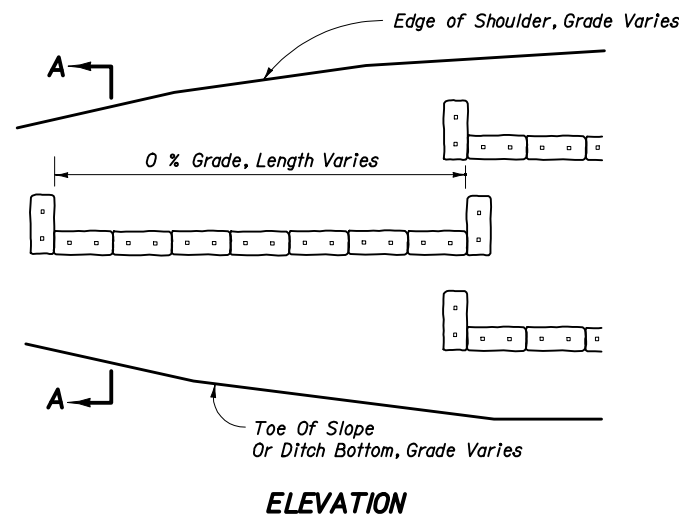
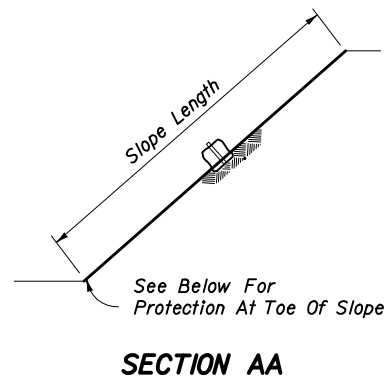
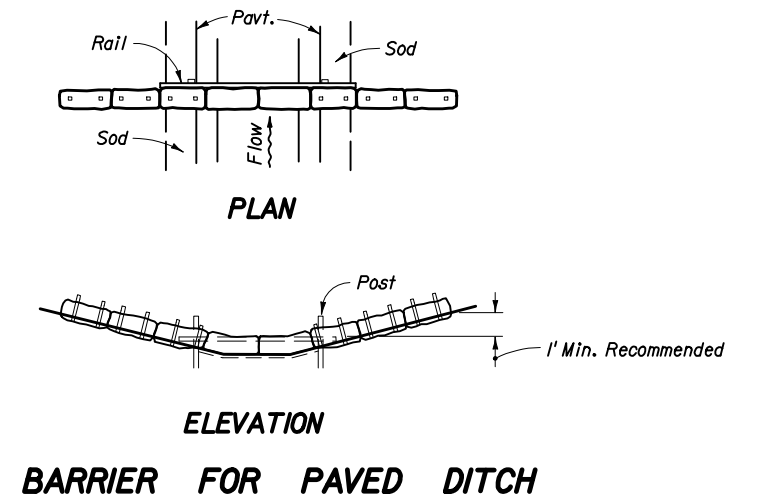
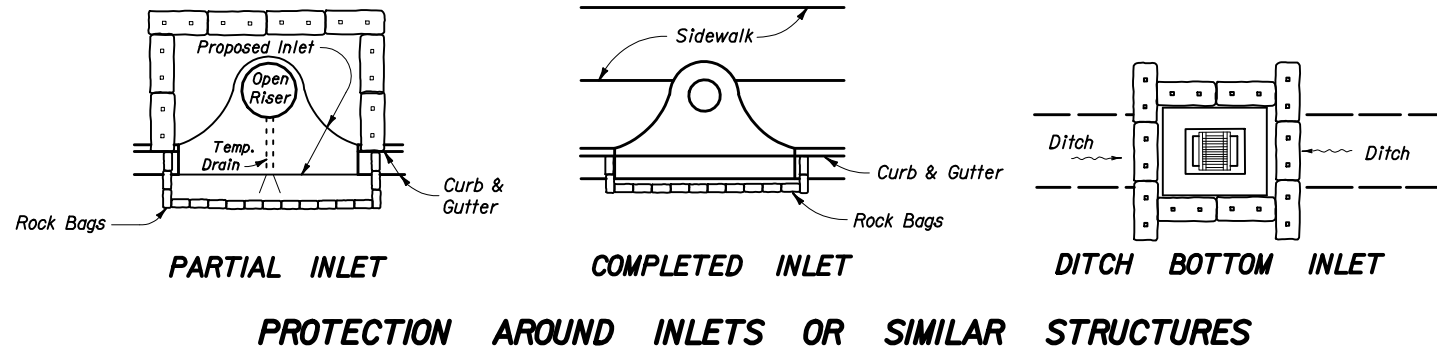
**CHART I**

RECOMMENDED SPACING FOR BALED HAY BARRIERS AND TYPE III SILT FENCE



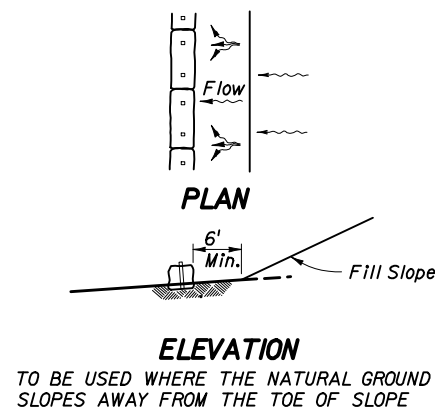
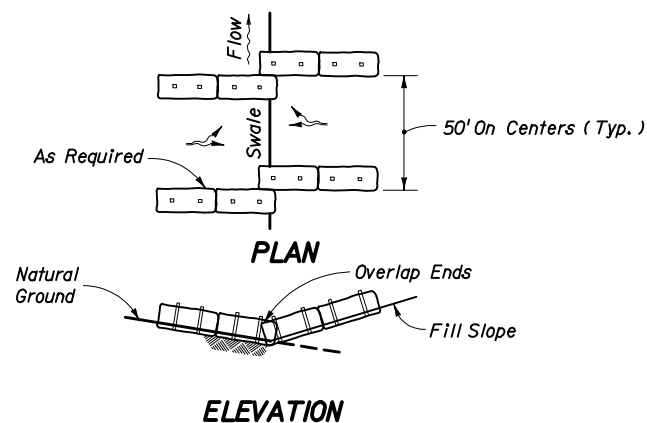
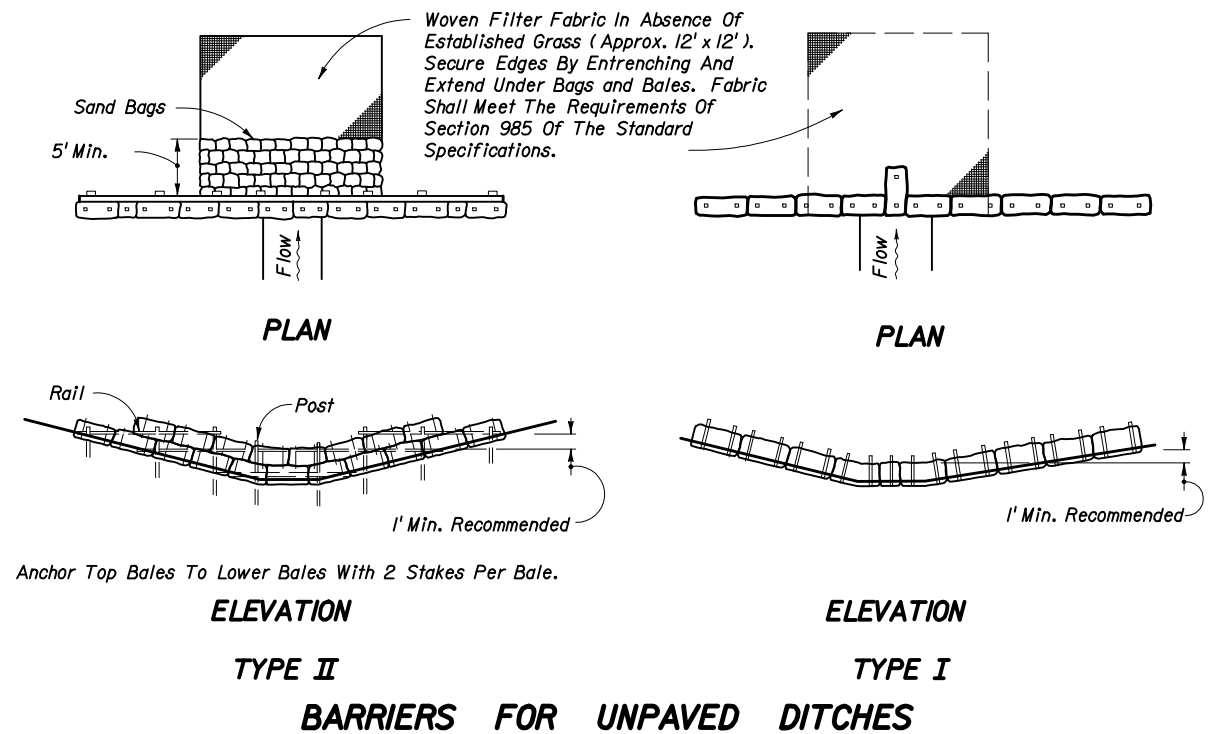
DITCH INSTALLATIONS AT DRAINAGE STRUCTURES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TEMPORARY EROSION AND SEDIMENT CONTROL</b>				
Designed By	EGR	02/80	Approved By <i>S. A. McHenry</i> State Drainage Engineer	
Drawn By	HSD	09/82	Revision	Sheet No. Index No.
Checked By	JVG	09/82	00	1 of 3 102



**ALONG FILL SLOPE**

Note:  
Where the slope length exceeds 25 feet, construct one row of bale barriers at 0% longitudinal grade midway up the slope. Construct two rows of bale barriers where the slope length exceeds 50 feet.



**AT TOE OF SLOPE**

**BARRIERS FOR FILL SLOPES**

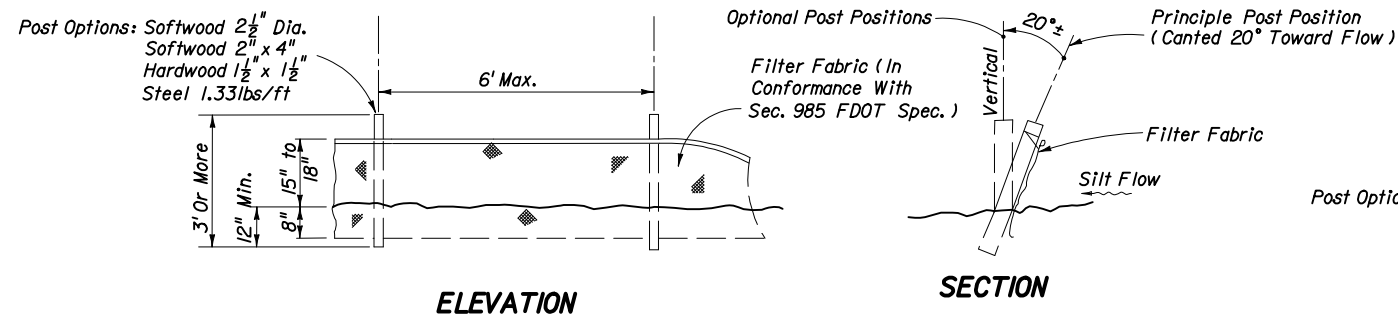
TO BE USED WHERE THE NATURAL GROUND SLOPES TOWARD THE TOE OF SLOPE

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

**NOTES FOR BALED HAY OR STRAW BARRIERS**

1. Type I and II Barriers should be spaced in accordance with Chart 1, Sheet 1.
2. Hay bales shall be trenched 3" to 4" and anchored with 2 - 1" x 2" (or 1" dia.) x 4' wood stakes. Stakes of other material or shape providing equivalent strength may be used if approved by the Engineer. Stakes other than wood shall be removed upon completion of the project.
3. Rails and posts shall be 2" x 4" wood. Other materials providing equivalent strength may be used if approved by the Engineer.
4. Adjacent bales shall be butted firmly together. Unavoidable gaps shall be plugged with hay or straw to prevent silt from passing.
5. Where used in conjunction with silt fence, hay bales shall be placed on the upstream side of the fence.
6. Bales to be paid for under the contract unit price for Baled Hay or Straw, EA. The unit price shall include the cost of filter fabric for Type I and II Barriers. Sand bags shall be paid for under the unit price for Sandbagging, CY. Rock bags to be paid for under the contract unit price for Rock Bags, EA.

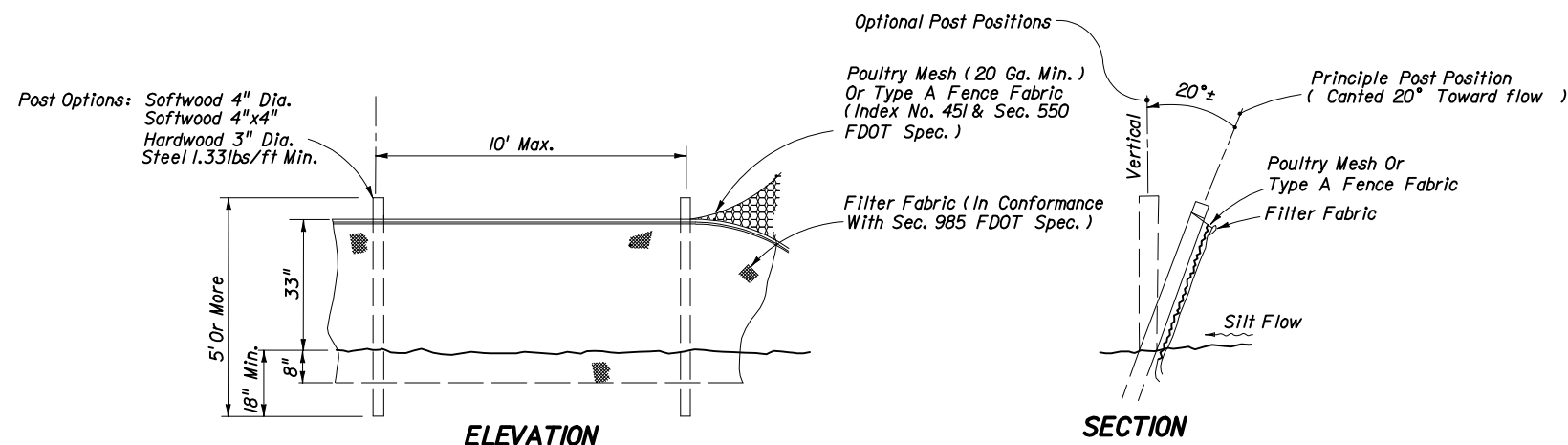
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TEMPORARY EROSION AND SEDIMENT CONTROL</b>				
Designed By	WJR	Dates	5/74	Approved By
Drawn By		Revision		 State Drainage Engineer
Checked By	HLB	6/74	00	
			Sheet No.	Index No.
			2 of 3	102



ELEVATION

SECTION

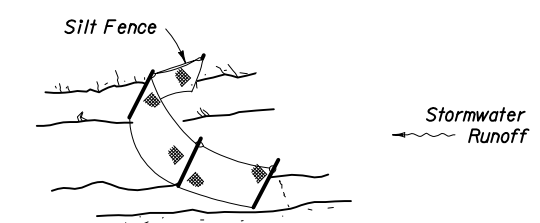
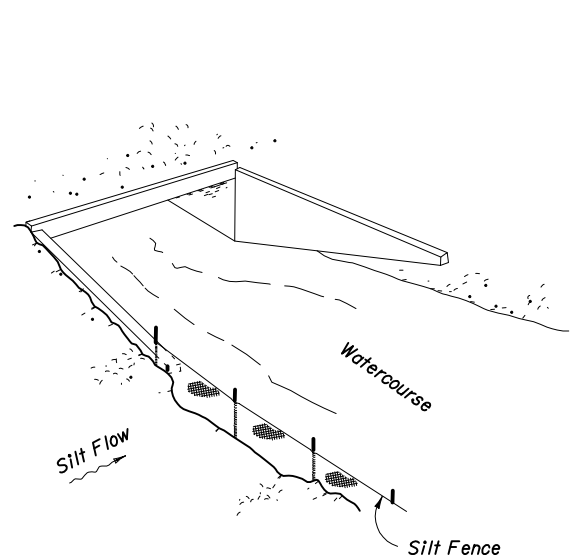
**TYPE III SILT FENCE**



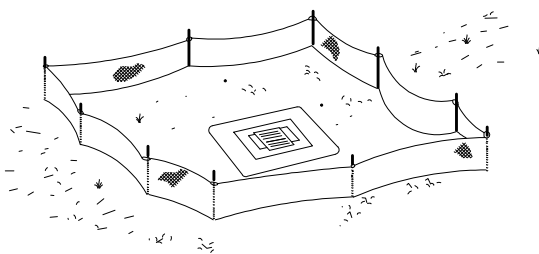
ELEVATION

SECTION

**TYPE IV SILT FENCE**

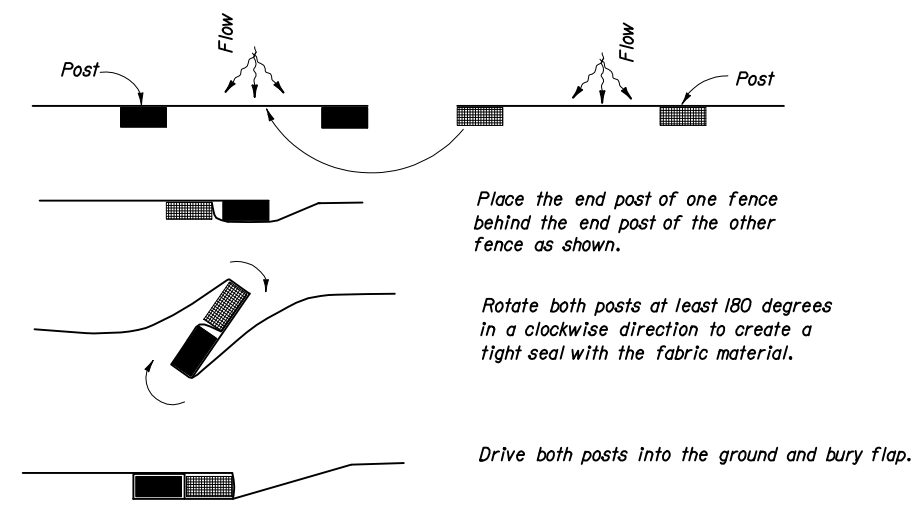


Silt Fence Protection in Ditches with Intermittent Flow



Silt Fence Protection Around Ditch Bottom Inlets.

**SILT FENCE APPLICATIONS**



Place the end post of one fence behind the end post of the other fence as shown.

Rotate both posts at least 180 degrees in a clockwise direction to create a tight seal with the fabric material.

Drive both posts into the ground and bury flap.

PLAN VIEW

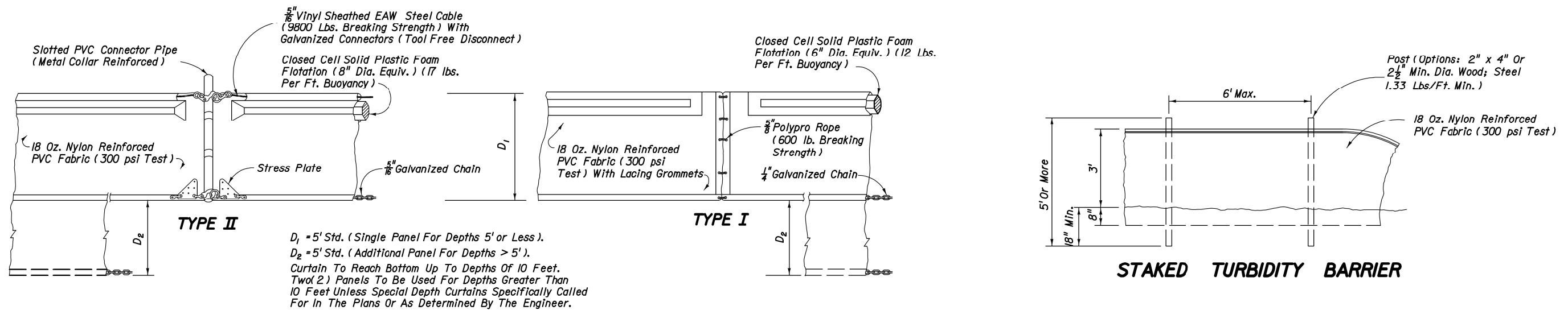
**JOINING TWO SILT FENCES**

**NOTES FOR SILT FENCES**

1. Type III Silt Fence to be used at most locations. Where used in ditches, the spacing for Type III Silt fence shall be in accordance with Chart 1, Sheet 1.
2. Type IV Silt Fence to be used where large sediment loads are anticipated. Suggested use is where fill slope is 1:2 or steeper and length of slope exceeds 25 feet. Avoid use where the detained water may back into travel lanes or off the right of way.
3. Do not construct silt fences across permanent flowing watercourses. Silt fences are to be at upland locations and turbidity barriers used at permanent bodies of water.
4. Where used as slope protection, Silt Fence is to be constructed on 0% longitudinal grade to avoid channelizing runoff along the length of the fence.
5. Silt Fence to be paid for under the contract unit price for Staked Silt Fence, (LF).

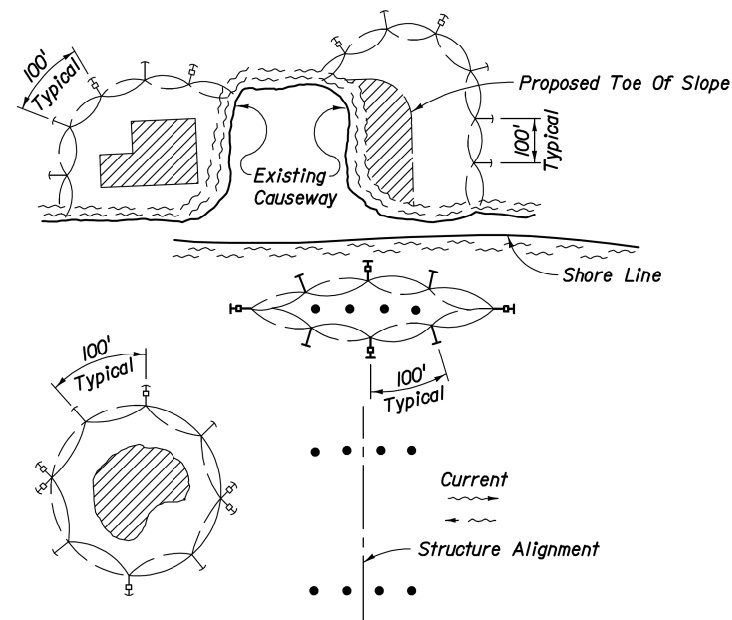
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TEMPORARY EROSION AND SEDIMENT CONTROL</b>				
Designed By	RAA/CJA	09/85	Approved By <i>S. A. McHenry</i> State Drainage Engineer	
Drawn By	LRE	09/85	Revision	Sheet No.
Checked By	RAA	10/85	02	3 of 3
				Index No. <b>102</b>





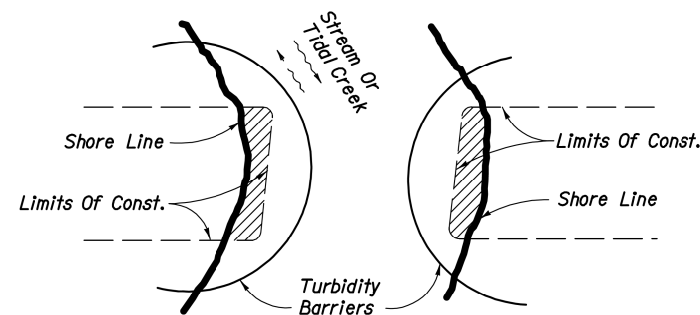
NOTICE: COMPONENTS OF TYPES I AND II MAY BE SIMILAR OR IDENTICAL TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER. SUBSTITUTIONS FOR TYPES I AND II SHALL BE AS APPROVED BY THE ENGINEER.

**FLOATING TURBIDITY BARRIERS**



**LEGEND**

- Pile Locations
- ▨ Dredge Or Fill Area
- Mooring Buoy w/Anchor
- Anchor
- Barrier Movement Due To Current Action



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 Contractors 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.

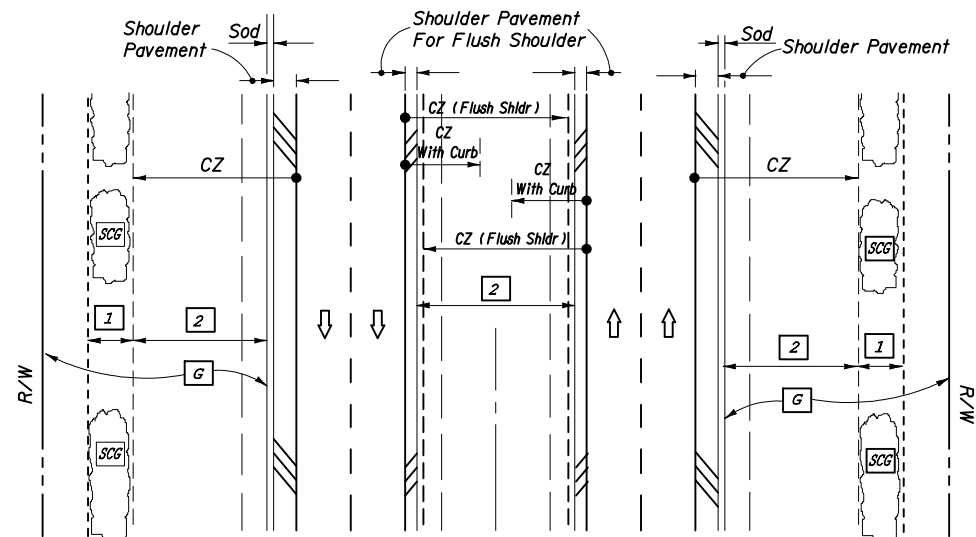
- NOTES:
1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
  2. Number and spacing of anchors dependent on current velocities.
  3. Deployment of barrier around pile locations may vary to accommodate construction operations.
  4. Navigation may require segmenting barrier during construction operations.
  5. For additional information see Section 104 of the Standard Specifications.

**GENERAL NOTES**

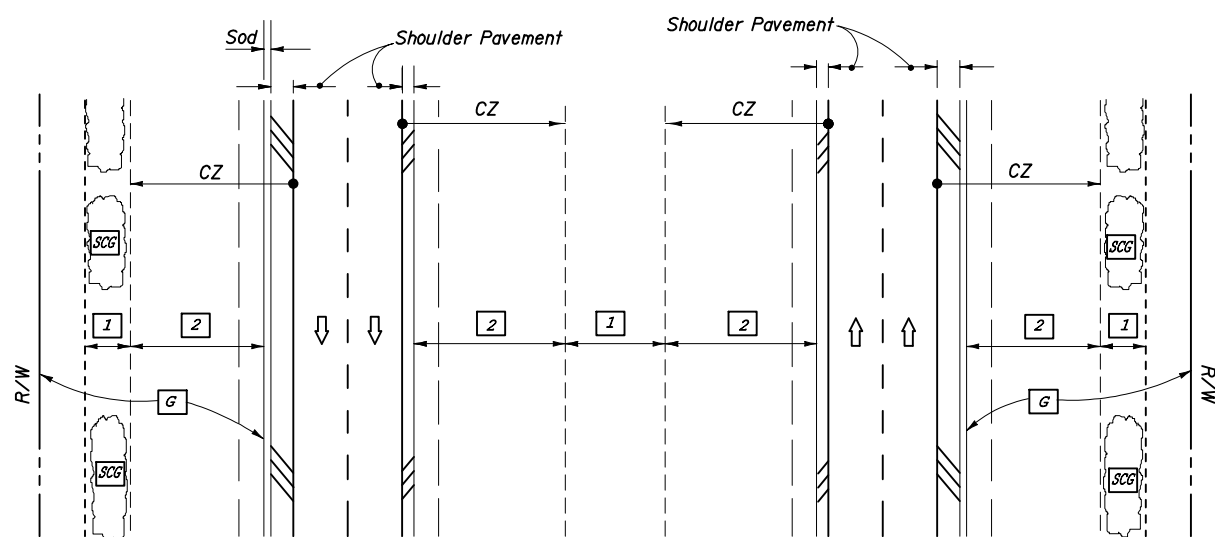
1. Floating turbidity barriers are to be paid for under the contract unit price for Floating Turbidity Barrier, LF.
2. Staked turbidity barriers are to be paid for under the contract unit price for Staked Turbidity Barrier, LF.

**TURBIDITY BARRIER APPLICATIONS**

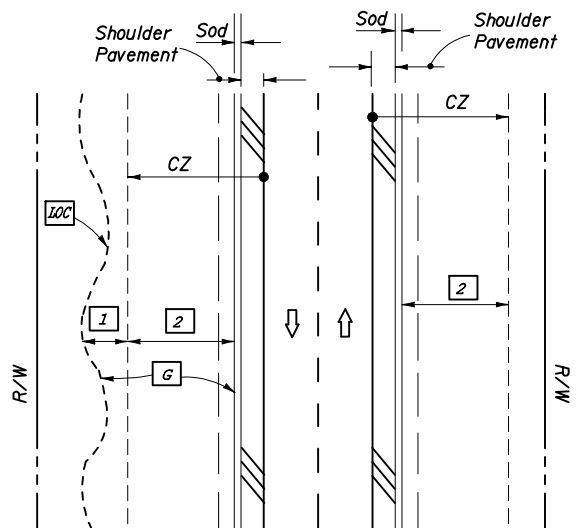
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TURBIDITY BARRIERS</b>				
Names	Dates	Approved By <i>S. A. Mehemou</i>		
Designed By RAA/CIA	9/85	State Drainage Engineer		
Drawn By LRE	9/85	Revision	Sheet No.	Index No.
Checked By RAA	10/85	00	1 of 1	103



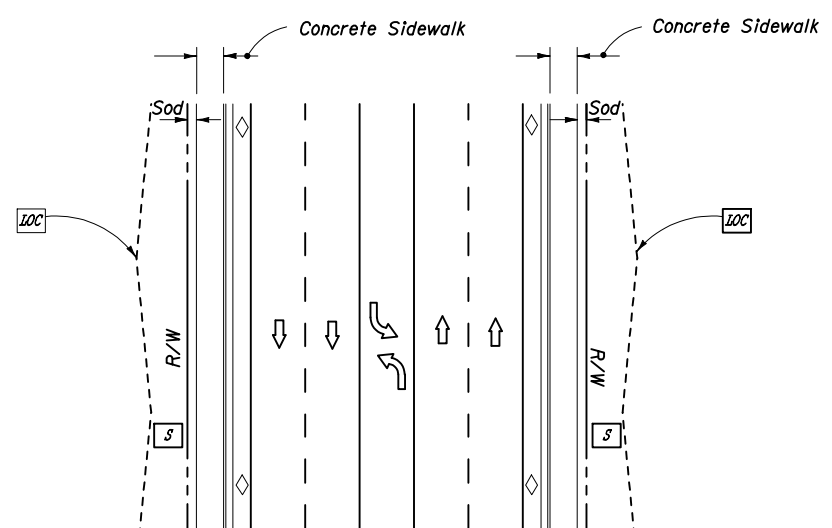
DIVIDED NARROW MEDIAN WITH OR WITHOUT CURBED MEDIAN



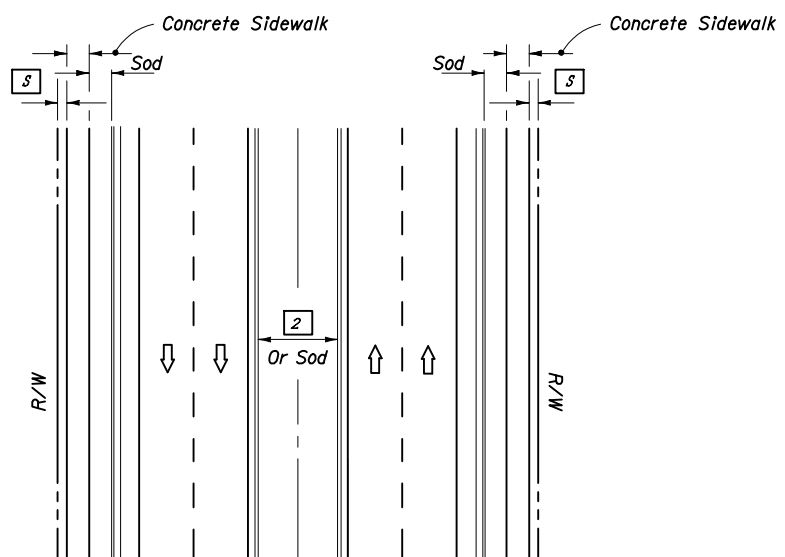
DIVIDED WIDE MEDIAN WITH OR WITHOUT CURBED MEDIAN



UNDIVIDED FLUSH SHOULDER



UNDIVIDED CURBED



DIVIDED CURBED

LEGEND

- 1 Wildflower Group #1
- 2 Wildflower Group #2
- G Grass-Seed/Seed & Mulch (To Limit of Construction)
- SCG Selective Clearing And Grubbing
- LOC Limits Of Construction
- S Seed, Seed And Mulch, Sod Or Seed, Sod

WILDFLOWERS SEEDING RATE	
Common Name ( Botanical Name )	lbs/ac
#1 Group	
Black-Eyed Susan ( <i>Rudbeckia hirta</i> )	2
Tickseed ( <i>Coreopsis tinctoria</i> )	
Lance-Leaf Tickseed ( <i>Coreopsis lanceolata</i> )	10
Indian Blanket ( <i>Gaillardia pulchella</i> )	10
#2 Group	
Annual Phlox ( <i>Phlox drummondii</i> )	10
Moss Verbena ( <i>Berben tenuisecta</i> )	6

TYPE OF SEED	ZONE I				ZONE II			
	COASTAL		INLAND		COASTAL		INLAND	
	Mar. To Nov.	Nov. To Mar.	Mar. To Oct.	Oct. To Mar.	Feb. To Dec.	Dec. To Feb.	Feb. To Dec.	Dec. To Feb.
PERMANENT GRASSES								
Unhulled Bermuda	20	20	20	20	20	20	20	20
Bahia Argentina Or Pensacola Bahia			80	80			80	80
QUICK GROWING GRASS								
Annual Rye		20		20		20		20
TOTAL Lbs/ PER ACRE	20	40	100	120	20	40	100	120

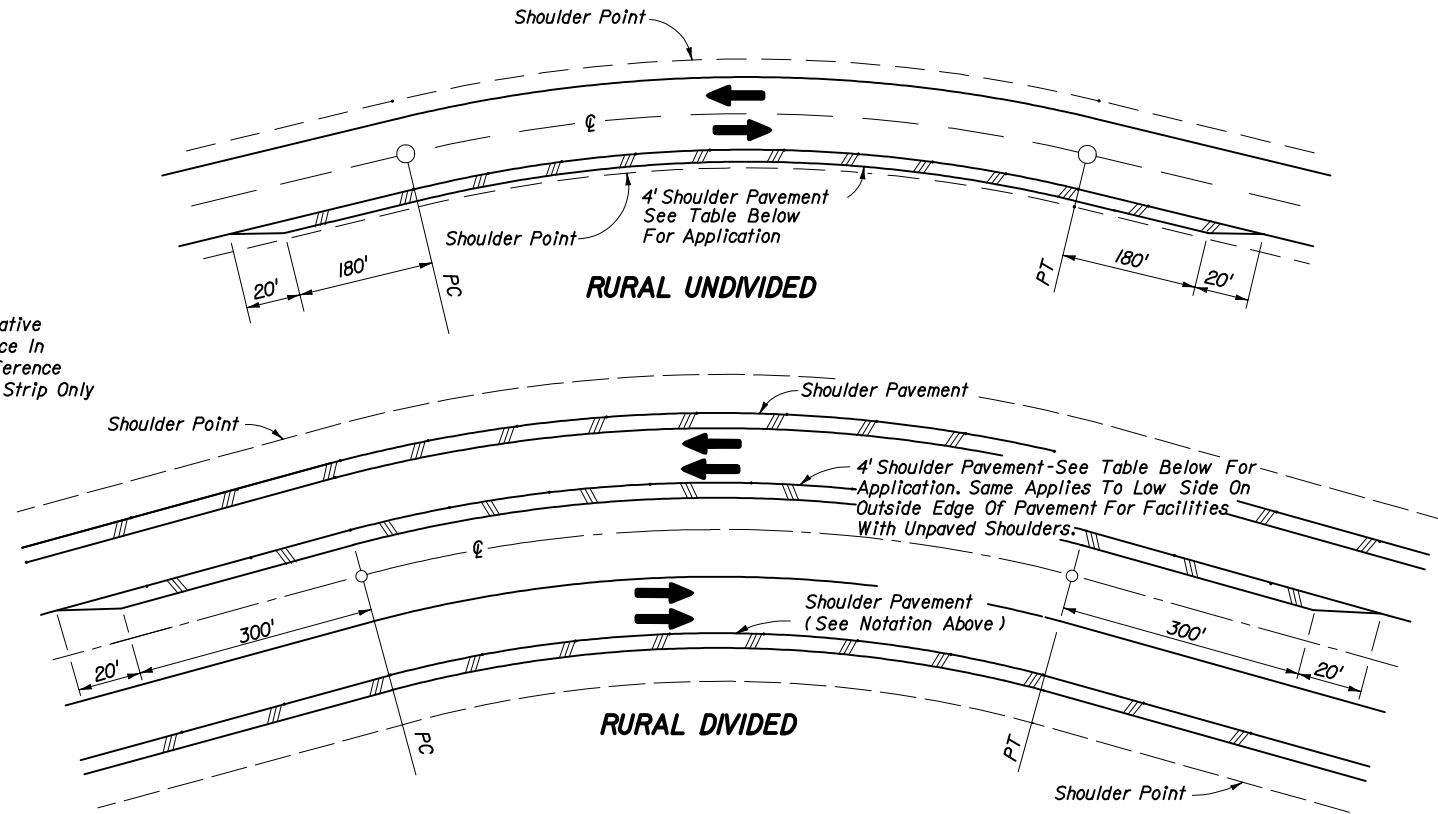
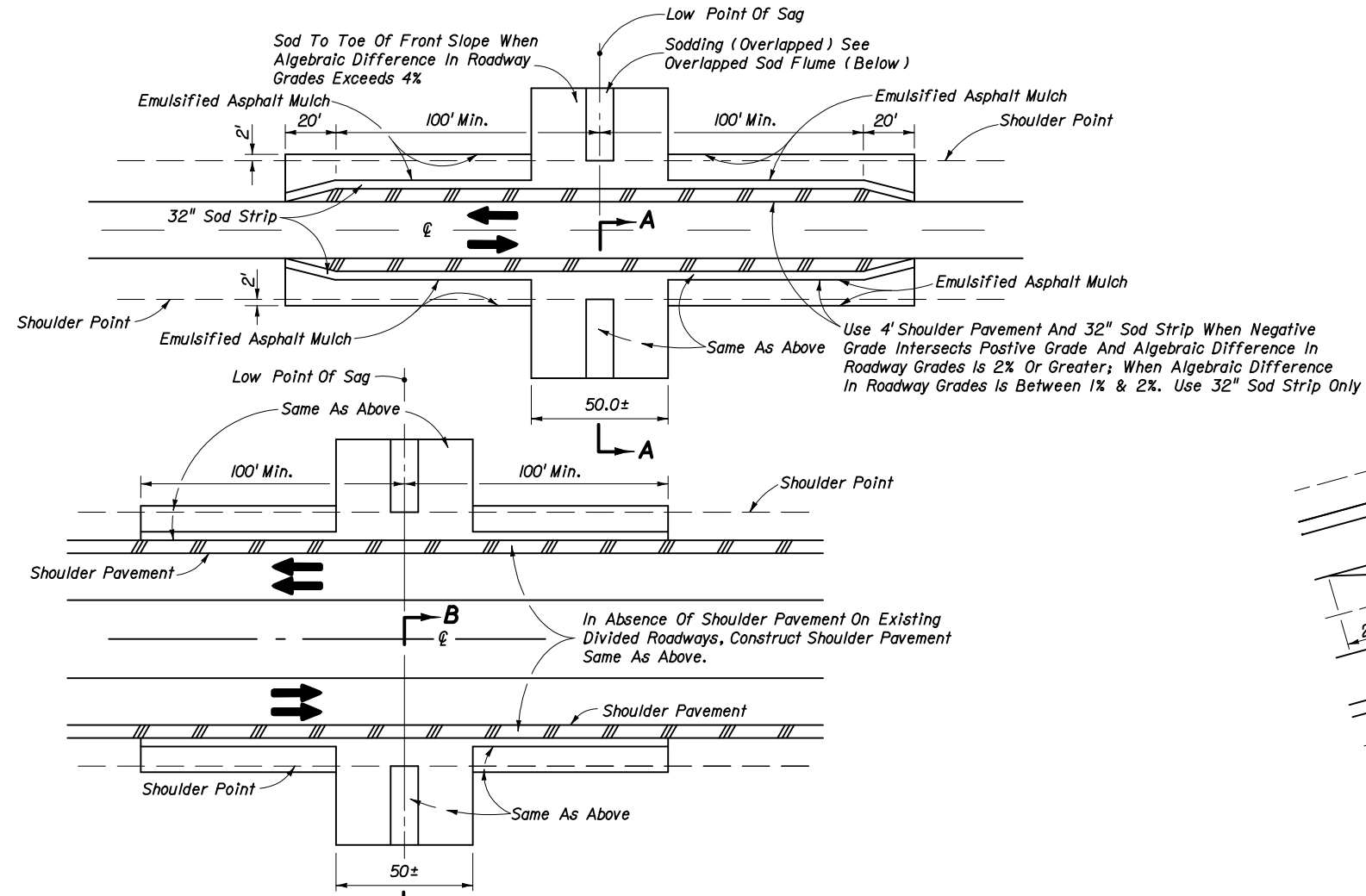
Note: The seeding rates shown in this table apply only when seed is spread by an approved mechanical spreader meeting the requirements of Section 570 and 577 of the Standard Specifications.  
 \*See Index No. 105 for zone boundaries and seeding rates for shoulder reworking.

SEEDING FOR PERMANENT GRASSING AND WILDFLOWERS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

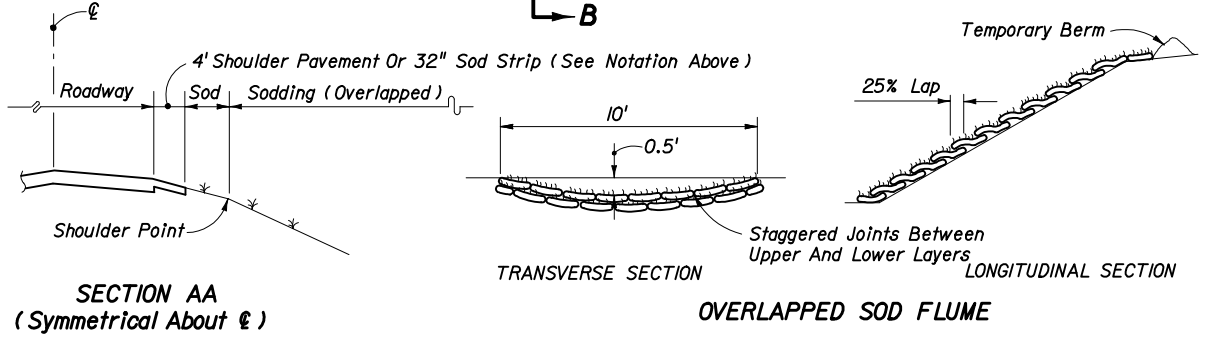
**PERMANENT EROSION CONTROL**

Names	Dates	Approved By	
Designed By	GLH 01/00	 State Drainage Engineer	
Drawn By	HSD 01/00		
Checked By	GLH 01/00		
Revision	02		
Sheet No.	1 of 2	Index No.	104



CRITERIA FOR PAVING SHOULDER ON DIVIDED AND UNDIVIDED FACILITIES		
Design Speed (mph)	Radius Of Curve	Notes:
30	7° Or Greater	(1) Shoulder Pavement is 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. (2) If outside shoulder is paved as designated bike lane, the paved width within curves shall match the bike lane width.
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**

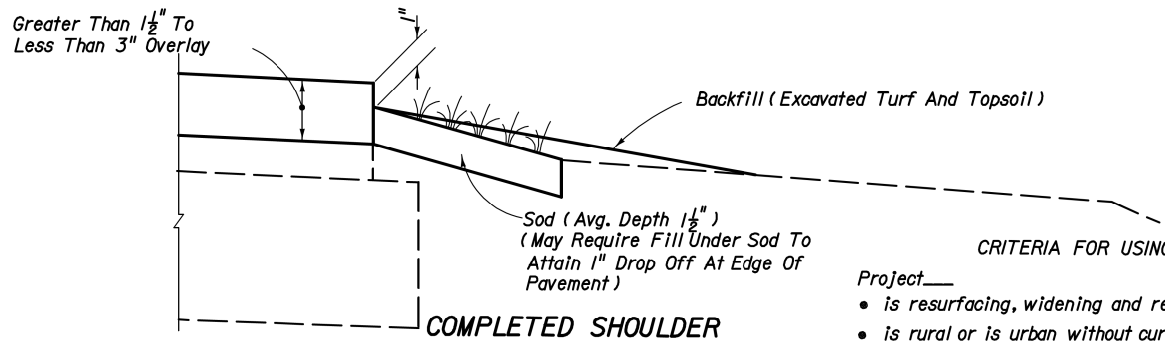
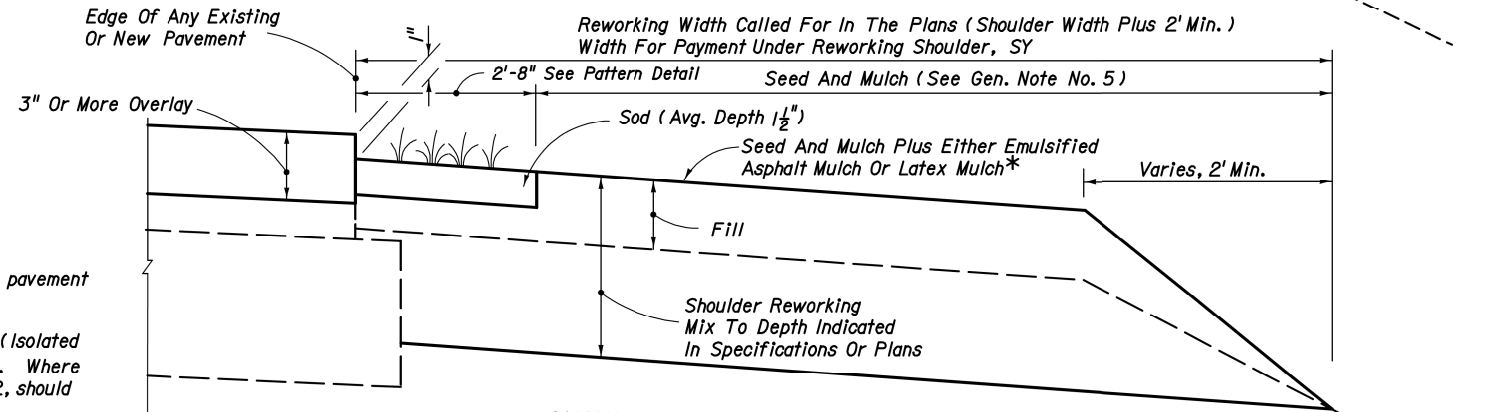
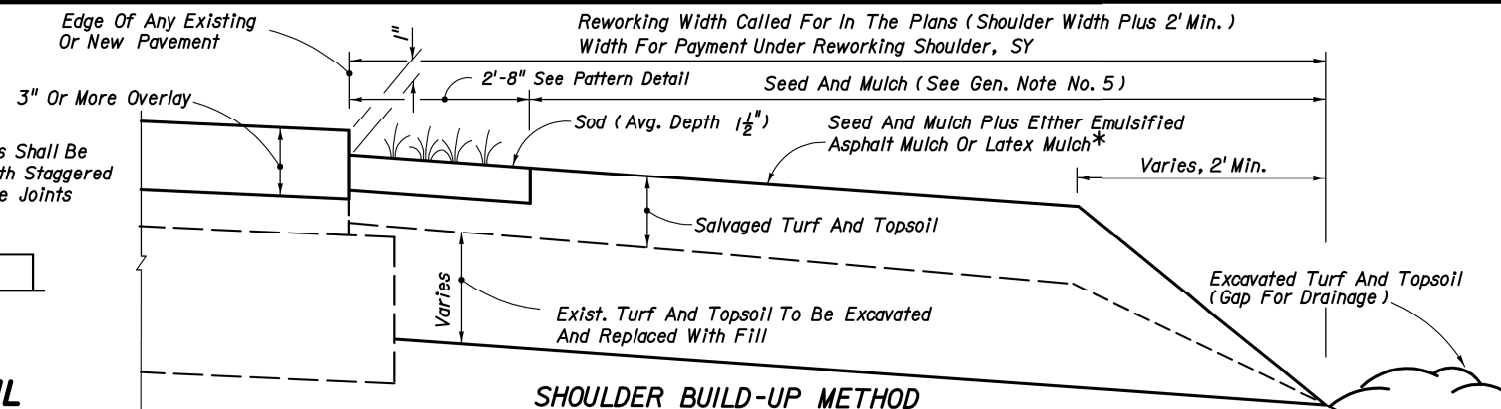
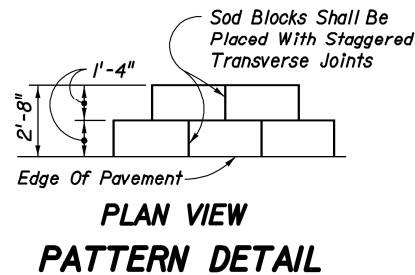
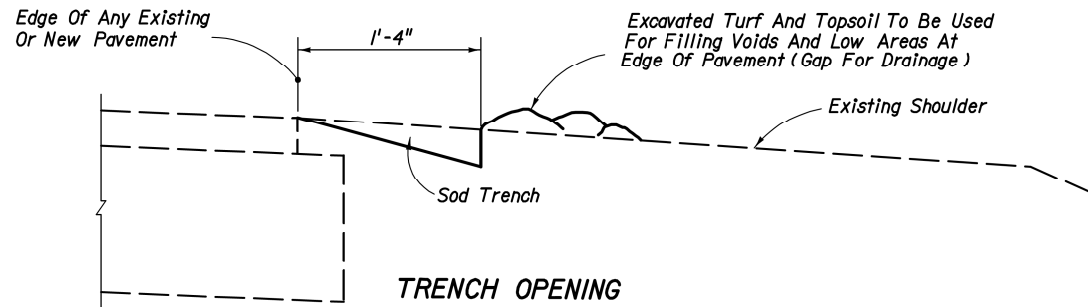


- NOTES**
1. These treatments are applicable to new construction, reconstruction and RRR projects. Project requirements for shoulder pavement and sodding that exceed the limits of this standard take precedence.
  2. For sodding adjacent to ditches and at headwalls, see Index No. 281.
  3. All front slopes steeper than 1:3 are to be sodded.

**SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES**

**TREATMENTS FOR PROTECTION FROM CONCENTRATED ROADWAY RUNOFF EROSION AND SHOULDER RAVELING**

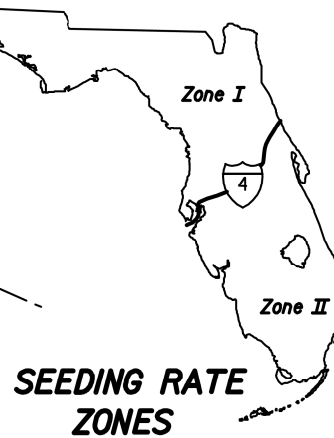
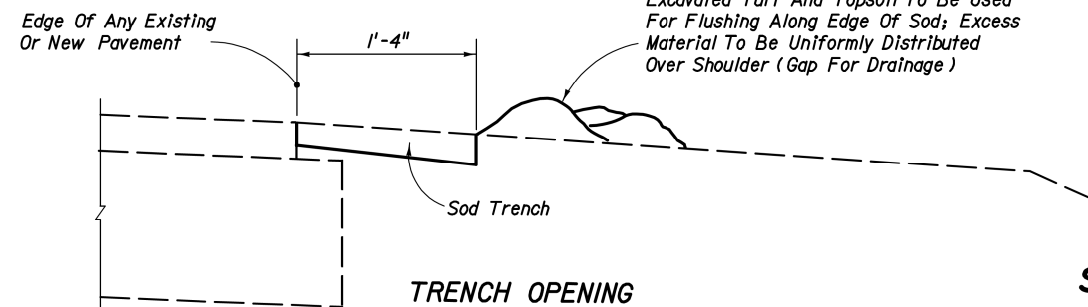
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PERMANENT EROSION CONTROL</b>				
Designed By	HLG	Dates	04/75	Approved By
Drawn By		Revision		State Drainage Engineer
Checked By	DCB	04/75	02	2 of 2
				104



**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 greater than 1 1/2" to less than 3"

**TYPE R-1**



**SEEDING RATE ZONES**

\*Emulsified 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

**TYPE R-2**

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

**GENERAL NOTES**

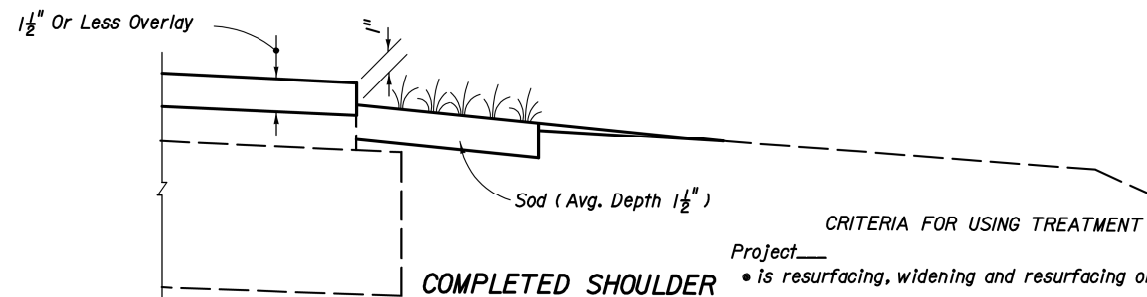
1. Special attention is to be directed to the construction of the required 1" drop-off at edge of pavement.
2. Fertilize entire unpaved shoulder and front slope to toe of slope or bottom of ditch.
3. Topsoil obtained from borrow pits or other sources may be used in lieu of excavated turf and topsoil 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 under Types R-1 and R-3, is to be included in the contract unit price for Sodding, SY.
5. Payment for reworking shoulders, shall include the cost for those seeding and mulching operations within the limits for reworking shoulders. Materials (Seed, Mulch, Fertilizer and Water) and Sodding shall be paid for as separate items. Reworking shoulders shall be paid for under the contract unit price for Reworking Shoulders, SY.

**SEEDING RATES (Lbs/Ac)**

TYPE OF SEED	ZONE I		ZONE II		ZONE I		ZONE II	
	COASTAL		INLAND		COASTAL		INLAND	
	Mar. to Nov.	Nov. to Mar.	Mar. to Oct.	Oct. to Mar.	Feb. to Dec.	Dec. to Feb.	Feb. to Dec.	Dec. to Feb.
<b>PERMANENT GRASSES</b>								
Unhulled Bermuda	20	20	20	20	20	20	20	20
Bahia Argentina Or Pensacola Bahia			80	80			80	80
<b>QUICK GROWING GRASS</b>								
Annual Rye Grass		20		20		20		20
<b>TOTAL POUNDS PER ACRE</b>	20	40	100	120	20	40	100	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.

Wildflowers destroyed by shoulder reworking are to be reestablished under the seeding rates prescribed for permanent wildflower #2 Group shown by table on Index No. 104.



**CRITERIA FOR USING TREATMENT TYPE R-3**

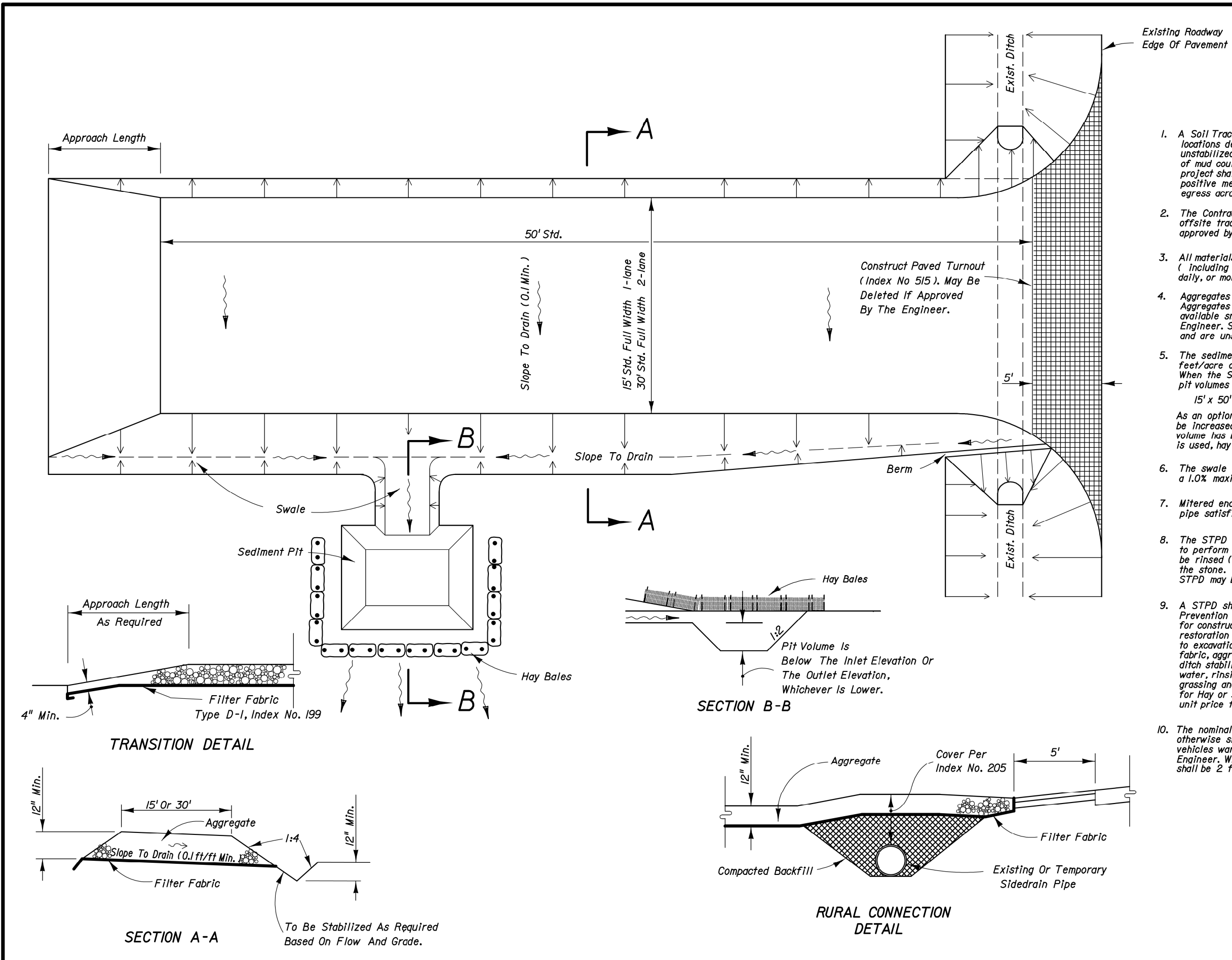
- Project—
- is resurfacing, widening and resurfacing or construction of shldr. pavt.
  - is rural or is urban without curb and gutter
  - has good existing soil and turf with no significant shoulder erosion (isolated areas of significant erosion will require additional special treatment. Where poor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

**TYPE R-3**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SHOULDER SODDING AND REWORKING ON EXISTING FACILITIES**

Names	Dates	Approved By			
Designed By	EGR	09/07/84	S. A. McHenry		
Drawn By	HSD	09/07/84	Revision	Sheet No.	Index No.
Checked By	EGR	09/07/84	00	1 of 1	105



**GENERAL NOTES**

1. A Soil Tracking Prevention Device ( STPD ) shall be constructed at locations designated by the engineer for points of egress from unstabilized areas of the project to public roads where offsite tracking of mud could occur. Traffic from unstabilized areas of the construction project shall be directed thru a STPD. Barriers, flagging, or other positive means shall be used as required to limit and direct vehicular egress across the STPD.
2. The Contractor may propose an alternative technique to minimize offsite tracking of sediment. The alternative must be reviewed and approved by the Engineer prior to its use.
3. All materials spilled, dropped, or tracked onto public roads ( including the STPD aggregate and construction mud ) shall be removed daily, or more frequently if so directed by the Engineer.
4. Aggregates shall be as described in Section 901 excluding 901-2.3. Aggregates shall be FDOT size #1. If this size is not available, the next available smaller size aggregate may be substituted with the approval of the Engineer. Sizes containing excessive small aggregate will track off the project and are unsuitable.
5. The sediment pit should provide a retention volume of 3600 cubic feet/acre of surface area draining to the pit. When the STPD is isolated from other drainage areas, the following pit volumes will satisfy this requirement:  
 $15' \times 50' = 100 \text{ ft}^3$        $30' \times 50' = 200 \text{ ft}^3$   
 As an option to the sediment pit, the width of the swale bottom can be increased to obtain the volume. When the sediment pit or swale volume has been reduced to one half, it shall be cleaned. When a swale is used, hay bales or silt fence shall be placed along the entire length.
6. The swale ditch draining the STPD shall have a 0.2% minimum and a 1.0% maximum grade along the STPD and to the sediment pit.
7. Mitered end sections are not required when the sidedrain pipe satisfies the clear zone requirements.
8. The STPD shall be maintained in a condition that will allow it to perform its function. To prevent offsite tracking, the STPD shall be rinsed ( daily when in use ) to move accumulated mud downward thru the stone. Additional stabilization of the vehicular route leading to the STPD may be required to limit the mud tracked.
9. A STPD shall be paid for under the contract unit price for Soil Tracking Prevention Device, EA. The unit price shall constitute full compensation for construction, maintenance, replacement of materials, removal, and restoration of the area utilized for the STPD; including but not limited to excavation, grading, temporary pipe ( including MES when required ), filter fabric, aggregate, paved turnout ( including asphalt and base construction ), ditch stabilization, approach route stabilization, sediment removal and disposal, water, rinsing and cleaning of the STPD and cleaning of public roads, grassing and sod. Hay bales shall be paid for under the contract unit price for Hay or Straw Baled, EA. Silt fence shall be paid for under the contract unit price for Staked Silt Fence, LF.
10. The nominal size of a standard STPD is 15' x 50' unless otherwise shown in the plans. If the volume of entering and exiting vehicles warrant, a 30' width STPD may be used if approved by the Engineer. When a double width ( 30' ) STPD is used, the pay quantity shall be 2 for each location.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SOIL TRACKING PREVENTION DEVICE TYPE A</b>				
Designed By	COMM	11/94	Approved By	<i>S. A. McHenry</i>
Drawn By	JDT	1/96	Revision	Sheet No. Index No.
Checked By	CRH	1/96	00	1 of 1 106

## STANDARD CRITERIA

CLASS	TYPE (1)	APPLICATION DESCRIPTION	STANDARD INDEX NO.	PERMITTIVITY SEC <sup>-1</sup>	A. O. S. SIEVE #	GRAB TENSILE STRENGTH N	SEWN STRENGTH N	PUNCTURE N	TRAPEZOIDAL TEAR N	WIDE WIDTH TENSILE STRENGTH KN/M	UV RESISTANCE (Min. Allowed)		COMMENTS	
											%	Time (Hrs.)		
DRAINAGE (D)	D-1	Revetment (Special)		(See D-2)	(See D-2)	1400	1260	500	500		50	500	Woven Monofilament Geotextiles only (Elongation < 50%) Provide 6" thick aggregate bedding layer.	
	D-2	Revetment (Standard)		% SOIL PASSING No. 200 SIEVE < 15% 0.7 15% to 50% 0.2 > 50% 0.1	% SOIL PASSING No. 200 SIEVE < 15% 40 15% to 50% 60 > 50% 70 *	Woven Monofilament	Woven Monofilament	Woven Monofilament	Woven Monofilament		50	500	Woven Geotextiles only. No Slit Film Geotextiles allowed. Provide 150 mm thick aggregate bedding layer for revetment (standard). The bedding layer may be omitted if a D-1 fabric is used with revetment (standard).  * For cohesive soils with a plasticity index > 7, maximum average role value for AOS is number 50 sieve.	
		Articulating Block	1100			990	400	250						
		Gabions	Other Geotextiles: Elongation < 50% 1400 > 50% 900			Other Geotextiles: Elongation < 50% 1200 > 50% 810	Other Geotextiles: Elongation < 50% 500 > 50% 350	Other Geotextiles: Elongation < 50% 500 > 50% 350						
	D-3	Underdrain * * *	286	% SOIL PASSING No. 200 SIEVE < 15% 0.5 15% to 50% 0.2 > 50% 0.1	% SOIL PASSING No. 200 SIEVE < 15% 40 15% to 50% 60 > 50% 70 *	Elongation	Elongation	Elongation	Elongation		50	500	No woven slit film fabrics allowed. * For cohesive soils with a plasticity index > 7, maximum average role value for AOS is number 50 sieve. ** Required Trapezoidal tear for woven monofilament is 250. *** See Index No. 286 for the permittivity and AOS values of the internal filter fabric of type V underdrain.	
		French Drain	285			< 50% 1100	< 50% 990	< 50% 400	< 50% 400 **					
		Sheet Piling Filter				> 50% 700	> 50% 630	> 50% 250	> 50% 250					
		Filter Fabric Jacket (Culvert)	280											
	D-4	Slope Pavement (Sand-Cement)												Nonwoven only. Min. Thickness 90 Mils Elongation ≥ 50%
		Ditch Pavement (Sand-Cement)	281	0.5	40	800	720	220	155		50	500		
D-5	Mechanical Stabilized Retaining Wall													
	Cast-In-Place Retaining Wall		0.5	40	400	360	220	175		50	500			
D-6	Slope Pavement (Concrete)												Nonwoven only. Min. Thickness 120 Mils Elongation ≥ 50%	
	Ditch Pavement (Concrete)	281	0.5	40	800	720	220	155		50	500			
EROSION (E)	E-1	Staked Slit Fence	102	0.5	NA	400	360	NA	155		80	500	Minimum Filtration Efficiency of 75% and minimum flow rate of 0.3 gal.	
	E-2	Wind Screen		0.5	NA	400	360	NA	NA		80	150		
	E-3	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 1)	NA	NA	NA	NA	NA	NA	NA	15 x 11	80	2,000	Maximum Permissible design velocity 3.0 M/Sec	
	E-4	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 2)	NA	NA	NA	NA	NA	NA	NA	29 x 21	80	2,000	Maximum Permissible design velocity 4.3 M/Sec	
	E-5	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 3)	NA	NA	NA	NA	NA	NA	NA	44 x 32	80	2,000	Maximum Permissible design velocity 5.5 M/Sec	
STABILIZATION (R)	R-1	Reinforcement		0.05	30	880	800	400	400		80	150		
	R-2	Separation		0.05	30	800	720	355	220		—	—		

(1) Type refers to FDOT class and application.

TABLE 1

Test	Unit	Test Method
Permittivity	sec <sup>-1</sup>	ASTM-D-4491
AOS	mm	ASTM-D-4751
Elongation	%	ASTM-D-4632
Grab Tensile Strength	N	ASTM-D-4632
Wide With Tensile Strength	kN/M	ASTM-D-4595
Maximum Design Velocity	M/sec	See Design Note 3
Sewn Strength	N	ASTM-D-4884
Puncture	N	ASTM-D-4833
Trapezoidal Tear	N	ASTM-D-4533
Ultraviolet Resistance	% Retained In Strength	ASTM-D-4355
Filtration Efficiency	%	ASTM-D-5141
Flow Rate	L <sup>3</sup> /min.	ASTM-D-5141

### GENERAL NOTES

1. Specifications for geotextiles are in Section 985. Physical criteria for each application is provided by this standard, in conjunction with those sections.
2. All values except AOS are MINIMUM AVERAGE ROLL values in the weakest principal direction. Values for AOS are MAXIMUM AVERAGE ROLL values.
3. Test soil or fill material adjacent to the geotextile for gradation to select values for permittivity and AOS.
4. Unless specifically restricted in COMMENTS column, any type of material may be used.

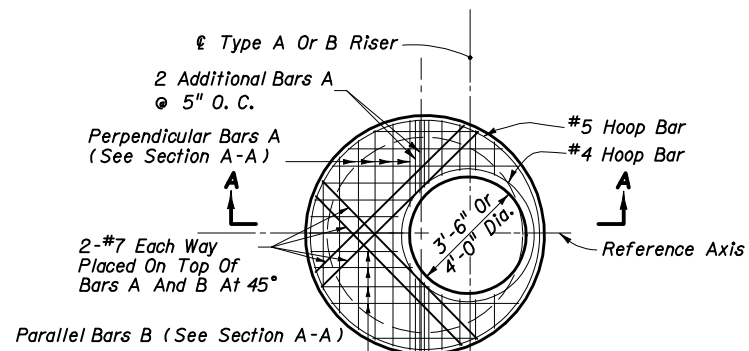
### DESIGN NOTES

1. The Designer shall review this criteria and adjust the values as necessary to satisfy project requirements. These adjustments shall be called for in the plans or contained in the project special provisions.
2. UV Resistance: The value represents the percent of minimum textile strength retained (ASTM-D-4632) after weathering per ASTM-D-4355 for the test period (hours).
3. Maximum design velocity for plastic erosion mats shall be determined by tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the State Drainage Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

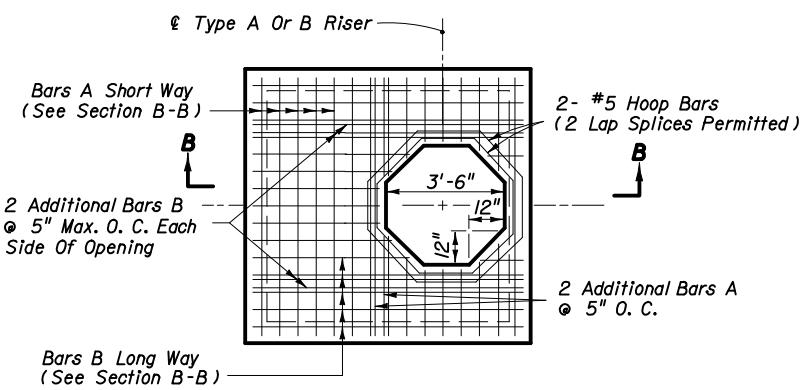
## GEOTEXTILE CRITERIA

Designed By		Names	Dates	Approved By	
Drawn By				State Drainage Engineer	
Checked By		Revision	Sheet No.	Index No.	
		00	1 of 1	199	

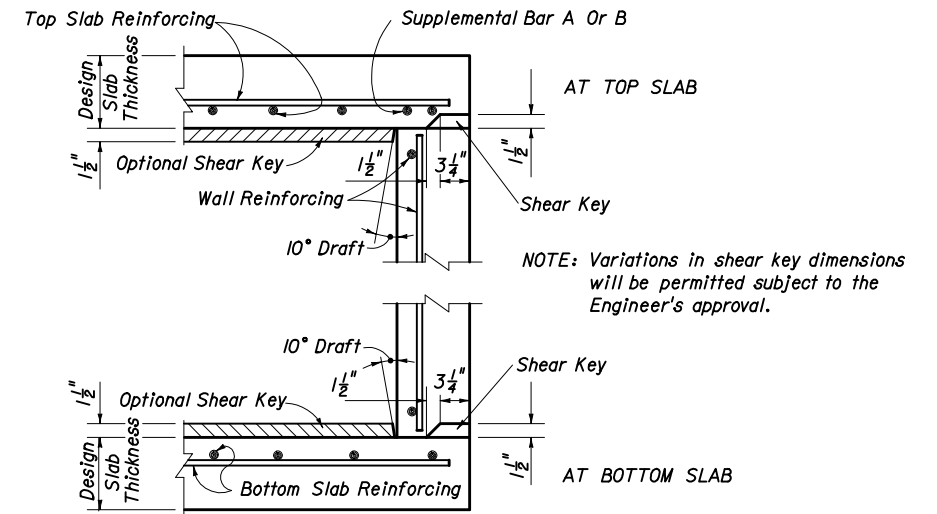


Note: Not Applicable For Type C, D & E Ditch Bottom Inlets. See Index No. 232.

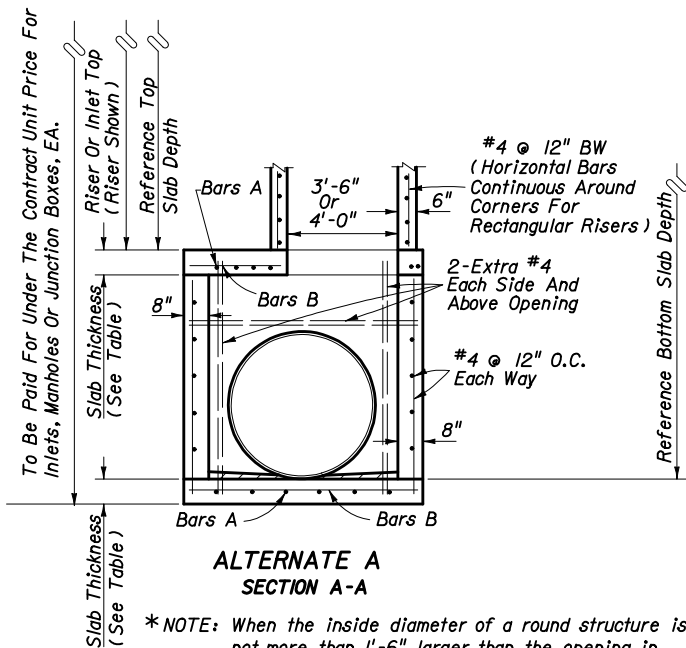
TOP SLAB REINFORCING STEEL DIAGRAM



TOP SLAB REINFORCING STEEL DIAGRAM

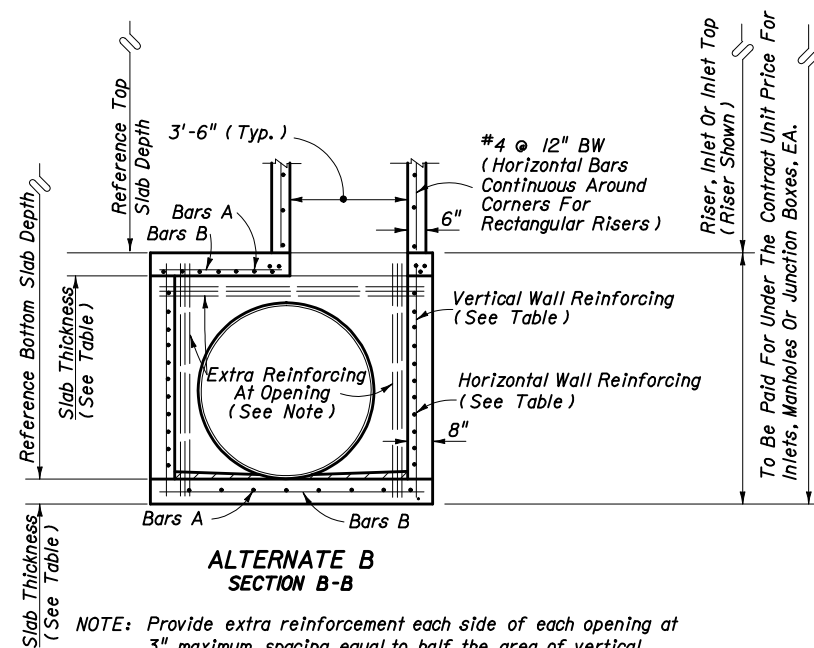


SLAB TO WALL DETAILS FOR PRECAST ALTERNATE WITH 8" WALLS



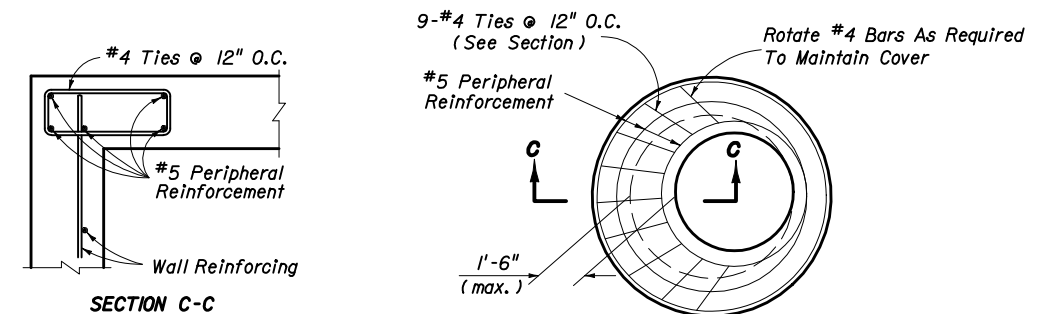
ALTERNATE A SECTION A-A

\*NOTE: When the inside diameter of a round structure is not more than 1'-6" larger than the opening in the riser or top slab, the top of the structure or riser shall be constructed according to the "Special Top Slab" details on this sheet.



ALTERNATE B SECTION B-B

NOTE: Provide extra reinforcement each side of each opening at 3" maximum spacing equal to half the area of vertical reinforcement removed by the opening and provide the same area of reinforcement above each opening at 3" maximum spacing as removed by the opening.



SPECIAL TOP SLAB\*

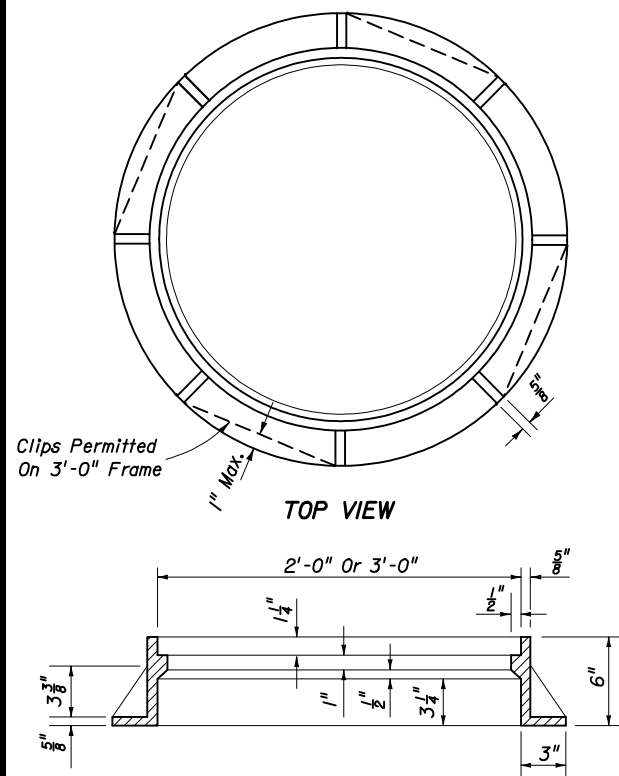
GENERAL NOTES

- Standard structure bottoms 4'-0" diameter and smaller (Alt. A) and 3'-6" square (Alt. B) are designated Type P. Larger standard structure bottoms are designated Type J. Risers are permitted for all structures.
- 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.
- 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. C478 (up to 96" diameter) or A.S.T.M. C76, Class III, B Wall, modified where the elliptical steel cage area is placed in the center one-third of the wall.
- Top and floor slab thickness and reinforcement are for precast and cast in place construction. Top and floor slabs shall be of Class II concrete. Concrete as specified in A.S.T.M. C478 (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.
- All reinforcement shown is A.S.T.M. A615/A615M Grade 60 steel, either smooth or deformed. Equivalent area Grade 40 steel or Grade 65KSI welded wire fabric may be substituted according to index No. 201.
- Structure bottoms 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. Alt. B structure bottoms 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.
- Rectangular structures may be rotated as directed by the Engineer in order to facilitate connections between the structure walls and storm sewer pipes.
- Except when ACI hooks are specifically required, reinforcement top and slab shall be straight embedment.
- All steel bars shall have 1/2" minimum cover unless otherwise shown except for precast circular units manufactured under ASTM C76 or ASTM C478. Horizontal steel in rectangular structures shall be lapped a minimum of 24 bar diameters at corners.
- 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 lieu of the bottom slab of the Alt. B riser when used with the Alt. A box. Each fillet shall be reinforced with 2-#5 bars.
- Inlet throats, riser or manhole tops shall be secured to structures as shown on Index No. 201.
- Structures with depths over 14' are to be checked for floatation by designer of project drainage.
- Units larger than specified standard 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.
- For manhole and junction box tops, for frames and covers, and, for supplementary details see Index No. 201.

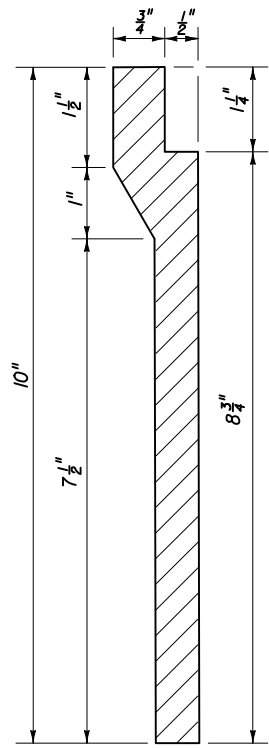
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>STRUCTURE BOTTOMS TYPE J AND P</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 2	200



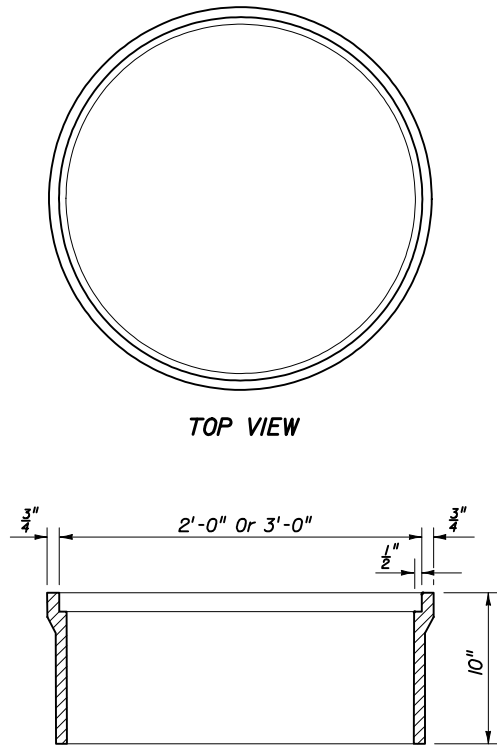




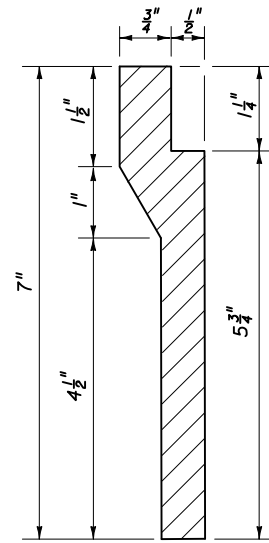
**SECTION TYPE I**  
For Manholes



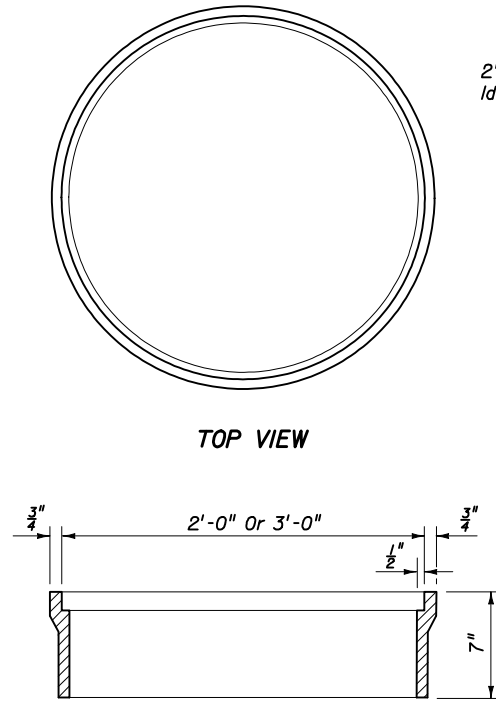
**WALL SECTION TYPE II**



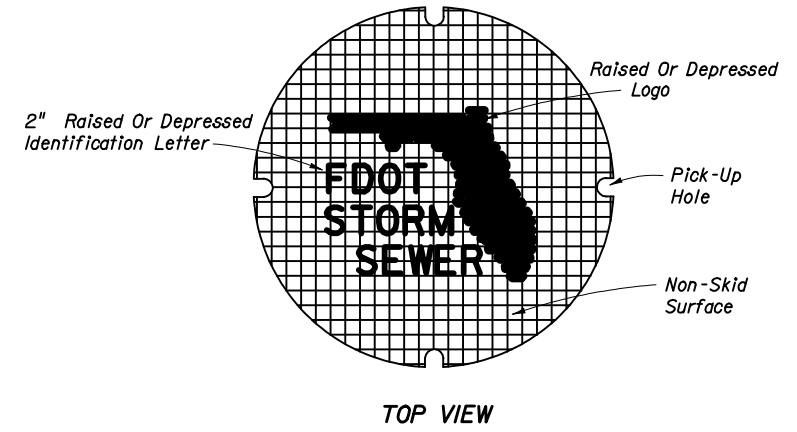
**SECTION TYPE II**  
For Curb Inlets Types 1, 2, 3, & 4



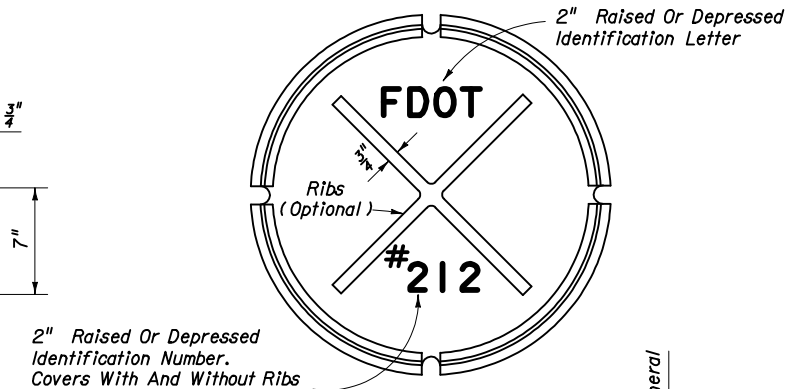
**WALL SECTION TYPE III**



**SECTION TYPE III**  
For Curb Inlets Types 7 & 8



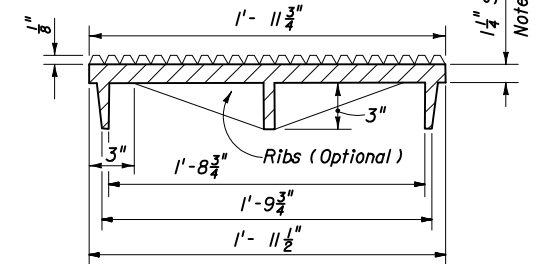
**TOP VIEW**



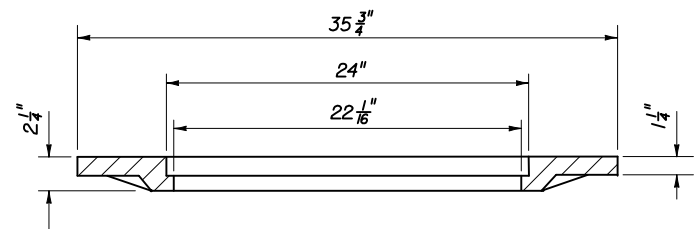
**BOTTOM VIEW**

2" Raised Or Depressed Identification Number. Covers With And Without Ribs Shall Bear The Same #212 Identification Number.

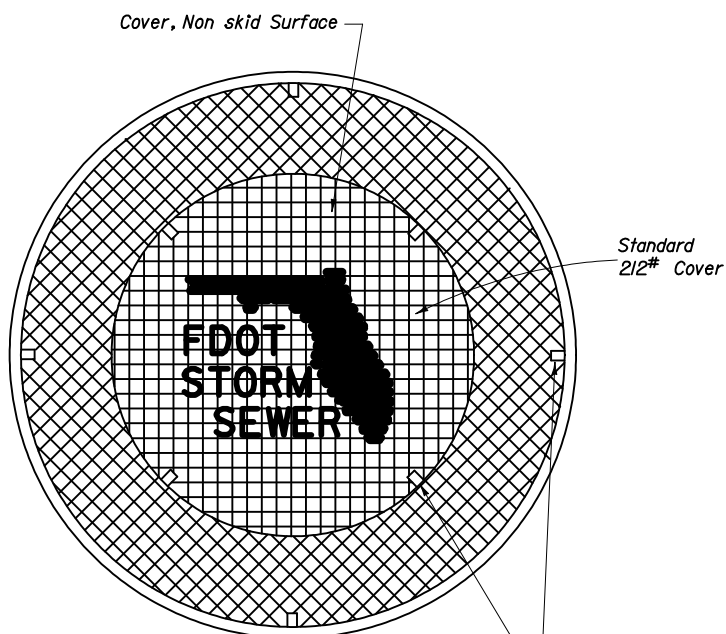
1/4" See General Note No. 1



**SECTION COVER FOR ALL FRAMES**



**2-PIECE COVER**



For Use With Types I, II And III Frames With 3'-0" Opening

**2-PIECE COVER**

**CAST IRON FRAMES**

WEIGHT OF CASTINGS						
Frame Type	2' OPENING		3' OPENING			
	Frame	Cover (Std.)	Frame	2-Piece Cover		
				Inside	Outside	Total
I	155 Lbs.	190 Lbs.	220 Lbs.	190 Lbs.	220 Lbs.	410 Lbs.
II	145 Lbs.	190 Lbs.	255 Lbs.	190 Lbs.	220 Lbs.	410 Lbs.
III	90 Lbs.	190 Lbs.	180 Lbs.	190 Lbs.	220 Lbs.	410 Lbs.

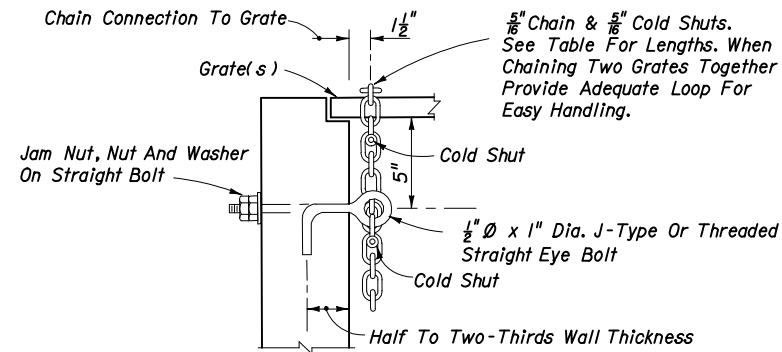
**NOTES (FRAMES, AND COVER)**

- The #212 cover is to be used for all frames Types I, II, III and the 2-Piece Cover, and is the replacement cover for all previous frames with 1 1/2" deep seats (traffic type). The 185 lb. cover (non-traffic type), 1984 Roadway and Traffic Design Standards Index No. 201, is the replacement cover for existing frames with 1/2" deep seats. Installation of frames with 1/2" deep seats is not permitted. The 185 lb. covers are to be placed in existing 1/2" deep seated frames only when specifically called for in the plans or as specifically directed by the Engineer.
- Use the 2'-0" cover, unless the 2-piece cover is called for in the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

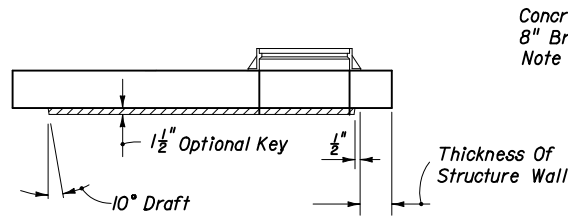
**SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS**

Designed By	HSD	06/82	Revision	00	Sheet No.	1 of 6	Index No.	201
Checked By	JBW	06/82	Approved By	S. A. McHenry State Drainage Engineer				

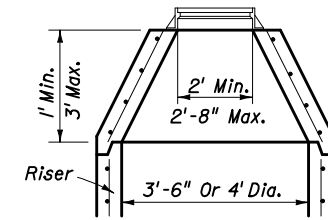
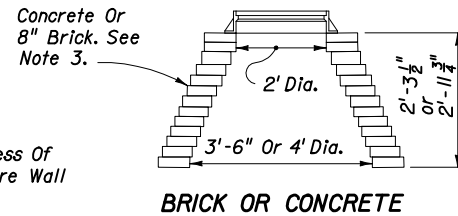


Note: When Alternate G grate is specified, the chain, bolt, nuts, washer and cold shuts shall be galvanized in accordance with the specifications for the grate.

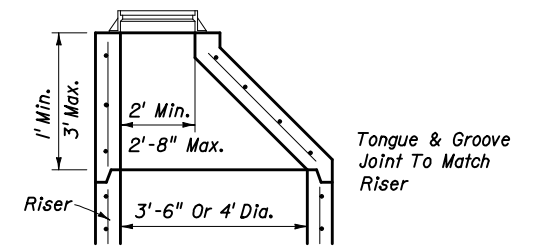
Cost of eye bolt and chain to be included in the contract unit price for inlets.



SECTION  
Note: See Slab Designs Index 200.  
**TYPE 7**



**TYPE 8**



**TYPE 8**

**MANHOLE TOPS**

**NOTES (TOPS)**

1. Manhole top Type 7 slabs shall be of Class II concrete. Concrete as specified in ASTM C478 may be used for precast units; see General Note No. 3.
2. Manhole top Type 7 slabs may be of cast-in-place or precast construction. The optional key is for precast tops and in lieu of dowels. Frame and slab openings are to be omitted when top is used over a junction box. Frames can be adjusted with from one to six courses of brick.
3. Manhole top Type 8 may be of cast-in-place or precast concrete construction or brick construction. For concrete construction, the concrete and steel reinforcement shall be the same as the supporting wall unit. An eccentric cone may be used.
4. Manhole tops shall be secured to structures by optional construction joints as shown on Sheet 3 of 6.
5. Substitution of manhole top Type 8 for manhole top Type 7 is allowed provided that minimum dimensions shown above are not reduced.

**DESIGN NOTES**

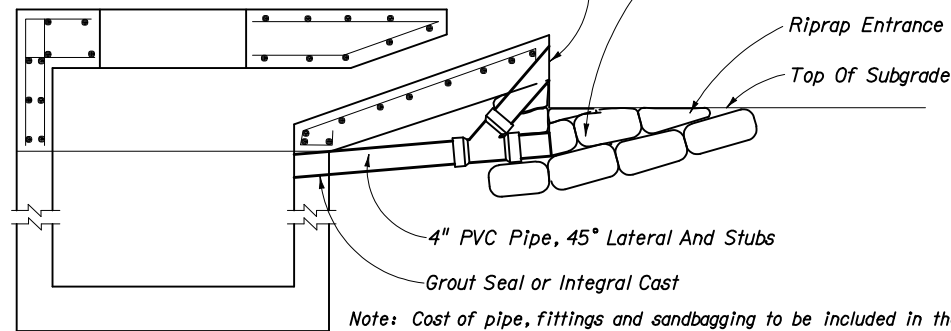
1. Manhole top Type 8 should be specified in the plans when depths shown above can be maintained.

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
218	(BW)	1	3'-8"	Slide Or Slide & Spin
219	(BW, RGD)	1	4'-0"	Slide & Spin
220	S	1	4'-0"	Slide & Spin
221	V	1	4'-0"	Slide & Spin
230	A	1	3'-0"	Slide
231	B	1	5'-0"	Slide & Spin
232	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
234	J	1	4'-0"	Slide & Spin

**EYE BOLT AND CHAIN FOR LOCKING GRATES TO INLETS**

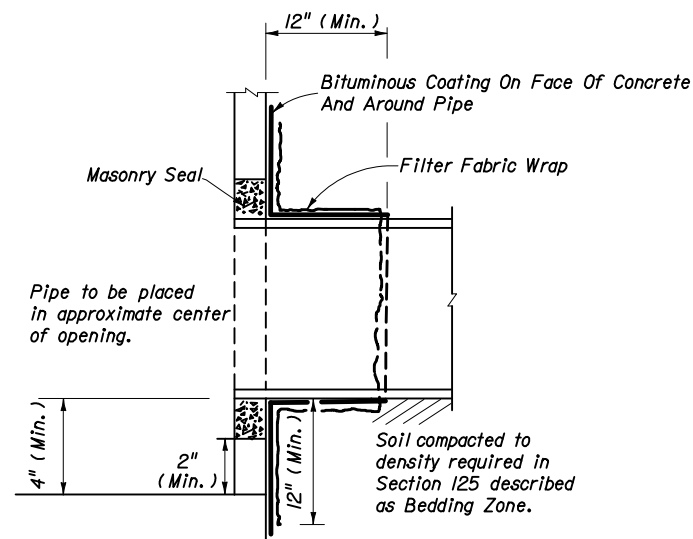
Bevel Cut Upper Stub To Match Forming For Apron Face. Capping Or Plugging Of Upper Stub Not Required (Friable base material at stub opening shall be removed to permit covering of opening with structural course material.)

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

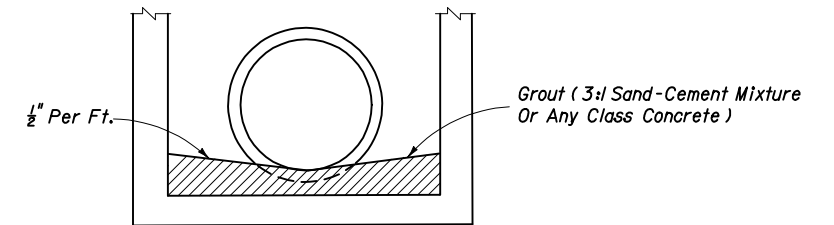


Note: Cost of pipe, fittings and sandbagging to be included in the contract unit price for inlets. See Index No. 102 for sediment control at inlet.

**TEMPORARY DRAINS FOR SUBGRADE AND BASE**



**FILTER FABRIC WRAP ON GROUTED PIPE TO STRUCTURE JOINT**



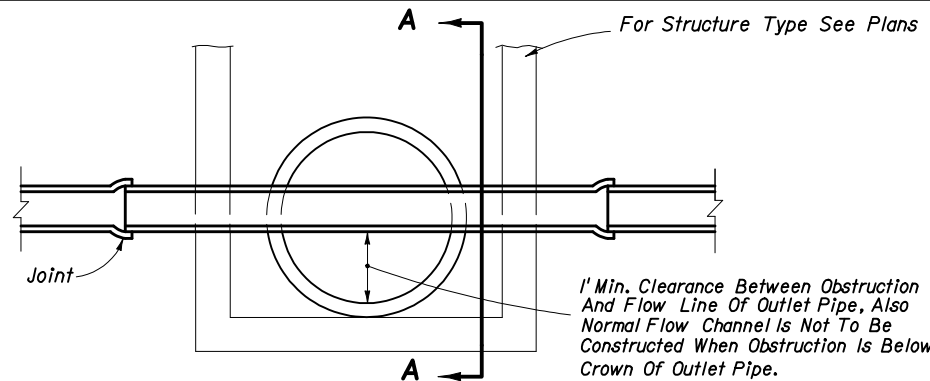
FOR ALL STRUCTURES UNLESS EXCLUDED BY SPECIAL DETAIL

**ALL PIPE TYPES  
DRAINAGE STRUCTURE INVERT**

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.

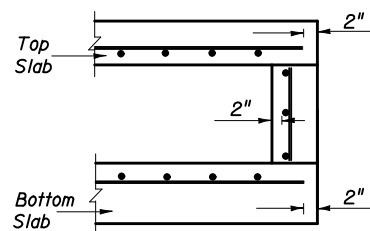
**SUMP BOTTOM**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS</b>				
Names	Dates	Approved By		
Designed By	HLB	04/75	S. A. McHenry	
Drawn By			Revision	Sheet No.
Checked By	LMF	04/75	02	2 of 6
				Index No. 201

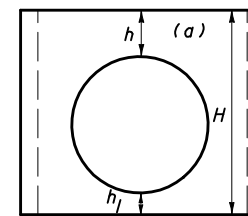


NOTE: No joints allowed inside the Condition I structure.

**CONDITION I**

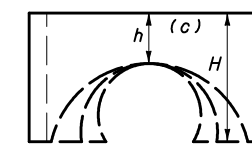


**REBAR STRAIGHT END EMBEDMENT FOR TOP AND BOTTOM SLABS**



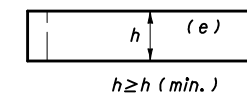
**When**  
 $h_1 < 0.75h$  (min.)  
 $h_1 \geq 0.75h$  (min.)

**Then (Req'd)**  
 $h \geq 0.4H$   
 $h \geq h$  (min.)



$h_{min} \leq h \leq 0.4H$

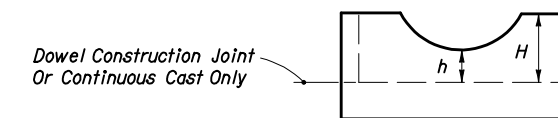
Segments may be inverted. Maximum opening for pipe shall be the pipe O.D. plus 6". If h can not be attained, then a top or bottom slab must be attached to the segment as shown below.



$h \geq h$  (min.)

Minimum Value For h	
h (min.)	Box Or Riser Diameter
1'-0"	3'-6" & 4'-0"
1'-6"	5'-0" & 6'-0"
2'-0"	>6'-0"

**SEPARATE RISER SEGMENTS WITH CONSTRUCTION JOINTS OTHER THAN DOWEL OPTION**



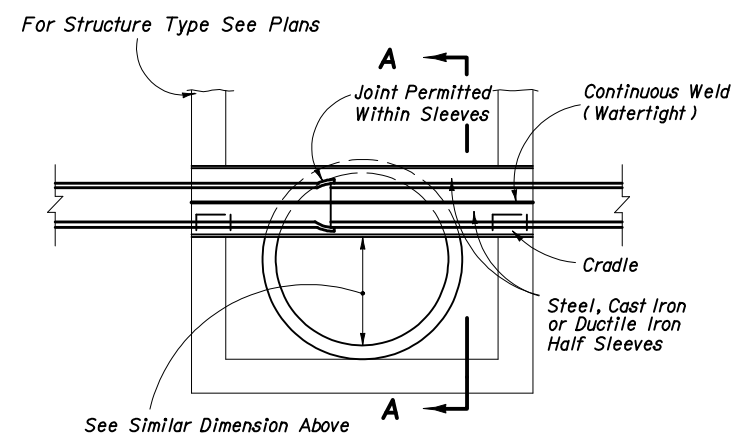
$h \geq zero$

(h min Tabulated Above Do Not Apply)

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

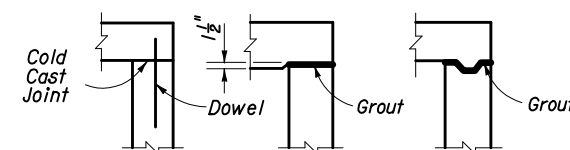
**COMPARATIVE SIDE VIEWS**

**MINIMUM DIMENSIONS FOR BOX AND RISER SEGMENTS**

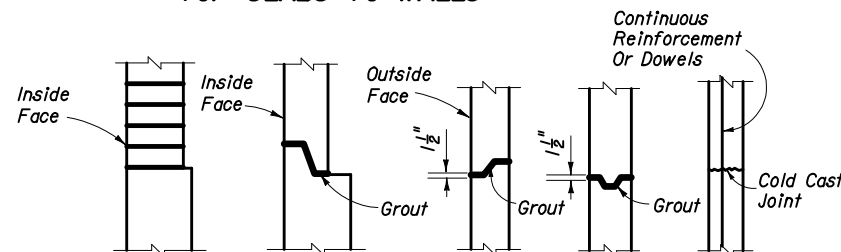


NOTE: Only water mains will be allowed to pass through a Condition II structure.

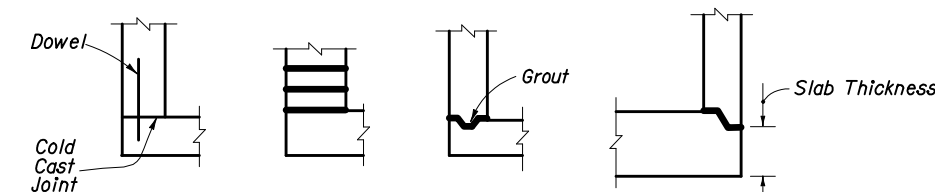
**CONDITION II**



**TOP SLABS TO WALLS**



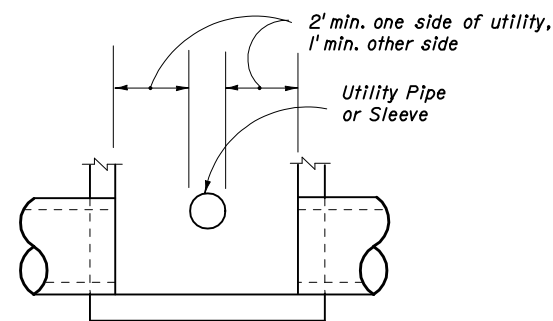
**WALL JOINTS**



**BOTTOM SLABS TO WALLS**

**GENERAL NOTES**

- For square or rectangular precast drainage structures, either deformed or smooth welded wire fabric may be used provided:
  - The smooth welded wire fabric shall comply with ASTM A185, and deformed welded wire fabric shall comply with ASTM A497.
  - Width and length of the unit is four times the spacing of the cross wires.
  - 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 2".
- For equivalent steel areas for precast drainage structures, see Sheet 4.
- Horizontal steel in the walls of rectangular structures shall be lapped a minimum of 24 bar diameter at corners.
- Welding of splices and laps is permitted. The requirements and restrictions placed on welding in AASHTO M259 shall apply.
- 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.
- Concrete as specified in ASTM C478, (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'.
- 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.
- 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 or to top of sump floor.



**SECTION AA**

**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.


**UTILITY PIPES THRU STORM SEWER STRUCTURES**

- 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.
- All grouted joints are to have a maximum thickness of 1".
- Keyways are to be a minimum of 1 1/2" deep.
- Joint dowels are to be #4 bars, 12" long with a minimum of 6 bars per joint approximately evenly spaced for circular structures or 2 bars per side at approximate quarter points for rectangular. Bars are to be placed approximately 6" into fresh concrete leaving the remainder to extend into the secondary cast. Welded wire fabric may be substituted for the dowels bar in accordance with the equivalent steel area table on Index 201, Sheet 4.
- Minimum cover on reinforcing bars is 1 1/2".
- 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.
- Approved product inserts may be used in lieu of dowel embedment.

**OPTIONAL CONSTRUCTION JOINTS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS**

Names	Dates	Approved By		
Designed By	HLB	04/75	 State Drainage Engineer	
Drawn By				
Checked By	LMF	04/75	Revision	02
			Sheet No.	3 of 6
			Index No.	201

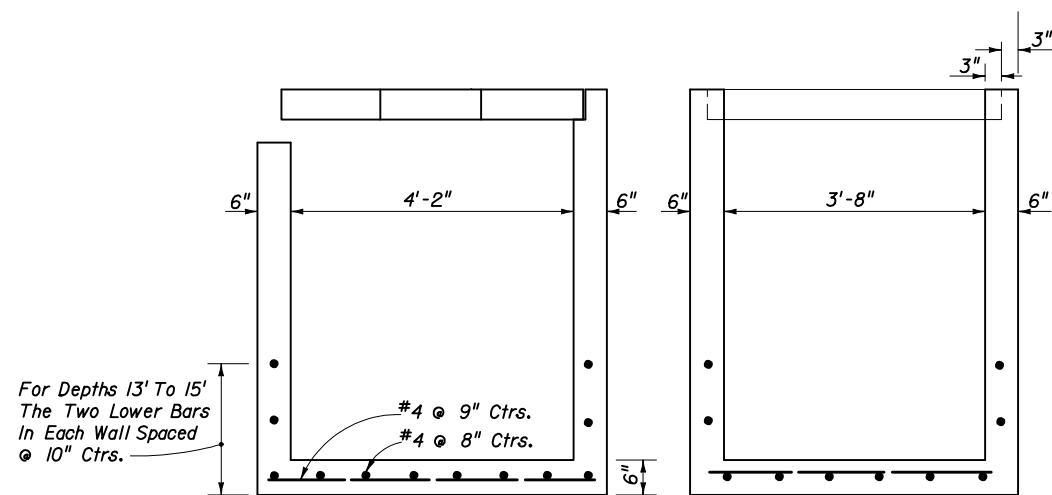
**NOTES FOR THIN-WALL PRECAST OPTIONS**

1. The details on Sheets 4, 5 & 6 are optional for precast inlet construction up to depths of 15'. These inlets can be used with Alt. "B" Bottoms, Index 200. Cast-in-place construction must adhere to the details contained on the referenced indexes.
2. Only the dimensions and reinforcement changes or other modifications are indicated. For all other dimensions and details, the referenced index drawings apply. When these precast units are used in conjunction with Alt "B" Structure Bottoms, Index 200, the interior dimensions of an Alt. "B" Bottom can be adjusted to reflect these inlet interior dimensions.
3. Concrete which meets the requirements of ASTM C478 shall be used for structures constructed to these details.
4. 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:

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

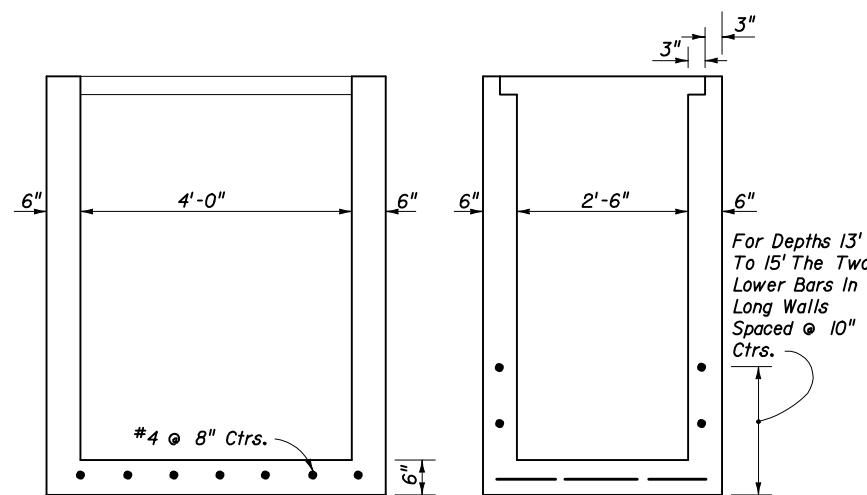
$$\text{Welded Wire Fabric Steel Area} = A_s 65 = \frac{65}{40} \times A_s 40$$

In no case will fabric with wires smaller than W3.1 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".



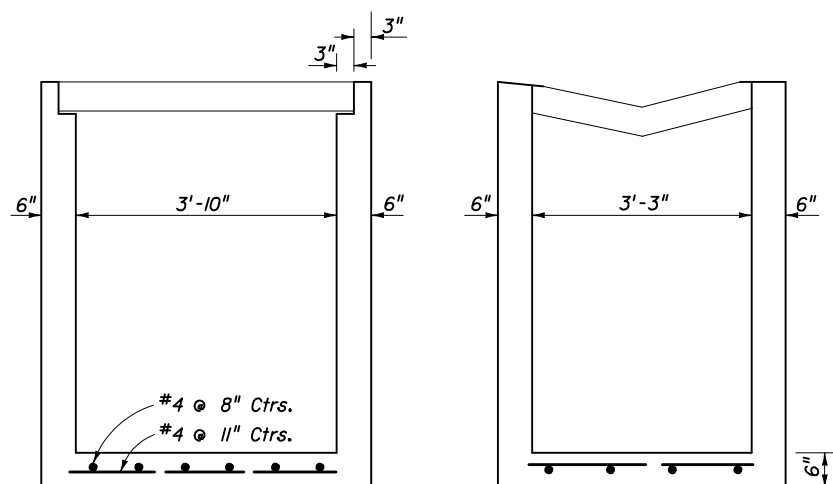
PARTIAL SECTION AA PARTIAL SECTION BB

**DITCH BOTTOM INLET TYPE B**  
**INDEX 231**



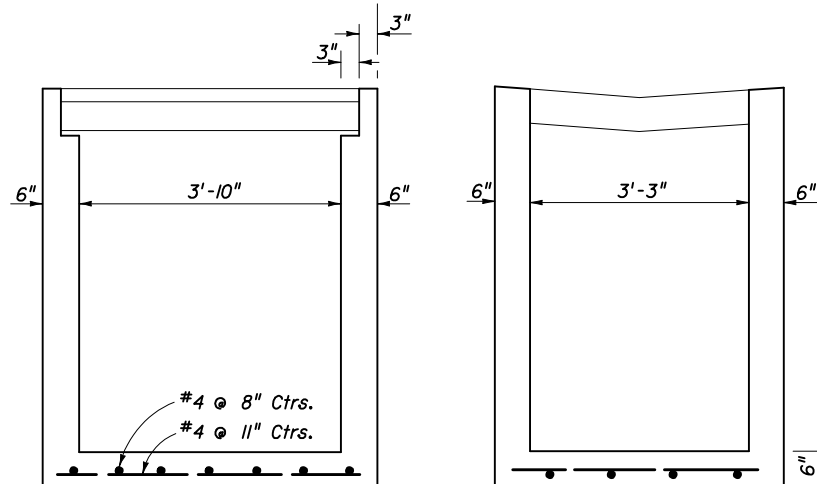
PARTIAL SECTION AA PARTIAL SECTION BB

**DITCH BOTTOM INLET TYPE F**  
**INDEX 233**



PARTIAL SECTION AA PARTIAL SECTION BB

**GUTTER INLET TYPE S**  
**INDEX 220**



PARTIAL SECTION AA PARTIAL SECTION BB

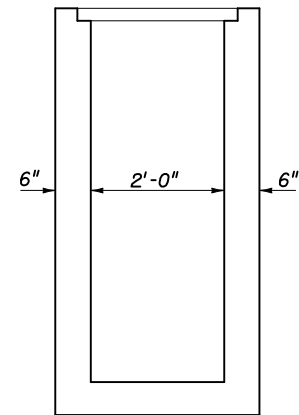
**GUTTER INLET TYPE V**  
**AND DITCH BOTTOM INLET TYPE J**  
**INDEX 221 & 234**

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	Style Designation	Min. Steel Area
#4 @ 12" CCEW	0.20	#3 @ 9 1/2" CCEW	.1333	3" x 3" - W3.1 x W3.1 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 1/2" 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
#6 @ 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
#7 @ 6" CCEW	1.20	#6 @ 6 1/2" CCEW or #7 @ 9" CCEW	.80	4" x 4" - W26 x W26	.7385

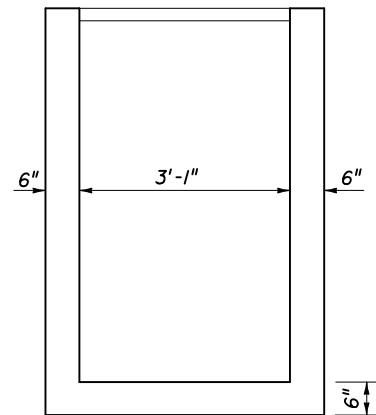
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS**

Names	Dates	Approved By		
Designed By	EGR/JGW	09/86	State Drainage Engineer	
Drawn By	WPH/dde	09/86	Revision	Sheet No.
Checked By	EGR	09/86	00	4 of 6
			Index No.	201

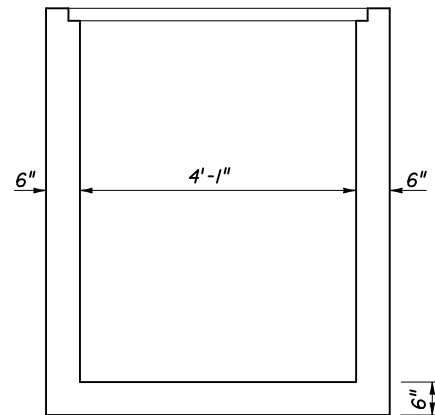


PARTIAL SECTION BB

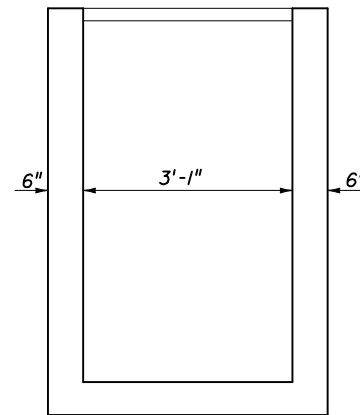


PARTIAL SECTION CC

DITCH BOTTOM INLET C  
INDEX 232

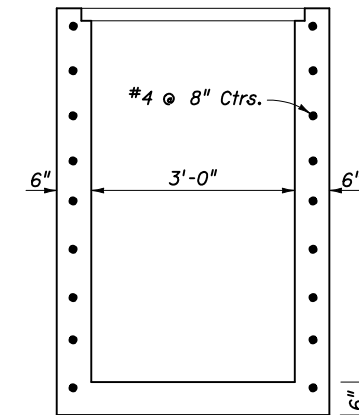


PARTIAL SECTION BB

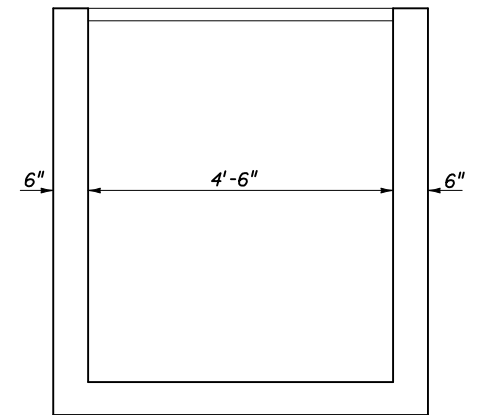


PARTIAL SECTION CC

DITCH BOTTOM INLET D  
INDEX 232

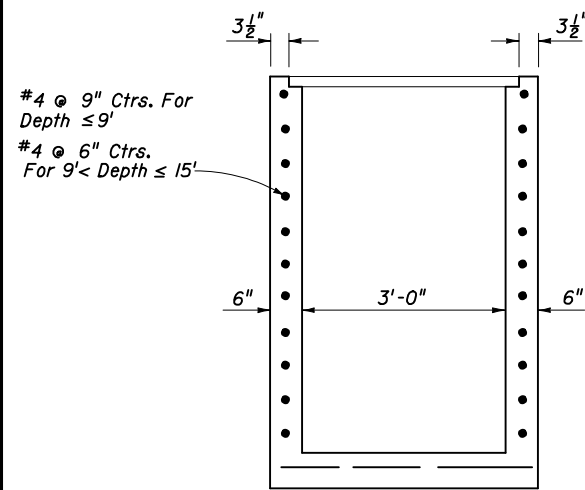


PARTIAL SECTION BB

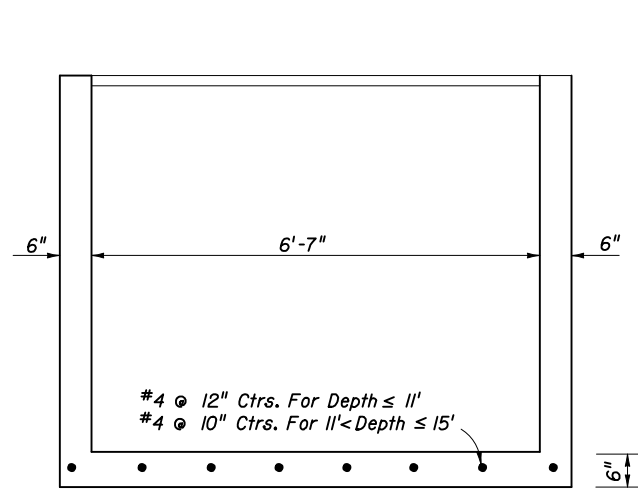


PARTIAL SECTION CC

DITCH BOTTOM INLET E  
INDEX 232

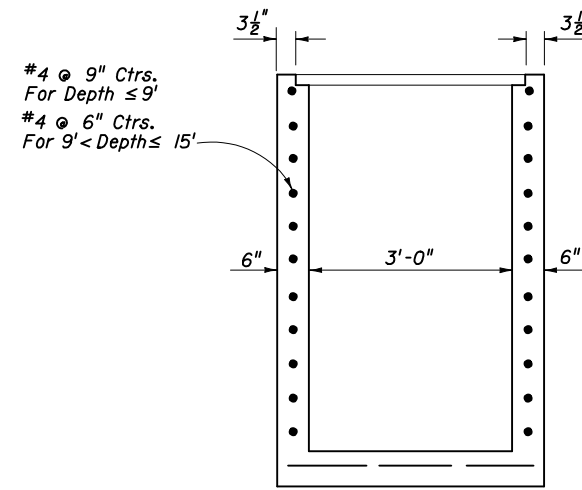


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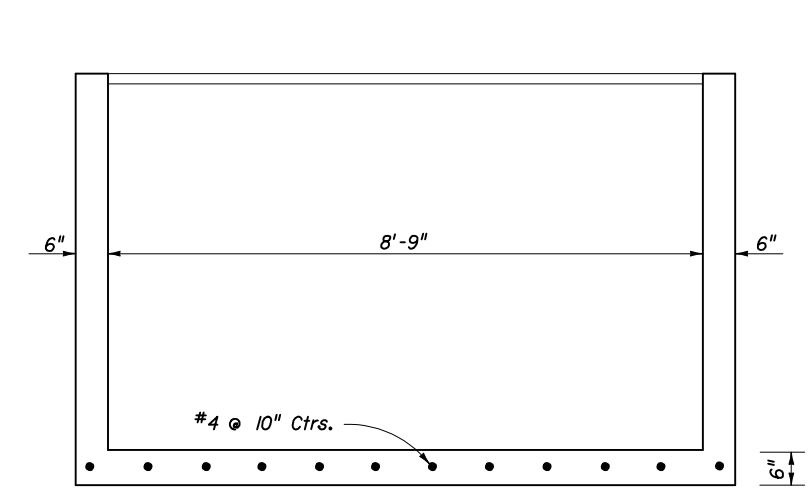


PARTIAL SECTION CC

DITCH BOTTOM INLET H (3-GRATE)  
INDEX 232



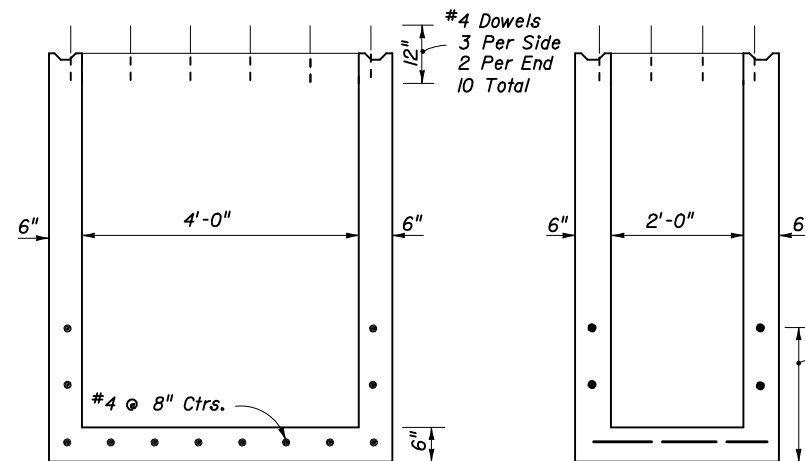
PARTIAL SECTION BB



PARTIAL SECTION CC

DITCH BOTTOM INLET H (4-GRATE)  
INDEX 232

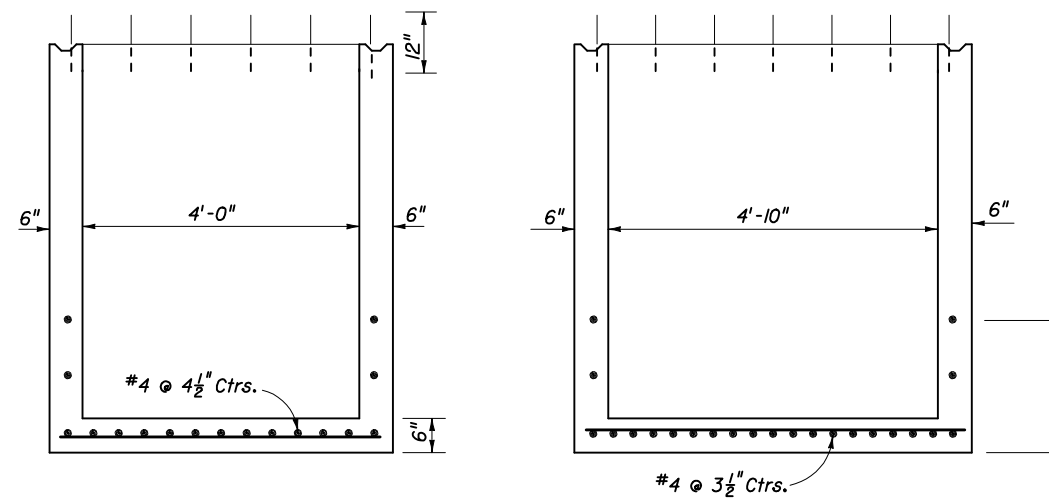
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By	EGR/JSW	09/86	State Drainage Engineer	
Drawn By	WPH/dde	09/86	Revision	Sheet No.
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				Index No. <b>201</b>



PARTIAL SECTION AA

PARTIAL SECTION BB

MEDIAN BARRIER INLET TYPES 1 & 2

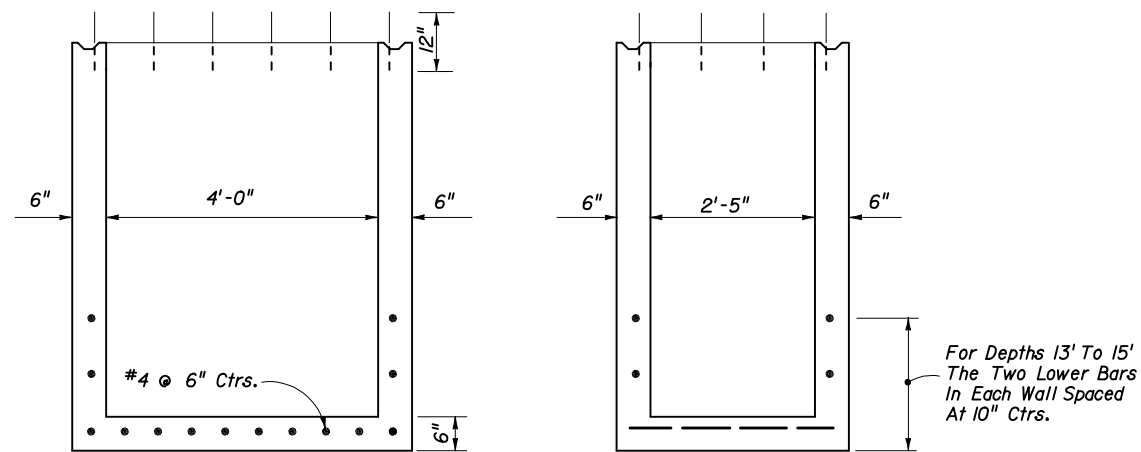


PARTIAL SECTION AA

PARTIAL SECTION BB

MEDIAN BARRIER INLET TYPES 3, 4, & 5

**INDEX 217**

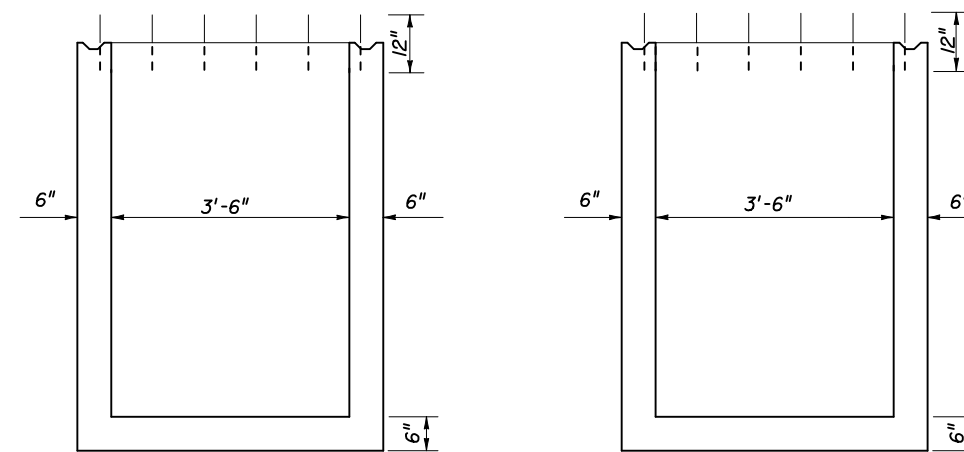


PARTIAL SECTION AA

PARTIAL SECTION BB

BARRIER WALL (RIGID) (C & G)

**INDEX 219**



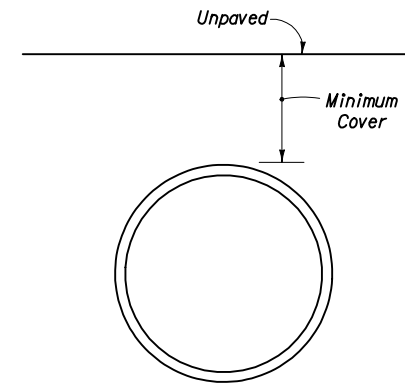
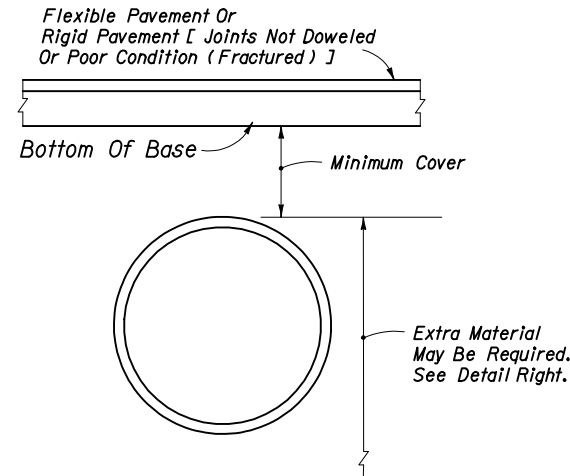
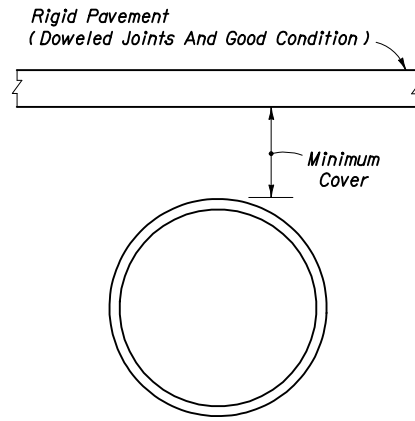
PARTIAL SECTION AA

PARTIAL SECTION BB

STRUCTURE BOTTOM TYPE P

**INDEX 200**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS</b>				
Designed By	Names	Dates	Approved By <i>S. A. McHenry</i>	
Drawn By			State Drainage Engineer	
Checked By			Revision	Sheet No. Index No.
			00	6 of 6 201



**RIGID PAVEMENT**

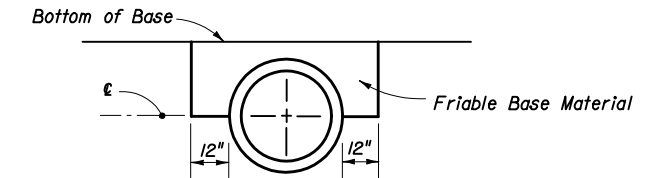
PIPE TYPE/SIZE & SHAPE	MINIMUM COVER
<b>CONCRETE</b> (See Note 6)	
Round & Elliptical	6"
<b>CORRUGATED STEEL</b>	
15"-72" Round & Arch Equiv.	9"
78" & Larger Round & Arch Eq.	15"
<b>CORRUGATED ALUMINUM</b>	
15"-72" Round & Arch Equiv.	9"
78"-102" Round & Arch Equiv.	15"
108" & Larger Round	18"
<b>CORRUGATED POLYETHYLENE</b>	
15"-48" Round	9"
<b>POLYVINYL CHLORIDE</b>	
15"-48" Round	9"

**FLEXIBLE PAVEMENT**

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER
<b>CONCRETE</b> (See Note 6)	
Round & Elliptical	6"
<b>CORRUGATED STEEL</b>	
12"-30" Round	12" [12"]
36"-48" Round	18" (12") [15"]
54"-72" Round	21" (15") [18"]
78"-96" Round	(18") [27"]
102" & Larger Round	(24") [33"]
15"-30" Arch Equivalent	18" [18"]
36"-48" Arch Equivalent	24" (12") [18"]
54"-72" Arch Equivalent	27" (15") [24"]
78"-96" Arch Equivalent	(18") [30"]
102" & Larger Arch Equivalent	(24")
<b>CORRUGATED ALUMINUM</b>	
12"-24" Round	15" [12"]
30"-48" Round	18" (12") [18"]
54"-72" Round	24" (18") [24"]
78"-102" Round	(24") [30"]
108" & Larger	(30")
15"-24" Arch Equivalent	24" [21"]
30"-48" Arch Equivalent	27" (15") [24"]
54"-72" Arch Equivalent	30" (18") [27"]
78"-90" Arch Equivalent	(24") [30"]
96"-102" Arch Equivalent	(30")
<b>CORRUGATED POLYETHYLENE</b>	
15"-48" Round	15"
<b>POLYVINYL CHLORIDE</b>	
15"-48" Round	15"

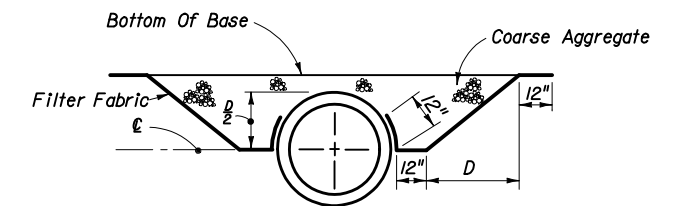
**UNPAVED**

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER	
	COMMERCIAL	NON-COMMERCIAL
<b>CONCRETE</b> (See Note 6)		
Round & Elliptical	9"	3"
<b>CORRUGATED STEEL</b>		
12"-30" Round	18" [15"]	12" [12"]
36"-48" Round	18" (12") [15"]	12" (12") [12"]
54"-72" Round	18" (12") [15"]	15" (12") [12"]
78"-96" Round	(18") [27"]	(12") [12"]
102" & Larger Round	24" [33"]	18" [21"]
15"-30" Arch Equivalent	18" [18"]	12" [12"]
36"-48" Arch Equivalent	24" (12") [21"]	18" (12") [15"]
54"-72" Arch Equivalent	30" (18") [24"]	24" (12") [18"]
78"-96" Arch Equivalent	(24") [27"]	(18") [21"]
102" & Larger Arch Equivalent	(30")	(24")
<b>CORRUGATED ALUMINUM</b>		
12"-24" Round	21" [21"]	15" [15"]
30"-48" Round	24" (18") [21"]	18" (12") [15"]
54"-72" Round	30" (24") [27"]	24" (18") [21"]
78"-102" Round	(30") [33"]	(24") [27"]
108" & Larger	36"	30"
15"-24" Arch Equivalent	27" [24"]	24" [21"]
30"-48" Arch Equivalent	33" (21") [27"]	27" (15") [21"]
54"-72" Arch Equivalent	36" (24") [30"]	30" (18") [24"]
78"-90" Arch Equivalent	(30") [36"]	(24") [30"]
96"-102" Arch Equivalent	(36")	(30")
<b>CORRUGATED POLYETHYLENE</b>		
15"-48" Round	21"	15"
<b>POLYVINYL CHLORIDE</b>		
15"-48" Round	21"	15"



The cost of furnishing and installing the extra base material shall be included in the cost of the culvert.

**FRIABLE BASE**



The coarse aggregate shall be placed in 6 inch lifts and compacted sufficiently as to be firm and unyielding. The coarse aggregate shall be gravel or stone meeting the requirements of Section 901-2 or 901-3 respectively. The gradation shall meet Section 901-6, Grades 4, 467, 5, 56, or 57 unless restricted in the plans. The filter fabric shall be Type D-3 (See Index 199). The cost of furnishing and installing the coarse aggregate and filter fabric shall be included in the cost of the culvert.

**ASPHALTIC CONCRETE BASE**

Note: Extra material is required when cross culverts are located on facilities subject to high speed traffic ( $\geq 55$  mph) or high traffic volumes ( $> 1600$  ADT) and the cover is less than 12 inches For Concrete Pipe, 15 inches For Corrugated Steel Pipe And 18 inches For Corrugated Aluminum Pipe, Corrugated Polyethylene And Corrugated Polyvinyl Chloride Pipe.

**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. Some size thickness combinations may require minimum cover greater than those listed above. See Sheets 2, 3, & 4.
- Less than the tabulated minimum cover may be used provided suitable method (s) are detailed in the plans.
- Values shown in parentheses ( ) are for 3" x 1" corrugations which must be specified to utilize the lesser cover.
- The tabulated values in the brackets [ ] apply to Type I-R (Spiral Rib) pipe 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.
- For Pipe Class S with diameters of 12" to 30", the minimum height of fill measured from top of finished grade to outside top of pipe is 3 feet.

**MINIMUM COVER FOR CONCRETE, STEEL, ALUMINUM, POLYETHYLENE AND POLYVINYL CHLORIDE PIPE**

**EXTRA MATERIAL FOR CROSS CULVERTS UNDER FLEXIBLE PAVEMENTS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>COVER HEIGHT</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By EGR	09/84	State Drainage Engineer		
Drawn By DAE	09/84	Revision	Sheet No.	Index No.
Checked By EGR	09/84	00	1 of 5	205

ROUND PIPE DIMENSIONS				
Equiv. Dia. (In.)	Area (Sq. Ft.)	Wall Thickness (In.)* Classes II, III, IV, V		
		A WALL	B WALL	C WALL
12	0.8	1 3/4	2	NA
15	1.2	1 7/8	2 1/4	NA
18	1.8	2	2 1/2	NA
24	3.1	2 1/2	3	3 3/4
30	4.9	2 3/4	3 1/2	4 1/4
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	—	—

\* For Informational Purposes Only  
Do Not Specify Wall Thickness  
Option B Wall Is Industry Standard

ELLIPTICAL PIPE DIMENSIONS						
Nominal Dimensions				Equiv. Dia. (In.)	Area (Sq.Ft.)	Wall Thickness (In.) Classes HE II, III, IV VE II, III, IV
Horiz.		Vert.				
Rise (In.)	Span (In.)	Rise (In.)	Span (In.)			
NA	NA	NA	NA	12	NA	NA
12	18	18	12	15	1.3	2 1/2
14	23	23	14	18	1.8	2 3/4
19	30	30	19	24	3.3	3 1/4
24	38	38	24	30	5.1	3 3/4
29	45	45	29	36	7.4	4 1/2
34	53	53	34	42	10.2	5
38	60	60	38	48	12.9	5 1/2
43	68	68	43	54	16.6	6
48	76	76	48	60	20.5	6 1/2
53	83	83	53	66	24.8	7
58	91	91	58	72	29.5	7 1/2
63	98	98	63	78	34.6	8
68	106	106	68	84	40.1	8 1/2
72	113	113	72	90	46.1	9
77	121	121	77	96	52.4	9 1/2
82	128	128	82	102	59.2	10
87	136	136	87	108	66.4	10 1/2
92	143	143	92	114	74.0	11
97	151	151	97	120	82.0	11 1/2

For Informational Purposes Only

ROUND PIPE INSTALLATIONS						
PIPE DIAMETER	Maximum Height of Fill (ft)					
	Class S	Class I	Class II	Class III	Class IV	Class V
12"-30"	9	13	17	24	36	55
36"-54"	8	12	16	22	34	52
60"-78"	7	11	15	21	33	51
84"-96"	6	10	14	20	32	49

Pipe Class S D-Load=600 Lbs/Ft/Ft (.01" Crack)  
D-Load=900 Lbs/Ft/Ft (Ultimate)

Pipe Class I D-Load=800 Lbs/Ft/Ft (.01" Crack)  
D-Load=1200 Lbs/Ft/Ft (Ultimate)

Pipe Class II D-Load=1000 Lbs/Ft/Ft (.01" Crack)  
D-Load=1500 Lbs/Ft/Ft (Ultimate)

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)

Note: At the option of the pipe supplier or the contractor, a Pipe Class with greater strength may be substituted for the Pipe Class designated in the plans.

ELLIPTICAL PIPE INSTALLATIONS (All Sizes)			
Installation	Maximum Height Of Fill (Ft.)	Pipe Class	Bedding Class
Horizontal	1-6*	HE II*	C
	7-10	HE III	C
	11-16	HE IV	C
	17+	Special Design	Modified
Vertical	1-6*	VE II*	C
	7-10	VE III	C
	11-16	VE IV	C
	17+	Special Design	Modified

Pipe Class HE II D-Load=1000 Lbs/Ft/Ft (.01" Crack)  
And VE II D-Load=1500 Lbs/Ft/Ft (Ultimate)

Pipe Class HE III D-Load=1350 Lbs/Ft/Ft (.01" Crack)  
And VE III D-Load=2000 Lbs/Ft/Ft (Ultimate)

Pipe Class HE IV D-Load=2000 Lbs/Ft/Ft (.01" Crack)  
And VE IV D-Load=3000 Lbs/Ft/Ft (Ultimate)

\*Note: HE III and VE III pipe required for depths of cover less than 2' for 15", 18" and 24" equivalent.

**PIPE DIMENSIONS  
CONCRETE PIPE**

**MAXIMUM COVER HEIGHTS  
CONCRETE PIPE**

POLYETHYLENE PIPE	
DIAMETER	HEIGHT OF MAXIMUM FILL (Ft)
12"-48"	17'

POLYVINYL CHLORIDE PIPE	
DIAMETER	HEIGHT OF MAXIMUM FILL (Ft)
12"-48"	17'

**MAXIMUM COVER FOR PLASTIC PIPE**

Note: Height of fill (maximum cover) is measured from top of finished grade to outside top of pipe.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
COVER HEIGHT				
Designed By	EGR	09/85	Approved By <i>S. A. McHenry</i> State Drainage Engineer	
Drawn By	HSD	09/85	Revision	Sheet No. Index No.
Checked By	EGR	09/85	02	2 of 5 205





ROUND PIPE - 2 5/8" x 1/2" CORRUGATION							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. 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 5
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 Fill (Ft.)					Min. 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 5
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	

ROUND PIPE - SPIRAL RIB RIB SPACING (3/4" x 3/4" x 7 1/2")							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.060 (16)	0.075 (14)	0.105 (12)	0.135 (10)	0.164 (8)	
12	0.79	NA	NA	NA	NA	NA	See Sheet 1 of 5
15	1.23	63 ①	87 ①	NA	NA	NA	
18	1.77	55	76	NA	NA	NA	
21	2.40	47	65	NA	NA	NA	
24	3.14	41	57	NA	NA	NA	
30	4.91	33 DR	45	73	NA	NA	
36	7.1	27 ④	38 DR	61	NA	NA	
42	9.6	NS	32 ④	52	NA	NA	
48	12.6	NS	NS	46	65	NA	
54	16.0	NS	NS	40 DR	57	NA	
60	19.6	NS	NS	36 ④	52	NA	
66	23.8	NS	NS	NS	47 DR	NA	
72	28.3	NS	NS	NS	43 ④	NA	
78	33.2	NS	NS	NS	39 ④	NA	
84	38.5	NS	NS	NS	34 ④	NA	
90	44.2	NS	NS	NS	30 ①③④	NA	
96	50.3	NS	NS	NS	27 ①③④	NA	

- NOTE  
Special installation required. Refer to AASHTO Standard Specifications for Highway Bridges or ASTM B788-88 and manufacturer's recommendations.

PIPE ARCH - 2 5/8" x 1/2" CORRUGATION ②							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In.) (Ga)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure-Lbs/Sq.Ft.		
					4000	6000	
17	13	15	1.1	.060 (16)	12	15	See Sheet 1 of 5
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 ① ②							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In.) (Ga)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure-Lbs/Sq.Ft.		
					4000	6000	
40	31	36	7.0	.060 (16)	8	12	See Sheet 1 of 5
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	79	102	54.2	.164 (8)	10	15	

PIPE ARCH - SPIRAL RIB RIB SPACING (3/4" x 3/4" x 7 1/2")							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In.) (Ga)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure-Lbs/Sq.Ft.		
					4000	6000	
16	14	15	1.2	.060 (16)	12	13	See Sheet 1 of 5
20	16	18	1.7	.060 (16)	10	12	
23	19	21	2.3	.060 (16)	7	11	
27	21	24	3.0	.060 (16)	5	10	
33	26	30	4.7	.075 (14)	NS	9	
40	31	36	7.0	.075 (14)	NS	8	
46	36	42	9.4	.105 (12)	NS	8	
53	41	48	12.3	.105 (12)	NS	8	
60	46	54	15.6	.105 (10)	NS	8	
66	51	60	19.3	.135 (10)	NS	8	
73	55	66	23.2	.135 (10) ④	NS	8	
81	59	72	27.4	.135 (10) ④	NS	8	

**MAXIMUM COVER FOR CORRUGATED ALUMINUM ALLOY ROUND PIPE AND PIPE ARCH**

**Notes:**

Increase the minimum cover values shown on Sheet 1 of 5 by 6" for gage and size combinations below the heavy lines.

Height of fill (maximum cover) is measured from top of finished grade to outside top of pipe.

- NA - Not Available  
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. (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.) (NOTE: The DESIGNER may use a thicker gage in lieu of the Design Review.)

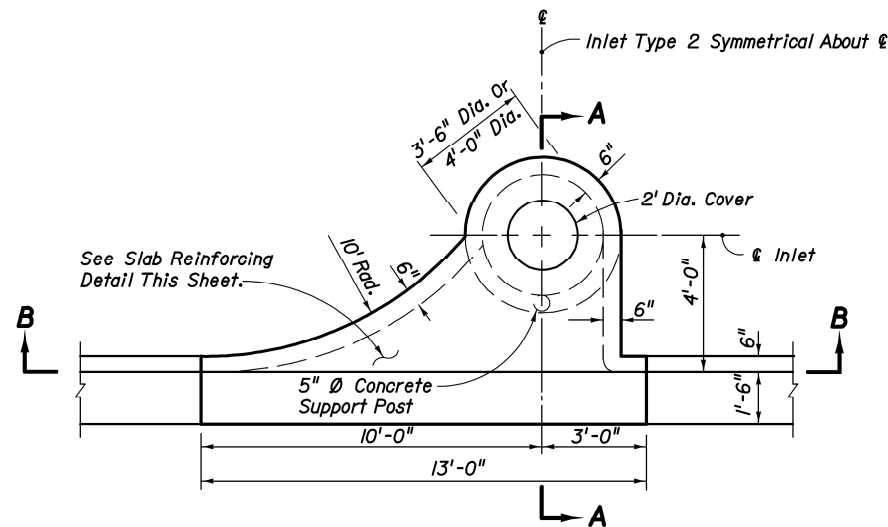
- ① Limited availability of this product. Check availability before specifying.  
② 360° perforated pipe (french drain pipe) is not recommended in the pipe arch shape. Do not specify without checking both for suitability and availability.  
③ This size and gage combination must be strutted during installation per manufacturers recommendations. Extra care will be required during handling and installation.  
④ Use of this size and gage combination must be approved by the State Drainage Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

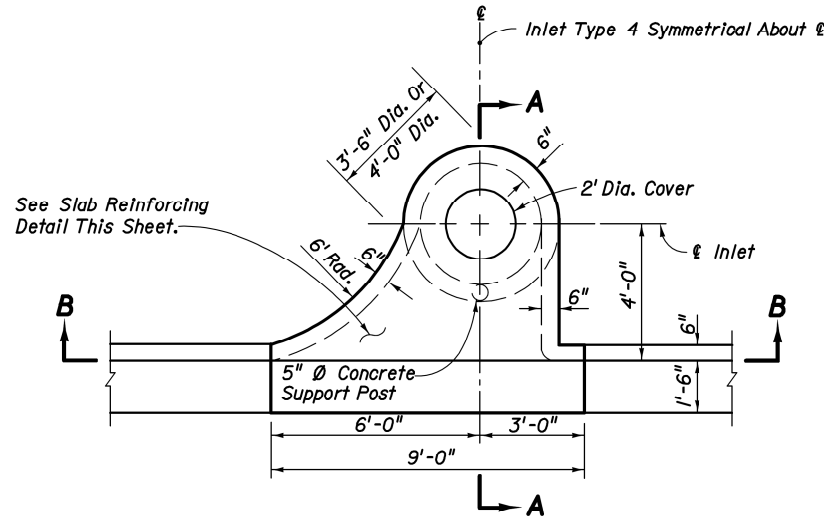
**COVER HEIGHT**

Names	Dates	Approved By		
Designed By	EGR	09/85	a Mchenore State Drainage Engineer	
Drawn By	HSD	09/85	Revision	Sheet No.
Checked By	EGR	09/85	00	4 of 5
			Index No.	205

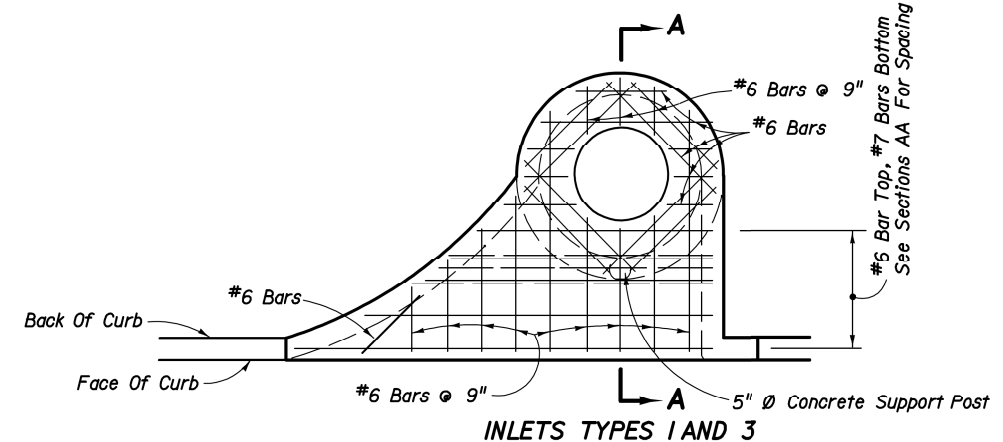




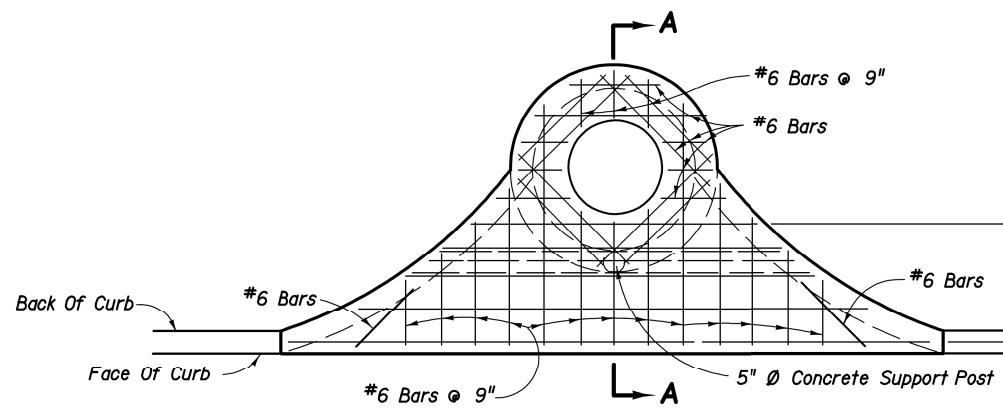
PLAN (INLET TYPE 2 SYMMETRICAL ABOUT  $\epsilon$ )



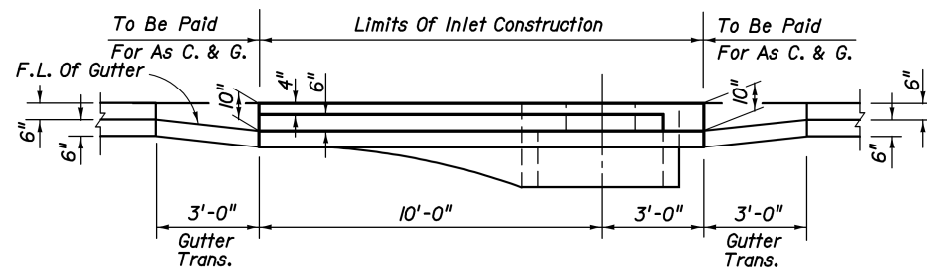
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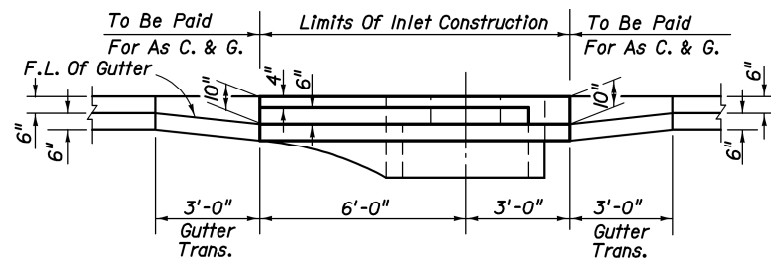
INLETS TYPES 1 AND 3



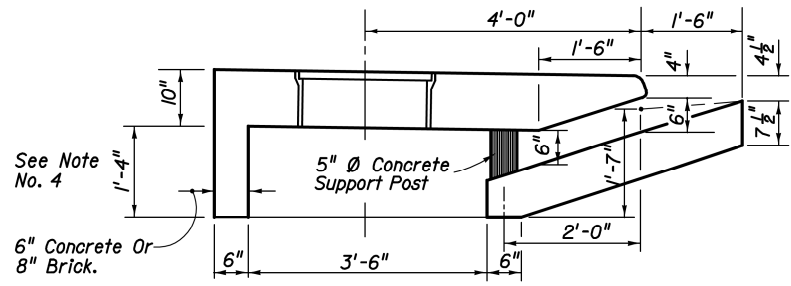
INLETS TYPES 2 AND 4  
**SLAB REINFORCING**



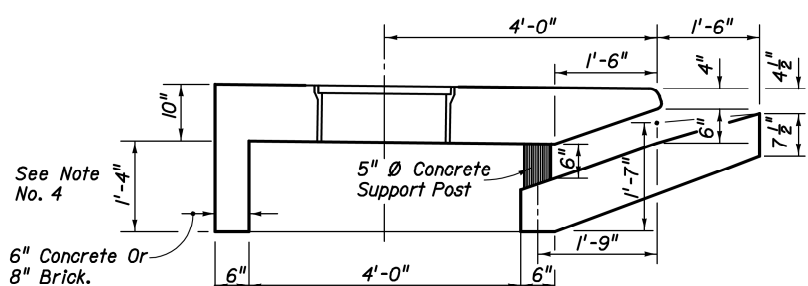
SECTION BB (INLET TYPE 2 SYMMETRICAL ABOUT  $\epsilon$ )



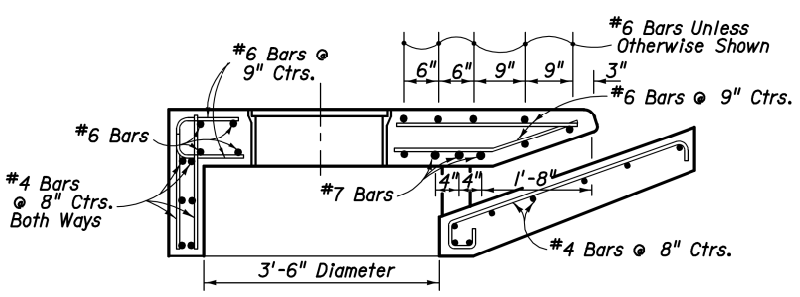
SECTION BB (INLET TYPE 4 SYMMETRICAL ABOUT  $\epsilon$ )



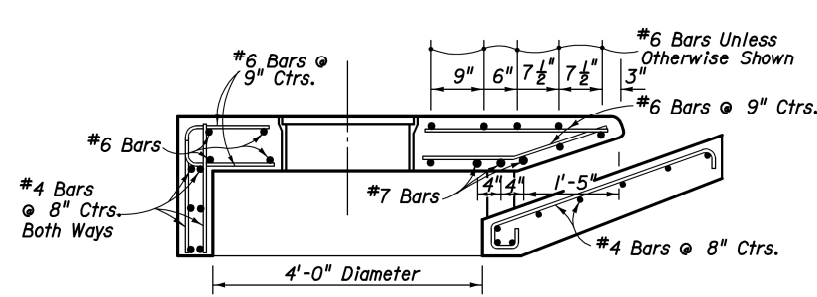
DIMENSIONAL SECTION  
**INLETS TYPES 1 AND 2**



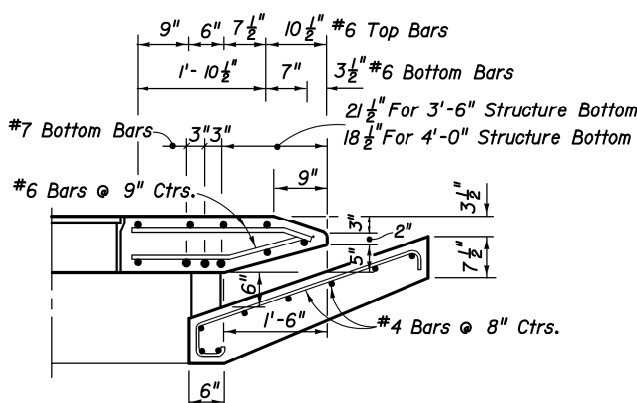
DIMENSIONAL SECTION  
**INLETS TYPES 3 AND 4**



REINFORCING SECTION  
3'-6" DIA. STRUCTURE BOTTOM (SECTION AA)



REINFORCING SECTION  
4'-0" DIA. STRUCTURE BOTTOM (SECTION AA)

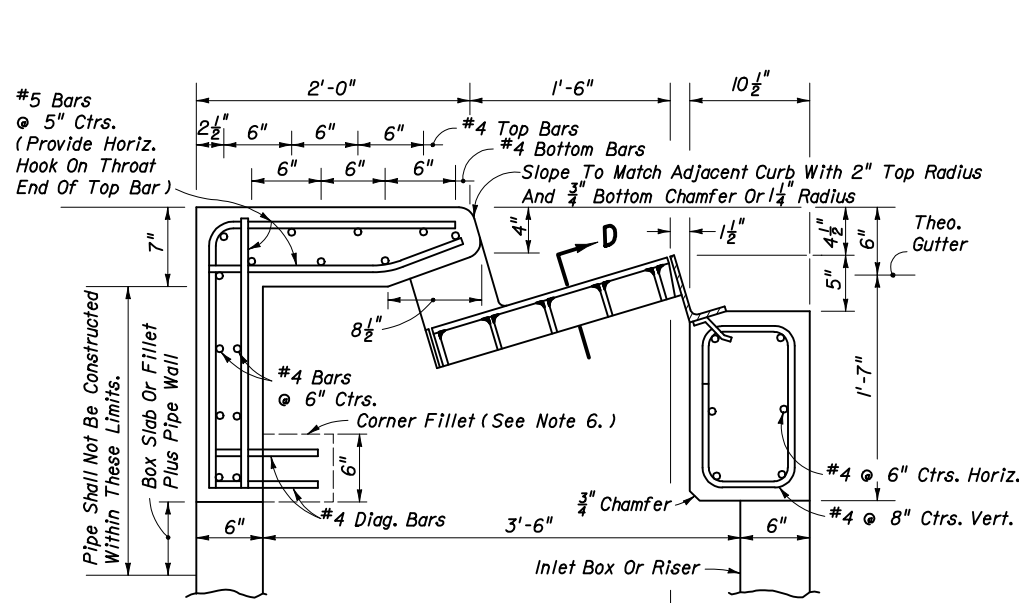


DIMENSION & REINFORCING HALF SECTION  
TYPES A & E CURB (HALF SECTION AA)  
(TYPE E GUTTER SHOWN)

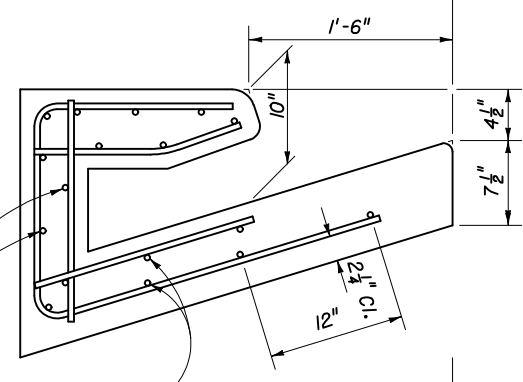
**GENERAL NOTES**

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 border.
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 steel in inlet top shall have 1/2" minimum cover unless otherwise shown. Inlet tops shall be either cast-in-place or precast concrete.
4. The rear wall portion of inlet tops Types 1, 2, 3 & 4 may be constructed with brick. Dowels to top slab required.
5. For supplemental details see Index No. 201.
6. Only round concrete support post will be acceptable.
7. These inlets are to be used with Curb and Gutter Types E and F. Locate outside of pedestrian crosswalk where practical.
8. For structure bottoms see Index No. 200.
9. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type —), Each.

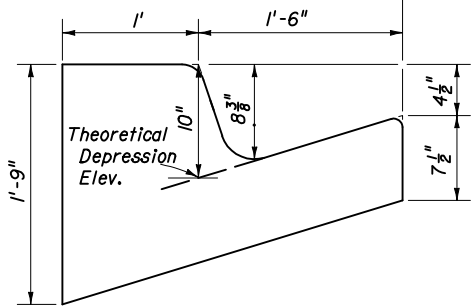
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CURB INLET TOPS TYPES 1, 2, 3, &amp; 4</b>				
Designed By	Names	Dates	Approved By <i>S. A. McHenry</i>	
Drawn By			State Drainage Engineer	
Checked By			Revision	Sheet No. Index No.
			00	1 of 1 210



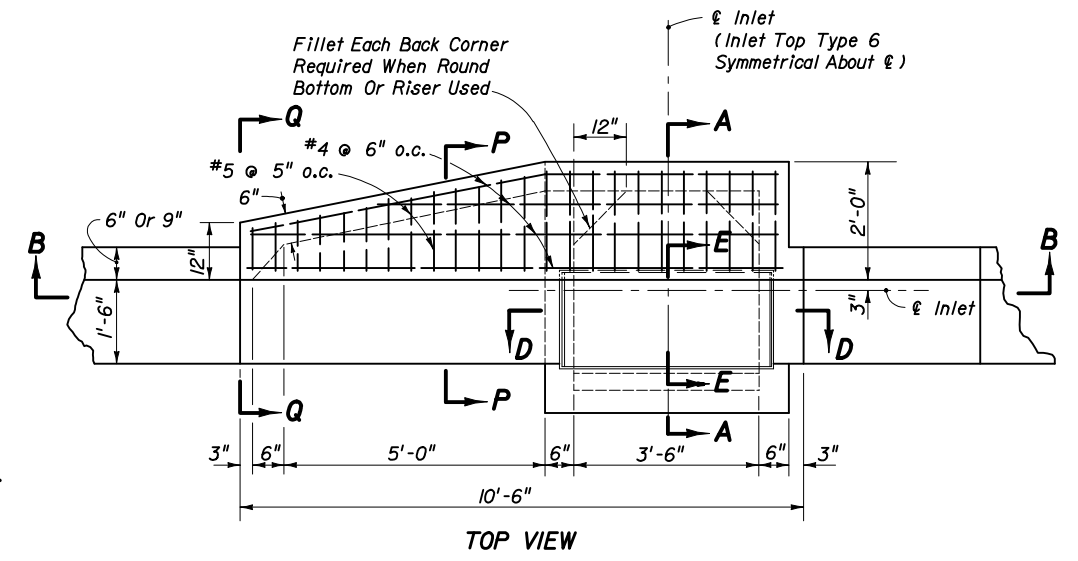
(Steel Cover Shown)  
**SECTION AA**



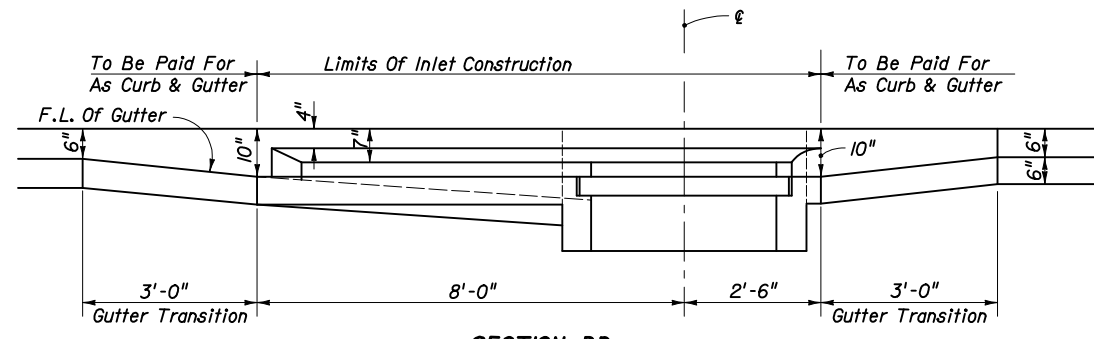
**SECTION PP**



**SECTION QQ**



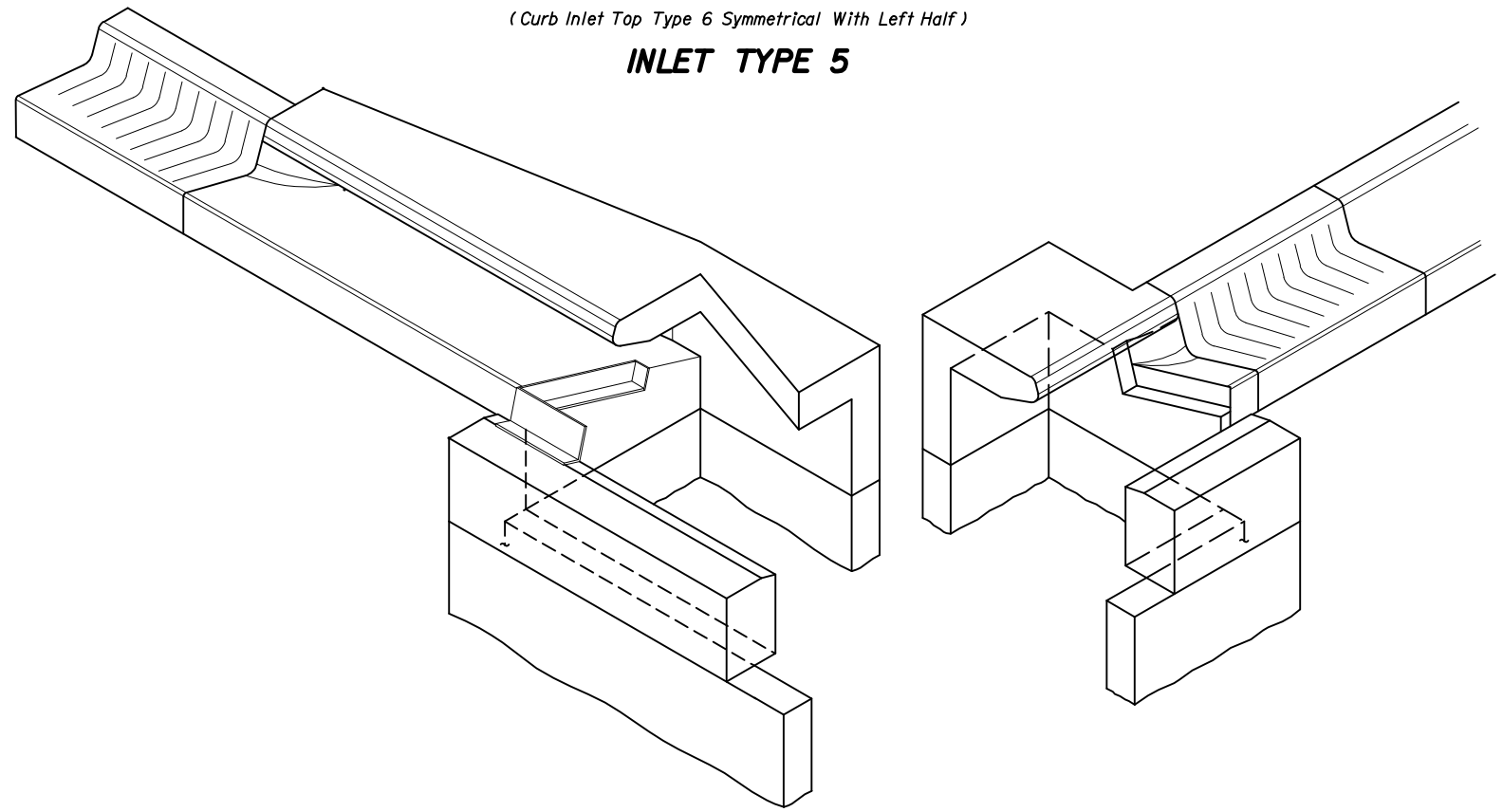
**TOP VIEW**



**SECTION BB**

(Curb Inlet Top Type 6 Symmetrical With Left Half)

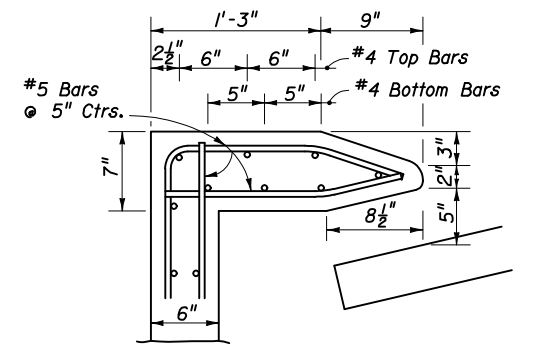
**INLET TYPE 5**



**SKETCH SHOWING FRAME SEAT AND THROAT RECESS**

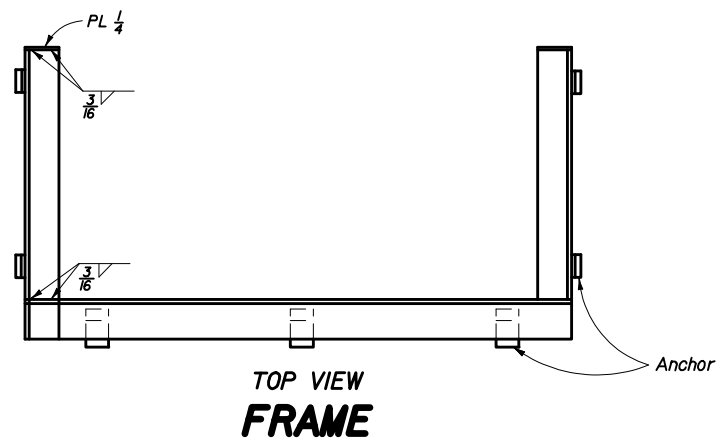
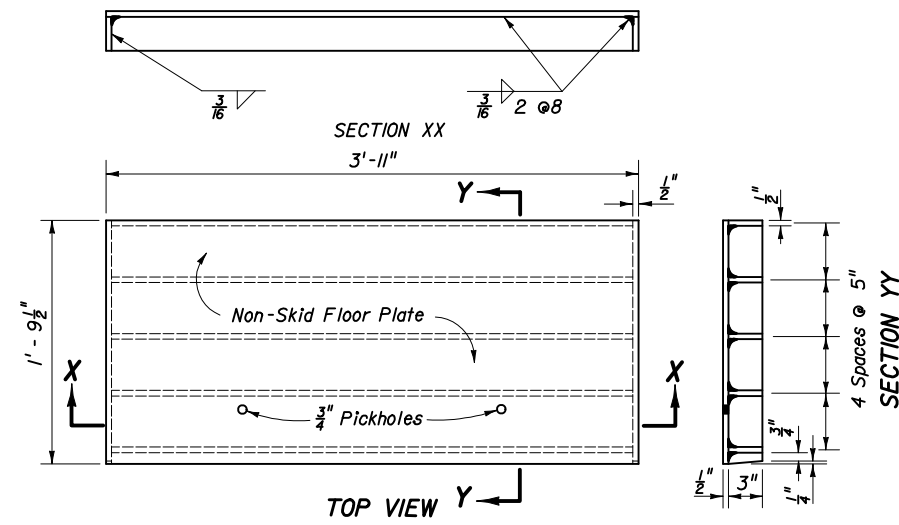
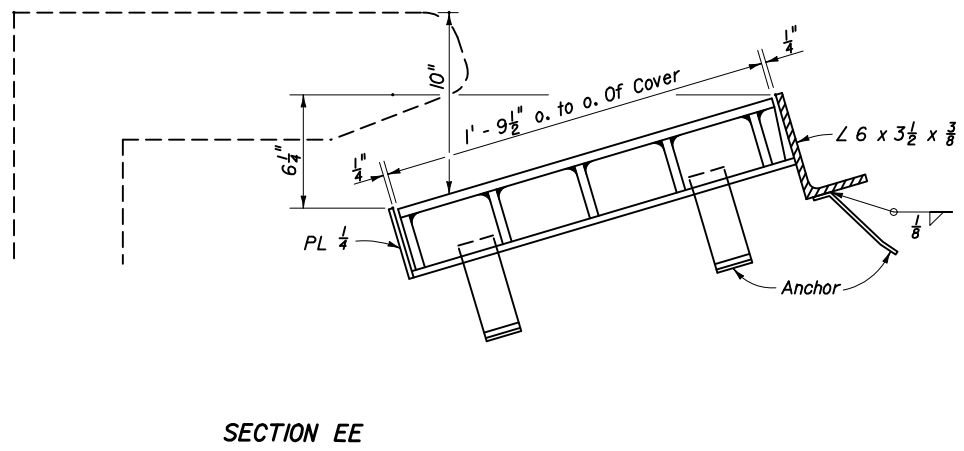
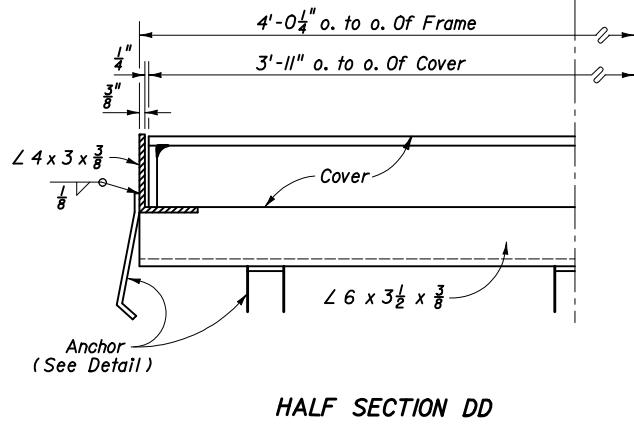
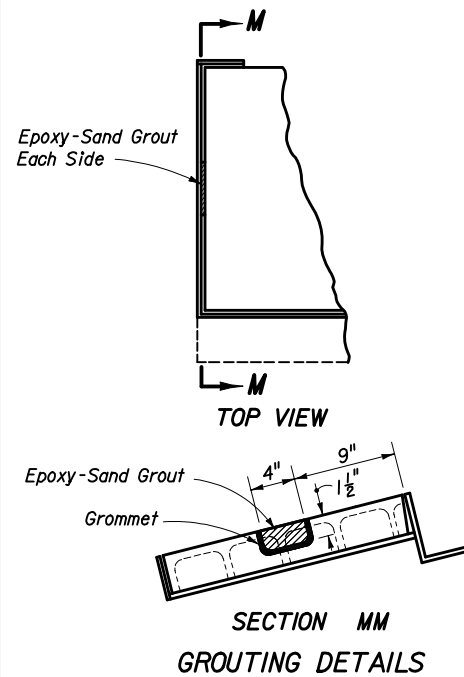
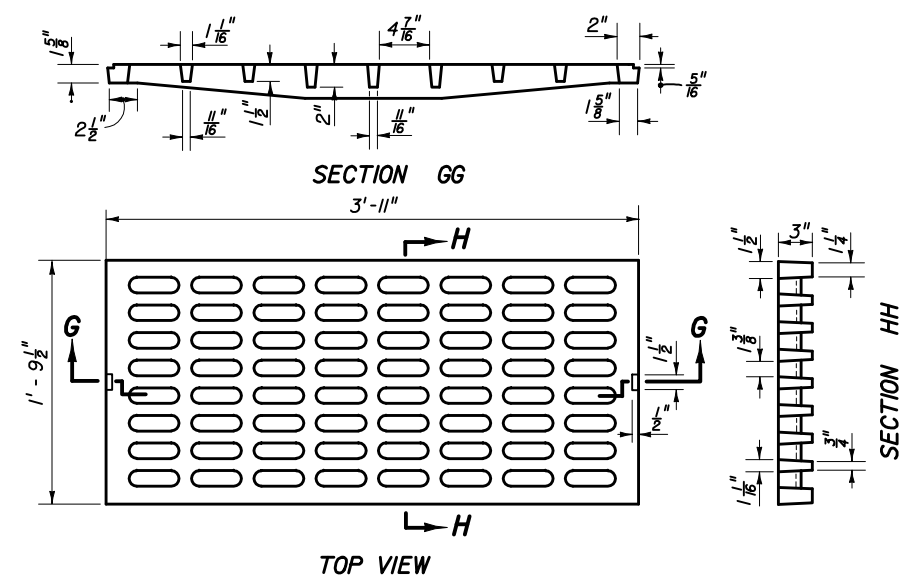
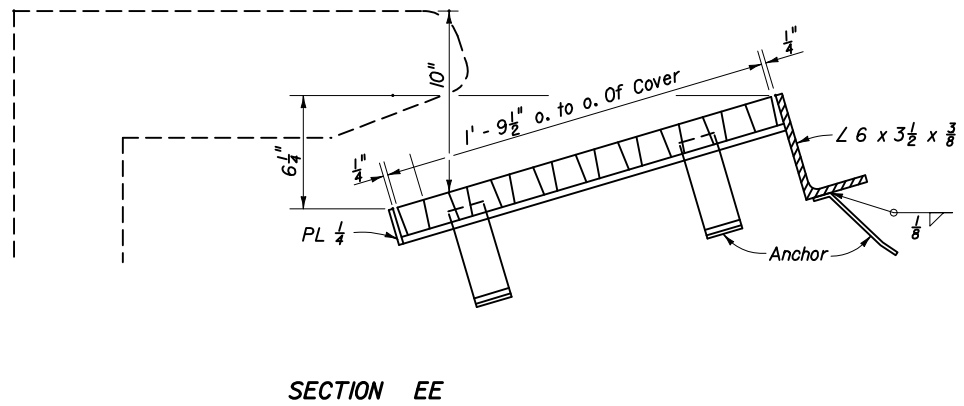
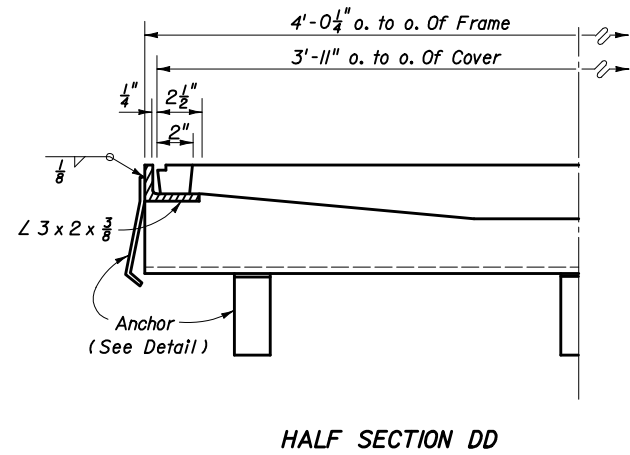
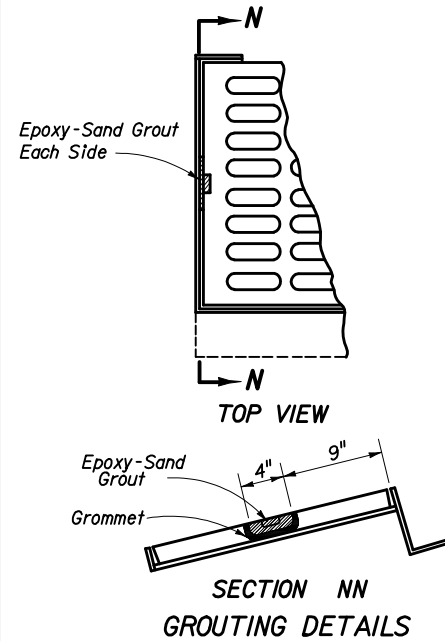
**GENERAL NOTES**

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 1/4 inch 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. C478 (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 20I for supplemental details.
10. All steel used for frame and cover shall meet the requirements of ASTM A36/A36M.
11. Either cast iron covers or steel covers may be used. Iron covers shall be Class No. 30 castings in accordance with ASTM A48.
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 tack welding.
13. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type— ), Each.

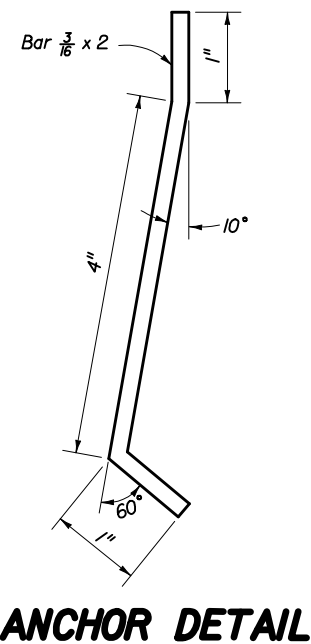


**TOP MODIFICATION FOR TYPE E CURB**

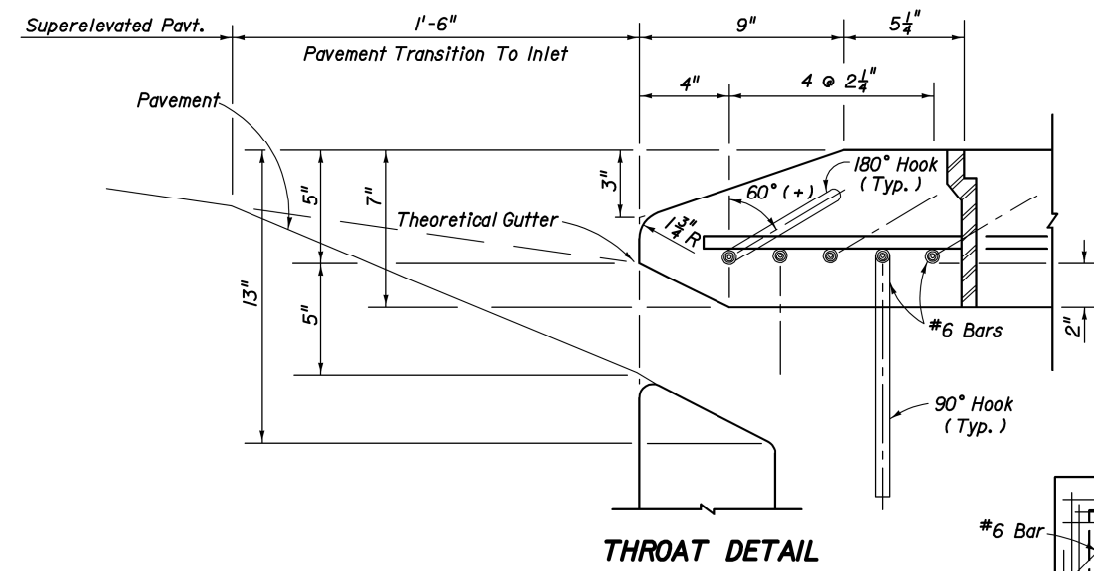
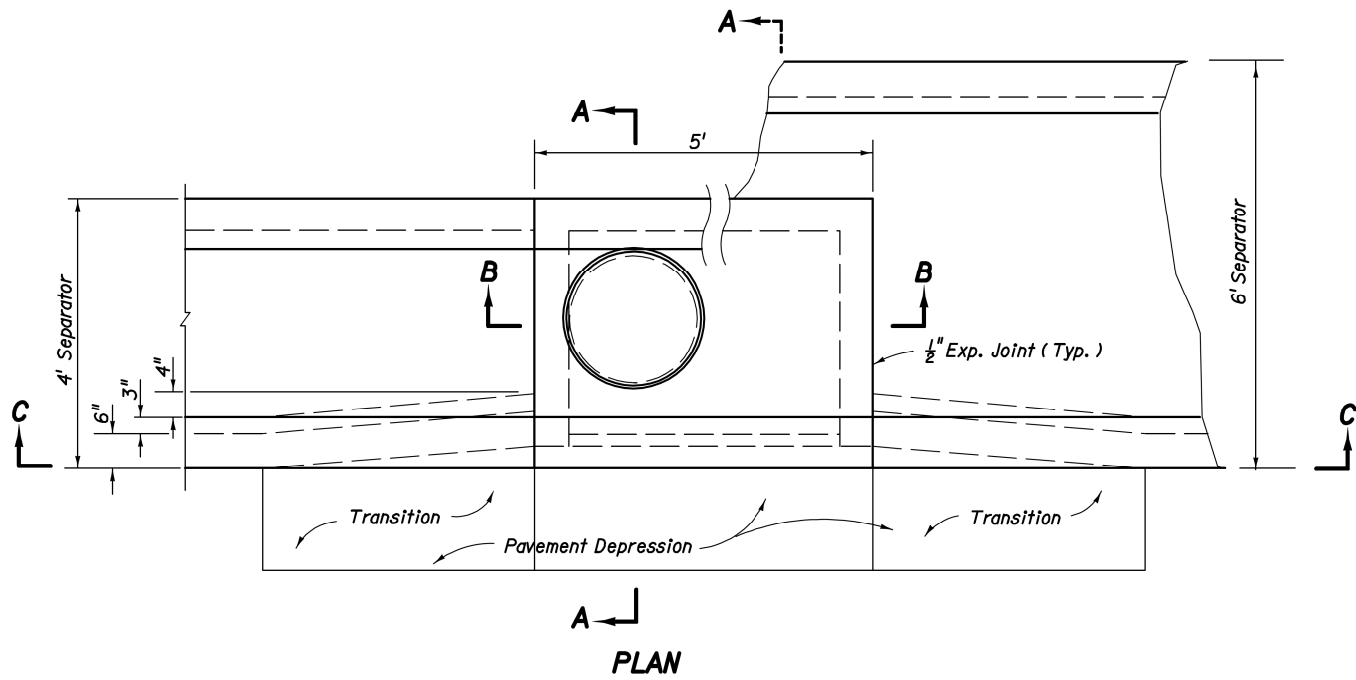
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CURB INLET TOPS TYPES 5 &amp; 6</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 2	211



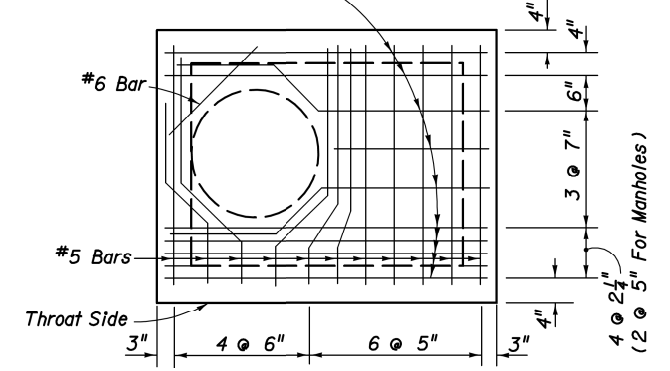
### STEEL COVER



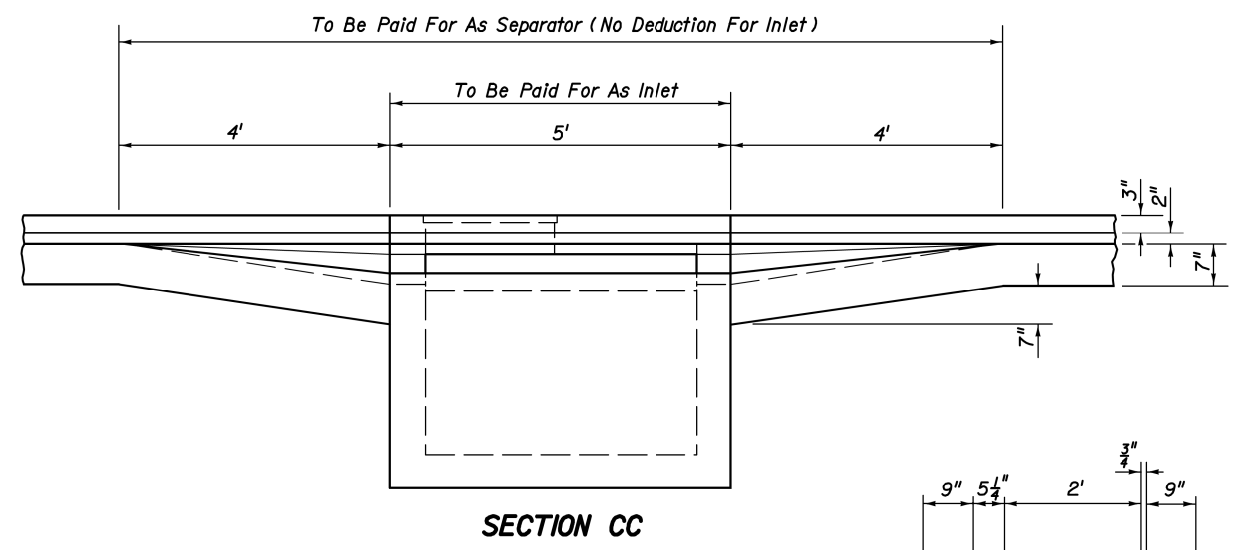
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
CURB INLET TOPS TYPES 5 & 6					
Designed By	Names	Dates	Approved By	<i>S. A. McHenry</i>	
Drawn By			State Drainage Engineer		
Checked By	Revision	Sheet No.	Index No.		
	00	2 of 2	211		



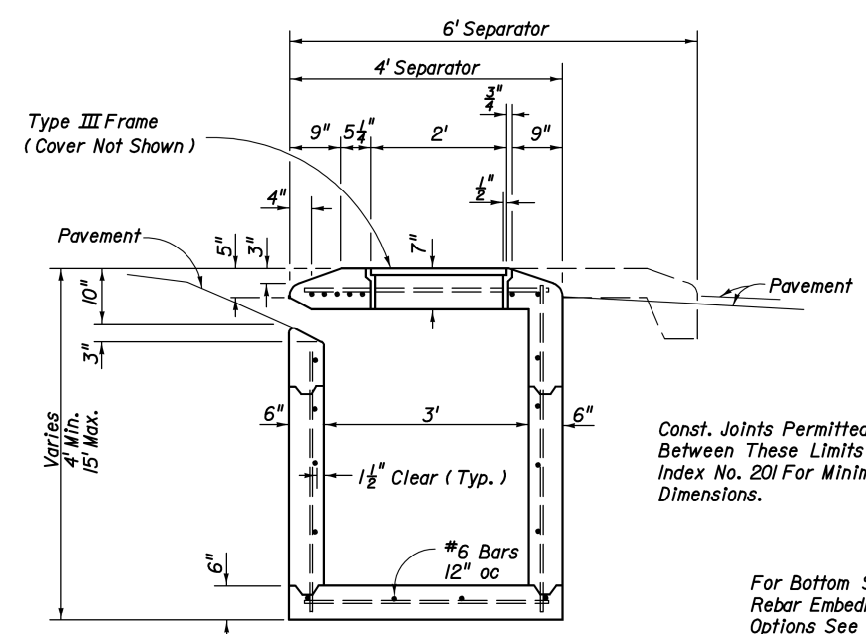
#6 Bars  
 ACI Std. Hooks Required Each End Of  
 Straight Bars And Right End Of Bent  
 Bars: 180° Hooks, Canted 60° (+), On  
 Odd Bars; 90° Hooks, Down, On Even  
 Bars Numbered From Throat Side.



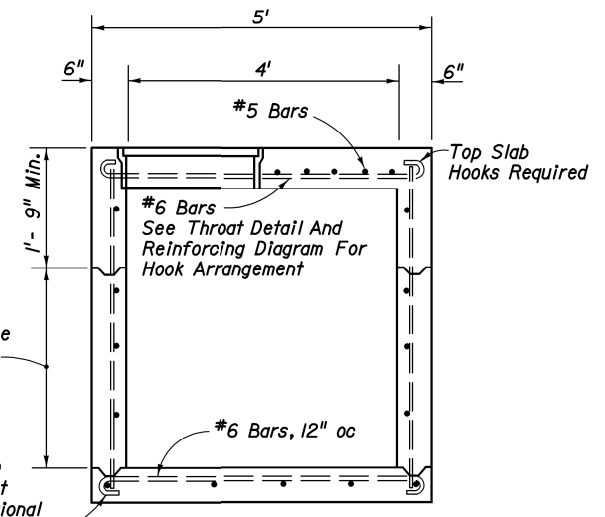
REINFORCING STEEL DIAGRAM  
 TOP SLAB OF INLETS



SECTION CC



SECTION AA

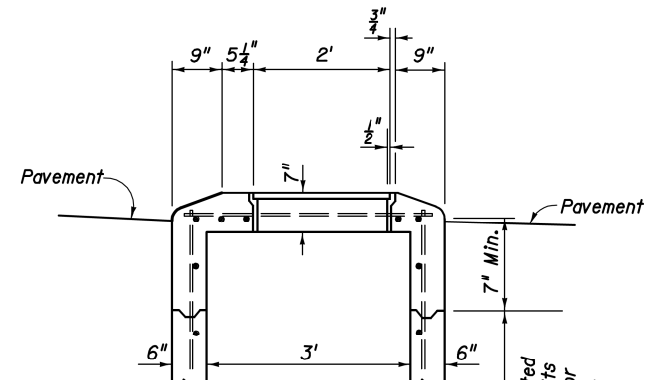


SECTION BB

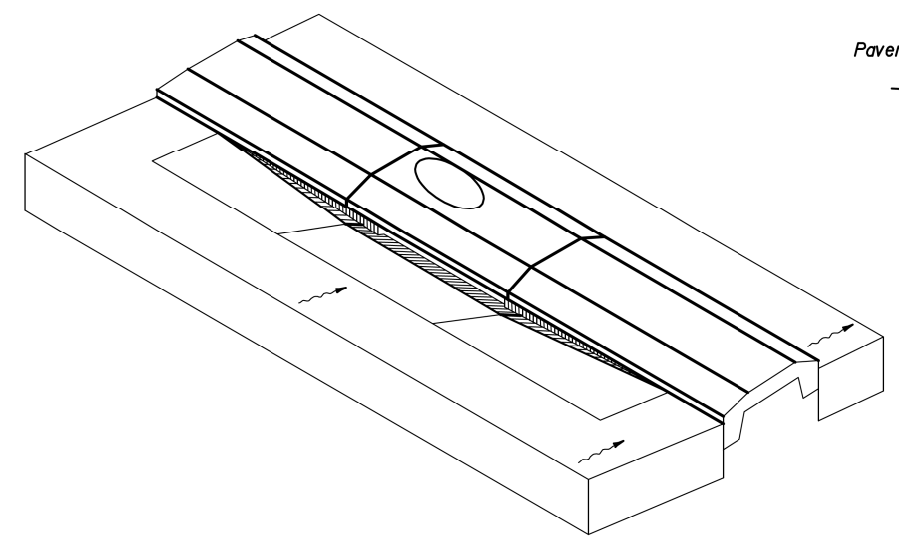
GENERAL NOTES

1. This inlet is used in Traffic Separators Types I and II; or, in separators constructed with Curbs Types A, B and E and sidewalk paving, which cannot accommodate Inlets Types 1, 2, 3, 4, 5, or 6. Use of this Inlet on through traffic side of the separator is not permitted in medians with Curb Types A and B. Locate inlet outside of pedestrian cross traffic.
2. Reinforcing - #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 Alt. B bottoms, Index No. 200 are recommended.
4. For supplementary details see Index No. 201.
5. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type 7), Each.

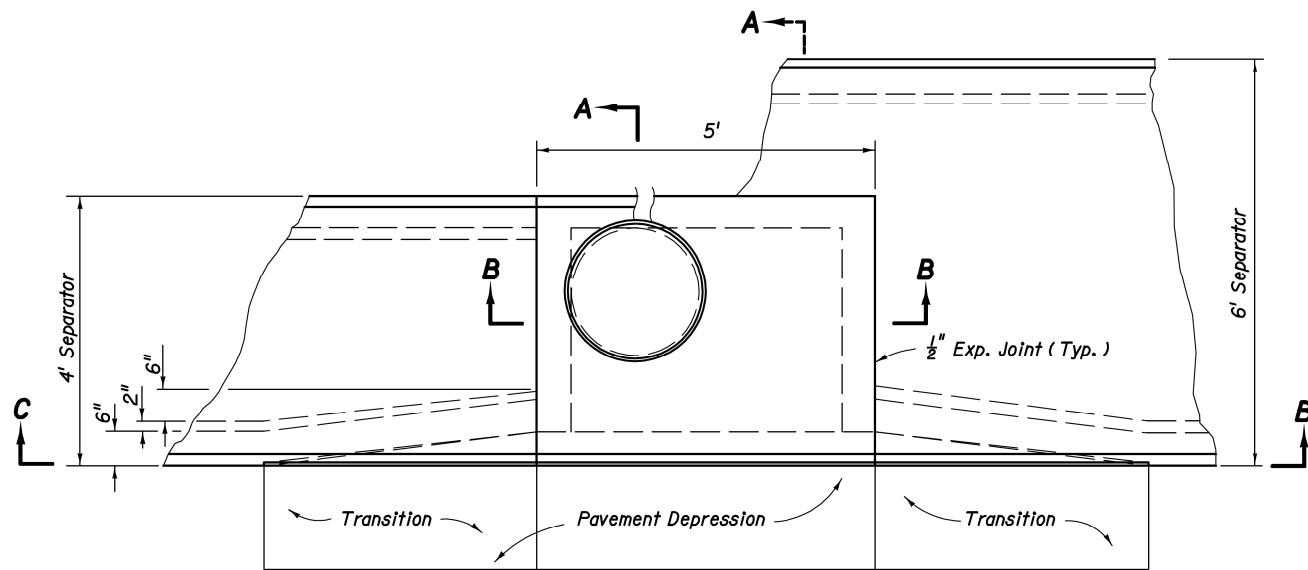
MODIFICATION WHEN USED  
 AS A MANHOLE



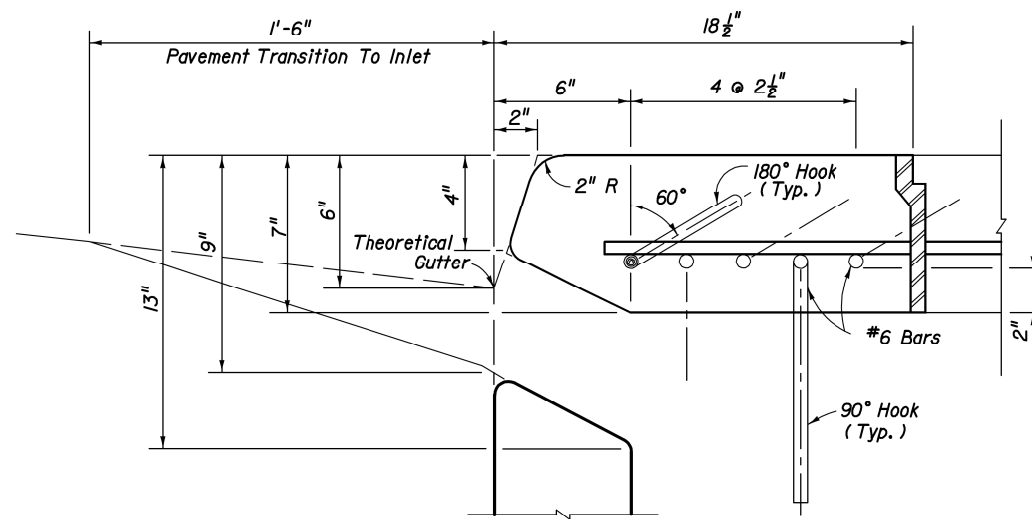
Const. Joints Permitted  
 Between These Limits  
 See Index No. 201 For  
 Minimum Dimensions.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CURB INLET TYPE 7</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By EGR	08/81	State Drainage Engineer		
Drawn By HSD	08/81	Revision	Sheet No.	Index No.
Checked By JG	08/81	00	1 of 1	212

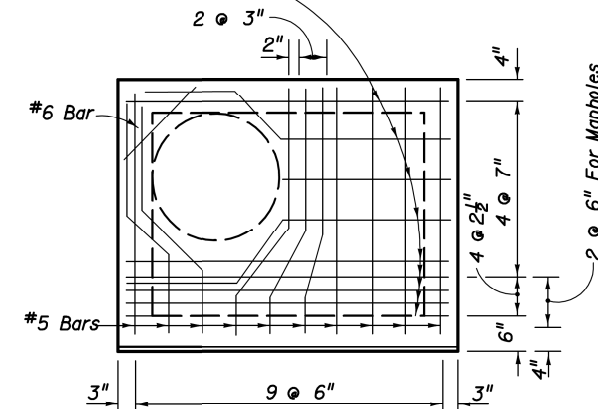


**PLAN**

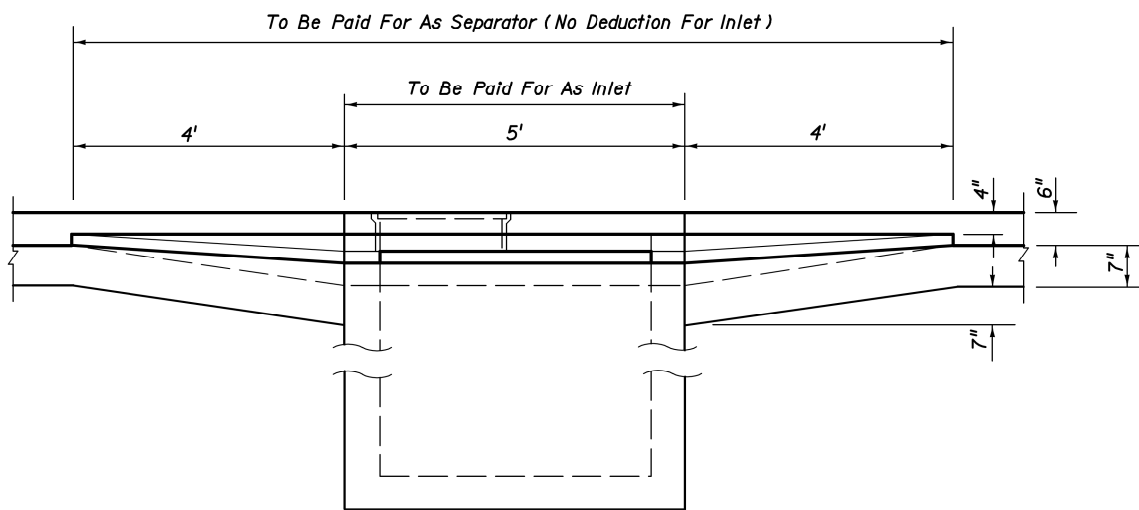


**THROAT DETAIL (SECTION AA)**

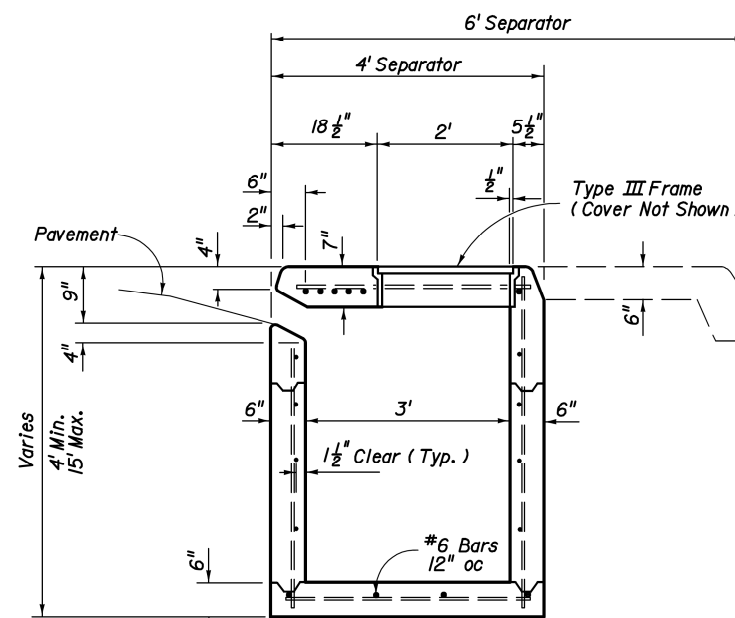
#6 Bars  
 ACI Std. Hooks Required Each End Of  
 Straight Bars And Right End Of Bent  
 Bars. 180° Hooks, Canted 60° (+), On Odd  
 Bars; 90° Hooks, Down, On Even Bars  
 Numbered From Throat Side.



**REINFORCING STEEL DIAGRAM  
 TOP SLAB OF INLET**

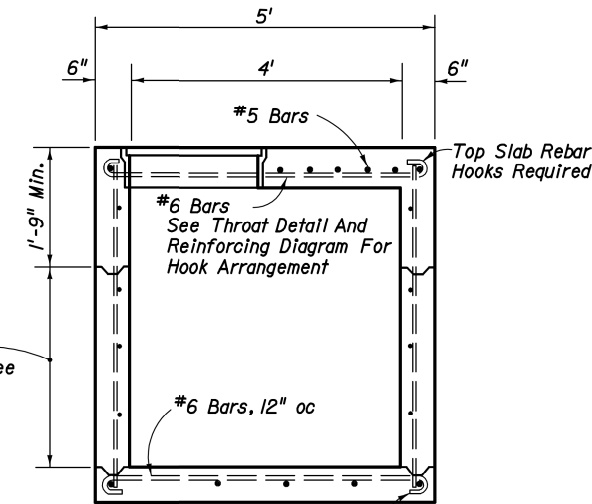


**SECTION CC**



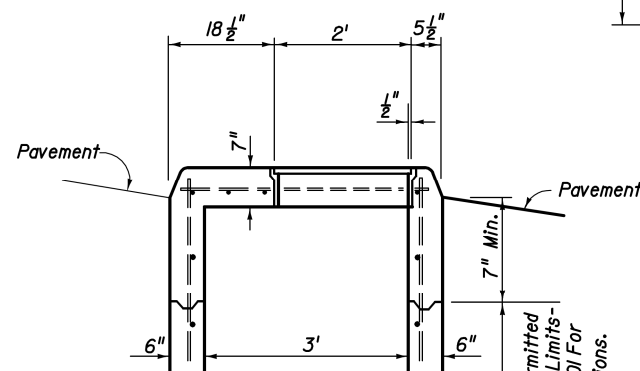
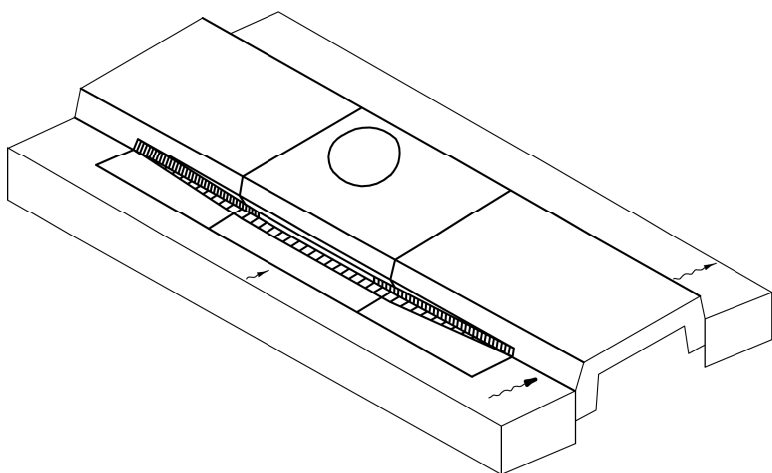
**SECTION AA**

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



**SECTION BB**

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



**MODIFICATION WHEN USED  
 AS A MANHOLE**

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

**GENERAL NOTES**

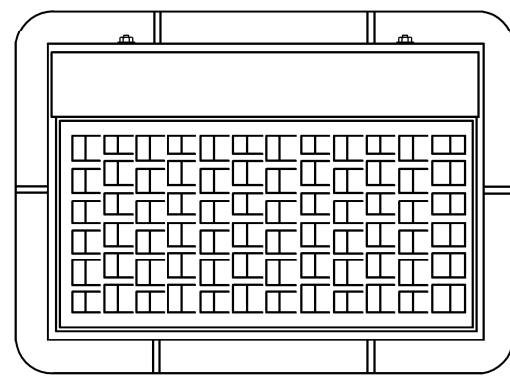
1. This inlet is to be used only in Traffic Separators Types IV and V; or, in separators constructed with Curbs Types D and F and sidewalk paving, which cannot accommodate Inlets Types 1, 2, 3, 4, 5 or 6. Use of this inlet on the through traffic side of the separator should be avoided in medians constructed with Curb Type D (Curb inlets Types 9 or 10 are recommended). Locate inlet outside of pedestrian cross traffic.
2. Reinforcing - #4 bars at 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 Alt. B bottoms, Index No. 200 are recommended.
4. For supplemental details see Index No. 201.
5. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type 8), Each.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

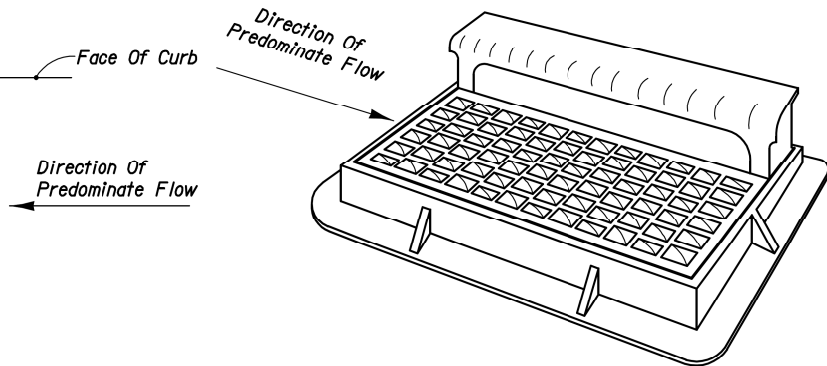
**CURB INLET  
 TYPE 8**

Names	Dates	Approved By		
Designed By	EGR 07/81	S. A. McHenry State Drainage Engineer	Revision	Sheet No.
Drawn By	HSD 07/81		00	1 of 1
Checked By	JG 07/81	Index No.	213	

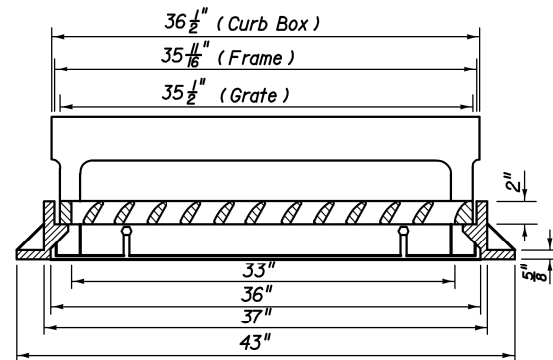




TOP VIEW

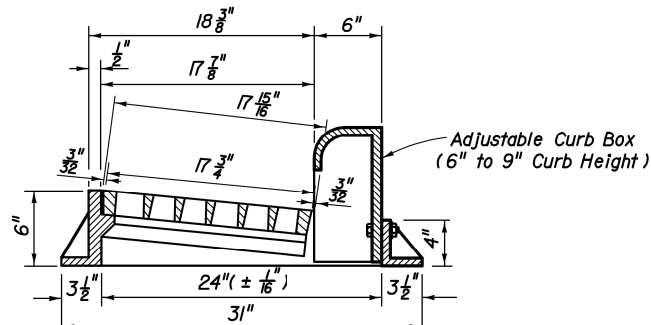


Face Of Curb  
Direction Of Predominate Flow

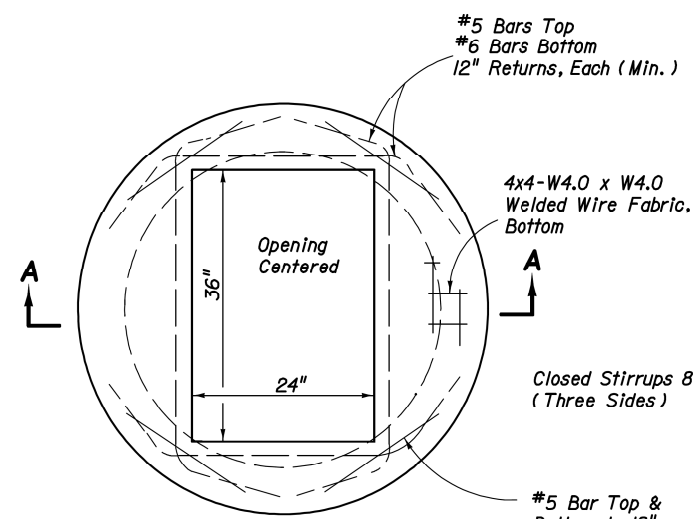


LONGITUDINAL SECTION

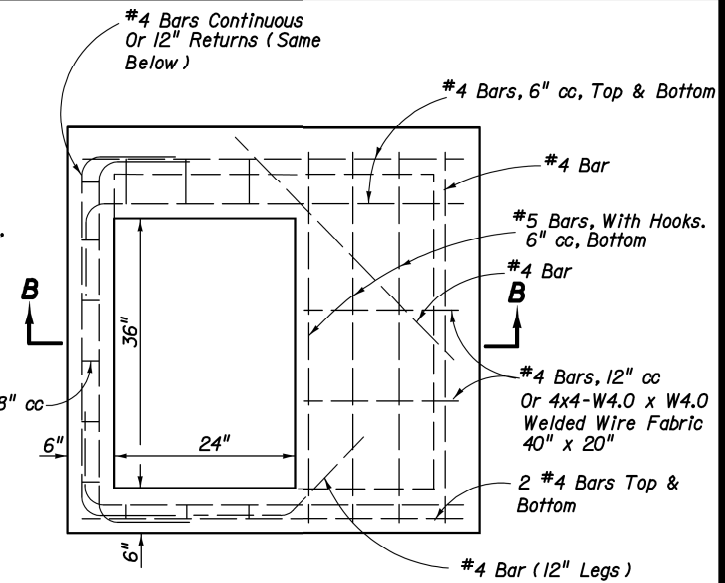
FRAME AND GRATE



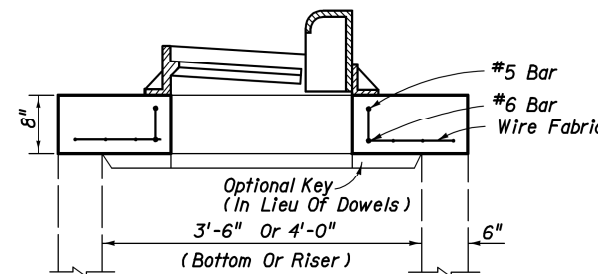
TRANSVERSE SECTION



TOP VIEW

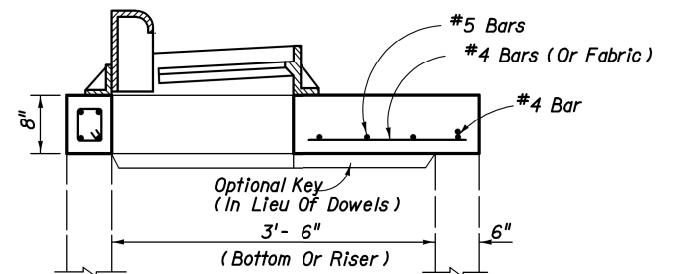


TOP VIEW



SECTION AA

(SEE NOTE 6 BELOW)



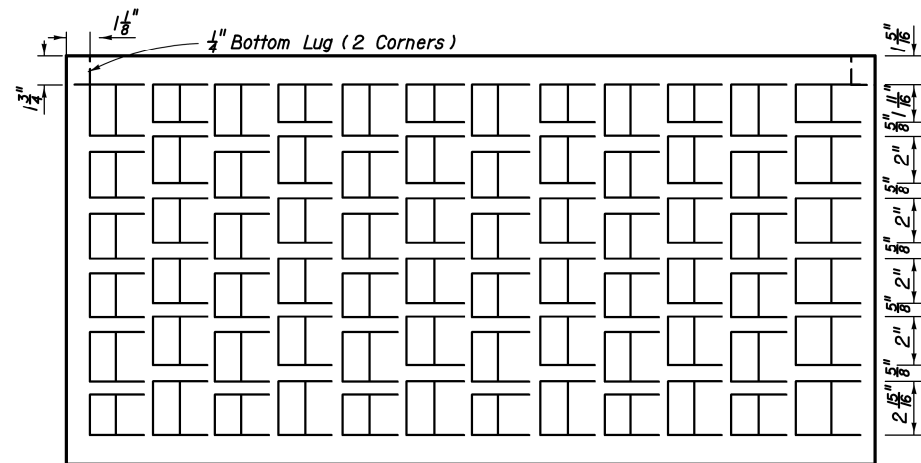
SECTION BB

(SEE NOTE 6 BELOW)

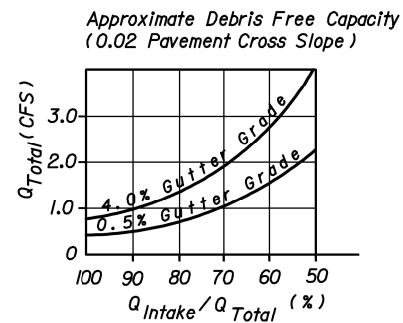
TOP SLABS

GENERAL NOTES

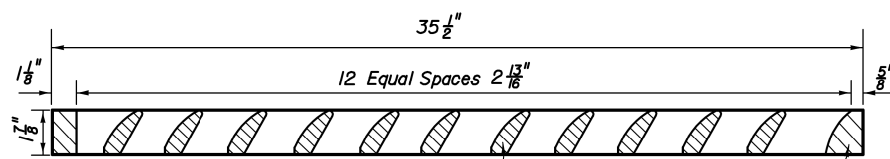
1. This inlet is primarily intended for locations with light to moderate flows where right of way does not permit the use of throated Curb Inlets Types 1 through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This inlet 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  $1\frac{1}{4}$ " 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. When used on a structure with dimensions larger than those detailed above and risers are not applied, the top slab shall be constructed using Index 200 with the slab opening adjusted to 24" x 36". The "Special Top Slab" on Index 200 is not permitted.
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 A48M. Grates shall be reversible, right or left.



TOP VIEW

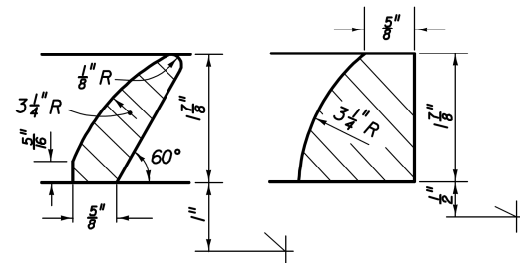


EFFICIENCY CURVE



SECTION

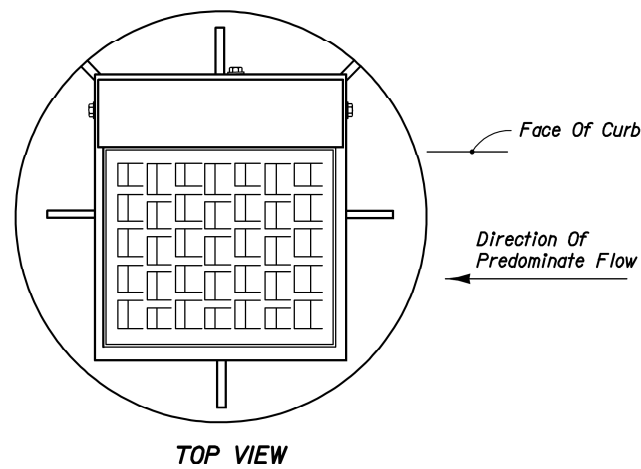
GRATE DETAIL



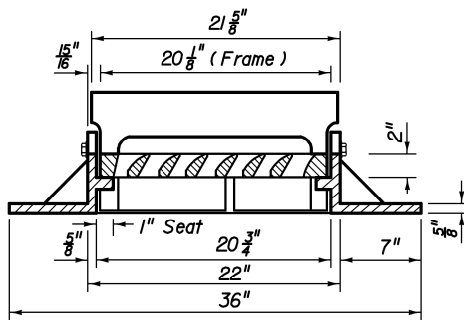
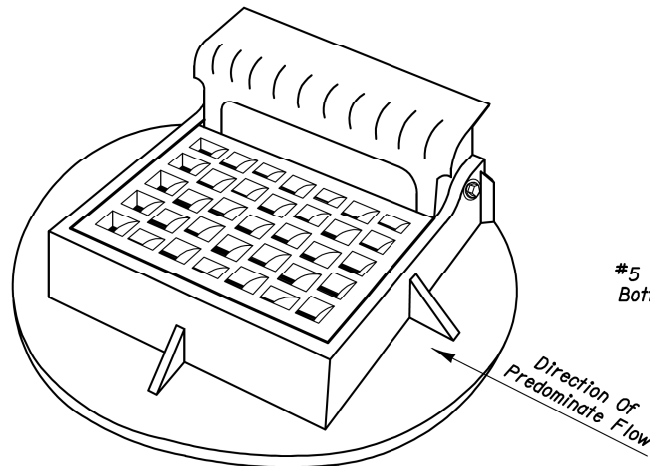
DETAIL A

DETAIL B

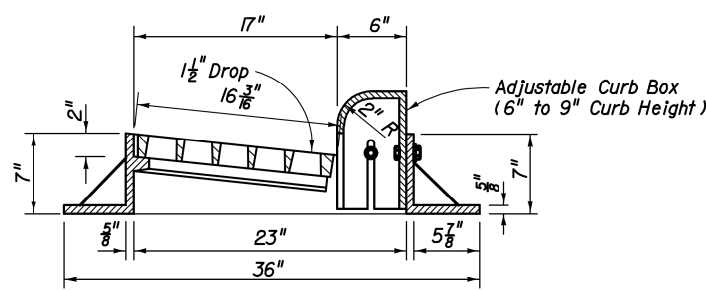
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CURB INLET TOP TYPE 9</b>				
Designed By	EGR	Dates	Approved By <i>S. A. McHenry</i> State Drainage Engineer	
Drawn By	HSD	QI/BI	Revision	Sheet No. 1 of 1
Checked By	JMG	QI/BI	00	Index No. 214



TOP VIEW

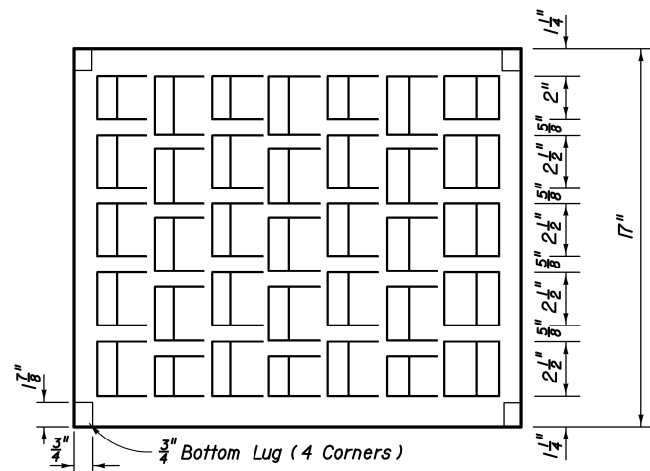


LONGITUDINAL SECTION

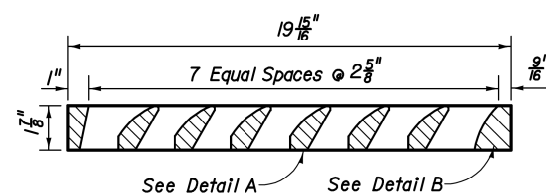


TRANSVERSE SECTION

FRAME AND GRATE

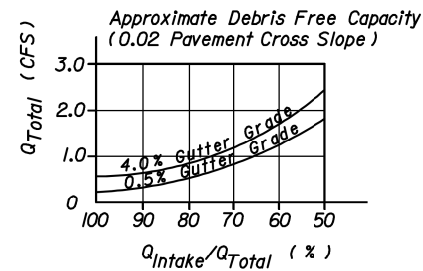


PLAN

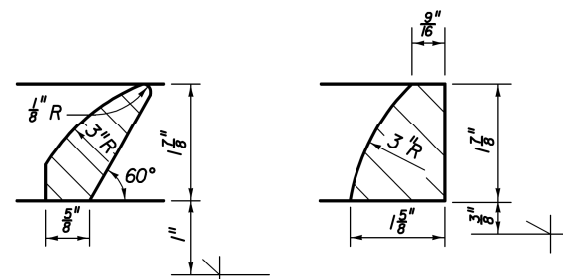


SECTION

GRATE DETAIL

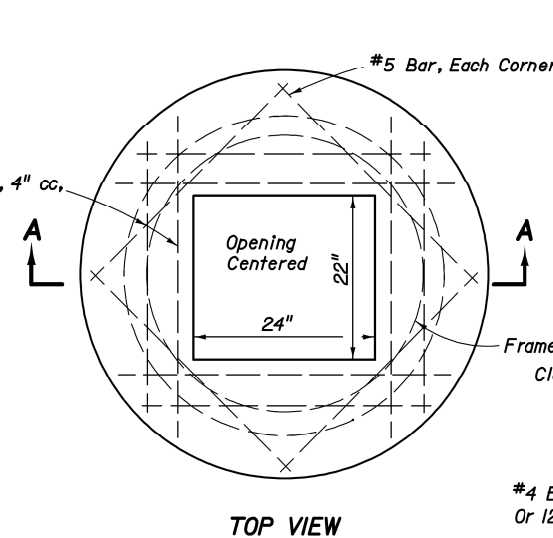


EFFICIENCY CURVE

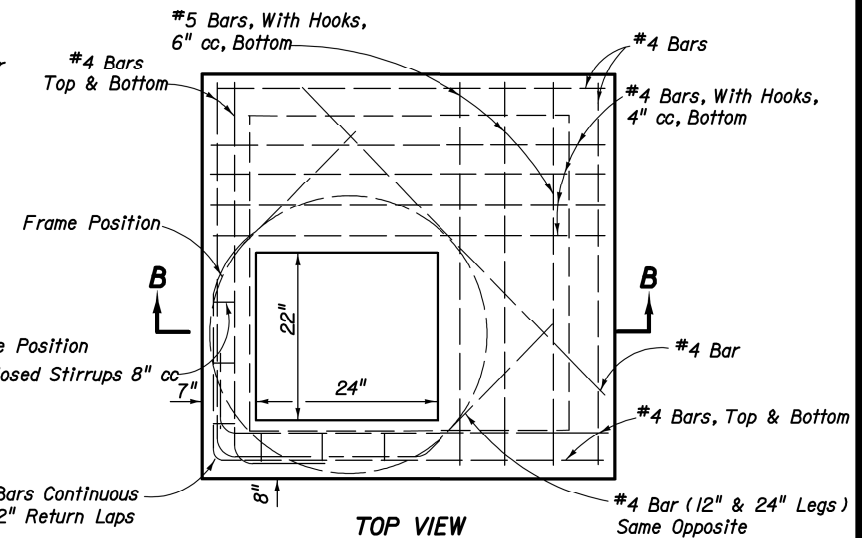


DETAIL A

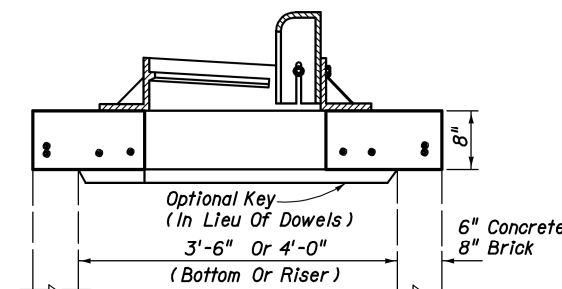
DETAIL B



TOP VIEW

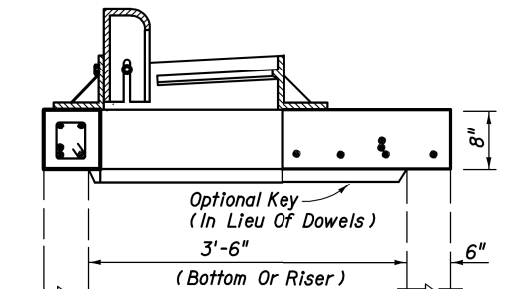


TOP VIEW



SECTION AA

(SEE NOTE 6 BELOW)



SECTION BB

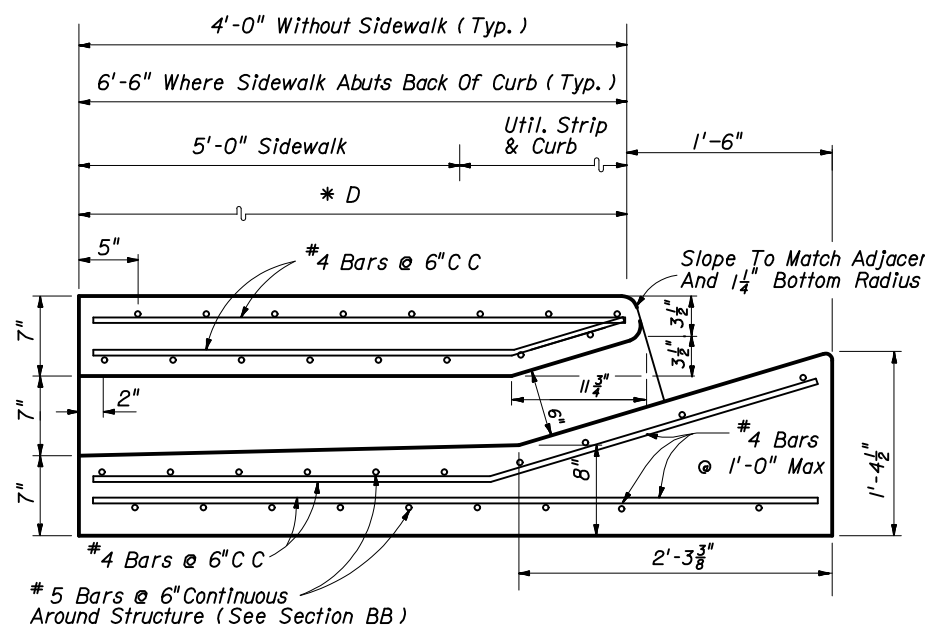
(SEE NOTE 6 BELOW)

TOP SLABS

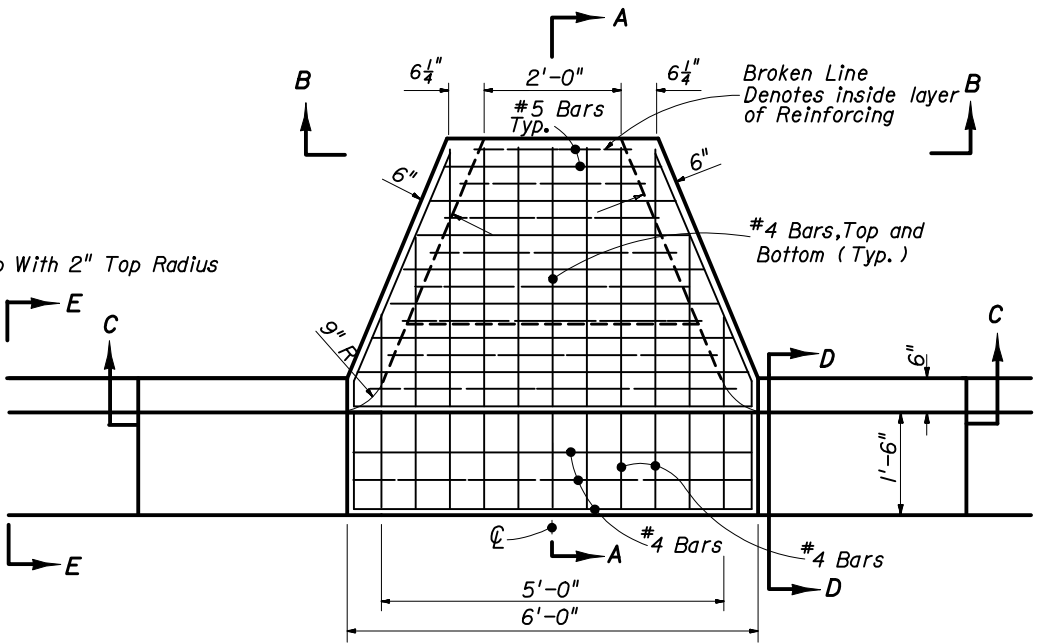
GENERAL NOTES

- This inlet is primarily intended for locations with light flows where right of way does not permit the use of throated Curb Inlets Types I through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
- 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.
- For structure bottoms see Index No. 200. For supplemental details see Index No. 201.
- All steel in slab tops shall have 1 1/4" minimum cover unless otherwise shown. Tops shall be either cast-in-place or precast concrete.
- 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.
- When used on a structure with dimensions larger than those detail above and risers are not applied, the top slab shall be constructed using Index 200 with the slab opening adjusted to 24" x 36". The "Special Top Slab" on Index 200 is not permitted.
- Frame may be adjusted with one to six courses of brick.
- 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 A49M. Grates shall be reversible, left or right.

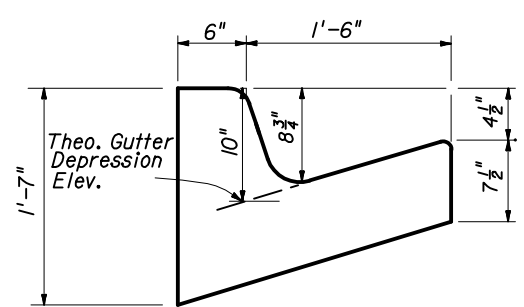
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
CURB INLET TOP TYPE 10				
Names	Dates	Approved By		
Designed By	EGR	S. A. McHenry State Drainage Engineer		
Drawn By	HSD	Revision	Sheet No.	Index No.
Checked By	JWG	00	1 of 1	215



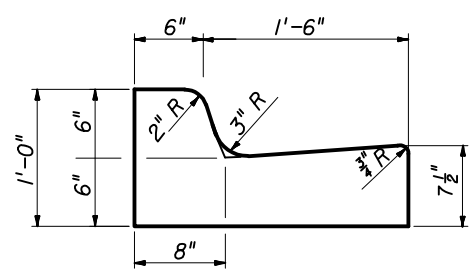
**SECTION AA**



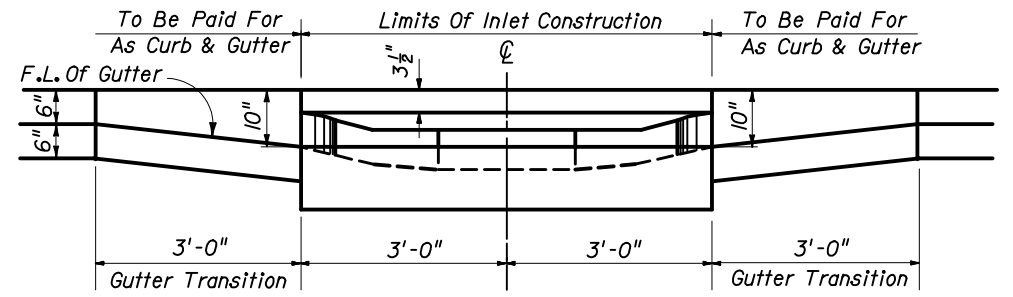
**TOP VIEW**



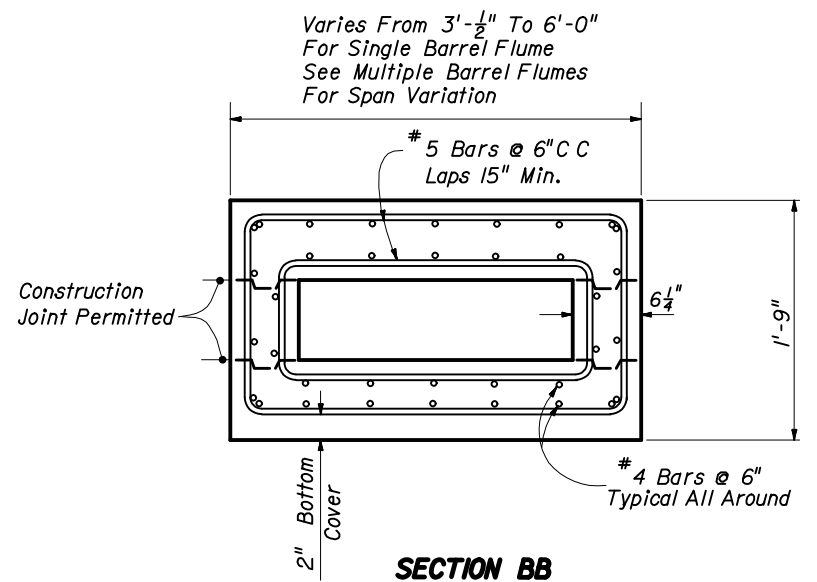
**SECTION DD**



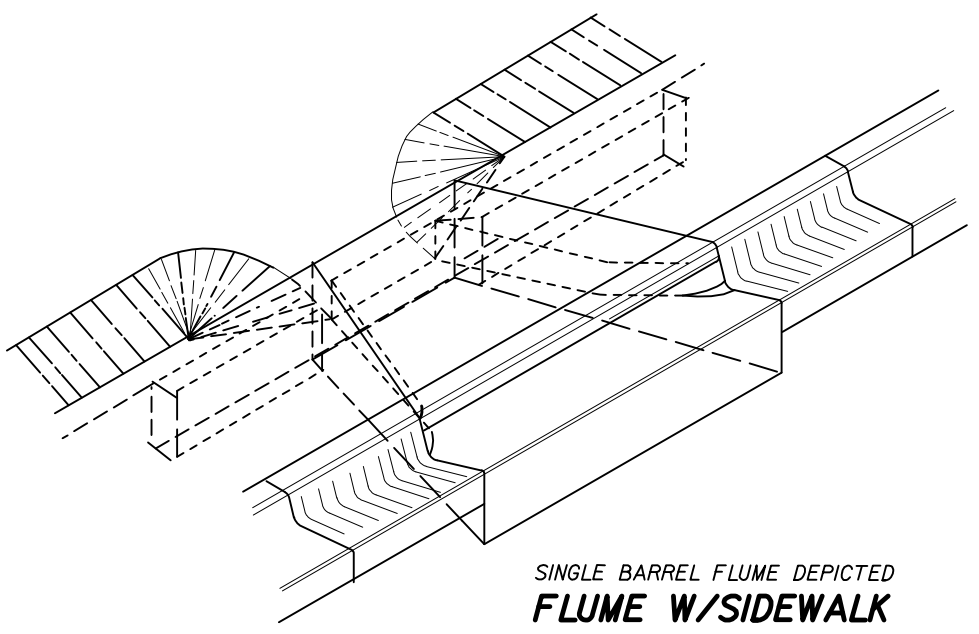
**Curb And Gutter Type F SECTION EE**



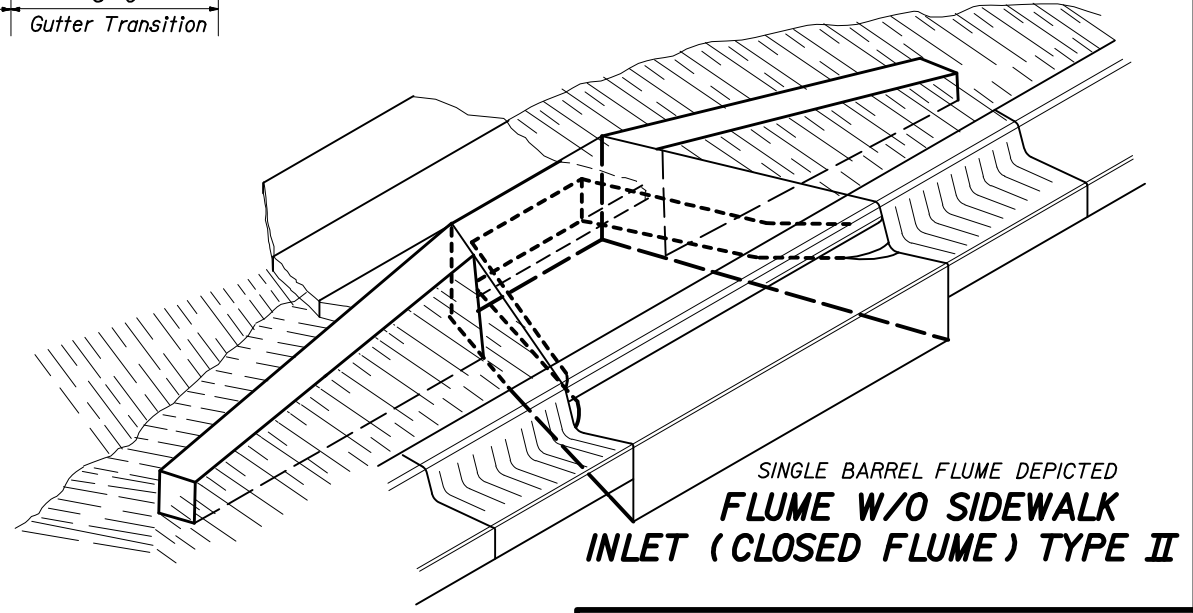
**SECTION CC SINGLE BARREL FLUME**



**SECTION BB**



**SINGLE BARREL FLUME DEPICTED FLUME W/SIDEWALK INLET (CLOSED FLUME) TYPE I**



**SINGLE BARREL FLUME DEPICTED FLUME W/O SIDEWALK INLET (CLOSED FLUME) TYPE II**

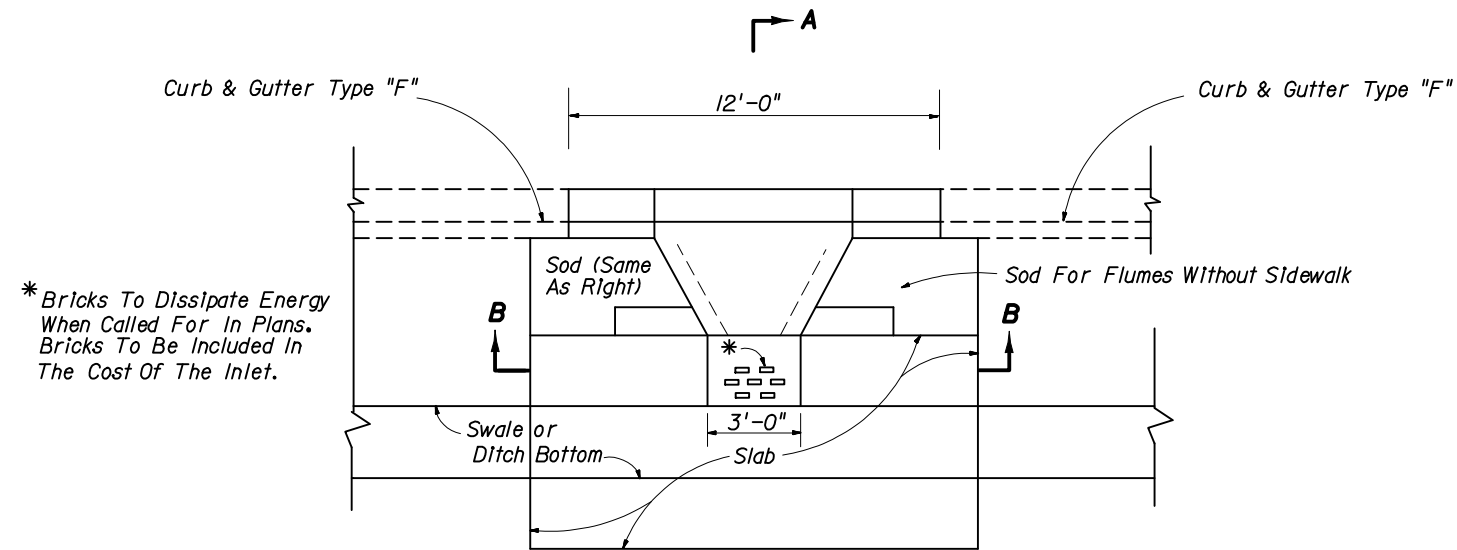
**GENERAL NOTES**

1. The finished grade and slope of the inlet top are to conform with the finished cross slope and grade of the proposed sidewalk and/or border.
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 steel shall have 1 1/4" minimum cover unless otherwise shown. Inlets can be either cast-in-place or precast concrete. Chamfer all exposed edges 3/4".
4. All reinforcement is ASTM A615/A615M Grade 60 steel, either smooth or deformed. Equivalent area grade 40 steel or 65 ksi welded wire fabric may be substituted.
5. Precasting of this inlet 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.
6. Inlets to be paid for under the contract unit price for Inlets (Closed Flume) EA.

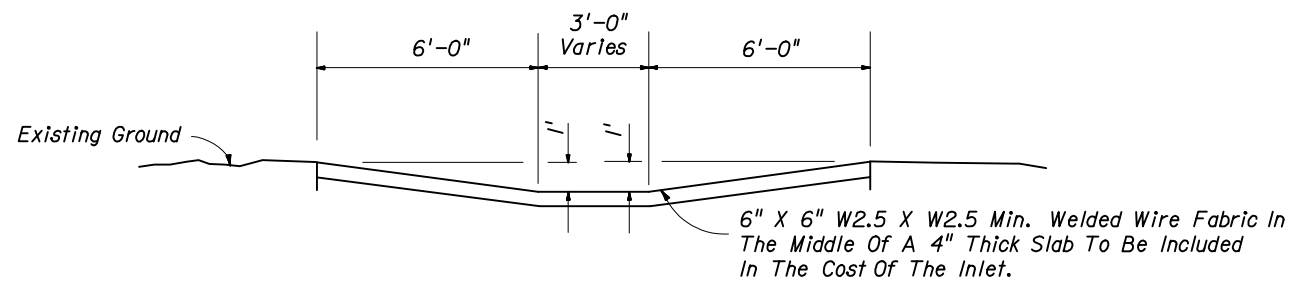
**DESIGN NOTES**

1. These inlets are designed for use with Type F curb and gutter only. The Single Barrel Flume is intended for locations with light to moderate flows. Multiple Barrel Flumes must be selected to meet design heavy flows.
2. Designer must specify Flume Type, "D" dimension and number of barrels in plans.
3. Designer must specify where energy dissipating bricks are required.

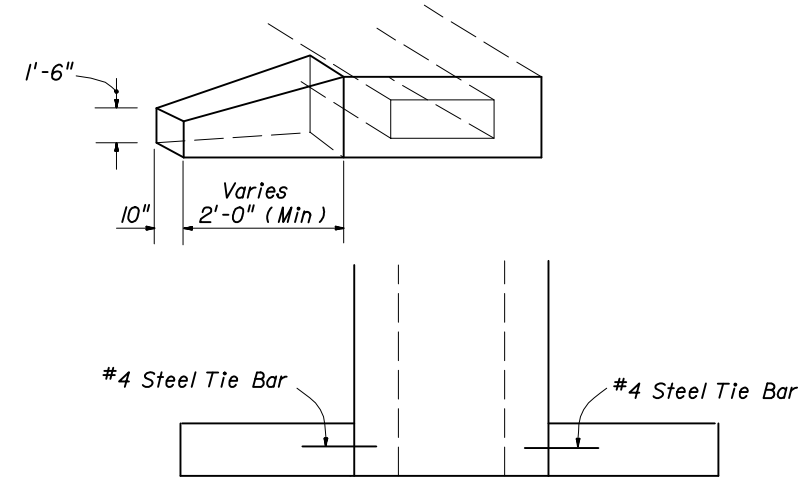
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CLOSED FLUME INLET</b>				
Designed By	J.D.T.	Dates	03/96	Approved By
Drawn By		Revision	02	State Drainage Engineer
Checked By	W.P.H.	Sheet No.	1 of 3	Index No.
				<b>216</b>



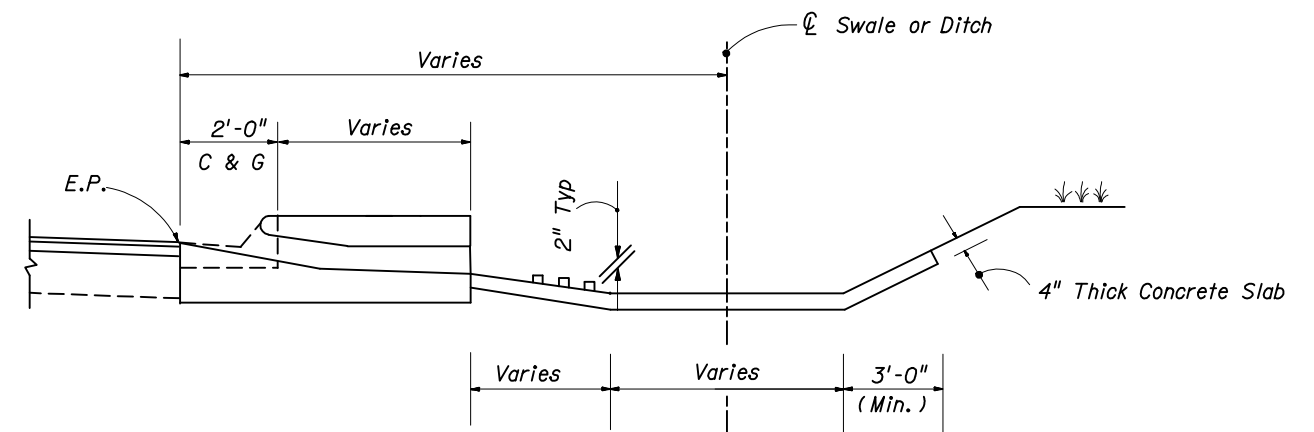
SINGLE BARREL FLUME DEPICTED  
**PLAN**



SINGLE BARREL FLUME DEPICTED  
**SECTION BB**

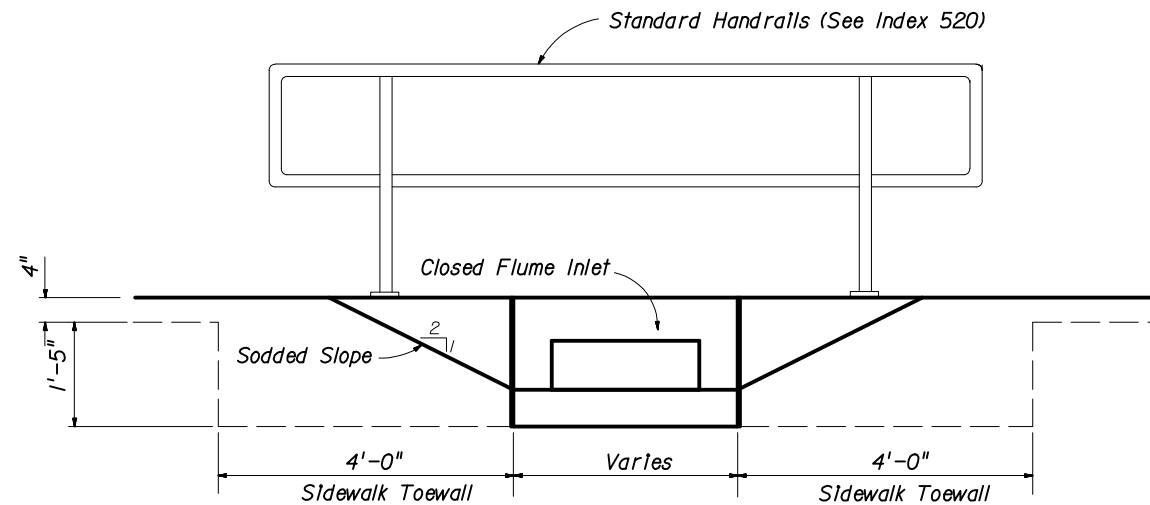


SINGLE BARREL FLUME DEPICTED  
**ENDWALL**



Ditch Pavement To Be Adjusted When Inlet Present  
**SECTION AA**

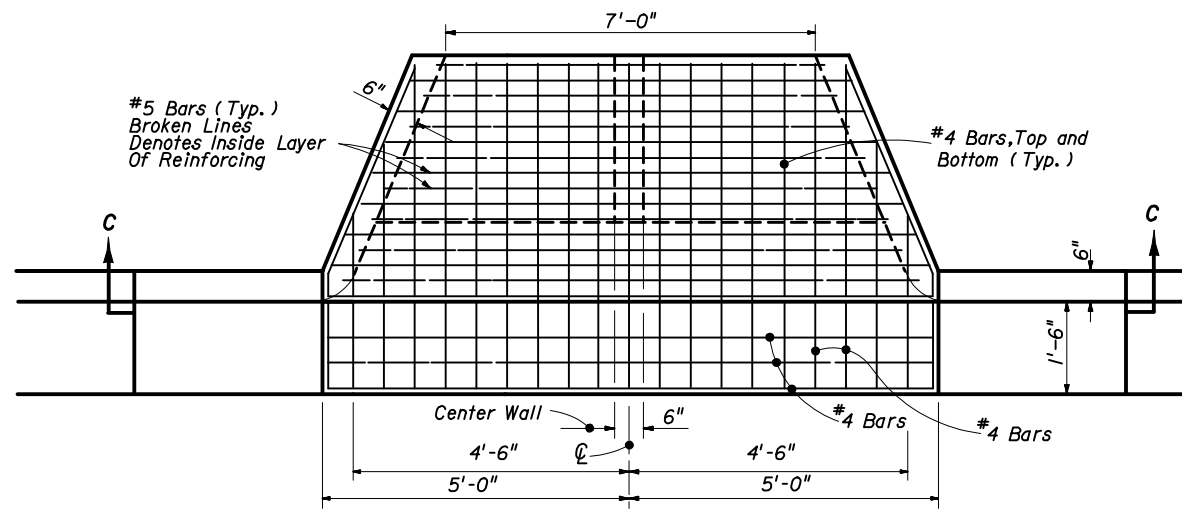
**SLOPES, DITCH APRON AND ENDWALLS**



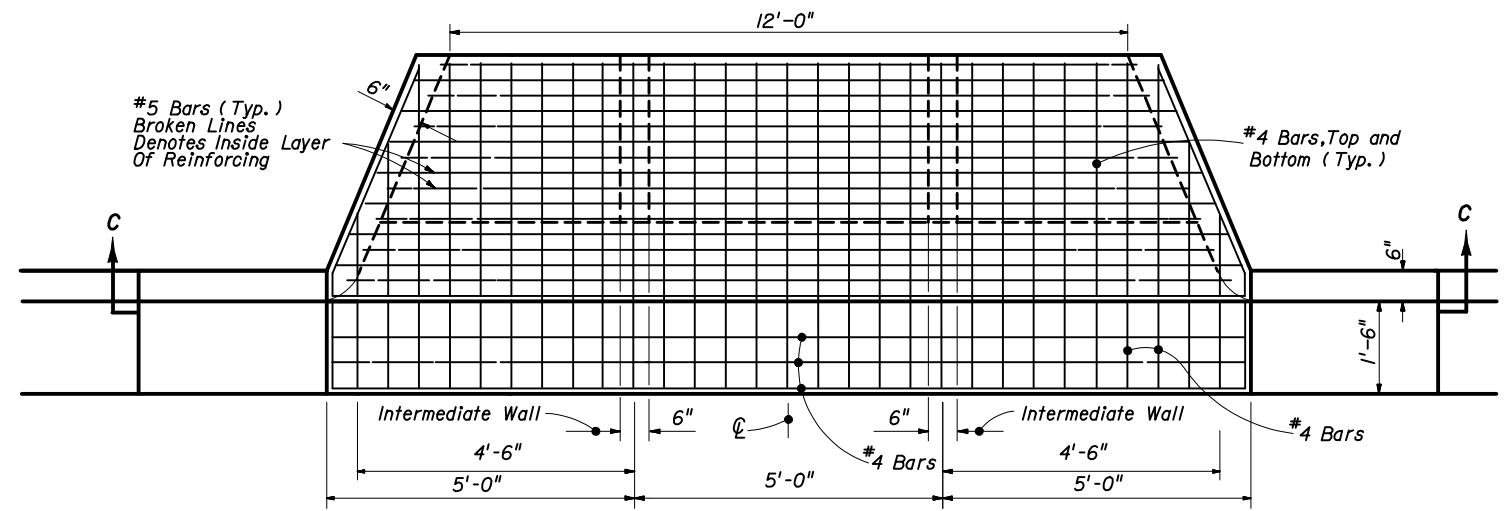
SINGLE BARREL FLUME DEPICTED  
**ELEVATION**

**HANDRAIL FOR FLUME IN SIDEWALK**

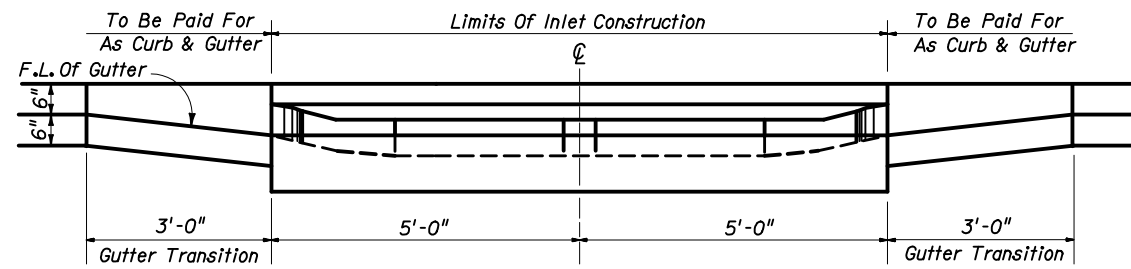
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CLOSED FLUME INLET</b>				
Designed By	J.D.T.	Dates	03/99	Approved By <i>A. A. McHenry</i> State Drainage Engineer
Drawn By		Revision	02	Sheet No. 2 of 3
Checked By	W.P.H.	Dates	03/99	Index No. 216



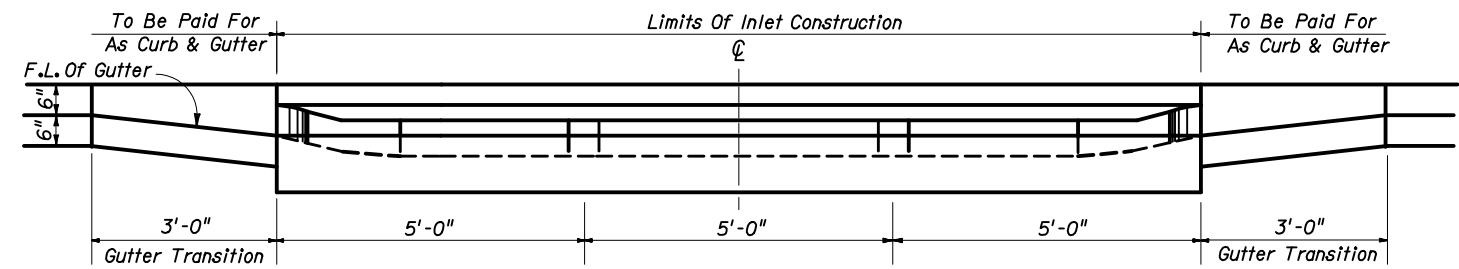
TOP VIEW



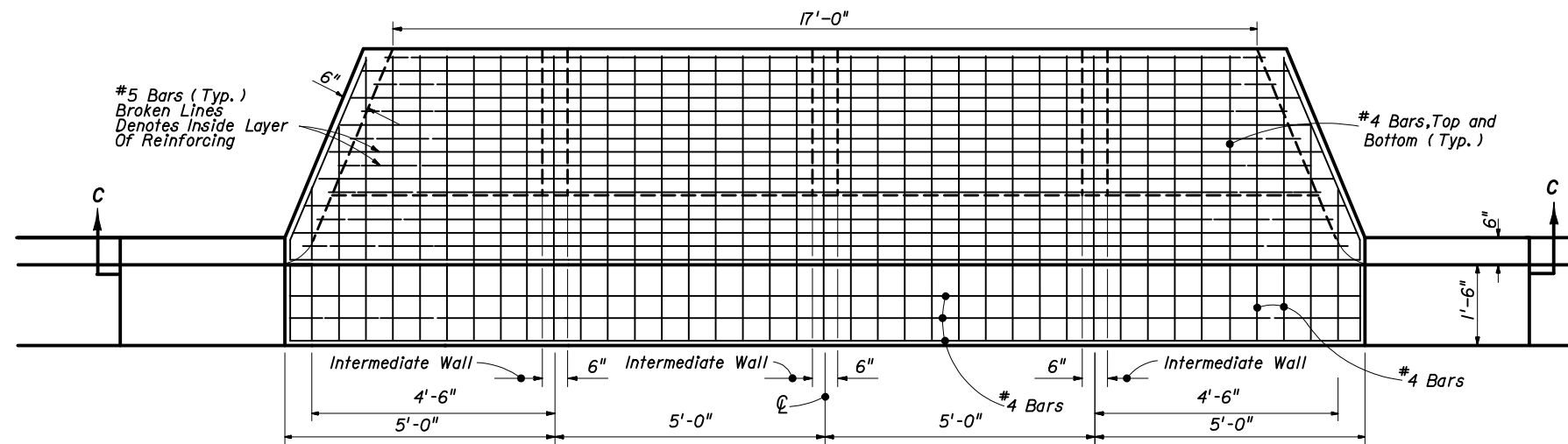
TOP VIEW



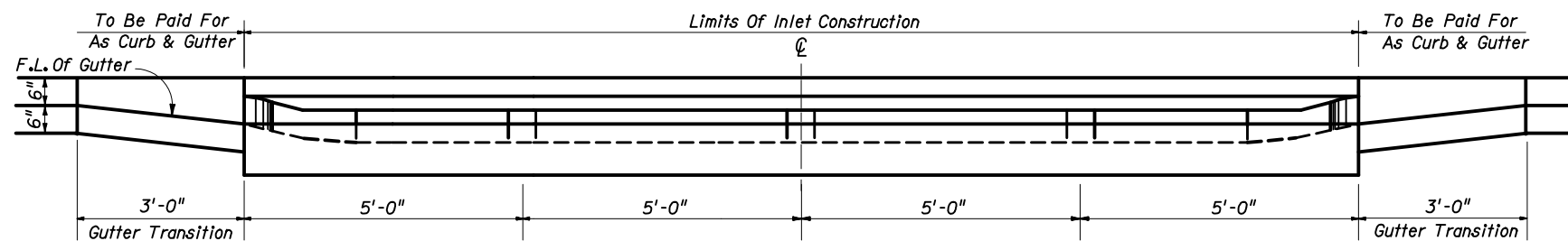
SECTION CC  
DOUBLE BARREL FLUME



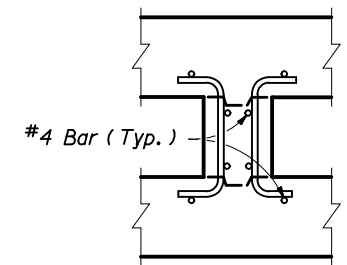
SECTION CC  
TRIPLE BARREL FLUME



TOP VIEW



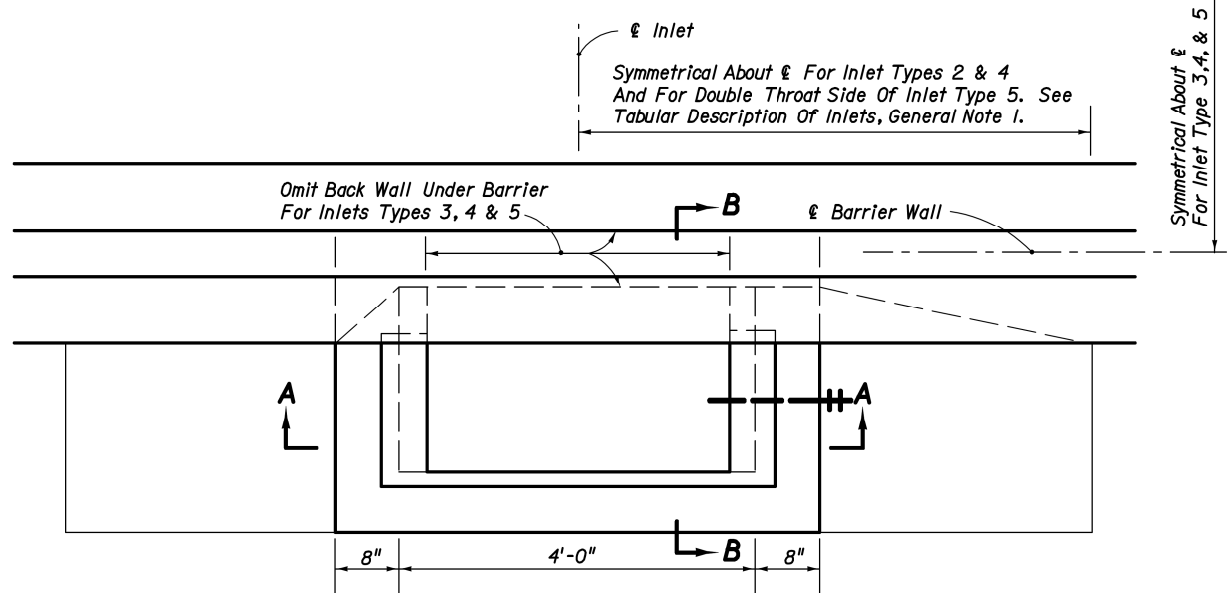
SECTION CC  
QUADRUPLE BARREL FLUME



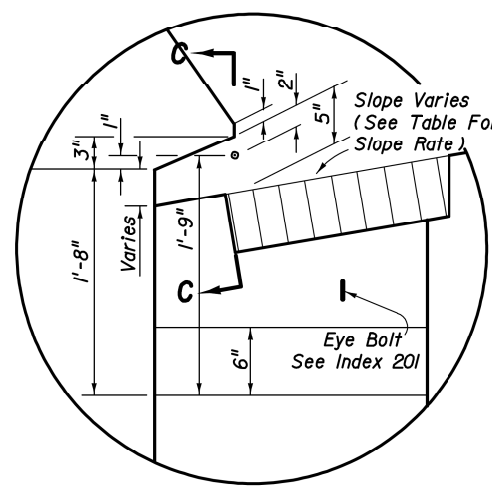
INTER WALL REINFORCING

NOTE: See Single Barrel Flume For Base Dimensions.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CLOSED FLUME INLET</b>				
Designed By	Names	Dates	Approved By <i>S. A. Mchenroe</i>	
Drawn By			State Roadway Design Engineer	
Checked By			Revision 02	Sheet No. 3 of 3
				Index No. 216

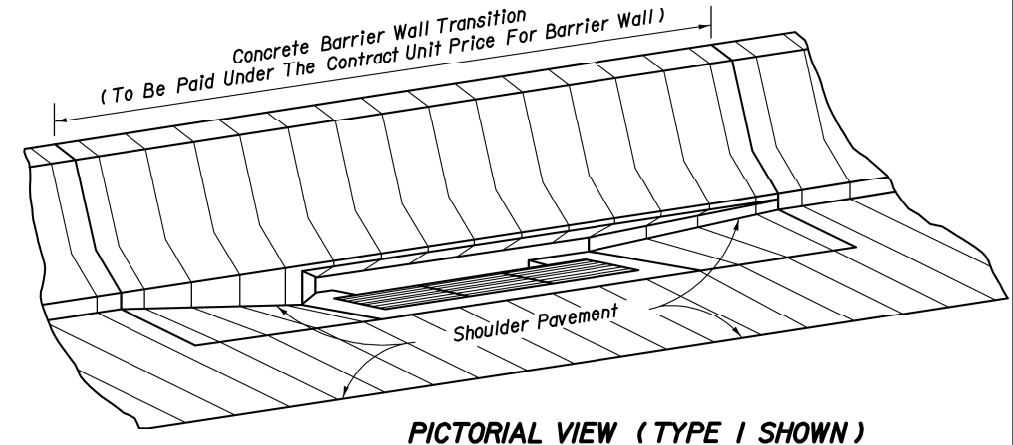


PLAN (INLETS TYPES 1 THRU 5)

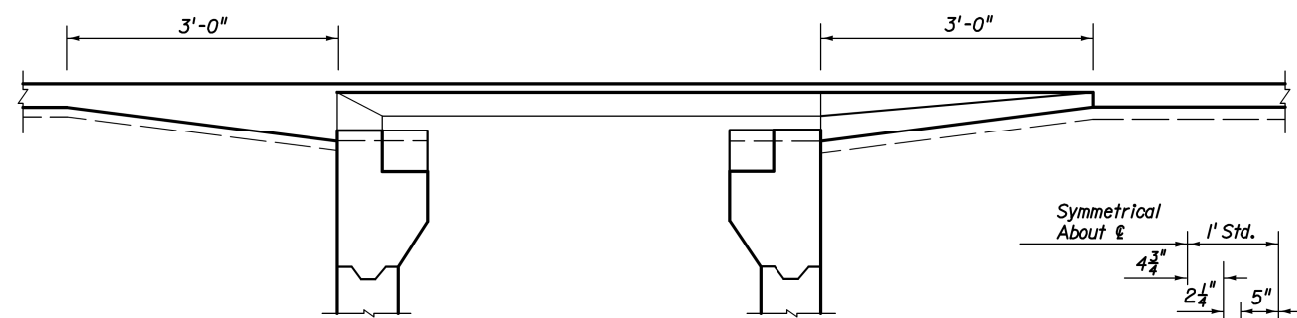


INSET A

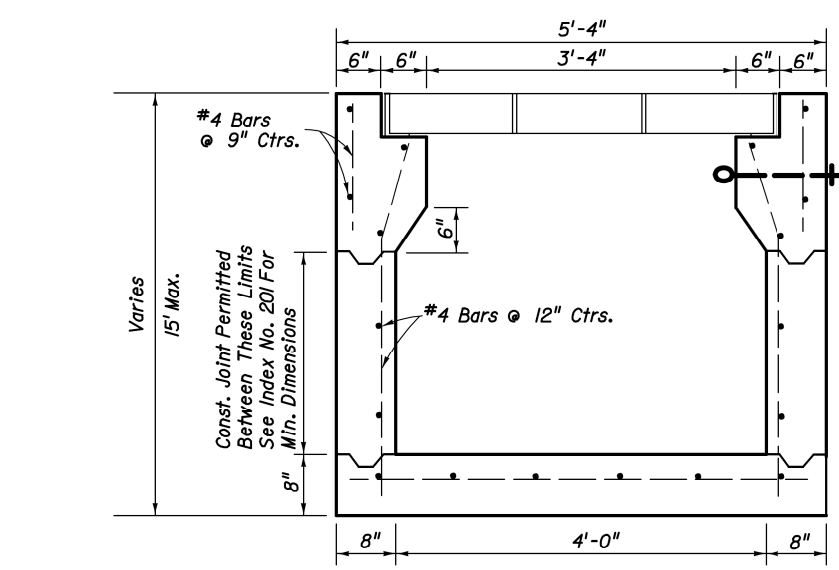
GRATE SLOPE		
Shoulder Slope	Grate Slope Rate	Remarks
0.03	1:6.7	Std. Med. Conc. Shldr.
0.05	1:6	Std. Med. Flex. Shldr.
0.06	1:5.6	
0.07	1:5.2	
0.08	1:5	
0.09	1:4.5	
0.10	1:4.5	e (max)



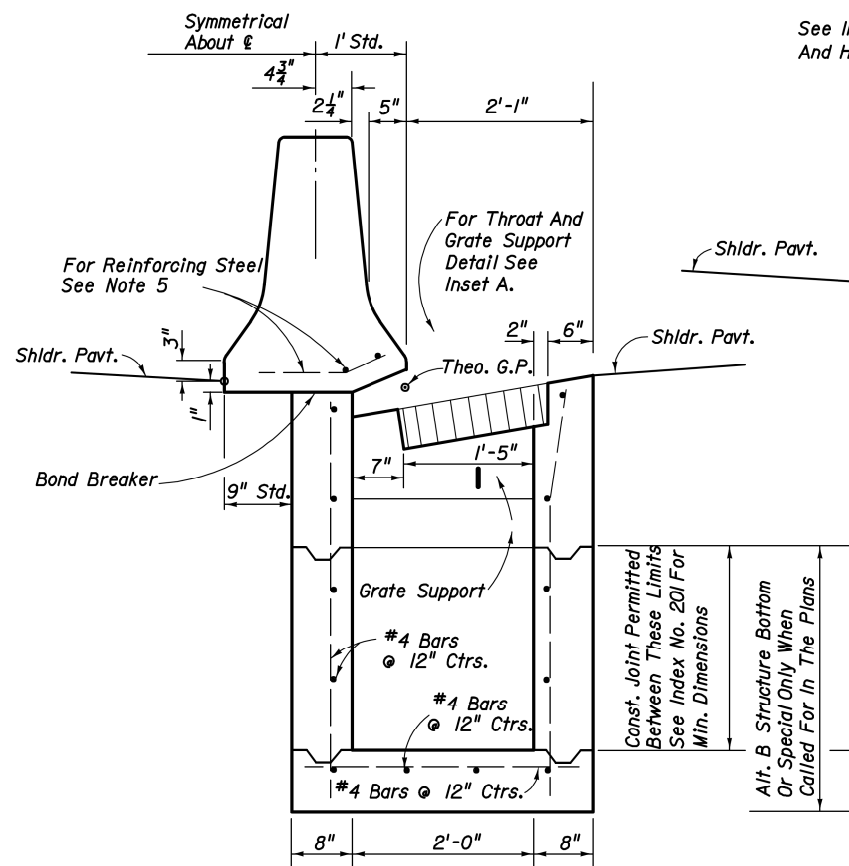
PICTORIAL VIEW (TYPE 1 SHOWN)



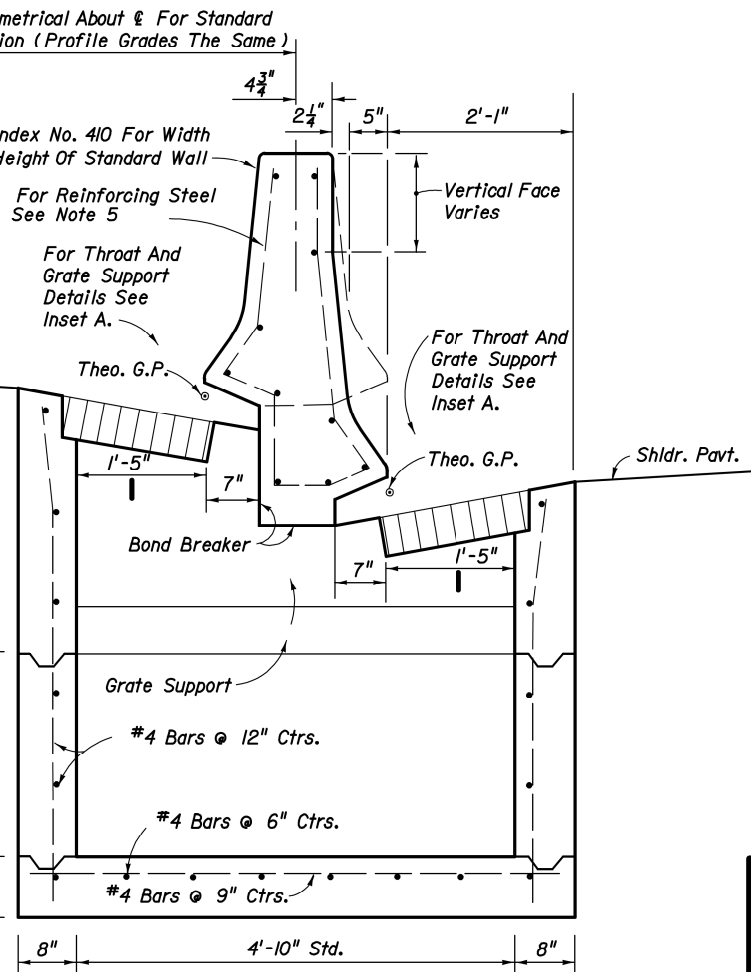
SECTION CC



SECTION AA



SECTION (INLETS TYPES 1 & 2)



SECTION (INLETS TYPES 3, 4 & 5) (NON-SYMMETRICAL SECTION SHOWN)

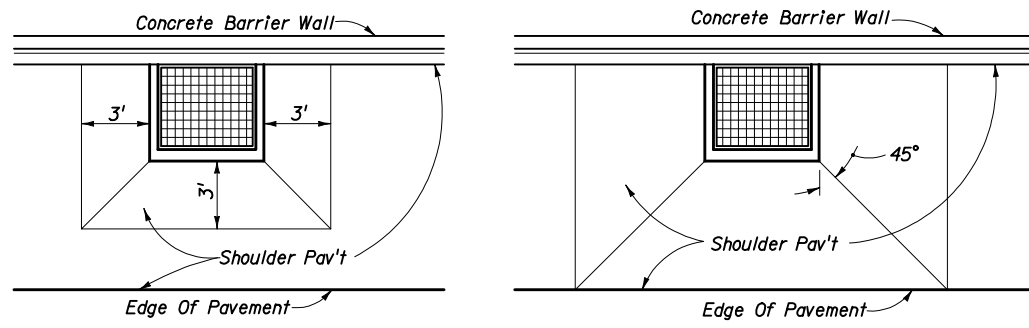
GENERAL NOTES

- Inlet Descriptions:  
 Type 1 Single throat, one side of barrier wall.  
 Type 2 Double throats, one side of barrier wall.  
 Type 3 Two single throats, opposite sides of barrier wall.  
 Type 4 Two double throats, opposite sides of barrier wall.  
 Type 5 Double throats, one side of barrier wall, and single throat other side of barrier wall.
- For grate details see Index No. 220. The parallel bar grate shall be used unless the reticuline grate is called for in the plans. The reticuline grate shall be specified where bicycle traffic is anticipated.
- For standard concrete barrier wall dimensions, and for dimensions of concrete barrier wall incorporating light standards within the wall, see Index No. 410.
- Reinforcing steel shall have 2" minimum cover.
- All reinforcing steel #4 bars. Longitudinal steel bars extend over full length of concrete barrier wall transition. Tie bars @ 12" ctrs. Reinforcing to be paid for under the contract unit price for Concrete Barrier Wall, LF.
- For supplemental details see Index No. 201.
- Inlets to be paid for under the contract unit price for Inlets (Median Barrier Type...), EA. Barrier wall to be paid for under the contract unit price for Concrete Barrier Wall, LF.

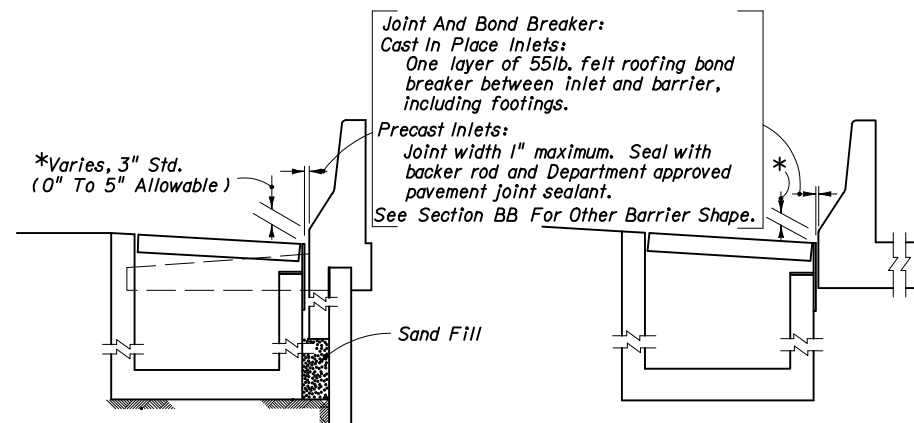
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**MEDIAN BARRIER INLETS  
TYPES 1, 2, 3, 4 & 5**

Names	Dates	Approved By	S. A. McHenry	
Designed By		State Drainage Engineer		
Drawn By	HSD 06/83	Revision	Sheet No.	Index No.
Checked By	JVG/JBW 07/83	00	1 of 1	217

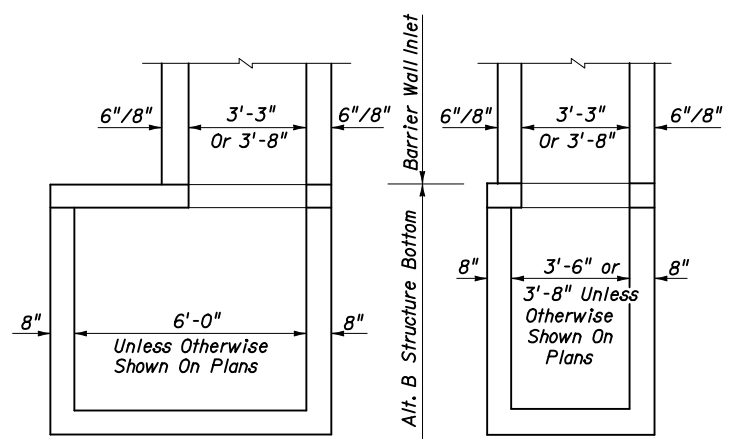


**LOW SIDE SUPERELEVATION PAVEMENT WARP FOR SHOULDERS IN SUPERELEVATION**      **HIGH SIDE TRANSITION PAVEMENT WARP FOR SHOULDERS IN SUPERELEVATION**



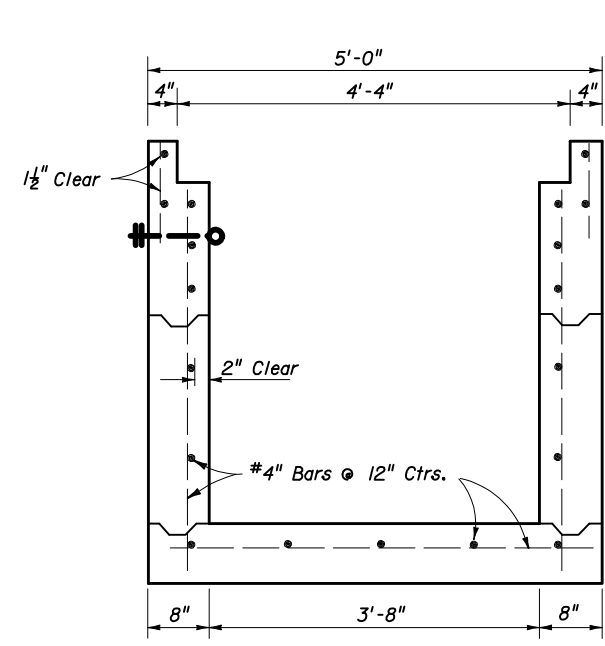
**BARRIER WALL / RETAINING WALL**      **SINGLE FACE ROADWAY BARRIER**

**INLET SECTION AT WALLS**

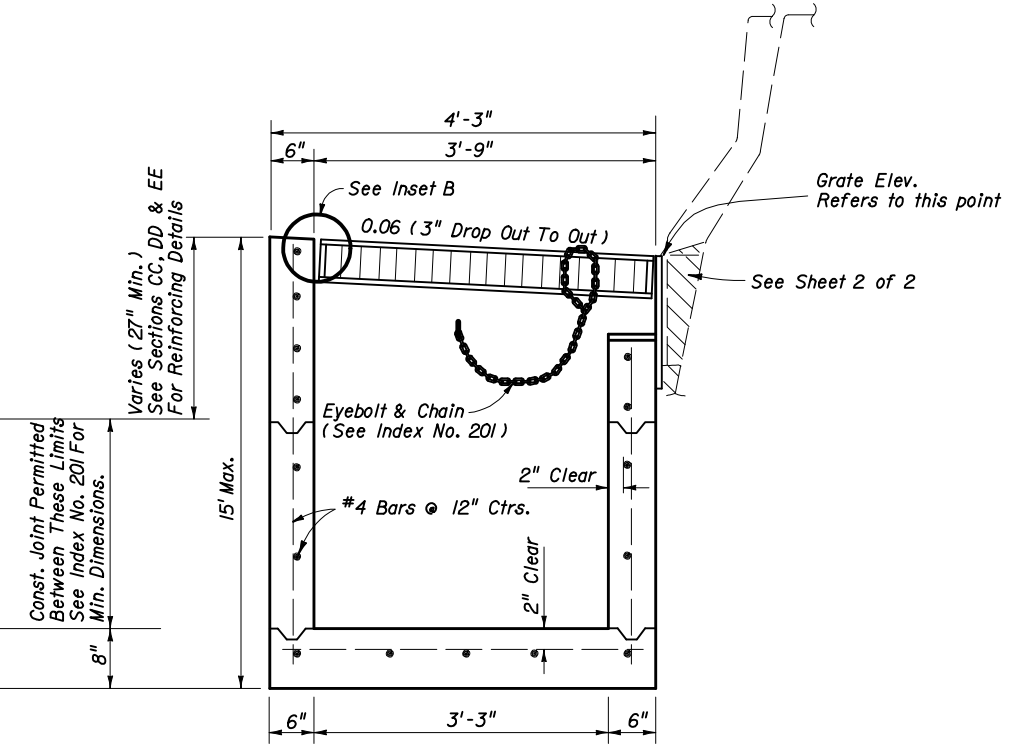


Note: Alt. B Structure Bottom Only. See Index No. 200.

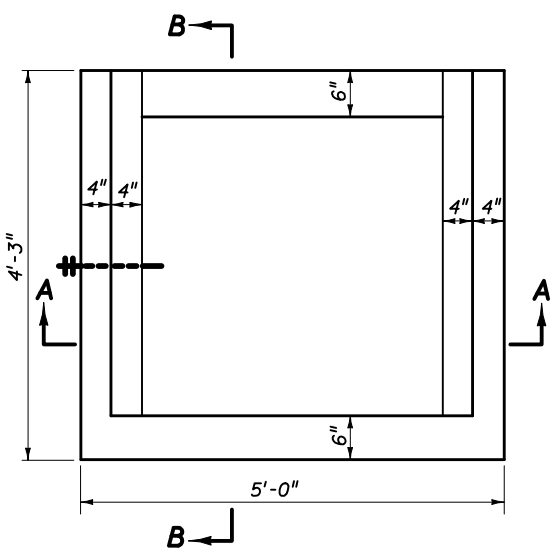
**INLET WITH STRUCTURE BOTTOM**



**SECTION AA (WITHOUT GRATE)**



**SECTION BB**

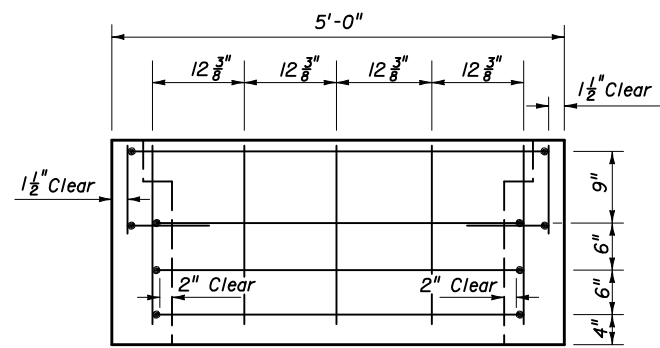


**TOP VIEW (WITHOUT GRATE)**

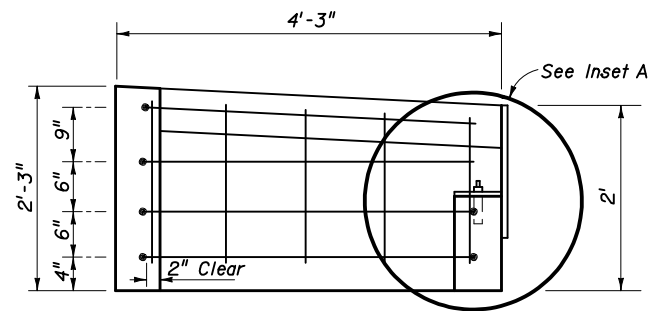
**GENERAL NOTES**

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 3/4".
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.
7. Inlets to be paid for under the contract unit for Inlets (Barrier Wall), Each.

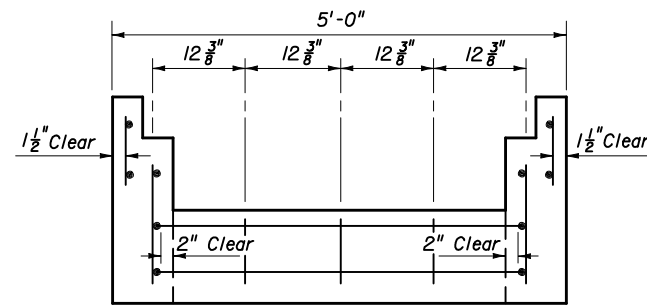
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>BARRIER WALL INLET</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By	JVG/EGR	09/86	State Drainage Engineer	
Drawn By	HSD	09/86	Revision	Sheet No.
Checked By	JVG	09/86	00	1 of 2
				Index No. <b>218</b>



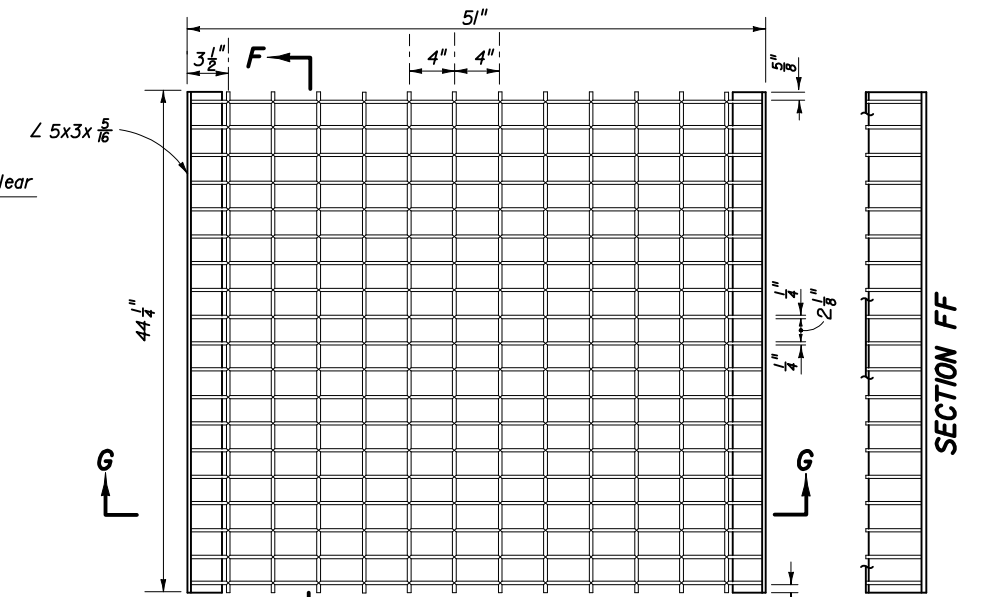
SECTION CC



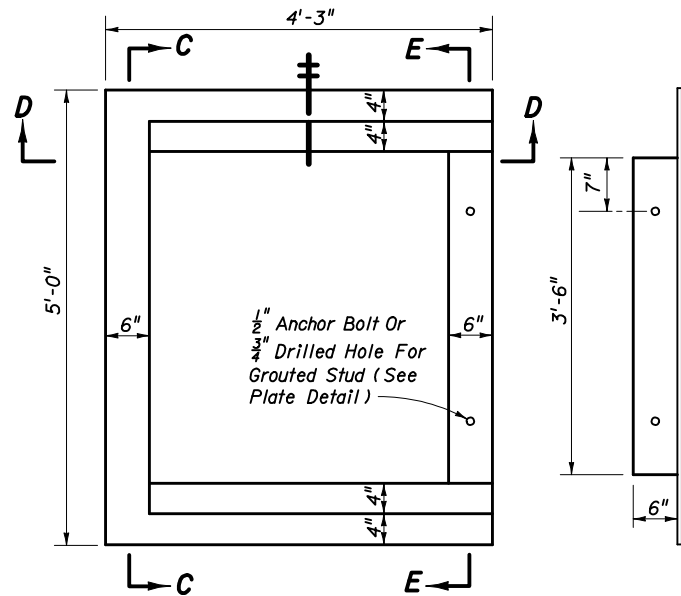
SECTION DD



SECTION EE

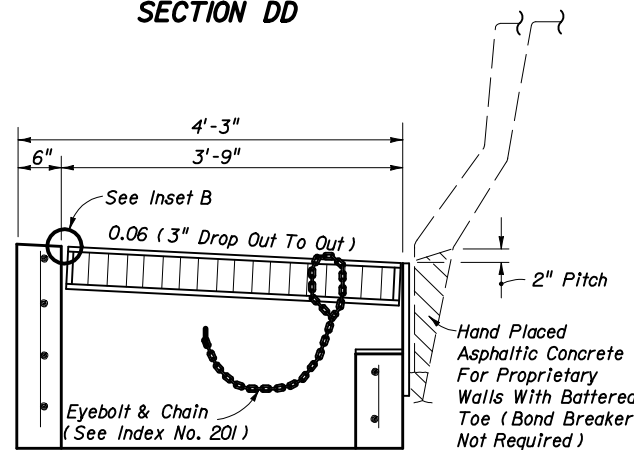


Main Bars 5" x 1/4"  
Cross Bars: Either 3/8" Dia Electroforged Or 1/2" Dia Welded  
TOP VIEW

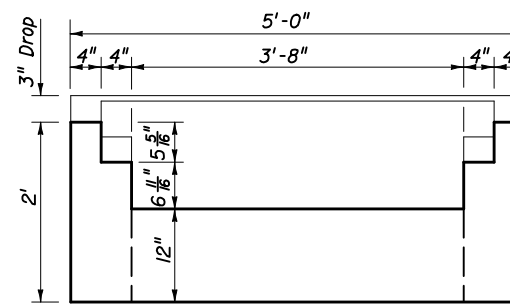


TOP VIEW OF INLET WITHOUT GRATE

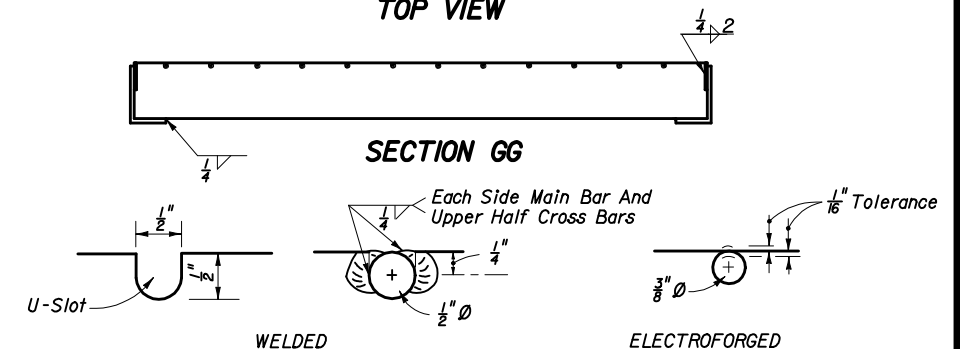
TOP VIEW OF METAL PLATE



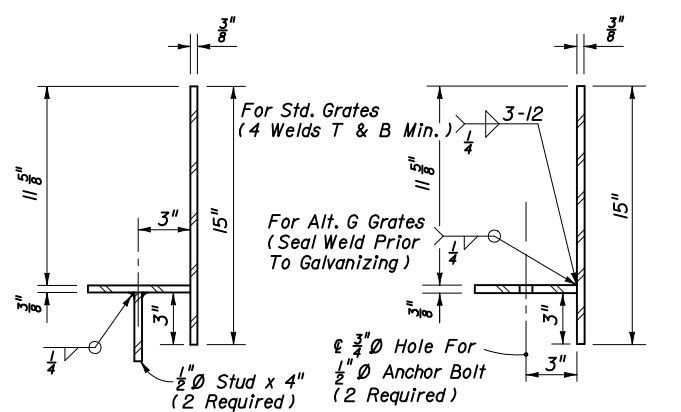
TRANSVERSE SECTION WITH GRATE & PLATE



BACK VIEW WITHOUT BACK PLATE

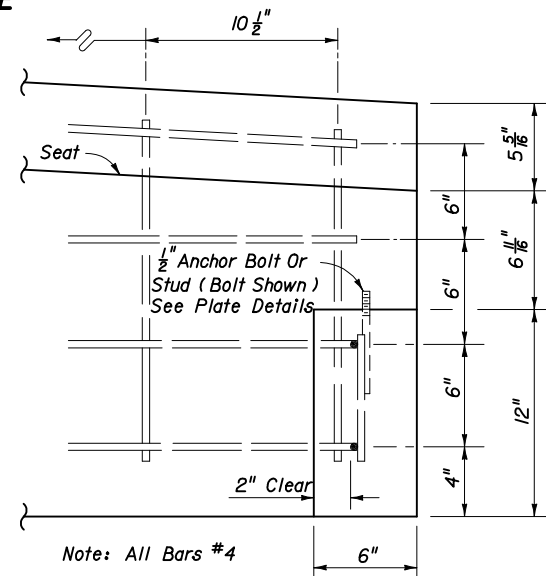


CROSS BAR OPTIONS STEEL GRATE

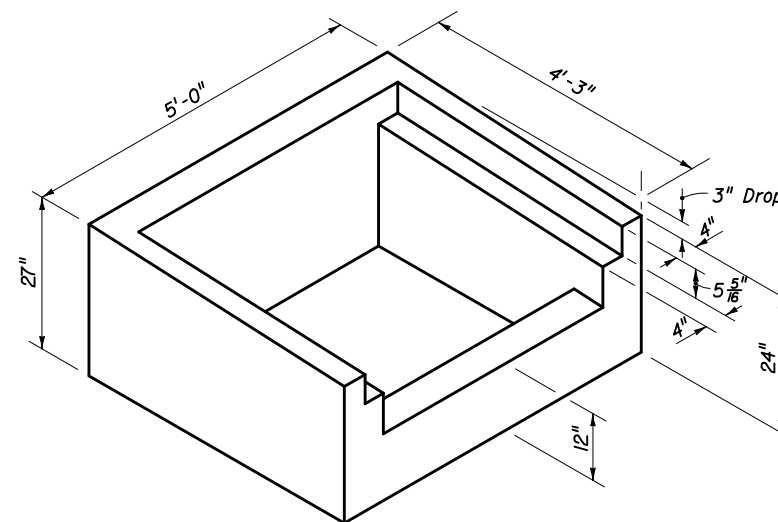


OPTION FOR GROUT STUD

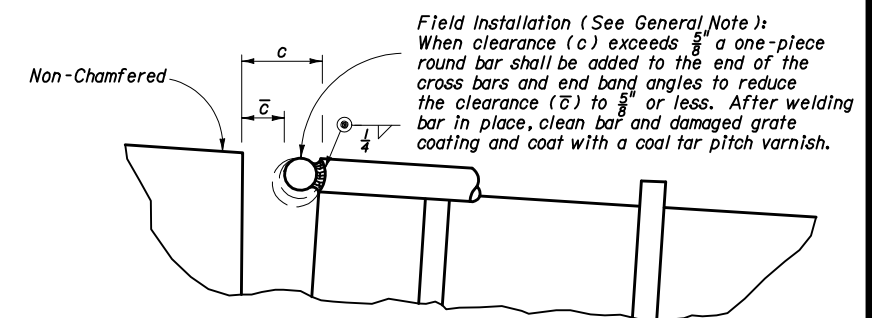
OPTION FOR IMBEDDED ANCHOR



INSET A



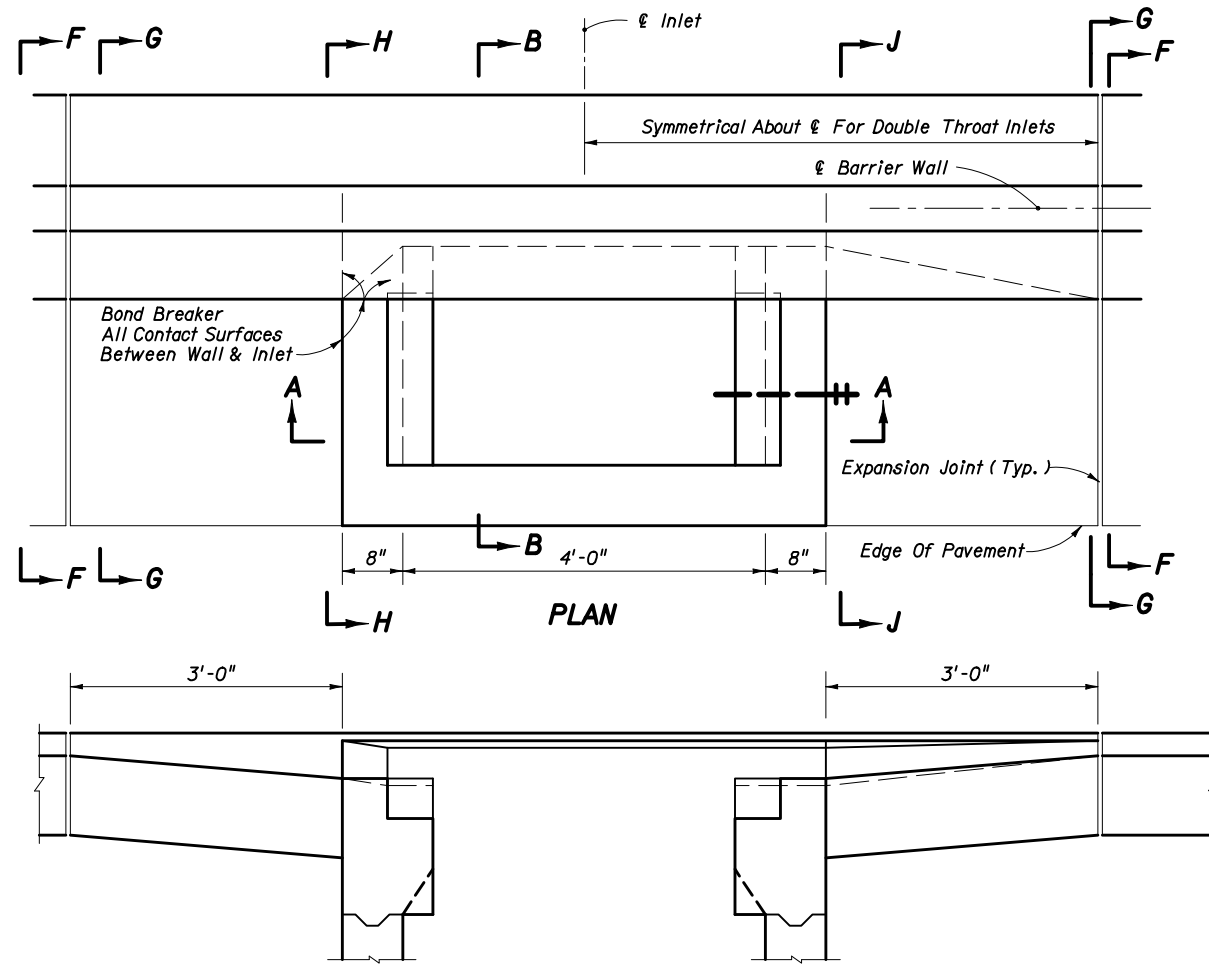
PICTORIAL VIEW



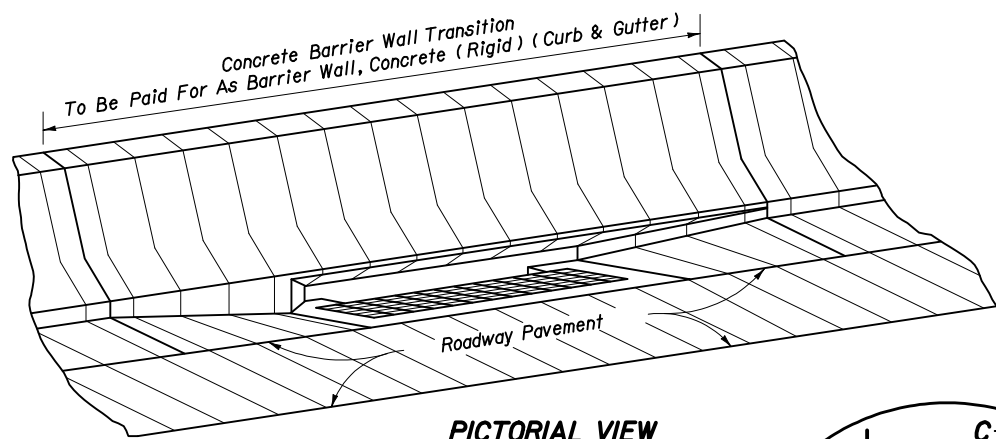
INSET B

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>BARRIER WALL INLET</b>				
Designed By	JVG/EGR	Dates	09/86	Approved By
Drawn By	HSD	09/86	Revision	00
Checked By	JVG	09/86	Sheet No.	2 of 2
			Index No.	218

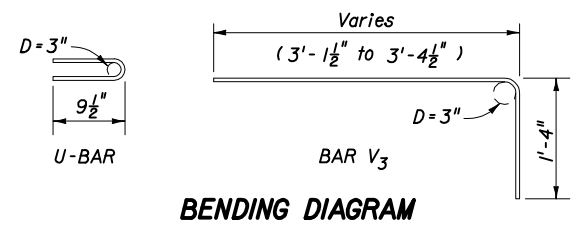




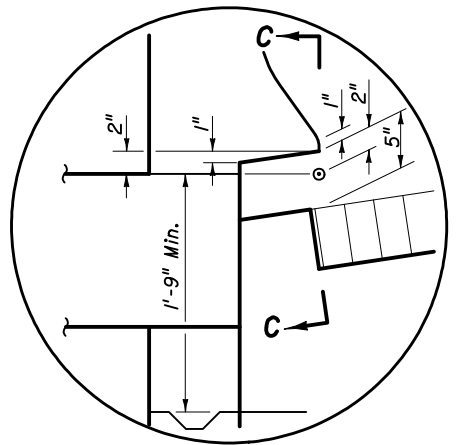
SECTION CC



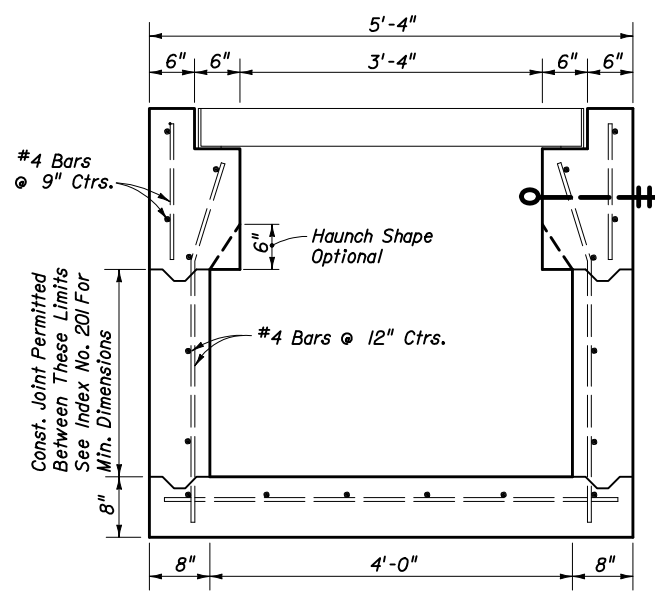
PICTORIAL VIEW



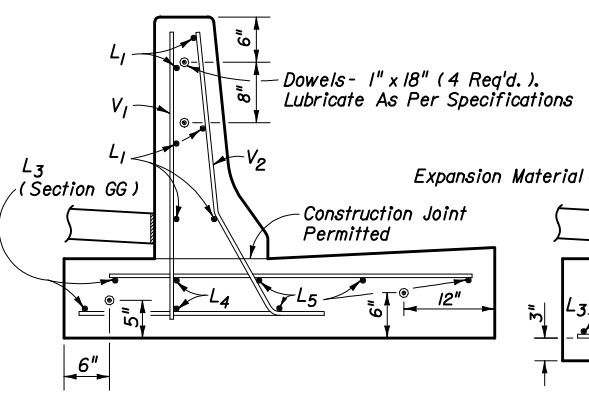
BENDING DIAGRAM



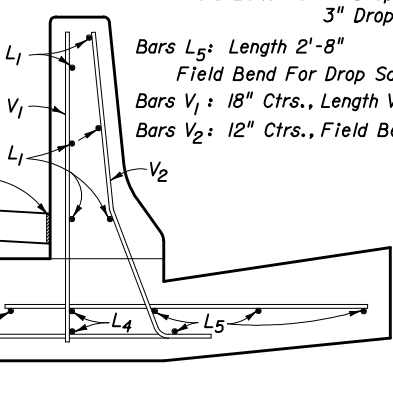
INSET A



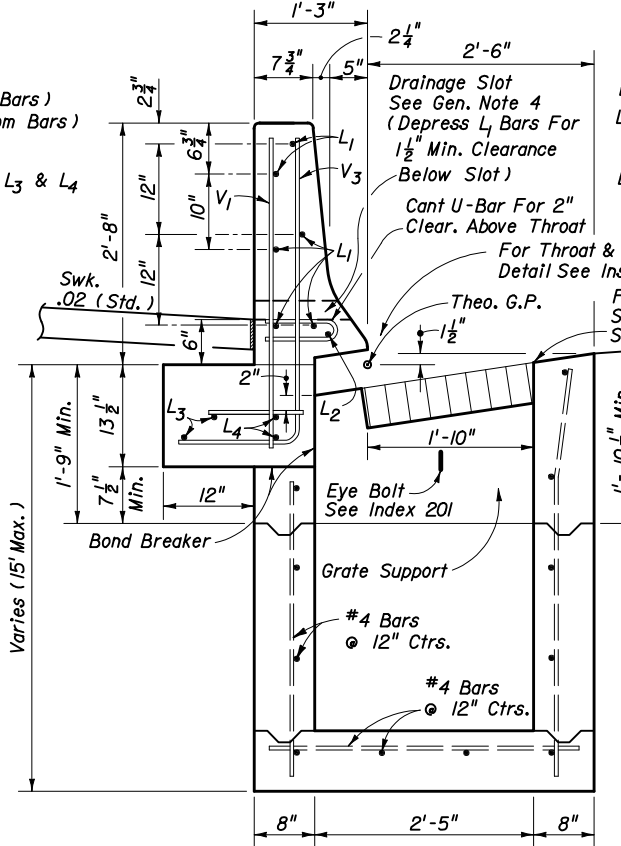
SECTION AA



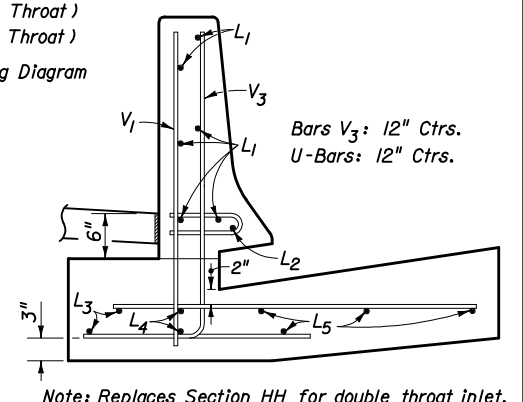
SECTION FF & GG



SECTION HH



SECTION BB



SECTION JJ

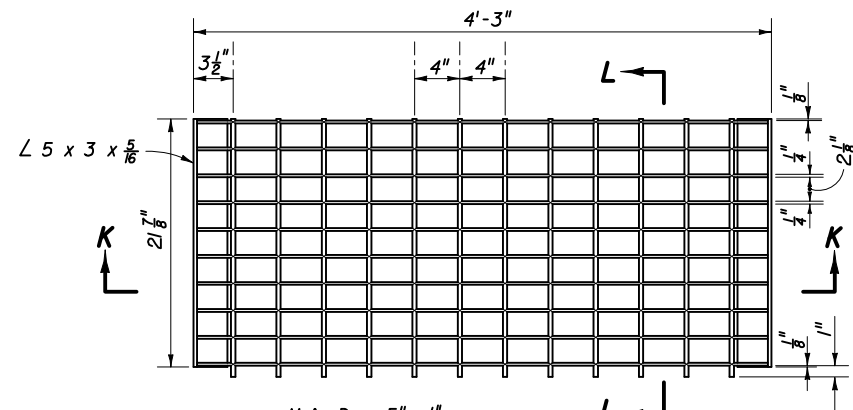
GENERAL NOTES

1. This inlet to be used in conjunction with Barrier Wall, Concrete (Rigid) (Curb & Gutter), Index No. 410.
2. All reinforcing steel #4 bars. Reinforcing shall have 2" min. cover unless otherwise shown. Cost to be included in cost for concrete barrier wall.
3. Barrier wall shall be Class II concrete, finished in accordance with Index No. 410.
4. A flat 18" x 2 1/2" drainage slot shall be constructed at the inlet centerline when the inlet is located in a curb sag. No more than one V1 bar, one V3 bar and one U-bar are to be deleted for construction of the drainage slot.
5. For supplemental details see Index Nos. 201, 209 and 410.
6. Recommended maximum pipe sizes are 18" longitudinal and 30" transverse. For larger pipe, use Alt. B bottoms, Index No. 200.
7. Grates can be fabricated with reticuline bars or with either 3/8" dia electroforged or 1/2" dia welded cross bars and full depth bars as detailed.
8. When Alternate G grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
9. For pay item purposes the height of the structure shall be computed using the theoretical gutter elevation, less the flow line elevation of the lowest pipe or to top of sump floor.
10. Inlets to be paid for under the contract unit price for Inlets (Barrier Wall) (Rigid) (Curb & Gutter), Each.
11. Barrier wall to be paid for under the contract unit price for Barrier Wall, Concrete (Rigid-Curb & Gutter) LF.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

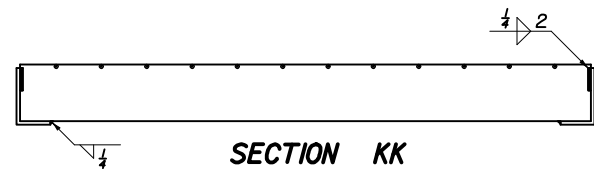
**BARRIER WALL INLET**  
BARRIER WALL, CONCRETE (RIGID) (C & G)

Names	Dates	Approved By		
Designed By	EGR/JVG 9/89	S. A. McHenry State Roadway Design Engineer		
Drawn By	JBW 9/89			
Checked By	EGR/JVG 9/89	Revision	Sheet No.	Index No.
		00	1 of 2	219

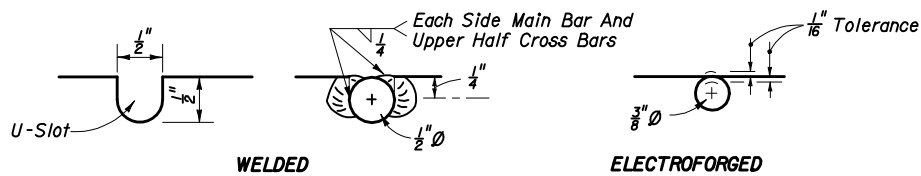


Main Bars 5" x 1/4"  
 Cross Bars : Either 3/8" Ø Electroforged Or 1/2" Ø Welded

PLAN



SECTION KK

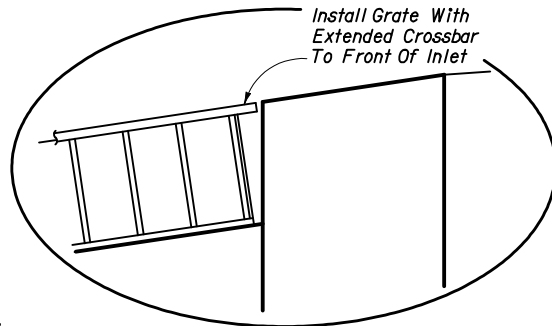


CROSS BAR OPTIONS

CROSS BAR

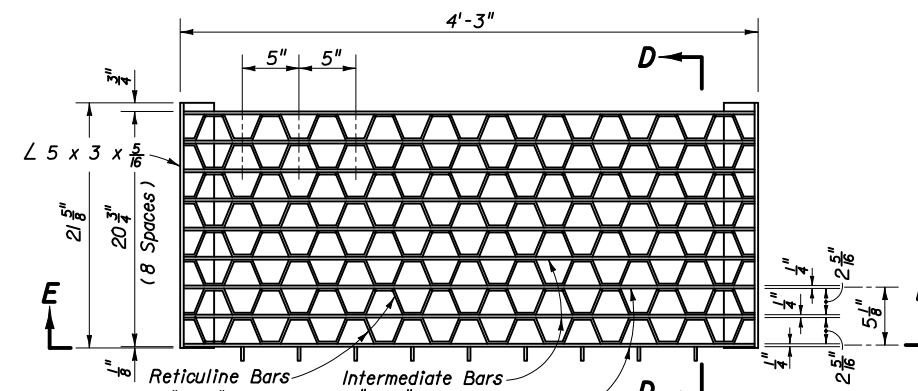


SECTION LL



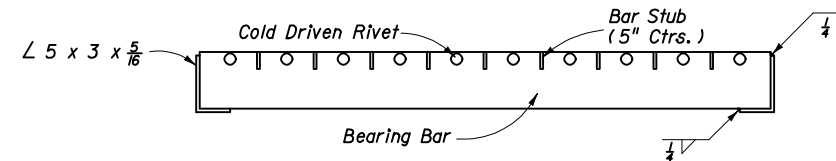
INSET B

Install Grate With  
 Extended Crossbar  
 To Front Of Inlet



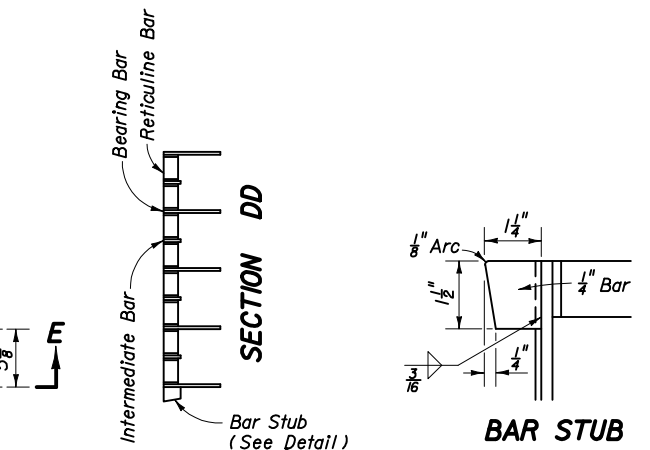
Reticuline Bars  
 1 1/4" x 3/16"  
 Intermediate Bars  
 1 1/2" x 1/4"  
 Bearing Bars  
 5" x 1/4"

PLAN



SECTION EE

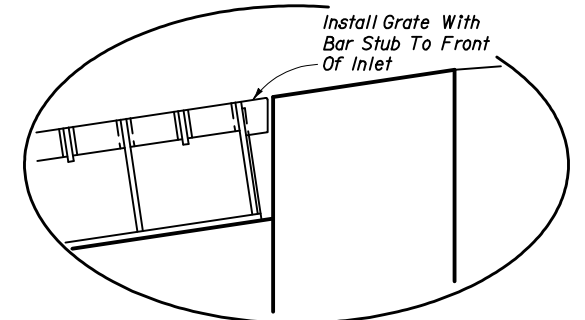
Cold Driven Rivet  
 Bar Stub  
 (5" Ctrs.)  
 Bearing Bar



SECTION DD

BAR STUB

Install Grate With  
 Bar Stub To Front  
 Of Inlet

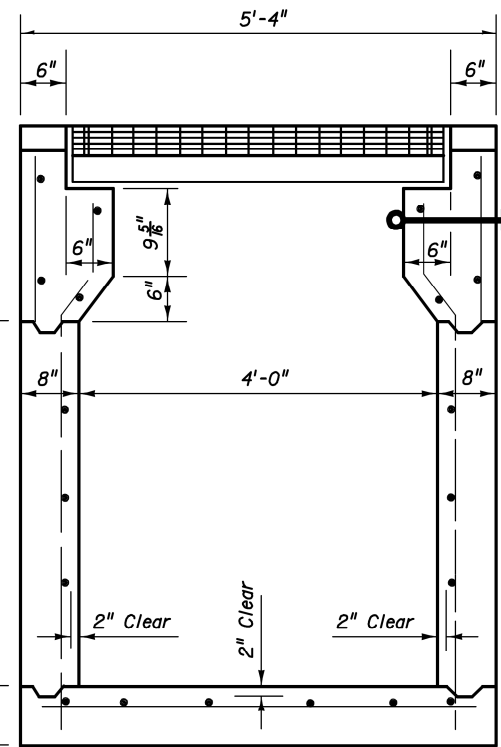
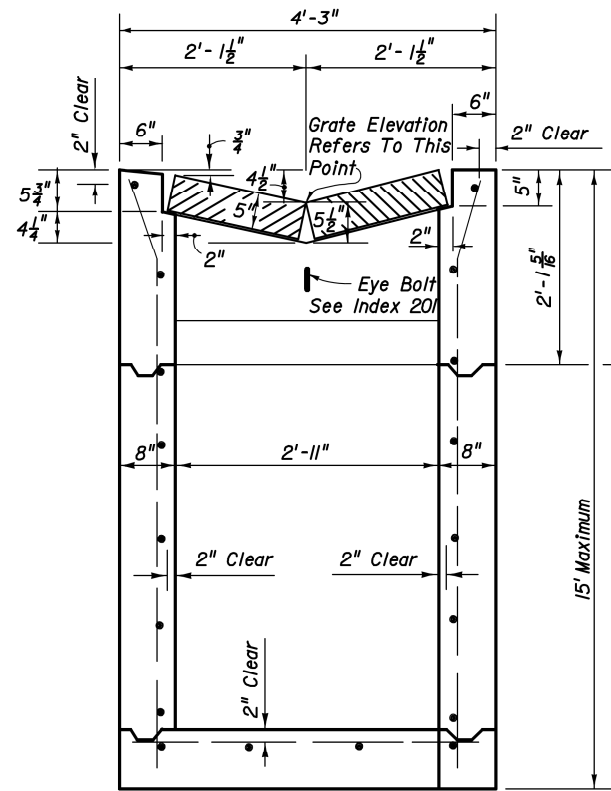
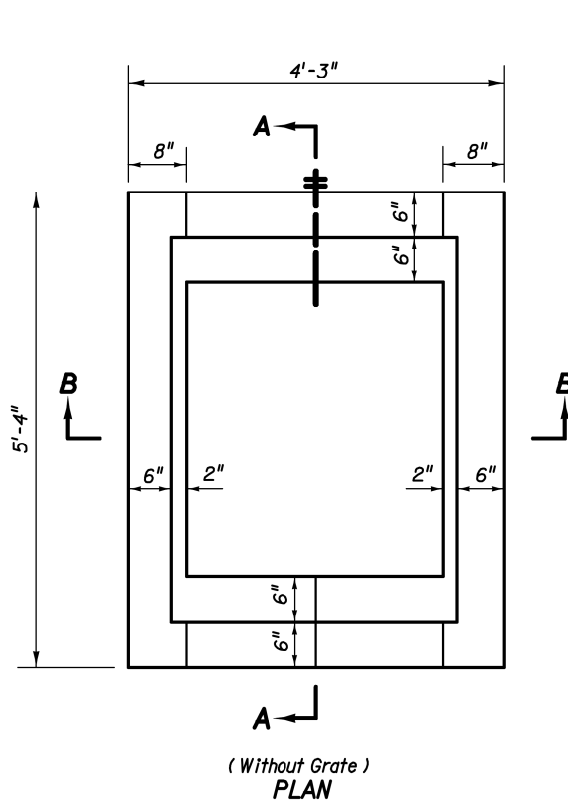


INSET C

RETICULINE

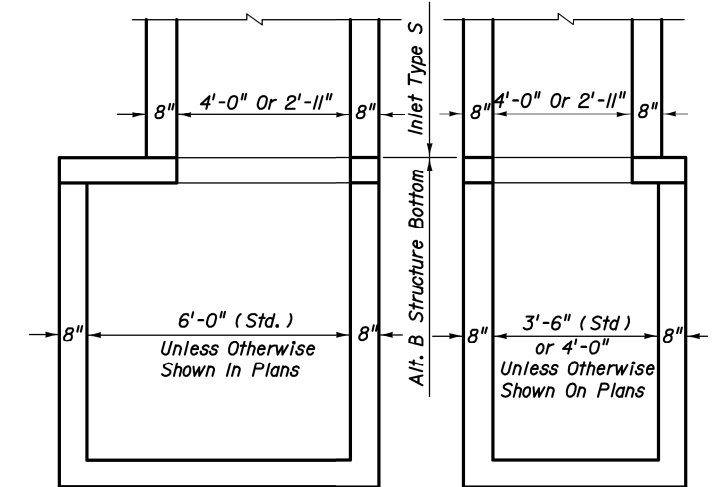
OPTIONAL STEEL GRATES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>BARRIER WALL INLET</b>				
<b>BARRIER WALL, CONCRETE (RIGID) (C &amp; G)</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By	EGR/JVG	9/89	State Drainage Engineer	
Drawn By	JBW	9/89	Revision	Sheet No.
Checked By	EGR/JVG	9/89	00	2 of 2
				Index No. <b>219</b>



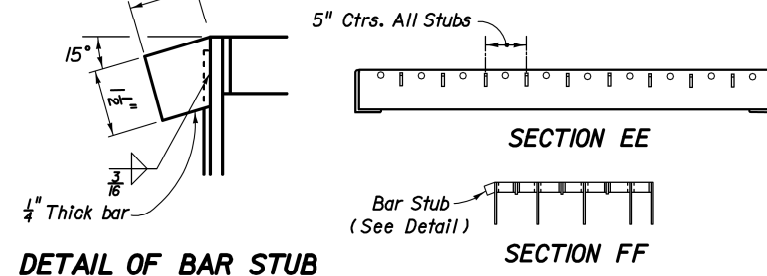
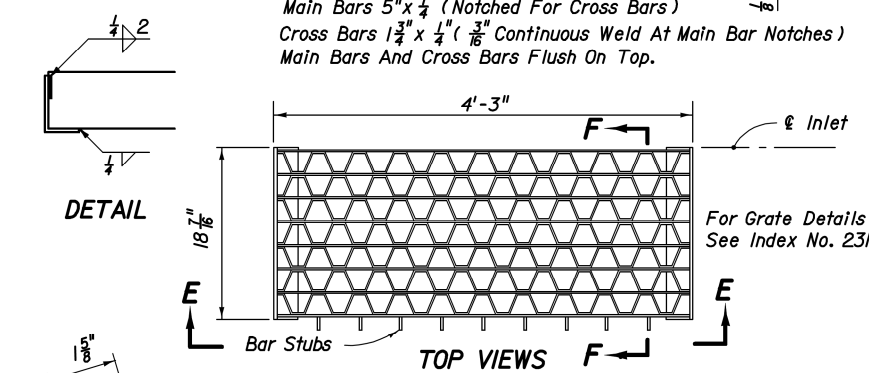
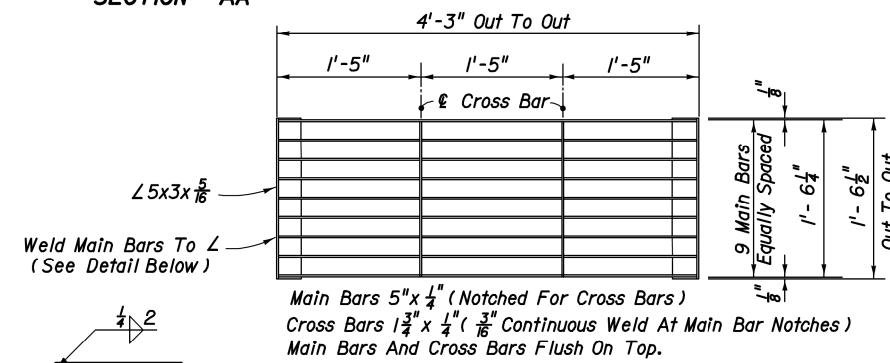
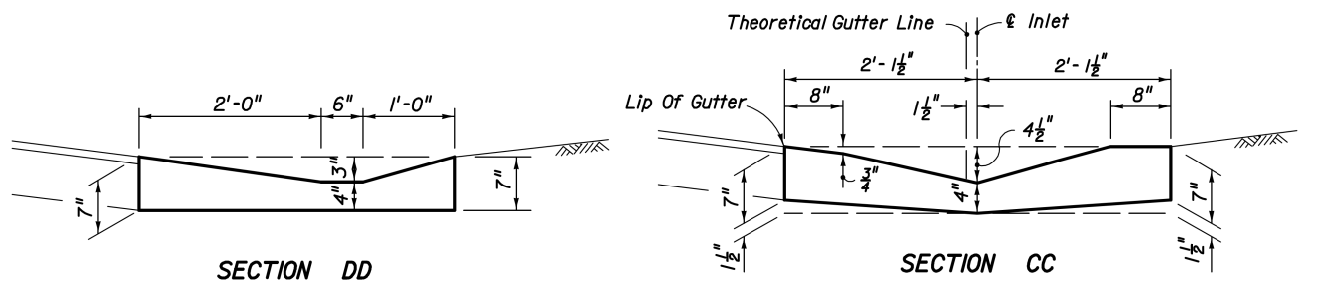
RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
2'-11"	24"
4'-0"	30"

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 detail right and Index No. 200.



NOTE: Alt. B Structure Bottom Only. See Index No. 200 for structure bottom details and hole reinforcement.

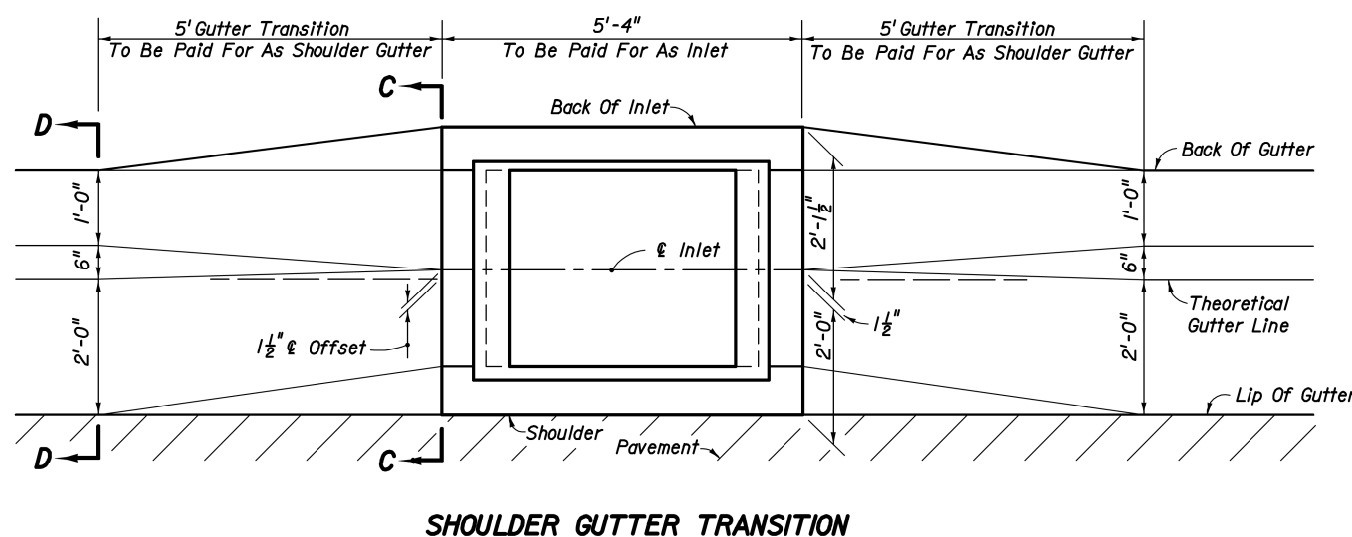
**INLET WITH STRUCTURE BOTTOM**



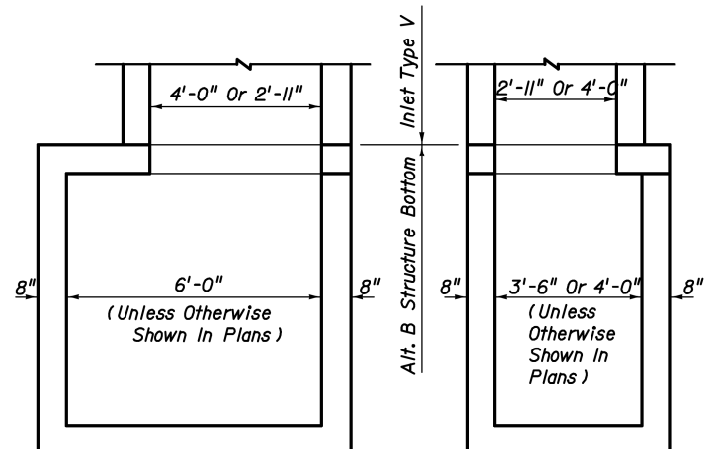
**STEEL GRATE**

**GENERAL NOTES**

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 1/2" minimum clearance around pipe.
3. All exposed edges and corners shall be tooled to 3/4" 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				
<b>GUTTER INLET TYPE S</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 1	220

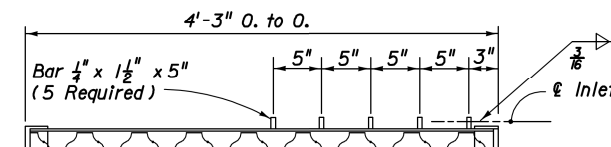


NOTE: Alt. B Structure Bottom Only. See Index No. 200 for structure bottom details and hole reinforcement. (For Pipes 30" Dia. And Larger)

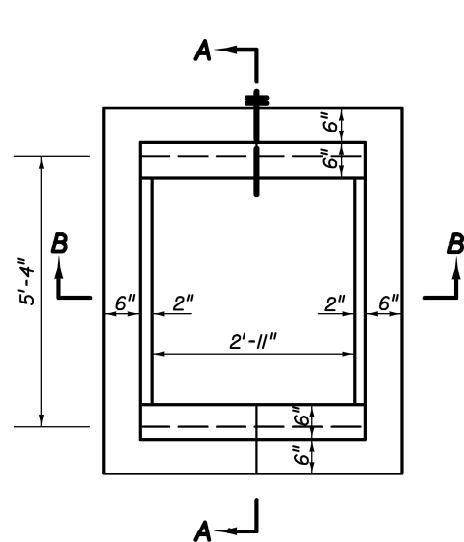
**INLET WITH STRUCTURE BOTTOM**

**GENERAL NOTES**

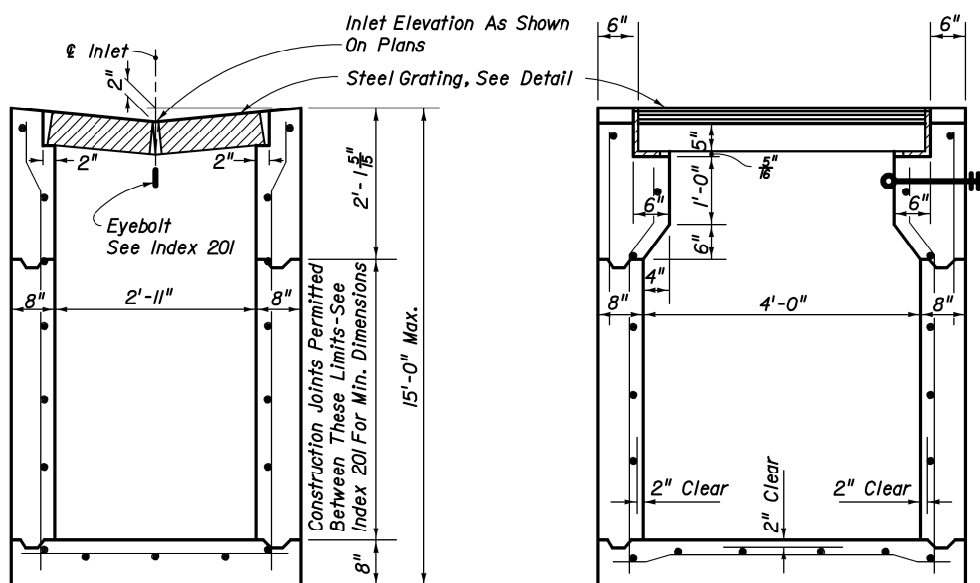
1. This inlet is designed for village swales, ditches, or other areas subject to heavy wheel loads, minimum debris and subject to pedestrian and/or bicycle traffic.
2. When alternate "G" grate is specified in plans, the grate is to be hot dipped galvanized after fabrication.
3. Reinforcing - #4 bars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



**OPTIONAL BAR SPACING**



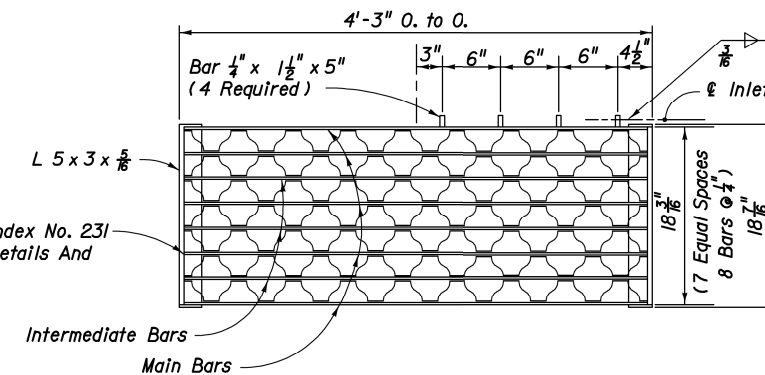
**PLAN**



**SECTION BB**

Recommended Maximum Pipe Size:  
2'-11" Wall - 24" Size  
4'-0" Wall - 30" Size

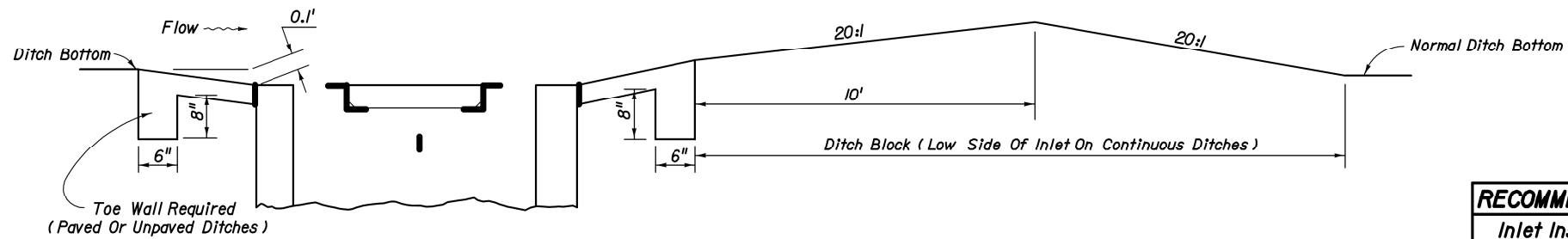
**SECTION AA**



**STEEL GRATE**

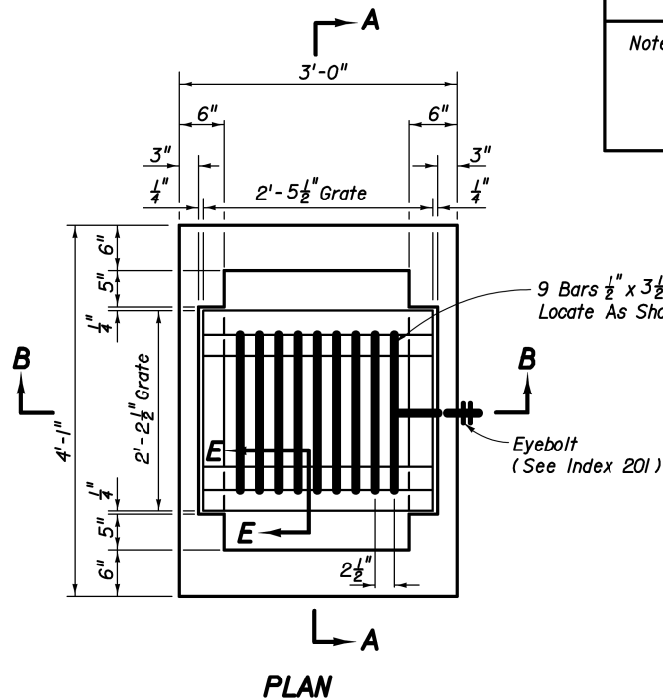
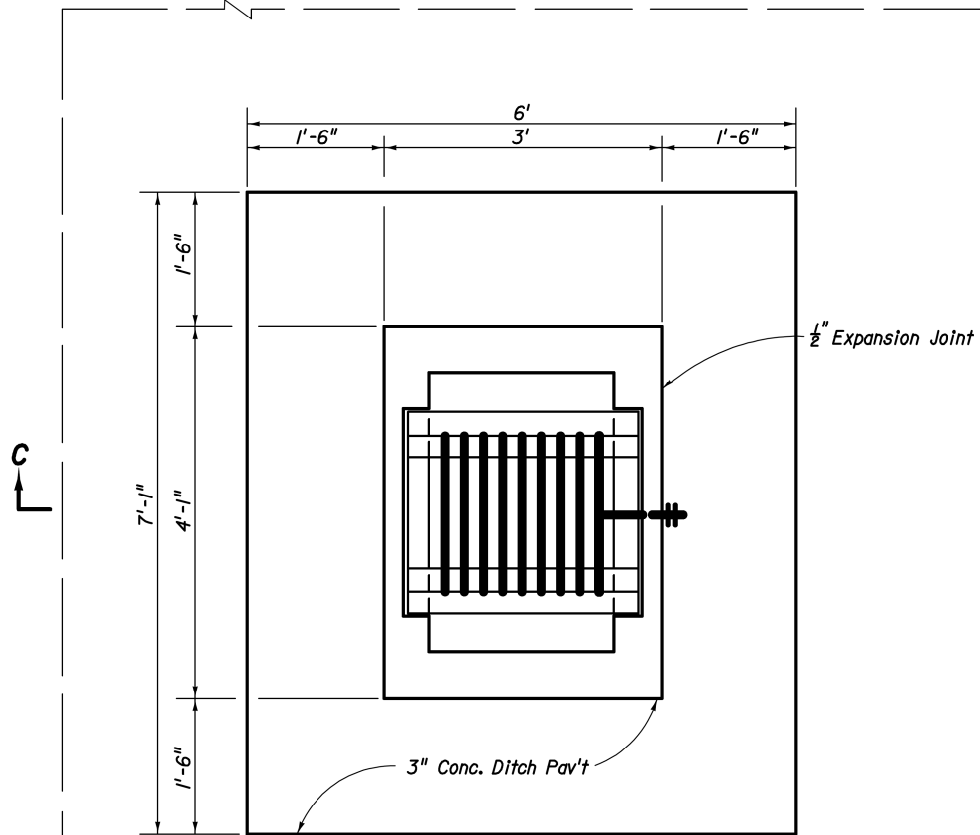
TWO REQUIRED PER INLET  
5" Steel Grate Main Bars 5" x 1/4"  
Intermediate Bars 1 1/2" x 1/4" Reticuline Bars 1 1/4" x 3/8"  
Steel Grate : Manufactured By Borden, Florida Steel, U.S. Foundry Irving, Reliance, Greulich ( Or Equal ).

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUTTER INLET TYPE V</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By	WHW 4/57	Revision	Sheet No.	Index No.
Checked By	RMM 4/57	02	1 of 1	221



SECTION DD

→ D

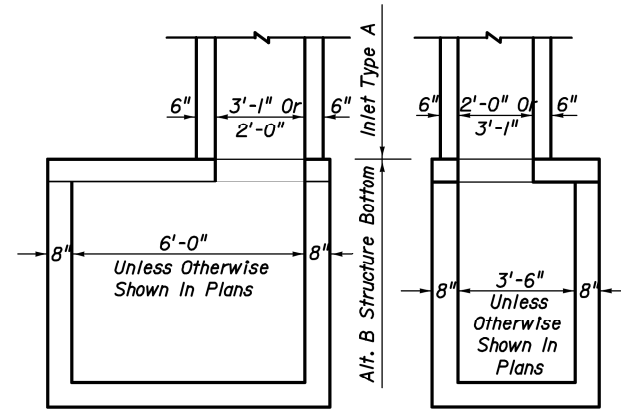


PLAN

~ Predominate Flow ~

RECOMMENDED MAXIMUM PIPE SIZES	
Inlet Inside Width	Pipe Size
2'-0"	18"
3'-1"	24"
18" where an 18" pipe enters a 2'-0" wall	

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 detail right and Index No. 200.

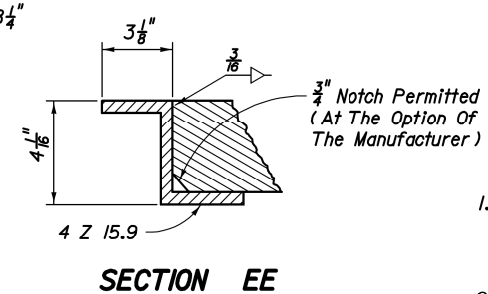


NOTE: Alt. B Structure Bottom Only. See Index No. 200 for Structure Bottom Details And Hole Reinforcement.

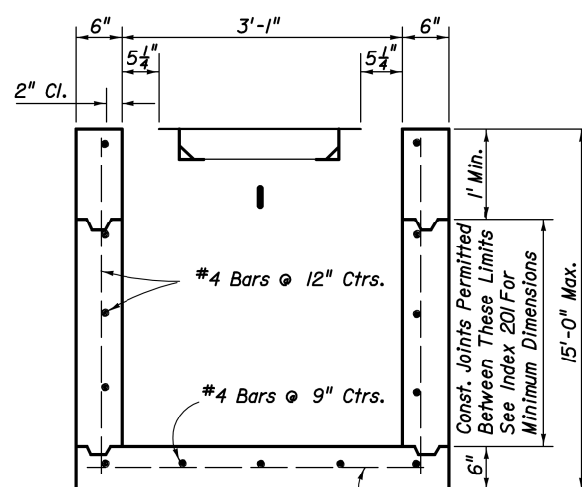
INLET WITH STRUCTURE BOTTOM

**GENERAL NOTES**

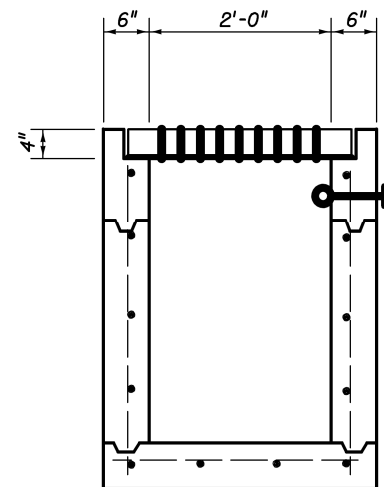
- This inlet is designed for ditches, medians, or other areas subject to heavy wheel loads on limited access facilities where debris may be a problem. NOTICE: This inlet is not for use in areas subject to pedestrian and/or bicycle traffic.
- Reinforcing-2" clearance to inside face. Cut or bend bars out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



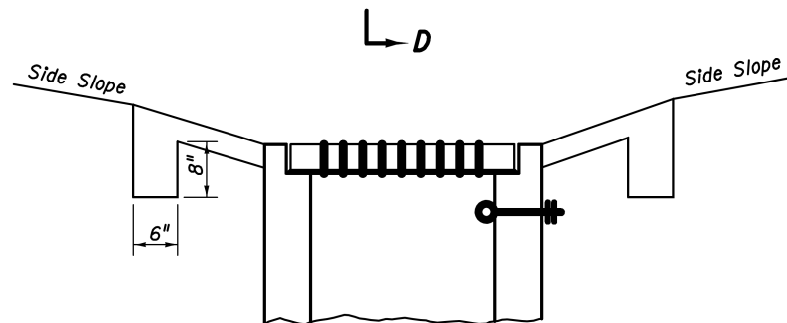
SECTION EE



SECTION AA #4 Bars @ 12" Ctrs.

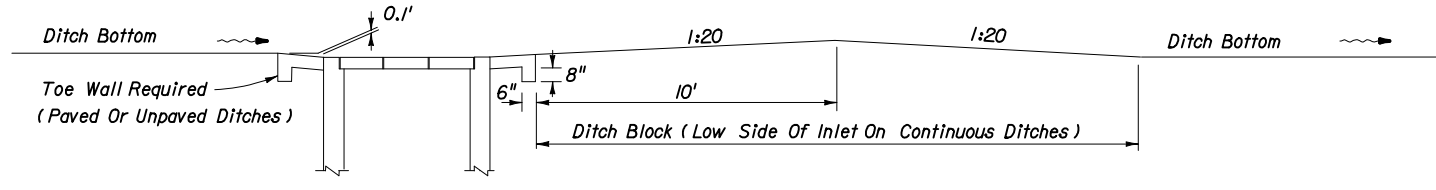


SECTION BB



SECTION CC

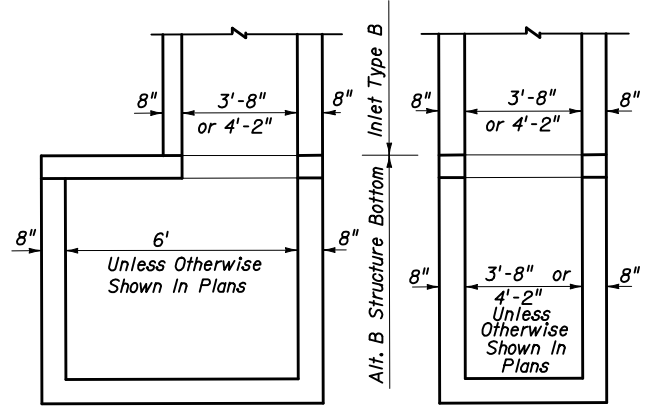
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>DITCH BOTTOM INLET TYPE A</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 1	230



**SECTION EE  
DITCH BLOCK**

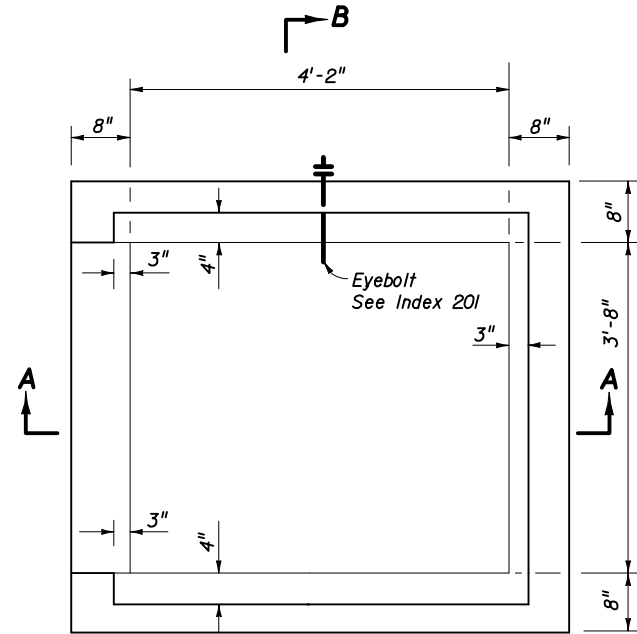
RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
3'-8"	30"
4'-2"	36"

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 detail above and Index No. 200.



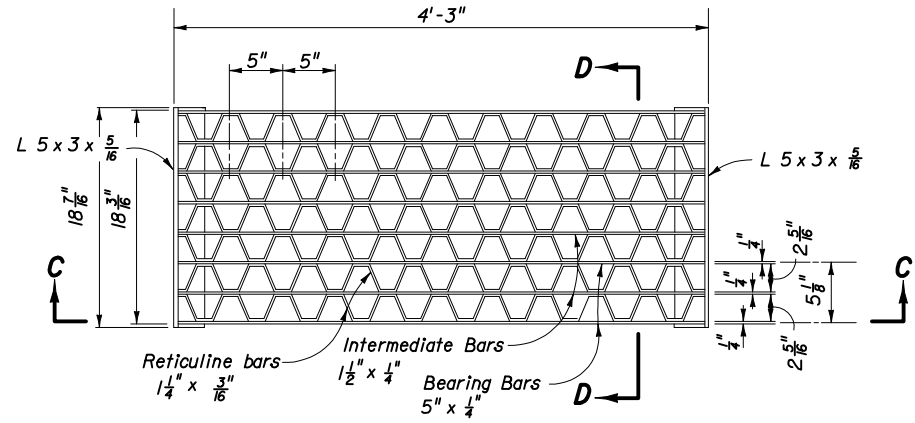
NOTE: Alt. B Structure Bottom Only. See Index No. 200 for structure bottom details and hole reinforcement.

**INLET WITH STRUCTURE BOTTOM**



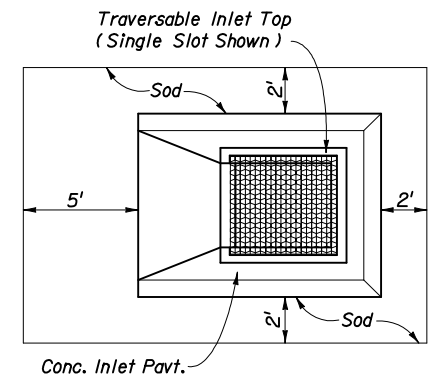
**PLAN**

Predominate Flow (s)  
(Grate, Apron And Slot Not Shown)

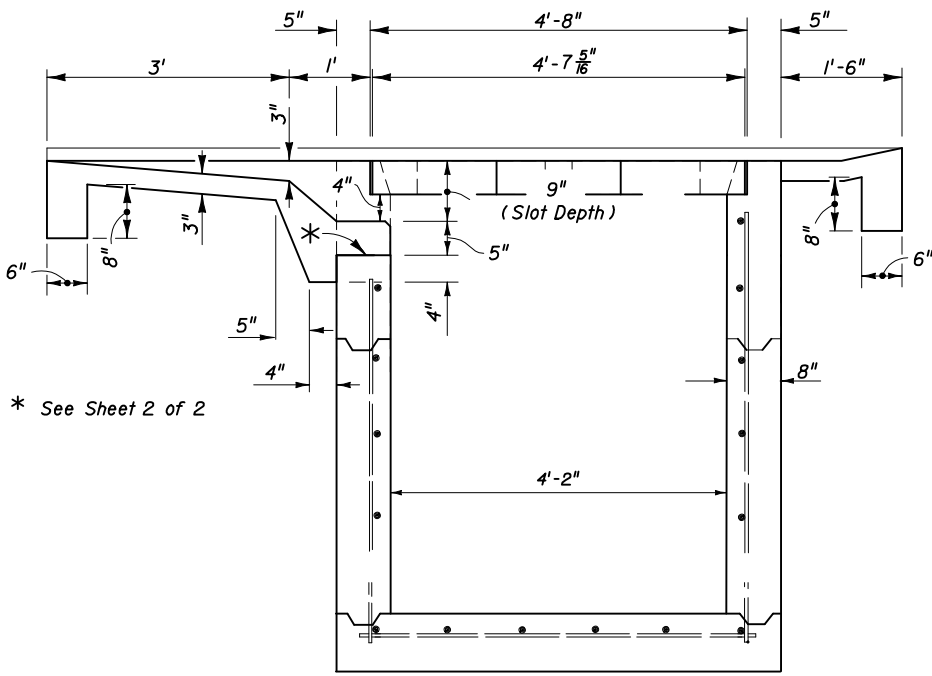


**PLAN**

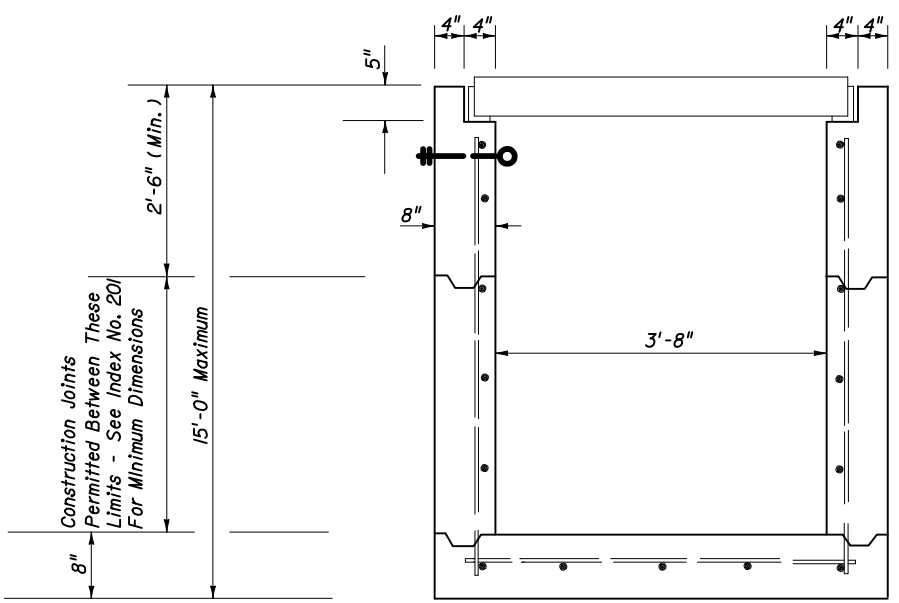
ESTIMATED QUANTITIES For Informational Purposes Only			
SLOT TYPE	PAVEMENT		SOD
	SY	CY	SY
Single Slot	6.2	0.9	14
Double Slot	8.1	1.1	19



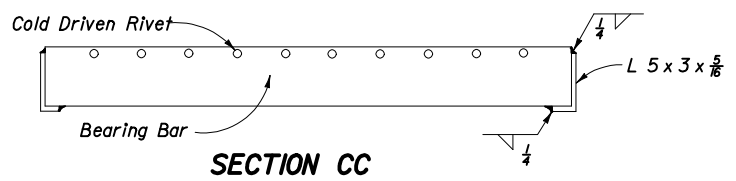
**CONCRETE INLET PAVEMENT AND SODDING**



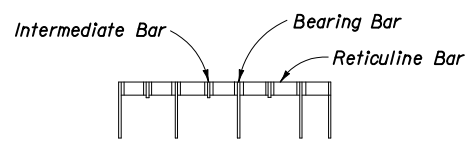
**SECTION AA**



**SECTION BB**



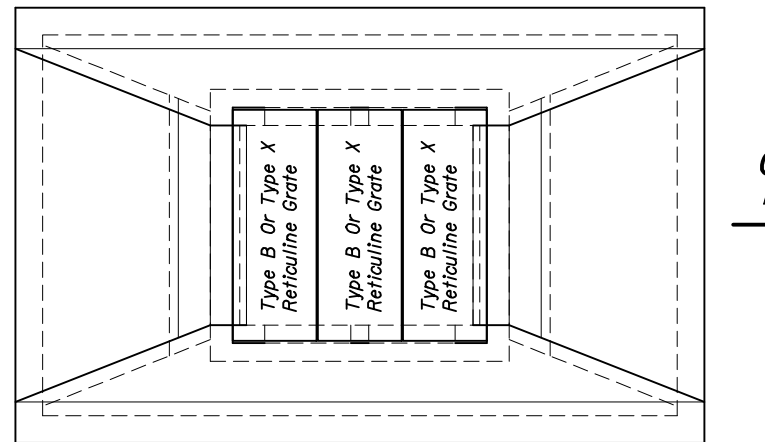
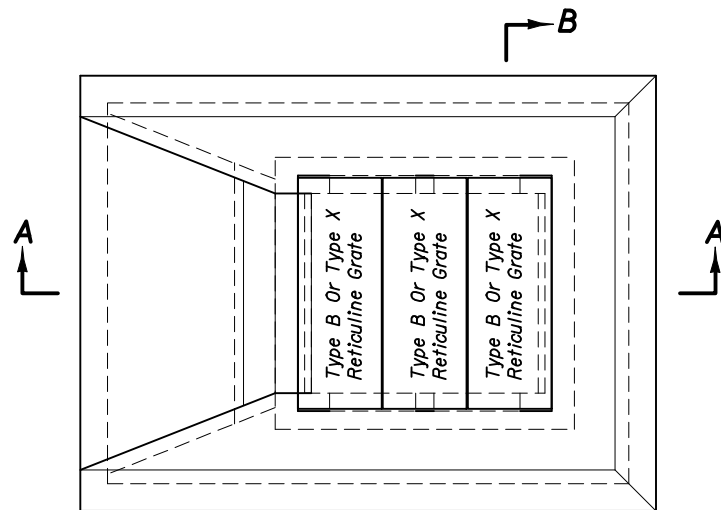
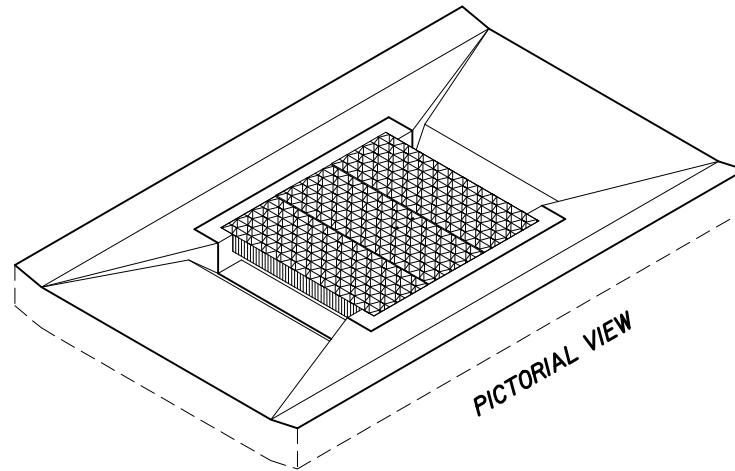
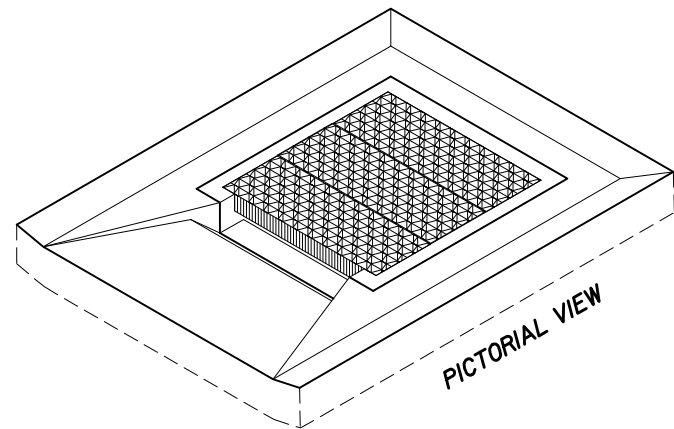
**SECTION CC**



**SECTION DD**

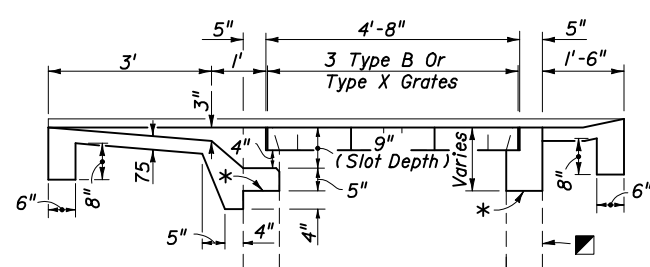
**STEEL GRATE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
DITCH BOTTOM INLET TYPE B				
Designed By	HAB	04/67	Approved By	<i>S. A. McHenry</i>
Drawn By	RWR	05/82	Revision	Sheet No.
Checked By	JVG	05/82	00	1 of 2
				Index No. <b>231</b>

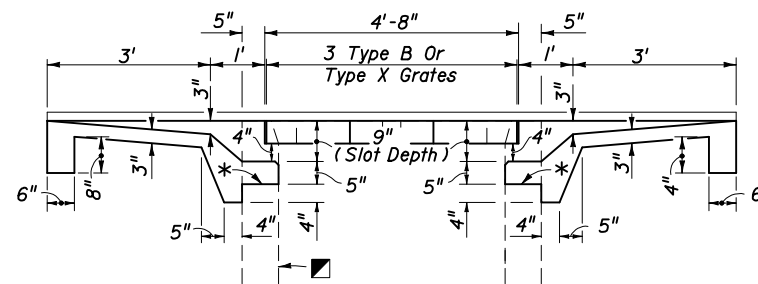


PLAN

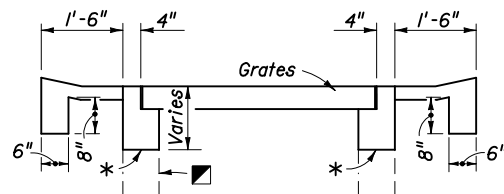
PLAN



SECTION AA  
SINGLE SLOT



SECTION CC  
DOUBLE SLOT



SECTION BB

■ Inlet Box (Line Type Indicates Existing Box To Facilitate Depiction Of Partial Construction On Existing Inlets)

\* On new boxes the traversable top may be cast as a monolithic unit or cast in segments, and the location of this line may be lower to facilitate handling and placement; however, the slot depth is to remain at 9 inches. See Index No. 20I for top to wall connection. For converting to traversable tops on existing inlets remove concrete to this line and expose the existing reinforcement. Reshape or splice in reinforcement to penetrate the rim and returns of the grate seat, and bend the reinforcement into the slot shelf to extend into the abutting throat pavement.

**GENERAL NOTES**

1. The general purpose of the inlet top designs are:
  - a. For ditches, medians or other areas subject to heavy wheel loads accommodating minimal debris locations and debris imposed locations.
  - b. Provide full grate and horizontal slot designs for new construction.
  - c. Provide full grate and horizontal slot designs for replacing the verticle slot tops on existing Inlets Type B and Type X that are in locations which have become pedestrian active.
2. Box, walls and bottoms reinforcing steel all #4 bars at 12" centers both ways with 2" clearance to inside of walls and bottom. Bars to be cut or bent for 1 1/2" minimum clearance around pipe.
3. When Alternate G grates are specified in the plans, the grates are to be hot-dipped galvanized after fabrication.
4. Cost for constructing traversable tops on new inlet boxes shall be included in the contract unit price for Inlets (DT BOT) (Type B), EA., and shall include the cost for surrounding concrete inlet pavement. Existing Inlets Type B and Inlets Type X that are converted to traversable inlet tops shall be paid for under the contract unit price for Inlets (DT BOT) (Type B) (Partial), EA. Unit price and payment shall be full compensation for inlet conversion and shall include the removal and disposal of any existing concrete inlet pavement; the removal and stockpiling or disposal of sufficient material from the existing inlet box to facilitate construction of the required inlet top; construction of the required inlet conversion; backfill construction; construction of concrete inlet pavement; reusing, supplementing, transferring or replacing grates as required by plans or as directed by the Engineer; any required earthwork for ditch restoration within 30' of the inlet; and, seeding and mulching disturbed grasses.
5. Ditch pavement shall be paid for, separate from the inlet and concrete inlet pavement, by pavement types and units as called for in the plans.
6. Sod will be paid for under the contract unit price for Sodding, SY.
7. For supplementary details see Index No. 20I.

**DESIGN NOTES**

1. The type of top (single or double slots) depends on the approach ditch configuration and the hydraulic requirements of the site. The designer will stipulate in the plans the type of top to be constructed at each individual inlet location.

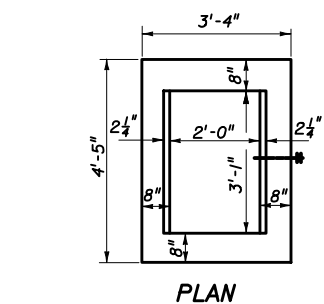
On existing inlets conversion grates shall be constructed at the original grate elevations unless other elevations are called for in the plans. When plans call for the inlet top to be constructed to support storm water detention, details for ditch modifications and underdrains shall be shown in the plans.

**MAINTENANCE NOTES**

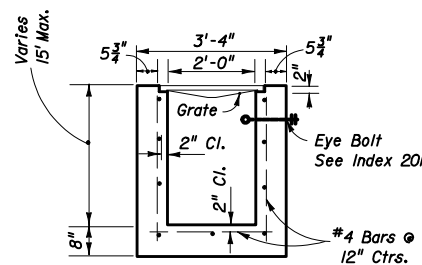
1. Traversable inlet tops that are constructed by maintenance contract or by maintenance forces may reuse the existing grates that are determined by the Maintenance Engineer to be functionally sound, and their reuse is so directed by the Maintenance Engineer. Existing grates approved for reuse and new grates may be mixed, matched or replaced as directed by the Maintenance Engineer.

**TRAVERSABLE TOPS FOR INLETS TYPE B AND FOR CONVERSIONS OF EXISTING INLETS TYPE B AND TYPE X**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>DITCH BOTTOM INLETS TYPE B</b>				
Names	Dates	Approved By		
Designed By	WPH	02/98	<i>A. A. McHenry</i> State Drainage Engineer	
Drawn By	JDT	02/98	Revision	Sheet No.
Checked By			00	2 of 2
				Index No. <b>231</b>

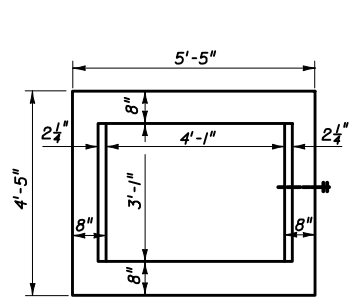


PLAN

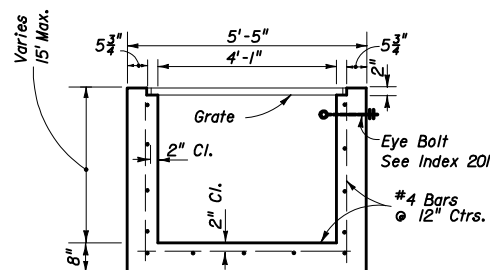


SECTION  
TYPE C

Recommended Maximum Pipe Size:  
2'-0" Wall 18" Pipe  
3'-1" Wall 24" Pipe (18" where an 18" pipe enters a 2'-0" wall)

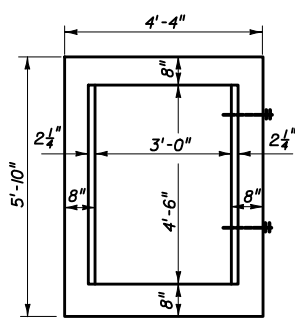


PLAN

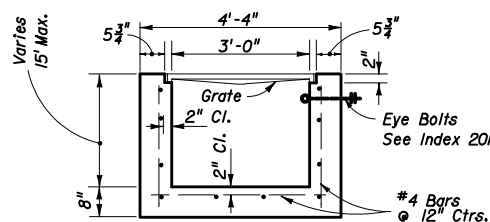


SECTION  
TYPE D

Recommended Maximum Pipe Size:  
3'-1" Wall-24" Pipe  
4'-1" Wall-36" Pipe

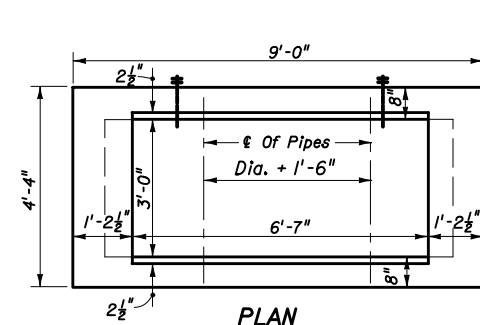


PLAN

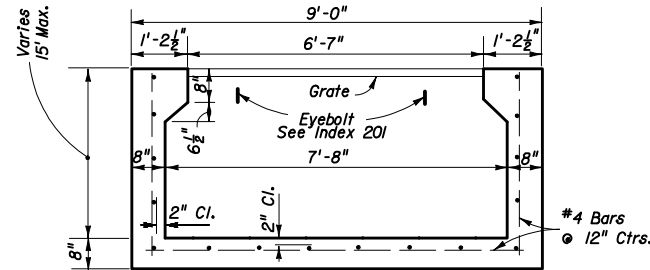


SECTION  
TYPE E

Recommended Maximum Pipe Size:  
3'-0" Wall-24" Pipe  
4'-6" Wall-36" Pipe



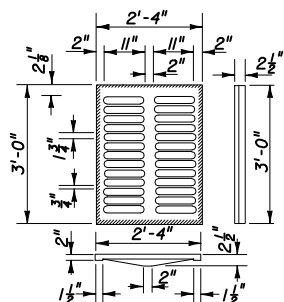
PLAN



SECTION  
TYPE H

Recommended Maximum Pipe Size:  
3'-0" Wall-24" Pipe  
7'-8" Wall-1-66" Pipe  
2-30" Pipe

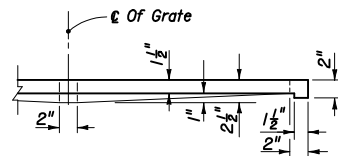
## INLETS



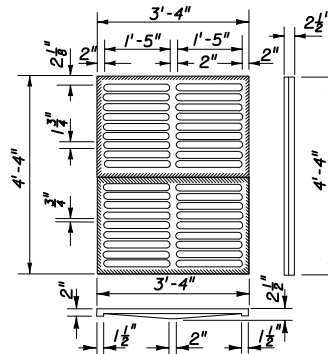
TYPE C

Approx. Weight 235 Lbs.

CAST IRON GRATE NOT PERMITTED ON INLET TYPE D

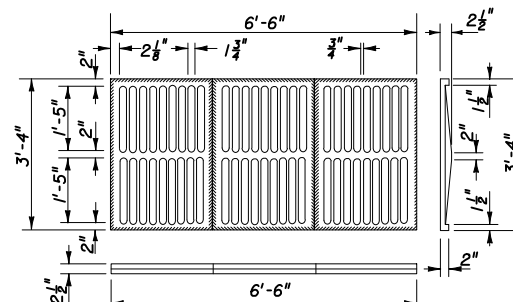


HALF SECTION CAST IRON GRATES



TYPE E

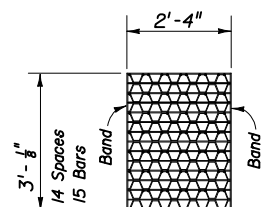
Approx. Weight 465 Lbs.



TYPE H

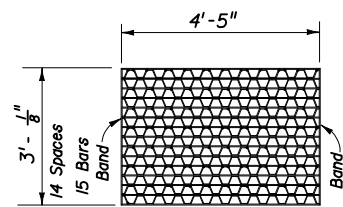
Approx. Weight 725 Lbs.

## CAST IRON GRATES



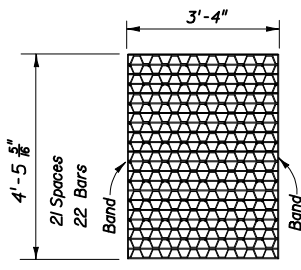
TYPE C

Straight Bars 2" x 1/4"  
Reticuline Bars 1 1/4" x 3/16"  
Bands 2" x 1/4"  
Approx. Weight 104 Lbs.



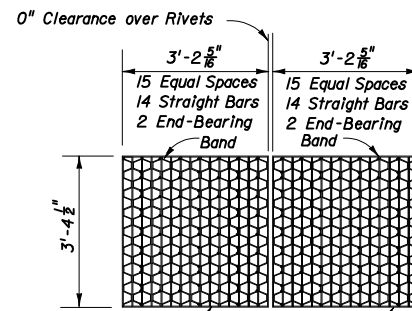
TYPE D

Straight Bars 2" x 1/4"  
Reticuline Bars 1 1/4" x 3/16"  
Bands 2" x 1/4"  
Approx. Weight 190 Lbs.



TYPE E

Straight Bars 2" x 1/4"  
Reticuline Bars 1 1/4" x 3/16"  
Bands 2" x 1/4"  
Approx. Weight 215 Lbs.



TYPE H

Straight End-Bearing Bars 2" x 3/8"  
Straight Bearing Bars 2" x 1/4"  
Reticuline Bars 1 1/4" x 3/16"  
Bandling Bars 2" x 1/4"  
Approx. Total Weight 310 Lbs.

NOTICE: Steel Grates Are Required On Inlets With Traversable Slots And On Inlets where Bicycle Traffic Is Anticipated.


## STEEL GRATES

### GENERAL NOTES

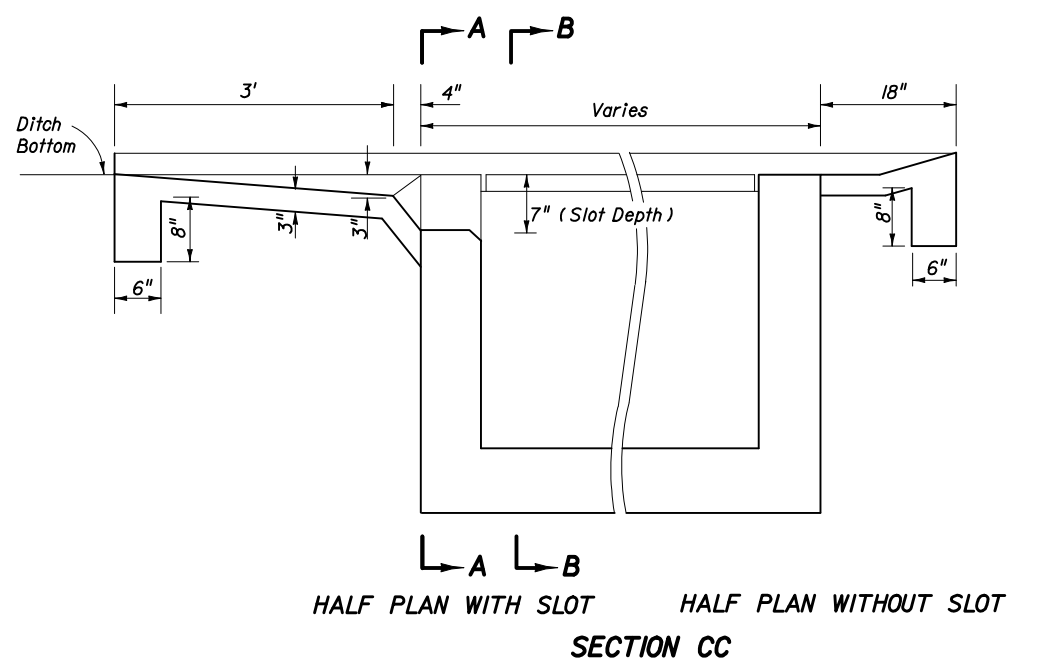
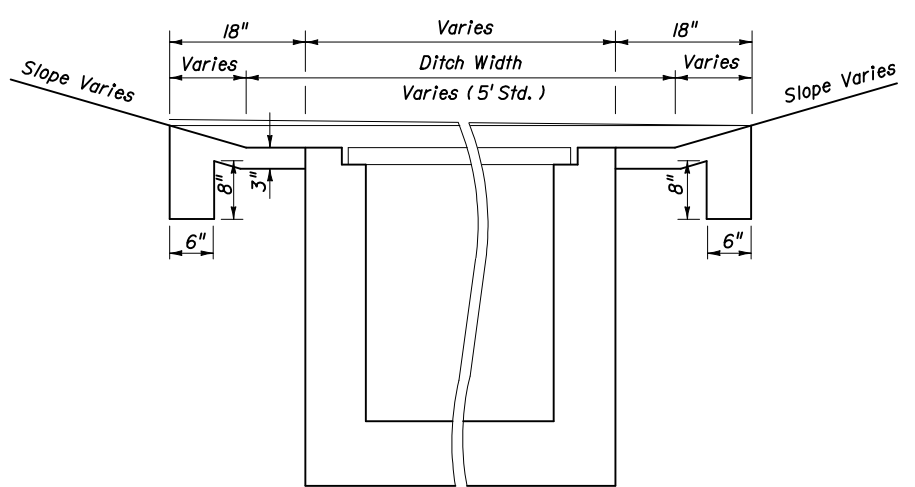
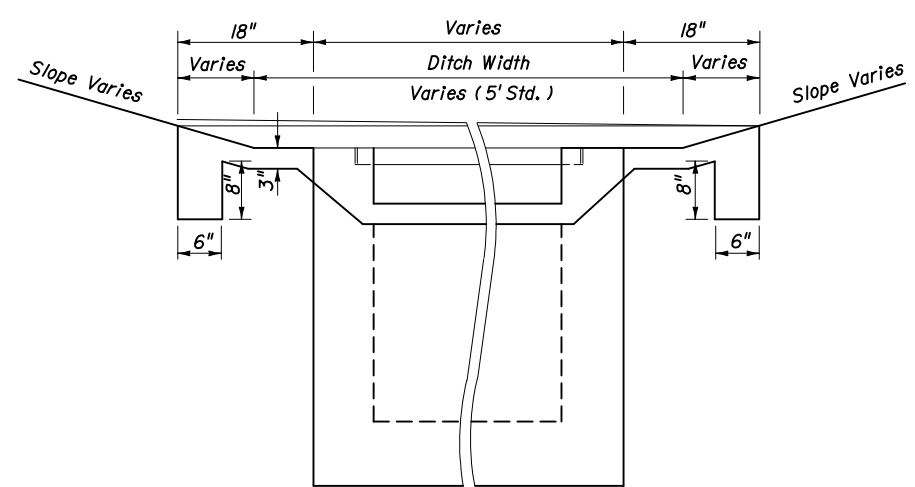
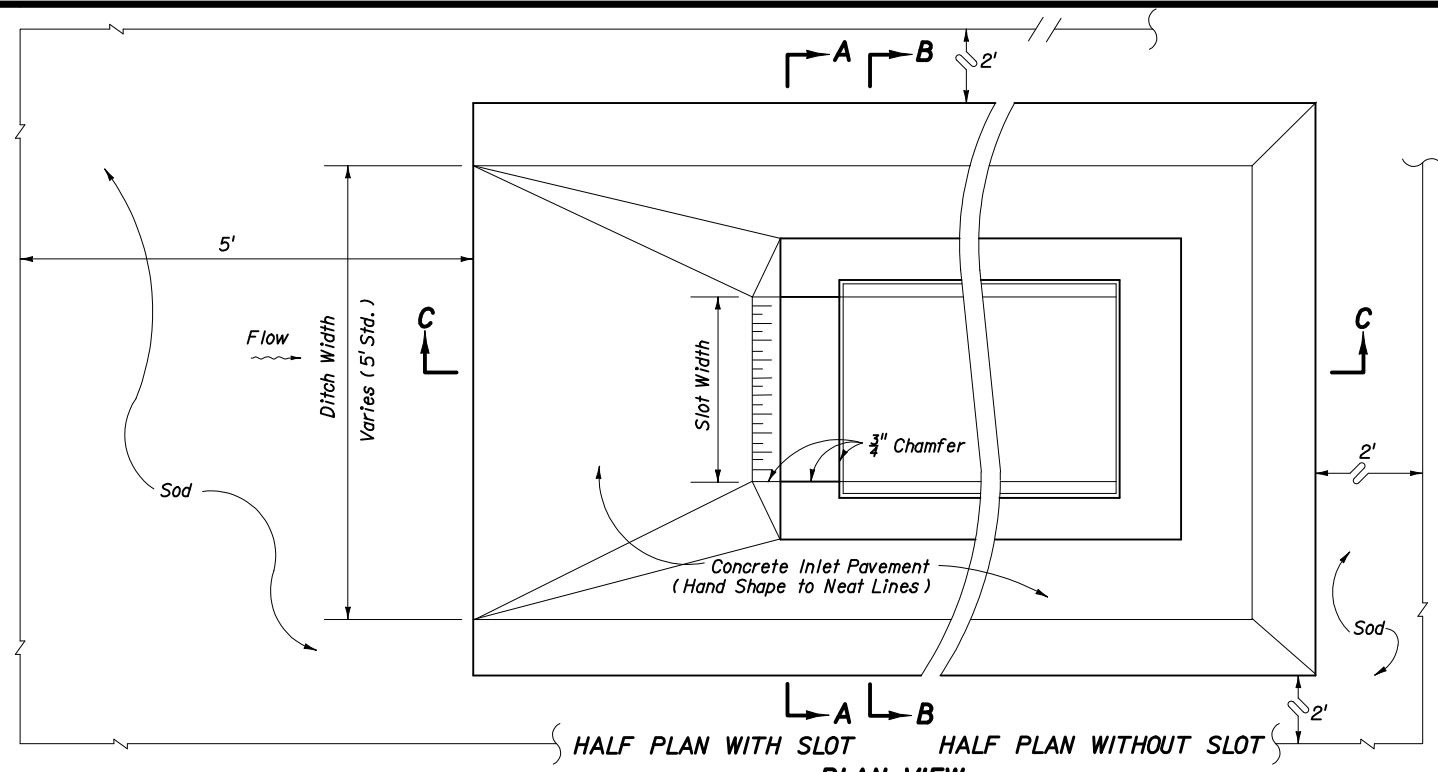
- These inlets are suitable for bicycle and pedestrian areas and are to be used in ditches, medians and other areas subject to infrequent traffic loadings but are not to be placed in areas subject to any heavy wheel loads.
- Inlets subject to minimal debris should be constructed without slots. Where 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.
- Steel grates are to be used on all inlets where bicycle traffic is anticipated. Steel grates are to be used on all inlets with traversable slots. Either cast iron or steel grates may be used on inlets without slots where bicycle traffic is not anticipated. Either cast iron or steel grates may be used on all inlets with non-traversable slots. Subject to the selection described above, 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. Size for other types of pipe must be checked for fit.
- All exposed corners and edges of concrete are to be chamfered 3/4".
- Concrete inlet 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, concrete inlet pavement and any required replacement grates.
- Sodding to be used on all inlets not located in paved areas and paid for under contract concrete inlet pavement unit price for Sodding, SY.
- For supplementary details see Index No. 201.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

## DITCH BOTTOM INLETS TYPES C, D, E & H

Names	Dates	Approved By		
Designed By		 State Drainage Engineer		
Drawn By				
Checked By	EGR/JG 07/81	Revision	Sheet No.	Index No.
		02	1 of 5	232





PAVEMENT AND SODDING QUANTITIES FOR TRAVERSABLE SLOTS

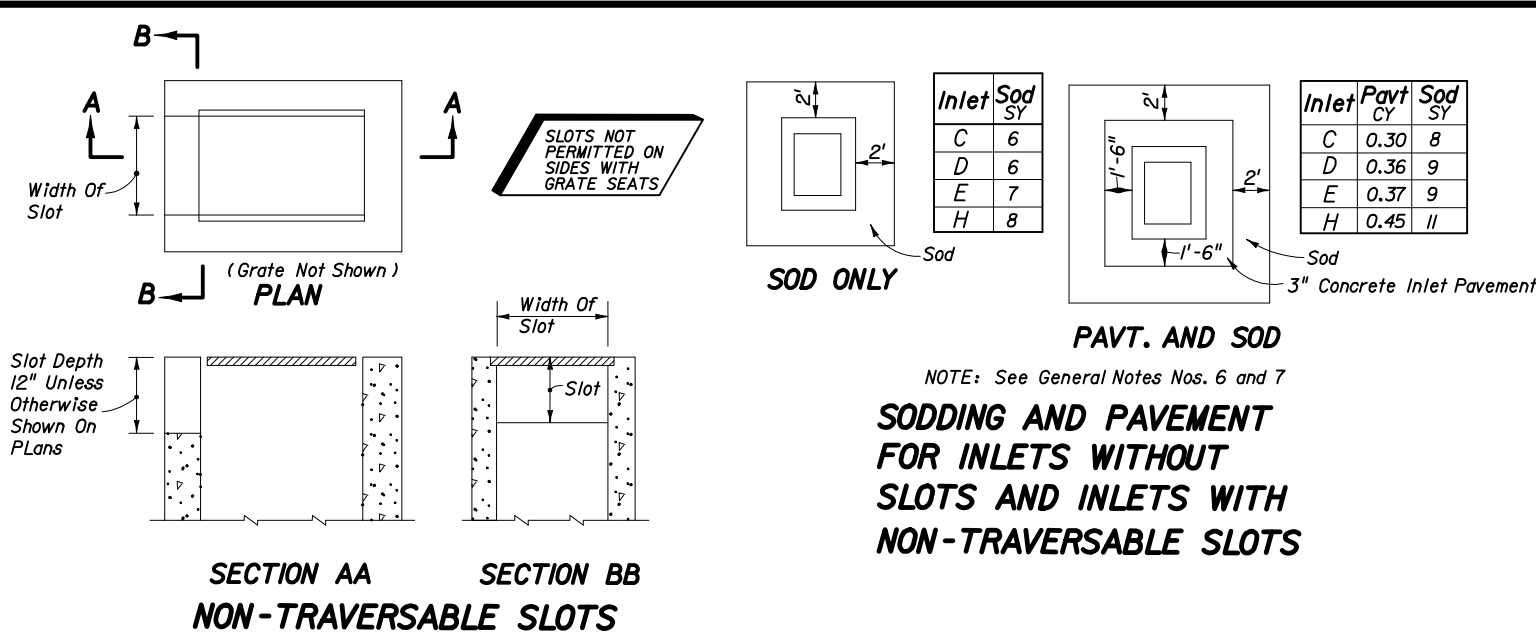
Inlet	Pavement				Sod	
	Single Slot		Double Slot		Single Slot	Double Slot
	SY	CY	SY	CY	SY	SY
C	4.87	0.77	6.16	0.93	12	16
D	5.99	0.91	7.70	1.10	14	19
E	5.88	0.91	7.37	1.08	14	18

TRAVERSABLE SLOTS

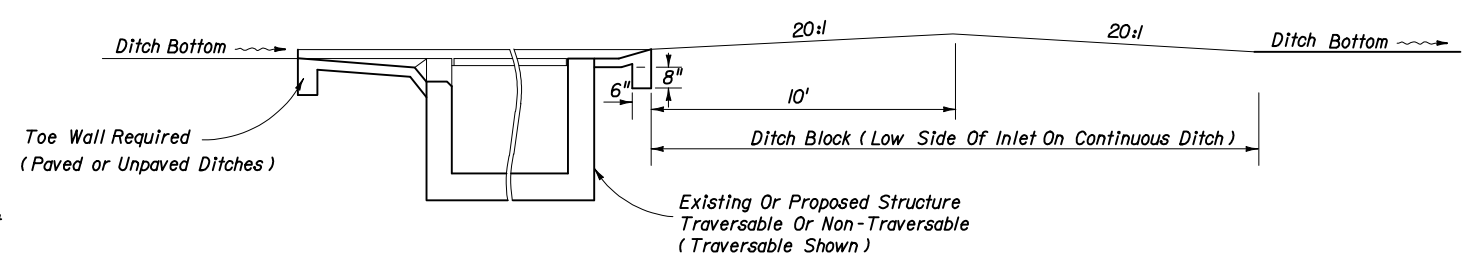
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**DITCH BOTTOM INLETS  
TYPES C, D, E, & H**

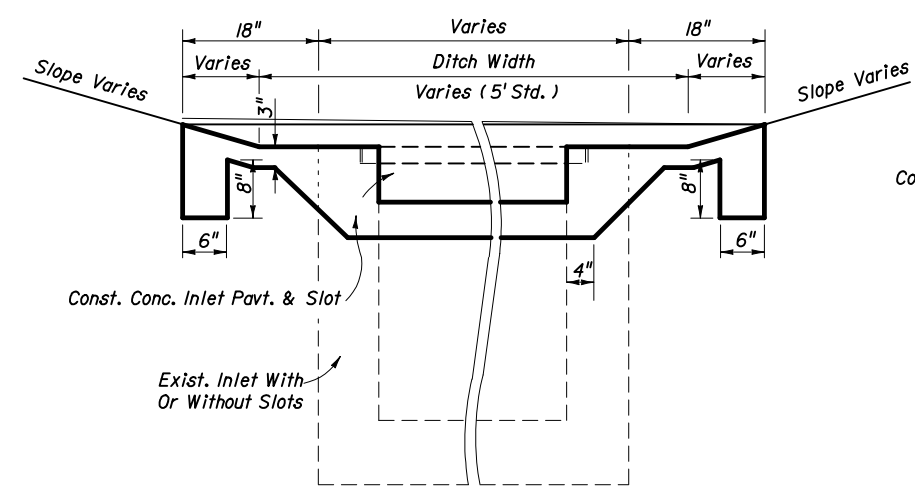
Names	Dates	Approved By	<i>S. A. McHenry</i>		
Designed By	EGR	02/80	State Drainage Engineer		
Drawn By	JM	02/80	Revision	Sheet No.	Index No.
Checked By	JVG	02/80	00	2 of 5	232



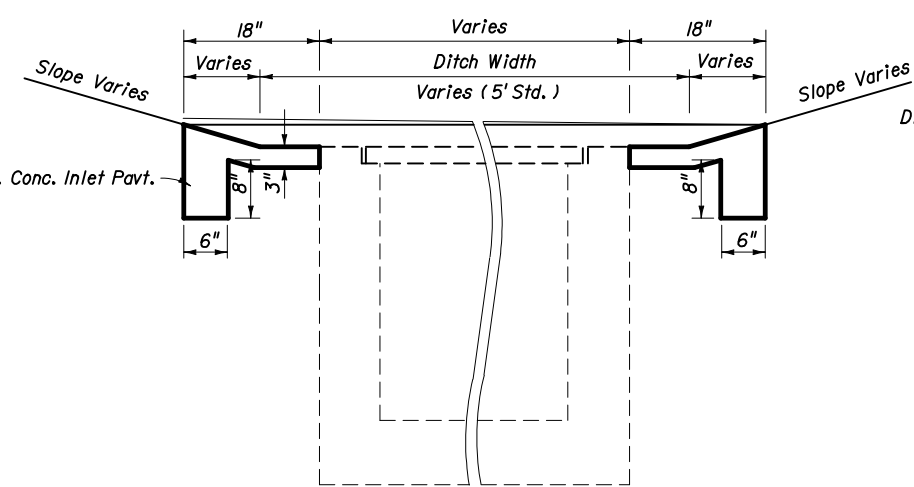
NOTE: See General Notes Nos. 6 and 7  
**SODDING AND PAVEMENT FOR INLETS WITHOUT SLOTS AND INLETS WITH NON-TRAVERSABLE SLOTS**



**DITCH BLOCK FOR INLETS WITH OR WITHOUT SLOTS**

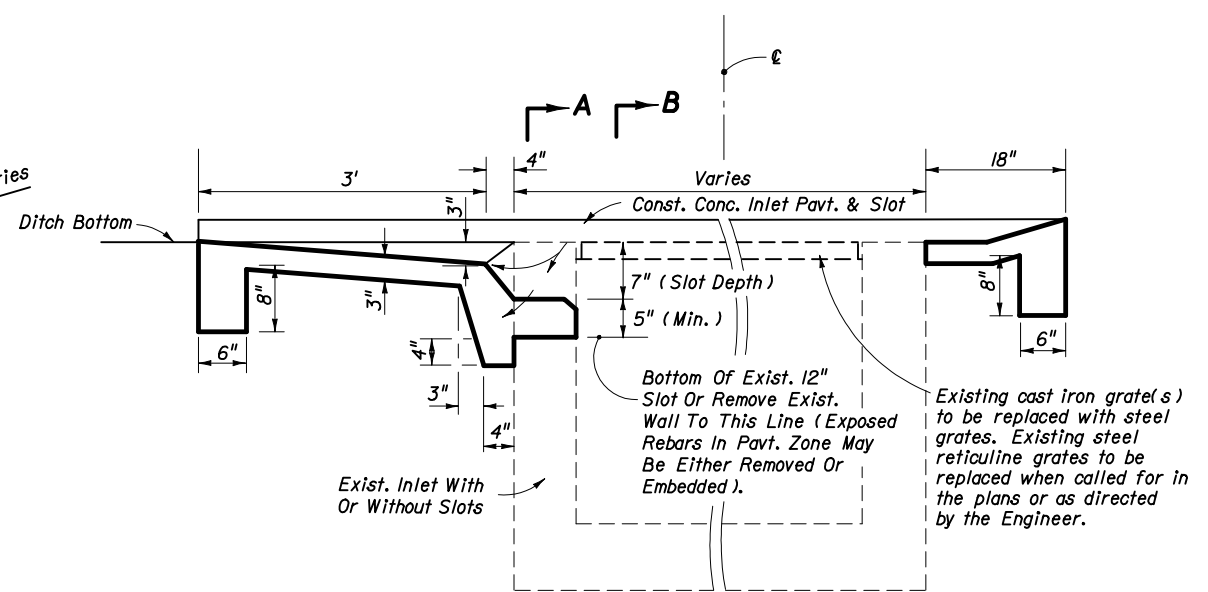


**SECTION AA**



**SECTION BB**

Inlet	PAVEMENT AND SODDING QUANTITIES FOR TRAVERSABLE SLOTS			
	Pavement		Sod	
	Single Slot SY	Double Slot CY	Single Slot SY	Double Slot SY
C	4.87	0.83	6.16	1.05
D	5.99	1.01	7.70	1.30
E	5.88	0.99	7.37	1.24



**SECTION CC (CASE 1)**  
 SINGLE SLOT SHOWN (DOUBLE SLOTS SYMMETRICAL ABOUT CENTERLINE)

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**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**DITCH BOTTOM INLETS TYPES C,D,E & H**

Names	Dates	Approved By		
Designed By	EGR 07/84	S. A. McHenry State Roadway Design Engineer		
Drawn By	DAE 07/84			
Checked By	JBW/JVG 07/84	Revision	Sheet No.	Index No.
		00	3 of 5	232

**DESIGN NOTES FOR TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS**

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.

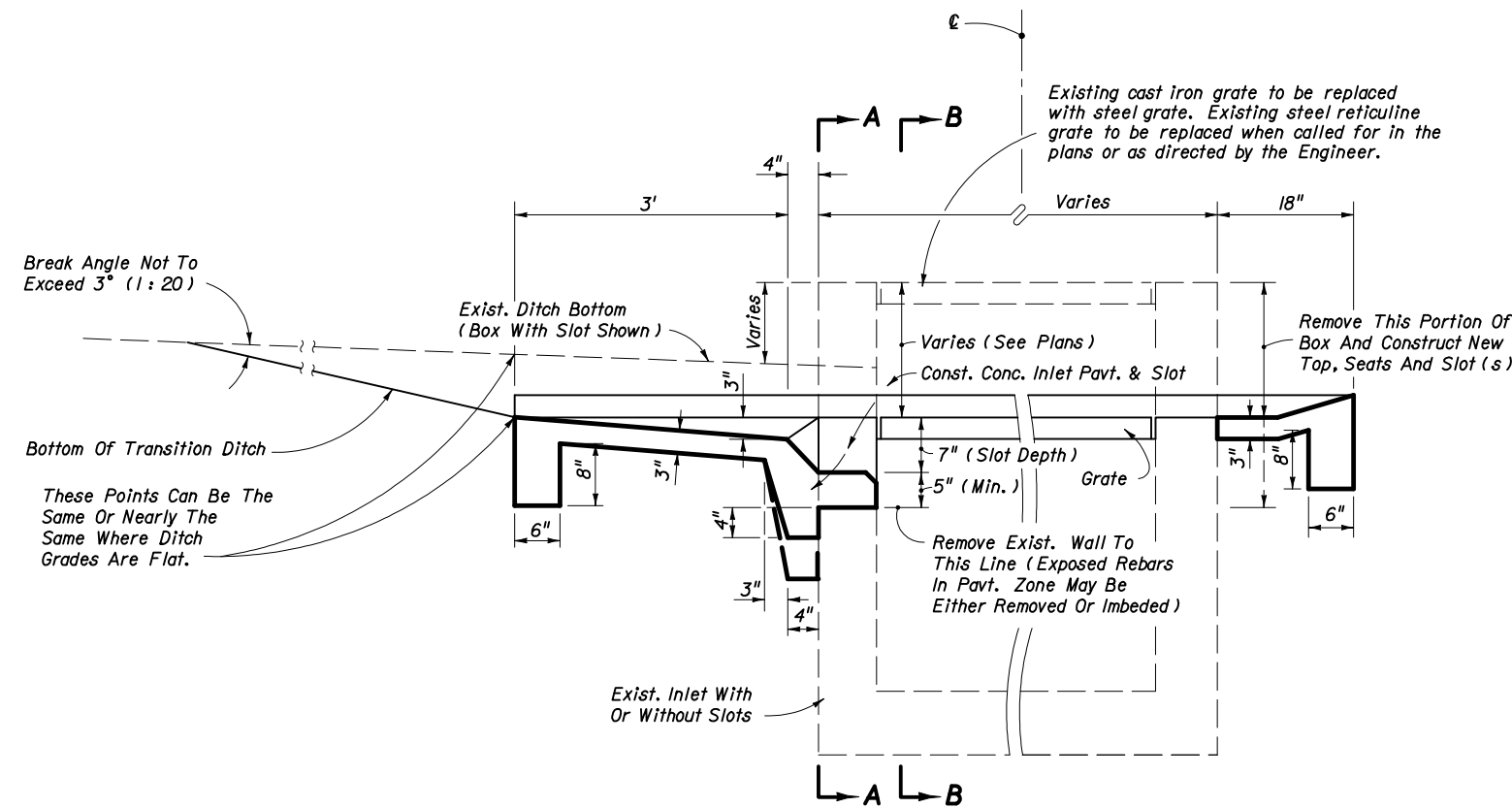
The designer shall determine whether tight soil or other conditions at each individual inlet indicates the need for underdrain in Case 3 conversions and shall call for Underdrain, Type I in the plans.

**METHOD OF PAYMENT FOR TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS**

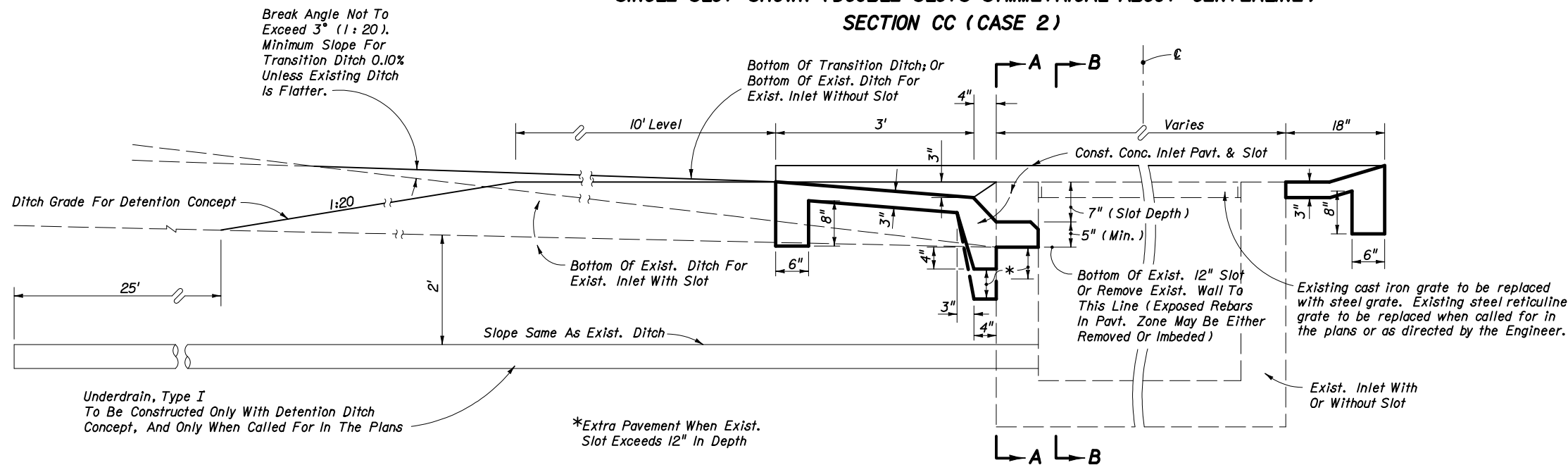
1. Existing inlets converted to traversable slot tops under Cases 1, 2 and 3 shall be paid for as inlets partial, each. Case shall not be included in the pay item description.
2. All ditch reconstruction work within 35 feet of each traversable slot conversion, whether required by these details or as 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. Concrete inlet pavement and sodding shall be in accordance with the sections on this detail and with the Plan on Sheet 2 and Sections AA, BB and CC (as Case 1) and tabular quantities on Sheet 3.
4. Unit price and payment shall constitute full compensation for inlet conversion (including concrete inlet paving and replacement grate (s)), ditch reconstruction, seeding and mulching, and shall be paid for under the contract 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.



**SINGLE SLOT SHOWN (DOUBLE SLOTS SYMMETRICAL ABOUT CENTERLINE)  
SECTION CC (CASE 2)**



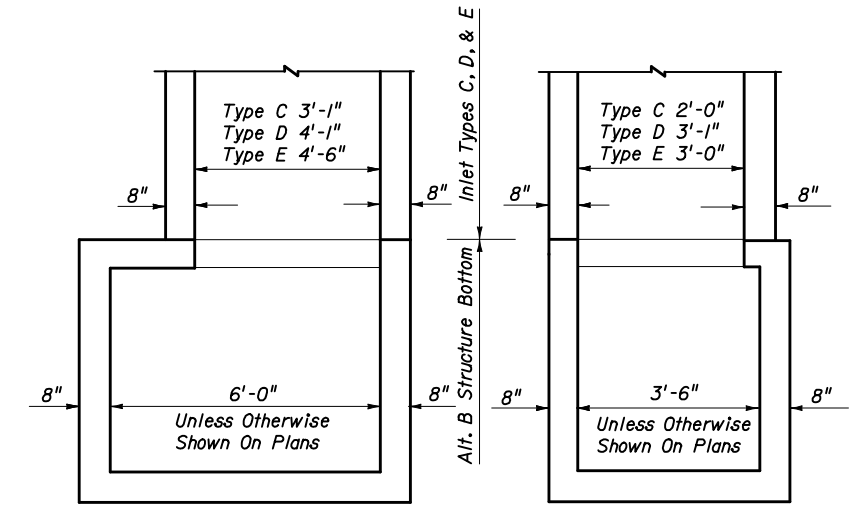
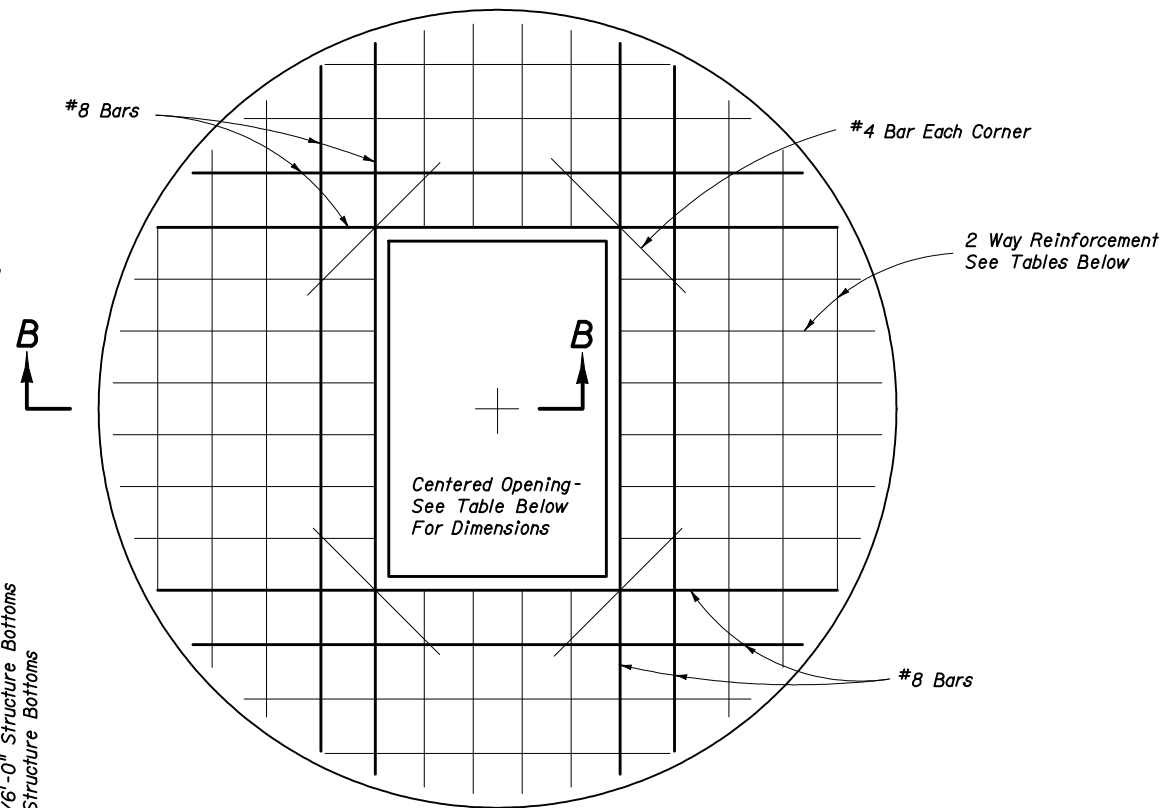
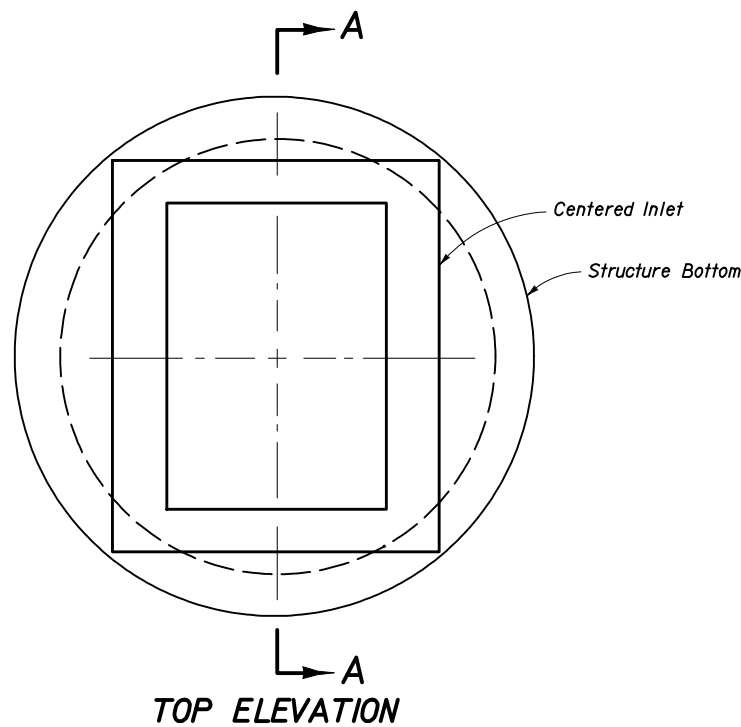
**SINGLE SLOT SHOWN (DOUBLE SLOTS SYMMETRICAL ABOUT CENTERLINE)  
SECTION CC (CASE 3)**

**TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**DITCH BOTTOM INLETS  
TYPES C, D, E & H**

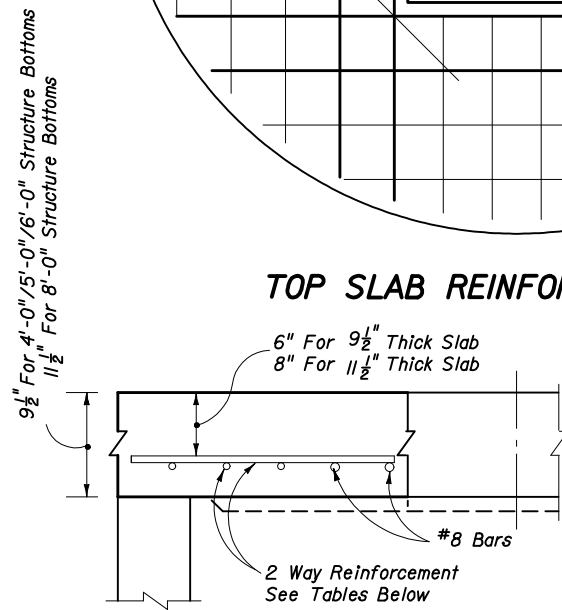
Names	Dates	Approved By
Designed By: JVG/EGR	3/10/86	A. McHenry State Drainage Engineer
Drawn By: HSD/dde	5/20/86	
Checked By: JVG/EGR	5/22/86	
Revision	00	
Sheet No.	4 of 5	Index No.
		232



See Index No. 200 for structure bottom details and hole reinforcement.  
**ALT. B STRUCTURE BOTTOM FOR INLETS TYPE C, D & E**

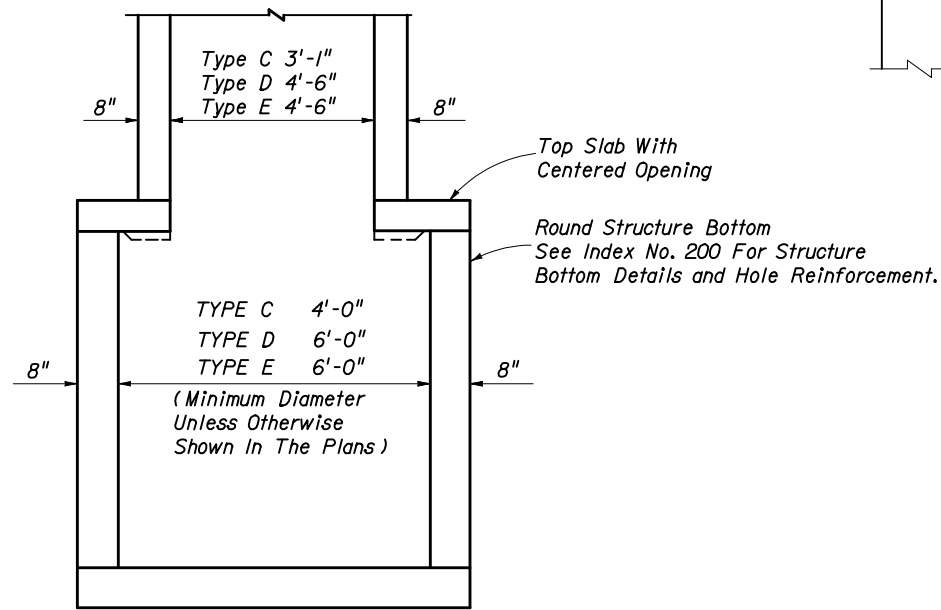
TOP SLAB OPENINGS		
DIAMETER	OPENING SIZE	
	MIN.	MAX.
4'-0"	2'-0" x 3'-1"	2'-0" x 3'-1"
5'-0"	2'-0" x 3'-1"	3'-1" x 4'-1"
6'-0"	2'-0" x 3'-1"	3'-0" x 4'-4"
8'-0"	2'-0" x 3'-1"	3'-0" x 4'-4"

**TOP SLAB REINFORCING DIAGRAM**



**SECTION BB**

TOP SLAB WITH CENTERED OPENING		
SLAB DEPTH	SLAB THICKNESS	REINFORCING (2 WAYS) SCHEDULE
SIZE: 4'-0"		
≥ 0.5'-40'	9 1/2"	C
SIZE: 5'-0"		
≥ 0.5' < 30'	9 1/2"	C
30'-40'	9 1/2"	D
SIZE: 6'-0"		
0.5' < 8'	9 1/2"	B
8' < 18'	9 1/2"	C
18' < 30'	9 1/2"	D
30' < 37'	9 1/2"	E
37'-40'	9 1/2"	G
SIZE: 8'-0"		
≥ 0.5' < 9'	11 1/2"	C
9' < 15'	11 1/2"	D
15' < 23'	11 1/2"	E
23' < 33'	11 1/2"	E
33'-40'	11 1/2"	G

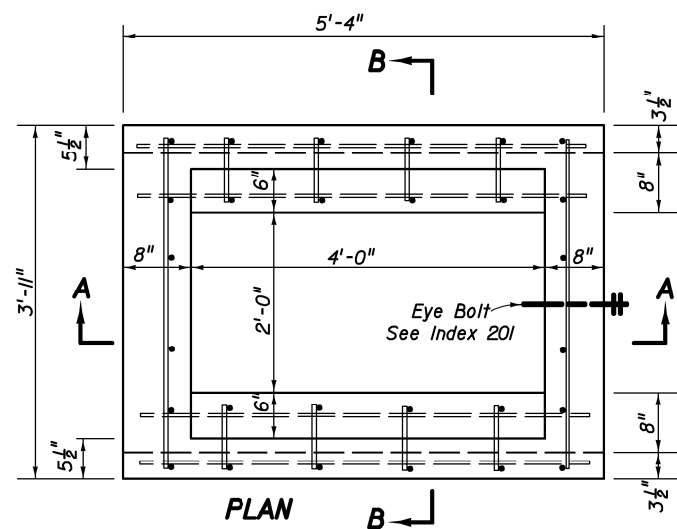


**SECTION AA**

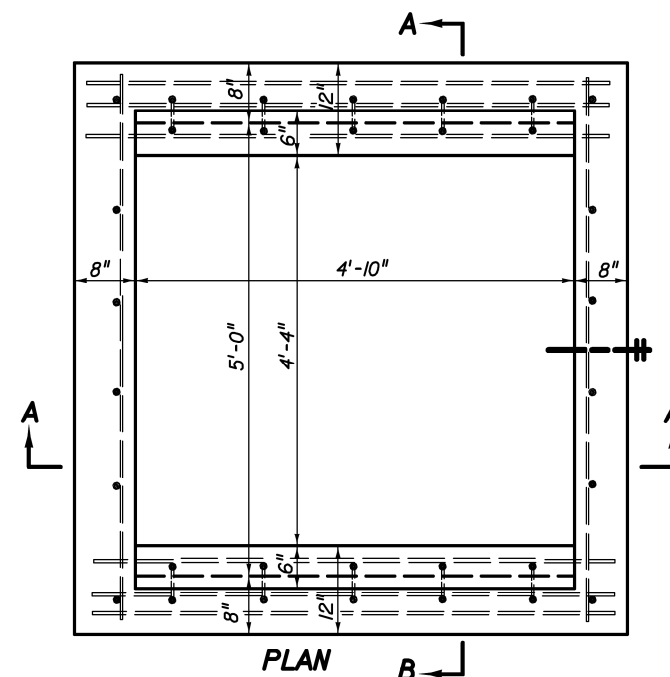
TOP SLAB REINFORCING SCHEDULE	
SCHEDULE	GRADE 60 OR 65KSI OR (WIRE FABRIC) In <sup>2</sup> /ft
A	0.20
B	0.24
C	0.37
D	0.53
E	0.73
F	1.06
G	1.45

**ALT. A STRUCTURE BOTTOM FOR INLETS TYPE C, D AND E**

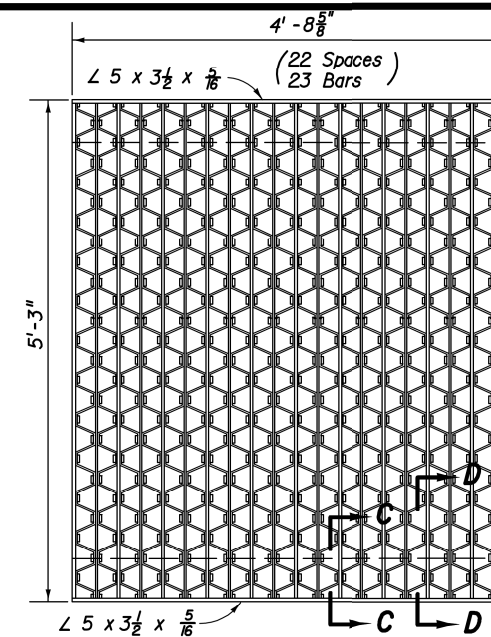
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>DITCH BOTTOM INLETS TYPES C, D, E &amp; H</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By	JDP 02/99	Revision	Sheet No.	Index No.
Checked By		00	5 of 5	232



PLAN B

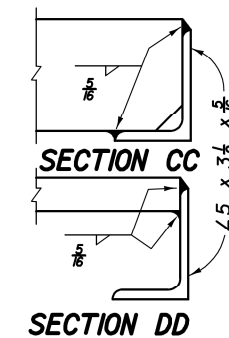


PLAN B

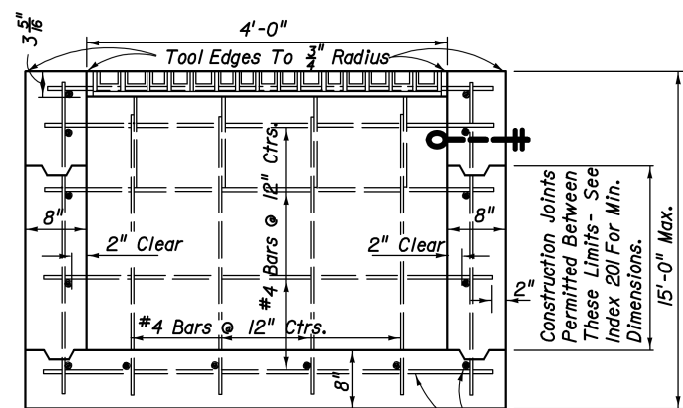


STEEL GRATE

5" Steel Decking, Weight 630 Lbs. Main Bars 5" x 1/4"  
Intermediate Bars 1 1/2" x 1/4", Reticuline Bars 1 1/4" x 3/8"

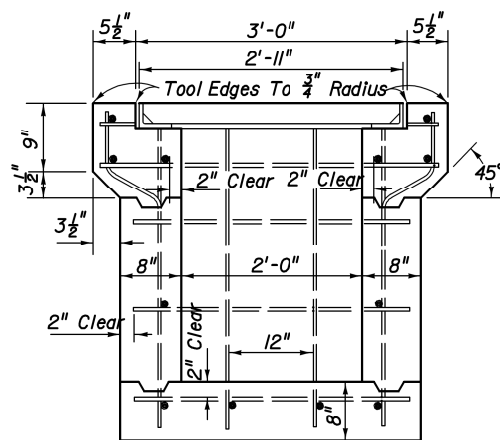


SECTION CC  
SECTION DD

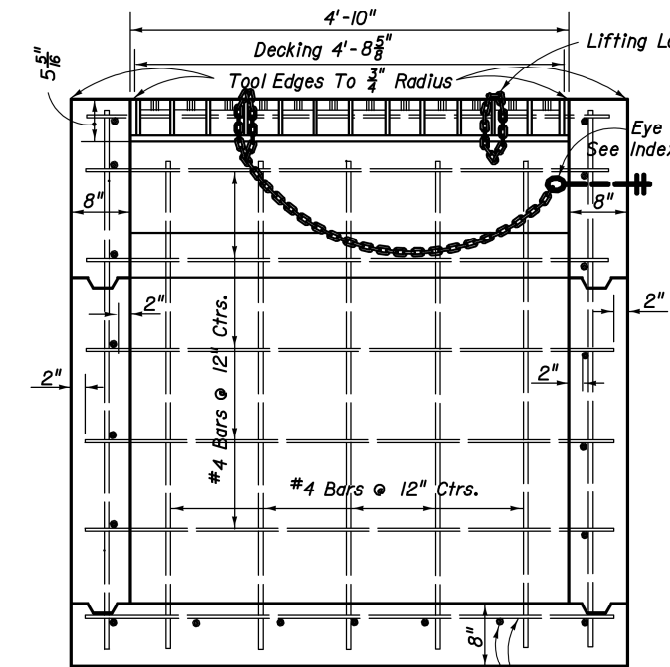


SECTION AA

#4 Bars @ 12" Ctrs.

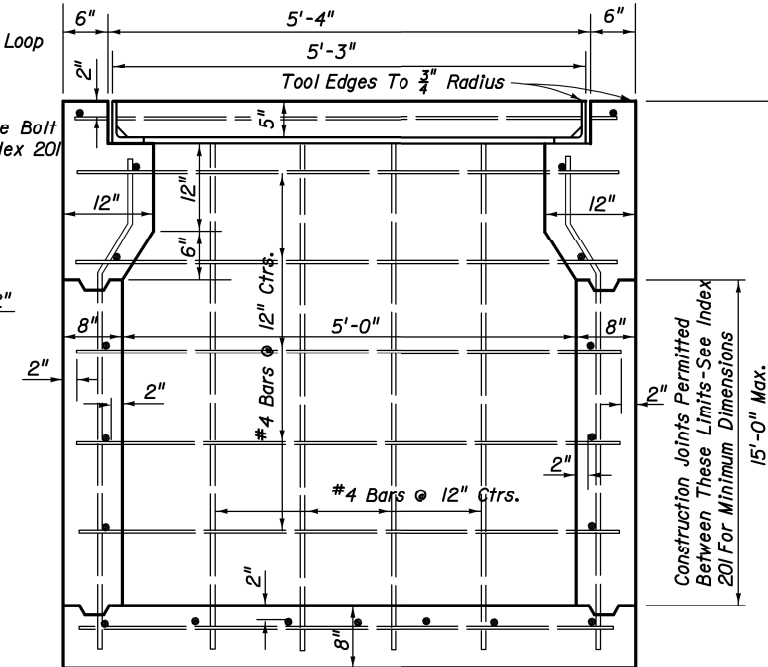


SECTION BB



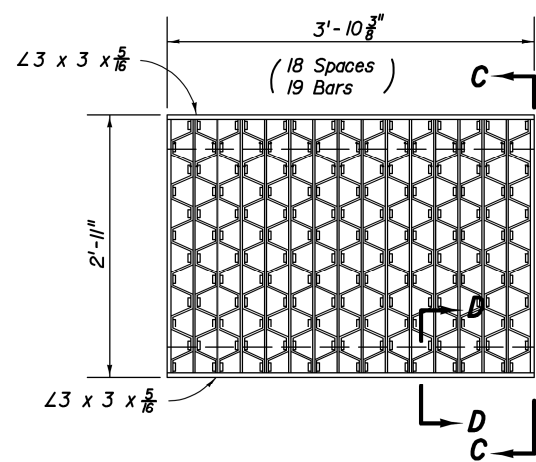
SECTION AA

#4 Bars @ 12" Ctrs.



SECTION BB

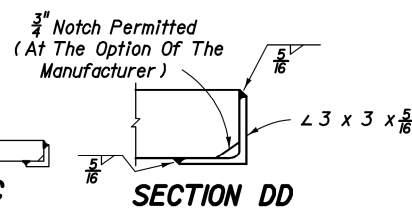
Construction Joints Permitted Between These Limits - See Index 201 For Minimum Dimensions 15'-0" Max.



STEEL GRATE

Steel Grating, Straight Bars 3" x 1/4"  
Reticuline Bars 2" x 3/8"

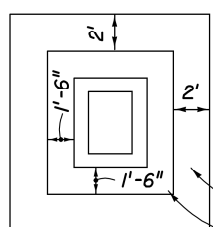
TYPE F



SECTION CC

SECTION DD

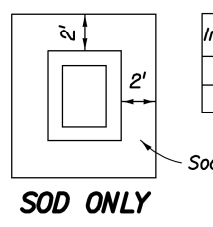
3/4" Notch Permitted (At The Option Of The Manufacturer)



PAVT. AND SOD

Inlet	Pavt Cy*	Sod SY
G	0.43	10
F	0.34	9

\*For Estimating Purposes Only



SOD ONLY

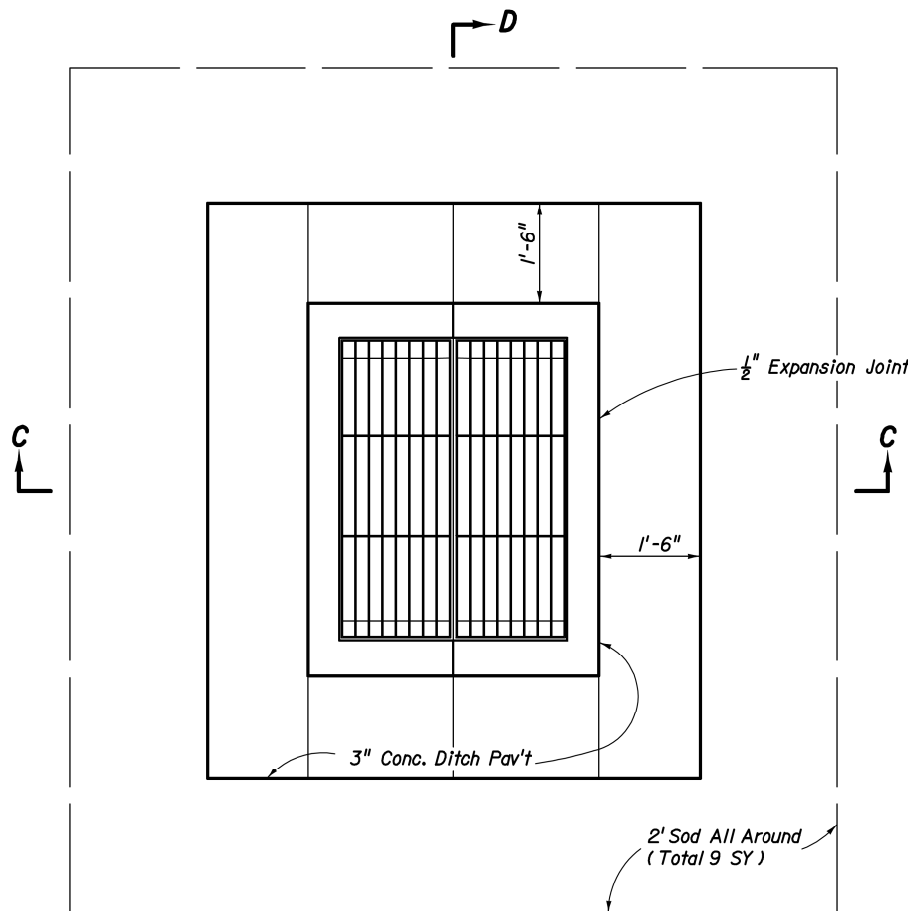
Notes: 1. Pavement and/or sod to be used only where called for in the plans.  
2. Cost of paving to be included in cost of inlet.

PAVEMENT AND SODDING

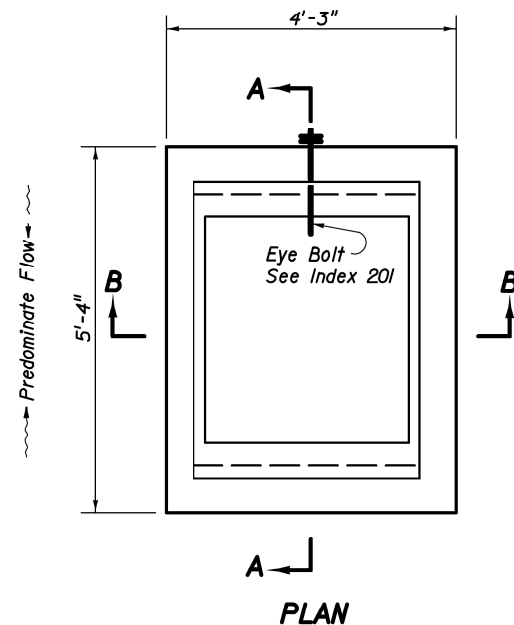
GENERAL NOTES

- 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 Alt. B structure bottoms, Index 200. 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), Ea.
- For supplemental details (Type F only), see Index 201.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
DITCH BOTTOM INLETS TYPES F & G				
Names	Dates	Approved By		
Designed By	TWJ 01/50	S. A. McHenry State Drainage Engineer		
Drawn By	MEF 01/50			
Checked By	WHM 01/50	Revision	00	Sheet No. 1 of 1
				Index No. 233



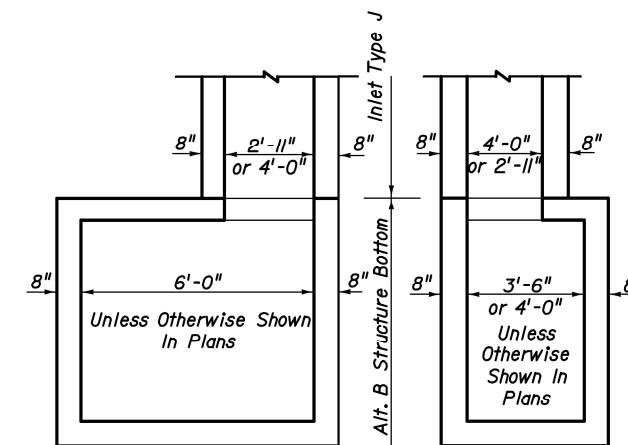
PAVEMENT & SODDING



PLAN

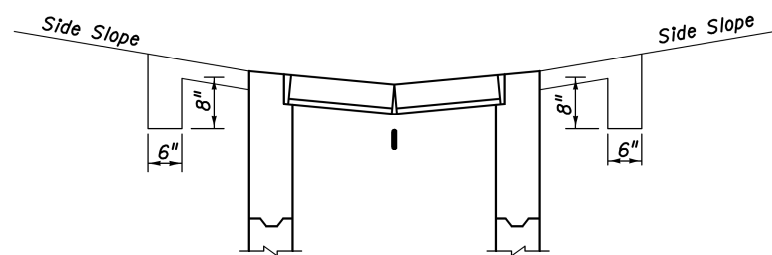
RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
2'-11"	24"
4'-0"	30"

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 detail right and Index No. 200.

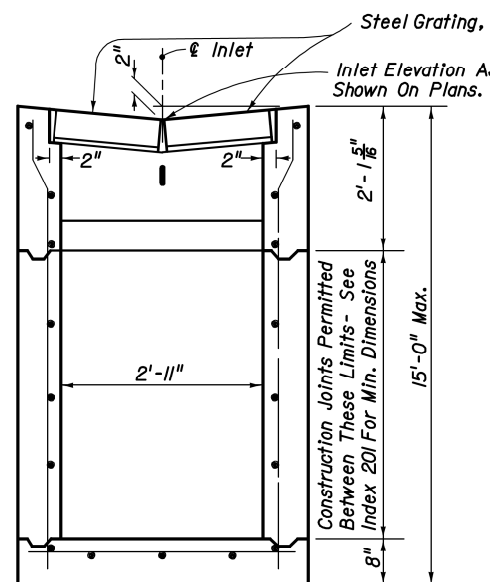


NOTE: Alt. B Structure Bottom Only. See Index 200 for structure bottom details and hole reinforcement.

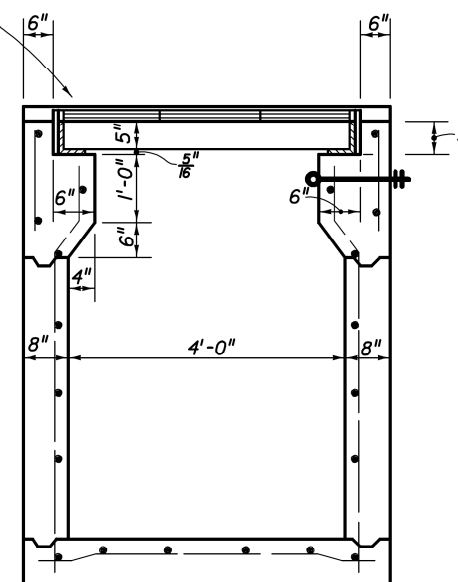
INLET WITH STRUCTURE BOTTOM



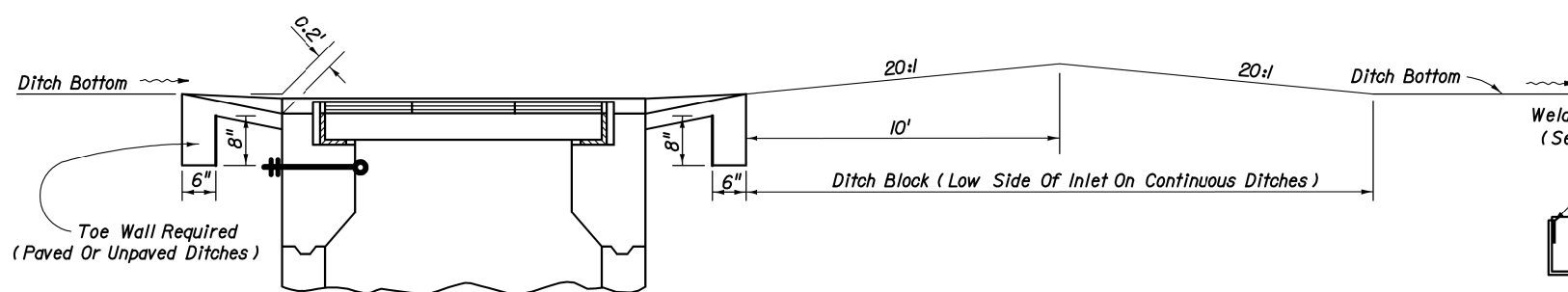
SECTION CC



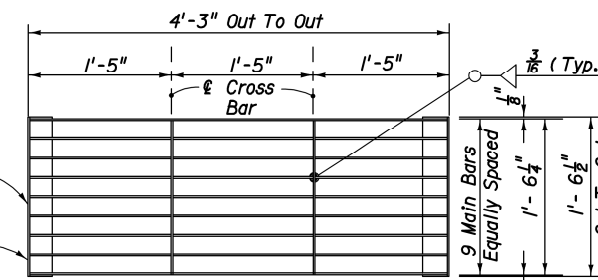
SECTION BB



SECTION AA

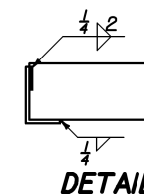


SECTION DD



STEEL GRATING

Note: Two Required Per Inlet  
 Main Bars 5" x 1/4" (Notched For Cross Bars).  
 Cross Bars 1 3/4" x 1/4" (Continuously Welded At Main Bar Notches).  
 Main Bars And Cross Bars Flush On Top.



DETAIL

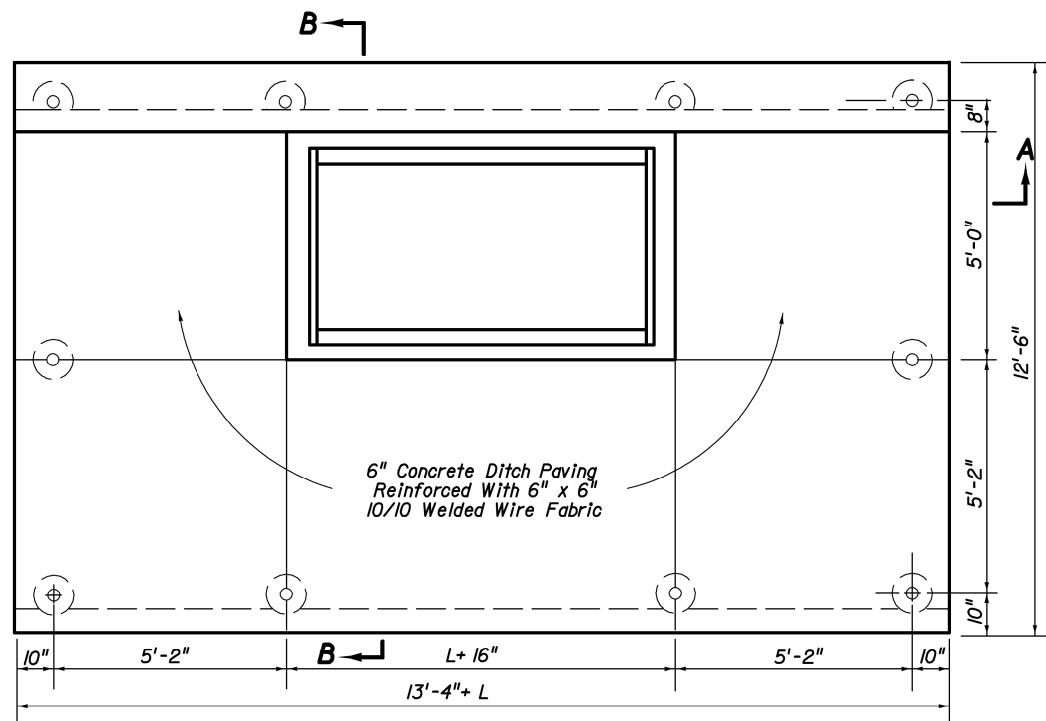
GENERAL NOTES

- 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- #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.

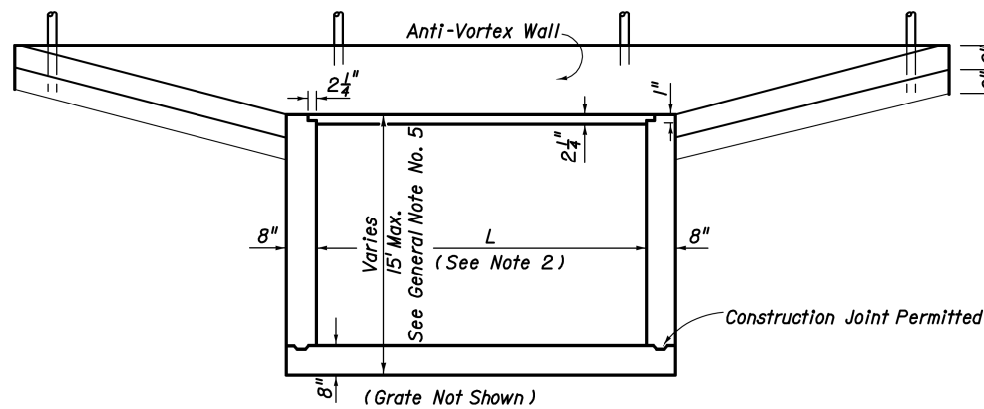
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLET TYPE J

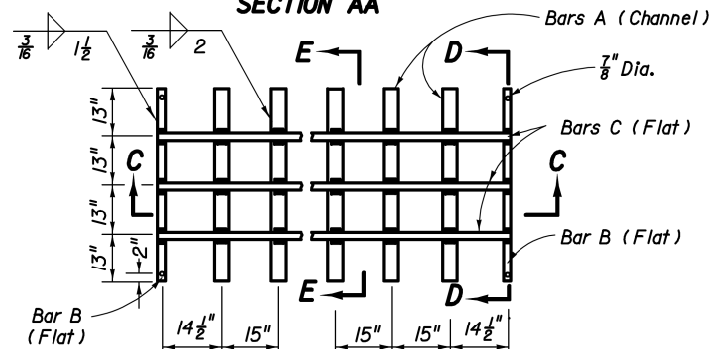
Names	Dates	Approved By		
Designed By	LMF	08/76	S. A. McHenry	
Drawn By			Revision	Sheet No.
Checked By	SRL	08/76	02	1 of 1
			Index No.	234



PLAN

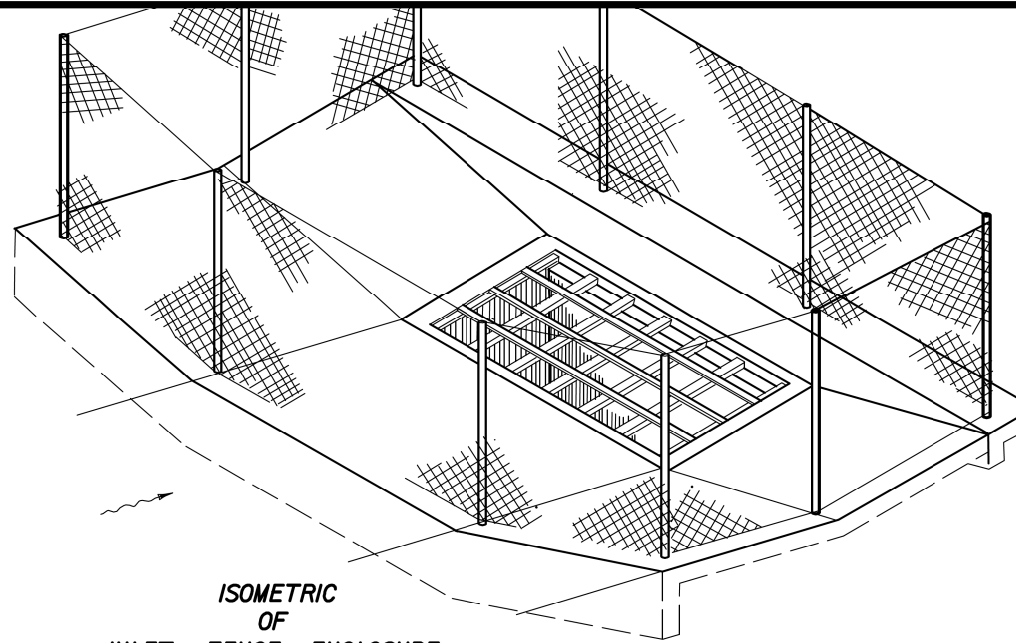


SECTION AA

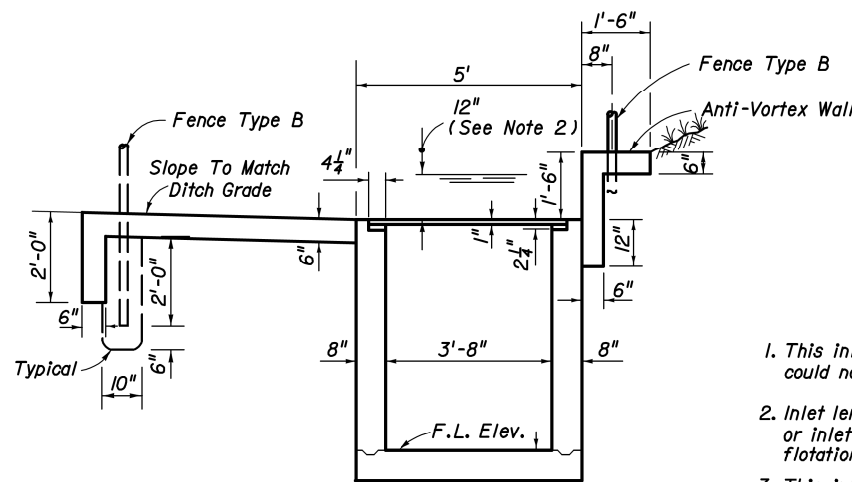


STEEL GRATE

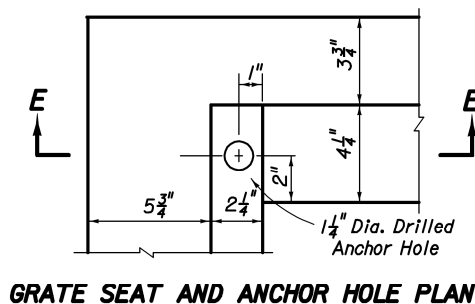
SECTION CC



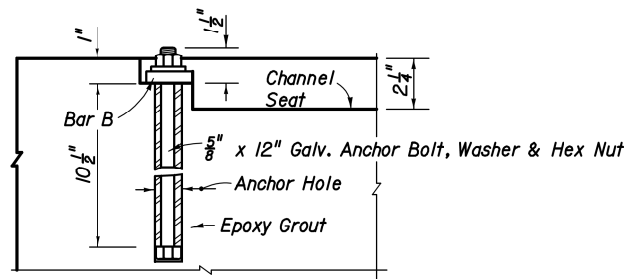
ISOMETRIC OF INLET FENCE ENCLOSURE



SECTION BB



GRATE SEAT AND ANCHOR HOLE PLAN



SECTION FF

GRATE QUANTITIES						
PIPE SIZE	L	BILL OF STEEL			STEEL WEIGHT	
		BAR	No. REQ'D.	LENGTH	CHANNEL 4" x 5.4#	FLAT 2" x 1/2" (3.4#)
30" & 36"	4'-9"	A	3	4'-4"	70	30
		B	2	4'-4"		
		C	3	5'-1"		
42" & 48"	6'-0"	A	4	4'-4"	94	30
		B	2	6'-4"		
		C	3	6'-4"		
54" & 60"	7'-3"	A	5	4'-4"	117	30
		B	2	4'-4"		
		C	3	7'-7"		
66" & 72"	8'-6"	A	6	4'-4"	140	30
		B	2	4'-4"		
		C	3	8'-10"		
SPECIAL	9'-9"	A	7	4'-4"	164	30
		B	2	4'-4"		
		C	3	10'-1"		
SPECIAL	11'-0"	A	8	4'-4"	187	30
		B	2	4'-4"		
		C	3	11'-4"		
SPECIAL	12'-3"	A	9	4'-4"	211	30
		B	2	4'-4"		
		C	3	12'-7"		
SPECIAL	13'-6"	A	10	4'-4"	234	30
		B	2	4'-4"		
		C	3	13'-10"		
SPECIAL	14'-9"	A	11	4'-4"	257	30
		B	2	4'-4"		
		C	3	15'-1"		
SPECIAL	16'-0"	A	12	4'-4"	281	30
		B	2	4'-4"		
		C	3	16'-4"		
SPECIAL	17'-3"	A	13	4'-4"	304	30
		B	2	4'-4"		
		C	3	17'-7"		
SPECIAL	18'-6"	A	14	4'-4"	328	30
		B	2	4'-4"		
		C	3	18'-10"		

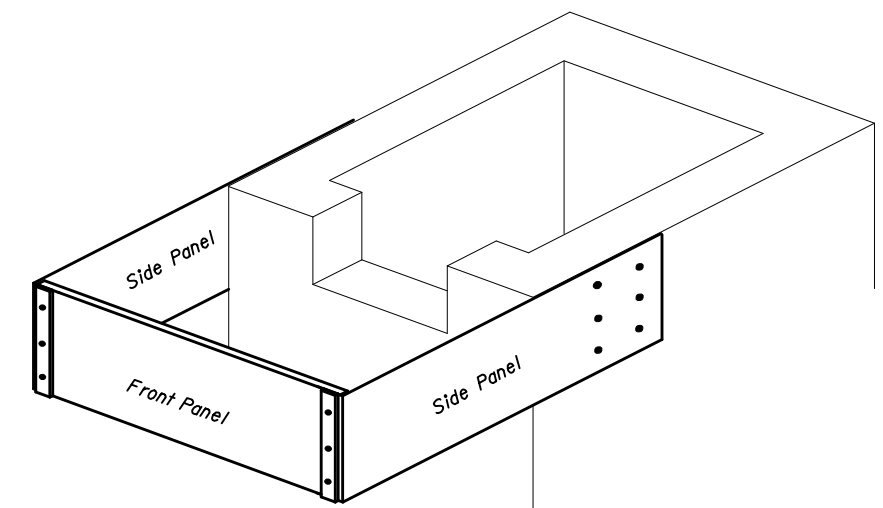
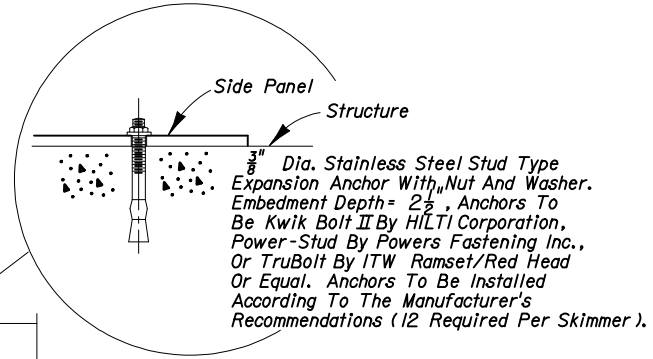
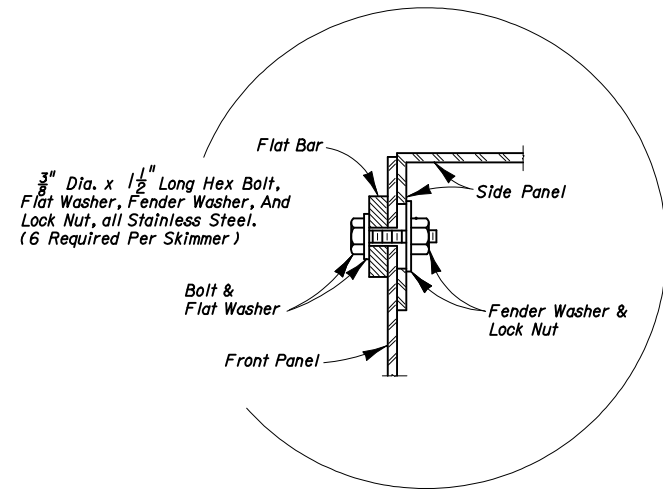
GENERAL NOTES

- This inlet is to be used at locations having high flow rates, usually where an endwall could not be utilized without hazardous intake.
- 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 not intended for use with Alternate B structure bottoms.
- Inlet and anti-vortex wall to be Class I Concrete.
- Reinforcing- #4 bars at 12" centers both ways for pipe sizes up to 72" diameter; 1 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 shall be ASTM A242/A242M, A572/A572M or A588/A588M, Grade 50 steel, and galvanized in accordance with Section 962-7 of the Standard Specifications.
- 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 diameter.
- Cost of ditch paving, anti-vortex wall, grate, concrete, reinforcing steel and fence enclosure to be included in the cost of inlet. Inlet to be paid for under the contract unit price for Inlets (DT Bot) (Type K), Each.

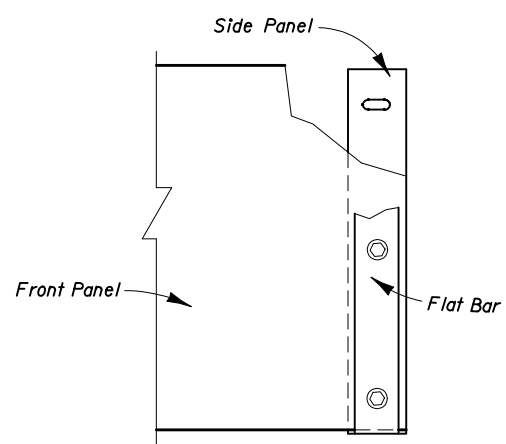
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

DITCH BOTTOM INLET TYPE K

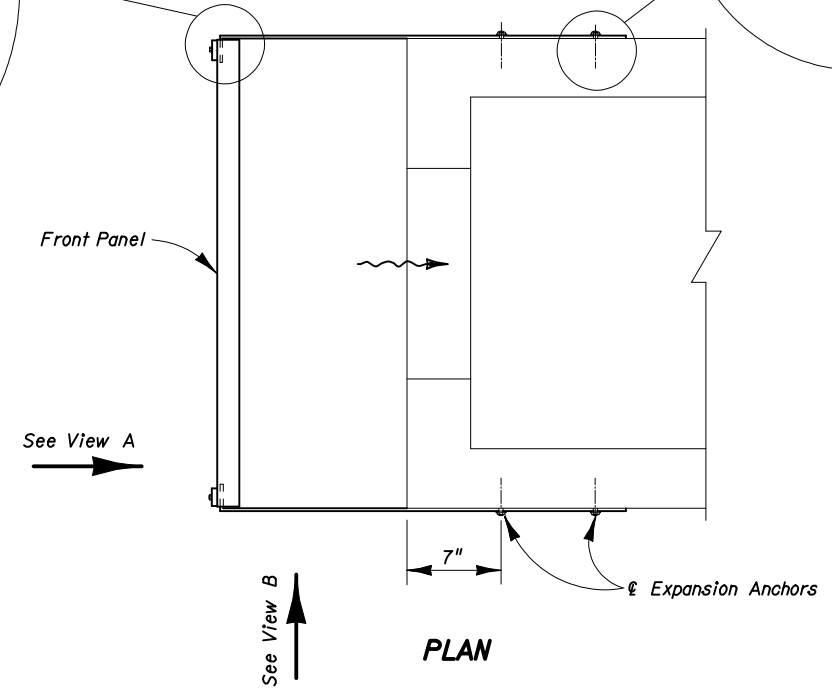
Designed By	FHWA	Dates	Approved By	S. A. Mchemou
Drawn By	SM	6/79	State Drainage Engineer	
Checked By	JG	6/79	Revision	00
			Sheet No.	1 of 1
			Index No.	235



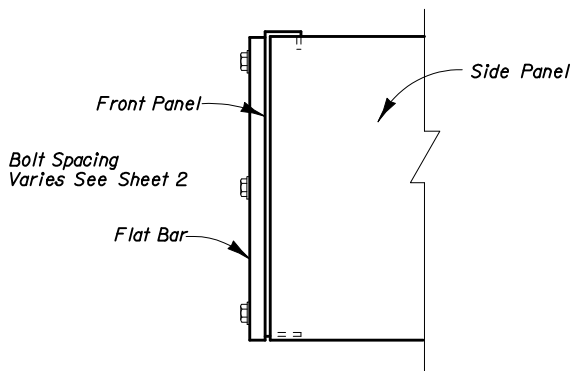
PICTORIAL VIEW



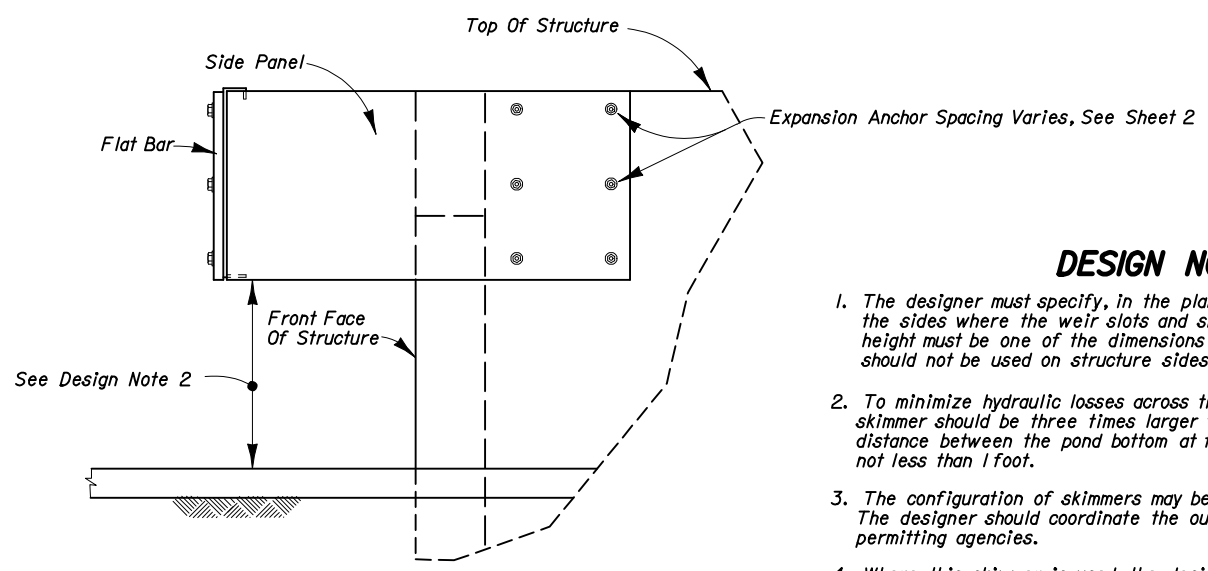
VIEW A



PLAN



VIEW B



SIDE VIEW

GENERAL NOTES

1. This skimmer is intended for use on Type C, D, or E Ditch Bottom Inlets that are used as outlet control structures of stormwater management facilities.
2. The side panels are dimensionally symmetric, therefore they may be used on either side of the structure.
3. Two (2) skimmers may be constructed on one structure provided they are on opposite ends.
4. The width of the front panel (dimension W) shall be the same as the outside dimension across the front of the structure.
5. The front panel, side panels, and flat bars are to be hot dipped galvanized after fabrication.
6. The location of the reinforcing steel in these structures must conform to the applicable standards to avoid conflict with the expansion anchors used to attach the skimmer.
7. Grates to be used on the inlets unless otherwise specified in the plans.
8. A skimmer consists of two (2) side panels, one front panel, two (2) flat bars, and accessory hardware. The cost of skimmers is to be included in the cost of the inlet.

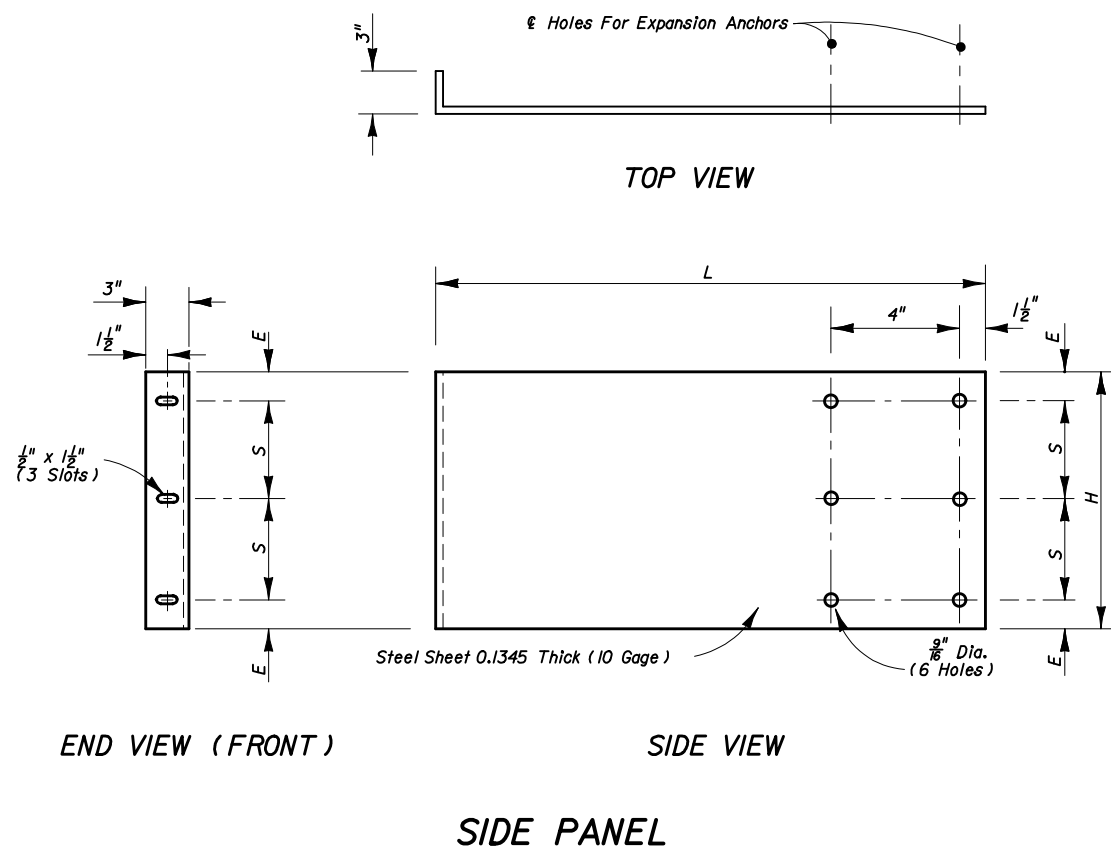
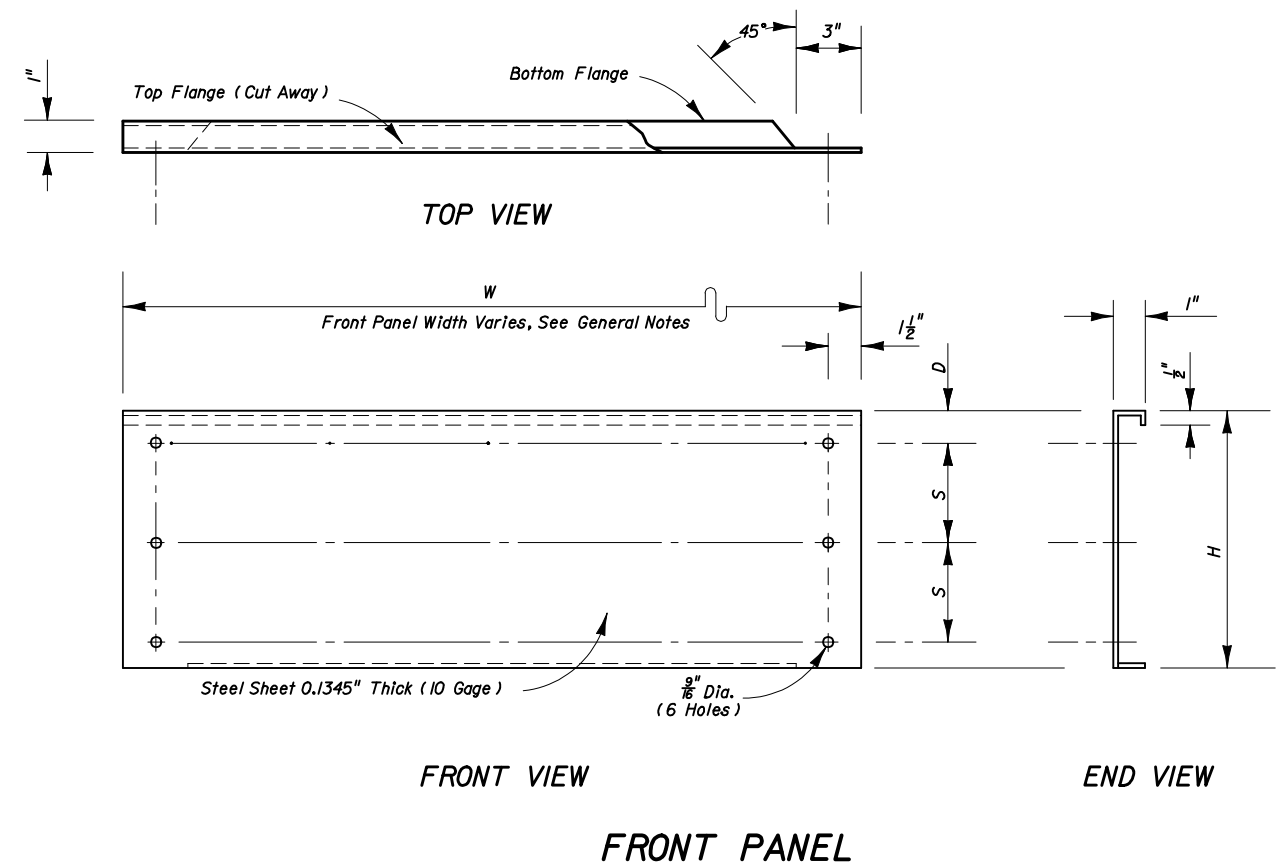
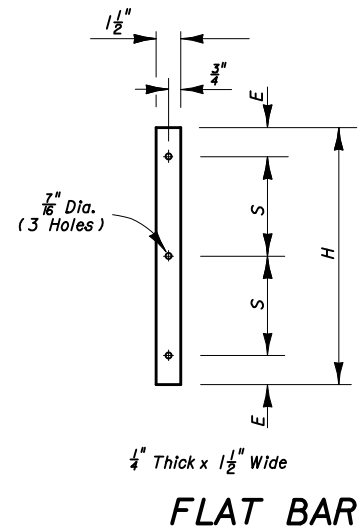
DESIGN NOTES

1. The designer must specify, in the plans, the skimmer height (dimension H) and the sides where the weir slots and skimmers are located. The skimmer height must be one of the dimensions shown in the table on Sheet 2. The skimmer should not be used on structure sides with outside dimensions greater than 6'-4".
2. To minimize hydraulic losses across the skimmer, the flow area under the skimmer should be three times larger than the flow area of the weir slot. The distance between the pond bottom at the structure and the skimmer shall be not less than 1 foot.
3. The configuration of skimmers may be subject to regulatory requirements. The designer should coordinate the outlet control structure details with the permitting agencies.
4. Where this skimmer is used, the designer should reference this index with the outlet control structure details. Where a different skimmer design is needed, the designer should provide skimmer details in the plans.
5. The designer shall evaluate if a grate is needed for safety reasons. Where a grate is not needed for safety reasons and is not desirable for hydraulic or other reasons, the designer may omit the grate by stating so in the outlet control structure details.
6. The designer must show the configuration of the weir slots in the outlet control structure detail.

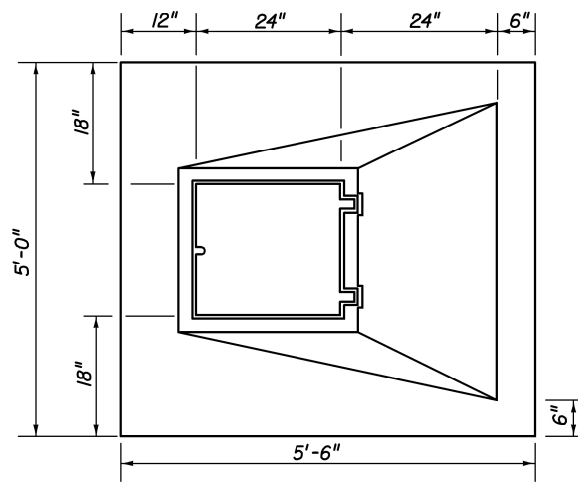
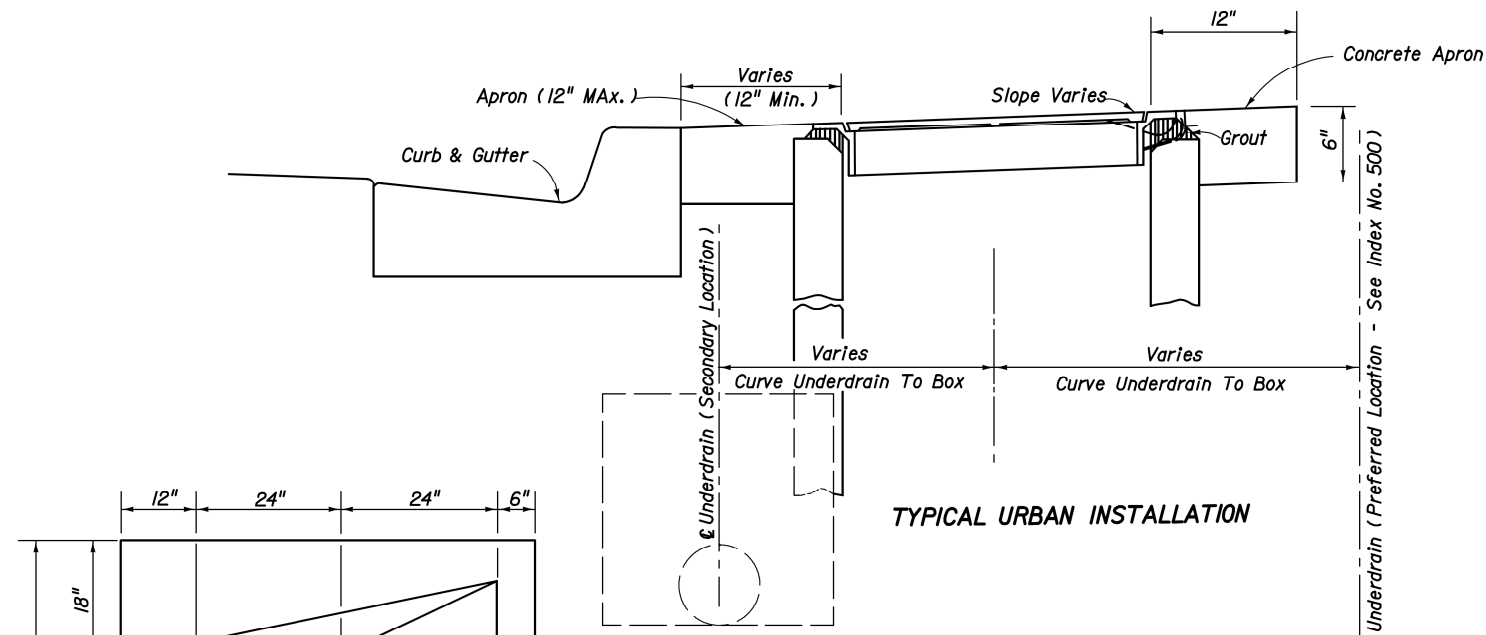
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SKIMMER FOR OUTLET CONTROL STRUCTURES</b>				
Designed By	CRH	02/99	Approved By <i>S. A. McHenry</i> State Drainage Engineer	
Drawn By	JT	02/99	Revision	Sheet No.
Checked By	WPH	02/99	00	1 of 2
				Index No. <b>240</b>



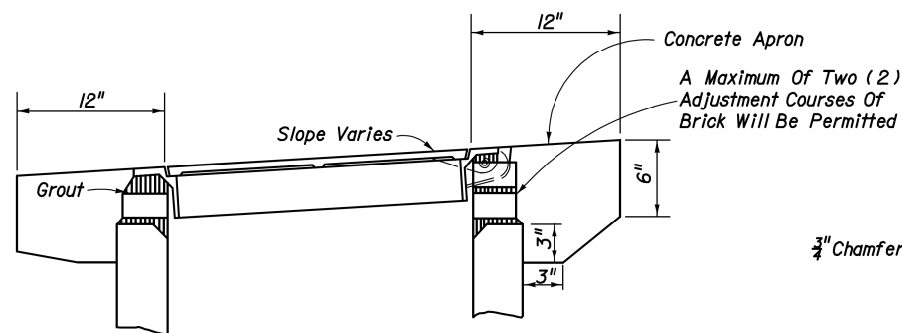
DIMENSIONS				
Skimmer Height as specified in the plans				Bolt Spacing
H	D	E	L	S
Inches				
12	3 $\frac{3}{8}$ "	3	28	3
14	3 $\frac{3}{8}$ "	3	28	4
16	3 $\frac{3}{8}$ "	3	28	5
18	3 $\frac{3}{8}$ "	3	28	6
20	4 $\frac{3}{8}$ "	4	31	6
22	4 $\frac{3}{8}$ "	4	31	7
24	4 $\frac{3}{8}$ "	4	31	8
26	4 $\frac{3}{8}$ "	4	31	9
28	4 $\frac{3}{8}$ "	4	31	10
30	5 $\frac{3}{8}$ "	5	31	10
32	5 $\frac{3}{8}$ "	5	31	11
34	5 $\frac{3}{8}$ "	5	31	12
36	6 $\frac{3}{8}$ "	6	31	12
38	6 $\frac{3}{8}$ "	6	31	13
40	6 $\frac{3}{8}$ "	6	31	14



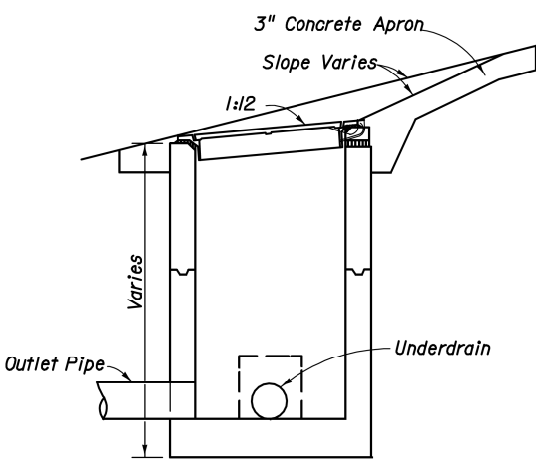
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SKIMMER FOR OUTLET CONTROL STRUCTURES</b>				
Designed By	Names	Dates	Approved By	
Drawn By	CRH	02/99	<i>S. A. McHenry</i> State Drainage Engineer	
Checked By	JT	02/99	Revision	Sheet No.
	WPH	02/99	00	2 of 2
				Index No. <b>240</b>



TOP VIEW

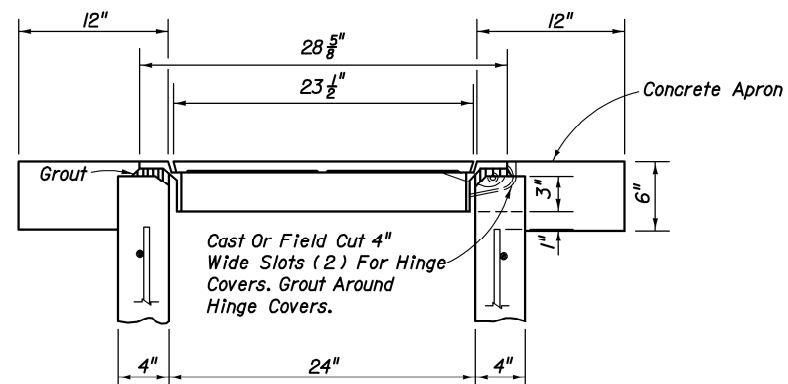


PERMISSIBLE TOP ADJUSTMENT

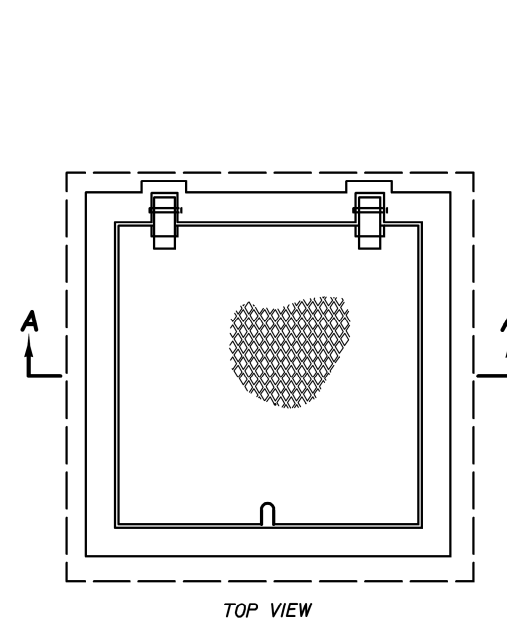


SECTION

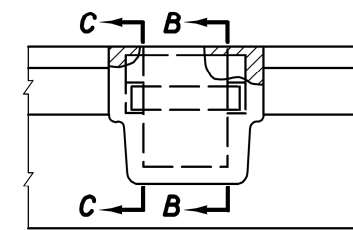
TYPICAL INSTALLATION ON SLOPES



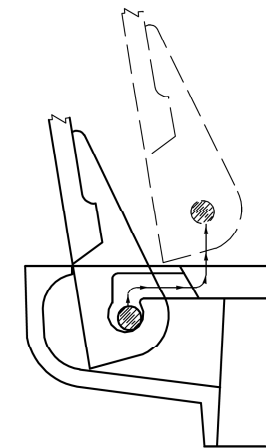
TYPICAL TOP AND APRON



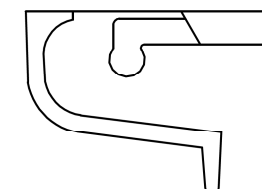
TOP VIEW



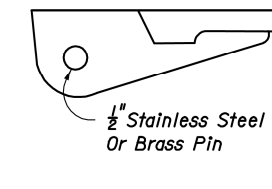
BACK VIEW



COVER REMOVAL



SECTION CC

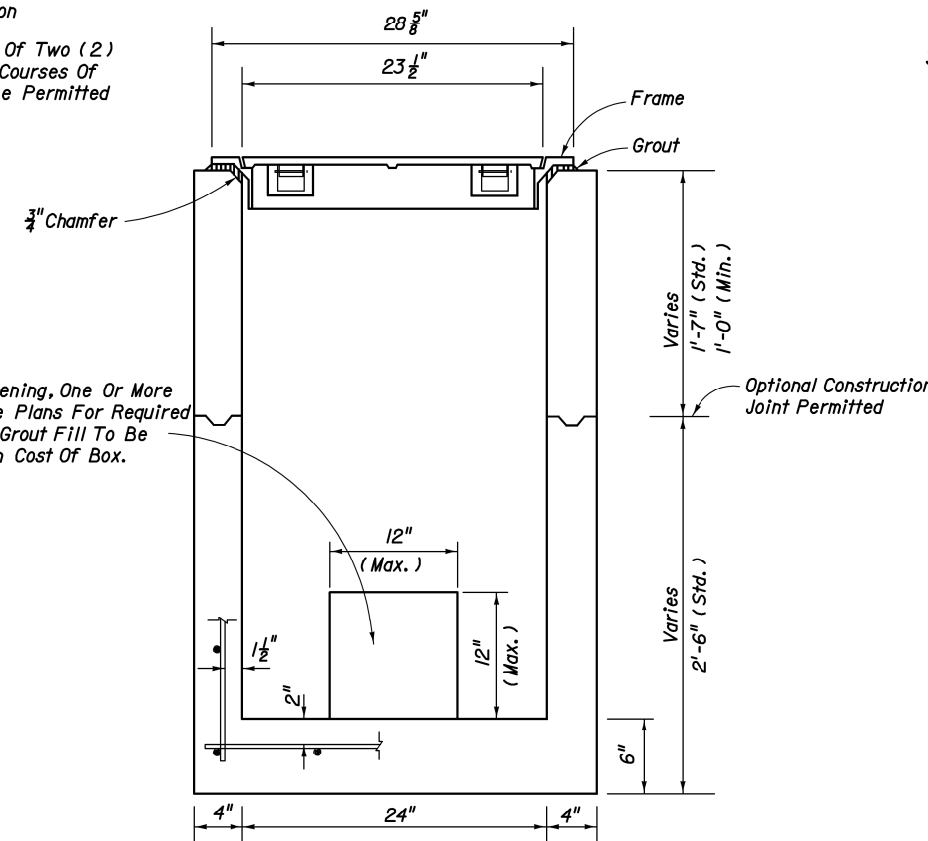


SECTION BB

**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.



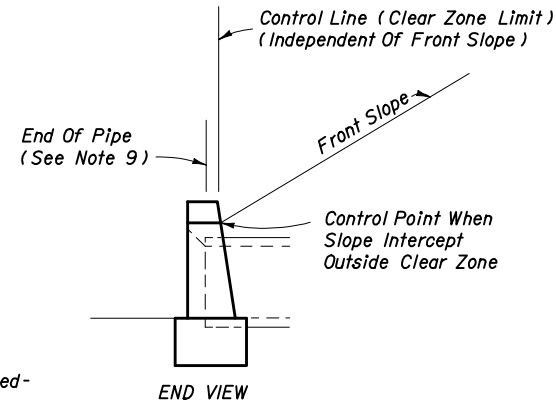
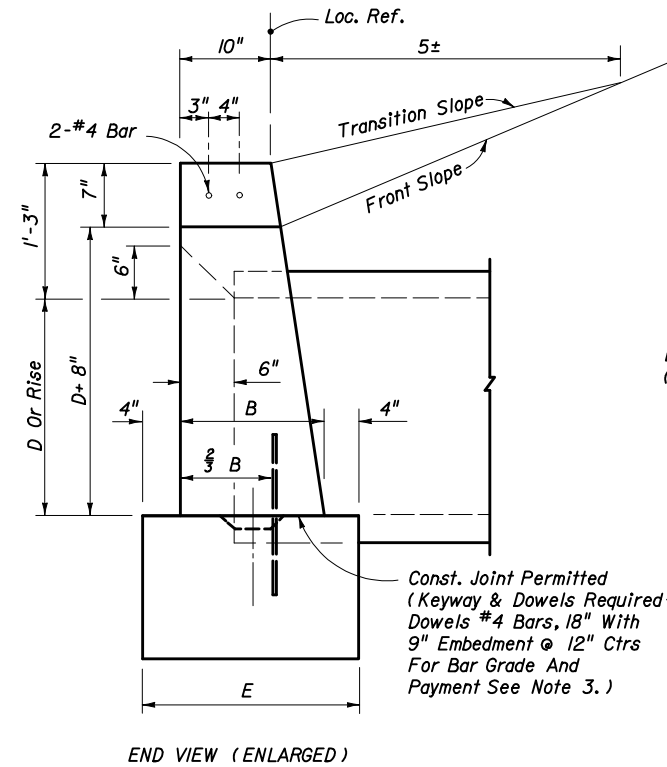
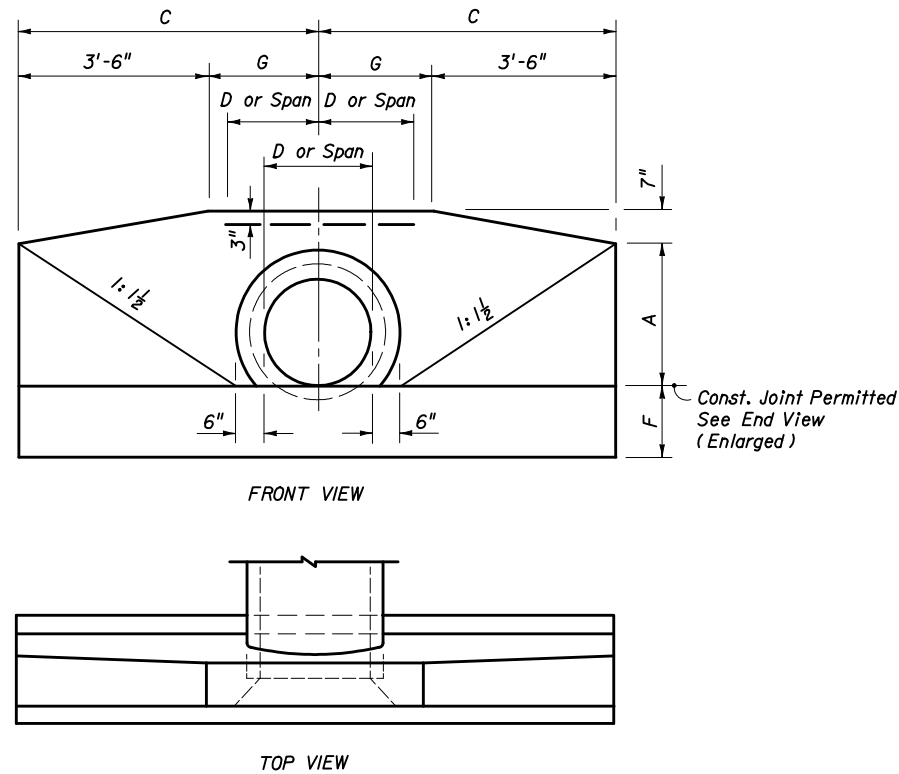
SECTION AA

BOX AND TOP

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**UNDERDRAIN INSPECTION BOX**

Names	Dates	Approved By		
Designed By	WS 05/81	 State Drainage Engineer		
Drawn By	JM 05/81			
Checked By	JVG 05/81	Revision	Sheet No.	Index No.
		00	1 of 1	245



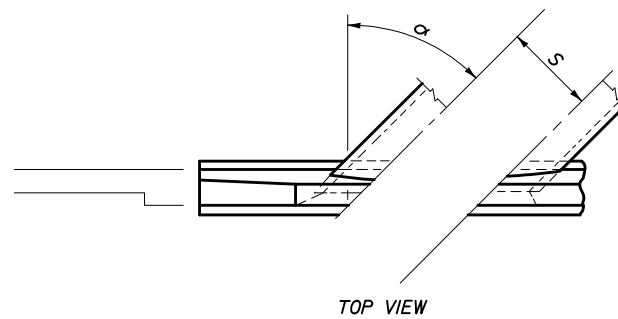
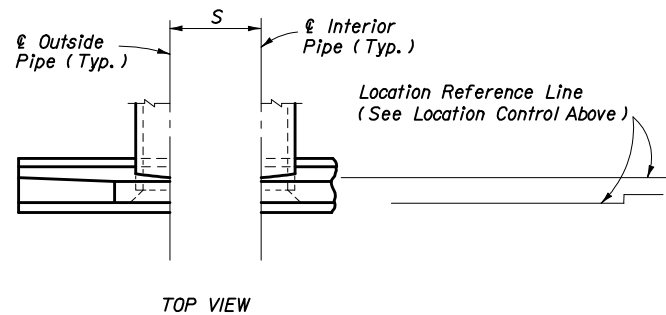
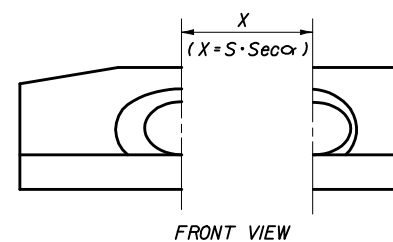
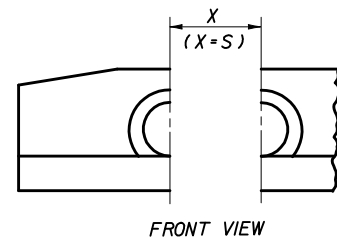
**STANDARD LOCATION CONTROL**

**GENERAL NOTES**

1. 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.
2. Front slope and ditch transitions shall be in accordance with Index No. 280.
3. 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, (endwalls).
4. All exposed corners and edges of concrete are to be chamfered  $\frac{3}{4}$ ".
5. Concrete meeting the requirements of ASTM C478 (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.
6. On outfall ditches with side slopes flatter than 1:1 1/2 provide 20' transitions from the endwall to the flatter side slopes, right of way permitting.
7. For sodding around endwalls see Index No. 281.
8. 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°
9. Pipe length plan quantities shall be based on the pipe end locations shown in the standard location control end view, or lengths based on special endwall locations called for in the plans.
10. Payment for pipe in pipe culverts shall be based on plan quantities, adjusted for endwall locations subsequently established by the Engineer.
11. Endwalls to be paid for under the contract unit price for Concrete Class I (Endwalls), CY.

**ENDWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)**




**NORMAL PIPE**

**SKewed PIPE**

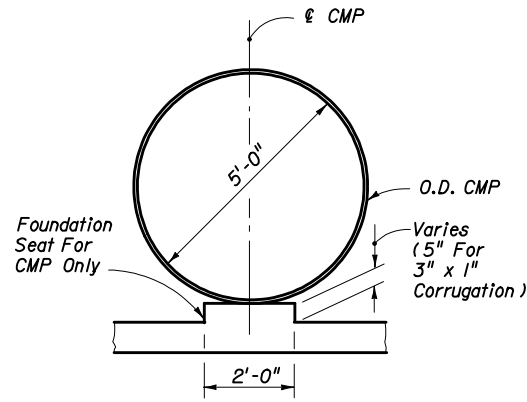
**LEGEND**

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

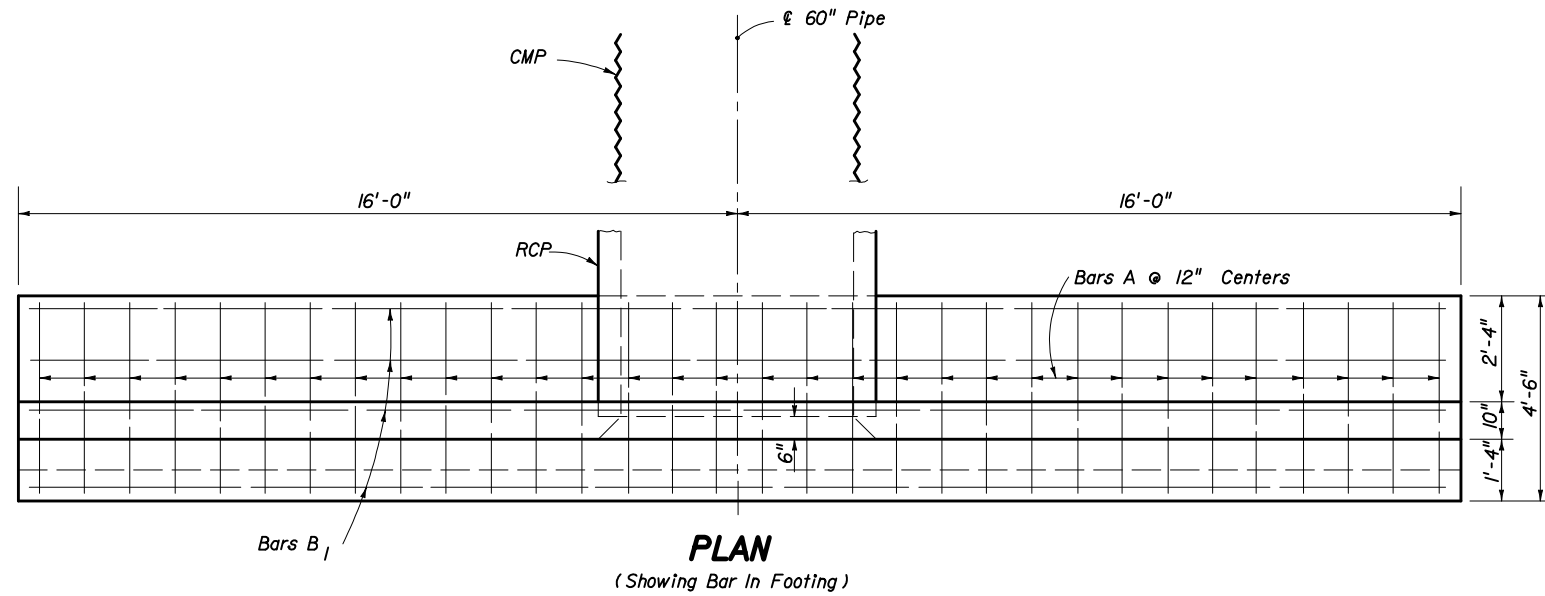
**ENDWALL POSITIONS FOR SINGLE AND MULTIPLE PIPE AND SPACING FOR MULTIPLE PIPE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>STRAIGHT CONCRETE ENDWALLS SINGLE AND MULTIPLE PIPE</b>				
Names	Dates	Approved By		
Designed By	HAB/EGR	73/83	 State Drainage Engineer	
Drawn By	RWR/HSD	83	Revision	Sheet No.
Checked By	JBW/JVG	83	00	1 of 2
				Index No. <b>250</b>





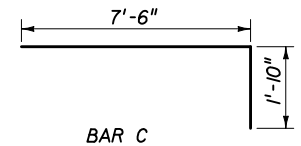
**SECTION BB**



**PLAN**  
(Showing Bar In Footing)

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

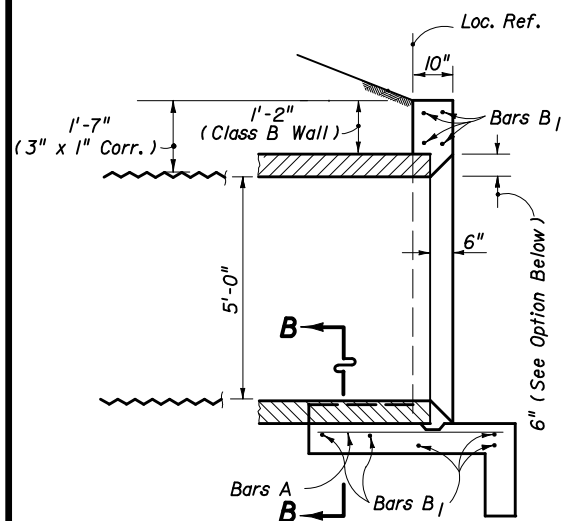
**BENDING DIAGRAM**



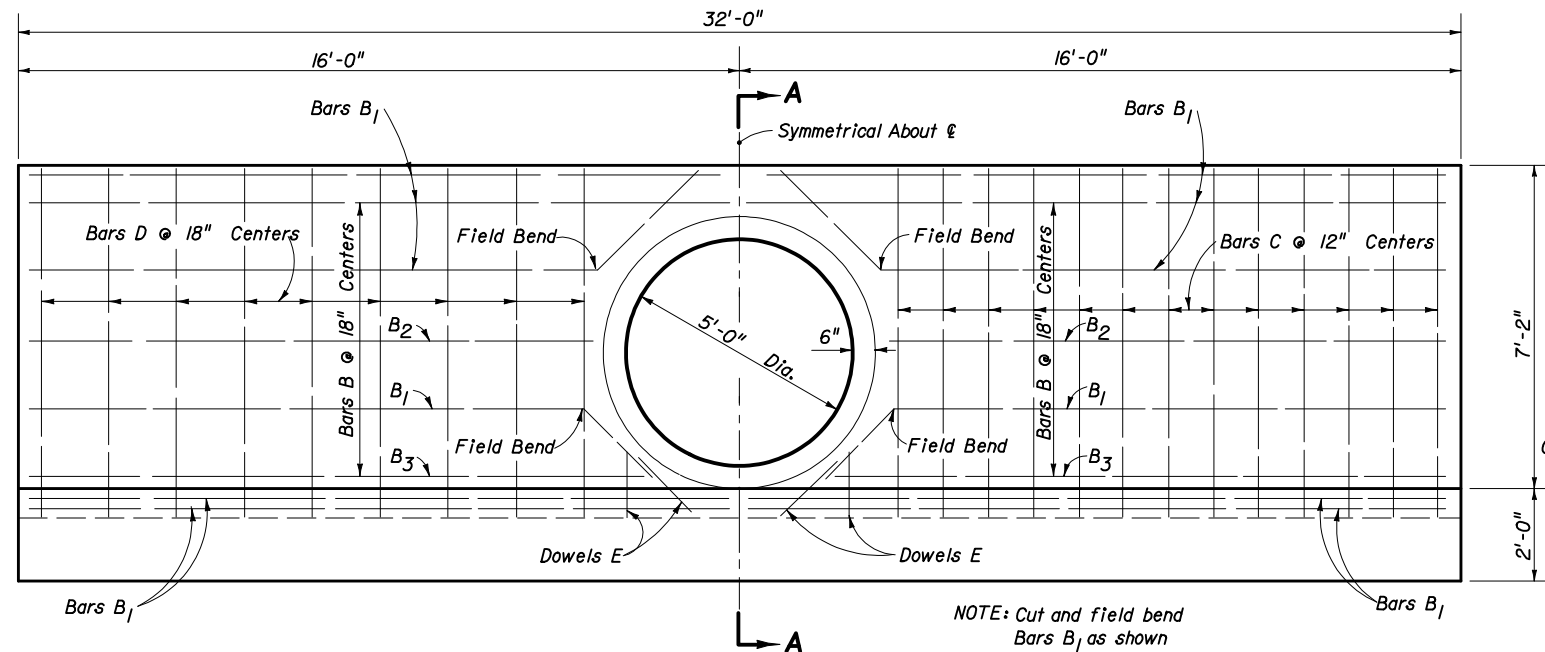
NOTE: All bar dimensions are out to out

**ESTIMATED QUANTITIES**

ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	11.3	11.4
Reinforcing Steel	Lb.	695	695



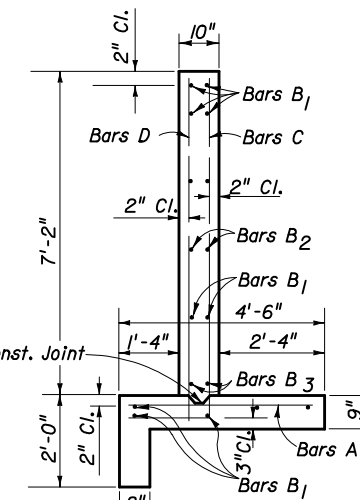
**SECTION AA**



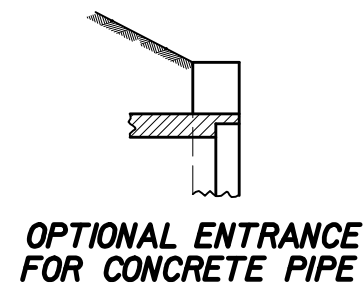
**HALF ELEVATION**  
(Showing Bars In Front Face Of Wall)



**HALF ELEVATION**  
(Showing Bars In Back Face Of Wall)



**TYPICAL SECTION THRU ENDWALL**



**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

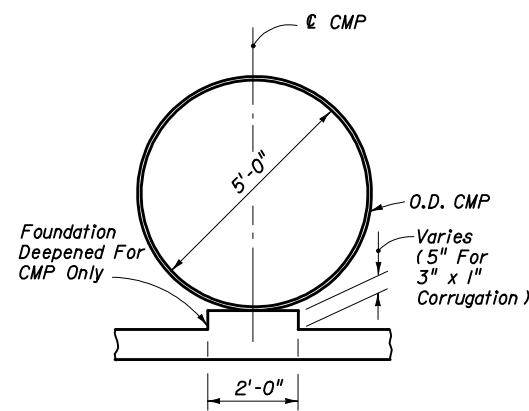
**GENERAL NOTES**

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this Index, design specifications AASHTO 1989. 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.
3. Reinforcing steel shall be either Grade 40 or 60.
4. 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.
5. Chamfer: All exposed edges and corners to be chamfered  $\frac{3}{4}$ " unless otherwise shown.
6. 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.
7. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Sodding, SY.
8. 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 Concrete, Class II (Endwalls), CY and Reinforcing Steel (Roadway), LB.

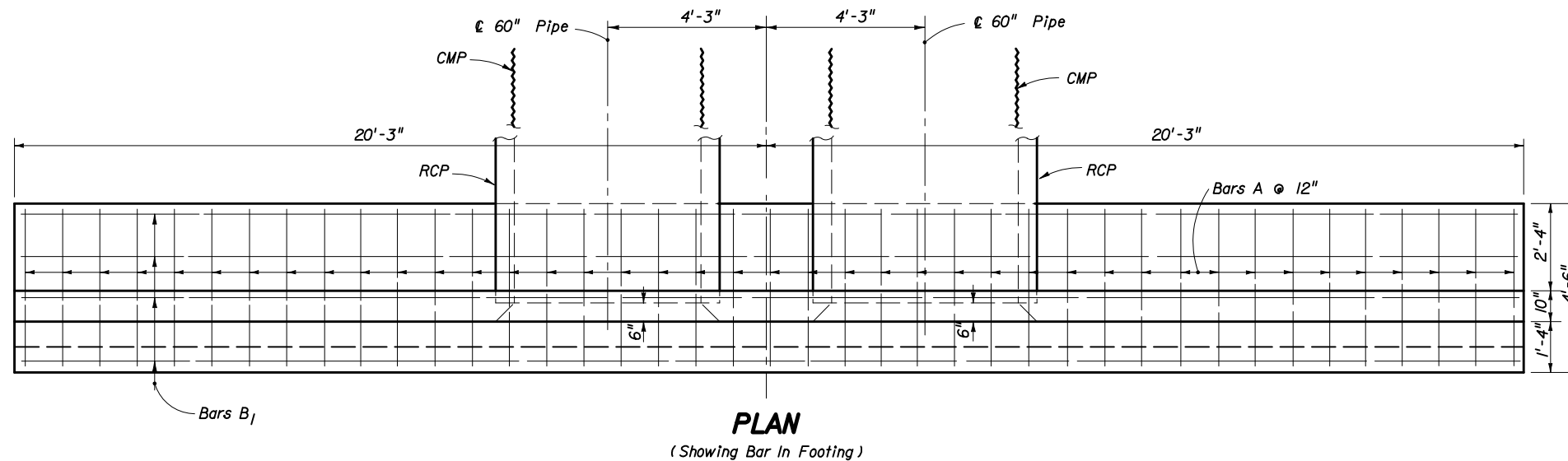
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STRAIGHT CONCRETE ENDWALLS**  
SINGLE AND DOUBLE 60" PIPE

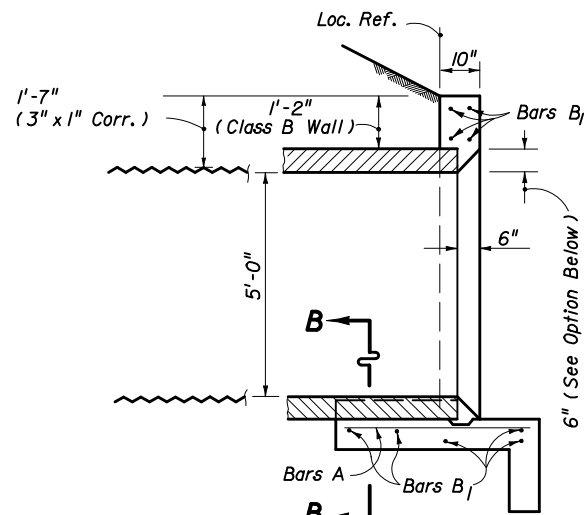
Names	Dates	Approved By		
Designed By		S. A. McHenry State Drainage Engineer	Revision	Sheet No.
Drawn By	TWJ 11/49		00	1 of 2
Checked By	WHM 11/49			251



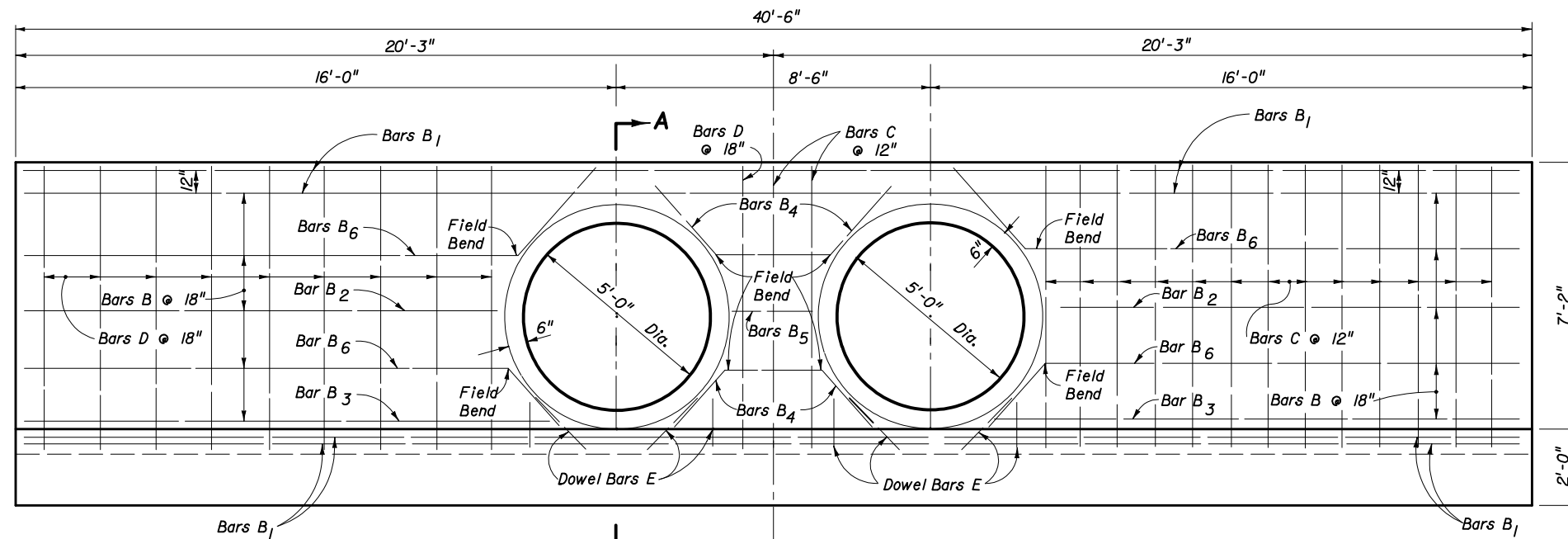
**SECTION BB**



**PLAN**  
(Showing Bar In Footing)



**SECTION AA**

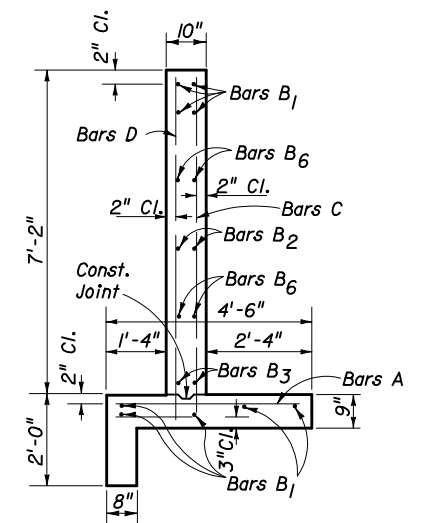


**HALF ELEVATION**

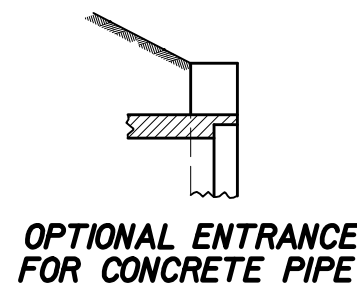
(Showing Bars In Front Face Of Wall)

**HALF ELEVATION**

(Showing Bars In Back Face Of Wall)



**TYPICAL SECTION THRU ENDWALL**

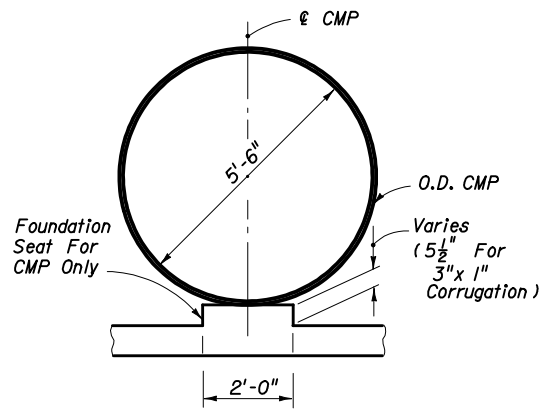


**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

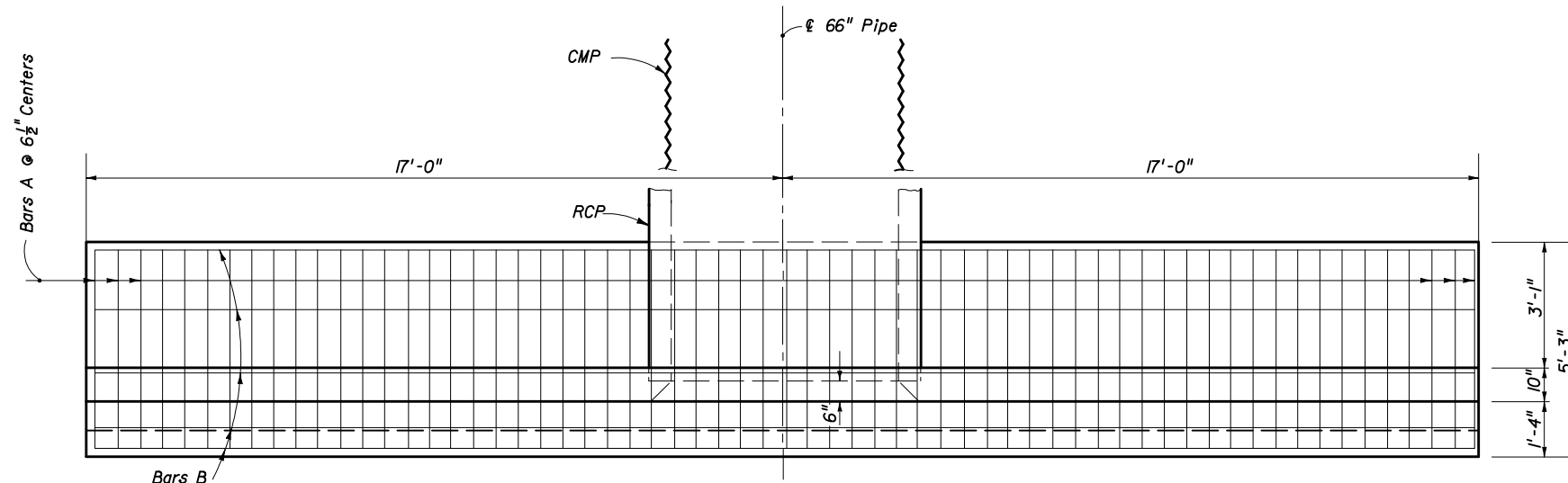
BILL OF REINFORCING STEEL						BENDING DIAGRAM			
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING	ESTIMATED QUANTITIES			
A	#4	41	4'-2"	Footing	Straight	Concrete Class II	Cu. Yd.	13.7	13.8
B1	#4	9	40'-2"	Footing & Wall	Straight				
B2	#4	4	12'-6"	Wall	Straight	Reinforcing Steel	Lb.	824	824
B3	#4	4	13'-9"	Wall	Straight				
B4	#4	4	6'-0"	Wall	Field Bend	<p>NOTE: All bar dimensions are out to out</p>			
B5	#4	2	2'-2"	Wall	Straight				
B6	#4	8	15'-0"	Wall	Field Bend				
C	#4	29	9'-4"	Footing & Wall	Bend				
D	#4	20	7'-6"	Footing & Wall	Straight				
E	#4	16	1'-8"	Footing & Wall	Straight				

NOTE: See Sheet 1 of 2 For General Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>STRAIGHT CONCRETE ENDWALLS</b>				
SINGLE AND DOUBLE 60" PIPE				
Designed By	Names	Dates	Approved By	
Drawn By	TWJ	11/49	S. A. McHenry	
Checked By	WHM	11/49	Revision	00
			Sheet No.	2 of 2
			Index No.	251



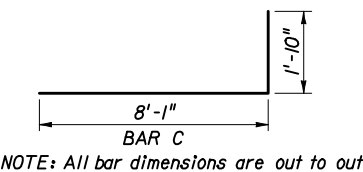
**SECTION BB**



**PLAN**  
(Showing Bars In Footing)

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

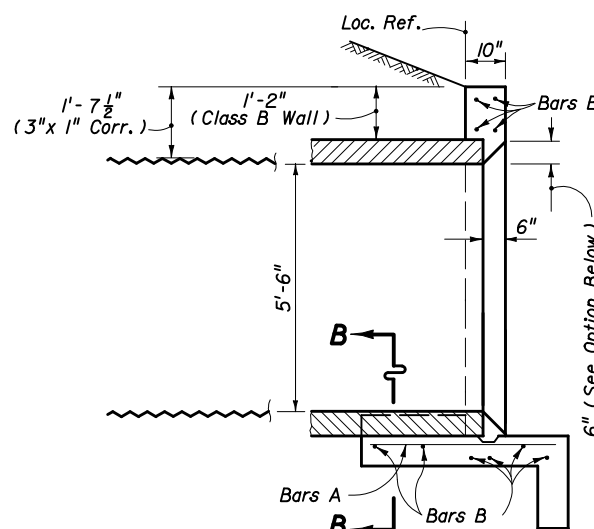
**BENDING DIAGRAM**



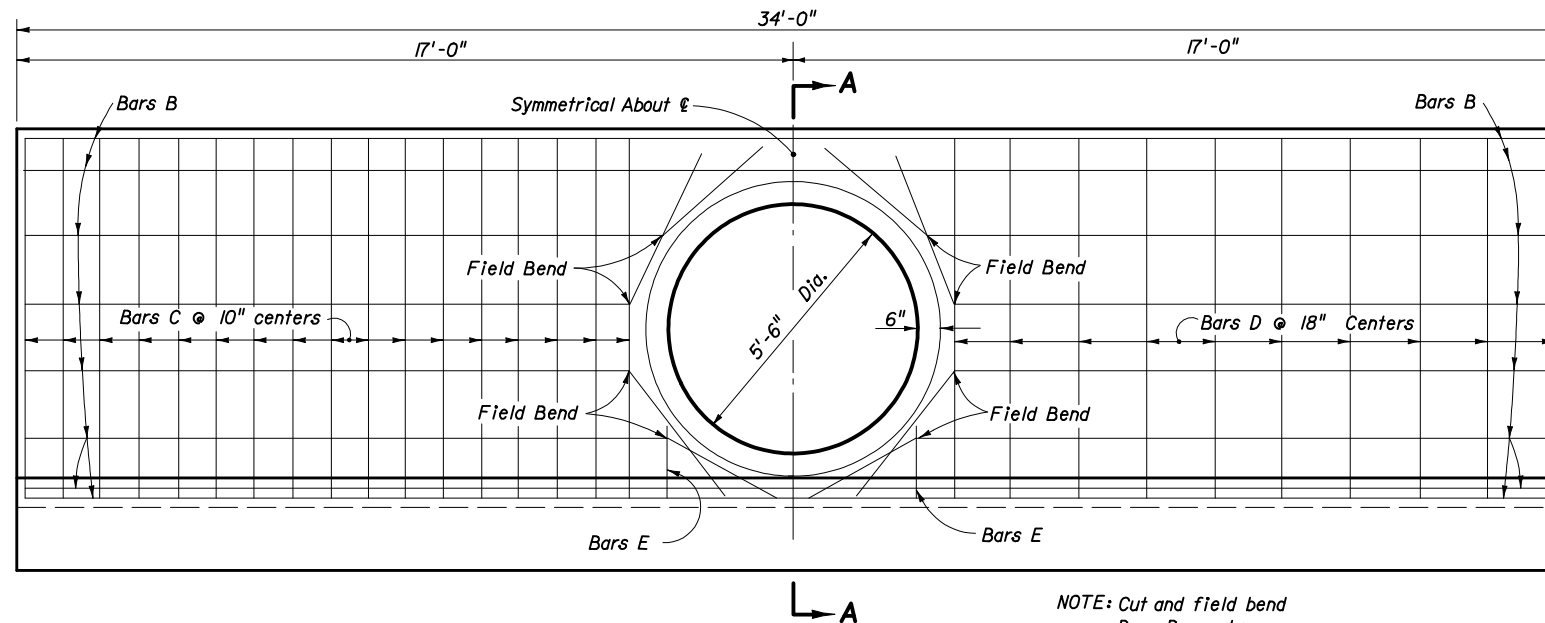
NOTE: All bar dimensions are out to out

**ESTIMATED QUANTITIES**

ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	13.2	13.3
Reinforcing Steel	Lb.	1170	1170

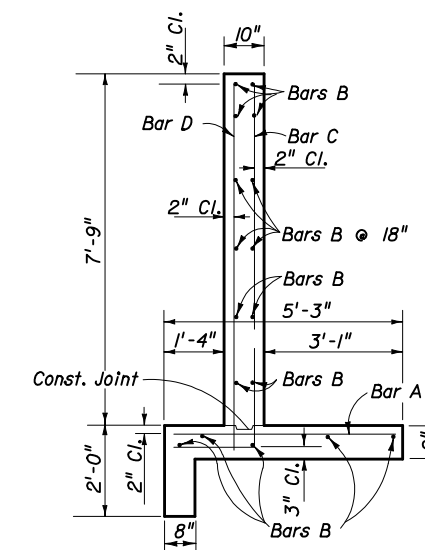


**SECTION AA**



**HALF ELEVATION**  
(Showing Bars In Back Face Of Wall)

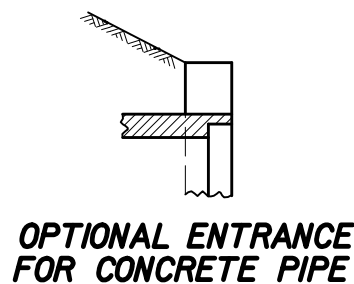
**HALF ELEVATION**  
(Showing Bars In Front Face Of Wall)



**TYPICAL SECTION THRU ENDWALL**

**GENERAL NOTES**

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1989. 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.
3. Reinforcing steel shall be either Grade 40 or 60.
4. 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.
5. Chamfer: All exposed edges and corners to be chamfered  $\frac{3}{4}$ " unless otherwise shown.
6. 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.
7. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Sodding, SY.
8. 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 Concrete Class II (Endwalls), CY and Reinforcing Steel (Roadway), LB.

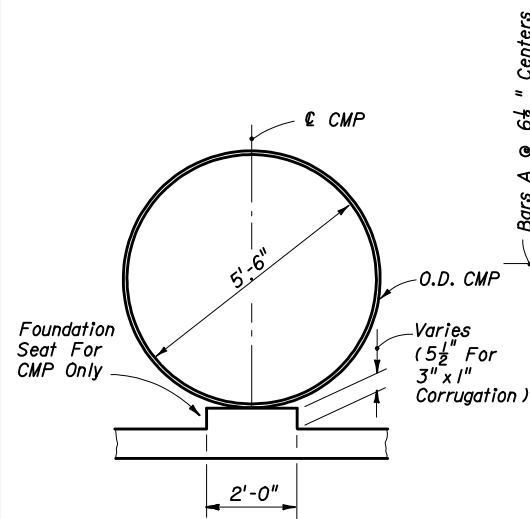


**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

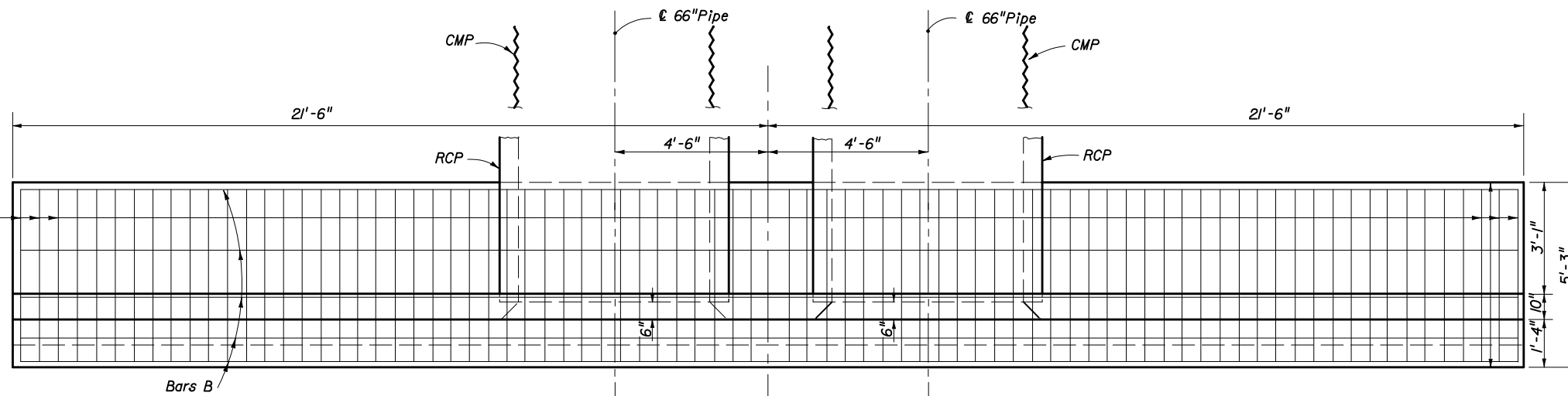
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STRAIGHT CONCRETE ENDWALLS**  
SINGLE AND DOUBLE 66" PIPE

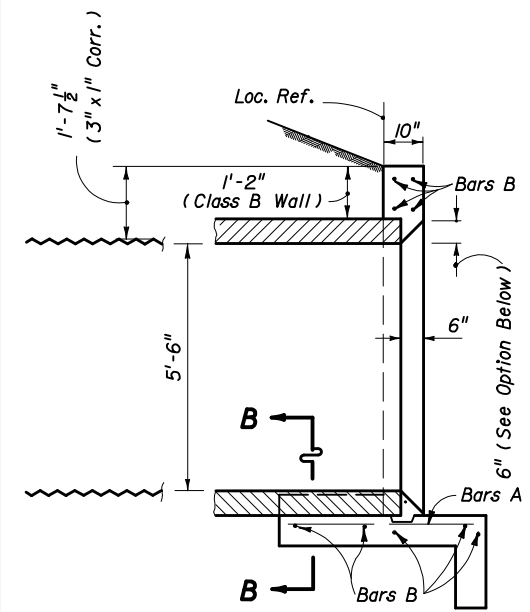
Designed By	JLW	Dates	03/54	Approved By	<i>S. A. McHenry</i>
Drawn By		Revision		State Drainage Engineer	
Checked By	RCB	03/54	00	Sheet No.	1 of 2
				Index No.	252



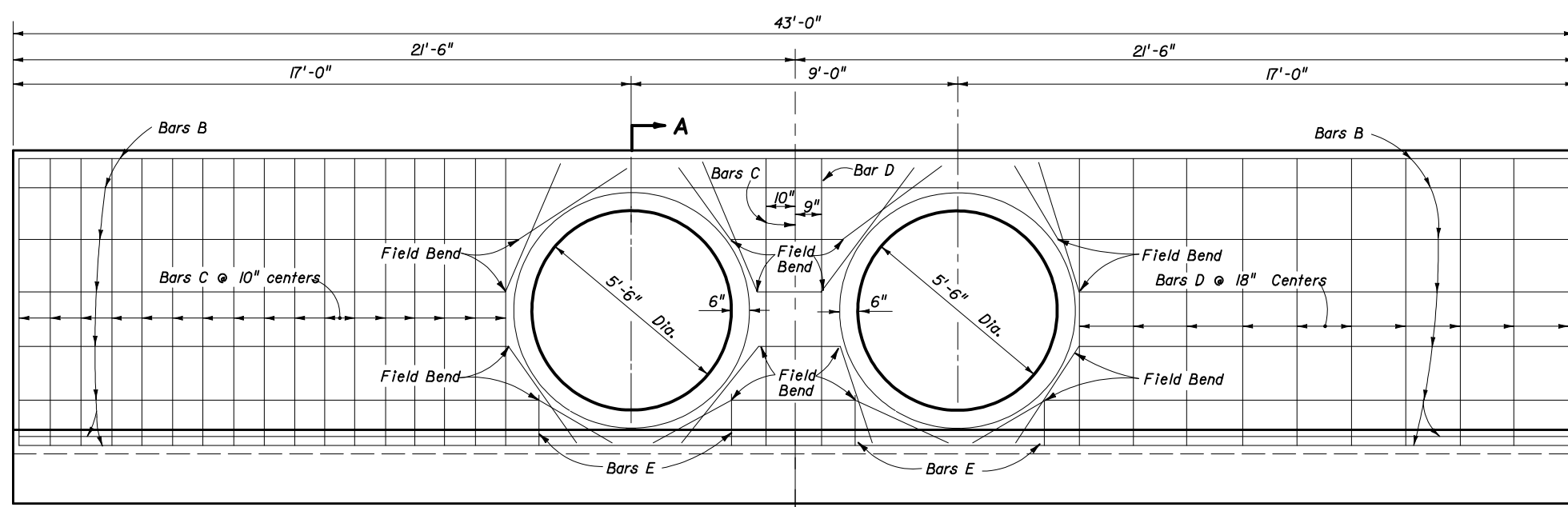
**SECTION BB**



**PLAN**  
(Showing Bars In Footing)

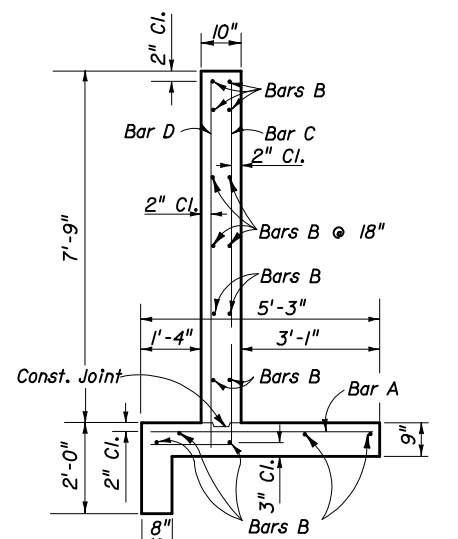


**SECTION AA**

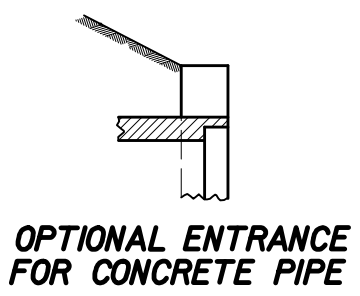


**HALF ELEVATION**  
(Showing Bars In Back Face Of Wall)

**HALF ELEVATION**  
(Showing Bars In Front Face Of Wall)

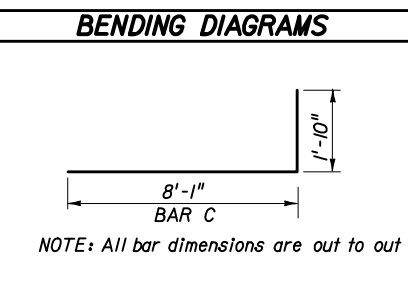


**TYPICAL SECTION THRU ENDWALL**



**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	5	80	4'-11"	Footing	Straight
B	4	17	42'-8"	Footing & Wall	Straight
C	5	37	9'-11"	Wall	Bend
D	4	22	8'-1"	Wall	Straight
E	4	8	1'-8"	Wall	Straight



ESTIMATED QUANTITIES			
ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	16.0	16.2
Reinforcing Steel	Lb.	1,406	1,406

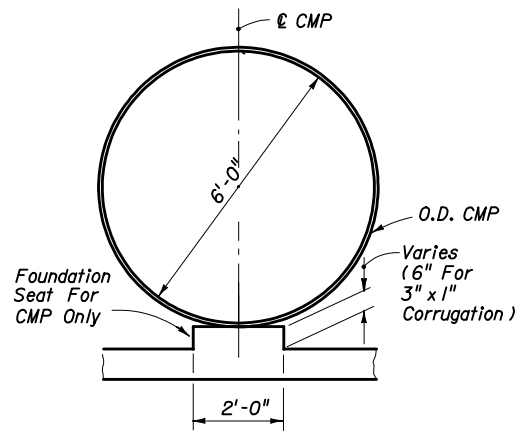
NOTE: See Sheet 1 of 2 for General Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

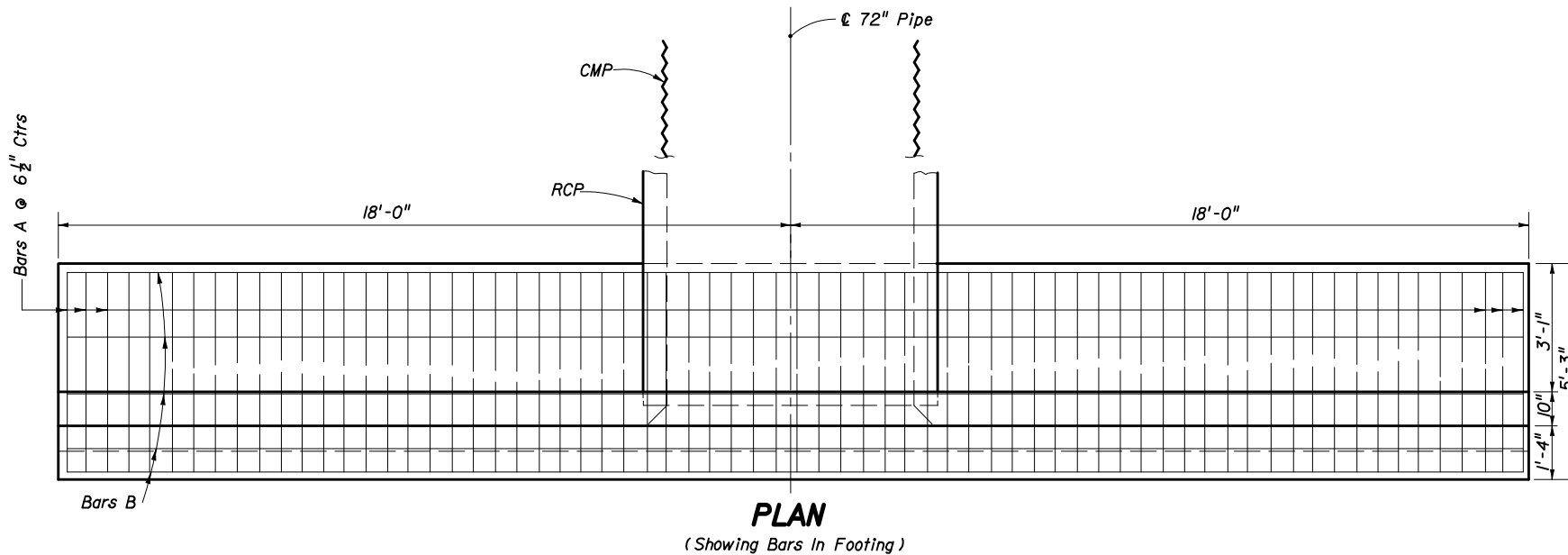
**STRAIGHT CONCRETE ENDWALLS**  
SINGLE AND DOUBLE 66" PIPE

Designed By	JSP	Dates	11/79	Approved By	<i>S. A. McHenry</i>
Drawn By	FWT	Revision	11/79	Sheet No.	2 of 2
Checked By			00	Index No.	252





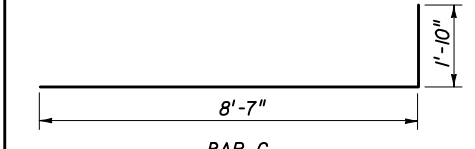
**SECTION BB**



**PLAN**  
(Showing Bars In Footing)

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

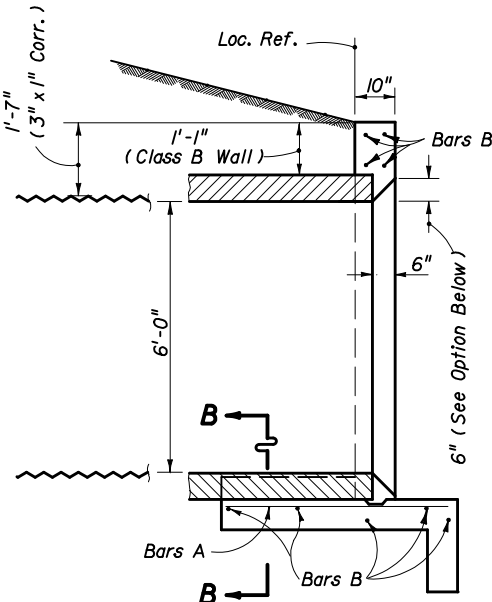
**BENDING DIAGRAM**



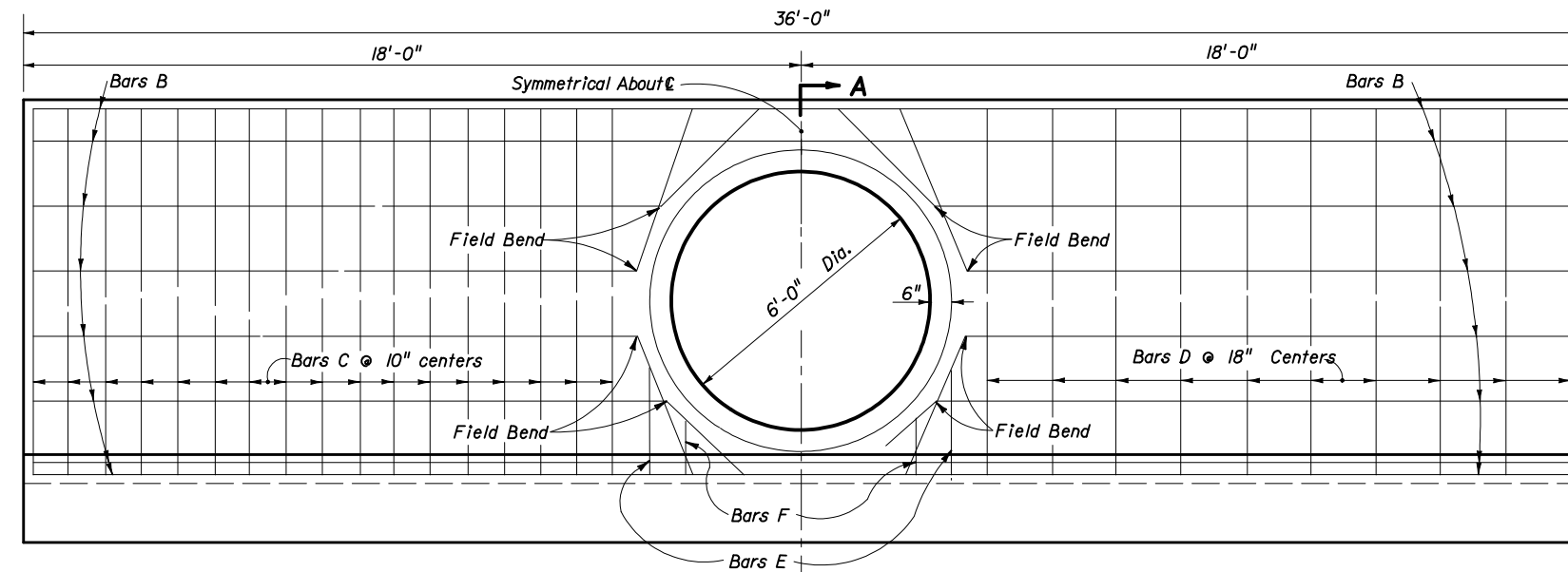
NOTE: All bar dimensions are out to out

**ESTIMATED QUANTITIES**

ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	14.4	14.5
Reinforcing Steel	Lb.	1249	1249



**SECTION AA**

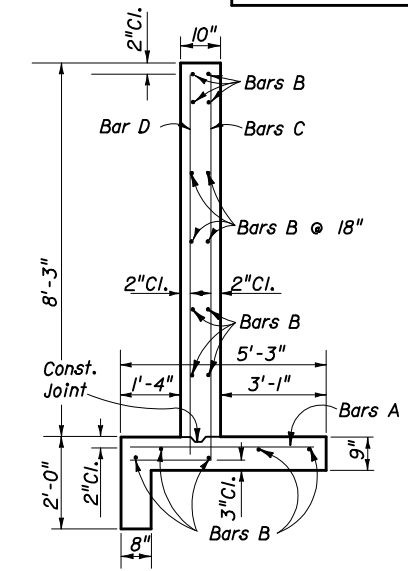


**HALF ELEVATION**  
(Showing Bars In Back Face Of Wall)

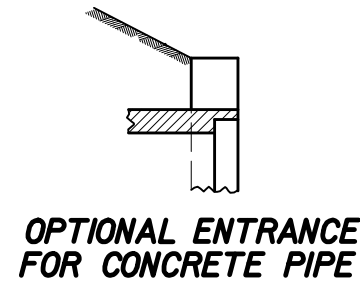
NOTE: Cut and field bend Bars B as shown

**HALF ELEVATION**  
(Showing Bars In Front Face Of Wall)

**GENERAL NOTES**



**TYPICAL SECTION THRU ENDWALL**



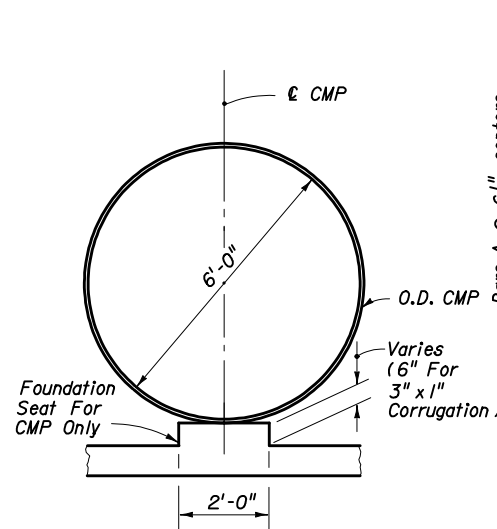
**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1989. 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.
3. Reinforcing steel shall be either Grade 40 or 60.
4. 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.
5. Chamfer: All exposed edges and corners to be chamfered  $\frac{3}{4}$ " unless otherwise shown.
6. 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.
7. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Sodding, SY.
8. 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 Concrete, Class II (Endwalls), CY and Reinforcing Steel (Roadway), LB.

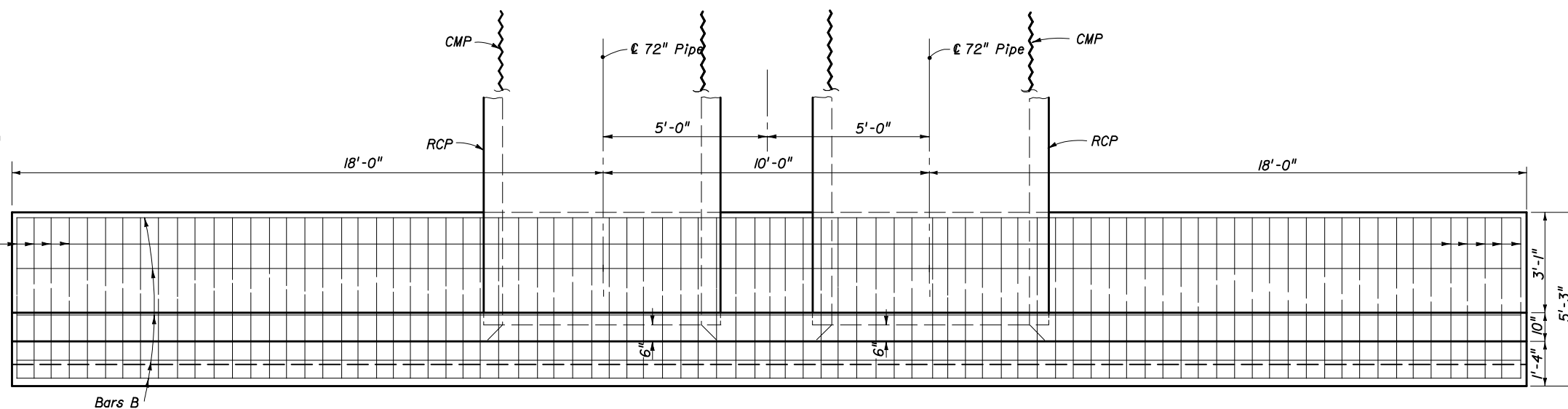
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STRAIGHT CONCRETE ENDWALLS**  
SINGLE AND DOUBLE 72" PIPE

Names	Dates	Approved By		
Designed By	EVC	10/55	S. A. McHenry State Drainage Engineer	
Drawn By			Revision	Sheet No.
Checked By	WHW	10/55	00	1 of 2
				Index No.
				253

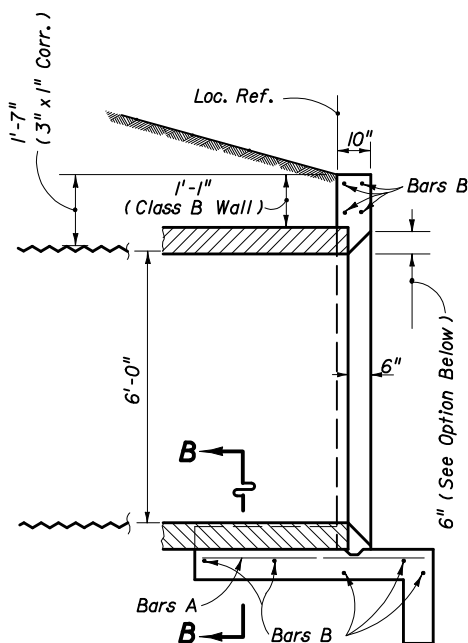


**SECTION BB**

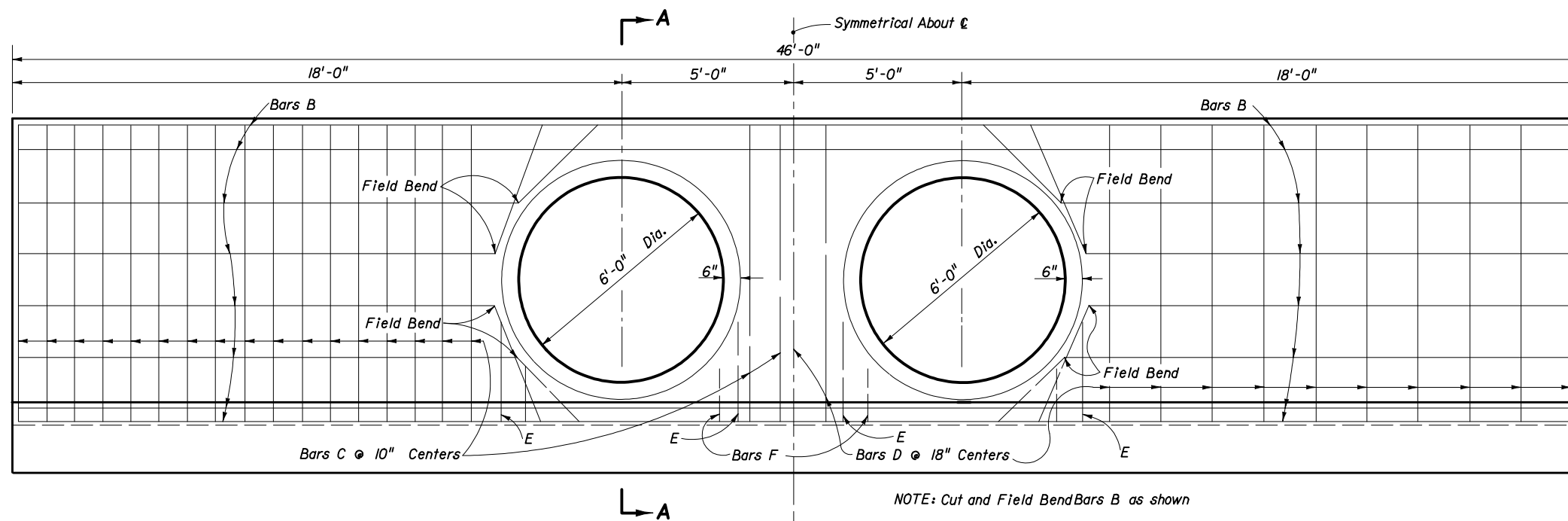


**PLAN**

(Showing Bars In Footing)



**SECTION AA**

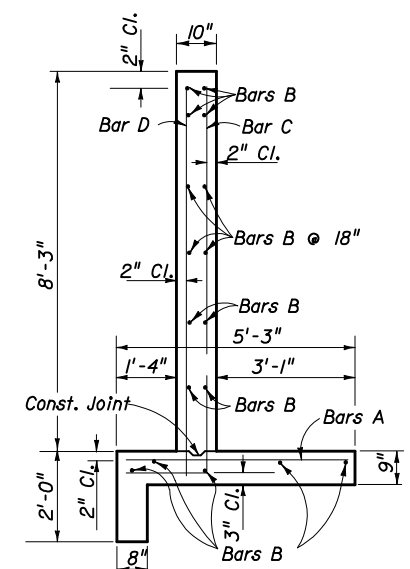


**HALF ELEVATION**

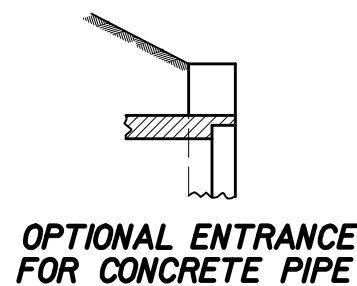
(Showing Bars In Back Face Of Wall)

**HALF ELEVATION**

(Showing Bars In Front Face Of Wall)

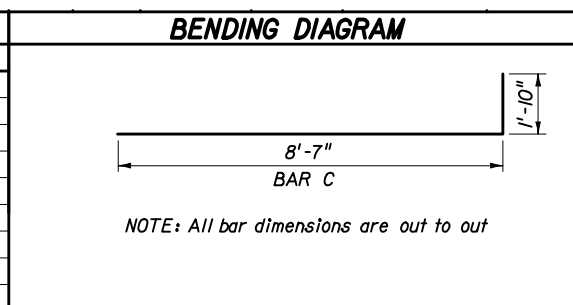


**TYPICAL SECTION THRU ENDWALL**



**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

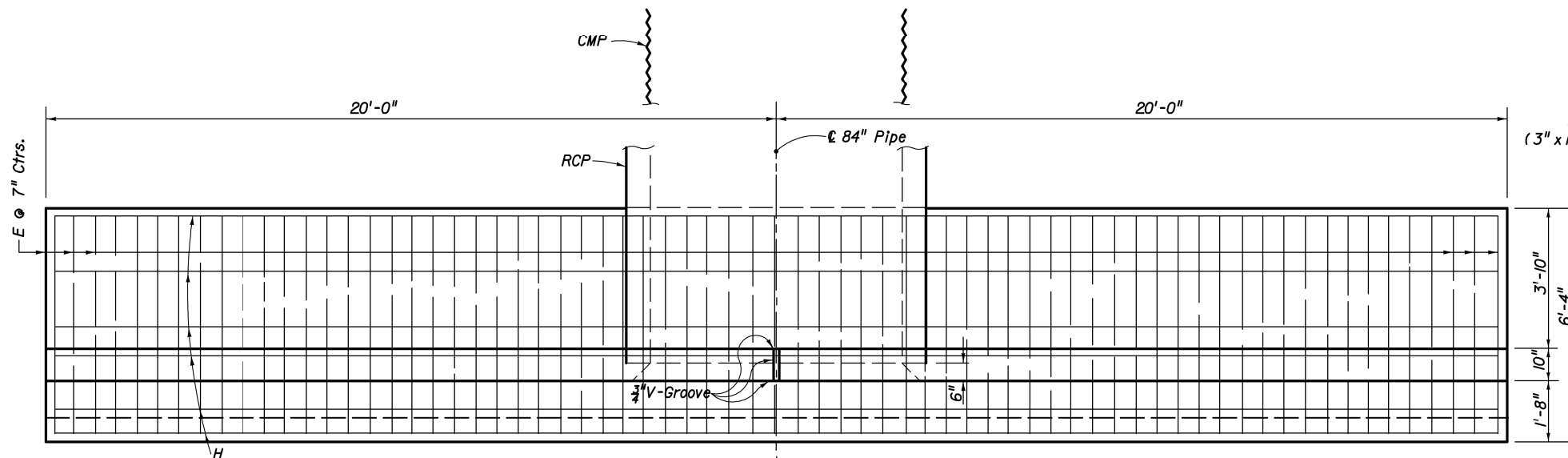
BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQ'D	LENGTH	LOCATION	BENDING
A	5	85	4'-11"	Footing	Straight
B	4	17	45'-8"	Footing & Wall	Straight
C	5	38	10'-5"	Wall	Bend
D	4	23	8'-7"	Wall	Straight
E	4	8	2'-6"	Wall	Straight
F	4	8	1'-6"	Wall	Straight



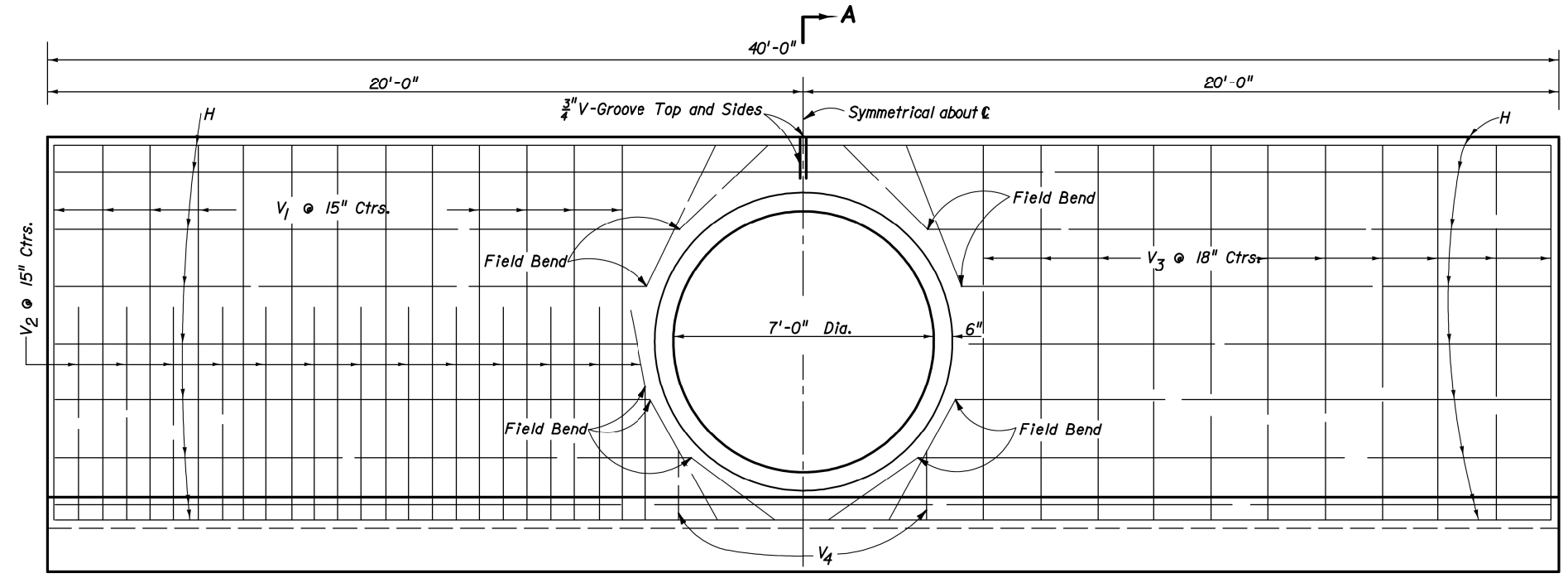
ESTIMATED QUANTITIES			
ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	17.5	17.8
Reinforcing Steel	Lb.	1519	1519

NOTE: See Sheet 1 of 2 for General Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>STRAIGHT CONCRETE ENDWALLS</b>				
SINGLE AND DOUBLE 72" PIPE				
Designed By	Names	Dates	Approved By	
Drawn By	EVC	10/55	S. A. McHenry	
Checked By	WHW	10/55	Revision	Sheet No.
			00	2 of 2
			Index No.	253



**PLAN**  
(Showing Bars In Footing)



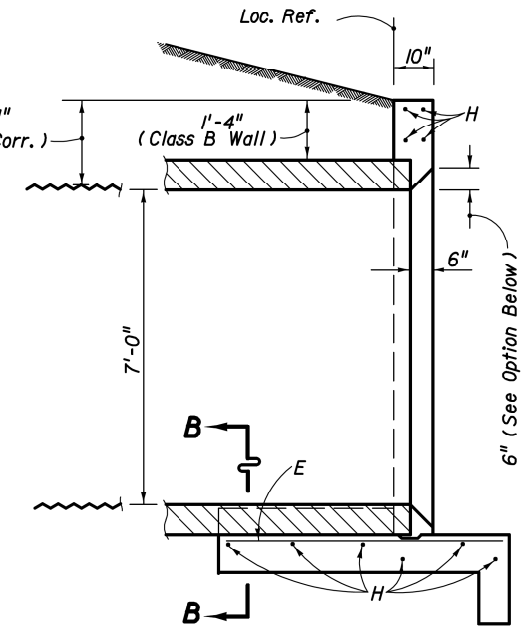
**HALF ELEVATION**  
(Showing Bars In Back Face Of Wall)

**GENERAL NOTES**

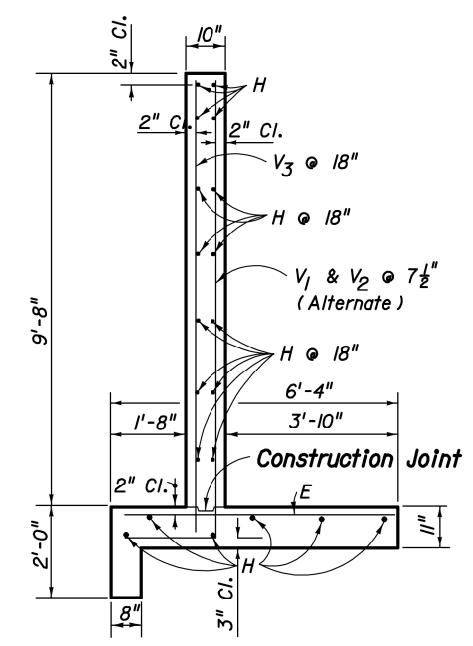
**HALF ELEVATION**  
(Showing Bars In Front Face Of Wall)

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1989. 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.
3. Reinforcing steel shall be either Grade 40 or 60.
4. 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.

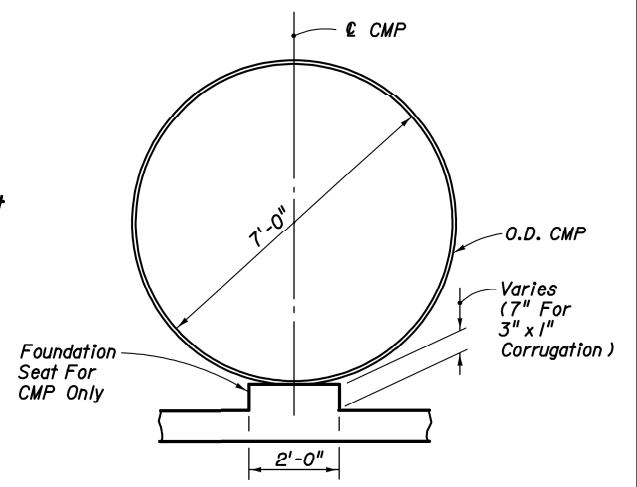
5. Chamfer: All exposed edges and corners to be chamfered  $\frac{3}{4}$ " unless otherwise shown.
6. Metal pipe shall be bituminous coated on all surfaces in contact with concrete and 12" beyond the boundary of contact. Any suitable bituminous material may be field applied.
7. Sodding shall be in accordance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



**SECTION AA**



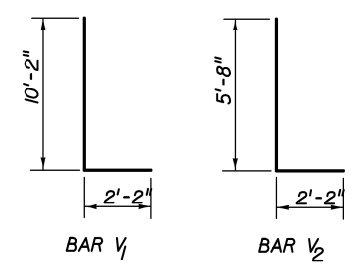
**TYPICAL SECTION THRU ENDWALL**



**SECTION BB**

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
E	6	69	6'-0"
H	4	20	39'-8"
V <sub>1</sub>	6	26	12'-4"
V <sub>2</sub>	6	26	7'-10"
V <sub>3</sub>	4	22	10'-2"
V <sub>4</sub>	4	4	2'-0"

**BENDING DIAGRAM**



NOTE: All bar dimensions are out to out

**ESTIMATED QUANTITIES**

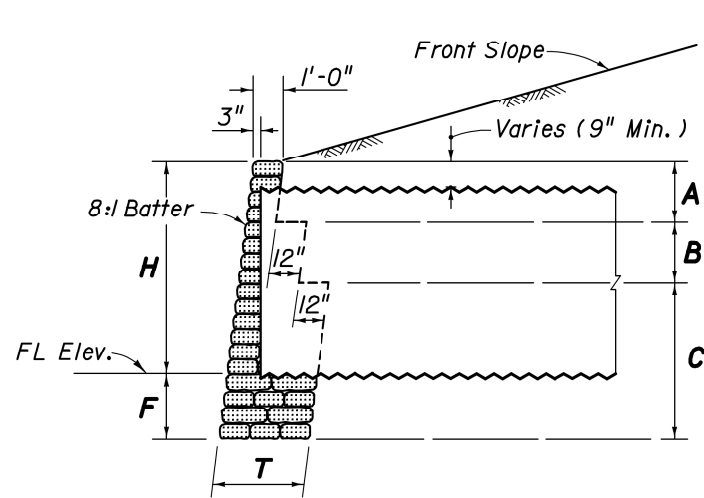
ITEM	UNIT	RCP	CMP
Concrete Class II	Cu. Yd.	20.0	20.2
Reinforcing Steel	Lb.	2,095	2,095

**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

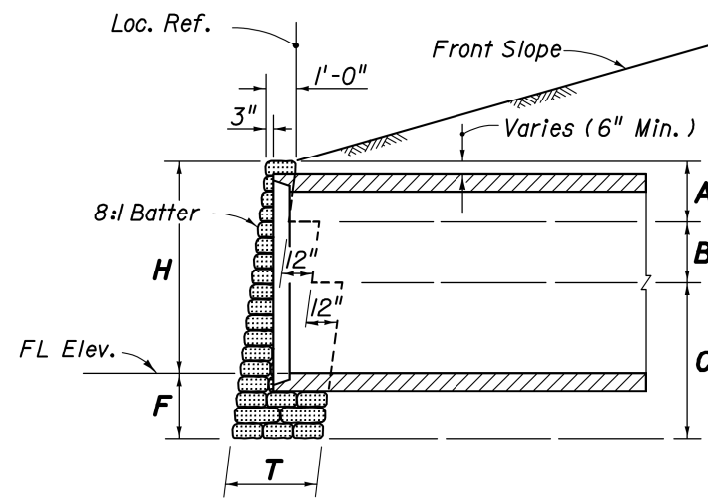
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STRAIGHT CONCRETE ENDWALL  
SINGLE 84" PIPE**

Names	Dates	Approved By	
Designed By		S. A. McHenry State Drainage Engineer	
Drawn By	WHW 07/58		
Checked By	HCG 07/58	Revision	00
		Sheet No.	1 of 1
		Index No.	255

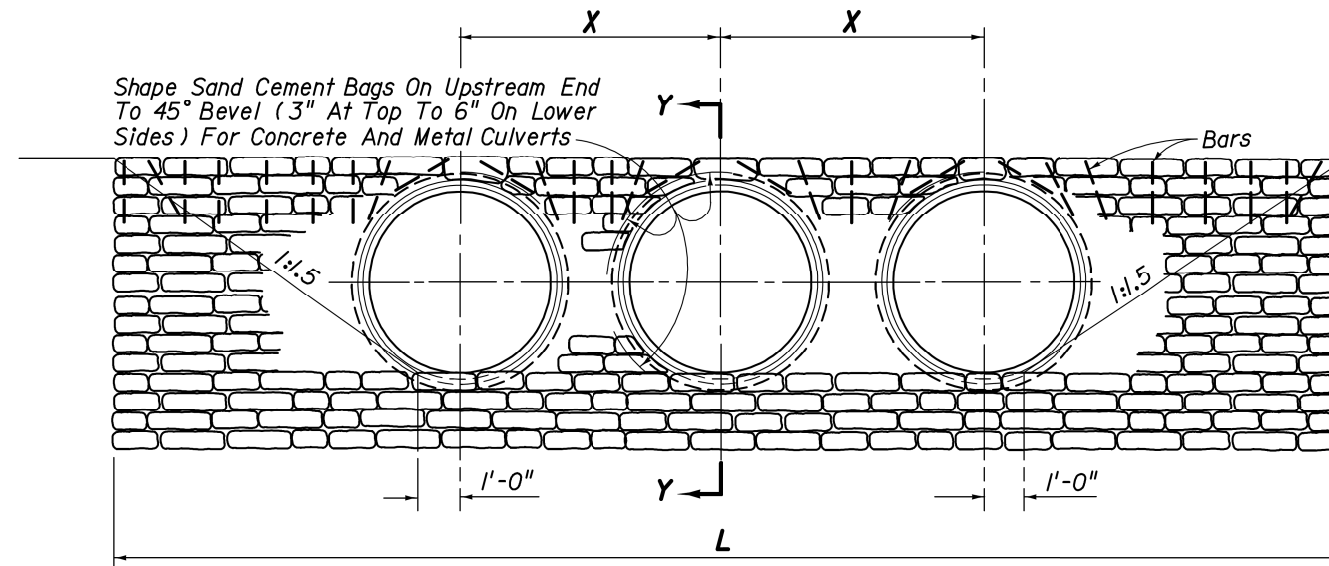


CORRUGATED METAL PIPE



CONCRETE PIPE

SECTION YY



- Note: (1) For concrete and corrugated metal pipes. Concrete pipe shown.  
 (2) The top row of riprap bags shall be secured by pinning, using #4 reinforcing bars 18 inches in length, as follows:  
 (a) The end bags shall be secured using two bars per bag, one vertical and one diagonal as shown.  
 (b) The next to last bag on each end shall be secured with two bars vertically.  
 (c) Bags located over the pipe shall be secured by a bar which is driven diagonally except that for concrete pipe two bars shall be used for single bags above the pipe.  
 (d) Intermediate bags shall be secured with a single bar.  
 Bars shall be driven to one inch below the surface of the bag.  
 The cost of furnishing and installing the bars shall be included in the cost of the riprap.

FRONT ELEVATION

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE ENDWALL


SIZE OF PIPE	H	T	A	B	C	F	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		CP	CMP
18"	2'-3"	1'-0"	4'-0"	0'-0"	0'-0"	1'-9"	2'-10"	8'-9"	1.2	1.2	11'-7"	1.5	1.6	14'-5"	1.8	1.9	17'-3"	2.1	2.3
24"	2'-9"	2'-0"	2'-0"	2'-6"	0'-0"	1'-9"	3'-5"	10'-3"	2.4	2.5	13'-8"	3.0	3.2	17'-1"	3.7	4.0	20'-6"	4.3	4.7
30"	3'-4"	2'-0"	2'-0"	3'-2"	0'-0"	1'-10"	4'-3"	12'-0"	3.3	3.4	16'-3"	4.2	4.5	20'-6"	5.1	5.5	24'-9"	6.0	6.5
36"	3'-10"	2'-0"	2'-0"	3'-8"	0'-0"	1'-10"	5'-1"	13'-6"	4.0	4.2	18'-7"	5.2	5.7	23'-8"	6.3	6.9	28'-9"	7.4	8.2
42"	4'-5"	3'-0"	2'-0"	2'-0"	2'-4"	1'-11"	6'-0"	15'-3"	6.4	6.7	21'-3"	8.3	8.9	27'-3"	10.2	11.2	33'-3"	12.3	13.4
48"	4'-11"	3'-0"	2'-0"	2'-0"	2'-10"	1'-11"	6'-9"	16'-9"	7.7	8.1	23'-6"	10.0	10.8	30'-3"	12.3	13.5	37'-0"	14.5	16.2
54"	5'-6"	3'-0"	2'-0"	2'-0"	3'-6"	2'-0"	7'-8"	18'-6"	9.5	10.1	26'-2"	12.4	13.5	33'-10"	15.3	17.0	41'-6"	18.2	20.4
60"	6'-0"	3'-0"	2'-0"	2'-0"	4'-0"	2'-0"	8'-6"	20'-0"	11.0	11.7	28'-6"	14.4	15.8	37'-0"	17.8	19.8	45'-6"	21.1	23.8
66"	6'-7"	3'-0"	2'-0"	2'-0"	4'-8"	2'-1"	9'-3"	21'-9"	13.2	14.1	31'-0"	17.2	18.9	40'-3"	21.2	23.7	49'-6"	25.1	28.5
72"	7'-1"	3'-0"	2'-0"	2'-0"	5'-2"	2'-1"	10'-0"	23'-3"	15.0	16.0	33'-3"	19.4	21.4	43'-3"	23.9	26.8	53'-3"	28.3	32.3
78"	7'-8"	3'-0"	2'-0"	2'-0"	5'-10"	2'-2"	10'-9"	25'-0"	17.5	18.7	35'-9"	22.6	25.0	46'-6"	27.8	31.3	57'-3"	32.9	37.6
84"	8'-2"	3'-0"	2'-0"	2'-0"	6'-4"	2'-2"	11'-8"	26'-6"	19.5	20.9	38'-2"	25.3	28.1	49'-10"	31.1	35.2	61'-6"	36.9	42.4

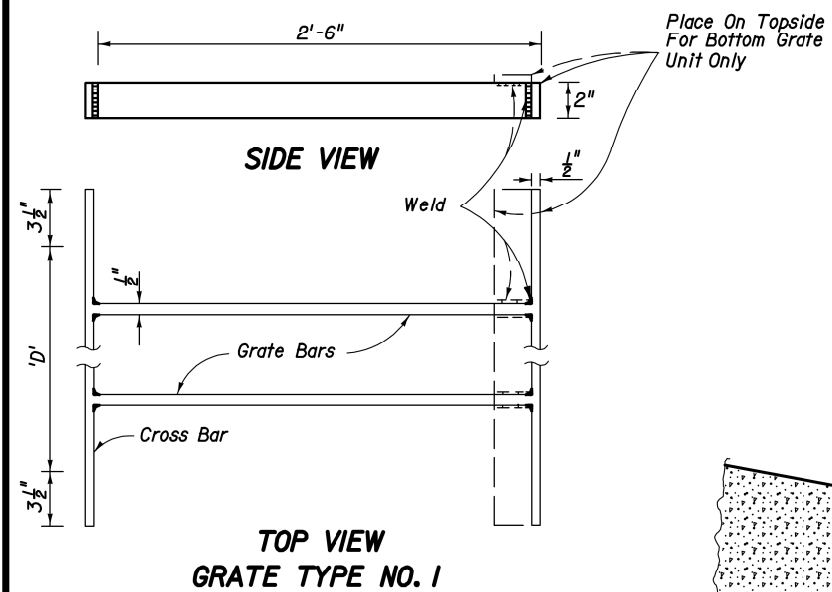
GENERAL NOTES

1. Straight sand-cement endwalls are intended for use outside the clear zone.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

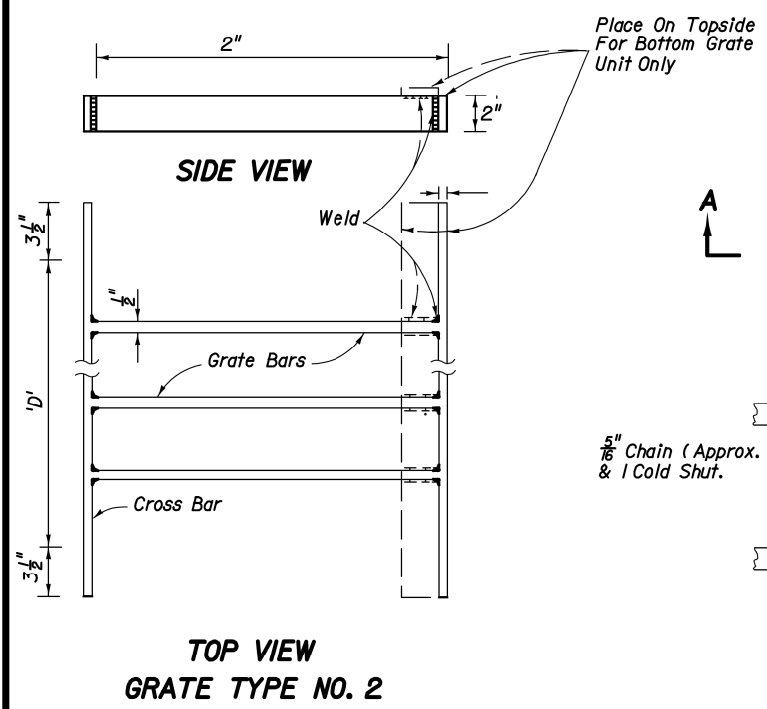
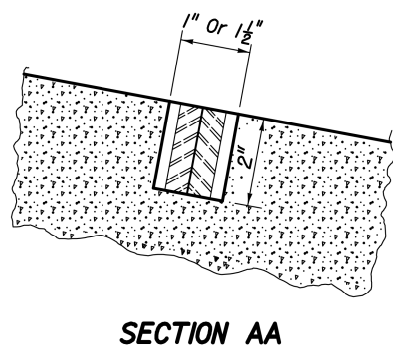
STRAIGHT SAND-CEMENT ENDWALLS

Designed By	Names	Dates	Approved By		
Drawn By	JBW	07/88	 State Drainage Engineer	Revision	Sheet No.
Checked By	JVG/EGR	08/88		00	1 of 1
					258



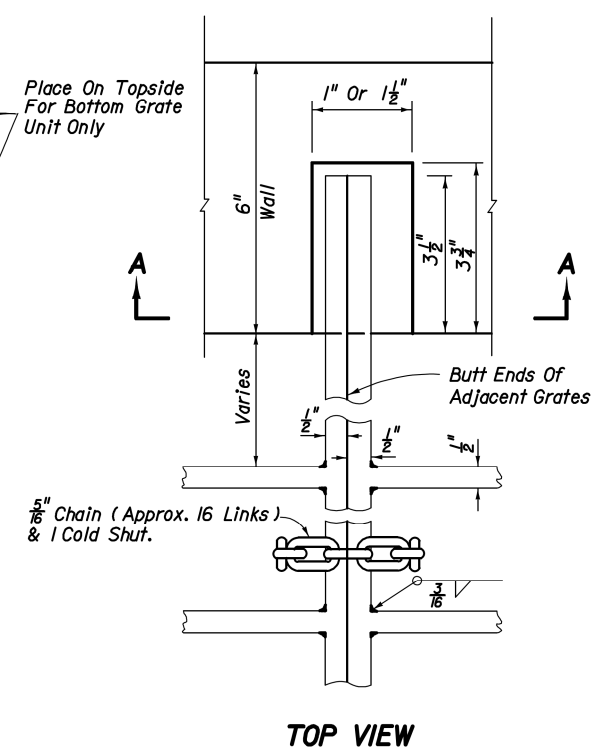
Pipe Size	Grate Bars Req'd.	Grate LB.
15"	2	28.93

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

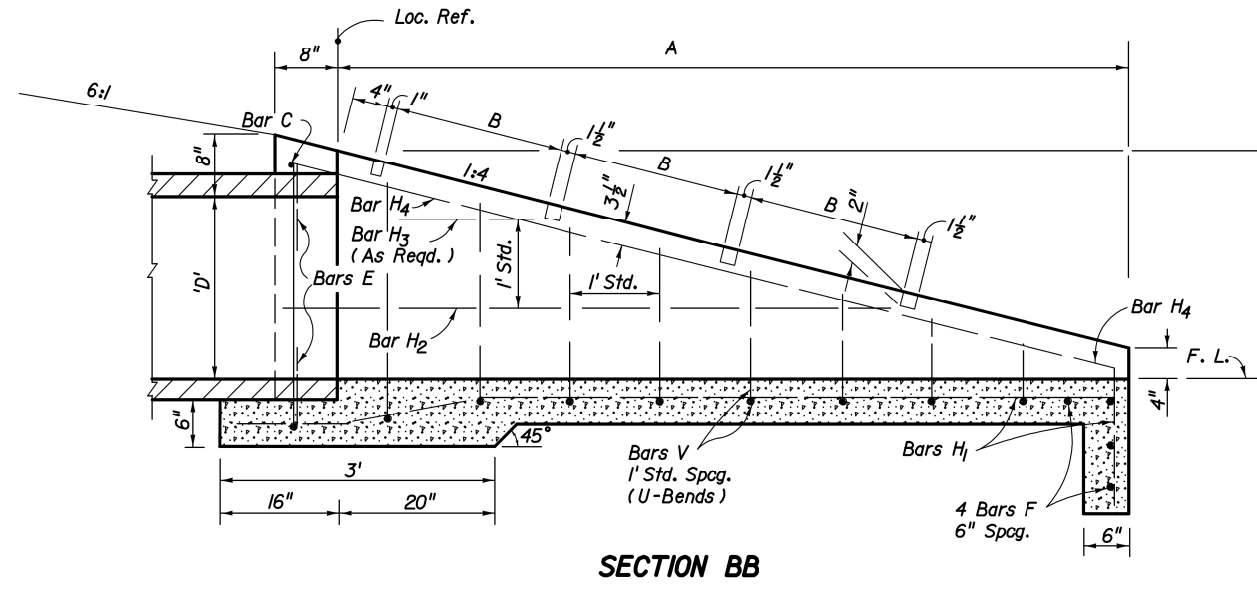


Pipe Size	Grate Bars Req'd.	Grate LB.
18"	3	33.69
24"	4	43.63
30"	5	53.55

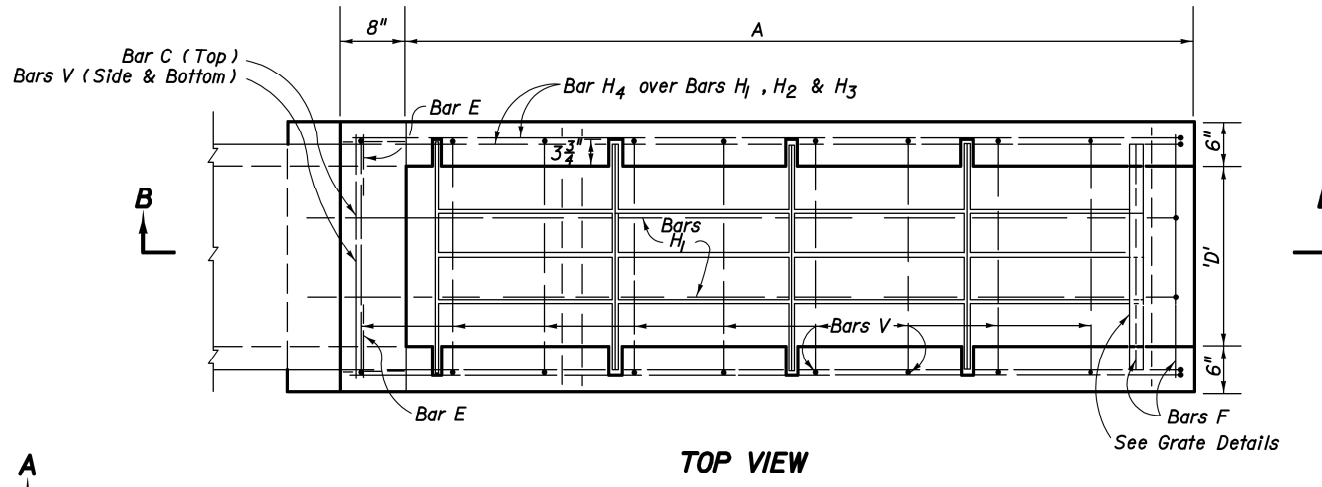
Bars to be evenly spaced across dimension 'D'.  
All bars 1/2" x 2".



GRATE, SEAT, WELD & CHAIN DETAIL



SECTION BB

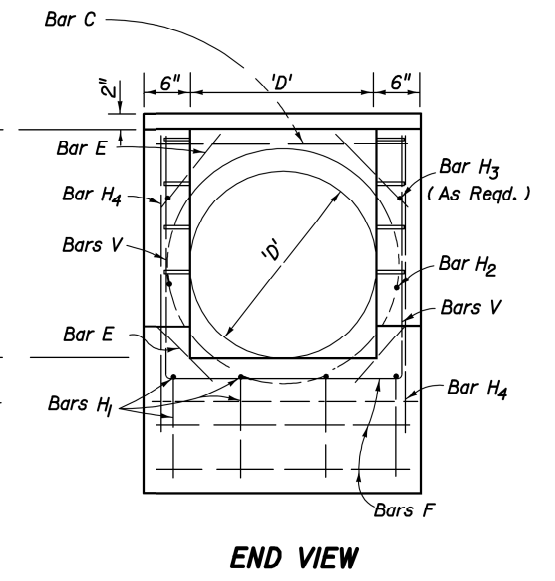


TOP VIEW

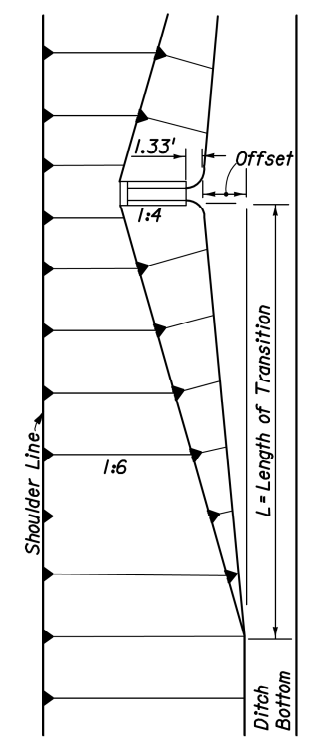
Slope	Pipe Size D	TABLE OF DIMENSIONS AND QUANTITIES		Conc. Class I (CY)	Reinf. Steel (Lbs.)	Number Of Grates Req'd		Total Grate Wt. (Lbs.)	Sodding (SY)	Slope Transition	
		A	B			Type No. 1	Type No. 2			Offset	L
4:1	15"	5.67'	2.38'	0.85	56	2	0	57.86	15	4.2'	42'
	18"	6.67'	1.875'	1.01	73	0	3	101.08	16	4.8'	48'
	24"	8.67'	1.875'	1.65	97	0	4	174.52	19	5.8'	58'
	30"	10.67'	1.875'	2.33	129	0	5	267.75	21	6.9'	69'

GENERAL NOTES

- 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.
- 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.
- Grates shall be ASTM A242/A242M, A572/A572M or ASTM A588/A588M, Grade 50 steel, and galvanized in accordance with Section 962-7 of the Standard Specifications.
- Endwall to be paid for under the contract unit price for U-Endwall With Grate, Each. Payment shall include cost of concrete, reinforcing steel, grate, and accessories. Quantities shown are for estimating purposes only.
- Sod slopes 5' each side and above endwall. Sodding to be paid for under contract unit price for sodding.
- 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.
- Concrete meeting the requirements of ASTM 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



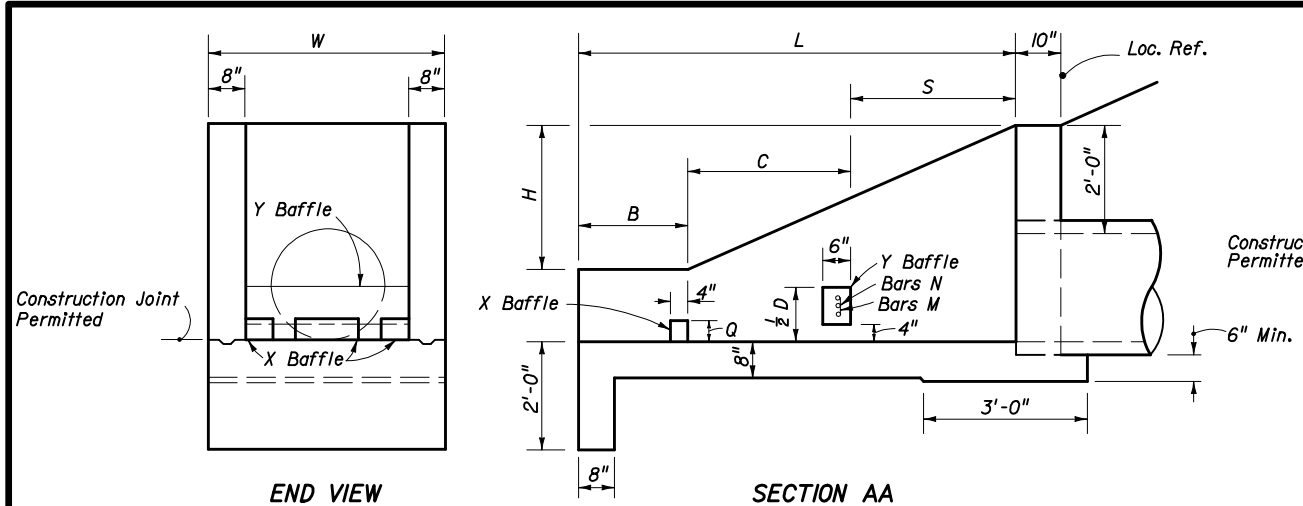
FRONT SLOPE TRANSITION AT ENDWALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**U-TYPE CONCRETE ENDWALLS WITH GRATES**

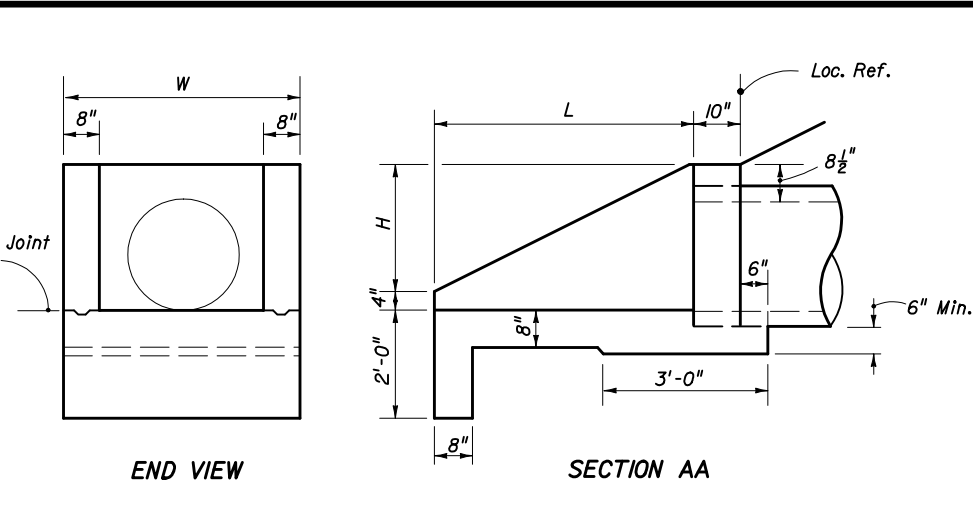
15" TO 30" PIPE

Designed By	EGR	Dates	06/77	Approved By	<i>S. A. McHenry</i>
Drawn By	HKH	Revision	06/77	Sheet No.	1 of 1
Checked By	JVG	Index No.	00		260



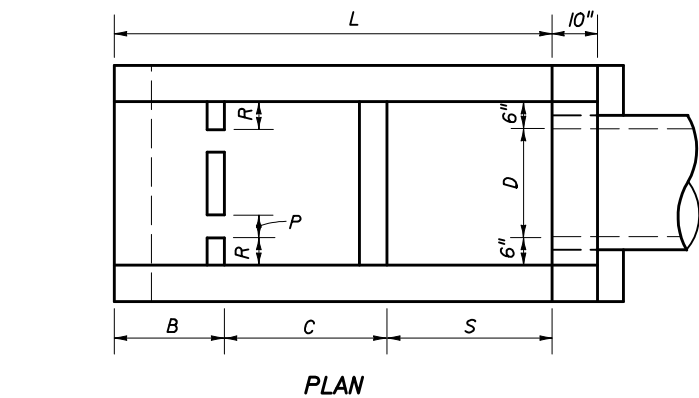
END VIEW

SECTION AA

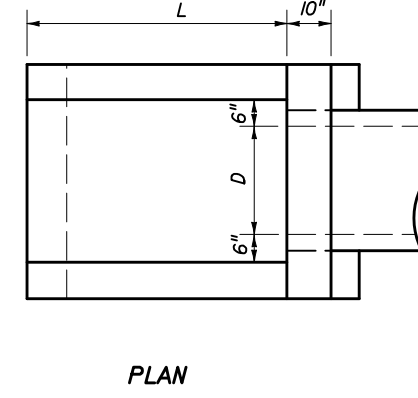


END VIEW

SECTION AA



PLAN



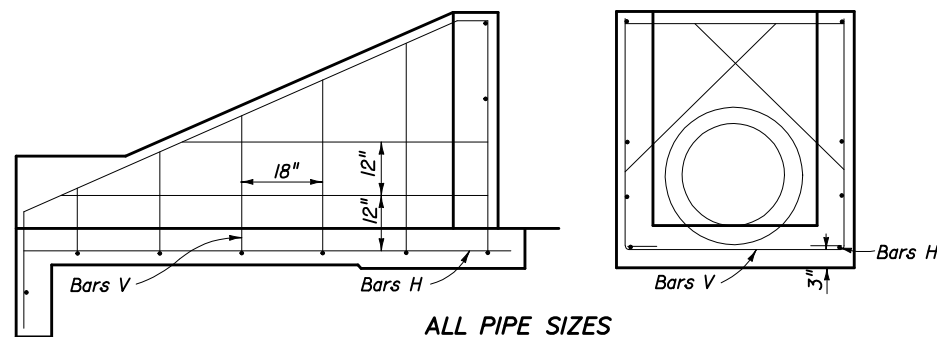
PLAN

DIMENSIONAL DETAILS

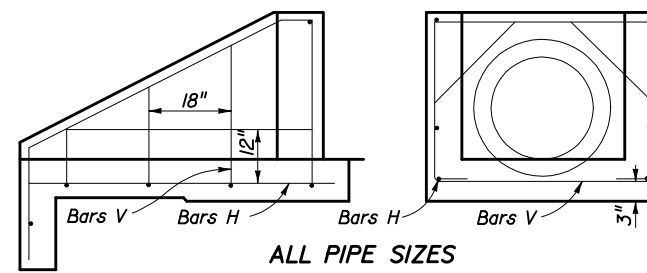
DIMENSIONAL DETAILS

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 shall be ASTM A242/A242M, A572/A572M or A588/A588M Grade 50 steel, when designated Alternate G in the plans galvanized in accordance with Section 962-7 of the Standard Specifications.
5. Channel section C 3 x 6 may be substituted for C 4 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. 281, 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.



ALL PIPE SIZES  
SIDE VIEW AND BACKWALL SECTION  
REINFORCING DETAIL



ALL PIPE SIZES  
SIDE VIEW AND BACKWALL SECTION  
REINFORCING DETAIL

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL														
Pipe Size		X Baffle							Y Baffle Reinf. Steel		Concrete Class I Cu. Yd.	Reinf. Steel Lbs.		
D	Area Sq. Ft.	L	H	W	S	B	C	P	Q	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

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

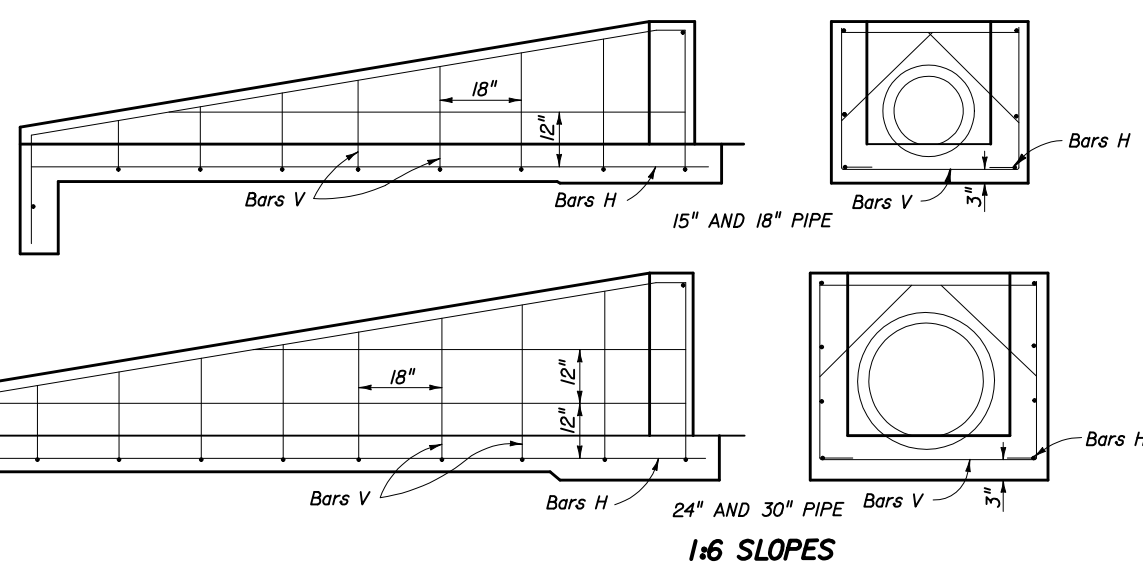
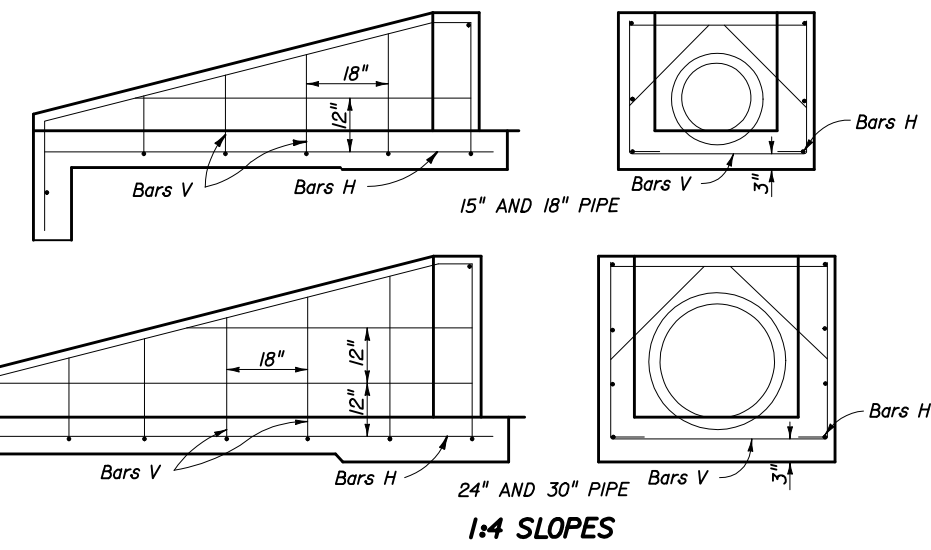
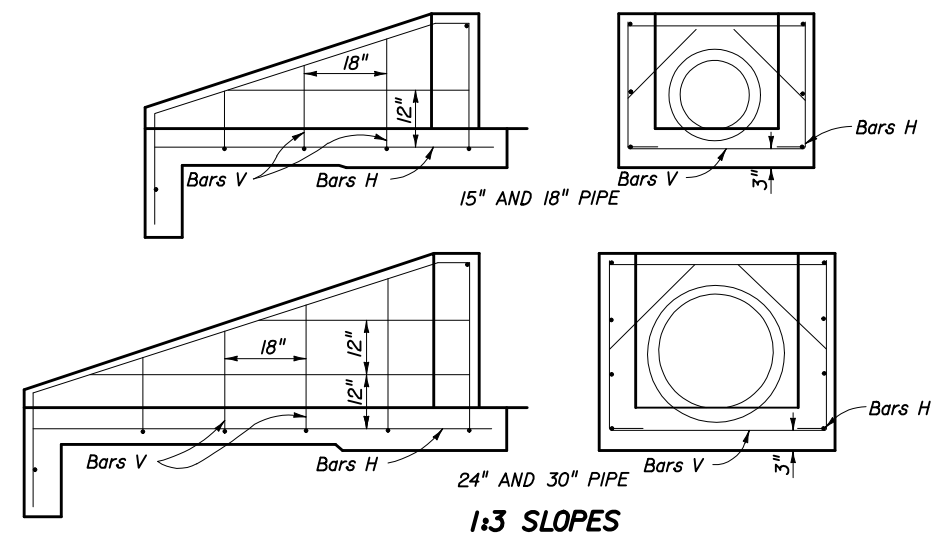
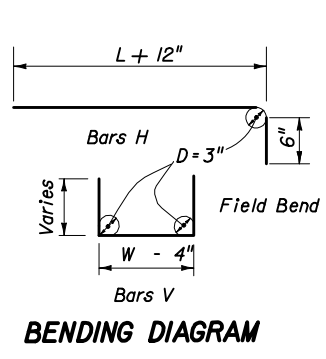
WITHOUT BAFFLES

ENDWALLS FOR 2:1 SLOPES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

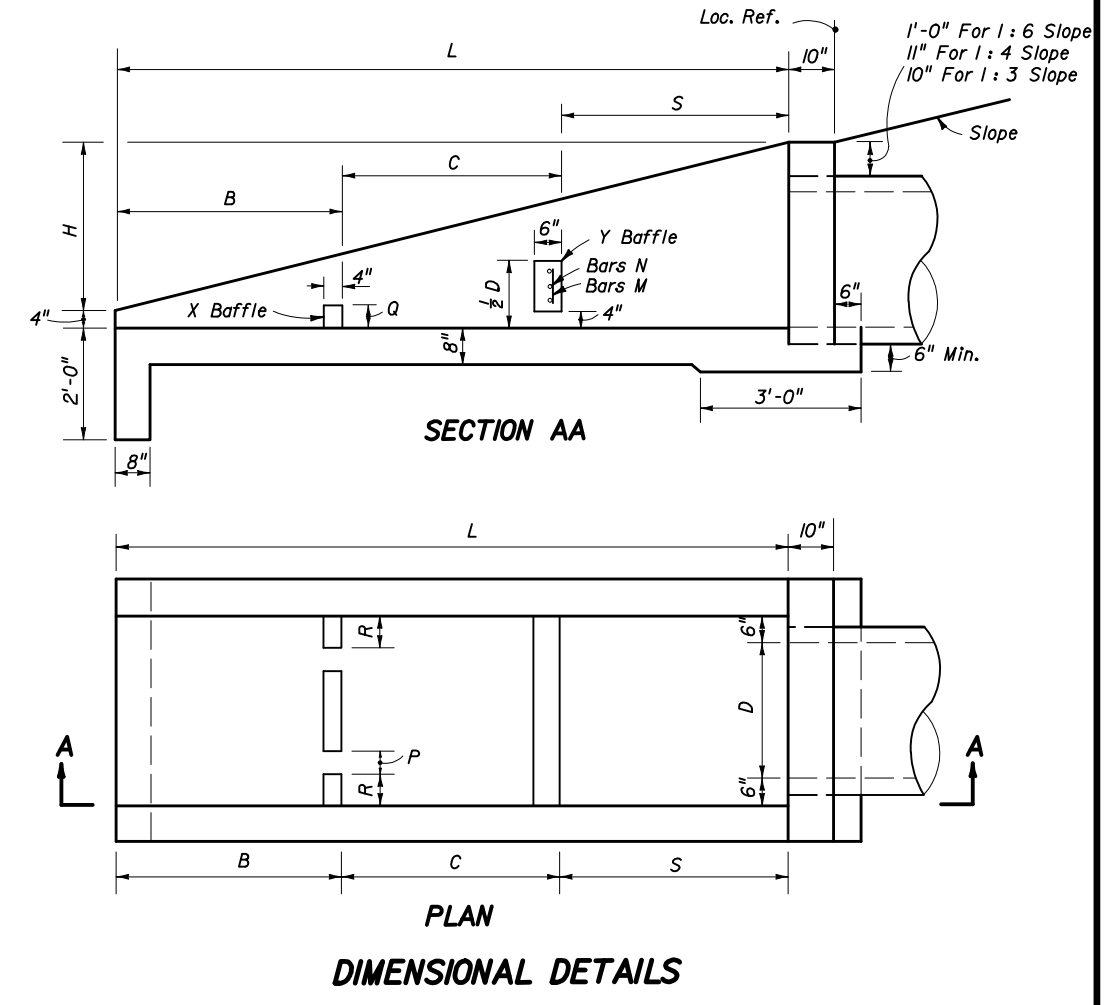
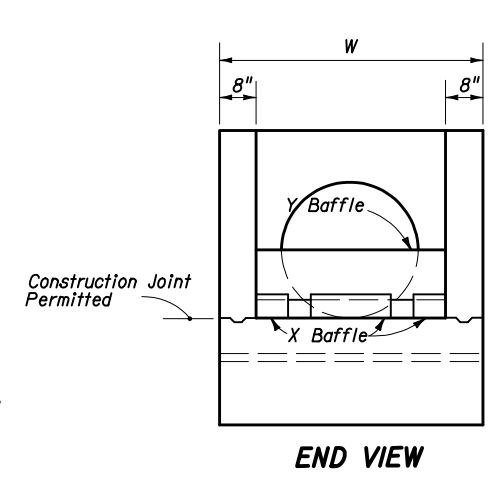
**U-TYPE CONCRETE ENDWALLS  
BAFFLES AND GRATE OPTIONAL  
15" TO 30" PIPE**

Names	Dates	Approved By	State Drainage Engineer	
Designed By		S. A. McHenry		
Drawn By	dde 09/85	Revision	Sheet No.	Index No.
Checked By		00	1 of 3	261



**SIDE VIEWS AND BACKWALL SECTIONS REINFORCING DETAILS**

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



**DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL**

Rate Of Slope	Pipe Size		Baffle Locations (When Required)			Concrete Class I Cu. Yd.	Reinf. Steel Lbs.	
	D	Area Sq. Ft.	L	H	W			
1:3	15"	1.23	5'-3"	1'-9"	3'-7"	1'-9" 1'-9" 1'-9"	1.19	51
	18"	1.77	6'-0"	2'-0"	3'-10"	2'-0" 2'-0" 2'-0"	1.42	56
	24"	3.14	7'-6"	2'-6"	4'-4"	2'-6" 2'-6" 2'-6"	1.94	77
	30"	4.91	9'-0"	3'-0"	4'-10"	3'-0" 3'-0" 3'-0"	2.54	96
1:4	15"	1.23	7'-4"	1'-10"	3'-7"	2'-6" 2'-6" 2'-4"	1.54	64
	18"	1.77	8'-4"	2'-1"	3'-10"	2'-10" 2'-10" 2'-8"	1.84	71
	24"	3.14	10'-4"	2'-7"	4'-4"	3'-6" 3'-6" 3'-4"	2.53	92
	30"	4.91	12'-4"	3'-1"	4'-10"	4'-2" 4'-2" 4'-0"	3.34	124
1:6	15"	1.23	11'-6"	1'-11"	3'-7"	3'-10" 3'-10" 3'-10"	2.19	89
	18"	1.77	13'-0"	2'-2"	3'-10"	4'-4" 4'-4" 4'-4"	2.63	103
	24"	3.14	16'-0"	2'-8"	4'-4"	5'-4" 5'-4" 5'-4"	3.59	143
	30"	4.91	19'-0"	3'-2"	4'-10"	6'-4" 6'-4" 6'-4"	4.81	180

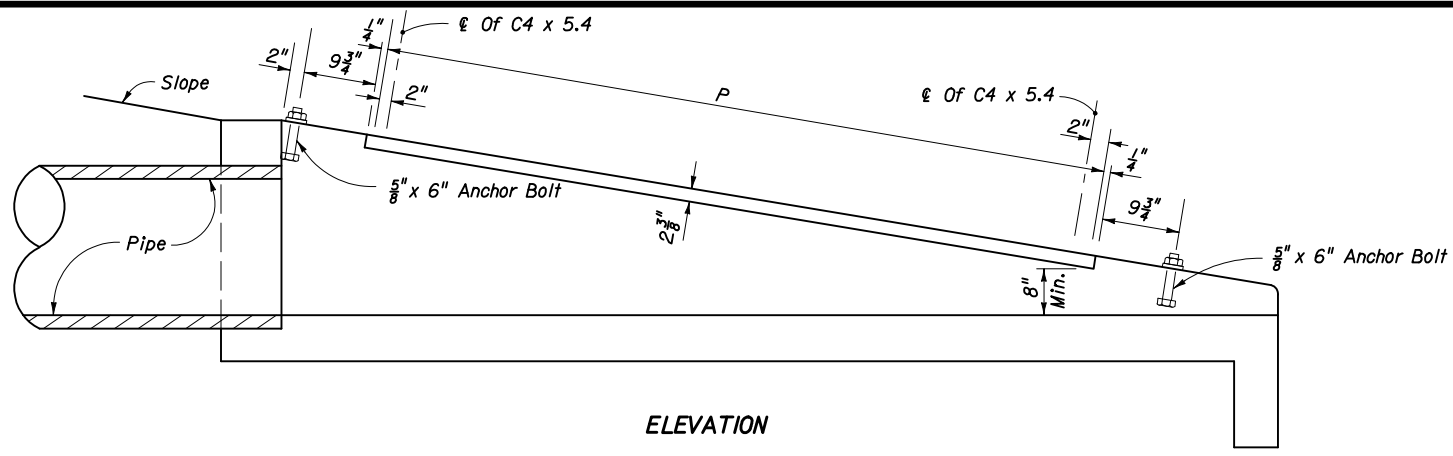
**DIMENSIONS AND QUANTITIES FOR BAFFLES**

Pipe Size D	X Baffle			Y Baffle Reinf. Steel	Concrete Class I Cu. Yd.	Reinf. Steel Lbs.
	P Width	Q Height	R Length			
15"	4"	4"	4"	2-#4 1-#4	0.10	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

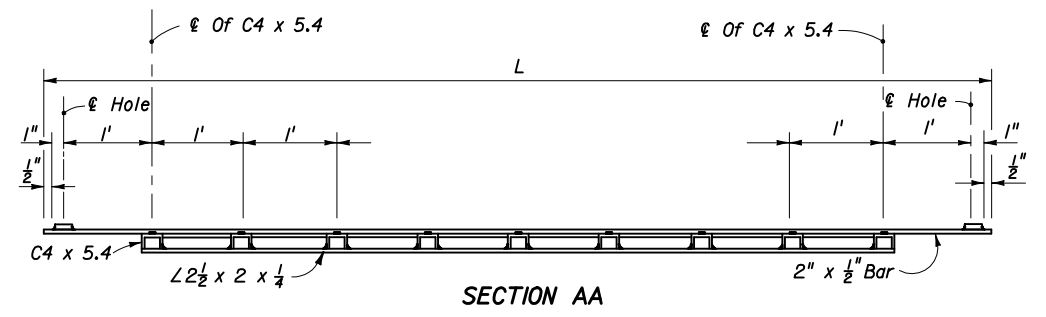
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**U-TYPE CONCRETE ENDWALLS BAFFLES AND GRATE OPTIONAL 15" TO 30" PIPE**

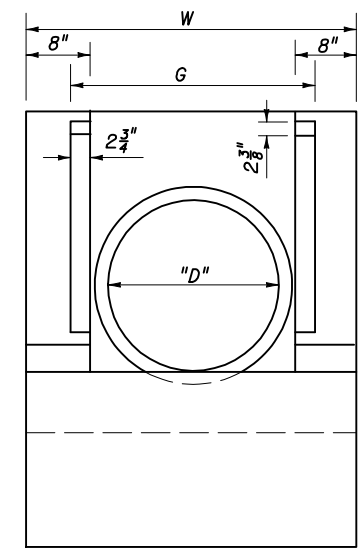
Designed By	Names	Dates	Approved By	<i>S. A. McHenry</i>
Drawn By	ddd	9/85	State Drainage Engineer	
Checked By			Revision	Sheet No. 2 of 3
			00	Index No. 261



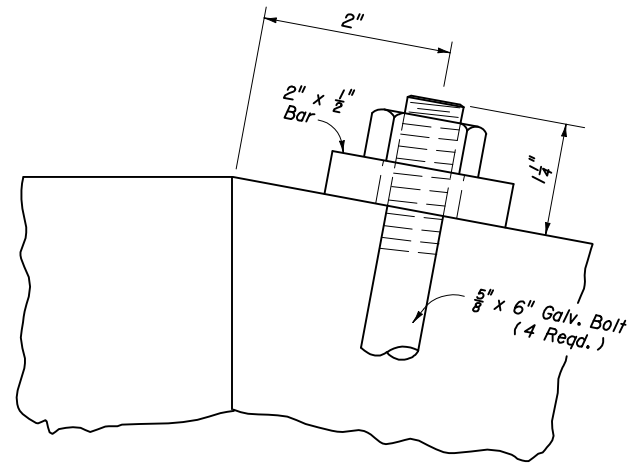
ELEVATION



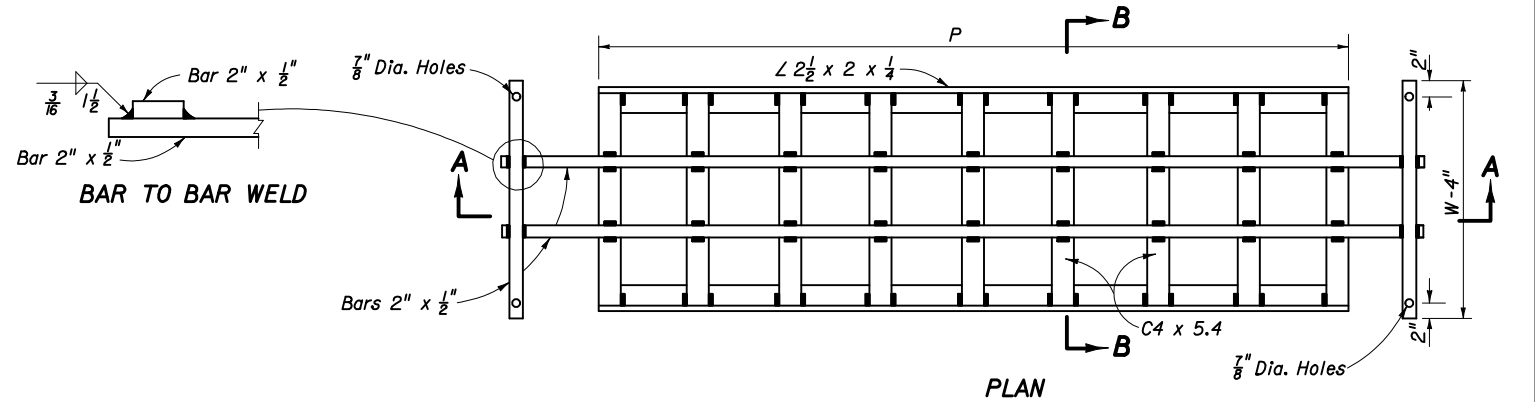
SECTION AA



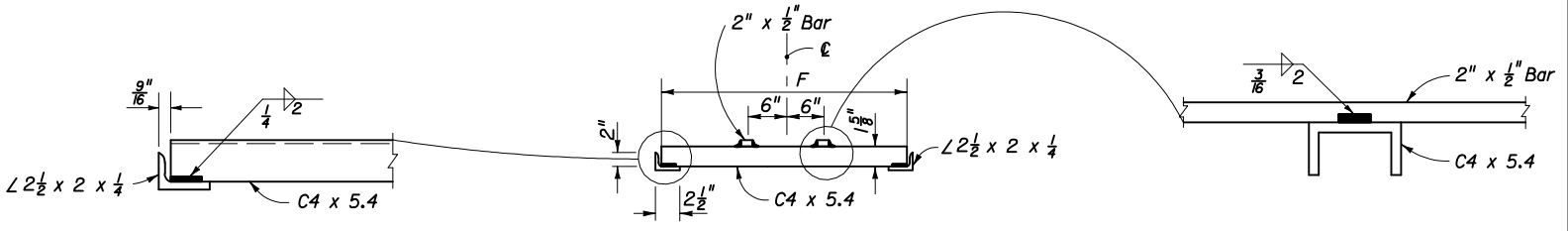
END VIEW



ANCHOR BOLT DETAIL



PLAN



CHANNEL TO ANGLE WELD

SECTION BB

BAR TO CHANNEL WELD

STEEL GRATE

MOUNTING FOR STEEL GRATE

STEEL GRATING USE CRITERIA

1. Grates to be used on pipe culvert endwalls located within the designated clear zone. Positive debris control shall be provided at all upgradient openings. Grates shall not be used unless one or more of the following conditions exist :
  - A. Drainage area to culvert consists of median or infield areas or areas where debris and/or drift is negligible.
  - B. Runoff to culvert is by sheet flow or in such ill defined channels that debris transport is not considered a major problem.
  - C. 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.
  - D. Areas where culvert blockage with resultant backwater would not seriously affect roadway embankment, traffic operation or upland property.
2. Steel grating to be used only where called for in plans.

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

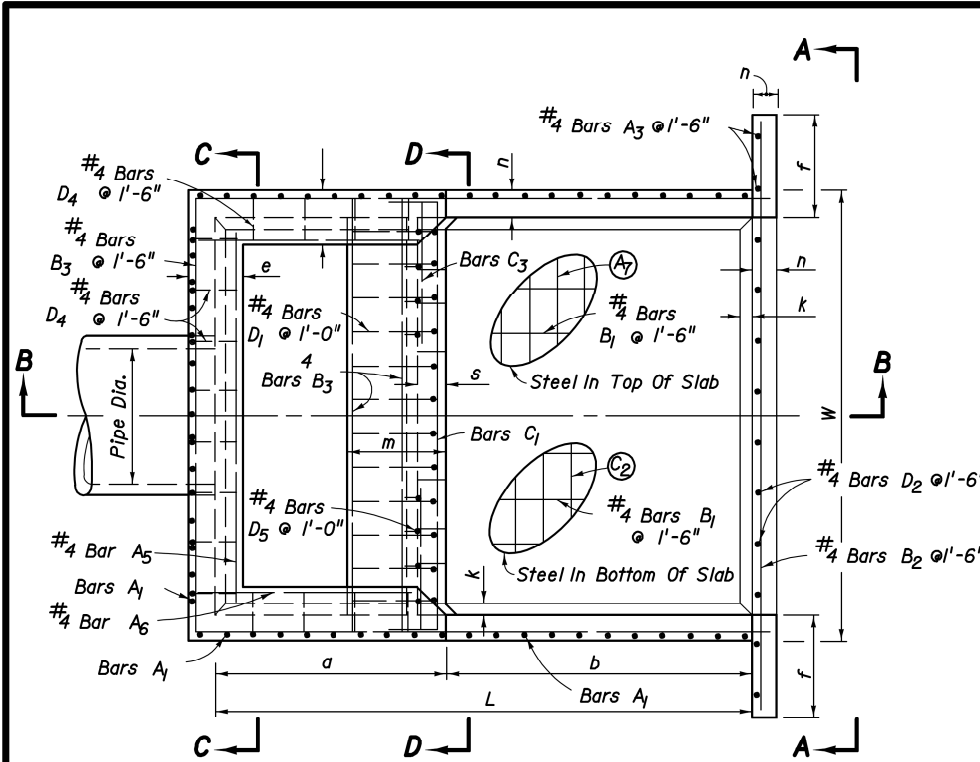
Rate Of Slope	Size Pipe " D "	G	2 Each Bars @ 3.4 Lbs./L.F.			(X) Channels @ 5.4 Lbs./L.F.			2 Angles @ 3.62 Lbs./L.F.		Total Weight Lbs.
			L	W-4"	Lbs.	(X)	F	Lbs.	P	Lbs.	
1:6	15"	2' - 8 1/2"	9' - 3"	3' - 3"	85	8	2' - 6 7/8"	111	7' - 4"	53	249
	18"	2' - 11 1/2"	10' - 3"	3' - 6"	94	9	2' - 9 7/8"	137	8' - 4"	62	292
	24"	3' - 5 1/2"	13' - 3"	4' - 0"	117	12	3' - 3 7/8"	215	11' - 4"	82	414
	30"	3' - 11 1/2"	16' - 3"	4' - 6"	141	15	3' - 9 7/8"	310	14' - 4"	104	555
1:4	15"	2' - 8 1/2"	6' - 3"	3' - 3"	65	5	2' - 6 7/8"	70	4' - 4"	32	167
	18"	2' - 11 1/2"	7' - 3"	3' - 6"	73	6	2' - 9 7/8"	92	5' - 4"	39	204
	24"	3' - 5 1/2"	9' - 3"	4' - 0"	90	8	3' - 3 7/8"	144	7' - 4"	53	287
	30"	3' - 11 1/2"	11' - 3"	4' - 6"	107	10	3' - 9 7/8"	206	9' - 4"	68	381
1:3	15"	2' - 8 1/2"	4' - 3"	3' - 3"	51	3	2' - 6 7/8"	42	2' - 4"	17	110
	18"	2' - 11 1/2"	5' - 3"	3' - 6"	60	4	2' - 9 7/8"	61	3' - 4"	24	145
	24"	3' - 5 1/2"	6' - 3"	4' - 0"	70	5	3' - 3 7/8"	90	4' - 4"	31	191
	30"	3' - 11 1/2"	8' - 3"	4' - 6"	87	7	3' - 9 7/8"	145	6' - 4"	46	278

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

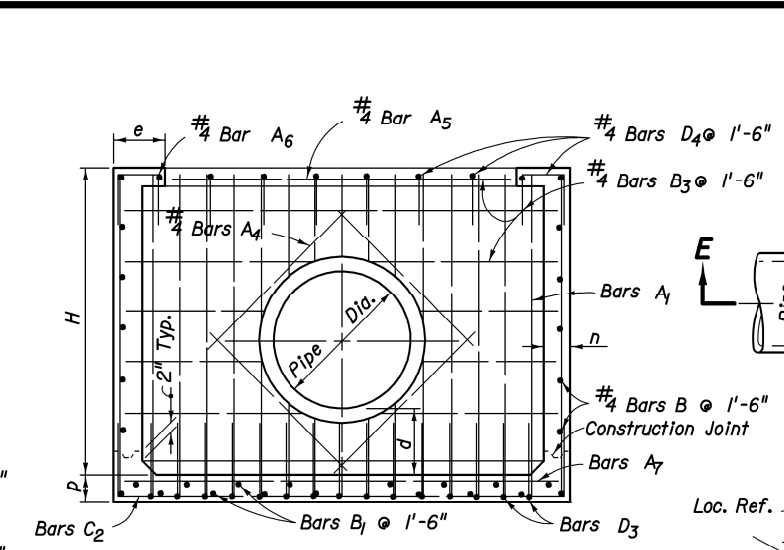
**U-TYPE CONCRETE ENDWALLS  
BAFFLES AND GRATE OPTIONAL  
15" TO 30" PIPE**

Designed By	Names	Dates	Approved By
Drawn By	CDP	07/71	<i>S. A. McHenry</i> State Drainage Engineer
Checked By			Revision
			00
			Sheet No.
			3 of 3
			Index No.
			261

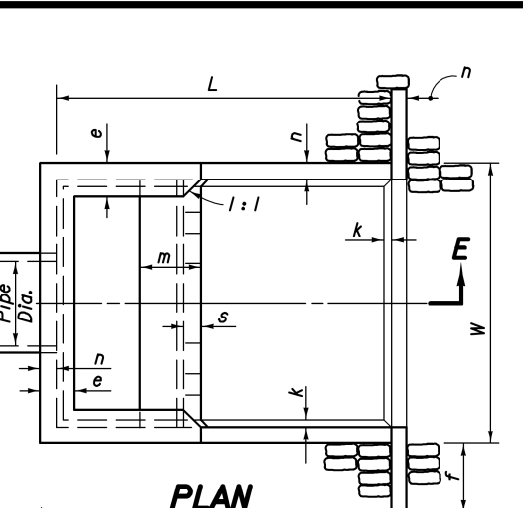




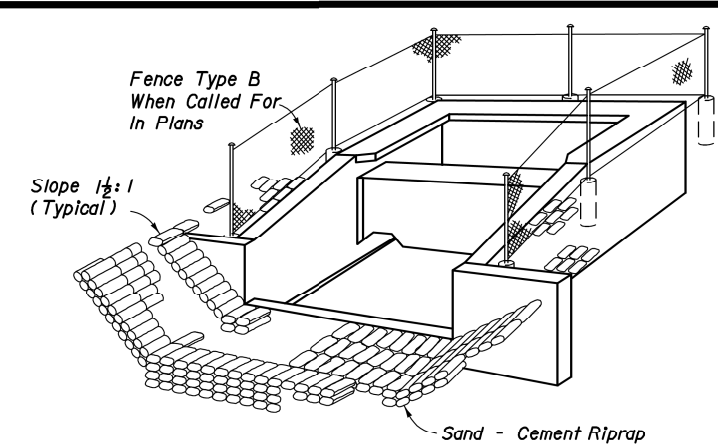
PLAN



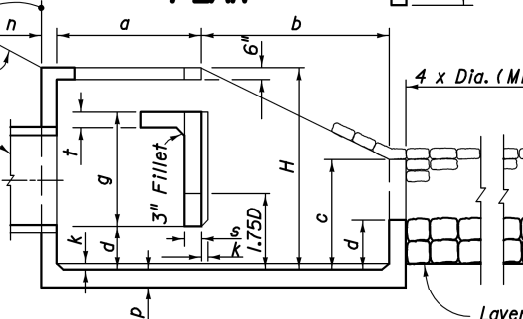
SECTION CC



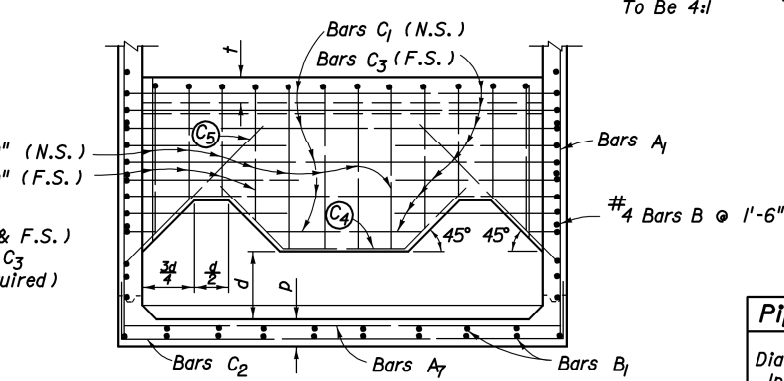
PLAN



PERSPECTIVE

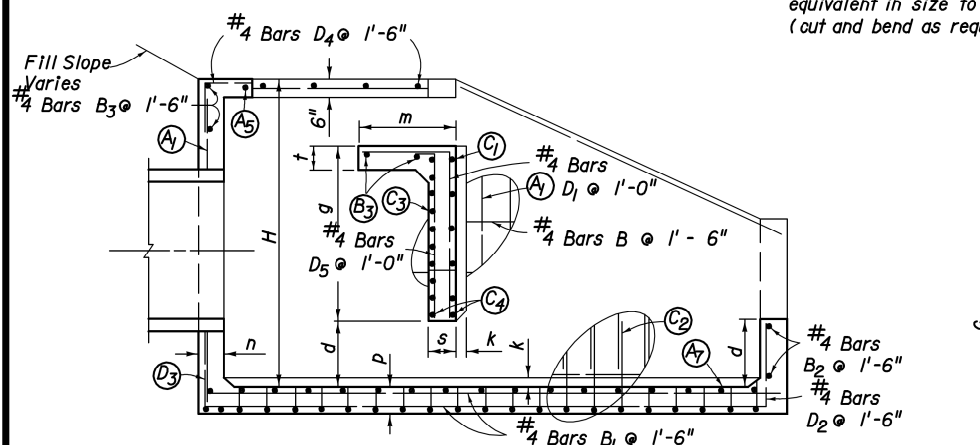


SECTION EE

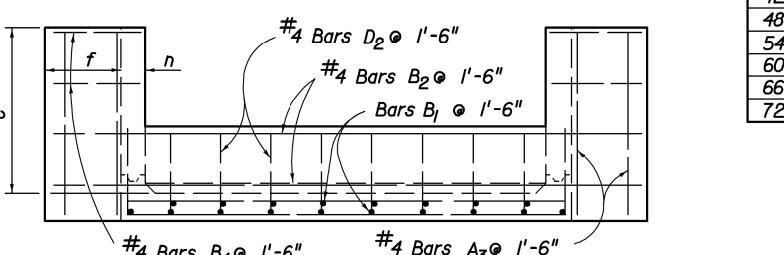


SECTION DD

Note: Bars C4 & C5 (N.S. & F.S.) equivalent in size to C3 (cut and bend as required)



SECTION BB



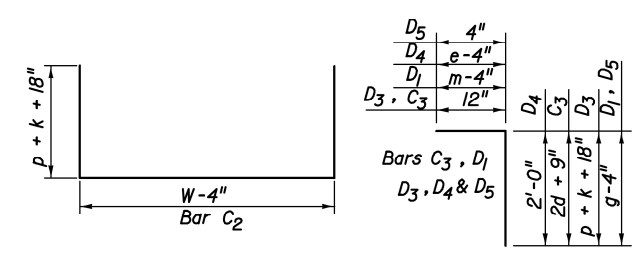
VIEW AA

Pipe Size	Dia. In.	Area S.F.	Q (Max.) (cfs)	Dimensions																Concrete Class I C.Y.	Reinf. Steel Lbs.	Sand Cement Riprap C.Y. (Nom.)
				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 1/2	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 1/2	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 1/2	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 1/2	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 1/2	10	8	4	27.19	2,659	27.2	
60	13.63	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 1/2	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 1/2	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 1/2	12	8	6	50.68	5,426	44.5	

GENERAL NOTES

- U-type concrete endwall energy dissipators are intended for use outside the clear zone.
- Chamfer all exposed edges 3/8"
- Concrete meeting the requirements of ASTM C478 (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.
- Reinforcing steel shall have 2" min. cover.
- 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 end posts to be paid for under the contract unit price for Corner Post Assembly (Type B Fence), EA. and End Post Assembly (Type B Fence), EA. respectively. See Index No. 452 for details of Type B fencing.

BARS												
Pipe Size	A1		A7		C1		C2		C3		D3	
	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	0-9 1/2	4	1-6	5	0-11	4	0-9 1/2	5	0-5 1/2	4	0-9 1/2
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	0-6 1/2	5	0-11
48"	5	0-9 1/2	4	1-0	6	1-0	5	0-9 1/2	6	0-6	5	0-9 1/2
54"	5	0-8 1/2	4	0-10	7	1-1	5	0-8 1/2	7	0-6 1/2	5	0-8 1/2
60"	6	0-10	5	1-1	7	1-0	6	0-10	7	0-6	6	0-10
66"	6	0-8 1/2	5	0-11 1/2	7	0-11	6	0-8 1/2	7	0-5 1/2	6	0-8 1/2
72"	6	0-7 1/2	5	0-10	7	0-10	6	0-7 1/2	7	0-5	6	0-7 1/2



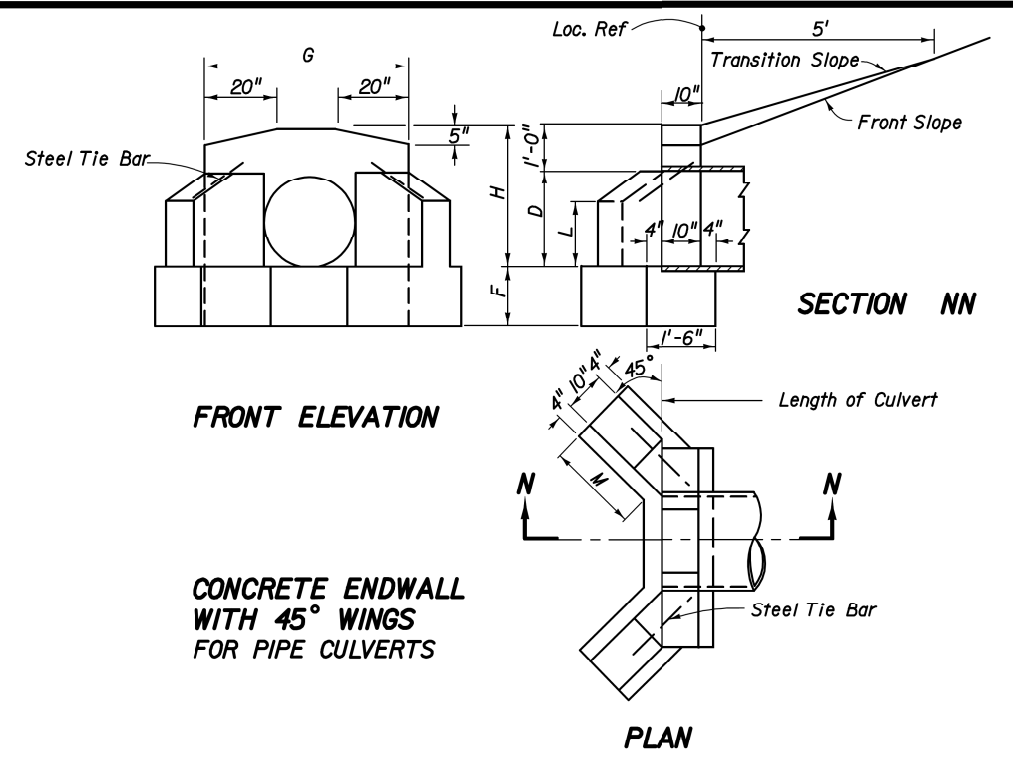
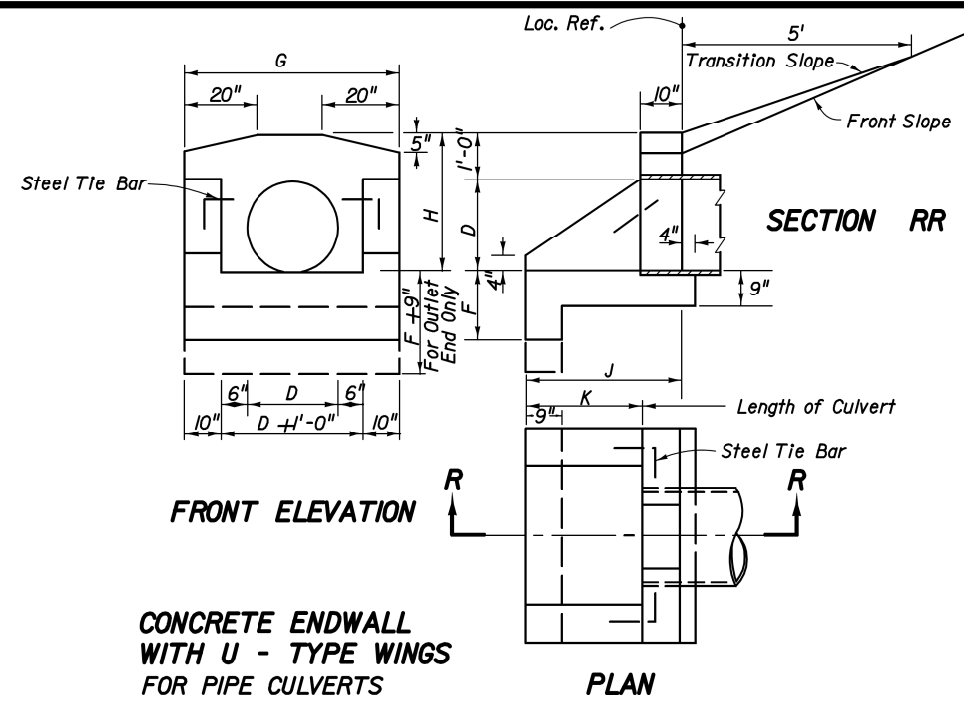
Note: All bar dimensions are out to out.

BENDING DIAGRAM

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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

Designed By	HAB	10/69	Approved By	S. A. McHenry	
Drawn By	RWR	02/84	Revision	Sheet No.	Index No.
Checked By	JVG	02/84	00	1 of 1	264



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

Opening D	Area Sq.Ft.	DIMENSIONS						QUANTITIES IN ONE ENDWALL						Steel Tie Bars	
		Wall		Footing		Total Cu. Yds. Concrete, Class I									
		G	H	K	F	J	Conc. Pipe		C.M. Pipe		C.I. Pipe				
12"	0.8	3'-8"	2'-0"	1'-0"	1'-3"	2'-2"	0.48	0.55	0.49	0.57	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	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	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 - 3/8" 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 - 3/8" 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 - 3/8" 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 - 3/8" 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 - 3/8" x 3'-0"		

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

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

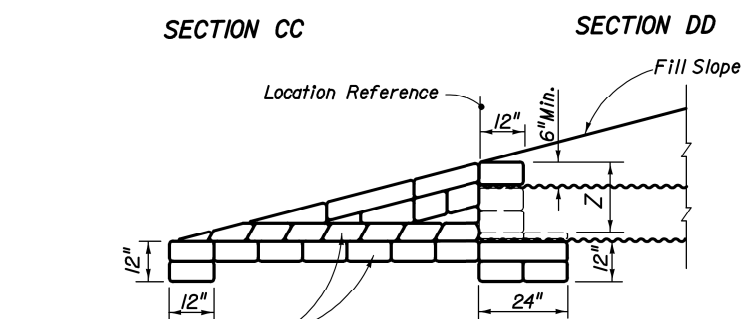
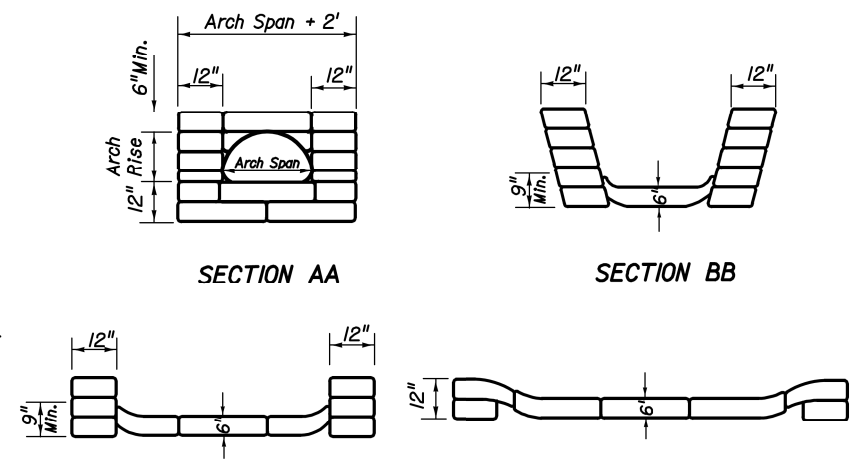
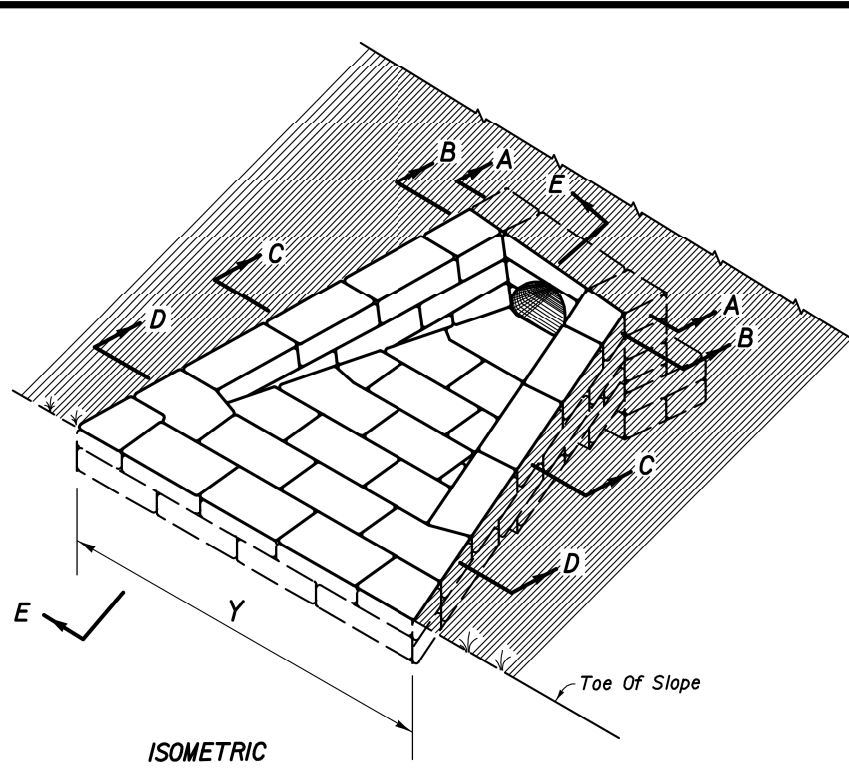
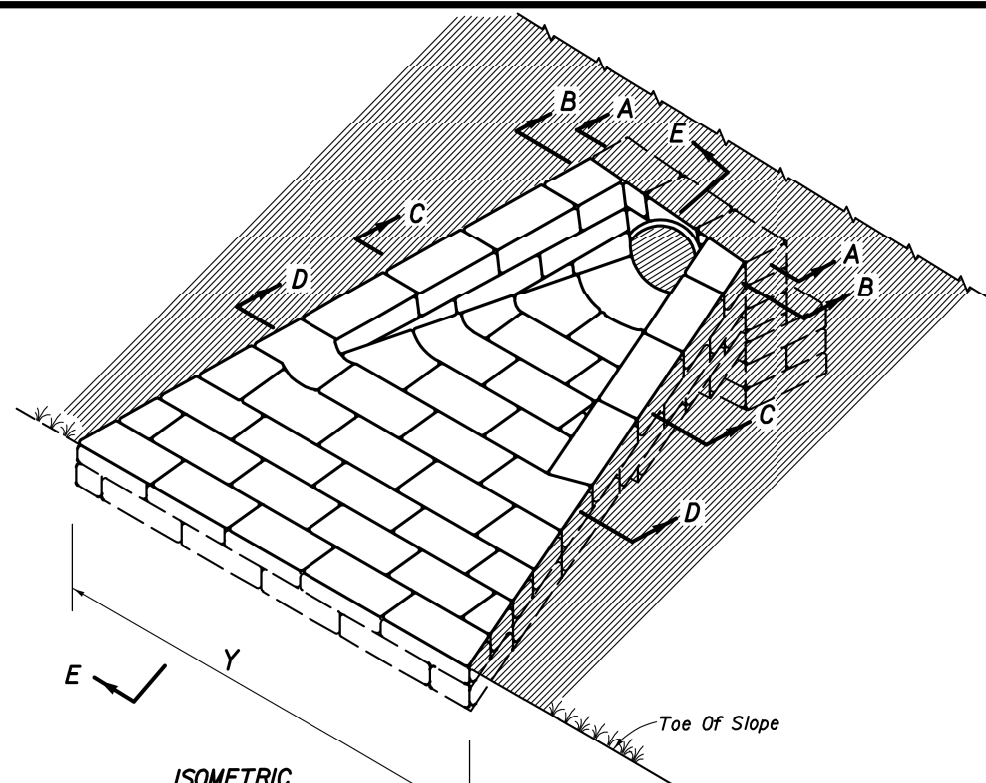
**GENERAL NOTES**

1. Winged concrete endwalls are intended for use outside the clear zone.
2. Chamfer all exposed edges 3/4"
3. 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.
4. 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.
5. 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

**WINGED CONCRETE ENDWALLS  
SINGLE ROUND PIPE**

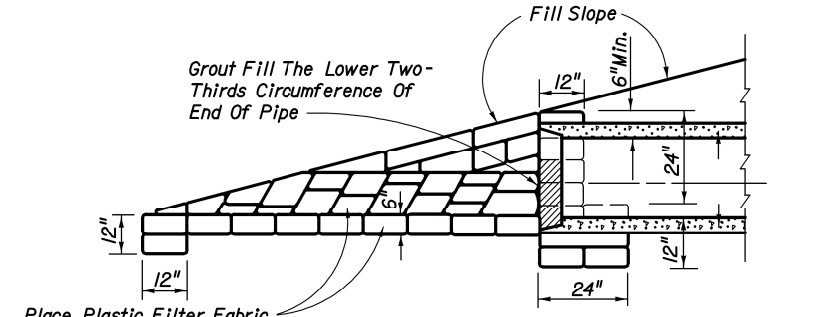
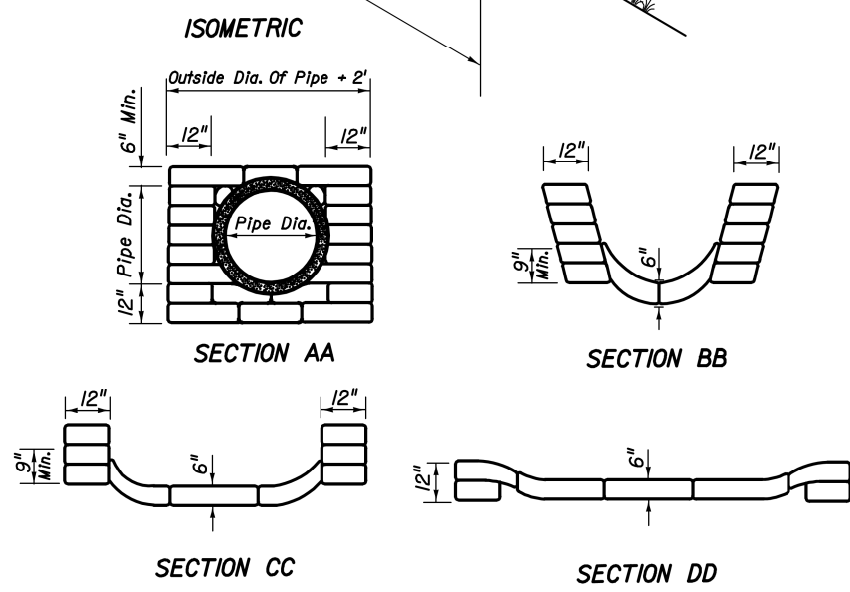
Names	Dates	Approved By	<i>S. A. McHenry</i>		
Designed By		State Drainage Engineer			
Drawn By	TJK	12/31	Revision	Sheet No.	Index No.
Checked By	GEF	03/32	00	1 of 1	266



Place Plastic Filter Fabric Type D-4 (See Index 199) Around And Below Sand Cement Riprap. Cost Of Fabric To Be Included In Cost Of Sand Cement Riprap

**DETAILS FOR SINGLE METAL PIPE ARCH CULVERTS**

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



Place Plastic Filter Fabric Type D-4 (See Index 199) Around And Below Sand Cement Riprap. Cost Of Fabric To Be Included In Cost Of Sand Cement Riprap

**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 1:2 Slopes		For 1:4 Slopes		For 1:6 Slopes			
		1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch
17"	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"	29"	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				
49"	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				
57"	38"	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				

**GENERAL NOTES**

1. U-Type Sand-Cement Endwalls Are Intended For Use Outside The Clear Zone.

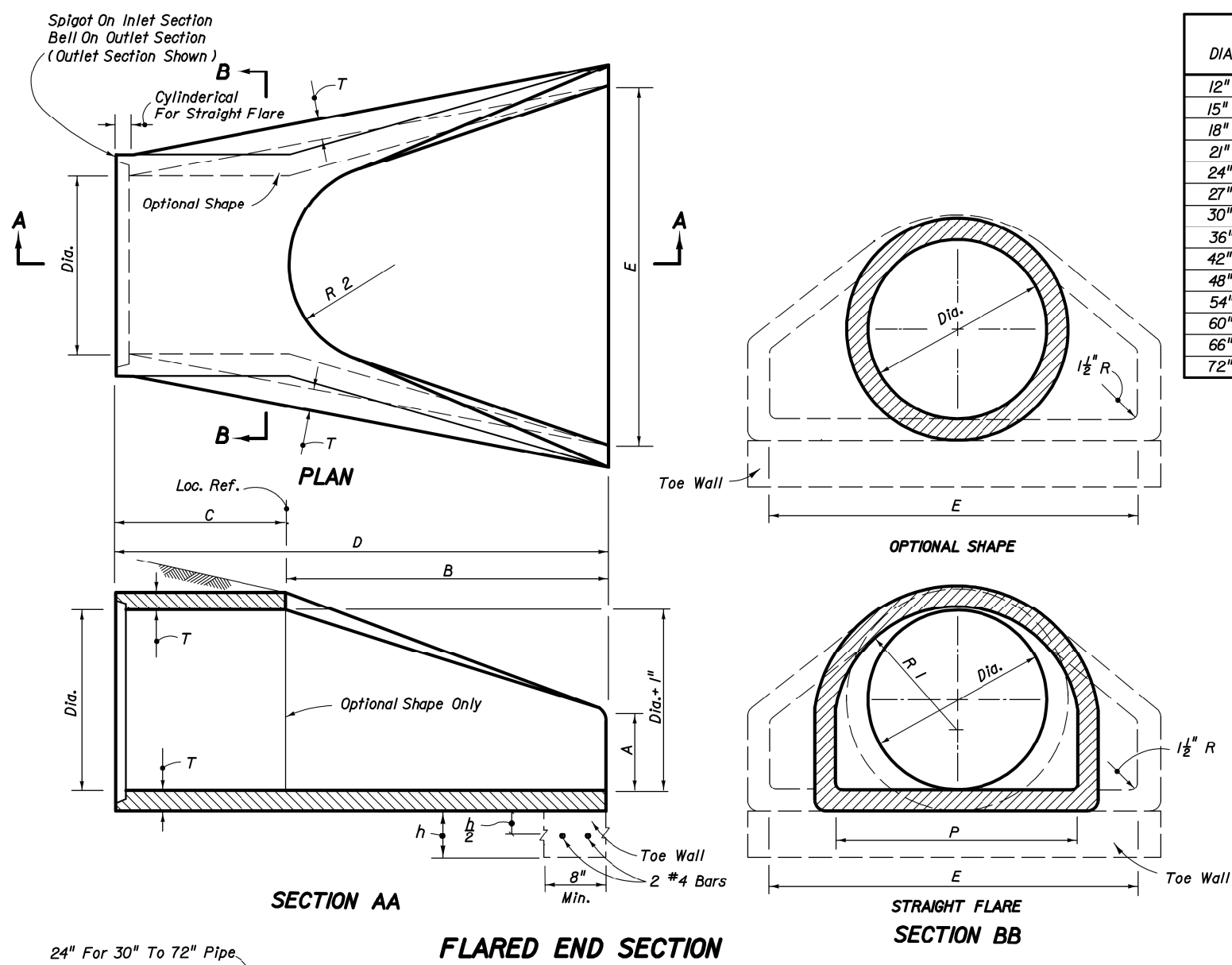
DIMENSIONS AND QUANTITIES FOR ROUND PIPE CULVERTS																			
Pipe Dia.	X	Dimensions								Quantity of Sand-Cement Riprap in Cu. Yds. for One Endwall									
		Y				For 1:2 Slopes		For 1:4 Slopes		For 1:6 Slopes		For 1:2 Slopes		For 1:4 Slopes		For 1:6 Slopes			
		1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	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'-10"	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

**U-TYPE SAND-CEMENT ENDWALLS**

Designed By	JEP	12/48	Names	Dates	Approved By	<i>S. A. McHenry</i>
Drawn By	HW	03/54	Revision	Sheet No.	State Drainage Engineer	Index No.
Checked By	CDD	03/54	00	1 of 1		268

DIA.	T	REINF. SQ IN/LF	BELL Or SPIGOT	A	B	C	D	E	P	R 1	R 2	FLAT	WEIGHT (LBS.)	h	TOE WALL CLASS I CONC (Misc.) CY
12"	2"	0.07	1 1/2"	4"	2'-0"	4'-0 1/2"	6'-0 1/2"	2'-0"	19 1/8"	10 1/8"	9"	3 1/2"	530	12"	.06
15"	2 1/4"	0.07	2"	6"	2'-3"	3'-10"	6'-1"	2'-6"	24 3/8"	12 1/2"	11"	3 1/2"	740	12"	.07
18"	2 3/4"	0.07	2 1/2"	9"	2'-3"	3'-10"	6'-1"	3'-0"	29"	15 1/2"	12"	4"	990	15"	.11
21"	3"	0.07	3"	9"	2'-11"	3'-2"	6'-1"	3'-6"	31 5/8"	16 1/2"	13"	4"	1280	15"	.12
24"	3 1/2"	0.07	3 1/2"	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	33 3/8"	16 3/8"	14"	4 1/2"	1520	18"	.17
27"	3 3/4"	0.148	4"	10 1/2"	4'-0"	2'-1 1/2"	6'-1 1/2"	4'-6"	36"	18 3/8"	14 1/2"	4 1/2"	1930	18"	.19
30"	4"	0.148	4 1/2"	1'-0"	4'-6"	1'-7 3/4"	6'-1 1/2"	5'-0"	37"	18 1/2"	15"	5"	2190	21"	.24
36"	4 1/2"	0.148	5"	1'-3"	5'-3"	2'-10 3/4"	8'-1 1/2"	6'-0"	47 1/8"	24 3/8"	20"	5 1/2"	4100	21"	.29
42"	5"	0.148	5 1/2"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	53 3/8"	27 1/2"	22"	5 3/4"	5380	24"	.36
48"	5 1/2"	0.148	6"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	56 1/2"	28 1/2"	22"	5 3/4"	6550	24"	.39
54"	6"	0.174	6 1/2"	2'-3"	5'-5"	2'-11"	8'-4"	7'-6"	65 1/2"	33 3/8"	24"	6 1/4"	8040	24"	.42
60"	6 1/2"	0.174	7"	2'-6"	5'-0"	3'-3"	8'-3"	8'-0"	72 1/2"	36 1/2"	24"	6 3/4"	8750	24"	.44
66"	7"	0.174	7 1/2"	2'-0"	6'-6"	1'-9"	8'-3"	8'-6"	72"	36 1/2"	24"	7 1/4"	10630	24"	.47
72"	7"	0.174	8"	2'-0"	6'-6"	1'-9"	8'-3"	9'-0"	77 1/8"	38 1/8"	24"	7 3/4"	12520	24"	.50



**GENERAL NOTES**

- Flared end sections shall conform to the requirements of ASTM C76 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 (O-Ring Gasket). Flared end section joint dimensions and tolerances shall be identical or compatible to those used in the pipe culvert joint. When pipe culvert and flared end section manufacturers are different, the compatibility of joint designs shall be certified to by the manufacturer of the flared end sections.
  - 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. Concrete jacket shall be as specified on index No. 280. Cost of concrete and reinforcement shall 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. Sodding shall be in accordance with Index No. 281, and paid for under the contract unit price for Sodding, 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, 12" and 15" 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

**FLARED END SECTION**

Designed By	EGR	Dates	09/77	Approved By	S. A. McHenry		
Drawn By	HKH	Revision	09/77	State Drainage Engineer		Index No.	
Checked By	JVG	09/77	00	Sheet No.	1 of 1		270

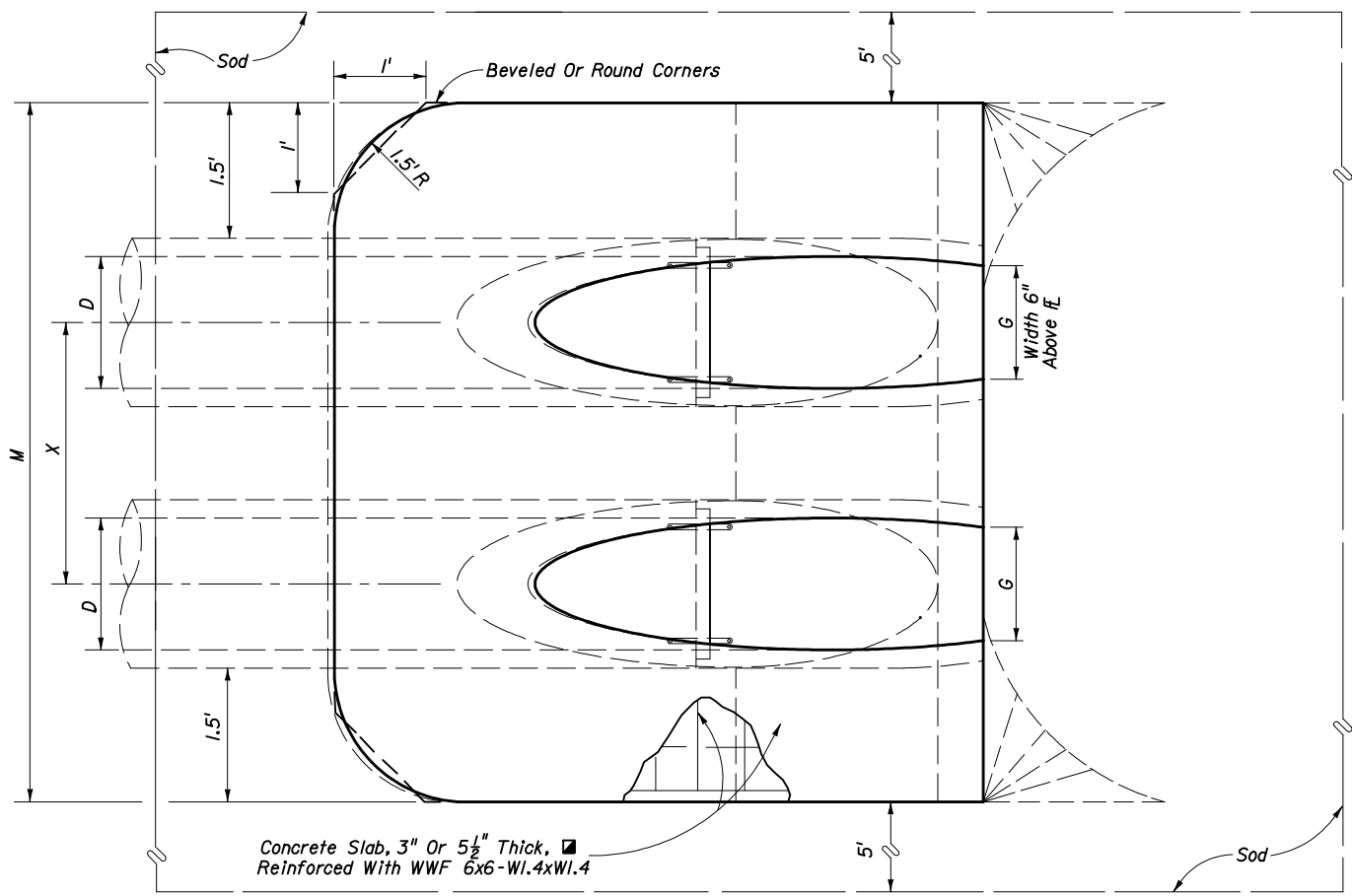
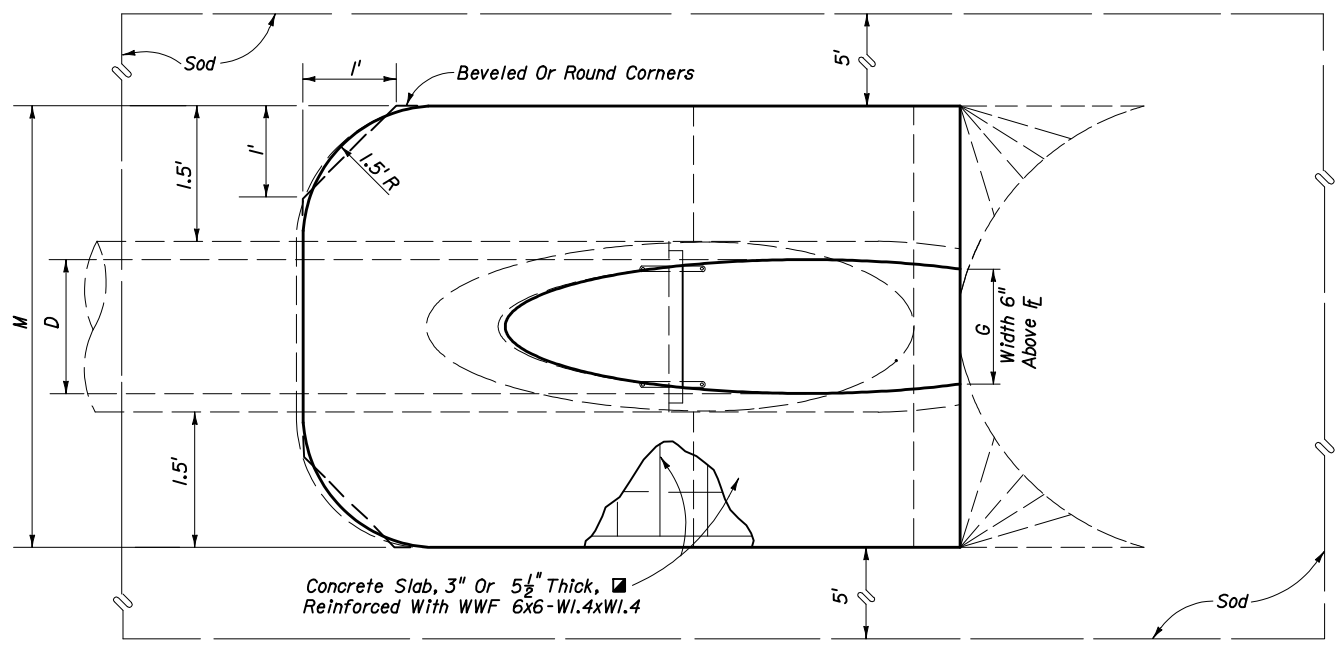
**DIMENSIONS AND QUANTITIES**

	D	X	A	B	C	E	F	G	H	M				N	5 1/2" 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
1:2 Slope	15"	2'-7"	1.92'	2.18'	4.10'	2.06'	5'	1.22'	2.9'	4.63'	7.21'	9.79'	12.37'	1.19'	0.38	0.58	0.77	0.96	21	24	27	30
	18"	2'-10"	1.97'	2.74'	4.71'	2.56'	6'	1.41'	3.4'	4.92'	7.75'	10.58'	13.42'	1.21'	0.44	0.65	0.87	1.09	22	25	28	31
	24"	3'-5"	2.06'	3.85'	5.91'	3.56'	7'	1.73'	3.4'	5.50'	8.92'	12.33'	15.75'	1.25'	0.54	0.83	1.12	1.42	24	28	32	35
	30"	4'-3"	2.15'	4.95'	7.10'	4.56'	8'	2.00'	3.4'	6.08'	10.33'	14.58'	18.83'	1.29'	0.66	1.09	1.50	1.91	26	31	35	40
	36"	5'-1"	2.25'	6.08'	8.33'	5.56'	9'	2.24'	3.4'	6.67'	11.75'	16.83'	21.92'	1.33'	0.81	1.38	1.95	2.51	28	34	39	45
	42"	6'-0"	2.34'	7.21'	9.55'	6.56'	10'	2.45'	3.4'	7.25'	13.25'	19.25'	25.25'	1.38'	0.97	1.70	2.45	3.19	30	37	43	50
	48"	6'-9"	2.43'	8.33'	10.76'	7.56'	11'	2.65'	3.4'	7.83'	14.58'	21.33'	28.08'	1.42'	1.13	2.04	2.93	3.84	32	39	47	54
	54"	7'-8"	2.52'	9.44'	11.96'	8.56'	12'	2.83'	3.4'	8.42'	16.08'	23.75'	31.42'	1.46'	1.31	2.44	3.58	4.72	34	42	51	59
	60"	8'-6"	2.62'	10.56'	13.18'	9.56'	14'	3.00'	4.4'	9.00'	17.50'	26.00'	34.50'	1.50'	1.51	2.89	4.28	5.68	36	45	55	64
	66"	9'-2"	2.71'	11.68'	14.39'	10.56'	15'	3.18'	4.4'	9.58'	18.75'	27.92'	37.08'	1.54'	1.68	3.25	4.84	6.43	38	48	58	68
72"	10'-0"	2.80'	12.80'	15.60'	11.56'	16'	3.30'	4.4'	10.16'	20.16'	30.16'	40.16'	1.58'	1.89	3.74	5.59	7.45	40	51	62	73	
1:4 Slope	15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.0'	4.63'	7.21'	9.79'	12.37'	1.19'	0.57	0.87	1.15	1.44	23	26	29	32
	18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.0'	4.92'	7.75'	10.58'	13.42'	1.21'	0.66	0.99	1.31	1.65	25	28	31	35
	24"	3'-5"	2.53'	7.18' Δ	9.71'	7.03' Δ	11'	1.73'	4.0'	5.50'	8.92'	12.33'	15.75'	1.25'	0.85	1.30	1.75	2.20	28	32	36	40
	30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	4.0'	6.08'	10.33'	14.58'	18.83'	1.29'	1.10	1.74	2.39	3.05	31	36	41	46
	36"	5'-1"	2.87'	11.31' ◇	14.18'	11.03' ◇	15'	2.24'	4.0'	6.67'	11.75'	16.83'	21.92'	1.33'	1.32	2.21	3.08	3.96	34	40	46	52
	42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	4.0'	7.25'	13.25'	19.25'	25.25'	1.38'	1.58	2.76	3.91	5.09	38	44	51	58
	48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	4.0'	7.83'	14.58'	21.33'	28.08'	1.42'	1.85	3.30	4.73	6.17	41	48	56	63
	54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	4.0'	8.42'	16.08'	23.75'	31.42'	1.46'	2.14	3.95	5.77	7.58	44	52	61	69
	60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	4.0'	9.00'	17.50'	26.00'	34.50'	1.50'	2.45	4.66	6.87	9.07	47	56	66	75
	66"	9'-2"	3.73'	21.62'	25.35'	21.03'	25'	3.18'	4.0'	9.58'	18.75'	27.92'	37.08'	1.54'	2.88	5.54	8.18	10.84	49	59	69	80
72"	10'-0"	3.91'	23.68'	27.59'	23.03'	27'	3.30'	4.0'	10.16'	20.16'	30.16'	40.16'	1.58'	3.54	6.61	9.87	13.13	52	63	74	85	

■ See General Note No. 3.  
See Sheet 5 Of 6 For 3" Slab Quantities

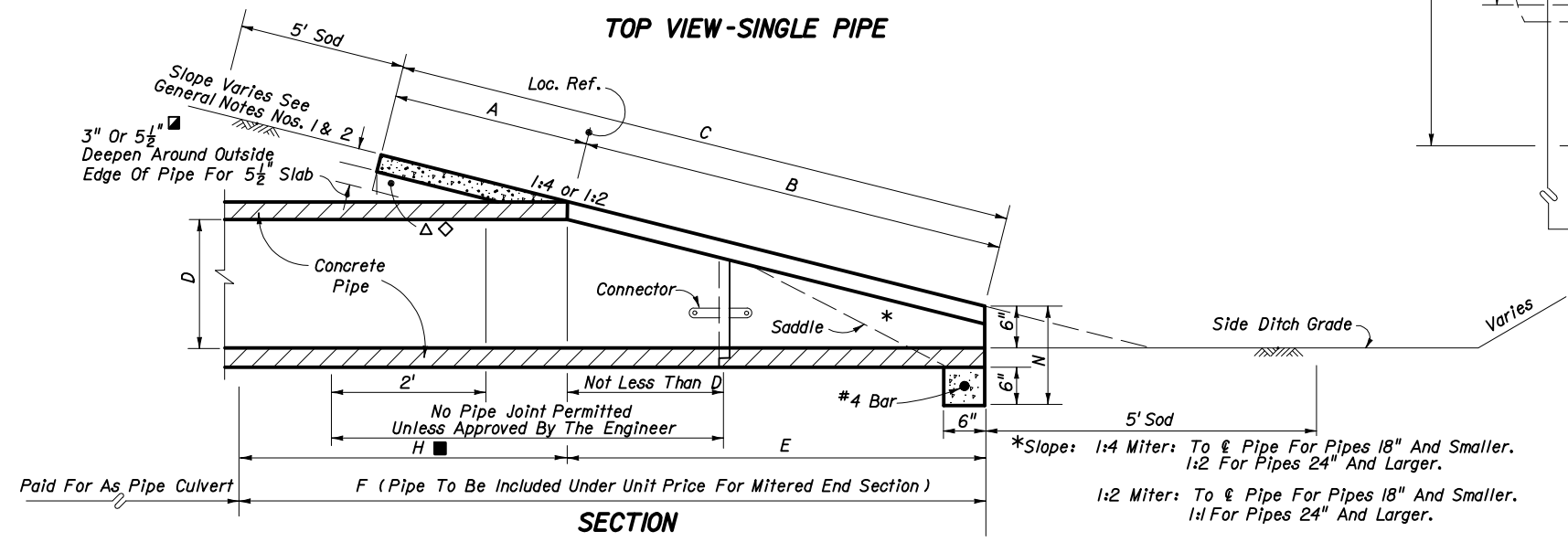
■ Values shown for estimating pipe quantities and are for information only.

**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**



NOTE: See sheet 6 for details and notes.

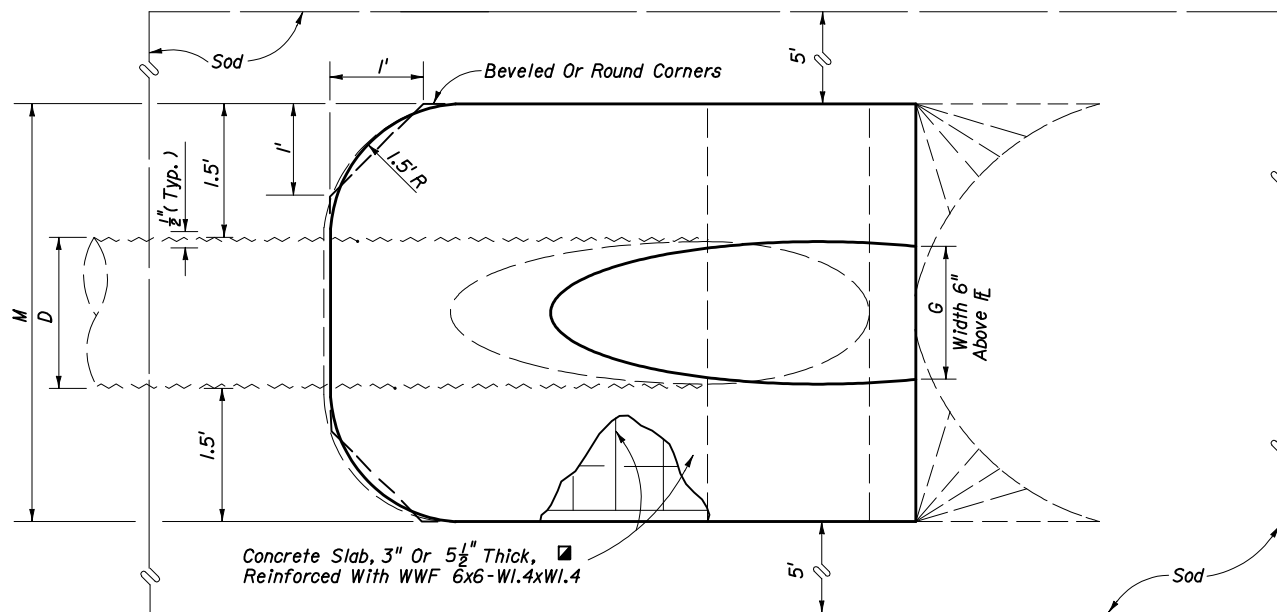
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CROSS DRAIN MITERED END SECTION</b>				
SINGLE AND MULTIPLE ROUND CONCRETE PIPE				
Names	Dates	Approved By		
Designed By	DCB	06/78	 State Drainage Engineer	
Drawn By				
Checked By	KNM	06/78		
Revision	02	Sheet No.	1 of 6	Index No.
				272

**DIMENSIONS AND QUANTITIES**

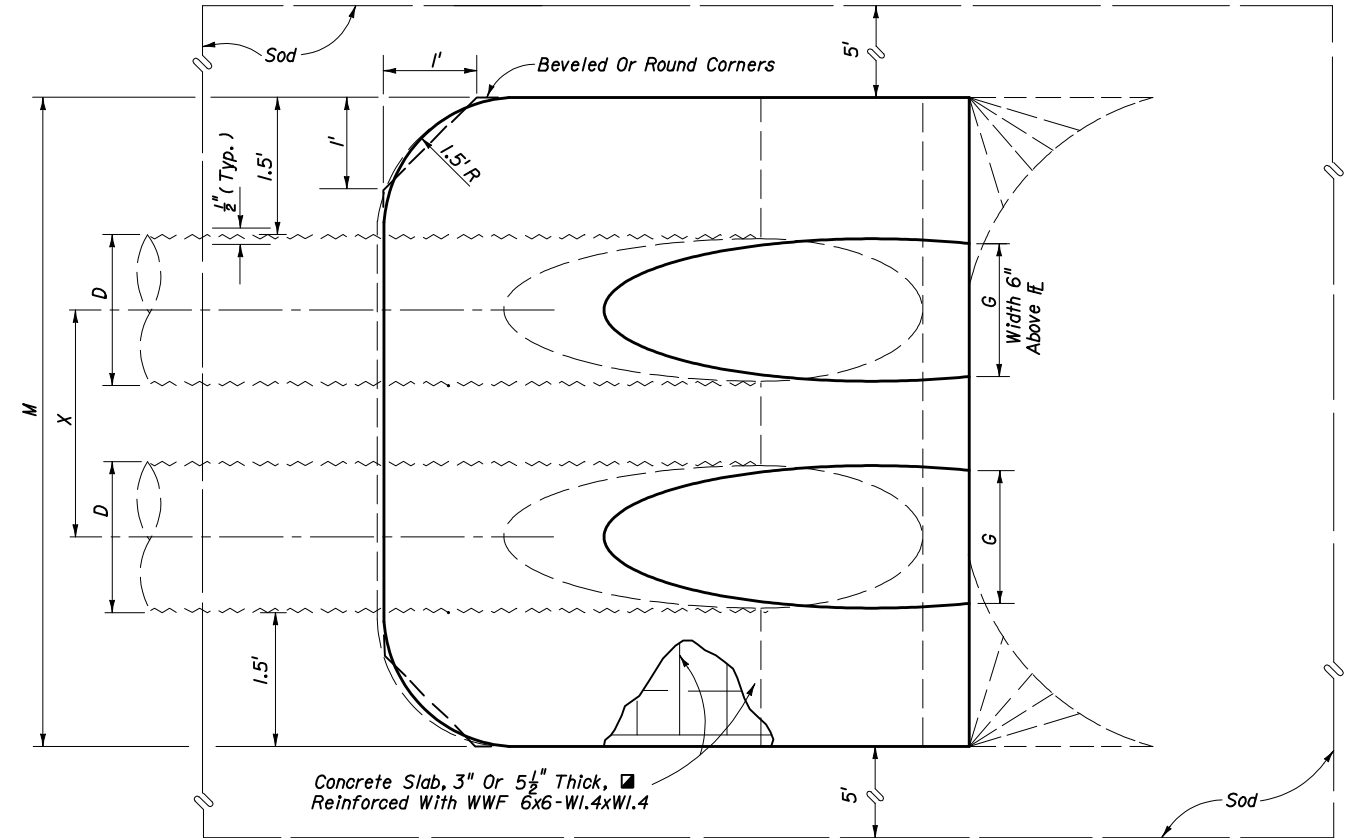
	D	X	A	B	C	E	F	G	H	M				N	5 1/2" CONCRETE SLAB (CY) ■				SODDING (SQ. YDS.)			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	15"	2'-7"	2.5'	1.68'	4.18'	1.50'	5'	1.23'	3.5'	4.33'	6.92'	9.50'	12.08'	1.04'	0.35	0.54	0.74	0.94	21	24	27	29
	18"	2'-10"	2.5'	2.24'	4.74'	2.00'	6'	1.41'	4'	4.58'	7.42'	10.25'	13.08'	1.04'	0.38	0.62	0.87	1.12	22	25	28	31
	24"	3'-5"	2.5'	3.35'	5.85'	3.00'	7'	1.73'	4'	5.08'	8.50'	11.92'	15.33'	1.04'	0.47	0.76	1.05	1.34	23	27	31	35
	30"	4'-3"	2.5'	4.47'	6.97'	4.00'	8'	2.00'	4'	5.58'	9.83'	14.08'	18.33'	1.04'	0.57	0.96	1.37	1.77	25	30	35	39
	36"	5'-1"	2.5'	5.59'	8.09'	5.00'	9'	2.24'	4'	6.08'	11.17'	16.25'	21.33'	1.04'	0.67	1.19	1.72	2.26	27	33	38	44
	42"	6'-0"	2.5'	6.71'	9.21'	6.00'	10'	2.45'	4'	6.58'	12.58'	18.58'	24.58'	1.04'	0.78	1.48	2.17	2.87	29	36	42	49
	48"	6'-9"	2.5'	7.83'	10.33'	7.00'	11'	2.65'	4'	7.08'	13.83'	20.58'	27.33'	1.04'	0.89	1.71	2.54	3.36	31	38	46	53
	54"	7'-8"	2.5'	8.94'	11.44'	8.00'	12'	2.83'	4'	7.58'	15.25'	22.92'	30.58'	1.04'	1.02	2.06	3.10	4.14	33	41	50	58
60"	8'-6"	2.5'	10.06'	12.56'	9.00'	13'	3.00'	4'	8.08'	16.58'	25.08'	33.58'	1.04'	1.14	2.38	3.63	4.89	34	44	53	63	
1:4 Slope	15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4'	4.33'	6.92'	9.50'	12.08'	1.04'	0.44	0.68	0.91	1.15	22	25	28	31
	18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4'	4.58'	7.42'	10.25'	13.08'	1.04'	0.49	0.77	1.03	1.31	24	27	30	33
	24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	4'	5.08'	8.50'	11.92'	15.33'	1.04'	0.65	1.09	1.38	1.77	27	30	34	38
	30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	4'	5.58'	9.83'	14.08'	18.33'	1.04'	0.81	1.34	1.90	2.44	29	34	39	44
	36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	4'	6.08'	11.17'	16.25'	21.33'	1.04'	0.97	1.68	2.41	3.14	32	38	44	49
	42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	4'	6.58'	12.58'	18.58'	24.58'	1.04'	1.13	2.08	3.06	4.02	35	42	48	55
	48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	4'	7.08'	13.83'	20.58'	27.33'	1.04'	1.29	2.49	3.69	4.88	38	46	53	60
	54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	4'	7.58'	15.25'	22.92'	30.58'	1.04'	1.48	2.98	4.47	5.98	41	49	58	66
60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	4'	8.08'	16.58'	25.08'	33.58'	1.04'	1.66	3.49	5.31	7.13	44	53	63	72	

■ See General Note No. 3.  
See Sheet 5 Of 6 For 3" Slab Quantities

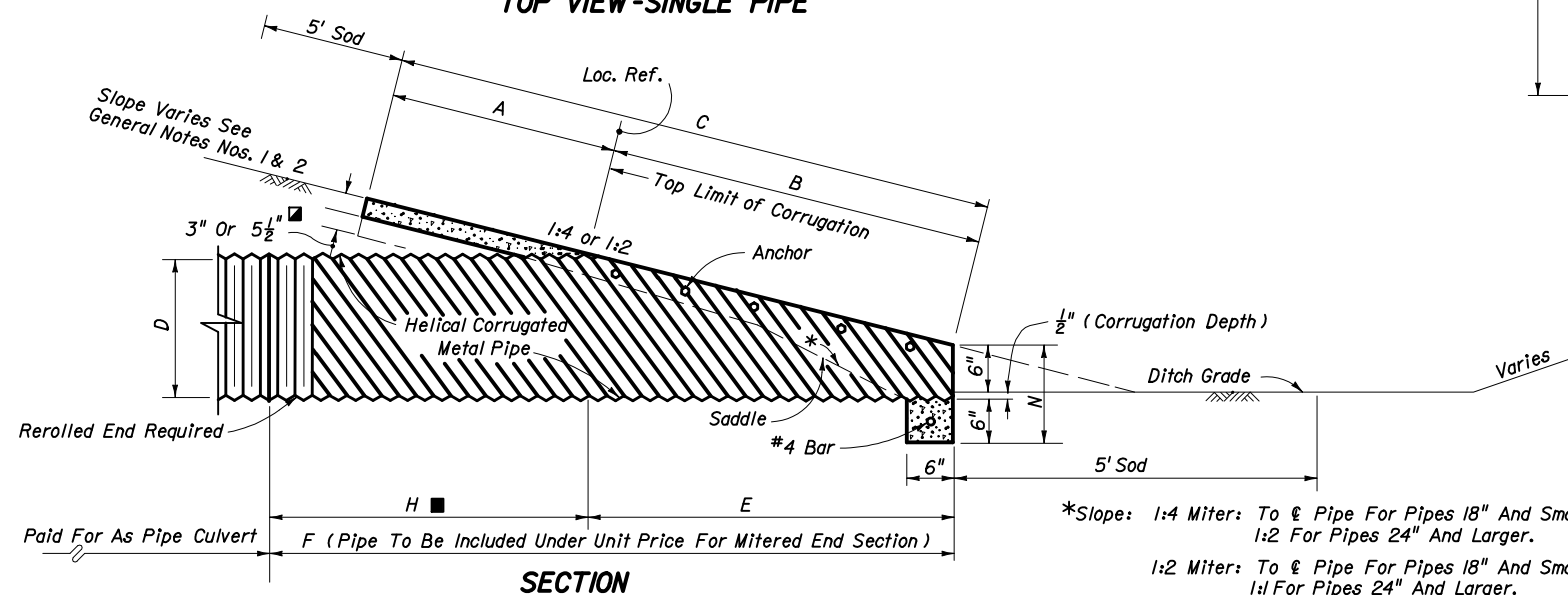
■ Values shown for estimating pipe quantities and are for information only



**TOP VIEW-SINGLE PIPE**



**TOP VIEW-MULTIPLE PIPE**



**SECTION**

\*Slope: 1:4 Miter: To  $\phi$  Pipe For Pipes 18" And Smaller.  
1:2 For Pipes 24" And Larger.  
1:2 Miter: To  $\phi$  Pipe For Pipes 18" And Smaller.  
1:1 For Pipes 24" And Larger.

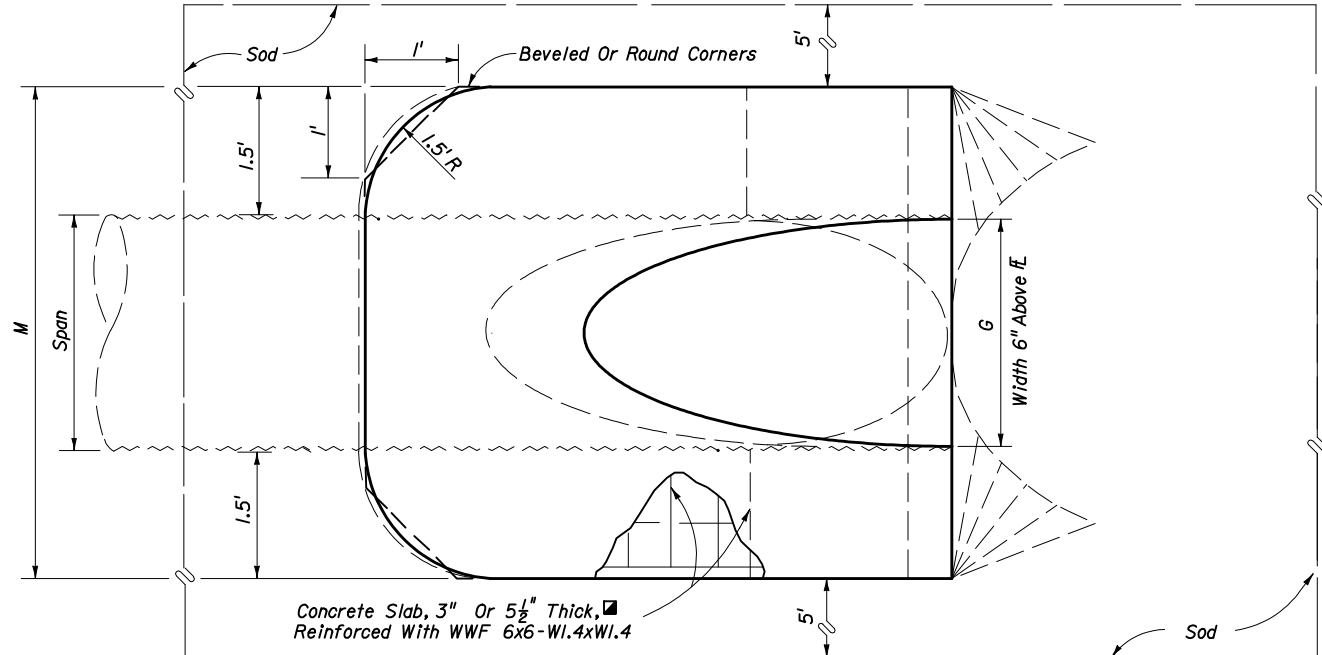
NOTE: See Sheet 6 For Details And Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CROSS DRAIN MITERED END SECTION</b>				
SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By DCB	06/78	State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By KNW	06/78	02	2 of 6	272

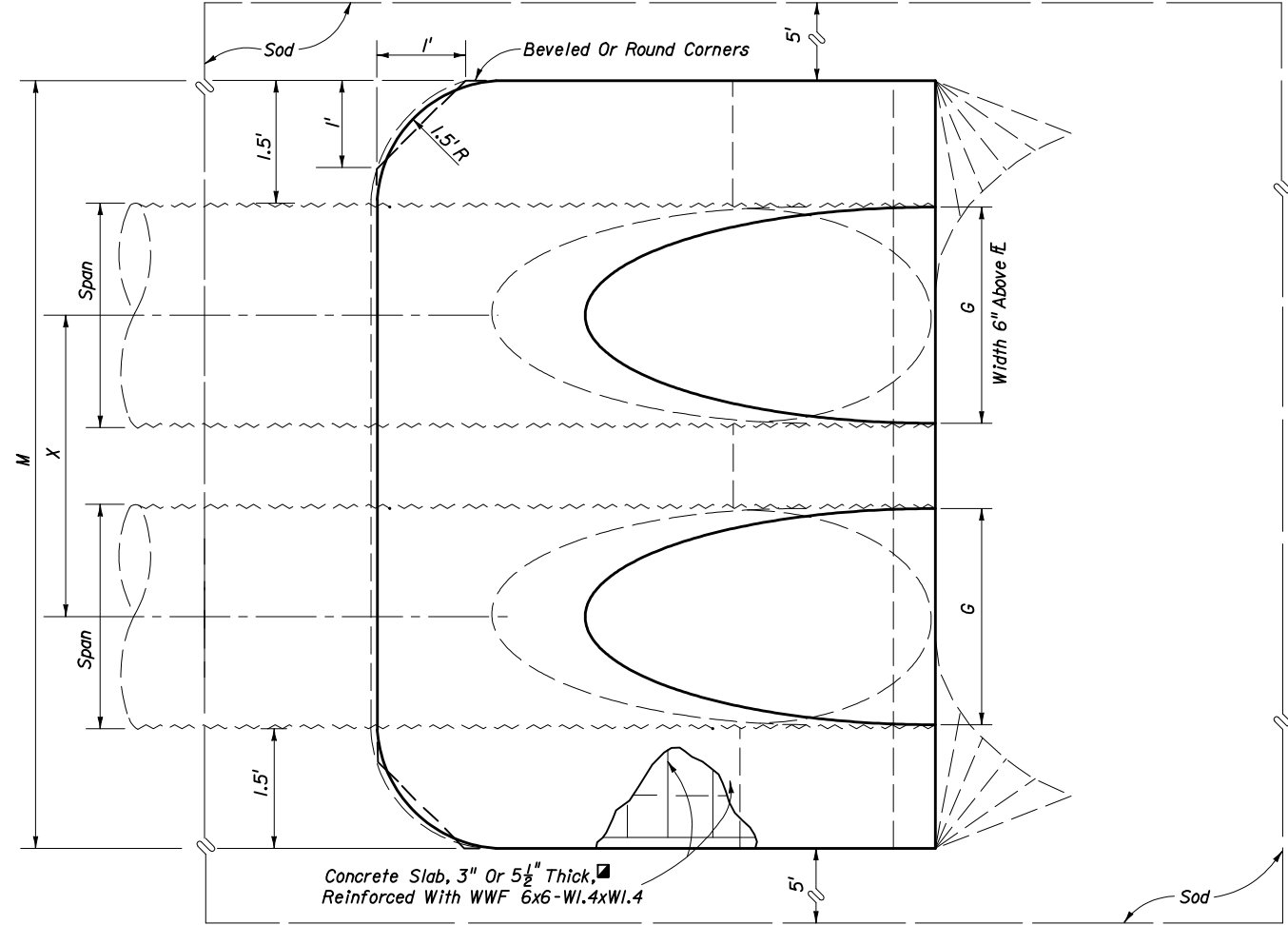
1974 AASHTO		DIMENSIONS AND QUANTITIES														5 1/2" CONCRETE SLAB (CY) ■				SODDING (SQ. YDS.)										
SPAN	RISE	X	A	B	C	E	F	G	H ■	M				N	Single Pipe				Double Pipe				Triple Pipe				Quad. Pipe			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe				
1:2 Slope	17"	13"	2'-6"	2.5'	1.30'	3.80'	1.77'	4'	1.39'	2.8'	4.50'	7.00'	9.50'	12.00'	1.04'	0.41	0.61	0.81	1.02	21	23	26	29							
	21"	15"	2'-10"	2.5'	1.68'	4.17'	1.50'	5'	1.76'	3.5'	4.83'	7.67'	10.50'	13.33'	1.04'	0.43	0.66	0.88	1.10	22	25	28	31							
	28"	20"	3'-5"	2.5'	2.61'	5.11'	2.33'	6'	2.22'	3.7'	5.42'	8.83'	12.25'	15.67'	1.04'	0.51	0.78	1.06	1.33	23	27	30	34							
	35"	24"	4'-0"	2.5'	3.35'	5.85'	3.00'	7'	2.55'	4.0'	6.00'	10.00'	14.00'	18.00'	1.04'	0.57	0.90	1.22	1.55	24	29	33	38							
	42"	29"	4'-9"	2.5'	4.29'	6.79'	3.83'	8'	2.97'	4.2'	6.58'	11.33'	16.08'	20.83'	1.04'	0.64	1.04	1.46	1.87	26	31	37	42							
	49"	33"	5'-6"	2.5'	5.03'	7.53'	4.50'	9'	3.34'	4.5'	7.17'	12.67'	18.17'	23.67'	1.04'	0.73	1.23	1.72	2.22	28	34	40	46							
	57"	38"	6'-4"	2.5'	5.96'	8.46'	5.33'	10'	3.65'	4.7'	7.83'	14.17'	20.50'	26.83'	1.04'	0.83	1.44	2.04	2.64	29	36	44	51							
	71"	47"	7'-10"	2.5'	7.64'	10.14'	6.83'	12'	4.14'	5.2'	9.00'	16.83'	24.67'	32.50'	1.04'	1.05	1.89	2.74	3.57	33	41	50	59							
1:4 Slope	17"	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.7'	4.50'	7.00'	9.50'	12.00'	1.04'	0.48	0.71	0.95	1.18	22	25	27	30							
	21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	5.0'	4.83'	7.67'	10.50'	13.33'	1.04'	0.52	0.80	1.09	1.31	23	26	29	32							
	28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	4.3'	5.42'	8.83'	12.25'	15.67'	1.04'	0.61	0.92	1.27	1.59	25	29	33	37							
	35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	5.0'	6.00'	10.00'	14.00'	18.00'	1.04'	0.73	1.14	1.55	1.97	28	32	37	41							
	42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	4.3'	6.58'	11.33'	16.08'	20.83'	1.04'	0.87	1.39	1.92	2.45	30	35	41	46							
	49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	5.0'	7.17'	12.67'	18.17'	23.67'	1.04'	1.00	1.66	2.30	2.96	32	38	45	51							
	57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	5.3'	7.83'	14.17'	20.50'	26.83'	1.04'	1.18	2.00	2.82	3.64	35	42	49	56							
	71"	47"	7'-10"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	4.7'	8.42'	15.50'	22.58'	29.67'	1.04'	1.36	2.39	3.38	4.38	38	45	53	61							

■ See General Note No. 3.  
See Sheet 5 Of 6 For 3" Slab Quantities

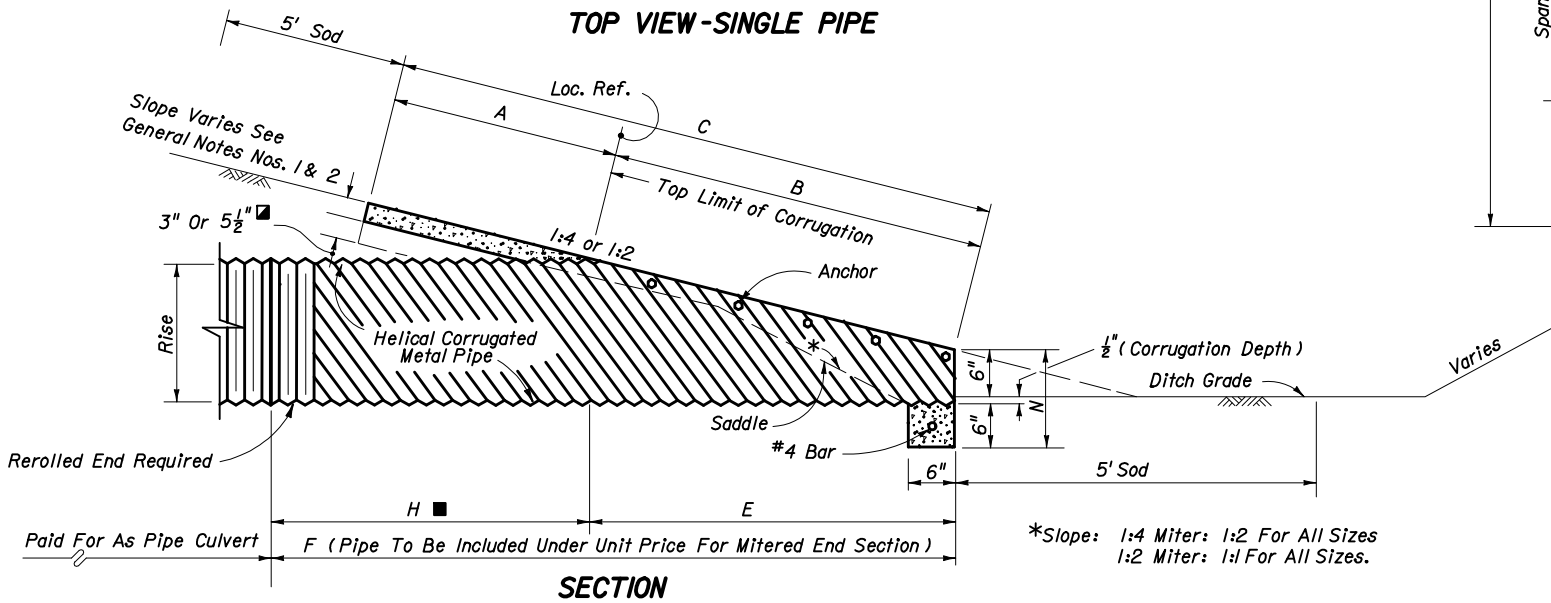
■ Values shown for estimating pipe quantities and are for information.



TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE



SECTION

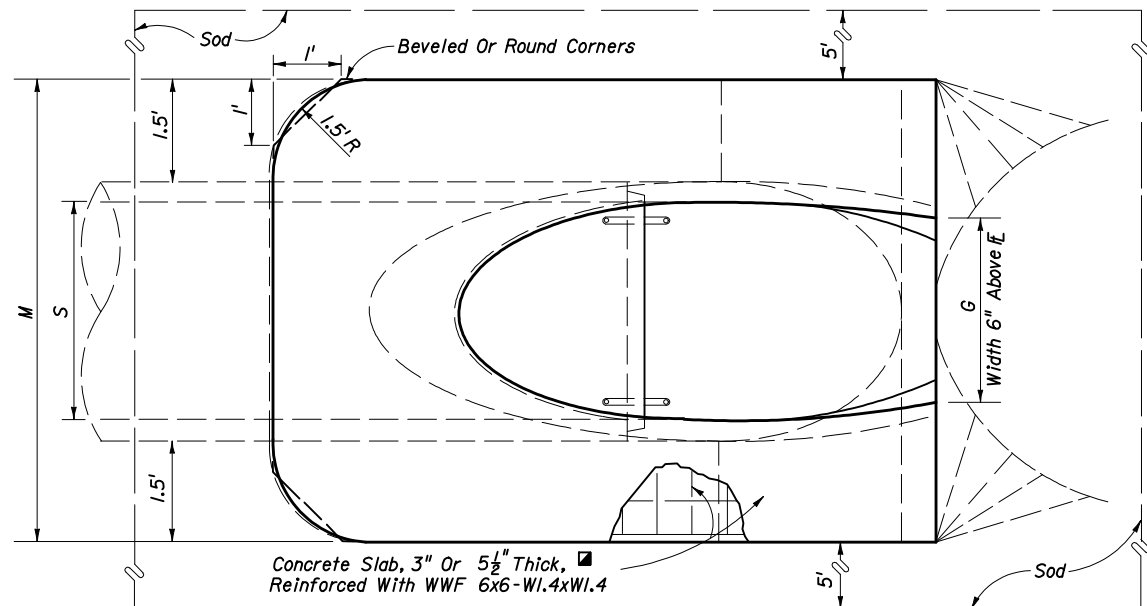
NOTE: See Sheet 6 For Details And Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CROSS DRAIN MITERED END SECTION</b>				
SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH				
Names	Dates	Approved By		
Designed By	DCB	06/78	S. A. McHenry State Drainage Engineer	
Drawn By	KMW	06/78	Revision	Sheet No.
Checked By			02	3 of 6
				Index No. <b>272</b>

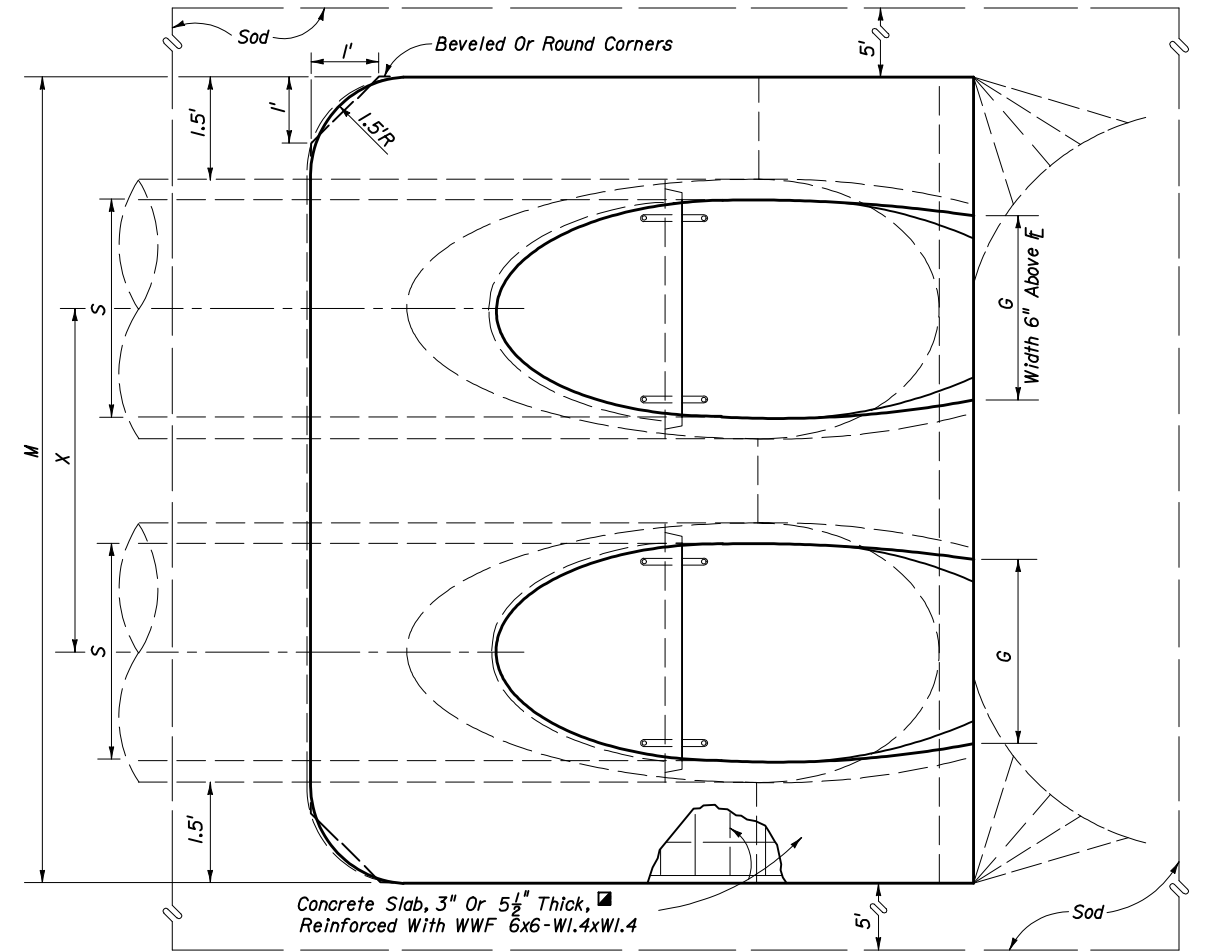
DIMENSIONS & QUANTITIES																							
Rise R	Span S	X	A	B	C	E	F	G	H	M				5 1/2" CONC. SLAB (CY)				SODDING (SQ. YDS.)					
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	N	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	
1:2 Slope																							
12"	18"	2'-10"	1.97'	1.62'	3.59'	1.56'	4'	1.50'	2.4'	4.92'	7.75'	10.58'	13.42'	1.21'	0.30	0.49	0.67	0.85	21	24	27	30	
14"	23"	3'-4"	2.01'	1.99'	4.00'	1.89'	5'	1.90'	3.1'	5.38'	8.71'	12.04'	15.38'	1.23'	0.37	0.59	0.81	1.02	22	26	29	33	
19"	30"	4'-0"	2.11'	2.92'	5.03'	2.73'	6'	2.37'	3.3'	6.04'	10.04'	14.04'	18.04'	1.27'	0.50	0.80	1.09	1.39	24	28	33	37	
24"	38"	5'-0"	2.20'	3.85'	6.05'	3.56'	7'	2.85'	3.4'	6.79'	11.79'	16.79'	21.79'	1.31'	0.62	1.03	1.45	1.86	26	31	37	42	
29"	45"	5'-11"	2.34'	4.79'	7.13'	4.39'	8'	3.19'	3.6'	7.50'	13.42'	19.33'	25.25'	1.38'	0.75	1.30	1.84	2.39	28	34	41	47	
34"	53"	7'-0"	2.43'	5.72'	8.15'	5.23'	9'	3.57'	3.8'	8.25'	15.25'	22.25'	29.25'	1.42'	0.90	1.61	2.32	3.03	30	37	45	53	
38"	60"	7'-10"	2.52'	6.46'	8.98'	5.89'	9'	3.95'	3.1'	8.92'	16.75'	24.58'	32.42'	1.46'	1.03	1.89	2.74	3.60	31	40	49	57	
43"	68"	8'-11"	2.62'	7.39'	10.01'	6.73'	10'	4.28'	3.3'	9.67'	18.58'	27.50'	36.42'	1.50'	1.19	2.26	3.33	4.40	33	43	53	63	
48"	76"	9'-11"	2.71'	8.33'	11.04'	7.56'	11'	4.59'	3.4'	10.42'	20.33'	30.25'	40.17'	1.54'	1.38	2.65	3.93	5.21	35	46	57	68	
53"	83"	10'-8"	2.80'	9.26'	12.06'	8.39'	12'	4.77'	3.6'	11.08'	21.75'	32.42'	43.08'	1.58'	1.55	3.03	4.50	5.96	37	49	61	73	
58"	91"	11'-8"	2.90'	10.19'	13.09'	9.23'	13'	5.01'	3.8'	11.83'	23.50'	35.17'	46.83'	1.63'	1.75	3.47	5.20	6.93	39	52	65	78	
1:4 Slope																							
12"	18"	2'-10"	2.36'	3.06'	5.42'	3.03'	5'	1.50'	2.0'	4.92'	7.75'	10.58'	13.42'	1.21'	0.45	0.68	0.92	1.14	23	26	29	32	
14"	23"	3'-4"	2.44'	3.75'	6.19'	3.70'	6'	1.90'	2.3'	5.38'	8.71'	12.04'	15.38'	1.23'	0.53	0.83	1.13	1.42	24	28	32	35	
19"	30"	4'-0"	2.62'	5.47'	8.09'	5.36'	8'	2.37'	2.6'	6.04'	10.04'	14.04'	18.04'	1.27'	0.74	1.15	1.57	1.98	27	32	36	40	
24"	38"	5'-0"	2.79'	7.18'	9.97'	7.03'	10'	2.85'	3.0'	6.79'	11.79'	16.79'	21.79'	1.31'	0.97	1.57	2.19	2.81	30	36	41	47	
29"	45"	5'-11"	3.05'	8.90'	11.95'	8.70'	12'	3.19'	3.3'	7.50'	13.42'	19.33'	25.25'	1.38'	1.22	2.07	2.92	3.77	33	40	46	53	
34"	53"	7'-0"	3.22'	10.62'	13.84'	10.36'	13'	3.57'	2.6'	8.25'	15.25'	22.25'	29.25'	1.42'	1.48	2.62	3.77	4.92	36	44	52	59	
38"	60"	7'-10"	3.39'	11.99'	15.38'	11.70'	15'	3.95'	3.3'	8.92'	16.75'	24.58'	32.42'	1.46'	1.72	3.12	4.53	5.92	38	47	56	65	
43"	68"	8'-11"	3.56'	13.71'	17.27'	13.36'	17'	4.28'	3.6'	9.67'	18.58'	27.50'	36.42'	1.50'	2.02	3.78	5.56	7.32	41	51	61	71	
48"	76"	9'-11"	3.73'	15.43'	19.16'	15.03'	19'	4.59'	4.0'	10.42'	20.33'	30.25'	40.17'	1.54'	2.34	4.49	6.64	8.79	44	55	66	77	
53"	83"	10'-8"	3.91'	17.15'	21.06'	16.70'	20'	4.77'	3.3'	11.08'	21.75'	32.42'	43.08'	1.58'	2.66	5.17	7.66	10.16	47	59	71	83	
58"	91"	11'-8"	4.08'	18.87'	22.95'	18.36'	22'	5.01'	3.6'	11.83'	23.50'	35.17'	46.83'	1.63'	3.02	5.98	8.95	11.90	50	63	76	89	

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

Values shown for estimating pipe quantities and are for information only.

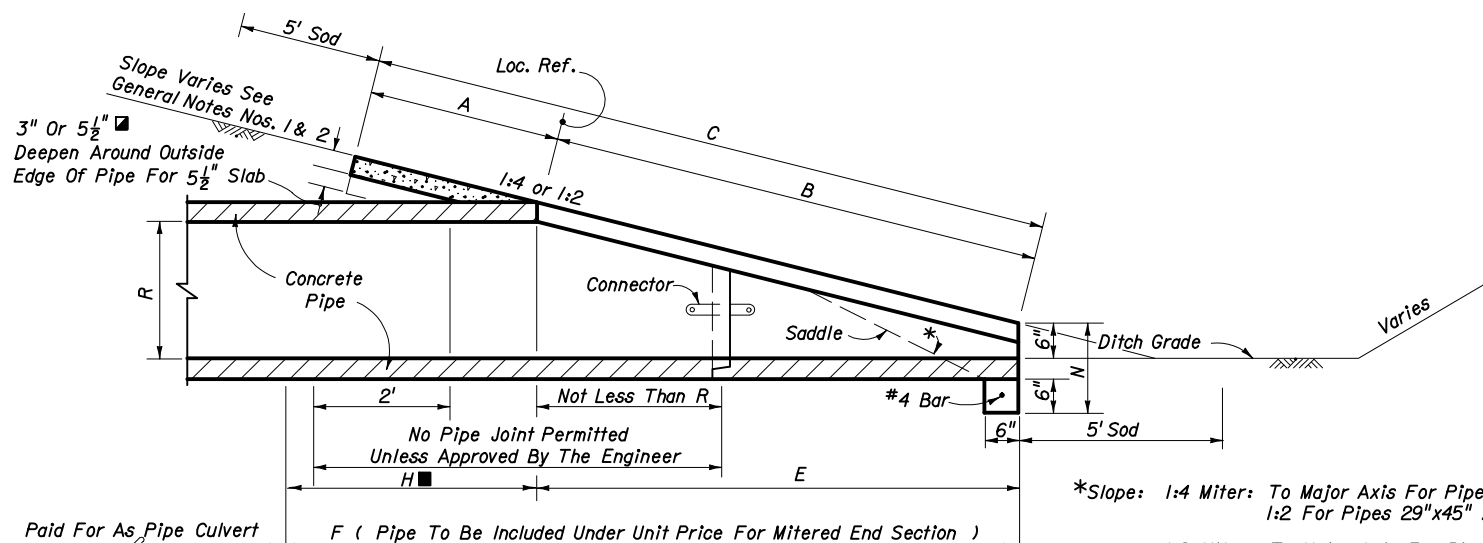


TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE

NOTE: See Sheet 6 For Details And Notes.



SECTION

\*Slope: 1:4 Miter: To Major Axis For Pipes 24"x38" And Smaller.  
1:2 For Pipes 29"x45" And Larger.

1:2 Miter: To Major Axis For Pipes 29"x45" And Smaller.  
1:1 For Pipes 34"x53" And Larger.

Paid For As Pipe Culvert

F ( Pipe To Be Included Under Unit Price For Mitered End Section )

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CROSS DRAIN MITERED END SECTION</b>				
SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE				
Names	Dates	Approved By		
Designed By	EGR	06/81	S. A. McHenry State Drainage Engineer	
Drawn By	HSD	06/81	Revision	Sheet No.
Checked By	JVG/JBW	06/81	02	4 of 6
				Index No. <b>272</b>



**QUANTITIES FOR 3" THICK CONCRETE SLABS (CY)**

	D	ROUND-CONCRETE			
		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	15"	0.27	0.41	0.54	0.67
	18"	0.31	0.45	0.60	0.75
	24"	0.39	0.59	0.79	1.00
	30"	0.46	0.76	1.04	1.32
	36"	0.55	0.94	1.33	1.71
	42"	0.66	1.15	1.66	2.15
	48"	0.76	1.37	1.96	2.57
	54"	0.87	1.62	2.38	3.14
	60"	0.99	1.90	2.81	3.73
	66"	1.11	2.15	3.21	4.27
72"	1.24	2.46	3.68	4.90	
1:4 Slope	15"	0.40	0.61	0.80	1.00
	18"	0.47	0.69	0.91	1.14
	24"	0.60	0.90	1.21	1.52
	30"	0.76	1.19	1.63	2.07
	36"	0.89	1.48	2.05	2.63
	42"	1.05	1.82	2.57	3.34
	48"	1.21	2.15	3.07	4.00
	54"	1.39	2.55	3.72	4.88
	60"	1.59	3.02	4.44	5.86
	66"	1.91	3.66	5.40	7.15
72"	2.12	4.18	6.24	8.30	

	D	ROUND-CMP			
		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	15"	0.24	0.37	0.51	0.64
	18"	0.26	0.43	0.61	0.78
	24"	0.32	0.52	0.72	0.91
	30"	0.38	0.64	0.91	1.18
	36"	0.44	0.78	1.13	1.48
	42"	0.51	0.96	1.41	1.87
	48"	0.57	1.09	1.63	2.15
	54"	0.65	1.32	1.99	2.66
	60"	0.71	1.49	2.28	3.07
1:4 Slope	15"	0.31	0.47	0.63	0.79
	18"	0.34	0.53	0.71	0.90
	24"	0.44	0.69	0.92	1.18
	30"	0.53	0.88	1.25	1.60
	36"	0.62	1.07	1.53	2.00
	42"	0.71	1.30	1.92	2.52
	48"	0.80	1.54	2.29	3.02
	54"	0.91	1.83	2.74	3.67
	60"	1.02	2.15	3.27	4.39

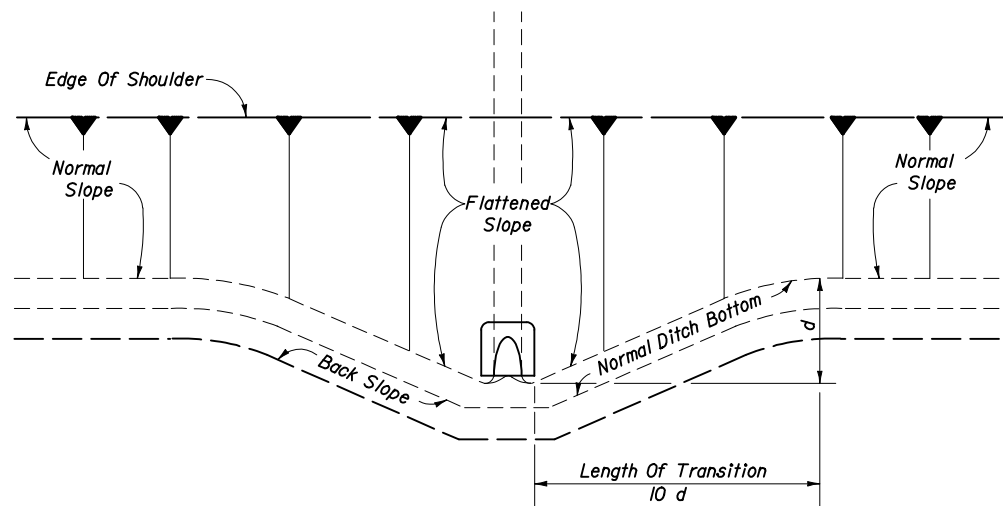
	Span	Rise	CMP-ARCH			
			Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	17"	13"	0.33	0.49	0.65	0.81
	21"	15"	0.33	0.50	0.67	0.83
	28"	20"	0.37	0.56	0.76	0.95
	35"	24"	0.40	0.62	0.84	1.07
	42"	29"	0.43	0.70	0.98	1.25
	49"	33"	0.49	0.82	1.15	1.48
	57"	38"	0.55	0.95	1.35	1.75
	64"	43"	0.62	1.10	1.57	2.05
	71"	47"	0.69	1.24	1.80	2.35
1:4 Slope	17"	13"	0.38	0.56	0.74	0.92
	21"	15"	0.39	0.59	0.80	0.95
	28"	20"	0.43	0.64	0.88	1.10
	35"	24"	0.49	0.77	1.05	1.33
	42"	29"	0.57	0.92	1.27	1.62
	49"	33"	0.65	1.08	1.50	1.93
	57"	38"	0.76	1.30	1.83	2.37
	64"	43"	0.87	1.55	2.18	2.83
	71"	47"	0.95	1.68	2.43	3.17

	Rise	Span	ELLIPTICAL-CONCRETE			
			Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	12"	18"	0.19	0.33	0.45	0.57
	14"	23"	0.25	0.40	0.55	0.69
	19"	30"	0.34	0.55	0.75	0.95
	24"	38"	0.43	0.71	1.00	1.28
	29"	45"	0.52	0.90	1.27	1.65
	34"	53"	0.62	1.11	1.60	2.09
	38"	60"	0.70	1.29	1.87	2.46
	43"	68"	0.81	1.54	2.26	2.99
	48"	76"	0.93	1.79	2.66	3.53
	53"	83"	1.04	2.04	3.03	4.02
58"	91"	1.17	2.33	3.49	4.66	
1:4 Slope	12"	18"	0.30	0.45	0.61	0.76
	14"	23"	0.36	0.56	0.76	0.95
	19"	30"	0.51	0.79	1.08	1.36
	24"	38"	0.68	1.10	1.53	1.96
	29"	45"	0.86	1.45	2.04	2.63
	34"	53"	1.02	1.81	2.60	3.39
	38"	60"	1.18	2.14	3.10	4.05
	43"	68"	1.38	2.58	3.79	4.99
	48"	76"	1.59	3.05	4.51	5.97
	53"	83"	1.80	3.50	5.19	6.88
58"	91"	2.04	4.04	6.05	8.05	

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>CROSS DRAIN MITERED END SECTION</b>					
Designed By	Names	Dates	Approved By	<i>S. A. McHenry</i> State Drainage Engineer	
Drawn By	dde	05/86	Revision	Sheet No.	Index No.
Checked By	JBW	05/86	00	5 of 6	272

## GENERAL NOTES

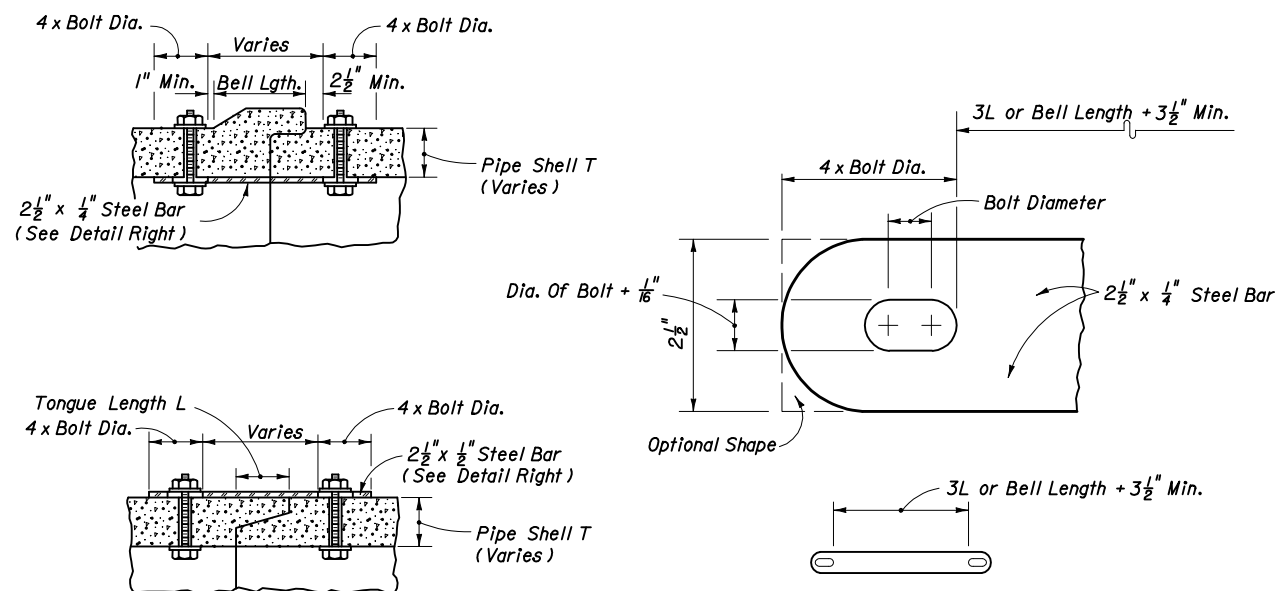
- Mitered end sections for pipe sizes 15", 18" and 24" round or equivalent pipe arch or elliptical pipe are permitted within the clear zone. When the slope intersection permits, the mitered end section may be located with the culvert opening as close as 8' beyond the outside edge of the shoulder.
- Slope and ditch transitions shall be used when the normal roadway slope must be flattened to place end section outside clear zone. See detail left.
- 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 5½" thick unless 3" thickness called for in plans.
- Concrete pipe used in the assembly of mitered end sections shall be selective lengths to avoid excessive connections.
- Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
- That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
- 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.
- 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.
- 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.
- The cost of all pipe(s), fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets, and coupling bands shall be included in the cost for the mitered end section. Sodding shall be paid for separately under the contract unit price of Sodding, SY.
- Mitered end sections shall be paid for under the contract unit price for Mitered End Section (CD), Each, based on each independent pipe end.



PLAN

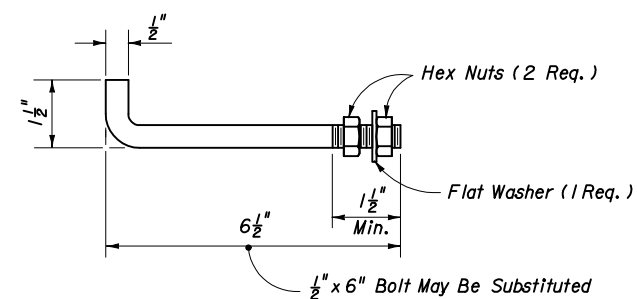
NOTE: See General Note 2

## SLOPE AND DITCH TRANSITIONS



All bars, bolts, nuts and washers are to be galvanized steel.  
Bolts diameters shall be 3/8" for 15" to 36" pipe and 5/8" 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

## CROSS DRAIN MITERED END SECTION SPECIAL DETAILS AND NOTES

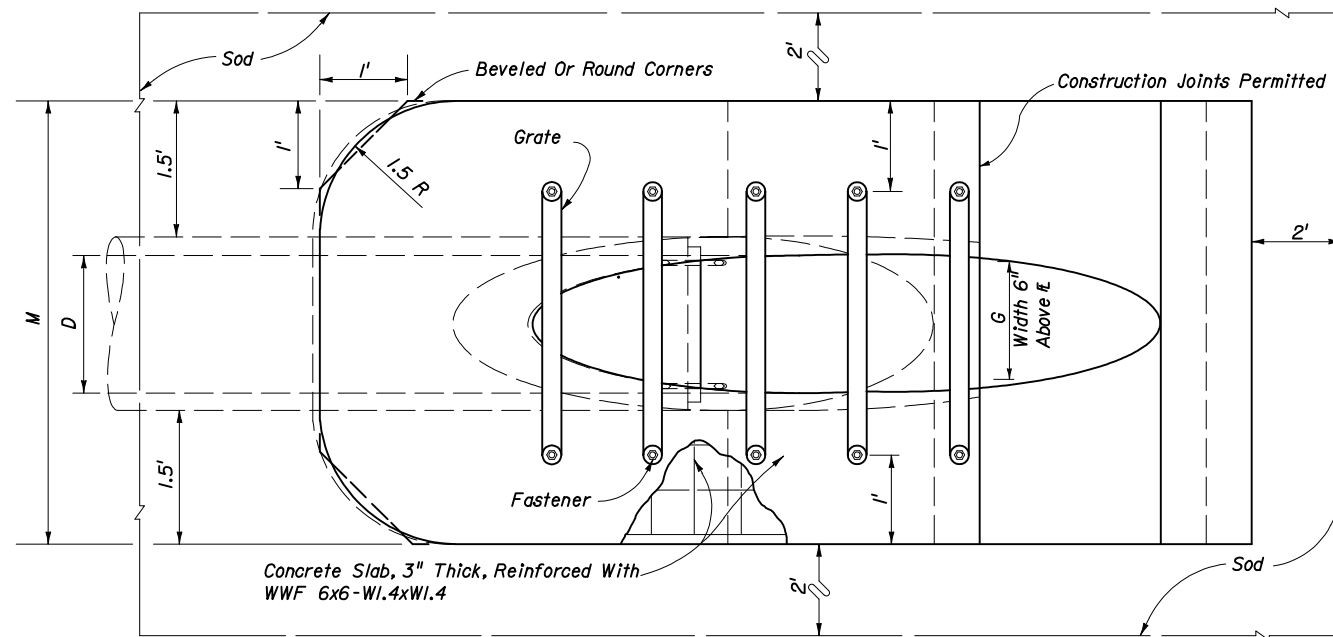
Names	Dates	Approved By
Designed By	DCB	06/78
Drawn By		
Checked By	KNM	06/78
Revision	00	
Sheet No.	6 of 6	
Index No.	272	

### DIMENSIONS & QUANTITIES

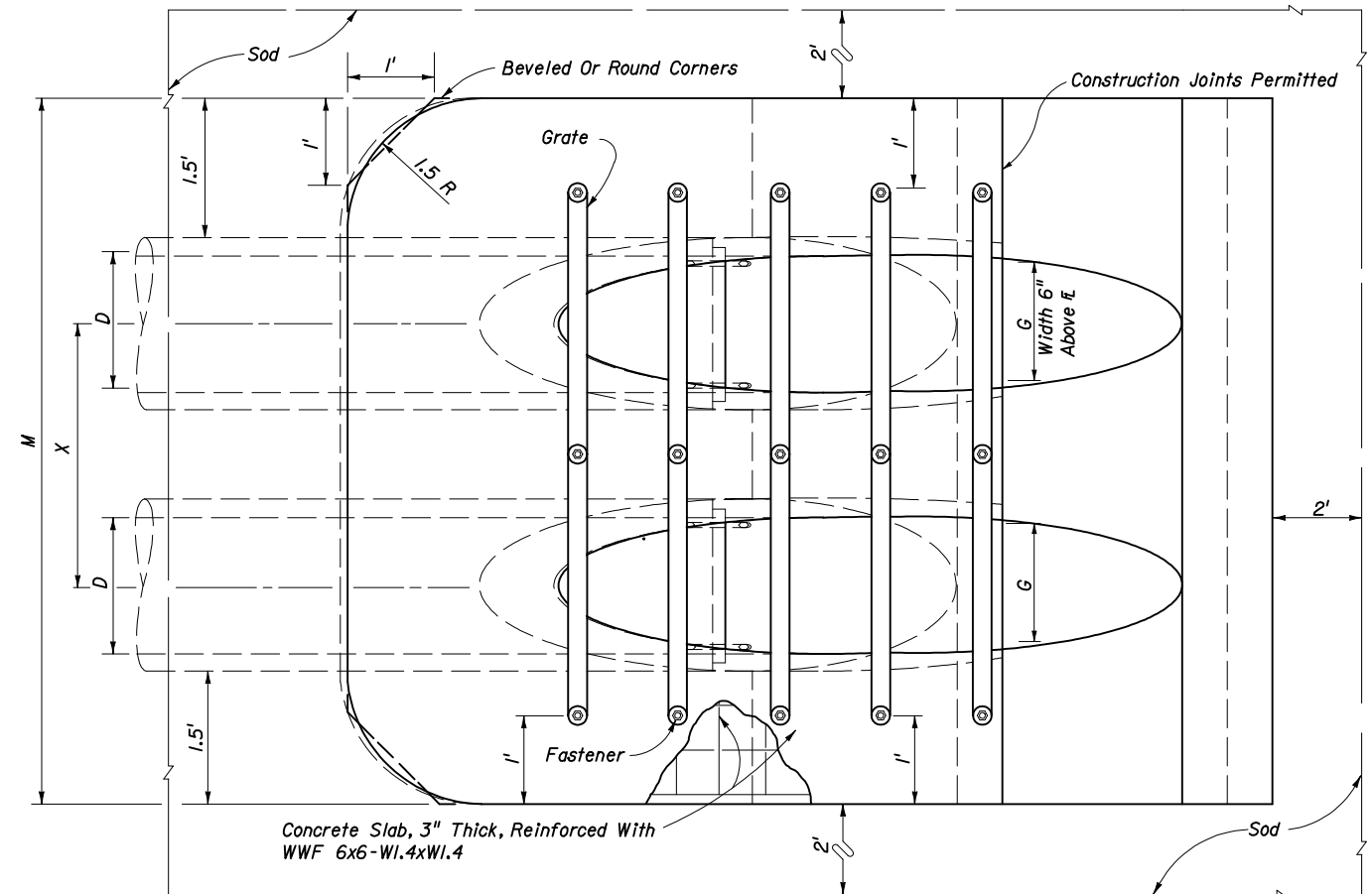
D	X	A	B	C	E	F	G	H	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
									Single Pipe	Double Pipe	Triple Pipe	Quad Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad Pipe
15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.0'	4.63'	7.21'	9.79'	12.37'	1.19'			0.76	1.16	1.54	1.94	8	10	11	12
18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.0'	4.92'	7.75'	10.58'	13.42'	1.21'			0.85	1.28	1.71	2.17	9	10	12	13
24"	3'-5"	2.53'	7.18' Δ	9.71'	7.03' Δ	11'	1.73'	4.0'	5.50'	8.92'	12.33'	15.75'	1.25'			1.02	1.58	2.15	2.75	10	12	13	15
30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	4.0'	6.08'	10.33'	14.58'	18.83'	1.29'	2 1/2"	3"	1.23	1.98	2.74	3.50	12	14	15	17
36"	5'-1"	2.87'	11.31' ◇	14.18'	11.03' ◇	15'	2.24'	4.0'	6.67'	11.75'	16.83'	21.92'	1.33'	2 1/2"	3"	1.40	2.38	3.33	4.24	13	15	17	20
42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	4.0'	7.25'	13.25'	19.25'	25.25'	1.38'	2 1/2"	3 1/2"	1.60	2.83	4.04	5.26	14	17	19	22
48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	4.0'	7.83'	14.58'	21.33'	28.08'	1.42'	2 1/2"	3 1/2"	1.81	3.26	4.70	6.14	15	18	21	24
54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	4.0'	8.42'	16.08'	23.75'	31.42'	1.46'	3"	4"	2.03	3.78	5.54	7.28	17	20	23	27
60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	4.0'	9.00'	17.50'	26.00'	34.50'	1.50'	3"	4"	2.28	4.36	6.43	8.50	18	22	25	29

Δ 6.42'      ◇ 10.40'      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.

■ Values shown for estimating pipe quantities and are for information only.

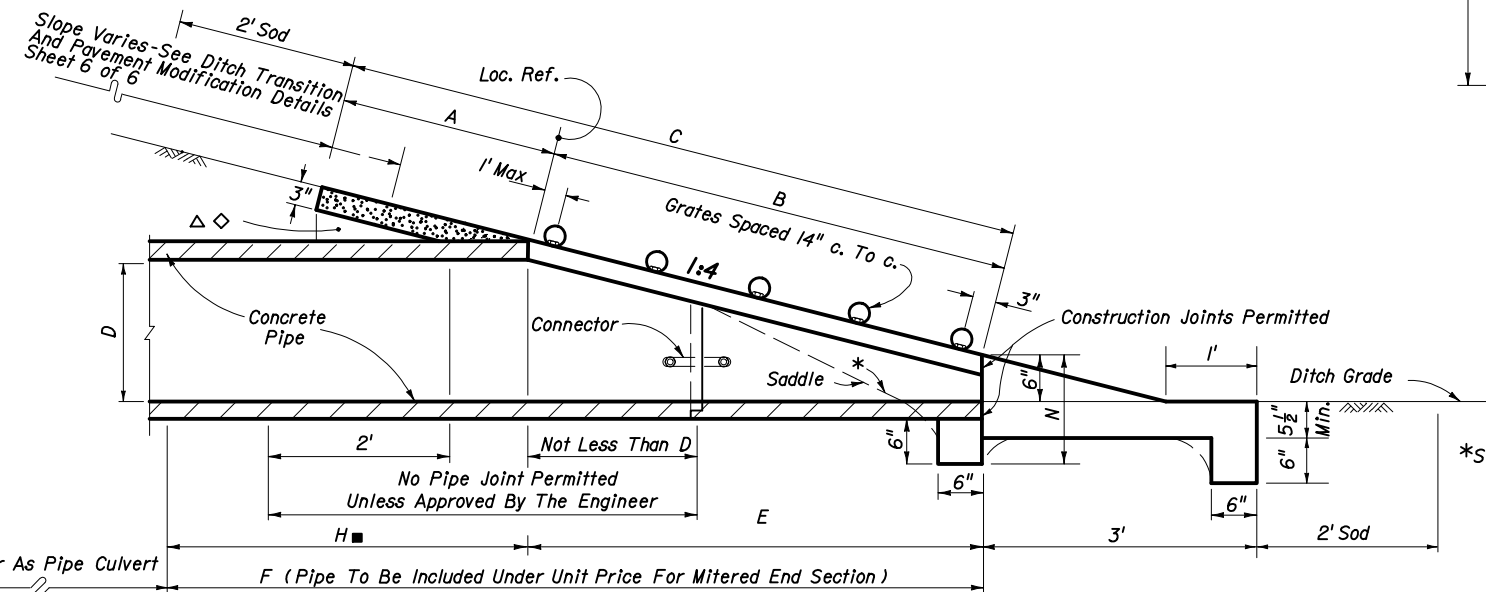


**TOP VIEW-SINGLE PIPE**



**TOP VIEW-MULTIPLE PIPE**

Note: See Sheets 5 and 6 for details and general notes.



**SECTION**

\*Slope:  
To ½ Pipe For Pipes 18" And Smaller  
1:2 For Pipes 24" And Larger.

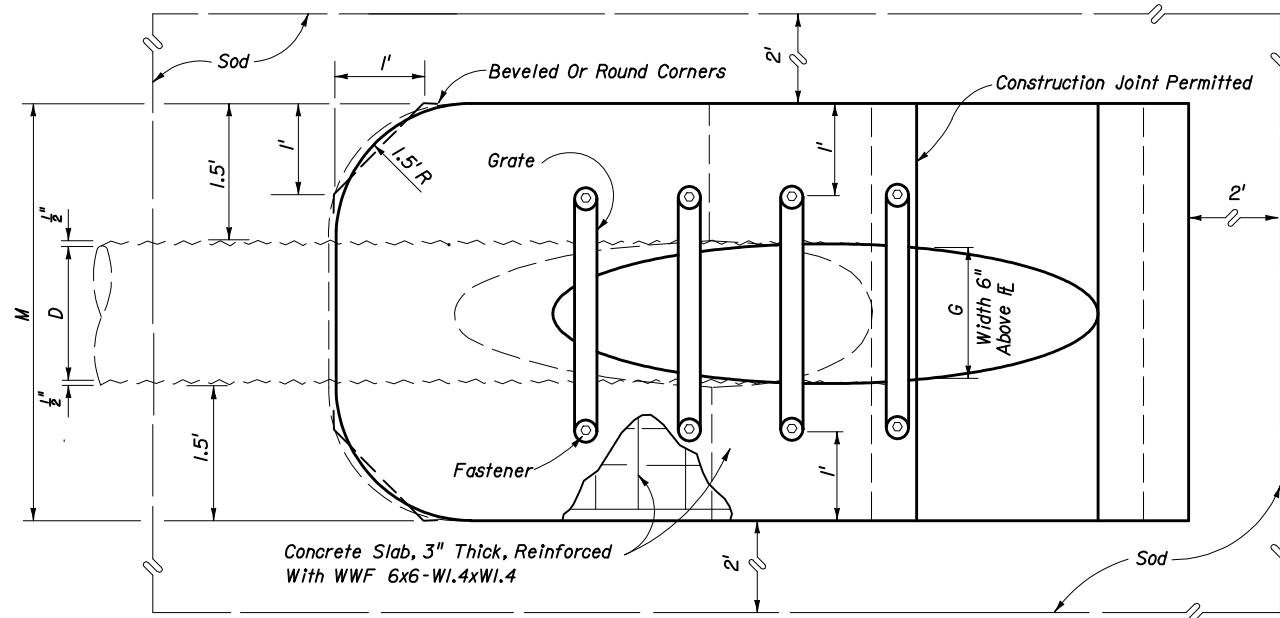
Paid For As Pipe Culvert

F (Pipe To Be Included Under Unit Price For Mitered End Section)

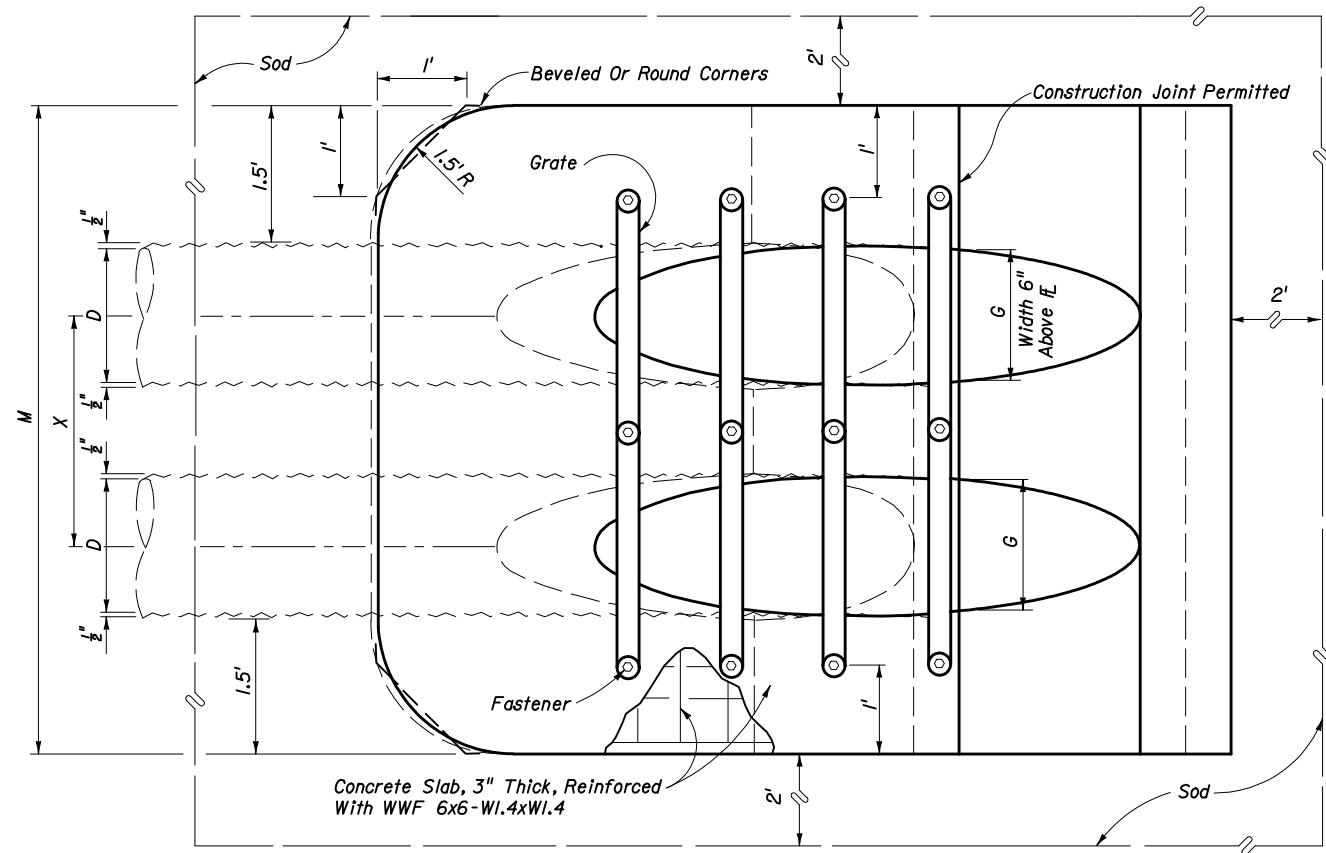
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SIDE DRAIN MITERED END SECTION</b>				
SINGLE AND MULTIPLE ROUND CONCRETE PIPE				
Names	Dates	Approved By		
Designed By	EGR 06/78	S. A. McHenry State Drainage Engineer		
Drawn By	HKH 06/78	Revision	Sheet No.	Index No.
Checked By	JVG 06/78	02	1 of 6	273

## DIMENSIONS & QUANTITIES

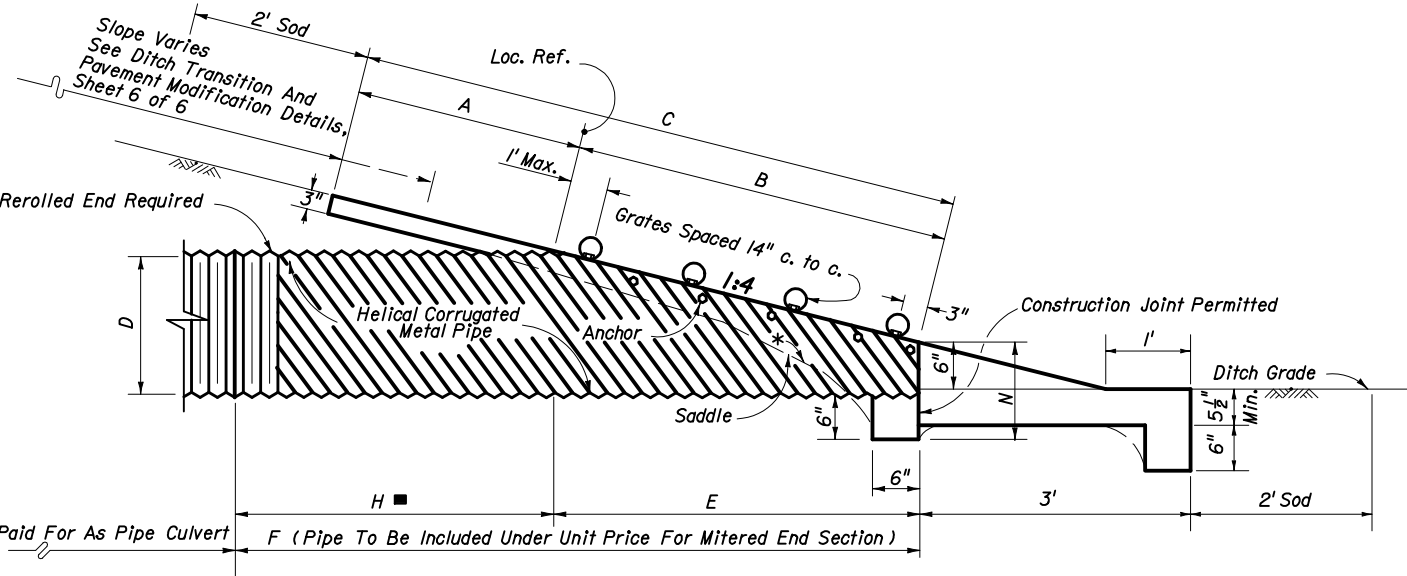
D	X	A	B	C	E	F	G	H	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)				REMARKS
									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	
8"	2'-0"	2.5'	0.72'	3.22'	0.7'	4.0'	0.58'	3.3'	3.75'	5.75'	7.75'	9.75'	1.04'			0.52	0.90	1.22	1.54	7	8	8	9	These sizes are restricted to inlet and outlet treatment for water management systems or similar applications. ■ Values shown for estimating pipe quantities and are for information only.
10"	2'-2"	2.5'	1.34'	3.84'	1.3'	5.0'	0.81'	3.7'	3.92'	6.08'	8.25'	10.41'	1.04'			0.64	0.99	1.34	1.70	7	8	9	10	
12"	2'-4"	2.5'	2.06'	4.56'	2.0'	6.0'	1.00'	4.0'	4.08'	6.42'	8.75'	11.08'	1.04'			0.68	1.09	1.48	1.88	7	8	10	11	
15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4.0'	4.33'	6.92'	9.50'	12.08'	1.04'			0.64	1.00	1.35	1.71	8	9	10	11	
18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.0'	4.58'	7.42'	10.25'	13.08'	1.04'			0.69	1.09	1.49	1.89	9	10	11	12	
24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	4.0'	5.08'	8.50'	11.92'	15.33'	1.04'			0.83	1.34	1.82	2.34	10	11	13	14	
30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	4.0'	5.58'	9.83'	14.08'	18.33'	1.04'	2½"	3"	0.96	1.63	2.32	2.99	11	13	15	17	
36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	4.0'	6.08'	11.17'	16.25'	21.33'	1.04'	2½"	3"	1.08	1.92	2.77	3.62	12	14	17	19	
42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	4.0'	6.58'	12.58'	18.58'	24.58'	1.04'	2½"	3½"	1.20	2.26	3.34	4.61	13	16	18	21	
48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	4.0'	7.08'	13.83'	20.58'	27.33'	1.04'	2½"	3½"	1.60	3.11	4.62	6.12	14	17	20	23	
54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	4.0'	7.58'	15.25'	22.92'	30.58'	1.04'	3"	4"	1.76	3.56	5.34	7.14	15	19	22	26	
60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	4.0'	8.08'	16.58'	25.08'	33.58'	1.04'	3"	4"	1.94	4.03	6.12	8.20	17	20	24	28	



**TOP VIEW-SINGLE PIPE**



**TOP VIEW-MULTIPLE PIPE**



**SECTION**

NOTE: See Sheets 5 and 6 for details and general notes.

\*Slope:  
To ½ Pipe For Pipe 18" And Smaller  
1:2 For Pipe 24" And Larger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

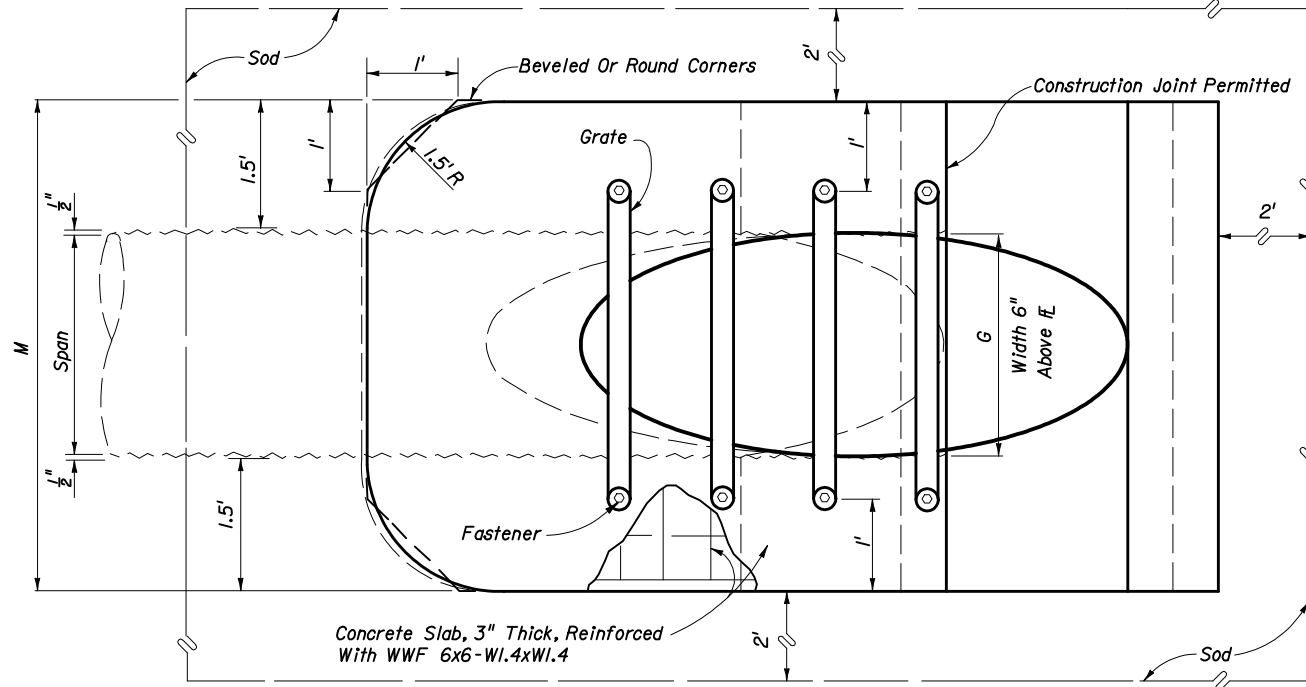
### SIDE DRAIN MITERED END SECTION SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE

Designed By	EGR	08/77	Approved By	<i>S. A. McHenry</i> State Roadway Design Engineer	
Drawn By	HKH	08/77	Revision	Sheet No.	Index No.
Checked By	JVG	08/77	02	2 of 6	273

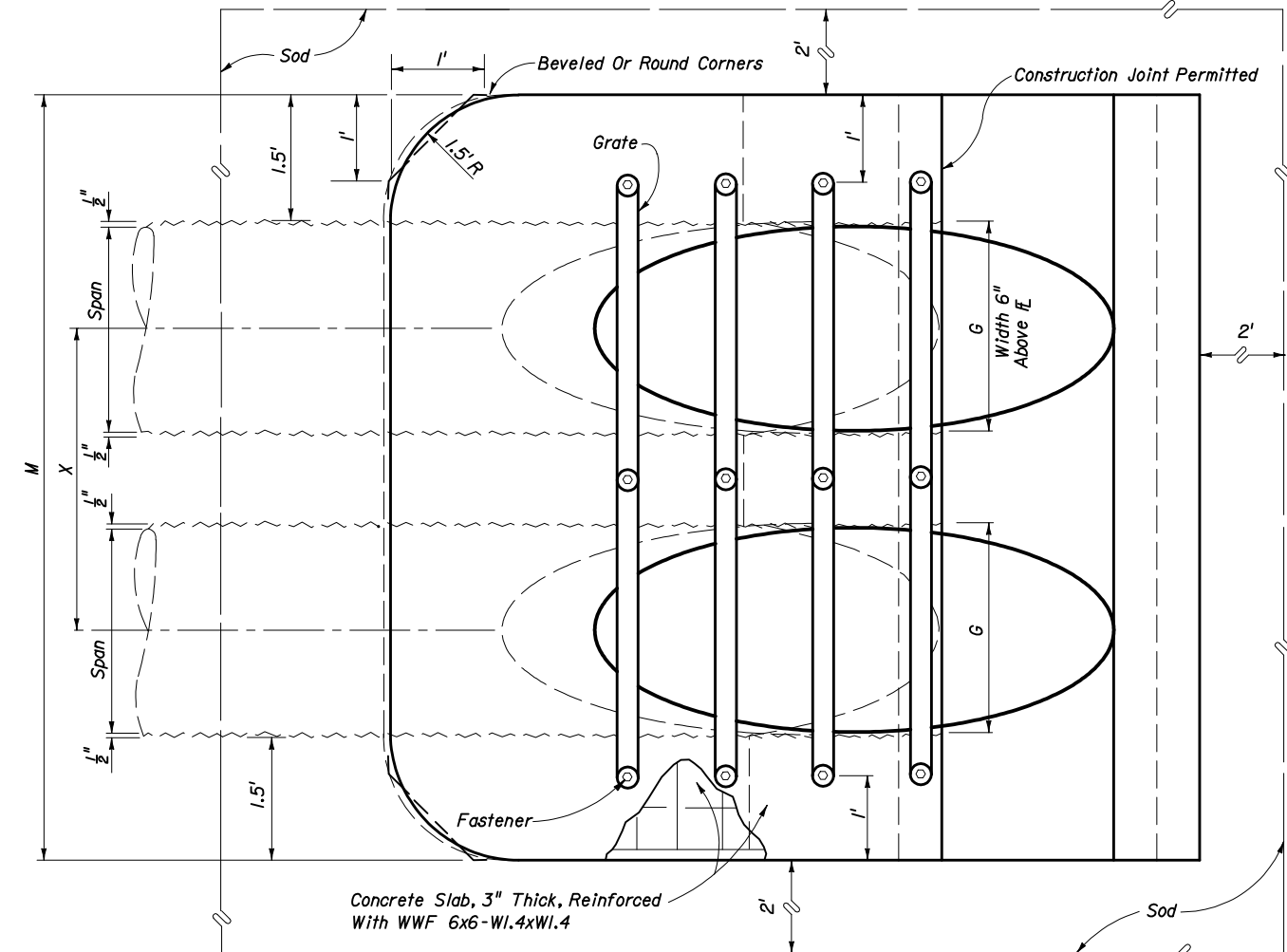
## DIMENSIONS & QUANTITIES

1974 AASHTO		X	A	B	C	E	F	G	H	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'	2.4'	4.9'	2.33'	7'	1.39'	4.7'	4.50'	7.00'	9.50'	12.00'	1.04'			0.62	0.95	1.27	1.60	8	9	10	11
21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	5.0'	4.83'	7.67'	10.50'	13.33'	1.04'			0.69	1.06	1.44	1.77	8	9	11	12
28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	4.3'	5.42'	8.83'	12.25'	15.67'	1.04'			0.81	1.26	1.73	2.19	9	11	12	14
35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	5.0'	6.00'	10.00'	14.00'	18.00'	1.04'	2 1/2"	3"	0.94	1.51	2.09	2.66	10	12	14	15
42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	4.3'	6.58'	11.33'	16.08'	20.83'	1.04'	2 1/2"	3 1/2"	1.06	1.76	2.46	3.16	11	13	15	17
49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	5.0'	7.17'	12.67'	18.17'	23.67'	1.04'	2 1/2"	3 1/2"	1.19	2.02	2.84	3.68	12	14	17	19
57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	5.3'	7.83'	14.17'	20.50'	26.83'	1.04'	3"	4"	1.35	2.35	3.35	4.36	13	16	19	22
64"	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	4.7'	8.42'	15.50'	22.58'	29.67'	1.04'	3"	4"	1.50	2.70	3.86	5.03	14	17	20	24
71"	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	5.3'	9.00'	16.83'	24.67'	32.50'	1.04'	3"	4"	1.62	2.94	4.27	5.59	15	18	22	25

■ Values shown for estimating pipe quantities and are for information only.

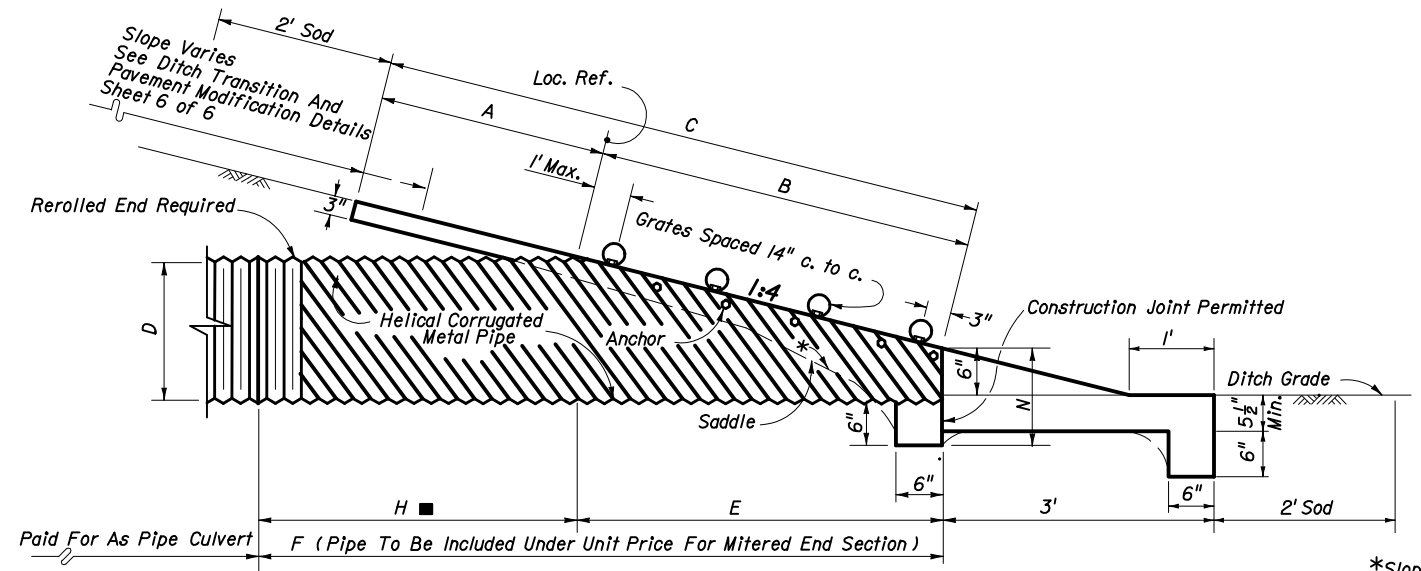


**TOP VIEW-SINGLE PIPE**



**TOP VIEW-MULTIPLE PIPE**

NOTE: See Sheets 5 and 6 for details and general notes.



**SECTION**

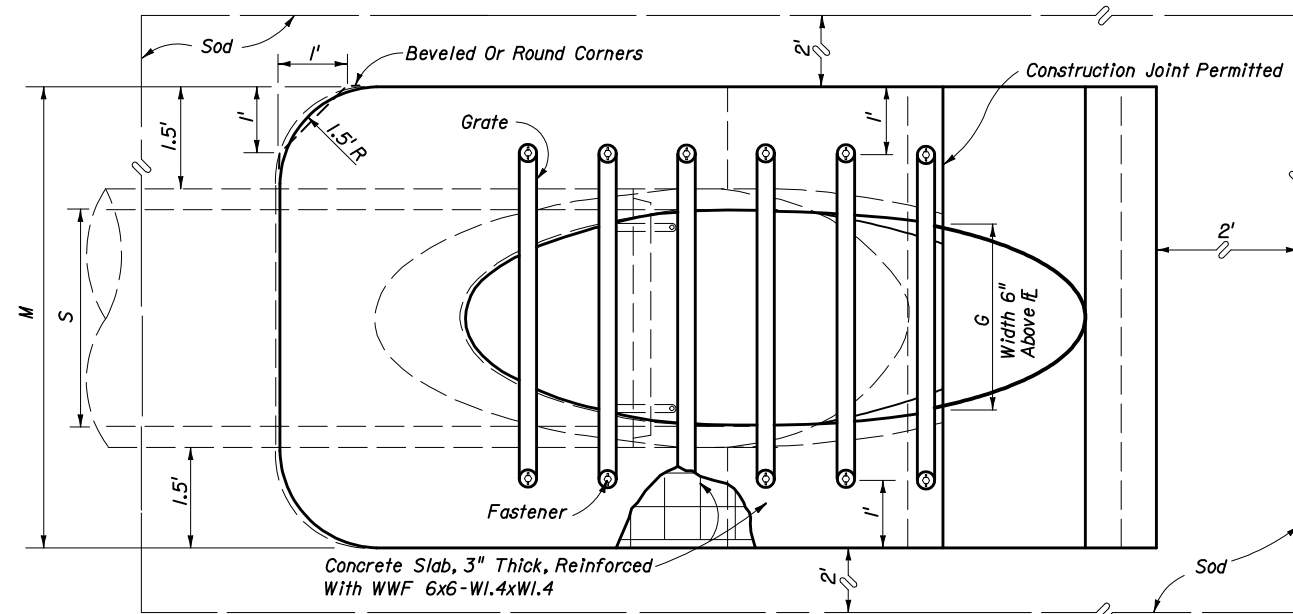
\*Slope:  
To Span Line For Pipe Arch 28" x 20" And Smaller  
1:2 For Pipe Arch 35" x 24" And Larger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SIDE DRAIN MITERED END SECTION</b>				
SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH				
Designed By	EGR	08/77	Approved By <i>S. A. McHenry</i>	
Drawn By	HKH	08/77	State Drainage Engineer	
Checked By	JVG	08/77	Revision	Sheet No.
			02	3 of 6
			Index No.	273

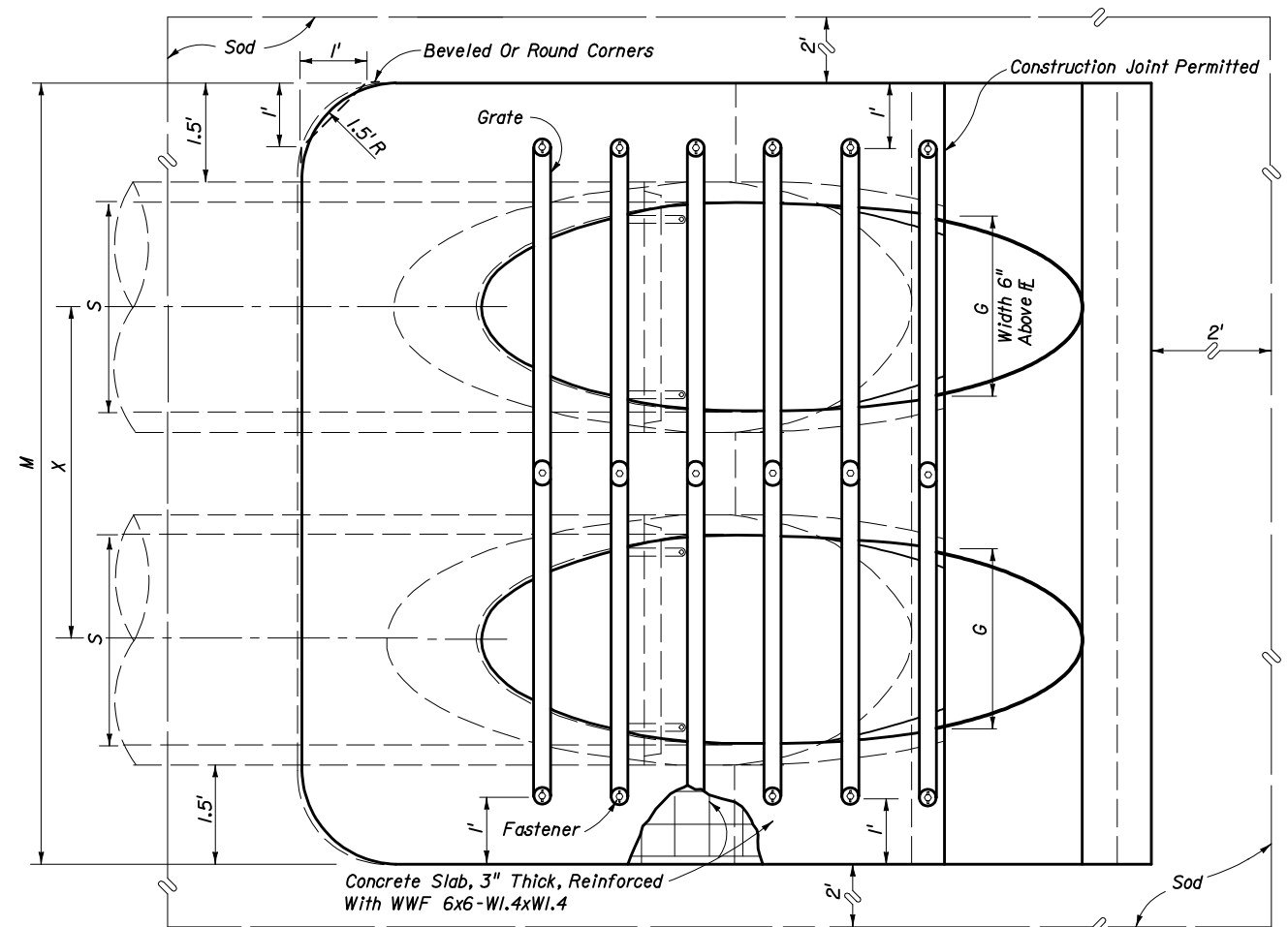
## DIMENSIONS & QUANTITIES

Rise R	Span S	X	A	B	C	E	F	G	H	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'	2.0'	4.92'	7.75'	10.58'	13.42'	1.21'			0.68	1.04	1.41	1.77	8	9	11	12
14"	23"	3'-4"	2.44'	3.75'	6.19'	3.70'	6'	1.90'	2.3'	5.38'	8.71'	12.04'	15.38'	1.23'			0.76	1.19	1.63	2.05	9	10	12	13
19"	30"	4'-0"	2.62'	5.47'	8.09'	5.36'	8'	2.37'	2.6'	6.04'	10.04'	14.04'	18.04'	1.27'	2 1/2"	3"	0.95	1.52	2.09	2.65	10	12	13	15
24"	38"	5'-0"	2.79'	7.18'	9.97'	7.03'	10'	2.85'	3.0'	6.79'	11.79'	16.79'	21.79'	1.31'	2 1/2"	3"	1.18	1.95	2.74	3.53	11	13	15	18
29"	45"	5'-11"	3.05'	8.90'	11.95'	8.70'	12'	3.19'	3.3'	7.50'	13.42'	19.33'	25.25'	1.38'	2 1/2"	3 1/2"	1.41	2.42	3.44	4.45	12	15	18	20
34"	53"	7'-0"	3.22'	10.62'	13.84'	10.36'	13'	3.57'	2.6'	8.25'	15.25'	22.25'	29.25'	1.42'	3"	3 1/2"	1.63	2.92	4.22	5.52	13	17	20	23
38"	60"	7'-10"	3.39'	11.99'	15.38'	11.70'	15'	3.95'	3.3'	8.92'	16.75'	24.58'	32.42'	1.46'	3"	4"	1.83	3.36	4.89	6.41	14	18	21	25
43"	68"	8'-11"	3.56'	13.71'	17.27'	13.36'	17'	4.28'	3.6'	9.67'	18.58'	27.50'	36.42'	1.50'	3"	4"	2.09	3.95	5.80	7.65	16	20	23	27
48"	76"	9'-11"	3.73'	15.43'	19.16'	15.03'	19'	4.59'	4.0'	10.42'	20.33'	30.25'	40.17'	1.54'	Special	Special	2.37	4.54	6.73	8.92	17	21	26	30
53"	83"	10'-8"	3.91'	17.15'	21.06'	16.70'	20'	4.77'	3.3'	11.08'	21.75'	32.42'	43.08'	1.58'	Special	Special	2.61	5.09	7.56	10.03	18	23	27	32
58"	91"	11'-8"	4.08'	18.87'	22.95'	18.36'	22'	5.01'	3.6'	11.83'	23.50'	35.17'	46.83'	1.63'	Special	Special	2.91	5.77	8.64	11.50	19	24	29	35

■ Values shown for estimating pipe quantities and are for information only.

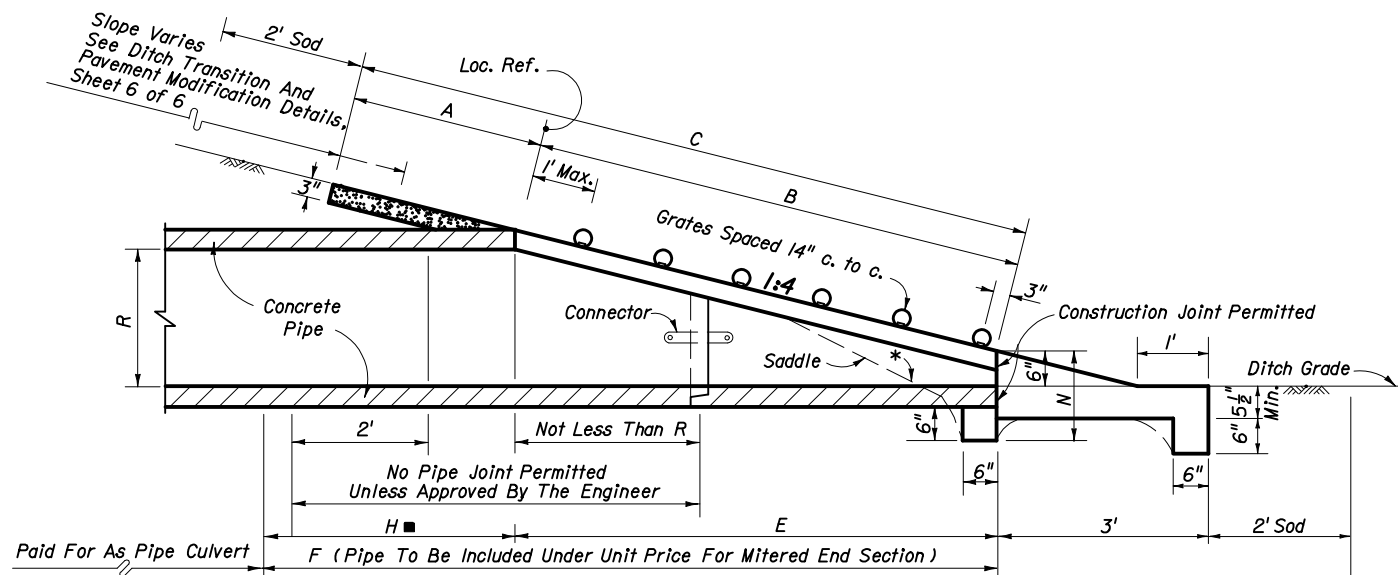


**TOP VIEW-SINGLE PIPE**



**TOP VIEW-MULTIPLE PIPE**

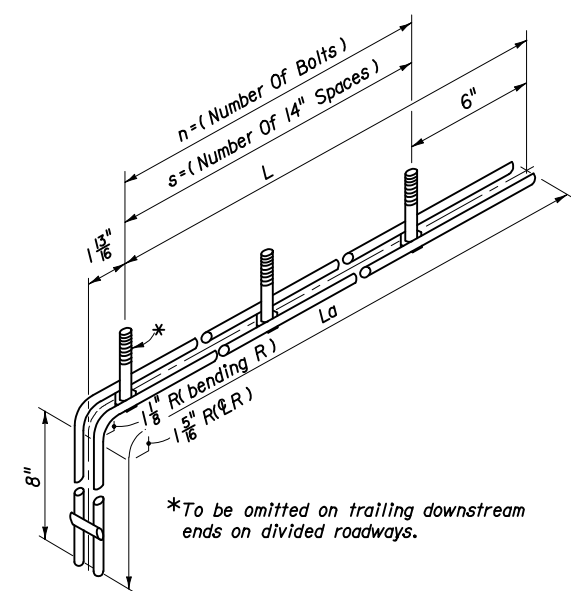
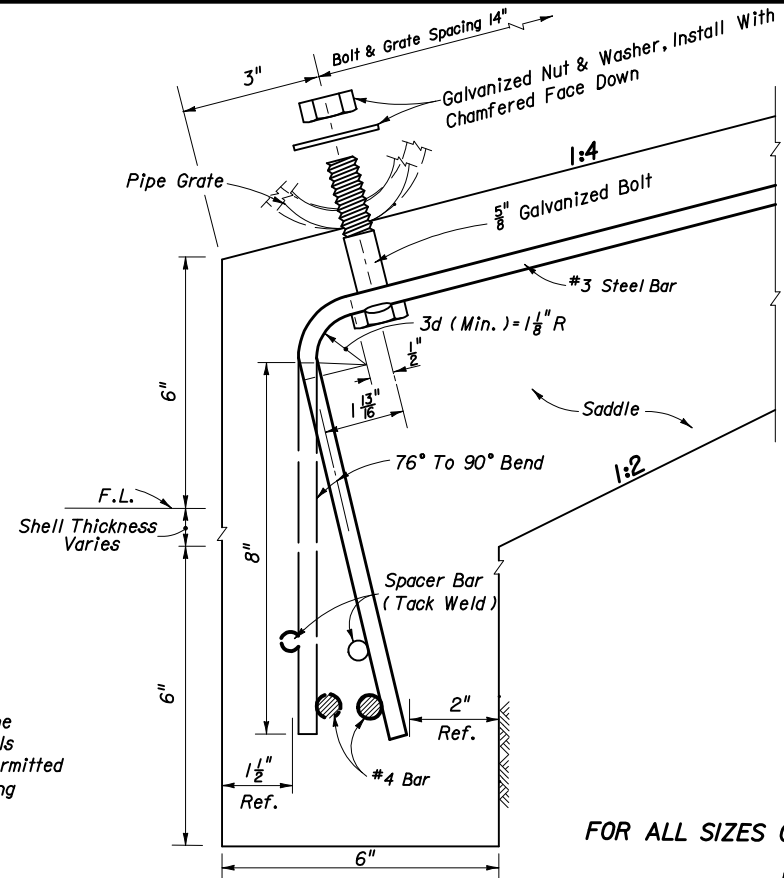
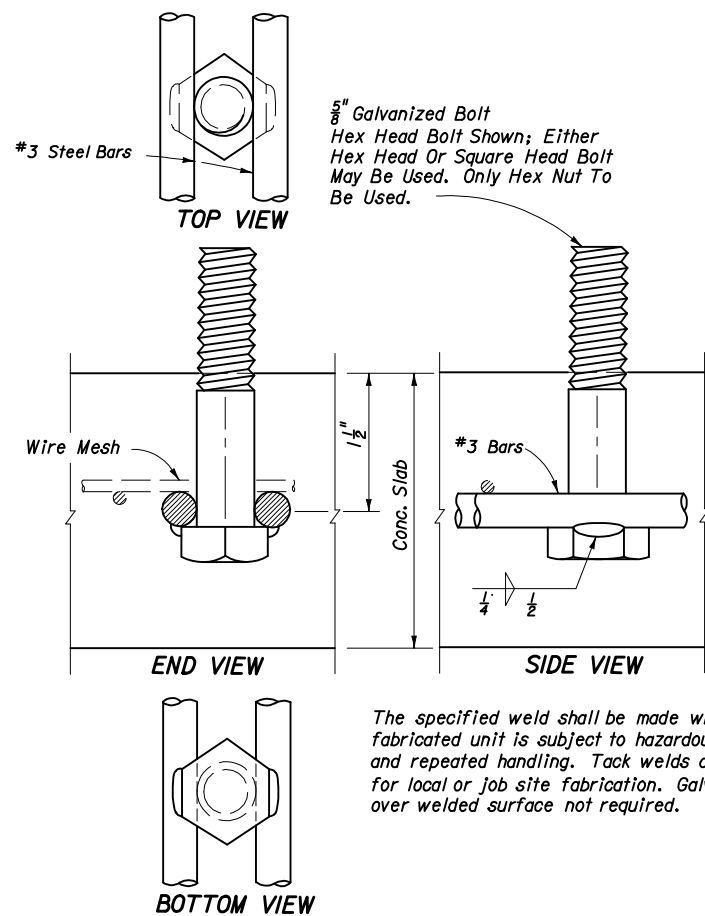
NOTE: See Sheets 5 and 6 for details and general notes.



**SECTION**

\*Slope:  
To Major Axis For Pipes 24" x 38" And Smaller.  
1:2 For Pipes 29" x 45" And Larger.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SIDE DRAIN MITERED END SECTION</b>				
SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE				
Designed By	EGR	06/81	Approved By <i>S. A. McHenry</i>	
Drawn By	HSD	06/81	State Drainage Engineer	
Checked By	JVG/JBW	06/81	Revision	Sheet No. Index No.
			02	4 of 6 273



FOR ALL SIZES OF SINGLE AND MULTIPLE DRAIN PIPE  
**FASTENER UNIT**

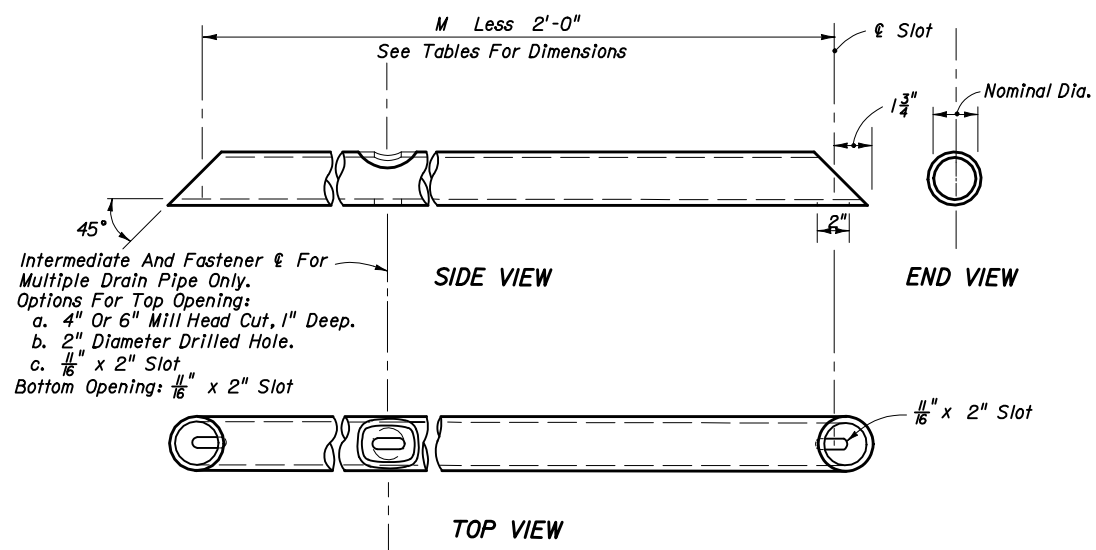
Drain Size	s	n	L	La
<b>CONCRETE PIPE (ROUND)</b>				
15"	3	4	4'-0"	4'-11"
18"	4	5	5'-2"	6'-1"
24"	6	7	7'-6"	8'-5"
30"	7	8	8'-8"	9'-7"
36"	9	10	11'-0"	11'-11"
42"	11	12	13'-4"	14'-3"
48"	13	14	15'-8"	16'-7"
54"	14	15	16'-10"	17'-9"
60"	16	17	19'-2"	20'-1"
<b>CORRUGATED METAL PIPE (ROUND)</b>				
15"	2	3	2'-10"	3'-9"
18"	3	4	4'-0"	4'-11"
24"	5	6	6'-4"	7'-3"
30"	7	8	8'-8"	9'-7"
36"	8	9	9'-10"	10'-9"
42"	10	11	12'-2"	13'-1"
48"	12	13	14'-6"	15'-5"
54"	14	15	16'-10"	17'-9"
60"	15	16	18'-0"	18'-11"
<b>CORRUGATED METAL PIPE (ARCH) ***</b>				
17" x 13"	1	2	1'-8"	2'-7"
21" x 15"	2	3	2'-10"	3'-9"
28" x 20"	4	5	5'-2"	6'-1"
35" x 24"	5	6	6'-4"	7'-3"
42" x 29"	6	7	7'-6"	8'-5"
49" x 33"	7	8	8'-8"	9'-7"
57" x 38"	9	10	11'-0"	11'-11"
64" x 43"	10	11	12'-2"	13'-1"
71" x 47"	12	13	14'-6"	15'-5"

Drain Size	s	n	L	La
<b>ELLIPTICAL CONCRETE PIPE</b>				
12" x 18"	2	3	2'-10"	3'-9"
14" x 23"	3	4	4'-0"	4'-11"
19" x 30"	4	5	5'-2"	6'-1"
24" x 38"	5	6	6'-4"	7'-3"
29" x 45"	7	8	8'-8"	9'-7"
34" x 53"	8	9	9'-10"	10'-9"
38" x 60"	10	11	12'-2"	13'-1"
43" x 68"	11	12	13'-4"	14'-3"
48" x 76"	13	14	15'-8"	16'-7"
53" x 83"	14	15	16'-10"	17'-9"
58" x 91"	15	16	18'-0"	18'-11"

Note: 5/8 x 3" bolts are standard for all grate fasteners, except when the contractor elects to use the slotted upper holes for the intermediate fasteners on multiple drain pipe, which will require the following bolt lengths:

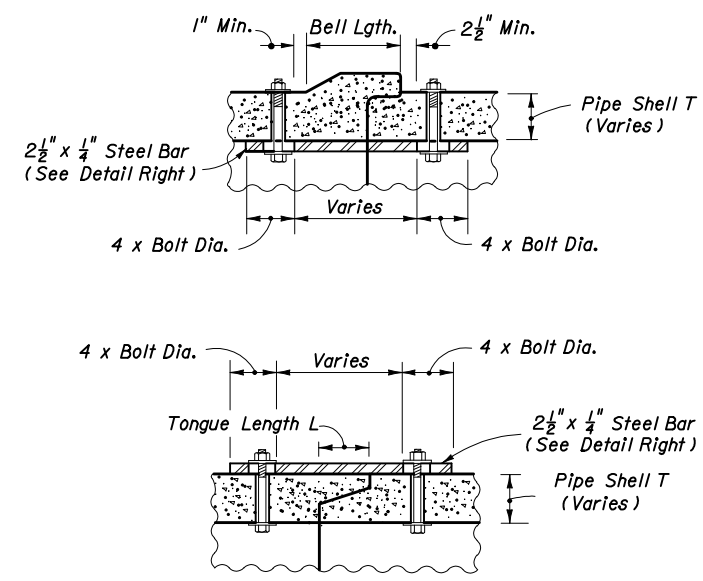
Grate Size (Std. & X-Stg.)	Bolt Length
2 1/2"	5 1/2"
3"	6"
3 1/2"	6 1/2"
4"	7"

\*\*To be used only when grates are called for in the plans.  
\*\*\*1974 AASHTO Pipe Arch Sizes.



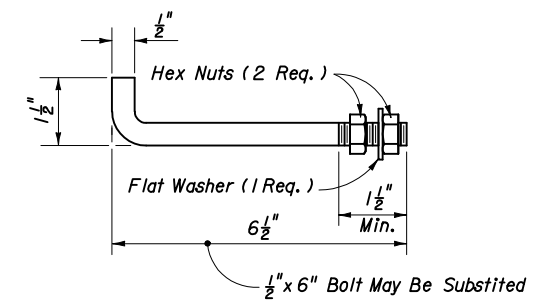
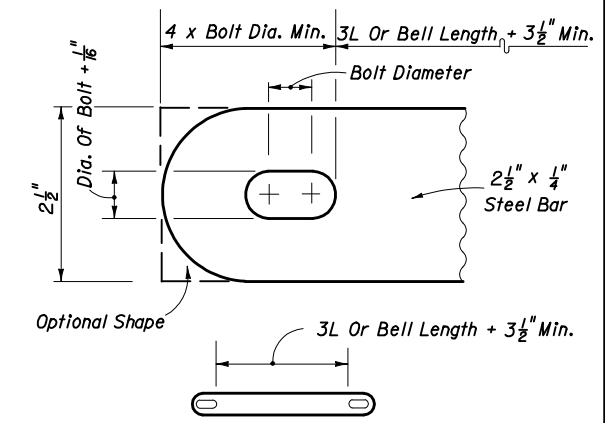
**GRATE DETAIL**  
FOR SINGLE & MULTIPLE DRAIN PIPE

See General Notes, Sheet 6.



All bars, bolts, nuts and washers are to be galvanized steel.  
Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 60" 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 DETAIL**



ANCHOR DETAIL

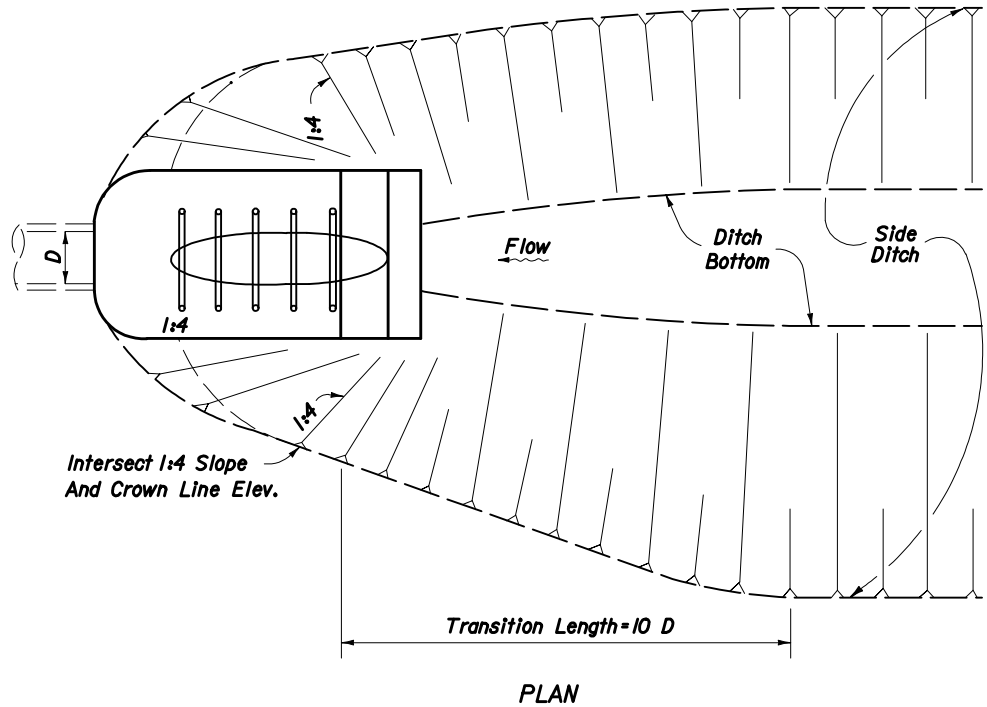
anchors required for CMP only.  
Anchor, washer and nuts to be galvanized steel.  
Bend anchor where required to center in concrete slab. Damaged surfaces to be repaired after bending.  
Anchors are to be spaced a distance equal to four (4) corrugations. Place the anchors in the outside crest of corrugation.  
Flat washer to be placed on inside wall of pipe.  
Holes in the mitered end pipe are to be drilled or punched; burning not permitted.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SIDE DRAIN MITERED END SECTION**  
DETAILS FOR CONCRETE & CORRUGATED METAL PIPE

Names	Dates	Approved By
Designed By	EGR 08/77	S. A. McHenry State Drainage Engineer
Drawn By	HKH 08/77	
Checked By	JVG 08/77	
Revision	00	
Sheet No.		5 of 6
Index No.		273

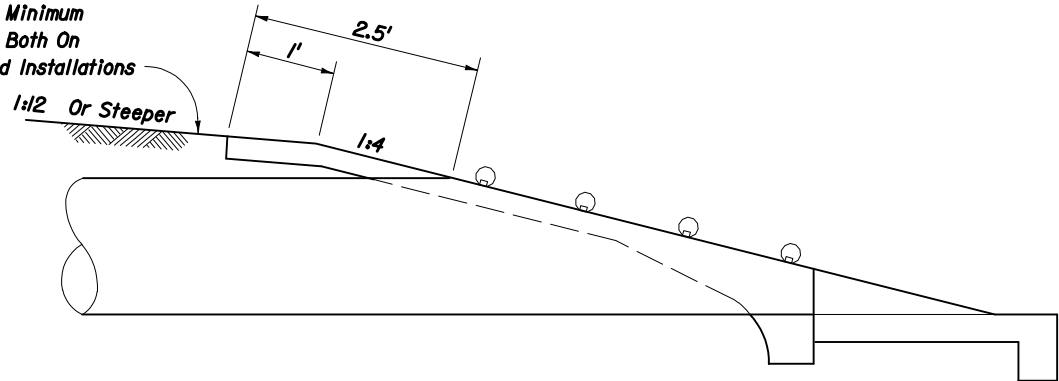
**GENERAL NOTES**



**DITCH TRANSITION**

1. 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.
2. Concrete pipe used in the assembly of mitered end sections shall be of selective lengths to avoid excessive connections.
3. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
4. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing of the concrete.
5. 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.
6. 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.
7. In addition to the requirements of Section 430-4, side drain culverts shall comply with the cover requirements shown on Index No. 205.
8. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cast in place with Class I concrete.
9. Round pipe size 30" or greater, pipe-arch size 35" x 24" or greater and elliptical pipe 19" x 30" or greater shall be grated unless excepted in the plans. Smaller sizes of pipe shall be grated only when called for in plans. The lower grate on trailing downstream ends on divided highways shall be omitted.
10. Grates are to be fabricated from steel ASTM A53, 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 A123. Grates subject to salt water or highly corrosive environment shall be hot dipped galvanized after fabrication in accordance with ASTM A123.
11. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.
12. 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.
13. The cost of all pipe (s), grates, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bands shall be included in the cost for the mitered end section. Sodding shall be paid for separately under the contract unit price for Sodding, SY.
14. Mitered end sections shall be paid for under the contract unit price for Mitered End Section (SD), Ea., based on each independent pipe end.

Modified Slope When Minimum Cover Or Less Occurs Both On Existing And Proposed Installations



**PERMISSIBLE PAVEMENT MODIFICATION**

**DESIGN NOTES**

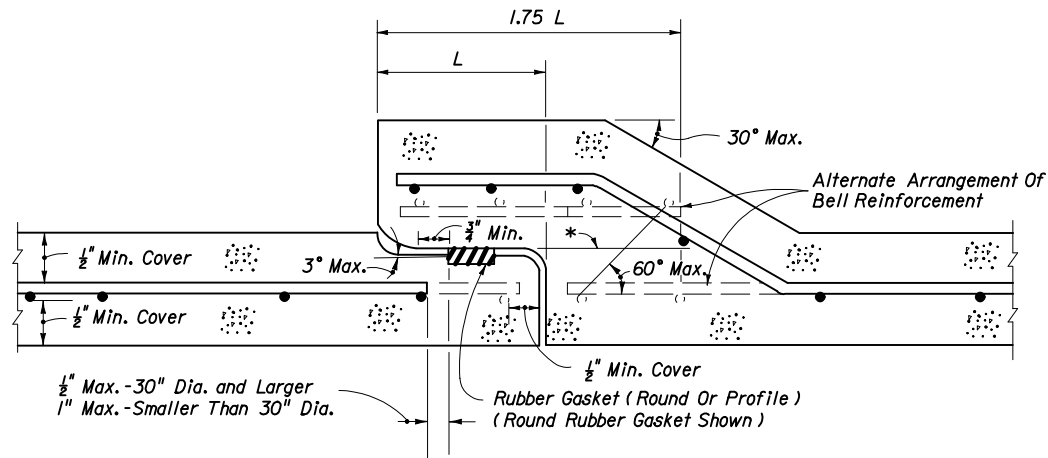
1. In critical hydraulic locations, grates shall not be used until potential debris transport has been evaluated by the drainage engineer and appropriate adjustments made. Ditch grades in excess of 3% or pipe with less than 1.5' of cover and grades in excess of 1% will require such an evaluation (General Note 9).
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 10).
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				
<b>SIDE DRAIN MITERED END SECTION</b>				
NOTES & INFORMATION				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By EGR	08/77	State Drainage Engineer		
Drawn By HKH	08/77	Revision	Sheet No.	Index No.
Checked By JVK	08/77	00	6 of 6	273



**SCHEDULE OF BELL REINFORCEMENT**  
Classes II, III, IV, V; Wall A, B, C

Nominal Pipe Diameter	Design Bell Reinforcement	Maximum Reinforcement Under Tolerance
	SQ. IN. PER FOOT	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

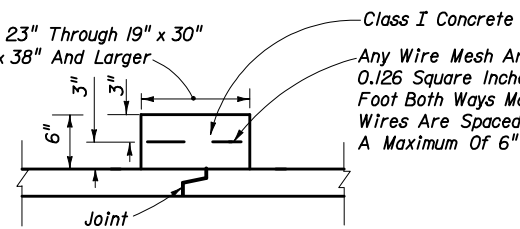


\*All circumferential steel located above this line within 1.75 L is defined as bell reinforcement.

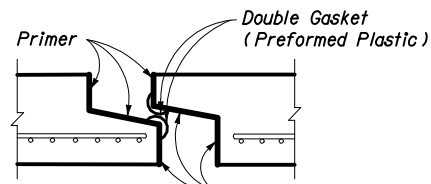
ROUND RUBBER GASKET SHOWN

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

12" For Pipes 14" x 23" Through 19" x 30"  
24" For Pipes 24" x 38" And Larger



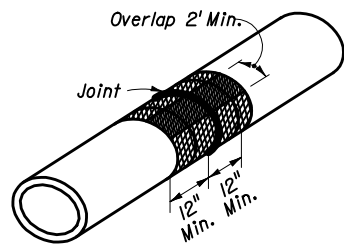
**CONCRETE JACKET**



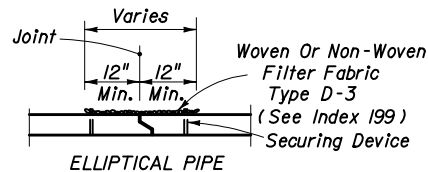
**PREFORMED PLASTIC JOINT (BEFORE PULL-UP)**

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

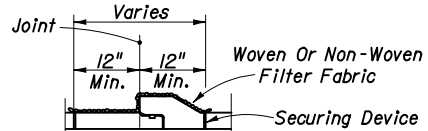
**ELLIPTICAL CONCRETE PIPE JOINTS**



ELLIPTICAL PIPE SHOWN ISOMETRIC VIEW



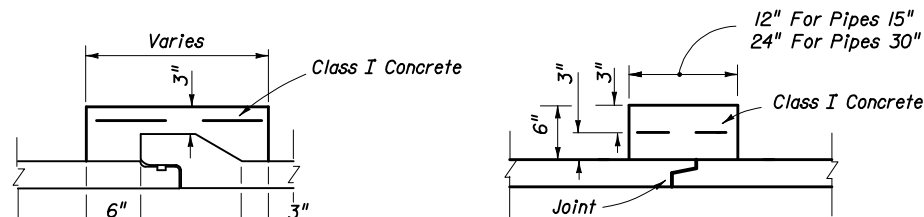
ELLIPTICAL PIPE



ROUND PIPE PIPE SECTIONS

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

**FOR ALL PIPE TYPES - CONCRETE PIPE SHOWN FILTER FABRIC JACKET**



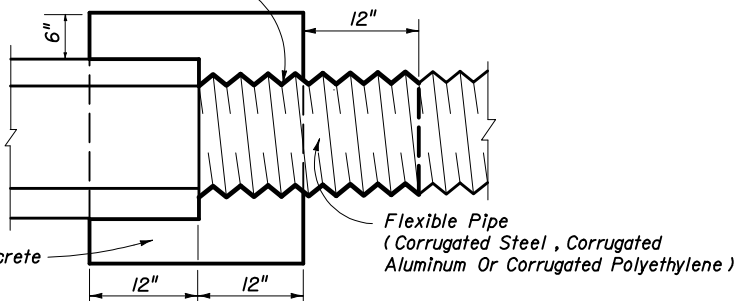
Note: For reinforcement see elliptical pipe concrete jacket.  
(All Pipe Sizes)

**BELL AND SPIGOT**

**TONGUE & GROOVE**

**DISSIMILAR JOINTS**

Bituminous Coating Required For CMP (Any Suitable Bituminous Material May Be Field Applied)

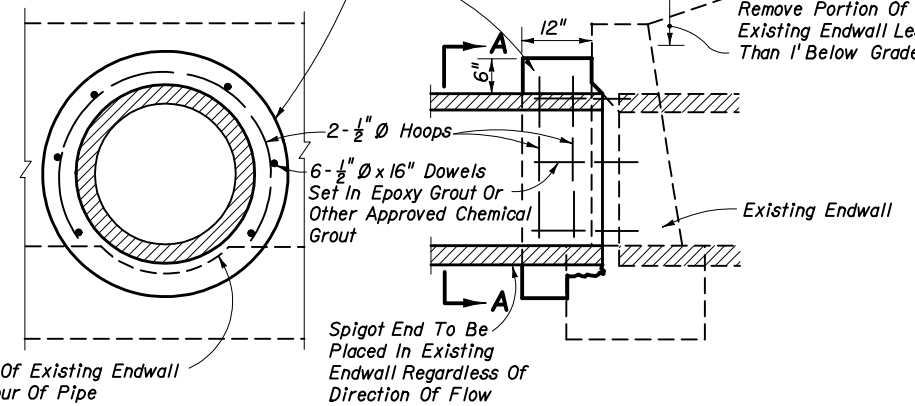


Note: Cost of concrete and bituminous coating to be included in contract unit price for either new pipe or Mitered End Section. A concrete jacket shall not be used to join:  
(a) metal pipe of dissimilar materials  
(b) flexible pipe when the minimum cover required in accordance with Index No. 205 cannot be obtained.

**DISSIMILAR TYPES**

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

Collar Of Class I Concrete (May Be Formed By Any Method Approved By The Engineer)

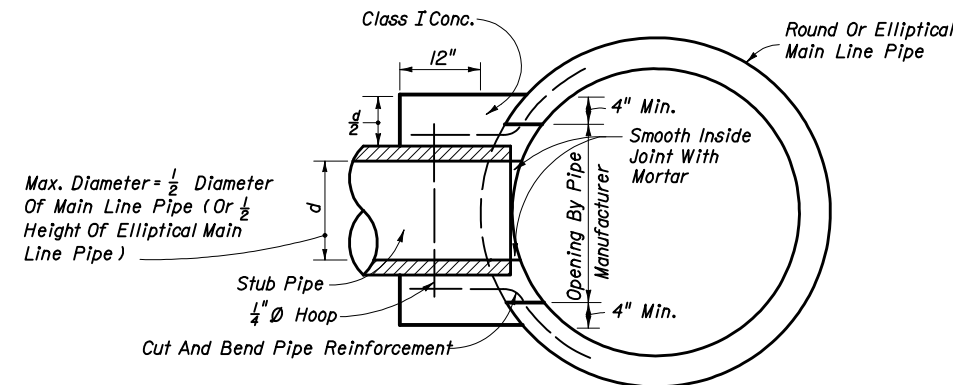


**SECTION AA**

**LONGITUDINAL SECTION**

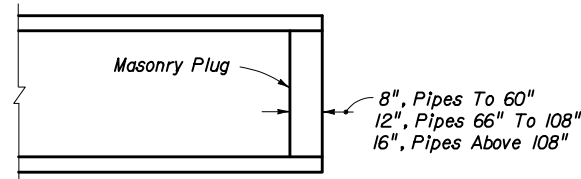
Note: Cost for removal and disposal of portions of top and toe of existing endwall and cost of concrete, reinforcing steel and construction of collar to be included in the contract unit price for pipe culvert.

**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**



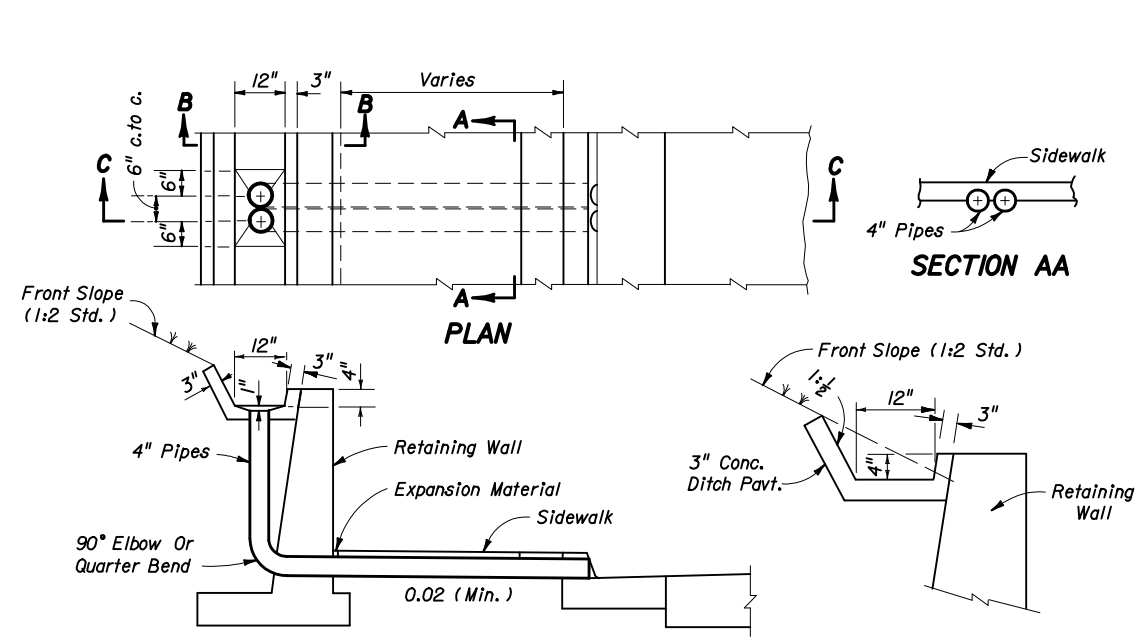
Note: Unless otherwise called for in the plans, the cost of plugging pipes to be included in contract unit price for new pipe.

**PIPE PLUG**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

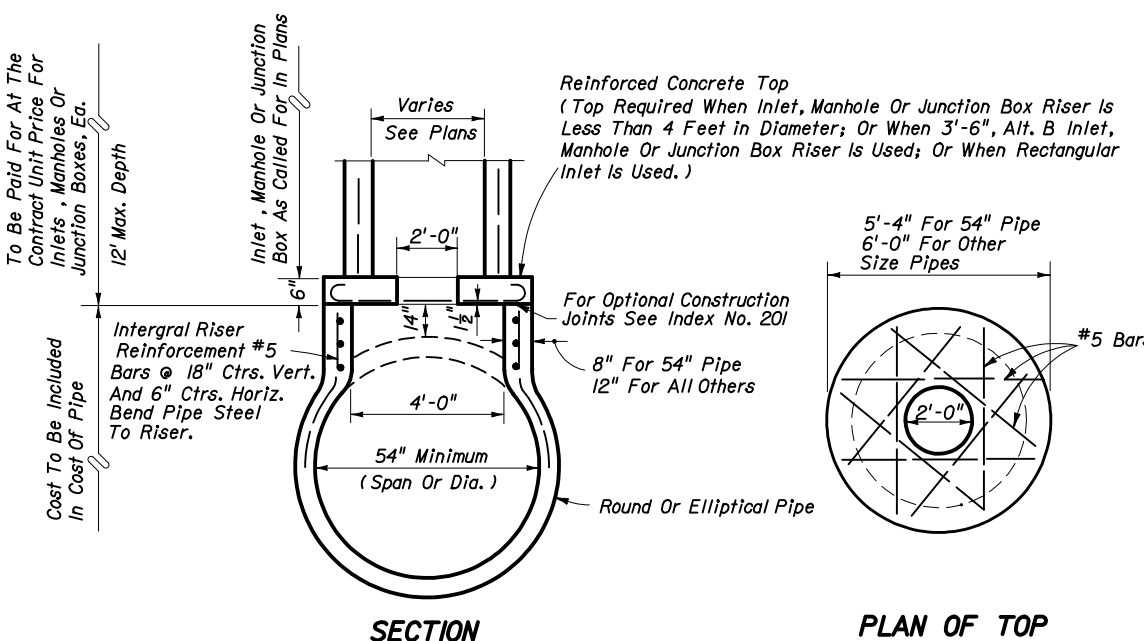
**MISCELLANEOUS DRAINAGE DETAILS**

Names	Dates	Approved By		
Designed By		S. A. McHenry State Drainage Engineer		
Drawn By	HSD 01/85			
Checked By	JBW/JVG 09/85	Revision	Sheet No.	Index No.
		00	1 of 4	280

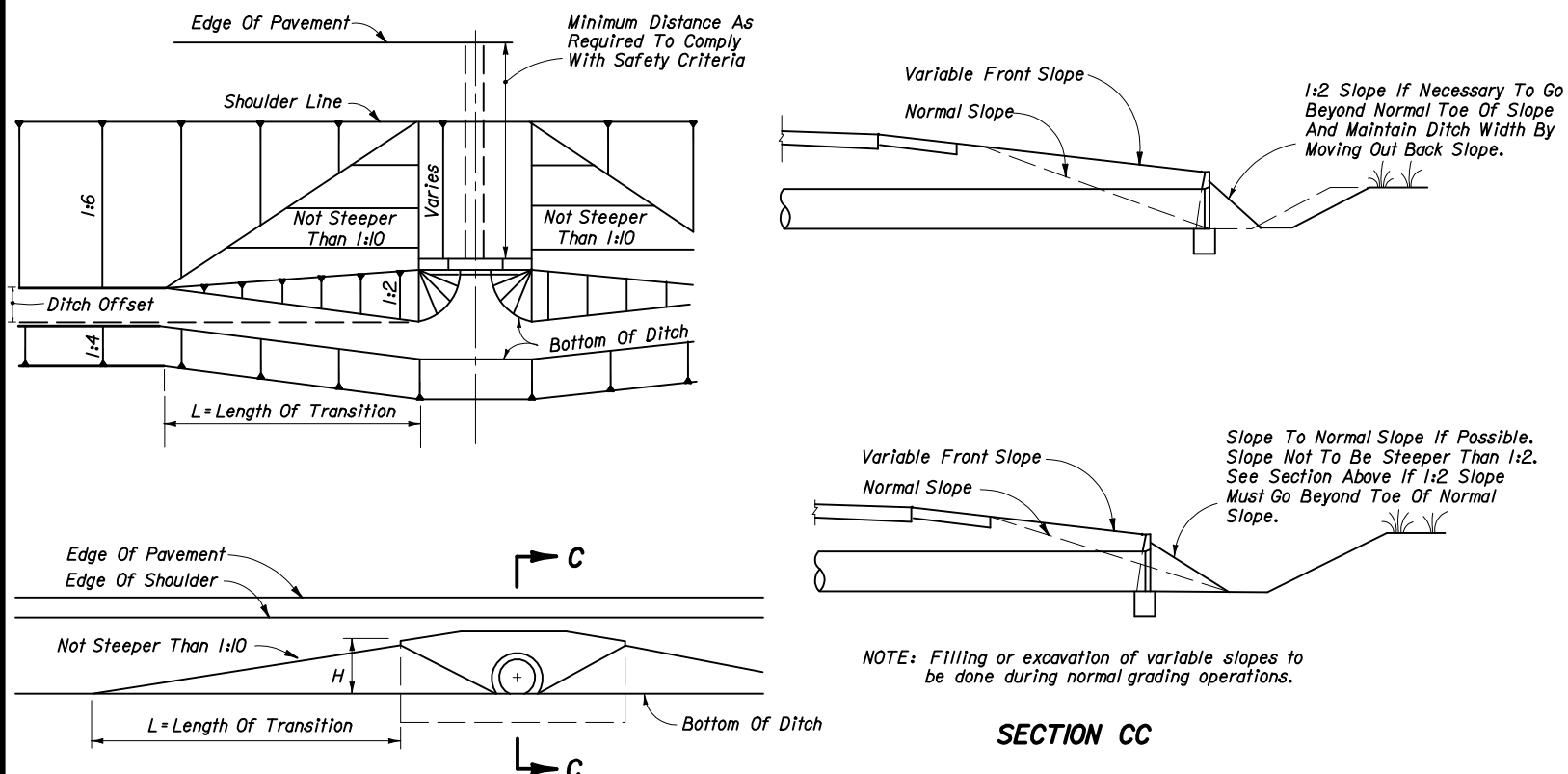


**CONCRETE GUTTER AND DRAINS AT RETAINING WALLS**

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.



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

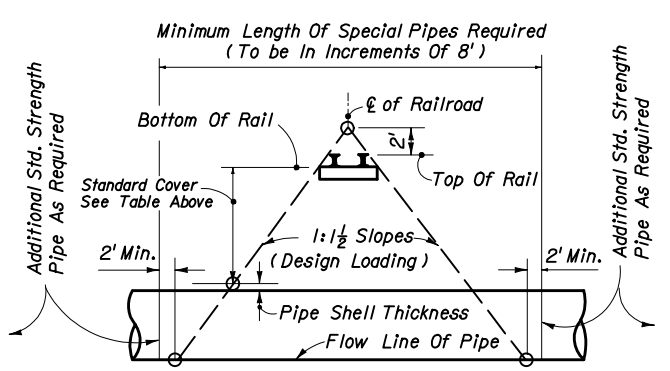


**METHOD FOR SETTING LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES**

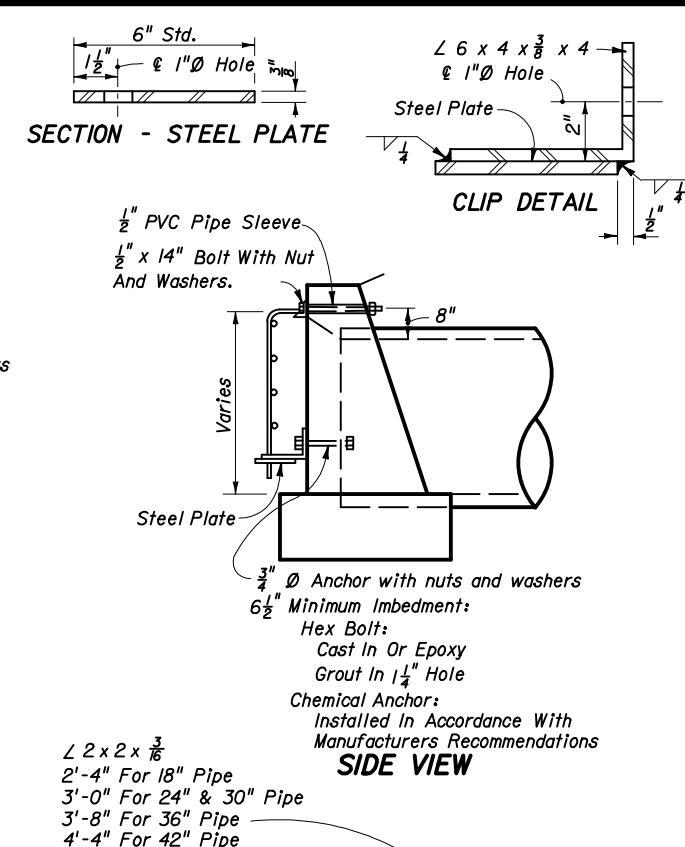
Use Larger Value Of Either:  
 1.  $L = 10 \times H$  (No Maximum)  
 2.  $L = 10 \times \text{Ditch Offset}$  (Maximum  $L = 100'$ )

RAILROAD COMPANY	CLEARANCE BELOW BOTTOM OF RAIL (FEET)	STRENGTH ASTM (C76) CLASS
Apalachicola Northern	4.0	IV
Atlanta And St. Andrews Bay	4.0	IV
Florida East Coast	5.5*	IV
Burlington Northern Railroad	S-TRK M/L 4.5 5.5	IV
CSX Transportation, Inc.	5.5	IV
Southern Railway System		
Georgia Southern And Florida	5.5	V
Live Oak Perry And South Georgia	5.5	V
St. Johns River Terminal	5.5	V

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



**METHOD FOR DETERMINING THE LENGTH OF SPECIAL PIPE REQUIRED UNDER RAILROADS**



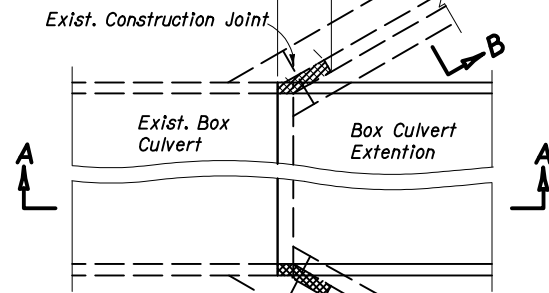
Pipe Dia.	18"	24"	30"	36"	42"
Grate (Lbs.)	48	58	74	90	111

**GUARD AT PIPE ENDS**

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.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
MISCELLANEOUS DRAINAGE DETAILS				
Names	Dates	Approved By		
Designed By		S. A. McHenry		
Drawn By		State Drainage Engineer		
Checked By		Revision	Sheet No.	Index No.
		00	2 of 4	280

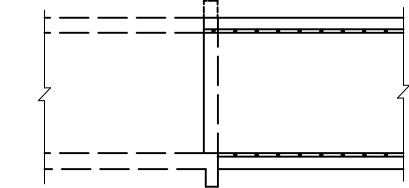
Remove Headwall, Outside Wall And Wingwall From Inside Face Of Headwall Sufficient To Construct Culvert Extension. Longitudinal Reinforcing Steel To Be Cleaned, Straightened And Extended Into Culvert Extension.



Length For Manually Estimated Or Computerized Quantities (Coding And Printout Lengths)

Tie-In Length

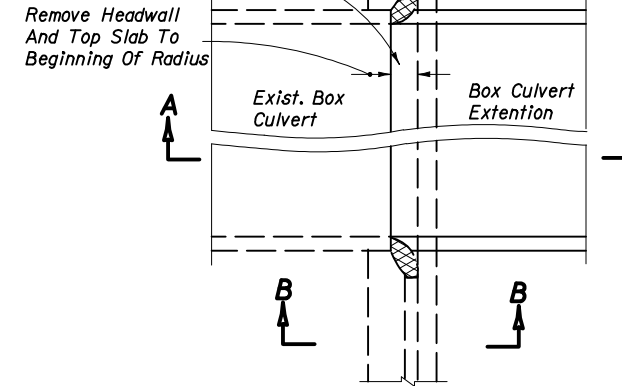
Culvert Extension (Length Tabulated On Drainage Structures And Summary Sheet For Standard Box Section Extension)



SECTION AA

Longitudinal Reinforcing Steel In Top Slab And Wall Return To Be Cleaned, Straightened And Extended Into Culvert Extension.

Remove Wall And Headwall To Construction Joint

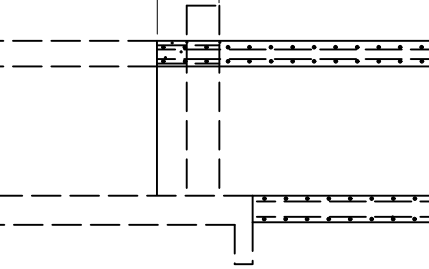


OUTSIDE WALLS-SINGLE, DOUBLE, TRIPLES, & QUADRUPLE BOXES

Length For Manually Estimated Or Computerized Quantities (Coding And Printout Lengths)

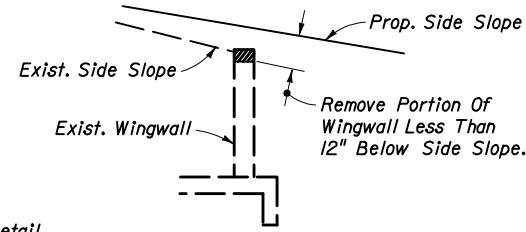
Tie-In Length

Culvert Extension (Length Tabulated On Drainage Structures And Summary Sheet For Standard Box Section Extension)

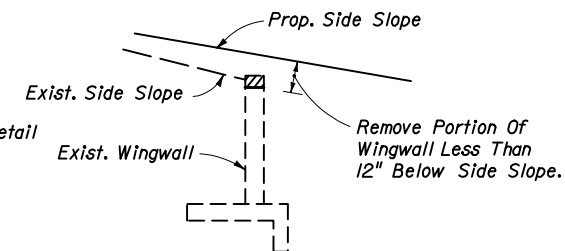


SECTION AA

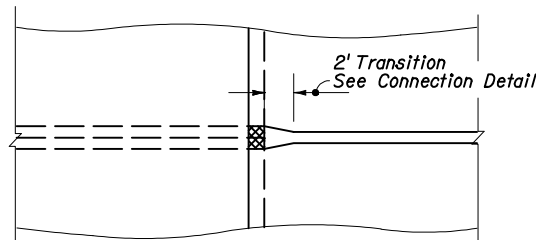
OUTSIDE WALLS-SINGLE, DOUBLE, TRIPLES, & QUADRUPLE BOXES



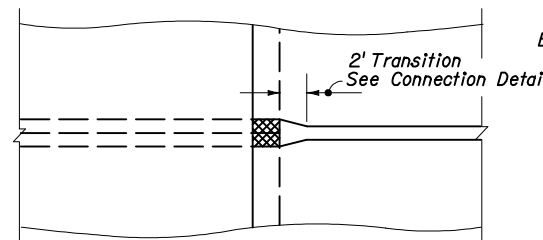
SECTION BB



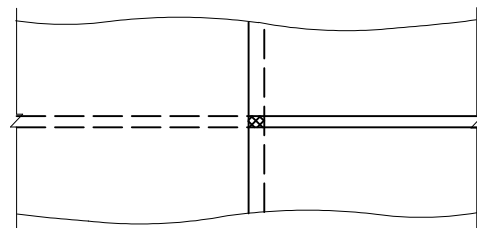
SECTION BB



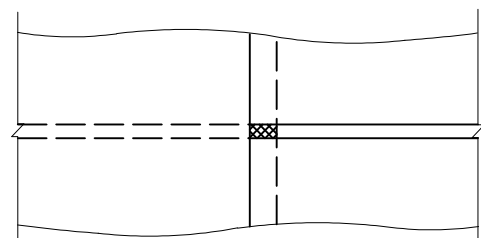
CENTER WALL-QUADRUPLE BOXES



CENTER WALL-QUADRUPLE BOXES



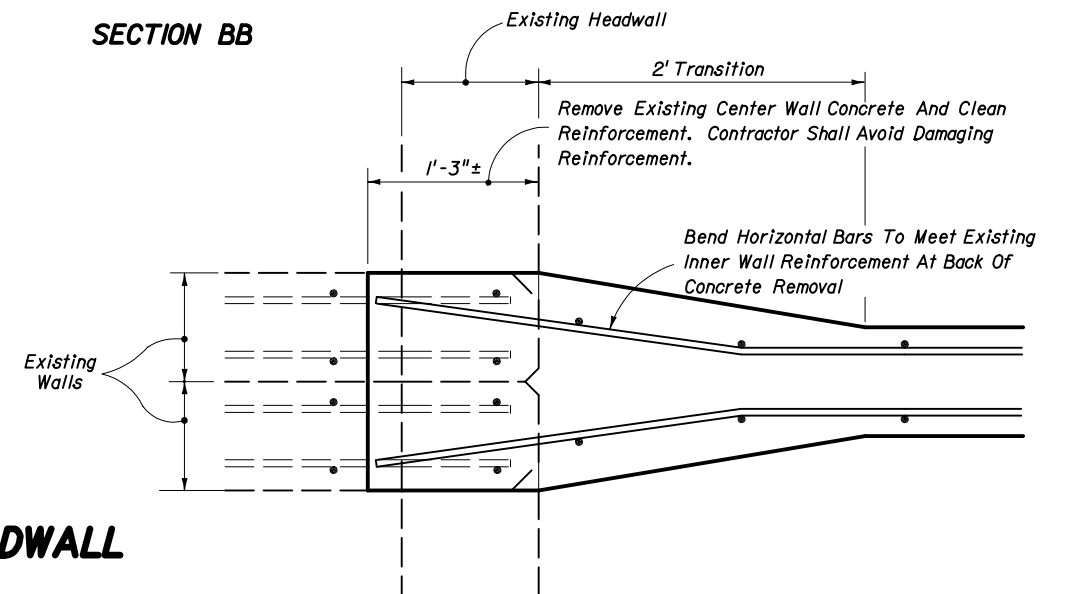
INTERIOR WALLS-DOUBLE & TRIPLE BOXES  
INTERMEDIATE WALLS-QUADRUPLE BOXES



INTERIOR WALLS-DOUBLE & TRIPLE BOXES  
INTERMEDIATE WALLS-QUADRUPLE BOXES

PLAN VIEWS

STRAIGHT ENDWALL



CONNECTION AT CENTER WALL OF QUADRUPLE CULVERTS

PLAN VIEWS

FLARED ENDWALL

NOTE: The computerized printout for reinforcing steel does not include the additional lengths needed for extension and overlaps or connections to the horizontal reinforcement in the interior walls of double, triple and quadruple existing concrete box culverts; the cost for additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for constructing the tie-in.

Cost for removal and disposal of material from existing headwalls, wingwalls and the top slab, and cost of cleaning, straightening and extending longitudinal reinforcing steel shall be included in the cost for concrete and steel of the culvert extension.

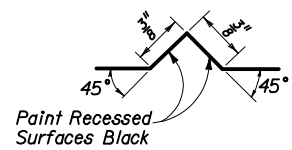
For concrete box culvert details, see Index No. 290.

CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

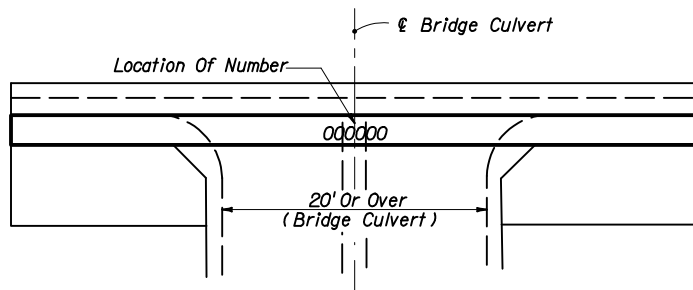
MISCELLANEOUS DRAINAGE DETAILS

Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	3 of 4	280



Black Plastic Figures 3" in height as approved by the Engineer may be used in lieu of numbers formed by  $\frac{3}{8}$ " V Grooves. V Grooves shall be formed by preformed figures.

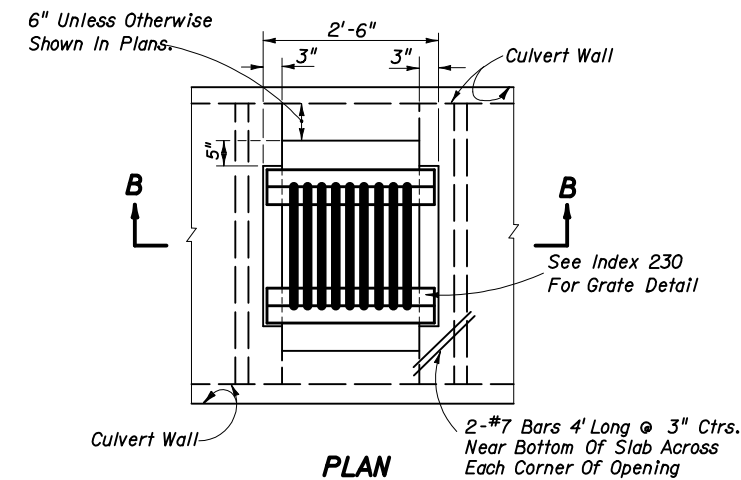
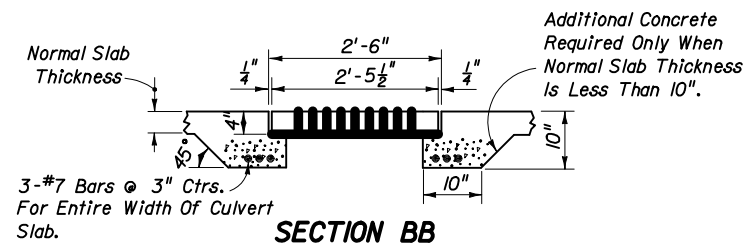
**SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED FIGURES**



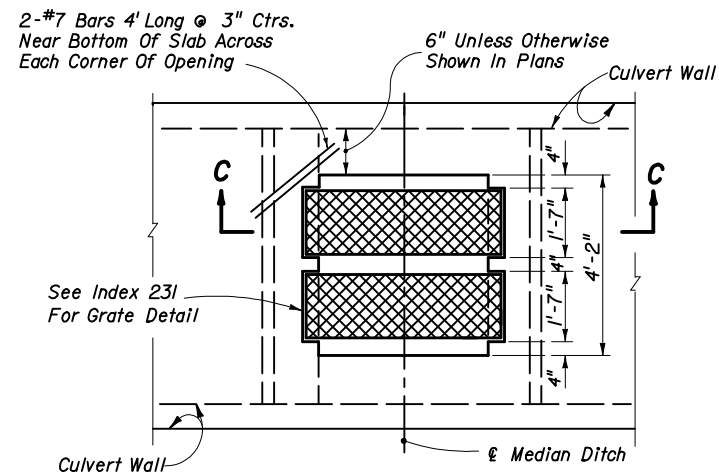
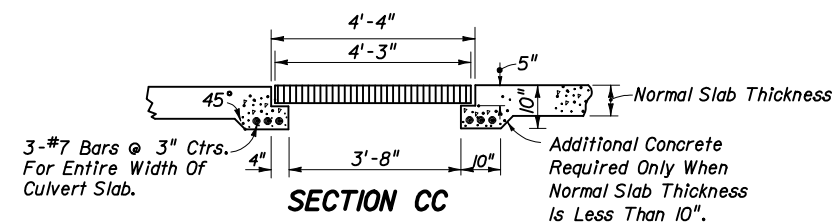
The number is to be placed in the center of the top surface of all bridge culvert headwalls. For Bridge Number See Plan-Profile Sheets.

**TOP VIEW OF HEADWALL**

**BRIDGE CULVERT NUMBER LOCATION**



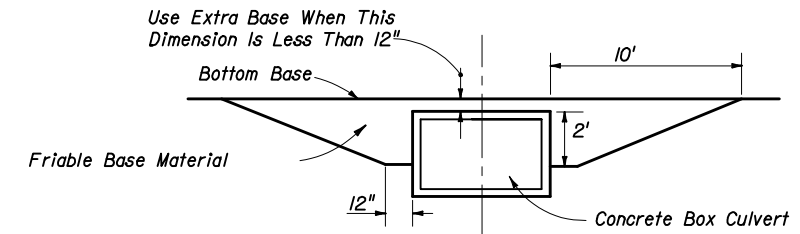
**INLET TYPE A GRATE**



**PLAN INLET TYPE B GRATE**

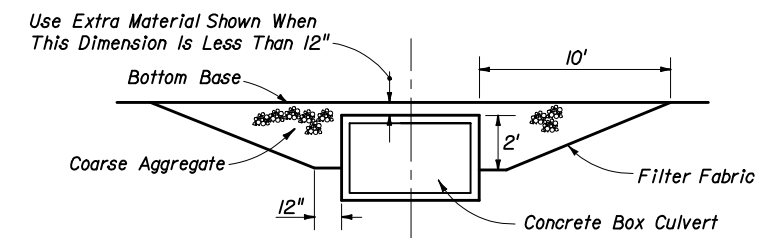
NOTE: 1. Cost of Steel Grating to be included in cost of Box Culvert.  
2. All steel shall be  $1\frac{1}{4}$ " clear.

**INLET IN TOP OF BOX CULVERT**



The cost of furnishing and installing extra friable base material shall be included in the cost of the Box Culvert.

**FRIABLE BASE**



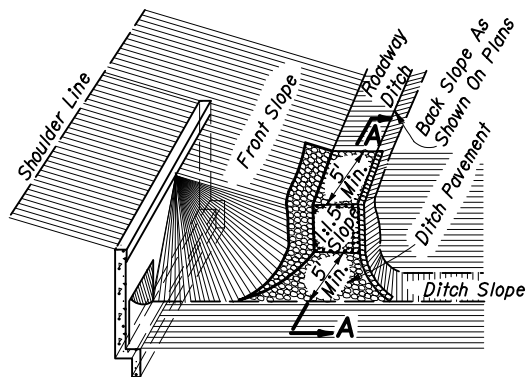
The coarse aggregate shall be placed in 6 inch lifts and compacted sufficiently as to be firm and unyielding. The coarse aggregate shall be gravel or stone meeting the requirements of Section 901-2 or 901-3 respectively. The gradation shall meet Section 901-6, Grades 4, 467, 5, 56, or 57 unless restricted in the plans. The filter fabric shall be Type D-3 (See Index 199). The cost of furnishing and installing the coarse aggregate and filter fabric shall be included in the cost of the Box Culvert.

**ASPHALTIC CONCRETE BASE**

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

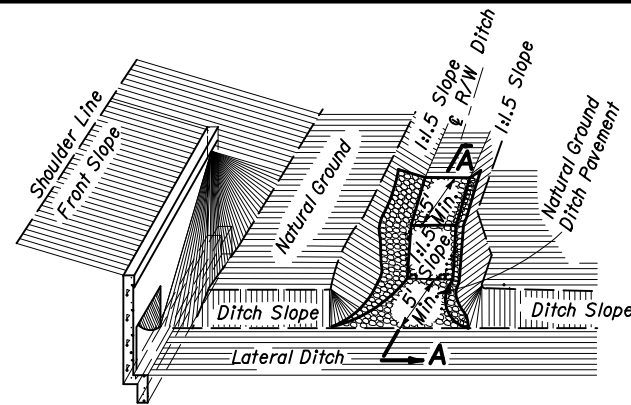
**EXTRA BASE FOR CROSS BOX CULVERTS UNDER FLEXIBLE PAVEMENT**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MISCELLANEOUS DRAINAGE DETAILS</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	4 of 4	280

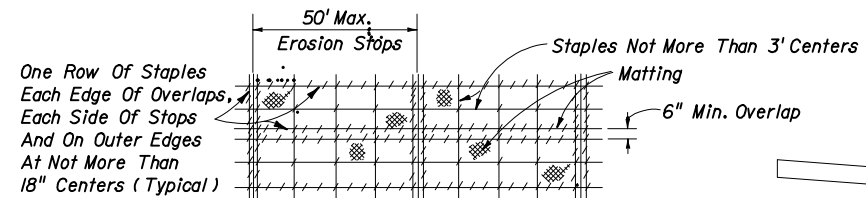


**JUNCTION OF ROADWAY DITCH \* AND LATERAL DITCH**

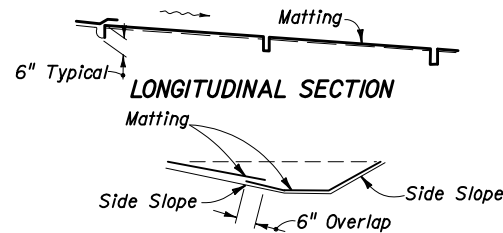
\* Soil cement or misc. asphalt will not be permitted for this type of construction



**JUNCTION OF R/W DITCH \* AND LATERAL DITCH**

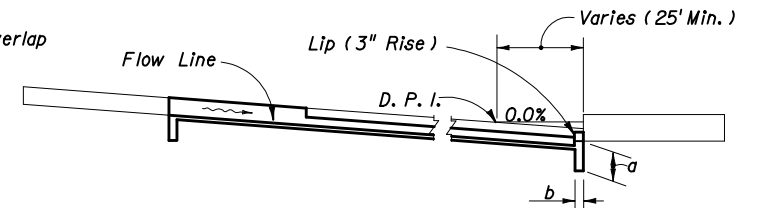


**PLAN**

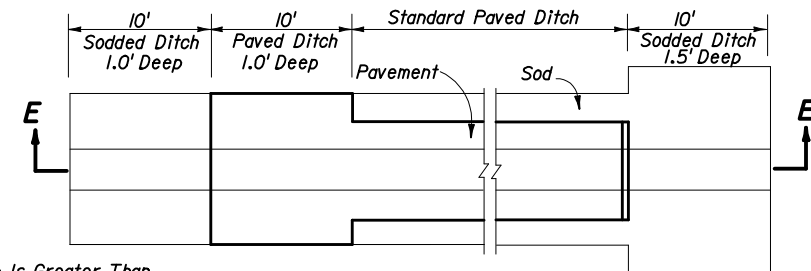


**LONGITUDINAL SECTION**

**SECTION MATTING FOR DITCH**

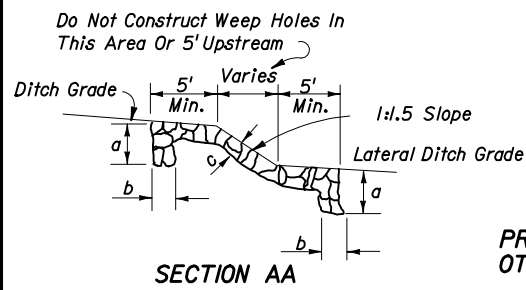


**SECTION EE**



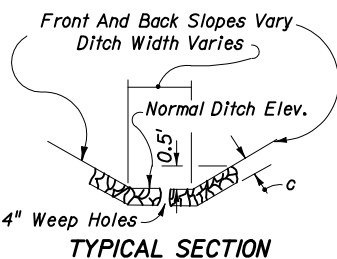
**PLAN**

**PAVED DITCH END TREATMENT**

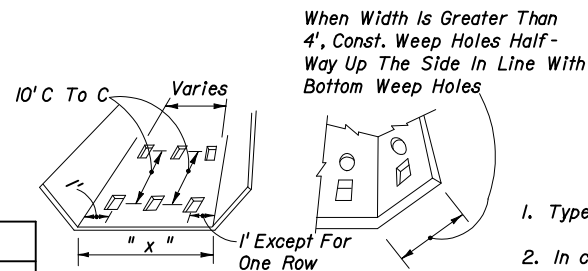


**SECTION AA**

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



**TYPICAL SECTION**



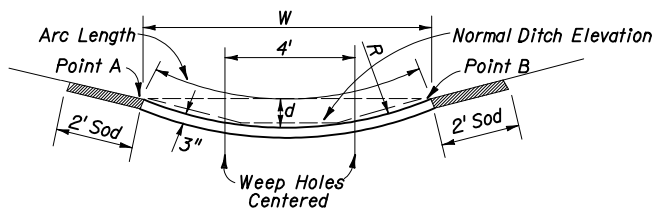
When "X" = 1' To 4' Const. 1 Row (Centered)  
 "X" = 5' To 7' Const. 2 Rows  
 "X" = 8' To 12' Const. 3 Rows  
 "X" = 13' To 17' Const. 4 Rows  
 "X" = 18' To 22' Const. 5 Rows

**GENERAL NOTES**

- Type of ditch pavement shall be as shown on plans.
- 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.
- 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.
- Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
- When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
- For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
- 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 overlapping the pavement fabric. (See Index 199 for fabric type and application).
- Ditch pavement requiring reinforcement shall be detailed in the plan.
- Cost of plastic filter fabric to be included in the contract unit price for ditch pavement.

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 (1/4" 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**

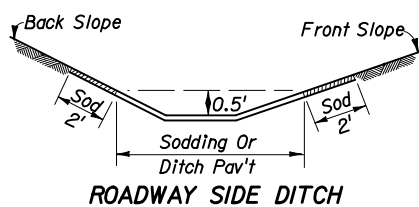


**TO REPLACE:**

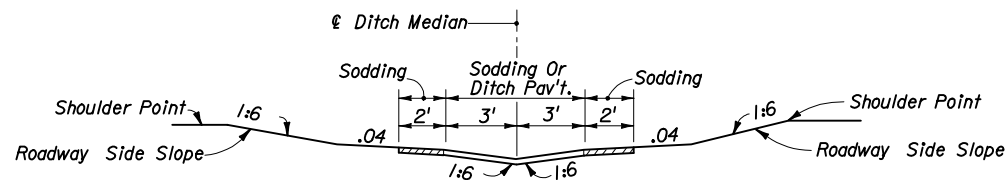
	W		d	R	No. Of Rows Of Weep Holes	Arc Length
	6'	10'				
6' Median Swale 1:6 Front Slopes; 1:4 Back Slope	6'	.24'	19'	0	6.0	
5' B.W. Ditch	10'	.67'	19'	2	10.1	
4' B.W. Ditch	9'	.54'	19'	2	9.1	
1:4 Front Slopes & Back Slope	9'	.74'	14'	2	9.2	
5' B.W. Ditch	8'	.58'	14'	1 (in center)	8.1	

**ALTERNATE DITCH PAVEMENT**

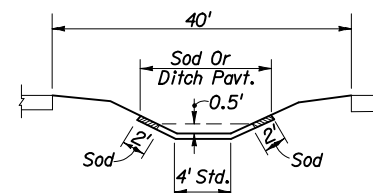
For use only where side slopes are 1:4 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.



**ROADWAY SIDE DITCH**



**SWALED MEDIAN (No Weep Holes)**

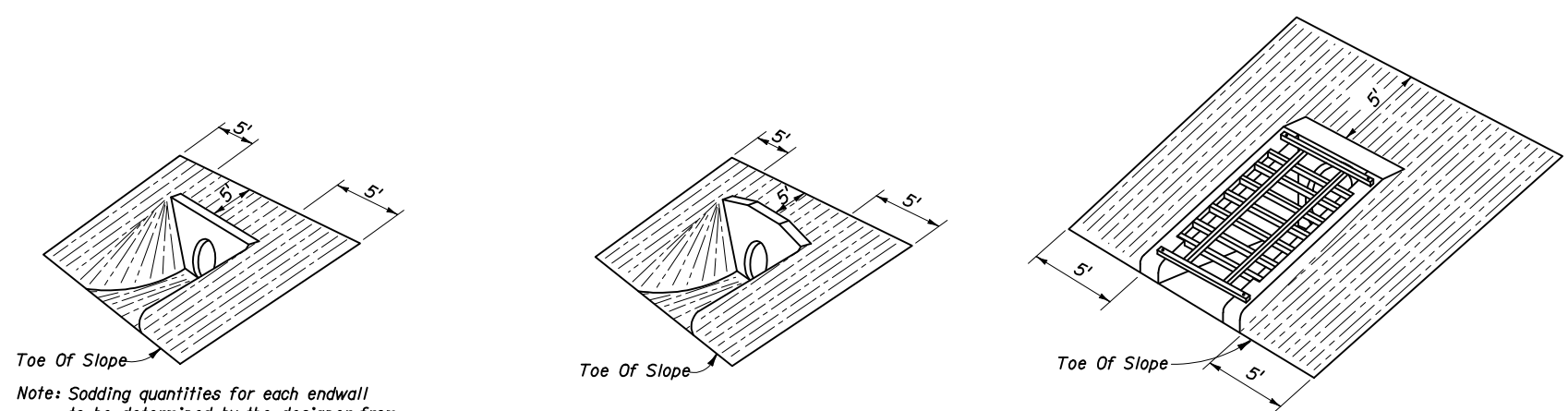


**40' MEDIAN**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**DITCH PAVEMENT & SODDING**

Designed By	Names	Dates	Approved By	S. A. McHenry	
Drawn By			State Drainage Engineer	Revision	Sheet No.
Checked By			00	1 of 2	281

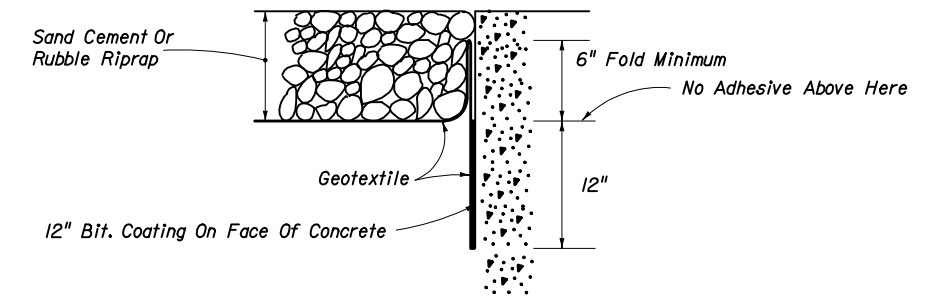


Note: Sodding quantities for each endwall to be determined by the designer from this detail.

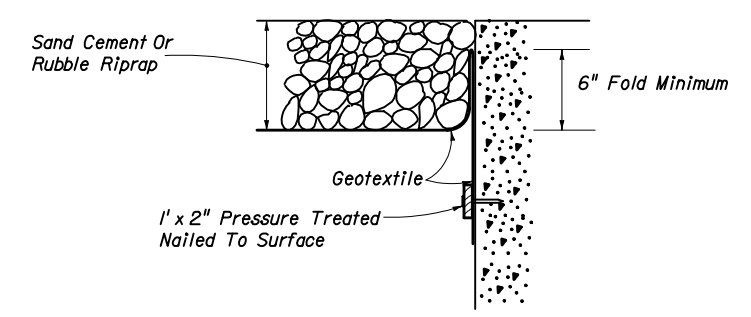
(EXCEPT INDEX 250)  
**STRAIGHT ENDWALL**

**STRAIGHT ENDWALL**  
**INDEX 250**

**U - TYPE ENDWALL**  
**INDEX 261**



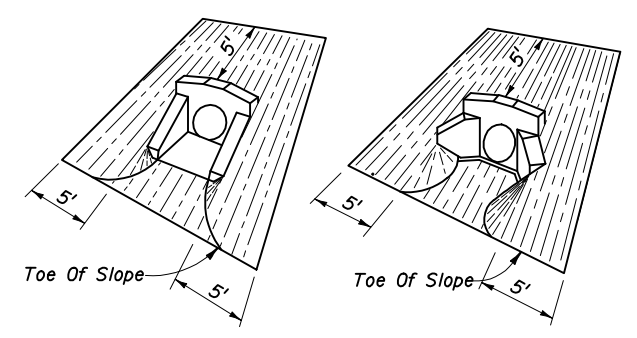
**BONDED OPTION**



**NAILED OPTION**

Note: Either option may be used unless otherwise called for in the plans.

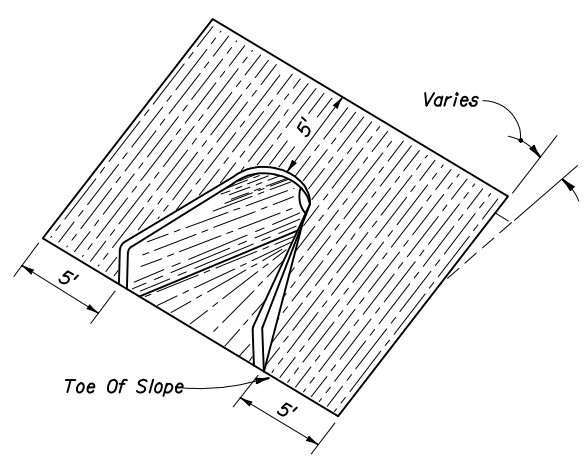
**GEOTEXTILE PLACEMENT AT CONCRETE STRUCTURE**



**U - TYPE WINGS**

**45° WINGS**

**WINGED ENDWALLS**  
**INDEX 266**



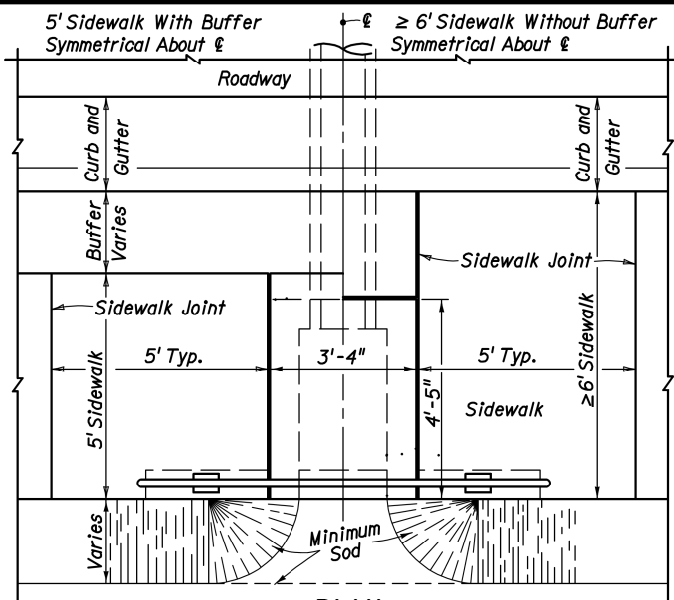
**FLARED END SECTION**  
**INDEX 270**

SODDING QUANTITIES (S. Y.)																						
PIPE SIZE	INDEX 250												INDEX 261				INDEX 266				INDEX 270	
	SLOPE												SLOPE				SLOPE					ALL SLOPES
	1:2			1:3			1:4			1:6			1:2		1:3		1:4		1:6			
	PIPES												PIPES				PIPES					
1	2	3	1	2	3	1	2	3	1	2	3	1	1	1	1	1	1	1	1	1		
12"																	14	15	18	22	10	
15"	19	21	24	22	26	29	26	30	33	34	38	43	13 (15)	16	17	23	15	17	20	25	11	
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	

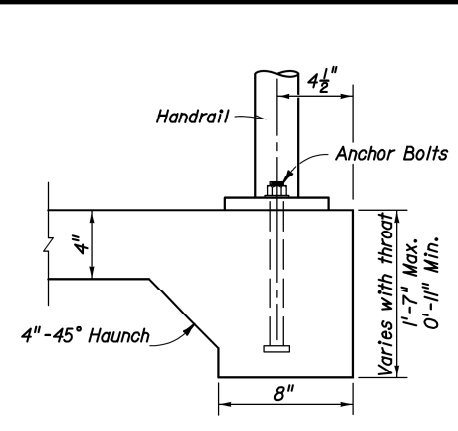
( ) Endwall With Baffles

**SODDING**

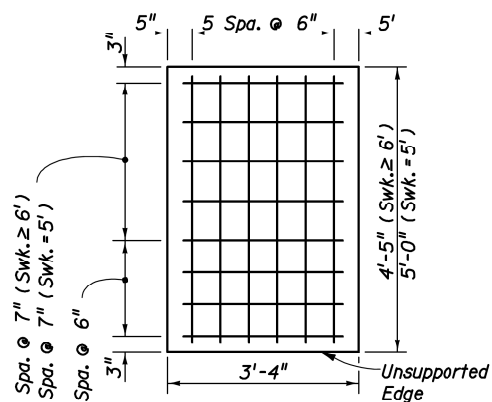
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>DITCH PAVEMENT &amp; SODDING</b>				
Designed By	Names	Dates	Approved By <i>S. A. McHenry</i>	
Drawn By	HSD	08/85	State Drainage Engineer	
Checked By	JBW/JVG	09/85	Revision	Sheet No.
			00	2 of 2
			Index No.	<b>281</b>



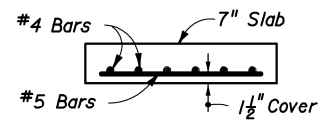
PLAN



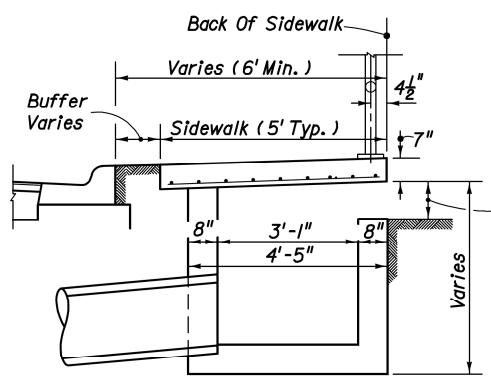
SECTION BB



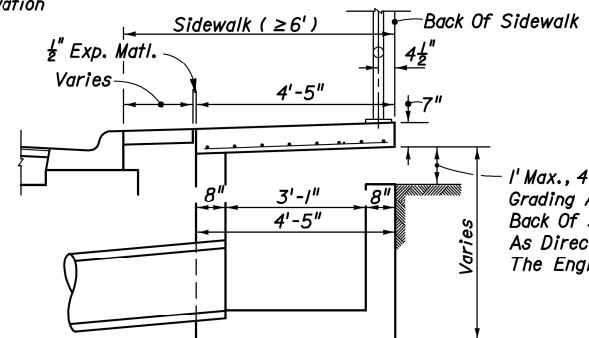
SLAB REINFORCEMENT



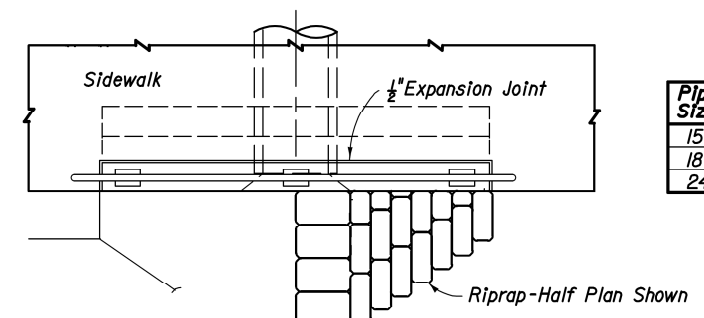
SLAB SECTION



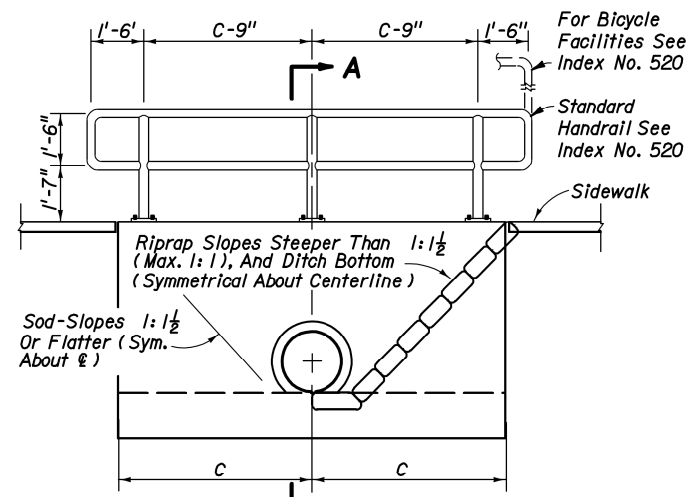
5' SIDEWALK SECTION AA



≥6' SIDEWALK SECTION AA

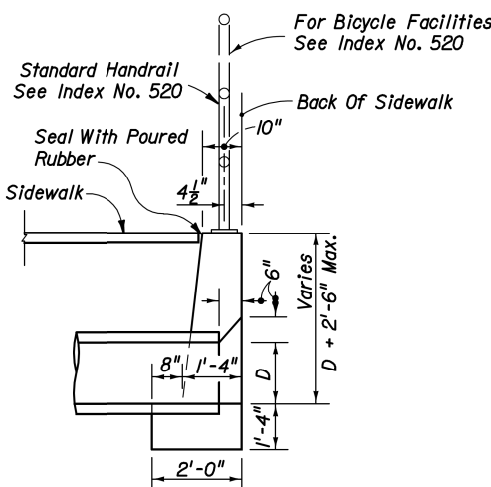


PLAN



FRONT ELEVATION

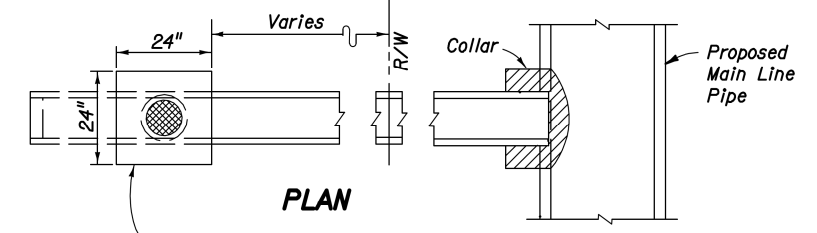
Pipe Size	C	Conc. -CY	Riprap -CY (Sand-Cement)
15"	4'-9"	2.27	1.1
18"	5'-3"	2.59	1.3
24"	6'-3"	3.26	1.8



SECTION AA

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

**SPECIAL CONCRETE ENDWALL**



PLAN

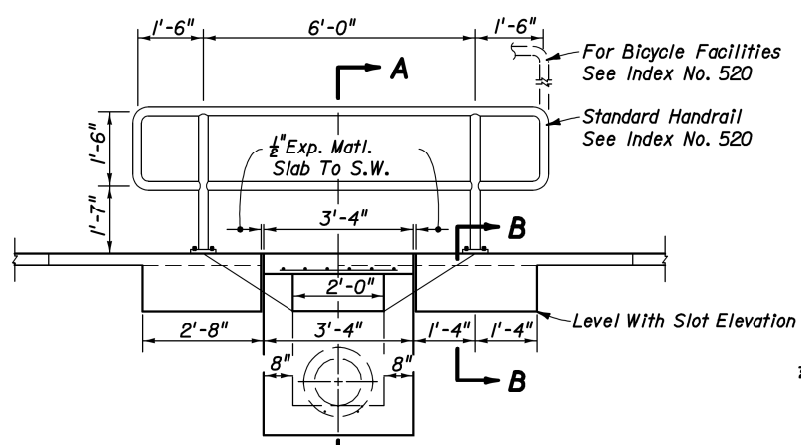
ELEVATION

**YARD DRAIN ITEM INCLUDES :**

- ① 15" x 15" x 12" Concrete or PVC Tee 4' long.
- ② One ( 1 ) Grate-Neenah No. R-4030, Phoenix No. P-1058, U.S. Foundry No. 5605 or equivalent.
- ③ 12" pipe as necessary.
- ④ 0.04 Cu. yds. conc. for slab.

- Notes:
1. Yard drains to be located outside the R/W. Drainage area should not exceed 750 S.F. (grate flow 0.1 Cfs).
  2. Yard drains may be constructed at the option of the property owner as shown on the plans.
  3. Cost of plugs and collars to be included in the cost for 15" pipe. For collar and plug details see Index No. 280.
  4. Yard drains to be paid for under the contract unit price for Yard Drains, EA.

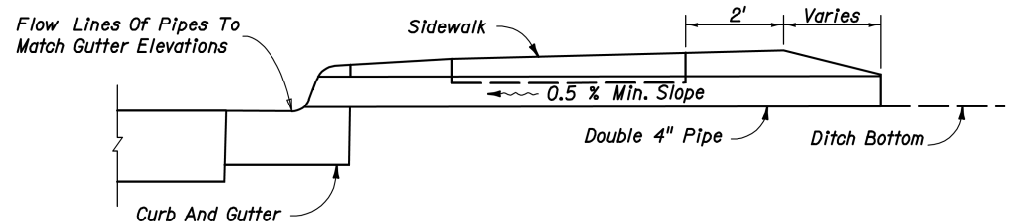
**YARD DRAINS**



FRONT ELEVATION

**INLET TYPE C (MODIFIED)**

- Notes:
1. For additional details see Index No. 232.
  2. Inlet to be paid for under the contract unit price for Inlets (Ditch Bottom Type C Modified), EA. Handrail to be paid for under the contract unit price for Pipe Handrail, (Material), LF.



**SHALLOW DITCHES**

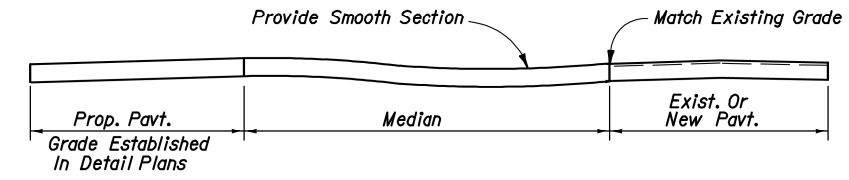
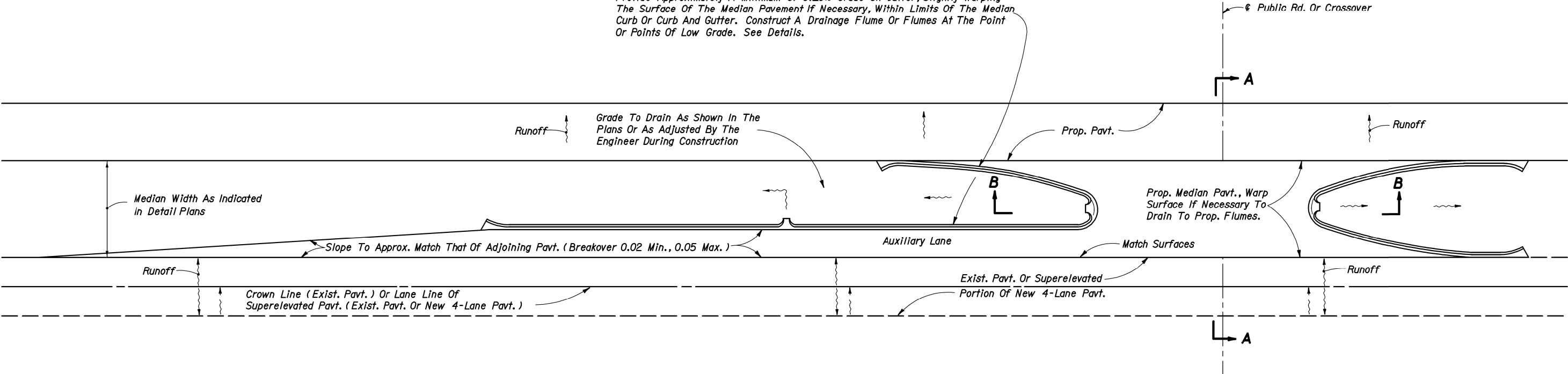
- Notes:
1. To be constructed at locations as directed by the Engineer.
  2. Either cast iron pipe or PVC rigid conduit, U.L. listed for direct sunlight exposure, Schedule 40, may be used.
  3. Pipe to be paid for under the contract unit price for either Cast Iron Soil Pipe (Standard) (4"), LF or Polyvinyl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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

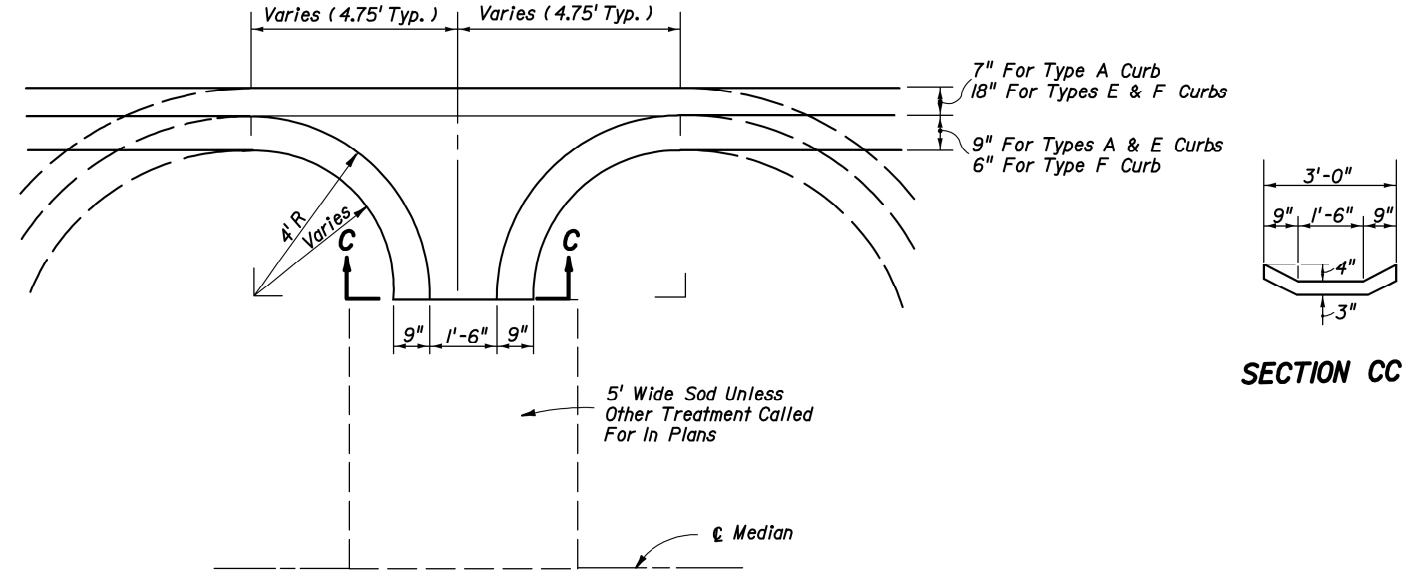
**BACK OF SIDEWALK DRAINAGE**

Names	Dates	Approved By	S. A. McHenry	
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 1	282

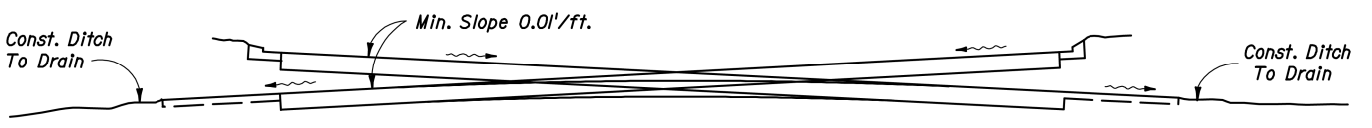
Provide Approximately A Minimum Of 0.20% Grade On Gutter, Slightly Warping The Surface Of The Median Pavement If Necessary, Within Limits Of The Median Curb Or Curb And Gutter. Construct A Drainage Flume Or Flumes At The Point Or Points Of Low Grade. See Details.



**SECTION AA**



**FLUME DETAIL**



**SECTION BB**

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

**GENERAL NOTES**

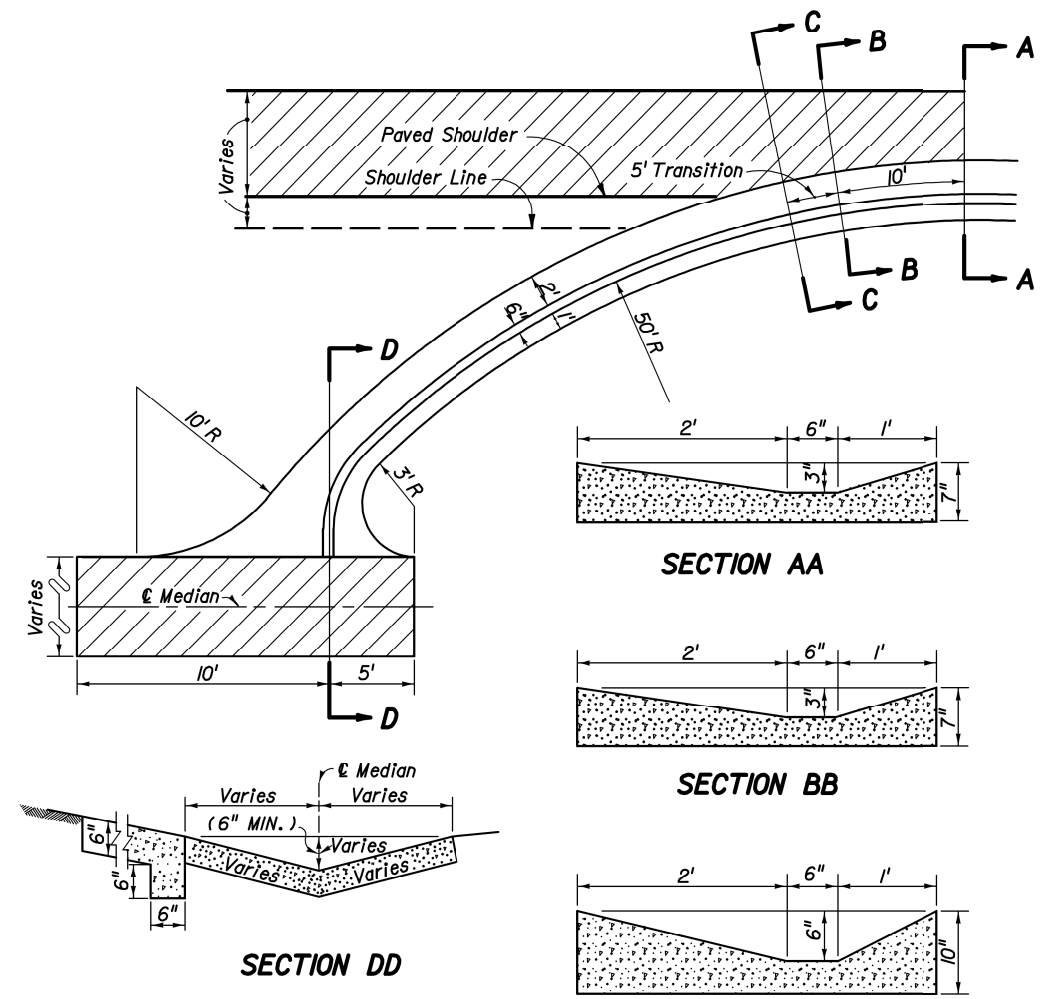
1. These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for superelevated sections of new 4-lane divided highways. Layout above is illustration only. Cost of flumes to be included in the contract price for Curb or Curb and Gutter. Sod to be paid for under the contract unit price for Sodding, SY.
2. 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

**MEDIAN OPENING FLUME**

Names	Dates	Approved By <i>S. A. McHenry</i> State Drainage Engineer		
Designed By	CHR	03/59	Revision	Sheet No.
Drawn By			00	1 of 1
Checked By	CDD	03/59		<b>283</b>

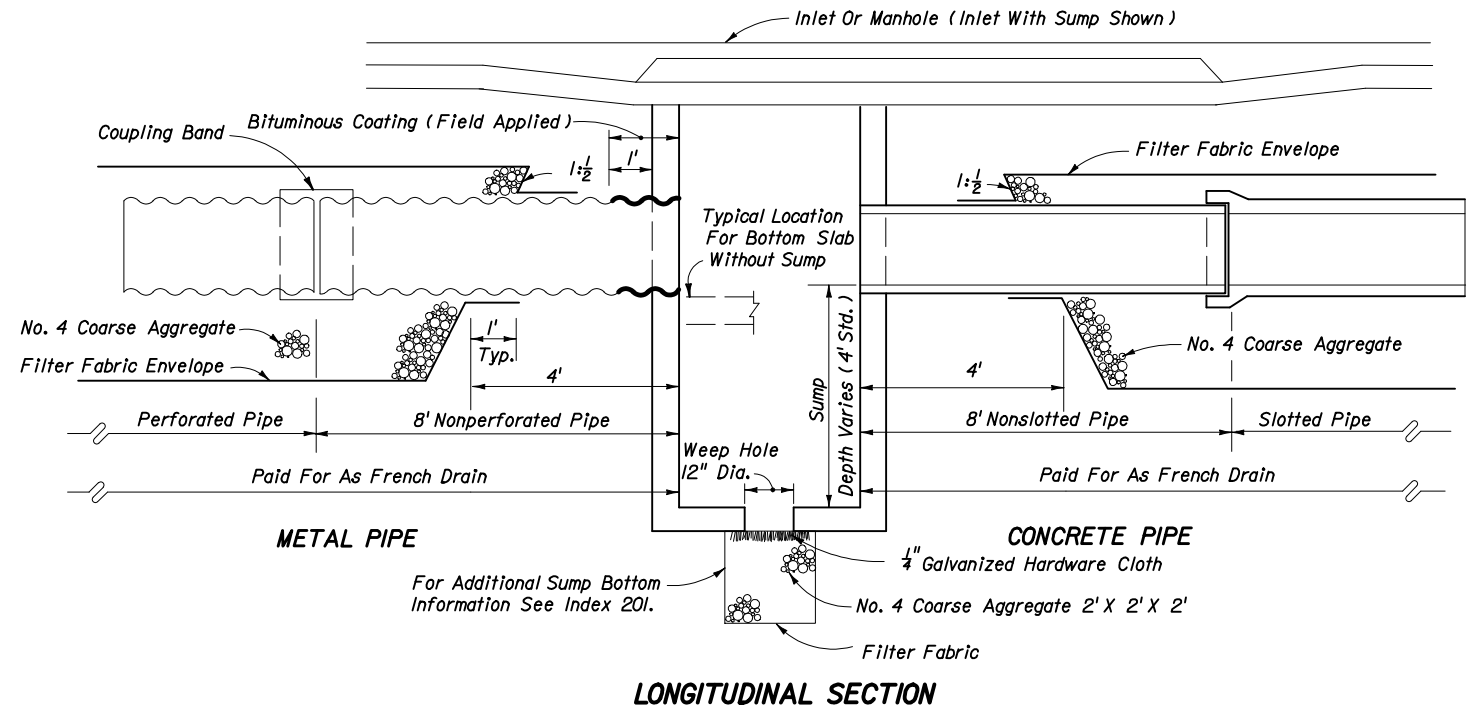




1. Spillway to be paid for as shoulder gutter.
2. If spillway empties into a shallow or median ditch, the detail should be modified as necessary.

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE SPILLWAYS</b>				
<b>SHOULDER GUTTER SPILLWAY</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By		State Drainage Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 1	284



**GENERAL NOTES**

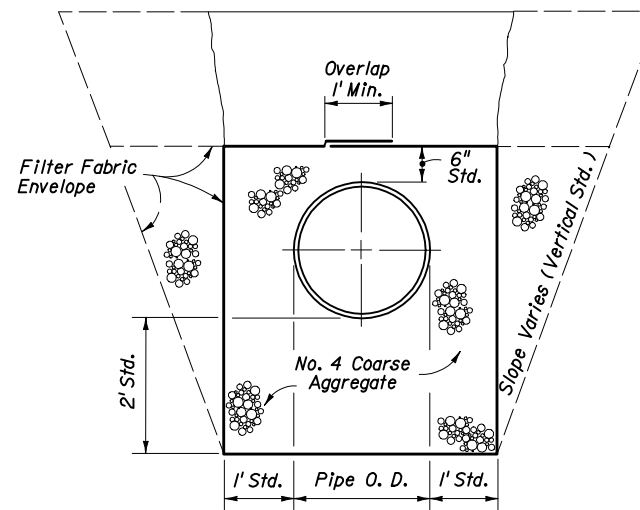
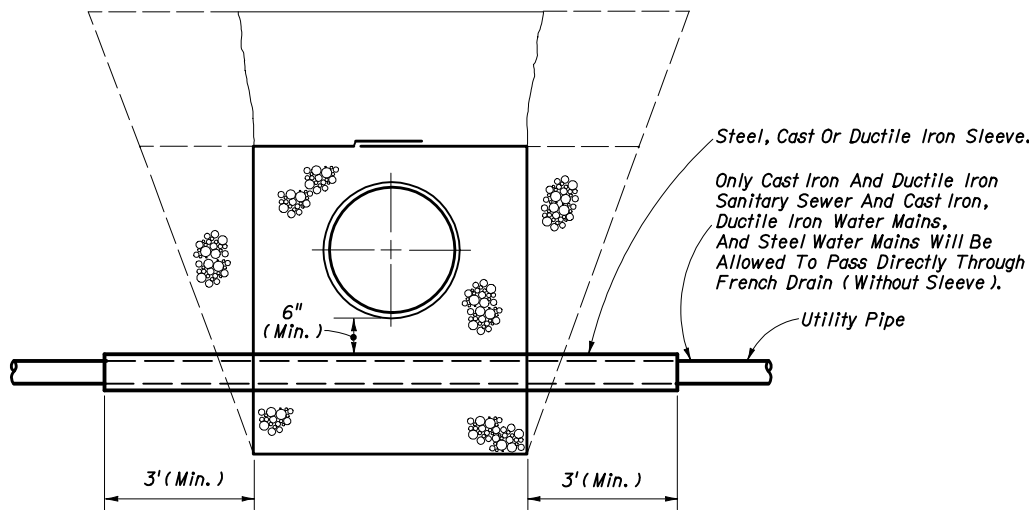
1. Pipe shall be any of the optional types permitted in Section 443 of the Specifications unless otherwise restricted in the plans. Dissimilar types of pipe will not be permitted in a continuous run of pipe.
2. Concrete pipe shall be placed with the slots positioned on sides.
3. Alignment joints are standard (gaskets not required). Recorrugation of metal pipe ends not required.
4. The contractor may submit other methods of providing slots having equal or greater area of opening, for approval by the Engineer.
5. 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.
6. The standard cross section shall be constructed unless other section(s) described or detailed in the plans.
7. For supplemental details see Index No. 280.
8. The contractor shall take the necessary precautions to prevent contamination of the trench with sand, silt and foreign materials.
9. 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.
10. 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 of 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:

- (a) Slotted or Perforated Pipe Culvert, LF. Unit price shall include cost for pipe, pipe plugs and fittings in place.
- (b) Ballast Rock (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.
- (c) Plastic Filter Fabric (Subsurface), 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**

1. Pipe invert should be at or above the water table whenever possible.
2. 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.

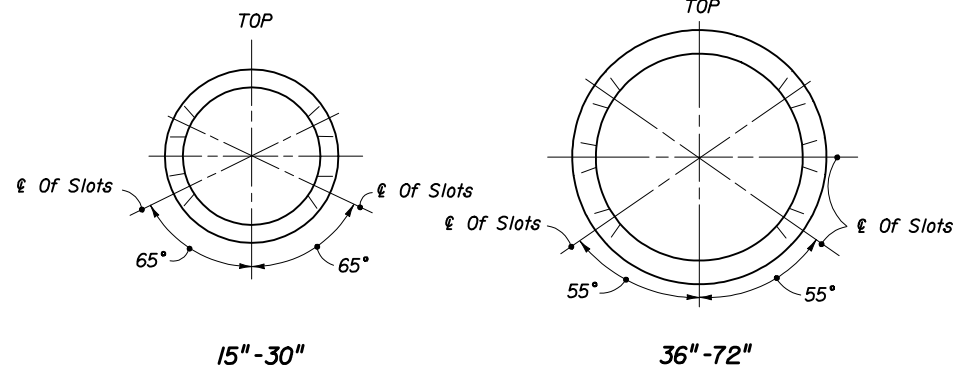


ROUND PIPE SHOWN  
UTILITY PIPES THRU FRENCH DRAIN

ROUND PIPE SHOWN  
STANDARD CROSS SECTION (ENLARGED)

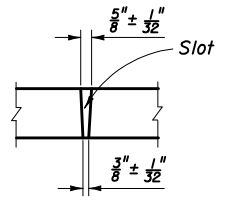
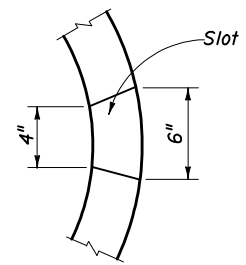
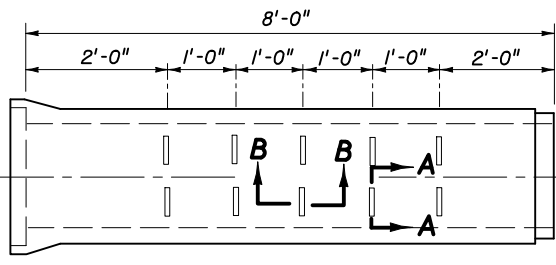
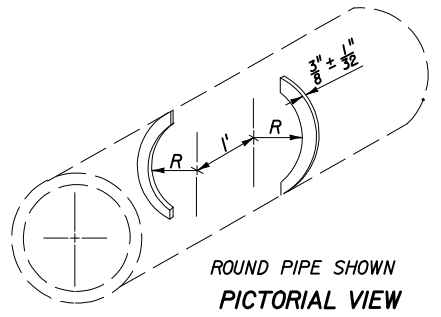
**FRENCH DRAIN SYSTEM**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>FRENCH DRAIN</b>				
Names	Dates	Approved By		
Designed By	MFS	09/83	S. A. McHenry State Drainage Engineer	
Drawn By	RWR	09/83	Revision	Sheet No.
Checked By	EGR	09/83	00	1 of 2
				Index No. <b>285</b>

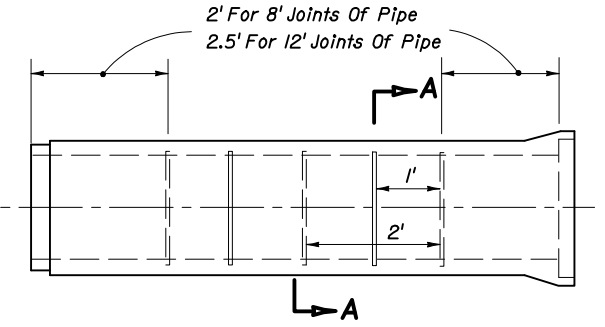
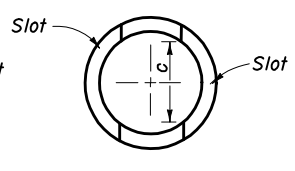
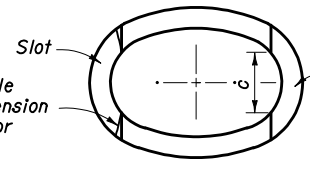


ELLIPTICAL PIPE			
Pipe Size	Slot Cut		
	Opening c		
	Min.	Max.	
14"x23"	10"	12"	
19"x30"	14"	16"	
24"x38"	14"	16"	
29"x45"	20"	22"	
34"x53"	20"	22"	
38"x60"	20"	22"	

ROUND PIPE			
Pipe Size	Slot Cut		
	Opening c		
	Min.	Max.	
15"	12"	14"	
18"	12"	14"	
24"	16"	18"	
30"	16"	18"	
36"	22"	24"	
42"	22"	24"	
48"	22"	24"	
54"	24"	26"	
60"	24"	26"	
66"	24"	26"	
72"	24"	26"	



A curved cut is acceptable provided the control dimension is maintained (Typical For Elliptical & Round Pipe)



SIDE VIEW

SECTION AA

SECTION BB

ELLIPTICAL PIPE

ROUND PIPE

SECTION AA

SIDE VIEW

OPTION A - ROUND PIPE

OPTION B - ROUND OR ELLIPTICAL PIPE

### SLOTTED PIPE OPTIONS

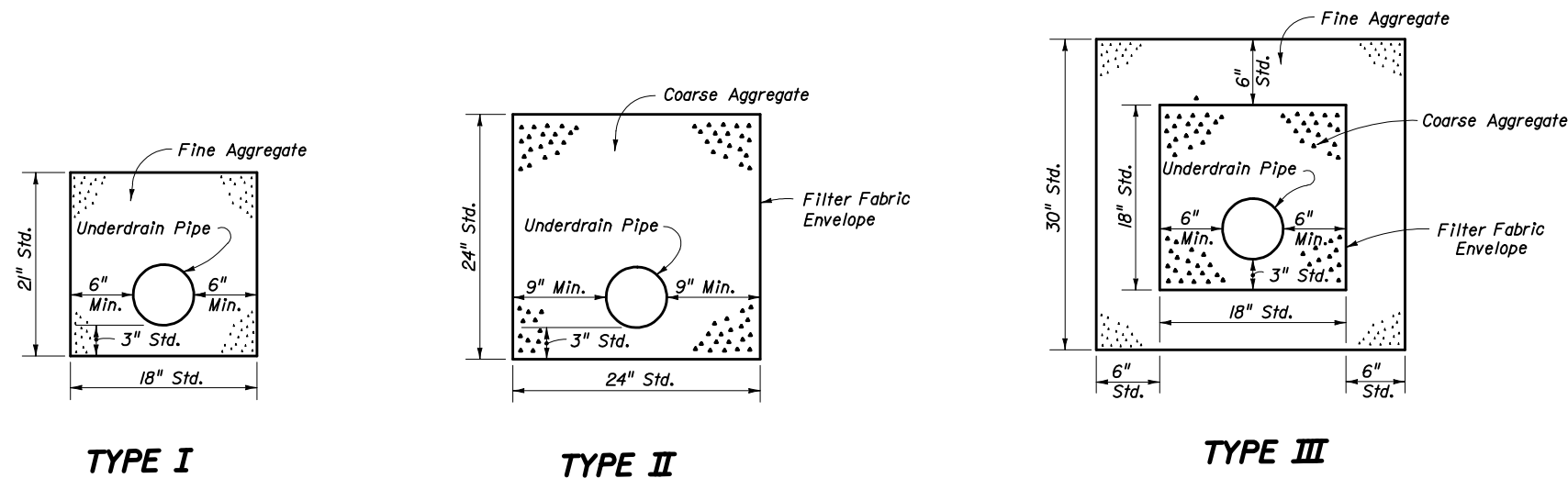
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

## FRENCH DRAIN

Designed By	Names	Dates	Approved By	 State Drainage Engineer	
Drawn By			Revision	Sheet No.	Index No.
Checked By			00	2 of 2	285

## GENERAL NOTES

- The underdrain pipe shall be either 4" smooth or 5" corrugated tubing unless otherwise shown in the plans. The size to be furnished will be based on the nominal internal diameter of a pipe with a smooth interior wall. Except when prohibited by the plans, the special provisions or this standard, pipe with a corrugated interior wall may be provided based on the following size equivalency.
  - 4" smooth interior equivalent to 5" corrugated interior
  - 5" smooth interior equivalent to 6" corrugated interior
  - 6" smooth interior equivalent to 8" corrugated interior
  - 8" smooth interior equivalent to 10" corrugated interior
- Fine aggregate shall be quartz sand meeting the requirements of Sections 902-4 of the Standard Specifications.
- Coarse aggregate shall be gravel or stone meeting the requirements of Sections 901-2 or 901-3. The gradation shall meet Section 901, Grades 4, 467, 5, 56 or 57 stone unless otherwise shown restricted in the plans.
- Underdrain Type I, II, III and V shall be in accordance with Section 440.
- Filter fabric shall be Type D-3 (See Index No. 199). The internal filter fabric of Type V underdrain shall have a permittivity of 0.7 /sec and an AOS of #40 sieve.
- When corrugated polyethylene tubing with slots or 360° perforations is used in conjunction with fine aggregate, a filter fabric sock meeting Section 948 is required.
- See Index no. 500 for the standard location of Type I, II, and III underdrain. The location of Type V underdrain and non standard locations of Type I, II, and III underdrain will be as detailed in the plans.
- All Filter fabric joints shall overlap a minimum of 1'. The internal filter fabric of Type V underdrain shall overlap into the coarse aggregate or the fine aggregate a minimum of 1'.
- Underdrain outlet pipes shall be non-perforated and all bends shall be made using  $\frac{1}{8}$  (45 deg.) elbows. 90 deg. bends shall be constructed with two  $\frac{1}{8}$  elbows separated by at least 1' of straight pipe. Outlet pipes stubbed into inlets or other drainage structures shall be not less than 6" above the structure flow line. Outlet pipes discharging to grassed areas shall have concrete aprons, hardware cloth, and bordering sod as shown in Index no. 287 for Edgedrain outlets.
- Pay Item shall be based on the size of the smooth interior products. The contract unit price for Underdrain, LF, shall include the cost of pipe, fittings, aggregate, sock, filter fabric, underdrain cleanouts, and concrete aprons.  
The contract unit price for Underdrain Outlet Pipe, LF, shall be full compensation for trench excavation, pipe and fittings, concrete aprons, hardware cloth for concrete aprons, stubbing into drainage structures, backfill in place, and disposal of excess materials.  
The contract unit price for Underdrain Inspection Box, EA, shall be for the number completed and accepted.



**TYPE I**

**TYPE II**


**TYPE III**

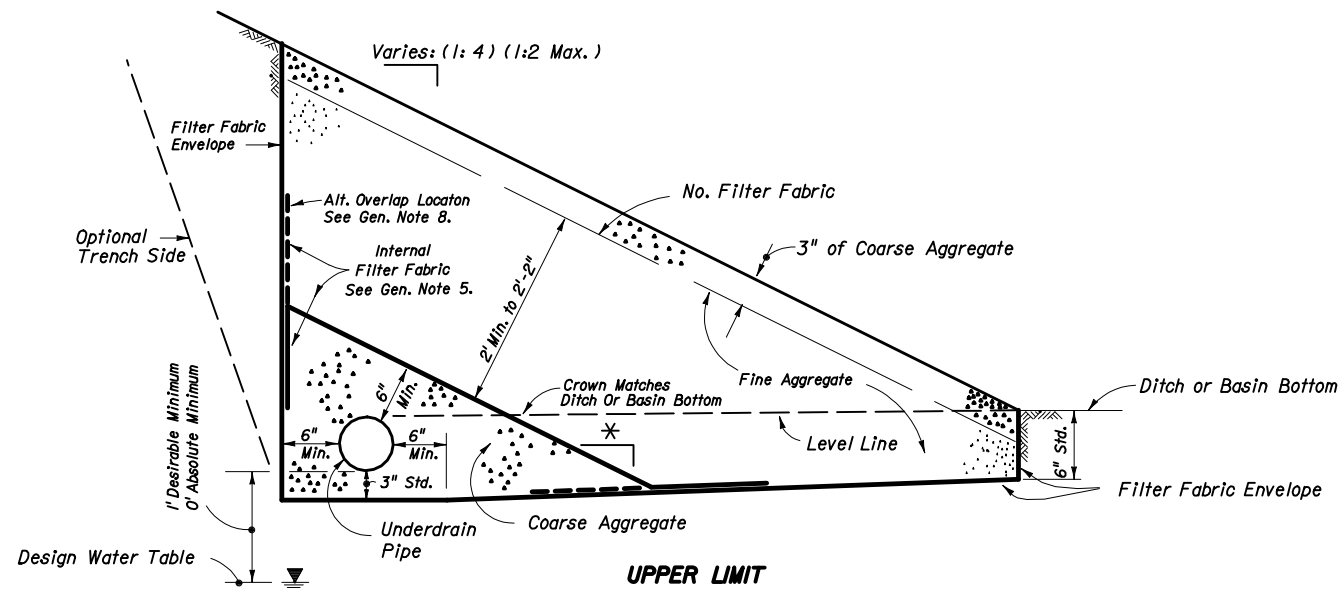
## DESIGN NOTES

- 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.
- Type I underdrain is intended for minimum water removal conditions.
- 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.
- Type III underdrain is intended for maximum water removal conditions. Filter fabric 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.
- Type V underdrain is intended for use in detention basins and other locations which require a filtration system. The standard fine aggregate specified for Type V underdrain conforms to filtration gradation requirements of Chapter 62-25 F.A.C..
- The designer should detail in the plans, the location of:
  - (a) Type V underdrain, (b) non-standard locations of Type I, II, and III underdrain, (c) underdrain inspection boxes, (d) cleanouts for Type V underdrain, and (e) underdrain outlet pipes.
- The designer should specify the flow line elevations at the beginning, bends, junctions and ends of underdrain pipes and outlet pipes.
- The designer should evaluate whether an external filter fabric envelope is required around underdrain Types I and III. When required, fabric shall be specified in the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

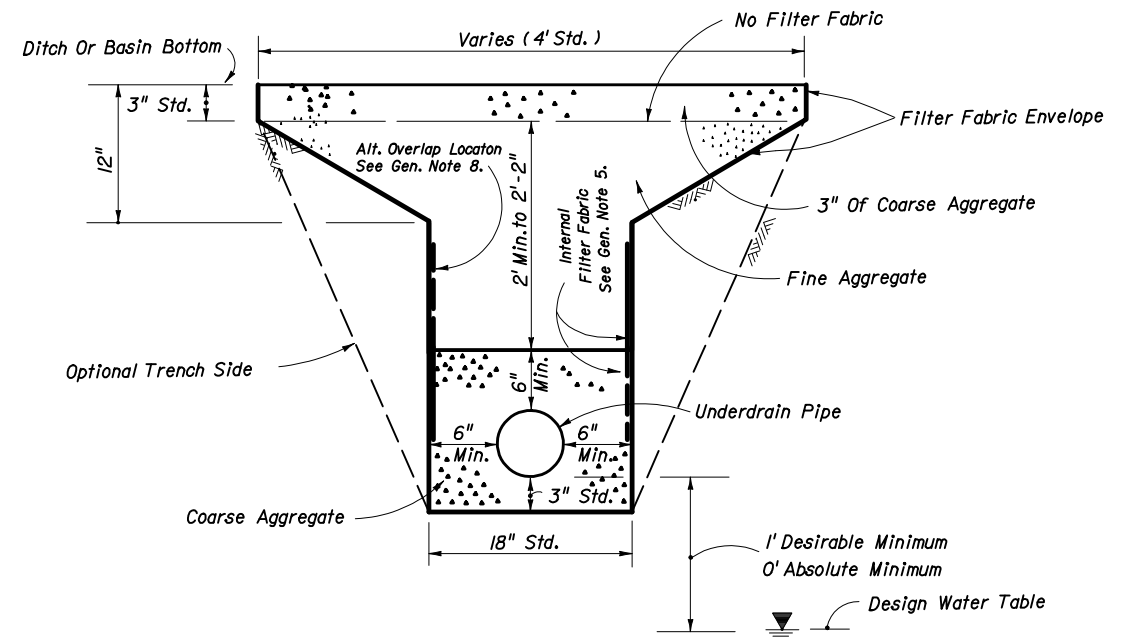
## UNDERDRAIN

Names	Dates	Approved By		
Designed By	EGR	10/85	 State Drainage Engineer	
Drawn By	HSD	10/85		
Checked By	EGR	10/85	Revision	00
			Sheet No.	1 of 2
			Index No.	286

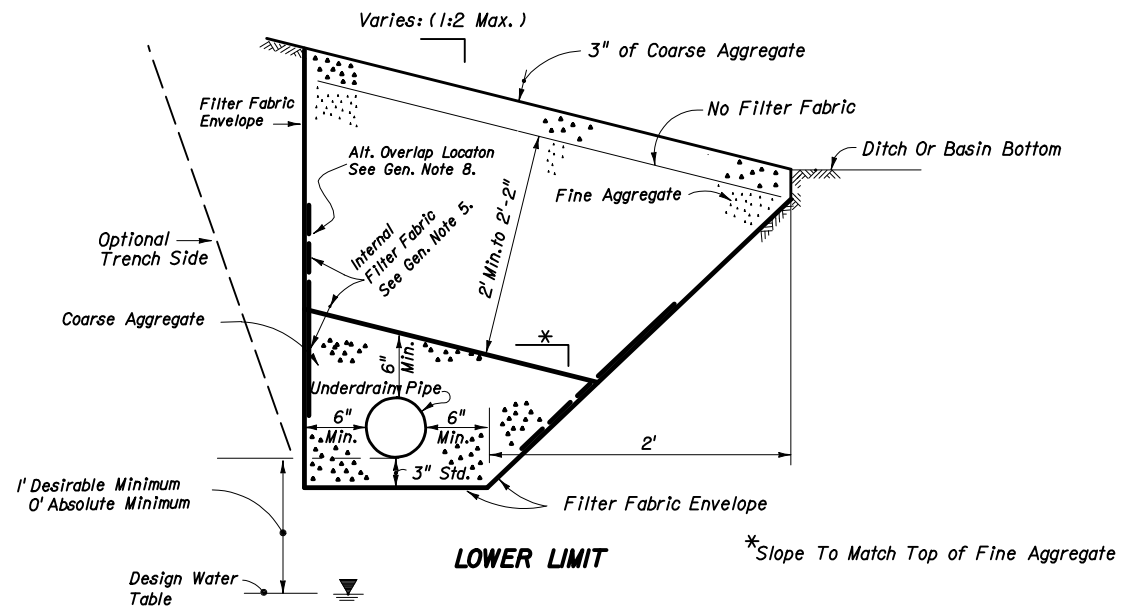


**UPPER LIMIT**

\* Slope To Match Top of Fine Aggregate



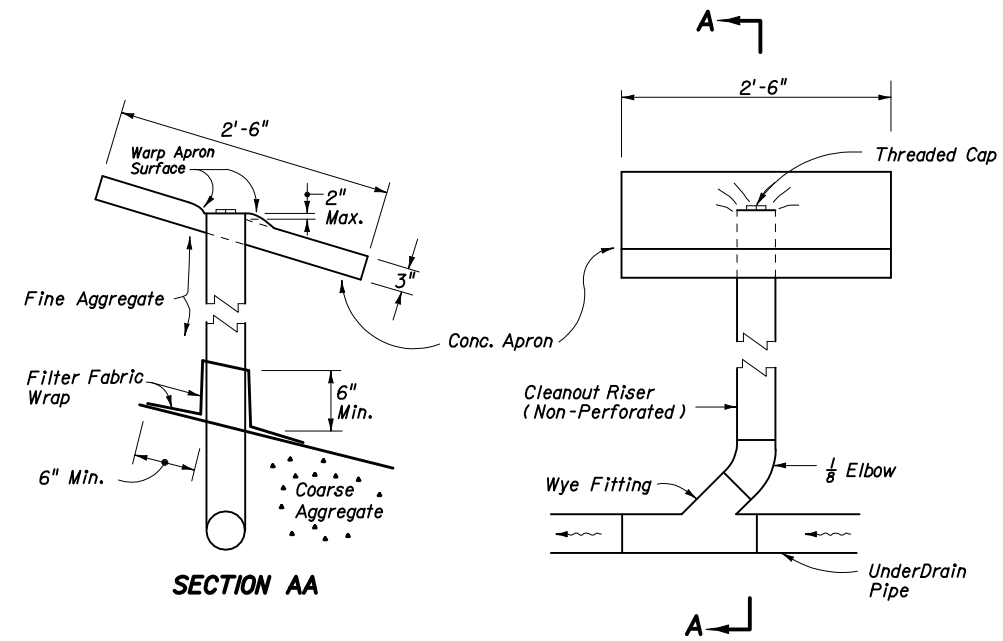
**TYPE V b**



**LOWER LIMIT**

\* Slope To Match Top of Fine Aggregate

**TYPE V a**



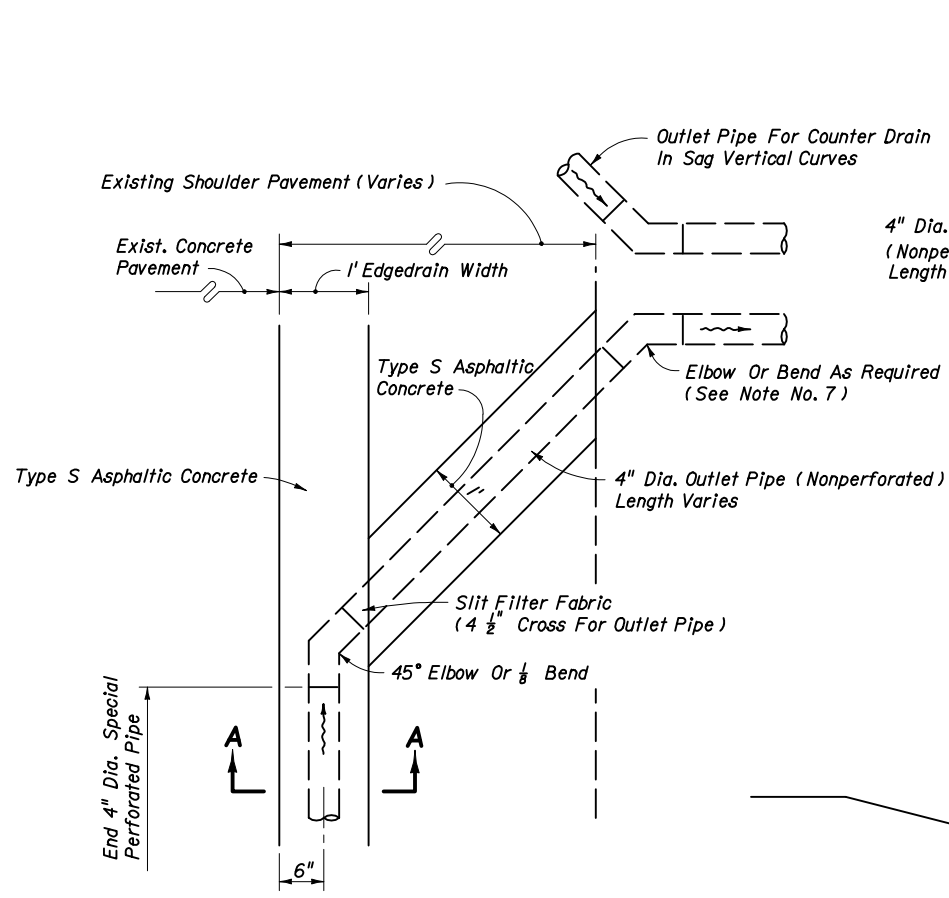
**SECTION AA**

**CLEANOUT FOR TYPE V UNDERDRAIN**

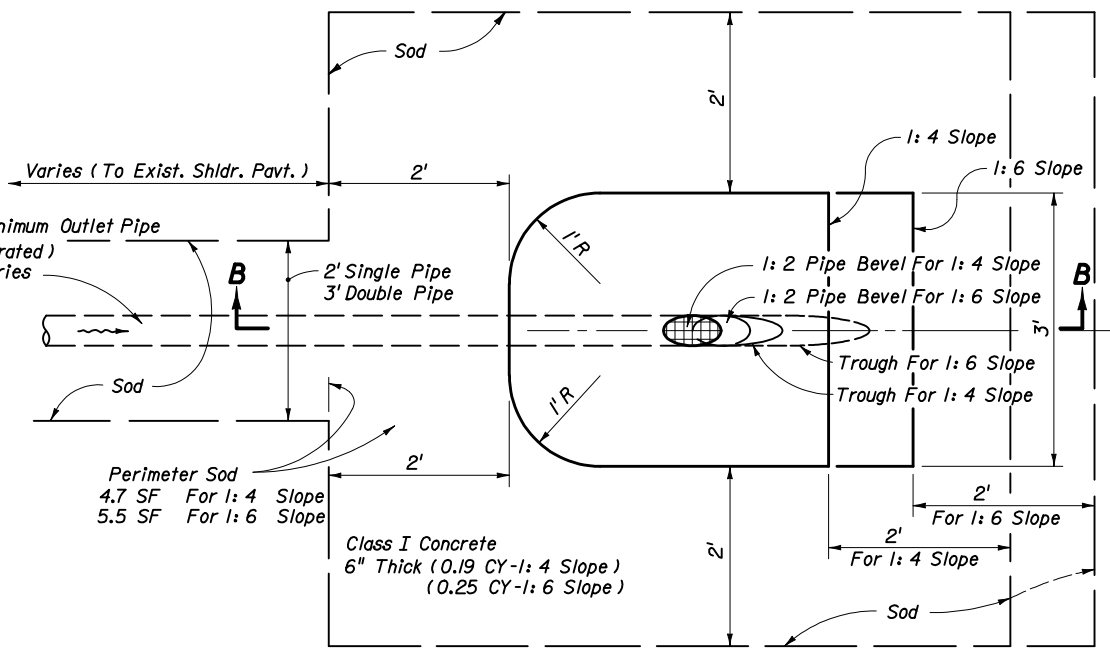
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>UNDERDRAIN</b>				
Designed By	Names	Dates	Approved By <i>S. A. McHenry</i>	
Drawn By	JDT		Revision	Sheet No. Index No.
Checked By			02	2 of 2 286

**GENERAL NOTES FOR CONCRETE PAVEMENT SUBDRAINAGE**

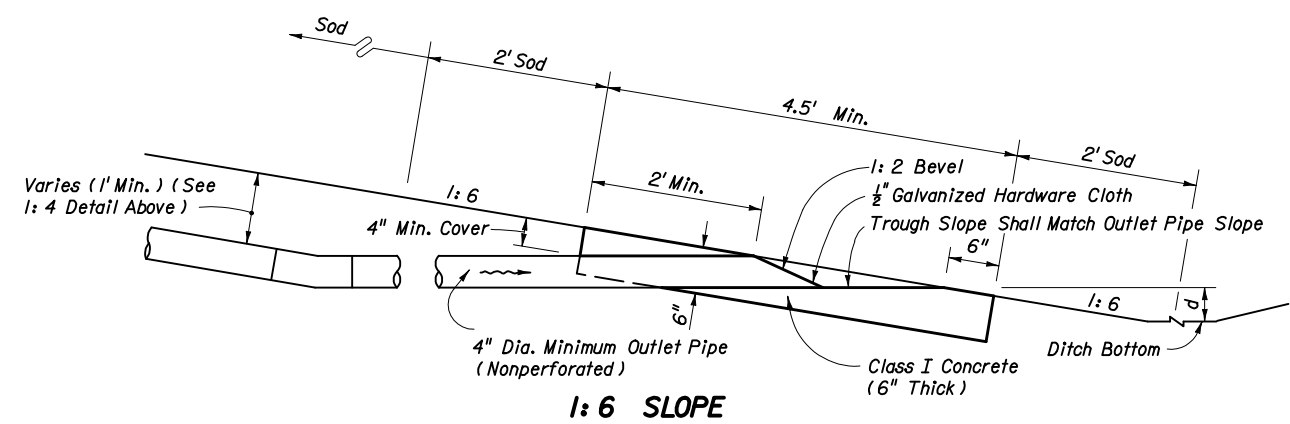
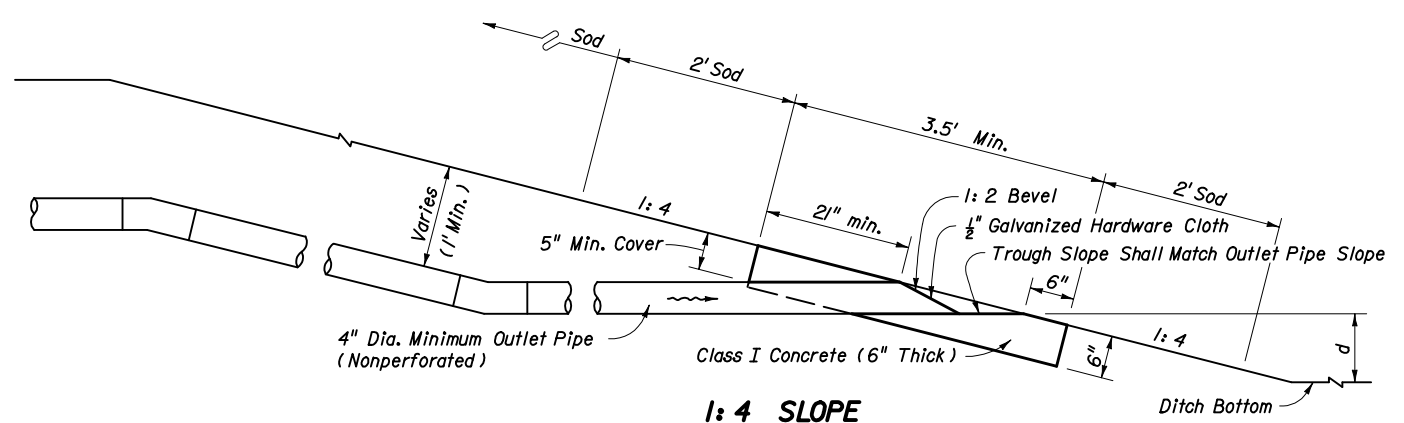
- No trench greater than 2' in depth will be allowed overnight. Trenches shall be barricaded at all times.
- Concrete pavement subdrainage shall be constructed adjacent to the low edge of the roadway pavement and under travel lanes, auxiliary pavement and shoulders, as called for in the plans. When the low edge shifts between outside and inside edges of pavement the concrete pavement subdrainage shall extend 50' beyond and begin 50' before the flat point (100' overlap).  
Concrete pavement subdrainage shall be placed on the low side of ramps of crossroad terminals.
- Concrete pavement subdrainage shall be constructed on a grade parallel with the edge of pavement profile, except on profiles flatter than one-tenth percent (0.10%) the concrete pavement subdrainage 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 the concrete pavement subdrainage pipe shall be capped.
- Outlet pipes shall be constructed at a maximum of 500' intervals. Elbows or  $\frac{1}{4}$  bends shall be used to connect the outlet pipe to the concrete pavement subdrain pipe. The elbows or bends shall be of the same material as the outlet pipe but compatible with the pipe.  
When directed by the Engineer, outlet pipes shall be stubbed into existing inlets or into existing ditch pavements at an elevation 6" 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 concrete pavement subdrains 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 LB per SY.
- The contract unit price for Edgedrain Outlet Pipe (4") LF, shall be full compensation for removal of existing shoulder pavement, trench excavation, pipe and fittings, concrete apron, hardware cloth, sod, stubbing into existing inlets and paved ditches, restoration of ditch pavement, backfill in place, and disposal of excess materials.



**ALIGNMENT OF OUTLET PIPE**



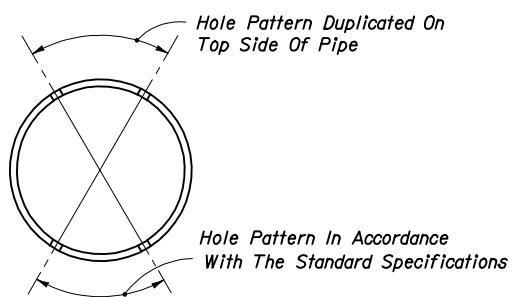
**PLAN - OUTLET PIPE APRON**



**SECTIONS BB**

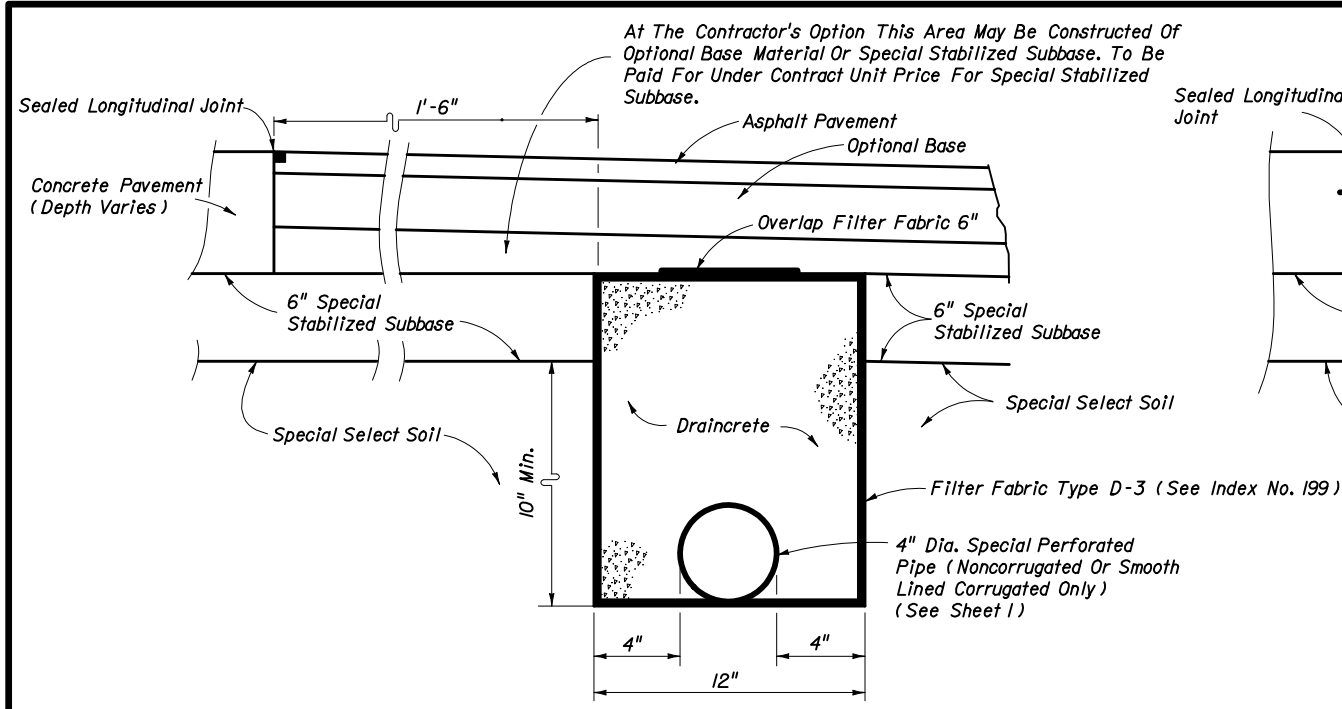
d 1.75' std. for grassed ditches  
0.5' std. for paved ditches [less is acceptable to provide minimum 0.1% outlet pipe slope]

**4" EDGEDRAIN EDGEDRAIN OUTLET**

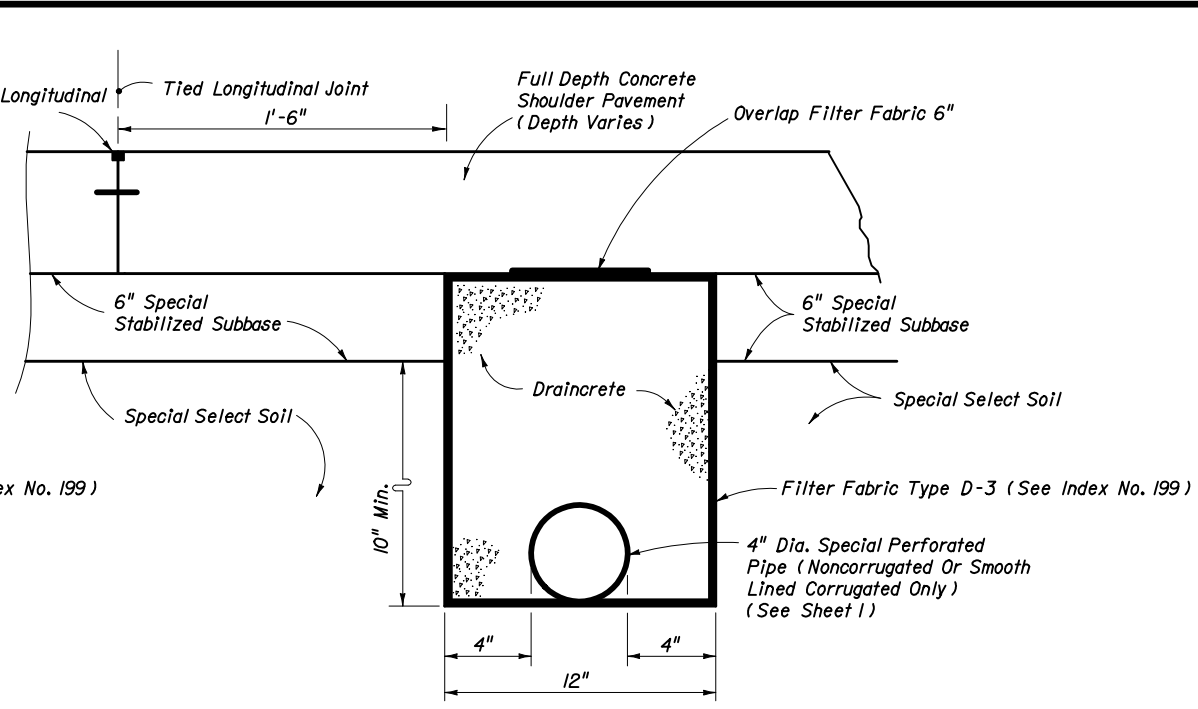


**HOLE PATTERN SUBDRAINAGE PIPE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE PAVEMENT SUBDRAINAGE</b>				
Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By HMD	10/94	State Drainage Engineer		
Drawn By DLD	10/94	Revision	Sheet No.	Index No.
Checked By HMD/WPH	10/94	00	1 of 3	287



**ASPHALT SHOULDERS**



**CONCRETE TRAVEL LANES, SHOULDERS, AND AUXILIARY PAVEMENT**

**NEW CONSTRUCTION**

**NOTES FOR DRAINCRETE PAVEMENT SUBDRAINAGE**

1. The edgedrain sections for DRAINCRETE SUBDRAINAGE are applicable to pavement construction identified as RIGID PAVEMENT Alternate #1 on Index No. 505 (sheet 2 of 3)
2. The contractor shall confine the construction of draincrete edgedrain 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 pavement.

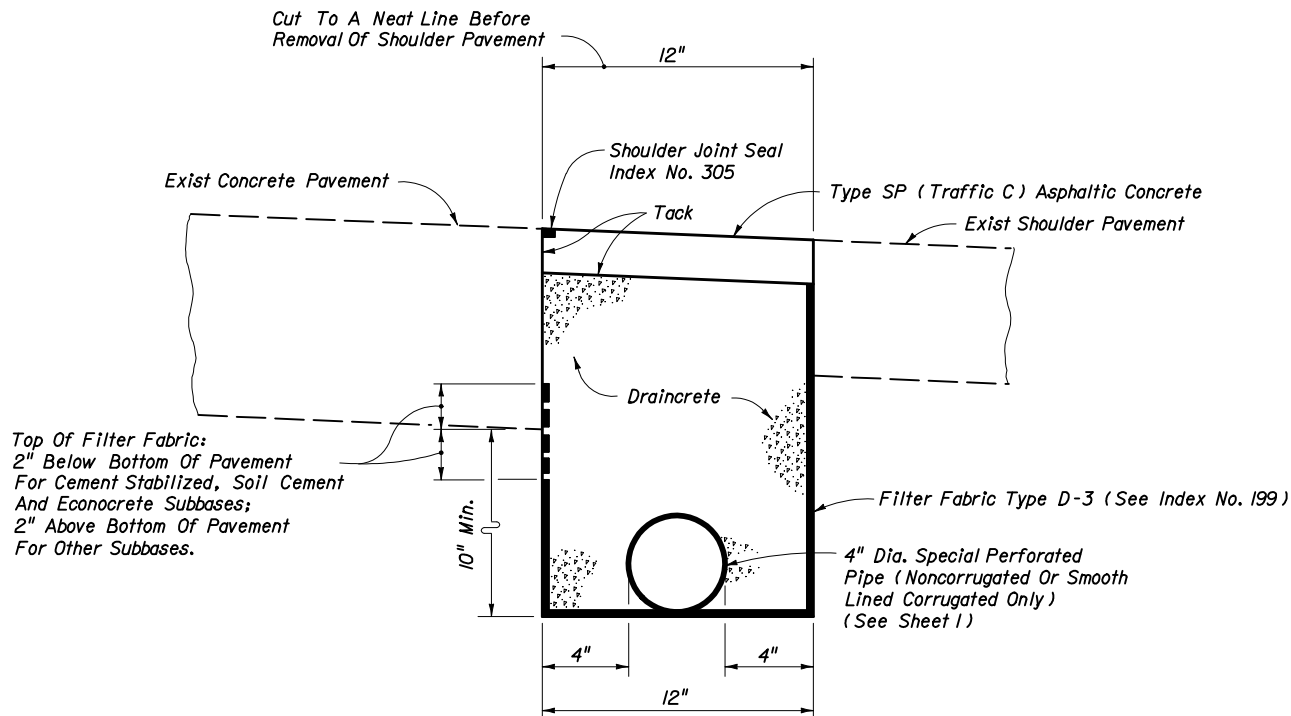
**METHOD OF PAYMENT**

**NEW CONSTRUCTION:**

1. The contract unit price for Edgedrain (Draincrete) LF shall be full compensation for trench excavation disposal of excess material, filter fabric, draincrete edgedrain pipe and fittings and draincrete.  
Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 3.

**FOR REHABILITATION:**

1. The contract unit price for Edgedrain (Draincrete) LF, shall be full compensation for removal of existing shoulder pavement, trench excavation, disposal of excess materials, filter fabric, draincrete edgedrain pipe and fittings, and draincrete, necessary for edgedrain construction.  
Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 3.  
Shoulder pavement shall be paid for under the contract unit price for Type SP, Asphaltic Concrete.  
Tack coat shall be paid for under the contract unit price for Bit Matl (Tack Coat), GA.  
Shoulder joint seal shall be paid for under the contract unit price for Pavement Joint or, LF.

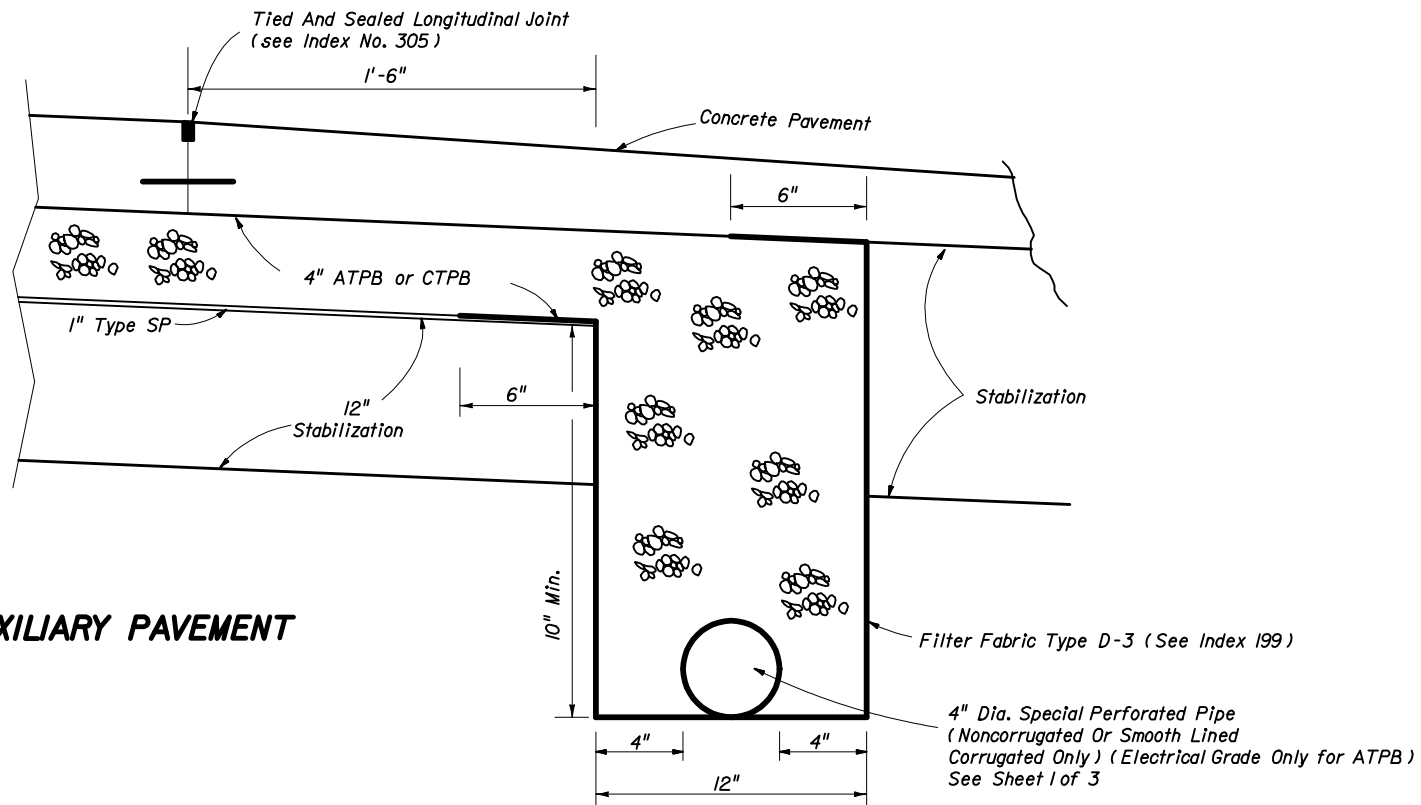
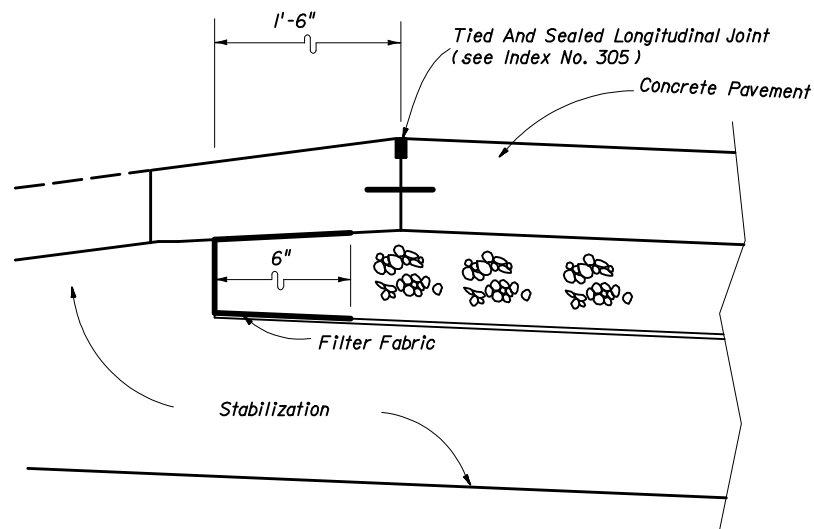


**REHABILITATION**

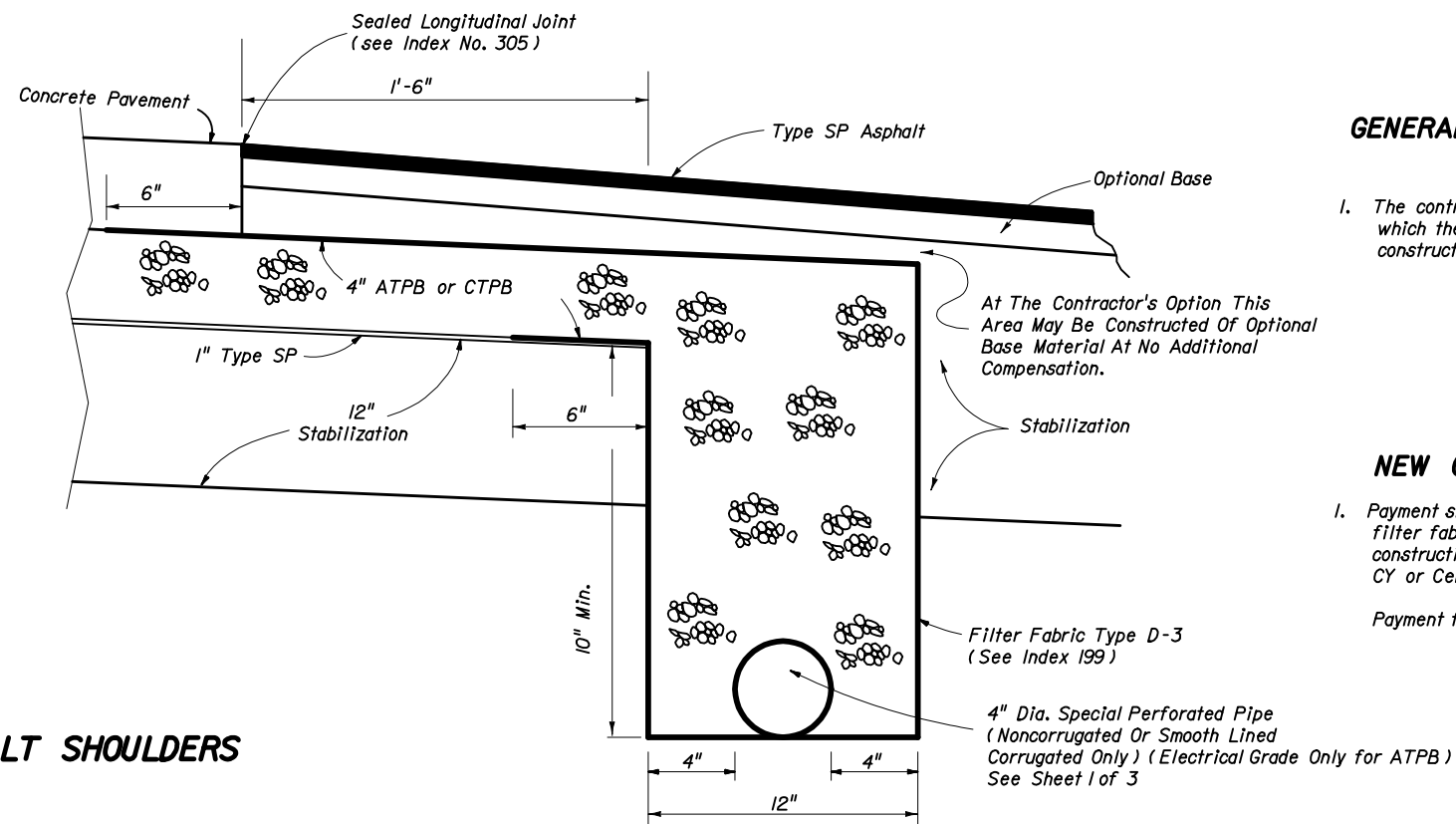
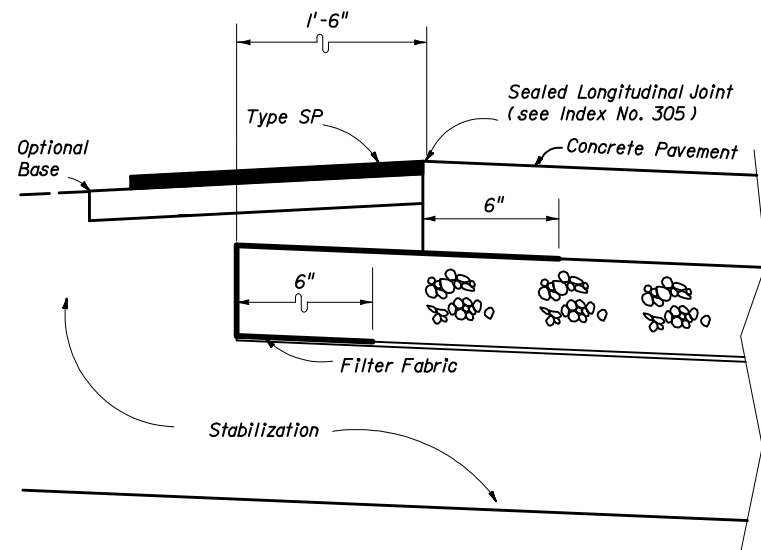
**DRAINCRETE SUBDRAINAGE**

Not to scale

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE PAVEMENT SUBDRAINAGE</b>				
Designed By	HMD	10/94	Approved By <i>S. A. McHenry</i> State Drainage Engineer	
Drawn By	DLD	10/94	Revision	Sheet No. Index No.
Checked By	HMD/WPH	10/94	02	2 of 3 287



**CONCRETE TRAVEL LANE, SHOULDERS, AND AUXILIARY PAVEMENT**



**ASPHALT SHOULDERS**

**TREATED PERMEABLE BASE SUBDRAINAGE**

**GENERAL NOTES FOR TREATED PERMEABLE BASE EDGEDRAIN (NEW CONSTRUCTION)**

- The contractor shall confine the construction of monolithic edgedrain to an area in which the entire operation can be carried out in (5) work days, unless another construction period is called for the plans.

**METHOD OF PAYMENT**

**NEW CONSTRUCTION**

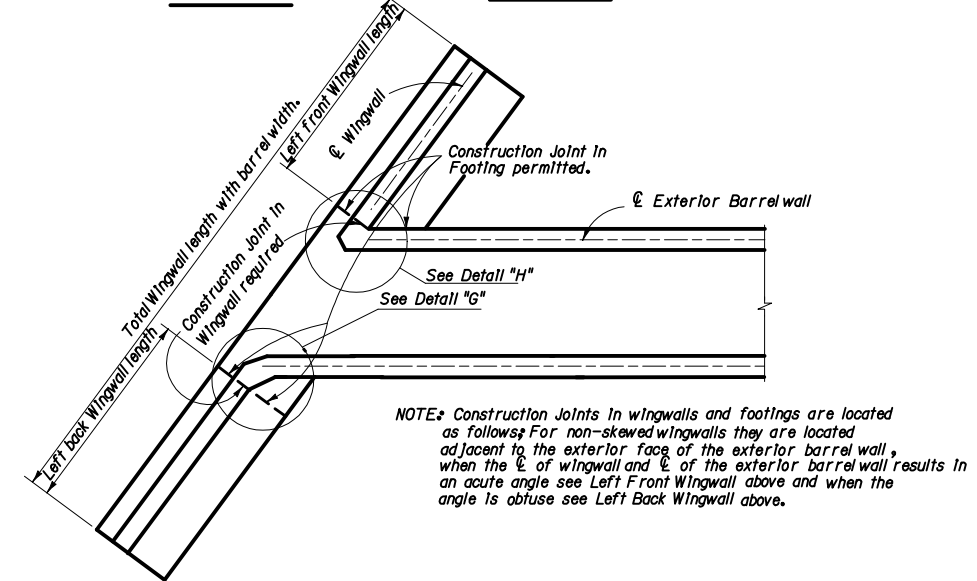
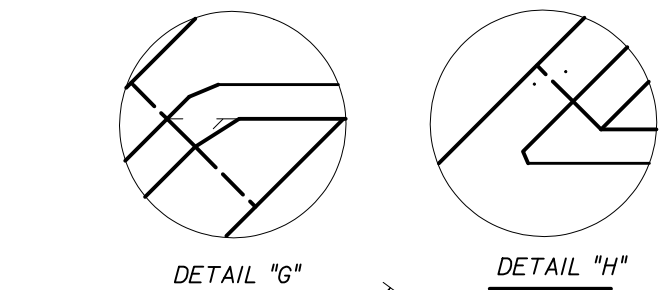
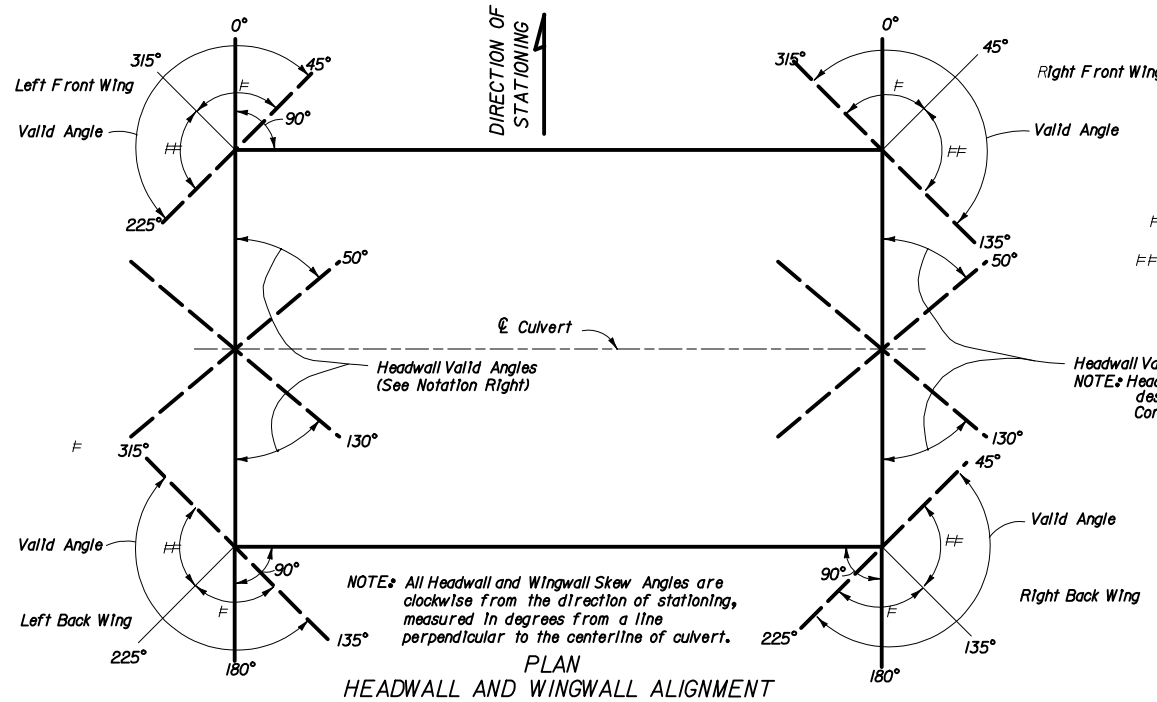
- Payment shall be full compensation for trench excavation, disposal of excess materials, filter fabric, pipe and fittings, necessary for concrete pavement subdrainage construction. Payment shall be included in the cost for Asphalt Treated Permeable Base, CY or Cement Treated Permeable Base, CY.

Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 3.

Not To Scale

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE PAVEMENT SUBDRAINAGE</b>				
Names	Dates	Approved By		
Designed By	HMD	10/94	 State Drainage Engineer	
Drawn By	DLD	10/94		
Checked By	HMD/WPH	10/94	Revision	02
			Sheet No.	3 of 3
			Index No.	287





PART PLAN SHOWING WINGWALLS AND THE LOCATION OF CONSTRUCTION JOINTS

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 barrel(s) as shown in the roadway plans. It is the construction Contractor's responsibility to provide for supporting construction loads that exceed the above loadings.

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

Headwall Valid Angles  
 NOTE: Headwalls with skew angles between 5° and 129° require special design authorization. Other design options should be considered. Contact the District Drainage Engineer to obtain authorization.

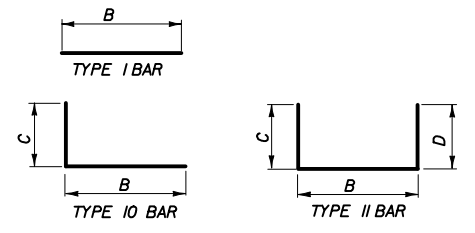
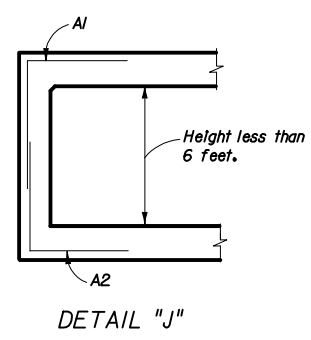
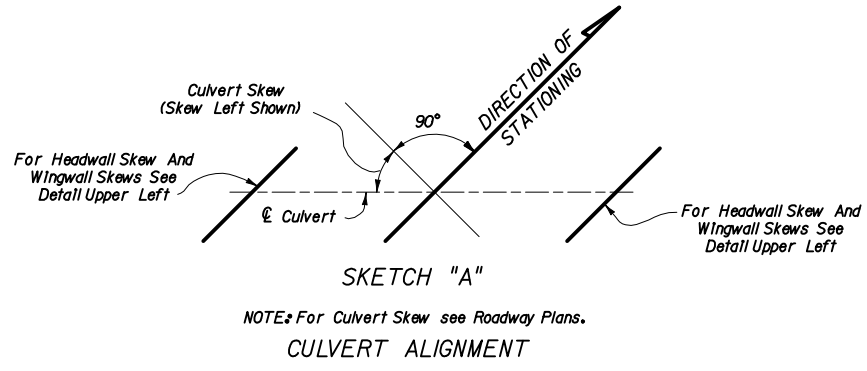
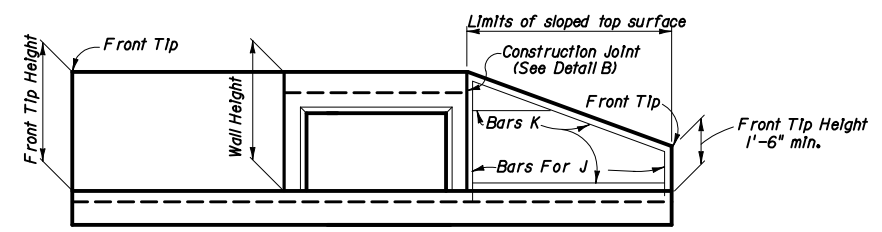


TABLE OF MINIMUM BAR SPLICE LENGTHS

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



END ELEVATION OF CULVERT

NOTE: Cut the vertical bars Fas 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.

GENERAL NOTES

- DESIGN SPECIFICATIONS: A.A.S.H.T.O. 1996.
- LOADING: HS20-44, Modified for Military Loading as Required or HS25, see Structures Design Guidelines.
- 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 table (lower right) this sheet. The cost of construction joints shall be at the expense of the contractor.
- CULVERT EXTENSIONS: For cut backs and ties into existing concrete box culverts see Index No. 280.

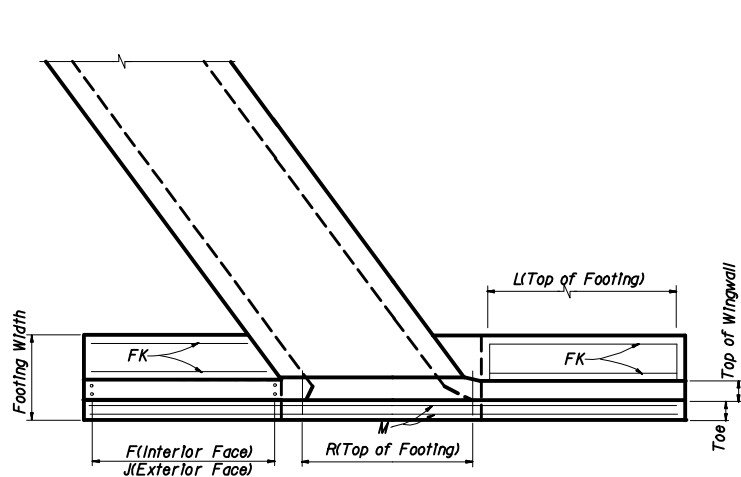
\* REINFORCING BAR SCHEDULE:

- A. 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.
- B. 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.
- C. When the barrel height is less than 6 feet, Bars B2 will be eliminated as shown in Detail J.
- D. If the span is less than five feet, Bars A1 and A2 will be Type II Bars.
- E. The portions of Bars "N" that extend thru construction joints into wingwalls above footings shall be given one coat of approved zinc rich paint and shall be encased in approved capped plastic (PVC) pipes filled with approved durable lubricant or cut back asphalt. The length and inside diameter of the plastic pipe shall be approximately 1/4" larger than those of the bar.
- F. For culvert extensions Bar C1 is redesignated Bar C3 in the bottom slab.

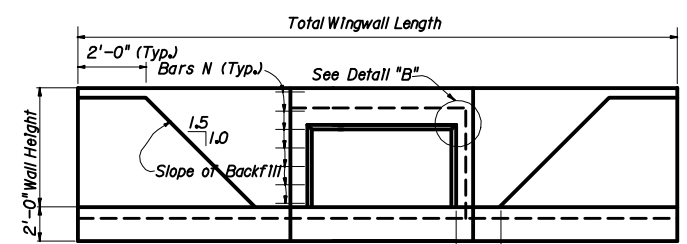
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONCRETE BOX CULVERT  
 CULVERT DETAILS

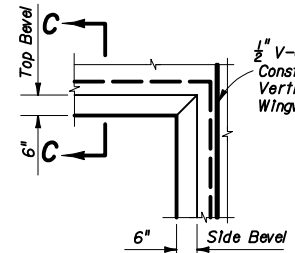
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Designed By		J. A. McHenry State Drainage Engineer	Revision	Sheet No.
Drawn By	GFG 1-86		00	1 of 5
Checked By	RCB 1-86			Index No. 290



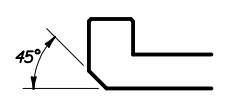
PART PLAN AT END OF CULVERT



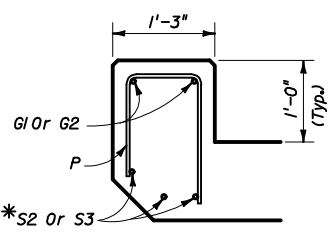
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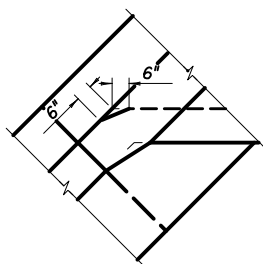
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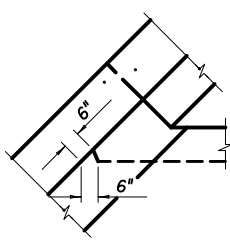
SECTION C-C



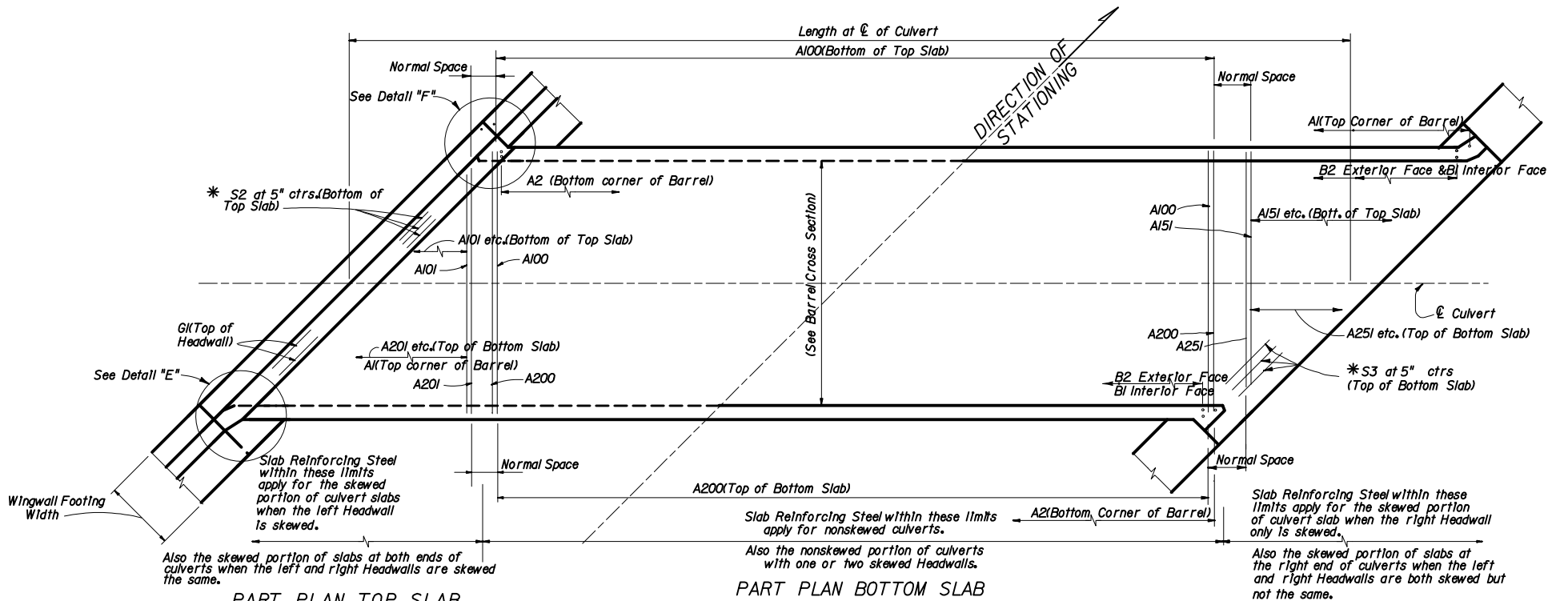
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DETAIL "E"

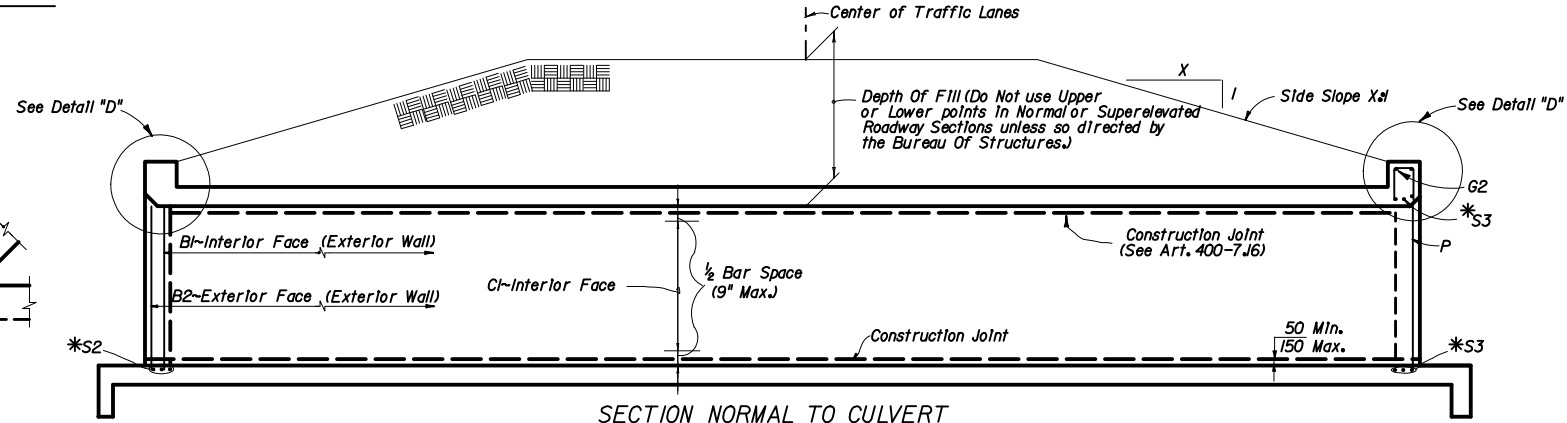


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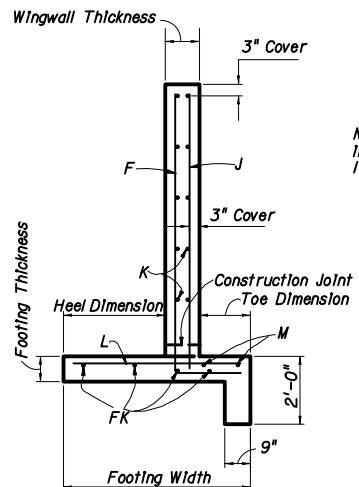


PART PLAN TOP SLAB

PART PLAN BOTTOM SLAB

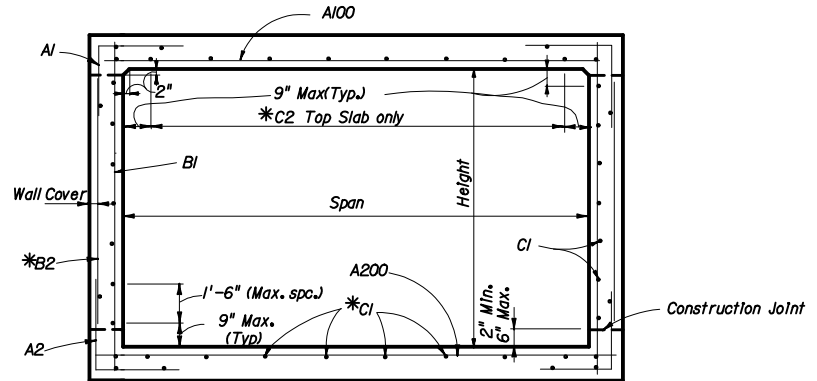


SECTION NORMAL TO CULVERT



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

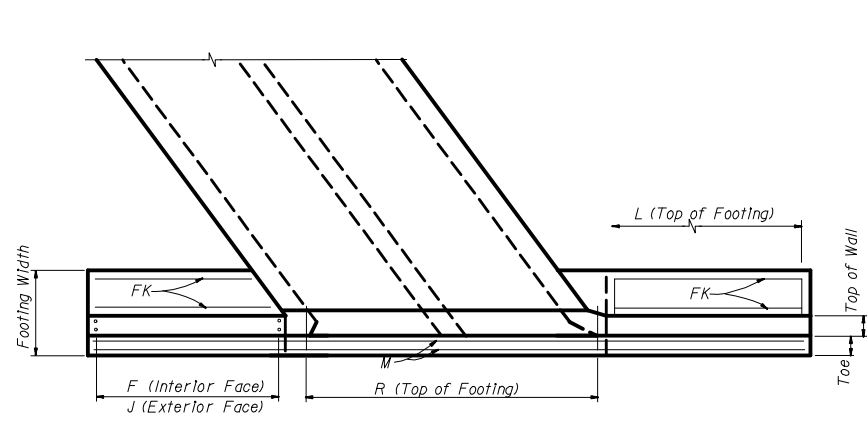


SECTION THRU BARREL

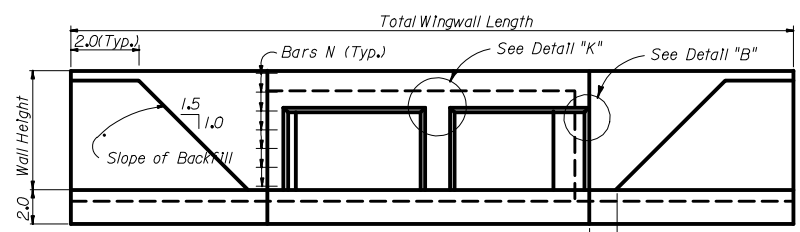
NOTE: The location of the first bar from the ends of the culvert shall not be less than 3", but not greater than one half the bar spacing.

\* See Culvert Details and Reinforcing Bar Schedule, Sheet 1 of 5

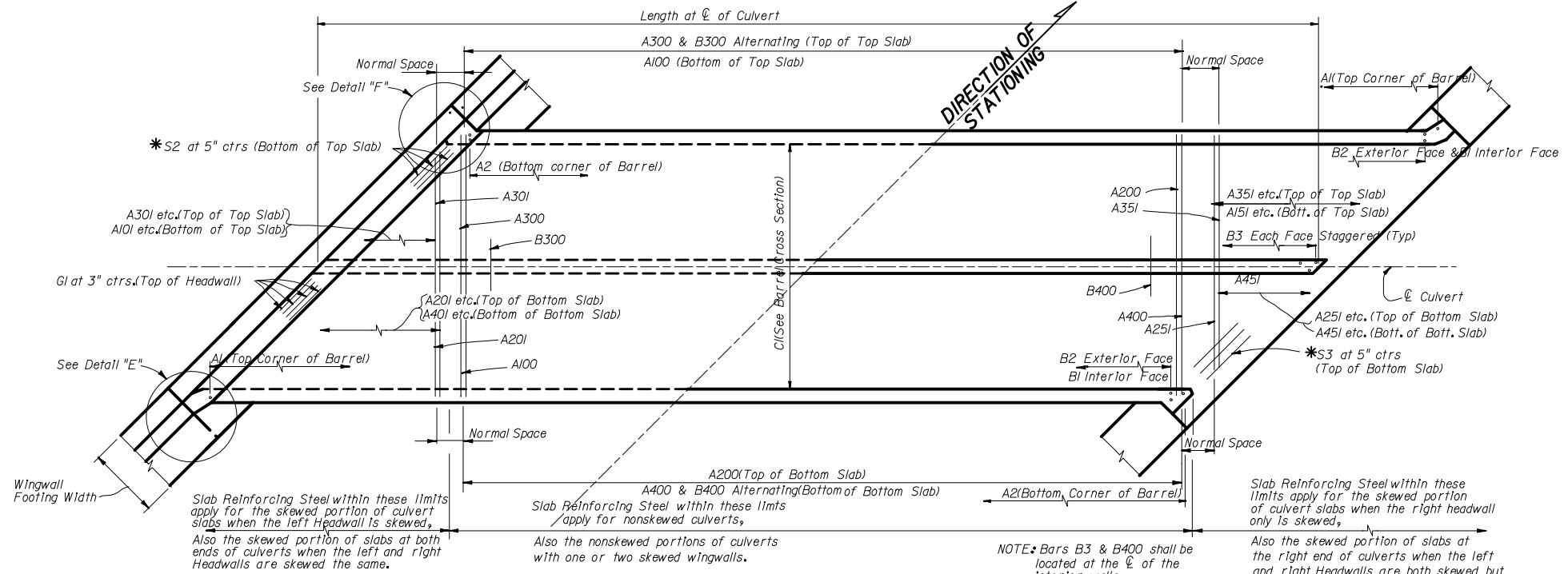
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CONCRETE BOX CULVERT SINGLE BARREL				
Names	Dates	Approved By		
Designed By		S. A. McHenry State Drainage Engineer		
Drawn By	GFG 1-86			
Checked By	RCB 1-86	Revision	00	Sheet No. 2 of 5
				Index No. 290



PART PLAN AT END OF CULVERT

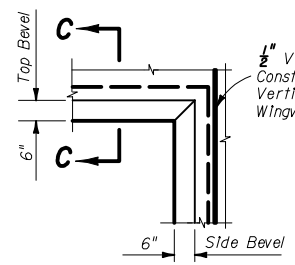


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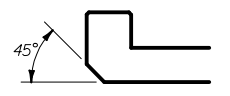


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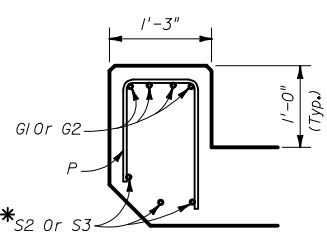
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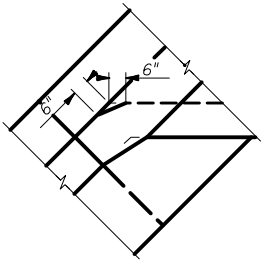
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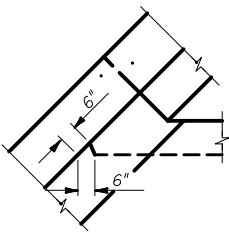
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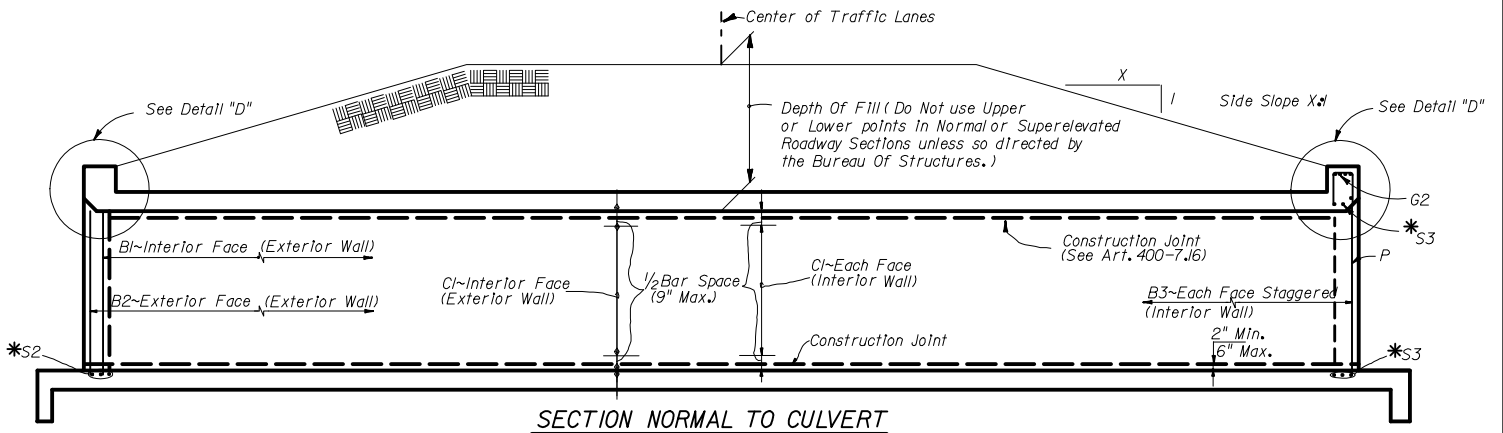
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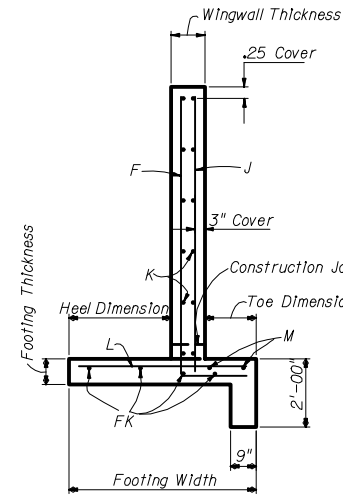
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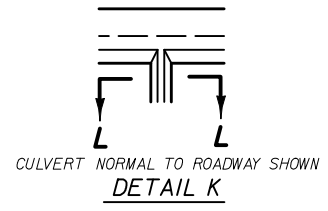
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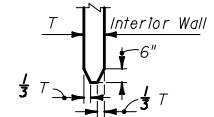
SECTION NORMAL TO CULVERT



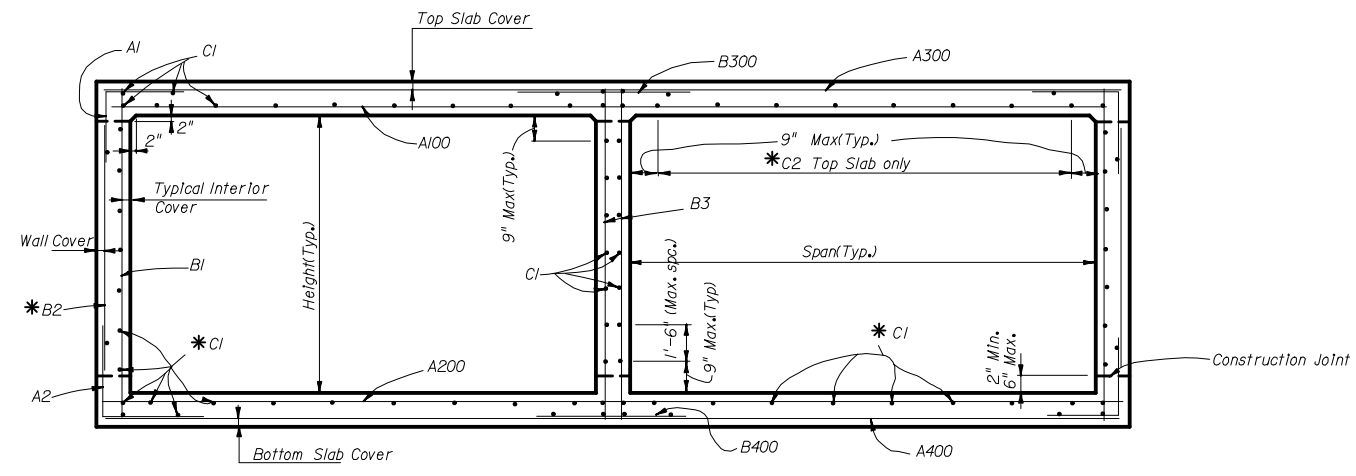
SECTION THRU WINGWALL



DETAIL K



SECTION LL

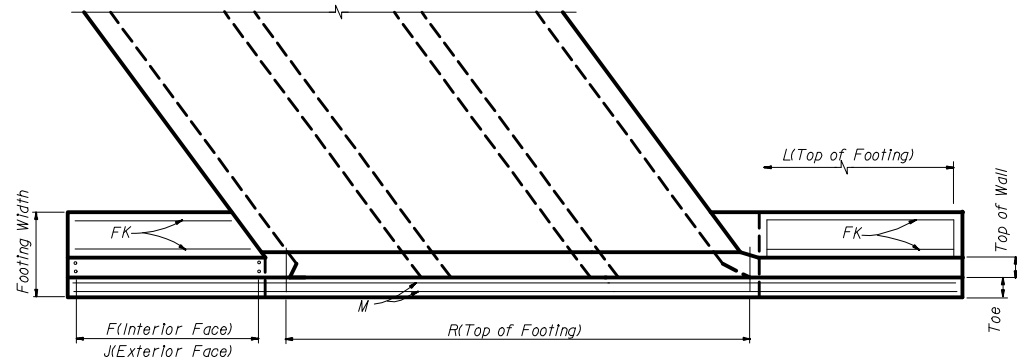


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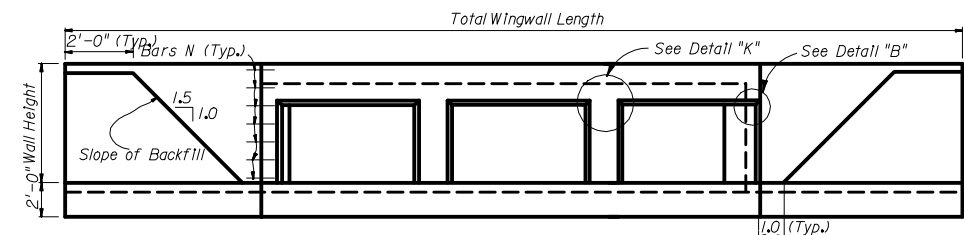
NOTE: The location of the first bar from the ends of the culvert shall not be less than .25, but not greater than one half the bar spacing.

\* See Culvert Details and Reinforcing Bar Schedule, Sheet 1 of 5

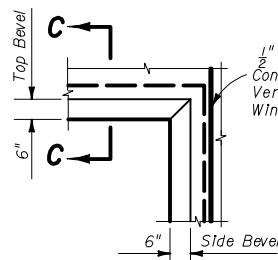
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DOUBLE BARREL				
Names	Dates	Approved By		
Designed By		S. A. McHenry		
Drawn By	GFG	1-86	Revision	Sheet No.
Checked By	RCB	1-86	00	3 of 5
				Index No.
				290



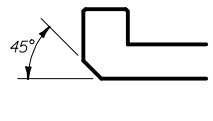
PART PLAN AT END OF CULVERT



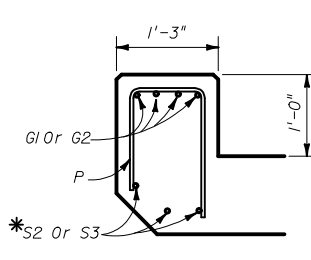
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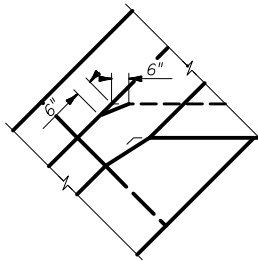
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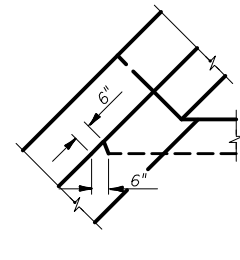
SECTION C-C



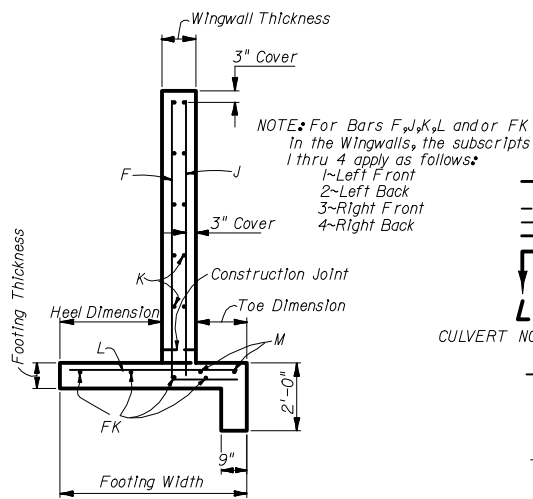
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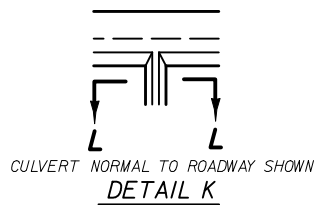
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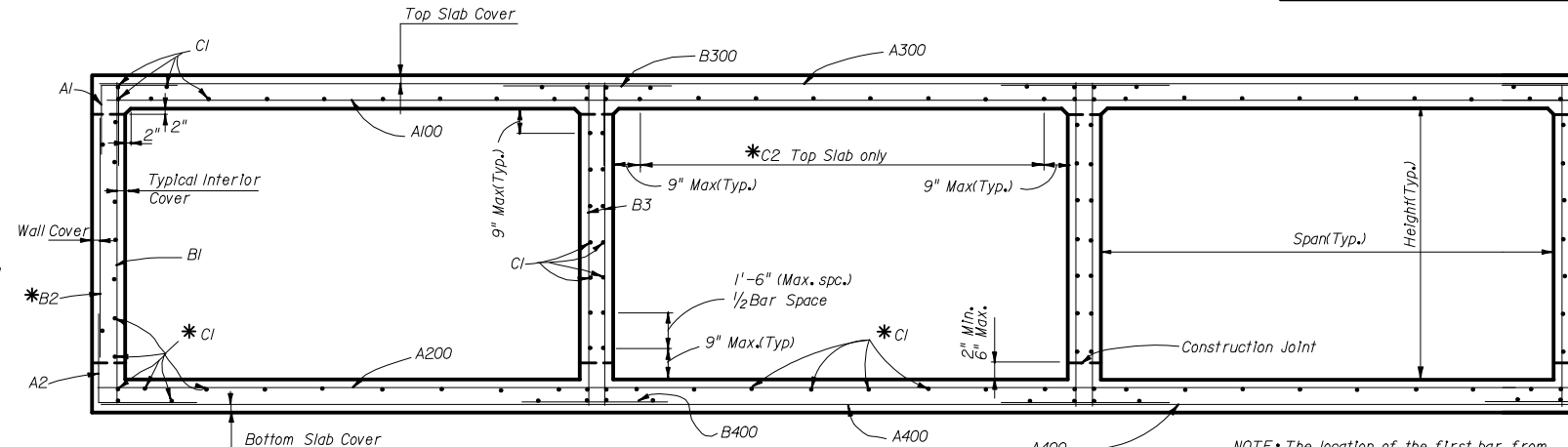
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SECTION THRU WINGWALL

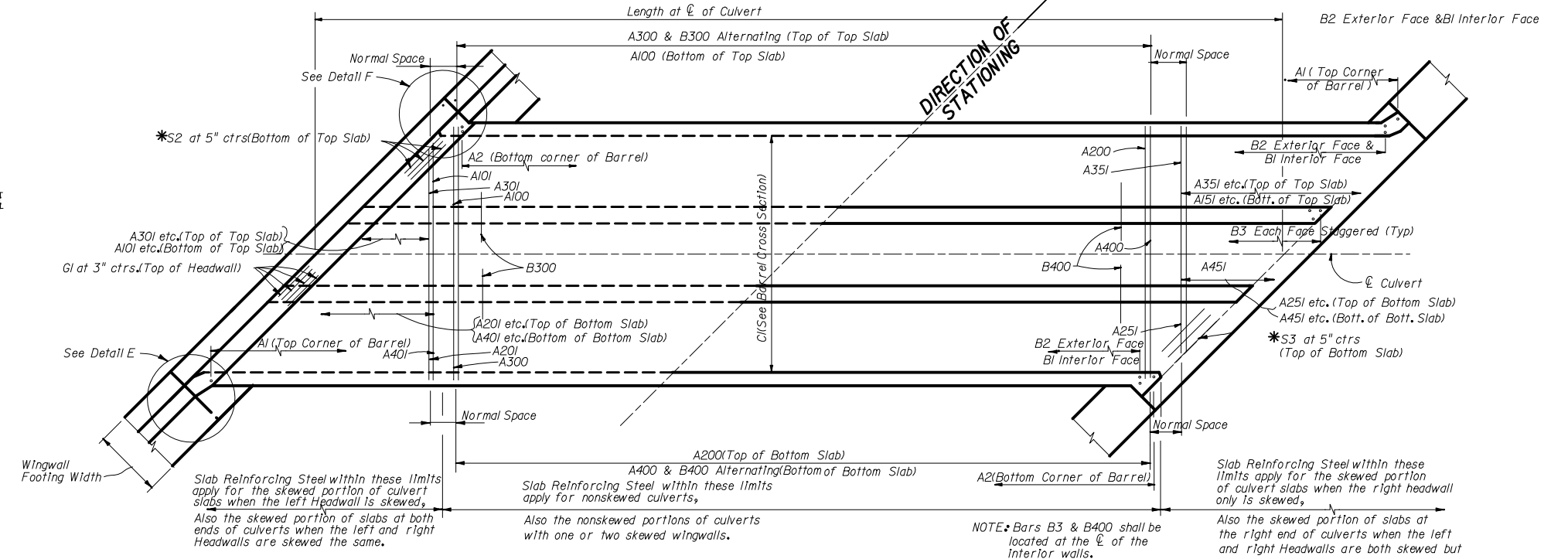


SECTION LL



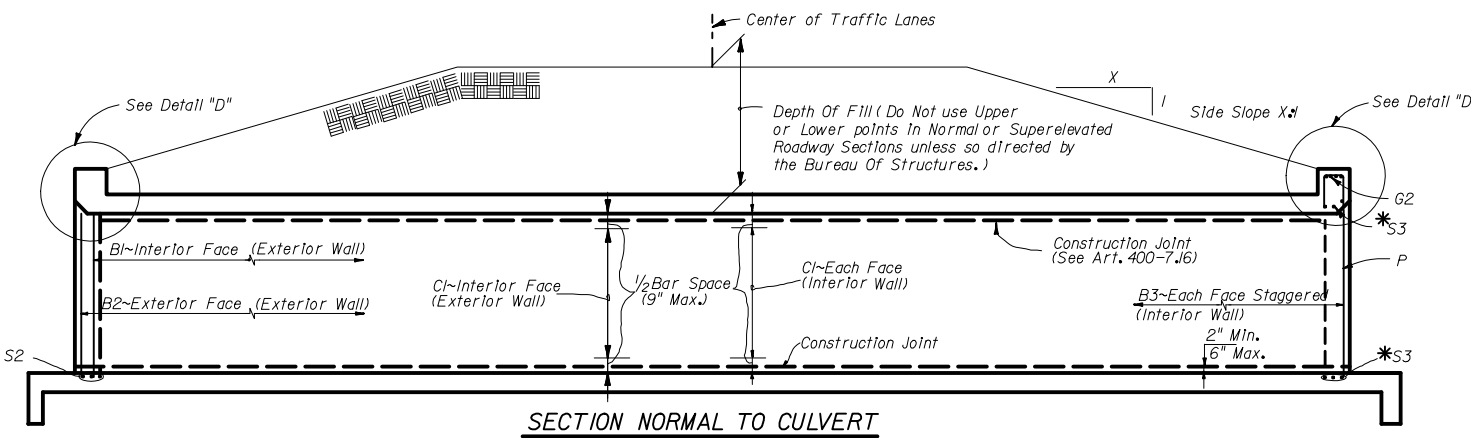
SECTION THRU BARREL

NOTE: The location of the first bar from the ends of the culvert shall not be less than 3", but not greater than one half the bar spacing.



PART PLAN TOP SLAB

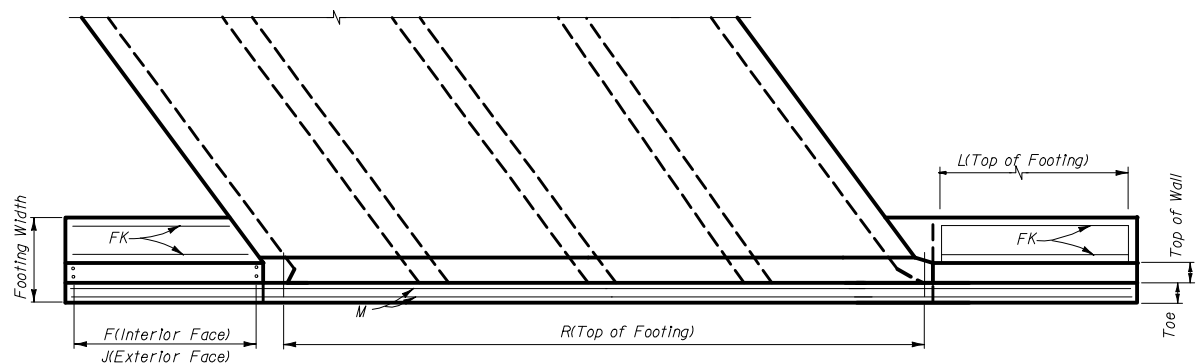
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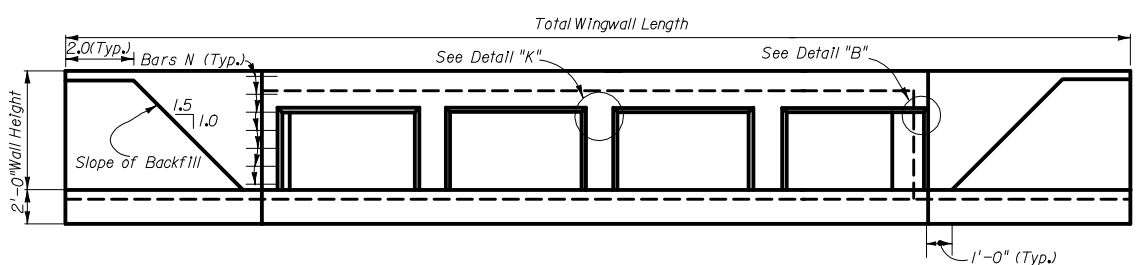
SECTION NORMAL TO CULVERT

\*See Culvert Details and Reinforcing Bar Schedule, Sheet 1 of 5

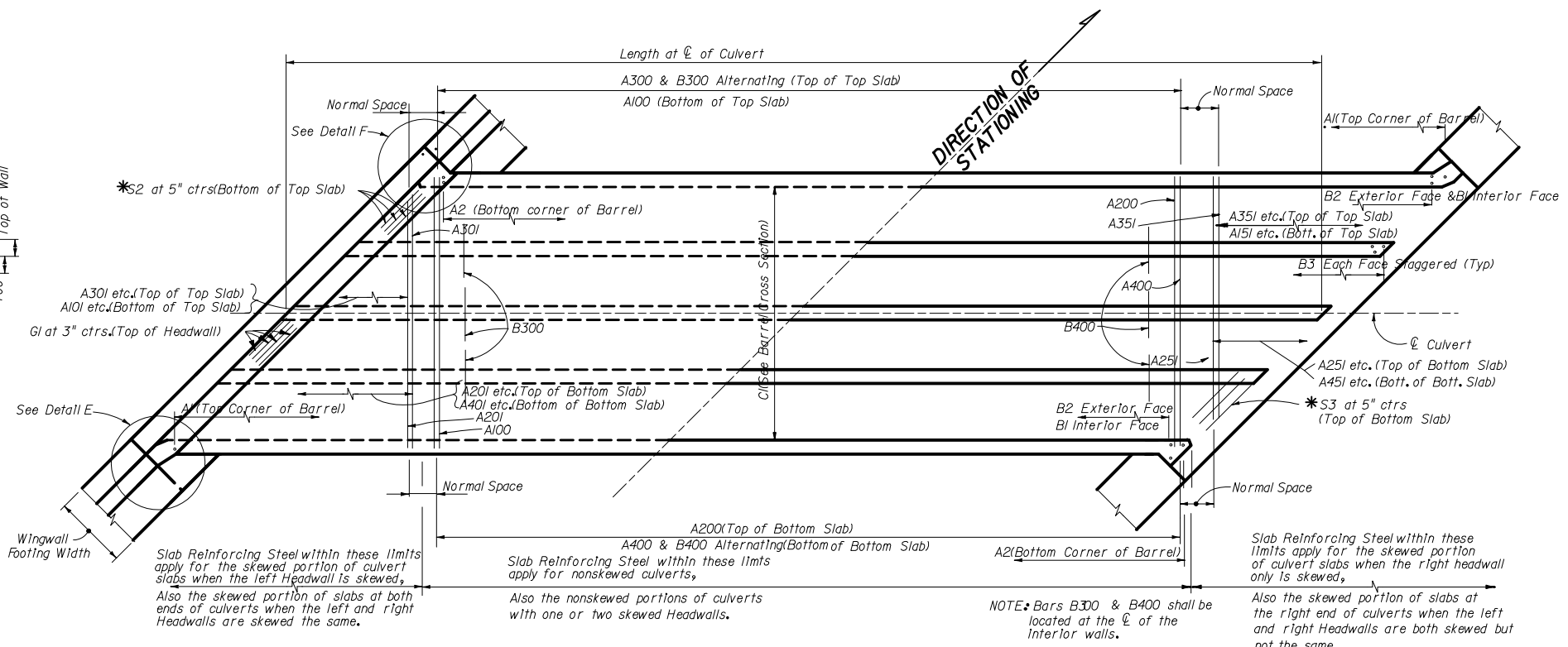
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Names	Dates	Approved By		
Designed By		S. A. McHenry		
Drawn By	GFC 1-86	Revision	Sheet No.	Index No.
Checked By	RCB 1-86	00	4 of 5	290



PART PLAN AT END OF CULVERT

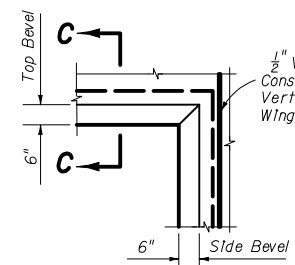


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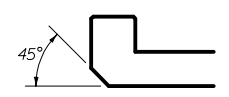


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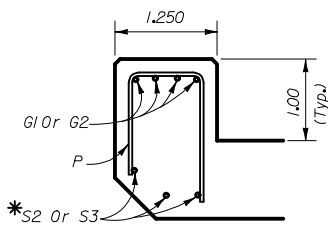
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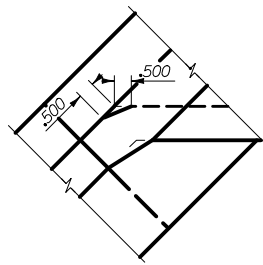
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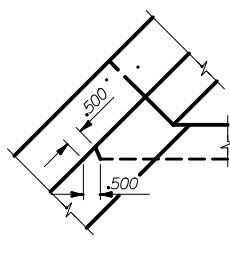
SECTION C-C



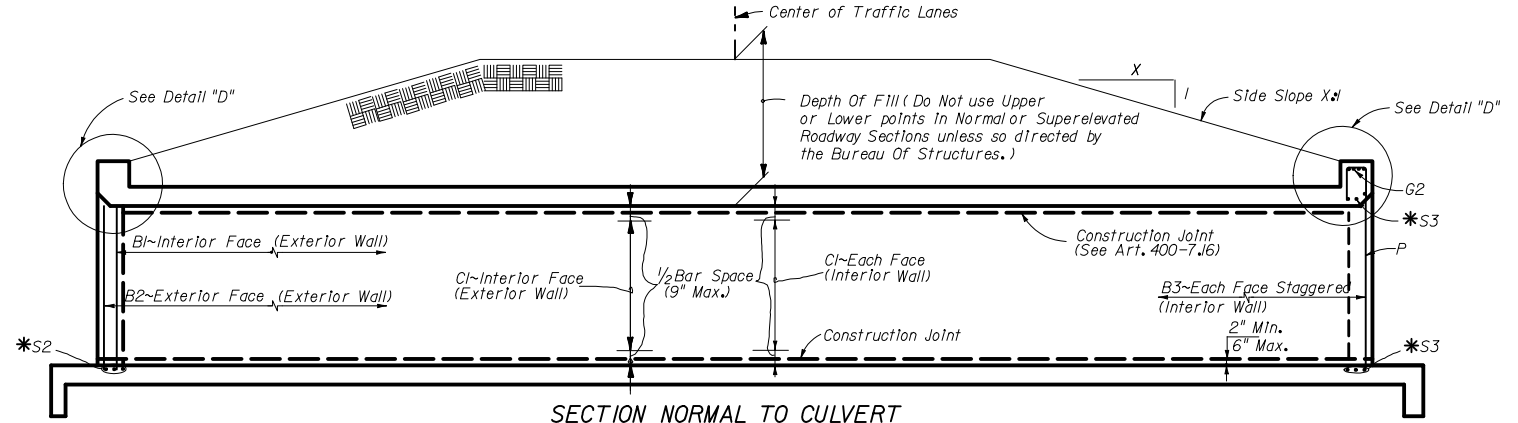
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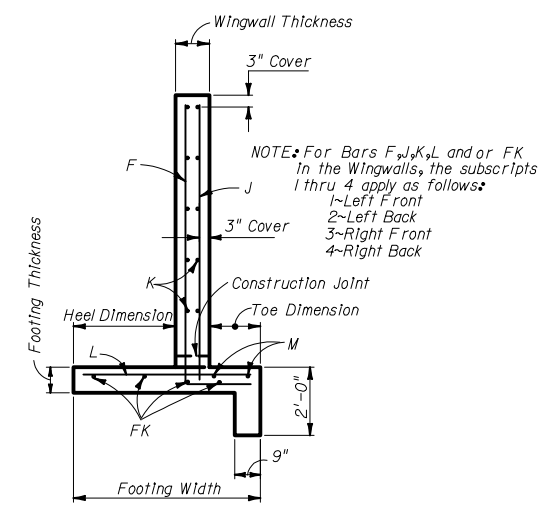
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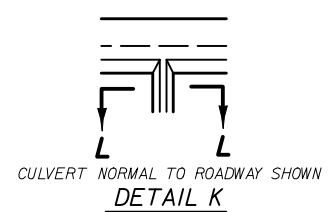
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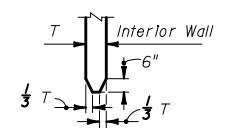
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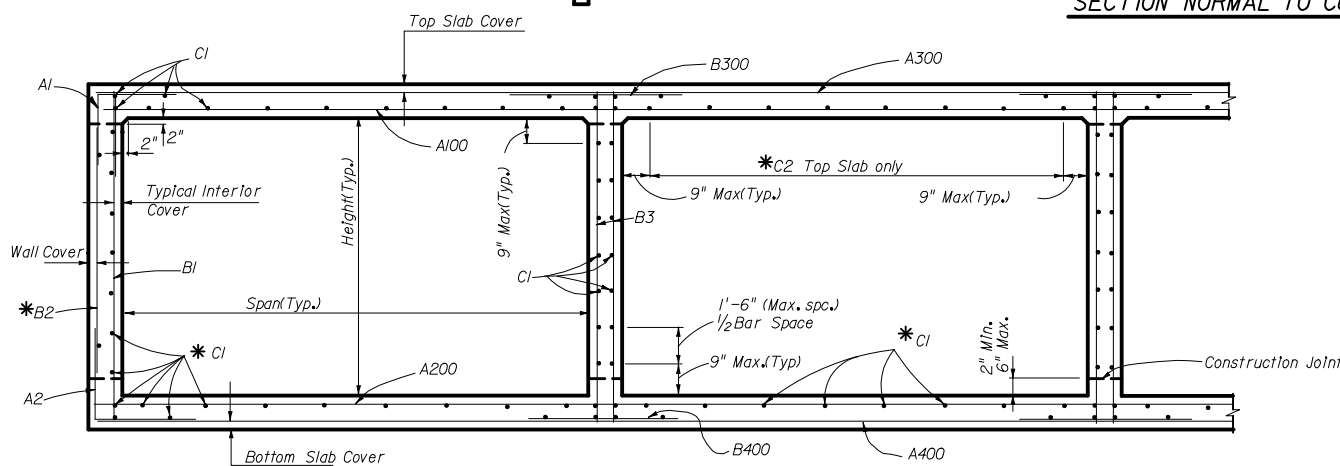
SECTION THRU WINGWALL



DETAIL K



SECTION LL

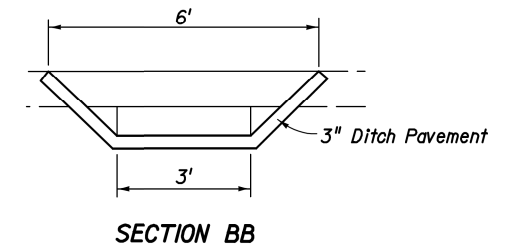
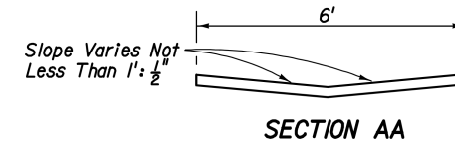
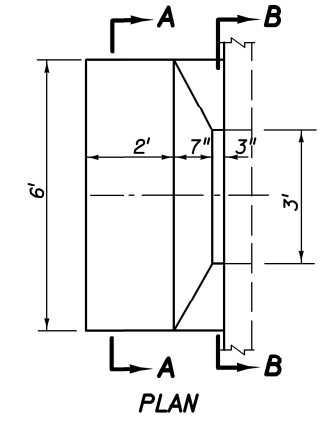
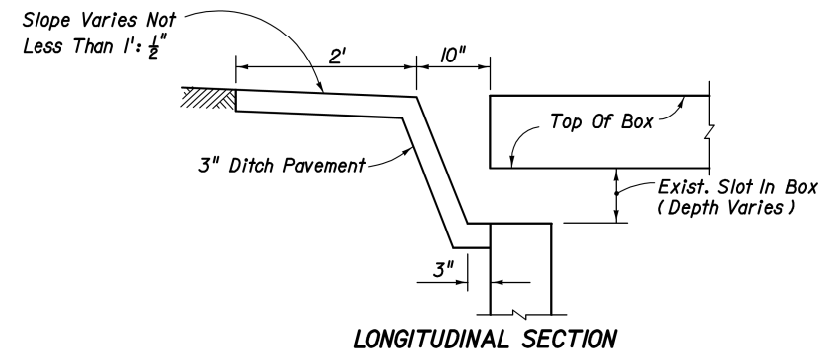


SECTION THRU BARREL

NOTE: The location of the first bar from the ends of the culvert shall not be less than 3', but not greater than one half the bar spacing.

\* See Culvert Details and Reinforcing Bar Schedule, Sheet 1 of 5

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BOX CULVERT QUADRUPLE BARREL</b>				
Designed By	Names	Dates	Approved By <i>S. A. McHenry</i>	
Drawn By	GFG	1-86	Revision	Sheet No. 5 of 5
Checked By	RCB	1-86	00	Index No. 290

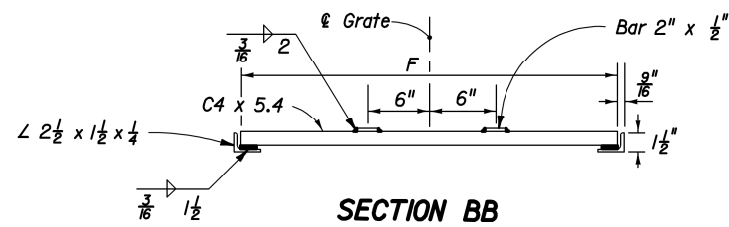
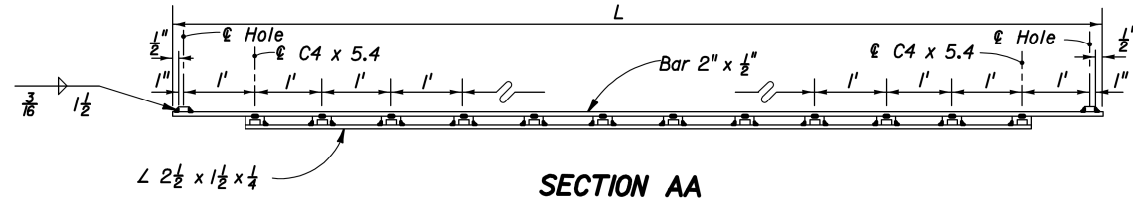
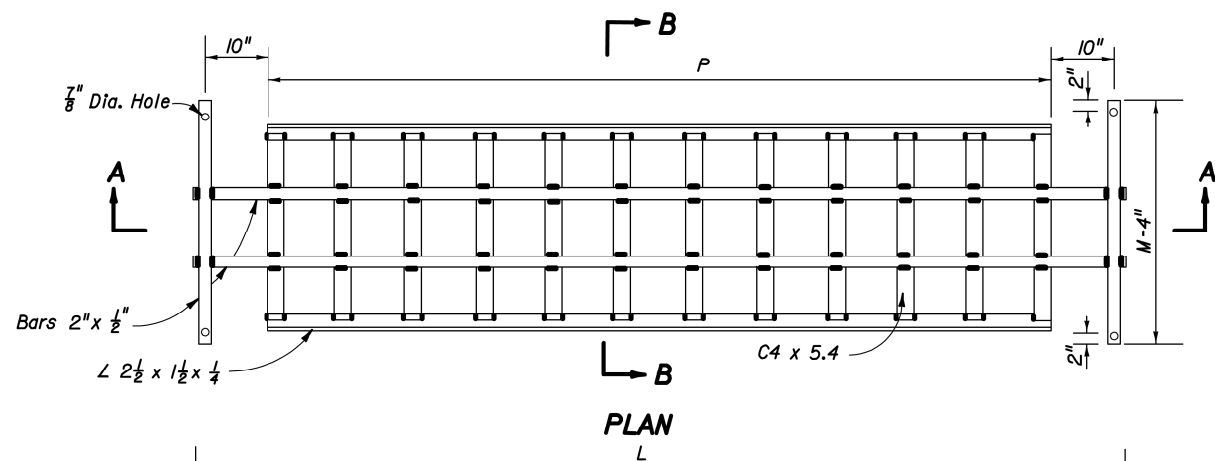


**SAFETY MODIFICATION FOR INLETS IN BOX CULVERTS**

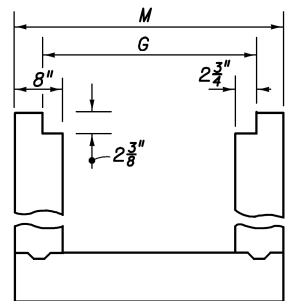
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SAFETY MODIFICATIONS  
FOR INLETS IN BOX CULVERTS**

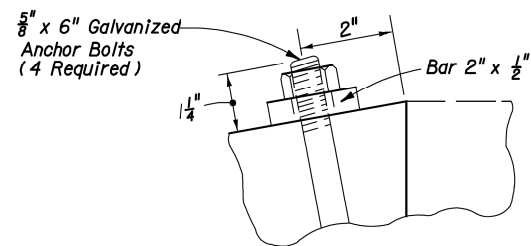
	Names	Dates	Approved By <i>S. A. McHenry</i>		
Designed By	HAB	07/67	State Drainage Engineer		
Drawn By	MJT	07/67	Revision	Sheet No.	Index No.
Checked By	DWS	07/67	00	1 of 1	293



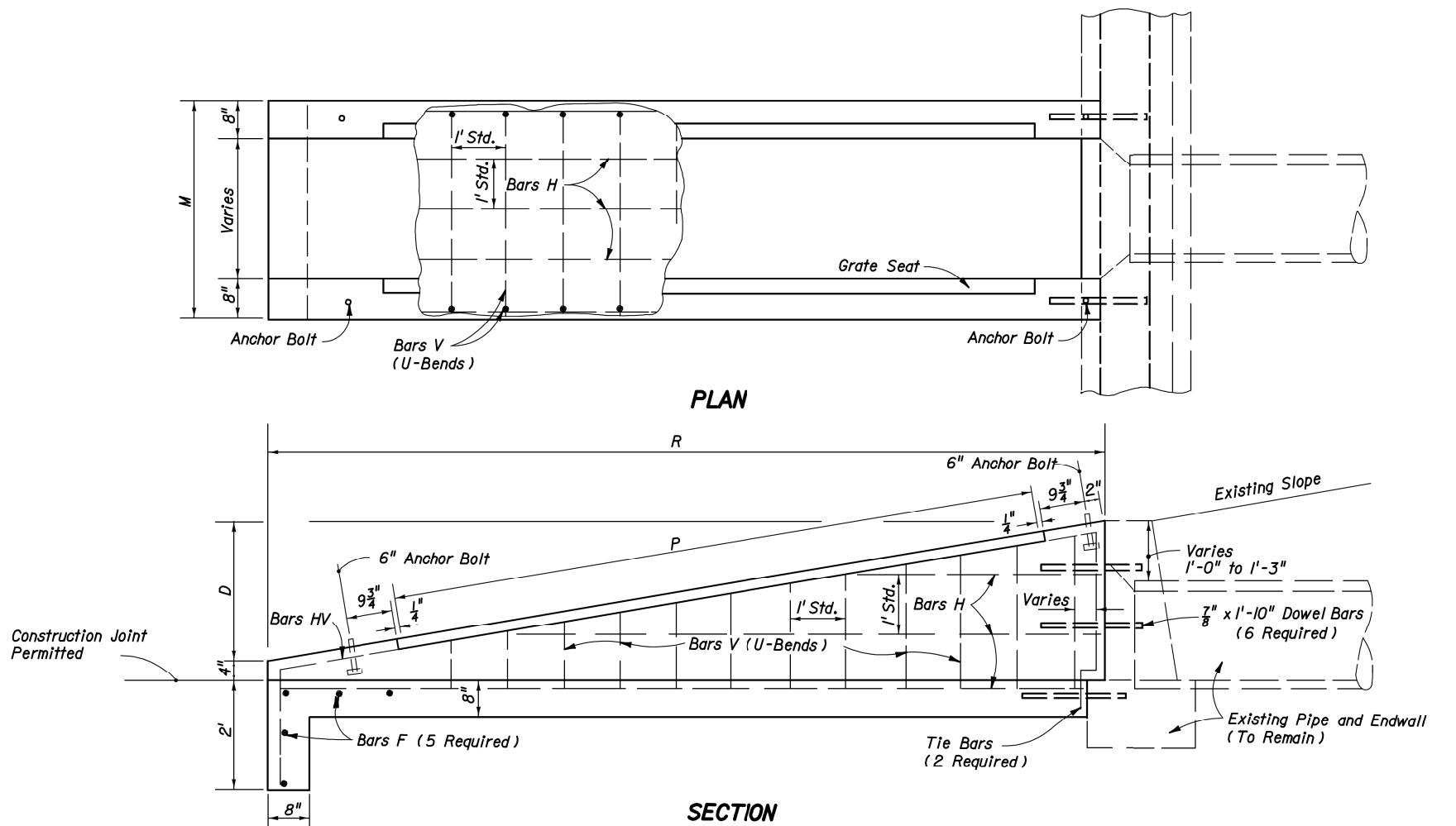
**GRATE DETAIL**



**GRATE SEAT DETAIL**



**ANCHOR BOLT DETAIL**



**GENERAL NOTES**

1. For use criteria see " Steel Grating Use Criteria " Index No. 261.
2. Grates shall be ASTM A242/A242M, A572/A572M or A588/A588M, Grade 50 steel, and galvanized in accordance with Section 962-7 of the Standard Specifications.
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 1/4" 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), CY 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, SY.

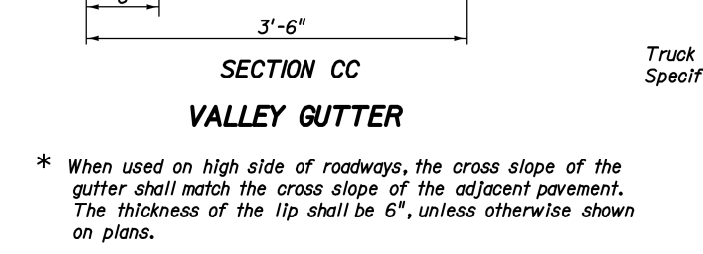
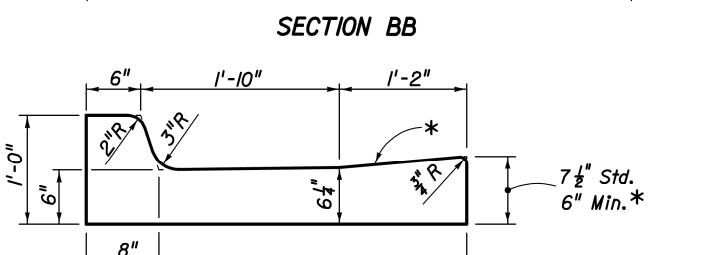
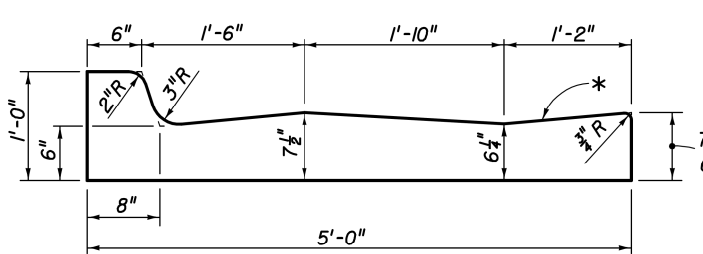
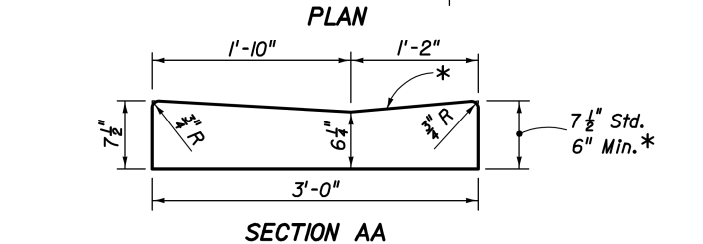
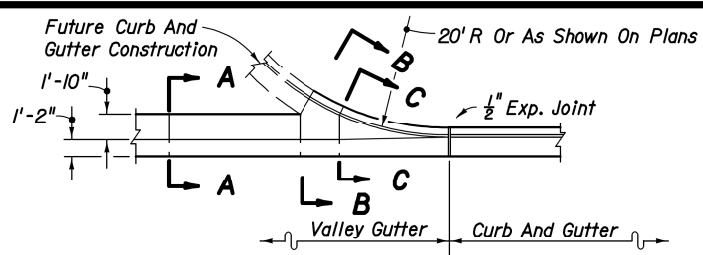
<b>DIMENSIONS AND QUANTITIES PER GRATE</b>										
Slope	Pipe Size	Channels @ 5.4 Lbs./L.F.		Bars @ 3.4 lbs/L.F. (2 ea.)		Angles @ 3.2 Lbs./L.F. (2)		Total Weight-Lbs.		
		Quantity	F	Lbs.	L	M-4"	Lbs.		P	Lbs.
1:6	15"	10	2'-6 7/8"	139	11'-3"	3'-3"	99	9'-4"	60	298
	18"	12	2'-9 7/8"	183	13'-3"	3'-6"	114	11'-4"	73	370
	24"	15	3'-3 7/8"	269	16'-3"	4'-0"	138	14'-4"	92	499
	30"	18	3'-9 7/8"	372	19'-3"	4'-6"	162	17'-4"	111	645
1:4	15"	6	2'-6 7/8"	83	7'-3"	3'-3"	71	5'-4"	34	188
	18"	7	2'-9 7/8"	107	8'-3"	3'-6"	80	6'-4"	41	228
	24"	9	3'-3 7/8"	161	10'-3"	4'-0"	97	8'-4"	53	311
	30"	11	3'-9 7/8"	227	12'-3"	4'-6"	114	10'-4"	66	407

<b>DIMENSIONS AND QUANTITIES PER U-ENDWALL</b>									
Pipe Size	G	M	D	R	P	Class I Concrete-C.Y.	Reinforcing Steel-Lbs.	Sodding S Y	
15"	2'-8 1/2"	3'-7"	2'-2"	13'-0"	9'-4"	2.12	167	23	
18"	2'-11 1/2"	3'-10"	2'-5"	14'-6"	11'-4"	2.53	173	25	
24"	3'-5 1/2"	4'-4"	2'-11"	17'-6"	14'-4"	3.48	238	29	
30"	3'-11 1/2"	4'-10"	3'-5"	20'-6"	17'-4"	4.57	315	32	
15"	2'-8 1/2"	3'-7"	2'-2"	8'-8"	5'-4"	1.44	120	19	
18"	2'-11 1/2"	3'-10"	2'-5"	9'-8"	6'-4"	1.72	130	20	
24"	3'-5 1/2"	4'-4"	2'-11"	11'-8"	8'-4"	2.36	167	22	
30"	3'-11 1/2"	4'-10"	3'-5"	13'-8"	10'-4"	3.09	225	25	

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SAFETY MODIFICATIONS FOR ENDWALLS**

Designed By	Names	Dates	Approved By	<i>S. A. McHenry</i>
Drawn By			State Drainage Engineer	
Checked By			Revision	Sheet No.
			00	1 of 1
				Index No.
				295

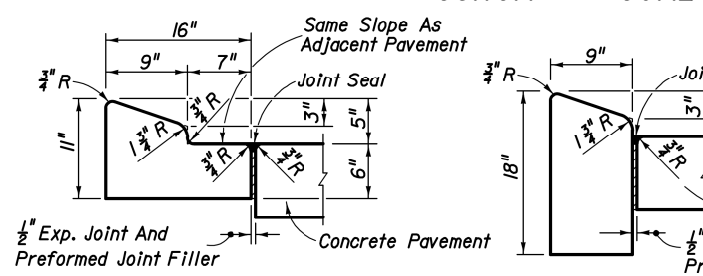


\* When used on high side of roadways, the cross slope of the gutter shall match the cross slope of the adjacent pavement. The thickness of the lip shall be 6", unless otherwise shown on plans.

☑ Rotate entire section so that gutter cross slope matches slope of adjacent circulating roadway pavement.

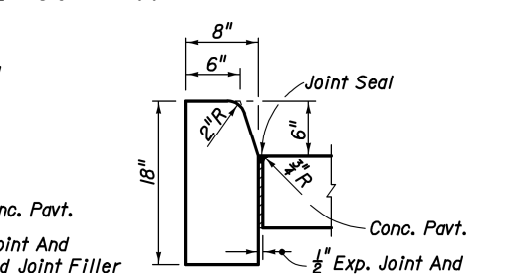
Note: For use adjacent to concrete or flexible pavement. For details depicting usage adjacent to flexible pavement, see diagram right. Expansion joint, preformed joint filler and joint seal are required between curb & gutter and concrete pavement only, see diagram right.

**CONCRETE CURB AND GUTTER**

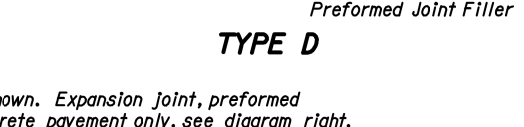


For details depicting usage adjacent to flexible pavement, see diagram right.

**TYPE B**



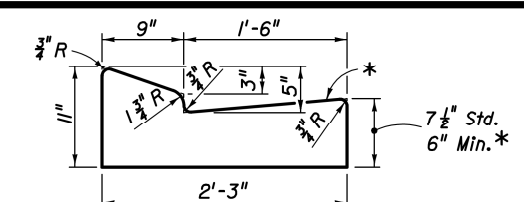
**TYPE B**



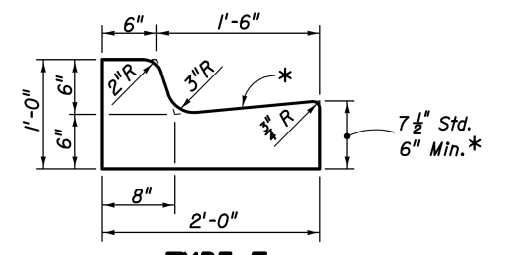
**TYPE D**

**CONCRETE CURB**

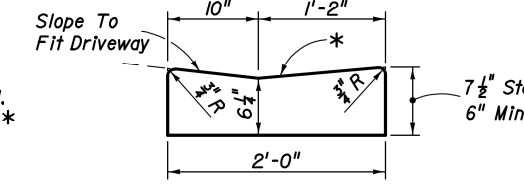
Note: For use adjacent to concrete or flexible pavement, concrete shown. Expansion joint, preformed joint filler and joint seal are required between curbs and concrete pavement only, see diagram right.



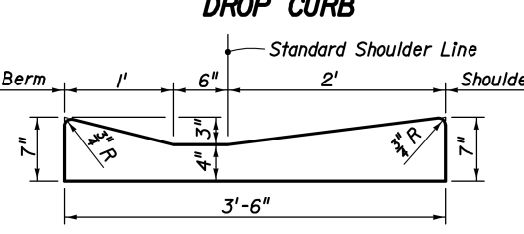
**TYPE E**



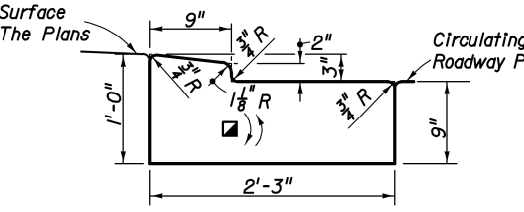
**TYPE F**



**DROP CURB**

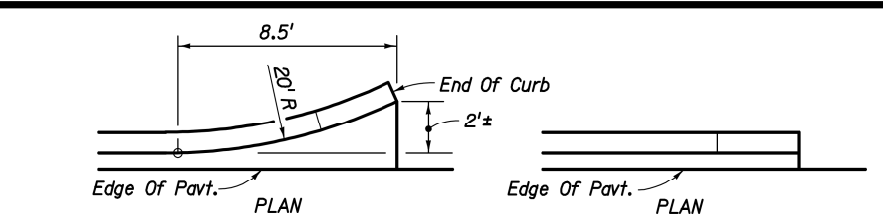


**SHOULDER GUTTER**

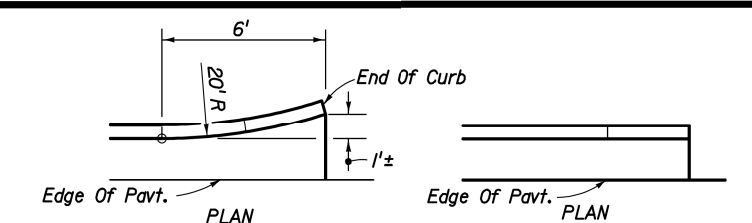


**TYPE RA**

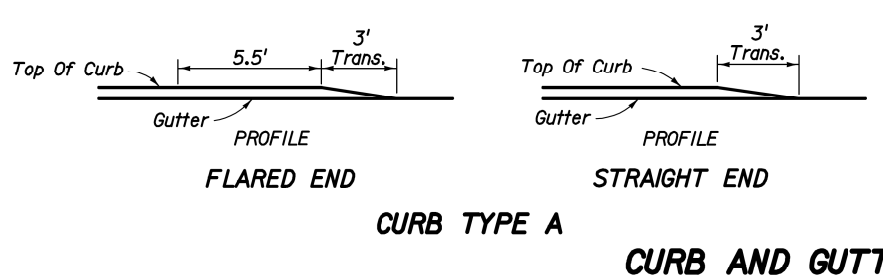
TRAFFIC BEARING SECTION FOR USE IN ROUNDABOUT CENTRAL ISLAND CONSTRUCTION



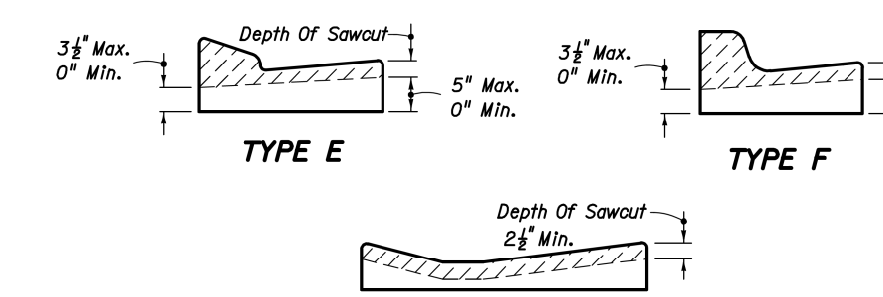
**CURB TYPE A**



**CURB AND GUTTER TYPES E & F**

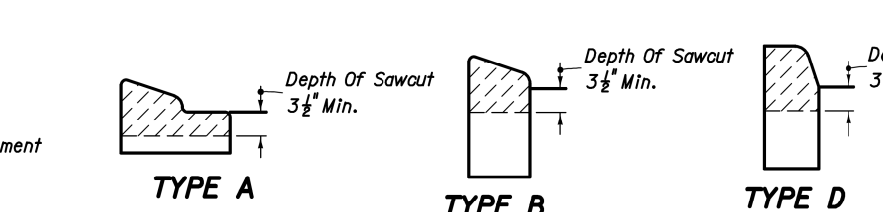


**SHOULDER GUTTER**

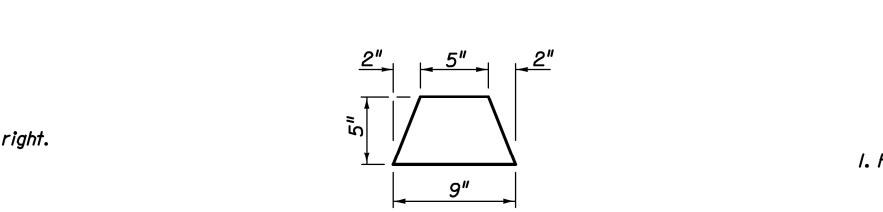


Sawcuts should be avoided within valley gutter and within curb and gutter endings.

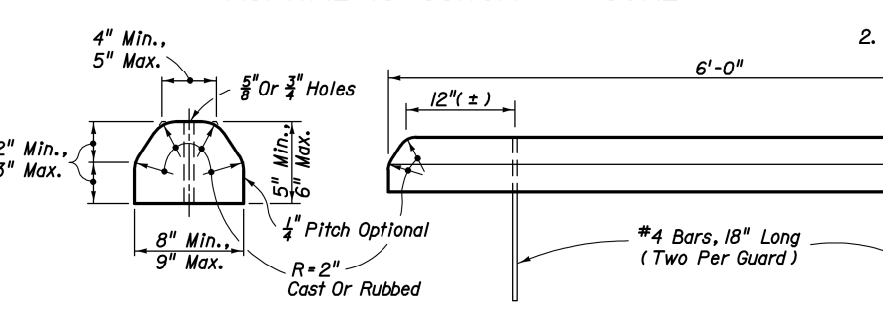
**CONTRACTION JOINT IN CURB AND GUTTER**



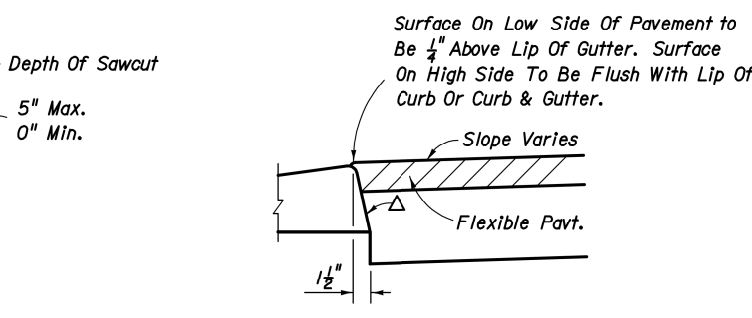
**CONTRACTION JOINT IN CURB**



**ASPHALTIC CONCRETE CURB**

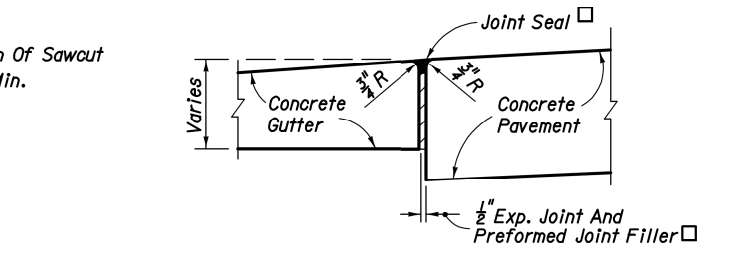


**CONCRETE BUMPER GUARD**



△ Applies to both high and low sides of pavement, low side shown. Applies to shoulder gutter only where adjoining traffic lanes.

**CURB AND GUTTER AND TYPE A CURB ADJACENT TO FLEXIBLE PAVEMENT**



□ Applies to both high and low sides of pavement, low side shown.

**EXPANSION JOINT BETWEEN GUTTER AND CONCRETE PAVEMENT**

**GENERAL NOTES**

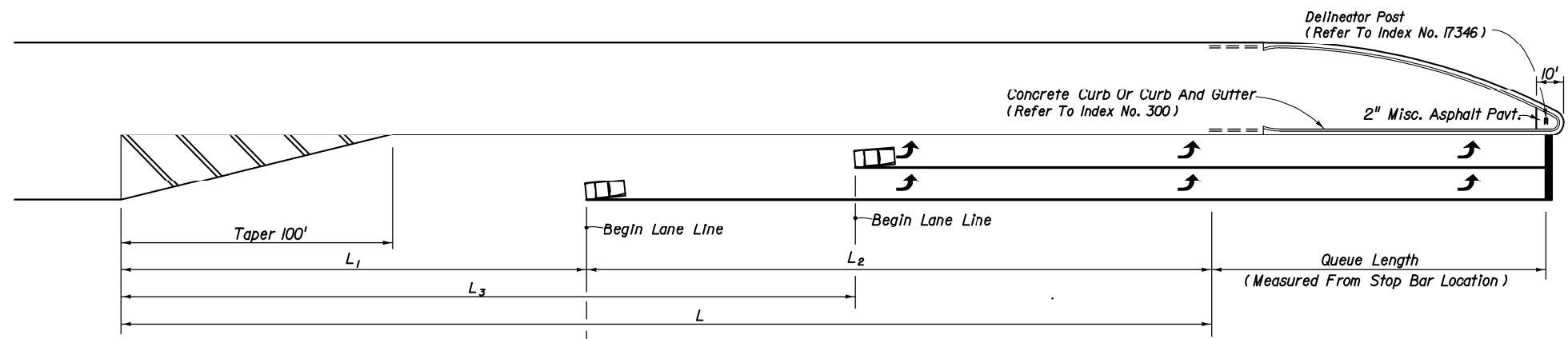
- For curb, gutter and curb & gutter provide 1/8" - 1/4" contraction joints at 10' centers (max.). Contraction joints adjacent to concrete pavement on tangents and flat curves are to match the pavement joints, with intermediate joints not to exceed 10' centers. Curb, gutter and curb & gutter expansion joints shall be located in accordance with Section 520 of the standard specifications.
- Ends of Curbs Types B and D shall transition from full to zero heights in 3'.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CURB & CURB AND GUTTER**

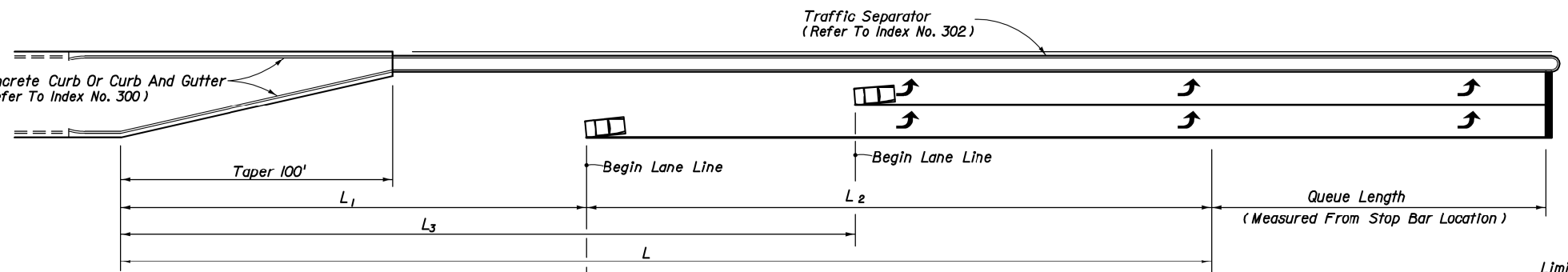
Names	Dates	Approved By		
Designed By		<i>Brian Blankenship</i>	State Roadway Design Engineer	
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 1	300





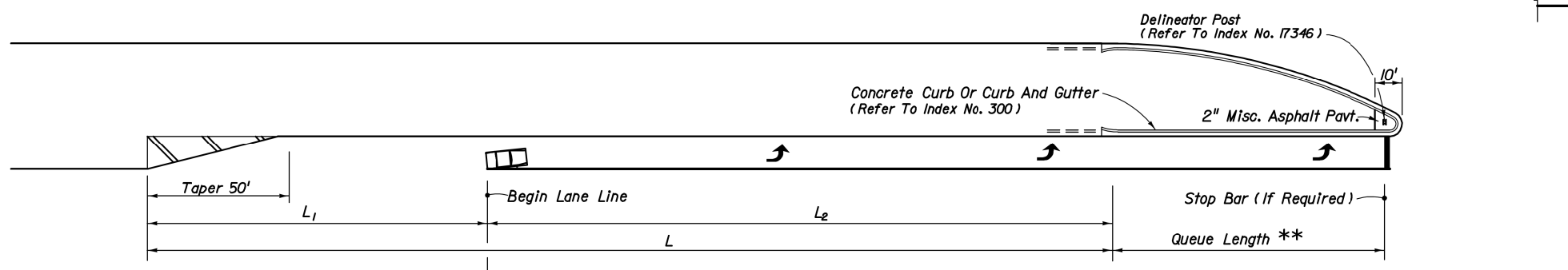
Brakes Applied After Turning Vehicle Clears Through Lane;  
Entry Speed: 10 mph Below Design Speed For Urban Condition  
Average Running Speed For Rural Condition

**FLUSH AND/OR CURBED SEPARATION**



Brakes Applied After Turning Vehicle Clears Through Lane;  
Entry Speed: 10 mph Below Design Speed For Urban Condition  
Average Running Speed For Rural Condition

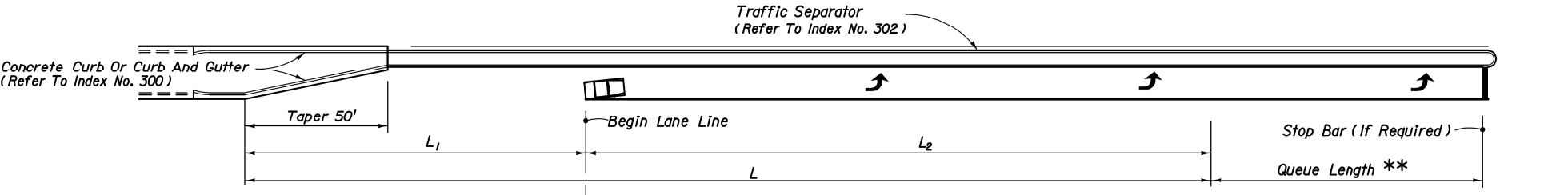
**RAISED SEPARATION  
DOUBLE LEFT TURNS**



Brakes Applied After Turning Vehicle Clears Through Lane;  
Entry Speed: 10 mph Below Design Speed For Urban Condition  
Average Running Speed For Rural Condition

**FLUSH AND/OR CURBED SEPARATION**

\*\* Queue Length Is Measured From The Median Nose Radial Point Or, When A Stop Bar Is Required, From The Stop Bar.

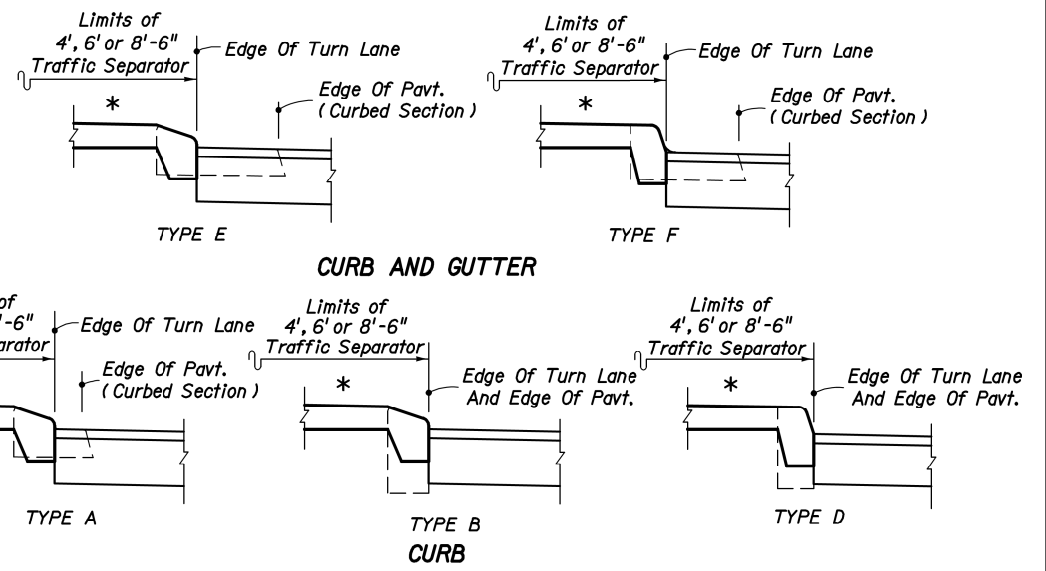


Brakes Applied After Turning Vehicle Clears Through Lane;  
Entry Speed: 10 mph Below Design Speed For Urban Condition  
Average Running Speed For Rural Condition

**RAISED SEPARATION  
SINGLE LEFT TURNS**

# TURN LANES

TURN LANES • CURBED AND UNCURBED MEDIANS								
Design Speed (mph)	Entry Speed (mph)	Clearance Distance L <sub>1</sub>	URBAN CONDITITONS			RURAL CONDITITONS		
			Brake To Stop Distance L <sub>2</sub>	Total Decel. Distance L	Clearance Distance L <sub>3</sub>	Brake To Stop Distance L <sub>2</sub>	Total Decel. Distance L	Clearance Distance L <sub>3</sub>
35	25	70'	75'	145'	110'	---	---	---
40	30	80'	75'	155'	120'	---	---	---
45	35	85'	100'	185'	135'	---	---	---
50	40/44	105'	135'	240'	160'	215'	320'	160'
55	48	125'	---	---	---	260'	385'	195'
60	52	145'	---	---	---	310'	455'	230'
65	55	170'	---	---	---	350'	520'	270'



For Curb And Curb & Gutter Types, See Index No. 300  
\* Option I Separators Shown (Refer To Index No. 302)

## MEDIAN CURB AND TRAFFIC SEPARATOR JUNCTURE DETAILS

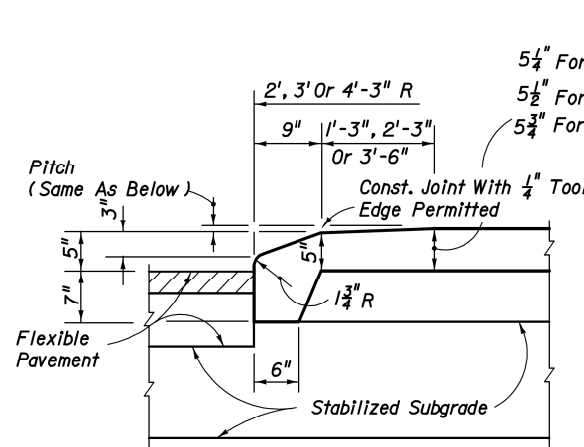
### GENERAL NOTES

1. The plan views shown are for turn lane taper shapes and dimensional purposes only, they do not prescribe the use of curb, curb and gutter, shoulders nor separators specifically to either rural or urban conditions.
2. Total deceleration distances must not be reduced except where lesser values are imposed by unrelocatable control points.
3. Right turn lane tapers and distances identical to left turn lanes under stop control conditions. Right turn lane tapers and/or distances are site specific under free flow or yield conditions.
4. These left turn configurations apply to continuous left turn lanes only where specifically called for in the plans.
5. For pavement markings see Index No. 17346.

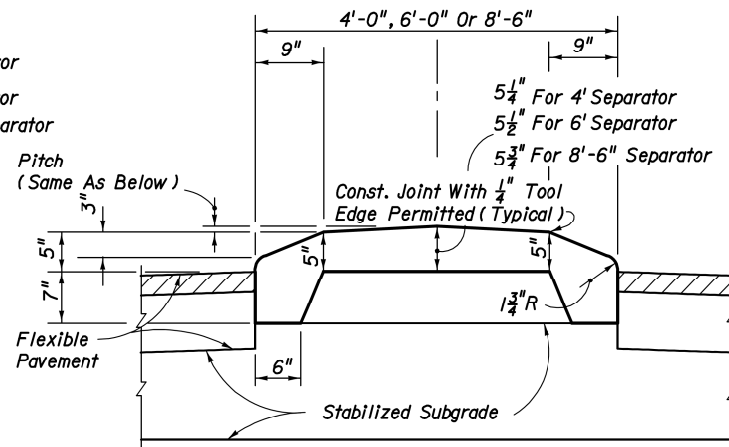
### DESIGN NOTES

1. Basis for turn lane configurations:
  - Informed Driver.
  - Stop condition (With Or Without Stop Control).
  - Wet Pavement.
  - Reaction preceeding entry point.
  - Maximum safe deceleration rates for urban conditions.
  - Comfortable deceleration rates for rural conditions.

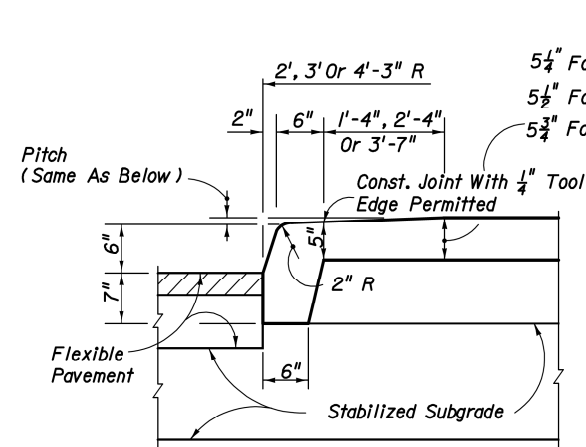
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TURN LANES</b>				
Names	Dates	Approved By		
Designed By	RER 05/91	 State Roadway Design Engineer		
Drawn By	HSD/HKH 05/91			
Checked By	JVG/RER 05/91	Revision	Sheet No.	Index No.
		00	1 of 1	301



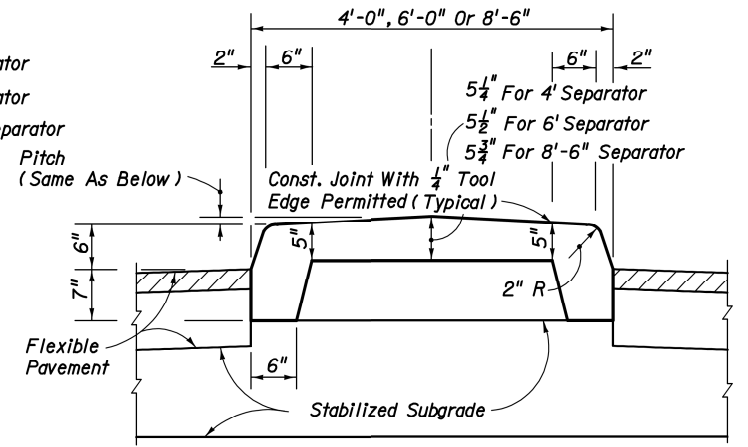
LONGITUDINAL SECTION (NOSE)



TRANSVERSE SECTION



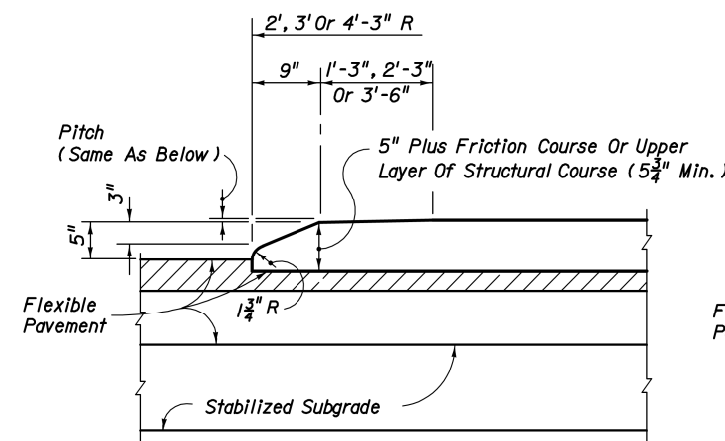
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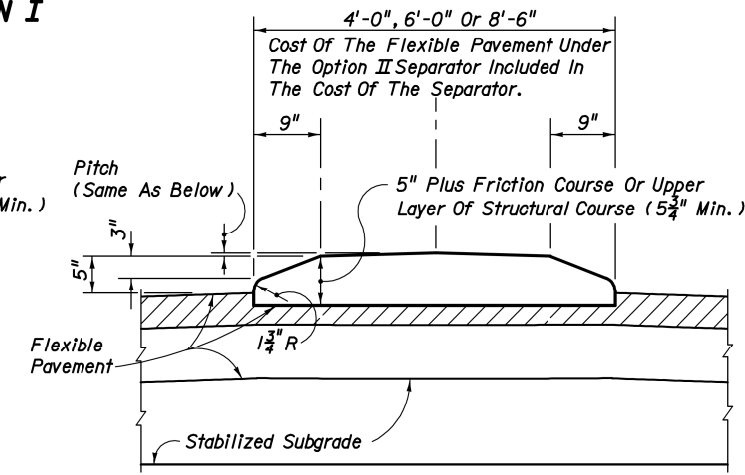
TRANSVERSE SECTION

**OPTION I**

**OPTION I**



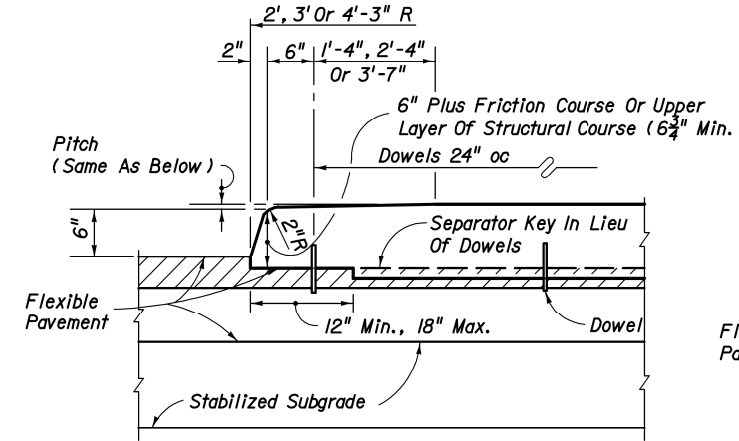
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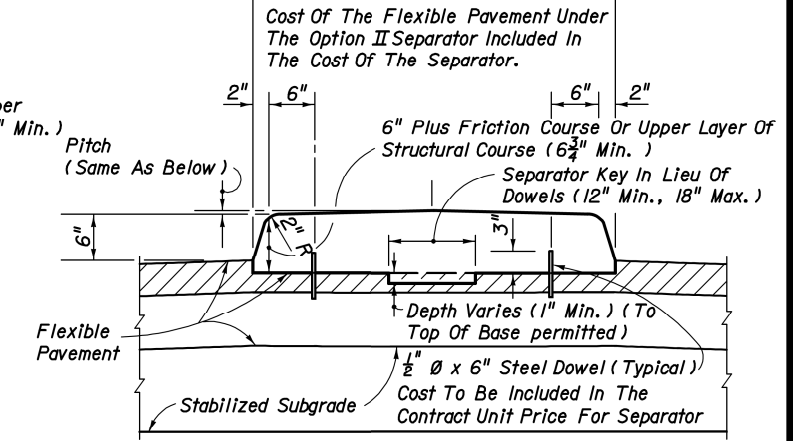
TRANSVERSE SECTION

**OPTION II**

**TYPE I CONCRETE TRAFFIC SEPARATOR**



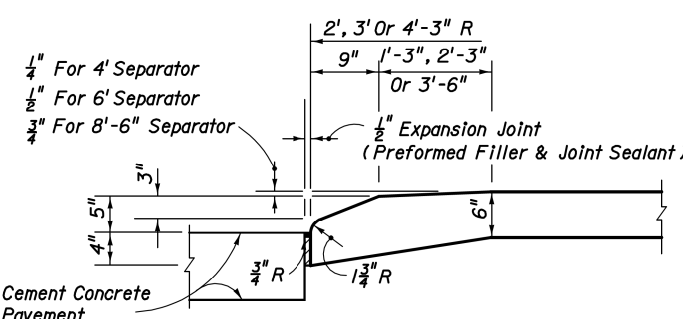
LONGITUDINAL SECTION (NOSE)



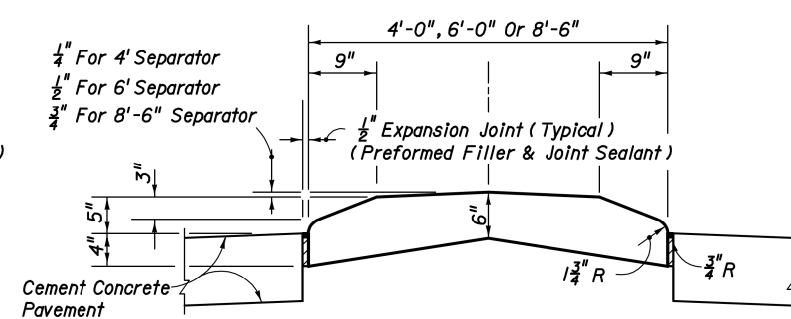
TRANSVERSE SECTION

**OPTION II**

**TYPE IV CONCRETE TRAFFIC SEPARATOR**

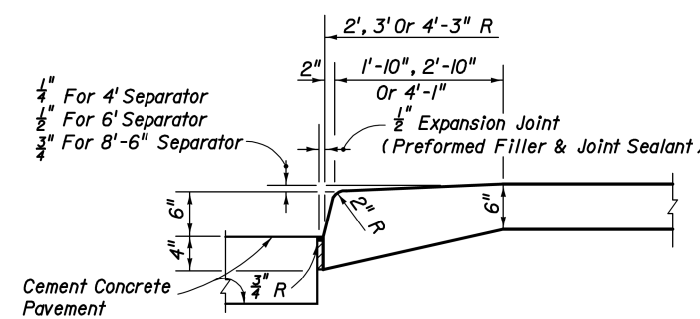


LONGITUDINAL SECTION (NOSE)

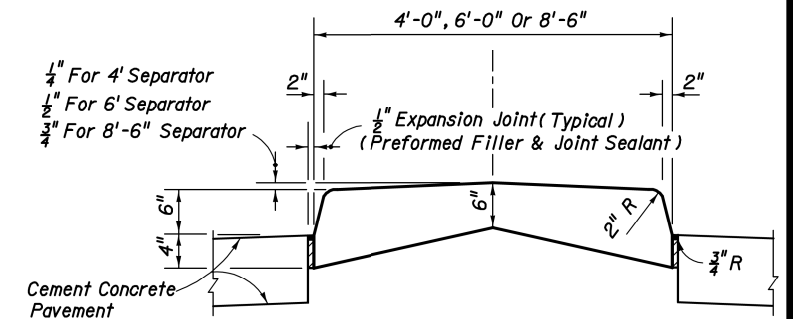


TRANSVERSE SECTION

**TYPE II CONCRETE TRAFFIC SEPARATOR**



LONGITUDINAL SECTION (NOSE)



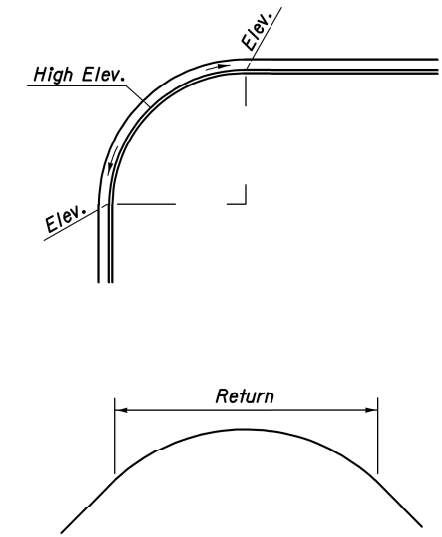
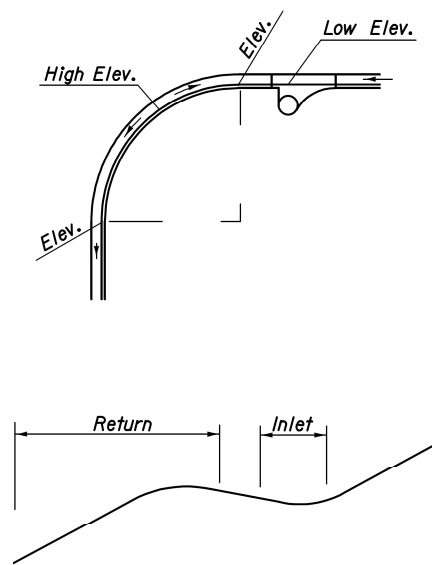
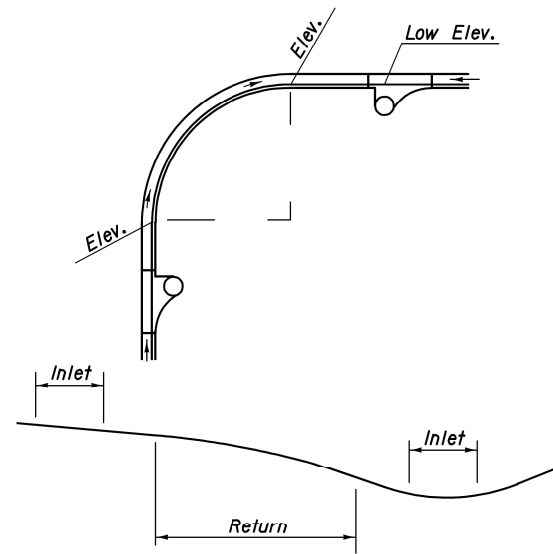
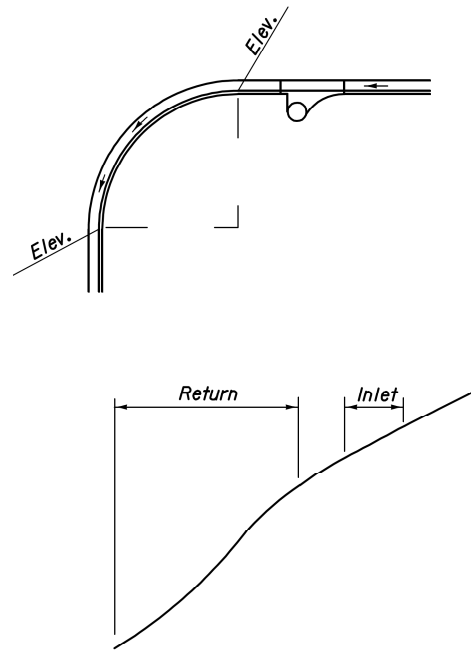
TRANSVERSE SECTION

**TYPE V CONCRETE TRAFFIC SEPARATOR**

**NOTES**

- Separators Type I and IV are to be used with flexible pavement. Separators Types II and V are to be used with rigid pavement.
- Either Option I or Option II may be used for Types I and IV separators except when a specific option is called for in the plans.
- For all separators provide 1/8 inch - 1/4 inch contraction joints at 10' centers (max.). Contraction joints adjacent to concrete pavement on tangents and flat curves are to match the pavement joints, with intermediate joints not to exceed 10' centers.
- Separators having widths of 4', 6' or 8'-6" shall be paid for under the contract unit price for Concrete Traffic Separator (Type \_\_\_) (\_\_\_' Wide) LF. 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 Concrete Traffic Separator (Special) SY.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC SEPARATORS</b>				
Names	Dates	Approved By		
Designed By		<i>Brian Blankenship</i> State Roadway Design Engineer		
Drawn By	HSD 09/81	Revision	Sheet No.	Index No.
Checked By	JVG 09/81	02	1 of 1	302




**Note:**

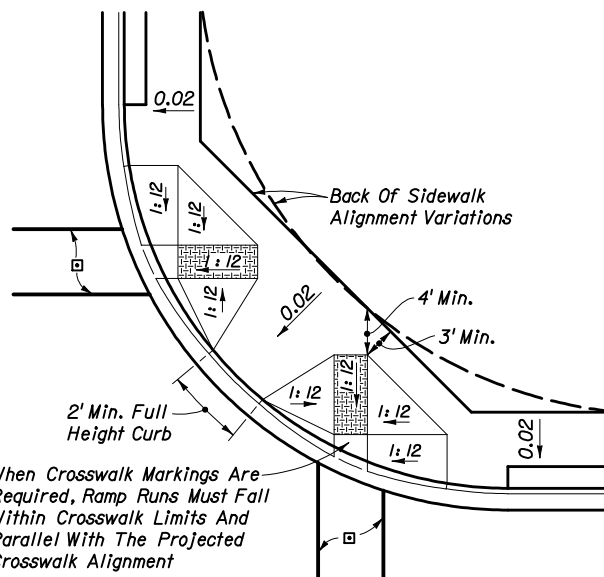
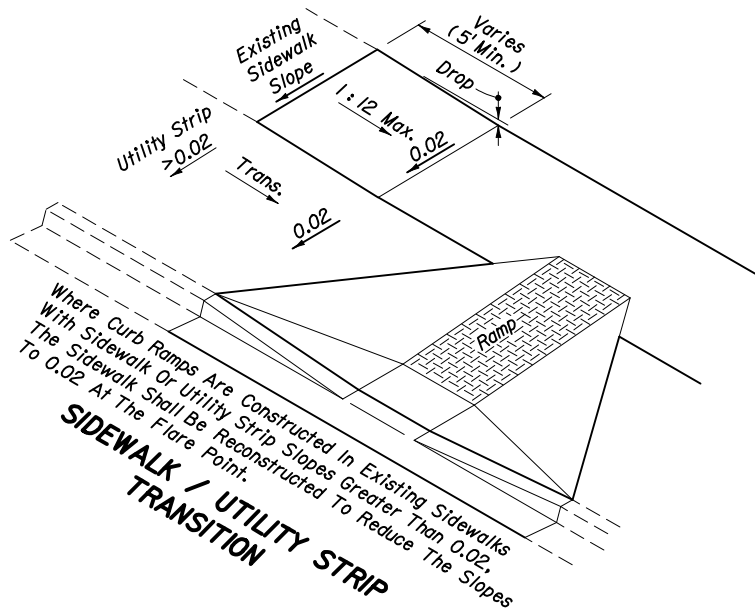
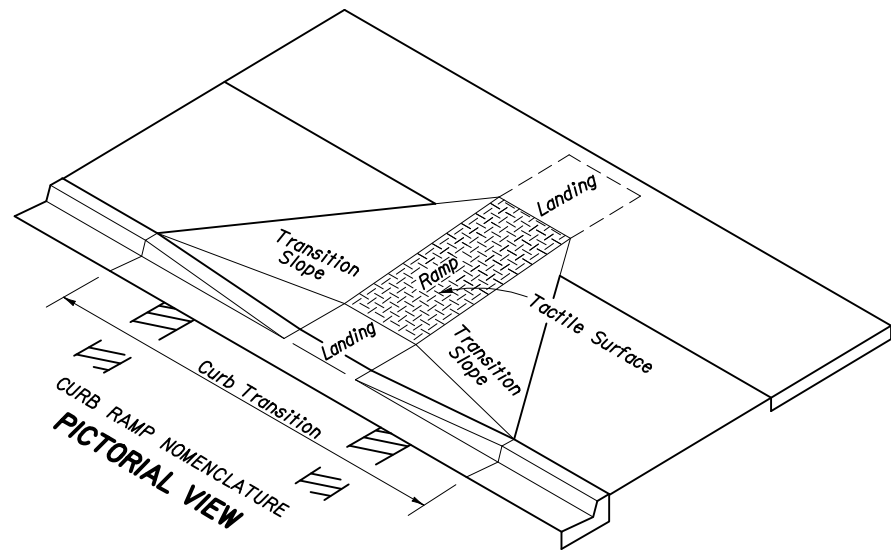
Profile grades should be established that will allow Inlets to be located outside the return whenever practical. Inlets should be located to avoid conflict with pedestrian movement. Special care must be exercised to prevent conflict with public sidewalk curbed ramps for the disabled. For information on public sidewalk curbed ramps refer to Index No. 304.

**SHOWING LOCATION OF INLETS ON RETURN  
TYPICAL RETURN PROFILES**

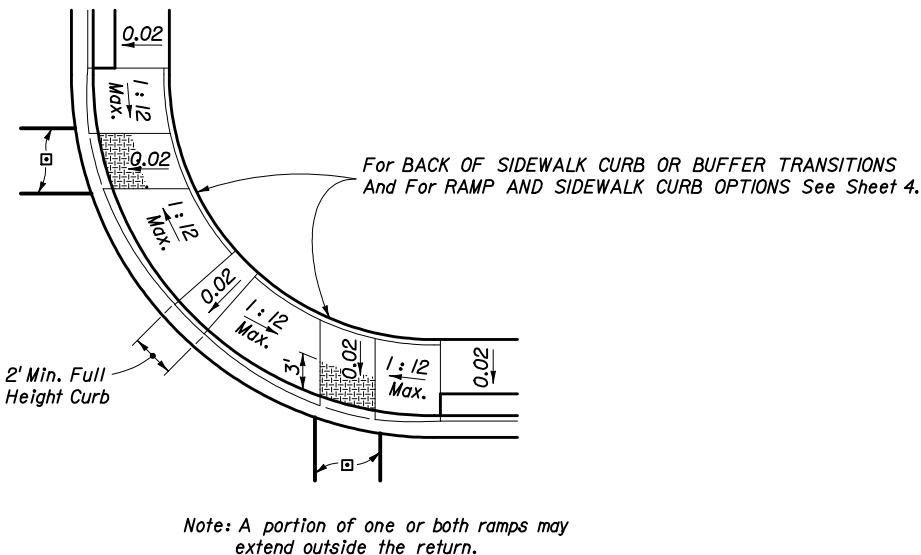
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CURB RETURN PROFILES**

	Names	Dates	Approved By	
Designed By			 State Roadway Design Engineer	
Drawn By				
Checked By			Revision	Sheet No.
			00	1 of 1
				Index No.
				303



□ Crosswalk widths and configuration vary; must conform to Index No. 17344 and 17346.



**TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS**

**GENERAL NOTES**

1. Public sidewalk curb ramps shall be constructed in the public right of way at locations that will provide continuous unobstructed pedestrian circulation paths to pedestrian areas, elements and facilities in the public right of way and to accessible pedestrian routes on adjacent sites. Curbed facilities with sidewalks and those without sidewalks are to have curb ramps constructed at all street intersections and at turnouts that have curbed returns. Partial curb returns shall extend to the limit prescribed by Index No. 515 to accommodate curb ramps. Ramps constructed at locations without sidewalks shall have a landing constructed at the top of each ramp, see Sheet 5.

2. The location and orientation of curb ramps shall be as shown in the plans.

3. Curb ramp running slopes at unrestrained sites shall not be steeper than 1:12 and cross slope shall be 0.02 or flatter. Transition slopes shall not be steeper than 1:12. Where curb ramps are located on roadway grades steeper than 0.02 and the accompanying sidewalk has a concurrent grade, the transverse slope of connecting perpendicular ramps, combined crossing ramps and interior block ramps.

When altering existing pedestrian facilities where existing site development precludes the accommodation of a ramp slope of 1:12, a running slope between 1:12 and 1:10 is permitted for a rise of 6" maximum and a running slope of between 1:10 and 1:8 is permitted for a rise of 3" maximum. Where compliance with the requirements for cross slope cannot be fully met, the minimum feasible cross slope shall be provided.

Ramp running slope is not required to exceed 8' in length, except at sites where the plans specify a greater length.

4. If a curb ramp is located where pedestrians must walk across the ramp, then the walk shall have transition slopes to the ramp; the maximum slope of the transitions shall be 1:12. Ramps with curb returns may be used at locations where other improvements provide guidance away from that portion of curb perpendicular to the sidewalk; improvements for guidance are not required at curb ramps for linear pedestrian traffic.

5. When perpendicular curb ramps abut the back of curb a tactile surface shall be applied to the full width and length of the ramp. When landings of parallel curb ramps abut the back of curb the tactile surface shall extend full width and 3' back of the curb. The tactile surfaces on curb ramps for linear pedestrian traffic and for corner ramps under conditions of infeasibility are to conform with the details in this Index for those specific ramp types. Tactile surfaces shall be constructed by texturing to a depth not less than 1/8" and not exceeding 1/4" by use of a tamp or roller fabricated with an imprinting surface of either 1" mesh 1/4" wire cloth (plain weave, conventional crimp) #6 expanded metal (standard) or 3 lb. expanded metal grating. Transition slopes are not to have tactile surfaces. Detectable surface requirements have been suspended; if reinstated the detectable surface requirements will replace the tactile surface requirements and notice will be by special provision.

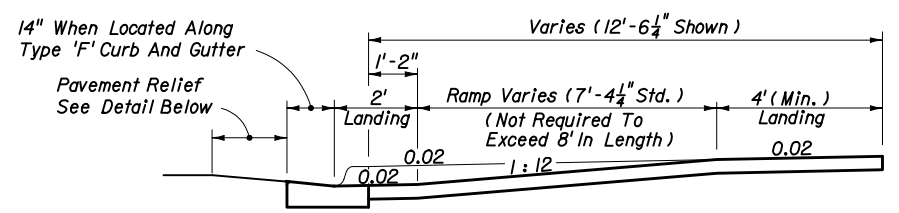
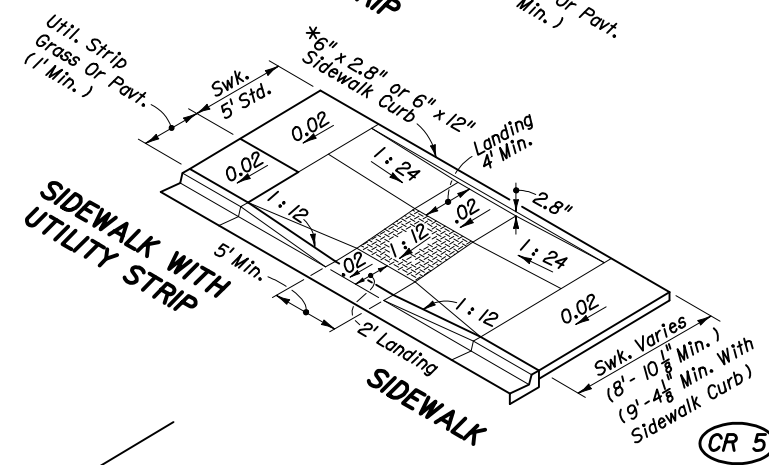
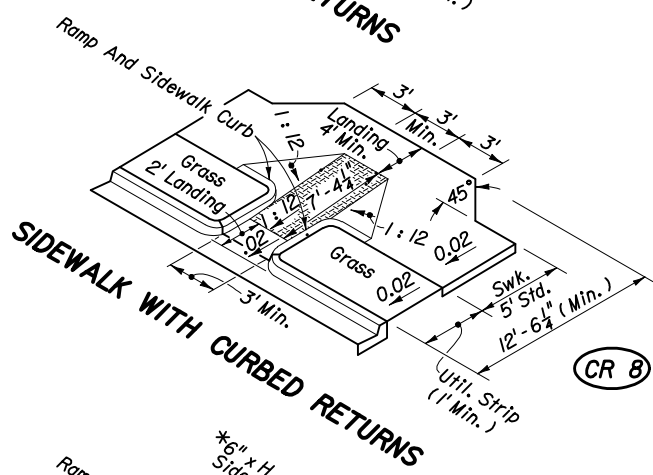
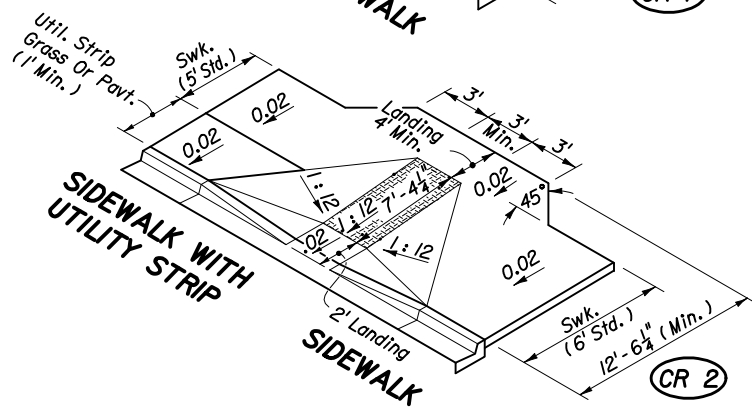
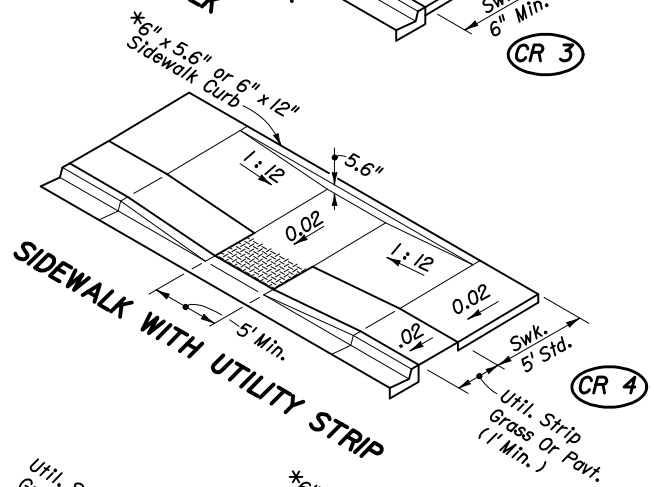
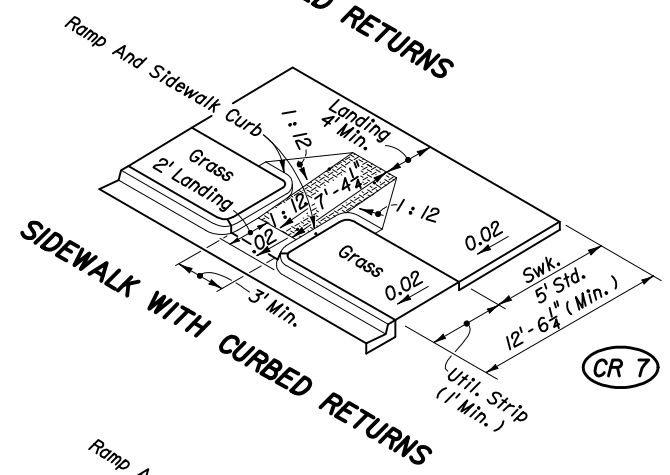
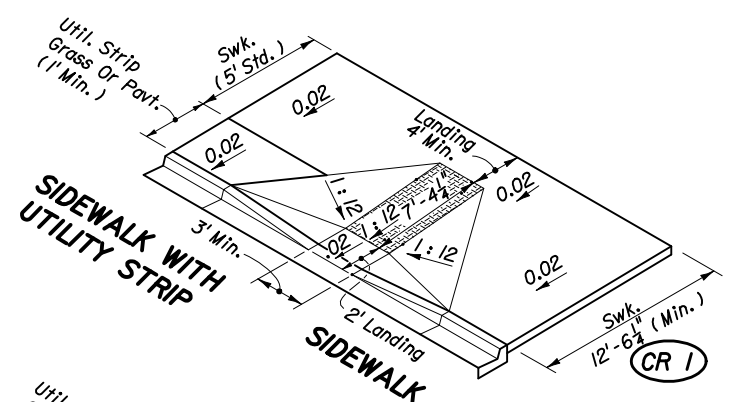
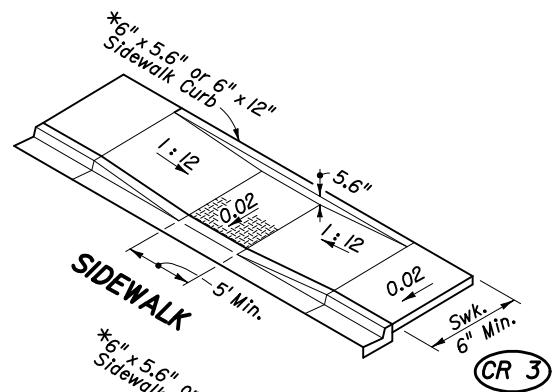
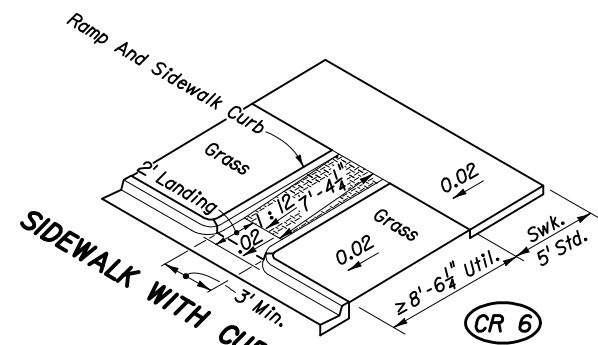
6. Where a curb ramp is constructed within existing curb, curb and gutter and/or sidewalk, the existing curb or curb and gutter shall be removed to the nearest joint beyond the curb transitions or to the extent that no remaining section of curb or curb and gutter is less than 5' long. The existing sidewalk shall be removed to the nearest joint beyond the transition slope or walk around or to the extent that no remaining section of sidewalk is less than 5' long.

7. Alpha-numeric identifications are for reference (plans, permits, etc.).

8. Public sidewalk curb ramps are to be paid for as follows:  
Ramps, reconstructed sidewalks, walk around sidewalks, sidewalk landings and sidewalk curbs are to be paid for under the contract unit price for Sidewalk Concrete, (\_\_\_" Thick), SY. Curb transitions and reconstructed curbs are to be paid for under the contract unit price for the parent curb, i.e., Curb Conc., (Type \_\_\_), LF or Curb and Gutter Conc., (Type \_\_\_), LF.

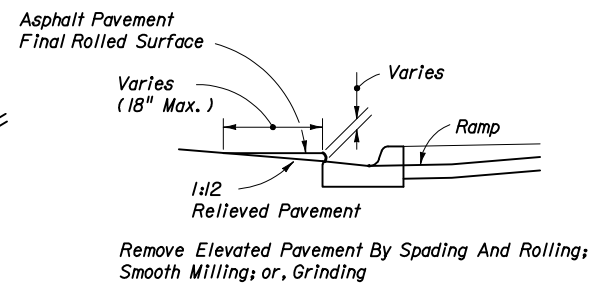
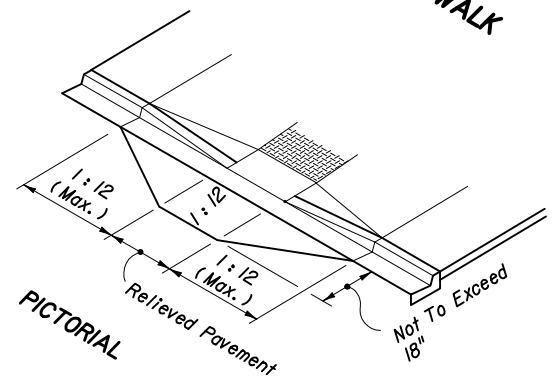
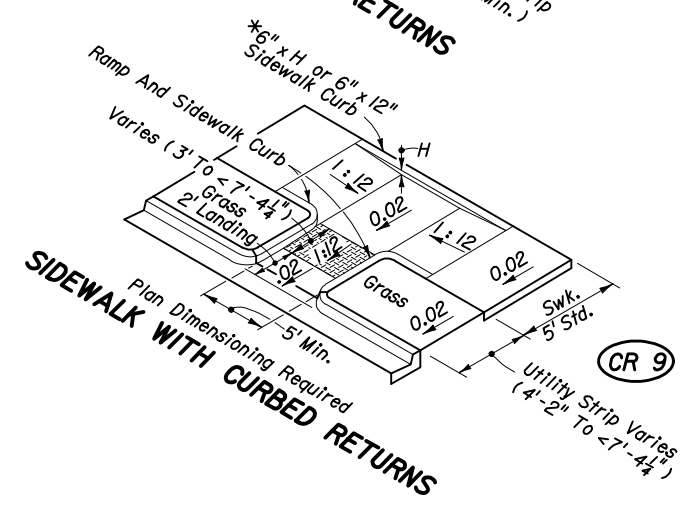
When a separate pay item for the removal and disposal of existing curb, curb and gutter, and/or sidewalk is not provided in the plans, the cost of removal and disposal of these features shall be included in the contract unit price for new curb, curb and gutter and/or sidewalk respectively.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PUBLIC SIDEWALK CURB RAMPS</b>				
Names	Dates	Approved By		
Designed By	STAFF	10/94	 State Roadway Design Engineer	
Drawn By	HKH	10/94		
Checked By	JVG	10/94	Revision	Sheet No.
			02	1 of 5
				304



SECTION THROUGH RAMP RUN AND LANDINGS WITH UPPER LANDING AT NORMAL SIDEWALK ELEVATION

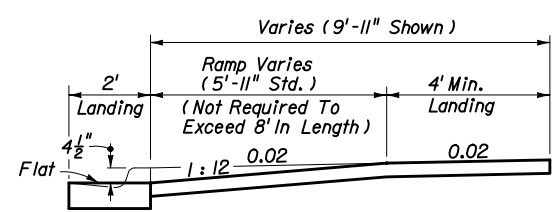
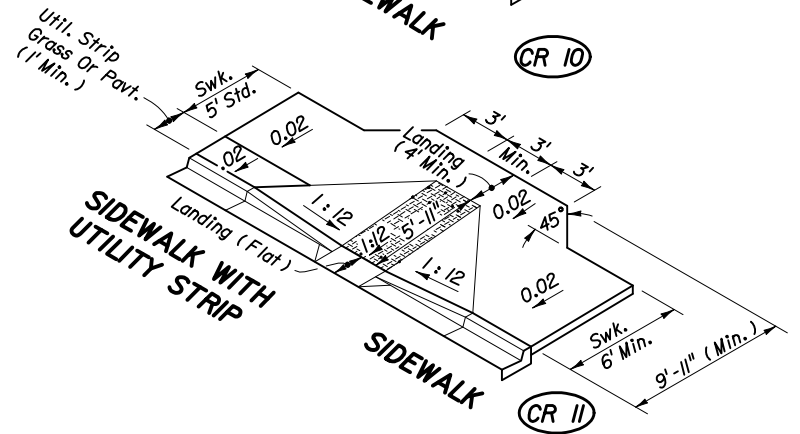
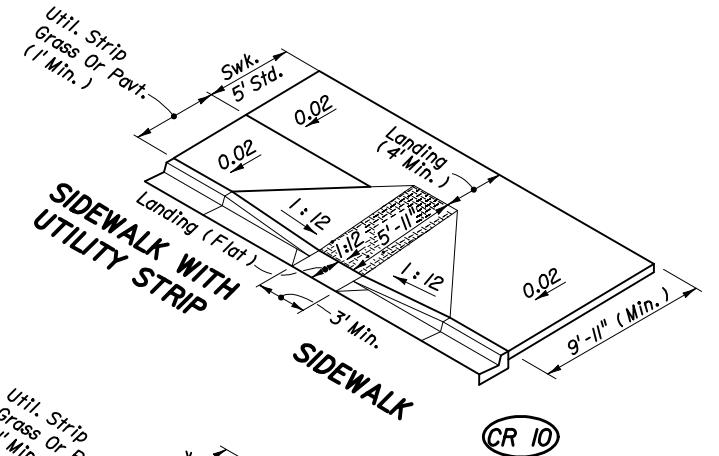
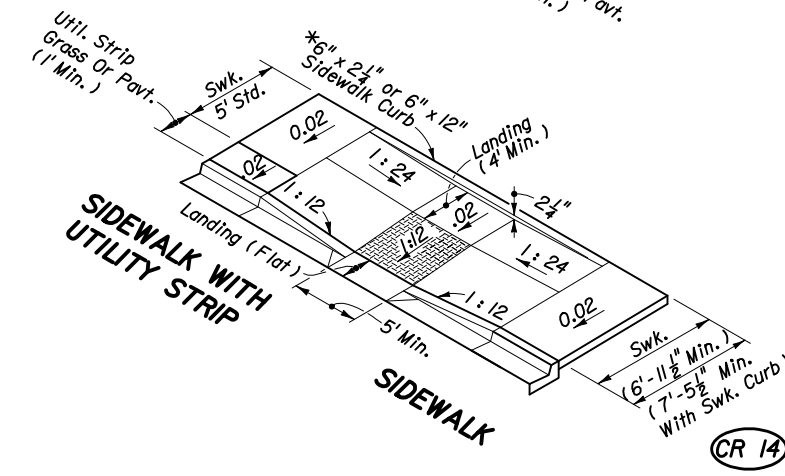
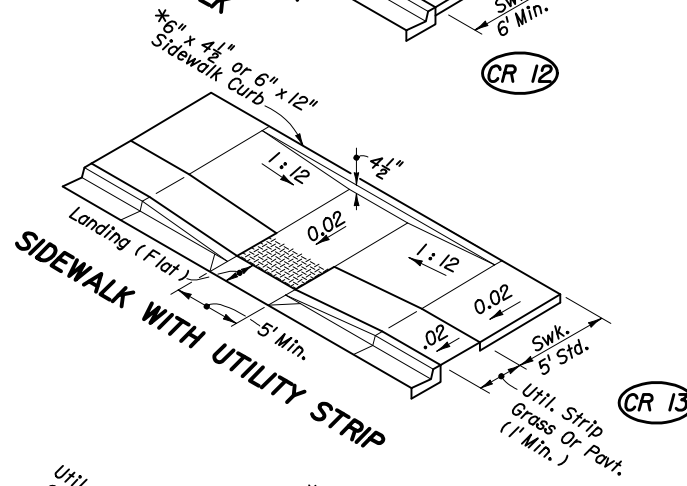
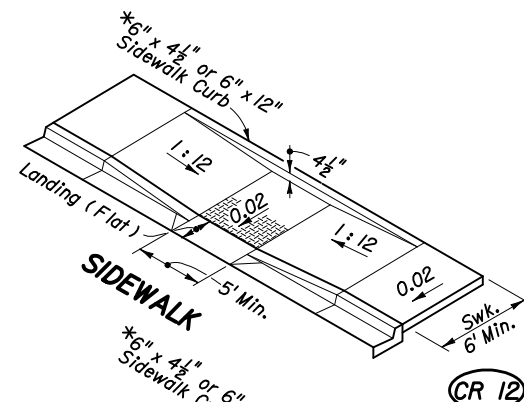
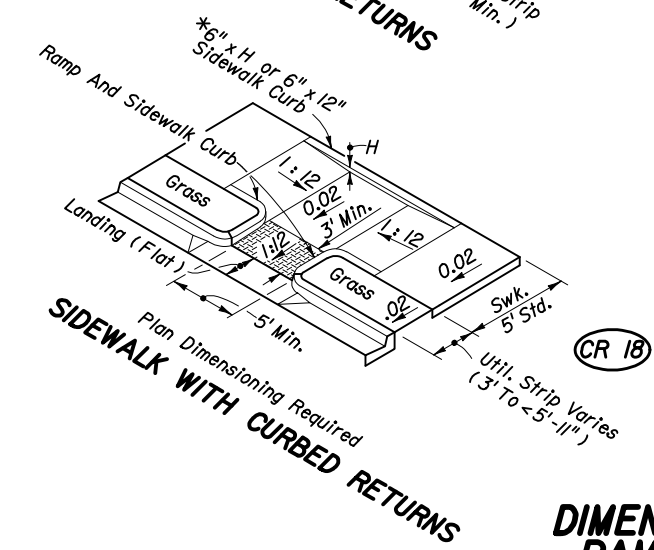
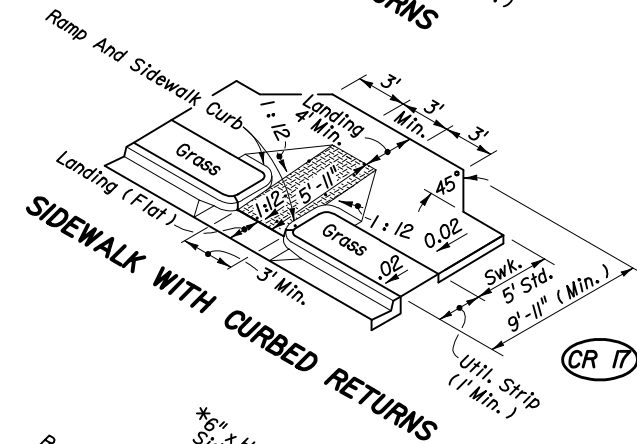
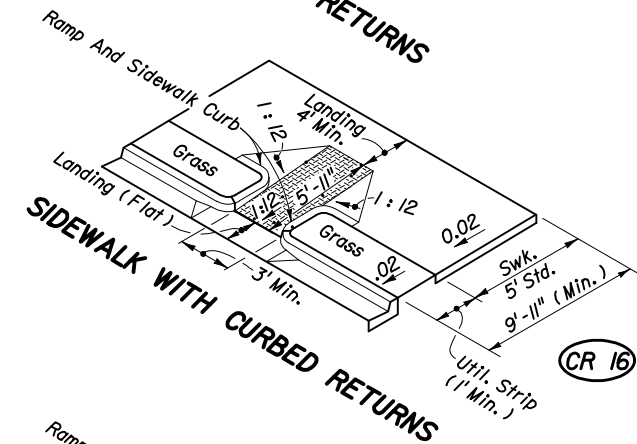
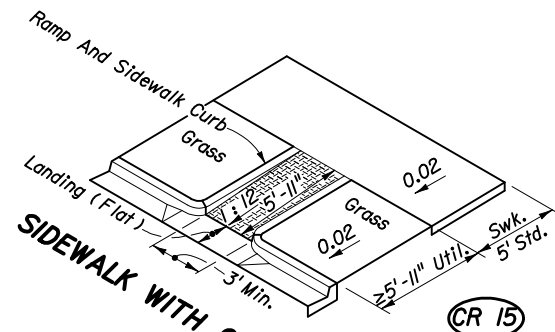
\* For BACK OF SIDEWALK CURB OR BUFFER TRANSITION And For RAMP AND SIDEWALK CURB OPTIONS See Sheet 4.



PAVEMENT RELIEF AT LIP OF CURB

**DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS WHERE RAMP AND LANDING DEPTH ARE NOT RESTRICTED BY RIGHT OF WAY**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PUBLIC SIDEWALK CURB RAMPS</b>				
Names	Dates	Approved By		
Designed By	STAFF	10/94	 State Roadway Design Engineer	
Drawn By	HKH	10/94		
Checked By	JVG	10/94		
Revision	02	Sheet No.		
		2 of 5	304	

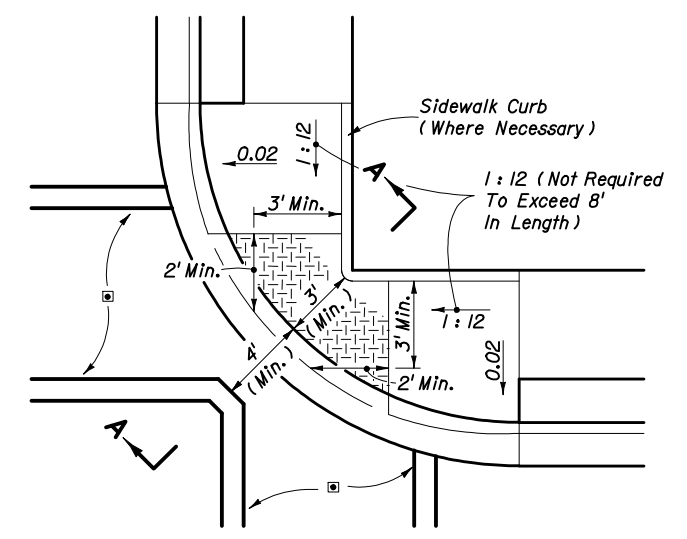
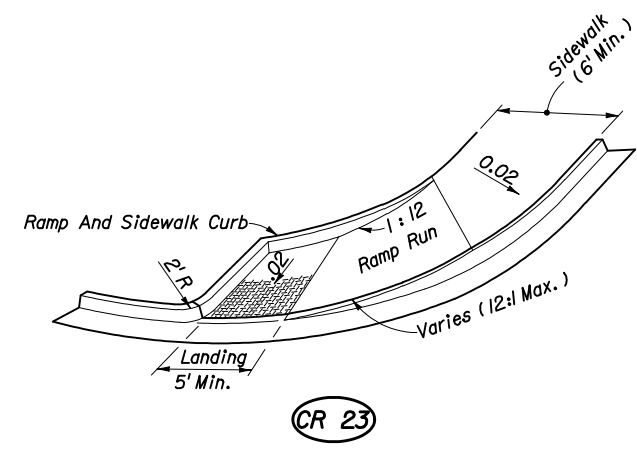
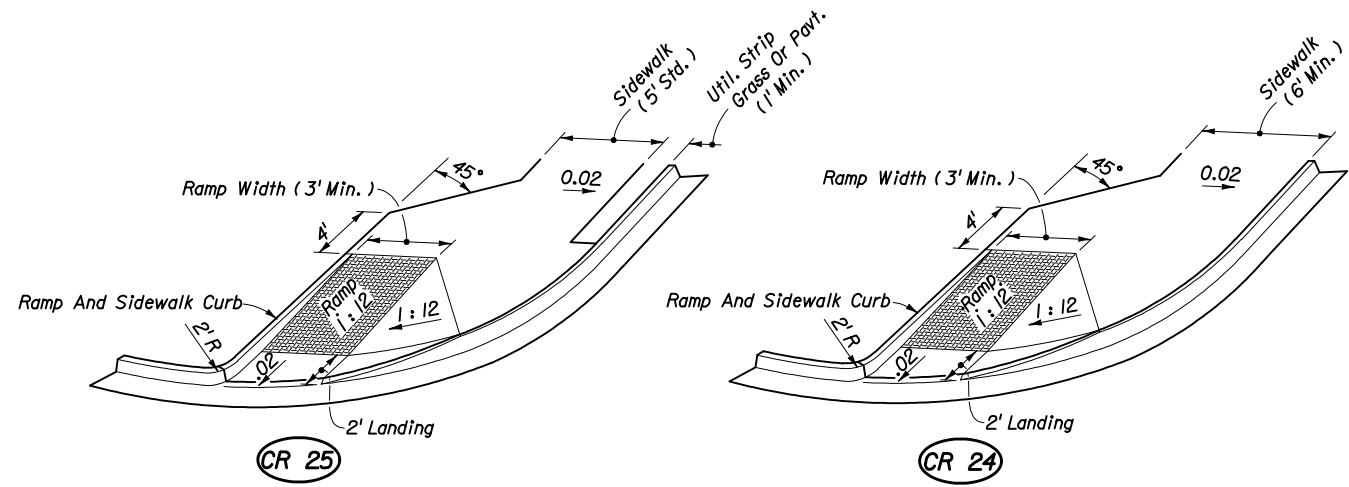


SECTION THROUGH RAMP RUN AND LANDINGS WITH UPPER LANDING AT NORMAL SIDEWALK ELEVATION

\* For BACK OF SIDEWALK CURB OR BUFFER TRANSITION And For RAMP AND SIDEWALK CURB OPTIONS See Sheet 4.

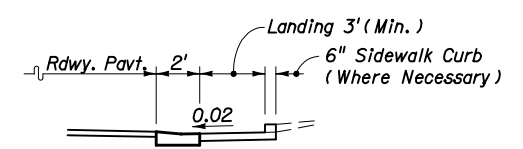
**DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS WHERE RAMP AND LANDING DEPTH ARE RESTRICTED BY RIGHT OF WAY**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PUBLIC SIDEWALK CURB RAMPS</b>				
Names	Dates	Approved By		
Designed By	STAFF	10/94	State Roadway Design Engineer	
Drawn By	HKH	10/94		
Checked By	JVG	10/94		
Revision	00	Sheet No.		
		3 of 5	304	



□ Crosswalk width and configuration vary; must conform to Index No. I7344 and I7346.

PLAN

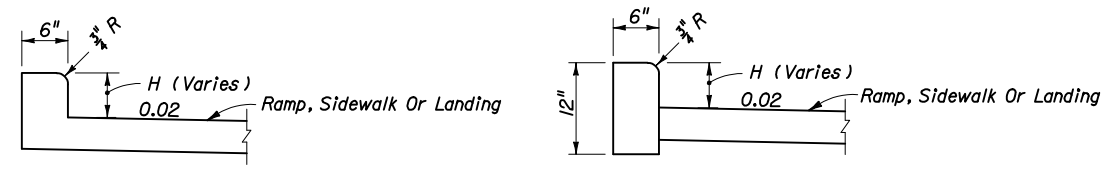


SECTION AA

CR 26

**DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS FOR LINEAR PEDESTRIAN TRAFFIC**

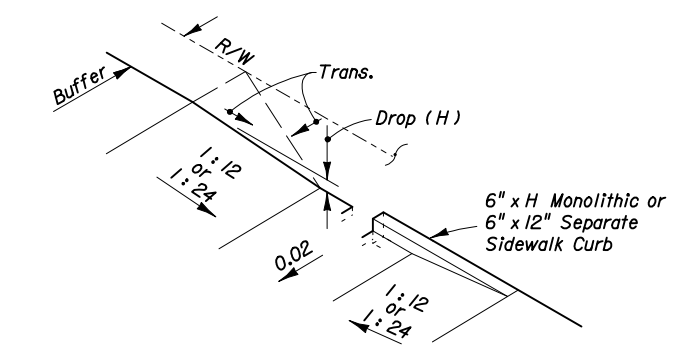
**DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK COMBINED CORNER RAMPS UNDER CONDITIONS OF INFEASIBILITY**



MONOLITHIC CAST CURB

SEPARATELY CAST CURB

**RAMP AND SIDEWALK CURB OPTIONS**

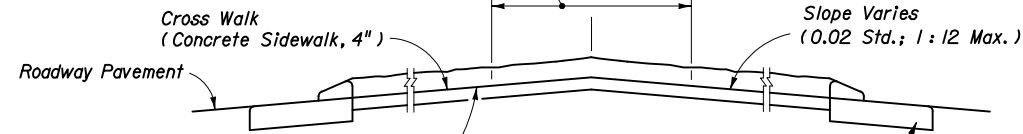


Construct Sidewalk Curb In Absence Of Adequate Buffer, Maintainable Surface Contour, Abutting Structure, Or When Called For In The Plans Or Standards

**BACK OF SIDEWALK CURB OR BUFFER TRANSITION**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PUBLIC SIDEWALK CURB RAMPS</b>				
Names	Dates	Approved By		
Designed By	STAFF	10/94	 State Roadway Design Engineer	
Drawn By	HKH	10/94		
Checked By	JVG	10/94		
Revision	00	Sheet No.		
			Index No.	304

5' Refuge With Maximum Slope Of 0.02 Must Be Provided When Slopes Of 0.05 Or Flatter And 5' In Length Are Not Available On Crosswalk; The Refuge Can Be Constructed At Any Location Within The Crosswalk; Or, A 5' x 5' Concrete Landing With Maximum Slope Of 0.02 Can Be Constructed Adjacent To The Crosswalk.

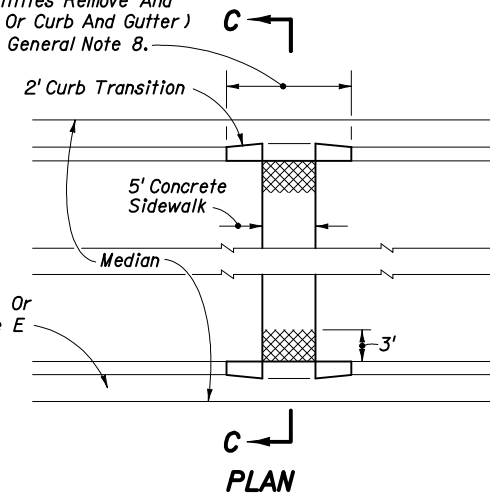


Slopes Shall Intersect At Centerline Of Median On The 0.02 Rate When The Edge Of Pavement Elevations Are Equal. The Slopes May Intersect Off The Centerline For Variable Edge Of Pavement Elevations Or To Accommodate Other Construction In The Median; However, Slopes Shall Not Be Steeper Than 1:12.

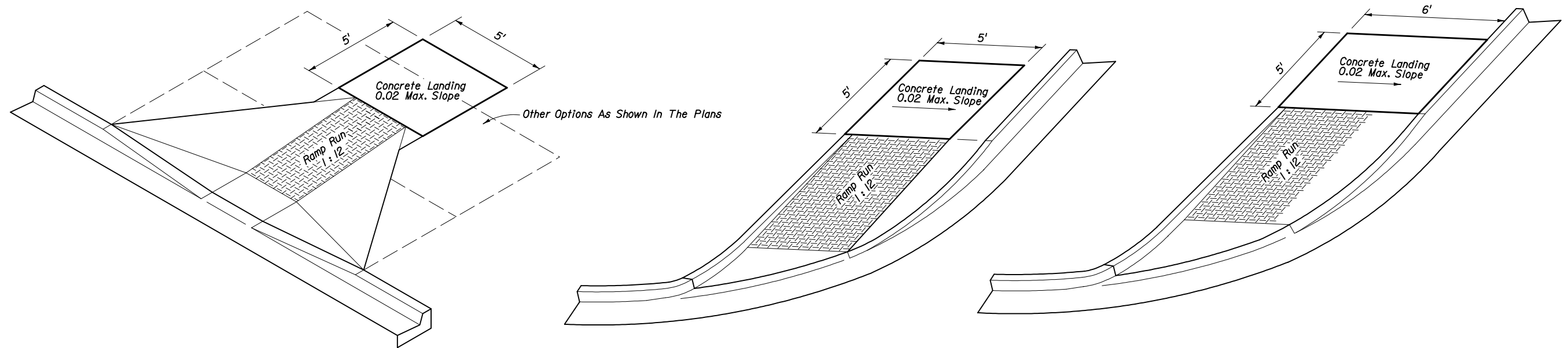
SECTION CC

**MEDIAN CROSSWALKS**

Curb Transition (On Existing Facilities Remove And Reconstruct Curb Or Curb And Gutter) For Payment See General Note 8.



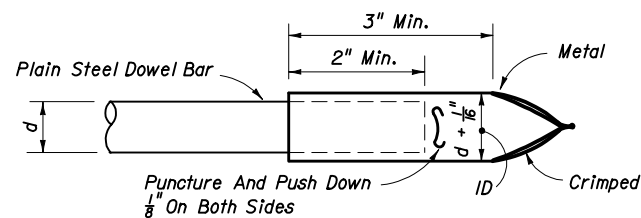
Curb Types A Or B Or Curb & Gutter Type E (Curb And Gutter Type E Shown)



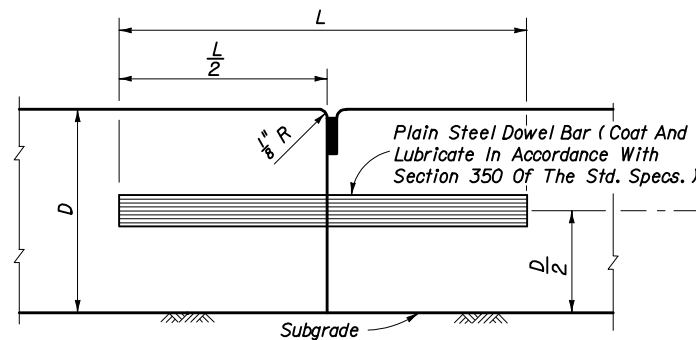
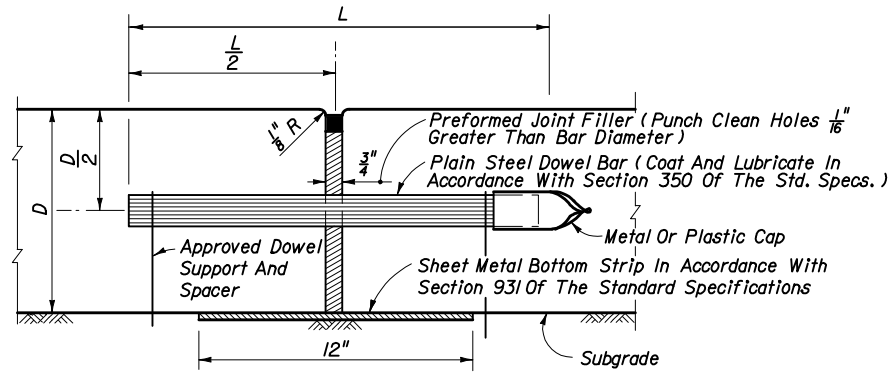
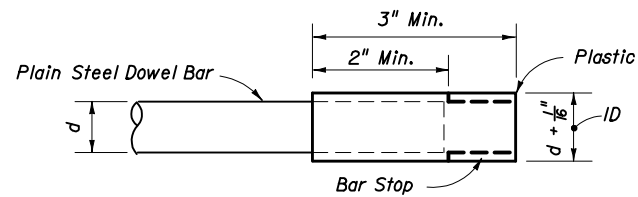
**LANDINGS FOR RAMPS WITHIN PUBLIC RIGHT OF WAY CONSTRUCTED AT LOCATIONS WHERE FUTURE SIDEWALKS ARE PROPOSED, WHERE STABLE SURFACES OTHER THAN SIDEWALKS ARE PART OF A CONTINUOUS PASSAGE OR WHERE A CURB FALLS ALONG THE CIRCULATION PATH TO PEDESTRIAN ROUTES ON ADJACENT SITES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PUBLIC SIDEWALK CURB RAMPS</b>				
Names	Dates	Approved By		
Designed By	STAFF	10/94	 State Roadway Design Engineer	
Drawn By	HKH	10/94		
Checked By	JVG	10/94	Revision	00
			Sheet No.	5 of 5
			Index No.	304





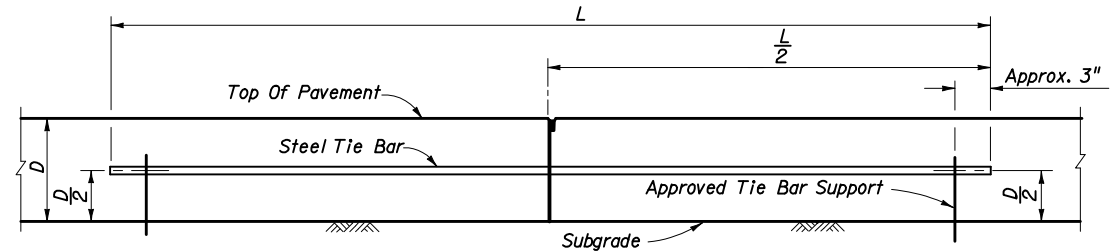
**METAL OR PLASTIC CAPS FOR DOWEL BARS**



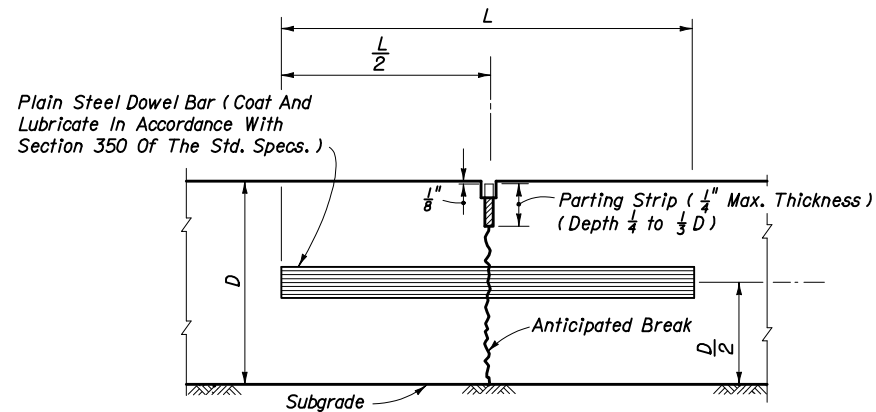
**BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUANCES OF WORK**

Note: Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in detail plans.

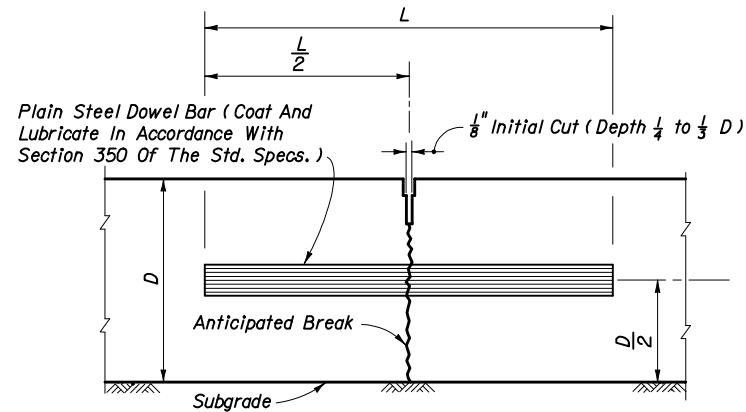
**TRANSVERSE EXPANSION JOINT**



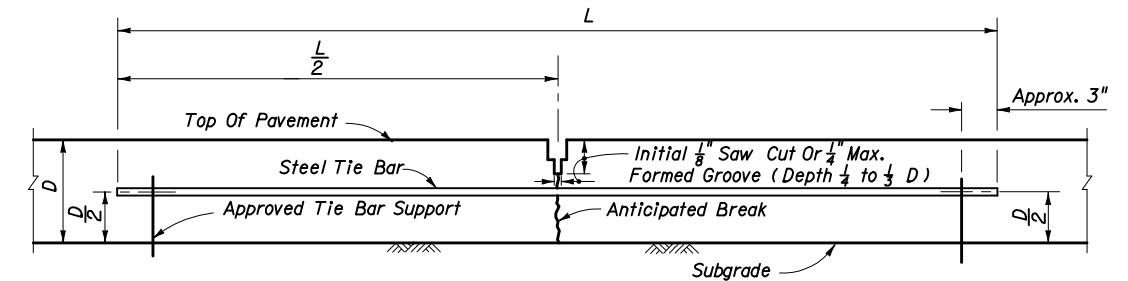
Note: Tie bar spacing shall not exceed 24" at these joints.  
**LONGITUDINAL BUTT CONSTRUCTION JOINT**



**TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD**

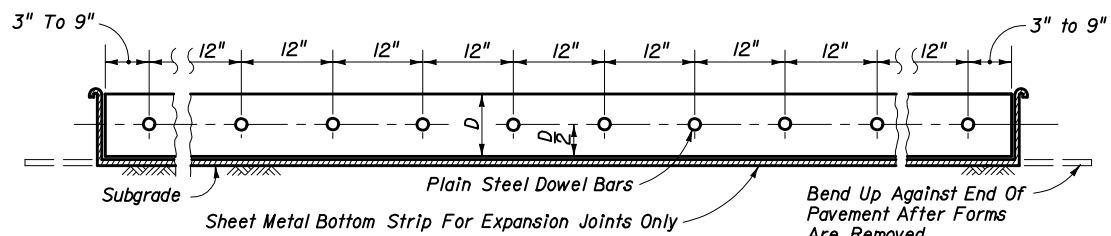


**TRANSVERSE CONTRACTION JOINT, SAWED METHOD**



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

**LONGITUDINAL LANE-TIE JOINT**



**DOWEL BAR LAYOUT**

DOWELS (LENGTH 18")	
Pavement Thickness "D"	Diameter
6"	3/4"
7"	1"
8"	1"
9"	1 1/4"
10"	1 1/4"
≥11"	1 1/2"

TRANSVERSE JOINTS ARE TO BE SPACED AT A MAXIMUM OF 15'. DOWELS ARE REQUIRED AT ALL TRANSVERSE JOINTS UNLESS OTHERWISE NOTED IN PLANS.

**TRANSVERSE JOINTS**

**LONGITUDINAL JOINTS**

Note: For joint seal dimensions see Sheet 2.

Pavement Thickness "D"	MAXIMUM TIE BAR SPACING			
	Distance To Closest Free Edge			
	12'	24'	24'	24'
	#4 Bars Length 25"	#5 Bars Length 30"	#4 Bars Length 25"	#5 Bars Length 30"
6"	48"	48"	26"	41"
7"	45"	48"	22"	35"
8"	39"	48"	19"	31"
9"	35"	48"	17"	27"
10"	31"	48"	15"	24"
11"	29"	45"	14"	22"
12"	26"	41"	13"	20"
13"	24"	38"	12"	19"
14"	22"	35"	11"	17"
15"	21"	33"	10"	16"

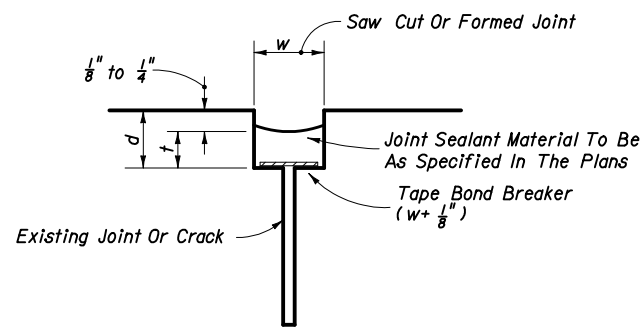
Tie bars are deformed #4 or #5 reinforcing steel bars meeting the requirements of Section 931 of the Standard Specifications.

When the distance to the closest free edge exceeds 24', provide a standard load transfer tied joint with #4 bars at 24" spacing. This joint can then be considered a free edge for determination of tie bar spacing on other joints.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

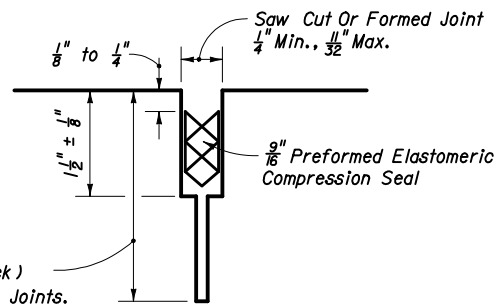
**CONCRETE PAVEMENT JOINTS**

Designed By	Names	Dates	Approved By <i>Bruce Distel</i>		
Drawn By	HW	08/57	State Pavement Design Engineer		
Checked By	HBC	08/57	Revision	Sheet No.	Index No.
			00	1 of 4	305



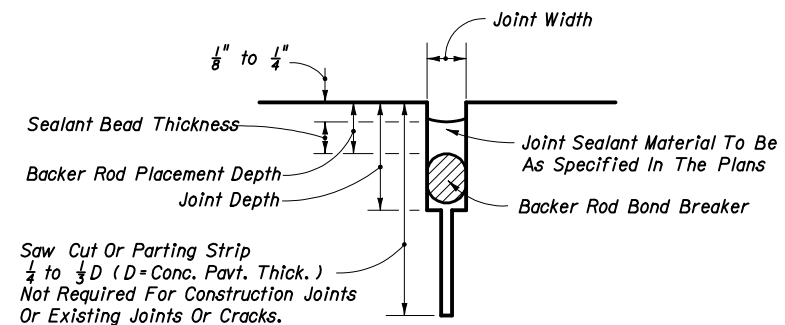
Note: Dimension w will be shown in the plans or established by the Engineer based on field conditions. Dimension d will be constructed so that the shape factor  $\frac{d}{w}$  has a maximum value of 2.0 and a minimum value of 1.0.

FOR REHABILITATION PROJECTS  
**TAPE BOND BREAKER**



Saw Cut Or Parting Strip  
 $\frac{1}{4}$  to  $\frac{1}{2}$  D (D = Conc. Pavt. Thick)  
Not Required For Construction Joints.

FOR NEW PROJECTS  
**PREFORMED ELASTOMERIC COMPRESSION SEAL**



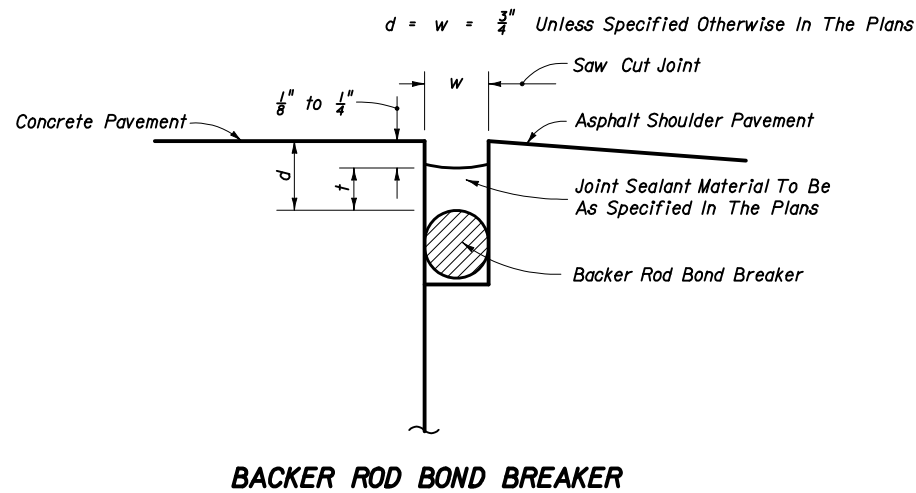
FOR NEW AND REHABILITATION PROJECTS  
**BACKER ROD BOND BREAKER**

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
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	1	$\frac{1}{2}$
$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{8}$	$1\frac{1}{2}$	$\frac{1}{2}$
$\frac{5}{8}$	$\frac{5}{16}$	$\frac{3}{4}$	$1\frac{1}{2}$	$\frac{9}{16}$
$\frac{3}{4}$	$\frac{3}{8}$	1	$1\frac{3}{4}$	$\frac{5}{8}$
$\frac{7}{8}$	$\frac{7}{16}$	$1\frac{1}{8}$	$1\frac{3}{4}$	$\frac{11}{16}$
1	$\frac{1}{2}$	$1\frac{1}{4}$	2	$\frac{3}{4}$
> 1	$\frac{1}{2}$	$1\frac{1}{2} +$	2+	$\frac{3}{4}$

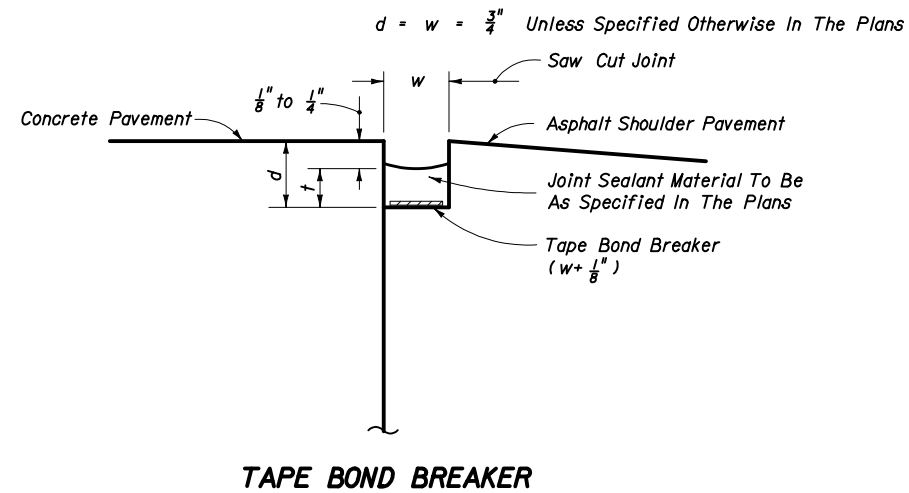
Unless otherwise indicated on the plans the joint width for new construction will be  $\frac{1}{4}$ " for construction joints,  $\frac{3}{8}$ " for all other joints.

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**



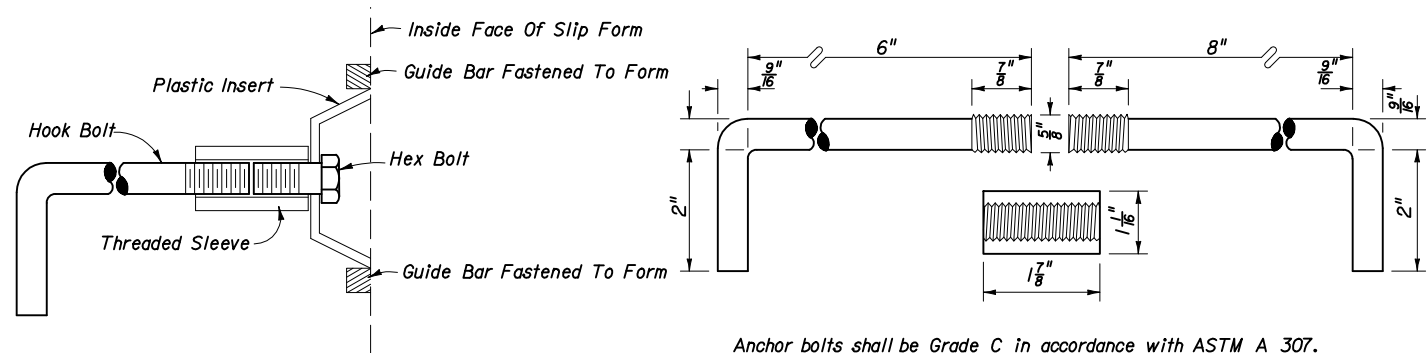
**TAPE BOND BREAKER**

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

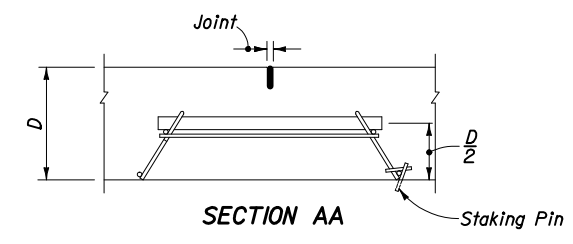
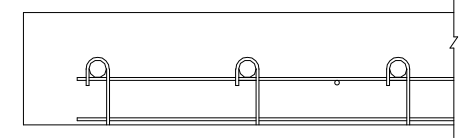
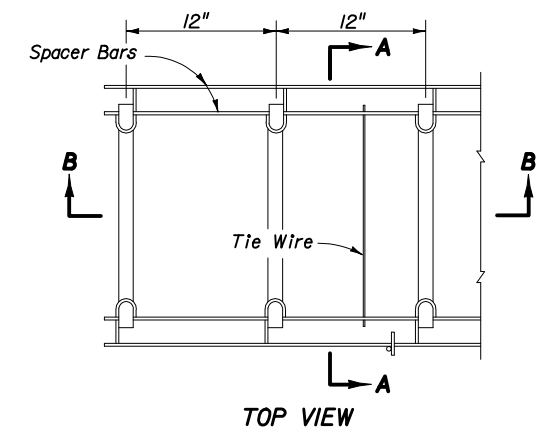
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
CONCRETE PAVEMENT JOINTS				
Names	Dates	Approved By		
Designed By	HWL	05/86	Bryan Distel State Pavement Design Engineer	
Drawn By	HSD	05/86	Revision	Sheet No.
Checked By	JVG	05/86	00	2 of 4
				Index No. 305



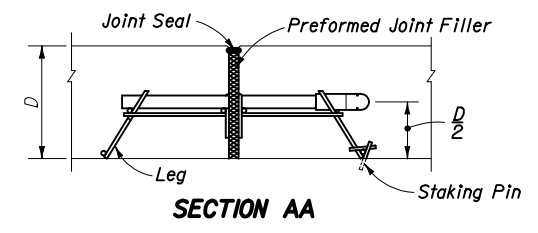
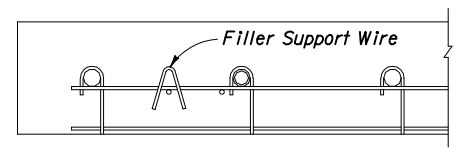
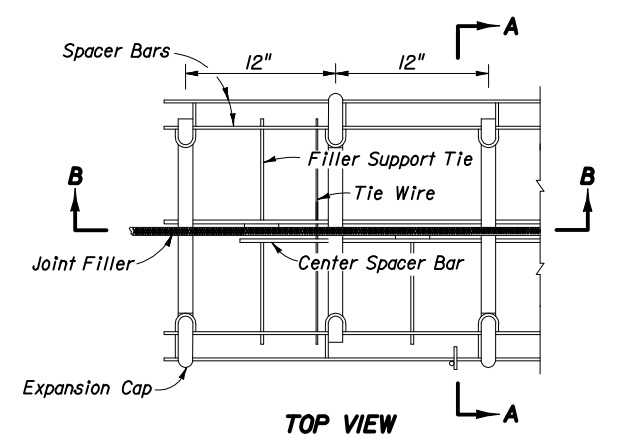
NOTE: After the concrete has set to the extent that the keyway will retain its shape, the hex bolt and plastic insert shall be removed. The remaining portion of the hook bolt assembly shall be installed immediately prior to placing of concrete in the adjacent lane.

Anchor bolts shall be Grade C in accordance with ASTM A 307. Threaded sleeves shall develop the full strength of the bolt and meet the material and thread requirements of ASTM A 563.

**ALTERNATE KEYWAY AND HOOK BOLT  
STEEL HOOK BOLT ASSEMBLY**

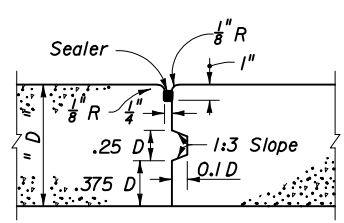


**CONTRACTION ASSEMBLY**

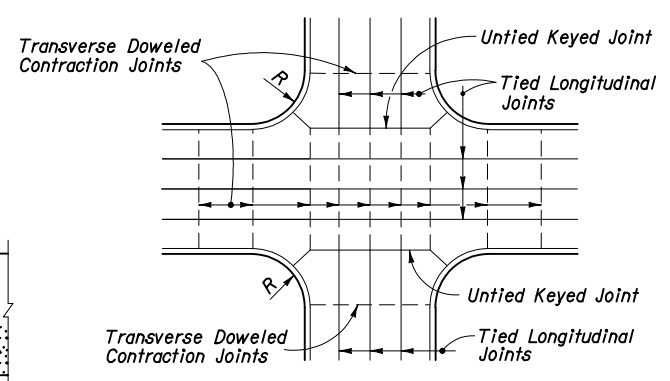


**EXPANSION ASSEMBLY**

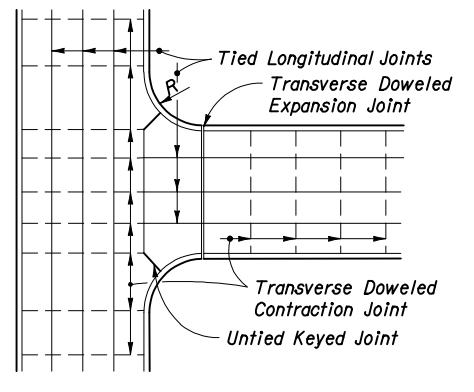
Note:  
Proprietary contraction and expansion assemblies may be used. Products shall be introduced to the State Construction Office in accordance with section (C) of the Product Evaluation Procedure.



**KEYED JOINT**



**JOINT LAYOUT AT THRU INTERSECTION**



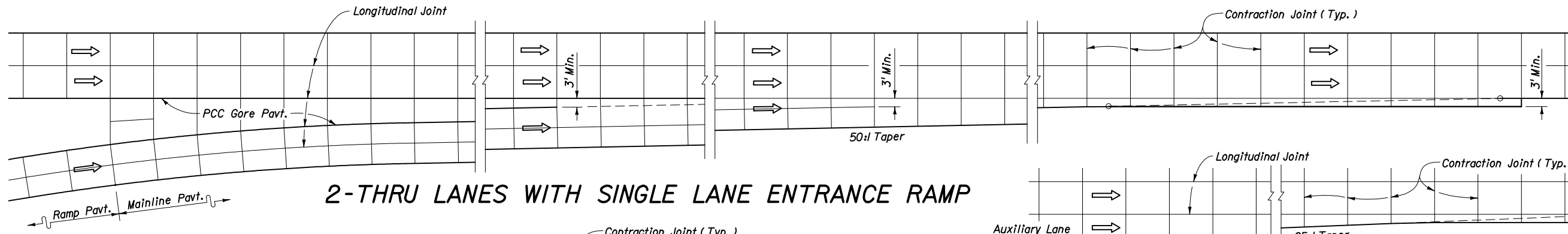
**JOINT LAYOUT AT 'T' INTERSECTIONS**

**NOTES**

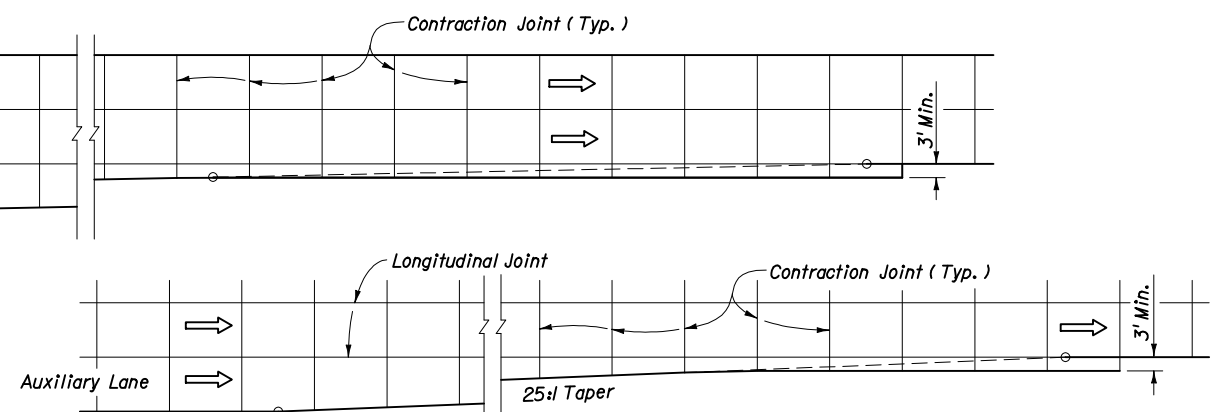
1. Longitudinal joints will not be required for single lane pavement 14' or less in width. For entrance and exit ramp joint details, see Sheet 4 of 4.
2. Arrangement of longitudinal joints are to be as directed by the Engineer.
3. All manholes, meter boxes and other projections into the pavement shall be boxed-in with 1/2" preformed expansion joint material.

**JOINT ARRANGEMENT**

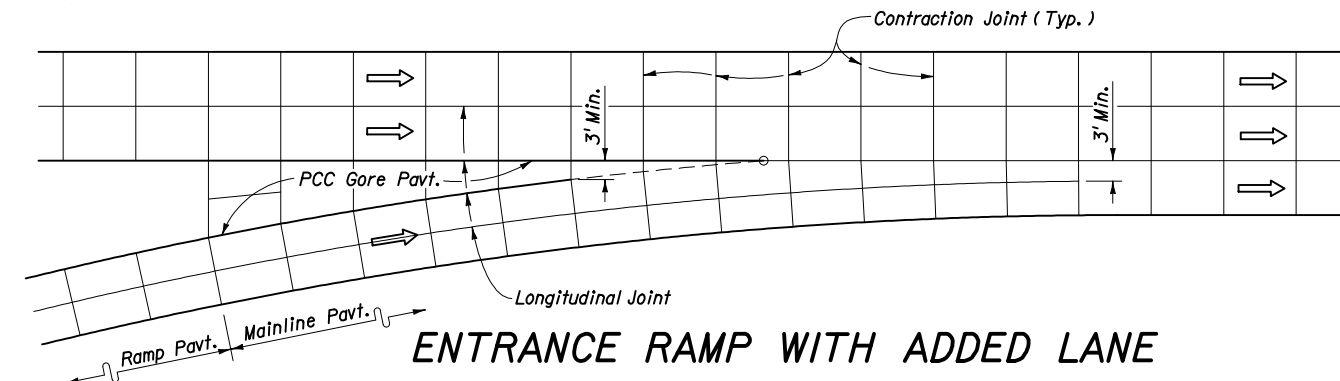
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE PAVEMENT JOINTS</b>				
Names	Dates	Approved By <i>Bruce Dittel</i>		
Designed By HMD	07/97	State Pavement Design Engineer		
Drawn By HSD	07/94	Revision	Sheet No.	Index No.
Checked By HMD	07/97	00	3 of 4	305



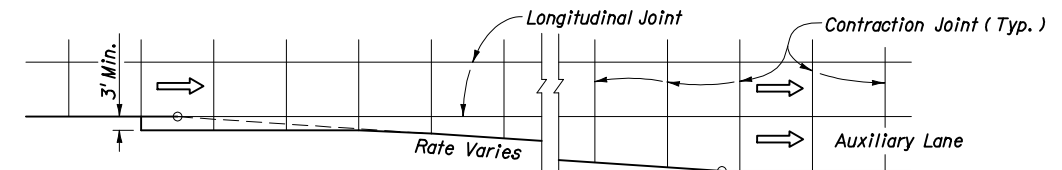
2-THRU LANES WITH SINGLE LANE ENTRANCE RAMP



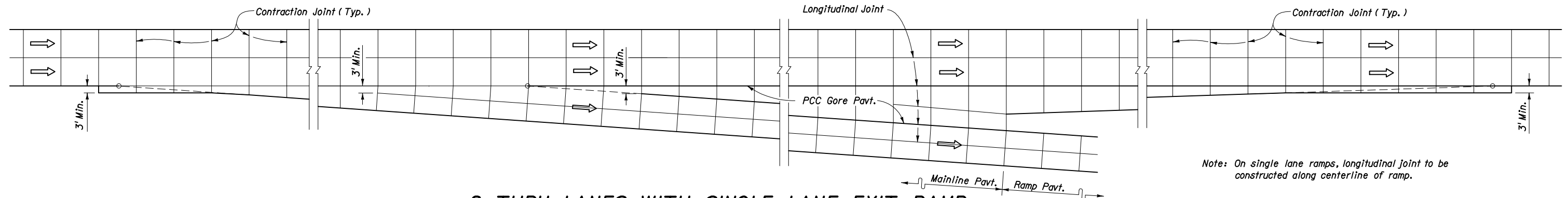
ENTRANCE TAPER WITH AUXILIARY LANE



ENTRANCE RAMP WITH ADDED LANE

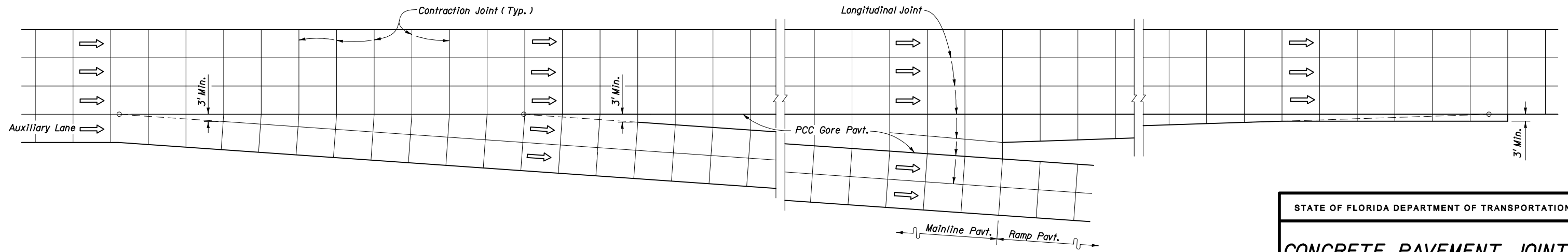


EXIT TAPER WITH AUXILIARY LANE



2-THRU LANES WITH SINGLE LANE EXIT RAMP

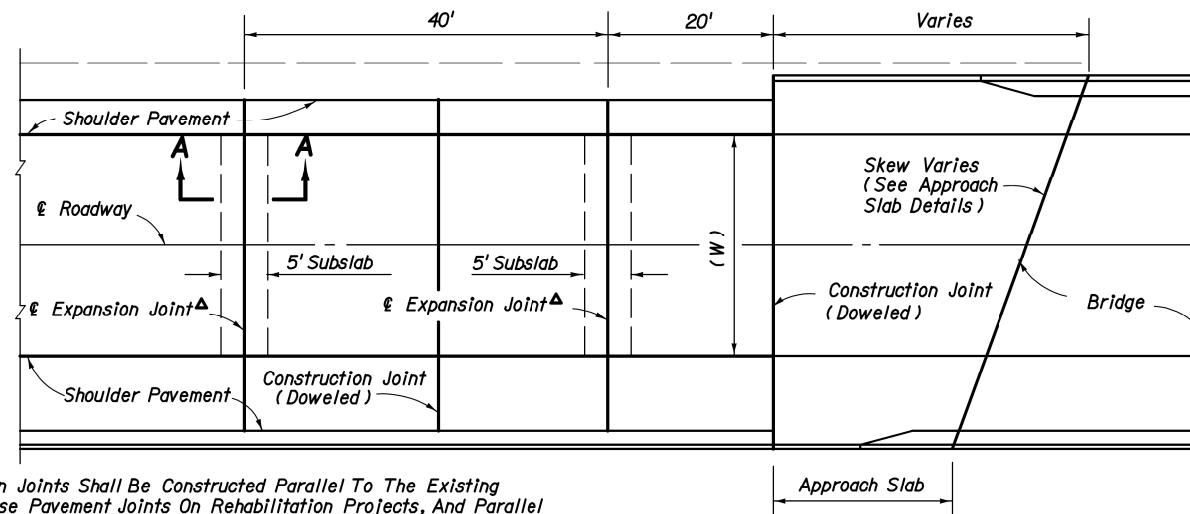
Note: On single lane ramps, longitudinal joint to be constructed along centerline of ramp.



3-THRU LANES WITH AUXILIARY LANE AND 2-LANE EXIT RAMP

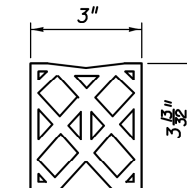
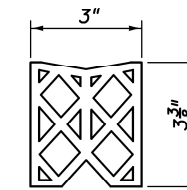
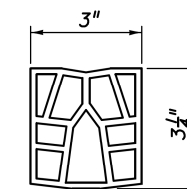
JOINT LAYOUT AT ENTRANCE AND EXIT RAMP TERMINALS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
CONCRETE PAVEMENT JOINTS				
Designed By	Names	Dates	Approved By	
Drawn By	HKH/STD	11/91	B. W. D. [Signature]	
Checked By	WNL	11/91	Revision	00
			Sheet No.	4 of 4
			Index No.	305

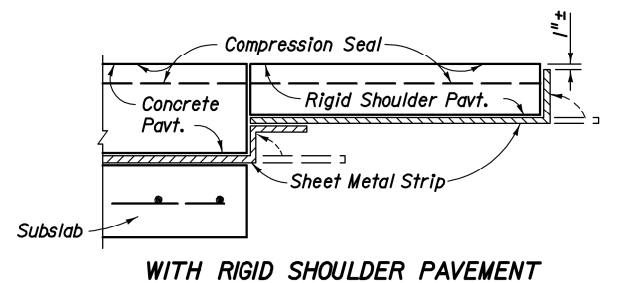


▲ Expansion Joints Shall Be Constructed Parallel To The Existing Transverse Pavement Joints On Rehabilitation Projects, And Parallel To The Standard Transverse Pavement Joints Shown In The Plans For New Construction.

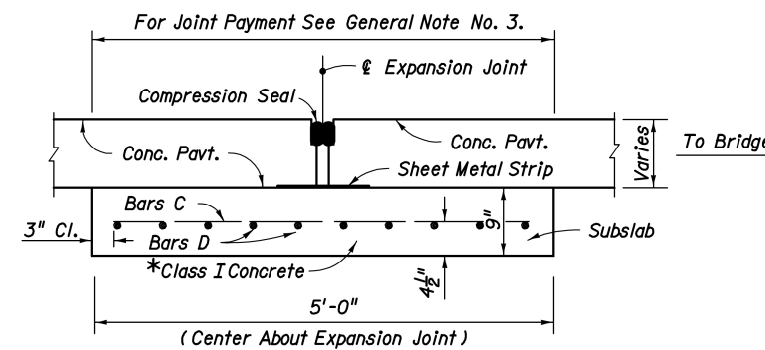
PLAN



OPTIONAL SEALS



WITH RIGID SHOULDER PAVEMENT



REINFORCING STEEL				
Mark	Size	Spac.	No. Req.	Lgth.
C	5	6"	Varies	4'-6"
D	5	6"	10	W Minus 6"

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

SECTION AA EXPANSION JOINT

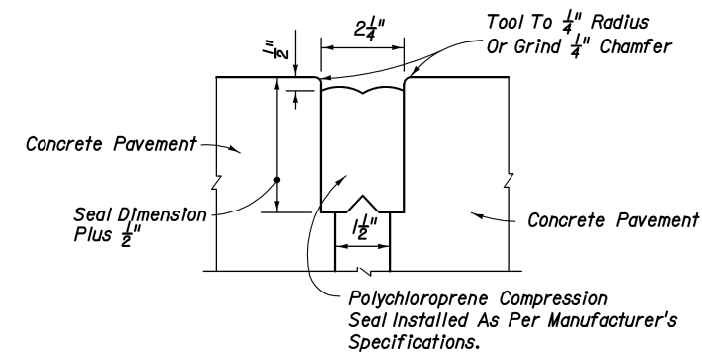
WITH GRASSED SHOULDER OR FLEXIBLE SHOULDER PAVEMENT

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-526, Coating Designation G90.

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

DETAIL SHOWING SHEET METAL STRIP



Note: All contacting surfaces between the compression seal and concrete shall be thoroughly coated with a lubricant-adhesive.

JOINT DIMENSIONS COMPRESSION SEAL DETAIL

DESIGN NOTES

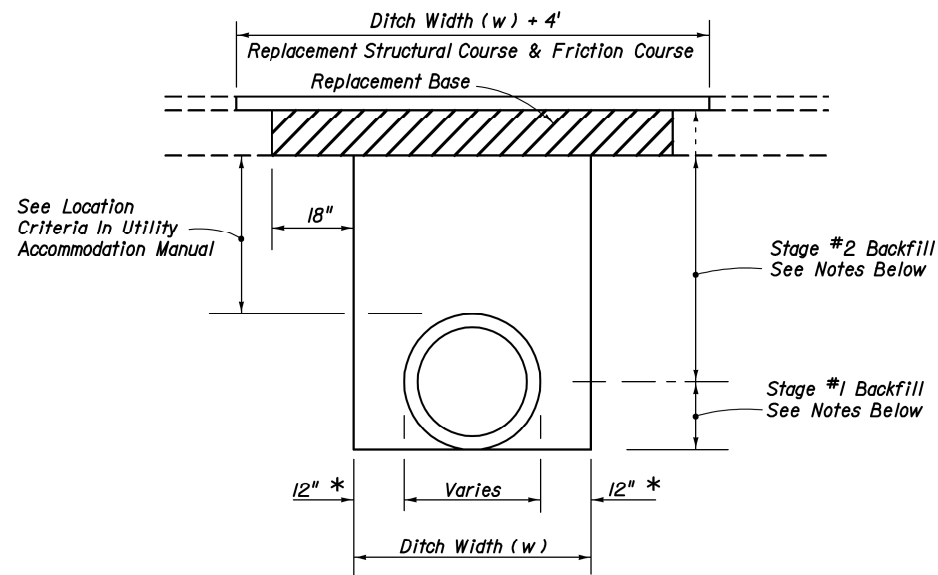
- For rehabilitation projects, the designer must indicate in the plans the number of slabs to be removed, the number of slabs to be constructed/reconstructed, and the location of expansion joints.
- Pay quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement. Shoulder pavement joint included.

GENERAL NOTES

- The centerline of roadway and the centerline of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the centerline of the roadway pavement shall be determined.
- For information on other types of concrete pavement joints see Index No. 305.
- Pay quantity for expansion joint is the length of joint to be constructed across the roadway and shoulder pavements, measured at right angles to the centerline of the roadway. Payment for expansion joint shall be full compensation for joint construction, including reinforced concrete subslab, sheet metal strip and compression seal, but, not including roadway pavement reconstruction associated with joint replacement or reconstruction. Expansion joint to be paid for under the contract unit price for Bridge Approach Expansion Joint, LF.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
BRIDGE APPROACH EXPANSION JOINT-CONCRETE PAVEMENT

Names	Dates	Approved By <i>Bruce Ditch</i>		
Designed By		State Pavement Design Engineer		
Drawn By	LMF 06/75	Revision	Sheet No.	Index No.
Checked By	SFA 06/75	00	1 of 1	306



**FLEXIBLE PAVEMENT NOTES**

**PAVEMENT REMOVAL AND REPLACEMENT**

Pavement shall be mechanically sawed.

The replacement friction course shall match the existing friction course, except Structural course may be used in lieu of dense graded friction course. The thickness of the replacement asphalt pavement shall match the thickness of the existing asphalt pavement.

The new base materials shall be either of the same type and composition as the materials removed or of equal or greater structural adequacy (See Index No. 514).

**BACKFILL**

**COMPACTED AND STABILIZED FILL OPTION**

Backfill material shall be placed in accordance with Section 125 of the Standard Specifications.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct compacted fill along the sides of the pipe and up to the bottom of the base, with the upper 12" receiving Type B Stabilization. In lieu of Type B Stabilization, the Contractor may construct using Optional Base Group 3.

**\* FLOWABLE FILL OPTION**

If mechanical compaction is difficult to achieve, then flowable fill may be used. When flowable fill is used, this dimension may be reduced to 4".

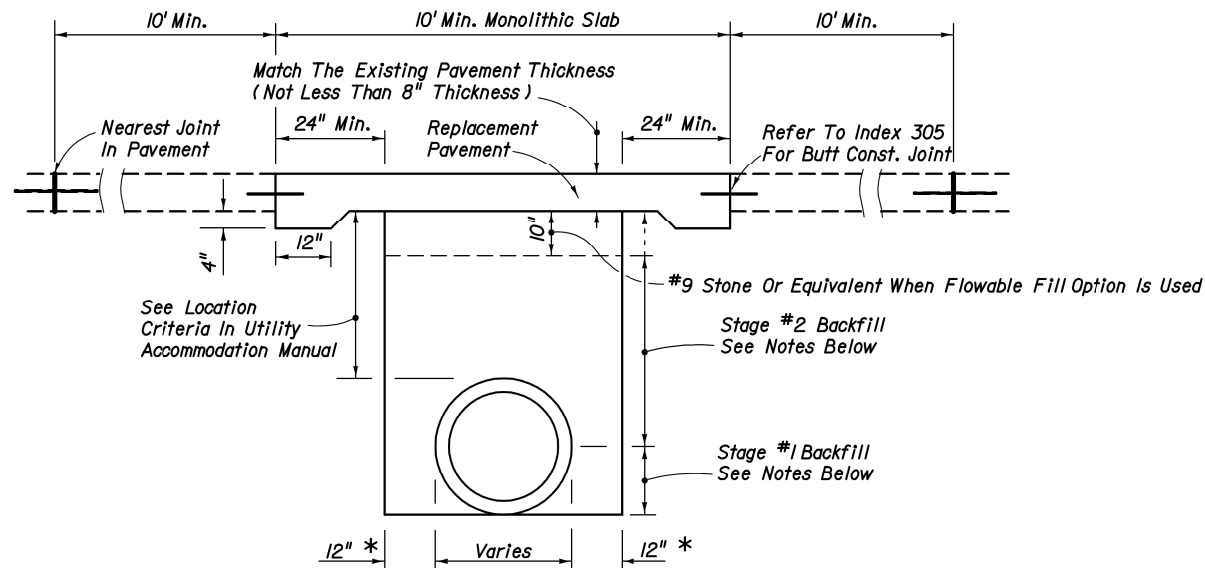
Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

If forms are used to temporarily contain flowable fill, the forms shall be in accordance with the Standard Specifications.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.

In Stage #2, place flowable fill to the bottom of the existing base course. Do not allow the utility being installed to float. If a method is provided to prevent floatation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

**FLEXIBLE PAVEMENT CUT**



**RIGID PAVEMENT NOTES**

**PAVEMENT REMOVAL AND REPLACEMENT**

High early strength cement concrete (3000 psi) meeting the requirements of Standard Specification 346 shall be used for rigid pavement replacement.

Pavement shall be mechanically sawed and restored to conform with existing pavement joints within 12 hours. (See Index No. 305)

**GRANULAR BACKFILL**

Any edgedrain system that is removed shall be replaced with the same type materials. Any edgedrain system that is damaged shall be repaired with methods approved by the Engineer.

Fill material shall be placed in accordance with the Standard Specifications. Fill material shall be special select soil in accordance with Index No. 505.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct fill along the sides of the pipe and up to the bottom of replacement pavement.

**\* FLOWABLE FILL OPTION**

If mechanical compaction is difficult to achieve, then flowable fill may be used. When flowable fill is used, this dimension may be reduced to 4".

Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

If forms are used to temporarily contain flowable fill, the forms shall be in accordance with the Standard Specifications.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.

In Stage #2, place flowable fill to the bottom of the stone layer. Do not allow the utility being installed to float. If a method is provided to prevent floatation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

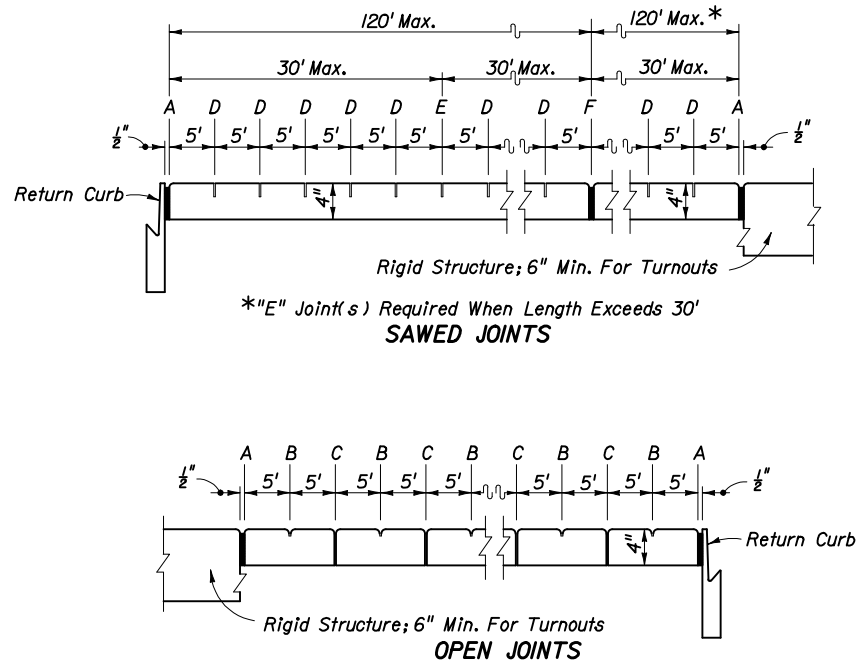
**RIGID PAVEMENT CUT**

**GENERAL NOTES**

- The details provided in this standard index apply to cases in which Jack and bore or directional boring methods are not feasible.
- Flowable fill shall not be placed directly over loose, or High Plastic, or Muck material (see Index 505) which will cause settlement due to fill weight. Where highly compressible material exists, the amount, shape and depth of flowable fill must be engineered to prevent pavement settlement.
- These details should not apply to utility cuts longitudinal to the centerline of the roadway which may require the additional use of geotextiles, special bedding and backfill, or other special requirements.
- Method of construction must be approved by the Engineer.
- Some pipe may require special granular backfill up to 6" above top of pipe. Geotextiles may be required to encapsulate the special granular material.
- Where asphalt concrete overlays exist over full slab concrete pavement, the replacement pavement shall have an overlay constructed over the replacement slab. The overlay shall match the existing asphalt pavement thickness. The replacement friction course shall match the existing friction course, except Structural course may be used in lieu of dense graded friction course.  
  
Existing broken and seated pavements shall be treated as flexible pavements.
- All shoulder pavement, curb and curb and gutter and their substructure disturbed by utility trench cut construction shall be restored in kind.
- Approved permanent patch materials may be used in lieu of structural courses.
- Where long sections of flowable fill are installed, caution must be applied so local ground water flow will not be interrupted.

**TRENCH CUT AND RESTORATION WITHIN ROADWAY LIMITS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>UTILITY CUT</b>				
Designed By	Names	Dates	Approved By	
Drawn By	JGW/RMD	12/95	State Utilities Engineer	
Checked By	HSD	12/95		
	RMD/JVG	12/95	00	1 of 1
				Index No. 307



\*"E" Joint(s) Required When Length Exceeds 30'  
**SAWED JOINTS**

Rigid Structure; 6" Min. For Turnouts  
**OPEN JOINTS**

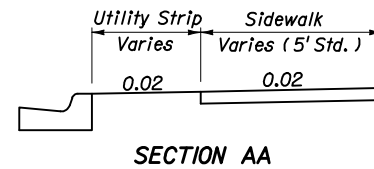
EXAGGERATED SCALE  
 LONGITUDINAL SECTION  
**SIDEWALK JOINTS**

**JOINT LEGEND**

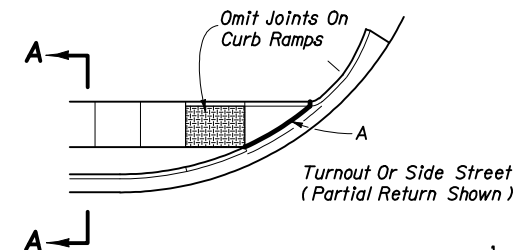
- A-  $\frac{1}{2}$ " Expansion Joints (Preformed Joint Filler)
- B-  $\frac{1}{8}$ " Dummy Joints, Tooled
- C-  $\frac{1}{8}$ " Formed Open Joints
- D-  $\frac{3}{16}$ " Saw Cut Joints,  $\frac{1}{2}$ " Deep (96 Hour) Max. 5' Centers
- E-  $\frac{3}{16}$ " Saw Cut Joints,  $\frac{1}{2}$ " Deep (12 Hour) Max. 30' Centers
- F-  $\frac{1}{2}$ " Expansion Joint When Run Of Sidewalk Exceeds 120'.  
 Intermediate locations when called for in the plans or at locations as directed by the Engineer.
- G- Cold Joint With Bond Breaker, Tooled

**NOTES FOR CONCRETE SIDEWALK ON CURBED ROADWAYS**

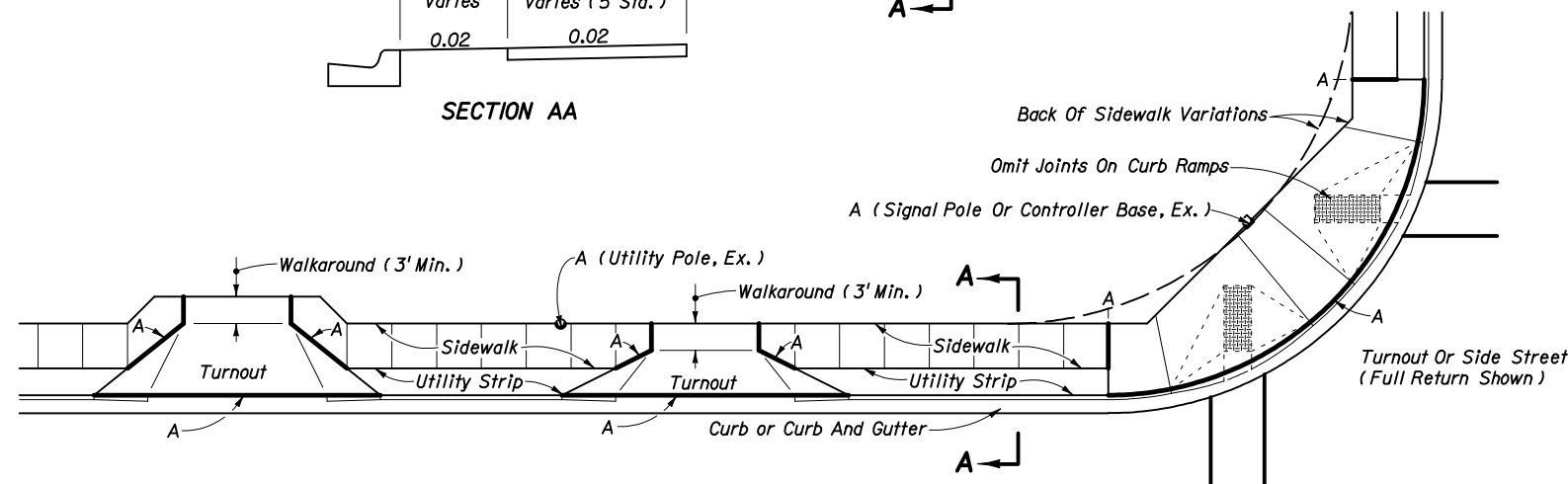
1. Sidewalks shall be constructed in accordance with Section 522 of the FDOT Standard Specifications except for public sidewalk curb ramp runs which shall be finished in accordance with Index No. 304.
2. Bond breaker material can be any impermeable coated or sheet membrane or preformed material having a thickness of not less than 6 mils nor more than  $\frac{1}{2}$ ".
3. For public sidewalk curb ramps see Index No. 304.
4. For turnouts see Index No. 515.
5. Sidewalk shall be paid for under the contract unit price for Sidewalk Concrete ( \_\_\_ Thick ), S.Y.



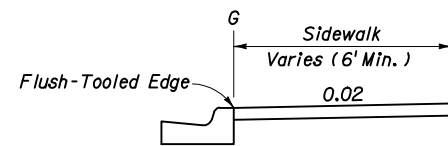
**SECTION AA**



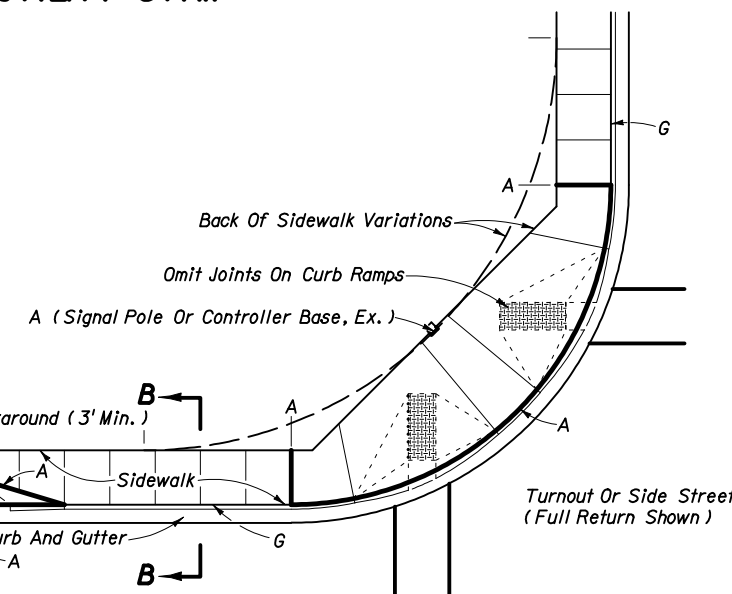
Turnout Or Side Street  
 (Partial Return Shown)



**SIDEWALK WITH UTILITY STRIP**



**SECTION BB**



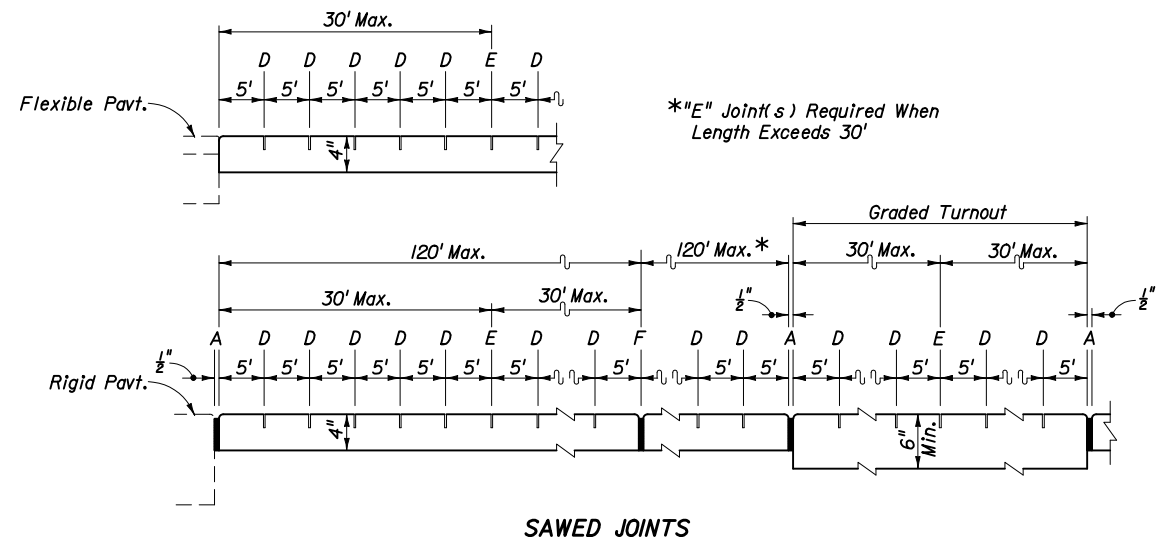
**SIDEWALK WITHOUT UTILITY STRIP**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE SIDEWALK**

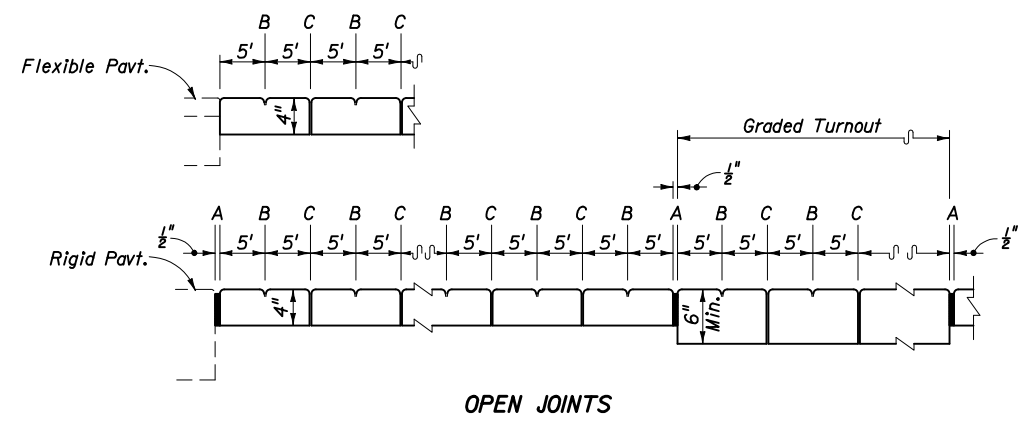
Names	Dates	Approved By			
Designed By	SPBCS	 State Roadway Design Engineer			
Drawn By	HKH				11/93
Checked By	JVG	11/93	00	1 of 2	310

**CONCRETE SIDEWALK FOR CURBED ROADWAYS**

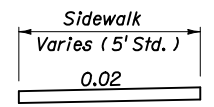


**NOTES FOR CONCRETE SIDEWALKS ON UNCURBED ROADWAYS**

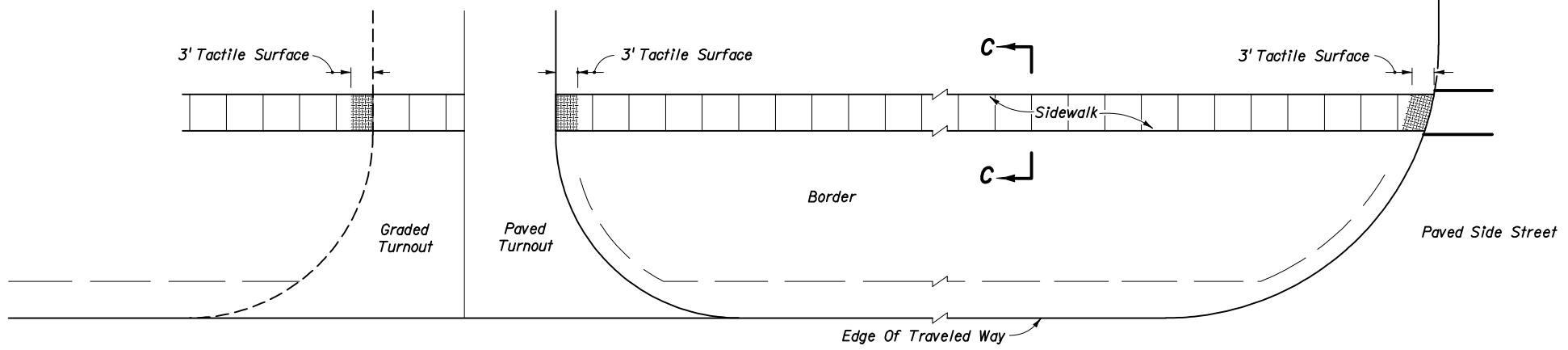
1. Sidewalks shall be constructed in accordance with Section 522 of the FDOT Standard Specifications.
2. Sidewalks crossing streets and driveways shall have a tactile surface for a minimum of 3' adjacent to each crossing. Tactile surfaces shall conform to the requirements described in the General Notes on Index No. 304.
3. For turnouts see Index No. 515.
4. Sidewalk shall be paid for under the contract unit price for Sidewalk Concrete ( \_\_\_\_ Thick ), SY.



**OPEN JOINTS**  
EXAGGERATED SCALE  
**LONGITUDINAL SECTIONS**  
**SIDEWALK JOINTS**



**SECTION CC**



**PLAN**

- JOINT LEGEND**
- A- 1/2" Expansion Joints (Preformed Joint Filler)
  - B- 1/8" Dummy Joints, Tooled
  - C- 1/8" Formed Open Joints
  - D- 3/16" Saw Cut Joints, 1 1/2" Deep (96 Hour) Max. 5' Centers
  - E- 3/16" Saw Cut Joints, 1 1/2" Deep (12 Hour) Max. 30' Centers
  - F- 1/2" Expansion Joint When Run Of Sidewalk Exceeds 120'. Intermediate locations when called for in the plans or at locations as directed by the Engineer.

**CONCRETE SIDEWALKS FOR UNCURBED ROADWAYS**


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>CONCRETE SIDEWALK</b>					
Designed By	SPBCS	Dates	Approved By <i>Ben Blankenship</i> State Roadway Design Engineer		
Drawn By	HKH	4/99	Revision	Sheet No.	Index No.
Checked By	JVG	4/99	00	2 of 2	310



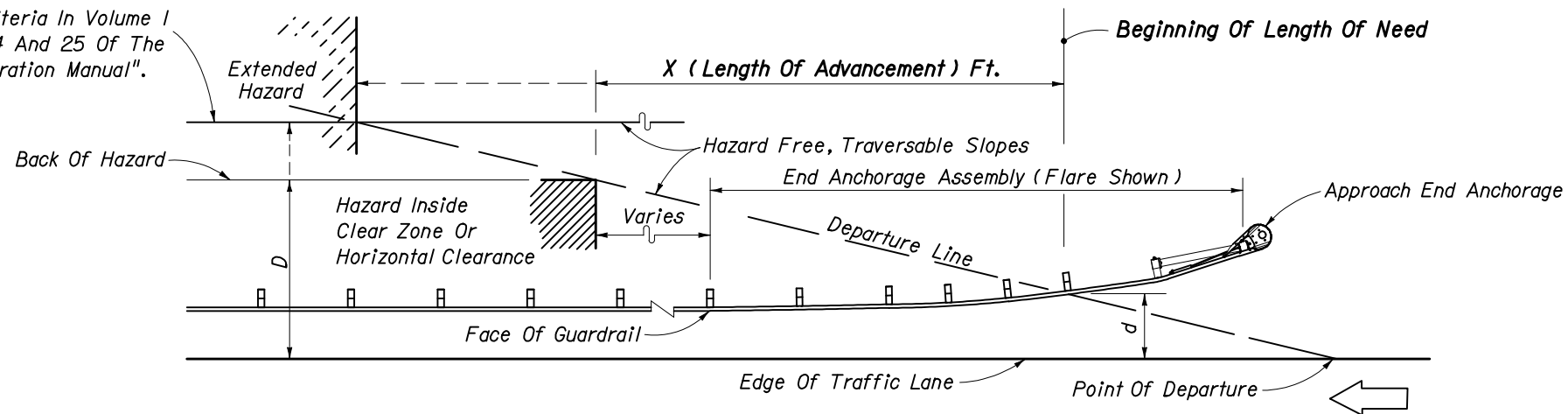
## GENERAL NOTES

1. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific condition to attain optimum design for function, economy and serviceability.
2. The beginning of guardrail need shall be at the greatest of the upstream distances from the hazard, as determined from Figure 1, and other application details of this Index.
3. One Panel (i.e. panel length) equals 12'-6". Guardrail shall be constructed with rail elements 12'-6" in length except where 25'-0" elements are called for by this and other standards (indexes) or specifically called for in the plans.  
  
Post spacings shall be 6'-3" except that reduced spacings shall be used for (a) transitions to anchorages at rigid structures such as bridges (See Details E and J) and transitions to redirective crash cushions, (b) the conditions in Note No. 7 below, (c) special post applications, (d) reduced post spacing required for specific end anchorage assemblies, and, (e) specific spacings called for in the plans.
4. Guardrail mounting height for the W-beam without rubrail and for thrie-beam is 1'-9" to the center of beam, and for W-beam with rubrail 2'-0" to center of beam. Modified thrie-beam shall be mounted at a height of 2'-0" to center of beam. The height is critical and shall be attained in all cases; a tolerance of 3" above and 1" below the standard mounting heights is permissible over necessary surface irregularities (e.g., across shoulder gutters, inlets and roadway surface break lines).
5. All guardrail panels, end sections and special end shoes shall be lapped in the direction of adjacent traffic.
6. Flared end anchorage assemblies providing 4' offset are the standard end treatments for single face free standing guardrail approach ends. Parallel end anchorage assemblies for guardrail approach end treatments will be constructed only when restraints prevent construction of flared end anchorages.
7. At above ground rigid hazards where the face of guardrail is offset from the hazard less than the 4' minimum for standard W-beam, other guardrail configurations may be applicable; see General Note No. 10 and the minimum offset table on Sheet 18. For guardrail with post spacing less than 6'-3" the reduced spacing should extend a minimum of one panel in advance of the hazard. When minimum offset cannot be attained safety shape concrete barrier shall be used unless other shielding is approved by the Engineer of record. See Index No. 410 for safety shape concrete barriers and typical applications, and the plans for special barrier shapes and applications.
8. In addition to use at conventional roadside hazards, guardrail will be required on flush shoulder sections where fill slopes are steeper than 1:3 within the clear zone, and on curbed sections where fill slopes are steeper than 1:3 within 4' of the face of curb. However, when fill heights are less than 6' the guardrail may be omitted, unless in the opinion of the Engineer its use is deemed necessary due to other roadside features.
9. The guardrail to bridge connections contained in this Index are for bridges with Test Level 4 safety shaped traffic rails. For guardrail to concrete barrier wall connections see Index No. 410.
10. Thrie-beam guardrail panels shall be used in guardrail transitions to bridge traffic rail barriers, to concrete and certain water filled safety shaped barriers, certain crash cushion and as a continuous barrier when called for in the plans. For additional information on rail attachment, post spacings, nested rails, location of thrie-beam transition panels and offset block configurations see details elsewhere in this Index, and Index Nos. 410, 416 and 435. The use of thrie-beam guardrail with standard offset blocks may be considered where one or more of the conditions listed below or similar conditions are anticipated or exist:
  - a. W-beam deflection is marginal,
  - b. W-beam with rubrail considered functionally deficient,
  - c. Overriding W-beam is probable,
  - d. Drainage will be impeded or blocked by the use of concrete barrier wall,
  - e. High frequency of repairs to W-beam,
  - f. Spandrel beam with low deflection needed around unrelocatable structure, and,
  - g. Accommodating passenger vehicles heavier or larger than the standard passenger car (e.g., passenger vans and small buses)

The modified thrie-beam guardrail may have application to accommodate large buses.
11. Single face median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:
  - (a) Wide medians where approach end anchor is located outside of opposing roadway clear zone.
  - (b) Medians of uniform width that are occupied by other transportation and joint use facilities.
  - (c) Medians of uniform or variable widths with independent vertical alignments not suited to normal median guardrail installations.
  - (d) Medians of bifurcated roadways.
12. Straight rail sections may be used to construct radii of 125' or greater. For radii less than 125' the rail must be fabricated (shop-bent) to fit.
13. 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. Crash cushions shall be constructed at or in lieu of Type II assemblies located in the approach clear zones.
14. Corrugated sheet steel beams, end shoes, end sections and back-up plates shall conform to the current requirements of AASHTO M180, Class A, Type II (zinc) coating. Aluminum guardrail elements will not be permitted unless specifically called for in the plans. All other metallic components, hardware and accessories shall be in conformance with the appropriate current AASHTO requirements.  
  
Recycled beams: Used Class A guardrail beams that have been refurbished to condition new (AASHTO M180) may be used for both construction of new guardrail and maintenance of existing guardrail. Refurbishing shall include stripping of the existing galvanizing, restoration of the base metal in section and straightness free of warp and deformation, and, regalvanizing to AASHTO Type II specifications. Refurbished beams that retain ruptured holes, gashes or tears will not be accepted.
15. Steel offset blocks other than modified thrie-beam offset blocks are not permitted for new guardrail construction. Existing steel offset blocks may remain throughout the service life of the existing guardrail. Permissible post and offset block combinations are tabulated on Sheet 16.
16. 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 971 of the Standard Specifications. No burning of holes will be permitted.
17. Guardrail reflector color (white or yellow) shall conform to the color of the near lane edgeline.
18. Any run of guardrail with existing concrete posts that is being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts are on hand at time of repair.
19. Substitutions between thrie-beam guardrail and concrete barrier wall are not eligible for VECP consideration.
20. On roadways designated for reverse laning, all downstream ends of guardrail that are not shielded or that are not designed as approach end terminals shall be marked with post-mounted Type 3 Object Markers. Trailing bridge ends and trailing shoulder concrete barrier wall ends shall be marked with Type 3 Object Markers except where there is trailing end guardrail. Object markers to be installed facing reverse laning traffic.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>GUARDRAIL</b>					
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Clear Zone Limit Or Horizontal Clearance Limit In Accordance With The Criteria In Volume I Chapters 2, 4 And 25 Of The "Plans Preparation Manual".



Design Speed mph	X (Length Of Advancement) Ft. <sup>■</sup>
≤ 45	= 16 (D-d)
≥ 50	= 13 (D-d)

■ Length of advancement determined from the diagram and equations above establishes the location of the upstream beginning length of need for guardrail, however, the length of advancement can be no less than that required by other details of this index.

The flared end anchorage with 4' nose offset is shown in the diagram above, however, the diagram applies to other configurations that may occur at the beginning of length of need, such as, other flare designs; upstream returns; and, other upstream deflected, tangent and curvilinear conditions.

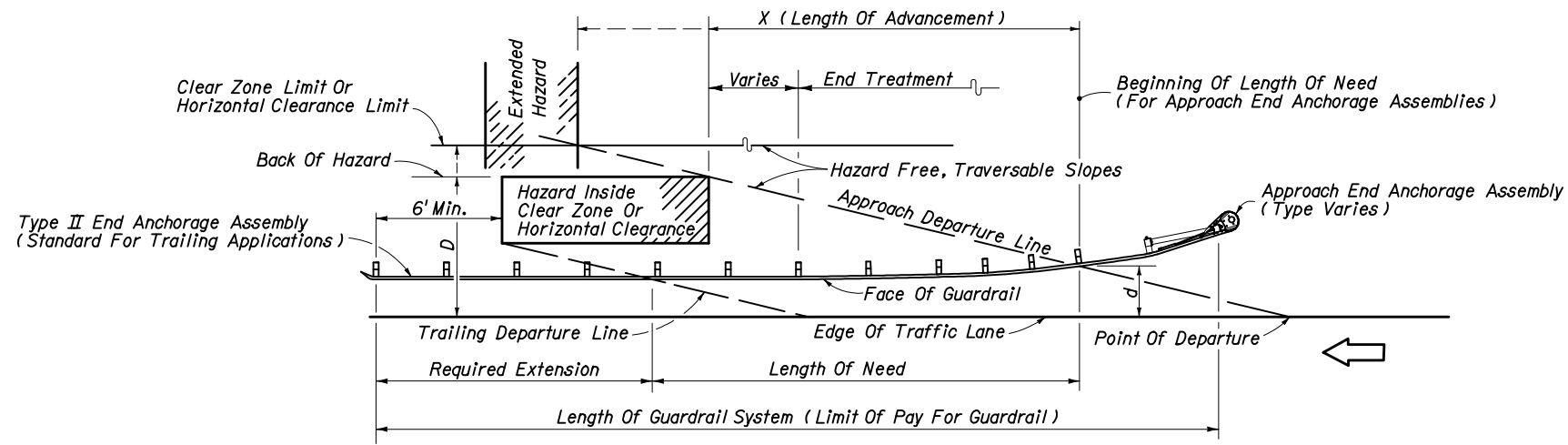
**Equation Variables:**

D=Distance in feet from near edge of the near approach traffic lane to either (a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance or (b) the clear zone or horizontal clearance outer limit, when the hazard extends to or goes beyond the clear zone or horizontal clearance limit. For left side hazards on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane (see Figure 2).

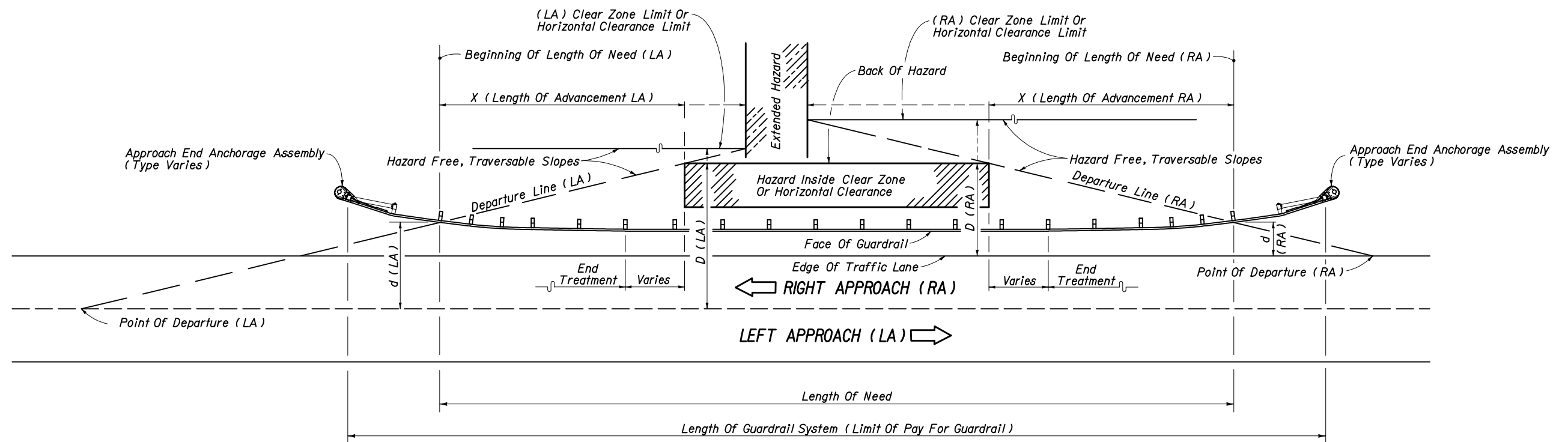
d=Distance in feet from the near edge of the near approach traffic lane to the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane (see Figure 2).

**LENGTH OF ADVANCEMENT - FIGURE 1**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>GUARDRAIL</b>					
Designed By	Names	Dates	Approved By		
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(LEFT SIDE OPPOSITE HAND)  
**ONE-WAY TRAFFIC**

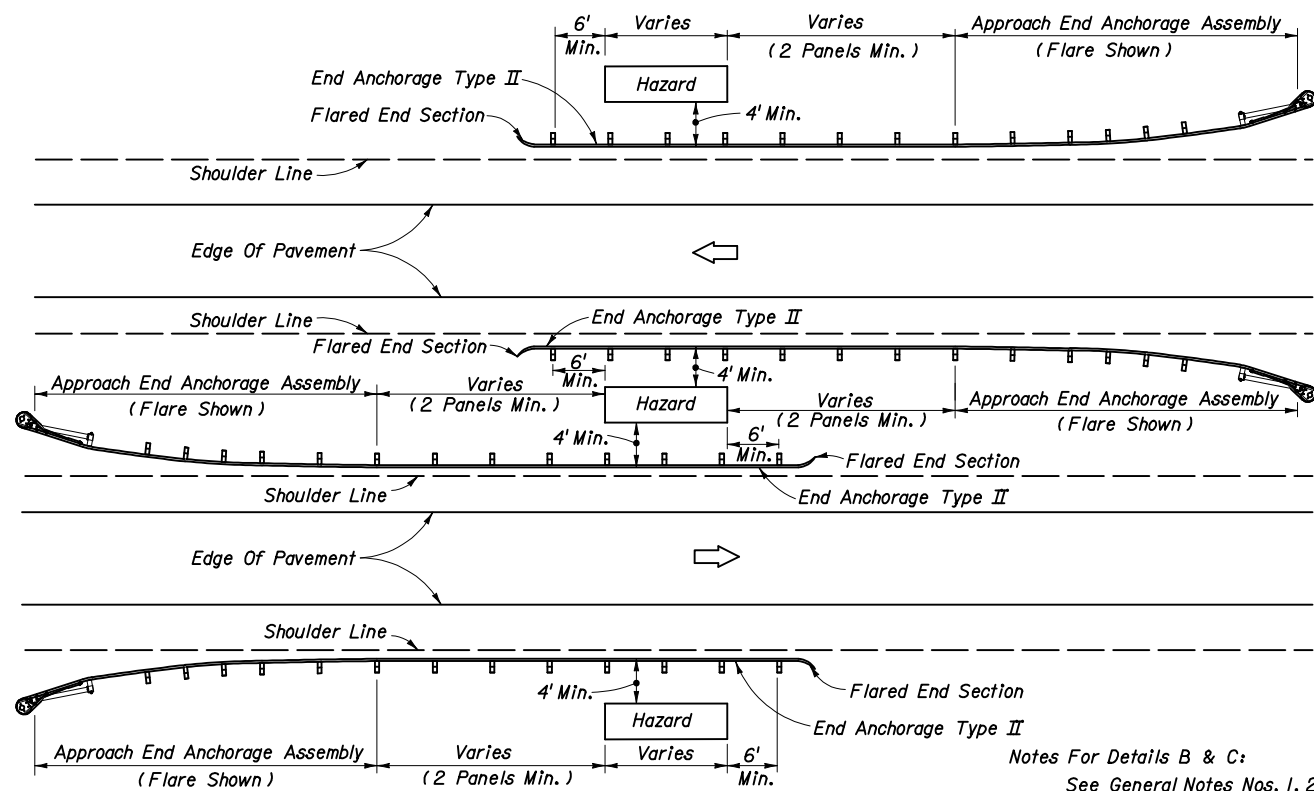


**TWO-LANE TWO-WAY TRAFFIC**

For description of the dimensions *D*, *d* and *X*, see Length of Advance ment - Figure 1.  
For additional shoulder guardrail information, see Details B and C.

**LOCATING TERMINALS ON SHOULDER GUARDRAILS - FIGURE 2**

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<b>GUARDRAIL</b>				
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Median Guardrail Applications Shown Are For Locations Where Approach End Anchorage Assemblies Are Outside Of The Opposing Roadway Clear Zone.

**DIVIDED ROADWAY- DETAIL B**

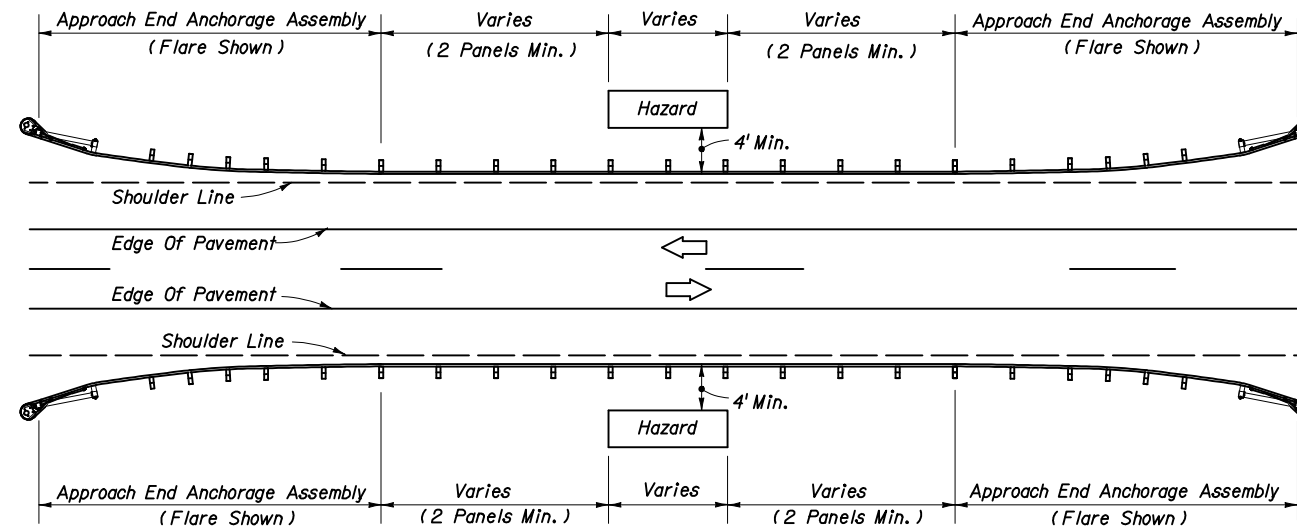
**Notes For Details B & C:**

See General Notes Nos. 1, 2, 3, 4, 5, 6, 7 and 8.

See Details K and L for guardrail offsets.

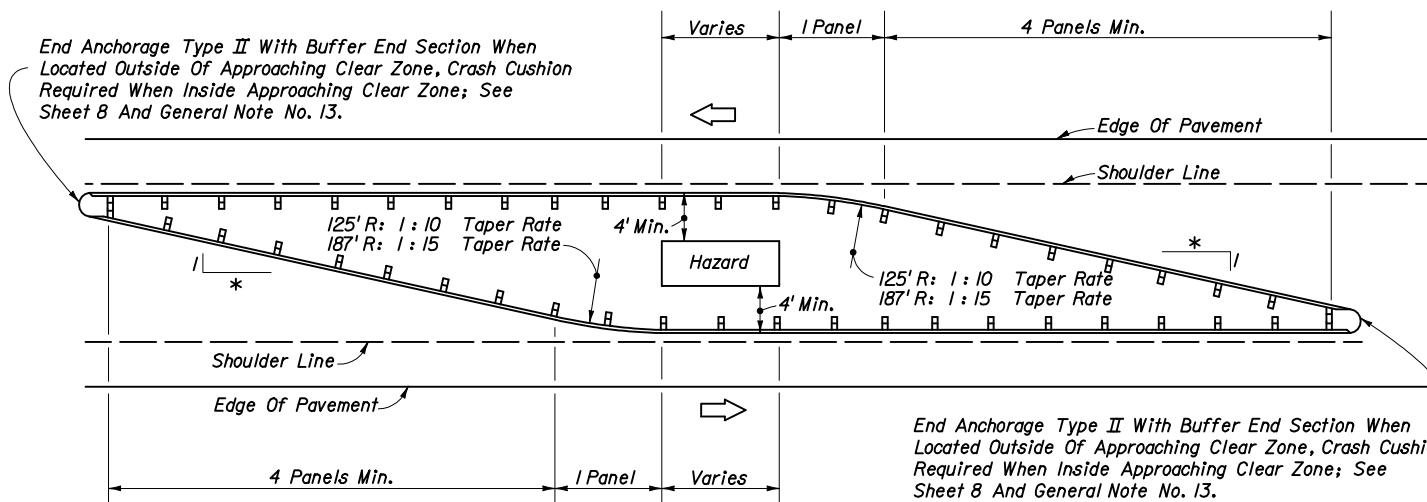
For end anchorage assemblies see sheets elsewhere in this index and the plans.

For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.



**UNDIVIDED ROADWAY- DETAIL C**

**GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS**



This Guardrail Configuration Applies Where Approach End Anchorage Assemblies Cannot be Located Outside Of The Opposing Roadway Clear Zone.

**OPPOSING TRAFFIC- DETAIL D**

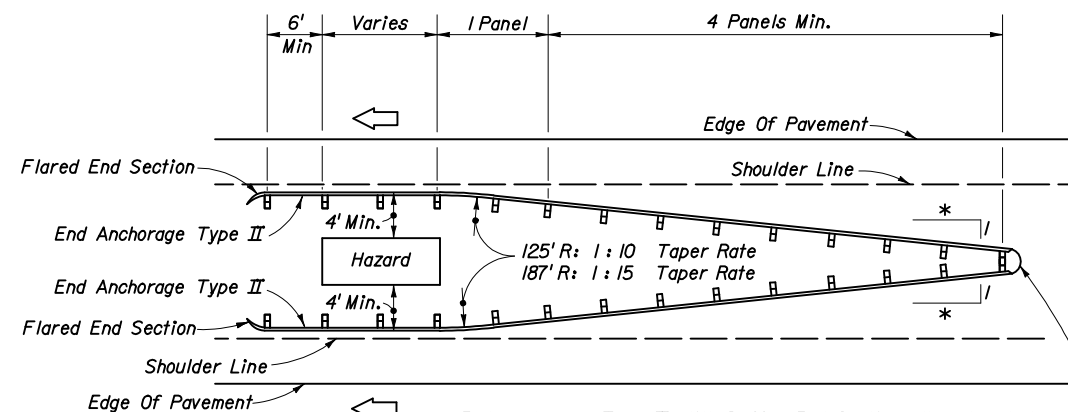
**Notes For Details D & G:**

See General Notes Nos. 1, 2, 3, 4, 5, 7, and 12.

See Details K and L for guardrail offsets.

For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.

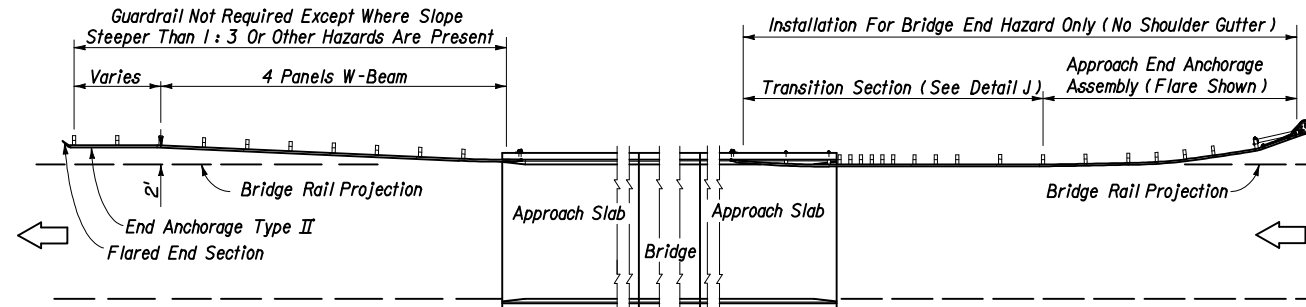
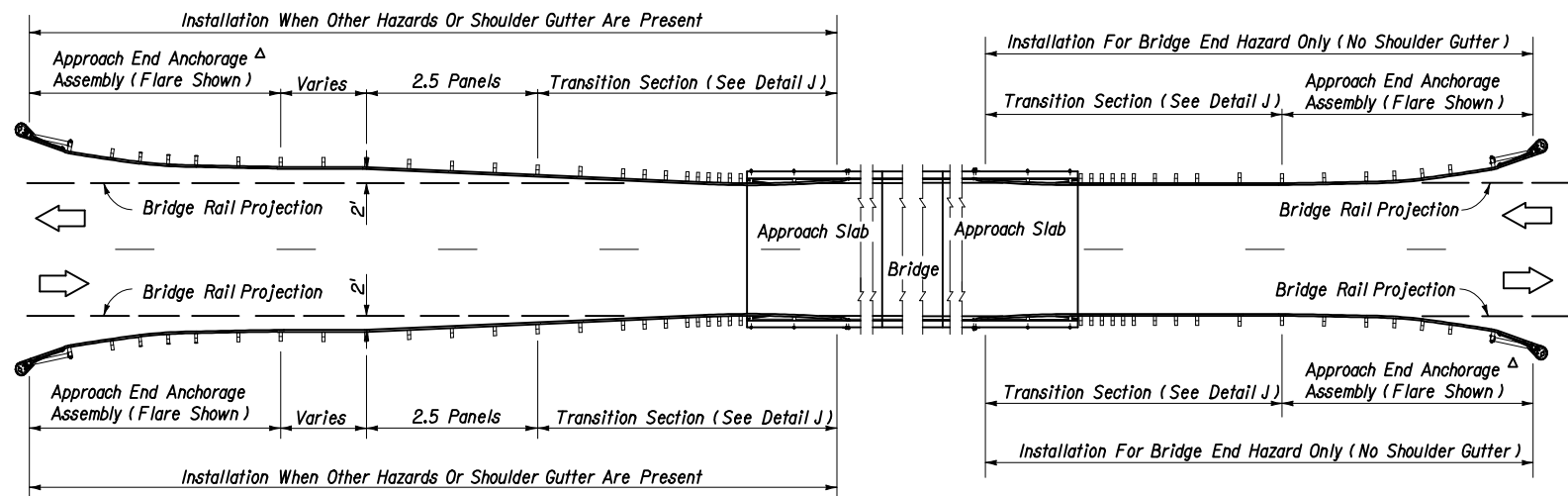
**GUARDRAIL APPLICATION FOR NARROW MEDIAN AND GORE HAZARDS**



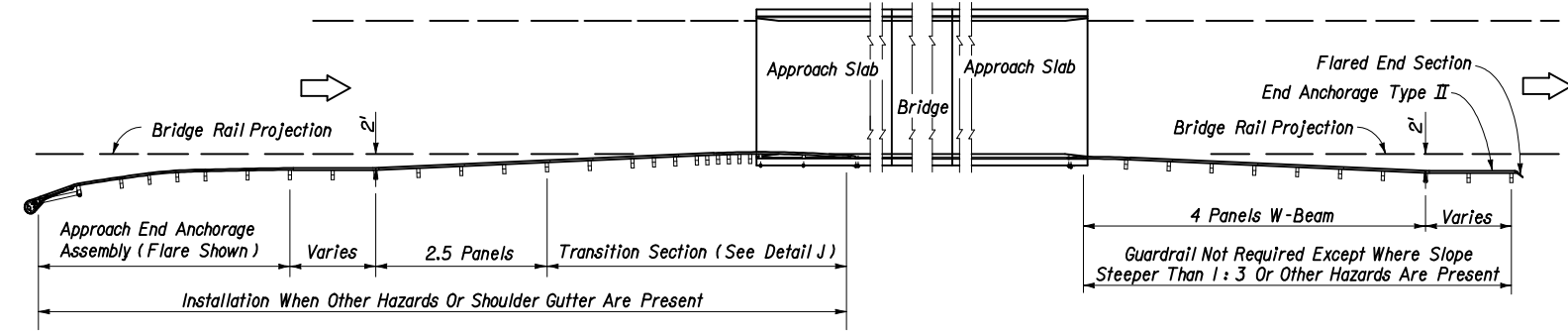
End Anchorage Type II With Buffer End Section When Located Outside Of Approaching Clear Zone, Crash Cushion Required When Inside Approaching Clear Zone. See General Note No. 13

**ONE-WAY TRAFFIC- DETAIL G**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
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For Median Guardrail See Sheets 7 & 8 And General Note II.



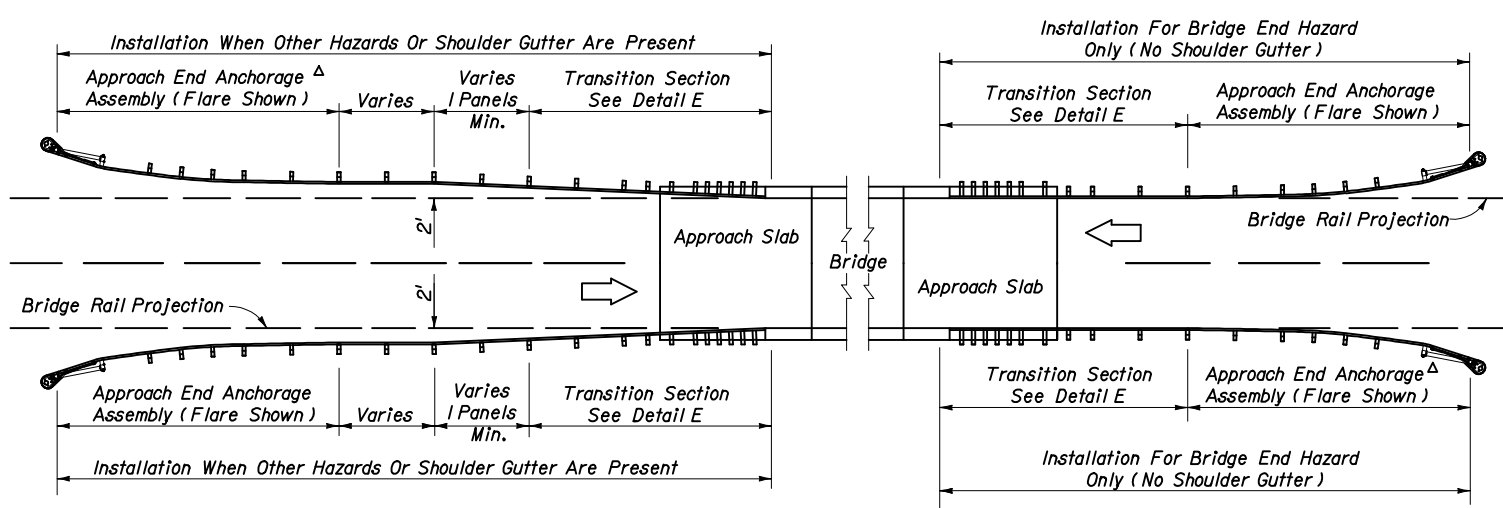
<sup>Δ</sup>With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail P Unless Other Anchorage Called Out In The Plans  
**UNDIVIDED ROADWAY - DETAIL O**

**DIVIDED ROADWAY - DETAIL P**

Notes For Details O & P:  
 See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Detail J for connections to bridges.  
 For end anchorage assemblies see sheets elsewhere in this Index and the plans.  
 Shoulder gutter in itself does not require the installation of guardrail.

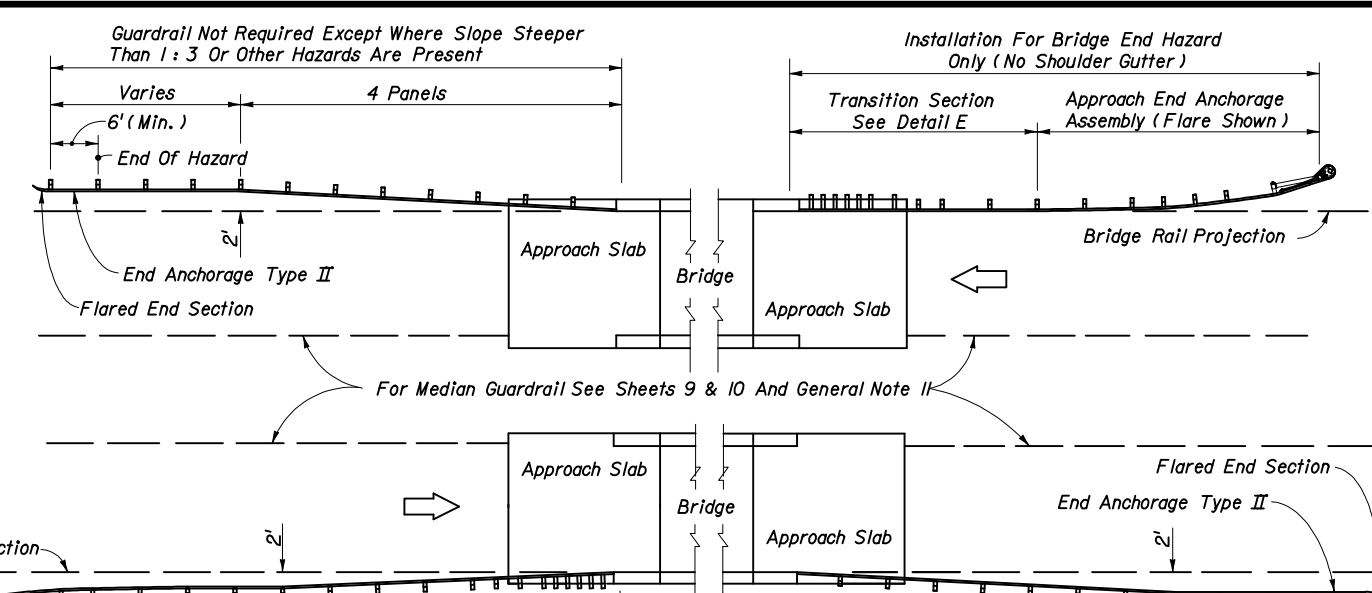
**GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL LENGTH OF APPROACH SLAB**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	HSD	08/83	Revision	02
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			Approved By	<i>[Signature]</i> Roadway Design Engineer



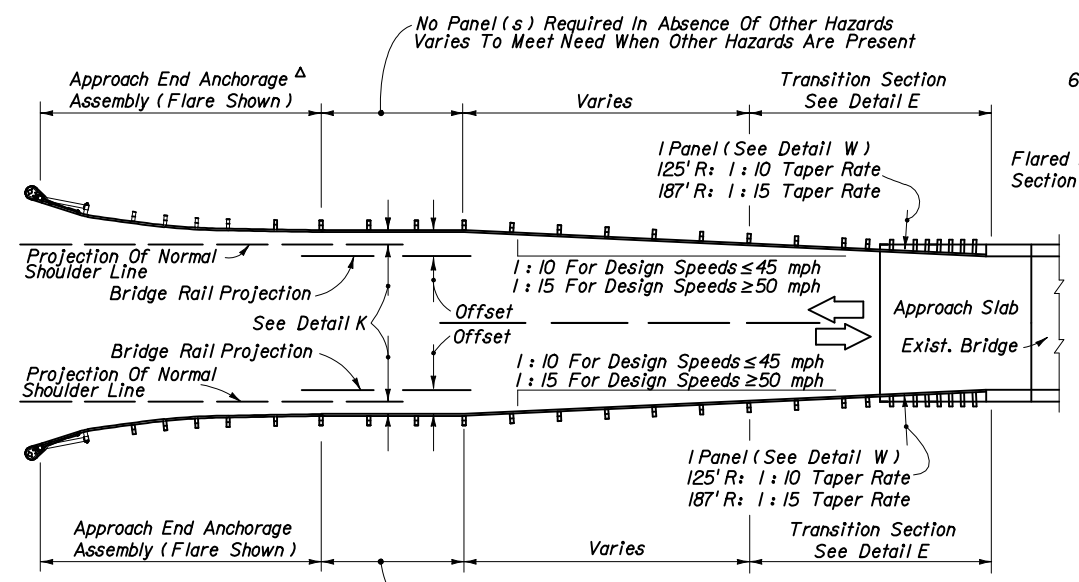
△With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans  
**UNDIVIDED ROADWAY - DETAIL H**

Notes For Details H & I:  
 See General Notes Nos. 1, 2, 3, 4, 5, 6, 8, and 9. See Details E and N for approach connections to bridges.  
 For end anchorage assemblies see sheets elsewhere in this Index and in the plans.  
 Shoulder gutter in itself does not require the installation of guardrail.



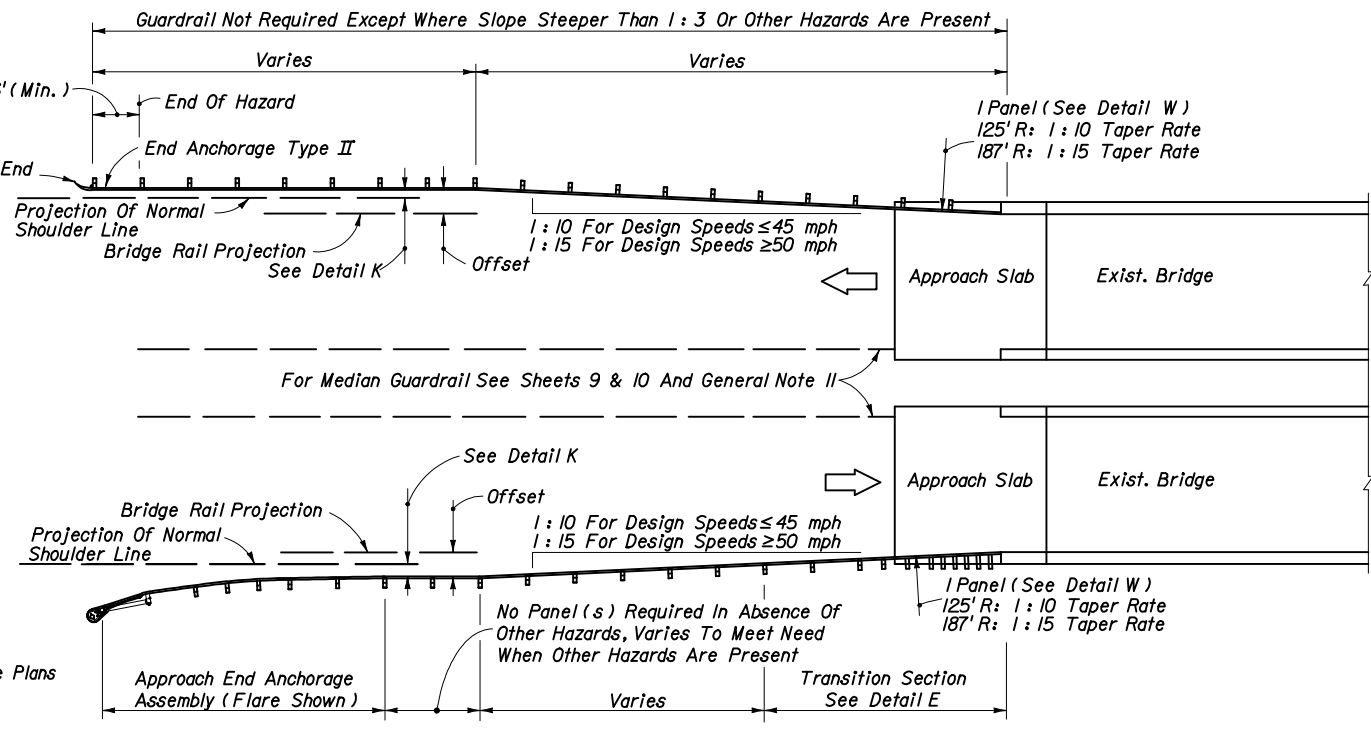
**DIVIDED ROADWAY - DETAIL I**

**GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH**

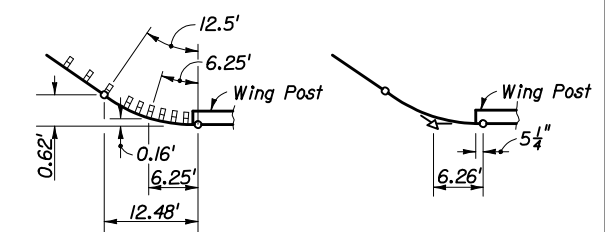


△With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans  
**UNDIVIDED ROADWAY - DETAIL S**

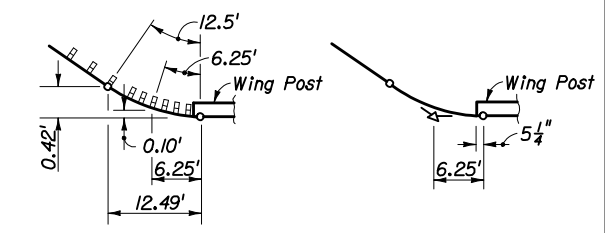
Notes for Details S & T:  
 See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Details E and N for approach connections to bridges.  
 For end anchorage assemblies see sheets elsewhere in this Index and the plans.



**DIVIDED ROADWAY - DETAIL T**



**125' R LAYOUT**

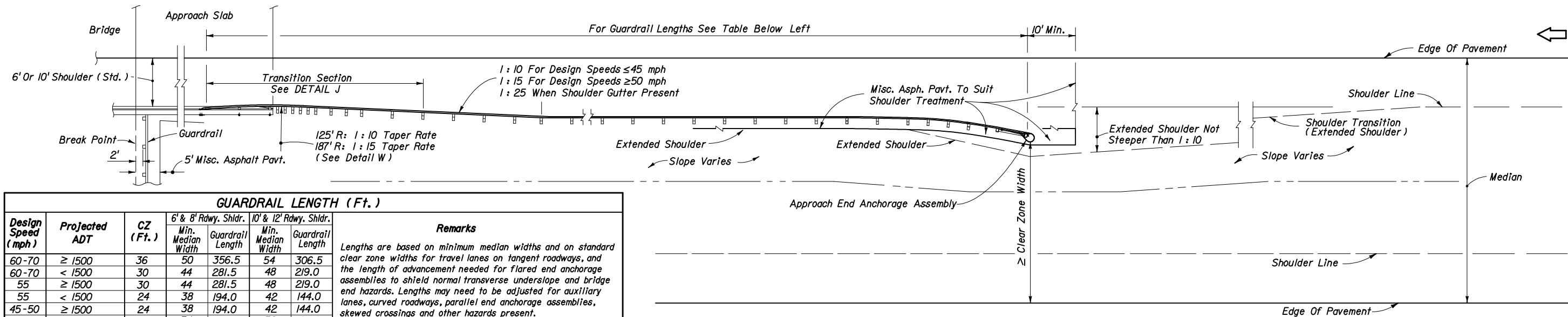


**187' R LAYOUT**  
 See General Note No. 12

**STANDARD PANELS SET TO RADIALS ADJOINING BRIDGES  
 DETAIL W**

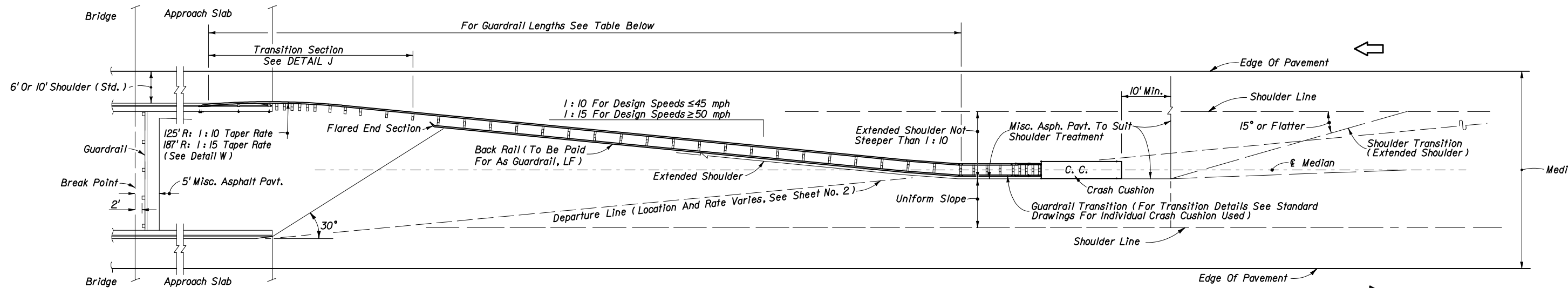
**GUARDRAIL APPLICATIONS FOR BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
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Drawn By	HSD	08/83	Roadway Design Engineer	
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GUARDRAIL LENGTH (Ft.)							
Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr.		10' & 12' Rdwy. Shldr.		Remarks
			Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length	
60-70	≥ 1500	36	50	356.5	54	306.5	Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present.
60-70	< 1500	30	44	281.5	48	219.0	
55	≥ 1500	30	44	281.5	48	219.0	
55	< 1500	24	38	194.0	42	144.0	
45-50	≥ 1500	24	38	194.0	42	144.0	
45-50	< 1500	20	34	144.0	38	94.0	
45-50	Urban % Curb	24	38	194.0	42	144.0	
35-40	Urban % Curb	18	32	144.0	36	81.5	

Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.  
**WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**



Median Width (Ft.)	GUARDRAIL LENGTHS															
	1:10 TAPER RATE								1:15 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.)	
32	9.5	6	15.5	193.75	6.5	4	10.5	131.25	13.5	10	23.5	293.75	8.5	6	14.5	181.25
34	10.5	7	17.5	218.75	7.5	5	12.5	156.25	14.5	11	25.5	318.75	9.5	7	16.5	206.25
36	10.5	7	17.5	218.75	7.5	5	12.5	156.25	15.5	12	27.5	343.75	10.5	8	18.5	231.25
38	11.5	8	19.5	243.75	8.5	6	14.5	181.25	16.5	13	29.5	368.75	11.5	9	20.5	256.25
40	12.5	9	21.5	268.75	9.5	6	15.5	193.75	17.5	13	30.5	381.25	13.5	11	24.5	306.25
42	13.5	9	22.5	281.25	10.5	7	17.5	218.75	19.5	15	34.5	431.25	14.5	11	25.5	318.75
44	14.5	10	24.5	306.25	10.5	7	17.5	218.75	20.5	16	36.5	456.25	15.5	12	27.5	343.75
46	14.5	10	24.5	306.25	11.5	8	19.5	243.75	21.5	17	38.5	481.25	16.5	13	29.5	368.75
48	15.5	11	26.5	331.25	12.5	9	21.5	268.75	22.5	17	39.5	493.75	17.5	13	30.5	381.25

The lengths shown on this table are typical for roadways with standard width shoulders. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and end anchorage or end shielding use.

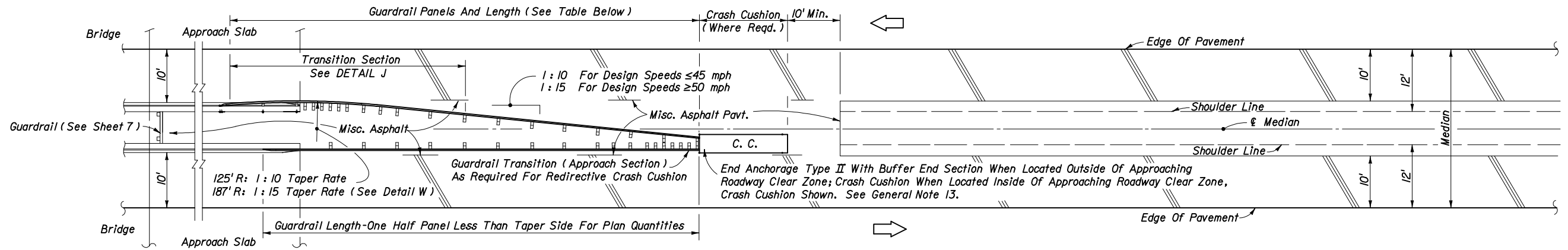
**WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**

**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING  
 EXTENDING FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS**

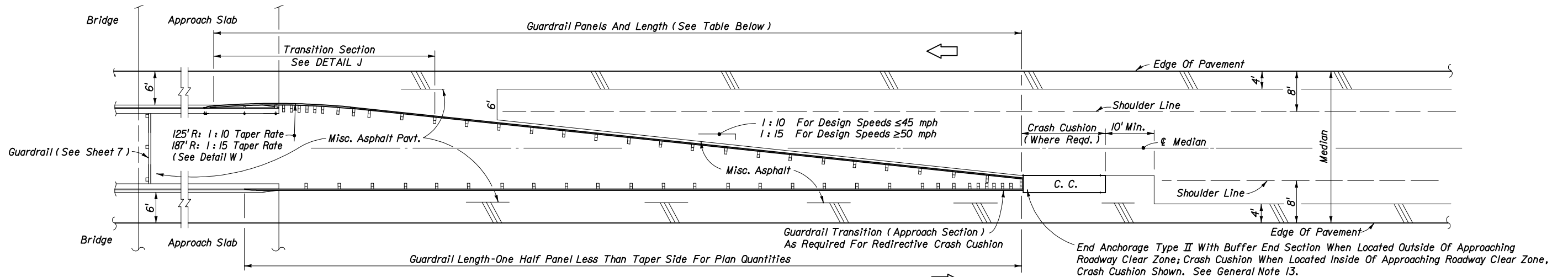
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL**

Names	Dates	Approved By		
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Drawn By	HSD 09/81	Revision	Sheet No.	Index No.
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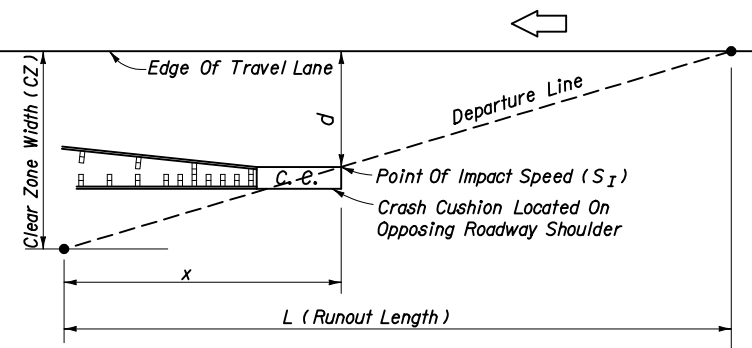
**MEDIANS WITH 10' BRIDGE SHOULDERS**



**MEDIANS WITH 6' BRIDGE SHOULDERS**

Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.

Design Speed (mph)	CZ (Ft.)
< 45	18
45	24
50	24
55	30
>55	36



Speed ( $S_I$ ) For Determining Crash Cushion Size:  

$$S_I = \frac{x}{L} (\text{Design Speed}) = \frac{(CZ-d)}{CZ} [\text{Design Speed}]$$

**SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS**

MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1:10 TAPER RATE		1:15 TAPER RATE		1:10 TAPER RATE		1:15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	14.5	181.25	20.5	256.25	7.5	93.75	10.5	131.25
28	12.5	156.25	18.5	231.25	6.5	81.25	8.5	106.25
26	11.5	143.75	15.5	193.75	5.5*	68.75	6.5	81.25
24	9.5	118.75	13.5	168.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds ( $S_I$ 's) along the runouts from the approach roadways; however, when calculated speeds ( $S_I$ 's) are less than 30 mph; crash cushions shall be no less in size than for 30 mph, see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width, see \* below.

\* Number shown is the minimum number of panels plus a W-Three beam transition panel; single faced guardrail must have a length of five (5) or more panels.

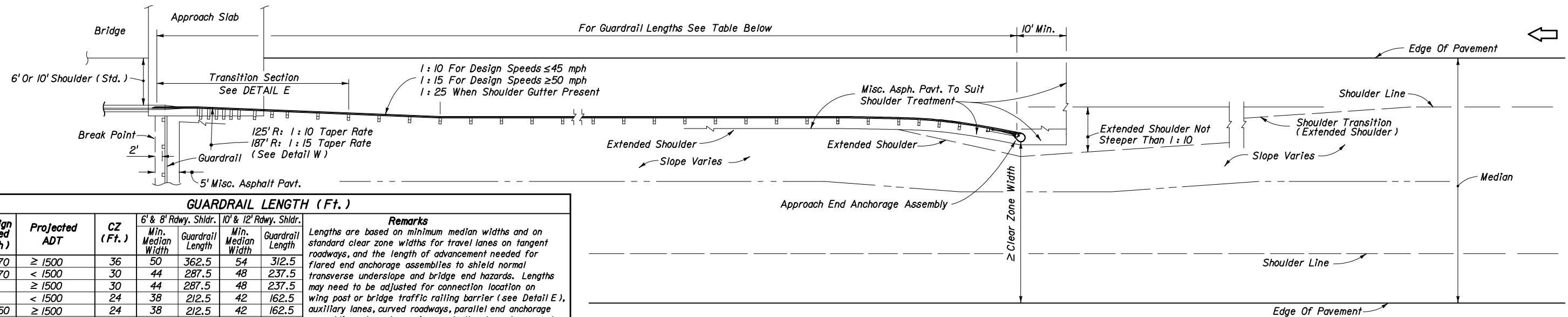
**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL**

Names	Dates	Approved By		
Designed By		<i>[Signature]</i>	Roadway Design Engineer	
Drawn By	RWR 08/82	Revision	Sheet No.	Index No.
Checked By	JVG/JBW 08/82	00	8 of 32	400

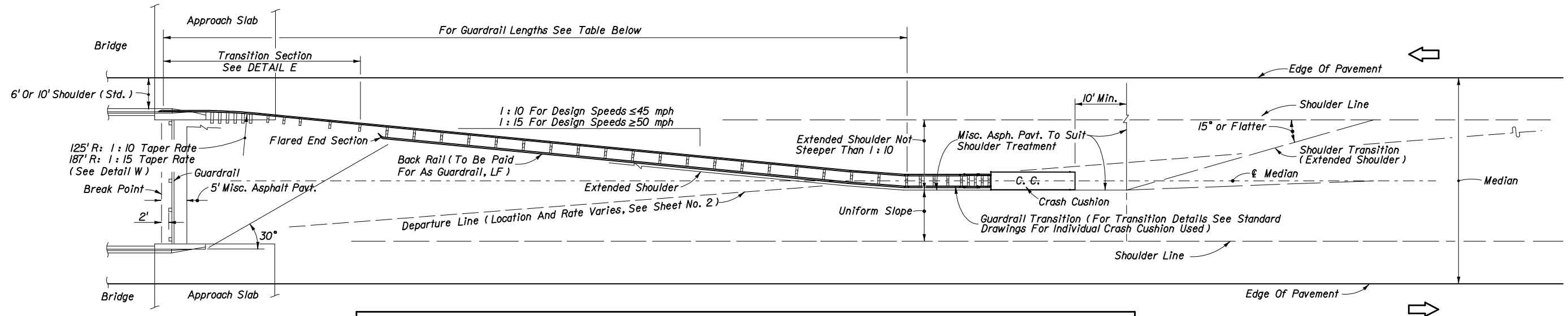




GUARDRAIL LENGTH (Ft.)							Remarks
Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr. Min. Median Width	10' & 12' Rdwy. Shldr. Guardrail Length	10' & 12' Rdwy. Shldr. Min. Median Width	Guardrail Length	
60-70	≥ 1500	36	50	362.5	54	312.5	Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for connection location on wing post or bridge traffic railing barrier (see Detail E), auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present. When the wing post is replaced by bridge traffic railing barrier, see Detail E with reference to Detail J.
60-70	< 1500	30	44	287.5	48	237.5	
55	≥ 1500	30	44	287.5	48	237.5	
55	< 1500	24	38	212.5	42	162.5	
45-50	≥ 1500	24	38	212.5	42	162.5	
45-50	< 1500	20	34	162.5	38	112.5	
45-50	Urban % Curb	24	38	212.5	42	162.5	
30-40	Urban % Curb	18	32	162.5	36	100.0	

Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.

**WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**



Median Width (Ft.)	GUARDRAIL LENGTHS															
	1:10 TAPER RATE								1:15 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.)	
	Front	Back	Total	Front	Back	Total	Front	Back	Total	Front	Back	Total	Front	Back	Total	
32	7.5	6	13.5	168.75	4.5	3	7.5	93.75	11.5	9	20.5	256.25	7.5	6	13.5	168.75
34	8.5	6	14.5	181.25	5.5	4	9.5	118.75	12.5	10	22.5	281.25	7.5	6	13.5	168.75
36	9.5	7	16.5	206.25	6.5	5	11.5	143.75	13.5	11	24.5	306.25	8.5	7	15.5	193.75
38	10.5	8	18.5	231.25	7.5	6	13.5	168.75	14.5	12	26.5	331.25	10.5	9	19.5	243.75
40	10.5	8	18.5	231.25	7.5	6	13.5	168.75	16.5	13	29.5	368.75	11.5	9	20.5	256.25
42	11.5	8	19.5	243.75	8.5	6	14.5	181.25	17.5	14	31.5	393.75	12.5	10	22.5	281.25
44	12.5	9	21.5	268.75	9.5	7	16.5	206.25	18.5	15	33.5	418.75	13.5	11	24.5	306.25
46	12.5	9	21.5	268.75	10.5	8	18.5	231.25	19.5	16	35.5	443.75	14.5	12	26.5	331.25
48	14.5	11	25.5	318.75	11.5	9	20.5	256.25	20.5	16	36.5	456.25	16.5	13	29.5	368.75

The lengths shown on this table are typical for roadways with standard width shoulders and a relocated connection to the existing wing post. When the wing post is replaced by bridge traffic railing barrier, see Detail E with reference to Detail J. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and for end anchorage or end shielding use.

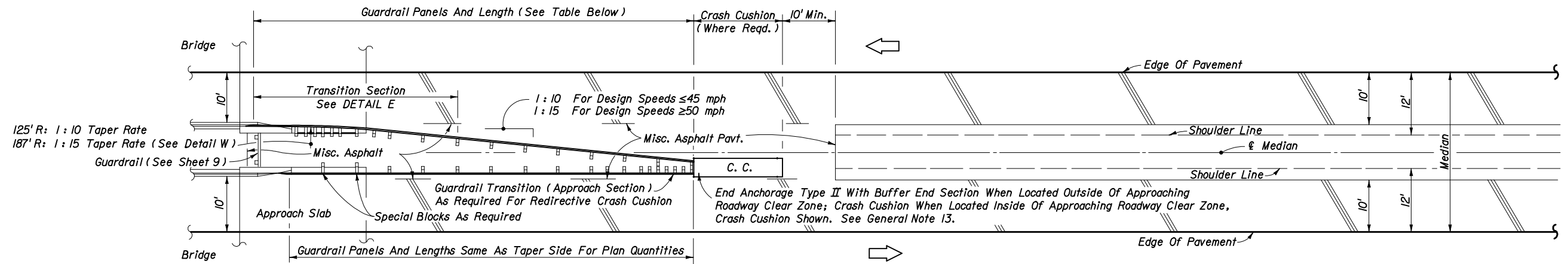
**WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**

**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS**

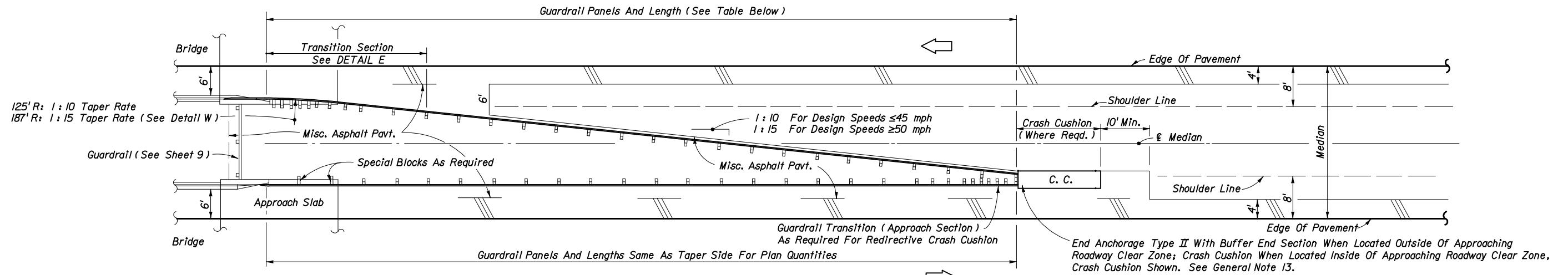
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL**

Designed By	HSD	09/81	Revision	00	Sheet No.	9 of 32	Index No.	400
Checked By	JBM/JVG	09/81	Approved By	[Signature]				



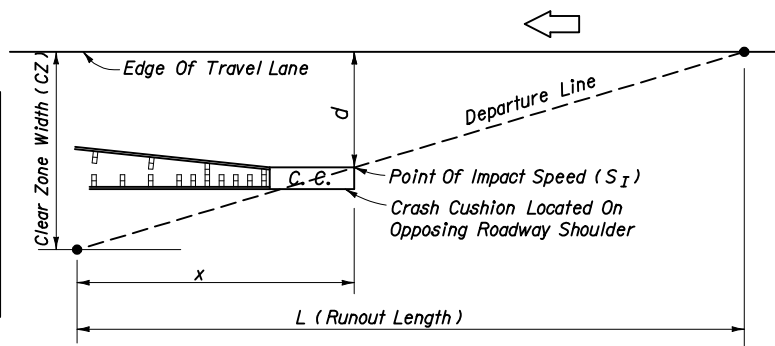
**MEDIANS WITH 10' BRIDGE SHOULDERS**



**MEDIANS WITH 6' BRIDGE SHOULDERS**

Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.

Design Speed (mph)	CZ (Ft.)
< 45	18
45	24
50	24
55	30
>55	36



Speed ( $S_I$ ) For Determining Crash Cushion Size:

$$S_I = \frac{x}{L} (\text{Design Speed}) = \frac{(CZ-d)}{CZ} [\text{Design Speed}]$$

**SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS**

GUARDRAIL LENGTHS								
MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1:10 TAPER RATE		1:15 TAPER RATE		1:10 TAPER RATE		1:15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	12.5	156.25	18.5	231.25	6.5	81.25	9.5	118.75
28	11.5	143.75	16.5	206.25	5.5	68.75	7.5	93.75
26	9.5	118.75	14.5	181.25	5.5*	68.75	5.5*	68.75
24	8.5	106.25	11.5	143.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds ( $S_I$ 's) along the runouts from the approach roadways; however, when calculated speeds ( $S_I$ 's) are less than 30 mph crash cushions shall be no less in size than for 30 mph; see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width; see \* below.

\*Number shown is the minimum number of panels plus a W-Three beam transition panel; single faced guardrail must have a length of five (5) or more panels.

**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS**

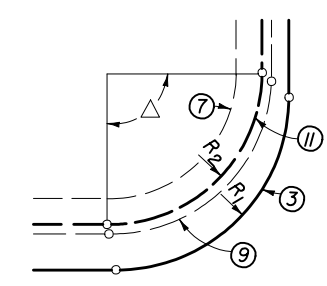
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL**

Designed By	Names	Dates	Approved By
Drawn By	RWR	08/82	<i>[Signature]</i> Roadway Design Engineer
Checked By	JVG/JBN	08/82	Revision
		00	Sheet No. 10 of 32
			Index No. 400

RADIAL GUARDRAIL						
Normal Turnouts						
		Taper			Simple Curve	
$R_1$	$R_2$	Panels Required	$\Delta$	$R_2$	Panels Required	$\Delta$
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'

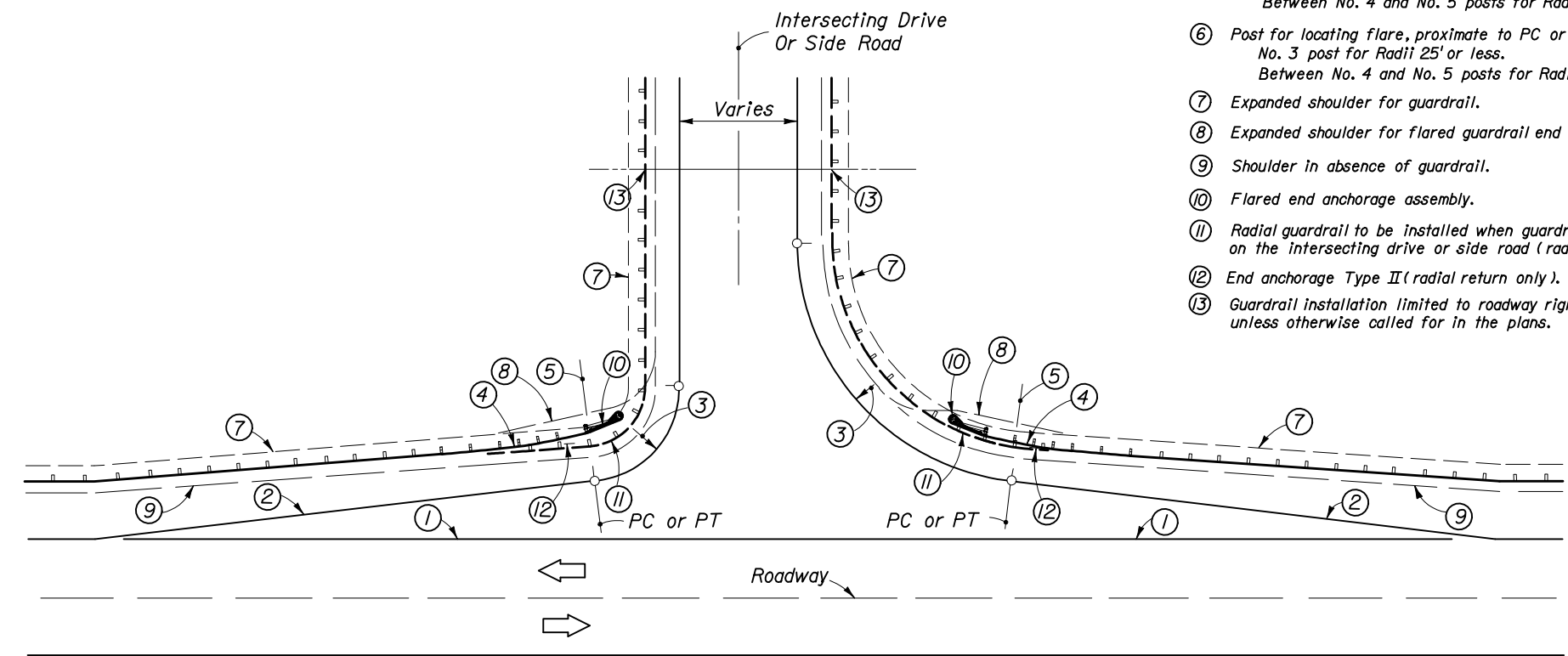
Note: Only 25' and 40' radius panels are to be used for return guardrail on normal turnouts. On skewed turnouts the number of panels used and their arrangement with straight panels will be as shown in the plans or as directed by the Engineer.



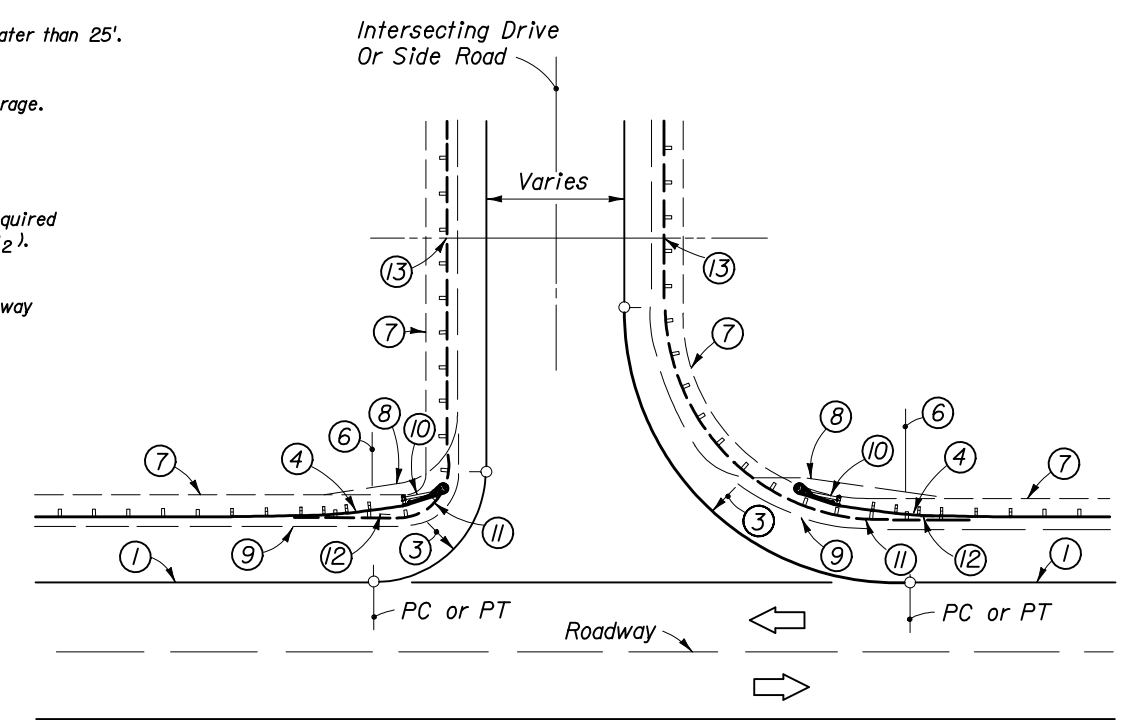
RADIAL GUARDRAIL

**LEGEND**

- ① Edge of roadway pavement.
- ② Taper.
- ③ Pavement return (radius  $R_1$ ).
- ④ Flared end anchorage to be installed except when existing guardrail on intersecting drive or side road adjoins the project.
- ⑤ Post for locating flare, proximate to PC or PT:  
No. 2 post for Radii 25' or less.  
No. 3 post for Radii >25' and <50'.  
Between No. 4 and No. 5 posts for Radii 50' or greater.
- ⑥ Post for locating flare, proximate to PC or PT:  
No. 3 post for Radii 25' or less.  
Between No. 4 and No. 5 posts for Radii greater than 25'.
- ⑦ Expanded shoulder for guardrail.
- ⑧ Expanded shoulder for flared guardrail end anchorage.
- ⑨ Shoulder in absence of guardrail.
- ⑩ Flared end anchorage assembly.
- ⑪ Radial guardrail to be installed when guardrail required on the intersecting drive or side road (radius  $R_2$ ).
- ⑫ End anchorage Type II (radial return only).
- ⑬ Guardrail installation limited to roadway right of way unless otherwise called for in the plans.



TAPER TURNOUTS



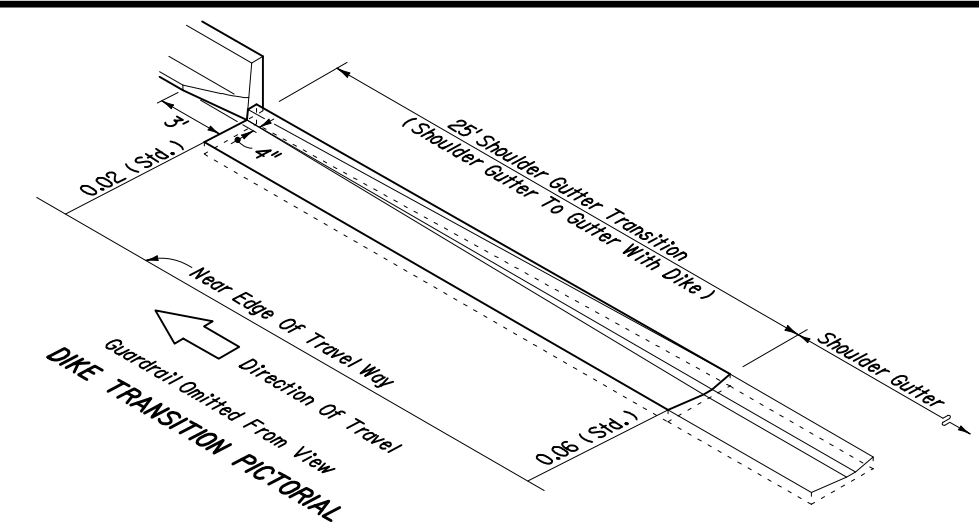
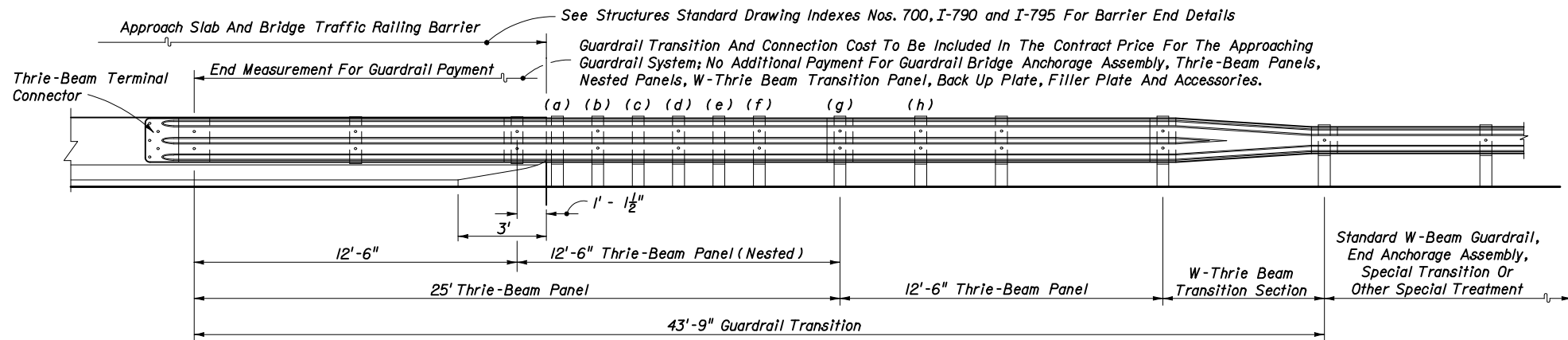
SIMPLE CURVE TURNOUTS

Note: The guardrail application shown on this sheet are for highways with flush shoulders and no restraints for constructing flared end anchorages and minimum lengths of guardrail. For highways with flush shoulders and restraints to constructing flared anchorages, see General Note No. 6.

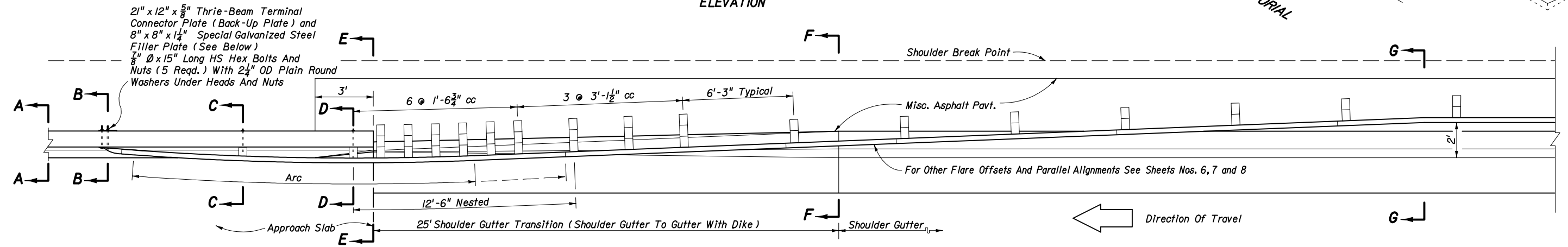
Where openings in guardrail are required in close proximity to bridge traffic rails or ends of concrete barrier walls, and minimum length guardrail with flared end anchorages can not be applied, either controlled release returns or energy absorbing terminals are to be applied.

**GUARDRAIL APPLICATIONS FOR INTERSECTING DRIVES AND SIDE ROADS ON RURAL FACILITIES**

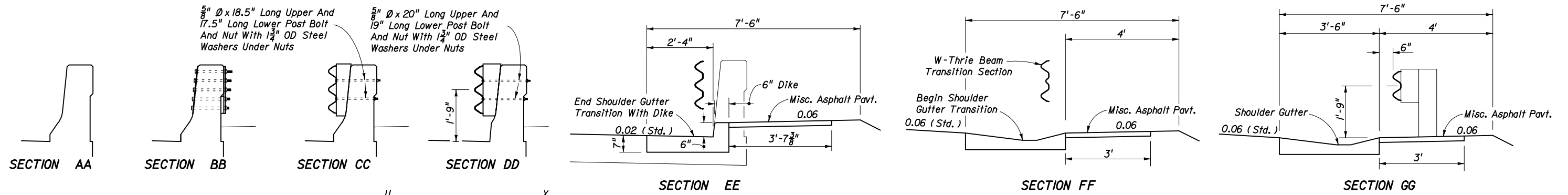
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION						
<b>GUARDRAIL</b>						
Designed By	Names	Dates	Approved By			
Drawn By	HSD	09/83	Revision	Sheet No.	Index No.	
Checked By	JVG	09/83	00	11 of 32	400	



ELEVATION



PLAN - GUARDRAIL, SHOULDER GUTTER AND SHOULDER TRANSITIONS



SECTION AA

SECTION BB

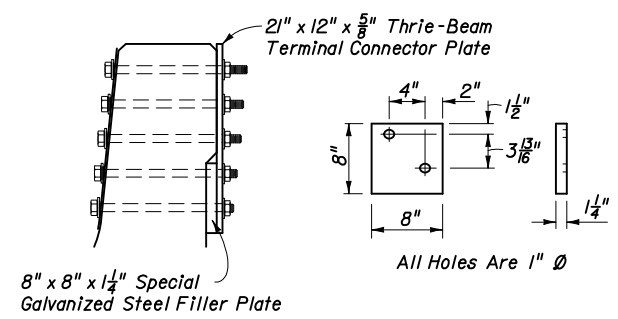
SECTION CC

SECTION DD

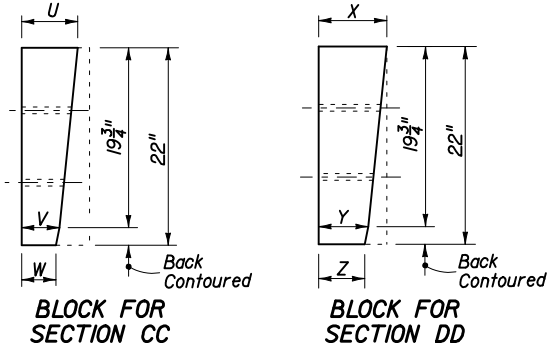
SECTION EE

SECTION FF

SECTION GG



SPECIAL GALVANIZED STEEL FILLER PLATE FOR USE AT SECTION BB



THRIE-BEAM OFFSET BLOCKS FIELD TRIMMED FOR USE AT SECTIONS CC & DD  
**GUARDRAIL APPROACH TRANSITION AND CONNECTION FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIERS EXTENDING FULL LENGTH OF APPROACH SLAB**

DETAIL J

APPLICATIONS	SECTION CC			SECTION DD		
	U	V	W	X	Y	Z
Single Face Guardrail	6 1/8"	4 1/8"	3 5/8"	7 1/2" nom.	5 1/2" nom.	5" nom.
Double Face Guardrail With Timber Posts	5 1/8"	3 1/8"	2 5/8"	6 1/2" nom.	4 1/2" nom.	4" nom.
Double Face Guardrail With Steel Posts	4 3/8"	2 3/8"	1 7/8"	5 3/4"	3 3/4"	3 1/4"

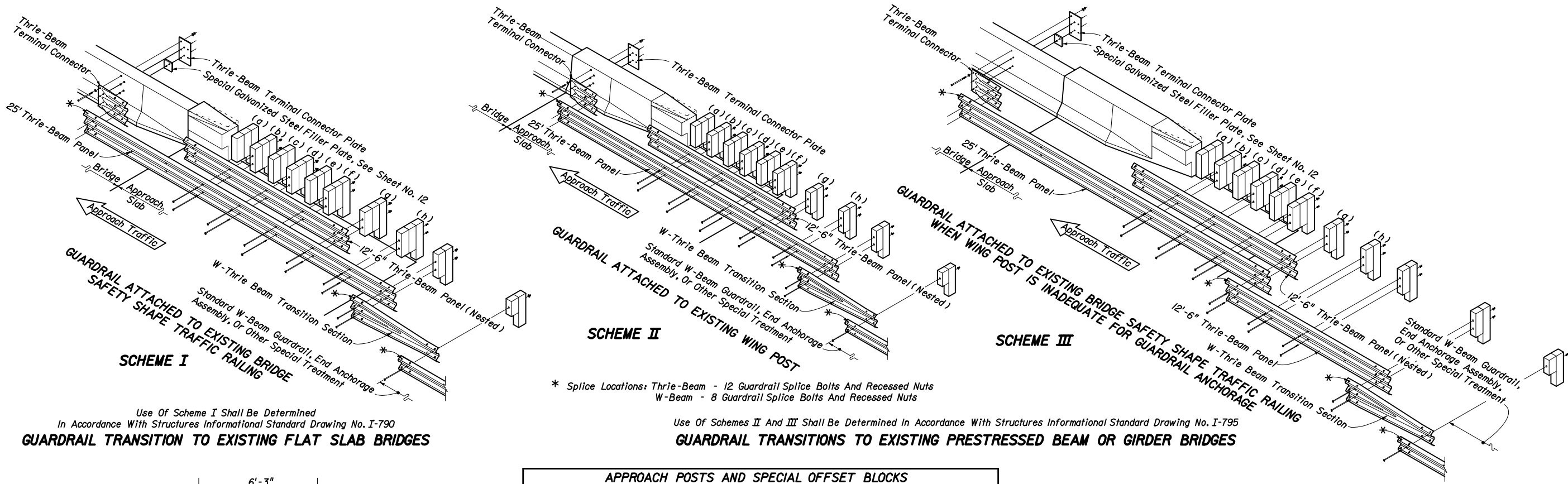
For Double Face Guardrail Connections To Median Bridge Traffic Railing Barrier, See Index No. 410 'Guardrail Connection To Concrete Barrier Wall Approach Ends'.

**GUARDRAIL TRANSITION NOTE**  
 When shoulder gutter is required, the 25' long dike transition, shown in the 'PLAN' and 'PICTORIAL' above, is required. Double offset blocks are shown for guardrail installations adjacent to shoulder gutter/dike transitions; single offset blocks shall be installed in absence of shoulder gutter. Nested rails shall not be bolted to the blocks and posts at posts (a), (c), and (e). One 16d galvanized nail shall be driven between each post and block, and between double blocks, in order to prevent block rotation, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION', this Index.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL**

Names	Dates	Approved By <i>[Signature]</i>		
Designed By		Roadway Design Engineer		
Drawn By	HKH 9-98	Revision	Sheet No.	Index No.
Checked By	JVG 9-98	00	12 of 32	400

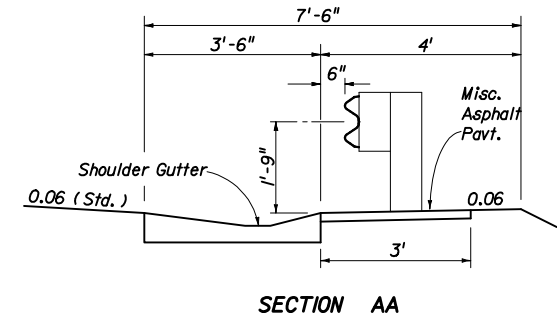
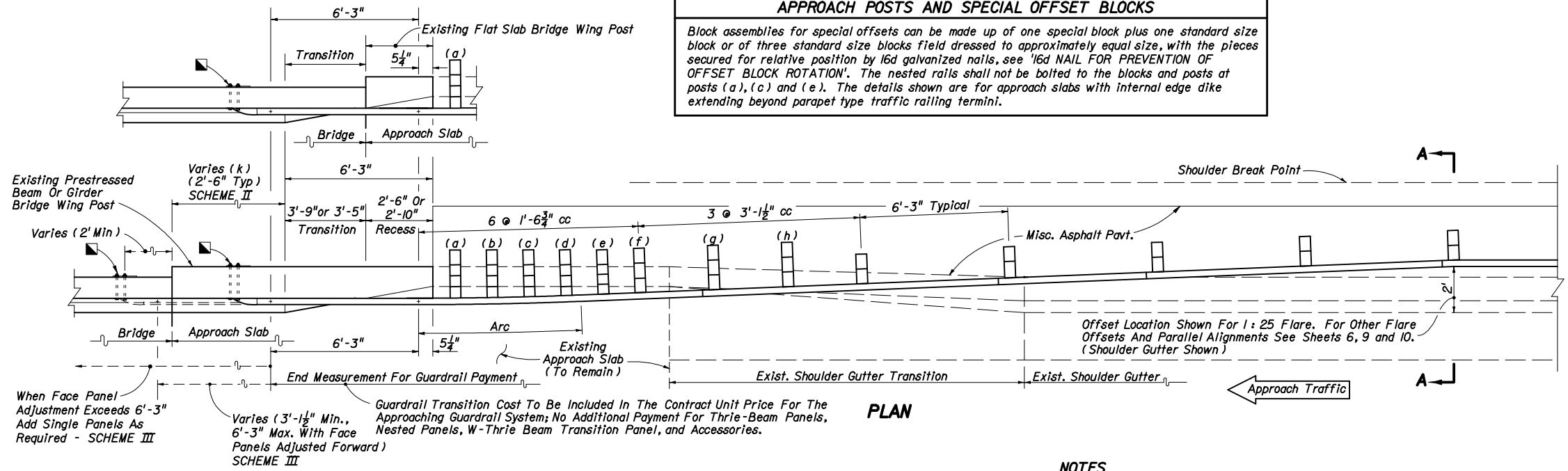


Use Of Scheme I Shall Be Determined In Accordance With Structures Informational Standard Drawing No. I-790  
**GUARDRAIL TRANSITION TO EXISTING FLAT SLAB BRIDGES**

Use Of Schemes II And III Shall Be Determined In Accordance With Structures Informational Standard Drawing No. I-795  
**GUARDRAIL TRANSITIONS TO EXISTING PRESTRESSED BEAM OR GIRDER BRIDGES**

\* Splice Locations: Thrie-Beam - 12 Guardrail Splice Bolts And Recessed Nuts  
 W-Beam - 8 Guardrail Splice Bolts And Recessed Nuts

**APPROACH POSTS AND SPECIAL OFFSET BLOCKS**  
 Block assemblies for special offsets can be made up of one special block plus one standard size block or of three standard size blocks field dressed to approximately equal size, with the pieces secured for relative position by 16d galvanized nails, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION'. The nested rails shall not be bolted to the blocks and posts at posts (a), (c) and (e). The details shown are for approach slabs with internal edge dike extending beyond parapet type traffic railing termini.



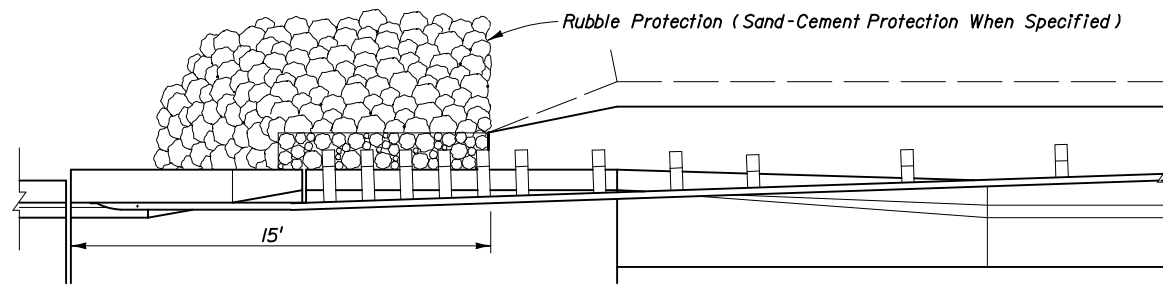
When Face Panel Adjustment Exceeds 6'-3" Add Single Panels As Required - SCHEME III  
 Varies (2' Min)  
 Varies (k) (2'-6" Typ) SCHEME II  
 Varies (3'-1 1/2" Min., 6'-3" Max. With Face Panels Adjusted Forward) SCHEME III  
 Guardrail Transition Cost To Be Included In The Contract Unit Price For The Approaching Guardrail System; No Additional Payment For Thrie-Beam Panels, Nested Panels, W-Thrie Beam Transition Panel, and Accessories.

- NOTES**
- When the existing wing post is to be replaced with a bridge traffic railing barrier in accordance with Structure Standard Drawings No. I-790 or No. I-795, the thrie-beam guardrail connection shall be in accordance with Detail J.
  - When retrofitting thrie-beam guardrail to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.

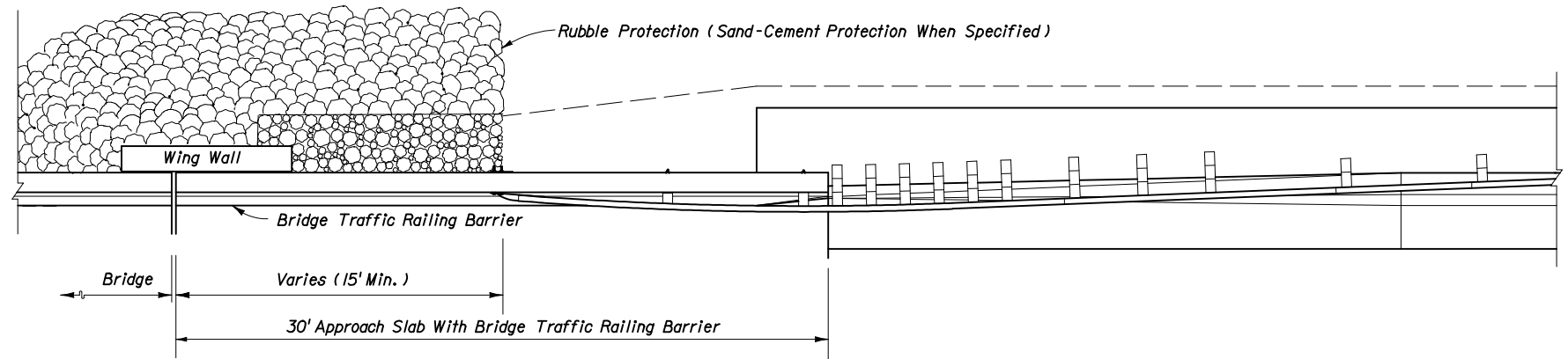
**GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH**

**DETAIL E**

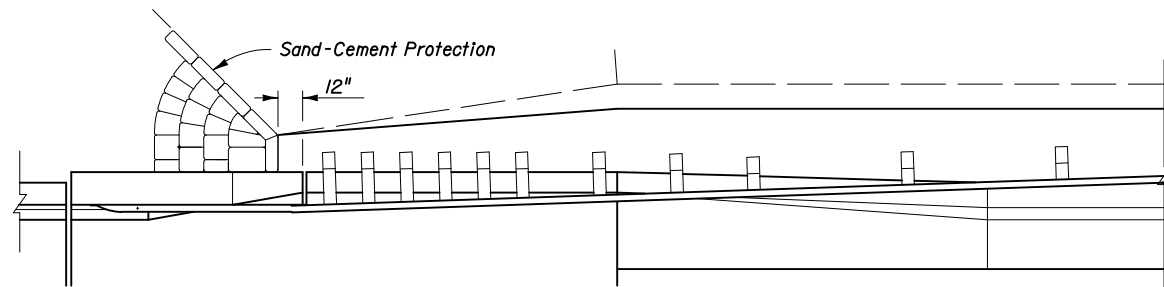
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	JKH	9-98	Revision	Sheet No. 13 of 32
Checked By	JVG	9-98	00	Index No. 400



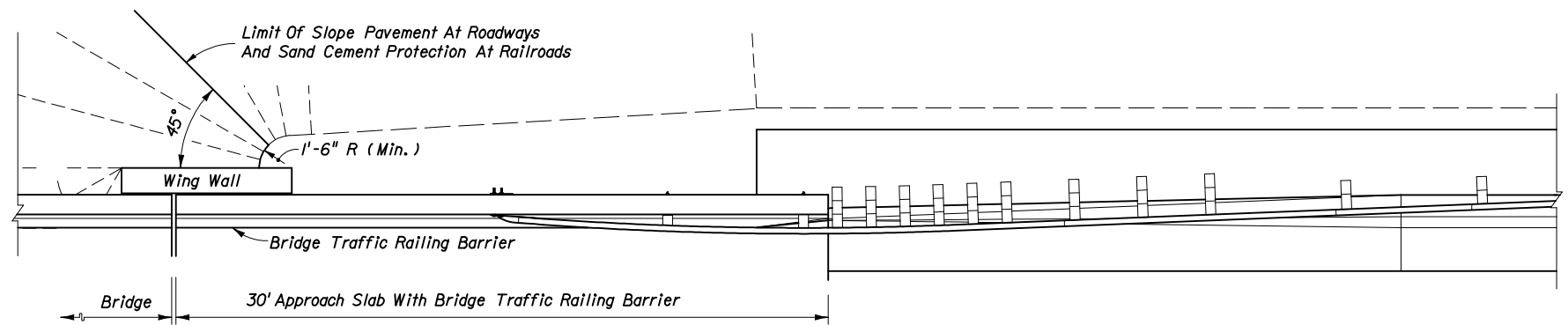
BRIDGES OVER STREAMS



BRIDGES OVER STREAMS



BRIDGES OVER RAILROADS



BRIDGES OVER ROADWAYS OR RAILROADS

For Additional Information See Sheet 13

SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

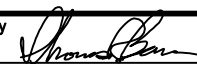
For Additional Guardrail Information See Sheet 12

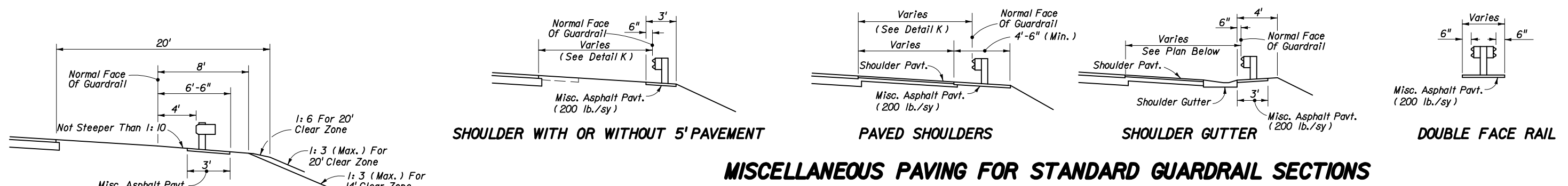
SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL APPROACH SLAB LENGTH

SKETCH NOTES

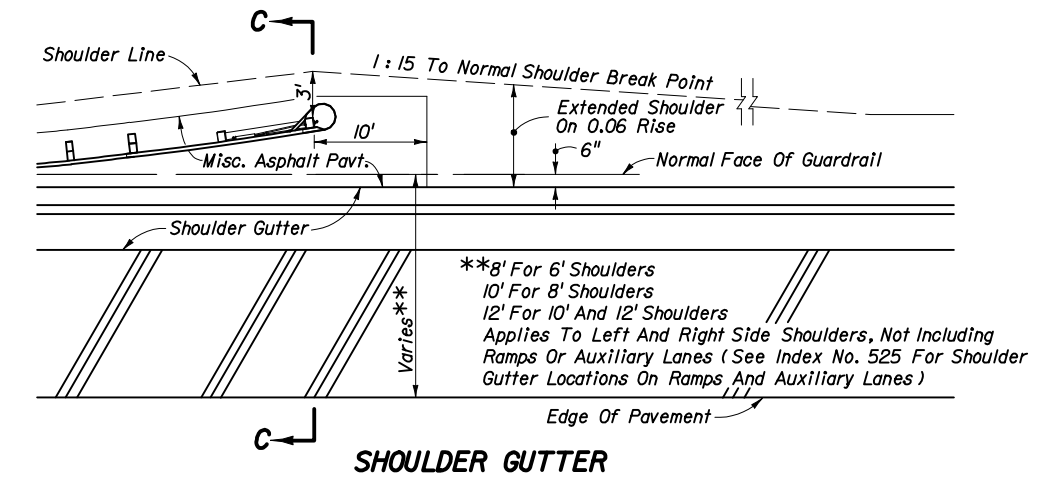
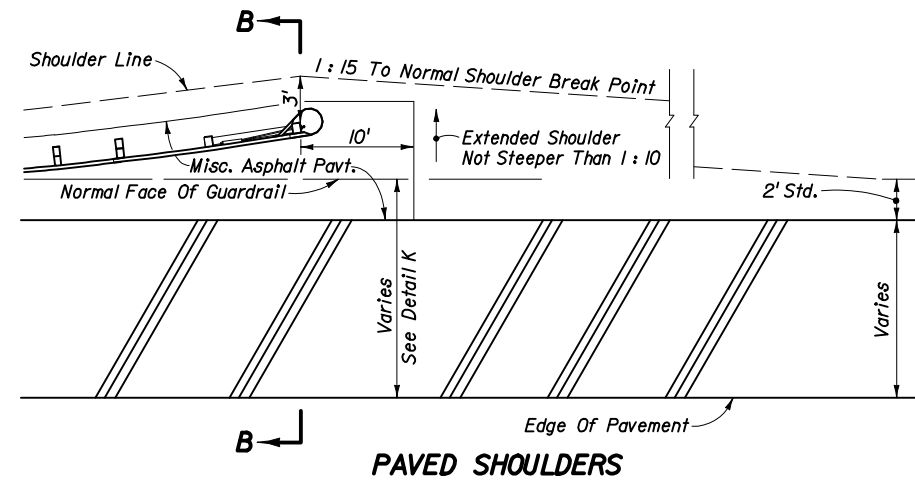
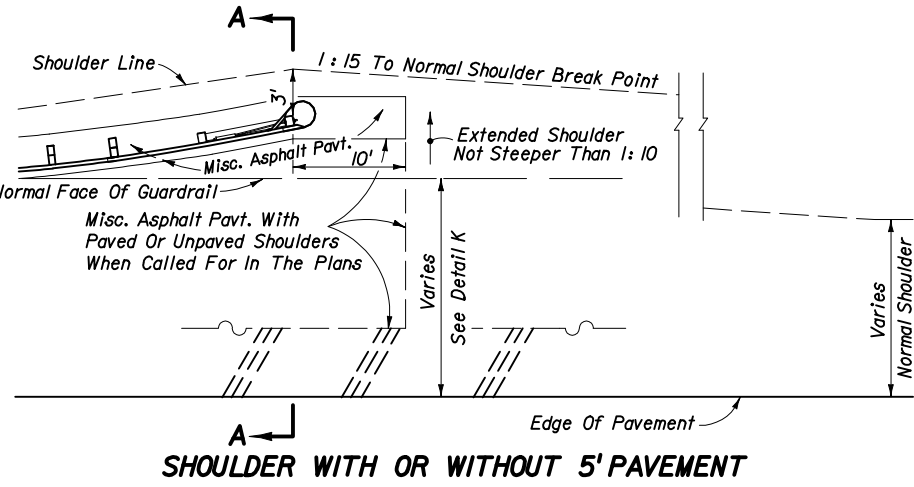
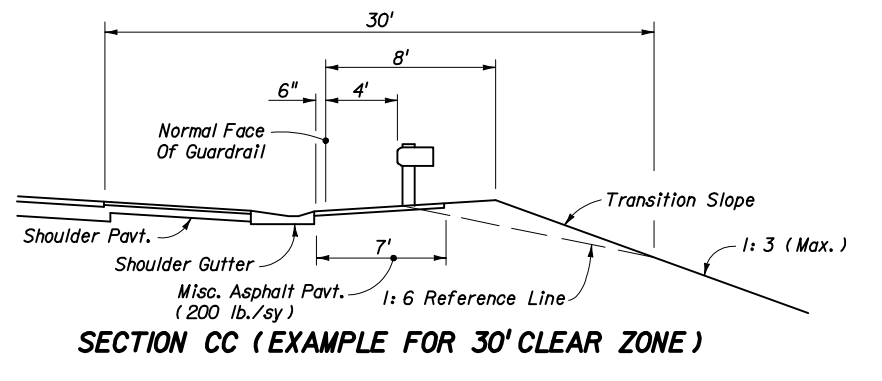
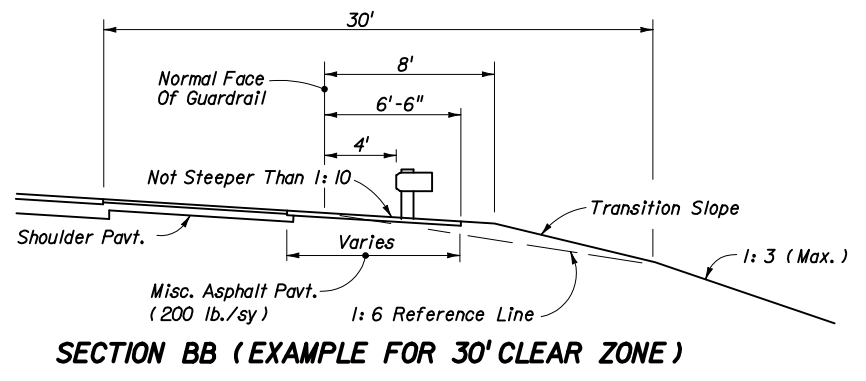
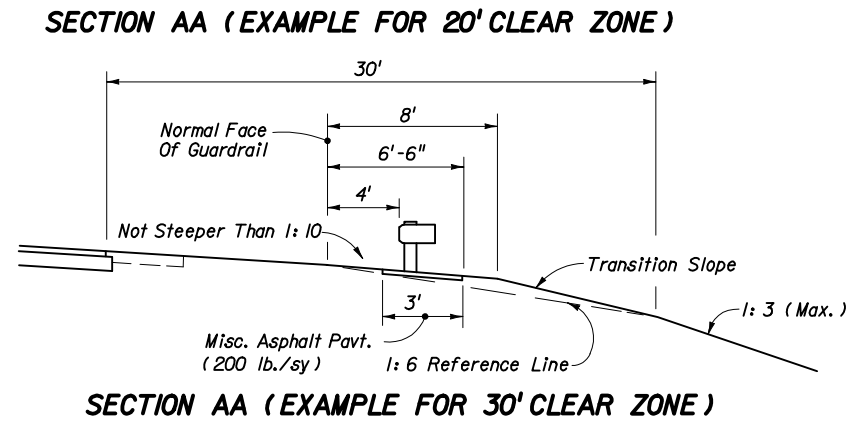
1. These sketches are for showing shoulder interface between roadways and bridges where crossings are normal to other roadways, railroads and streams. For site specific applications and details see the plans and the FDOT Structures Design Office "Detailing Manual" and "Design Guidelines".
2. Shoulder treatments shown in these sketches are for locations with shoulder gutter; shoulder hinge location will vary for facilities without shoulder gutter.

SHOULDER INTERFACE BETWEEN ROADWAYS AND BRIDGES

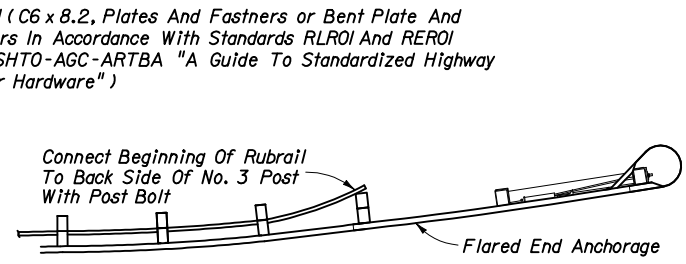
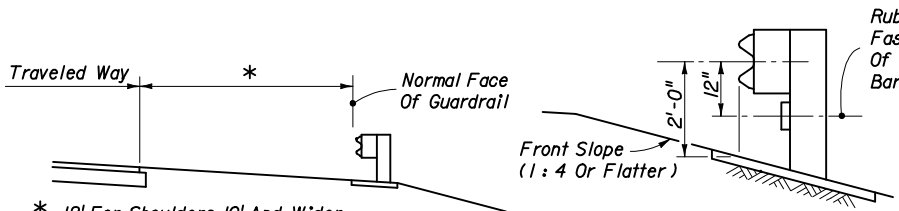
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	Names	Dates	Approved By 	
Drawn By			Revision	Sheet No. Index No.
Checked By			00	14 of 32 400



**MISCELLANEOUS PAVING FOR STANDARD GUARDRAIL SECTIONS**



**SHOULDERS, SLOPES AND MISCELLANEOUS PAVING FOR FLARED END ANCHORAGE ASSEMBLIES**



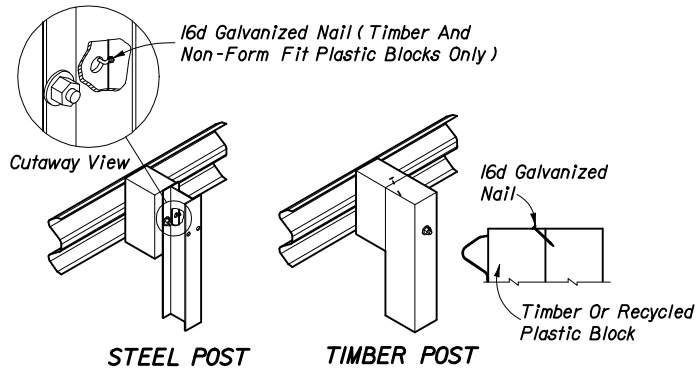
LATERAL PLACEMENT ON FRONTSLOPES (FROM EDGE OF TRAVELED WAY)			
SLOPE	NOT RECOMMENDED	ACCEPTABLE WITH RUBRAIL	Notes:
4:1	14' to 27'	28' to 45'	For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width. Placement of guardrail on front slopes steeper than 4:1 not recommended. Cost of rubrail to be included in the contract unit price for guardrail.
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'	

**GUARDRAIL LOCATION-DETAIL K**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL**

Names	Dates	Approved By		
Designed By		 Roadway Design Engineer	Revision	Sheet No.
Drawn By	JM 07/81		00	15 of 32
Checked By	JBW/JVG 07/81			400

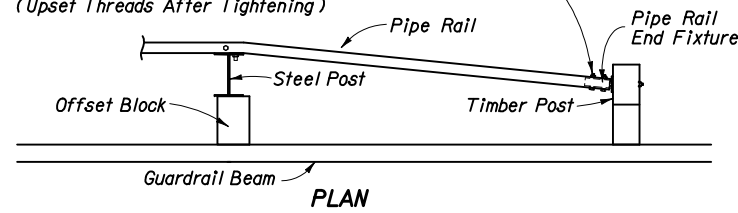


STEEL POST      TIMBER POST

16d Galvanized Nail Driven After Post Bolt Pull-Up, Single And Double Face Guardrail, Single Face Guardrail Shown (16d Nail Between Blocks For Multiple Offset Blocks).

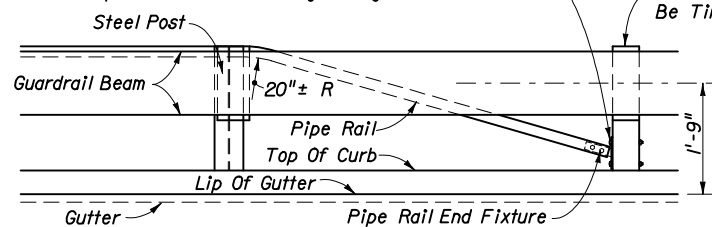
**16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION**

Install Pipe Rail Over Pipe Rail End Fixture And Thru-bolt With  $\frac{1}{2}$ " x  $3\frac{1}{2}$ " Long Hex Bolts And Nuts With  $\frac{1}{2}$ " Plain Round Washers Under Heads And Nuts (2 Req.) (Upset Threads After Tightening)

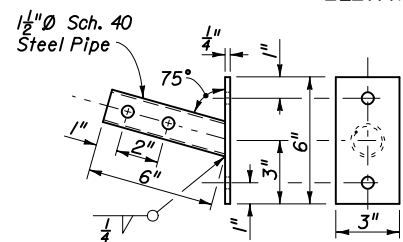


PLAN

Attach Pipe Rail End Fixture To Post With  $\frac{1}{2}$ " x 7" Long Hex Bolts And Nuts With  $\frac{1}{2}$ " Plain Round Washers Under Heads And Nuts (2 Req.) (Upset Threads After Tightening)

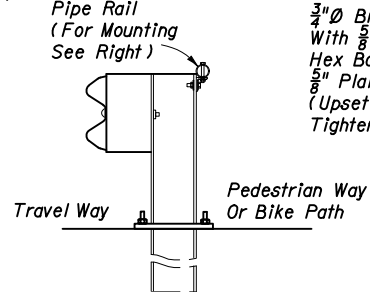


ELEVATION



All Holes Shall Be  $\frac{5}{8}$ "  $\phi$  Galvanize After Drilling And Welding

PIPE RAIL END FIXTURE

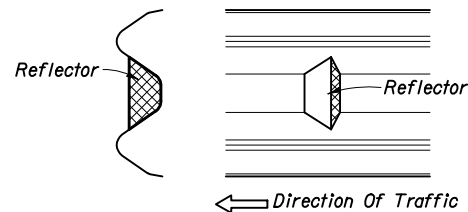


STEEL POST SECTION

**NOTES**

1. Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Begin and end the pipe rail in accordance with this detail.
2. When guardrails with timber posts are located with the back of posts 4' or less from the near edge of the pedestrian way or bikeway, the bolt ends will require one of the following treatments:
  - (a) Trimming back flush with the face of nut and metalizing or
  - (b) Use of post bolts 15" in length with the washers and nuts counter sunk into sinks 1" to  $1\frac{1}{2}$ " deep or
  - (c) Use of post bolts 15" in length with sleeve nuts and washers.
3. The cost for Pipe Rail, mounting components and installation shall be included in the contract unit price for guardrail. Bolt end treatment for timber post shall be included in the contract unit price for guardrail.

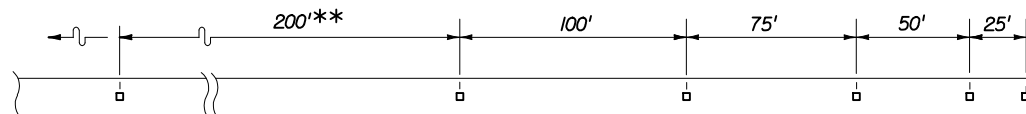
FOR LOCATIONS USED BY PEDESTRIANS OR CYCLISTS  
**PEDESTRIAN SAFETY TREATMENTS**



SECTIONAL VIEW      FACE VIEW

Reflectors shall be centered in the channel of W-beam and in the top channel of thrie-beam.

**REFLECTOR MOUNTING**



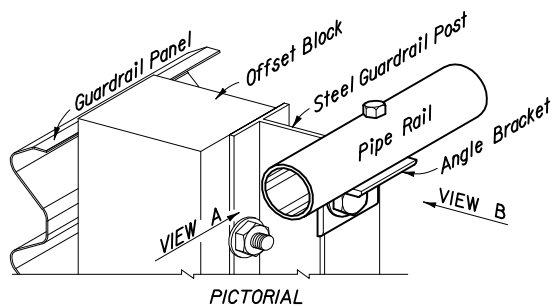
Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and at approximate center.

\*\*For curves greater than 2° the spacing shall be reduced to 100' through the curve.

**REFLECTOR NOTES**

1. Reflectors shall conform to Section 993 of the Standard Specifications.
2. Reflector color (white or yellow) shall conform to the color of the near lane edgeline.
3. Face of rail bolt, screw, rivet or bracket mounted reflectors shall not be used in lieu of adhesive mounted reflectors.
4. Post mounted reflectors approved on the 'Qualified Products List' may be used by FDOT Maintenance to replace damaged or missing reflector in a continuous run of existing post mounted reflectors. Adhesive and post mounted reflectors shall not be intermixed in a continuous run of guardrail.
5. The cost for reflectors shall be included in the contract unit price for Guardrail.

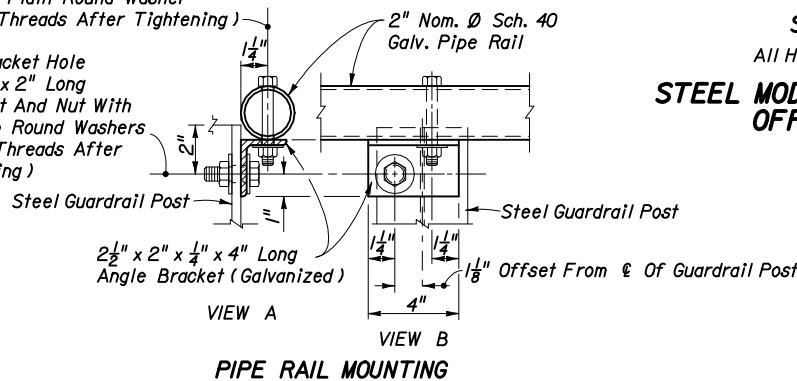
**REFLECTOR SPACING  
ADHESIVE REFLECTORS-DETAIL M**



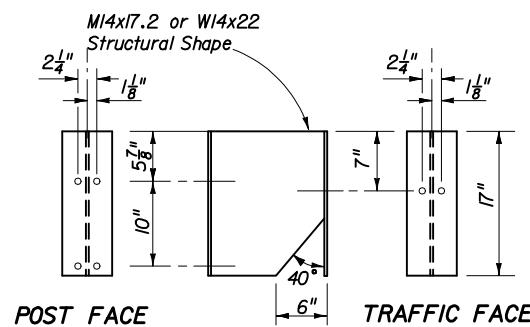
PICTORIAL

$\frac{5}{8}$ "  $\phi$  Bracket And Pipe Holes With  $\frac{1}{2}$ " x  $3\frac{1}{2}$ " Long Hex Bolt And Nut With  $\frac{1}{2}$ " Plain Round Washer (Upset Threads After Tightening)

$\frac{3}{4}$ "  $\phi$  Bracket Hole With  $\frac{1}{2}$ " x 2" Long Hex Bolt And Nut With  $\frac{1}{2}$ " Plain Round Washers (Upset Threads After Tightening)



PIPE RAIL MOUNTING

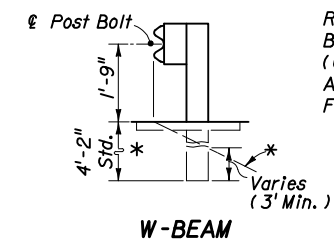


POST FACE      TRAFFIC FACE

SIDE VIEW

All Holes Are  $\frac{15}{16}$ "  $\phi$

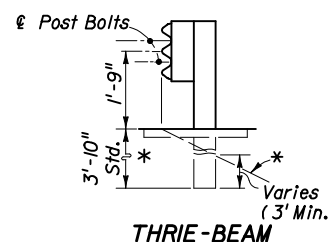
**STEEL MODIFIED THRIE-BEAM  
OFFSET BLOCK**



W-BEAM

W-BEAM WITH RUBRAIL

MODIFIED THRIE-BEAM



THRIE-BEAM

W-BEAM

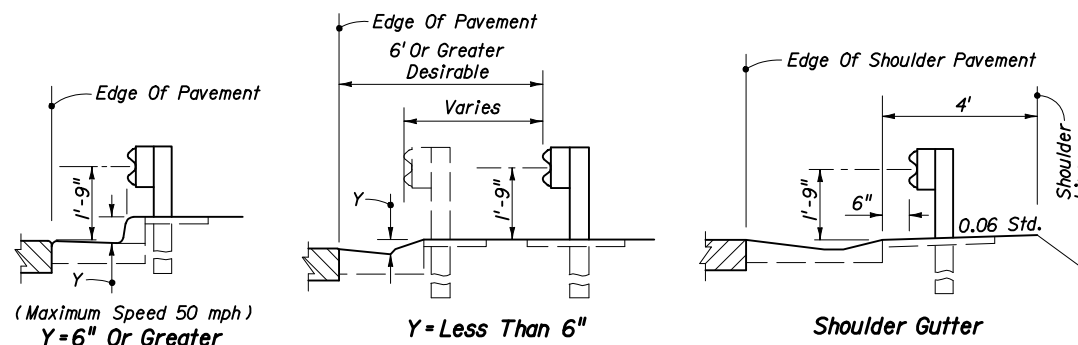
THRIE-BEAM

**DOUBLE FACED GUARDRAIL**

\*Front Slope When Right Of Way, Environmental Or Other Restrictions Prohibit Normal Shoulder Extension

**SINGLE FACED GUARDRAIL**

**MOUNTING HEIGHTS ON SHOULDERS AND IN MEDIANS**



Y = 6" Or Greater

Y = Less Than 6"

Shoulder Gutter

**LOCATION AT CURB & GUTTER SECTIONS-DETAIL L**

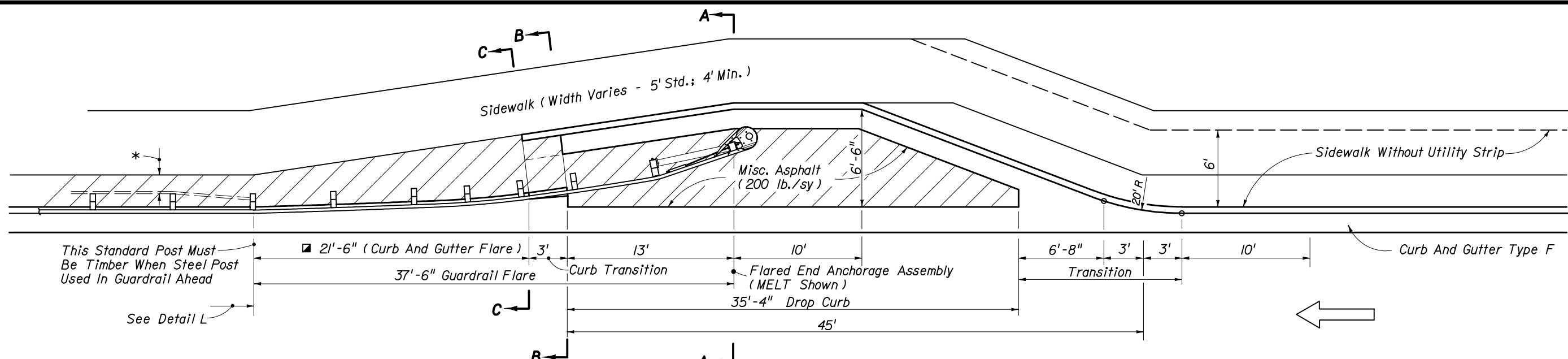
POSTS	OFFSET BLOCKS	REMARKS
Timber	6" x 8" x 14" Timber (Nominal) Or 6" x 8" x 14" Recycled Plastic	Post bolt hole in timber and plastic blocks to be centered ( $\pm \frac{1}{4}$ "). All timber offset blocks shall be dressed on all four sides (S4S). See Note 1 below. One 16d galvanized nail per block is to be used to prevent rotation of block (see detail left).
Steel W6 x 9 Or 6" C	6" x 8" x 14" Timber (Nominal) Or 6" x 8" x 14" Recycled Plastic	Same as above for timber and plastic blocks. Form fit plastic block holes align with holes in steel posts and do not require nails.
Steel W6 x 9 Or 6" C	M14 x 18 x 17" Or W14 x 22 x 17" (Steel Modified Thrie-Beam)	$\frac{5}{8}$ " $\phi$ x $1\frac{1}{2}$ " long hex head bolts with full length thread and nuts (2 Req.) and $\frac{3}{8}$ " plain round washers (4 Req.) for mounting steel block to post. Bolts are to be installed in opposite holes, top and bottom.

Notes: 1. Thrie-beam timber and recycled plastic offset blocks are 22" in length.  
2. Timber and recycled plastic offset blocks of equal size can be intermixed within a run of rail.  
3. Rubber offset blocks are not to be used on moderate or high volume facilities and used only on low volume facilities when specifically called for in the plans.

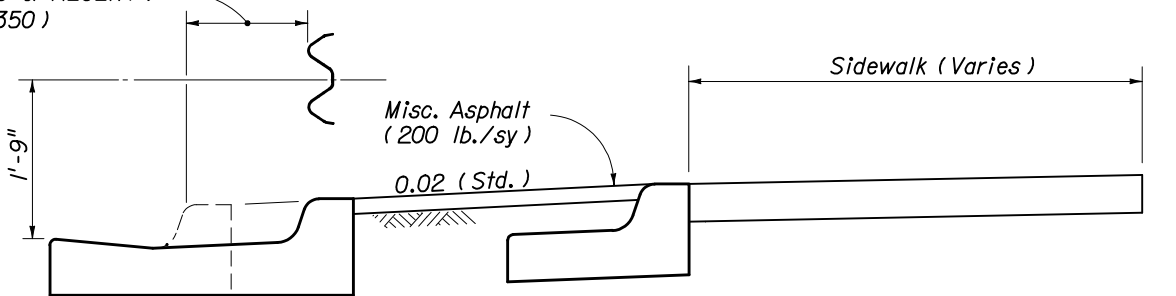
**PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Names	Dates	Approved By		
Designed By		Roadway Design Engineer		
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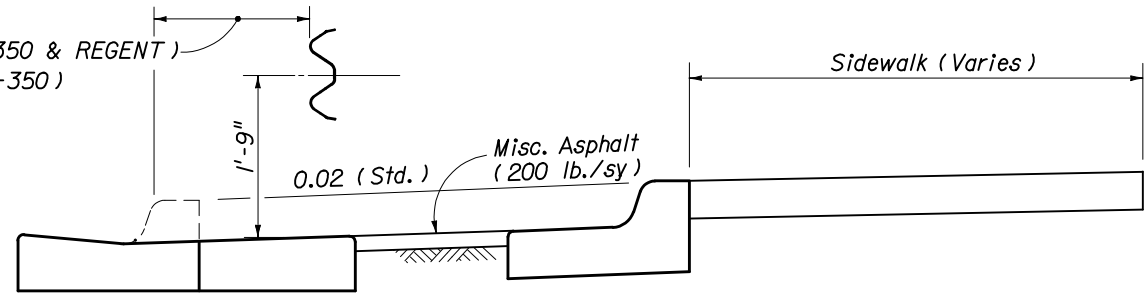


0'-9" (MELT)  
 1'-3 1/2" (SRT-350 & REGENT)  
 2'-3 1/2" (FLEAT-350)

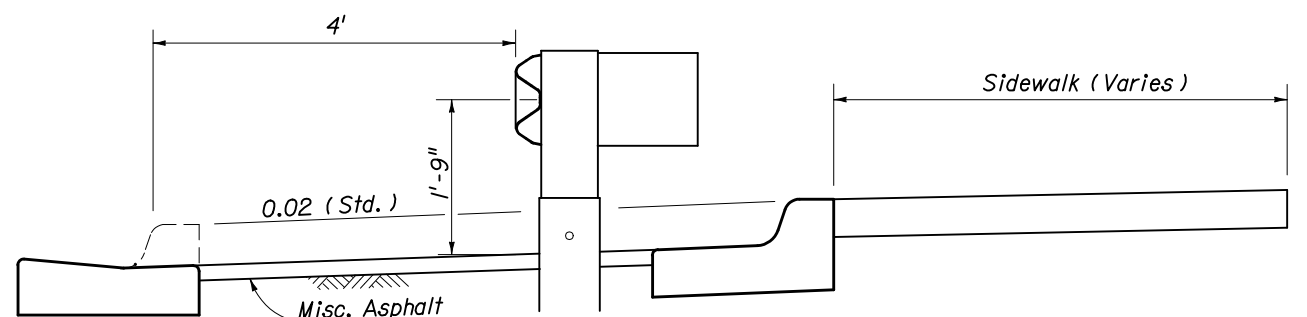


SECTION CC

1'-1" (MELT)  
 1'-8 1/2" (SRT-350 & REGENT)  
 1'-7" (FLEAT-350)



SECTION BB



SECTION AA

**APPROACH TREATMENT FOR CURB AND GUTTER**  
**DETAIL Q**

\*Safety pipe rail is required when the back of steel guardrail posts are 4' or less from the near edge of a pedestrian way or bikeway and post bolt treatment is required when the back of timber posts are 4' or less from the near edge of a pedestrian way or bikeway; see 'PEDESTRIAN SAFETY TREATMENTS'.

█ Curb flare shall follow guardrail flare, see elsewhere in this Index for additional guardrail flare information.

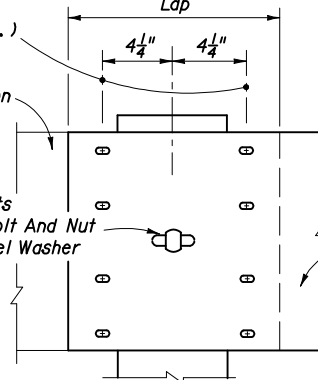
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	JVG/JBW	10/87	Approved By <i>[Signature]</i> Roadway Design Engineer	
Drawn By	JBW	10/87	Revision	Sheet No.
Checked By	JVG	10/87	02	17 of 32
				Index No. 400

$\frac{29}{32}$ " x  $\frac{1}{8}$ " Slots  
(8 Per Beam)  
With  $\frac{5}{8}$ " x  $1\frac{1}{4}$ " Long  
Button Head Bolts  
And Nuts (8 Req'd.)

Trailing Beam,  
Terminal Section  
Or End Shoe

$\frac{3}{4}$ " x  $2\frac{1}{2}$ " Slots  
With Post Bolt And Nut  
With  $\frac{5}{8}$ " Steel Washer  
Under Nut

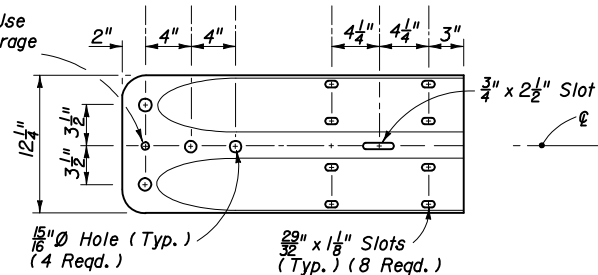
Direction Of Traffic



**W-BEAM RAIL SPLICE**

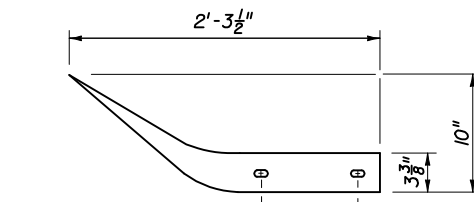
$25\frac{1}{2} \pm$  For End  
Anchorage Type  
MELT and CRT.  
Field Bend With  
Metalizing Permitted

$\frac{3}{4}$ "  $\emptyset$  Hole For Use  
With End Anchorage  
Type MELT

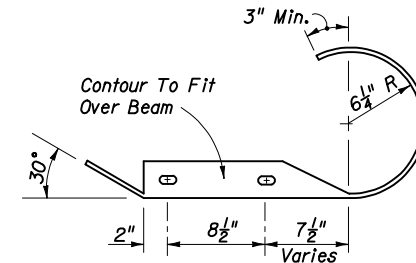


Note:  $\frac{5}{8}$ "  $\emptyset$  Steel washer required with splice bolts

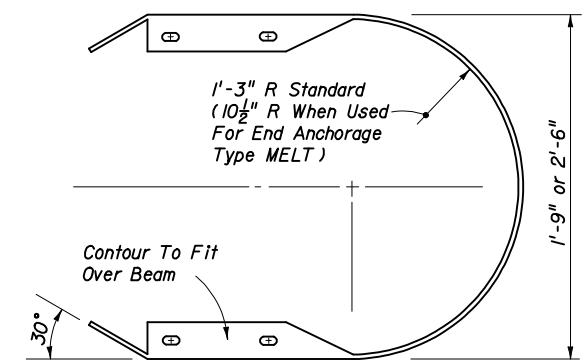
**SPECIAL END SHOE**



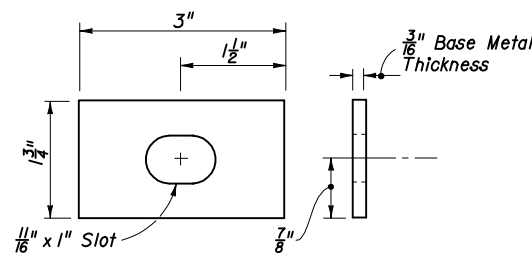
**FLARED END SECTION**



**ROUNDED END SECTION**

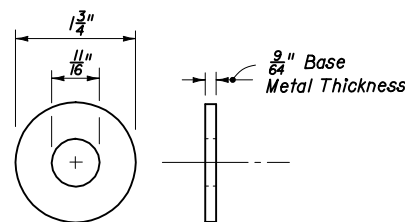


**BUFFER END SECTION**



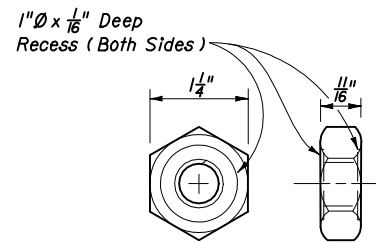
**(RECTANGULAR PLATE WASHER)  
BEAM WASHER**

Note: For beam washer requirements on end terminals, see individual end anchorage assembly details. Washers are to be used where necessary to accomplish alignment or where the post bolt head shows tendency to pull through the rail slot. Washers installed on guardrail, between end anchorages, prior to July 1, 1990 may remain in place until the guardrail is relocated or until repairs require removal and reinstallation of a post bolt.

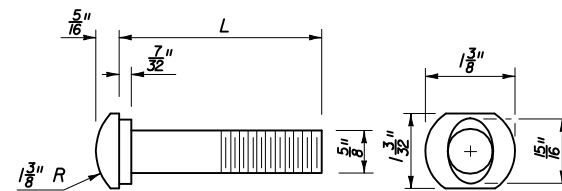


**$\frac{5}{8}$ " STEEL WASHER**

Note: The round washer is not intended for use under the recess nut for the beam to beam rail splice. The washer is required under the recess nut for connecting the beam to the special end shoe; under the post bolt nut for connecting the beam to the timber post and offset blocks; for connecting the beam to steel posts with timber offset blocks; under the hex bolt head for securing the beam anchor plate to the beam; and, for general guardrail connections by  $\frac{5}{8}$ "  $\emptyset$  hex bolts and nuts. For supplemental information see BEAM ANCHOR PLATE, PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS, individual end anchorage assembly details, SPECIAL STEEL GUARDRAIL POSTS, SPECIAL END SHOE, W-BEAM RAIL SPLICE, THRIE-BEAM RAIL SPLICE, and THRIE-BEAM TERMINAL CONNECTOR details.



**$\frac{5}{8}$ " MODIFIED HEAVY  
HEX NUT (RECESSED NUT)**



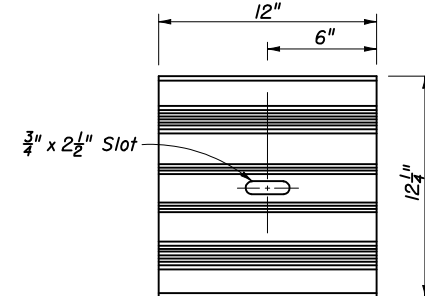
**$\frac{5}{8}$ " OVAL SHOULDER BUTTON HEAD BOLT**

L (In.)	THREAD LENGTH (Min.) (In.)	APPLICATION
$1\frac{1}{4}$ "	Full Length	Rail Splice Bolt
10"	4"	Single Or Double Faced Guardrail Post Bolt - Timber Or Recycled Plastic Offset Block(s) On Steel Post
18"	4"	Post Bolt - Single Faced Guardrail Timber Posts
25"*	4"	Post Bolt - Double Faced Guardrail Timber Posts

Special bolts having lengths of 10" or greater shall have a thread length of not less than 4".

\* Use of the 25" AASHTO-AGC-ARTBA standard length post bolt on double faced guardrail that results in the bolt projecting more than  $\frac{3}{4}$ " beyond the face of the nut after pull-up shall be trimmed to  $\frac{3}{4}$ " reveal and metalized with organic zinc-rich coating.

Note: Specifications same as for hex bolts.



Note: For application information see individual end anchorage assembly details.

**W-BEAM BACK-UP PLATE**

Hex bolts shall conform to the requirements of ASTM F568M and hex nuts to the requirements of ASTM A563M. Heavy hex nuts may be used in lieu of hex nuts and hex nuts used for jam nuts.

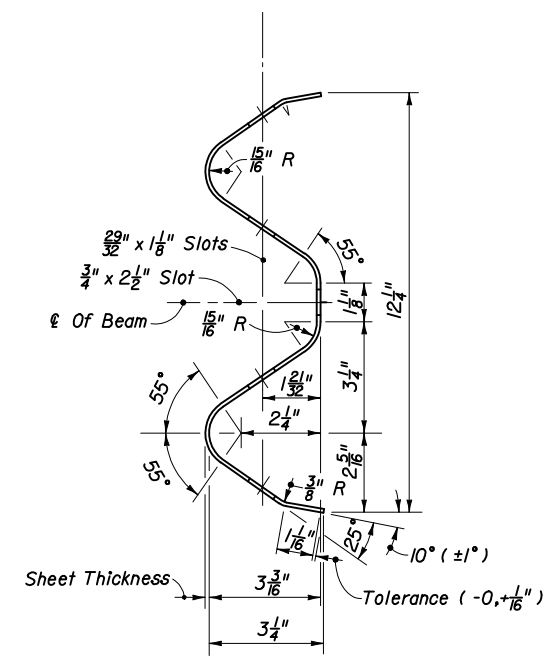
**HEX BOLTS AND NUTS**

OFFSETS (Ft.)  
Measured From Face Of Guardrail To Front Of Above Ground Rigid Hazard

POST SPACING (Ft.)	SINGLE BEAM		NESTED BEAMS	
	W-Beam	Thrie-Beam	W-Beam	Thrie-Beam
6'-3"	4'	3'-3"	N/A	N/A
3'-1 1/2"	3'	2'-8"	2'-8"	2'-4"
1'-6 3/4"	N/A	N/A	2'-4"	2'

Note: The values shown should be utilized unless changes are supported by empirical validation. Those desiring to develop offset values from the simulated deflection values shown in Table 5.3 of the AASHTO Roadside Design Guide are cautioned to proceed only if back-ground in the table development is understood.

**MINIMUM OFFSET FOR  
SINGLE FACED GUARDRAIL (Ft.)**

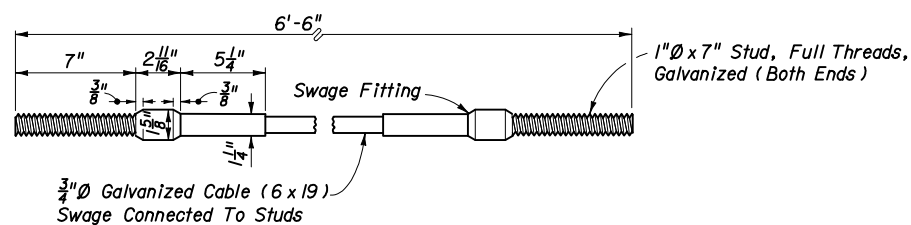


**W-BEAM**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

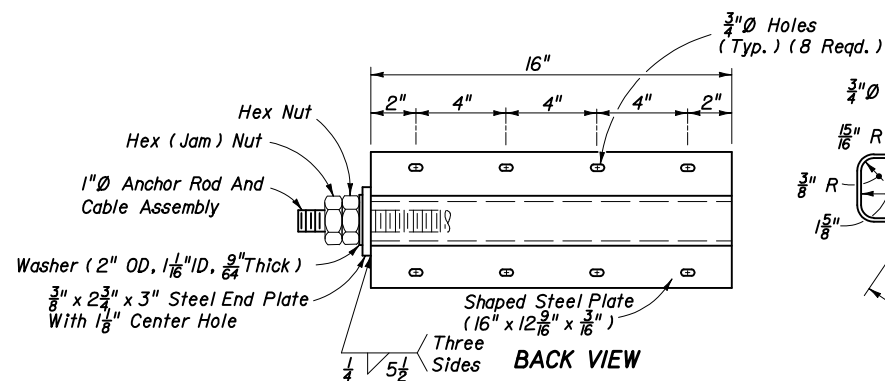
**GUARDRAIL**

Names	Dates	Approved By		
Designed By		Roadway Design Engineer		
Drawn By	HSD 8/81			
Checked By	JBW/JVG 8/81	00	18 of 32	400

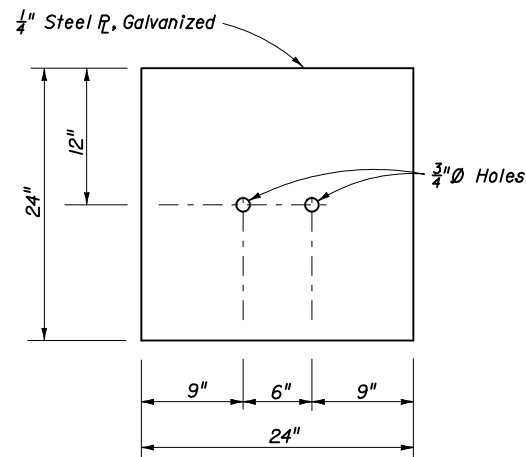
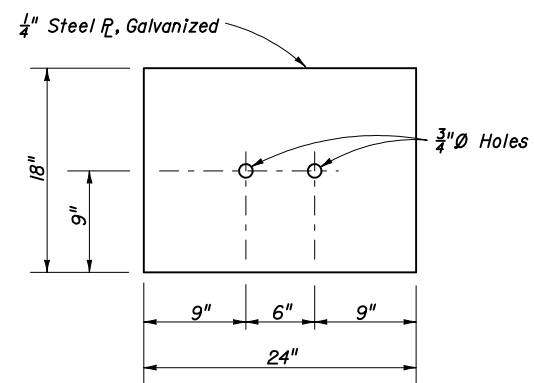
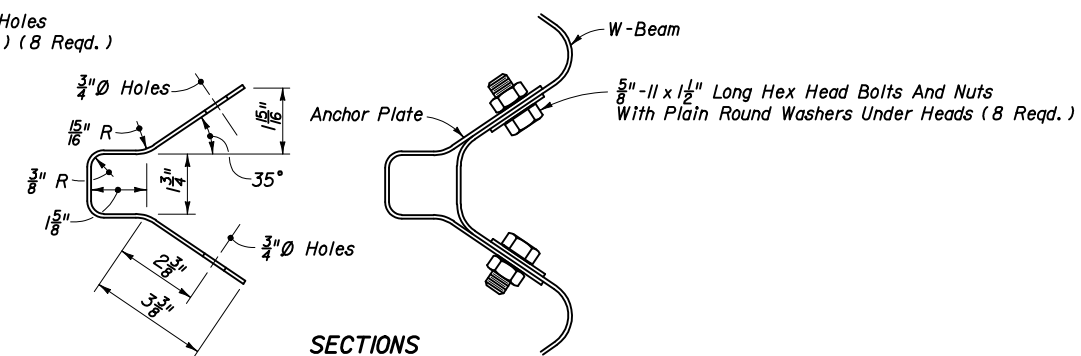


Note: Cable assemblies shall be in accordance with the specifications of AASHTO-AGC-ARTBA 'A Guide To Standardized Highway Barrier Hardware' Cable Anchor Assembly FCAOI. An additional cable assembly 9' in length with a swaged fitting on one (1) end is required for each end anchorage assembly Type CRT.

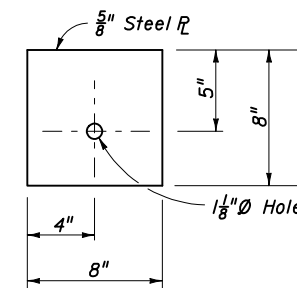
**CABLE ASSEMBLY**



**BEAM ANCHOR PLATE**



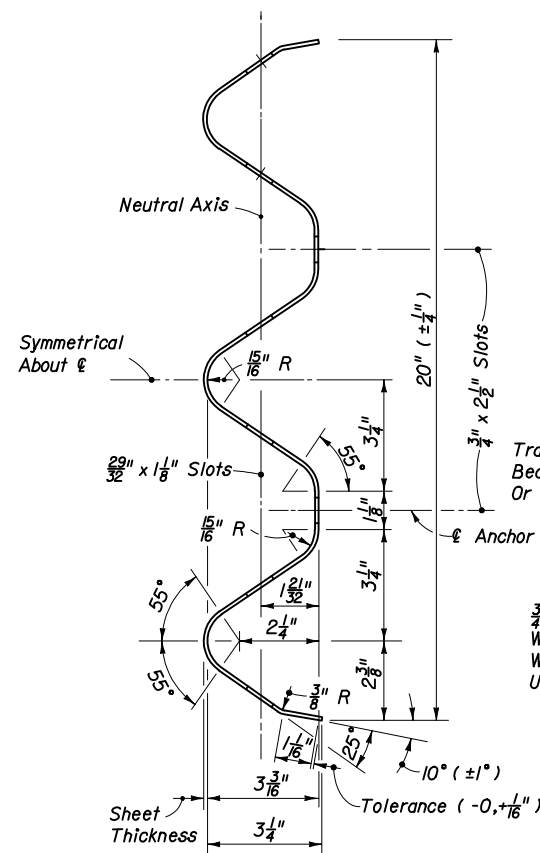
**SOIL PLATES**



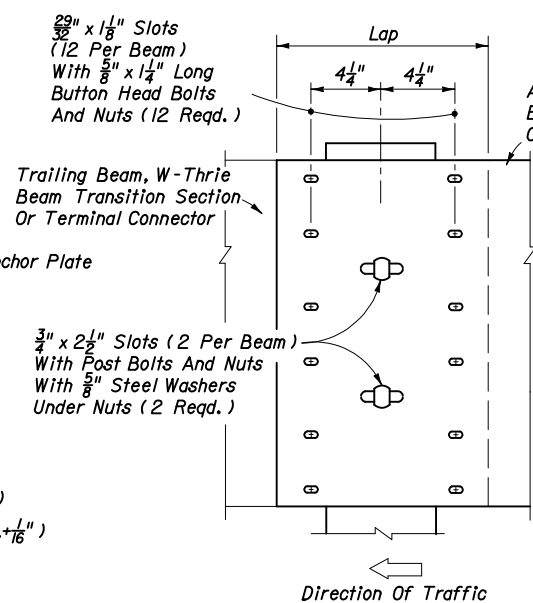
**BEARING PLATE**



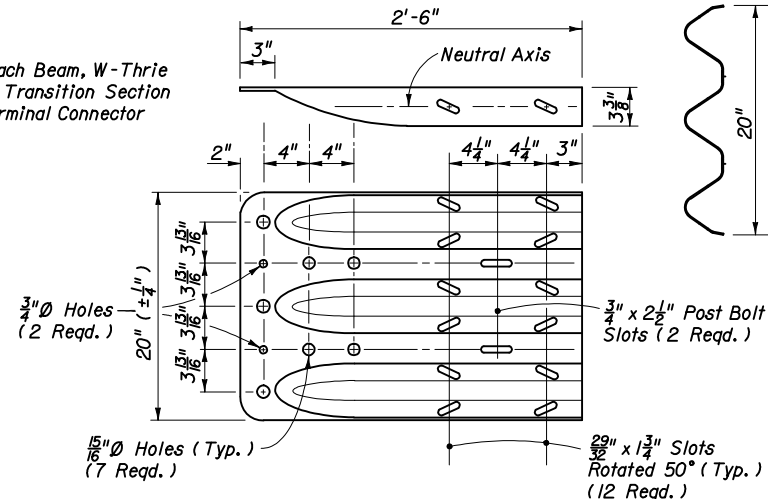
**BREAKAWAY TERMINAL POST SLEEVE**



**THRIE-BEAM**

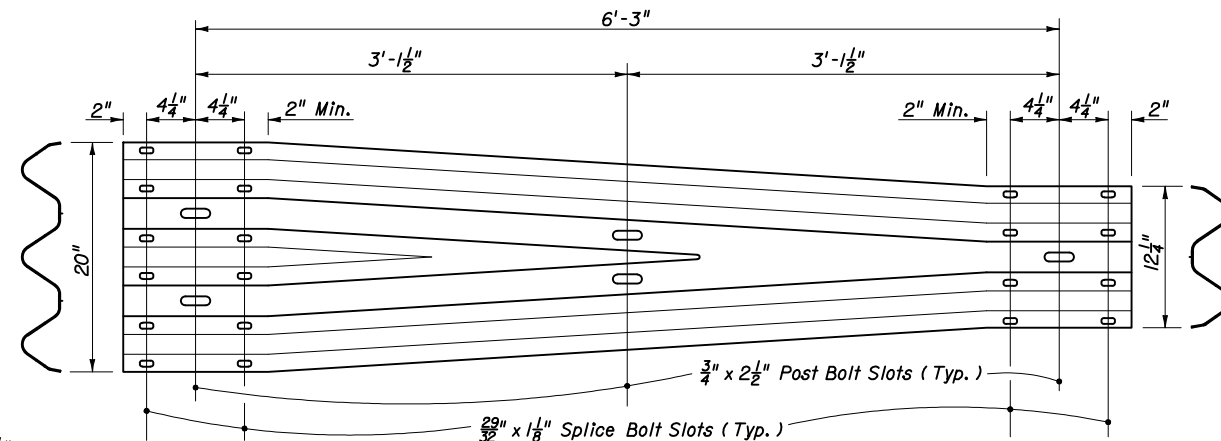


**THRIE-BEAM RAIL SPLICE**



Note: 5/8" steel washer required with splice bolts

**THRIE-BEAM TERMINAL CONNECTOR**

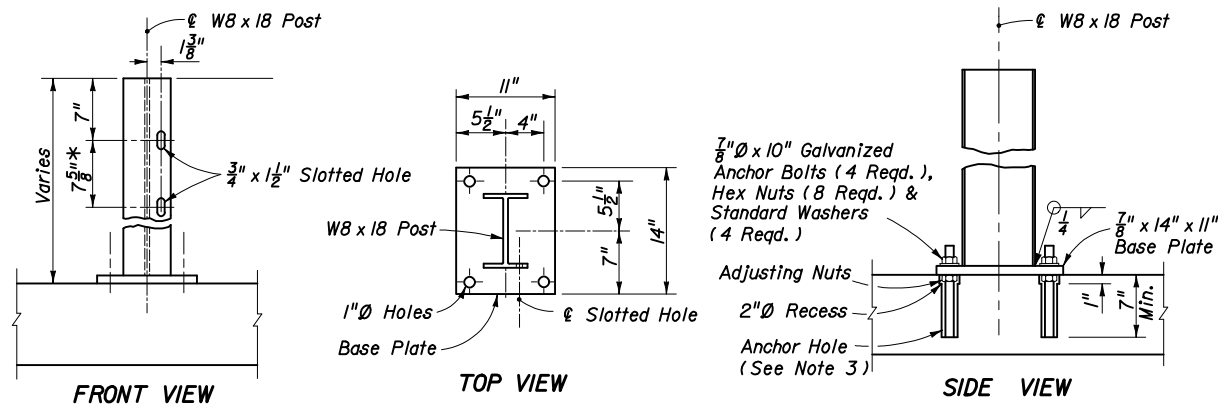


**W-THRIE BEAM TRANSITION SECTION**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

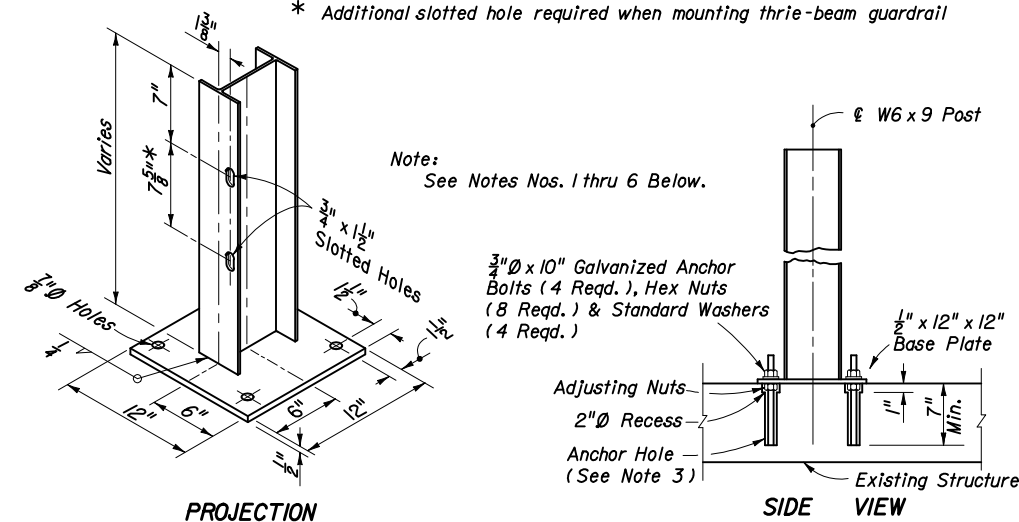
**GUARDRAIL**

Names	Dates	Approved By		
Designed By		Roadway Design Engineer		
Drawn By				
Checked By				
		Revision	Sheet No.	Index No.
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**FOR MOUNTING GUARDRAIL ON EXISTING APPROACH SLABS AND BRIDGE SIDEWALKS**

\* Additional slotted hole required when mounting thrie-beam guardrail



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

NOTES: (SPECIAL STEEL POST)

1. Either anchor bolts, concrete wedge anchors or approved Adhesive-Bonded Anchors for Structural Applications may be used.

Anchor bolts, wedge anchors and adhesive anchors shall have a minimum tensile strength of 60,000 psi and galvanized in accordance with ASTM A153 (stainless steel components may be substituted but components plated in accordance with ASTM B-633 are not acceptable). Adhesive anchor rods shall be equal in diameter to that detailed for anchor bolts. Wedge anchors are to be installed in accordance with the manufacturer's recommendations, assuming 3,000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements: (a) tensile load each anchor: approach slabs 14,000 lbs.; other structures 8,000 lbs. (b) shear load each anchor: approach slabs 15,000 lbs.; other structures 7,800 lbs.

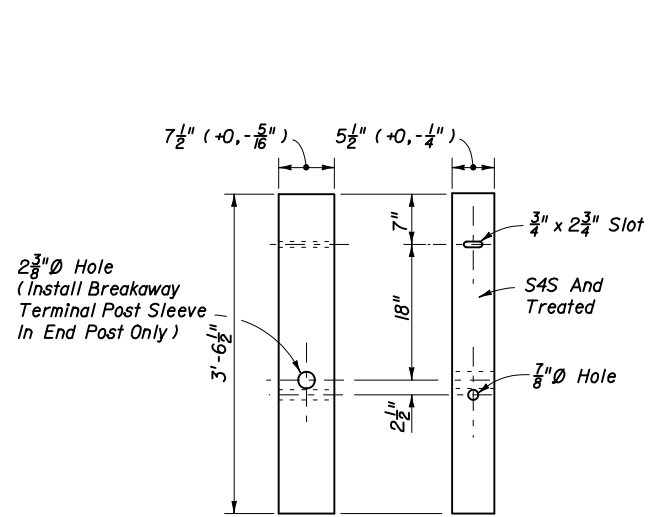
2. Posts are to be plumbed by adjusting nuts or mortar seating. Posts installed using anchor bolts and adhesive anchors are to be set with adjusting nuts as detailed, unless the Engineer approves the use of mortar seating in lieu of adjusting nuts. Posts installed using wedge anchors are to be set with mortar seating. Base plates shall be grouted with neat finish.

3. Adhesive-Bonded Anchors for Structural Applications shall comply with Section 937 and be installed in accordance with Section 416. Drilled hole diameter shall be in accordance with the manufacturer's instructions.

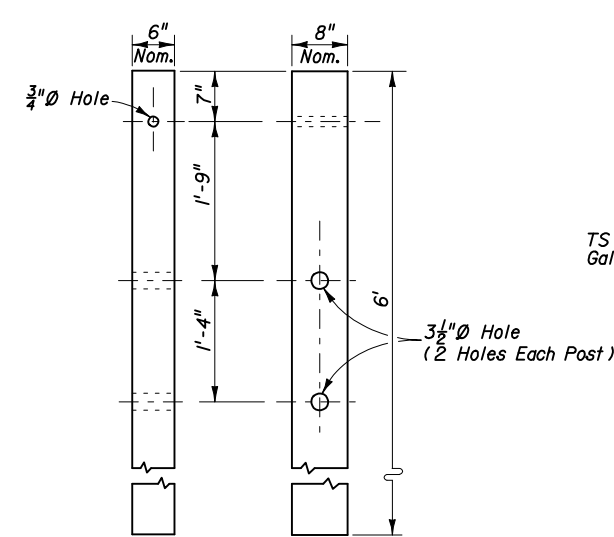
4. Anchor holes and recesses shall be drilled; wedge anchor holes are to be drilled in accordance with the manufacturer's specifications. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly cleaned when setting bolts and anchors and dry when setting wedge anchors.

5. Steel post and base units shall be galvanized in accordance with ASTM A123. Any damaged galvanized areas are to be metalized in accordance with Section 562 of the Standard Specifications.

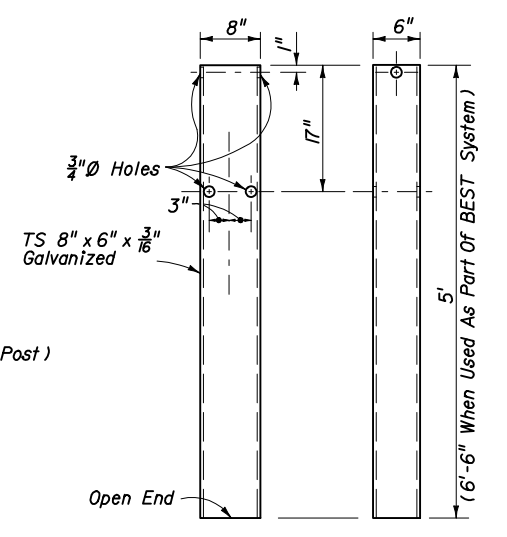
**SPECIAL STEEL GUARDRAIL POSTS**



**SHORT TIMBER BREAKAWAY POST**  
For Use In Combination With Steel Tube

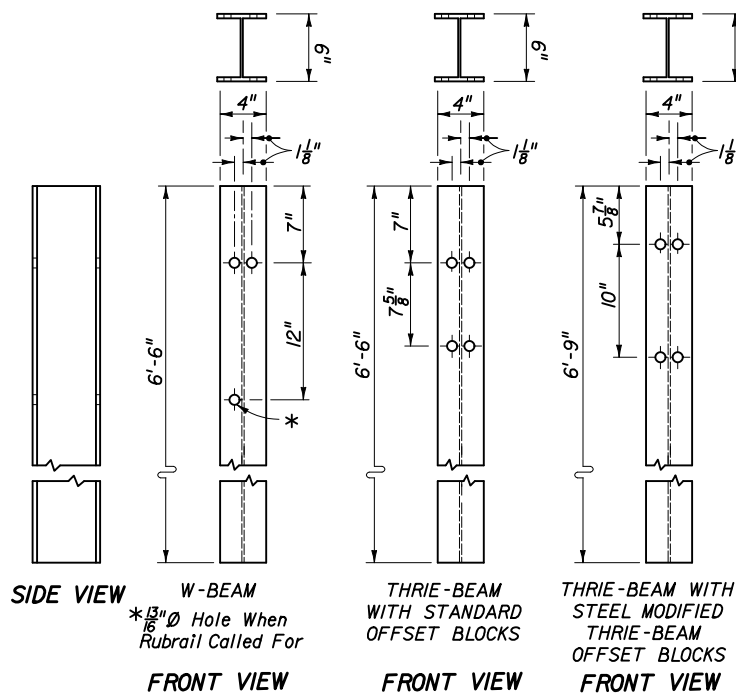


**CRT TIMBER POST**



**STEEL TUBE**  
For Use In Combination With Short Timber Breakaway Post

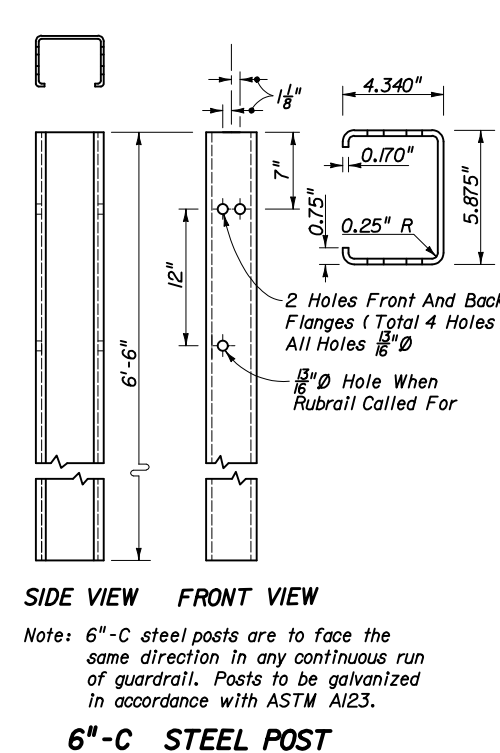
**SPECIAL TIMBER GUARDRAIL POSTS**



All Holes Shall Be 3/8 inch Diameter Identical Front And Back Flanges

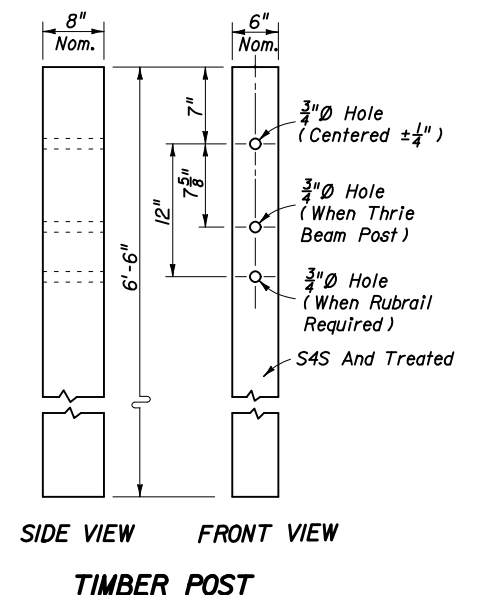
Note: W6 x 8.5 or W6 x 9 steel posts may be either rolled or welded structural shapes conforming to or exceeding the design properties of ASTM A6/A6M. Welding shall be in accordance with the requirements of ASTM A769/A769M. Posts shall be cut to length and the ends seal welded between web and flange before galvanizing. Posts to be galvanized in accordance with ASTM A123.

**W6 x 8.5 OR W6 x 9 STEEL POST**  
**STANDARD TIMBER AND STEEL GUARDRAIL POSTS**



Note: 6 inch-C steel posts are to face the same direction in any continuous run of guardrail. Posts to be galvanized in accordance with ASTM A123.

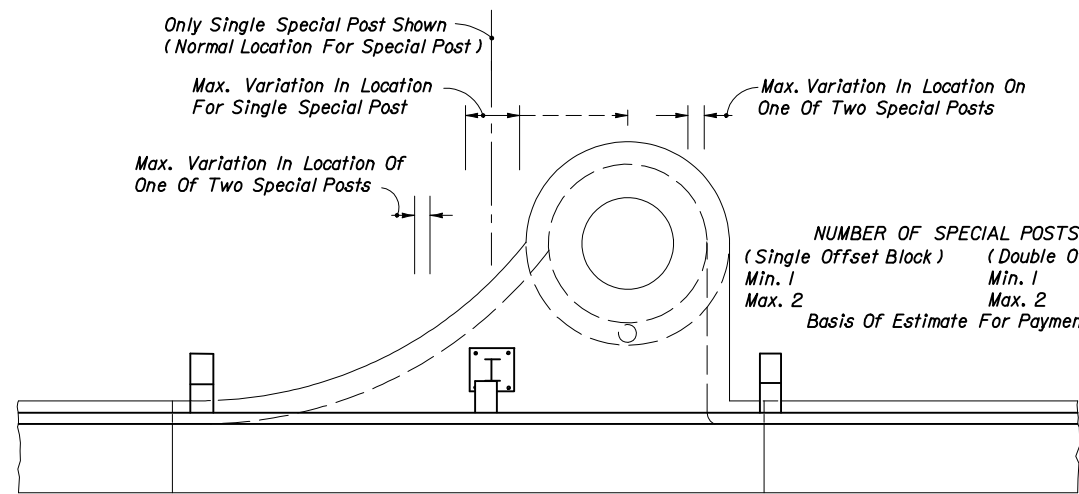
**6 inch-C STEEL POST**



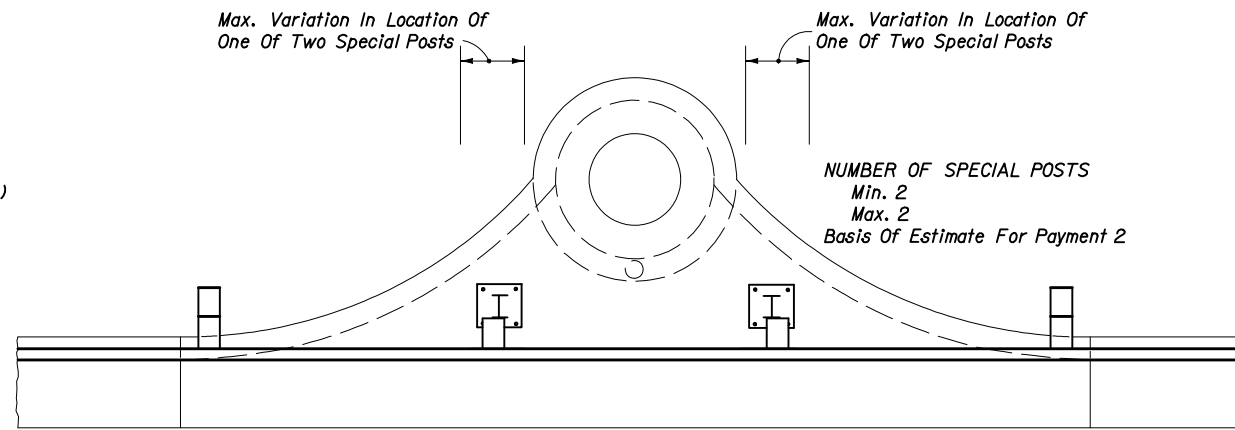
**TIMBER POST**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		Roadway Design Engineer		
Drawn By	JM 08/81	Revision	Sheet No.	Index No.
Checked By	JVG/JBW 08/81	00	20 of 32	400

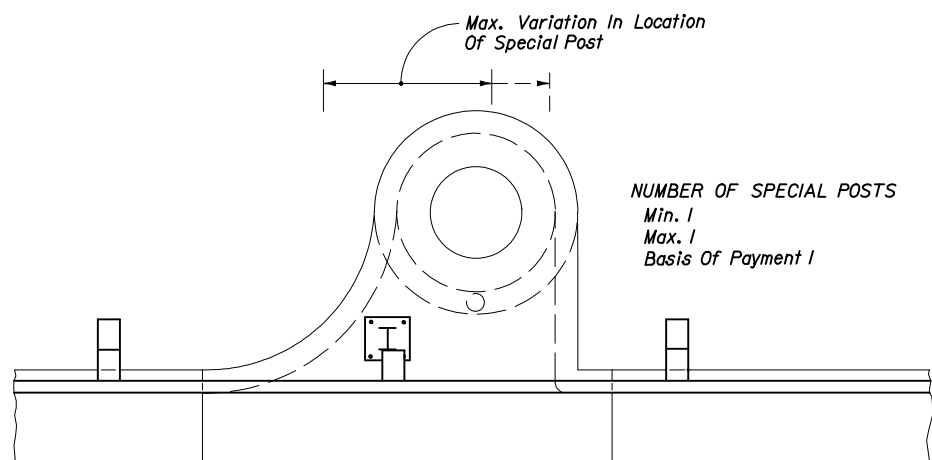
**GUARDRAIL POSTS**



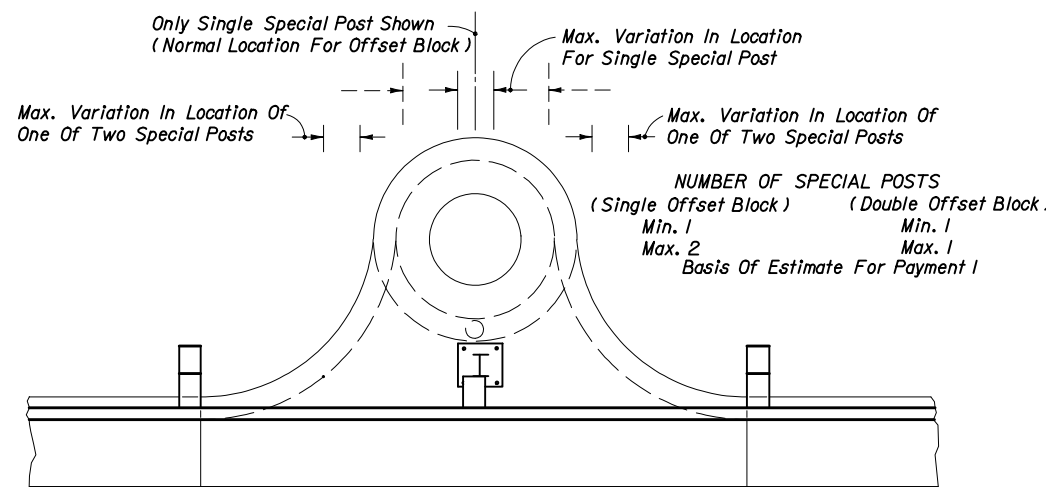
**CURB INLET TYPE 1**



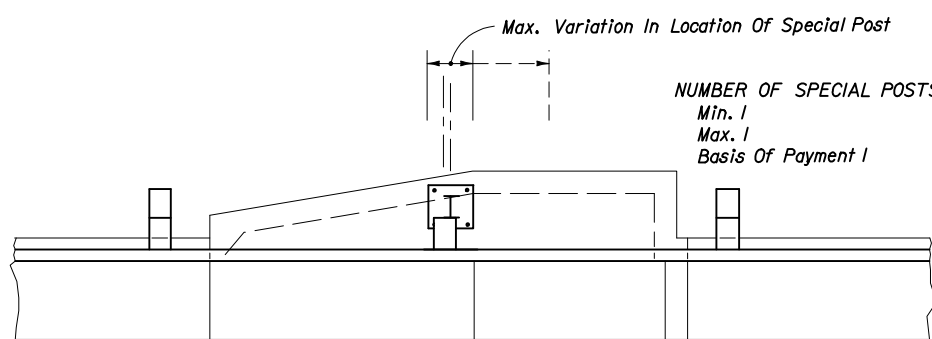
**CURB INLET TYPE 2**



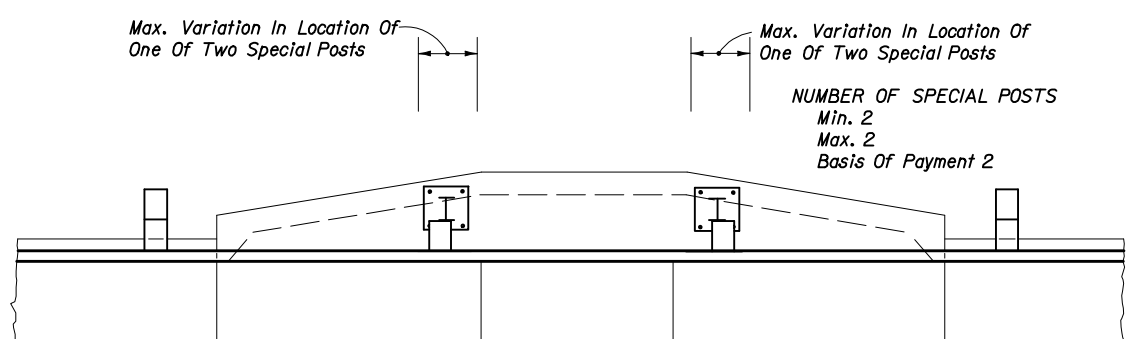
**CURB INLET TYPE 3**



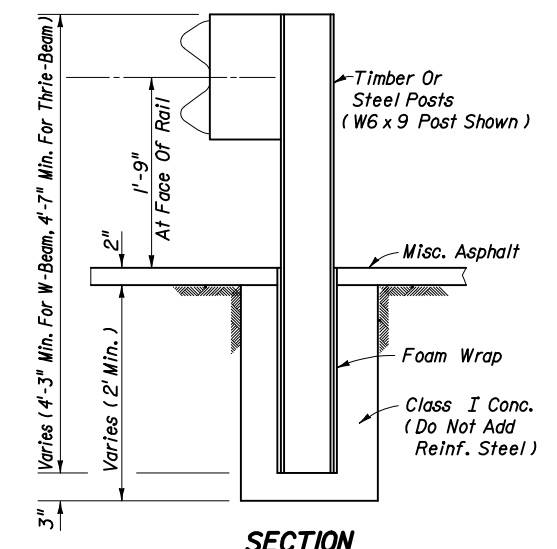
**CURB INLET TYPE 4**



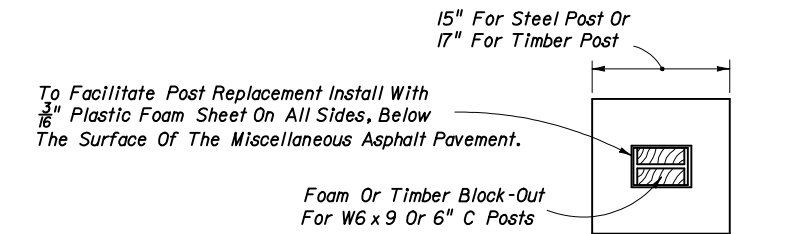
**CURB INLET TYPE 5**



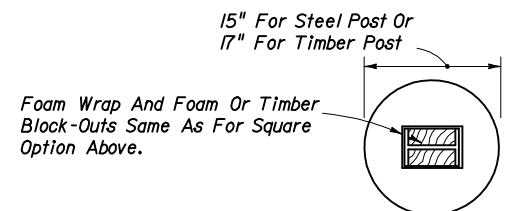
**CURB INLET TYPE 6**



**SECTION**



**PLAN (SQUARE OPTION)**



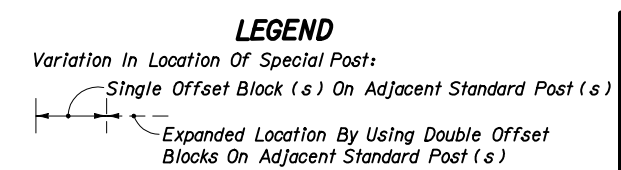
**PLAN (ROUND OPTION)**

Note: For line post applications only, i.e., not to be used with breakaway post applications nor be used to modify End Anchorage Assemblies Type II.

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

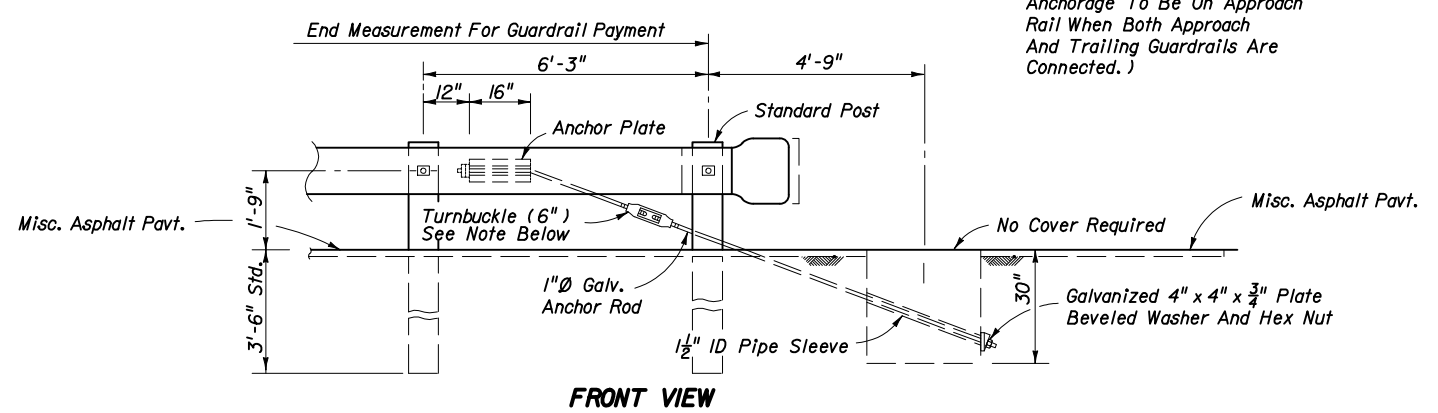
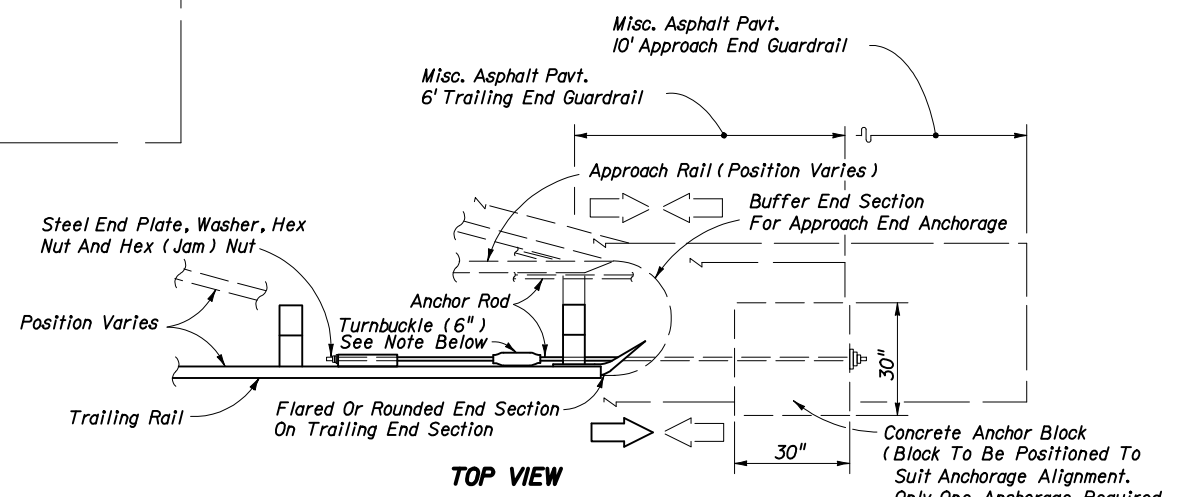
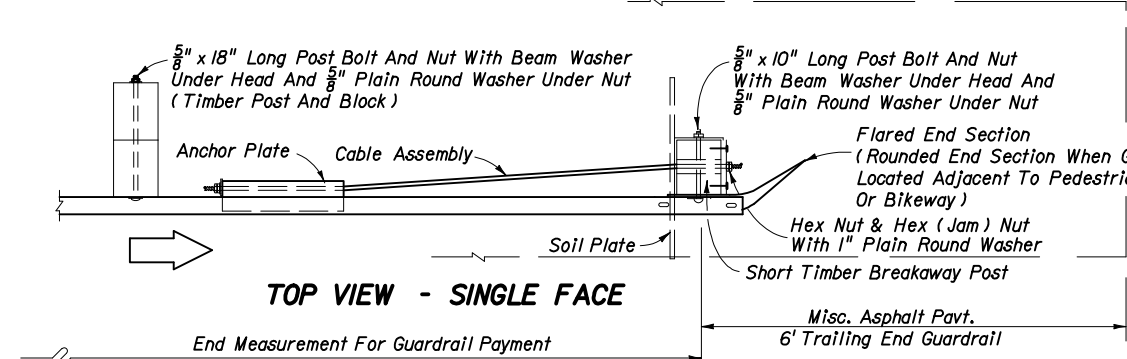
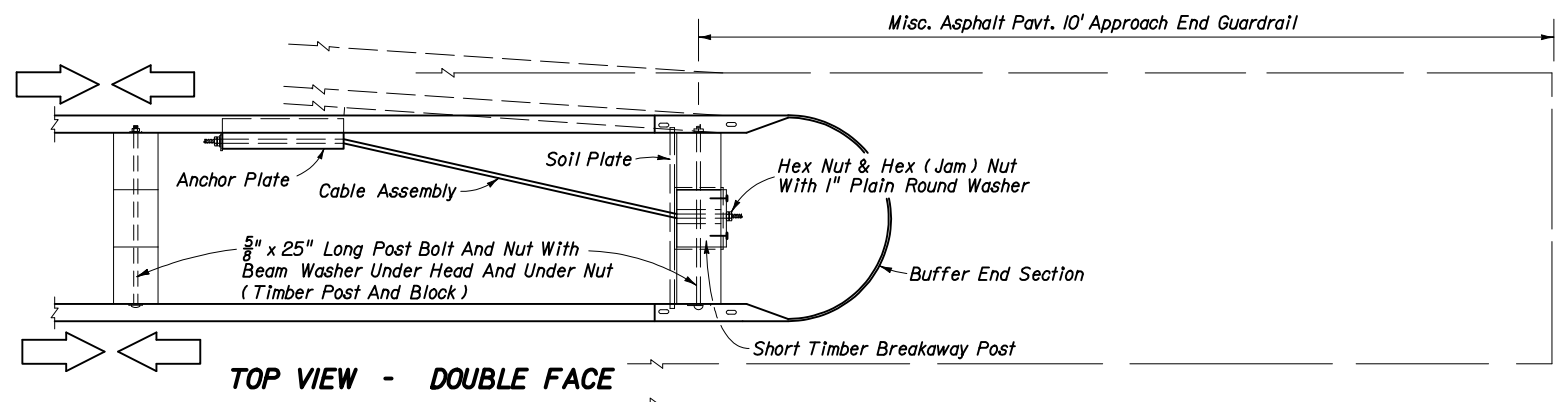
- Notes:**
- The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.
  - Special posts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 20, and paid for under the contract unit price for Special Guardrail Post, EA.

- 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 3/4" for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail 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, EA. Payment shall include cost of foam wrap and concrete encasement.



**SPECIAL POST LOCATIONS ON CURB INLETS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	HSD	08/83	Roadway Design Engineer	
Checked By	JVG	08/83	Revision	Sheet No. Index No.
			00	21 of 32 400



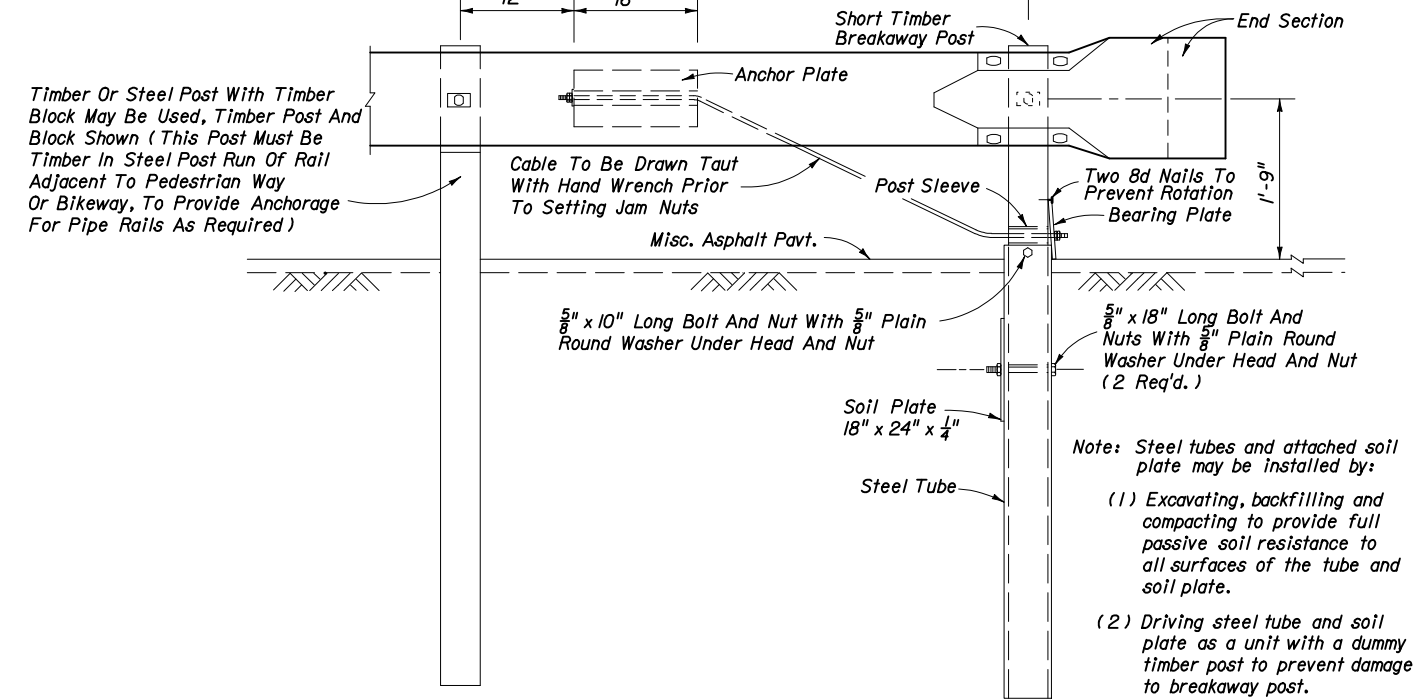
Turnbuckle to be used only for guardrail that is reset vertically. The existing anchor rod (1" or 1 1/4" Dia.) shall be field cut, threaded 4" on each end, and metalized in accordance with Sections 562 and 971 of the Standard Specifications. The cost for cutting, threading, metalizing and the turnbuckle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

The payment for the items of End Anchorage Assembly Type II (Concrete Anchor Block Option) shall be full compensation for furnishing and installing the Beam Anchor Plate, Anchor Rod, Pipe Sleeve, Anchor Block, either Flared, Rounded or Buffer End Section, and the necessary hardware.

**CONCRETE ANCHOR BLOCK OPTION**

**TYPE II NOTES**

1. Unless specified in the plans, the contractor can supply either the cable anchor option or the concrete anchor block option.
2. Type II end anchorage assemblies are approved for all speeds and are intended for use as:
  - (a) trailing end anchorages for single face free standing guardrail systems;
  - (b) approach end anchorages for single face free standing guardrail systems when end anchorage is located outside of the clear zone; and,
  - (c) both approach and trailing ends of double face guardrail systems.
 Crash cushions shall be constructed at or in lieu of approach Type II end anchorages located inside the clear zone.
3. These end anchors are to be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Type II), EA as called for in the plans or by permit.



Note: Steel tubes and attached soil plate may be installed by:

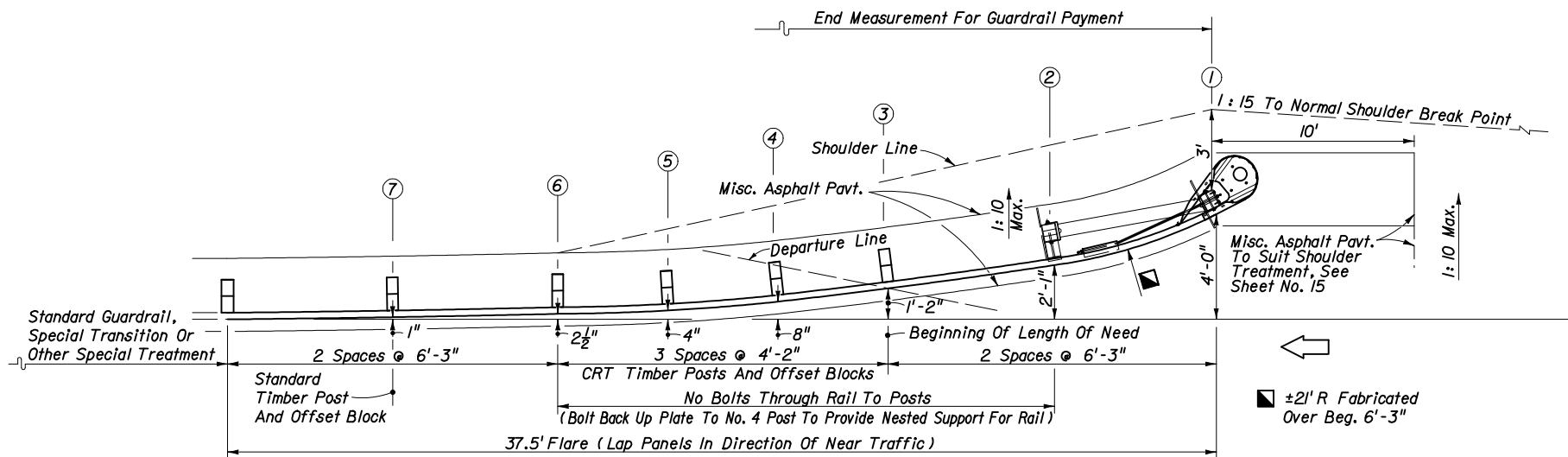
- (1) Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.
- (2) Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

The payment for the items of End Anchorage Assembly Type II (Cable Option) shall be full compensation for furnishing and installing either the Round or the Buffer End Section, the Beam Anchor Plate, Cable Assembly, Pipe Sleeve, Soil Plate, Steel Tube, Bearing Plate, Short Timber Breakaway Post, Offset Blocks and the necessary hardware.

**CABLE ANCHOR OPTION**

**END ANCHORAGE ASSEMBLY TYPE II**

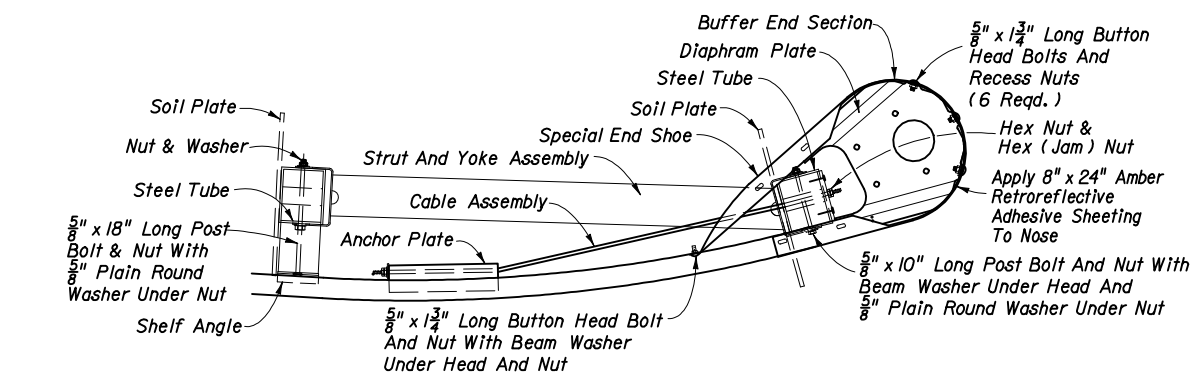
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Names	Dates	Approved By		
Designed By		Roadway Design Engineer		
Drawn By	JM	01/81	Revision	Sheet No.
Checked By	JGV	01/81	00	22 of 32
				Index No. 400



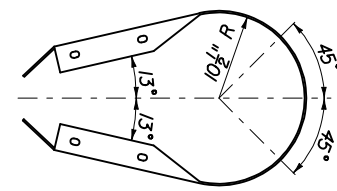
**PLAN**  
**MODIFIED ECCENTRIC LOADER TERMINAL (MELT)**

**MODIFIED ECCENTRIC LOADER TERMINAL NOTES**

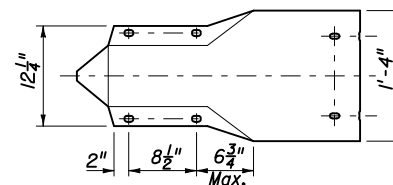
1. The MELT is applicable for design speeds up to 45 mph. The MELT is intended for use as an approach end guardrail anchorage for shoulder guardrail. Its alignment is a flare from the normal guardrail alignment with an effective length of 37.5' including three standard W-beam panel outside of any standard guardrail, guardrail transitions or other special treatments.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the MELT and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the MELT when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The MELT shall be assembled in accordance with the distributor's detailed drawings, procedures and specifications.
4. The first two post must be short timber breakaway posts with steel foundation tubes and soil plates, post Nos. 3 thru 6 must be CRT timber posts and post No. 7 must be a standard timber post.
5. The MELT can not be used in medians where horizontal clearance requires the use of a backrail.
6. See the General Notes for galvanizing requirements of metallic components.
7. If the plans call for the MELT at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly that meet the applications for that location. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECP consideration.
8. The MELT shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans, the distributor's detailed drawings, procedures and specifications and this Index.



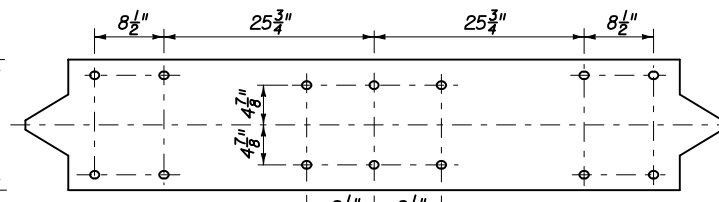
**TOP VIEW**



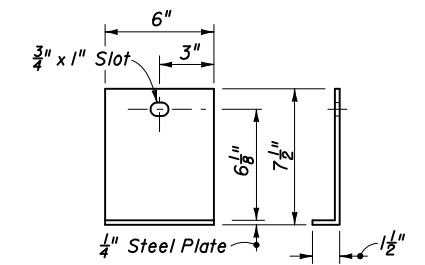
**PLAN**



**ELEVATION**

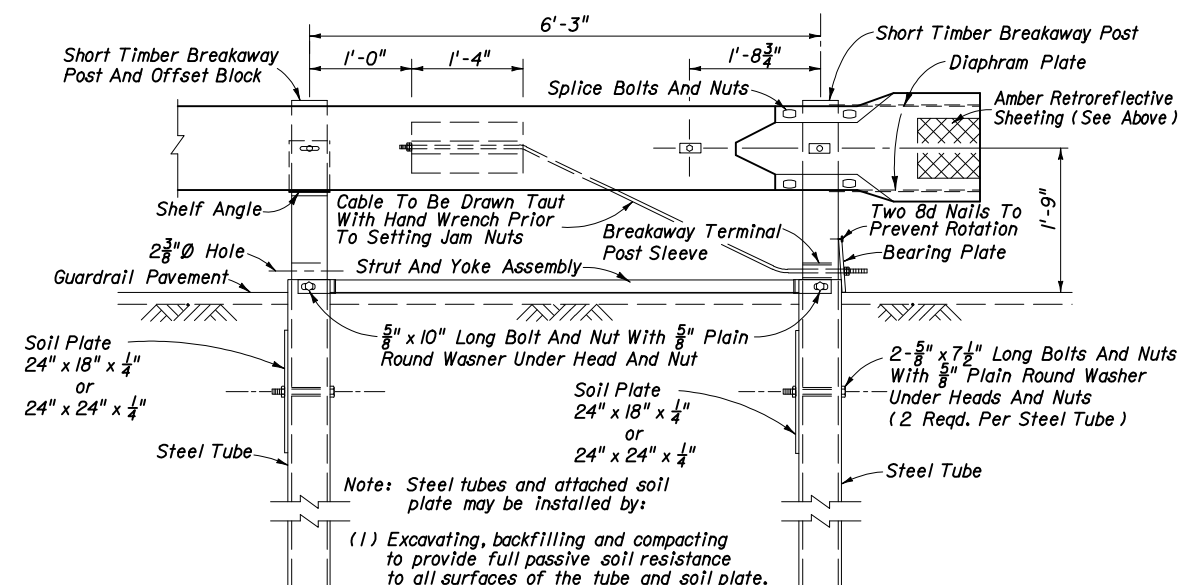


**FLAT PLATE LAYOUT**

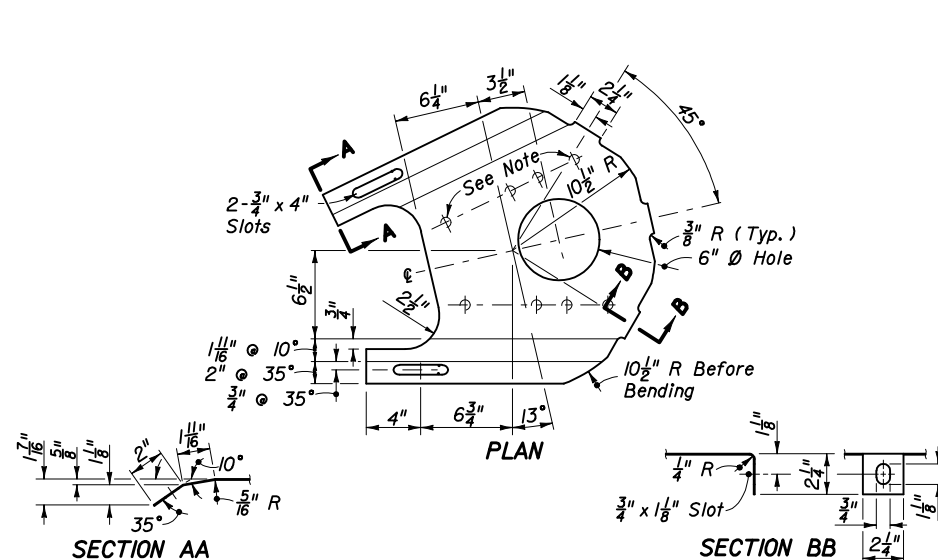


**SHELF ANGLE**

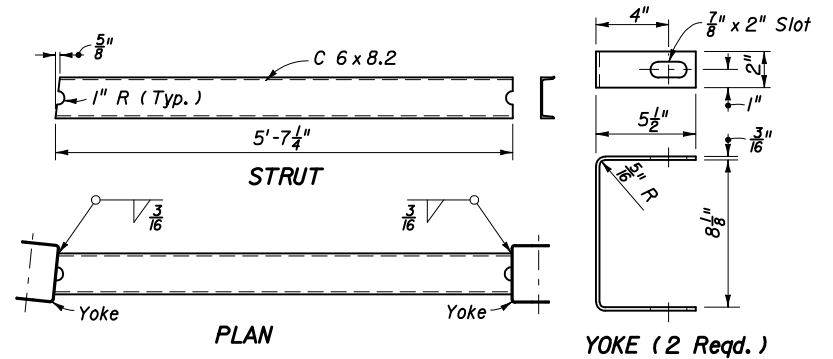
**BUFFERED END SECTION**  
All Slots Shall Be  $\frac{29}{32}$ " x  $1\frac{1}{8}$ "



**FRONT VIEW**



**DIAPHRAGM PLATE (2 Req'd.)**

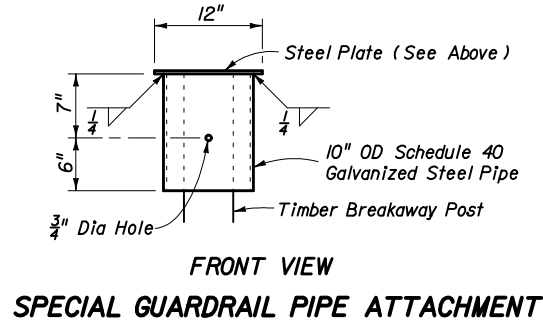
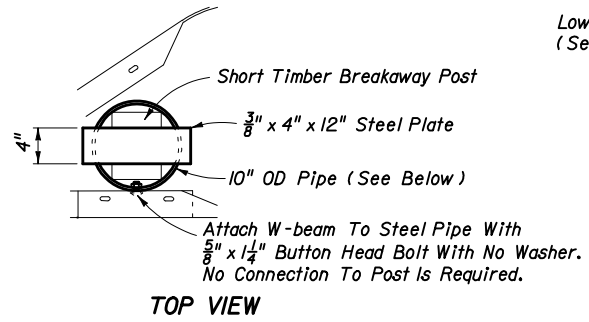
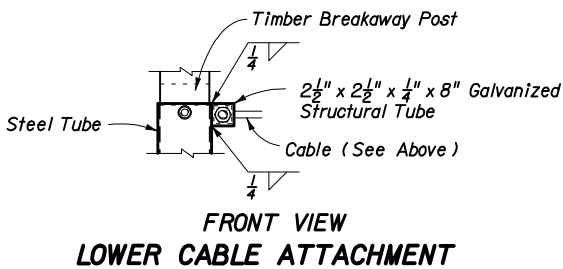
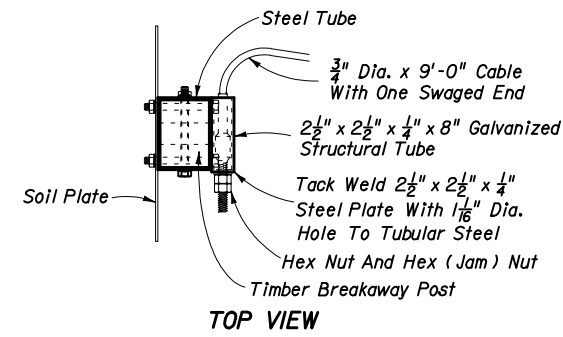


**STEEL STRUT AND YOKE ASSEMBLY**  
Note: Assembly installed with channel turned down for right side guardrail and turned up for left side guardrail.

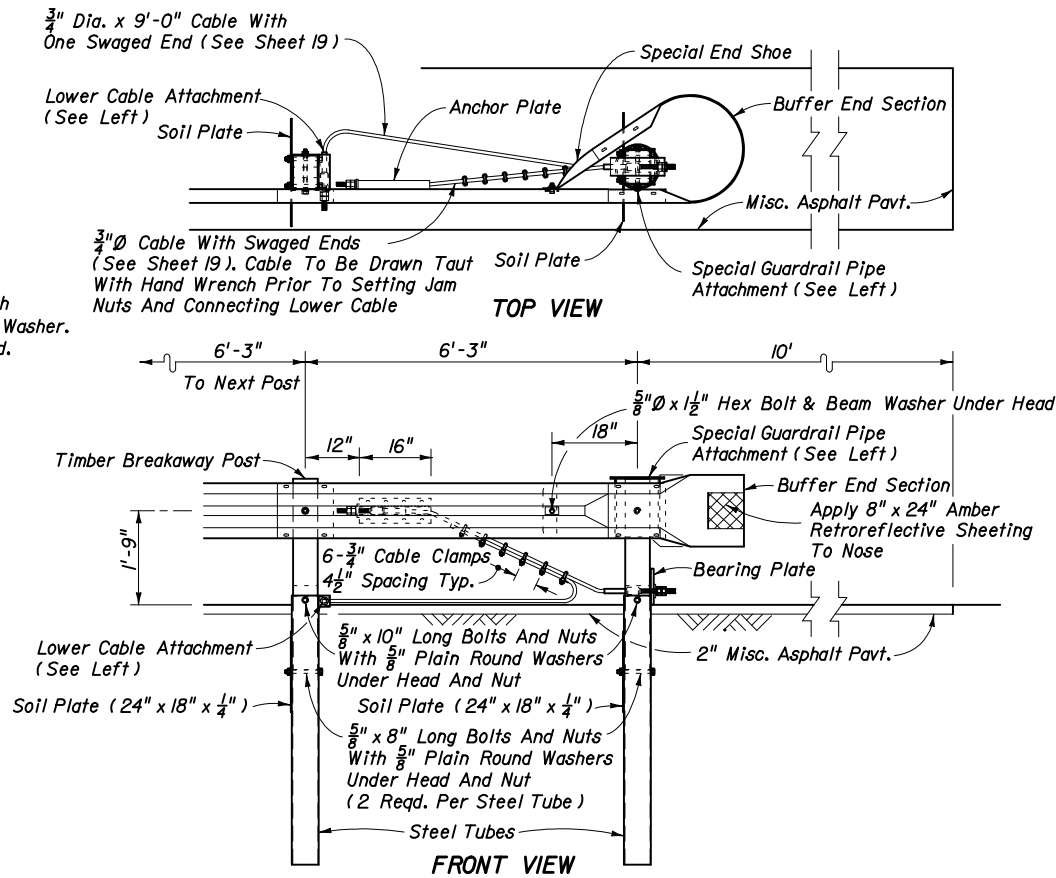
- Note: Steel tubes and attached soil plate may be installed by:
- (1) Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.
  - (2) Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

**END ANCHORAGE ASSEMBLY TYPE MELT**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	FHWA	3/95	Approved By <i>[Signature]</i>	
Drawn By	HKH	3/95	Revision	Sheet No.
Checked By	JVG	3/95	02	23 of 32
				400



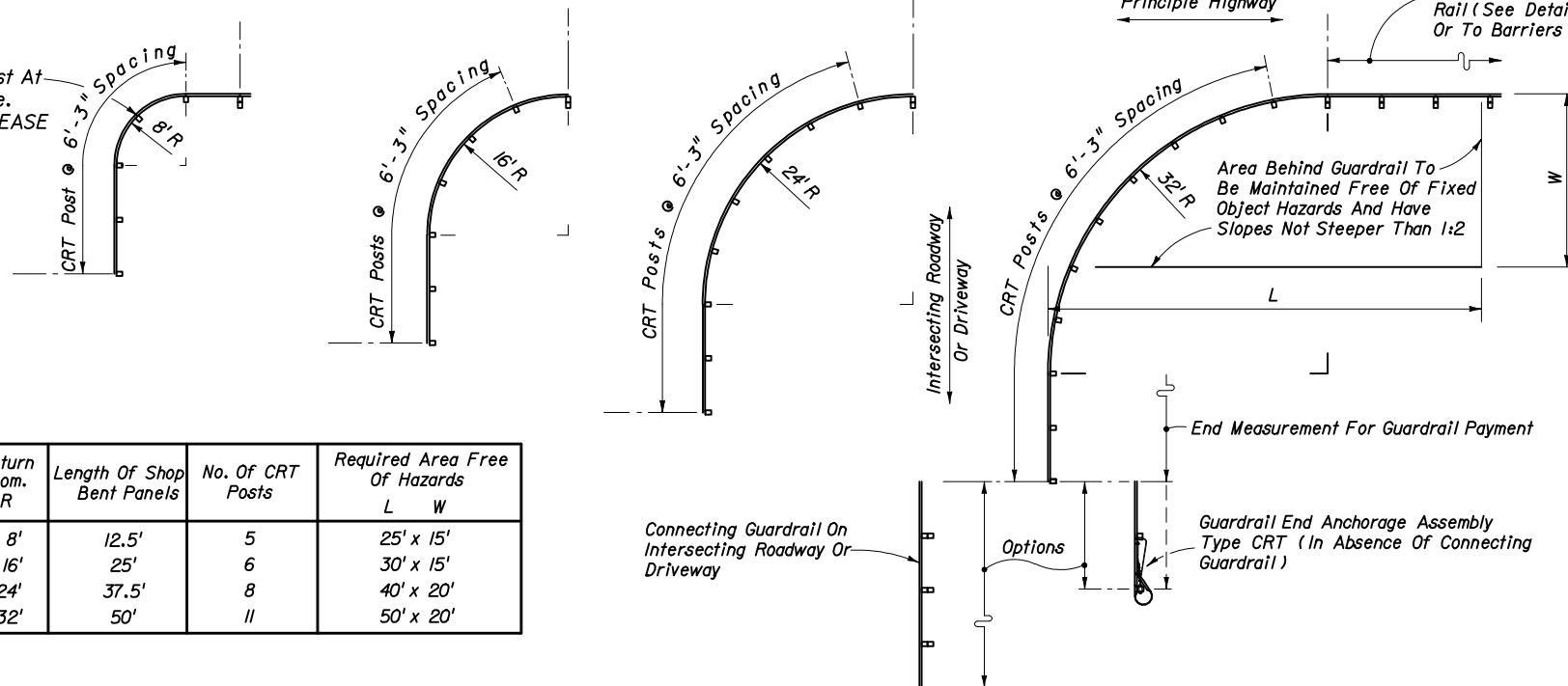
**GUARDRAIL END ANCHORAGE ASSEMBLY TYPE CRT**



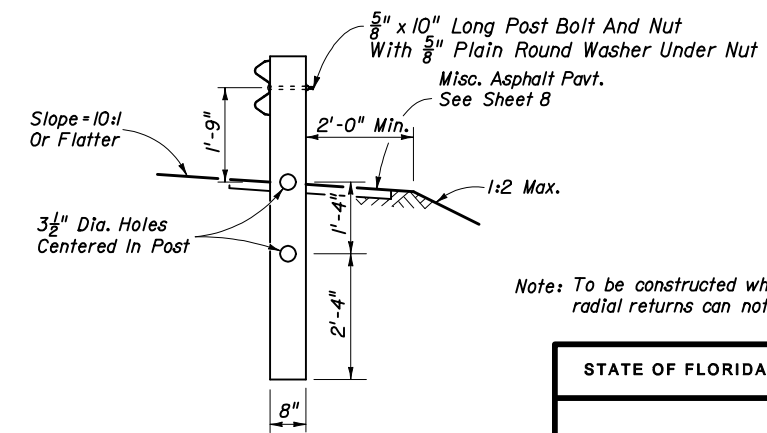
**CONTROLLED RELEASE RETURN NOTES**

- Controlled release returns are intended for use (a) in openings in continuous guardrail for driveway and side road access when flares and transitions or standard radial returns can not be applied (Sheet II); and, (b) for shielding the ends of bridge traffic rails and barrier walls where the driveway and side road access is in close proximity to the structure and space does not permit the proper use of approved flared and parallel types of Guardrail End Anchorage Assemblies.
- Controlled release returns are not intended as a substitute or replacement for the appropriate use of approved vehicle impact attenuators.
- Controlled release returns with either 8', 16' or 24' radii are designed for highway speeds of 60 mph or less; the 32' radius return is to be used only for highway speeds of 45 mph or less.
- The controlled release returns shown are designed as full returns based on an intersection angle of 90°. The return can be terminated with the Guardrail End Anchorage Assembly Type CRT or connected to standard guardrail as shown or as otherwise detailed in the plans.
- The Guardrail End Anchorage Assembly Type CRT is to be used only for the controlled release returns with 8', 16', 24' and 32' radii as shown; the assembly is not to be used in any tangent rail or flared rail applications. Other types of end anchorage assemblies are not to be used in the controlled release returns.
- The area immediately behind the control release return shall have slopes not steeper than 1:2 and be maintained free of fixed objects in accordance with the area limits tabulated in the plan below.
- The surface approaching the controlled release return shall have a transverse slope not exceeding 1:10. The effective width of the transverse surface is to be based on standard vehicle departure, return radii and preceding shielding; the width (beyond shoulder) shall be not greater than the corresponding 15' and 20' W values tabulated below.
- The curved guardrail portion of the controlled release return shall be full section shop bent panels (12.5' or 25' panels).
- Washers are not to be used between the guardrail beam and the head of the button head post bolts at any controlled release terminal (CRT) post or at any Guardrail End Anchorage Assembly Type CRT breakaway timber post.
- The guardrail beam of the 8' radius return is not bolted to the center control release post.
- See the General Notes for galvanizing requirements of metallic components.
- Controlled release return systems shall be paid for under the contract unit prices for Guardrail (Roadway), LF, Guardrail (Shop-bent Panels), LF, and Guardrail, End Anchorage Assembly (Type CRT), EA as called for in the plans or by permit and shall be full compensation for furnishing and installing all components in accordance with the plans and with this index. CRT posts are included in the cost for guardrail.

Do NOT Bolt Rail To Post At The Center Of The Nose. (See 'CONTROLLED RELEASE RETURN NOTES' No. 10)



Return Nom. R	Length Of Shop Bent Panels	No. Of CRT Posts	Required Area Free Of Hazards L W
8'	12.5'	5	25' x 15'
16'	25'	6	30' x 15'
24'	37.5'	8	40' x 20'
32'	50'	11	50' x 20'



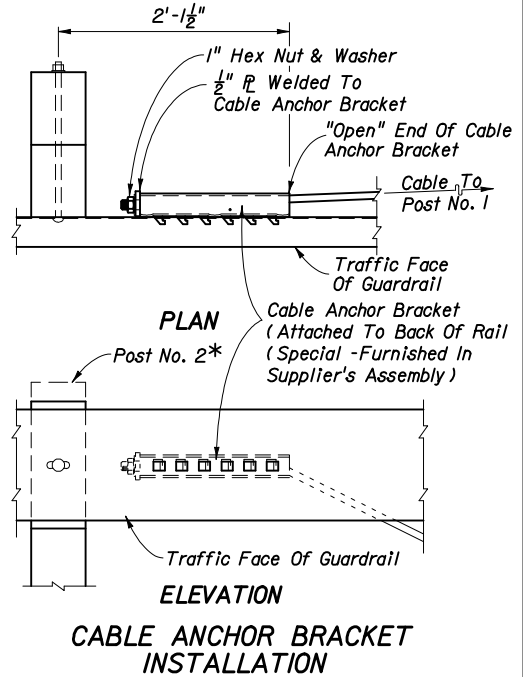
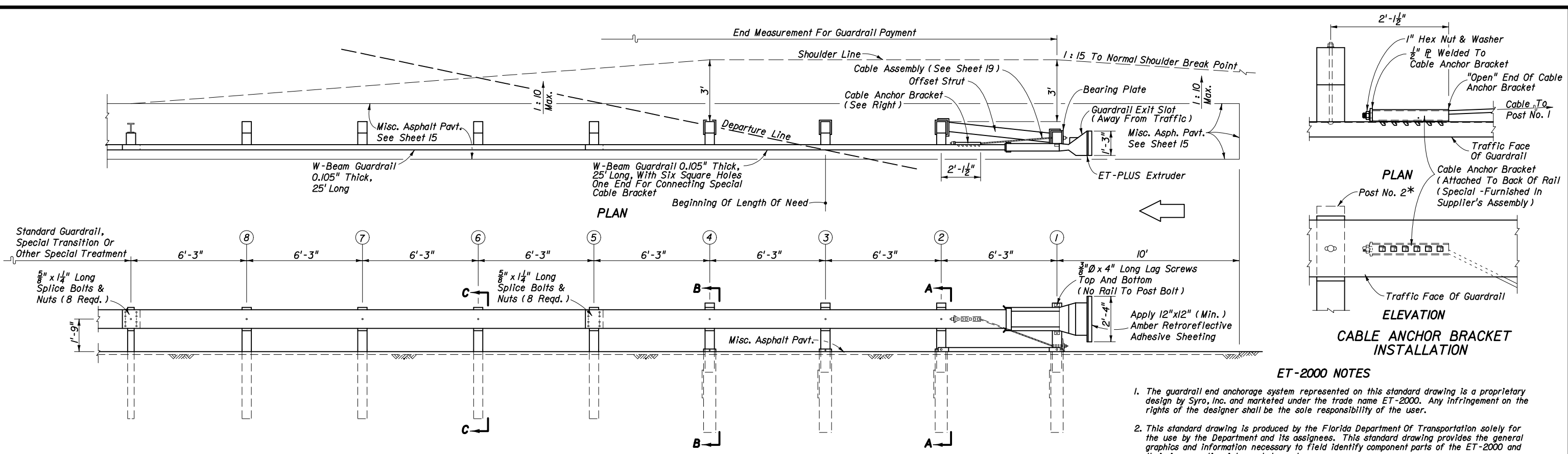
Note: To be constructed when flares and transitions or standard radial returns can not be applied. See Sheet II.

**CRT TIMBER POST**

**CONTROLLED RELEASE RETURN FOR SIDE ROAD AND DRIVEWAY ACCESS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
GUARDRAIL				
Names	Dates	Approved By		
Designed By	FHWA	 Roadway Design Engineer		
Drawn By	HSD 1/93			
Checked By	JVG 1/93	Revision	Sheet No.	Index No.
		02	24 of 32	400

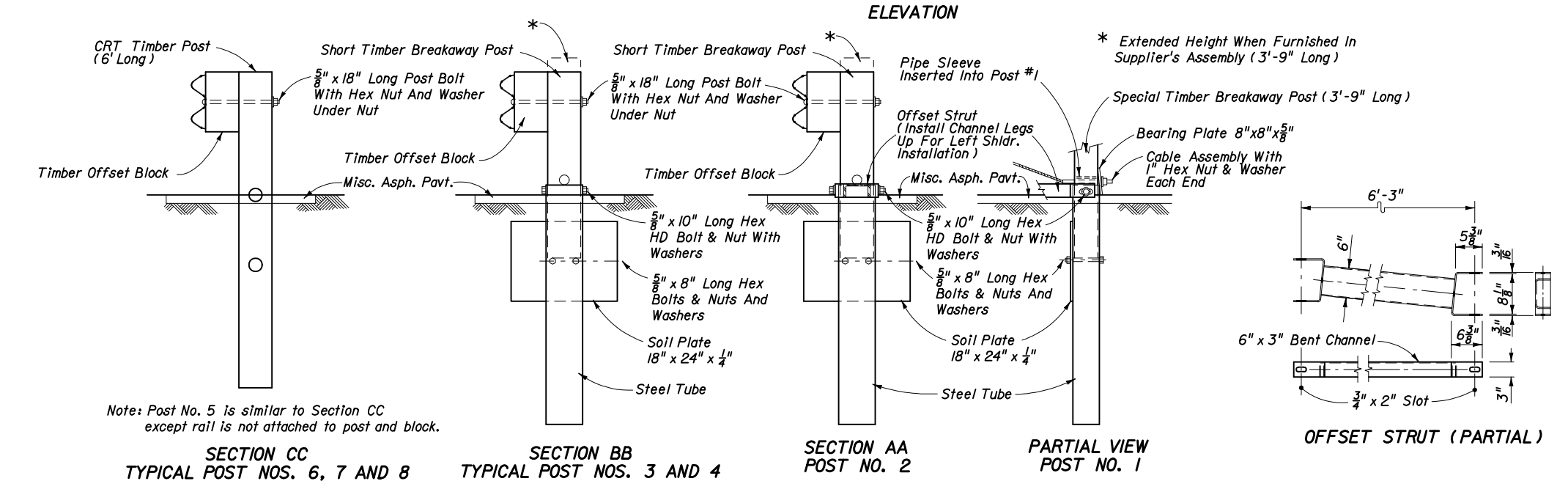




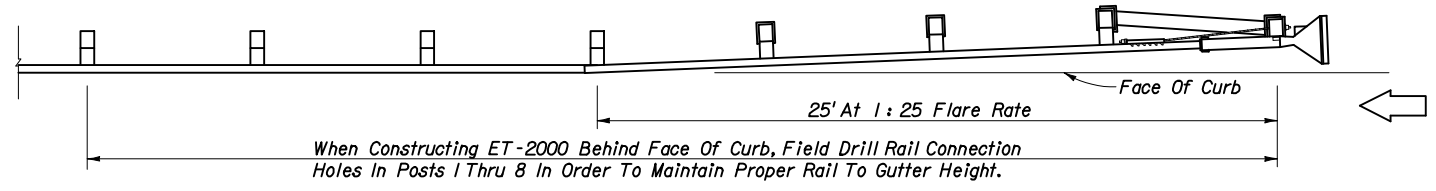
**ET-2000 NOTES**

1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Syro, Inc. and marketed under the trade name ET-2000. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for the use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the ET-2000 and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the ET-2000 when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The ET-2000 shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The ET-2000 is intended for use as an approach end guardrail anchorage for shoulder guardrail located parallel to travel or auxiliary lanes. The effective length of the ET-2000 is 50' including two 25' W-Beam panels of guardrail. The effective length is outside of any standard guardrail, guardrail transitions or other special treatments. The ET-2000 alignment is an extension of the normal guardrail alignment, except when constructed with curb the alignment of the ET-2000 will be flared over the first 25' at a rate of 1:25.
5. The ET-2000 can not be used in medians where horizontal clearance requires the use of a backrail.
6. Posts at location Nos. 1, 2, 3 and 4 must be timber breakaway posts with steel foundation tubes. The breakaway posts at location Nos. 5, 6, 7 and 8 may be constructed as shown in Section CC or may utilize timber breakaway posts with steel foundation tubes as shown in Section BB.
7. See the General Notes for galvanizing requirements of metallic component.
8. If the plans call for the ET-2000 at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'parallel' at a specific location the contractor has the option to construct any FDOT approved parallel assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECP consideration.
9. The ET-2000 shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Parallel), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detail drawings, procedures and specifications and this Index.

Do Not Attach Rail To Block At Post No. 5 And Rail To Post At Post No. 1.



Note: Post No. 5 is similar to Section CC except rail is not attached to post and block.

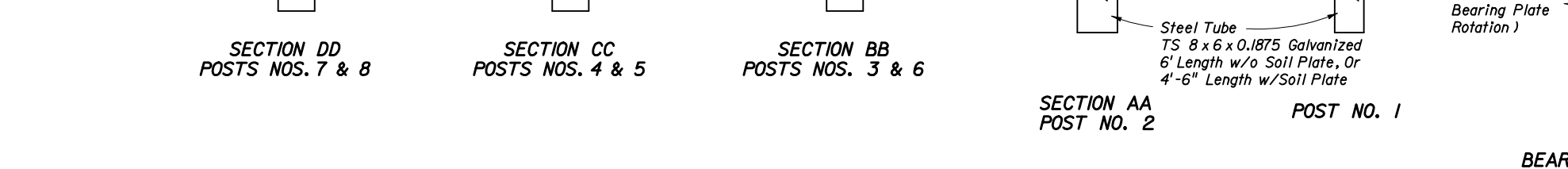
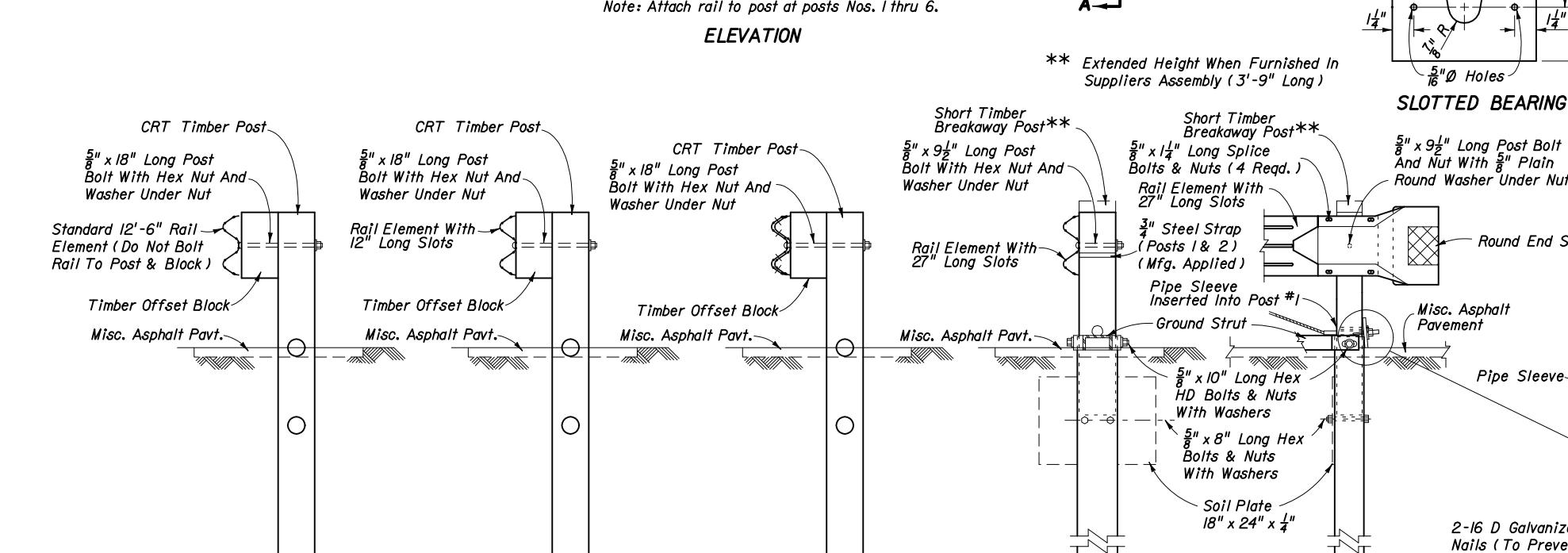
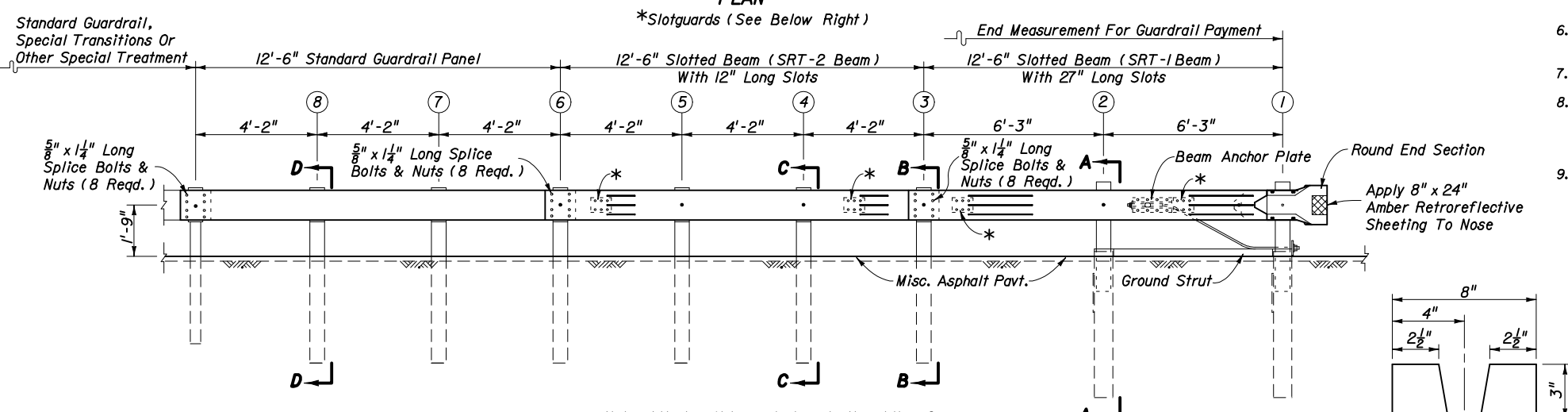
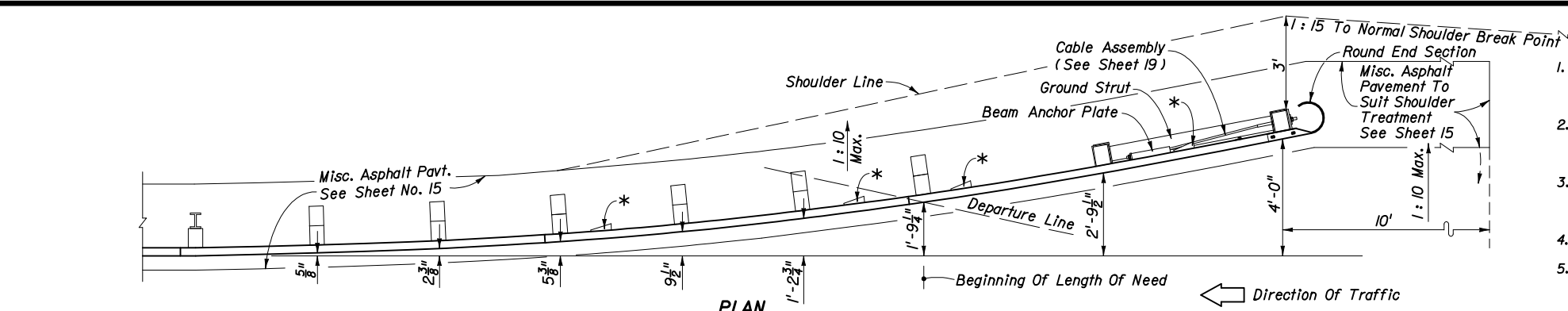


**DESIGN NOTES**

1. A special site evaluation should be considered prior to using the ET-2000 where there is less than 25' clear area on the extrusion side (back side) of the ET-2000.
2. The ET-2000 is suitable for all design speeds.

**END ANCHORAGE ASSEMBLY TYPE ET-2000**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	MFG	8/95	Approved By <i>[Signature]</i>	
Drawn By	HKH	8/95	Revision	Sheet No.
Checked By	JVG	8/95	02	25 of 32
				Index No. 400

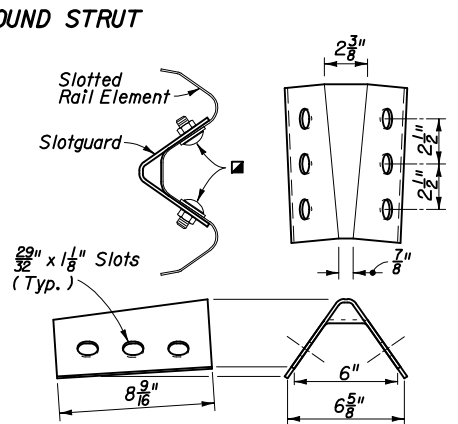
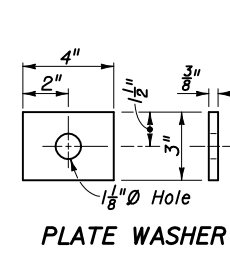
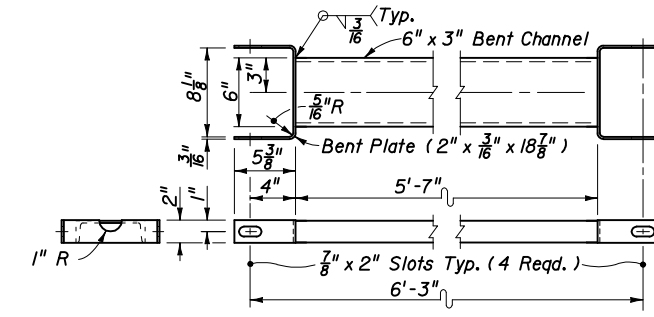
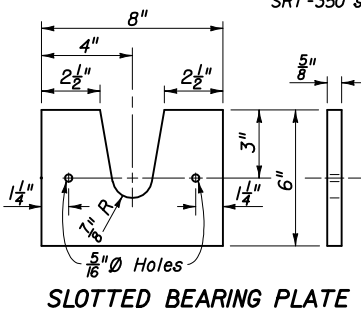


**SRT-350 NOTES**

1. The guardrail end anchorage system represented on this drawing is a proprietary eight (8) post design by Trinity Industries, Inc. and marketed by Syro, Inc. under the trade name SRT-350, short for Slotted Rail Terminal. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the SRT-350 and their incorporation into a whole system.
3. This drawing is sufficient for plan details for the SRT-350 when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless called for elsewhere in the plans. The SRT-350 shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The SRT-350 can not be used in medians where horizontal clearance requires the use of a backrail.
5. The SRT-350 is suitable for all design speeds. The SRT-350 is intended for use as an approach end anchorage for shoulder guardrail. Its alignment is a parabolic flare from the normal guardrail alignment with an effective length of 37.5' including two special slotted W-Beam panels and one standard W-Beam panel outside of any standard guardrail, guardrail transitions or other special treatments.
6. Posts 1 and 2 must be timber breakaway posts each with a 3/4" steel strap located approximately 1" below the post bolt and a steel foundation tube. CRT breakaway posts shall be used at all other locations within the system.
7. See the General Notes for galvanizing requirements of metallic component.
8. If the plans call for the SRT-350 at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECP consideration.
9. The SRT-350 shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans, the manufacturer's detail drawings, procedures and specifications and this index.

**SLOTTED BEAM NOTES**

The 12'-6" SRT-1 and SRT-2 beams can be used for the repair or replacement of slotted rails in existing 9 or 10 post SRT-350 systems.

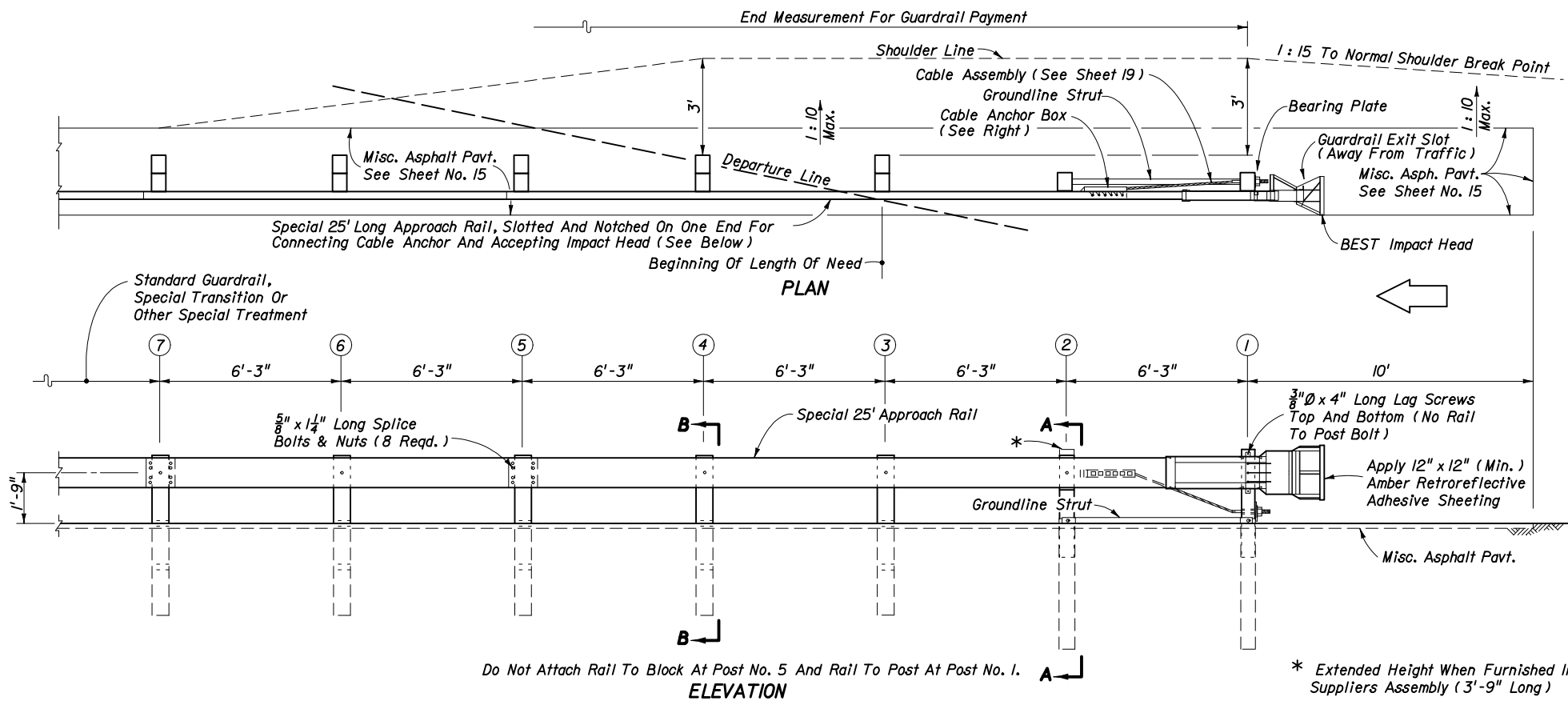


Assemble With 5/8" Dia x 1 1/4" Long Oval Shoulder Button Head Bolts And Nuts (6 Reqd.).

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

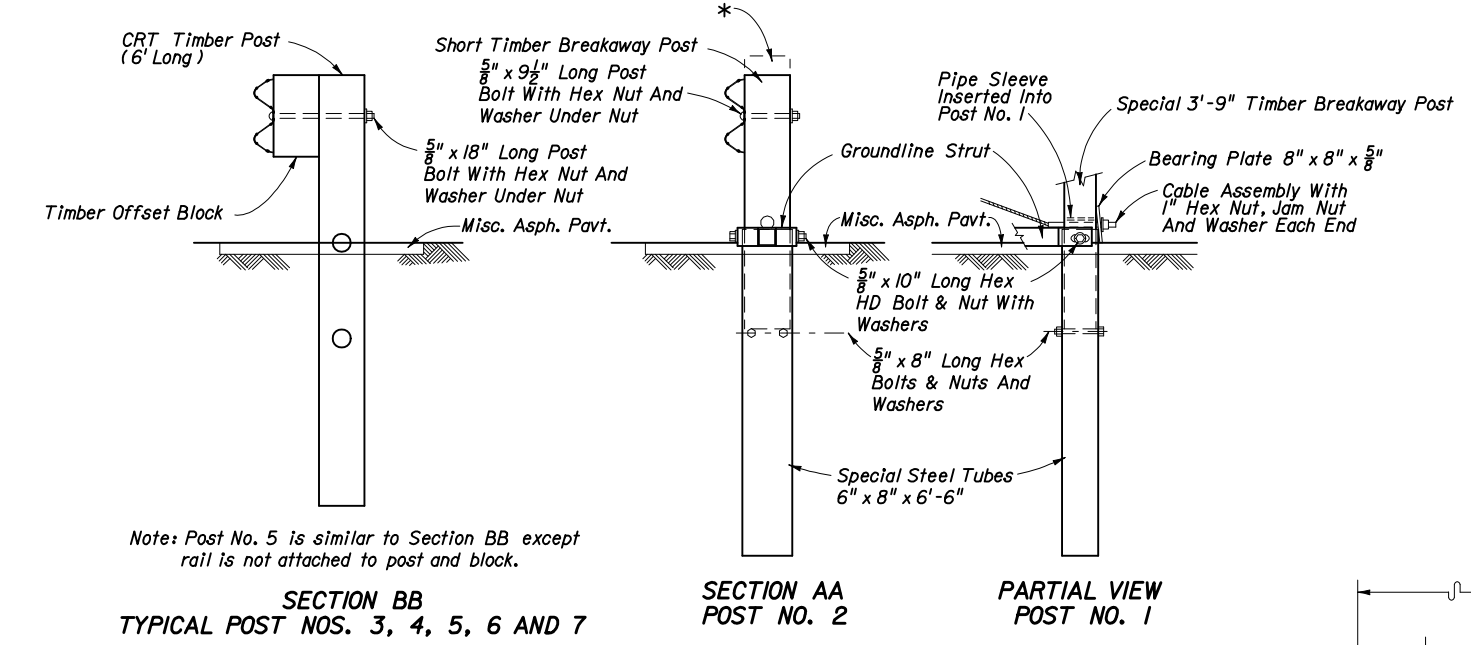
<b>GUARDRAIL</b>				
Designed By	MFG	2/96	Approved By	
Drawn By	HKH	2/96	Revision	Sheet No.
Checked By	JVG	2/96	02	26 of 32
			Index No.	400

**END ANCHORAGE ASSEMBLY TYPE SRT-350 (8 POST SYSTEM)**

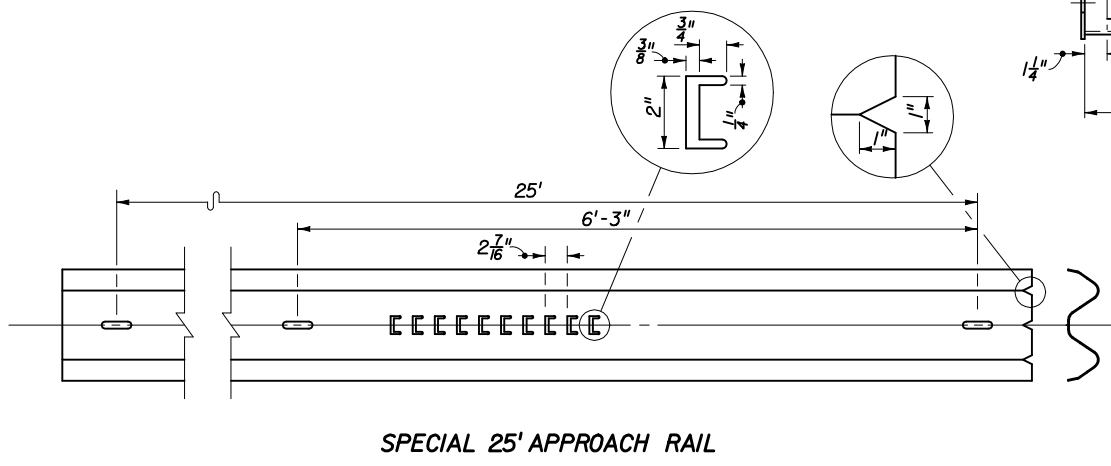
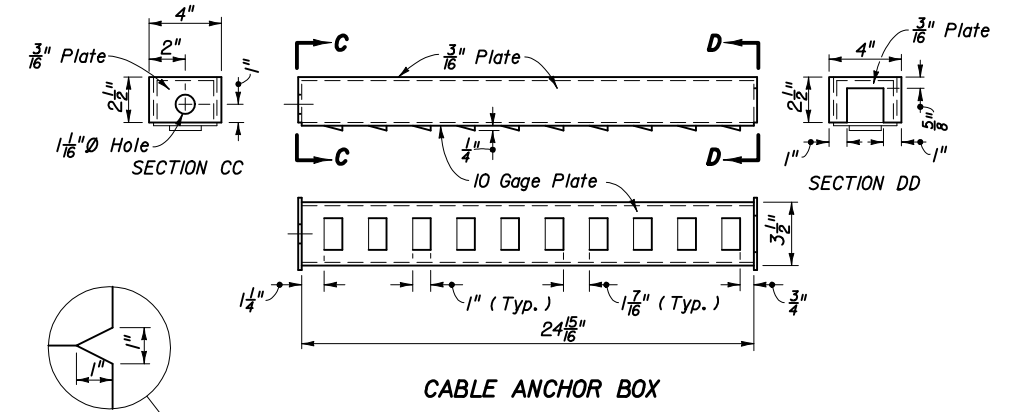
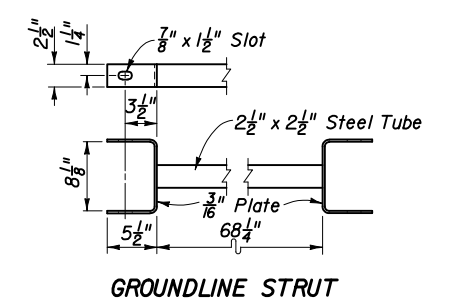
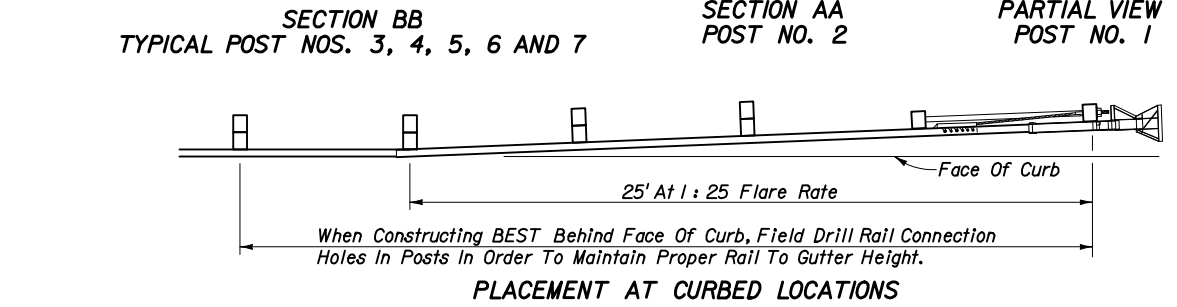


- 'BEST' NOTES**
1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Interstate Steel Corporation and marketed under the trade name BEST. Any infringement on the rights of the designer shall be the sole responsibility of the user.
  2. This standard drawing is produced by the Florida Department Of Transportation solely for the use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the BEST and their incorporation into a whole system.
  3. This standard drawing is sufficient for plan details for the BEST when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The BEST shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
  4. The BEST is intended for use as an approach end guardrail anchorage for shoulder guardrail located parallel to travel or auxiliary lanes. The effective length of the BEST is 37.5' including a 25' special W-Beam panel plus one 12.5' standard W-Beam panel outside of any other standard guardrail, guardrail transitions or other special treatments. The alignment of the BEST is an extension of the normal guardrail alignment, except when constructed with curb the alignment of the BEST will be flared over the first 25' at a rate of 1:25.
  5. The BEST can not be used in medians where horizontal clearance requires the use of a backrail.
  6. Posts at location Nos. 1 and 2 must be timber breakaway posts with special length steel foundation tubes without soil plates. The posts at location Nos. 3, 4, 5, 6 and 7 shall be CRT timber posts.
  7. See the General Notes for galvanizing requirements of metallic components.
  8. If the plans call for the 'BEST' at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'parallel' at a specific location, the contractor has the option to construct any FDOT approved parallel assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchor will not be eligible for VECP consideration.
  9. The BEST shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Parallel), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detail drawings, procedures and specifications and this Index.

- DESIGN NOTES**
1. A special site evaluation should be considered prior to using the BEST where there is less than 25' clear area on the extrusion side (back side) of the BEST.
  2. The BEST is suitable for all design speeds.

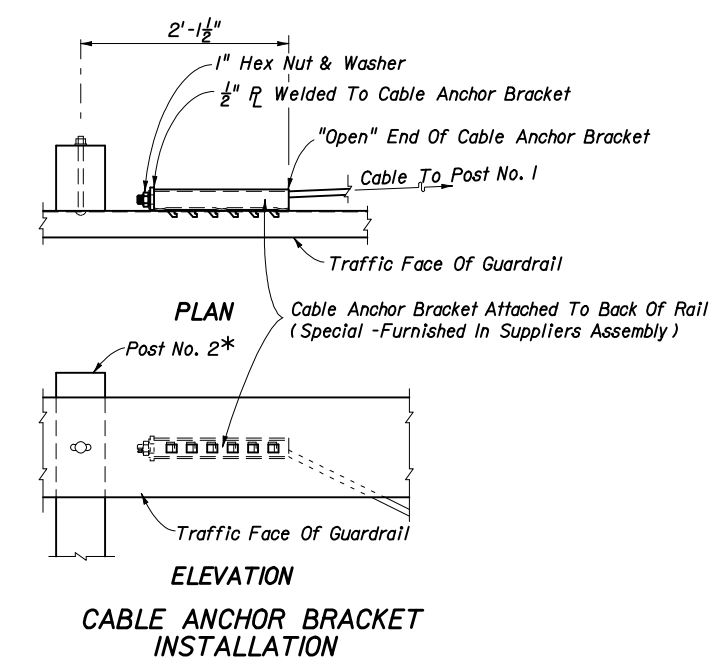
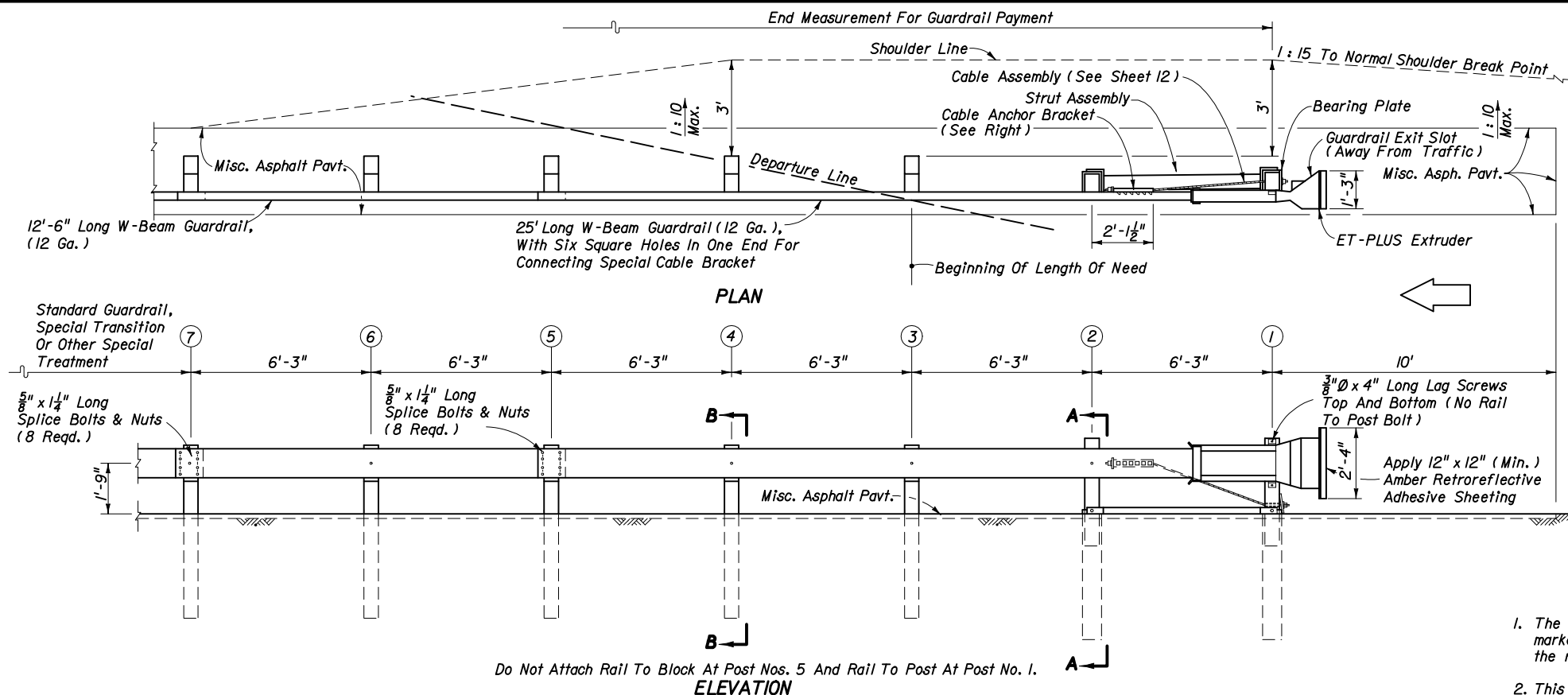


Note: Post No. 5 is similar to Section BB except rail is not attached to post and block.



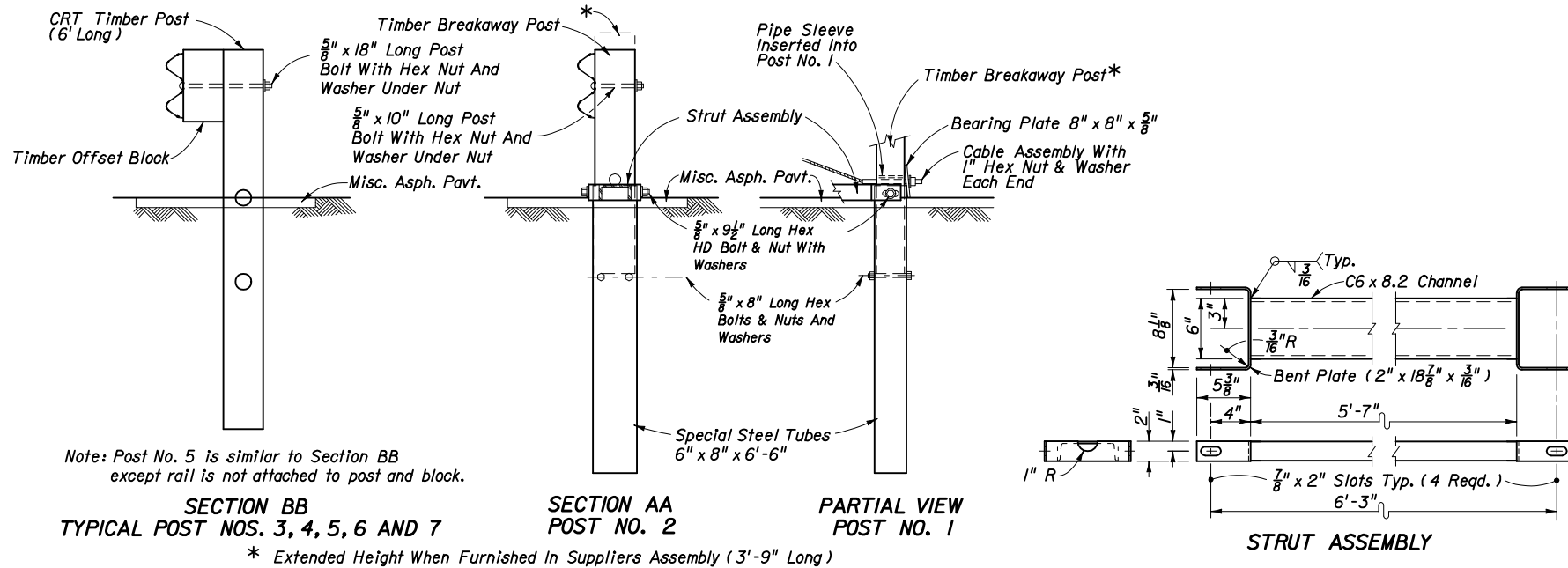
**END ANCHORAGE ASSEMBLY TYPE BEST**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	MFG	8/95	Approved By <i>[Signature]</i>	
Drawn By	HKH	8/95	Revision	Sheet No. 27 of 32
Checked By	JVG	8/95	00	Index No. 400



**LET NOTES**

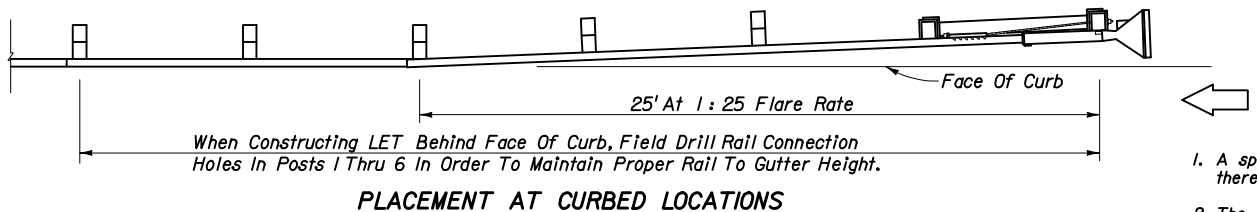
1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Syro, Inc. and marketed under the trade name ET-2000 LET hereafter referred to and identified as LET. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the LET and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the LET when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The LET shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The LET is intended for use as an approach end guardrail anchorage for shoulder guardrail located parallel to travel or auxiliary lanes. The effective length of the LET is 37.5' including one 25' special W-Beam panel and one 12.5' standard W-Beam panel. The effective length is outside of any other standard guardrail, guardrail transitions or other special treatments. The LET alignment is an extension of the normal guardrail alignment, except when constructed with curb the alignment of the LET will be flared over the first 25' at a rate of 1 : 25.
5. The LET can not be used in medians where horizontal clearance requires the use of a backrail.
6. Posts at location Nos. 1 and 2 must be timber breakaway posts with special length steel foundation tubes without soil plates. Posts at location Nos. 3, 4, 5, 6 and 7 must be CRT timber posts.
7. See the General Notes for galvanizing requirements of metallic components.
8. If the plans call for the 'LET' at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'parallel' at a specific location, the contractor has the option to construct any FDOT approved parallel assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchor will not be eligible for VECP consideration.
9. The LET shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Parallel), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detailed drawings, procedures and specifications and this Index.



Note: Post No. 5 is similar to Section BB except rail is not attached to post and block.

**SECTION BB TYPICAL POST NOS. 3, 4, 5, 6 AND 7**

\* Extended Height When Furnished In Suppliers Assembly (3'-9" Long)

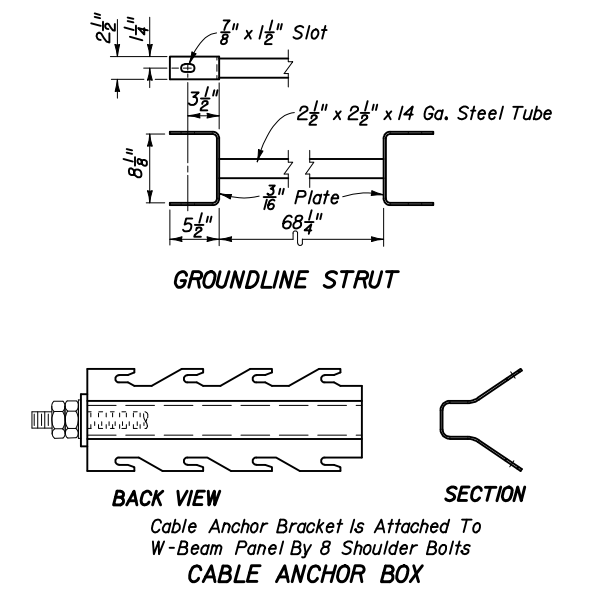
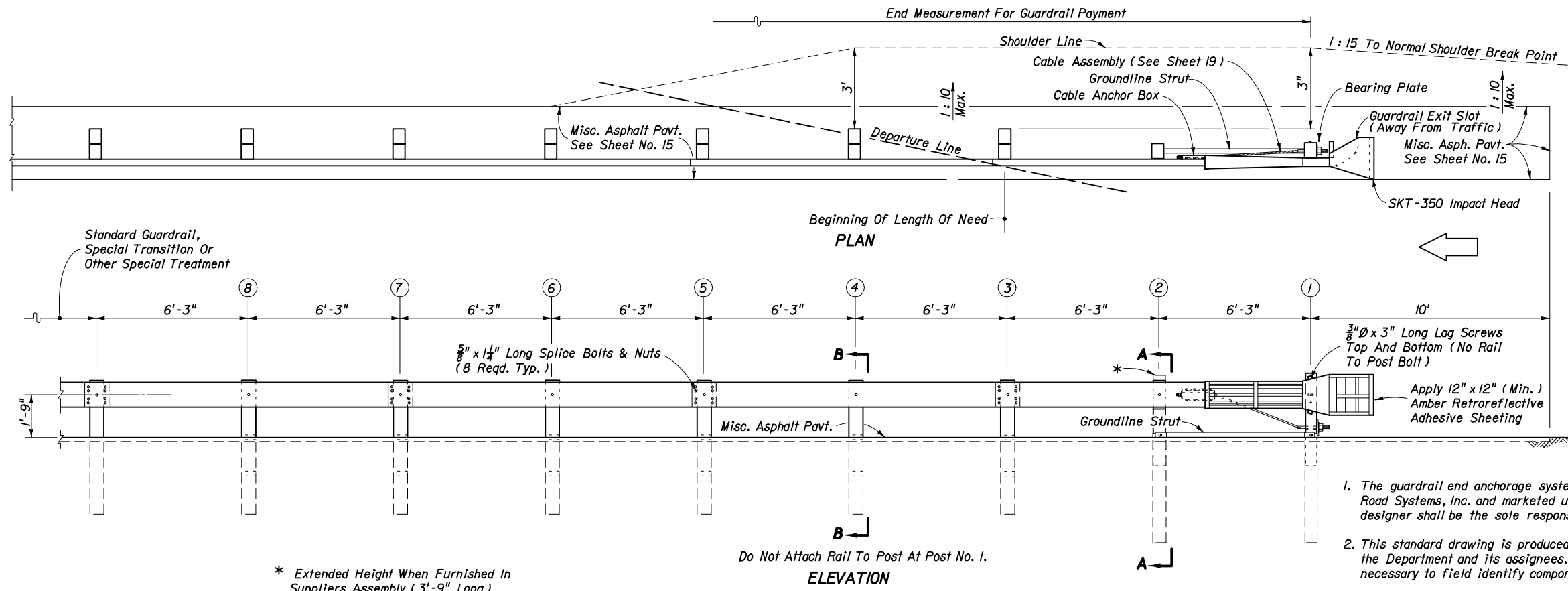


**DESIGN NOTES**

1. A special site evaluation should be considered prior to using the LET where there is less than 25' clear area on the extrusion side (back side) of the LET.
2. The LET is suitable for all design speeds.

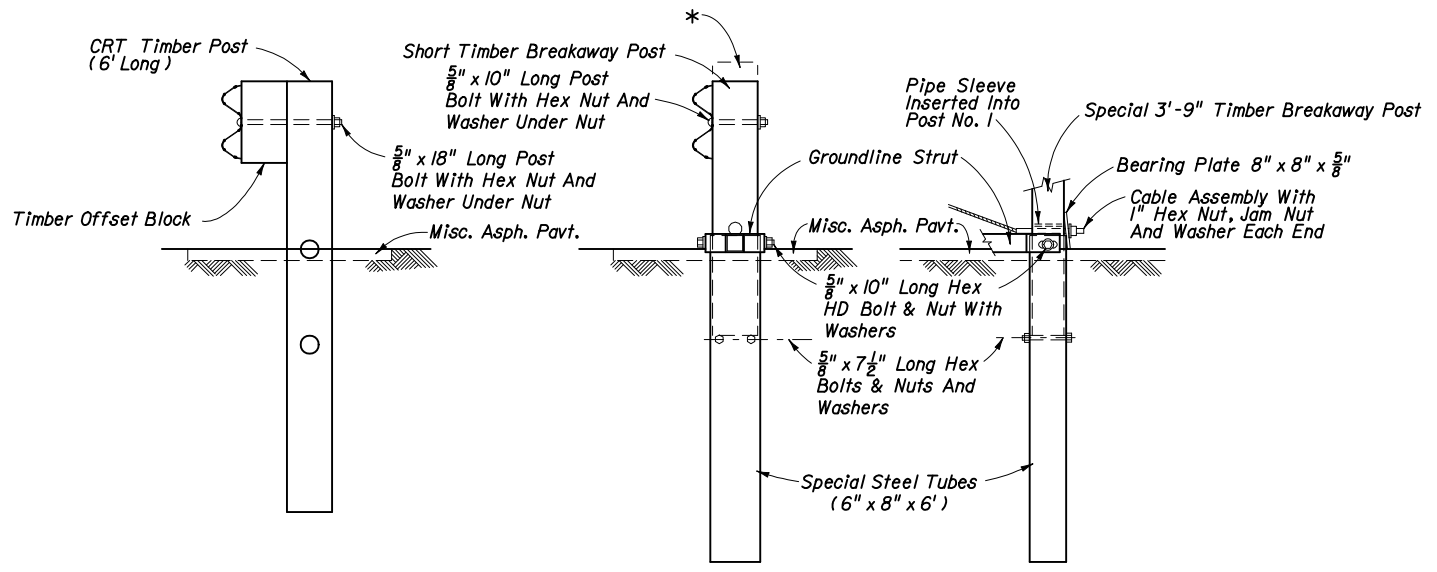
**END ANCHORAGE ASSEMBLY TYPE LET**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	STAFF	Dates	Approved By <i>[Signature]</i>	
Drawn By	HKH	10/97	Roadway Design Engineer	
Checked By	JVG	10/97	Revision	Sheet No.
			02	28 of 32
				Index No. 400



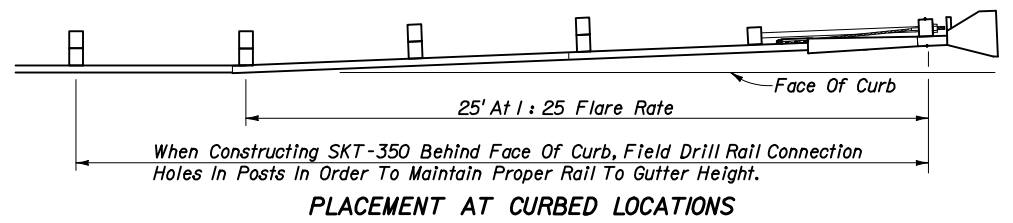
\* Extended Height When Furnished In Suppliers Assembly (3'-9" Long)

Do Not Attach Rail To Post At Post No. 1.



**'SKT-350' NOTES**

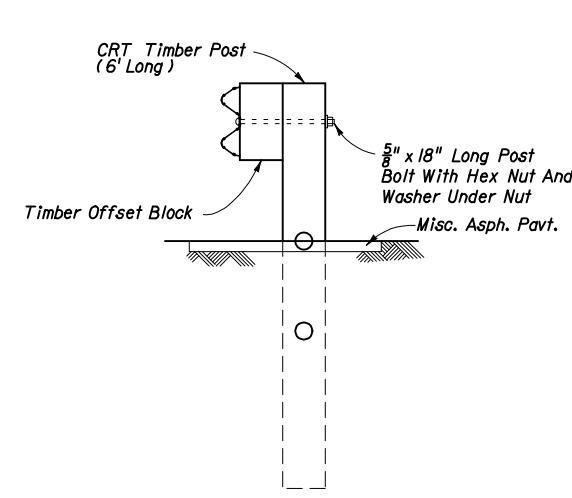
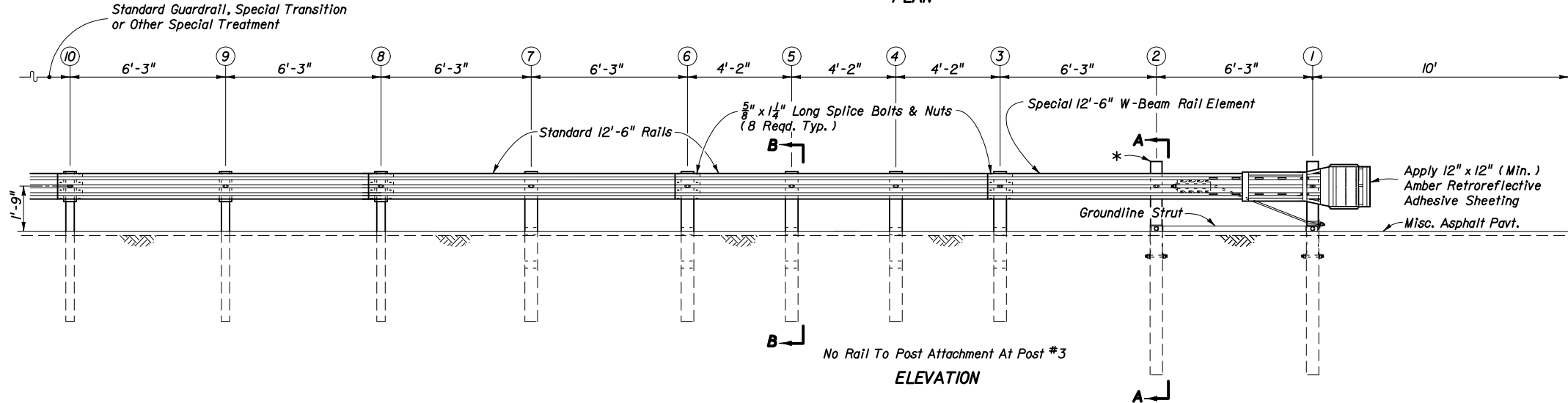
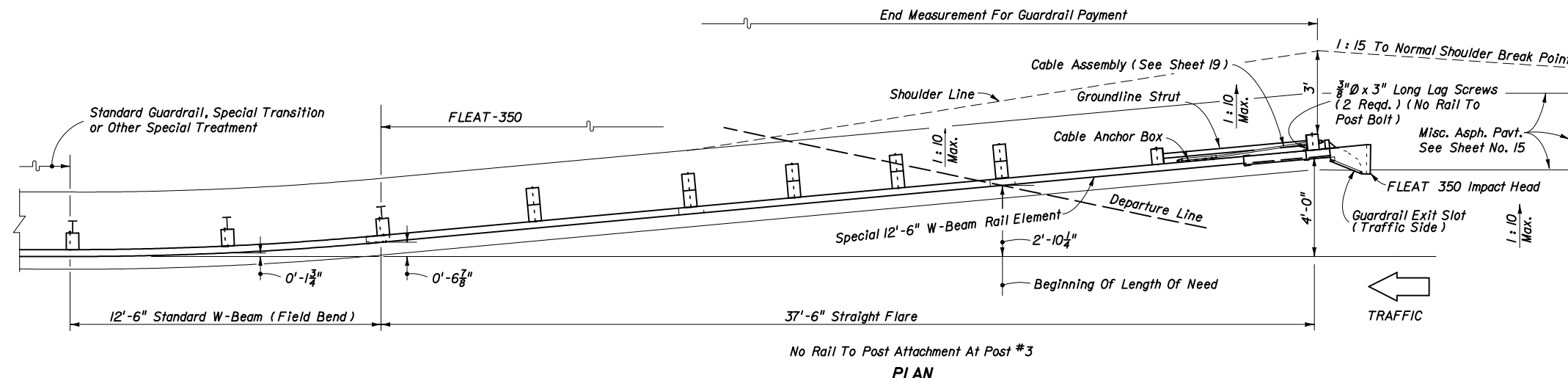
1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Road Systems, Inc. and marketed under the trade name SKT-350. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for the use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the SKT-350 and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the SKT-350 when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The SKT-350 shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The SKT-350 is intended for use as an approach end guardrail anchorage for shoulder guardrail located parallel to travel or auxiliary lanes. The effective length of the SKT-350 is 50'. The alignment of the SKT-350 is an extension of the normal guardrail alignment, except when constructed with curb the alignment of the SKT-350 will be flared over the first 25' at a rate of 1:25.
5. The SKT-350 can not be used in medians where horizontal clearance requires the use of a backrail.
6. Posts at location Nos. 1 and 2 must be timber breakaway posts with special length steel foundation tubes without soil plates. The posts at location Nos. 3, 4, 5, 6, 7 and 8 shall be CRT timber posts.
7. See the General Notes for galvanizing requirements of metallic components.
8. If the plans call for the 'SKT-350' at a specific location, substitution with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'parallel' at a specific location, the contractor has the option to construct any FDOT approved parallel assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchor will not be eligible for VECP consideration.
9. The SKT-350 shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Parallel), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detail drawings, procedures and specifications and this Index.



- DESIGN NOTES**
1. A special site evaluation should be considered prior to using the SKT-350 where there is less than 25' clear area on the extrusion side (back side) of the SKT-350.
  2. The SKT-350 is suitable for all design speeds.

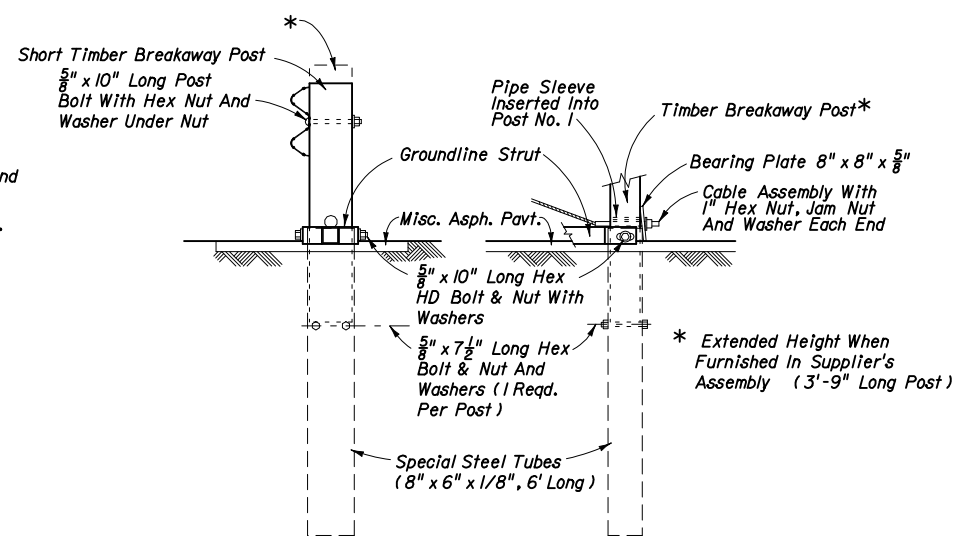
**END ANCHORAGE ASSEMBLY TYPE SKT-350**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Names	Dates	Approved By <i>Shawn</i>		
Designed By MFG	8/95	Roadway Design Engineer		
Drawn By HKH	8/95	Revision	Sheet No.	Index No.
Checked By JVG	8/95	02	29 of 32	400



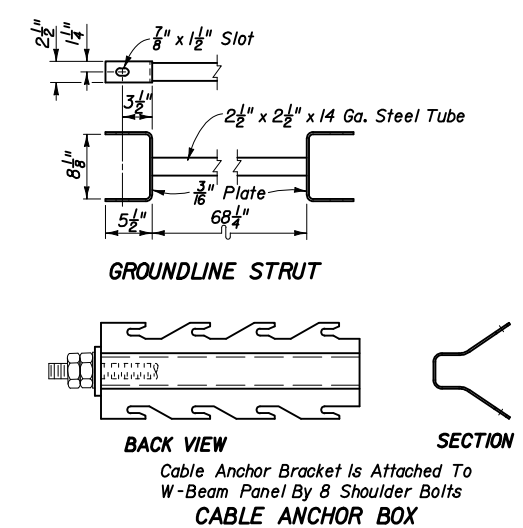
Note: Do not attach rail to block at post location 3.

SECTION BB  
TYPICAL POST NOS. 3, 4, 5, 6 AND 7



SECTION AA  
POST NO. 2

PARTIAL VIEW  
POST NO. 1



GROUNDLINE STRUT  
BACK VIEW SECTION  
Cable Anchor Bracket Is Attached To  
W-Beam Panel By 8 Shoulder Bolts  
CABLE ANCHOR BOX

**'FLEAT-350' NOTES**

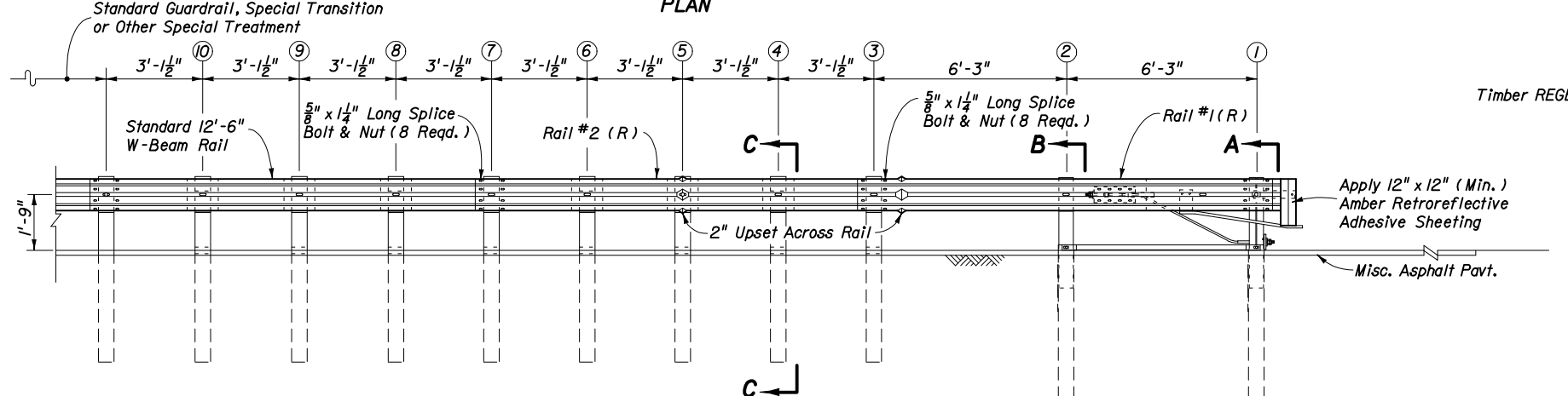
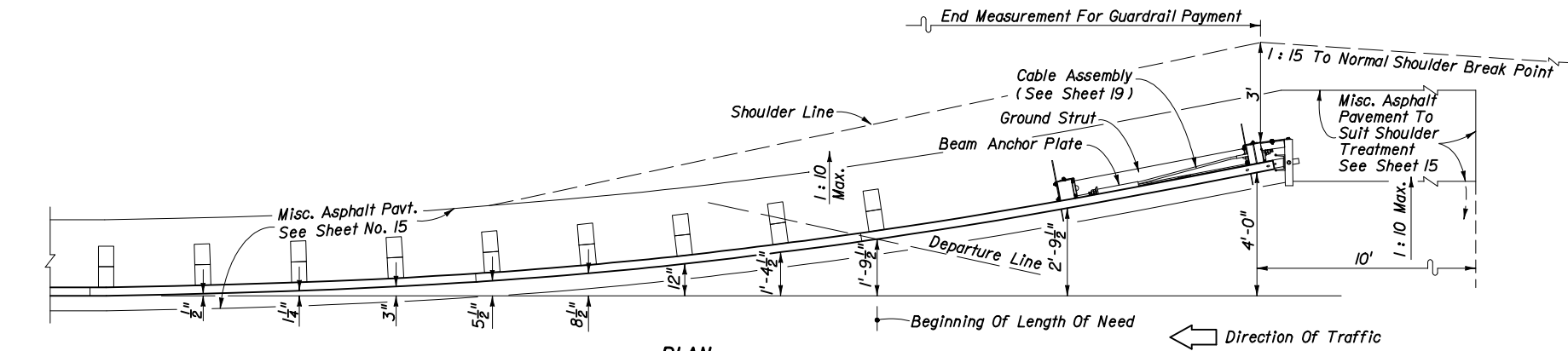
1. The guardrail end anchorage system represented on this standard drawing is a proprietary design by Road Systems, Inc. and marketed under the trade name FLEAT-350. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for the use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the FLEAT-350 and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the FLEAT-350 when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The FLEAT-350 shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The FLEAT-350 is intended for use as an approach end guardrail anchorage for shoulder guardrail. The effective length of the FLEAT-350 is 37.5' including one 12.5' special W-Beam panel plus two 12.5' standard W-Beam panels outside of any other standard guardrail, guardrail transitions or other special treatments. The alignment of the FLEAT-350 is a straight flare with an upstream offset of 4' and a downstream offset of 0'-6 7/8" from the normal guardrail alignment.
5. The FLEAT-350 can not be used in medians where horizontal clearance requires the use of a backrail.
6. Posts at location Nos. 1 and 2 must be timber breakaway posts with special length steel foundation tubes without soil plates. The posts at location Nos. 3, 4, 5, 6, and 7 shall be CRT timber posts.
7. See the General Notes for galvanizing requirements of metallic components.
8. If the plans call for the 'FLEAT-350' at a specific location, substitution with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECP consideration.
9. The FLEAT-350 shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detail drawings, procedures and specifications and this Index.

**DESIGN NOTES**

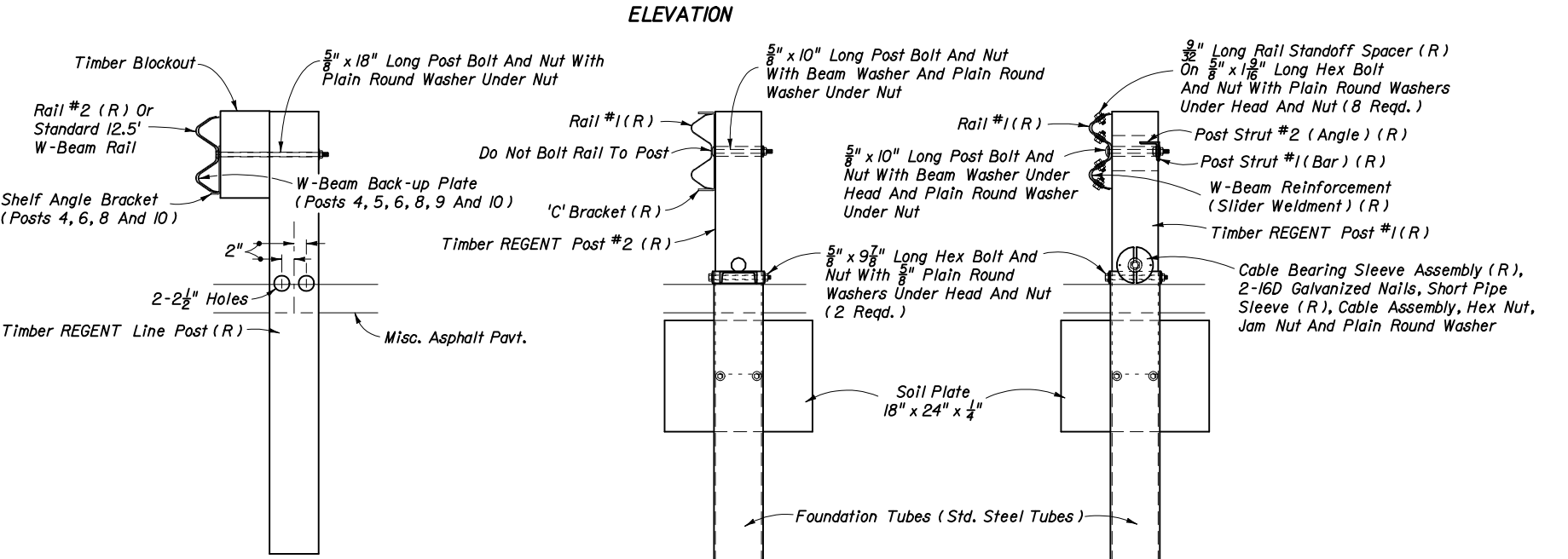
1. The FLEAT-350 is suitable for all design speeds.

**END ANCHORAGE ASSEMBLY TYPE FLEAT-350**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HKH	07/98	 Roadway Design Engineer	
Checked By	JVG	07/98		
	Revision	Sheet No.	Index No.	
	02	30 of 32	400	



Note: Attach rail to post at posts Nos. 1 and 5 only. W-Beam back-up plates are to be installed at posts Nos. 4, 5, 6, 8, 9 and 10 only. Shelf angle brackets are to be installed at posts Nos. 4, 6, 8 and 10 only.

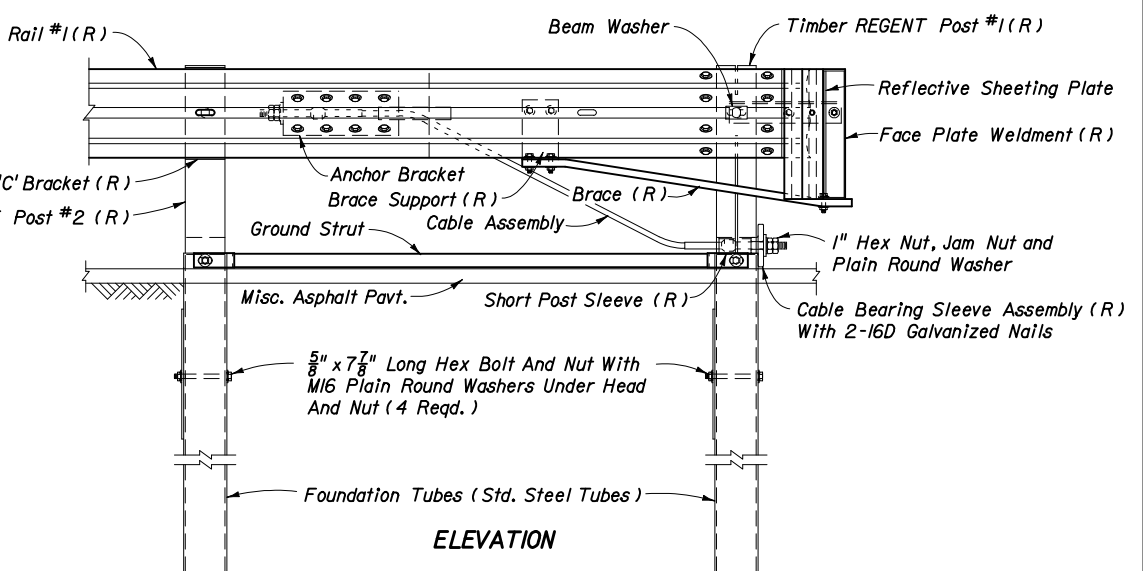
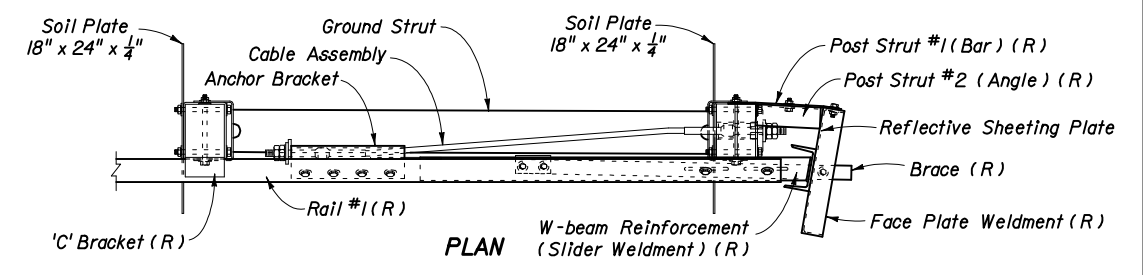


Note: Attach Rail To Post At Post No. 5 Only

SECTION CC  
TYPICAL POST NOS. 3 THRU 10

SECTION BB  
POST NO. 2

SECTION AA  
POST NO. 1



'REGENT' NOTES

- The REGENT is suitable for all design speeds. The REGENT is intended for use as an approach end guardrail anchorage for shoulder guardrail. Its alignment is a parabolic flare from the normal guardrail alignment with an effective length of 37.5' including two special W-Beam panels and one standard W-Beam panel outside of any standard guardrail, guardrail transitions or other special treatments.
- This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the REGENT and their incorporation into a whole system.
- This standard drawing is sufficient for plan details for the REGENT when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The REGENT shall be assembled in accordance with the distributor's detailed drawings, procedures and specifications.
- The first post must be a timber REGENT Post #1 with a steel foundation tube and soil plate; the second post must be a timber REGENT Post #2 with a steel foundation tube and soil plate; and, posts Nos. 3 thru 10 must be timber REGENT line posts.
- The suffix (R) indicates components unique to the REGENT System, these components along with bolts, nuts and washers not labeled are to be furnished in the distributor's package.
- The REGENT can not be used in medians where horizontal clearance requires the use of a backrail.
- See the General Notes for galvanizing requirements of metallic components.
- If the plans call for the 'REGENT' at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECP consideration.
- The REGENT shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the distributor's detailed drawings, procedures and specifications and this Index.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

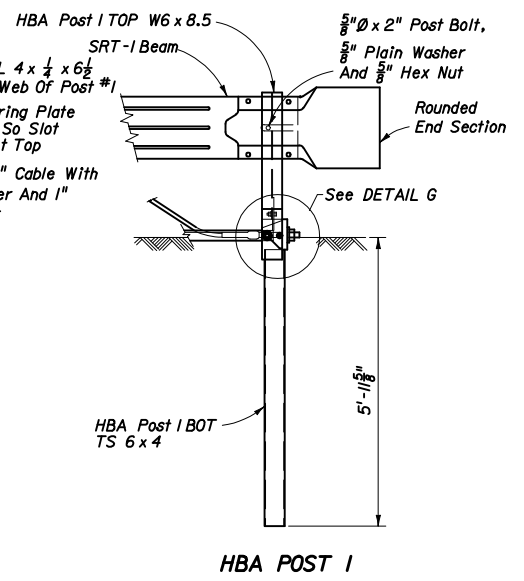
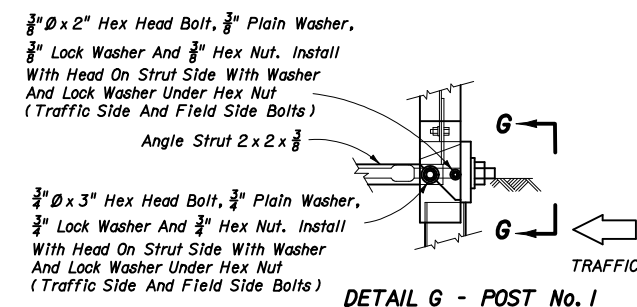
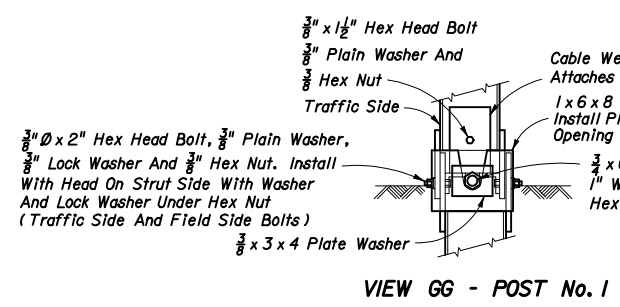
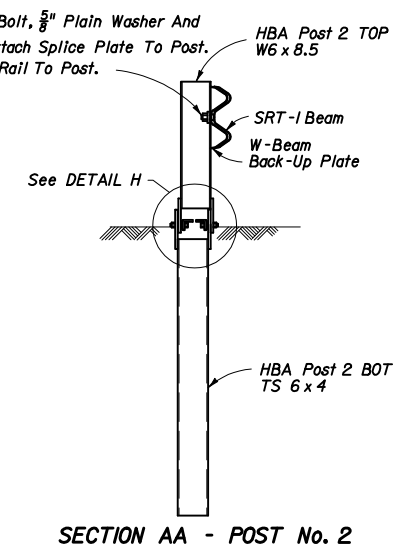
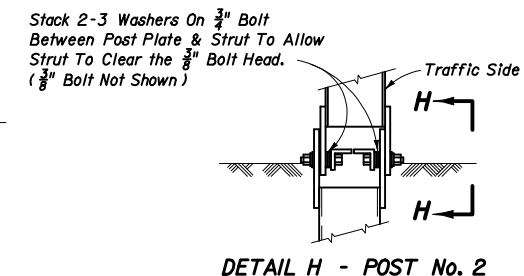
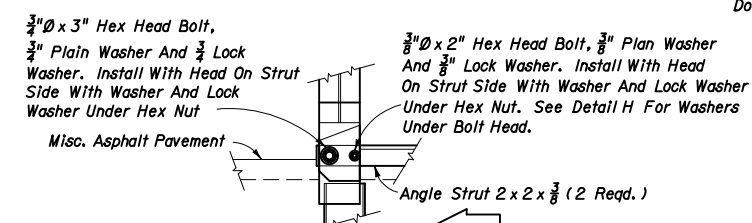
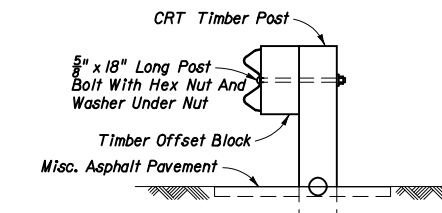
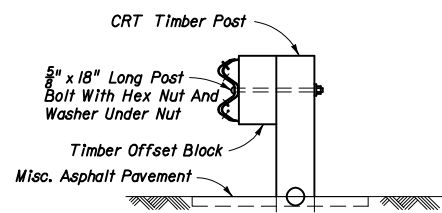
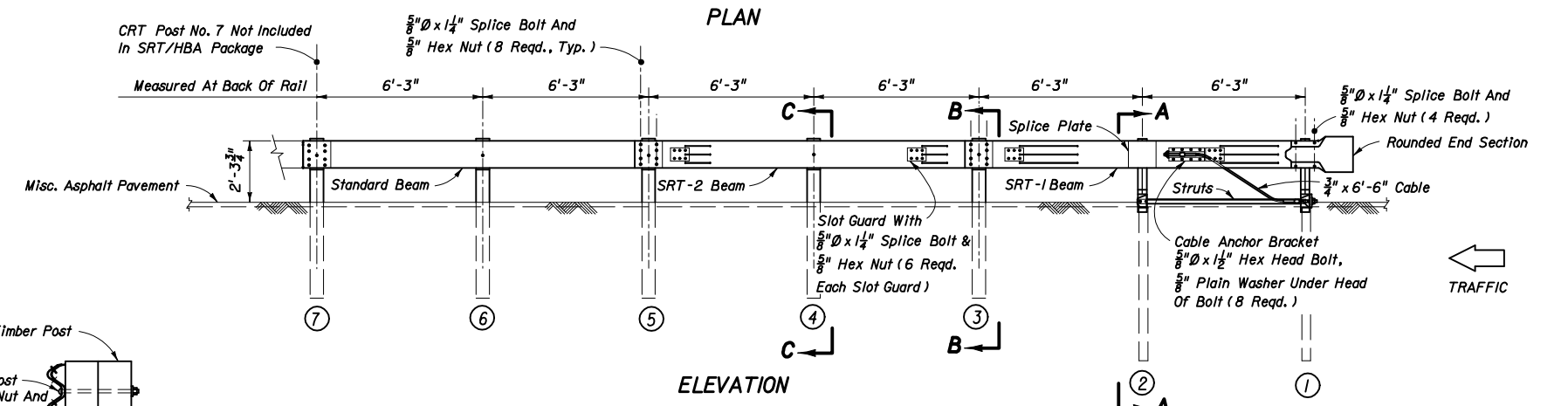
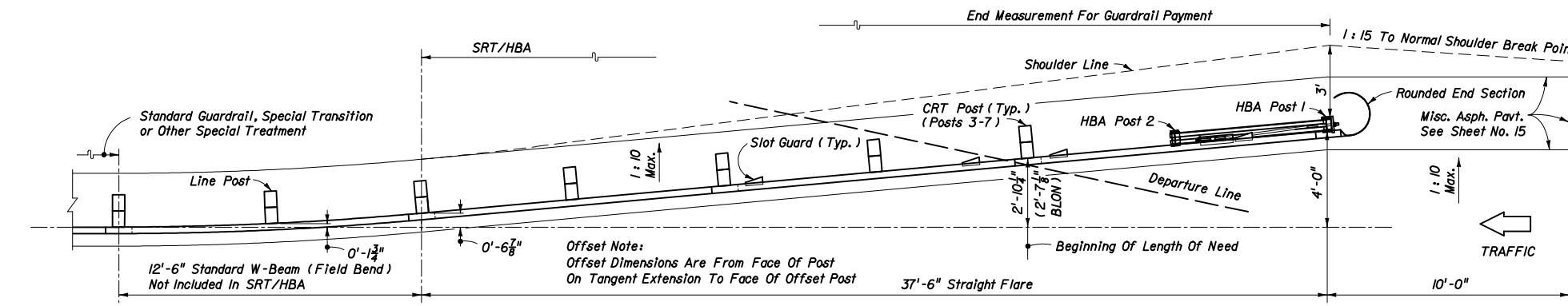
GUARDRAIL

Designed By	MFG	07/98	Approved By	<i>[Signature]</i>	
Drawn By	HKH	07/98	Revision	Sheet No.	Index No.
Checked By	JVG	07/98	00	31 of 32	400

END ANCHORAGE ASSEMBLY TYPE REGENT

SRT/HBA 6 POST SYSTEM NOTES

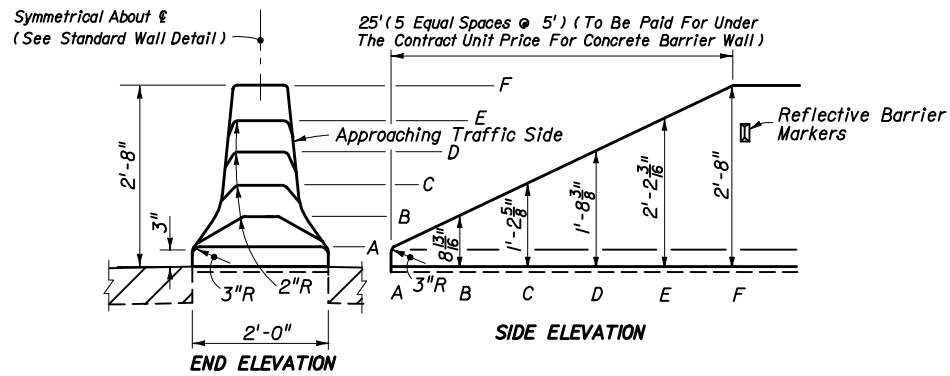
1. The guardrail end anchorage system represented on this drawing is a proprietary six (6) post design by Trinity Industries, Inc. and marketed by Syro, Inc. under the trade name SRT/HBA 6 Post. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the SRT/HBA 6 Post and their incorporation into a whole system.
3. This drawing is sufficient for plan details for the SRT/HBA 6 Post when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless called for elsewhere in the plans. The SRT/HBA 6 Post shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The SRT/HBA 6 Post can not be used in medians where horizontal clearance requires the use of a backrail.
5. The SRT/HBA 6 Post is suitable for all design speeds. The SRT/HBA 6 Post is intended for use as an approach end anchorage for shoulder guardrail. Its alignment is a straight flare from the normal guardrail alignment with an effective length of 37.5' including two special slotted W-Beam panels and one standard W-Beam panel outside of any standard guardrail, guardrail transitions or other special treatments.
6. Posts 1 and 2 must be hinged breakaway steel posts. CRT breakaway posts shall be used at all other locations within the system.
7. See the General Notes for galvanizing requirements of metallic component.
8. If the plans call for the SRT/HBA 6 Post at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECP consideration.
9. The SRT/HBA 6 Post shall be paid for under the contract unit price for Guardrail End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detail drawings, procedures and specifications and this Index.



SRT/HBA-6 POST SYSTEM

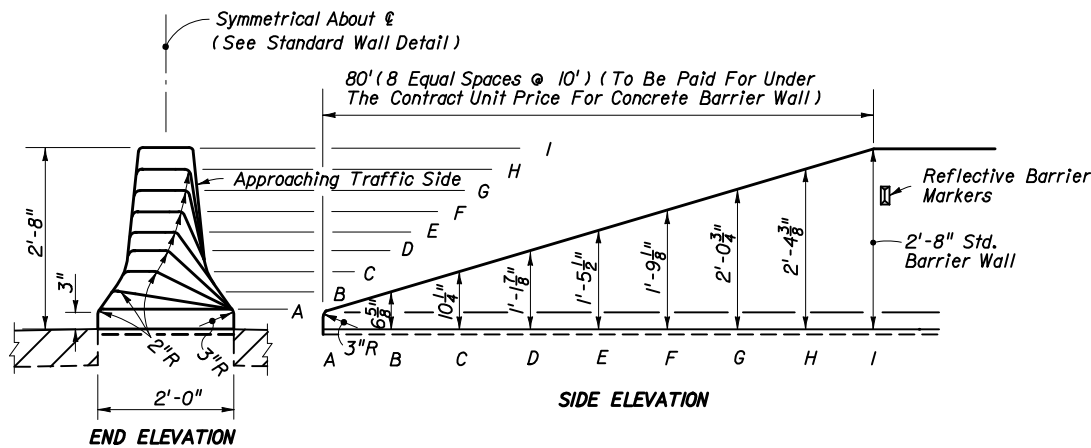
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GUARDRAIL</b>				
Designed By	Names	Dates	Approved By	
Drawn By	SBC	3/01	 Roadway Design Engineer	
Checked By	JVG	3/01		
			Revision	Sheet No.
			02	32 of 32
				Index No.
				400





TO BE USED ONLY WHERE TERMINAL LOCATED CLEAR ZONE WIDTH FROM EDGE OF THE NEAR APPROACH TRAFFIC LANE.

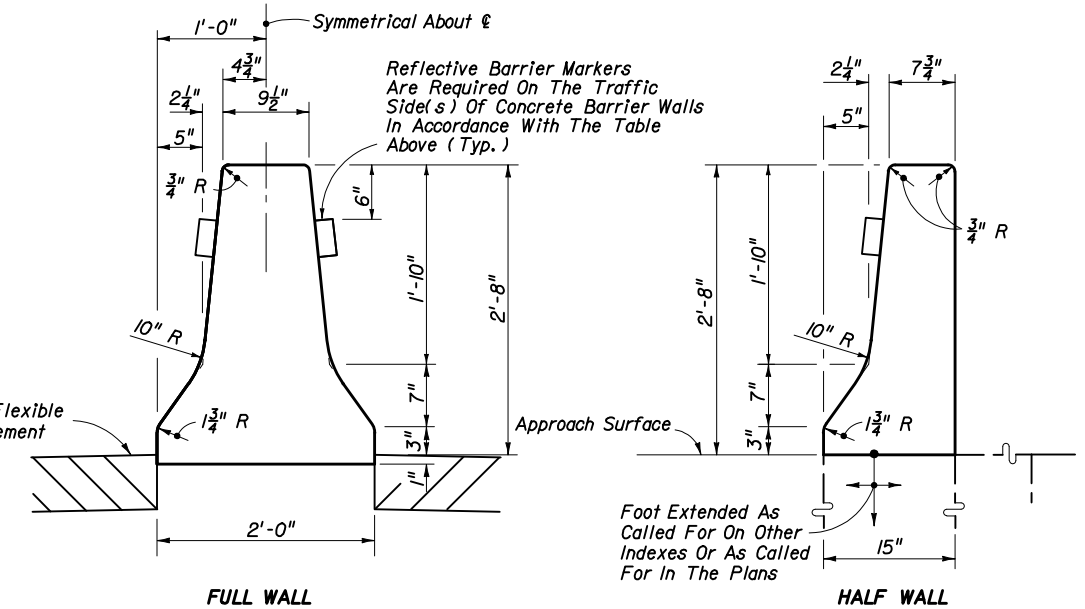
**CONCRETE BARRIER WALL TERMINAL  
DETAIL II**



DESIGN SPEED 45 MPH OR LESS

**CONCRETE BARRIER WALL TERMINAL FOR NARROW MEDIAN  
DETAIL III**

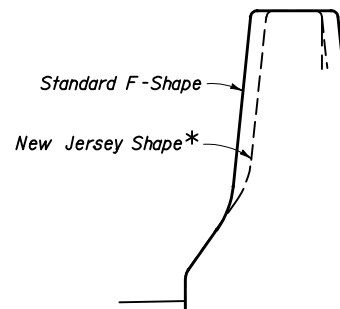
REFLECTIVE BARRIER MARKER SPACING ON WALL		
Distance - Edge of Travel Lane to Barrier Wall. (Ft.)	Spacing (Ft.)	REMARKS
< 4'	40'	1. Reflectors shall conform to Section 993-5 of the Standard Specifications. 2. Reflector color (white or yellow) shall conform to the color of the near edge line.
4' to 8'	80'	
> than 8'	none required	



For concrete barrier wall details at piers, highway lighting and guardrail connections, see other sheets of this Index.

Standard barrier to be paid for under the contract unit price for Concrete Barrier Wall, LF.

**STANDARD BARRIER WALL SECTIONS**



\*Existing New Jersey shaped walls that are to remain in place or be modified as called for in the plans; or, walls that are to be repaired, modified or constructed as directed by the Engineer. Wall dimensions shall be in accordance with Index No. 410 of the 1988 Roadway and Traffic Design Standards.

Where standard F-Shape walls abut existing NJ Shape walls, face transitions of not less than 5' in length shall be constructed at the end of the F-Shape wall.

**WALL FACE SAFETY SHAPES**

**GENERAL NOTES**

- Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls; except, in moderately and extremely aggressive environments, Class III concrete shall be used. Exposed concrete surfaces shall have a Class 3 surface finish in accordance Section 521 of the Standard Specifications, 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.
- Concrete barrier wall terminal notes for design speeds  $\geq 50$  mph.
  - Terminated outside clear zone of the approach traffic with 'DETAIL II' end treatment.
  - Terminated within a shielded location.
  - Terminal protection by the use of a crash cushion system.
  - Terminated in conjunction with a suitably designed transition to another barrier.
- 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; wall joints are to match an existing or proposed expansion joint.
- When the barrier is installed adjacent to the pavement the top 12" of the subgrade shall be compacted to at least 100% of the density as defined in the AASHTO T-99 specifications.
- Cast-in-place barrier wall normally will be a continuous pour without transverse contraction joints. Cast-in-place segments with a length < 40' shall be joined to adjacent sections by doweling. See Detail B.
- Precast construction is allowed as an alternate to cast-in-place construction.
  - Wall segments < 40' in length shall be joined by a transverse joint in accordance with Details C & D. The minimum segment length is 20'.
  - Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing. Reinforcement may be required for handling stresses.
- Cost of reinforcing steel and reflective barrier markers shall be included in the contract unit price for concrete barrier wall. See individual details for pay item information.
- For barrier wall inlet details see Indexes Nos. 217, 218 and 219.

Note:  
Wall segments shall be 20' or more in length.

**Design Criteria:**

Vehicle: 4000 lbs., 60 mph, 25°, Avg. Lat. Impact Deceleration Force - 7G's (28 kips)  
Vehicle Force Applications: 1000 lbs. Vert. At Top of Toe; 28 kips Horiz. At 5 1/2" Above Pavt.

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 walls of heights Y=0' To 0'-6" when footing and stem cast as one unit. When footing and stem cast separately by construction joint, the footing joint surface shall be roughened and #4 dowels 24" long installed at the centerline of the stem on 24" centers with 9" embedment in the footing.

Cost of the steel and concrete footing to be included in the contract unit price for Barrier Wall Concrete, LF.

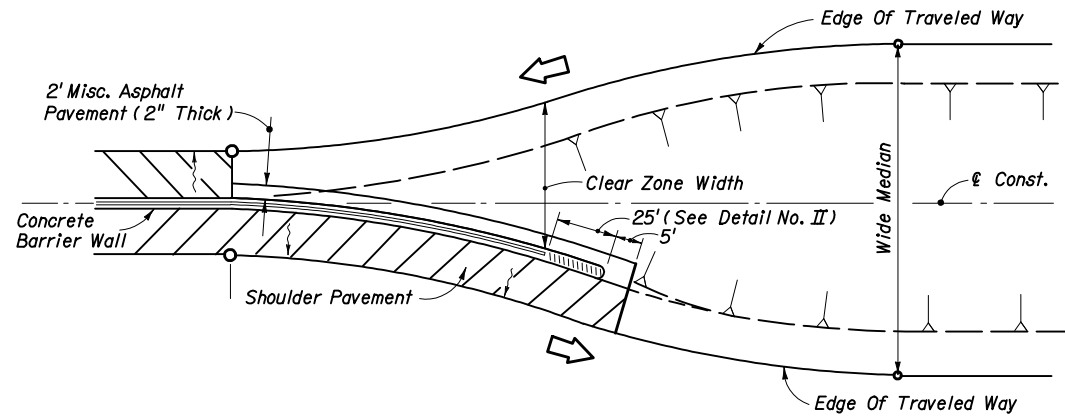
	Height Y	0'-0"	0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
Cantilever Wall	Width X	4'-10"	5'-0"	5'-2"	5'-3"	5'-5"	5'-6"	5'-7"	5'-9"	5'-10"
"L" Wall	Width X <sub>1</sub>	4'-0"	4'-4"	4'-8"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"

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

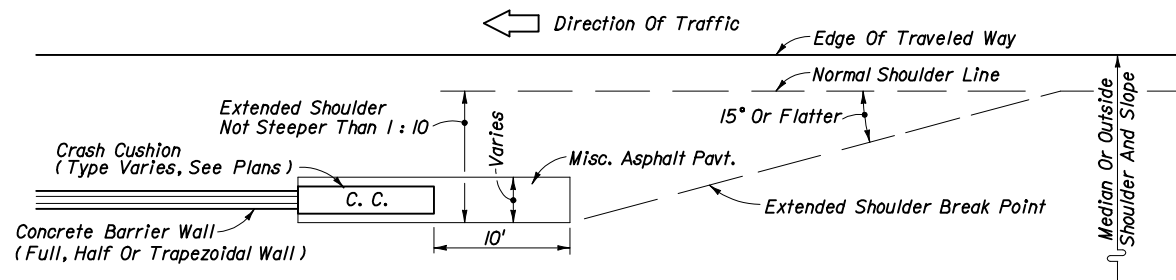
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER WALL**

Names	Dates	Approved By
Designed By		<i>Ben Blum</i> State Roadway Design Engineer
Drawn By	AF/HSD 73/91	Revision
Checked By	LMF/JG 73/91	Sheet No. 1 of 22
		Index No. 410

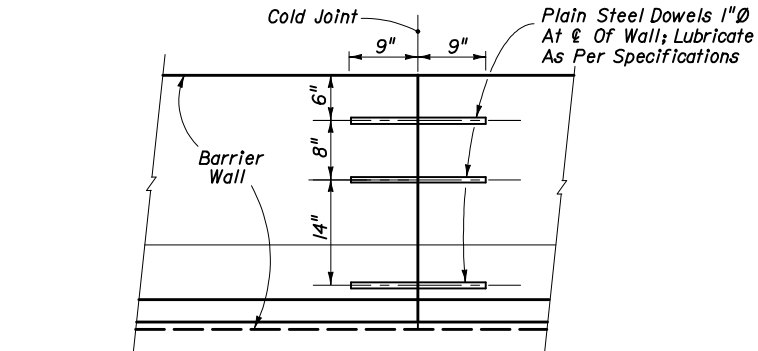


**CONCRETE BARRIER WALL TRANSITION BETWEEN WIDE AND NARROW MEDIANS WHEN BARRIER WALL END LOCATED OUTSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE**



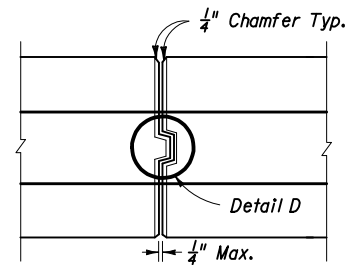
**SHOULDER TREATMENT WHEN CRASH CUSHIONS SHIELDING CONCRETE BARRIER WALL END LOCATED INSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE**

**DETAIL A**

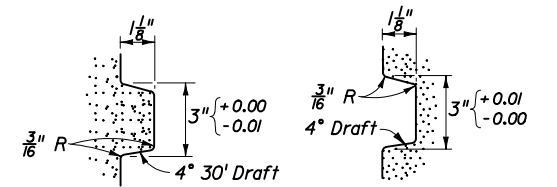


**DOWELED TRANSVERSE CONSTRUCTION JOINT WHEN ABUTTING SEGMENT(S) LESS THAN 40' IN LENGTH**

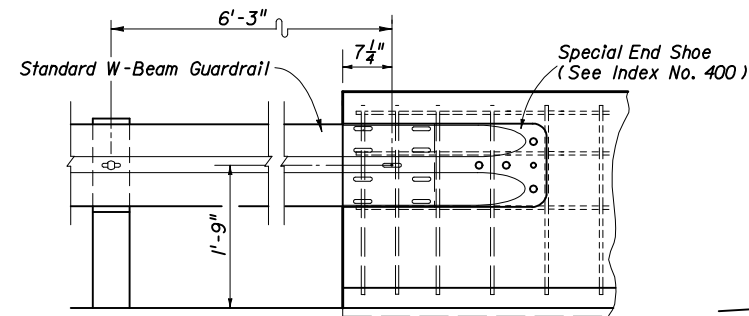
**DETAIL B**



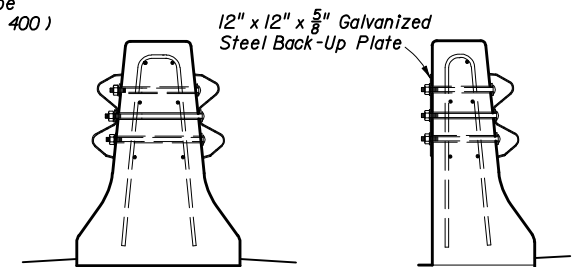
**PRECAST BARRIER TRANSVERSE JOINTS  
DETAIL C**



**STRAIGHT TONGUE AND GROOVE  
DETAIL D**



**FRONT VIEW**



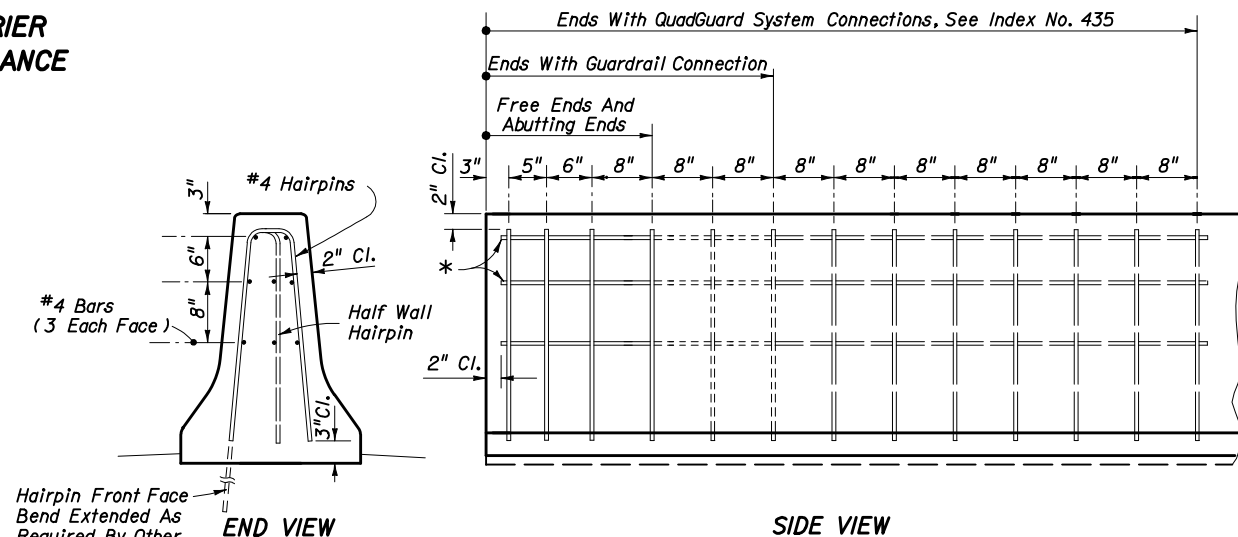
**END VIEW**

**END VIEW**

**NOTES**

- End of wall flush mounted connections are not applicable to two-lane two-way facilities. See Sheets 18 and 20 for trailing end connections on two-lane two-way facilities and for approach guardrail connections.
- Trailing guardrail connections to double face safety shaped walls will be under one of the following traffic conditions and mounting methods:
  - One-way traffic trailing condition one side only - flush mount with flat steel back-up plate on back side.
  - One-way traffic trailing condition both sides - flush mount both sides.
  - For trailing condition one side and approach traffic condition opposite side - see "Median Barrier Wall" mounting, Sheet 20.

**W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS**



Hairpin Front Face Bend Extended As Required By Other Indexes For Mounting Half Walls On Rigid Concrete Surfaces

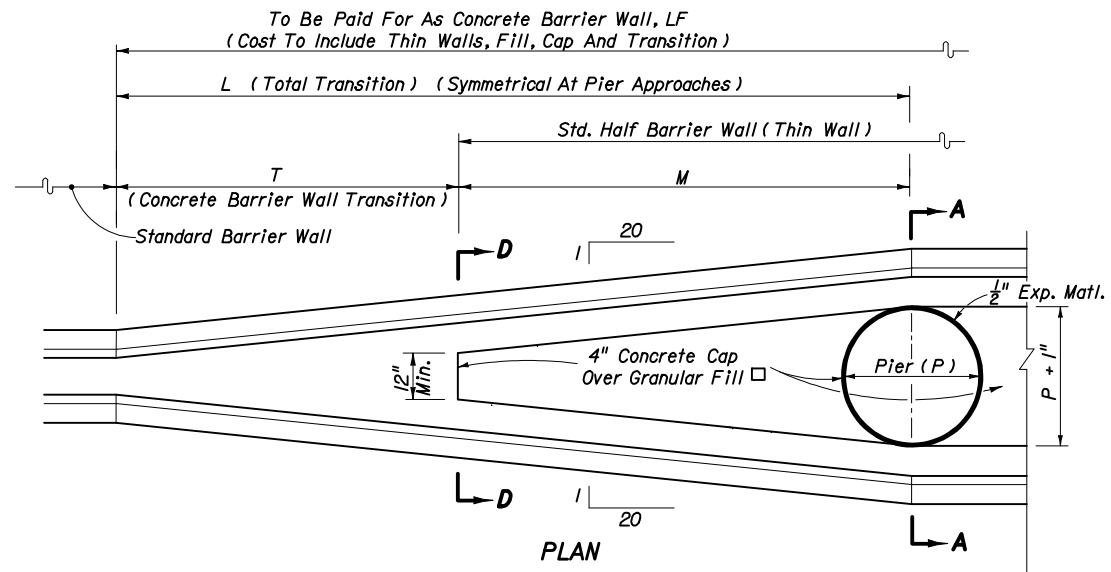
Note: Free end reinforcement required for nonreinforced walls at all exposed ends; abutting ends of true joints; ends with guardrail connections; ends with QuadGuard System connections; and, ends connecting to bridge traffic rails or other rigid barrier walls.

**FREE END REINFORCEMENT**

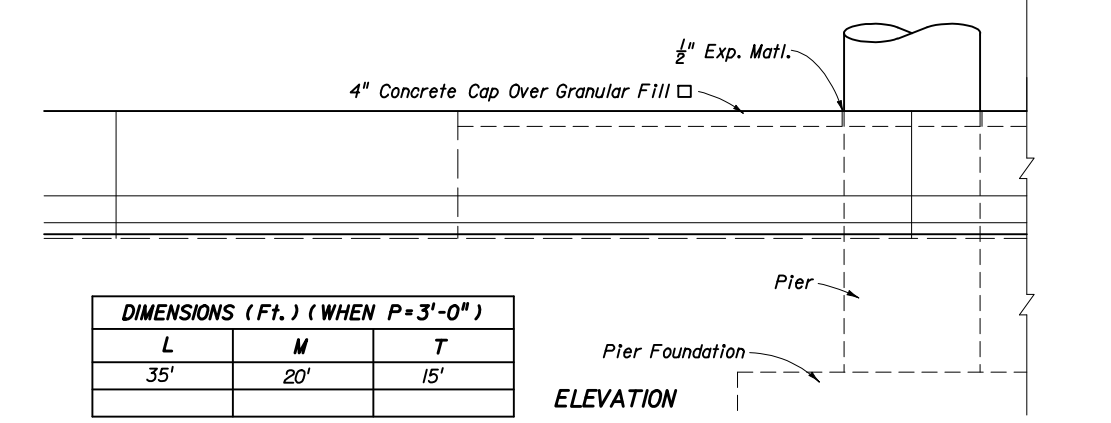
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER WALL**

Names	Dates	Approved By				
Designed By		State Roadway Design Engineer				
Drawn By	AF/HSD 73/91				Revision	Sheet No.
Checked By	LMF/JVG 73/91				00	2 of 22
						410

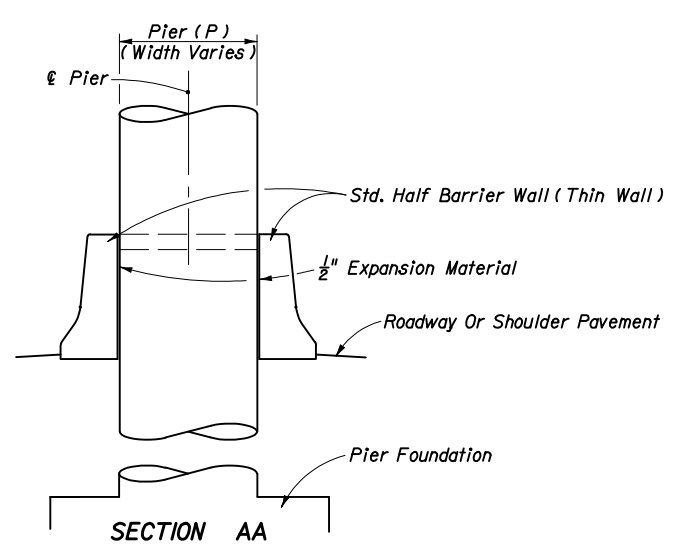


PLAN

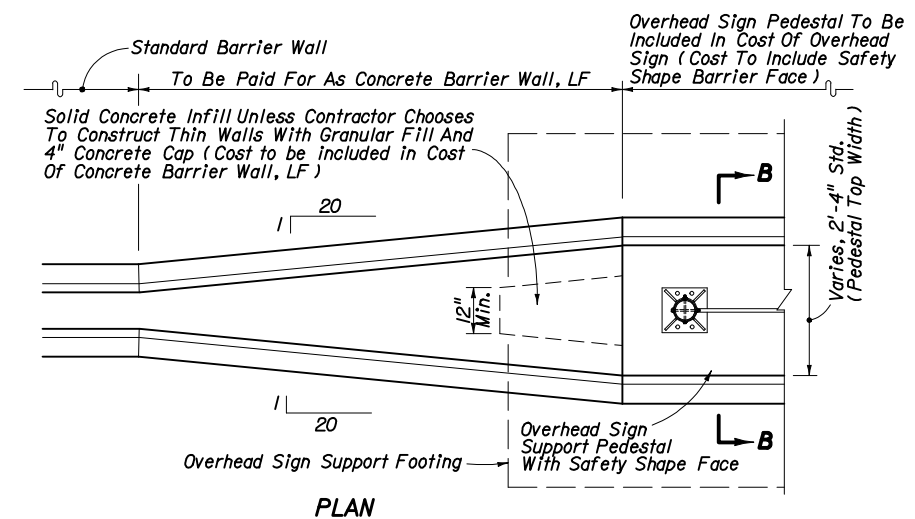


ELEVATION

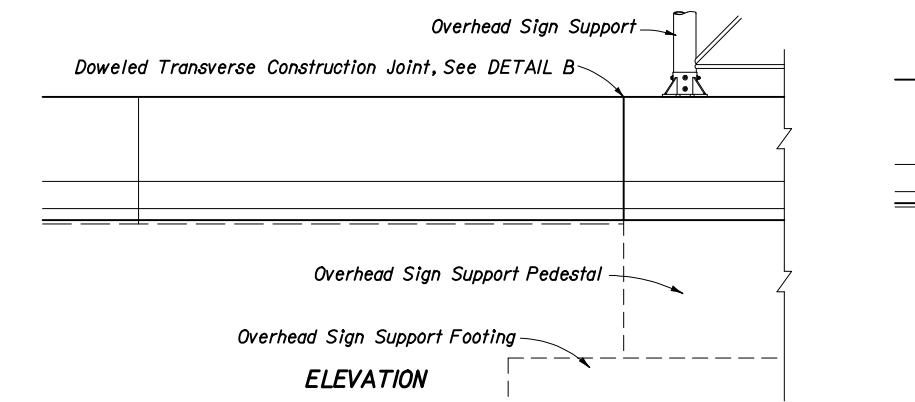
DIMENSIONS (Ft.) (WHEN P=3'-0")		
L	M	T
35'	20'	15'



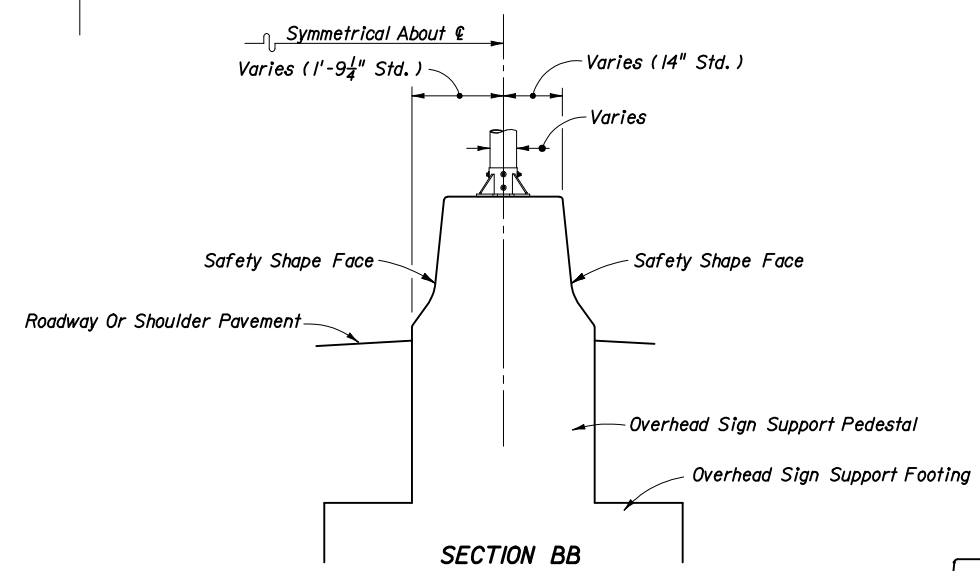
SECTION AA  
BRIDGE PIERS



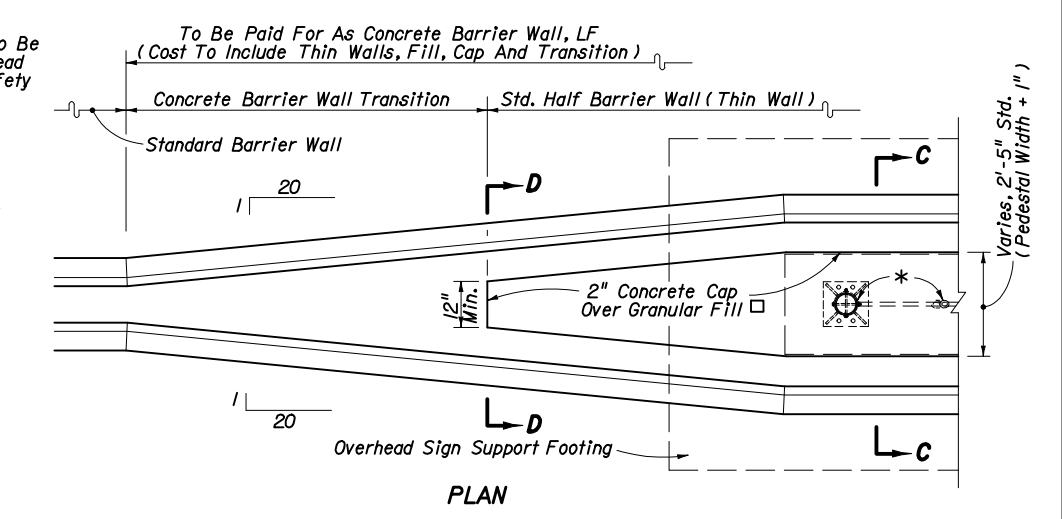
PLAN



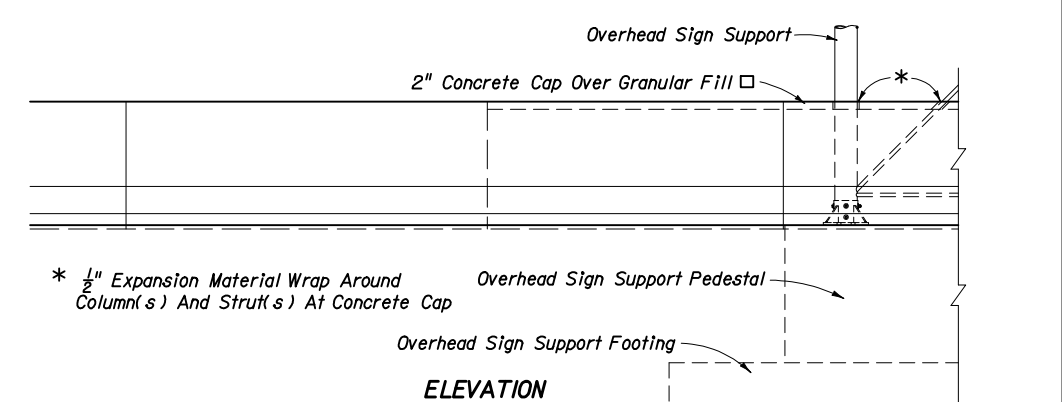
ELEVATION



SECTION BB  
COMBINATION BARRIER AND SIGN PEDESTAL

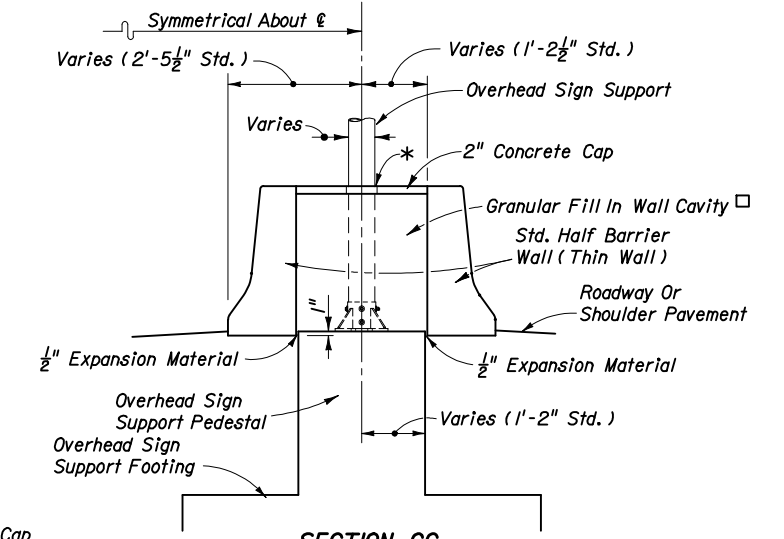


PLAN

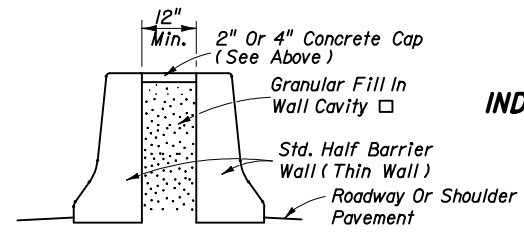


ELEVATION

\* 1/2" Expansion Material Wrap Around Column(s) And Strut(s) At Concrete Cap



SECTION CC  
INDEPENDENT BARRIER AND SIGN PEDESTAL



SECTION DD

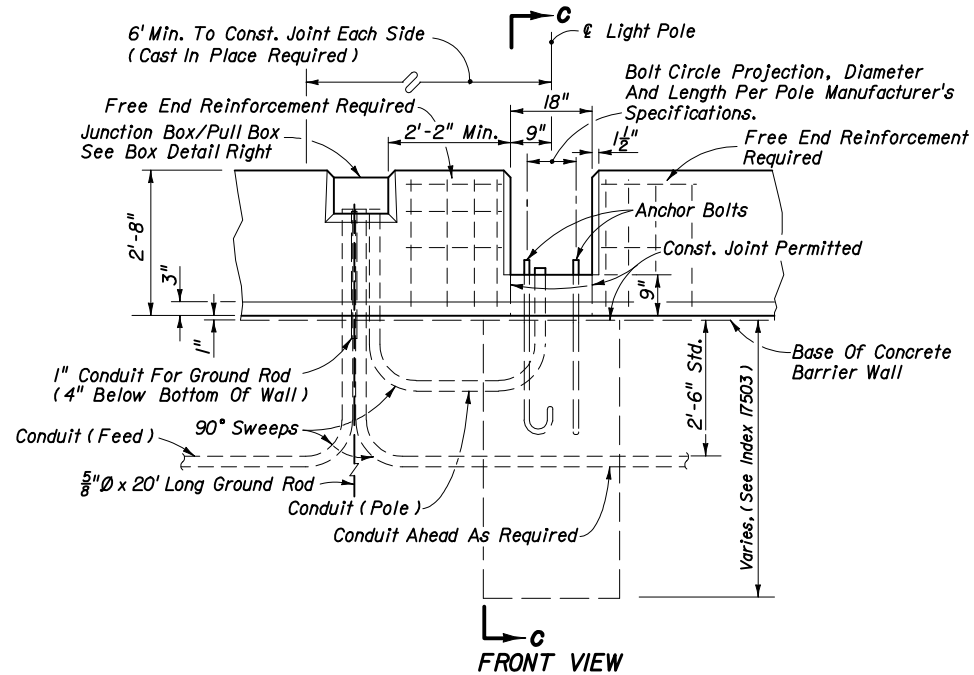
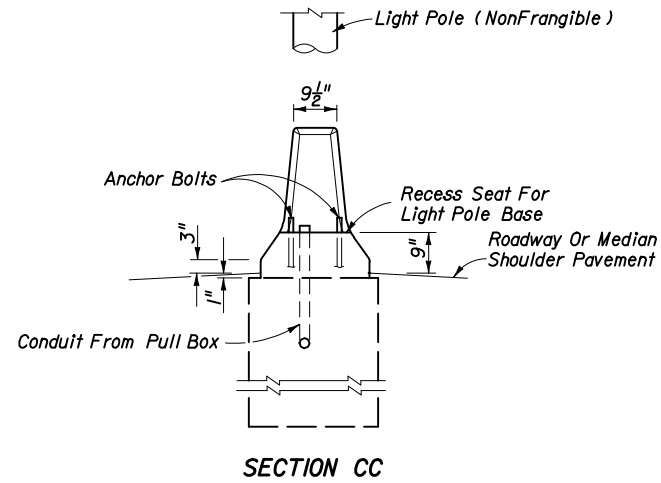
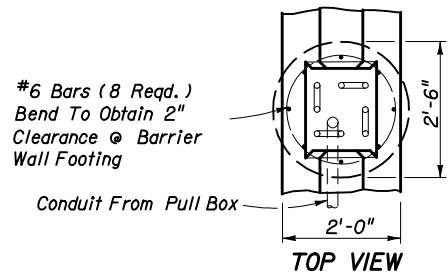
□ Free Of Deleterious And Cementsations Materials

# CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT BRIDGE PIERS AND OVERHEAD SIGN SUPPORTS

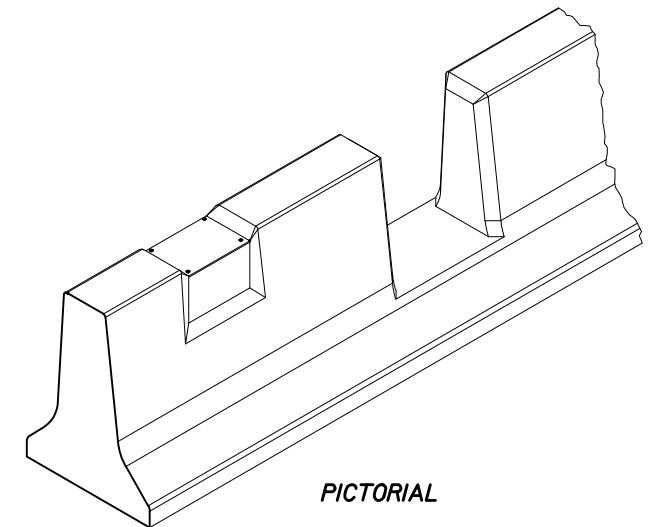
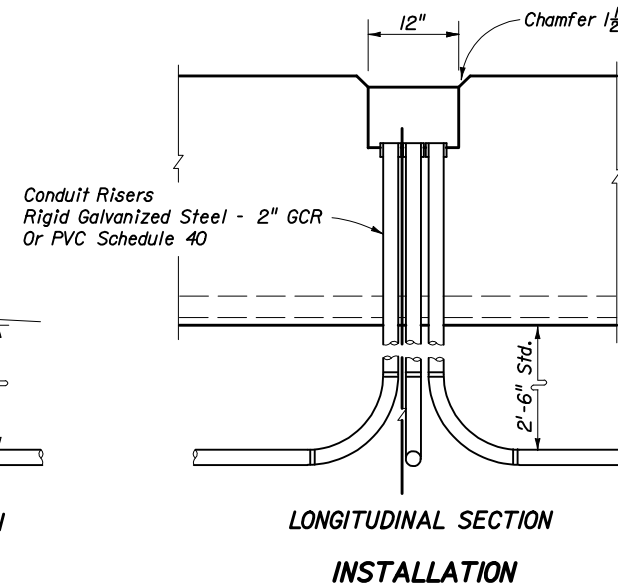
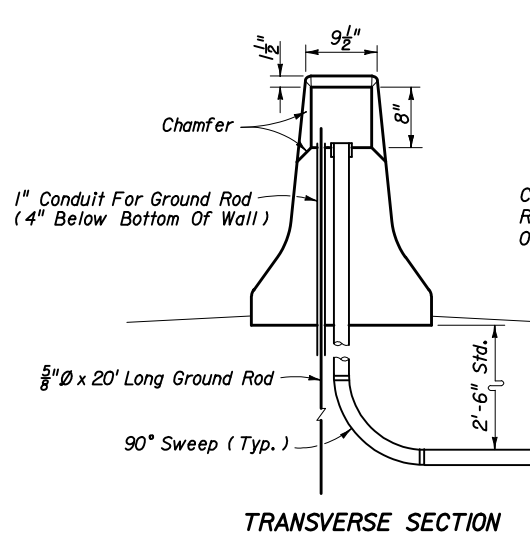
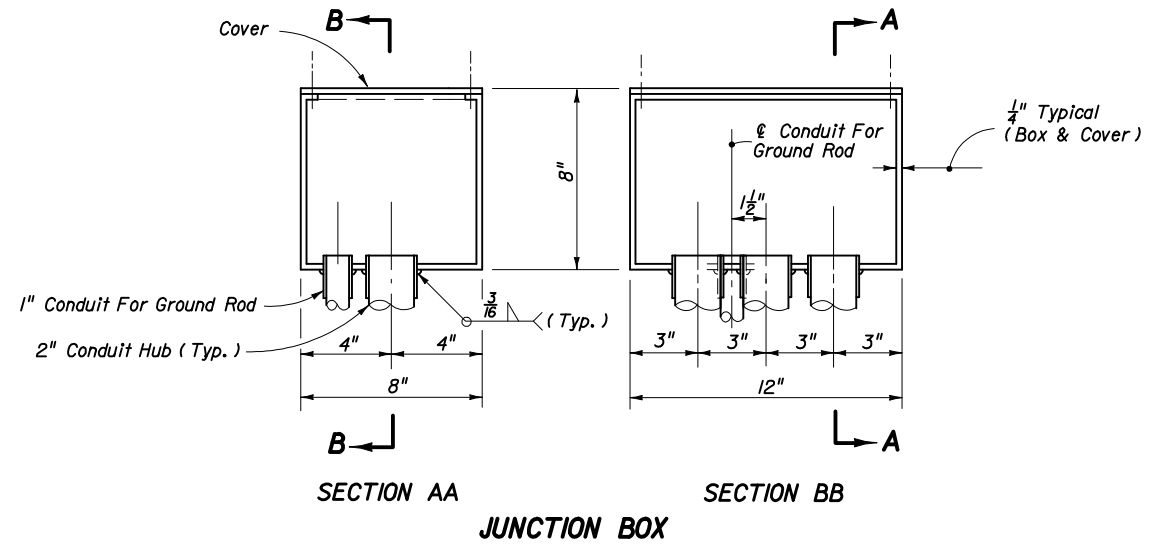
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

## CONCRETE BARRIER WALL

Names	Dates	Approved By		
Designed By		 State Roadway Design Engineer		
Drawn By				
Checked By				
		Revision	Sheet No.	Index No.
		00	3 of 22	410



Note: For foundation design and details see Index No. I7503.  
Refer to Lighting Plans for size of conduit.  
Payment for the 2'-6" concrete shaft including reinforcing steel, anchor bolts and accessories shall be included in the contract unit price for Light Pole Complete, EA.



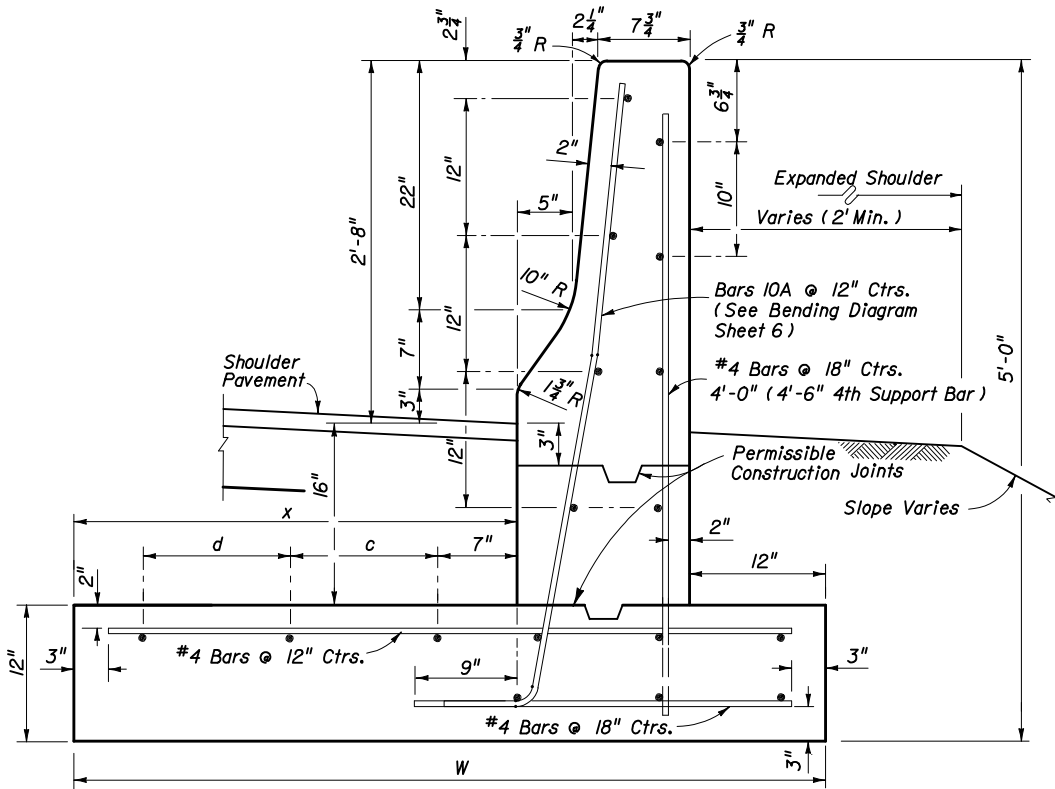
JUNCTION BOX NOTES

1. Junction boxes are to be fabricated from steel conforming to ASTM A36 and be hot dipped galvanized after fabrication. All seams shall be continuously welded and ground smooth. A neoprene gasket shall be attached to the box to provide a watertight cover. The cover screws shall be fully galvanized.
2. Remove excess concrete while green and hand form chamfers.
3. Junction box complete and conduit risers are incidental to the construction and cost of the barrier wall; there is to be no separate compensation for the box, risers or installation unless specifically called for in the plans.

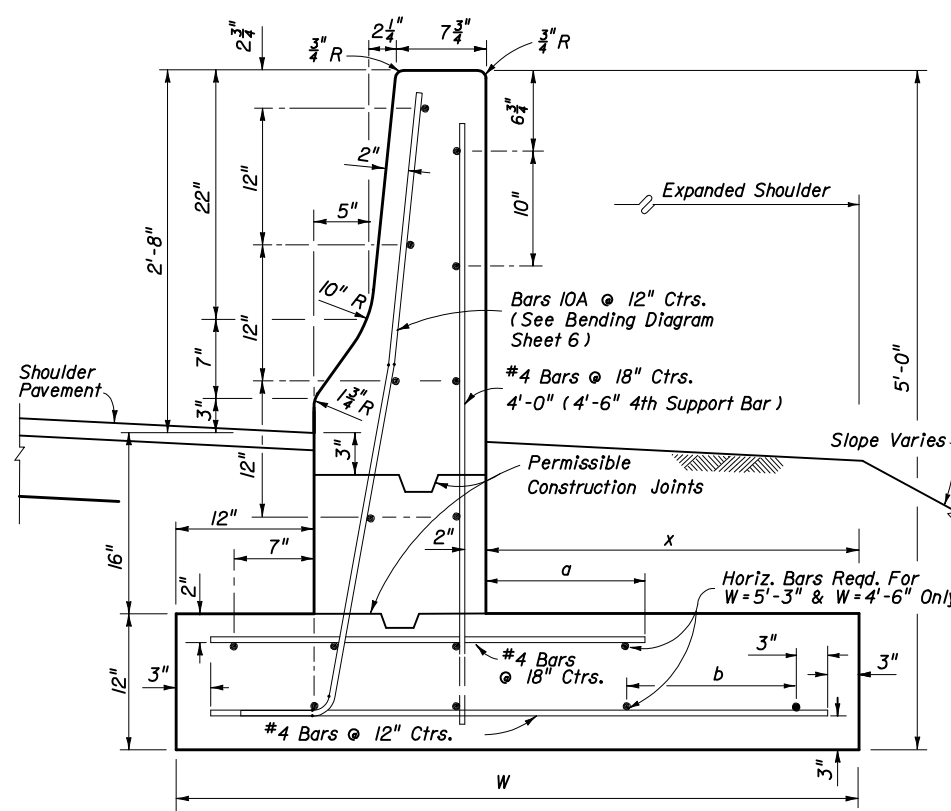
JUNCTION BOX - ELECTRICAL

LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HSD	9/85	 State Roadway Design Engineer	
Checked By	JVG	9/85		
			00	4 of 22
				Index No. 410

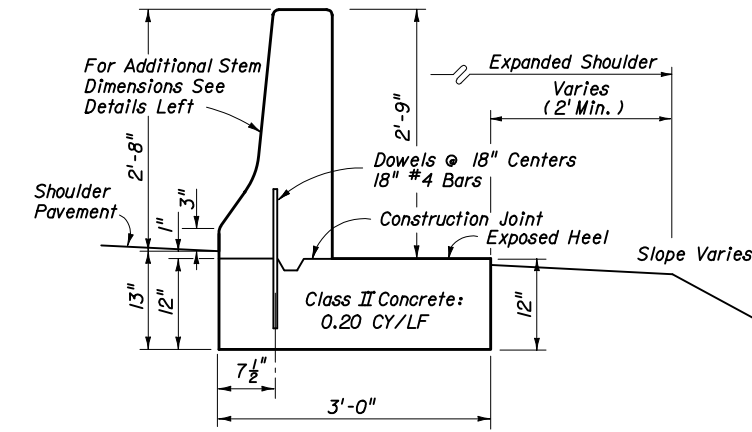
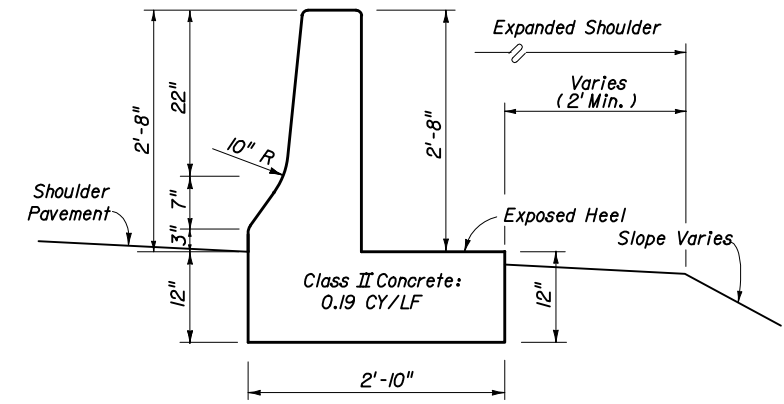


**CANTILEVER WALL**



**L-WALL**

NOTE: All longitudinal reinforcement #4 bars.

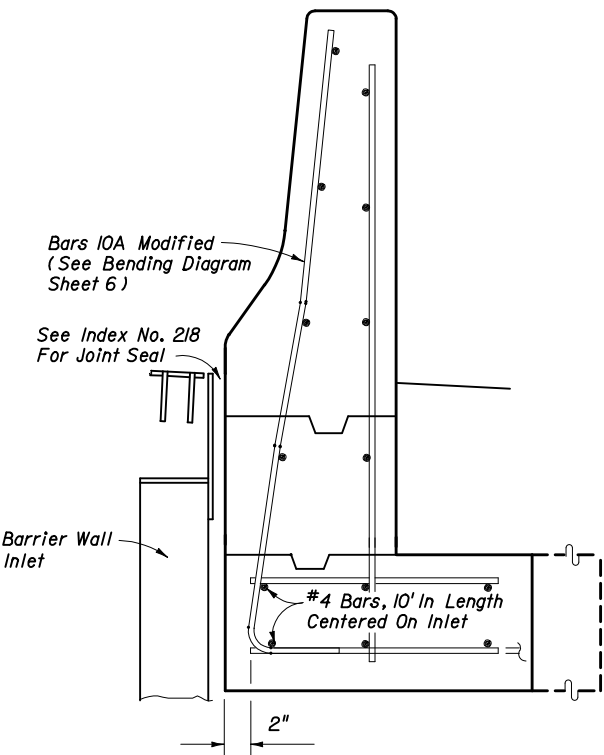


**WALL OPTIONS**

NOTE:  
Wall to be paid for under the contract unit price for Concrete Barrier Wall (Plain-Shoulder), LF.

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, Sheet 2; segments shall have dimensions same as wall shown above.

**PLAIN CONCRETE BARRIER WALL (SHOULDER)**



**REINFORCING STEEL MODIFICATIONS AT BARRIER WALL INLETS (INDEX NO. 218)**

DIMENSIONS AND QUANTITIES													
CANTILEVER WALL						L-WALL							
Length* Of Barrier Wall	W	x	c	d	Class II Concrete CY Per Lin. Ft.	Reinforcing Steel LBS. Per Lin. Ft.	Length* Of Barrier Wall	W	x	a	b	Class II Concrete CY Per Lin. Ft.	Reinforcing Steel LBS. Per Lin. Ft.
≥ 40'	3'-3"	1'-0"	NA	NA	0.27	18	≥ 40'	3'-3"	1'-0"	6"	NA	0.27	18
35' to 39'	3'-6"	1'-3"	NA	NA	0.28	18	35' to 39'	3'-6"	1'-3"	6"	NA	0.28	18
30' to 34'	4'-0"	1'-9"	NA	NA	0.29	19	30' to 34'	3'-9"	1'-6"	6"	NA	0.29	18
25' to 29'	4'-6"	2'-3"	14"	NA	0.31	20	25' to 29'	4'-0"	1'-9"	9"	NA	0.30	19
21' to 24'	5'-0"	2'-9"	18"	NA	0.33	20	20' to 24'	4'-6"	2'-3"	12"	12"	0.31	20
19' & 20'	5'-6"	3'-3"	13"	13"	0.35	21	15' to 19'	5'-3"	3'-0"	16"	17"	0.34	21
17' & 18'	6'-0"	3'-9"	16"	16"	0.37	21							
15' & 16'	6'-6"	4'-3"	18"	18"	0.39	22							

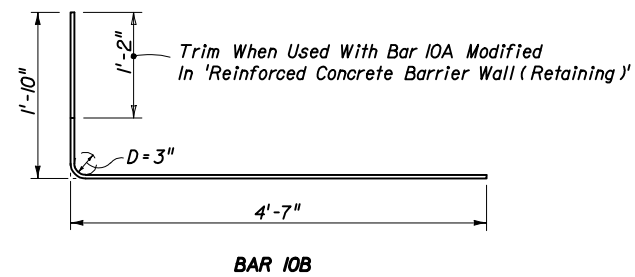
Quantities shown are for information only. For method of payment see payment note below.  
Barrier wall inlets (Index 218) shall be isolated from the barrier wall stem and footing by 1" expansion material.  
\*Any length less than 40' must be a continuous (nonjointed) segment. Walls of 40' or more in 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, Sheet 2; segments shall have dimensions same as wall ≥ 40' above.

PAYMENT:  
Wall to be paid for under the contract unit price for Concrete Barrier Wall (Rigid-Shoulder), LF.

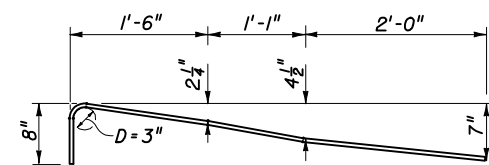
DESIGN NOTES:  
Use of this barrier wall should be limited to special applications such as hazard encroachment into the clear zone where barrier wall deflection, rotation or translation cannot be tolerated; example hazards to consider are as follows:  
(a) Structure supporting piers, bents and pylons (b) Pumping, metering, control or other similar critical stations (c) Quarries (d) Intolerable vertical drops (e) Historic structures or monuments (f) Rail transit travel way or passenger station (g) Other similar occupancies

**REINFORCED CONCRETE BARRIER WALL (SHOULDER)**

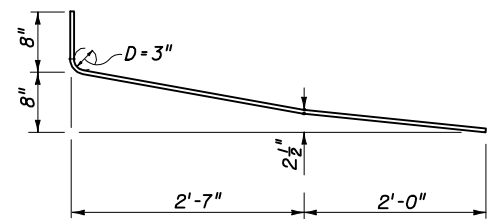
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>CONCRETE BARRIER WALL</b>					
Names	Dates	Approved By			
Designed By		<i>Blair Blackwell</i> State Roadway Design Engineer			
Drawn By	HSD 9/85	Revision	Sheet No.	Index No.	
Checked By	JVG 9/85	00	5 of 22	410	



BAR 10B

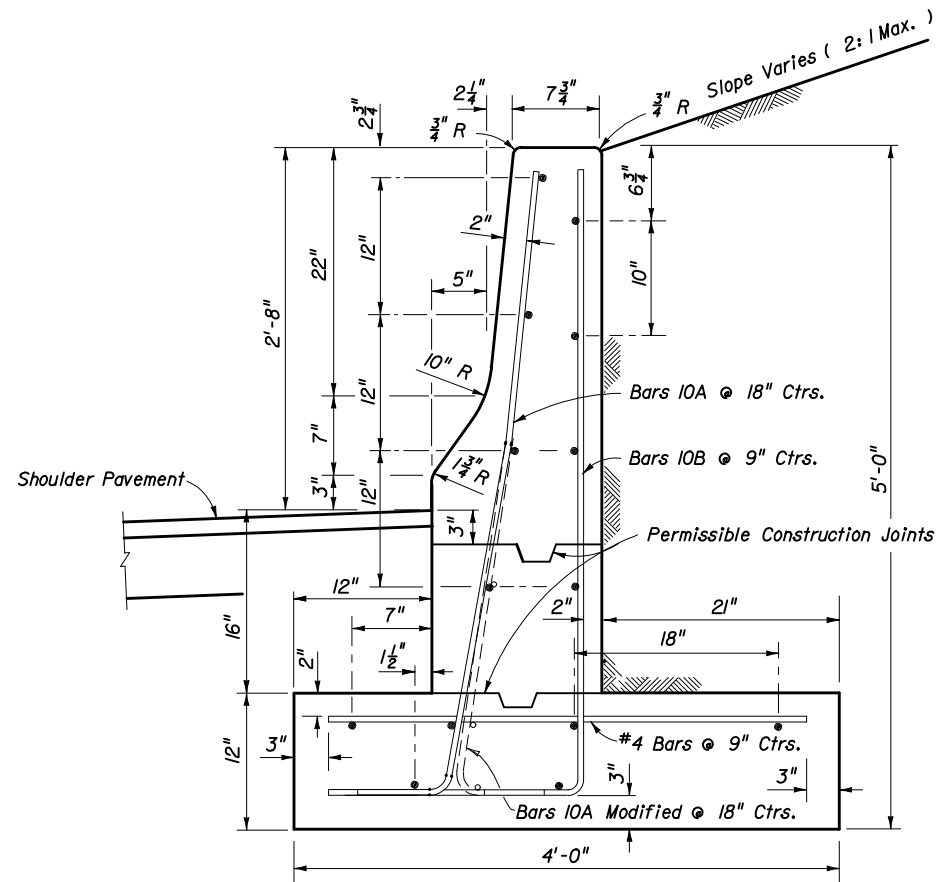


For Use In Areas Where Obstructions Require Localized Omission Of Toe  
**BAR 10A MODIFIED**



BAR 10A

**BENDING DIAGRAMS**



NOTE: All longitudinal reinforcement #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), LF.

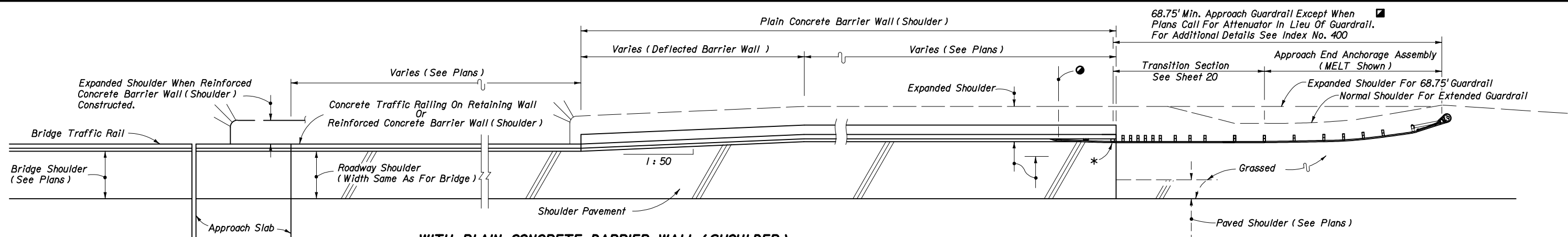
QUANTITIES: Class II Concrete 0.29 CY/LF  
 Reinforcing Steel 21 LBS/LF

**REINFORCED CONCRETE BARRIER WALL (RETAINING)**

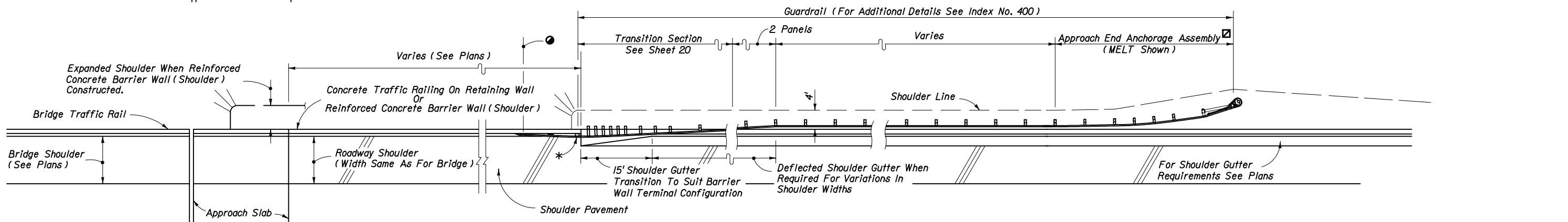
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER WALL**

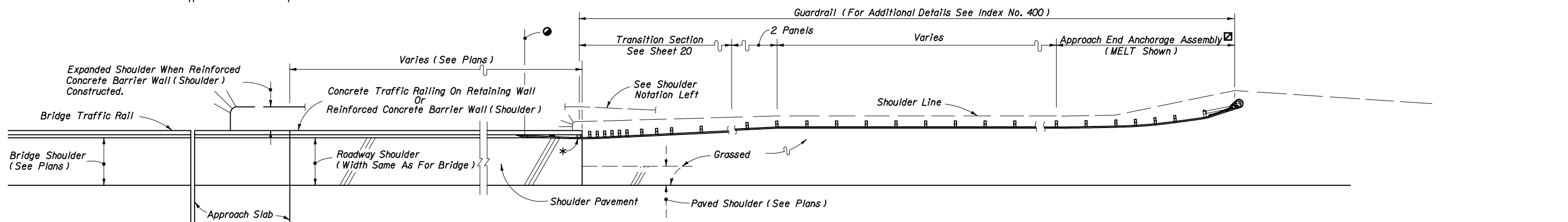
Designed By	Names	Dates	Approved By
Drawn By			<i>Ben Blankenship</i> State Roadway Design Engineer
Checked By			Revision Sheet No. Index No.
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**WITH PLAIN CONCRETE BARRIER WALL (SHOULDER)**



**WITH SHOULDER GUTTER AND GUARDRAIL**



**WITH GRASSED OR PAVED SHOULDERS AND GUARDRAIL**

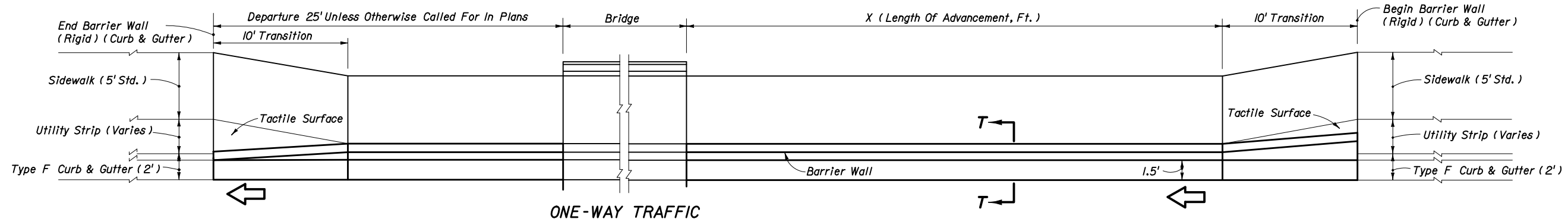
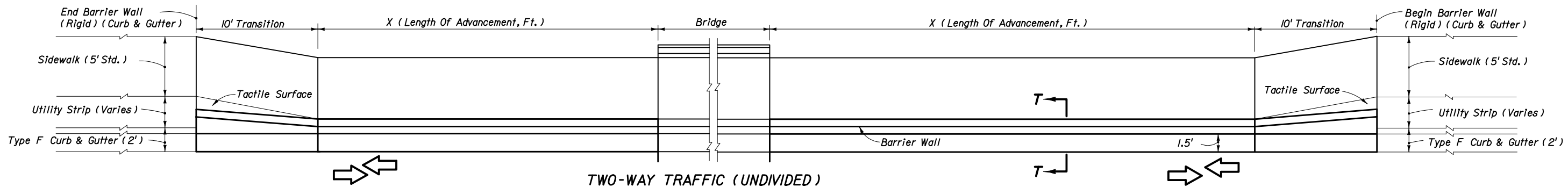
△ Views show approach roadside barriers when length of need exceeds the length of either retaining walls with concrete traffic railings\* or Reinforced Concrete Barrier Wall (Shoulder) on shoulders. When either of these rigid barriers alone satisfies the approach length of need, the wall ends shall be shielded by crash cushions, or, by guardrail the same as for bridge traffic rails, as detailed in Index No. 400.  
See other flagged notes for trailing end treatments.  
Miscellaneous asphalt paving under guardrail not shown.

\* Guardrail connection to concrete traffic railings on retaining walls shall be in accordance with the Structures Design Office Standard Drawings and the plans. Approach guardrail connections to shoulder concrete barrier walls shall be in accordance with the details shown on Sheets 2 and 20 of this Index and Index No. 400, Detail J.  
● End measurement for guardrail payment when guardrail connected to shoulder barrier walls. See Index No. 400, Detail J for end measurement when guardrail connected to concrete traffic rails constructed with approach slab or on retaining walls.

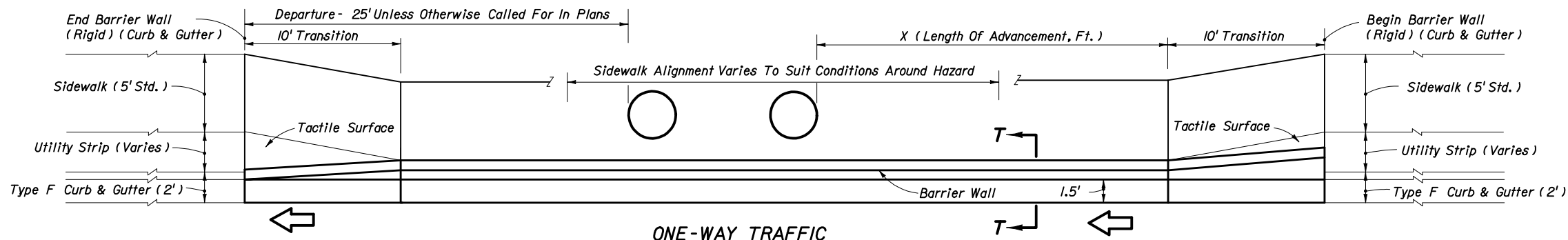
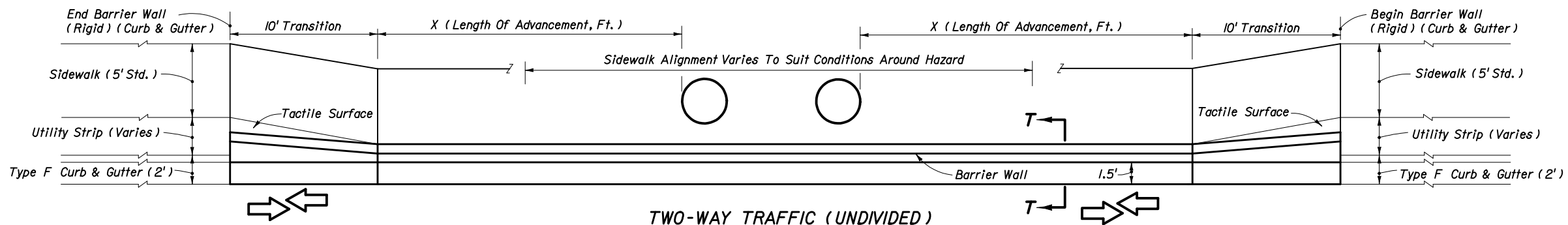
☑ To be deleted on trailing ends except for 2-lane 2-way facilities. The tangent guardrail shall be anchored by End Anchorage Type II, Index No. 400.  
☑ To be deleted on trailing ends except for 2-lane 2-way facilities.

**EITHER REINFORCED CONCRETE BARRIER WALL (SHOULDER) OR RETAINING WALL WITH CONCRETE TRAFFIC RAILING**  
**CONCRETE BARRIER WALLS ON APPROACHES TO BRIDGES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HSD	8/89	 State Roadway Design Engineer	
Checked By	KNM/JVG	8/89		
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**BRIDGE END HAZARD**



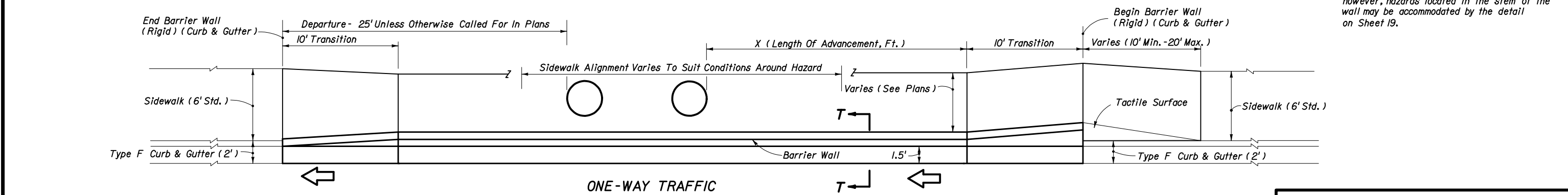
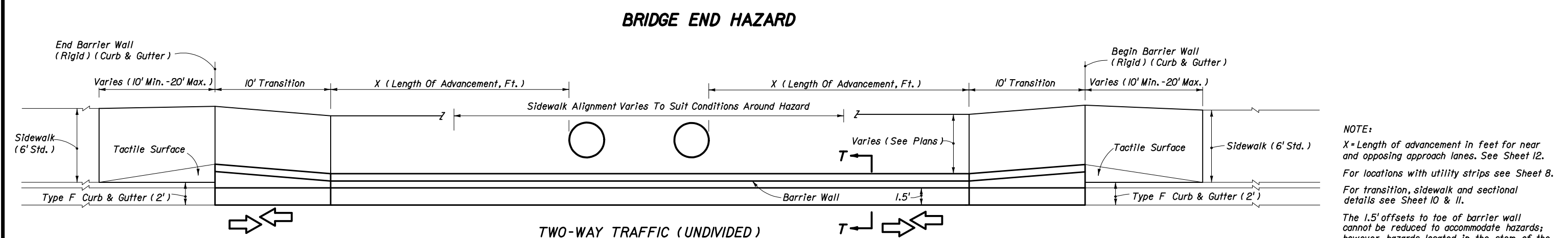
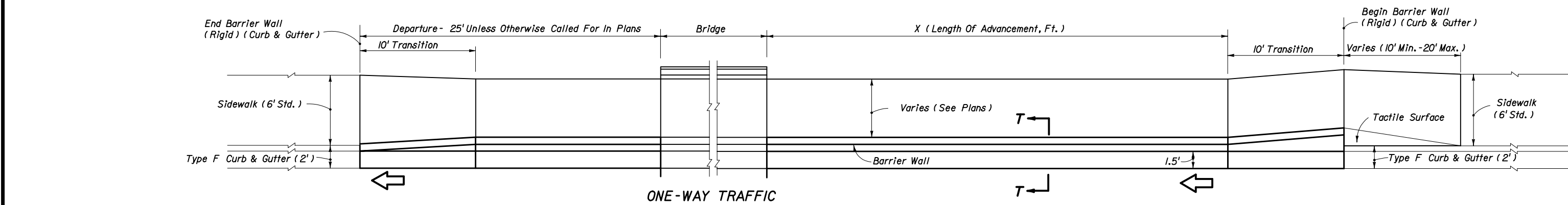
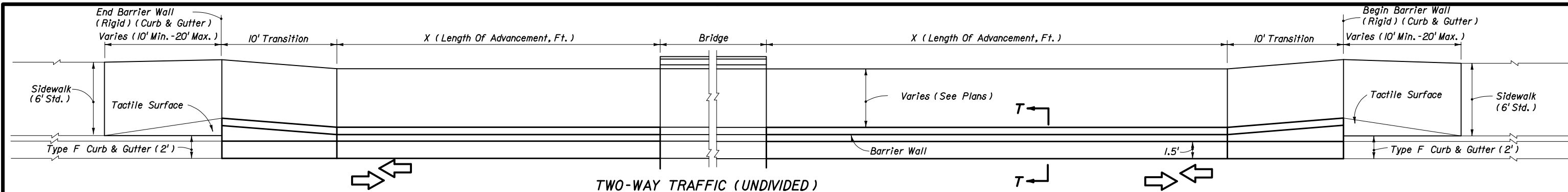
**HAZARD 4' OR LESS FROM FACE OF CURB**

**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)  
CURB AND GUTTER WITH UTILITY STRIP AND WITH ADJACENT BICYCLE LANE**

**NOTE:**  
 X = Length of advancement in feet for near and opposing approach lanes. See Sheet 12.  
 For locations without utility strips see Sheet 9.  
 For transition, sidewalk and sectional details see Sheets 10 & 11.  
 The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheet 19.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	STAFF	10/97	Approved By <i>Ben Blum</i> State Roadway Design Engineer	
Drawn By	HKH	10/97	Revision	Sheet No. Index No.
Checked By	JVG	10/97	00	8 of 22 410

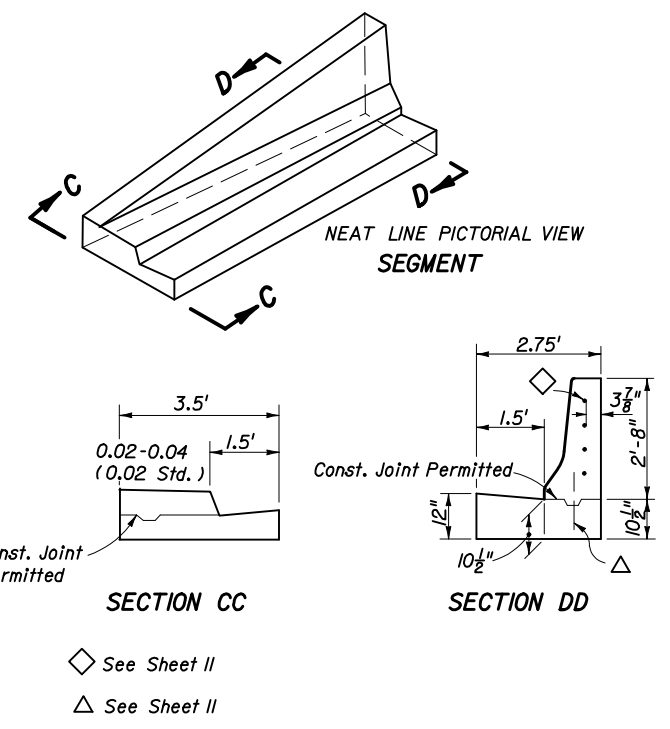
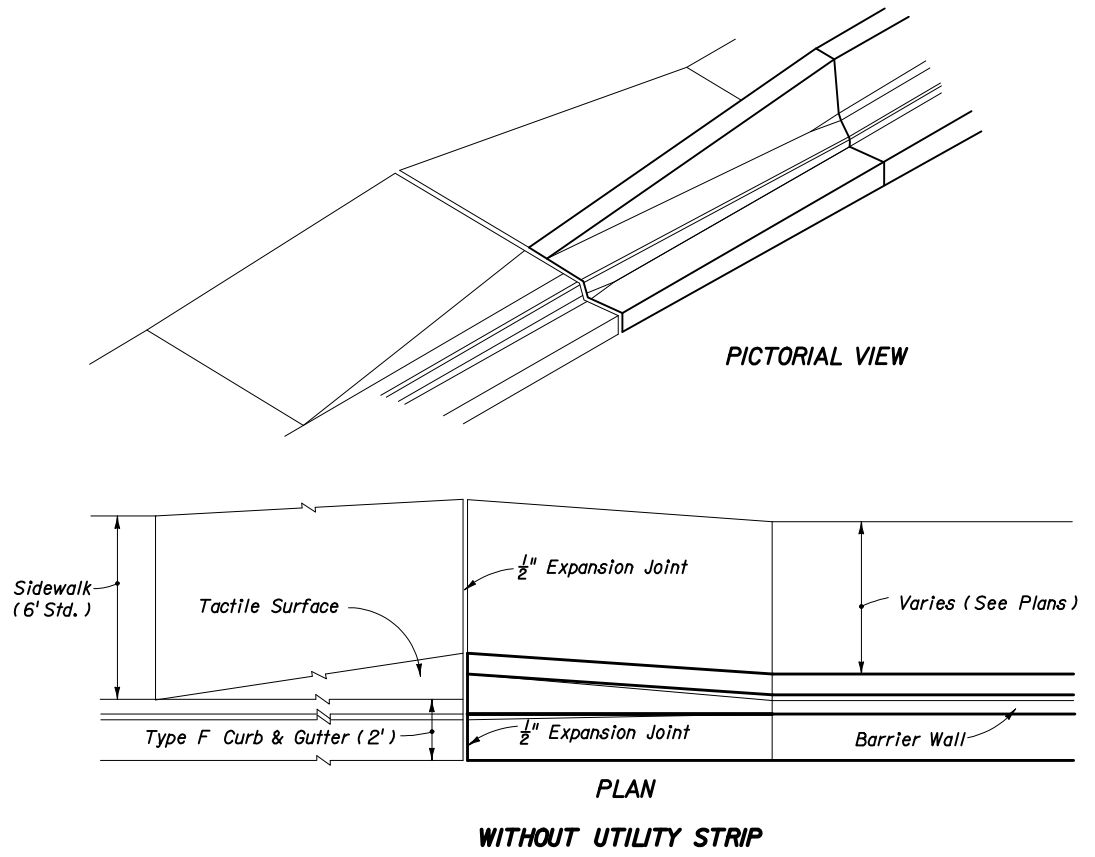
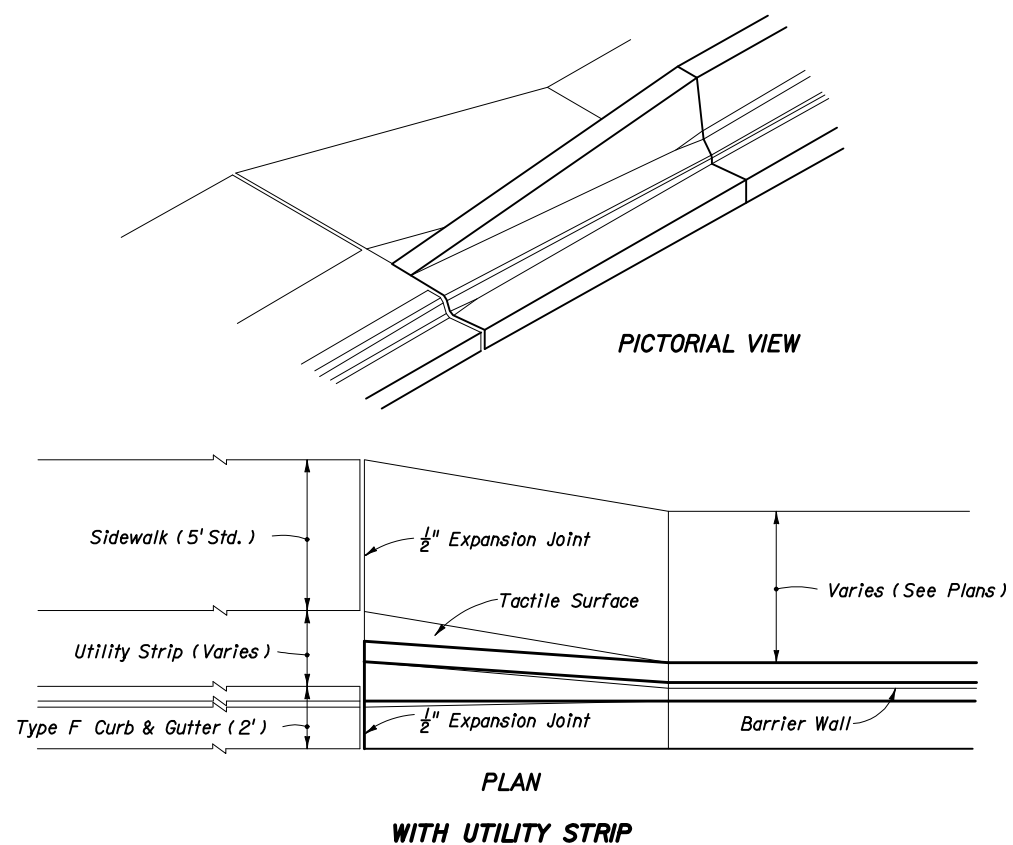




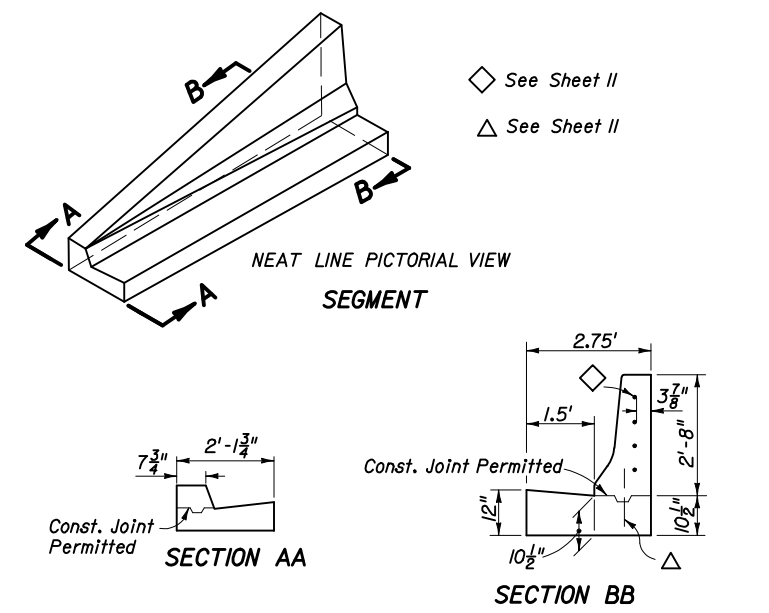
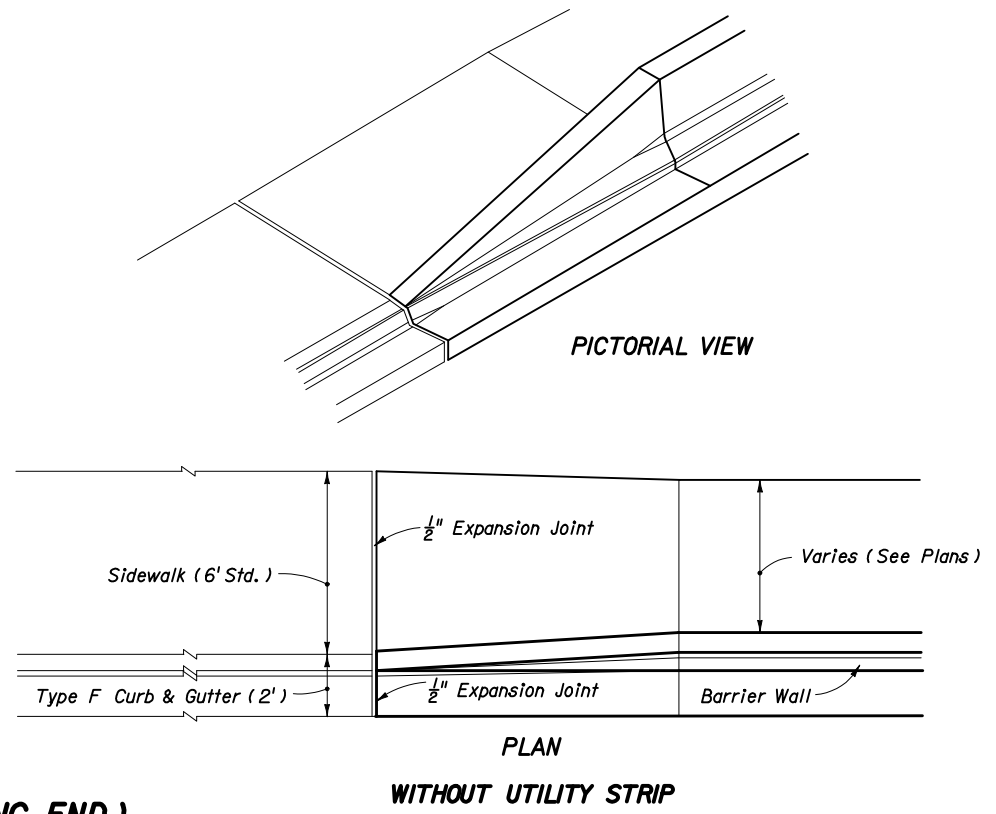
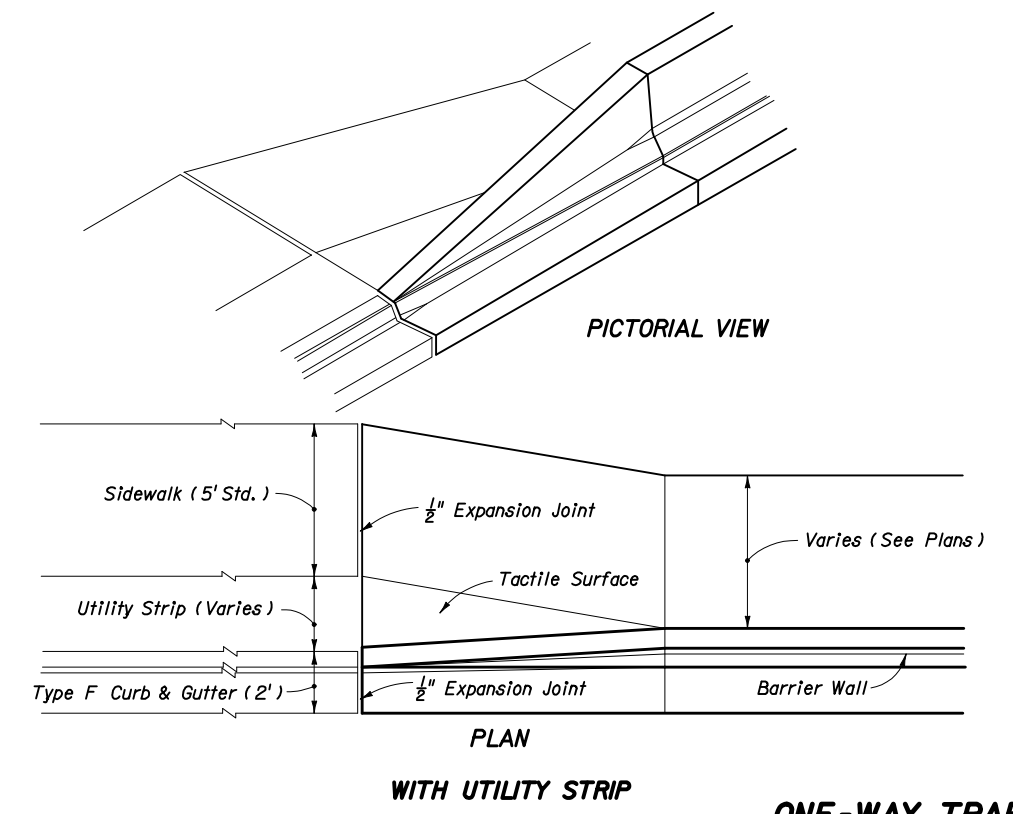
**NOTE:**  
 X = Length of advancement in feet for near and opposing approach lanes. See Sheet 12.  
 For locations with utility strips see Sheet 8.  
 For transition, sidewalk and sectional details see Sheet 10 & 11.  
 The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheet 19.

**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)  
 CURB AND GUTTER WITHOUT UTILITY STRIP AND WITH ADJACENT BICYCLE LANE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	STAFF	Dates	10/97	Approved By
Drawn By	HKH	10/97	Revision	Sheet No.
Checked By	JVG	10/97	00	9 of 22
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				410



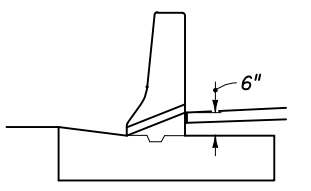
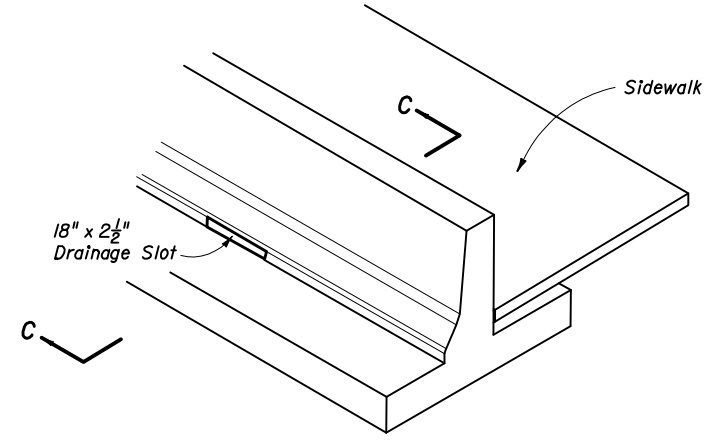
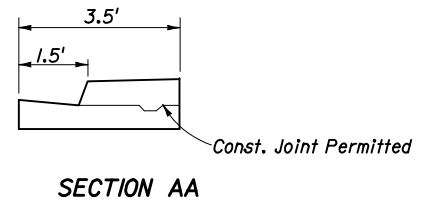
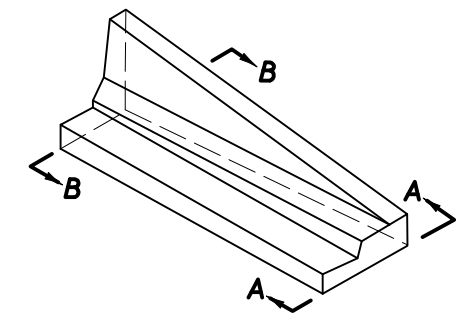
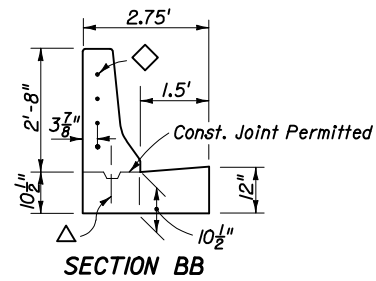
TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)



ONE-WAY TRAFFIC (TRAILING END)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITH ADJACENT BICYCLE LANE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	STAFF	Dates	Approved By	
Drawn By	HKH	10/97	 State Roadway Design Engineer	
Checked By	JVG	10/97		
			00	10 of 22
				410

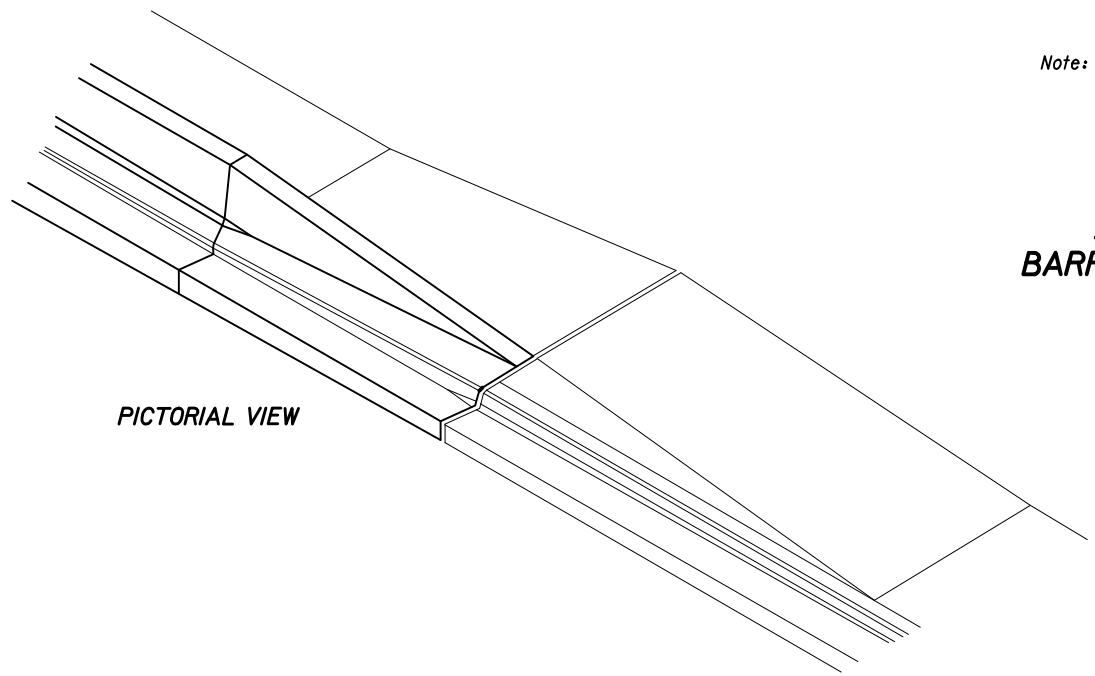
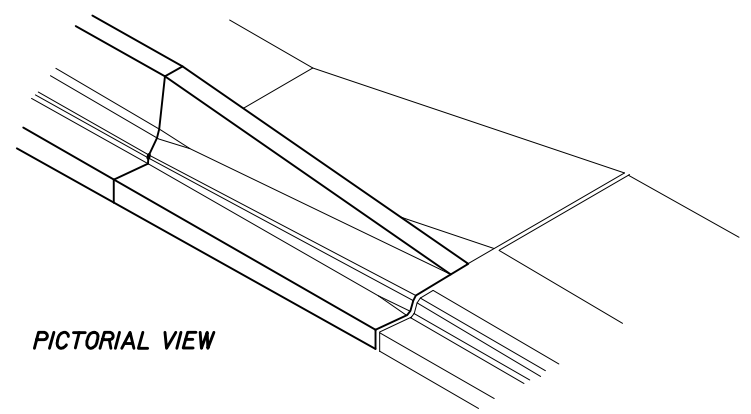


◇ See Notes This Sheet  
 △ See Notes This Sheet

WITH OR WITHOUT UTILITY STRIP  
 NEAT LINE PICTORIAL VIEW

NEAT LINE PICTORIAL VIEW

SECTION CC



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' in fill sections and 20' 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.

**SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER)**

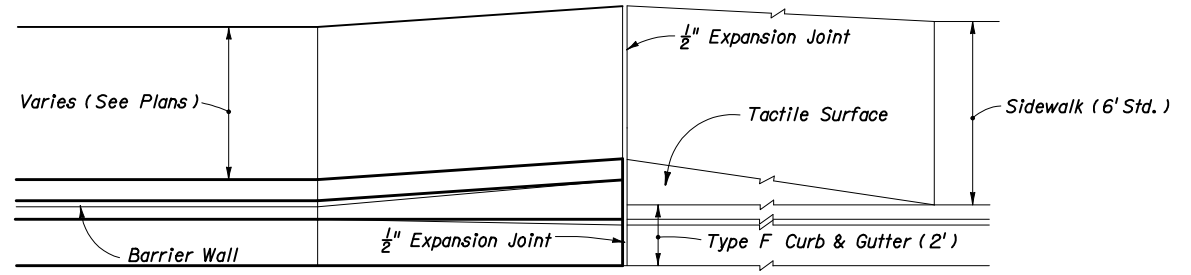
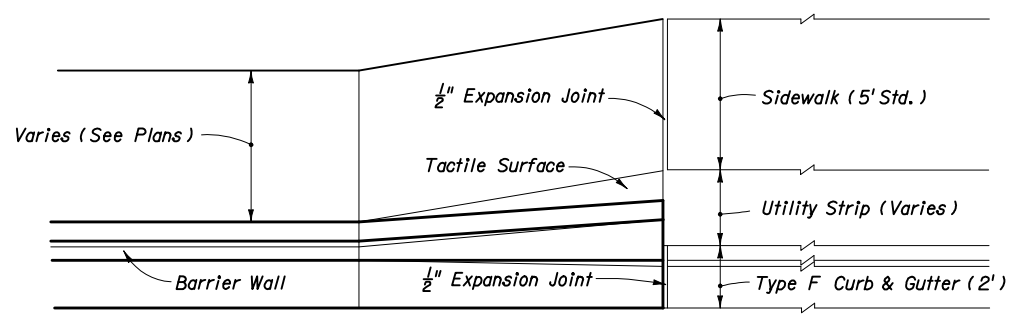
PICTORIAL VIEW

PICTORIAL VIEW

NOTE:

◇ Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner:  
 Four 1 1/4" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #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. Type I asphalt-saturated roofing 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 #5 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

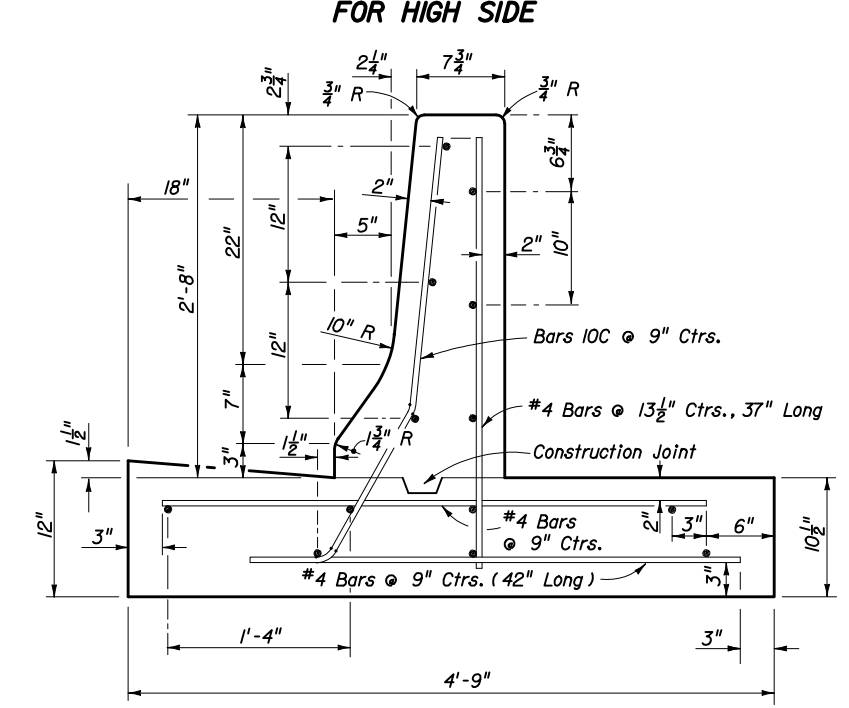
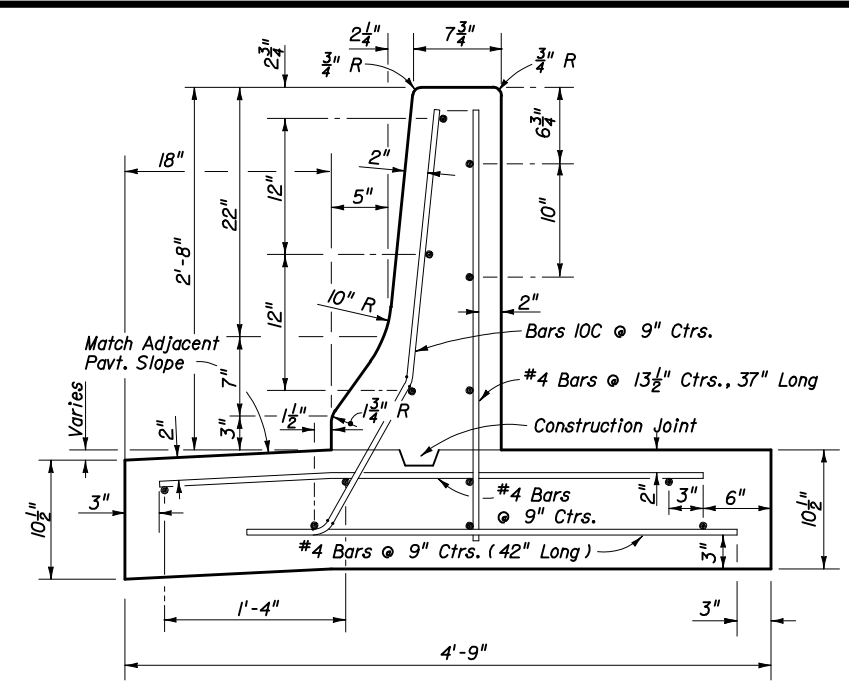
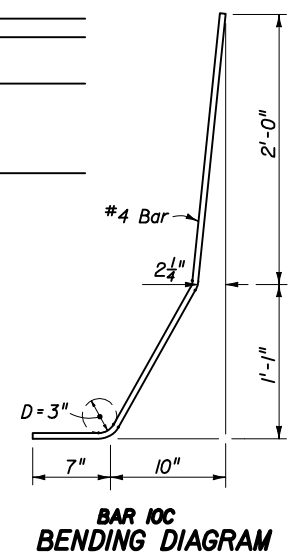
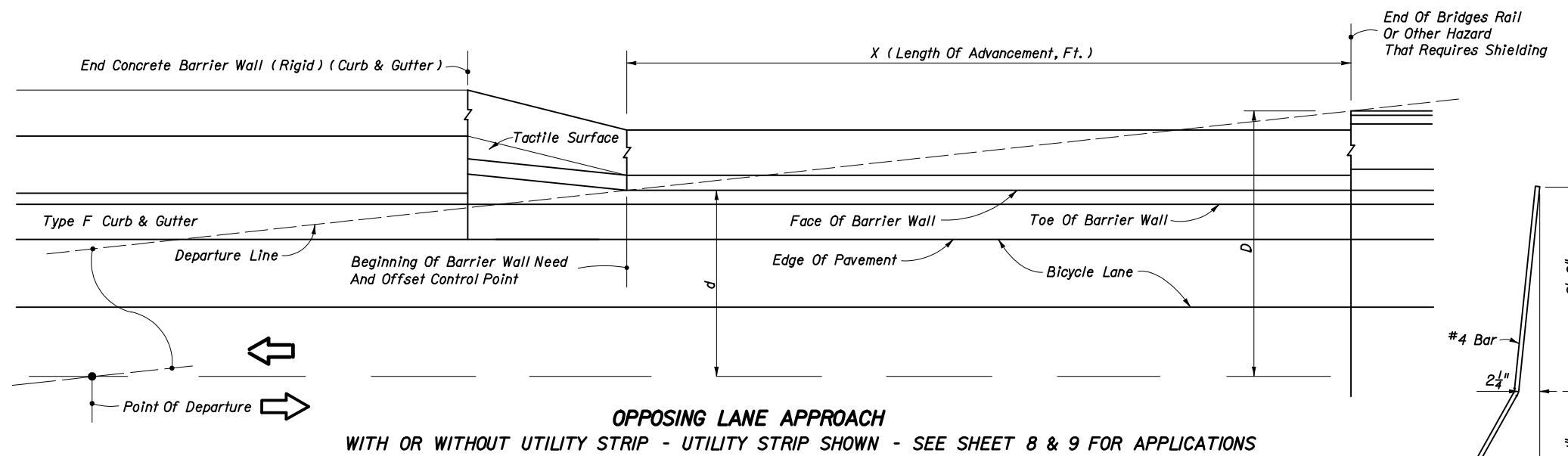
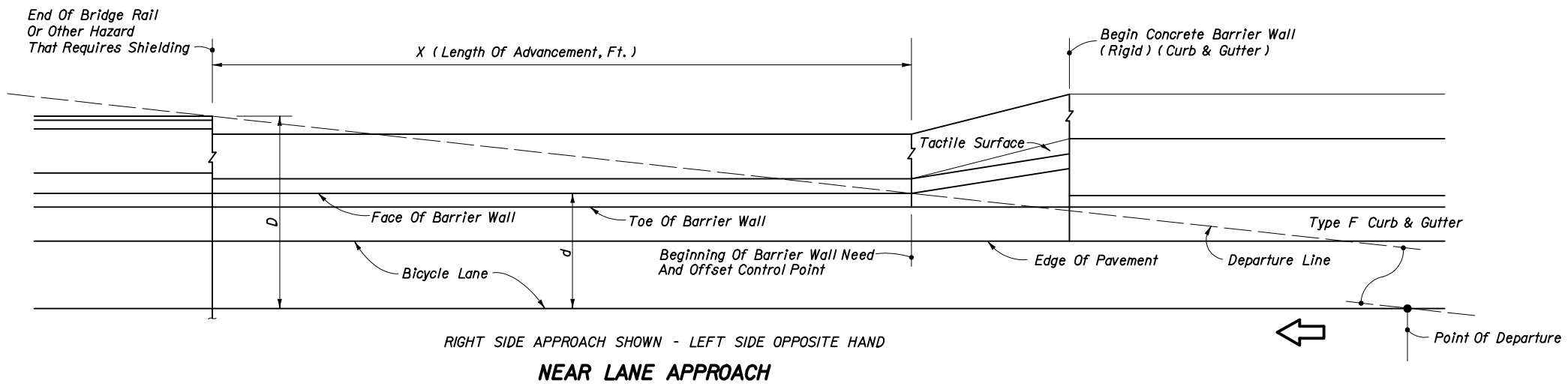
RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND  
 ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENT • WITH ADJACENT BICYCLE LANE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER WALL**

Names	Dates	Approved By		
Designed By	STAFF	10/97	State Roadway Design Engineer	
Drawn By	HKH	10/97		
Checked By	JVG	10/97	Revision	00
			Sheet No.	11 of 22
			Index No.	410



Design Speed mph	Length Of Advancement, Ft. (X)
≤45	= 16 (D-d)

Note: The minimum length of advancement for both near and opposing lane approaches is 40'.

Equation Variables:

D = Distance in feet from near edge of the near approach traffic 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 traffic lane.

d = Distance in feet from near edge of the near approach traffic lane to the face of barrier (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

Note: All longitudinal reinforcement #4 bars. Minimum segment length for this wall is 40'. Shorter segments due to construction or expansion joint shall be dowled in the manner described for 'Transition Segments' on Sheet II. Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'. For barrier wall inlet details see Index No. 219. Inlet extends into bicycle lane 12". Wall to be paid for under the contract unit Price for Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

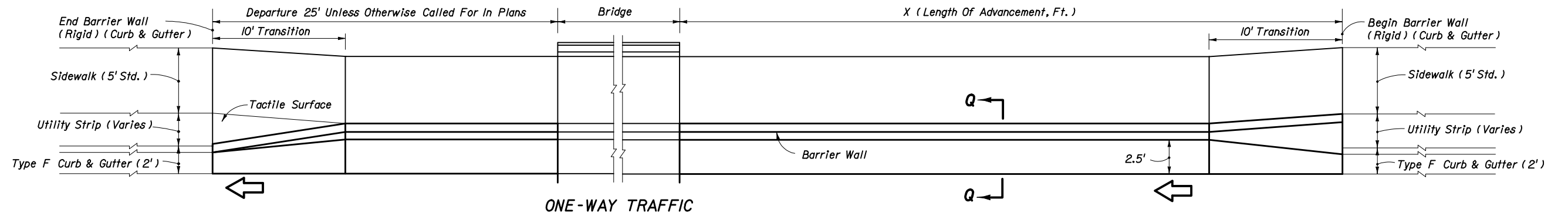
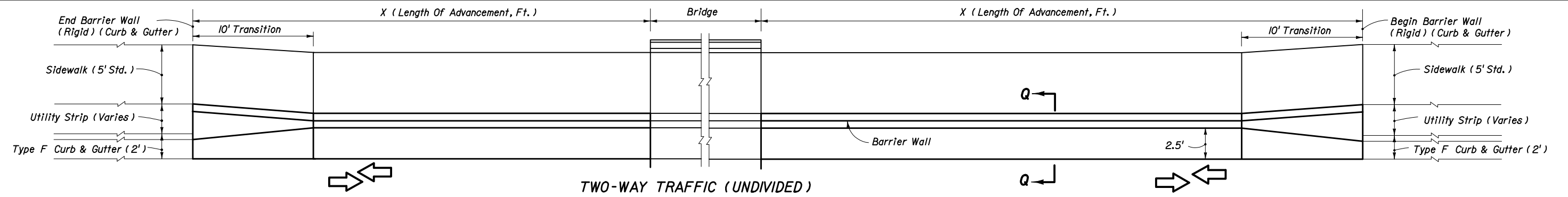
Estimated Quantities Per Linear Foot Of Wall:  
 Class II Concrete: 0.23 C.Y.  
 Reinforcing Steel: 20.7 Lbs.

**LENGTH OF ADVANCEMENT**

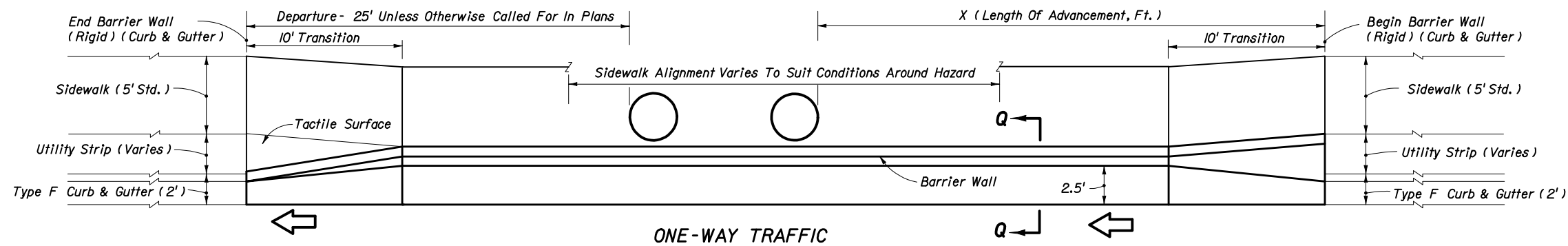
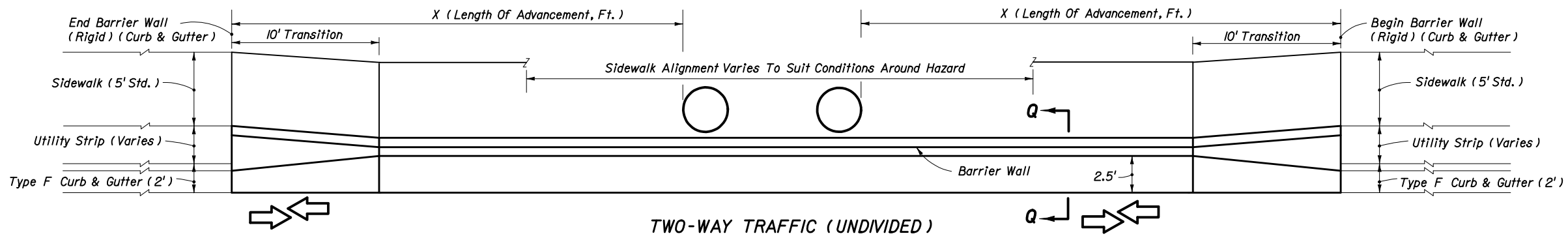
**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • WITH ADJACENT BICYCLE LANE**

**SECTION TT**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Names	Dates	Approved By		
Designed By	STAFF	10/97	 State Roadway Design Engineer	
Drawn By	HKH	10/97		
Checked By	JVG	10/97		
Revision	00	Sheet No.	12 of 22	Index No.
				410



**BRIDGE END HAZARD**

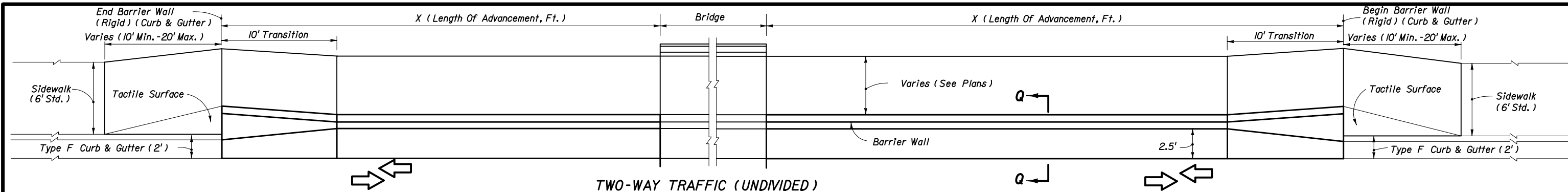


**HAZARD 4' OR LESS FROM FACE OF CURB**

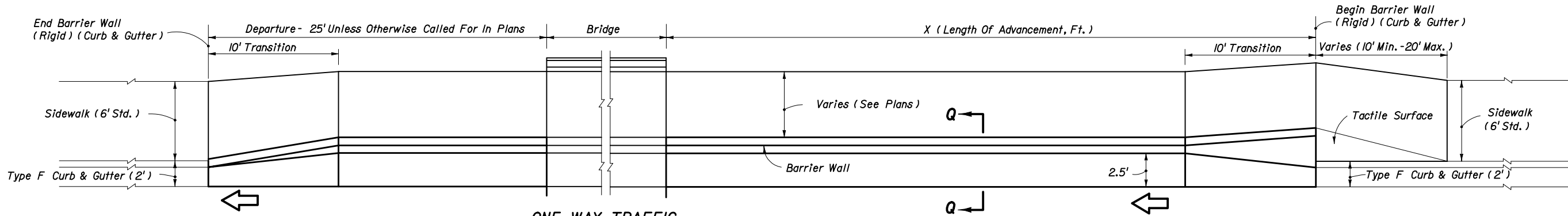
**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)  
CURB AND GUTTER WITH UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE**

**NOTE:**  
 X = Length of advancement in feet for near and opposing approach lanes. See Sheet 17.  
 For locations without utility strips see Sheet 14.  
 For transition, sidewalk and sectional details see Sheets 15 & 16.  
 The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheet 19.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HSD	10/85	<i>Brian Blankenship</i> State Roadway Design Engineer	
Checked By	JBW/JVG	10/85	Revision	Sheet No.
			00	13 of 22
				Index No.
				410

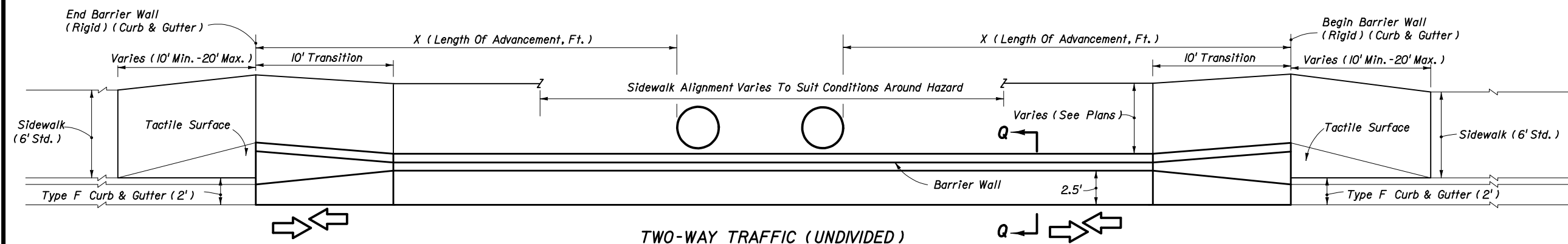


TWO-WAY TRAFFIC (UNDIVIDED)

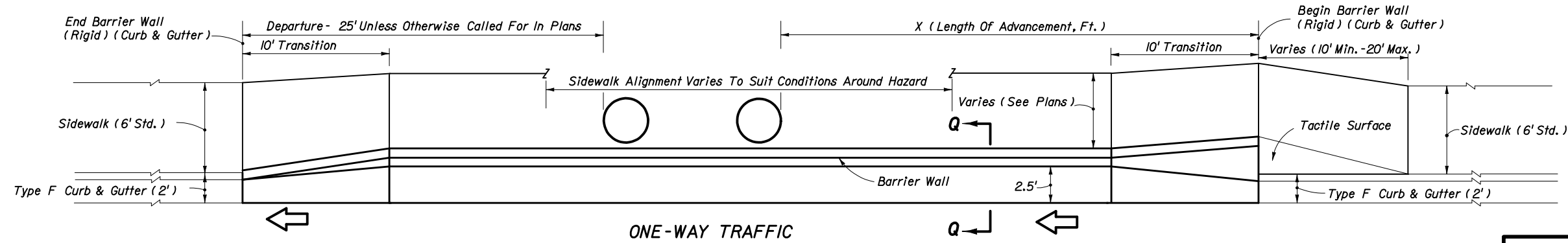


ONE-WAY TRAFFIC

**BRIDGE END HAZARD**



TWO-WAY TRAFFIC (UNDIVIDED)



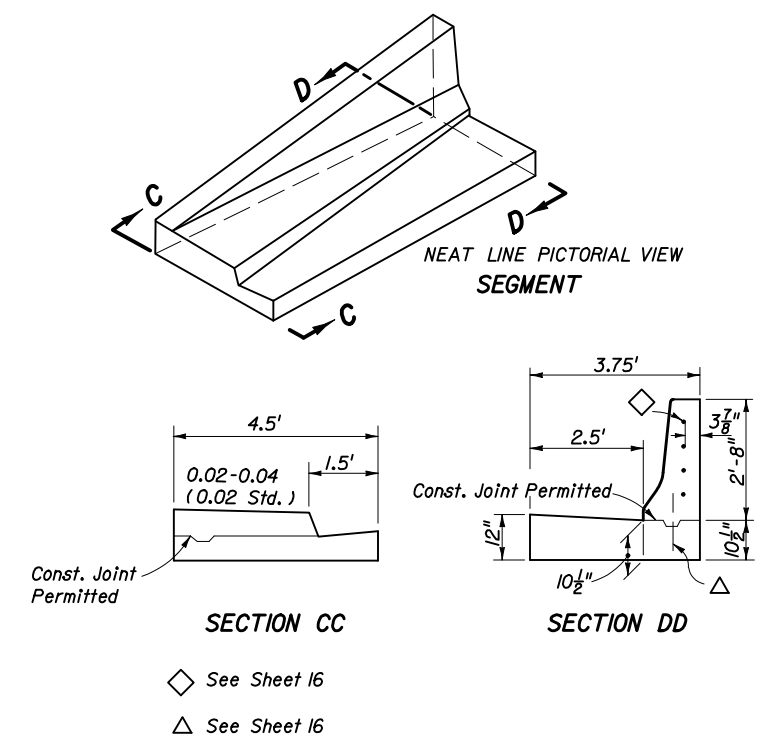
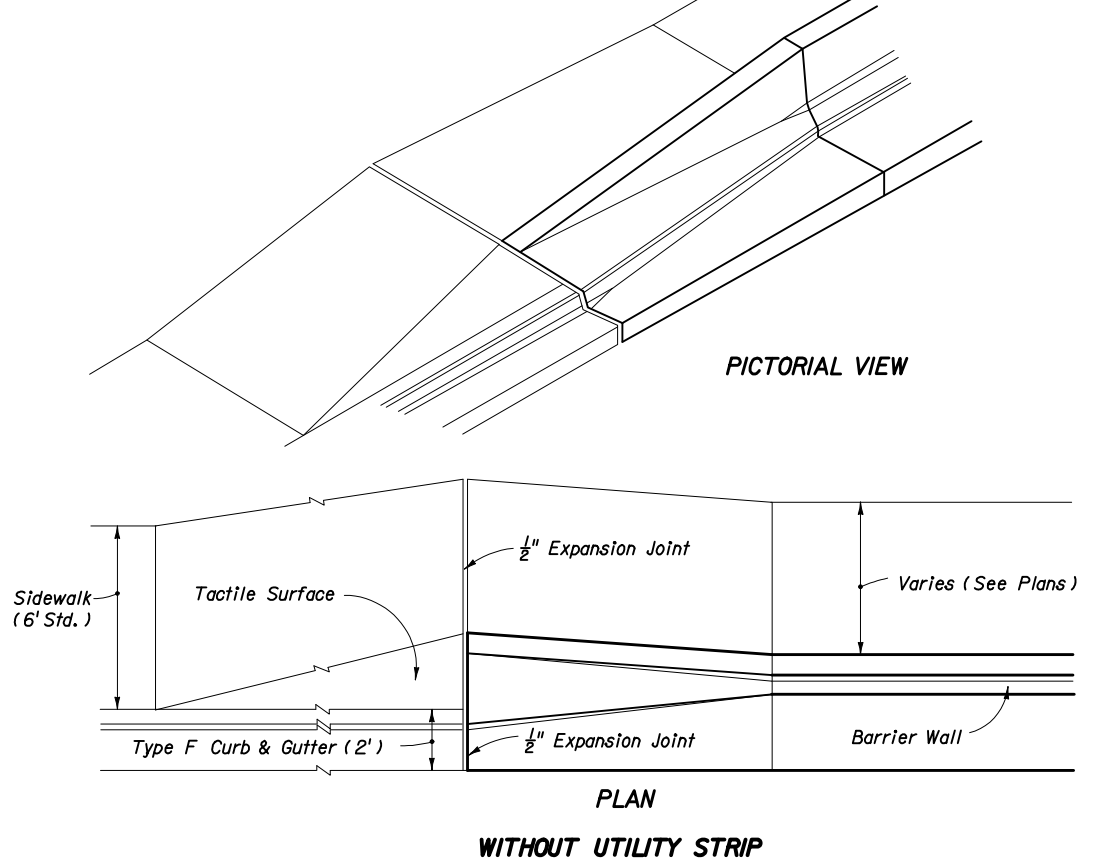
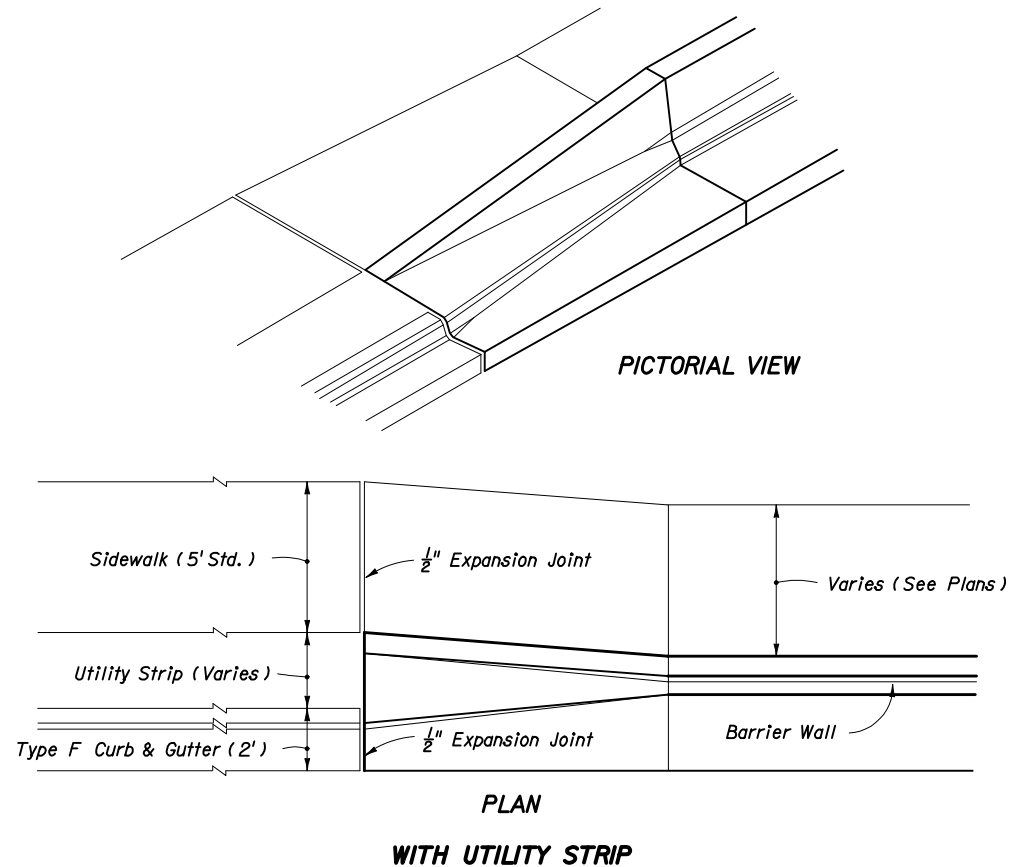
ONE-WAY TRAFFIC

**HAZARD 4' OR LESS FROM FACE OF CURB**

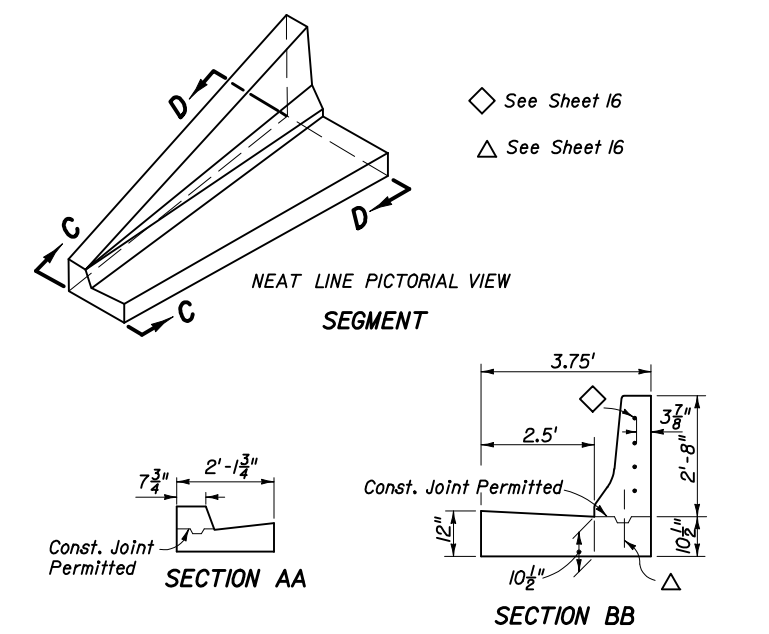
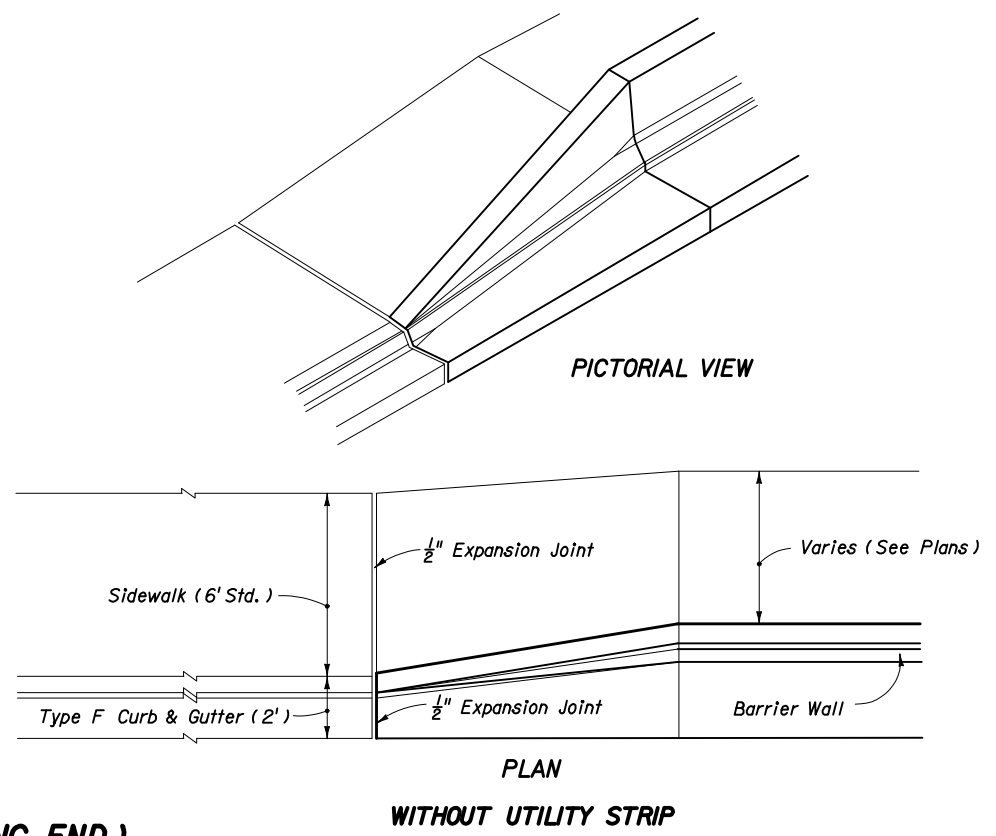
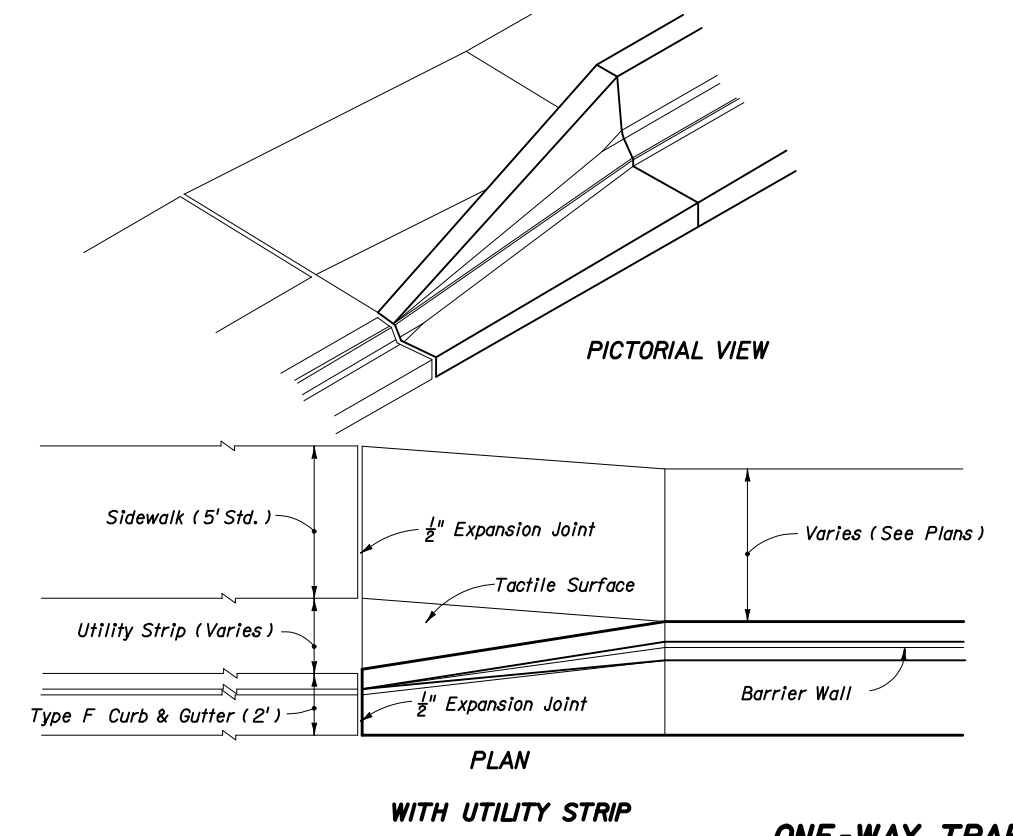
**NOTE:**  
 X = Length of advancement in feet for near and opposing approach lanes. See Sheet 17.  
 For locations with utility strips see Sheet 13.  
 For transition, sidewalk and sectional details see Sheet 15 & 16.  
 The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheet 19.

**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)  
 CURB AND GUTTER WITHOUT UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Names	Dates	Approved By		
Designed By		<i>Brian Blankenship</i> State Roadway Design Engineer		
Drawn By	HSD 10/85	Revision	Sheet No.	Index No.
Checked By	JBW/JVG 10/85	00	14 of 22	410



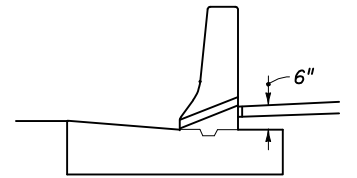
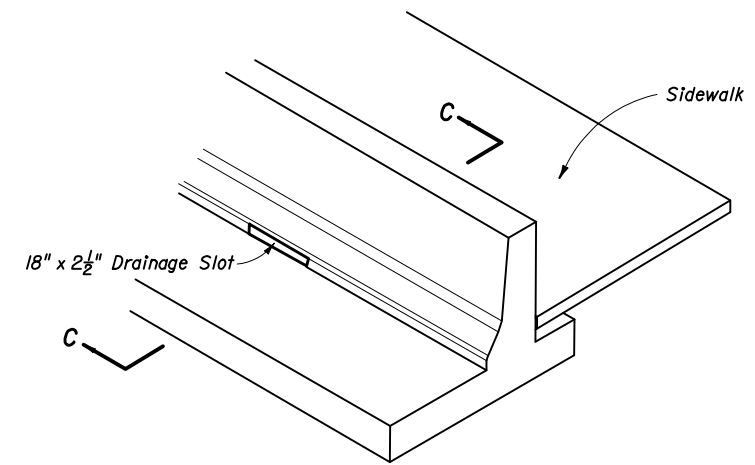
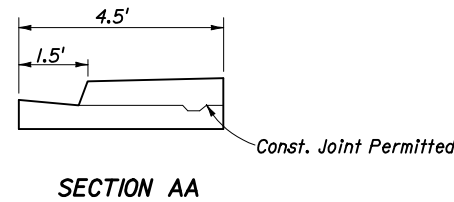
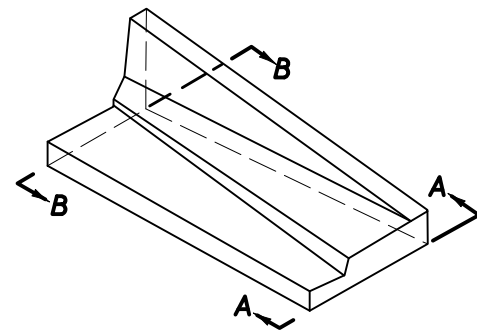
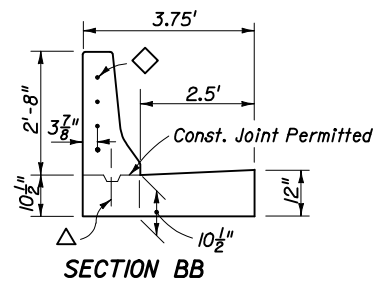
**TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)**



**ONE-WAY TRAFFIC (TRAILING END)**

**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITHOUT ADJACENT BICYCLE LANE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Names	Dates	Approved By		
Designed By		<i>Ben Blackwell</i> State Roadway Design Engineer		
Drawn By	HSD 10/85	Revision	Sheet No.	Index No.
Checked By	JBW/JVG 10/85	00	15 of 22	410



NEAT LINE PICTORIAL VIEW

SECTION CC

WITH OR WITHOUT UTILITY STRIP  
NEAT LINE PICTORIAL VIEW

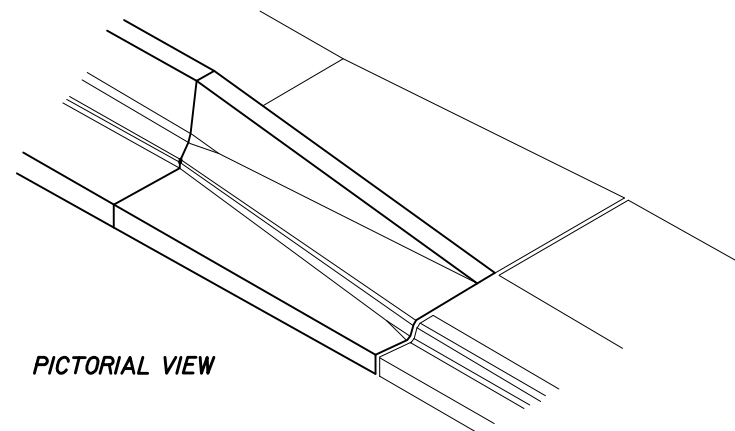
Note: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines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

**SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER)**

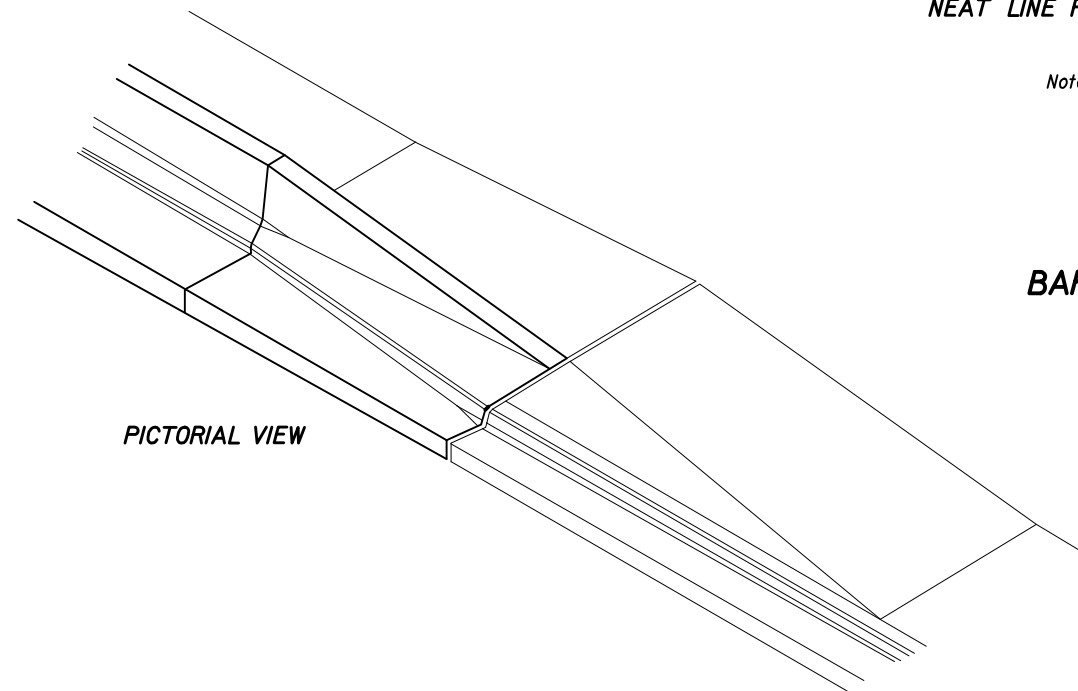
NOTE:

◇ Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner:  
Four 1 1/4" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #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. Type I asphalt-saturated roofing felt with the ends crimped.

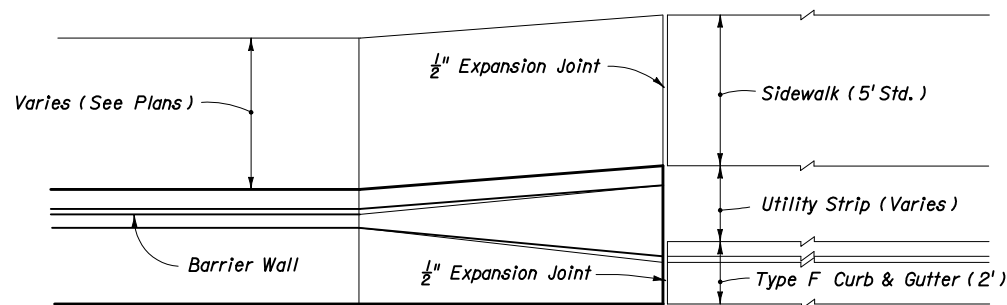
△ When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner:  
Five #5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



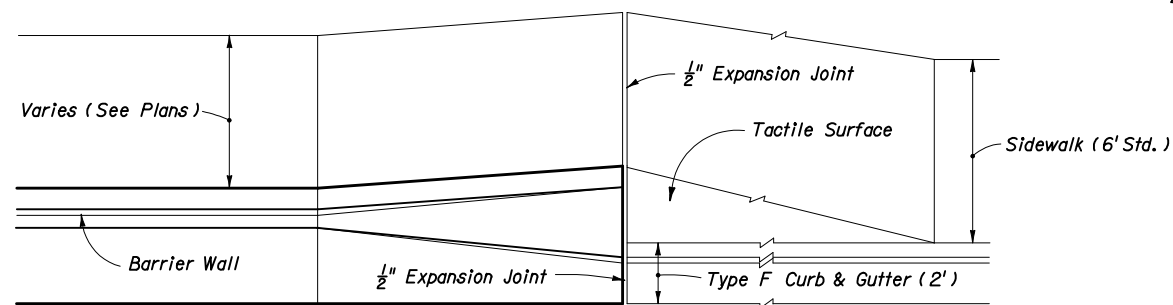
PICTORIAL VIEW



PICTORIAL VIEW



PLAN  
WITH UTILITY STRIP



PLAN  
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND  
ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

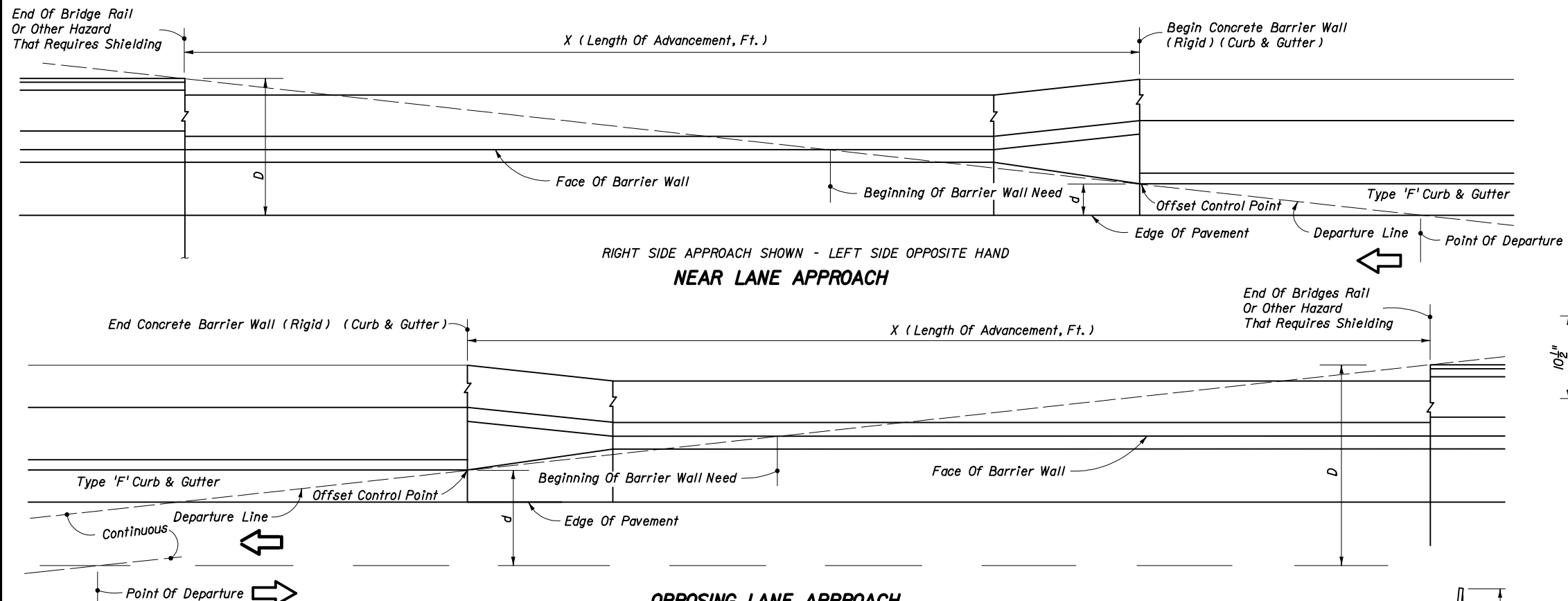
**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENT • WITHOUT ADJACENT BICYCLE LANE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER WALL**

Names	Dates	Approved By		
Designed By		<i>Ben Blankenship</i> State Roadway Design Engineer		
Drawn By	HSD 10/85			
Checked By	JBW/JVG 10/85	Revision	Sheet No.	Index No.
		00	16 of 22	410





**OPPOSING LANE APPROACH**  
WITH OR WITHOUT UTILITY STRIP - UTILITY STRIP SHOWN - SEE SHEET 13 & 14 FOR APPLICATIONS

Design Speed mph	Length Of Advancement, Ft. (X)
≤ 45	16 (D-d)

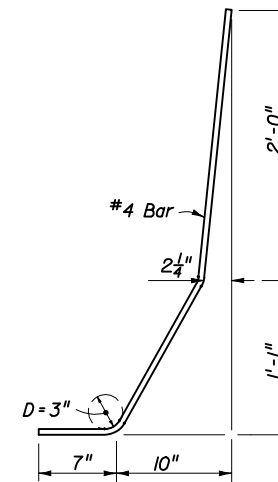
Note: The minimum length of advancement for both near and opposing lane approaches is 40'.

**Equation Variables:**

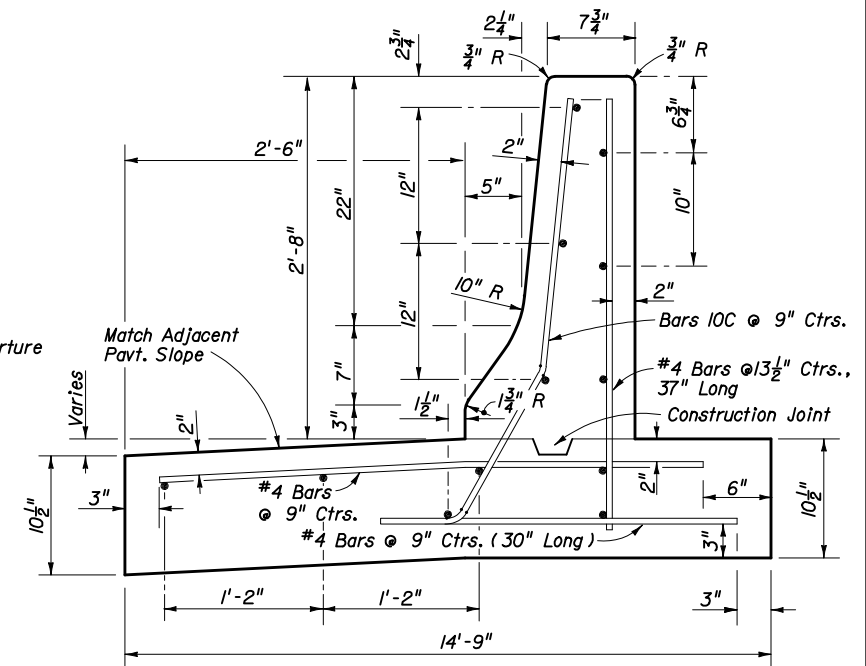
D = Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

d = Distance in feet from near edge of the near approach traffic lane to the face of curb (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

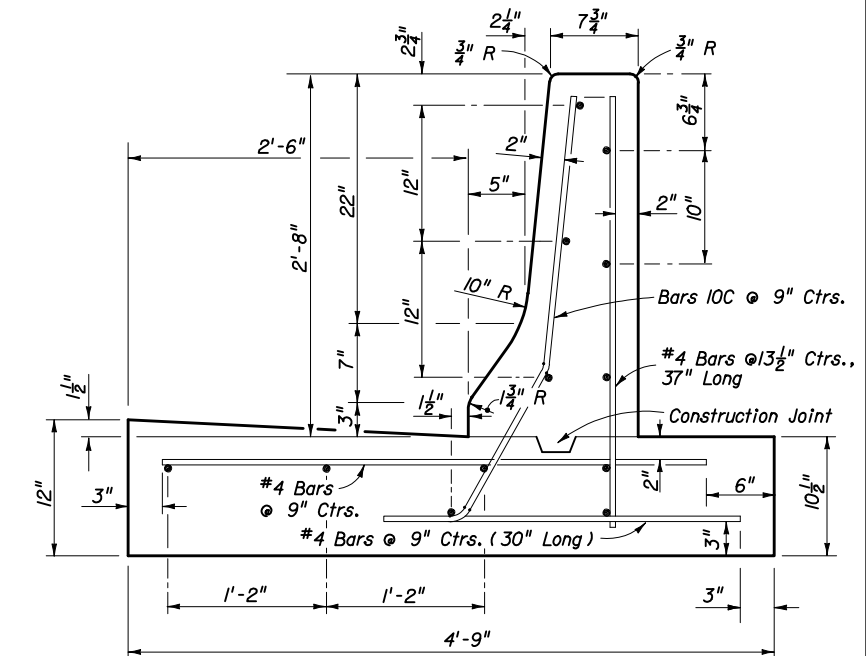
**LENGTH OF ADVANCEMENT**



**BAR 10C BENDING DIAGRAM**



**FOR HIGH SIDE**



**FOR LOW SIDE**

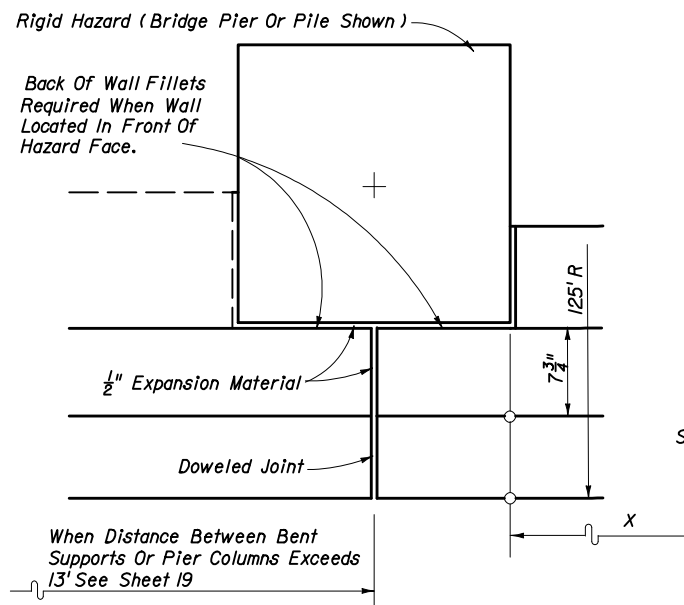
Note: All longitudinal reinforcement #4 bars. Minimum segment length for this wall is 40'. Shorter segments due to construction or expansion joint shall be dowled in the manner described for 'Transition Segments' on Sheet 16. Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'. For barrier wall inlet details see Index No. 219. Wall to be paid for under the contract unit Price for Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

Estimated Quantities Per Linear Foot Of Wall:  
Class II Concrete: 0.23 C.Y.  
Reinforcing Steel: 19.7 Lbs.

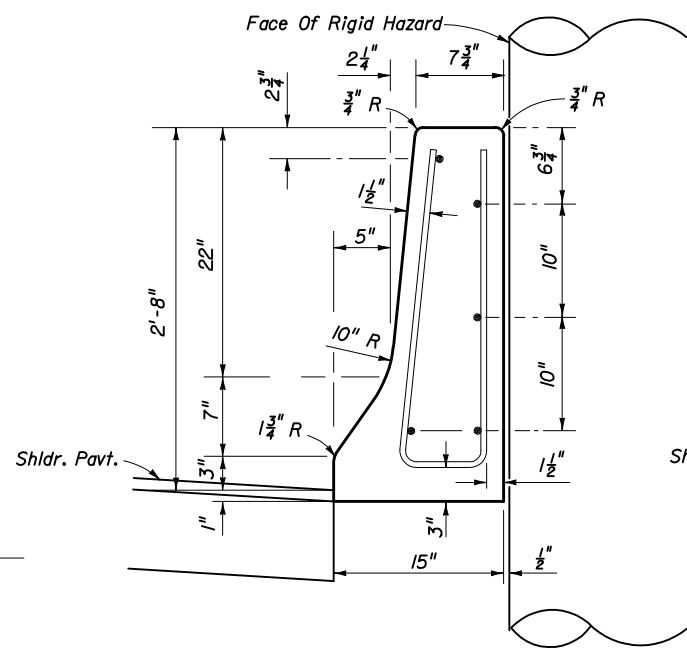
**SECTION QQ**

**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • WITHOUT ADJACENT BICYCLE LANE**

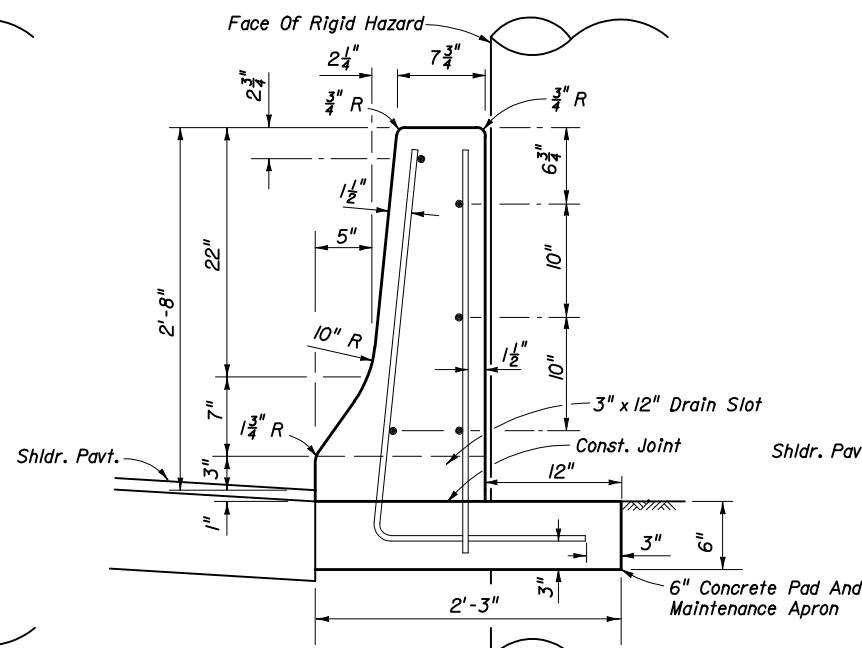
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Names	Dates	Approved By		
Designed By		<i>Blair Blackwell</i> State Roadway Design Engineer		
Drawn By	HSD 10/85	Revision	Sheet No.	Index No.
Checked By	JBW/JVG 10/85	00	17 of 22	410



BARRIER WALL AT SQUARE OR RECTANGULAR SHAPED HAZARD  
PARTIAL PLAN

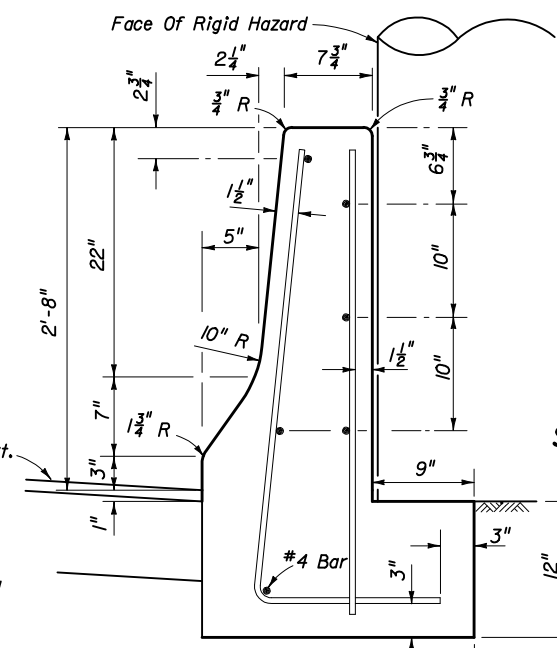


SECTION AA

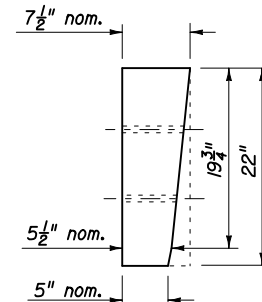


SECTION BB

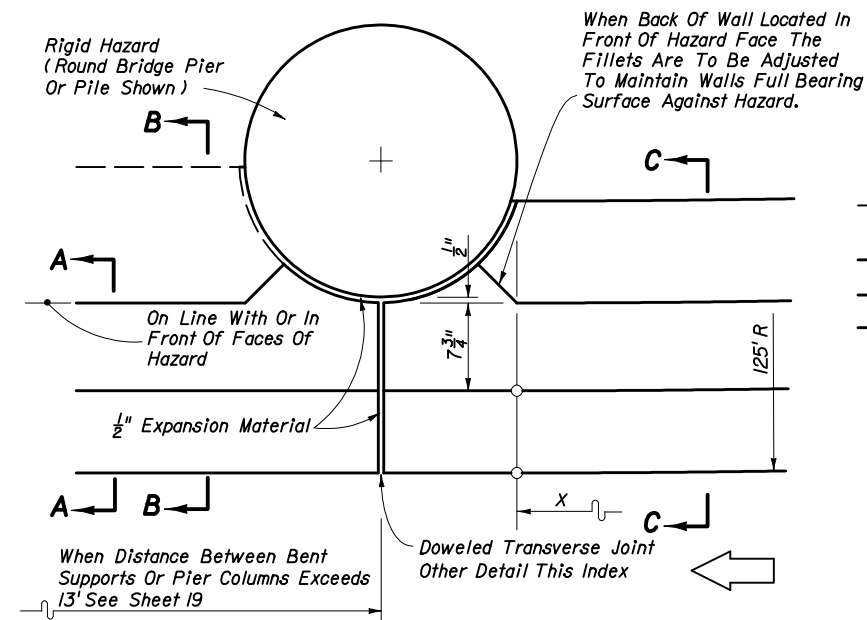
TO BE CONST. IN LIEU OF SECTION AA WHEN THRU DRAINAGE REQUIRED



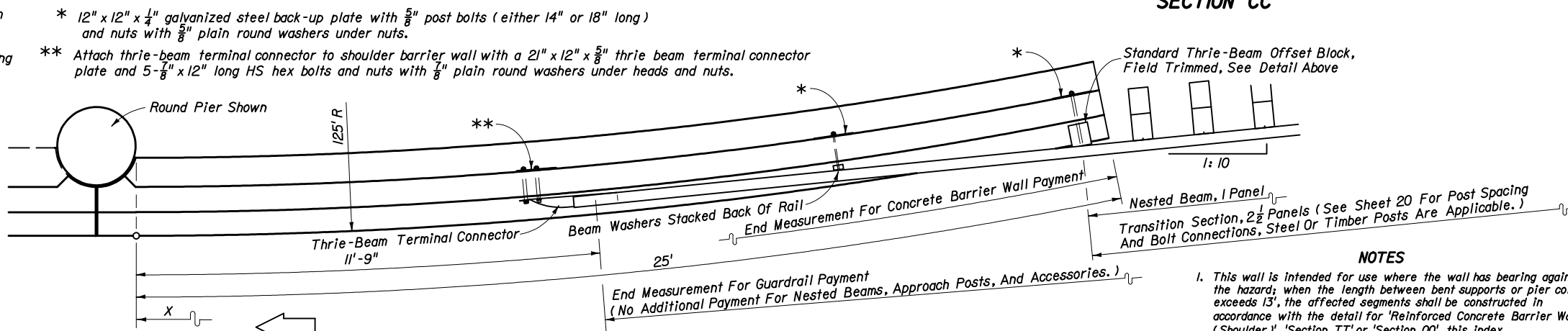
SECTION CC



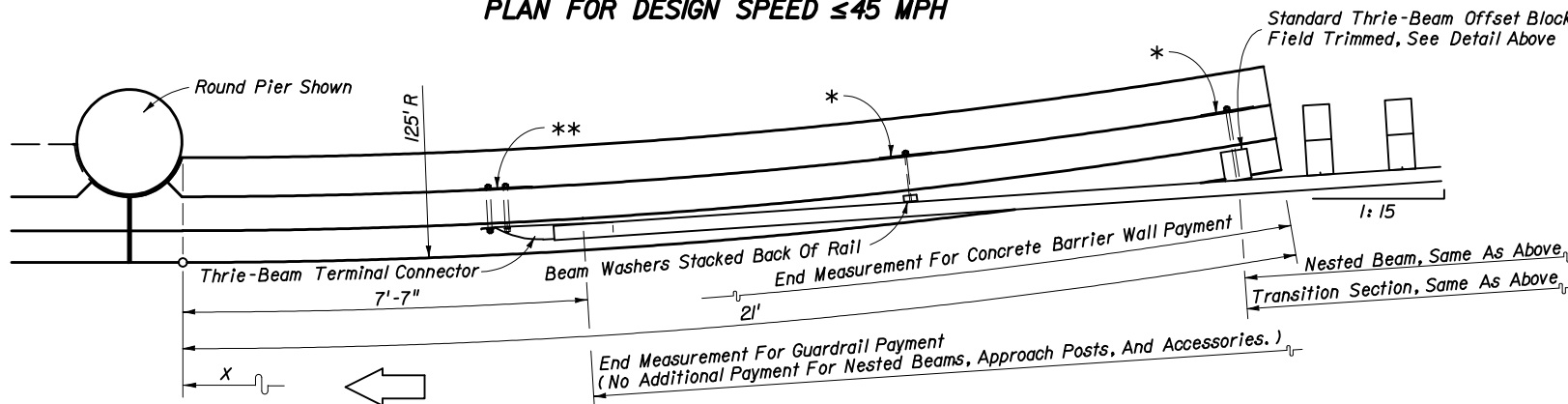
FOR USE WITH EITHER  
1:10 OR 1:15  
GUARDRAIL TRANSITIONS  
**STANDARD THRIE-BEAM  
OFFSET BLOCK  
(FIELD TRIMMED)**



BARRIER WALL AT ROUND HAZARD  
PARTIAL PLAN



PLAN FOR DESIGN SPEED ≤ 45 MPH



PLAN FOR DESIGN SPEED ≥ 50 MPH

Note: For continuous barrier between independent bents or single pier columns see Sheet 19.

**SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS  
WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 3'**

- NOTES**
- This wall is intended for use where the wall has bearing against the hazard; when the length between bent supports or pier columns exceeds 13', the affected segments shall be constructed in accordance with the detail for 'Reinforced Concrete Barrier Wall (Shoulder)', 'Section TT' or 'Section QQ', this index. In cases where the barrier wall and slope pavement or other structure would occupy the same location, the wall and structure are to be modified as detailed in the plans.
  - The barrier wall radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. On trailing ends of two-way multilane and one-way facilities the end connection on Sheet 2 may be used. For walls with normal offsets from hazards and their guardrail connections, see Sheet 20.
  - All vertical reinforcement #4 bars at 12" centers. All horizontal bars #5 bars.
  - Refer to Index No. 400 for additional guardrail information.
  - Wall to be paid for under the contract unit price for Barrier Wall Concrete (Rigid-Shoulder), LF.

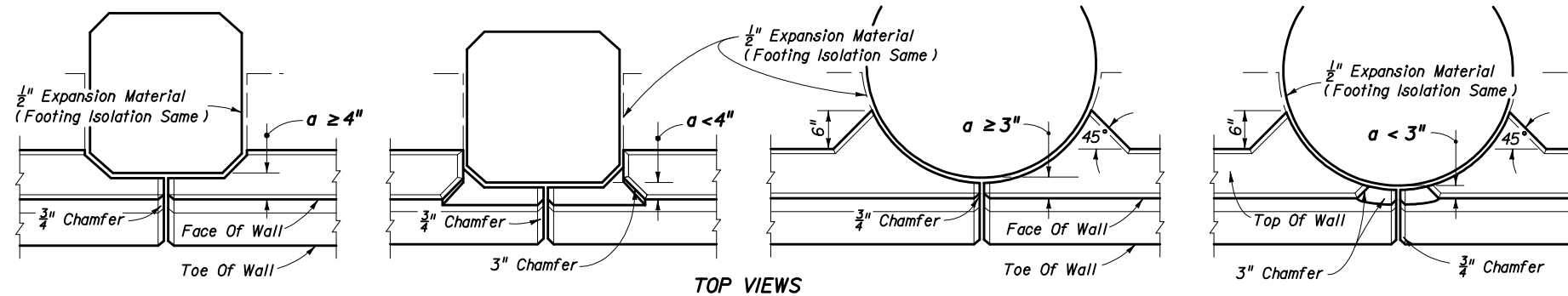
ARC LENGTH (FT)	DISTANCE "x" (FT)	OFFSETS "y" "y" (FT)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
24	23.85	2.30
25	24.83	2.49

Note: Wall may be constructed in chords having lengths ≤ 4 feet.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

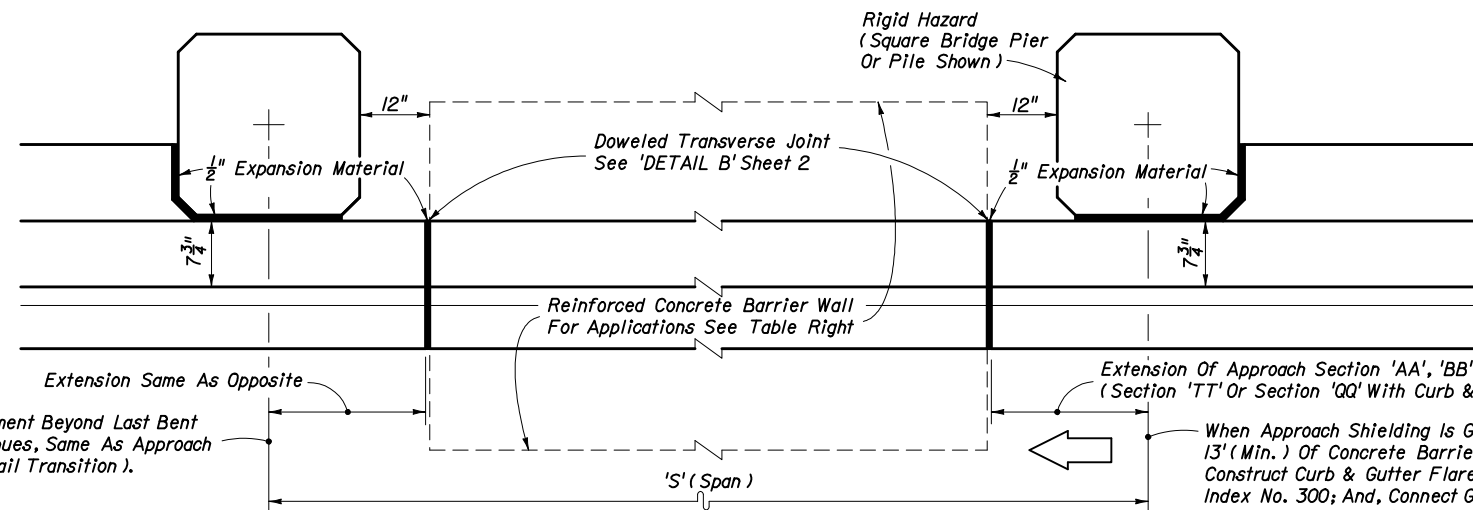
**CONCRETE BARRIER WALL**

Names	Dates	Approved By
Designed By		<i>Blair Blankenship</i> State Roadway Design Engineer
Drawn By	HSD 11/89	Revision
Checked By	JVG/KNM 11/89	Sheet No.
	00	18 of 22
		Index No.
		410



'a' Varies (Circular Or Octagonal Hazard Not More Than 2" In Front Of Face Of Wall).  
 Applicable To Sections 'AA' And 'BB' With Spans Of  $\leq 13'$ , And To Section 'CC', Sheet No. 18.  
 Applicable To Other Rigid Walls Of This Index For Spans  $> 13'$  Unless Otherwise Shown In The Plans.

### HAZARD PENETRATING STEM OF RIGID CONCRETE BARRIER WALLS

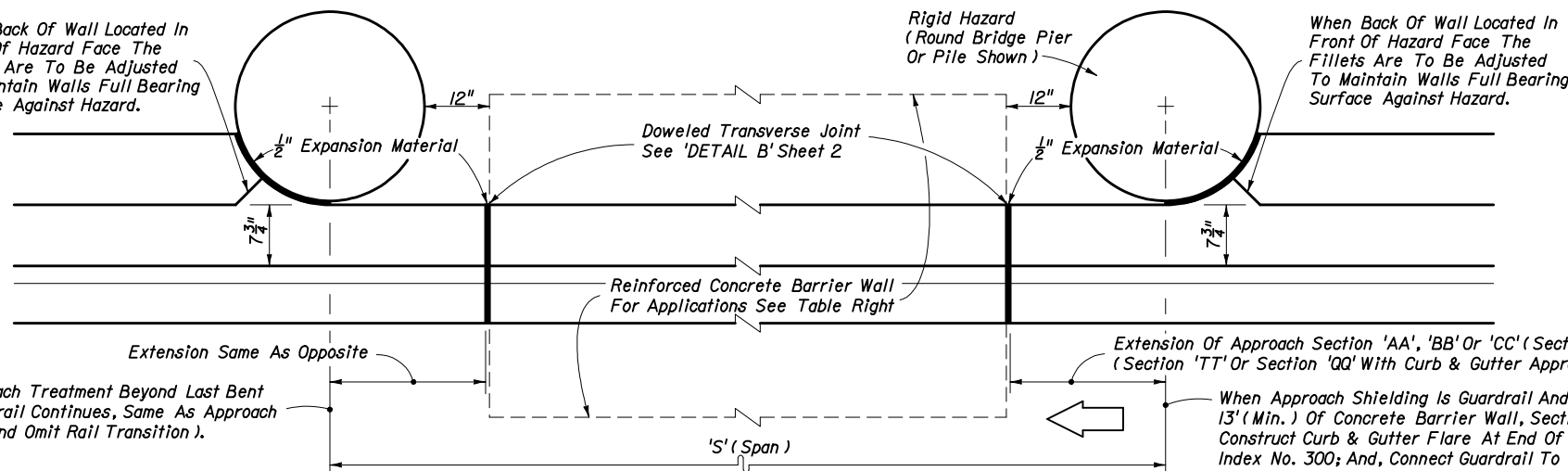


TOP VIEW  
 BARRIER WALL AT SQUARE PIER

Construct Wall Same As Approach Treatment Beyond Last Bent Support Or Pier (Where Guardrail Continues, Same As Approach Except On One Way Trailing End Omit Rail Transition).

When Approach Shielding Is Guardrail And Curb & Gutter, Construct 13' (Min.) Of Concrete Barrier Wall, Section 'TT' Or Section 'QQ'; Construct Curb & Gutter Flare At End Of Wall With Full Height Curb, Index No. 300; And, Connect Guardrail To Wall With Transition Rails In Accordance With Sheet No. 20.

'S' feet	REINFORCED CONCRETE BARRIER WALL APPLICATIONS
>13'	'Reinforced Concrete Barrier Wall (Shoulder)' With Flush Shoulders; Or, Section 'TT' Or Section 'QQ' With Curb & Gutter
Barrier wall footings that conflict with bent or pier foundations shall be modified as described in the plans.	



TOP VIEW  
 BARRIER WALL AT ROUND PIER

When Back Of Wall Located In Front Of Hazard Face The Fillets Are To Be Adjusted To Maintain Walls Full Bearing Surface Against Hazard.

When Back Of Wall Located In Front Of Hazard Face The Fillets Are To Be Adjusted To Maintain Walls Full Bearing Surface Against Hazard.

Construct Wall Same As Approach Treatment Beyond Last Bent Support Or Pier (Where Guardrail Continues, Same As Approach Except On One Way Trailing End Omit Rail Transition).

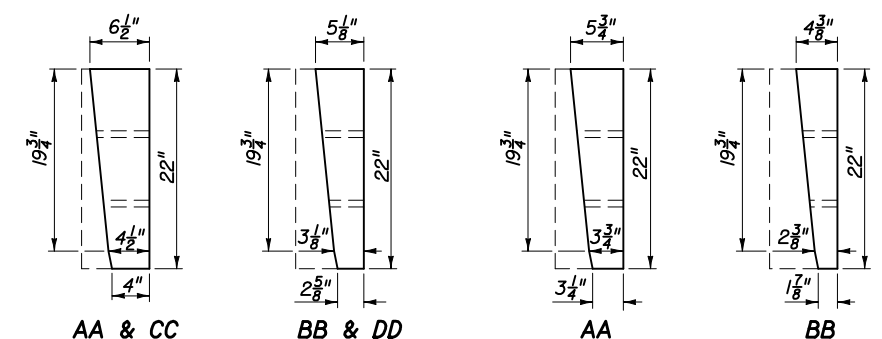
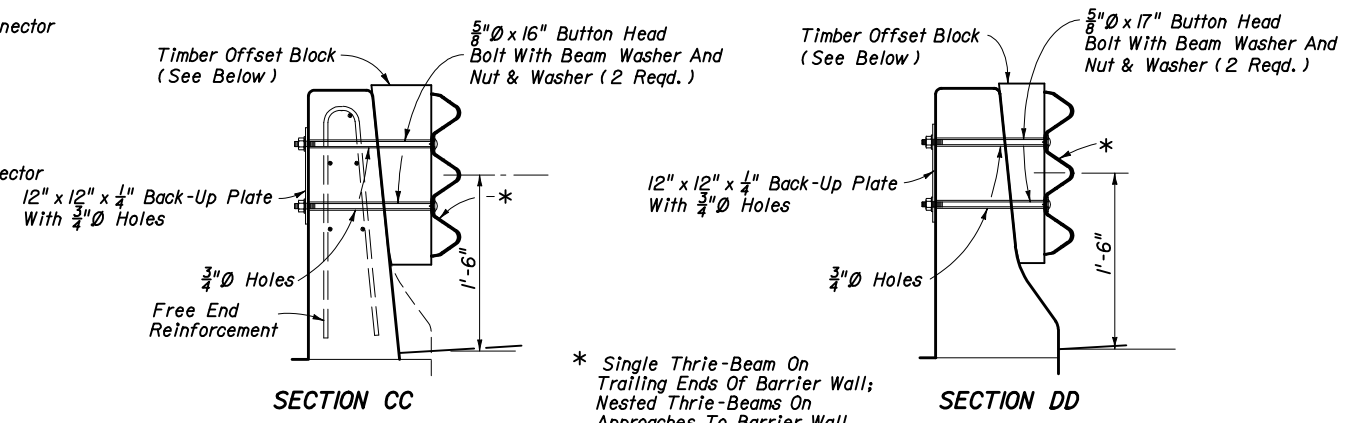
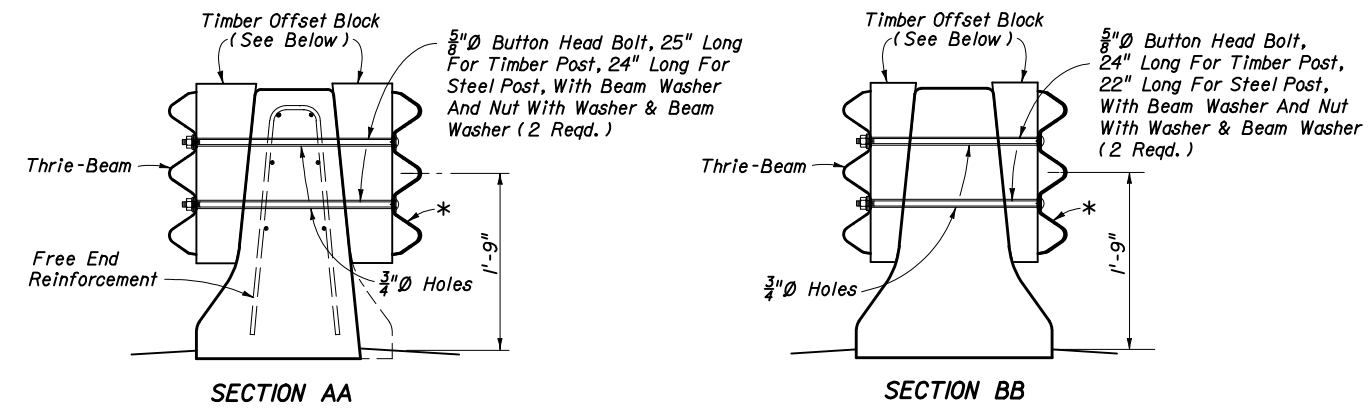
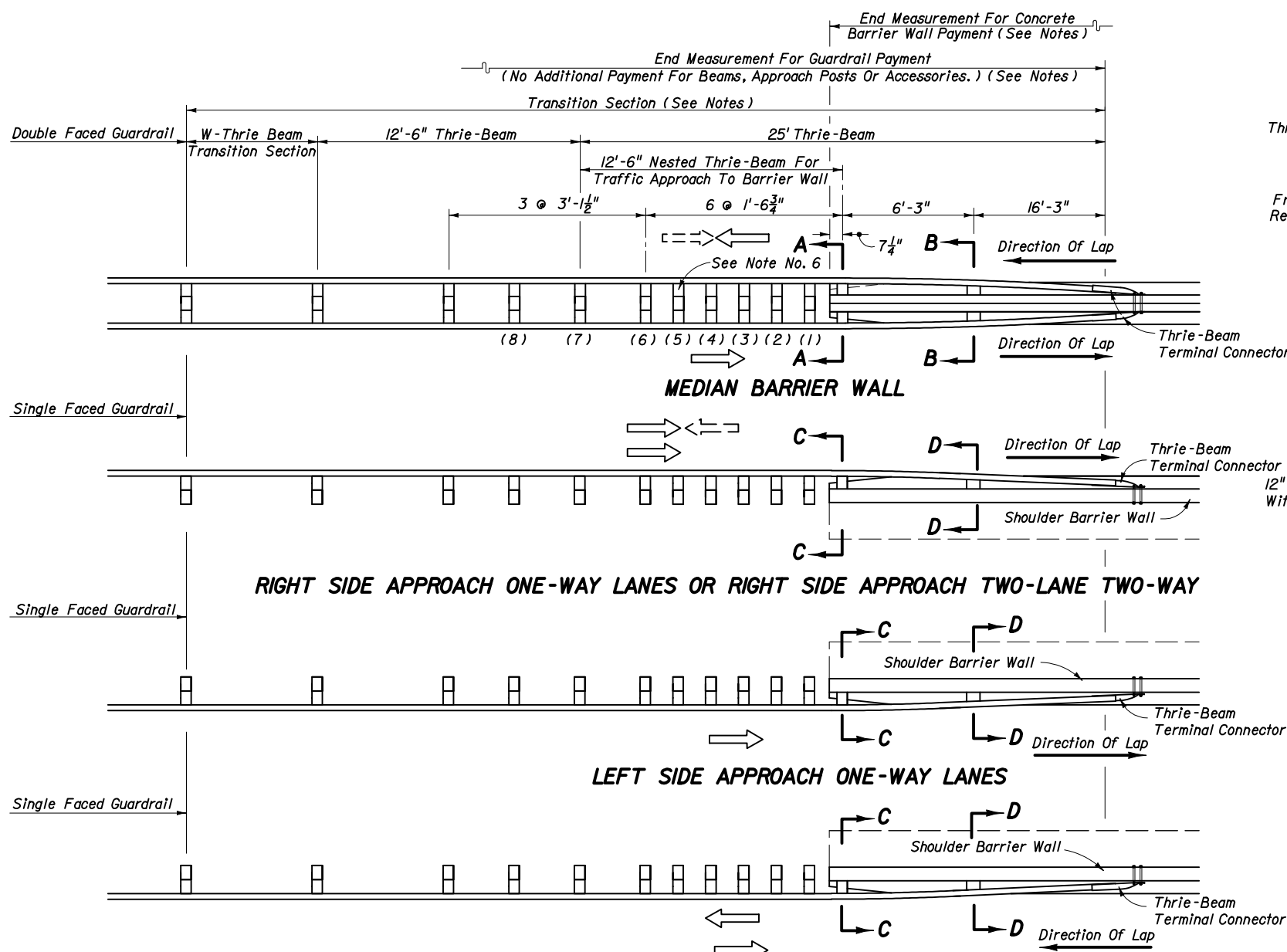
When Approach Shielding Is Guardrail And Curb & Gutter, Construct 13' (Min.) Of Concrete Barrier Wall, Section 'TT' Or Section 'QQ'; Construct Curb & Gutter Flare At End Of Wall With Full Height Curb, Index No. 300; And, Connect Guardrail To Wall With Transition Rails In Accordance With Sheet No. 20.

The details on this sheet are treatments to the F-shape concrete barrier walls depicted on Sheet Nos. 8 through 18, where site conditions impose reduced clearances between above ground hazards and the walls. Bridge bent supports and piers are shown. These treatments are not applicable to hazards that cannot provide lateral support for the walls. See the plans for limits of wall sections applied and other associated wall treatments.

### CONCRETE BARRIER WALL WHEN SPAN BETWEEN BENT SUPPORTS OR PIER COLUMNS EXCEEDS 13'

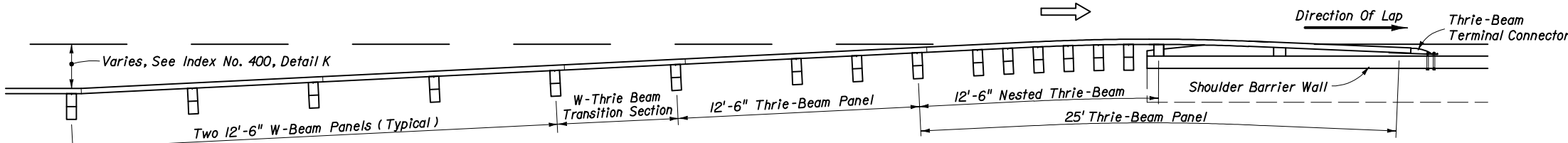
### CONCRETE BARRIER WALL WHEN GUARDRAIL OFFSET FROM BENT OR PIER LESS THAN 3 FEET OR WHERE WALL STEM ABUTTS SUPPORTS OR PIER COLUMN

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
CONCRETE BARRIER WALL				
Names	Dates	Approved By		
Designed By	STAFF	10/97	 State Roadway Design Engineer	
Drawn By	HKH	10/97		
Checked By	JVG	10/97	Revision	00
			Sheet No.	19 of 22
			Index No.	410



Attach thrie-beam terminal connector to median barrier wall with 5-7/8" x 15" long HS hex bolts and nuts with 7/8" plain round washers under heads and nuts. Attach to shoulder barrier wall with a 21" x 12" x 3/8" thrie-beam terminal connector plate and 5-7/8" x 12" long HS hex bolts and nuts with 7/8" plain round washers under heads and nuts.

FOR DOUBLE FACED GUARDRAIL USING TIMBER POSTS AND FOR SINGLE FACED GUARDRAIL USING EITHER TIMBER OR STEEL POSTS  
**STANDARD TIMBER OR PLASTIC OFFSET BLOCKS • FIELD TRIMMED**  
**FOR USE AT SECTIONS AA, BB, CC & DD**



**STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER**

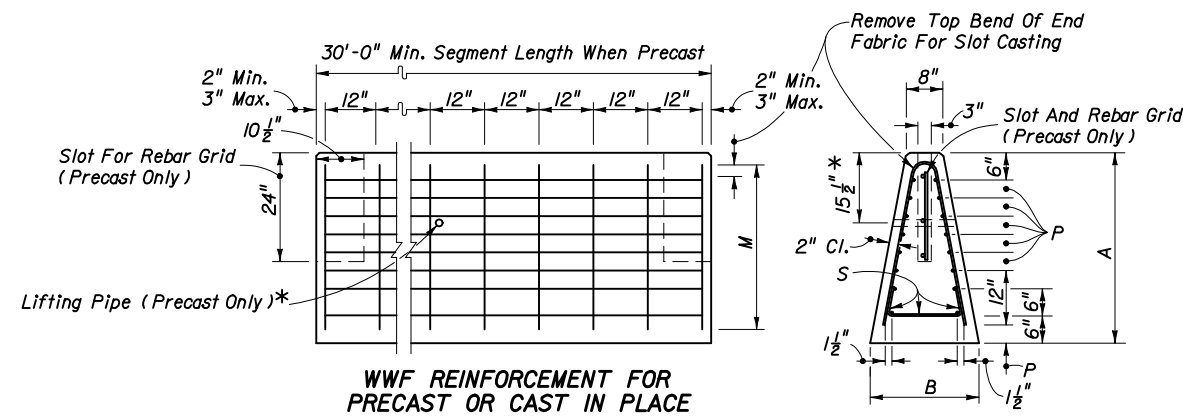
- NOTES**
1. The longitudinal dimensions and payment limits shown for median concrete barrier wall also apply to shoulder concrete barrier walls.
  2. W-beam elements do not apply to these transition schemes. For barrier wall trailing end guardrail connections for one-way lanes, see Sheet 2.
  3. Where reaming is necessary to fit nested beams the reamed surfaces shall be metalized in accordance with Index No. 400.
  4. Either steel or timber guardrail post may be used, timber posts shown.
  5. The nested beams shall not be bolted to blocks and posts at posts numbers (1), (3) and (5).
  6. On the trailing side of MEDIAN BARRIER WALL, offset blocks may be omitted at posts numbers 1, 2, 3, 5, 6 and 8.
  7. For additional guardrail information refer to Index No. 400.

**GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	JVG	05/91	Approved By <i>Ben Blankenship</i> State Roadway Design Engineer	
Drawn By	HSD	05/91	Revision	Sheet No.
Checked By	JVG	05/91	00	20 of 22
				Index No. 410

**GENERAL NOTES FOR TRAPEZOIDAL BARRIER WALL**

- Concrete trapezoidal barrier wall can be either precast or cast in place. The wall is designed for zero deflection and shall have a minimum system length of 120'.
- Where concrete trapezoidal barrier wall height changes from 42" to 48" or from 48" to 54", height change will be uniform for each 6" of height change per 90' of wall. Steel placement shall meet the dimensional positioning requirements of 42", 48" and 54" high barriers at the respective points along the vertical transition, with the vertical steel uniformly lengthened and the horizontal steel uniformly splayed throughout.
- Welded wire fabric (WWF) made in accordance with ASTM A497 may be used as an option to the conventional reinforcement for precast or cast in place barrier wall, with the exception that only conventional reinforcement shall be used for horizontal transition and half wall sections. These sections shall be cast in place with length, shape and reinforcement as shown in this Index.
- To attain system length, precast segments shall be interconnected with rebar grids placed in the preformed slots and grouted into place. Segment length shall be not less than 30' unless otherwise specified in the plans.
- The centerline axis of the barrier shall be vertical except where the roadway is superelevated in which case it shall be normal to the cross slope unless otherwise shown in the plans or directed by the Engineer.
- For reflective barrier marker requirements see 'STANDARD BARRIER WALL SECTIONS' and the GENERAL NOTES, Sheet I.
- The concrete trapezoidal barrier wall is considered by the Federal Highway Administration to be innovative and may be used as such on Federal Aid projects.
- The concrete trapezoidal barrier wall is to be paid for under the contract unit price for Barrier Wall Concrete (Trapezoidal), LF. This price will include full payment for transitions, half walls, fill and concrete caps.

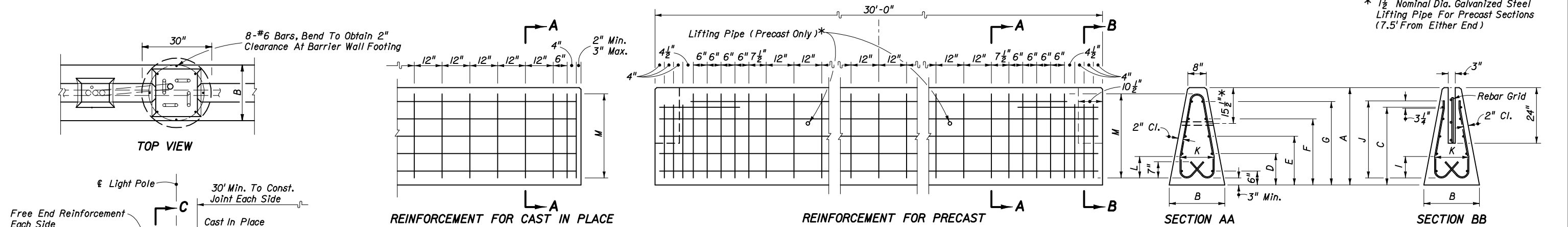


**WWF REINFORCEMENT FOR PRECAST OR CAST IN PLACE**

**REBAR GRID FOR PRECAST INSTALLATION**

All Transverse Reinforcing Wire Size D14  
All Longitudinal Reinforcing Wire Size D20  
**WELDED WIRE FABRIC REINFORCING**

\* 1/2" Nominal Dia. Galvanized Steel Lifting Pipe For Precast Sections (7.5' From Either End)



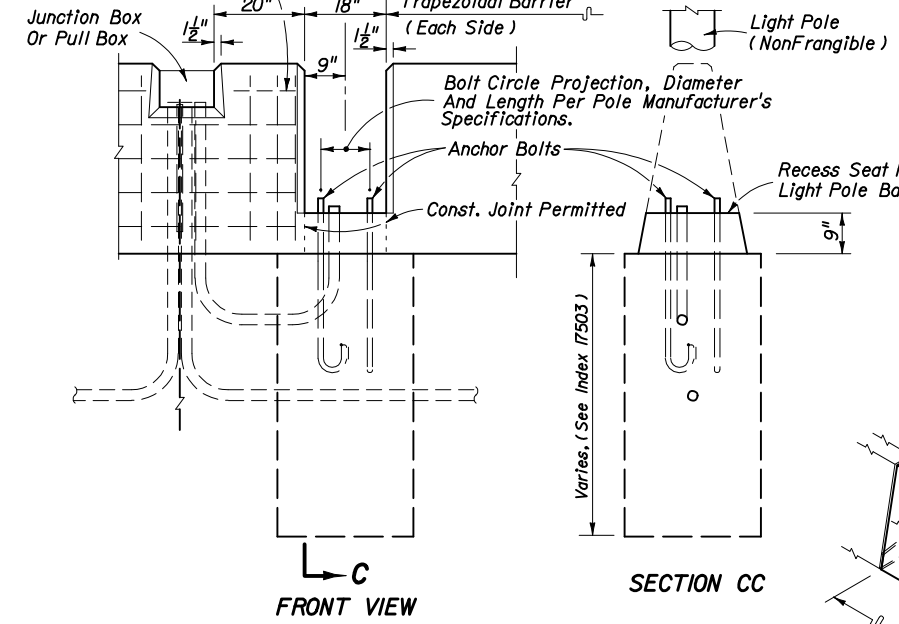
**REINFORCEMENT FOR CAST IN PLACE**

**REINFORCEMENT FOR PRECAST**

**SECTION AA**

**SECTION BB**

All Vertical Reinforcing #4 Bars  
All Horizontal Reinforcing #5 Bars  
**CONVENTIONAL REINFORCING**

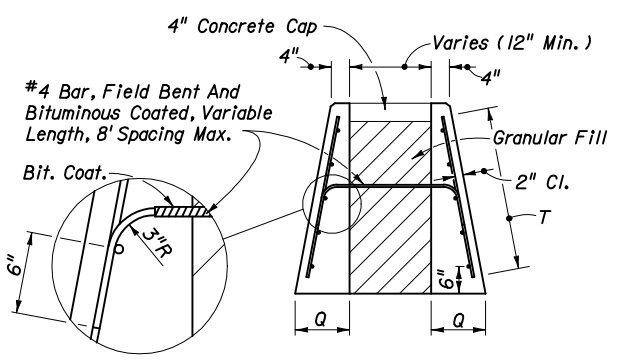


**FRONT VIEW**

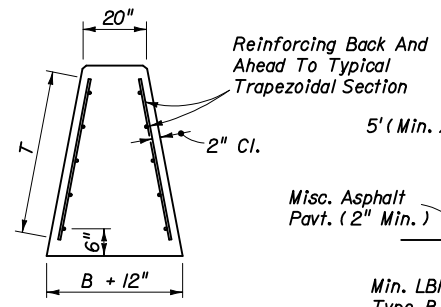
**SECTION CC**

Note: For Additional Details See Sheet 4

**LIGHT POLE MOUNTING IN TRAPEZOIDAL SECTIONS**

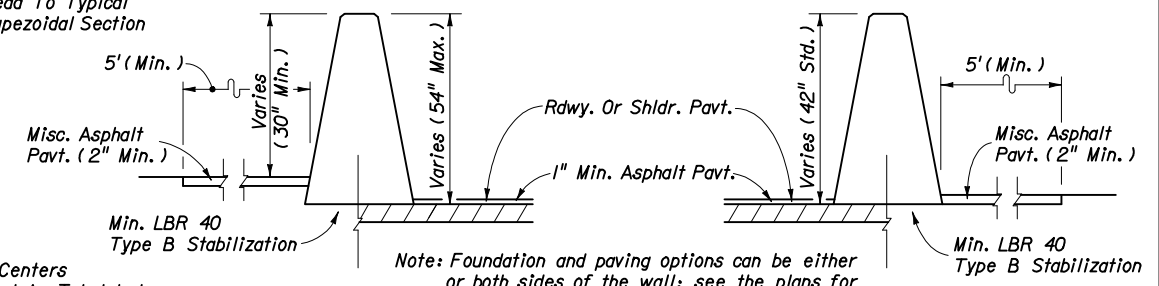


All Vertical Reinforcing #4 Bars On 12" Centers  
All Horizontal Reinforcing #5 Bars Spaced As Tabulated  
**TYPICAL HALF WALLS AROUND OBSTRUCTION**



All Vertical Reinforcing #4 Bars On 12" Centers  
All Horizontal Reinforcing #5 Bars Spaced As Tabulated  
**SECTION AT BEGIN AND END OF HALF WALLS**

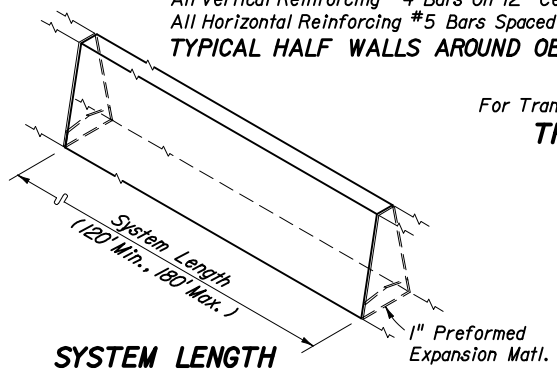
For Transition Wall Plan See DETAIL I 'PLAN'  
**TRANSITION SECTIONS**



**INDEPENDENT ROADWAY PROFILES**

**MATCHING ROADWAY PROFILES**

Note: Foundation and paving options can be either or both sides of the wall; see the plans for the options applied.



**SYSTEM LENGTH**

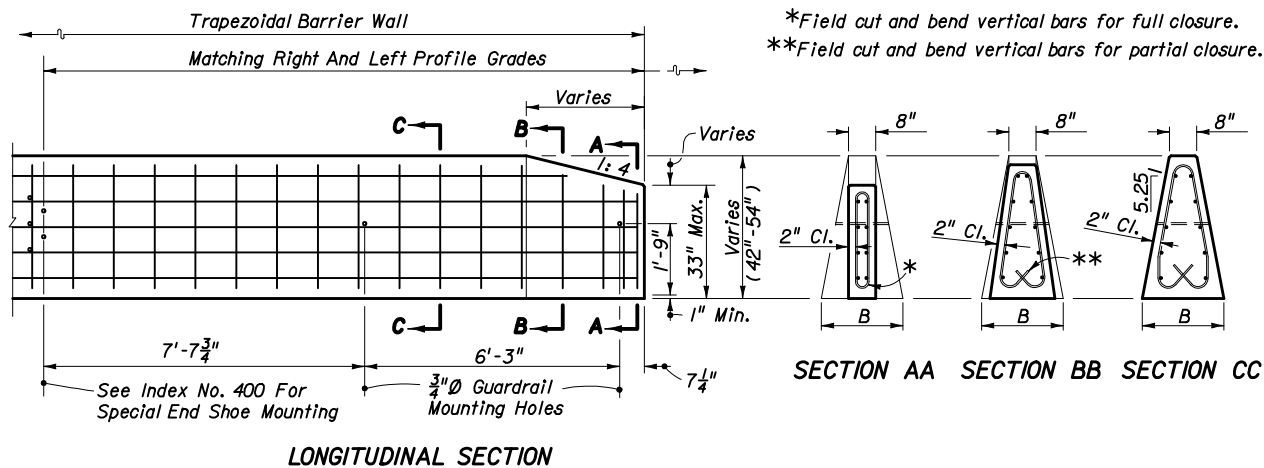
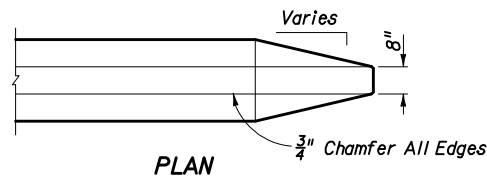
Barrier Height (in.)	DIMENSIONS (Inches)																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	S	T
42	42	24	33 1/2	13 1/2	21	28 1/2	36	15	9 1/4	33 1/4	15	9 1/4	36	72	4	12	28	36
48	48	26 3/8	39 1/2	15	24	33	42	17 1/4	10 3/4	39 1/4	17 1/4	10 3/4	42	84	5	13 3/8	31 1/2	42
54	54	28 3/16	45 1/2	16 1/2	27	37 1/2	48	19 1/2	12 1/4	45 1/4	19 1/2	12 1/4	48	96	6	14 3/8	34 3/4	48

**TRAPEZOIDAL BARRIER WALL**

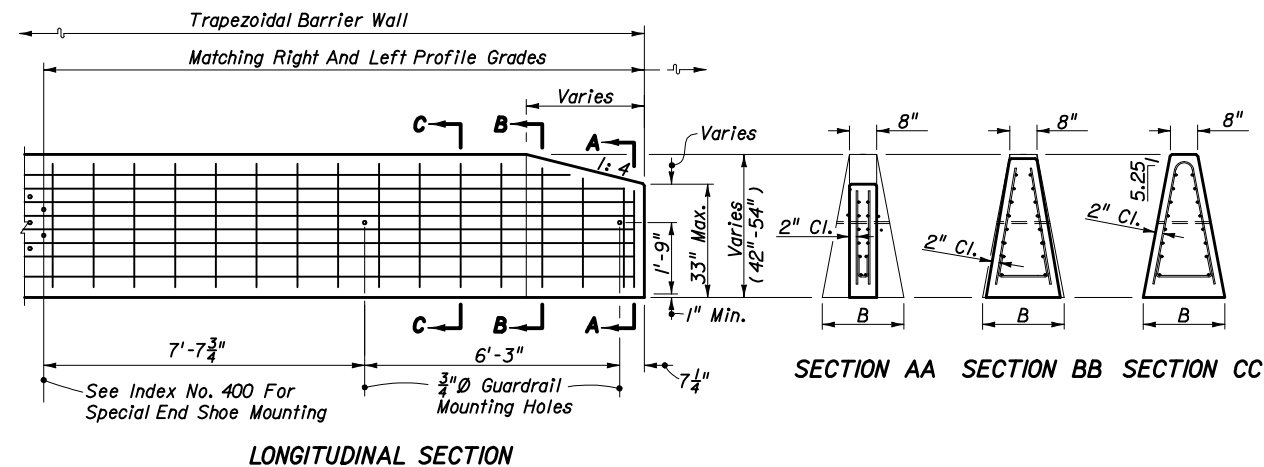
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE BARRIER WALL**

Designed By	FHWA	11/93	Names	Dates	Approved By
Drawn By	HKH	11/93			<i>Blair Blankenship</i> State Roadway Design Engineer
Checked By	JVG	11/93	Revision	00	Sheet No. 21 of 22
					Index No. 410



CONVENTIONAL REINFORCEMENT



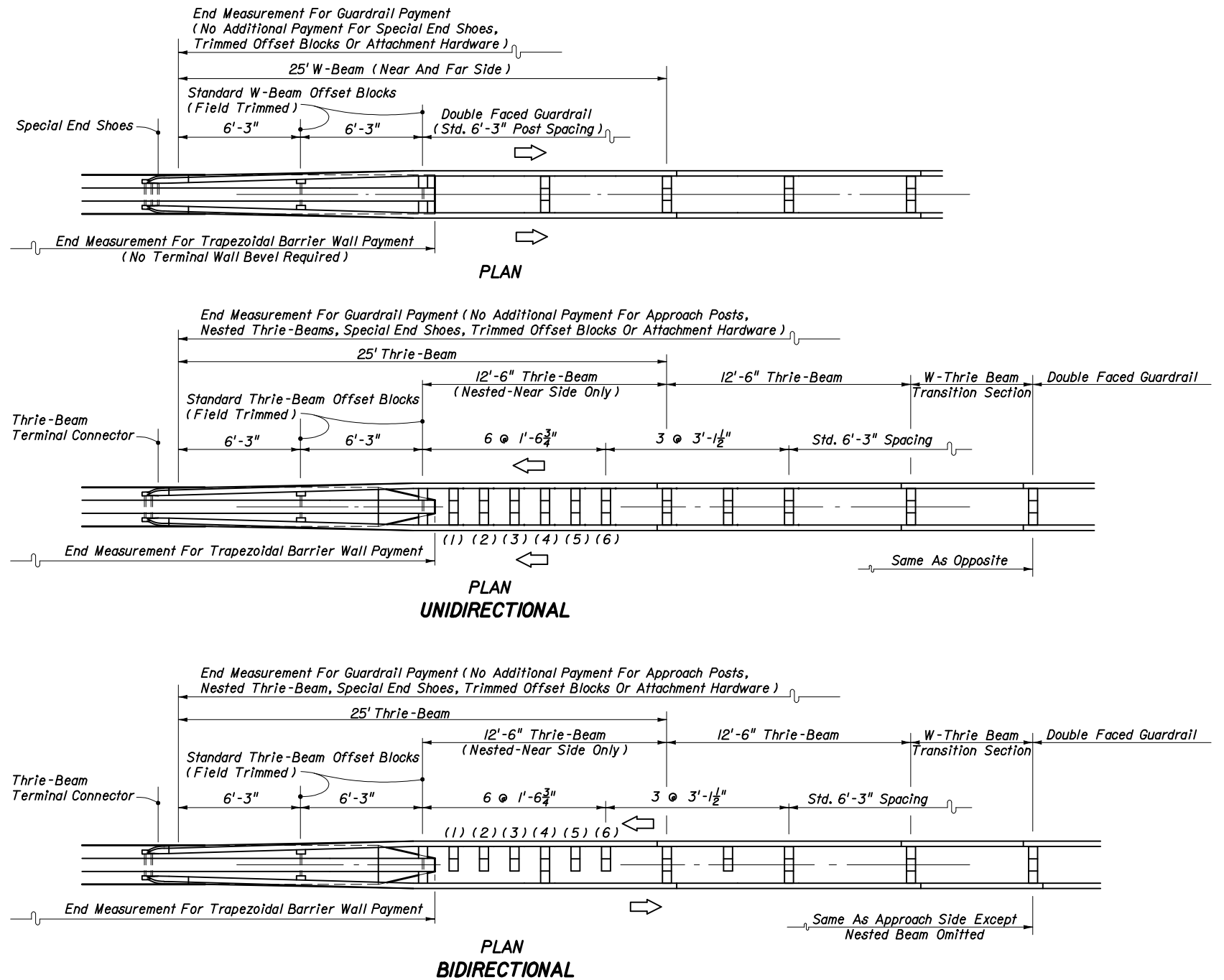
WELDED WIRE FABRIC REINFORCEMENT

END TREATMENT FOR PRECAST OR CAST-IN-PLACE WALLS

NOTES

1. Where reaming is necessary to fit nested beams the reamed surface shall be metalized in accordance with Index No. 400.
2. The nested beams shall not be bolted to the posts and blocks at post numbers (1), (3) and (5).
3. For additional wall details, see Sheet 21.
4. For additional guardrail information refer to Index No. 400.

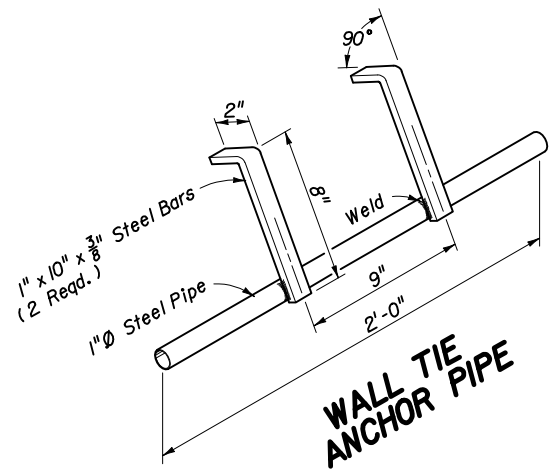
GUARDRAIL CONNECTION TO TRAPEZOIDAL BARRIER WALL



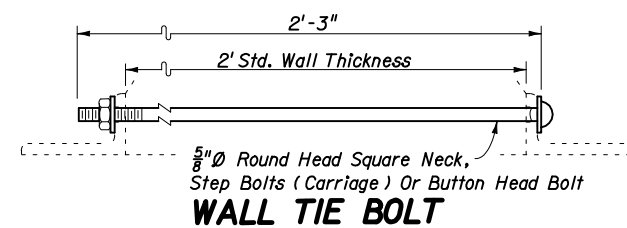
Note: Timber or steel posts may be used, timber posts shown.

GUARDRAIL TRANSITIONS AND CONNECTIONS

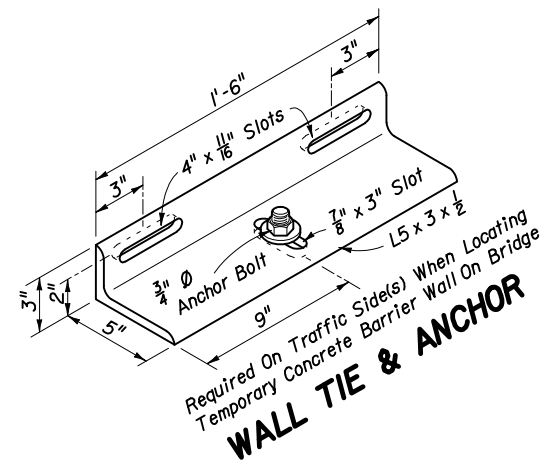
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONCRETE BARRIER WALL</b>				
Designed By	JVG/HKH	7/96	Approved By <i>Ben Blankenship</i> State Roadway Design Engineer	
Drawn By	HKH	7/96	Revision	Sheet No.
Checked By	JVG	7/96	00	22 of 22
				Index No. 410



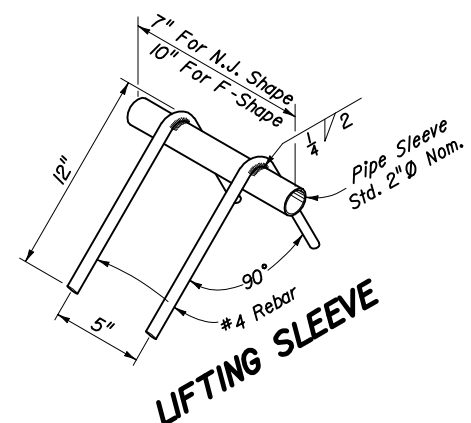
**WALL TIE ANCHOR PIPE**



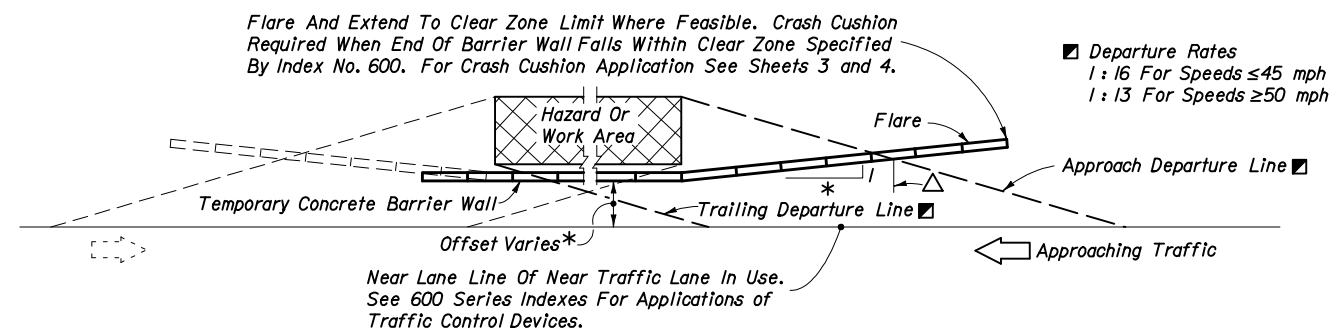
**WALL TIE BOLT**



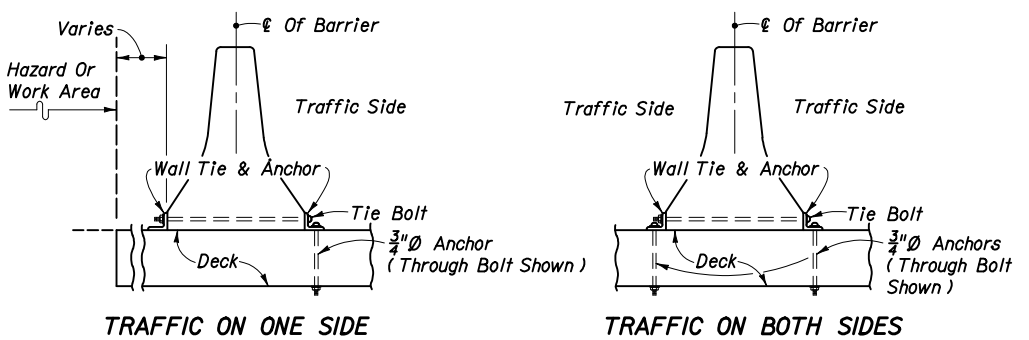
**WALL TIE & ANCHOR**



**LIFTING SLEEVE**

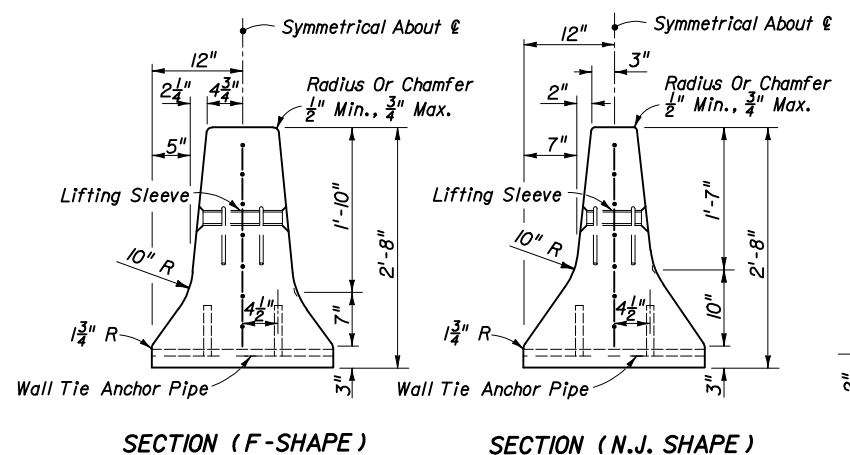


**PLAN  
TEMPORARY CONCRETE BARRIER WALL ALIGNMENT**

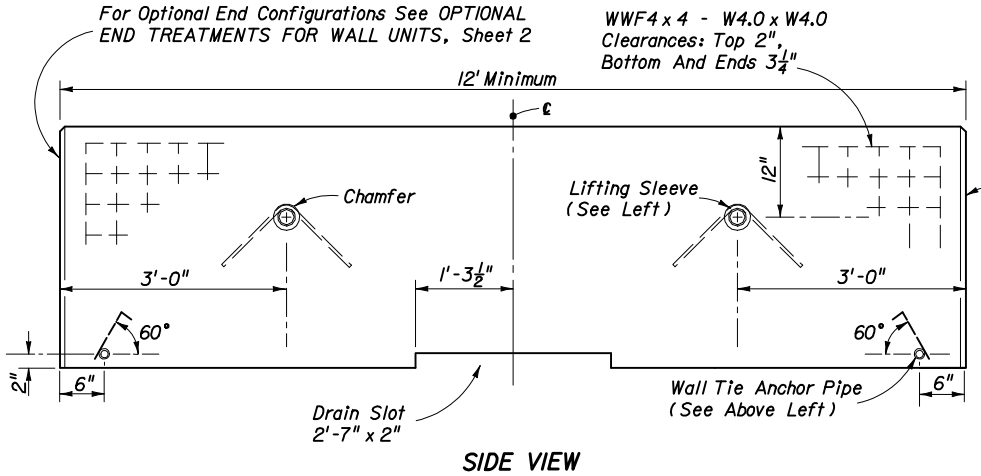


Anchor bolts shall have a pullout and shear capacity of 14,000 lbs. Expansion or chemical anchor bolts will be used to secure walls to approach slabs. Expansion or chemical anchor bolts or through bolts with washers and nuts will be used to secure walls to bridge decks. Core drills shall be used to construct through bolt holes, and, drills specified by the manufacturer shall be used to construct expansion and chemical anchor bolt holes. Chemical anchorage shall be an Adhesive Material System in accordance with Specification Sections 416 and 937. After removal of walls, anchors shall be removed to 1" min. below deck surface and holes filled with epoxy grout.

**BRIDGE DECK AND APPROACH SLAB INSTALLATIONS**

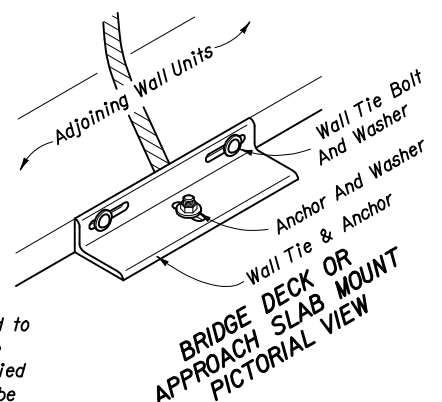


**SECTION (F-SHAPE) SECTION (N.J. SHAPE)**



**SIDE VIEW**

**WALL UNIT**



**BRIDGE DECK OR APPROACH SLAB MOUNT PICTORIAL VIEW**

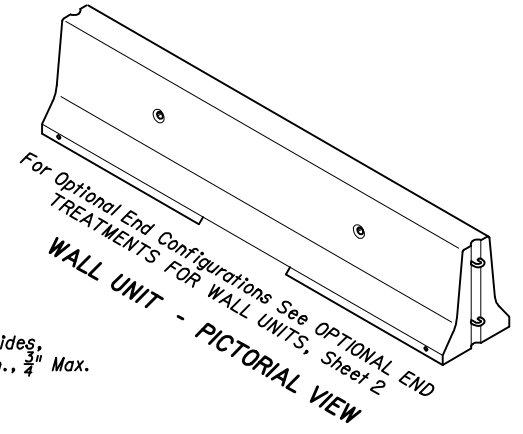
**GENERAL NOTES**

1. Temporary concrete barrier wall units may be either the New Jersey shape or the F-Shape configuration, unless the plans specify other types of temporary concrete barrier wall; however, intermixing of units with different shapes in a continuous run of barrier will not be permitted.
2. 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.
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 in transitions, 100' centers on curves and 200' centers on tangent roadways. 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. The temporary concrete barrier wall units with the optional end connections shown on this index are the standard optional units for Florida Department Of Transportation projects. Standard optional end units can be intermixed in a run of wall, and interconnected with other barrier systems as specified on other standard drawings or with appropriate transitions as detailed in the plans.

Temporary concrete barrier wall units with end configurations that are on the 'Qualified Products' listing may be substituted for the standard optional end units when approved by the Engineer; however, substitution units cannot be intermixed with dissimilar units in a run of wall. Substitution units shall have positive interconnections between each adjoining unit; wall units with plain ends will not be permitted regardless of ties or anchorages.

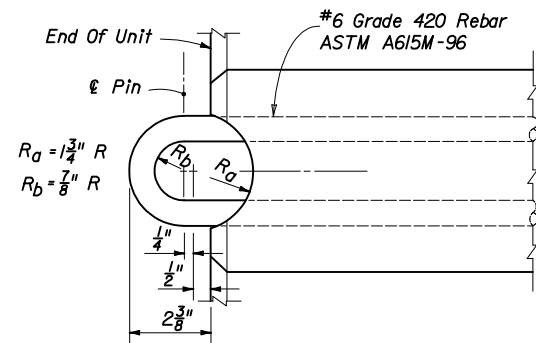
The temporary concrete barrier wall unit design shown on this index is to be discontinued from use on State highway projects by October 1, 2012; see the NOTICE on sheet 3 of 4. Any wall unit that contains double drain slots, that were cast in conformance with prior Index No. 415 designs and current end connections, are to be used only on the high side of the cross section.

6. Wall units may be reused provided they have the structural integrity and surface qualities of new units.
7. Wall 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.
- When the plans stipulate that temporary concrete barrier wall(s) are to become property of the Department at completion of the project, only the standard optional end treatment units are to be used, except as otherwise specified in the plans.
8. If the plans specify Barrier (Temporary) Optional, the Contractor has the option to furnish either concrete or water filled barriers. If the plans specify Barrier (Temporary) Concrete, substitution with water filled barriers will not be permitted.
9. Wall units used for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier (Temporary) Concrete, LF, or Barrier (Temporary) Optional, LF. Type C Steady-Burn Lights shall be paid for under the contract unit price for Lights, Temp. Barrier Wall Mount (Type C, Steady-Burn), ED.

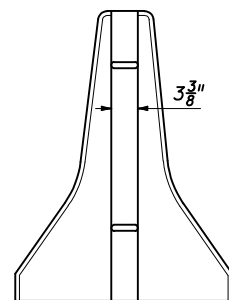


**For Optional End Configurations See OPTIONAL END TREATMENTS FOR WALL UNITS, Sheet 2  
WALL UNIT - PICTORIAL VIEW**

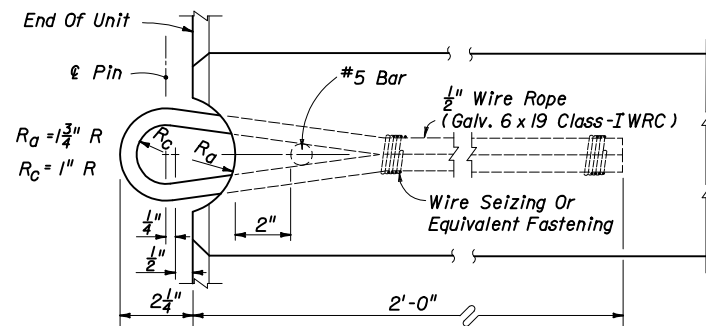
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PRECAST CONCRETE TEMPORARY BARRIER WALL</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	HSD	04/82	Roadway Design Engineer	
Checked By	JVG	04/82	Revision	Sheet No. Index No.
			02	1 of 4 415



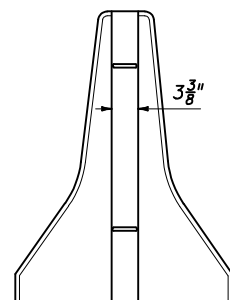
TOP VIEW



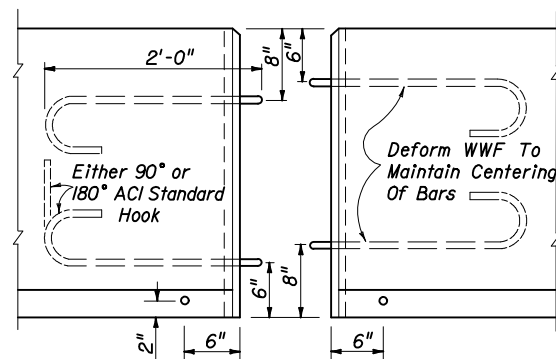
END VIEW



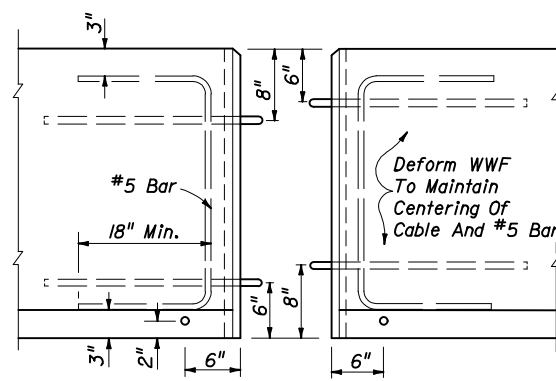
TOP VIEW



END VIEW

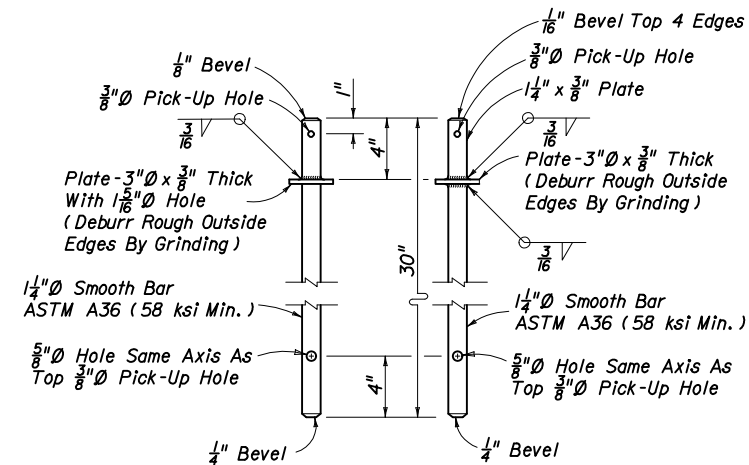


SIDE VIEW  
ROUND BAR CONNECTOR

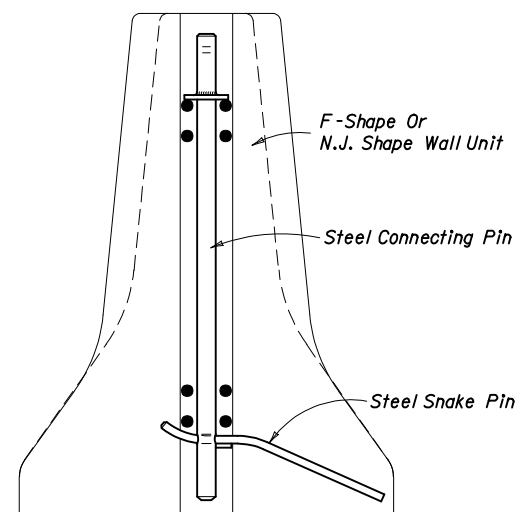


SIDE VIEW  
WIROPE CONNECTOR

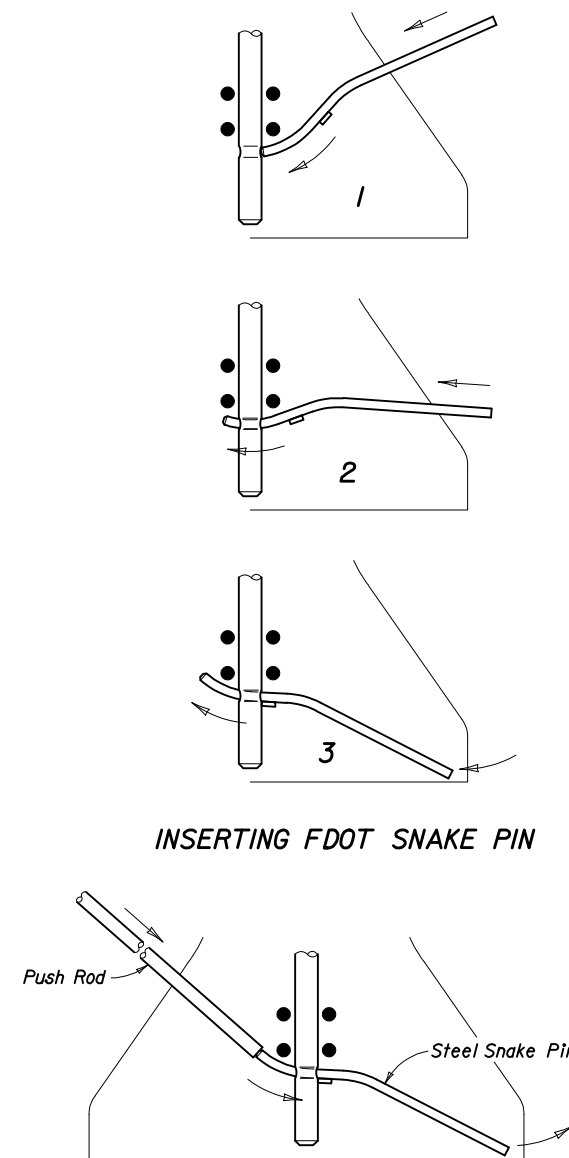
OPTIONAL END TREATMENTS FOR WALL UNITS



OPTIONAL PINS  
STEEL CONNECTING PIN

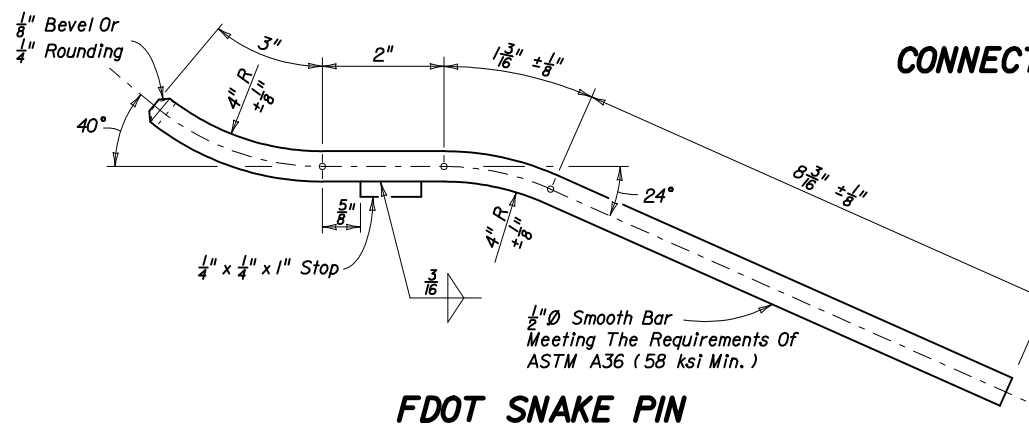


ASSEMBLED UNIT



INSERTING FDOT SNAKE PIN

REMOVING FDOT SNAKE PIN

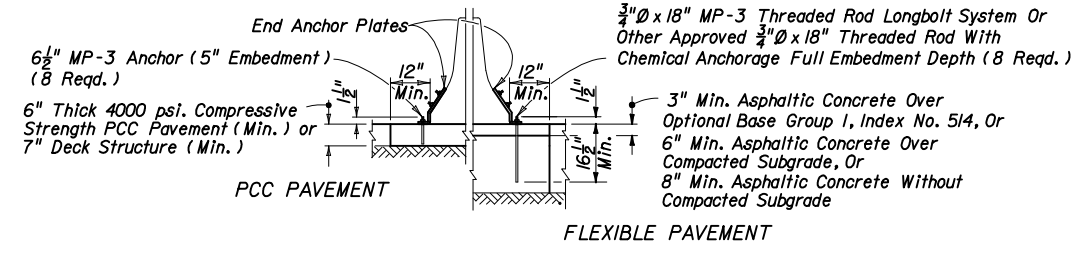
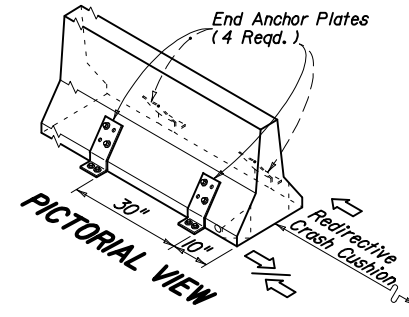


FDOT SNAKE PIN

CONNECTING PIN ASSEMBLY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PRECAST CONCRETE TEMPORARY BARRIER WALL</b>				
Names	Dates	Approved By		
Designed By		<i>Brian Blackwell</i> State Roadway Design Engineer		
Drawn By	HSD 04/82	Revision	Sheet No.	Index No.
Checked By	JVG 04/82	00	2 of 4	415





**SURFACE ANCHORAGE REQUIREMENTS**

**END ANCHORAGE NOTES**

- For temporary barrier wall end anchorage applications, see 'TEMPORARY CONCRETE BARRIER WALL ALIGNMENT' and 'NOTES FOR TEMPORARY CONCRETE BARRIER WALL END SHIELDING'.
- The temporary concrete barrier wall anchor plate depicted above is a proprietary design by Energy Absorption Systems, Inc. Other temporary anchorage methods can be substituted when wall rigidity is assured by any of the following:
  - proven by associated crash test of redirective crash cushions, or
  - meet anchorage prescribed in 'A Guide To Standardized Highway Barrier Hardware', or
  - crash cushion manufacturer's engineered design, or
  - approved shop drawings on a case by case basis.
- The cost for anchoring the wall segment will be included in the cost for the adjoining redirective crash cushion.

**BARRIER WALL END ANCHORAGE**

**NOTES FOR TEMPORARY CONCRETE BARRIER WALL END SHIELDING**

- Redirective crash cushions are the principal (standard) device to be used for shielding approach ends of temporary concrete barrier walls. Except where the plans designate a particular type of redirective crash cushion for a specific location, the contractor has the option to construct either the REACT 350, QuadGuard, ADIEM 350 or TRACC crash cushions subject to the uses and limitations described on Index Nos. 434, 435, 436 and 440 respectively. The barrier wall end segment must be anchored to a paved surface in accordance with 'BARRIER WALL END ANCHORAGE'.
- Temporary redirective crash cushions shall be installed in accordance with the manufacturer's specifications and recommendations. Temporary crash cushions can be either new or functionally sound used devices. Performance of intended function is the only condition for acceptance, whether the crash cushion is new, used, refurbished, purchased, leased, rented, on loan, shared between projects, or made up of mixed new and used components.
- Inertial crash cushions are not optional systems for locations designated for redirective crash cushions by the plans; can not be substituted for redirective crash cushions, and are not eligible for VECP consideration.
- A yellow post mounted Type 1 Object Marker shall be centered 3' in front of the nose of all temporary crash cushions. Mounting hardware shall be in accordance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the crash cushion.
- Optional temporary redirective crash cushions are to be paid for per location under the contract unit price for Vehicular Impact Attenuator (Temporary) (Redirective Option), LO.

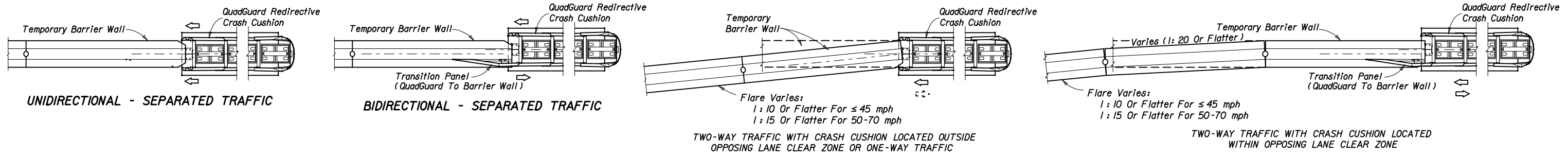
**NOTICE**

THE TEMPORARY CONCRETE BARRIER WALL UNIT SHOWN ON THIS INDEX THAT IS PRODUCED PRIOR TO OCTOBER 1, 2002, AND THAT IS IN GOOD CONDITION, CAN BE USED ON STATE HIGHWAY PROJECTS THROUGH SEPTEMBER 30, 2012. TEMPORARY CONCRETE BARRIER UNITS PRODUCED ON AND AFTER OCTOBER 1, 2002 FOR USE ON STATE HIGHWAY PROJECTS MUST MEET NCHRP 350 CRITERIA, AND MUST BE INCLUDED ON THE QUALIFIED PRODUCTS LIST. IF AND WHEN A GENERIC TEMPORARY CONCRETE BARRIER WALL UNIT IS APPROVED FOR USE ON STATE HIGHWAY PROJECTS, THE UNIT DESIGN WILL BE POSTED ON THE ROADWAY DESIGN WEB SITE.

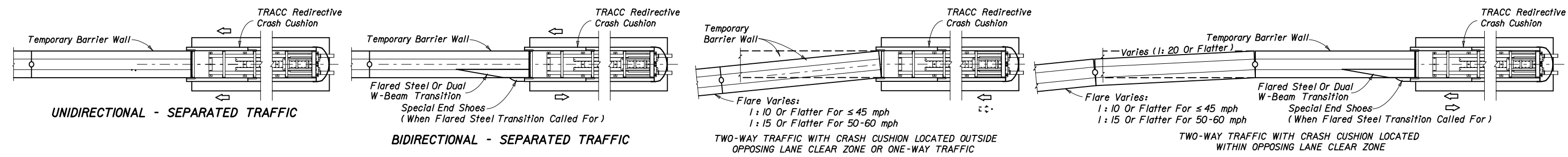
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**PRECAST CONCRETE  
TEMPORARY BARRIER WALL**

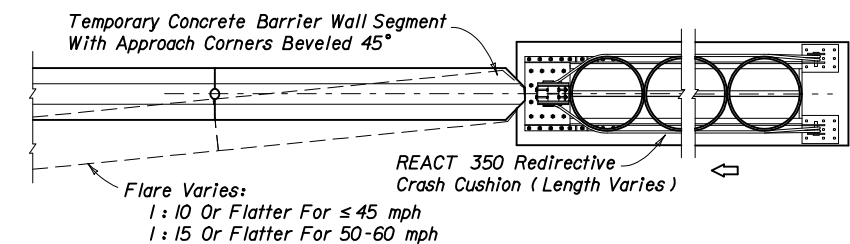
Designed By	Names	Dates	Approved By		
Drawn By	HKH	03/99	Revision	Sheet No.	Index No.
Checked By	JVG	03/99	02	3 of 4	415



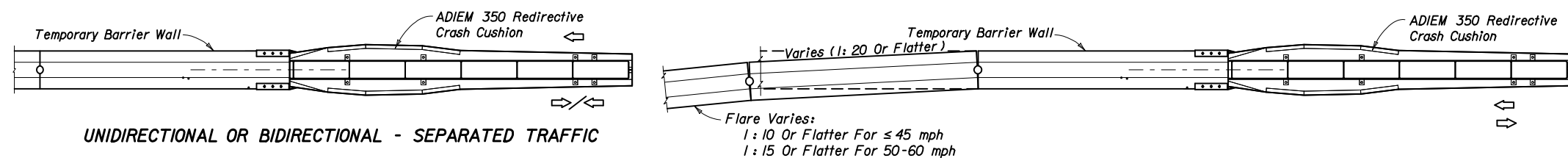
SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)  
**TEMPORARY CONCRETE BARRIER WALL END TREATMENT WHEN SHIELDED BY A QuadGuard CRASH CUSHION**



**TEMPORARY CONCRETE BARRIER WALL END TREATMENT WHEN SHIELDED BY A TRACC CRASH CUSHION**



FOR ANY APPROACH CONDITION IN ACCORDANCE WITH INDEX NO. 434  
**TEMPORARY CONCRETE BARRIER WALL END TREATMENT WHEN SHIELDED BY A REACT 350 CRASH CUSHION**



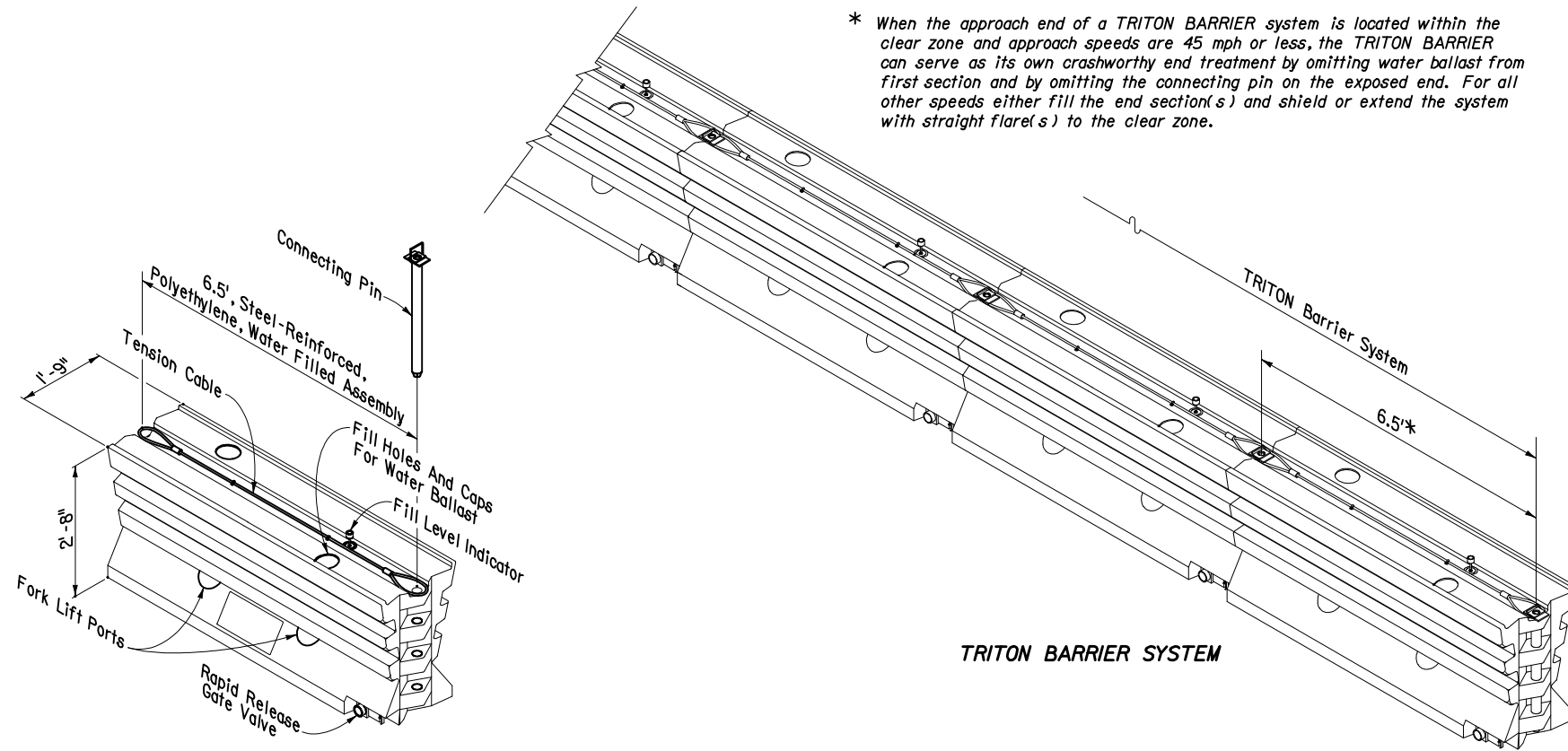
**TEMPORARY CONCRETE BARRIER WALL END TREATMENT WHEN SHIELDED BY AN ADIEM 350 CRASH CUSHION**

See 'TEMPORARY CONCRETE BARRIER WALL ALIGNMENT', 'BARRIER WALL END ANCHORAGE' and 'NOTES FOR TEMPORARY CONCRETE BARRIER WALL END SHIELDING' for additional information.

**SHIELDING TEMPORARY CONCRETE BARRIER WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PRECAST CONCRETE TEMPORARY BARRIER WALL</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HKH	3/99	<i>Ben Blankenship</i> State Roadway Design Engineer	
Checked By	JVG	3/99	Revision	00
			Sheet No.	4 of 4
			Index No.	415

\* When the approach end of a TRITON BARRIER system is located within the clear zone and approach speeds are 45 mph or less, the TRITON BARRIER can serve as its own crashworthy end treatment by omitting water ballast from first section and by omitting the connecting pin on the exposed end. For all other speeds either fill the end section(s) and shield or extend the system with straight flare(s) to the clear zone.



TRITON BARRIER SECTION

TRITON BARRIER SYSTEM

**GENERAL NOTES**

1. This standard drawing (index) presents proprietary temporary water filled barrier designs and is produced by the Florida Department Of Transportation solely for use by the Department and its assignees.
2. Any system presented on this index can be used as a temporary barrier in traffic control work zones and other Department permitted traffic control zones but cannot be constructed as a permanent barrier.
3. All systems shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications; however, installation will be limited to the applications shown on this index, except when otherwise detailed in the plans or approved by shop drawings or approved by the Engineer.
4. Water filled barrier systems are to be used only as longitudinal systems. A longitudinal system may include encapsulating work space barriers within low speed intersections only where the approach longitudinal system deflects the traffic alignment around the work space enclosure.
5. One type proprietary water filled barrier system is not to be used in conjunction with another type proprietary water filled barrier system, except when specifically called for and detailed in the plans.
6. All water filled barrier system sections shall be interconnected with manufacturer and Department approved crash tested connections, i.e., no individual sections or interconnected sections of substandard length are to stand alone, except when specifically called for and detailed in the plans, or for specific applications of interconnected sections around work spaces shown on this index.
7. Water filled barrier systems are not to be used on surfaces with cross slopes exceeding 0.05 (steeper than 1:20), including the surface within the design deflection space behind the barrier.
8. Water filled barrier systems are not to be used on grades steeper than 5%, nor placed over surface irregularities that cause vertical deflection exceeding 1:20 between connected sections.
9. Water filled barrier systems are not permitted on bridges or approach slabs; however, they can be placed over box culverts, including those of bridge length, where design deflection space is adequate. The system should be used on concrete pavements only where the Engineer determines that the dynamic loading of pavement slabs will not cause the system to crab out of alignment.
10. Temporary water filled barriers are to be paid for under the contract unit price for Barrier (Temporary) (Water Filled), LF, or Barrier (Temporary) (Optional), LF. If the plans specify Barrier (Temporary) (Optional), the Contractor has the option to furnish either concrete or water filled barriers. If the plans specify Barrier (Temporary) Water Filled, substitution with concrete barriers will not be permitted. For additional payment information see the supplemental general notes for the individual barrier systems.

Type C Steady-Burn lights are to be mounted on top of all water filled barriers used along travelways in work zones. The lights are to be spaced at 50' centers on transitions, 100' centers on curves and 200' centers on tangent roadways. Lights shall be paid for under the contract unit price for Lights (Temporary Barrier Wall Mount) (Type C Steady-Burn), ED.

**SUPPLEMENTAL GENERAL NOTES FOR THE TRITON BARRIER**

1. The system presented on this standard drawing (index) under the label TRITON BARRIER is a proprietary design by Energy Absorption Systems, Inc. and is marketed under the trade name TRITON BARRIER.
2. This index provides the general graphics and information necessary to field identify component parts of the TRITON BARRIER and their incorporation as a whole system for Department standard applications.
3. The TRITON BARRIER system can be installed as a free standing system or in combination with other Department temporary and permanent barrier systems, exclusive of other proprietary water filled barrier systems.
4. Connections between the TRITON BARRIER and other barrier systems shall be as shown in the 'TRITON BARRIER TRANSITION HARDWARE ASSEMBLIES'. Variation from these connections shall be as detailed in the plans or as prescribed by the manufacturer.
5. The TRITON BARRIER section or sections are not to be used as perpendicular road closure blocks, whether connected, unconnected, filled or unfilled.
6. Sections shall be installed in alternating white and work zone safety orange colors.
7. The TRITON BARRIER systems shall be paid for under the contract unit price for Barrier (Temporary) (Water Filled), LF, or Barrier (Temporary) (Optional), LF and shall be full compensation for furnishing and installing TRITON BARRIER in accordance with this index, with the plans and with the manufacturer's detailed drawings, procedures and specifications. The cost for transition hardware detailed in this index shall be included in the contract unit price for the barrier. TRITON modules considered a part of the systems crashworthy end treatment shall be included in the linear measure; other crashworthy end terminals, crash cushions or other shielding required for use of the TRITON barrier will not be included in the contract unit price for the barrier.

**SUPPLEMENTAL DESIGN NOTES AND GUIDELINES FOR THE TRITON BARRIER**

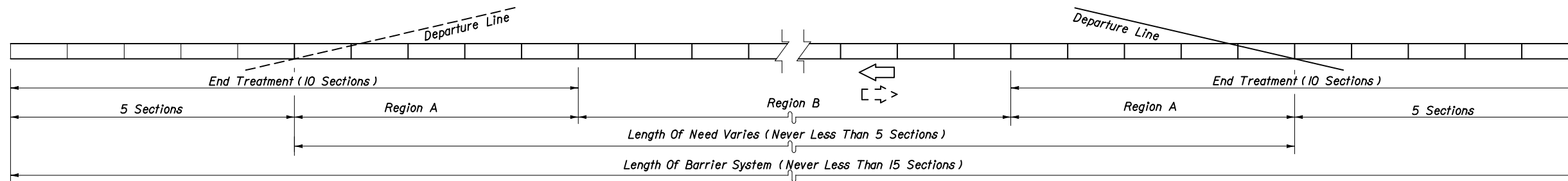
1. The longitudinal system can be used for work zone speeds of 60 mph or less. Transition hardware can be used in areas where speeds are limited to 45 mph or less.
2. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the TRITON BARRIER, and until such alternatives are available, the TRITON BARRIER need not be bid against other proprietary items.

**DESIGN NOTES**

1. The TRITON and GUARDIAN water filled barriers are considered by the Federal Highway Administration to be innovative temporary barriers, and, may be used as such toward compliance with the percentage of innovative barrier required in the total median barrier on Federal Aid Projects.

**TRITON BARRIER**

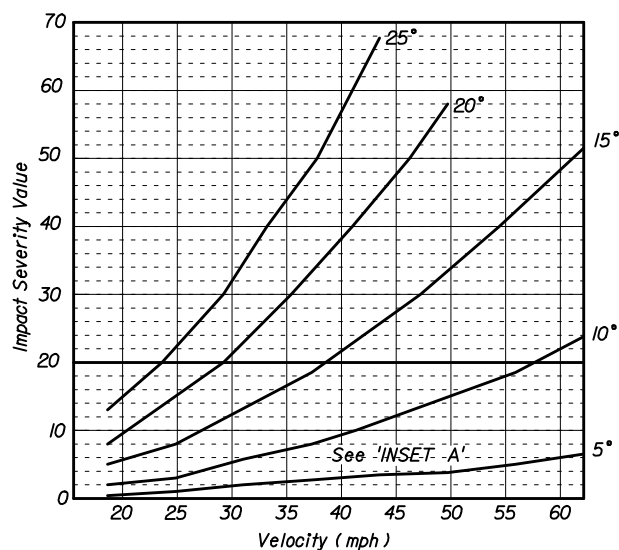
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TEMPORARY WATER FILLED BARRIERS</b>				
	Names	Dates	Approved By	
Designed By	MFG/HKH	6/95	<i>Brian Blankenship</i> State Roadway Design Engineer	
Drawn By	HKH	6/95	Revision	Sheet No. Index No.
Checked By	JVG	6/95	00	1 of 5 416



Note: For Departure Line requirements see Index No. 400.

When TRITON BARRIER is used as its own end treatment fill all sections with water ballast except the approach end section(s). Do not use connecting pin on the exposed end of the end section(s).

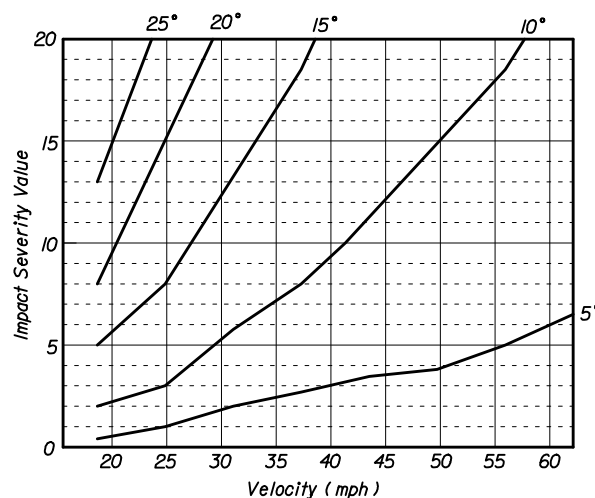
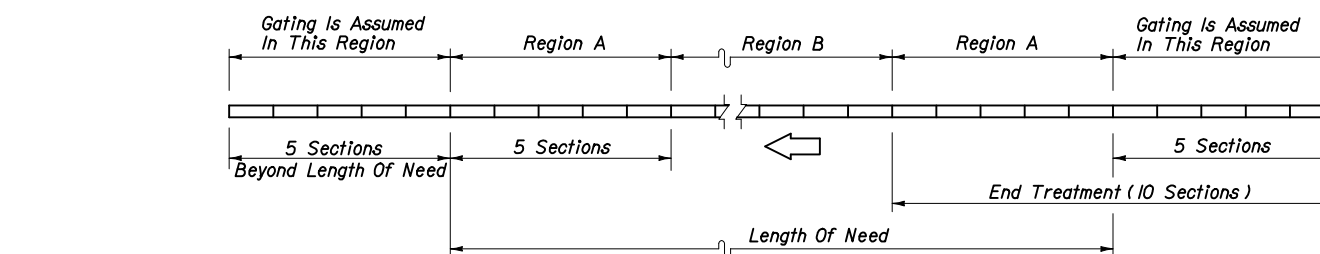
**SYSTEM LENGTHS FOR UNIDIRECTIONAL OR BIDIRECTIONAL TRAFFIC**



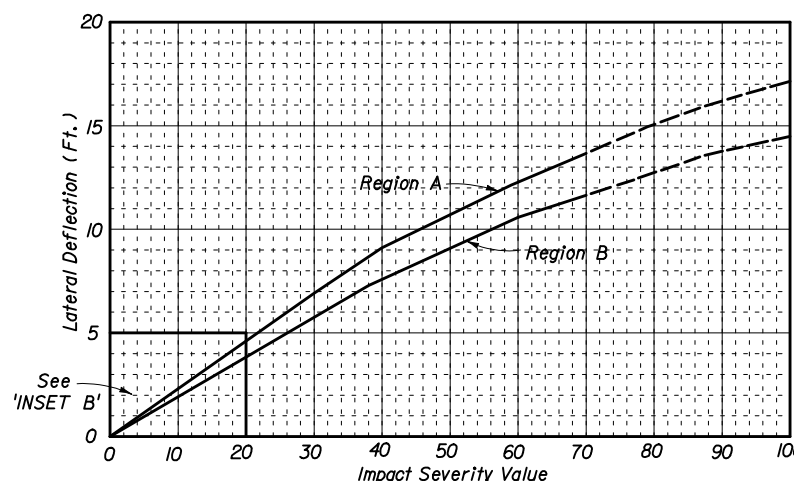
**DETERMINING THE IMPACT ANGLE CURVE TO APPLY**

Except where the plans call for the use of a certain impact angle curve, or where a certain impact angle is anticipated by site specific conditions, the impact angle curve to be used in determining impact severity will be selected on the following basis:

Barrier Location	Graph Curve
Parallel to tangent roadway	5°
Parallel to and on the inside of roadway curve	5°
Standard lane shift or drop ( $WS & \frac{WS^2}{60}$ )	5°
Parallel to and on the outside of roadway curve	5° (10°) [15°]
Approach flared end section on inside of roadway curve	10°
Approach flared end section on approach tangent roadway	10°
Approach flared end section on outside of roadway curve	10° (15°) [25°]
( ) Max. Curvature (Min. Radius), High Speed Facilities	
[ ] Max. Curvature (Min. Radius), Low Speed Facilities	



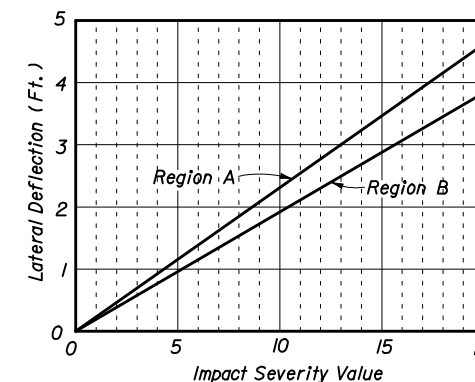
INSET A



Notes: Curves for Regions 'A' and 'B' apply to vehicles ≤ 4400 lbs.

--- Indicates impact severity levels created by higher impact angles not anticipated in work zone.

**SINGLE ROW TRITON BARRIER INSTALLATION DEFLECTION CURVES**



INSET B

**IMPACT SEVERITY DETERMINATION FOR VEHICLES ≤4400 LB IMPACTING SINGLE ROW TRITON SYSTEM**

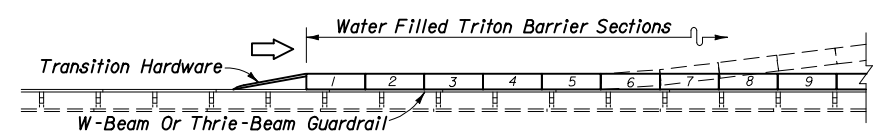
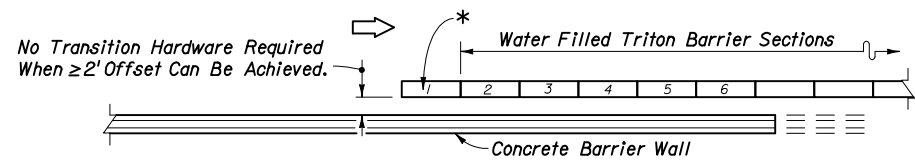
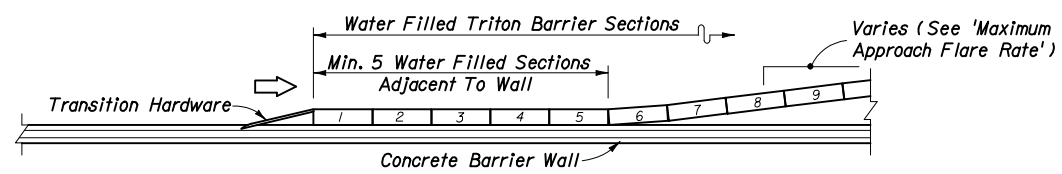
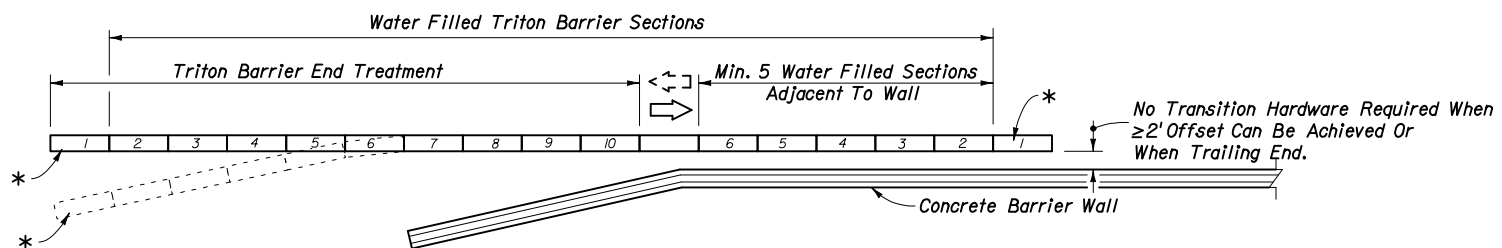
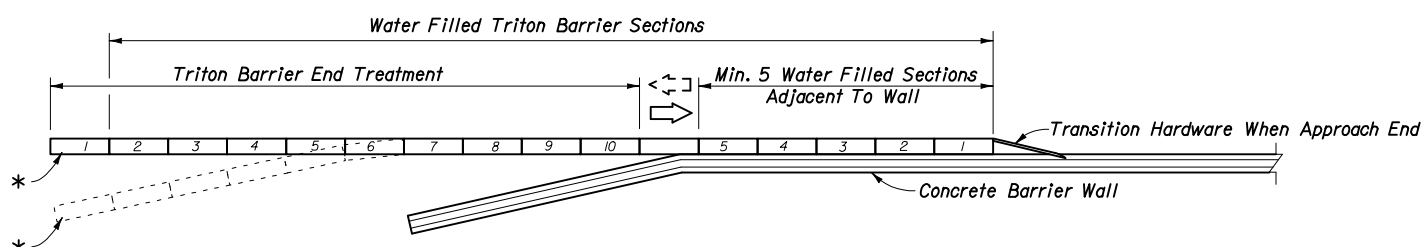
**IMPACT SEVERITY AND LATERAL DEFLECTION DISTANCES**

**TRITON BARRIER SYSTEM LENGTHS AND DEFLECTIONS**

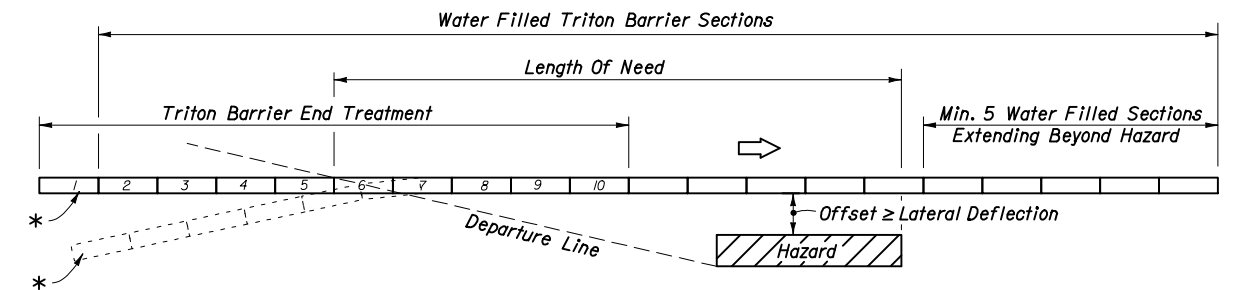
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**TEMPORARY WATER FILLED BARRIERS**

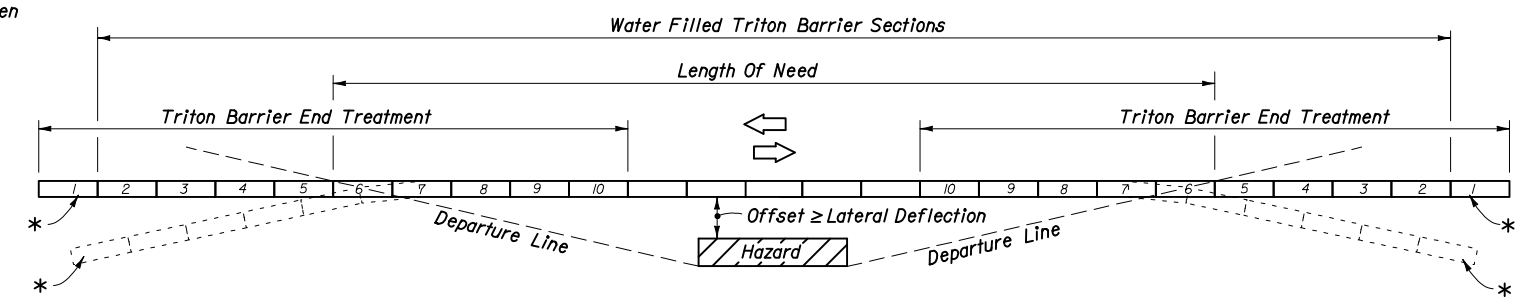
Names	Dates	Approved By		
Designed By	MFG/HKH 6/95	<i>Blair Blackwell</i> State Roadway Design Engineer		
Drawn By	HKH 6/95			
Checked By	JVG 6/95	Revision	Sheet No.	Index No.
		00	2 of 5	416



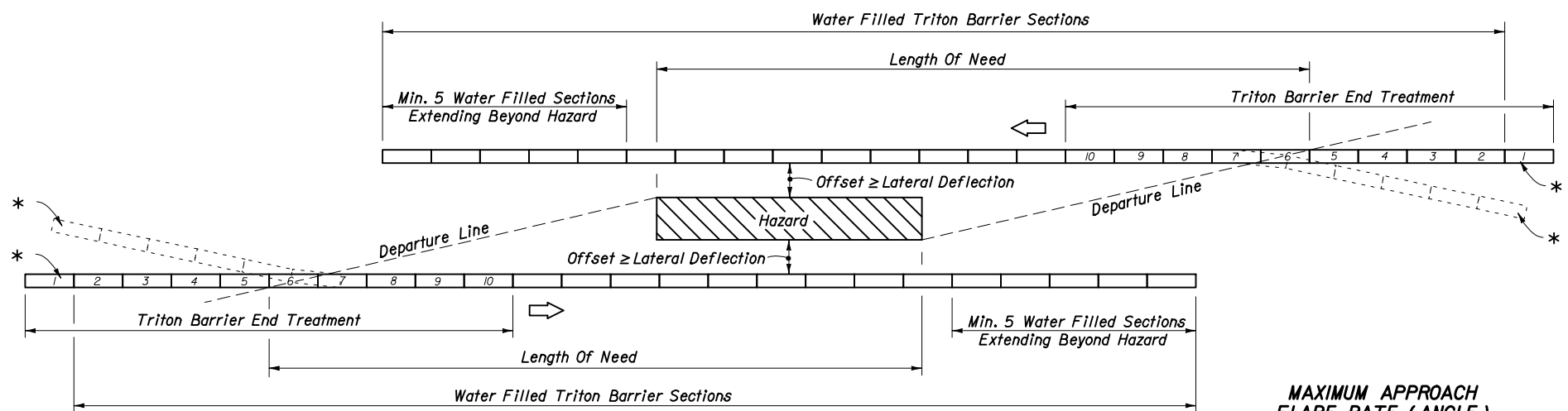
**BARRIER SYSTEM IN COMBINATION WITH OTHER BARRIER SYSTEMS WHEN SPEEDS ARE ≤45 mph**



**TYPICAL UNIDIRECTIONAL SHOULDER LAYOUT**



**TYPICAL BIDIRECTIONAL SHOULDER LAYOUT**

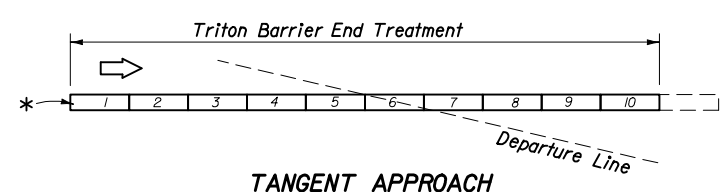


**TYPICAL MEDIAN LAYOUT FREE STANDING BARRIER SYSTEMS**

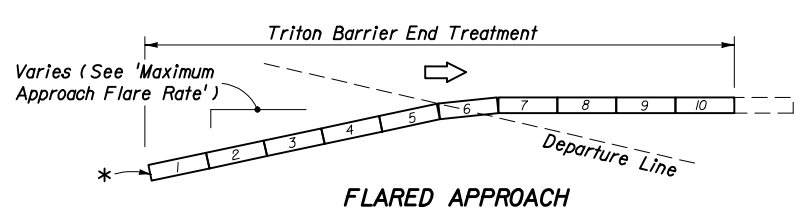
**MAXIMUM APPROACH FLARE RATE (ANGLE)**

≤40 mph	1:9 (6°)
45 mph	1:10 (5.5°)
50 mph	1:11 (5°)
55 mph	1:12 (4.5°)
60 mph	1:13 (4°)

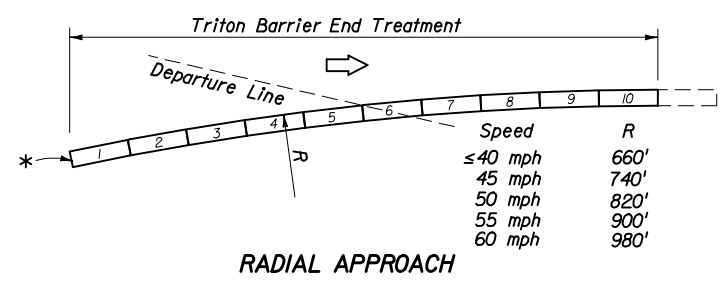
For Departure Line requirements see Index 400.  
 \* When used as an approach end treatment for speeds ≤45 mph, omit water ballast from first section and omit connecting pin on exposed end. For speeds ≥50 mph fill and shield or extend with straight flare to CZ.



**TANGENT APPROACH**



**FLARED APPROACH**



**RADIAL APPROACH**

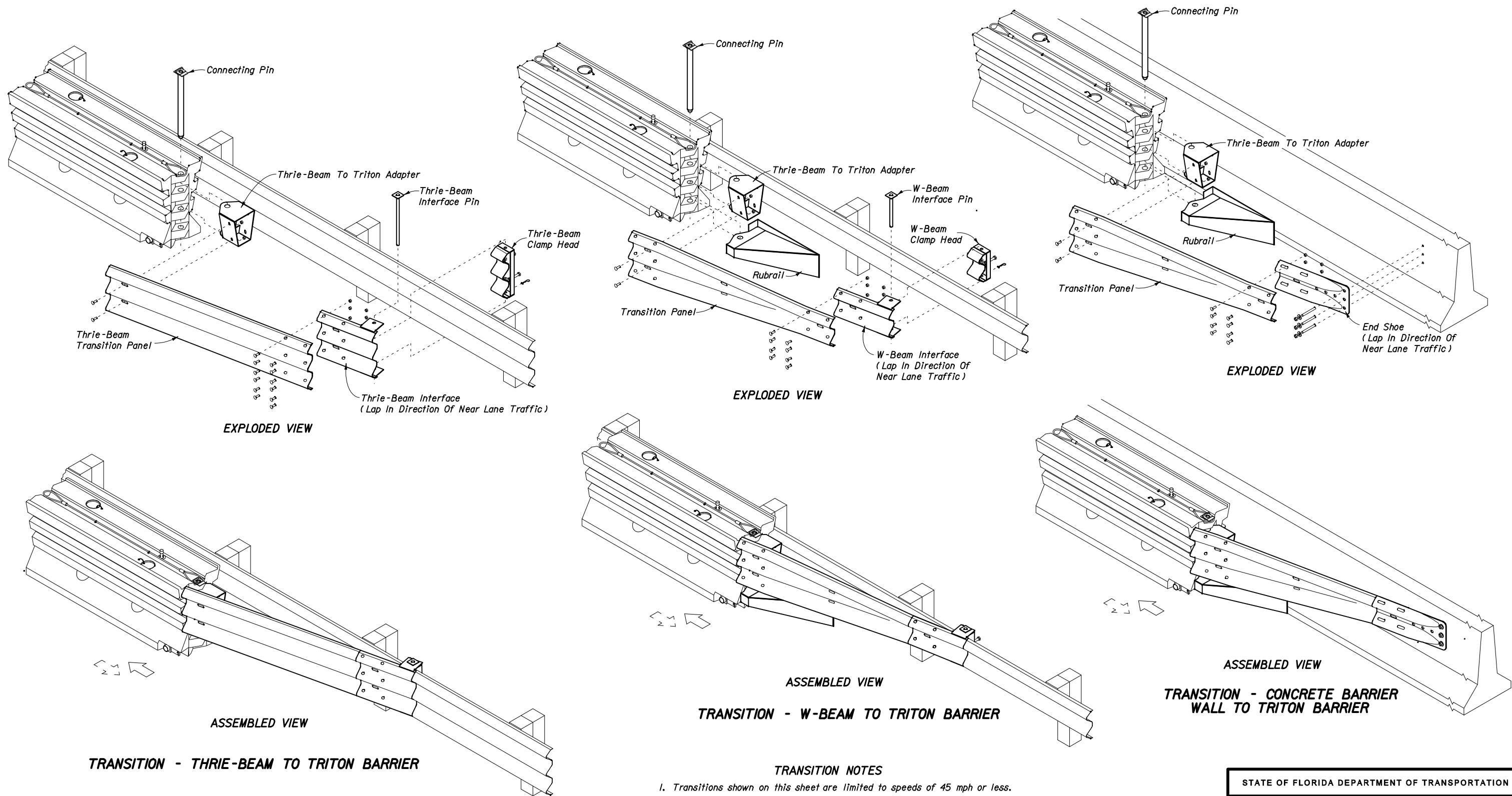
**END TREATMENT CONFIGURATIONS**

**TRITON BARRIER - TYPICAL APPLICATIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**TEMPORARY WATER FILLED BARRIERS**

Names	Dates	Approved By		
Designed By	MFG/HKH	6/95	State Roadway Design Engineer	
Drawn By	HKH	6/95		
Checked By	JVG	6/95		
Revision	00	Sheet No.		
		3 of 5	416	



TRANSITION - THRIE-BEAM TO TRITON BARRIER

TRANSITION - W-BEAM TO TRITON BARRIER

TRANSITION - CONCRETE BARRIER WALL TO TRITON BARRIER


TRANSITION NOTES

1. Transitions shown on this sheet are limited to speeds of 45 mph or less.
2. Transition hardware can be placed on either end of TRITON section.
3. Transition hardware can be located on left or right side of roadway, right side shown.
4. TRITON Barrier end sections must be filled with water when using transition hardware assemblies.
5. Install transition hardware in accordance with the manufacturer's recommendations and specifications.

TRITON BARRIER TRANSITION HARDWARE ASSEMBLIES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TEMPORARY WATER FILLED BARRIERS

Names		Dates		Approved By		
Designed By	MFG/HKH	6/95	 State Roadway Design Engineer			
Drawn By	HKH	6/95				
Checked By	JVG	6/95				
Revision	00	4 of 5	Index No.	416		

**SUPPLEMENTAL GENERAL NOTES FOR THE GUARDIAN BARRIER**

1. The barrier units presented on this standard drawing (index) and the label GUARDIAN are proprietary designs by Safety Barrier Systems and are marketed under the trade name GUARDIAN Safety Barrier.
2. This index provides general schematics and information necessary to field identify the water filled polyethylene segmental barrier module and the module frame and basic connections, but does not identify the incorporation of the modules and frame connections into a whole system. Any use of the GUARDIAN must be in accordance with the details on the plans, or by shop drawing approval or by the Engineer in absence of plan detail.
3. The GUARDIAN modules are approved for use on highways with all design speeds and only when the "GUARDIAN 350 Highway Kit" is incorporated throughout the system in use.
4. The GUARDIAN modules can be used only in a stand alone system. i.e., not connected to other types of barrier systems.
5. The GUARDIAN can be used only as a longitudinal barrier on the State maintained highway system. Any longitudinal system must have a minimum of eleven (11) longitudinally connected modules in advance of and following the length of need; in no case can the longitudinal run of barrier be less than 33 modules.

The approach end of the GUARDIAN must either extend to the outer limit of the clear zone; be shielded by a crash cushion; or, begin behind but not connected to another barrier or shielding feature.

6. The GUARDIAN system must be placed on a cross slope not exceeding 1:10, and located to provide a deflection distance between the system and hazards in accordance with the table below.

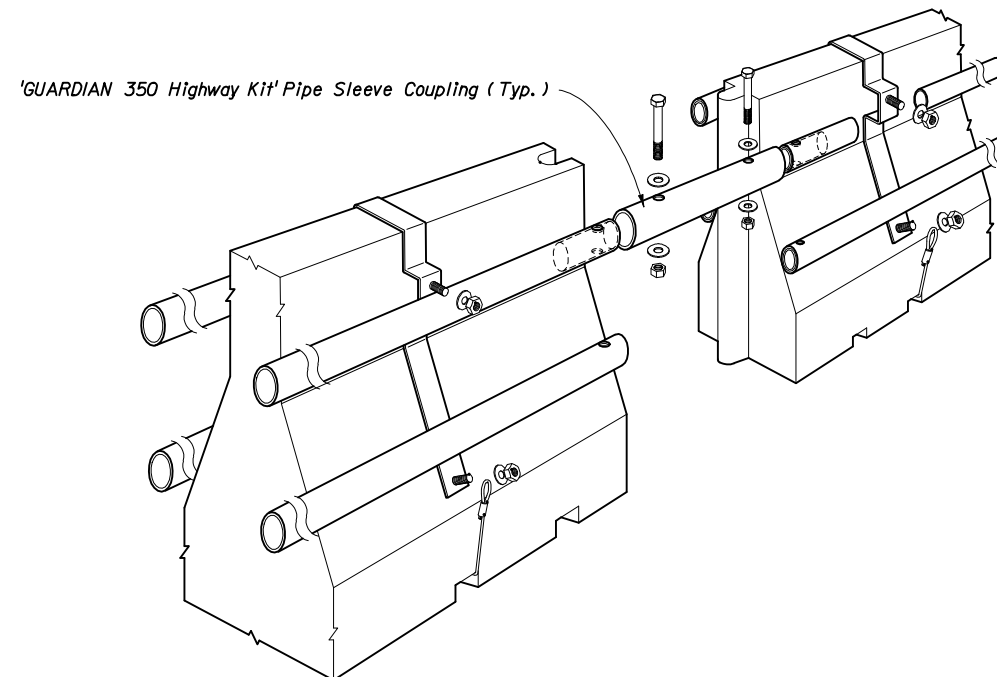
GUARDIAN BARRIER WITH 350 HIGHWAY KIT ESTIMATED BARRIER DEFLECTION (FEET)					
Vehicle Speed (mph)	Vehicle Impact Angle (Degrees)				
	25°	20°	15°	10°	5°
≤ 45	6.5	5.3	4.0	2.7	1.3
50	8.0	6.4	4.9	3.3	1.6
55	9.5	7.7	5.8	4.0	2.0
60	11.2*	9.0	6.9	4.6	2.3

\* Observed Value (Crash Test Result)  
Other Values Manufacturers Calculated Estimates

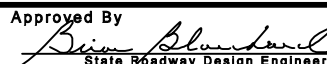
7. The GUARDIAN barrier system shall be paid for under the contract unit price for Barrier (Temporary) (Water Filled), LF, or Barrier (Temporary) (Optional), LF, and shall be full compensation for furnishing and installing GUARDIAN barrier in accordance with this index, with the plans and with the manufacturer's detailed drawings, procedures and specifications. Any crashworthy end terminal, crash cushion or other shielding required for use of the GUARDIAN barrier will not be included in the contract unit price for the barrier.

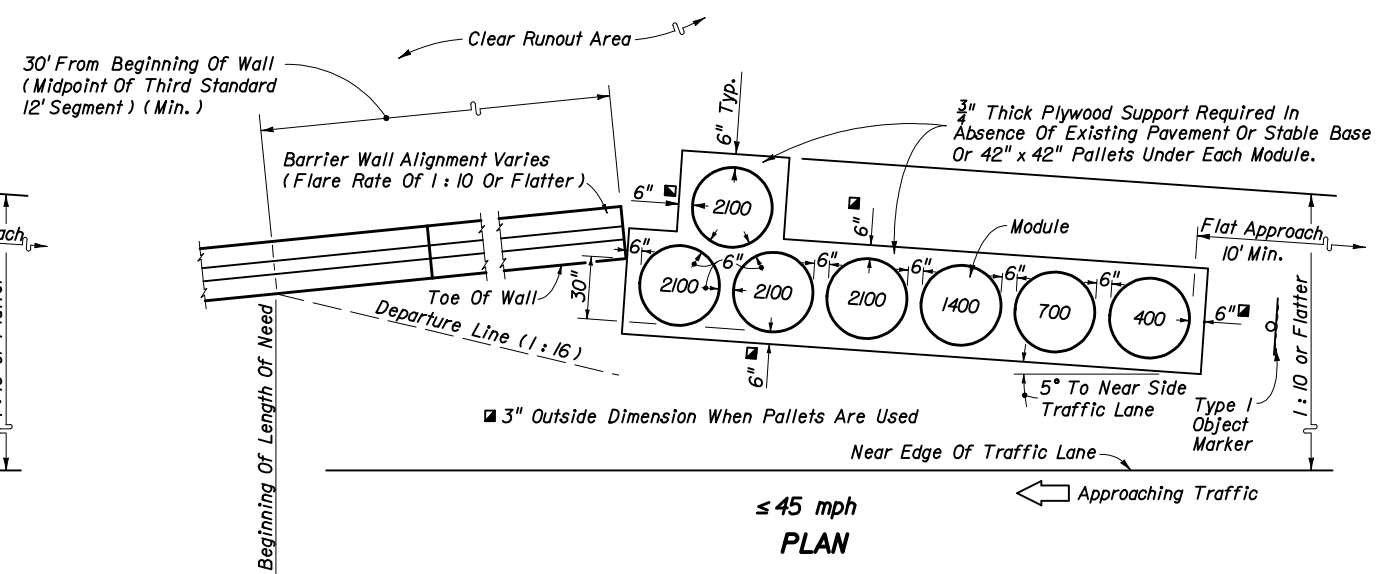
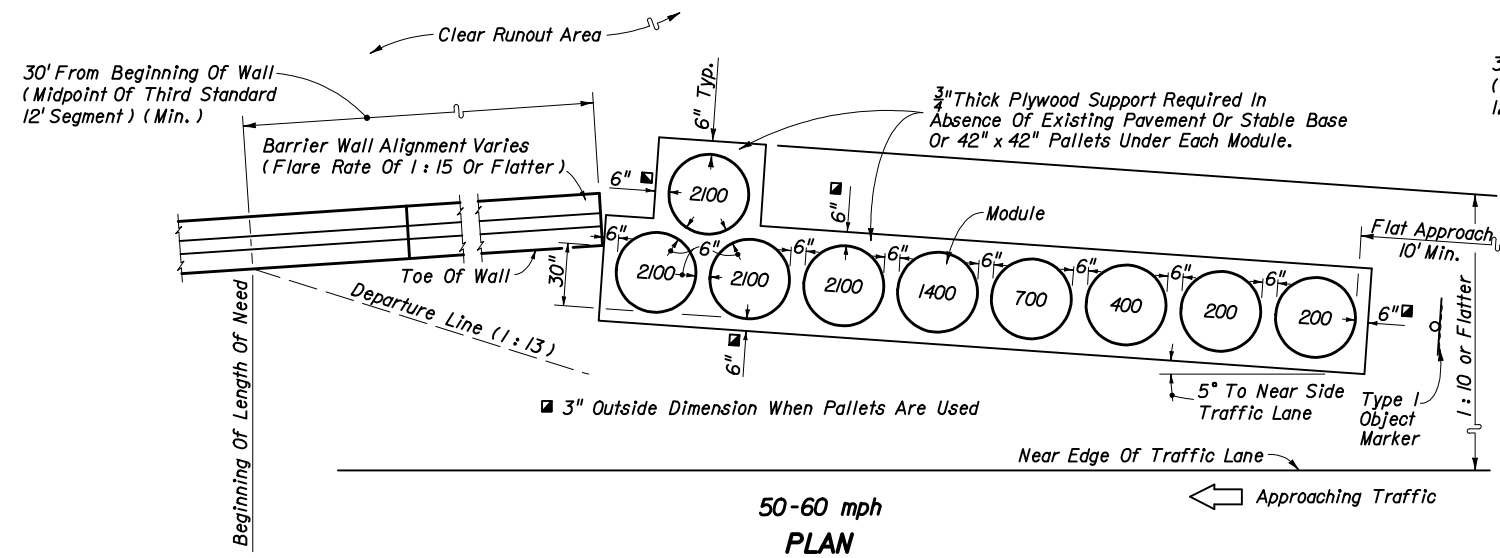
**SUPPLEMENTAL DESIGN NOTES FOR THE GUARDIAN BARRIER**

1. At time of publication of this standard no crash test data was available to provide a crashworthy end terminal design using the barrier modules; only the requirement for eleven (11) interconnected modules preceding and following the length of need, based on available crash test data.
2. Systems included in any maintenance of traffic plan will require detailed location and placement information.
3. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the GUARDIAN barrier, and until such alternatives are available, the GUARDIAN barrier need not be bid against other proprietary items.



**GUARDIAN BARRIER WITH 350 HIGHWAY KIT**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>TEMPORARY WATER FILLED BARRIERS</b>					
	Names	Dates	Approved By		
Designed By	MFG/HKH	6/95	 State Roadway Design Engineer		
Drawn By	HKH	6/95			
Checked By	JVG	6/95	Revision	Sheet No.	Index No.
			00	5 of 5	416

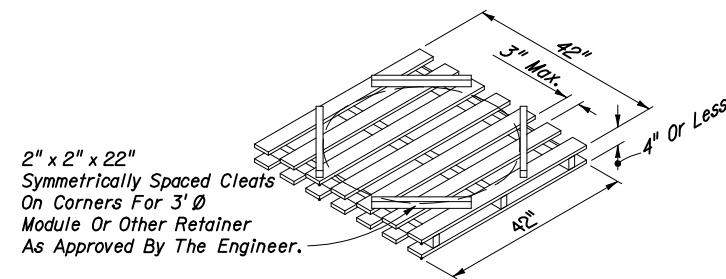


Note: Numbers shown inside modules indicate mass in pounds of sand. All modules are approximately 3' in diameter with heights ranging from 3' to 3'-9".

### INERTIAL CRASH CUSHION ARRAYS

#### NOTES FOR TEMPORARY INERTIAL CRASH CUSHIONS

1. The crash cushion arrays shown on this index can be used on the State highway system only for shielding temporary concrete barrier wall approach ends. These arrays can not be substituted for redirective crash cushions called for in the plans, and are not eligible for VECF considerations.
2. Inertial crash cushions are gating type crash cushions, and a clear runout area back of the array must be provided. The arrays shown can be used for outer roadway applications, exclusive of gore areas, and for median applications where the median width is sufficient to provide clear zone width between the back side module and the near lane of the opposing traffic.
3. Inertial crash cushion modules shall be installed in accordance with the manufacturer's specifications and recommendations, and can be constructed of either new or functionally sound used modules.
4. Anchorage of barrier wall end segment is not required.
5. A yellow post mounted Type I Object Marker shall be centered 3' in front of the nose of all crash cushion arrays. Mounting hardware shall be in accordance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the modules.
6. Temporary inertial crash cushions are to be paid for per module under the contract unit price for Impact Attenuator Modules (Inertial) (Temporary), EA.



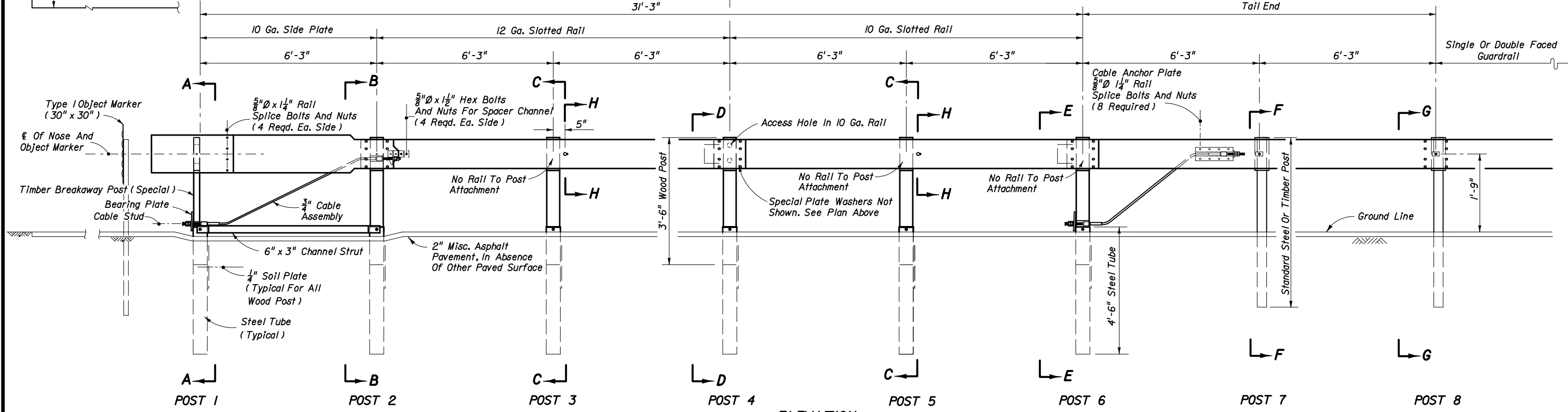
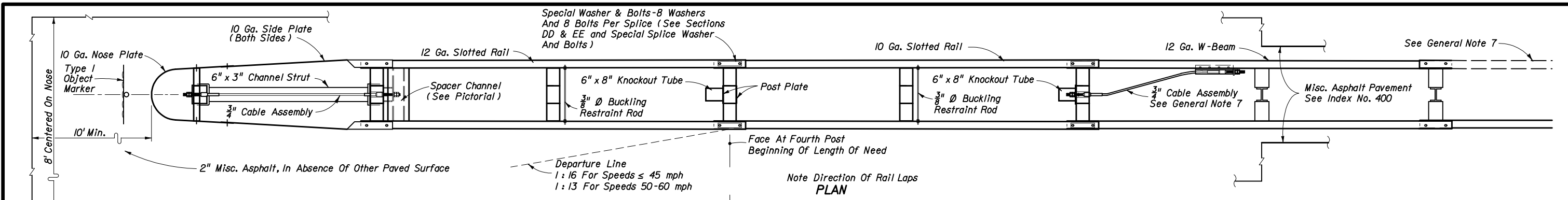
Pallet Shall Be Constructed Of Wood Or Other Frangible Or Resilient Materials Other Than Metals, And, Shall Be Sufficiently Durable To Support Modules For Their Expected Period Of Use; Wood Pallet Detail Shown.

#### INERTIAL MODULE PALLET

## TEMPORARY INERTIAL CRASH CUSHIONS FOR SHIELDING ENDS OF TEMPORARY CONCRETE BARRIER WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>INERTIAL CRASH CUSHION</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	HKH	3/99	Roadway Design Engineer	
Checked By	JVG	3/99	Revision	Sheet No.
			02	1 of 1
				Index No. 417





**GENERAL NOTES**

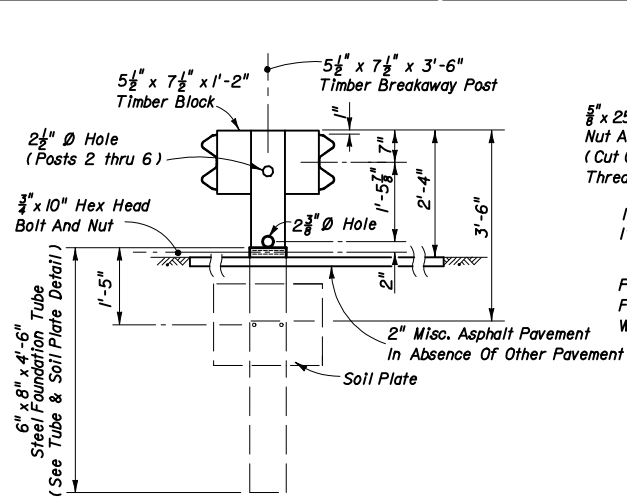
1. The energy absorbing system represented on this standard drawing is a proprietary design by SYRO Inc. and marketed under the trade name C-A-T 350, short for Crash Cushion/Attenuating Terminal. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the C-A-T 350 system and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the C-A-T 350 system installed in connection with standard single and double faced W-beam guardrail systems, and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals.
4. The C-A-T 350 system shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications.
5. The C-A-T 350 system is suitable for speeds ≤ 60 mph.
6. The C-A-T 350 system shall be located on slopes of 1 : 10 or flatter and not closer than 11' to any traffic lane.
7. The 'tail end' section represented on this drawing applies to connections with single and double faced guardrail. The cable anchorage at Post No. 6 is to be used with single faced guardrail connections only.  
  
Where the C-A-T 350 system is installed in conjunction with a rigid structure, a guardrail transition section shall be constructed between the C-A-T 350 system and the structure connection. The transition sections shown on Indexes 400 and 410 shall be constructed for connected to bridge concrete traffic rails and roadway concrete barrier walls; transition sections for connections to other rigid structures shall be as detailed in the plans and/or as approved by shop drawings.

8. Metallic components shall meet the galvanizing requirements for guardrail, Index No. 400.
9. A yellow Type I Object Marker shall be centered 3' in front of the nose of the C-A-T 350 system. Mounting hardware shall be in conformance with Index No. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the C-A-T 350.
10. The C-A-T 350 system for single and double faced guardrail applications will be paid for the under the contract unit price for Impact Attenuator Vehicular (CAT), EA.

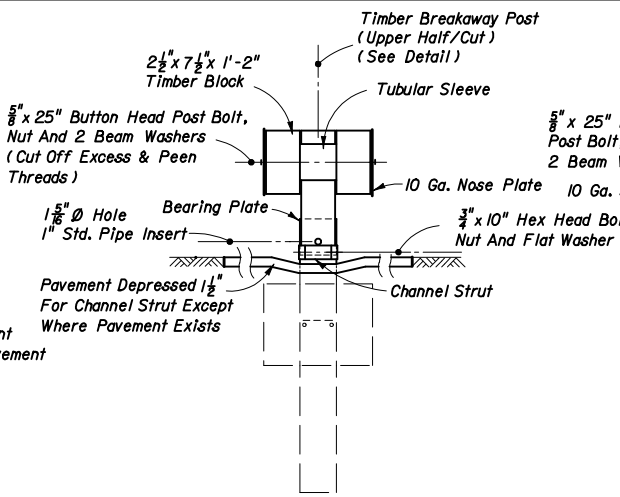
**DESIGN NOTES AND GUIDELINES**

1. The C-A-T 350 system is designed to cushion automobile end-on hits and to redirect automobiles from side hits when impacting at speeds up to and including 60 mph. The C-A-T 350 system has a singular design for all speeds of 60 mph or less, and any adjustment to its design will not be permitted except as authorized by the manufacturer.
2. The C-A-T 350 system is not intended for use in gores of freeway and expressway mainline ramp terminals; gores of roadway forks; or other gore locations where there is a history of high frequency vehicle departure from the roadway or the potential exists for such departures. The C-A-T 350 system is not a restorable design and therefore requires complete replacement after having sustained either an end-on or a side vehicular impact. Deformed side rail elements that will inhibit the shearing of lands between the rail slots will be subfunctional and are to be replaced immediately; deformed elements are not to be refurbished for reuse.
3. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the C-A-T 350, and until such alternatives are available, the C-A-T 350 need not be bid against other proprietary items.

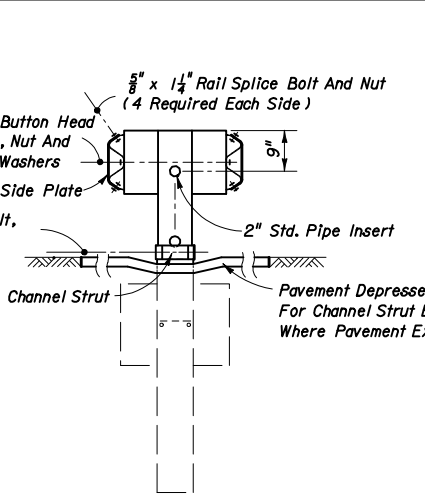
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
C-A-T 350				
Names		Dates		Approved By
Designed By	MFG/JVG	7/91	 State Roadway Design Engineer	
Drawn By	HSD	7/91		
Checked By	JVG/RER	7/91		
Revision		Sheet No.		Index No.
00		1 of 2		432



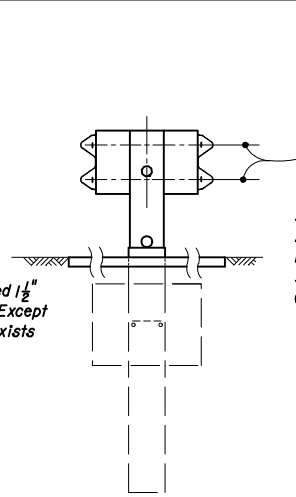
TYPICAL DIMENSIONING



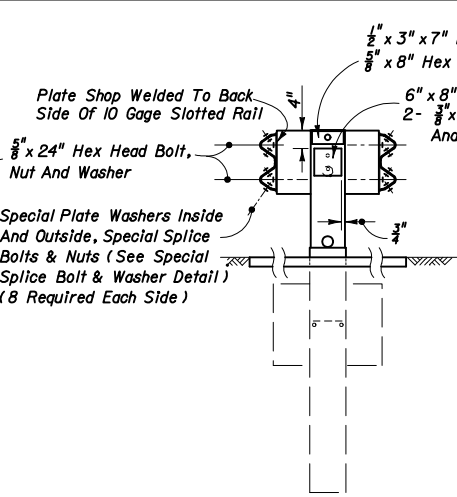
SECTION AA  
POST NO. 1



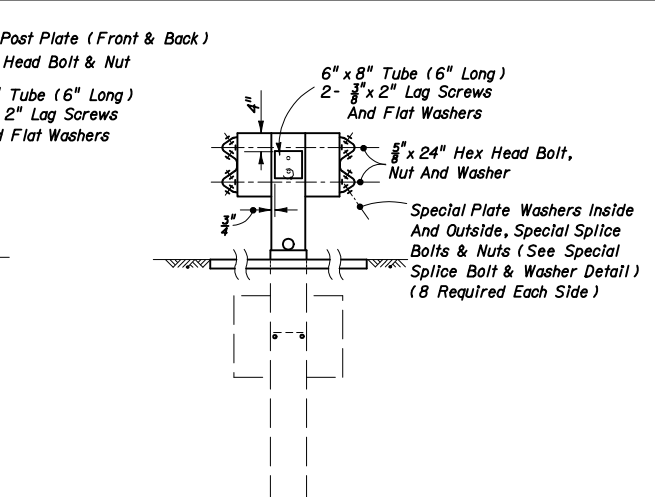
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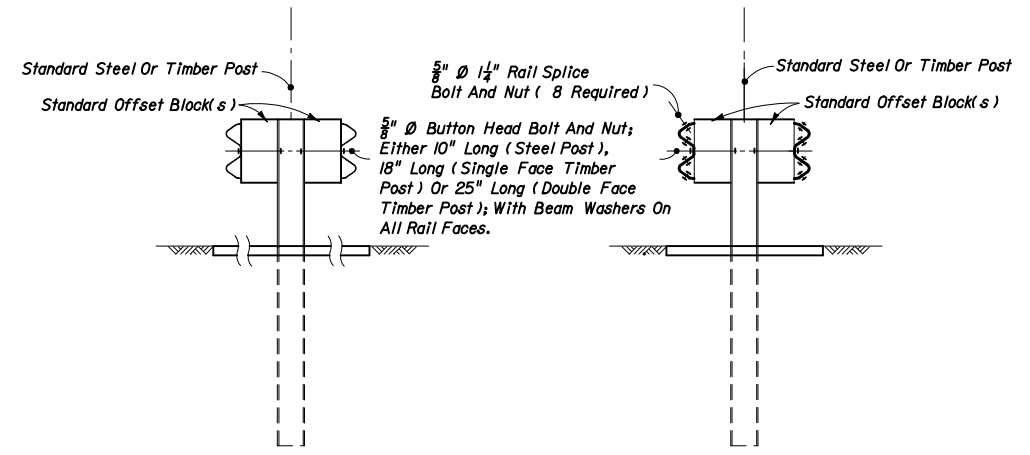
SECTION CC  
POST 3 & 5



SECTION DD  
POST NO. 4

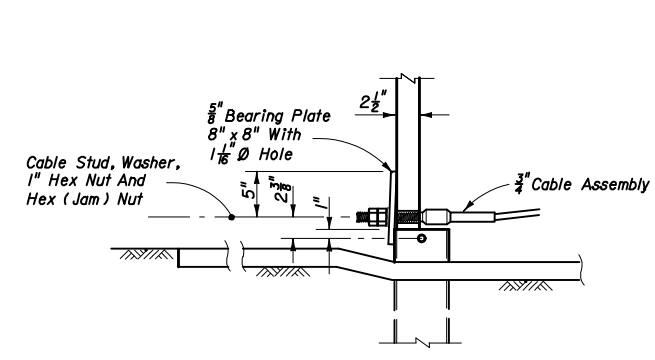


SECTION EE  
POST NO. 6

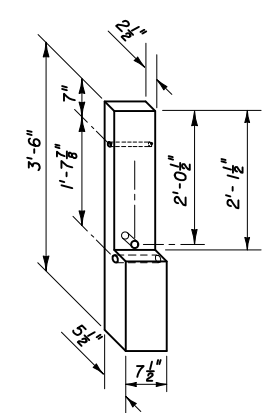


SECTION FF  
POST NO. 7

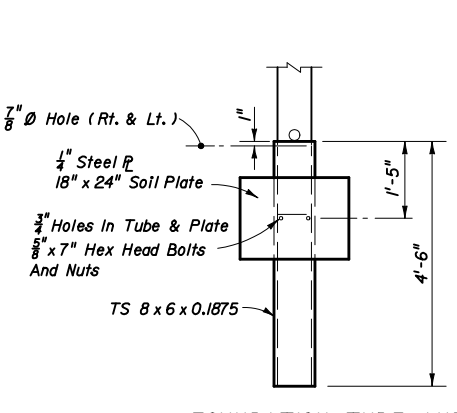
SECTION GG  
POST NO. 8



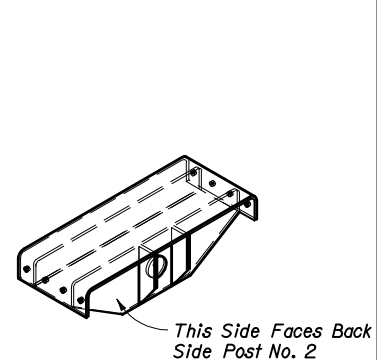
SIDE VIEW  
(Channel Strut Not Shown)  
CABLE-LOWER ASSEMBLY  
POST NO. 1



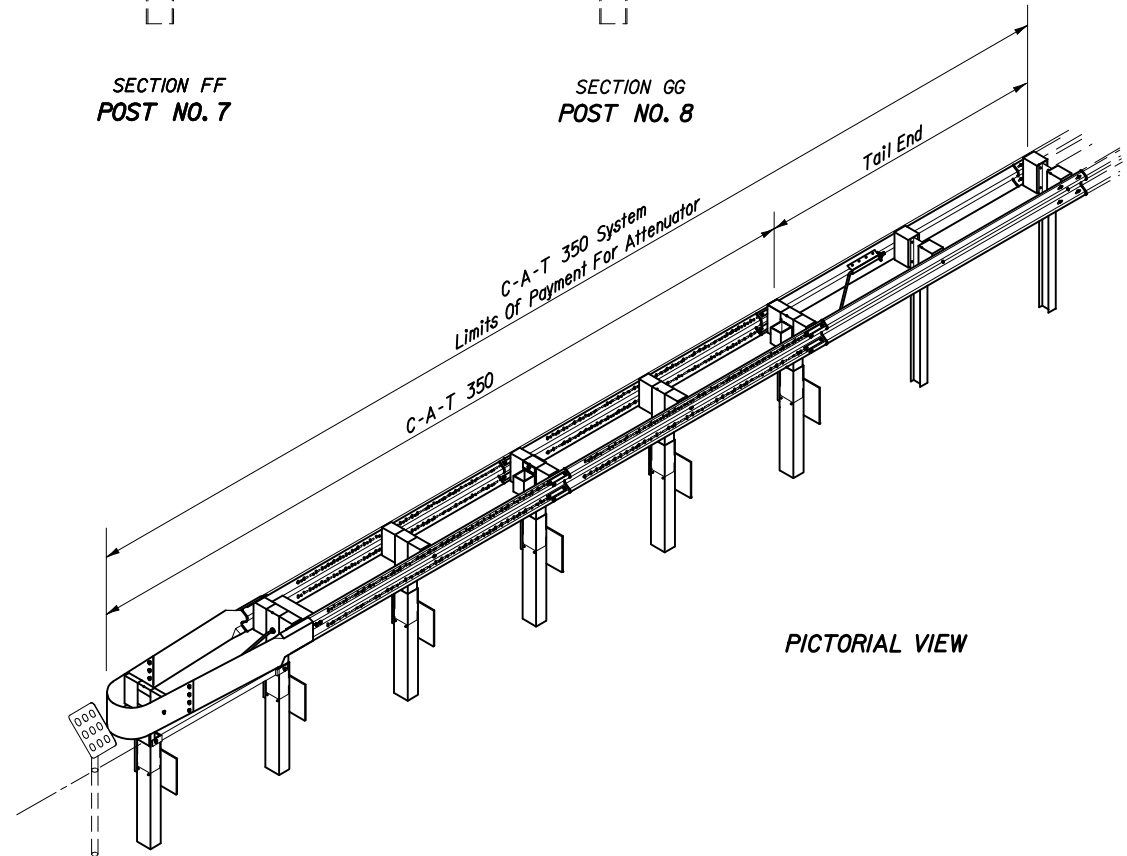
OBLIQUE VIEW-BACK VIEW  
POST NO. 1



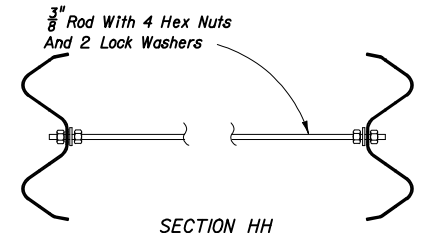
FOUNDATION TUBE AND  
SOIL PLATE



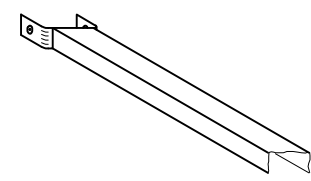
PICTORIAL VIEW  
SPACER CHANNEL



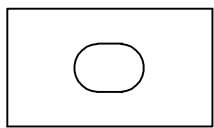
PICTORIAL VIEW



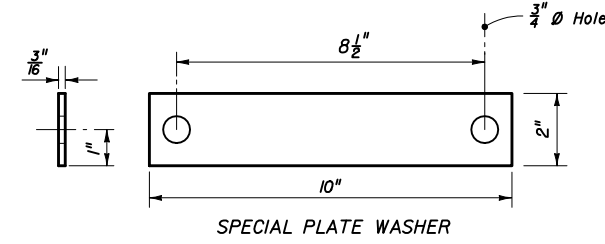
SECTION HH  
BUCKLING RESTRAINT ROD



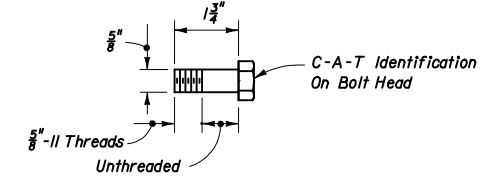
OBLIQUE HALF SECTION  
6" x 3" CHANNEL STRUT



See Index 400 For Details  
BEAM WASHER

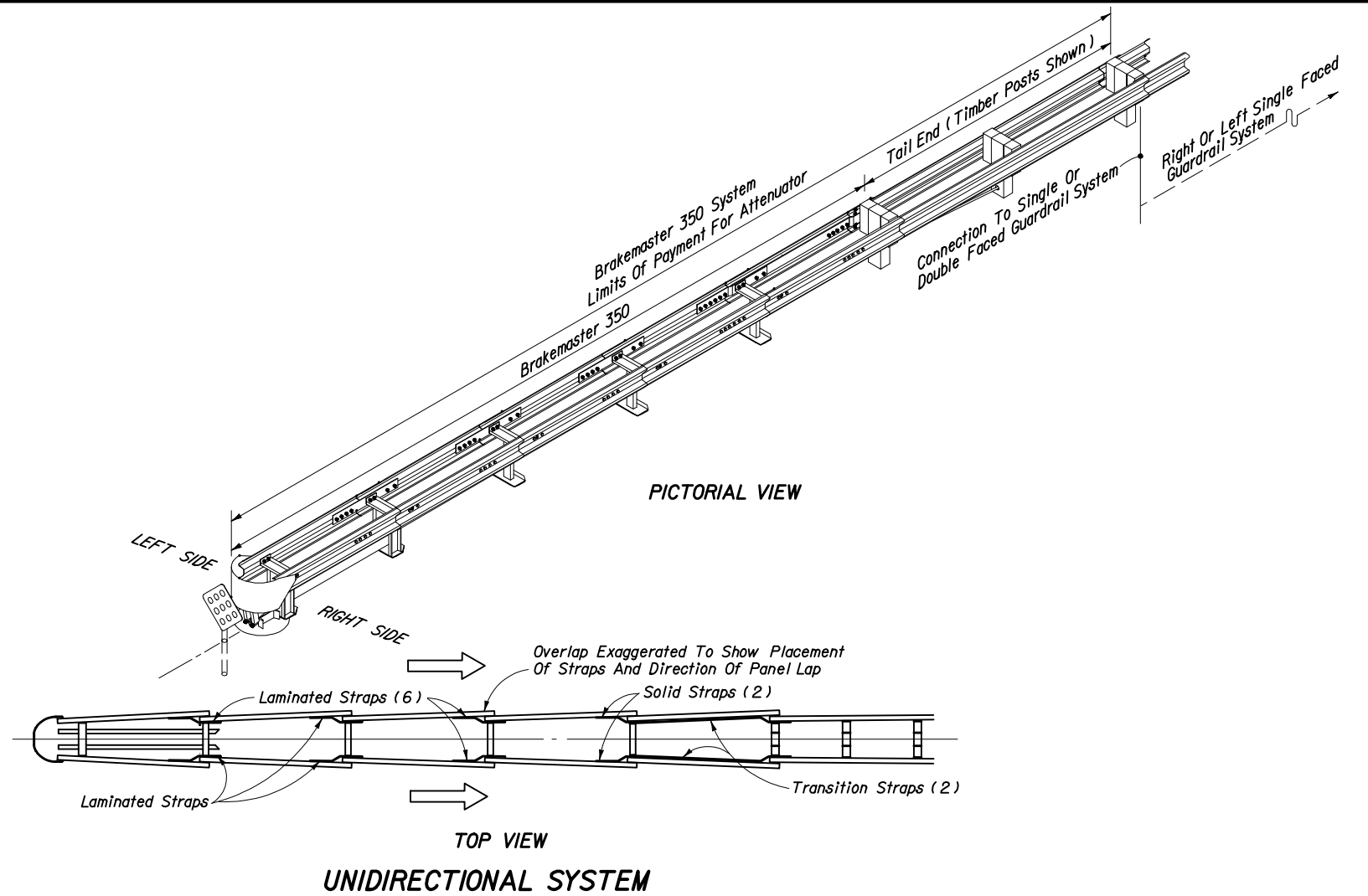
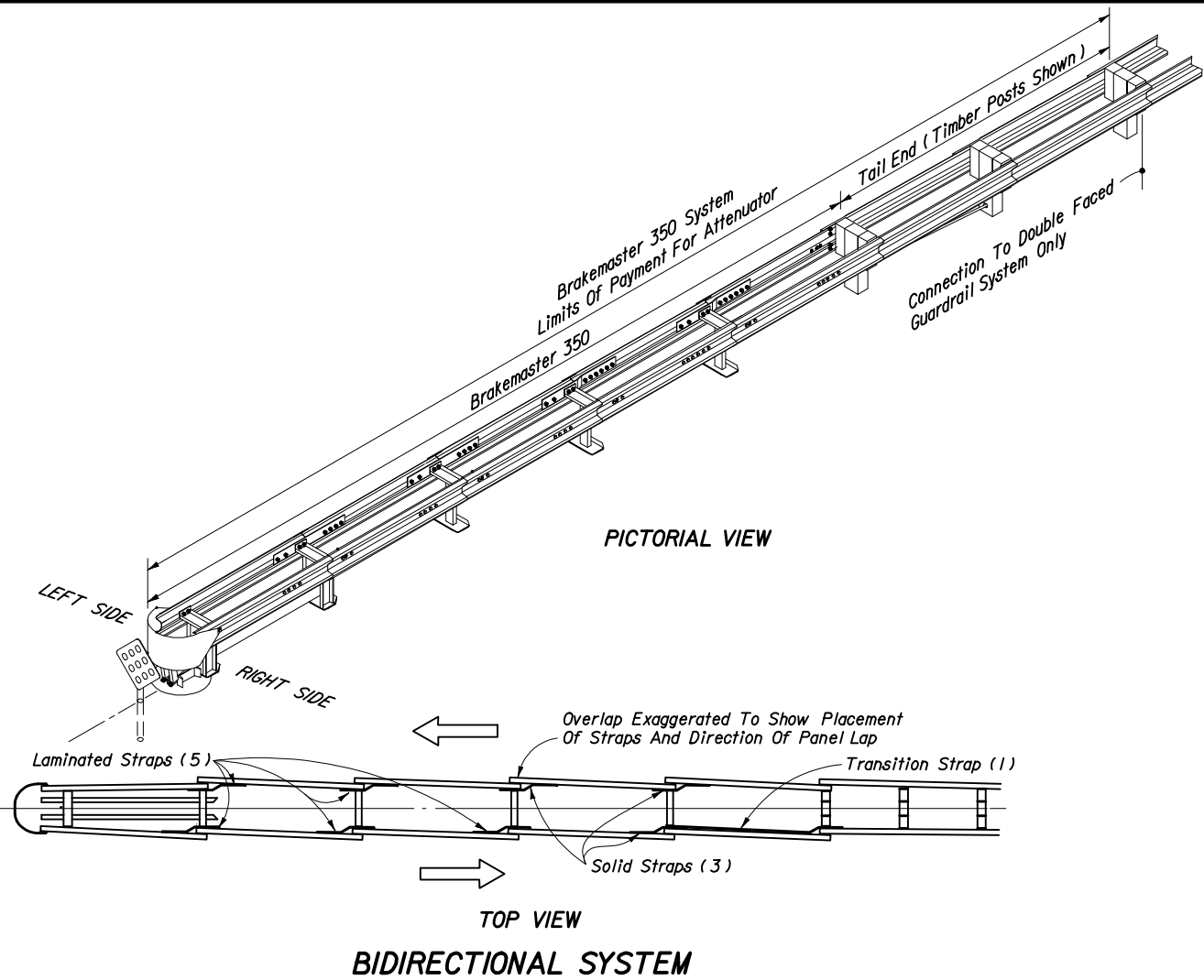


SPECIAL PLATE WASHER



SPECIAL HEX HEAD BOLT  
SPECIAL PLATE WASHER AND SPLICE BOLT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>C-A-T SYSTEM</b>				
DESIGNED BY	NAMES	DATES	APPROVED BY	
DRAWN BY	MFG/JVG	7/91	<i>David Blankard</i> STATE ROADWAY DESIGN ENGINEER	
CHECKED BY	HSD	7/91		
F. H. W. A. APPROVED	JVG/REB	7/91	REVISION NO.	SHEET NO.
			00	2 of 2
				INDEX NO. 432



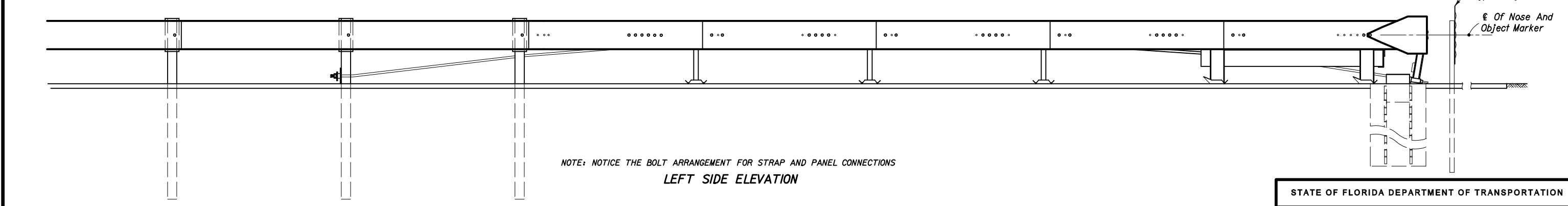
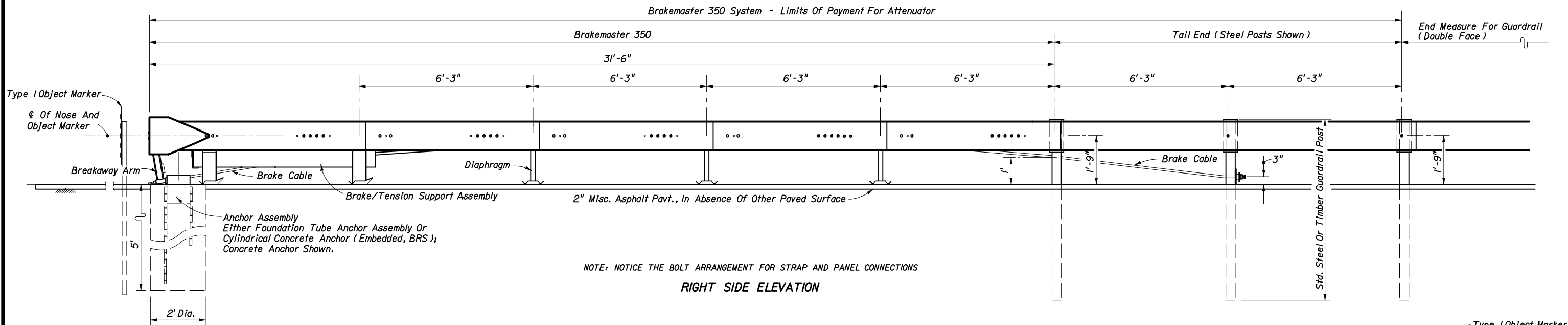
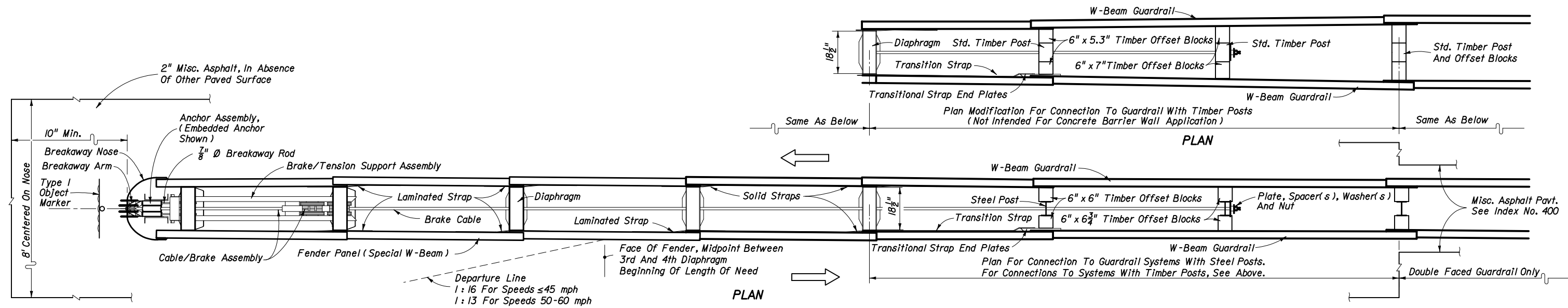
**GENERAL NOTES**

1. The energy absorbing system represented on this standard drawing is a proprietary design by Energy Absorption Systems, Inc. and marketed under the trade name Brakemaster 350. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general information and graphics necessary to field identify component parts of the Brakemaster 350 system and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the Brakemaster 350 system installed in connection with standard single and double faced W-beam guardrail systems, and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals.
4. The Brakemaster 350 system shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications.
5. The Brakemaster 350 system is suitable for speeds  $\leq 60$  mph.
6. The Brakemaster 350 system shall be located on slopes of 1:10 or flatter and not closer than 11' to any traffic lane.
7. The 'tail end' section represented on this drawing applies to connections with single and double faced guardrail. Where the Brakemaster 350 system is installed in conjunction with safety shaped or vertical faced barrier walls or other rigid structures, a special transitional guardrail section between the Brakemaster 350 and wall or structure shall be as detailed on Index No. 410 or as approved by shop drawings.
8. Metallic components shall meet the galvanizing requirements for guardrail, Index No. 400.
9. A yellow Type I Object Marker shall be centered 3' in front of the nose of the Brakemaster 350 system. Mounting hardware shall be in conformance with Index No. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the BRAKEMASTER 350.
10. The Brakemaster 350 system will be paid for under the contract unit price for Impact Attenuator Vehicular (Brakemaster), EA.

**DESIGN NOTES AND GUIDELINES**

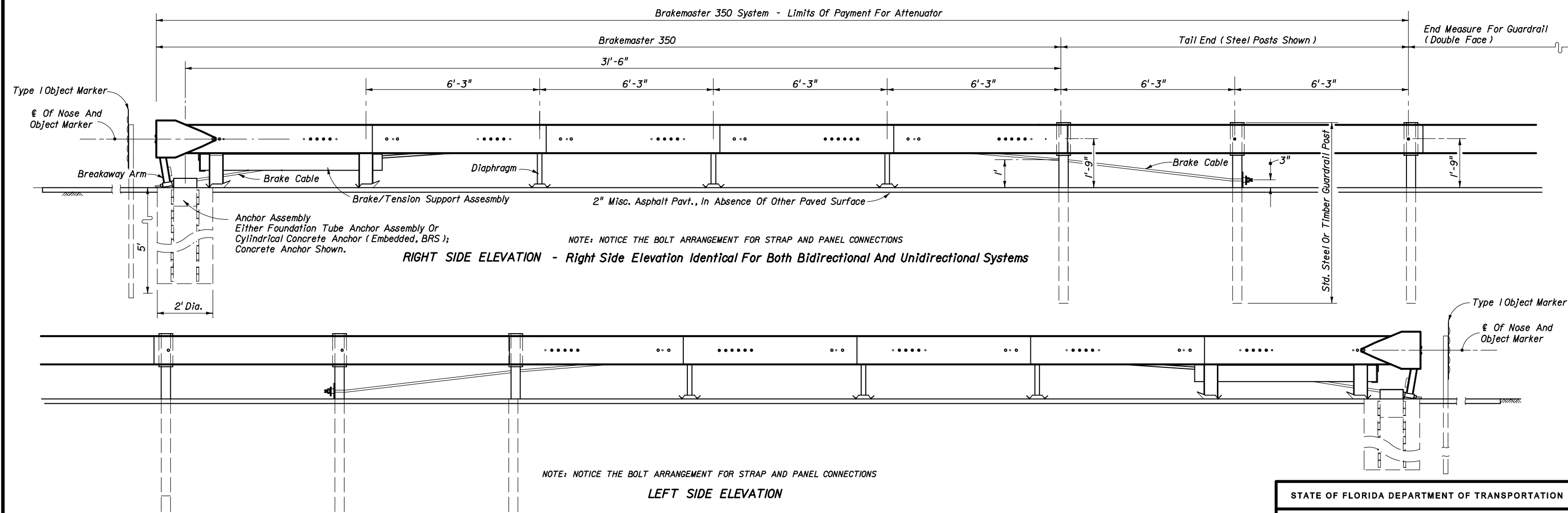
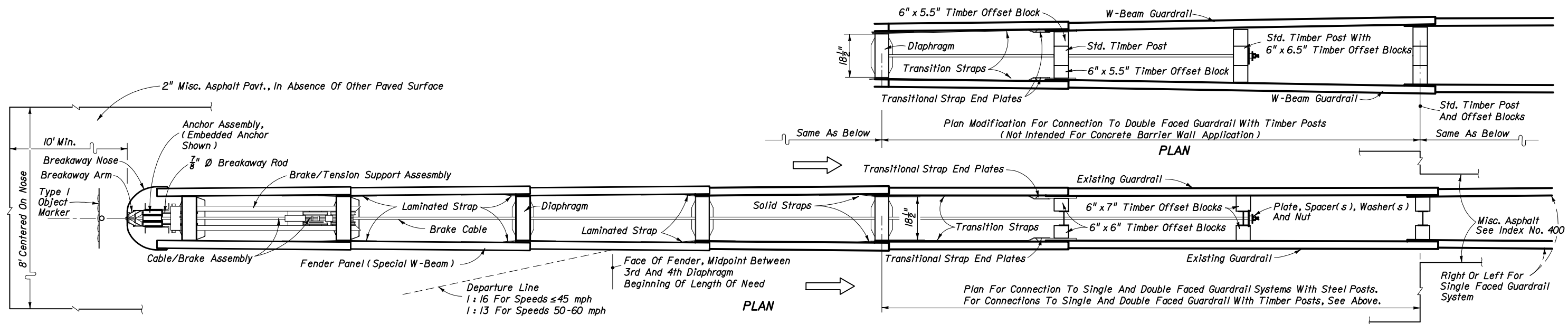
1. The Brakemaster 350 system is designed to cushion automobile end-on hits and to redirect automobiles from side hits when impacting at speeds up to and including 60 mph. The Brakemaster 350 system has a singular design for all speeds of 60 mph or less, and any adjustment to its design will not be permitted except as authorized by the manufacturer.
2. The Brakemaster 350 system is specially designed to shield both narrow hazards and the ends of other fixed barriers located in low frequency impact areas. The Brakemaster 350 system is not intended for use in gores of freeways and expressway mainline ramp terminals; gores of roadway forks; and, other gore locations where there is a history of high frequency vehicle departures from the roadway or the potential exists for such departures. The Brakemaster 350 system is not a restorable design and therefore requires complete replacement after having sustained either an end-on or a side vehicular impact. Deformed side rail elements of the Brakemaster 350 will be subfunctional and are to be replaced immediately; deformed elements are not to be refurbished for reuse. When replacing an impacted Brakemaster 350 system the cable/brake assembly is not to be reused, if the cable sleeve is exposed. After vehicle impact on the Brakemaster 350 system the cable/brake assembly can be returned to the manufacturer for credit toward replacement of the cable.
3. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the Brakemaster 350, and until such alternatives are available, the Brakemaster 350 need not be bid against other proprietary items.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>BRAKEMASTER 350</b>				
	Names	Dates	Approved By	
Designed By	MFG/JVG	7/91	 State Roadway Design Engineer	
Drawn By	HSD	7/91		
Checked By	JVG	7/91		
	Revision	Sheet No.	Index No.	
	00	1 of 4	433	



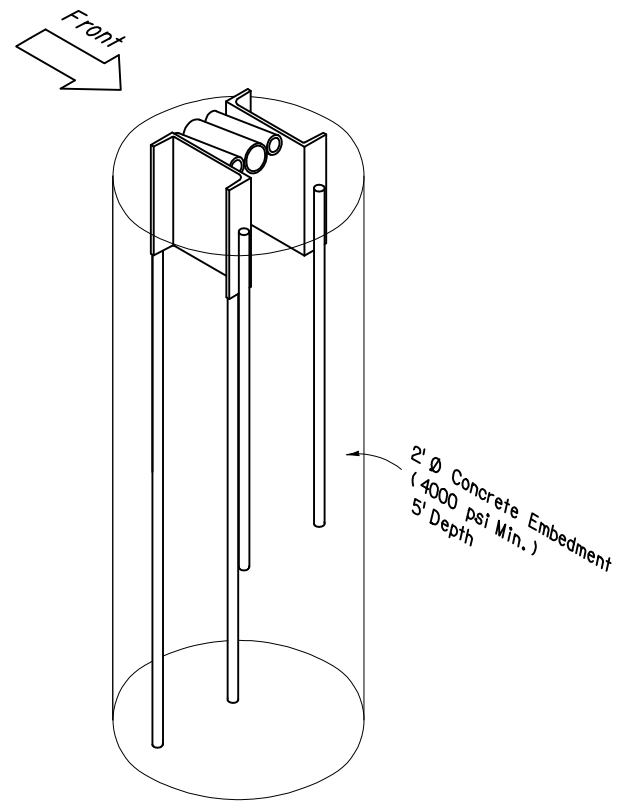
**BIDIRECTIONAL SYSTEM**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>BRAKEMASTER 350</b>				
Names	Dates	Approved By		
Designed By	MFG/JVG	7/91	State Roadway Design Engineer	
Drawn By	HSD	7/91		
Checked By	JVG	7/91	Revision	Sheet No.
			00	2 of 4
				433



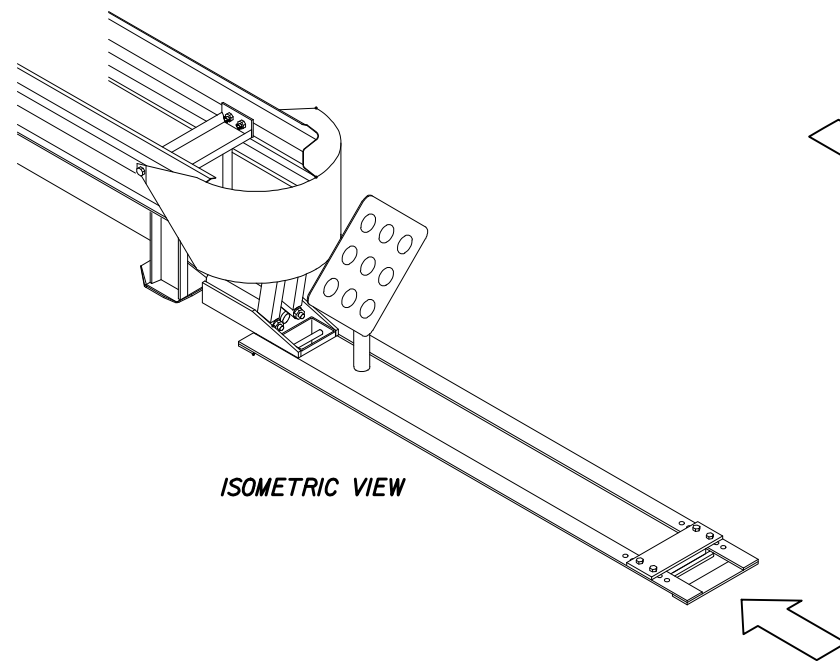
**UNIDIRECTIONAL SYSTEM**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>BRAKEMASTER 350</b>				
Designed By	MFG/JVG	7/91	Approved By <i>Ben Blankenship</i> State Roadway Design Engineer	
Drawn By	HSD	7/91	Revision	Sheet No.
Checked By	JVG	7/91	00	3 of 4
				433

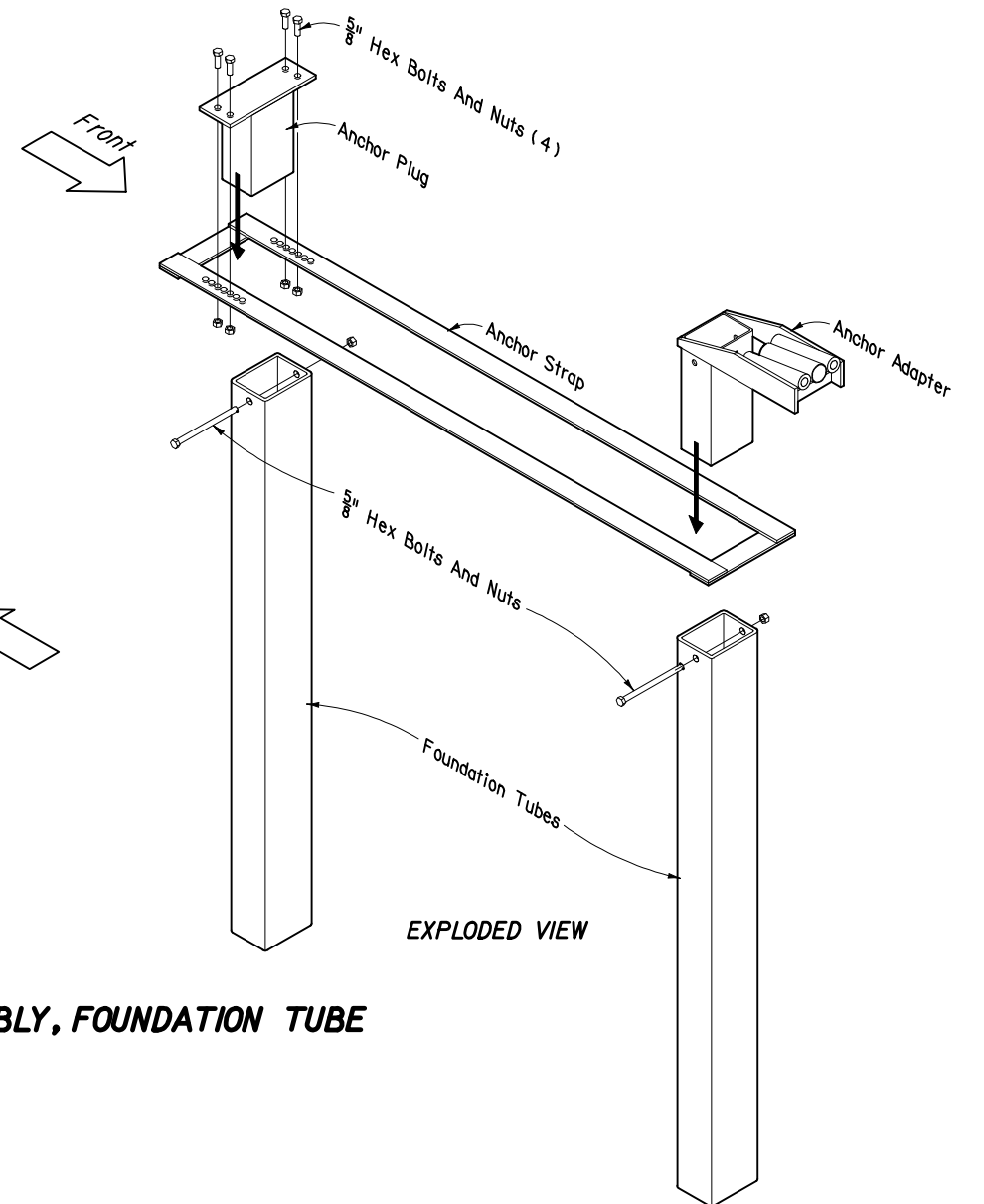


ISOMETRIC VIEW

**ANCHOR ASSEMBLY, EMBEDDED BRS**

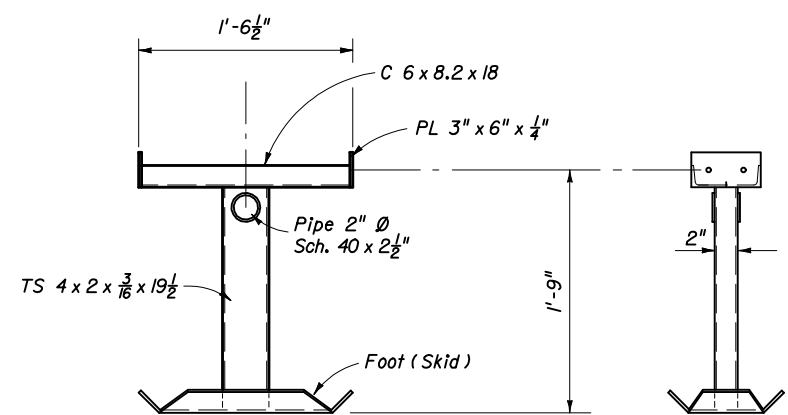


ISOMETRIC VIEW



EXPLODED VIEW

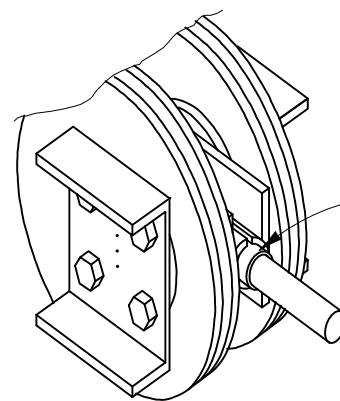
**ANCHOR ASSEMBLY, FOUNDATION TUBE**



FRONT VIEW

SIDE VIEW

**DIAPHRAGM, BRS**




Cable Replacement Required When Cable Sleeve Exposed. See "Design Notes And Guidelines", Note No. 2, For Additional Information.

**BRAKE/CABLE REPLACEMENT**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

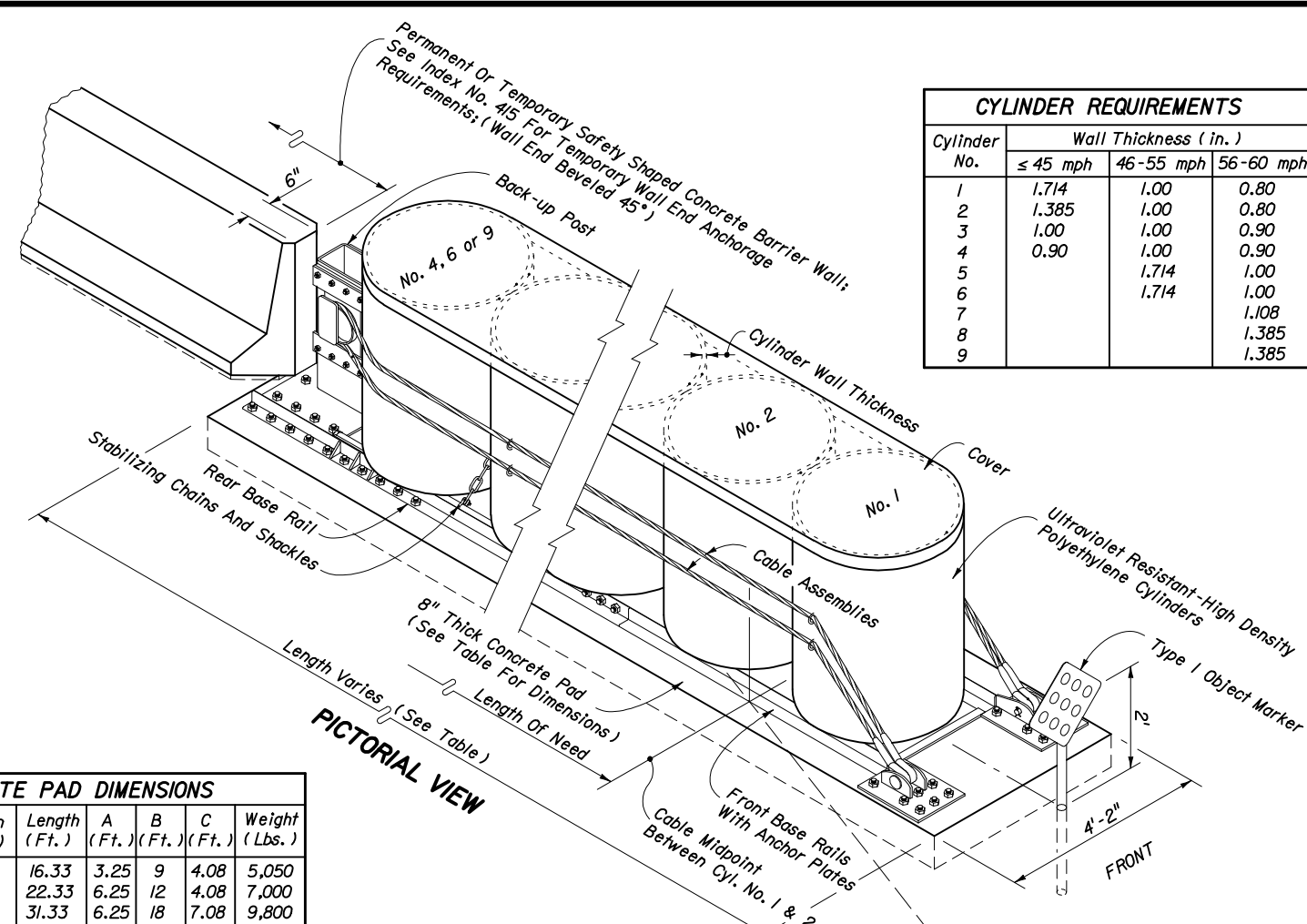
**BRAKEMASTER 350**

Names			Dates			Approved By		
Designed By	MFG/JVG	7/91	 State Roadway Design Engineer			Revision	Sheet No.	Index No.
Drawn By	HSD	7/91				00	4 of 4	433
Checked By	JVG	7/91						

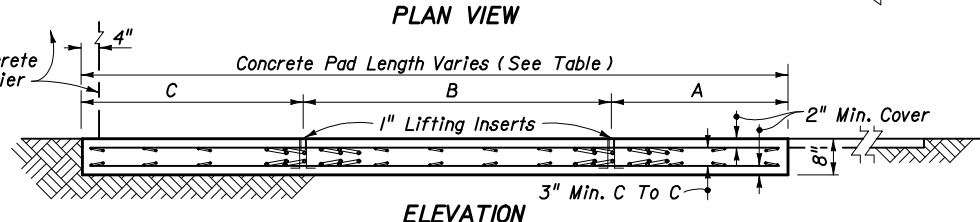
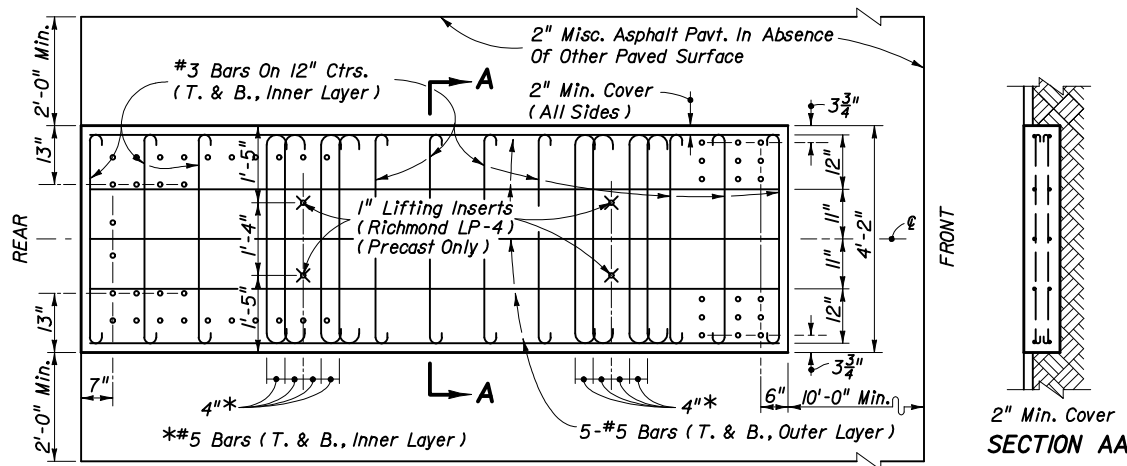
**GENERAL NOTES**

- The energy absorbing unit represented on this standard drawing is a proprietary design by Energy Absorption Systems, Inc. and marketed under the trade name REACT 350, short for Reusable Energy Absorbing Crash Terminal. Any infringement on the rights of the designer shall be the sole responsibility of the user.
- This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the REACT 350 and their incorporation into a whole unit.
- This standard drawing is sufficient for plan details for the REACT 350 installed as a free standing unit shielding safety shaped concrete barrier wall ends and for that use precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. Use of the REACT 350 for shielding other hazards will require plan details, shop drawings, or both where called for in the plans.
- The REACT 350 shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications.
- Concrete foundations shall be constructed with 4000 psi min. compressive strength concrete.
- The REACT 350 is suitable for speeds  $\leq 60$  mph.
- The REACT 350 shall be constructed on cross slopes 1:10 or flatter.
- On facilities with speeds of  $\leq 45$  mph, the REACT 350 can be used in any location specified by the plans or by Department permit. On facilities with speeds of 50-60 mph, units shall not be used in narrow medians where post impact trajectory from end on crashes (rebound) will result in the crash vehicle rebounding into opposing traffic lanes, nor used in gore locations where the crash vehicle is likely to rebound into either the continuing or departing traffic lanes; units can be used in medians and gores where other features such as profile differentials, berms, ditches or other barriers will prevent adverse rebounding encroachment into traffic lanes.
- Due to the overall unit height of 4'-0", which exceeds the drivers height of eye, caution is to be exercised in locating the REACT 350 to avoid blockage of required sight distance.
- All metallic components shall meet the galvanizing requirements for guardrail, Index No. 400.
- A yellow Type I Object Marker shall be centered 3' in front of the nose of the REACT 350. Mounting hardware shall be in conformance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the REACT 350.
- For REACT 350 units that have been impacted by vehicle crashes and are to remain in service, close inspection must be made on the anchorages of the front cable anchor plates and the rear pylon; the anchorages must be in design condition when restoration is complete.
- Quantity for payment of both permanently and temporarily installed REACT 350 units will be based on each independent installation as called for in the plans or as directed by the Engineer. Payment for the permanently installed REACT 350 is for an assembled and installed system including the foundation, and will be paid for under the contract unit price for Impact Attenuator Vehicular (REACT 350), EA. Payment for the temporary REACT 350 is for an assembled and installed unit with components as described for the permanent installation with the addition of miscellaneous asphalt pavement and will be paid for under the contract unit price for Vehicular Impact Attenuator (Temporary) (REACT 350), LO, or when the REACT 350 is used as an option in accordance with Index No. 415 it will be paid for under the contract unit price for Vehicular Impact Attenuator (Temporary) (Redirective Option), LO.

Cylinder No.	Wall Thickness (in.)		
	$\leq 45$ mph	46-55 mph	56-60 mph
1	1.714	1.00	0.80
2	1.385	1.00	0.80
3	1.00	1.00	0.90
4	0.90	1.00	0.90
5		1.714	1.00
6		1.714	1.00
7			1.108
8			1.385
9			1.385

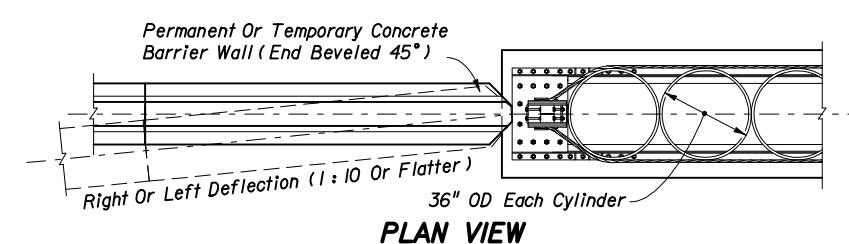


CONCRETE PAD DIMENSIONS						
Number of Cylinders	Width (Ft.)	Length (Ft.)	A (Ft.)	B (Ft.)	C (Ft.)	Weight (Lbs.)
4	4	16.33	3.25	9	4.08	5,050
6	4	22.33	6.25	12	4.08	7,000
9	4	31.33	6.25	18	7.08	9,800



Note: Concrete pads may be precast or cast in place. Precast pads may be permanent or temporary and can be relocated and require reinforcement. Cast in place pads can be permanent or temporary and cannot be relocated and do not require reinforcement.

**CONCRETE PAD**



**REACT 350**

**DESIGN NOTES**

- The REACT 350 is designed to cushion automobile end-on hits and to redirect automobiles from side hits. The number of cylinders to be used in a specific unit will be determined by the design speed, except where the Engineer determines that another speed is more applicable.
- The REACT 350 is a restorable system that is particularly suited to shielding hazards in areas with a history of frequent errant vehicle departures from the roadway or the potential exists for such departures. Until further development is completed in the application of the REACT 350 to shielding other hazards, this Index is limited to use with safety shaped concrete barrier walls. The REACT 350 alone is not suited to shielding a wide hazard.
- The REACT 350 crash data accepted by the Federal Highway Administration (FHWA) covers vehicular impacts at speeds of 60 mph with 9 cylinder units and 45 mph with 4 cylinder units. The 6 cylinder unit has been developed by analytical deduction based on relative energy imparted by an impacting vehicle at various speeds. Until crash test data, accident data or other in service data is available to indicate change in application, the Department will support appropriate use of the six 6 cylinder units at locations where speeds are 55 mph or less. See 'CYLINDER REQUIREMENTS' table above.
- The REACT 350 is a proprietary device with distinct performance, vehicular response and restoration characteristics, unlike other redirective crash cushions. Currently the Department recognizes the devices selective features and does not recognize other proprietary devices as equal alternatives, and until such alternatives are available the REACT 350 need not be bid against other proprietary items.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>REACT 350</b>				
Names	Dates	Approved By		
Designed By	MFG 8-95	 Roadway Design Engineer		
Drawn By	HKH 8-95			
Checked By	JVG 8-95			
Revision	00	Sheet No.	Index No.	
		1 of 1	434	

## GENERAL NOTES

- The energy absorbing system represented on this standard drawing is a proprietary design by Energy Absorption Systems, Inc. and marketed under the trade name QuadGuard. Any infringement on the rights of the designer shall be the sole responsibility of the user.
- This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the QuadGuard System and their incorporation into a whole system.
- This standard drawing is sufficient for plan details for the QuadGuard installed as a free standing system or installed in connection with concrete barrier walls and other fixed barrier systems, and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals.  
  
The QuadGuard tension strut backup is the primary backup to be used on Florida Department Of Transportation projects. Use of concrete backups will be permitted, but will require call out and detailing in the plans for site specific construction; concrete backups must meet manufacturers specifications, installation guidelines and transition hardware requirements.
- The QuadGuard shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications.
- The QuadGuard is available in 24", 30", and 36" nominal widths for narrow hazards and 69" and 90" nominal widths for wide hazards. The system width will be as called out in the plans, permit or other contract document for each location.
- Only the QuadGuard Type I and Type II cartridges shall be used in bay and nose locations as described in the 'BAY SELECTION GUIDELINES' table.
- Cement concrete foundations and cement concrete backup assemblies shall be constructed with 4000 psi min. compressive strength concrete.
- The QuadGuard shall be constructed on cross slopes 1 : 10 or flatter.
- All metallic components shall meet the galvanizing requirements for guardrail, Index No. 400.
- A yellow Type I Object Marker shall be centered 3' in front of the nose of the QuadGuard. Mounting hardware shall be in conformance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the QuadGuard.
- Quantity for payment is based on each independent location as called for in the plans or as directed by the Engineer. The cost for foundations, subgrade preparation and miscellaneous asphalt shown on this index will be included in the cost for the QuadGuard system. The permanent QuadGuard System will be paid for under the contract unit price for Impact Attenuator Vehicular (QuadGuard), EA; temporary units will be paid for under the contract unit price for Vehicular Impact Attenuator (Temporary) (QuadGuard), LO, or when the QuadGuard system is used as an option in accordance with Index No. 415, it will be paid for under contract unit price for Vehicular Impact Attenuator (Temporary) (Redirective Option), LO.

## DESIGN NOTES AND GUIDELINES

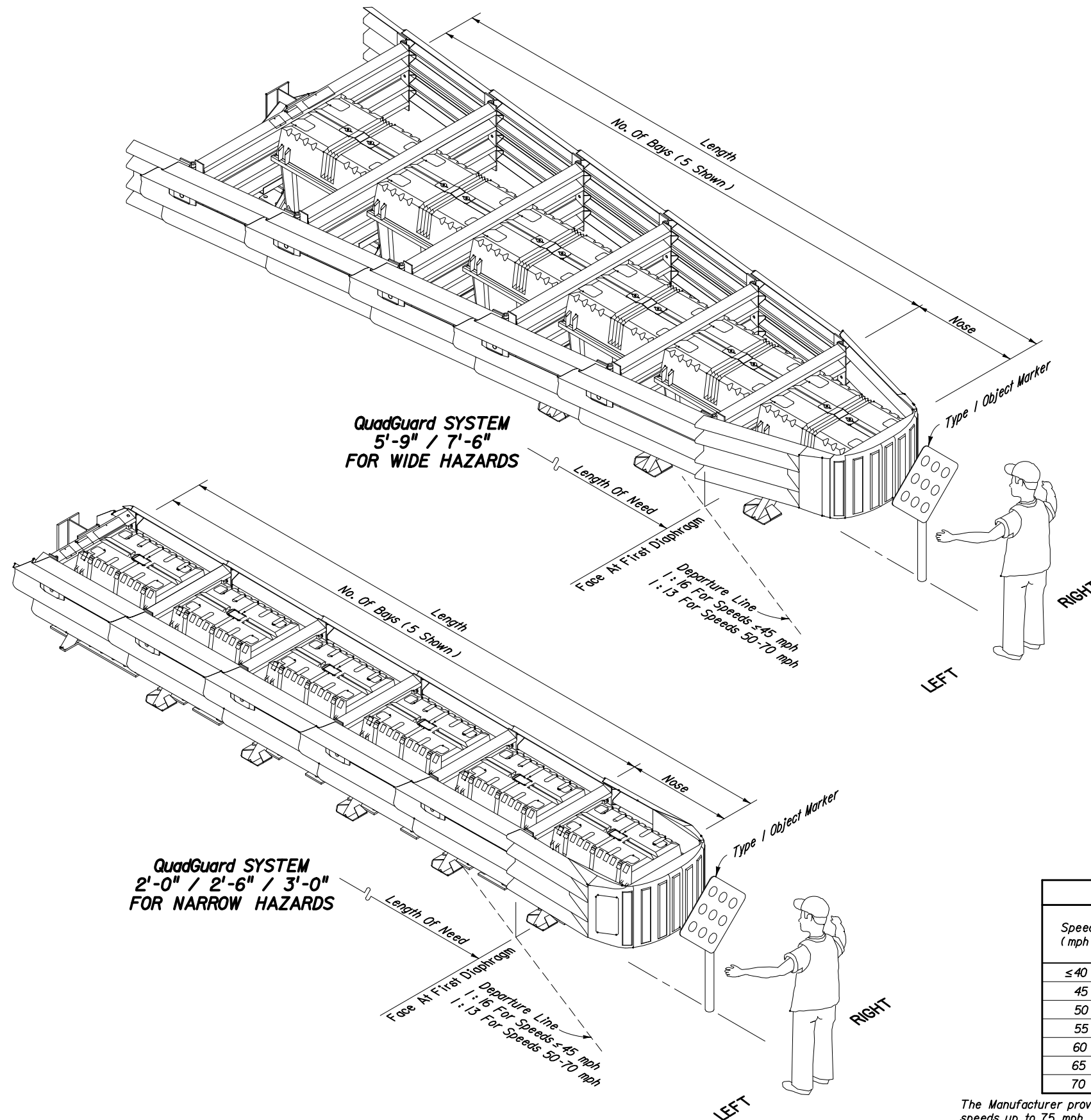
- The QuadGuard System is designed to cushion automobile end-on hits and to redirect automobiles from side hits. The QuadGuard is designed to shield fixed hazards or the ends of other temporary and permanent barrier systems. The number of bays to be used in a specific unit will be determined by the design speed, except where the Engineer determines that another speed is more applicable. The unit width will be determined by the width of the object to be shielded or by the connecting barrier system. The backup assembly for a specific unit will be determined by either (a) the unit standing free of the object to be shielded or (b) the barrier system(s) to which it is connected.
- The QuadGuard is a restorable system that is particularly suited to shielding hazards subject to high speed traffic, high volume traffic, and/or traffic with a history of frequent errant vehicle departures from the roadway or the potential exists for such departures. The QuadGuard is particularly suited to shielding hazards where the approach space is limited; and, is particularly suited to conditions where the terminal must be located close to the traffic lane.
- Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the QuadGuard, and until such alternatives are available, the QuadGuard need not be bid against other proprietary items. However, for temporary use where the QuadGuard and other approved redirective crash cushions meet or exceed the minimum requirements for a specific location, the approved crash cushions will be considered optional systems and paid for as described in General Note II above.

### BAY SELECTION GUIDELINES

Speed (mph)	No. Of Bays	Number Of Cartridges		Length
		Type I (Front)	Type II (Rear)	
≤40	2	2	1	8'-8"
45	3	3	1	11'-8"
50	4	3	2	14'-8"
55	5	4	2	17'-8"
60	6	4	3	20'-8"
65	7	4	4	23'-8"
70	9	4	6	29'-8"


The Manufacturer provides QuadGuard units with up to 12 bays designed for use with speeds up to 75 mph. These larger units may be utilized when called for in the plans or as directed by the Engineer.

## GENERAL SYSTEM FEATURES AND BAY SELECTION GUIDELINES

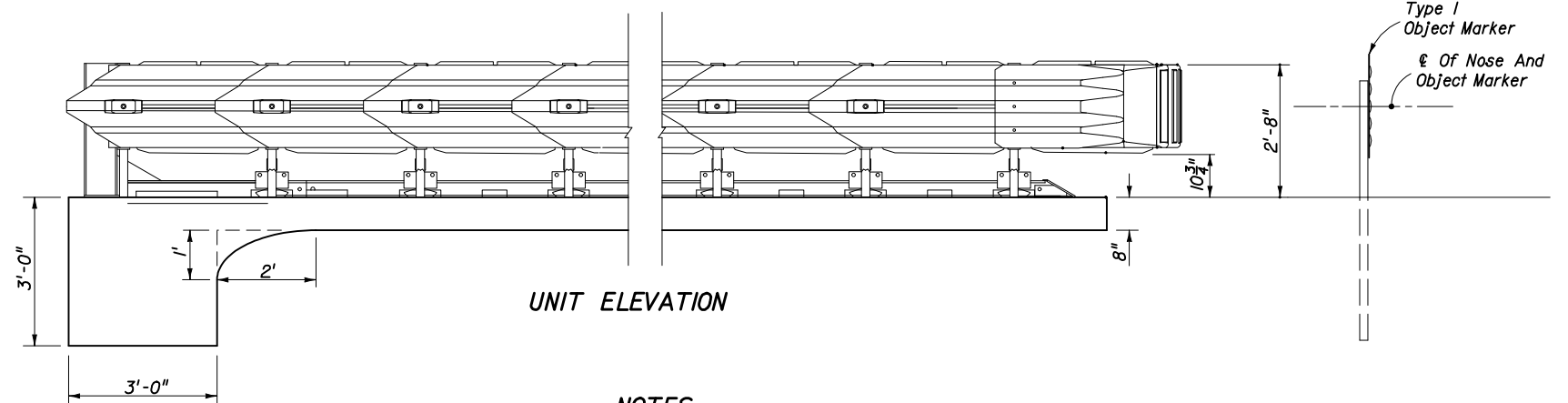
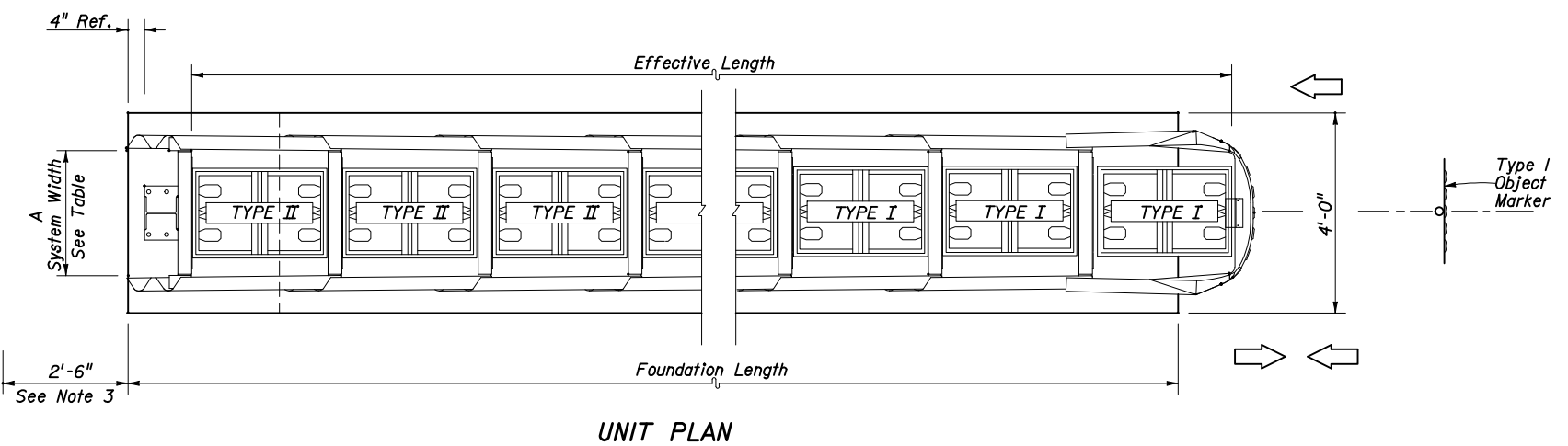
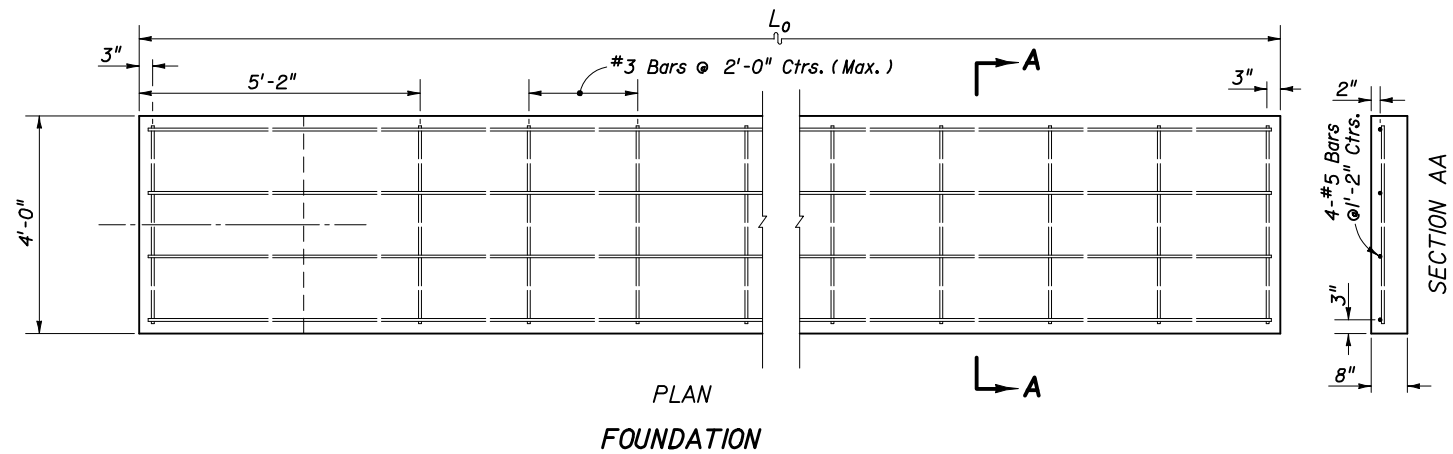


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**QuadGuard**

Names	Dates	Approved By		
Designed By	MFG/STD	 State Roadway Design Engineer		
Drawn By	HKH			
Checked By	JVG	Revision	Sheet No.	Index No.
		00	1 of 6	435





Nominal System Width	A (Backup Width)
2'-0"	2'-0"
2'-6"	2'-6"
3'-0"	3'-0"
5'-9"	5'-3 3/4"
7'-6"	6'-10 5/8"

ESTIMATED FOUNDATION QUANTITIES For Informational Purposes Only				
No. Of Bays	L <sub>0</sub>	REINFORCEMENT		CONCRETE (CY)
		#3	#5	
2	9'-0"	14'-8"	34'-8"	2.0
3	12'-0"	22'-0"	46'-8"	2.3
4	15'-0"	25'-8"	58'-8"	2.6
5	18'-0"	33'-0"	70'-8"	2.9
6	21'-0"	36'-8"	82'-8"	3.2
7	24'-0"	44'-0"	94'-8"	3.5
9	30'-0"	55'-0"	118'-8"	4.1

Note: Monorail anchorage bolt spacing to be in accordance with the manufacturer's installation drawings and specifications.

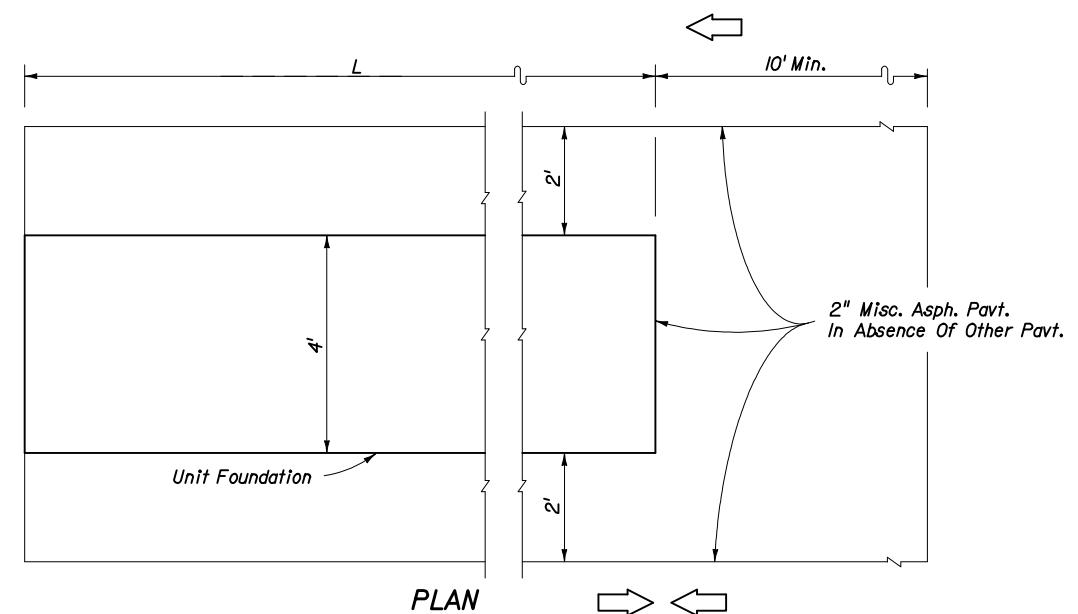
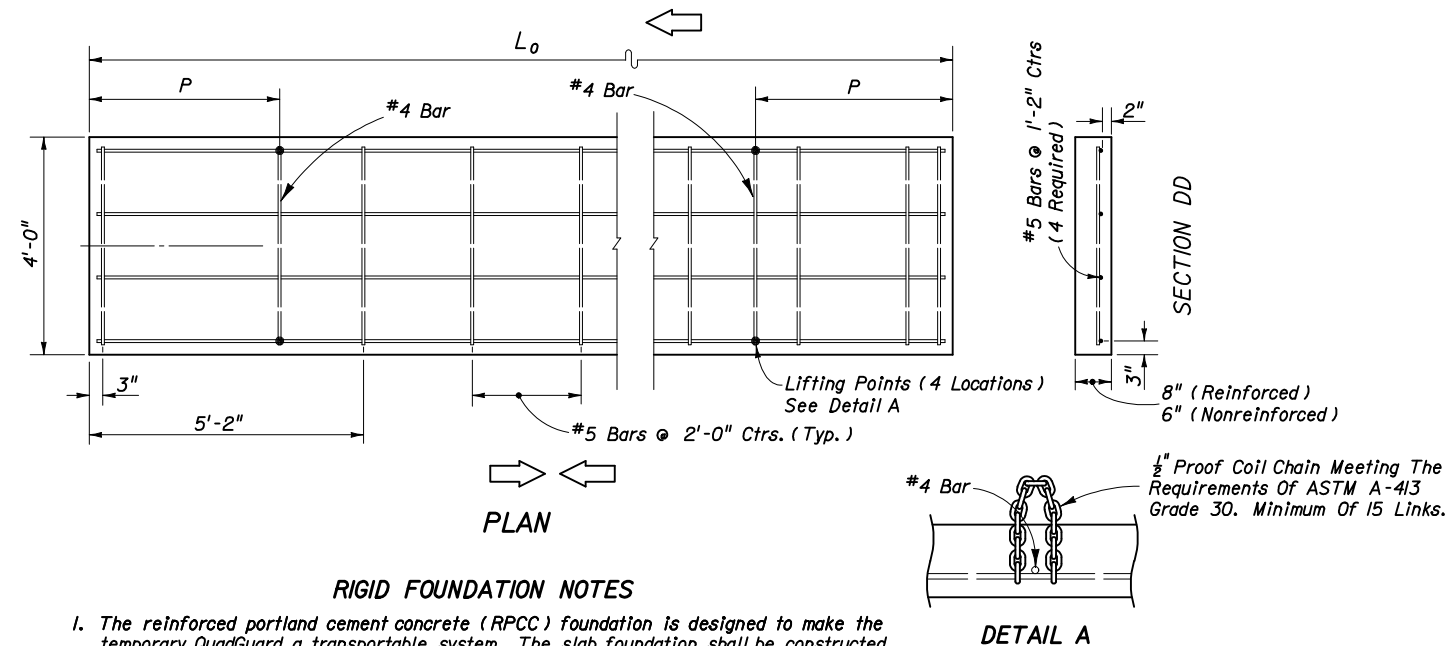
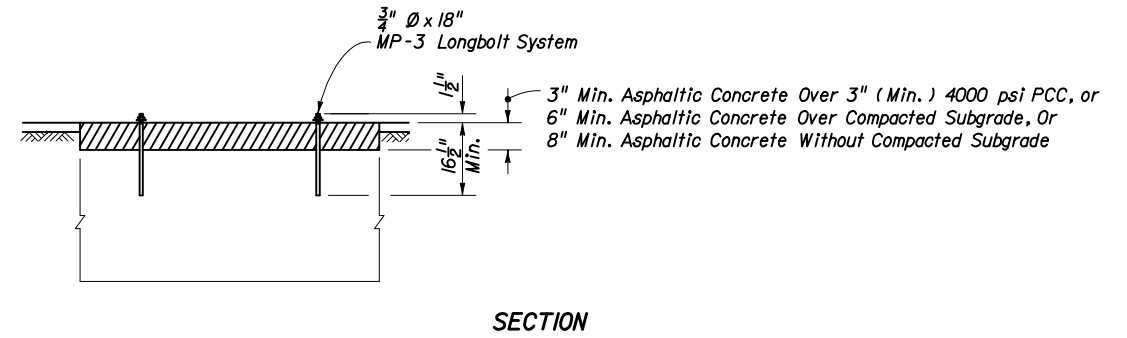
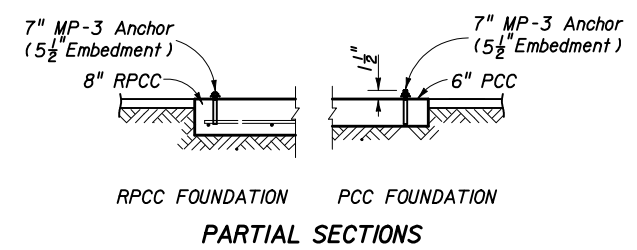
**NOTES**

1. The foundation depicted on this sheet is applicable to QuadGuard systems for both narrow and wide hazards, 2'-6" system shown.
2. For the number of bays required see table, Sheet 1.
3. Provision shall be made for rear fender panels to slide rearward upon impact 2'-6" min.
4. For barrier connections see 'TRANSITIONS', Sheet Nos. 4 and 5.

**PERMANENT FOUNDATION FOR TENSION STRUT BACKUP ASSEMBLY**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>QuadGuard</b>				
Names	Dates	Approved By		
Designed By	MFG/STD	 State Roadway Design Engineer		
Drawn By	HKH			
Checked By	JVG	Revision	Sheet No.	Index No.
		02	2 of 6	435

ESTIMATED FOUNDATION QUANTITIES For Informational Purposes Only					
No. Of Bays	L <sub>0</sub>	P	REINFORCED		NONREINFORCED
			Rebar Required	Concrete Required (CY)	Concrete Required (CY)
3	12'	3'-0"	68'-0"	1.2	0.9
4	15'	3'-9"	83'-8"	1.5	1.1
5	18'	4'-6"	103'-0"	1.8	1.3
6	21'	5'-3"	118'-8"	2.1	1.6
7	24'	6'-0"	138'-0"	2.4	1.8
9	30'	7'-6"	173'-0"	3.0	2.2



**RIGID FOUNDATION NOTES**

- The reinforced portland cement concrete (RPCC) foundation is designed to make the temporary QuadGuard a transportable system. The slab foundation shall be constructed with 4000 psi min. compressive strength concrete. The slab shall be seated so the top of the slab is flush with the surface intended for approaching vehicles. In absence of other pavement the surrounding surface shall be paved with 2" of miscellaneous asphalt pavement as depicted in 'ASPHALTIC CONCRETE FOUNDATIONS'. The QuadGuard shall be anchored exclusively with the 7" MP-3 anchor system supplied with the QuadGuard unit, unless another anchor is supplied or approved by the QuadGuard manufacturer.
- The nonreinforced portland cement concrete (PCC) foundation shall be Class I concrete, having depth equal to or greater than 6". The PCC foundation utilization options are as follows: (a) Poured in place as an expendable slab, having a thickness of not less than 6"; disposal of the slab will be as approved by the Engineer, (b) Project constructed roadway PCC pavement, or, (c) Existing 9" PCC roadway pavement.  
  
The utilization option applied shall be as approved by the Engineer on a site specific basis. The top of the foundation shall be flush with the surface intended for approaching vehicles. In absence of surrounding pavement the surrounding surface shall be paved as shown on this sheet in 'ASPHALTIC CONCRETE FOUNDATIONS'.  
  
The QuadGuard installed on PCC pavement shall be anchored only with the MP-3 anchor system supplied with the QuadGuard unit. Holes for the 7" anchors shall be drilled in both existing and new pavements. When the QuadGuard is removed from the project pavement or from existing pavement that is to remain in place, the anchor shall be cut off flush with the top of the pavement, unless the plans call for other treatment.
- For additional information see the General Notes.

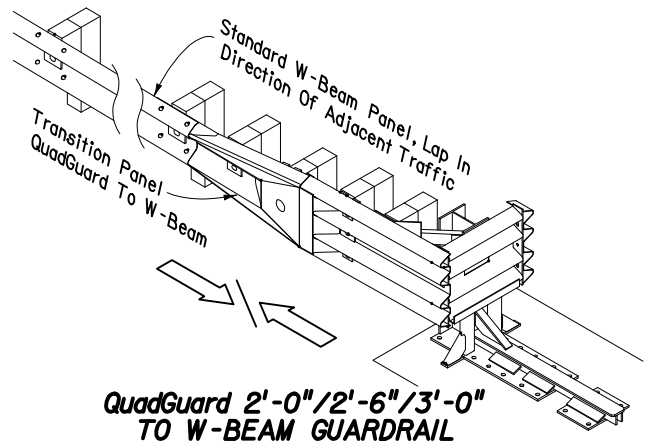
**NOTES**

- For the number of bays required see table, Sheet 1.
- For barrier connections see 'TRANSITIONS', Sheet Nos. 4 and 5.

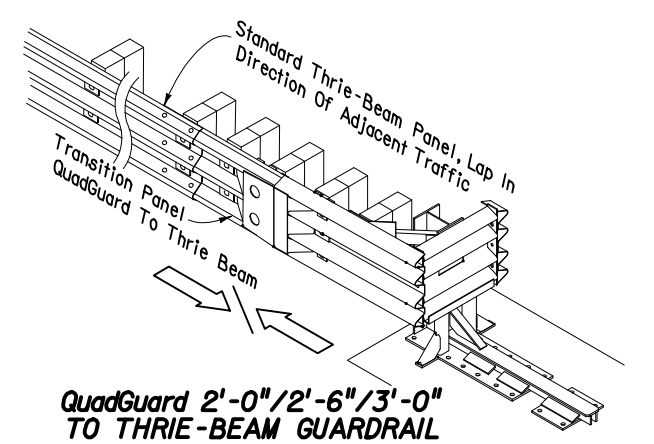
**REINFORCED AND NONREINFORCED CONCRETE PAD SYSTEMS  
CEMENT CONCRETE FOUNDATIONS**

**TEMPORARY FOUNDATIONS**

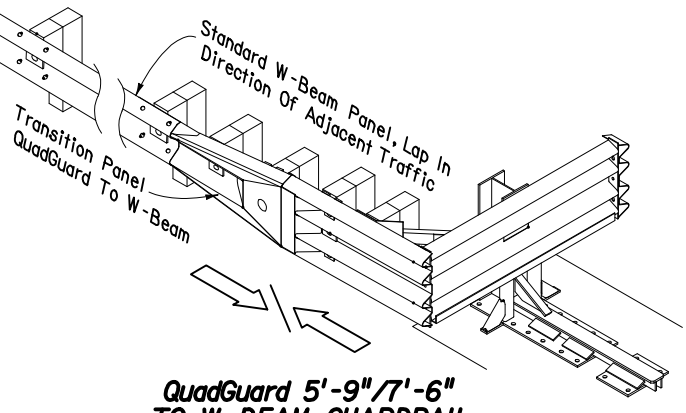
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>QuadGuard</b>					
Names	Dates	Approved By			
Designed By	MFG	<i>Brian Blankenship</i> State Roadway Design Engineer			
Drawn By	HKH	8/97	Revision	Sheet No.	Index No.
Checked By	JVG	8/97	00	3 of 6	435



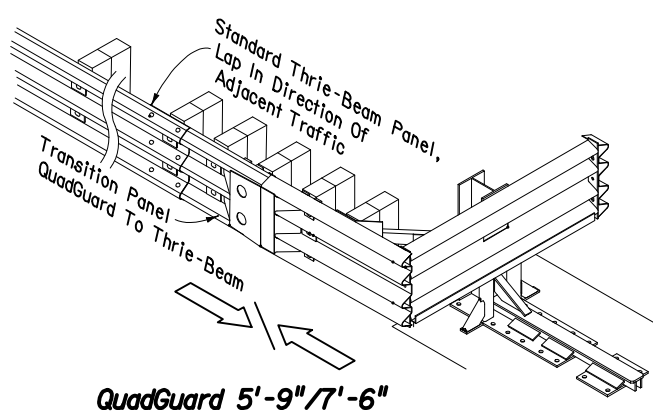
**QuadGuard 2'-0"/2'-6"/3'-0" TO W-BEAM GUARDRAIL**



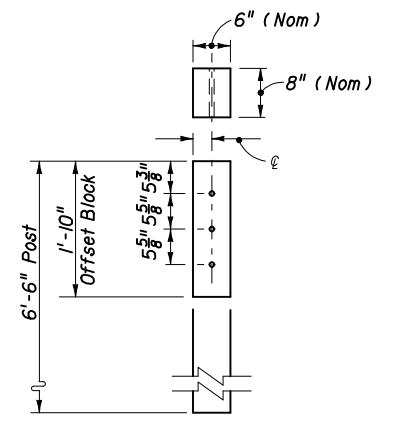
**QuadGuard 2'-0"/2'-6"/3'-0" TO THRIE-BEAM GUARDRAIL**



**QuadGuard 5'-9"/7'-6" TO W-BEAM GUARDRAIL**



**QuadGuard 5'-9"/7'-6" TO THRIE-BEAM GUARDRAIL**

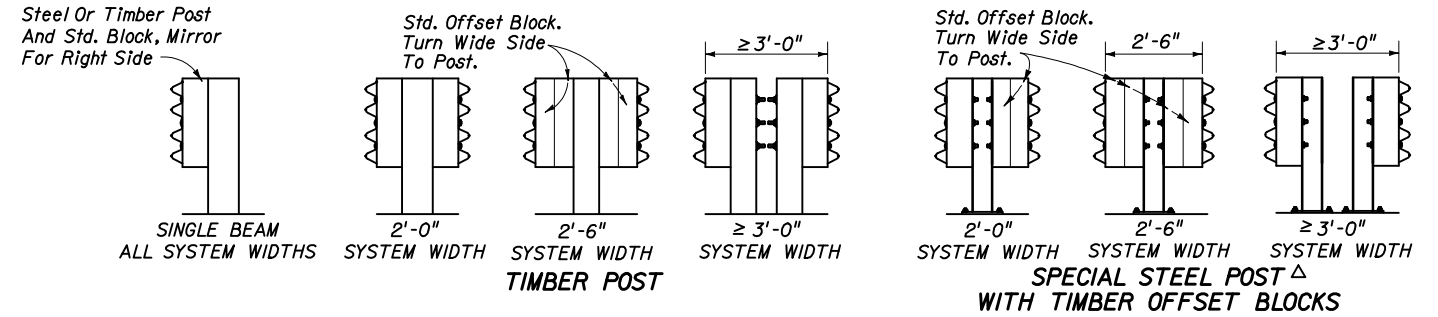


**TIMBER**

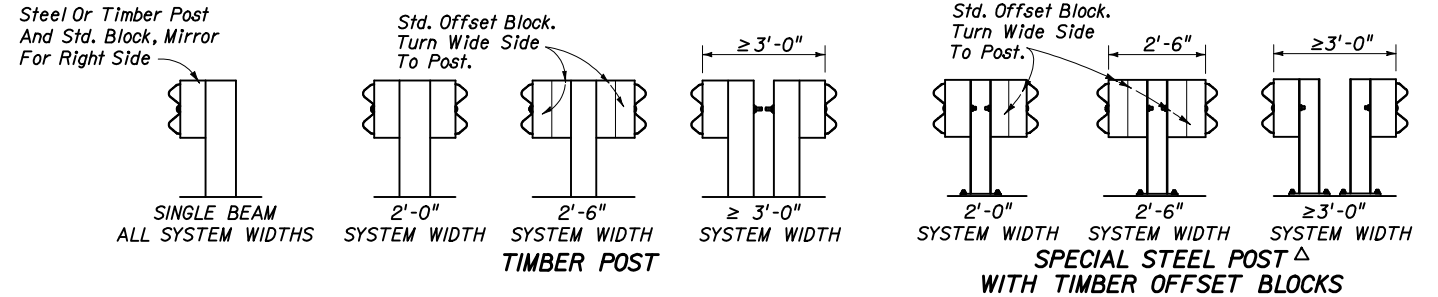
**NOTES**

- All holes  $\frac{3}{4}$ "  $\varnothing$ .
- When using a special steel post with a timber offset block at location #2, field drill matching attachment holes in block and in post flange. When drilling special steel posts metalize holes in accordance with Index No. 400.
- For double face guardrail applications with special steel posts and 2'-0" or 2'-6" system widths, and, with timber posts and 2'-6" system widths, turning wide side of standard offset block to post or field trimming will be required, see Sections right.

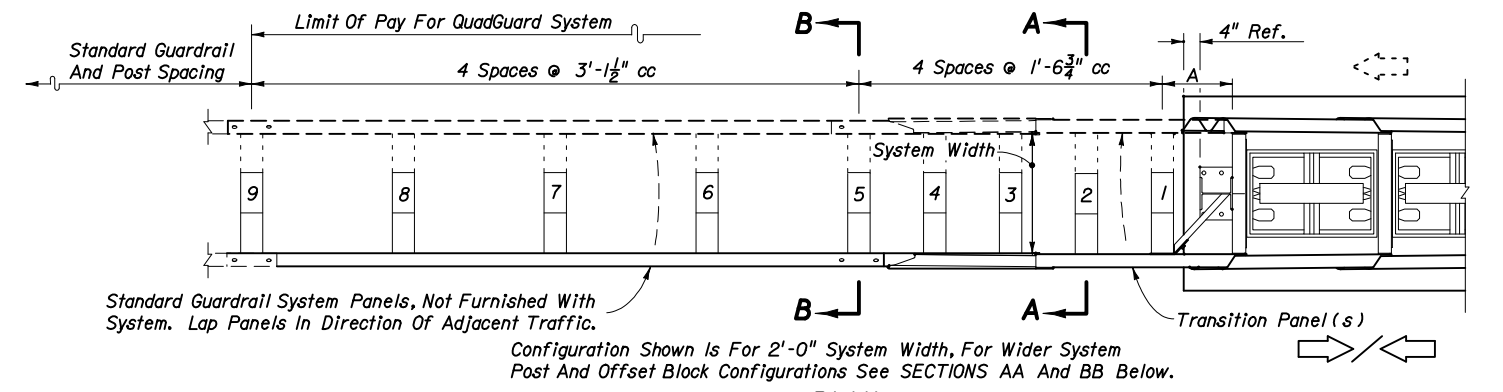
**POSTS AND OFFSET BLOCKS FOR LOCATIONS #1 AND #2**



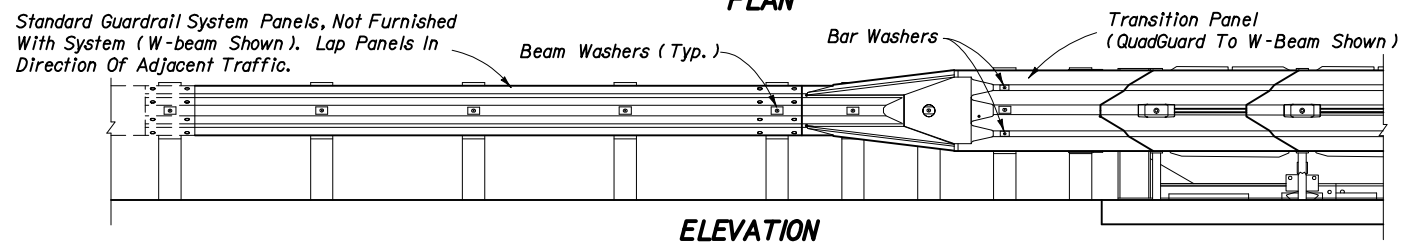
See Post And Offset Block Details Left  
**SECTION AA (POSTS #1 AND #2)**



Post And Offset Block Configurations Are Identical For W-beam Or Thrie-beam, W-beam Shown  
**SECTION BB (POSTS #3 THRU #9)**



**PLAN**



**ELEVATION**

**NOTES**

- Transitions are required when connecting the QuadGuard to any guardrail system.
- Post spacing identical for W-beam or thrie-beam, W-beam shown.
- Post #1 is not bolted directly to transition panel(s).
- Install beam washers on post bolts on posts #2 thru #9, with supplementary bar washers at post #2.
- W-Beam Transition:  
Posts #1 and #2 - Posts and offset blocks as shown below.  
Posts #3 thru #9 - Standard W-beam posts and offset blocks, see Index No. 400.  
Thrie-Beam Transition:  
Posts #1 and #2 - Posts and offset blocks as shown below.  
Posts #3 thru #9 - Standard thrie-beam posts and offset blocks, see Index No. 400.  
Transitions using steel posts: Use limited to rigid surface mounting (decks and slabs). See Index No. 400 for special steel guardrail posts. See section below.  $\Delta$

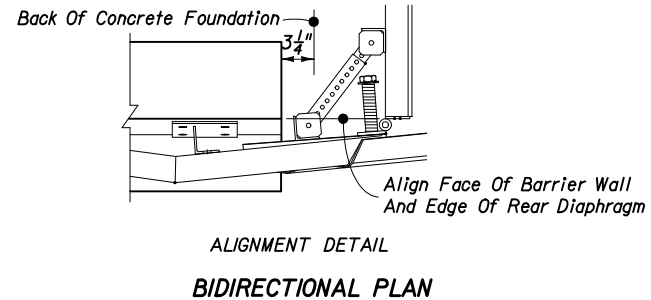
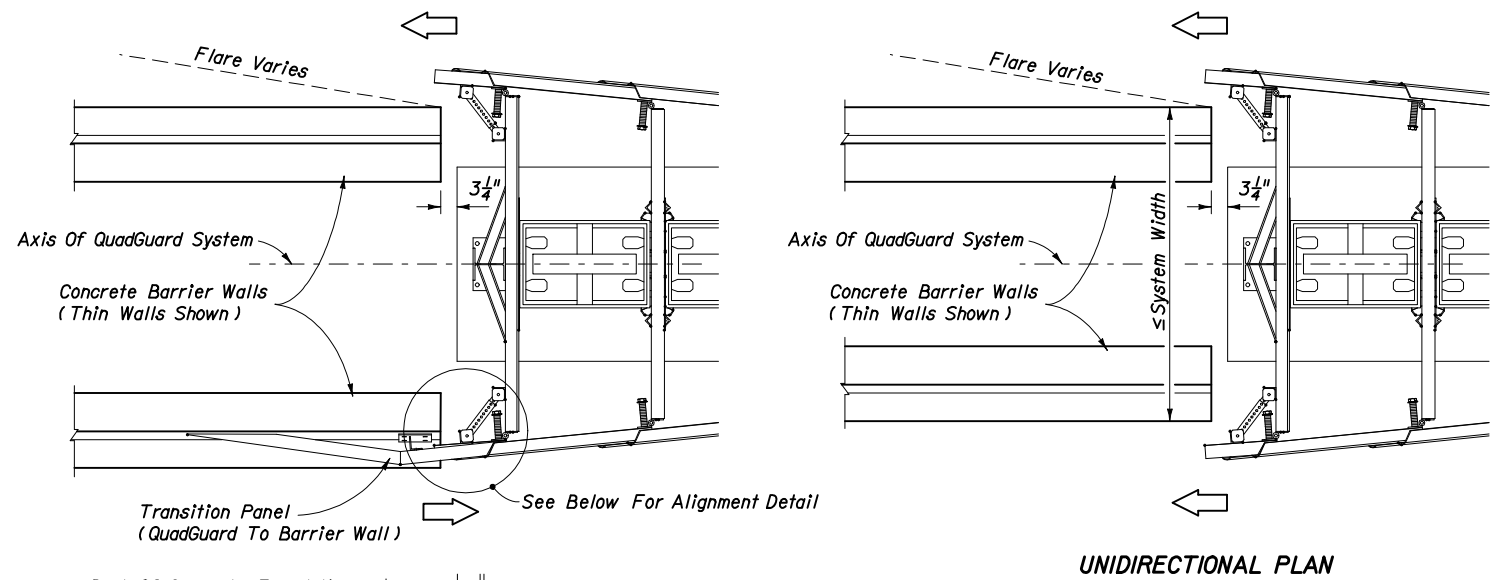
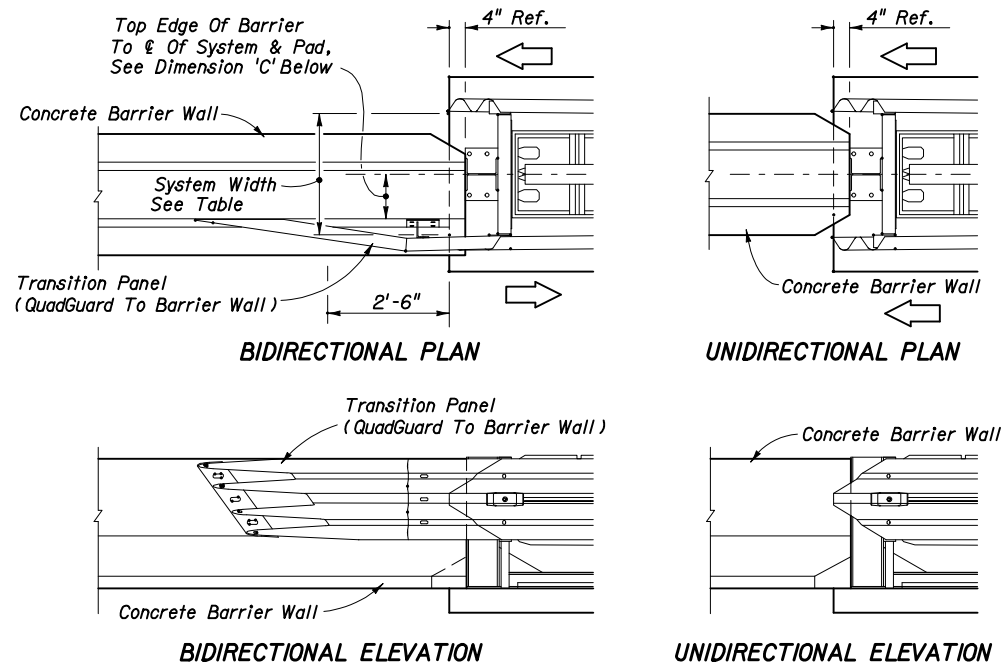
System Width	A
2'-0"/2'-6"/3'-0"	18.7"
5'-9"/7'-6"	21.93"

**QuadGuard TO GUARDRAIL TRANSITIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

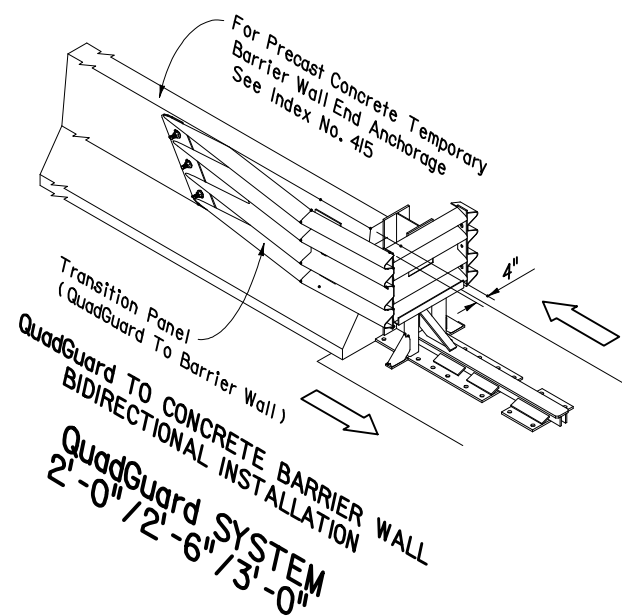
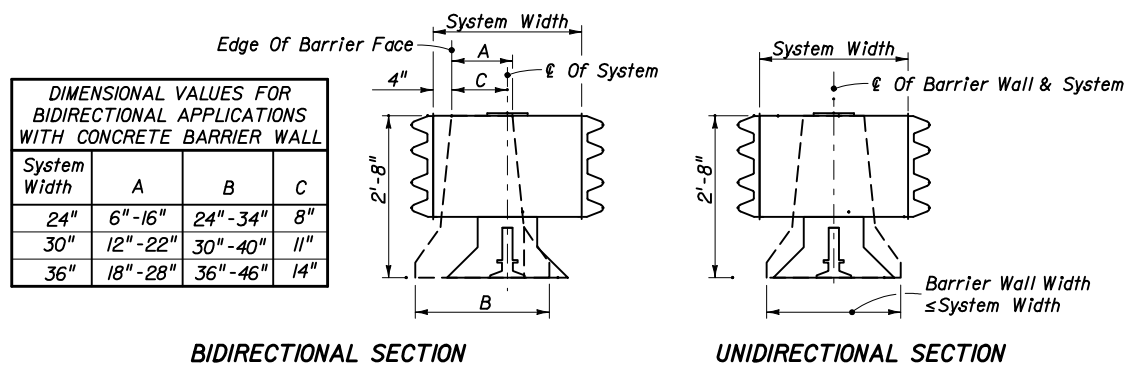
**QuadGuard**

Names	Dates	Approved By
Designed By: MFG/JVG	09/97	<i>Blair</i> State Roadway Design Engineer
Drawn By: HKH	09/97	
Checked By: JVG	09/97	
Revision: 00	09/97	
Sheet No.	Index No.	
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The axis of the QuadGuard relative to concrete barriers will be established on site specific basis. The QuadGuard supplier shall furnish dimensional data for setback between the barrier wall end and the system foundation, and for the alignment between the face of the barrier wall and the rear diaphragm where dimensions other than those above apply.

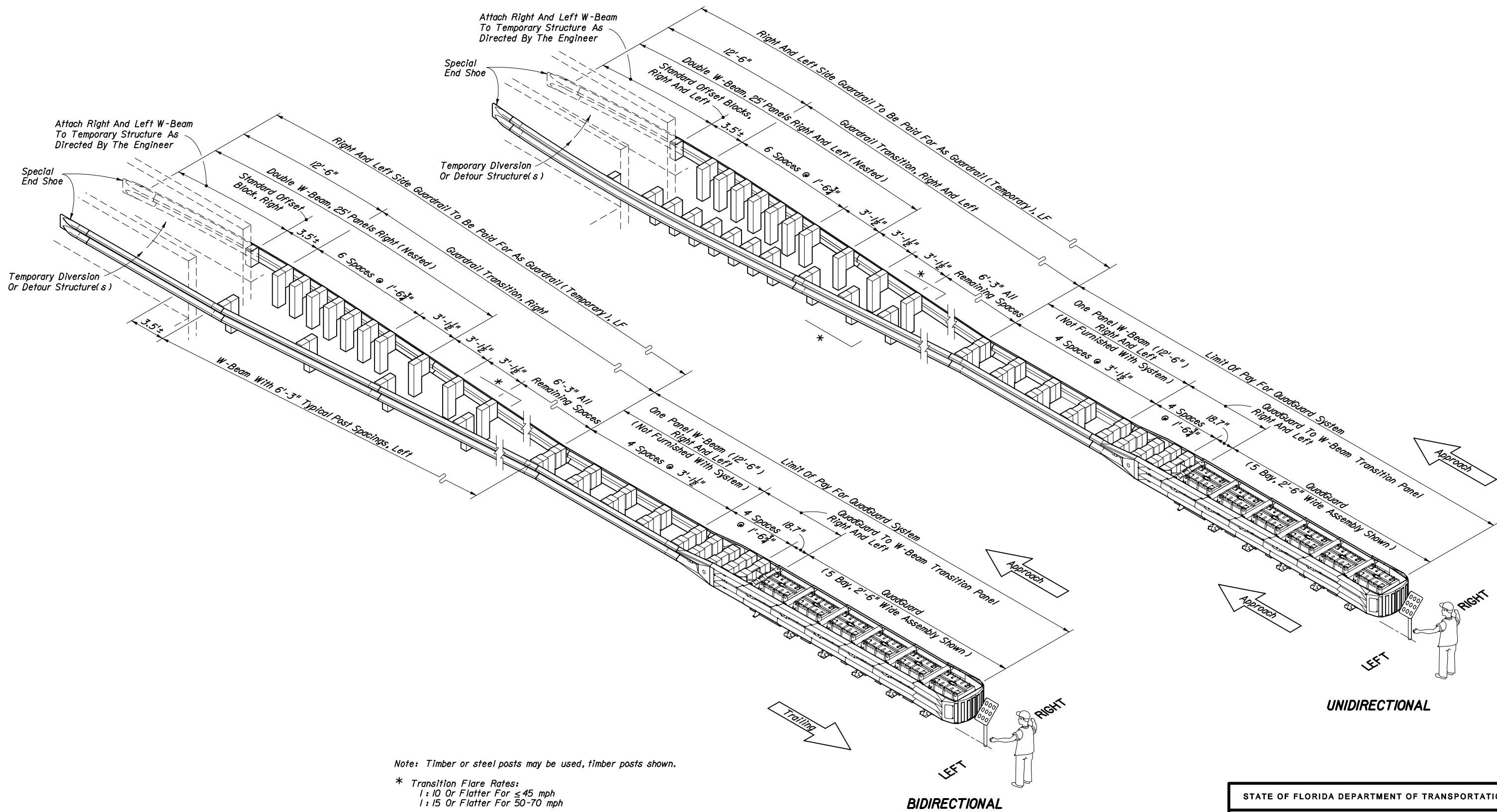
**QuadGuard SYSTEM**  
5'-9" / 7'-6"



**BARRIER WALL TRANSITION NOTE**  
Barrier wall free end must be reinforced in accordance with Index No. 410 and temporary walls must be adequately anchored for proper impact performance in accordance with Index No. 415.

**QuadGuard TO CONCRETE BARRIER WALL TRANSITIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>QuadGuard</b>				
Names	Dates	Approved By		
Designed By	MFG/JVG	09/97	 State Roadway Design Engineer	
Drawn By	HKH	09/97		
Checked By	JVG	09/97	Revision	00
			Sheet No.	5 of 6
			Index No.	435



Note: Timber or steel posts may be used, timber posts shown.

\* Transition Flare Rates:  
 1:10 Or Flatter For ≤ 45 mph  
 1:15 Or Flatter For 50-70 mph

# GUARDRAIL TRANSITION TO TEMPORARY DIVERSION OR DETOUR STRUCTURES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>QuadGuard</b>				
Names	Dates	Approved By		
Designed By	MFG/STD	<i>Blair</i> State Roadway Design Engineer		
Drawn By	HKH	Revision	Sheet No.	Index No.
Checked By	JVG	00	6 of 6	435

## GENERAL NOTES

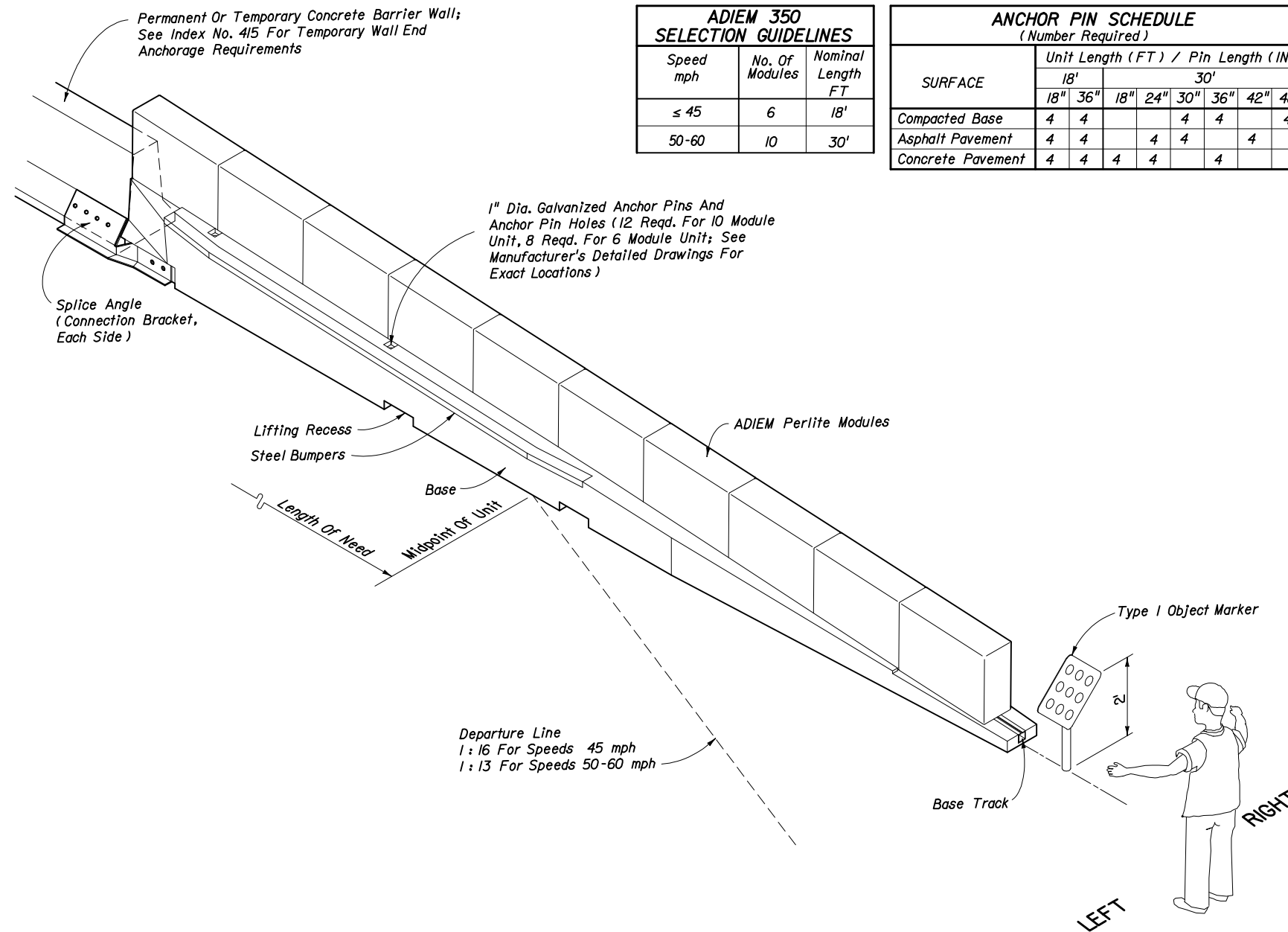
- The energy absorbing system represented on this standard drawing is a proprietary design by SYRO Inc. and marketed under the trade name ADIEM 350. Any infringement on the rights of the designer shall be the sole responsibility of the user.
- This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the ADIEM 350 and their incorporation into a whole system.
- This standard drawing is sufficient for plan details for the ADIEM 350 installed in connection with permanent or temporary concrete barrier walls, and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals.
- The ADIEM 350 shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications.
- The ADIEM 350 can be located on compacted base, asphalt or concrete. Driving of anchor pins into compacted base or soft asphalt will be permitted while drilling will be necessary for hard asphalt or concrete pavements. See schedule left for anchor pin requirements.
- The ADIEM 350 is suitable for speeds  $\leq 60$  mph.
- The ADIEM 350 shall be located parallel to the approach travel lane(s), on 1:10 or flatter cross slopes. Until there is further development in the application of the ADIEM 350, the system is not to be located in narrow medians, gores or locations where frequent side impacts can be expected.
- All modules are alike in size and mass (interchangeable).
- Due to the overall unit height of 4', which exceeds the drivers height of eye, caution is to be exercised in locating the ADIEM 350 to avoid blockage of required sight distance.
- Attach splice angle (connection bracket) to ADIEM 350 base with 2-1/8" dia. x 25" long HD hex bolts. Attach splice angle to barrier wall with 8 field drilled 5/8" dia. x 6" long chemical anchors.
- A yellow Type I Object Marker shall be centered 3' in front of the nose of the ADIEM 350. Mounting hardware shall be in conformance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the ADIEM 350.
- Temporary ADIEM 350 systems can be reused provided the bases have the structural integrity and surface qualities of new systems, and the modules are condition new. Refurbished systems can be made up of mixed new and used components. New and used systems can be purchased, leased, rented, on loan or shared between projects.
- The permanent ADIEM 350 will be paid for under the contract unit price for Impact Attenuator Vehicular (ADIEM), EA; temporary units will be paid for under the contract unit price for Vehicular Impact Attenuator (Temporary) (ADIEM), LO, or when the ADIEM 350 is used as an option in accordance with Index No. 415, it will be paid for under the contract unit price for Vehicular Impact Attenuator (Temporary) (Redirective Option), LO.

## DESIGN AND MAINTENANCE NOTES AND GUIDELINES

- The ADIEM 350 is designed to cushion automobile end-on hits and to redirect automobiles from side hits within the length of need while shielding the ends of permanent or temporary concrete barrier walls.
- The ADIEM 350 is a restorable system that is particularly suited to shielding concrete barrier wall ends. The 18' unit is applicable for speeds of 45 mph or less, the 30' unit is applicable for speeds of 50-60 mph.
- The upstream half of the system (3 or 5 modules) is a gating design. Each module (cartridge) has a mass of 180 lbs. Care must be exercised in locating the system where debris scatter may pose a hazard. Upstream modules or their residual components must be removed to replace damaged downstream modules.
- The ADIEM 350 will require close monitoring for damage that will open module encasement; immediate repair is essential to prevent moisture absorption into module core.
- Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the ADIEM 350, and until such alternatives are available, the ADIEM 350 need not be bid against other proprietary items. However, where the ADIEM 350 and other approved temporary redirective crash cushions meet or exceed the minimum requirements for a specific location, the approved crash cushions will be considered optional systems and paid for as described in General Note 13 above.

ADIEM 350 SELECTION GUIDELINES		
Speed mph	No. Of Modules	Nominal Length FT
$\leq 45$	6	18'
50-60	10	30'


ANCHOR PIN SCHEDULE (Number Required)								
SURFACE	Unit Length (FT) / Pin Length (IN)				30'			
	18"	36"	18"	24"	30"	36"	42"	48"
Compacted Base	4	4			4	4		4
Asphalt Pavement	4	4		4	4		4	
Concrete Pavement	4	4	4	4		4		

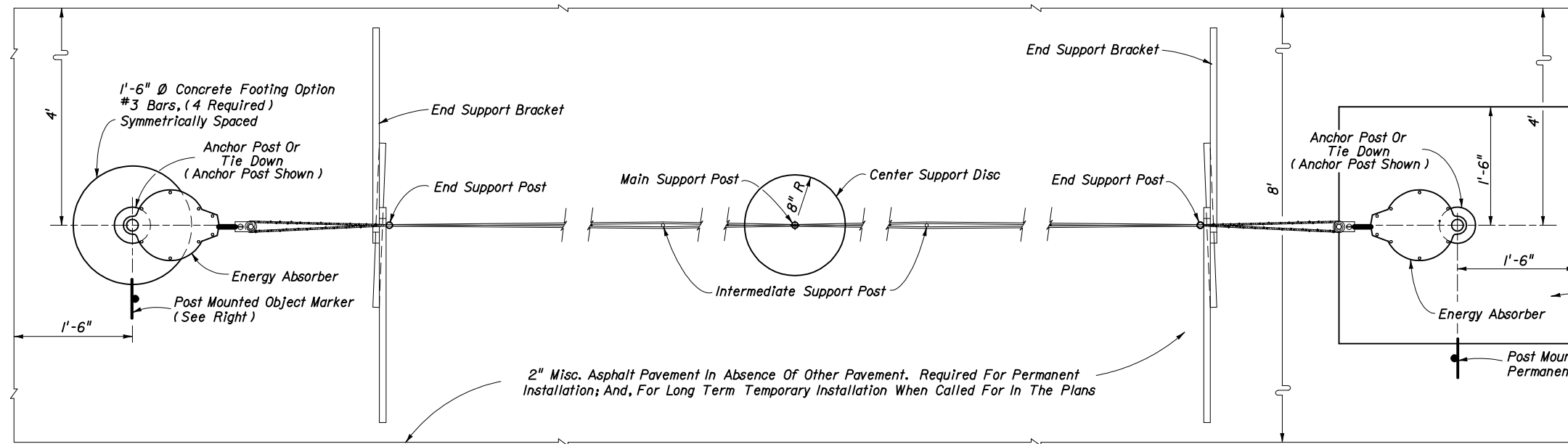


## GENERAL SYSTEM FEATURES AND GUIDELINES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

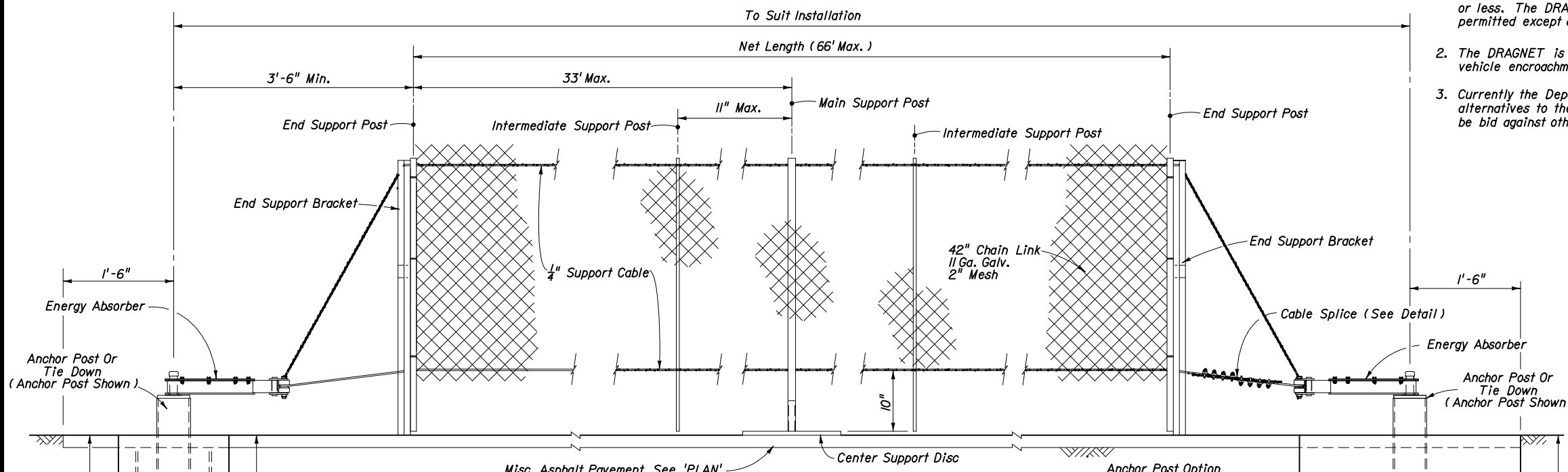
### ADIEM 350

Names		Dates		Approved By		
Designed By	MRG			 State Roadway Design Engineer		
Drawn By	HKH	7/97				
Checked By	JVG	7/97		Revision	Sheet No.	Index No.
				00	1 of 1	436



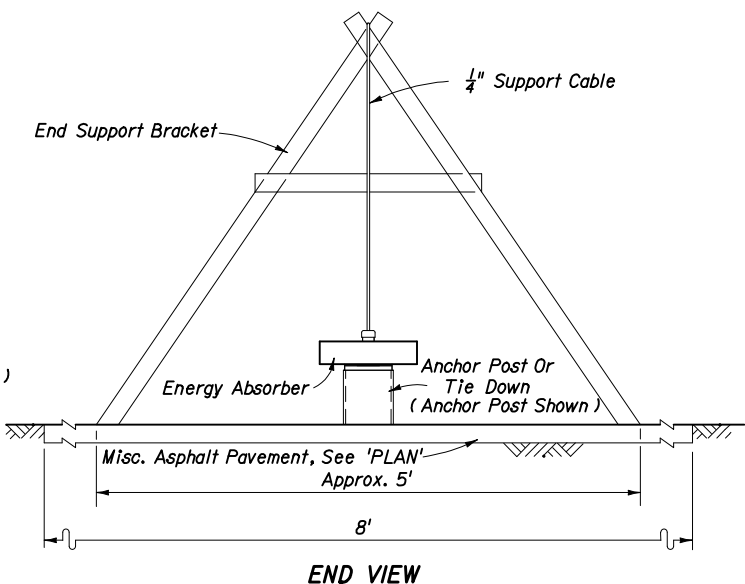
**DESIGN NOTES AND GUIDELINES**

1. The DRAGNET is designed to safely stop automobiles when impacted at speeds of 60 mph or less. The DRAGNET has a singular design and any adjustment to its design will not be permitted except as authorized by the manufacturer.
2. The DRAGNET is a restorable system that is particularly suited to the prevention of head-on vehicle encroachment into hazardous areas.
3. Currently the Department does not recognize other proprietary items as being equally suitable alternatives to the DRAGNET and until such alternatives are available, the DRAGNET need not be bid against other proprietary items.

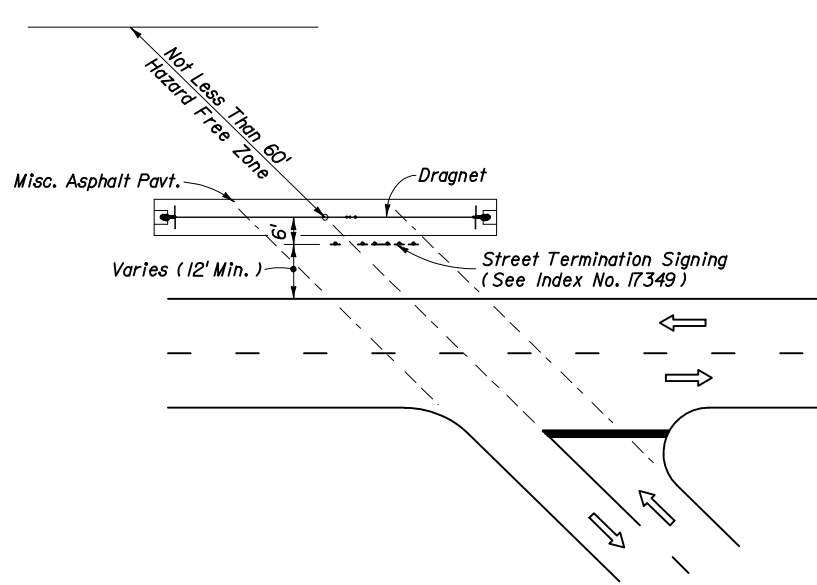


**GENERAL NOTES**

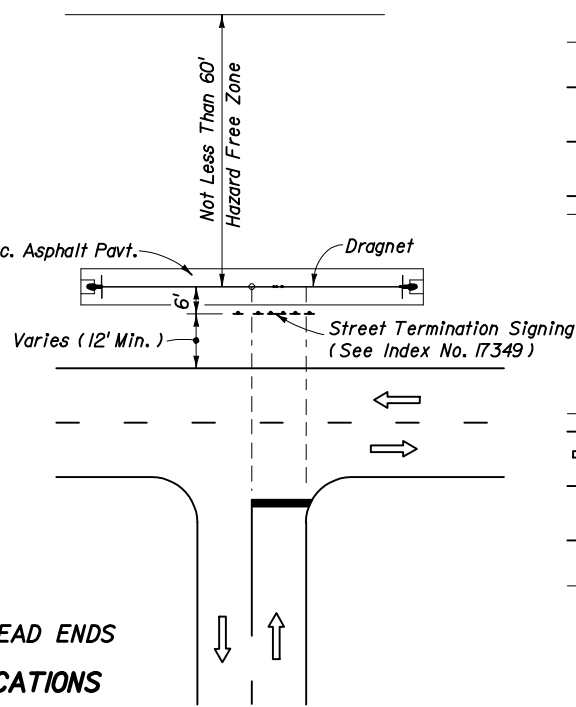
1. The vehicle arresting barrier represented on this standard is a proprietary product of Energy Absorption Systems, Inc. and marketed under the trade name DRAGNET. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the DRAGNET system and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the DRAGNET installed as a free standing system and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals.
4. The DRAGNET shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures and specifications.
5. Concrete footings shall be constructed with Class I concrete.
6. Each temporary DRAGNET assembly shall include a spare parts package consisting of two extra arresting tapes and a set of end support brackets. The spare parts package shall be stored on site at locations approved by the Engineer. Damaged attenuators shall be restored within 24 hours. The cost of furnishing and maintaining spare parts packages for each attenuator shall be included in the cost of the attenuator.
7. The cost of the DRAGNET shall include furnishing and installing all components and materials necessary for a complete installation and will be paid for under the contract unit price for Impact Attenuator Vehicular (Dragnet), EA., for permanent installations or Vehicle Arresting Barrier (Net Type), EA., for temporary installations.



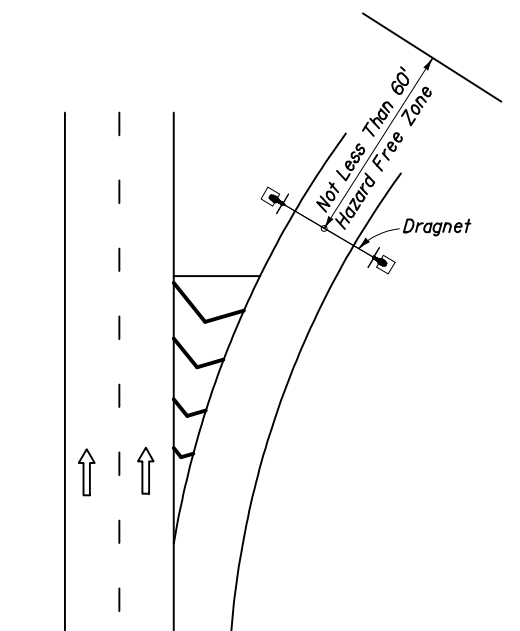
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>DRAGNET</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HKH	10/91	State Roadway Design Engineer	
Checked By	JVG	10/91		
	Revision	00	Sheet No.	Index No.
			1 of 2	438



**'T' INTERSECTIONS OR DEAD ENDS  
PERMANENT APPLICATIONS**



**TEMPORARY ROADWAY CLOSURES**

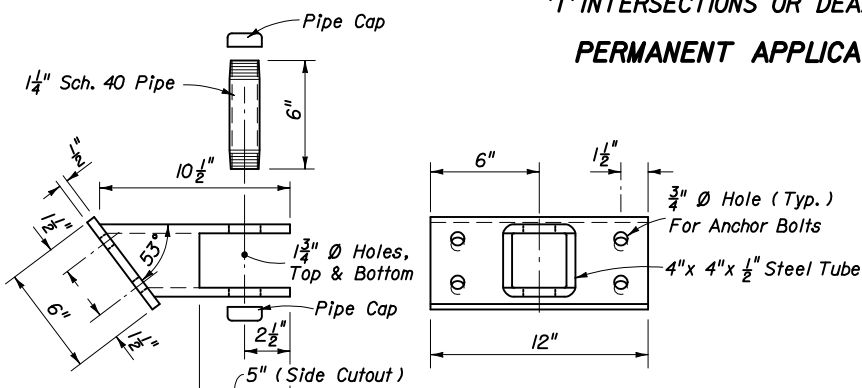


**TEMPORARY RAMP CLOSURES**

See Index No. 600 For Traffic Control Through Work Zones

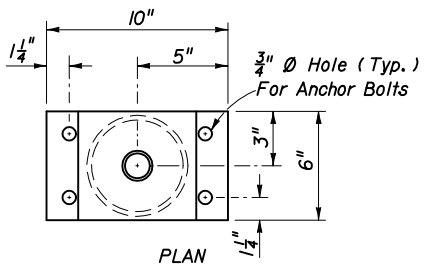
**TEMPORARY APPLICATIONS**

**TYPICAL APPLICATIONS**

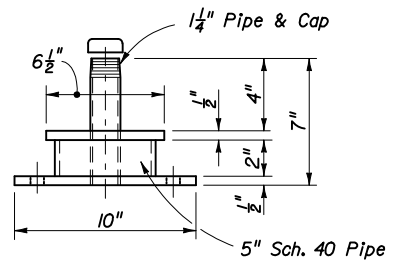


**SIDE VIEW  
For Use On Concrete Barrier Installation  
TIE DOWN**

**FRONT VIEW**



**PLAN**



**ELEVATION**

For Use Where Anchor Post Is To Be Removed.

For Use Inside Clear Zone. Can Be Used With Either Concrete Footing Option Or On Existing Concrete Slab.

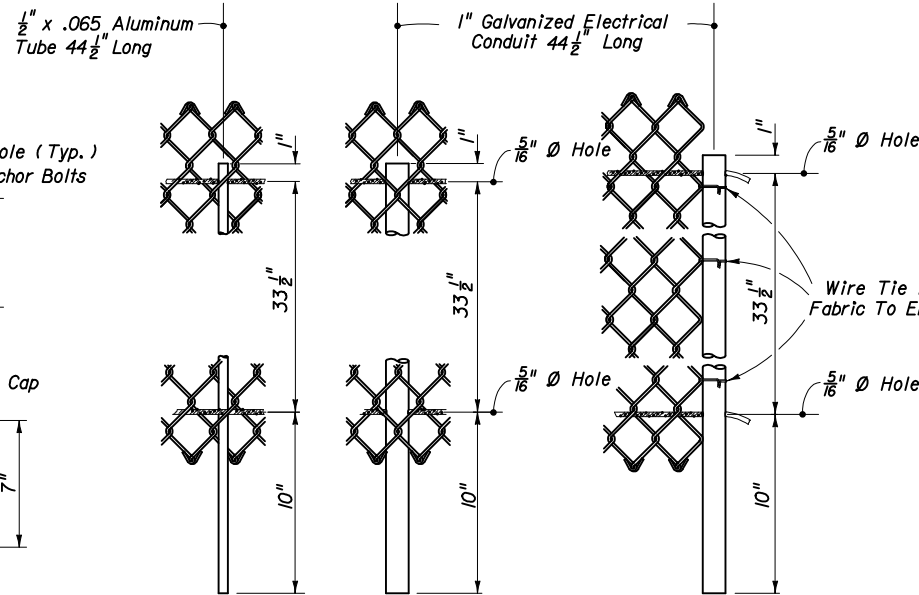
**ANCHOR POST ASSEMBLY**

**ANCHOR POST SOCKET**

**TIE DOWN**

Note: Tie down anchor bolts shall be 1/2" dia. adhesive anchors with 4 1/2" min. embedment, installed to manufacturer's specifications; 4 required per tie down.

**ANCHOR DETAILS**

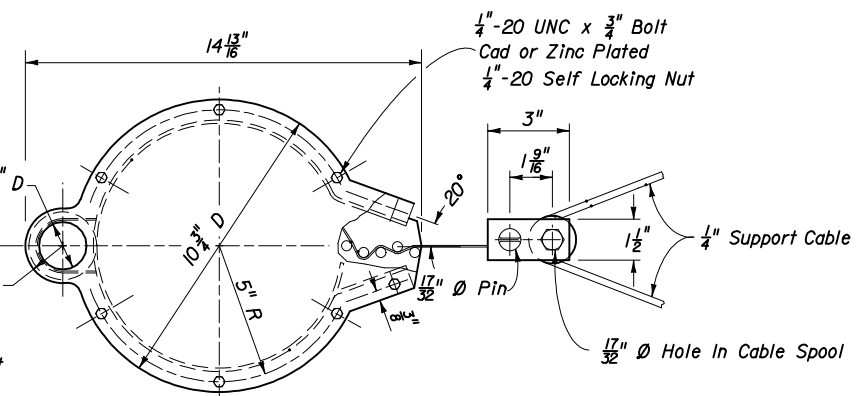


**INTERMEDIATE SUPPORT POST**

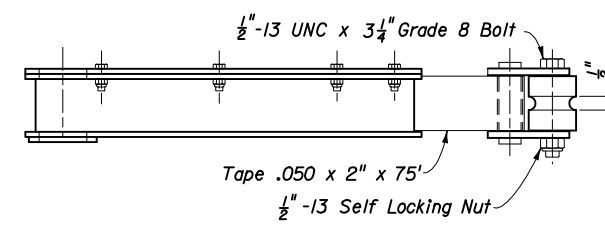
**MAIN SUPPORT POST**

**END SUPPORT POST**

**SUPPORT POST DETAILS**

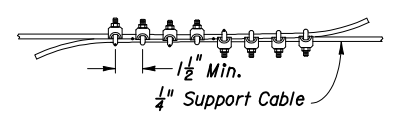


**PLAN**



**ELEVATION**

**ENERGY ABSORBER ASSEMBLY**




U-bolt Presses Against Dead End Of Cable. Torque Nuts To 130 In. Lbs. (8 Required)

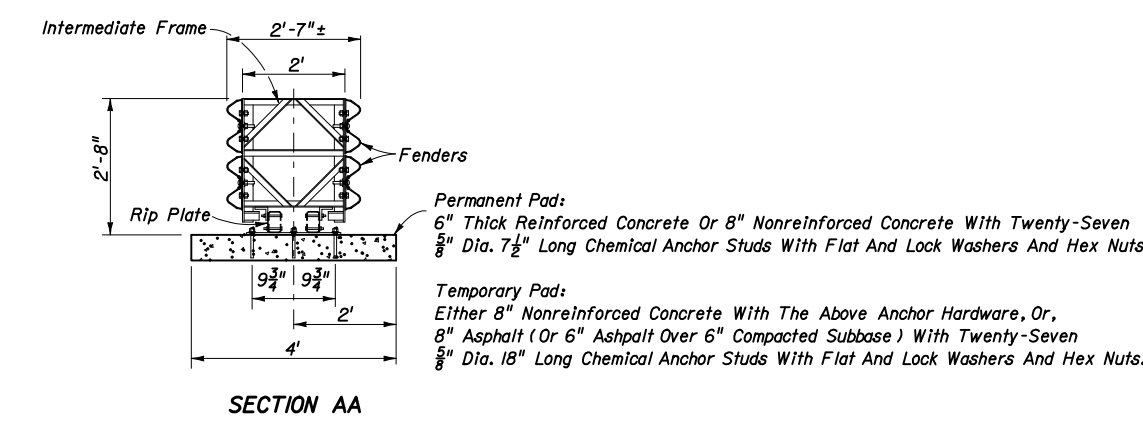
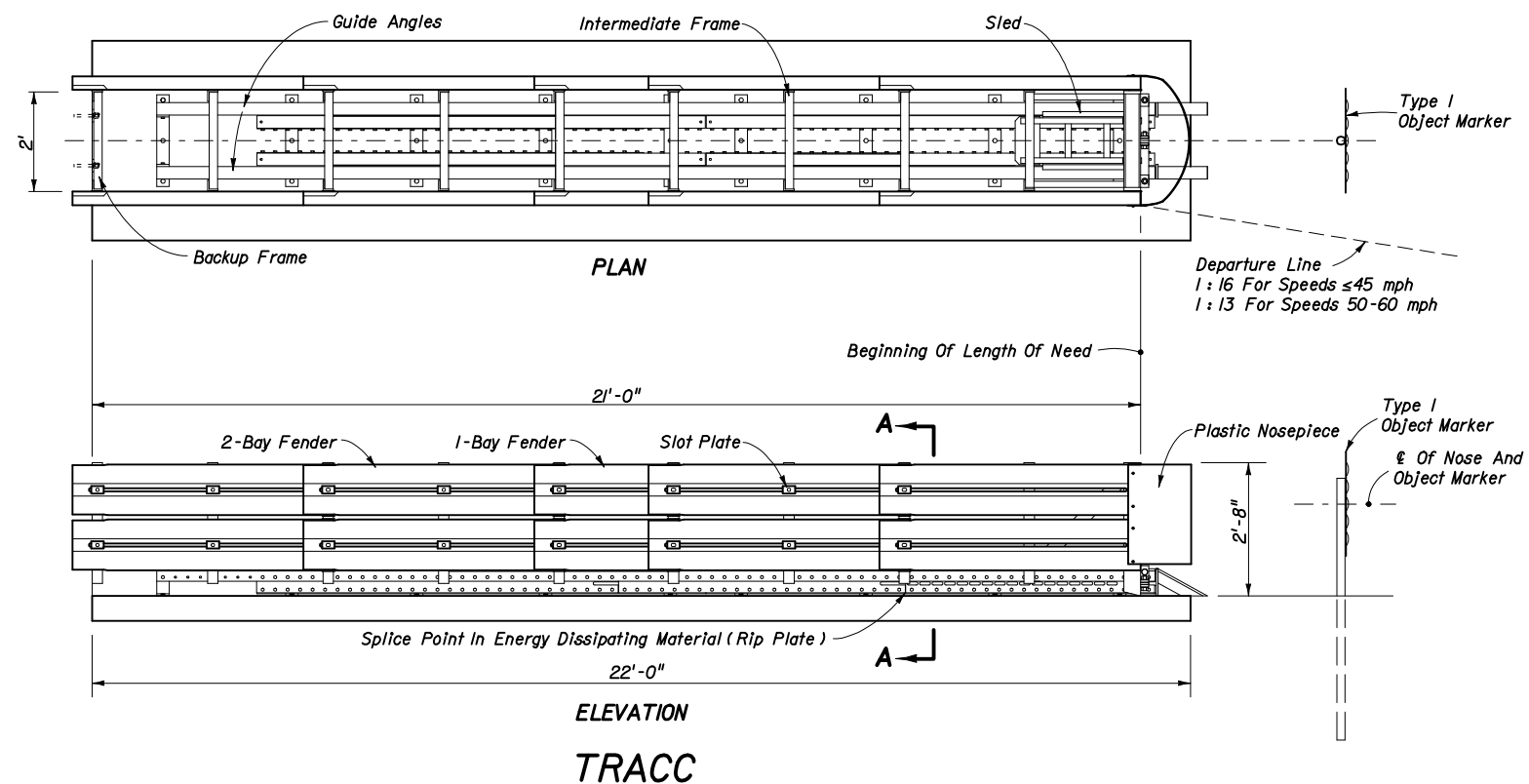
**CABLE SPLICE DETAIL**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**DRAGNET**

Names	Dates	Approved By		
Designed By	MGR/HKR	10/91	 State Roadway Design Engineer	
Drawn By	HKR	10/91		
Checked By	JVG	10/91		
Revision	00	Sheet No.		
		2 of 2	438	





TRACC MODULE GUIDELINES		
Speed (mph)	Manufacturer's Naming Convention	Length (Feet)
≤45	SHORTTRACC	14'-1"
>45 ≤60	TRACC	21'-0"
>60 ≤70	FASTRACC	26'-0"

**GENERAL NOTES**

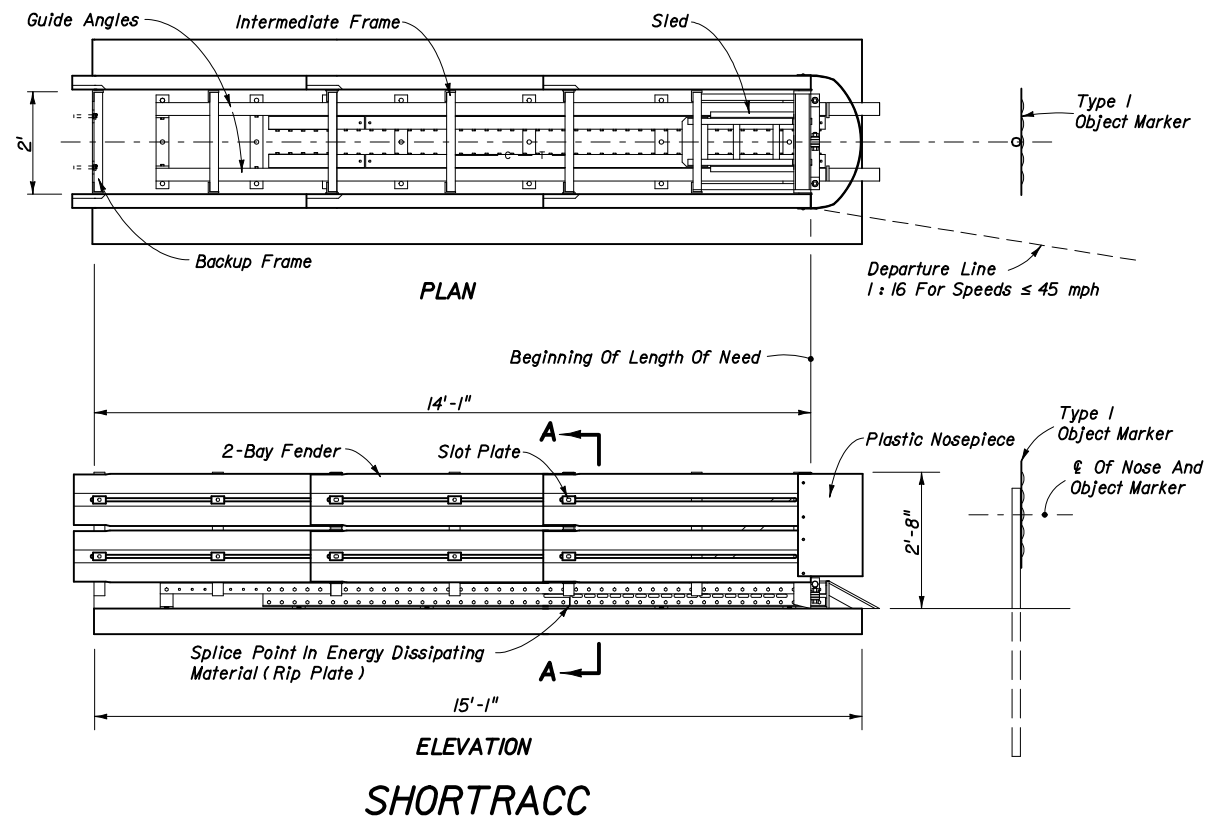
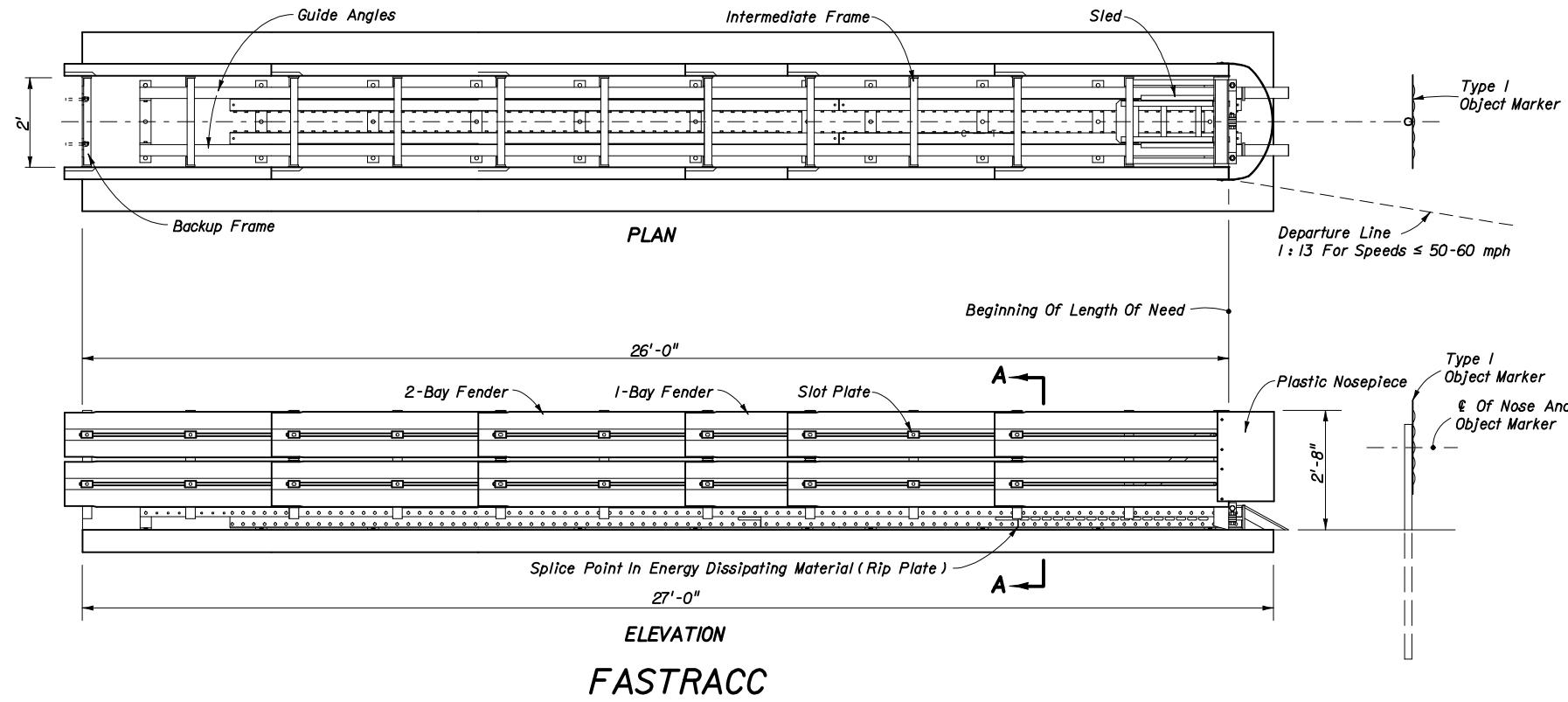
- The energy absorbing system represented on this standard drawing is a proprietary design by Trinity Industries, Inc. and marketed under the trade names SHORTRACC, TRACC, and FASTRACC. Any infringement on the rights of the designer shall be the sole responsibility of the user.
- This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of TRACC Systems and their incorporation into a whole system. This standard drawing is sufficient for plan details, and precludes the requirement for shop drawing submittals unless the plans call for such submittals.
- TRACC Systems shall be installed in accordance with the manufacturer's detailed drawings, procedures and specifications, except that transition section posts will be set to connect to guardrail at standard W-beam center bolt height (1'-9").
- TRACC Systems include pre-assembled energy absorbing modules that are available in three sizes. Larger modules can be substituted for smaller modules. See selection table below.
- When TRACC Systems are installed at permanent locations they shall be anchored to either a reinforced 6" thick concrete pad or a nonreinforced 8" thick concrete pad with twenty-seven 7 1/2" long 5/8" dia. chemical anchor studs, flat and lock washers, and, hex nuts. When TRACC Systems are installed at temporary locations they shall be anchored to a nonreinforced 8" thick concrete pad with the above mentioned anchor hardware, or a 8" thick asphalt pad (or a 6" thick asphalt over 6" of compacted subbase) using twenty-seven 18" long 5/8" dia. Grade 5 threaded chemical anchor studs, flat and lock washers, and, hex nuts.
- TRACC Systems shall be located parallel to the approach travel lane(s), on 1:10 or flatter cross slopes.
- In-place repairs on TRACC modules are limited to (a) end-on impacts which cause the sled to stroke 54" or less, and (b) side impacts where permanent distortion is limited to fender panels and where distortion of the intermediate frame(s) can be restored manually and (c) end on impacts that cause the sled to stroke more than 54", yet where repair can be accomplished in a period not to exceed 24 continuous hours. Unit replacement is required when damage exceeds these conditions. Temporary construction units and units under Maintenance responsibility may be shop repaired units utilizing new or salvaged parts which will produce condition new units. All permanent units shall be factory new at completion of construction.
- A yellow Type I Object Marker shall be centered 3' in front of the nose of the TRACC System. Mounting hardware shall be in conformance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the TRACC System.
- Permanent TRACC Systems will be paid for under the contract unit price for Vehicular Impact Attenuator (TRACC), EA. Temporary TRACC Systems will be paid for under the contract unit price for Vehicular Impact Attenuator (Temporary) (TRACC), LO. However, when a TRACC system is used as an option in accordance with Index No. 415, it will be paid for under the contract unit price for Vehicular Impact Attenuator (Temporary) (Redirective Option), LO.

**DESIGN NOTES AND GUIDELINES**

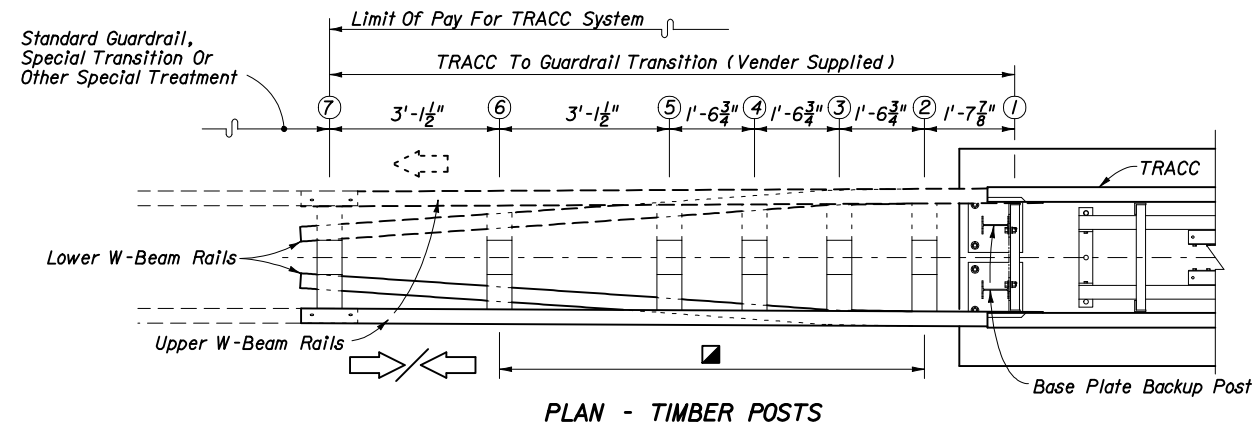
- TRACC Systems are designed to cushion automobile end-on hits and to redirect automobiles from side hits within the length of need while shielding the ends of permanent or temporary concrete barrier walls or double faced guardrails.
- The TRACC System is not field-restorable for all impacts. Repairs or replacement will be in accordance with GENERAL NOTE 7 above.  
  
Until additional replacement and repair experience is available, the TRACC System should not be permanently installed in gore of freeways and expressway mainline ramp terminals; gore of roadway forks; or other gore locations where the Engineer of Record has identified a specific history of high frequency vehicle departure from the roadway or the potential exists for such departures.  
  
The TRACC can be used in any temporary location identified in the plans for optional redirective crash cushion in accordance with Index No. 415, and will be used as a temporary crash cushion in any location identified in the plans for Vehicle Impact Attenuator (Temporary) (TRACC); likewise the TRACC is not to be substituted when the plans call for other crash cushion systems at specified locations.
- Currently the Department does not recognize other proprietary items as being equally suitable alternatives to TRACC Systems, and until such alternatives are available, the TRACC Systems need not be bid against other proprietary items. However, where the TRACC Systems and other approved temporary redirective crash cushions meet or exceed the minimum requirements for a specific location, the approved crash cushions will be considered optional systems and paid for as described in General Note 9 above.

**GENERAL SYSTEM FEATURES AND GUIDELINES**

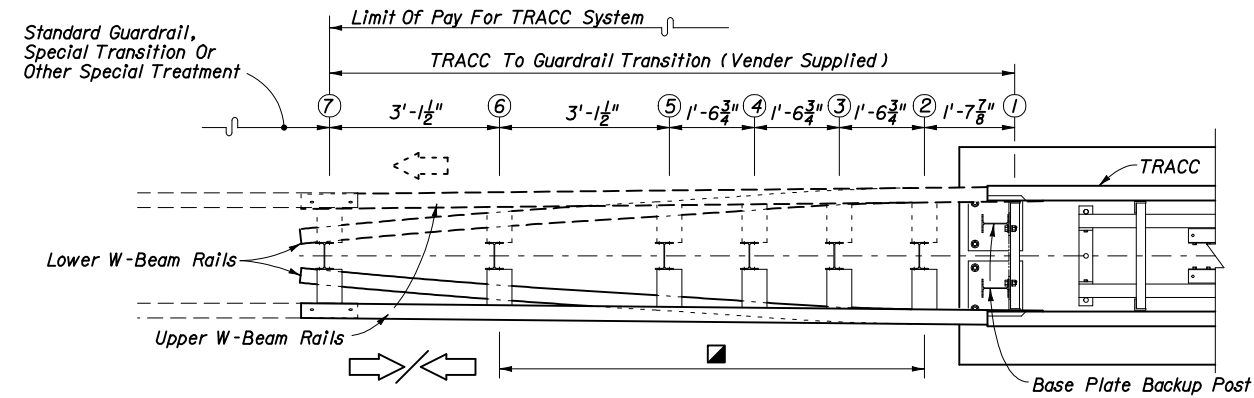
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>TRACC SYSTEMS</b>					
Designed By	Names	Dates	Approved By		
Drawn By	HKH	7/97	 Roadway Design Engineer		
Checked By	JVG	7/97			
			Revision	Sheet No.	Index No.
			02	1 of 5	440



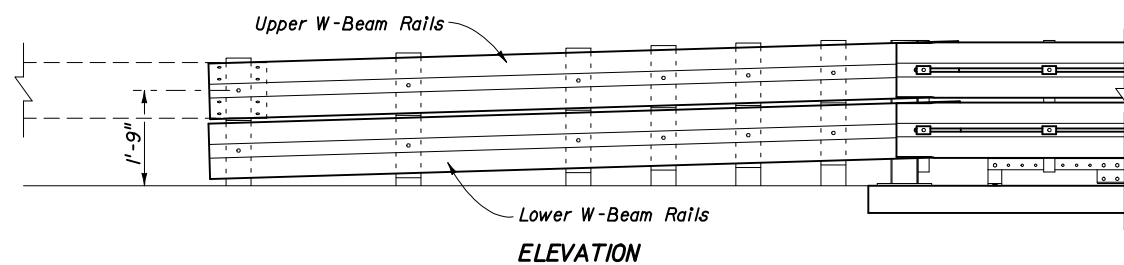
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRACC SYSTEMS</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	HKH	7/97	Revision	Sheet No. Index No.
Checked By	JVG	7/97	02	2 of 5 440



PLAN - TIMBER POSTS



PLAN - STEEL POSTS

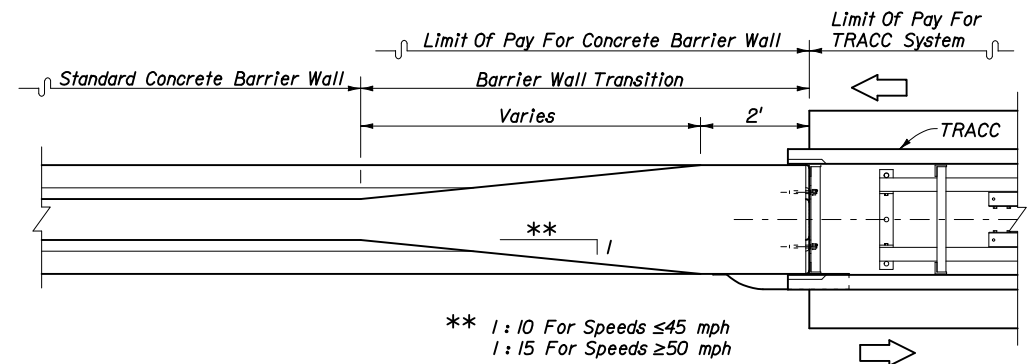


ELEVATION

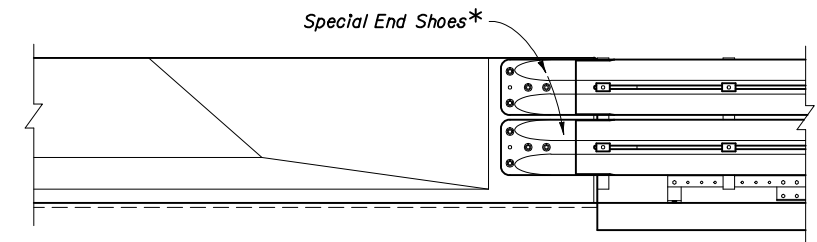
Offset blocks that exceed standard block depth can be made up of blocks of special size or multiple standard blocks field trimmed to approximately equal size to achieve full transition width. Offset blocks for lower W-beam that are less in depth than standard blocks may be field trimmed standard blocks. All blocks are to be secured to plan position by 16d galvanized nails.

Transitions are required when connecting the TRACC System to any guardrail system.

**TRACC TO GUARDRAIL**



PLAN



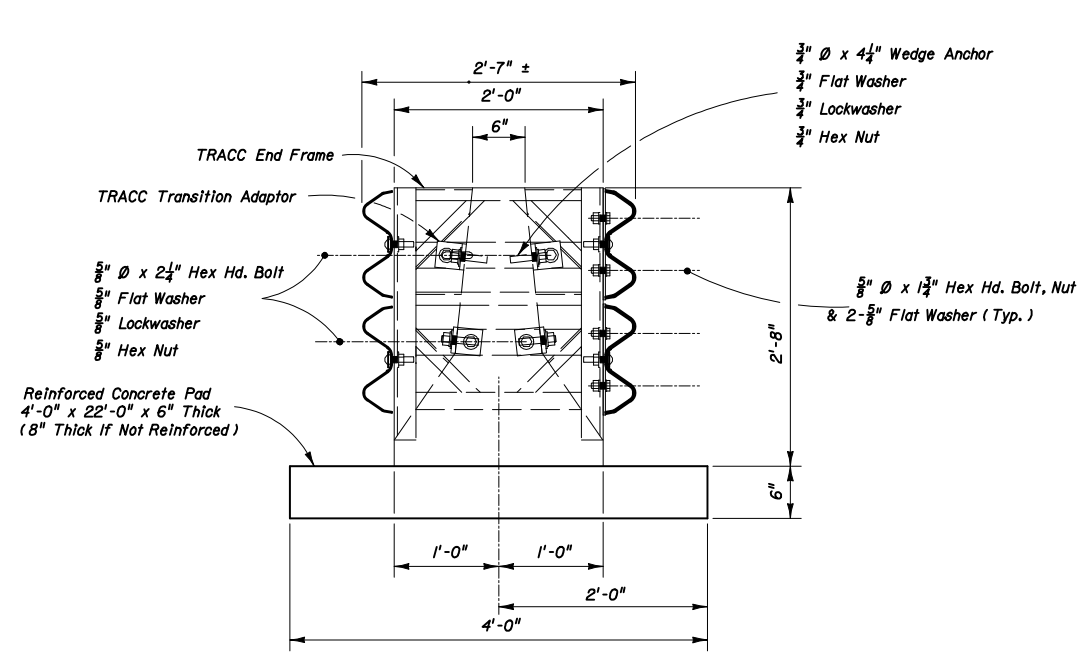
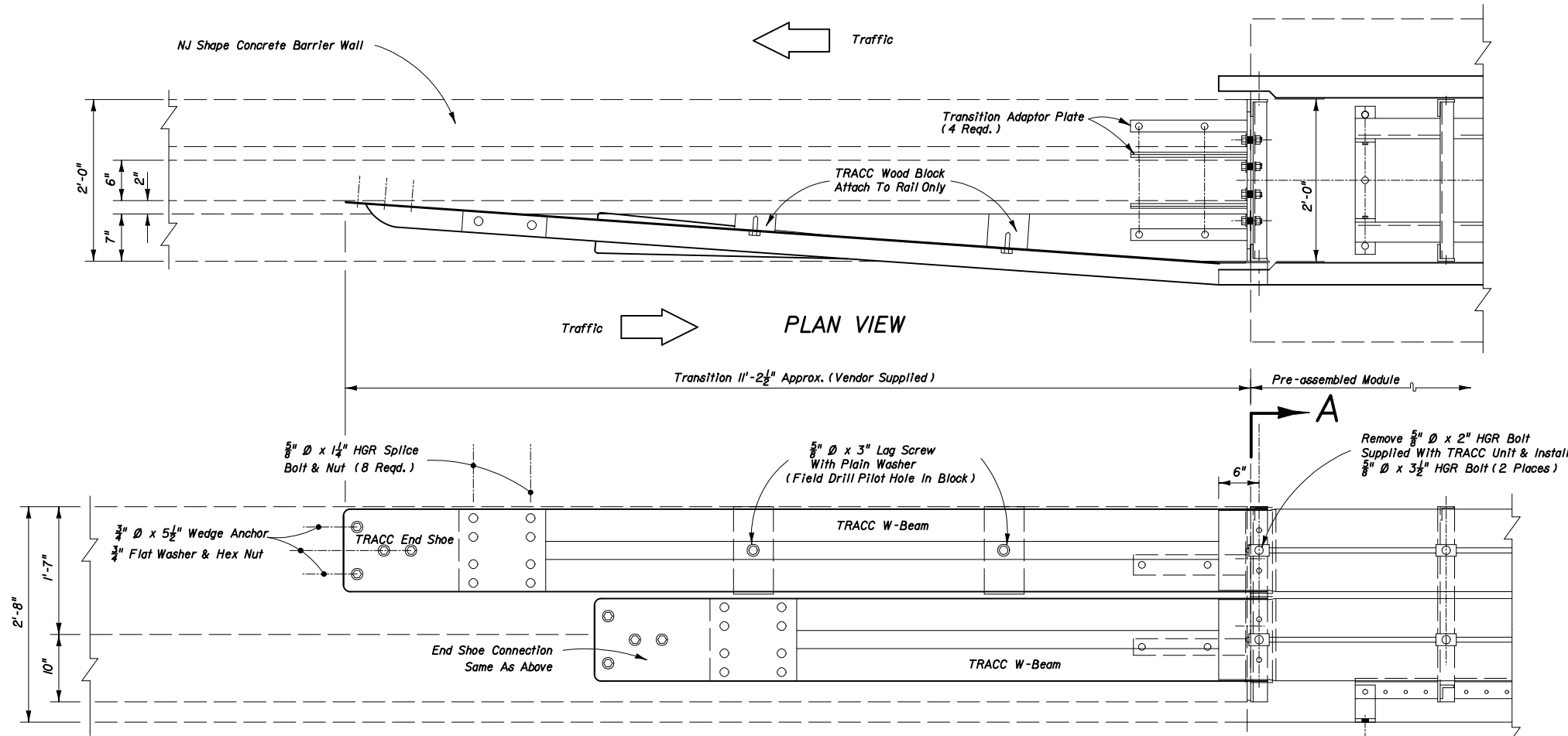
ELEVATION

\* To Be Included In Cost Of TRACC System

**INTEGRAL WALL TRANSITION  
TRACC TO CONCRETE BARRIER WALL**

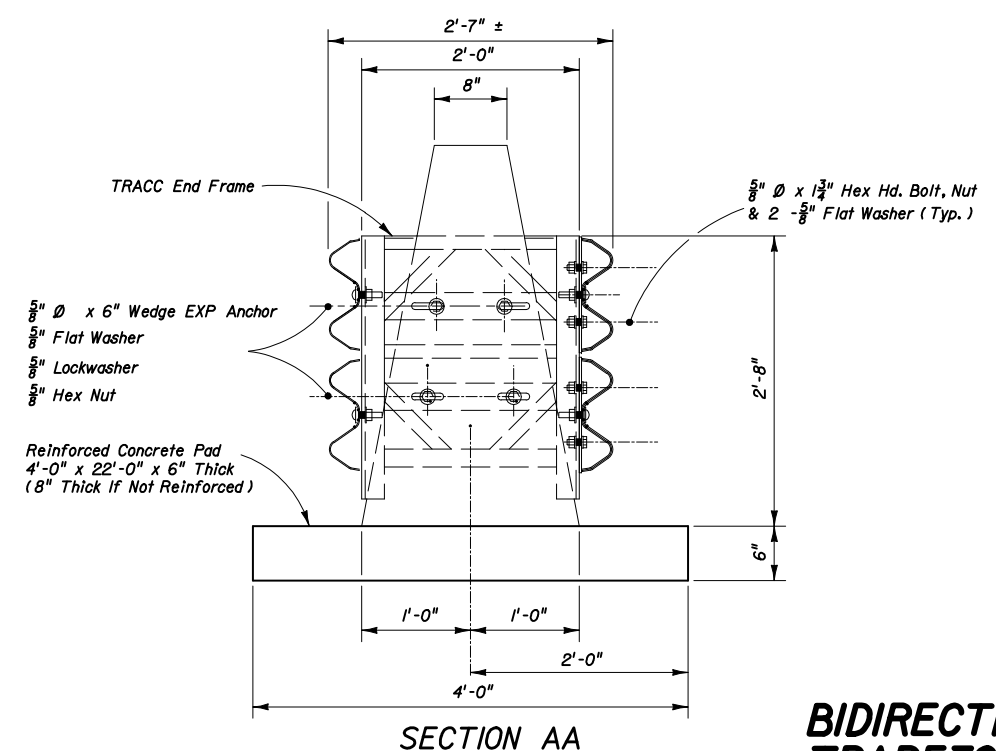
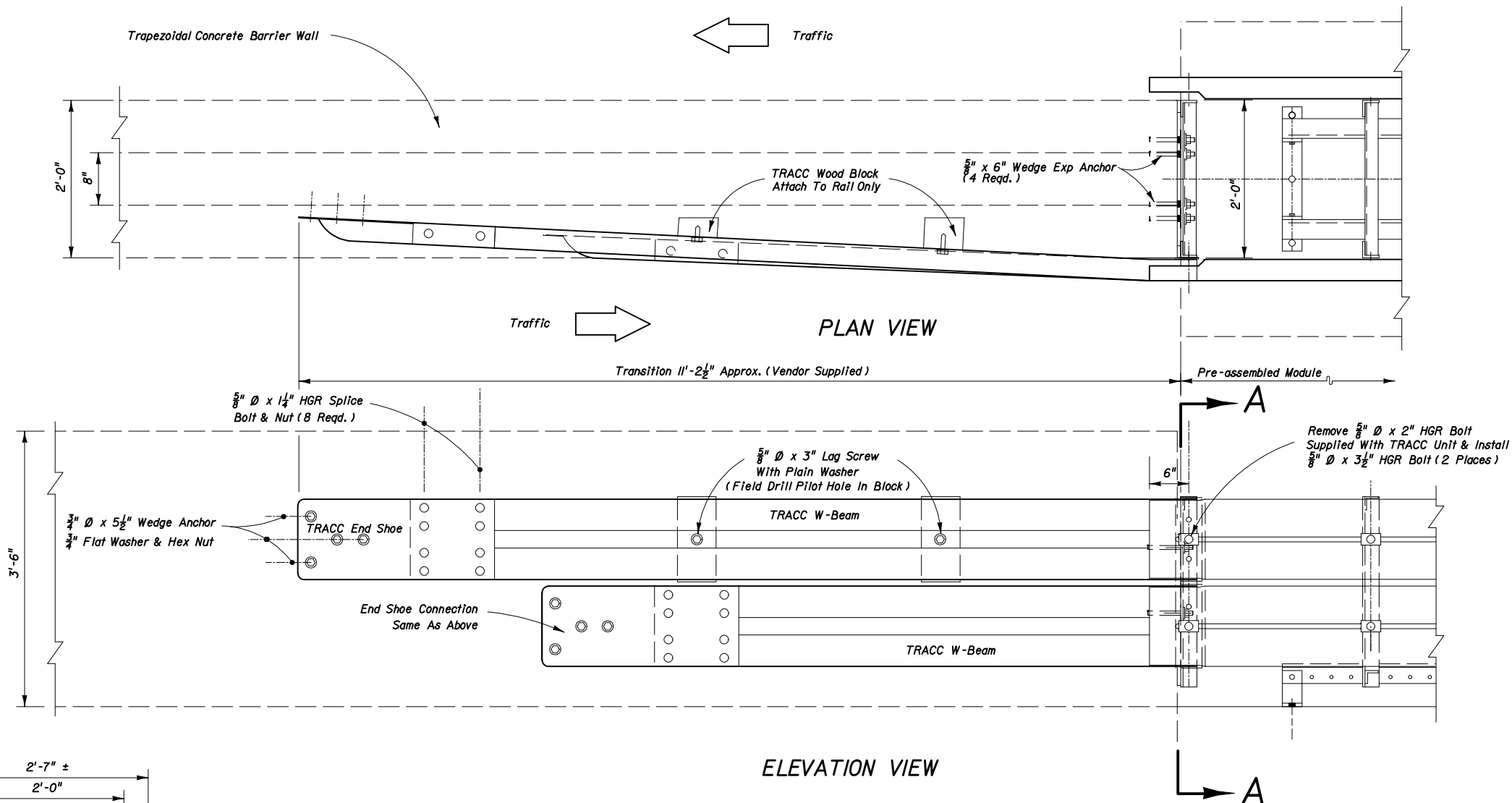
**TRACC TRANSITIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRACC SYSTEMS</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	HKH	7/97	Revision	Sheet No.
Checked By	JVG	7/97	02	3 of 5
				Index No. 440



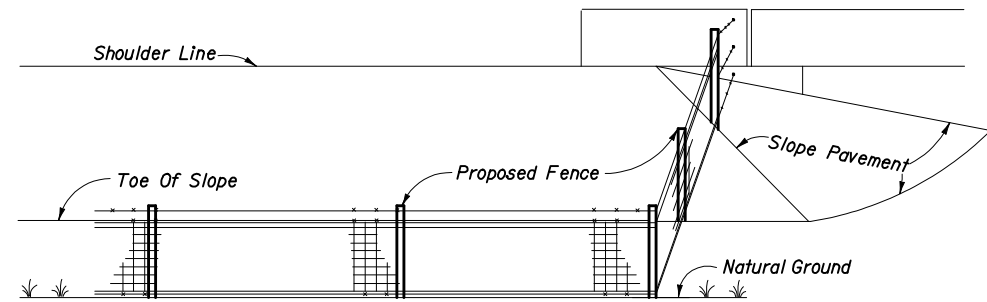
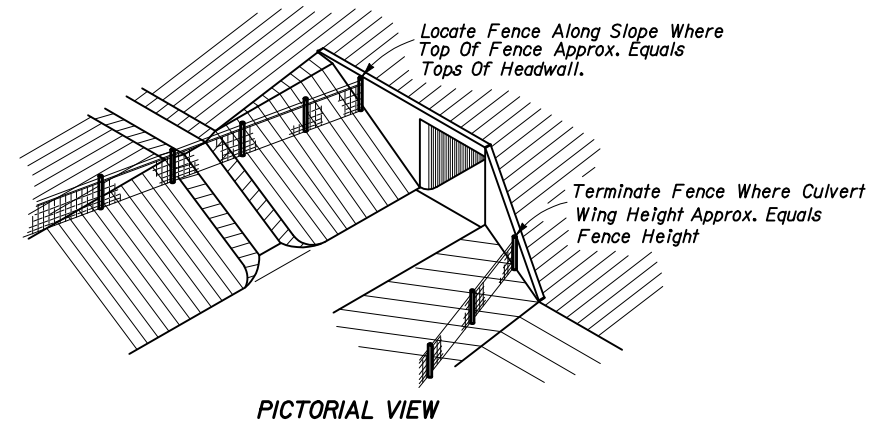
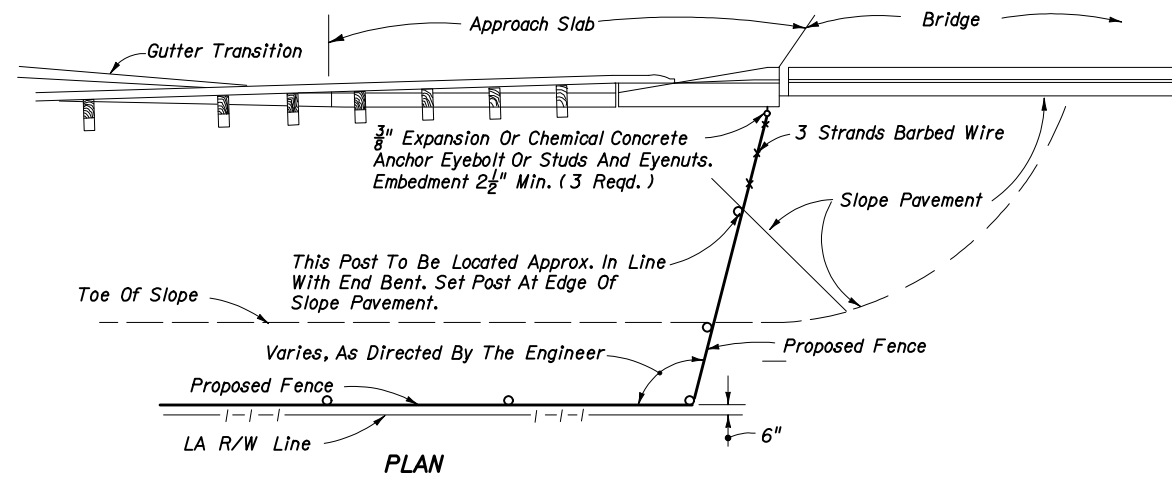
**BIDIRECTIONAL TRANSITION FOR CONNECTION TO NJ SHAPE CONCRETE BARRIER WALL**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRACC SYSTEMS</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HKH	7/97	 Roadway Design Engineer	
Checked By	JVG	7/97	Revision	Index No.
			02	4 of 5
				440

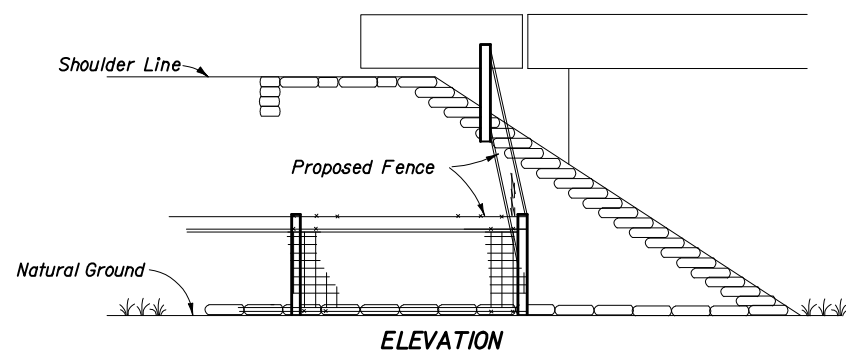
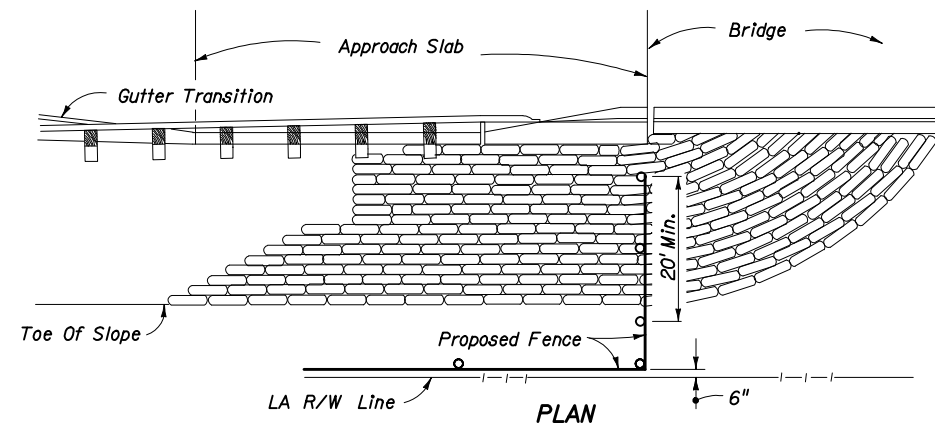


**BIDIRECTIONAL TRANSITION FOR CONNECTION TO TRAPEZOIDAL SHAPE CONCRETE BARRIER WALL**

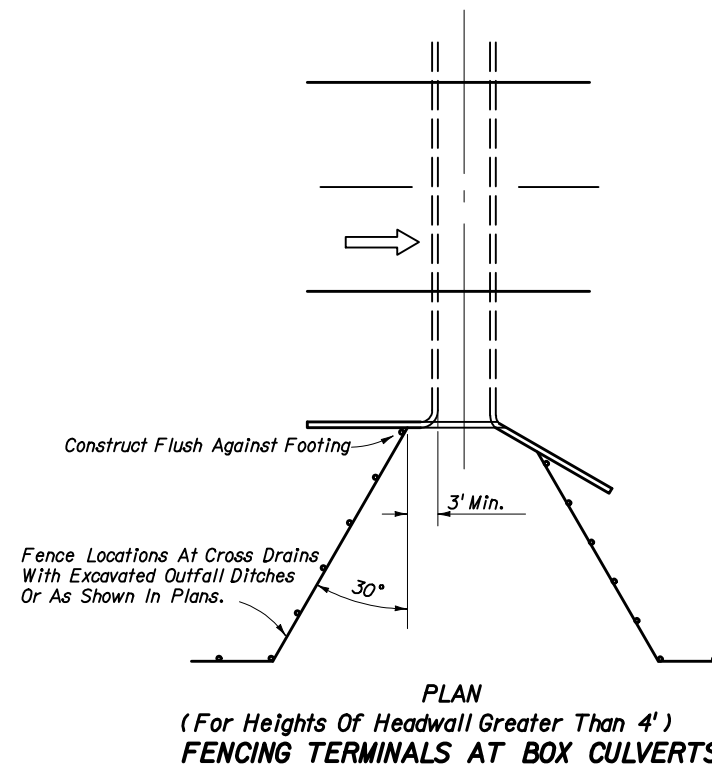
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRACC SYSTEMS</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	HKH	7/97	Revision	Sheet No. Index No.
Checked By	JVG	7/97	02	5 of 5 440



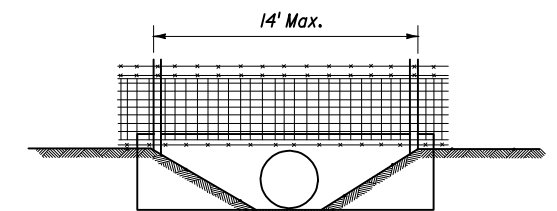
**FENCING TERMINALS AT BRIDGE ENDS (ROADWAY)**



**FENCING TERMINALS AT BRIDGE ENDS (STREAM CROSSING)**



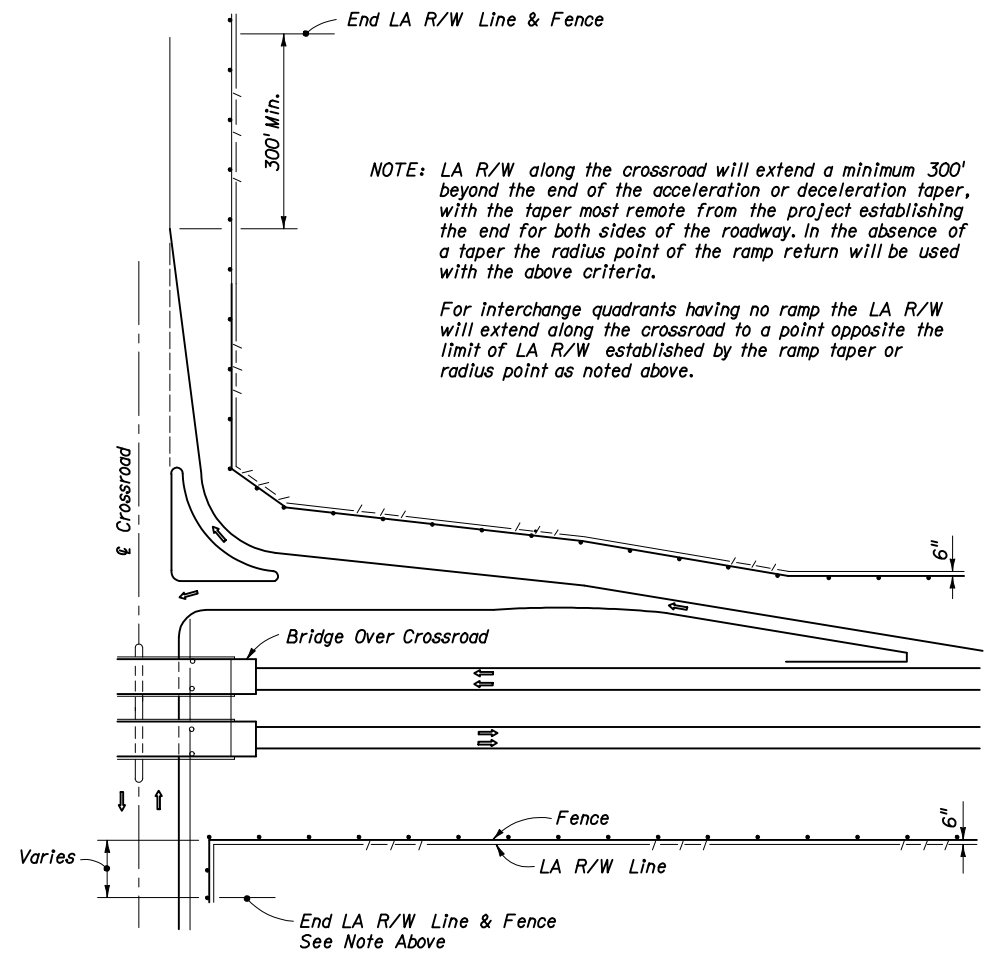
**(For Heights Of Headwall Greater Than 4') FENCING TERMINALS AT BOX CULVERTS**



**(For Heights Of Headwalls 4' Or Less.)**

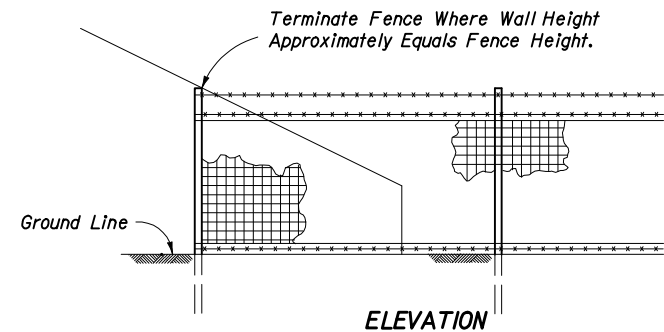
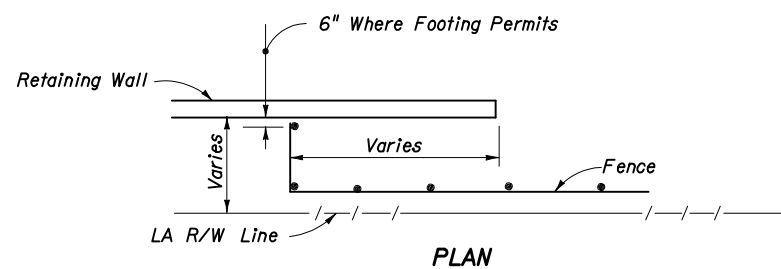
Note: When height of headwall is 4' or less (drainage pipe 36" or less) the fence shall not be tied to the headwall, but shall span the lateral ditch.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>FENCE LOCATION</b>				
	Names	Dates	Approved By	
Designed By	HFW	02/65	State Roadway Design Engineer	
Drawn By	HFW	02/65		
Checked By	RLO	02/65		
	Revision	00	Sheet No.	Index No.
			1 of 2	450

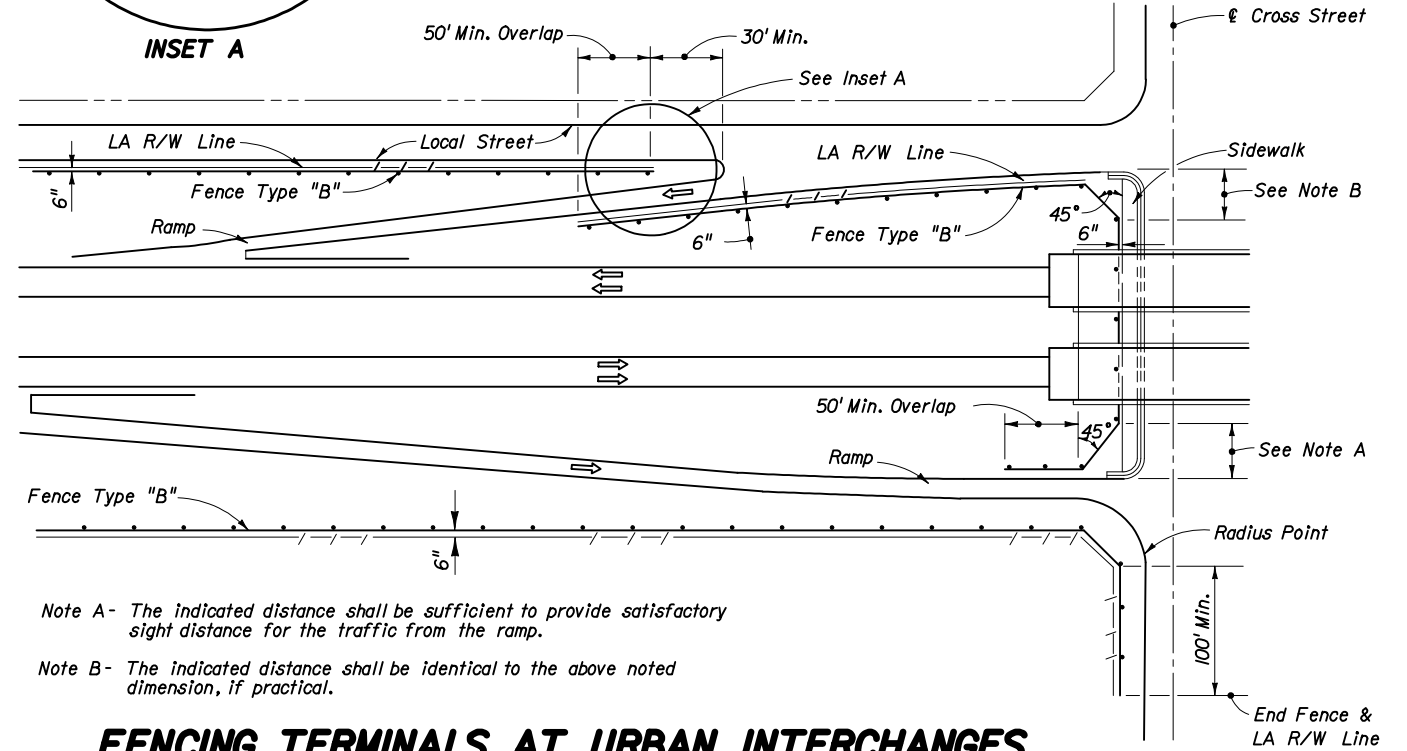
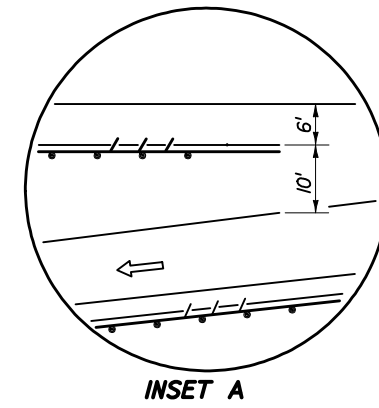


APPLIES TO BRIDGE OVER CROSSROAD AND CROSSROAD OVER FREEWAY (BRIDGE OVER CROSSROAD SHOWN)

### FENCING TERMINALS AT RURAL INTERCHANGES



### FENCING TERMINALS AT RETAINING WALLS

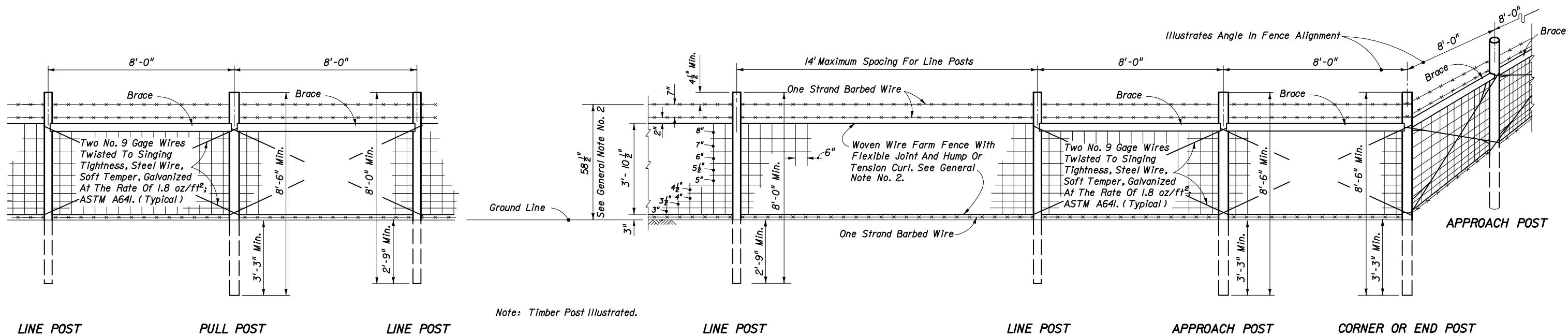


### FENCING TERMINALS AT URBAN INTERCHANGES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

### FENCE LOCATION

Names	Dates	Approved By		
Designed By	HFW 02/65	<i>Brian Blankenship</i> State Roadway Design Engineer		
Drawn By	HFW 02/65			
Checked By	RLO 02/65	Revision	Sheet No.	Index No.
		00	2 of 2	450

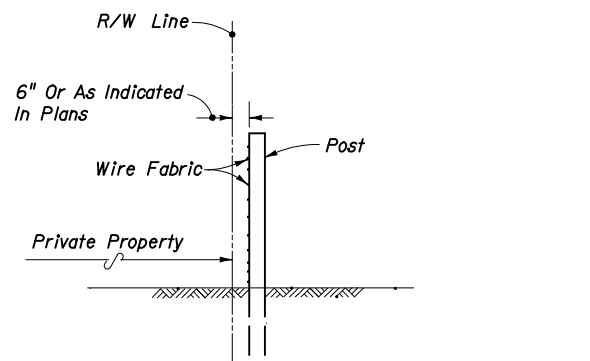


Note: Timber Post Illustrated.

**GENERAL NOTES**

- This fence to be provided generally in rural areas. For supplemental information see Section 550 of the FDOT Specifications.
- Fabric shall be woven wire, either galvanized steel, meeting the requirements of ASTM A116, No. 9 Farm, Design Number 1047-6-9, with Class 3 zinc coating, or aluminum coated steel, meeting the requirements of ASTM A584, No. 9 Farm, Design Number 1047-6-9, with a minimum coating weight of 0.40 oz./ft<sup>2</sup>. For additional information see payment note below.
- 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.
- Posts may be either timber, steel, recycled plastic or concrete. 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 timber, steel, recycled plastic 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.
- Timber line posts are to be minimum 4" diameter. Timber corner, pull, approach and end posts are to be minimum 5" diameter. Timber braces are to be minimum 4" diameter.
  - Staples for line posts to be 1 1/4" minimum length; for approach, corner and pull posts 1 1/2" minimum length. At approach, corner and pull posts, staple every line wire. At line posts, staple every line wire in top half and alternate line wires in bottom half. Staples shall be driven diagonally across the line wire with the points in separate grains.
  - Connections between timber posts and braces to be provided by dowels as shown in fastener details.
  - Wire to be wrapped and tied, as shown in the splice details, at the following locations:
    - All end posts, (b) Corner post, including the assemblies at vertical breaks of 15° or more and (c) Pull posts where the wire is not spliced and pulled through the assembly; see General Note 18.
- Steel posts and braces shall be standard steel posts, galvanized at the rate of 2 oz/ft<sup>2</sup>, together with necessary hardware and wire clamps and meeting the following requirements:
  - Line posts: 8' long; 1.33 lbs./ft.; roll formed studding; anchor plate attached (23 in<sup>2</sup>).
  - Approach posts: 2 1/2" x 2 1/2" x 2 1/2" 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 2 1/2" 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.
  - The pull, corner, approach and end posts are to be set in concrete as per detail. (Also see Note No. 15)
- Recycled plastic posts shall meet the material requirements of specification Section 972 and be one of the products included on the Qualified Products List current at the time of installation. Line posts shall have a minimum section of 4" round or 4" square. Plastic posts shall not be used as corner, pull, end or approach posts unless such use specifically detailed in the plans. Plastic posts can be set by either digging and tamped backfill or by driving into full depth preformed holes 1/4" to 1/2" smaller than cross section of post. Staples for fabric and barbed wire connection to plastic line posts shall be the same size, count and location as that for timber posts.
- 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 index, will be required prior to construction of the fence. Precast posts shall be Class I concrete. Prestressed posts shall be Class III concrete. Lengths of concrete post to be as indicated for timber posts.
- Aluminum post, braces and accessory framing hardware shall not be used unless the plans specifically detail their application or the Engineer specifically approves their incorporation in fence construction or repair. Aluminum framed gates are permitted as described in General Note 19.

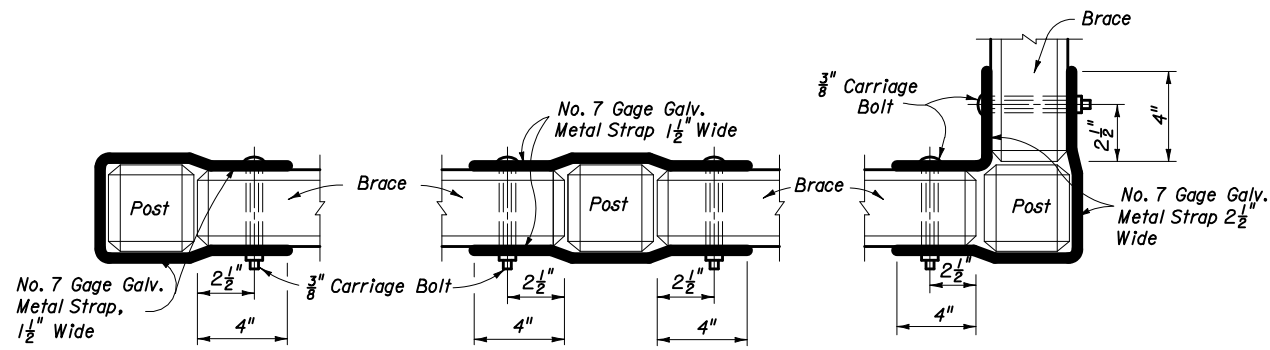
- The woven wire shall be attached to steel and concrete posts by a minimum of five tie wires. The single wire ties shall be applied to the top, bottom and three intermittent line wires. The ends of each tie wire shall have a minimum of two tight turns around the line wire. Tie wires shall be steel wire not less than 0.120" diameter, zinc coating Class 3, soft temper, in accordance with ASTM A641.
- Steel Barbed Wire can be either of the following types:
  - Type I: This type shall conform to the requirements of ASTM A121, with two strands of 12 1/2 gage wire; four point barbs, wire size 14 gage, twisted around both line wires; and, Class 3 coating.
  - Type II: This type same as Type I except the two strand wires are twisted in alternating directions between consecutive barbs.
 Aluminum Barbed Wire shall be fabricated of two strands of 0.110-inch wire with 0.08-inch diameter four-point barbs spaced at approximately 5 1/2", and at a maximum spacing of 6". The wire for the strands and for the barbs shall be of ASTM B211M Alloy 5052-H38 or equal.
- The woven wire shall be stretched only until one-half the tension curl has been pulled out of the line wires.
- Posts to be set by driving or digging. If by digging, the posts shall be set at the center of the hole and the soil tamped securely on all sides.
- Longer posts than those indicated above may be required by the plans or for deeper installations.
- Concrete bases for angular steel posts (pull, corner, end and approach) shall be Class I as specified in Section 347 except that the requirements of 347-7 shall not apply. Materials for Class I concrete may be proportioned by volume and/or by weight.
- Pull post assemblies shall be installed at approximately 330' centers except that this maximum interval may be reduced by the Engineer on curves where the radius is less than 3°.
- Corner post assemblies 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. For pulls through a pull post assembly the fabric shall be spliced by crimping sleeves only. Pulls through a corner post assembly will not be permitted.
- Unless otherwise called for in the plans gates shall be commercially available metal swing gates assembled and installed in accordance with the manufacturer's 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. Gate size is full opening width whether single leaf or double leaves. 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, EA.
- For construction and pay purposes assemblies are defined as follows: End post assemblies shall consist of: one end post, one approach post, two braces, four diagonal tension wires and all necessary fittings and hardware. Pull post assemblies shall consist of: one pull post, two braces, four diagonal tension wires and necessary fittings and hardware. Corner post assemblies shall consist of: one corner post, two approach posts, four braces, eight diagonal tension wires and all necessary fittings and hardware.
- This index details fencing that is constructed with farm fabric 46 1/2" (47" nominal) in height and with specific ground clearance and specific barbed wire spacings, and, is to be paid for under the contract unit price for Fencing, Type A, LF. When the plans detail other combinations of materials or variation in dimensions, the fence shall be paid for under the contract unit price for Fencing, Type A, ( \_' Height), LF. Fencing Type A, LF, shall be inclusive of the lengths of pull, end and corner post assemblies but exclusive of gate widths. Assemblies shall be paid for as follows:
  - Corner Post Assemblies, EA.
  - Pull and End Post Assemblies, EA.



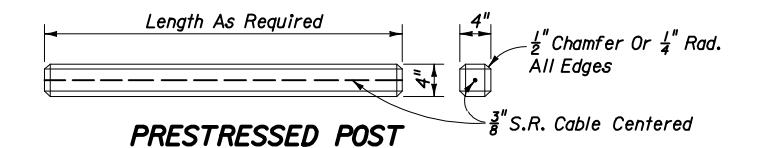
**FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS**  
(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>FENCE TYPE A</b>				
Names	Dates	Approved By		
Designed By		State Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 2	451

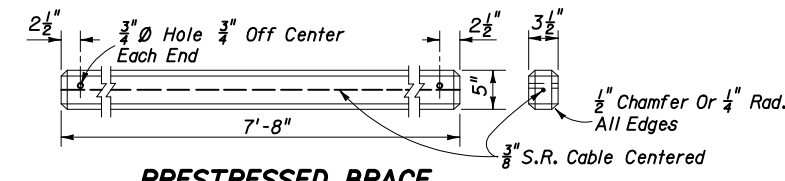




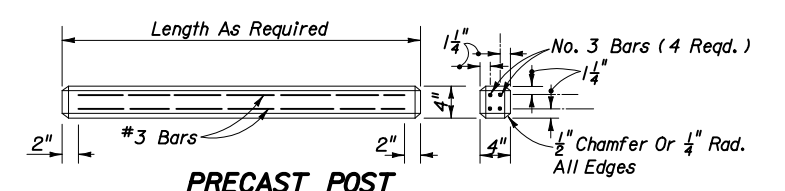
**BRACE AND POST      BRACE TO BRACE ON LINE      BRACE TO BRACE AT CORNER**  
**FASTENER FOR CONCRETE POST AND BRACES**



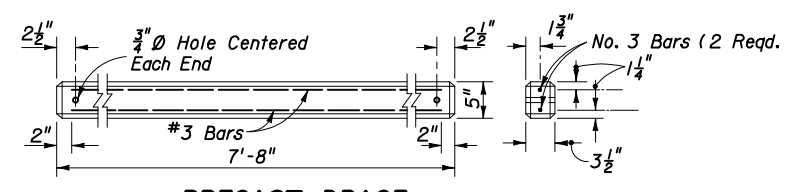
**PRESTRESSED POST**



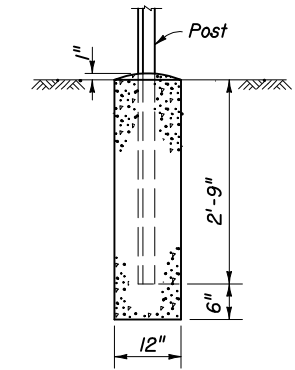
**PRESTRESSED BRACE**



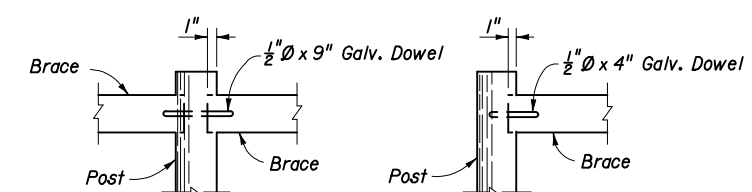
**PRECAST POST**



**PRECAST BRACE**

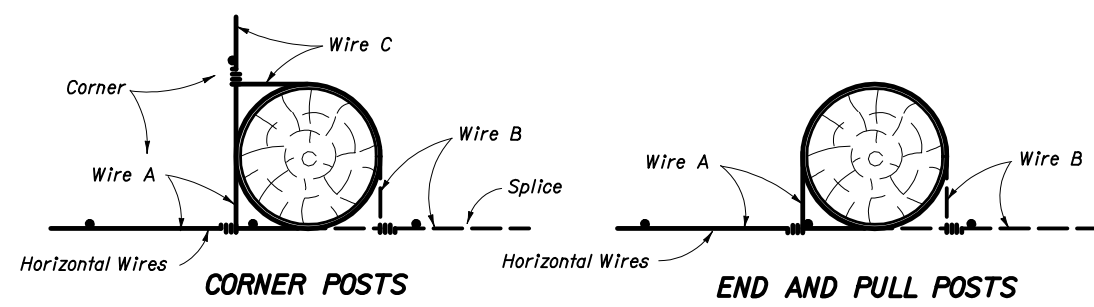


(Pull, Corner, End And Approach Posts)  
**CONCRETE BASE FOR ANGULAR STEEL POST**



**FASTENER FOR TIMBER POST AND BRACE**

**ALTERNATE CONCRETE POSTS AND BRACES**



**CORNER POSTS      END AND PULL POSTS**

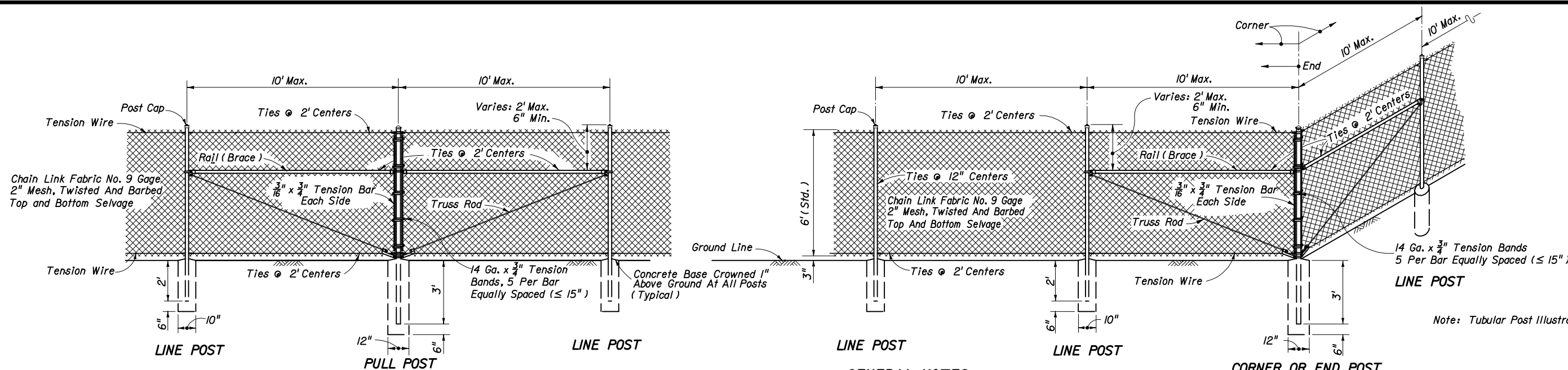
Each horizontal wire to be wrapped around corner, end and pull posts and tied to same wire. See General Notes 5 and 17. Timber post illustrated. These methods also apply to steel and concrete post illustrations.

**SPLICES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**FENCE TYPE A**

Names	Dates	Approved By <i>Blair Blackwell</i> State Roadway Design Engineer		
Designed By		Revision	Sheet No.	Index No.
Drawn By		00	2 of 2	451
Checked By				



- This fence to be used generally in urban areas.
- For supplemental information refer to Section 550 of FDOT 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 M181 unless otherwise specified by this index. Stipulated AASHTO and ASTM signify current reference.
- Fence Component Options:
  - Line post options:
    - Galvanized steel pipe, Schedule 40- 1 1/2" nominal dia. zinc galvanized at the rate of 1.8 oz/sf: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
    - Aluminum coated steel pipe; ASTM A53, X 2 Tables Schedule 40; 1 1/2" nominal dia., 1.90" OD; coated at the rate 0.40 oz/sf: AASHTO M111.
    - Aluminum alloy pipe- 2" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
    - Steel H-Beam- 1 1/8" x 1 5/8": Zinc Galv. 1.8 oz/sf: AASHTO M111 and Detail.
    - Aluminum alloy H-Beam- 1 1/8" x 1 5/8": Detail.
    - Steel C- 1 1/2" x 1 1/2": Galv.: 1.8 oz/sf zinc: AASHTO M111; or, 0.9 oz/sf zinc- 5% aluminum-mischmetal: ASTM F1043 and Detail.
    - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2" OD, 1 1/2" NPS, 1.900" dec. equiv., 0.120" min. wall thick. and min. wt. 2.28 lb/ft; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15 µg/in<sup>2</sup> min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.
  - Corner, end, and pull post options:
    - Galvanized steel pipe, Schedule 40- 2" nominal dia. zinc galvanized at the rate of 1.8 oz/sf: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
    - Aluminum coated steel pipe; ASTM A53 steel, X 2 Tables Schedule 40; 2" nominal dia., 2.375" OD; coated at the rate 0.40 oz/sf: AASHTO M111.
    - Aluminum alloy pipe- 2 1/2" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
    - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2 1/2" OD, 2" NPS, 2.375" dec. equiv., 0.130" min. wall thick. and min. wt. 3.17 lb/ft; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15 µg/in<sup>2</sup> min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.
  - Rail options:
    - Galvanized steel pipe, Schedule 40- 1 1/4" nominal dia. zinc galvanized at the rate of 1.8 oz/sf: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
    - Aluminum coated steel pipe; ASTM A53 steel, X 2 Tables Schedule 40; 1 1/4" nominal dia., 1.660" OD; coated at the rate 0.40 oz/sf: AASHTO M111.
    - Aluminum alloy pipe- 1 1/4" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
    - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 1 1/2" OD, 1 1/4" NPS, 1.660" dec. equiv., 0.111" min. wall thick. and min. wt. 1.836 lb/ft; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15 µg/in<sup>2</sup> min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.

- Chain link fabric options (2" mesh with twisted and barbed selvage top and bottom for all options except as described in Note No. 10):
  - AASHTO M181 Type I - Zinc Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 1.8 oz/sf (M181 Class D 2.0 oz/sf modified to 1.8 oz/sf).
  - AASHTO M181 Type II - Aluminum Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 0.40 oz/sf.
  - AASHTO M181 Type III - Polyvinyl Chloride (PVC) Coated Steel, No. 9 gage (coated core wire diameter), core wire-zinc coated steel. PVC coating: M181 Class A (either extruded or extruded and bonded) or Class B (bonded). See table right. Unless the plans call for M181 standard colors medium green, dark green or black the coating color shall be soft gray matching that of No. 36622 of Federal Standard 595a.
- Tension wire options:
  - Steel wire No. 7 gage zinc galvanized at the rate of 1.2 oz/sf: AASHTO M181.
  - Aluminum alloy wire with a diameter of 0.1875" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
  - Aluminum coated steel wire No. 7 gage coated at the rate of 0.40 oz/sf: AASHTO M181.
- Tie wire and hog ring options:
  - Steel wire No. 9 gage zinc galvanized at the rate of 1.2 oz/sf.
  - Aluminum alloy wire with a diameter of 0.1443" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
  - Aluminum coated steel wire No. 7 gage coated at the rate of 0.40 oz/sf.
- 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 material; 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 either Class I concrete or 'Sackcrete' premix. Class I concrete shall be as specified in Section 347 of the Standard Specifications. Materials for Class I concrete may be proportioned by volume and/or by weight.
- Line posts are to be set in concrete as detailed above or by the following methods:
  - In accordance with special details and/or as specifically described in the contract plans and specifications.
  - In accordance with ASTM F567 Subsections 4.4 through 4.7 and 4.9 and 4.10 as approved by the Engineer.
  - Posts mounted on concrete structure or solid rock shall be mounted in accordance with the base plate detail "Fence Mounting On Concrete Endwalls And Retaining Wall", Sheet 2; or, by embedment in accordance with ASTM F567 Subsection 4.5.

- Pull posts shall be used at breaks in vertical grades of 15° or more, or at approximately 350' centers except that this maximum interval may be reduced by the Engineer on curves where the curve 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.
  - When fence has an installed top of fabric height less than 6', knuckled top and bottom selvages shall be used unless the plans specifically identify locations for twisted selvage fabrics.
  - 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, EA.
  - Line posts, tension wires, chain link fabric, tie wires, Class I concrete, and all miscellaneous fittings and hardware to be included in the cost for Fencing Type B, LF. The standard 6' high fence shall be paid for under the contract unit price for Fencing Type B, LF. Fence having other height, line components and/or barbed wire attachments shall be paid for under the contract unit price for Fencing Type B ( ), LF.
- 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), EA.
- End post assemblies shall consist of one 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 End Post Assembly (Type B Fence), EA.

TYPE IV VINYL COATED FABRIC								
AASHTO M181 Table 4 Redefined As Follows								
Specified Diameter Of Metallic Coated Core Wire		Minimum Weight Of Zinc Coating		PVC Thickness Range				
				M181 Class A (Extruded Or Extruded And Bonded Coating)		M181 Class B (Bonded Coating)		
in.	mm	gage	oz/sf	g/m <sup>2</sup>	in.	mm	in.	mm
0.148	3.77	9	0.30	92	0.015 to 0.025	0.38 to 0.64	0.006 to 0.010	0.15 to 0.25

cont. ....

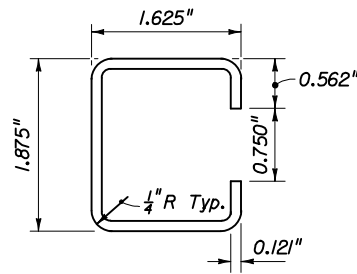
End, pull and corner post assemblies shall be set in concrete as detailed above for all soil conditions other than solid rock. Posts within assemblies that are located on concrete structures or solid rock shall be set by base plate or by embedment as prescribed under (b) above for line posts.

Line and assembly posts set in concrete bases shall be set an additional 3" in depth for each 1' of fence height greater than 6'.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

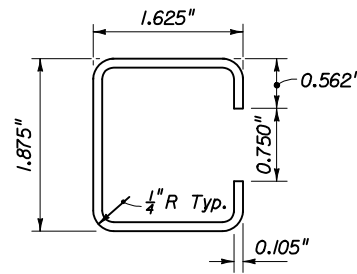
## FENCE TYPE B

Names	Dates	Approved By
Designed By		<i>Blair Blumhail</i> State Roadway Design Engineer
Drawn By		Revision Sheet No. Index No.
Checked By		02 1 of 2 452



Galv. Wt. Per. Ft. = 2.34# ±5%  
Yield p.s.i. (Min.) 45,000

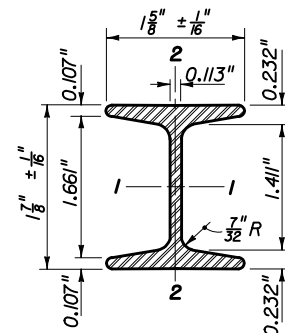
STANDARD WALL



Galv. Wt. Per. Ft. = 1.85# ±5%  
Yield p.s.i. (Min.) 45,000

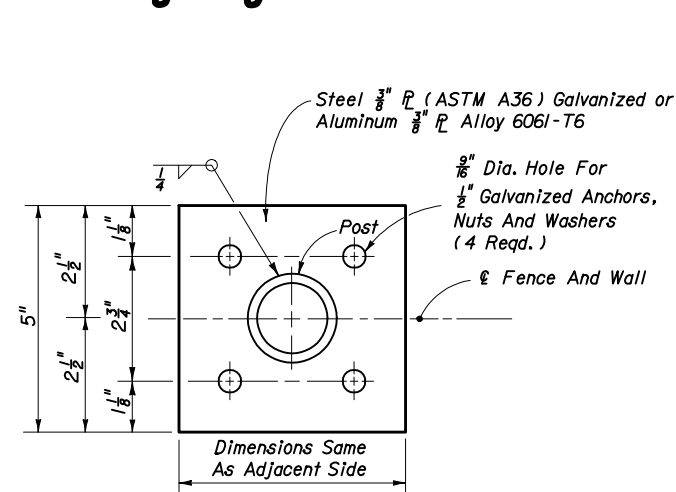
THINWALL

**OPTIONAL "C" LINE POST**

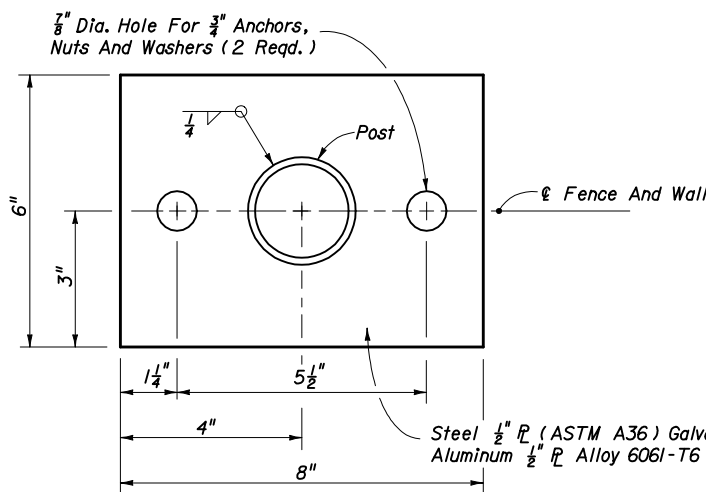


	STEEL		ALUMINUM	
	1-1	2-2	1-1	2-2
Area (Sq. In.)		724		724
Weight (Lb./Ft.)		2.72 ±5% (Galv.)		0.91 ±5%
Surface Area (SF/Ft.)		0.776		0.776
Tensile Strength (psi Min.)		80,000		30,000
Yielding Point (psi Min.)		48,000		25,000
	<b>Axes</b>		<b>Axes</b>	
Moment of Inertia	0.428	0.101	0.428	0.101
Section Modulus	0.456	0.124	0.456	0.124
Rad. Of Gyration	0.779	0.373	0.779	0.373

**OPTIONAL 1 7/8" x 1 5/8" H-BEAM LINE POST**

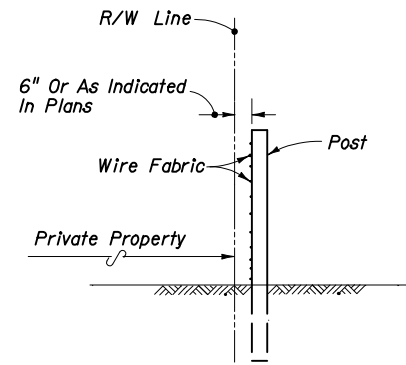


TOP VIEW  
FOUR ANCHOR OPTION

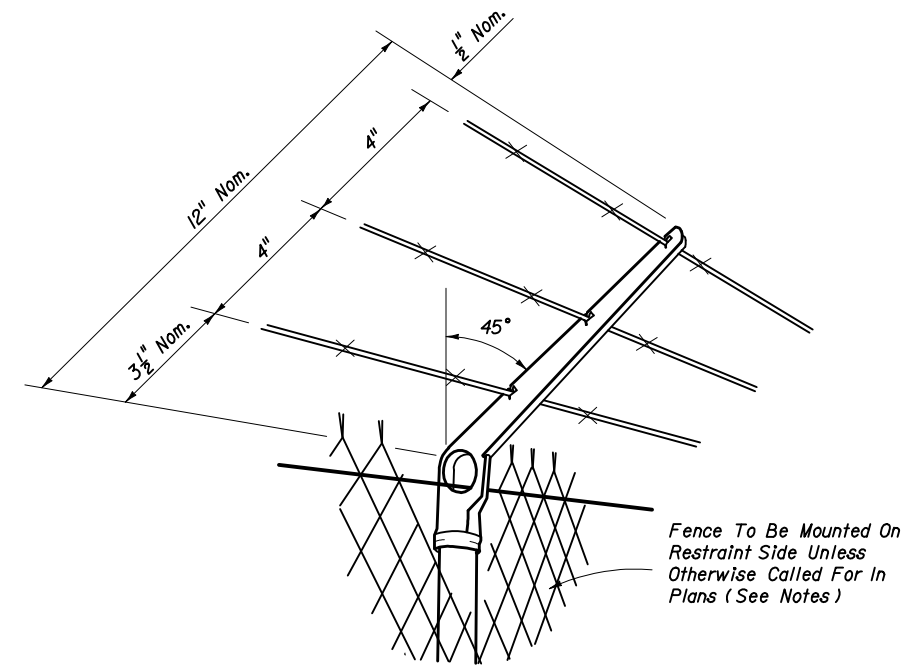


TOP VIEW  
TWO ANCHOR OPTION

**FENCE MOUNTING ON CONCRETE ENDWALL AND RETAINING WALLS**



**FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS**  
(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)



Fence To Be Mounted On Restraint Side Unless Otherwise Called For In Plans (See Notes)

NOTES

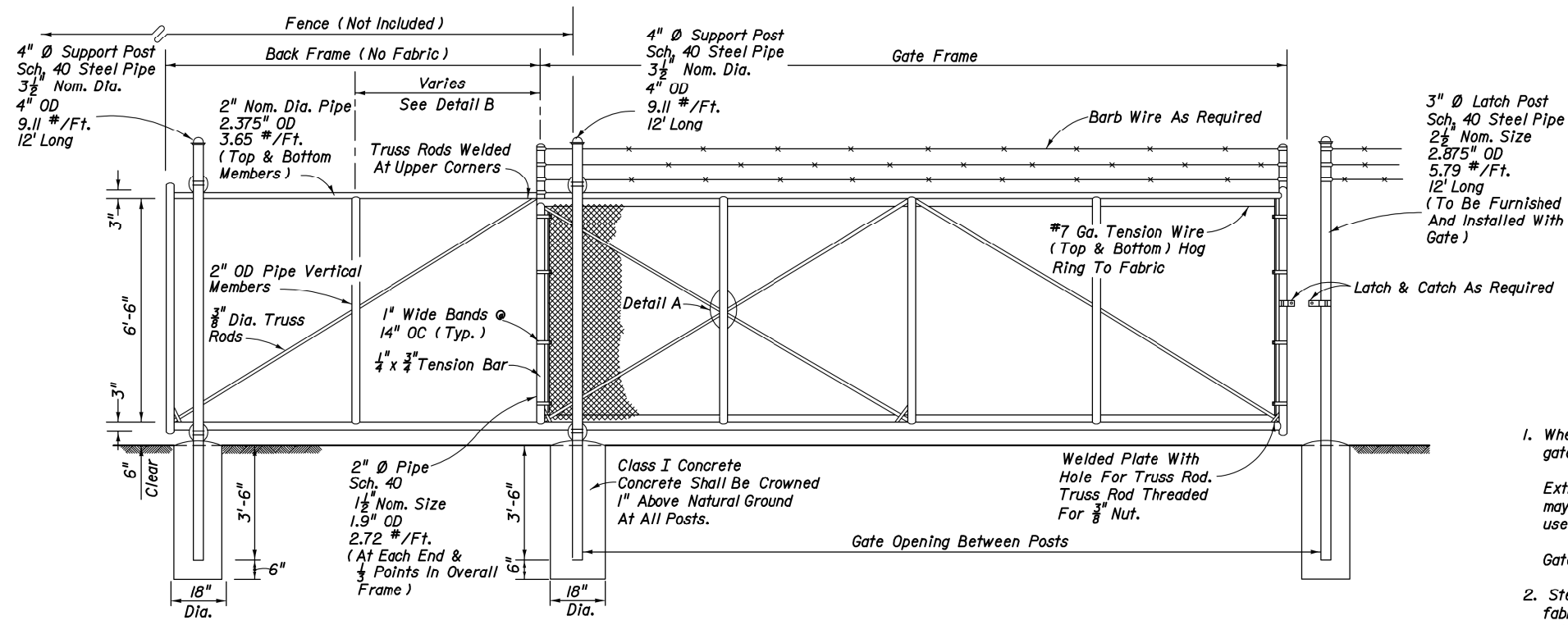
- Attachments to be used only when called for in the plans.  
Attachments to extend in direction of restraint. Unless otherwise called for in plans, direction of restraint will be as follows:
- Outward on limited access right of way line.
  - Outward on controlled access right of way line.
  - Outward 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-arm 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**

- BASE PLATE AND ANCHOR NOTES:**
- 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.
  - Post to be plumbed by grout shim under base plate.
  - Anchors (Galvanized Steel):  
12" Cast In Place, 10 1/2" Embedment:  
Headed Bolts, U-Bolts or Cluster Plates.  
8" Adhesive Anchors, 6" Min. Embedment.\*  
\*Adhesive anchors shall be headless anchor bolts set in drilled holes with an Adhesive Material System in accordance with Specification Sections 416 and 937; drilled holes shall be 1/8" larger in diameter than the anchor bolt.  
Expansion Bolts Not Permitted.

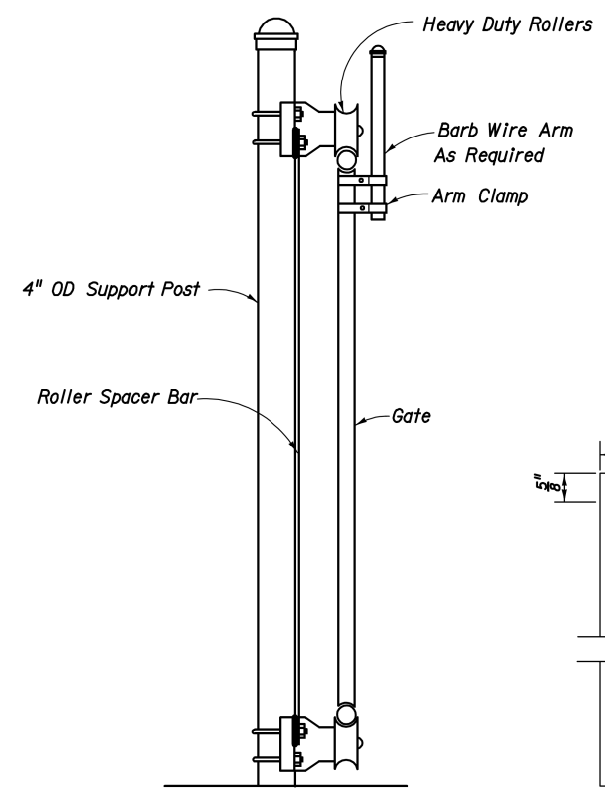
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>FENCE TYPE B</b>				
Names	Dates	Approved By		
Designed By		<i>Ben Blumhard</i> State Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	2 of 2	452



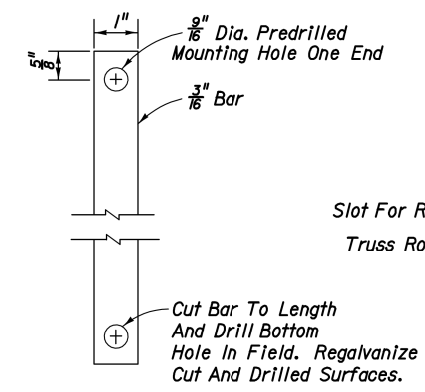
**FRONT ELEVATION**

**GENERAL NOTES**

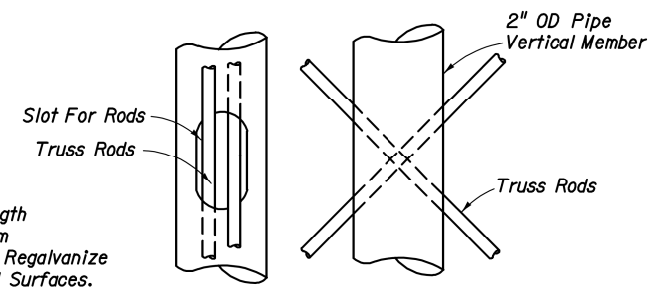
- When approved by the Engineer the Contractor may substitute any cantilever slide gate from the fencing systems on the Qualified Products List.  
  
Extruded, rolled or formed components that provide equal strength and stability may be used in lieu of the pipe components shown; and, internal rollers may be used in lieu of the external roller units shown.  
  
Gate components shall meet or exceed the protective coatings specified on Index No. 452.
- Steel gate frame shall be fabricated prior to galvanizing, except that truss rods may be fabricated following frame galvanizing provided surfaces damaged during welding are galvanized in accordance with Section 24 of AASHTO M36; or, fabricated from pipe components with protective coating meeting the requirements of Index No. 452 that are tolerant of welding (low burn back), and a protective coating applied to the weld and damaged pipe surfaces that is equivalent to the protective coating of the fabricated pipe stock.
- All fabric shall be knuckled top and bottom selvages.
- Cost of all gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever), EA.



**SUPPORT POST DETAIL**

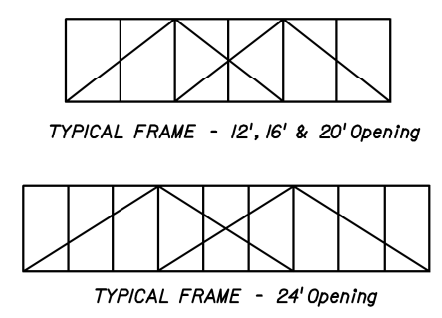


**ROLLER SPACER BAR**



**DETAIL A**

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

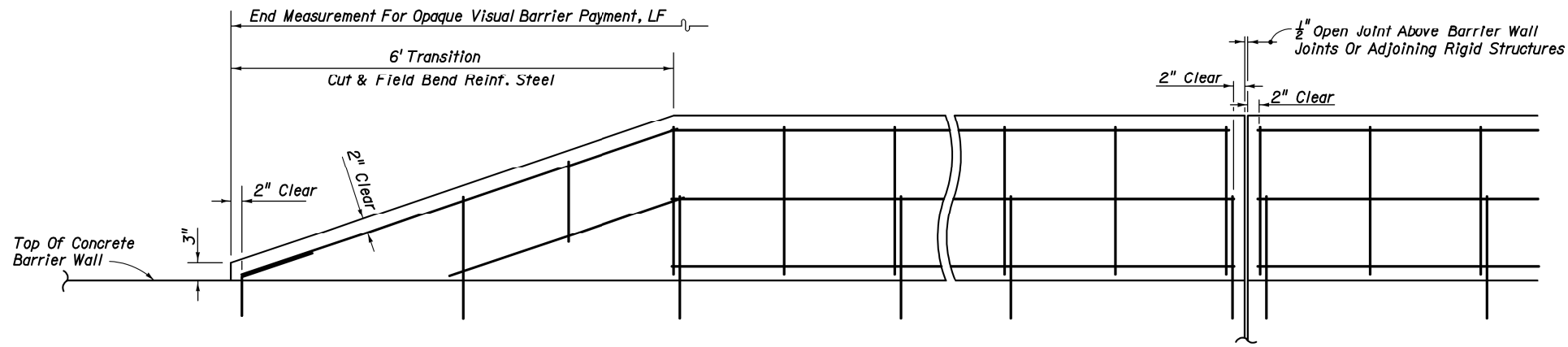


**DETAIL B**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CANTILEVER SLIDE GATE  
TYPE B FENCE**

Names	Dates	Approved By		
Designed By		<i>Brian Blumhail</i> State Roadway Design Engineer		
Drawn By	HDD 9/78			
Checked By	IMF 9/78	02	1 of 1	453



ELEVATION OF REINFORCEMENT AND DOWELING

**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 restrict 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'-8" in length, embedded 6" into the barrier wall and set with an approved chemical grout. Embedment holes shall be 3/8" diameter, drilled to a depth 1/4" 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 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 alignments 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.

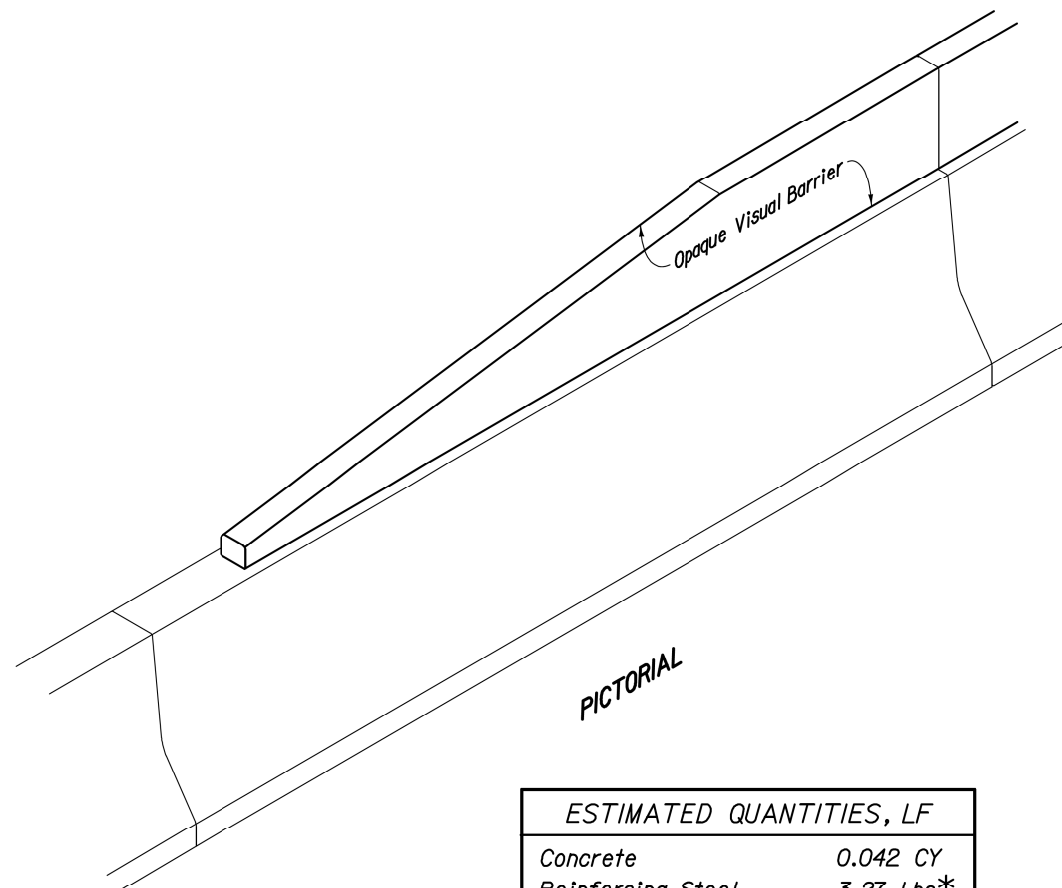
4. In lieu of the reinforcement shown the Contractor may substitute welded wire fabric equal to or better than that shown, when approved by the Engineer. Details shall be submitted with requests for substitution.

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.

The Contractor may construct the opaque screen monolithically with the barrier wall, however, the screen design shall not be modified so as to cause the wall to be dynamically active from strikes on the screen; see design considerations in Note No. 1 above.

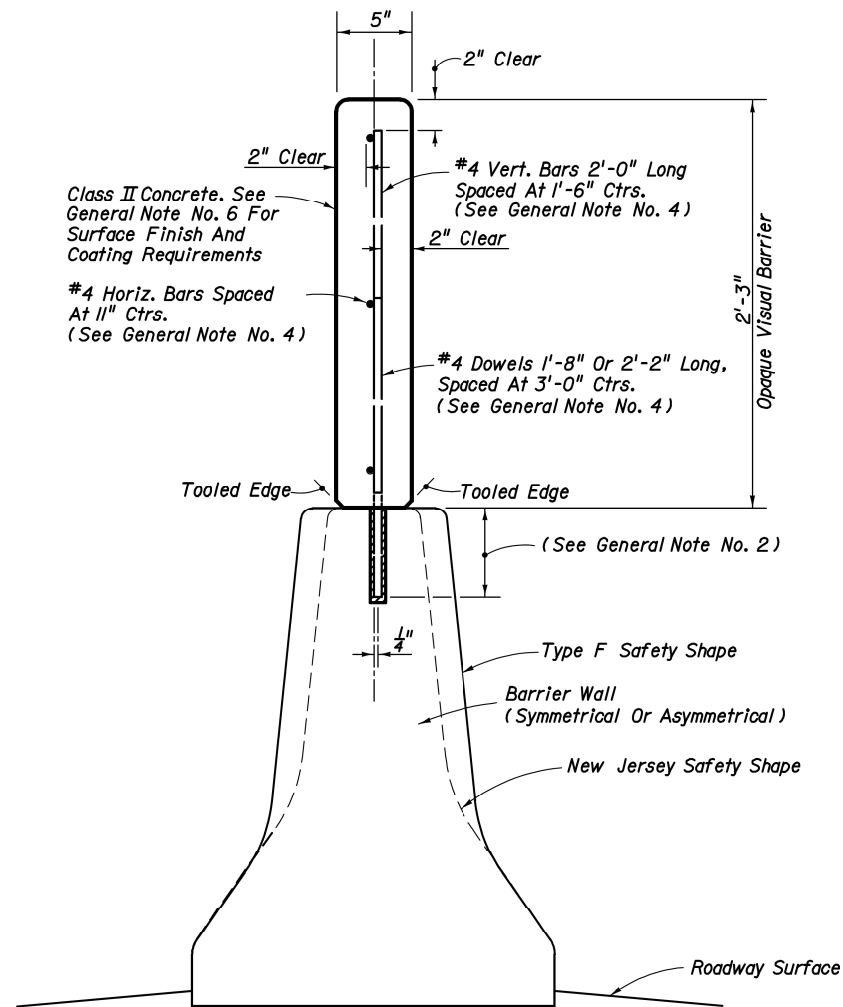
6. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specification, unless other finish called for in the plans. The surfaces shall have a Class 5 Applied Finish Coating in accordance with Section 400 only when called for in the plans.

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.



PICTORIAL

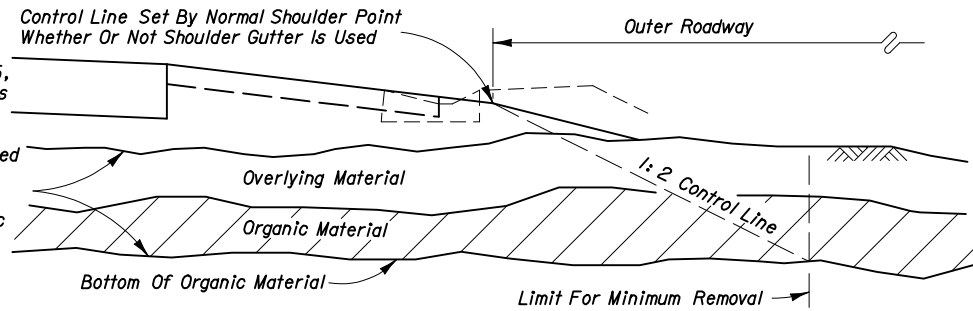
ESTIMATED QUANTITIES, LF	
Concrete	0.042 CY
Reinforcing Steel	3.27 Lbs*
*3.38 Lbs. With 2'-2" Dowels	



END VIEW

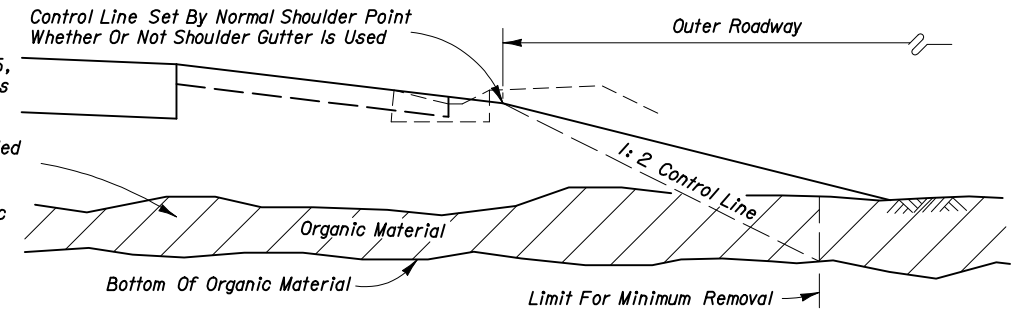
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>OPAQUE VISUAL BARRIER</b>				
	Names	Dates	Approved By	
Designed By	DCB/JVG	9/87	 State Roadway Design Engineer	
Drawn By	JBW	9/87		
Checked By	DCB/JVG	9/87	Revision	Sheet No.
			00	1 of 1
				Index No.
				461

Remove Overlying Material And Organic Material Within The Limits Shown And Backfill In Accordance With Index No. 505, Unless Otherwise Called For In The Plans Or Directed Otherwise By The District Geotechnical Engineer; The Limits Include Full Median Width When Applied To Divided Facilities With Median Widths Up To 64'; When Median Width Is Greater Than 64' And For Bifurcated Roadways The Organic Material Removal Limits Will Be Set By A 1:2 Control Line Complimentary To The Outer Roadway That Will Accomodate One Future Median Lane On Each Roadway Unless Specified Otherwise By The Plans.



WITH OVERBURDEN - HALF SECTION

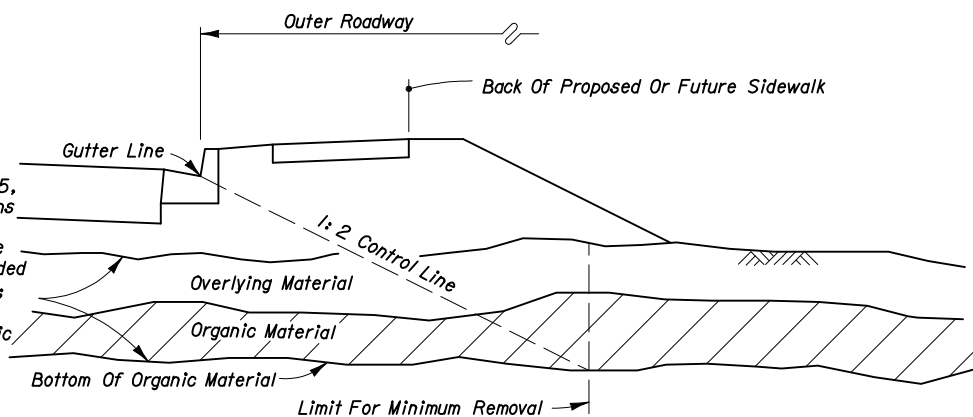
Remove Overlying Material And Organic Material Within The Limits Shown And Backfill In Accordance With Index No. 505, Unless Otherwise Called For In The Plans Or Directed Otherwise By The District Geotechnical Engineer; The Limits Include Full Median Width When Applied To Divided Facilities With Median Widths Up To 64'; When Median Width Is Greater Than 64' And For Bifurcated Roadways The Organic Material Removal Limits Will Be Set By A 1:2 Control Line Complimentary To The Outer Roadway That Will Accomodate One Future Median Lane On Each Roadway Unless Specified Otherwise By The Plans.



WITHOUT OVERBURDEN - HALF SECTION

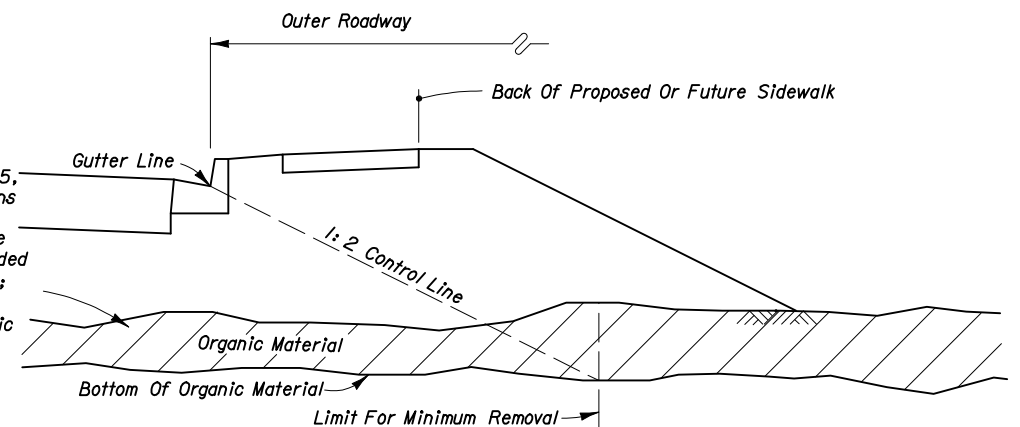
IN RURAL CONSTRUCTION

Remove Overlying Material And Organic Material Within The Limits Shown And Backfill In Accordance With Index No. 505, Unless Otherwise Called For In The Plans Or Directed Otherwise By The District Geotechnical Engineer; The Limits Include Full Median Width When Applied To Divided Facilities With Median Widths Up To 64'; When Median Width Is Greater Than 64' And For Bifurcated Roadways The Organic Material Removal Limits Will Be Set By A 1:2 Control Line Complimentary To The Outer Roadway That Will Accomodate One Future Median Lane On Each Roadway Unless Specified Otherwise By The Plans.



WITH OVERBURDEN - HALF SECTION

Remove Overlying Material And Organic Material Within The Limits Shown And Backfill In Accordance With Index No. 505, Unless Otherwise Called For In The Plans Or Directed Otherwise By The District Geotechnical Engineer; The Limits Include Full Median Width When Applied To Divided Facilities With Median Widths Up To 64'; When Median Width Is Greater Than 64' And For Bifurcated Roadways The Organic Material Removal Limits Will Be Set By A 1:2 Control Line Complimentary To The Outer Roadway That Will Accomodate One Future Median Lane On Each Roadway Unless Specified Otherwise By The Plans.



WITHOUT OVERBURDEN - HALF SECTION

IN URBAN CONSTRUCTION

REMOVAL OF ORGANIC MATERIAL


GENERAL NOTES

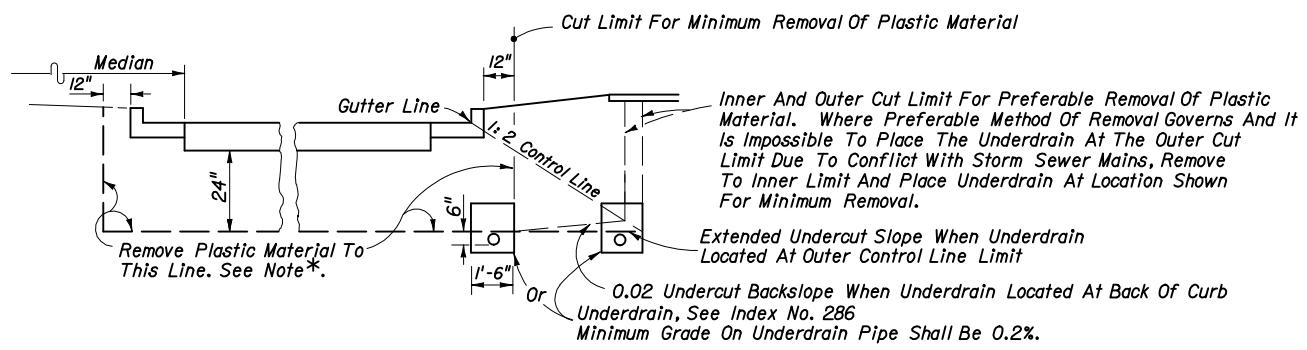
1. All details shown on this index for removal of organic and plastic materials apply unless otherwise shown on the plans.
2. Utilization of excavated materials shall be in accordance with Index No. 505.
3. Where organic or plastic material is undercut, backfill shall be made of suitable material in accordance with Index No. 505, unless otherwise shown on the plans.
4. The term "Plastic Material" used in this index in conjunction with removal of plastic soil is as defined under soil classifications for Plastic (P) and High Plastic (H) on Index No. 505.
5. The term "Organic Material" as used on this index is defined as any soil which has an average organic content greater than five (5.0) percent, or an individual organic content test result which exceeds seven (7.0) percent. Organic material shall be removed as shown on this index and the plans unless directed otherwise by the District Geotechnical Engineer.
6. The normal depth of side ditches shall be 3.5' below the shoulder point except in special cases.
7. In municipal areas, where underdrain is to be constructed beneath the proposed pavement, the grade of the underdrain filter material will not extend above the bottom of the stabilized section of the subgrade. Gradation of the filter material shall conform to FDOT specifications. Minimum grade on underdrain pipe shall be 0.2%.
8. See Index No. 506 for miscellaneous earthwork details.

DESIGN NOTES

1. At locations where organic material or other soft soil deposits persists to such depth that removal is impractical, the construction of a geosynthetic foundation over those soils should be considered. The Engineer of Record should request guidance from the District Geotechnical Engineer and make a geosynthetic foundation design in accordance with Index No. 501 when pursuing geosynthetic alternates.
2. The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated specify in the plans the limits of removal of organic and plastic materials necessary to accommodate anticipated widening.

Average organic content shall be determined from the test results from a minimum of three randomly selected samples from each stratum. Tests shall be performed in accordance with AASHTO T 267 on the portion of a sample passing the No. 4 sieve.

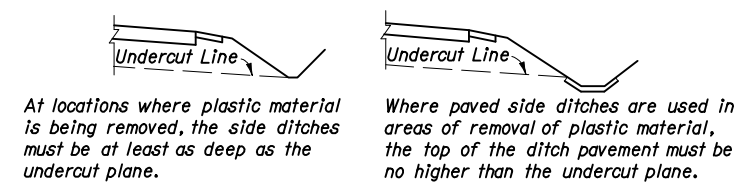
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION						
<b>REMOVAL OF ORGANIC AND PLASTIC MATERIAL</b>						
Designed By	GEOTECH	9/93	Approved By	 State Geotechnical Engineer		
Drawn By	HKH	9/93	Revision			Sheet No.
Checked By	BTD/FLS	9/93	02			1 of 2
			Index No. 500			



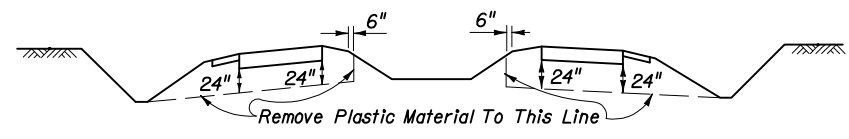
HALF SECTION

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, total removal of this material shall be approved by the Engineer.

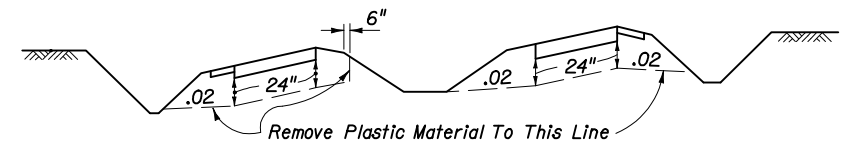
**REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN URBAN CONSTRUCTION**



MISCELLANEOUS DETAILS

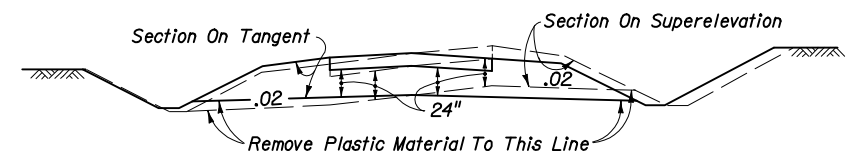


TYPICAL CUT SECTION ON TANGENT



TYPICAL CUT SECTION ON SUPERELEVATION

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



TYPICAL CUT SECTION

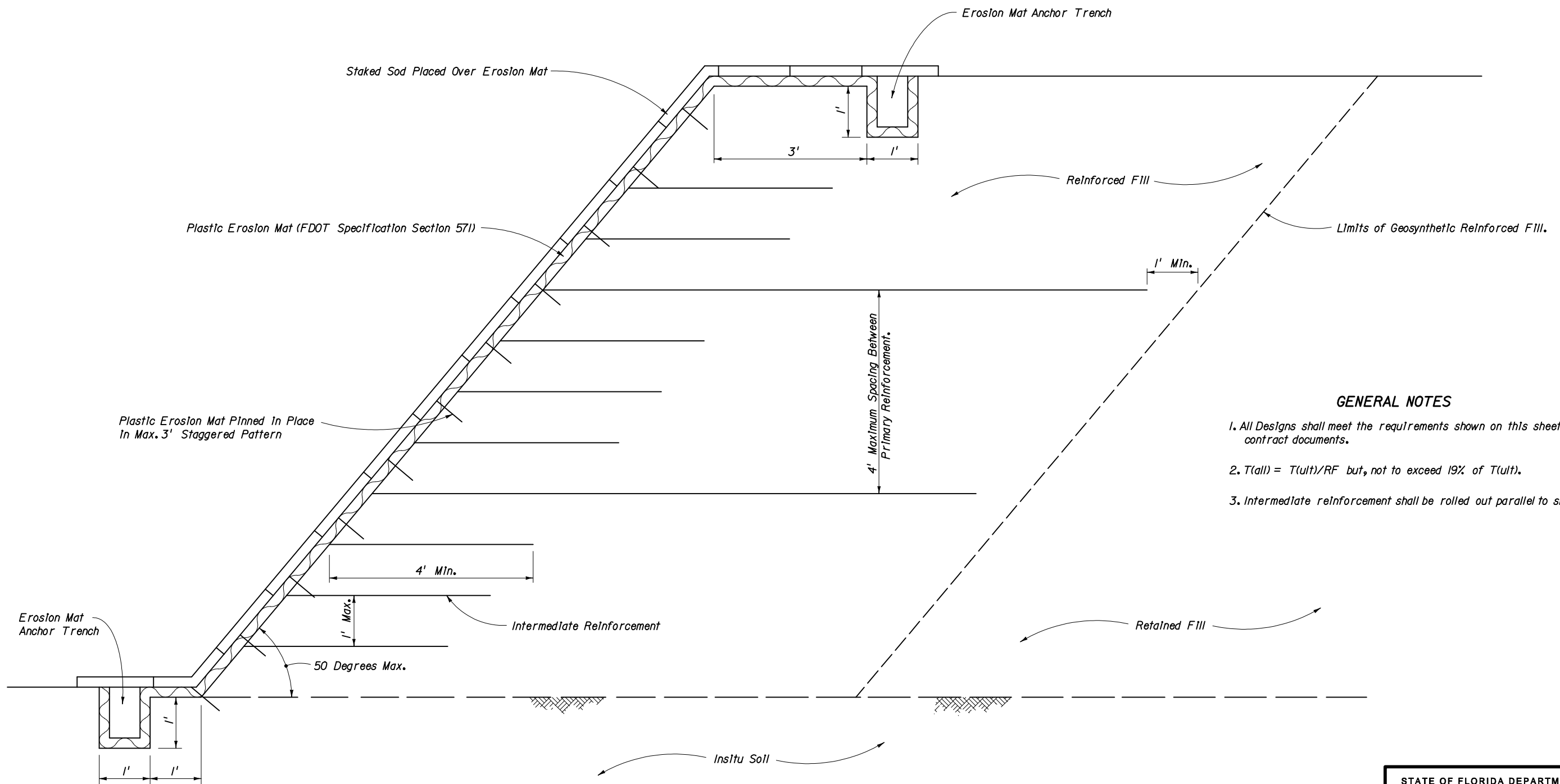
Note: When this detail is applied to minor collectors and local facilities, the undercut may be reduced to 18".

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

**REMOVAL OF PLASTIC MATERIAL**

Note: For GENERAL NOTES see Sheet 1.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>REMOVAL OF ORGANIC AND PLASTIC MATERIAL</b>				
Designed By	KHH/WNL	Dates	05/91	Approved By
Drawn By	HKH	05/91	Revision	Sheet No.
Checked By	JVG/WNL	05/91	00	2 of 2
			Index No.	500



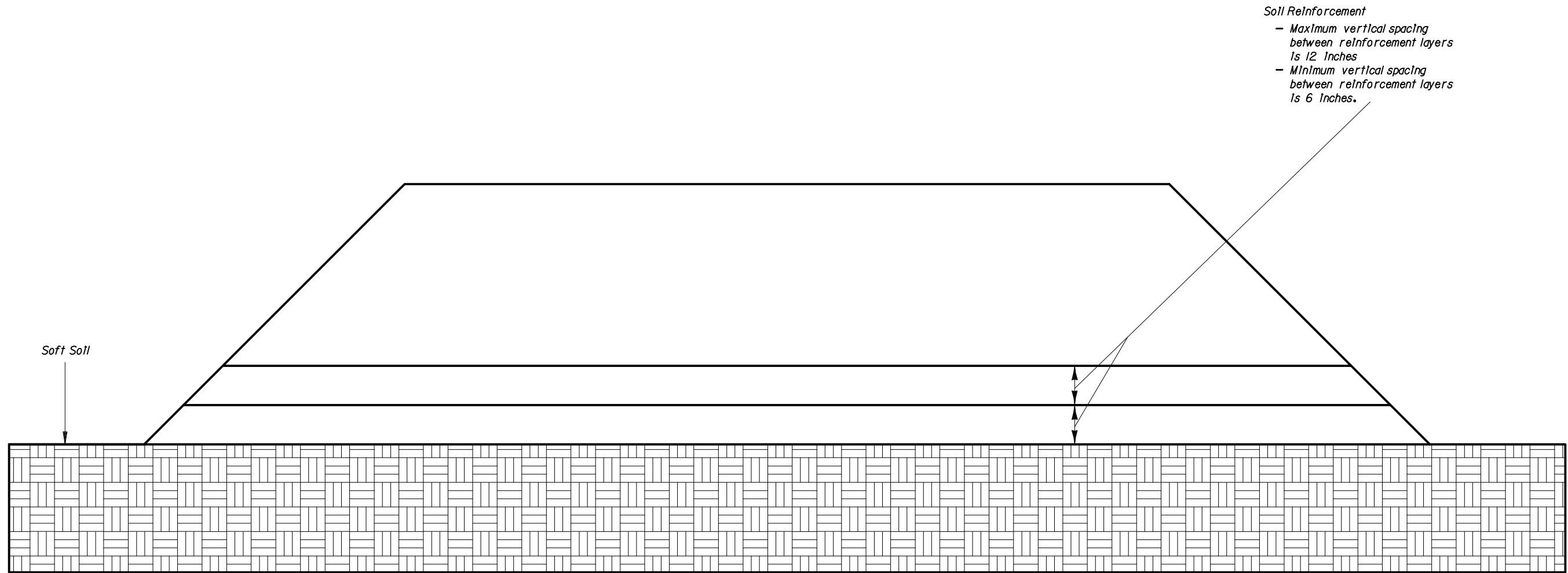
**GENERAL NOTES**

1. All Designs shall meet the requirements shown on this sheet and the contract documents.
2.  $T(alt) = T(ult)/RF$  but, not to exceed 19% of  $T(ult)$ .
3. Intermediate reinforcement shall be rolled out parallel to slope face.

**GEOSYNTHETIC REINFORCED SOIL SLOPES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GEOSYNTHETIC REINFORCED SOILS</b>				
Names	Dates	Approved By <i>W. V. [Signature]</i> for		
Designed By PDP	07/99	State Geotechnical Engineer		
Drawn By SM	07/99	Revision	Sheet No.	Index No.
Checked By FWL	08/99	00	1 of 8	501





*Soil Reinforcement*

- Maximum vertical spacing between reinforcement layers is 12 Inches
- Minimum vertical spacing between reinforcement layers is 6 Inches.

*Soft Soil*

***GEOSYNTHETIC REINFORCED FOUNDATIONS CONSTRUCTED ON SOFT SOILS***

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

***GEOSYNTHETIC REINFORCED SOILS***

	Names	Dates	Approved By <i>W. V. [Signature]</i> for		
Designed By	PDP	07/99	State Geotechnical Engineer		
Drawn By	SM	07/99	Revision	Sheet No.	Index No.
Checked By	PDP	08/99	00	2 of 8	501

TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY	REQUIRED TEST METHOD	MIRAFI HP 370	MIRAFI HP 470	MIRAFI HP 570	MIRAFI HP 670	MIRAFI HP 770	MIRAFI HS 400	MIRAFI HS 600	MIRAFI HS 800	MIRAFI HS 1150	
Permittivity (0.05 sec <sup>-1</sup> Min.)	ASTM D 4491	0.52	0.20	0.40	0.50	0.23	0.026	0.32	0.20	0.32	
UV Stability (Retained 50% Strength Min. @ 500 hr.)	ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	
Burst Strength (psi)	GRI & GSI	800	1,200	1,200	1,200	1,200	—	—	—	—	
Grab Strength (lb)	ASTM D 4632	400 x 250	380 x 350	475 x 440	650 x 450	600 x 550	—	—	—	—	
A.O.S. (In)	ASTM D 4751	0.0236	0.0335	0.0236	0.0335	0.0236	0.0118	0.0335	0.0335	0.0236	
Tensile Strength (lb/ft)	ASTM D 4595	Ultimate	3,240	3,600	4,800	6,420	7,200	4,800	7,200	9,600	13,800
		2% Ultimate	540	900	960	1,080	1,080	—	—	—	—
		5% Ultimate	1,356	1,800	2,400	2,700	3,000	1,080	2,040	3,600	4,800
		Cross Direction Ultimate	2,700	3,600	4,800	4,800	4,800	4,800	3,600	3,600	3,600
		Cross Direction 2% Ultimate	540	1,200	1,320	1,200	1,320	—	—	—	—
		Cross Direction 5% Ultimate	1,356	1,800	2,400	2,700	2,400	2,400	—	—	—
Strain @ Ultimate Tensile Strength (lb/ft)	ASTM D 4595	14%	10%	10%	14%	12%	15%	15%	10%	12%	
		2% strain	27,000	45,000	48,000	54,000	54,000	—	—	—	—
		5% strain	27,200	36,000	48,000	54,000	60,000	21,600	40,800	72,000	96,000
		10% strain	24,000	36,000	48,000	54,000	66,000	33,600	57,600	96,000	120,000
Seam Breaking Strength (lb/ft)	ASTM D 4884	1,440	1,800	3,000	3,600	1,200	2,400	2,400	2,400	2,400	
Puncture Resistance (lb)	ASTM D 4833	180	170	190	200	220	—	—	—	—	
Tear Strength (lb)	Machine Direction	ASTM D 4833	180	130	180	250	250	—	—	—	—
	Cross Direction	ASTM D 4833	110	200	180	200	400	—	—	—	
Soil-Geosynthetic Friction	GRI & GG5, GT7	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	
Creep Resistance - T <sub>creep</sub> (lb/ft)	ASTM D 5262	—	—	—	—	—	2,880	4,320	5,760	8,280	
Creep Reduction Factor (T <sub>ult</sub> / T <sub>creep</sub> )	GRI & GG3 & GT5	5.0	5.0	5.0	5.0	5.0	1.67	1.67	1.67	1.67	
Installation Damage (RF <sub>C</sub> )	Sand	GRI & GG4 & GT7	1.25	1.25	1.15	1.15	1.15	1.3	1.25	1.2	1.15
	Limestone		1.5	1.5	1.35	1.35	1.35	5	3.5	1.85	1.7
Durability (RF <sub>D</sub> )	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Joint Strength (RF <sub>J</sub> )	Mechanical	ASTM D 4595, GRI & GG4 & GT7	—	—	—	—	—	—	—	—	
	Overlap	GRI & GG5 & GT6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Approved Application Usage		3	3	3	3	3	3	3	3	3	

Approved Application Usage: 1 = Steepened Slopes  
 2 = Reinforcement of Foundations over Soft Soils  
 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils

**APPROVED GEOSYNTHETIC PRODUCTS  
 (WOVEN GEOTEXTILES)  
 APPLICATION AND PROPERTIES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GEOSYNTHETIC REINFORCED SOILS**

Names	Dates	Approved By	W. V. [Signature]		
Designed By	PDP 07/99	State Geotechnical Engineer			
Drawn By	PDP 08/99	Revision	Sheet No.	Index No.	
Checked By	PWL 08/99	00	3 of 8	501	

TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY	REQUIRED TEST METHOD	MIRIFI HS 1400	MIRIFI HS 1715	MIRIFI HS 2400	MIRIFI HS 3000	MIRIFI HS 3600	AMOCO 2006	AMOCO 2016	AMOCO 2044	COMTRAC 70/70
Permittivity (0.05 sec <sup>-1</sup> Min.)	ASTM D 4491	0.20	0.32	0.02	0.02	0.02	0.05	0.70	0.15	0.20
UV Stability (Retained 50% Strength Min. @ 500 hr.)	ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Burst Strength (psi)	GRI & GSI	—	—	—	—	—	1,000	1,100	1,500	—
Grab Strength (lb)	ASTM D 4632	—	—	—	—	—	315	315	600/500	—
A.O.S. (In)	ASTM D 4751	0.0335	0.0335	0.0118	0.0118	0.0118	0.0167	0.0167	0.0236	0.0335
Tensile Strength (lb/ft)										
Machine Direction	Ultimate	16,800	20,580	28,800	36,000	43,200	2,100	2,400	4,800	16,800
	2% Ultimate	—	—	—	—	—	156	276	456	—
	5% Ultimate	6,000	8,400	14,400	18,000	21,600	564	744	1,452	6,000
Cross Direction	Ultimate	3,600	3,600	3,600	3,600	3,600	2,100	2,400	4,800	3,600
	2% Ultimate	—	—	—	—	—	576	660	1,380	—
	5% Ultimate	—	—	—	—	—	1,104	1,404	2,604	—
Strain @ Ultimate Tensile Strength		14%	14%	10%	10%	10%	8%	8%	8%	14%
Modulus @ (lb/ft)	2% strain	—	—	—	—	—	7,800	13,800	22,800	—
	5% strain	120,000	168,000	288,000	360,000	432,000	11,280	14,880	29,040	120,000
	10% strain	120,000	162,000	288,000	360,000	432,000	10,440	12,480	31,200	120,000
Seam Breaking Strength (lb/ft)	ASTM D 4884	2,400	2,400	3,600	3,600	3,600	—	—	—	2,400
Puncture Resistance (lb)	ASTM D 4833	—	—	—	—	—	120	120	170	—
Tear Strength (lb)	Machine Direction	—	—	—	—	—	120	120	250	—
	Cross Direction	—	—	—	—	—	120	120	250	—
Soil-Geosynthetic Friction	GRI & GG5, GT7	0.9	0.9	0.9	0.9	0.9	0.65	0.65	0.65	0.9
Creep Resistance-T <sub>creep</sub> (lb/ft)	ASTM D 5262	10,080	12,348	17,280	21,600	21,600	600	685	1,371	—
Creep Reduction Factor (T <sub>ult</sub> / T <sub>creep</sub> )	GRI & GG3 & GT5	1.67	1.67	1.67	1.67	1.67	3.5	3.5	3.5	1.67
Installation Damage (RF <sub>C</sub> )	Sand	1.15	1.15	1.1	1.1	1.1	1.10	1.05	1.05	1.15
	Limestone	1.5	1.35	1.25	1.25	1.25	1.20	1.20	1.10	1.5
Durability (RF <sub>D</sub> )	Chemical	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF <sub>J</sub> )	Mechanical	—	—	—	—	—	—	—	—	—
	Overlap	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.0
Approved Application Usage		3	3	3	3	3	3	3	3	3

Approved Application Usage: 1 = Steepened Slopes  
 2 = Reinforcement of Foundations over Soft Soils  
 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils

**APPROVED GEOSYNTHETIC PRODUCTS  
 (WOVEN GEOTEXTILES)  
 APPLICATION AND PROPERTIES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GEOSYNTHETIC REINFORCED SOILS**

Names	Dates	Approved By	W. V. [Signature]		
Designed By	PDP 07/99	State Geotechnical Engineer			
Drawn By	PDP 08/99	Revision	Sheet No.	Index No.	
Checked By	FWL 08/99	00	4 of 8	501	

TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	MIRIFI MG 2XT	MIRIFI MG 3XT	MIRIFI MG 5XT (Matrex 30)	MIRIFI MG 7XT	MIRIFI MG 8XT	MIRIFI MG 10XT (Matrex 60)	MIRIFI MG 18XT (Matrex 90)	MIRIFI MG 20XT (Matrex 120)	MIRIFI MG 22XT (Matrex 180)	MIRIFI MG 24XT (Matrex 240)	
UV Stability (Retained 50% Strength Min. @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	
Tensile Strength (lb/ft)		ASTM D 4595											
Machine Direction	Ultimate		2,000	2,800	3,590	4,350	6,230	8,300	9,360	12,420	17,760	25,380	
	2% Ultimate		—	—	—	—	—	—	—	—	—	—	
	5% Ultimate		1,200	1,056	1,740	2,160	2,520	3,120	4,400	5,340	7,140	10,020	
Cross Direction	Ultimate		2,000	—	—	—	—	—	—	—	—	—	—
	2% Ultimate		—	—	—	—	—	—	—	—	—	—	—
	5% Ultimate	—	—	—	—	—	—	—	—	—	—	—	
Strain @ Ultimate Tensile Strength		ASTM D 4595	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	
Secant Modulus @ (lb/ft)	2% strain		—	—	—	—	—	—	—	—	—	—	
	5% strain		—	21,120	34,800	43,200	50,400	62,400	88,800	106,800	142,800	200,400	
	10% strain		—	—	—	—	—	—	—	—	—	—	
Junction Strength (lb/ft)		GRI # GG2	—	—	—	—	—	—	—	—	—	—	
Soil-Geosynthetic Friction		GRI # GG5, GT7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Creep Resistance- $T_{creep}$ (lb/ft)		ASTM D 5262	1,200	1,680	2,154	2,610	3,738	4,980	5,616	7,221	10,326	14,756	
Creep Reduction Factor ( $T_{ult}/T_{creep}$ )		GRI # GG3 & GT5	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	
Installation Damage (RF <sub>C</sub> )	Sand	GRI # GG4 & GT7	1.25	1.20	1.15	1.15	1.15	1.1	1.1	1.1	1.1	1.1	
	Limestone		Not Recommended	1.75	1.3	1.3	1.3	1.25	1.25	1.25	1.25	1.25	
Durability (RF <sub>D</sub> )	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Joint Strength (RF <sub>J</sub> )	Mechanical	ASTM D 4595, GRI # GG4 & GT7	—	—	—	—	—	—	—	—	—	—	
	Overlap	GRI # GG5 & GT6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Approved Application Usage			3	3	3	3	3	3	3	3	3	3	

Approved Application Usage: 1 = Steepened Slopes  
 2 = Reinforcement of Foundations over Soft Soils  
 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils

APPROVED GEOSYNTHETIC PRODUCTS  
 (WOVEN GEOGRIDS)  
 APPLICATION AND PROPERTIES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
GEOSYNTHETIC REINFORCED SOILS				
Names	Dates	Approved By <i>W. V. [Signature]</i> for		
Designed By PDP	07/99	State Geotechnical Engineer		
Drawn By PDP	08/99	Revision	Sheet No.	Index No.
Checked By FWL	08/99	00	5 of 8	501

TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	SYNTEEN SF 20	SYNTEEN SF 35	SYNTEEN SF 40	SYNTEEN SF 50	SYNTEEN SF 55	SYNTEEN SF 80	SYNTEEN SF 110	Raugrid 3/13	Raugrid 4/12	Raugrid 6/13	Raugrid 8/13	Raugrid 10/13	
UV Stability (Retained 50% Strength Min. @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	95%	95%	95%	95%	95%	
Tensile Strength (lb/ft)															
Machine Direction	Ultimate	ASTM D 4595	1,809	2,627	3,051	3,731	3,774	5,583	8,226	2,233	2,843	4,350	5,288	6,590	
	2% Ultimate		370	462	488	791	736	1,016	1,186	—	—	—	—	—	
	5% Ultimate		670	725	970	922	1,159	1,273	1,684	712	767	1,144	1,165	1,582	
Cross Direction	Ultimate		1,809	2,556	3,051	3,933	2,499	2,206	2,176	2,213	1,459	1,959	2,089	2,192	
	2% Ultimate		370	399	488	791	604	882	1,274	—	—	—	—	—	
	5% Ultimate		670	583	970	922	796	1,563	1,581	541	356	452	507	521	
Strain @ Ultimate Tensile Strength				9.4%	14.1%	9.9%	14.2%	11.5%	14.2%	18.8%	10.8%	11.8%	13.1%	12.2%	11.2%
Secant Modulus @ (lb/ft)	2% strain		ASTM D 4595	18,494	23,114	24,408	39,551	36,799	50,807	59,298	—	—	—	—	—
	5% strain			13,397	14,499	19,404	18,432	23,174	25,459	33,676	—	—	—	—	—
	10% strain	15,206		15,234	22,089	18,432	27,137	37,910	27,380	—	—	—	—	—	
Junction Strength (lb/ft)		GRI : GG2	—	—	—	—	—	—	—	N/A	617	1139	961	833	
Soil- Geosynthetic Friction		GRI : GG5, GT7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	—	—	—	—	—	
Creep Resistance- $T_{creep}$ (lb/ft)		ASTM D 5262	1,005	1,523	1,525	2,201	2,265	3,182	4,026	1,469	1,870	2,862	3,479	4,335	
Creep Reduction Factor ( $T_{ult} / T_{creep}$ )		GRI : GG3 & GT5	1.80	1.72	2.00	1.70	1.67	1.75	2.02	1.52	1.52	1.52	1.52	1.52	
Installation Damage (RF <sub>C</sub> )	Sand	GRI : GG4 & GT7	1.05	1.15	1.15	1.08	1.08	1.08	1.08	1.10	1.10	1.10	1.10	1.10	
	Limestone		1.75	1.70	1.60	1.55	1.55	1.55	1.35	1.14	1.14	1.14	1.14	1.14	
Durability (RF <sub>D</sub> )	Chemical	ASTM D 5322	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.15	1.15	1.15	1.15	1.15	
	Biological	ASTM D1987, D3083, G21 & G22	1.10	1.10	1.10	1.10	1.10	1.10	1.10						
Joint Strength (RF <sub>J</sub> )	Mechanical	ASTM D 4595, GRI : GG4 & GT7	—	—	—	—	—	—	—	—	—	—	—	—	
	Overlap	GRI : GG5 & GT6	1.10	1.10	1.10	1.10	1.10	1.10	1.10	—	—	—	—	—	
Approved Application Usage			3	3	3	3	3	3	3	3	3	3	3	3	

Approved Application Usage: 1 = Steepened Slopes  
 2 = Reinforcement of Foundations over Soft Soils  
 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils

**APPROVED GEOSYNTHETIC PRODUCTS  
 (WOVEN GEOGRID)  
 APPLICATION AND PROPERTIES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GEOSYNTHETIC REINFORCED SOILS</b>				
Designed By	PDP	07/99	Approved By	<i>W. V. [Signature]</i> for
Drawn By	PDP	08/99	State Geotechnical Engineer	
Checked By	FWL	08/99	Revision	02
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			Index No.	501

TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENSAR BX 4100	TENSAR BX 4120	TENSAR BX 4200	TENSAR BX 4220	TENSAR UX 900 HS	TENSAR UX 1100 HS	TENSAR UX 1400 HS	TENSAR UX 1500 HS	TENSAR UX 1600 HS	TENSAR UX 1700 HS
UV Stability (Retained 50% Strength Min. @ 500 hr.)		ASTM D 4355	—	90%	90%	90%	90%	90%	90%	90%	90%	90%
Tensile Strength (lb/ft)												
Machine Direction	Ultimate	ASTM D 4595	860	860	1,270	1,270	3,700	3,700	4,400	6,900	9,000	10,800
	2% Ultimate		240	240	370	370	840	840	1,000	1,800	2,330	2,740
	5% Ultimate		480	480	705	705	1,440	1,440	2,000	3,700	4,450	5,400
Cross Direction	Ultimate		875	875	1,370	1,370	—	—	—	—	—	—
	2% Ultimate		300	300	500	500	—	—	—	—	—	—
	5% Ultimate		635	635	960	960	—	—	—	—	—	—
Strain @ Ultimate Tensile Strength		ASTM D 4595	—	—	—	—	10%	10%	10%	10%	10%	10%
Secant Modulus (lb/ft)	2% strain		11,995	11,995	18,506	18,506	42,015	42,015	50,000	89,993	116,518	137,012
	5% strain		9,596	9,596	14,092	14,092	28,800	28,800	40,000	73,996	89,006	108,005
	10% strain		—	—	—	—	—	—	—	—	—	—
Junction Strength (lb/ft)		GRI : GG2	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Soil- Geosynthetic Friction		GRI : GG5, GT7	—	0.90	0.95	0.95	0.462	0.462	0.462	0.462	0.462	0.462
Creep Resistance- $T_{creep}$ (lb/ft)		ASTM D 5262	250	250	420	420	900	1,350	1,850	2,800	3,700	4,650
Creep Reduction Factor ( $T_{ult}/T_{creep}$ )		GRI : GG3 & GT5	3.5	3.5	3.27	3.27	4.12	3.65	2.381	2.46	2.43	2.33
Installation Damage (RF <sub>C</sub> )	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Limestone		1.43	1.43	1.35	1.35	1.25	1.25	1.20	1.20	1.20	1.20
Durability (RF <sub>d</sub> )	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF <sub>j</sub> )	Mechanical	ASTM D 4595, GRI : GG4 & GT7	—	—	—	—	1.0	1.0	1.0	1.0	1.0	1.0
	Overlap	GRI : GG5 & GT6	1.0	1.0	1.0	1.0	—	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3	3	3	3	3	3	3	3	3	3

Approved Application Usage: 1 = Steepened Slopes  
 2 = Reinforcement of Foundations over Soft Soils  
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**APPROVED GEOSYNTHETIC PRODUCTS  
 (EXTRUDED GEOGRID)  
 APPLICATION AND PROPERTIES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GEOSYNTHETIC REINFORCED SOILS</b>				
Names	Dates	Approved By <i>W. V. [Signature]</i> for		
Designed By PDP	07/99	State Geotechnical Engineer		
Drawn By PDP	08/99	Revision	Sheet No.	Index No.
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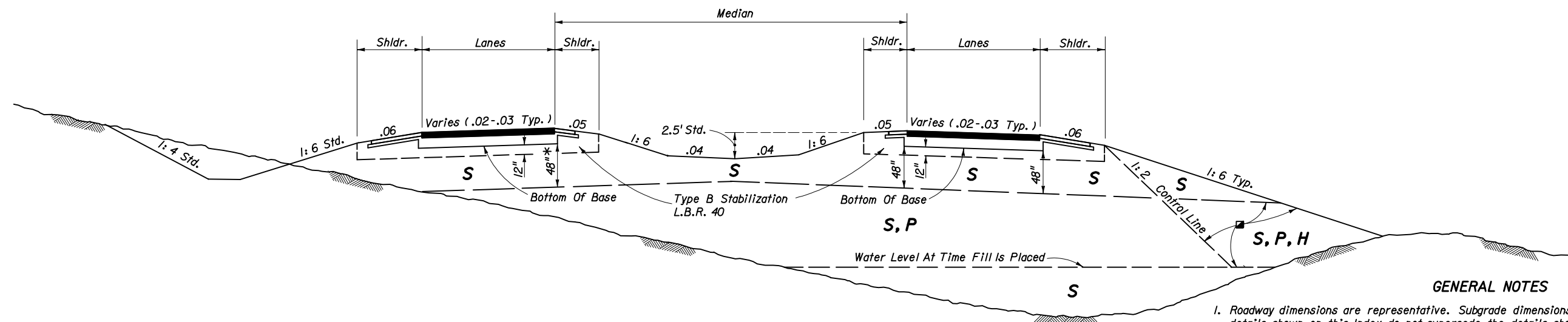
TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENAX MS 220	TENAX MS 330							
UV Stability (Retained 50% Strength Min. @ 500 hr.)		ASTM D 4355	85%	85%							
Tensile Strength (lb/ft)											
Machine Direction	Ultimate	ASTM D 4595	925	1,370							
	2% Ultimate		300	418							
	5% Ultimate		615	925							
Cross Direction	Ultimate		1,400	2,100							
	2% Ultimate		445	616							
	5% Ultimate		890	1,340							
Strain @ Ultimate Tensile Strength			12%	12%							
Secant Modulus @ (lb/ft)	2% strain	ASTM D 4595	15,000	20,900							
	5% strain		12,330	18,500							
	10% strain		—	—							
Junction Strength (lb/ft)		GRI : GG2	835	1,230							
Soil- Geosynthetic Friction		GRI : GG5, GT7	—	—							
Creep Resistance- $T_{creep}$ (lb/ft)		ASTM D 5262	—	—							
Creep Reduction Factor ( $T_{ult} / T_{creep}$ )		GRI : GG3 & GT5	5.0	5.0							
Installation Damage (RF <sub>C</sub> )	Sand	GRI : GG4 & GT7	3.0	3.0							
	Limestone		3.0	3.0							
Durability (RF <sub>D</sub> )	Chemical	ASTM D 5322	2.0	2.0							
	Biological	ASTM D1987, D3083, G21 & G22									
Joint Strength (RF <sub>J</sub> )	Mechanical	ASTM D 4595, GRI : GG4 & GT7	—	—							
	Overlap	GRI : GG5 & GT6	—	—							
Approved Application Usage			2	2							

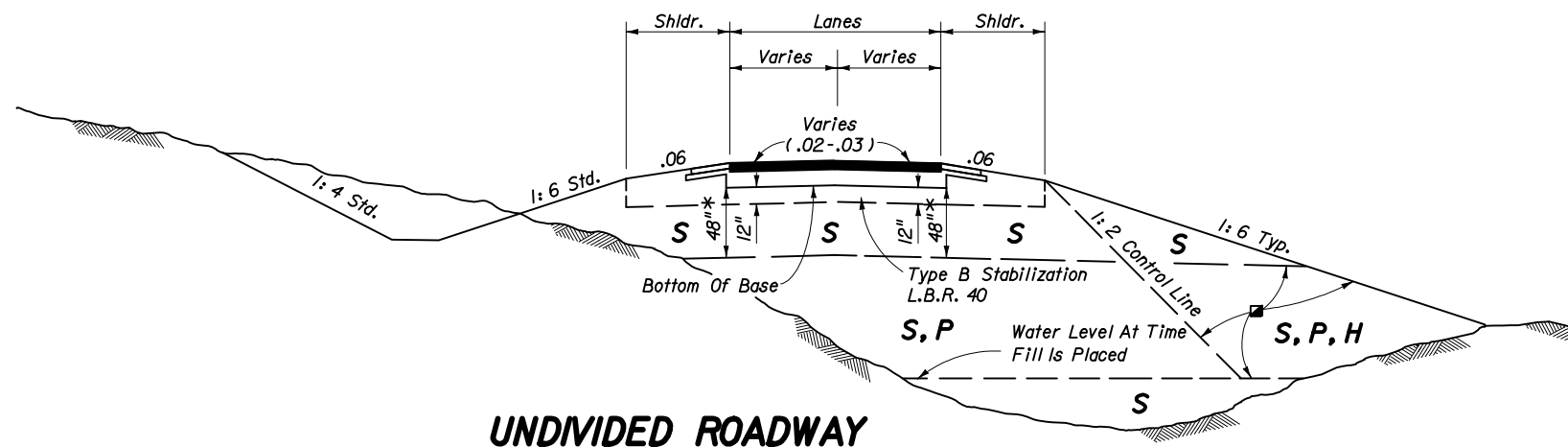
Approved Application Usage: 1 = Steepened Slopes  
 2 = Reinforcement of Foundations over Soft Soils  
 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils

**APPROVED GEOSYNTHETIC PRODUCTS  
 (EXTRUDED GEOGRID)  
 APPLICATION AND PROPERTIES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GEOSYNTHETIC REINFORCED SOILS</b>				
Names	Dates	Approved By <i>W. V. [Signature]</i> for		
Designed By PDP	07/99	State Geotechnical Engineer		
Drawn By PDP	08/99	Revision	Sheet No.	Index No.
Checked By FWL	08/99	00	8 of 8	501



### DIVIDED ROADWAYS



### UNDIVIDED ROADWAY

- GENERAL NOTES**
- Roadway dimensions are representative. Subgrade dimensions and control lines are standard. The details shown on this Index do not supersede the details shown in the plans or on Index Nos. 500 or 506.
  - Plastic (P) soils may be placed above the existing water level (at the time of construction) to within 4 feet 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.
  - High Plastic (H) soils excavated within the project limits may be used in embankment construction as indicated on this index. High Plastic soils are not to be used for embankment construction when obtained from outside the project limits.
  - Select (S) soils having an average organic content of more than two and one-half (2.5) percent, or having an individual test value which exceeds four (4) percent, shall not be used in the subgrade portion of the roadbed.

Select (S), Plastic (P), or High Plastic (H) soils having an average organic content of more than five (5) percent, or an organic content individual test result which exceeds seven (7) percent, shall not be used in the portion of embankment inside the control line, unless written authorization is provided by the District Geotechnical Engineer; these soils may be used for embankment construction outside the control line, unless restricted by the plans or otherwise specified in the plans, provided they can be compacted sufficiently to sustain a drivable surface for operational vehicles as approved by the Engineer.

Average organic content shall be determined from the test results from a minimum of three randomly selected samples from each stratum or stockpile of a particular material. Tests shall be performed in accordance with AASHTO T 267 on the portion of a sample passing the No. 4 sieve.

- Highly organic soils, composed primarily of partially decayed organic matter, often dark brown or black in color with an odor of decay, and sometimes fibrous, shall be designated as muck. Further, any stratum or stockpile of soil which contains pockets of highly organic material may be designated as Muck (M).

Highly organic soils shall not be used within the subgrade or embankment portion of the roadbed, with the exception of muck used as a supplement to construct a finish soil layer as described in Section 162 of the FDOT Standard Specifications.

### DESIGN NOTES

- The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated, specify in the plans the utilization of Select (S), Plastic (P) and/or High Plastic (H) soils classified as organic material, in the embankment outside the control line.

SYMBOL	SOIL	CLASSIFICATION (AASHTO M-145)
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

Classification listed left to right in order of preference.

See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

\*\* Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Geotechnical Engineer.

\* For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".

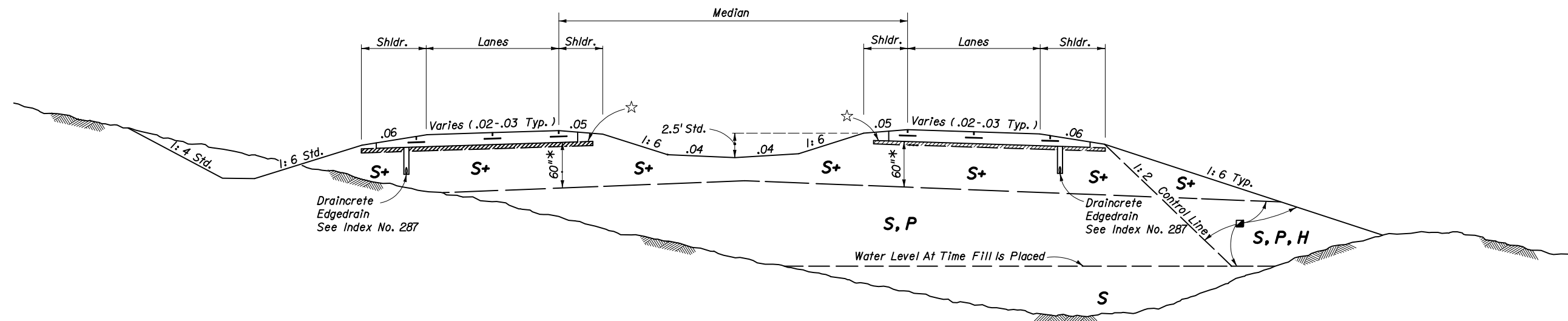
### FLEXIBLE PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

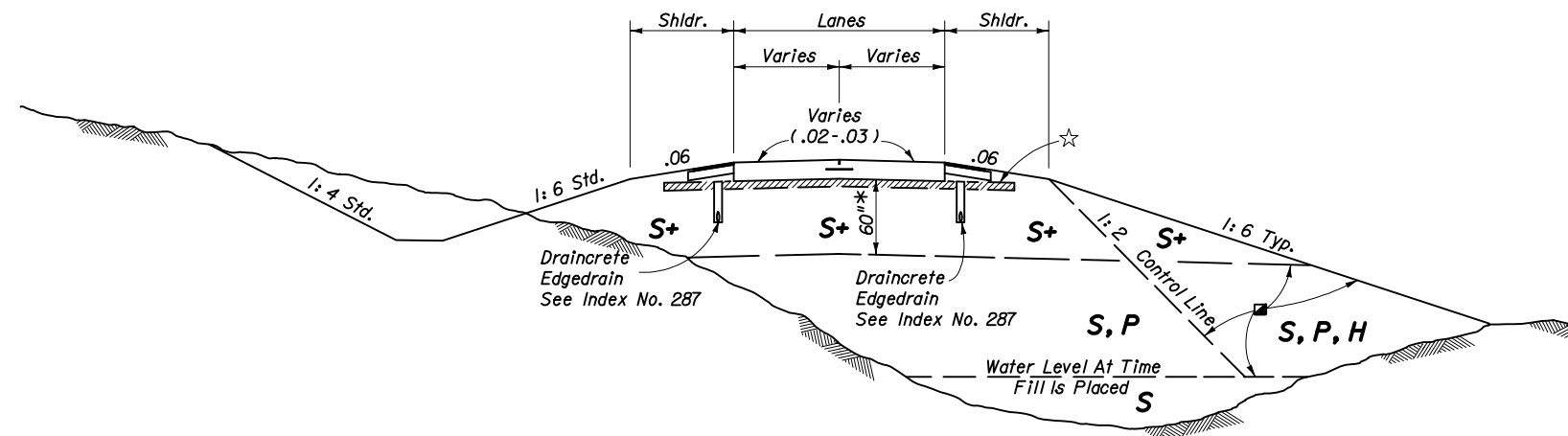
### EMBANKMENT UTILIZATION

Designed By	GEOTECH	Dates	09/93	Approved By	<i>[Signature]</i>
Drawn By	HSD	Revision	09/93	Sheet No.	1 of 3
Checked By	BTD	Index No.	09/93		505





**DIVIDED ROADWAYS**



**UNDIVIDED ROADWAY**

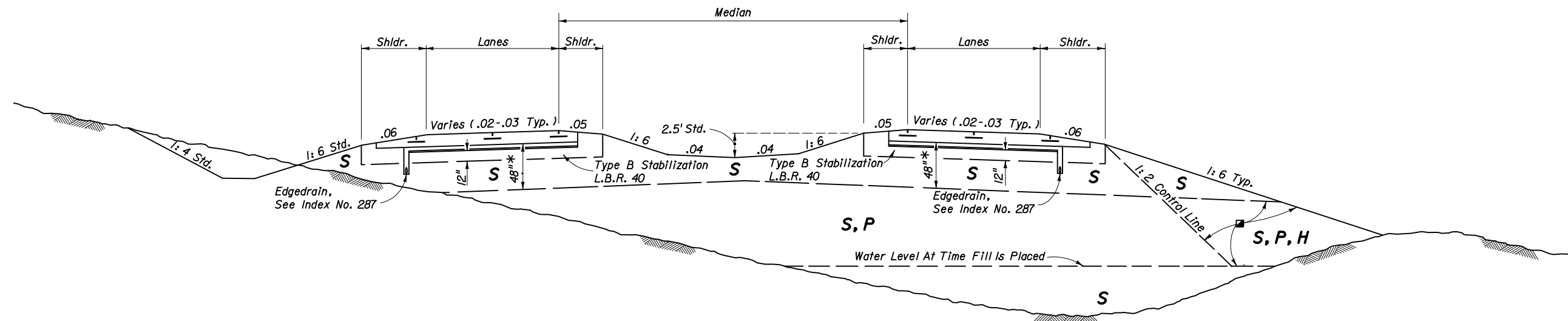
SYMBOL	SOIL	CLASSIFICATION (AASHTO M-145)
S	Select	A-1, A-3, A-2-4 **
S+	Special Select	A-3 *** With Minimum Average Lab Permeability of $5 \times 10^{-5}$ cm/sec (0.14 ft./day) as per FM 1-T2/5
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Classification listed left to right in order of preference.

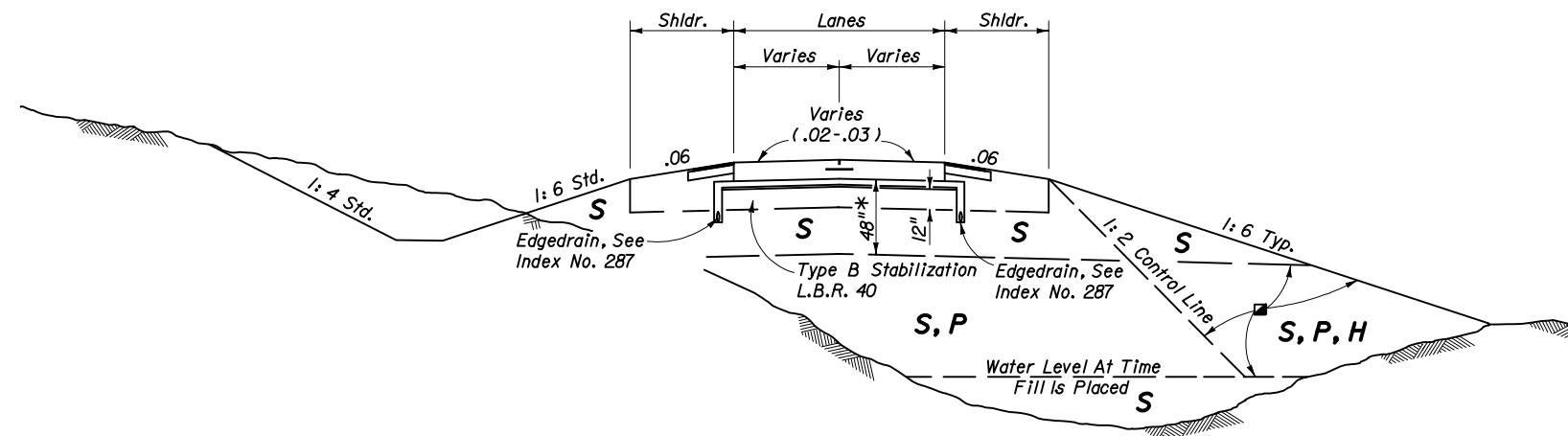
- See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.
- \*\*\*When allowed by the plans, some types of A-2-4 material may be approved in writing by the District Materials Engineer. This material must meet the minimum lab permeability requirement, be non-plastic, and not exceed 12% passing the No. 200 sieve.
- \*\* Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction.
- \* For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".
- ☆ 3" of #57 Coarse Aggregate Mixed Into Top 6".

**RIGID PAVEMENT - SPECIAL SELECT SOIL**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>EMBANKMENT UTILIZATION</b>				
Designed By	HMD	Dates	09/93	Approved By
Drawn By	HSD	Revision	09/93	State Geotechnical Engineer
Checked By	BTD	Sheet No.	00	Index No.
			2 of 3	505



**DIVIDED ROADWAYS**



**UNDIVIDED ROADWAY**

SYMBOL	SOIL	CLASSIFICATION (AASHTO M-145)
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

Classification listed left to right in order of preference.

- See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.
- \*\* Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Geotechnical Engineer.
- \* For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".

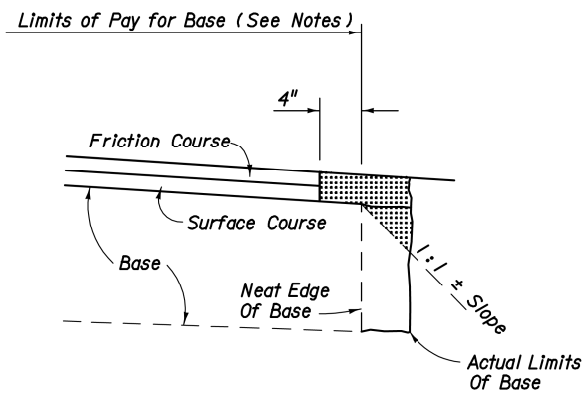
**DESIGN NOTE**  
 1. Concrete pavement is to be placed over 4" of Asphalt Treated Permeable Base (ATPB) or Cement Treated Permeable Base (CTPB) as identified in the plans. This will be placed on an aggregate separator layer using 1" Type SP (Traffic C). This will be placed on a working platform using 12" of Type B Stabilization.

**RIGID PAVEMENT - TREATED PERMEABLE BASE**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**EMBANKMENT UTILIZATION**

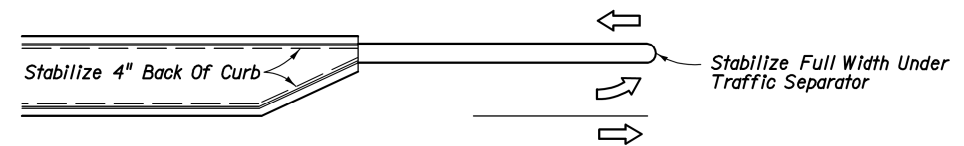
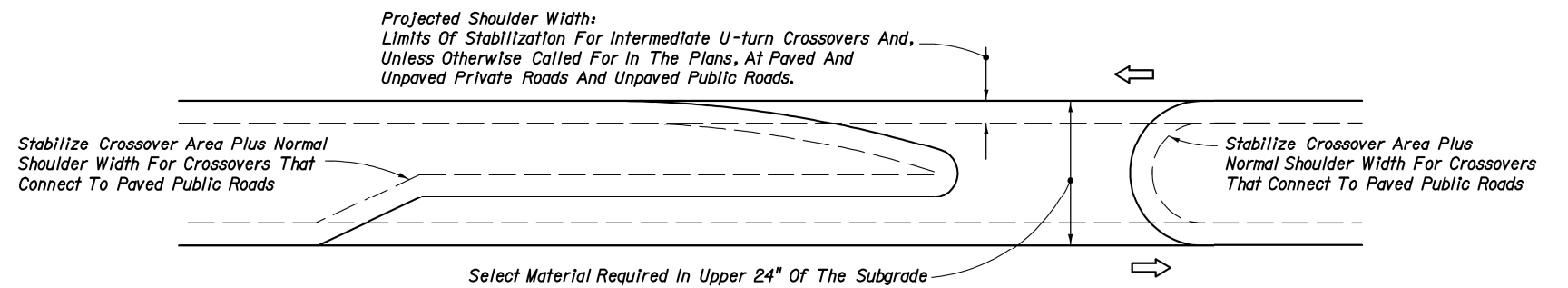
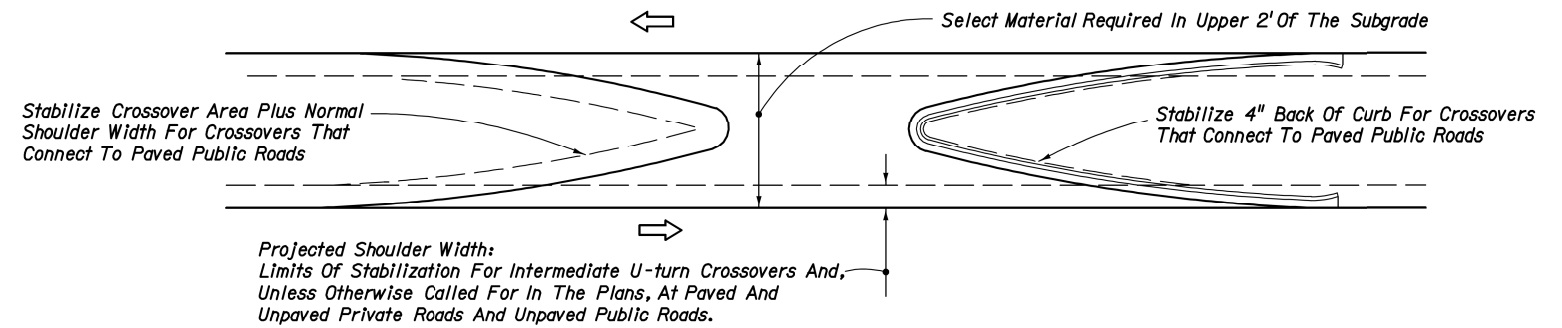
Names	Dates	Approved By		
Designed By	HMD 09/93		State Geotechnical Engineer for	
Drawn By	HSD 09/93		Revision	Sheet No.
Checked By	BTD 09/93	00	3 of 3	505



**NOTES**

1. All material in the shaded area is excess base to be removed.
2. The cost for removal of excess base material shall be included in the contract unit price for base.
3. Payment for base shall be calculated using normal width.

**REMOVAL OF EXCESS BASE MATERIAL**

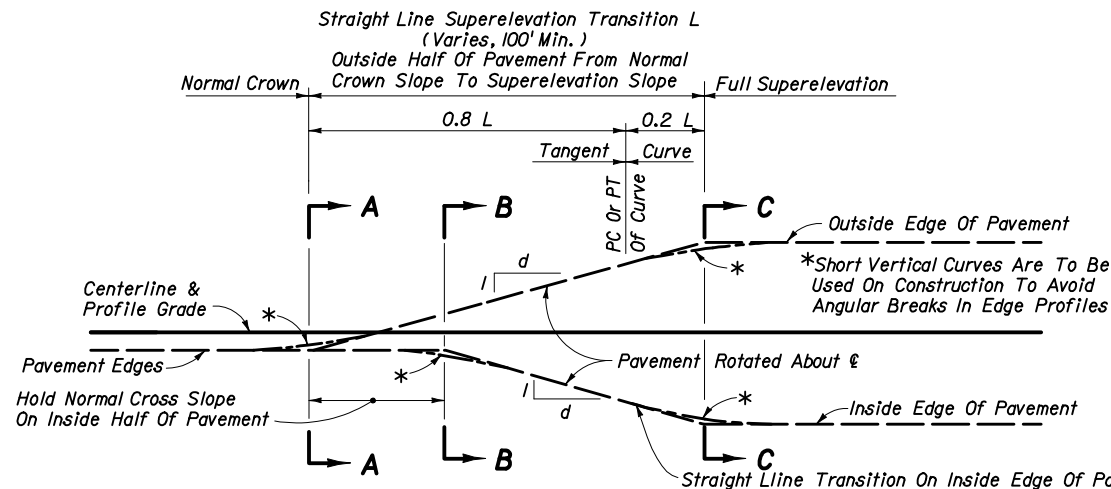


**NOTES**

1. When the median has curb or curb and gutter, stabilize 4" back of curb.
2. When the median has shoulder with no curb or curb and gutter, stabilize to normal shoulder width.
3. See the details above for stabilizing requirements at crossroads.
4. Stabilize entire area under all paved traffic islands.
5. Stabilize full width under all traffic separators.
6. Select material as defined on Index No. 505. For minor collectors and local facilities the depth of select material thickness may be reduced from 24" to 18".

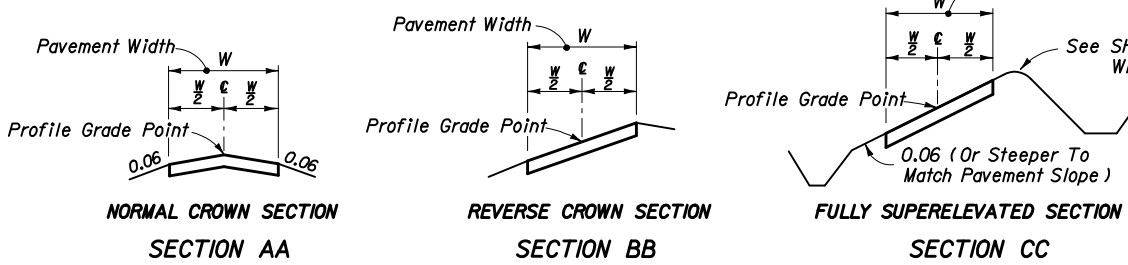
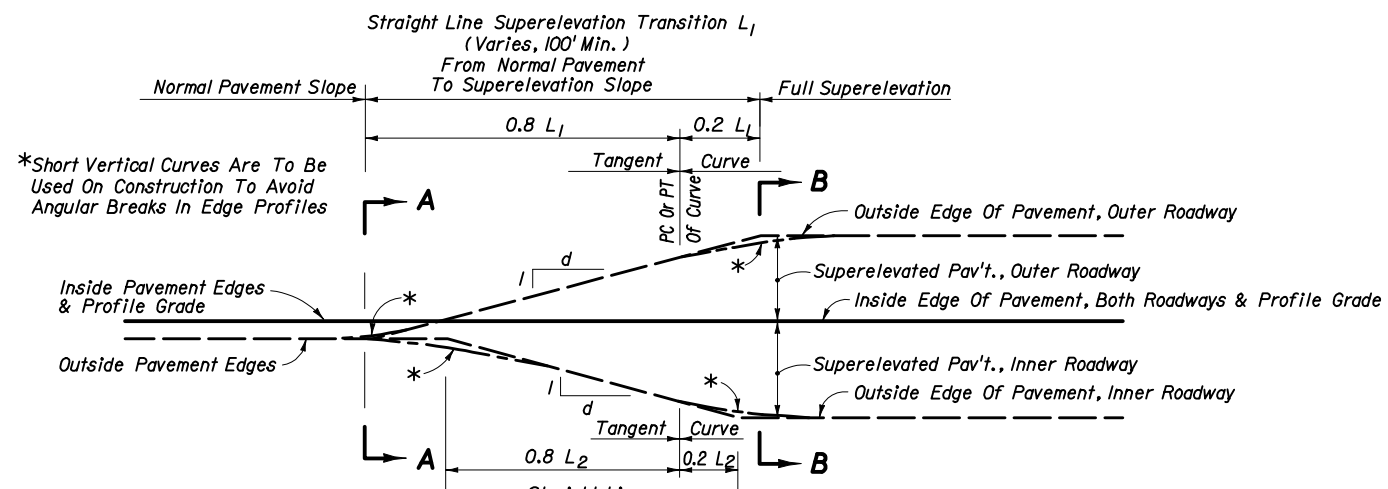
**MEDIAN STABILIZING DETAILS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>MISCELLANEOUS EARTHWORK DETAILS</b>					
Designed By	Names	Dates	Approved By		
Drawn By	RL/WNL	05/91	<i>Brian Blankenship</i> State Roadway Design Engineer		
Checked By	JKH	05/91			
	JVG/WNL	05/91	Revision	Sheet No.	Index No.
			00	1 of 1	506

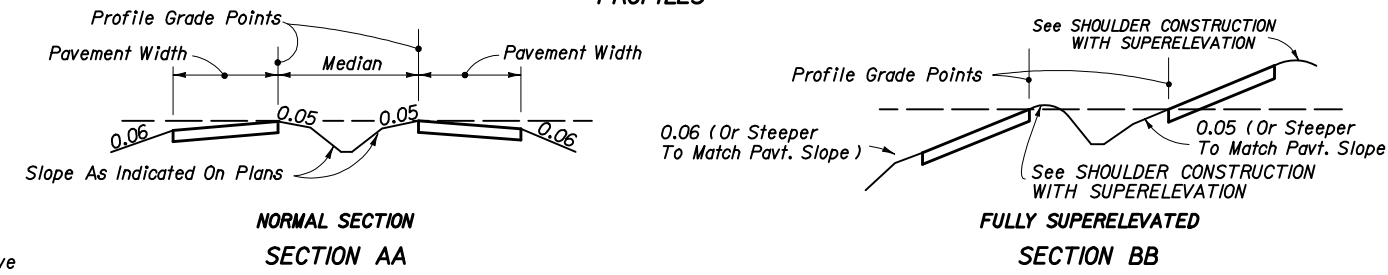


SLOPE RATIOS FOR SUPERELEVATION TRANSITIONS			
SECTION	DESIGN SPEED, MPH		
	45-50	55-60	65-70
2 Lane & 4 Lane	1: 200	1: 225	1: 250
6 Lane	1: 160	1: 180	1: 200
8 Lane	1: 150	1: 170	1: 190

The length of superelevation transition is to be determined by the relative slope between the travel way edge of pavement and the profile grade, except that the minimum length of transition shall be 100 ft.



2-LANE, 4-LANE OR 6-LANE PAVEMENT, NO MEDIAN



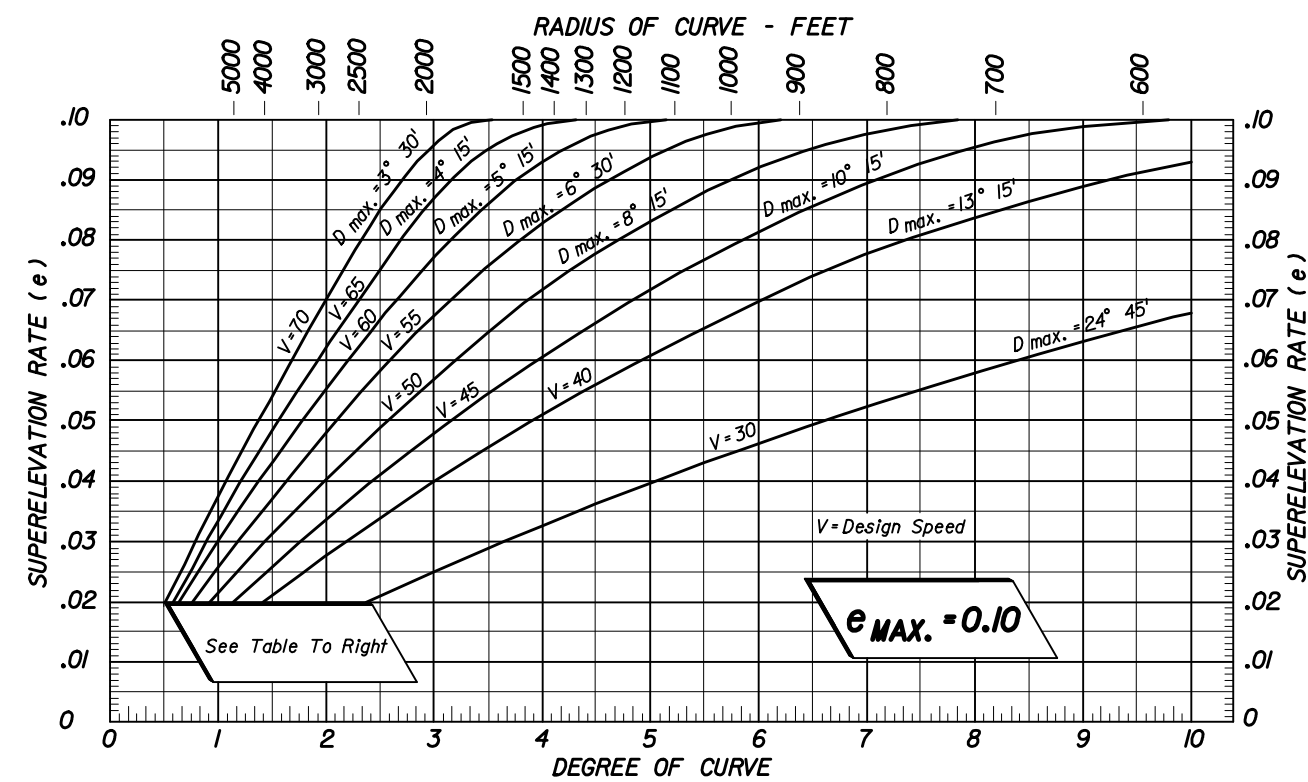
4-LANE OR 6-LANE PAVEMENT WITH MEDIAN

THESE TRANSITION DETAILS ARE TO APPLY IN ALL IN ALL CASES, EXCEPT UNDER THE FOLLOWING CONDITIONS:

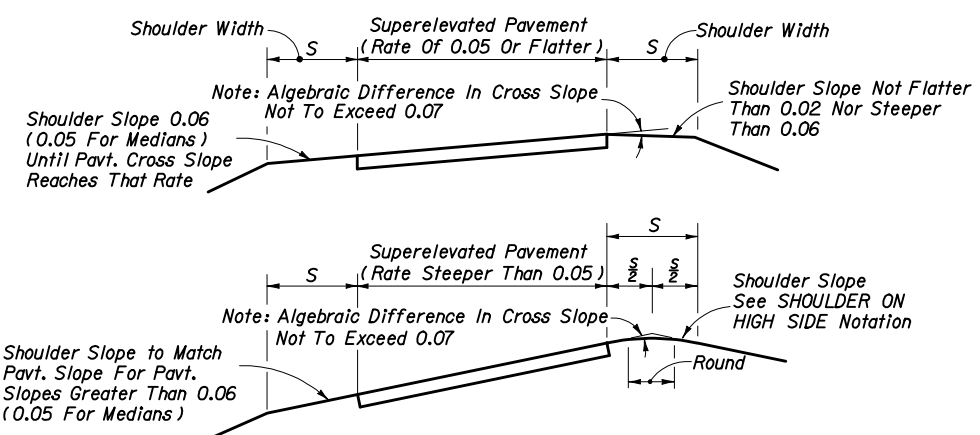
1. Curves of insufficient length.
2. Insufficient tangent length between curves.
3. Deficient transition distance between a curve and other control point(s).
4. At PCC's or PRC's (Runoff rates are applicable).

Transitions for these exceptions are to be as detailed in the plans.

**SUPERELEVATION TRANSITIONS**



DEGREE OF CURVE (D)	DESIGN SPEED, V MPH						
	30	40	45/50	55	60	65	70
0° 15'	NC	NC	NC	NC	NC	NC	NC
0° 30'	NC	NC	NC	NC	RC	RC	RC
0° 45'	NC	NC	RC	RC	0.023	0.025	0.028
1° 00'	NC	NC	0.021	0.025	SEE DESIGN SUPERELEVATION RATE TO LEFT		
1° 30'	NC	0.021					
2° 00'	RC						



**SHOULDER ON HIGH SIDE:** A shoulder slope of 0.06 downward from the edge of pavement will be maintained until a 0.07 break in slope at the pavement edge is reached due to superelevation of the pavement. As the pavement superelevation increases, the 0.07 break in slope will be maintained and the shoulder flattened until the shoulder slope reaches the minimum of 0.02 downward from the edge of pavement. Any further increase in pavement superelevation will necessitate sloping the inside half of the shoulder toward the pavement and the outer half outward, both at 0.02 for superelevations 0.06-0.09 and both at 0.03 for superelevation 0.10.

**SHOULDER ON LOW SIDE:** Maintain 0.06 drop across inside shoulder until pavement cross slope reaches 0.06. For pavement cross slopes greater than 0.06, shoulder to have same slope as pavement. These slopes are the same as those shown pictorially on sheet 2.

**NOTE:** These details apply to both paved and grassed shoulders. For median shoulders use 0.05 in lieu of 0.06.

**SHOULDER CONSTRUCTION WITH SUPERELEVATION**

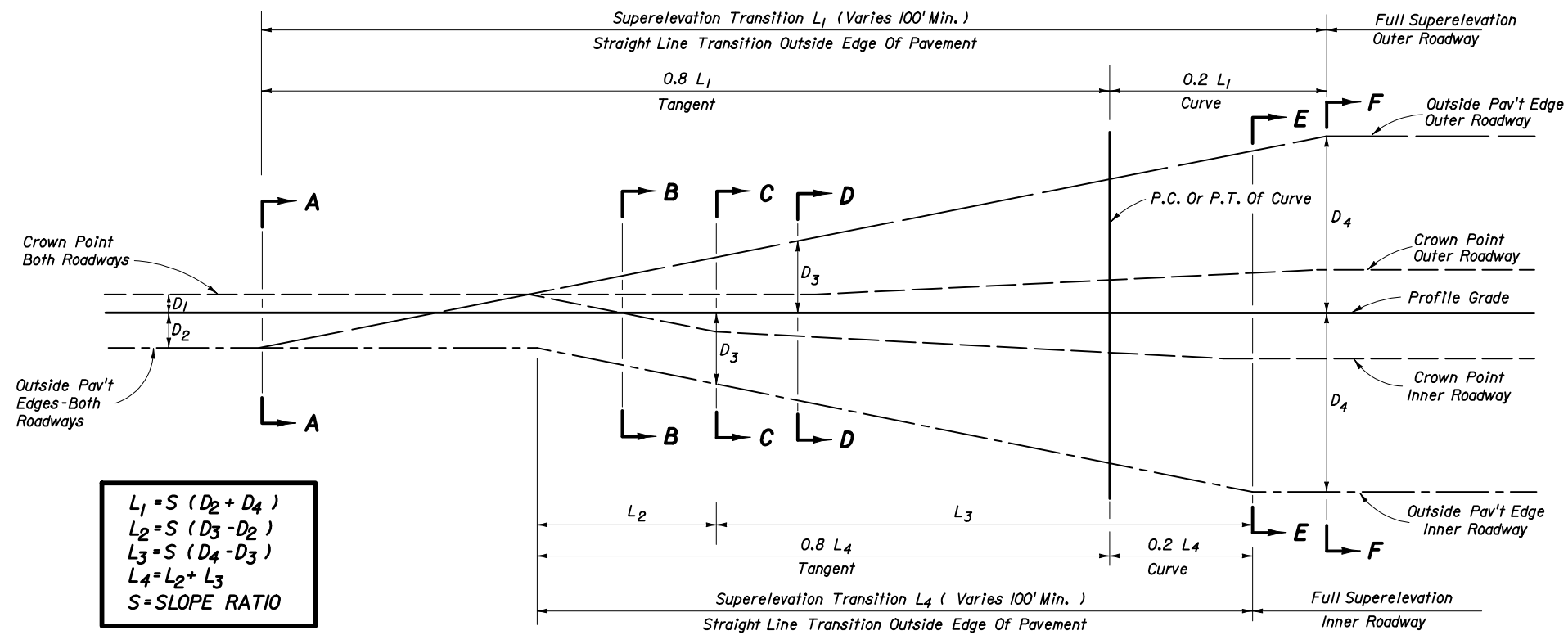
**GENERAL NOTES**  
1. For curves in urban highways and high speed urban streets, see Index No. 511.

**DESIGN SUPERELEVATION RATES FOR RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SUPERELEVATION**  
RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS

Designed By	HFW	5/65	Approved By	
Drawn By	LMF	10/74	Revision	
Checked By			00	1 of 2
				510



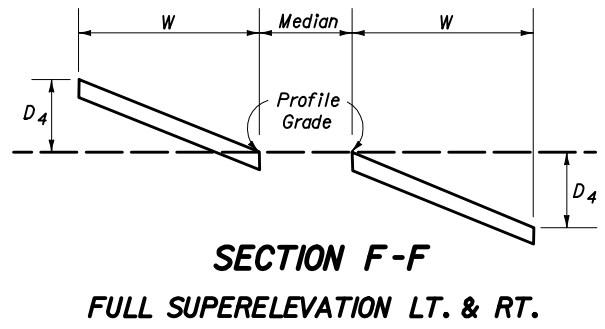
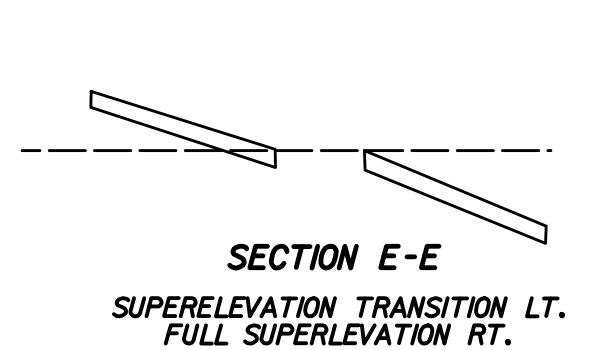
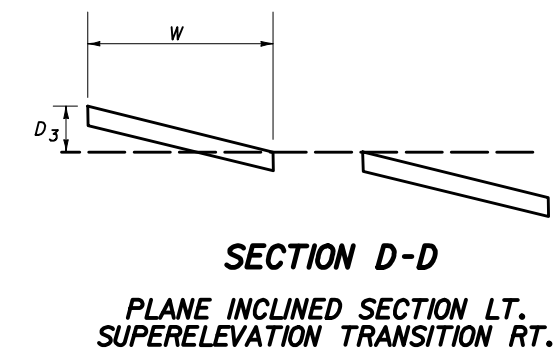
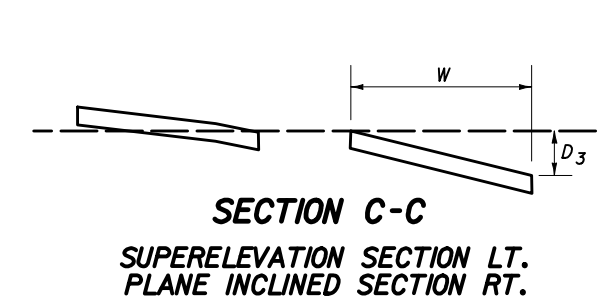
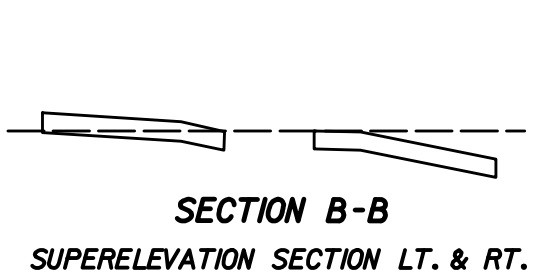
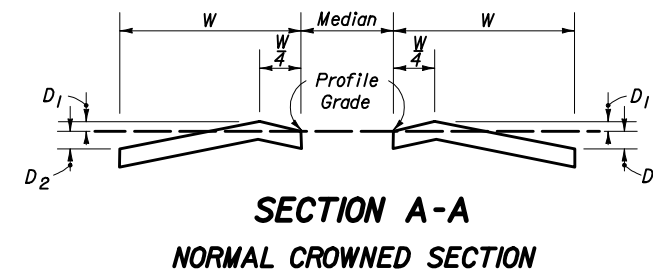
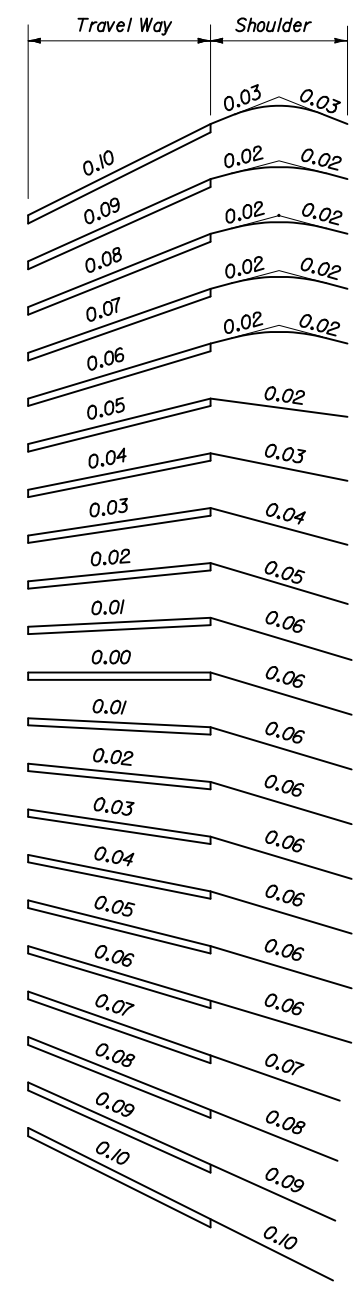
$$L_1 = S (D_2 + D_4)$$

$$L_2 = S (D_3 - D_2)$$

$$L_3 = S (D_4 - D_3)$$

$$L_4 = L_2 + L_3$$


$$S = \text{SLOPE RATIO}$$



SLOPES OF TRAVELED WAY  
AND ABUTTING SHOULDERS

**SHOULDER SLOPES ON  
SUPERELEVATION SECTIONS**

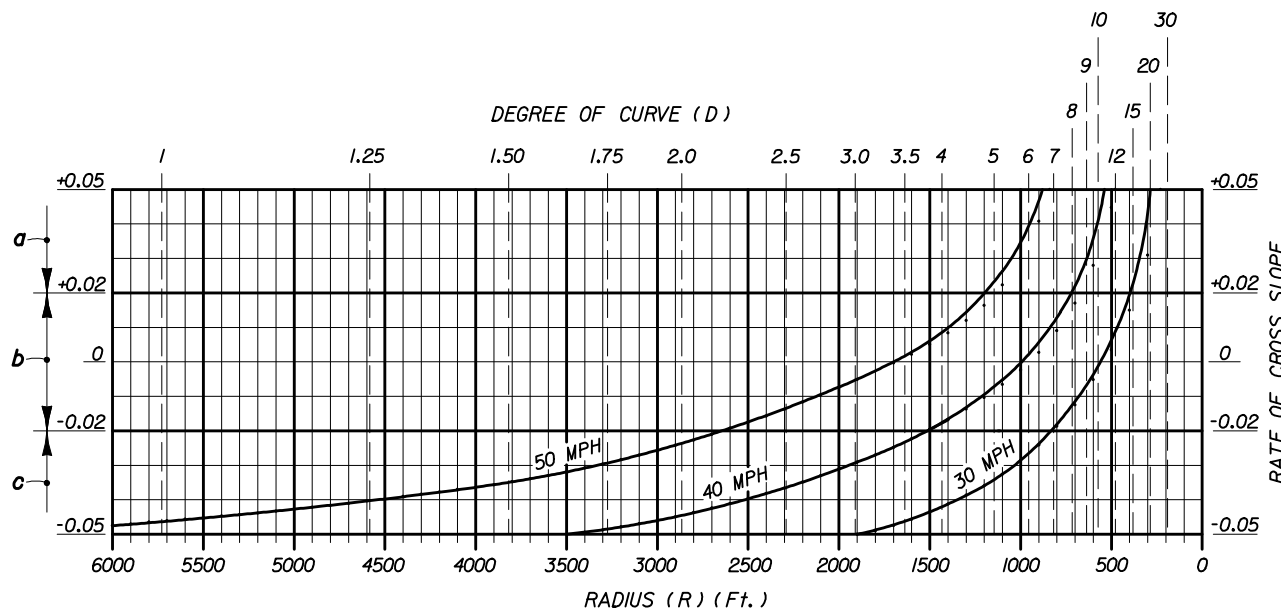
**8-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
SUPERELEVATION				
RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS				
Names	Dates	Approved By		
Designed By	WAL 8/77	 State Roadway Design Engineer		
Drawn By	LMF 8/77			
Checked By	WAL 8/77	Revision	Sheet No.	Index No.
		00	2 of 2	510

**SUPERELEVATION RATES (e) FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**

$e_{max} = 0.05$

TABULATED VALUES		CHARTED VALUES				
Degree Of Curve (D)	Radius (R) (Ft.)	Design Speed (mph)				
		30	35	40	45	50
2° 00'	2,865	NC	NC	NC	NC	NC
2° 15'	2,546					RC
2° 45'	2,083				NC	
3° 00'	1,910				RC	
3° 45'	1,528			NC		
4° 00'	1,432			RC		
4° 45'	1,206					RC
5° 00'	1,146		NC			0.023
5° 15'	1,091		RC			0.027
5° 30'	1,042					0.030
5° 45'	996					0.035
6° 00'	955				RC	0.040
6° 15'	917				0.022	0.045
6° 30'	881				0.024	0.050
6° 45'	849				0.027	$D_{max.} = 6° 30'$
7° 00'	819	NC			0.030	
7° 15'	790	RC			0.033	
7° 30'	764				0.037	
7° 45'	739				0.041	
8° 00'	716			RC	0.045	
8° 15'	694			0.022	0.050	
8° 30'	674			0.025	$D_{max.} = 8° 15'$	
8° 45'	655			0.027		
9° 00'	637			0.030		
9° 30'	603			0.034		
10° 00'	573			0.040		
10° 30'	546		RC	0.047		
11° 00'	521		0.023	$D_{max.} = 10° 45'$		
11° 30'	498		0.026			
12° 00'	477		0.030			
13° 00'	441		0.036			
14° 00'	409	RC	0.045			
15° 00'	382	0.023	$D_{max.} = 14° 15'$			
16° 00'	358	0.027				
17° 00'	337	0.032				
18° 00'	318	0.038	NC = Normal Crown			
19° 00'	302	0.043	RC = Reverse Crown (+.02 Superelevation)			
20° 00'	286	0.050				
		$D_{max.} = 20° 00'$				



- a: When the speed curves and the degree of curve or radius lines intersect above this line, the pavement is to be superelevated (positive slope) at the rates indicated at the lines intersecting points.
- b: When the speed curves and the degree of curve or radius lines intersect between these limits, the pavement is to be superelevated at the rate of 0.02 (positive slope).
- c: When the speed curves and the degree of curve or radius lines intersect below this line. The pavement is to have normal crown (typically 0.02 and 0.03 downward slopes).

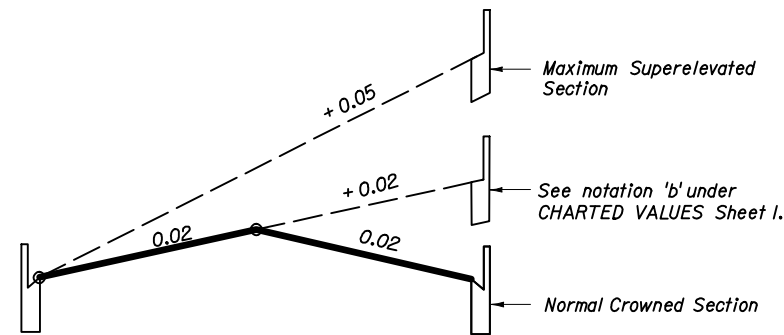
**GENERAL NOTES**

1. Maximum rate of superelevation for urban highways and high speed urban streets shall be 0.05.
2. 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 superelevation be required, the remaining rotation of the plane shall be about the low edge of the inside travel lane.  
Crown is to be removed in the auxiliary lane to the outside of the curve only when the adjoining travel lanes require positive superelevation.
3. When positive superelevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the superelevated pavement.
4. In construction, short vertical curves shall be placed at all angular profile breaks within the limits of the superelevation transition.
5. The variable superelevation transition length "L" shall have a minimum value of 50 feet for design speeds under 40 MPH and 75 feet for design speeds of 40 MPH or greater.
6. Roadway sections having lane arrangements different from those shown, but composed of a series of planes, shall be superelevated in a similar manner.
7. For superelevation of lower speed urban streets, see the FDOT 'Manual Of Uniform Minimum Standards For Design, Construction And Maintenance For Streets And Highways'. For superelevation of curves on rural highways, urban freeways and high speed urban highways, see Index No. 510.

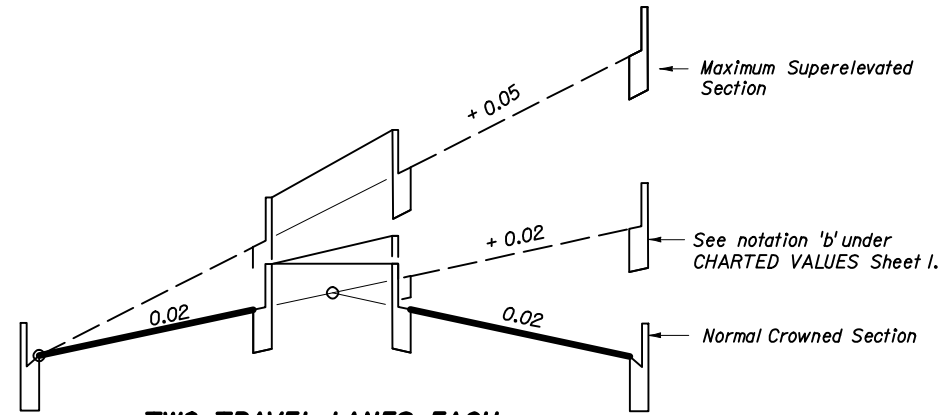
$e_{max} = 0.05$

**SUPERELEVATION FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**

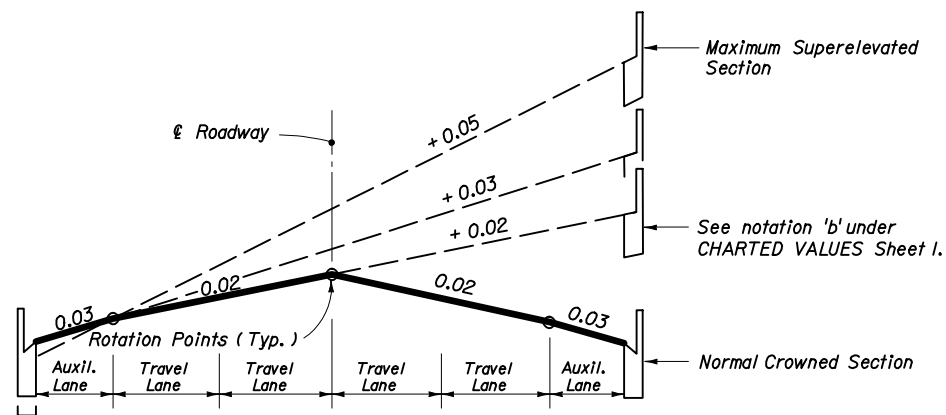
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SUPERELEVATION</b>				
URBAN HIGHWAYS AND STREETS				
Names	Dates	Approved By		
Designed By	WLB/JVG 66 & 90	<i>Reim Blumenthal</i> State Roadway Design Engineer		
Drawn By	CDR/HSD 67 & 90	Revision	Sheet No.	Index No.
Checked By	RLD/JVG 67 & 90	00	1 of 3	511



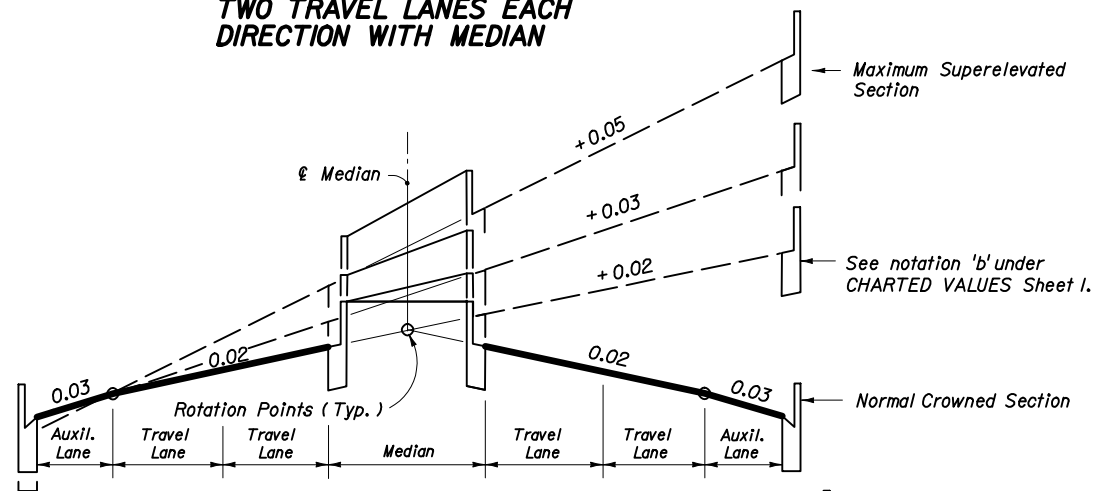
**TWO TRAVEL LANES EACH DIRECTION**



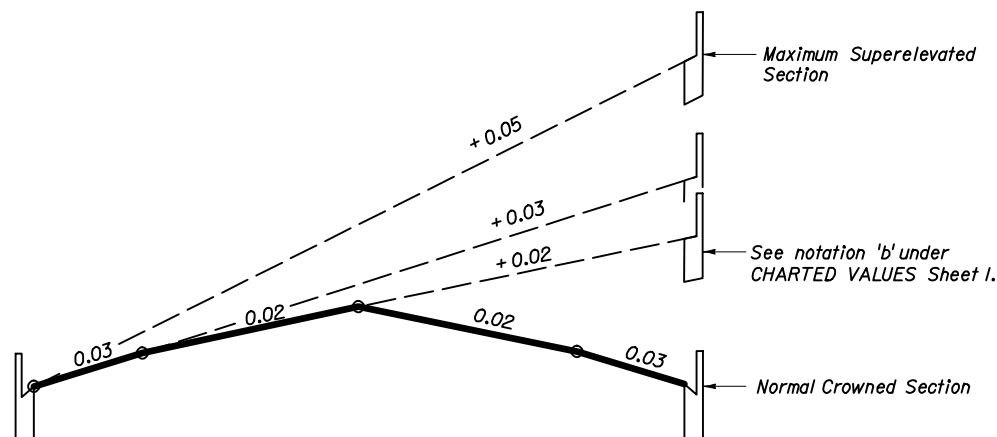
**TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN**



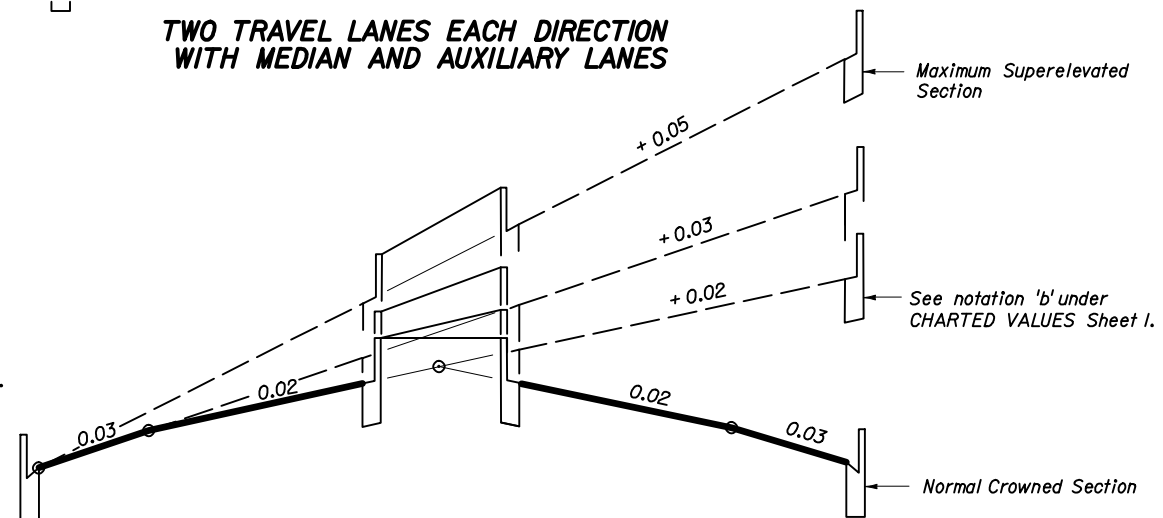
**TWO TRAVEL LANES EACH DIRECTION WITH AUXILIARY LANES**



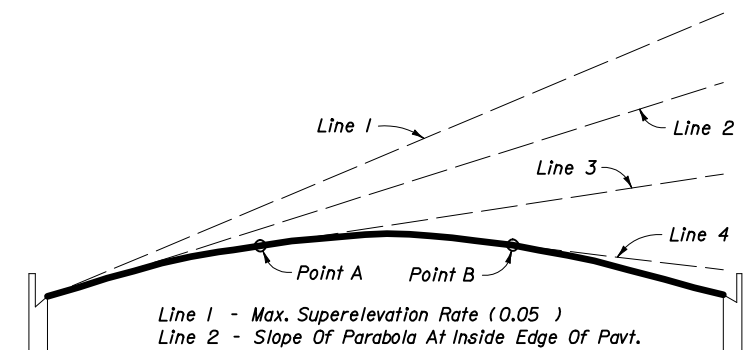
**TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANES**



**THREE TRAVEL LANES EACH DIRECTION**



**THREE TRAVEL LANES EACH DIRECTION WITH MEDIAN**



- Line 1 - Max. Superelevation Rate (0.05 )
- Line 2 - Slope Of Parabola At Inside Edge Of Pavt.
- Line 3 - Positive Superelevation Rate Less Than Max. Slope Of Parabola.
- Line 4 - Adverse Superelevation.

Superelevation rates obtained from the chart or table on Sheet 1 are also applicable to a parabolic crown section. When this section is used, superelevation 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.

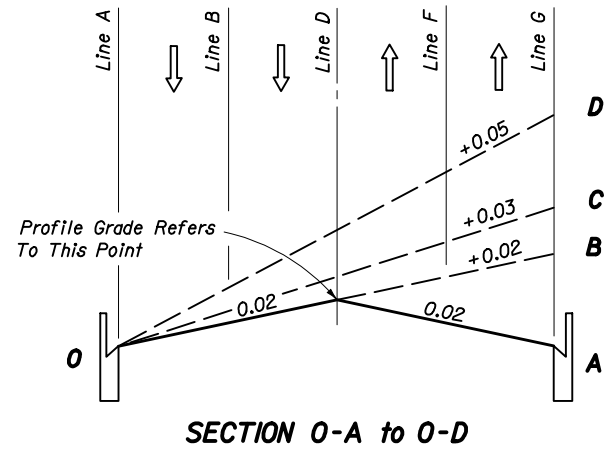
**PARABOLIC SECTION**

**UNDIVIDED FACILITIES**

**DIVIDED FACILITIES**

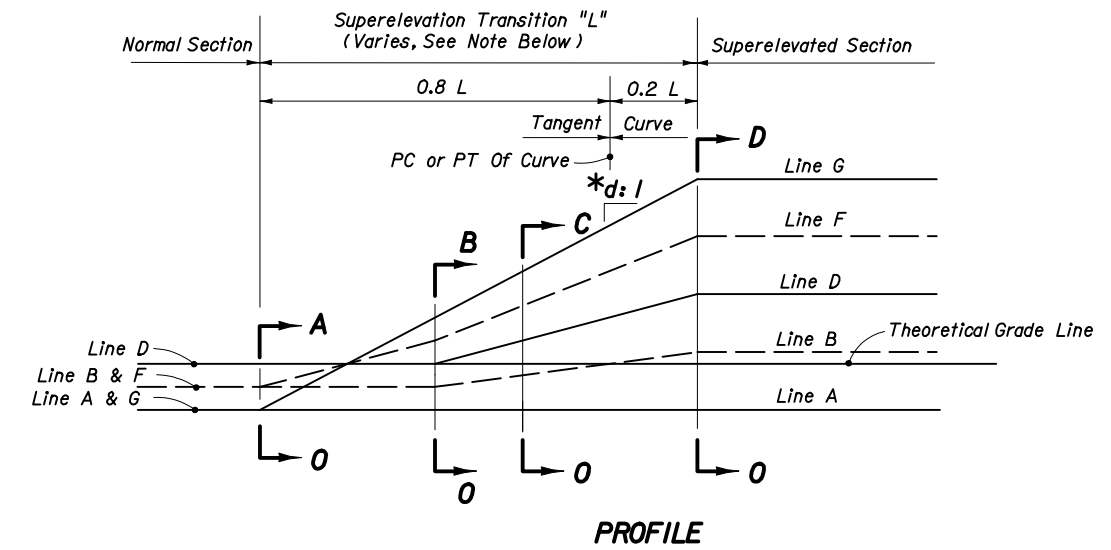
**SUPERELEVATION TRANSITION SECTIONS FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SUPERELEVATION</b>				
URBAN HIGHWAYS AND STREETS				
Names	Dates	Approved By		
Designed By	WLB/JVG	66/90	State Roadway Design Engineer	
Drawn By	CDR/HSD	67/90		
Checked By	RLO/JVG	67/90	Revision	00
			Sheet No.	2 of 3
			Index No.	511



SECTION 0-A to 0-D

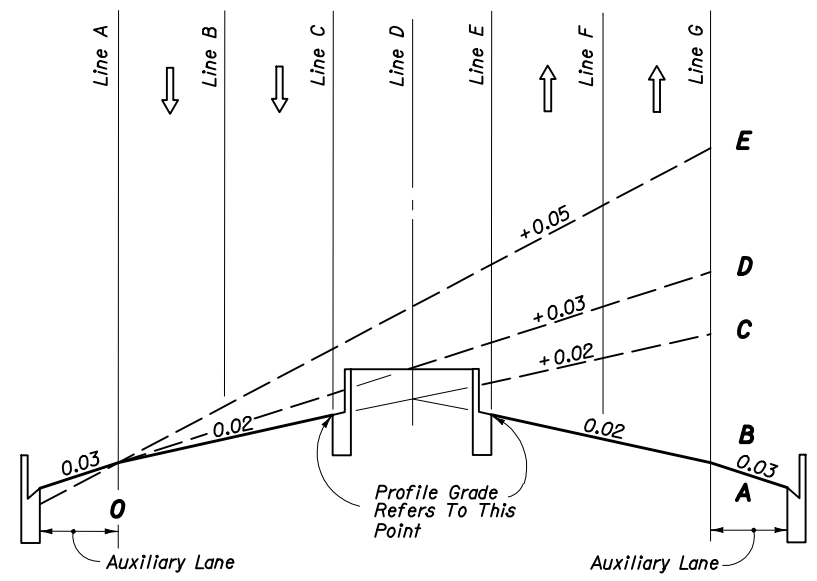
TWO LANES EACH DIRECTION



PROFILE

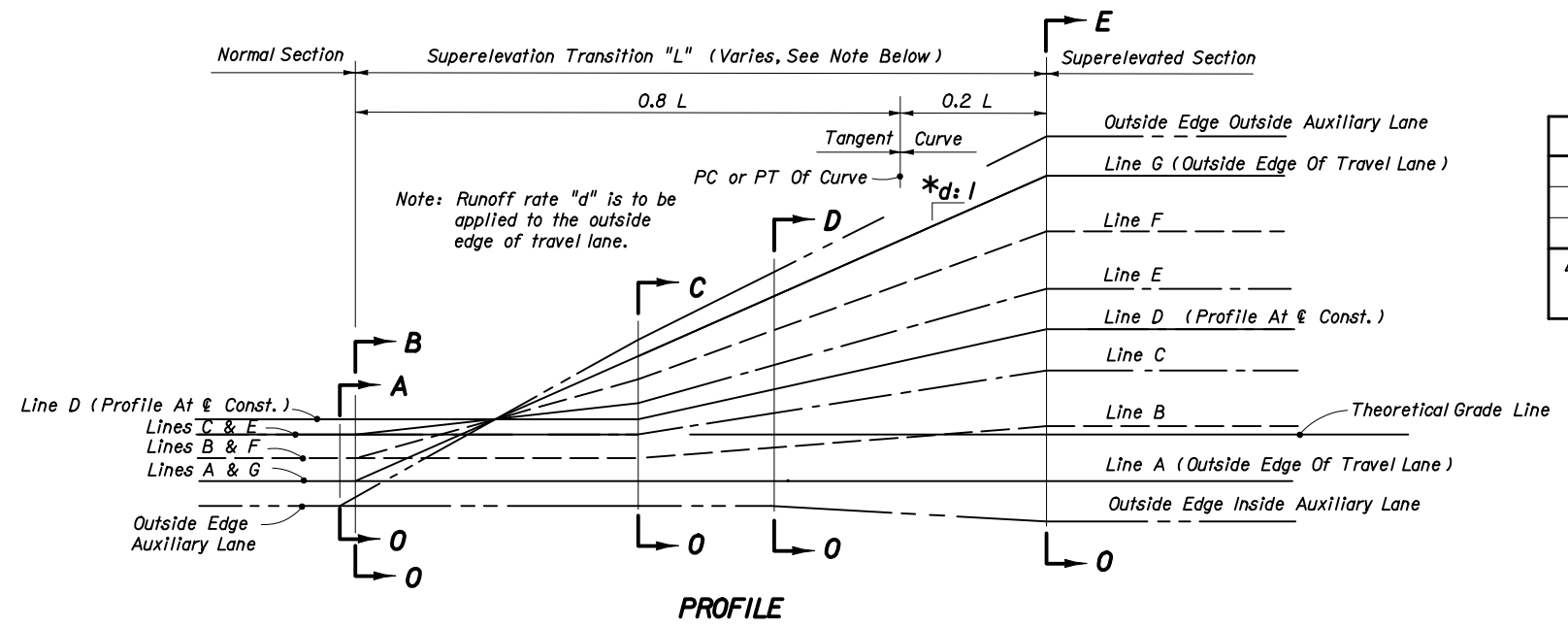
LINE	DESCRIPTION
A	Inside Travel Lane
B	Inside Lane Line
C	Inside Median Edge Pavement
D	℄ Construction
E	Outside Median Edge Pavement
F	Outside Lane Line
G	Outside Travel Lane

Inside And Outside Are Relative To Curve Center



SECTION 0-A to 0-E

TWO LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANE



PROFILE

*d (Slope Ratio)	
30 MPH	1: 100
40 MPH	1: 125
45-50 MPH $\Delta$	1: 150

$\Delta$  1: 125 May Be Used For 45 MPH Under Restricted Conditions.

Note: The sections and profiles shown are examples of superelevation transitions. Similar schemes should be used for roadways having other sections.

**EXAMPLE SUPERELEVATION SECTIONS AND PROFILES FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SUPERELEVATION</b>				
URBAN HIGHWAYS AND STREETS				
Names	Dates	Approved By		
Designed By	WLB/JVG	66/90	 State Roadway Design Engineer	
Drawn By	CDR/HSD	67/90		
Checked By	RLO/JVG	67/90		
Revision	00	Sheet No.		
		Index No.	511	



BASE THICKNESS AND OPTION CODES										
Base Group	Structural Range	Base Group Pay Item Number	Base Options							RAP Base
			Limerock LBR 100	Cemented Coquina LBR 100	Shell Rock LBR 100	Bank Run Shell LBR 100	Graded Aggregate Base LBR 100	Type B-12.5	B-12.5 And 4" Granular Subbase, LBR 100 *	
			Structural Number (Per. in.)							
			(.18)	(.18)	(.18)	(.18)	(.15)	(.30)	(.30 & .15)	(NA)
1	.65-.75	701	4"	4"	4"	4"	4 1/2"	△ 4"		□ 5"
2	.80-.90	702	5"	5"	5"	5"	5 1/2"	△ 4"		
3	.95-1.05	703	5 1/2"	5 1/2"	5 1/2"	5 1/2"	6 1/2"	△ 4"		
4	1.05-1.15	704	6"	6"	6"	6"	7 1/2"	△ 4"		
5	1.25-1.35	705	7"	7"	7"	7"	8 1/2"	4 1/2"		
6	1.35-1.50	706	8"	8"	8"	8"	9"	5"		
7	1.50-1.65	707	8 1/2"	8 1/2"	8 1/2"	8 1/2"	10"	5 1/2"		
8	1.65-1.75	708	9 1/2"	9 1/2"	9 1/2"	9 1/2"	11"	5 1/2"		
9	1.75-1.85	709	10"	10"	10"	10"	12"	6"	4"	
10	1.90-2.00	710	11"	11"	11"	11"	∅ 13"	6 1/2"	4 1/2"	
11	2.05-2.15	711	12"	12"	12"	12"	∅ 14"	7"	5"	
12	2.20-2.30	712	12 1/2"	12 1/2"	12 1/2"	12 1/2"		7 1/2"	5 1/2"	
13	2.35-2.45	713	∅ 13 1/2"	∅ 13 1/2"	∅ 13 1/2"	∅ 13 1/2"		8"	6"	
14	2.45-2.55	714	∅ 14"	∅ 14"	∅ 14"	∅ 14"		8 1/2"	6 1/2"	
15	2.60-2.70	715						9"	7"	

**GENERAL NOTES**

1. On new construction and complete reconstruction projects where an entirely new base is to be built, the design engineer may specify just the Base Group and any of the unrestricted General Use Optional Bases shown in that base group may be used. Note, however, that some thick granular bases are limited to widening which prevents their general use.
2. Where base options are specified in the plans, only those options may be bid and used.
3. The designer may require the use of a single base option, for instance Type B-12.5 in a high water condition. This will still be bid as Optional Base.

\* For granular subbase, the construction of both the subbase and Type B-12.5 will be paid for under the contract unit price for Optional Base. Granular subbases include Limerock, Cemented Coquina, Shell Rock, Bank Run Shell and Graded Aggregate Base at LBR 100. The base thickness shown is Type B-12.5. All subbase thicknesses are 4".

∅ To be used for widening only, three feet or less.

△ Based on minimum practical thicknesses.

□ Restricted to non-limited access shoulder base construction.

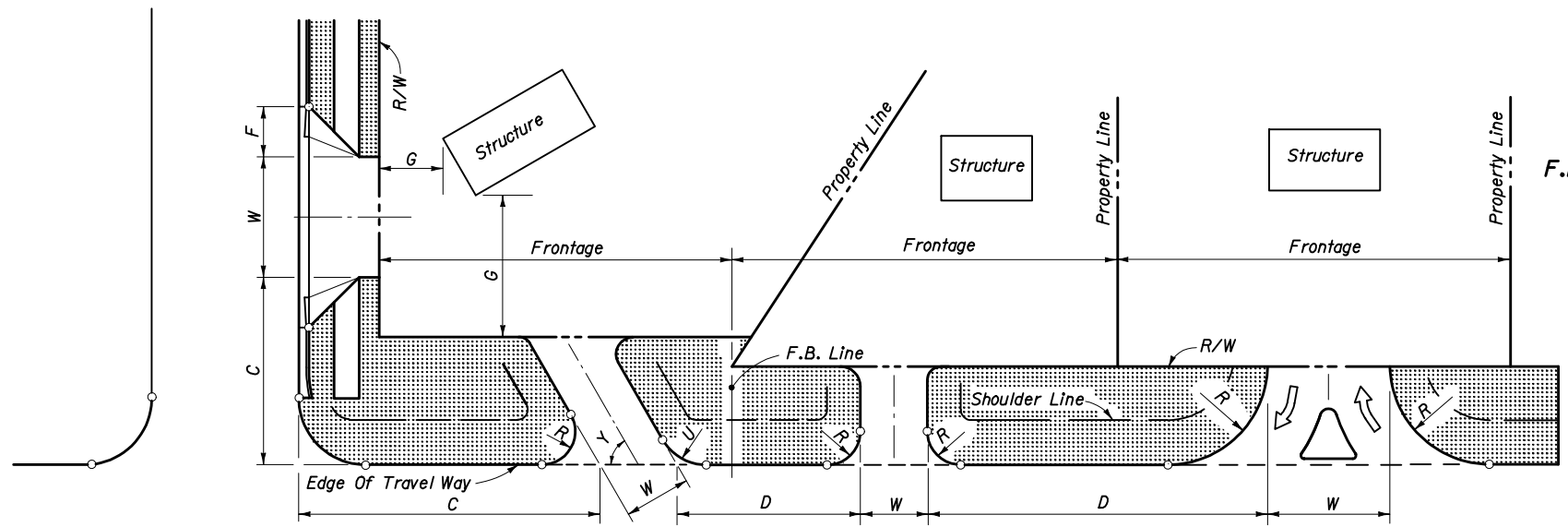
**GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>OPTIONAL BASE GROUP AND STRUCTURAL NUMBERS</b>				
Designed By	HMD	12/93	Approved By <i>Bruce Distefano</i> State Pavement Design Engineer	
Drawn By	HKH	12/93	Revision	Sheet No. Index No.
Checked By	BTD	12/93	00	1 of 2 514

BASE THICKNESS AND OPTION CODES									
Base Group	Structural Range	Base Group Pay Item Number	Base Options						
			Limerock Stabilized LBR 70	Shell LBR 70	Shell Stabilized LBR 70	Sand-Clay LBR 75	Soil Cement (300 psi) (Plant Mixed)	Soil Cement (300 psi) (Road Mixed)	Soil Cement (500 psi) (Plant Mixed)
			Structural Number (Per. in.)						
			(.12)	(.12)	(.10)	(.12)	(.15)	(.15)	(.20)
1	.60-.75	701	5"	5"	7"	5"	5"	5"	4"*
2	.75-.90	702	6 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "	4"
3	.95-1.05	703	8"	8"	9 $\frac{1}{2}$ "	8"	6 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "	5"
4	1.05-1.15	704	9"	9"	10 $\frac{1}{2}$ "	9"	7 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "	5 $\frac{1}{2}$ "
5	1.20-1.35	705	10"	10"	12"	10"	8 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "	6"
6	1.30-1.45	706	11"	11"		11"	9"		7"
7	1.45-1.60	707	12 $\frac{1}{2}$ "	12 $\frac{1}{2}$ "		12 $\frac{1}{2}$ "	10"		7 $\frac{1}{2}$ "
8	1.65-1.75	708					11"		8 $\frac{1}{2}$ "
<p>Not Recommended For 20 Year Design Accumulated 18 kip Equivalent Single Axle (ESAL) Loads Greater Than 1,000,000</p>									
<p>Note: These base materials may be used on FDOT projects when approved in writing by the District Materials Engineer and shown in the plans. * Based On Minimum Practical Thickness</p>									

**LIMITED USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>OPTIONAL BASE GROUP AND STRUCTURAL NUMBERS</b>				
	Names	Dates	Approved By	
Designed By	HMD	12/93	<i>Bruce Ditzel</i> State Pavement Design Engineer	
Drawn By	HKH	12/93	Revision	Sheet No. Index No.
Checked By	BTD	12/93	00	2 of 2 514



- LEGEND**
- Return Radius Point Or Flare Point
  - ▨ Buffer Areas
  - F.B. Line** Frontage Boundary Line
  - W** Driveway Width
  - Y** Driveway Angle
  - C** Corner Clearance
  - G** Setback
  - R** Outside Radius
  - U** Inside Radius
  - D** Distance Between Connections
  - F** Flare

**GENERAL NOTES**

1. For definitions and descriptions of access connection "Categories" and access "Classifications" of highway segments, and for other detailed information on access to the State Highway System, refer to FDOT Rule Chapter 14-96, "State Highway Connection Permits Administrative Process" and Rule Chapter 14-97, "State Highway System Access Management Classification System And Standards"
2. For this index the term 'turnout' applies to that portion of driveways, roads or streets adjoining the outer roadway. For this index the term 'connection' encompasses a driveway, street or road and their appurtenant islands, separators, transition tapers, auxiliary lanes, travelway flares, drainage pipes and structures, crossovers, sidewalks, curb cut ramps, signing, pavement marking, required signalization, maintenance of traffic or other means of access to or from controlled access facilities. The turnout requirements set forth in this index do not provide complete intersection design, construction or maintenance requirements.
3. The location, positioning, orientation, spacing and number of connections and median openings shall be in conformance with FDOT Rule Chapter 14-97.
4. On Department construction projects all driveways not shown on the plans are to be reconstructed at their existing location in conformance to these standards, or, in conformance to permits issued during the construction project.
5. Driveways shall have sufficient length and size for all vehicular queueing, stacking, maneuvering, standing and parking to be carried out completely beyond the right of way line. Except for vehicles stopping to enter the highway, the turnout areas and drives within the right of way shall be used only for moving vehicles entering or leaving the highway.
6. Connections with expected daily traffic over 4000 vpd are to be constructed as intersecting streets or roads. The design requirement of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department.  
  
For connections with expected daily traffic less than 4000 vpd, the Department will determine if drop curbs or radius returns are required in accordance with existing or planned connections. Where radius returns apply, the design requirements of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department.  
  
For connections that are intended to daily accommodate either multi-unit vehicles or single unit vehicles exceeding 30' in length, returns with 50' radii are to be used, unless otherwise called for in the plans or otherwise stipulated by permit. Where large numbers of multi-unit vehicles will use the connection, the connection width and radii are to be increased and auxiliary lanes, tapers, lane flares, separators and/or islands constructed, as determined by the Department to be necessary for safe turning movements.
7. Any connection on a highway having a posted or operating speed over 45 mph shall have radial returns. Any connection requiring or having a specified median opening with left turn storage and served directly by that opening shall have radial returns.
8. Where a connection is intended to align with a connection across the highway, the through lanes are to align directly with the corresponding through lanes.
9. For new connections and for connections on all new construction and reconstruction projects, pavement materials and thicknesses shall meet the requirements applicable to either that detailed for "Urban Flared Turnouts", or, that described in "Table 515-1" for connections with radial returns and/or auxiliary lanes.
10. The responsibility for the cost of construction or alteration to an access connection shall be in accordance with FDOT Rule Chapter 14-96.

For Additional Information Refer To FDOT Rules Chapters 14-96 And 14-97.

**SKETCH ILLUSTRATING DEFINITIONS**

**DESIGN NOTES**

1. Prior to the adoption of FDOT Rules Chapters 14-96 and 14-97, connections to the State Highway System were defined and permitted by Classes. Connections have been redefined by Categories under Rule 14-96; and, the term "Class" has been applied to highway segments of the State Highway System as defined under Rule 14-97.

ELEMENT DESCRIPTION	URBAN ( CURB & GUTTER )			RURAL		
	1-20 Trips/Day or 1-5 Trips/Hour	21-600 Trips/Day or 6-60 Trips/Hour	601-4000 Trips/Day <sup>■</sup> or 61-400 Trips/Hour	1-20 Trips/Day or 1-5 Trips/Hour	21-600 Trips/Day or 6-60 Trips/Hour	601-4000 Trips/Day <sup>■</sup> or 61-400 Trips/Hour
		2-Way □	2-Way □		2-Way □	2-Way □
CONNECTION WIDTH W	12' Min. 24' Max.	24' Min. 36' Max. ☆	24' Min. 36' Max. ☆	12' Min. 24' Max.	24' Min. 36' Max. ☆	24' Min. 36' Max. ☆
FLARE ( Drop Curb ) F	10' Min.	10' Min.	N/A	N/A	N/A	N/A
RETURNS ( Radius ) R & U	N/A	△	25' Min. 50' Std. 75' Max.	15' Min. 25' Std. 50' Max.	25' Min. 50' Std. 75' Max.	25' Min. 50' Std. ( Or 3-Centered Curves )
ANGLE OF DRIVE Y		60°-90°	60°-90°		60°-90°	60°-90°
DIVISIONAL ISLAND ( Throat Median )		4'-22' Wide	4'-22' Wide		4'-22' Wide	4'-22' Wide
SETBACK G	12' Min., All categories. See General Note No. 5.					

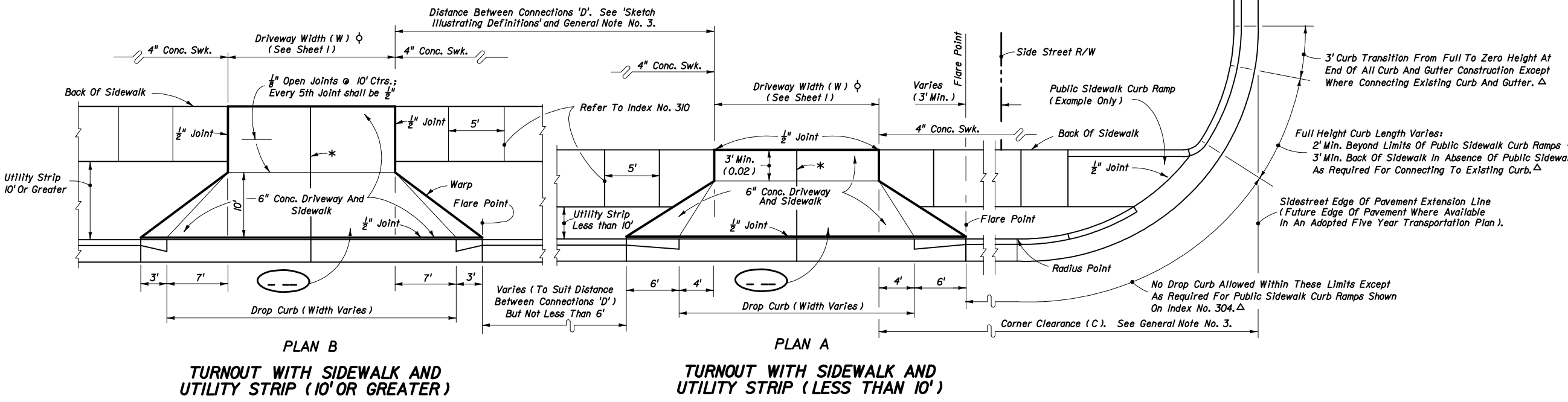
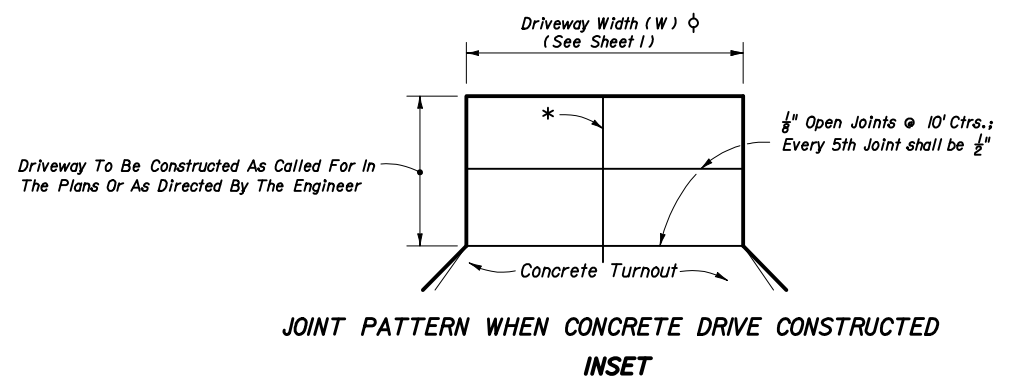
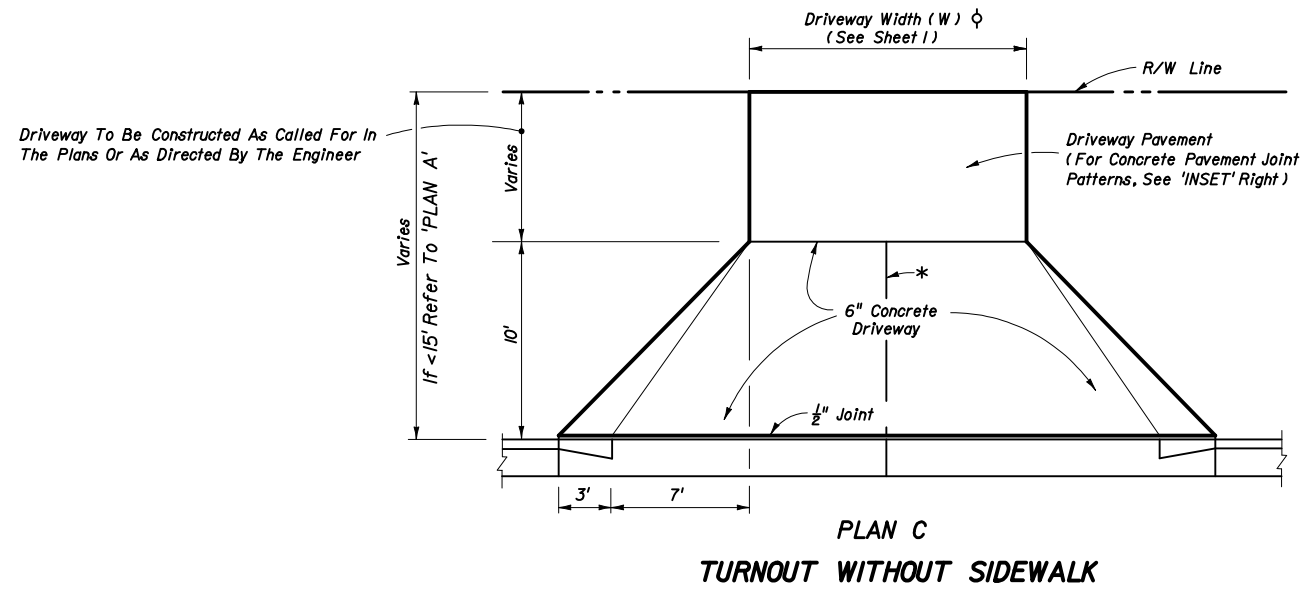
- Street or road intersection design, with possible auxiliary lanes and channelization, may be necessary. Intersection design, with possible auxiliary lanes and channelization, should be considered for connections with more than 4000 trips/days.
  - "2-Way" refers to one "in" movement and one "out" movement i.e. not exclusive left or right turn lanes on the connection.
  - ☆ When more than 2 lanes in the turnout connection are required, the 36' max. width may be increased to relieve interference between entering and exiting traffic which adversely affects traffic flow. These cases require documented site specific study and design.
  - △ Small radii may be used in lieu of flares as approved by the Department.
- DESIGN NOTE: 1-Way connections will be designed to effectively eliminate unpermitted movements.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**TURNOUTS**

Names	Dates	Approved By		
Designed By	COM/JV	90/91	State Roadway Design Engineer	
Drawn By	HSD	03/91		
Checked By	JVG	03/91		
Revision	02	Sheet No.		
		1 of 6	515	

NOT INTENDED FOR FULL INTERSECTION DESIGN  
**SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS**



**Footnotes:**

- All 1/2" joints shall be constructed with preformed joint filler.
- \* 1/8" Open Joints placed at equal (20' max.) intervals for driveways over 20' wide. Joints in curb and gutter to match joints in driveways.
- Δ When connecting to sidewalk curb and gutter sections, the no drop curb limits should extend back to the sidewalk radius point. With or without curb and gutter, no driveway should encroach on the corner radius.
- ◇ Driveways (6" concrete) shall be of a uniform width (W) to the right of way line.
- Alpha-numeric identification of a flared driveway type specifically called for in the plans, see sheets 3 and 4.

**SPECIAL NOTES FOR URBAN FLARED TURNOUTS**


1. Driveway 6" concrete pavement and drop curb shall meet the material and construction requirements of Sections 522 and 520 respectively of the FDOT Standard Specifications. The driveway foundation shall meet the requirement of Subarticle 522-4.
2. For details of drop curb and public sidewalk curb ramps refer to Index Nos. 300 and 304 respectively.
3. Where turnouts are constructed within existing curb and gutter, the existing curb and gutter shall be removed either to the nearest joint beyond the flare point or to the extent that no remaining section is less than 5' long; and, drop curb constructed in accordance with Notes Nos. 1 and 2.
4. Cost for preformed joint filler shall be included in the cost for the concrete pavement (concrete sidewalk, 6" thick).
5. For turnouts with radial returns see the requirements under the "Summary Of Geometric Requirements For Turnouts", the "General Notes", the details of "Rural Turnout Construction" and the detail of "Limits Of Clearing & Grubbing, Stabilization And Base At Intersections".
6. Department maintenance of pavement shall extend out to the right of way or 2' back of sidewalk, whichever distance is less.
7. The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.
8. All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.
9. All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.
10. Turnouts will be paid for under the contract unit price for Concrete Sidewalk (6" Thick), SY.

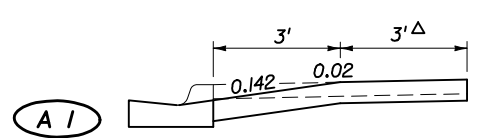
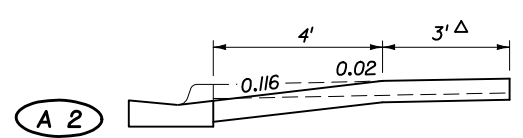
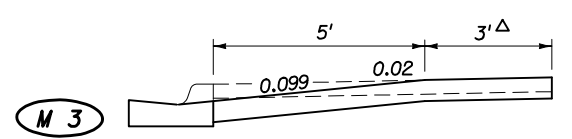
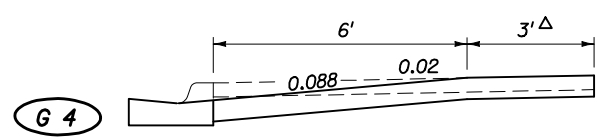
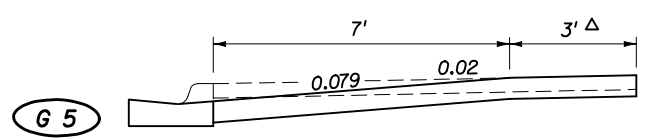
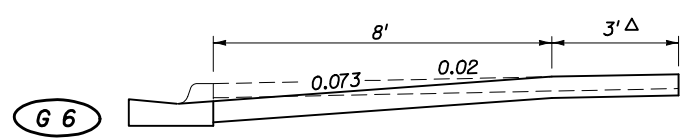
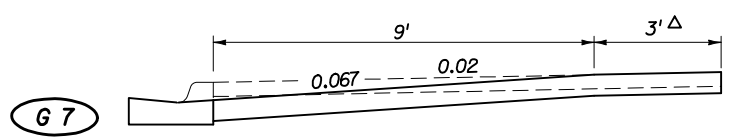
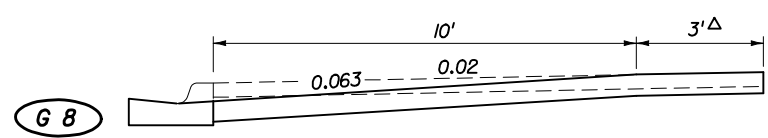
**DESIGN NOTES FOR URBAN FLARED TURNOUTS**

1. Driveways indicated as 'Adverse Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions; or, those with slopes that can cause drivers who are leaving the roadway to slow or pause to the extent that traffic demand volumes will be impeded.
  2. The standard flared driveways on this index may not accommodate vehicles with low beds, low undercarriage or low appendage features. Where such vehicles are design vehicles driveways are to have site specific flare designs or Category III designs.
  3. When specific flare type driveways are to be constructed, the type shall be designated in the plans using the assigned alpha-numeric designation.
- Driveways indicated as 'Marginal Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions when the driveway is located on the low side of fully superelevated roadways.
- Driveways indicated as 'General Applications' are those with slopes that can readily accommodate representative standard passenger vehicles and those that can accommodate representative standard trucks, vans, buses and recreational vehicles operating under normal crown and superelevation conditions.

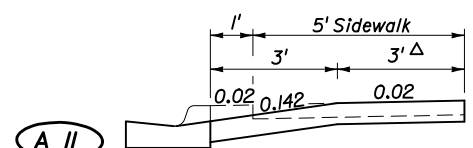
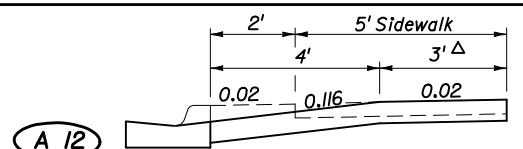
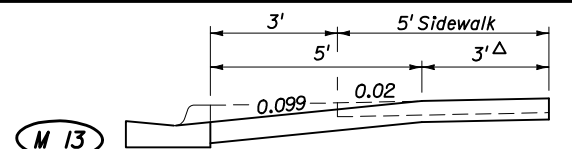
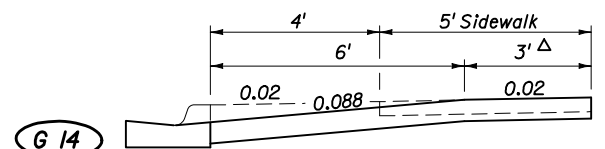
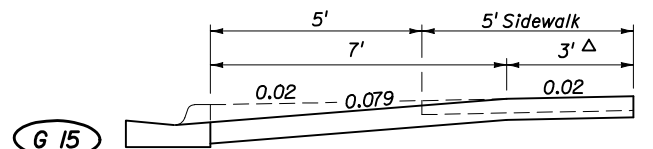
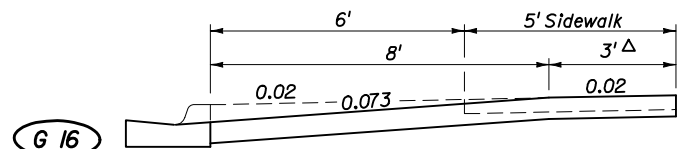
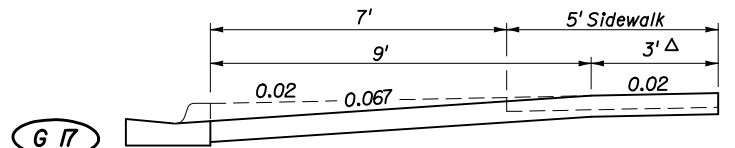
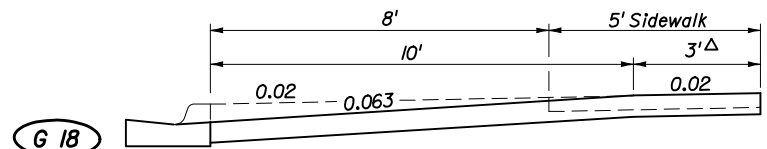
**URBAN FLARED TURNOUTS**

Note: See sheet 1 for 'GENERAL NOTES'

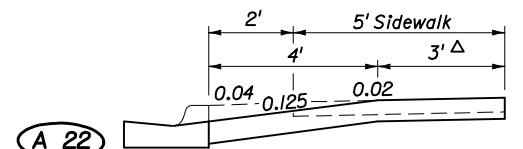
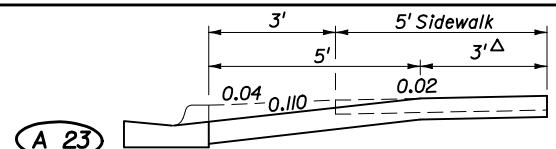
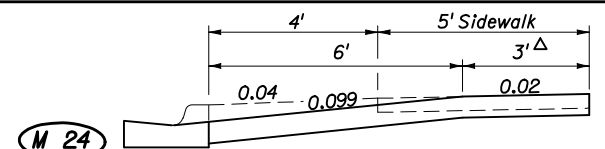
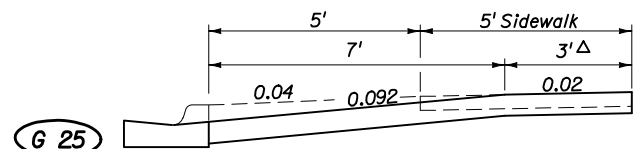
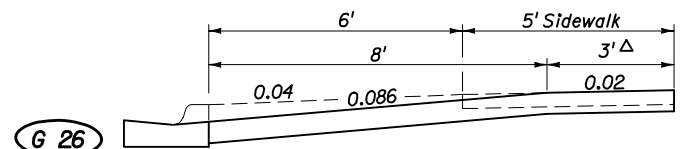
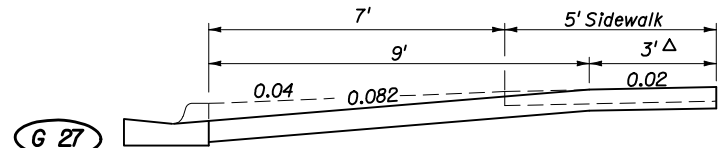
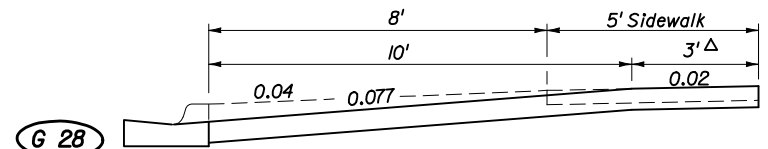
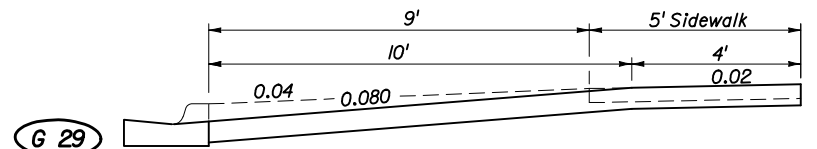
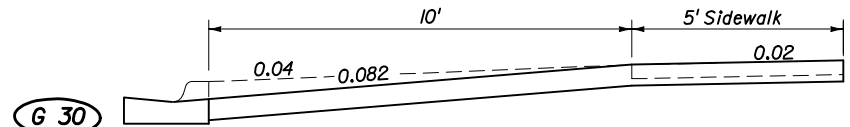
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TURNOUTS</b>				
Names	Dates	Approved By		
Designed By	JVG/HKH	09/93	 State Roadway Design Engineer	
Drawn By	HKH	09/93		
Checked By	JVG	09/93	Revision	00
			Sheet No.	2 of 6
			Index No.	515



SIDEWALK ADJACENT TO CURB



SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE



SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

GENERAL\* APPLICATIONS

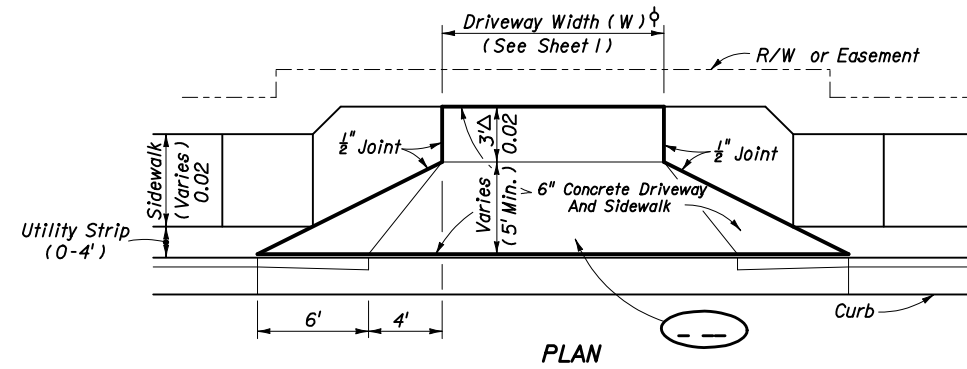
MARGINAL\* APPLICATIONS ON LOW SIDE OF FULLY SUPERELEVATED ROADWAY (REFER TO MODIFICATIONS ON SHEET 4)

ADVERSE\* APPLICATIONS (REFER TO MODIFICATIONS ON SHEET 4)

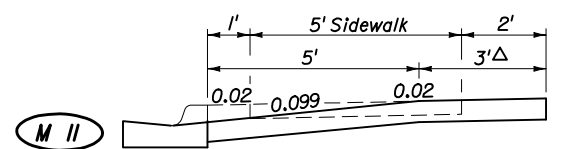
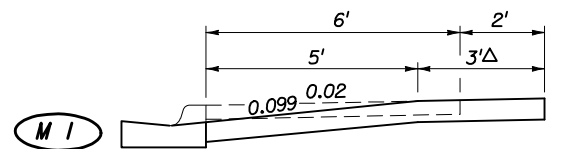
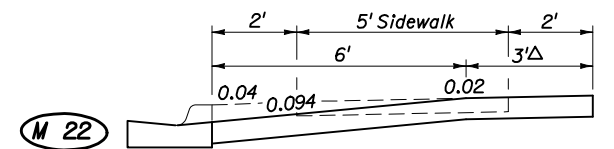
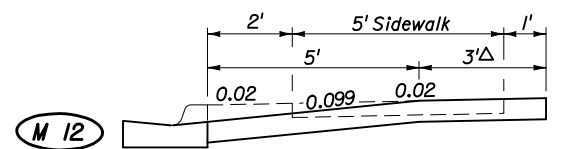
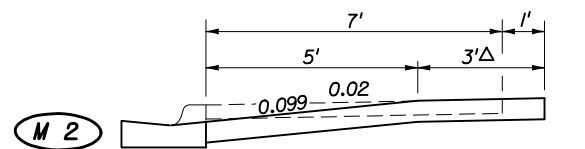
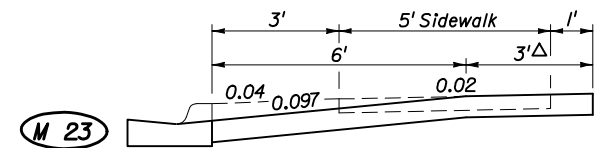
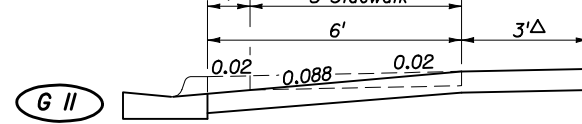
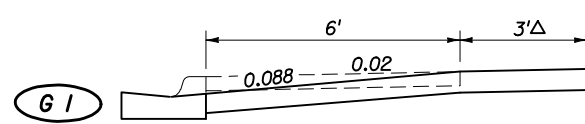
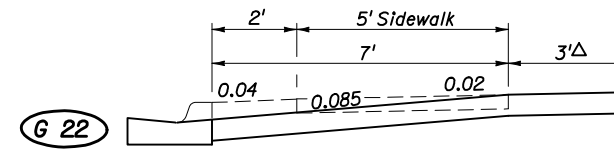
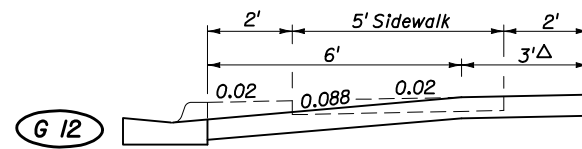
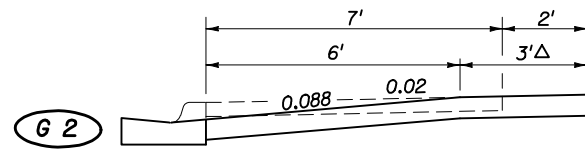
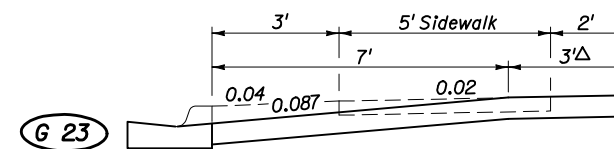
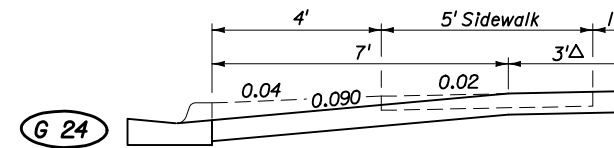
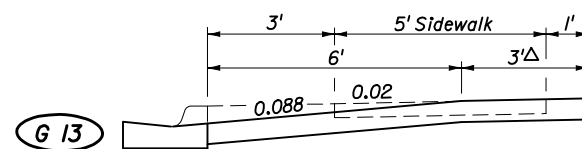
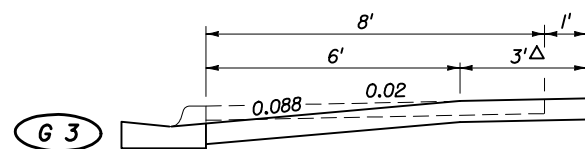
\* See 'DESIGN NOTES FOR URBAN FLARED TURNOUTS' On Sheet 2.  
 Δ Depth Less Than 3' Allowable Only Under Findings Of Infeasibility.

**DRIVEWAY SECTIONS ON CURBED FACILITIES WITH SIDEWALKS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TURNOUTS</b>				
Designed By	JVG/HKH	9/93	Approved By <i>Ben Blackwell</i> State Roadway Design Engineer	
Drawn By	HKH	9/93	Revision	Sheet No.
Checked By	JVG/FLS	9/93	00	3 of 6
				Index No. 515



**MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS**



ADVERSE\* AND MARGINAL\* SECTIONS MODIFIED TO ACHIEVE GENERAL\* APPLICATION

ADVERSE\* SECTIONS MODIFIED TO ACHIEVE MARGINAL\* APPLICATION

\* See 'DESIGN NOTES FOR URBAN FLARED TURNOUTS' On Sheet 2.  
Δ Depth Less Than 3' Allowable Only Under Findings Of Infeasibility.

SIDEWALK ADJACENT TO CURB

SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE

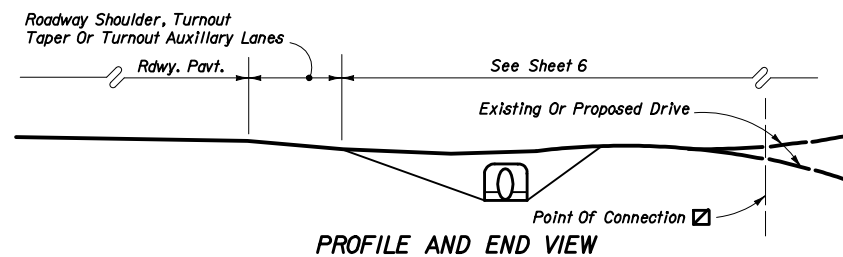
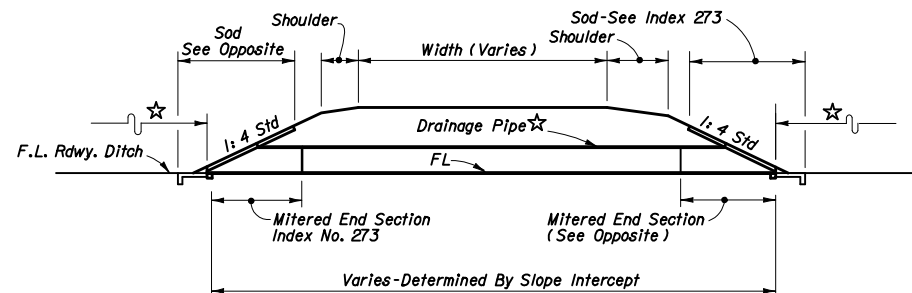
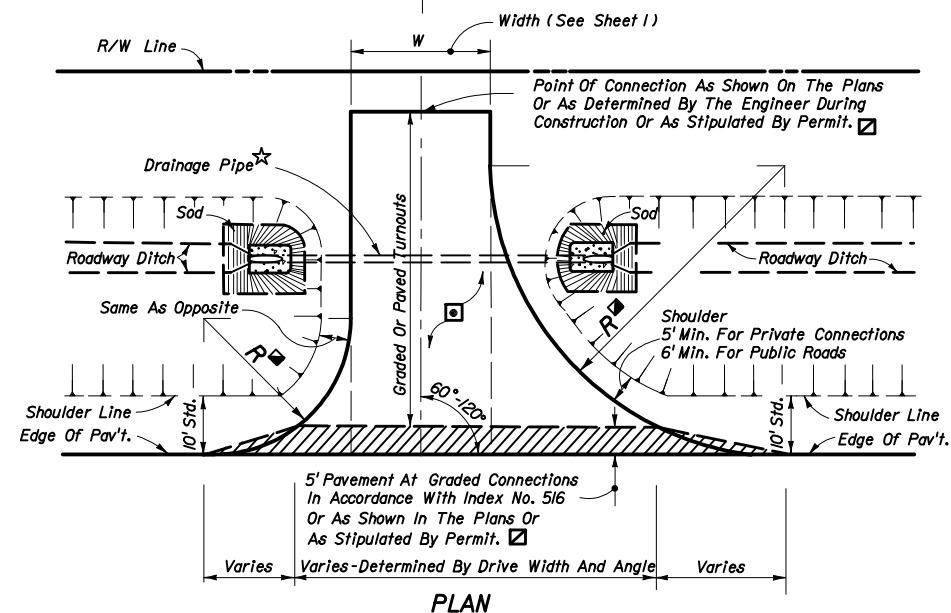
SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

**MODIFICATIONS TO ADVERSE AND MARGINAL SECTIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TURNOUTS</b>				
Designed By	JVG/HKH	9/93	Approved By <i>Ben Blankenship</i> State Roadway Design Engineer	
Drawn By	HKH	9/93	Revision	Sheet No.
Checked By	JVG/PLS	9/93	00	4 of 6
				Index No. 515

Typical Half Section For Low Volume/Residential Connections

Typical Half Section For Higher Volume Connections



★ Drainage pipe size and length shall be that shown on the plans, or as stipulated by permit, or, as determined by the Engineer during construction. The size shall be at least that established by the FDOT District, but not less than 15" diameter or equivalent. For minimum cover over drainage pipe see Index No. 205. Pipe arch or elliptical pipe may be required to obtain necessary cover. At minimal cover applications a modified pavement apron is permitted. See 'PERMISSIBLE PAVEMENT MODIFICATION' Index No. 273. For spacing between adjacent pipe end treatments see Index No. 273.

☐ Stable material may be required for graded turnouts to private property as directed by the Engineer in accordance with Section 102-6 of the Standard Specifications.

☑ The 5' pavement at graded connections is not required where there is paved shoulder 4' or more in width. The 5' pavement requirement may be waived for connections serving one or two homes or field entrances with less than 20 trips per day, or 5 trips per hour as approved by permit or by the Engineer, or when not itemized in the plans.

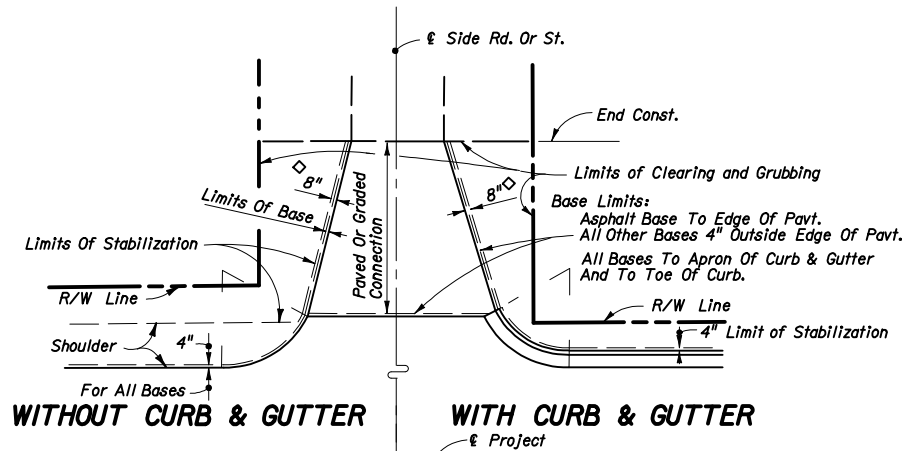
Paved turnouts are to be constructed for all paved connecting facilities. The connecting point will be determined by the Engineer.

Paved turnouts are to be constructed for all business, commercial, industrial or high volume residential graded connecting facilities. The connecting point shall be 30' from edge of roadway pavement or at R/W line, whichever is less.

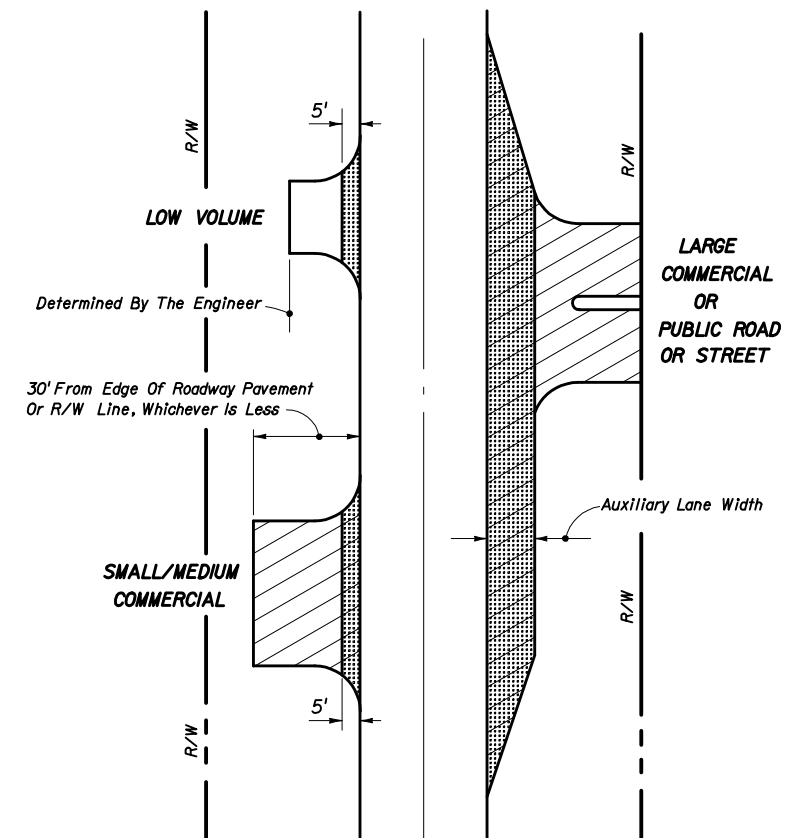
Paved turnouts are to be constructed for all connecting facilities over 4000 vehicles per day. The connecting point shall be at the R/W line.

☑ See "Summary Of Geometric Requirements For Turnouts" chart for return radii lengths and supplemental information.

### RURAL TURNOUT CONSTRUCTION



### LIMITS OF CLEARING & GRUBBING, STABILIZING AND BASE AT INTERSECTIONS



**LEGEND**  
 [Symbol] Graded Or Paved  
 [Symbol] Required Paving  
 [Symbol] Limits Of Department Maintenance

**NOTES**

- Auxiliary lane pavements and crossover pavements shall be maintained by the Department.
- Department maintenance of turnout pavement shall extend out to 5' from edge of the travel way or limits of paved shoulders, and, extend to include auxiliary lanes. The remainder of any turnout paved area on the right of way shall be maintained by the owner or his authorized agent. As a function of routinely reworking shoulders, the Department may grade and shape existing material on non-paved areas beyond the maintained pavement.
- Control and maintenance of drainage facilities within the right of way shall be solely the responsibility of the Department, unless specified differently by Department permit.
- The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.
- All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.
- All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.

### LIMITS OF CONSTRUCTION AND MAINTENANCE FOR RURAL CONNECTIONS

MATERIAL TYPES AND THICKNESSES IN DRIVING AREAS FOR RURAL AND URBAN CONNECTIONS			
Course	Materials <sup>②</sup>	Thickness (In.) <sup>①</sup>	
		Connections <sup>③</sup>	Roadway <sup>④</sup>
Structural	Asphaltic Concrete	1"	1 1/2"
Bases	Optional Base (See Index No. 514)	O.B.G. 1	O.B.G. 3

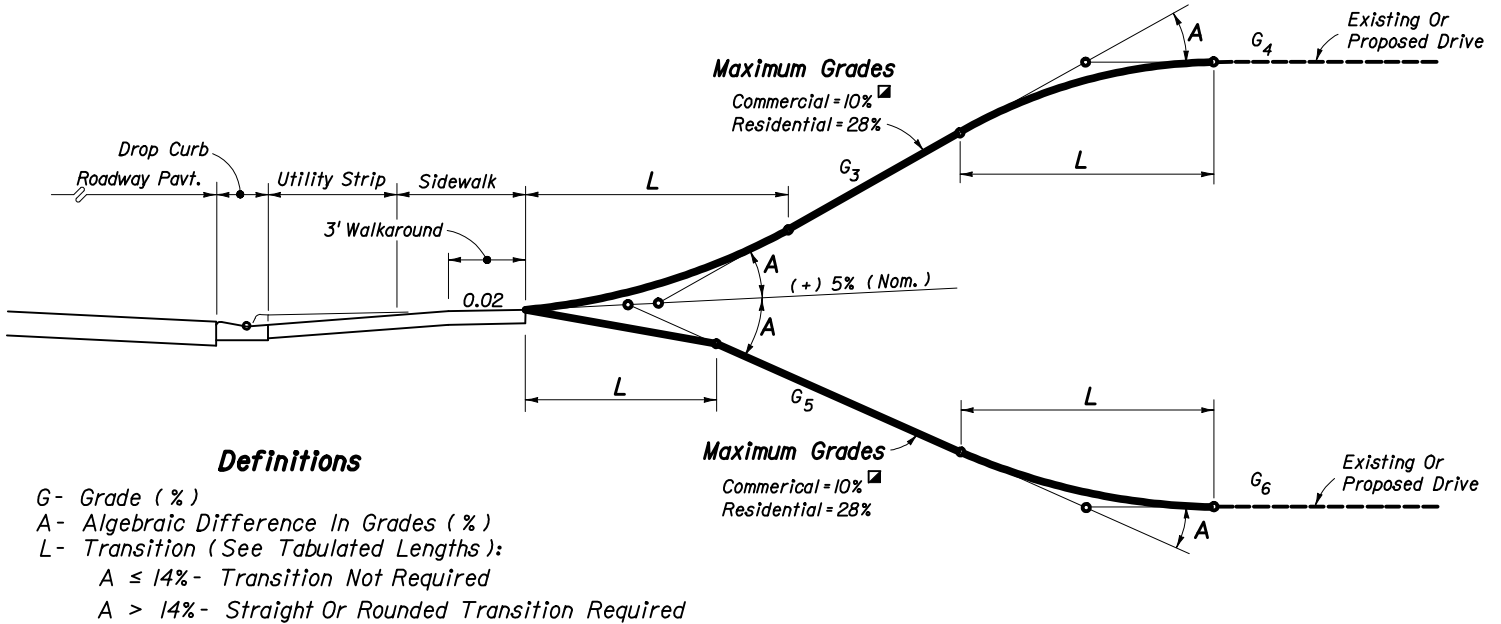
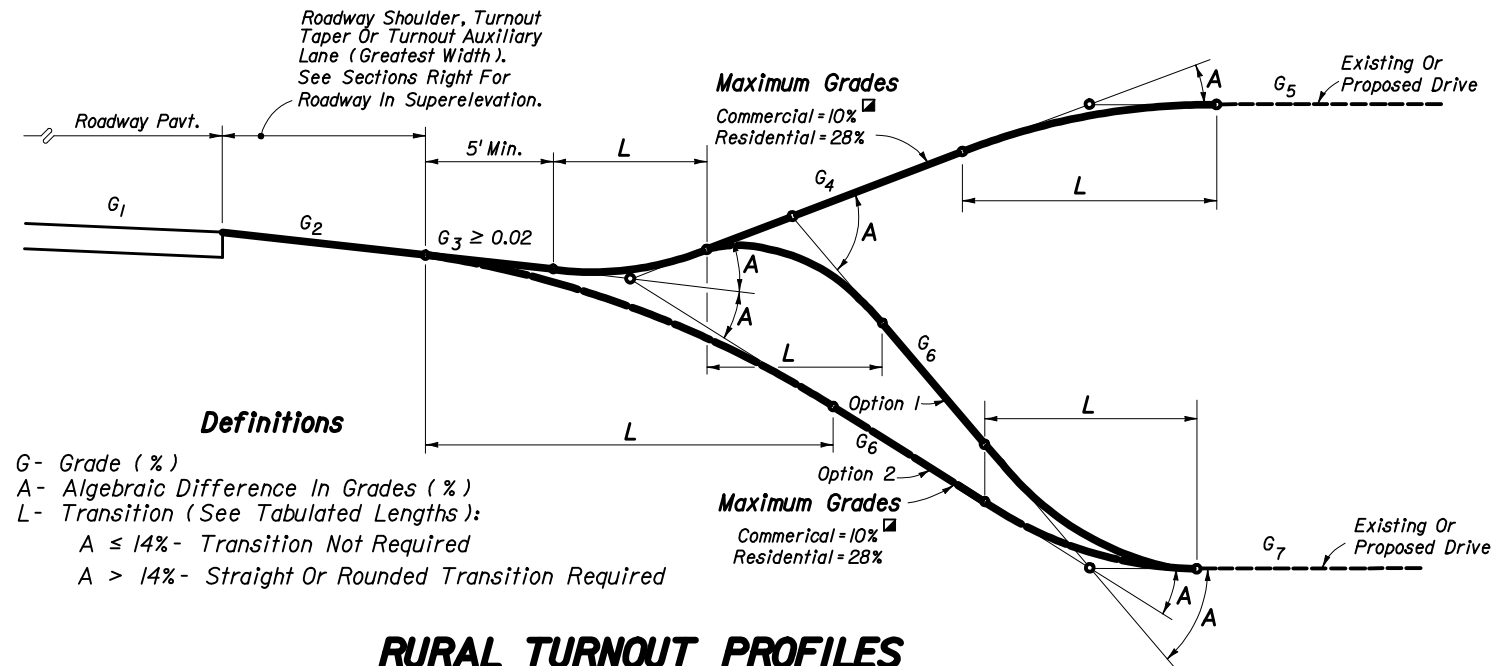
<sup>①</sup> Minimum thickness.  
<sup>②</sup> All materials shall be approved by the Department prior to being placed.  
<sup>③</sup> Connection structure other than traffic lanes. See Notes 1 and 2 below.  
<sup>④</sup> Travel way flares (bypass lanes), auxiliary lanes serving more than a single connection, and all median crossovers including their auxiliary lanes and/or transition tapers. See Notes 1 and 2 below.

**NOTES**

- The pavement should be structurally adequate to meet the expected traffic loads and should not be less than that shown above, except as approved by the Department for graded connections. Other Department approved pavement equivalences may be used at the discretion of the Engineer. For additional information see Index No. 514.
- Auxiliary lanes and their transition tapers shall be the same structure as the abutting roadway pavement or any of the roadway structures tabulated above, whichever is thicker.
- If an asphalt base course is used for a turnout, its thickness may be increased to match the edge of roadway pavement in lieu of a separate structural course. 6" of Portland cement concrete will be acceptable in lieu of the asphalt base and structural courses. See Notes 4 and 5 below.
- A structural course is required for flexible pavements when they are used for auxiliary lanes serving more than a single connection.
- Connections paved with Portland cement concrete shall be Class I concrete at least 6" thick. The Department may require greater thickness when called for in the plans or stipulated by permit. Materials and construction are to conform with FDOT Standard Specifications Sections 346, 350 and 522.
- The Department may require other pavement criteria where local conditions warrant.

PAVEMENT STRUCTURE FOR TURNOUTS AND AUXILIARY LANES TABLE 515-1

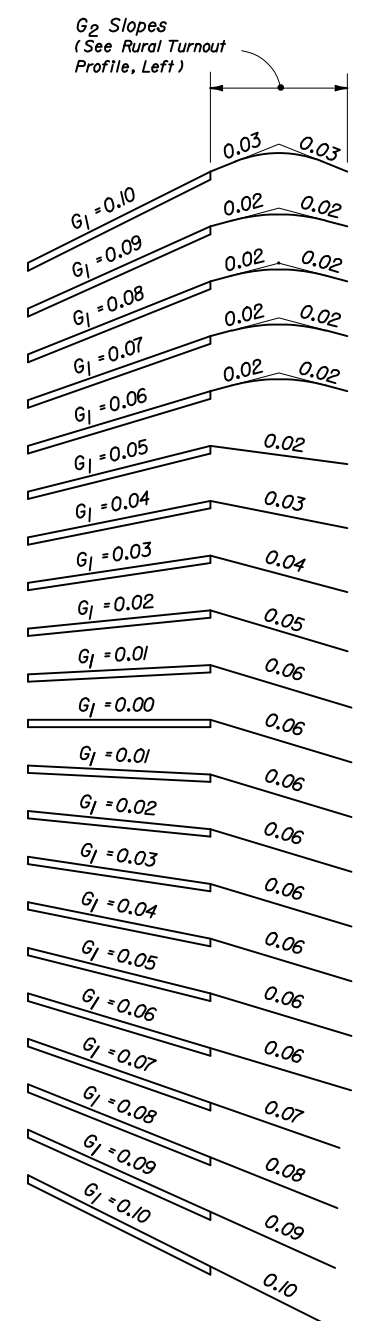
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TURNOUTS</b>				
Names	Dates	Approved By		
Designed By	COM/JV	90/91	State Roadway Design Engineer	
Drawn By	HSD	3/91		
Checked By	JVG	03/91		
Revision	00	Sheet No.		
		5 of 6	515	



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
30-31%	NA	NA	23	15	NA	NA	22	18
32-33%	NA	NA	24	16	NA	NA	23	20
34-36%	NA	NA	26	17	NA	NA	25	21
37-38%	NA	NA	27	18	NA	NA	26	22
39-41%	NA	NA	29	19	NA	NA	28	24
42-43%	NA	NA	30	20	NA	NA	29	25
44-46%	NA	NA	32	21	NA	NA	31	26
47-48%	NA	NA	33	22	NA	NA	32	27
49-51%	NA	NA	34	23	NA	NA	34	28
52-54%	NA	NA	36	24	NA	NA	35	30
55-56%	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.

**RECOMMENDED TURNOUT PROFILE TRANSITION LENGTHS (L) (FT)**



**STORMWATER RUNOFF AND PROFILE OPTION NOTES**

1. Turnouts shall neither cause water to flow on or across the roadway pavement, nor cause water ponding or 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 appropriate runoff control devices shall be constructed when runoff volumes are sufficient to cause erosion of the shoulder. Similar runoff control devices shall be constructed as necessary to properly direct and control the stormwater runoff on urban turnouts.
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.

**TURNOUT PROFILES**

When restoring or reconstructing existing commercial turnout connections on new construction and reconstruction projects, the maximum 10% commercial grade may be exceeded provided this does not create any adverse roadway operational or safety impacts. This shall be approved by the District Design Engineer and be supported by documented site specific findings.

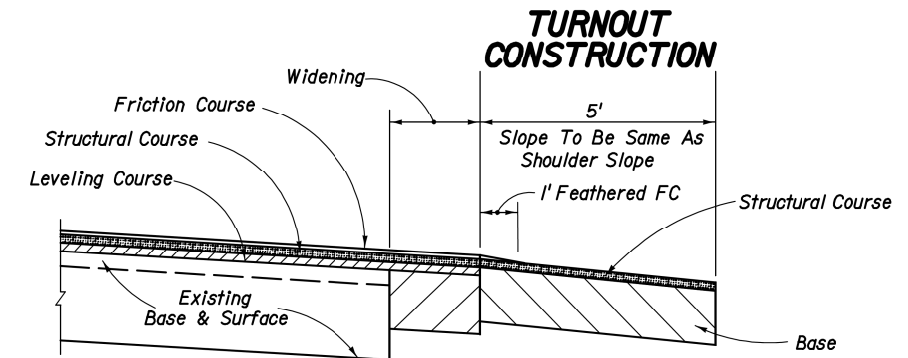
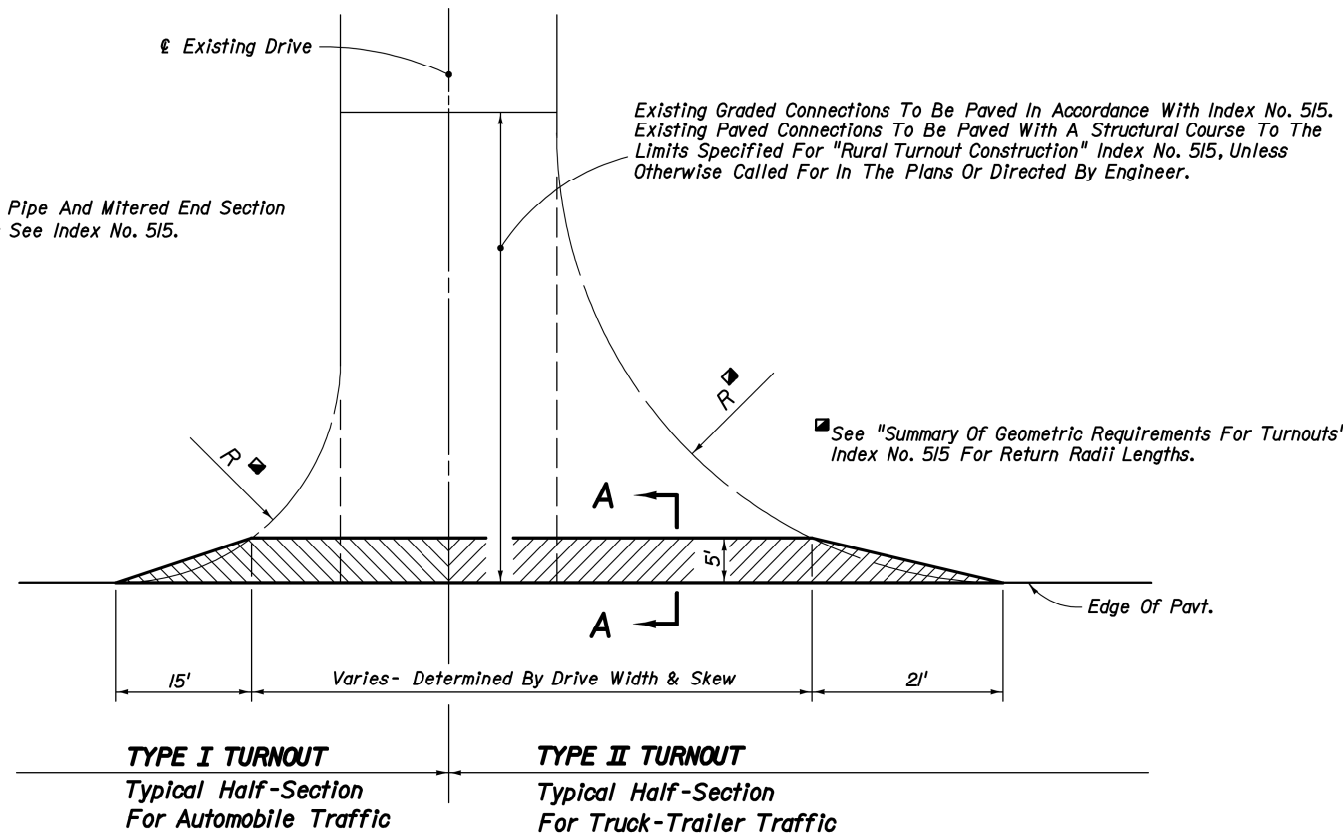
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**TURNOUTS**

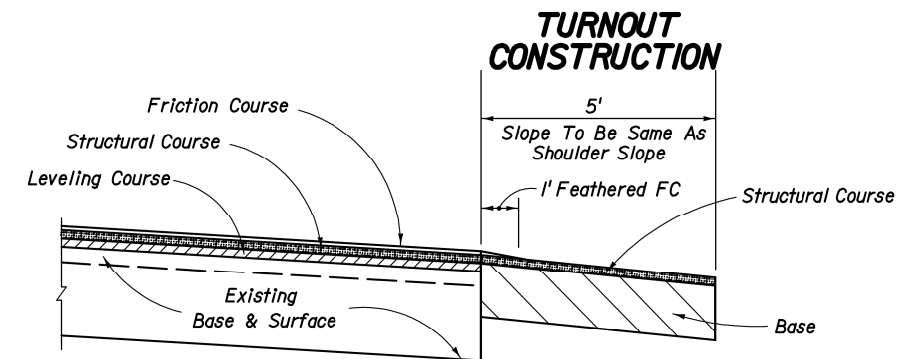
Names	Dates	Approved By		
Designed By		 State Roadway Design Engineer		
Drawn By	HSD 08/82			
Checked By	JVG 08/82	Revision	Sheet No.	Index No.
		02	6 of 6	515



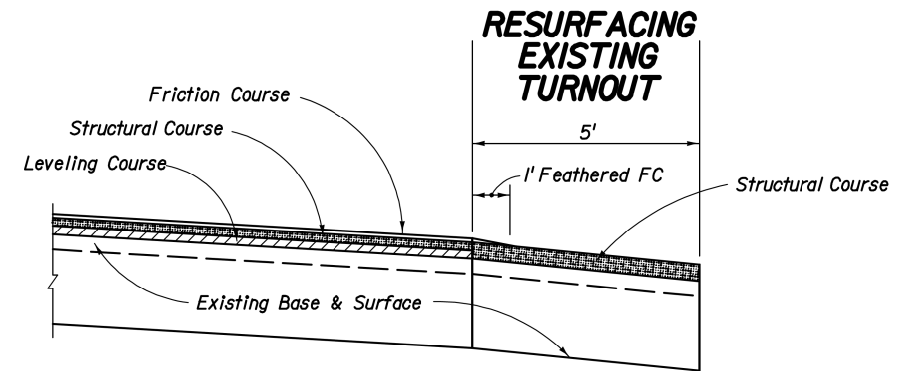
For Drainage Pipe And Mitered End Section Requirements See Index No. 515.



SECTION AA WITH WIDENING



SECTION AA



SECTION AA

Drive Width (Ft.)	AREAS FOR ONE 5' DEEP TURNOUT (SY)			
	Intersection			
	Normal		Skewed	
	Type I	Type II	Type I	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

PAVEMENT STRUCTURE FOR 5' DEEP TURNOUTS		
Course	Material	Minimum Thickness
Structural	Asphaltic Concrete	1"
Base	Optional Base (See Index No. 514)	O.B.G. 1

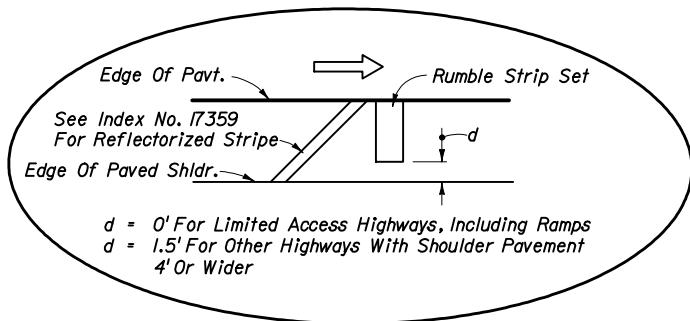
Notes:

- Turnout structural course to be the same material as roadway leveling or structure course. Structural course not required if asphalt base course and its thickness increased to match edge of roadway pavement.
- Any Department approved pavement structure equivalence may be used at the discretion of the Engineer.
- Additional structural strength may be required if heavy truck loads are anticipated.

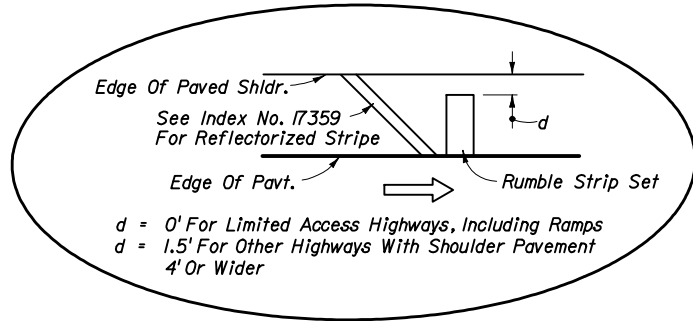
GENERAL NOTES

- Turnouts are to be constructed or resurfaced for low volume (single family, duplex, farm, etc.) residential connections as directed by the Engineer.
- Turnout construction not required for low volume residential connections where roadway shoulders are paved.
- Connections outside the 5' limit are to be constructed as directed by the Engineer.
- The contract unit price for Turnout Construction includes the cost for excavation and base.
- Payment for structural course to be included in roadway resurfacing pay item.
- 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-5 friction course.

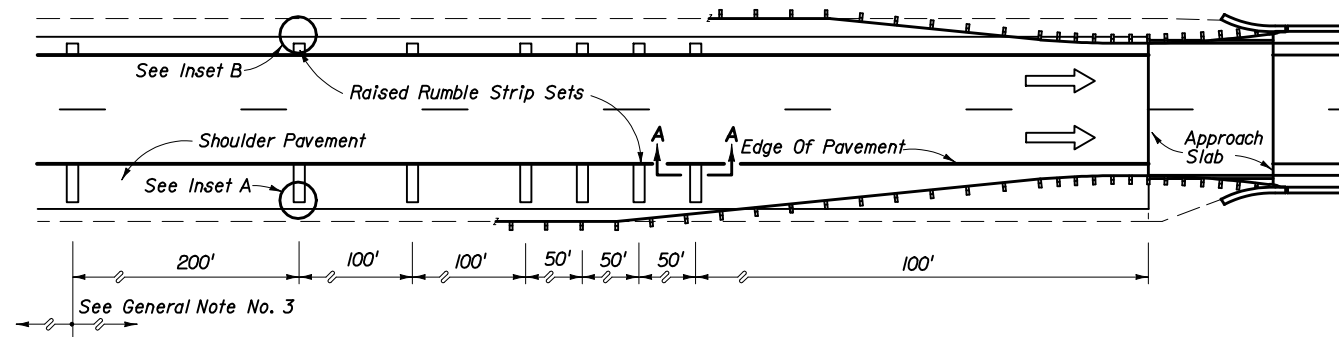
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TURNOUTS RESURFACING PROJECTS</b>				
Names	Dates	Approved By		
Designed By	DCB	11/77	<i>Brian Blackwell</i> State Roadway Design Engineer	
Drawn By	HKH	11/77		
Checked By	JVG	11/77	Revision	Sheet No.
			00	1 of 1
				Index No. <b>516</b>



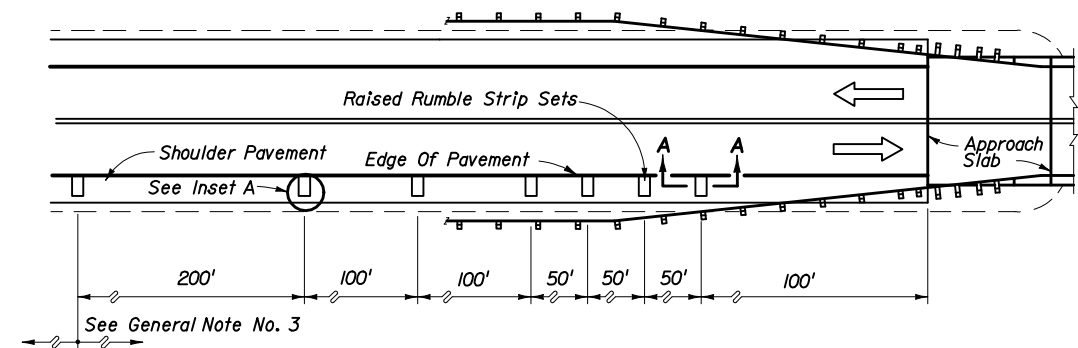
INSET A



INSET B

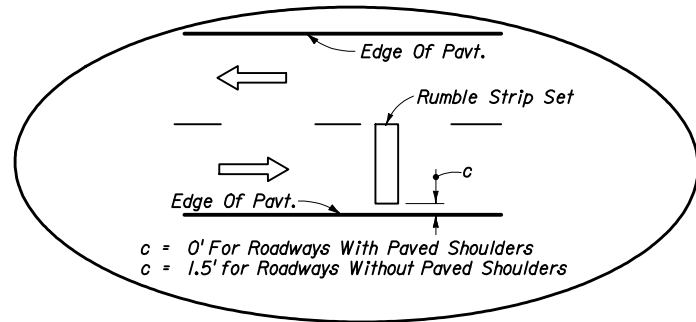


PLAN • ONE-WAY



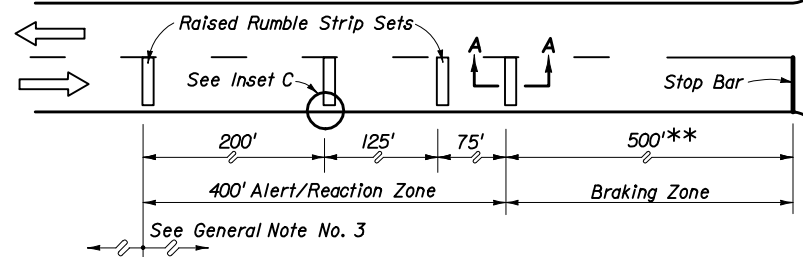
PLAN • TWO-WAY

STRUCTURES WITH LESS THAN FULL WIDTH SHOULDERS



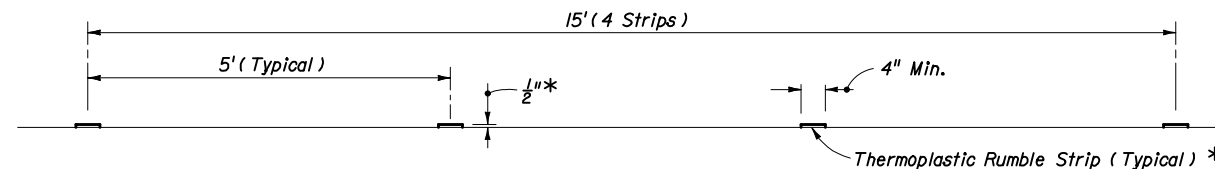
INSET C

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.



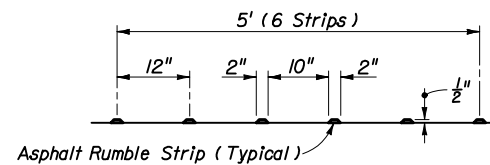
\*\* May be decreased in urban areas with low operating speeds.

PLAN INTERSECTIONS



\* Use multiple applications to achieve desired 1/2" thickness  
 Note: Shoulder thermoplastic rumble strip sets shall match edgeline color. Intersection thermoplastic rumble strip sets shall be white.

THERMOPLASTIC SET



ASPHALT SET

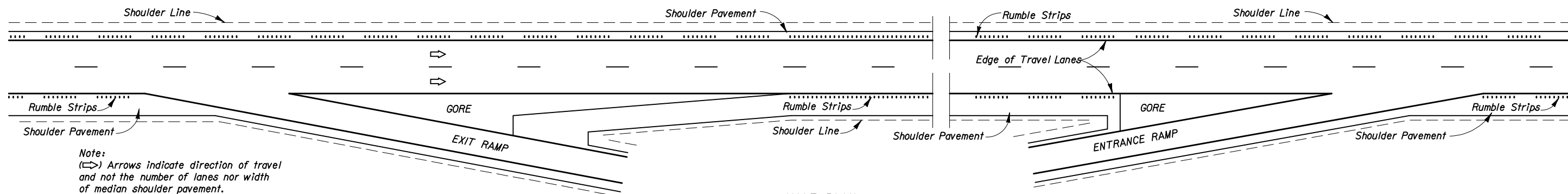
SECTION AA • FOR THERMOPLASTIC AND ASPHALT RUMBLE STRIP SETS

RAISED RUMBLE STRIPS

GENERAL NOTES FOR RAISED RUMBLE STRIPS

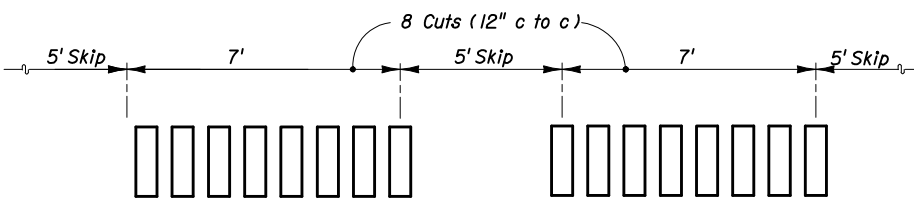
1. Raised rumble strips shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strips at intersections shall be constructed only when specified in the plans.
2. Raised rumble 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 throughout the remainder of the approaching curve.
4. Raised rumble strips shall be paid for per set under the contract unit price for Rumble Strips Sets, PS. Such price and payment shall be full compensation for all work and materials required without adjustment due to width of pavement receiving the strips or length of strips.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RUMBLE STRIPS</b>				
Designed By	Names	Dates	Approved By	
Drawn By	JBW	10/87	 State Roadway Design Engineer	
Checked By	KRM/JVG	10/87		
			Revision	Sheet No.
			00	1 of 2
				Index No.
				518

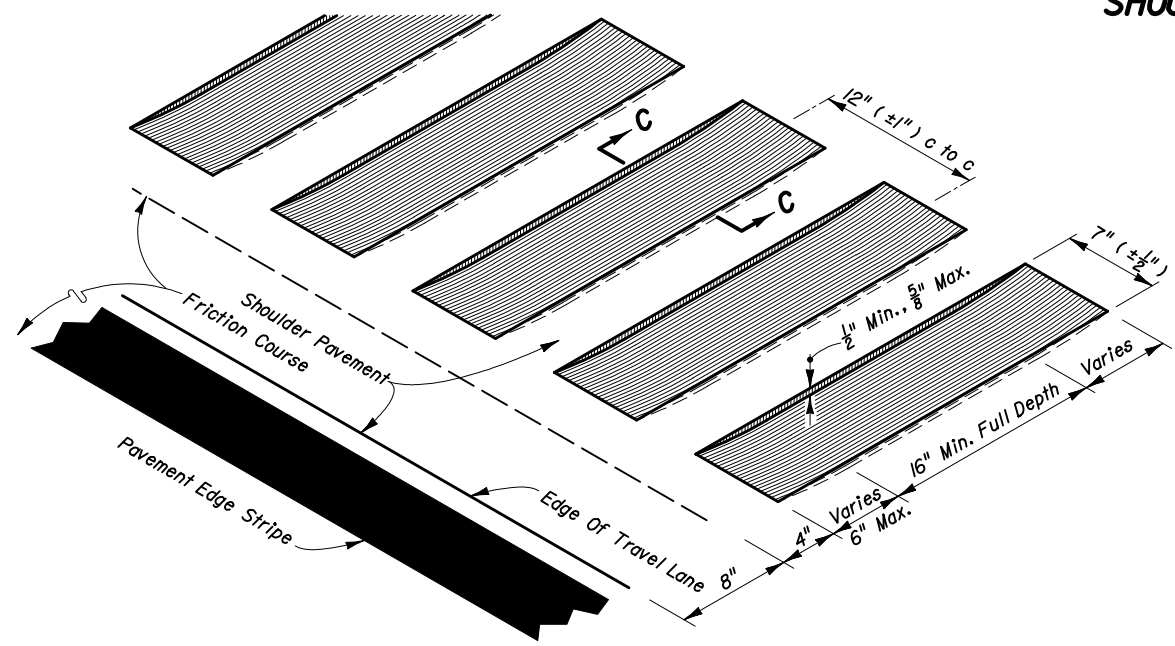


Note:  
 (→) Arrows indicate direction of travel  
 and not the number of lanes nor width  
 of median shoulder pavement.

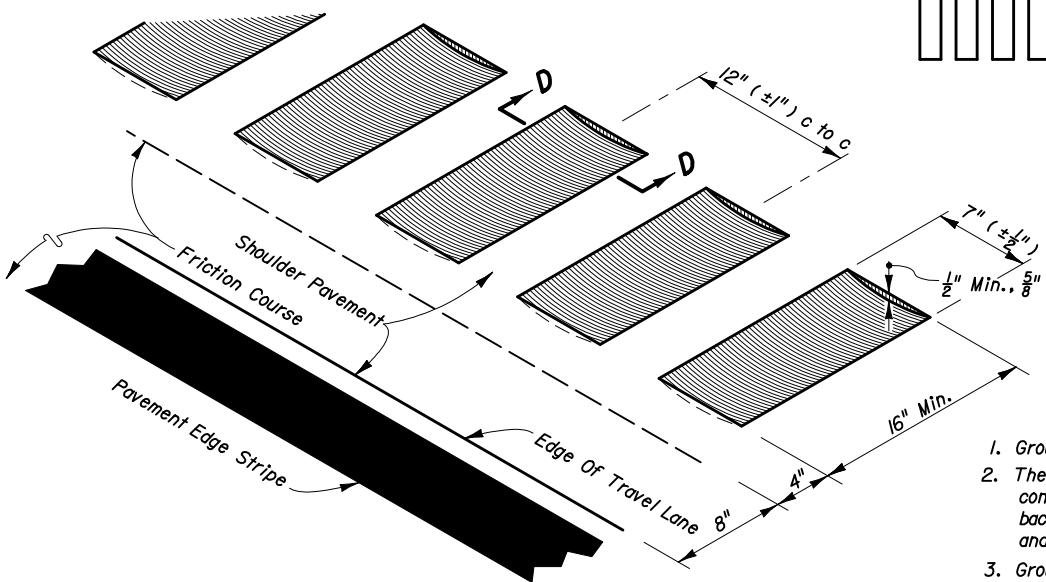
HALF PLAN  
 LIMITED ACCESS FACILITIES  
**SHOULDER GROUND-IN RUMBLE STRIP PLACEMENT**



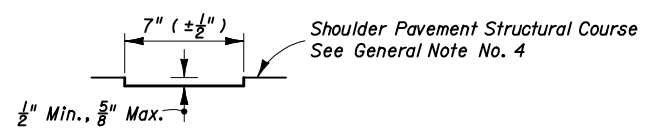
**SKIP ARRAY**  
 Continuous Cuts (12" c to c)  
**CONTINUOUS ARRAY**  
**ARRAYS**



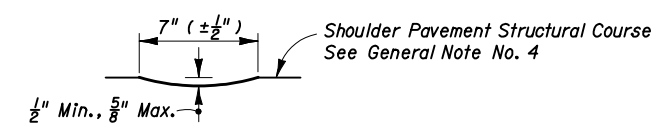
ISOMETRIC - TRANSVERSE CUT



ISOMETRIC - LONGITUDINAL CUT



SECTION CC  
 TRANSVERSE CUT



SECTION DD  
 LONGITUDINAL CUT

**GENERAL NOTES FOR SHOULDER GROUND-IN RUMBLE STRIPS**

1. Ground-in rumble strips shall be constructed on limited access facilities.
2. The skip array is the standard array. The continuous array shall be constructed in advance of bridge ends for a distance of 1000', or back to the gore recovery area for mainline interchange bridges; and constructed at other specific locations as called for in the plans.
3. Ground-in rumble strips are to be constructed in accordance with Section 546 of the Specifications.
4. When friction course extends more than 8" beyond the edge of the travel lane, the extended friction course shall be bladed off back to the 8" line, prior to rumble strip grinding.
5. Both arrays shall be paid for under the contract unit price for Rumble Strips (Ground-In), PM. Such price and payment shall be full compensation for all work and materials required.

**DESIGN NOTE**


1. The rumble strips described on this sheet are intended for use on flexible pavement shoulders. When constructing ground-in rumble strips on existing rigid (concrete) shoulders, no rumble strips shall be located closer than 6" from any pavement joint. When specifying ground-in rumble strips on existing rigid shoulders their location and array shall be detailed in the plans.
2. Other methods and types of applications shall not be used unless approved in writing by the State Roadway Design Engineer. Approval will be considered only with sufficient documented justification for variance from this standard.

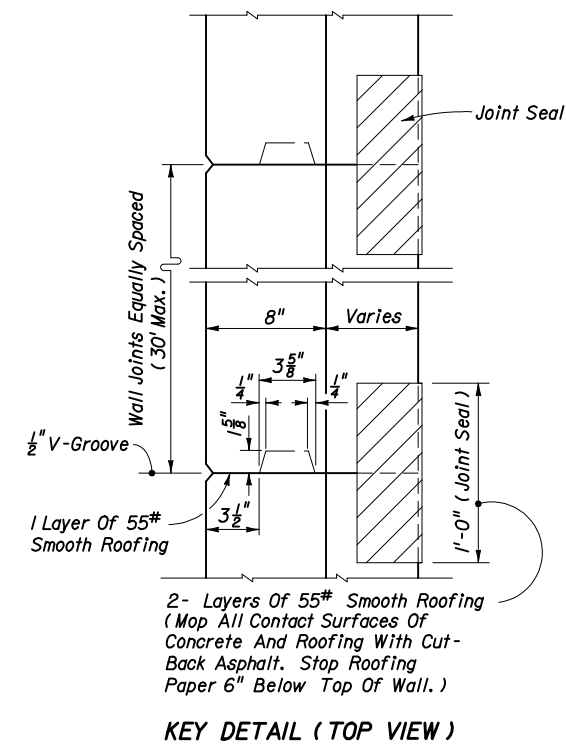
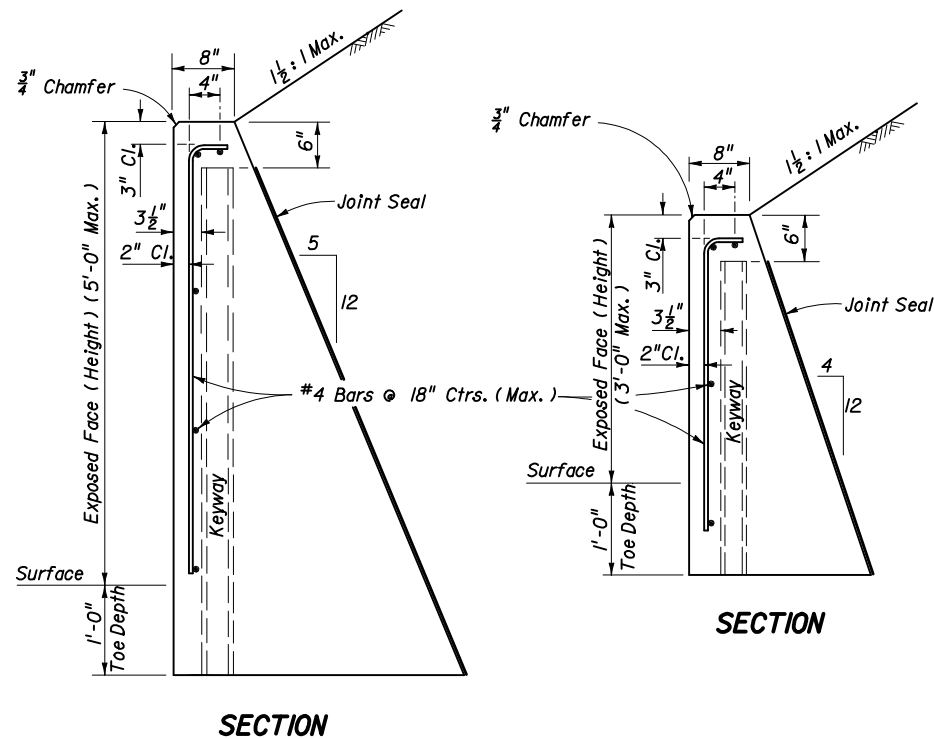
**LOCATION ALONG SHOULDER (FLEXIBLE PAVEMENT)**

**SHOULDER GROUND-IN RUMBLE STRIPS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RUMBLE STRIPS**

Names		Dates		Approved By		
Designed By	COM	11/93	 State Roadway Design Engineer			
Drawn By	HKH	11/93				
Checked By	FLS/JVG	11/93				
Revision		Sheet No.		Index No.		
02		2 of 2		518		



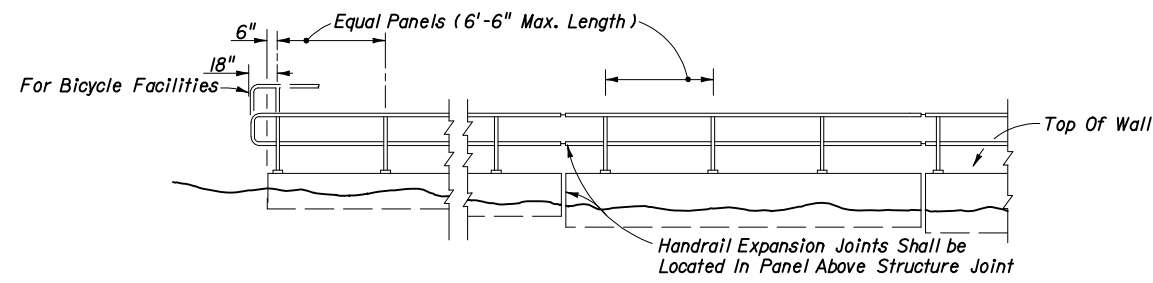
HEIGHT (EXPOSED FACED)	ESTIMATED QUANTITIES FOR WALL PER LINEAR FOOT OF WALL	
	CLASS I CONCRETE (CY)	STEEL (LB)
1'	0.07	3
2'	0.13	4
3'	0.20	5
4'	0.32	6
5'	0.43	7

**GRAVITY WALL NOTES**

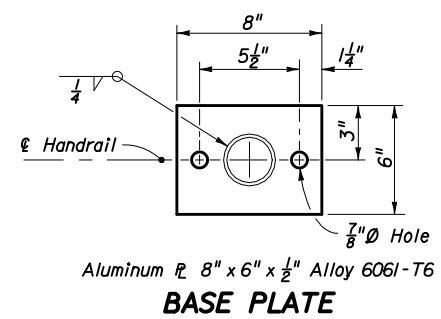
- Gravity walls constructed as extensions of reinforced concrete retaining walls, except walls of proprietary designs, shall have the same face texture and finish as the reinforced concrete retaining wall.
- When the plans call for adjunct handrail see Index No. 521 and for adjunct fence see Index No. 452.
- Cost of reinforcing steel, face texture, finish and joint seal to be included in the contract unit price for Class I Concrete (Retaining Walls) CY.

**GRAVITY WALL**

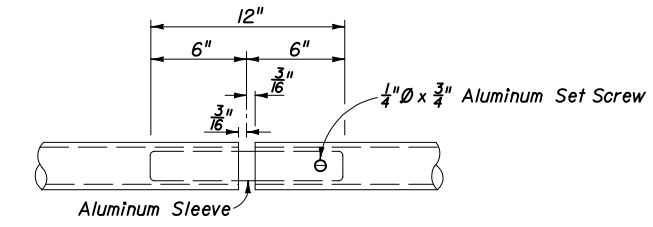
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>GRAVITY WALL</b>				
Designed By	Names	Dates	Approved By	
Drawn By	CDR	02/68	<i>Jim Blumhail</i> State Roadway Design Engineer	
Checked By	RHC	02/68	Revision	Sheet No. Index No.
			02	1 of 1 520



**ELEVATION**



**BASE PLATE**



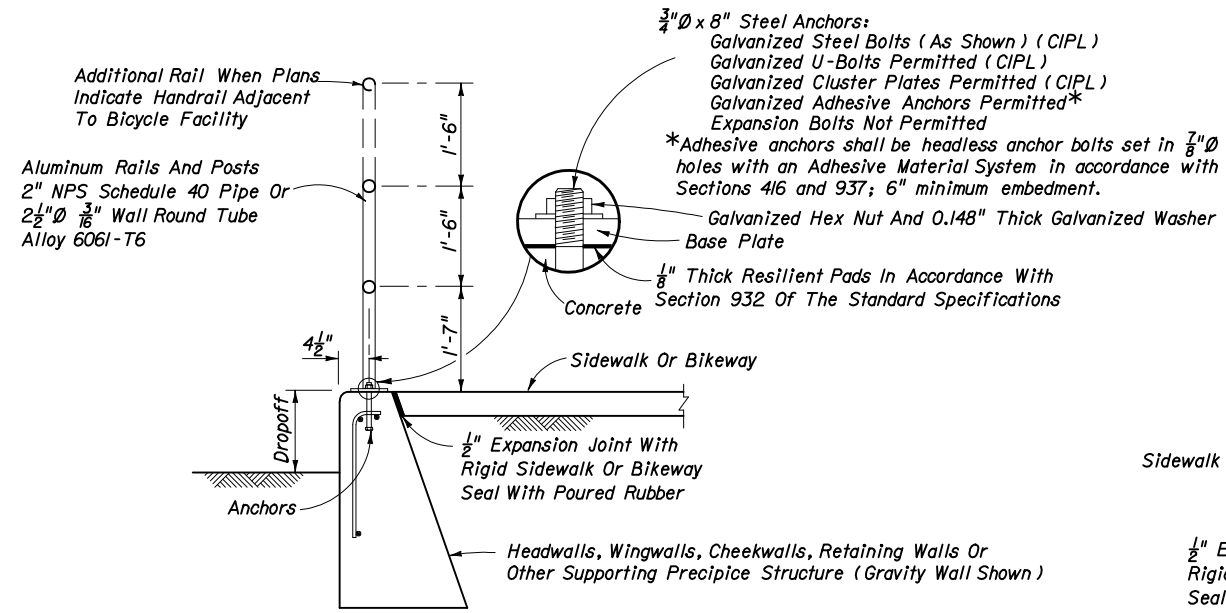
**EXPANSION JOINT**

**ALUMINUM PIPE HANDRAIL NOTES**

1. This handrail is applicable to mountings on walls and other roadway structures subject to pedestrian use where dropoffs do not exceed thirty inches (30"); and, applicable to select uses on sidewalk, within service areas and similar locations where foundation support and anchorage are adequate or can be provided.
2. All fixed joints to be either welded all around and ground smooth; or, commercially designed fixed joint systems (soldered, brazed, fused, bonded or shrink fitted) specified on the plans or approved by the Engineer. Mechanical joints other than expansion joints are not permitted unless specified on the plans or approved in writing by the Engineer. Posts shall be connected to base by weld only. Weld filler to be alloy ER5356, ER5556 or ER5183.
3. Anchor bolts shall be in accordance with ASTM A36 or A307. Nuts, washers, and bolts to be hot dip galvanized in conformance with ASTM A153. After the nuts have been tightened, the anchor bolt thread at the top of the nut shall be punch distorted and coated with zinc compound.
4. Aluminum handrail shall be constructed in accordance with Section 515 of the Standard Specifications. Payment shall be full compensation for furnishing and installing handrail, including mounting hardware, and shall be paid for under the contract unit price for Pipe Handrail (Aluminum), LF.

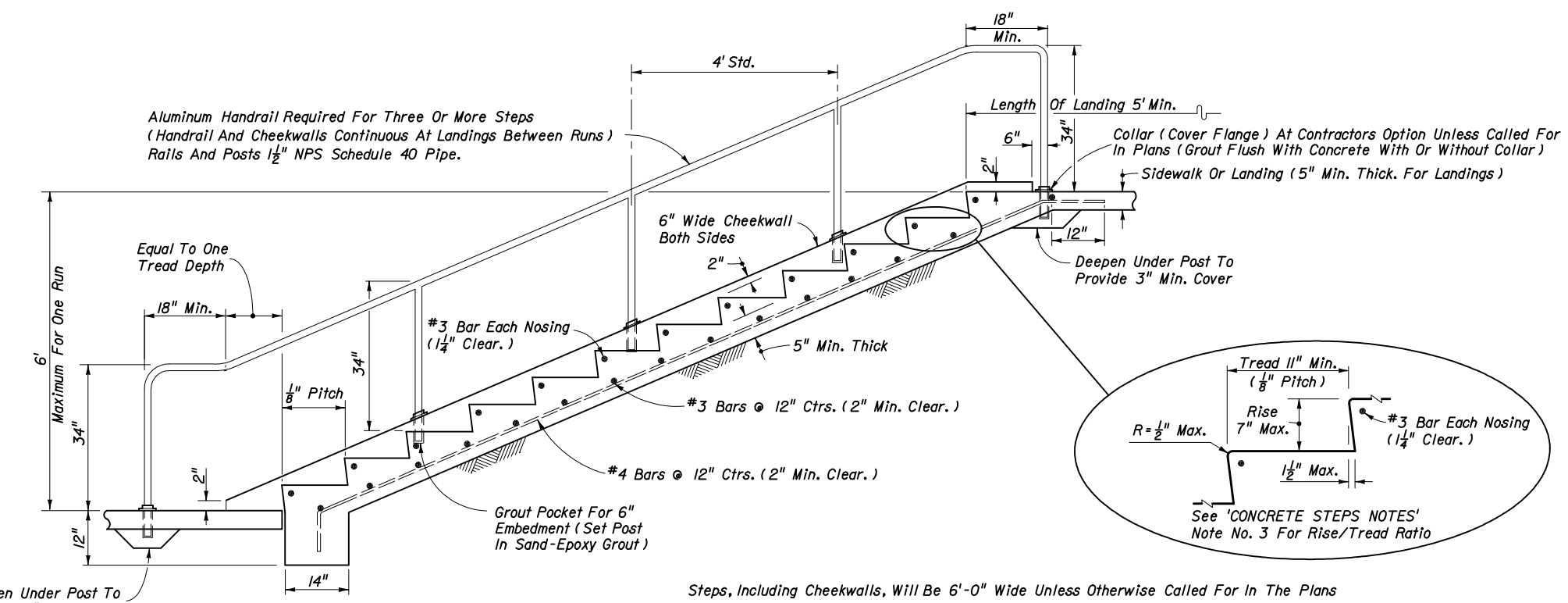
**DESIGN NOTES**

1. For dropoffs that exceed thirty inches (30"), handrails for customary applications are provided in Structures Standard Index Nos. 850 (Steel) and 860 (Aluminum). For customary fence applications see Index No. 452.



**TYPICAL SECTIONS AT POST**

**ALUMINUM PIPE HANDRAIL ON WALLS FOR DROPOFFS > 10" AND ≤ 2'-6"**



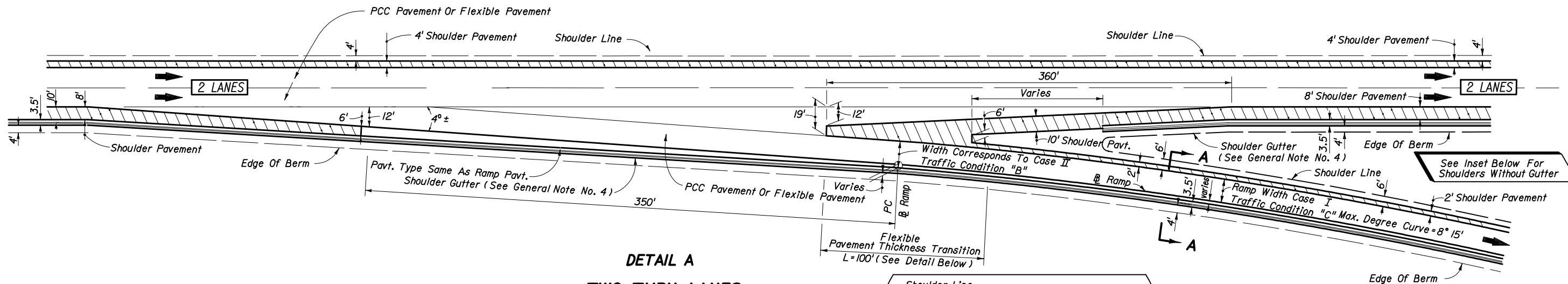
**CONCRETE STEPS NOTES**

1. Step and handrail design shown is for soil supported steps without adjacent dropoffs; do not use for suspended (structural) steps or stairway.
2. 12 risers maximum between landings.
3. Ratio of riser height to tread depth:  $2R + T = 26$ .
4. For steps parallel to and adjoining walls, delete adjoining cheek wall and mount handrail to wall at height and length shown.
5. Aluminum handrail shall be constructed in accordance with Section 515 of the Standard Specifications. Payment shall be full compensation for furnishing and installing handrail, including mounting hardware, and shall be paid for under the contract unit price for Pipe Handrail (Aluminum), LF.
6. Cost of concrete steps, landings and cheekwalls shall be paid for under the contract unit price for Class I Concrete (Miscellaneous), CY. Cost of reinforcing steel shall be paid for under the contract unit price for Reinforcing Steel (Miscellaneous), LB.

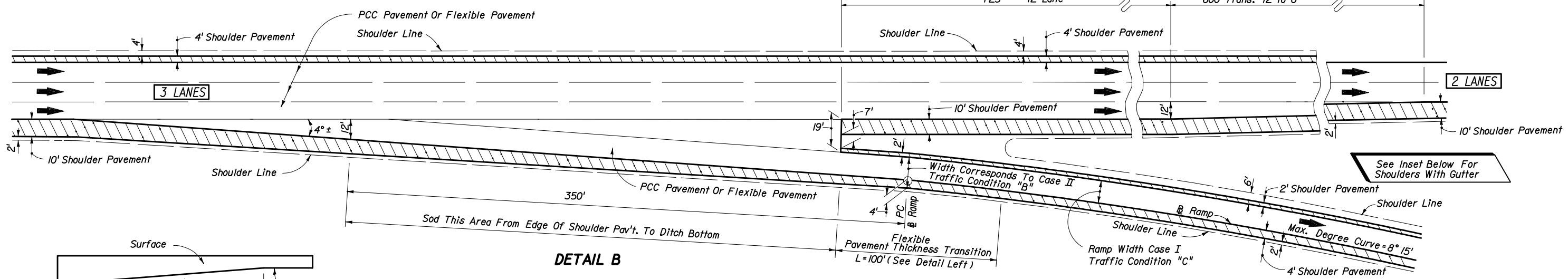
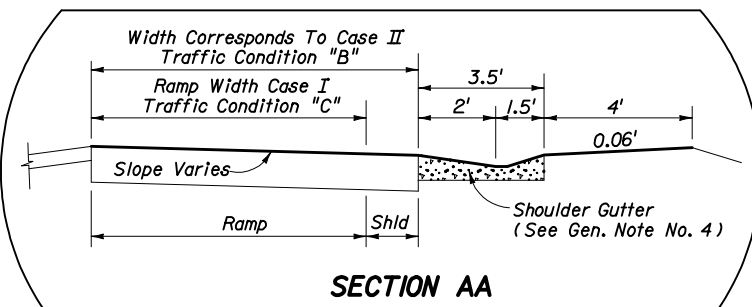
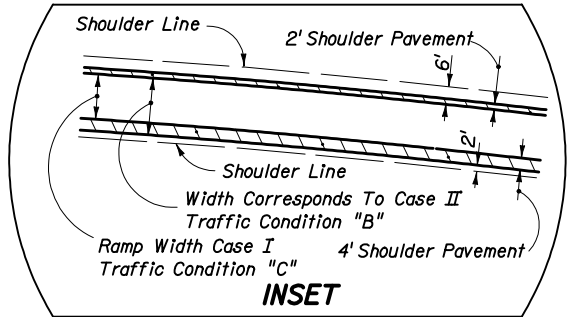
Steps, including Cheekwalls, Will Be 6'-0" Wide Unless Otherwise Called For In The Plans

**CONCRETE STEPS**

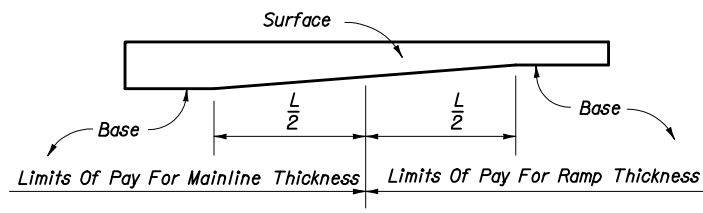
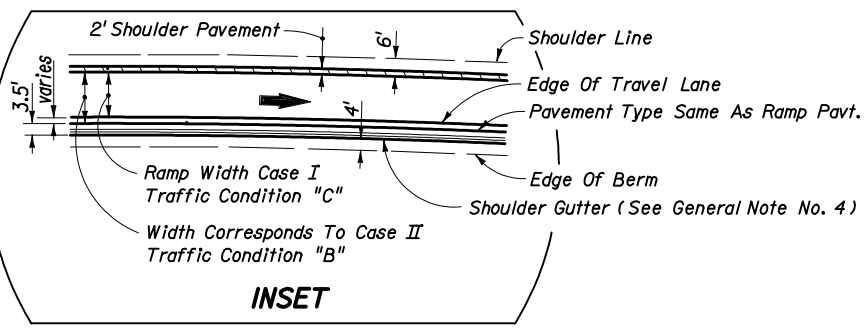
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>ALUMINUM PIPE HANDRAILS AND CONCRETE STEPS</b>				
Designed By	Names	Dates	Approved By	
Drawn By	CDR	02/68	 State Roadway Design Engineer	
Checked By	RHC	02/68	Revision	Sheet No.
			02	1 of 1
				Index No. 521



**DETAIL A  
TWO THRU LANES**



**DETAIL B  
THREE APPROACH LANES - TWO THRU LANES**



**FLEXIBLE PAVEMENT THICKNESS TRANSITION**

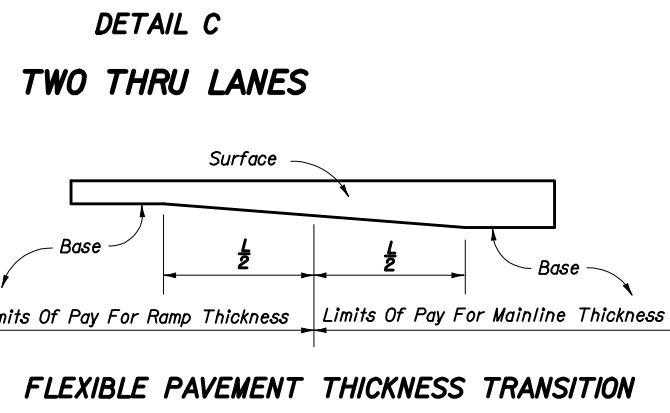
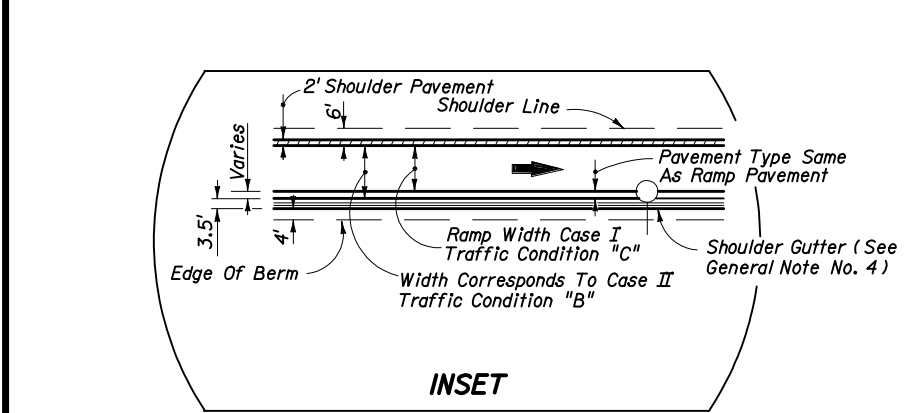
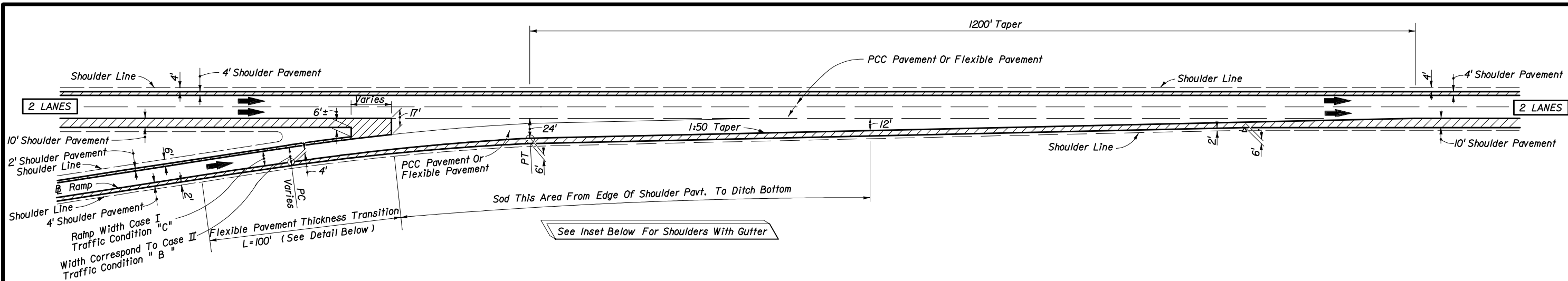
**EXIT TERMINALS  
SINGLE - LANE RAMPS**

NOTE: For General Notes See Sheet No. 2

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

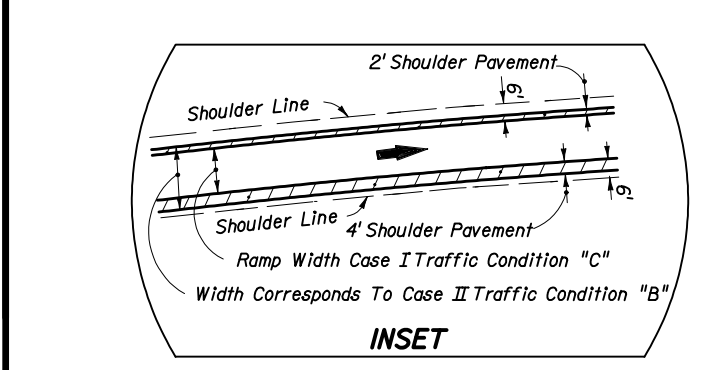
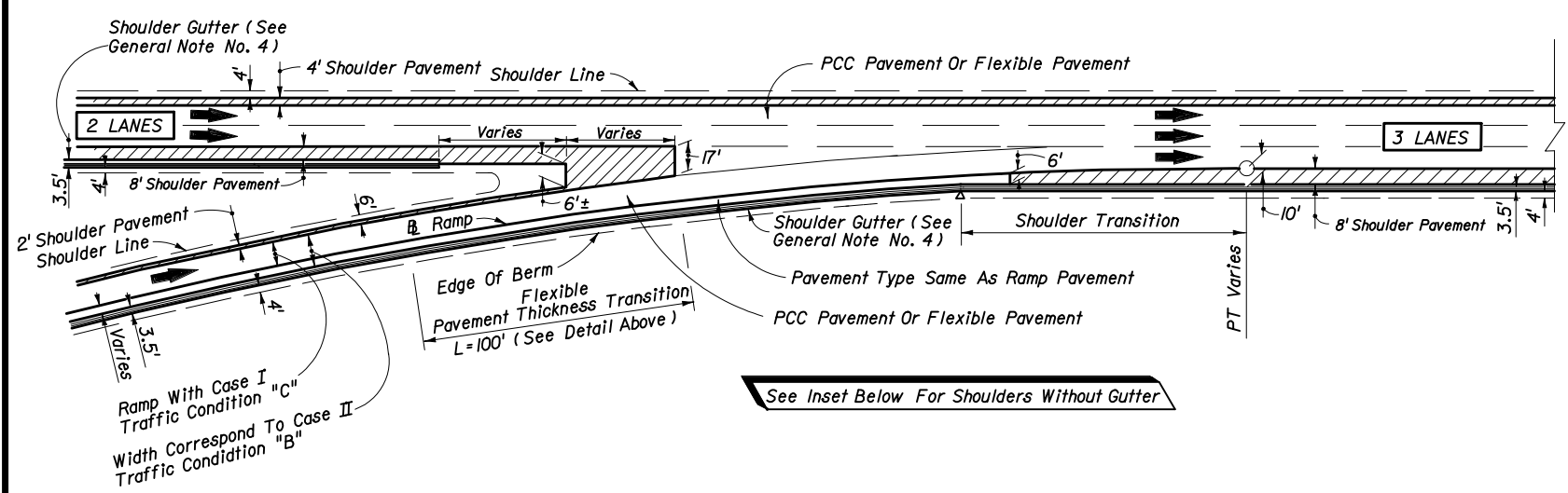
**RAMP TERMINALS**

Names	Dates	Approved By		
Designed By	EHH 01/65	State Roadway Design Engineer		
Drawn By	HEW 01/65			
Checked By	RLO 06/67	Revision	Sheet No.	Index No.
		00	1 of 5	525



**GENERAL NOTES**

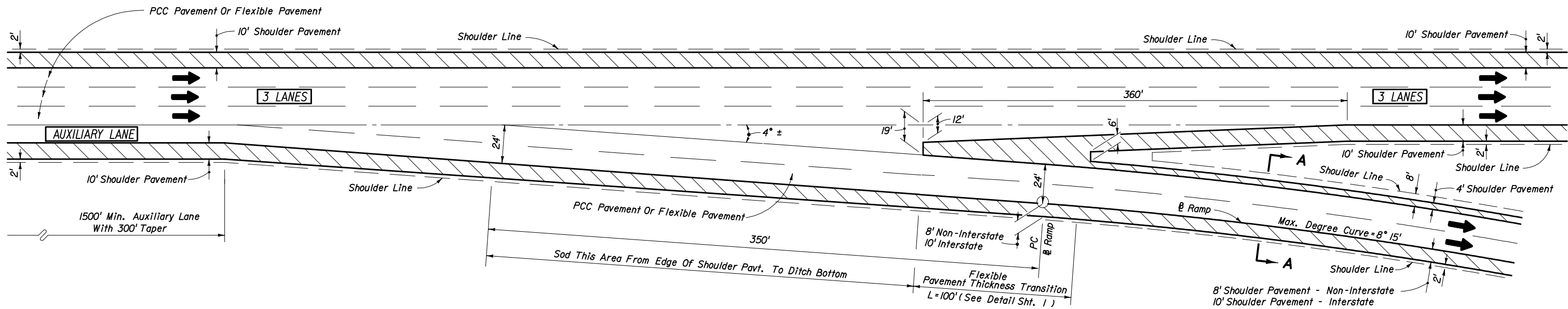
1. Exit and entrance terminals as detailed shall not be used on ramps for which a speed of 50 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to AASHTO.
2. (a.) PCC Pavement Projects:  
Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the tranverse joint nearest the point of 6' width.
- (b.) Flexible Pavement Projects:  
Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.
3. For concrete pavement joint details and layouts at entrance and exit ramp terminals see Index No. 305.
4. Shoulder gutter applications will be determined by drainage design.



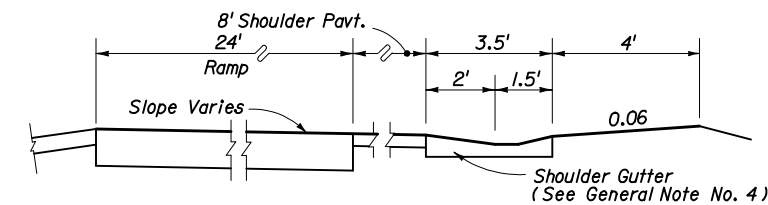
**DETAIL D**  
**WITH ADDED LANE**

**ENTRANCE TERMINALS**  
**SINGLE-LANE RAMPS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RAMP TERMINALS</b>				
	Names	Dates	Approved By	
Designed By	FHW	01/65	 State Roadway Design Engineer	
Drawn By	HFW	01/65	Revision	Sheet No.
Checked By	RLO	06/67	00	2 of 5
				Index No. 525



THREE THRU LANES - APPROACH AUXILIARY LANE

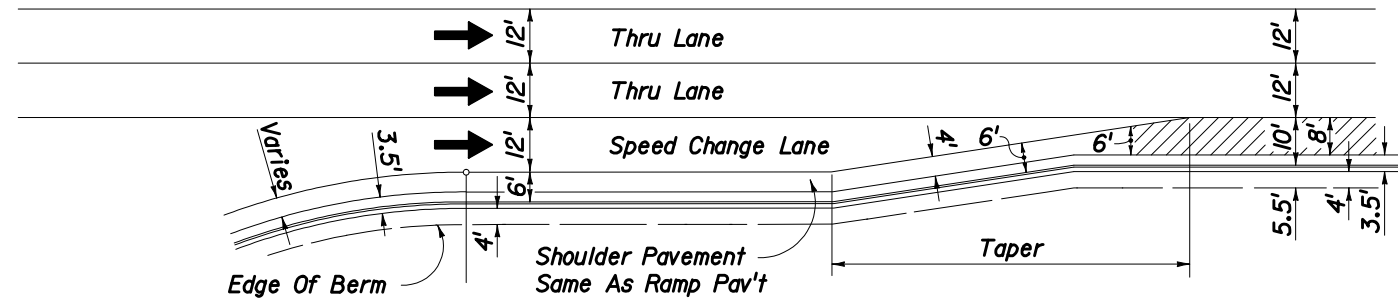


SECTION WHEN SHOULDER GUTTER USED  
SECTION AA

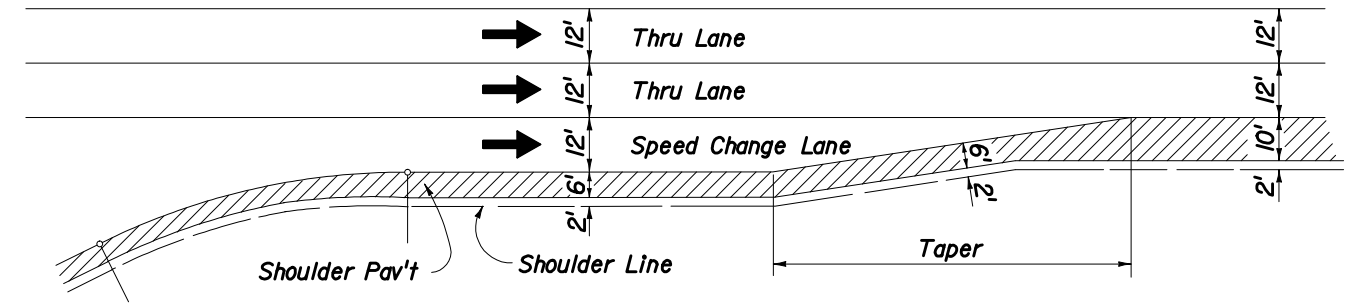
EXIT TERMINALS  
TWO-LANE RAMPS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RAMP TERMINALS</b>				
	Names	Dates	Approved By	
Designed By	DCB	07/86	<i>Ben Blankenship</i> State Roadway Design Engineer	
Drawn By	DDS	07/86	Revision	Sheet No.
Checked By	DCB	07/86	00	3 of 5
				Index No. 525

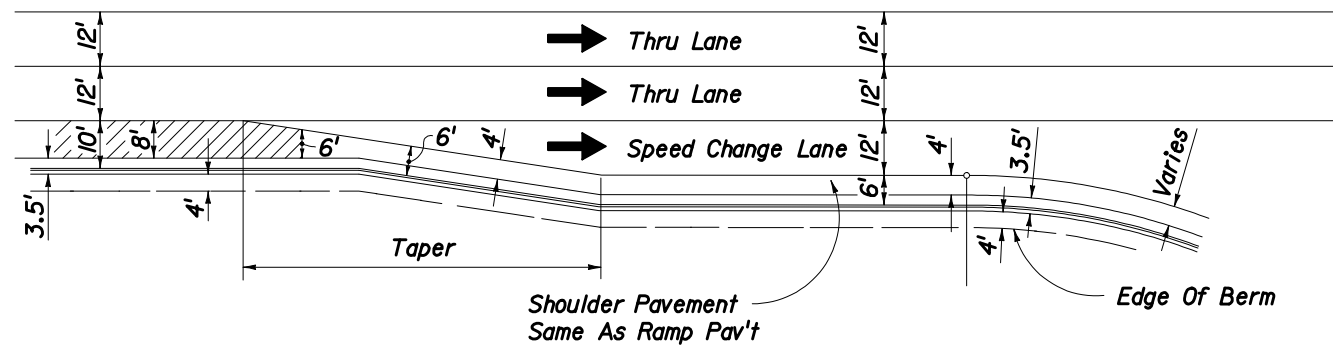




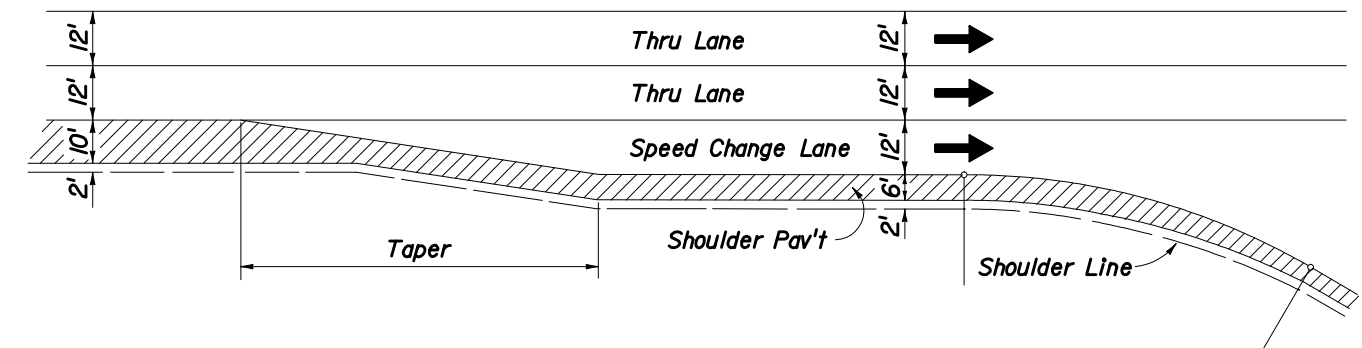
**ACCELERATION LANE WITH SHOULDER GUTTER**



**ACCELERATION LANE WITHOUT SHOULDER GUTTER**




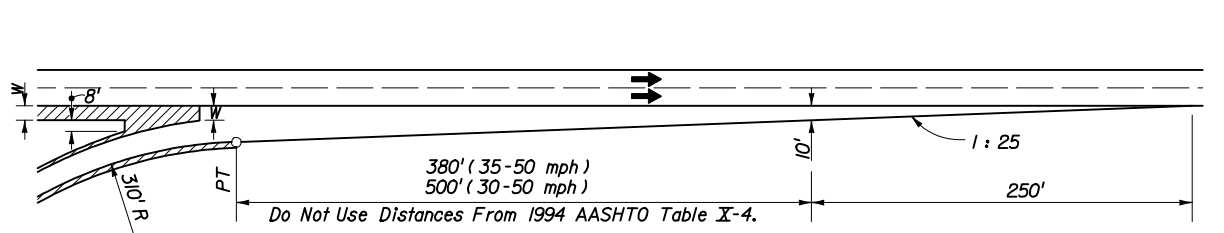
**DECELERATION LANE WITH SHOULDER GUTTER**



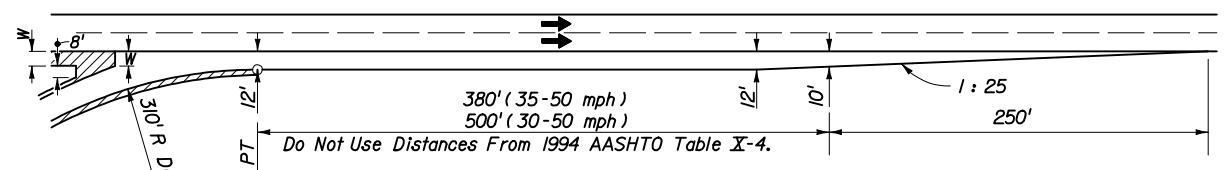
**DECELERATION LANE WITHOUT SHOULDER GUTTER**

**SHOULDER TREATMENT  
AT SPEED CHANGE LANES AT EXPRESSWAY RAMP TERMINALS  
EXPRESSWAY RAMP TERMINALS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RAMP TERMINALS</b>				
	Names	Dates	Approved By	
Designed By	EHH	01/65	 State Roadway Design Engineer	
Drawn By	HEW	01/65		
Checked By	RLO	06/67	Revision	Index No.
			00	4 of 5
				525

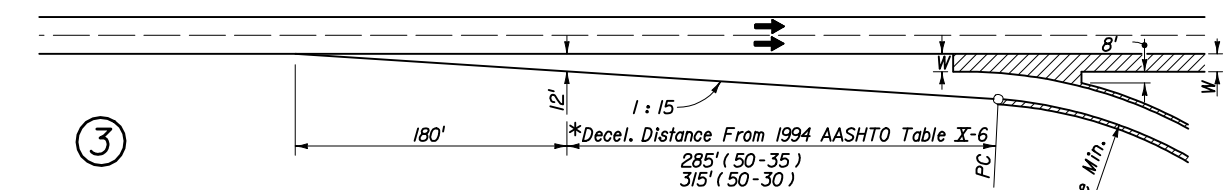


Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.

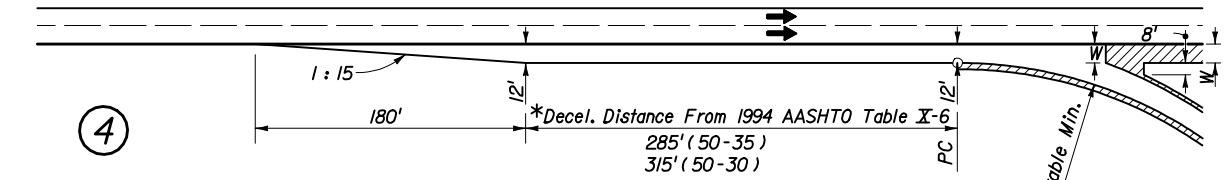


Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.

**UNSIGNALIZED ENTRANCES**



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.

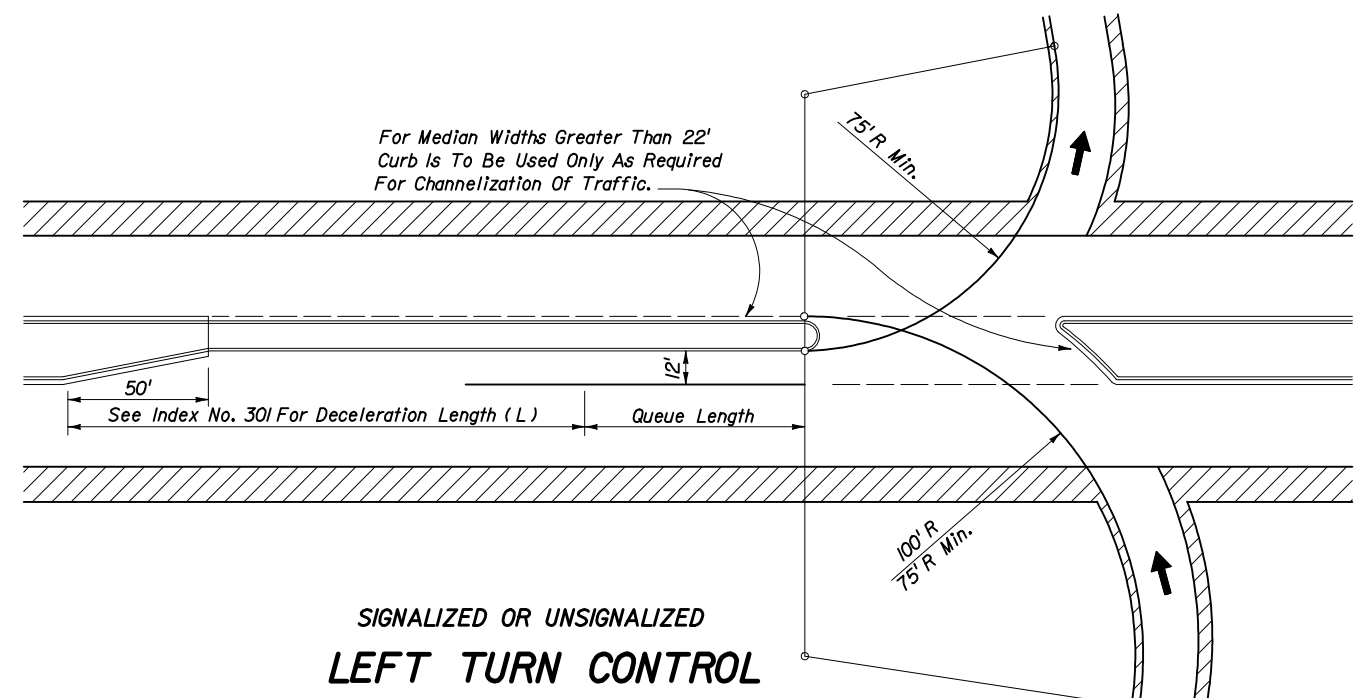
**UNSIGNALIZED EXITS**

**FOOTNOTES:**

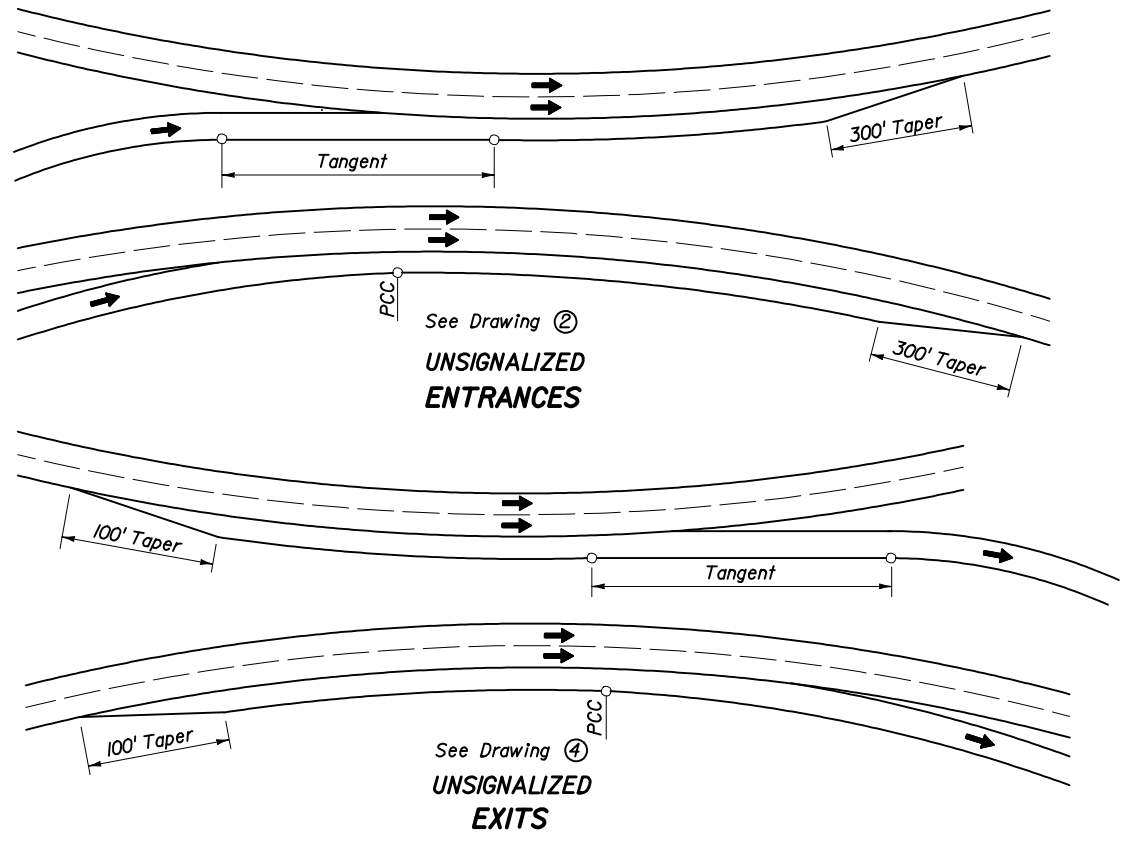
- W Normal shoulder pavement width.
- \* Adjust for grades if greater than 2% (See Table X-5, AASHTO).

**RAMP TERMINALS**

**CROSSROAD TERMINALS**



**SIGNALIZED OR UNSIGNALIZED LEFT TURN CONTROL**



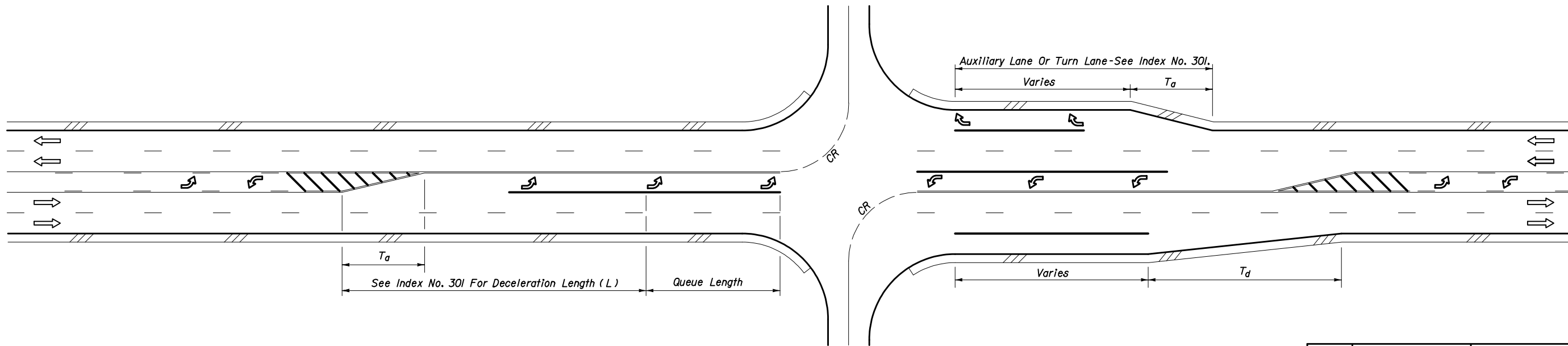
NOTE: Ramp terminals on curves should be avoided when possible.

**RAMP TERMINALS ON CURVES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RAMP TERMINALS**

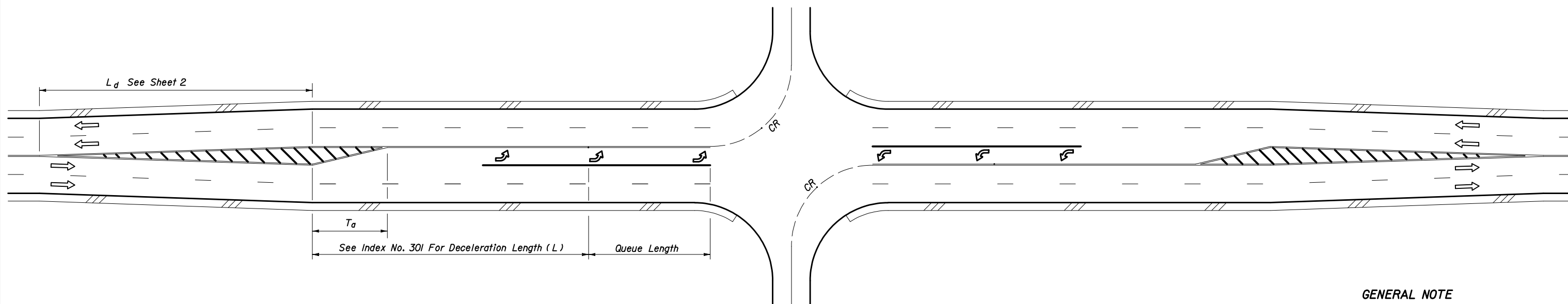
Names	Dates	Approved By		
Designed By	EHH	1/65	State Roadway Design Engineer	
Drawn By	HFW	1/65		
Checked By	RLO	6/67	Revision	00
			Sheet No.	5 of 5
			Index No.	525



4-LANE UNDIVIDED WITH OPTIONAL LANE

DESIGN SPEED (mph)	$T_a$ (FEET)	$T_d$
	ADD LANE	LANE DROP
< 30	50' (± 1 : 4)	1 : 25
30-45		1 : 30
> 45		1 : 40

Note: For locations with unrelocatable control points minimum taper rates for lane drop ( $T_d$ ) will be 1 : 20.



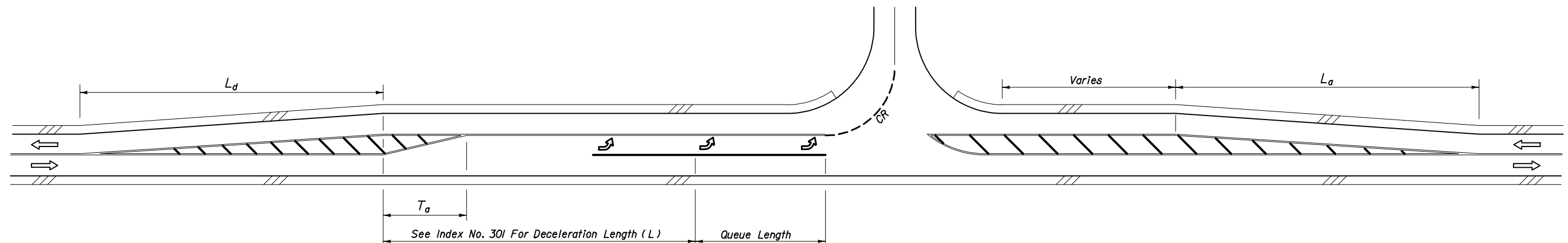
4-LANE UNDIVIDED FLARED - SYMMETRICAL

INTERSECTION TURNS AND STORAGE

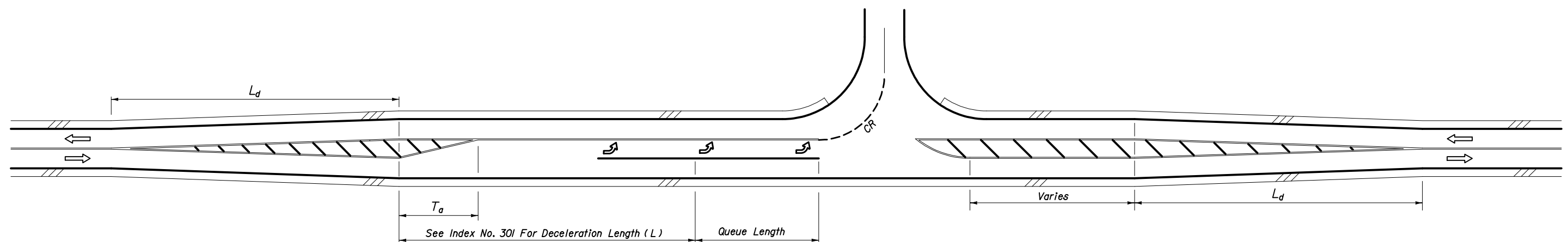
GENERAL NOTE

1. For pavement markings refer to Index No. 17346.

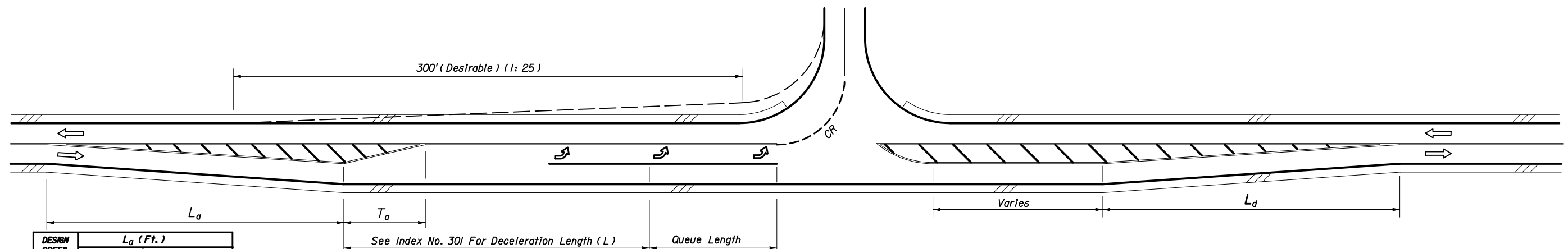
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>ROADWAY TRANSITIONS</b>				
Designed By	KNM	Dates	Approved By	
Drawn By	JBW	9/89	 State Roadway Design Engineer	
Checked By	KNM/JVG			
			Revision	00
			Sheet No.	1 of 8
			Index No.	526



**LEFT SIDE WIDENING**



**CENTERED WIDENING**



**RIGHT SIDE WIDENING**

DESIGN SPEED (mph)	L <sub>a</sub> (Ft.)	
	STANDARD	MINIMUM UNDER RESTRAINTS
30	180	120
40	320	150
50	500	180
60	720	240

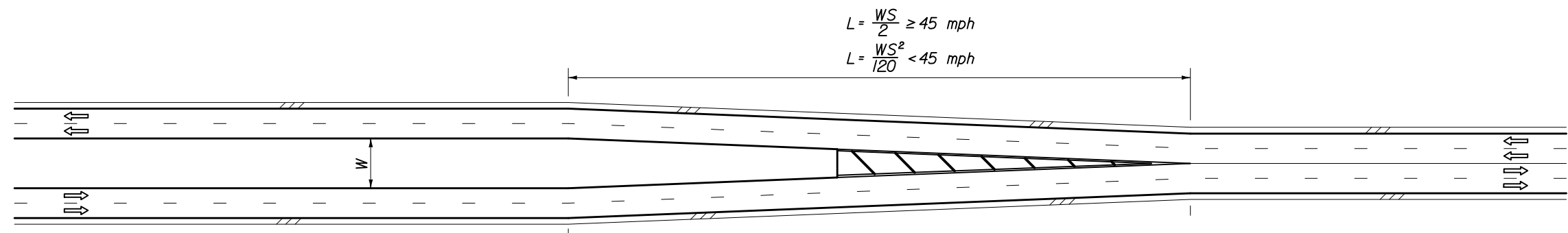
(mph)	L <sub>d</sub> (Ft.)	
30	180	120
40	240	150
50	360	180
60	480	240

**FLARED & PAINTED LEFT TURNS FOR 2-LANE 2-WAY ROADWAYS**

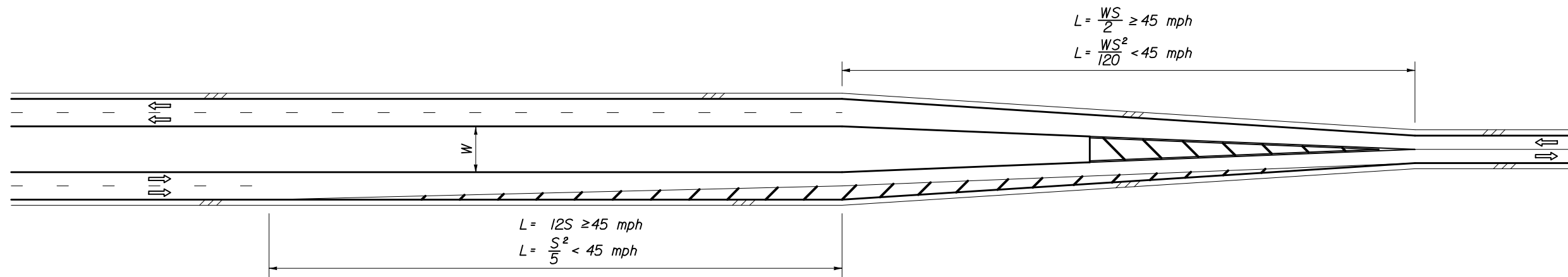
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**ROADWAY TRANSITIONS**

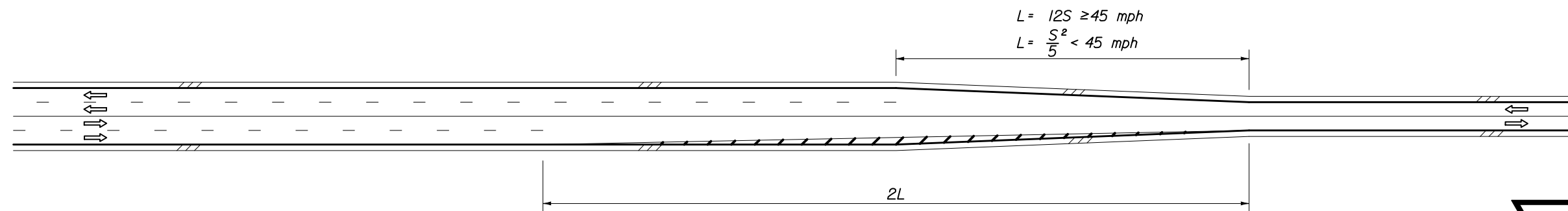
Names	Dates	Approved By	
Designed By: RER/JVG	9/98	<i>Ben Blankenship</i> State Roadway Design Engineer	
Drawn By: JBW	9/98		
Checked By: RER/JVG	9/98		
Revision	00	Sheet No. 2 of 8	Index No. 526



**4-LANE DIVIDED TO 4-LANE UNDIVIDED**



**4-LANE DIVIDED TO 2-LANE UNDIVIDED**

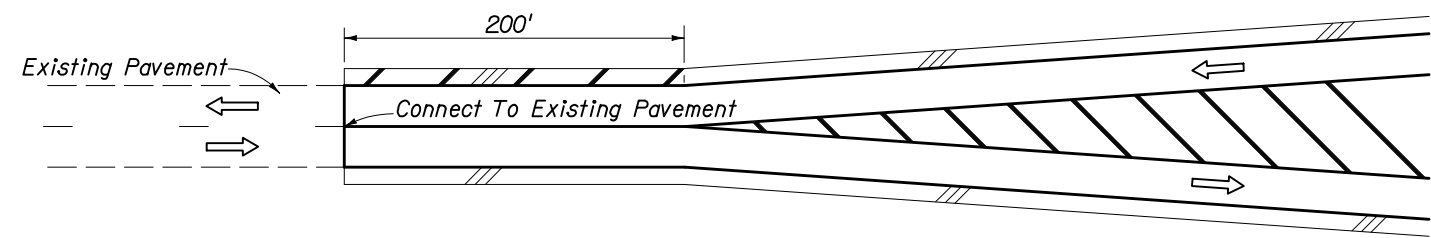


**4-LANE UNDIVIDED TO 2-LANE UNDIVIDED**

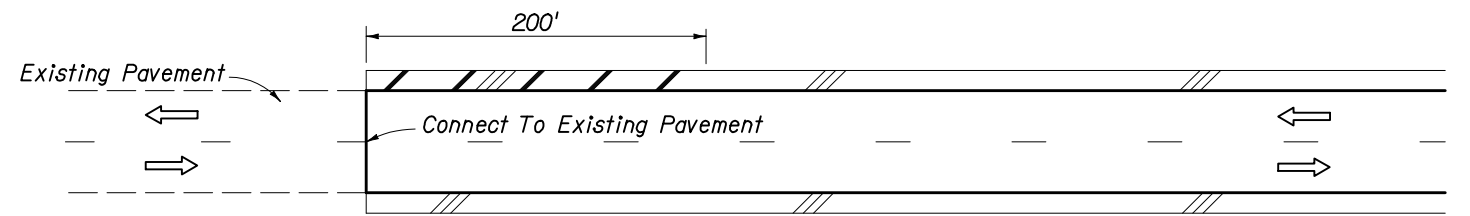
S = Design speed (mph).

**LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS**

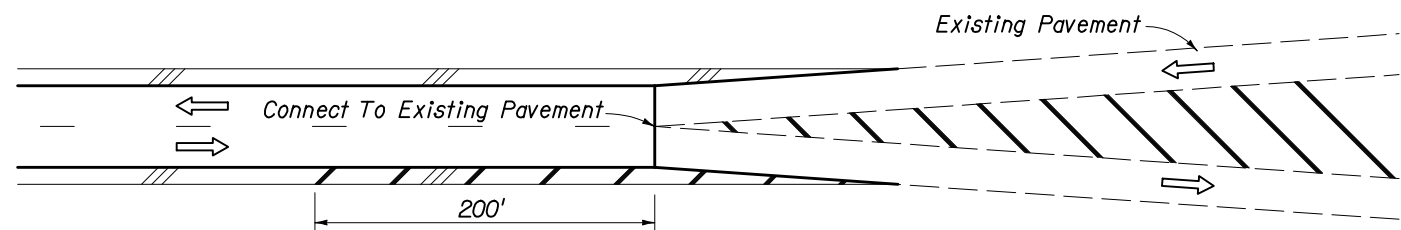
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>ROADWAY TRANSITIONS</b>				
Designed By	KNM	9/89	Approved By <i>Kevin Blankenship</i> State Roadway Design Engineer	
Drawn By	JBW	9/89	Revision	Sheet No.
Checked By	KNM/JVG	9/89	00	3 of 8
				Index No. 526



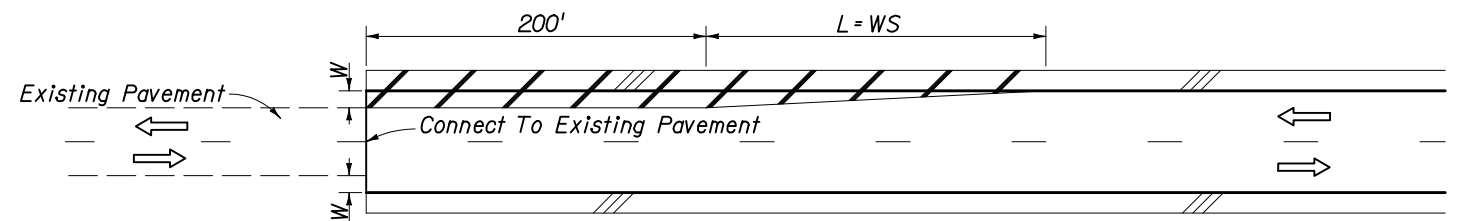
**CONNECTING FLARE WITH PAVED SHOULDERS TO EXISTING ROADWAY WITHOUT PAVED SHOULDERS**



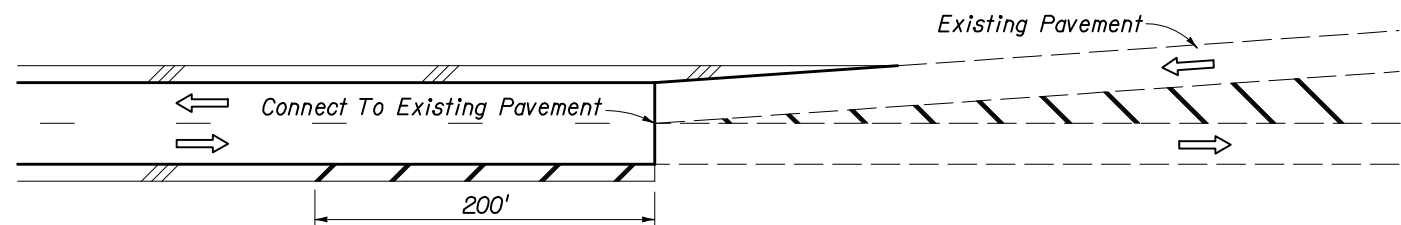
**CONNECTING SIMILAR WIDTH PAVEMENTS**



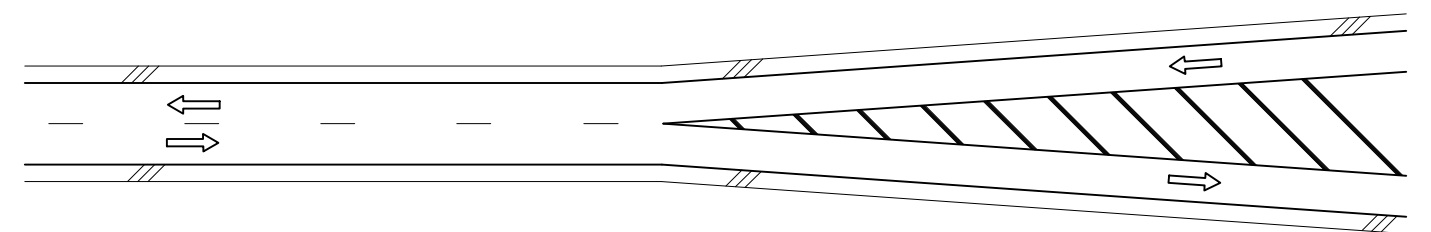
**CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING SYMMETRICAL FLARE WITHOUT PAVED SHOULDERS**



**CONNECTING DIFFERENT WIDTH PAVEMENTS**



**CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING ASYMMETRICAL FLARE WITHOUT PAVED SHOULDERS**




**FLARED - PAVED SHOULDERS**

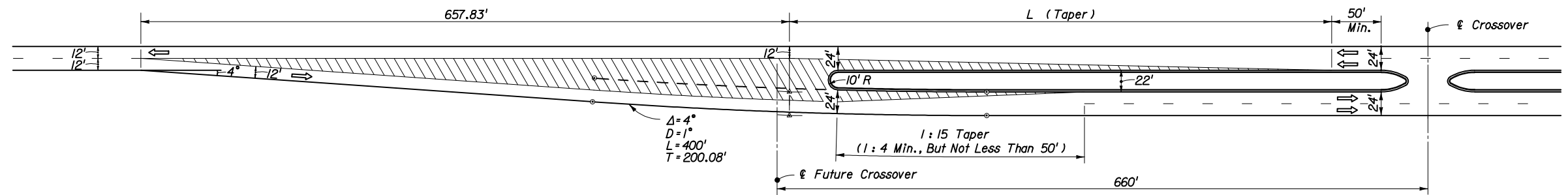
S = Design speed (mph).

**PAVED SHOULDER TREATMENT AT TRANSITIONS AND CONNECTIONS**

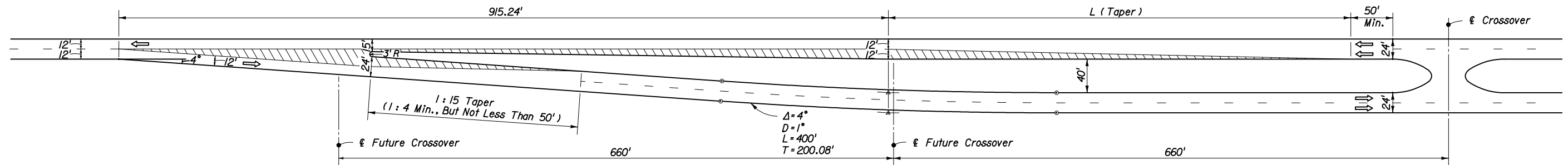
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**ROADWAY TRANSITIONS**

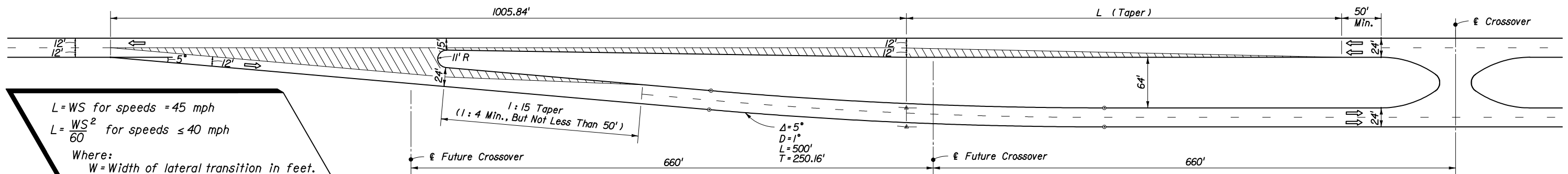
Names		Dates		Approved By		
Designed By	KNM	9/89	 State Roadway Design Engineer			
Drawn By	JBW	9/89				
Checked By	KNM/JVG	9/98				
Revision	00	4 of 8	Sheet No.	Index No.	526	



22' MEDIAN



40' MEDIAN



64' MEDIAN

$L = WS$  for speeds = 45 mph  
 $L = \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 W = Width of lateral transition in feet.  
 S = Design speed.


**NOTES FOR SHEETS 5 THRU 8**

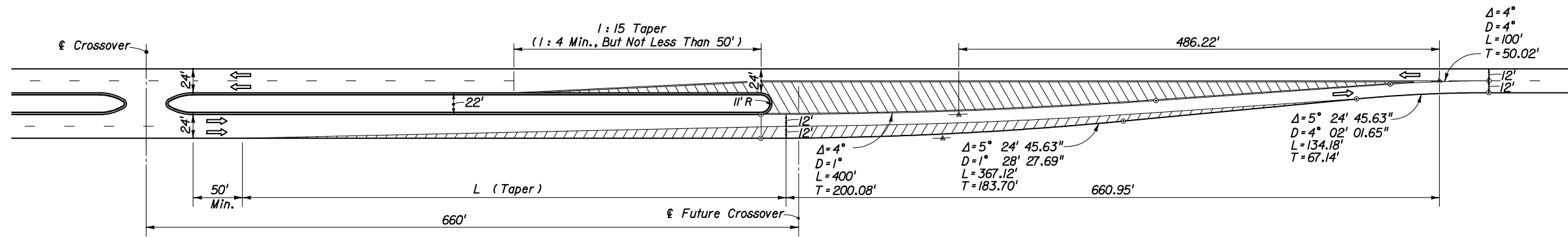
1. The transition details as represented on sheets 5 thru 8 are intended as guidelines only. The transition lengths, curve data, nose radii and offsets are valid only for tangent alignment, design speeds  $\leq 45$  mph, the median widths and lane widths shown.
2. Approach lane departures ( $\Delta = 5^\circ$ ) are suitable for design speeds up to 60 mph. Interior curves ( $D = 1^\circ$ ) are suitable for normal crown for design speeds up to 50 mph. Merging curves ( $D \geq 5^\circ$ ) will require superelevation.
3. The geometrics of these schemes are associated with the standard subsectional spacing for sideroads, but in any case will require modification to accommodate sideroad location, multilane and/or divided sideroads, oblique sideroads, crossover widths, storage and speed change lane requirements, and, other related features.

**LEFT ROADWAY CENTERED ON APPROACH ROADWAY  
TWO LANE TO FOUR LANE TRANSITION**

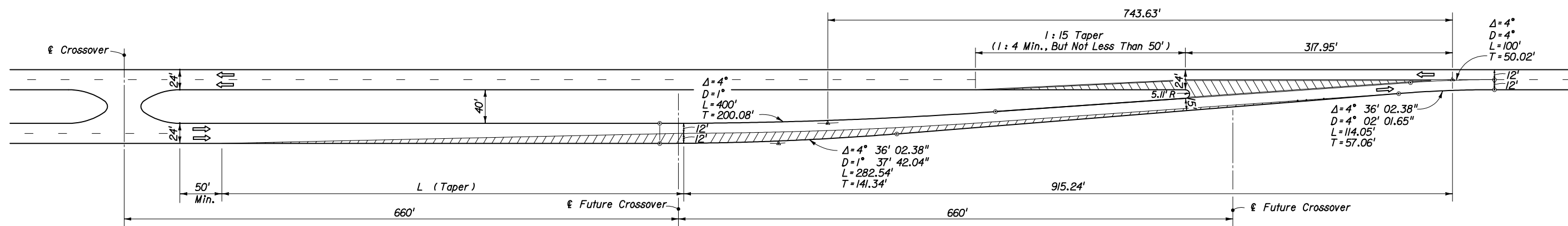
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**ROADWAY TRANSITIONS**

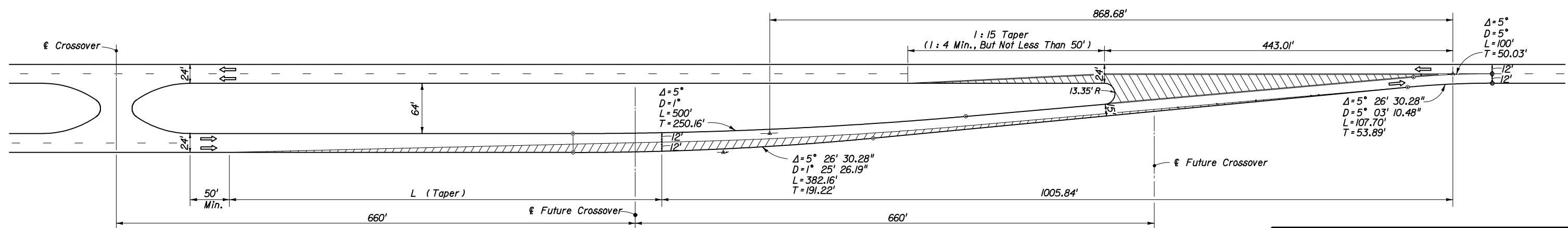
Names		Dates		Approved By		
Designed By	KNM	9/89	 State Roadway Design Engineer			
Drawn By	HKH	2/94				
Checked By	JVG	2/94				
Revision	00	5 of 8	Index No.	526		



22' MEDIAN



40' MEDIAN



64' MEDIAN

$L = WS$  for speeds = 45 mph

$L = \frac{WS^2}{60}$  for speeds  $\leq 40$  mph


Where:

W = Width of lateral transition in feet.  
S = Design speed.

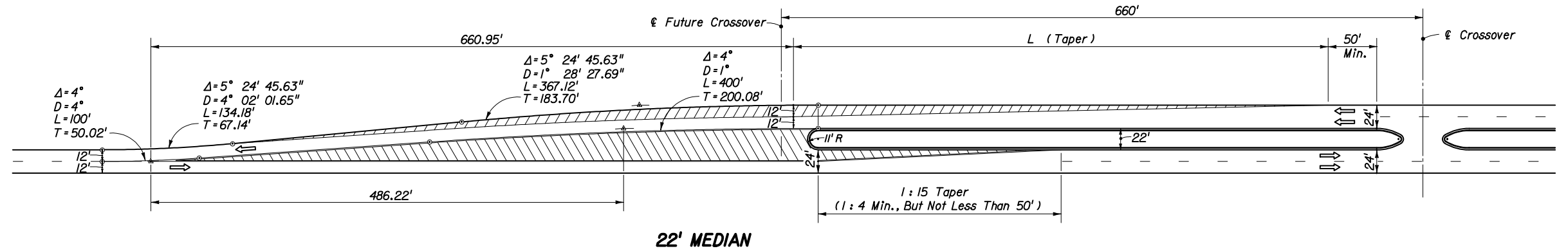
**LEFT ROADWAY CENTERED ON THRU ROADWAY  
FOUR LANE TO TWO LANE TRANSITION**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

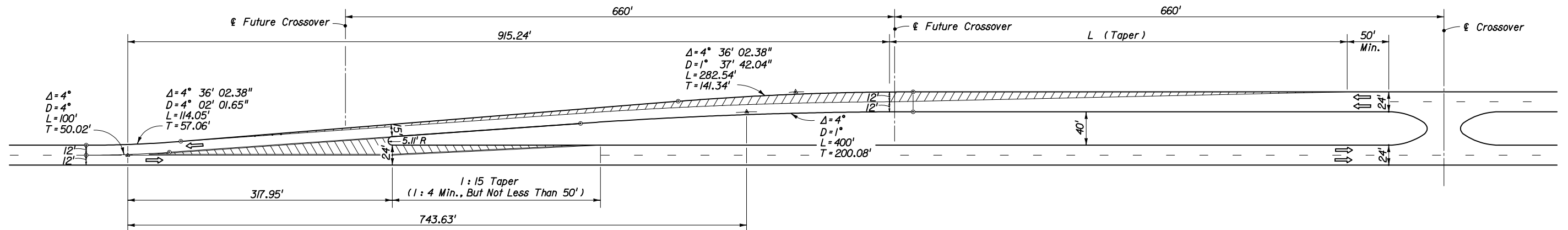
**ROADWAY TRANSITIONS**

Names		Dates	Approved By		
Designed By	KNM	9/89	 State Roadway Design Engineer		
Drawn By	HKH	2/94			
Checked By	JVG	2/94			
Revision	00		Sheet No.	6 of 8	Index No.
					526

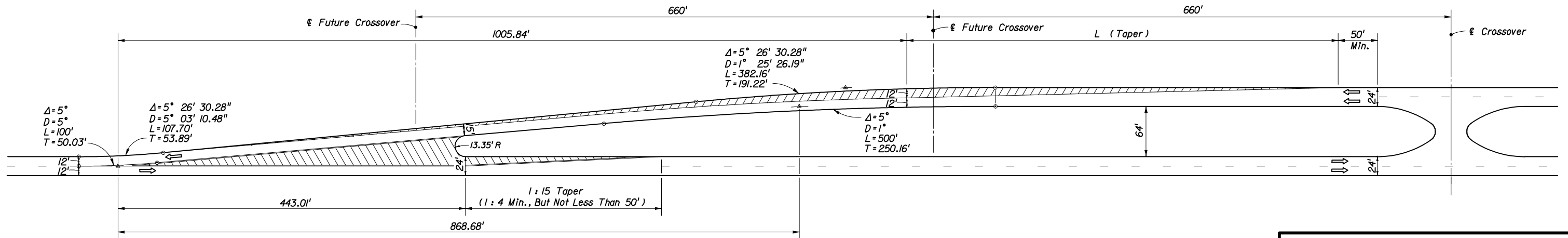




22' MEDIAN



40' MEDIAN

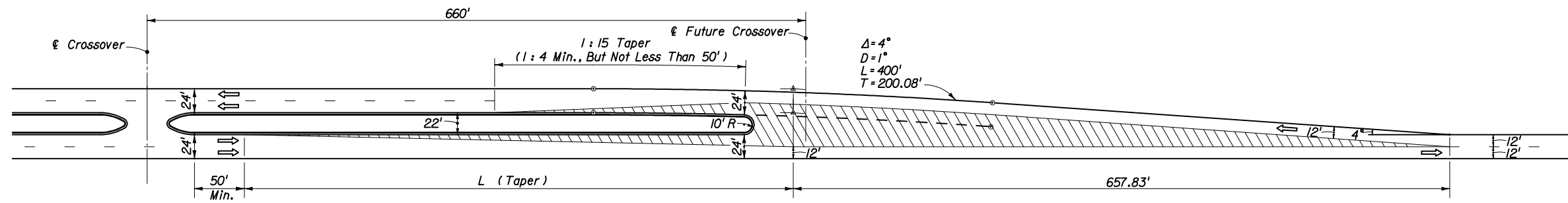


64' MEDIAN

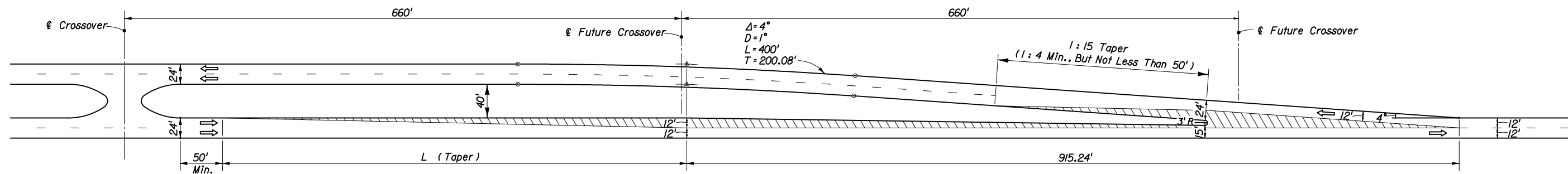
$L = WS$  for speeds = 45 mph  
 $L = \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 W = Width of lateral transition in feet.  
 S = Design speed.

**RIGHT ROADWAY CENTERED ON APPROACH ROADWAY**  
**TWO LANE TO FOUR LANE TRANSITION**

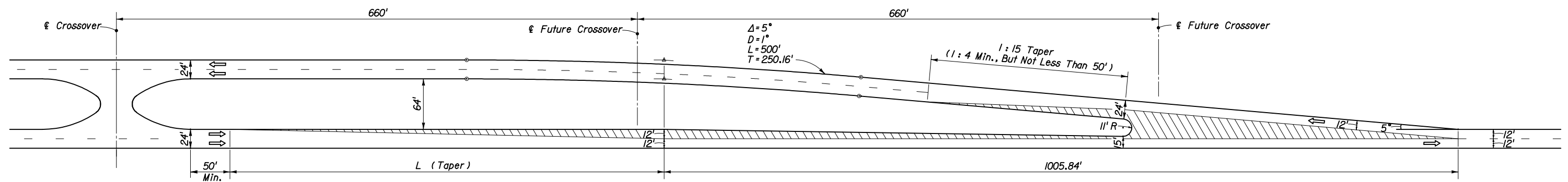
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>ROADWAY TRANSITIONS</b>				
Names	Dates	Approved By		
Designed By	KNM	9/89	 State Roadway Design Engineer	
Drawn By	HKH	2/94		
Checked By	JVG	2/94		
Revision	00	Sheet No.	7 of 8	Index No.
				526



22' MEDIAN



40' MEDIAN




64' MEDIAN

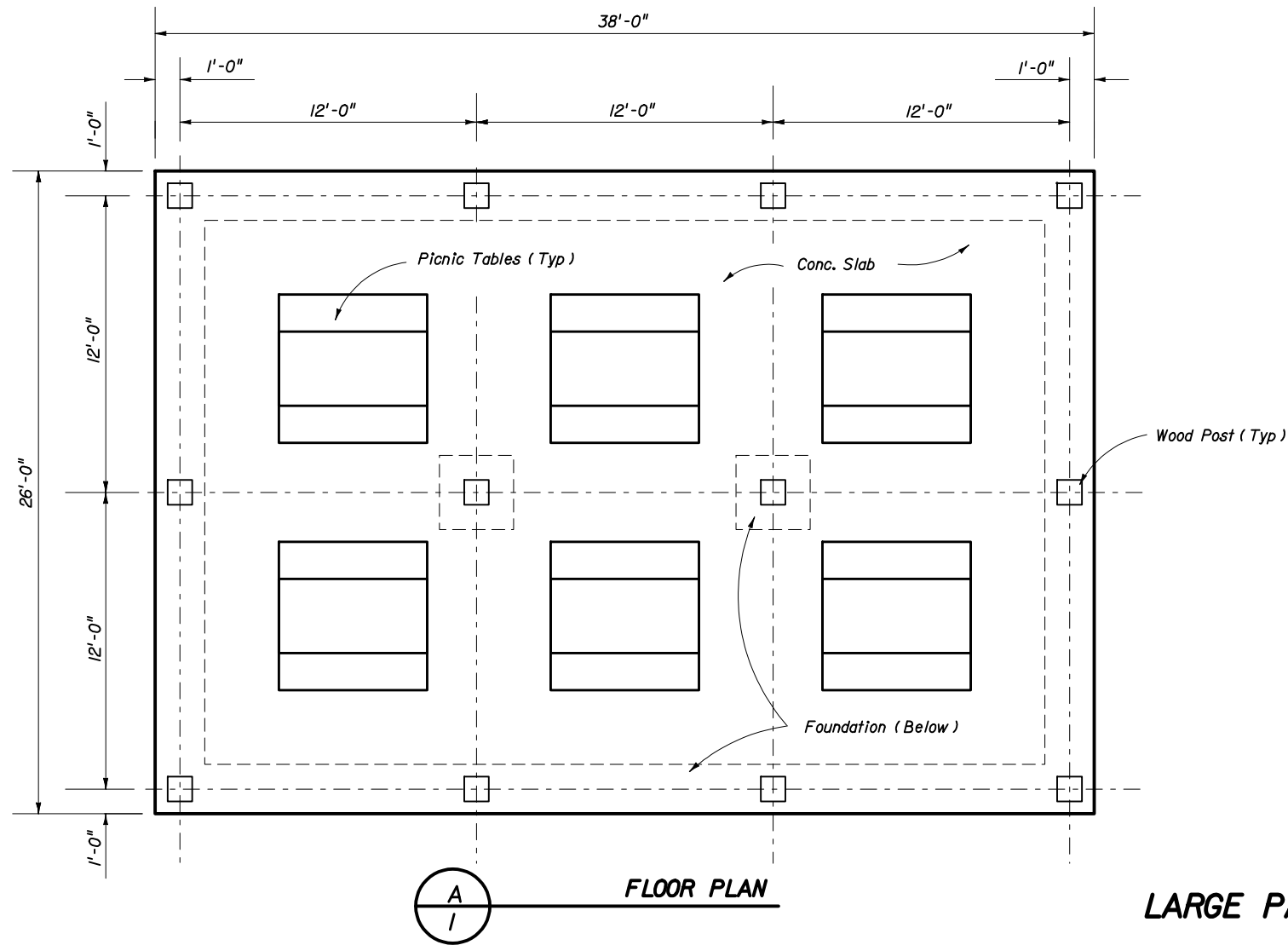
$L = WS$  for speeds = 45 mph  
 $L = \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 W = Width of lateral transition in feet.  
 S = Design speed.

**RIGHT ROADWAY CENTERED ON THRU ROADWAY**  
**FOUR LANE TO TWO LANE TRANSITION**

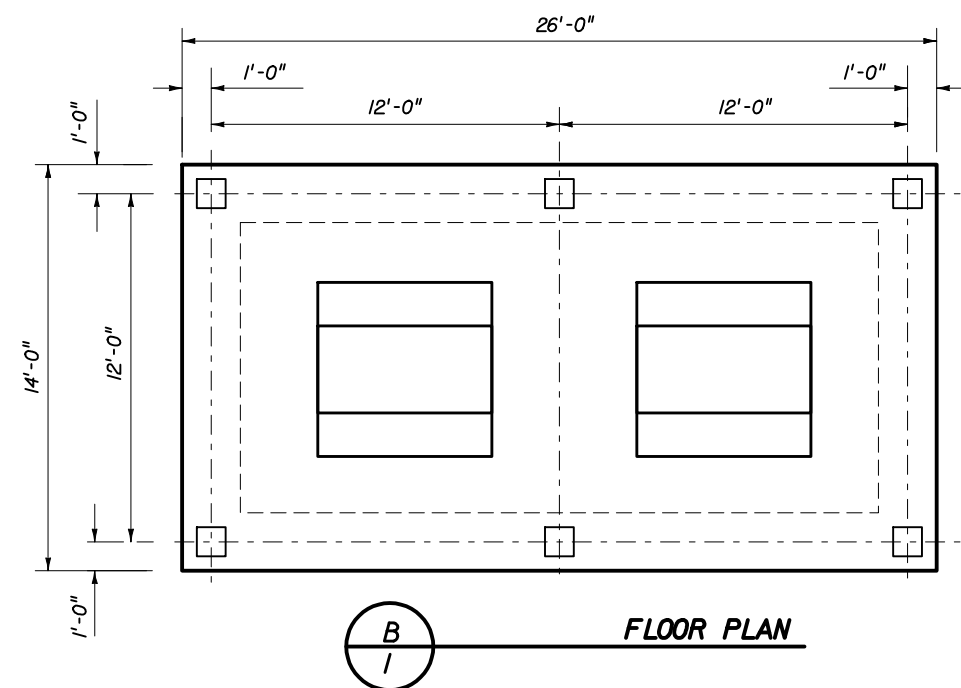
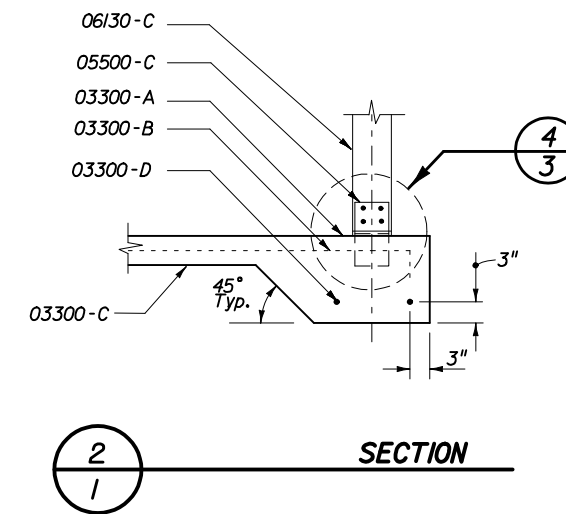
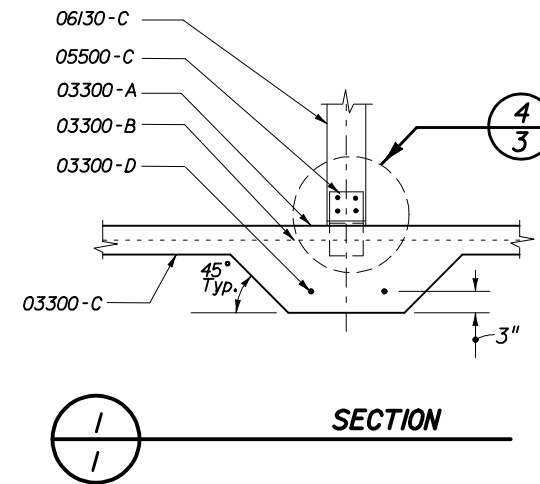
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**ROADWAY TRANSITIONS**

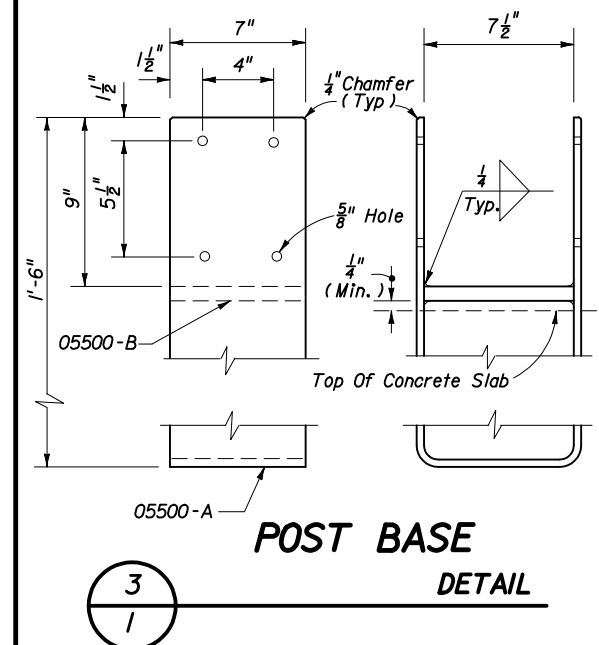
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Designed By	KNM	9/89	 State Roadway Design Engineer		
Drawn By	HKH	2/94			
Checked By	JVG	2/94			
Revision	00		Sheet No.	8 of 8	Index No.
					526



**LARGE PAVILION**



**SMALL PAVILION**



**NOTES**

Keynotes On Sheet 2.

**FLOOR**

6" Reinf. Concrete Slab w/WWF6 x 6-WI.4 x WI.4  
 1'-6" x 1'-6" Drop Footing At Slab Perimeter & Interior Posts.  
 Harden & Broom Finish Slab Surface.

**STRUCTURE**

Posts: 8 x 8 PT  
 Beams: 4 x 6 PT  
 Framing: 4x PT As Described.  
 Misc Members: 1x and 2x As Described.

**ROOF**

3" x 6" T&G Wood Decking.  
 30# Asphalt Impregnated Fiberglass Felt Underlayment.  
 Standing Seam Metal Roof (24 GA Steel Or .032 Alum.) w/ Kynar 500 Finish.  
 Structure, Decking And Roofing Shall Be Designed To Withstand 130 mph Wind Load.

**BUILDING CODE**

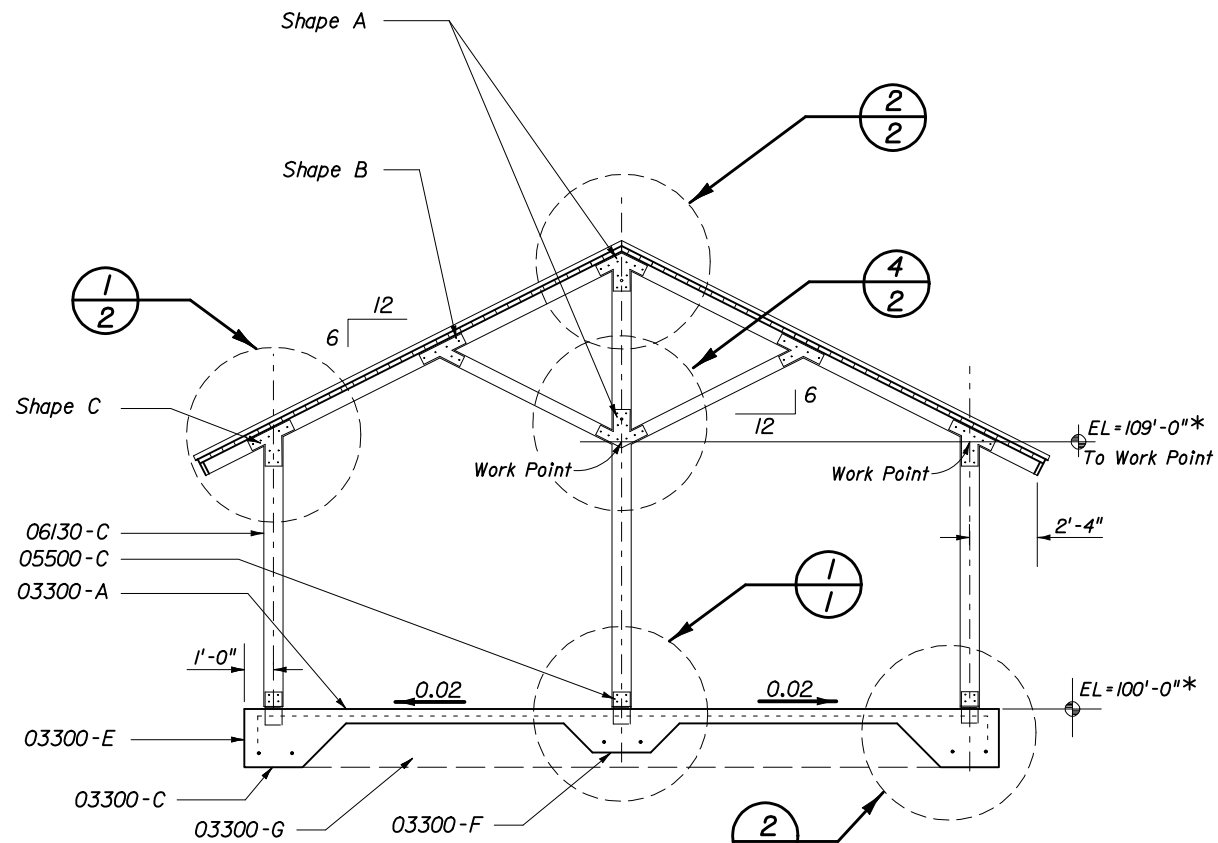
Picnic Pavilions Shall Be Constructed According To The Requirements Of The Appropriate Sections Of Applicable "Standard Building Code" or "South Florida Building Code", Current, Adopted Edition.

**PICNIC PAVILIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

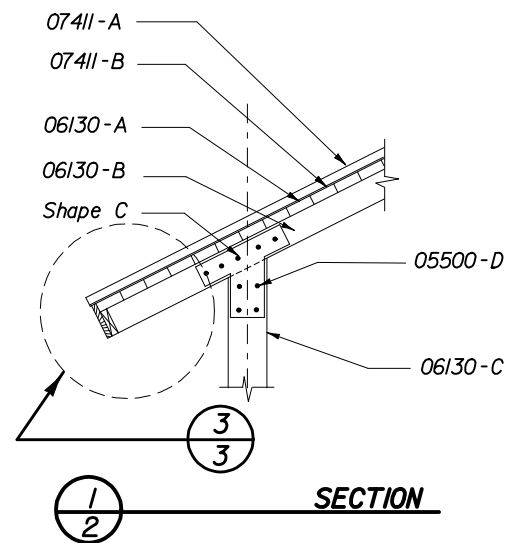
**REST AREA EQUIPMENT**

Names	Dates	Approved By		
Designed By	HDP 6/93	 State Roadway Design Engineer		
Drawn By	HDP 6/95			
Checked By	ABK 9/95			
Revision	00	Sheet No.	Index No.	
		1 of 3	530	

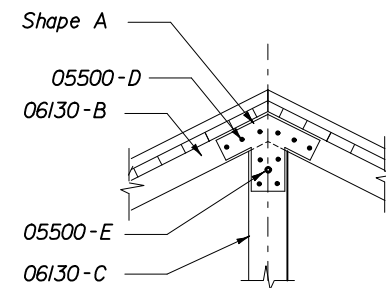


\* REFERENCE ELEVATION ONLY

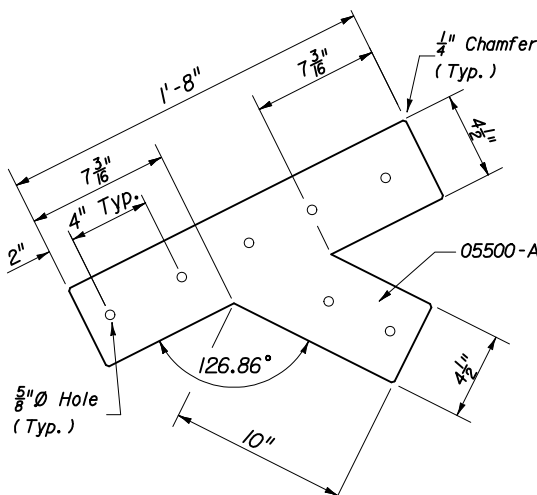
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2



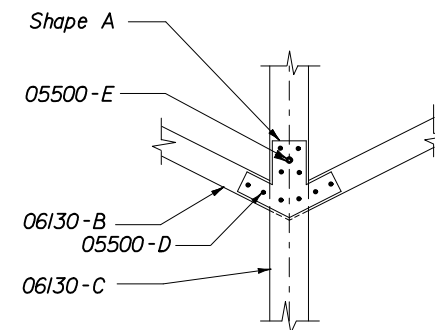
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2



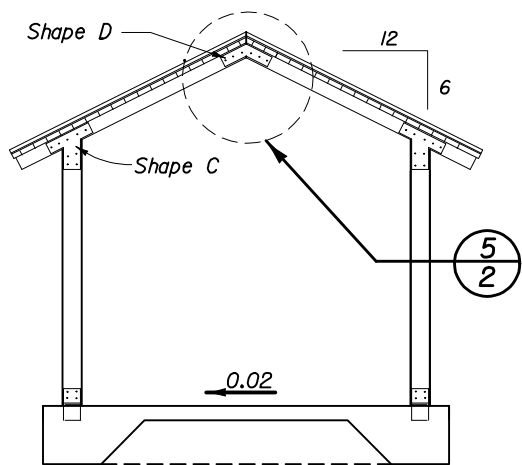
**SECTION**  
2  
2



**SHAPE B**  
DETAIL  
3  
2

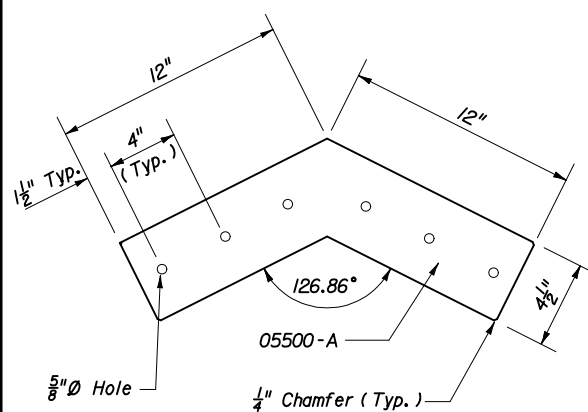


**SECTION**  
4  
2

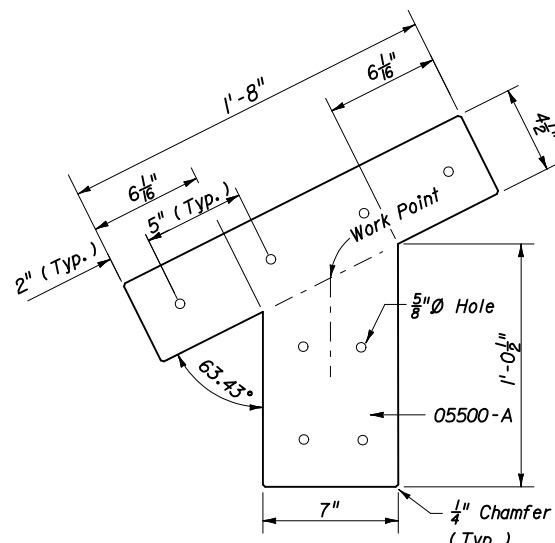


NOTE: DETAILS TO MATCH THOSE OF LARGE PICNIC PAVILION

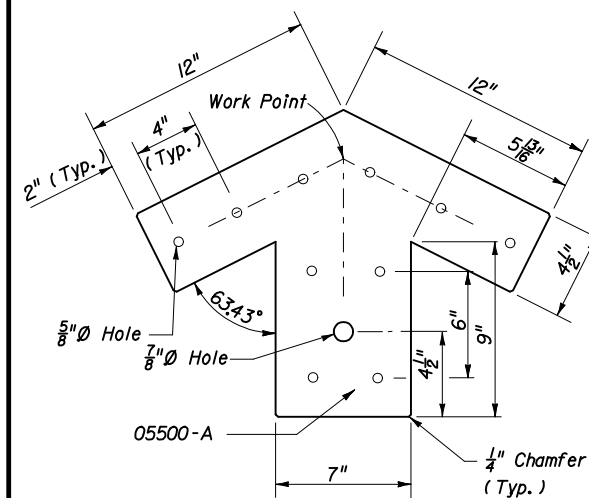
**SECTION**  
B  
2



**SHAPE D**  
DETAIL  
5  
2



**SHAPE C**  
DETAIL  
6  
2



**SHAPE A**  
DETAIL  
7  
2

**KEYNOTES**

- 03300-A Class II Conc Slab
- 03300-B 6" x 6" - W1.4 x W1.4 @ 12" Of Slab
- 03300-C 6 Mil Vapor Barrier
- 03300-D #5 Rebar Cont. (2 Required)
- 03300-E 24" x 24" Drop Footing
- 03300-F 18" x 18" Drop Footing
- 03300-G 6" Min Comp Sand Fill
- 03300-H #5 x 18" Rebar (4 Required)

- 05500-A 3/8" Galv. Steel Plate
- 05500-B 1/2" Galv. Steel Plate
- 05500-C Post Base
- 05500-D 1/2" Dia Bolt, Washer & Nut (Typ)
- 05500-E 3/4" Dia Eyebolt, Washer & Nut For Cross Brace Bars
- 05500-F 1/2" Dia Steel Rod w/Turnbuckle

- 06130-A 3" x 6" T&G Wood Decking
- 06130-B 4" x 6" PT Wood Frame
- 06130-C 8" x 8" PT Wood Post
- 06130-D 2" x 6" PT Wood Fascia
- 06130-E 1" x 10" PT Wood Fascia
- 06130-F 3/4" ± Wood Shim

- 07411-A Standing Seam Metal Roof
- 07411-B Felt Underlayment

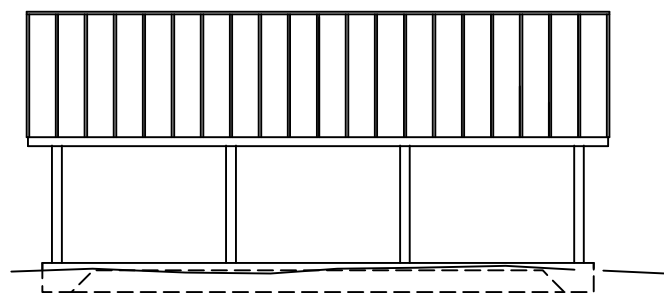
Alternate Material Note:  
These structures are shown with timber frames and decking. Alternate materials (ie. aluminum, steel, etc.) may be used when submittals are signed and sealed by a specialty engineer as per Section 5.1 of the Standard Specifications and when approved by the Engineer.

**PICNIC PAVILIONS**

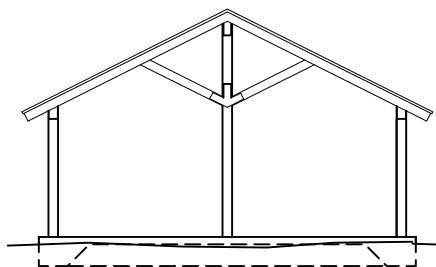
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**REST AREA EQUIPMENT**

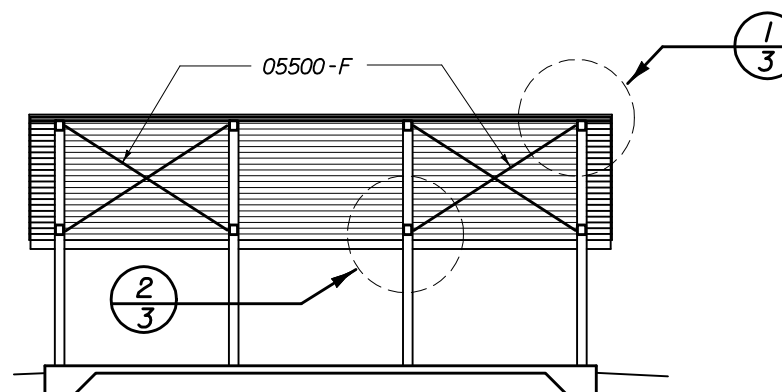
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Designed By	HDP	6/93	 State Roadway Design Engineer		
Drawn By	HDP	9/95			
Checked By	ABK	9/95			
Revision		Sheet No.		Index No.	
00		2 of 3		530	



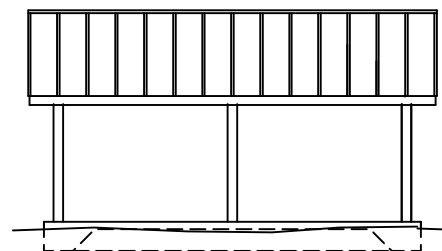
**A**  
3 SIDE ELEVATION



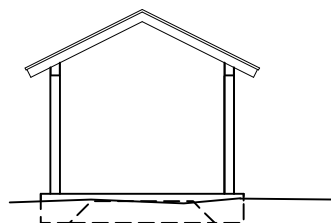
**B**  
3 END ELEVATION



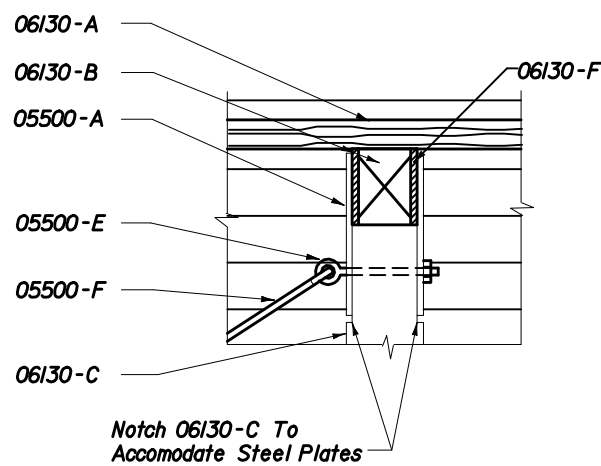
**C**  
3 SECTION



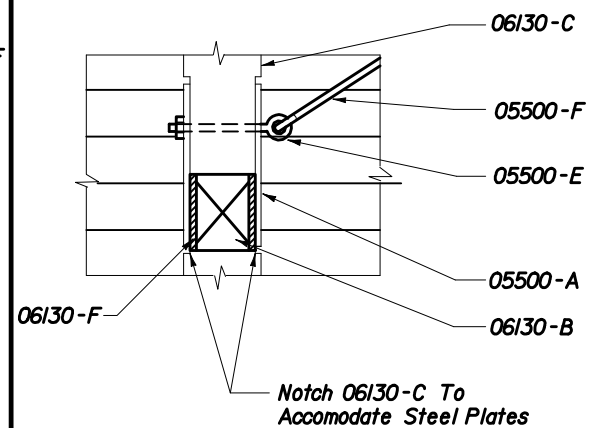
**D**  
3 SIDE ELEVATION



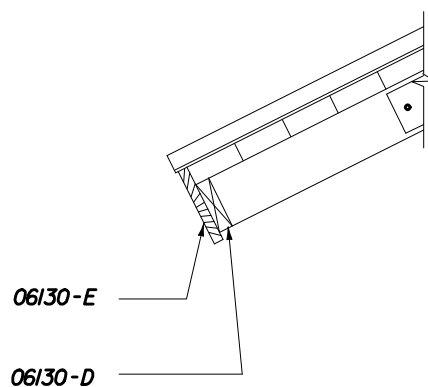
**E**  
3 END ELEVATION



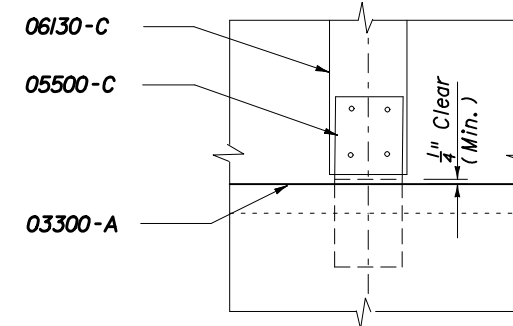
**1**  
3 DETAIL



**2**  
3 DETAIL



**3**  
3 DETAIL  
Similar At Roof Rake



**4**  
3 DETAIL

**SPECIFICATIONS**

Keynotes On Sheet 2.

**CONCRETE**

Concrete: FDOT Class II.  
Reinforcing Bars: ASTM A615/A615M, Grade 400.  
Welded Wire Fabric: ASTM A-185.  
Vapor Barrier: Black 6-Mil Polyethylene.

**STEEL**

Galvanized Steel Plate: Steel Plate ASTM A446 With G90 Zinc Coating.  
Galvanized Fasteners: High-Strength Bolts And Nuts, ASTM A325 With G90 Zinc Coating.  
Galvanize Shapes After Fabrication, Make Field Repairs To Galvanizing With High Zinc Dust Content Paint, Complying With SSPC-Paint-20.

**WOOD**

Comply With American Institute For Timber Construction AITC 108, "Standard For Heavy Timber Construction."  
For Solid Wood Decking, Comply With AITC 112, Standard For Tongue And Groove Heavy Timber Standard."  
Species: Douglas Fir, Hem-fir, Or Southern Pine, At Fabricator's Option.  
Preservative Treatment: Pressure Treat Fabricated Members With Waterborne Solution For Above Ground Use, Complying With AWPA C2.  
Wood Decking: Predrill Decking At 30" Centers For Lateral Spiking To Adjacent Units. Spikes To Be 20d Galvanized Common.


**PICNIC TABLES**

Picnic Tables And Benches Shall Be 6' x 6' w/Heavy Galvanized Pipe Frames And Recycled Plastic Wood Seats And Table Tops. All Tables Shall Be Of Walk Thru Design Suitable For Exterior Locations. Tables At Accessible Pavilions Shall Meet The Requirements Of The Americans With Disabilities Act (ADA) Accessibility Guidelines.

**PICNIC PAVILIONS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**REST AREA EQUIPMENT**

Names	Dates	Approved By		
Designed By	HDP 6/95	 State Roadway Design Engineer		
Drawn By	HDP 9/95			
Checked By	ABK 9/95			
		Revision	Sheet No.	Index No.
		00	3 of 3	530

## 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 1 as prescribed by the Domestic Mail Manual of the U. S. Postal Service (DMM).

Mailbox production standards, lists of approved manufacturers and suppliers of mailboxes, 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 roadside face of the box offset from the edge of the traveled way a minimum distance of the greater of the following:

- (a) Shoulder width plus 8" to 12".
- (b) 10' for ADT over 10,000 vpd.
- 8' for ADT 100 to 10,000 vpd.
- 6' for ADT under 100 vpd.
- 2'-6" for low speed and ADT under 100 vpd.

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. If the sidewalk abuts the curb or if an unusual condition exists which makes it difficult or impractical to install or serve boxes at the curb, the Contractor with concurrence of the local postal authority may be permitted to install all mailboxes at the back edge of the sidewalk, where they can be served by the carrier from the sidewalk.

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 surface mount 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.

Steel support posts shall have an external finish equal to or better than two coats of weather resistant, air dried or baked, paint or enamel. Surfaces(s) shall be cleaned of all loose scale prior to finishing. The Postal Service prefers that posts be painted white, but other colors may be used when approved by the Engineer. When galvanized posts are used painting is not required.

Mounting brackets, plates, platforms, shelves and accessory hardware surface finishes are to be suited to support post finish.

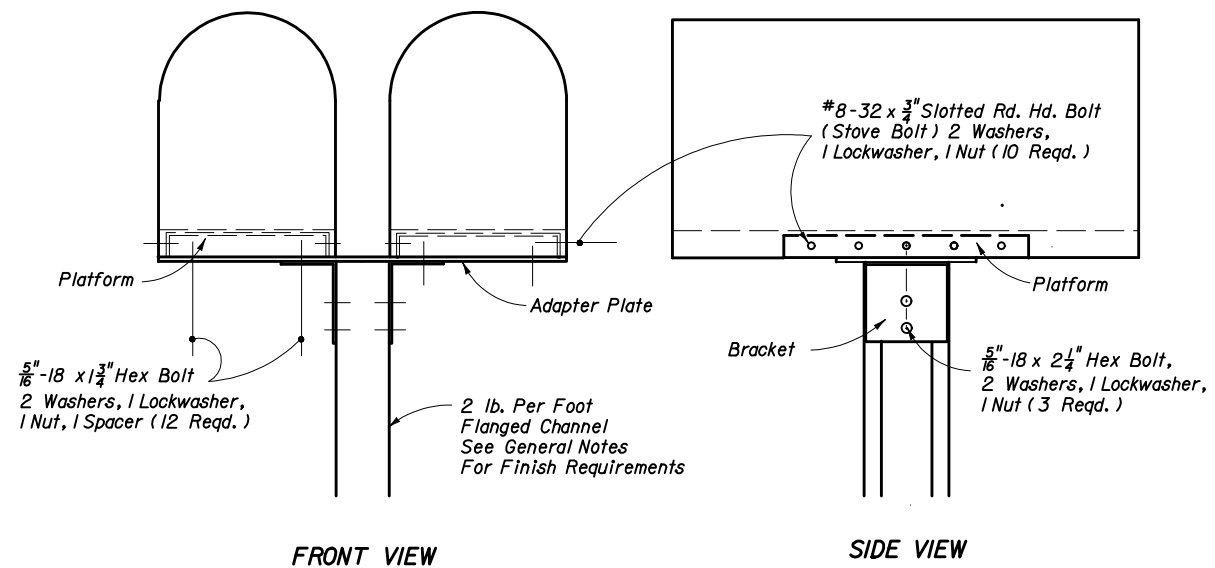
12. Mailboxes shall be paid for under the contract unit price for Mailboxes, Each. Payment shall be full compensation for boxes, posts and accessory items essential for installation in accordance with this standard; erection; adjustments to suit construction needs; and, for identification letters and 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.

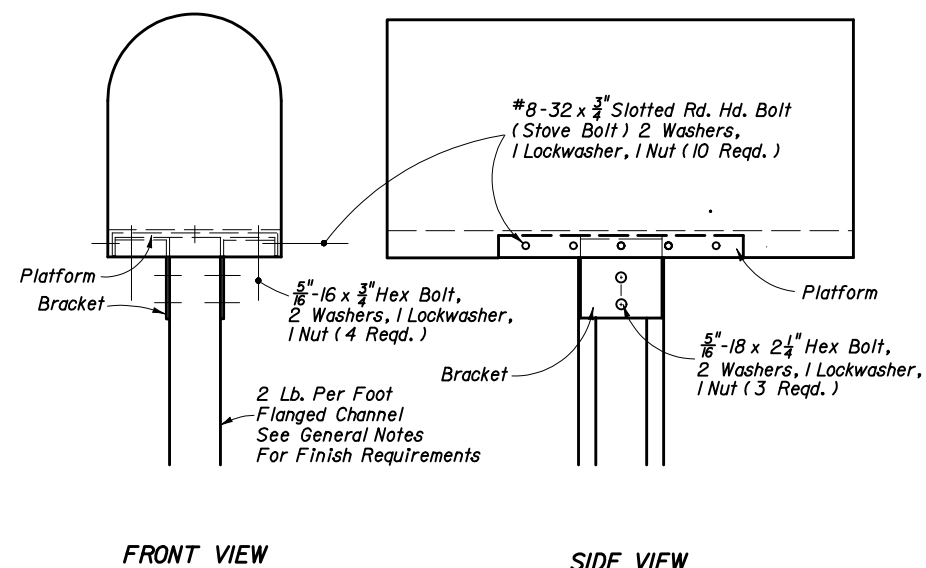
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
MAILBOXES					
	Names	Dates	Approved By		
Designed By			<i>Ben Blum</i> State Roadway Design Engineer		
Drawn By	HSD		Revision	Sheet No.	Index No.
Checked By	JVG/JBN		00	1 of 3	532



FRONT VIEW

SIDE VIEW

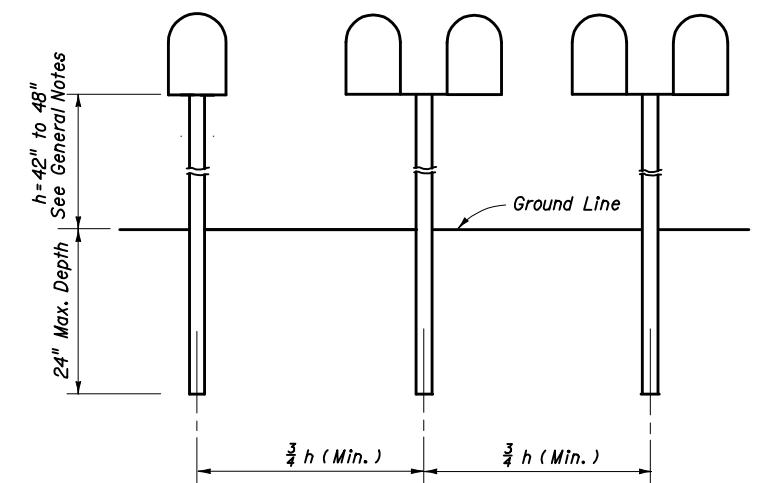
FLANGED CHANNEL



FRONT VIEW

SIDE VIEW

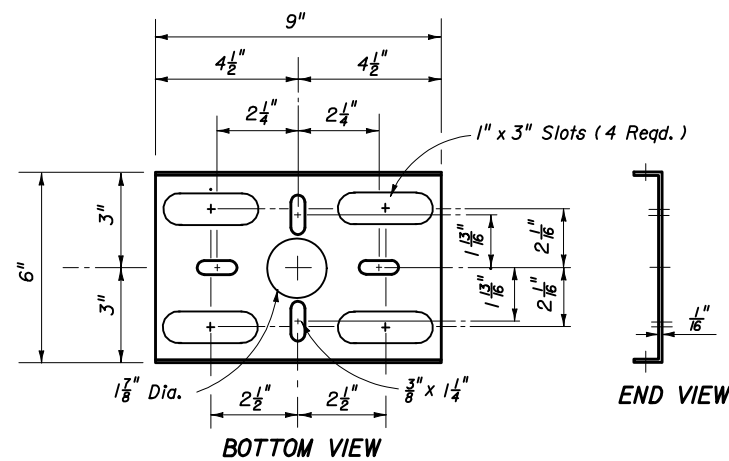
FLANGED CHANNEL



ELEVATION

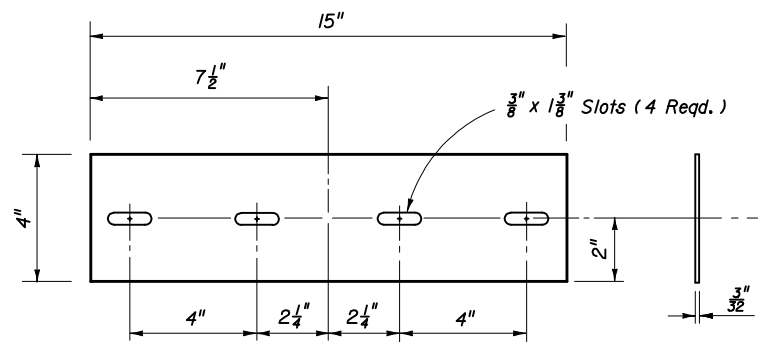
SINGLE OR COMBINED WOOD, FLANGED CHANNEL OR PIPE POST TYPES SHOWN ON THIS INDEX

POST SPACING



BOTTOM VIEW

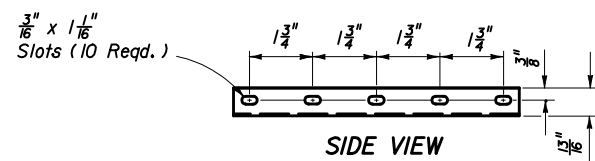
END VIEW



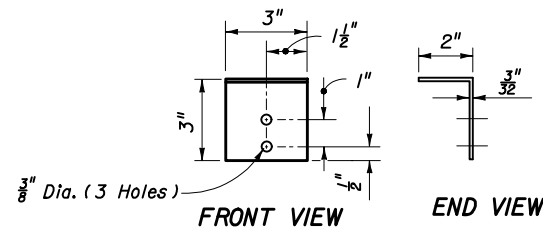
TOP VIEW

END VIEW

STEEL ADAPTER PLATE



STEEL PLATFORM

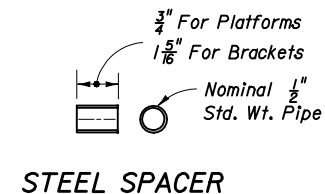


FRONT VIEW

END VIEW

TOP VIEW

STEEL BRACKET

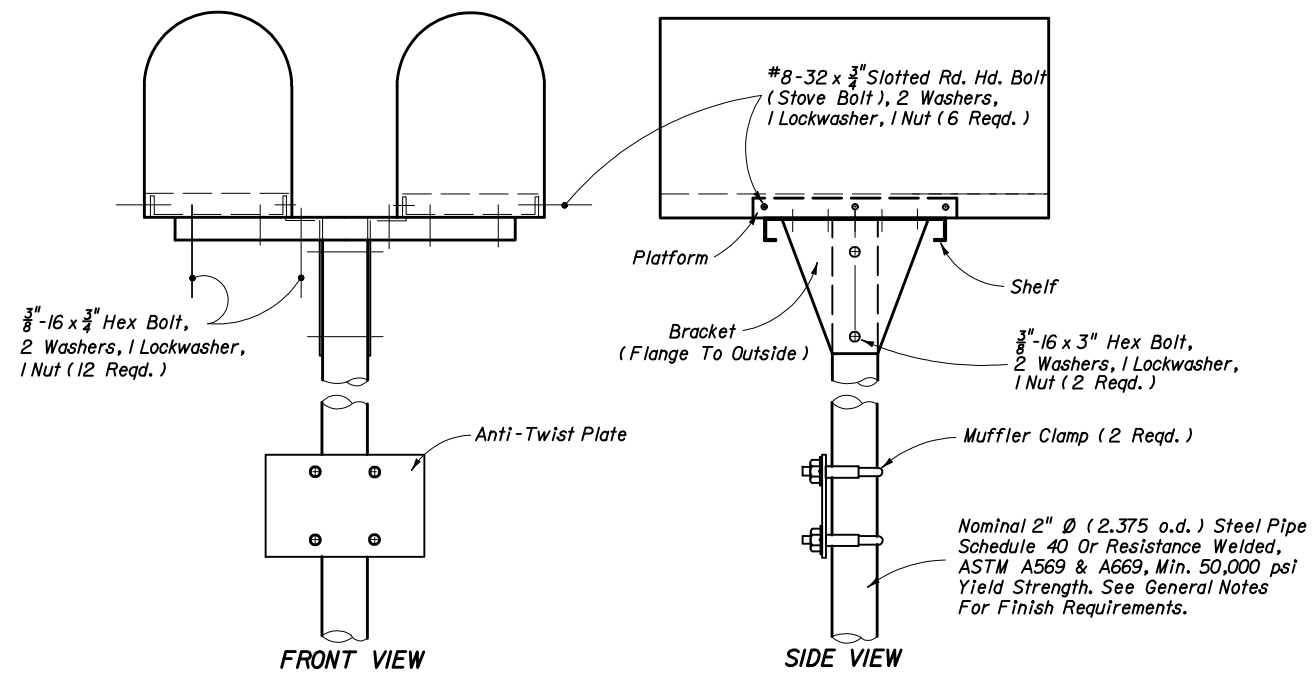


STEEL SPACER

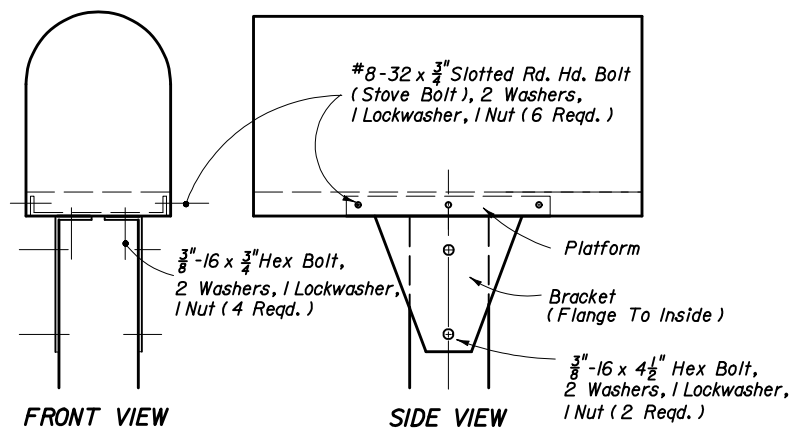
Note: See General Notes for finish requirements.

STEEL FLANGED CHANNEL SUPPORT POSTS

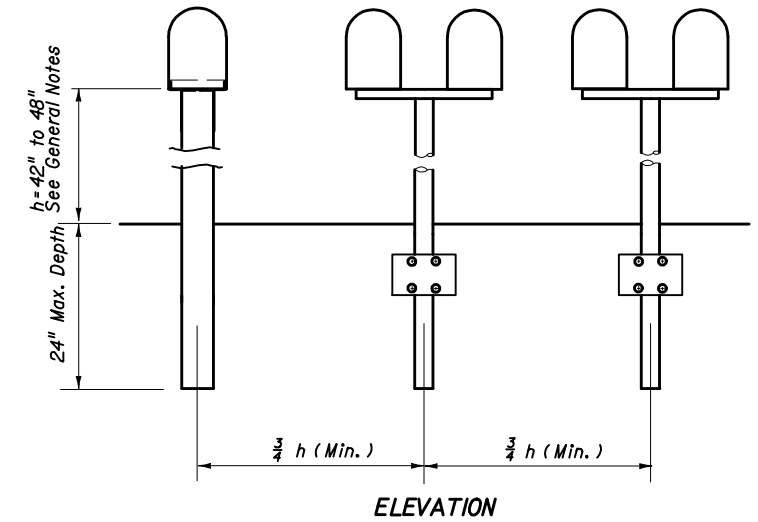
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MAILBOXES</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HSD	7/87	<i>Brian Blankenship</i> State Roadway Design Engineer	
Checked By	JVG/JBW	7/87	Revision	Sheet No.
			00	2 of 3
				532



**2" Ø PIPE POST**

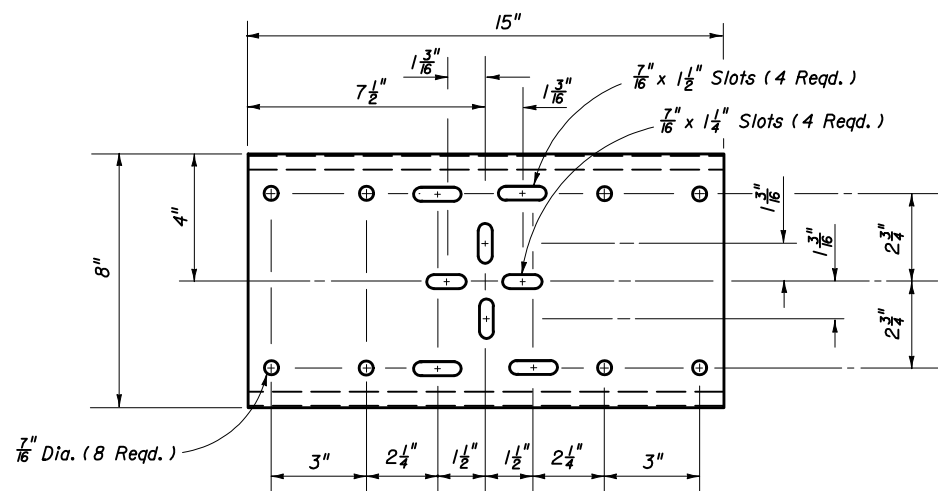


**4" X 4" WOOD POST**

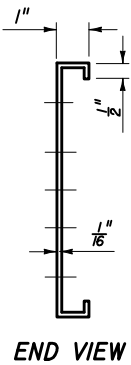


**ELEVATION**

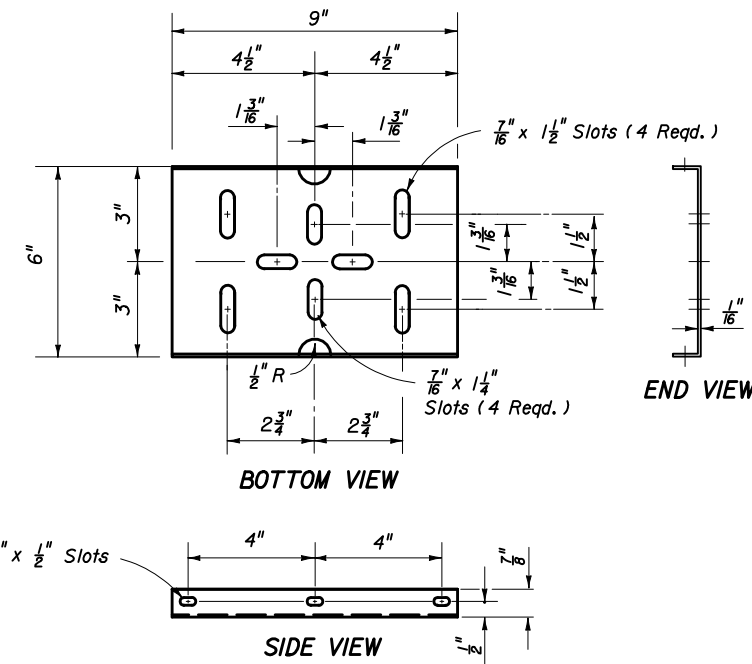
SINGLE OR COMBINED WOOD, FLANGED CHANNEL OR PIPE POST TYPES SHOWN ON THIS INDEX  
**POST SPACING**



**TOP VIEW  
STEEL SHELF**



**END VIEW**



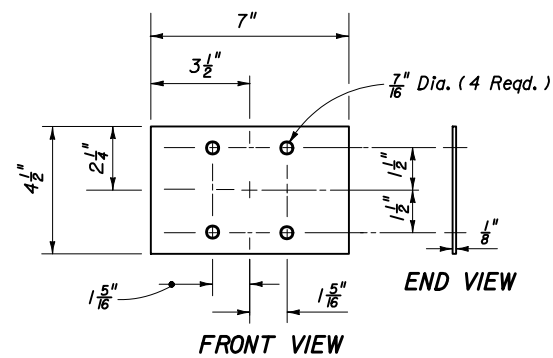
**BOTTOM VIEW**

**SIDE VIEW**

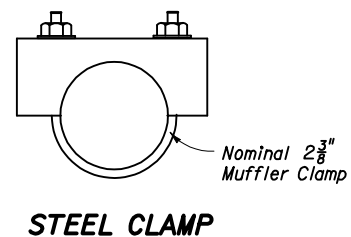
**STEEL PLATFORM**

**END VIEW**

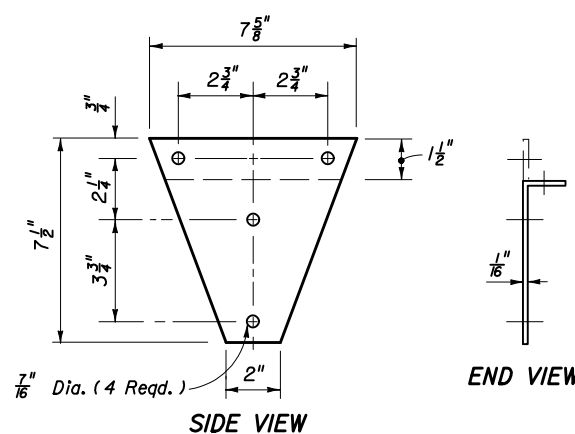
Note: See General Notes for finish requirements



**STEEL ANTI-TWIST PLATE**



**STEEL CLAMP**



**SIDE VIEW**

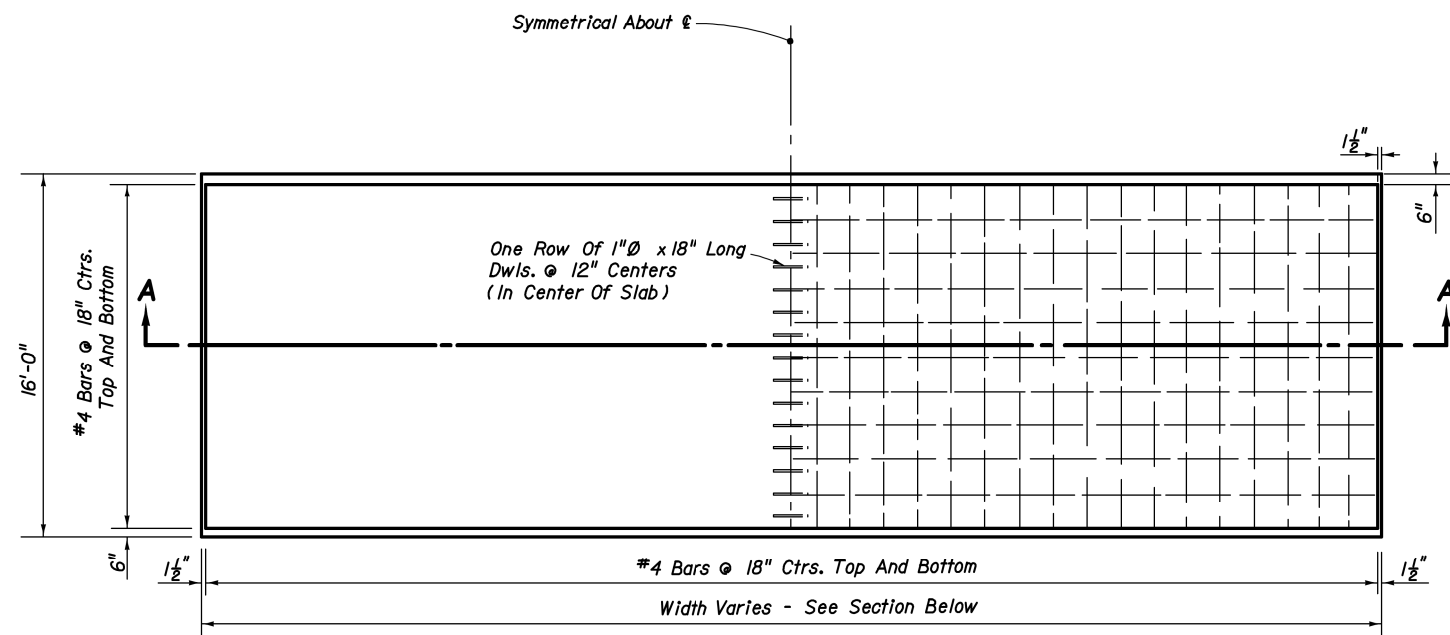
**END VIEW**

**STEEL BRACKET**

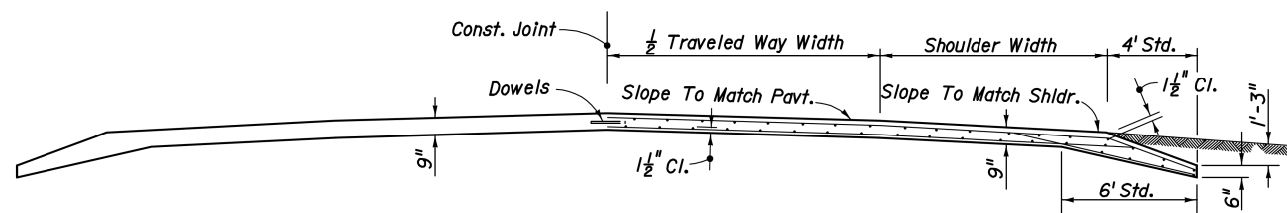
**STEEL PIPE AND WOOD SUPPORT POSTS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MAILBOXES</b>				
Designed By	Names	Dates	Approved By	
Drawn By	HSD	7/87	<i>Ben Blankenship</i> State Roadway Design Engineer	
Checked By	JVG/JBN	7/87	Revision	00
			Sheet No.	3 of 3
			Index No.	532





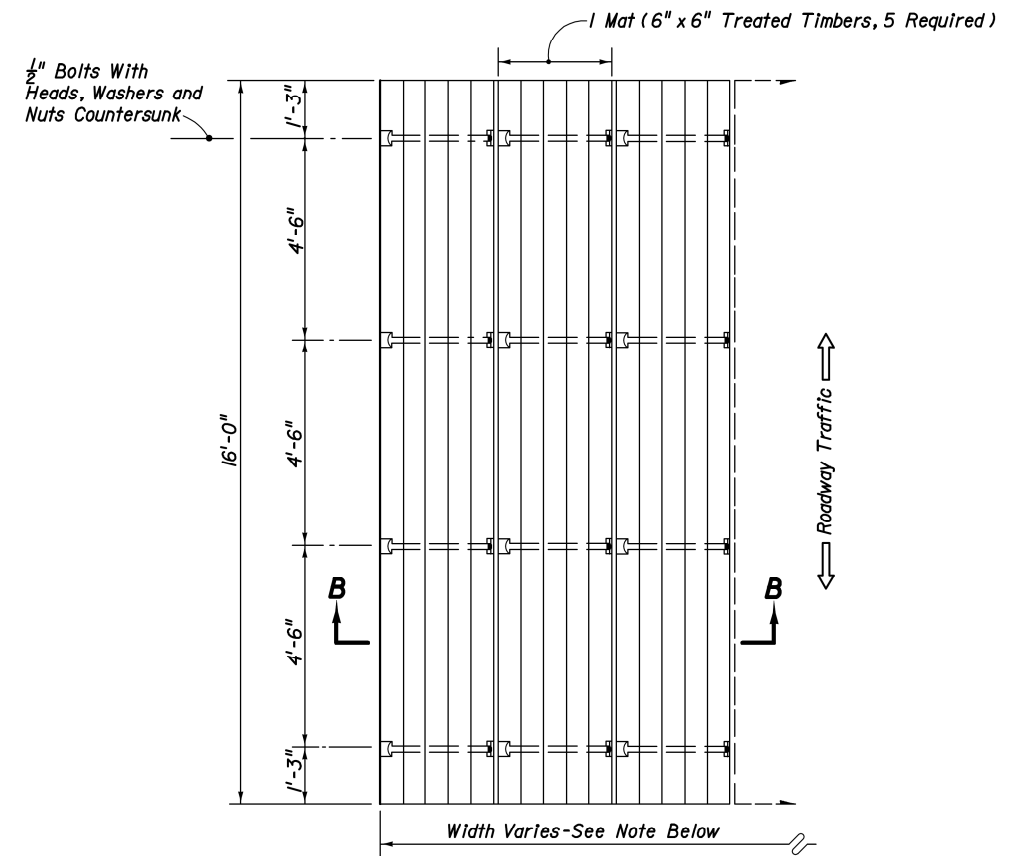
PLAN



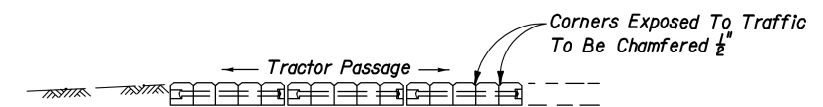
SECTION AA

Note: Class I concrete is to be used unless otherwise noted in plans or special provisions.

**REINFORCED CONCRETE  
TYPE A**



PLAN



SECTION BB

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 tractor crossing will extend a minimum of four feet (4') beyond roadway shoulders.

**TREATED TIMBER  
TYPE B**


**GENERAL NOTES**

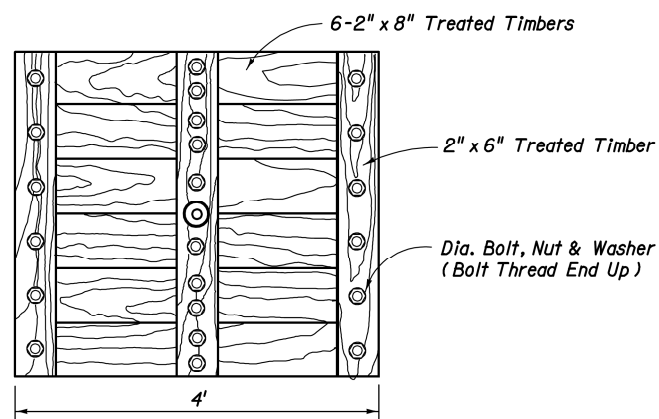
1. Tractor crossing shall be paid for under the contract unit price for Tractor Crossing, EA.

**TRACTOR CROSSINGS**

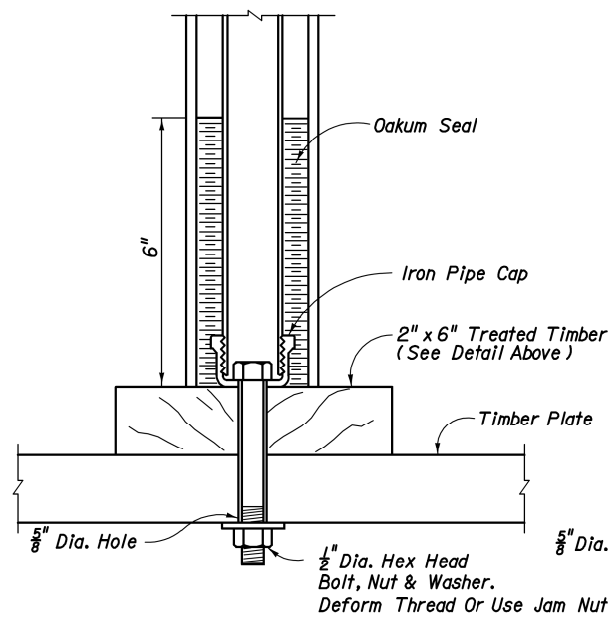
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**TRACTOR CROSSINGS**

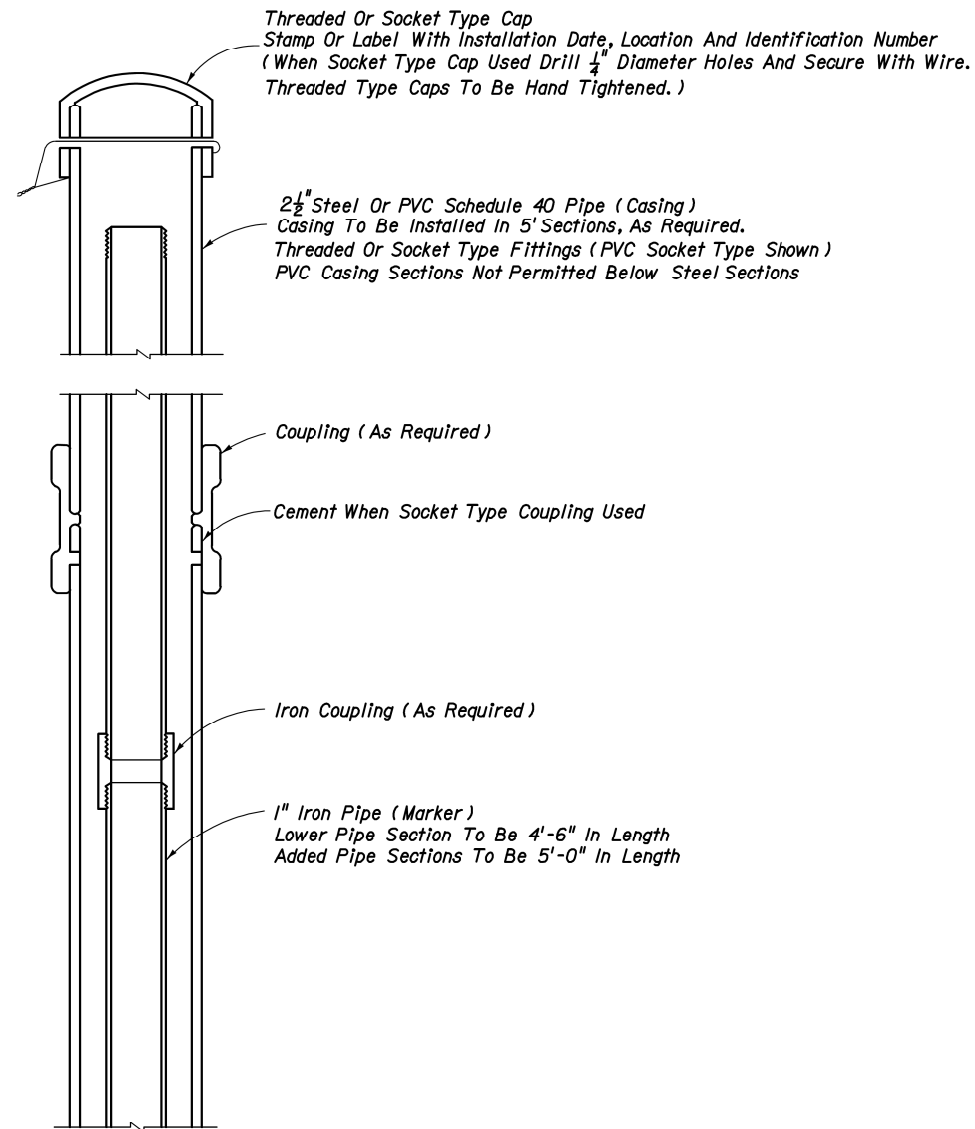
Names	Dates	Approved By		
Designed By		 State Roadway Design Engineer		
Drawn By	LH 01/61			
Checked By	CDD 01/61	00	1 of 1	535



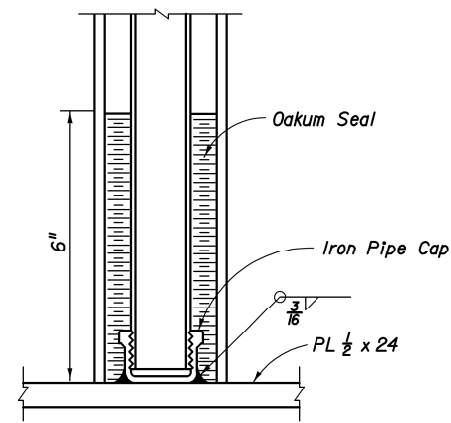
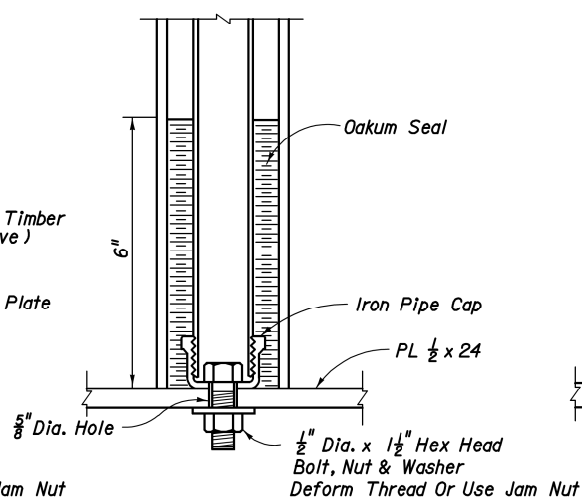
**PLAN  
TIMBER PLATE**



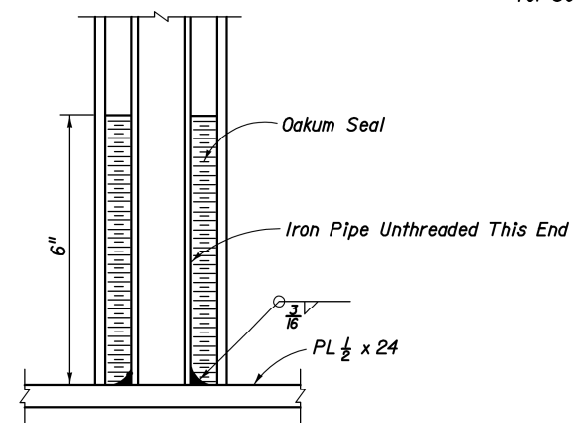
**TIMBER PLATE**



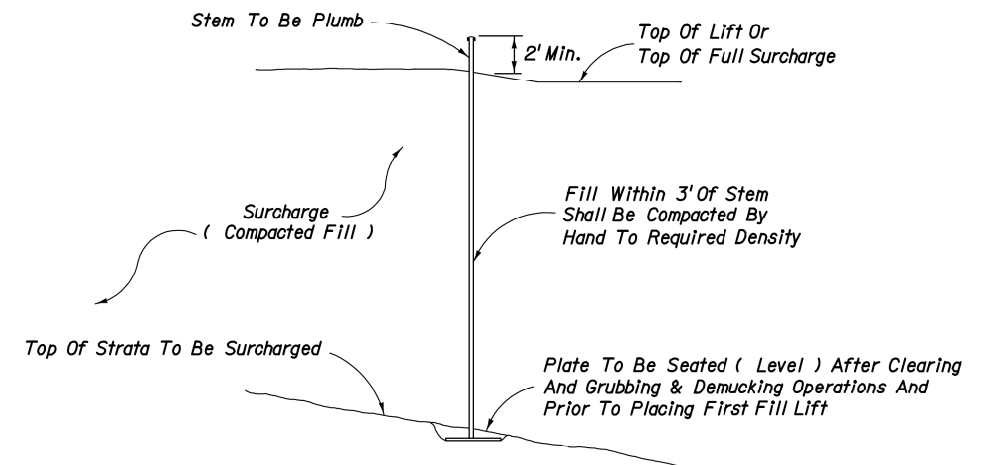
**STEM AND PLATE OPTIONS**



**STEEL PLATE**



**STEEL PLATE**



**INSTALLATION**

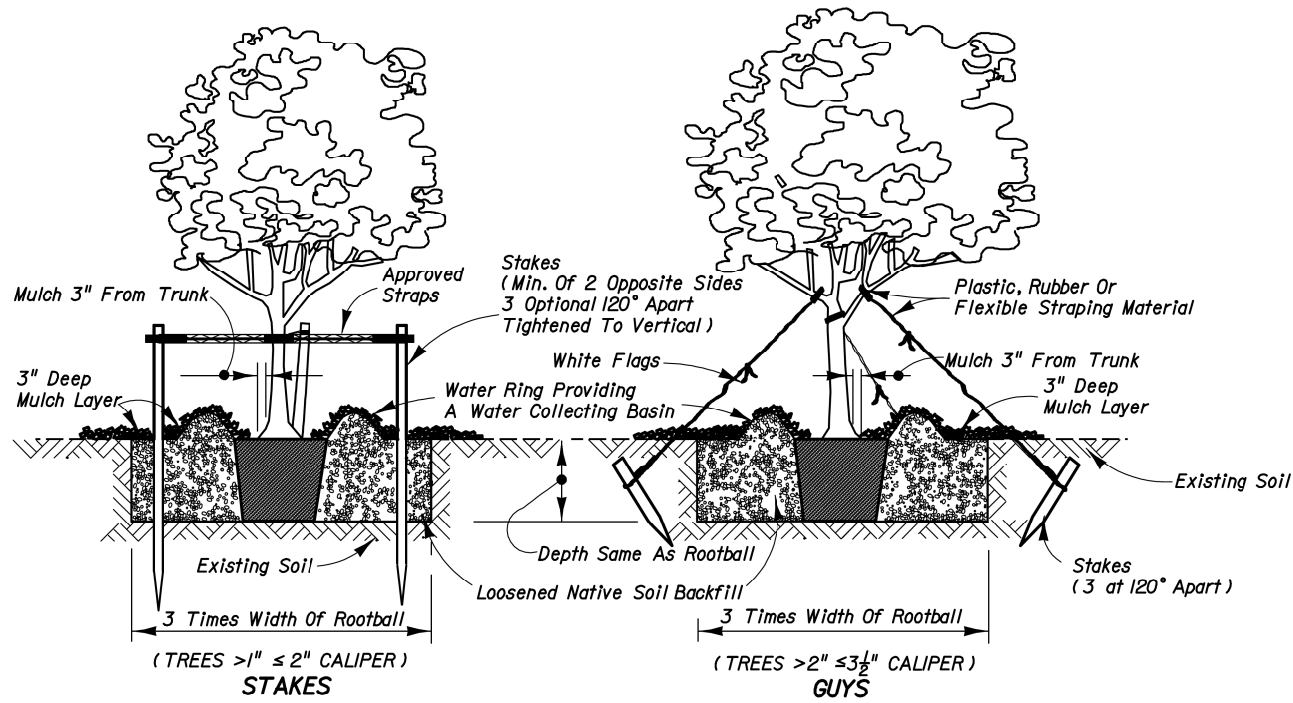
**NOTES**

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).
4. The settlement plates shall be paid for under the contract unit price for Settlement Plate Assembly, AS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

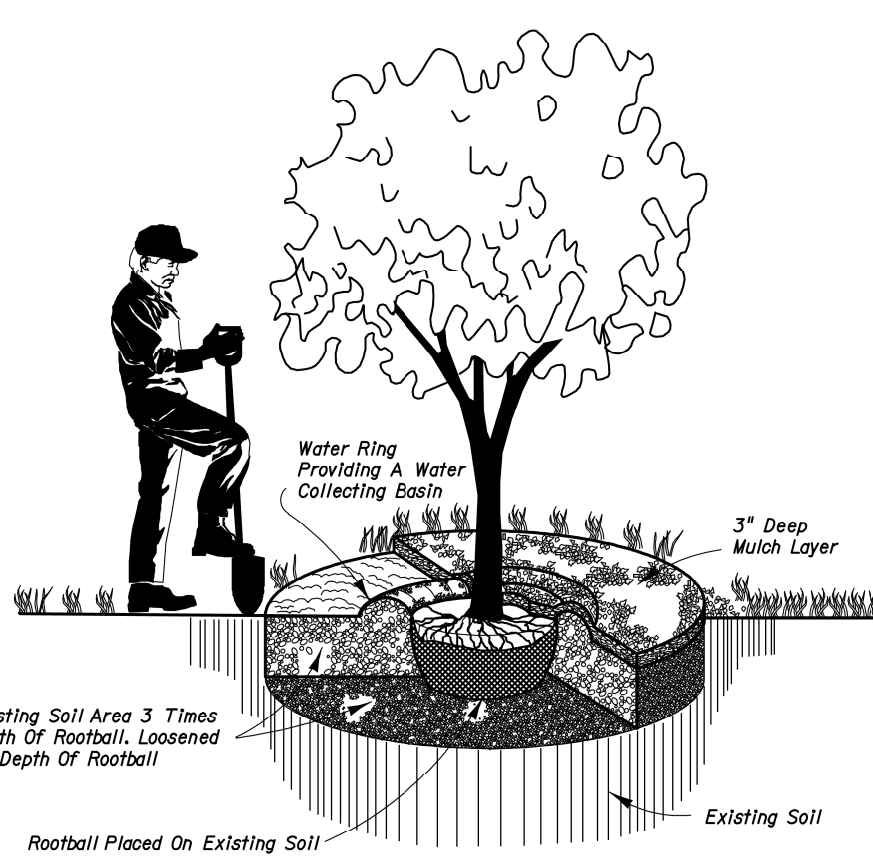
**SETTLEMENT PLATE**

Names	Dates	Approved By		
Designed By	JVG 10/79	<i>Brian Blankenship</i> State Roadway Design Engineer		
Drawn By	HSD 10/79			
Checked By	JBW 10/79	Revision	Sheet No.	Index No.
		00	1 of 1	540

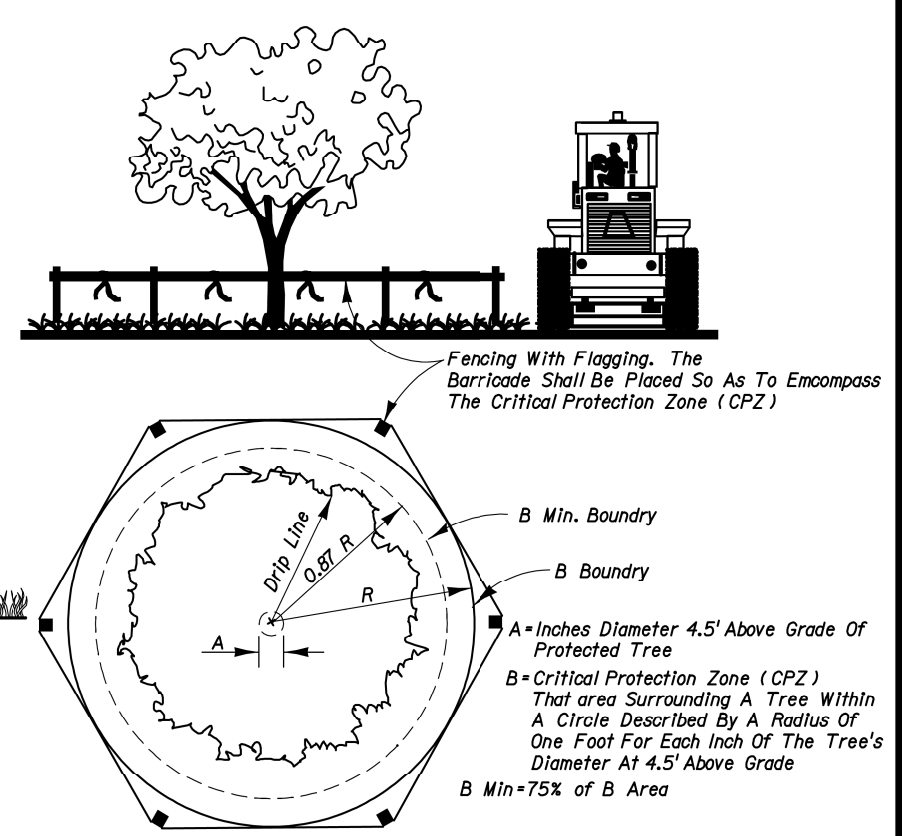


Trees planted on slopes are to be set relative to grade as shown in SHRUB PLANTING-WITH SLOPES

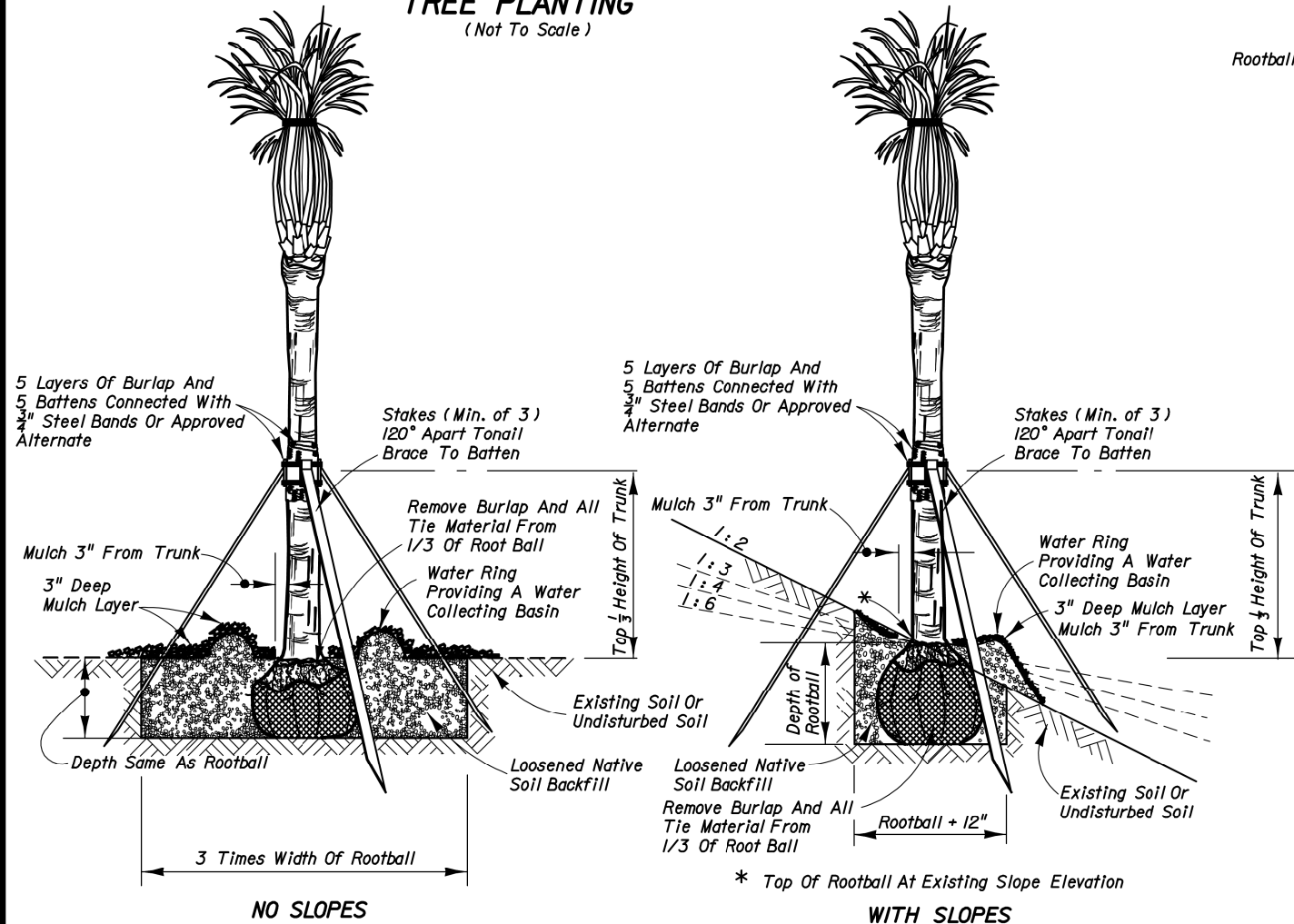
**CONTAINER GROWN PLANTS  
TREE PLANTING**  
(Not To Scale)



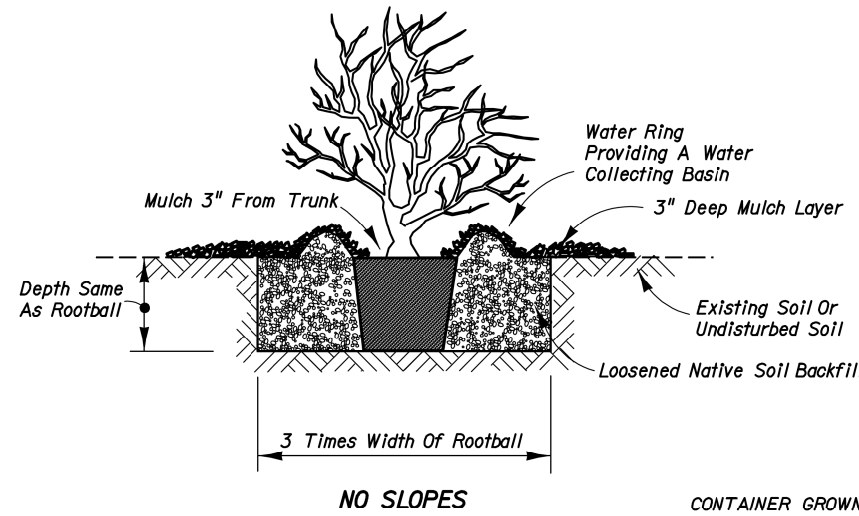
**BASIC GOOD TREE PLANTING**



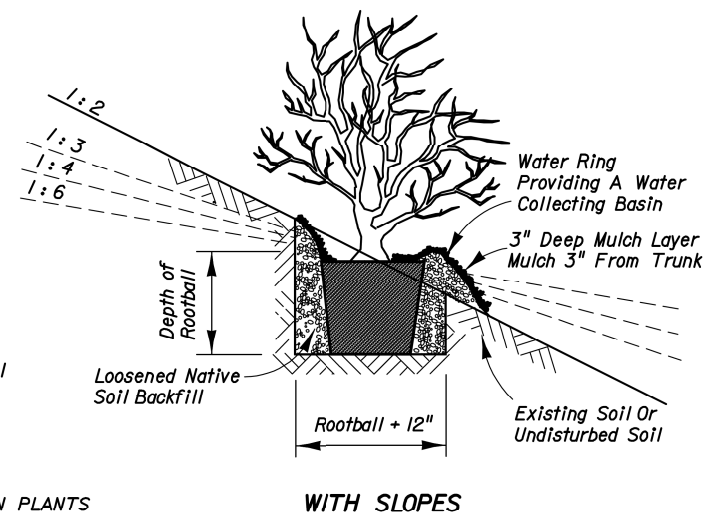
**TREE BARRICADE**



**PALM PLANTING**  
(Not To Scale)



**CONTAINER GROWN PLANTS  
SHRUB PLANTING**  
(Not To Scale)



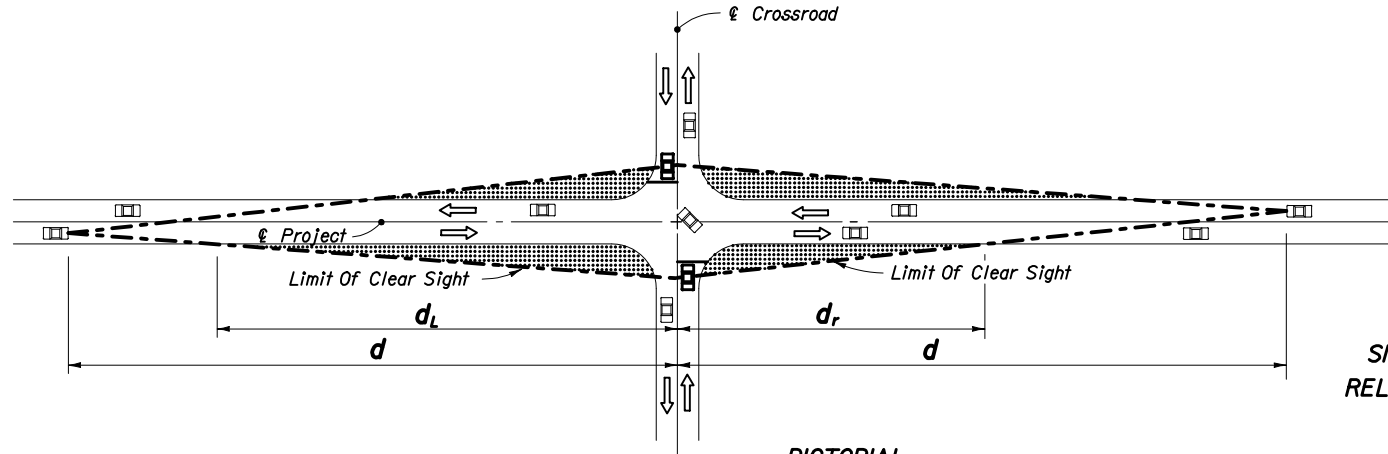
**NOTES:**

1. All trees and shrubs are to be positioned vertically regardless of the slope of the ground in which they are planted. Water rings are to be constructed which will most effectively serve the purpose of retaining water at the base of the plant.
2. Tree, palm and shrub planting shall be carried out in accordance with Section 580 of the Standard Specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**LANDSCAPE INSTALLATION**

Names	Dates	Approved By
Designed By: GLH/JHC	01/00	
Drawn By: HSD	01/00	
Checked By: GLH/JHC	01/00	
Revision: 00	Sheet No. 1 of 1	

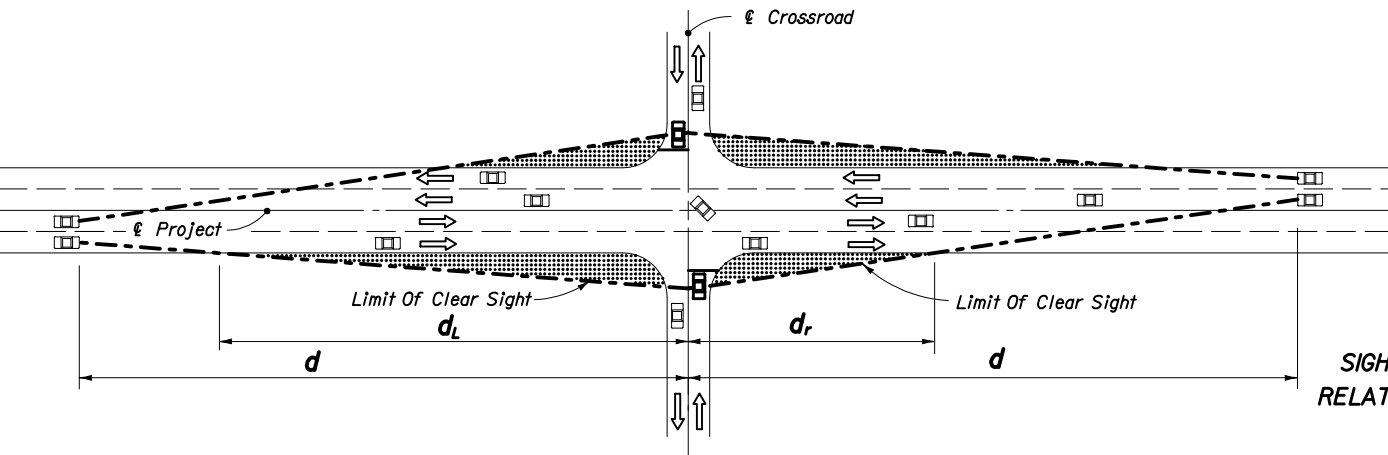


PICTORIAL  
2 LANE UNDIVIDED

Design Speed	d	d <sub>L</sub>	d <sub>r</sub>
30	380	290	200
35	470	370	250
40	580	450	310
45	710	550	380
50	840	650	450
55	990	760	520
60	1150	890	610
65	1350	1040	710

See General Note 2

SIGHT DISTANCE (d) AND  
RELATED DISTANCES (d<sub>L</sub>, d<sub>r</sub>)  
(FEET)

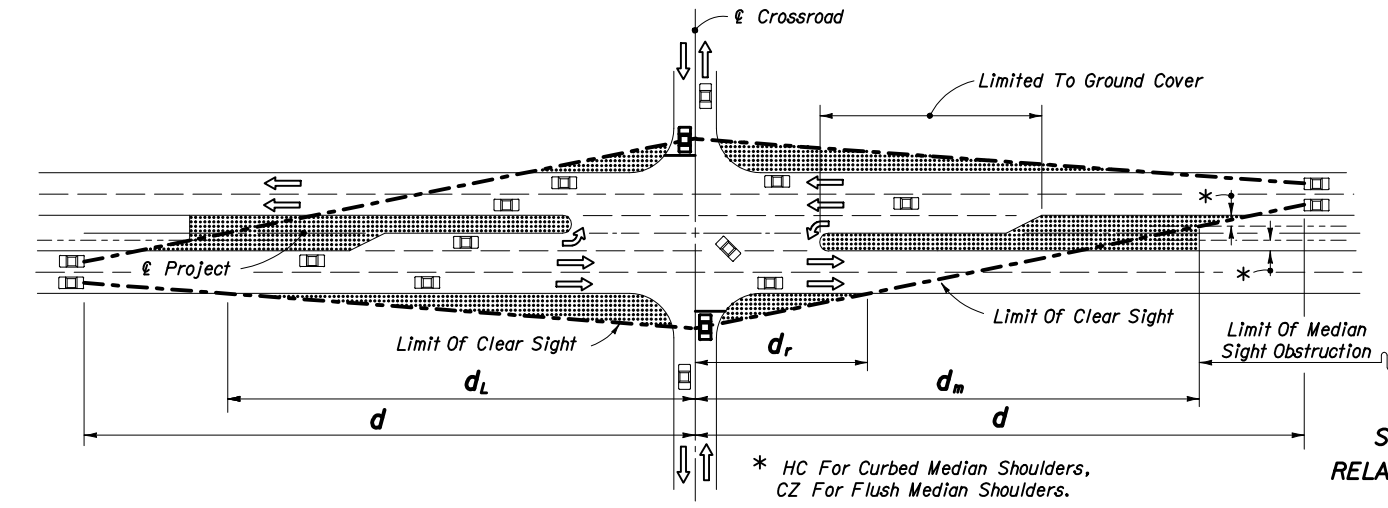


PICTORIAL  
MULTILANE UNDIVIDED

Design Speed	d	d <sub>L</sub>	d <sub>r</sub>
30	380	290	160
35	470	370	190
40	580	450	240
45	710	550	290
50	840	650	340
55	990	760	400
60	1150	890	460
65	1350	1040	540

See General Note 2

SIGHT DISTANCE (d) AND  
RELATED DISTANCES (d<sub>L</sub>, d<sub>r</sub>)  
(FEET)



PICTORIAL  
MULTILANE DIVIDED

Design Speed	d	d <sub>L</sub>	d <sub>r</sub>	d <sub>m</sub>
30	380	290	120	300
35	470	370	150	370
40	580	450	180	460
45	710	550	220	560
50	840	650	260	670
55	990	760	300	780
60	1150	890	360	910
65	1350	1040	420	1070

See General Note 2

SIGHT DISTANCE (d) AND  
RELATED DISTANCES (d<sub>L</sub>, d<sub>r</sub>, d<sub>m</sub>)  
(FEET)

\* HC For Curbed Median Shoulders,  
CZ For Flush Median Shoulders.

**LEGEND**  
Areas Free Of Sight Obstructions

NOTE: See Sheet 2 for intersecting roadway origin of clear sight and quadrant corner clips.

**GENERAL NOTES**

- Details apply to both rural and urban intersections under stop sign control or flashing beacon control. For full signal controlled intersections see Design Note No. 4 below.
- Sight distance (d) applies to normal and skewed intersections (intersecting angles between 60° and 120°), and where vertical and/or horizontal curves are present. Sight distance (d) is measured along the major roadway from the center of the intersecting roadway. Distances d<sub>L</sub> and d<sub>r</sub> are measured from the centerline of the intersecting roadway to a point on the edge of the near side outer traffic lane on the major roadway. Distance d<sub>m</sub> is measured from the centerline of the intersecting roadway to a point on the median clear zone limit or horizontal clearance limit for the far side roadway of the major roadway.
- a. The limits of clear sight define a corridor throughout which a clear sight window must be preserved. See WINDOW DETAIL, Sheet 2.  
b. Clear sight must be provided between vehicles at intersection stop locations, and vehicles on the major roadway within dimension 'd'.  
c. Since observations are made in both directions along the line of sight, the reference datum between roadways is 3'-6" above respective pavements.
- Barrier systems within intersection sight corridors, where penetration into the sight window might occur, shall be located to provide the least adverse affect practical.
- The corridor defined by the limits of clear sight is a restricted planting area. Drivers of vehicles on the intersecting roadway and vehicles on the major roadway must be able to see each other clearly throughout the limits of 'd'. If, in the Engineers judgement landscaping interferes with the line of sight corridor prescribed by these standards the Engineer may rearrange, relocate or eliminate plantings. Plantings within the restricted areas are limited to selections as follows:  
Ground Cover & Trunked Plants (Separate or Combined):  
Ground Covers - Plant selection of low growing vegetation which at maturity does not attain a height greater than 18" below the sight line datum.  
For ground cover in combination with trees and palms; the following heights below the sight line datum will apply: 24" for trees and palms ≤ 11" dia.; and, 18" for sabal palms > 11" ≤ 18" dia. (dia. - within Sight Window).  
Trunked Plants - Plant selection of a mature trunk diameter 4" or less measured at 6" above the ground. Canopy or high borne foliage shall never be lower than 5' above the sight line datum. These selections shall be spaced no closer than 20'.  
Trees: Trees can be used with lawn; pavers; pavement; gravel; bark or wood chip beds; ground covers or other Department approved material. The clear sight window must be in conformance with the 'WINDOW DETAIL' modified to attain the height requirements listed in 'Ground Covers' above. Tree size and spacing shall conform to the following tabular values:

Description	Speed (mph)													
	30	35	40	45	50	55	60	(Inches)						
Diameter (Within Limits Of Sight Window)	>4 ≤ 11	>11 ≤ 18	>4 ≤ 11	>11 ≤ 18	>4 ≤ 11	>11 ≤ 18	>4 ≤ 11	>11 ≤ 18	>4 ≤ 11	>11 ≤ 18	>4 ≤ 11	>11 ≤ 18	>4 ≤ 11	>11 ≤ 18
Minimum Spacing (c. to c. Of Trunk)	22	91	27	108	33	126	40	146	45	165	52	173	60	193

Sizes and spacings are based on the following conditions:  
 (a) A single line of trees in the median parallel to but not necessarily colinear with the centerline.  
 (b) A straight approaching mainline, within skew limits as described in No. 2 above.  
 (c) 1. Trees and palms ≤ 11" in diameter casting a vertical 6' wide shadow band on a vehicle entering at stop bar location when viewed by mainline driver beginning at distance 'd'; see SHADOW DIAGRAM, Sheet 2.  
 2. Sabal palms with diameters > 11" to ≤ 18" spaced at intervals providing a 2 second full view of entering vehicle at stop bar location when viewed by mainline driver beginning at distance 'd'; see PERCEPTION DIAGRAM, Sheet 2.  
 For any other conditions the tree sizes, spacings and locations shall be detailed in the plans; see Design Note No. 5.

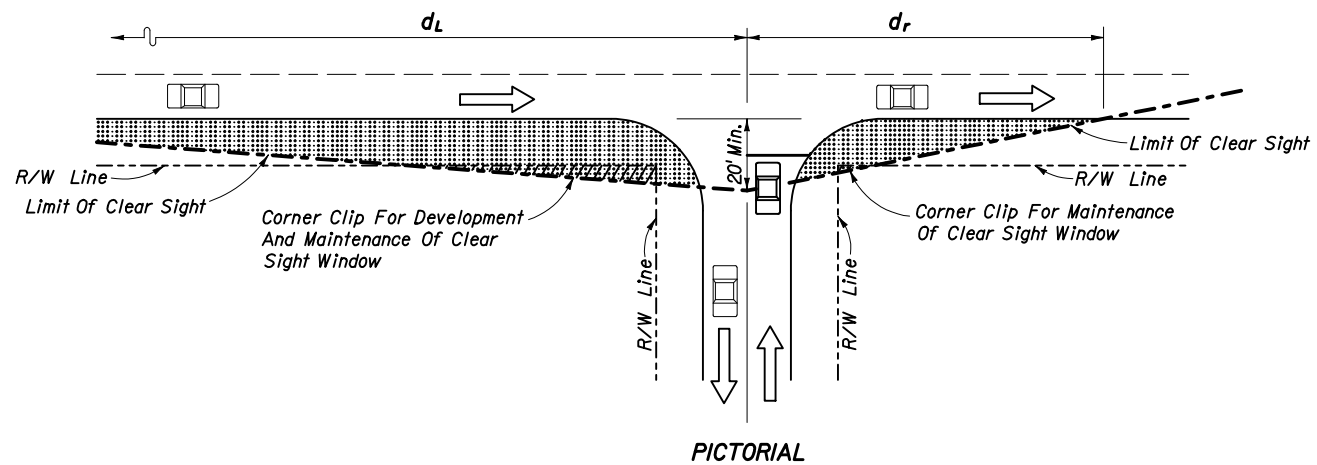
**DESIGN NOTES**

- The information shown on this index is intended solely for the purpose of clear sight development and maintenance at intersecting highways, roads and streets, and is not intended to be used to establish geometric design, speed control, signing, marking, lighting or signalization, or to establish roadway and roadside safety except as related to clear sight corridors. An analysis of sight distance shall be documented for all intersections.
- Details are based on the AASHTO 'A Policy On Geometric Design Of Highways And Streets', Chapter IX, Cases III and IV, and Department practices for channelized median openings (left turns from major roadways).
- The minimum driver eye setback of 20' from the edge of the traffic lane may be adjusted on any intersection leg only when justified by a documented, site specific field study of vehicle stopping position and driver eye position.
- For SIGNALIZED INTERSECTIONS: Due to a variety of standard operational characteristics associated with signal controlled intersections, the sight distances based on Case III procedures should be available to the driver. Unanticipated vehicle conflicts at signalized intersections, such as violation of the signal, turns on red, malfunction of the signal, or use of the flashing red/yellow mode further substantiate the need for incorporation of Case III sight distances. If the proper sight distances can not be attained, other design features such as 'no right-on-red' may be necessary. Where landscaping is incorporated with construction or superimposed on existing facilities, the planting restrictions listed under the General Notes above are to be considered in the sight distance analysis.
- Where curvature, superelevation, adverse split profiles or other conditions preclude the use of standard tree sizes and spacing, proof of view and shadowing restraints must be documented and the size and location of trees in medians detailed in the plans.

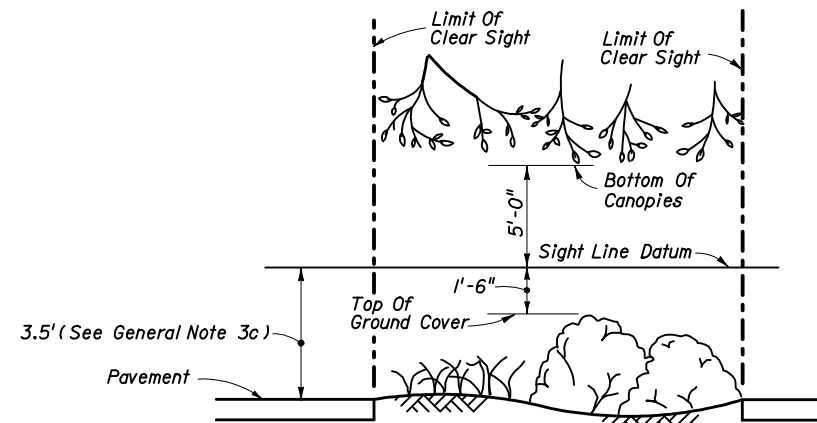
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SIGHT DISTANCE  
AT INTERSECTIONS**

Names	Dates	Approved By		
Designed By	KRM/JVG 10/89	 State Roadway Design Engineer		
Drawn By	HSD 10/89			
Checked By	JVG/KRM 10/89	Revision	Sheet No.	Index No.
		00	1 of 2	546

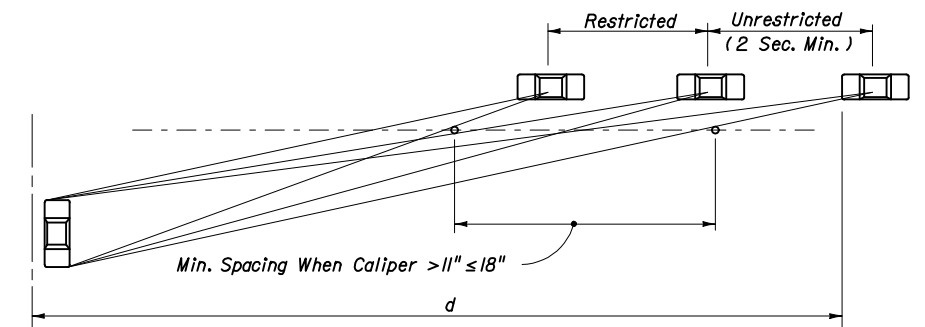


PICTORIAL  
ORIGIN OF CLEAR SIGHT LINE  
AND PROPERTY CORNER CLIPS

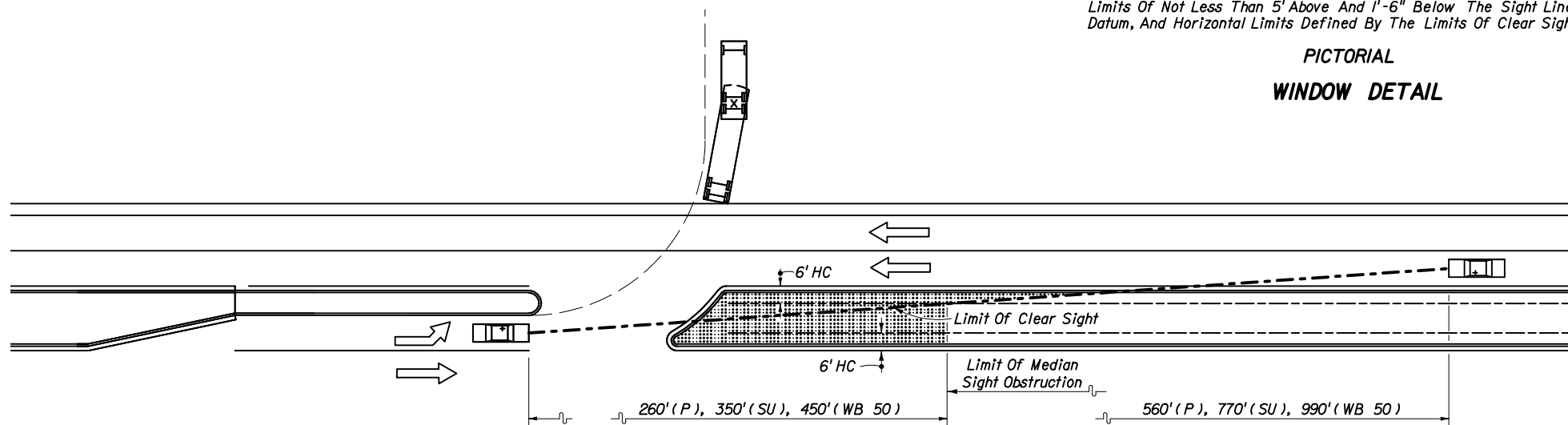


PICTORIAL  
WINDOW DETAIL

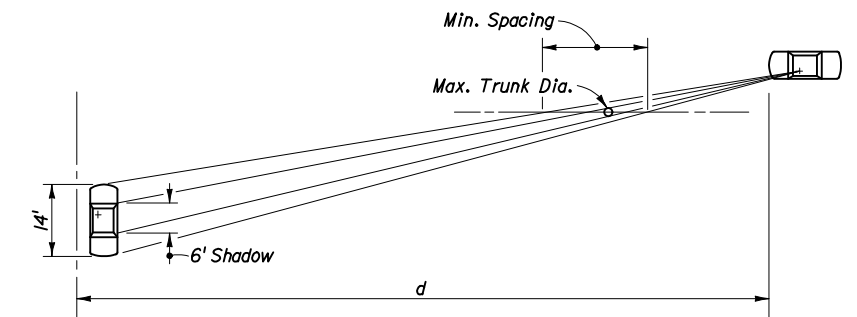
The Intent Of This Standard Is To Provide A Window With Vertical Limits Of Not Less Than 5' Above And 1'-6" Below The Sight Line Datum, And Horizontal Limits Defined By The Limits Of Clear Sight.



PERCEPTION DIAGRAM  
SETTING SABAL PALM (STATE TREE) SPACING



PICTORIAL  
CHANNELIZED DIRECTIONAL MEDIAN OPENINGS



SHADOW DIAGRAM

LEGEND

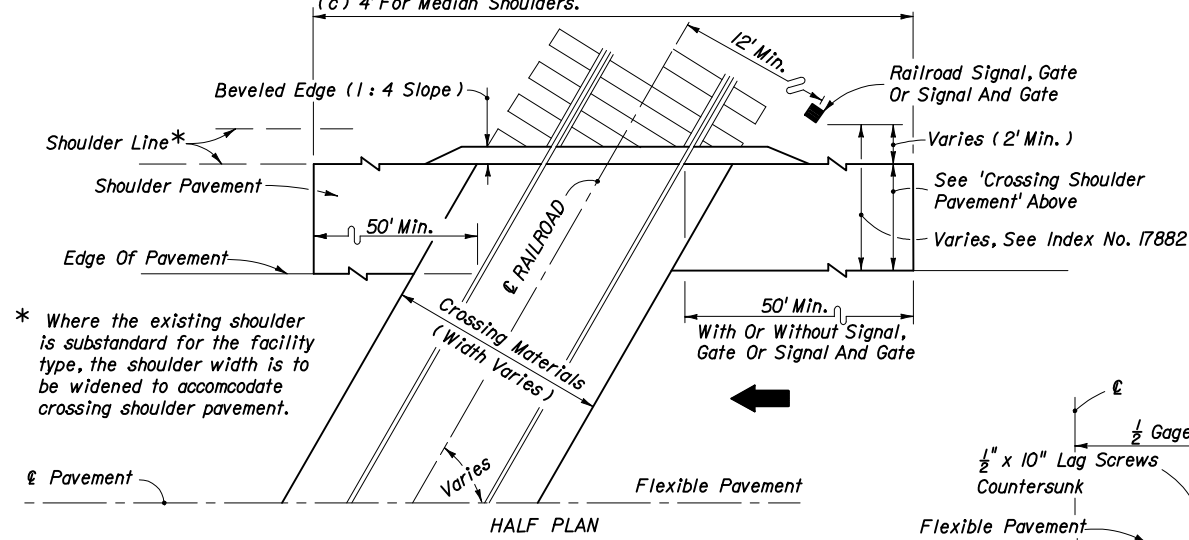
Areas Free Of Sight Obstructions

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

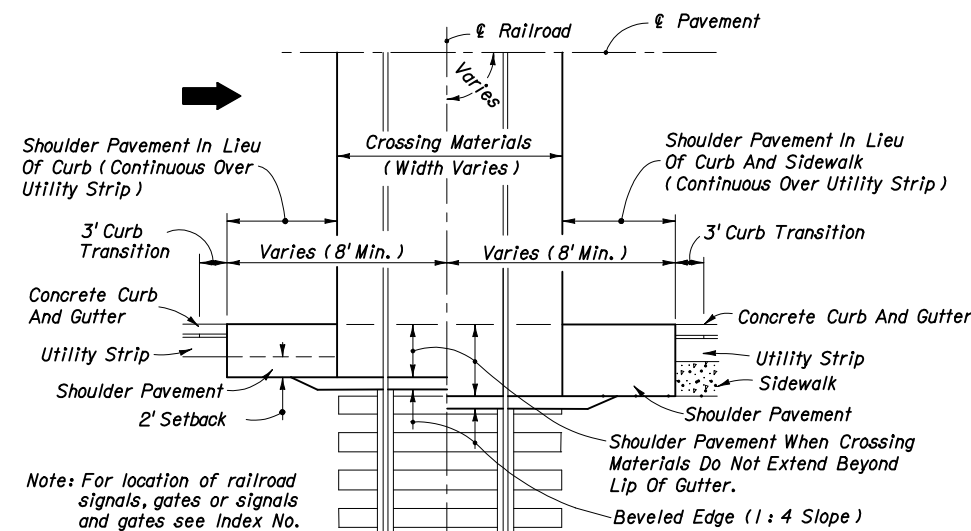
SIGHT DISTANCE  
AT INTERSECTIONS

Names	Dates	Approved By		
Designed By	KRM/JVG 10/89			
Drawn By	HSD 10/89			
Checked By	JVG/KRM 10/89	Revision	Sheet No.	Index No.
		00	2 of 2	546

Crossing Shoulder Pavement (Except Area Occupied By Crossing Surfacing Material):  
 (a) To Shoulder Line For Outside Shoulders Less Than 8' Wide.  
 (b) To 8' Maximum Width For Outside Shoulders 8' Or Wider (Regardless Of Approach Shoulder Pavement Width).  
 (c) 4' For Median Shoulders.

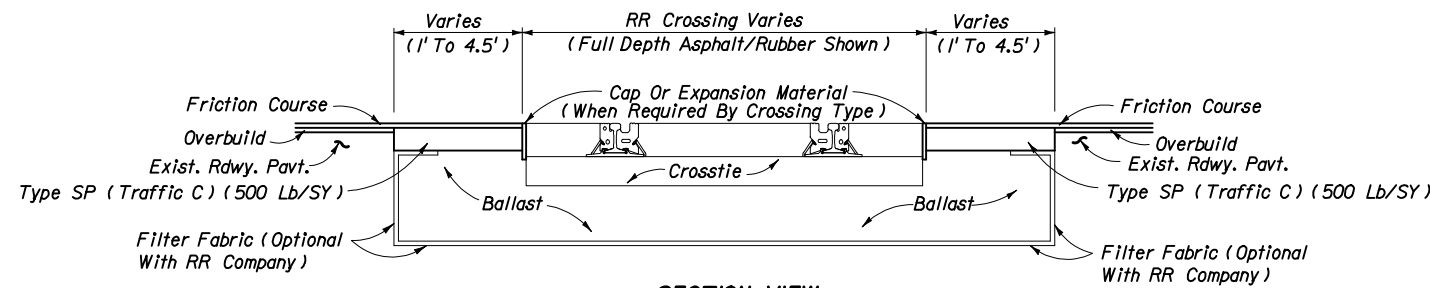


HALF PLAN  
**ROADWAYS WITH FLUSH SHOULDERS**



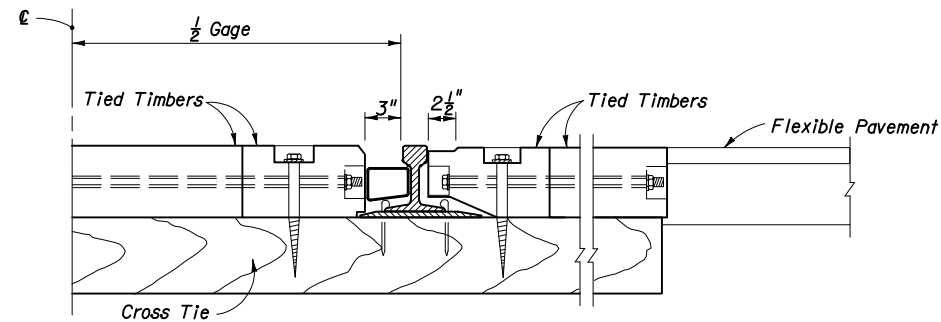
HALF PLAN  
**CURBED ROADWAYS**

Note: For location of railroad signals, gates or signals and gates see Index No. 17882

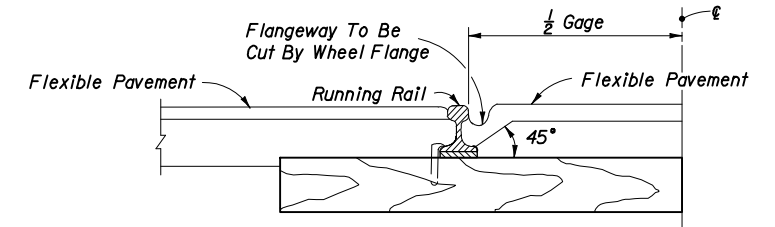


SECTION VIEW

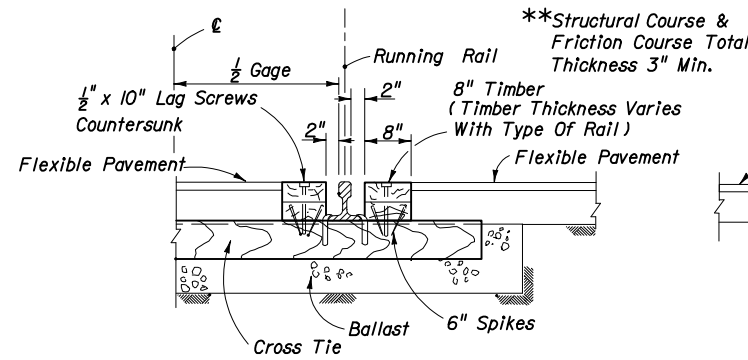
**TYPICAL FLEXIBLE PAVEMENT REPLACEMENT AT RR CROSSINGS**



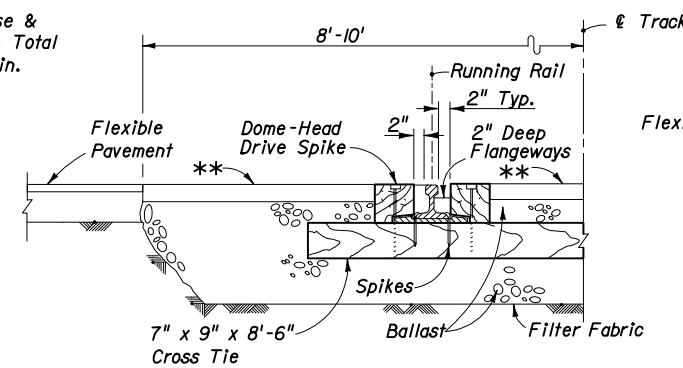
**HALF SECTION TYPE D**



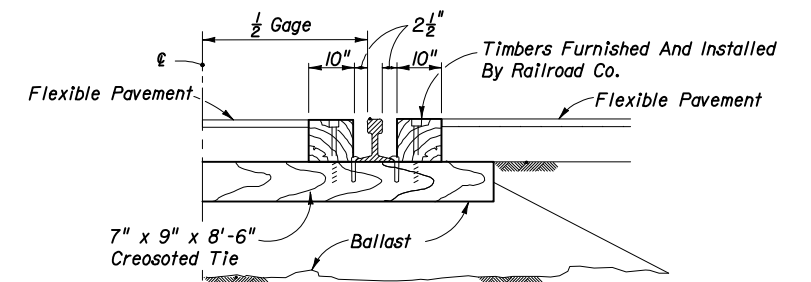
**HALF SECTION TYPE E**



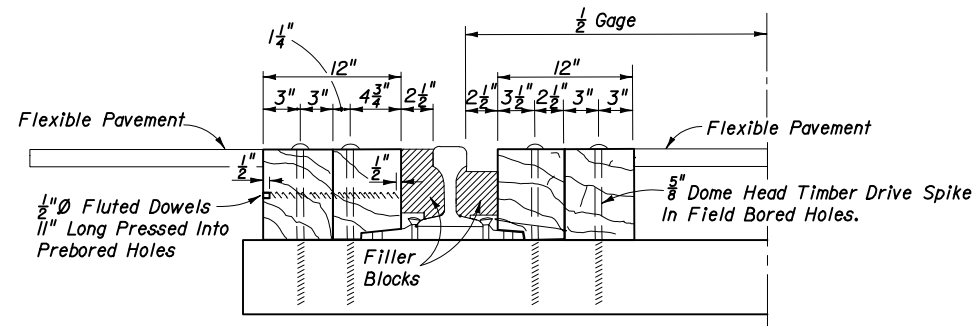
**HALF SECTION TYPE G**



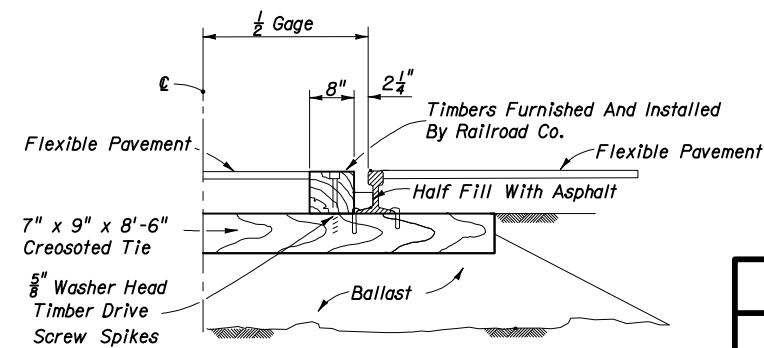
**HALF SECTION TYPE G MODIFIED**



**HALF SECTION TYPE H**



**HALF SECTION TYPE L**



**HALF SECTION TYPE S**

**NOTES**

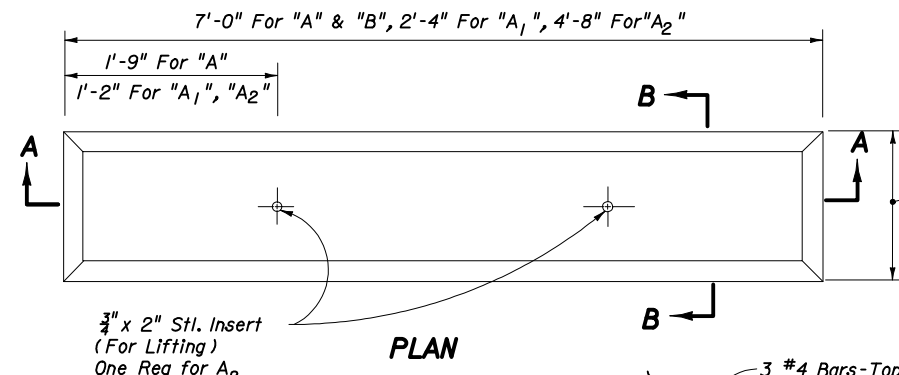
- The Railroad Company will furnish and install all track bed (ballast), cross-ties, rails, crossing surface panels and accessory components. All pavement material, including that through the crossing, will be furnished and installed by the Department or its Contractor, unless negotiated otherwise.
- Gage is standard A.R.E.A. track gage of 4'-8 1/2" (56 1/2").

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

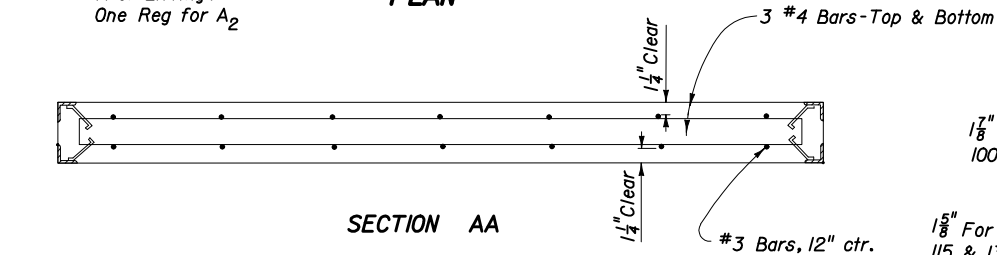
**RAILROAD CROSSINGS**

Names	Dates	Approved By		
Designed By		State Roadway Design Engineer		
Drawn By	HW 08/69			
Checked By	JKC 08/69			
Revision	02			
Sheet No.	1 of 5	Index No.	560	

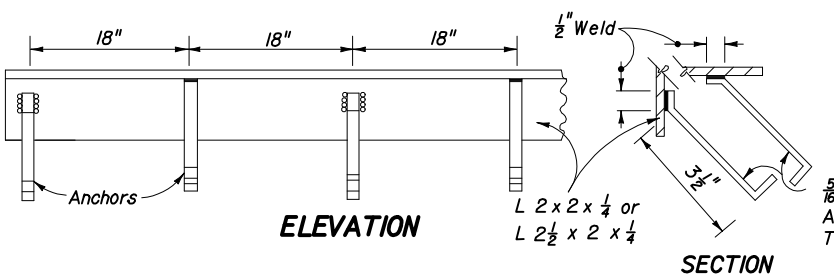
**TYPES D, E, G, G-MOD., H, L AND S**



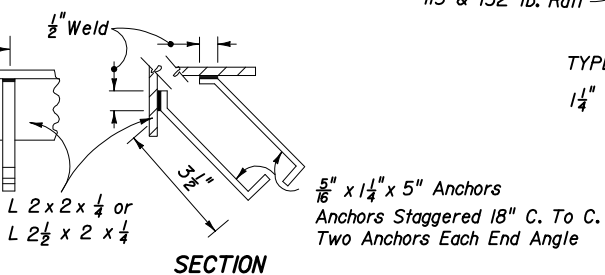
PLAN



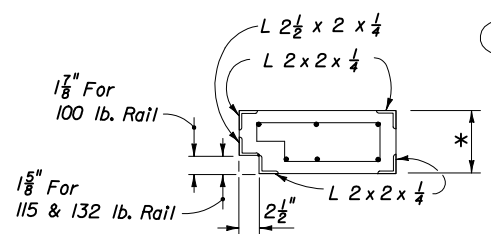
SECTION AA



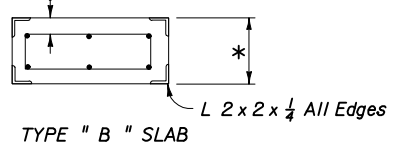
ELEVATION



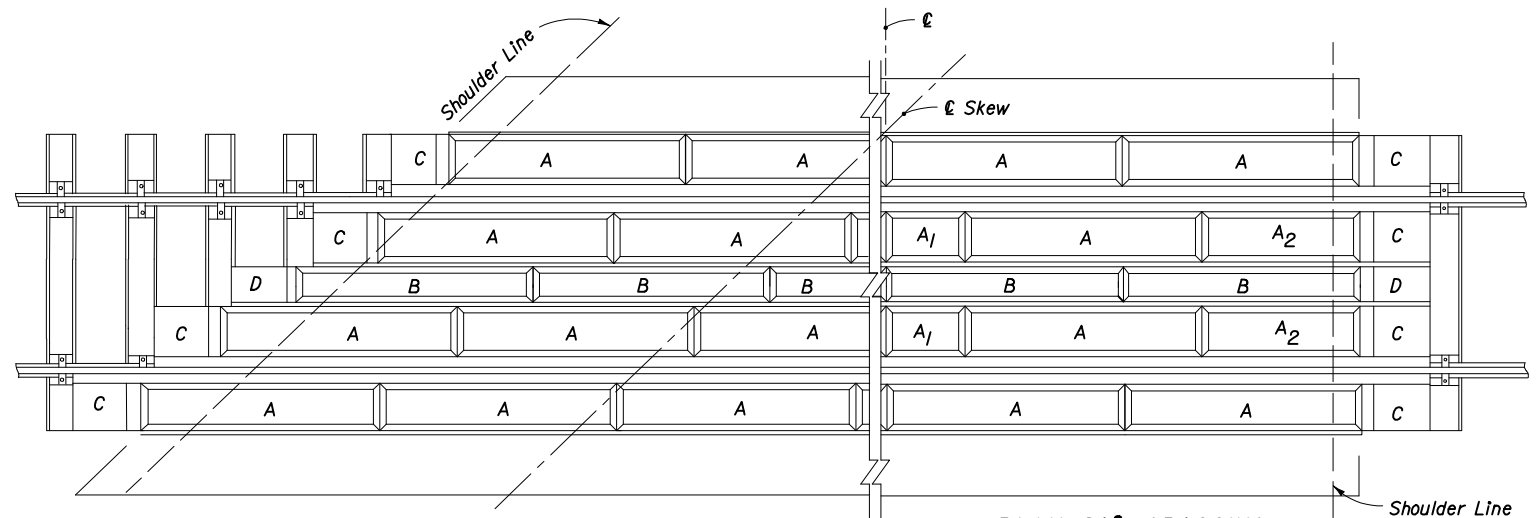
SECTION



TYPE "A", "A1" & "A2" SLABS

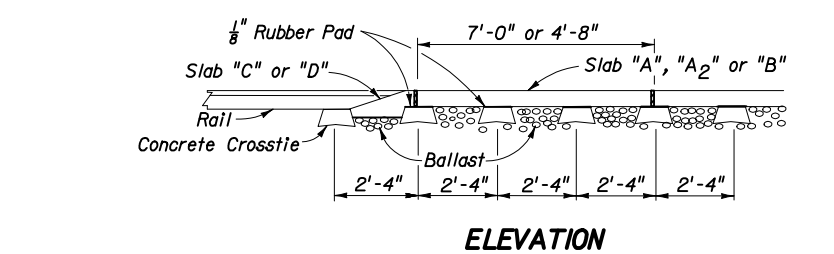


TYPE "B" SLAB

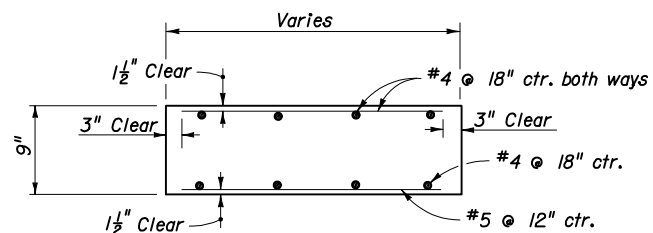


PLAN OF SKEWED CROSSING

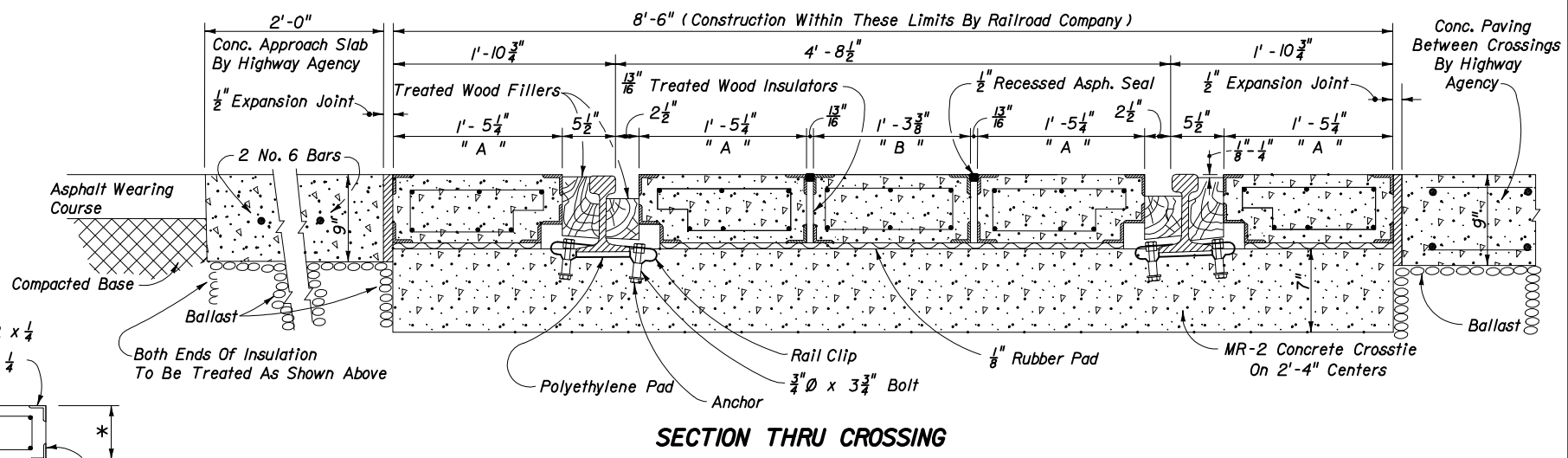
PLAN -90° CROSSING



ELEVATION

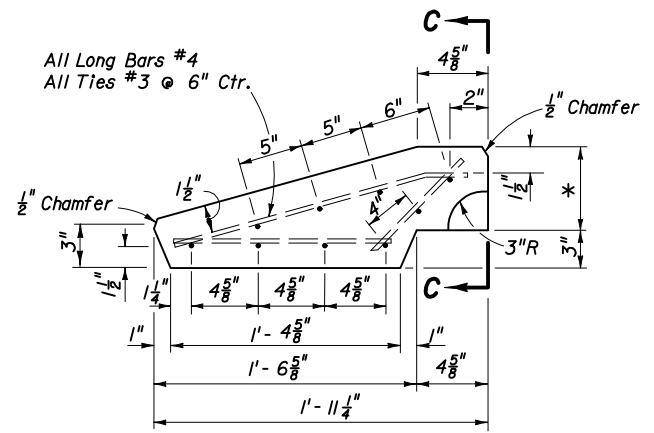


CONCRETE PAVING BETWEEN MULTIPLE CROSSINGS  
(Cost Of Reinforcing To Be Included In The Cost Of Concrete, See Note No. 6)



SECTION THRU CROSSING

\*SLAB THICKNESS VARIES  
 5 3/8" For 100 lb. Rail  
 6 3/8" For 115 lb. Rail  
 6 7/8" For 132 lb. Rail



TYPE "C" & "D" SLAB DETAILS

NOTES

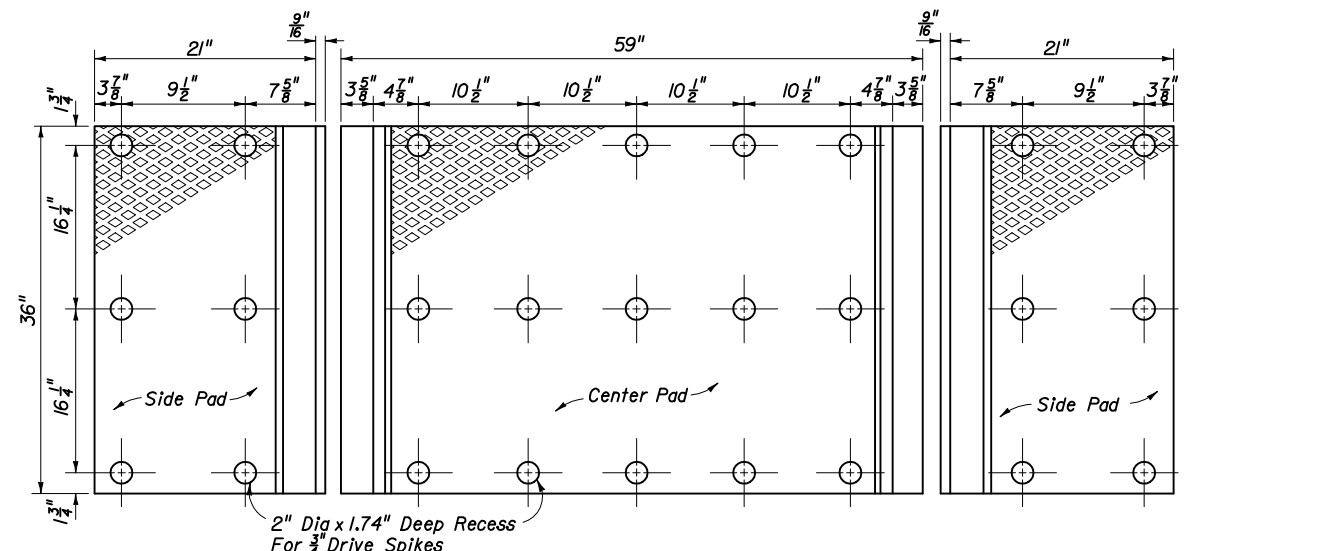
1. The furnishing and installing of concrete crossies together with any necessary reballasting, grade adjustment and track alignment shall be done by the Railroad Company without cost to the Contractor or to the Highway Agency.
2. All concrete slabs, rubber pads for tops of ties and wood filler blocks shall be furnished and installed by the Railroad Company.
3. Concrete crossies shall be spaced on 28" centers.
4. Rubber pads shall be installed on concrete ties in field using contact cement.
5. Filler blocks shall be pressure treated pine or clear heart redwood and shall be shaped prior to treatment.
6. Cost of concrete and reinforcing steel necessary for approach slabs and paving between multiple crossings shall be paid for by the Highway Agency under the contract unit price for Cement Concrete Pavement Reinforced, (9"), SY.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

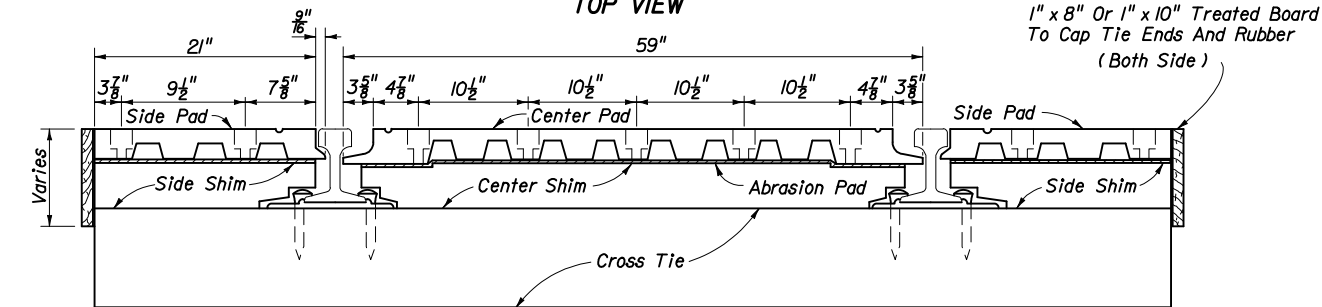
RAILROAD CROSSINGS

Names	Dates	Approved By				
Designed By		 State Roadway Design Engineer				
Drawn By	HW 08/69				Revision	Sheet No.
Checked By	JKC 08/69				00	2 of 5
						560

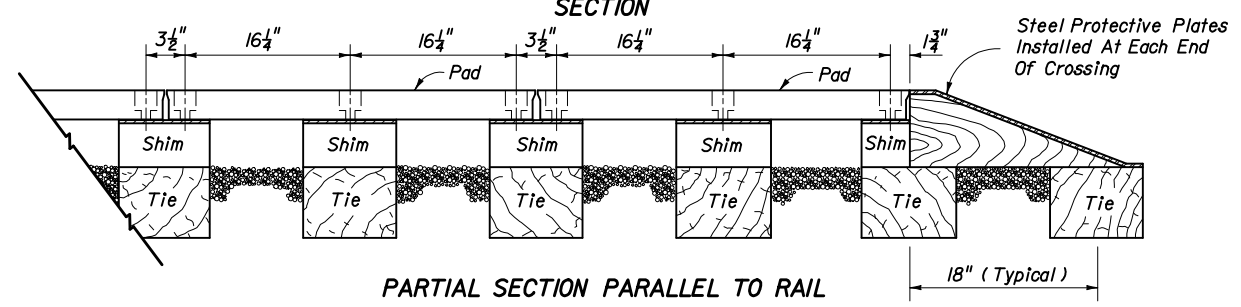
TYPE K



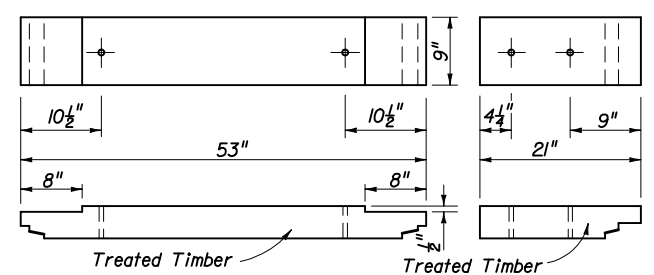
TOP VIEW



SECTION



PARTIAL SECTION PARALLEL TO RAIL



Shim Thickness Varies With Height Of Rail.

CENTER SHIM

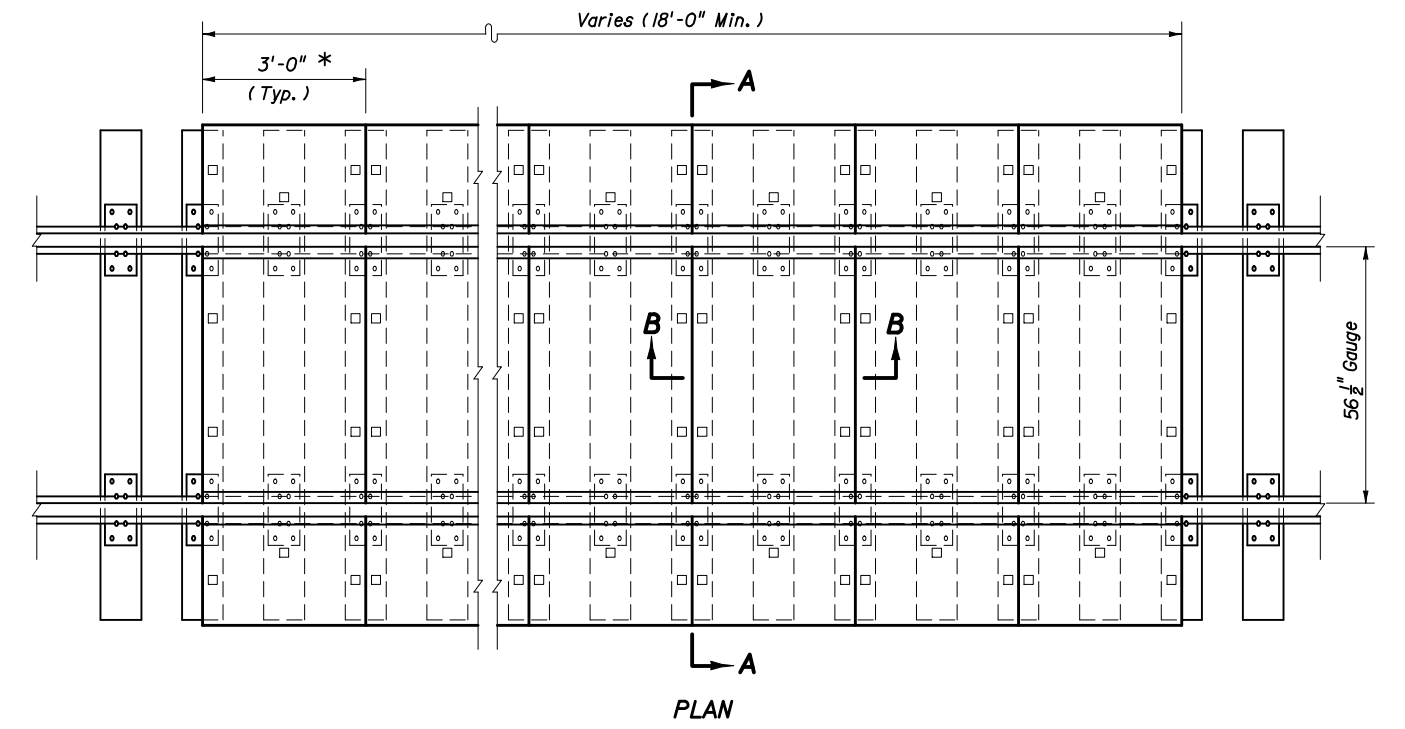
SIDE SHIM

TYPE R

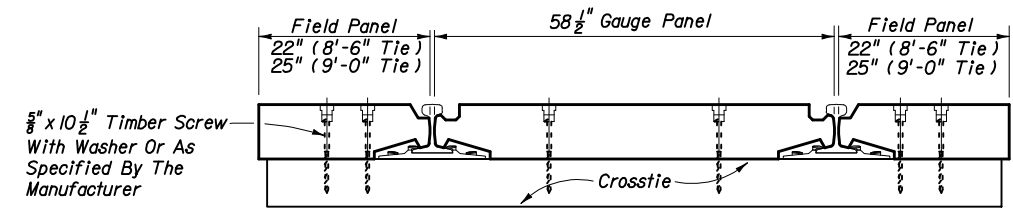
STOP ZONE	
Design Speed (mph)	Zone Length (Distance From Stop)
45 Or Less	250'
50 - 55	350'
60 - 65	500'
70	600'

NOTES

- 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.
- Crossings on this sheet may be used for single track crossings within the zones on the chart unless engineering or safety considerations dictate otherwise.
- Tie spacing is critical, ties shall be spaced in accordance with the manufacturers specifications.
- Details shown are for straight track installations. Materials are also available for curved track installations.
- For additional details, materials required and installation procedures refer to the manufacturers specifications.

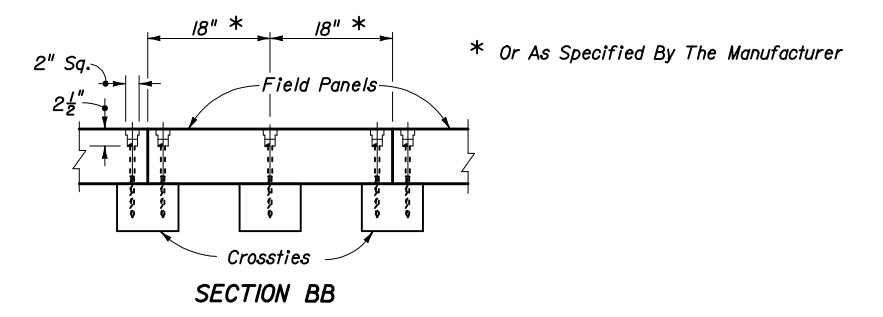


PLAN



SECTION AA

5/8" x 10 1/2" Timber Screw With Washer Or As Specified By The Manufacturer



SECTION BB

HEAVY DUTY - FULL DEPTH RUBBER CROSSING  
TYPE R FULL DEPTH

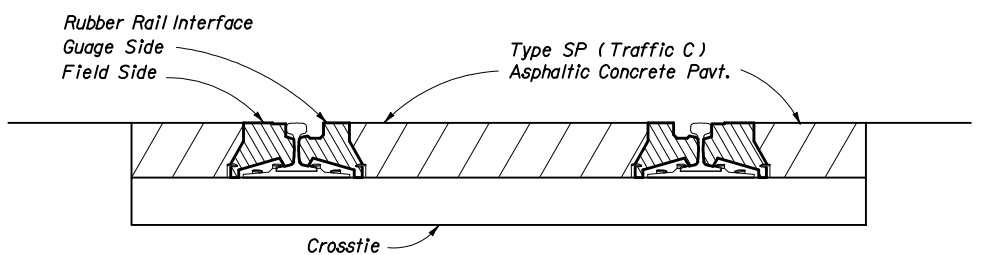
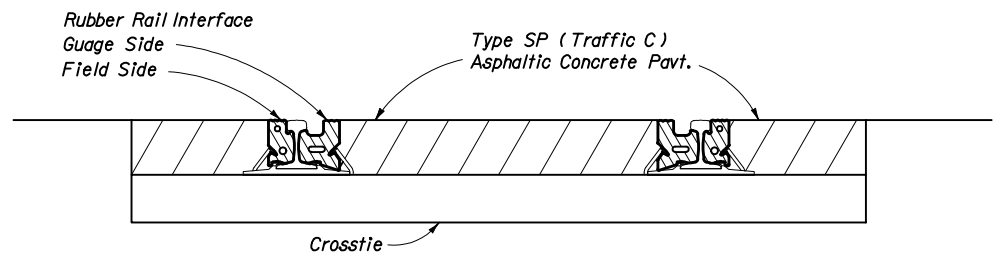
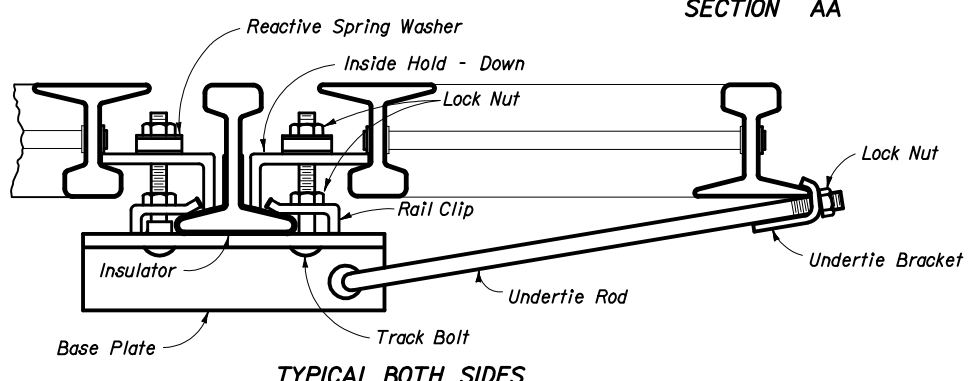
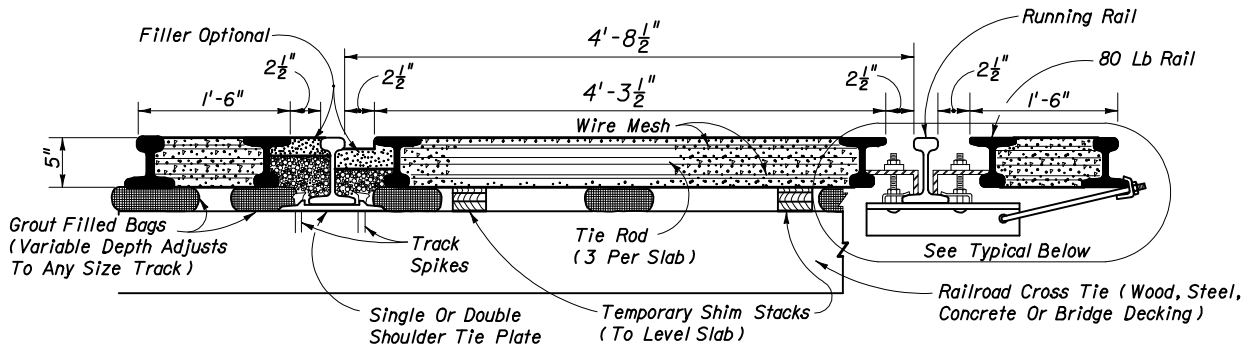
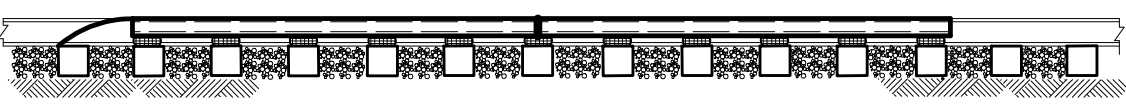
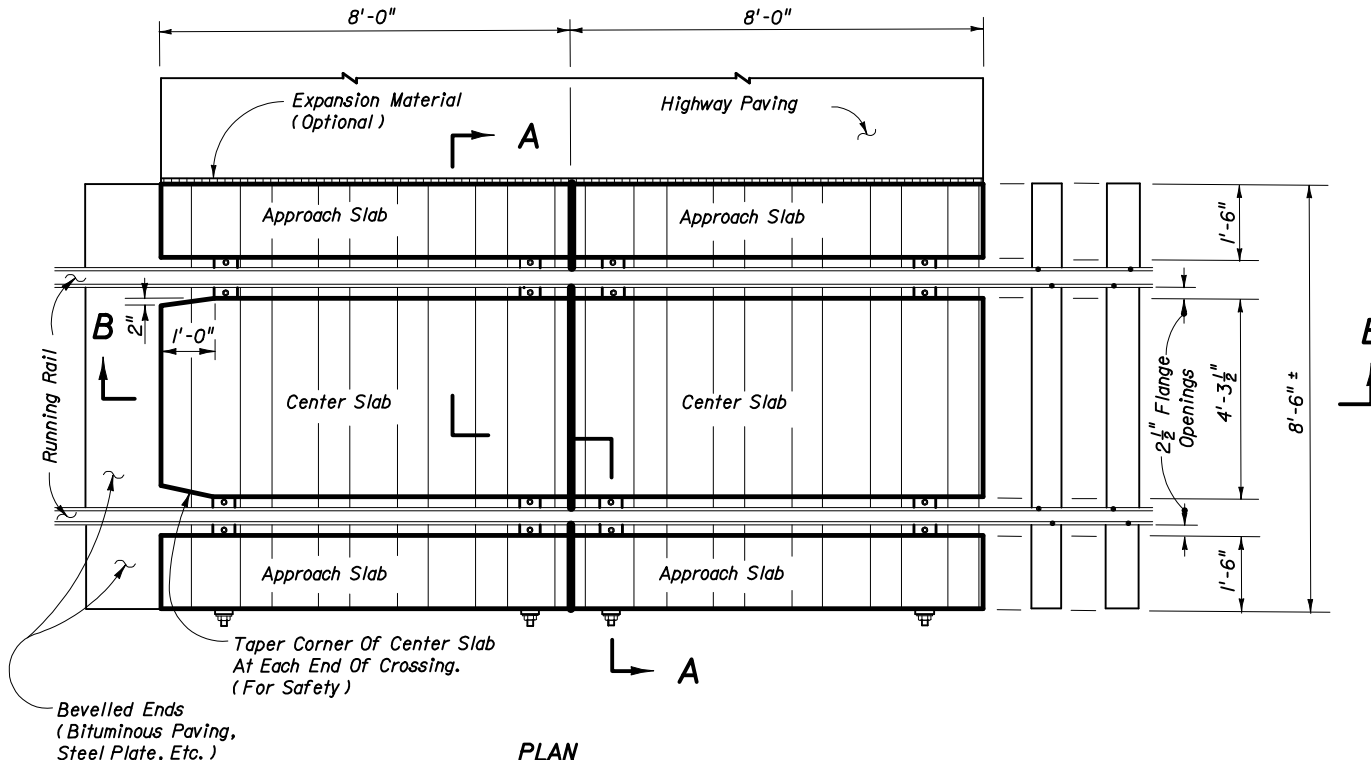
TYPES R RUBBER & R FULL DEPTH RUBBER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RAILROAD CROSSINGS

Names	Dates	Approved By				
Designed By		 State Roadway Design Engineer				
Drawn By	LMP 11/75				Revision	Sheet No.
Checked By	GSB 11/75				00	3 of 5
						560





- NOTES
1. Rubber rail interface systems are manufactured to fit various rails from 115# to 136#.
  2. The Railroad Company will furnish and install all crossing material except as specified in the agreement.
  3. For additional details, methods required and installation procedures refer to the manufacturers specifications.

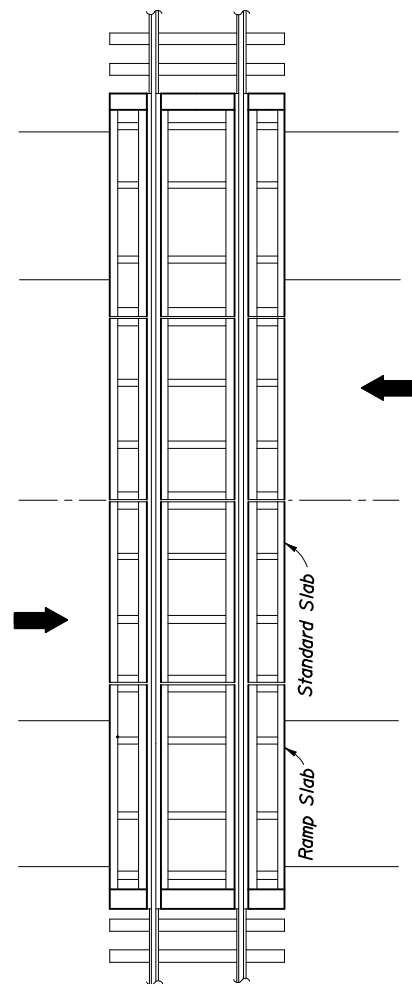
- NOTES
1. The reinforced concrete slabs are manufactured in 8'-0" sections, 5" in depth to fit all rail sections 5 1/4" in height or heavier. Slabs are interchangeable and relocateable.
  2. Center slabs are one piece construction allowing for 2 1/2" flange opening, 80 lb. rail is used to encase, armor and reinforce slabs and is held to gage with 3 tie rods per slabs.
  3. Slabs are installed by a "flotation" 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.

**FULL DEPTH ASPHALT/RUBBER CROSSING  
TYPE RS**

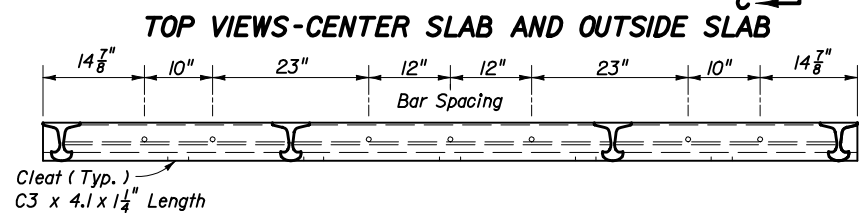
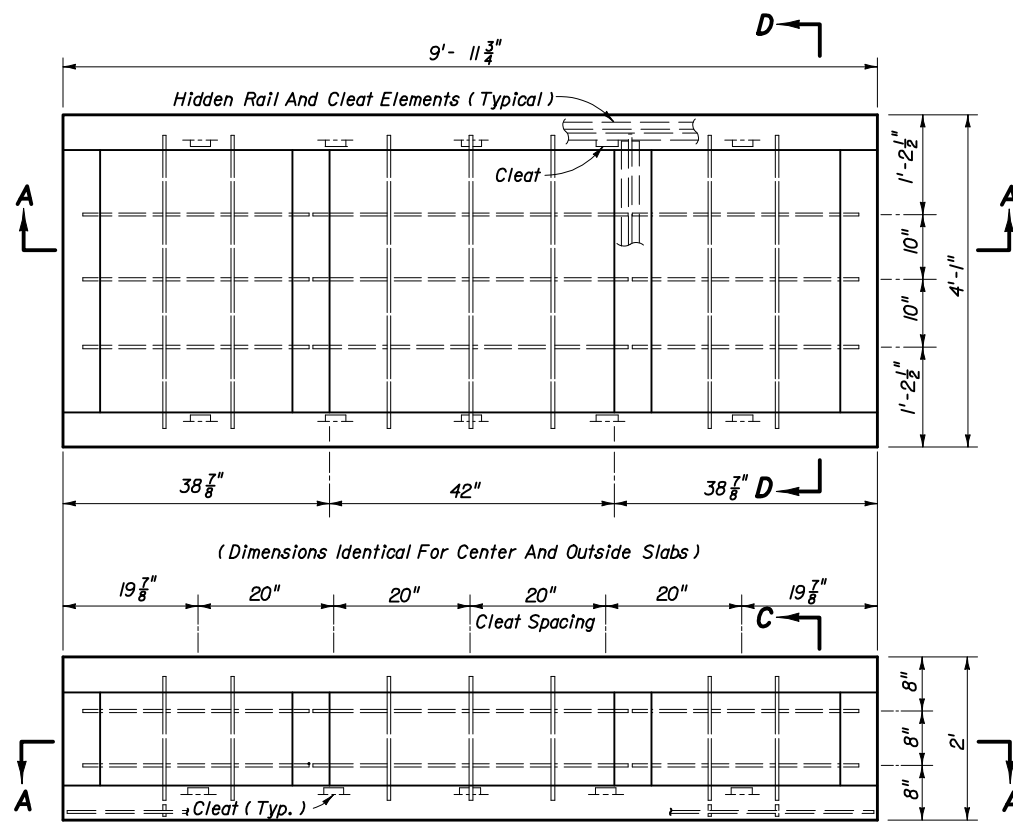
TYPE T

TYPES T & RS

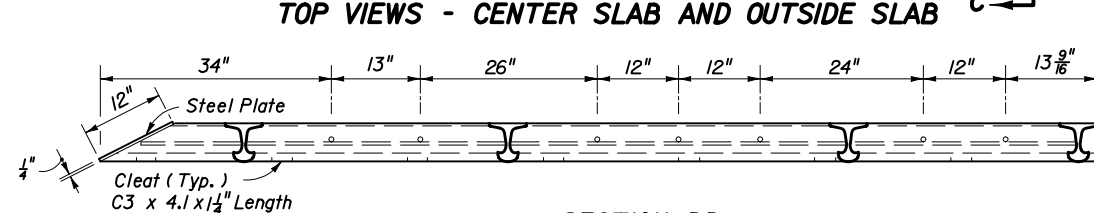
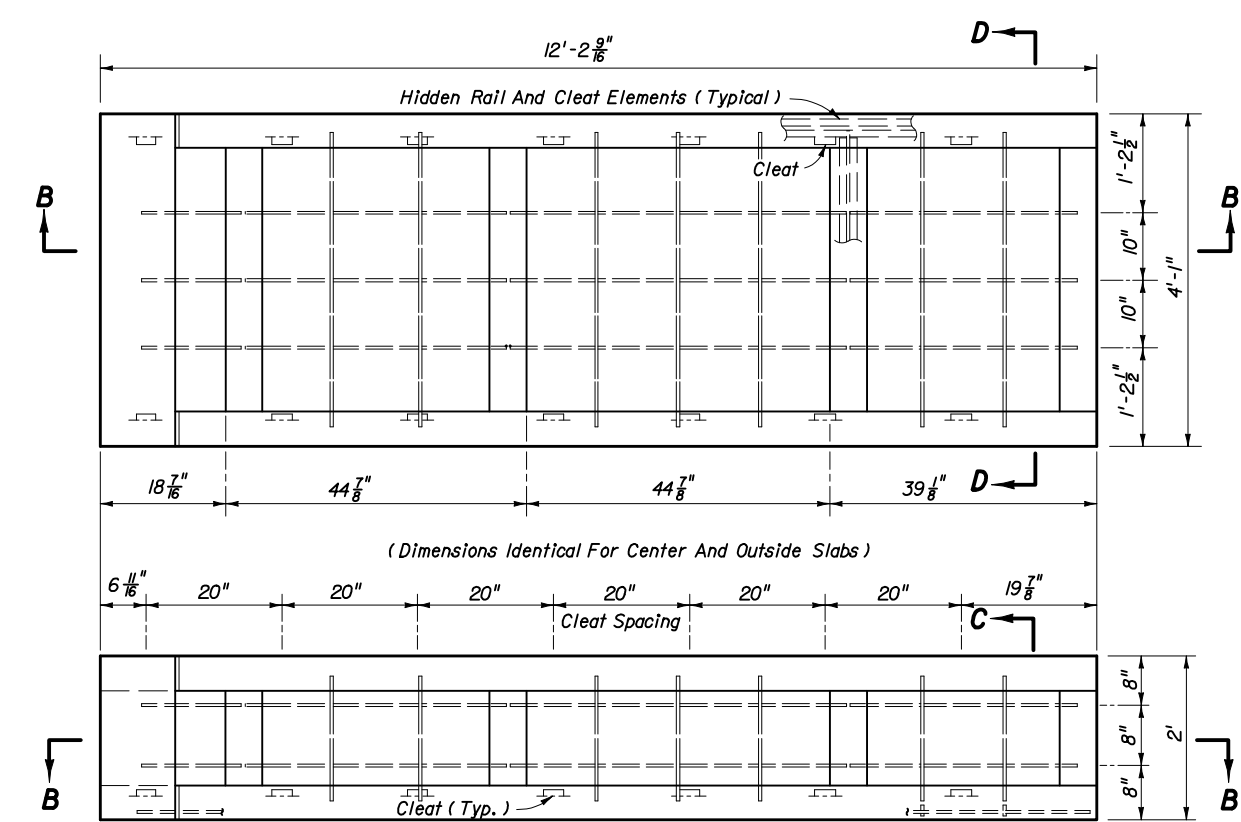
RAILROAD CROSSINGS				
Names	Dates	Approved By		
Designed By		State Roadway Design Engineer		
Drawn By	IMP 02/77			
Checked By	GSB 02/77	Revision	Sheet No.	Index No.
		02	4 of 5	560



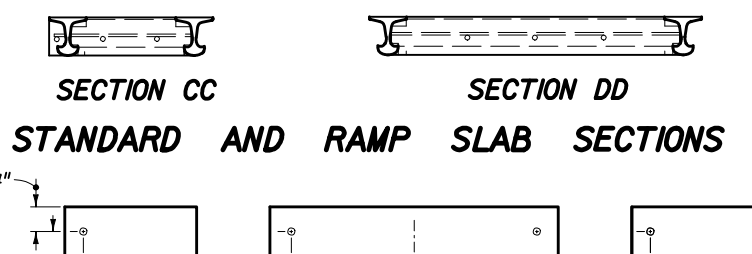
PLAN VIEW  
TYPICAL 44' CROSSING



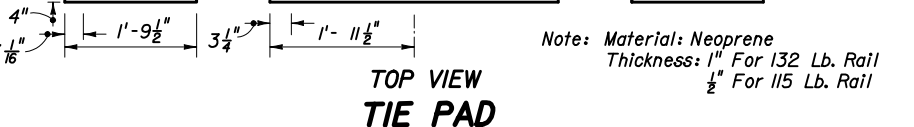
SECTION AA  
STANDARD SLABS (PRECAST CONCRETE)



SECTION BB  
RAMP SLABS (PRECAST CONCRETE)

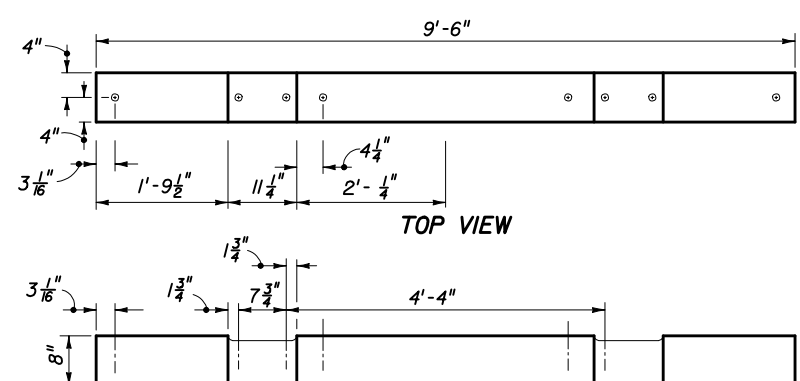


SECTION CC  
SECTION DD  
STANDARD AND RAMP SLAB SECTIONS

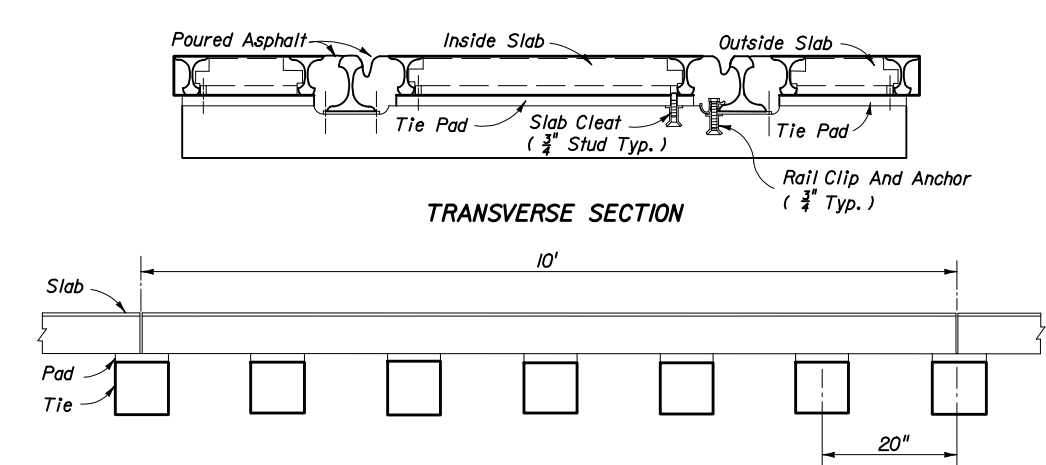


TOP VIEW  
TIE PAD  
Note: Material: Neoprene  
Thickness: 1" For 132 Lb. Rail  
1/2" For 115 Lb. Rail

- NOTES
- Slab frames are welded 90 lb. rails.
  - Slab reinforcement all #4 bars.



TOP VIEW  
SIDE VIEW  
PRECAST CONCRETE (CROSSING TIE)



TRANSVERSE SECTION  
ELEVATION TIE SPACING

TYPE T MODIFIED

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RAILROAD CROSSING</b>				
Designed By	Names	Dates	Approved By	
Drawn By	RWR	9/82	<i>Brian Blumhail</i> State Roadway Design Engineer	
Checked By	JVG/JBW	9/82	Revision	Sheet No.
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- Overhead Work
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- Work Zone Sign Supports
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- Manholes/Crosswalks
- Dropoffs In Work Zones
- Temporary Curb
- Identifications-Channelizing And Lighting Devices  
And Advance Warning Arrow Panel Modes
- Commonly Used Warning and Regulatory Signs  
In Work Zones
- Pavement Markings

## 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 and standards 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.

Index 600 provides Department policy and standards. Changes are only to be made thru Department approved procedures. Indexes 601 thru 665 provide typical application for various situations. Modification can be made to these indexes as long as the changes comply with the M.U.T.C.D. and Department Design Standards.

The sign spacings shown on the indexes are typical (recommended) distances. These distances may be increased or decreased based on field conditions, in order to avoid conflicts or to improve site specific traffic controls.

## 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:


COMM	Traffic Control Standards Committee
DTOE	District Traffic Operations Engineer
FDOT	Florida Department Of Transportation
HAR	Highway Advisory Radio
L	Taper Length, Buffer Length Or Taper Length Plus Buffer Space
LEO	Law Enforcement Officer
MOT	Maintenance Of Traffic
MUTCD	Manual On Uniform Traffic Control Devices For Streets And Highways
PRS	Portable Regulatory Sign
R	Radius
RPM	Raised Retroreflective Pavement Marker
RSDU	Radar Speed Display Unit
S	Posted Speed Of Off-Peak 85 Percentile Speed (M.P.H.)
TCP	Traffic Control Plan(s)
TCZ	Traffic Control Through Work Zones
TMA	Truck Mounted Attenuator
VMS	Variable Message Sign
VECP	Value Engineering Change Proposal
W	Width Of Taper Transition In Feet i.e., Lateral Offset

## SYMBOLS

The symbols shown are found in the Traffic Control Zone Cell Library (TCZ.cel) on the CADD system.

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 Vertical Panel Or Drum
-  Type I Or Type II Barricade Or Vertical Panel Or Drum (With Flashing Light At Night Only)
-  Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
-  Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
-  Cone Or Tubular Marker
-  Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum
-  Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Flashing Light)
-  Type I, Type II Or Type III Barricade Or Vertical Panel 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) Or Advance Warning (AW) Vehicle With Advance Warning Arrow Panel And Warning Sign
-  Truck Mounted Attenuator (TMA)
-  Orange Flag For TCZ Signs
-  Type B Light For TCZ Signs
-  Law Enforcement Officer
-  Portable Regulatory Sign
-  Radar Speed Display Unit
-  Variable Message Sign

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES</b>				
	Names	Dates	Approved By 	
Designed By			Roadway Design Engineer	
Drawn By			Revision	Sheet No.
Checked By			02	1 of 10
				Index No. 600

## DEFINITIONS

### Regulatory Speed ( In Work Zones )

The maximum permitted travel speed posted for the work zone as indicated by the regulatory speed limit signs. The work zone speed must be shown or noted in the plans. This speed should be used as the minimum design speed to determine runout lengths, departure rates, flare rates, lengths of need, clear widths, taper lengths, crash cushion requirements, marker spacings, superelevation and other similar features.

### Advisory Speed

The maximum recommended travel speed through a curve or a hazardous area.

### 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, Lane Shift, and Diversion

A detour is the redirection of traffic onto another roadway to bypass the temporary traffic control zone. A lane shift is the redirection of traffic onto a different section of the permanent pavement. A diversion is the redirection of traffic onto a temporary roadway, usually adjacent to the permanent roadway and within the limits of the right-of-way.

### Above Ground Hazard

An above ground hazard is any object, material or equipment other than traffic control devices that encroaches upon the travel way or that is located within the clear zone which does not meet the Departments safety criteria, i.e., anything that is greater than 4" in height and is firm and unyielding or doesn't meet breakaway requirements.

## TEMPORARY TRAFFIC CONTROL DEVICES

All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, temporary traffic control devices that are no longer appropriate shall be removed or covered.

## PEDESTRIANS AND BICYCLIST

When an existing pedestrian way or bicycle way is located within a traffic control work zone, accomodation must be maintained and include provision for the disabled.

Only approved temporary traffic control devices may be used to delineate a temporary traffic control zone pedestrian walkway.

Advanced notification of sidewalk closures and detours marked shall be provided by appropriate signs.

## RAILROADS

Railroad crossings affected by a construction project should be evaluated for traffic controls to reduce queuing on the tracks. The evaluation should include as a minimum: traffic volumes, distance from the tracks to the intersections, lane closure or taper locations, signal timing, etc.

## OVERHEAD WORK

No work shall be allowed over a traffic lane using a bucket truck, unless a lane closure has been set up in accordance with the appropriate Index.

## OVERWEIGHT/OVERSIZE VEHICLES

Restrictions to Lane Widths, Heights or Load Capacity can greatly impact the movement of over dimensioned loads. The Contractor shall notify the Engineer who in turn shall notify the State Permits Office, phone no. (850) 488-4961, at least seven calander days in advance of implementing a maintenance of traffic plan which will impact the flow of overweight/ oversized vehicles. Information provided shall include location, type of restriction (height, width or weight) and restriction time frames. When the roadway is restored to normal service the State Permits Office shall be notified immediately.

## 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 as follows: 11' for Interstate with at least one 12' lane provided in each direction, unless formally excepted by the Federal Highway Administration; 11' for freeways; and 10' for all other facilities.

## 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.

## ABOVE GROUND HAZARD

Above ground hazards (see definitions) are to be considered work areas during working hours and treated with appropriate work zone traffic control procedures. During non-working hours, all objects, materials and equipment that constitute an above ground hazard must be stored/placed outside the travel way and clear zone or be shielded by a barrier or crash cushion.

For above ground hazards within a work zone the clear zone required should be based on the regulatory speed posted during construction.

## CLEAR ZONE WIDTHS

The term 'clear zone' describes the unobstructed relatively flat area, impacted by construction, extending outward from the edge of the travel lane. The table below gives clear zone widths in work zones for medians and roadside conditions other than for roadside canals; where roadside canals are present, clear zone widths are to conform with the distances to canals as described in Volume I Ch 4, Sec 4.2 and Exhibit 4-A and 4-B of the Plans Preparation Manual.

CLEAR ZONE WIDTHS FOR WORK ZONES	
WORK ZONE SPEED (MPH)	WIDTHS (feet)
60-70	30
55	24
45-50	18
30-40	14
ALL SPEEDS CURB & GUTTER	4' BEHIND FACE OF CURB

## 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	
DESIGN SPEED	MINIMUM RADIUS R
MPH	feet
65	3130
60	2400
55	1840
50	1390
45	1080
40	820
35	610
30	430
Superelevate When Smaller Radii Used	

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
GENERAL INFORMATION FOR				
TRAFFIC CONTROL THROUGH WORK ZONES				
	Names	Dates	Approved By	
Designed By		12/87	James D. Mill Roadway Design Engineer	
Drawn By		12/87	Revision	Sheet No. Index No.
Checked By		12/87	02	2 of 10 600

## REGULATORY SPEEDS IN WORK ZONES

Traffic Control Plans (TCPs) for all projects must include specific regulatory speeds for each phase of work. This can either be the posted speed or a reduced speed. The speed shall be noted in the TCPs; this includes indicating the existing speed if no reduction is to be made. Regulatory speeds are to be uniformly established through each phase.

In general, the regulatory speed should be established to route vehicles safely through the work zone as close to normal highway speed as possible. The regulatory speed should not be reduced more than 10 mph below the posted speed and never below the minimum statutory speed for the class of facility. When a speed reduction greater than 10 mph is imposed, the reduction is to be done in 10 mph per 500' increments.

Temporary regulatory speed signs shall be removed as soon as the conditions requiring the reduced speed no longer exist. Once the work zone regulatory speeds are removed, the regulatory speed existing prior to construction will automatically go back into effect unless new speed limit signing is provided for in the plans.

On projects with interspaced work activities, speed reductions should be located in proximity to those activities which merit a reduced speed, and not "blanketed" for the entire project. At the departure of such activities, the normal highway speed should be posted to give the motorist notice that normal speed can be resumed.

If the existing regulatory speed is to be used, consideration should be given to supplementing the existing signs when the construction work zone is between existing regulatory speed signs. For projects where the reduced speed conditions exist for greater than 1 mile in rural areas (non-interstate) and on rural or urban interstate, additional regulatory speed signs are to be placed at no more than 1 mile intervals. Engineering judgement should be used in placement of the additional signs. Locating these signs beyond ramp entrances and beyond major intersections are examples of proper placement. For urban situations (non-interstate), additional speed signs are to be placed at a maximum of 1000' apart.

When field conditions warrant speed reductions different from those shown in the TCP the contractor may submit to the project engineer for approval by the Department, a signed and sealed study to justify the need for further reducing the posted speed, or, the engineer may request the District Traffic Operations Engineer (DTOE) to investigate the need. It will not be necessary for the DTOE to issue regulations for regulatory speeds in work zones due to the revised provisions of F.S. 316.0745(2)(b). Advisory Speed plates will be used at the option of the field engineer for temporary use while processing a request to change the regulatory speed specified in the plans when deemed necessary. Advisory speed plates cannot be used alone but must be placed below the construction warning sign for which the advisory speed is required.

For additional information refer to the FDOT Roadway Plans Preparation Manual, Volume I, Chapter 10.

## FLAGGER CONTROL

Where flaggers are used, a FLAGGER symbol or legend sign must replace the WORKERS symbol or legend sign.

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 Flagger's reflective garments and equipment and the work area background.

### HIGH-VISIBILITY CLOTHING

For daytime work, the flagger's vest, shirt, or jacket shall be either orange, yellow, yellow-green, or a fluorescent version of these colors. For nighttime work, similar outside garments shall be retroreflective. The retroreflective material shall be either orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and be visible at a minimum distance of 1,000 ft. The retroreflective clothing shall be designed to clearly identify the wearer as a person.

### HAND-SIGNALING DEVICES

STOP/SLOW paddles are the primary hand-signaling device. The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 26 inches wide with letters at least 6 inches high and should be fabricated from light semi-rigid material. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be orange with black letters and border. When used at nighttime, the STOP/SLOW paddle shall be retroreflectorized.

Flag use is limited to immediate emergencies, intersections, and when working on centerline or shared left turn lanes where two (2) flaggers are required and there is opposing traffic in the adjacent lanes. Flags, when used, shall be a minimum of 24 inches square, made of a good grade of red material, and securely fastened to a staff that is approximately 36 inches in length. When used at nighttime, flags shall be retroreflectorized red.

Flashlight, lantern or other lighted signal that will display a red warning light shall be used at night.

### FLAGGER STATIONS

Flagger stations shall be located far enough in advance of the work space so that approaching road users will have sufficient distance to stop before entering the work space. When used at nighttime, the flagger station should be illuminated.

## SURVEY WORK ZONES

The SURVEY CREW AHEAD symbol or legend sign shall be the principal Advance Warning Sign used for Traffic Control Through Survey Work Zones and may replace the ROAD WORK AHEAD sign when lane closures occur, at the discretion of the Party Chief. Type B Light or dual orange flags shall be used at all times to enhance the SURVEY CREW AHEAD sign, even with mesh signs.

When Traffic Control Through Work Zones is being used for Survey purposes only, the END ROAD WORK sign as called for on certain 600 Series Indexes should be omitted.

### Survey Between Active Traffic Lanes or Shared Left Turn Lanes

The following provisions apply to Main Roadway Traffic Control Work Zones. These provisions must be adjusted by the Party Chief to fit roadway and traffic conditions when the Survey Work Zone includes Intersections.

- (A) A STAY IN YOUR LANE (MOT-1) sign shall be added to the Advance Warning Sign sequence as the second most immediate sign from the work area.
- (B) Elevation Surveys-Cones may be used at the discretion of the Party Chief to protect prism holder and flagger(s). Cones, if used, may be placed at up to 50' intervals along the break line throughout the work zone.
- (C) Horizontal Control-With traffic flow in the same direction, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' towards the flow of traffic.
- (D) Horizontal Control-With traffic flow in opposite directions, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' in both directions towards the flow of traffic.

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## SIGN PLACEMENT

Post-mounted signs installed at the side of the road shall be mounted at a height at least 7 feet measured from the bottom of the sign to a horizontal line extended from the near edge of the pavement. Signs mounted on barricades, or other portable supports shall be no less than 1 foot above the travel way.

## ADJOINING AND/OR OVERLAPPING 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:

- 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.
- 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.
- The District Maintenance Engineer will resolve anticipated and occurring conflicts within scheduled maintenance operations.
- 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.

## SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING

Existing signs that conflict with temporary work zone signing shall be removed or covered as approved by the Engineer. 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.

Covers, blanks, hinged panels and intermittent work stoppage shields and plaques are incidental to work operation signs and are not to be paid for separately.

## SIGN MATERIALS

Mesh signs may be used only for Daylight Operations as noted in the standards. Type B Lights and Orange Flags are not required.

Vinyl signs may be used for Day or Night Operations not to exceed 12 hours except as noted in the standards. Type B Lights and Orange Flags are not required.

All signs shall be post mounted if operation exceeds 12 hours except as noted in the standards.

## WORK ZONE SIGN SUPPORTS

Signs mounted on temporary supports or barricades, and barricade/sign combination shall be crashworthy in accordance with NCHRP 350 requirements and included on the Qualified Products List (QPL).

All post mounted Work Zone signs shall be installed on either round aluminum or steel channel post as specified in the table below.

SUPPORTS FOR MAINTENANCE OF TRAFFIC SIGNS					
SIGN SIZE	SIGN BRACKET	ROUND ALUMINUM	DEPTH IN GROUND	STEEL CHANNEL	DEPTH IN GROUND
24" x 36"	2-I	NPS 2.0" x $\frac{1}{8}$ "	2'-0"	2.5 lb F/M*	3'-0"
48" x 48" DIAMOND	2-I & 1-II	NPS 3.5" x $\frac{3}{16}$ "	3'-4"	**	3'-0"
60" x 48"	3-I	NPS 3.5" x $\frac{3}{16}$ "	3'-4"	**	3'-0"
24" x 30"	2-I	NPS 2.0" x $\frac{1}{8}$ "	2'-0"	2.5 lb F/M*	3'-0"
48" x 48"	2-II	NPS 3.0" x $\frac{1}{8}$ "	2'-6"	**	3'-0"
60" x 24"	3-I	NPS 3.0" x $\frac{1}{8}$ "	2'-6"	3.0 lb F/M*	3'-0"
60" x 36"	3-I	NPS 3.5" x $\frac{3}{16}$ "	3'-4"	4.0 lb F/M*	3'-0"

\* F/M Indicates Type F or Type M

\*\* Requires two 3 lb/ft steel channel (F/M) at 2'-6" center to center. All sign brackets shall be Type I. The total number of brackets shall be per post as tabulated, except the "Diamond" sign which shall use two Type I brackets per post.

The 4 lb/ft steel channel shall be installed with approved breakaway bases.

Refer to Design Standard 11860, Sheet 3, for round aluminum sign bracket details, and 11865 Sheet 2 for steel channel breakaway bases, and notes.

## SIGNING FOR DETOURS, LANE SHIFTS AND DIVERSIONS

Detours should be signed clearly over their entire length so that motorists can easily determine how to return to the original roadway. The W1-4R, MOT-2, and MOT-3 warning signs should be used for the advanced warning for a lane shift. A diversion should be signed as a lane shift.

## EXTENDED DISTANCE ADVANCE WARNING SIGNS

Advance Warning Signs shall be used at extended distance of one-half mile or more when limited sight distance or the nature of the obstruction may require a motorist to bring their vehicle to a stop. Extended distance Advanced Warning Signs may be required on any type roadway, but particularly be considered on multi-lane divided highways where vehicle speed is generally in the higher range (45 M.P.H. or more).

## SPEEDING FINES DOUBLED WHEN WORKERS PRESENT SIGN

The SPEEDING FINES DOUBLED WHEN WORKERS PRESENT sign should be installed on all projects. The placement should be 500 ft beyond the ROAD WORK AHEAD sign or midway to the next sign whichever is less.

## LENGTH OF ROAD WORK SIGN

The length of road work sign (G20-1) bearing the legend ROAD WORK NEXT \_\_\_\_\_ MILES is required for all projects of more than 2 miles in length. The number of miles entered should be rounded up to the nearest mile. The sign shall be located at begin construction points.

## INTERSECTING ROAD SIGNING

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 WORK AHEAD sign, including light and flag, for approaching vehicles.

## END ROAD WORK SIGNS

The END ROAD WORK sign (G20-2A) should be erected approximately 500 feet beyond the end of a construction or maintenance project unless other distance called for in the plans. When other Construction or Maintenance Operations occur within 1 mile this sign should be omitted and signing coordinated in accordance with Index No. 600, ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING.

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## VARIABLE MESSAGE SIGNS (VMS)

The VMS can be used to:

- (1) Supplement standard signing in construction/maintenance work zones.
- (2) Reinforce static advance warning messages.
- (3) Provide motorists with updated guidance information.

The message should be visible and legible at a minimum distance of 900 feet. All messages should be cycled so that two message cycles are displayed to a driver while approaching the sign from 900 feet at 55 mph.

VMS should be placed approx. 500 to 800 feet in advance of the work zone conflicts or 1.5 to 2 miles in advance of complex traffic control schemes which require new and/or unusual traffic maneuvers.

If VMS are to be used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.

For additional information refer to the FDOT Roadway Plans Preparation Manual, Volume I, Chapter 10.

## 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 revisions provided in the contract documents.

Primary work zone traffic control devices are shown on Sheet 8 for the purpose of ready identification. Approved devices are listed on the Departments Qualified Product List.

## CHANNELIZING AND LIGHTING DEVICE CONSISTENCY

Barricades, vertical panels, cones, tubular markers and drums shall not be intermixed within either the lateral transition or within the tangent alignment.

## 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. Full pavement width overlays of either asphalt concrete SP 9.5 or FC-6 is a positive means to achieve obliteration.

## SIGNALS

Existing traffic signal operations that require modification in order to carry out work zone traffic control shall be included in the TCP and be approved by the District Traffic Operations Engineer.

Maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the Contract and require restoration of any loss of detection within 12 hours. The contractor shall select only detection technology listed on the Department's Approved Products List (APL) and approved by the Engineer to restore detection capabilities. The plans should identify the intersections where Temporary Traffic Detection is required.

## 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. 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, diversion 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.

## ROADSIDE BARRIERS

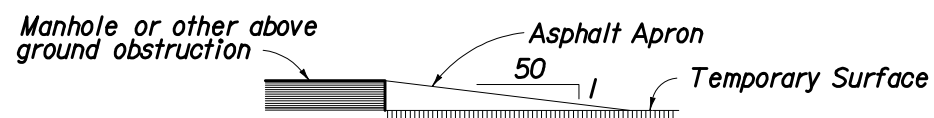
When connecting temporary concrete barrier wall to guardrail the connection shall be made in accordance with Index No. 410. All guardrail end anchorages to be included in the cost of Temporary Guardrail.

## TRUCK MOUNTED ATTENUATORS


Truck-mounted attenuators (TMA) can be used for moving operations and short-term stationary operations. For moving operations, see Index No. 627. For short term, stationary operations, see Part VI of the MUTCD.

## MANHOLES/CROSSWALKS

Manholes extending 1" or more above the travel lane and crosswalks having an uneven surface greater than  $\frac{1}{2}$ " shall have a temporary asphalt apron constructed as shown in the diagram below.

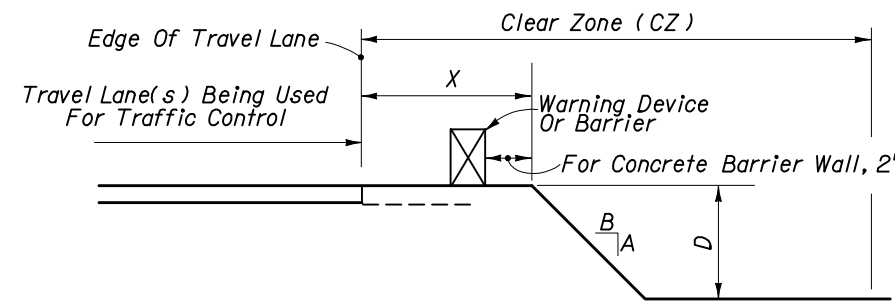


The apron is to be removed prior to constructing the next lift of asphalt. The cost of the temporary asphalt shall be included in the Contract Unit Price for Maintenance of Traffic, L.S.

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## DROPOFF CONDITION

1. A dropoff is defined as a drop in elevation, parallel to the adjacent travel lanes, greater than 3" with slopes (A:B) steeper than 1:4. When dropoffs occur within the clear zone due to construction or maintenance activities, protection devices are required, see chart.
2. Distance X is to be the maximum practical under project conditions.
3. Distance from the travel lane to the barrier or warning device should be maximum practical for project conditions.
4. Any dropoff condition that is created and restored within the same work period will not be subject to the use of barriers; however, warning devices will be required.
5. When permanent curb heights are  $\geq 6"$ , no warning device will be required. For curb heights  $< 6"$ , see chart.



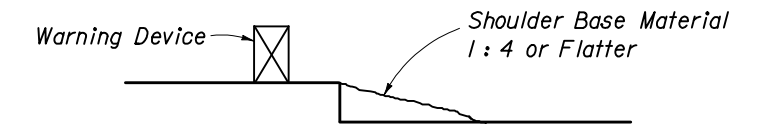
DROPOFF PROTECTION REQUIREMENTS ALL SPEEDS NO CURB AND GUTTER		
X (ft)	D (in)	Device Required
0-CZ	$\leq 3$	Sign W8-9AS
0-I2	$> 3$	Barrier
I2-CZ	$> 3$ to $\leq 5$	Warning Device
0-CZ	$> 5$	Barrier

For Clear Zone widths, see Index No. 600 sheet 4.

## DROPOFF 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:
  - a. Vertical Panel
  - b. Type I Or Type II Barricades
  - c. Drum
  - d. Cone (where allowed)
  - e. Tubular Marker (where allowed)
3. Where a barrier is specified any of the types below may be used as shown in the plans:
  - a. Concrete temporary barrier wall;
  - b. Temporary guardrail and end anchorages;
  - c. Temporary Curb;
  - d. Temporary water filled barriers.
4. Warning device spacing shall be as follows:
  - A. On Taper  
Maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30 - 40 MPH; 50' for 45 MPH and greater.
  - B. On Alignments  
Maximum spacing between cones or tubular markers shall be 25'. and for Type I or Type II barricades, vertical panels or drums is 50' on center for the first 250'; thereafter, cones or tubular markers at 50' on center and Type I or Type II barricades drums or vertical panels at 100' on center.

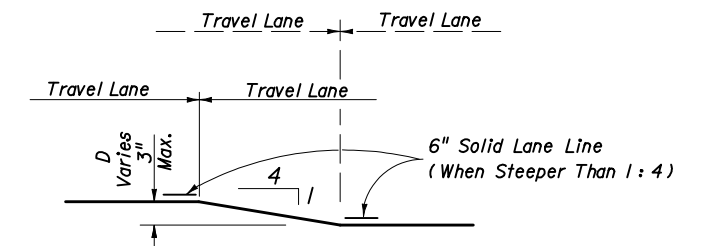
## SHOULDER TREATMENT



### NOTES

1. Shoulder treatment may be used in lieu of barrier. Warning devices are required.
2. Daily inspections shall be conducted to assure that no erosion, excessive slopes, rutting, or other adverse conditions exist. Any deficiencies shall be repaired immediately.
3. Compensation for the placement and removal of the material required for the shoulder treatment shall be included in the cost for Maintenance Of Traffic, LS. Use of shoulder treatment in lieu of a barrier is not eligible for VECP consideration.

## TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING



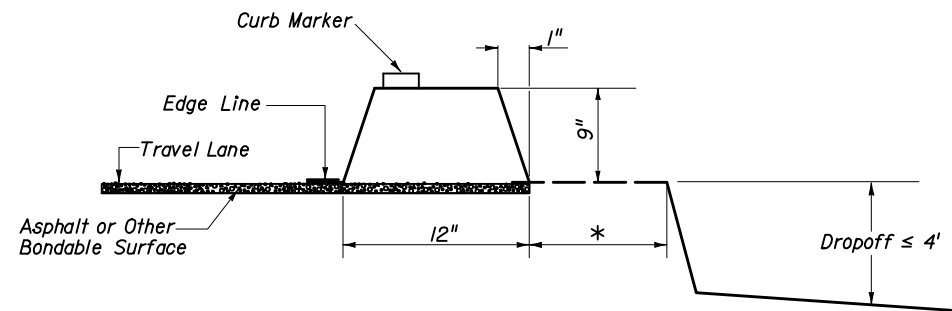
### NOTES

1. This treatment applies to resurfacing or milling operations between adjacent travel lanes.
2. Whenever there is a difference in elevation between adjacent travel lanes, the W8-9A sign with "UNEVEN PAVEMENT" plaque is required at intervals of  $\frac{1}{2}$  mile maximum.
3. If D is  $1\frac{1}{2}"$  or less, no treatment is required.
4. Treatment allowed only when D is 3" or less.
5. If the slope is steeper than 1:4 (not to be steeper than 1:1), the R4-1 and MOT-1 signs shall be used as a supplement to the W8-9A; this condition should never exceed 3 miles in length.

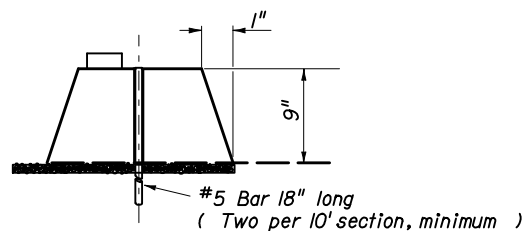
# DROPOFFS IN WORK ZONES

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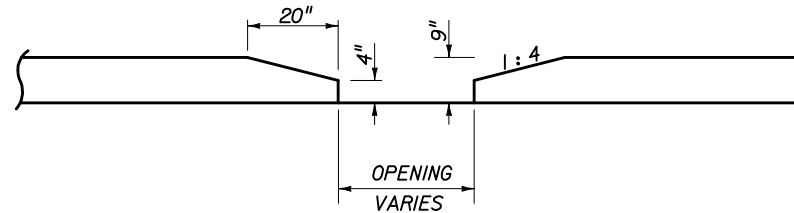


**TEMPORARY CURB DETAIL**

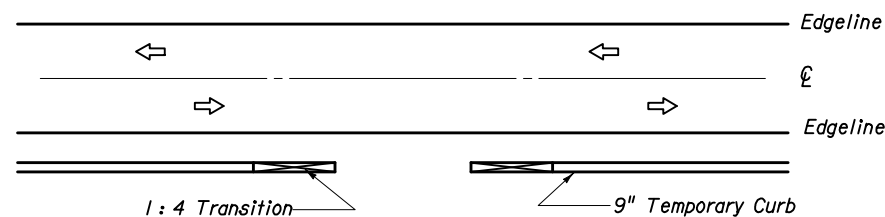


**PINNING DETAIL**

\* 12" ( or more ) is desirable in order to enhance/improve stability. However, it is recognized that there may be cases where 12" ( or more ) is not feasible or obtainable. In these instances, engineering judgement must be used to balance this offset distance with the depth of dropoff, soil type, etc.



**ELEVATION**



**PLAN  
TEMPORARY CURB OPENINGS**

**TEMPORARY CURB**

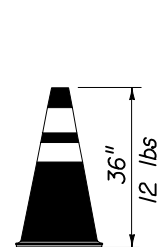
1. Application: Temporary curb shall not be used on facilities with posted speeds greater than 45 mph or dropoffs greater than 4' deep. It shall not be used on Interstate or limited access facilities.
2. Edgelines shall be provided in accordance with the traffic striping specifications, including reflective beads. The face of the curb shall also be painted (white or yellow as appropriate). A Curb Marker shall be placed on the temporary curb every 10' (Colorless when curb is on the right side of the lane, and amber when the curb is on the left side of the lane).
3. The temporary asphalt curb is to be bonded to the surface by use of a tack coat. It is important that the curb adhere to the surface in order to provide the strength necessary to redirect errant vehicles. Concrete curb and curb of other approved materials shall be pinned to a paved surface as shown in detail.
4. When temporary curb is call for in the plans the contractor has the option to construct temporary curb of asphalt, Class I concrete, or other Department approved material. Temporary Traffic Separator as shown in Index 614 shall not be allowed as a substitute for Temporary Curb.
5. When concrete is used to construct temporary curb, 1/2" open joints shall be constructed every 10' in order to control cracking.
6. Drainage needs must be addressed when using temporary curb. If driveways or other accesses are not frequent enough to allow for water runoff, the designer may need to specify the need for "drainage slots" at an appropriate spacing based on grades, number of lanes, etc. Typically, a drainage slot should be 12" wide (a break in the curb) at 50' spacings.
7. At openings such as driveways and business accesses, the temporary curb should be transitioned in height from 4" up to 9" at a 1 : 4 slope in order to eliminate a potential hazard at the end points.
8. Temporary curb shall be paid for under the contract unit price for Temporary Curb, LF, and will include all materials (including Curb Markers) and work necessary to construct, maintain and remove the temporary curb. Any damage to existing pavement caused by the removal of temporary curb shall be satisfactorily repaired and the cost of such repairs are to be included in the cost of the temporary curb.

**NOTICE**

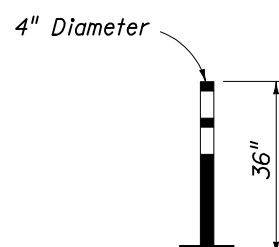
THE TEMPORARY CURB SHOWN ON THIS INDEX CAN BE USED ON STATE HIGHWAY PROJECTS LET TO CONTRACT THROUGH SEPTEMBER 30, 2002. TEMPORARY CURB AND BARRIERS OTHER THAN THE PRECAST TEMPORARY CONCRETE BARRIER WALL DETAILED ON INDEX 415 THAT ARE USED FOR SHIELDING DROPOFFS ON STATE HIGHWAY PROJECTS LET TO CONTRACT AFTER OCTOBER 1, 2002 MUST MEET NCHRP 350 CRITERIA AND MUST BE INCLUDED ON THE QUALIFIED PRODUCTS LIST. IF AND WHEN A GENERIC TEMPORARY CURB OR LOW PROFILE TYPE BARRIER IS APPROVED FOR USE ON STATE HIGHWAY PROJECTS, THE DESIGN WILL BE POSTED ON THE ROADWAY DESIGN WEB SITE.

**TEMPORARY CURB**

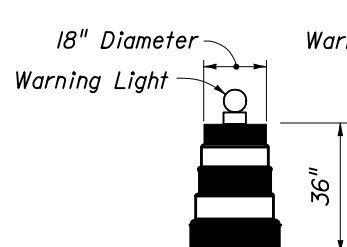
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CONES

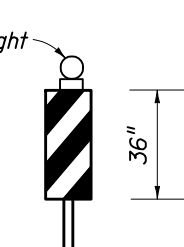


TUBULAR NON-FIXED MARKER TO BE USED DURING DAYLIGHT ONLY.



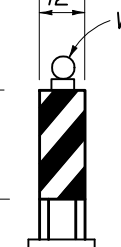
STEEL DRUMS NOT PERMITTED

PLASTIC DRUMS

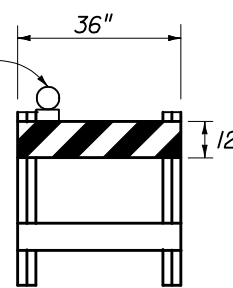


POST MOUNT

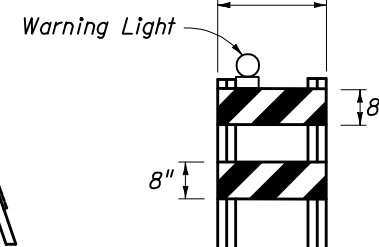
VERTICAL PANEL



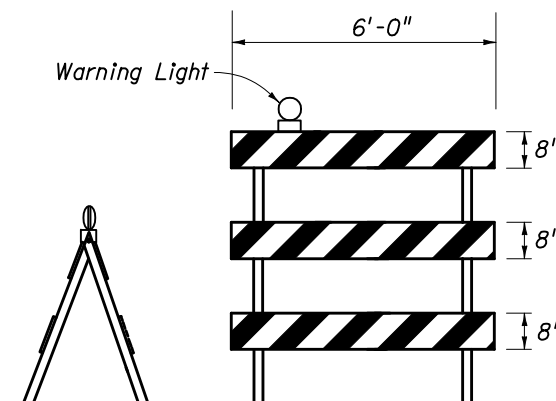
A-FRAME



TYPE I BARRICADE

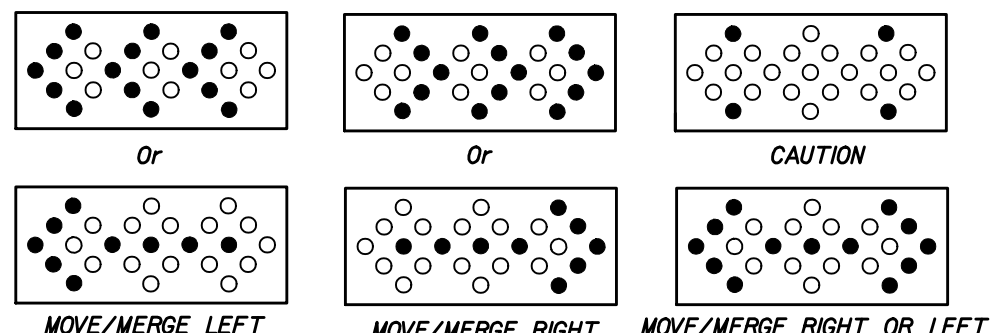


TYPE II BARRICADE



TYPE III BARRICADE

CHANNELIZING AND LIGHTING DEVICE AND ADVANCE WARNING ARROW PANEL NOTES



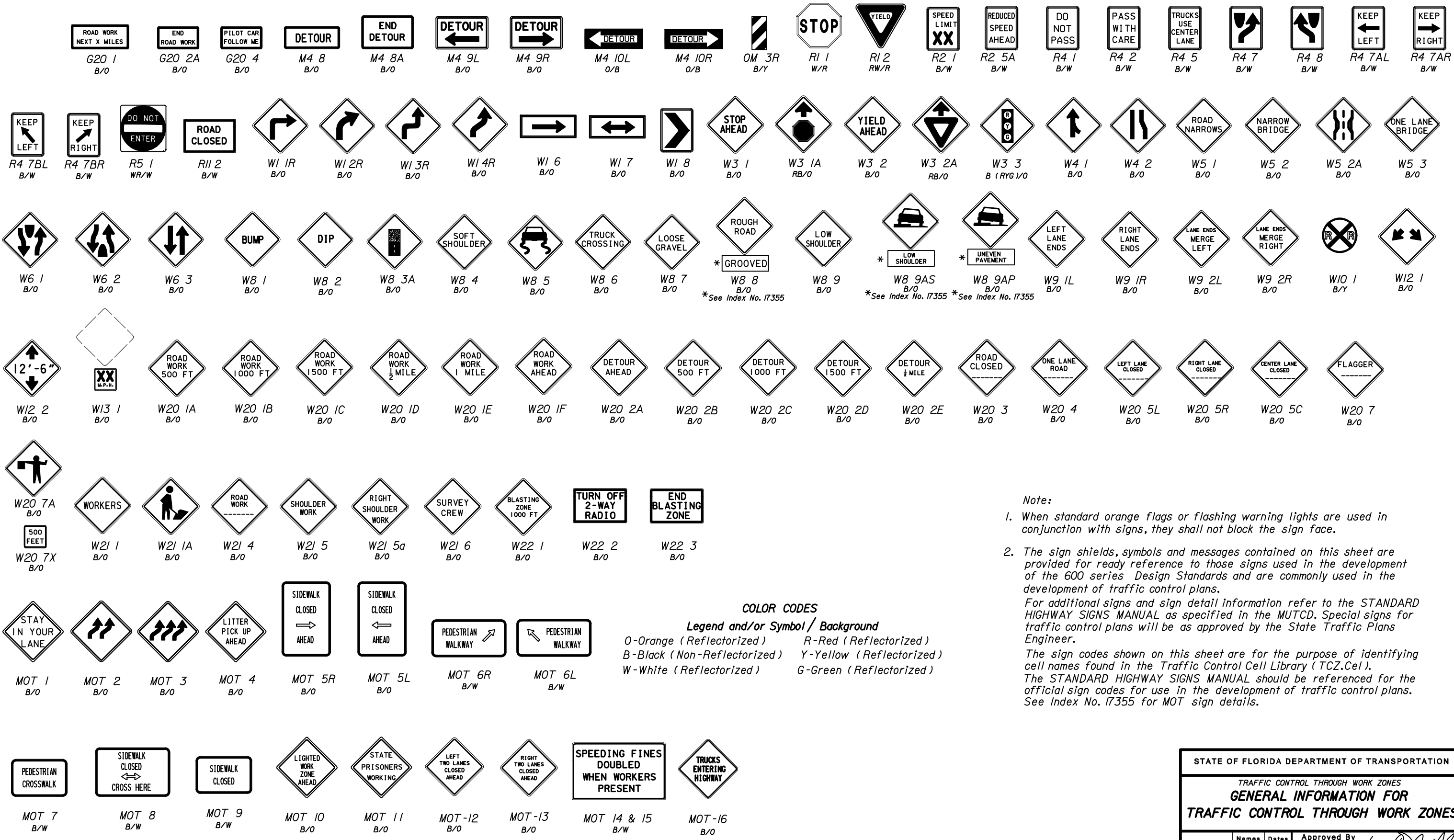
● Minimum Required Lamps  
○ Additional Lamps Allowed

MODES  
ADVANCE WARNING ARROW PANELS

- Only approved traffic control devices included on the Qualified Products List (QPL) may be used.
- The FDOT approval number shall be engraved on the device at a convenient and readily visible location. Where engraving is not practical a water-resistant type label may be used.
- The details shown on this sheet are for the following purposes: (a) For ease of identification and (b) To provide information that supplements or supercedes that provided by the MUTCD.
- The Type III Barricade shall have a unit length of 6'-0" only. When barricades of greater lengths are required those lengths shall be in multiples of the 6'-0" unit. Signs used in conjunction with Type III Barricades may be mounted on or above the Barricade. These Signs should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails.
- During hours of darkness, warning lights shall be used on drums, vertical panels, Type I, Type II and Type III barricades in accordance with 'Warning Lights' Sheet 5.
- Ballast shall not be placed on top rails or any striped rails or higher than 13" above the driving surface.
- For rails less than 3'-0" long, 4" stripes shall be used.
- When Advance Warning Arrow Panels are used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.
- A single arrow panel shall not be used to shift traffic laterally more than one lane. When arrow panels are used to close multiple lanes, a single panel shall be used at the merging taper for each closed lane.
- Cones Shall:
  - Be used only in work zones where workers are present.
  - Not exceed 1 mile in length of use at any one time nor exceed a 12 hour work period.
  - Have as a minimum, one designated person for the purpose of continuous monitoring and maintenance of cones during lane closures.
  - Be reflectorized as per the MUTCD with Department approved reflective collars when used at night.
- The splicing of sheeting is not permitted on either channelizing devices or MOT signs.

IDENTIFICATIONS - CHANNELIZING AND LIGHTING DEVICES AND  
ADVANCE WARNING ARROW PANEL MODES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
GENERAL INFORMATION FOR				
TRAFFIC CONTROL THROUGH WORK ZONES				
Names	Dates	Approved By		
Designed By	12/87	James D. Mill Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	02	8 of 10	600



\*See Index No. I7355 \*See Index No. I7355 \*See Index No. I7355

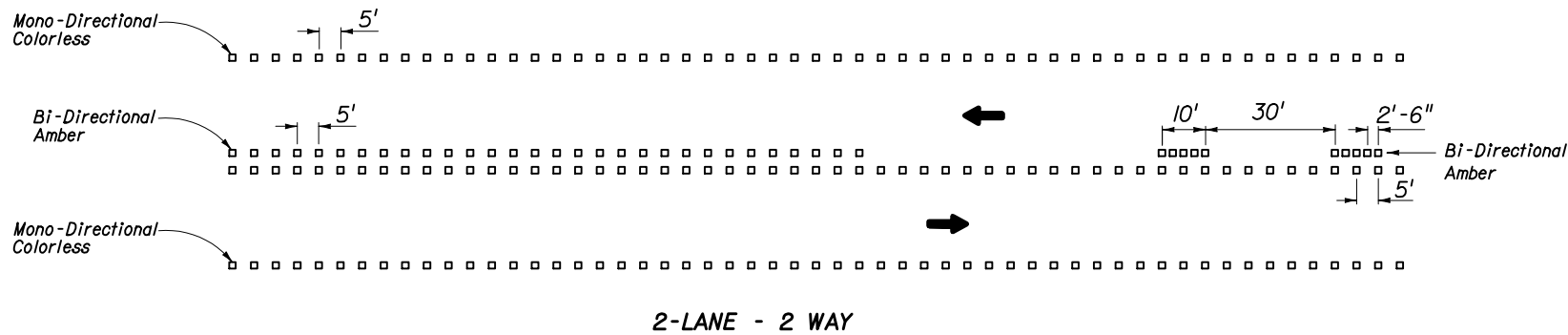
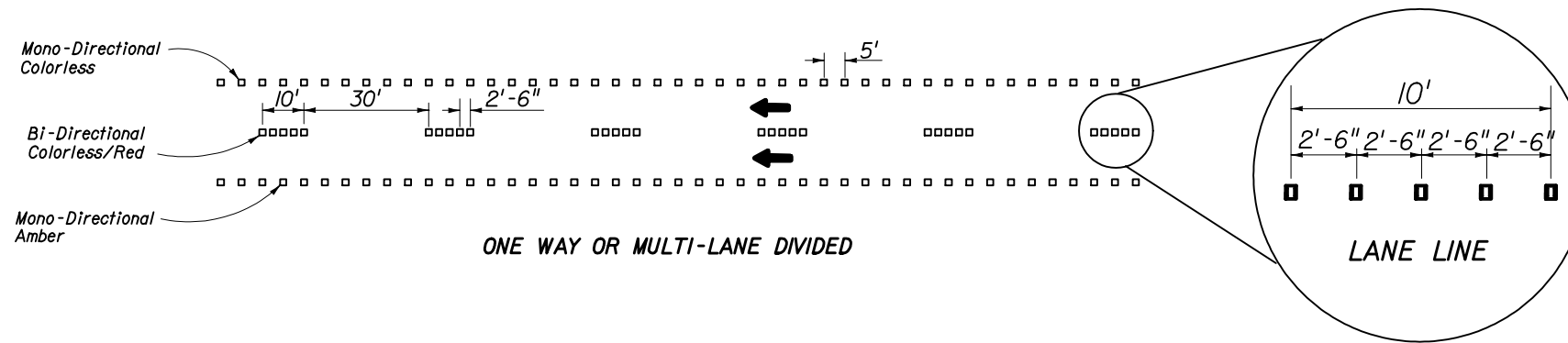
**Note:**

- When standard orange flags or flashing warning lights are used in conjunction with signs, they shall not block the sign face.
- 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 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 cell names found in the Traffic Control Cell Library (TCZ.Cel). The STANDARD HIGHWAY SIGNS MANUAL should be referenced for the official sign codes for use in the development of traffic control plans. See Index No. I7355 for MOT sign details.

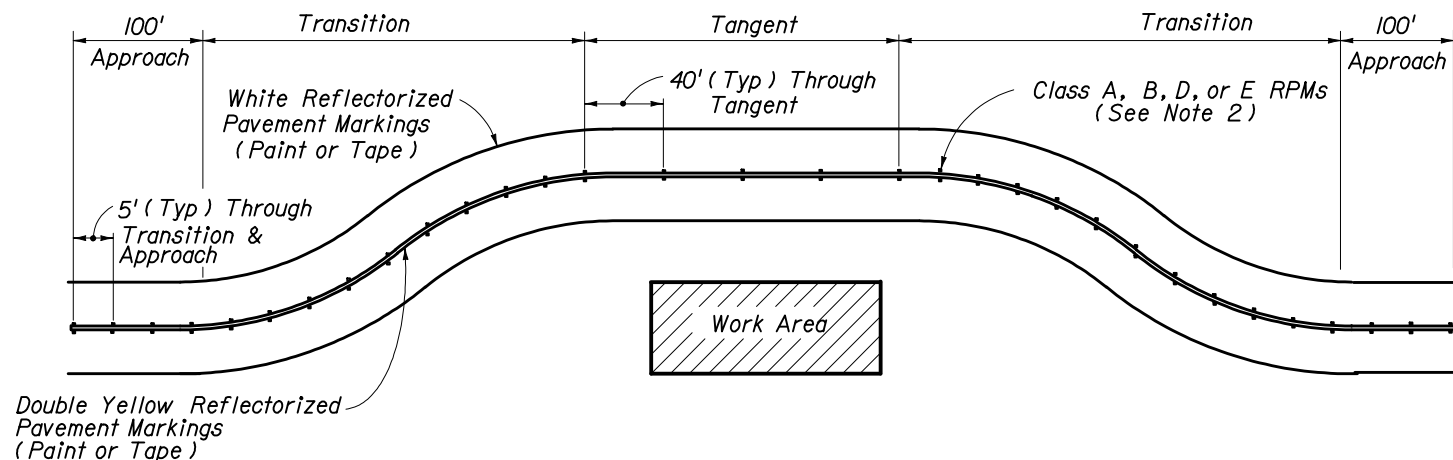
**COLOR CODES**  
**Legend and/or Symbol / Background**  
 O-Orange (Reflectorized) R-Red (Reflectorized)  
 B-Black (Non-Reflectorized) Y-Yellow (Reflectorized)  
 W-White (Reflectorized) G-Green (Reflectorized)

**COMMONLY USED WARNING AND REGULATORY SIGNS IN WORK ZONES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
GENERAL INFORMATION FOR				
TRAFFIC CONTROL THROUGH WORK ZONES				
Names	Dates	Approved By		
Designed By	12/87	[Signature]		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	02	9 of 10	600



**TYPICAL PLACEMENT OF REFLECTIVE PAVEMENT MARKERS  
IN LIEU OF TEMPORARY TAPE OR PAINT IN WORK ZONES**



**USE OF RPMs TO SUPPLEMENT PAINT OR TAPE**

**PAVEMENT MARKINGS**

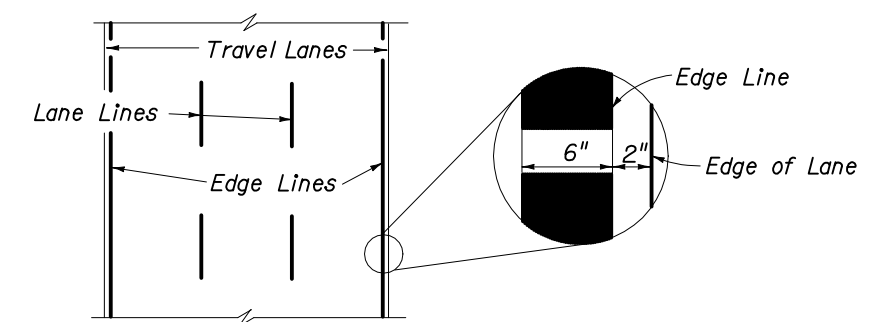
**RPM CLASS**

**APPLICATION FOR REFLECTIVE PAVEMENT MARKERS**

- A Permanent Applications In Non-Traffic Areas Or Can Be Used In Work Zone Applications For Traffic And Non-Traffic Areas.
- B Permanent Application In Traffic And Non-Traffic Areas Or Can Be Used In Work Zone Applications For Traffic And Non-Traffic Areas.
- D Work Zone Application Only, For Traffic And Non-Traffic Areas.
- E Temporary Work Zone Application Only, Not Exceeding Five (5) Continuous Days, For Traffic And Non-Traffic Areas.

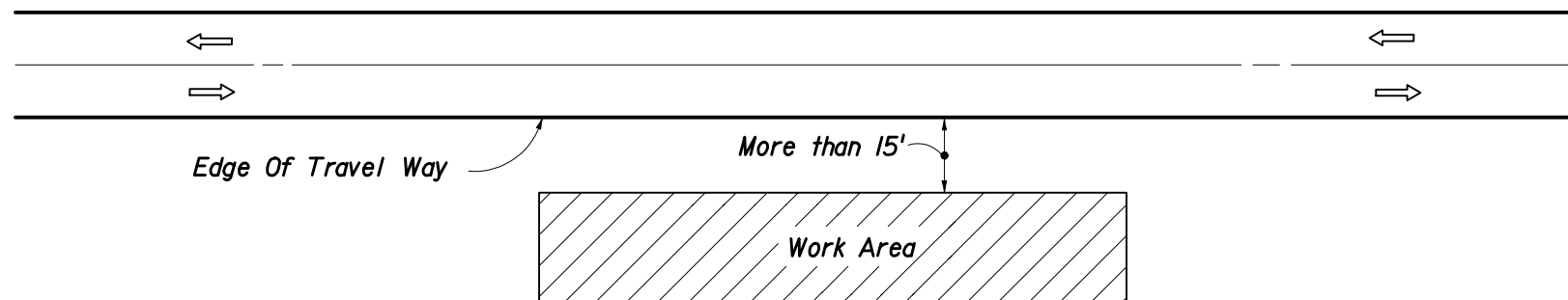
**NOTES FOR REFLECTIVE PAVEMENT MARKERS**

1. RPMs shall be installed as a supplement to all lane lines and the edge lines of of gore areas during construction. Placement of RPMs should be as shown in Index I7352 with the exception that Class D markers be placed at a maximum spacing of 5' center to center.
2. In work zones, CLASS A, B, or D RPMs may be used to form lane lines, edge lines and temporary gore areas, in lieu of tape or paint; however, tape or paint must be used in all transition areas in addition to RPMs. In short term work zones, where the RPMs will be used for five (5) days or less, CLASS "E" RPMs may be used to form lane or edge lines.
3. Basic color rule: colorless reflectors supplement white lines and amber reflectors supplement yellow lines.
4. To provide contrast on concrete pavement, or light asphalt, the five (5) colorless RPMs shall be followed by five black RPMs. The spacing between RPMs shall be 2'-6". Black RPMs will not be required for contrast with amber RPMs.
5. It shall be the contractors responsibility to replace damaged or missing RPMs.
6. RPMs used to supplement lane lines are to be paid for as Reflective Pavement Marker (Temporary), EA. RPM's used in lieu of temporary tape or paint are to be paid for as Removable Pavement Marking L.F.



**PLACEMENT OF PAINT OR TAPE PAVEMENT MARKINGS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
GENERAL INFORMATION FOR				
TRAFFIC CONTROL THROUGH WORK ZONES				
Names	Dates	Approved By <i>Samuel D. Mill</i>		
Designed By		Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	10 of 10	600



**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

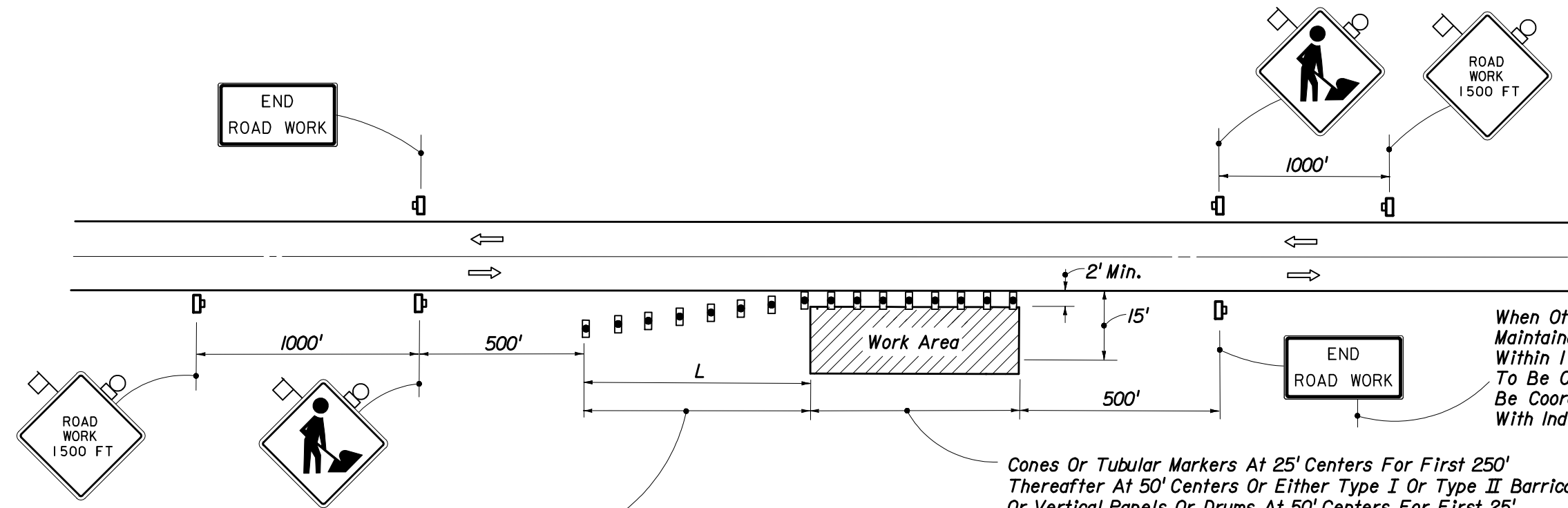
**TYPICAL APPLICATIONS**

- 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					
TRAFFIC CONTROL THROUGH WORK ZONES					
<b>TWO-LANE, TWO-WAY • RURAL</b>					
<b>DAY OR NIGHT OPERATIONS</b>					
	Names	Dates	Approved By 		
Designed By		12/87	Roadway Design Engineer		
Drawn By		12/87	Revision	Sheet No.	Index No.
Checked By		12/87	00	1 of 1	601



Maximum spacing between cones and tubular markers shall be 25'  
 Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows:  
 15' up to 25 MPH; 30' for 30 - 40 MPH;  
 50' for 45 MPH and greater.

Cones Or Tubular Markers At 25' Centers For First 250'  
 Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 25'  
 Thereafter At 100' Centers.

### GENERAL NOTES

- All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
- If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.
- When four or more work vehicles enter the through traffic lanes in a one hour period or less, the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs, see Index No. 603.
- The first two warning 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 (Daylight Only) operations  
 Type B Lights and Orange Flags are not required.
- The WORKERS legend sign may be substituted for the symbol sign.
- All signs shall be post mounted if the work operation time exceeds 12 hours.
- $L (min) = \frac{WS}{2}$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{120}$  for speeds  $\leq 40$  mph
- 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.
- WORKERS sign to be removed or fully covered when no work is being performed.
- 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.

Where:  
 W = Width of shoulder in feet, 8' minimum.  
 S = Posted speed limit (mph)

### SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).  
 (Tubular Markers May Be Used During Daylight Only).  
 Cones May Be Used -See Index 600).
- Work Zone Sign

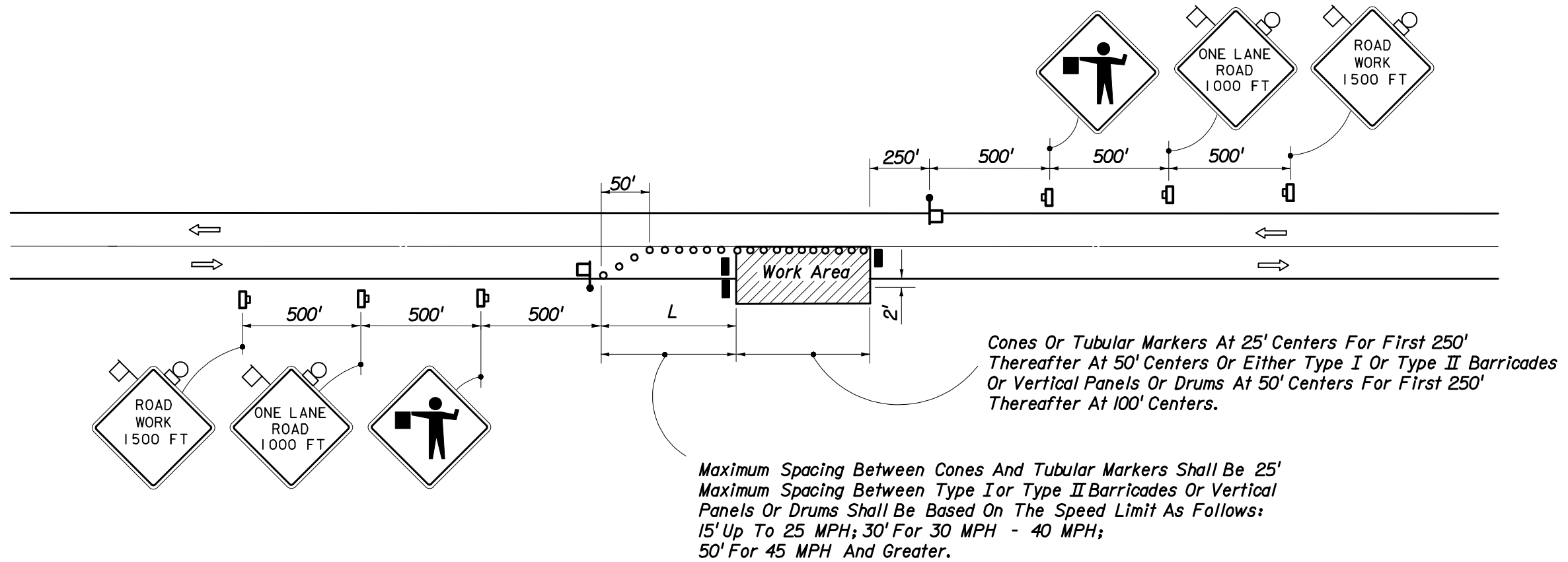
### TYPICAL APPLICATIONS

- Utility Work
- Culvert Extensions
- Side Slope Work
- Guardrail Work
- Landscaping Work
- Cleaning Drainage Structures
- Reworking Ditches
- Sign Installation And Maintenance
- Shoulder Repair

### CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • RURAL DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	00	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 roadway.
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 warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.  
 Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
6. The FLAGGER legend sign may be substituted for the symbol sign.
7.  $L (min) = \frac{WS}{2}$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{120}$  for speeds  $\leq 40$  mph  
 Where:  
 W = Width of lateral transition in feet  
 S = Posted speed limit (mph)
8. 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.
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.

**TYPICAL APPLICATIONS**

- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work

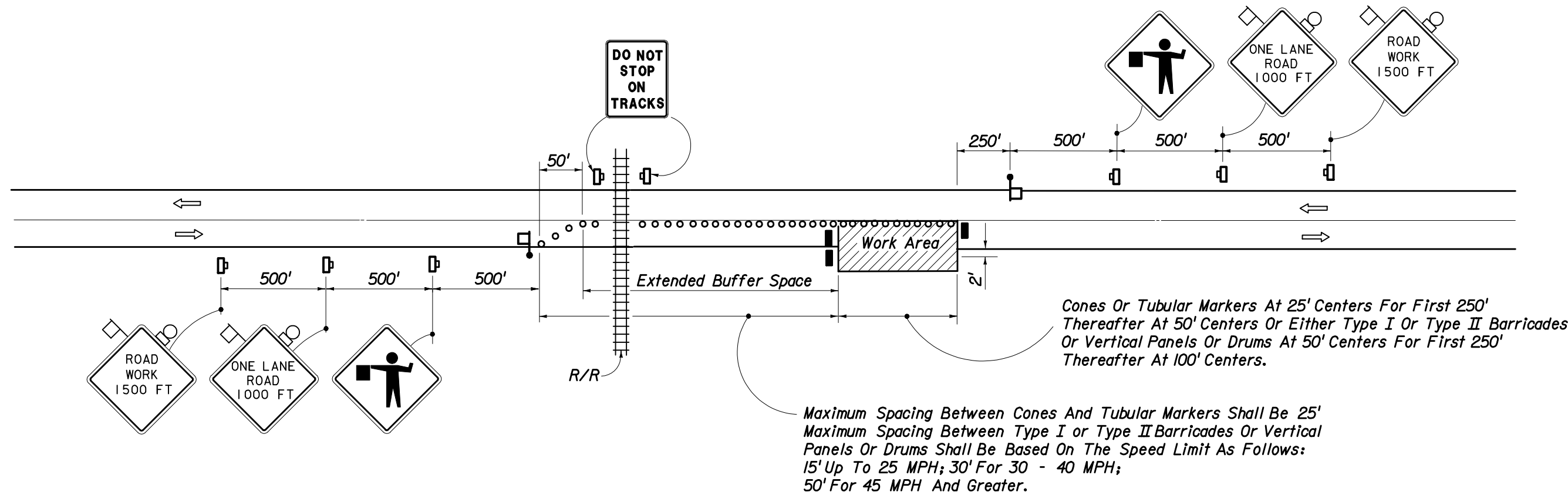
**CONDITIONS**

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, Type II Or Type III Barricade Or Vertical Panel Or Drum
- Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- Flagger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • RURAL OPERATIONS ONE DAYLIGHT PERIOD OR LESS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
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**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 roadway.
3. 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. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.  
*Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.*
5. The FLAGGER legend sign may be substituted for the symbol sign.
6. 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.
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. 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.
10. For general TCZ requirements and additional information, refer to Index No. 600.
11. Discontinuing of extended buffer space will not occur until the queue length plus 300' is reached.

**TYPICAL APPLICATIONS**

- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work

**CONDITIONS**

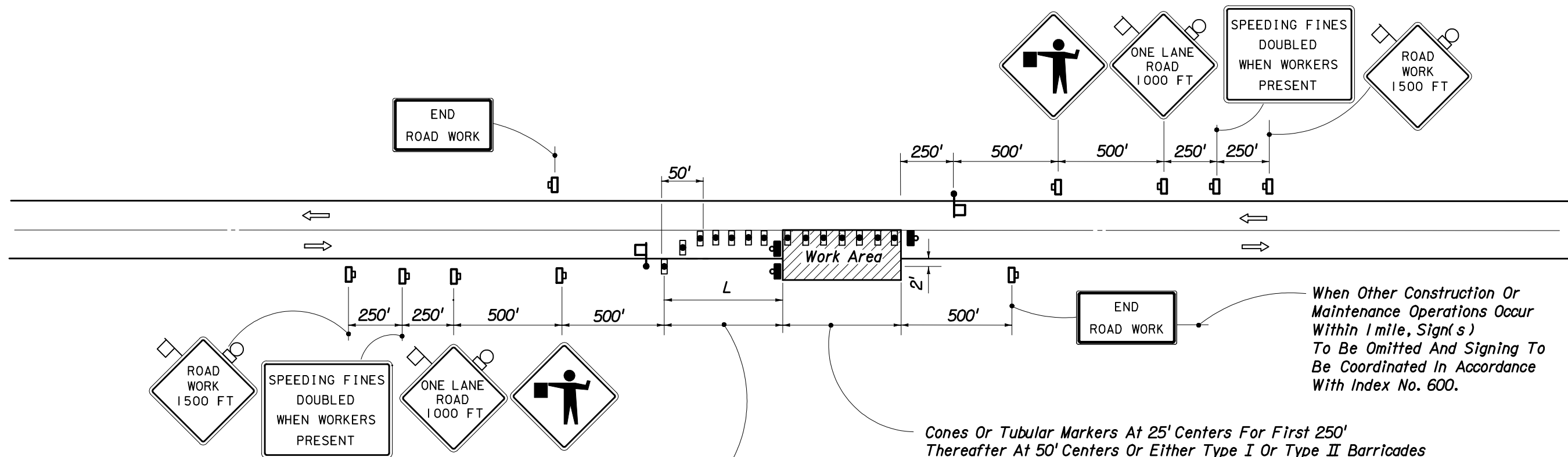
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF PAVEMENT THAT REQUIRES A LANE CLOSURE IN THE VICINITY OF A RAILROAD CROSSING.

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum
- Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- Flagger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • RURAL OPERATIONS ONE DAYLIGHT PERIOD OR LESS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	00	2 of 2	603





Maximum Spacing Between Cones And Tubular Markers Shall Be 25'  
 Maximum Spacing Between Type I or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:  
 15' Up To 25 MPH; 30' For 30 - 40 MPH;  
 50' For 45 MPH And Greater.

Cones Or Tubular Markers At 25' Centers For First 250'  
 Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250'  
 Thereafter At 100' Centers.

**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 roadway.
- 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 warning signs shall have an 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.

7.  $L (min) = \frac{WS}{2}$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{120}$  for speeds  $\leq 40$  mph  
 Where:  
 W = Width of lateral transition in feet.  
 S = Posted speed limit (mph)

- 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

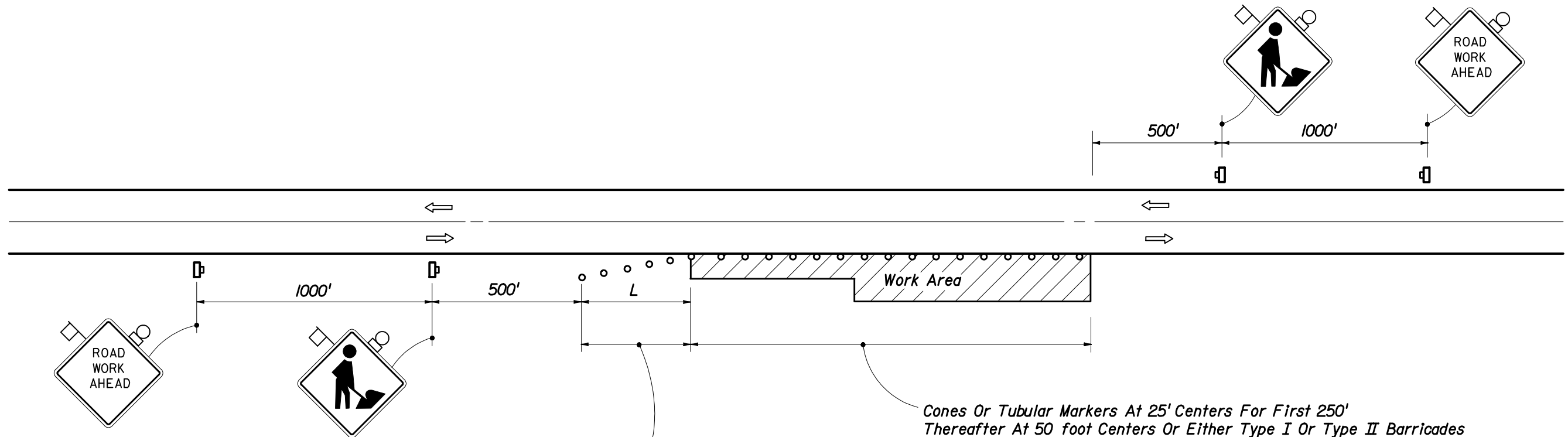
**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT WORKERS OR THEIR ACTIVITIES ENCRANCH 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 Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Flashing Light)
- Work Zone Sign
- Flagger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • RURAL NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD</b>				
Names	Dates	Approved By		
Designed By	12/87			
Drawn By	12/87	Roadway Design Engineer		
Checked By	12/87	Revision	Sheet No.	Index No.
		00	1 of 1	604



Maximum Spacing Between Cones And Tubular Markers Shall Be 25'  
 Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:  
 15' Up To 25 MPH; 30' For 30 MPH - 40 MPH;  
 50' For 45 MPH And Greater.

Cones Or Tubular Markers At 25' Centers For First 250'  
 Thereafter At 50 foot Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250'  
 Thereafter At 100' Centers.

**TYPICAL APPLICATIONS**

- Shoulder And Slope Work
- Utility Work
- Guardrail Work
- Landscape Work
- Delineator Installation And Maintenance
- \* Mowing
- \* Litter Removal

**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 warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
5. The WORKERS legend sign may be substituted for the symbol sign.
- \* 6. Where work activities within 2' of the edge of pavement are incidental (ie. Mowing, Litter Removal) the engineer may delete requirements for cones and signs provided a vehicle with flashing warning lights is present.

7.  $L$  (min.) =  $\frac{WS}{2}$  for speeds  $\geq 45$  mph  
 =  $\frac{WS^2}{120}$  for speeds  $\leq 40$  mph

Where:  
 W = Width of shoulder in feet, 8' minimum.  
 S = Posted speed limit (mph)

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.

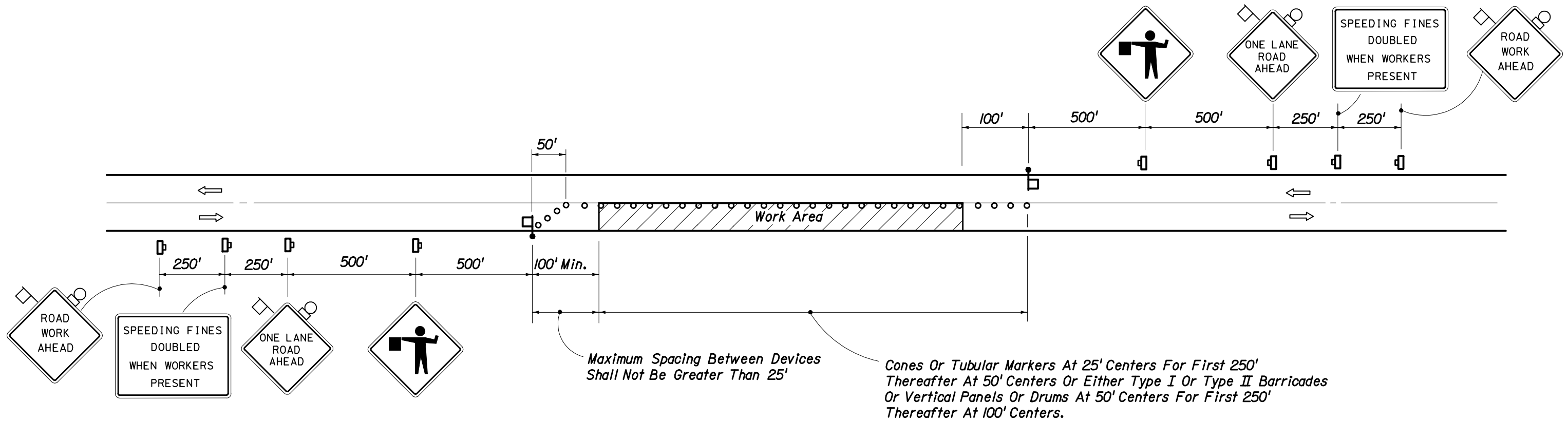
**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION ON THE SHOULDER OR SHOULDER AND SLOPES

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • RURAL MOVING OPERATIONS-DAYLIGHT ONLY</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	02	1 of 1	605



Maximum Spacing Between Devices Shall Not Be Greater Than 25'

Cones Or Tubular Markers At 25' Centers For First 250' Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250' Thereafter At 100' Centers.

### GENERAL NOTES

- All vehicles, equipment, workers (except flaggers), and their activities are restricted at all times to one side of the roadway.
- Minimum length of work area is 200'. Maximum length to be determined by the Engineer, but in no case to exceed the length of one-half ( $\frac{1}{2}$ ) days operation or 2 miles whichever is less.
- If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.
- 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 warning signs shall have an 18" x 18" orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
- The FLAGGER legend sign may be substituted for the symbol sign.
- The ONE LANE ROAD AHEAD and FLAGGER signs are to be 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  
Pavement Surfacing  
Utility Work  
Delineator Maintenance  
Crack Sealing  
Core Boring

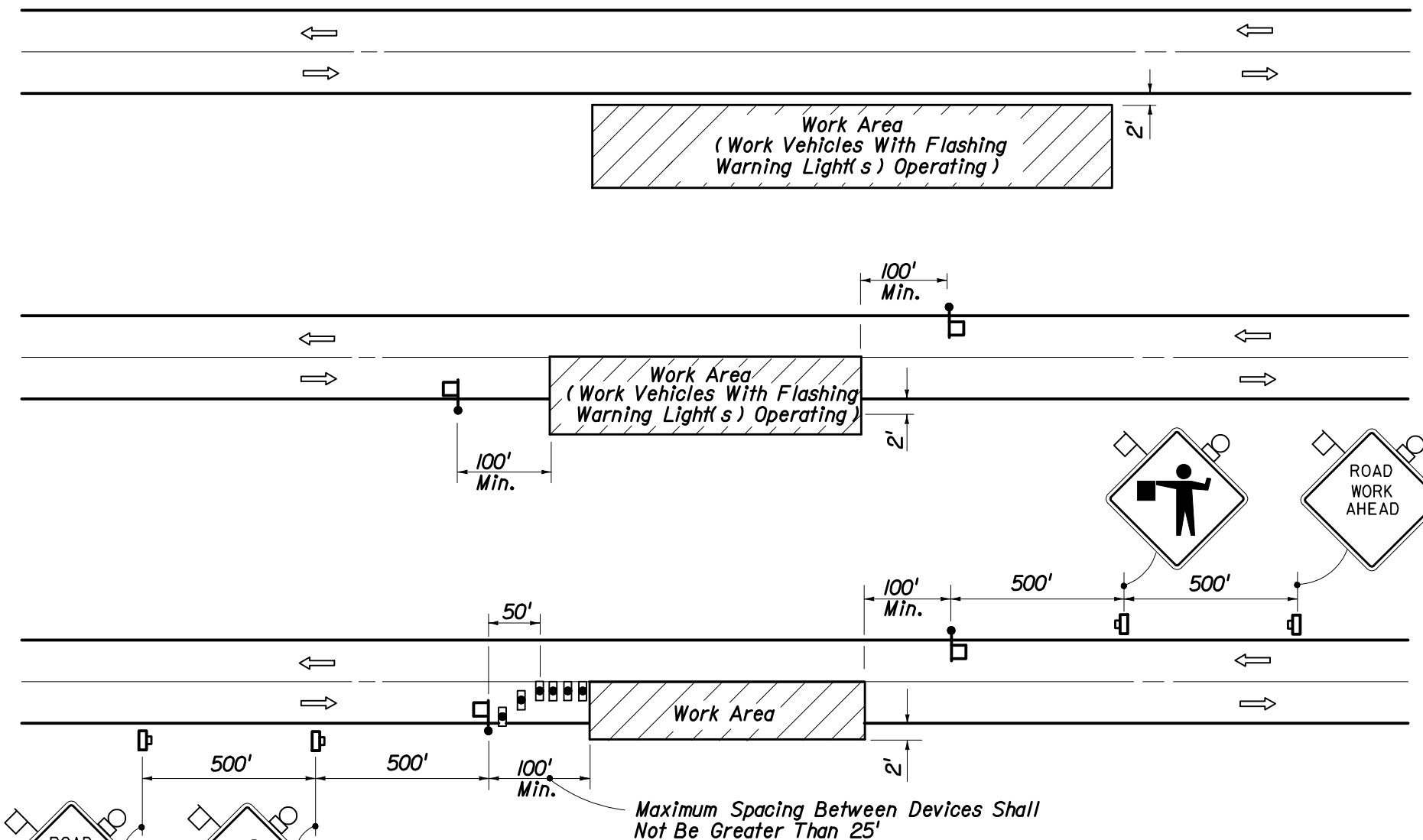
### CONDITIONS

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 4 MILES PER HOUR

### SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- Flagger

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
TWO-LANE, TWO-WAY • RURAL				
MOVING OPERATIONS-DAYLIGHT ONLY				
Names	Dates	Approved By		
Designed By	12/87			
Drawn By	12/87			
Checked By	12/87	Revision	Sheet No.	Index No.
		00	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**

- 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 2 miles whichever is less.
- All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
- 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 warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.  
 Mesh signs may be used for (Daylight Only) operations  
 Type B Lights and Orange Flags are not required.
- The FLAGGER legend sign may be substituted for the symbol sign.
- 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.

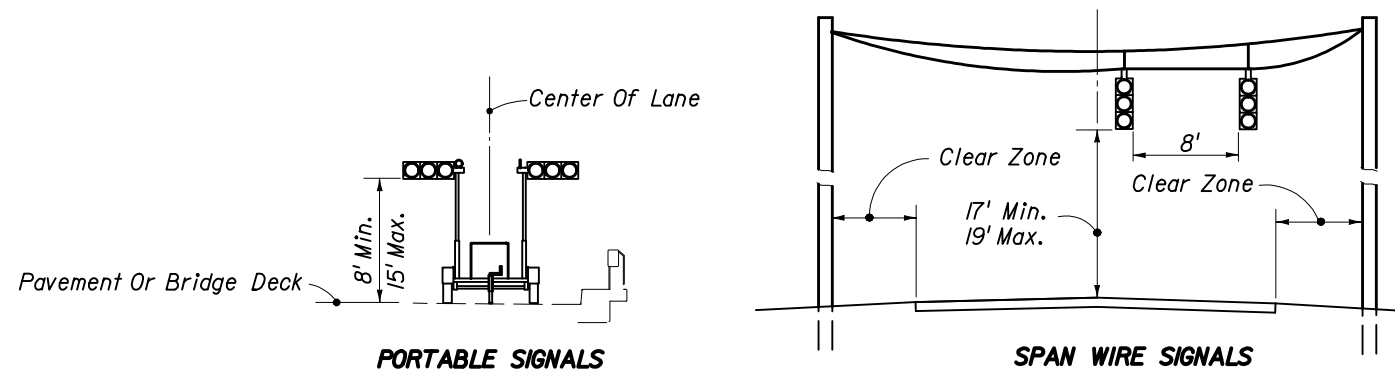
**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only). Cones May Be Used -See Index 600).
- Work Zone Sign
- Flagger

**TYPICAL APPLICATIONS**

- Marking Patches
- Field Patches
- String Line
- Utility Work
- Cleaning Up Debris On Pavement
- Pavement Coring And Straight Edging

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE TWO-WAY • RURAL</b>				
<b>SHORTTIME</b>				
<b>DAY OR NIGHT OPERATIONS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. Index No.
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**SIGNAL MOUNT DETAILS**

**GENERAL NOTES**

1. Work operations shall be confined to one traffic lane, except for haul road crossings, 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 roadway, except for haul road crossings.
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.  
The maximum distance between portable traffic signals (receiver/controllers) shall be .25 mile, however, in no case shall the distance exceed the maximum distance at which the remote operator (transmitter) can positively and safely operate both portable signals.
4. Flaggers to supplement the signal operator/flagger shall be used when needed to assure safe movements between traffic and operating equipment, as determined by the Engineer.
5. The first two warning signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
6. When needed, an additional warning sign may be installed in advance of the ROAD WORK AHEAD sign. The distance between successive signs shall be 500'.
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. SIGNAL AHEAD and EQUIPMENT CROSSING AHEAD signs are to be removed or fully covered when no work is being performed and the highway is open to two-way traffic. Type III Barricades shall be in place to block haul road access when the haul road is not in operation and a flagger/signal operator is not on duty, except when the haul road is an existing properly marked road.
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 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.
13. For general TCZ requirements and additional information refer to Index No. 600.
14. Span wire signals are to be used only in work zones with workers present, where the contractor can monitor signal operation and maintain traffic with flaggers in the event of a power failure.

**TYPICAL APPLICATION**

- Pavement Repair
- Shoulder & Roadside Work
- Bridge Work
- Box Culvert Work
- Drainage Work
- Utility Work
- Haul Road Crossing

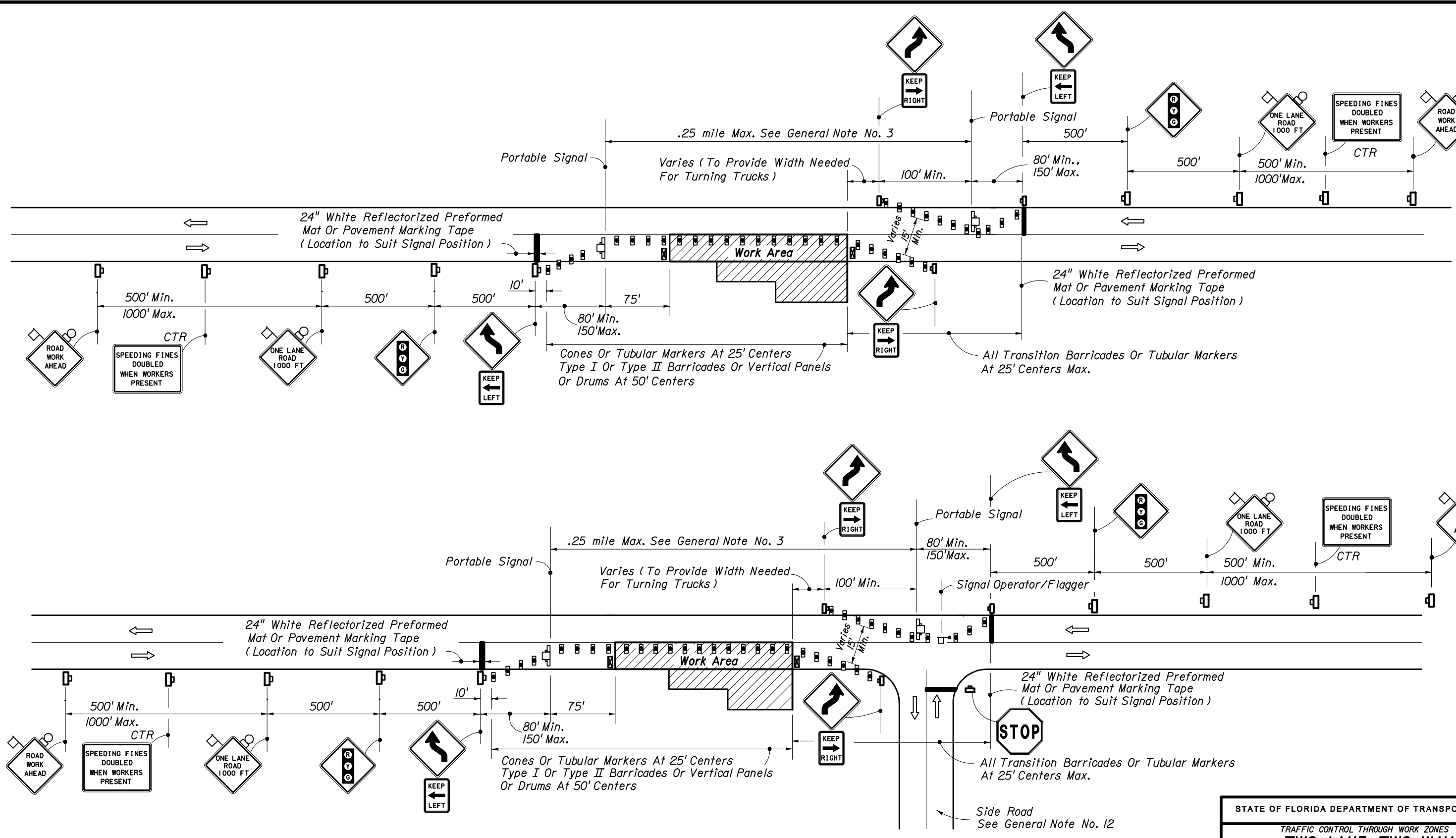
**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON ONE LANE OR MOMENTARILY ENCROACH ON BOTH LANES OF A TWO-LANE TWO-WAY ROADWAY AND TRAFFIC SIGNALS ARE NEEDED.

**SYMBOLS**

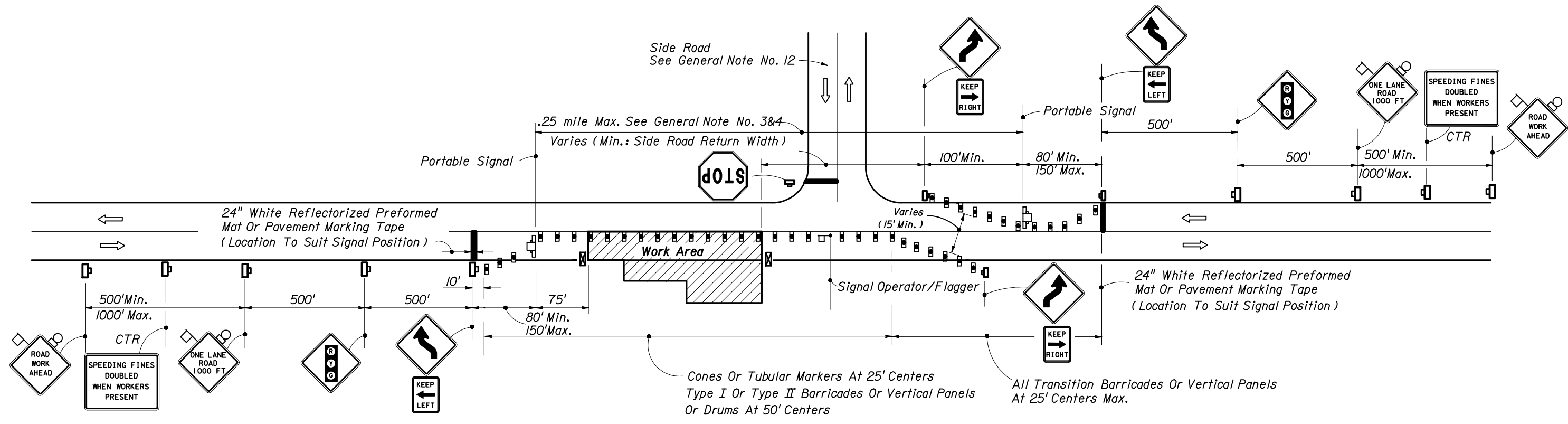
- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Work Zone Sign
- Traffic Signal
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Type III Barricade
- Stop Bar
- Flagger
- Portable Signal

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY</b>				
<b>LANE CLOSURE BY SIGNAL CONTROL</b>				
<b>DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	00	1 of 4	608

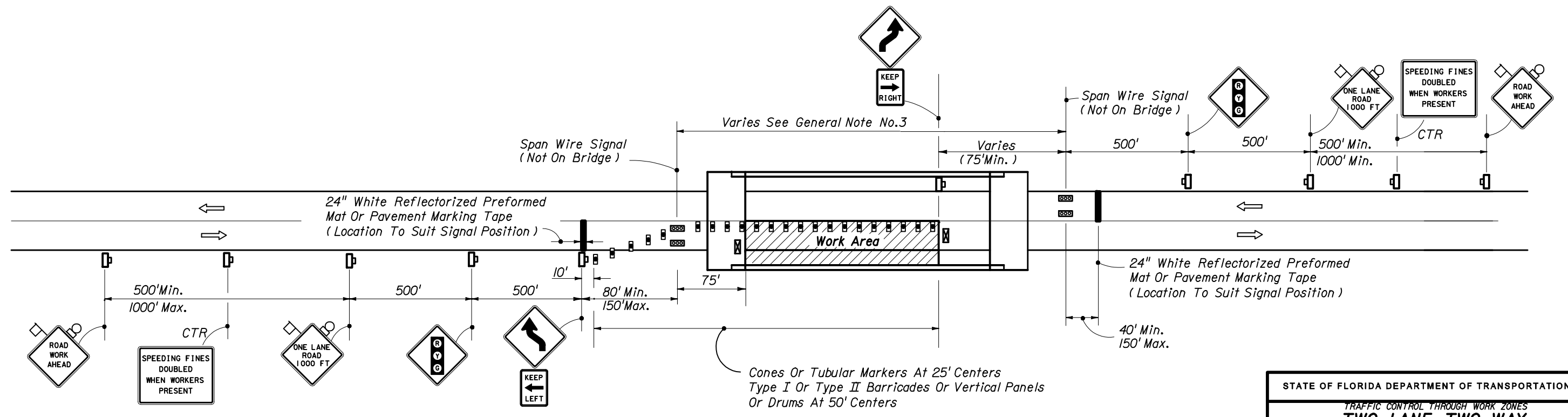


**SINGLE LANE CLOSURE • ROADWAY AND BRIDGES ALL LENGTHS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY</b>				
<b>LANE CLOSURE BY SIGNAL CONTROL</b>				
<b>DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By <i>Samuel D. Hill</i>		
Designed By	5/89	Roadway Design Engineer		
Drawn By	5/89	Revision	Sheet No.	Index No.
Checked By	5/89	00	2 of 4	608

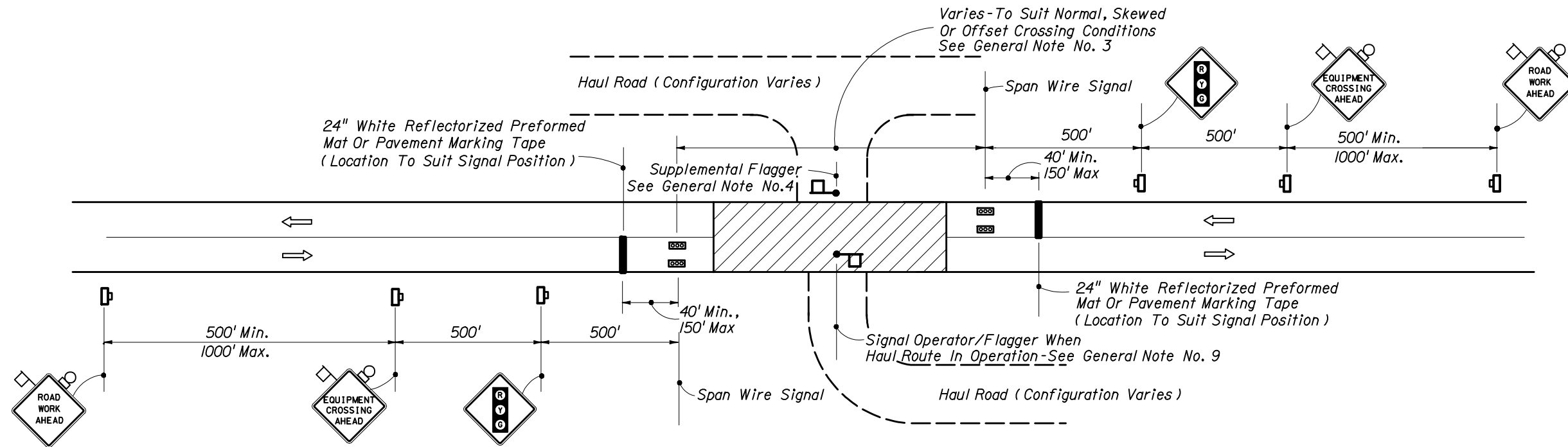


**SINGLE LANE CLOSURE • ROADWAY AND BRIDGES ALL LENGTHS**



**SINGLE LANE CLOSURE • SHORT BRIDGES**

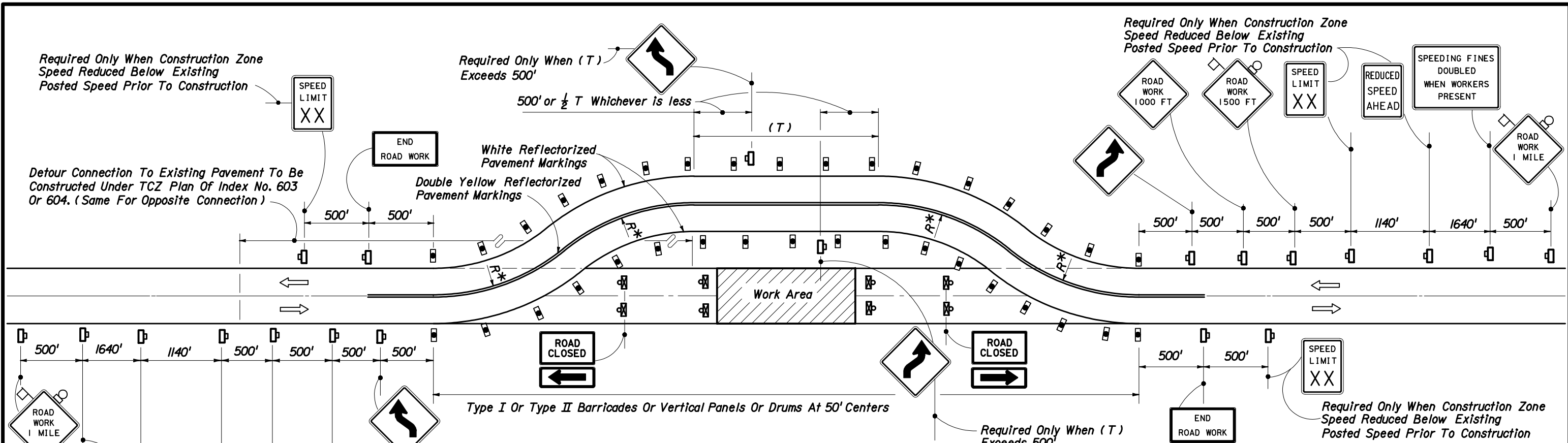
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY</b>				
<b>LANE CLOSURE BY SIGNAL CONTROL</b>				
<b>DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By <i>Samuel D. Mill</i>		
Designed By	5/89	Roadway Design Engineer		
Drawn By	5/89	Revision	Sheet No.	Index No.
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**MOMENTARY ROADWAY CLOSURE • HAUL ROUTE CROSSING**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY</b>				
<b>LANE CLOSURE BY SIGNAL CONTROL</b>				
<b>DAY OR NIGHT OPERATIONS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		5/89	James D. Milk Roadway Design Engineer	
Checked By		5/89	Revision	Sheet No.
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			Index No.	608





R\*: See SUPERELEVATION Index No. 600.

**GENERAL NOTES**

1. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
2. For speed sign applications see Index No. 600.
3. Where the tangent distance (T) exceeds 600', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or Type II barricades, vertical panels or drums may be increased to 100' within limits of the tangent, or post mounted delineators at 50' centers may be substituted for the barricades, vertical panels 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' 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 markings in a broken pattern. For raised pavement marker application see Index No. 600 and Index No. 17352.
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 diversion 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.
11. If posted speed for Work Zone is 45 mph or less use "ROAD WORK 1/2 MILE" and space accordingly.

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Type III Barricade (With Flashing Light)
- Work Zone Sign

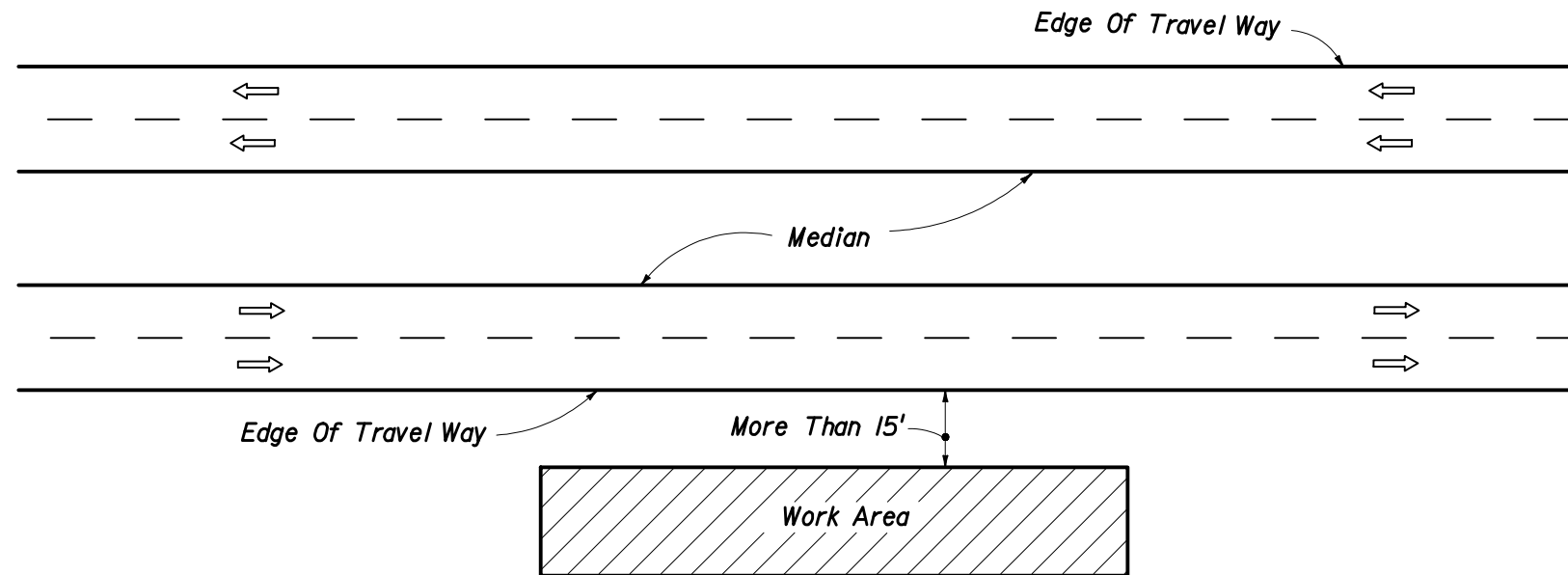
**TYPICAL APPLICATIONS**

- 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 DIVERSION IS CONSTRUCTED

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • RURAL TEMPORARY CONNECTION DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
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**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 undivided or Index No. 611 divided.
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' 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.

**TYPICAL APPLICATIONS**

- Landscaping Work
- Utility Work
- Fencing Work
- Cleaning Drainage Structures
- Reworking Ditches

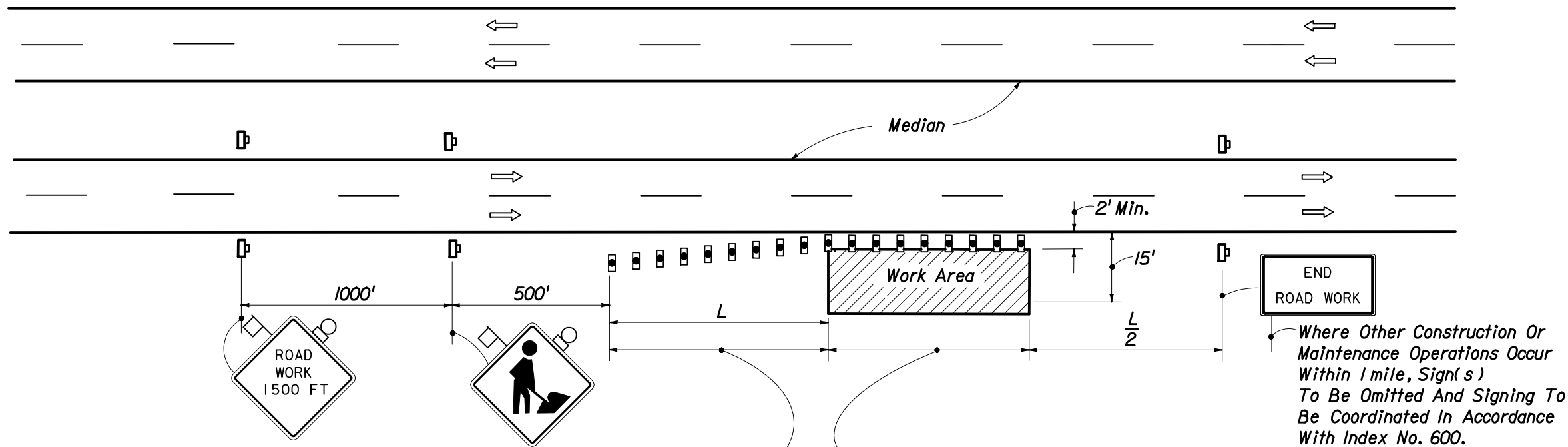
**CONDITIONS**

WHERE ALL VEHICLES, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE MORE THAN 15' FROM THE EDGE OF PAVEMENT

**SYMBOLS**

Work Area

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
TRAFFIC CONTROL THROUGH WORK ZONES					
<b>MULTILANE DIVIDED OR UNDIVIDED</b>					
<b>RURAL • DAY OR NIGHT OPERATIONS</b>					
Designed By	Names	Dates	Approved By <i>Jamal D. Mill</i>		
Drawn By		12/87	Roadway Design Engineer		
Checked By		12/87	Revision	Sheet No.	Index No.
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Maximum Spacing Between Cones And Tubular Markers Shall Be 25'  
 Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:  
 15' Up To 25 MPH; 30' For 30 - 40 MPH;  
 50' For 45 MPH And Greater.

Cones Or Tubular Markers At 25' Centers For First 250'  
 Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250'  
 Thereafter At 100' Centers.

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF PAVEMENT FOR A PERIOD OF 60 MINUTES OR GREATER

**TYPICAL APPLICATIONS**

- Utility Work
- Culvert Extensions
- Side Slope Work
- Guardrail Work
- Landscaping Work
- Cleaning Drainage Structures
- Reworking Ditches
- Sign Installation And Maintenance
- Shoulder Repair

**GENERAL NOTES**

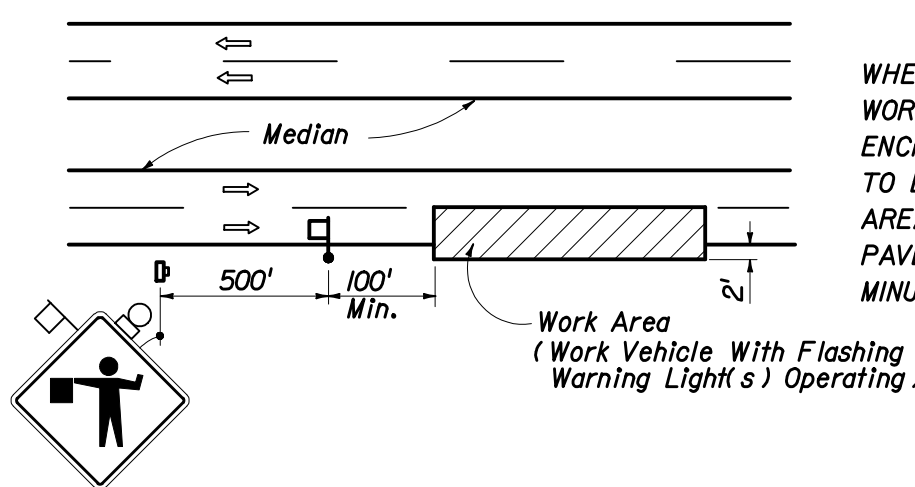
1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
2. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period a flagger shall be provided and a FLAGGER 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.
3. This TCZ plan also applies to work performed in the median more than 2' but less than 15' from the edge of either pavement.
4. The first two warning 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 (Daylight Only) operations  
 Type B Lights and Orange Flags are not required.
5. The WORKERS legend sign may be substituted for the symbol sign.
6.  $L (min) = \frac{WS}{2}$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{120}$  for speeds  $\leq 40$  mph
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
10. WORKERS signs to be removed or fully covered when no work is being performed.
11. END ROAD WORK signs required only when work exceeds one daylight period.
12. 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.
13. If the work operation is less than 60 minutes, signs, barricades, vertical panels, cones, tubular markers, or drums will not be required provided vehicles in the work area have warning light(s) operating.
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 Vertical Panel Or Drum (With Steady Burning Light At Night Only).  
 (Tubular Markers May Be Used During Daylight Only.  
 Cones May Be Used - See Index 600).
- Work Zone Sign

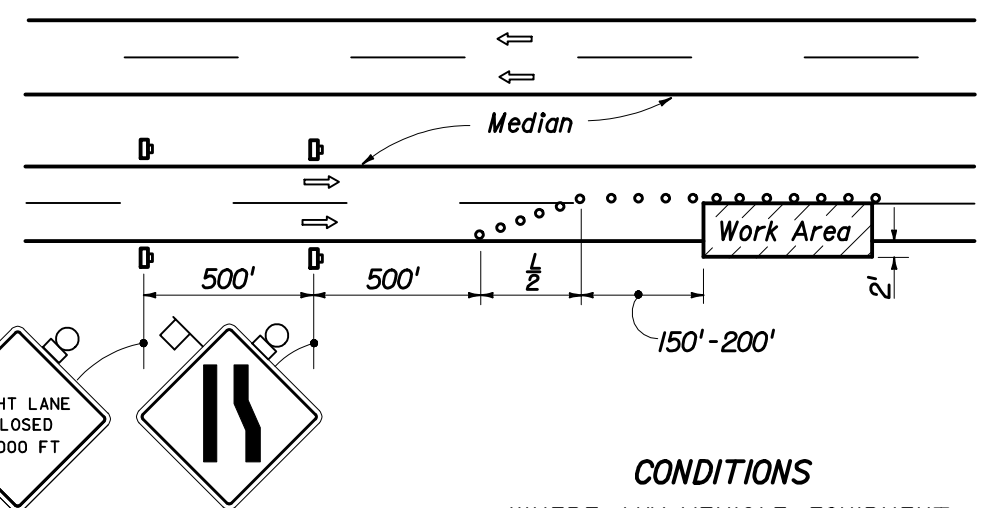
Where:  
 W = Width of lateral transition in feet.  
 S = Posted speed limit

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE DIVIDED OR UNDIVIDED RURAL • DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	02	1 of 1	611



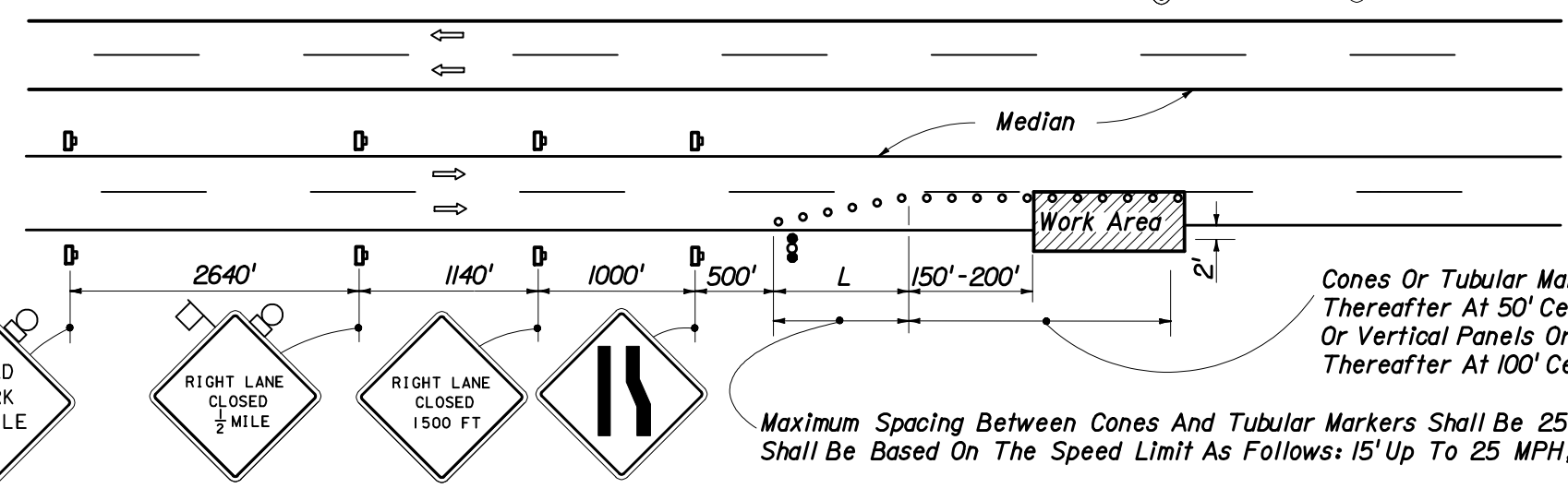
**CONDITIONS**

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



**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

Cones Or Tubular Markers At 25' Centers For First 250' Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250' Thereafter At 100' Centers.

Maximum Spacing Between Cones And Tubular Markers Shall Be 25'. Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows: 15' Up To 25 MPH; 30' For 30 - 40 MPH; 50' For 45 MPH And 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 roadway.
3. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.  
Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
4. On undivided highways the median signs as shown are to be omitted.
5. 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. 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.
7.  $L$  (min.) = Length of taper feet :  
=  $WS$  for speeds  $\geq 45$  mph  
=  $\frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
Where:  
W = Width of lateral transition in feet  
S = Posted speed limit
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 work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
11. 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.
12. 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.
13. For general TCZ requirements and additional information, refer to Index No. 600.

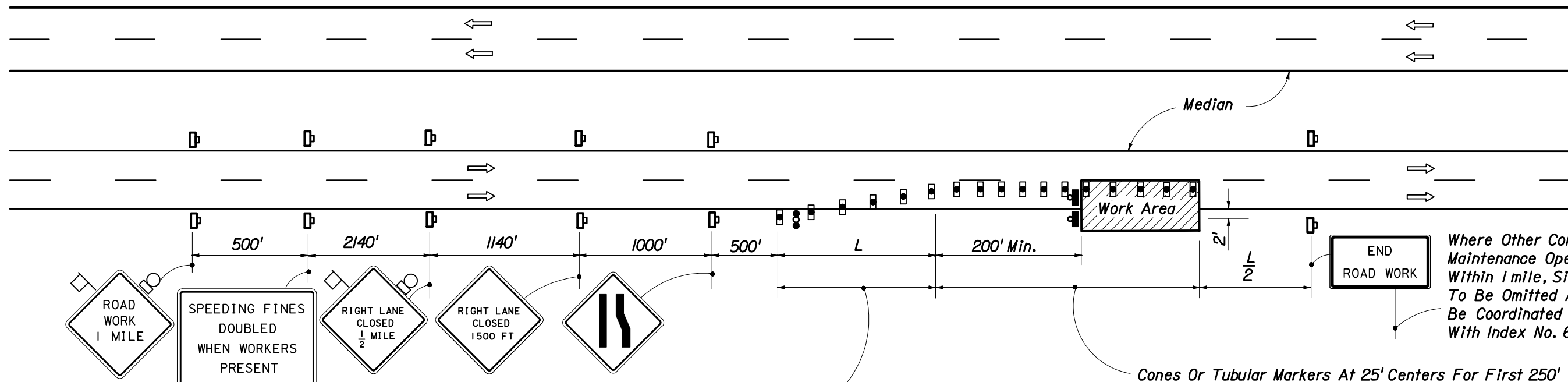
**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- Flagger
- Advance Warning Arrow Panel

**TYPICAL APPLICATIONS**

- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work
- Pavement Coring And Straight Edging

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE, DIVIDED AND UNDIVIDED RURAL OPERATIONS ONE DAYLIGHT PERIOD OR LESS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		12/87	Revision	Sheet No. 1 of 1
Checked By		12/87	00	Index No. 612



Maximum spacing between cones and tubular markers shall be 25'  
 Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows:  
 15' up to 25 MPH; 30' for 30 - 40 MPH; 50' for 45 MPH and greater.

Where Other Construction Or Maintenance Operations Occur Within 1 mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600

Cones Or Tubular Markers At 25' Centers For First 250'  
 Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250'  
 Thereafter At 100' Centers.

**SYMBOLS**

- Work Area
- Sign With 18"x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel

**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 roadway.
3. The first two warning 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. Signs and traffic control devices are to be modified in accordance with INTERMITTENT WORK STOPPAGE details (sheet 2 of 2) when no work is being performed and the highway is open to traffic.

8.  $L$  (min.) = Length of taper in feet:  
 =  $WS$  for speeds  $\geq 45$  mph  
 =  $\frac{WS^2}{60}$  for speeds  $\leq 40$  mph

Where:

$W$  = Width of lateral transition in feet  
 $S$  = Posted speed limit (mph).


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 work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
12. 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.
13. For general TCZ requirements and additional information refer to Index No. 600.

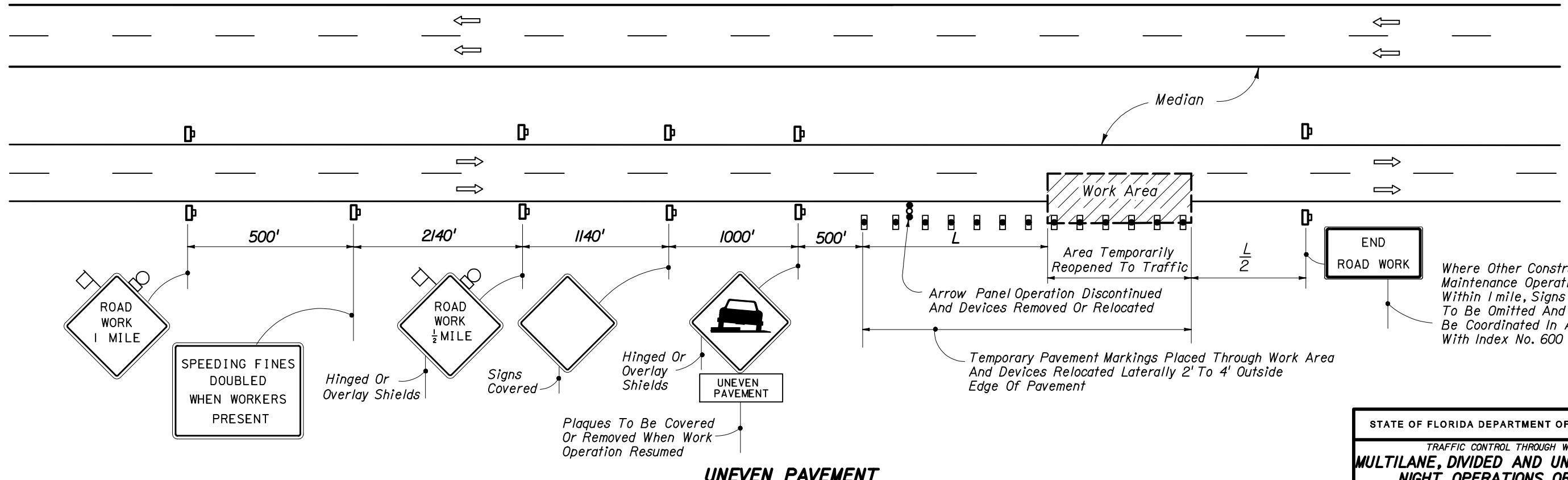
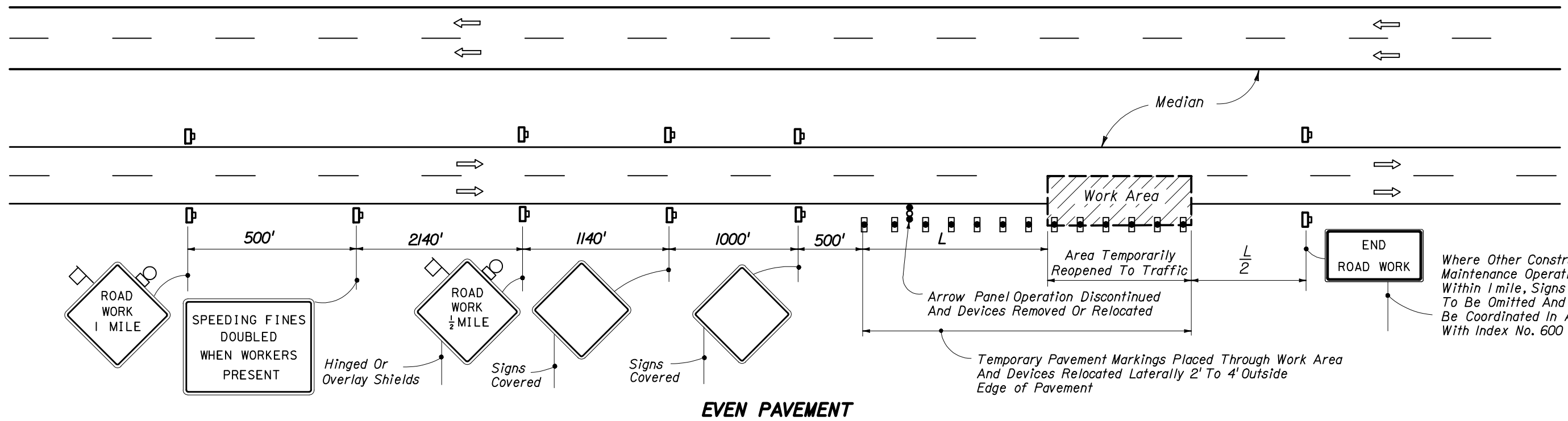
**TYPICAL APPLICATIONS**

- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work

**CONDITIONS**

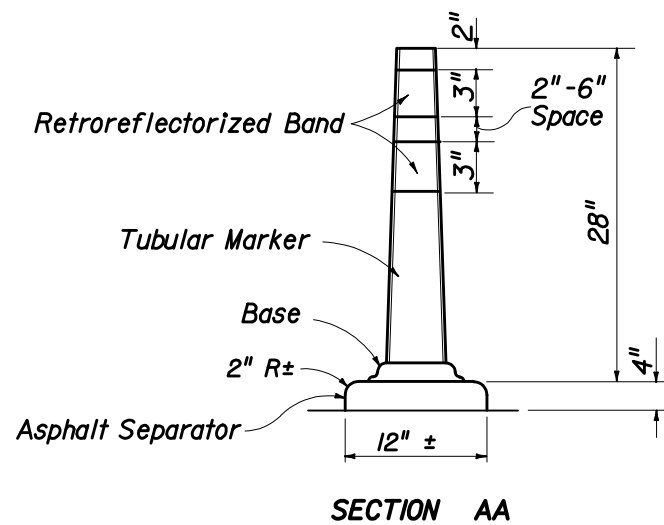
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE, DIVIDED AND UNDIVIDED • RURAL NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD</b>				
Designed By	Names	Dates	Approved By 	
Drawn By		12/87	Revision	Sheet No. 1 of 2
Checked By		12/87	00	Index No. 613

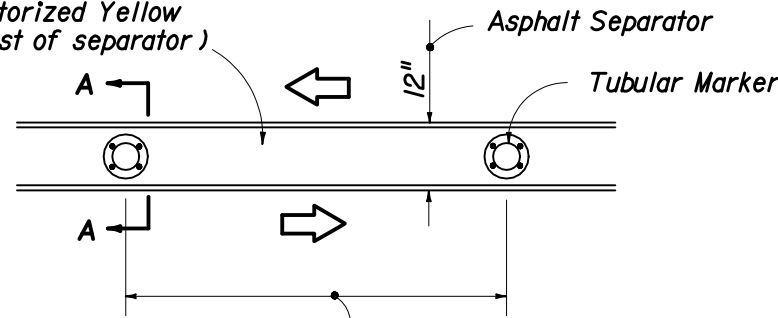


**INTERMITTENT WORK STOPPAGE • RIGHT LANE REOPENED TO TRAFFIC • DAYTIME OR NIGHTTIME**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE, DIVIDED AND UNDIVIDED • RURAL</b>				
<b>NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD</b>				
Designed By	Names	Dates	Approved By <i>Samuel D. Hill</i>	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. Index No.
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Entire Separator Shall Be Painted Reflectorized Yellow (included in cost of separator)



Based On Speed Limit As Follows:  
15' Up To 25 MPH; 30' For 30 - 40 MPH;  
50' For 45 MPH And Greater.

PLAN

- Notes: (a) The tubular marker 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 lb. vehicle at a velocity of 75'/sec.
- (b) The tubular marker shall be orange with two white retroreflective bands.
- (c) The tubular marker may be attached by bituminous adhesive or other methods approved by the Engineer.
- (d) Reflectorized materials shall have a smooth sealed outer surface which will display the same approximate color day and night.
- (e) 12" openings for drainage will be constructed in the separator island every 25' in areas with grades of 1% or less or every 50' in areas with grades over 1% as directed by the Engineer.

## DETAIL OF TEMPORARY ASPHALT TRAFFIC SEPARATOR

## 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

## GENERAL NOTES

- All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
- The first two warning signs, each side, shall have a 18" x 18" orange flag and a Type B light attached and operating at all times.
- All signs shall be post mounted.
- TWO-WAY TRAFFIC sign(s) shall be repeated every  $\frac{1}{4}$  mile in each direction, throughout the tangent distance (T).
- $L$  (min.) =  $WS$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 $W$  = Width of lateral transition in feet.  
 $S$  = Posted speed limit (mph).
- Where the tangent distance (T) exceeds 250', spacing between Type I or II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent, or post mounted delineators at 50' centers may be substituted for barricades, vertical panels or drums.

- All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings 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.
- The contractor has the option of using temporary traffic separators and tubular type warning devices from the qualified products list in lieu of the temporary asphalt traffic separator and tubular warning device detailed above. Temporary Curb shall not be allowed as a substitute for Temporary Traffic Separator.
- Temporary Traffic Separator shall be paid for under the contract unit price for Maintenance of Traffic, LS, and will include all materials and work necessary to construct, maintain and remove the temporary traffic separator. Any damage to existing pavement caused by the removal of temporary traffic separator shall be satisfactorily repaired and the cost of such repairs are to be included in the cost of Maintenance of Traffic, LS.

## 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

## SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used - See Index 600).
- Work Zone Sign
- Advance Warning Arrow Panel

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

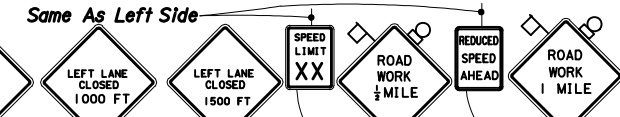
TRAFFIC CONTROL THROUGH WORK ZONES

**MULTILANE DIVIDED • RURAL  
DAY OR NIGHT OPERATIONS**

Names	Dates	Approved By	Revision	Sheet No.	Index No.
Designed By	12/87				
Drawn By	12/87				
Checked By	12/87		02	1 of 2	614

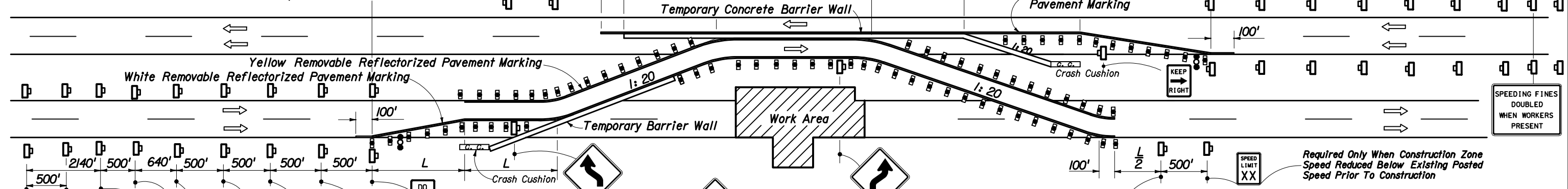
BUFFER LENGTH (FEET)		
Construction Zone Speed MPH	X (ft)	Z (ft)
60-70	560	630
55	360	510
≤ 50	180	380

Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers



Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Same As Left Side



SCHEME 1

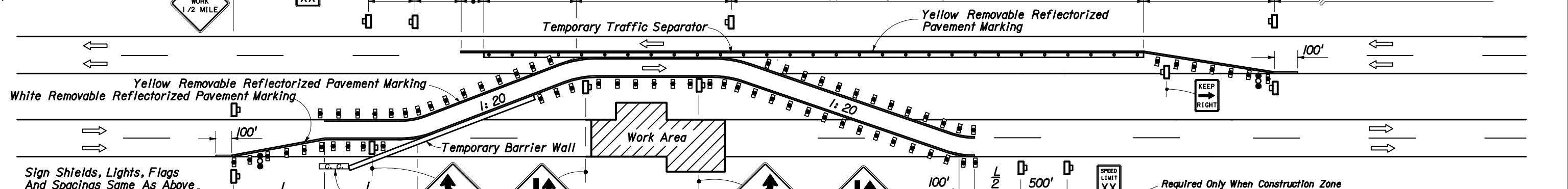
Where Other Construction Or Maintenance Operations Occur Within 1 mile, Sign(s) To Be Coordinated In Accordance With Index No. 600 (All Schemes)

Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers

Maximum As Called For In The Plans Or As Approved By The Engineer (2L Minimum)

Sign Shields, Lights, Flags And Spacings Same As Above

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction



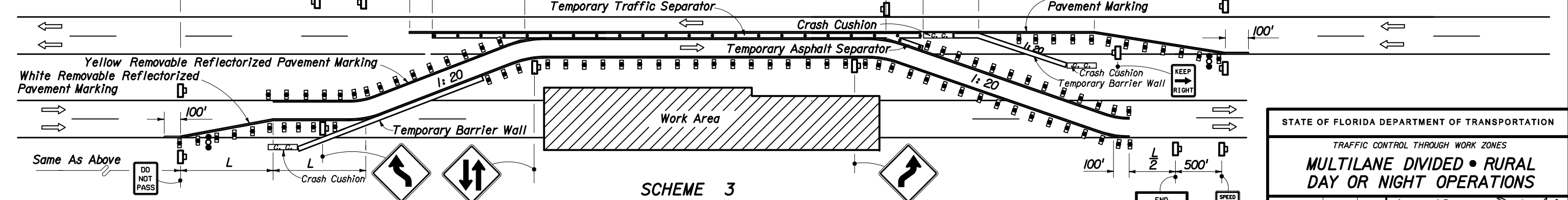
SCHEME 2

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers

Same As Above

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction



SCHEME 3

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Note: See Sheet 1 of 2 for Scheme Applications

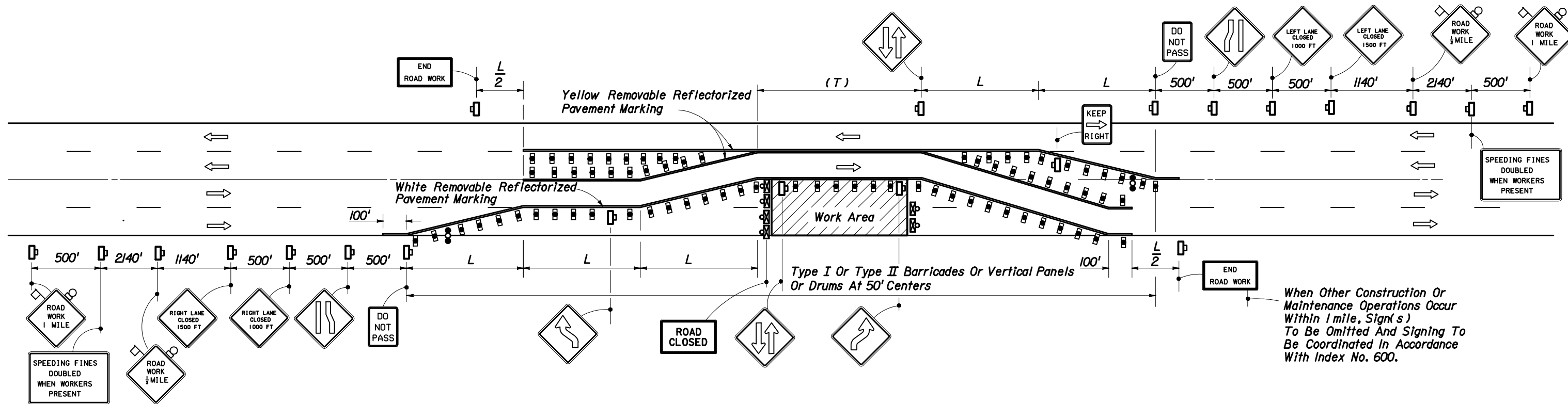
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES

**MULTILANE DIVIDED • RURAL DAY OR NIGHT OPERATIONS**

Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87			
Checked By	12/87			
Revision	00			
		2 of 2	614	





When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

**GENERAL NOTES**

- All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
- The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
- All signs, except those required in paved areas, shall be post mounted if the closure time exceeds 12 hours.
- TWO-WAY TRAFFIC signs shall be repeated every 1/4 mile in each direction, through the tangent distance (T).
- $L$  (min.) =  $WS$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 $W$  = Width of lateral transition in feet.  
 $S$  = Posted speed limit (mph).
- Where the tangent distance (T) exceeds 250', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or Type II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent.
- 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.
- 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.

**SYMBOLS**

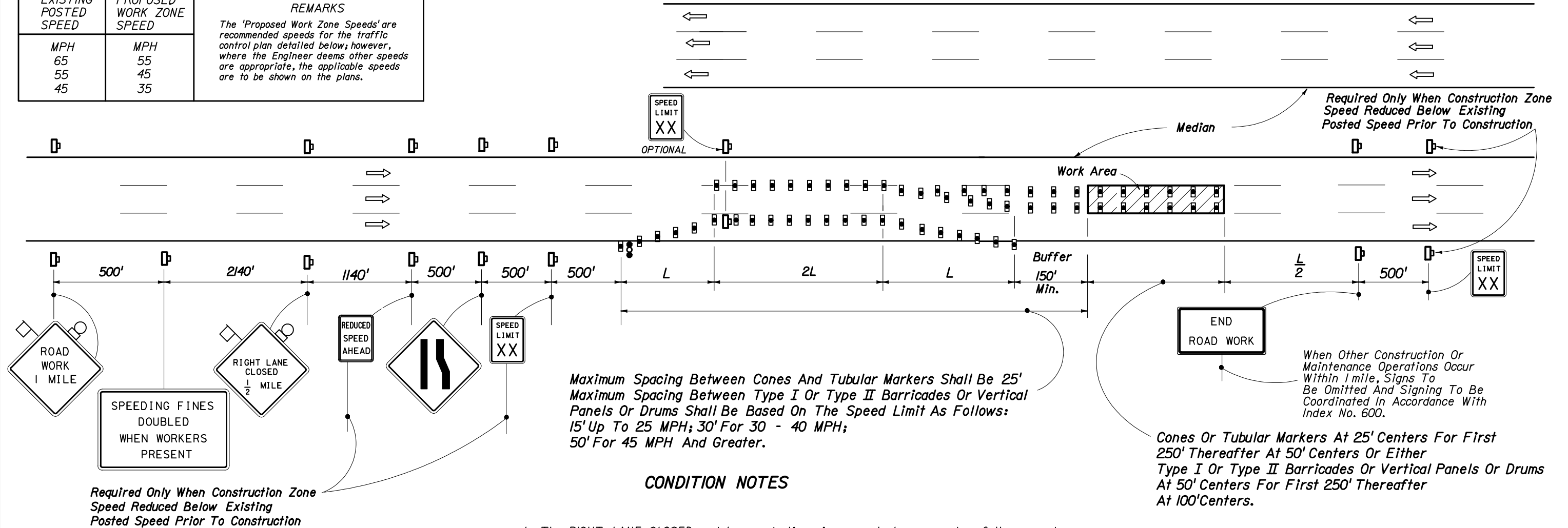
- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).  
(Tubular Markers May Be Used During Daylight Only. Cones May Be Used - See Index 600).
- Type III Barricade (With Flashing Light)
- 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 DIVERSION IS PROVIDED BY UTILIZING ONE LANE OF THE OPPOSING TRAFFIC LANES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE UNDIVIDED • RURAL DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	00	1 of 1	615

EXISTING POSTED SPEED	PROPOSED WORK ZONE SPEED	REMARKS
MPH	MPH	The 'Proposed Work Zone Speeds' are recommended speeds for the traffic control plan detailed below; however, where the Engineer deems other speeds are appropriate, the applicable speeds are to be shown on the plans.
65	55	
55	45	
45	35	



Maximum Spacing Between Cones And Tubular Markers Shall Be 25'  
 Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows:  
 15' Up To 25 MPH; 30' For 30 - 40 MPH;  
 50' For 45 MPH And Greater.

**CONDITION NOTES**

1. The RIGHT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the center lane is opened to traffic.
2. For work performed in the outside lane refer to Indexes Nos. 612 and 613. For work performed in the inside lane refer to Indexes Nos. 617.
3. When the lane closure exceeds a continuous 24 hour period 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 and centerline.

**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 warning signs each side shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
3. All signs shall be post mounted if closure time exceeds 12 hours.
4.  $L$  (min.) =  $WS$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 $W$  = Width of lateral transition in feet.  
 $S$  = Posted speed limit (mph).
5. Arrows denote direction of traffic only and do not reflect pavement markings.
6. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
7. END ROAD WORK signs required only when work exceeds one daylight period.
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.

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

When Other Construction Or Maintenance Operations Occur Within 1 mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Cones Or Tubular Markers At 25' Centers For First 250' Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250' Thereafter At 100' Centers.

**TYPICAL APPLICATIONS**

Pavement Resurfacing  
 Pavement Repair

**CONDITIONS**

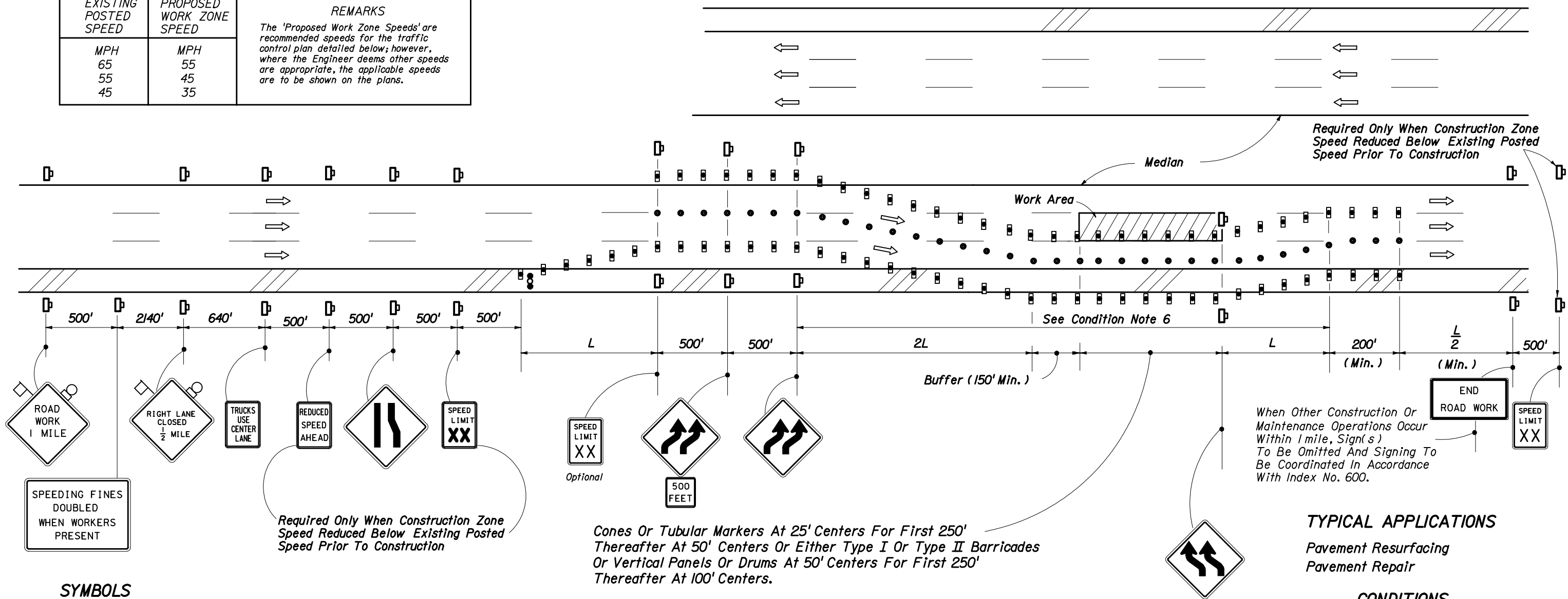
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY, AND TWO DRIVING LANES ARE MAINTAINED ON THE TRAVEL WAY.

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used - See Index 600).
- Work Zone Sign
- Advance Warning Arrow Panel

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE DIVIDED • RURAL</b>				
Designed By	Names	Dates	Approved By	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No.
			00	1 of 2
				616

EXISTING POSTED SPEED	PROPOSED WORK ZONE SPEED	REMARKS
MPH	MPH	The 'Proposed Work Zone Speeds' are recommended speeds for the traffic control plan detailed below; however, where the Engineer deems other speeds are appropriate, the applicable speeds are to be shown on the plans.
65	55	
55	45	
45	35	



When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

**Cones Or Tubular Markers At 25' Centers For First 250' Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250' Thereafter At 100' Centers.**

**TYPICAL APPLICATIONS**

Pavement Resurfacing  
Pavement Repair

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY, AND TWO DRIVING LANES ARE MAINTAINED, AND, THE OUTSIDE SHOULDER PAVEMENT IS TEMPORARILY USED AS A TRAVEL LANE.

**CONDITION NOTES**

1. See General Notes, Sheet 1 of 2.
2. Maximum spacing between devices (ft) to be equal to the speed limit (mph) but not greater than 25' for cones or tubular markers or 50' for Type I or Type II barricades or or vertical panels or drums.  
Barricades, vertical panels or drums shall be used to delineate the edge lines of the transition areas (i.e. L and 2L). Beyond the transition area, any of the above noted devices may be used to delineate the edge lines.  
Cones or tubular markers shall be used to delineate the center line. (Except at night use vertical panels)
3. Length of time that traffic is using shoulder should be minimized. For example, remove lane closure and lane shift at night (unless performing nightwork) if practical.
4. The RIGHT LANE CLOSED, lane reduction and reverse curve signs are to be removed or fully covered when no work is being performed and the travel way is open to traffic.
5. When the lane closure exceeds a continuous 24 hour period all existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking new edge lines and centerlines.
6. For general TCZ requirements and additional information refer to Index No. 600.

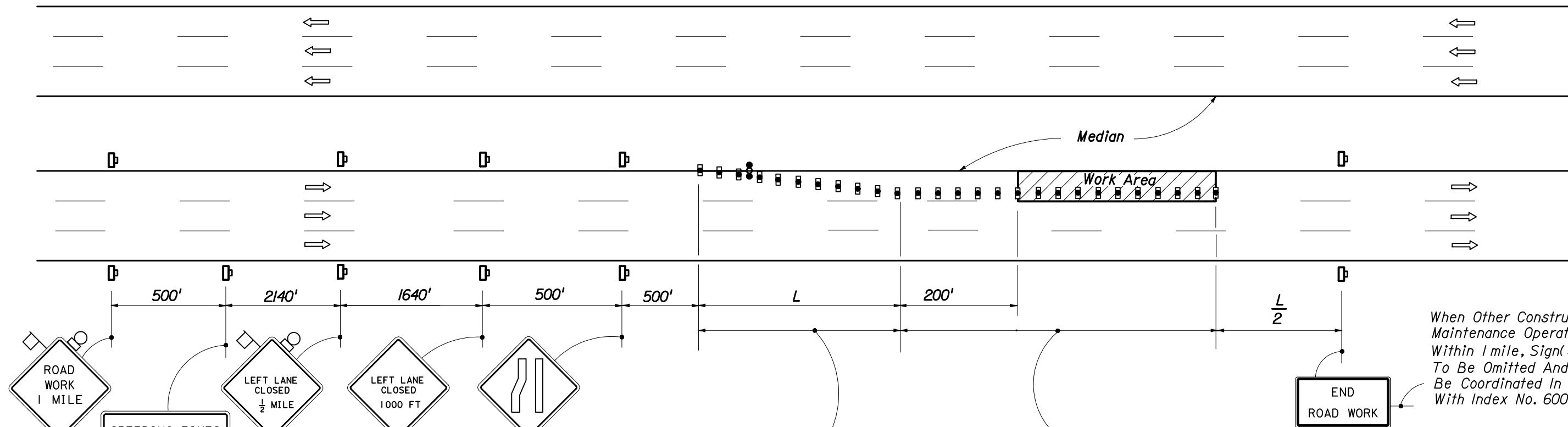
**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only). Cones May Be Used -See Index 600).
- Work Zone Sign
- Advance Warning Arrow Panel
- Cone Or Tubular marker (Except At Night Use Vertical Panels)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES  
**MULTILANE DIVIDED • RURAL**

Names	Dates	Approved By		
Designed By	6/09	 Roadway Design Engineer		
Drawn By	6/09			
Checked By	6/09	Revision	Sheet No.	Index No.
		00	2 of 2	616



When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Cones Or Tubular Markers At 25' Centers For First 250' Thereafter At 50' Centers Or Either Type I Or Type II Barricades Or Vertical Panels Or Drums At 50' Centers For First 250' Thereafter At 100' Centers.

Maximum Spacing Between Cones And Tubular Markers Shall Be 25'. Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows: 15' Up To 25 MPH; 30' For 30 - 40 MPH; 50' For 45 MPH And Greater.

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( With Steady Burning Light At Night Only ). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Work Zone Sign
- Advance Warning Arrow Panel

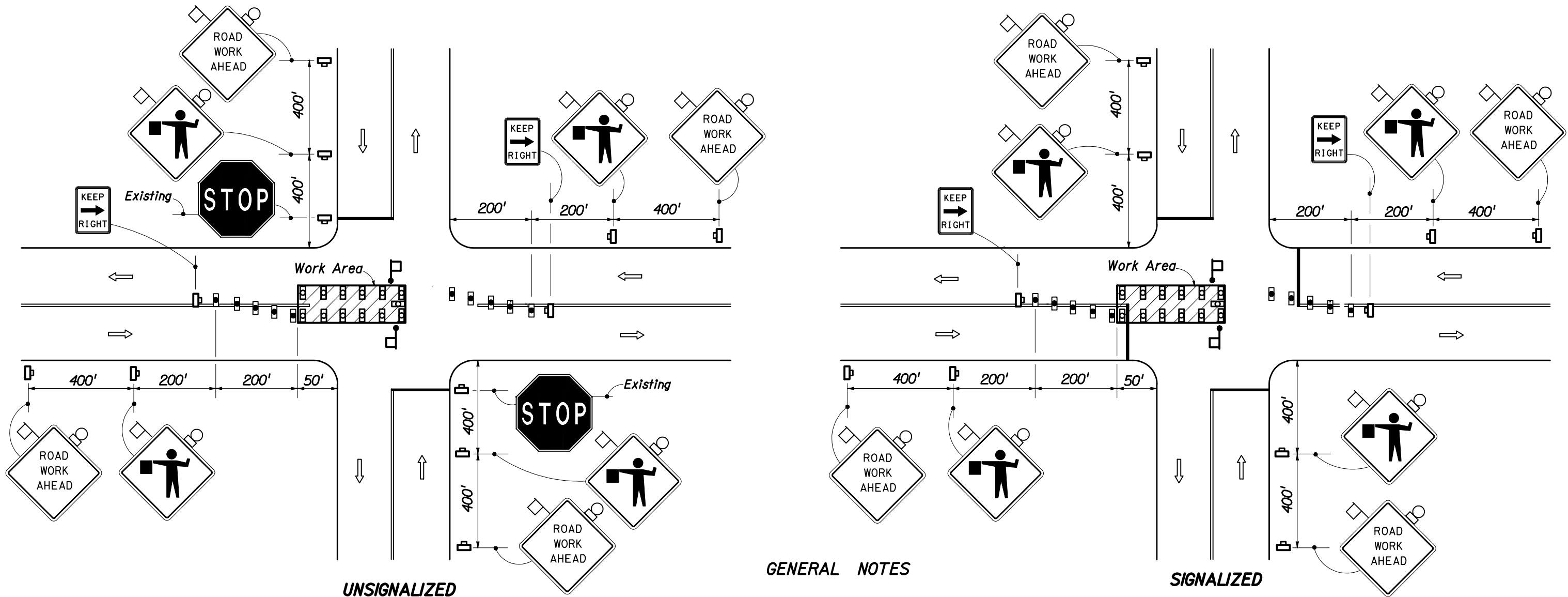
**GENERAL NOTES**

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
2. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.  
Mesh signs may be used for (Daylight Only) operations Type B Lights and Orange Flags are not required.
3. All signs shall be post mounted if closure time exceeds 12 hours.
4.  $L$  (min.) =  $WS$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 $W$  = Width of lateral transition in feet  
 $S$  = Posted speed limit (mph).
5. 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.
6. Advance warning arrow panels 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.
7. Arrows denote direction of traffic only and do not reflect pavement marking.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. 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.
10. For work performed in the outside lane refer to Indexes Nos. 612 and 613. For work performed in the center lane refer to Index No. 616.
11. For general TCZ requirements and additional information refer to Index No. 600.

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON ANY PORTION OF THE INSIDE LANE OF A MULTILANE HIGHWAY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE DIVIDED • RURAL</b>				
Designed By	Names	Dates	Approved By <i>Samuel D. Mill</i>	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. Index No.
			00	1 of 1 617



**UNSIGNALIZED**

**GENERAL NOTES**

**SIGNALIZED**

**TYPICAL APPLICATIONS**

Utility Work  
Pavement Repair

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH 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

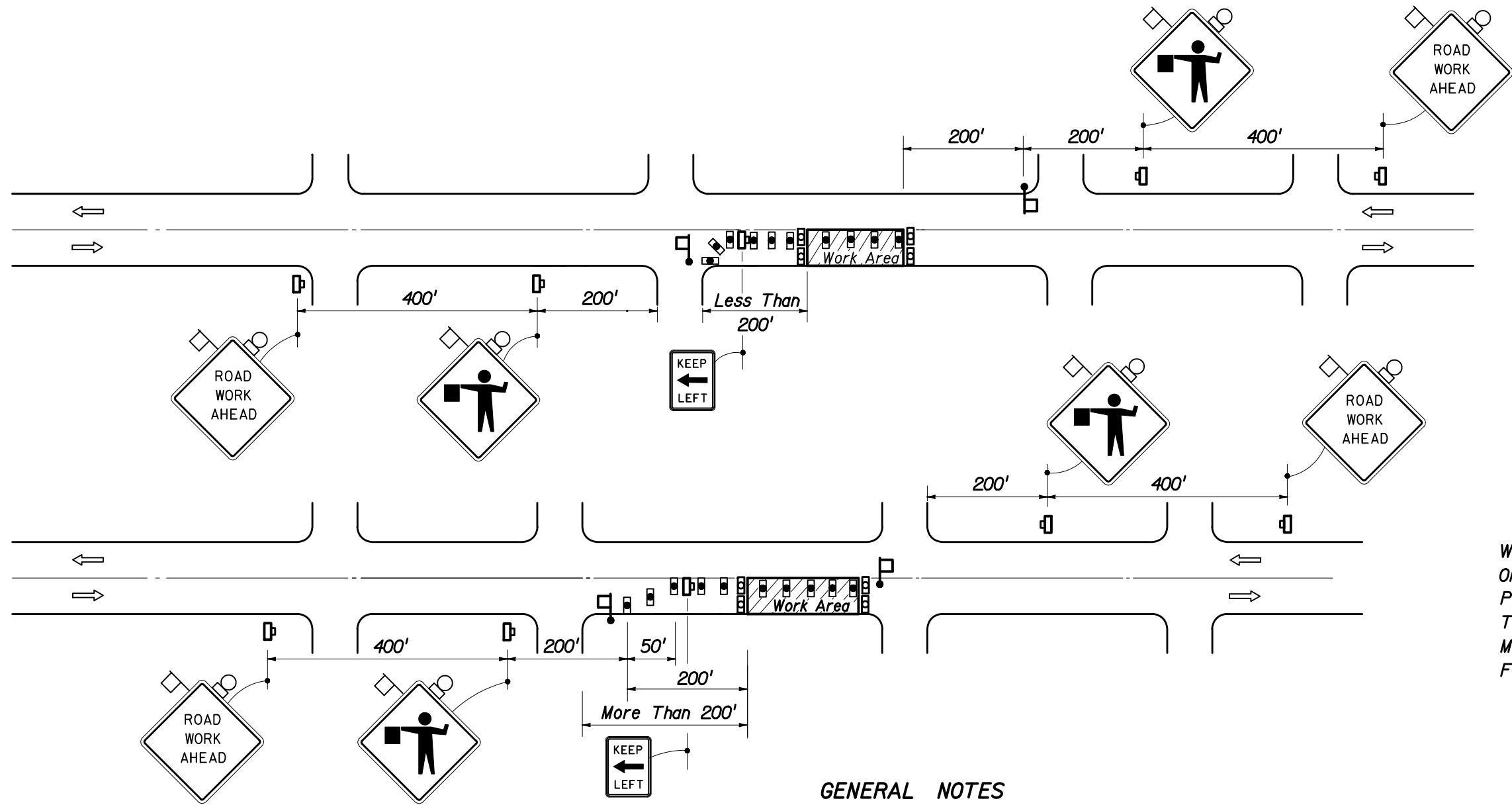
**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type I Or Type II Barricade Or Vertical Panel Or Drum (with Flashing Light At Night Only)
- Work Zone Sign
- Flagger
- Stop Bar

1. All vehicles, equipment, workers (except flaggers) and their activities are forbidden in lane and intersection areas reserved for traffic.
2. The first two warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. 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. Maximum spacing between barricades, vertical panels, cones, tubular markers and drums 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.
12. For general TCZ requirements and additional information refer to index No. 600.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • URBAN DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	00	1 of 1	620



**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF ONE TRAFFIC LANE, FOR WORK AREAS LESS THAN 200' DOWNSTREAM FROM AN 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 ONE TRAFFIC LANE, FOR WORK AREAS 200' OR MORE DOWNSTREAM FROM AN 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 WORK 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 an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.  
Mesh signs may be used for (Daylight Only) operations Type B Lights and Orange Flags are not required.
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 Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type I Or Type II Barricade Or Vertical Panel Or Drum (with Flashing Light At Night Only)
- Work Zone Sign
- Flagger

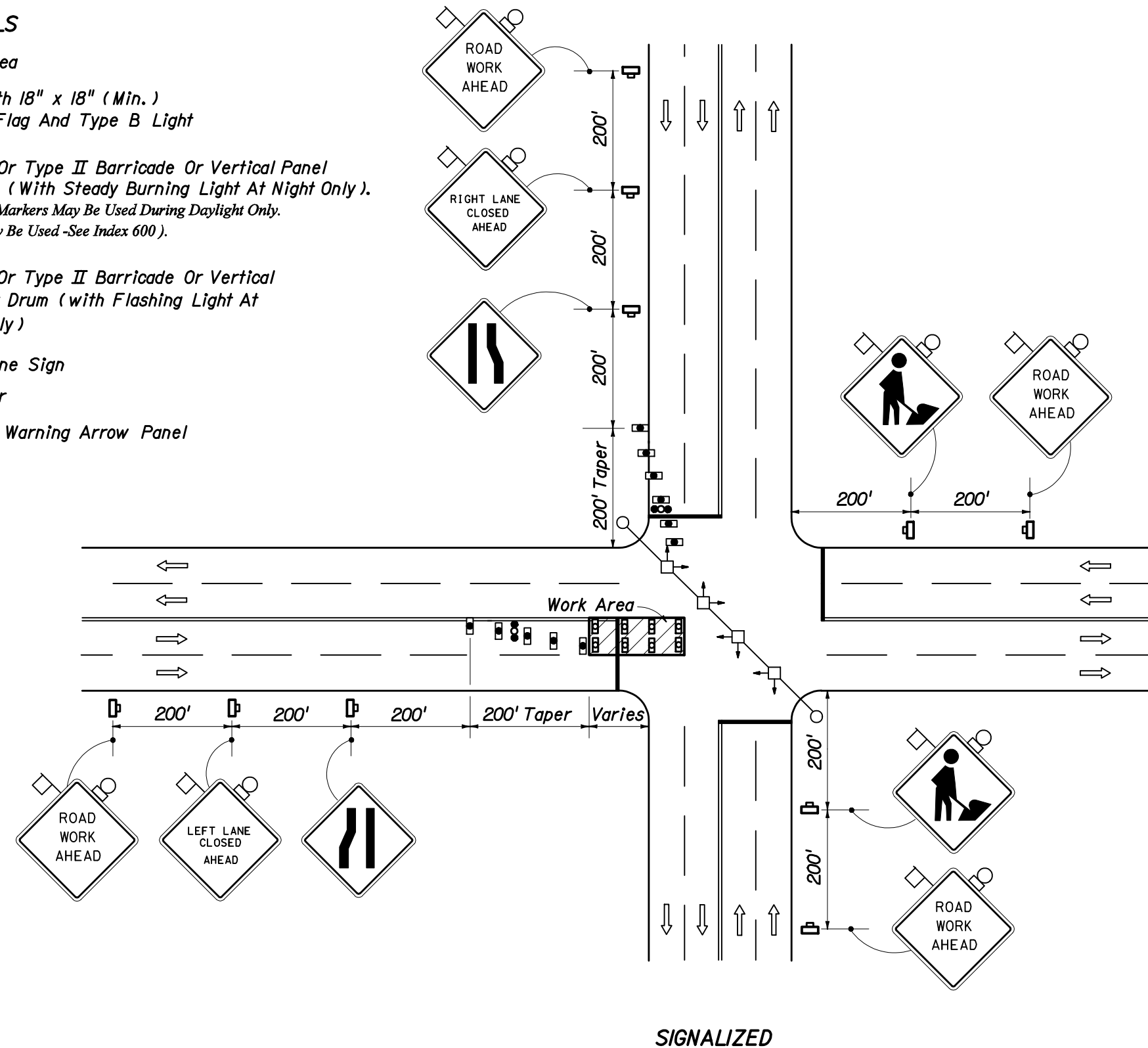
**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repair
- Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • URBAN DAY OR NIGHT OPERATIONS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. Index No.
			00	1 of 1 621

**SYMBOLS**

-  Work Area
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
-  Type I Or Type II Barricade Or Vertical Panel Or Drum ( With Steady Burning Light At Night Only ). ( Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600 ).
-  Type I Or Type II Barricade Or Vertical Panel 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 warning signs shall have an 18" x 18" ( min. ) orange flag and a Type B light attached and operating at all times.  
Mesh signs may be used for ( Daylight Only ) operations  
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. Maximum spacing between barricades, vertical panels, cones, tubular markers and drums 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. 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.

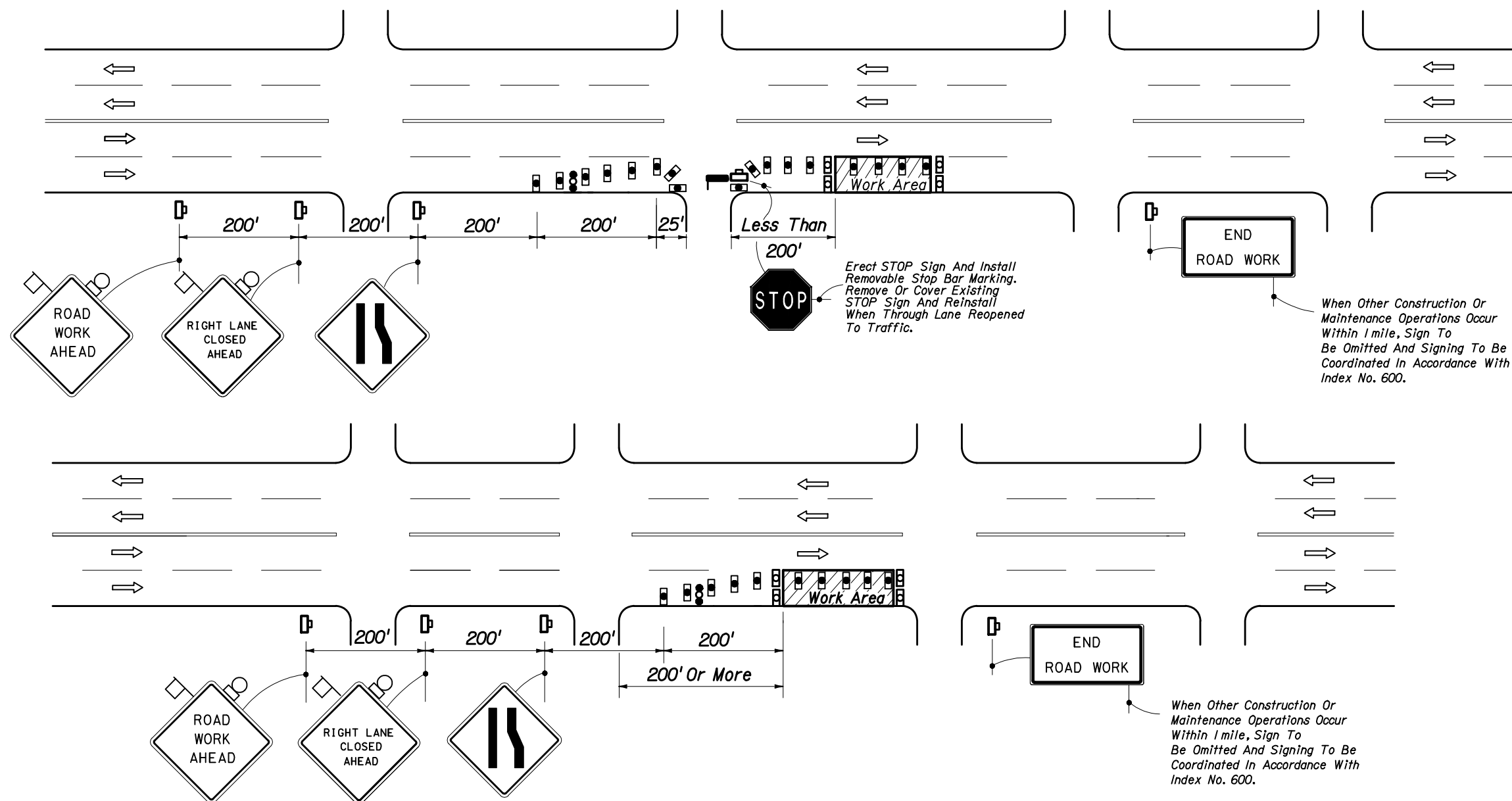
**TYPICAL APPLICATIONS**

- 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				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE, TWO-WAY • URBAN DIVIDED OR UNDIVIDED DAY OR NIGHT OPERATIONS</b>				
	Names	Dates	Approved By 	
Designed By		12/87	Roadway Design Engineer	
Drawn By		12/87	Revision	Sheet No. Index No.
Checked By		12/87	00	1 of 1 622



**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.

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used - See Index 600)
- Type I Or Type II Barricade Or Vertical Panel Or Drum (with Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

**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<sup>Δ</sup>; (e) Inside auxiliary lane<sup>Δ</sup>;
  - (f) Inside travel lane and adjoining auxiliary lane<sup>Δ</sup>;<sup>Δ</sup> 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 WORK AHEAD signs, and the merge symbol signs eliminated.
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 warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations Type B Lights and Orange Flags are not required.
6. All signs shall be post mounted if the closure times exceeds 12 hours.
7. Dual signs are required for divided roadways.

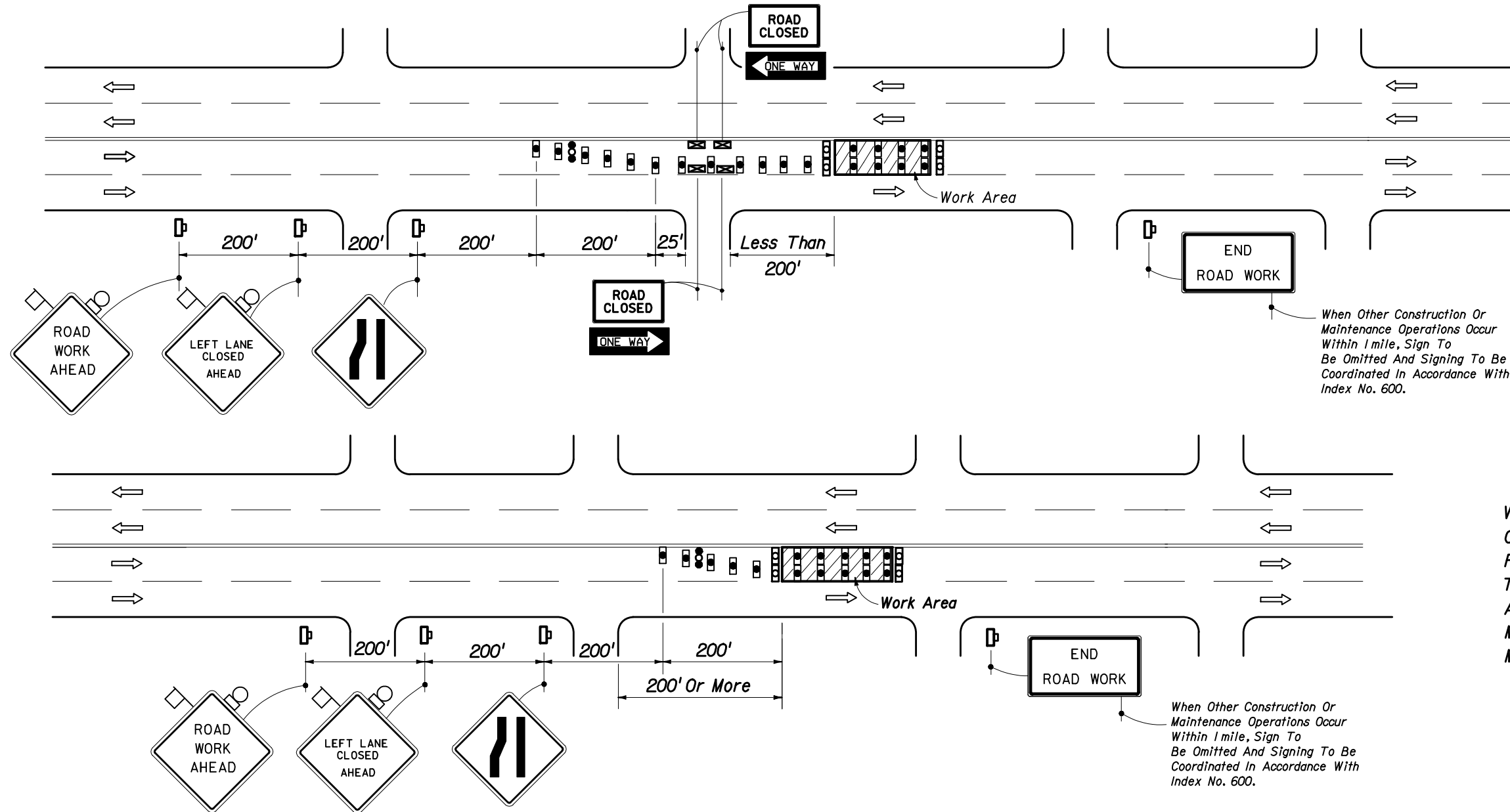
(Continued)

**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repairs
- Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE, TWO-WAY • URBAN DIVIDED OR UNDIVIDED DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87			
Drawn By	12/87			
Checked By	12/87	Revision	Sheet No.	Index No.
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**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.

When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign To Be Omitted And Signing To Be Coordinated In Accordance With 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 Vertical Panel Or Drum ( With Steady Burning Light At Night Only ). ( Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600 ).
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( with Flashing Light At Night Only )
- Type III Barricade
- Work Zone Sign
- Advance Warning Arrow Panel

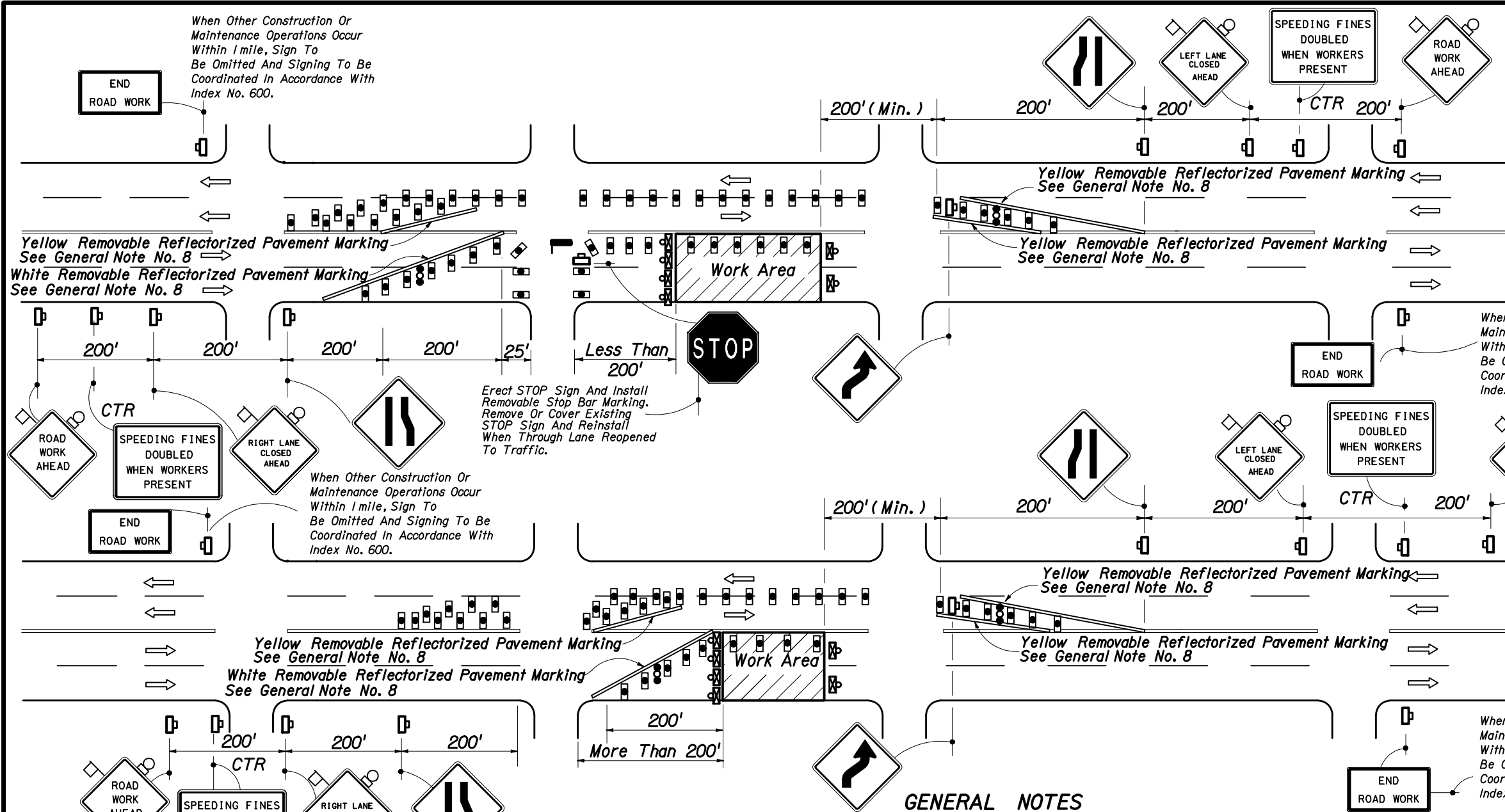
**GENERAL NOTES ( CONT. )**

8. Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH or greater. Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' Centers for Type I or Type II barricades or vertical panels or drums for 250', thereafter cones or tubular markers at 50' centers and Type I or Type II barricades or vertical panels or drums at 100' centers.
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.

**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repairs
- Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE, TWO-WAY • URBAN DIVIDED OR UNDIVIDED DAY OR NIGHT OPERATIONS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		12/87		
Checked By		12/87	Revision	Sheet No.
			00	2 of 2
			Index No.	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.

- SYMBOLS**
- Work Area
  - Sign With 18" x 18" (Min.) Orange Flag And Type B Light
  - Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
  - Type III Barricade (With Flashing Light)
  - Work Zone Sign
  - Advance Warning Arrow Panel
  - Stop Bar

- 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 warning signs shall have an 18" x 18" (min.) Orange flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations. Type B Lights and Orange Flags are not required.
  5. All signs shall be post mounted if the closure time exceeds 12 hours.
  6. Dual signs are required for divided roadways.
  7. Channelizing devices are to be spaced with Type I or Type II barricades or vertical panels or drums at 50' centers, except in tangent work areas spacing may be increased to 100' after the first 250' when approved by the Engineer.
  8. Removable reflectorized pavement markings shall be used when closure time exceeds one daylight period.
  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.

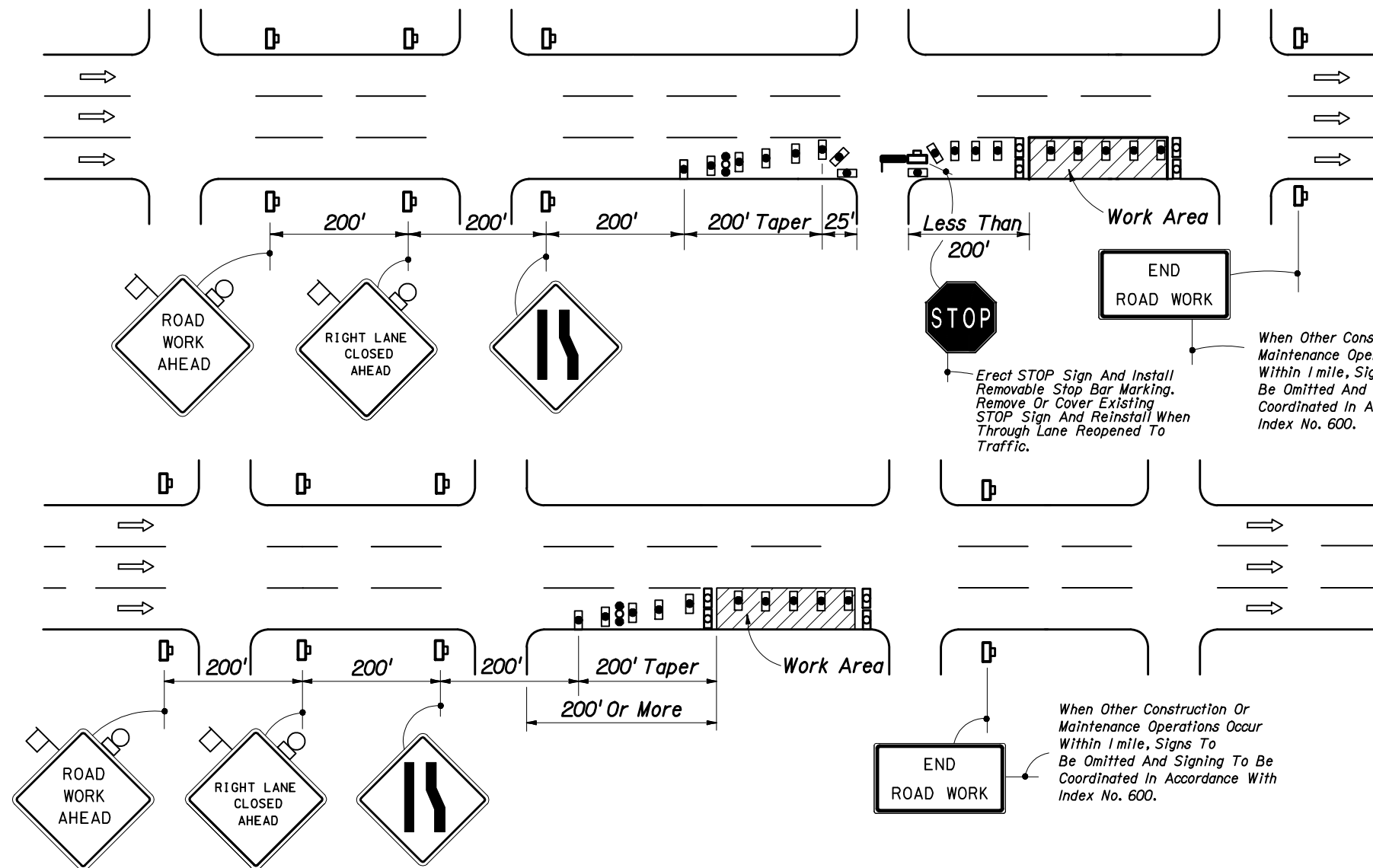
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE DIVIDED WITH TRAVERSABLE MEDIAN OR UNDIVIDED URBAN DAY OR NIGHT OPERATIONS</b>				
Designed By	Names	Dates	Approved By <i>James D. Hill</i>	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. 1 of 1
			00	Index No. 624

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH 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 ENCROACH 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.



When Other Construction Or Maintenance Operations Occur Within 1 mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Erect STOP Sign And Install Removable Stop Bar Marking. Remove Or Cover Existing STOP Sign And Reinstall When Through Lane Reopened To Traffic.

When Other Construction Or Maintenance Operations Occur Within 1 mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With 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 Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type I Or Type II Barricade Or Vertical Panel Or Drum (with Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

**GENERAL NOTES**

1. All vehicles, equipment, workers 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 a combination of lanes as follows:
  - (a) Outside travel lane; (b) Outside auxiliary lane;
  - (c) Outside travel lane and adjoining auxiliary lane;
  - (d) Outside travel lane and adjoining center lane;
  - (e) Outside travel lane and adjoining auxiliary and center lanes;
  - (f) Median travel lane<sup>Δ</sup>; (g) Median auxiliary lane<sup>Δ</sup>;
  - (h) Median travel lane and adjoining auxiliary lane<sup>Δ</sup>;
  - (i) Median travel lane and adjoining center lane<sup>Δ</sup>;
  - (j) Median travel lane and adjoining auxiliary and center lanes<sup>Δ</sup>;<sup>Δ</sup> See Sheet 2.
3. For work operations, that require only a single lane closure 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. 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 and merge right symbol signs shall be substituted for the RIGHT LANE CLOSED AHEAD and merge left symbol 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 WORK AHEAD signs and the merge right symbol signs eliminated.
6. The first two warning signs, each side, shall have an 18"x 18" (min.) orange flag and a Type B light attached and operating at all times.
 

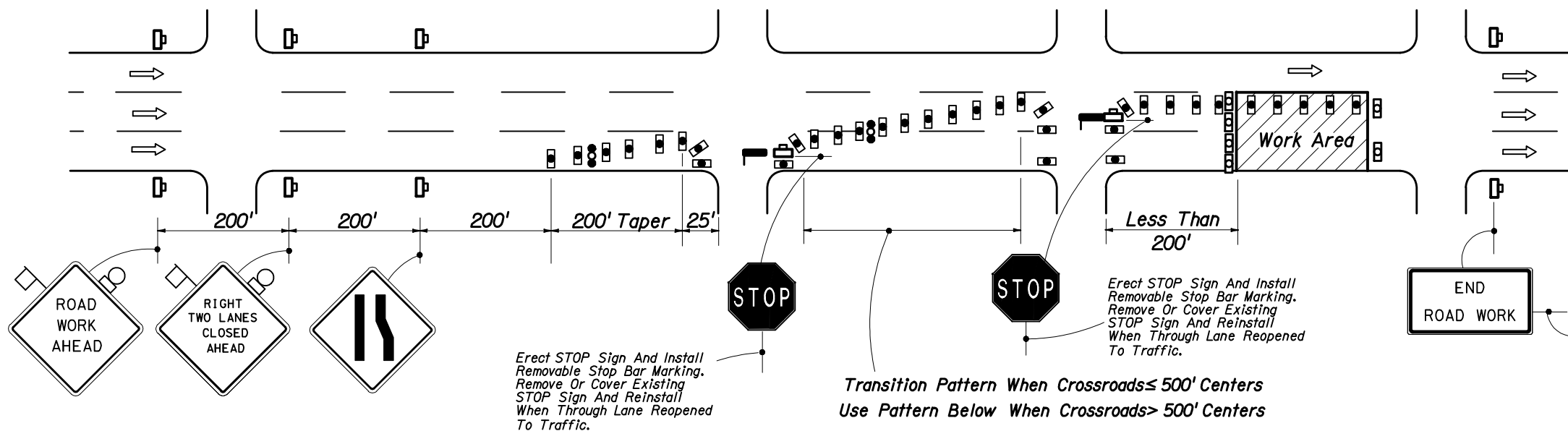
Mesh signs may be used for (Daylight Only) operations Type B Lights and Orange Flags are not required.

(Continued)

**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repair
- Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE ONE-WAY OR MULTILANE DIVIDED WITH NON-TRAVERSABLE MEDIAN • URBAN DAY OR NIGHT OPERATIONS</b>				
Designed By	Names	Dates	Approved By <i>Samuel D. Milk</i>	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. Index No.
			00	1 of 2 625



Erect STOP Sign And Install Removable Stop Bar Marking. Remove Or Cover Existing STOP Sign And Reinstall When Through Lane Reopened To Traffic.

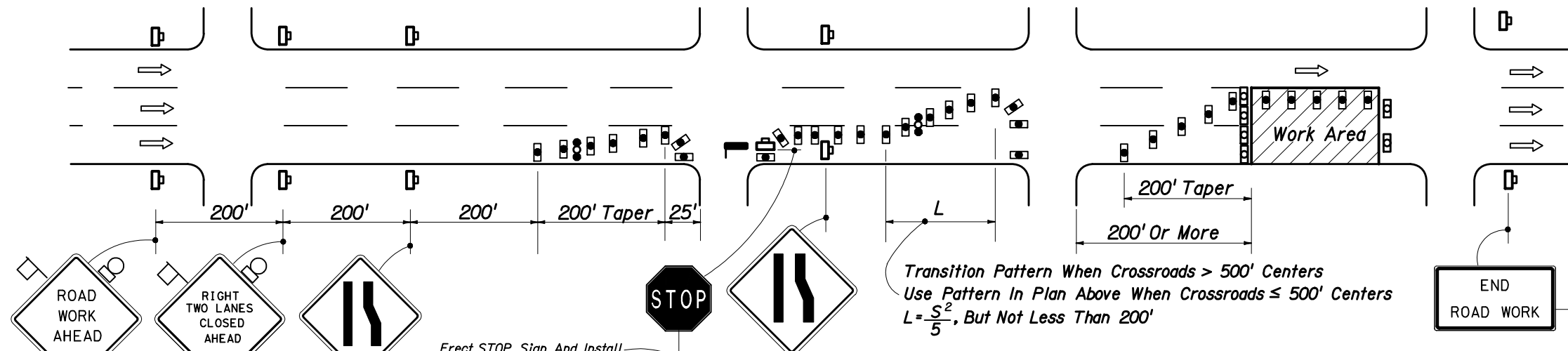
Transition Pattern When Crossroads  $\leq$  500' Centers  
Use Pattern Below When Crossroads  $>$  500' Centers

Erect STOP Sign And Install Removable Stop Bar Marking. Remove Or Cover Existing STOP Sign And Reinstall When Through Lane Reopened To Traffic.

When Other Construction Or Maintenance Operations Occur Within 1 mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

**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.



Erect STOP Sign And Install Removable Stop Bar Marking. Remove Or Cover Existing STOP Sign And Reinstall When Through Lane Reopened To Traffic.

Transition Pattern When Crossroads  $>$  500' Centers  
Use Pattern In Plan Above When Crossroads  $\leq$  500' Centers  
 $L = \frac{S^2}{5}$ , But Not Less Than 200'

When Other Construction Or Maintenance Operations Occur Within 1 mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

**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 Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type I Or Type II Barricade Or Vertical Panel Or Drum (with Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

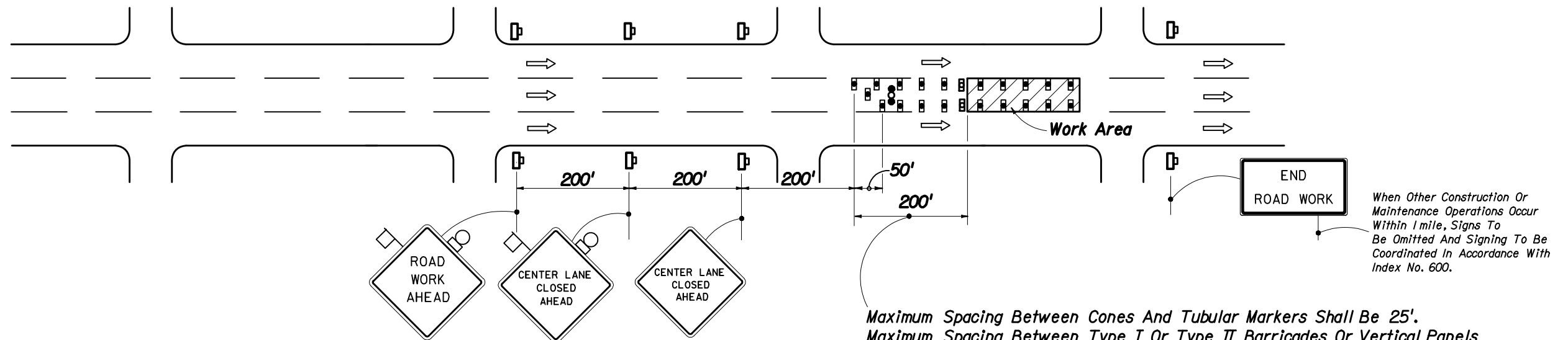
**GENERAL NOTES (CONT.)**

7. All signs shall be post mounted if closure time exceeds 12 hours.
8. Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30 MPH-40 MPH; 50' for 45 MPH or greater. Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' centers for Type I or Type II barricades or vertical panels or drums for 250', thereafter, cones or tubular markers at 50' centers and Type I or Type II barricades or vertical panels or drums at 100' centers.
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.

**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repair
- Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE ONE-WAY OR MULTILANE DIVIDED WITH NON-TRAVERSABLE MEDIAN • URBAN DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	James D. Mill Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
Checked By	12/87	00	2 of 2	625



When Other Construction Or Maintenance Operations Occur Within 1 mile, Signs To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Maximum Spacing Between Cones And Tubular Markers Shall Be 25'.  
 Maximum Spacing Between Type I Or Type II Barricades Or Vertical Panels Or Drums Shall Be Based On The Speed Limit As Follows: 15' Up To 25 MPH; 30' For 30 MPH-40 MPH; 50' For 45 MPH Or Greater.

**GENERAL NOTES**

- All vehicles, equipment, workers and their activities are prohibited at all times from the lane areas reserved for traffic.
- Work operations shall be confined to one center travel lane, leaving the adjacent travel lanes open to traffic.
- For work operations 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.
- The first two warning signs, each side, shall have an 18" x 18" orange flag and a Type B light attached and operating at all times.  
 Mesh signs may be used for (Daylight Only) operations Type B Lights and Orange Flags are not required.
- All signs shall be post mounted if the closure time exceeds 12 hours.
- Advance warning arrow panel is required for both day and night operations.
- Channelizing devices are to be spaced with cones or tubular markers at 25' centers; Type I or Type II barricades or vertical panels or drums at 50' centers for the first 250'; thereafter, cones or tubular markers at 50' centers and Type I or Type II barricades or vertical panels or drums at 100' centers.
- 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.
- For general TCZ requirements and additional information refer to Index No. 600.

**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repair
- Structure Adjustments

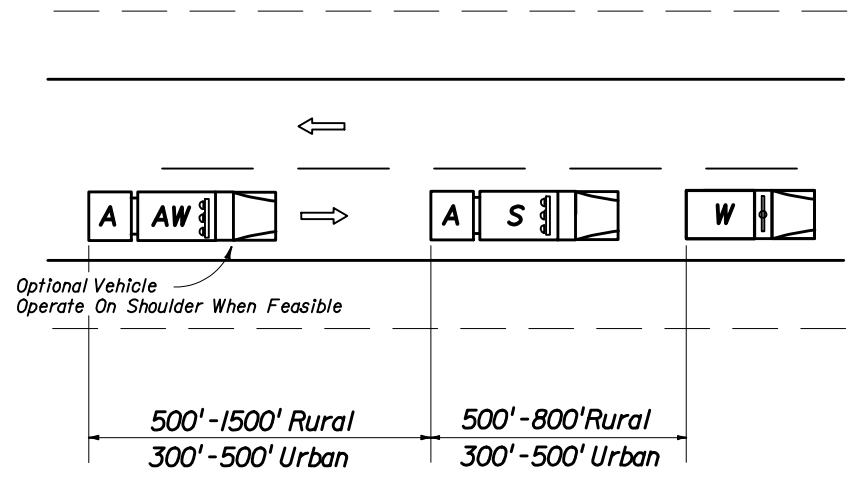
**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE CENTER LANE.

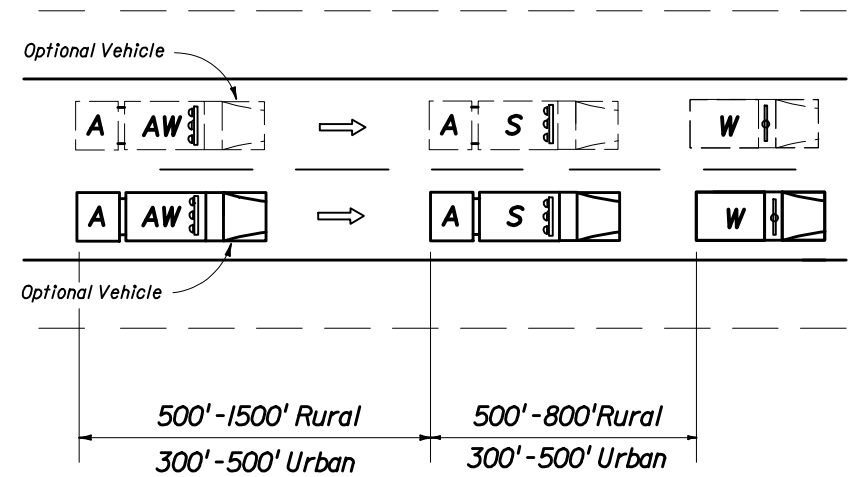
**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( With Steady Burning Light At Night Only ). ( Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600 ).
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( with Flashing Light At Night Only )
- Work Zone Sign
- Advance Warning Arrow Panel

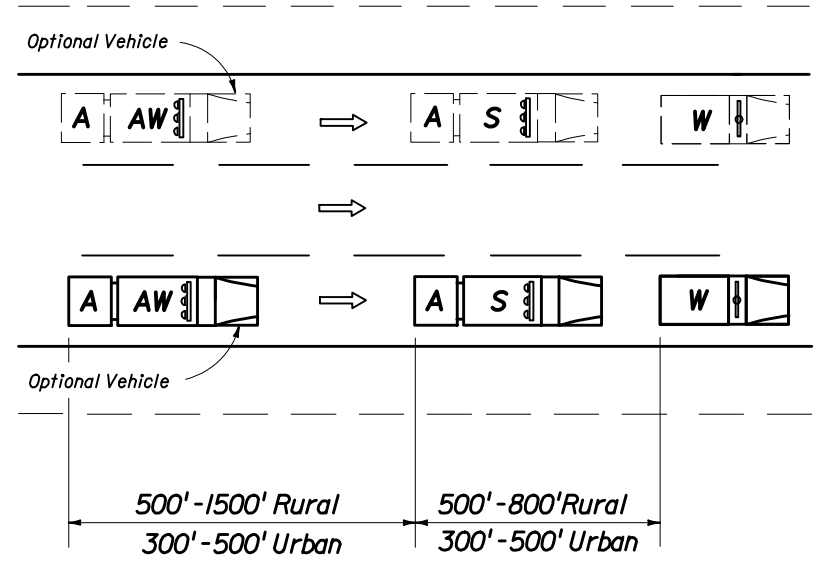
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE ONE-WAY OR MULTILANE DIVIDED WITH NON-TRAVERSABLE MEDIAN • URBAN DAY OR NIGHT OPERATIONS</b>				
Names	Dates	Approved By		
Designed By	12/87	Roadway Design Engineer		
Drawn By	12/87	Revision	Sheet No.	Index No.
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MODE • WARNING



MODE • PASS LEFT [RIGHT]  
MOVING OPERATIONS



MODE • PASS LEFT [RIGHT]

SYMBOLS

- Work Vehicle With Flashing Beacon
- Shadow (S) Or Advance Warning (AW) Vehicle With Advance Warning Arrow Panel And Sign Message
- Truck Mounted Attenuator (TMA)
- Lane Identification And Direction Of Traffic

GENERAL NOTES

1. These illustrations are representative of general conditions.
2. The intensity of light and the position of panels shall be as specified in Index No. 600.
3. The Advance Warning Vehicle (Optional) may be used at the direction of the Engineer. If an Advance Warning Vehicle is operated within the travel way, an approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle but not required on the Shadow Vehicle. The Advance Warning Arrow Panel and Warning Sign are required on both the Advance Warning and Shadow Vehicles.
4. For general TCZ requirements and additional information refer to Index No. 600.
5. If the work vehicle speed exceeds the minimum legal speed limit on limited access facilities and one half the posted speed limit on other facilities the engineer in charge may delete requirements for shadow vehicle and attenuators. The work vehicle will be required to have an advance warning arrow panel and sign message.

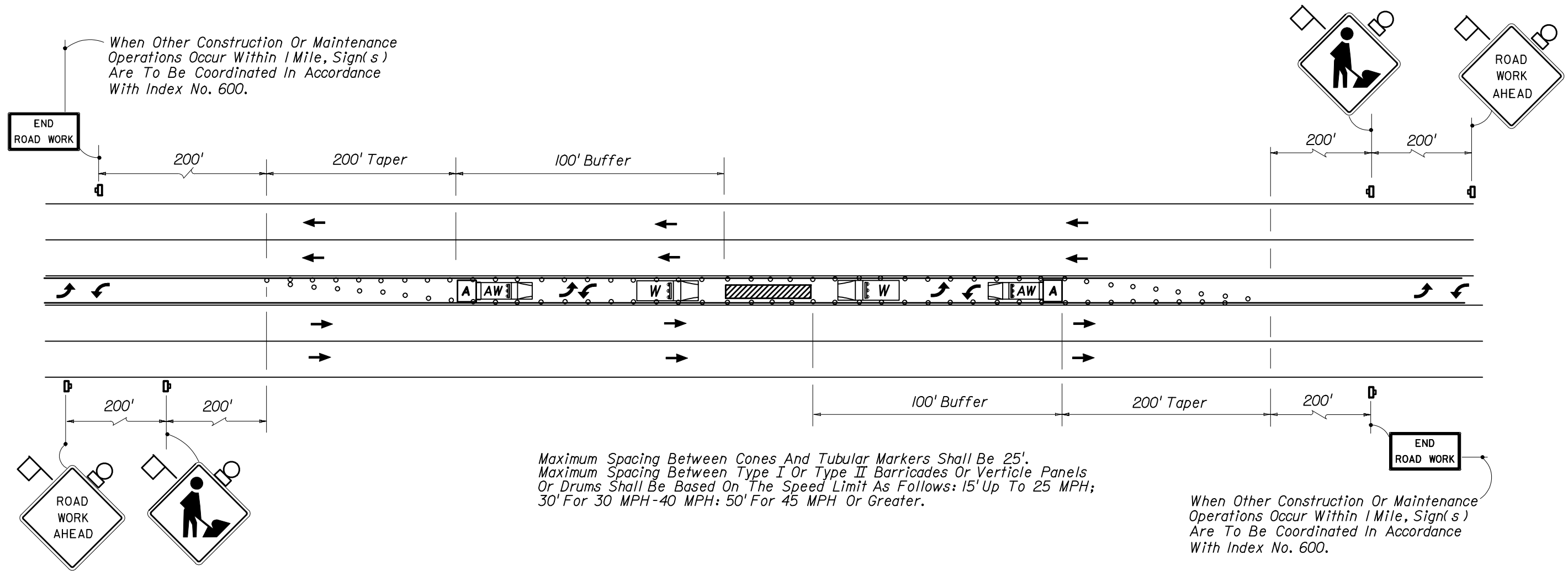
TYPICAL APPLICATIONS

- Striping
- RPM Placement
- Vegetation Control

CONDITIONS

MOVING OPERATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MOVING OPERATIONS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		12/87	<i>J. M. Mill</i> Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No.
			00	1 of 1
				Index No. 627



Maximum Spacing Between Cones And Tubular Markers Shall Be 25'.  
 Maximum Spacing Between Type I Or Type II Barricades Or Verticle Panels Or Drums Shall Be Based On The Speed Limit As Follows: 15' Up To 25 MPH; 30' For 30 MPH-40 MPH; 50' For 45 MPH Or Greater.

When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) Are To Be Coordinated In Accordance With Index No. 600.

**GENERAL NOTES**

1. Work operations shall be confined to two way left turn lane, leaving the adjacent lanes open to traffic.
2. The first two warning signs, each side, shall have an 18" x 18" (min.) Orange Flag and a Type B light attached and operating at all times. Mesh signs may be used for (Daylight Only) operations, Type B Lights and Orange Flags are not Required.
3. Advance Warning Vehicle will have an Advanced Warning Arrow Panel in the Warning Mode.
4. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
5. 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.
6. For general TCZ requirements and additional information, refer to Index No. 600.

**TYPICAL APPLICATIONS**

Pavement Repair  
 Utility Work

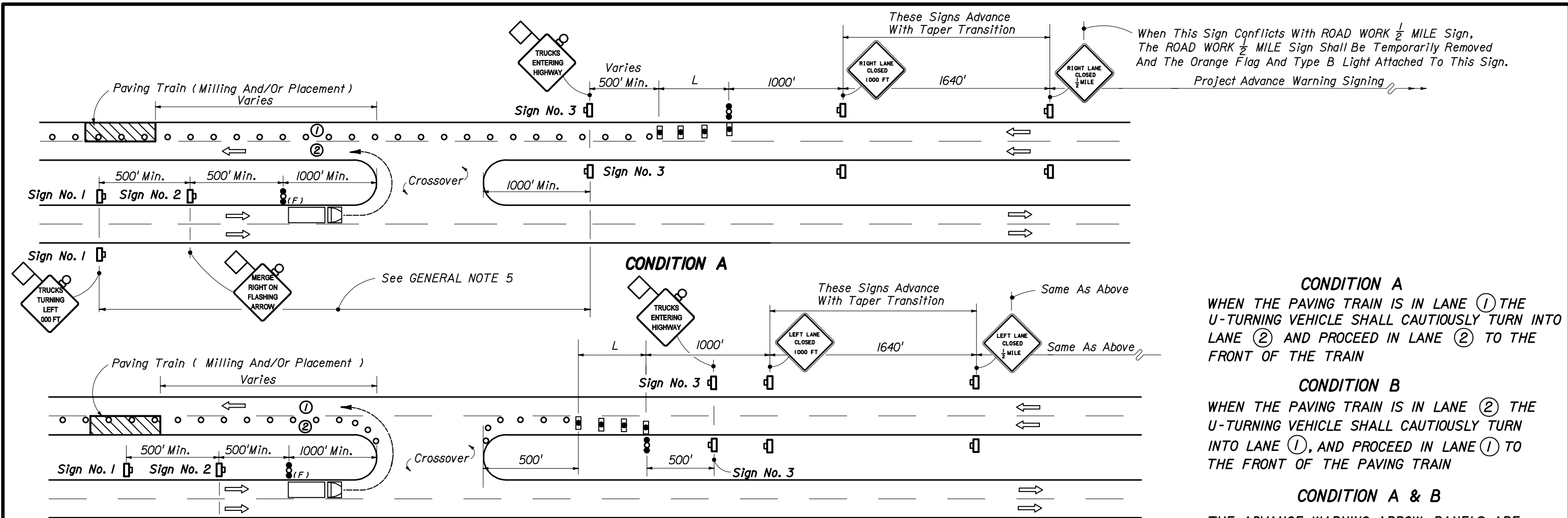
**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ARE BEING CONDUCTED IN THE TWO WAY LEFT TURN LANE.

**SYMBOLS**

- Work Area
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( With Steady Burn Light At Night Only )
- Type I Or Type II Barricade Or Verticle Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- Work Vehicle With Flashing Beacon ( optional )
- Advance Warning Vehicle Equipped With Advance Warning Arrow Panel And Truck Mounted Attenuator

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO WAY LEFT TURN LANE CLOSURE</b>				
Names	Dates	Approved By		
Designed By		Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 1	628



**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**

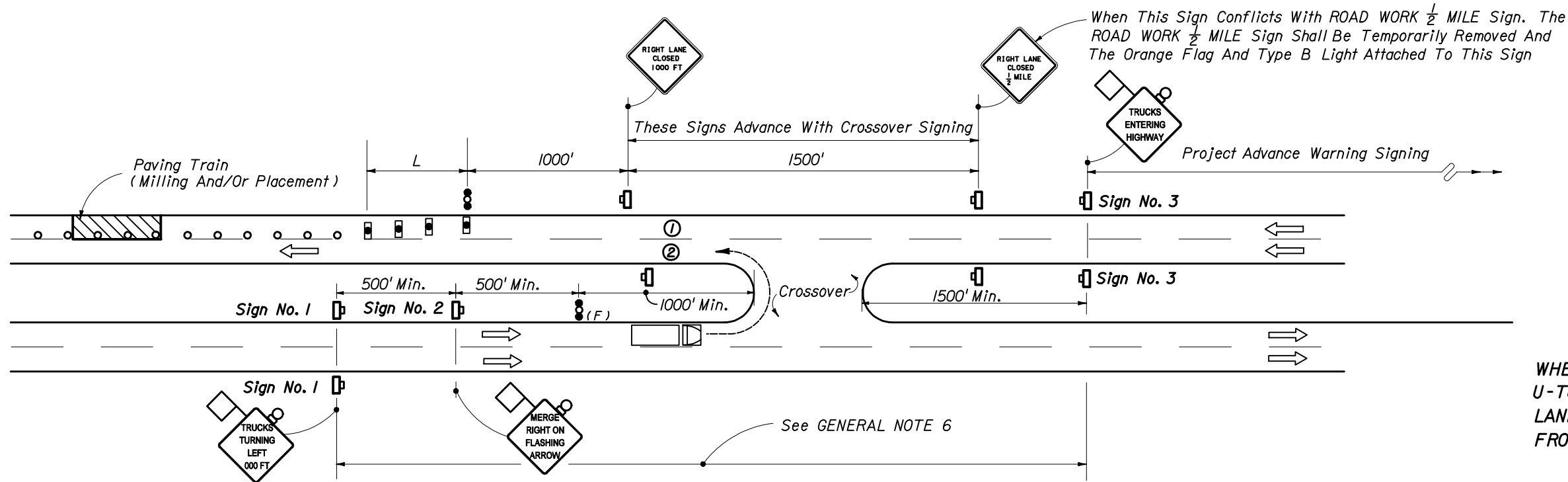
- When crossovers do not exist, the contractor will construct temporary crossovers in accordance with Index No. 631.
- $L =$  Length of taper in feet:  
 $= WS$  for speeds  $\geq 45$  mph  
 $= \frac{WS^2}{60}$  for speeds  $\leq 40$  mph  
 Where:  
 $W =$  Width of lateral transition in feet.  
 $S =$  Posted speed limit (mph).
- Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH or greater. Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' for Type I or Type II barricades or vertical panels or drums.
- Arrows denote direction of traffic only and do not reflect pavement markings.
- For Case I, Condition A, when the median width is too narrow for trucks to make turns into Lane No. 2, Sign Nos. 1, 2, 3 and the Flagger Actuated Advance Warning Arrow Panel shall be moved ahead to a crossover in advance of the paving lane taper. Project advance warning signs (not shown) shall be located in advance of the relocated Sign No. 3.
- For Case II, Conditions A & B, when the median width is too narrow for trucks to make turns into Lane No. 2, Sign Nos. 1, 2, 3 and the Flagger Actuated Advance Warning Arrow Panel shall be moved ahead to a crossover in advance of the 'RIGHT LANE CLOSED 1/2 MILE' sign. Project advance warning signs (not shown) shall be located in advance of the relocated Sign No. 3.

**SYMBOLS**

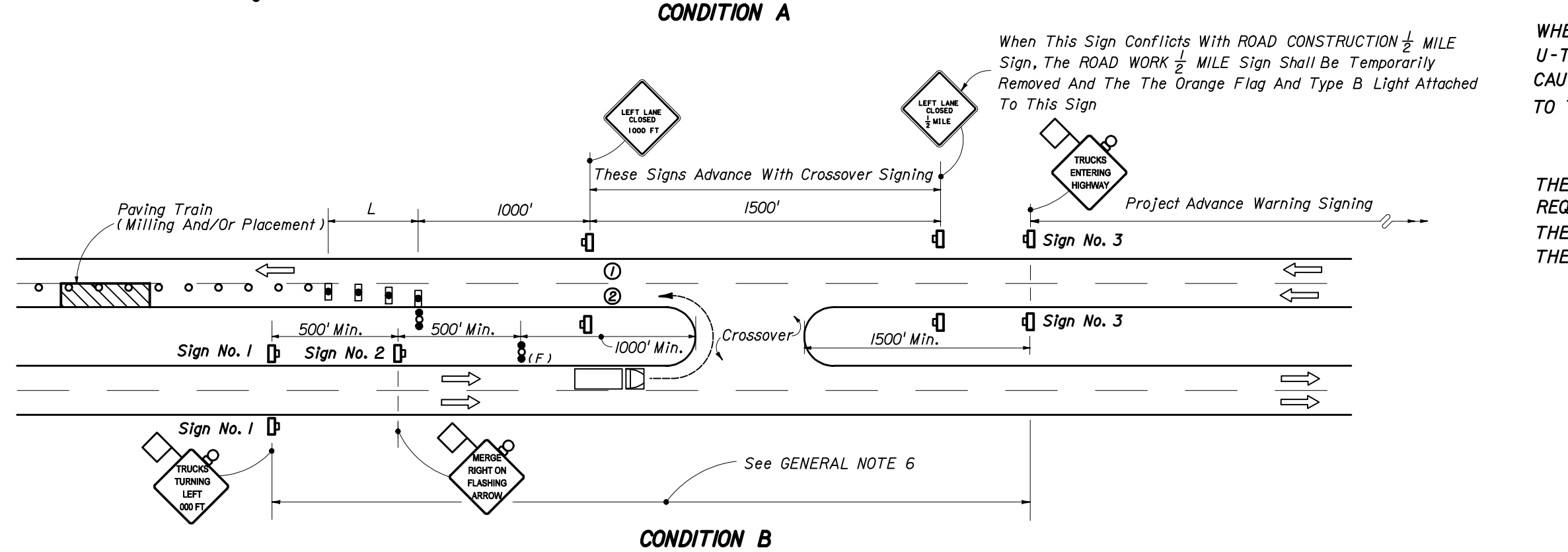
- Work Area
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( With Steady Burning Light At Night Only ). ( Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600 ).
- Type I Or Type II Barricade Or Vertical Panel Or Cone Or Tubular Marker Or Drum
- Work Zone Sign
- 60" x 60" Sign With 18" x 18" ( Min. ) Orange Flag And Type B Light
- Advance Warning Arrow Panel - Type C ( 48" x 96" )
- Advance Warning Arrow Panel - Type C ( 48" x 96" ) Trailer Mounted And Actuated By Flagger Upon Approach Of The Work Vehicle
- Work Vehicle
- Lane Number

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>CROSSOVER FOR PAVING TRAIN OPERATIONS • RURAL</b>				
Designed By	Names	Dates	Approved By <i>Lance D. Mill</i>	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. Index No.
			02	1 of 2 630





**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



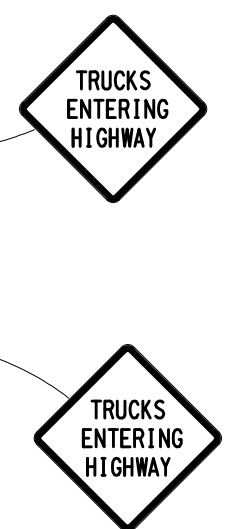
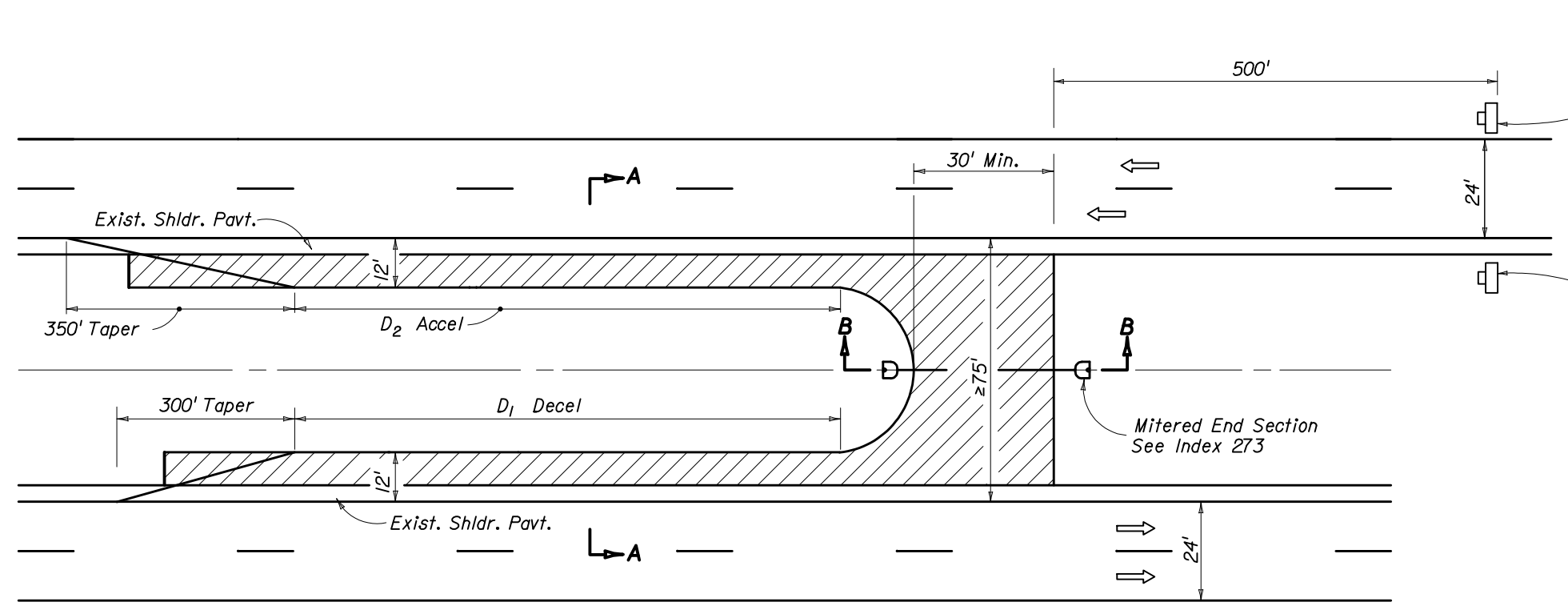
**CONDITION B**  
 WHEN THE PAVING TRAIN IS IN LANE ② THE U-TURNING VEHICLE SHALL TURN INTO LANE ①, CAUTIOUSLY MERGE INTO LANE ① AND PROCEED TO THE FRONT OF THE PAVING TRAIN

**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

TRAFFIC TRANSITION AREA DOWNSTREAM FROM CROSSOVER  
**CASE II**

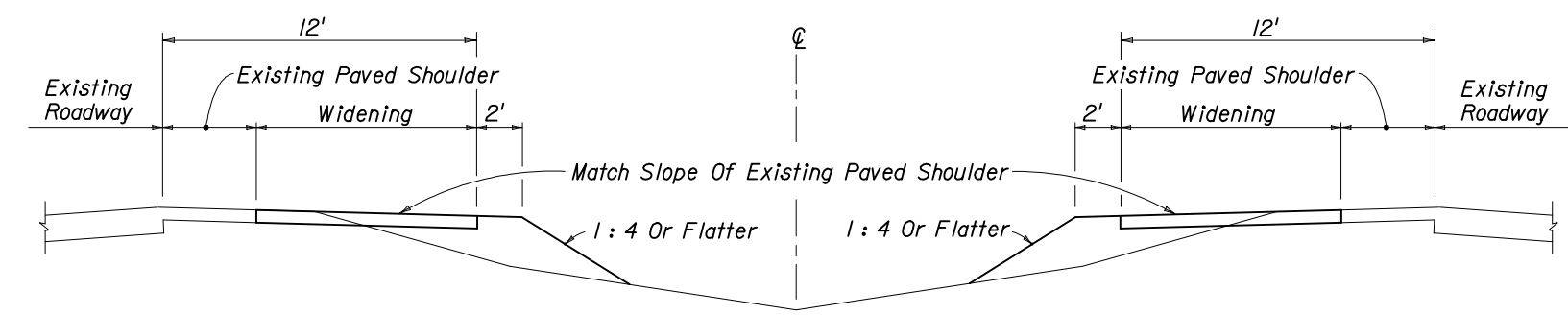
Note: See Sheet 1 of 2 For General Notes, Sign No. Details, And Conditions.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>CROSSOVER FOR PAVING TRAIN OPERATIONS • RURAL</b>				
Designed By	Names	Dates	Approved By <i>Lance D. Mill</i>	
Drawn By		12/87	Roadway Design Engineer	
Checked By		12/87	Revision	Sheet No. Index No.
			00	2 of 2 630

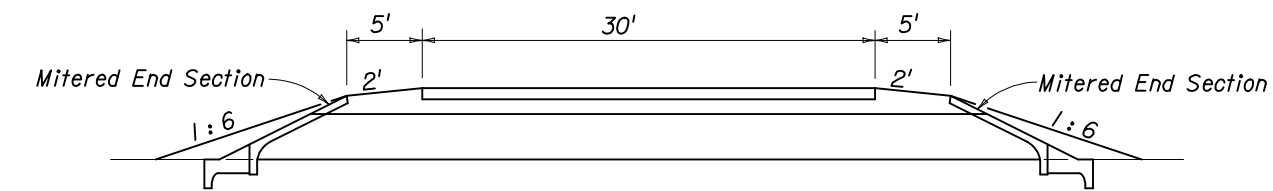


LENGTH OF ACCESS LANES (Ft.)		
Grade	D <sub>1</sub>	D <sub>2</sub>
2% or less	590'	1540'
3 to 4% Upgrade	530'	2310'
3 to 4% Downgrade	710'	925'

PLAN



SECTION AA



SECTION BB


**GENERAL NOTES**

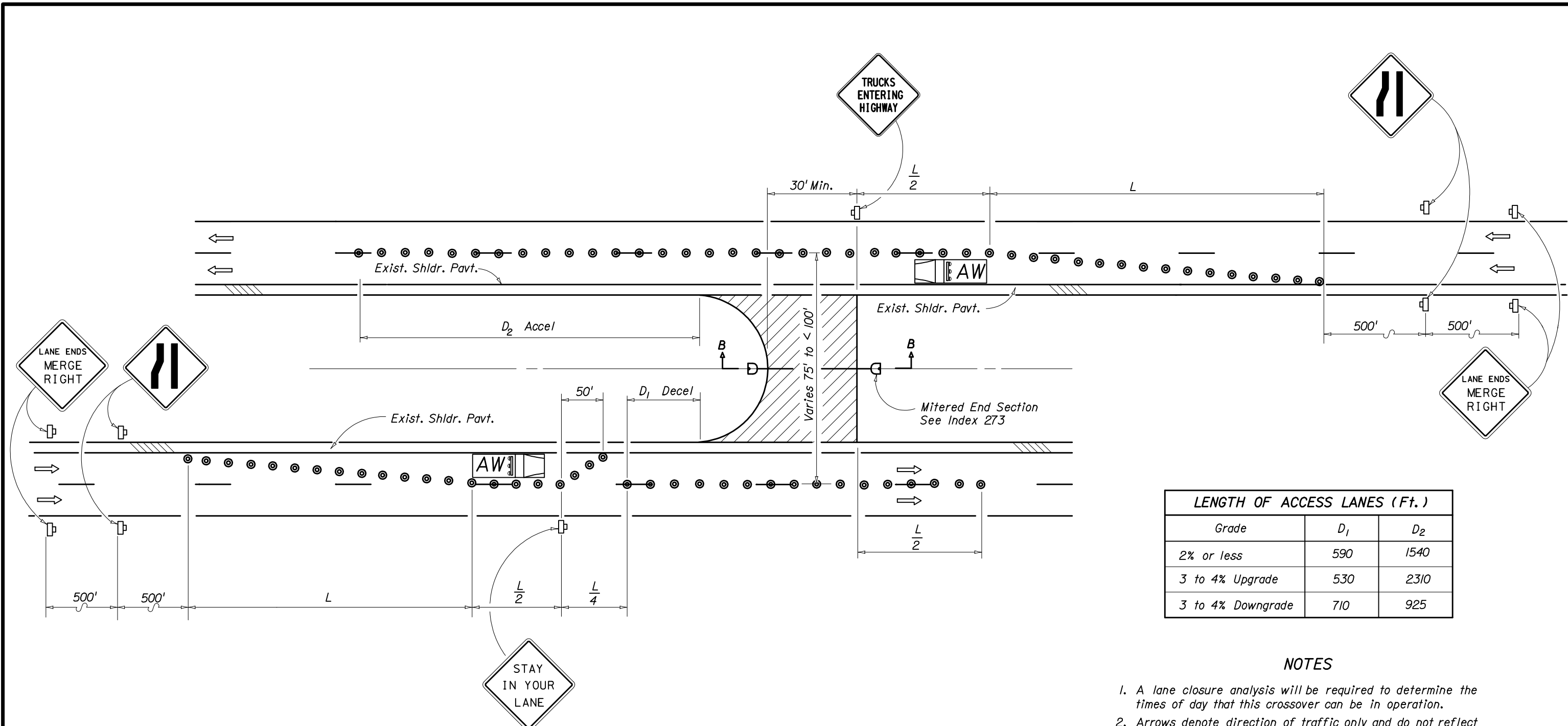
1. Temporary median crossovers shall be within the project limits and shall not be used for transporting materials to or from any other project. The acceleration-deceleration surfaces shall be paved. RAP material is acceptable for crossing surfacing.
2. Temporary median crossovers shall be located only in areas having adequate sight distance. On limited access facilities temporary median crossovers shall not be located within 1.5 miles of interchanges nor within 2000 ft. of acceleration-deceleration lanes at rest areas, other access openings or other highway service areas.
3. For paving train operations at permanent crossovers, see Index 630.
4. All traffic control devices are to be removed when crossover will not be in use for one hour or longer.
5. Trailer mounted advance warning panel may be used in lieu of advance warning vehicle.
6. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area restored to its original condition.
7. Cost of construction, maintenance, removal and restoration work related to temporary crossovers shall be included in the contract unit price for Maintenance of Traffic, LS.

**SYMBOLS**

 Work Zone Sign

**TEMPORARY CROSSOVER FOR MEDIAN WIDTHS ≥ 75'**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TEMPORARY CROSSOVER</b>				
Names	Dates	Approved By 		
Designed By		Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 2	631



LENGTH OF ACCESS LANES (Ft.)		
Grade	D <sub>1</sub>	D <sub>2</sub>
2% or less	590	1540
3 to 4% Upgrade	530	2310
3 to 4% Downgrade	710	925

**NOTES**

1. A lane closure analysis will be required to determine the times of day that this crossover can be in operation.
2. Arrows denote direction of traffic only and do not reflect pavement markings.

**SYMBOLS**

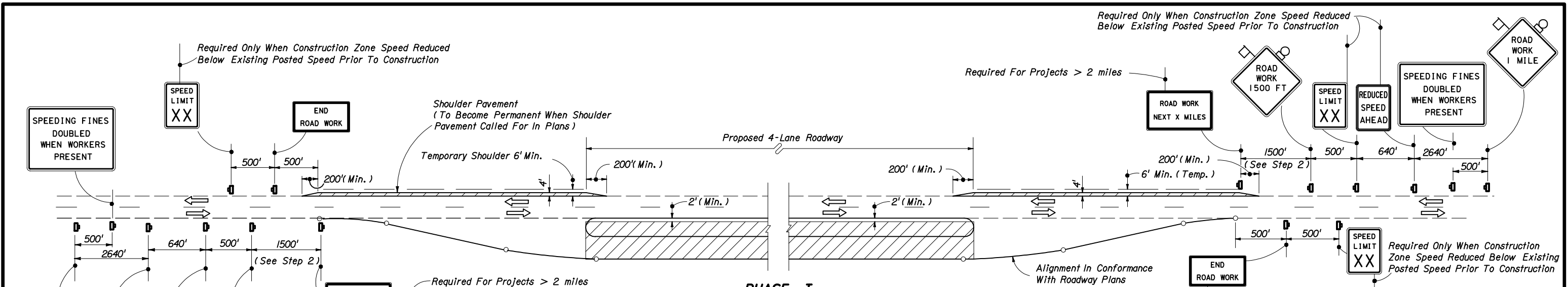
- Work Area
- Work Zone Sign
- Cone Or Tubular Marker
- Advance Warning Vehicle

Maximum Spacing Between Cones And Tubular Markers Shall Be 25'

$L$  (Min.) =  $WS$   
 $S$  = Existing Posted Speed (MPH)

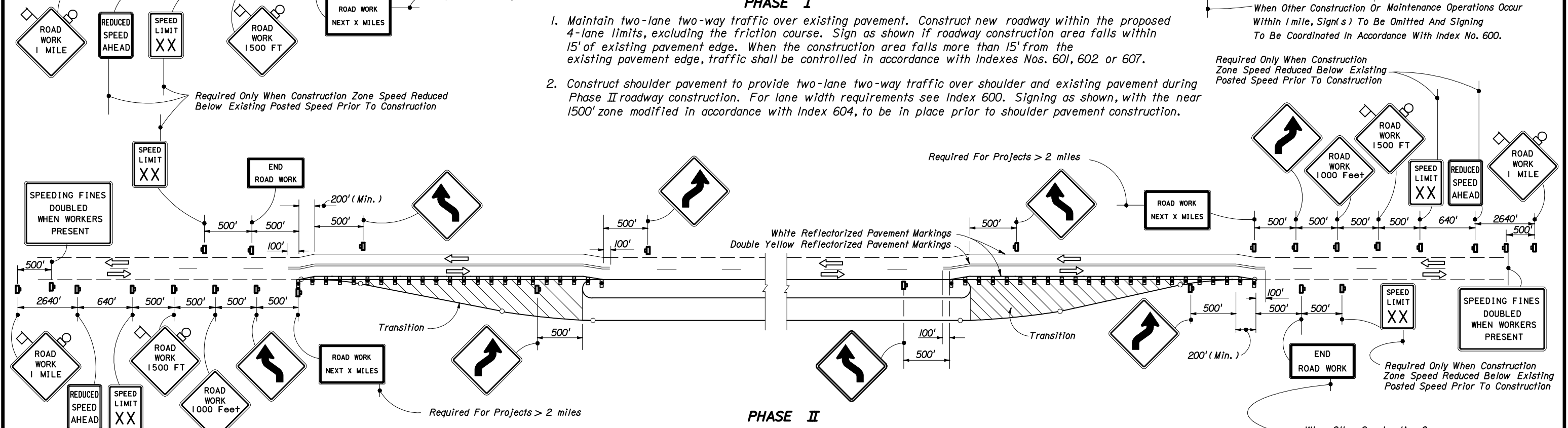
**TEMPORARY CROSSOVER FOR MEDIAN WIDTHS FROM 50' TO <75'**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TEMPORARY CROSSOVER</b>				
Designed By	Names	Dates	Approved By <i>Jamal D. Mill</i>	
Drawn By			Roadway Design Engineer	
Checked By			Revision	Sheet No. Index No.
			00	2 of 2 631



**PHASE I**

1. Maintain two-lane two-way traffic over existing pavement. Construct new roadway within the proposed 4-lane limits, excluding the friction course. Sign as shown if roadway construction area falls within 15' of existing pavement edge. When the construction area falls more than 15' from the existing pavement edge, traffic shall be controlled in accordance with Indexes Nos. 601, 602 or 607.
2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase II roadway construction. For lane width requirements see Index 600. Signing as shown, with the near 1500' zone modified in accordance with Index 604, to be in place prior to shoulder pavement construction.



**PHASE II**

1. Remove existing pavement marking, in areas of diversion and re-mark as shown, install warning devices and re-sign as shown. Traffic to be controlled in accordance with Index No. 606. For lane width requirements see Index No. 600.
2. Route through traffic to temporary and existing pavement.
3. Construct transitions, excluding friction course.

**SYMBOLS**

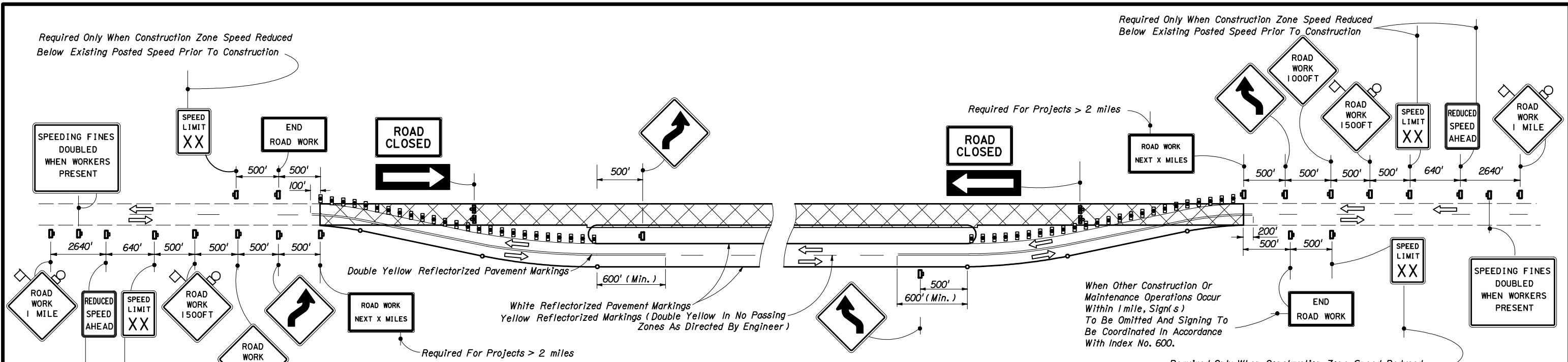
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Work Zone Sign

**LEGEND**

- Phase I Construction
- Phase II Construction
- Phase III Construction

Note: See Sheet 2 for General Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>CONVERTING TWO LANES TO FOUR LANES DIVIDED • RURAL</b>				
Names	Dates	Approved By <i>Samuel D. Mill</i>		
Designed By		Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 2	640



**PHASE III**

1. Remove temporary marking from the existing pavement and temporary shoulder pavement. Mark pavement, install warning devices and re-sign as shown. Traffic to be controlled in accordance with Index No. 606. For lane width requirements see Index No. 600.
2. Route through traffic to newly constructed roadway.
3. Resurface or reconstruct existing pavement including required shoulder pavement and friction course.

**PHASE IV**

1. Reroute through traffic as shown in Phase II. Signing to be as shown in Phase II.
2. Construct friction course over pavement constructed in Phases I and II.

**GENERAL NOTES**

1. The first two warning signs shall have an 18" x 18" (min.) orange flag And a Type B light attached and operating at all times.
2. Existing signs and pavement markings that conflict with construction signing and marking shall be obliterated or removed.
3. 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' in width. When one-lane one-way operations are necessary, a minimum width of 12' shall be maintained and traffic controlled in accordance with Indexes Nos. 603, 604, 606 and 607. Minimum width for the temporary shoulders is 6'.
4. Within the lateral transitions, the maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH or greater.  
The maximum spacing between warning devices used for delineation between the travel way and construction area to be 50' for Type I or Type II barricades or vertical panels or drums.
5. Warning Devices shall be in conformance with 'DropOffs In Work Zones'. Index No. 600.
6. For speed sign applications, see 'Regulatory Speed In Work Zones' Index No. 600.
7. For reflectORIZED raised pavement marker applications, see Reflective Pavement Markers Index 600 and Index No 17352.
8. Additional barricades, signing, lighting or other traffic controls shall be provided for limited work areas in accordance with other applicable TCZ Indexes.
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. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
13. For general TCZ requirements and additional information refer to Index No. 600.

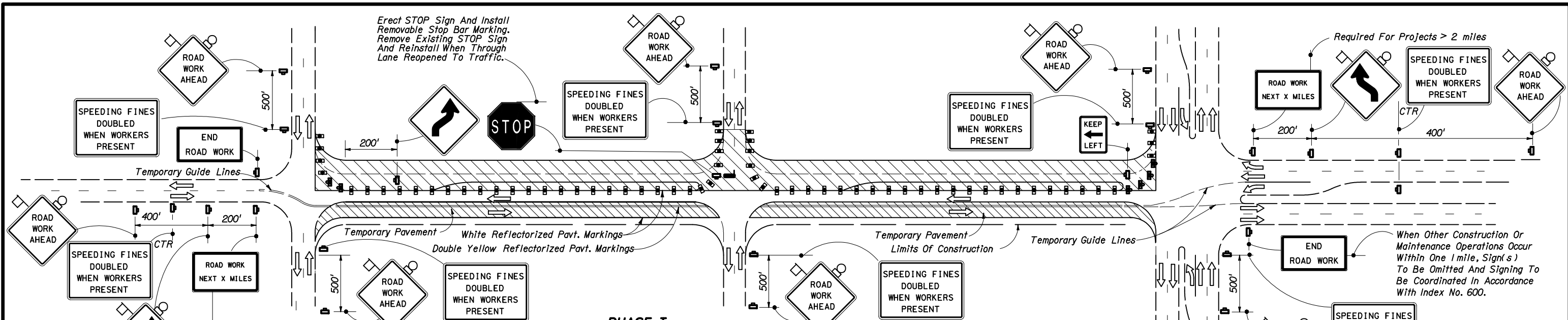
**SYMBOLS**

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type III Barricade (With Flashing Light)
- Work Zone Sign

**LEGEND**

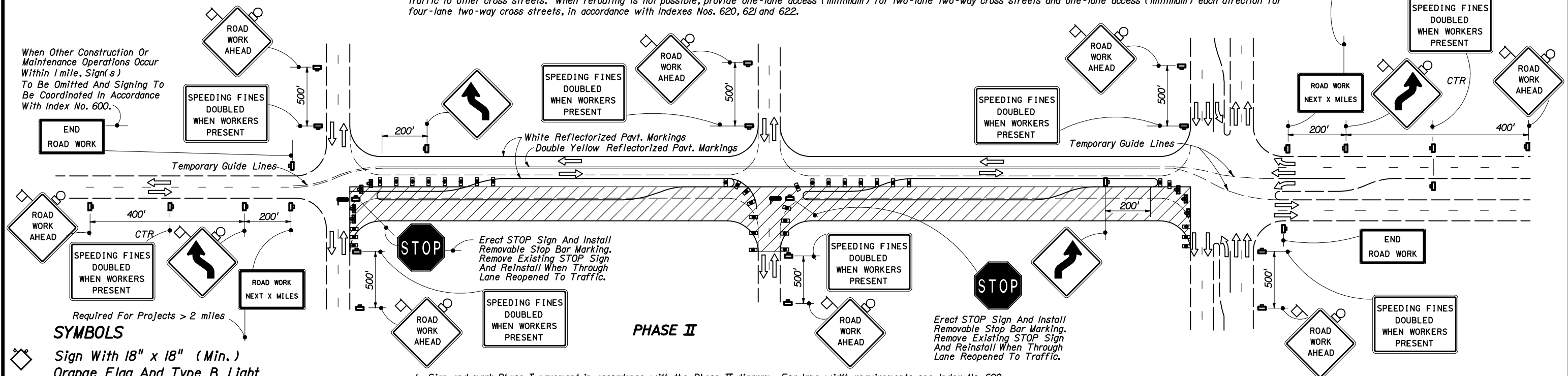
- Phase I Construction
- Phase II Construction
- Phase III Construction

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>CONVERTING TWO LANES TO FOUR LANES DIVIDED • RURAL</b>				
Designed By	Names	Dates	Approved By	
Drawn By			Roadway Design Engineer	
Checked By	Revision	Sheet No.	Index No.	
	00	2 of 2	640	



**PHASE I**

1. Maintain two-lane two-way traffic along existing facility. Install construction signing.
2. Remark existing pavement to facilitate temporary pavement construction. For lane width requirements see Index No. 600.
3. Construct temporary pavement of sufficient width to accommodate two-lane two-way traffic on the temporary pavement and a portion of the existing pavement during Phase I roadway construction. When two-lane two-way traffic can not be maintained during temporary pavement construction one-lane operations shall be maintained in accordance with Index No. 621. Channelizing devices shall be in conformance with 'Dropoffs in Work Zones' of Index No. 600.
4. Mark the pavement in accordance with the Phase I diagram. Reroute through traffic to the temporary pavement and a portion of the existing pavement. For lane width requirements see Index No. 600.
5. Construct two lanes of the proposed roadway, excluding the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Indexes Nos. 620, 621 and 622. Barricading shall be in conformance with 'Dropoffs in Work Zones', Index No. 600. When work extends through an intersection, temporarily reroute the 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, in accordance with Indexes Nos. 620, 621 and 622.



**PHASE II**

1. Sign and mark Phase I pavement in accordance with the Phase II diagram. For lane width requirements see Index No. 600.
2. Reroute through traffic to Phase I pavement.
3. Complete all Phase II construction, including the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Indexes Nos. 620, 621 and 622. Channelizing devices shall be in conformance with 'Dropoffs in Work Zones' of Index No. 600. 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, in accordance with Indexes Nos. 620, 621 and 622.

**SYMBOLS**

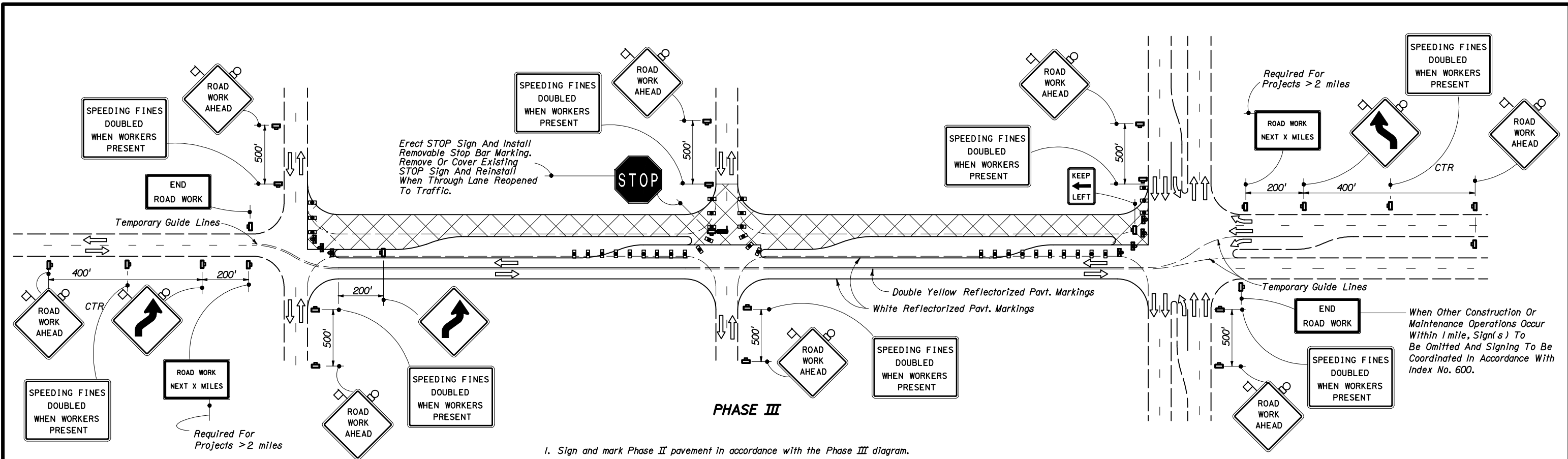
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Type III Barricade (With Flashing Light)
- Work Zone Sign
- Stop Bar

**LEGEND**

- Phase I Construction
- Phase II Construction
- Phase III Construction

See Sheet 2 for General Notes.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>CONVERTING TWO LANES TO FOUR LANES DIVIDED • URBAN</b>				
Names	Dates	Approved By <i>Jane D. Mill</i>		
Designed By	08/79	Roadway Design Engineer		
Drawn By	08/79	Revision	Sheet No.	Index No.
Checked By	08/79	00	1 of 2	641



**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 warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. 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' in width. When one-lane one-way operations are necessary, a minimum width of 12' should be maintained and traffic controlled in accordance with Indexes Nos. 620, 621 or 622.
4. At signalized intersections, signals shall be directed or relocated as required to the center of relocated lanes.
5. For reflectORIZED raised pavement marker application see index No. 600 and index No. 17352.
6. 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.
7. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
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. For general TCZ requirements and additional information refer to Index No. 600.

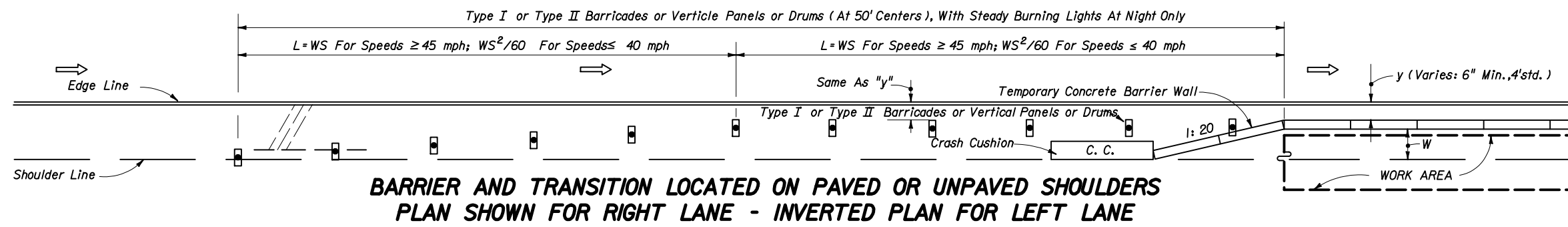
**SYMBOLS**

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( With Steady Burning Light At Night Only ). Tubular Markers May Be Used During Daylight Only.
- Type III Barricade ( With Flashing Light )
- Work Zone Sign
- Stop Bar

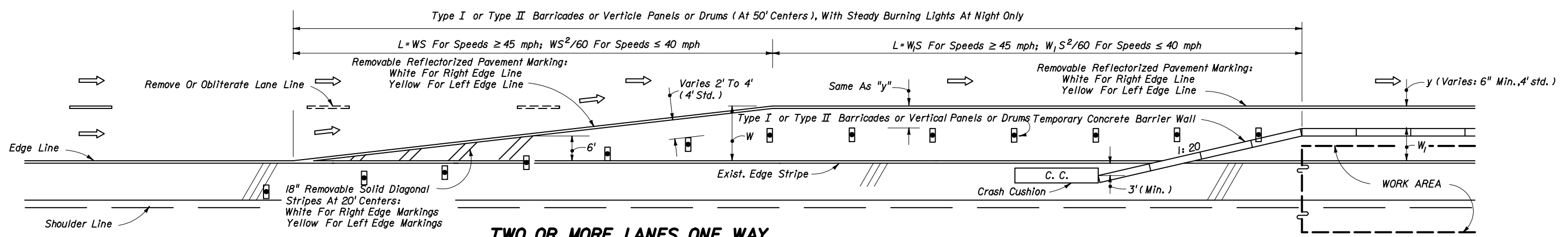
**LEGEND**

- Phase I Construction
- Phase II Construction
- Phase III Construction

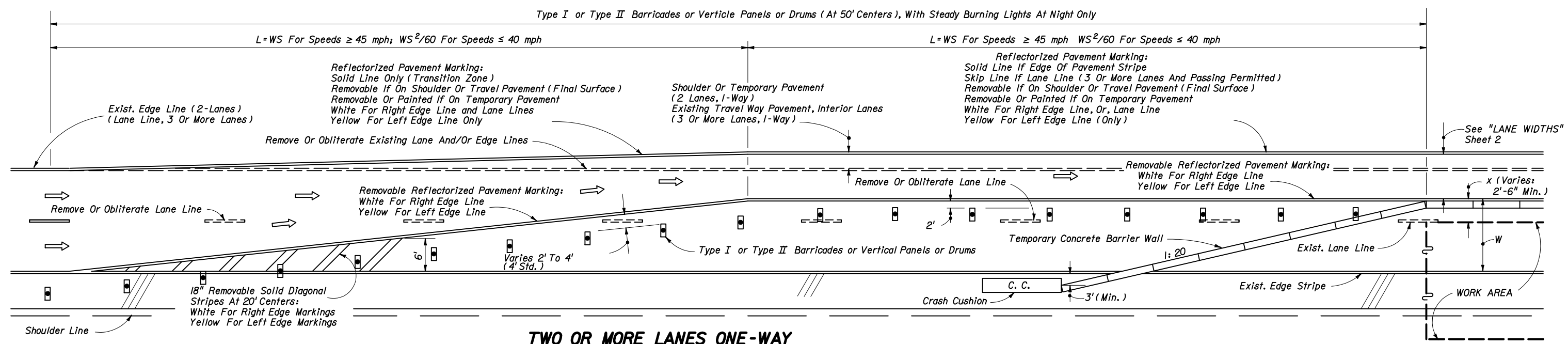
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>CONVERTING TWO LANES TO FOUR LANES DIVIDED • URBAN</b>				
Designed By	Names	Dates	Approved By <i>Jane D. Mill</i>	
Drawn By		08/79	Roadway Design Engineer	
Checked By		08/79	Revision	Sheet No. Index No.
			00	2 of 2 641



**BARRIER AND TRANSITION LOCATED ON PAVED OR UNPAVED SHOULDERS  
PLAN SHOWN FOR RIGHT LANE - INVERTED PLAN FOR LEFT LANE**



**TWO OR MORE LANES ONE WAY  
LANE DROP • PLAN SHOWN FOR RIGHT LANE MERGE LEFT - INVERTED PLAN FOR LEFT LANE MERGE RIGHT**



**TWO OR MORE LANES ONE-WAY  
LANE DROP AND LANE SHIFTS - PLAN SHOWN FOR RIGHT LANE MERGE LEFT - INVERTED PLAN FOR LEFT LANE MERGE RIGHT**

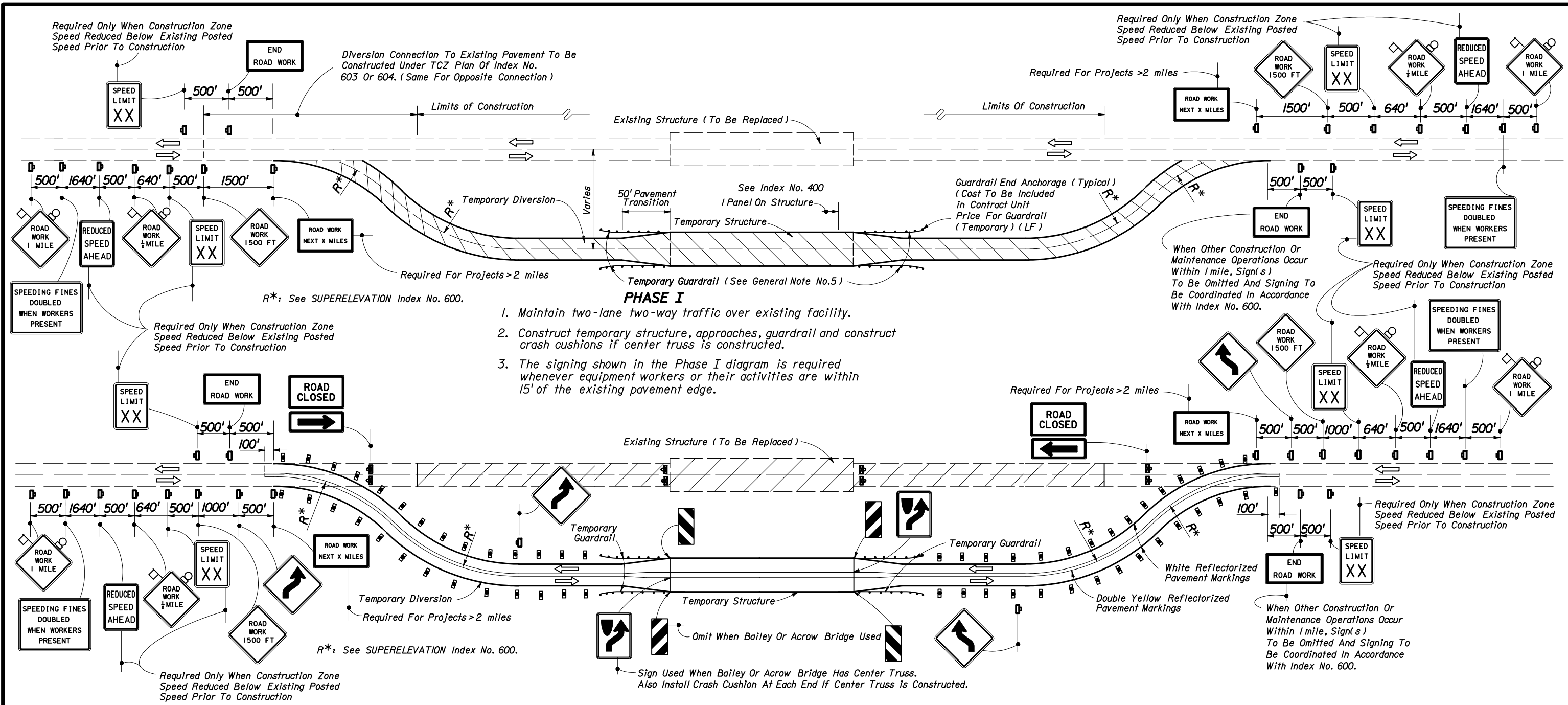
**GENERAL NOTES**

1. Barrier wall within the transition areas shall have reflective markers mounted on the travel side of the wall, 6" below the top and on 12' centers.
2. Arrows denote direction of traffic only and do not reflect pavement markings.
3. For signing information see the Plans, Specifications, MUTCD and other TCZ Standards.
4. Where W = width of lateral transition in feet, S = posted speed limit.

**TRANSITIONS FOR TEMPORARY CONCRETE BARRIER WALL ON FREEWAY FACILITIES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRANSITIONS FOR TEMPORARY CONCRETE BARRIER WALL ON FREEWAY FACILITIES</b>				
Designed By		Dates	Approved By	
Drawn By		4/89	<i>James D. Hill</i> Roadway Design Engineer	
Checked By		4/89	Revision	Sheet No. Index No.
			02	1 of 1 642





- PHASE I**
1. Maintain two-lane two-way traffic over existing facility.
  2. Construct temporary structure, approaches, guardrail and construct crash cushions if center truss is constructed.
  3. The signing shown in the Phase I diagram is required whenever equipment workers or their activities are within 15' of the existing pavement edge.

- PHASE II**
1. Re-sign and mark as shown in Phase II plan.
  2. Reroute traffic to diversion and maintain two-way traffic on diversion. Install Type III barricades.
  3. Construct proposed structure and reconstruct or resurface existing approaches.

**PHASE III (See Sheet 2 of 2)**  
**GENERAL NOTES (See Sheet 2 of 2)**

**SYMBOLS**

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Type III Barricade (With Flashing Light)
- Work Zone Sign

**LEGEND**

- Phase I
- Phase II

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
TRAFFIC CONTROL THROUGH WORK ZONES					
<b>TWO-LANE, TWO-WAY • RURAL</b>					
<b>STRUCTURE REPLACEMENT</b>					
Designed By	Names	Dates	Approved By	Roadway Design Engineer	
Drawn By	08/79				
Checked By	08/79	00	Revision	Sheet No.	Index No.
				1 of 2	650

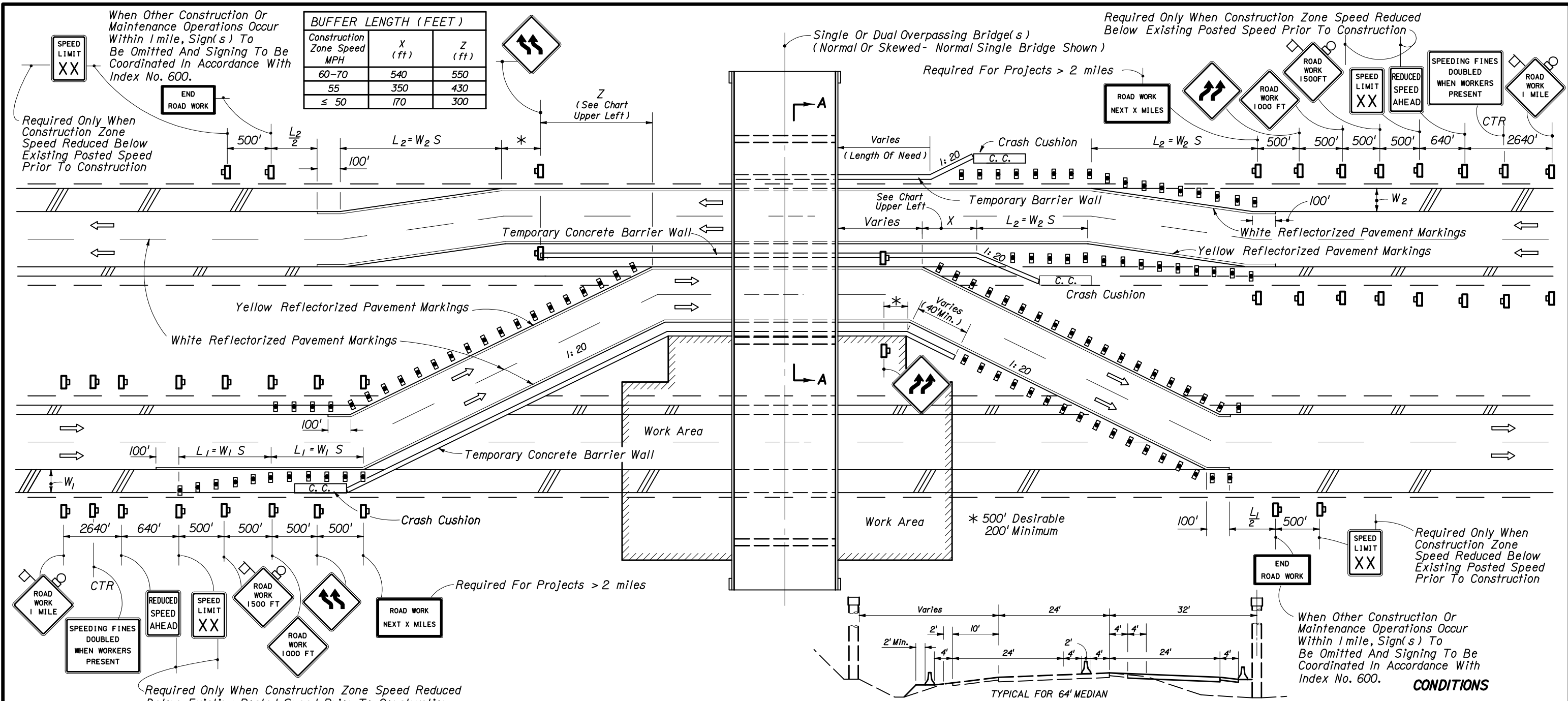
### PHASE III

1. Reroute traffic to final 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 warning signs shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. For speed sign applications see Index No. 600.
4. For lane width requirements see Index No. 600. When one-way one-lane operations are necessary, a minimum width of 12' 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'.
5. Method of attaching temporary guardrail to the diversion structure to be approved by the Engineer. Cost of temporary guardrail systems, including end anchorage assemblies, transitions and attachment to temporary structures, are to be included in the contract unit price for guardrail (temporary) LF.
6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
7. Only temporary crash cushions approved by the Department shall be used unless specified devices 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 diversion may be constructed in accordance with Index No. 609, unless otherwise stipulated in the plans.
11. For reflective raised pavement marker application see Index No. 600 and Index No. 17352.
12. For general TCZ requirements and additional information refer to Index No. 600.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>TWO-LANE, TWO-WAY • RURAL STRUCTURE REPLACEMENT</b>				
	Names	Dates	Approved By <i>James D. Hill</i>	
Designed By		08/79	Roadway Design Engineer	
Drawn By		08/87	Revision	Sheet No. Index No.
Checked By		08/79	02	2 of 2 650



BUFFER LENGTH (FEET)		
Construction Zone Speed MPH	X (ft)	Z (ft)
60-70	540	550
55	350	430
≤ 50	170	300

When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Required For Projects > 2 miles

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only).
- Work Zone Sign

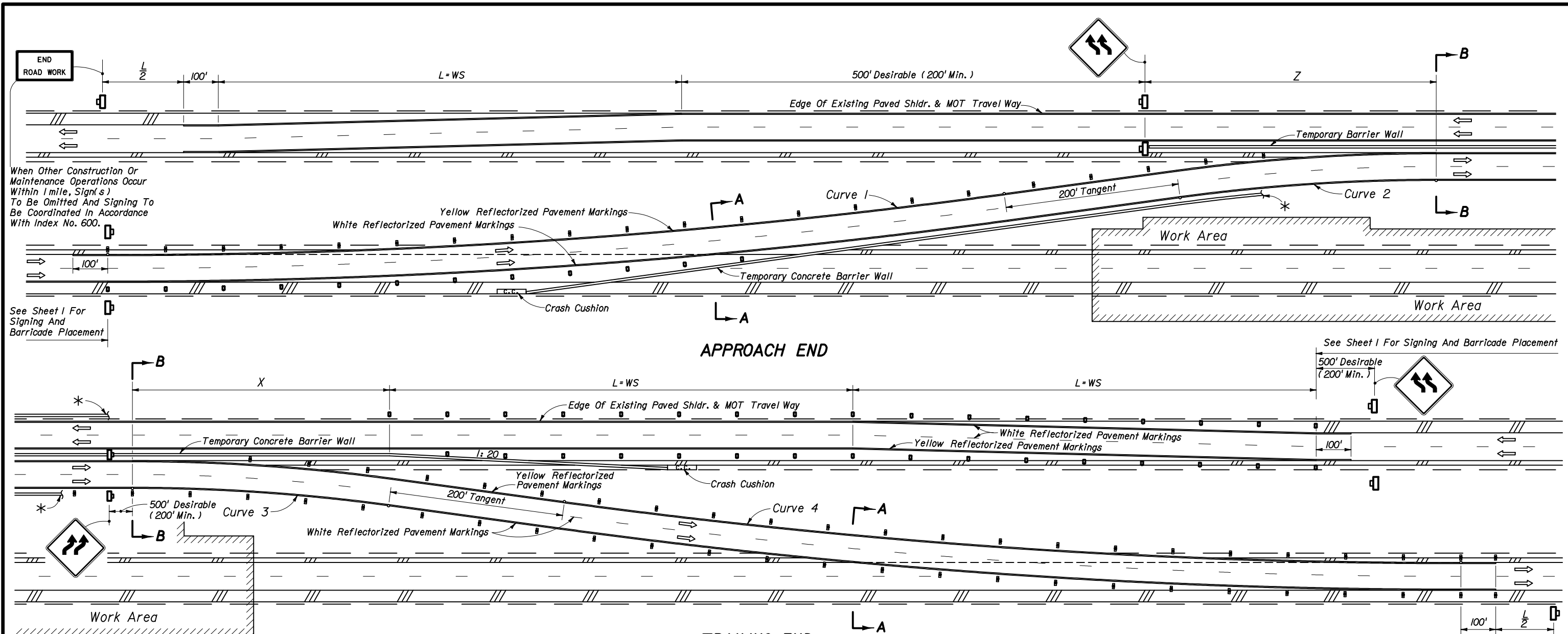
**GENERAL NOTES**

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.
2. The first two warning signs, each side, shall have an 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
3. All signs shall be post mounted.
4. S = Posted speed limit (mph).
5. Within the lateral transitions, the maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH or greater. Barricades, vertical panels, and drums shall not be intermixed in lateral transitions.
6. For speed sign applications see 'Regulatory Speed in Work Zones' Index No. 600.
7. All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and new pavement markings used for marking edge lines and lane lines.
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 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.
11. For general TCZ requirements and additional information refer to Index No. 600.

**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				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE DIVIDED MAINTENANCE AND CONSTRUCTION</b>				
Designed By	Names	Dates	Approved By	
Drawn By		10/89		
Checked By		10/89	Revision	Sheet No.
			00	1 of 2
				Index No. 651



When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

See Sheet 1 For Signing And Barricade Placement

See Sheet 1 For Signing And Barricade Placement

\* Length of barrier wall needed for protection of work area and/or other hazards to be shown in the plans. For complimentary information on barrier walls and work area see Sheet 1. See Index No. 600 for clear zone requirements.

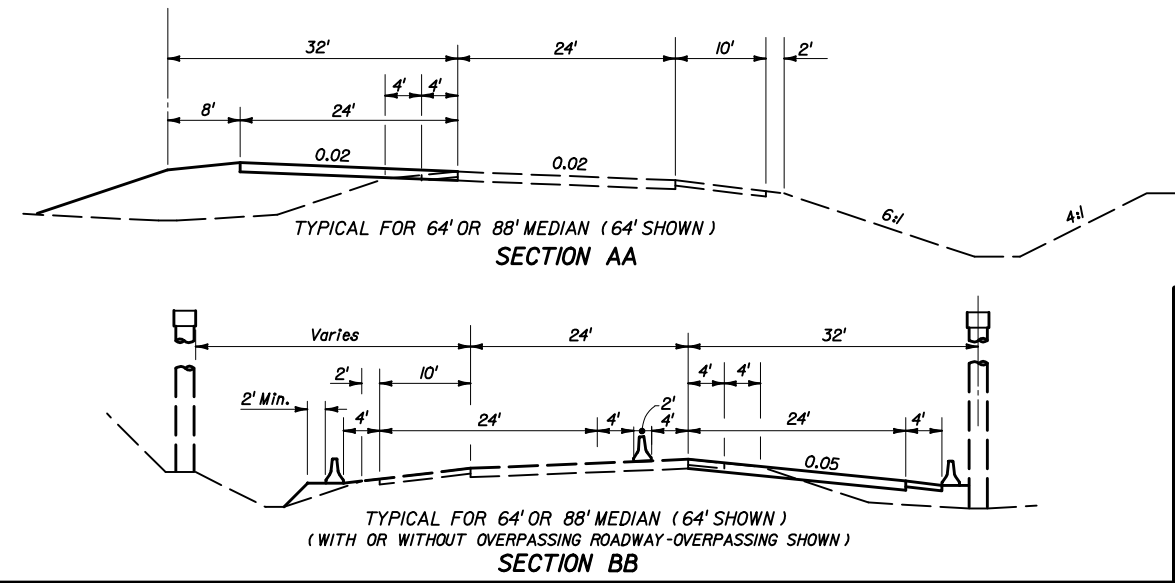
When Other Construction Or Maintenance Operations Occur Within 1 mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

### TRAILING END CURVILINEAR ALIGNMENT CROSSOVER

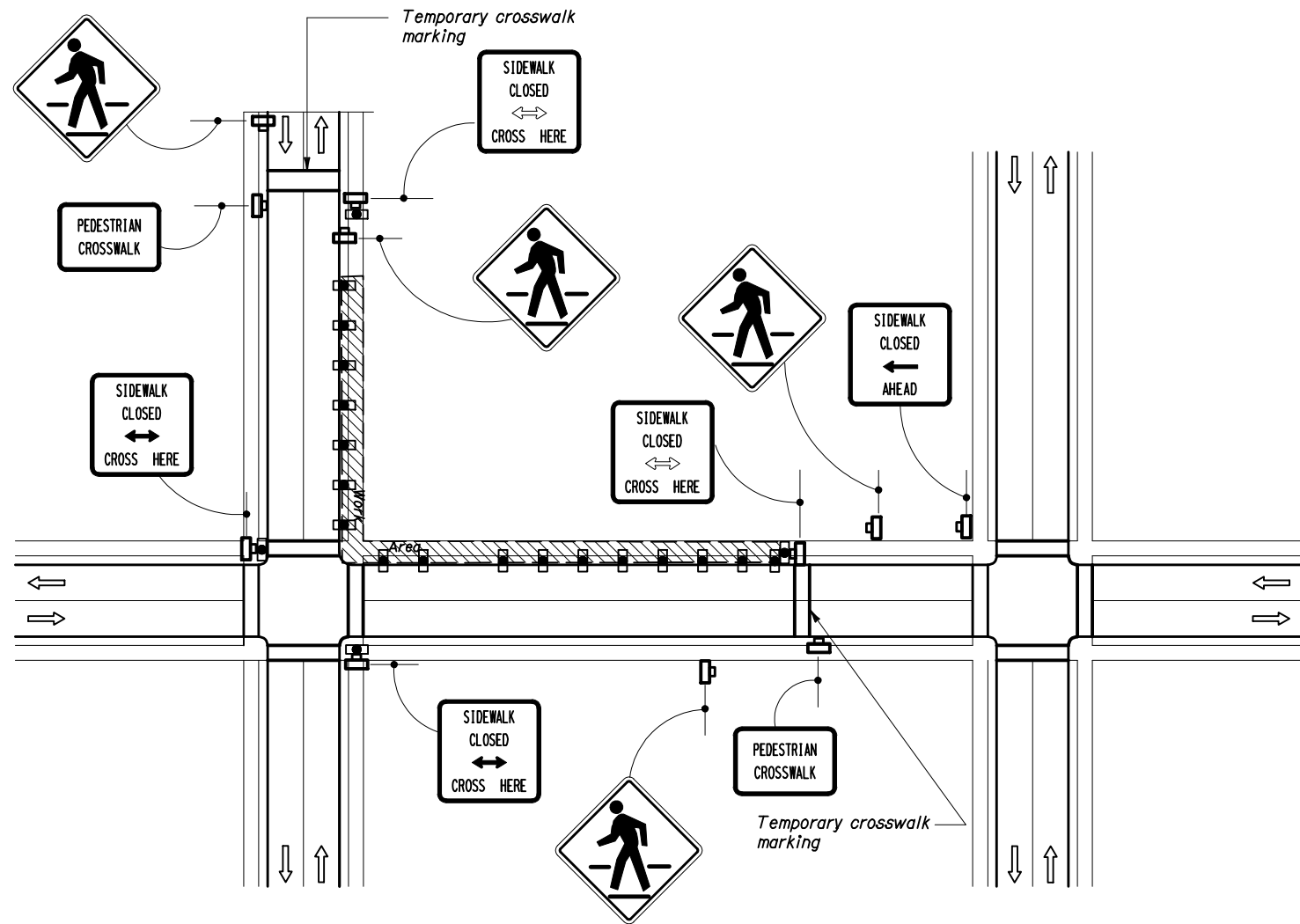
Construction Zone Speed MPH	64' Median		88' Median	
	X	Z	X	Z
70	607	588	582	545
65	581	562	552	514
60	562	543	531	492
55	337	369	330	350
50	201	286	200	276
45	115	164	115	163
40	104	149	104	148
35	91	134	91	132
30	78	118	78	115

Construction Zone Speed MPH	MINIMUM RADII FOR NORMAL CROSS SLOPES	
	Minimum Radius (ft) R	
	Curves 1 & 4	Curves 2 & 3
70	22,918 (0° 15')	4,584 (1° 15')
65	22,918 (0° 15')	3,820 (1° 30')
60	22,918 (0° 15')	3,274 (1° 45')
55	11,459 (0° 30')	2,546 (2° 15')
50	11,459 (0° 30')	2,292 (2° 30')
45	1,080 (5° 18')	700 (8° 11')
40	830 (6° 54')	550 (10° 25')
35	620 (9° 14')	410 (13° 58')
30	450 (12° 44')	285 (20° 06')

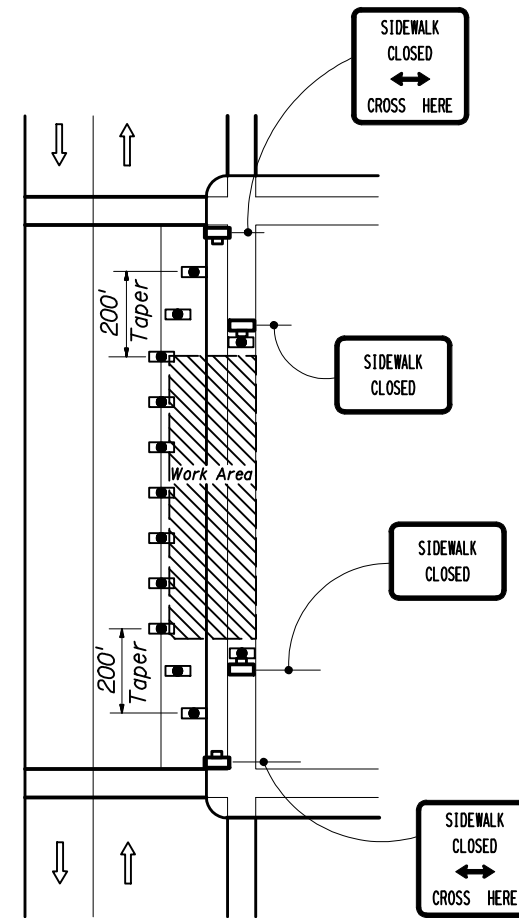
NOTE: Diversions with speeds of 50 mph or greater are considered high speed facilities; curvature and superelevation criteria for open highway conditions apply.



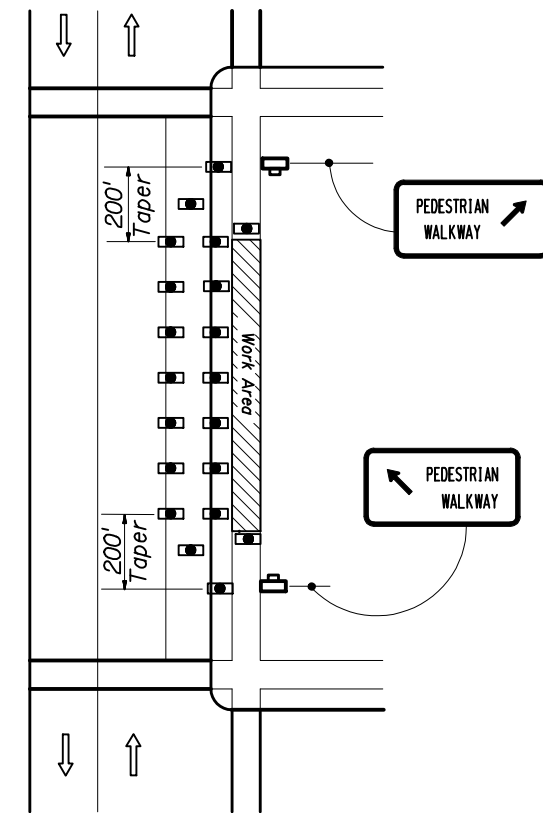
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>MULTILANE DIVIDED MAINTENANCE AND CONSTRUCTION</b>				
Designed By	Names	Dates	Approved By <i>Jamal D. Mill</i>	
Drawn By			Roadway Design Engineer	
Checked By			Revision	Sheet No. Index No.
			00	2 of 2 651



**CORNER SIDEWALK CLOSURE WITH TEMPORARY CROSSWALKS**



**MID-BLOCK SIDEWALK CLOSURE**



**MID-BLOCK SIDEWALK CLOSURE WITH TEMPORARY WALKWAY**

**GENERAL NOTES**

1. Arrows denote direction of traffic only and do not reflect pavement markings.
2. Only the signs controlling pedestrian flows are shown. Other work zone signs will be needed to control traffic on the streets.
3. For spacing of traffic control devices and general TCZ requirements refer to Index No. 600. Maximum spacing between barricades, vertical panels, drums or tubular markers shall not be greater than 25'.
4. Street lighting should be considered.
5. For nighttime closures use Type A flashing warning lights on barricades supporting signs and closing sidewalks. Use Type C steady-burn lights on channelizing devices separating the work area from vehicular traffic.
6. Pedestrian traffic signal display controlling closed crosswalks shall be covered or deactivated.

7. Temporary walkways shall be a minimum of 4' wide and kept free of any obstructions and hazards such as holes, debris, mud, construction equipment, stored materials and etc. ( For details see Index 600 )
8. Post Mounted Signs located near or adjacent to a sidewalk shall have a 7' minimum clearance from the bottom of sign to the sidewalk.
9. When construction activities involve sidewalks on both sides of the street, efforts should be made to stage the construction so that both sidewalks are not out of service at the same time.
10. In the event that sidewalks on both sides of the street are closed, then pedestrians shall be guided around the construction zone.

**SYMBOLS**

- Work Area
- Type I Or Type II Barricade Or Vertical Panel Or Drum ( With Steady Burning Light At Night Only ). ( Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600 ).
- Work Zone Sign

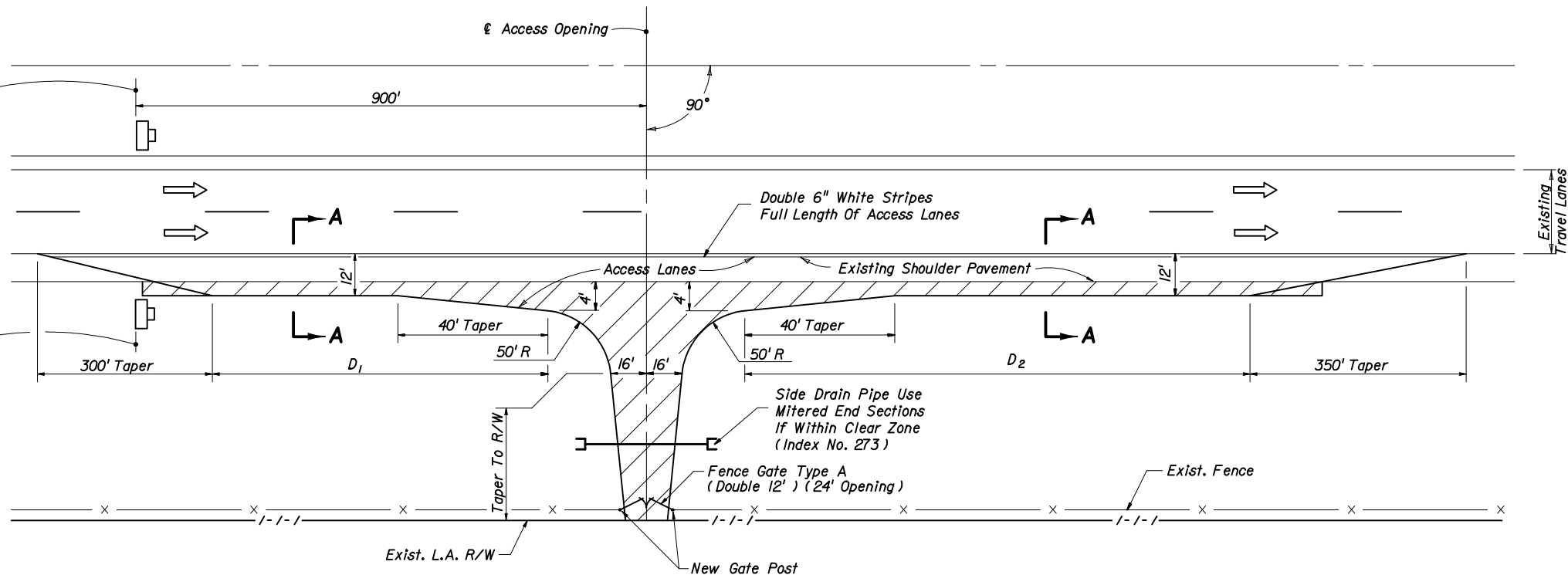
**TYPICAL APPLICATIONS**

- Sidewalk Repair
- Pavement Widening
- Utility Work

**CONDITIONS**

**WHERE ANY VEHICLE, EQUIPMENT WORKERS OR THEIR ACTIVITIES ENCROACH ON THE SIDEWALK FOR A PERIOD OF MORE THAN 60 MINUTES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>PEDESTRIAN CONTROL FOR CLOSURE OF SIDEWALKS</b>				
Designed By		Dates	Approved By <i>Jamal D. Mill</i>	
Drawn By		7/93	Roadway Design Engineer	
Checked By		7/93	Revision	Sheet No. Index No.
			00	1 of 1 660

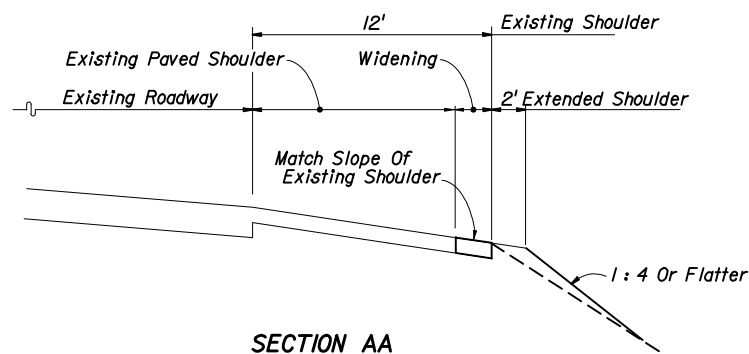


PLAN

SYMBOLS

Work Zone Sign

LENGTH OF ACCESS LANES (Ft)		
Grade	D <sub>1</sub>	D <sub>2</sub>
2% or less	590	1540
3 to 4% Upgrade	530	2310
3 to 4% Downgrade	710	925

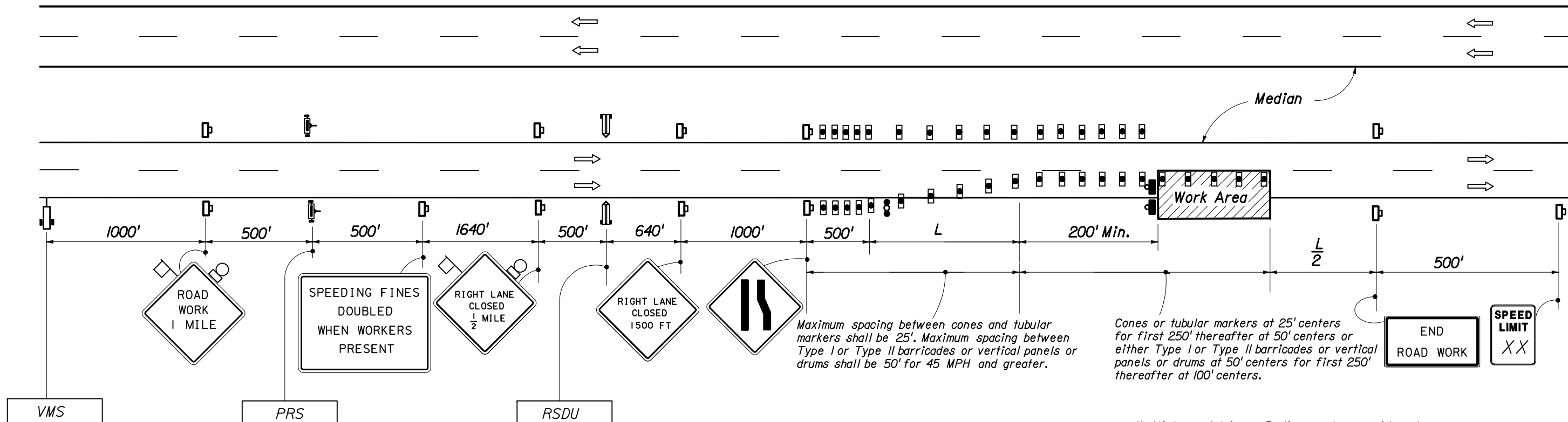


SECTION AA

GENERAL NOTES

1. Access openings across limited access right of way and use of this Index are prohibited unless specifically permitted in the Contract Plans or Special Provisions. When permitted in the Contract Plans or Special Provisions and prior to construction of any opening, the Contractor must submit, in writing, a request identifying specific locations for approval by the Engineer.
2. No more than two (2) access openings will be allowed on each project.
3. Access openings shall be located only in areas having adequate sight distance and shall not be located within 1.5 miles of interchanges nor within 2000 ft. of acceleration-deceleration lanes at rest areas, other access openings or other highway service areas.
4. Access openings shall not be constructed directly opposite temporary median crossovers nor within 2000 ft. of temporary median crossovers.
5. Access openings shall be within the project limits and shall not be used for transporting materials to or from any other project. The acceleration-deceleration surfaces shall be paved. RAP material is acceptable for driveway surfacing.
6. Any Motorist Aid Call Boxes affected by the temporary access openings shall be relocated outside the limits of access lanes and remain in use during construction. Upon removal of the access lanes, call boxes shall be returned to their previous location. Temporary relocation and restoration of call boxes shall be at the contractors expense.
7. Access openings in the limited access fence shall have gates which are to be locked during non-work hours or periods when the access is not in active use.
8. The contractor shall take all precautions necessary to insure against entrance by livestock or unauthorized persons or vehicles.
9. The contractor shall not vary from the plan detail without approval of the Engineer.
10. Gates shall be removed and access opening locations shall be restored to pre-construction condition immediately upon completion of activities utilizing the materials being transported through the openings whether or not the project is completed.
11. Failure to comply with any provision of the access opening plan shall be cause for terminating use of all openings. Upon notification by the Engineer, the contractor shall cease hauling and begin restoration of affected areas. Under this condition expense of removal, restoration and of additional hauling distances shall be borne by the contractor.
12. No guardrail or barrier wall will be removed for access openings.
13. Construction and removal of the access and restoring the area to pre-construction condition shall be included in the cost of Maintenance Of Traffic, LS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROL THROUGH WORK ZONES				
<b>LIMITED ACCESS RIGHT OF WAY TEMPORARY OPENING</b>				
Names	Dates	Approved By		
Designed By		Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 1	665



Note: VMS to be used when HAR is used. See note II

FHP Law Enforcement Officer (Patrol The Active Work Area on 15 to 20 Minute Intervals)

**SYMBOLS**

- Work Area
- Sign With 18"x18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Vertical Panel Or Drum (With Steady Burning Light At Night Only). (Tubular Markers May Be Used During Daylight Only. Cones May Be Used -See Index 600).
- Type I, Type II Or Type III Barricade Or Vertical Panel Or Drum (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel
- (1) VMS= Variable Message Sign (When Called For In Plans)
- (1) HAR= Highway Advisory Radio (When Called For In Plans)
- (2) PRS= Portable Regulatory Sign- Speed Limit When Flashing
- (2) RSU= Radar Speed Display Unit
- (1) LEO= Law Enforcement with Flashing Lights and Radar Paid As: FHP (Contract) (Do Not Bid)

**GENERAL NOTES**

1. Work operations shall be confined to one traffic lane, leaving the adjacent lanes open to traffic.
2. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
3. The first two warning 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. 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.
6.  $L$  (min.) = Length of taper in feet:  
=  $WS$  for speeds  $\geq 45$  mph  
Where:  
 $W$  = Width of lateral transition in feet  
 $S$  = Posted speed limit (mph)
7. Arrows denote direction of traffic only and do not reflect pavement markings.
8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
9. When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
10. For general TCZ requirements and additional information refer to Index No. 600.

Cones or tubular markers at 25' centers for first 250' thereafter at 50' centers or either Type I or Type II barricades or vertical panels or drums at 50' centers for first 250' thereafter at 100' centers.

- II. Highway Advisory Radio may be considered as a supplement to the Motorist Awareness System. The following operating parameters must be adhered to when using an Highway Advisory Radio:
  - A. Daytime construction periods only
  - B. Per CFR 90.242 (a) (5) the transmitting site of the HAR is restricted to the immediate vicinity of the following specified areas:  
  
Air, Train, Bus Transportation Terminals, Public Parks, Historical Sites, Bridges and Tunnels.  
  
Any Intersection of the following Federal Interstate Highway with any other Interstate, Federal, State, or Local Highway: I-4, I-10, I-75, I-275, I-95 and I-295

**Conditions**

1. The MAS is intended for use on rural high-speed high volume highways, which have lane closures with no more than two lanes open to traffic, and when the active work zone is less than one mile in length.
2. The MAS should be considered on projects where the likelihood of excessive speeds in the work area needs to be controlled.

VMS Display  
Message 1: TUNE TO XXX AM  
Message 2: FOR CONST INFO

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MOTORIST AWARENESS SYSTEM</b>				
Names	Dates	Approved By <i>James D. Hill</i>		
Designed By		Roadway Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 1	670

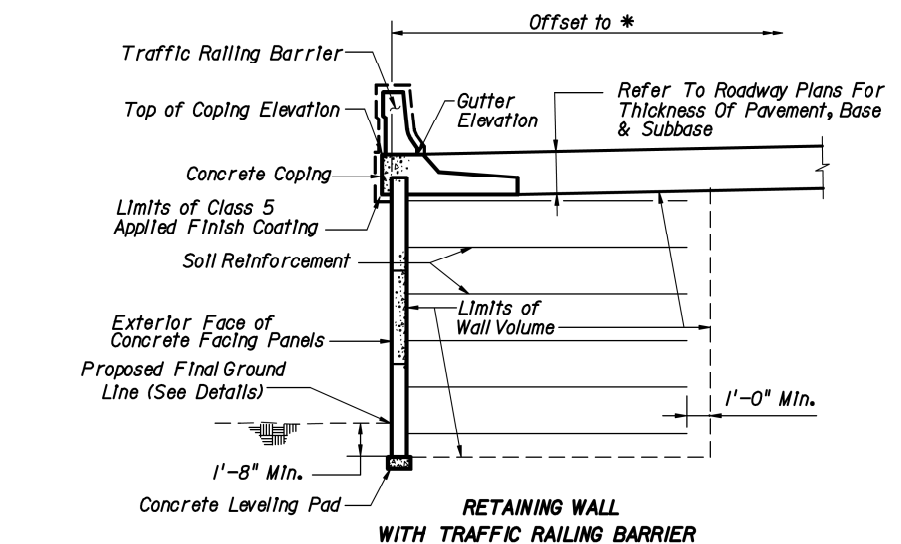
**NOTES**

- Walls shall be constructed in accordance with Section 548 and the wall suppliers instructions.
- Retaining Walls and all cast-in-place appurtenances, i.e., coping, traffic railing barriers, sidewalk parapets, light pilasters, integral sign foundations, etc., shall be paid for at the contract unit price per square feet of retaining wall under, Retaining Wall System (Permanent), Retaining Wall System (Temporary). Payment shall be based on plan quantities.
- The related cost of installation of drainage structures (only structures affected by wall) shall be included in the unit cost for retaining wall, Pay Item Retaining Wall System (Permanent), or Retaining Wall System (Temporary).
- All exposed surfaces of cast-in-place concrete shall receive a Class 5 Applied Finish Coating in accordance with Construction Specifications Section 400. Refer to Typical Wall Sections and the following notes for limits of applied finish:
  - The inside, backside and top of Traffic Railing Barriers and Pedestrian/Bicycle Railing Barriers.
  - Exposed surfaces of coping on top of retaining wall.
- Other coatings, colors or textures shall be applied as required by the Contract Documents.
- Piles within the wall volume shall be driven prior to construction of the retaining wall. The portion of the pile within the wall volume shall be wrapped with polyethylene sheeting in accordance with Section 459.
- A structural extension of the connection of the wall panel to the soil reinforcement shall be used whenever necessary to avoid the cutting or excessive skewing (greater than 15 degrees) of the soil reinforcements around obstructions (i.e., piles, pipes, etc.).
- For wall systems utilizing footings, the top of footing elevation is the same elevation as top of leveling pad.
- Steps in leveling pads shall occur at panel interfaces. Panels shall not cantilever past the end of the leveling pad.
- No cutting of soil reinforcement grids allowed unless shown on shop drawings and approved by the Engineer.

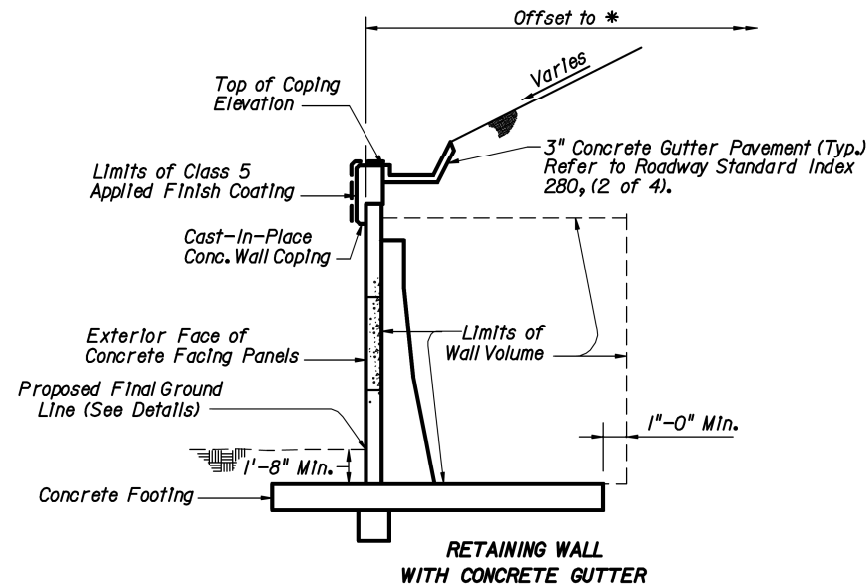
**SHOP DRAWING REQUIREMENTS**

The successful bidder shall submit the final design of the wall for review as shop drawings. The Shop Drawings shall include detailed design computations and all details, dimensions and quantities necessary to construct the wall. The design and fully detailed plans shall be prepared to Department standards current at time of bid and shall include, but not be limited to, presentation of required information as follows:

- Provide an elevation view of the wall indicating elevations at top of wall at begin and end wall stations, at all breaks in vertical alignment and at whole stations and 30 foot increments. Show elevations at top of leveling pad, bottom of footings, locations of all steps in leveling pad, panel designations, and length, size and designation of soil reinforcement in elevation view. Indicate location of the proposed final ground line.
- Provide a plan view detailing the horizontal alignment and offsets from the horizontal control line(s) to the exterior face of the wall.
- Show in the plan and elevation all utilities, sign supports, light pole pilasters, drainage structures, drainage pipes, etc. that affect the walls. Locate on the plan all piles within the wall volume including those for future widening as shown on Foundation Layout drawings.
- Provide general notes and design parameters on the shop drawings, including design soil characteristics, minimum factors of safety, allowable material stresses and all other pertinent notes required for the construction of the walls. Provide the allowable and maximum actual bearing pressure for each wall height increment.
- Show the limits of the wall volume.
- Show all details of each concrete panel, slip joint and all other concrete elements incorporated in the wall, including reinforcing bar size and spacing, reinforcing bar bending details and details of all embedments.
- Show all details of leveling pads and footings, including steps in leveling pads.
- Show all details for construction of wall around obstructions. Show details for placement of soil reinforcement at acute corners and at interface with temporary walls.



**TYPICAL WALL SECTION - MSE SYSTEM (N.T.S.)**

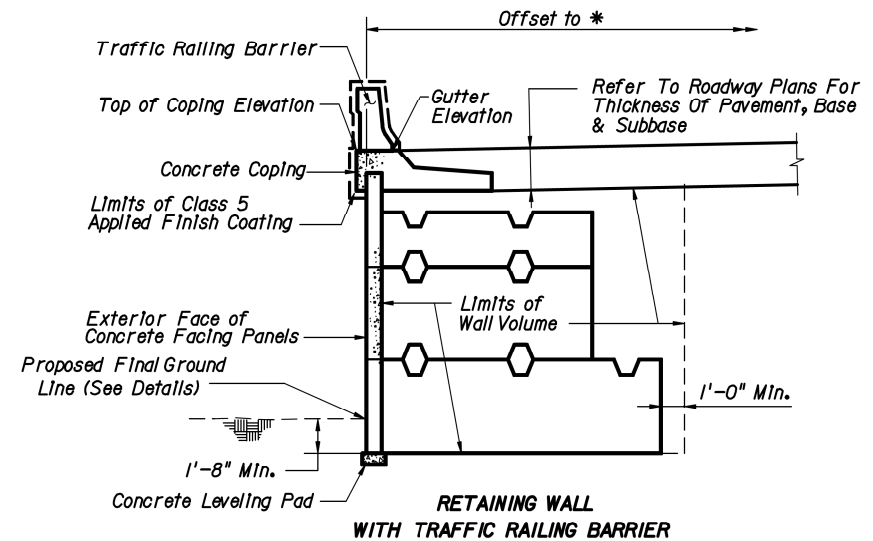


**TYPICAL WALL SECTION - COUNTERFORT SYSTEM (N.T.S.)**

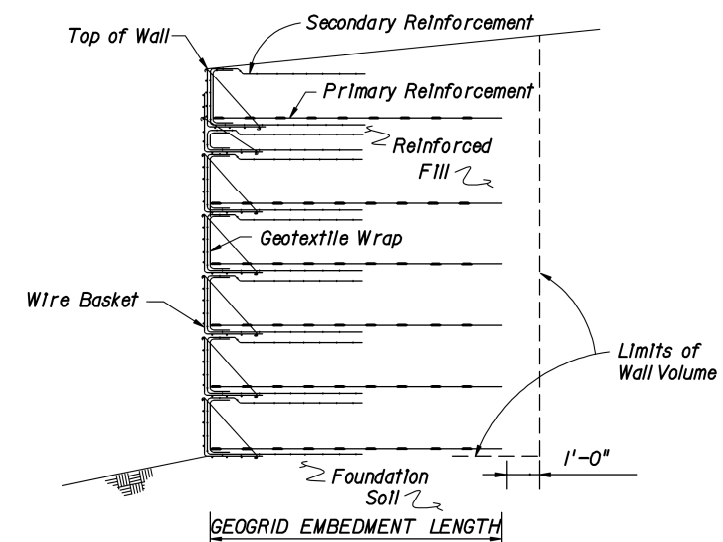
\* Insert control line designation i.e. C, B, etc.

- Show all details addressing conflicts between soil reinforcement, concrete facing panels and embedments in the wall volume. Provide full details of connections of barriers, coping, sign supports, light pole pilasters, acute corners, etc.
- Show all details where walls of different types intersect/influence one another.

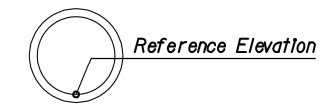
11. Provide fully detailed design calculations for each wall height increment utilized in the shop drawings. The submitted plans and design calculations shall be signed and sealed by a Professional Engineer registered in the State of Florida.



**TYPICAL WALL SECTION - CONCRETE STEM SYSTEM (N.T.S.)**



**TEMPORARY WALL - TYPICAL CROSS-SECTION (N.T.S.)**



NOTE: See Roadway plans for complete drainage details.

**DRAINAGE PIPE DETAIL**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>RETAINING WALL SYSTEM GENERAL NOTES</b>					
Names	Dates	Approved By <i>W. J. [Signature]</i>			
Designed By	RVR	11-98	State Structures Design Engineer		
Drawn By	JSP	11-98	Revision	Sheet No.	Index No.
Checked By	DEK	11-98	00	1 of 1	5000



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**FOSTER • GEOTECHNICAL**  
A Division of L. B. Foster Company

6455 OLD PEACHTREE ROAD  
NORCROSS, GA 30071  
Telephone: (770) 446-3000  
Fax: (770) 242-7493

GENERAL NOTES

DESIGN CRITERIA

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE REINFORCED EARTH VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO THE CONTRACTING AGENCY'S TECHNICAL SPECIFICATIONS FOR RETAINED EARTH WALLS.

2. FACTORS OF SAFETY

OVERTURNING 2.0  
INTERNAL PULLOUT 1.5 (ALLOW DEFORMATION 3/4")  
OVERALL STABILITY 1.5  
SLIDING 1.5  
BEARING 2.5

SOIL REINFORCEMENT MESH 0.47 Fy AT END OF DESIGN LIFE

3. SOIL CHARACTERISTICS ASSUMED FOR DESIGN:

SOIL PARAMETERS:

SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF  $\phi$ , C AND  $\gamma$  SHALL BE PROVIDED IN THE SHOP DRAWINGS.

4. THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF OTHERS TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.

5. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED EARTH VOLUME, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.

REINFORCING ELEMENTS

6. REINFORCING MESH ELEMENTS SHALL BE SHOP FABRICATED FROM COLD DRAWN STEEL ROD CONFORMING TO THE MINIMUM REQUIREMENTS OF ASTM A-82 AND SHALL BE WELDED AT THE JUNCTIONS BETWEEN LONGITUDINAL AND TRANSVERSE WIRES IN ACCORDANCE WITH ASTM A-185. GALVANIZATION SHALL BE APPLIED AFTER MESH FABRICATION AND SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF ASTM A-123.

LOOP EMBEDS SHALL BE FABRICATED FROM COLD DRAWN STEEL ROD CONFORMING TO ASTM A-510 OR ASTM A-82. LOOP EMBEDS SHALL BE WELDED IN ACCORDANCE WITH ASTM A-185. LOOP EMBEDS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM B-633.

DESIGN:

7. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS. ON THE BASIS OF THIS INFORMATION, THE WALL COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

WALL CONSTRUCTION

8A. (SQUARE PANELS) RETAINED EARTH WALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS OF 5.0' EACH TO MATCH DESIRED WALL ALIGNMENT.

8B. (HEX PANELS) RETAINED EARTH WALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS OF 4.33' EACH TO MATCH DESIRED WALL ALIGNMENT.

9. FOR LOCATION AND ALIGNMENT OF RETAINED EARTH WALLS. SEE RETAINING WALL CONTROL PLANS.

10. IF MANHOLES AND DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS.

11. IF PILES ARE LOCATED WITHIN REINFORCED SOIL VOLUME. THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE REINFORCED EARTH WALL UNLESS A METHOD TO PROTECT THE STRUCTURE WHICH IS ACCEPTABLE TO THE ENGINEER AND FOSTER GEOTECHNICAL COMPANY AND IS PROPOSED AND APPROVED IN WRITING.

12. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548 TO A LEVEL OF 2" (+/-) ABOVE THE TIE MESH EMBEDDED IN THE PANELS. INSTALLATION OF REINFORCING MESH SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.

13. WALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 548.

14. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY GUARDRAIL POSTS BEHIND RETAINED EARTH PANELS. PRIOR TO PLACEMENT OF THE TOP LAYER OF REINFORCING MESH, INDIVIDUAL REINFORCING MESH MAY BE SKEWED TO AVOID THE POST LOCATIONS IF AUTHORIZED BY THE ENGINEER (NO CUTTING OF SOIL REINFORCEMENT GRIDS ALLOWED UNLESS SHOWN ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER). ANY DAMAGE DONE TO THE REINFORCING MESH DUE TO THE INSTALLATION OF THE GUARDRAIL SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

15. IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR GUARDRAIL POSTS WHICH ARE WITHIN REINFORCED SOIL VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING MESH AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED ON THE PLANS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE WHAT COURSE OF ACTION SHOULD BE TAKEN.

16. TOP PANELS BENEATH CAST-IN-PLACE COPING SHALL HAVE #4 BARS PROTRUDING FROM THEIR TOP EDGE.

17. FOR OTHER INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO FOSTER GEOTECHNICAL CONSTRUCTION MANUAL.

18. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING MESH DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPER ELEVATION AND/OR SOIL MIXING ARE ANTICIPATED.

MATERIALS NOTES

19. NOMINAL MESH LENGTHS

THE REINFORCING MESH LENGTH SHOWN ON THE PLANS, MEASURED FROM BACK FACE OF PANEL ARE THE NOMINAL LENGTHS REQUIRED BY CALCULATION. THE ACTUAL FABRICATED MESH LENGTHS ARE OFTEN LONGER (UP TO 6") DUE TO MANUFACTURING TOLERANCES. THE REQUIRED HORIZONTAL LIMIT OF GRANULAR BACKFILL IS EQUAL TO THE NOMINAL MESH LENGTH. ADDITIONAL GRANULAR BACKFILL BEYOND THE NOMINAL MESH LENGTH IS NOT REQUIRED BY CALCULATION.

20. REINFORCED BACKFILL QUANTITY

THE REINFORCED BACKFILL QUANTITY INDICATED BY FOSTER GEOTECHNICAL IS CALCULATED BY MULTIPLYING THE NOMINAL MESH LENGTHS SHOWN ON THE PLANS BY THEIR TRIBUTARY WALL SURFACE AREA AND CONVERTING THE RESULT TO A NEATER CUBIC METER QUANTITY. THIS INFORMATION IS FURNISHED FOR THE CONTRACTOR'S INFORMATION ONLY AND IS NOT INTENDED TO PRESENT THE ACTUAL QUANTITIES REQUIRED TO COMPLETE THE WORK. THE CONTRACTOR MUST CALCULATE HIS OWN EXCAVATION AND BACKFILL QUANTITIES BASED UPON THE SPECIFIC CONDITIONS OF THE PROJECT.

21. PANEL FINISH

THE PRECAST PANELS FOR THIS PROJECT SHALL BE A PLAIN STEEL FORM FINISH UNLESS OTHERWISE SPECIFIED ON THE RETAINED EARTH CONTROL PLANS.

22. NOTE TO CONTRACTORS

ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY FOSTER GEOTECHNICAL

- PRECAST PANELS
- REINFORCING MESH
- LOOP EMBED
- HDPE BEARING PAD (NOMINAL 4.0 MELT / .950 DENSITY)
- NON-WOVEN FILTER CLOTH AND ADHESIVE (FOR PANEL JOINTS ONLY) (WEBTECH-TERRATEX NO. 4 OR EQUAL)

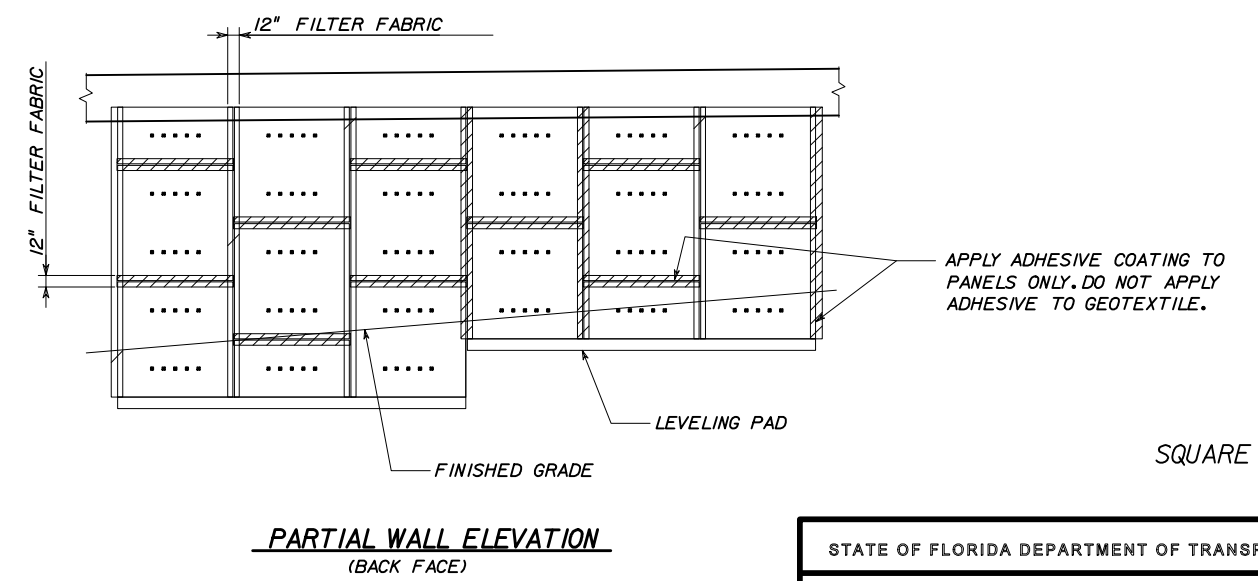
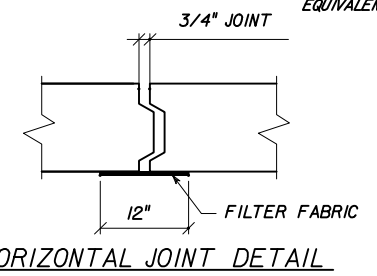
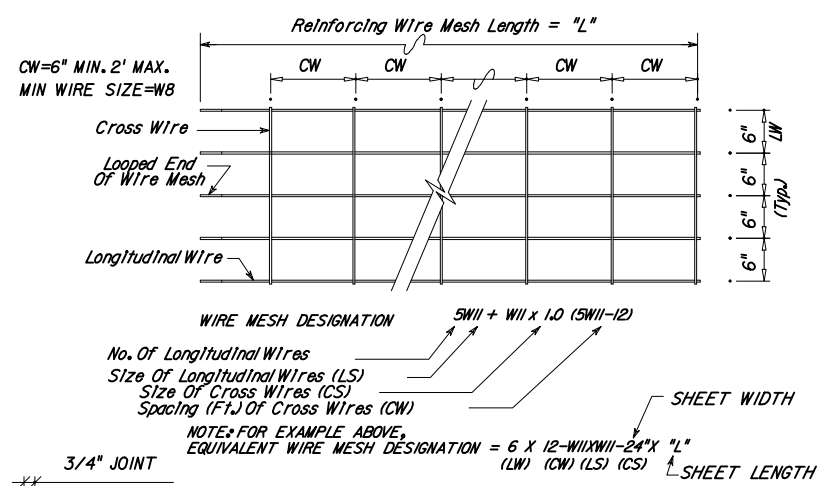
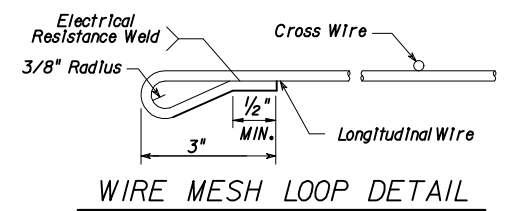
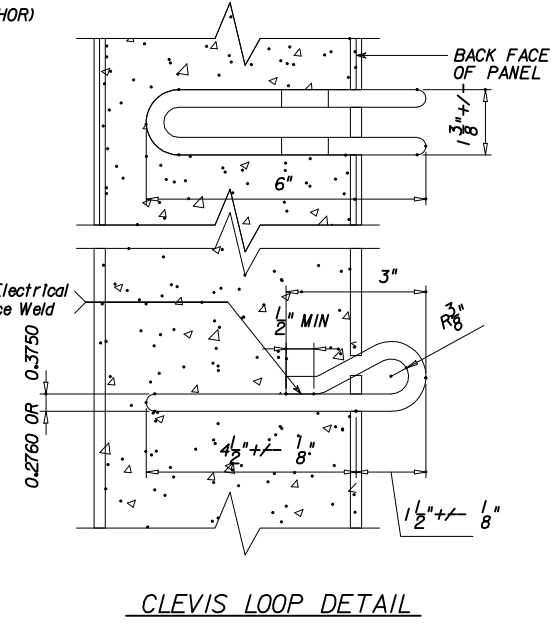
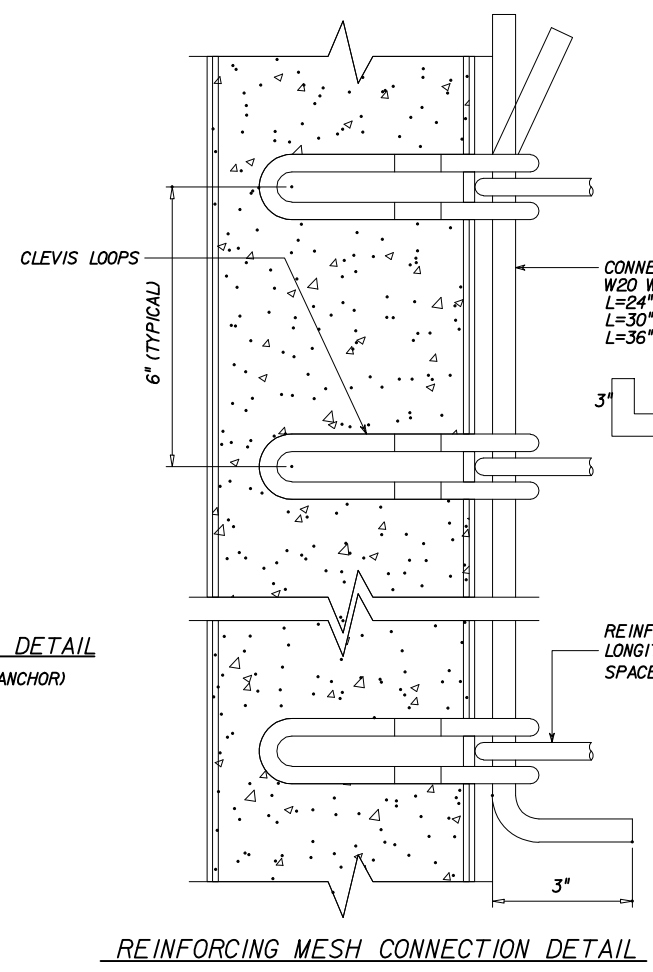
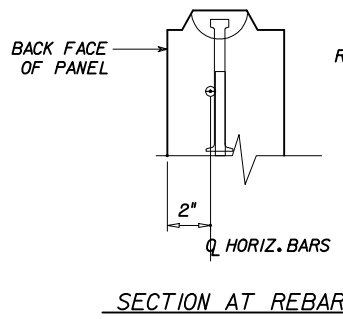
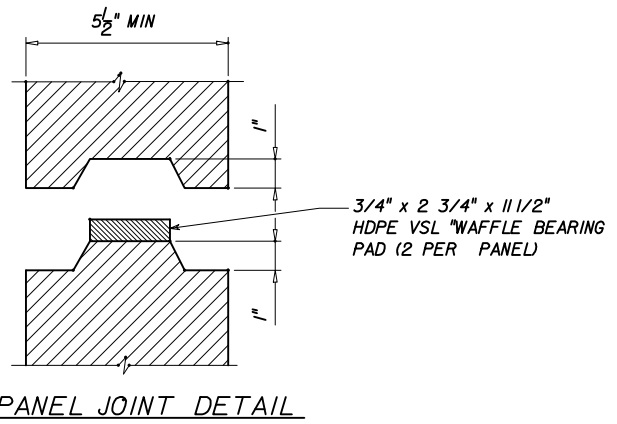
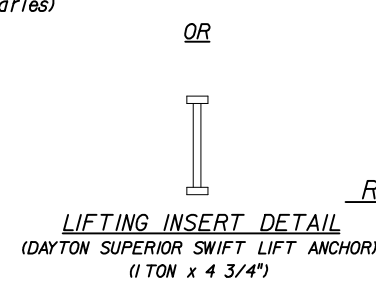
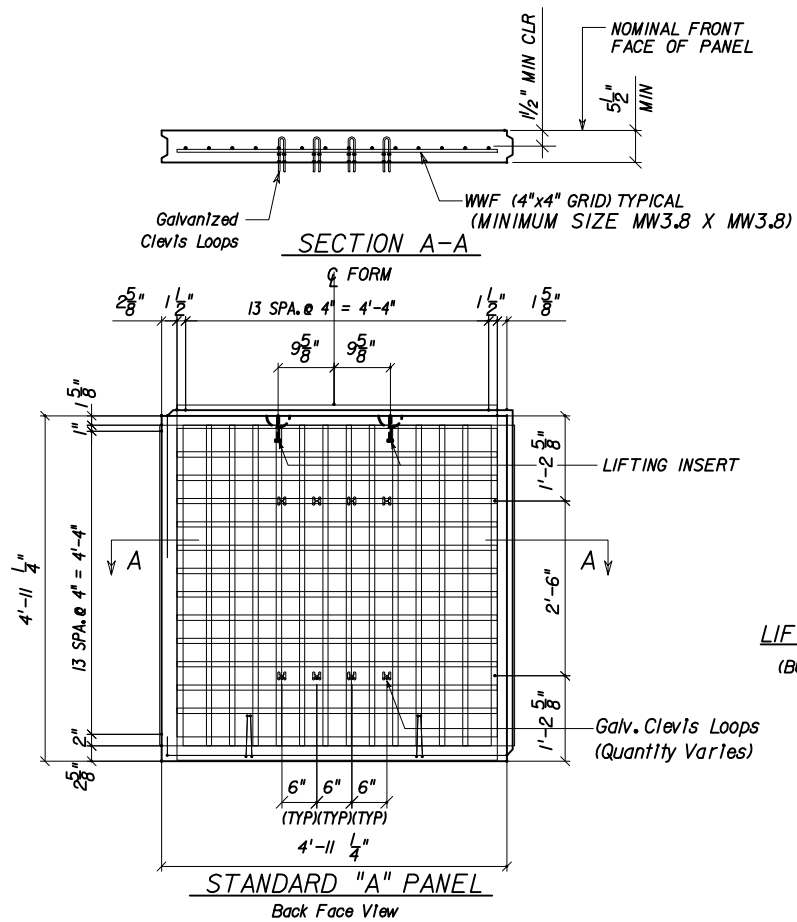
ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR. ANY JOINT MATERIALS SHOWN AT THE INTERFACE OF PRECAST PANELS AND CAST-IN-PLACE CONCRETE STRUCTURES ARE TO BE SUPPLIED BY THE ERECTION CONTRACTOR. ALL SANDBLASTING, PAINTING, SEALERS OR OTHER SPECIAL APPLIED COATINGS ARE ALSO SUPPLIED / INSTALLED BY THE CONTRACTOR IN THE FIELD FOLLOWING PANEL ERECTION.

23. FOSTER GEOTECHNICAL SUPPLIES PRECAST CONCRETE FACING PANELS AND ACCESSORIES TO BE USED IN CONJUNCTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF RETAINED EARTH WALLS DETAILED HEREIN. THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL FURNISHED BY FOSTER GEOTECHNICAL IS INTENDED TO PROVIDE A GENERAL EXPLANATION OF THE SYSTEM. IT IS THE CONTRACTOR'S OBLIGATION TO DEVISE AND EXECUTE A PROJECT SPECIFIC ERECTION SEQUENCE. PANEL UNLOADING, HANDLING AND BRACING SYSTEM, AND FALL PROTECTION SYSTEM. THE BRACING SYSTEM SHOWN IN THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL IS GENERAL IN NATURE AND DOES NOT ACCOUNT FOR PROJECT SPECIFIC CRITERIA COMPLIANCE WITH THE GUIDELINES IN THIS MANUAL DOES NOT RELIEVE THE CONTRACTOR OF ITS RESPONSIBILITY TO ADHERE TO THE PROJECT PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS OR COMPLIANCE WITH ALL FALL PROTECTION, SAFETY, LAWS, STANDARDS AND PROCEDURES AT THE JOBSITE. CONTRACTORS SHOULD TAKE SPECIAL PRECAUTIONS TO PREVENT THE PANELS FROM SHIFTING OR FALLING DURING THE ERECTION PROCESS.

SQUARE / HEX PANELS

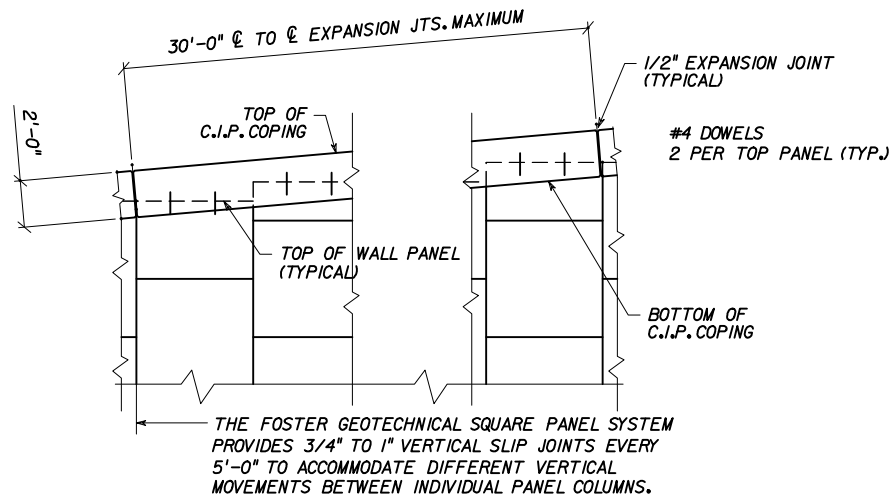
THIS SYSTEM SHALL BE USED IN MODERATELY OR SLIGHTLY AGGRESSIVE ENVIRONMENTS ONLY.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL</b>					
	Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	TCNA	11/98	State Structures Design Engineer		
Drawn By	CAD	11/98	Revision	Sheet No.	Index No.
Checked By	GEO	11/98	00	1 of 12	5005

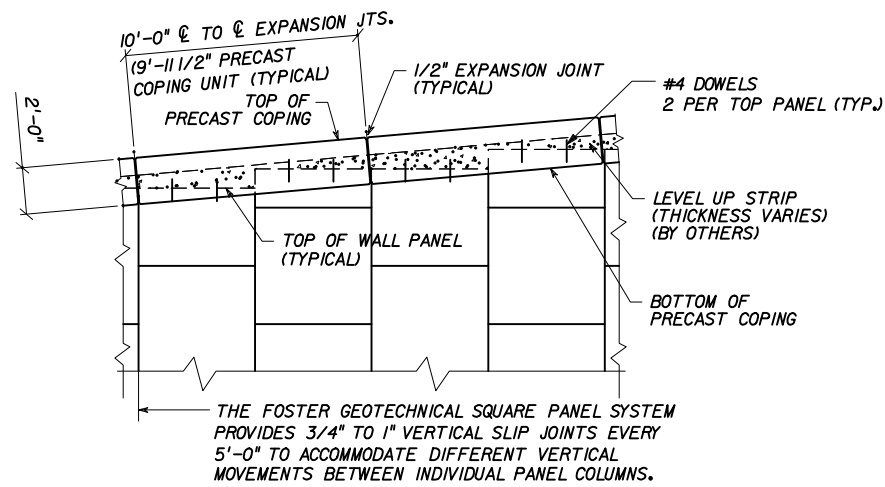


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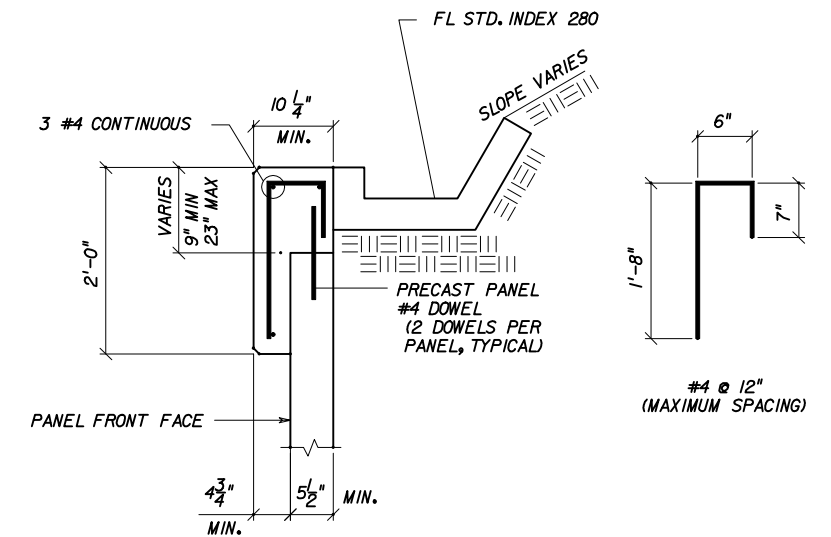
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL</b>				
Designed By	TCNA	Dates	11/98	Approved By
Drawn By	CAD	Revision	11/98	State Structures Design Engineer
Checked By	GEO	Sheet No.	00	
		Index No.	2 of 12	5005



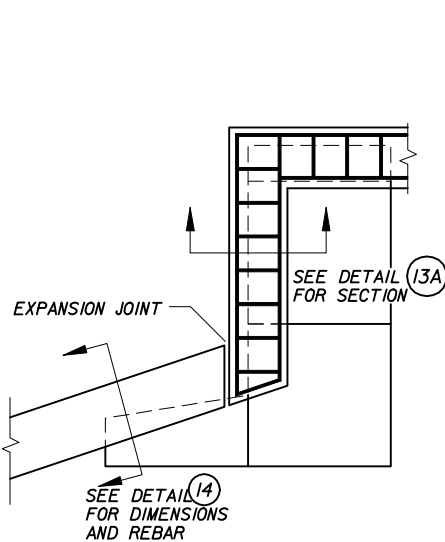
**14A PARTIAL ELEVATION C.I.P. COPING**  
(SQUARE PANELS SHOWN, HEX PANELS SIMILAR)



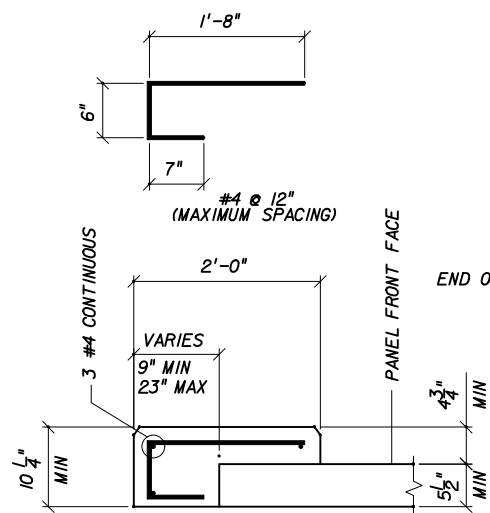
**20A PARTIAL ELEVATION PRECAST COPING**  
(SQUARE PANELS SHOWN, HEX PANELS SIMILAR)



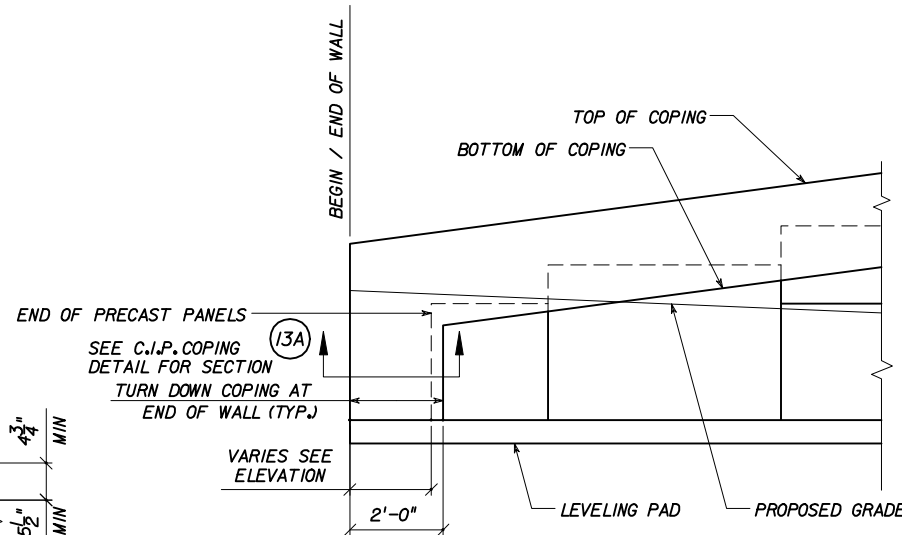
**14 C.I.P. COPING W/ DITCH**  
(2" MIN. COVER TYP.)



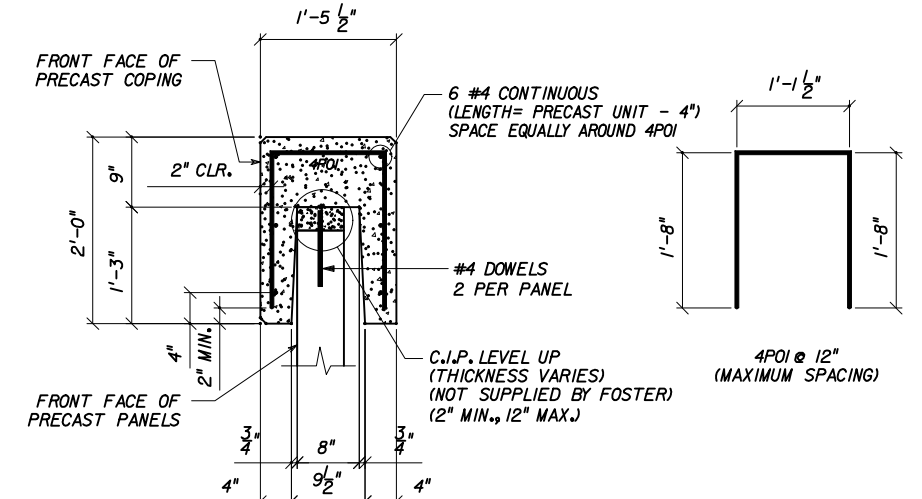
**13 VERTICAL COPING (C.I.P.)**  
(SQUARE PANELS SHOWN, HEX PANELS SIMILAR)



**13A VERTICAL COPING (C.I.P.) SECTION**  
(2" MIN. COVER TYP.)




**15 COPING ENCLOSURE (C.I.P.)**  
(SQUARE PANELS SHOWN, HEX PANELS SIMILAR)



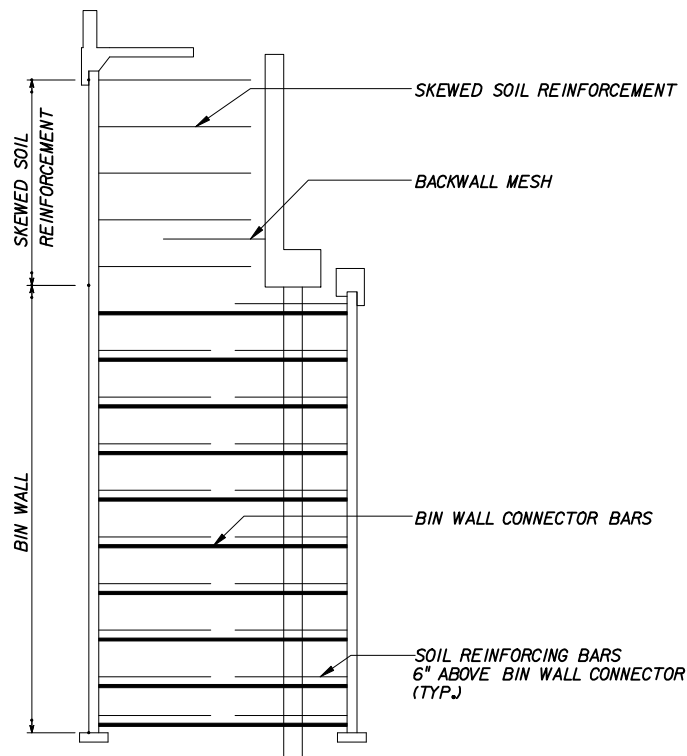
**20 TYPE H PRECAST COPING**  
(STANDARD PRECAST COPING)

SQUARE / HEX PANELS

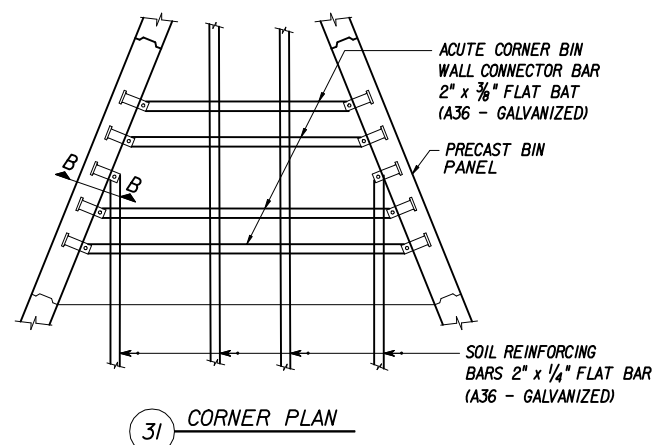
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL				
Names	Dates	Approved By		
Designed By	TCNA	11/98	 State Structures Design Engineer	
Drawn By	CAD	11/98		
Checked By	GEO	11/98	Revision	00
			Sheet No.	3 of 12
			Index No.	5005

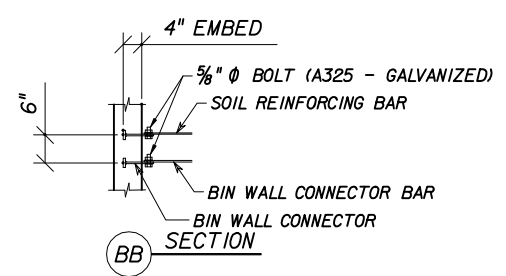
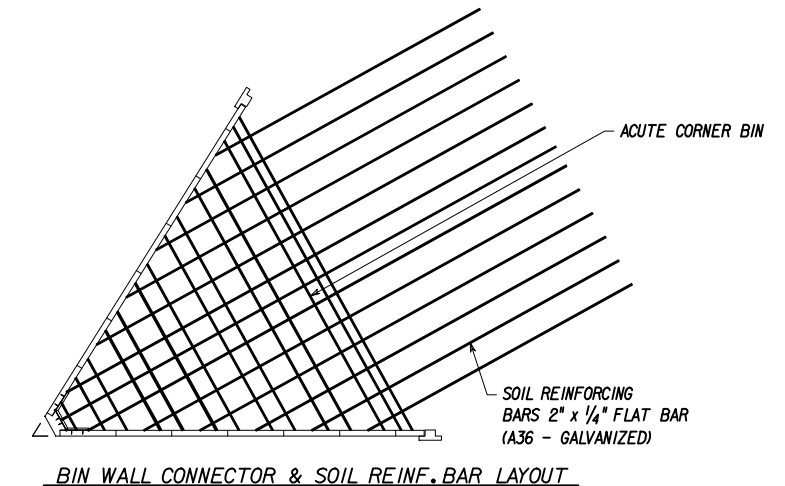
\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



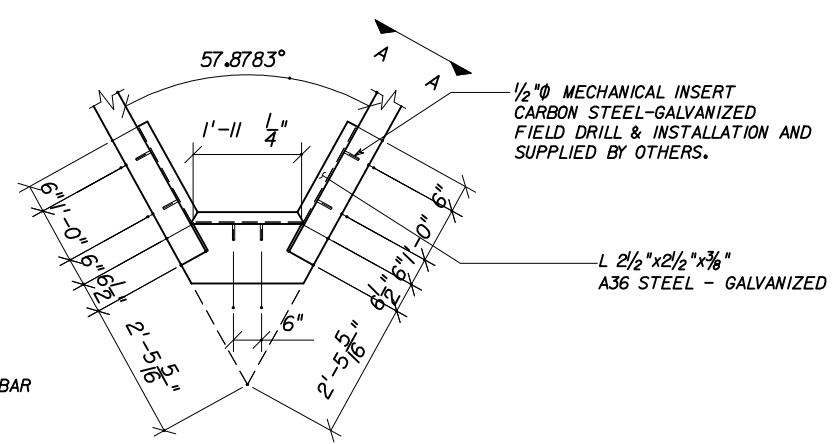
CC TYPICAL SECTION @ BIN WALL



31 CORNER PLAN

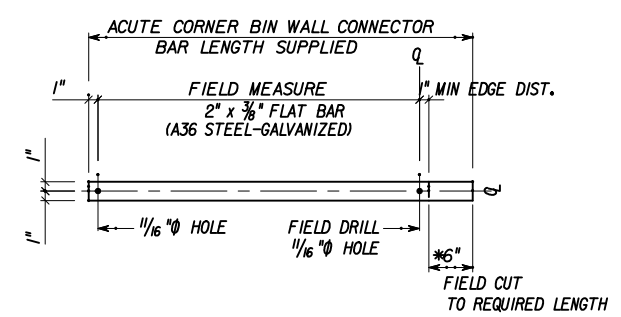


BB SECTION



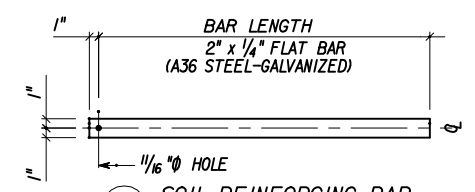
NOTES: BRACKETS TYPICALLY LOCATED IN THE CORNER BETWEEN BIN WALL CONNECTOR & SOIL REINFORCING BAR ELEVATION  
BIN WALL CONNECTOR BARS & SOIL REINF. BARS NOT SHOWN

30 ANGLE BRACKET DETAIL

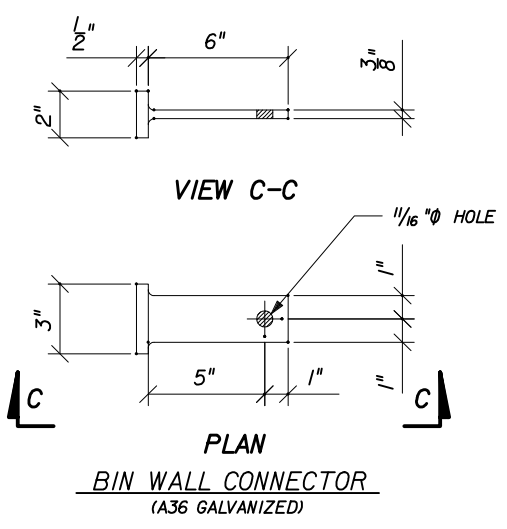


\* EXPOSED STEEL ON FIELD MODIFIED END SHALL BE COATED WITH ZINC RICH PAINT

32 BIN WALL CONNECTOR BAR



33 SOIL REINFORCING BAR

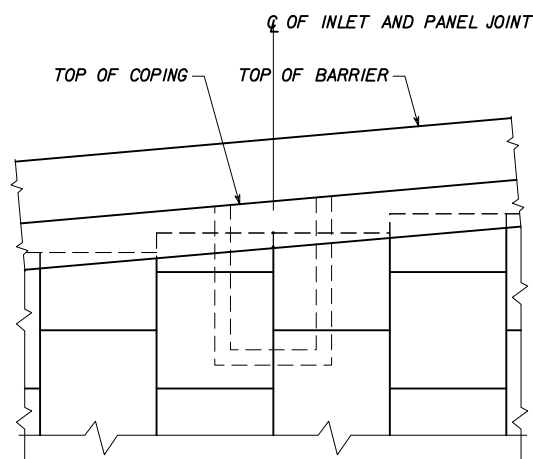


SQUARE / HEX PANELS

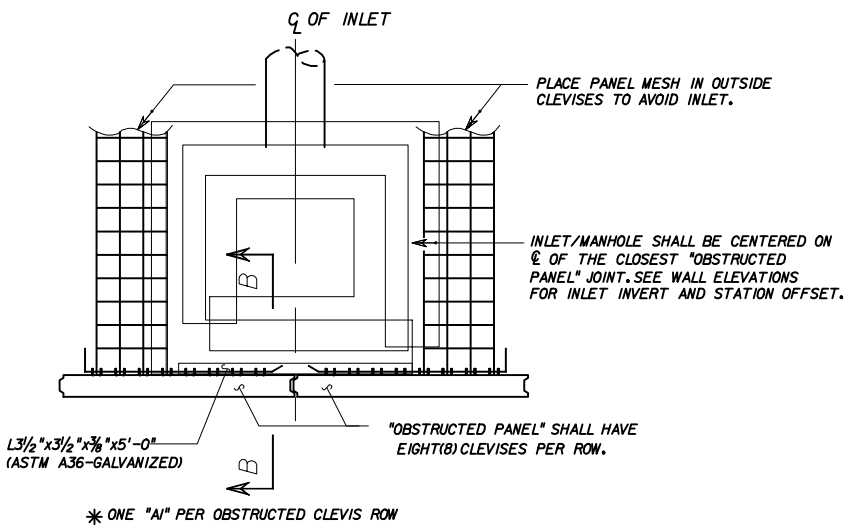
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				Index No. 5005

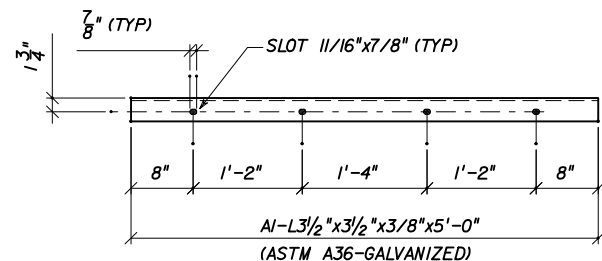
\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



65 PARTIAL ELEVATION WALL @ DRAINAGE INLET



65A OBSTRUCTION DETAIL (VERTICAL)  
INLETS  $\leq 5'-0"$  (TYP.)



65B OBSTRUCTED PANEL CONNECTOR (A)  
(ASTM A36 ANGLE - GALVANIZED)

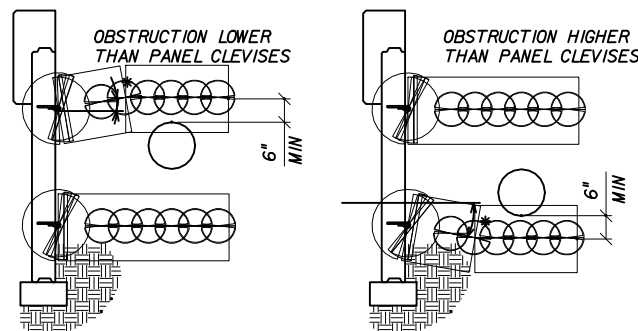
VERTICAL OBSTRUCTION NOTES

OBSTRUCTION SHALL BE CONSTRUCTED BEFORE WALL INSTALLATION.

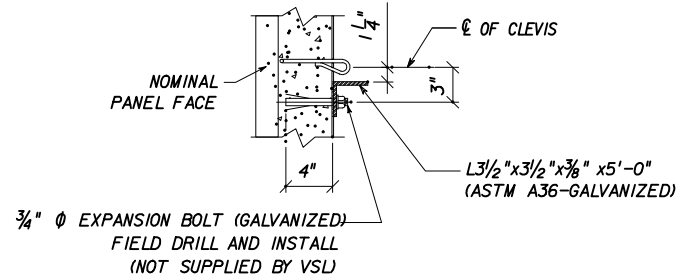
FIELD CUT AND SKEW MESH AROUND OBSTRUCTION AS REQUIRED. THESE AREAS WILL BE CLEARLY INDICATED ON THE RETAINED EARTH SHOP DRAWINGS AND APPROVED BY THE ENGINEER OF RECORD.

CUT MESH/DAMAGED GALV. SHALL BE COATED WITH ZINC RICH PAINT.

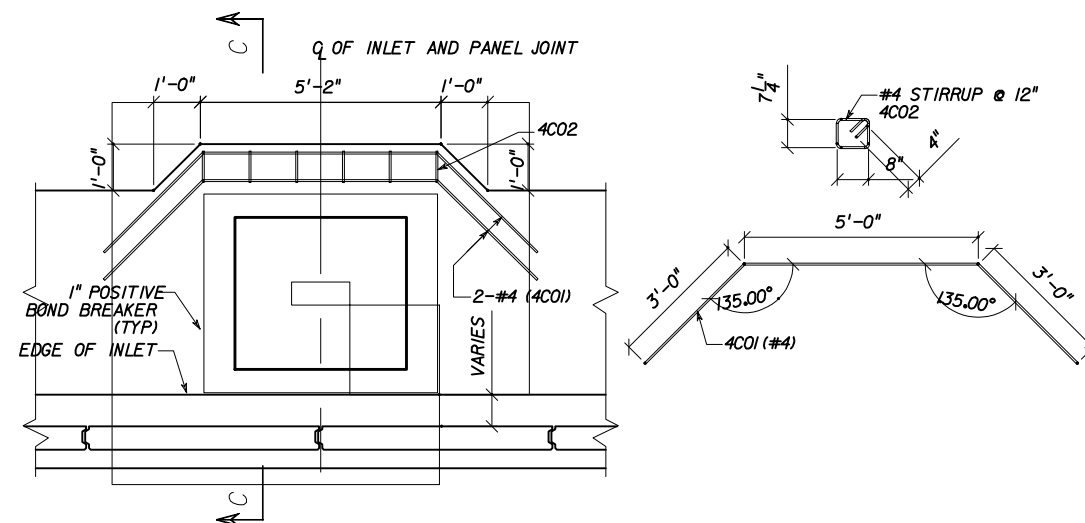
NO CUTTING OF SOIL REINFORCEMENT GRIDS ALLOWED UNLESS SHOWN ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER



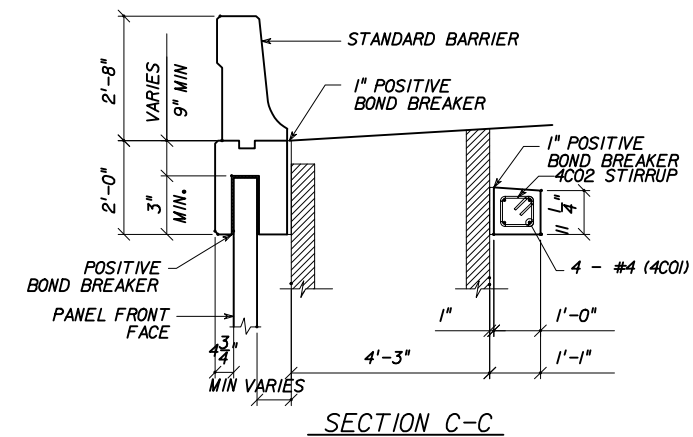
61 OBSTRUCTION (HORIZONTAL)  
\* 15 DEGREES MAX BEND



65C CONNECTOR INSTALLATION DETAIL  
(SECTION B-B)



66 PARTIAL PLAN - JUNCTION SLAB AROUND INLET  
(REBAR NOT SUPPLIED BY FOSTER GEOTECHNICAL)



SQUARE / HEX PANELS

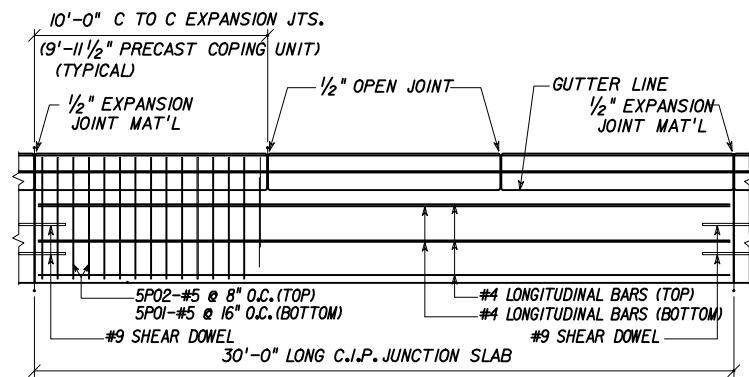
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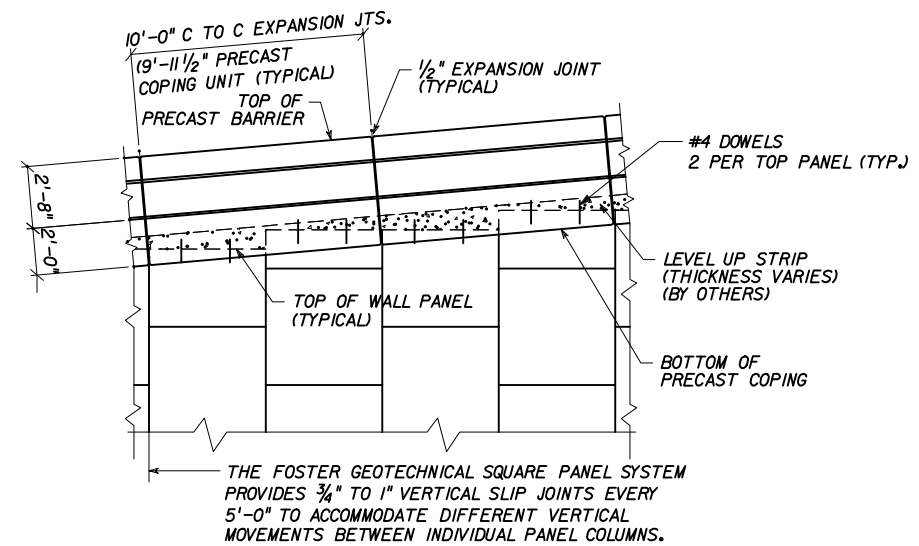
RETAINING WALL SYSTEM  
FOSTER GEOTECHNICAL RETAINED  
EARTH WALL

Names	Dates	Approved By		
Designed By	TCNA 11/98	W. J. [Signature]		
Drawn By	CAD 11/98			
Checked By	GEO 11/98	Revision	Sheet No.	Index No.
		00	5 of 12	5005

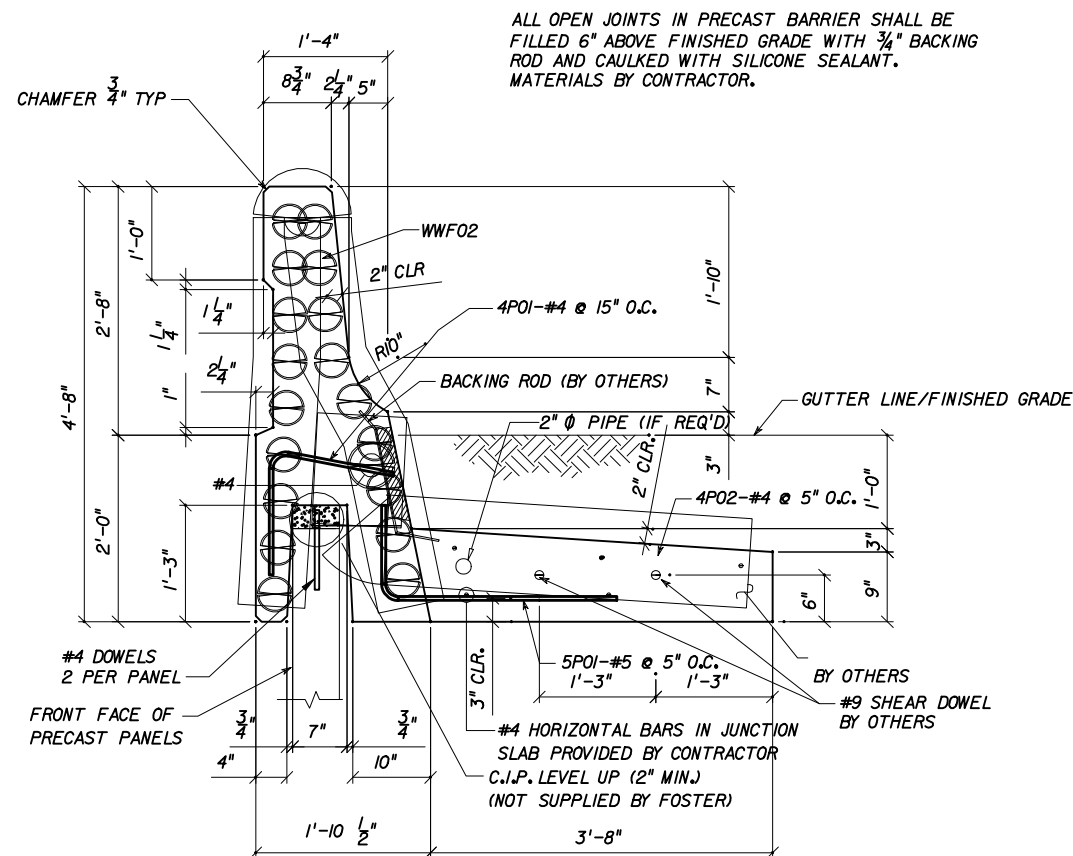
\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



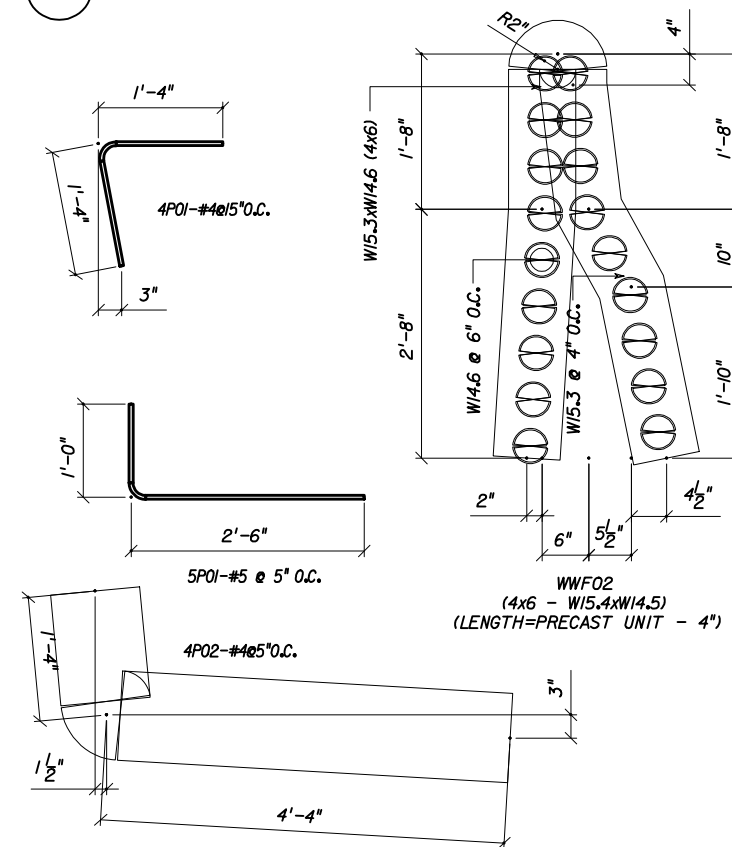
24A PLAN VIEW - PRECAST TRAFFIC BARRIER  
(HORIZONTAL BARS IN JUNCTION SLAB & #9 SHEAR DOWELS, NOT BY VSL)



24B PARTIAL ELEVATION PRECAST BARRIER



24 TYPE HTB\_ PRECAST BARRIER W/COPING & JUNCTION SLAB  
U.S. PATENT NO. 4,494,892

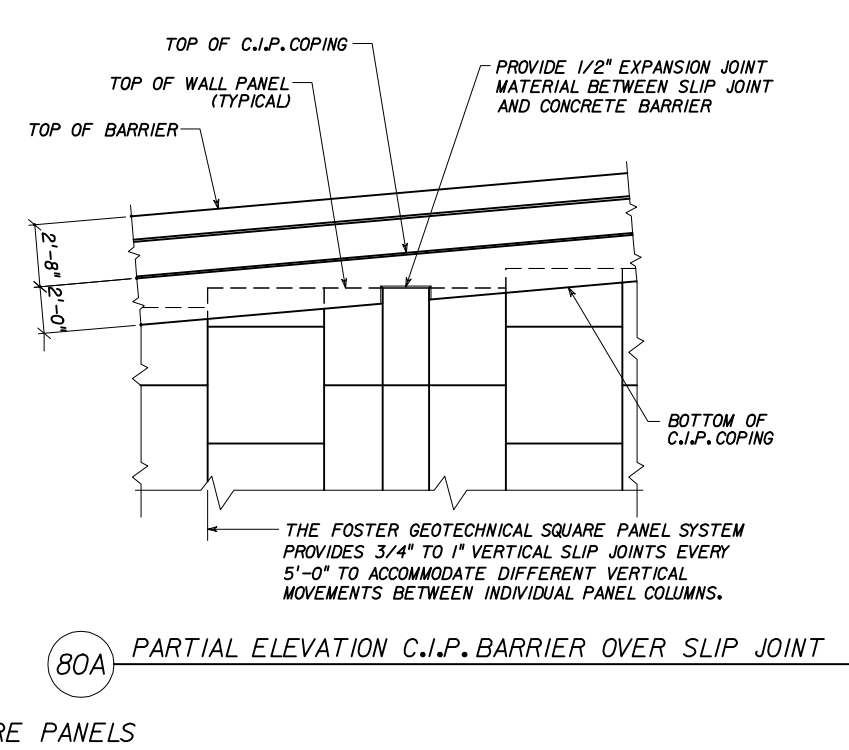
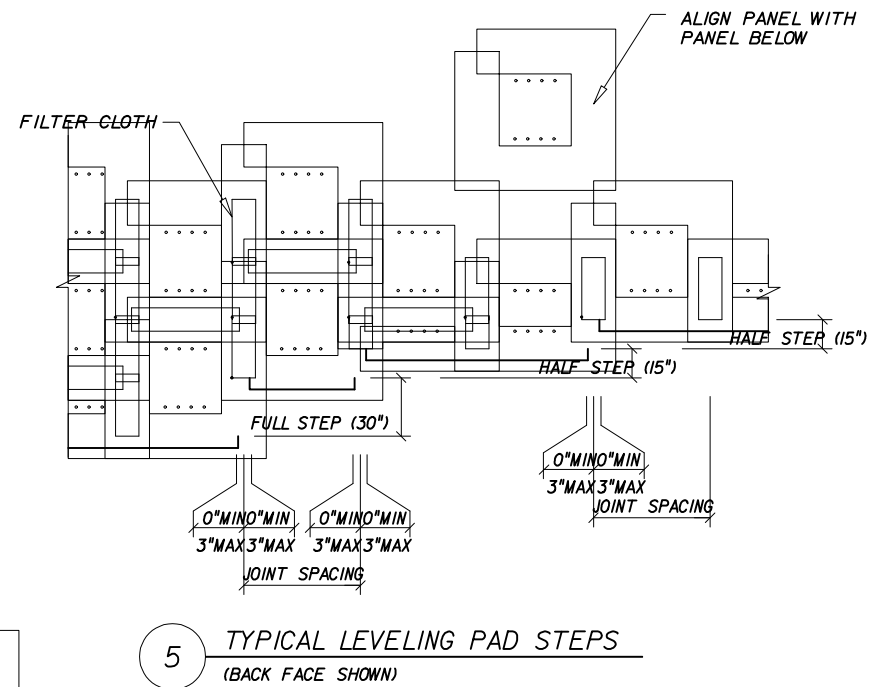
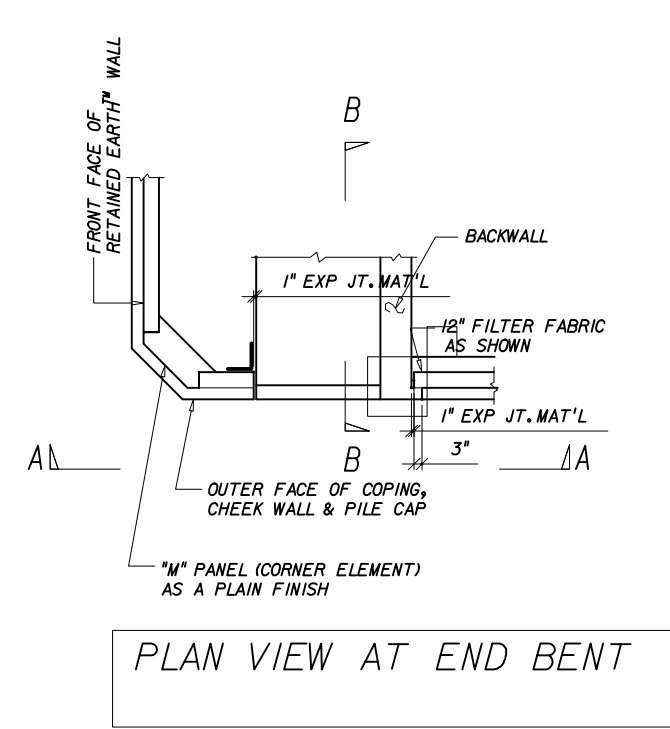
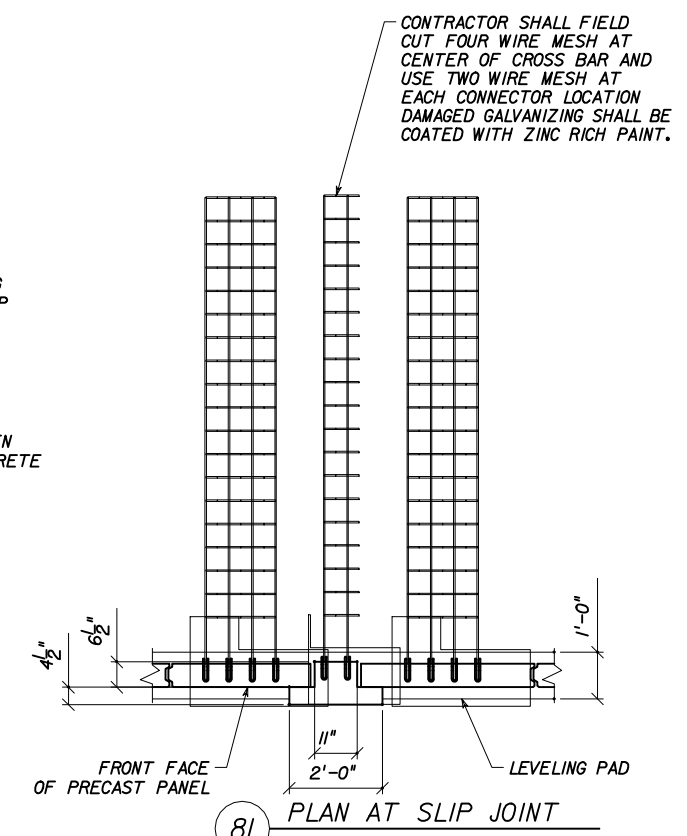
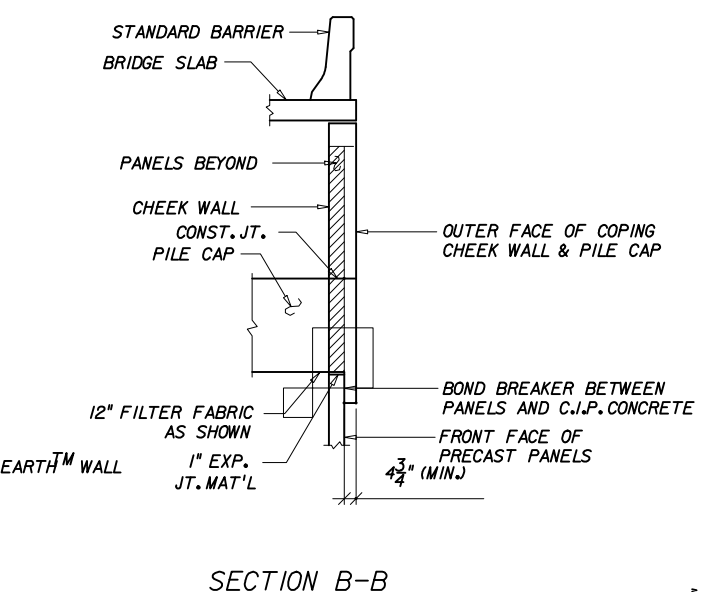
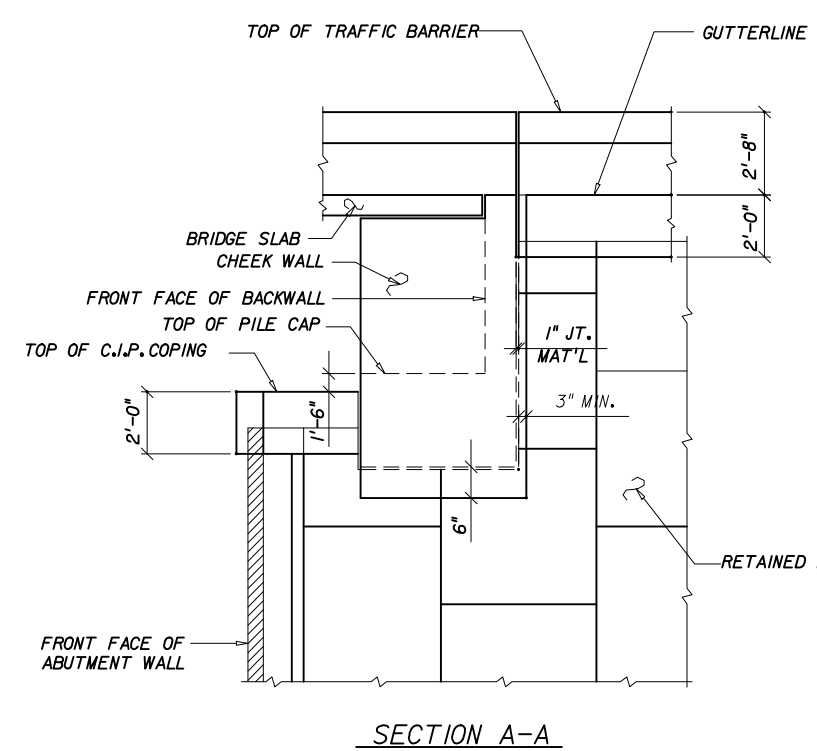
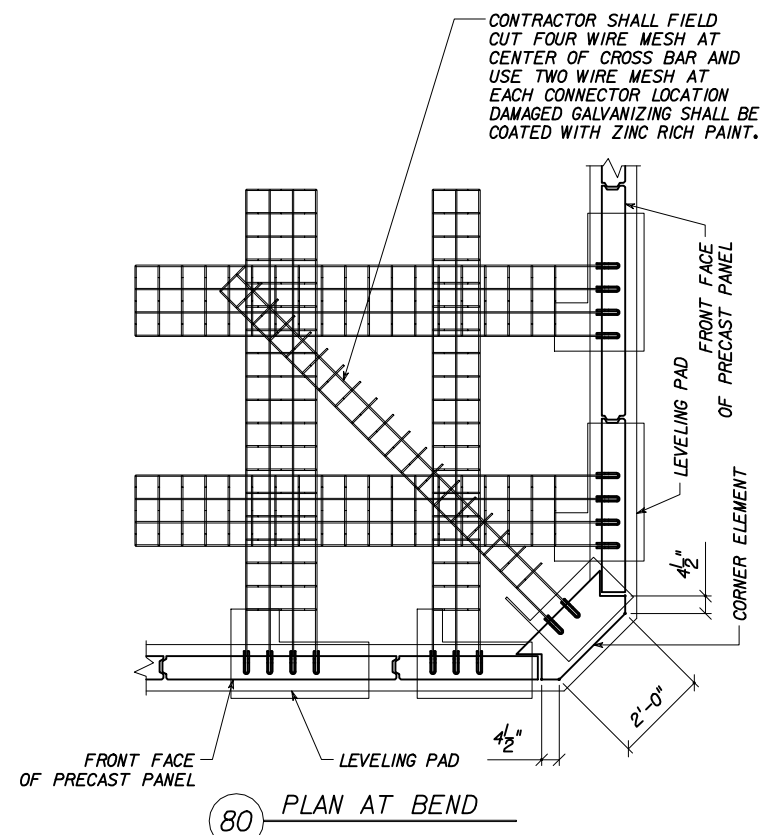


SQUARE / HEX PANELS

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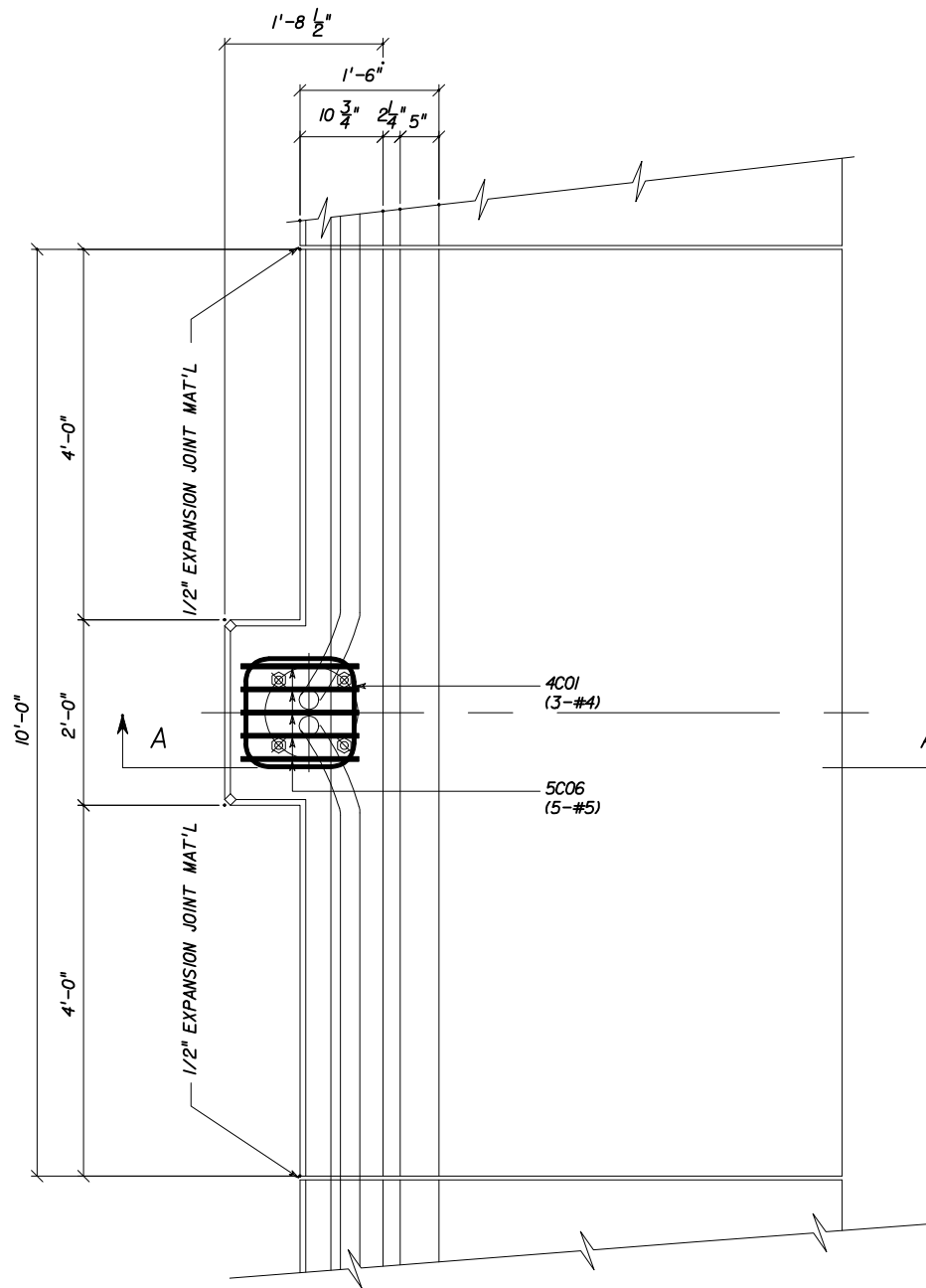
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	TCNA	11/98	State Structures Design Engineer	
Drawn By	CAD	11/98	Revision	Sheet No. Index No.
Checked By	GEO	11/98	00	6 of 12 5005

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

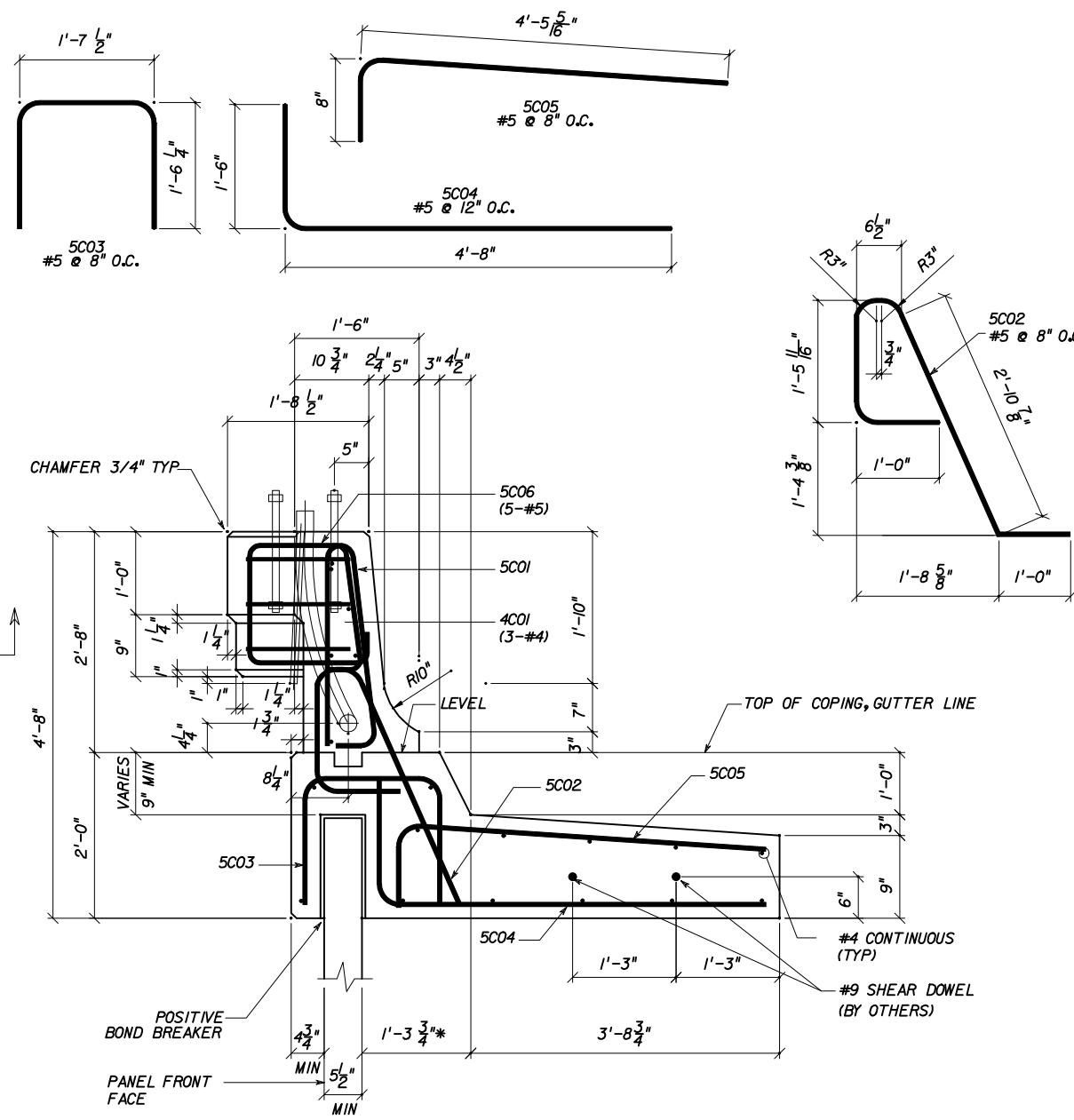


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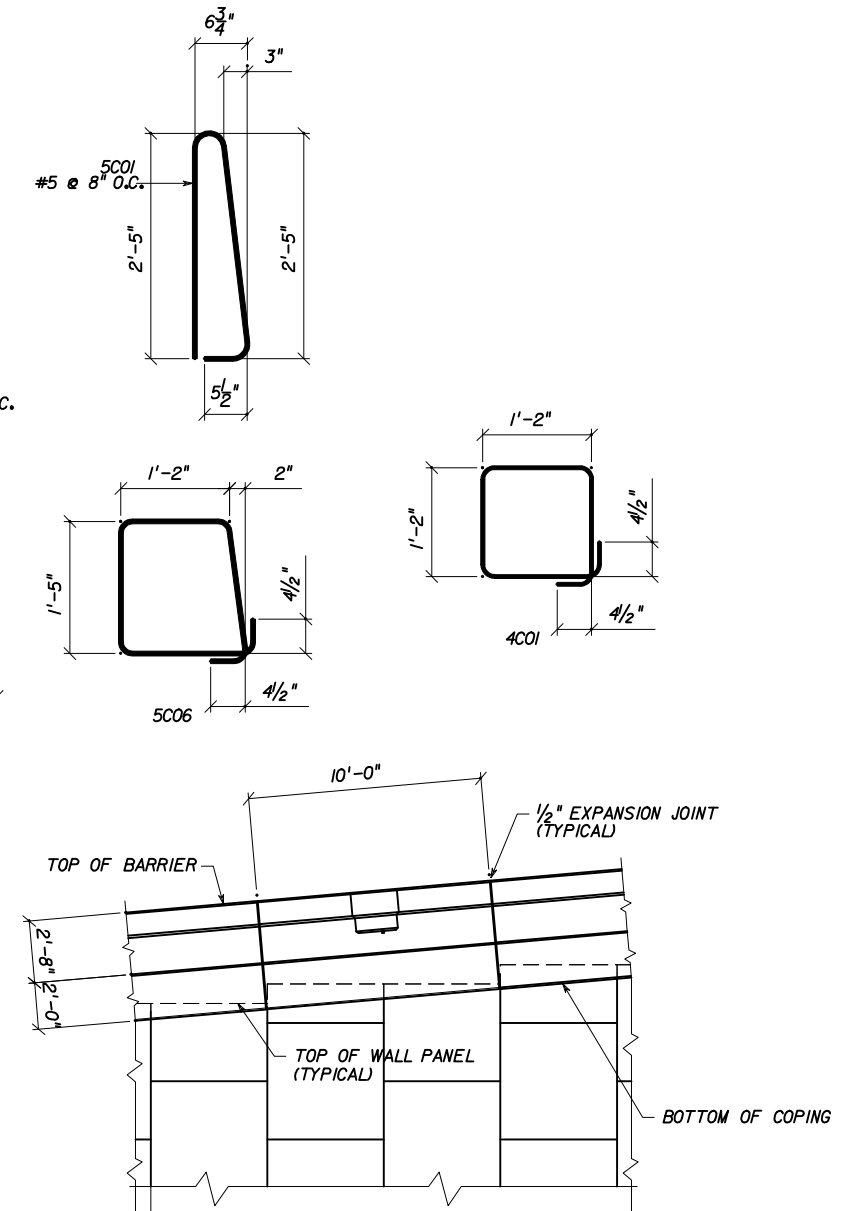
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL</b>				
Designed By	TCNA	Dates	11/98	Approved By
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29 CAST IN PLACE LIGHT POLE  
(ALL REBAR BY OTHERS)  
(LIGHT POLE/BARRIER COPING)



SECTION A-A  
(SEE STRUCTURES STANDARD DRAWING 500 FOR ADDITIONAL DETAILS)



29A PARTIAL ELEVATION AT LIGHT POLE

THE FOSTER GEOTECHNICAL SQUARE PANEL SYSTEM PROVIDES 3/4" TO 1" VERTICAL SLIP JOINTS EVERY 5'-0" TO ACCOMMODATE DIFFERENT VERTICAL MOVEMENTS BETWEEN INDIVIDUAL PANEL COLUMNS.

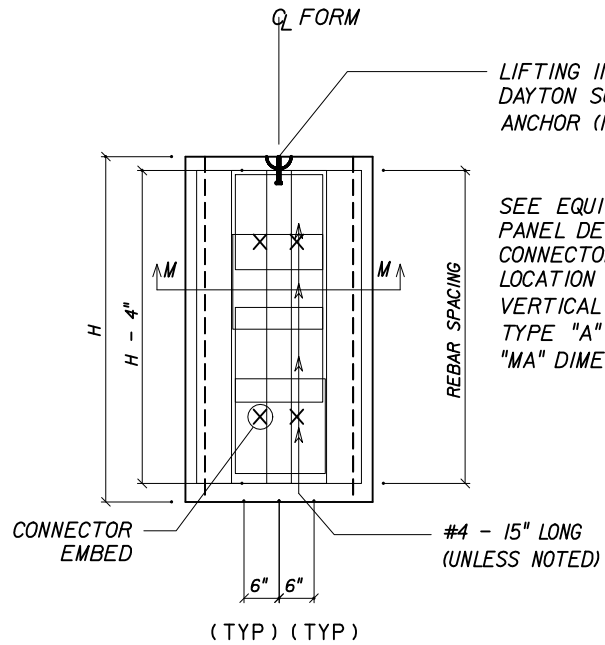
SQUARE / HEX PANELS

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FOSTER GEOTECHNICAL RETAINED EARTH WALL				
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\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



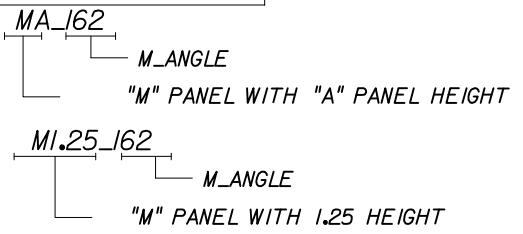


LIFTING INSERT  
DAYTON SUPERIOR SWIFT LIFT OR  
ANCHOR (1 TON X 4 3/4") (BURKE® SPREAD ANCHOR)  
(ONE TON)

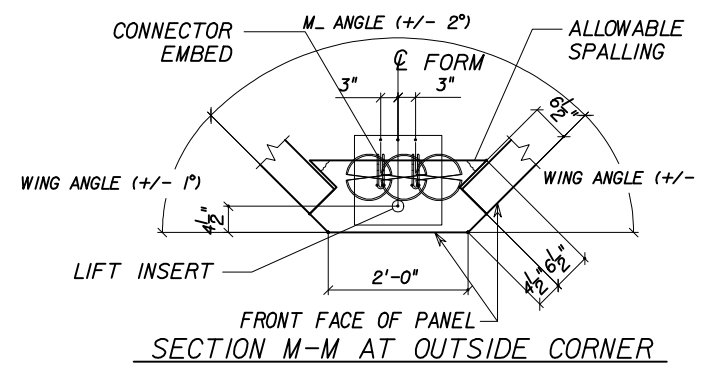
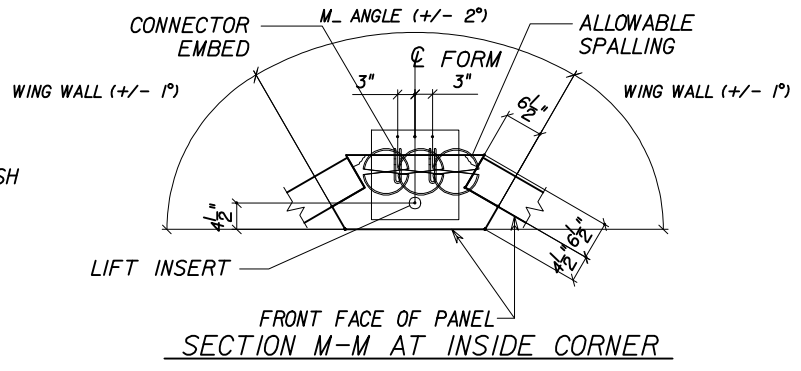
SEE EQUIVALENT TYPE  
PANEL DETAIL FOR  
CONNECTOR EMBED VERTICAL  
LOCATION AND REBAR  
VERTICAL SPACING (EXAMPLE:  
TYPE "A" PANEL DETAIL FOR  
"MA" DIMENSIONS)

**M** TYPE M REBAR  
"M" PANELS SHALL HAVE AN PLAIN SURFACE FINISH

PANEL AREAS	
PANEL NAME	SQ. FT.
MA	13.75
MD	11.46
MD2	9.77
MC2	6.55
MD4	4.58
MB6	10.31
MB2	6.88
MB4	3.44

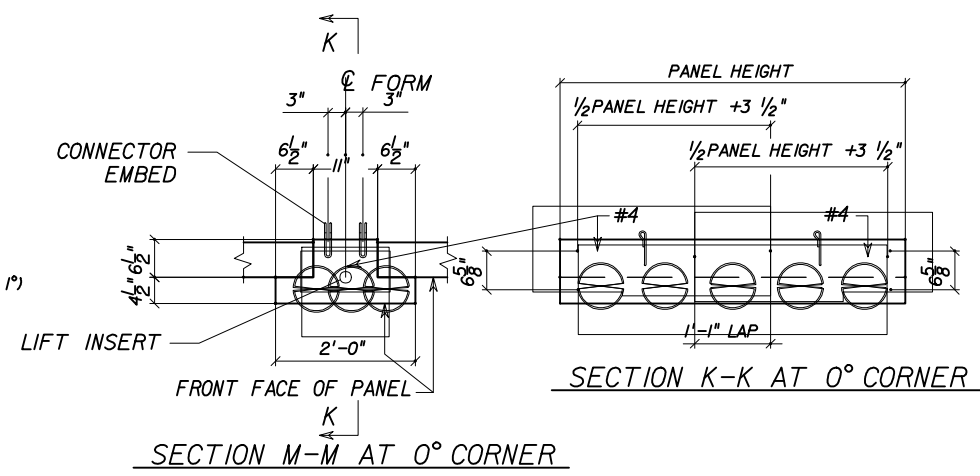


TYPICAL PANEL DESIGNATION



PANEL REINFORCEMENT NOTES:

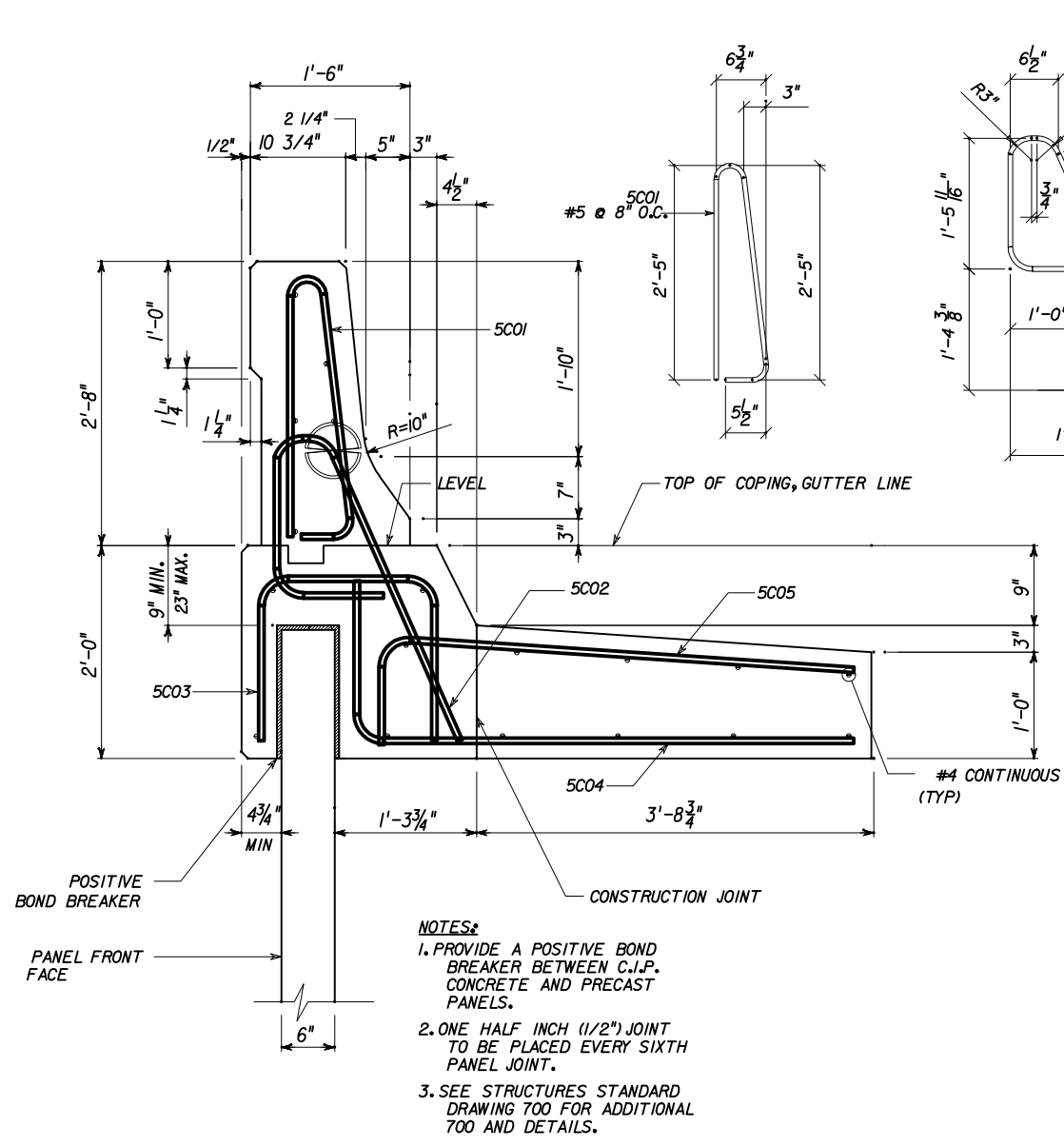
1. PANELS ARE SHOWN BACK FACE.
2. RIGHT END PANELS ARE OPPOSITE TO LEFT END.
3. DIMENSIONS ARE TO FORM INSIDE BACK FACE.
4. VERTICAL REINFORCEMENT SHALL HAVE 2" MINIMUM COVER TO THE BACK FACE.
5. HORIZONTAL REINFORCEMENT SHALL HAVE 1 1/2" MINIMUM COVER TO THE BACK FACE.
6. ALL REINFORCEMENT SHALL HAVE 2" MINIMUM COVER TO THE SIDES.
7. REINFORCEMENT LABELS INDICATE BAR SIZE AND LENGTH. EXAMPLE: 454 IS A #4 BAR 54" LONG.
8. REINFORCEMENT SHALL BE GRADE 60.
9. EQUIVALENT WELDED WIRE FABRIC MAY BE USED.
10. SEE RETAINED EARTH™ PRECASTING SPECIFICATIONS FOR CONCRETE REQUIREMENTS.
11. VSL RETAINED EARTH™ IS PROTECTED UNDER PATENT 4,725,770.
12. ALL PANELS TO USE .276" Ø CLEVIS LOOPS, EXCEPT PANELS WITH A "Q" SUFFIX WHICH REQUIRE .374" Ø CLEVIS LOOPS.
13. ALL "M" PANEL (CORNER ELEMENTS) SHALL HAVE A PLAIN FINISH.



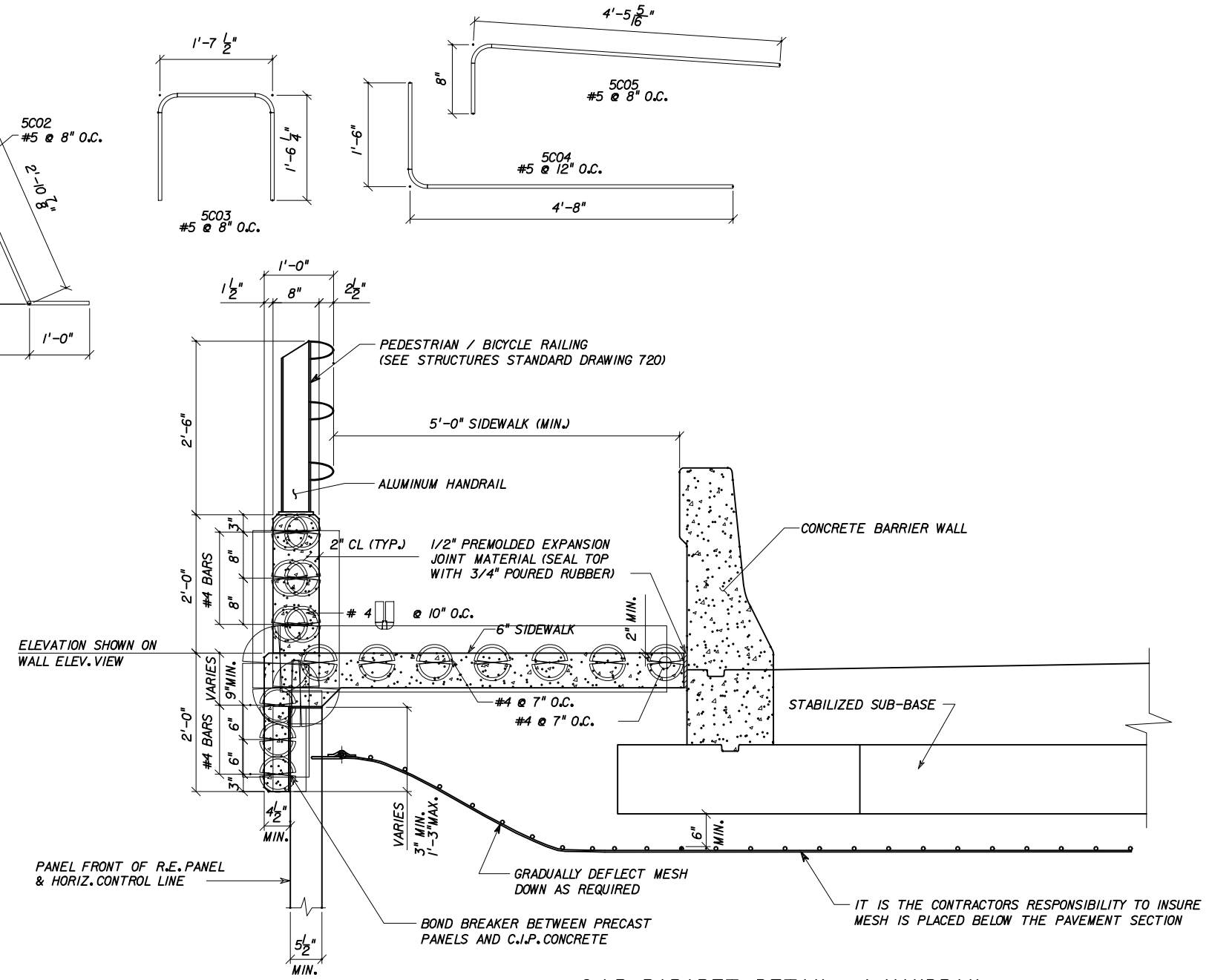
SQUARE / HEX PANELS

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL</b>				
Designed By	TCNA	Dates	11/98	Approved By
Drawn By	CAD	11/98	Revision	Sheet No.
Checked By	GEO	11/98	00	9 of 12
				Index No. 5005



- NOTES:**
1. PROVIDE A POSITIVE BOND BREAKER BETWEEN C.I.P. CONCRETE AND PRECAST PANELS.
  2. ONE HALF INCH (1/2") JOINT TO BE PLACED EVERY SIXTH PANEL JOINT.
  3. SEE STRUCTURES STANDARD DRAWING 700 FOR ADDITIONAL 700 AND DETAILS.



**6B C.I.P. BARRIER W/ COPING & JUNCTION SLAB STEEL**

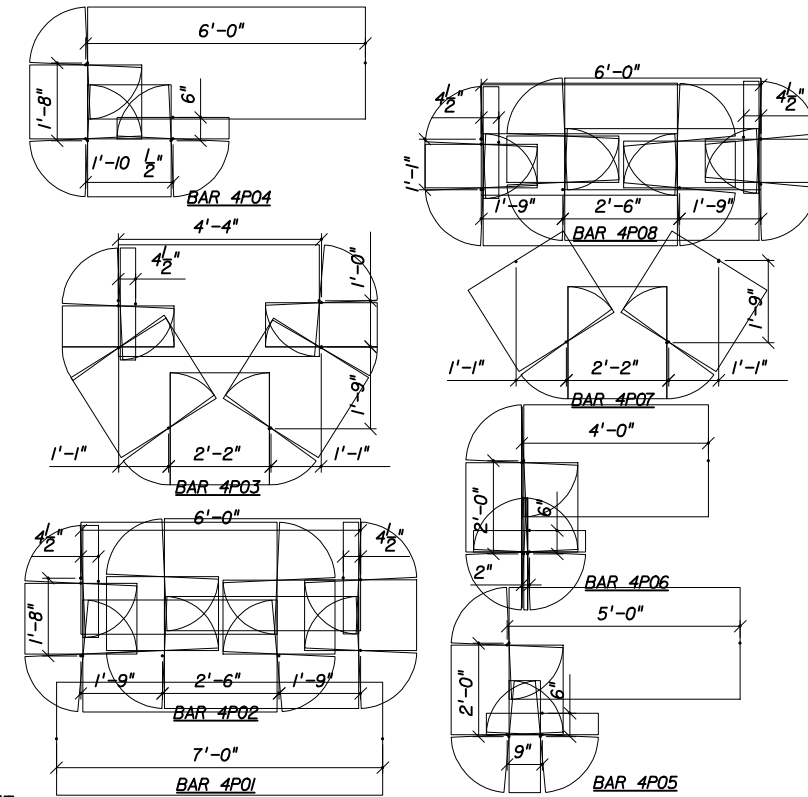
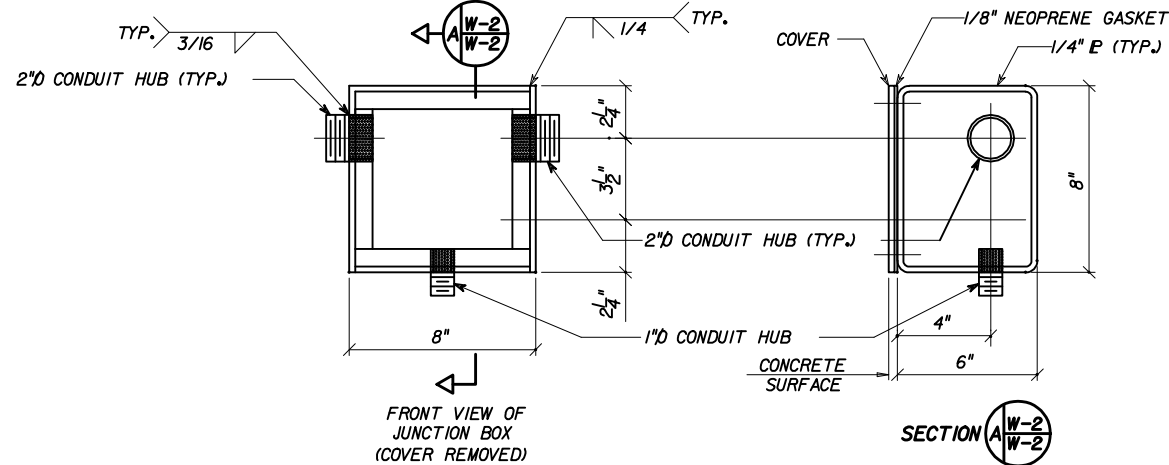
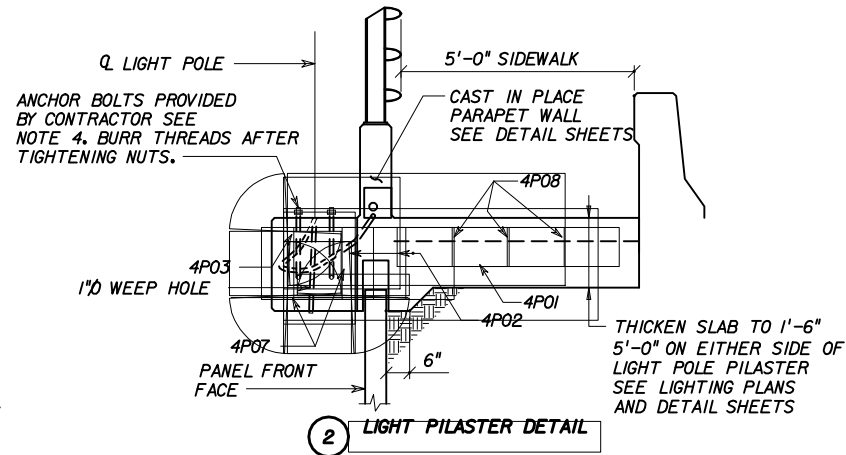
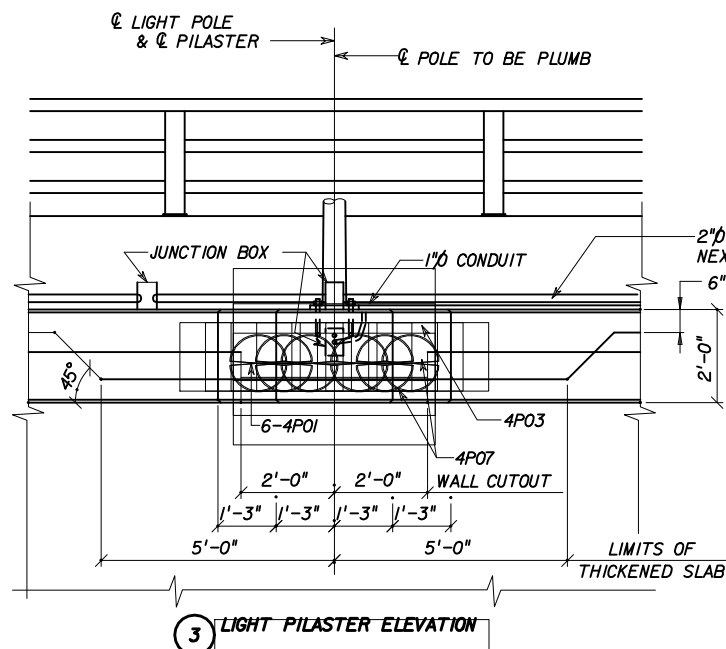
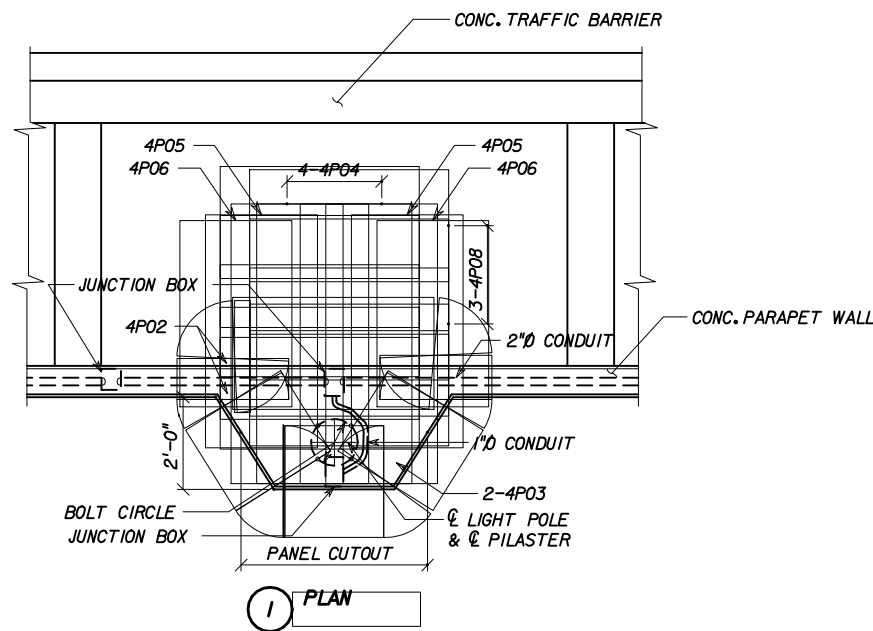
**C.I.P. PARAPET DETAIL w/ HANDRAIL**

SQUARE / HEX PANELS

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL</b>				
Designed By	TCNA	Dates	11/98	Approved By
Drawn By	CAD	11/98	Revision	Sheet No.
Checked By	GEO	11/98	00	10 of 12
				Index No. <b>5005</b>

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
4P01	#4	6	7'-0"
4P02	#4	2	24'-5"
4P03	#4	1	13'-1"
4P04	#4	4	10'-0 1/2"
4P05	#4	2	8'-3"
4P06	#4	2	6'-8"
4P07	#4	2	6'-4"
4P08	#4	3	22'-1"

4 BAR BENDING DETAIL

SQUARE / HEX PANELS

NOTES:

1. ADDITIONAL CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTER SHALL MEET THE SAME REQUIREMENTS AS THAT OF THE PARAPET WALL.

2. TOP OF PILASTER SHALL BE FINISHED TO A TRUE LEVEL AREA.

3. LIGHT POLE PILASTER IS DESIGNED TO RESIST WORKING LOADS (IN ANY DIRECTION) FROM THE LIGHT POLE APPLIED AT THE TOP OF THE PILASTER AS FOLLOWS:

LONGITUDINAL MOMENT = 30,000 FT. POUNDS  
 TRANSVERSE MOMENT = 6,000 FT. POUNDS  
 LONGITUDINAL SHEAR = 1,000 POUNDS  
 TRANSVERSE SHEAR = 200 POUNDS  
 TORSION = 3,000 FT. POUNDS  
 AXIAL = 400 POUNDS

IF THE LIGHT POLE PROVIDED APPLIES LOADS THAT ARE IN EXCESS OF THOSE SHOWN ABOVE, THE CONTRACTOR SHALL REDESIGN THE PILASTER AND SUBMIT HIS DESIGN TO THE DEPARTMENT FOR REVIEW. THE CONTRACTOR'S REDESIGN SHALL BE PREPARED, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA, AND QUALIFIED TO PERFORM THE WORK.

4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND THAT FIT THE REINFORCING CAGE. CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA SHALL BE SUBMITTED BY THE CONTRACTOR TO THE DEPARTMENT FOR REVIEW AND APPROVAL SHOWING THAT THESE REQUIREMENTS HAVE BEEN MET PRIOR TO CONSTRUCTION.

5. STEEL FOR JUNCTION BOXES SHALL CONFORM WITH ASTM-A36. THE BOXES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. IN LIEU OF STEEL BOXES THE CONTRACTOR MAY SUBMIT FOR APPROVAL MOLDED P.V.C. BOXES (SCHEDULE 80).

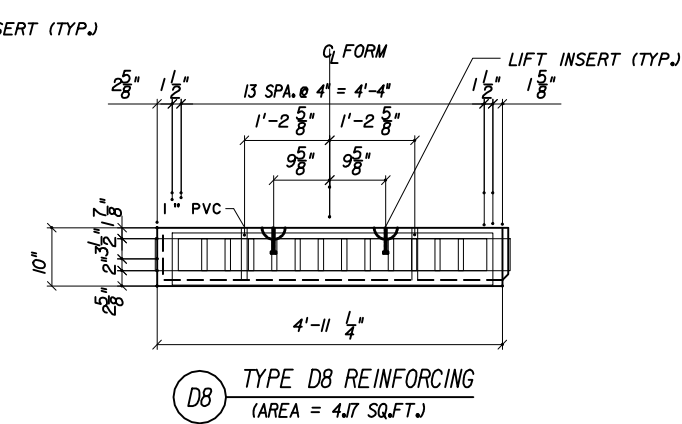
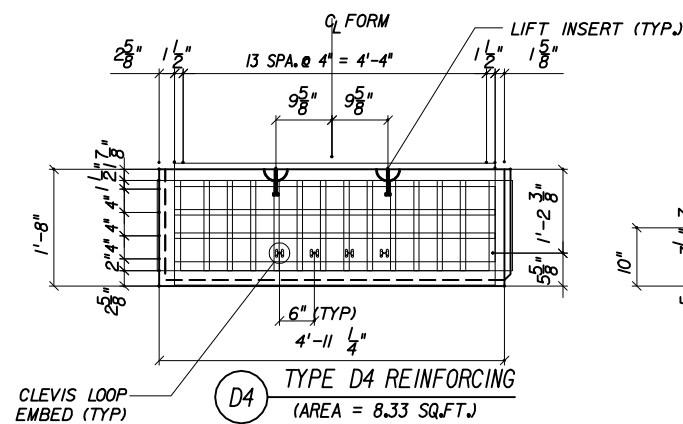
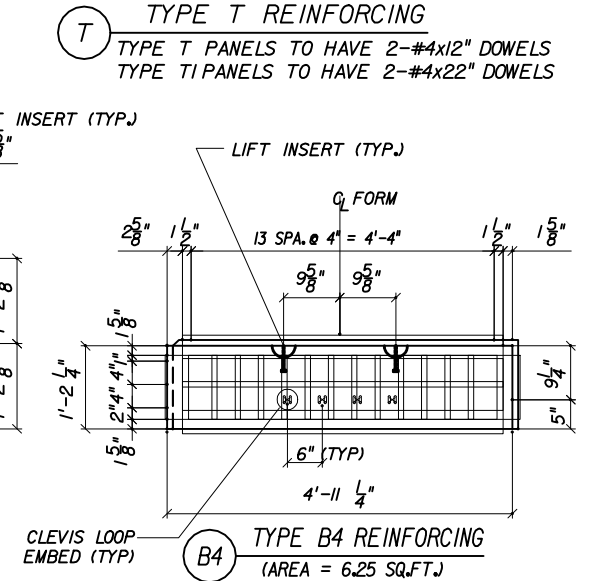
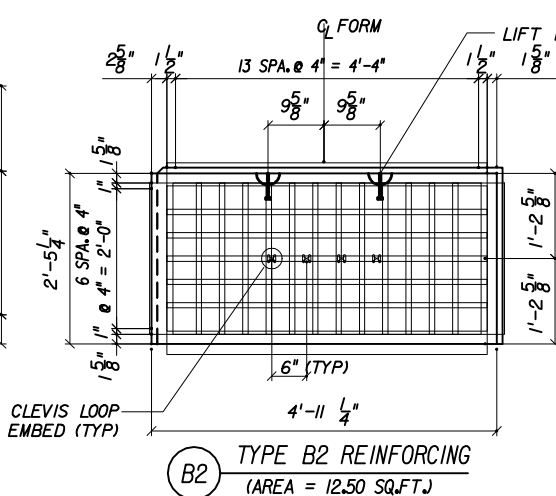
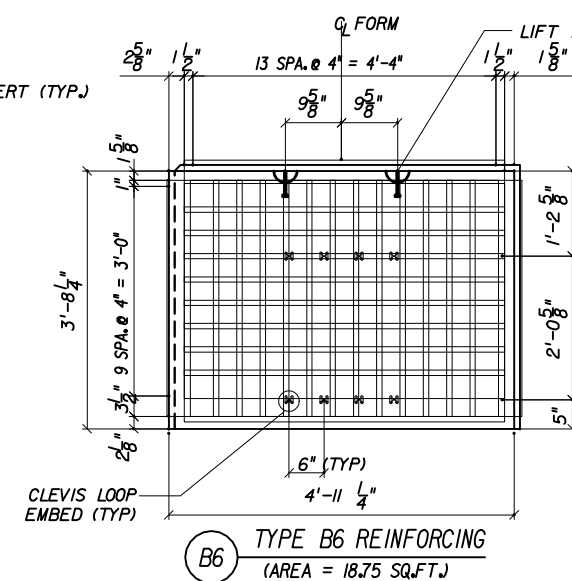
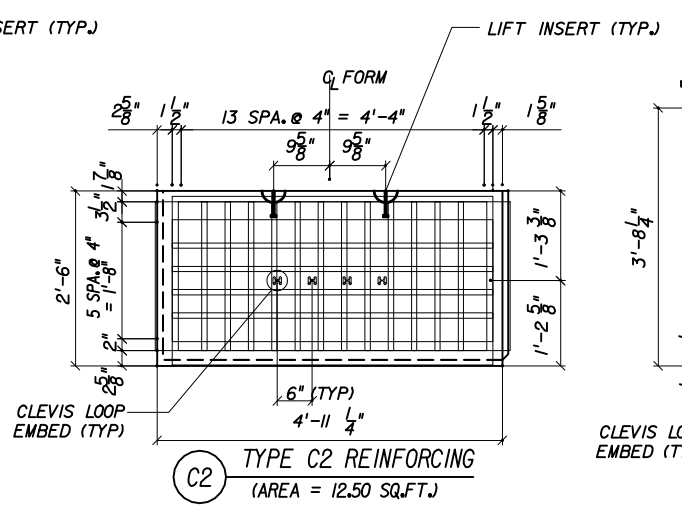
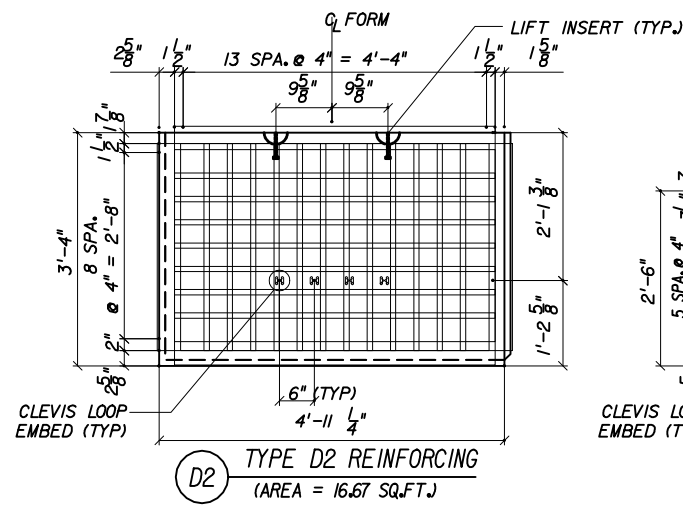
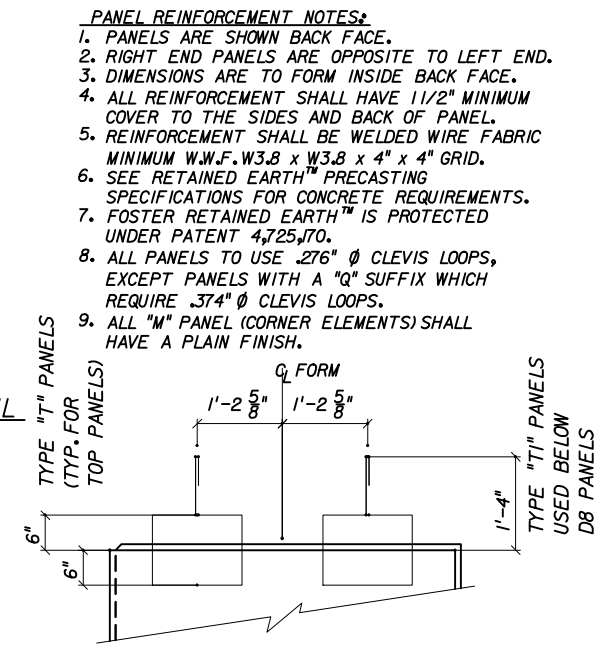
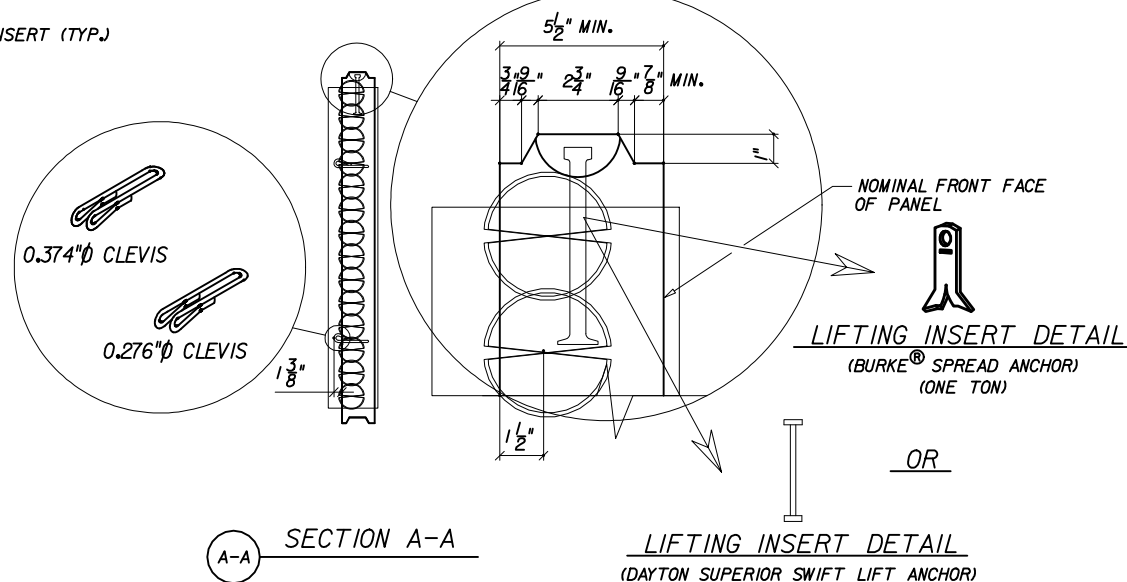
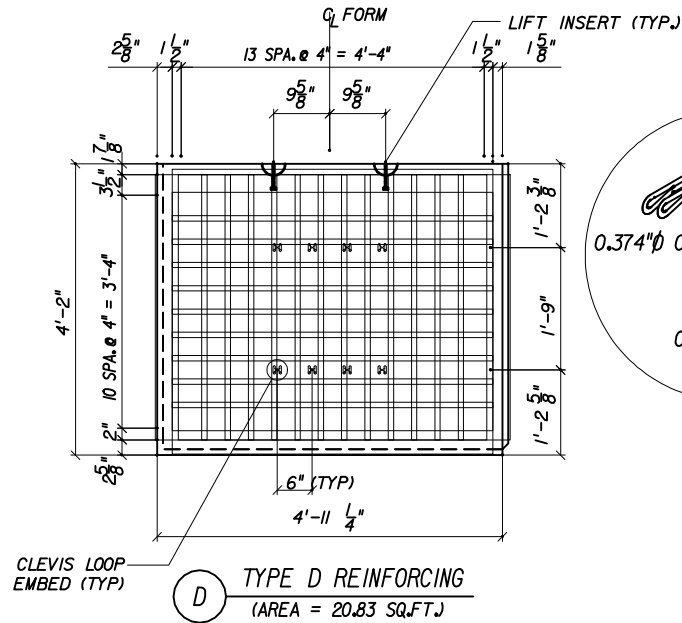
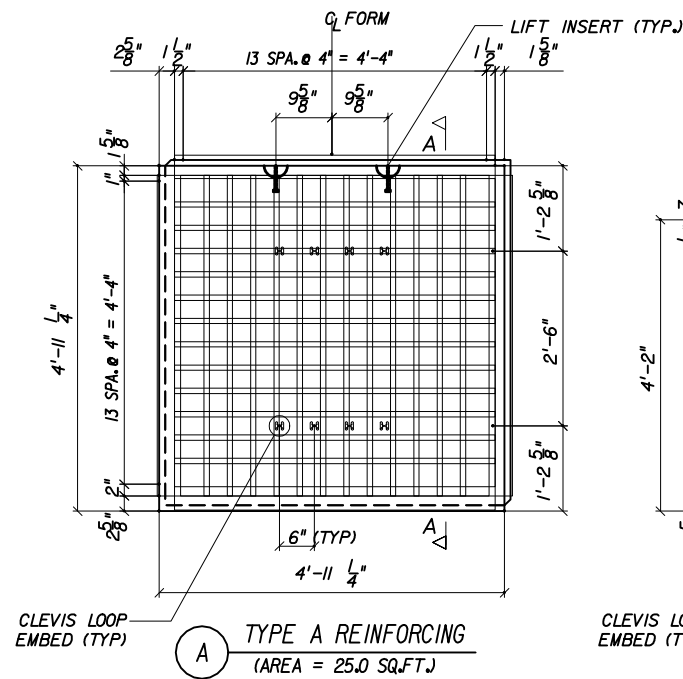
6. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL OR SCHEDULE 80 P.V.C.

7. THE COST OF ANCHOR BOLTS SHALL BE INCLUDED IN THE BID PRICE FOR LIGHT POLES.

8. PAYMENT: THE COST OF ALL LABOR, CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTERS AND ALL CONDUITS, EXPANSION COUPLINGS, JUNCTION BOXES AND MISCELLANEOUS HARDWARE REQUIRED FOR COMPLETION OF THE ELECTRICAL INSTALLATION WITHIN THE LIMITS SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE CONTRACTOR'S BID PRICE FOR THE MSE WALLS.

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL				
Names	Dates	Approved By		
Designed By	TCNA	11/98	W. J. [Signature]	
Drawn By	CAD	11/98	State Structures Design Engineer	
Checked By	GEO	11/98	Revision	Sheet No. Index No.
			00	11 of 12 5005



SQUARE PANELS

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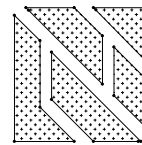
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL RETAINED EARTH WALL</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	TCNA	11/98	State Structures Design Engineer	
Drawn By	CAD	11/98	Revision	Sheet No.
Checked By	GEO	11/98	00	12 of 12
				Index No. 5005

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

# STANDARD DETAILS FOR 3" CONCRETE COVER

## T-WALL® RETAINING WALL SYSTEM

### DESIGNER



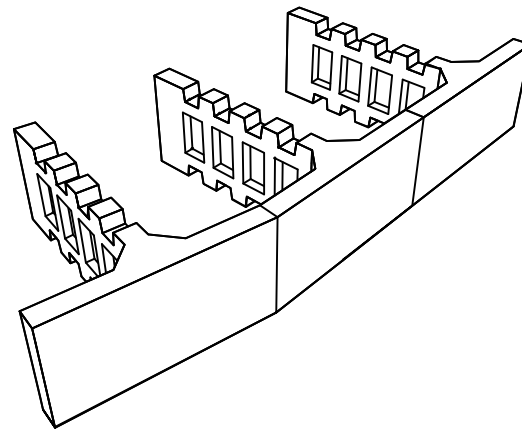
#### THE NEEL COMPANY

8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

### PRECASTER

#### OLDCASTLE PRECAST, INC.

11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992



#### MISCELLANEOUS NOTES:

1. DESIGNER:  
THE NEEL COMPANY  
8328-D TRAFORD LANE  
SPRINGFIELD, VA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859
2. PRECASTER:  
OLDCASTLE PRECAST INC.  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992
3. MATERIALS SUPPLIED BY PRECASTER:  
-PRECAST T-WALL UNITS  
-PRECAST SHEAR KEYS  
-HORIZONTAL JOINT MATERIAL  
-VERTICAL JOINT MATERIAL AND ADHESIVE  
-SHEAR KEY JOINT MATERIAL

#### DESIGN NOTES:

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE RETAINING WALL VOLUME, METHODS OF CONSTRUCTION, AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO SPEC SECTION 548 - RETAINING WALL SYSTEMS.
2. SOIL PARAMETERS:  
-SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUE OF  $\phi$ , C AND GAMMA SHALL BE PROVIDED IN THE SHOP DRAWINGS
3. FACTORS OF SAFETY:  
-OVERTURNING - 2.0  
-SLIDING - 1.5  
-INTERNAL PULLOUT - 1.5  
-BEARING CAPACITY - 2.5  
-OVERALL STABILITY - 1.5
4. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE NEEL COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF OTHERS.
5. PANELS WITH CANTILEVERED (EXTENDED) FACE SHALL ONLY BE USED TO AVOID OBSTRUCTIONS AS APPROVED ON THE SHOP DRAWINGS.

#### MATERIALS NOTES:

1. PRECAST CONCRETE:  
-PRECAST T-WALL UNITS - PER SPEC SECTION 548  
-PRECAST SHEAR KEYS - PER SPEC SECTION 548
2. C.I.P. CONCRETE:  
-C.I.P. LEVELING PAD - PER SPEC SECTION 548  
-OTHER C.I.P. CONCRETE - PER SPEC SECTION 548
3. REINFORCING STEEL:  
-PER SPEC SECTION 548
4. JOINT MATERIAL:  
-HORIZONTAL JOINT FILLER:  
-1/2" x 4" x 5'-0"  
-PREFORMED EPDM  
-DUROMETER: 80 - 90  
-VERTICAL JOINT COVER:  
-TENSAR DC4205 OR EQUAL  
-12" WIDE x HEIGHT OF JOINT  
-GEOCOMPOSITE MEETING REQUIREMENTS OF SPEC SECTION 548  
-SHEAR KEY WRAP:  
-1/4" x 8" x 24"  
-AVI ASTRO-FOAM AF-250
5. BACKFILL:  
-PER SPEC SECTION 548

#### CONSTRUCTION NOTES:

1. ALL CONSTRUCTION PROCEDURES SHALL COMPLY WITH SPEC SECTION 548 AND THE "T-WALL CONSTRUCTION MANUAL" (PROVIDED BY THE NEEL COMPANY OR OLDCASTLE PRECAST, INC). IN THE EVENT OF A DISCREPANCY BETWEEN THE SPEC AND THE "T-WALL CONSTRUCTION MANUAL", THE SPEC SHALL CONTROL.
2. FOR LOCATION AND ALIGNMENT OF T-WALL STRUCTURE, SEE RETAINING WALL CONTROL PLANS.
3. T-WALL STRUCTURES ON CURVES SHALL BE BUILT IN CHORDS AS SHOWN IN THE T-WALL DESIGN DRAWINGS.
4. IF MANHOLES OR DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN IN THE T-WALL DESIGN DRAWINGS.
5. IF PILES ARE LOCATED WITHIN THE RETAINING WALL VOLUME, THEY SHALL BE DRIVEN BEFORE CONSTRUCTION OF THE T-WALL STRUCTURE.
6. T-WALL UNITS SHALL BE PLACED ONE ROW AT A TIME, AND BACKFILLED BEFORE PLACEMENT OF THE NEXT ROW.
7. IF A STRUCTURE EXCEEDS 20' IN HEIGHT, THE FINISH GRADE AT THE FACE OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS 20' IN HEIGHT.
8. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING STORM WATER DRAINAGE IN THE VICINITY OF THE WALL DURING CONSTRUCTION. STORMWATER RUNOFF SHALL BE COLLECTED AND DISCHARGED AWAY FROM THE WALL AND THE RETAINING WALL VOLUME.

THIS SYSTEM SHALL NOT BE USED FOR WALLS WITH ACUTE INTERIOR CORNERS IN SALT WATER ENVIRONMENTS.

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

### RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)

	Names	Dates	Approved By		
Designed By	JMC	10/01/98	State Structures Design Engineer		
Drawn By	CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By	JMC	10/01/98	00	1 of 20	5010

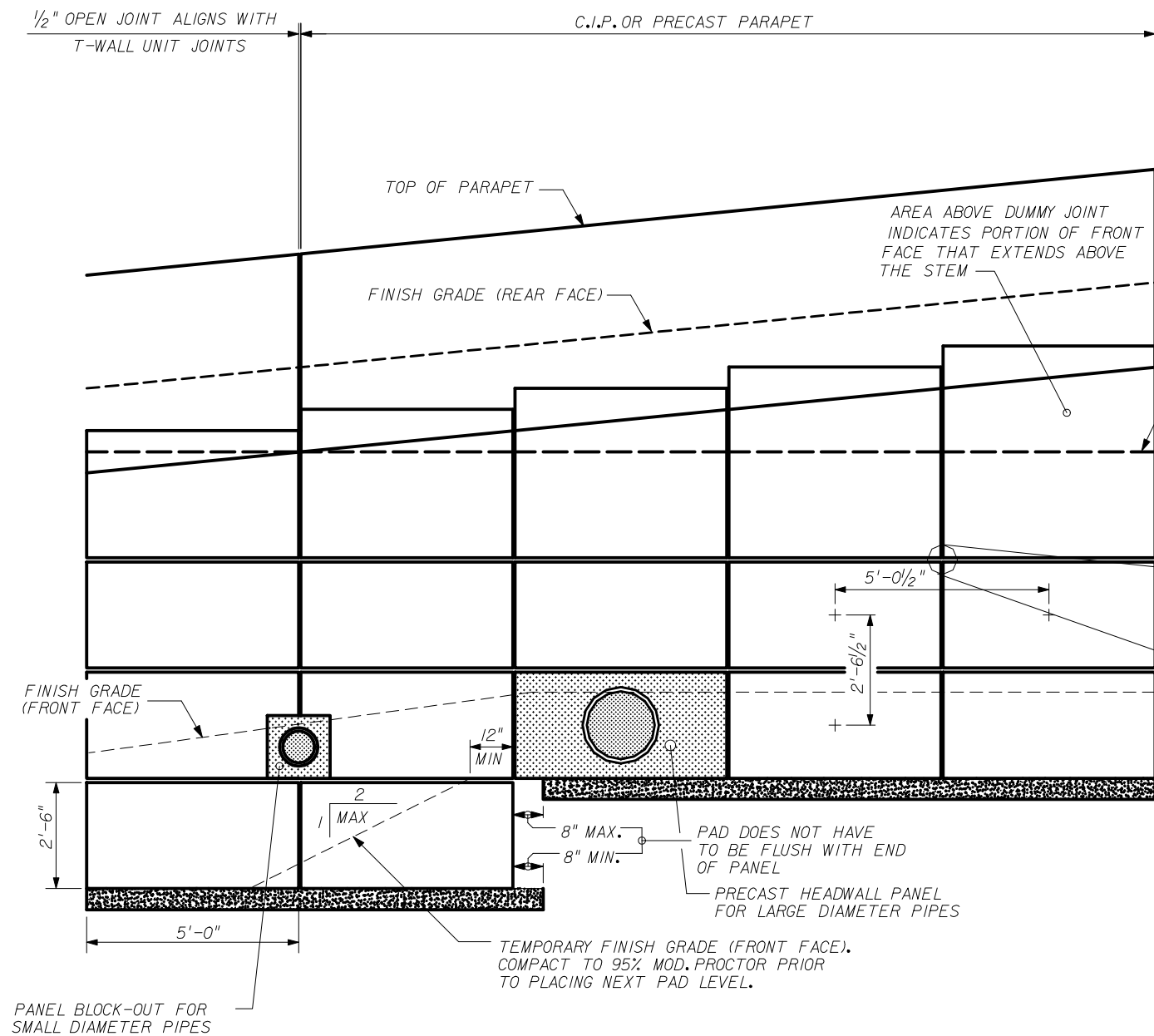


#### THE NEEL COMPANY

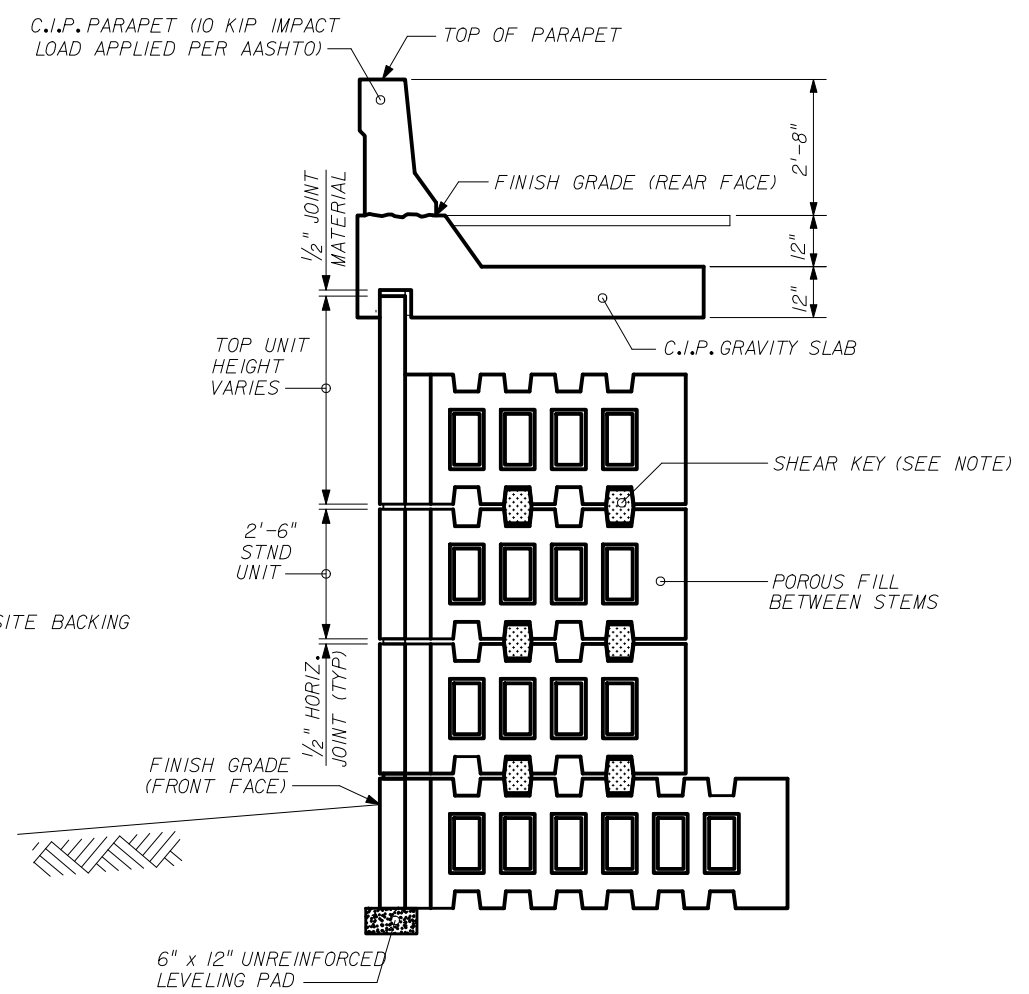
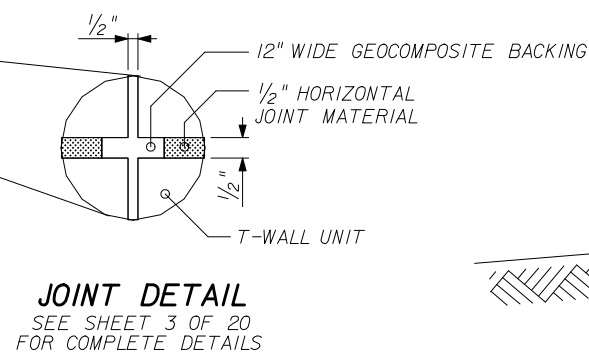
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

#### OLDCASTLE PRECAST, INC.

11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992



**PART ELEVATION SHOWING TYPICAL DETAILS**  
(NO SCALE)



**SECTION SHOWING TYPICAL DETAILS**  
(NOT ALL DETAILS APPLY TO EACH WALL)

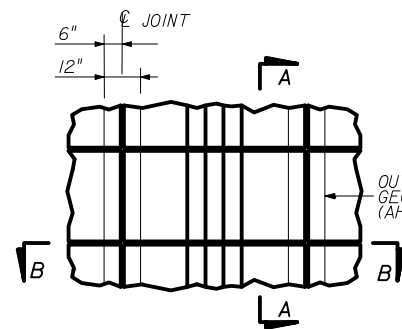
**NOTE:** ALL EXTENDED FACE TOP UNITS REQUIRE A MINIMUM OF TWO SHEAR KEYS. ALL OTHER UNITS ARE AS SHOWN BELOW:

- TOP UNITS - 2 SHEAR KEYS
- 6' STEM - 2 SHEAR KEYS
- 8' STEM - 2 SHEAR KEYS
- 10' STEM - 2 SHEAR KEYS
- 12' STEM - 2 SHEAR KEYS
- 14' STEM - 3 SHEAR KEYS
- 16' STEM - 3 SHEAR KEYS

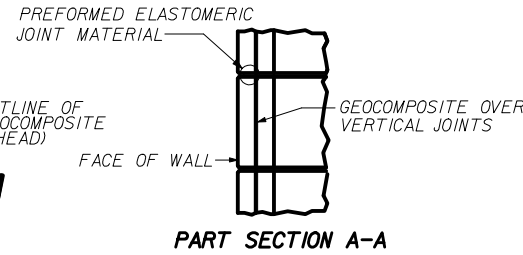
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7859  
FX: (703) 913-7859

**OLDCASTLE PRECAST, INC.**  
11543 1334 STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2966  
FX: (904) 778-2962

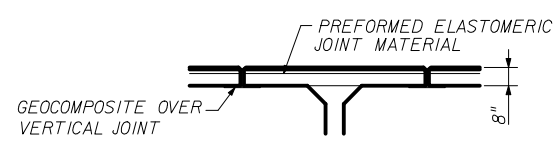
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM</b> <b>THE NEEL COMPANY T-WALL</b> <b>(3" COVER)</b>				
Designed By	JMC	10/01/98	Approved By <i>W. V. [Signature]</i>	
Drawn By	CAA	10/01/98	State Structures Design Engineer	
Checked By	JMC	10/01/98	Revision	Sheet No. Index No.
			00	2 of 20 5010



PART ELEVATION - REAR FACE



PART SECTION A-A

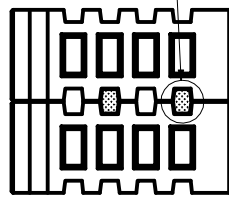


PART SECTION B-B

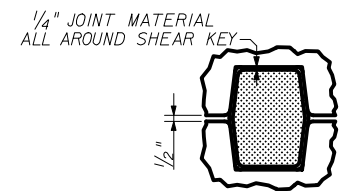
- NOTES:
- HORIZONTAL JOINT:  
1/2" x 4" x 5'-0" PREFORMED ELASTOMERIC JOINT MATERIAL
  - VERTICAL JOINT:  
1/2" SPACE  
12" WIDE GEOCOMPOSITE BACKING, CENTERED ABOUT JOINT CENTERLINE.

JOINT MATERIAL DETAILS

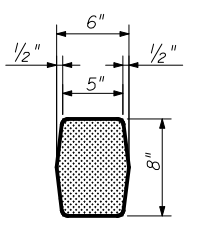
SHEAR KEY WRAPPED IN JOINT MATERIAL. SEE DETAILS THIS SHEET.



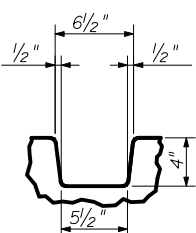
PART SECTION



SHEAR KEY / JOINT MATERIAL ARRANGEMENT



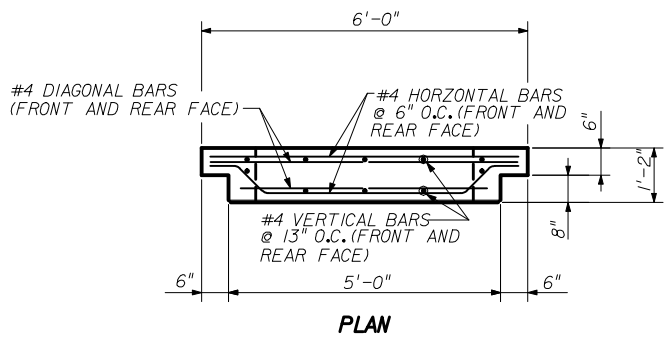
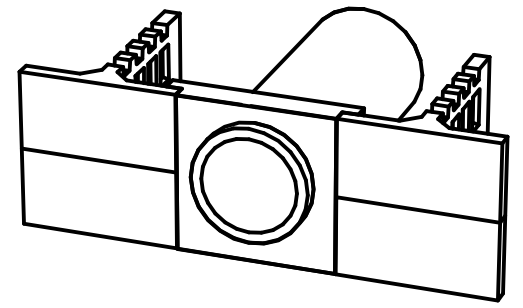
SHEAR KEY DIMENSIONS



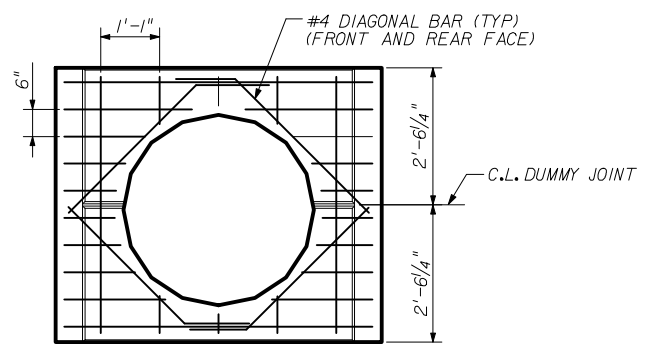
SHEAR KEY BLOCKOUT DIM'S

- NOTES:
- SHEAR KEY JOINT MATERIAL:  
MINIMUM OF ONE 1/4" x 8" x 24" PIECE OF AVI ASTRO-FOAM AF-250 PER SHEAR KEY.
  - JOINT MATERIAL MAY BE ADDED OR REMOVED TO AID IN SHIMMING AND ALIGNING, HOWEVER SHEAR KEY MUST FIT SNUG IN THE SHEAR KEY BLOCKOUT WHEN UNIT IS IN ITS FINAL POSITION.
  - MINIMUM OF 2 SHEAR KEYS REQUIRED PER UNIT. SEE NOTES ON SHEET 2 OF 20, 'TYPICAL DETAILS (1)'.

SHEAR KEY DETAILS



PLAN



ELEVATION (FRONT FACE)  
PRECAST HEADWALL PANEL  
FOR LARGE DIAMETER PIPES

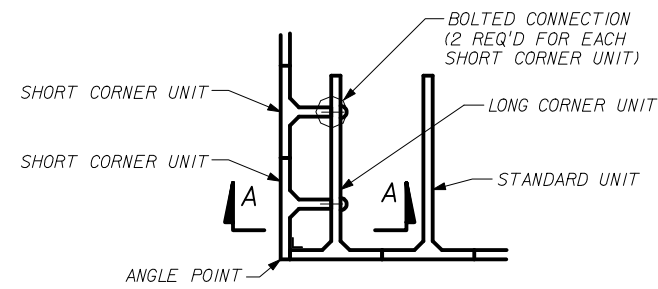
**THE NEEL COMPANY**  
8528 O'FRATORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

**OLDCASTLE PRECAST, INC.**  
11643 109th STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

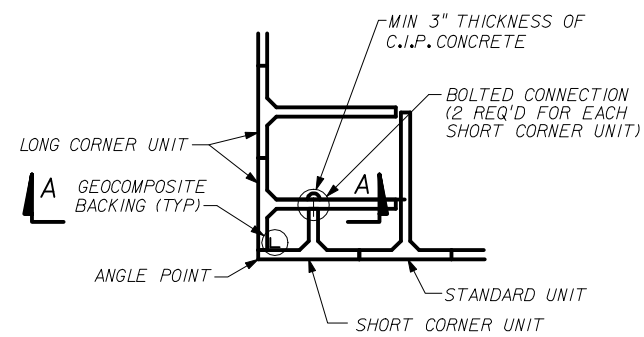
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(3" COVER)

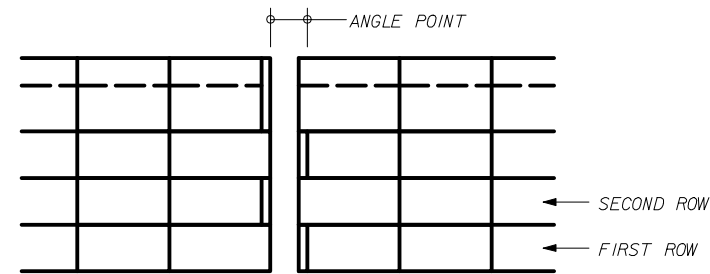
Names	Dates	Approved By			
Designed By	JMC	10/01/98	 State Structures Design Engineer		
Drawn By	CAA	10/01/98			
Checked By	JMC	10/01/98	Revision	Sheet No.	Index No.
			00	3 of 20	5010



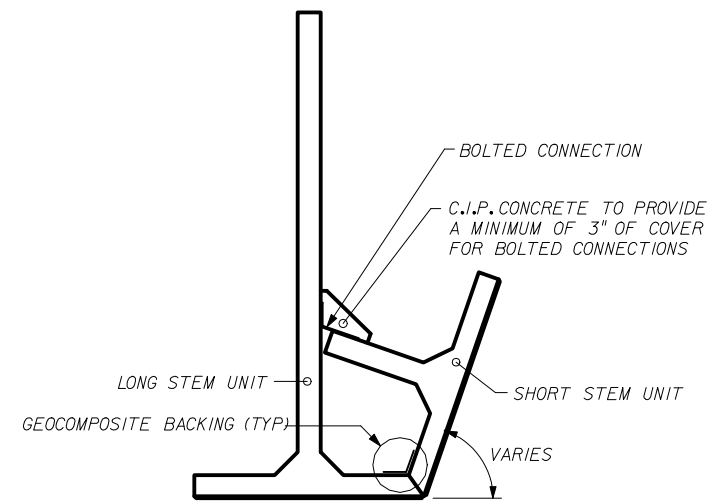
PART PLAN - FIRST ROW



PART PLAN - SECOND ROW

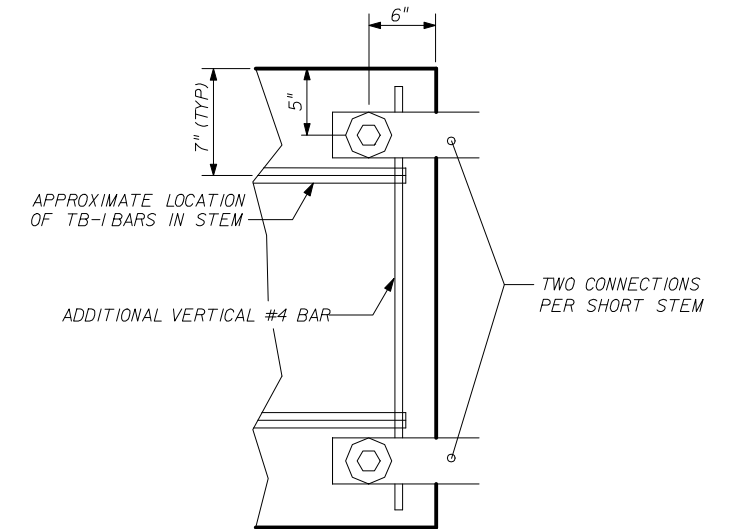


PART ELEVATION

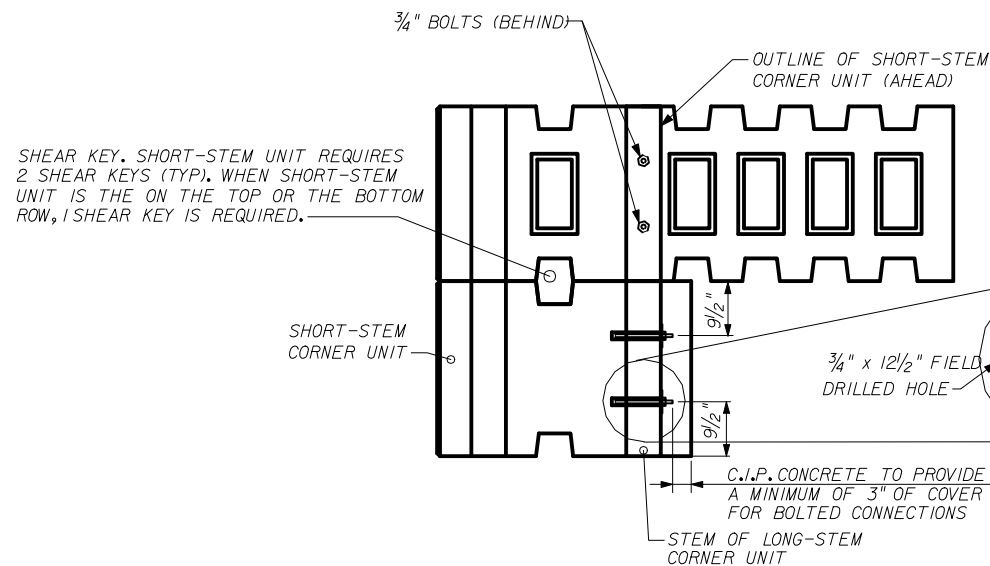


PART PLAN - ANGLE > 90°

SHORT AND LONG STEMS ALTERNATE PER 90° CORNER DETAIL

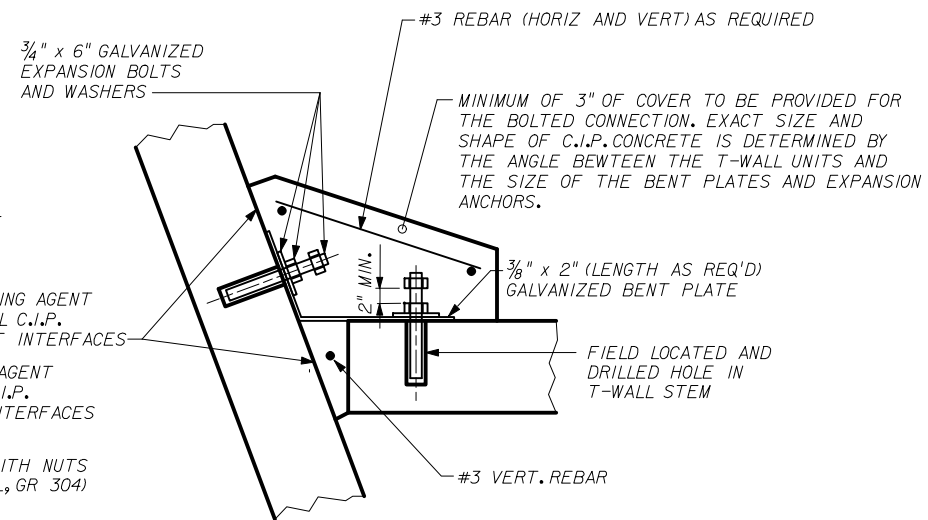


VIEW B-B



TYPICAL CORNER UNIT ARRANGEMENT

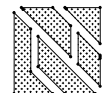
STEM LENGTHS VARY - SEE SPECIFIC ELEVATIONS FOR PROPER UNITS  
NO SCALE



TYPICAL BOLTED CONNECTION FOR ANGLE POINTS

TYPICAL ANGLE POINT DETAIL

NO SCALE



**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
Ph: (703) 913-7858  
Fx: (703) 913-7859

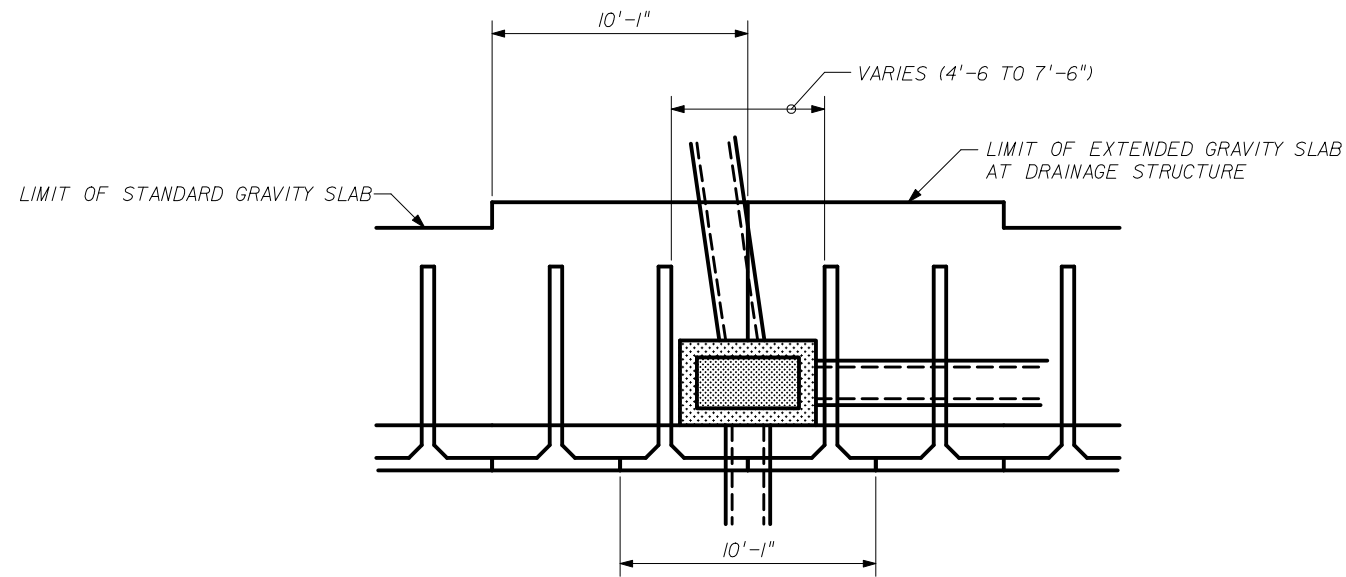
**OLDCASTLE PRECAST, INC.**  
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JACKSONVILLE, FL 32210  
Ph: (904) 778-2990  
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

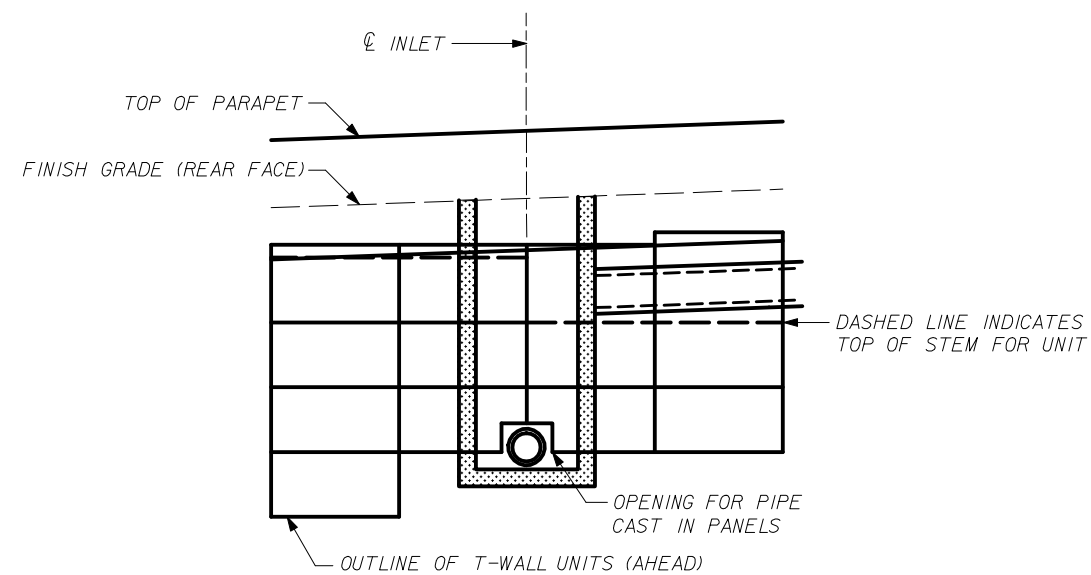
**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(3" COVER)**

Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No.
Checked By	JMC	10/01/98	00	4 of 20
				Index No. 5010

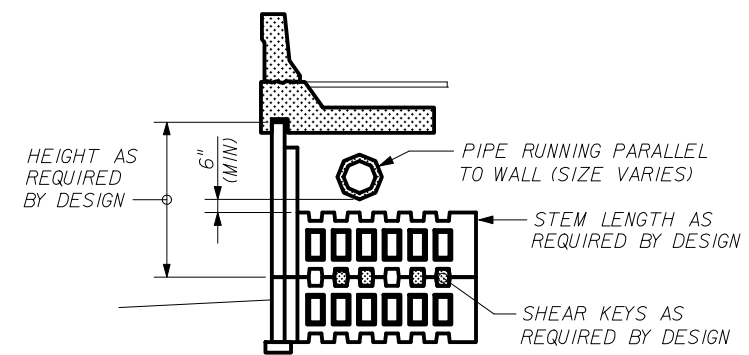




PART PLAN



PART ELEVATION (FRONT FACE)

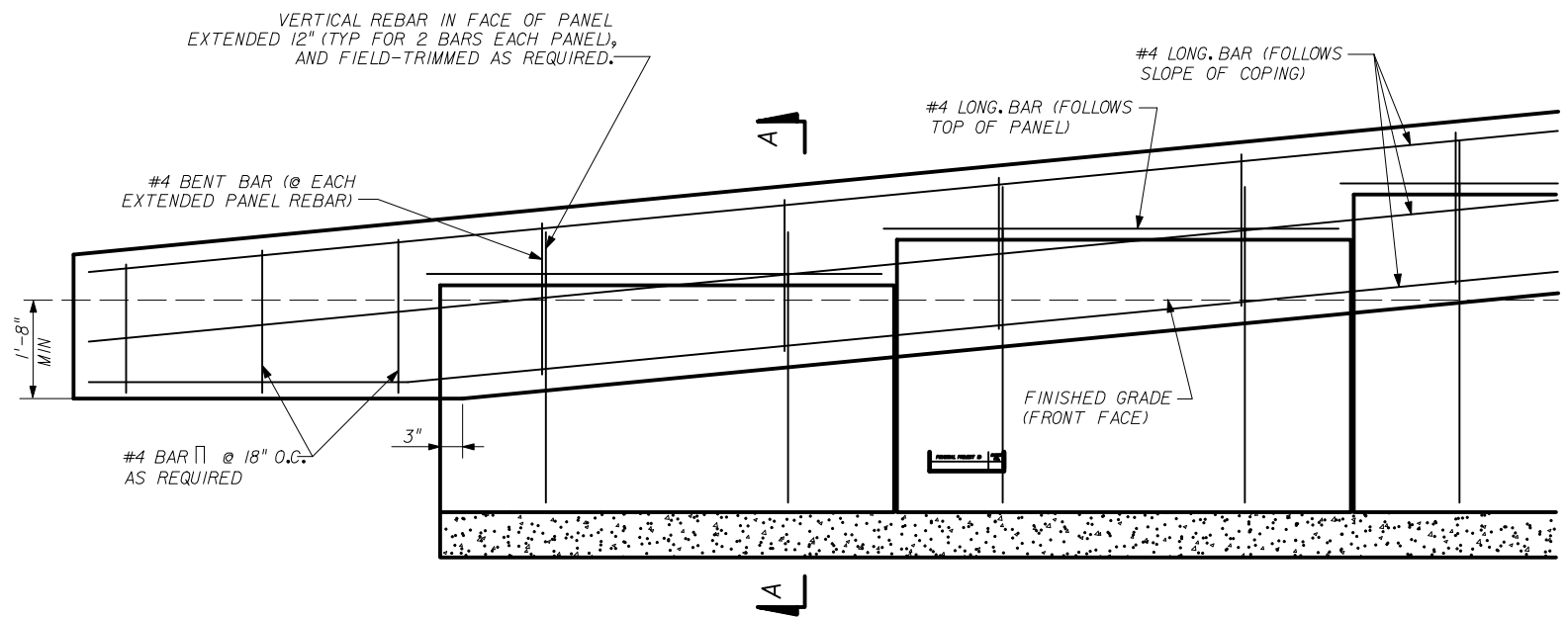


SECTION  
(SHOWING PIPE PARALLEL TO WALL)

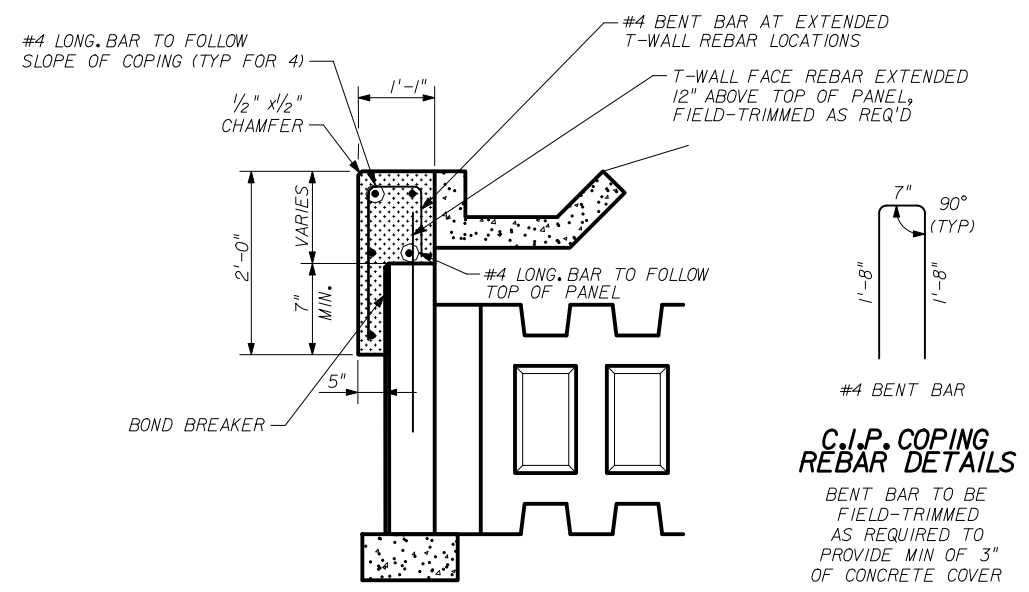
**THE NEEL COMPANY**  
 8328-D TRAFORD LANE  
 SPRINGFIELD, VIRGINIA 22152  
 Ph: (703) 913-7858  
 Fx: (703) 913-7859

**OLDCASTLE PRECAST, INC.**  
 11643 103RD STREET  
 JACKSONVILLE, FL 32210  
 Ph: (904) 778-2990  
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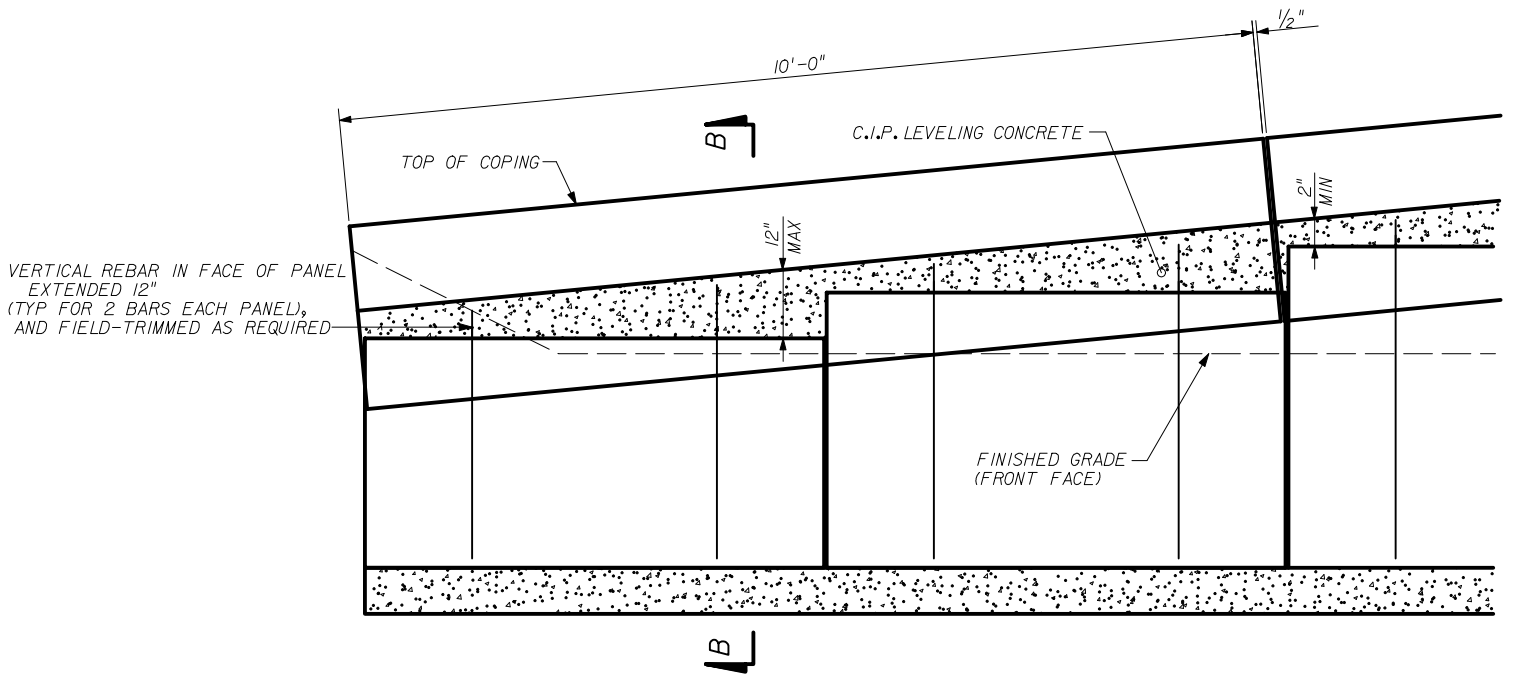
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RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)				
Names	Dates	Approved By		
Designed By	JMC	10/01/98	W. J. [Signature]	
Drawn By	CAA	10/01/98	State Structures Design Engineer	
Checked By	TCN	10/01/98	Revision	Index No.
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				5010



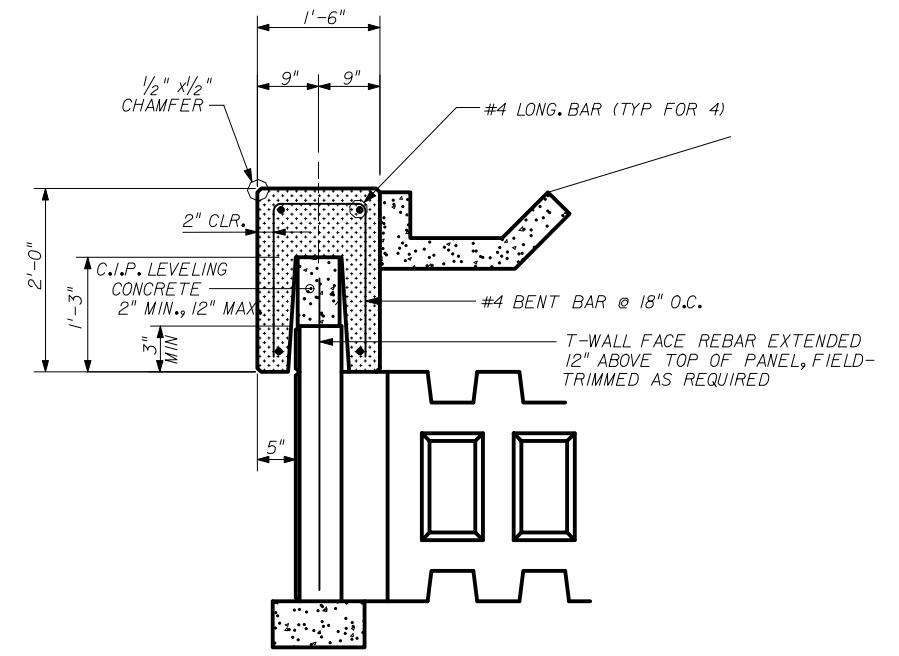
C.I.P. COPING TREATMENT AT BEGINNING/END OF WALLS



SECTION A-A  
C.I.P. COPING



PRECAST COPING - PART ELEVATION

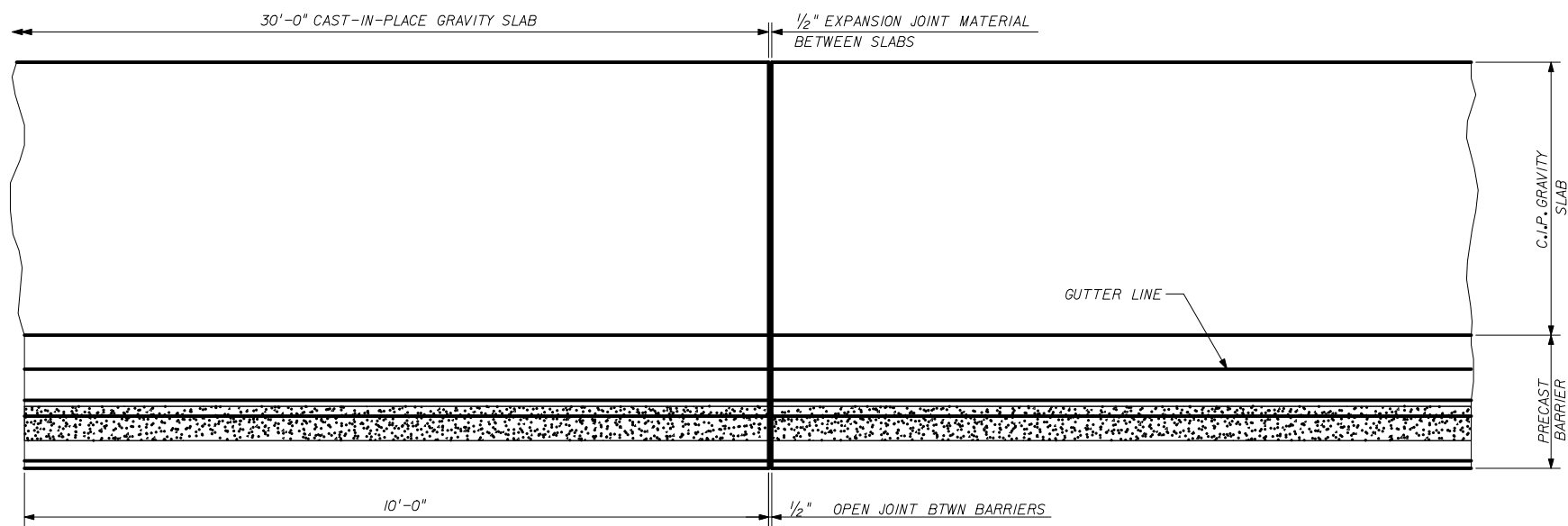


SECTION B-B  
PRECAST COPING

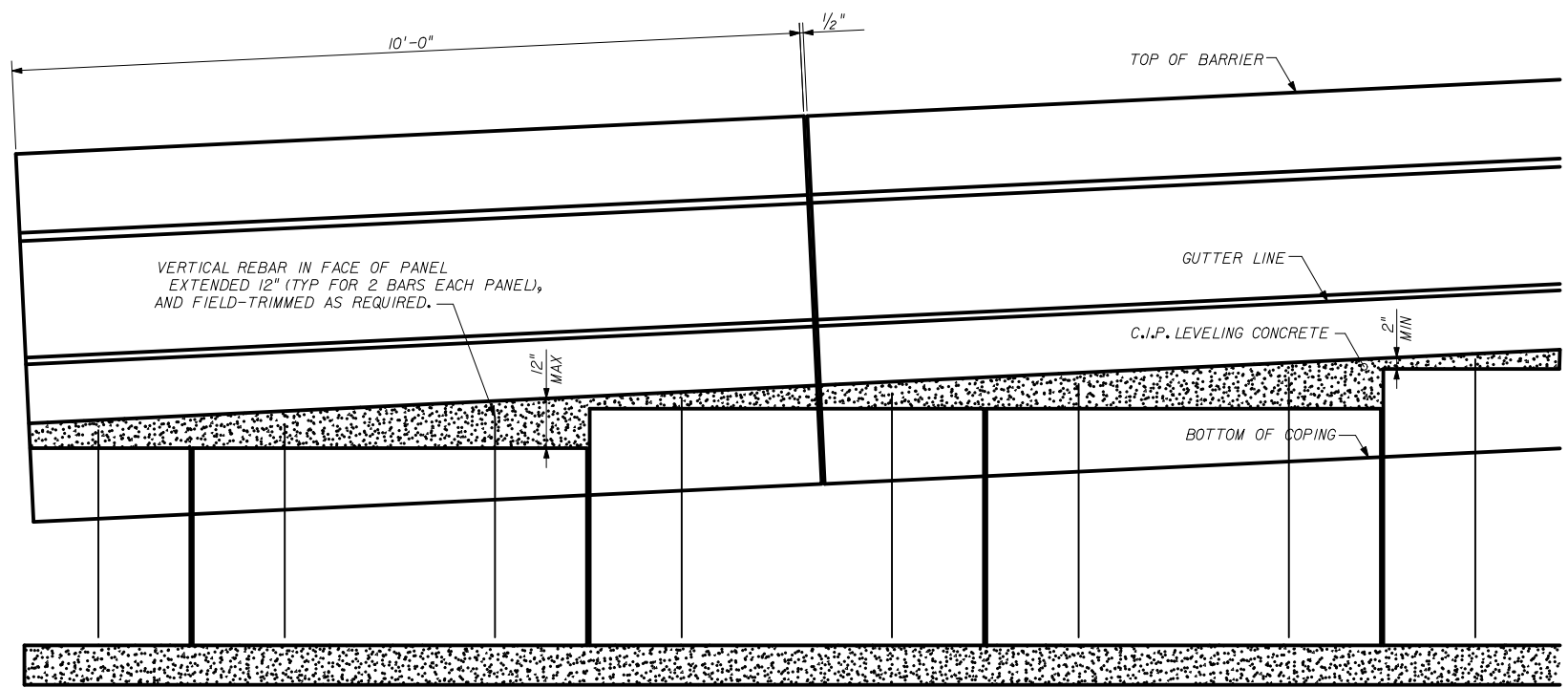
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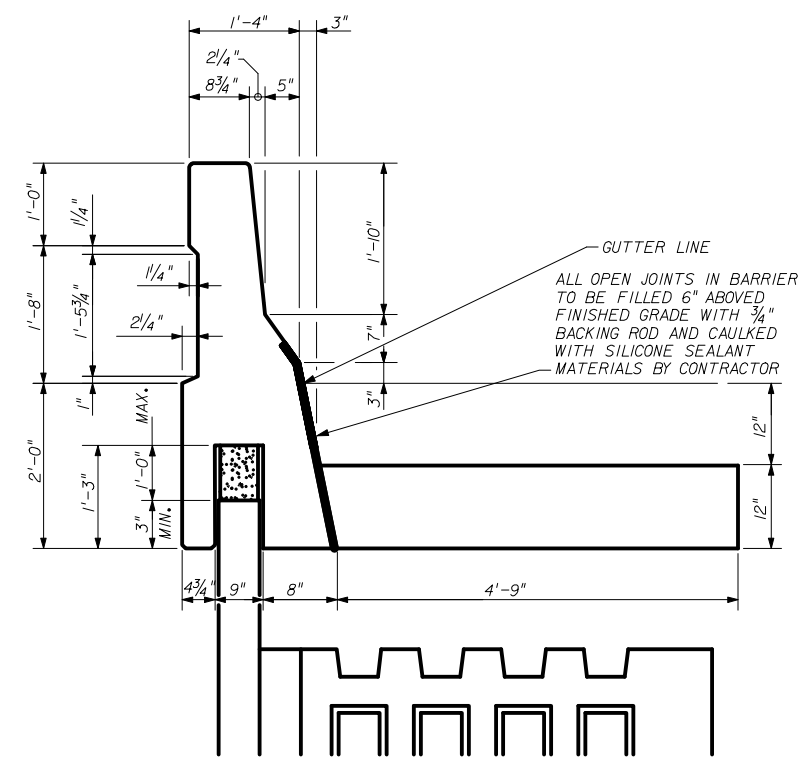
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)</b>				
Names	Dates	Approved By <i>W. V. [Signature]</i>		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No. Index No.
Checked By	JMC	10/01/98	00	6 of 20 5010



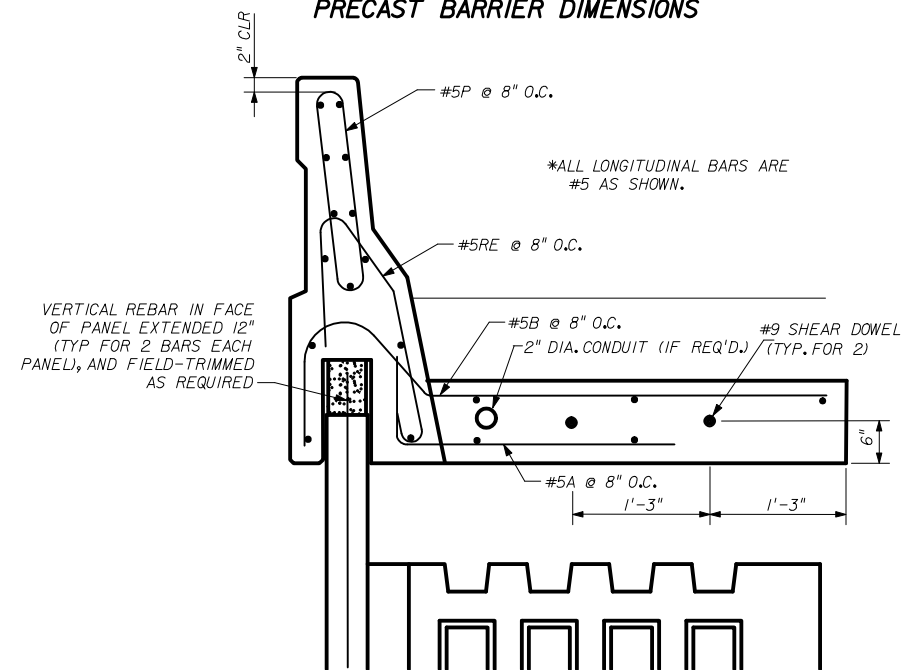
PART PLAN - PRECAST BARRIER



PART ELEVATION - PRECAST BARRIER



PRECAST BARRIER DIMENSIONS



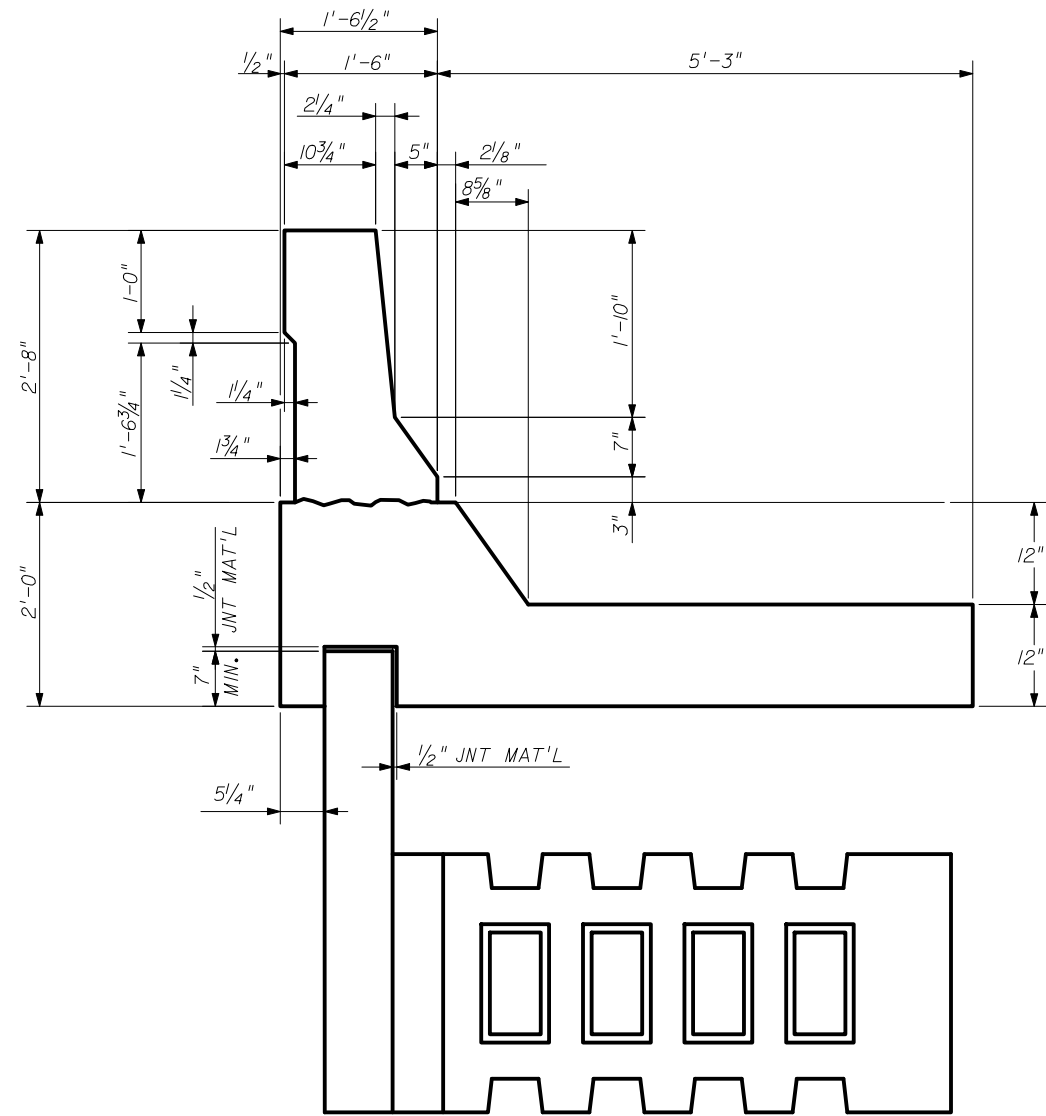
PRECAST BARRIER REBAR



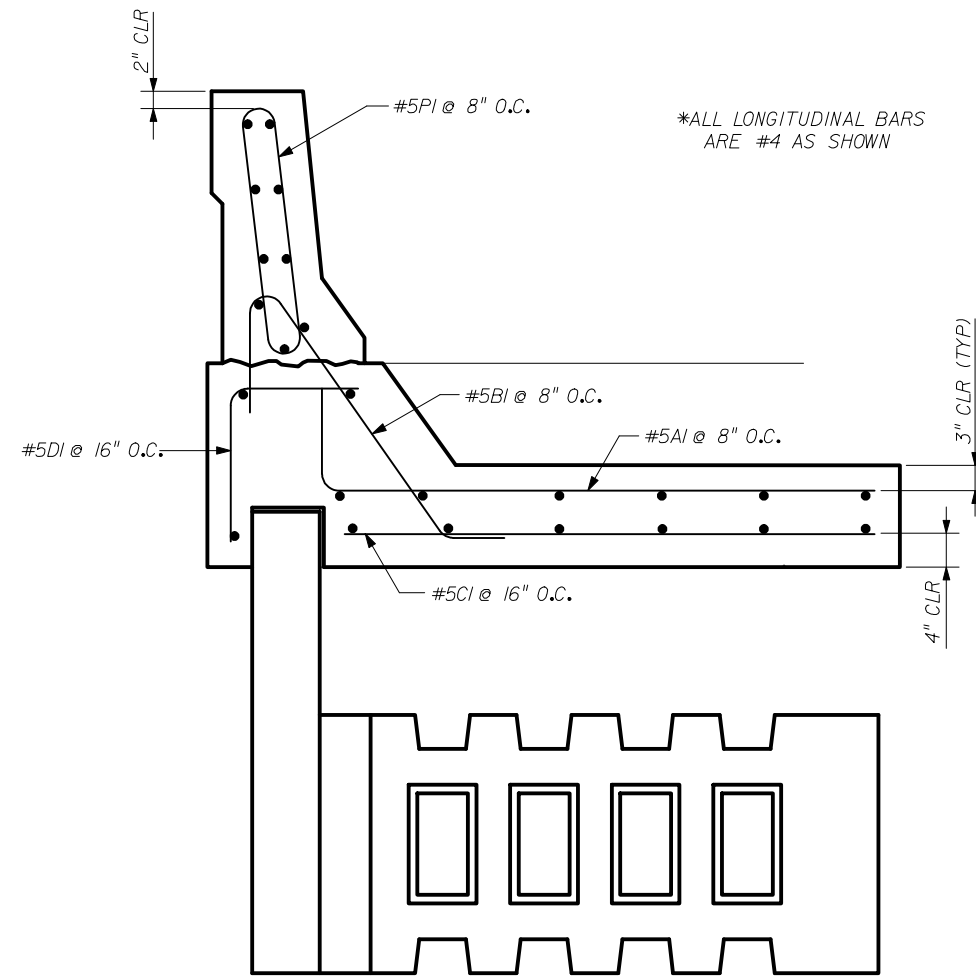
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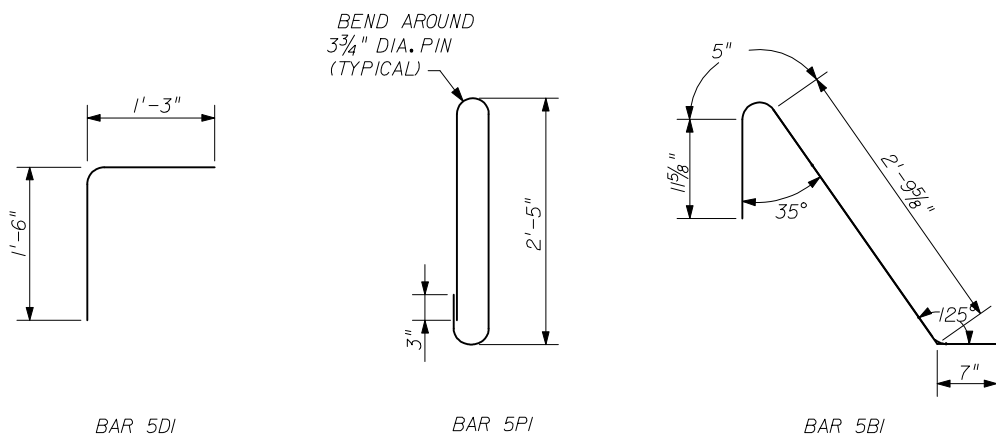
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By JMC	10/01/98	State Structures Design Engineer		
Drawn By CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By JMC	10/01/98	00	7 of 20	5010



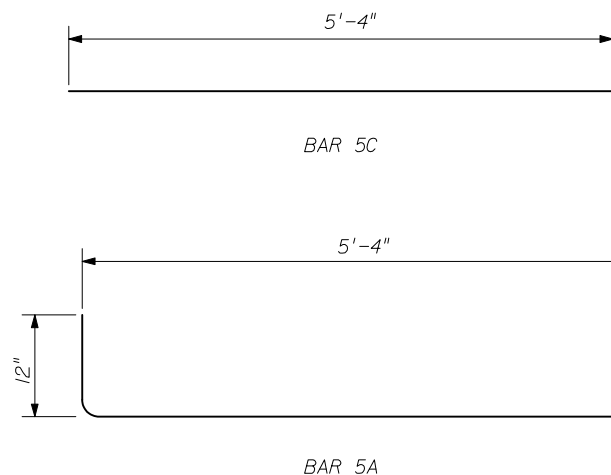
C.I.P. BARRIER AND C.I.P. JUNCTION SLAB DIMENSIONS



C.I.P. BARRIER AND C.I.P. JUNCTION SLAB REBAR



C.I.P. BARRIER REBAR DETAILS



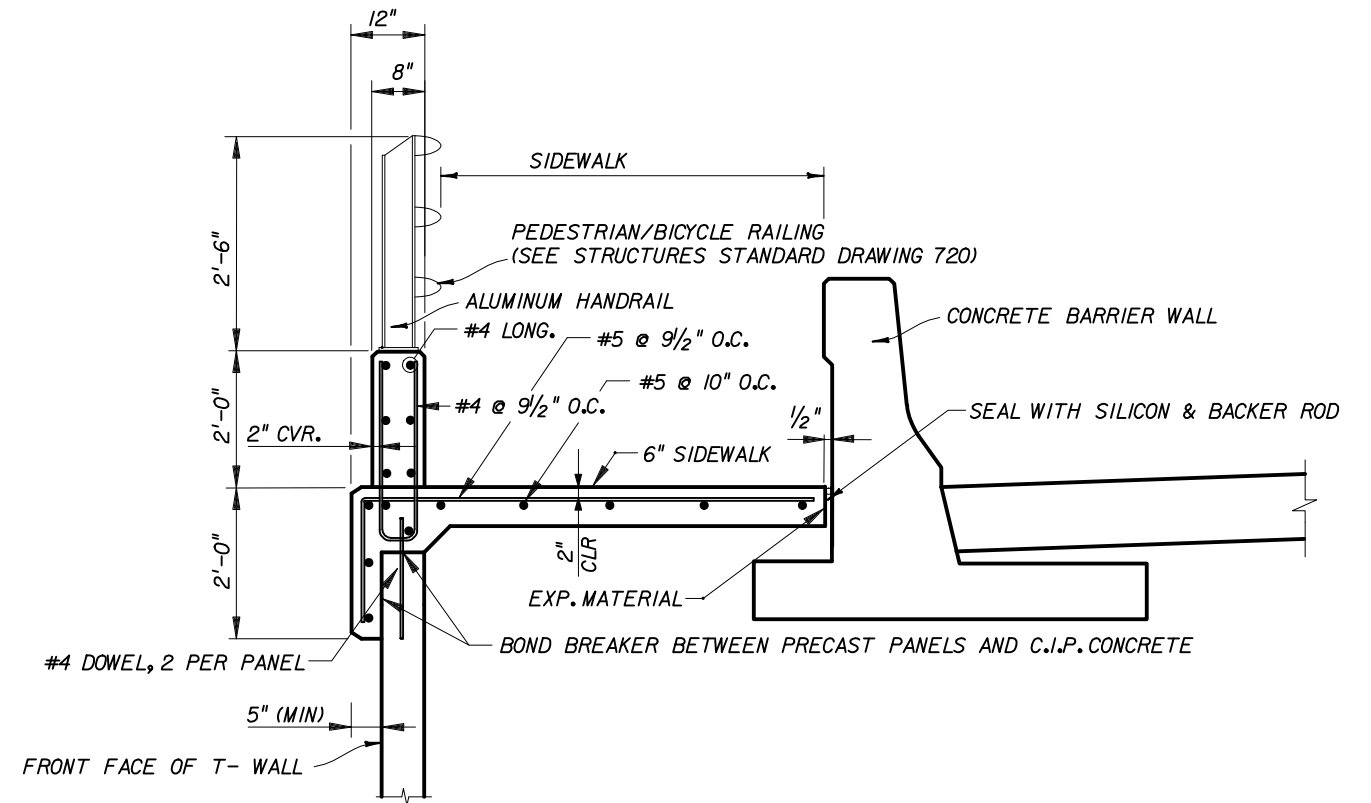
BAR 5A



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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)</b>				
Designed By	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Drawn By	CAA	10/01/98	State Structures Design Engineer	
Checked By	JMC	10/01/98	Revision	Sheet No.
			00	8 of 20
				Index No. 5010



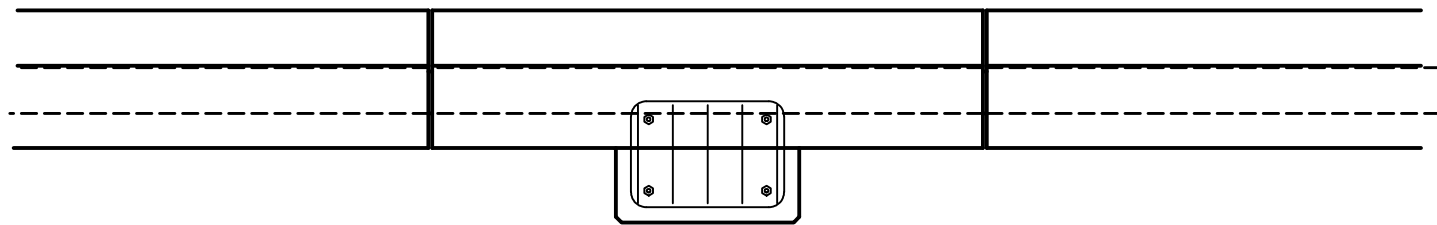
C.I.P. PARAPET DETAIL W/ HANDRAIL



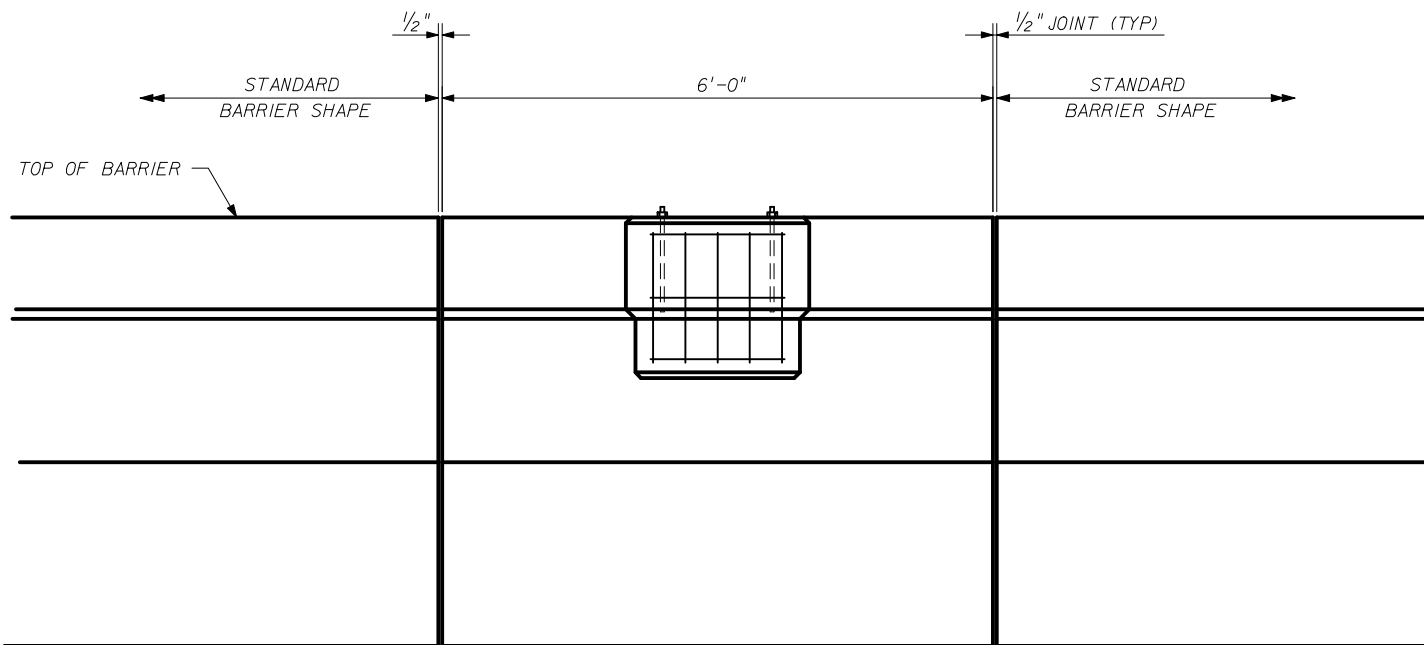
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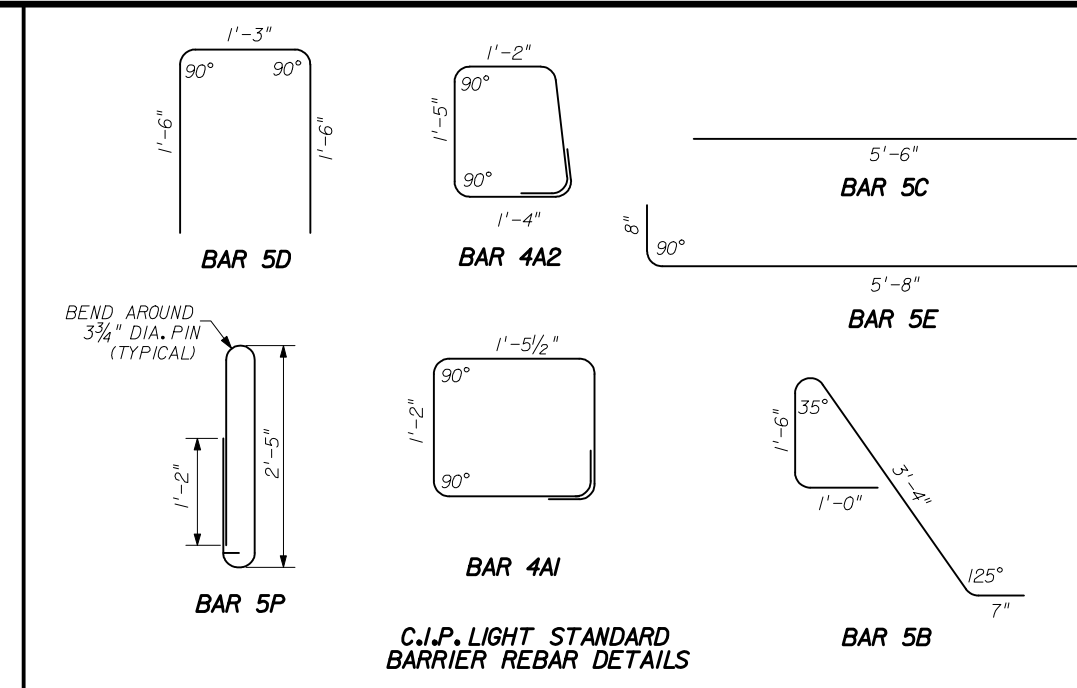
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)</b>				
	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No.
Checked By	JMC	10/01/98	00	9 of 20
				Index No. 5010



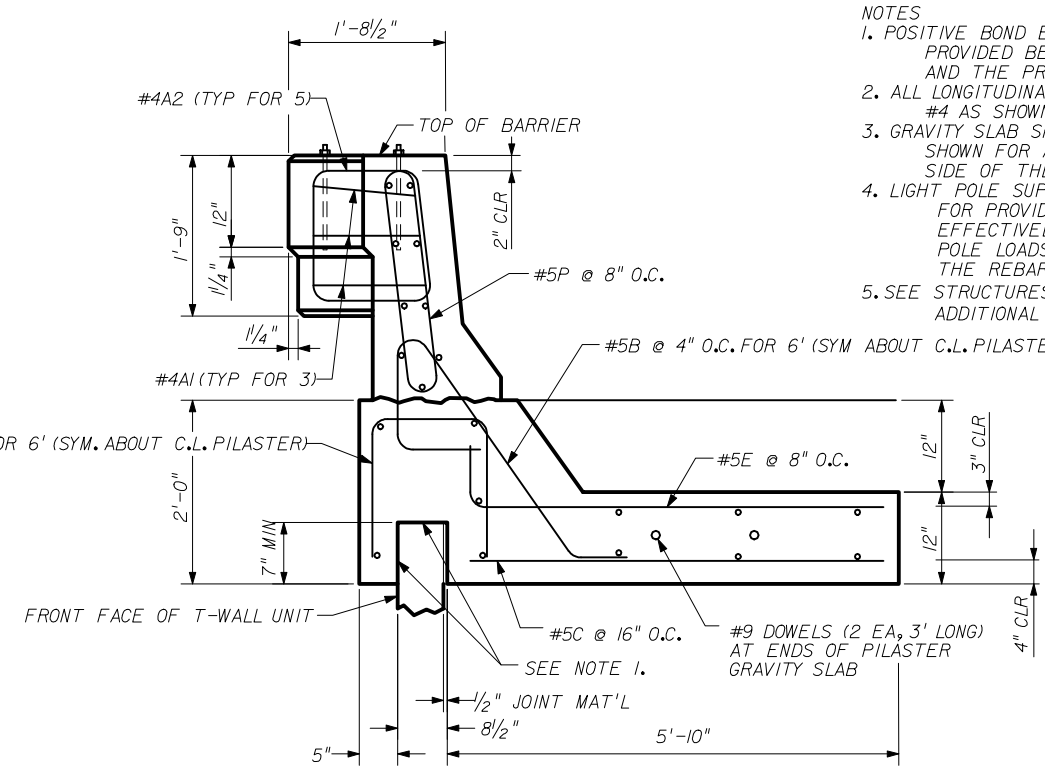
C.I.P. LIGHT STANDARD BARRIER - PART PLAN WITH REBAR  
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)



C.I.P. LIGHT STANDARD BARRIER - PART ELEVATION  
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)



C.I.P. LIGHT STANDARD BARRIER REBAR DETAILS



C.I.P. LIGHT STANDARD BARRIER - PART SECTION WITH REBAR

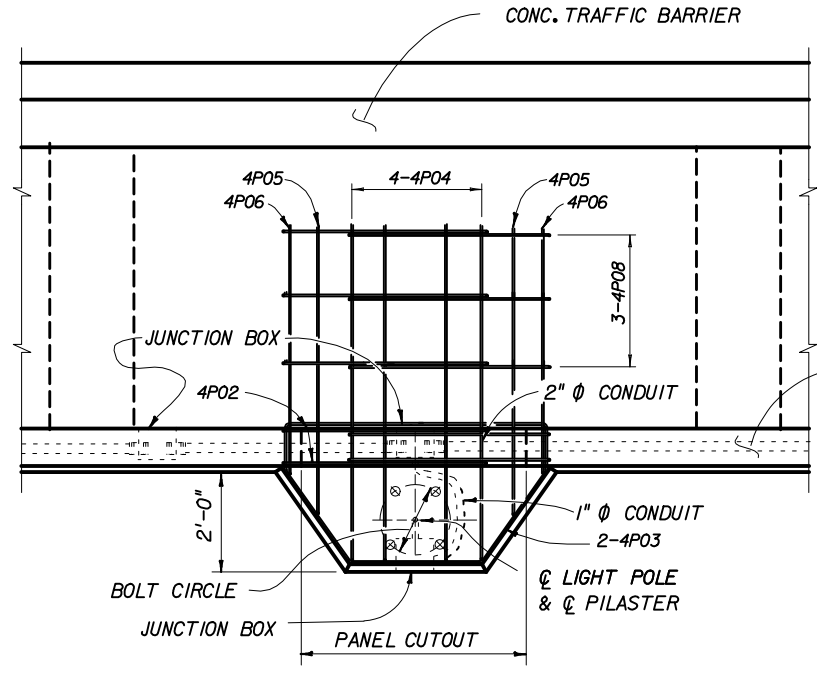
- NOTES
1. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN THE C.I.P. CONC. AND THE PRECAST PANEL.
  2. ALL LONGITUDINAL BARS ARE #4 AS SHOWN.
  3. GRAVITY SLAB SHALL HAVE DIMENSIONS SHOWN FOR A MIN. LENGTH OF 10'-0" EITHER SIDE OF THE LIGHT STANDARD BARRIER.
  4. LIGHT POLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND FIT THE REBAR CAGE.
  5. SEE STRUCTURES STANDARD DRAWING 500 FOR ADDITIONAL DETAILS.



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<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No. Index No.
Checked By	JMC	10/01/98	00	10 of 20 5010



**NOTES**

1. ADDITIONAL CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTER SHALL MEET THE SAME REQUIREMENTS AS THAT OF THE PARAPET WALL.
2. TOP OF PILASTER SHALL BE FINISHED TO A TRULY LEVEL AREA.
3. LIGHT POLE PILASTER IS DESIGNED TO RESIST WORKING LOADS (IN ANY DIRECTION) FROM THE LIGHT POLE APPLIED AT THE TOP OF THE PILASTER AS FOLLOWS:

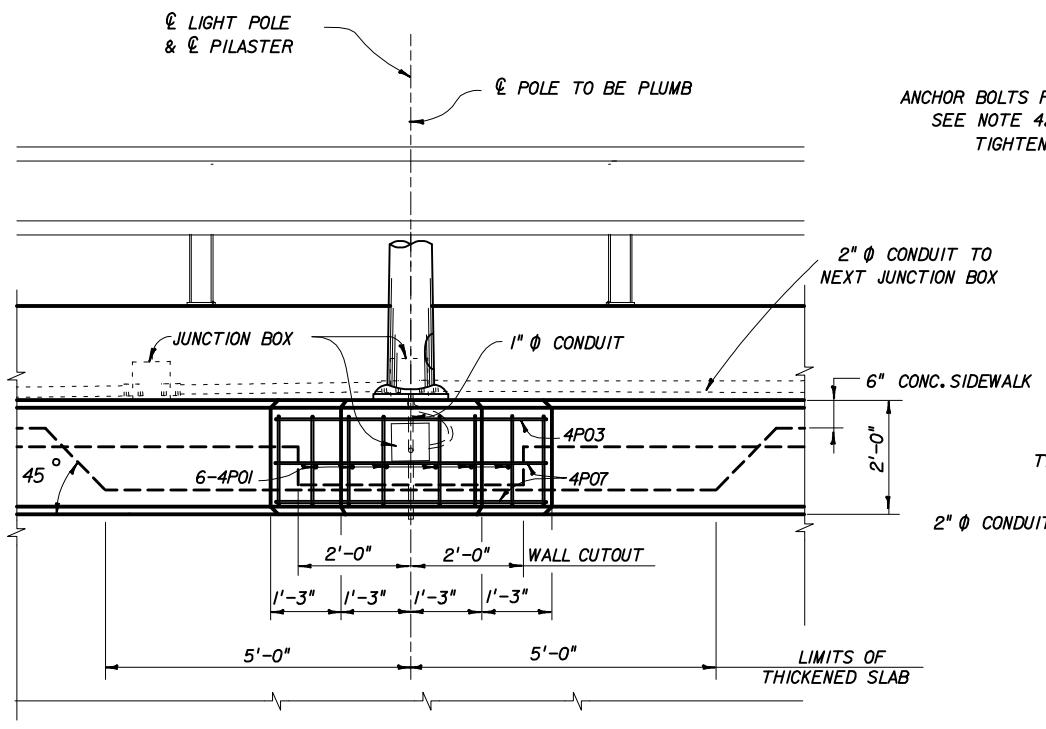
LONGITUDINAL MOMENT	=	30,000 FT. POUND
TRANSVERSE MOMENT	=	6,000 FT. POUND
LONGITUDINAL SHEAR	=	1,000 POUND
TRANSVERSE SHEAR	=	200 POUND
TORSION	=	3,000 FT. POUNDS
AXIAL	=	400 POUNDS

IF THE LIGHT POLE PROVIDED APPLIES LOADS THAT ARE IN EXCESS OF THOSE SHOWN ABOVE, THE CONTRACTOR SHALL REDESIGN THE PILASTER AND SUBMIT HIS DESIGN TO THE DEPARTMENT FOR REVIEW. THE CONTRACTOR'S REDESIGN SHALL BE PREPARED, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA, AND QUALIFIED TO PERFORM THE WORK.

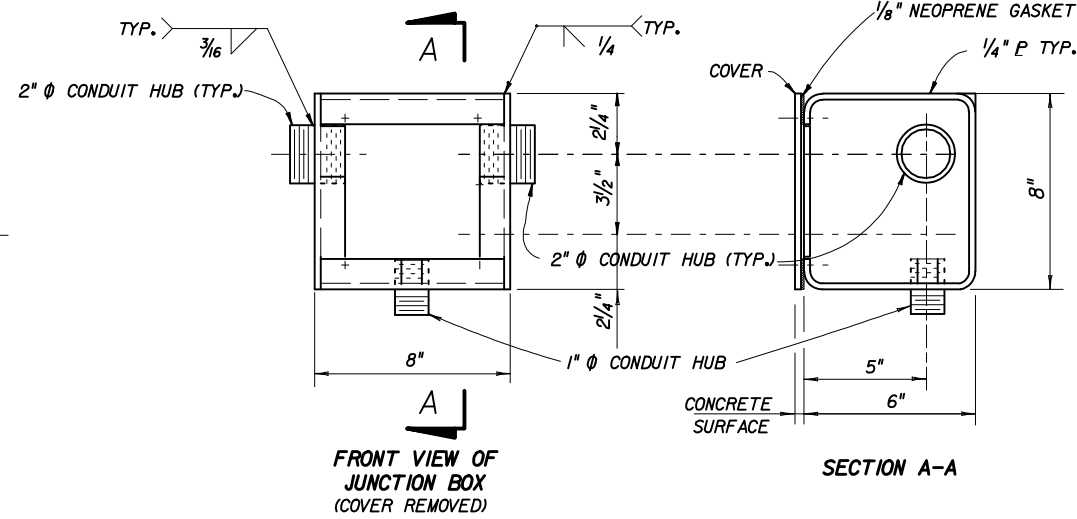
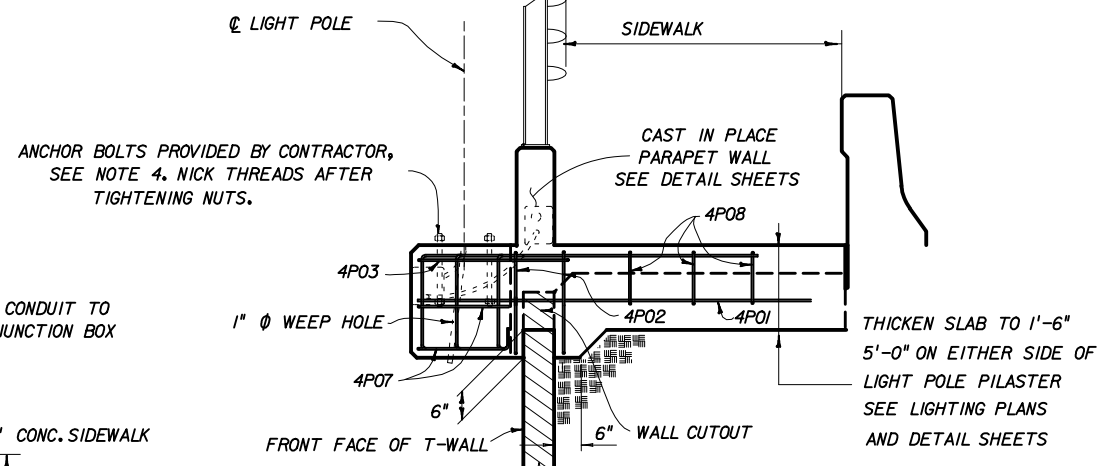
4. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND THAT FIT THE REINFORCING CAGE. CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA SHALL BE SUBMITTED BY THE CONTRACTOR TO THE DEPARTMENT FOR REVIEW AND APPROVAL SHOWING THAT THESE REQUIREMENTS HAVE BEEN MET PRIOR TO CONSTRUCTION.

5. STEEL FOR JUNCTION BOXES SHALL CONFORM WITH ASTM-A36. THE BOXES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. IN LIEU OF STEEL BOXES THE CONTRACTOR MAY SUBMIT FOR APPROVAL MOLDED P.V.C. BOXES (SCHEDULE 80).
6. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL OR SCHEDULE 80 P.V.C.
7. THE COST OF ANCHOR BOLTS SHALL BE INCLUDED IN THE BID PRICE FOR LIGHT POLES.
8. PAYMENT: THE COST OF ALL LABOR, CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTERS AND ALL CONDUITS. EXPANSION COUPLINGS, JUNCTION BOXES AND MISCELLANEOUS HARDWARE REQUIRED FOR COMPLETION OF THE ELECTRICAL INSTALLATION WITHIN THE LIMITS SHOWN ON THIS SHEET, SHALL BE INCLUDED IN THE CONTRACTOR'S BID PRICE FOR THE MSE WALLS.

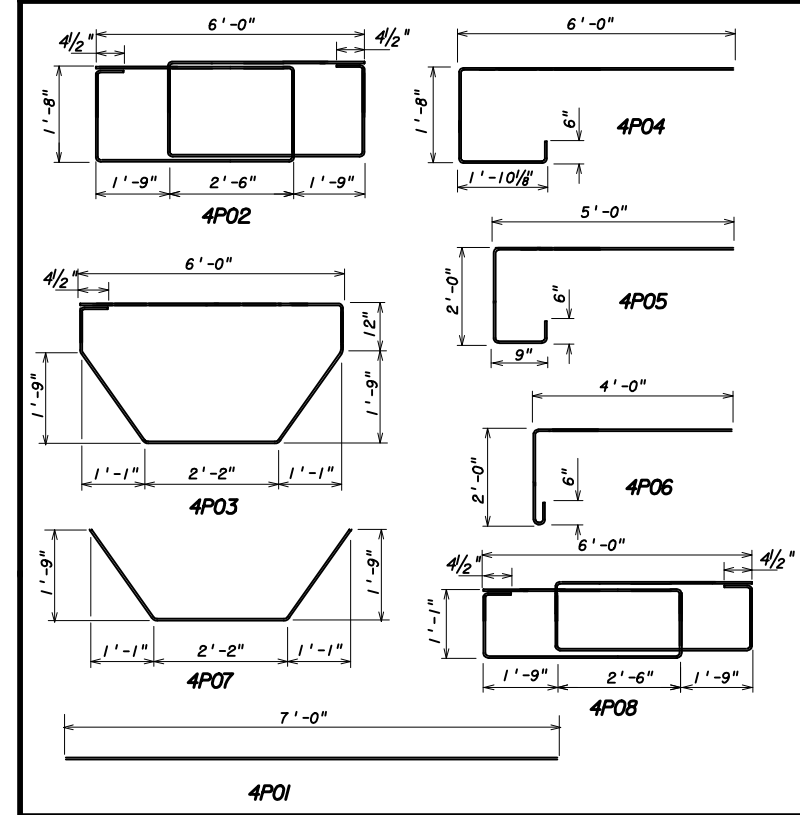
**PLAN**



**LIGHT PILASTER DETAIL**



**BAR BENDING DIAGRAMS**



**BILL OF REINFORCING STEEL**

MARK	SIZE	NO. REQ'D	LENGTH
4P01	4	6	7'-0"
4P02	4	2	24'-5"
4P03	4	1	14'-9"
4P04	4	4	9'-8"
4P05	4	2	7'-11"
4P06	4	2	6'-2"
4P07	4	2	6'-4"
4P08	4	3	22'-1"

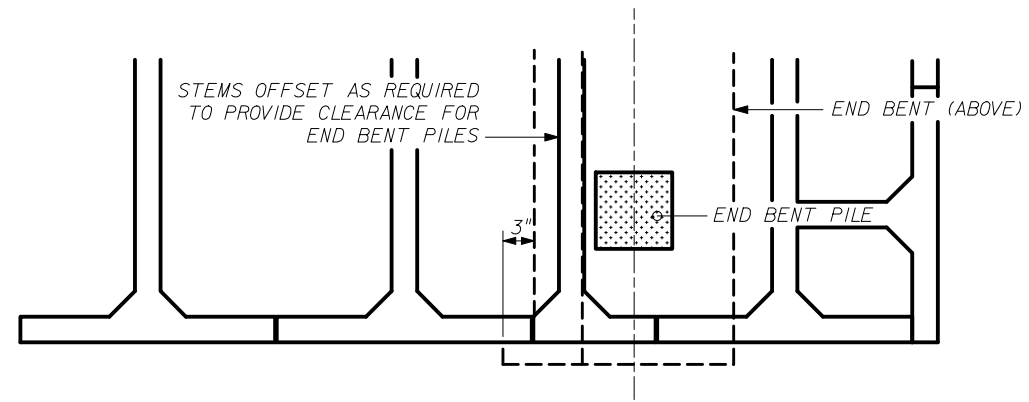
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(3" COVER)**

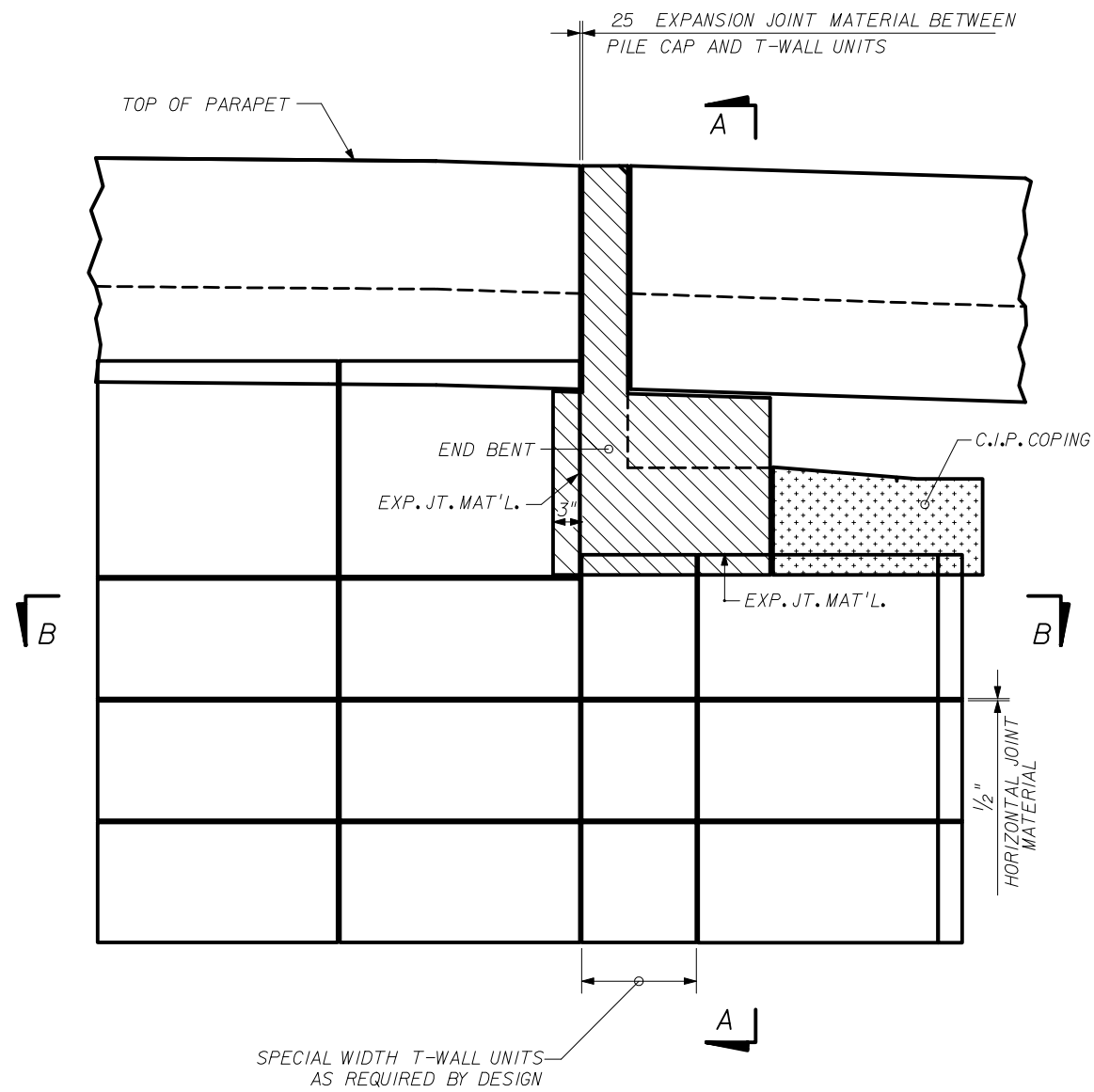
Designed By	JMC	Date	10/01/98	Approved By	<i>[Signature]</i>
Drawn By	CAA	Date	10/01/98	State Structures Design Engineer	
Checked By	JMC	Date	10/01/98	Revision	00
				Sheet No.	11 of 20
				Index No.	5010

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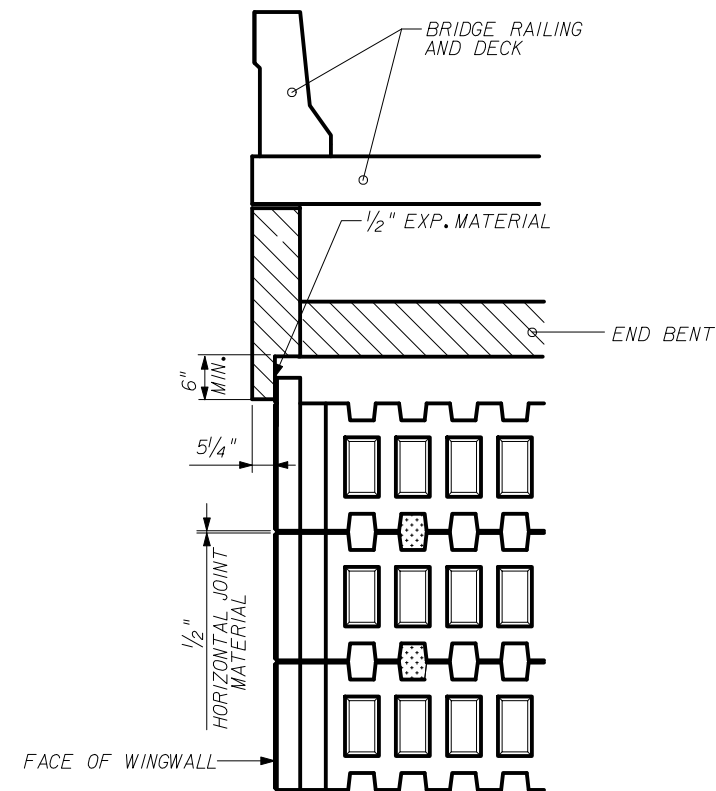
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**SECTION B-B**  
STEM / END BENT PILE INTERFACE



**PART ELEVATION SHOWING**  
WINGWALL / END BENT INTERFACE




**SECTION A-A**  
SECTION THRU PILE CAP

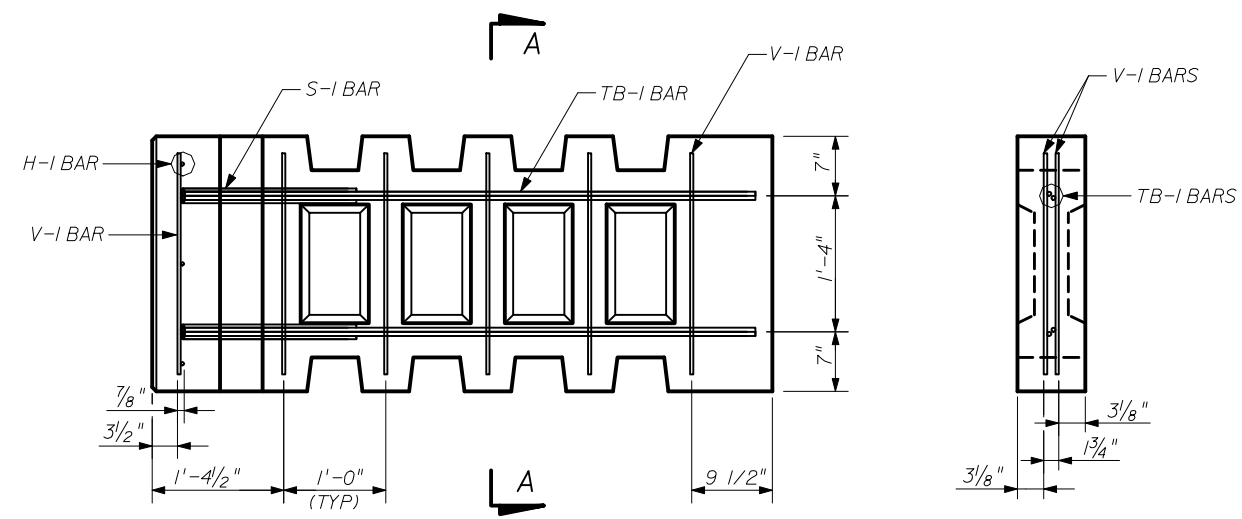
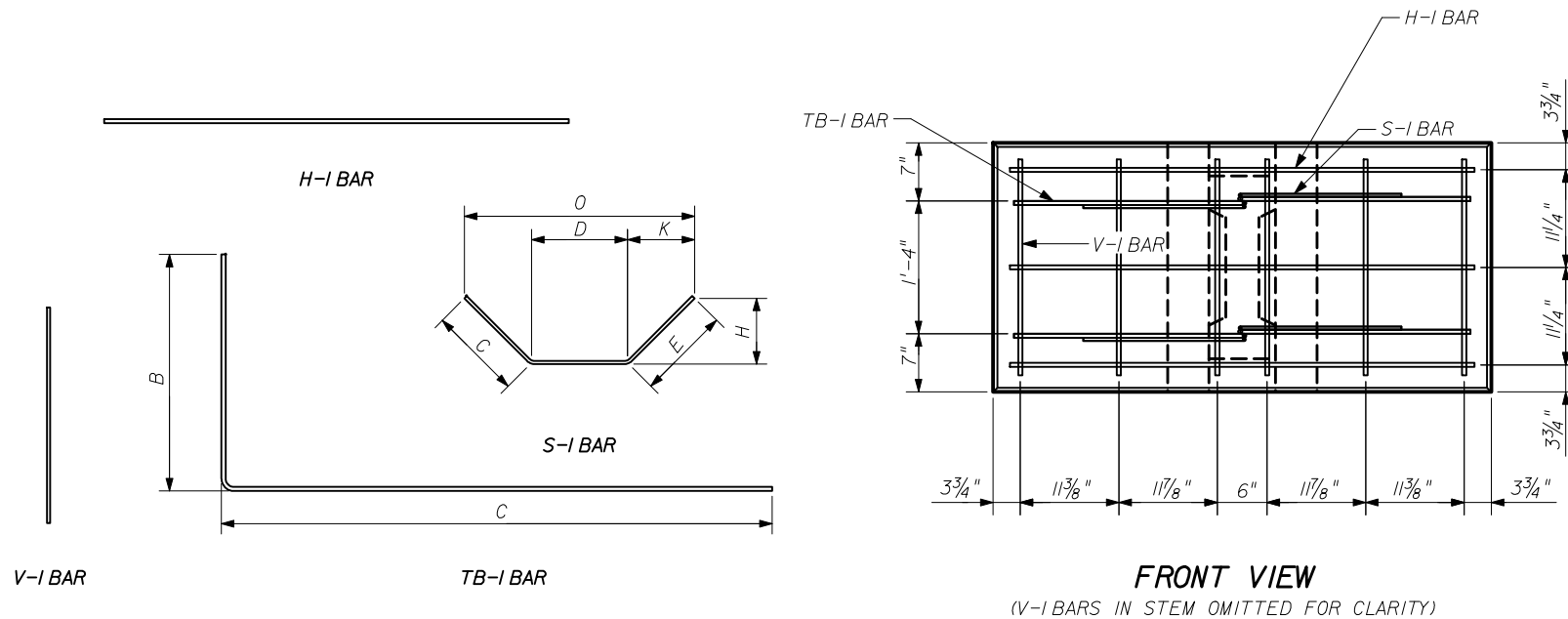
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**RETAINING WALL SYSTEM**  
**THE NEEL COMPANY T-WALL**  
**(3" COVER)**

Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By				
Checked By		Revision	Sheet No.	Index No.
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**FRONT VIEW**  
(V-I BARS IN STEM OMITTED FOR CLARITY)

**SIDE VIEW**

**SECTION A-A**

REBAR SCHEDULE - 2.5 x 5.0 x 04 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	12	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	5'-8 1/2"	2'-3 1/2"	3'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 06 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	16	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 08 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	20	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 10 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	24	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	11'-8 1/2"	2'-3 1/2"	9'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 12 STD UNIT

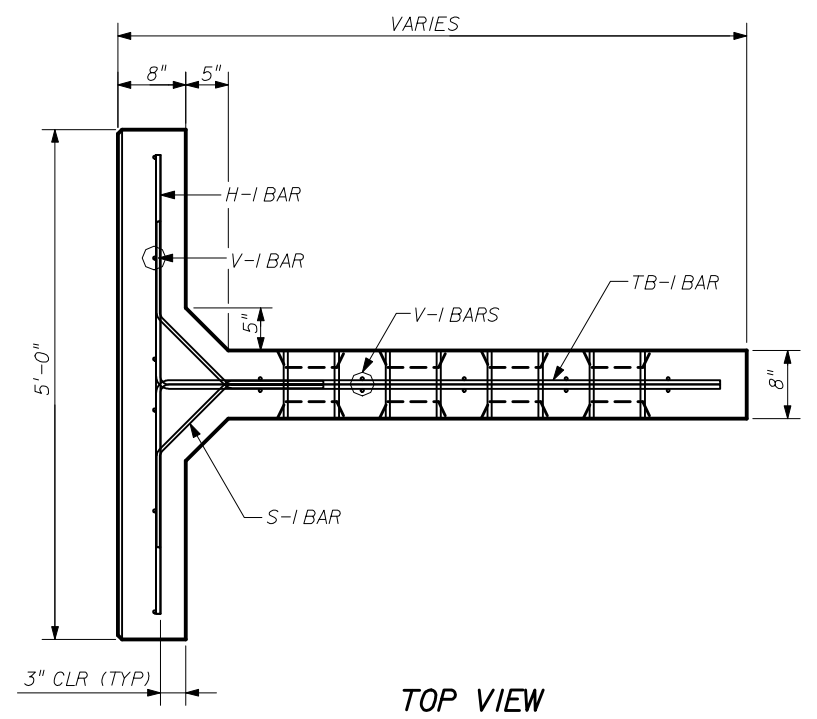
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H-I	3	4	-	4'-6"								-	
V-I	26	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	13'-8 1/2"	2'-3 1/2"	11'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 14 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	32	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	15'-8 1/2"	2'-3 1/2"	13'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 16 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	36	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	17'-8 1/2"	2'-3 1/2"	15'-6 1/2"						90	



**TOP VIEW**  
**REINFORCING STEEL - STANDARD UNITS**

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3" MIN. CONCRETE COVER

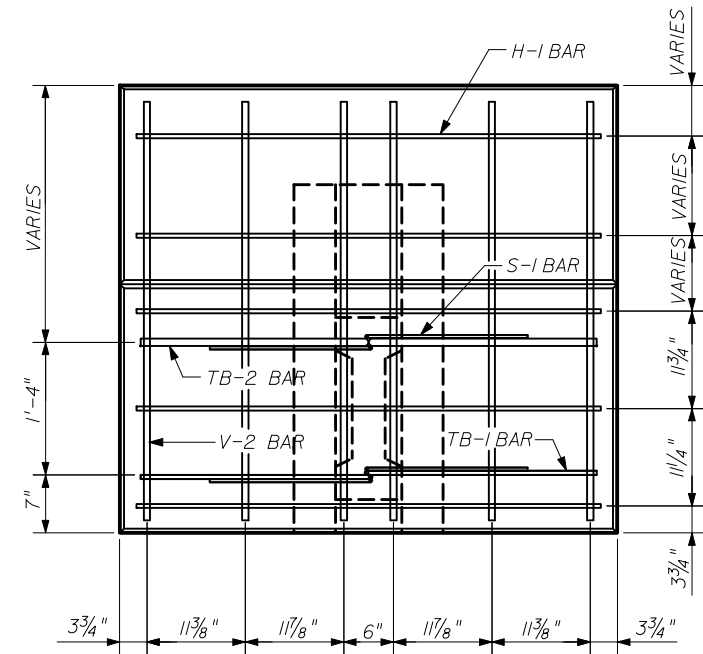
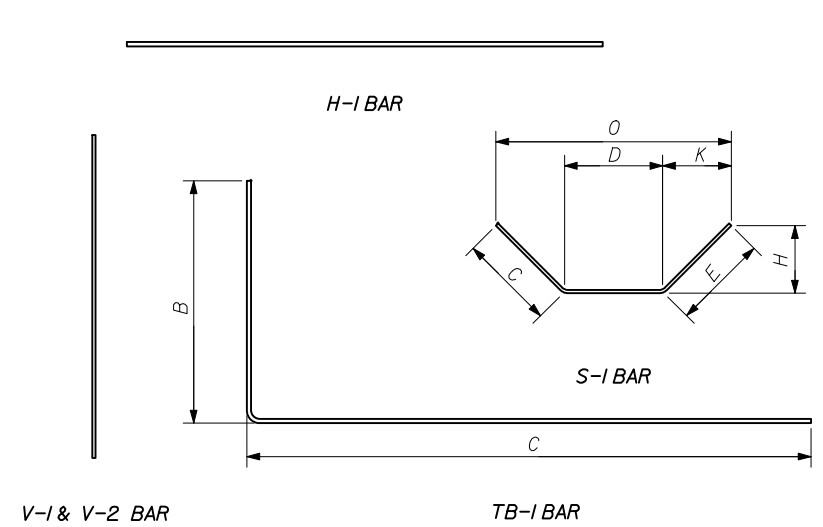


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FX: (904) 778-2992

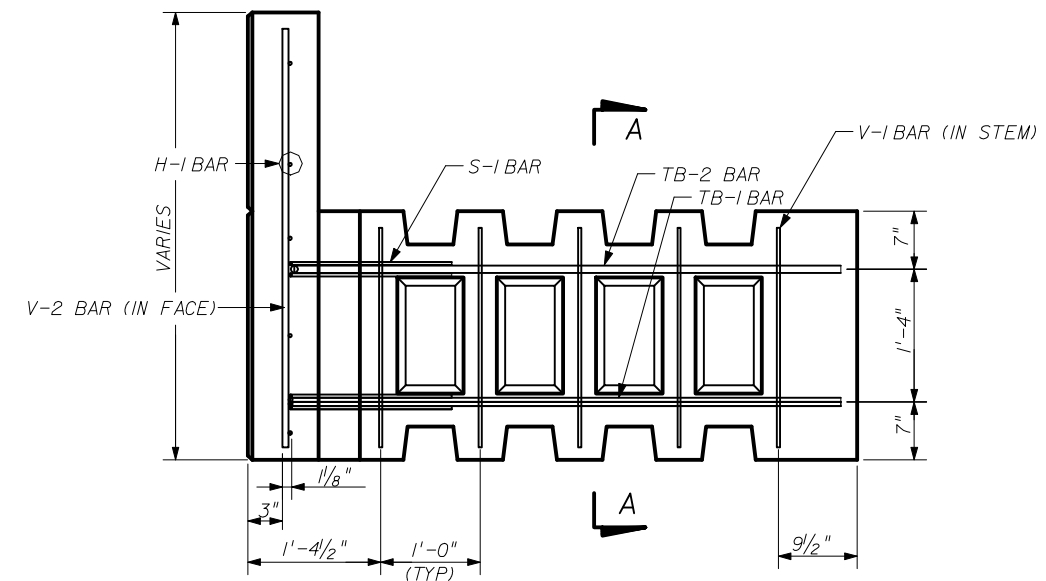
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)				
Names	Dates	Approved By		
Designed By	JMC	10/01/98	 State Structures Design Engineer	
Drawn By	CAA	10/01/98		
Checked By	JMC	10/01/98	Revision	Sheet No.
			00	13 of 20
				Index No.
				5010



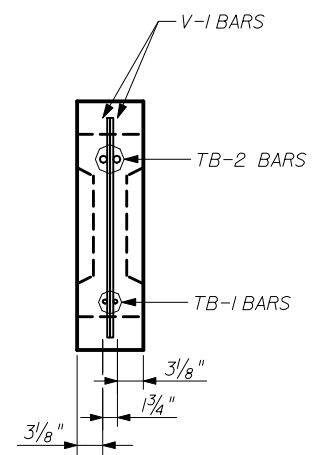


**FRONT VIEW**

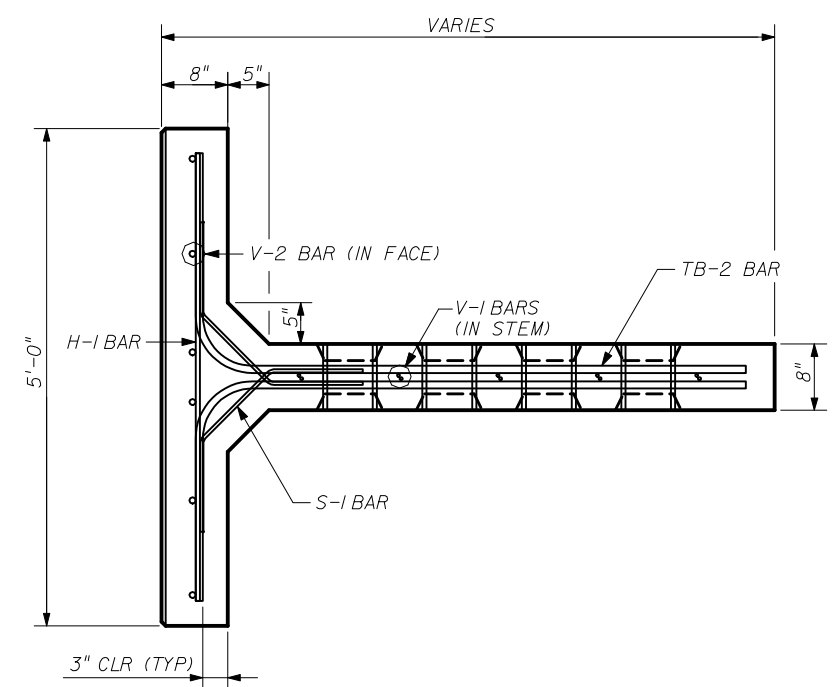
(V-1 BARS IN STEM OMITTED FOR CLARITY)



**SIDE VIEW**



**SECTION A-A**



**TOP VIEW**

**REINFORCING STEEL -TOP UNITS (II)**

REBAR SCHEDULE - 5.5 x 5.0 x 08 TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	6	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	5'-0"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 6.0 x 5.0 x 08 TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	5'-6"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 6.5 x 5.0 x 08 TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	6'-0"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 7.0 x 5.0 x 08 TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	8	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	6'-6"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

THESE UNITS WILL ONLY BE USED BY APPROVAL OF THE F.D.O.T. STRUCTURES DESIGN OFFICE ON A PROJECT BY PROJECT BASIS.

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3" MIN. CONCRETE COVER

**THE NEEL COMPANY**  
 8328-D TRAFORD LANE  
 SPRINGFIELD, VIRGINIA 22152  
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**OLDCASTLE PRECAST, INC**  
 11643 103rd STREET  
 JACKSONVILLE, FL 32210  
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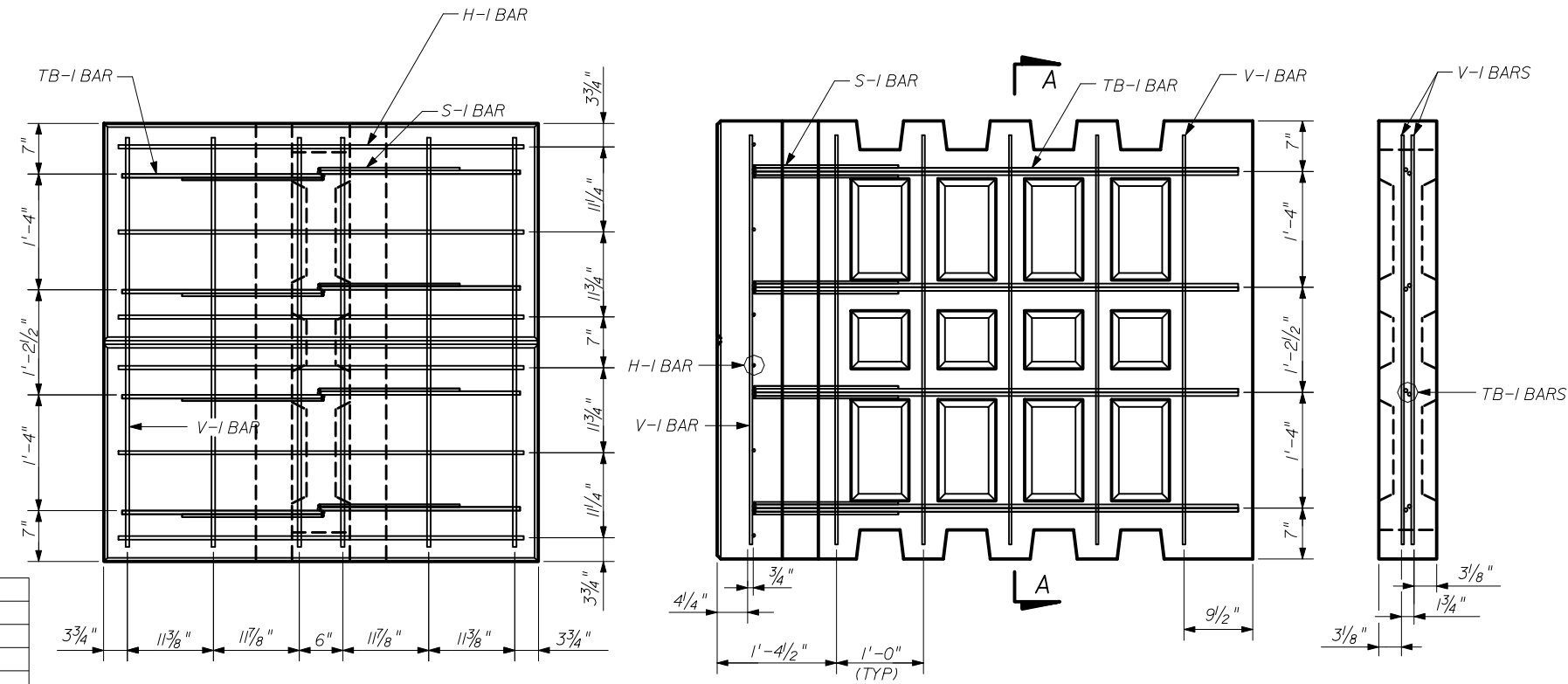
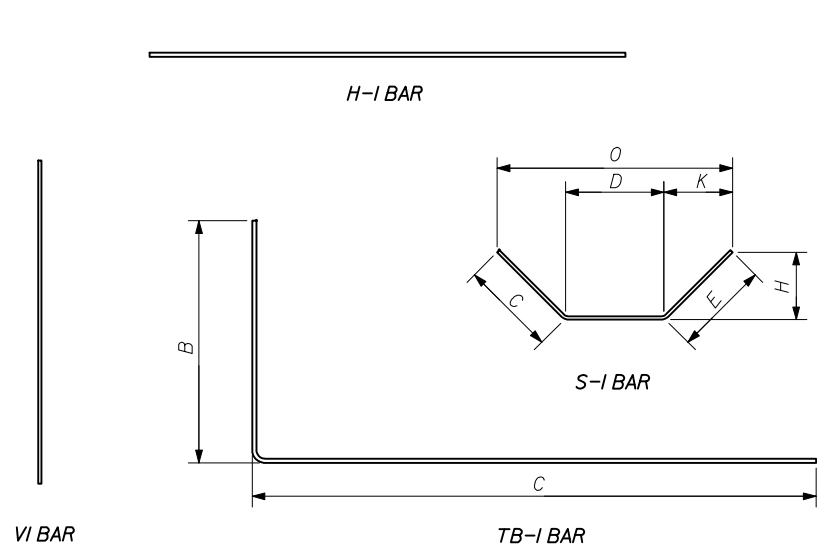
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
 THE NEEL COMPANY T-WALL  
 (3" COVER)**

Names	Dates	Approved By
Designed By: JMC	10/01/98	[Signature]
Drawn By: CAA	10/01/98	
Checked By: JMC	10/01/98	

Revision	Sheet No.	Index No.
00	15 of 20	5010





REBAR SCHEDULE - 5.0 x 5.0 x 04 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	12	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	5'-8 1/2"	2'-3 1/2"	3'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 06 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	16	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 08 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	20	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 10 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	24	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	11'-8 1/2"	2'-3 1/2"	9'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 12 DBL UNIT

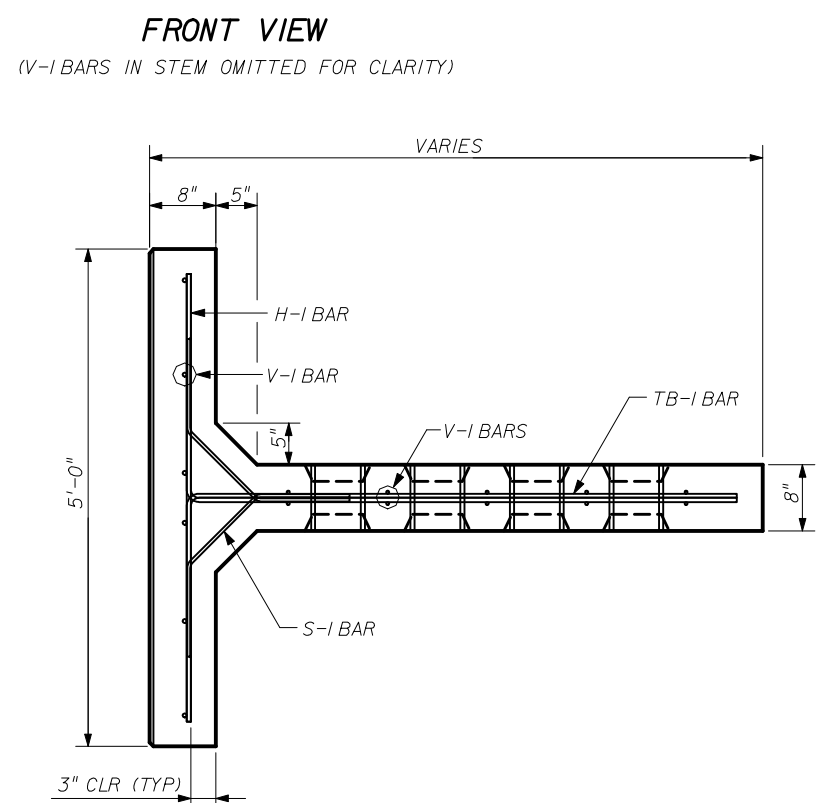
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H-I	6	4	-	4'-6"								-	
V-I	26	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	13'-8 1/2"	2'-3 1/2"	11'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 14 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	32	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	15'-8 1/2"	2'-3 1/2"	15'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 16 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	36	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	17'-8 1/2"	2'-3 1/2"	15'-6 1/2"						90	



TOP VIEW  
REINFORCING STEEL - DOUBLE UNITS

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3" MIN. CONCRETE COVER

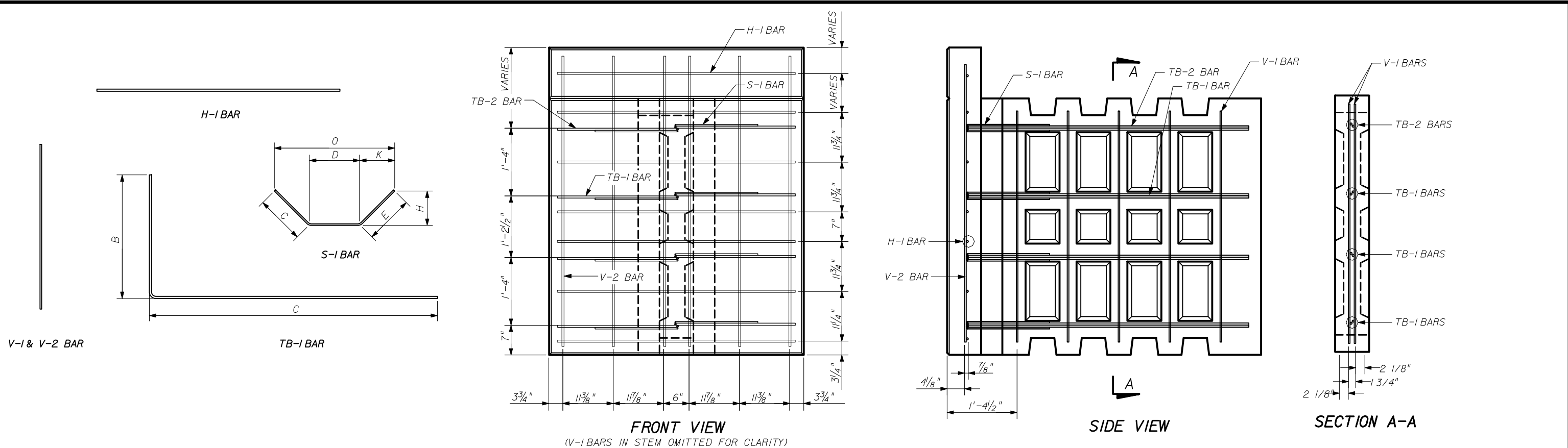
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
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**OLDCASTLE PRECAST, INC**  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
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FX: (904) 778-2992

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(3" COVER)**

Names	Dates	Approved By	
Designed By: JMC	10/01/98	[Signature]	
Drawn By: CAA	10/01/98		
Checked By: JMC	10/01/98		
Revision	00	Sheet No. 17 of 20	Index No. 5010



**FRONT VIEW**  
(V-I BARS IN STEM OMITTED FOR CLARITY)

**SIDE VIEW**

**SECTION A-A**

REBAR SCHEDULE - 5.5 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	6	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	5'-0"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 6.0 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	5'-6"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 6.5 x 5.0 x 06 DBL TOP UNIT

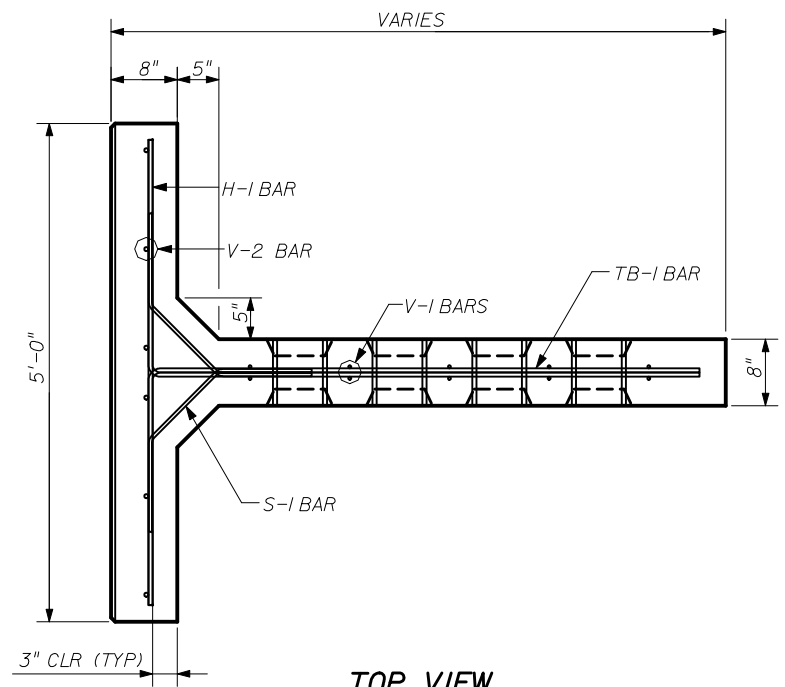
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	6'-0"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 7.0 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	8	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	6'-6"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 7.5 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	8	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	7'-0"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	



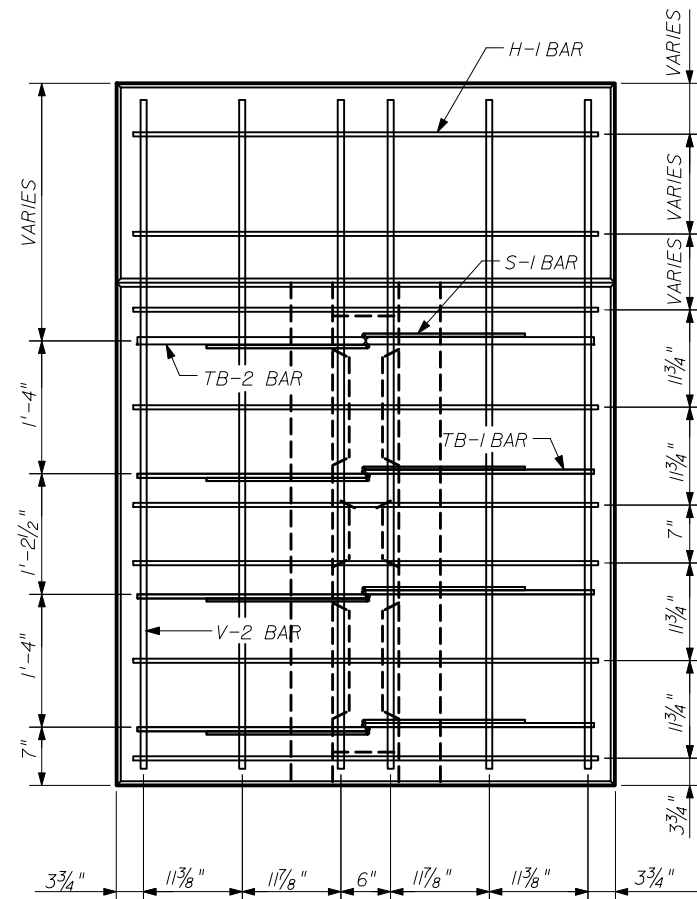
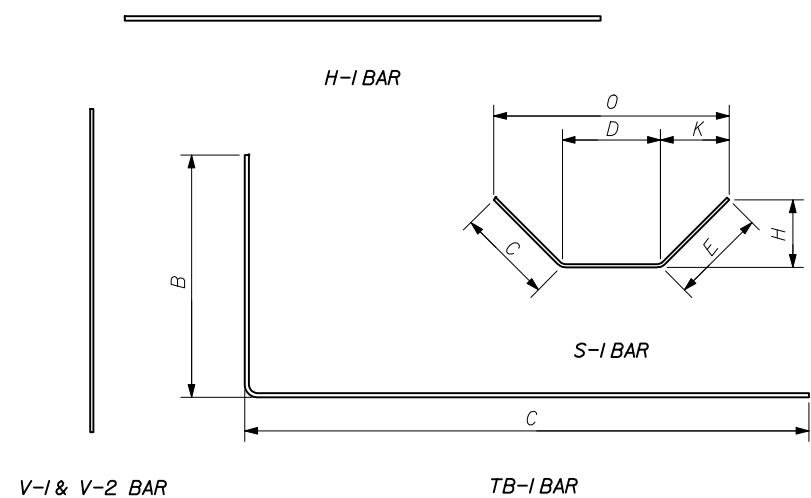
**TOP VIEW**  
**REINFORCING STEEL - DOUBLE TOP UNITS (I)**

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3" MIN. CONCRETE COVER

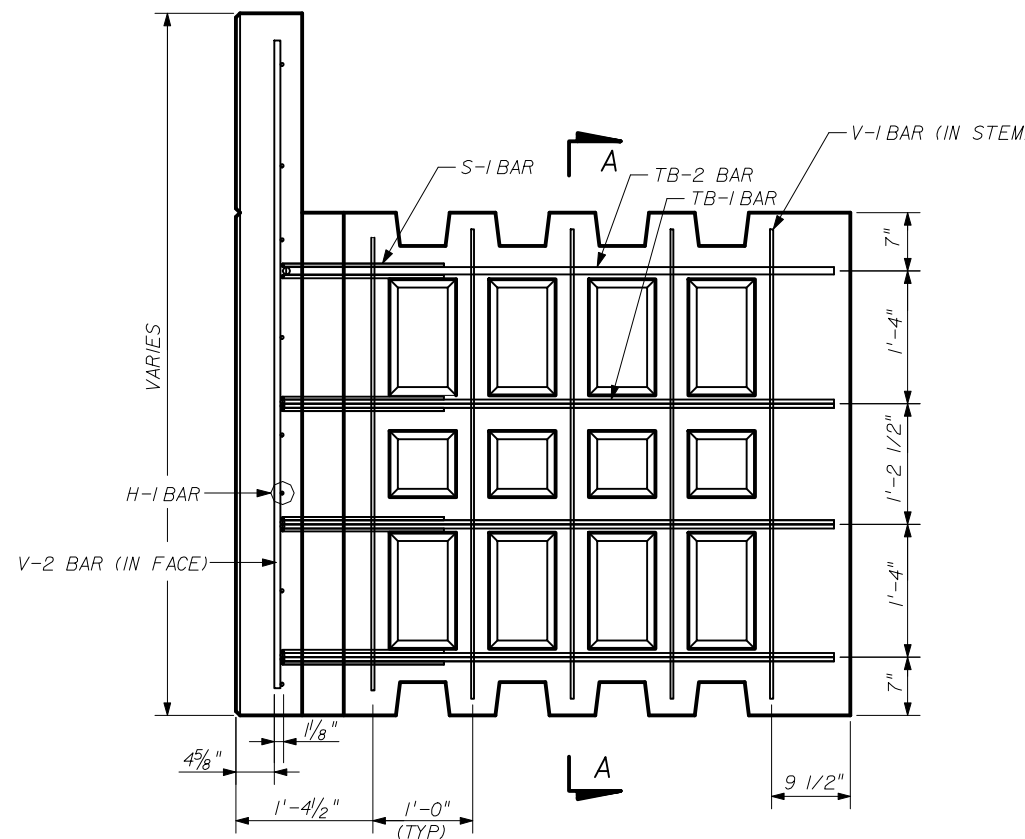
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
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**OLDCASTLE PRECAST, INC**  
11643 103RD STREET  
JACKSONVILLE, FL 32210  
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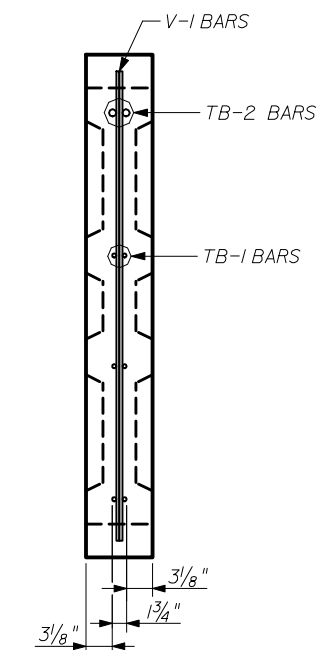
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No.
Checked By	JMC	10/01/98	00	18 of 20
				5010



FRONT VIEW  
(V-1 BARS IN OMITTED FOR CLARITY)



SIDE VIEW



SECTION A-A

REBAR SCHEDULE - 8.0 x 5.0 x 08 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	9	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	7'-6"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 8.5 x 5.0 x 08 DBL TOP UNIT

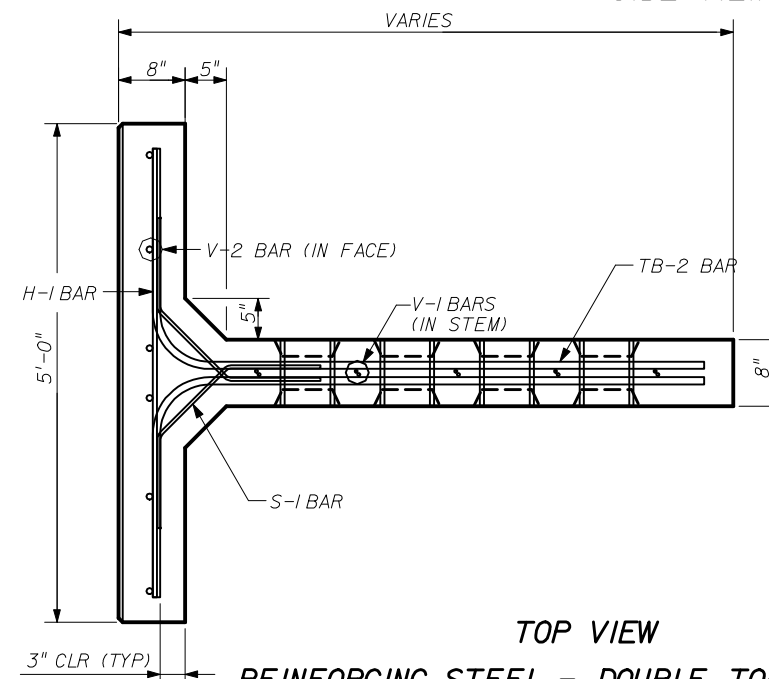
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	9	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	8'-0"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 9.0 x 5.0 x 08 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	10	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	8'-6"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 9.5 x 5.0 x 08 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	10	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	9'-0"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	



REINFORCING STEEL - DOUBLE TOP UNITS (II)

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3" MIN. CONCRETE COVER

THESE TWO UNITS WILL ONLY BE USED BY APPROVAL OF THE F.D.O.T. STRUCTURES DESIGN OFFICE ON A PROJECT BY PROJECT BASIS.



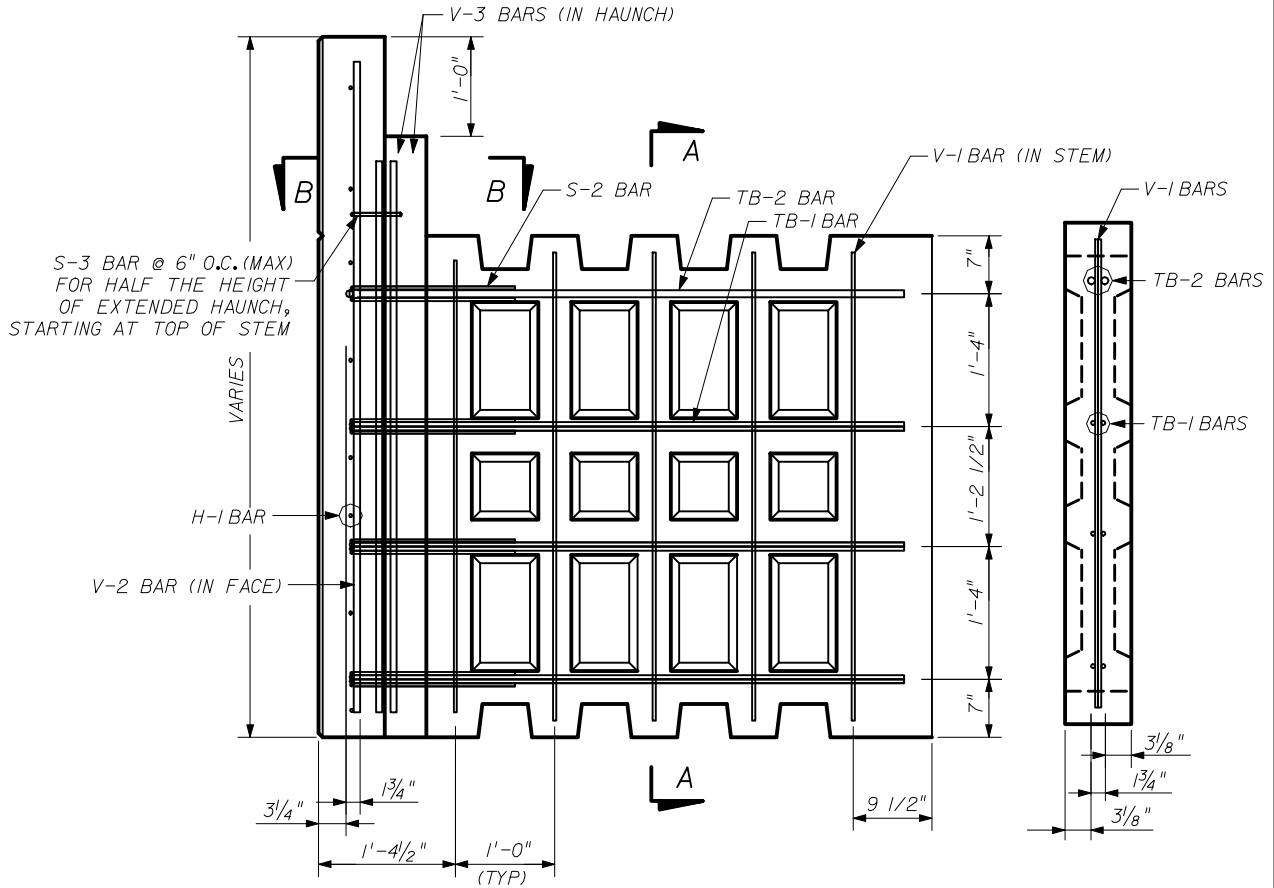
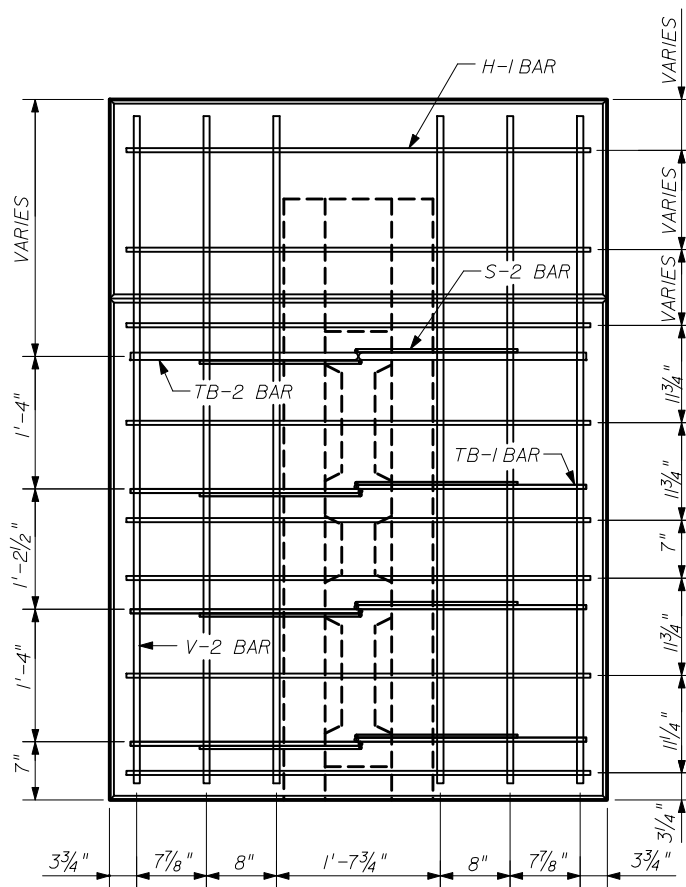
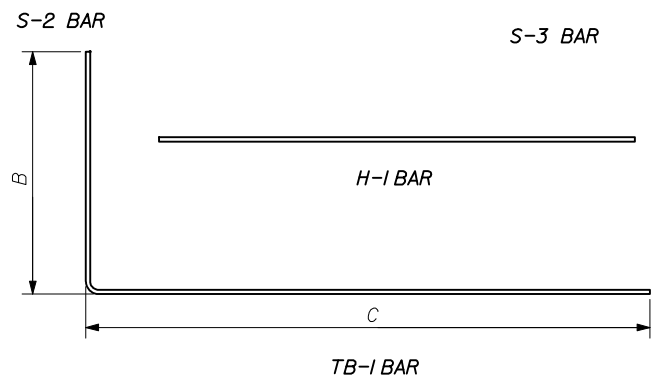
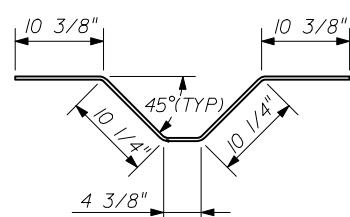
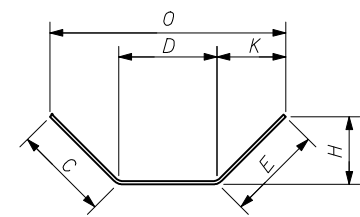
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
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**OLDCASTLE PRECAST, INC**  
11643 103RD STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(3" COVER)**

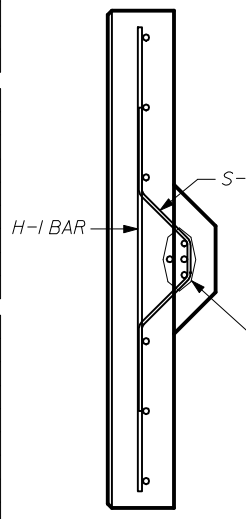
Names	Dates	Approved By	Revision	Sheet No.	Index No.
Designed By	JMC	10/01/98			
Drawn By	CAA	10/01/98			
Checked By	JMC	10/01/98	00	19 of 20	5010



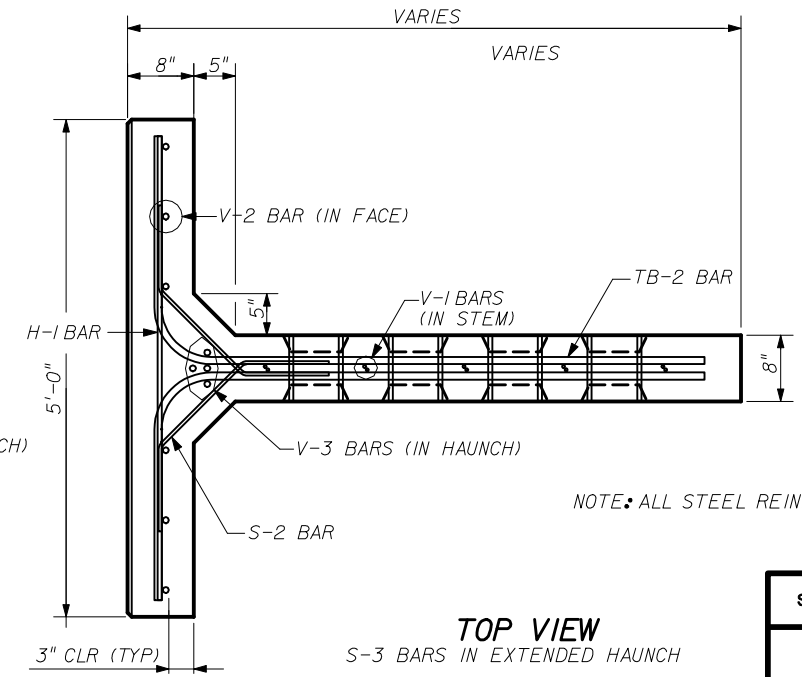
**FRONT VIEW**  
(V-1 BARS IN STEM AND V-3 BARS IN HAUNCH OMITTED FOR CLARITY)

**SIDE VIEW**

**SECTION A-A**



**SECTION B-B**



**TOP VIEW**  
S-3 BARS IN EXTENDED HAUNCH

**REINFORCING STEEL - DOUBLE TOP UNITS (III)**

1. ALL UNITS ON THIS SHEET WILL ONLY BE USED BY APPROVAL OF THE F.D.O.T. STRUCTURES DESIGN OFFICE ON A PROJECT BY PROJECT BASIS.

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 3" MIN. CONCRETE COVER

REBAR SCHEDULE - 10.0 x 5.0 x 10 DBL TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	11	4	-	4'-6"									
V-1	18	3	-	4'-6"									
V-2	6	6	-	9'-6"									
V-3	4	6	-	8'-6"									
S-2	8	3	3	2'-10"	10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45		
S-3	8	3	3	3'-3 5/8"									SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 7/8"						90	

REBAR SCHEDULE - 10.5 x 5.0 x 10 DBL TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	11	4	-	4'-6"									
V-1	18	3	-	4'-6"									
V-2	6	6	-	10'-0"									
V-3	4	6	-	9'-0"									
S-2	8	3	3	2'-10"	10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45		
S-3	9	3	3	3'-3 5/8"									SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 7/8"						90	

REBAR SCHEDULE - 11.0 x 5.0 x 10 DBL TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	12	4	-	4'-6"									
V-1	18	3	-	4'-6"									
V-2	6	6	-	10'-6"									
V-3	4	6	-	9'-6"									
S-2	8	3	3	2'-10"	10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45		
S-3	10	3	3	3'-3 5/8"									SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 7/8"						90	

REBAR SCHEDULE - 11.5 x 5.0 x 10 DBL TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	12	4	-	4'-6"									
V-1	18	3	-	4'-6"									
V-2	6	6	-	11'-0"									
V-3	4	6	-	10'-0"									
S-2	8	3	3	2'-10"	10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45		
S-3	11	3	3	3'-3 5/8"									SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 7/8"						90	

**THE NEEL COMPANY**  
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**OLDCASTLE PRECAST, INC.**  
11643 103RD STREET  
JACKSONVILLE, FL 32210  
Ph: (904) 778-2990  
Fx: (904) 778-2992

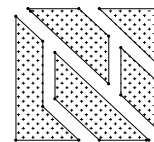
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (3" COVER)					
Names	Dates	Approved By			
Designed By	JMC	10/01/98	State Structures Design Engineer		
Drawn By	CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By	JMC	10/01/98	00	20 of 20	5010



# STANDARD DETAILS FOR 2" CONCRETE COVER

## T-WALL® RETAINING WALL SYSTEM

### DESIGNER



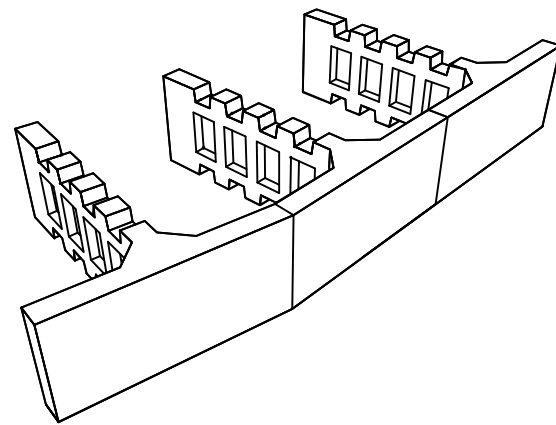
#### THE NEEL COMPANY

8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

### PRECASTER

#### OLDCASTLE PRECAST, INC.

11643 103rd STREET  
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FX: (904) 778-2992



#### MISCELLANEOUS NOTES:

- DESIGNER:  
THE NEEL COMPANY  
8328-D TRAFORD LANE  
SPRINGFIELD, VA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859
- PRECASTER:  
OLDCASTLE PRECAST INC.  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992
- MATERIALS SUPPLIED BY PRECASTER:  
-PRECAST T-WALL UNITS  
-PRECAST SHEAR KEYS  
-HORIZONTAL JOINT MATERIAL  
-VERTICAL JOINT MATERIAL AND ADHESIVE  
-SHEAR KEY JOINT MATERIAL

#### DESIGN NOTES:

- DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE RETAINING WALL VOLUME, METHODS OF CONSTRUCTION, AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO SPEC SECTION 548 - RETAINING WALL SYSTEMS.
- SOIL PARAMETERS:  
-SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUE OF  $\phi$ ,  $c$  AND  $\gamma$  SHALL BE PROVIDED IN THE SHOP DRAWINGS
- FACTORS OF SAFETY:  
-OVERTURNING - 2.0  
-SLIDING - 1.5  
-INTERNAL PULLOUT - 1.5  
-BEARING CAPACITY - 2.5  
-OVERALL STABILITY - 1.5
- THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE NEEL COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF OTHERS.
- PANELS WITH CANTILEVERED (EXTENDED) FACE SHALL ONLY BE USED TO AVOID OBSTRUCTIONS AS APPROVED ON THE SHOP DRAWINGS.

#### MATERIALS NOTES:

- PRECAST CONCRETE:  
-PRECAST T-WALL UNITS - PER SPEC SECTION 548  
-PRECAST SHEAR KEYS - PER SPEC SECTION 548
- C.I.P. CONCRETE:  
-C.I.P. LEVELING PAD - PER SPEC SECTION 548  
-OTHER C.I.P. CONCRETE - PER SPEC SECTION 548
- REINFORCING STEEL:  
-PER SPEC SECTION 548
- JOINT MATERIAL:  
-HORIZONTAL JOINT FILLER:  
-1/2" x 4" x 5'-0"  
-PREFORMED EPDM  
-DUROMETER: 80 - 90  
-VERTICAL JOINT COVER:  
-TENSAR DC4205 OR EQUAL  
-12" WIDE x HEIGHT OF JOINT  
-GEOCOMPOSITE MEETING REQUIREMENTS OF SPEC SECTION 548  
-SHEAR KEY WRAP:  
-1/4" x 8" x 24"  
-AVI ASTRO-FOAM AF-250
- BACKFILL:  
-PER SPEC SECTION 548

#### CONSTRUCTION NOTES:

- ALL CONSTRUCTION PROCEDURES SHALL COMPLY WITH SPEC SECTION 548 AND THE "T-WALL CONSTRUCTION MANUAL" (PROVIDED BY THE NEEL COMPANY OR OLDCASTLE PRECAST, INC). IN THE EVENT OF A DISCREPANCY BETWEEN THE SPEC AND THE "T-WALL CONSTRUCTION MANUAL", THE SPEC SHALL CONTROL.
- FOR LOCATION AND ALIGNMENT OF T-WALL STRUCTURE, SEE RETAINING WALL CONTROL PLANS.
- T-WALL STRUCTURES ON CURVES SHALL BE BUILT IN CHORDS AS SHOWN IN THE T-WALL DESIGN DRAWINGS.
- IF MANHOLES OR DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN IN THE T-WALL DESIGN DRAWINGS.
- IF PILES ARE LOCATED WITHIN THE RETAINING WALL VOLUME, THEY SHALL BE DRIVEN BEFORE CONSTRUCTION OF THE T-WALL STRUCTURE.
- T-WALL UNITS SHALL BE PLACED ONE ROW AT A TIME, AND BACKFILLED BEFORE PLACEMENT OF THE NEXT ROW.
- IF A STRUCTURE EXCEEDS 20' IN HEIGHT, THE FINISH GRADE AT THE FACE OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS 20' IN HEIGHT.
- THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING STORM WATER DRAINAGE IN THE VICINITY OF THE WALL DURING CONSTRUCTION. STORMWATER RUNOFF SHALL BE COLLECTED AND DISCHARGED AWAY FROM THE WALL AND THE RETAINING WALL VOLUME.

#### DESIGNER:



THE NEEL COMPANY  
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#### PRECASTER:

OLDCASTLE PRECAST, INC.  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

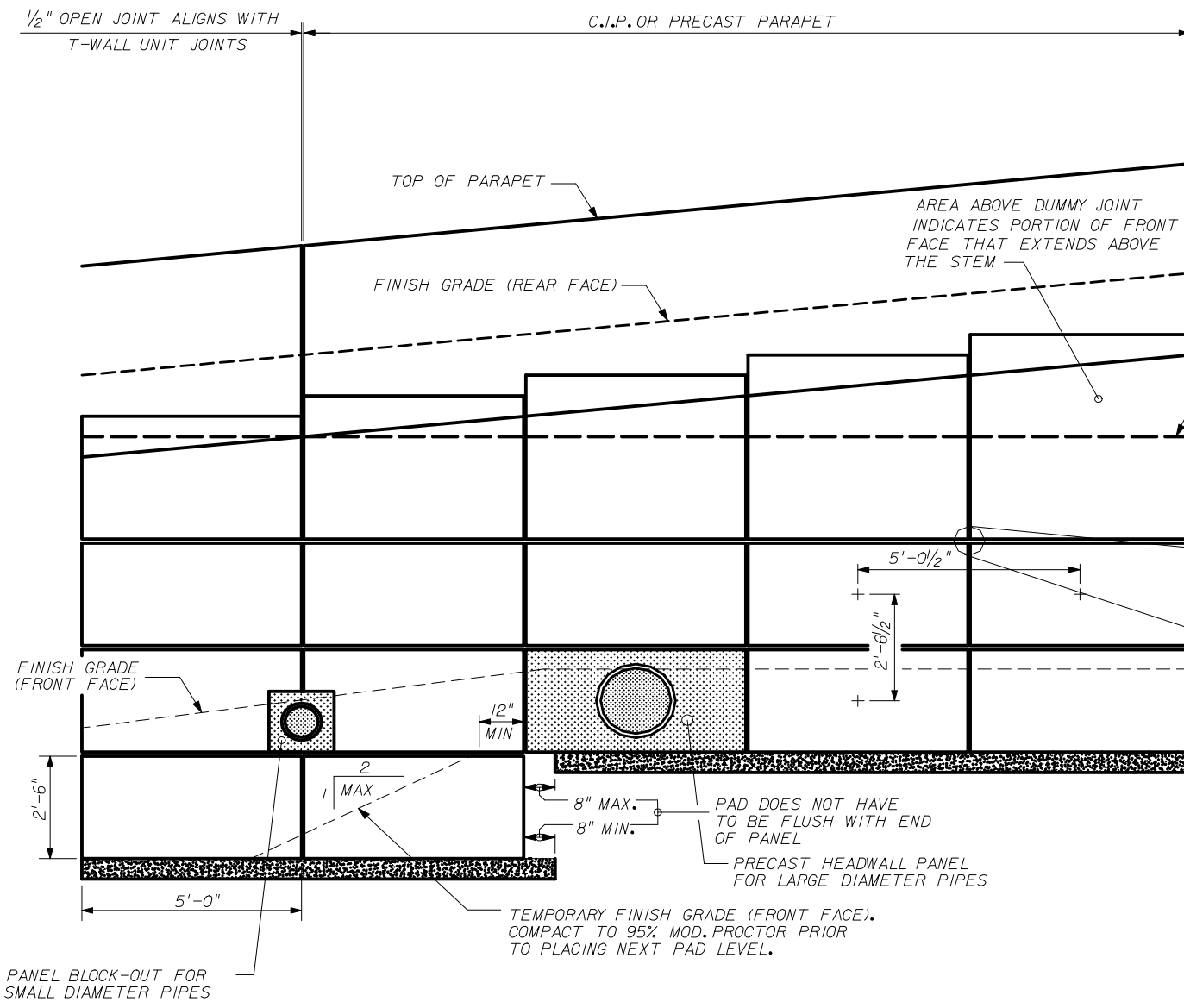
THIS SYSTEM SHALL BE USED IN MODERATELY OR SLIGHTLY AGGRESSIVE ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

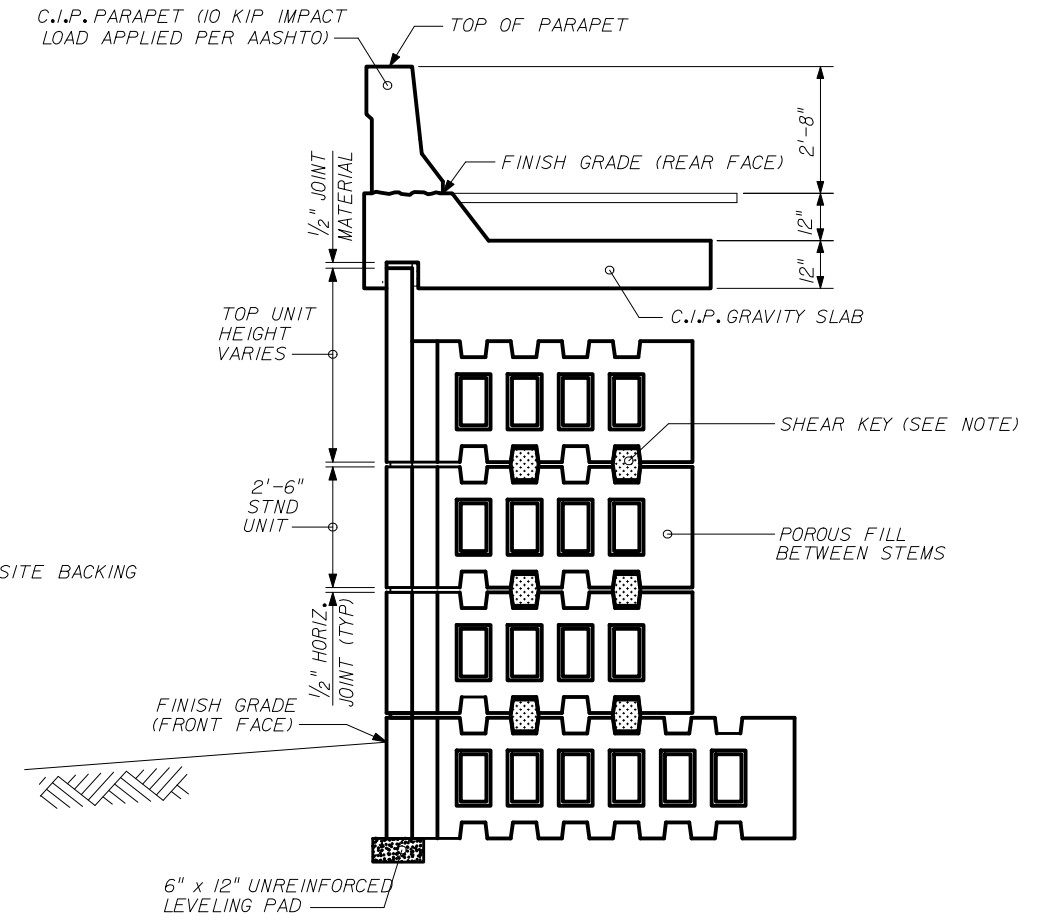
### RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)

Names	Dates	Approved By		
Designed By	..JMC..	10/01/98	 State Structures Design Engineer	
Drawn By	..CBA..	10/01/98		
Checked By	..JMC..	10/01/98		
Revision		Sheet No.	Index No.	
00		1 of 21	5011	

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



**PART ELEVATION SHOWING TYPICAL DETAILS**  
(NO SCALE)



**SECTION SHOWING TYPICAL DETAILS**  
(NOT ALL DETAILS APPLY TO EACH WALL)

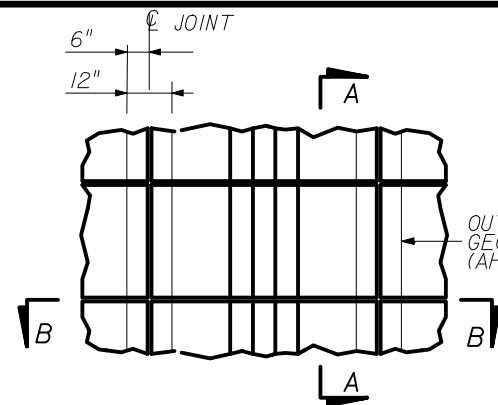
NOTE: ALL EXTENDED FACE TOP UNITS REQUIRE A MINIMUM OF TWO SHEAR KEYS. ALL OTHER UNITS ARE AS SHOWN BELOW.

- TOP UNITS - 2 SHEAR KEYS
- 6' STEM - 2 SHEAR KEYS
- 8' STEM - 2 SHEAR KEYS
- 10' STEM - 2 SHEAR KEYS
- 12' STEM - 2 SHEAR KEYS
- 14' STEM - 3 SHEAR KEYS
- 16' STEM - 3 SHEAR KEYS

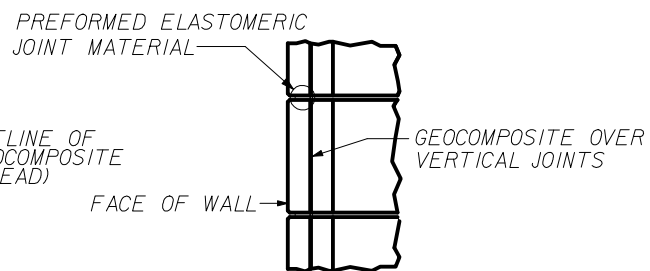
DESIGNER:  
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: 1703 913-7858  
FX: 1703 913-7859

PRECASTER:  
**OLDCASTLE PRECAST, INC**  
11643 103RD STREET  
JACKSONVILLE, FL 32210  
PH: 1904 778-2990  
FX: 1904 778-2992

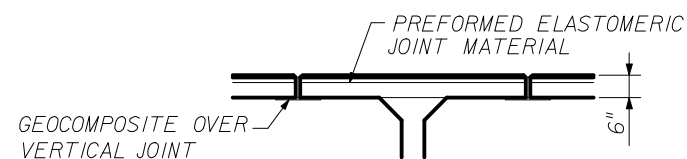
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)</b>				
	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No. Index No.
Checked By	JMC	10/01/98	00	2 of 21 5011



PART ELEVATION - REAR FACE



PART SECTION A-A

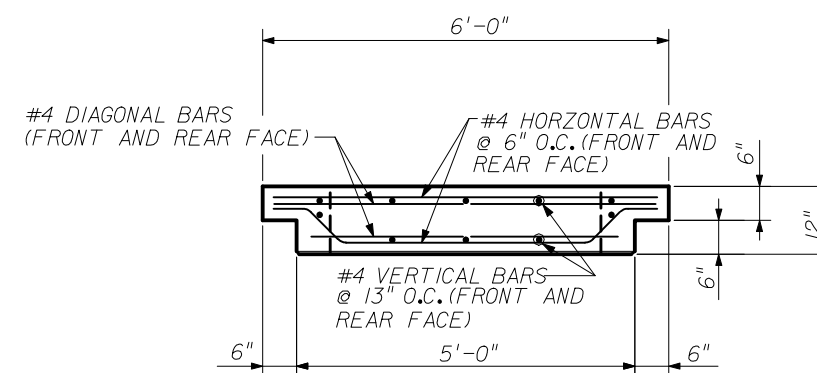
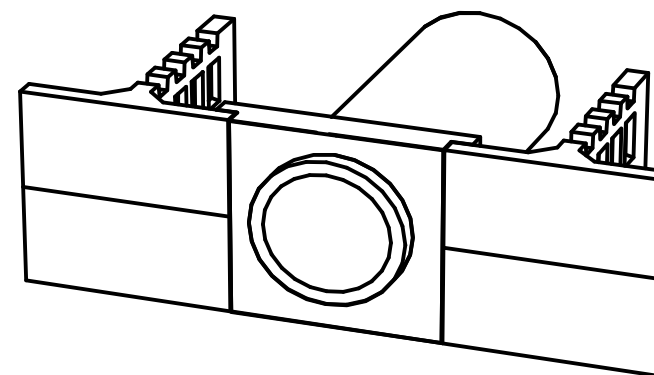


PART SECTION B-B

JOINT MATERIAL DETAILS

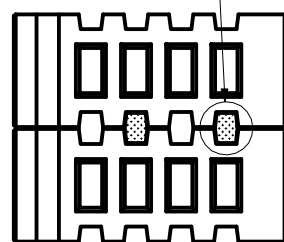
NOTES:

1. HORIZONTAL JOINT:  
1/2" x 4" x 5'-0" PREFORMED ELASTOMERIC JOINT MATERIAL
2. VERTICAL JOINT:  
1/2" SPACE  
12" WIDE GEOCOMPOSITE BACKING, CENTERED ABOUT JOINT CENTERLINE.



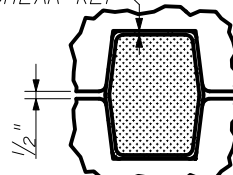
PLAN

SHEAR KEY WRAPPED IN JOINT MATERIAL. SEE DETAILS THIS SHEET.

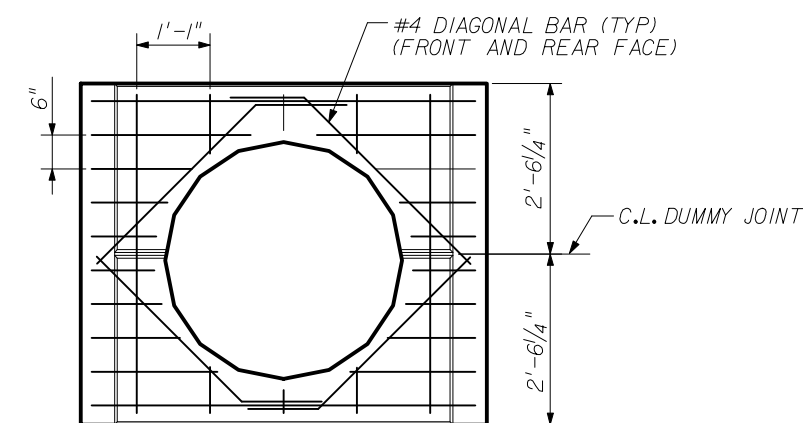


PART SECTION

1/4" JOINT MATERIAL ALL AROUND SHEAR KEY



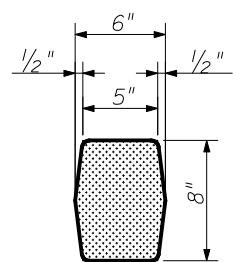
SHEAR KEY / JOINT MATERIAL ARRANGEMENT



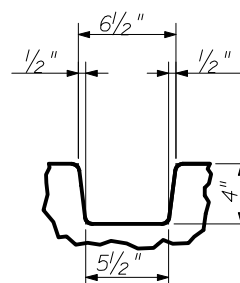
ELEVATION (FRONT FACE)  
PRECAST HEADWALL PANEL FOR LARGE DIAMETER PIPES

NOTES:

1. SHEAR KEY JOINT MATERIAL:  
MINIMUM OF ONE 1/4" x 8" x 24" PIECE OF AVI ASTRO-FOAM AF-250 PER SHEAR KEY.
2. JOINT MATERIAL MAY BE ADDED OR REMOVED TO AID IN SHIMMING AND ALIGNING, HOWEVER SHEAR KEY MUST FIT SNUG IN THE SHEAR KEY BLOCKOUT WHEN UNIT IS IN ITS FINAL POSITION.
3. MINIMUM OF 2 SHEAR KEYS REQUIRED PER UNIT. SEE NOTES ON SHEET 2 OF 21, 'TYPICAL DETAILS (1)'.



SHEAR KEY DIMENSIONS



SHEAR KEY BLOCKOUT DIM'S

SHEAR KEY DETAILS

DESIGNER:



THE NEEL COMPANY  
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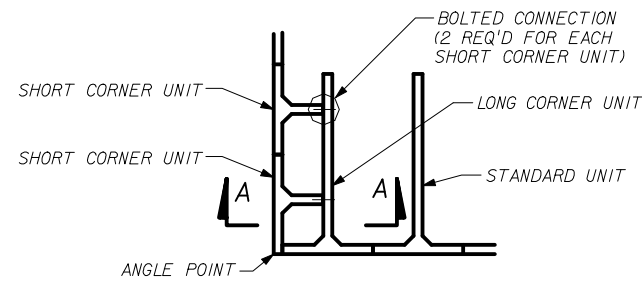
PRECASTER:

OLDCASTLE PRECAST, INC  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

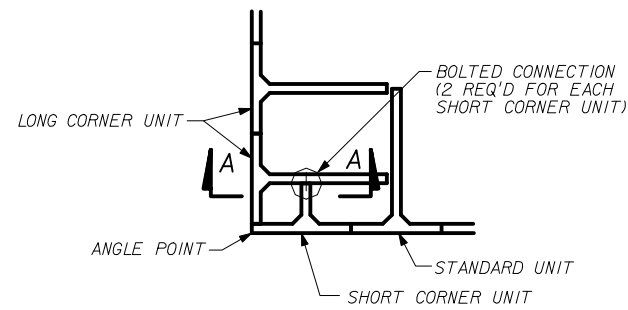
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(2" COVER)

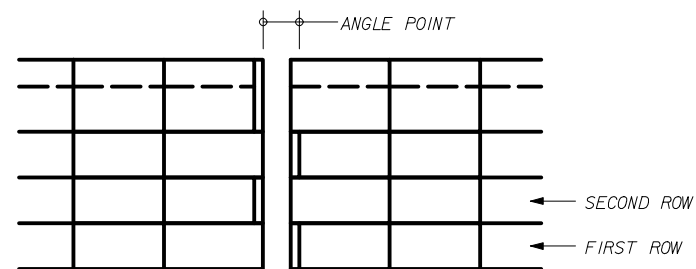
Names	Dates	Approved By				
Designed By	JMC	10/01/98	 State Structures Design Engineer			
Drawn By	CAA	10/01/98				
Checked By	JMC	10/01/98			Revision	Sheet No.
					00	3 of 21
				Index No.		
				5011		



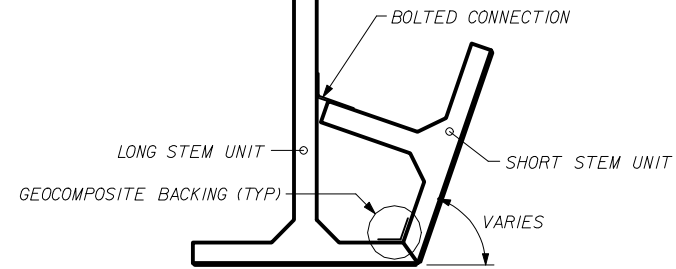
PART PLAN - FIRST ROW



PART PLAN - SECOND ROW

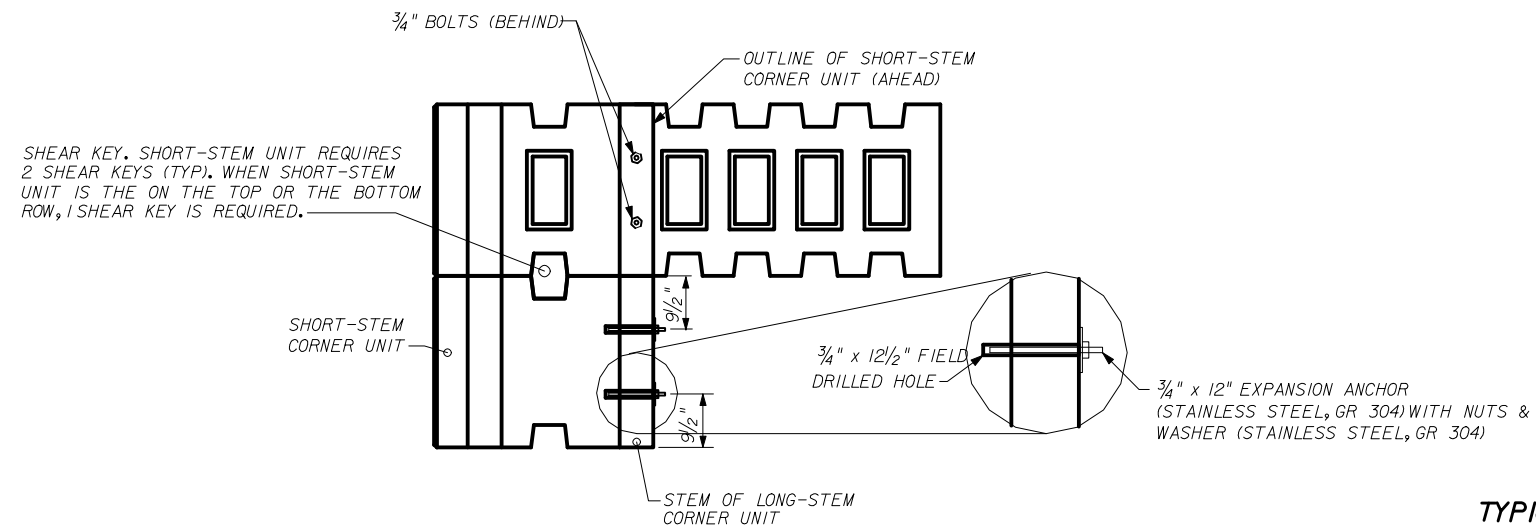


PART ELEVATION



PART PLAN - ANGLE > 90°

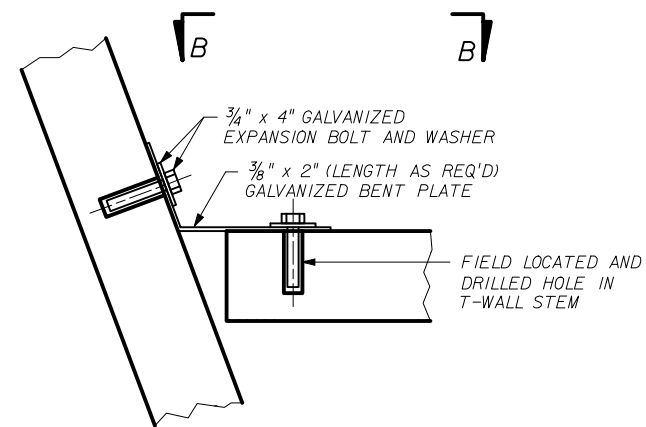
SHORT AND LONG STEMS ALTERNATE PER 90° CORNER DETAIL



SECTION A-A

TYPICAL CORNER UNIT ARRANGEMENT

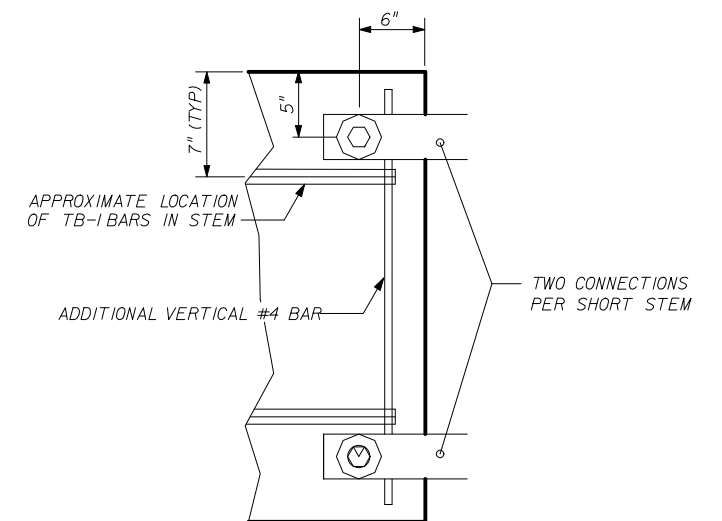
STEM LENGTHS VARY - SEE SPECIFIC ELEVATIONS FOR PROPER UNITS  
NO SCALE



TYPICAL BOLTED CONNECTION FOR ANGLE POINTS > 90°

TYPICAL ANGLE POINT DETAIL

NO SCALE




VIEW B-B

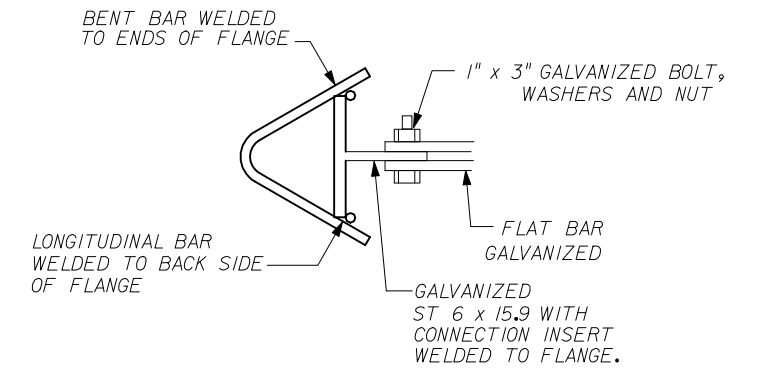
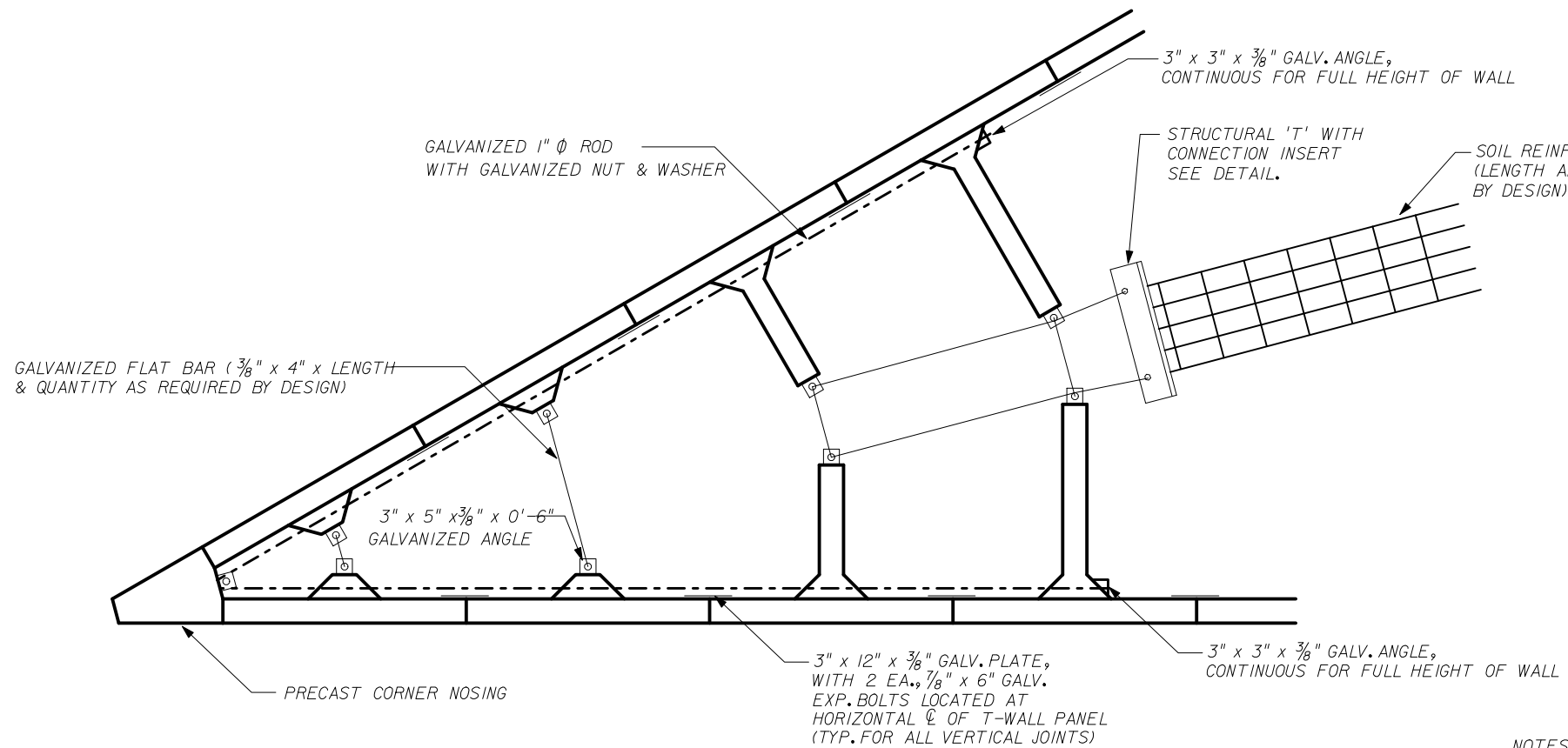
DESIGNER:  
 THE NEEL COMPANY  
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SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
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PRECASTER:  
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JACKSONVILLE, FL 32210  
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

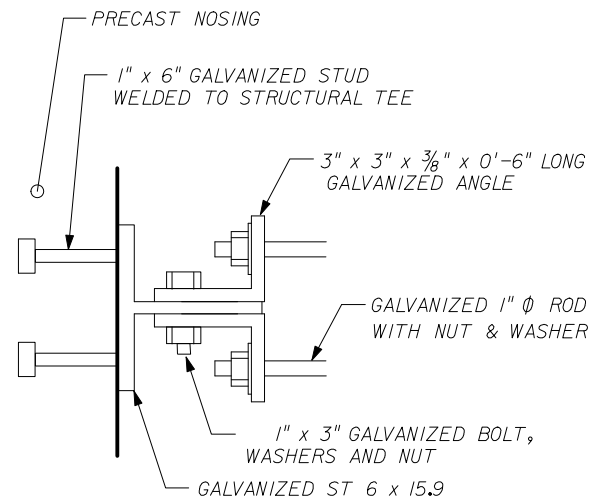
RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(2" COVER)

Names	Dates	Approved By 		
Designed By JMC	10/01/98	State Structures Design Engineer		
Drawn By CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By JMC	10/01/98	00	4 of 21	5011



SOIL GRID CONNECTION DETAIL  
SEVERE ACUTE CORNERS

PART PLAN  
SEVERE ACUTE ANGLE DETAIL  
ANGLE 45° OR LESS



ROD/NOSING CONNECTION DETAIL


NOTES:

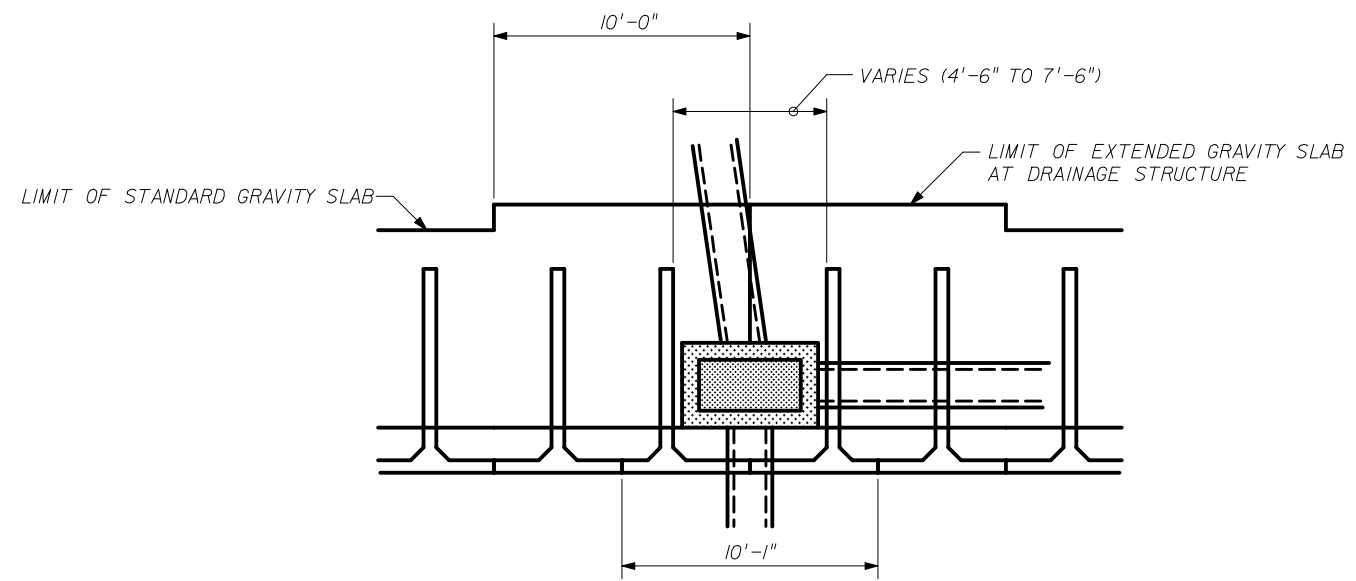
1. SOIL GRID TO BE DESIGNED FOR PULLOUT & TENSION. QUANTITY AND LENGTH OF GRIDS TO BE AS REQUIRED BY DESIGN.
2. CONNECTION INSERT:
  - PER SPEC SECTION 548
  - WIIWIRE
  - WELDED PER ASTM A185 PRIOR TO GALVANIZATION
3. LOCKING BAR:
  - PER SPEC SECTION 548
4. SOIL REINFORCEMENT GRIDS:
  - PER SPEC SECTION 548
  - WIIWELDED WIRE GRIDS:
    - 5 LONGITUDINAL WIRES @ 6" O.C., LENGTH AS REQUIRED BY DESIGN
    - 24" LONG TRANSVERSE BARS AT 6" OR 12" O.C., AS REQUIRED BY DESIGN
  - SOIL GRID LENGTHS SHOWN ON T-WALL DESIGN DRAWINGS ARE NOMINAL LENGTHS AS REQUIRED BY DESIGN CALCULATIONS. DUE TO MANUFACTURING TOLERANCES, ACTUAL GRID LENGTHS MAY BE LONGER.

DESIGNER:  

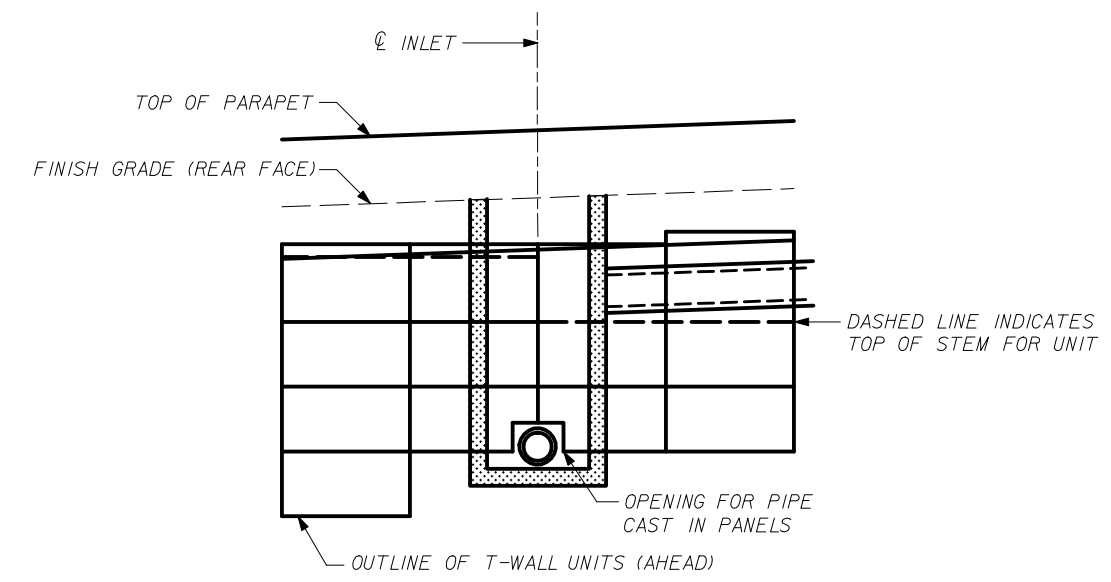
**THE NEEL COMPANY**  
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PRECASTER:  
**OLDCASTLE PRECAST, INC**  
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 JACKSONVILLE, FL 32210  
 Ph: (904) 778-2990  
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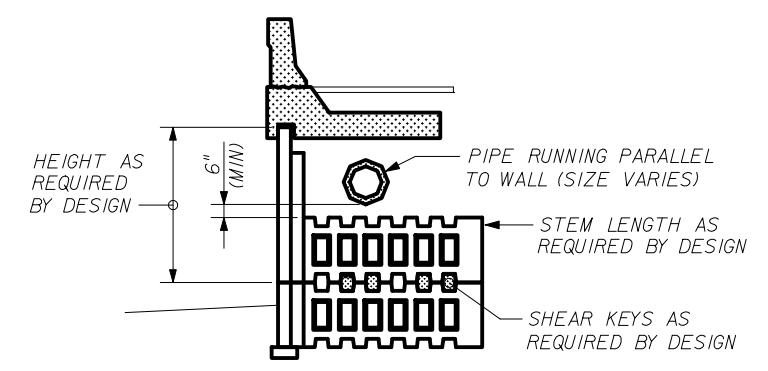
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)				
Names	Dates	Approved By 		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No. Index No.
Checked By	JMC	10/01/98	00	5 of 21 5011



PART PLAN



PART ELEVATION (FRONT FACE)



SECTION  
(SHOWING PIPE PARALLEL TO WALL)


DESIGNER:  

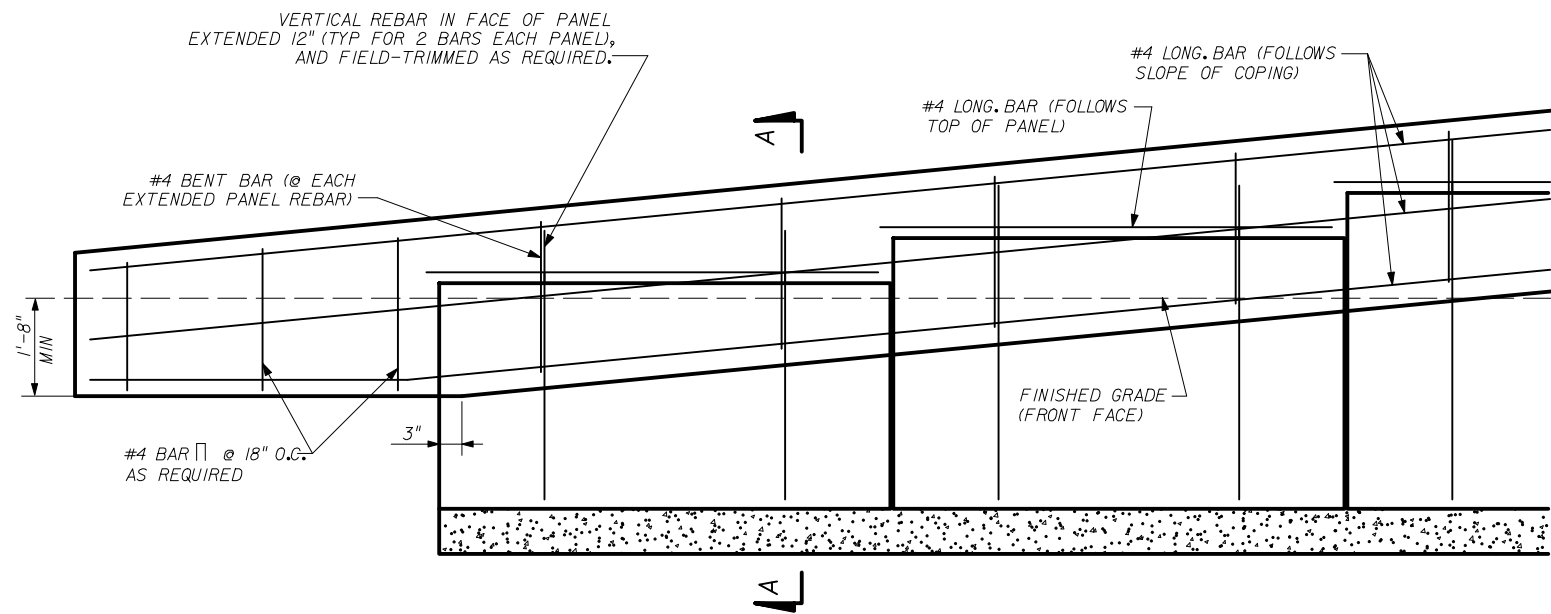
**THE NEEL COMPANY**  
 8328-D TRAFORD LANE  
 SPRINGFIELD, VIRGINIA 22152  
 PH: (703) 913-7858  
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PRECASTER:  
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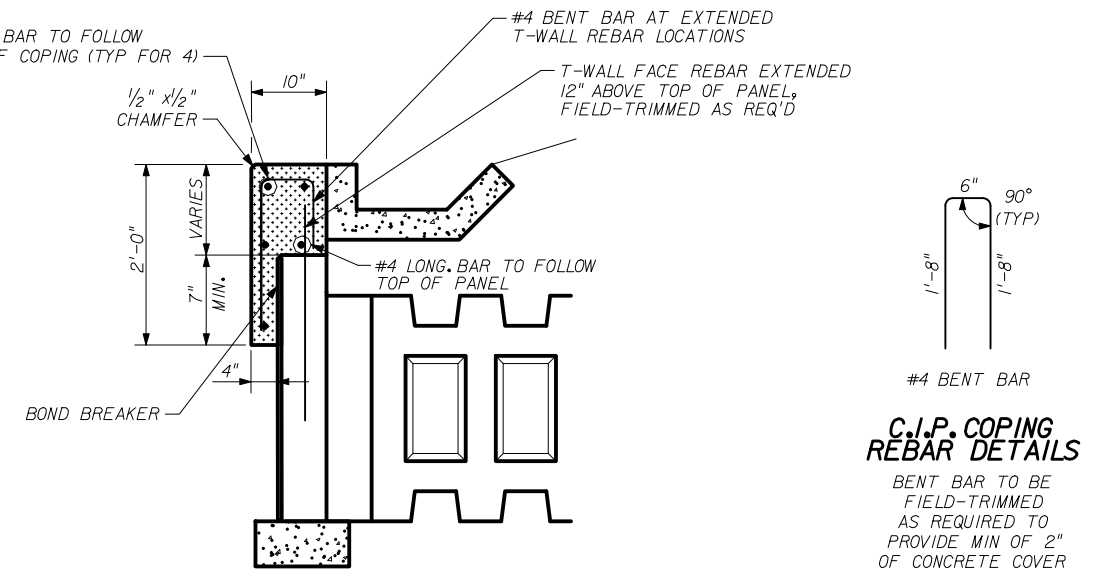
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
 THE NEEL COMPANY T-WALL  
 (2" COVER)**

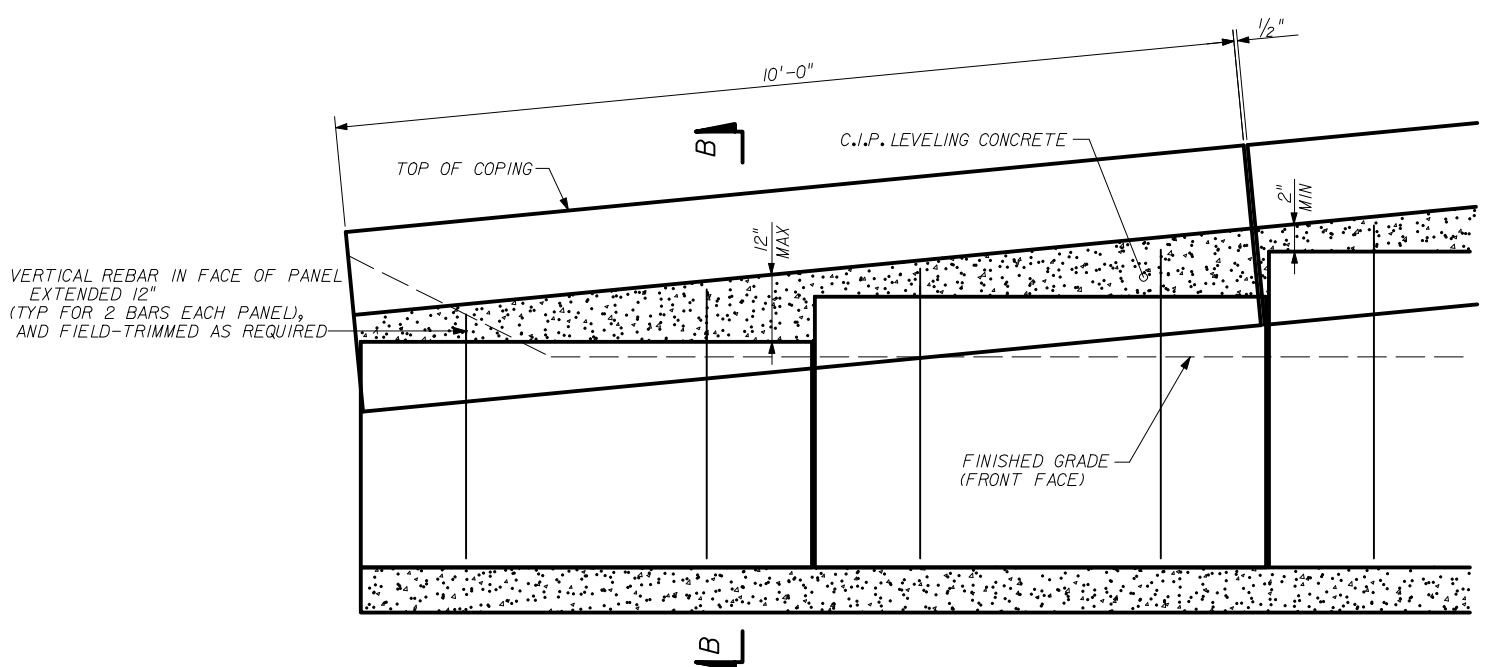
Names		Dates		Approved By 		
Designed By	JMC	10/01/98	State Structures Design Engineer			
Drawn By	CAA	10/01/98	Revision	Sheet No.	Index No.	
Checked By	JMC	10/01/98	00	6 of 21	5011	



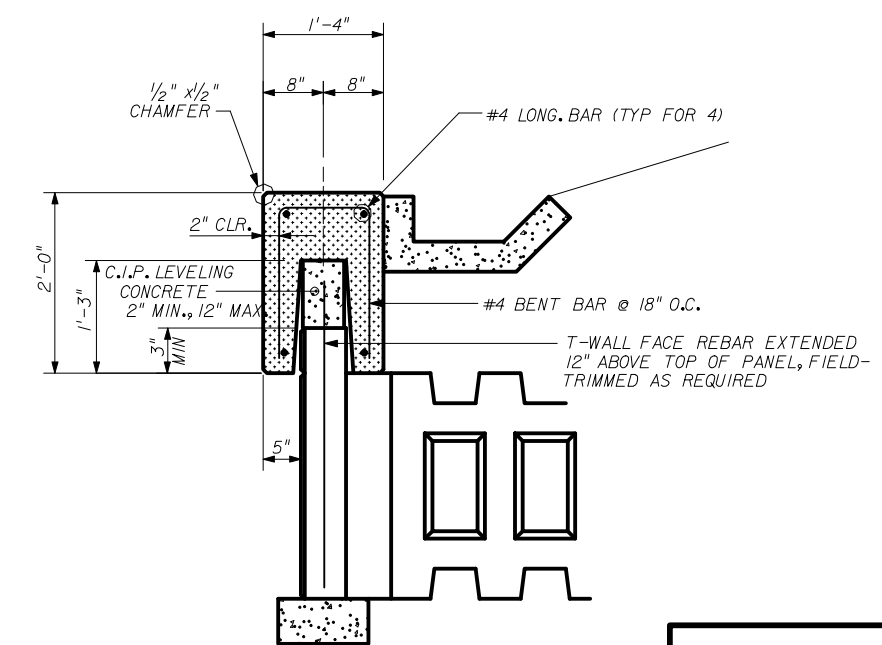
C.I.P. COPING TREATMENT AT BEGINNING/END OF WALLS



SECTION A-A  
C.I.P. COPING

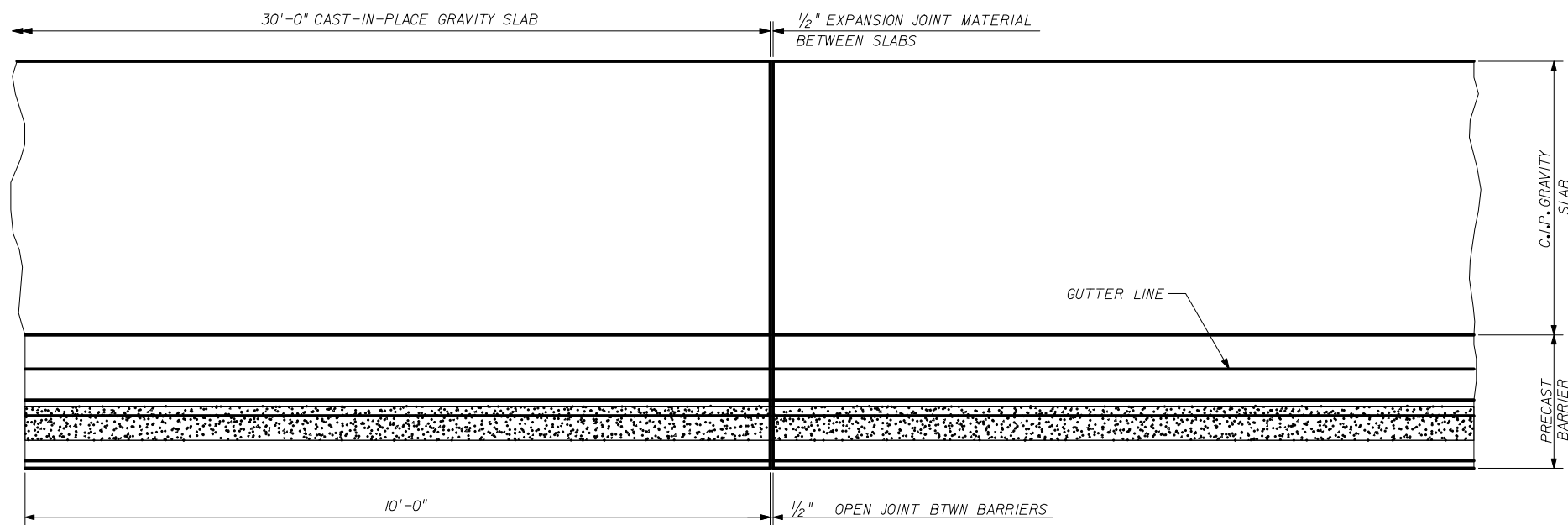


PRECAST COPING - PART ELEVATION

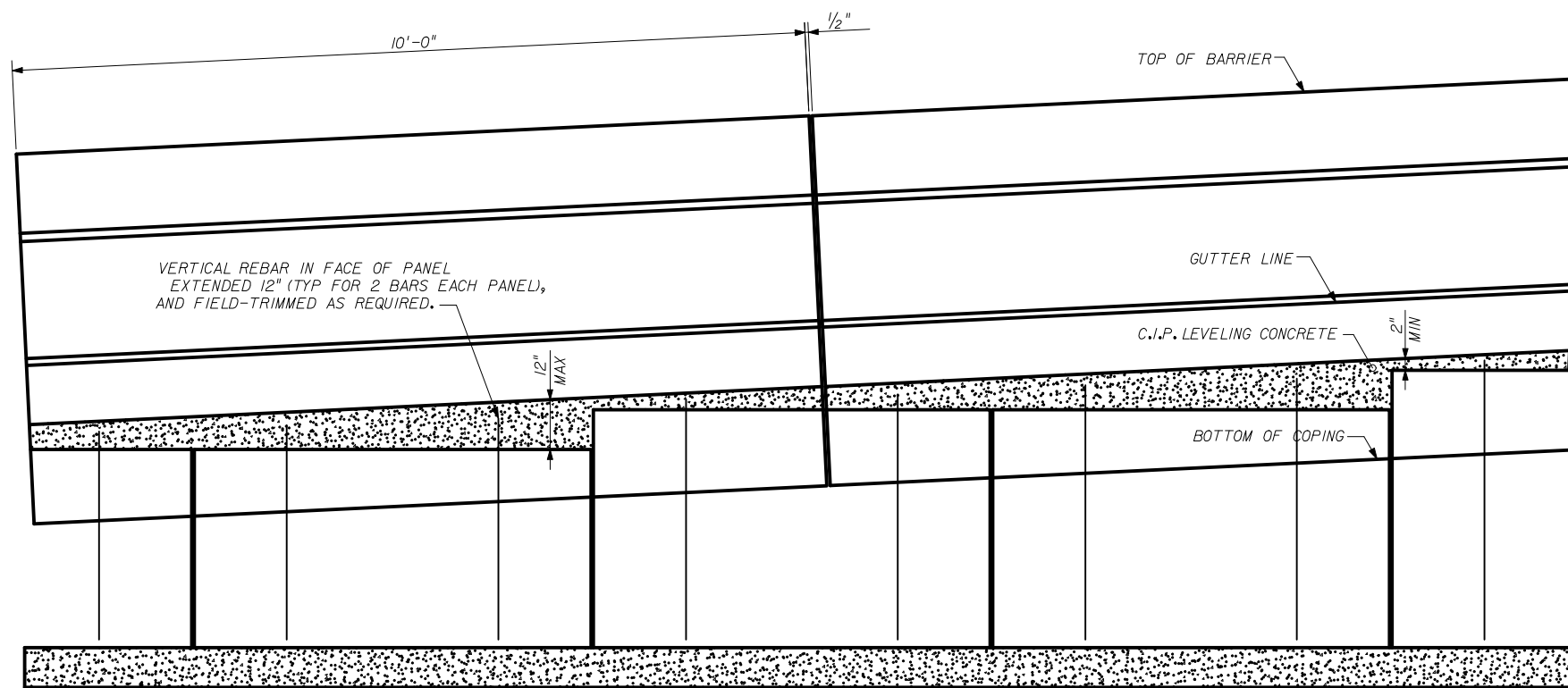


SECTION B-B  
PRECAST COPING

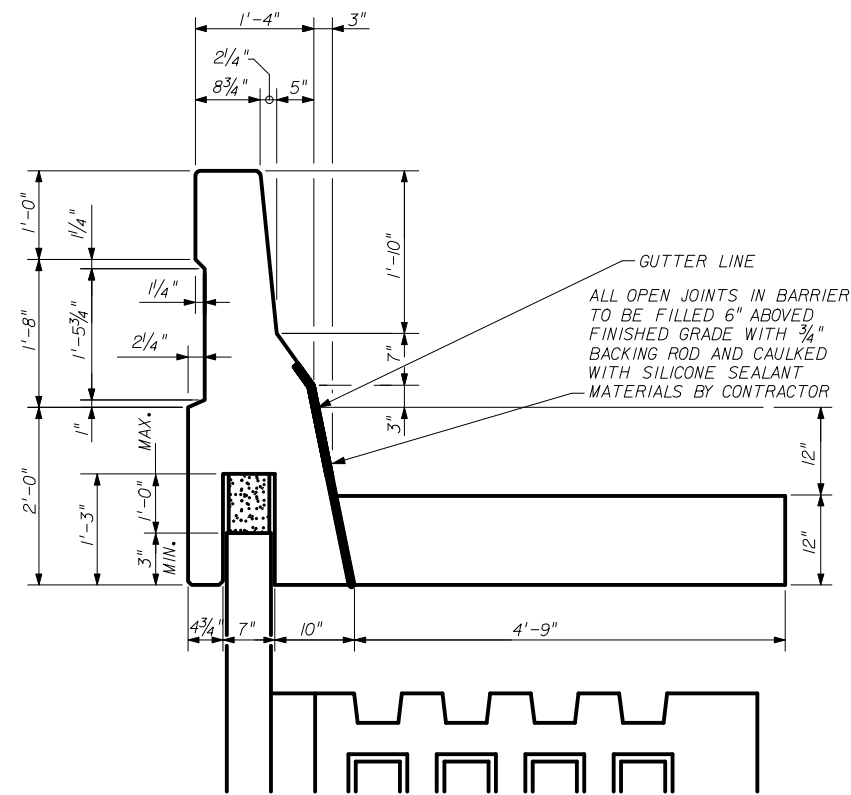
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No. Index No.
Checked By	JMC	10/01/98	00	7 of 21 5011



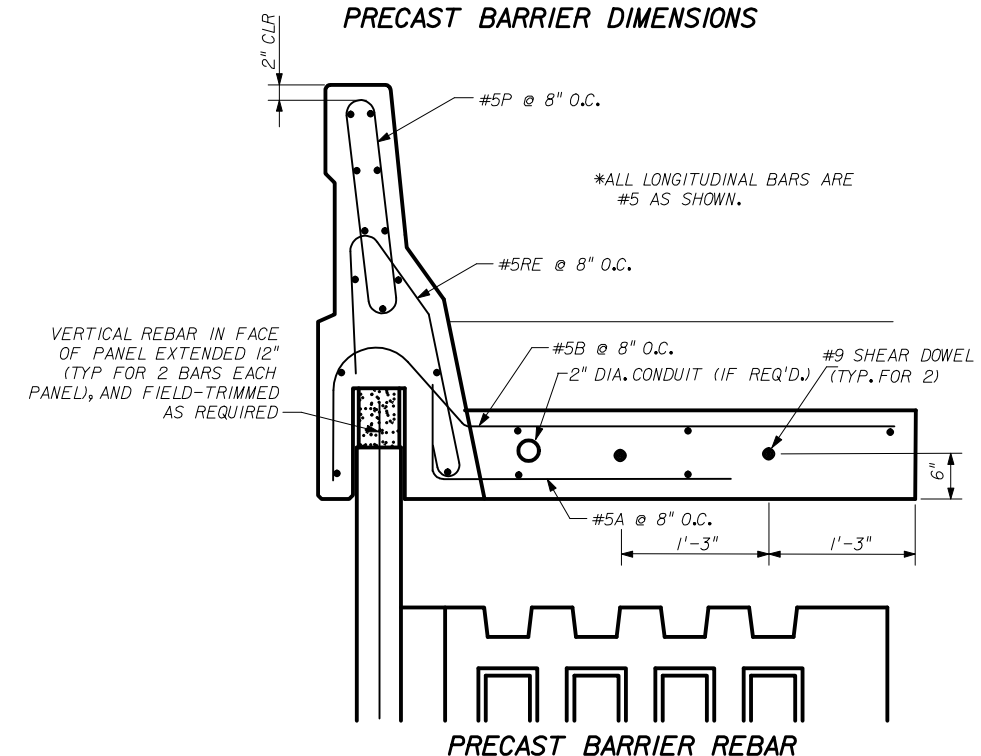
PART PLAN - PRECAST BARRIER



PART ELEVATION - PRECAST BARRIER



PRECAST BARRIER DIMENSIONS




PRECAST BARRIER REBAR

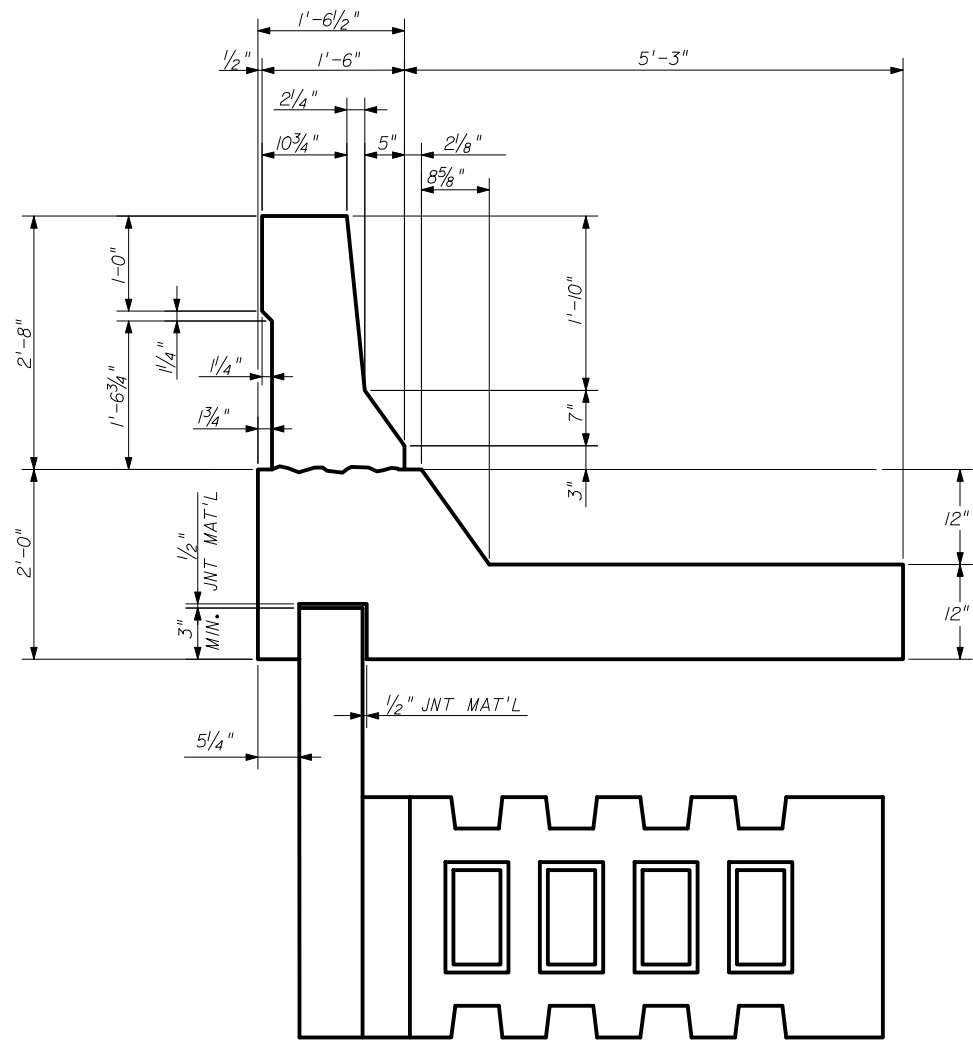
DESIGNER:  

**THE NEEL COMPANY**  
 8328-O TRAFORD LANE  
 SPRINGFIELD, VIRGINIA 22152  
 PH: (703) 913-7858  
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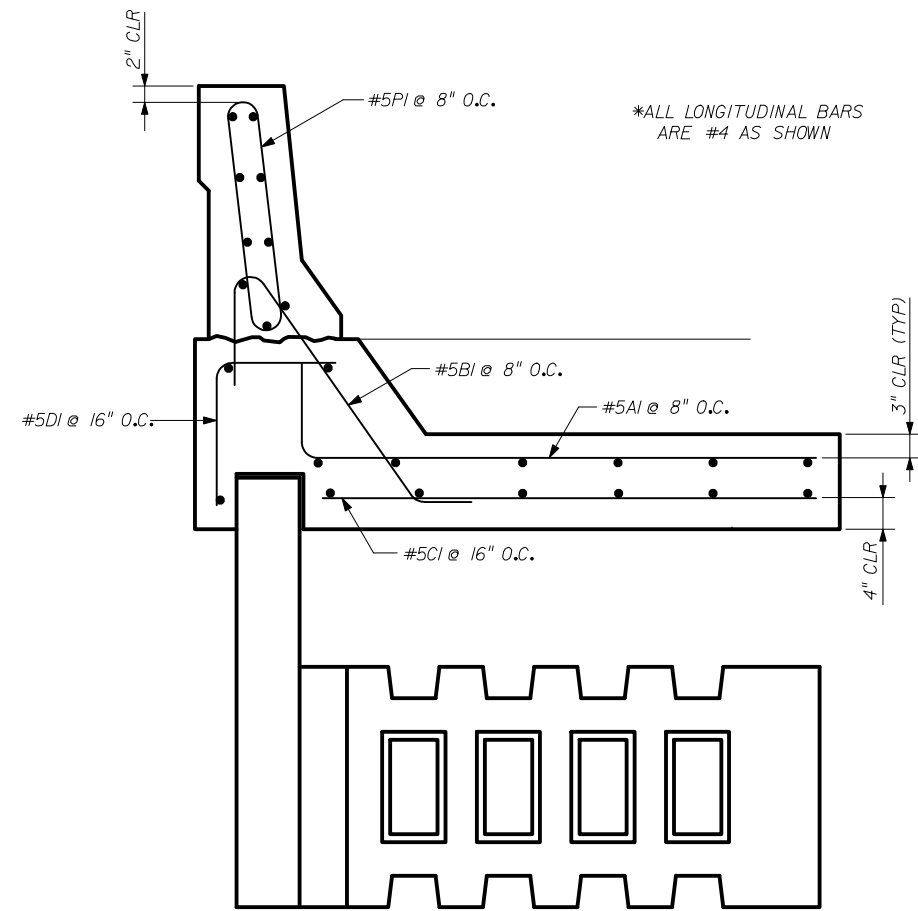
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 11643 103RD STREET  
 JACKSONVILLE, FL 32210  
 PH: (904) 778-2990  
 FX: (904) 778-2992

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)</b>				
Names	Dates	Approved By 		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No.
Checked By	JMC	10/01/98	00	8 of 21
				5011

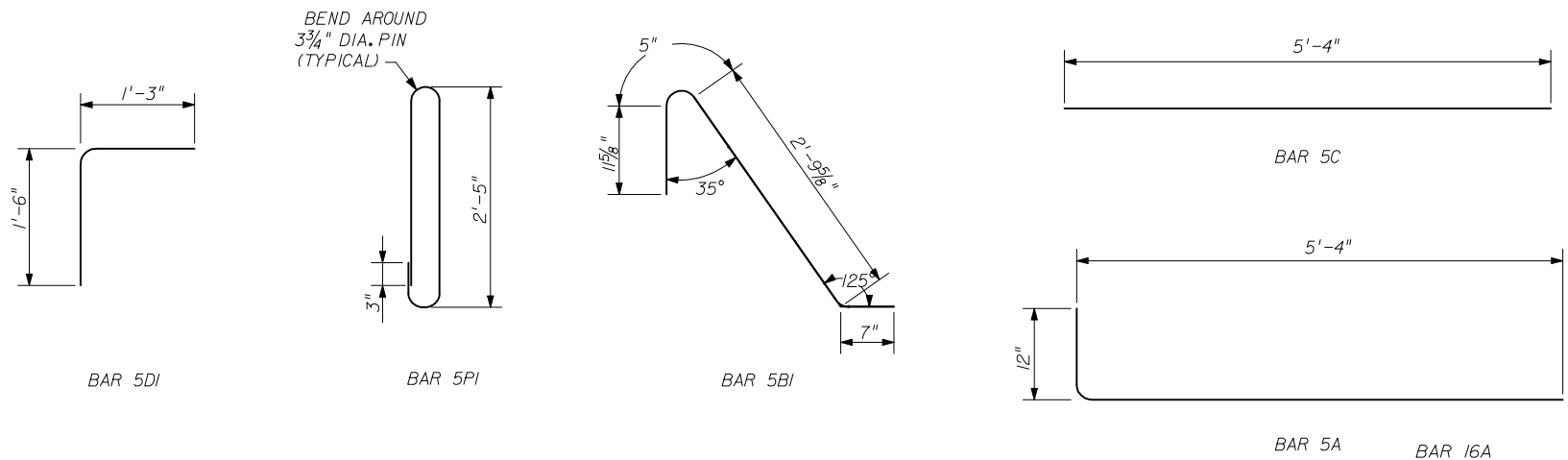




C.I.P. BARRIER AND C.I.P. JUNCTION SLAB DIMENSIONS




C.I.P. BARRIER AND C.I.P. JUNCTION SLAB REBAR

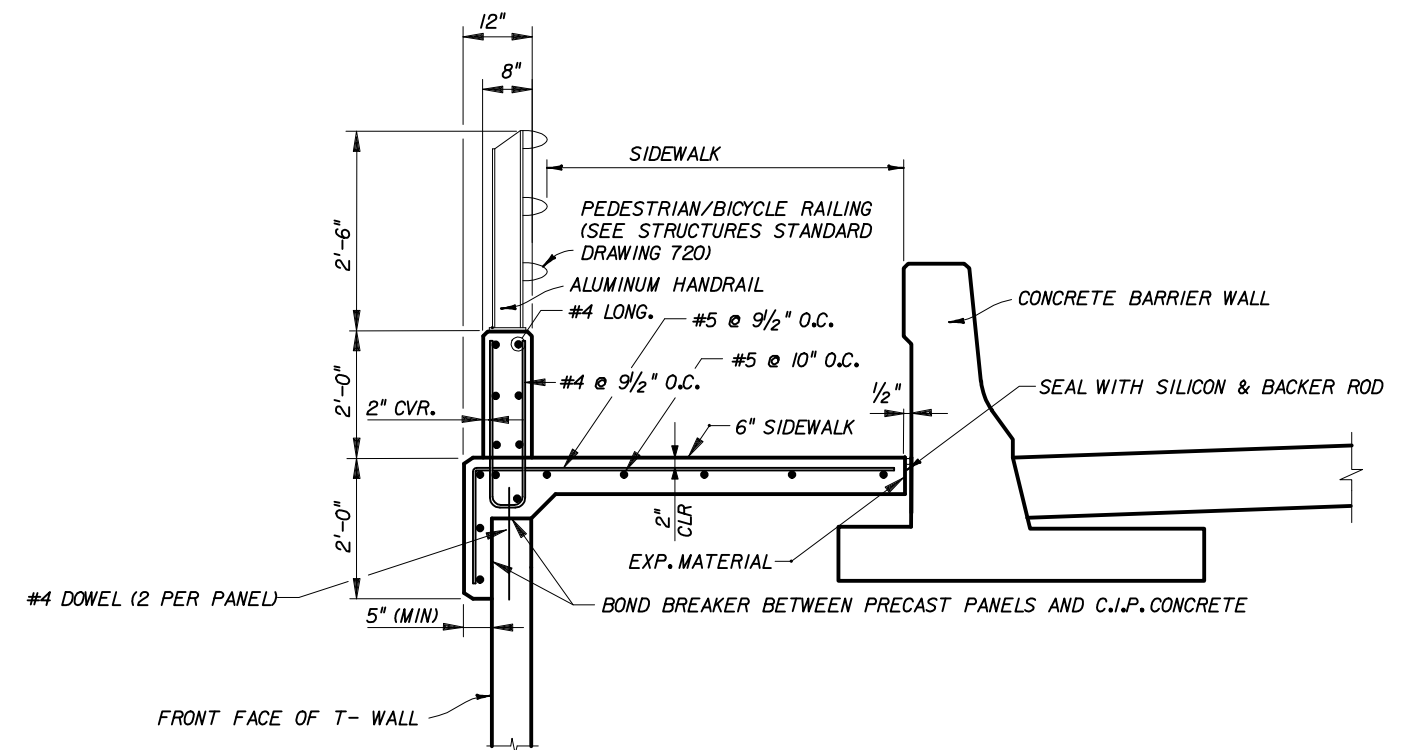


C.I.P. BARRIER REBAR DETAILS

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)</b>				
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C.I.P. PARAPET DETAIL W/ HANDRAIL

DESIGNER:



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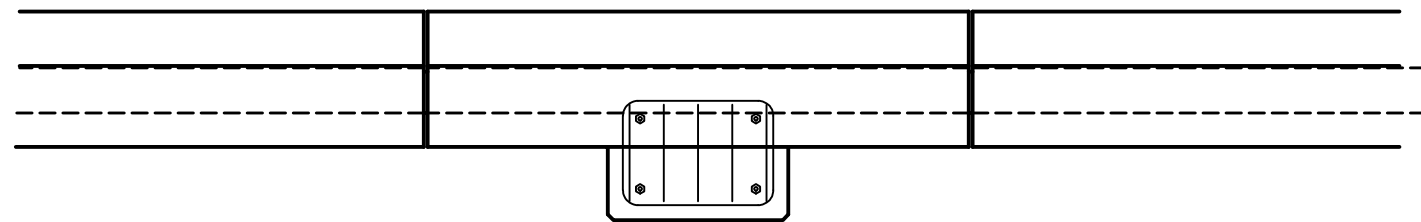
PRECASTER:

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 11643 103rd STREET  
 JACKSONVILLE, FL 32210  
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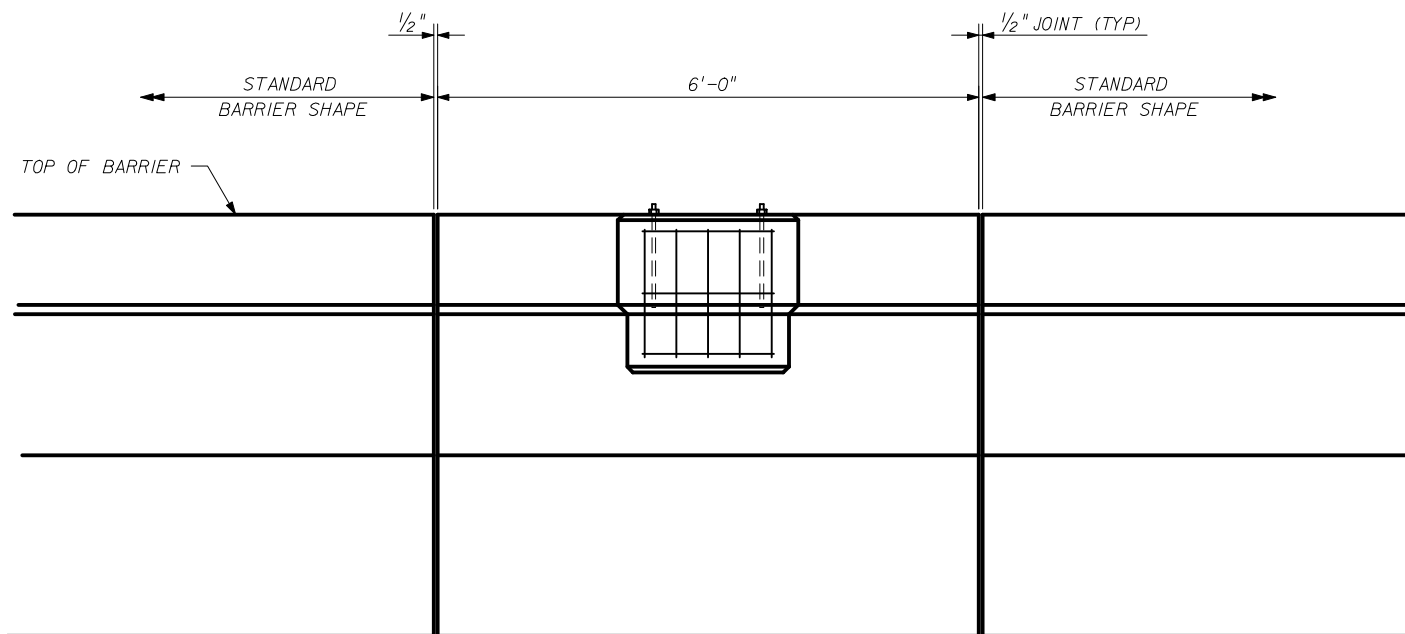
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
 THE NEEL COMPANY T-WALL  
 (2" COVER)**

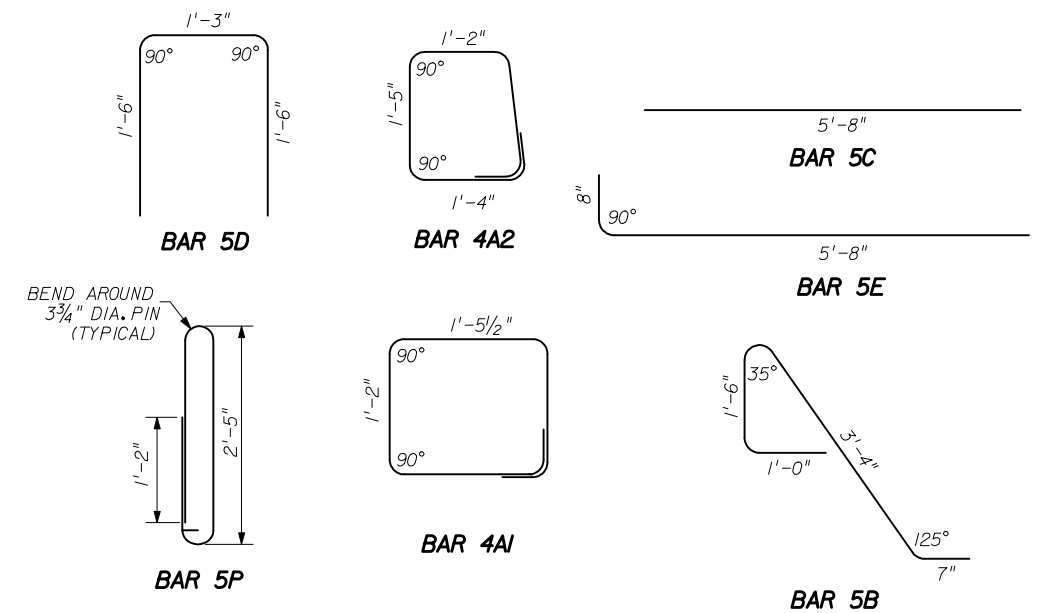
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Designed By	JMC	10/01/98	 State Structures Design Engineer			
Drawn By	CAA	10/01/98				
Checked By	JMC	10/01/98				
		Revision	Sheet No.	Index No.		
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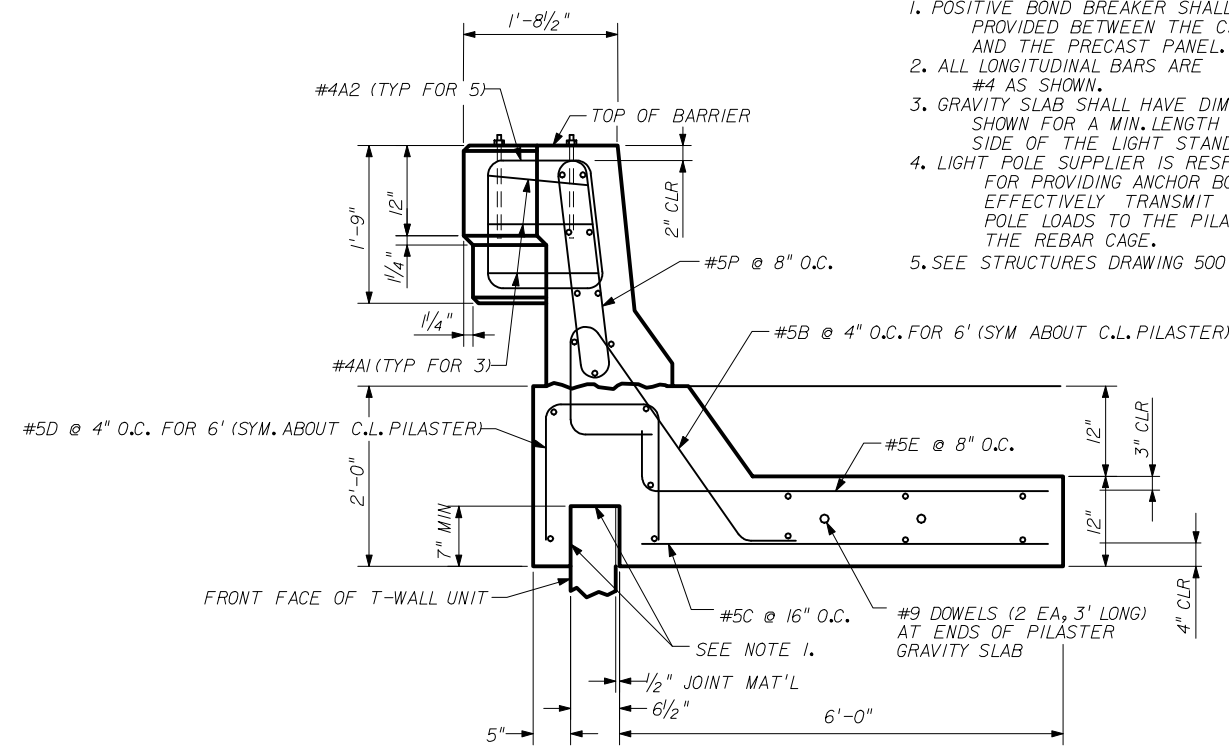
C.I.P. LIGHT STANDARD BARRIER - PART PLAN WITH REBAR  
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)



C.I.P. LIGHT STANDARD BARRIER - PART ELEVATION  
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)



C.I.P. LIGHT STANDARD BARRIER REBAR DETAILS



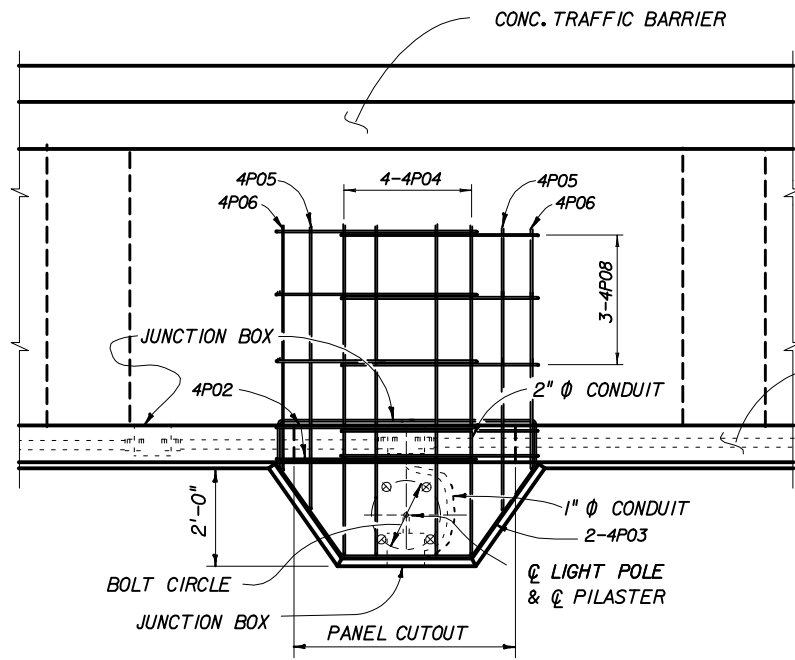
C.I.P. LIGHT STANDARD BARRIER - PART SECTION WITH REBAR

- NOTES
1. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN THE C.I.P. CONC. AND THE PRECAST PANEL.
  2. ALL LONGITUDINAL BARS ARE #4 AS SHOWN.
  3. GRAVITY SLAB SHALL HAVE DIMENSIONS SHOWN FOR A MIN. LENGTH OF 10'-0" EITHER SIDE OF THE LIGHT STANDARD BARRIER.
  4. LIGHT POLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND FIT THE REBAR CAGE.
  5. SEE STRUCTURES DRAWING 500 FOR ADDITIONAL DETAILS.

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)</b>				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By JMC	10/01/98	State Structures Design Engineer		
Drawn By CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By JMC	10/01/98	00	11 of 21	5011



**NOTES**

- ADDITIONAL CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTER SHALL MEET THE SAME REQUIREMENTS AS THAT OF THE PARAPET WALL.
- TOP OF PILASTER SHALL BE FINISHED TO A TRULY LEVEL AREA.
- LIGHT POLE PILASTER IS DESIGNED TO RESIST WORKING LOADS (IN ANY DIRECTION) FROM THE LIGHT POLE APPLIED AT THE TOP OF THE PILASTER AS FOLLOWS:
 

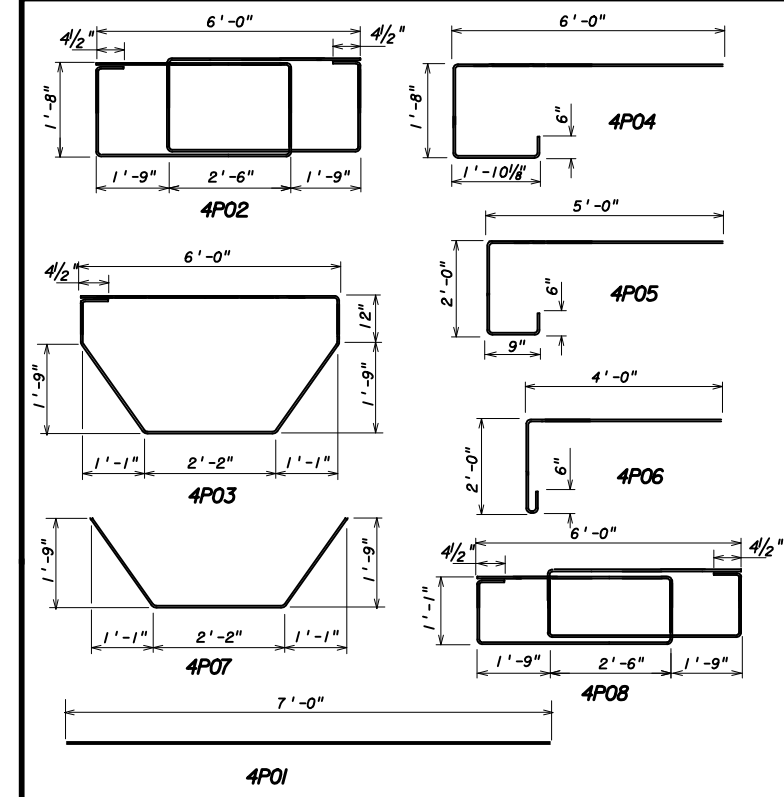
LONGITUDINAL MOMENT	=	30,000 FT. POUND
TRANSVERSE MOMENT	=	6,000 FT. POUND
LONGITUDINAL SHEAR	=	1,000 POUND
TRANSVERSE SHEAR	=	200 POUND
TORSION	=	3,000 FT. POUNDS
AXIAL	=	400 POUNDS

IF THE LIGHT POLE PROVIDED APPLIES LOADS THAT ARE IN EXCESS OF THOSE SHOWN ABOVE, THE CONTRACTOR SHALL REDESIGN THE PILASTER AND SUBMIT HIS DESIGN TO THE DEPARTMENT FOR REVIEW. THE CONTRACTOR'S REDESIGN SHALL BE PREPARED, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA, AND QUALIFIED TO PERFORM THE WORK.

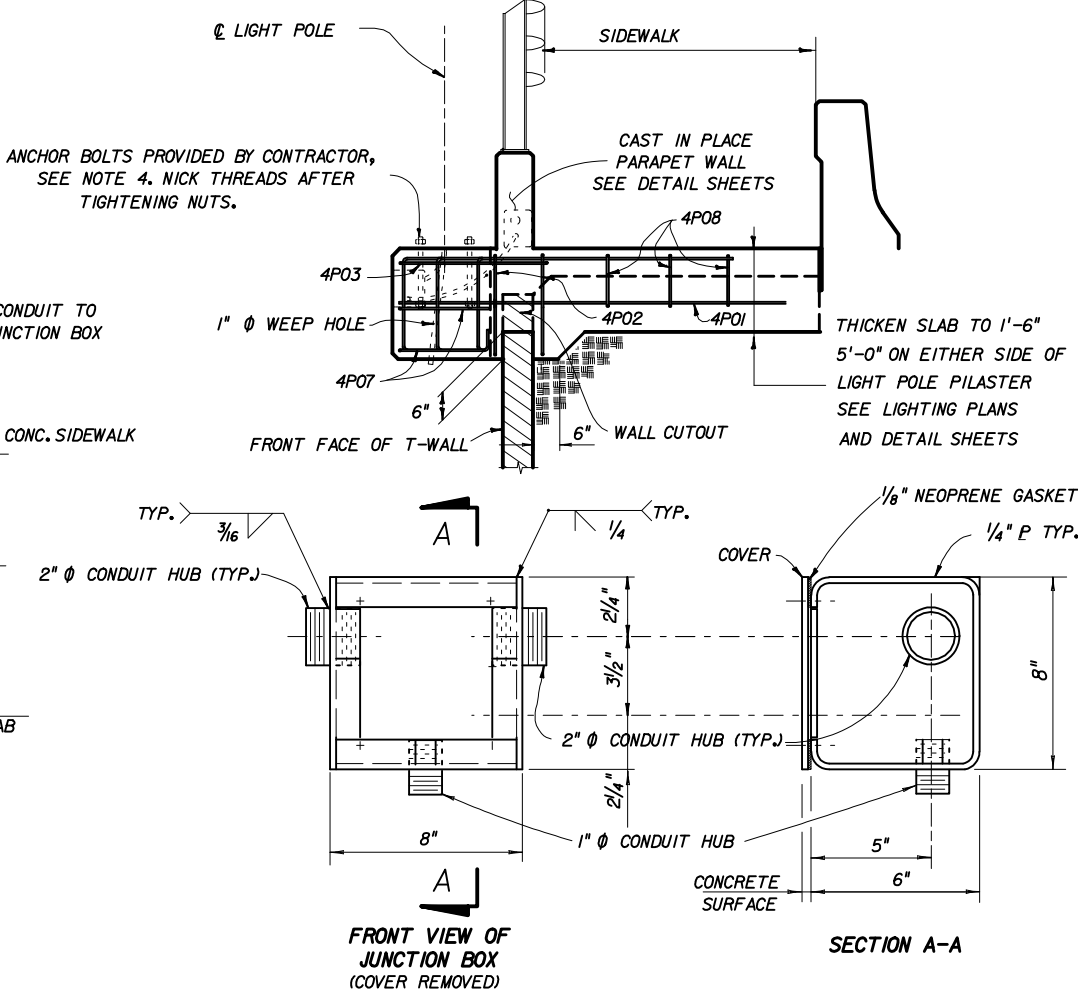
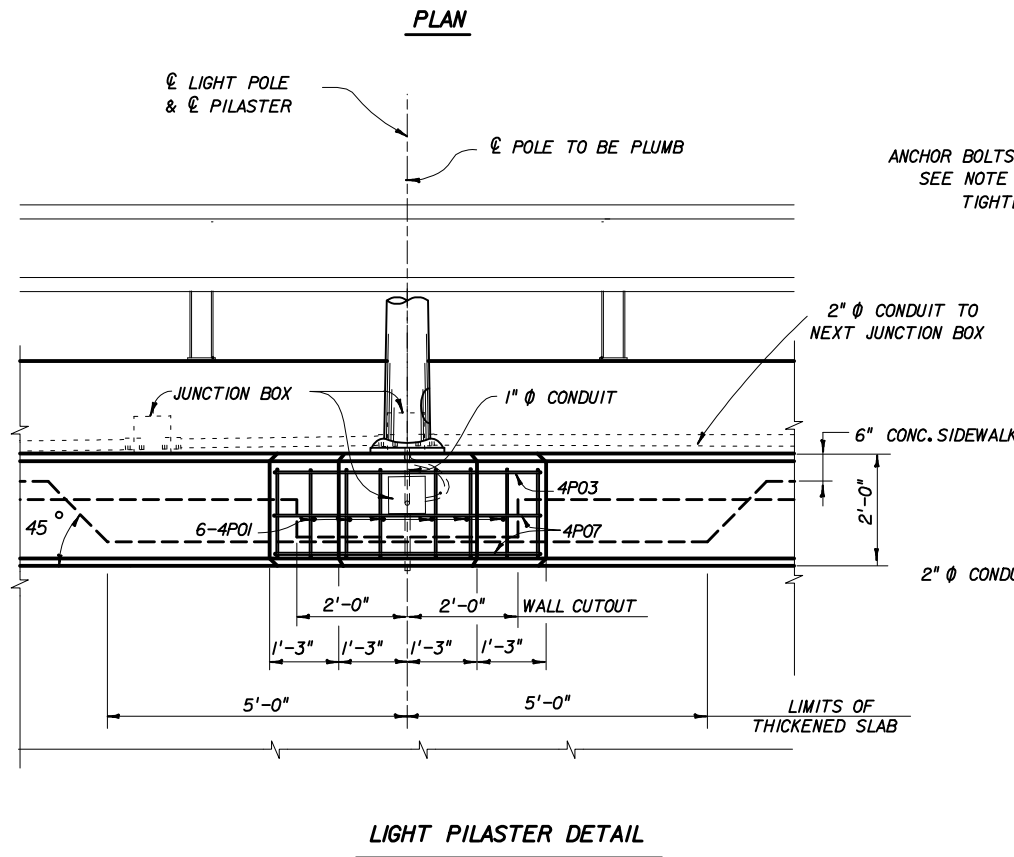
- THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND THAT FIT THE REINFORCING CAGE. CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA SHALL BE SUBMITTED BY THE CONTRACTOR TO THE DEPARTMENT FOR REVIEW AND APPROVAL SHOWING THAT THESE REQUIREMENTS HAVE BEEN MET PRIOR TO CONSTRUCTION.

- STEEL FOR JUNCTION BOXES SHALL CONFORM WITH ASTM-A36. THE BOXES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. IN LIEU OF STEEL BOXES THE CONTRACTOR MAY SUBMIT FOR APPROVAL MOLDED P.V.C. BOXES (SCHEDULE 80).
- ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL OR SCHEDULE 80 P.V.C.
- THE COST OF ANCHOR BOLTS SHALL BE INCLUDED IN THE BID PRICE FOR LIGHT POLES.
- PAYMENT: THE COST OF ALL LABOR, CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTERS AND ALL CONDUITS, EXPANSION COUPLINGS, JUNCTION BOXES AND MISCELLANEOUS HARDWARE REQUIRED FOR COMPLETION OF THE ELECTRICAL INSTALLATION WITHIN THE LIMITS SHOWN ON THIS SHEET, SHALL BE INCLUDED IN THE CONTRACTOR'S BID PRICE FOR THE MSE WALLS.

**BAR BENDING DIAGRAMS**



BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
4P01	4	6	7'-0"
4P02	4	2	24'-5"
4P03	4	1	14'-9"
4P04	4	4	9'-8"
4P05	4	2	7'-11"
4P06	4	2	6'-2"
4P07	4	2	6'-4"
4P08	4	3	22'-1"



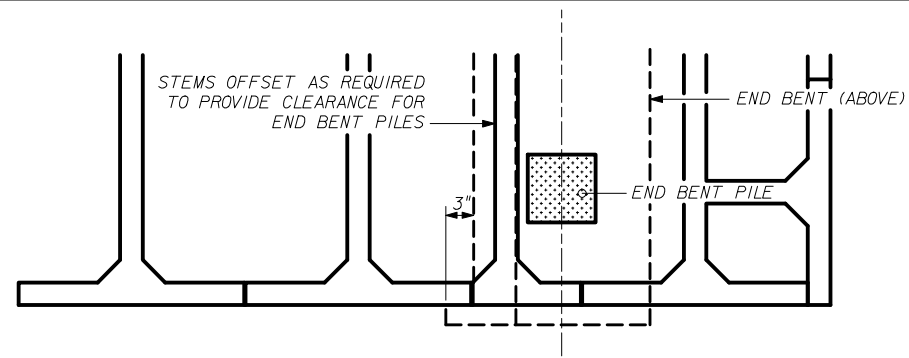
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(2" COVER)**

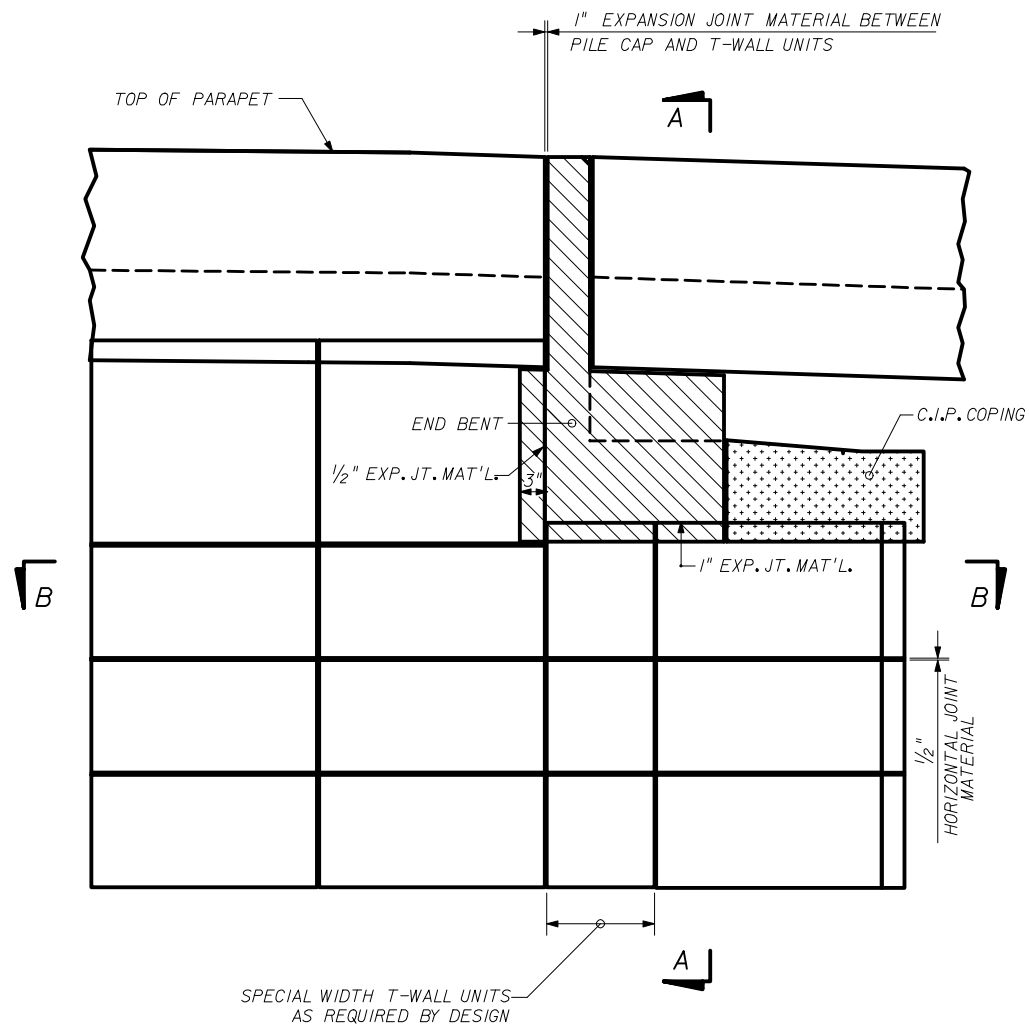
Designed By	JMC	Date	10/01/98	Approved By  State Structures Design Engineer
Drawn By	CAA	Date	10/01/98	
Checked By	JMC	Date	10/01/98	
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			Index No.	5011

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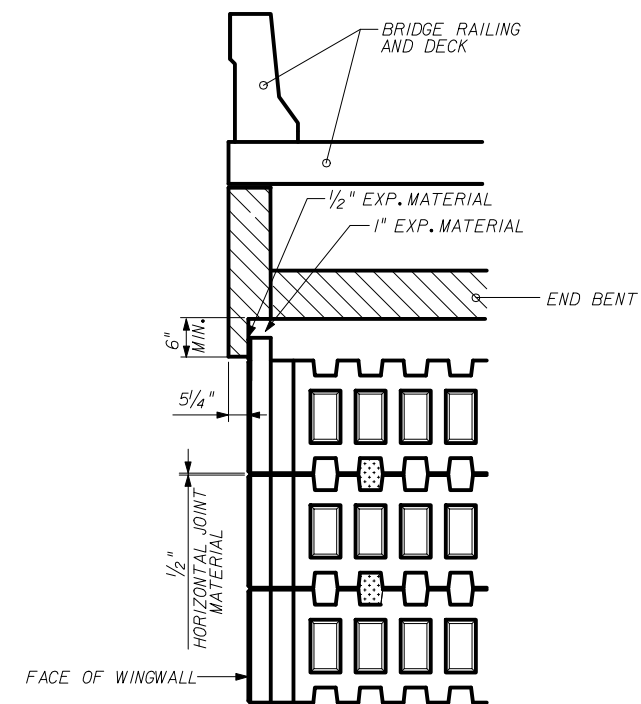
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**SECTION B-B**  
STEM / END BENT PILE INTERFACE

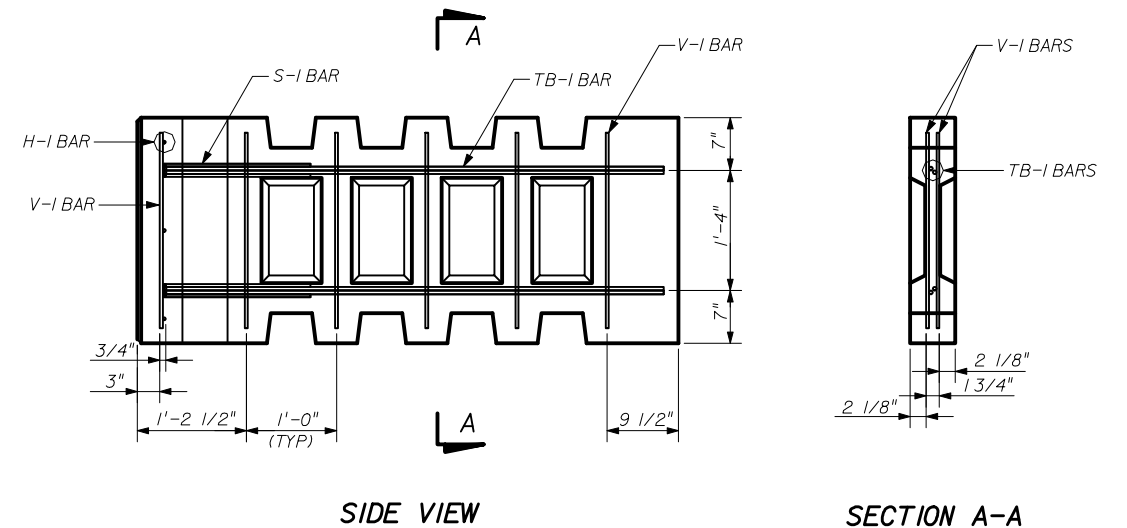
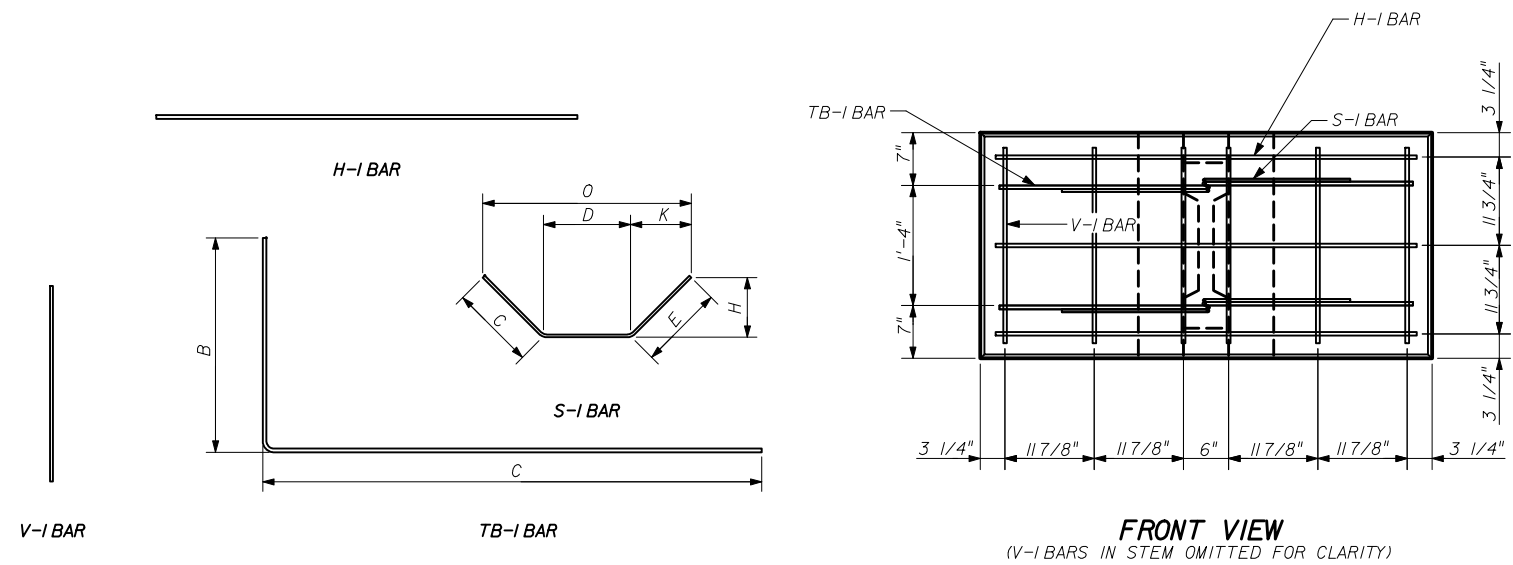


**PART ELEVATION SHOWING**  
WINGWALL / END BENT INTERFACE



**SECTION A-A**  
SECTION THRU PILE CAP

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)</b>				
Designed By	JMC	10/01/98	Approved By <i>W. J. [Signature]</i> State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No. Index No.
Checked By	JMC	10/01/98	00	13 of 21 5011



REBAR SCHEDULE - 2.5 x 5.0 x 04 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	12	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	5'-8 1/2"	2'-3 1/2"	3'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 06 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	16	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 08 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	20	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 10 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	24	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	11'-8 1/2"	2'-3 1/2"	9'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 12 STD UNIT

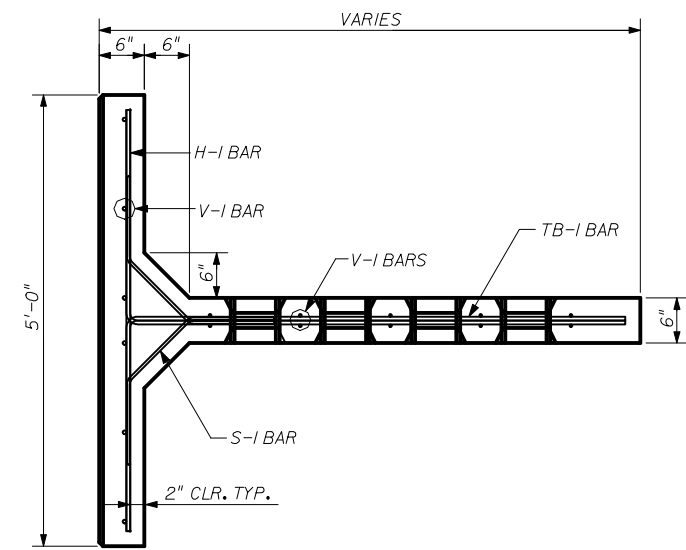
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H-I	3	4	-	4'-6"								-	
V-I	26	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	13'-8 1/2"	2'-3 1/2"	11'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 14 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	32	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	15'-8 1/2"	2'-3 1/2"	13'-6 1/2"						90	

REBAR SCHEDULE - 2.5 x 5.0 x 16 STD UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	3	4	-	4'-6"								-	
V-I	36	3	-	2'-0"								-	
S-I	4	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	4	4	17	17'-8 1/2"	2'-3 1/2"	15'-6 1/2"						90	



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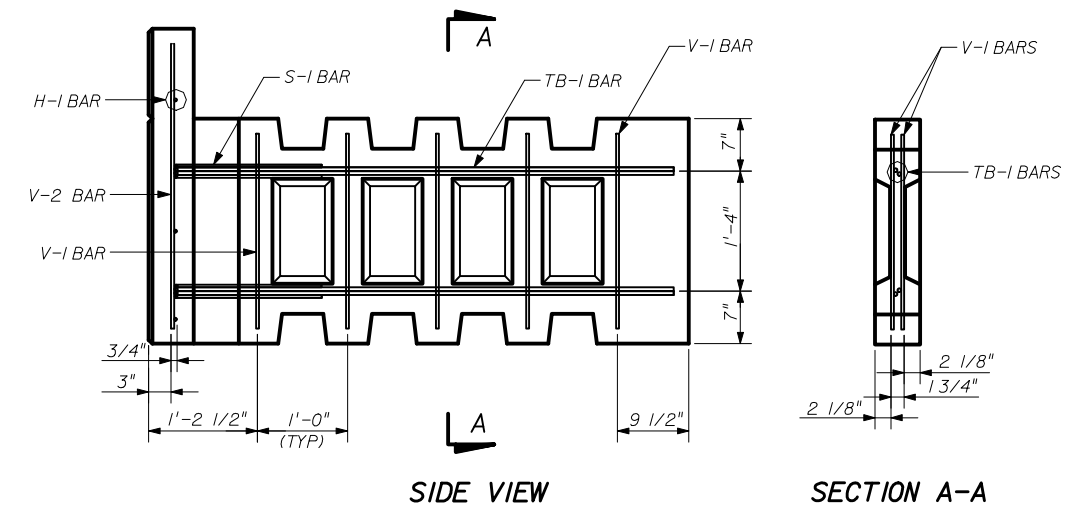
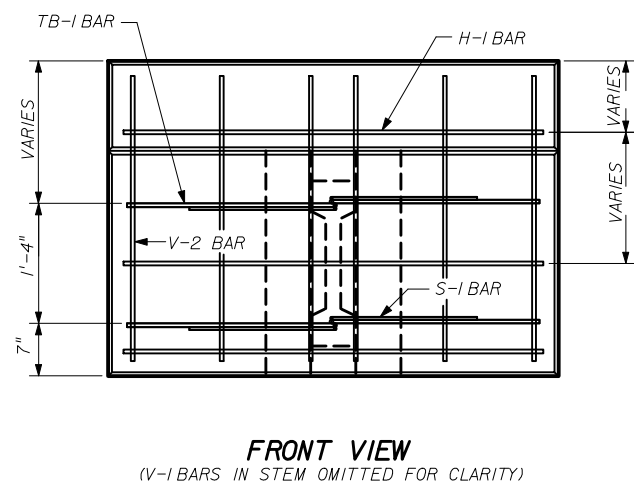
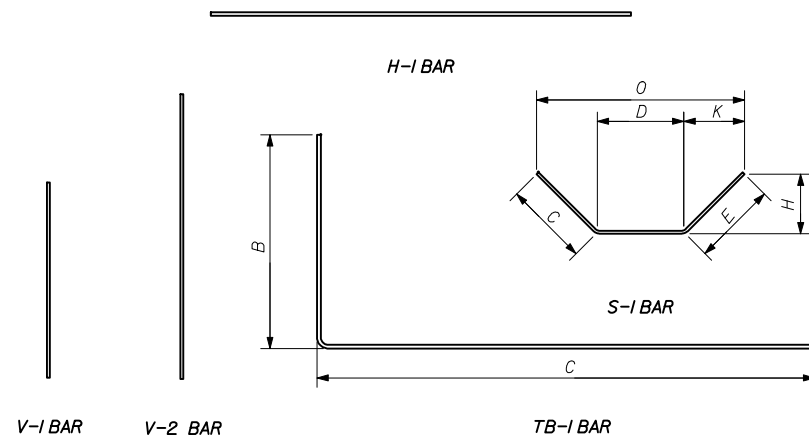
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(2" COVER)**

Names	Dates	Approved By
Designed By: JMC	10/01/98	[Signature]
Drawn By: CAA	10/01/98	
Checked By: JMC	10/01/98	

Revision	Sheet No.	Index No.
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NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER



**REBAR SCHEDULE - 3.0 x 5.0 x 04 TOP UNIT**

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	4	4	-	4'-6"								-	
V-1	6	3	-	2'-0"								-	
V-2	6	5	-	2'-6"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	5'-8 1/2"	2'-3 1/2"	3'-6 1/2"						90	

**REBAR SCHEDULE - 3.0 x 5.0 x 06 TOP UNIT**

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	4	4	-	4'-6"								-	
V-1	10	3	-	2'-0"								-	
V-2	6	5	-	2'-6"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

**REBAR SCHEDULE - 3.5 x 5.0 x 04 TOP UNIT**

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	5	4	-	4'-6"								-	
V-1	6	3	-	2'-0"								-	
V-2	6	5	-	3'-0"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	5'-8 1/2"	2'-3 1/2"	3'-6 1/2"						90	

**REBAR SCHEDULE - 3.5 x 5.0 x 06 TOP UNIT**

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	5	4	-	4'-6"								-	
V-1	10	3	-	2'-0"								-	
V-2	6	5	-	3'-0"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

**REBAR SCHEDULE - 4.0 x 5.0 x 04 TOP UNIT**

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	5	4	-	4'-6"								-	
V-1	6	3	-	2'-0"								-	
V-2	6	5	-	3'-6"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	5'-8 1/2"	2'-3 1/2"	3'-6 1/2"						90	

**REBAR SCHEDULE - 4.0 x 5.0 x 06 TOP UNIT**

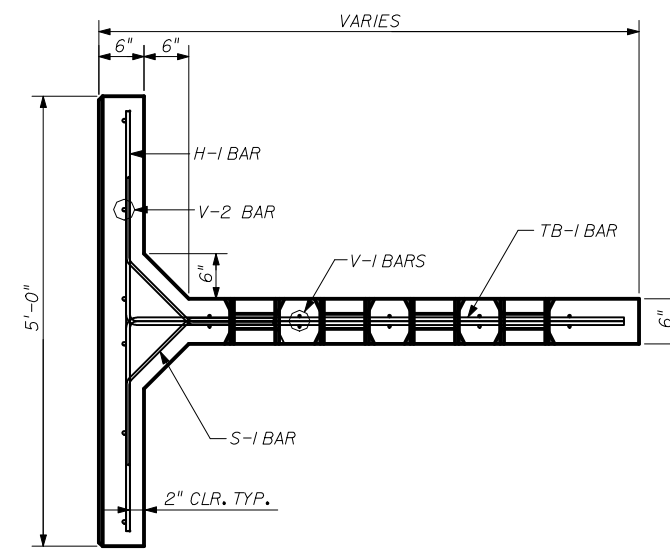
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H-1	5	4	-	4'-6"								-	
V-1	10	3	-	2'-0"								-	
V-2	6	5	-	3'-6"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

**REBAR SCHEDULE - 4.5 x 5.0 x 06 TOP UNIT**

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	6	4	-	4'-6"								-	
V-1	6	3	-	2'-0"								-	
V-2	6	5	-	4'-0"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

**REBAR SCHEDULE - 5.0 x 5.0 x 06 TOP UNIT**

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	6	4	-	4'-6"								-	
V-1	10	3	-	2'-0"								-	
V-2	6	5	-	4'-6"								-	
S-1	4	3	3	2'-9 1/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	4	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	




TOP VIEW  
REINFORCING STEEL - TOP UNITS (I)

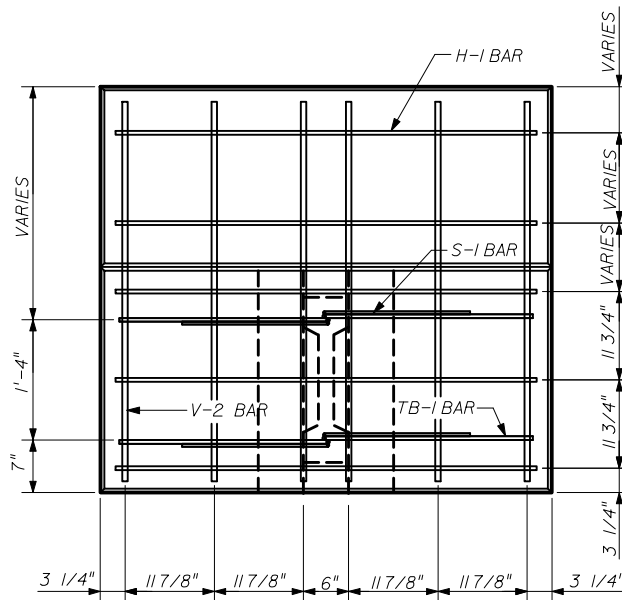
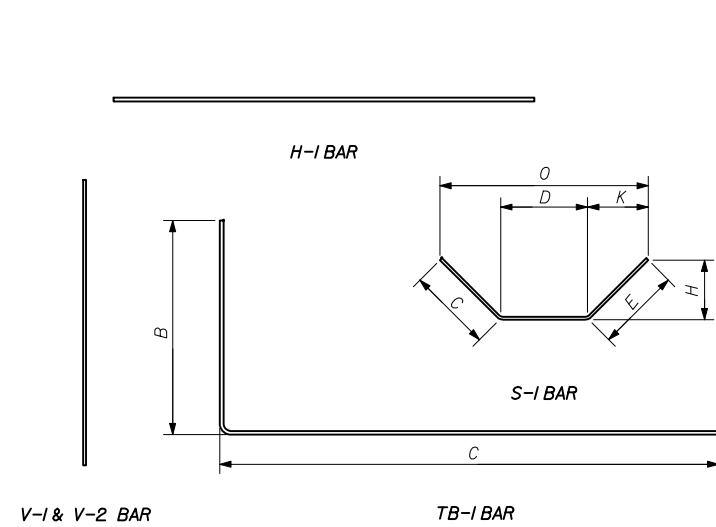
**DESIGNER:**  
  
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PH: (904) 778-2990  
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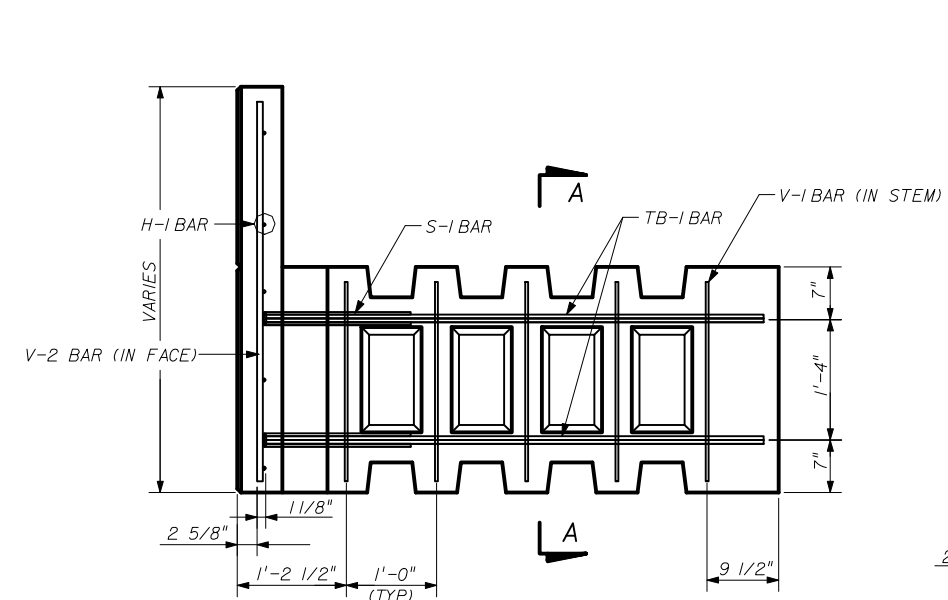
NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
**RETAINING WALL SYSTEM**  
**THE NEEL COMPANY T-WALL**  
**(2" COVER)**

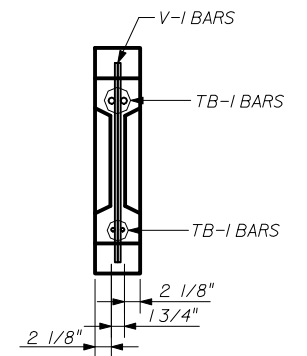
Names	Dates	Approved By		
Designed By	JMC	10/01/98		
State Structures Design Engineer				
Drawn By	CAA	10/01/98	Revision	Sheet No.
Checked By	JMC	10/01/98	00	15 of 21
				5011



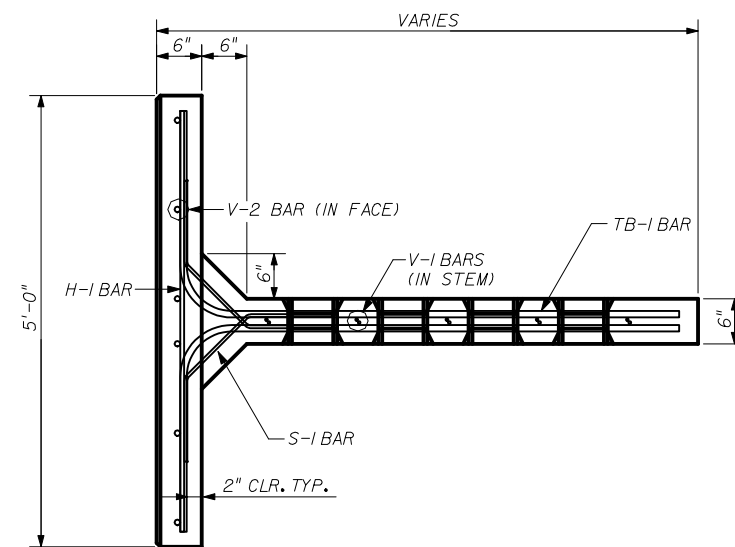
**FRONT VIEW**  
(V-1 BARS IN STEM OMITTED FOR CLARITY)



**SIDE VIEW**



**SECTION A-A**



**TOP VIEW**  
**REINFORCING STEEL - TOP UNITS (II)**

THESE UNITS WILL ONLY BE USED BY APPROVAL OF THE F.D.O.T. STRUCTURES DESIGN OFFICE ON A PROJECT BY PROJECT BASIS.

REBAR SCHEDULE - 5.5 x 5.0 x 08 TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	6	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	5'-0"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 6.0 x 5.0 x 08 TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	5'-6"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 6.5 x 5.0 x 08 TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	6'-0"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 7.0 x 5.0 x 08 TOP UNIT													
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	8	4	-	4'-6"								-	
V-1	14	3	-	2'-0"								-	
V-2	6	6	-	6'-6"								-	
S-1	4	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	4	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

DESIGNER:  
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

PRECASTER:  
**OLDCASTLE PRECAST, INC**  
11643 103RD STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

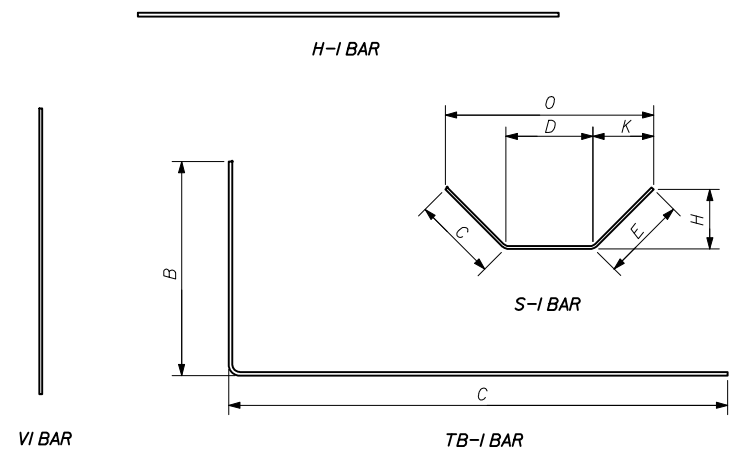
NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)				
Names	Dates	Approved By		
Designed By	JMC	10/01/98	 State Structures Design Engineer	
Drawn By	CAA	10/01/98		
Checked By	JMC	10/01/98		
Revision	00	16 of 21	Sheet No.	Index No.
				5011

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*







REBAR SCHEDULE - 5.0 x 5.0 x 04 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	12	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	5'-8 1/2"	2'-3 1/2"	3'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 06 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	16	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 08 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	20	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 10 DBL UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	24	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	11'-8 1/2"	2'-3 1/2"	9'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 12 DBL UNIT

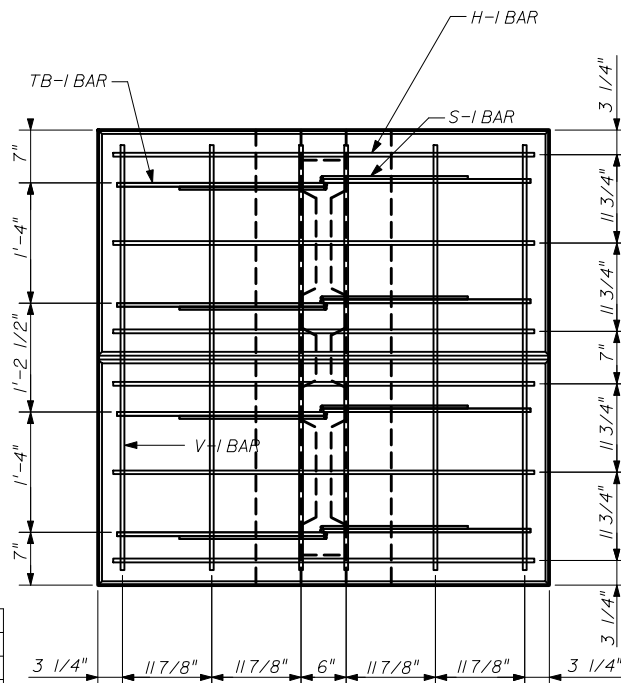
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	26	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	13'-8 1/2"	2'-3 1/2"	11'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 14 DBL UNIT

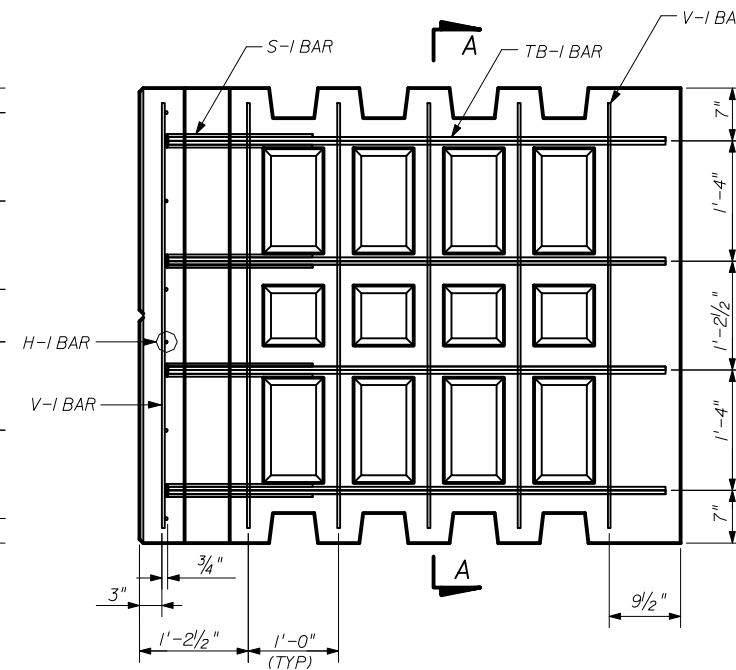
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	32	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	15'-8 1/2"	2'-3 1/2"	15'-6 1/2"						90	

REBAR SCHEDULE - 5.0 x 5.0 x 16 DBL UNIT

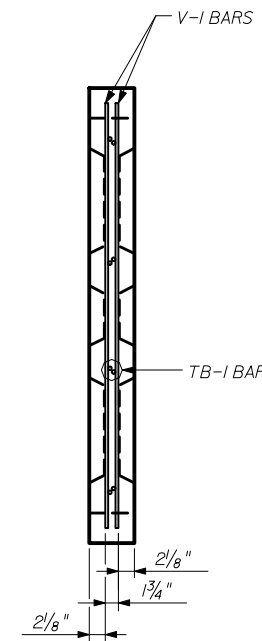
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-I	6	4	-	4'-6"								-	
V-I	36	3	-	4'-6"								-	
S-I	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-I	8	4	17	17'-8 1/2"	2'-3 1/2"	15'-6 1/2"						90	



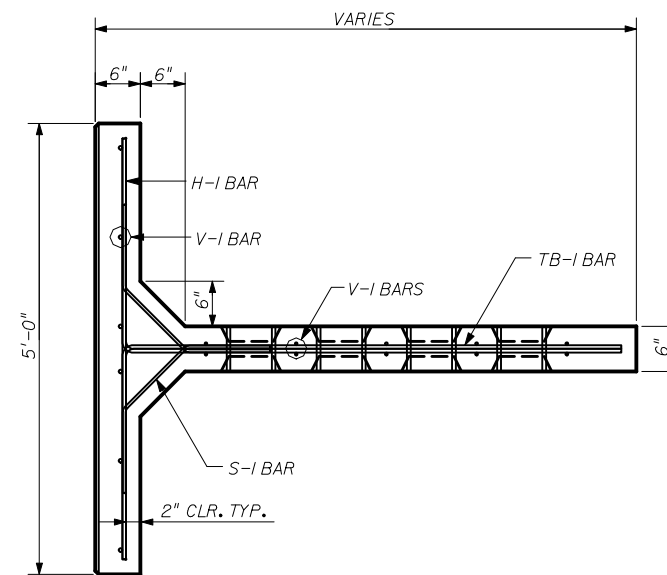
FRONT VIEW  
(V-I BARS IN STEM OMITTED FOR CLARITY)



SIDE VIEW



SECTION A-A



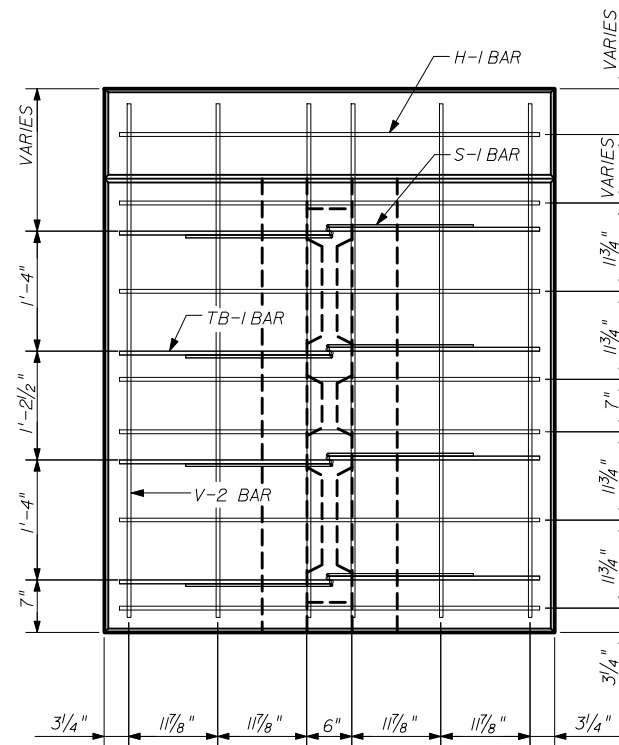
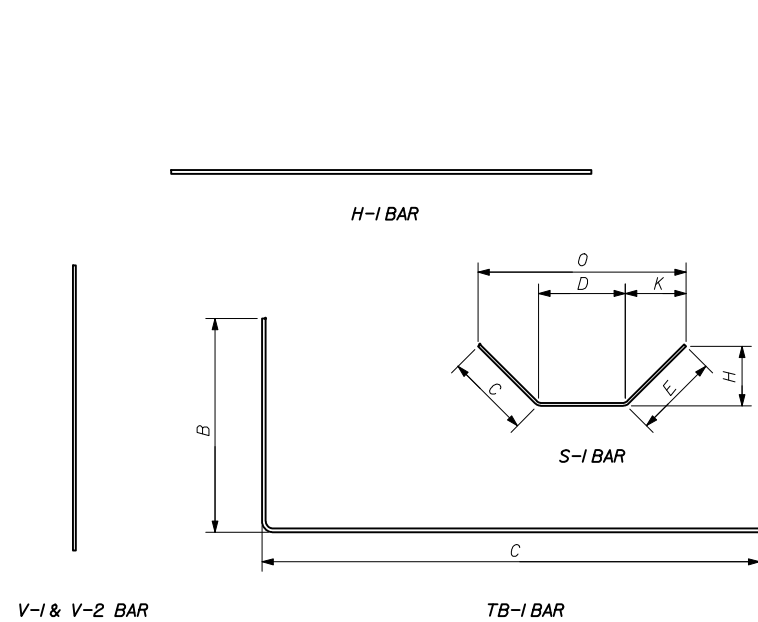
TOP VIEW  
REINFORCING STEEL -DOUBLE UNITS

DESIGNER:  
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

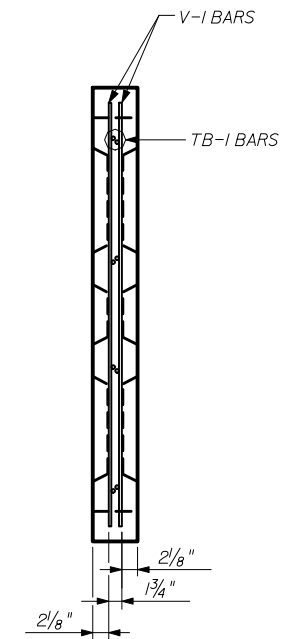
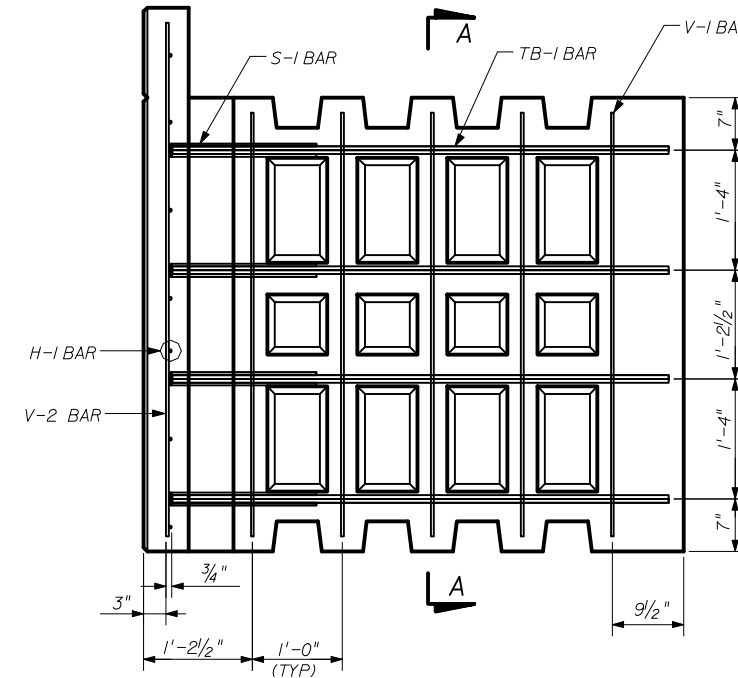
PRECASTER:  
**OLDCASTLE PRECAST, INC**  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM THE NEEL COMPANY T-WALL (2" COVER)				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By JMC	10/01/98	State Structures Design Engineer		
Drawn By CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By JMC	10/01/98	00	18 of 21	5011



(V-I BARS IN STEM OMITTED FOR CLARITY)



REBAR SCHEDULE - 5.5 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	6	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	5'-0"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 6.0 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	5'-6"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 6.5 x 5.0 x 06 DBL TOP UNIT

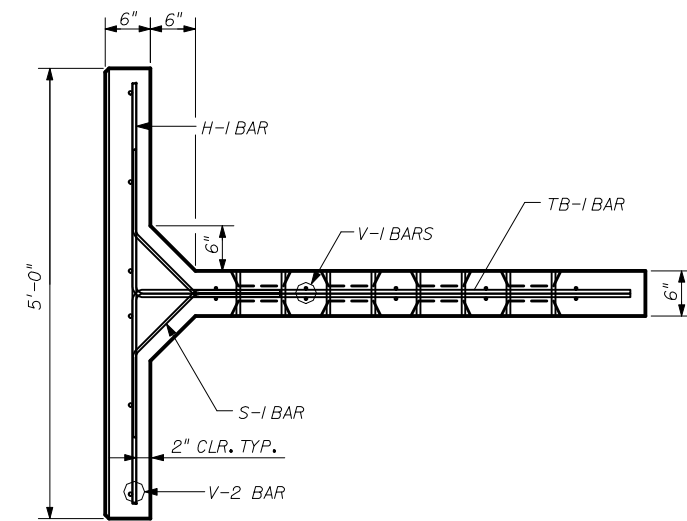
MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	7	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	6'-0"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 7.0 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	8	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	6'-6"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	

REBAR SCHEDULE - 7.5 x 5.0 x 06 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	8	4	-	4'-6"								-	
V-1	10	3	-	4'-6"								-	
V-2	6	5	-	7'-0"								-	
S-1	8	3	3	2'-9 7/8"		11 1/4"	11 1/4"	11 1/4"	8"	8"	2'-3 3/4"	45	
TB-1	8	5	17	7'-8 1/2"	2'-3 1/2"	5'-6 1/2"						90	



REINFORCING STEEL - DOUBLE TOP UNITS (I)

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER

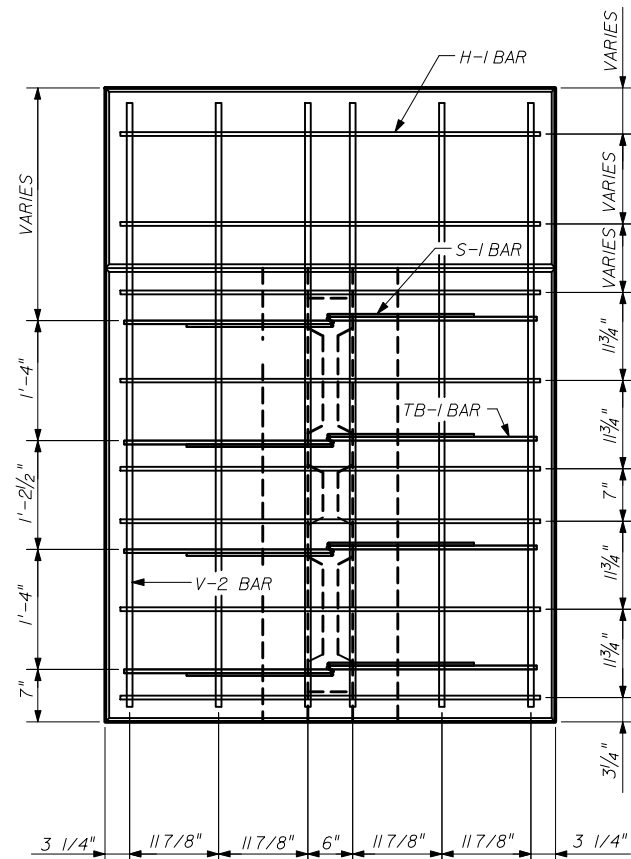
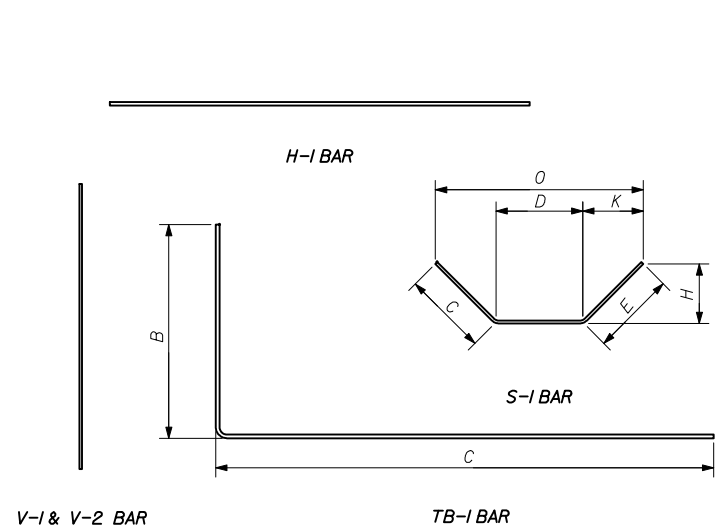
DESIGNER: THE NEEL COMPANY  
 8328-D TRAFORD LANE  
 SPRINGFIELD, VIRGINIA 22152  
 PH: (703) 913-7858  
 FX: (703) 913-7859

PRECASTER: OLDCASTLE PRECAST, INC.  
 11643 103RD STREET  
 JACKSONVILLE, FL 32210  
 PH: (904) 778-2990  
 FX: (904) 778-2992

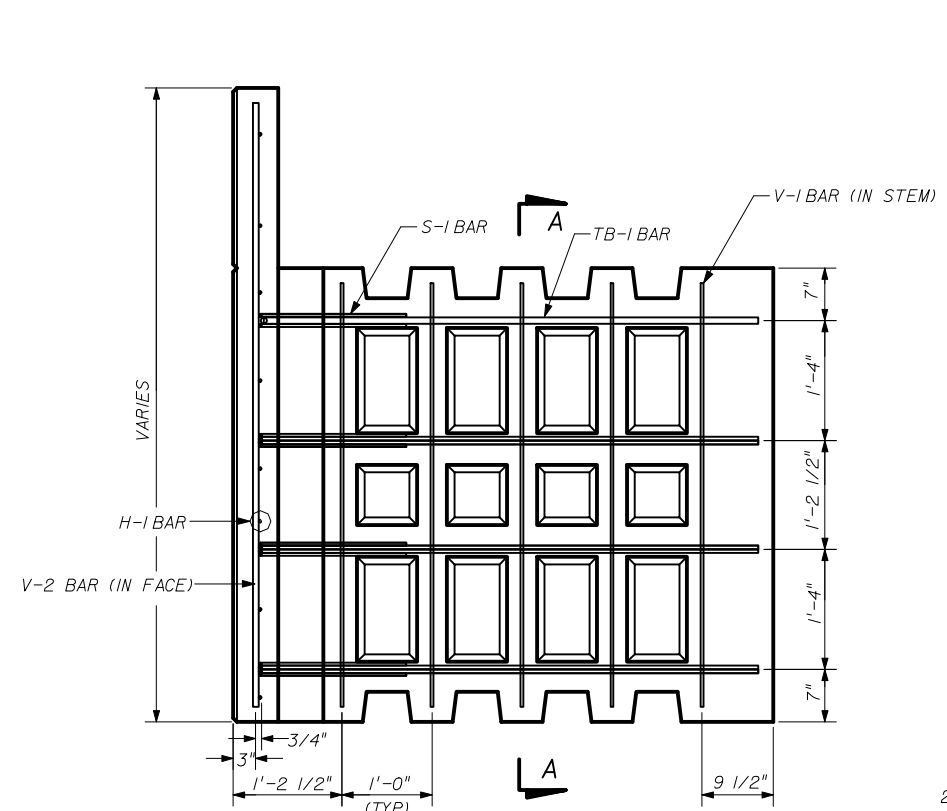
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
 THE NEEL COMPANY T-WALL  
 (2" COVER)

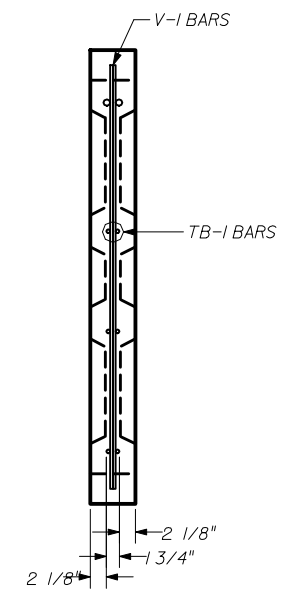
Names	Dates	Approved By
Designed By JMC	10/01/98	W. V. [Signature]
Drawn By CAA	10/01/98	
Checked By JMC	10/01/98	00
Revision		Sheet No. 19 of 21
Index No.		5011



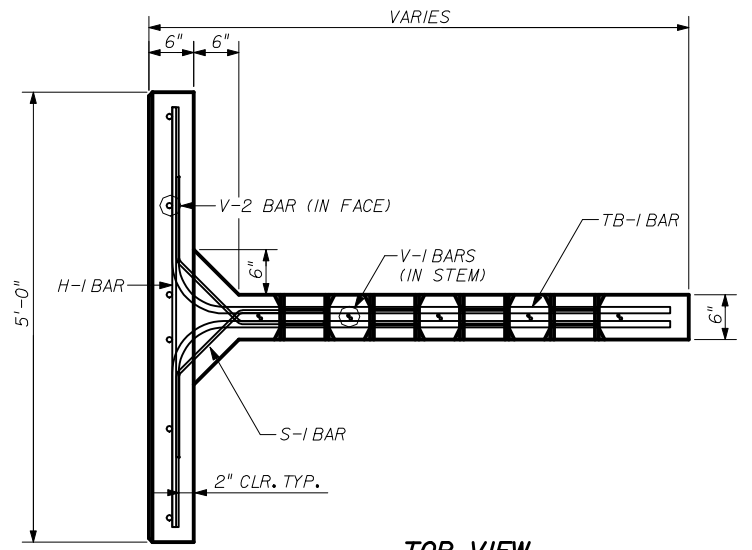
**FRONT VIEW**  
(V-1 BARS IN OMITTED FOR CLARITY)



**SIDE VIEW**



**SECTION A-A**



**TOP VIEW**  
**REINFORCING STEEL - DOUBLE TOP UNITS (II)**

REBAR SCHEDULE - 8.0 x 5.0 x 08 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	9	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	7'-6"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 8.5 x 5.0 x 08 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	9	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	8'-0"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 9.0 x 5.0 x 08 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	10	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	8'-6"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

REBAR SCHEDULE - 9.5 x 5.0 x 08 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	10	4	-	4'-6"								-	
V-1	14	3	-	4'-6"								-	
V-2	6	6	-	9'-0"								-	
S-1	8	3	3	2'-9"		9"	1'-3"	9"	5 3/8"	5 3/8"	2'-1 3/4"	45	
TB-1	8	6	17	9'-8 1/2"	2'-3 1/2"	7'-6 1/2"						90	

THESE TWO UNITS WILL ONLY BE USED BY APPROVAL OF THE F.D.O.T. STRUCTURES DESIGN OFFICE ON A PROJECT BY PROJECT BASIS.

DESIGNER:  
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

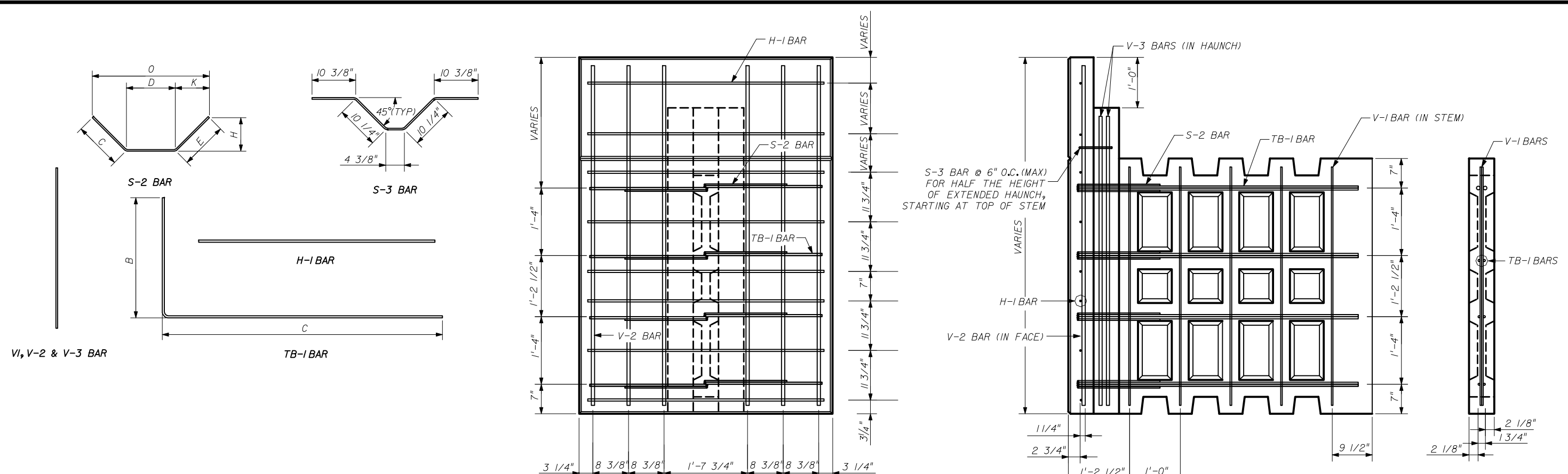
PRECASTER:  
**OLDCASTLE PRECAST, INC**  
11643 103RD STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(2" COVER)**

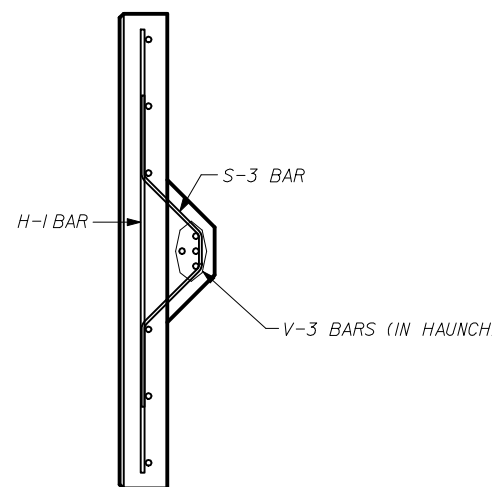
Names	Dates	Approved By	
Designed By JMC	10/10/98	 State Structures Design Engineer	
Drawn By CAA	10/10/98		
Checked By JMC	10/10/98		
Revision	00		
Sheet No.	20 of 21	Index No.	5011



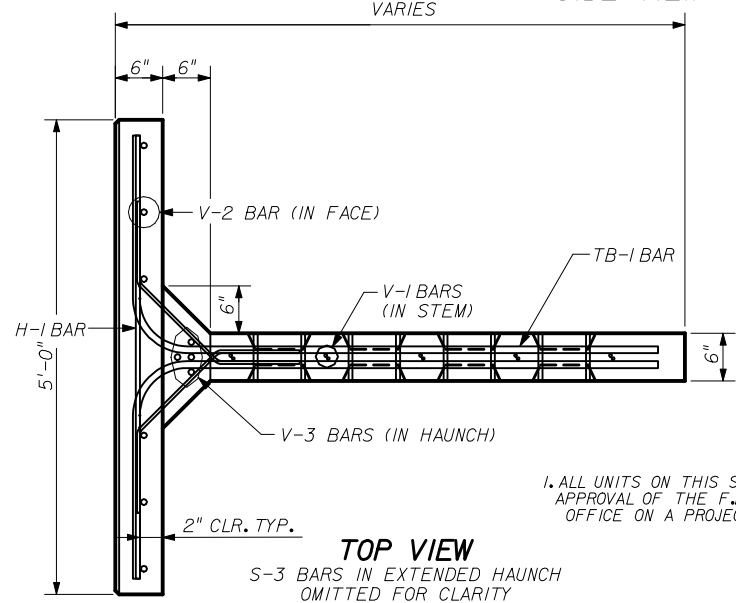
**FRONT VIEW**  
(V-1 BARS IN STEM AND V-3 BARS IN HAUNCH OMITTED FOR CLARITY)

**SIDE VIEW**

**SECTION A-A**



**SECTION B-B**



**TOP VIEW**  
S-3 BARS IN EXTENDED HAUNCH OMITTED FOR CLARITY  
**REINFORCING STEEL - DOUBLE TOP UNITS (III)**

1. ALL UNITS ON THIS SHEET WILL ONLY BE USED BY APPROVAL OF THE F.D.O.T. STRUCTURES DESIGN OFFICE ON A PROJECT BY PROJECT BASIS.

REBAR SCHEDULE - 10.0 x 5.0 x 10 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	11	4	-	4'-6"								-	
V-1	18	3	-	4'-6"								-	
V-2	6	6	-	9'-6"								-	
V-3	4	6	-	8'-6"								-	
S-2	8	3	3	2'-10"		10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45	
S-3	8	3	3	3'-3 5/8"								-	SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 1/8"						90	

REBAR SCHEDULE - 10.5 x 5.0 x 10 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	11	4	-	4'-6"								-	
V-1	18	3	-	4'-6"								-	
V-2	6	6	-	10'-0"								-	
V-3	4	6	-	9'-0"								-	
S-2	8	3	3	2'-10"		10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45	
S-3	9	3	3	3'-3 5/8"								-	SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 1/8"						90	

REBAR SCHEDULE - 11.0 x 5.0 x 10 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	12	4	-	4'-6"								-	
V-1	18	3	-	4'-6"								-	
V-2	6	6	-	10'-6"								-	
V-3	4	6	-	9'-6"								-	
S-2	8	3	3	2'-10"		10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45	
S-3	10	3	3	3'-3 5/8"								-	SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 1/8"						90	

REBAR SCHEDULE - 11.5 x 5.0 x 10 DBL TOP UNIT

MARK	QNTY	SIZE	TYPE	LGTH	B	C	D	E	H	K	O	ANGLE	REMARKS
H-1	12	4	-	4'-6"								-	
V-1	18	3	-	4'-6"								-	
V-2	6	6	-	11'-0"								-	
V-3	4	6	-	10'-0"								-	
S-2	8	3	3	2'-10"		10 3/8"	1'-2 3/8"	10 3/8"	7 1/2"	7 1/2"	2'-5"	45	
S-3	11	3	3	3'-3 5/8"								-	SEE BENDING DTL
TB-1	8	7	17	11'-7 1/8"	2'-2 1/4"	9'-6 1/8"						90	

DESIGNER:  
**THE NEEL COMPANY**  
8928-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

PRECASTER:  
**OLDCASTLE PRECAST, INC**  
11643 103RD STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

NOTE: ALL STEEL REINFORCING BARS SHALL HAVE 2" MIN. CONCRETE COVER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY T-WALL  
(2" COVER)**

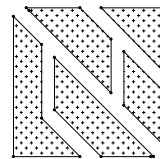
Names	Dates	Approved By
Designed By JMC	10/01/98	 State Structures Design Engineer
Drawn By CAA	10/01/98	
Checked By JMC	10/01/98	
Revision	00	
Sheet No.	21 of 21	Index No.
		5011

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

# STANDARD DETAILS

## ISOGRID® M.S.E. WALL SYSTEM

### DESIGNER



#### THE NEEL COMPANY

8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

### PRECASTER

#### OLDCASTLE PRECAST, INC.

11643 103rd STREET  
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### LEGEND

	PANEL WITH ONE SOIL REINFORCEMENT GRID		HORIZONTAL HALF-PANEL WITH ONE SOIL REINFORCEMENT GRID	
	PANEL WITH TWO SOIL REINFORCEMENT GRIDS		VERTICAL HALF-PANEL WITH ONE SOIL REINFORCEMENT GRID	
	PANEL WITH THREE SOIL REINFORCEMENT GRIDS		TL/BR & TR/BL QUARTER PANELS WITH ONE SOIL REINFORCEMENT GRID	
	PANEL WITH FOUR SOIL REINFORCEMENT GRIDS		SPECIAL HEIGHT PANELS (X-1 THRU X-5) WITH ONE SOIL REINFORCEMENT GRID	

DENOTES LIMITS OF DIFFERENT LENGTHS OF SOIL REINF. GRIDS

DESIGNER:



#### THE NEEL COMPANY

8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
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PRECASTER:

#### OLDCASTLE PRECAST, INC

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FX: (904) 778-2992

THIS SYSTEM SHALL BE USED IN MODERATELY OR SLIGHTLY AGGRESSIVE ENVIRONMENTS ONLY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

### RETAINING WALL SYSTEM THE NEEL COMPANY ISOGRID

Names		Dates		Approved By	
Designed By	JMC	10/01/98	 State Structures Design Engineer		
Drawn By	CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By	JMC	10/01/98	00	1 of 20	5012

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

MISCELLANEOUS NOTES:

1. DESIGNER:  
THE NEEL COMPANY  
8328-D TRAFORD LANE  
SPRINGFIELD, VA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859
2. PRECASTER:  
OLDCASTLE PRECAST INC.  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992
3. MATERIALS SUPPLIED BY PRECASTER:  
-PRECAST ISOGRID PANELS  
-GALVANIZED SOIL REINFORCEMENT GRID  
-GALVANIZED GRID LOCKING BAR  
-DIAGONAL JOINT MATERIAL AND ADHESIVE  
-VERTICAL JOINT MATERIAL

DESIGN NOTES:

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE RETAINING WALL VOLUME, METHODS OF CONSTRUCTION, AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO SPEC SECTION 548 - RETAINING WALL SYSTEMS.
2. SOIL PARAMETERS:  
-SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUE OF  $\phi$ ,  $c$  AND  $\gamma$  SHALL BE PROVIDED IN THE SHOP DRAWINGS
3. FACTORS OF SAFETY:  
-OVERTURNING - 2.0  
-SLIDING - 1.5  
-INTERNAL PULLOUT - 1.5 (ALLOWABLE DEFORMATION 0.75")  
-SOIL REINFORCEMENT GRID - 0.47  $F_y$  AT END OF DESIGN LIFE  
-BEARING CAPACITY - 2.5  
-OVERALL STABILITY - 1.5
4. THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL DESIGN DRAWINGS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE OWNER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.
5. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE NEEL COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF OTHERS

MATERIALS NOTES:

1. PRECAST CONCRETE:  
-PRECAST ISOGRID PANELS - PER SPEC SECTION 548  
-ARCHITECTURAL FINISH SHALL BE PLAIN STEEL FORM FINISH UNLESS OTHERWISE SPECIFIED ON THE RETAINING WALL CONTROL PLANS.
2. C.I.P. CONCRETE:  
-C.I.P. LEVELING PAD - PER SPEC SECTION 548  
-OTHER C.I.P. CONCRETE - PER SPEC SECTION 548
3. REINFORCING STEEL:  
-PER SPEC SECTION 548  
-6" x 6" WELDED GRID, D8 x D8 WIRE  
OR  
-#3 REBAR @ 6" O.C. EACH WAY  
-WELDED PER ASTM A497 PRIOR TO GALVANIZATION
4. CONNECTION INSERT:  
-PER SPEC SECTION 548  
-WII WIRE  
-WELDED PER ASTM A185 PRIOR TO GALVANIZATION
5. LOCKING BAR:  
-PER SPEC SECTION 548
6. SOIL REINFORCEMENT GRIDS:  
-PER SPEC SECTION 548  
-WII WELDED WIRE GRIDS:  
-5 LONGITUDINAL WIRES @ 6" O.C., LENGTH AS REQUIRED BY DESIGN  
-2' LONG TRANSVERSE BARS AT 6" OR 12" O.C., AS REQUIRED BY DESIGN  
-SOIL GRID LENGTHS SHOWN ON ISOGRID DESIGN DRAWINGS ARE NOMINAL LENGTHS AS REQUIRED BY DESIGN CALCULATIONS. DUE TO MANUFACTURING TOLERANCES, ACTUAL GRID LENGTHS MAY BE LONGER.
7. JOINT MATERIAL:  
-DIAGONAL JOINT FILLER:  
-1/2" x 4" x 4'-2"  
-PREFORMED EPDM  
-DUROMETER: 80 - 90  
-DIAGONAL JOINT BACKING:  
-MIRAFIL 140N OR EQUAL  
-12" WIDE x LENGTH OF JOINT  
-GEOTEXTILE MEETING REQUIREMENTS OF SPEC SECTION 548  
-WEEPHOLE COVER:  
-TENSAR DC4205 OR EQUAL  
-6" x 6 1/2" (MIN)  
-GEOCOMPOSITE MEETING REQUIREMENTS OF SPEC SECTION 548
8. BACKFILL:  
-PER SPEC SECTION 548

CONSTRUCTION NOTES:

1. ALL CONSTRUCTION PROCEDURES SHALL COMPLY WITH SPEC SECTION 548-8 AND THE "ISOGRID CONSTRUCTION MANUAL" (PROVIDED BY THE NEEL COMPANY OR OLDCASTLE PRECAST, INC). IN THE EVENT OF A DISCREPANCY BETWEEN THE SPEC AND THE "ISOGRID CONSTRUCTION MANUAL", THE SPEC SHALL CONTROL.
2. FOR LOCATION AND ALIGNMENT OF ISOGRID STRUCTURE, SEE RETAINING WALL CONTROL PLANS.
3. ISOGRID STRUCTURES ON CURVES SHALL BE BUILT IN CHORDS AS SHOWN IN THE ISOGRID DESIGN DRAWINGS.
4. IF MANHOLES OR DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN IN THE ISOGRID DESIGN DRAWINGS.
5. IF PILES ARE LOCATED WITHIN THE RETAINING WALL VOLUME, THEY SHALL BE DRIVEN BEFORE CONSTRUCTION OF THE ISOGRID STRUCTURE UNLESS A METHOD TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE NEEL COMPANY, IS SUBMITTED AND APPROVED IN WRITING.
6. IF A STRUCTURE EXCEEDS 20' IN HEIGHT, THE FINISH GRADE AT THE FACE OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS 20' IN HEIGHT.
7. IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR GUARDRAIL POSTS WHICH ARE WITHIN THE RETAINING WALL VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING GRIDS AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.
8. TOP PANELS ON WALLS WITH CAST-IN PLACE COPING SHALL HAVE #4 REBAR PROTRUDING FROM THEIR TOP EDGE.
9. BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE SPECIFICATIONS FOR MSE WALLS TO A LEVEL OF APPROXIMATELY 2" ABOVE THE CONNECTION INSERT EMBEDDED IN THE PANELS. INSTALLATION OF THE SOIL REINFORCEMENT SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.
10. COMPACTION AND OPERATION EQUIPMENT SHALL BE KEPT A MINIMUM DISTANCE OF 3' FROM THE BACK FACE OF THE ISOGRID PANELS. COMPACTION WITHIN 3' OF THE ISOGRID PANEL SHALL BE 90% OF AASHTO T-180.
11. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING GRIDS DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPERATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPERELEVATION AND/OR SOIL MIXING ARE ANTICIPATED.
12. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING STORM WATER DRAINAGE IN THE VICINITY OF THE WALL DURING CONSTRUCTION. STORMWATER RUNOFF SHALL BE COLLECTED AND DISCHARGED AWAY FROM THE WALL AND THE RETAINING WALL VOLUME.

DESIGNER:



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PRECASTER:

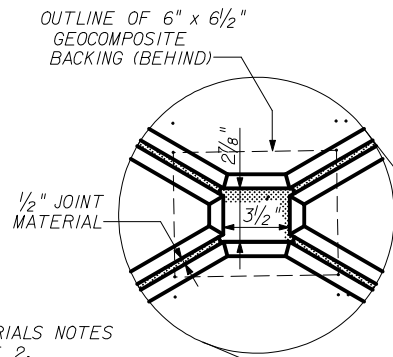
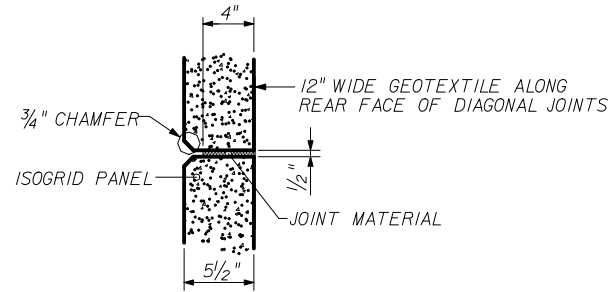
**OLDCASTLE PRECAST, INC**  
11643 103rd STREET  
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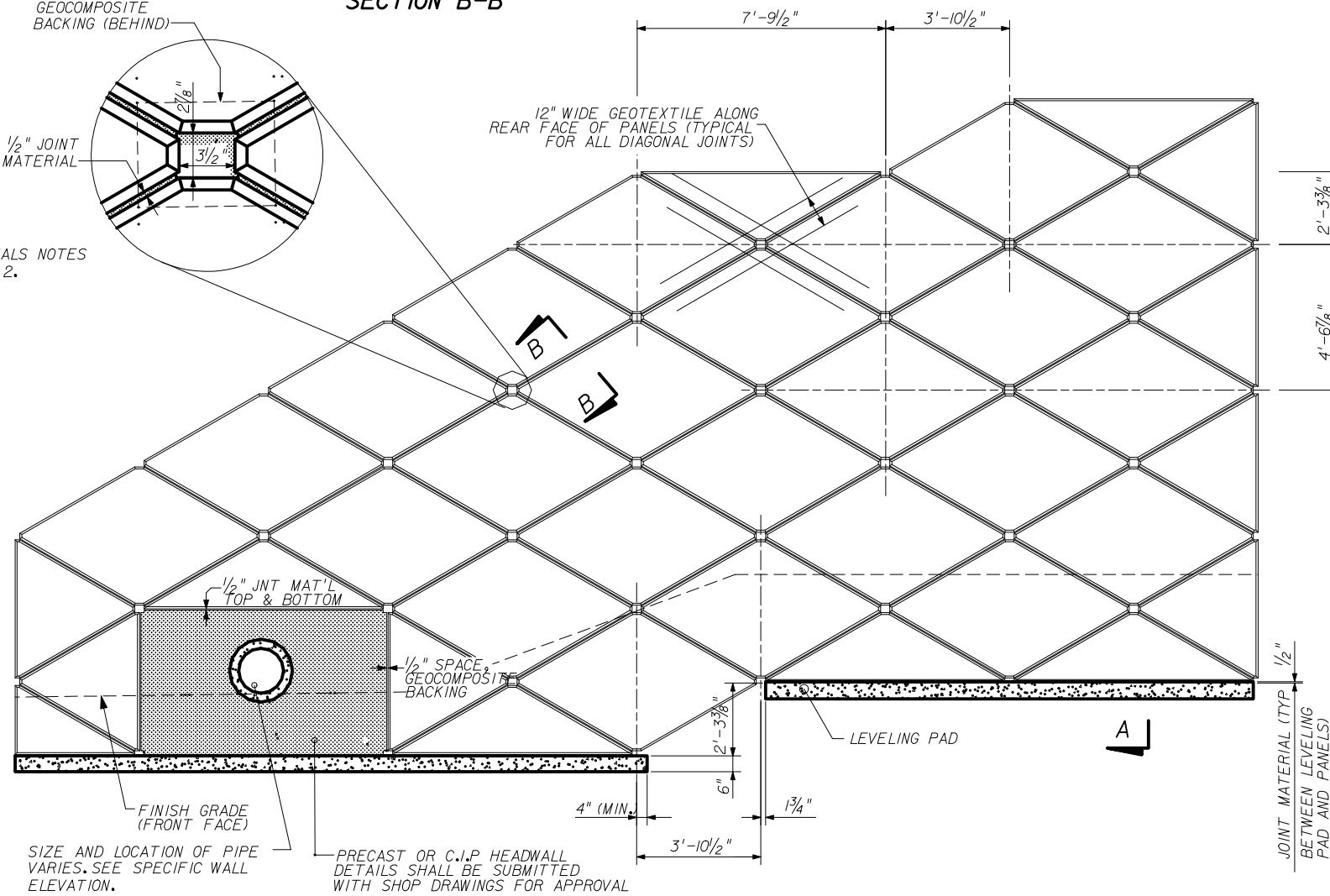
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
THE NEEL COMPANY ISOGRID

Names		Dates		Approved By		
Designed By	JMC	10/01/98	 State Roadway Design Engineer			
Drawn By	CAA	10/01/98				
Checked By	JMC	10/01/98	Revision	00	Sheet No.	2 of 20
			Index No.	5012		

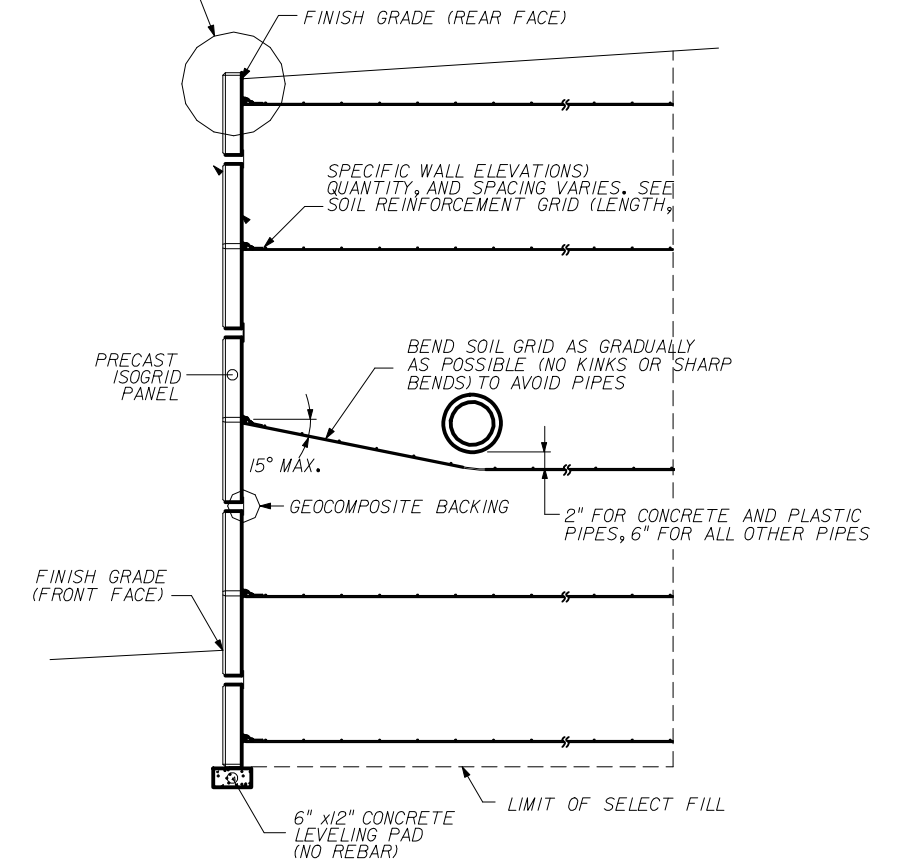


NOTE: FOR MATERIALS NOTES SEE SHEET 2.



ELEVATION (FRONT FACE) SHOWING TYPICAL DETAILS

TOP OF WALL TREATMENT VARIES, SEE SPECIFIC WALL ELEVATIONS AND ISOGRID STANDARD DRAWINGS FOR DETAILS




SECTION A-A SHOWING TYPICAL DETAILS

DESIGNER:  
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
 THE NEEL COMPANY ISOGRID

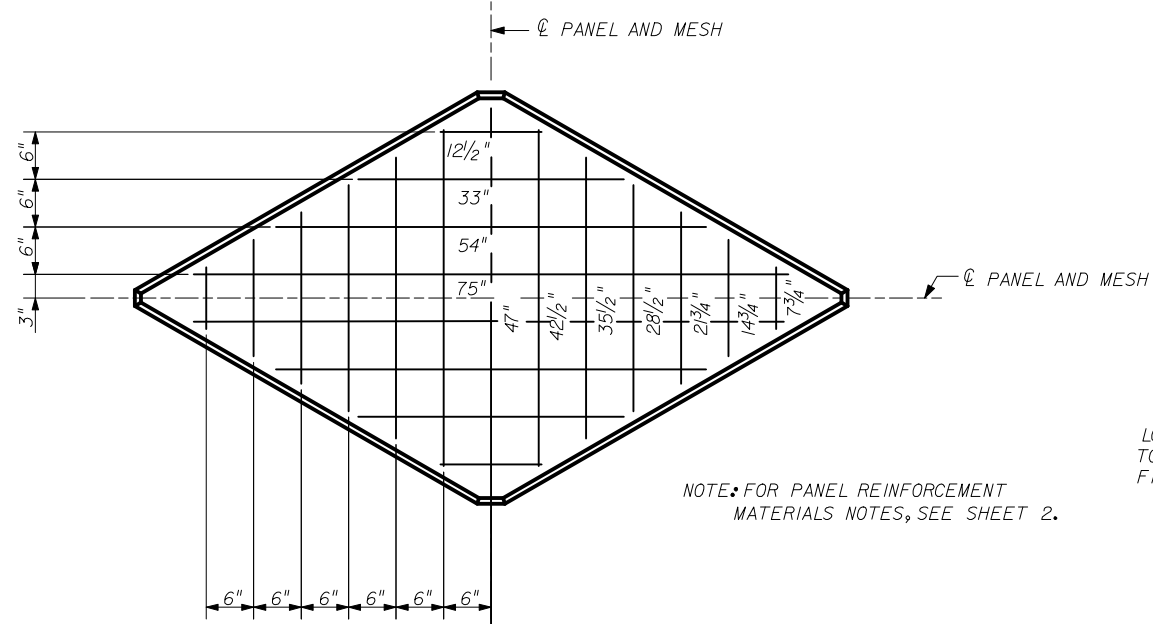
Names	Dates	Approved By		
Designed By	JMC 03/01/98	 State Structures Design Engineer		
Drawn By	CAA 03/01/98			
Checked By	JMC 03/01/98	00	3 of 20	5012

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
 \*\*\*\*\*SYTIME\*\*\*\*\*

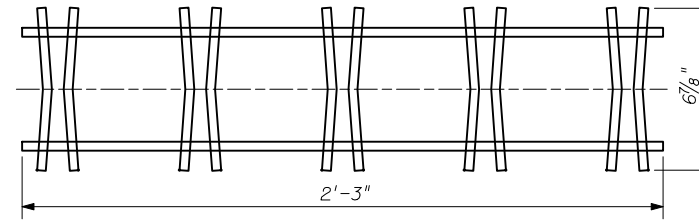


**NOTE:**

PANEL IS HANDLED BY LIFTING DEVICE THAT ATTACHES TO CONNECTION INSERT



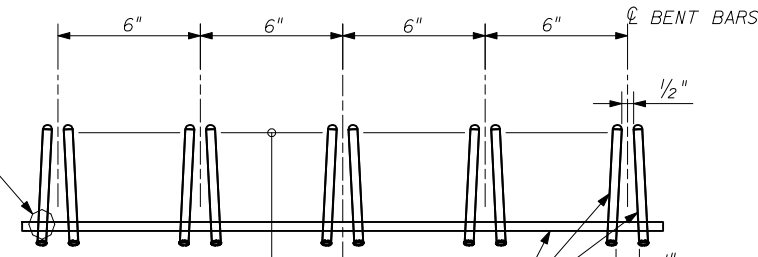
NOTE: FOR PANEL REINFORCEMENT MATERIALS NOTES, SEE SHEET 2.



TOP VIEW

NOTE: FOR CONNECTION INSERT MATERIALS NOTES, SEE SHEET 2.

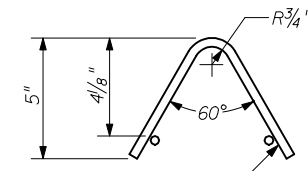
LONGITUDINAL WIRES TO BE WELDED TO BENT WIRES WHILE HELD IN A JIG FIXTURE (PRIOR TO GALVANIZATION).



INSIDE OF EACH BEND MUST BE WITHIN 1/16" (\*) OF INSIDE OF ALL OTHER BENDS TO ASSURE PROPER BEARING UPON LOCKING BAR.

SIDE VIEW

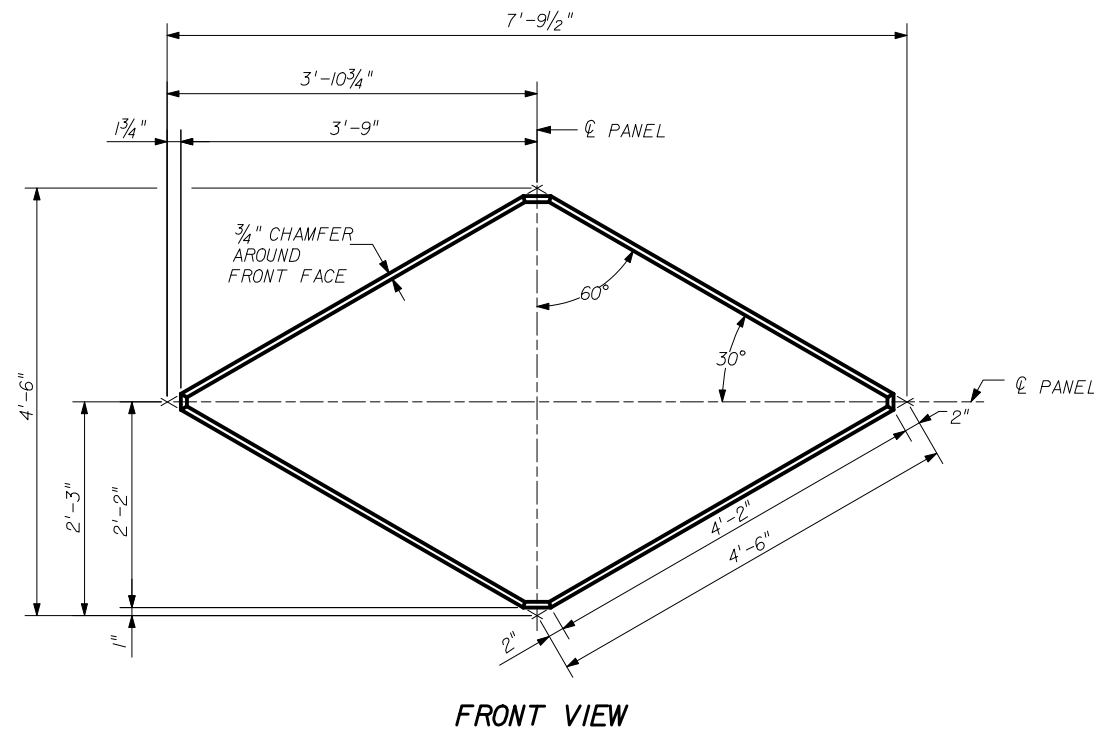
WIRE SIZE TO BE EQUAL TO SOIL REINFORCEMENT GRID WIRE SIZE



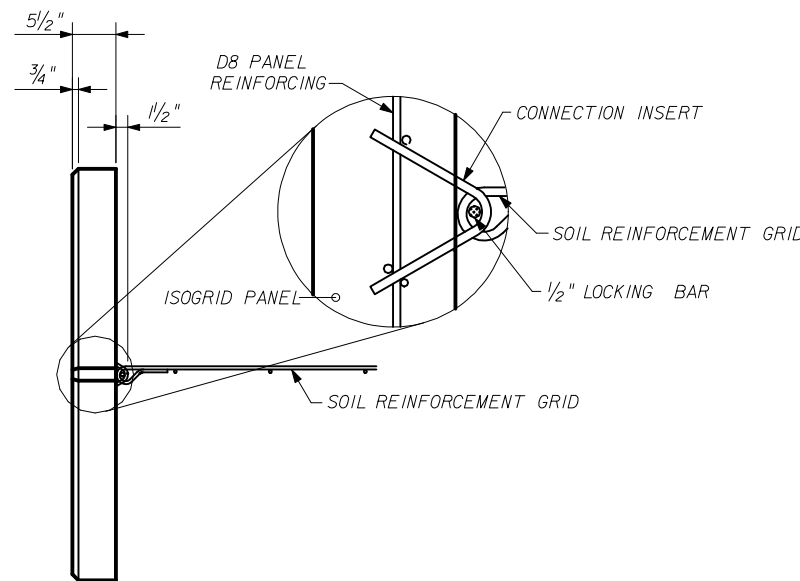
END VIEW

12" LENGTH OF WIRE BEFORE BENDING

**WELDED WIRE MESH PANEL REINFORCEMENT**



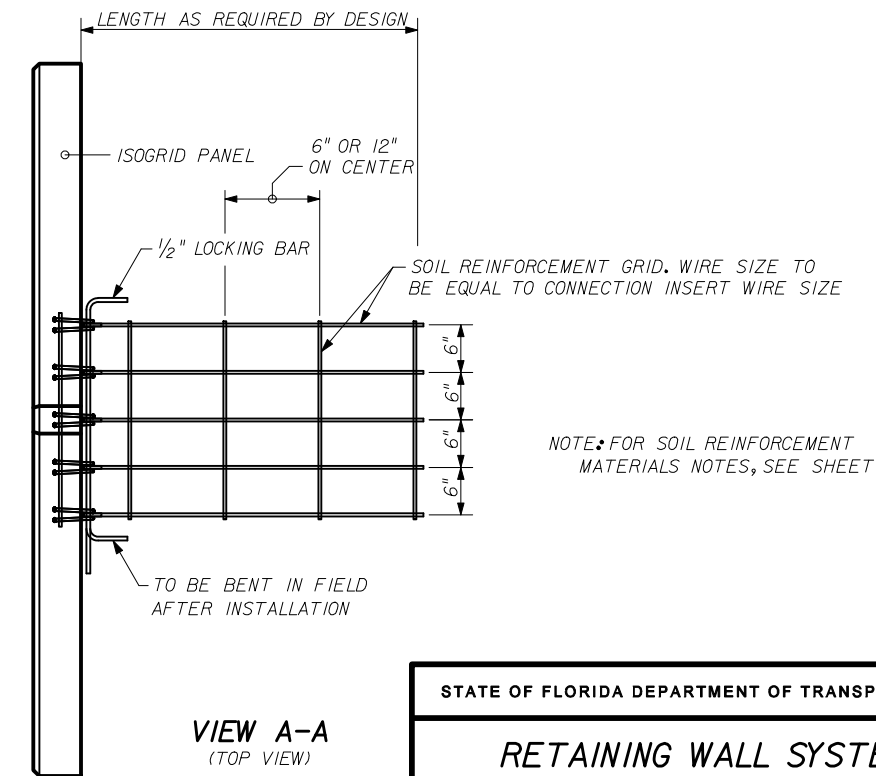
FRONT VIEW



SIDE VIEW

**FULL-SIZE PANEL TYPICAL DIMENSIONS**

**CONNECTION INSERT**



VIEW A-A (TOP VIEW)

NOTE: FOR SOIL REINFORCEMENT MATERIALS NOTES, SEE SHEET 2.

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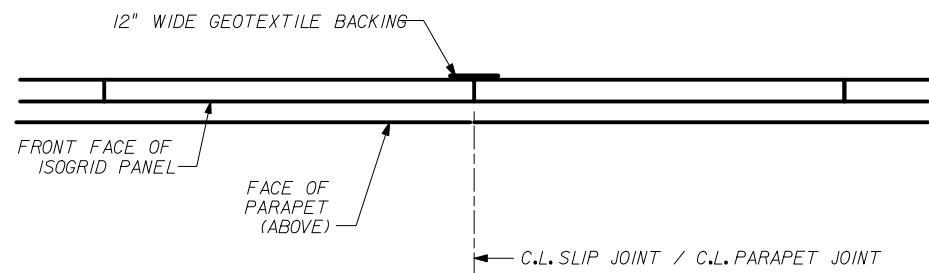
PRECASTER:

**OLDCASTLE PRECAST, INC.**  
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JACKSONVILLE, FL 32210  
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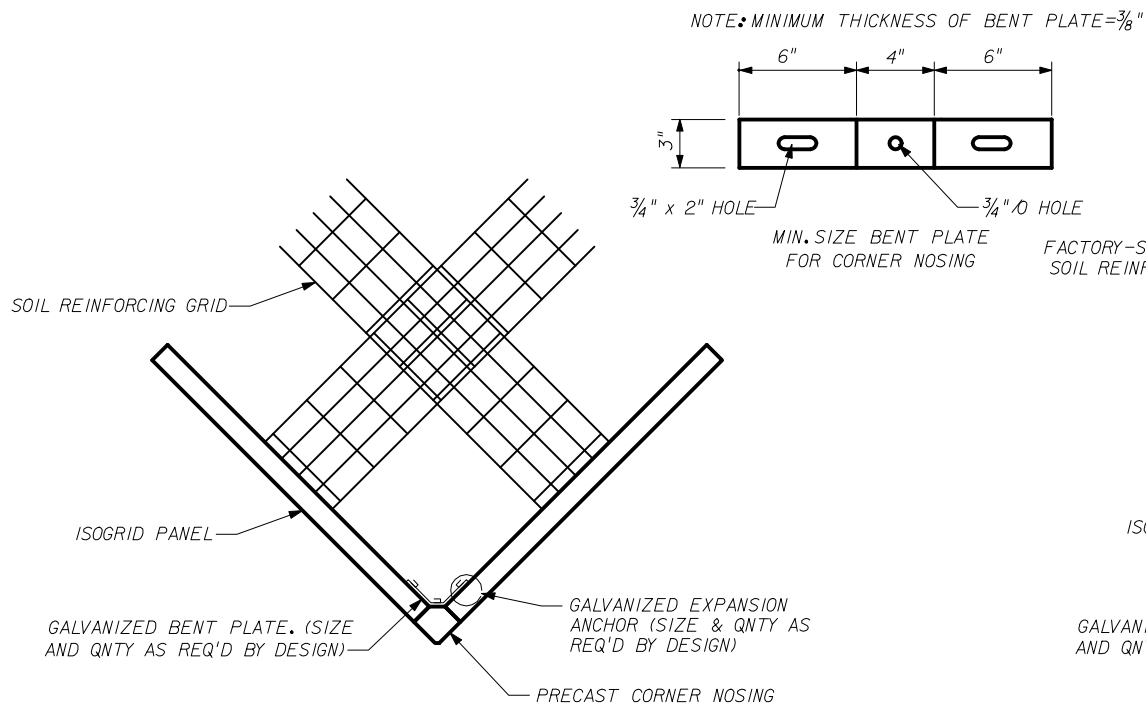
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY ISOGRID**

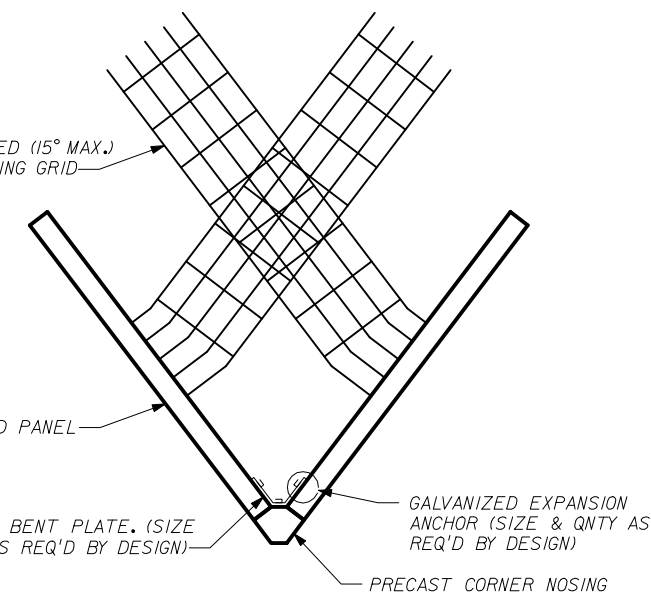
Names	Dates	Approved By		
Designed By	JMC	10/01/98	 State Structures Design Engineer	
Drawn By	CAA	10/01/98		
Checked By	JMC	10/01/98	Revision	Sheet No.
			00	4 of 20
				Index No.
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**PART PLAN  
SLIP JOINT DETAIL**

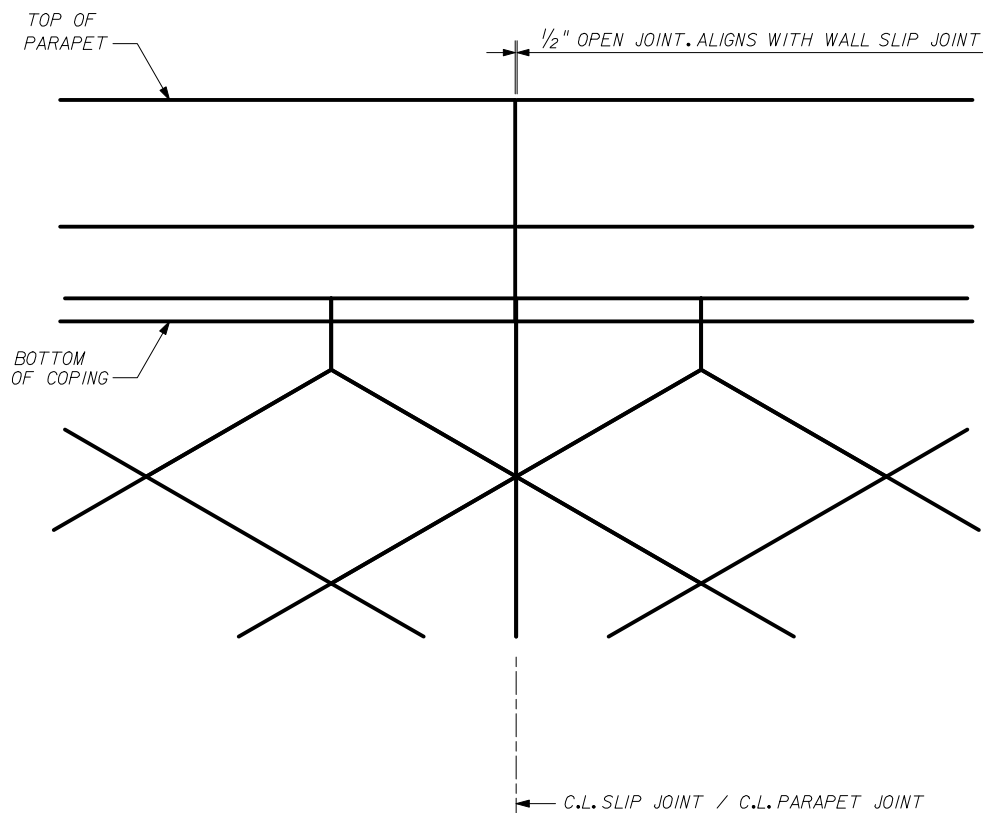


**PART PLAN  
STD CORNER DETAIL**

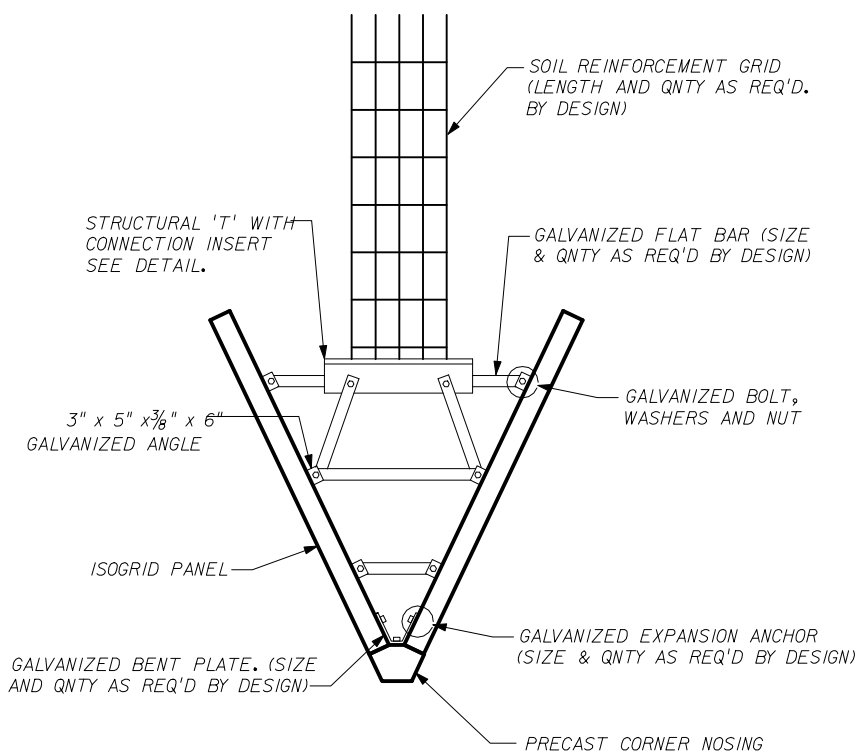


**PART PLAN  
MILD (65° MIN.) ACUTE CORNER DETAIL**

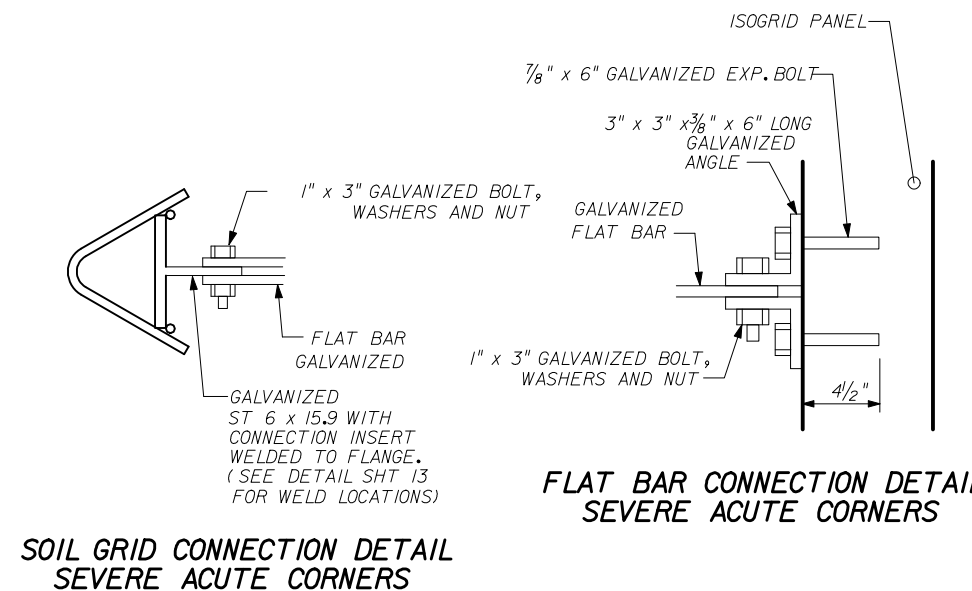
APPLIES UNTIL GRID CONFLICTS  
WITH ADJACENT PANELS



**PART ELEVATION  
SLIP JOINT DETAIL**



**PART PLAN  
SEVERE ACUTE CORNER DETAIL**



**SOIL GRID CONNECTION DETAIL  
SEVERE ACUTE CORNERS**

**FLAT BAR CONNECTION DETAIL  
SEVERE ACUTE CORNERS**

DESIGNER:




**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
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Ph: (703) 913-7858  
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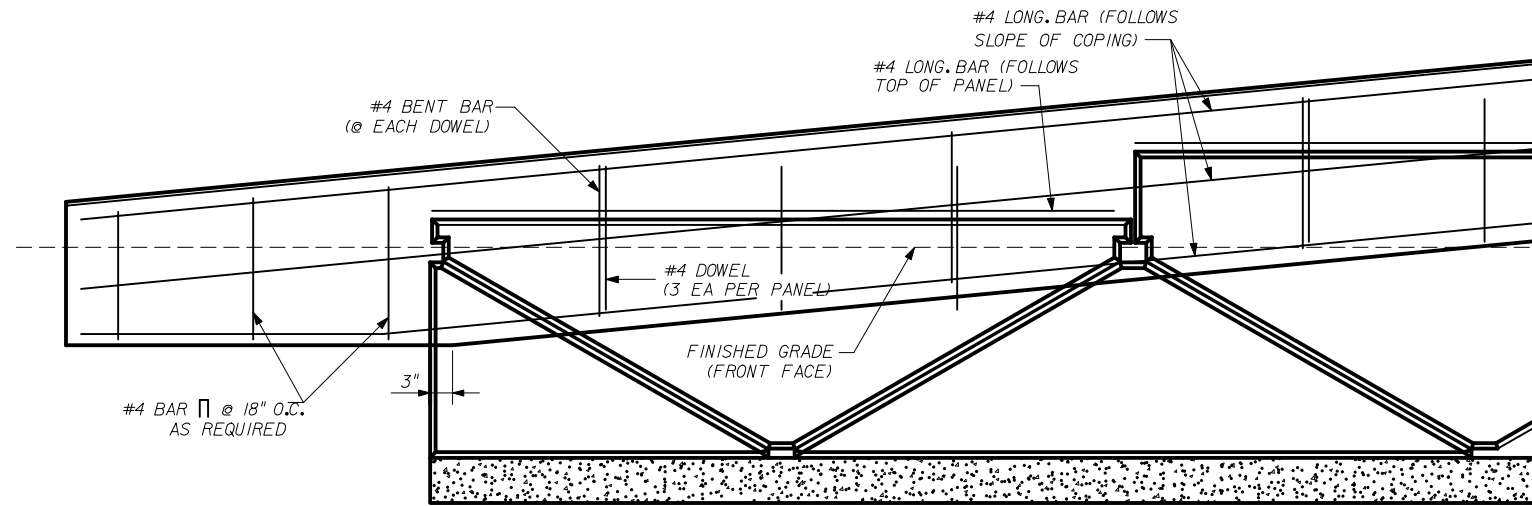
PRECASTER:

**OLDCASTLE PRECAST, INC.**  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
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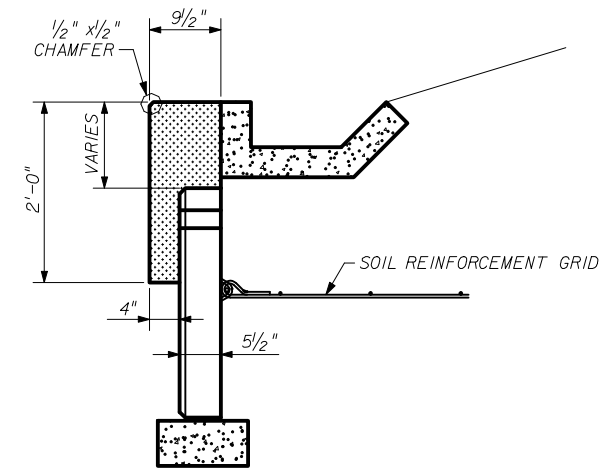
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
THE NEEL COMPANY ISOGRID**

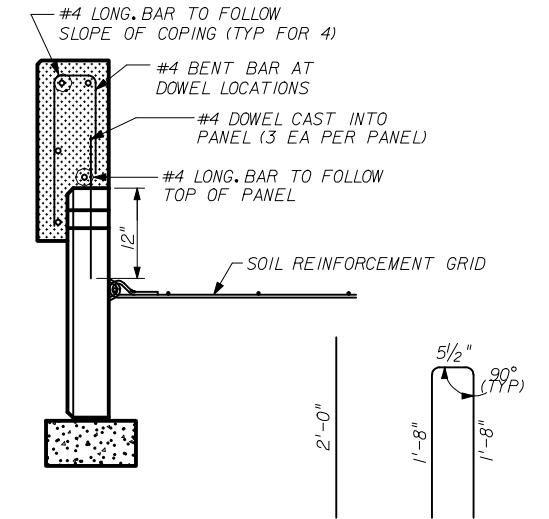
Names	Dates	Approved By		
Designed By	JMC	10/01/98	 State Structures Design Engineer	
Drawn By	CAA	10/01/98		
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			Sheet No.	5 of 20
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C.I.P. COPING TREATMENT AT BEGINNING/END OF WALLS



C.I.P. COPING DIMENSIONS

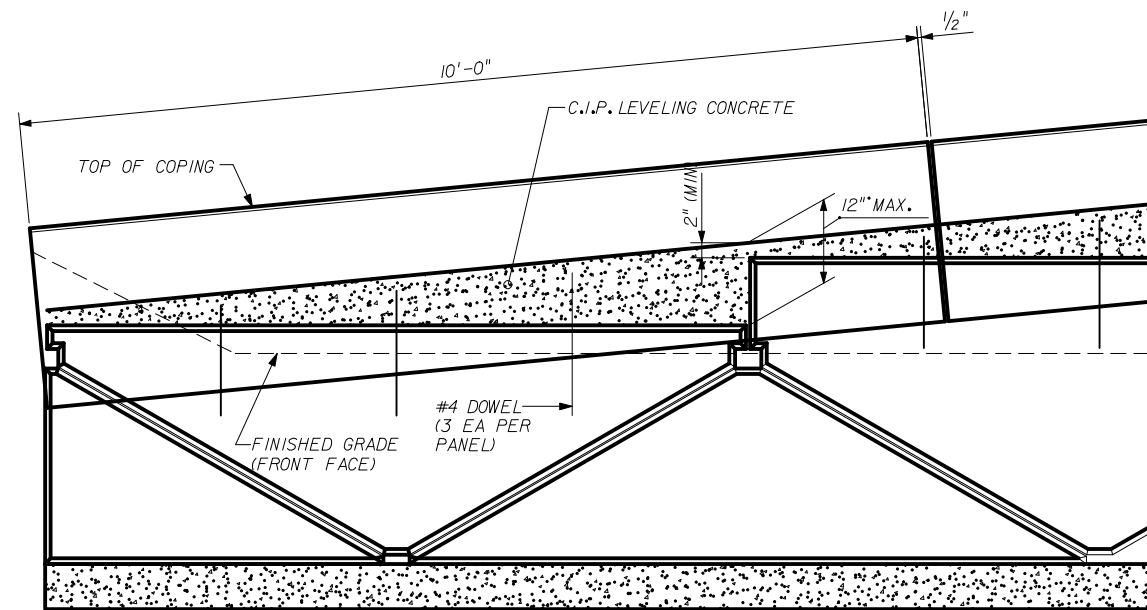


C.I.P. COPING REBAR

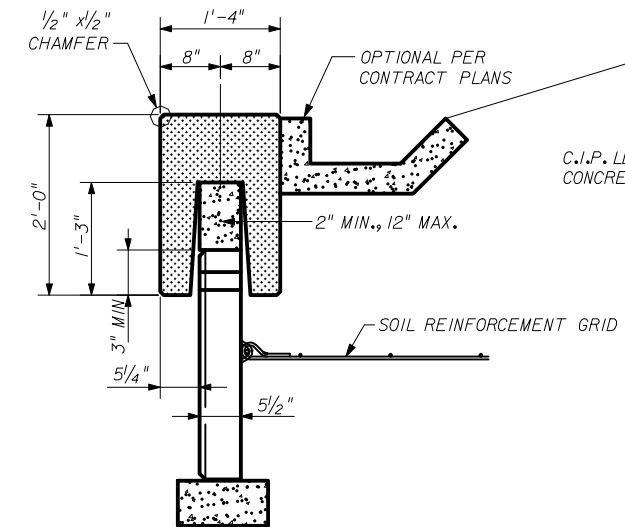
#4 DOWEL #4 BENT BAR

**C.I.P. COPING REBAR DETAILS**

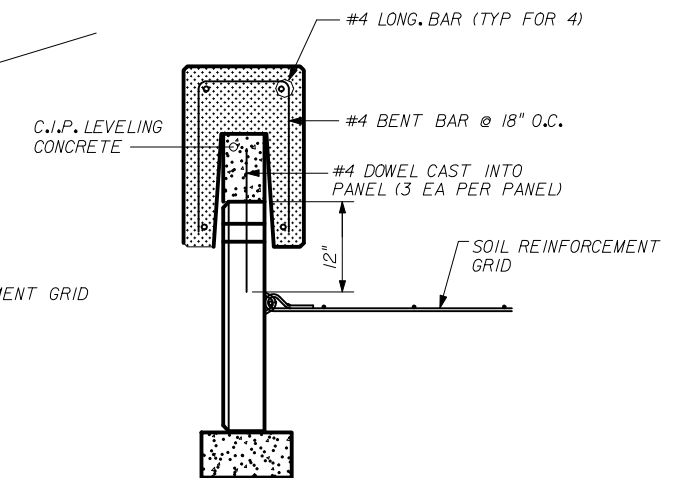
BENT BAR AND DOWEL TO BE FIELD-TRIMMED AS REQUIRED TO PROVIDE MIN OF 2" OF CONCRETE COVER



PRECAST COPING - PART ELEVATION



PRECAST COPING DIMENSIONS



PRECAST COPING REBAR


DESIGNER:  

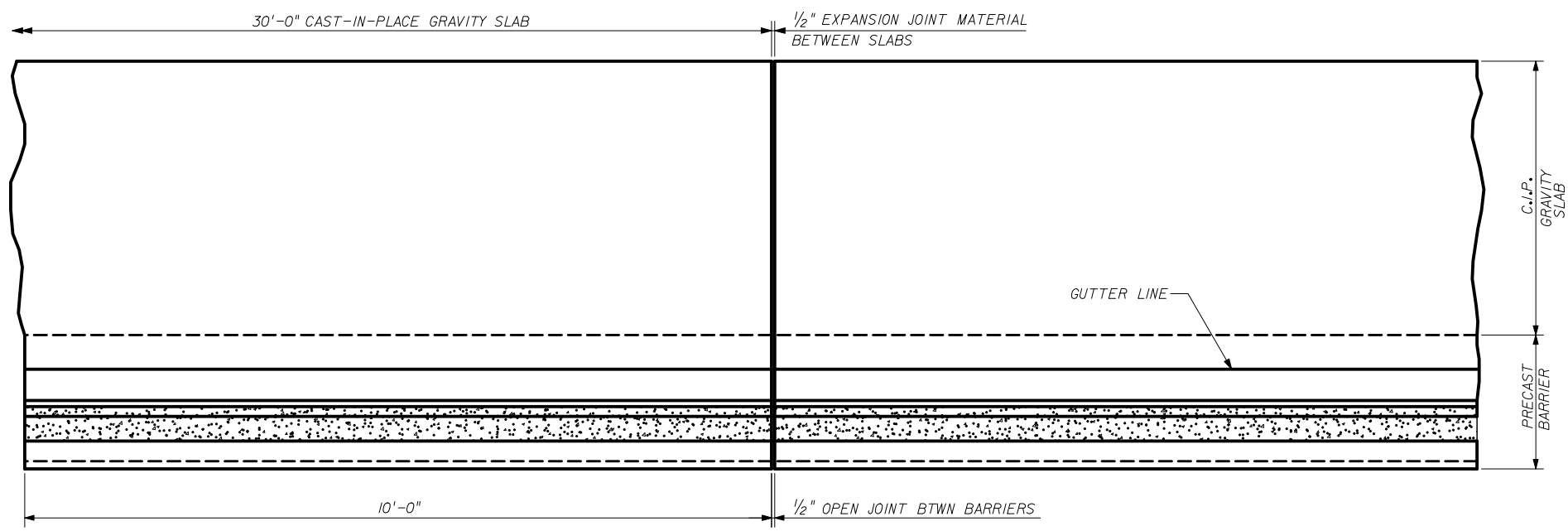
**THE NEEL COMPANY**  
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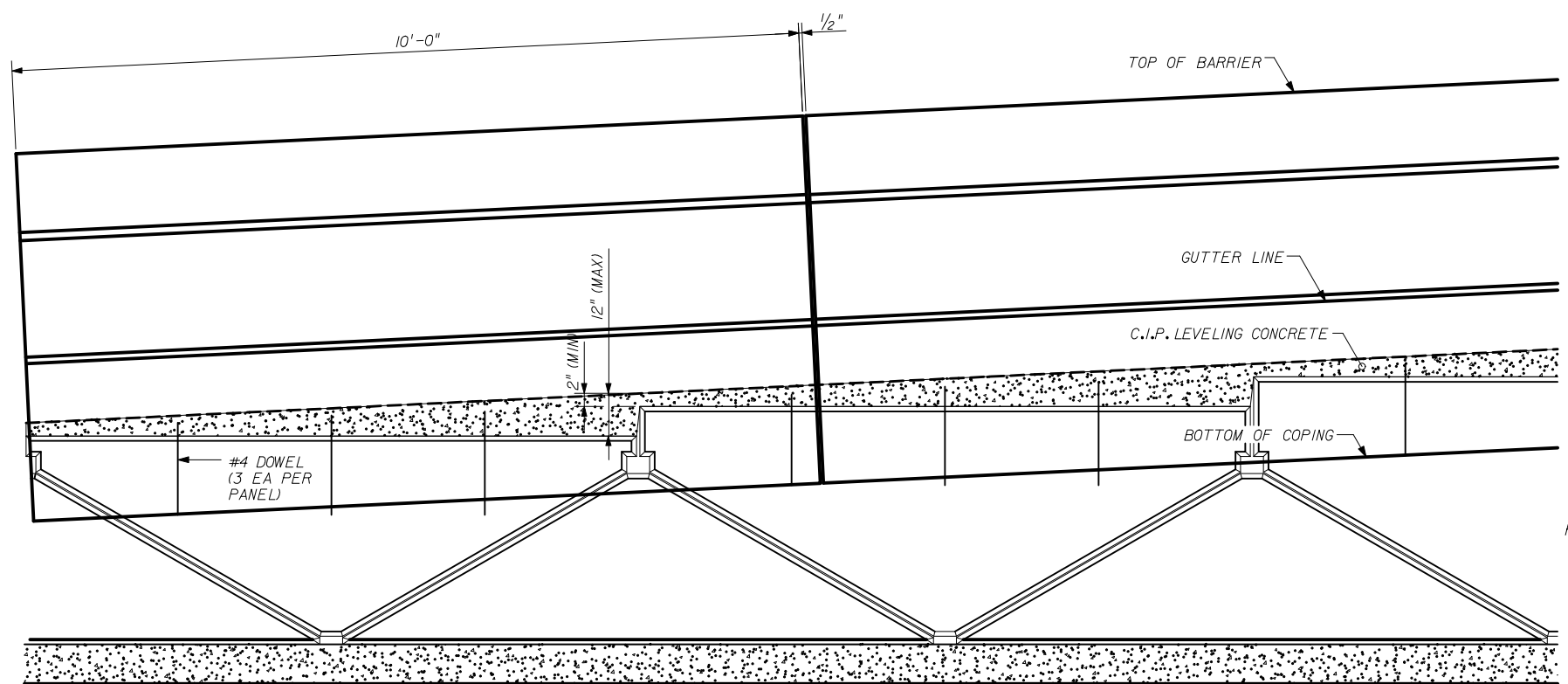
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
 THE NEEL COMPANY ISOGRID**

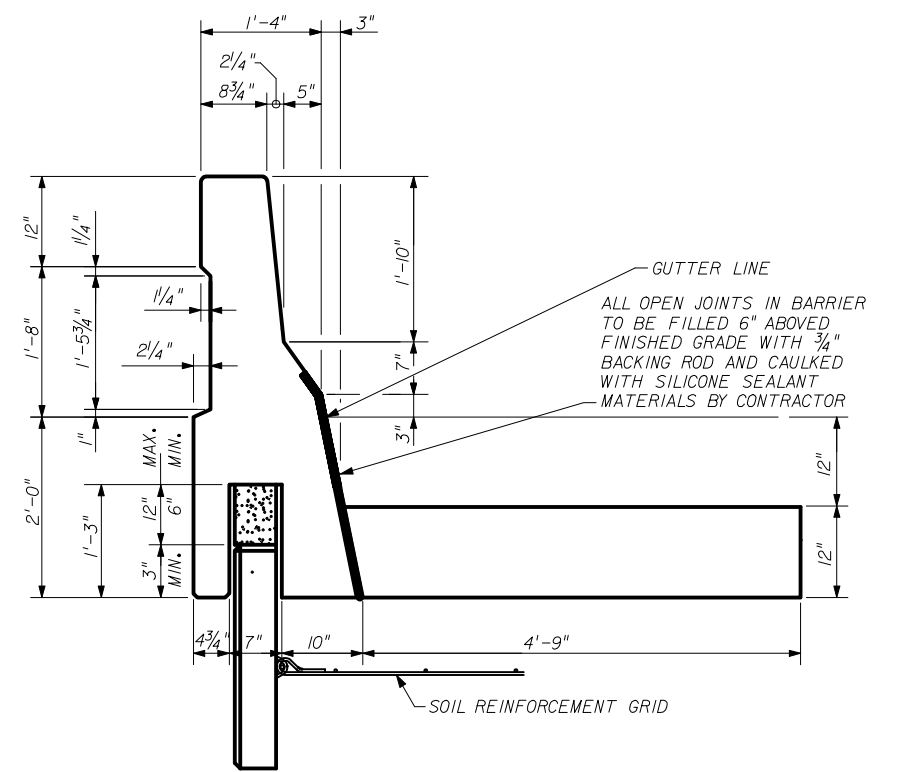
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Drawn By	CAA	10/01/98	Revision	Sheet No.	Index No.
Checked By	JMC	10/01/98	00	6 of 20	5012



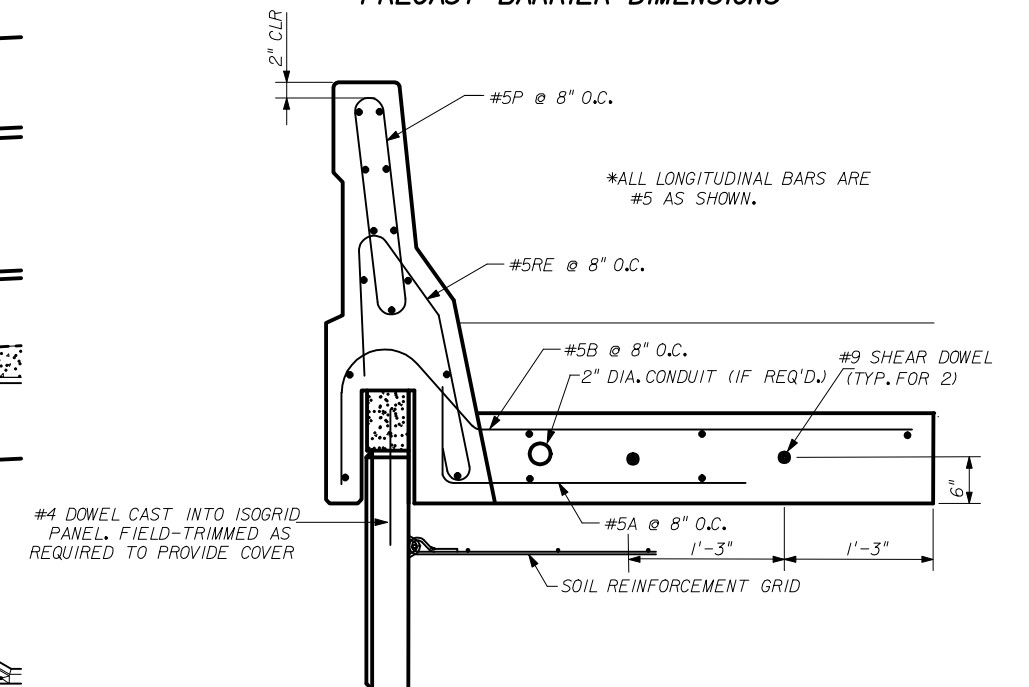
PART PLAN - PRECAST BARRIER



PART ELEVATION - PRECAST BARRIER



PRECAST BARRIER DIMENSIONS

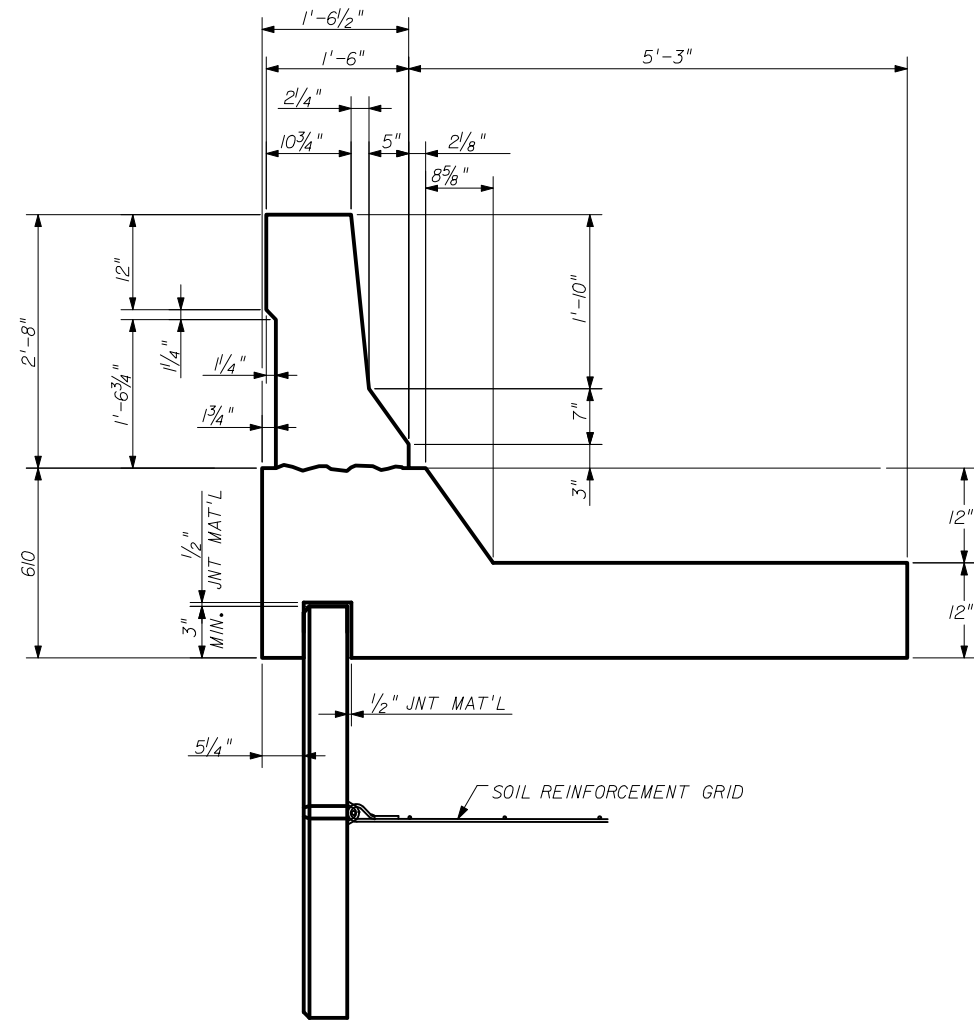


PRECAST BARRIER REBAR

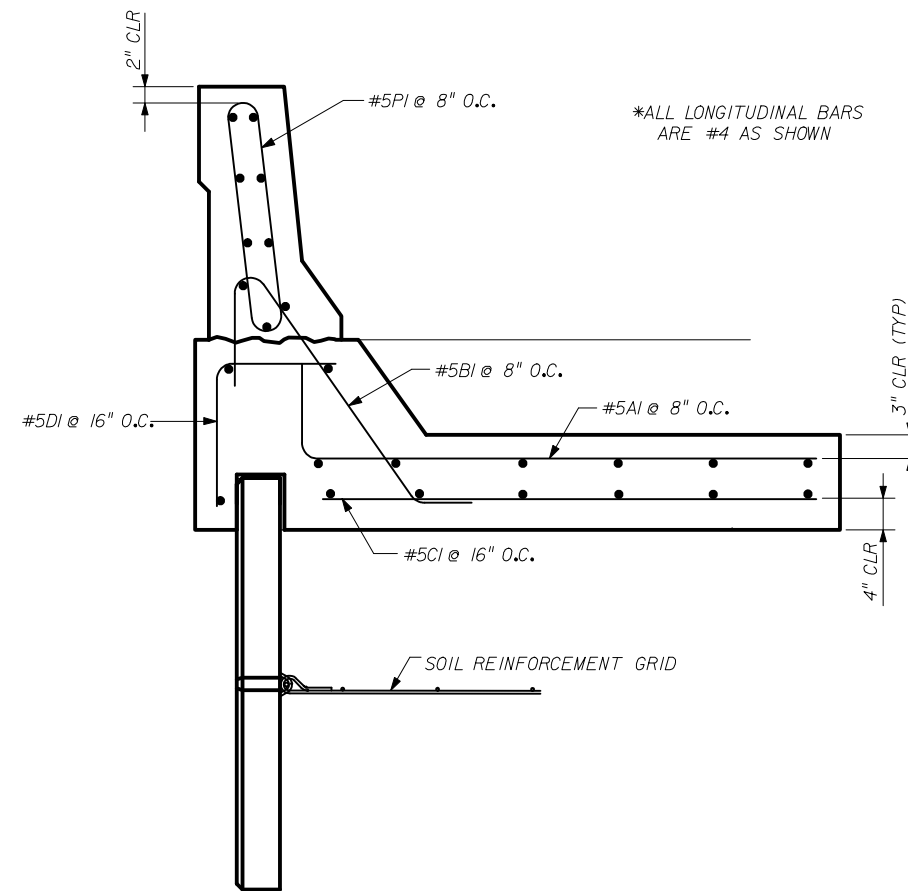
DESIGNER: **THE NEEL COMPANY**  
 8328-D TRAFORD LANE  
 SPRINGFIELD, VIRGINIA 22152  
 PH: (703) 913-7858  
 FX: (703) 913-7859

PRECASTER: **OLDCASTLE PRECAST, INC.**  
 11643 103rd STREET  
 JACKSONVILLE, FL 32210  
 PH: (904) 778-2990  
 FX: (703) 913-7859

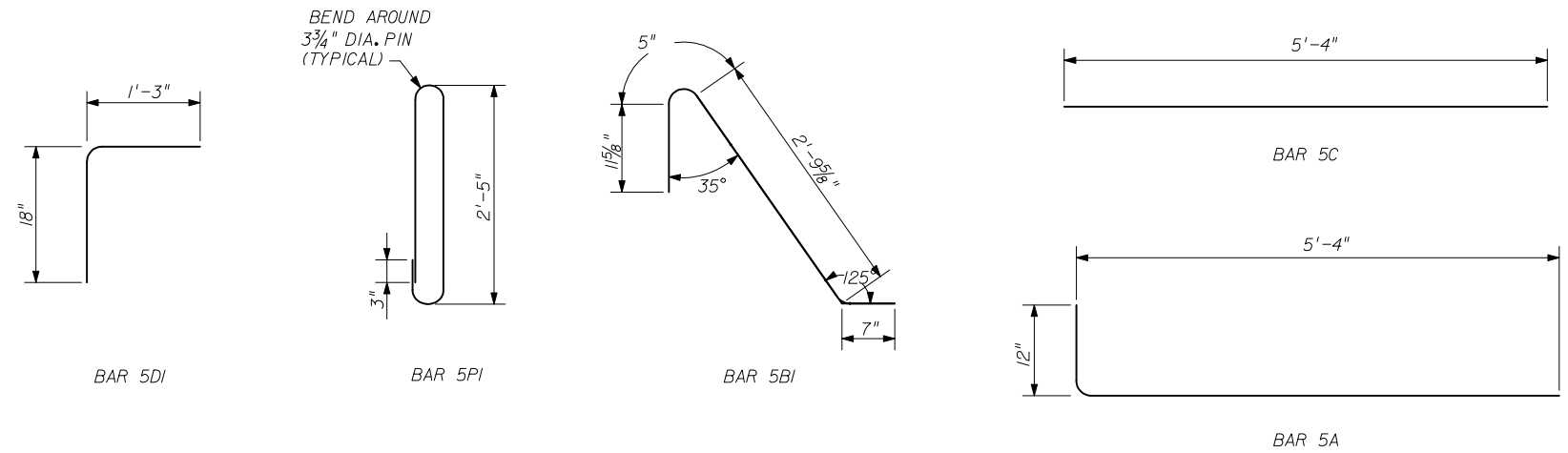
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM</b>				
<b>THE NEEL COMPANY ISOGRID</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By JMC	10/01/98	State Structures Design Engineer		
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C.I.P. BARRIER AND C.I.P. JUNCTION SLAB DIMENSIONS



C.I.P. BARRIER AND C.I.P. JUNCTION SLAB REBAR




C.I.P. BARRIER REBAR DETAILS

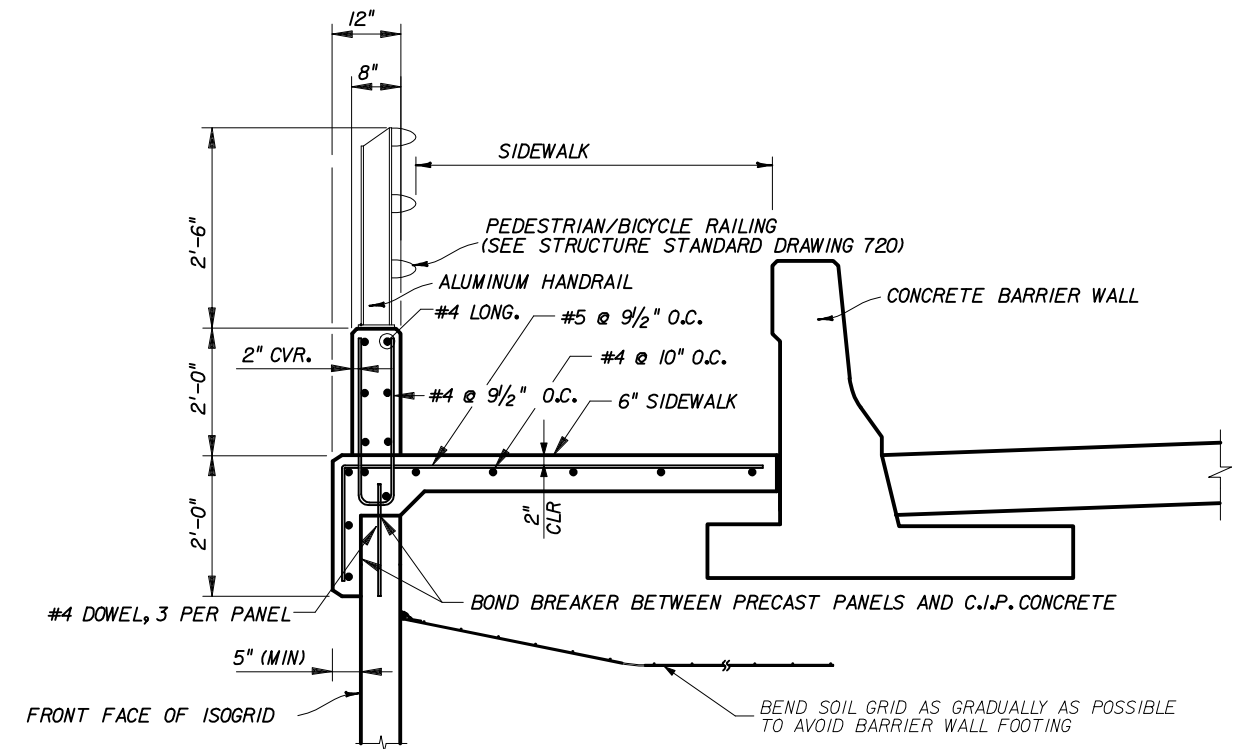
DESIGNER:  
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C.I.P. PARAPET DETAIL W/ HANDRAIL

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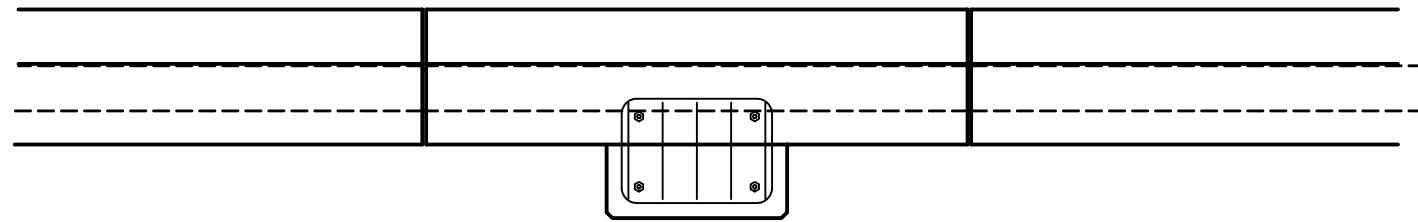
PRECASTER:

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 11643 103rd STREET  
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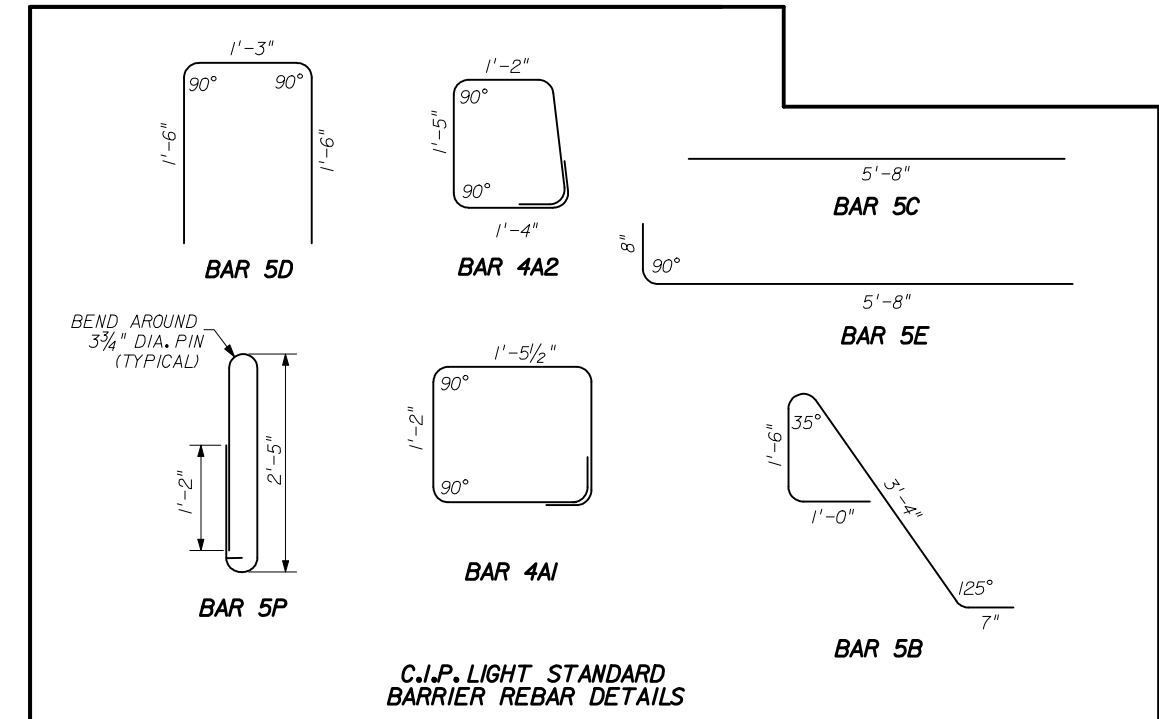
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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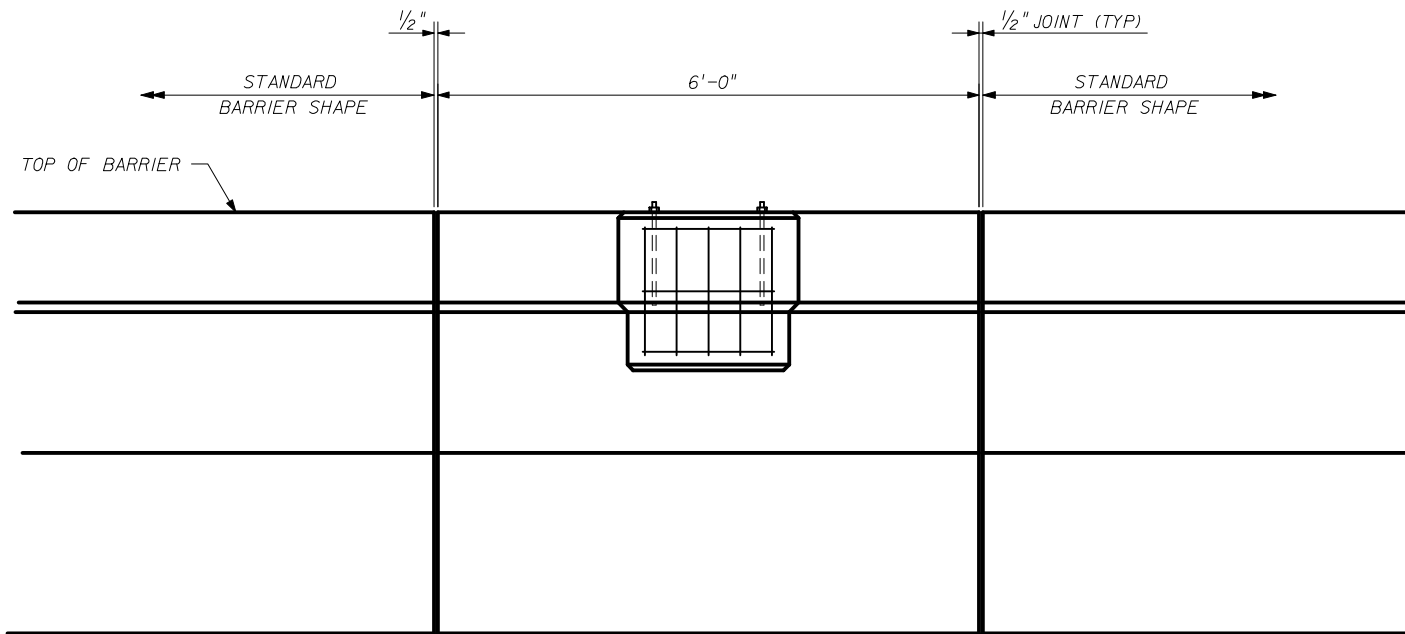


C.I.P. LIGHT STANDARD BARRIER - PART PLAN WITH REBAR  
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)

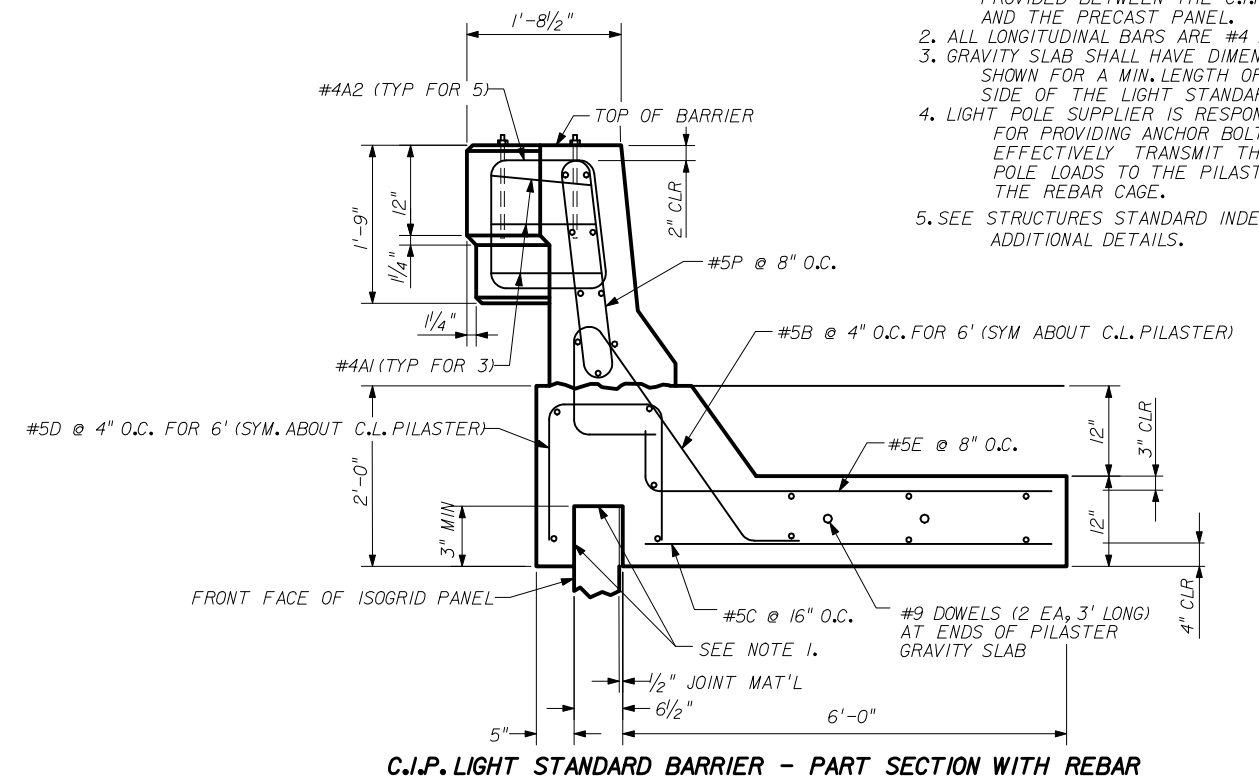


C.I.P. LIGHT STANDARD BARRIER REBAR DETAILS

- NOTES
1. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN THE C.I.P. CONC. AND THE PRECAST PANEL.
  2. ALL LONGITUDINAL BARS ARE #4 AS SHOWN.
  3. GRAVITY SLAB SHALL HAVE DIMENSIONS SHOWN FOR A MIN. LENGTH OF 10'-0" EITHER SIDE OF THE LIGHT STANDARD BARRIER.
  4. LIGHT POLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND FIT THE REBAR CAGE.
  5. SEE STRUCTURES STANDARD INDEX 500 FOR ADDITIONAL DETAILS.



C.I.P. LIGHT STANDARD BARRIER - PART ELEVATION  
(BARRIER AND GRAVITY SLAB REBAR OMITTED FOR CLARITY)



C.I.P. LIGHT STANDARD BARRIER - PART SECTION WITH REBAR

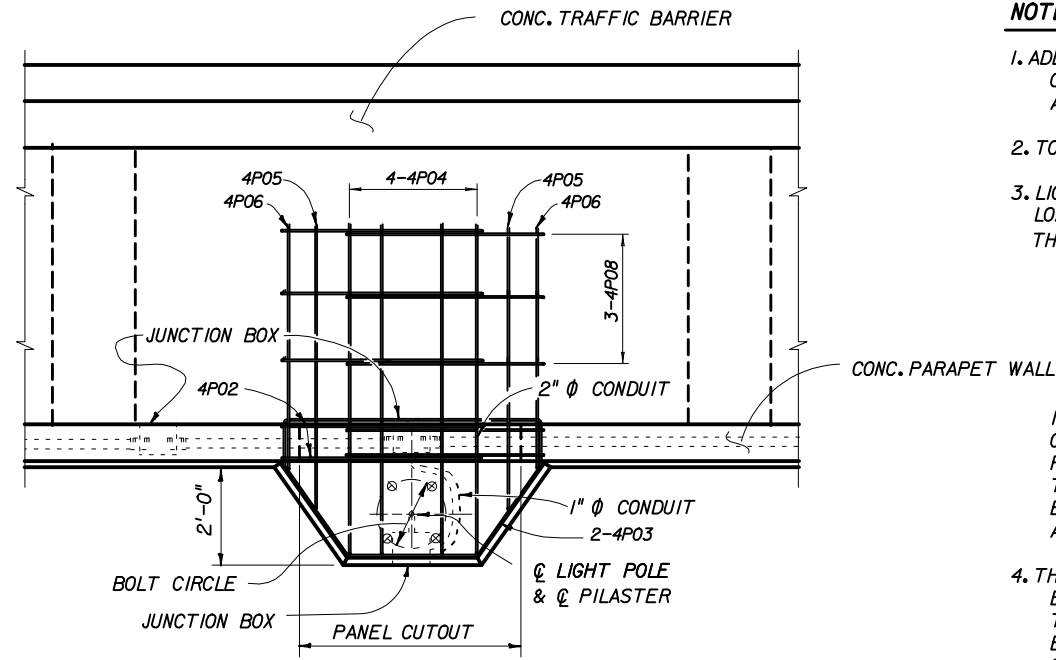
DESIGNER:  
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Ph: 17031 913-7858  
Fx: 17031 913-7859

PRECASTER:  
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JACKSONVILLE, FL 32210  
Ph: 19041 778-2990  
Fx: 19041 778-2992

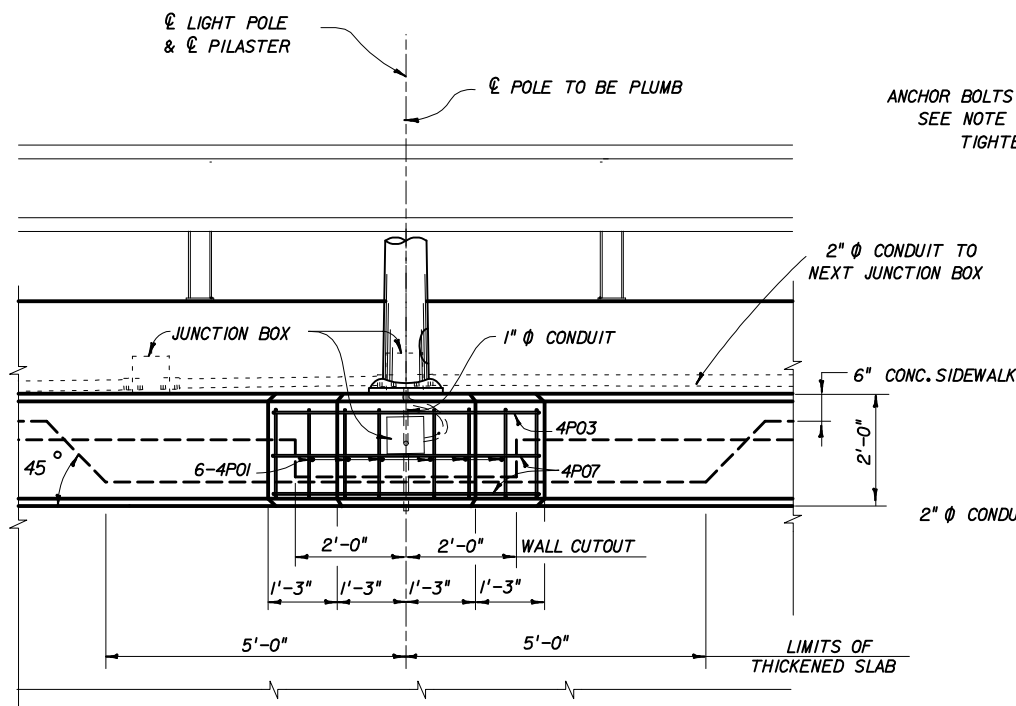
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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PLAN



LIGHT PILASTER DETAIL

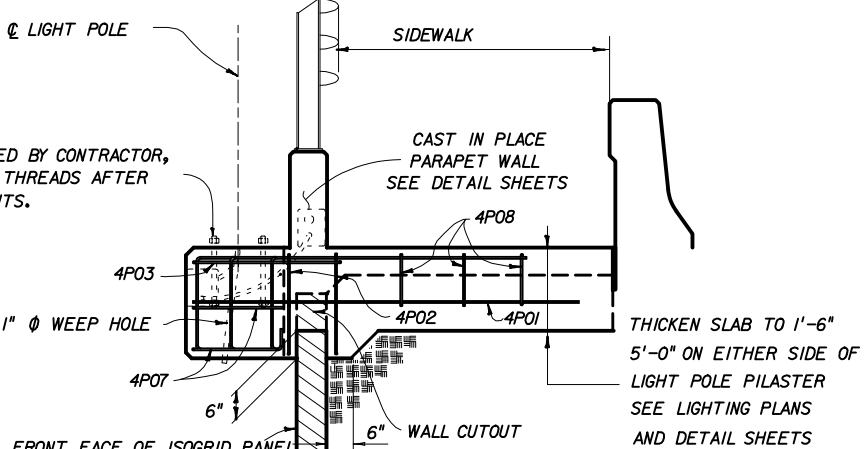
NOTES

- ADDITIONAL CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTER SHALL MEET THE SAME REQUIREMENTS AS THAT OF THE PARAPET WALL.
- TOP OF PILASTER SHALL BE FINISHED TO A TRULY LEVEL AREA.
- LIGHT POLE PILASTER IS DESIGNED TO RESIST WORKING LOADS (IN ANY DIRECTION) FROM THE LIGHT POLE APPLIED AT THE TOP OF THE PILASTER AS FOLLOWS:
 

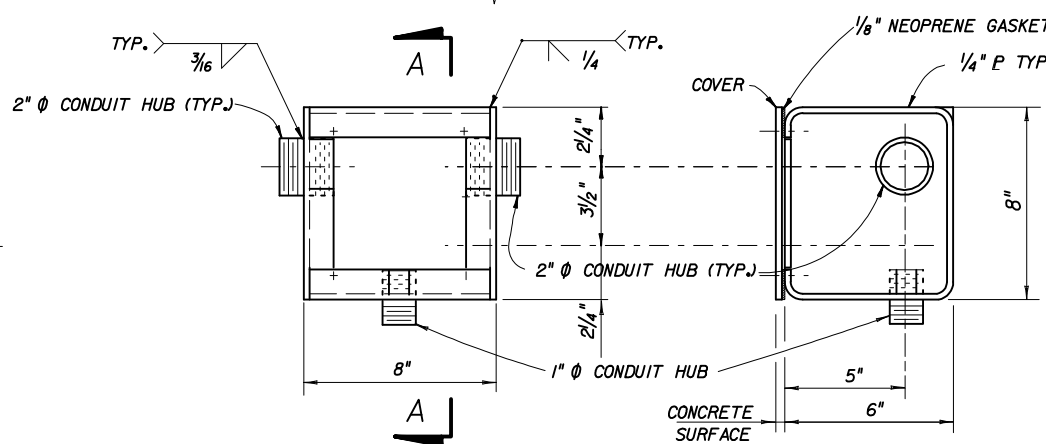
LONGITUDINAL MOMENT	=	30,000 FT. POUND
TRANSVERSE MOMENT	=	6,000 FT. POUND
LONGITUDINAL SHEAR	=	1,000 POUND
TRANSVERSE SHEAR	=	200 POUND
TORSION	=	3,000 FT. POUNDS
AXIAL	=	400 POUNDS

IF THE LIGHT POLE PROVIDED APPLIES LOADS THAT ARE IN EXCESS OF THOSE SHOWN ABOVE, THE CONTRACTOR SHALL REDESIGN THE PILASTER AND SUBMIT HIS DESIGN TO THE DEPARTMENT FOR REVIEW. THE CONTRACTOR'S REDESIGN SHALL BE PREPARED, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA, AND QUALIFIED TO PERFORM THE WORK.
- THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND THAT FIT THE REINFORCING CAGE. CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA SHALL BE SUBMITTED BY THE CONTRACTOR TO THE DEPARTMENT FOR REVIEW AND APPROVAL SHOWING THAT THESE REQUIREMENTS HAVE BEEN MET PRIOR TO CONSTRUCTION.

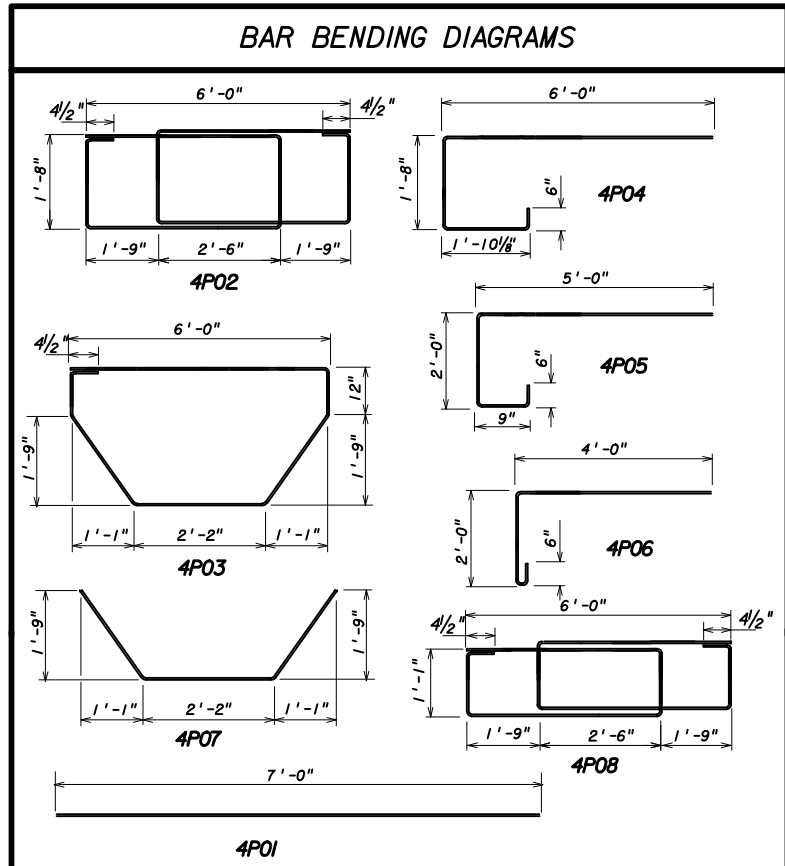
- STEEL FOR JUNCTION BOXES SHALL CONFORM WITH ASTM-A36. THE BOXES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. IN LIEU OF STEEL BOXES THE CONTRACTOR MAY SUBMIT FOR APPROVAL MOLDED P.V.C. BOXES (SCHEDULE 80).
- ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL OR SCHEDULE 80 P.V.C.
- THE COST OF ANCHOR BOLTS SHALL BE INCLUDED IN THE BID PRICE FOR LIGHT POLES.
- PAYMENT: THE COST OF ALL LABOR, CONCRETE AND REINFORCING STEEL REQUIRED FOR THE CONSTRUCTION OF THE PILASTERS AND ALL CONDUITS, EXPANSION COUPLINGS, JUNCTION BOXES AND MISCELLANEOUS HARDWARE REQUIRED FOR COMPLETION OF THE ELECTRICAL INSTALLATION WITHIN THE LIMITS SHOWN ON THIS SHEET, SHALL BE INCLUDED IN THE CONTRACTOR'S BID PRICE FOR THE MSE WALLS.



FRONT VIEW OF JUNCTION BOX (COVER REMOVED)



SECTION A-A



BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQ'D	LENGTH
4P01	4	6	7'-0"
4P02	4	2	24'-5"
4P03	4	1	14'-9"
4P04	4	4	9'-8"
4P05	4	2	7'-11"
4P06	4	2	6'-2"
4P07	4	2	6'-4"
4P08	4	3	22'-1"

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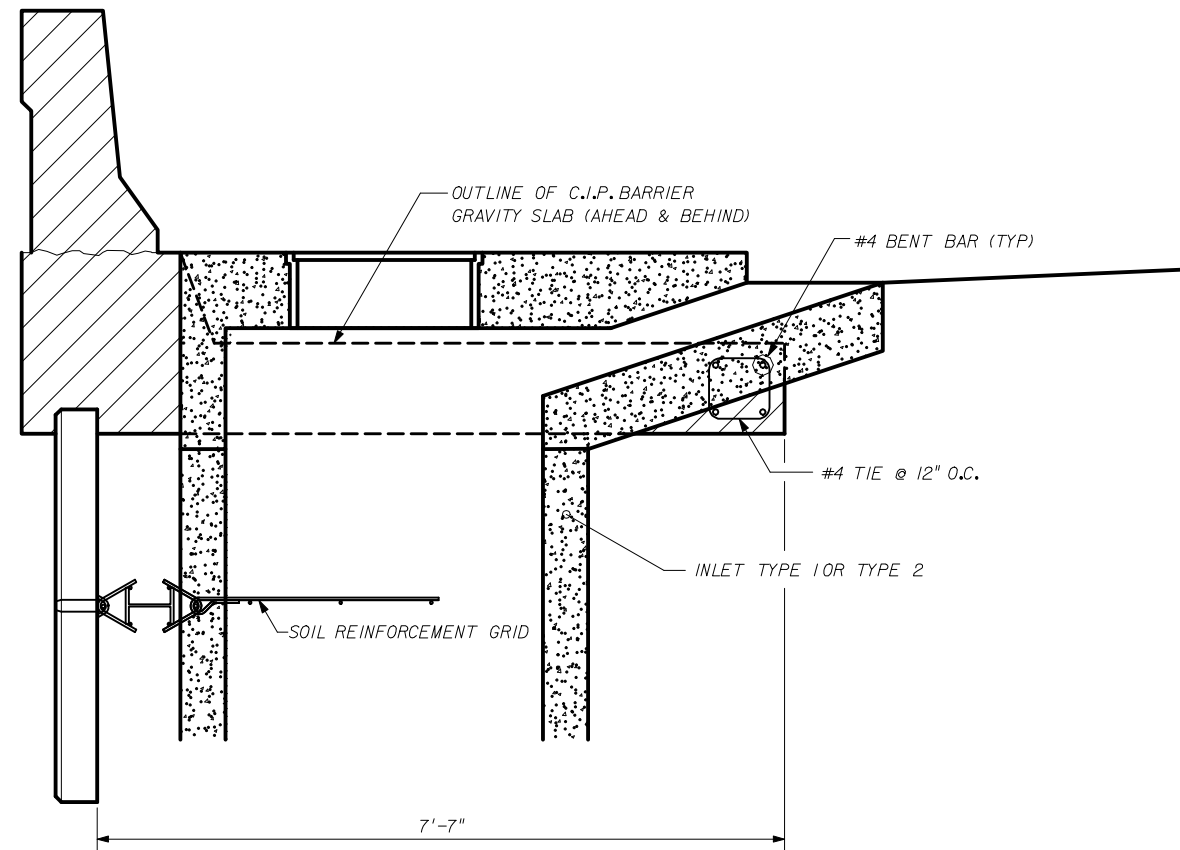
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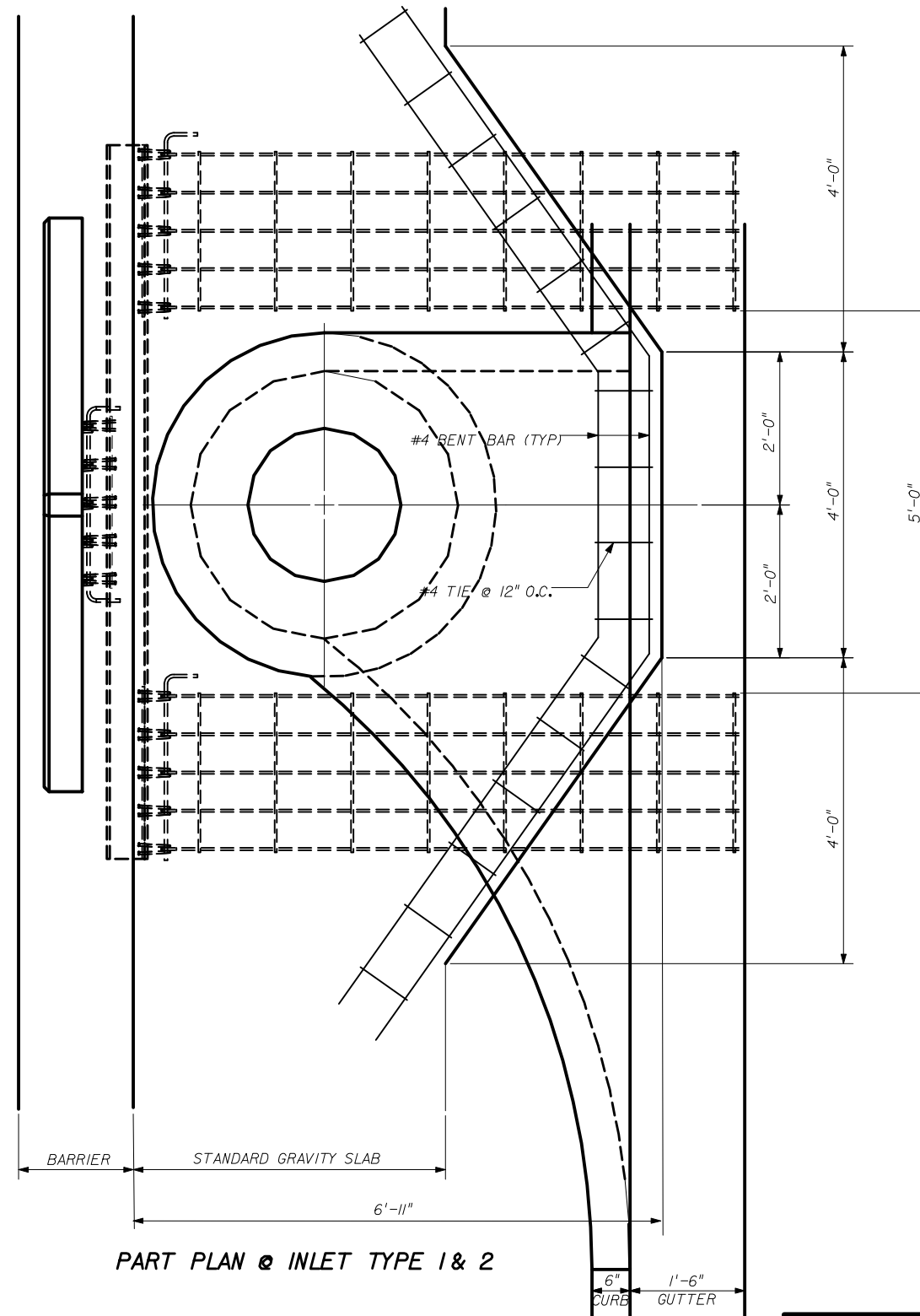
RETAINING WALL SYSTEM  
 THE NEEL COMPANY ISOGRID

Names	Dates	Approved By		
Designed By	JMC	10/01/98	State Structures Design Engineer	
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**PART SECTION @ INLET TYPE 1 & 2**  
 NOTE: GRID RELOCATION HARDWARE, SEE SHEET 13 OF 20 FOR DETAILS




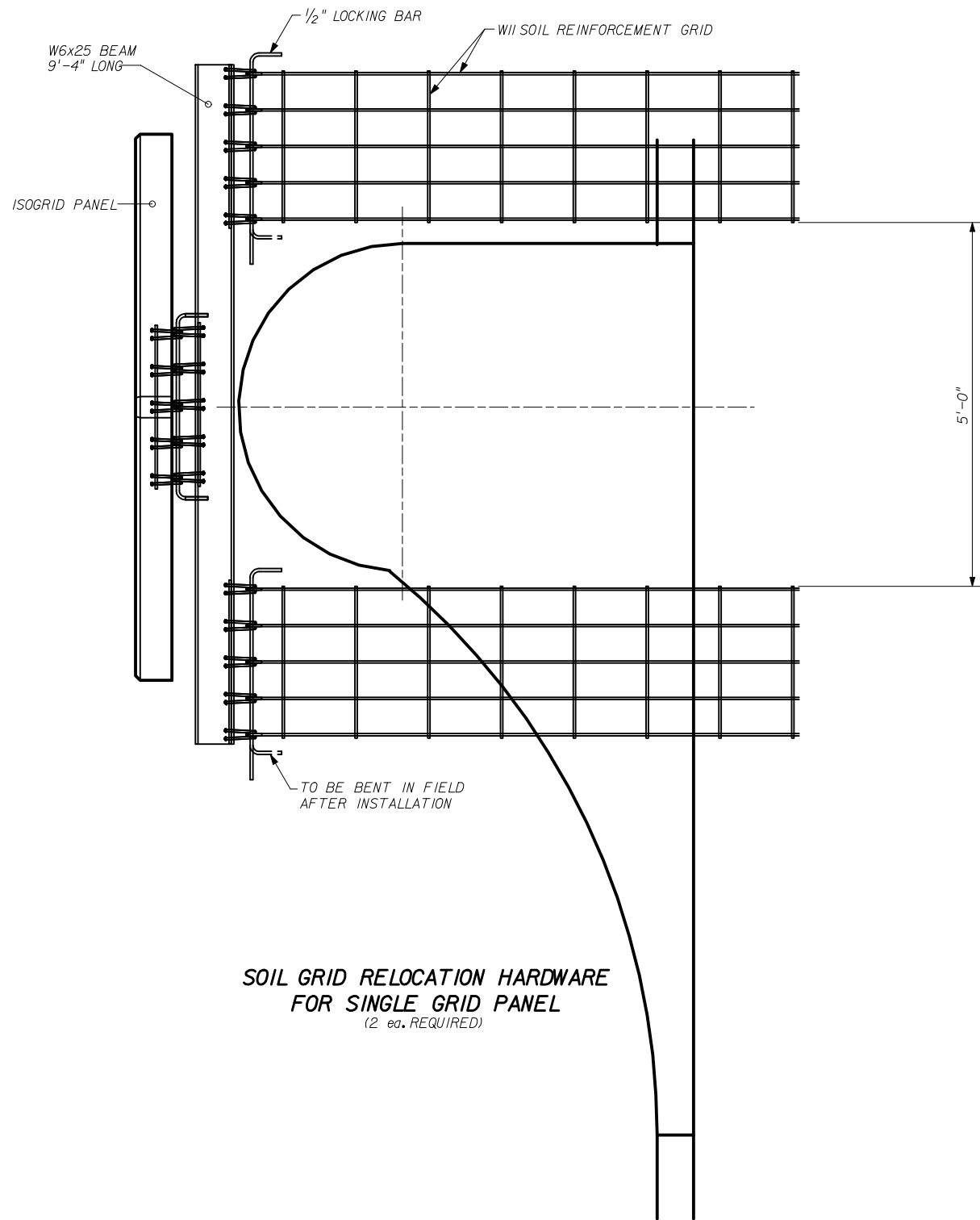
**PART PLAN @ INLET TYPE 1 & 2**

**GRAVITY SLAB AT INLET TYPE 1 & 2**

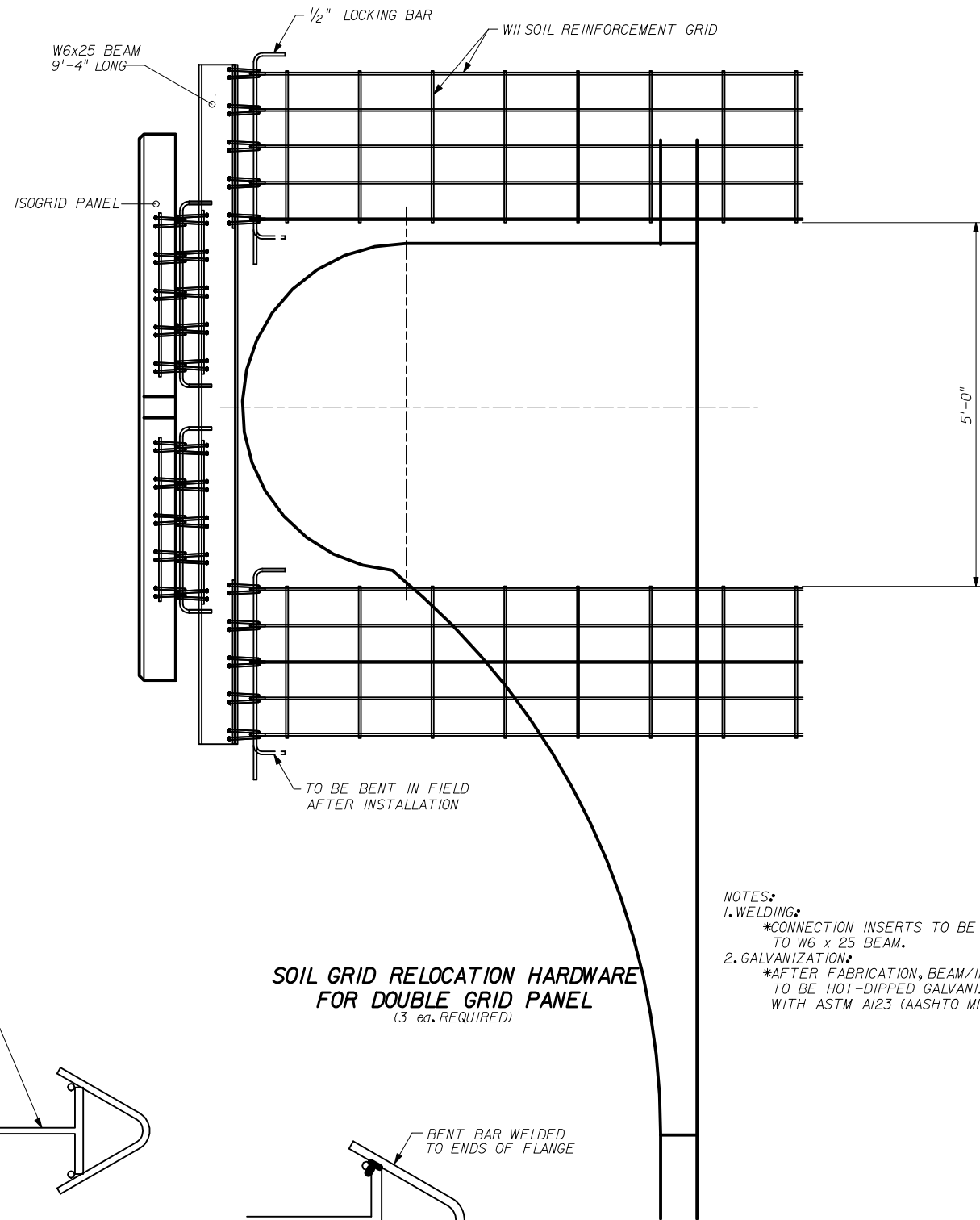
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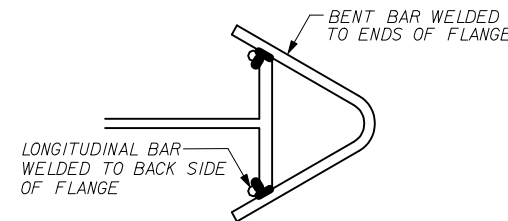
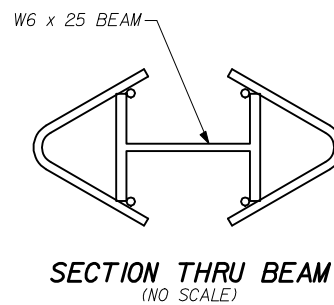
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE NEEL COMPANY ISOGRID</b>				
	Names	Dates	Approved By 	
Designed By	JMC	10/01/98	State Structures Design Engineer	
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**SOIL GRID RELOCATION HARDWARE FOR SINGLE GRID PANEL**  
(2 ea. REQUIRED)



**SOIL GRID RELOCATION HARDWARE FOR DOUBLE GRID PANEL**  
(3 ea. REQUIRED)



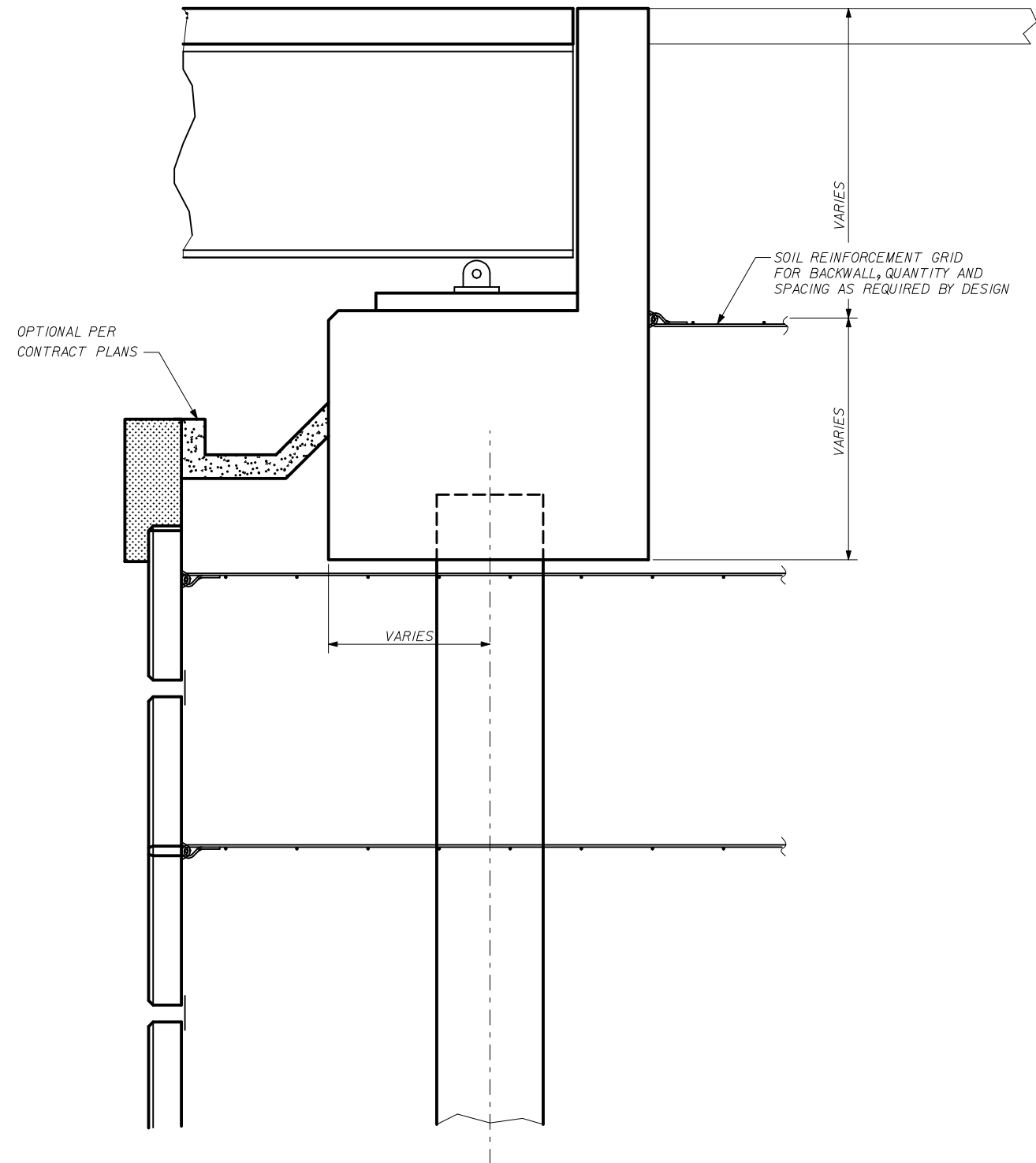
- NOTES:
- WELDING:
    - \*CONNECTION INSERTS TO BE WELDED TO W6 x 25 BEAM.
  - GALVANIZATION:
    - \*AFTER FABRICATION, BEAM/INSERT ASSEMBLY TO BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 (AASHTO M111-80)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
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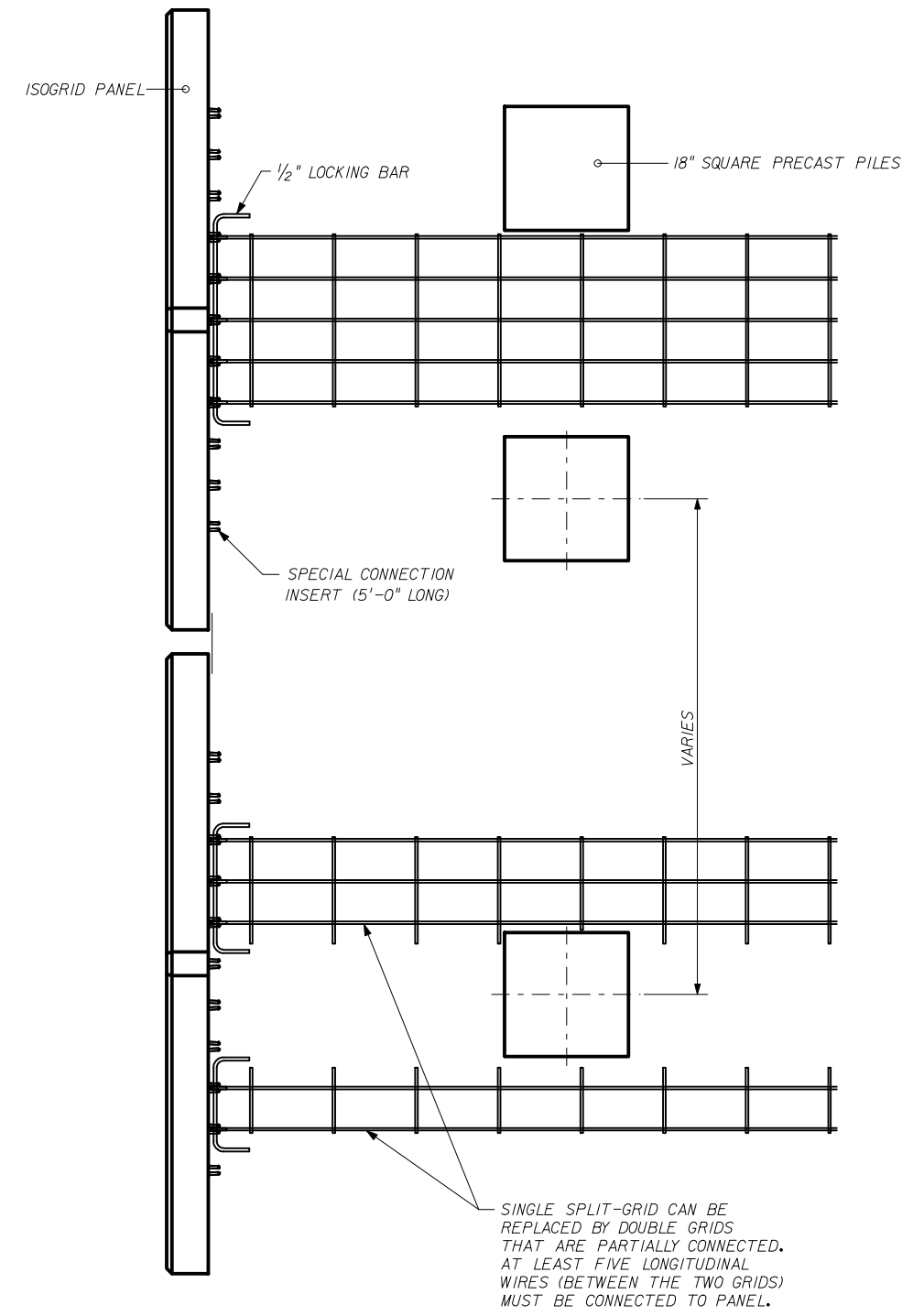
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SECTION THRU ABUTMENT




PLAN VIEW OF GRID/PILE ARRANGEMENT

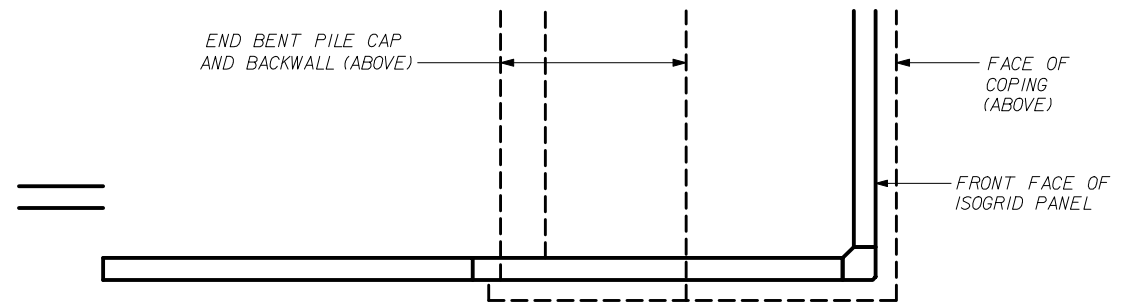
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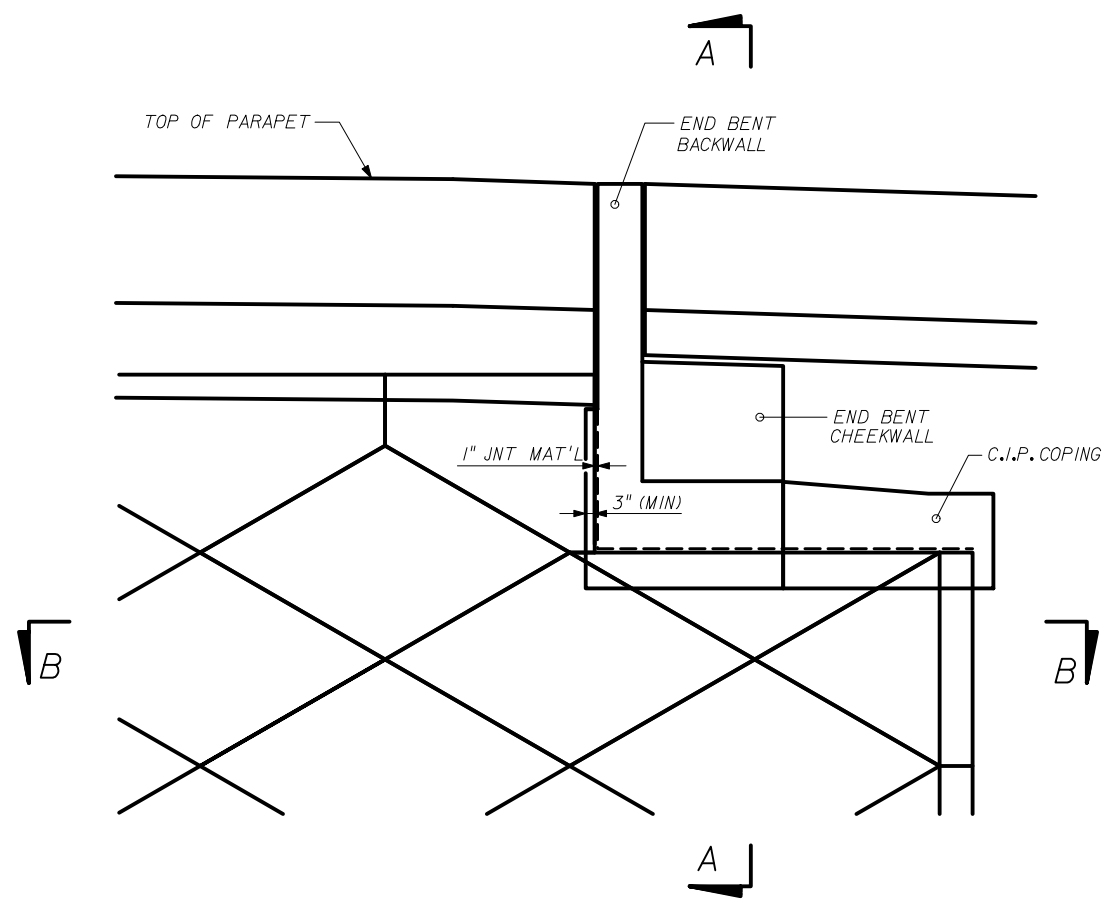
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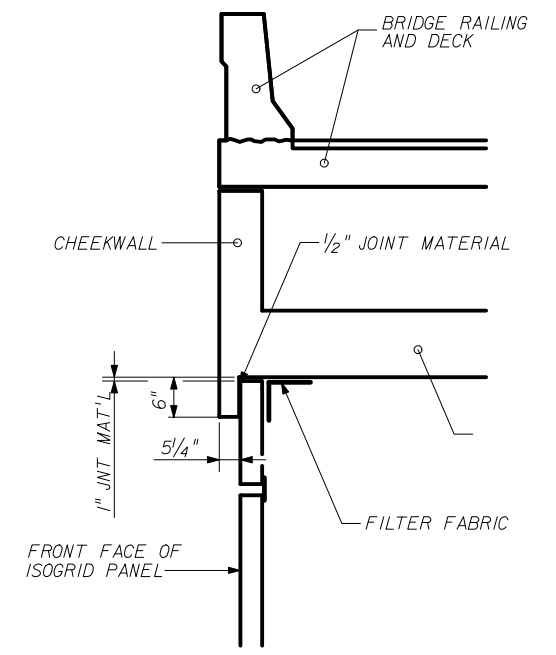
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
 \*\*\*\*\*SYTIME\*\*\*\*\*



SECTION B-B  
STEM / END BENT PILE INTERFACE



PART ELEVATION SHOWING  
WINGWALL / END BENT INTERFACE

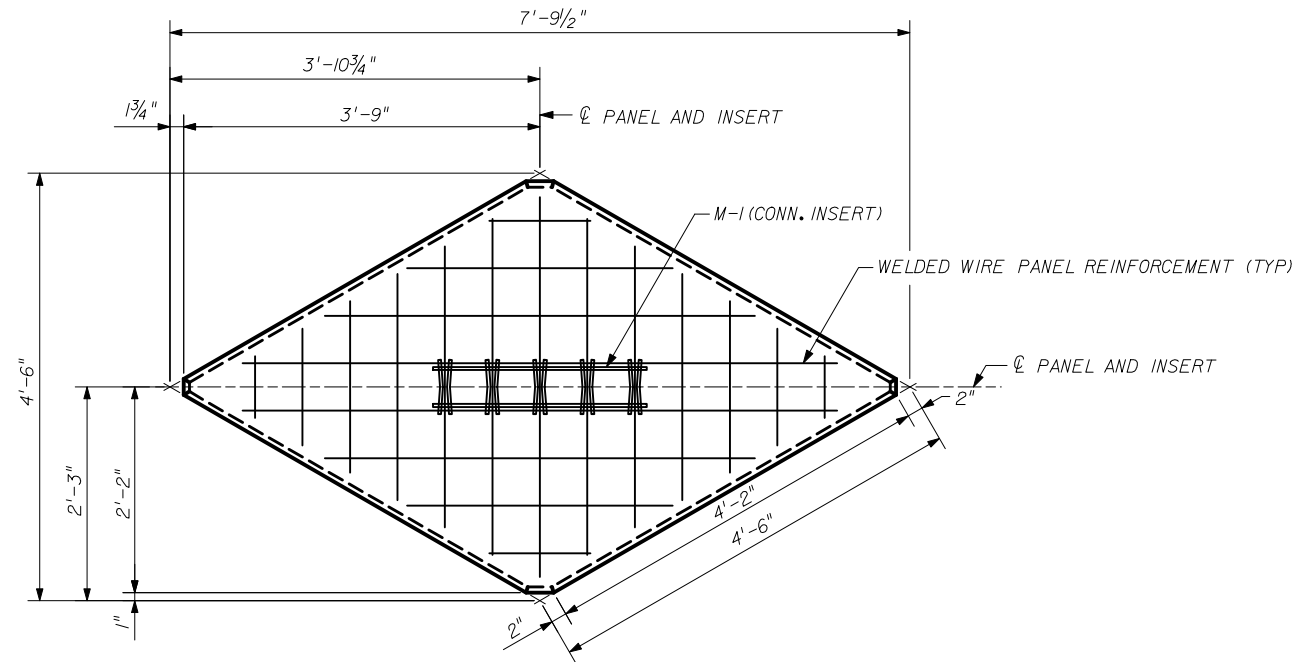


SECTION A-A  
SECTION THRU PILE CAP

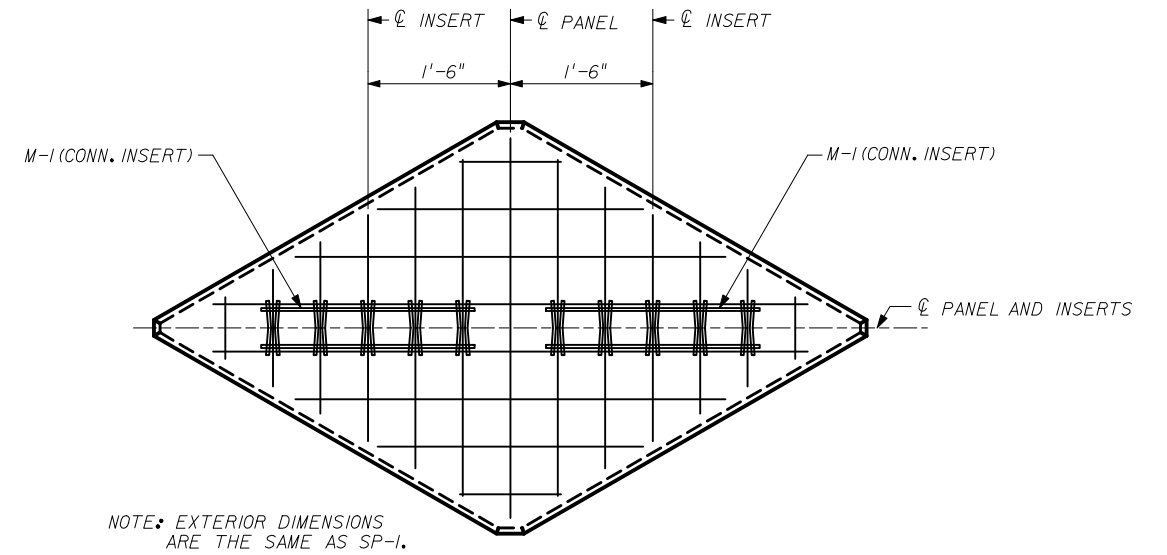
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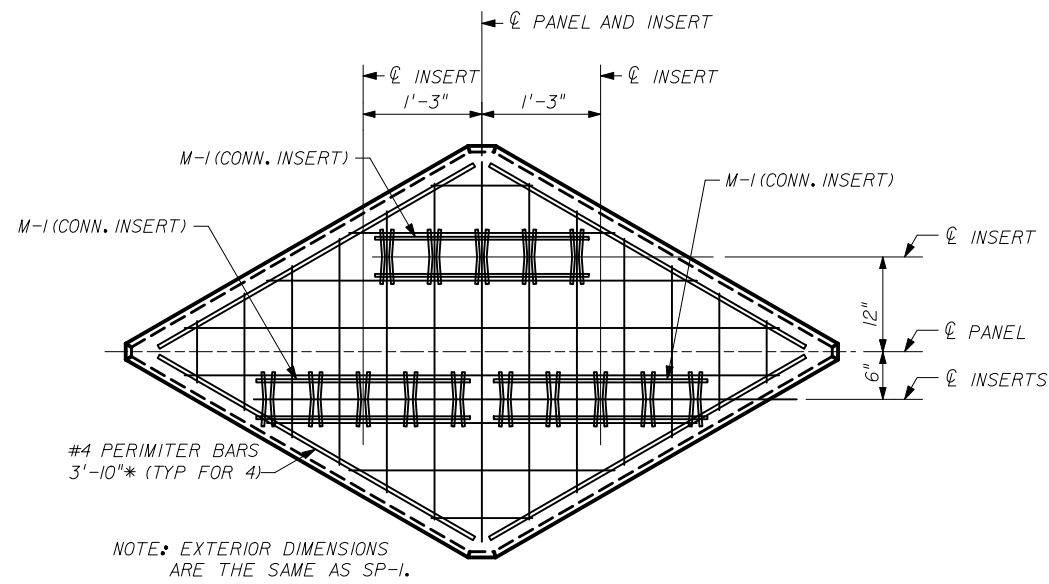
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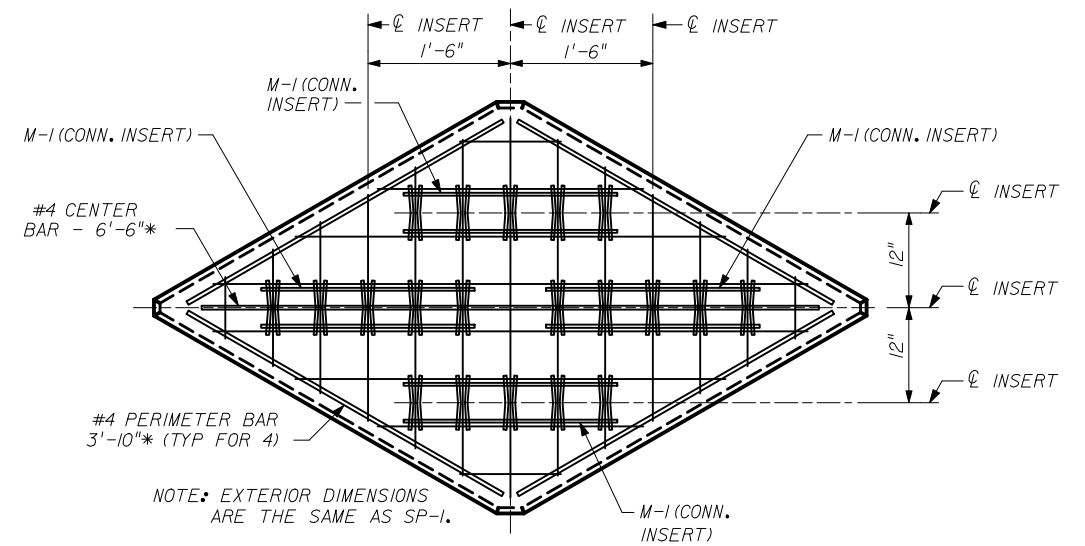
**SP-1**  
FULL-SIZE PANEL - ONE GRID  
ELEVATION (REAR FACE)



**SP-2**  
FULL-SIZE PANEL - TWO GRIDS  
ELEVATION (REAR FACE)



**SP-3**  
FULL-SIZE PANEL - THREE GRIDS  
ELEVATION (REAR FACE)



**SP-4**  
FULL-SIZE PANEL - FOUR GRIDS  
ELEVATION (REAR FACE)

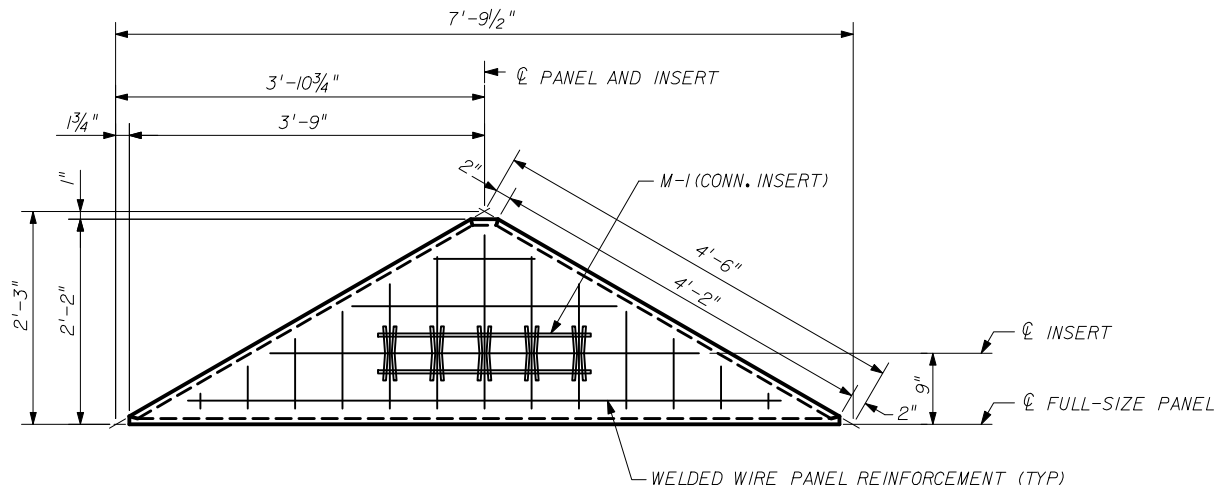
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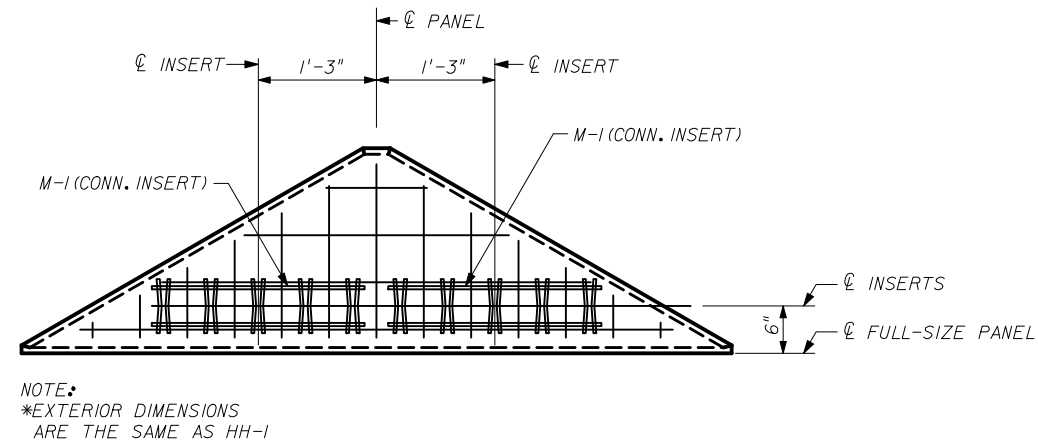
NOTE: FOR MATERIALS NOTES, SEE SHEET 2.

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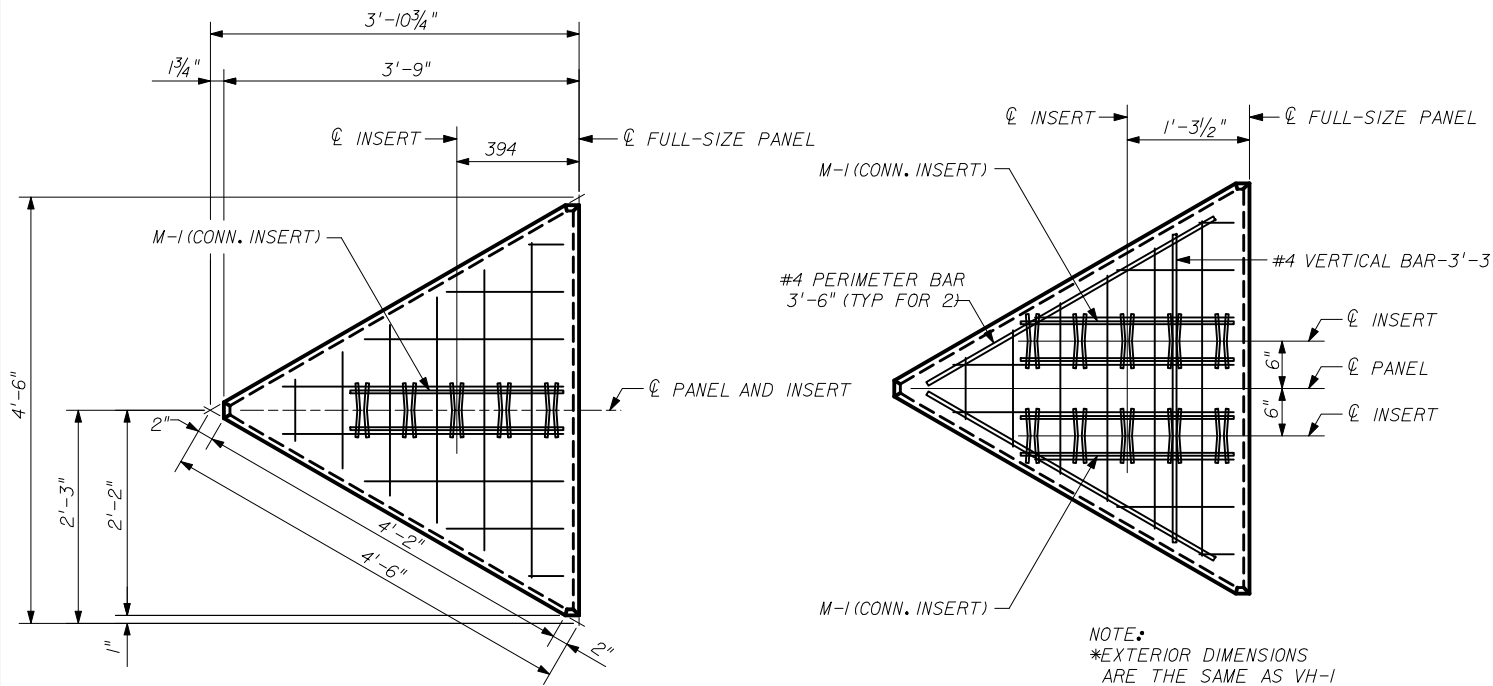
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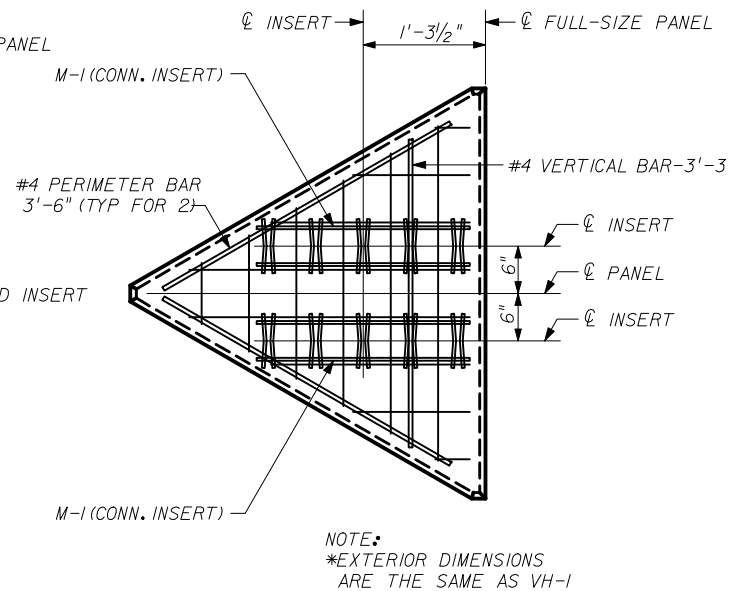
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HORIZ.-HALF PANEL - ONE GRID  
ELEVATION (REAR FACE)



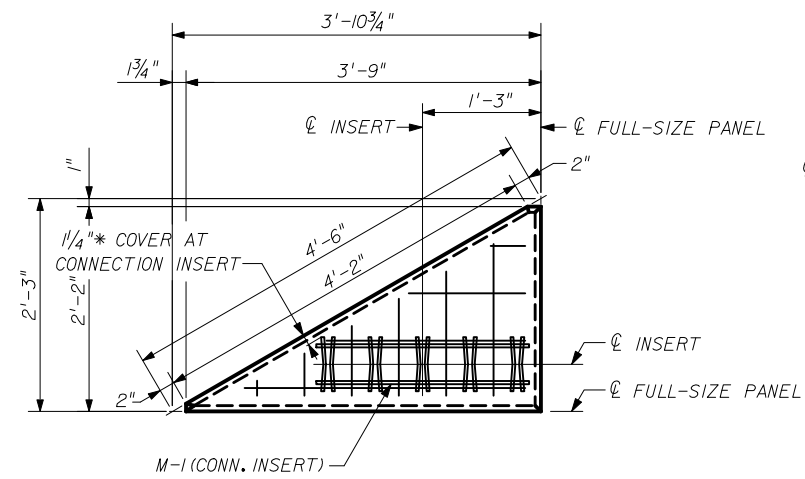
**HH-2**  
HORIZ.-HALF PANEL - TWO GRIDS  
ELEVATION (REAR FACE)



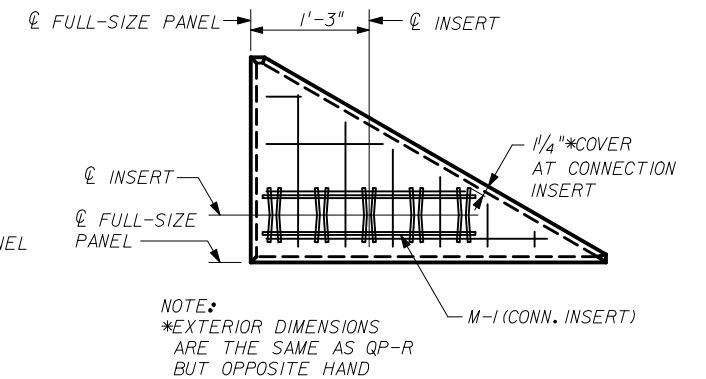
**VH-1**  
VERT.-HALF PANEL - ONE GRID  
ELEVATION (REAR FACE)



**VH-2**  
VERT.-HALF PANEL - TWO GRIDS  
ELEVATION (REAR FACE)



**QP-R**  
TOP RIGHT / BOTTOM LEFT  
QUARTER PANEL - ONE GRID  
ELEVATION (REAR FACE)



**QP-L**  
TOP LEFT / BOTTOM RIGHT  
QUARTER PANEL - ONE GRID  
ELEVATION (REAR FACE)

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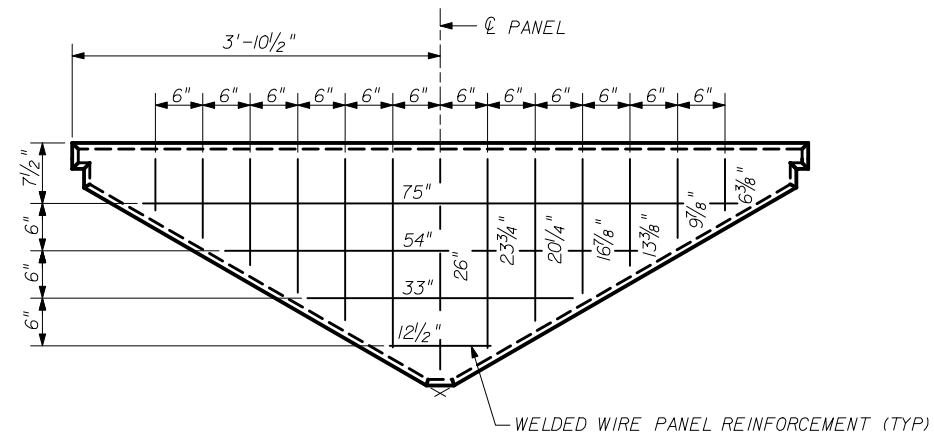
NOTE: FOR MATERIALS NOTES, SEE SHEET 2.

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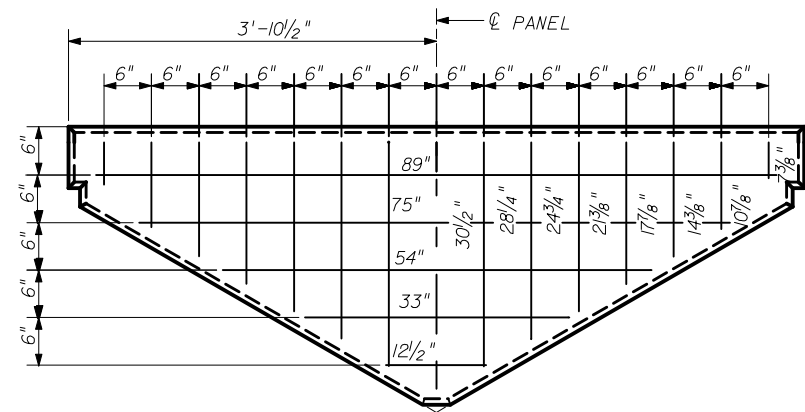
RETAINING WALL SYSTEM  
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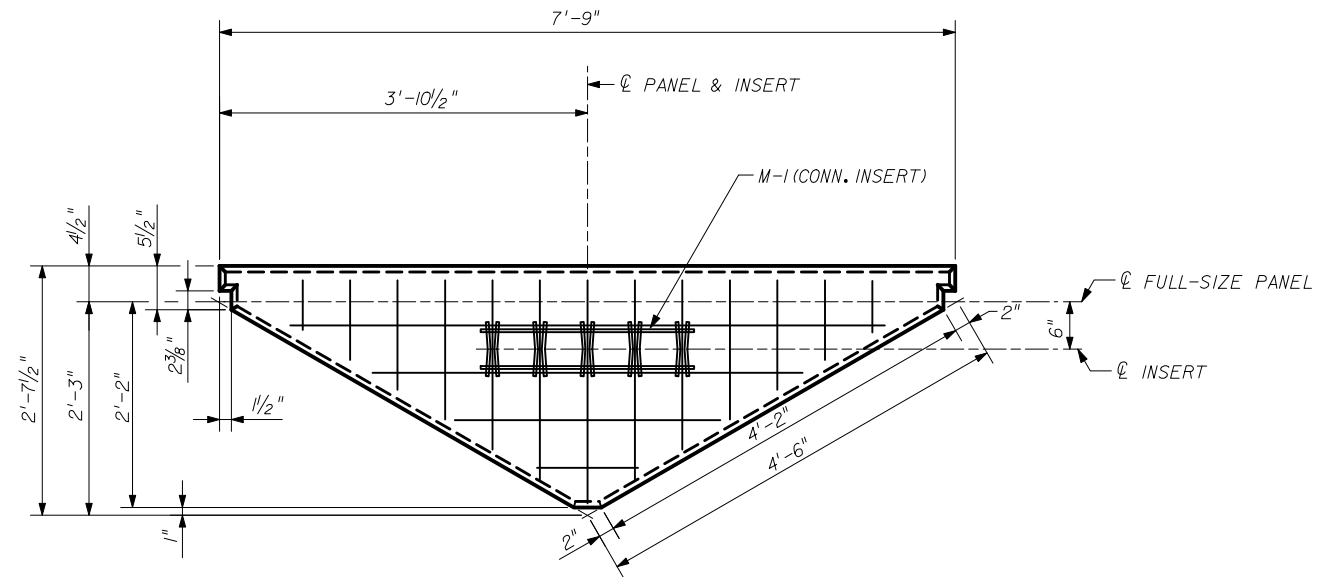
\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



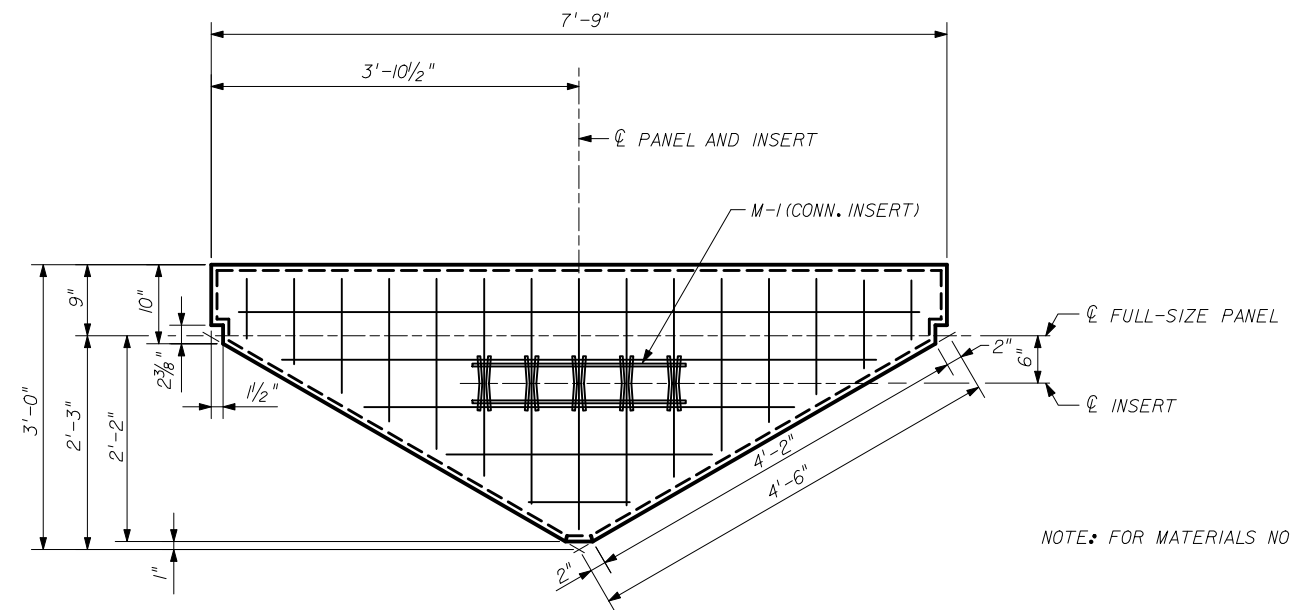
WELDED WIRE MESH PANEL REINFORCEMENT - X-1 PANEL  
ELEVATION (REAR FACE)



WELDED WIRE MESH PANEL REINFORCEMENT - X-2 PANEL  
ELEVATION (REAR FACE)



X-1  
4 1/2" RISER - ONE GRID  
ELEVATION (REAR FACE)



X-2  
9" RISER PANEL - ONE GRID  
ELEVATION (REAR FACE)

NOTE: FOR MATERIALS NOTES, SEE SHEET 2.

DESIGNER:  
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: 1703 913-7858  
FX: 1703 913-7859

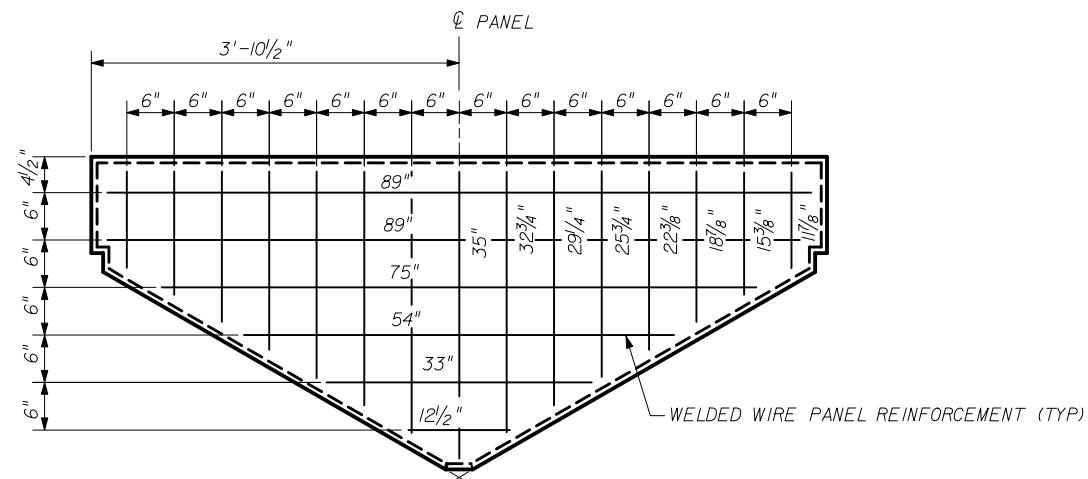
PRECASTER:  
**OLDCASTLE PRECAST, INC**  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: 1904 778-2990  
FX: 1904 778-2992

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

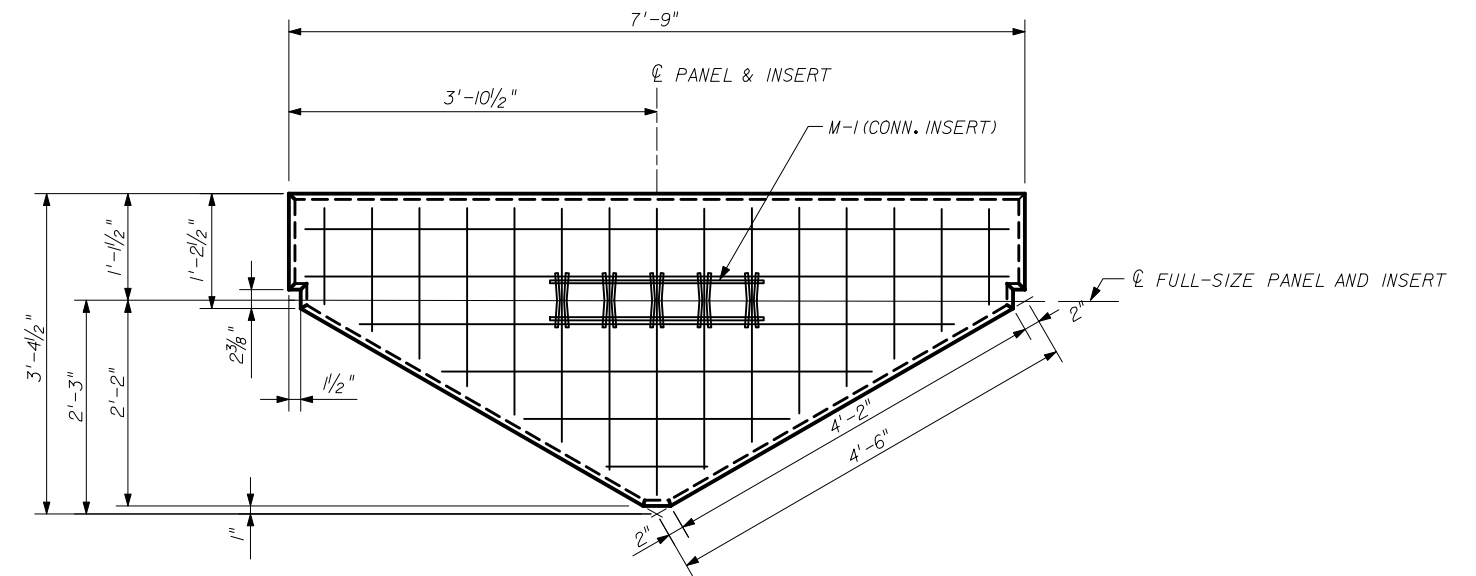
RETAINING WALL SYSTEM  
THE NEEL COMPANY ISOGRID

Names	Dates	Approved By		
Designed By	JMC	10/01/98	W. V. [Signature]	
Drawn By	CAA	10/01/98	Revision	Sheet No.
Checked By	JMC	10/01/98	00	18 of 20
				5012

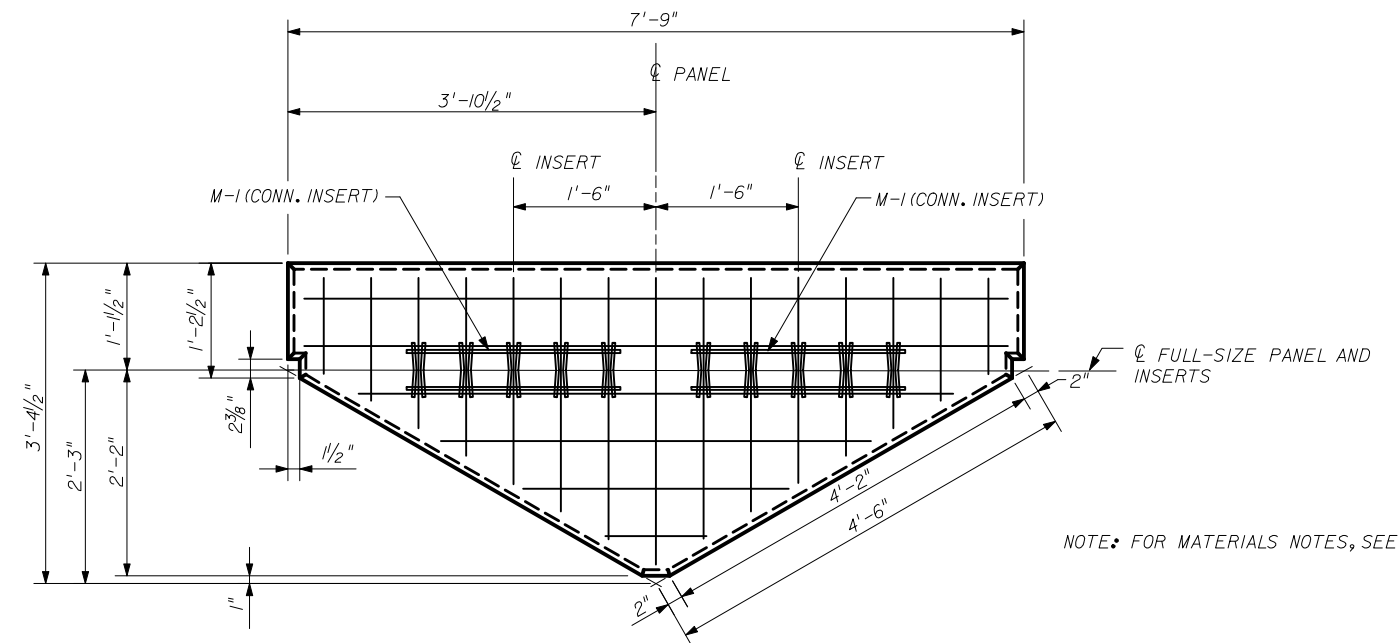
\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



WELDED WIRE MESH PANEL REINFORCEMENT - X-3 AND X-3(2) PANELS  
ELEVATION (REAR FACE)



X-3  
13 1/2" RISER - ONE GRID  
ELEVATION (REAR FACE)



X-3 (2)  
13 1/2" RISER - TWO GRIDS  
ELEVATION (REAR FACE)

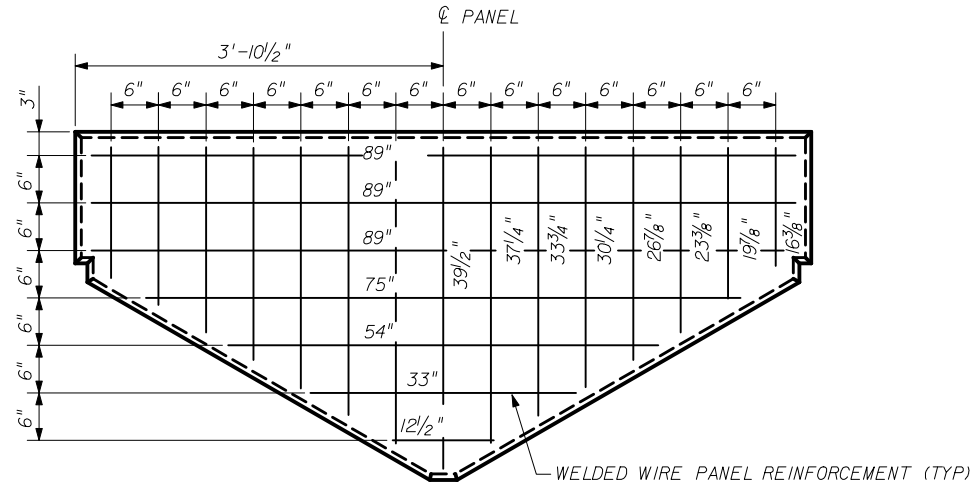
NOTE: FOR MATERIALS NOTES, SEE SHEET 2.

DESIGNER:  
**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
FX: (703) 913-7859

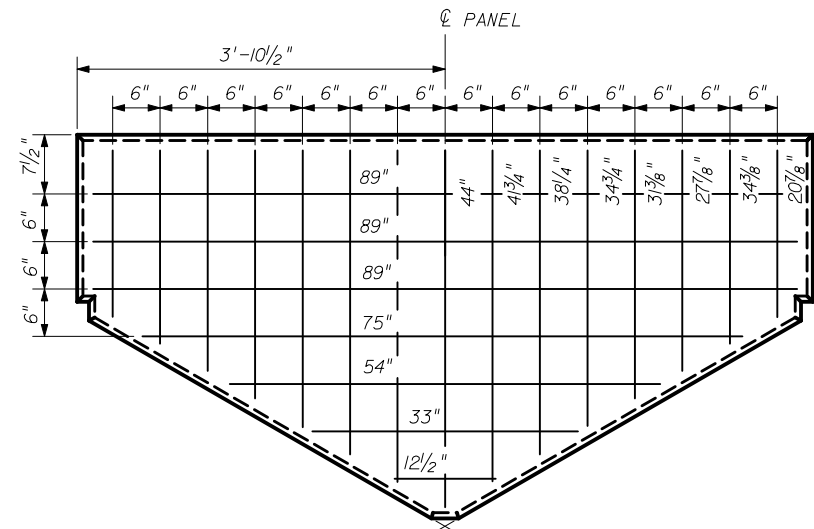
PRECASTER:  
**OLDCASTLE PRECAST, INC**  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM THE NEEL COMPANY ISOGRID				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	JMC	10/01/98	State Structures Design Engineer	
Drawn By	CAA	10/01/98	Revision	Sheet No. Index No.
Checked By	JMC	10/01/98	00	19 of 20 5012

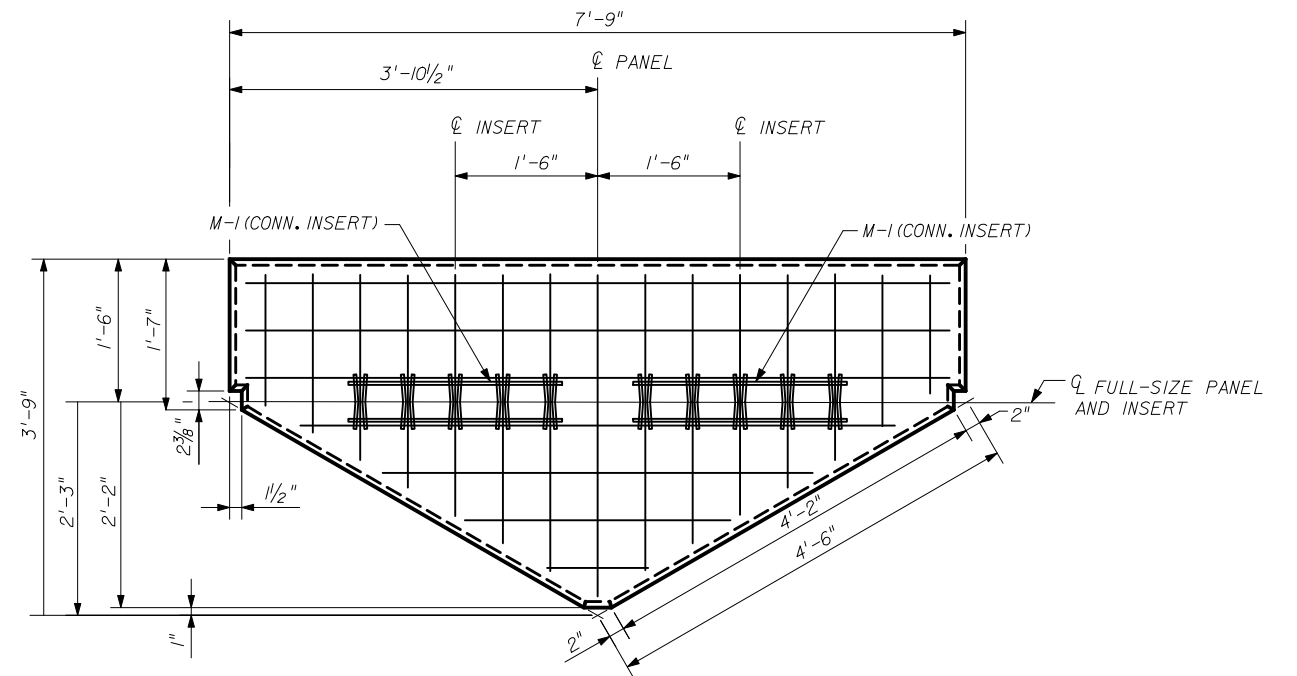




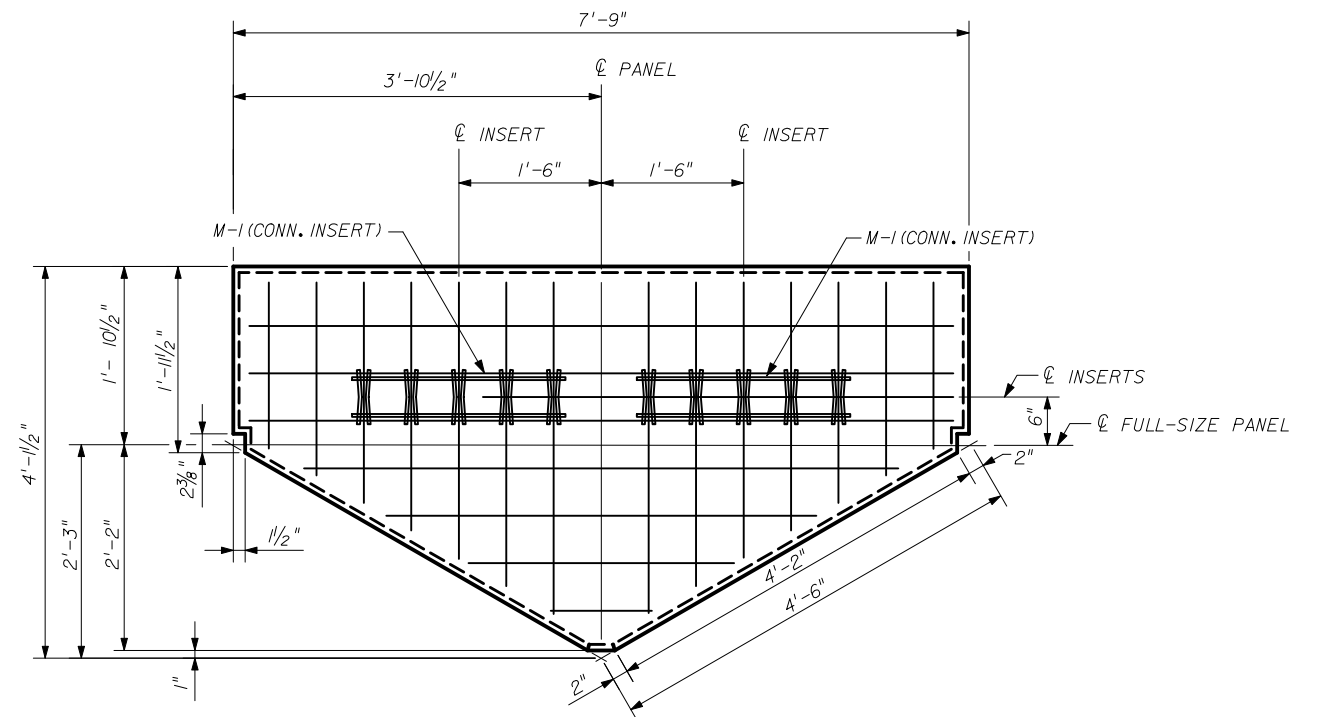
WELDED WIRE MESH PANEL REINFORCEMENT - X-4 PANEL  
ELEVATION (REAR FACE)



WELDED WIRE MESH PANEL REINFORCEMENT - X-5 PANEL  
ELEVATION (REAR FACE)



X-4  
18" RISER - TWO GRIDS  
ELEVATION (REAR FACE)



X-5  
22 1/2" RISER - TWO GRIDS  
ELEVATION (REAR FACE)

NOTE: FOR MATERIALS NOTES, SEE SHEET 2.

DESIGNER:



**THE NEEL COMPANY**  
8328-D TRAFORD LANE  
SPRINGFIELD, VIRGINIA 22152  
PH: (703) 913-7858  
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PRECASTER:

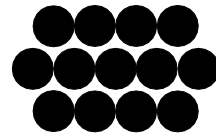
**OLDCASTLE PRECAST, INC**  
11643 103rd STREET  
JACKSONVILLE, FL 32210  
PH: (904) 778-2990  
FX: (904) 778-2992

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
THE NEEL COMPANY ISOGRID

Names		Dates	Approved By	
Designed By	JMC	10/01/98	[Signature]	
Drawn By	CAA	10/01/98	State Structures Design Engineer	
Checked By	JMC	10/01/98	Revision	Sheet No. Index No.
			00	20 of 20 5012

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



TAI

# The Reinforced Earth Company

8614 WESTWOOD CENTER DRIVE SUITE 1100, VIENNA VIRGINIA 22182 (703) 821-1175

## DESIGN CRITERIA

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE REINFORCED EARTH VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO THE CONTRACTING AGENCY'S TECHNICAL SPECIFICATIONS (SECTION 548) FOR REINFORCED EARTH WALLS
2. SOIL PARAMETERS:  
SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF FRICTION ANGLE ( $\phi$ ), COHESION ( $c$ ) AND TOTAL UNIT WEIGHT ( $\gamma$ ) SHALL BE PROVIDED IN THE SHOP DRAWINGS.
3. THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE OWNER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.
4. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED EARTH VOLUME, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.
5. REINFORCING STRIPS FOR REINFORCED EARTH WALLS SHALL BE 1<sup>3</sup>/<sub>32</sub>" WIDE AND 7/32" THICK, AND SHALL CONFORM TO THE PHYSICAL AND MECHANICAL PROPERTIES OF ASTM A-572 GRADE 65. GALVANIZATION SHALL BE APPLIED IN ACCORDANCE WITH ASTM A-123.
6. THE MINIMUM FACTORS OF SAFETY REQUIRED FOR DESIGN  
OVERTURNING = 2.0  
SLIDING = 1.5  
INTERNAL PULLOUT = 1.5  
(ALLOWABLE DEFORMATION = 0.75 INCH)  
BEARING CAPACITY = 2.5  
OVERALL STABILITY = 1.5  
STEEL SOIL REINFORCEMENT = 0.55F<sub>y</sub> AT END OF DESIGN LIFE AND 0.50 F<sub>u</sub> AT NET SECTION OF BOLTED CONNECTION  
MAXIMUM PULLOUT FACTOR f\* (FOR SAND) = 1.5  
(FOR LIMEROCK) = 2.0

## WALL CONSTRUCTION

7. REINFORCED EARTH WALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS OF 4'-11" EACH TO MATCH DESIRED WALL ALIGNMENT.
8. FOR LOCATION AND ALIGNMENT OF REINFORCED EARTH WALLS, SEE RETAINING WALL CONTROL PLANS.
9. IF MANHOLES AND DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS.
10. IF PILES ARE LOCATED WITHIN THE REINFORCED EARTH VOLUME, THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE REINFORCED EARTH WALL UNLESS A METHOD TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE REINFORCED EARTH COMPANY, AND IS PROPOSED AND APPROVED IN WRITING.

11. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SEC 548 TO A LEVEL OF 2" ± ABOVE THE TIE STRIPS EMBEDDED IN THE PANELS. INSTALLATION OF REINFORCING STRIPS SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.
12. IF STRUCTURES IN EXCESS OF 20' IN HEIGHT OCCUR, THE FINISHED GRADE IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS A HEIGHT OF 20'. FINISHED GRADE BACKFILL SHALL BE COMPACTED TO 95% OF AASHTO T-180 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
13. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY GUARDRAIL POSTS BEHIND THE REINFORCED EARTH PANELS PRIOR TO PLACEMENT OF THE TOP LAYER OF REINFORCING STRIPS. INDIVIDUAL STRIPS MAY BE SKEWED UP TO 15° TO AVOID THE POST LOCATIONS IF AUTHORIZED BY THE ENGINEER. ANY DAMAGE DONE TO THE REINFORCING STRIPS DUE TO THE INSTALLATION OF THE GUARDRAIL SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
14. IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR GUARDRAIL POSTS WHICH ARE WITHIN THE REINFORCED EARTH VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING STRIPS AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE WHAT COURSE OF ACTION SHOULD BE TAKEN.
15. TOP PANELS BENEATH COPING SHALL HAVE #4 DOWELS PROTRUDING FROM THEIR TOP EDGE.
16. FOR OTHER INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO THE REINFORCED EARTH CONSTRUCTION MANUAL.
17. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING STRIPS DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPERELEVATION AND/OR SOIL MIXING ARE ANTICIPATED.

## MATERIALS NOTES

18. NOMINAL STRIP LENGTHS  
THE REINFORCING STRIP LENGTHS SHOWN ON THE PLANS, MEASURED FROM BACK FACE OF PANEL, ARE THE NOMINAL LENGTHS REQUIRED BY CALCULATION. THE ACTUAL FABRICATED STRIP LENGTHS ARE OFTEN LONGER (UP TO 6") DUE TO MANUFACTURING TOLERANCES. THE REQUIRED HORIZONTAL LIMIT OF GRANULAR BACKFILL IS EQUAL TO THE NOMINAL STRIP LENGTH.
19. PANEL FINISH  
THE PRECAST PANELS FOR THIS PROJECT SHALL HAVE A PLAIN STEEL FINISH UNLESS OTHERWISE SPECIFIED ON THE RETAINING WALL CONTROL PLANS.

## 20. NOTE TO CONTRACTORS

ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:

- PRECAST CONCRETE FACING PANELS
- REINFORCING STRIPS
- BOLT SETS (FOR ATTACHING PANELS TO THE REINFORCING STRIPS)
- BEARING BLOCKS
- RUBBER SHIMS
- FILTER CLOTH AND ADHESIVE (FOR PANEL JOINTS ONLY)


ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR. ANY JOINT MATERIALS SHOWN AT THE INTERFACE OF PRECAST PANELS AND CAST-IN-PLACE CONCRETE STRUCTURES ARE TO BE SUPPLIED BY THE ERECTION CONTRACTOR. ALL SANDBLASTING, PAINTING, SEALERS OR OTHER SPECIAL APPLIED COATINGS ARE ALSO SUPPLIED/INSTALLED BY THE CONTRACTOR IN THE FIELD FOLLOWING PANEL ERECTION.

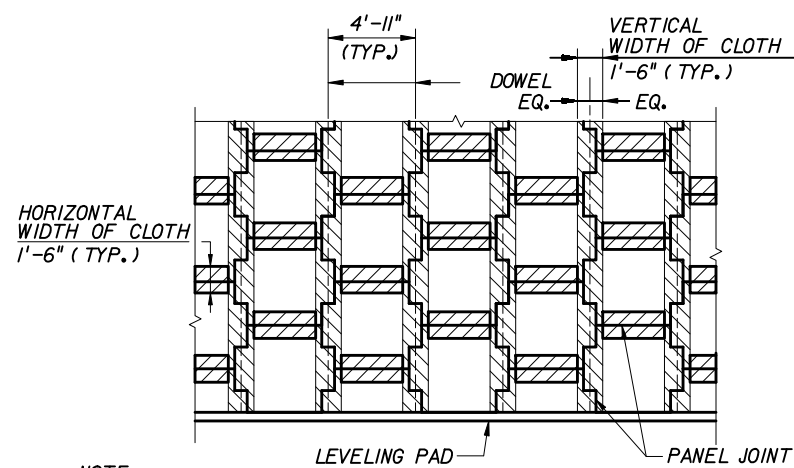
21. THE REINFORCED EARTH COMPANY SUPPLIES PRECAST CONCRETE FACING PANELS AND ACCESSORIES TO BE USED IN CONJUNCTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH RETAINING WALLS DETAILED HEREIN. THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL FURNISHED BY THE REINFORCED EARTH COMPANY IS INTENDED TO PROVIDE A GENERAL EXPLANATION OF THE SYSTEM. IT IS THE CONTRACTOR'S OBLIGATION TO DEVISE AND EXECUTE A PROJECT SPECIFIC ERECTION SEQUENCE, PANEL UNLOADING, HANDLING AND BRACING SYSTEM, AND FALL PROTECTION SYSTEM. THE BRACING SYSTEM SHOWN IN THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL IS GENERAL IN NATURE AND DOES NOT ACCOUNT FOR PROJECT SPECIFIC CRITERIA. COMPLIANCE WITH THE GUIDELINES IN THIS MANUAL DOES NOT RELIEVE THE CONTRACTOR OF ITS RESPONSIBILITY TO ADHERE TO THE PROJECT PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS OR COMPLIANCE WITH ALL FALL PROTECTION, SAFETY, LAWS, STANDARDS AND PROCEDURES AT THE JOBSITE. CONTRACTORS SHOULD TAKE SPECIAL PRECAUTIONS TO PREVENT THE PANELS FROM SHIFTING OR FALLING DURING THE ERECTION PROCESS.
22. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE REINFORCED EARTH COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.
23. THESE DRAWINGS ARE CERTIFIED WITH RESPECT TO THE INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY
24. THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND IS BEING FURNISHED FOR THE USE IN CONNECTION WITH FDOT PROJECTS ONLY, AND THE INFORMATION CONTAINED HEREIN IS NOT TO BE TRANSMITTED TO ANY OTHER ORGANIZATION UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY THE REINFORCED EARTH COMPANY. THE REINFORCED EARTH COMPANY IS EXCLUSIVE LICENSEE IN THE UNITED STATES UNDER PATENTS ISSUED TO HENRY VIDAL, AND THE FURNISHING OF THIS DRAWING DOES NOT CONSTITUTE AN EXPRESSED OR IMPLIED LICENSE UNDER THE VIDAL PATENTS.

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM AND SQUARE PANELS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

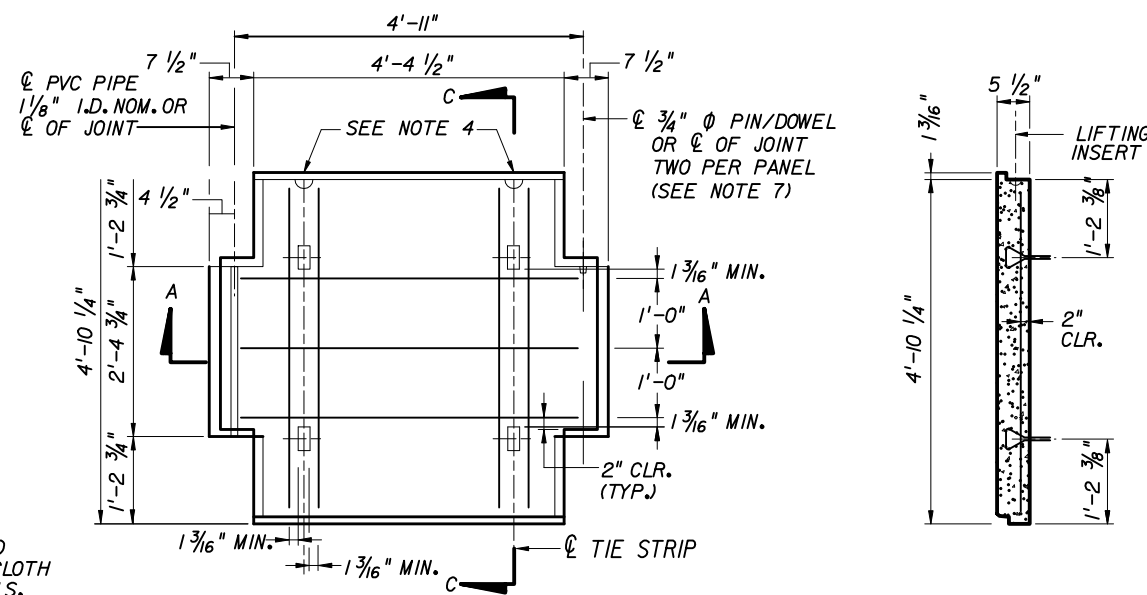
## RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL

Names		Dates	Approved By		
Designed By			 State Structures Design Engineer		
Drawn By					
Checked By					
			Revision	Sheet No.	Index No.
			00	1 of 14	5015

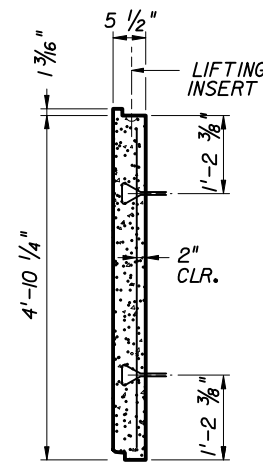


NOTE:  
STRIPS OF FILTER CLOTH SHALL BE PLACED ON BACK FACE OF PANEL, OVER PANEL JOINTS. FILTER CLOTH SHALL BE ADHERED TO BACK FACE OF PANELS USING AN ADHESIVE COMPOUND SUPPLIED BY THE REINFORCED EARTH COMPANY. ADHESIVE SHALL BE APPLIED TO PANEL THEN FILTER CLOTH (CARTHAGE MILLS TYPE FX-40HS OR EQUAL) SHALL BE APPLIED TO PANELS.

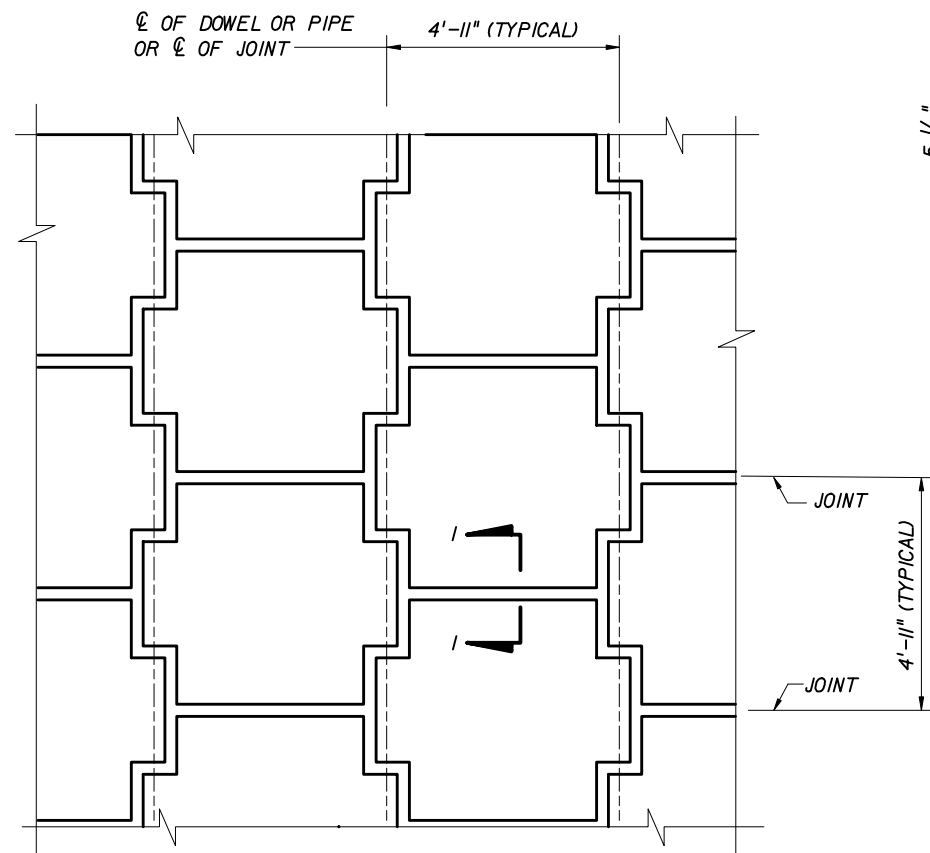
**FILTER CLOTH DETAIL  
PARTIAL ELEVATION - BACK FACE**



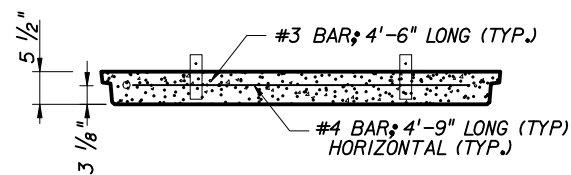
**PANEL TYPE "A"  
WITH R4 REINFORCEMENT  
FRONT VIEW**



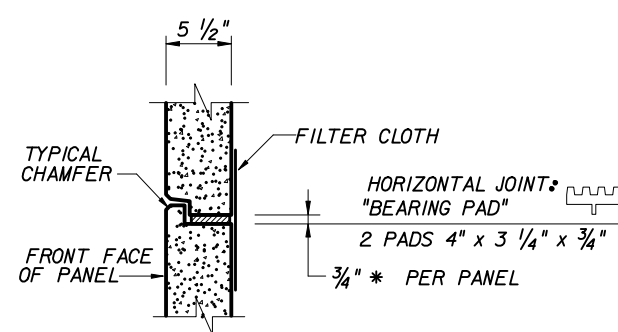
**SECTION C-C**



**TYPICAL PANEL LAYOUT  
PARTIAL ELEVATION - FRONT FACE**



**SECTION A-A**



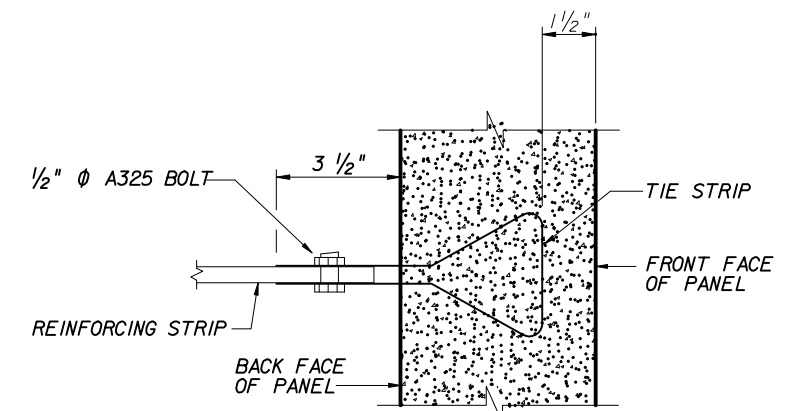
**SECTION I-I**

PANEL THICKNESS	REINFORCEMENT DESIGNATION	* PANEL REINFORCEMENT (IN <sup>2</sup> )	MAXIMUM ALLOWABLE HORIZONTAL STRESS AT FACING (KPA)
5 1/2"	R4	0.44 VERTICAL 0.58 HORIZONTAL	1.19
	R6	0.66 VERTICAL 0.78 HORIZONTAL	1.46
	R7	1.18 VERTICAL 1.78 HORIZONTAL	2.58

\* TOTAL AREA OF STEEL REQUIRED PER "TYPE A" PANEL.

**NOTES:**

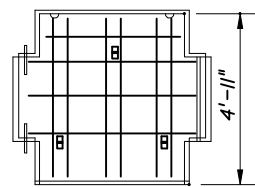
1. REINFORCING STEEL TO BE A615 GRADE 60.
2. 3/8" x 3/8" CHAMFER SHALL BE PROVIDED ON ALL EXPOSED EDGES (FRONT FACE ONLY).
3. ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILED ON SHOP DRAWINGS.
4. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF ONE TON CAPACITY EACH.
5. PANEL DESIGN THICKNESS IS 5 1/2". THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
6. ACTUAL PANEL REINFORCEMENT FOR ALL PANEL TYPES ON THIS PROJECT IS DESIGNATED ABOVE. R4 ILLUSTRATED FOR INFORMATION ONLY.
7. EACH 3/4" Ø DOWEL SHALL HAVE A TYP. LENGTH OF 10". DOWELS MAY BE GALVANIZED STEEL OR PVC ROD. A SINGLE FULL LENGTH DOWEL MAY BE USED AT THE DISCRETION OF THE MANUFACTURER.



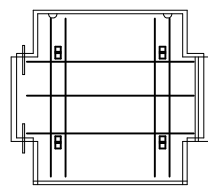
**CONNECTION DETAIL**

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM PANELS

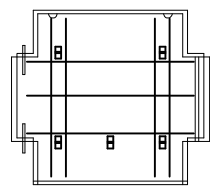
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL</b>				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By			Revision	Sheet No. Index No.
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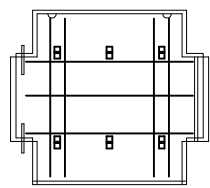
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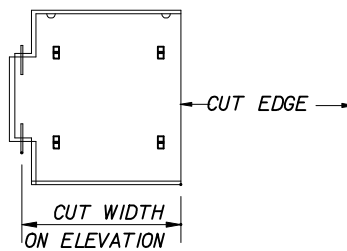
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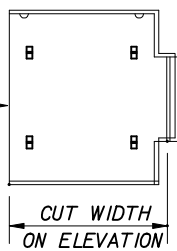
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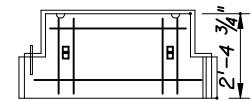
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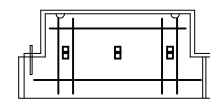
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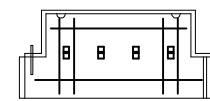
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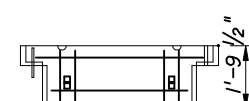
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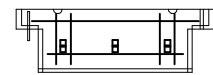
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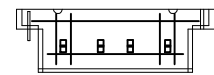
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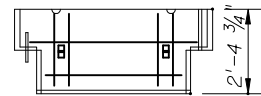
C-2-R4



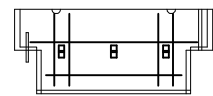
C-3-R4



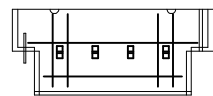
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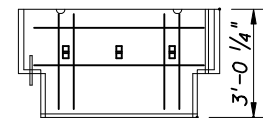
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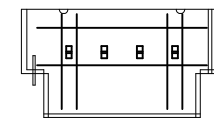
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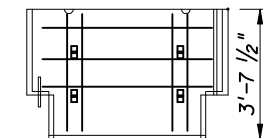
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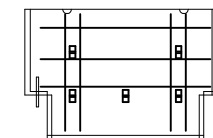
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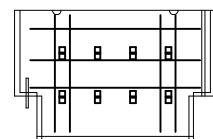
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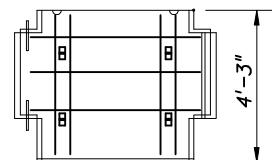
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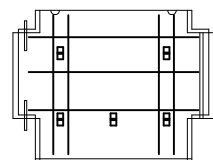
F-5-R4



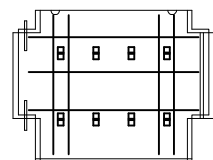
F-8-R4



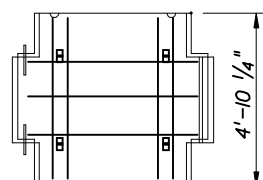
G-4-R4



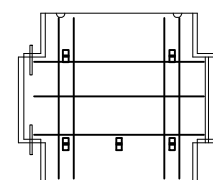
G-5-R4



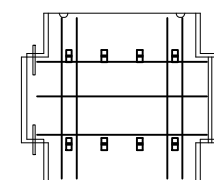
G-8-R4



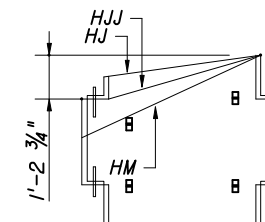
H-4-R4



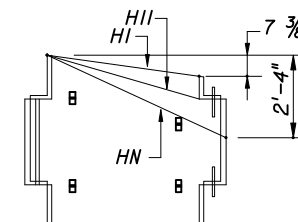
H-5-R4



H-8-R4

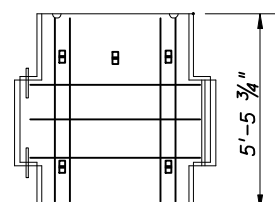


HJ-4-R4

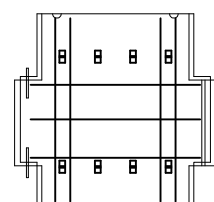


HI-4-R4

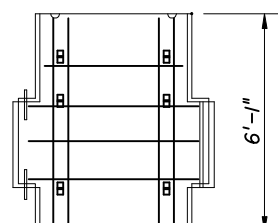
SLOPED TOP PANELS  
"H" PANEL USED FOR ILLUSTRATION ONLY.



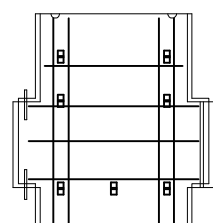
K-5-R4



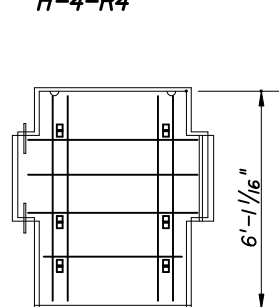
K-8-R4



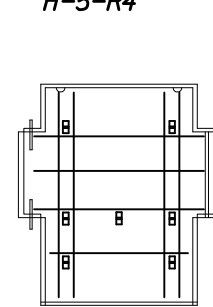
L-6-R4



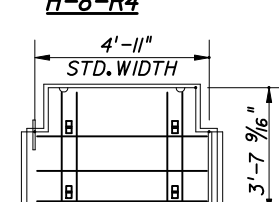
L-7-R4



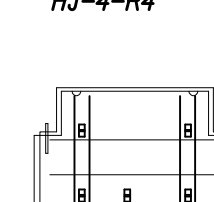
P-6-R4



P-7-R4



Q-4-R4



Q-5-R4

ALL PANELS ARE SHOWN BACK FACE VIEW

☐ TIE STRIP LOCATION

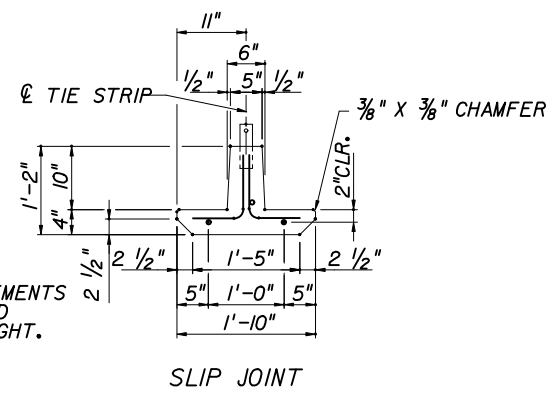
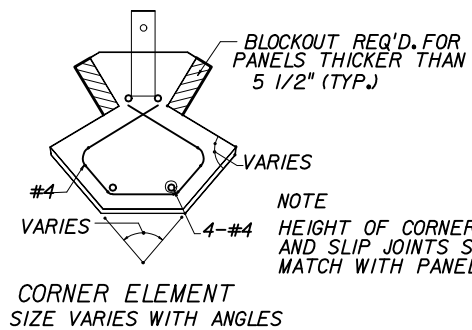
R4 VERTICAL BARS ARE #3 AS SHOWN  
R5 HORIZONTAL BARS ARE #4 AS SHOWN

R6 VERTICAL BARS ARE 6-#3  
R7 HORIZONTAL BARS ARE 4-#4

R7 VERTICAL BARS ARE 6-#4  
HORIZONTAL BARS ARE 4-#6

SEE PANEL TPE "A" WITH R4 REINFORCEMENT  
ON SHEET TITLED "PANEL DETAILS" FOR TYPICAL  
REINFORCEMENT SPACING

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR  
MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM PANELS



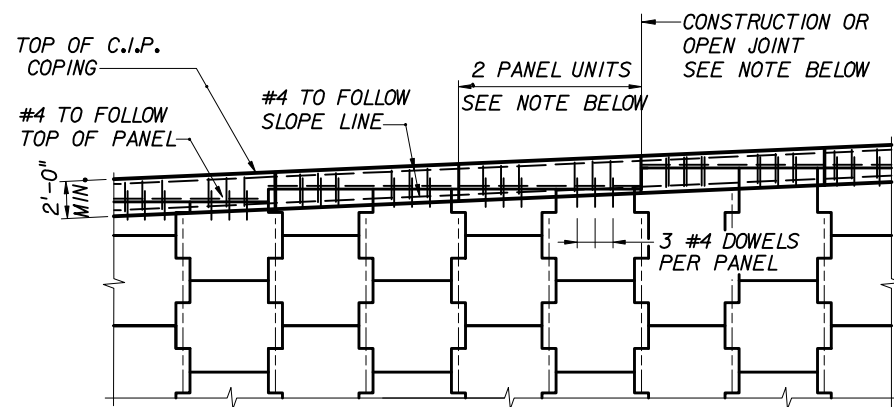
NOTE  
HEIGHT OF CORNER ELEMENTS  
AND SLIP JOINTS SHOULD  
MATCH WITH PANEL HEIGHT.

SLIP JOINT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
REINFORCED EARTH COMPANY  
REINFORCED EARTH WALL

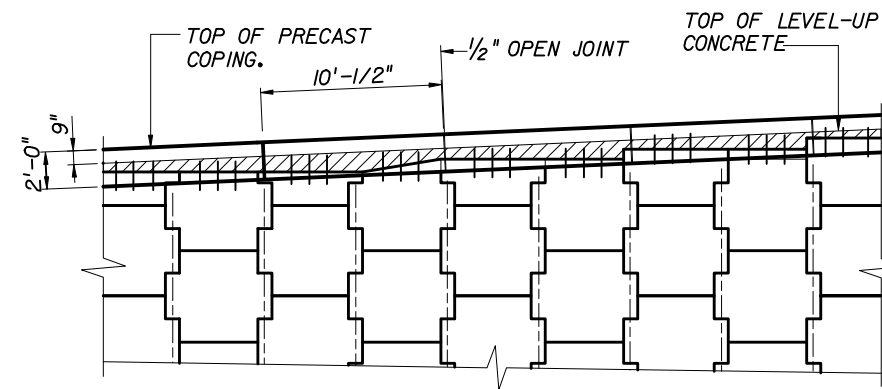
Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By				
Checked By				
		Revision	Sheet No.	Index No.
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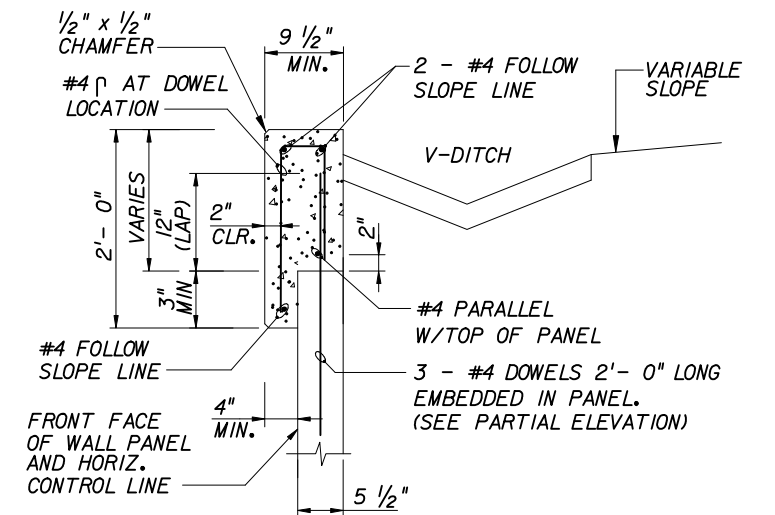
C.I.P. COPING - PARTIAL ELEVATION

**NOTE:**

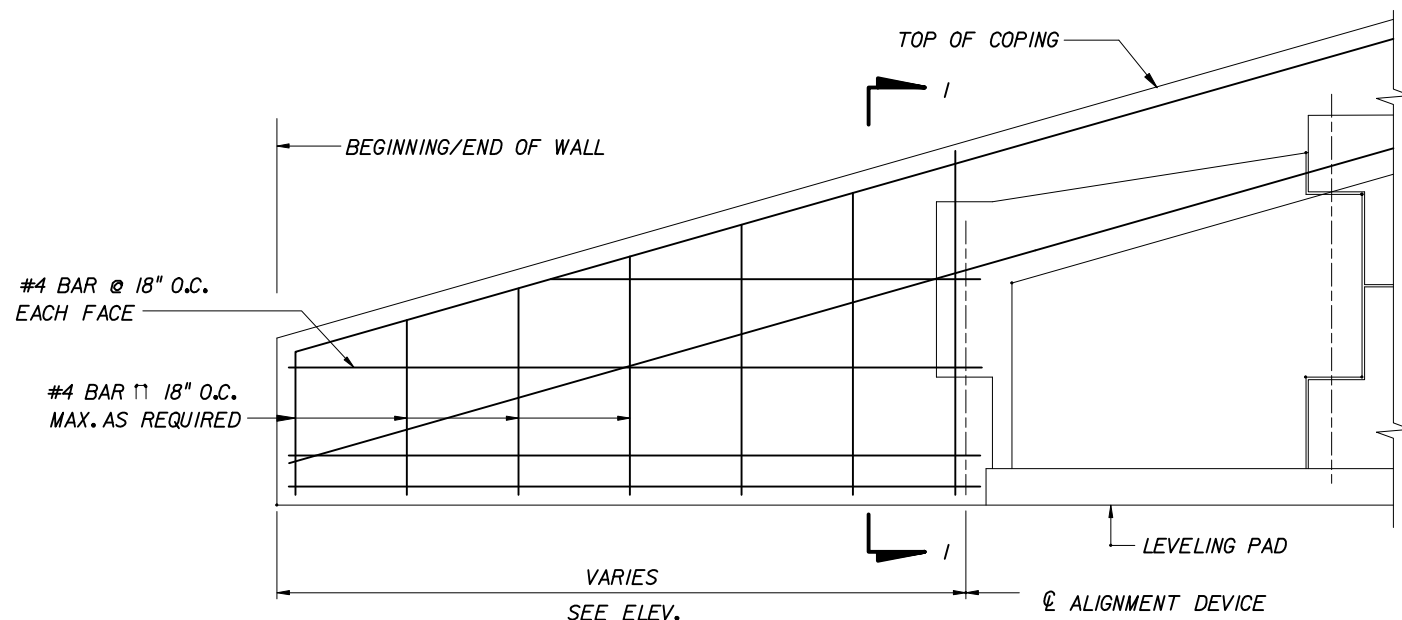
1/2-INCH OPEN JOINTS IN COPING SHALL BE AT 6 PANEL INTERVALS AND COINCIDE APPROXIMATELY WITH  $\phi$  OF ALIGNMENT PINS. REINFORCING STEEL SHALL BE STOPPED 2" SHORT OF EITHER SIDE OF THE JOINTS. CONSTRUCTION JOINTS IN BETWEEN THE OPEN JOINTS SHALL BE PROVIDED AT 2 PANELS INTERVALS.



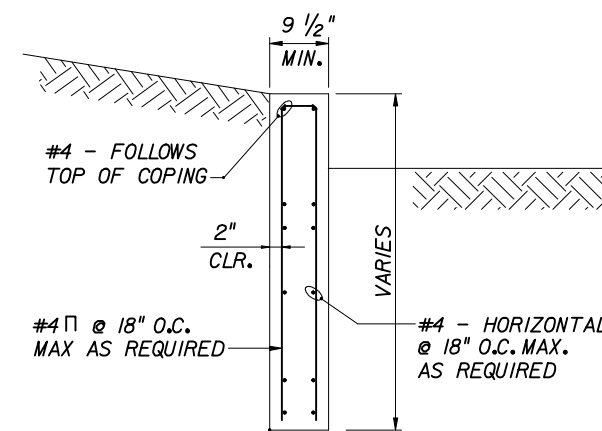
PRECAST COPING PARTIAL ELEVATION



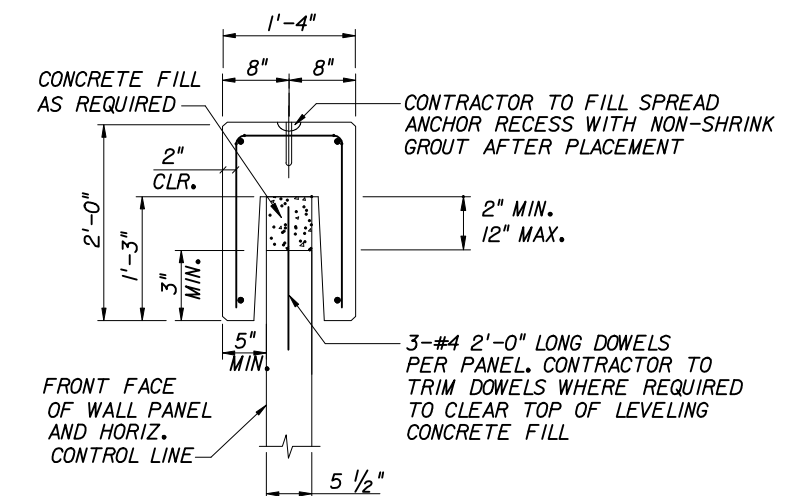
C.I.P. CONC. COPING W/DITCH



COPING ENCLOSURE DETAIL



SECTION A-A



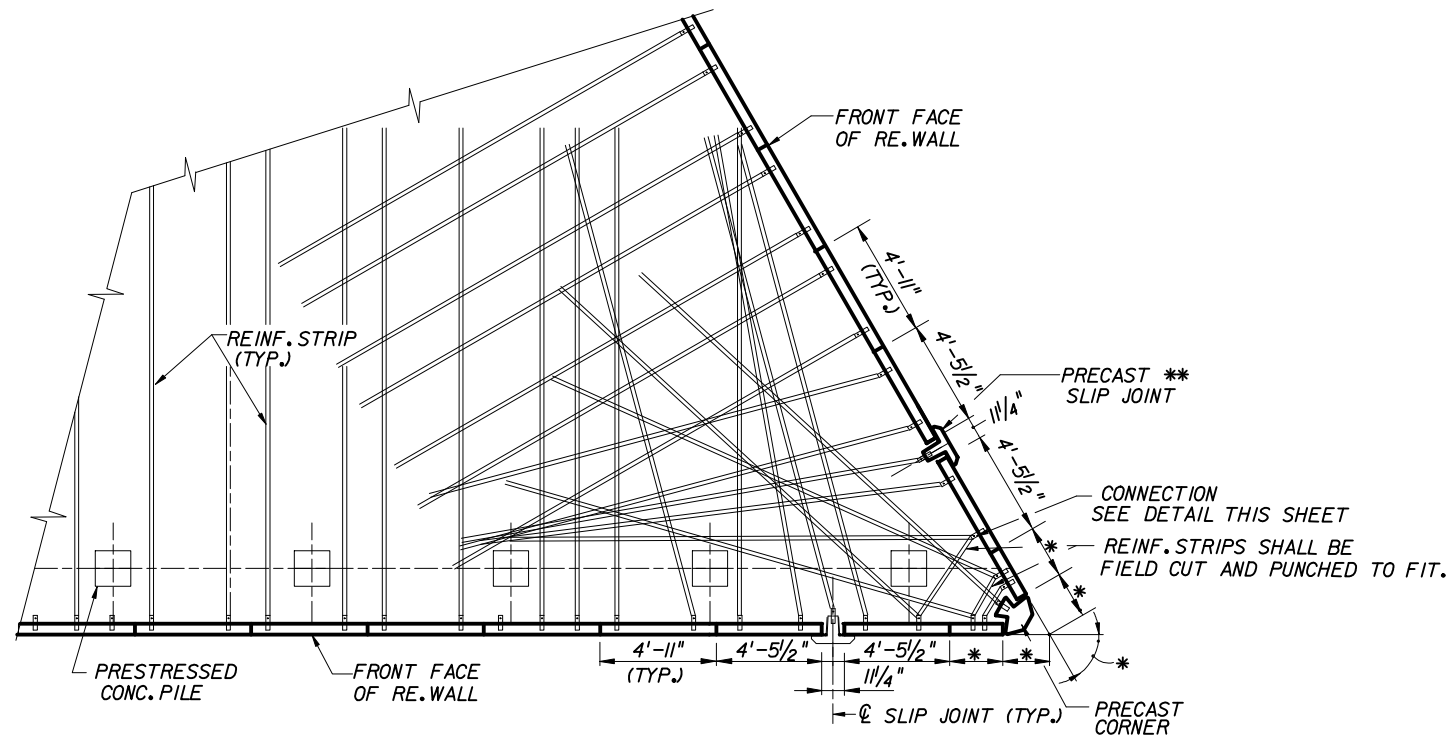
PRECAST COPING SECTION

**NOTE:**

STANDARD COPING UNIT IS 10' LONG WITH SQUARE ENDS.

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM AND SQUARE PANELS

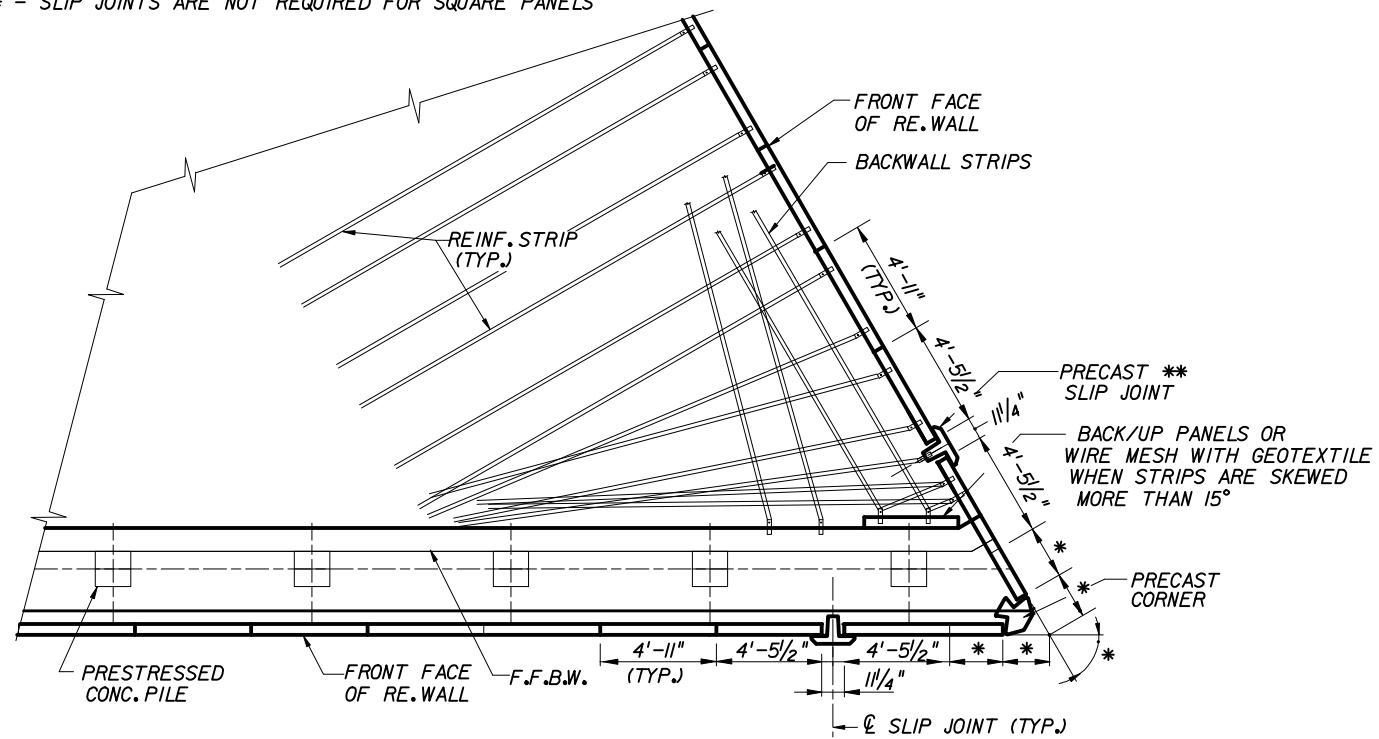
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
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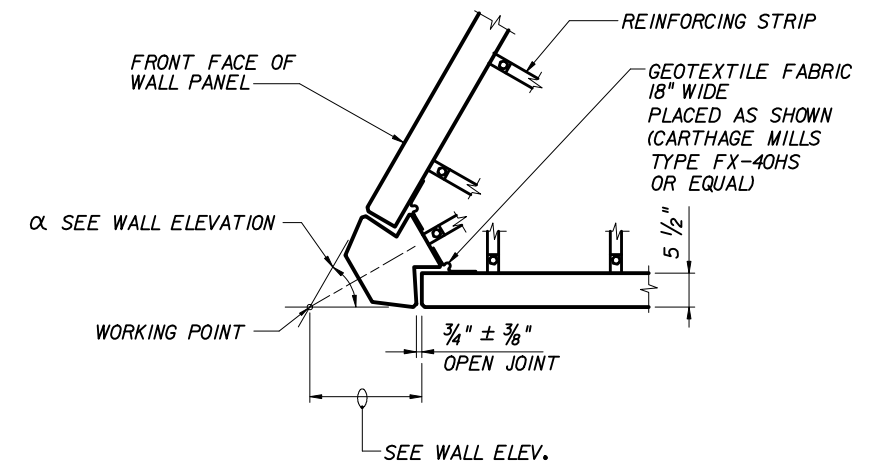
EXAMPLE ACUTE CORNER - SKEWED STRIPS UNDER PILE CAP

NOTE:

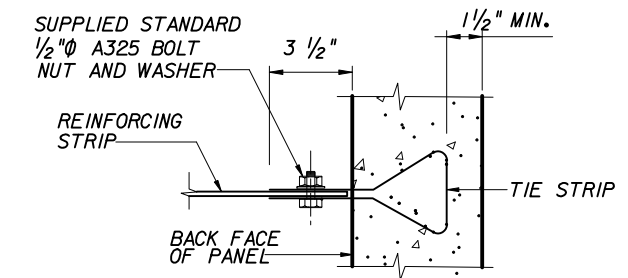
- \* - DIMENSION OR ANGLE VARIES, SEE WALL ELEVATION
- \*\* - SLIP JOINTS ARE NOT REQUIRED FOR SQUARE PANELS



EXAMPLE ACUTE CORNER - SKEWED STRIPS AT ABUTMENT LEVEL



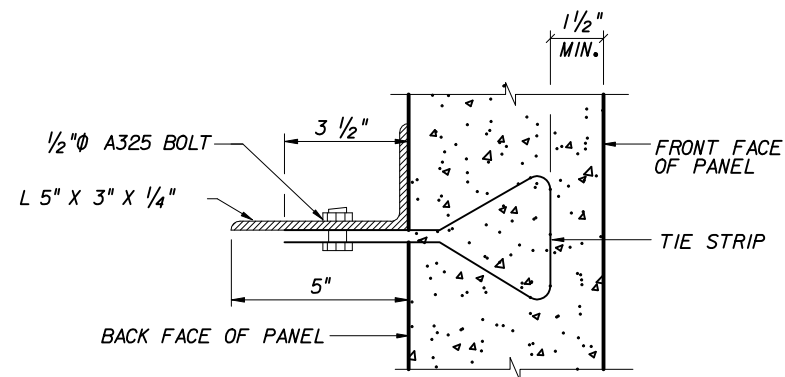
ACUTE CORNER ELEMENT DETAIL



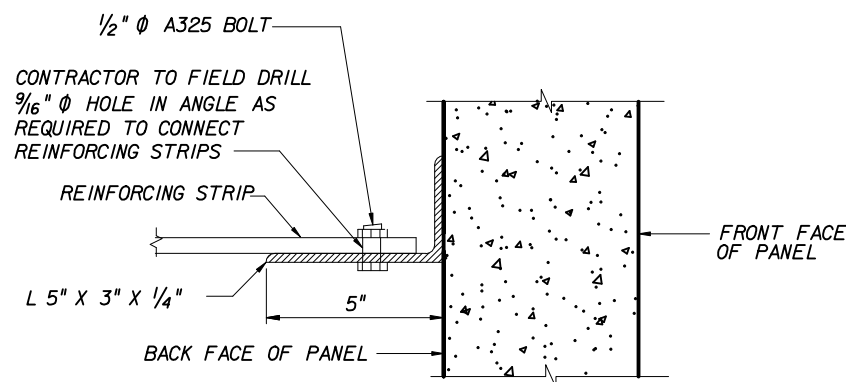
CONNECTION DETAIL

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY CRUCIFORM AND SQUARE PANELS

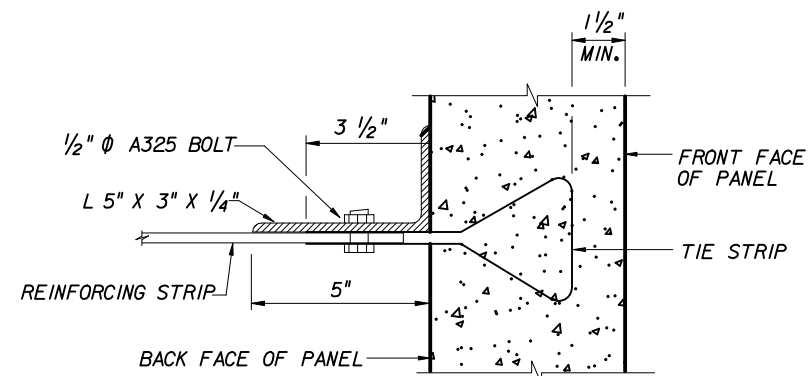
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By			Revision	Sheet No. Index No.
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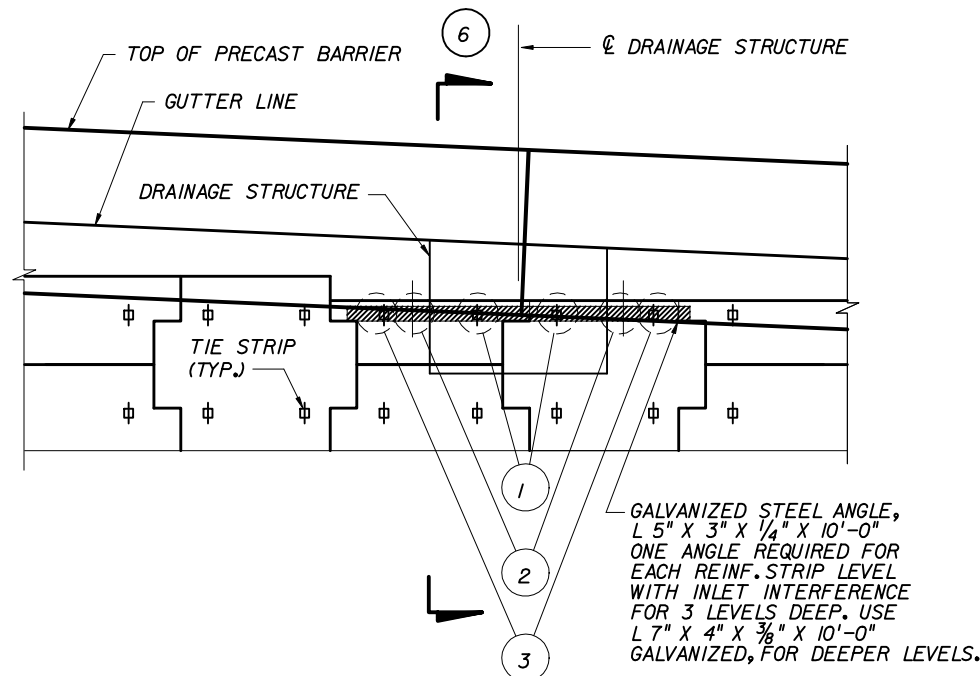
1 CONNECTION DETAIL  
ANGLE BOLTED TO TIE STRIP



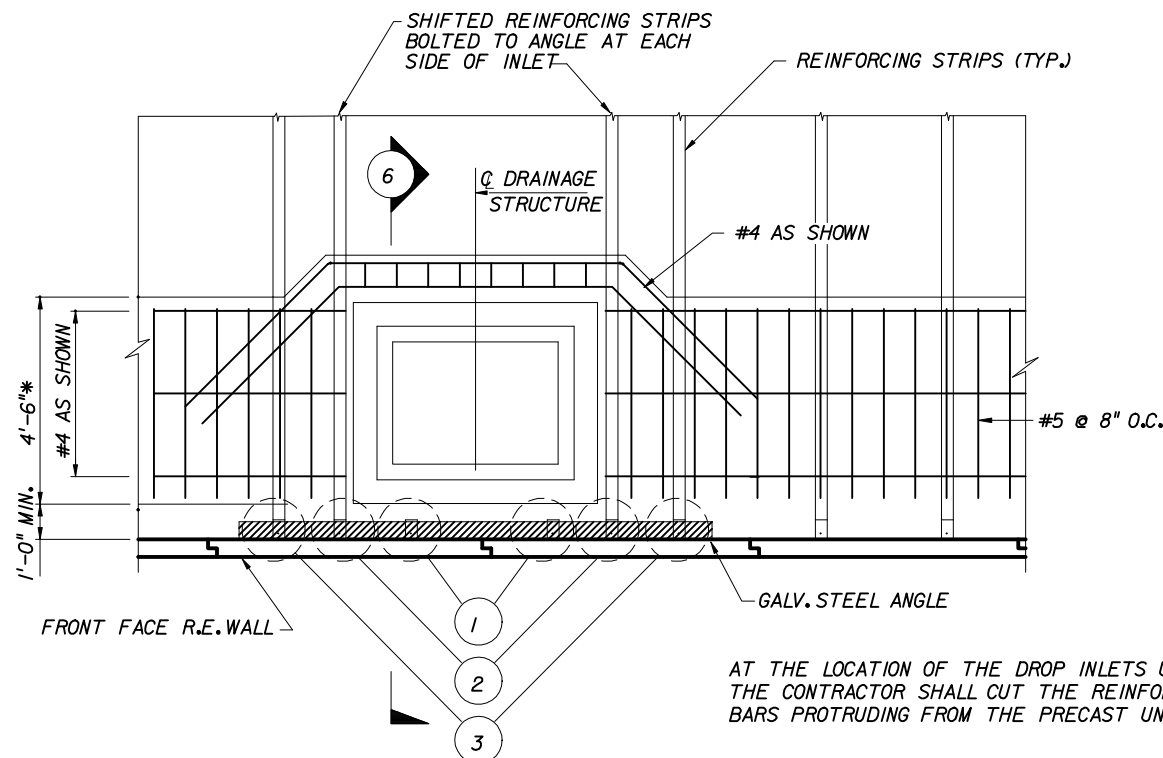
2 CONNECTION DETAIL  
SHIFTED REINF. STRIP BOLTED TO ANGLE



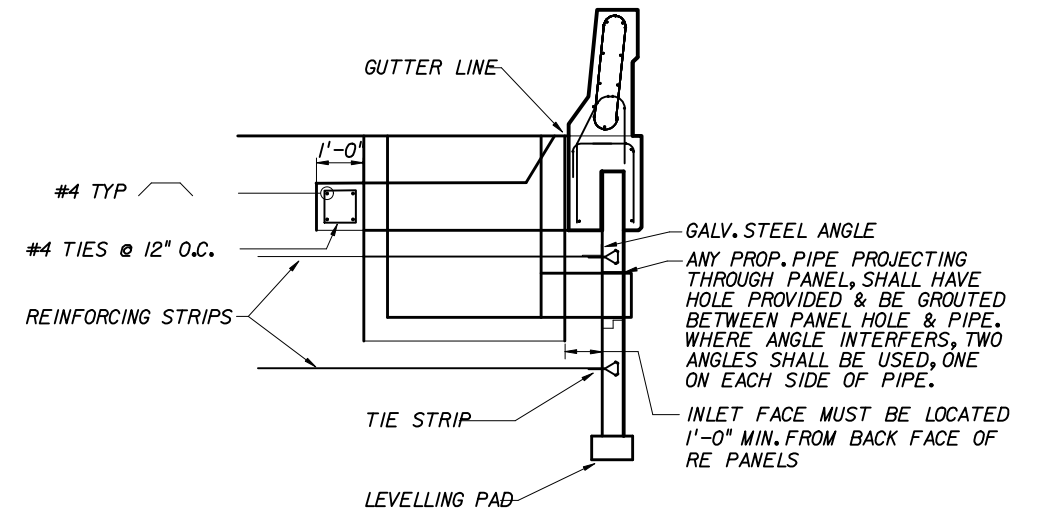
3 CONNECTION DETAIL  
ANGLE BOLTED TO TIE STRIP WITH REINF. STRIP



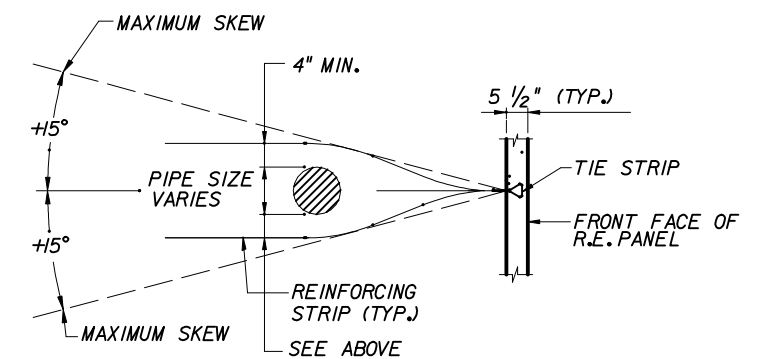
4 PARTIAL ELEVATION



5 PARTIAL PLAN



6 SECTION AT INLET



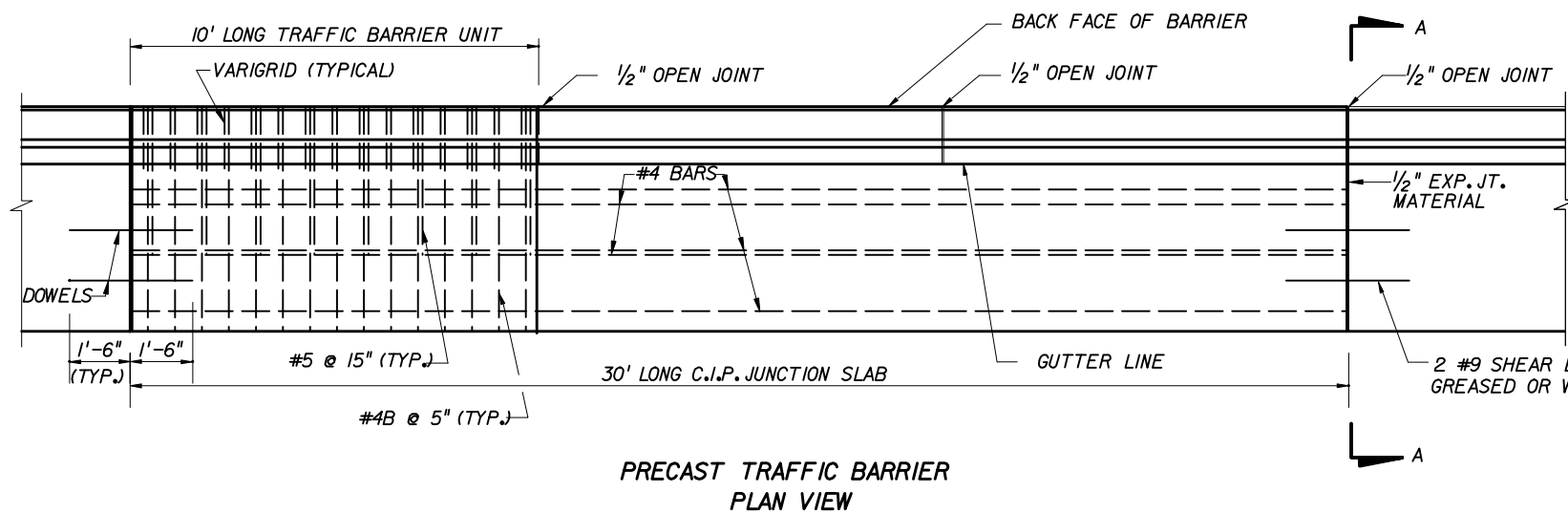
7 TYPICAL STRIP BENDING DETAIL AT  
ANY PROPOSED & EXISTING PIPES

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR  
MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM AND SQUARE PANELS

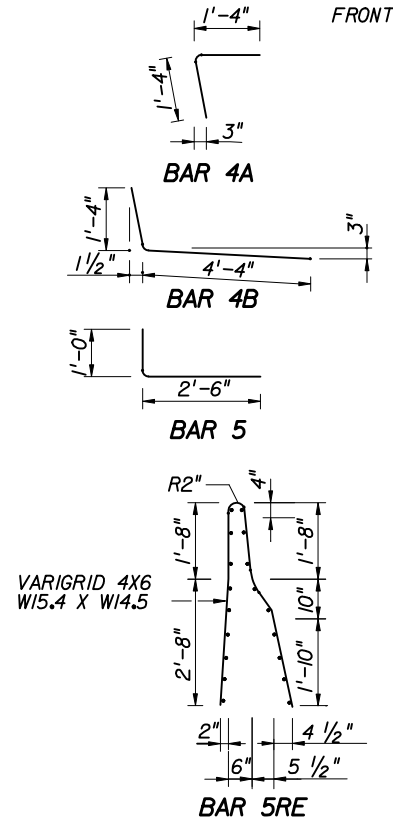
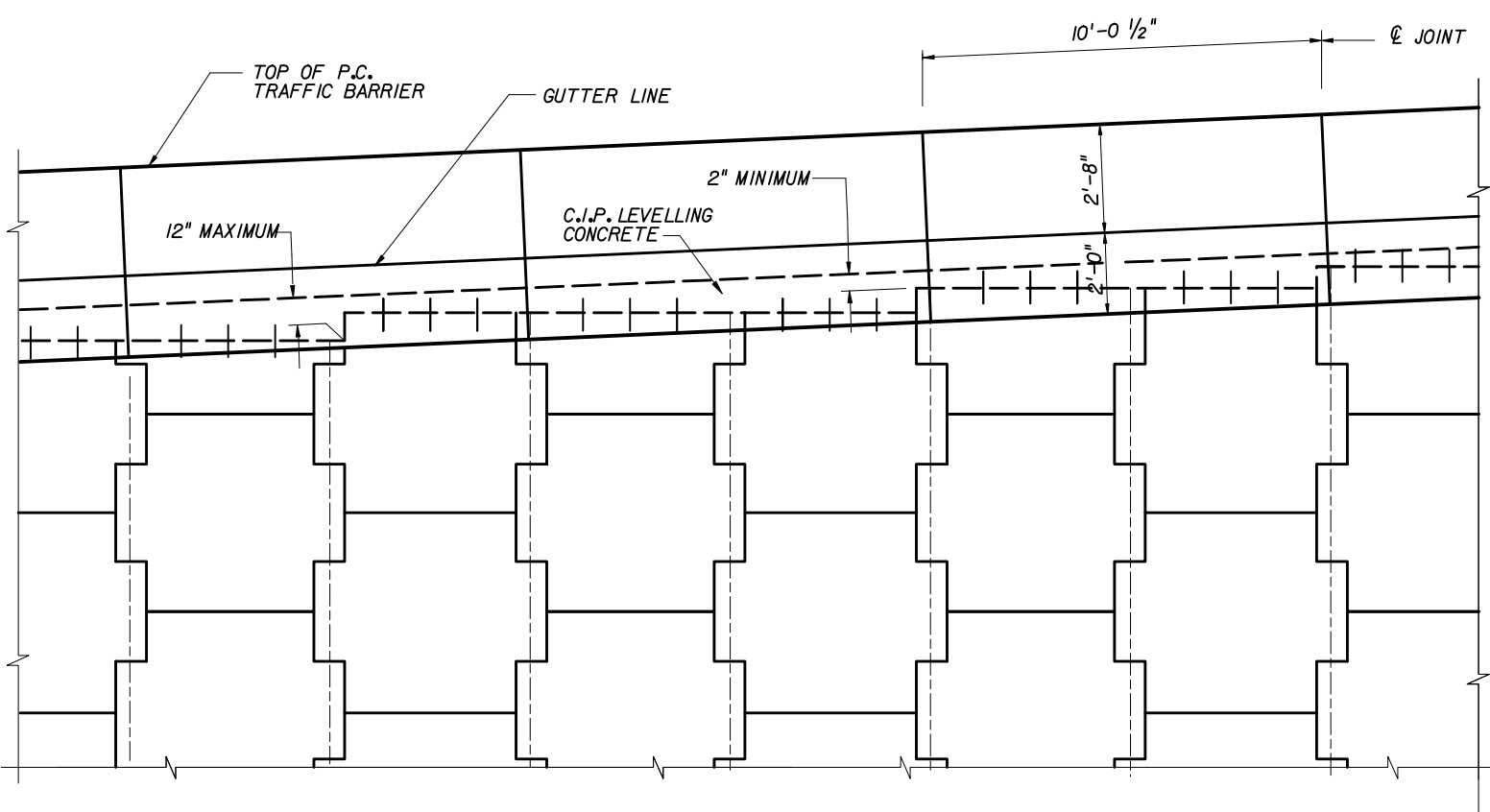
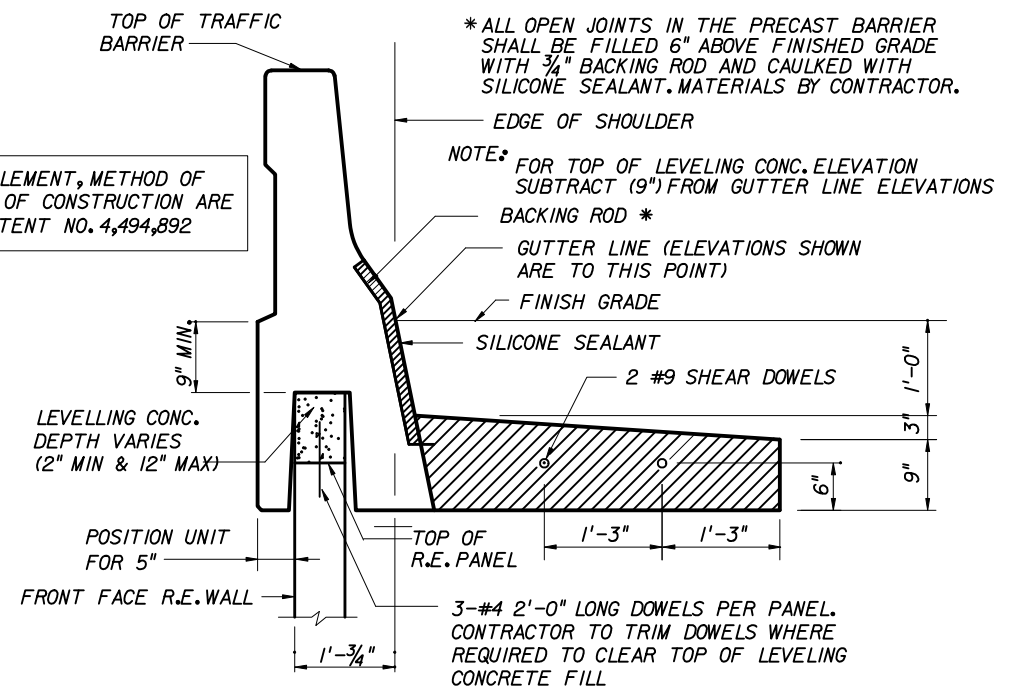
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
REINFORCED EARTH COMPANY  
REINFORCED EARTH WALL

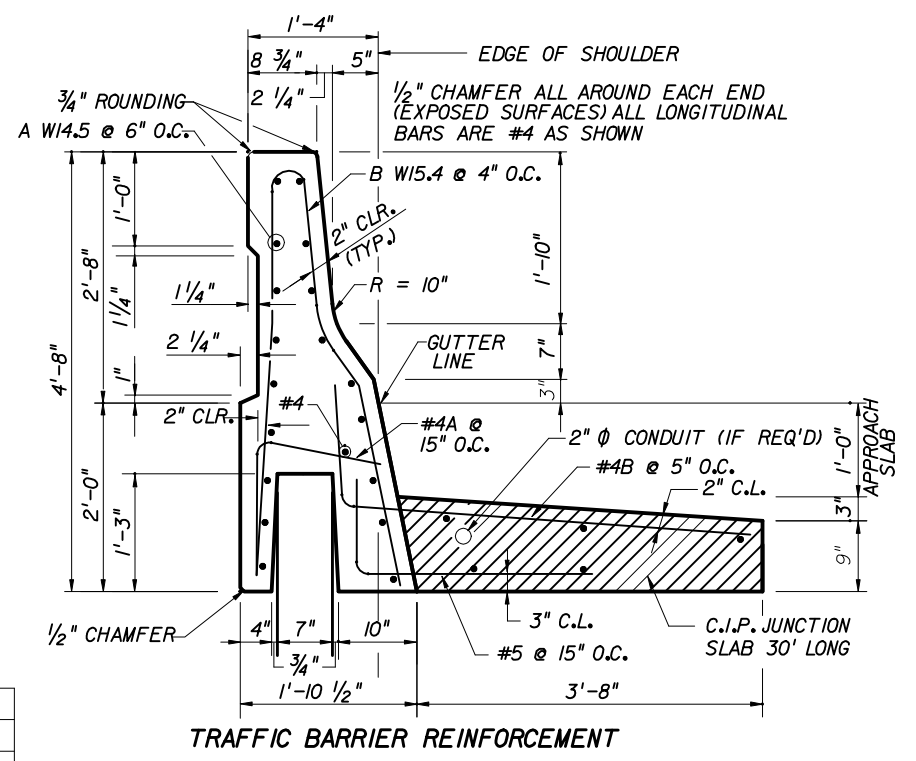
Names	Dates	Approved By		
Designed By		State Structures Design Engineer		
Drawn By				
Checked By				
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TRAFFIC BARRIER ELEMENT, METHOD OF SUPPORT AND METHOD OF CONSTRUCTION ARE COVERED BY U.S. PATENT NO. 4,494,892



MARK	QUANTITY	REMARKS
5	8	3'-6" LONG
A	VARIGRID	W14.5 @ 6" O.C.
B	VARIGRID	W15.4 @ 4" O.C.
4A	8	2'-8" LONG
4B	24	5'-8" LONG



PRECAST TRAFFIC BARRIER PARTIAL ELEVATION

TRAFFIC BARRIER REINFORCEMENT

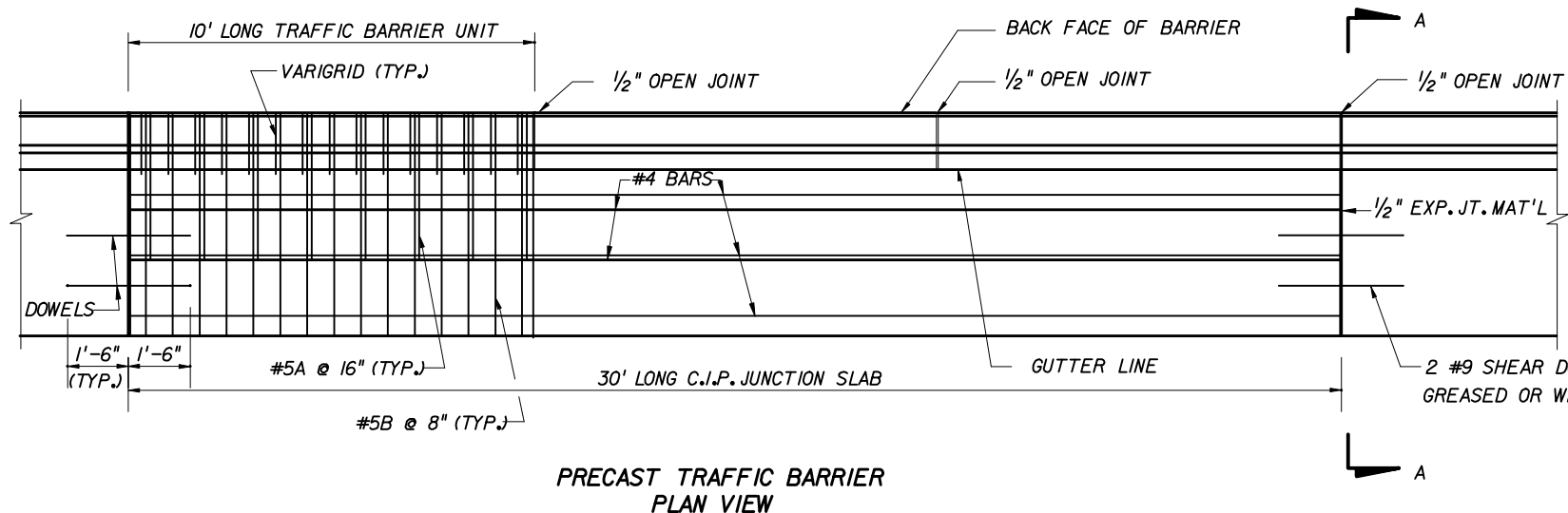
THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY CRUCIFORM AND SQUARE PANELS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

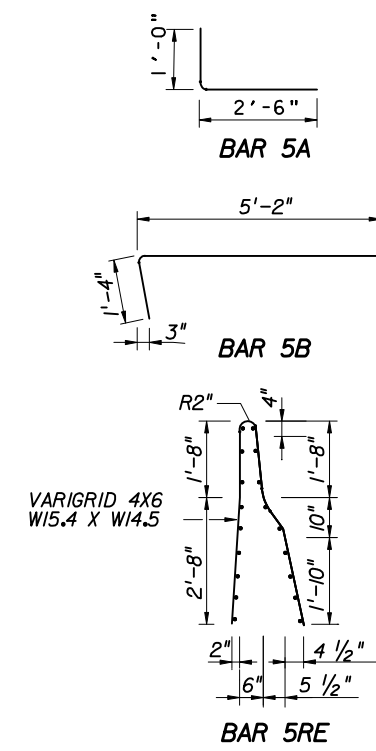
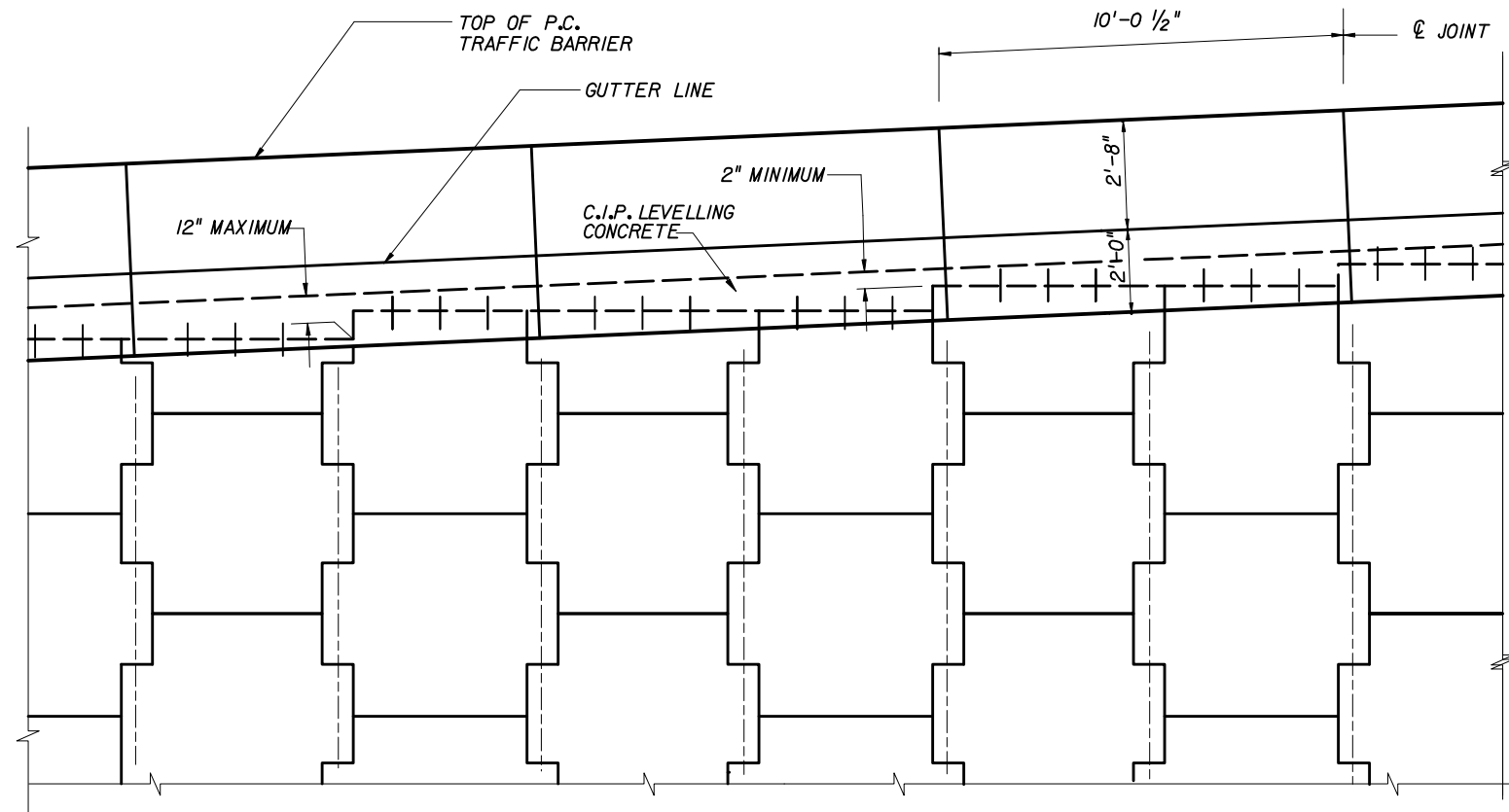
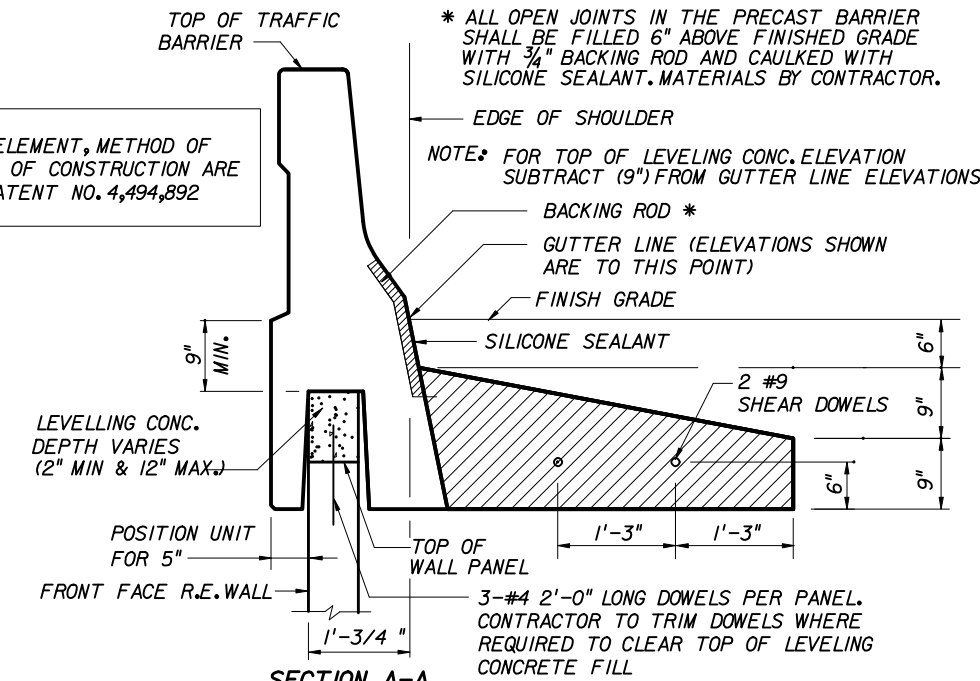
**RETAINING WALL SYSTEM  
REINFORCED EARTH COMPANY  
REINFORCED EARTH WALL**

Names	Dates	Approved By	[Signature]	
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	7 of 14	5015

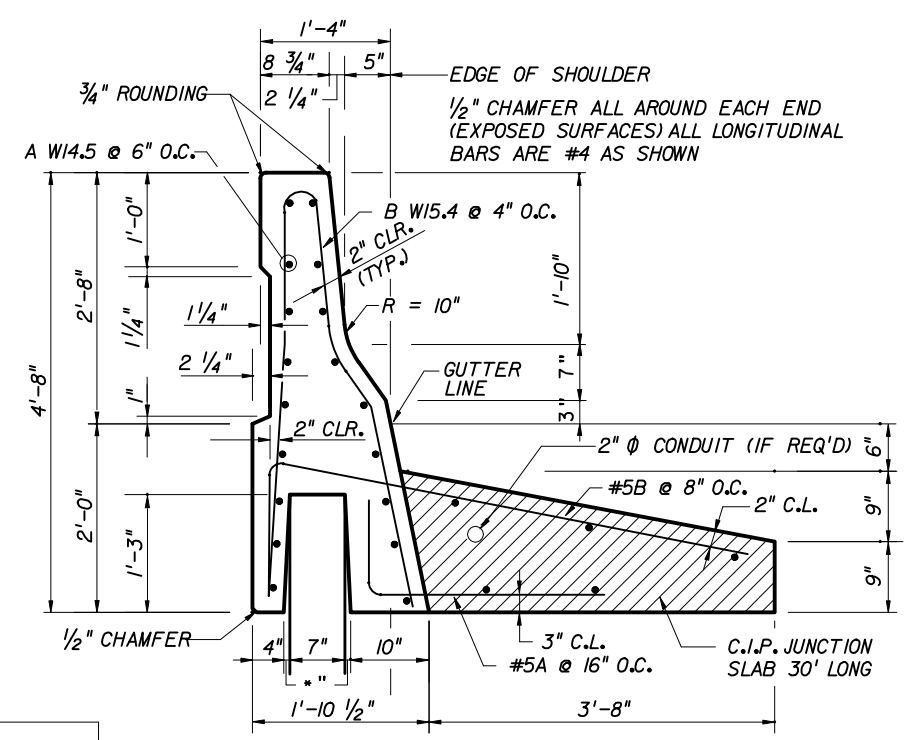




TRAFFIC BARRIER ELEMENT, METHOD OF SUPPORT AND METHOD OF CONSTRUCTION ARE COVERED BY U.S. PATENT NO. 4,494,892



MARK	QUANTITY	REMARKS
5A	8	3'-6" LONG
5B	15	6'-6" LONG
A	VARIGRID	W14.5 @ 6" O.C.
B	VARIGRID	W15.4 @ 4" O.C.



PRECAST TRAFFIC BARRIER PARTIAL ELEVATION

TRAFFIC BARRIER REINFORCEMENT

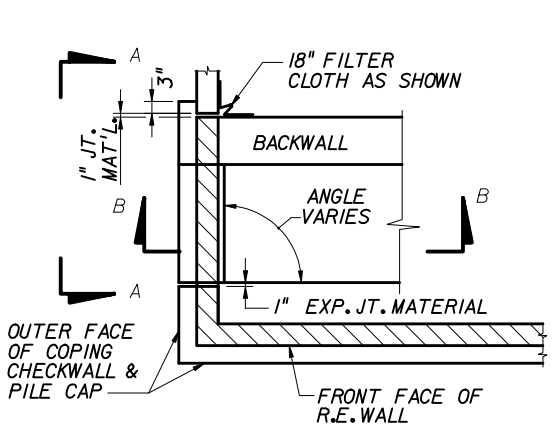
THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM AND SQUARE PANELS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

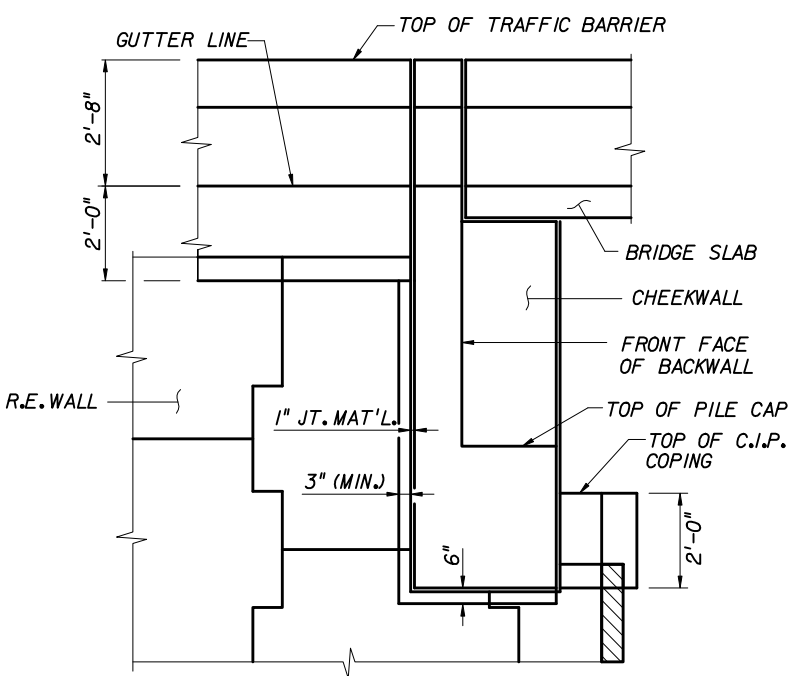
**RETAINING WALL SYSTEM  
REINFORCED EARTH COMPANY  
REINFORCED EARTH WALL**

Names	Dates	Approved By		
Designed By		 State Structures Design Engineer	Revision	Sheet No.
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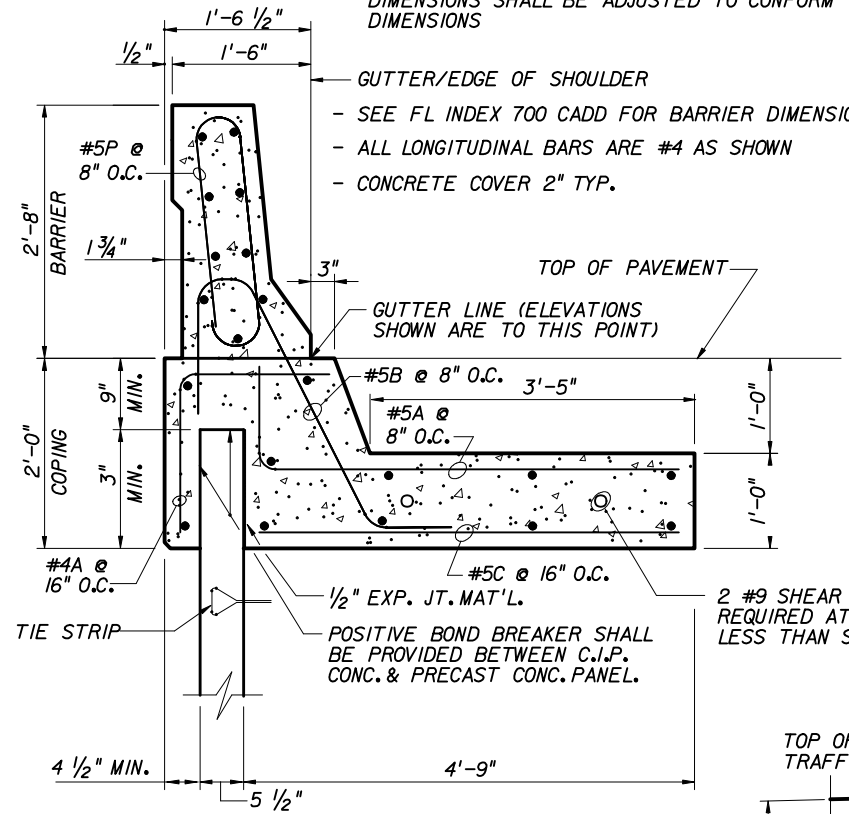
NOTE:  
 IF SHORT C.I.P. BARRIER SECTIONS ARE TO BE CONSTRUCTED ADJACENT TO PRECAST BARRIER SECTIONS, THEN THIS SECTION'S DIMENSIONS SHALL BE ADJUSTED TO CONFORM TO THE PRECAST DIMENSIONS



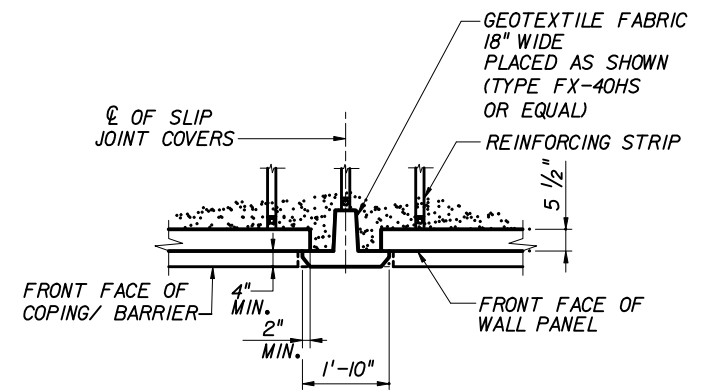
PLAN VIEW @ BEND (TYP.)



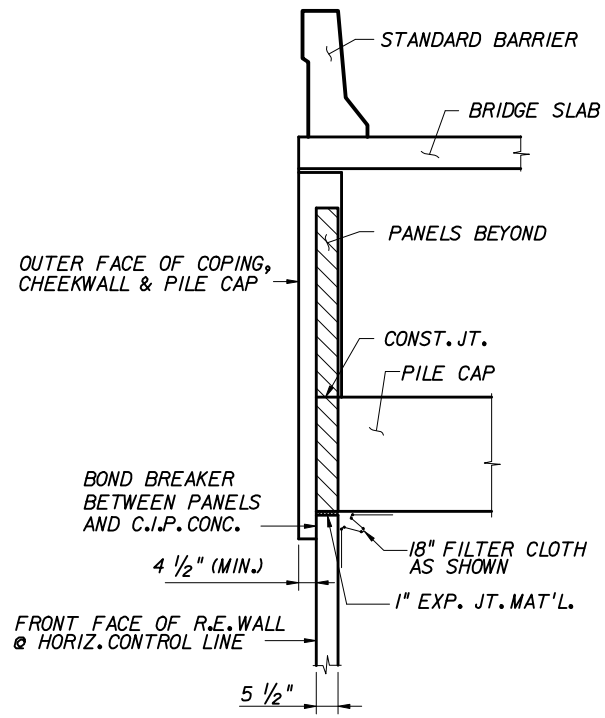
SECTION A-A



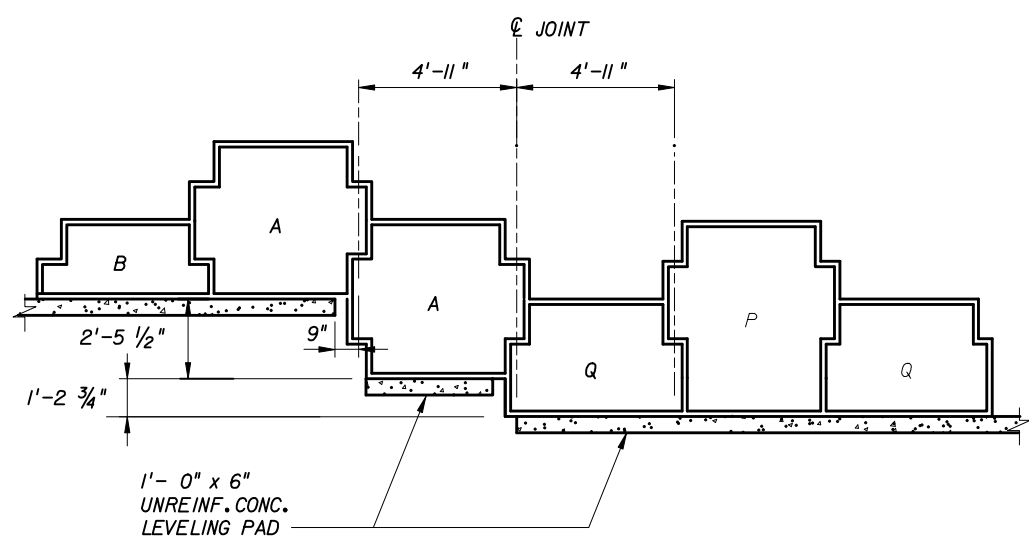
C.I.P. CONC. TRAFFIC BARRIER



SLIP JOINT COVER DETAIL

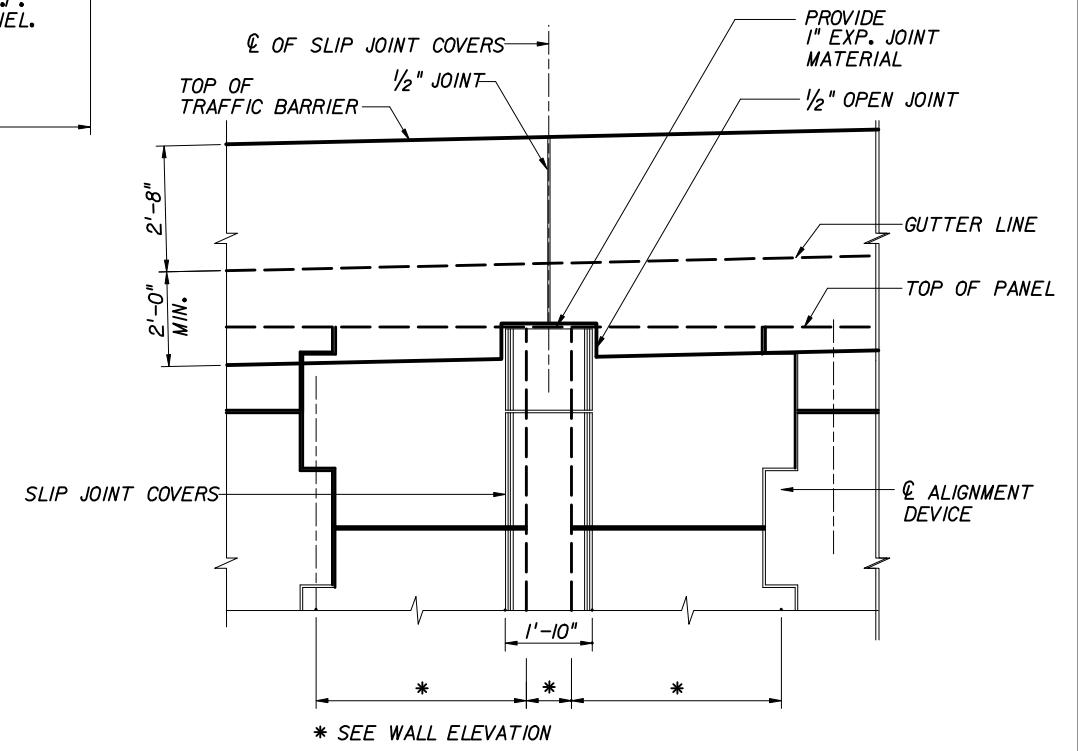


SECTION B-B



TYPICAL LEVELING PAD STEP DETAIL

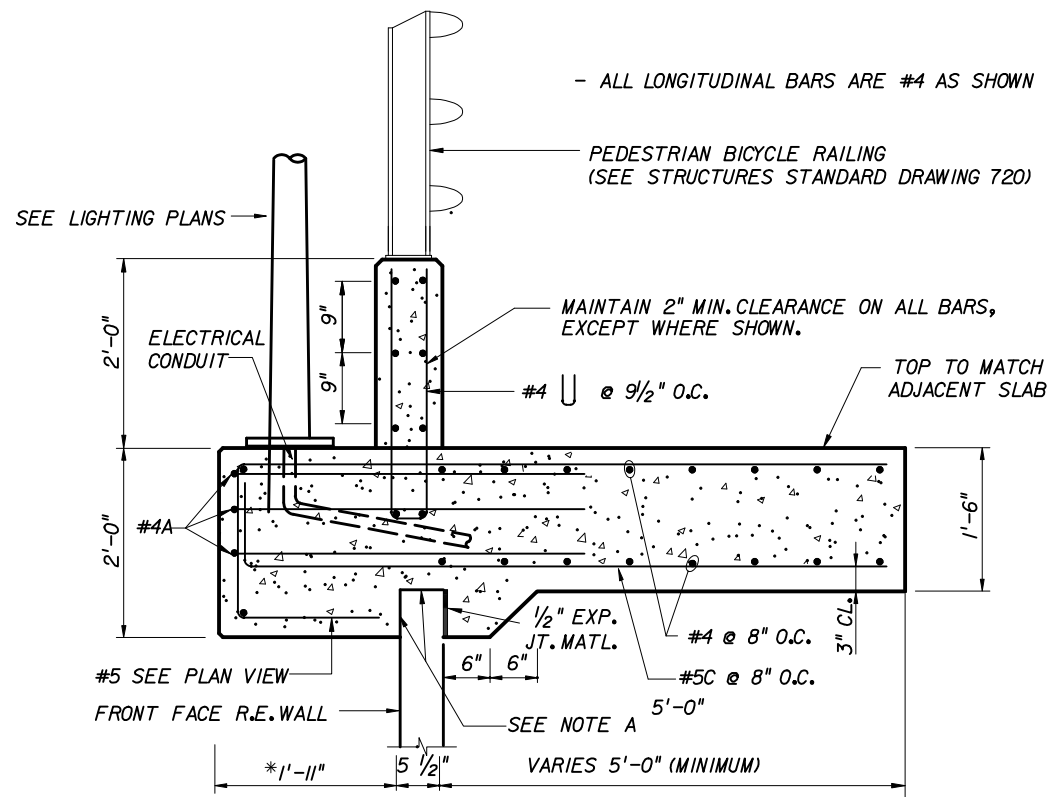
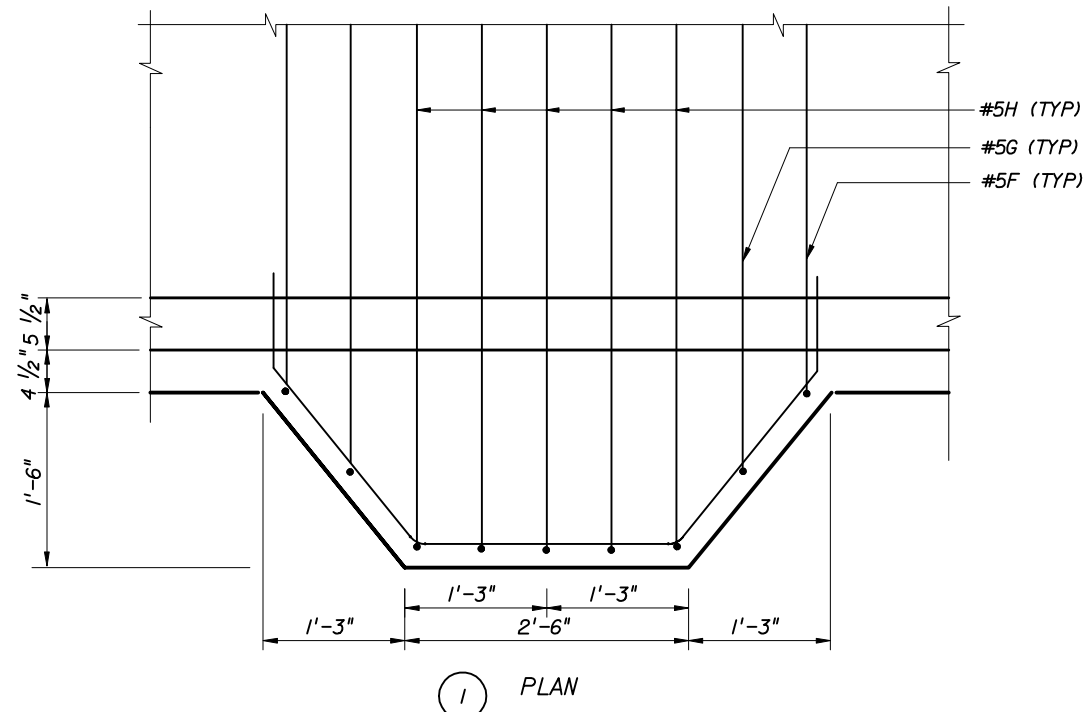
(LEVELING PAD DIMENSIONS ARE THE SAME FOR BOTH CRUCIFORM AND SQUARE PANELS, SEE WALL ELEVATIONS FOR PANEL TYPES AT STEPS)



C.I.P. TRAFFIC BARRIER OVER SLIP JOINT COVER

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
 CRUCIFORM AND SQUARE PANELS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
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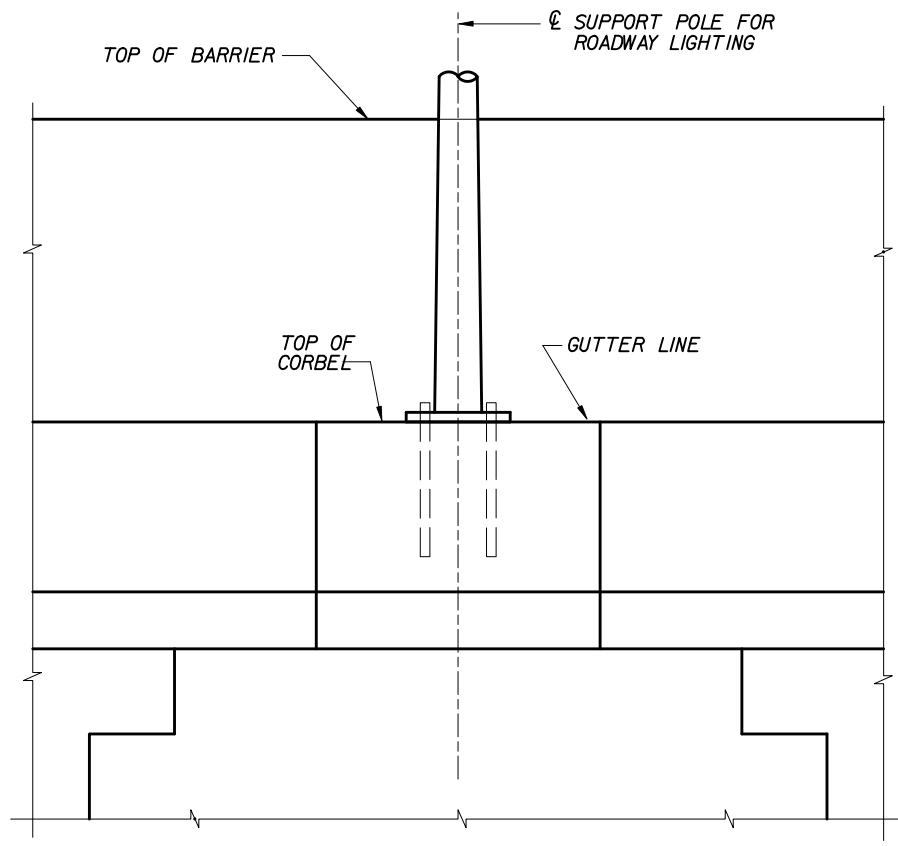
NOTE A:  
POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN C.I.P. CONCRETE AND CONCRETE PANEL

NOTE B:  
THE BARRIER JUNCTION SLAB SHALL HAVE THESE DIMENSIONS FOR ONE PRECAST UNIT EITHER SIDE OF LIGHT POLE BARRIER LONGITUDINAL BARS SHALL BE AS SHOWN ABOVE

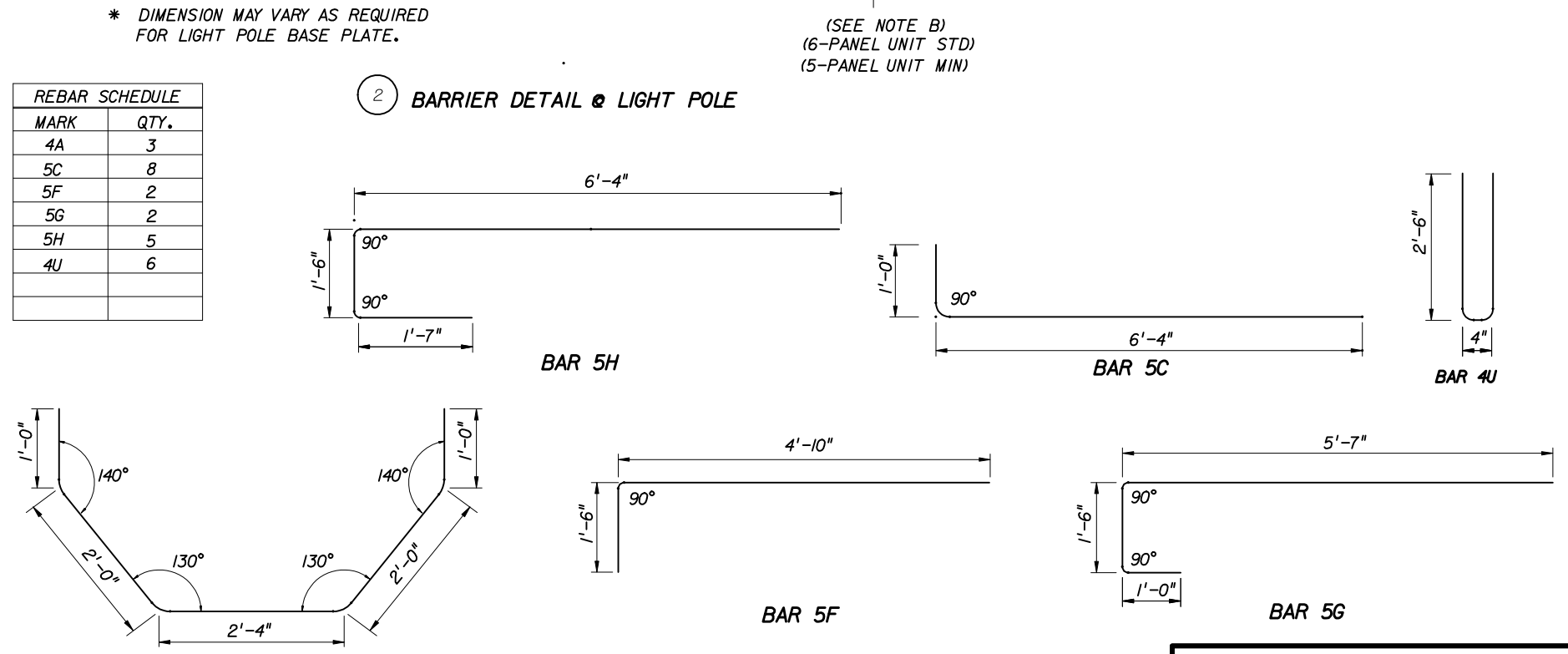
NOTE C:  
2 - #9 SHEAR DOWELS - 3'-0" LONG REFER TO PRECAST BARRIER SHEET

NOTE D:  
LIGHT POLE MANUFACTURER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT LOADS TO THE PILASTER AND FIT THE REINFORCING CAGE.

NOTE E:  
SEE STRUCTURES STANDARD DRAWING 500 FOR ADDITIONAL DETAILS.



REBAR SCHEDULE	
MARK	QTY.
4A	3
5C	8
5F	2
5G	2
5H	5
4U	6



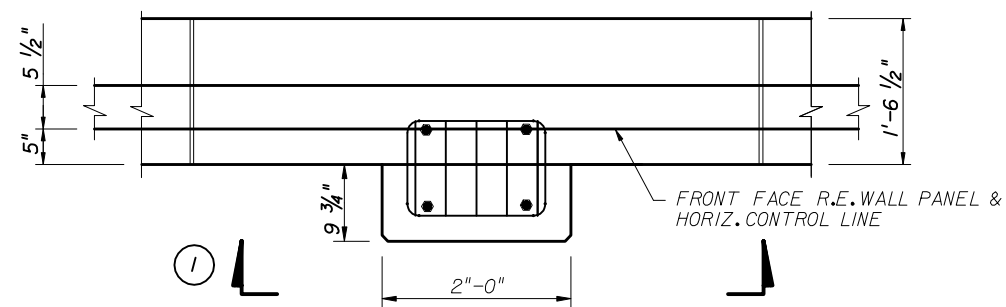
3 PARTIAL ELEVATION

2 BARRIER DETAIL @ LIGHT POLE

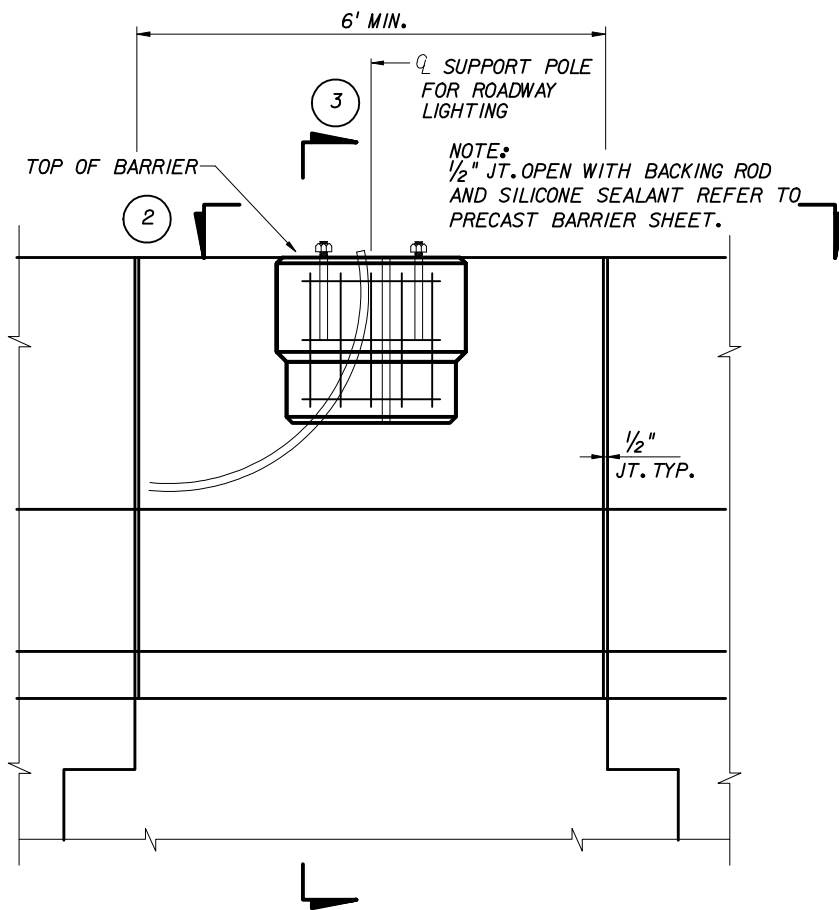
4 BAR BENDING DETAILS

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM AND SQUARE PANELS

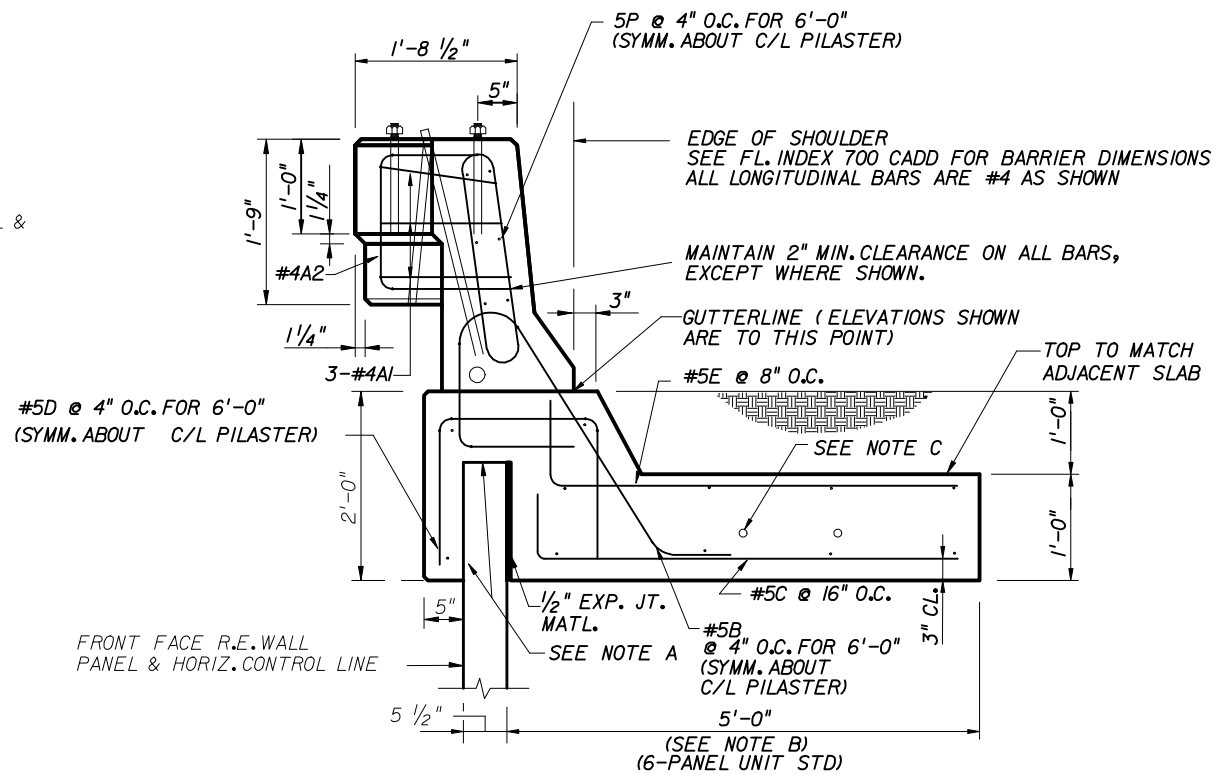
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL</b>				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By			Revision	Sheet No. Index No.
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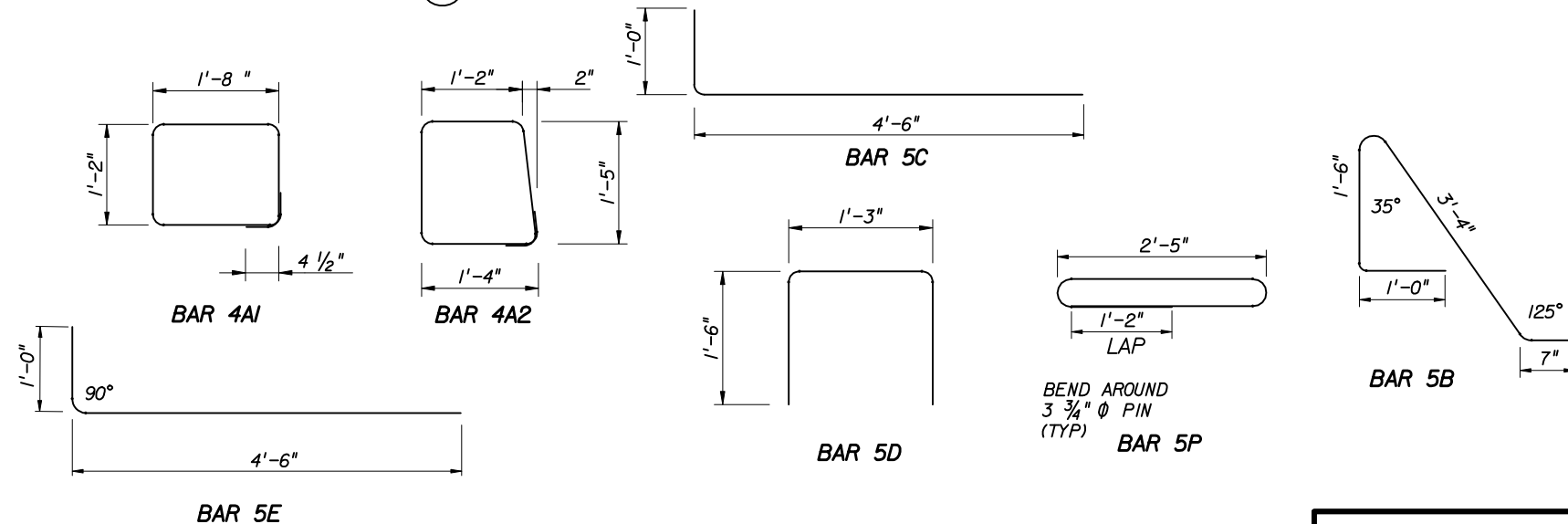
2 PLAN



1 PARTIAL ELEVATION



3 BARRIER DETAIL @ LIGHT POLE



4 BAR BENDING DETAILS

**NOTES:**

- A. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN CAST IN PLACE CONC. AND PRECAST CONC. PANEL.
- B. THE BARRIER JUNCTION SLAB SHALL HAVE THESE DIMENSIONS FOR ONE PRECAST UNIT EITHER SIDE OF LIGHT POLE BARRIER LONGITUDINAL BARS SHALL BE AS SHOWN ABOVE.
- C. 2 - #9 SHEAR DOWELS - 3'-0" LONG REFER TO PRECAST BARRIER SHEET
- D. LIGHT POLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND FIT THE REINFORCING CAGE.
- E. SEE STRUCTURES STANDARD DRAWING 500 FOR ADDITIONAL DETAILS.

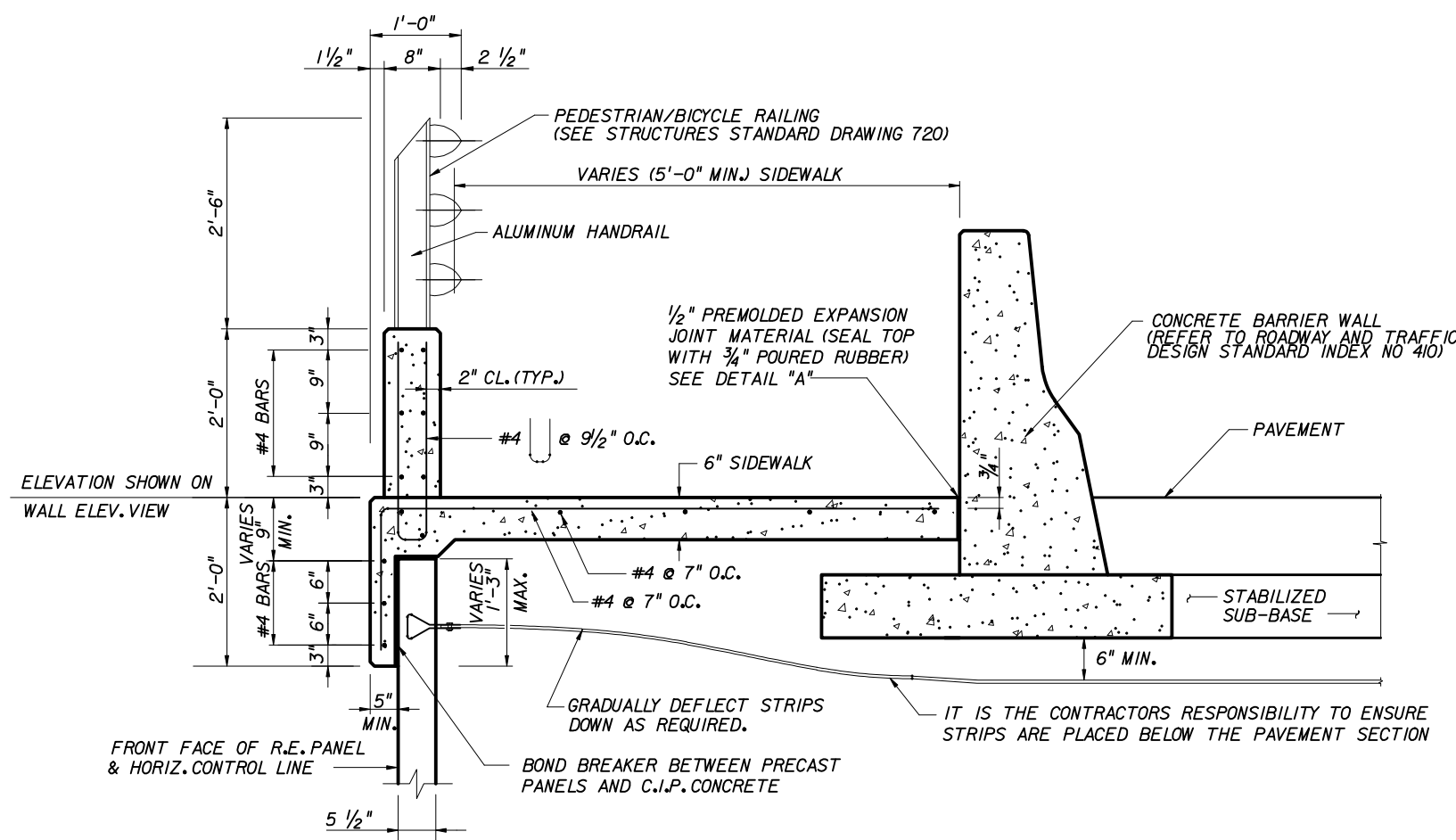
REBAR SCHEDULE	
MARK	QTY.
4A1	3
4A2	5
5B	18
5C	4
5D	18
5E	9
5P	18

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

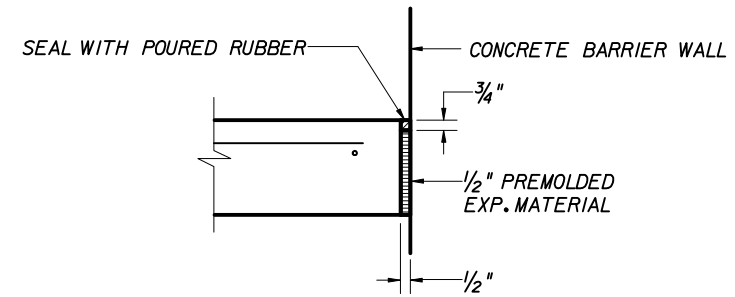
RETAINING WALL SYSTEM  
REINFORCED EARTH COMPANY  
REINFORCED EARTH WALL

Names	Dates	Approved By		
Designed By		[Signature]		
Drawn By				
Checked By		State Structures Design Engineer		
		Revision	Sheet No.	Index No.
		00	11 of 14	5015

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM AND SQUARE PANELS



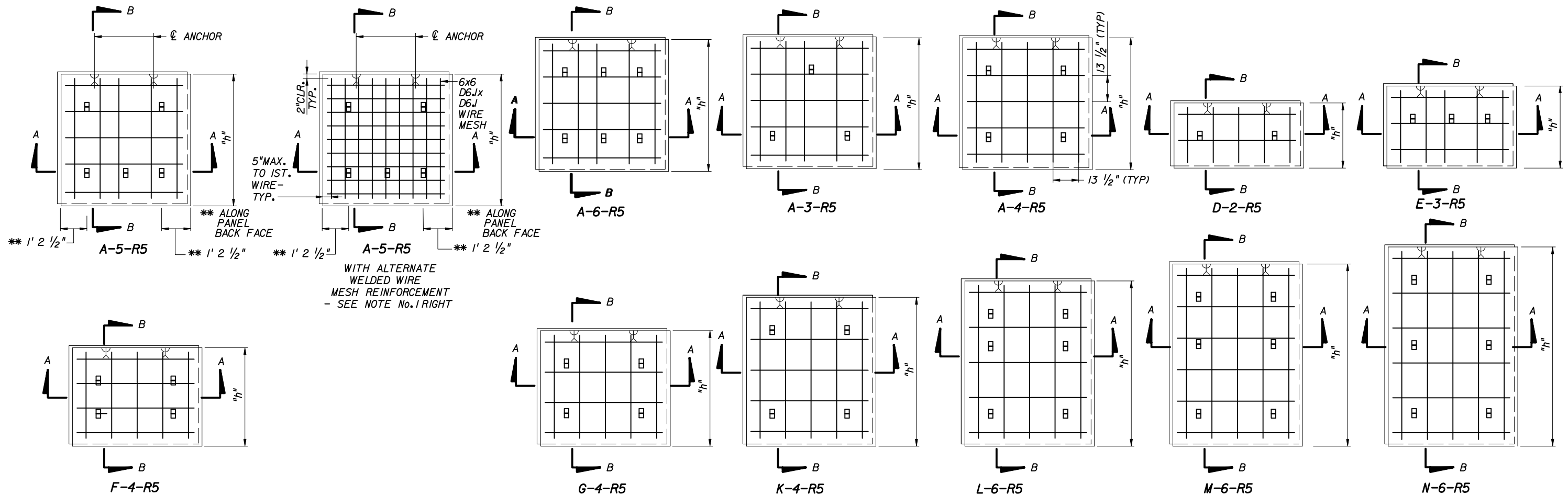
C.I.P. PARAPET DETAIL w/ HANDRAIL



DETAIL "A"

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
CRUCIFORM AND SQUARE PANELS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL</b>				
Names	Dates	Approved By <i>W. V. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	12 of 14	5015

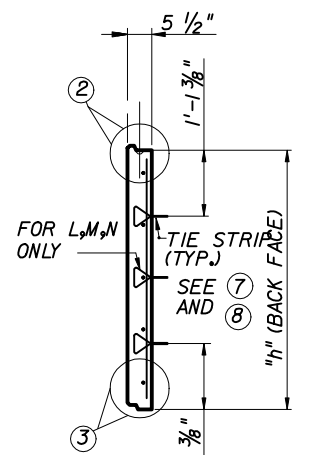


WITH ALTERNATE WELDED WIRE MESH REINFORCEMENT - SEE NOTE NO. 1 RIGHT

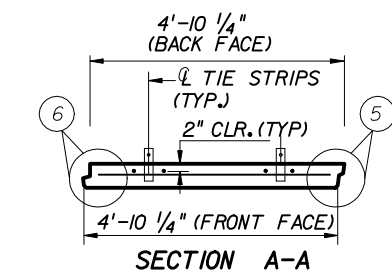
TYPICAL PANELS

NOTES:

1. REINFORCING STEEL TO BE A615, GRADE 60. DEFORMED WELDED WIRE MESH (ASTM A497) MAY BE SUBSTITUTED FOR REBARS. DEFORMED WELDED MESH REQUIREMENTS FOR PANEL "A" IS SHOWN IN THIS SHEET. MESH FOR OTHER PANEL TYPES SHALL BE DETERMINED BASED ON PANEL SHAPE MESH STYLE, AND MINIMUM EDGE CLEAR DISTANCES SHOWN ON THIS SHEET.
2. 1/2" x 1/2" CHAMFER SHALL BE PROVIDED ON ALL EXPOSED EDGES (FRONT FACE ONLY).
3. ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILED ON PANEL SHOP DRAWINGS.
4. ALL PANELS SHALL HAVE TWO 1 TON ANCHORS.
5. PANEL DESIGN THICKNESS IS 5 1/2" THICKNESS OF CONCRETE MUST INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
6. ACTUAL LOCATION OF REBARS WILL BE ADJUSTED TO ACCOMMODATE PANEL CASTING. MINIMUM 1 3/16" CLEARANCE IS REQUIRED BETWEEN REBARS & TIE-STRIPS.



SECTION B-B



SECTION A-A

PANEL TYPE	"h"
A	4'-10 1/4"
D	2'-4 3/4"
E	3'-0 1/4"
F	3'-7 1/2"
G	4'-3"
K	5'-5 3/4"
L	6'-1"
M	6'-8 1/2"
N	7'-4"

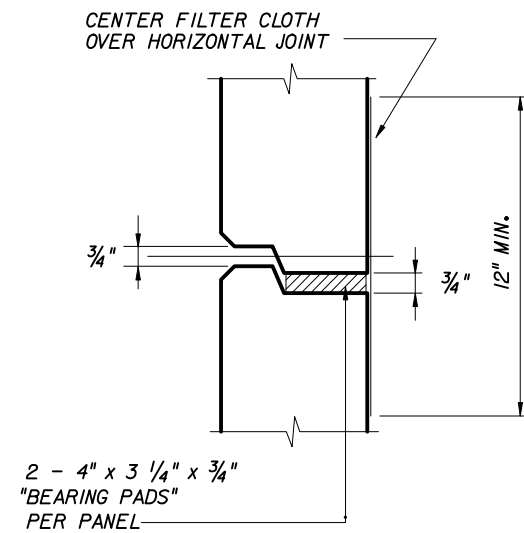
NOTE: CONCRETE COVER ON ALL REINFORCEMENT TO BE 2" MIN.

PANEL THICKNESS	REINFORCEMENT DESIGNATION	PANEL REINFORCEMENT A <sub>5</sub>	MAXIMUM ALLOWABLE HORIZONTAL STRESS AT FACING (KSF)
5 1/2" (MIN.)	R5	5-#3 VERTICAL 5-#3 HORIZONTAL	1.19
		ALTERNATE 6 x 6 D6J x D6J	
	R7	7-#3 VERTICAL 6-#3 HORIZONTAL	1.78
		ALTERNATE 6 x 6 D8.5 x D8.5	

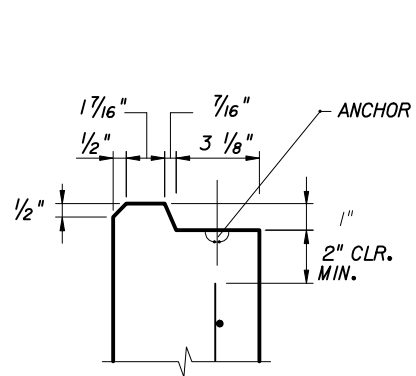
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
REINFORCED EARTH COMPANY  
REINFORCED EARTH WALL

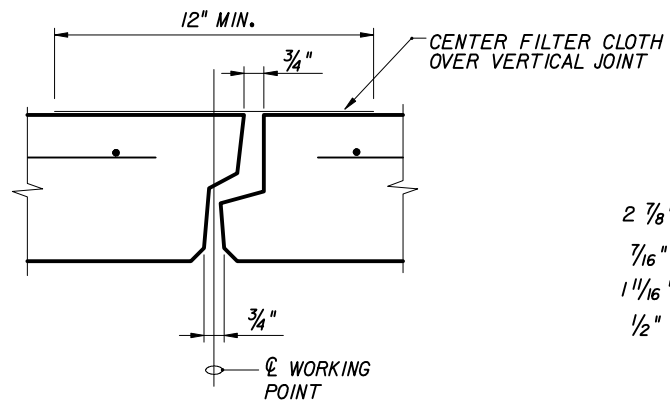
Names	Dates	Approved By		
Designed By		State Structures Design Engineer	Revision	Sheet No.
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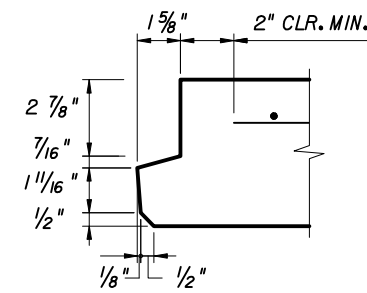
1 HORIZONTAL JOINT



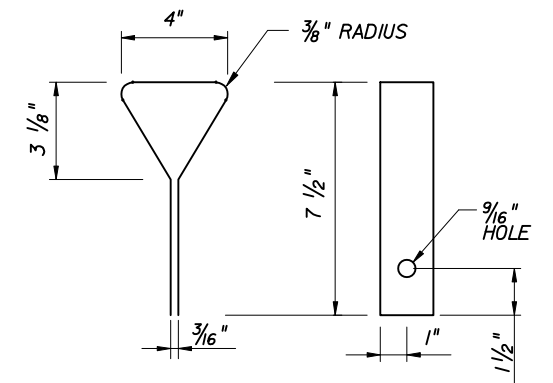
2 SECTION @ PANEL TOP



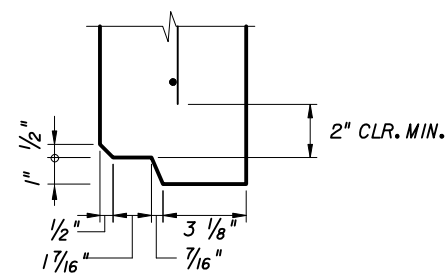
4 VERTICAL JOINT



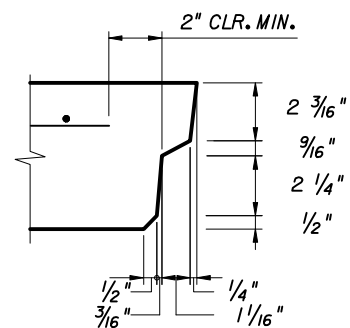
6 SECTION @ PANEL LEFT SIDE



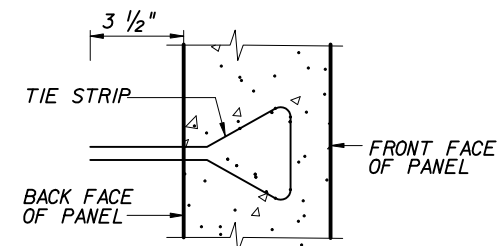
8 TIE STRIP DETAIL



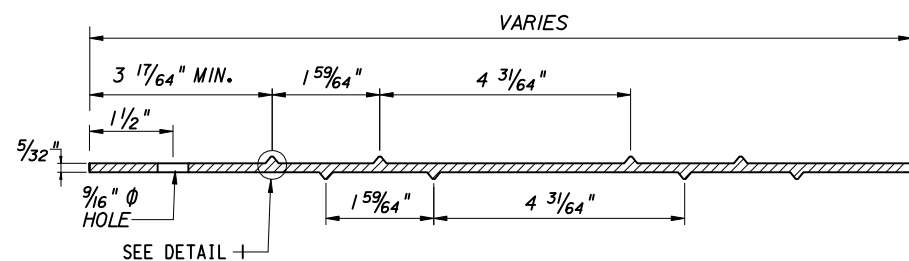
3 SECTION @ PANEL BOTTOM



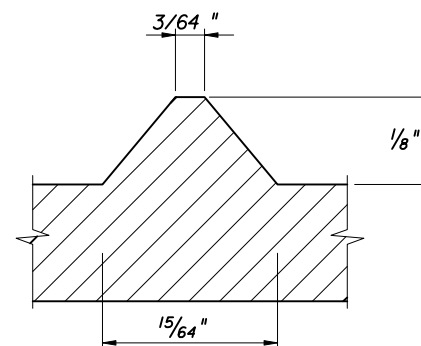
5 SECTION @ PANEL RIGHT SIDE



7 PARTIAL SECTION @ TIE STRIP



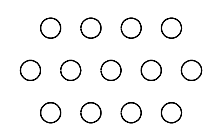
REINFORCING STRIP DETAIL



DETAIL I

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY SQUARE PANELS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM REINFORCED EARTH COMPANY REINFORCED EARTH WALL				
Names	Dates	Approved By		
Designed By		W. J. [Signature]		
Drawn By		State Structures Design Engineer		
Checked By		Revision	Sheet No.	Index No.
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TAI

# The Reinforced Earth Company

8614 WESTWOOD CENTER DRIVE SUITE 1100, VIENNA, VIRGINIA 22182 (703) 821-1175

### DESIGN CRITERIA

- DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL BEHIND THE PRECAST TECHWALL, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO THE SPECIFICATIONS FOR TECHWALL.
- SOIL PARAMETERS:  
SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF  $\phi$ ,  $c$  AND  $\gamma$  SHALL BE PROVIDED IN THE SHOP DRAWINGS.
- THE MAXIMUM APPLIED BEARING PRESSURE AT THE TOE OF THE TECHWALL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE OWNER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.
- ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE CAST-IN-PLACE FOOTING, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.
- THE MINIMUM FACTORS OF SAFETY REQUIRED FOR DESIGN  
OVERTURNING = 2.0  
SLIDING = 1.5  
BEARING CAPACITY = 2.5  
OVERALL STABILITY = 1.5  
REINFORCING STEEL DESIGN SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES AND FDOT DESIGN GUIDELINES NO. 625-020-150B.

### WALL CONSTRUCTION

- FOR LOCATION AND ALIGNMENT OF TECHWALL, SEE RETAINING WALL CONTROL PLANS
- TECHWALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS OF 8.00' EACH TO MATCH DESIRED WALL ALIGNMENT.
- IF MANHOLES AND DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS.
- IF PILES ARE LOCATED WITHIN THE TECHWALL RETAINED VOLUME, THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE TECHWALL UNLESS A METHOD IS USED TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE REINFORCED EARTH COMPANY, AND IS PROPOSED AND APPROVED IN WRITING.

- BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548 OF THE FLORIDA DOT SPECIFICATIONS.
- IF STRUCTURES IN EXCESS OF 20' IN HEIGHT OCCUR, THE FINISHED GRADE IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS A HEIGHT OF 20'. FINISHED GRADE BACKFILL SHALL BE COMPACTED TO 95% OF ASSHTO T-180, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- TECHWALL PANELS TO BE FINISHED WITH COPING SHALL HAVE #4 DOWELS PROTRUDING FROM THEIR TOP EDGE.
- FOR OTHER INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO THE REINFORCED EARTH CONSTRUCTION MANUAL FOR TECHWALL.
- IF UNDERDRAIN IS SHOWN, THE FLOWLINE AND OUTLETS SHALL BE AS PER THE CONTRACT PLANS.

### MATERIALS NOTES

- PANEL FINISH  
THE PRECAST PANELS FOR THIS PROJECT SHALL HAVE A PLAIN STEEL FORM FINISH UNLESS OTHERWISE SPECIFIED IN THE CONTROL PLANS.
- ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:  
  
- PRECAST CONCRETE FACING PANELS  
- GEOCOMPOSITE TERRADRAIN 101 OR EQUIVALENT (FOR PANEL JOINTS ONLY)  
- LIFTING HARDWARE FOR HANDLING PRECAST PANELS. (ON LOAN BASIS)  
- PANEL LEVELLING BOLTS AND PLATES.

ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR. ANY JOINT MATERIALS SHOWN AT THE INTERFACE OF PRECAST PANELS AND CAST-IN-PLACE CONCRETE STRUCTURES ARE TO BE SUPPLIED BY THE ERECTION CONTRACTOR. ALL SANDBLASTING, PAINTING, SEALERS OR OTHER SPECIAL APPLIED COATINGS ARE ALSO SUPPLIED/INSTALLED BY THE CONTRACTOR IN THE FIELD FOLLOWING PANEL ERECTION.

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, SUPPLY, AND INSTALLATION OF A TEMPORARY FALSEWORK SUPPORT SYSTEM TO ADEQUATELY BRACE THE ASSEMBLED PRECAST WALL UNITS UNTIL THE CONCRETE FOOTING HAS BEEN POURED AND ADEQUATELY CURED ACCORDING TO THE REINFORCED EARTH COMPANY SPECIFICATIONS. PLANS FOR THE TEMPORARY FALSEWORK SUPPORT SYSTEM SHOWING DIMENSIONS, SUPPORT POINTS, MEMBER SIZES, CONNECTIONS AND MATERIAL SPECIFICATIONS SHALL BE SUBMITTED TO THE REINFORCED EARTH COMPANY PRIOR TO WALL ERECTION. NOTWITHSTANDING ITS' REVIEW OF THE TEMPORARY FALSEWORK SUPPORT SYSTEM, THE REINFORCED EARTH COMPANY SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE OR LOSS CAUSED BY ANY DEFECT IN THE DESIGN AND/OR CONSTRUCTION OF THE TEMPORARY FALSEWORK SUPPORT SYSTEM. THRUST BLOCKS OR REACTION ASSEMBLIES SHALL BE OF SUFFICIENT SIZE SO THAT THE APPLIED SOIL PRESSURE DOES NOT EXCEED THE ALLOWABLE SOIL PRESSURE OR PRODUCE DETRIMENTAL DEFORMATIONS IN THE RESULTING POSITIONING OF THE ASSEMBLED PRECAST WALL UNITS.


- CONCRETE COVER  
- CAST-IN-PLACE  
4" CLEAR ON REBAR FOR CONCRETE CAST AGAINST EARTH.  
3" CLEAR ON REBAR FOR ALL OTHER C.I.P. CONCRETE UNLESS NOTED OTHERWISE.  
- PRECAST CONCRETE  
ALL REBARS IN PRECAST CONCRETE SHALL HAVE 2" MINIMUM CONCRETE COVER.
- CONCRETE FOR PRECAST PANELS WILL BE PROVIDED BY THE REINFORCED EARTH COMPANY'S MANUFACTURING PLANT IN ACCORDANCE WITH SECTION 346 OF THE FLORIDA DOT SPECIFICATIONS.
- THE REINFORCED EARTH COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.
- THESE DRAWINGS ARE CERTIFIED WITH RESPECT TO THE INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY
- THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND IS BEING FURNISHED FOR THE USE IN CONNECTION WITH FDOT PROJECTS ONLY, AND THE INFORMATION CONTAINED HEREIN IS NOT TO BE TRANSMITTED TO ANY OTHER ORGANIZATION UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY THE REINFORCED EARTH COMPANY. THE REINFORCED EARTH COMPANY IS EXCLUSIVE LICENSEE IN THE UNITED STATES UNDER PATENTS ISSUED TO HENRY VIDAL, AND THE FURNISHING OF THIS DRAWING DOES NOT CONSTITUTE AN EXPRESSED OR IMPLIED LICENSE UNDER THE VIDAL PATENTS.

THIS SYSTEM SHALL NOT BE USED IN ACUTE ANGLE SMALLER THAN 60°

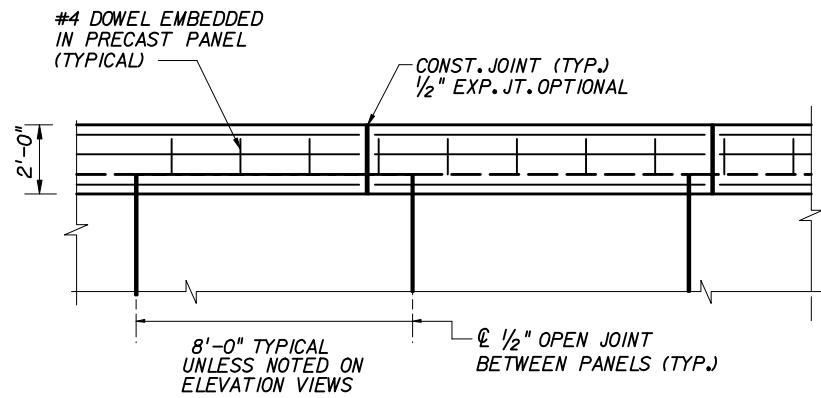
THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TECHWALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

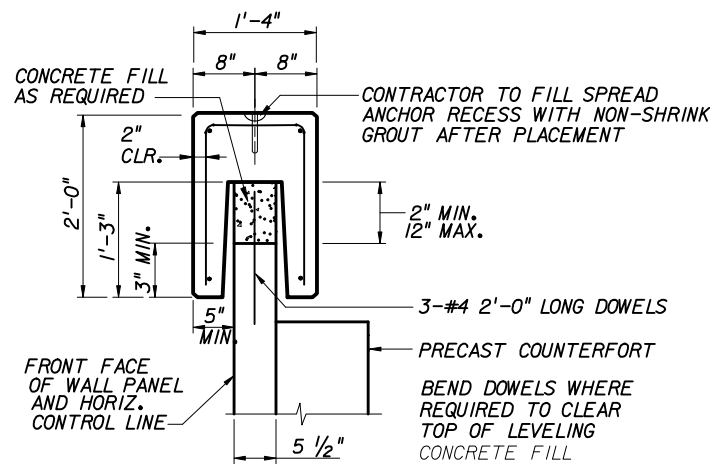
## RETAINING WALL SYSTEM REINFORCED EARTH COMPANY TECHWALL

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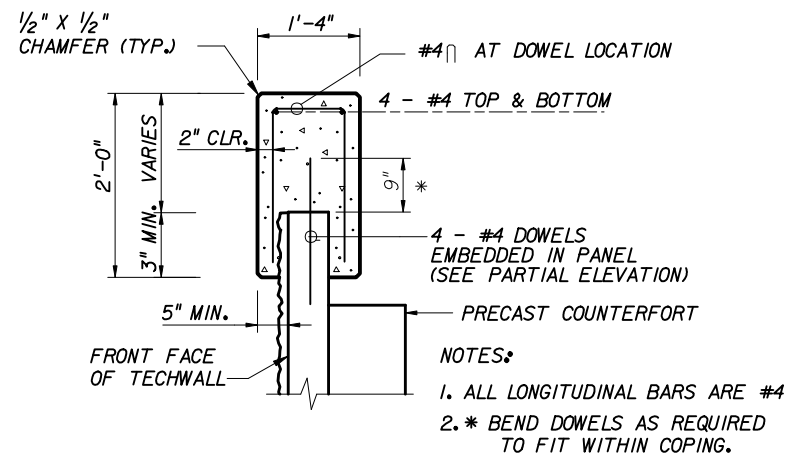


**PRECAST COPING - PARTIAL ELEVATION**

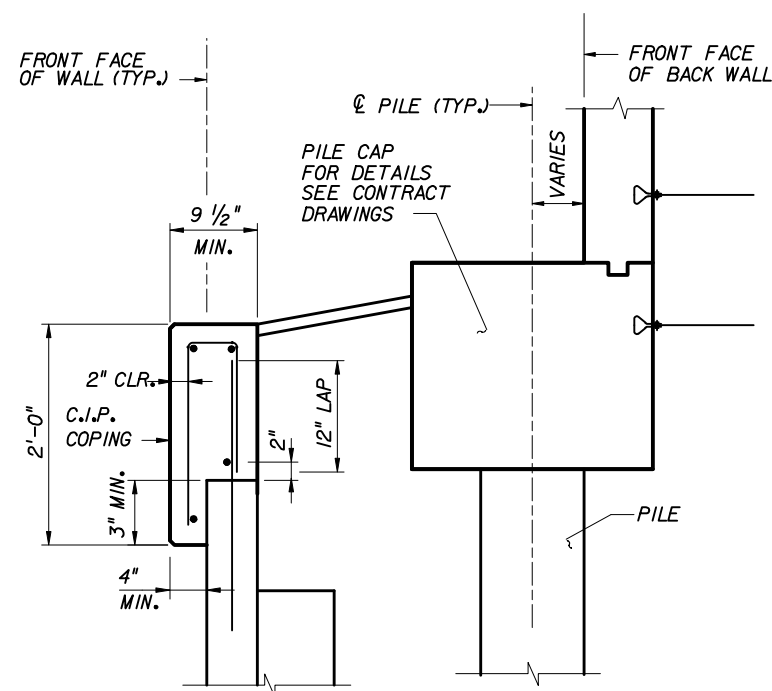


**PRECAST COPING SECTION**

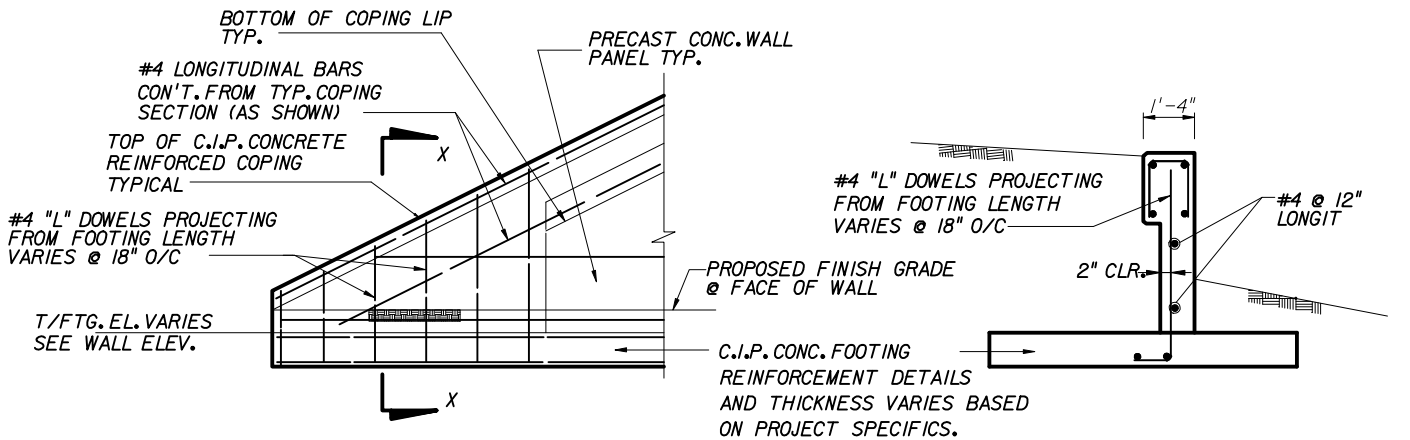
NOTE:  
STANDARD COPING UNIT IS 10.0' LONG WITH SQUARE ENDS.



**C.I.P. CONC. COPING DETAIL  
(TO MATCH ADJACENT PRECAST COPING)**

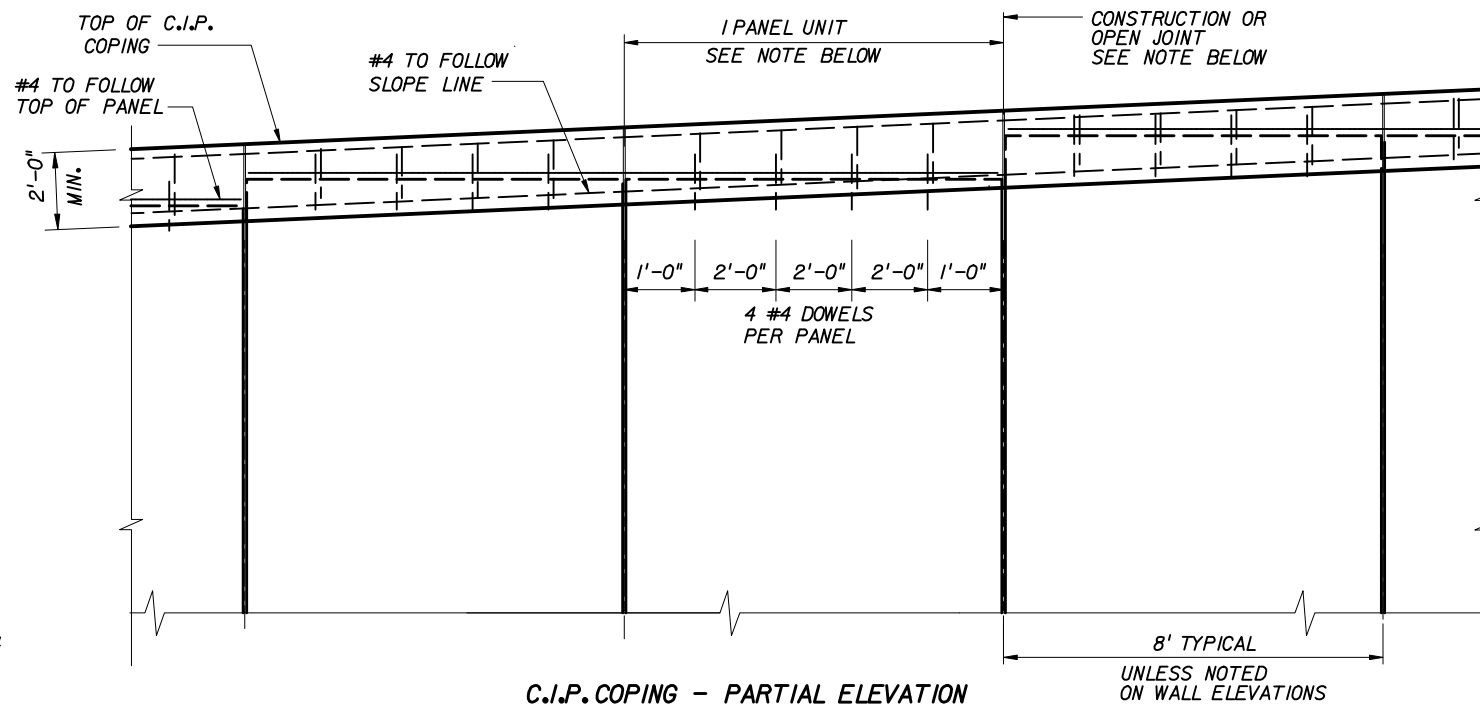


**WALL LOCATION SECTION**



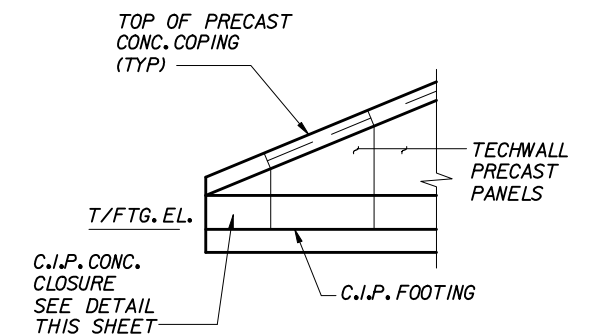
**C.I.P. CLOSURE - PARTIAL ELEVATION**

**SECTION X-X  
SECTION THRU C.I.P. END**



**C.I.P. COPING - PARTIAL ELEVATION**

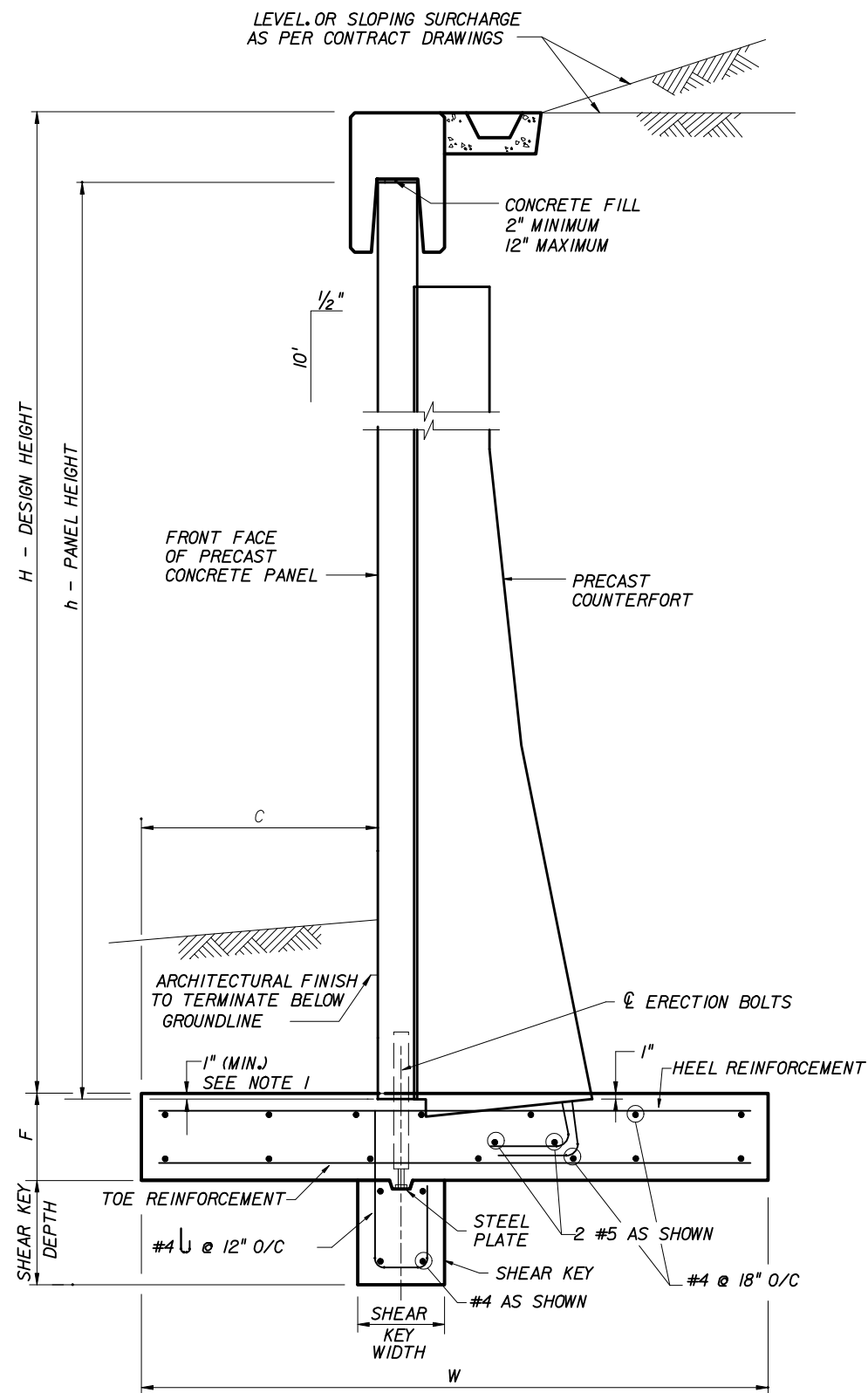
NOTE:  
1/2" OPEN JOINTS IN COPING SHALL BE AT 4 PANEL INTERVALS AND COINCIDE APPROXIMATELY WITH PANEL JOINTS. REINFORCING STEEL SHALL BE STOPPED 2" SHORT OF EITHER SIDE OF THE JOINTS. CONSTRUCTION JOINTS IN BETWEEN THE OPEN JOINTS SHALL BE PROVIDED AT EVERY PANEL JOINT.



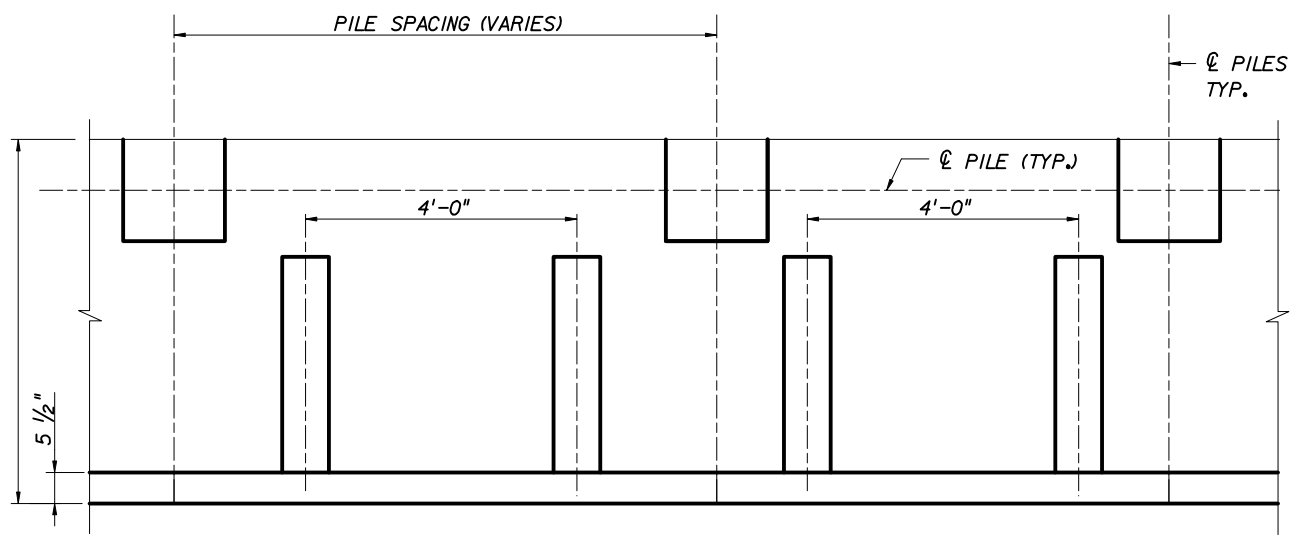
**PARTIAL ELEVATION  
C.I.P. CONCRETE CLOSURE**

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TECHWALL

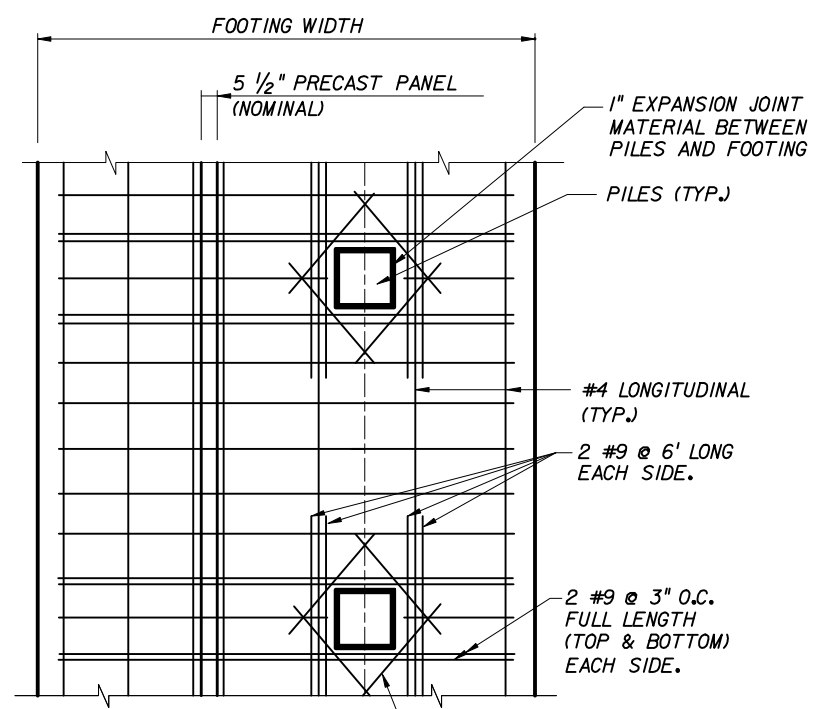
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY TECHWALL</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By		State Structures Design Engineer		
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TYPICAL SECTION THRU WALL



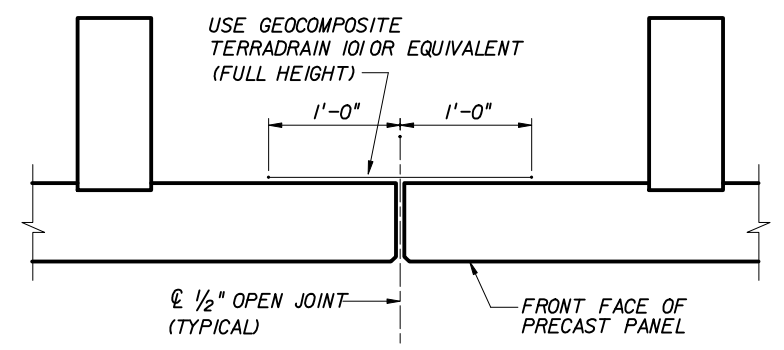
LAYOUT PRECAST PANEL W/COUNTERFORTS RELATED TO PILE LAYOUT



NOTE:  
TOE REINFORCEMENT NOT SHOWN FOR CLARITY

PLAN-FOOTING AT ABUTMENT PILES

C, F, H, W AND THE REINFORCEMENT DETAILS ARE DETERMINED BY PROJECT SPECIFICS.



JOINT DETAIL

NOTES:

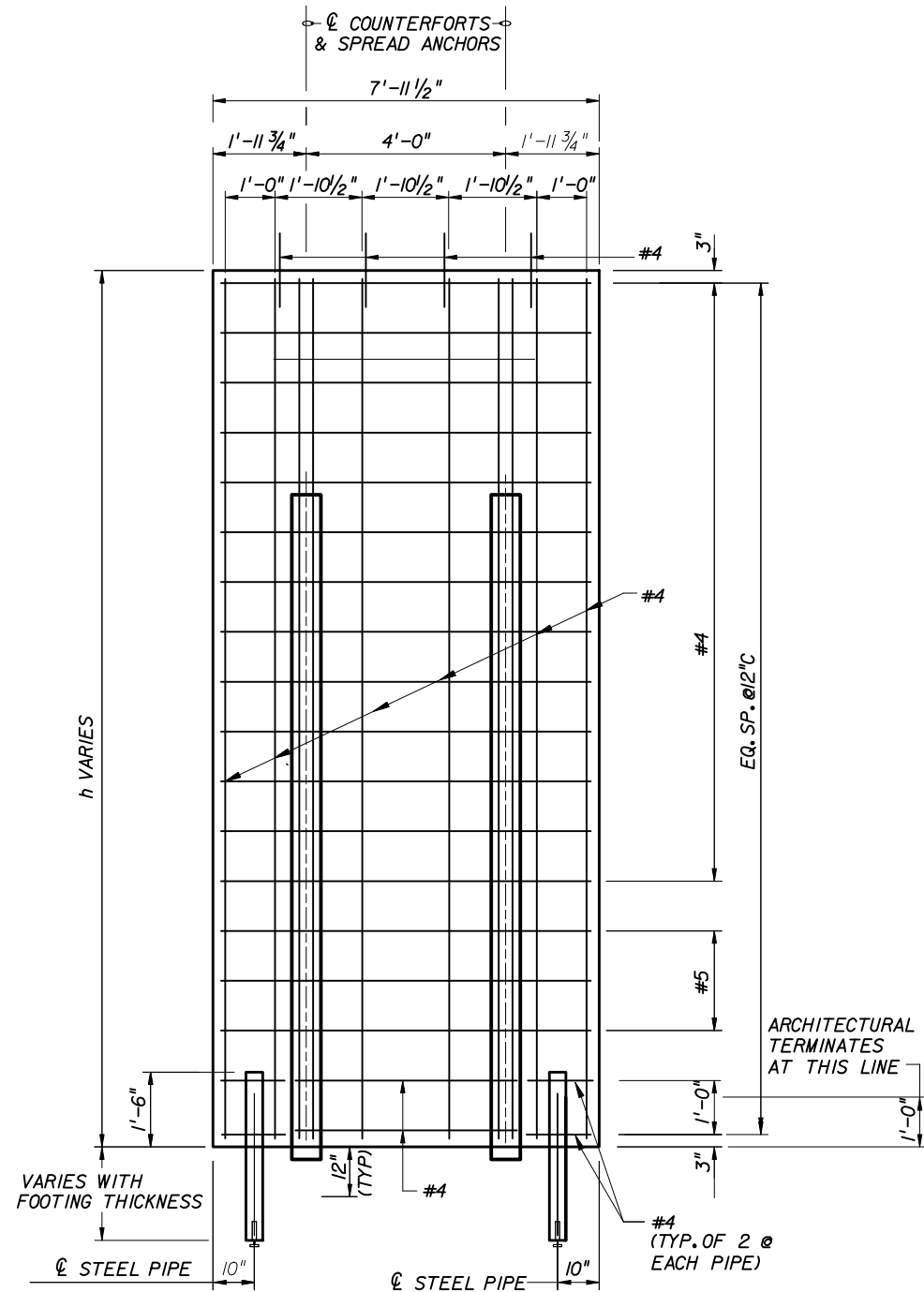
1. THE BOTTOM EDGE OF THE ASSEMBLED PRECAST PANEL SHALL BE COVERED BY 1" MINIMUM OF CAST-IN-PLACE FOOTING CONCRETE.
2. PRECAST WALL UNITS SHALL BE INSTALLED AT BATTER OF 1/2" PER 10' UNLESS OTHERWISE SHOWN ON CONSTRUCTION DRAWINGS.
3. FOR PANEL HEIGHTS OF 6.0' OR LESS COUNTERFORTS ARE NOT REQUIRED. PANELS WITHOUT COUNTERFORTS SHALL BE 8" THICK (NOMINAL). DETAILS WILL BE SHOWN ON CASTING DRAWINGS.

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TECHWALL

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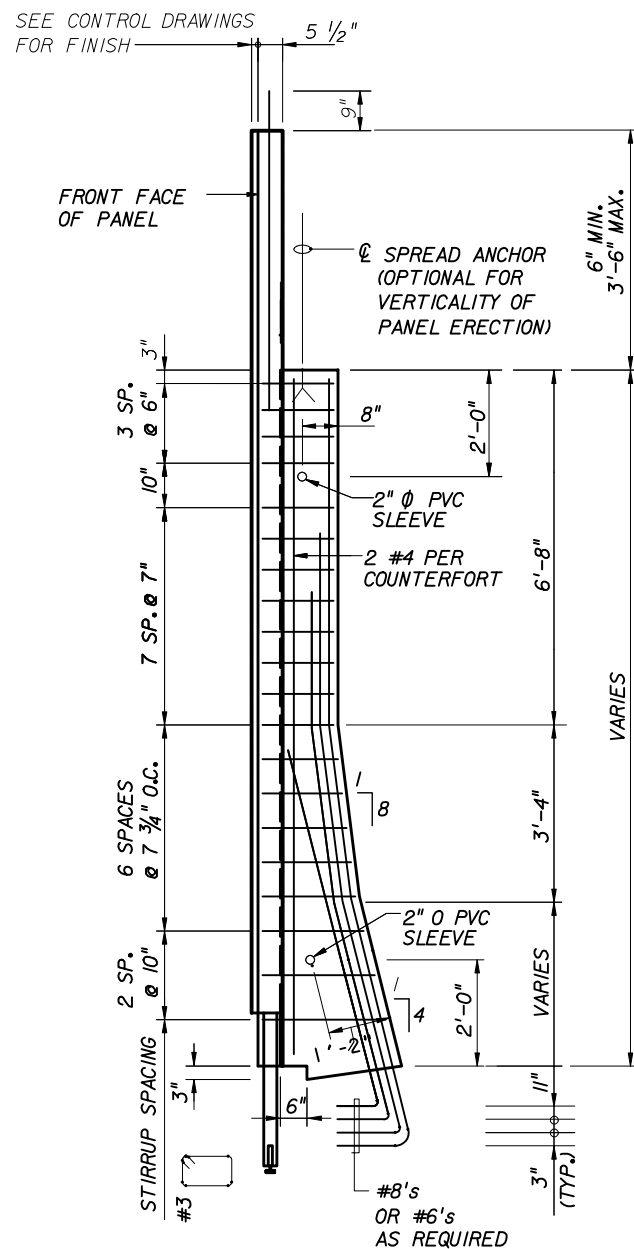
RETAINING WALL SYSTEM  
REINFORCED EARTH COMPANY  
TECHWALL

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**PANEL ELEVATION**

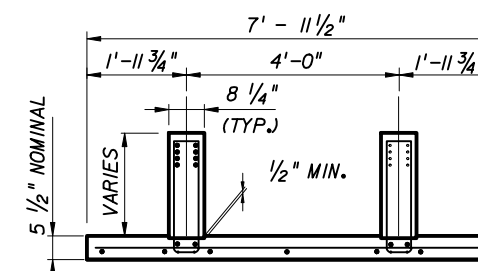
(REINFORCEMENT DETAILS MAY VARY WITH PROJECT SPECIFICS.)



**COUNTERFORT - SIDE ELEVATION**

(REINFORCEMENT DETAILS MAY VARY WITH PROJECT SPECIFICS.)

LIST OF MATERIALS	
CONCRETE PANEL FACING (CY)	VARIES
COUNTERFORT, EACH (CY)	VARIES
TOTAL (CY)	VARIES
TOTAL PANEL WT. (LB)	VARIES
2" I.D. X 1'-0" PVC SLEEVE	4
SPREAD ANCHORS	2



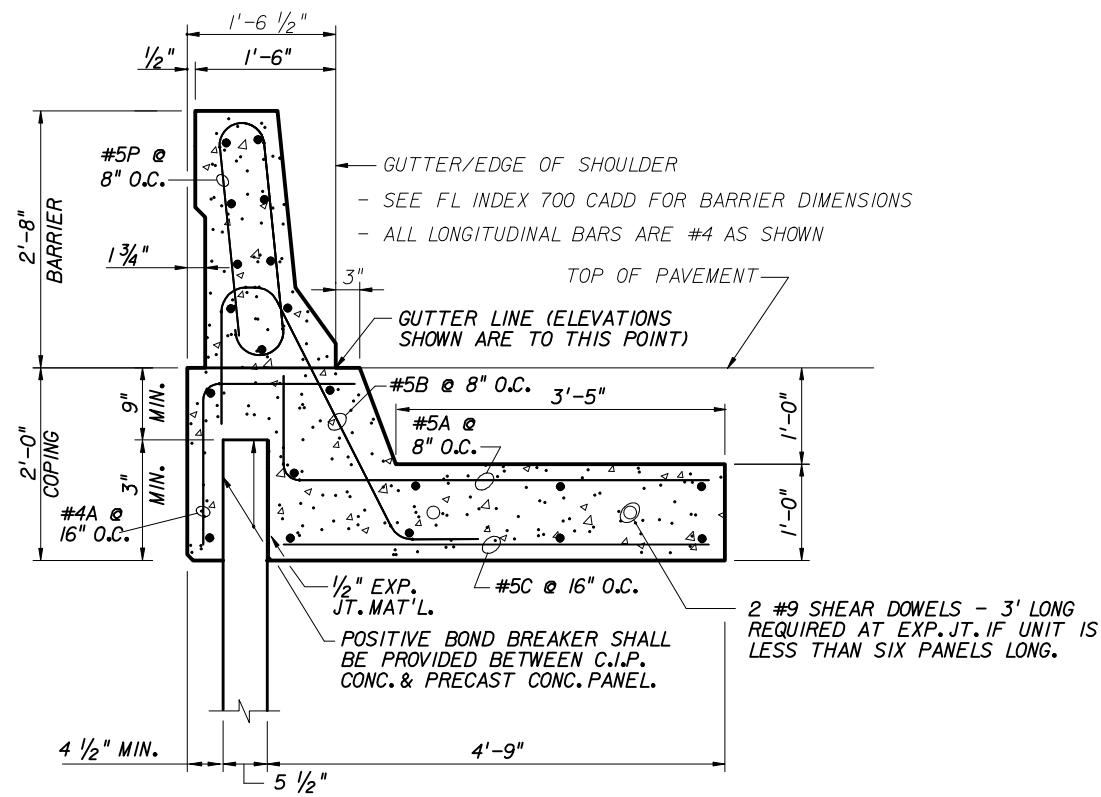
**PANEL SECTION**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

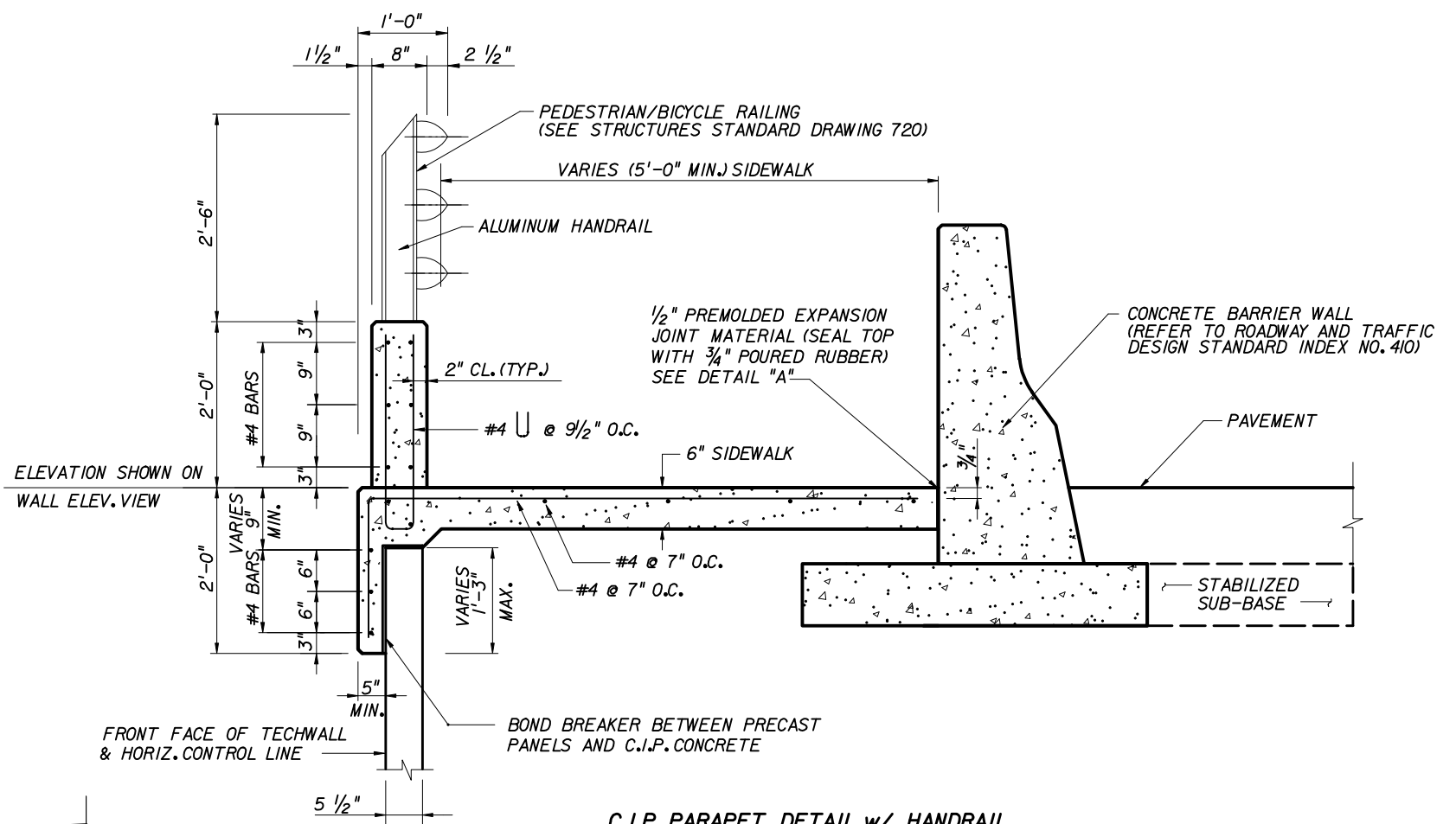
**RETAINING WALL SYSTEM  
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TECHWALL**

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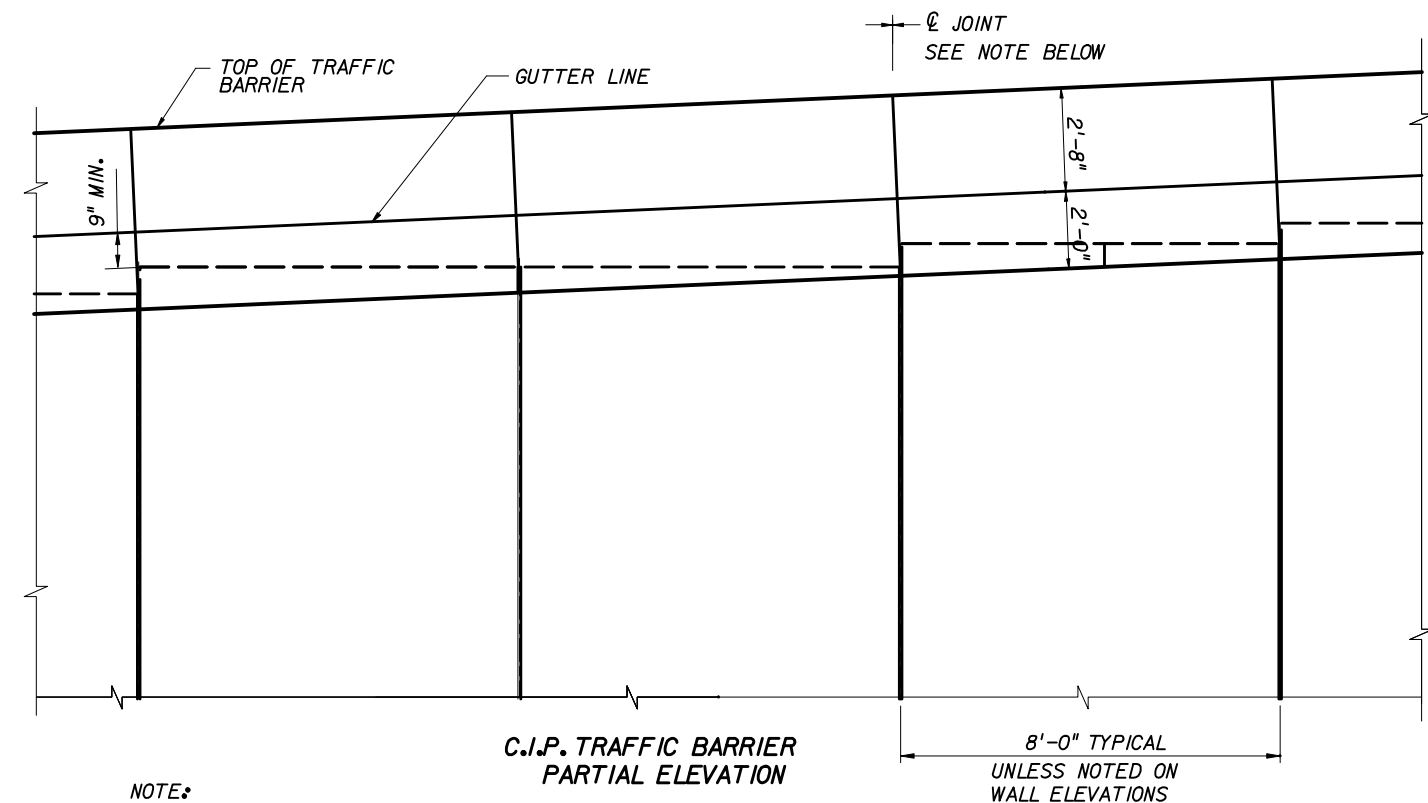
THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TECHWALL



C.I.P. CONC. TRAFFIC BARRIER

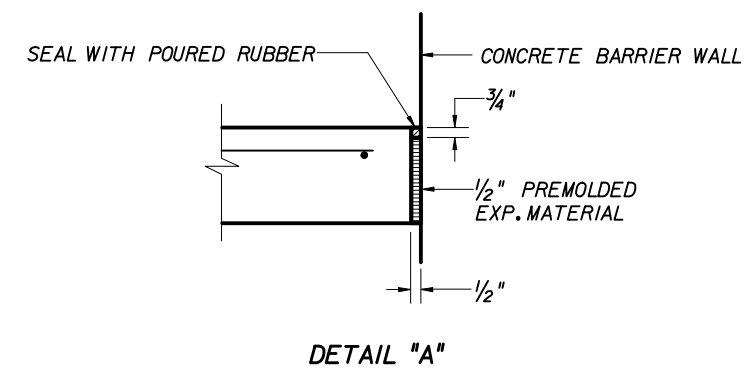


C.I.P. PARAPET DETAIL w/ HANDRAIL



NOTE:

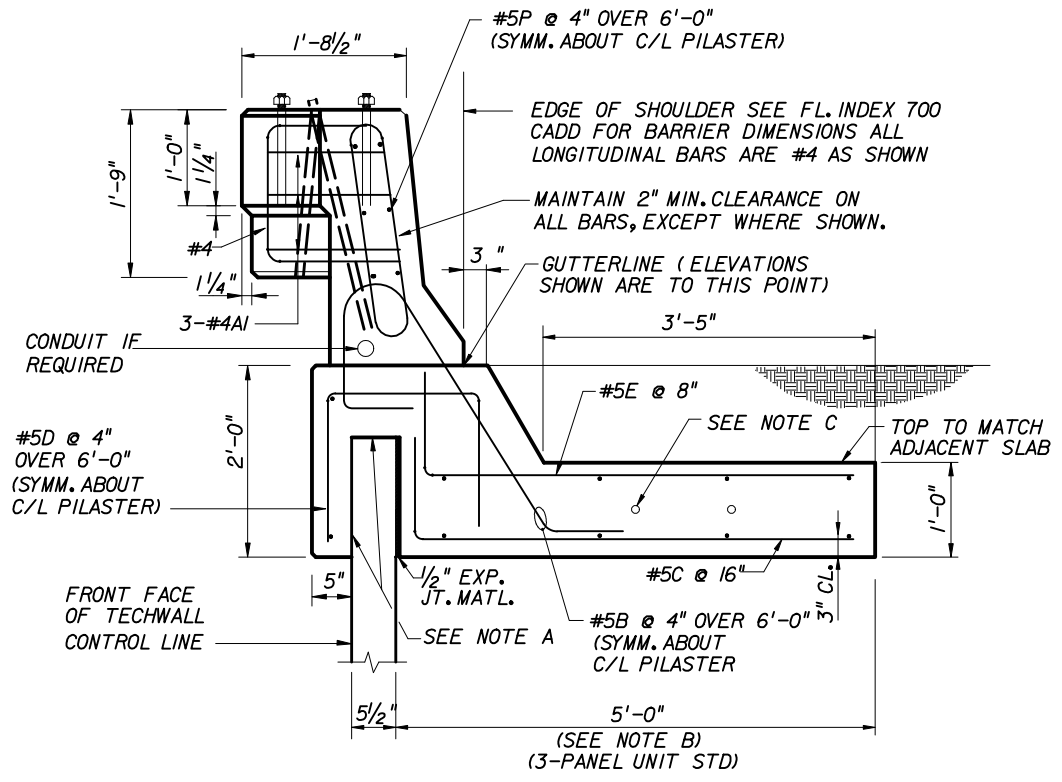
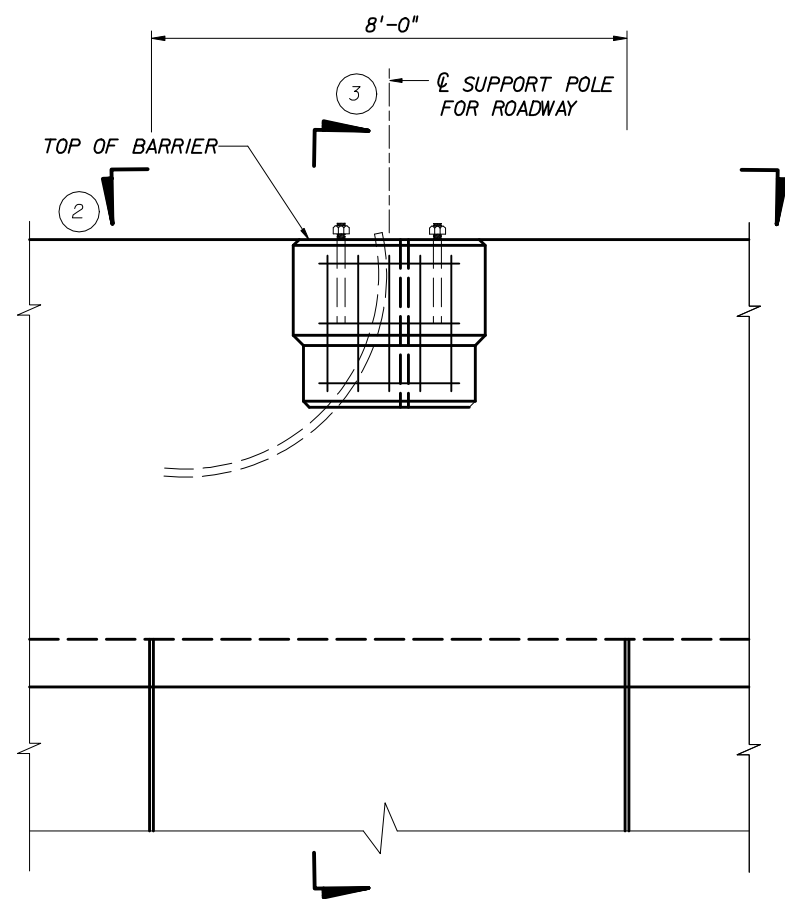
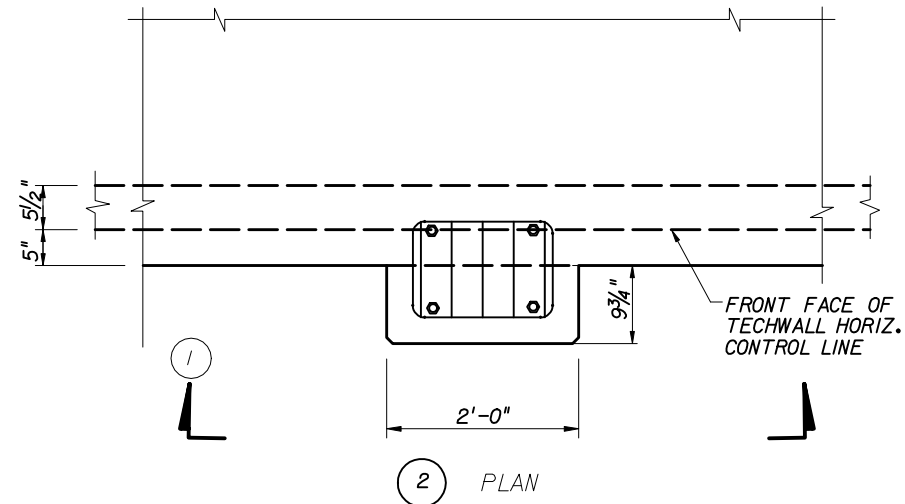
1/2-INCH OPEN JOINTS IN COPING SHALL BE AT 4 PANEL INTERVALS AND COINCIDE APPROXIMATELY WITH PANEL JOINTS. REINFORCING STEEL SHALL BE STOPPED 2" SHORT OF EITHER SIDE OF THE JOINTS. CONSTRUCTION JOINTS IN BETWEEN THE OPEN JOINTS SHALL BE PROVIDED AT EVERY PANEL JOINT.



DETAIL "A"

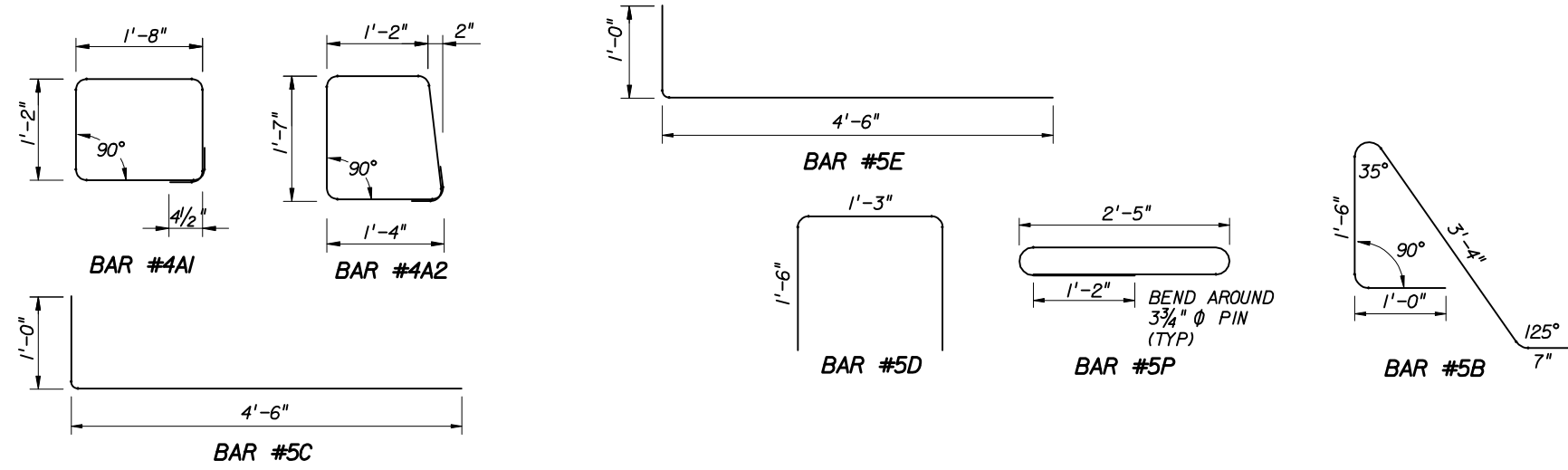
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TECHWALL

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<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY TECHWALL</b>				
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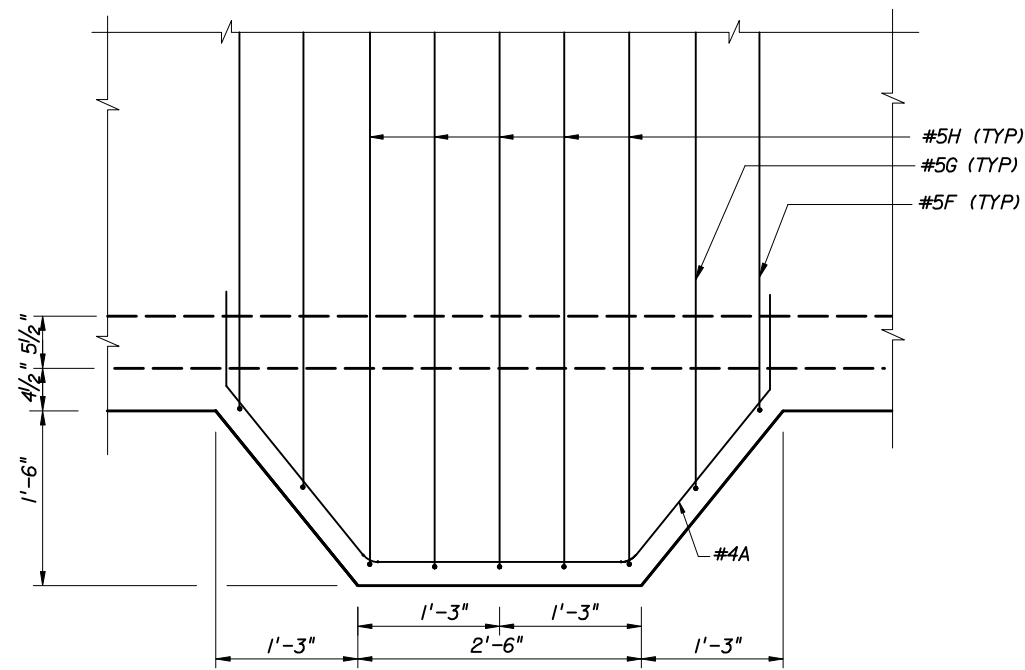
- NOTES:
- A. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN CAST IN PLACE CONC. AND PRECAST CONC. PANEL.
  - B. THE BARRIER JUNCTION SLAB SHALL HAVE THESE DIMENSIONS FOR ONE PRECAST UNIT EITHER SIDE OF LIGHT POLE BARRIER LONGITUDINAL BARS SHALL BE AS SHOWN ABOVE
  - C. 2 - #9 SHEAR DOWELS - 3'-0" LONG
  - D. LIGHTPOLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHTPOLE LOADS TO THE PILASTER AND FIT THE REINFORCING CAGE.
  - E. SEE STRUCTURES STANDARD DRAWING 500 FOR ADDITIONAL DETAILS.

REBAR SCHEDULE	
MARK	QTY.
#4A1	3
#4A2	5
#5B	18
#5C	4
#5D	18
#5E	9
#5P	18

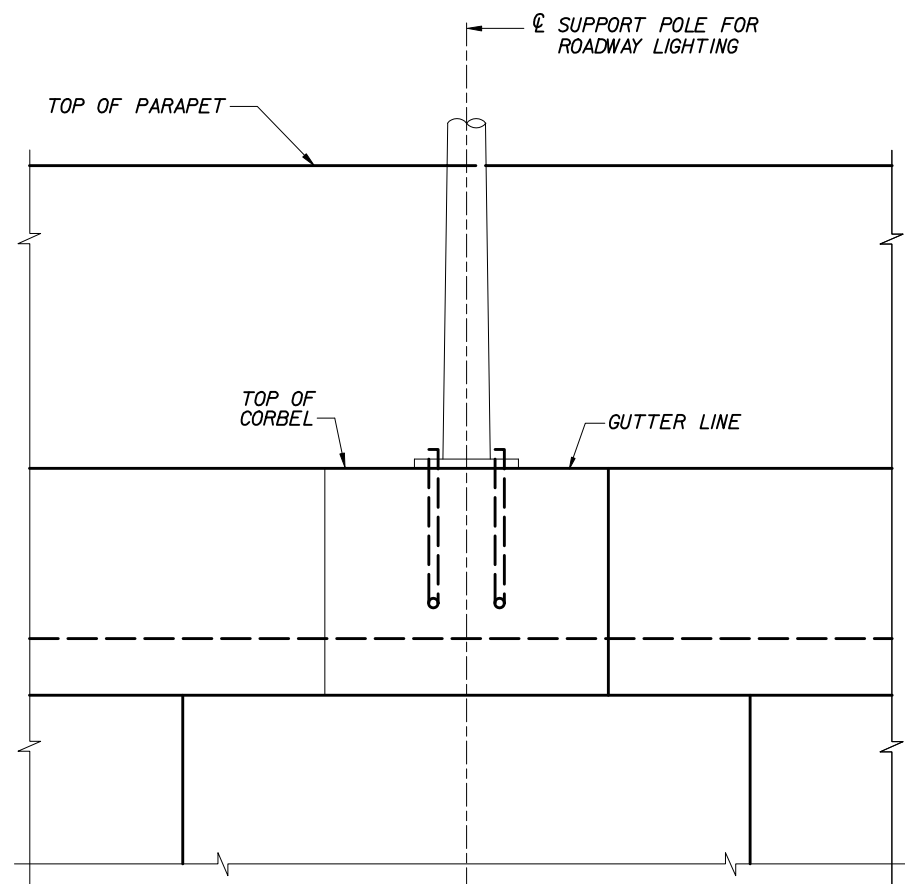


THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TECHWALL

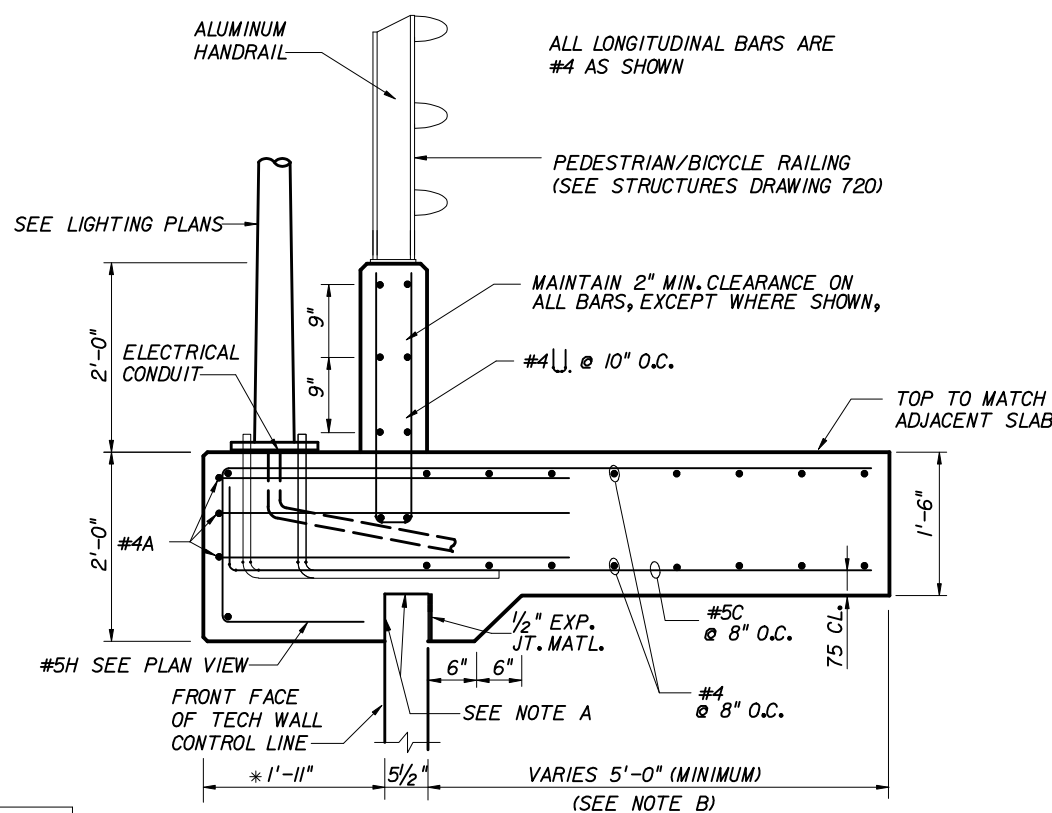
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY TECHWALL</b>				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By			Revision	Sheet No. 6 of 8
Checked By			00	Index No. 5016



1 PLAN



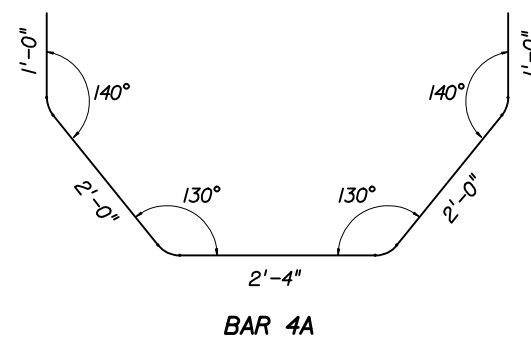
3 PARTIAL ELEVATION



\* DIMENSION MAY VARY AS REQUIRED FOR LIGHT POLE BASE PLATE.

2 BARRIER DETAIL @ LIGHT POLE

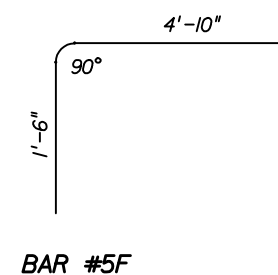
REBAR SCHEDULE	
MARK	QTY.
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#5C	8
#5F	2
#5G	2
#5H	5
#4U	6



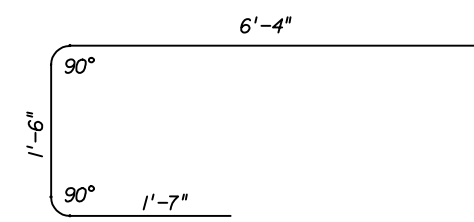
BAR 4A



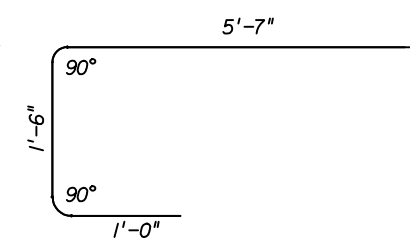
BAR #5C



BAR #5F



BAR #5H



BAR #5G

4 BAR BENDING DETAILS

NOTE A: POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN CAST IN PLACE CONC. AND PRECAST CONC. PANEL.

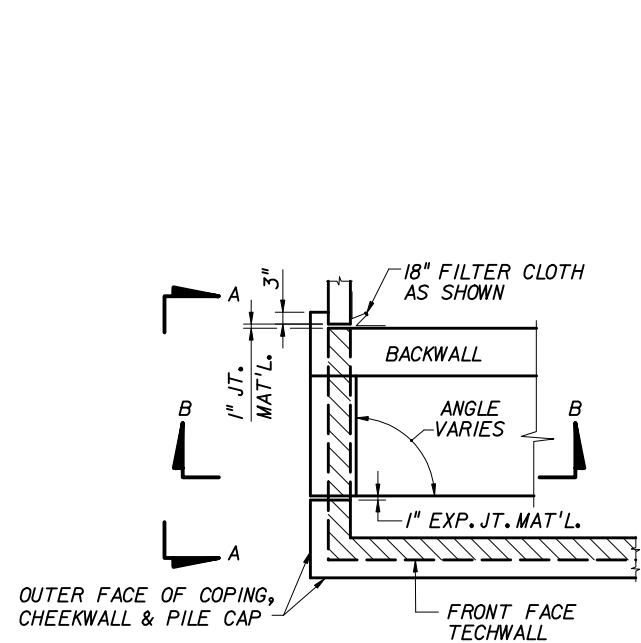
NOTE B: THE BARRIER JUNCTION SLAB SHALL HAVE THESE DIMENSIONS FOR 5' UNIT EITHER SIDE OF LIGHT POLE BARRIER LONGITUDINAL BARS SHALL BE AS SHOWN ABOVE

NOTE C: SEE STRUCTURES DRAWING 500 FOR ADDITIONAL DETAILS

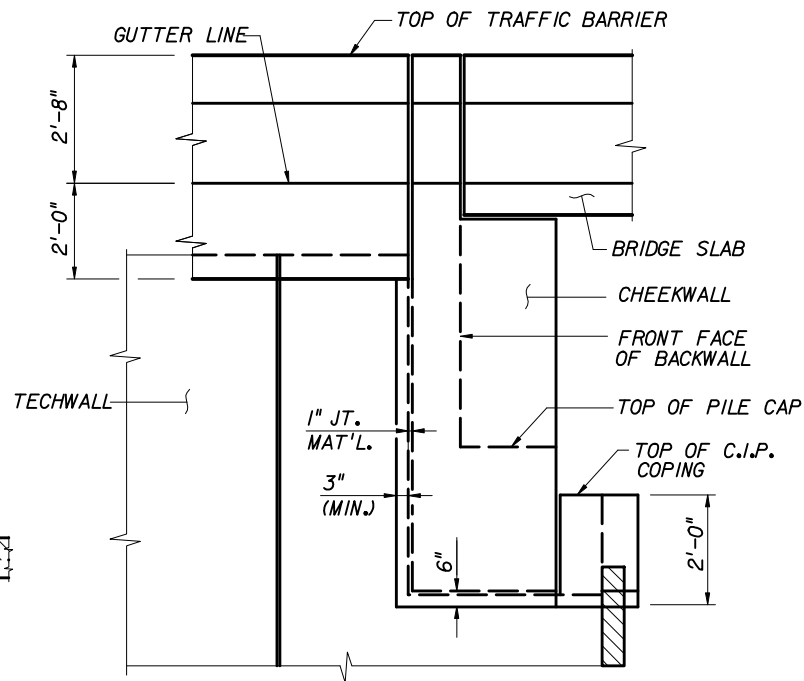
NOTE D: LIGHT POLE MANUFACTURER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT LOADS TO THE PILASTER AND FIT THE REINFORCING CAGE.

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TECHWALL

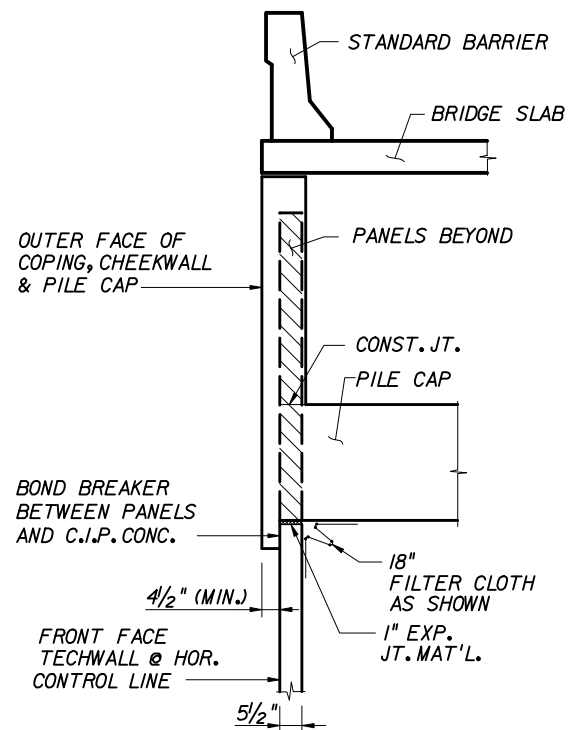
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY TECHWALL</b>				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By			Revision	Sheet No. Index No.
			00	7 of 8 5016



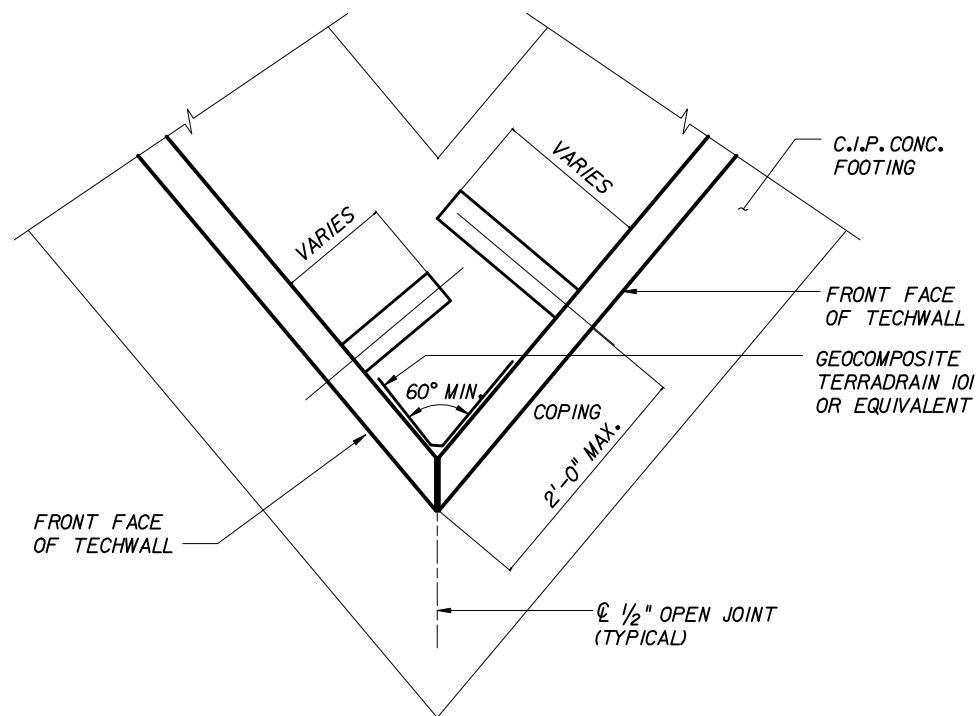
PLAN VIEW @ BEND (TYP.)



SECTION A-A



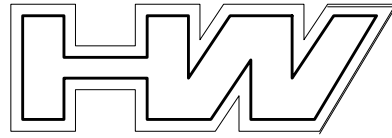
SECTION B-B



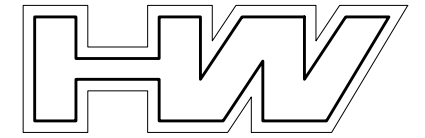
ACUTE CORNER DETAIL

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TECHWALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM REINFORCED EARTH COMPANY TECHWALL</b>				
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# HILFIKER MSE SQUARE PANEL WALL SYSTEM



## GENERAL NOTES

### DESIGN CRITERIA

1. THE ATTACHED DETAILS ARE BASED ON THE ASSUMPTIONS THAT THE MATERIAL WITHIN THE REINFORCED VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED COMPONENTS MEET THE GOVERNING AGENCIES SPECIFICATION FOR MECHANICALLY STABILIZED EARTH STRUCTURES

2. MINIMUM DESIGN PARAMETERS

SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UNITIZED AT THE SITE. THE VALUE OF THE INTERNAL FRICTION ANGLE, PHI, THE COHESION, C, AND THE UNIT WEIGHT, GAMMA, SHALL BE PROVIDED IN THE SHOP DRAWINGS.

#### EXTERNAL STABILITY

OVERTURNING  $\geq 2.0$   
SLIDING  $\geq 1.5$   
BEARING PRESSURE  $\geq 2.5$

OVERALL STABILITY  $\geq 1.5$

#### INTERNAL STABILITY

PULLOUT  $\geq 1.5$   
STEEL YIELD STRESS =  $0.47 F_y$

SERVICE LIFE = 75 YEARS

LIVE LOAD SURCHARGE = 250 PSF

3. THE MAXIMUM APPLIED BEARING PRESSURE AT THE INTERFACE OF THE FOUNDATION AND SELECT BACKFILL MATERIAL IS SHOWN ON THE PLANS. THE BEARING PRESSURE SHOWN IS THE MAXIMUM FOR THE GIVEN BASE MAT LENGTH. IT IS THE RESPONSIBILITY OF OTHERS TO DETERMINE THAT THE BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.

4. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED VOLUME AS DETERMINED BY THE ENGINEER SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL AS DIRECTED BY THE ENGINEER.

5. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS. ON THE BASIS OF THIS INFORMATION, T&B STRUCTURAL SYSTEMS IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

### WALL CONSTRUCTION

1. WALLS FOUNDED ON CURVES SHALL HAVE THEIR PANELS DIMENSIONED AS A SERIES OF CORDS (AS DIMENSIONED IN SHOP DRAWINGS) IN ORDER TO MATCH THE REQUIRED WALL RADIUS.

2. FOR LOCATION AND ALIGNMENT OF THE MSE STRUCTURES REFERENCE THE RETAINING WALL CONTROL PLANS.

3. IF MANHOLE AND DROP INLETS ARE REQUIRED, THEY SHALL BE LOCATED AS SHOWN ON THE RETAINING WALL ELEVATION DRAWINGS.

4. IF PILES ARE LOCATED WITHIN THE REINFORCED VOLUME THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE WALL UNLESS AN ALTERNATE METHOD IS USED TO ISOLATE THE COLUMNS FROM THE REINFORCED VOLUME AS APPROVED BY THE ENGINEER.

5. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548 TO A LEVEL 2" (PLUS OR MINUS) ABOVE THE ELEVATION OF THE SOIL REINFORCING ELEMENT. NO SOIL REINFORCEMENT SHALL BE ATTACHED TO ANY PANEL BEFORE THE BACKFILL IS PLACED AT THE REQUIRED ELEVATION AND IS COMPACTED.

6. STRUCTURES GREATER THAN 20 FEET SHALL HAVE THE FINISHED GRADE PLACED AND COMPACTED AT THE FRONT FACE OF THE STRUCTURE BEFORE THE STRUCTURE HEIGHT EXCEEDS 20 FEET. FINISH GRADE SHALL BE COMPACTED TO 95 % OF AASHTO T-180 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

7. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ANY GUARDRAIL POSTS PRIOR TO PLACING THE TOP ROW OF SOIL REINFORCEMENT. THE POST SPACING SHALL BE ADJUSTED TO AVOID CONFLICTS WITH THE LONGITUDINAL SOIL REINFORCING WIRE. CUTTING OF THE LONGITUDINAL WIRE SHALL BE ALLOWED ONLY AS DIRECTED BY THE ENGINEER.

8. IF EXISTING OR FUTURE STRUCTURES ARE TO BE PLACED IN THE REINFORCED VOLUME THAT INTERFERE WITH THE PROPER PLACEMENT OF THE SOIL REINFORCEMENT THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY FOR A COURSE OF ACTION.

9. TOP COPING PANELS BENEATH CAST-IN-PLACE COPING SHALL HAVE 1/2" DOWELS PROTRUDING FROM THEIR TOP EDGE.

10. FOR OTHER INFORMATION PERTAINING TO THE CONSTRUCTION OF THE HILFIKER RETAINING WALL PLEASE REFER TO T&B STRUCTURAL SYSTEMS ERECTION MANUAL.

11. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DEFLECT THE TOP ROW OF SOIL REINFORCEMENT DOWNWARD SO AS TO NOT CONFLICT WITH ROADWAY MIXING OPERATIONS AND/OR ROADWAY CONSTRUCTION OPERATIONS. ANY SOIL REINFORCING MATERIAL THAT IS DAMAGED SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

### MISCELLANEOUS NOTES

1. NOMINAL SOIL REINFORCING GRID LENGTH

THE WELDED WIRE MESH IS MANUFACTURED IN LENGTHS CORRESPONDING TO THE DIMENSION "B" AS GIVEN IN THE RETAINING WALL ELEVATIONS. THE ACTUAL LENGTH FROM THE FRONT FACE OF THE PANEL TO THE TAIL OF THE SOIL REINFORCING GRID IS PLUS 12" THIS ACCOUNTS FOR THE THICKNESS OF THE PANEL AND THE LOCATION OF THE CONNECTION OF THE SOIL REINFORCING MAT WITH THE PANEL ANCHOR. THE FOUNDATION SHALL BE EXCAVATED TO AN EXTENT OF "B" PLUS 12".

2. SELECT BACKFILL QUANTITY

THE REQUIRED VOLUME OF IN-PLACE SELECT BACKFILL IS CALCULATED BY MULTIPLYING THE RETAINING WALL FACE AREA BY THE SOIL REINFORCING LENGTH. THIS IS PERFORMED AT EACH INDIVIDUAL SEGMENT OF WALL FOR EACH CORRESPONDING "B". THE BACKFILL QUANTITY IF GIVEN BY T&B STRUCTURAL SYSTEMS IS AN ESTIMATE ONLY. THE CONTRACTOR IS ULTIMATELY TO DETERMINE THE QUANTITY OF SELECT BACKFILL MATERIAL THAT IS REQUIRED.

3. PANEL FINISH

THE CONCRETE PANELS SHALL HAVE A PLAIN STEEL FORM FINISH UNLESS OTHERWISE SPECIFIED ON THE RETAINING WALL CONTROL PLANS.

4. THE FOLLOWING MATERIALS ARE SUPPLIED BY T&B STRUCTURAL SYSTEMS

- PRECAST CONCRETE FACING PANEL
- SOIL REINFORCING GRIDS
- CONNECTION PINS
- 1/2" DIAMETER ALIGNMENT PINS
- 60 DURO 3/4" X 8" BEARING PADS
- SYNTHETIC INDUSTRIES GEOTEX 401NONWOVEN GEOTEXTILE FILTER FABRIC

\*\*THIS SYSTEM FOR USE IN MODERATELY OR SLIGHT AGGRESSIVE ENVIRONMENTS ONLY\*\*

ANY OTHER MATERIAL REQUIRED TO BUILD THE MSE STRUCTURES ACCORDING TO THE GOVERNING SPECIFICATION SHALL BE SUPPLIED BY THE CONTRACTOR.

5. T&B STRUCTURAL SYSTEM SUPPLIES MECHANICALLY STABILIZED EARTH STRUCTURAL COMPONENTS FOR USE WITH THE HILFIKER RETAINING WALL SYSTEMS FOR THE STRUCTURES DETAILED HEREIN. THE ERECTION MANUAL PROVIDED BY T&B STRUCTURAL SYSTEMS IS A GENERAL GUIDELINE FOR ERECTING THE HILFIKER RETAINING WALL SYSTEM. ALL QUALITY CONTROL PROCEDURES, STAGING PROCEDURES, MATERIAL HANDLING, AND SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE OBLIGATION TO CONSTRUCT THE RETAINING WALL ACCORDING TO THE PROJECT PLANS AND SPECIFICATIONS AND ALL LAWS OF THE GOVERNING STATE.

ENGLISH

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HILFIKER RETAINING WALL SYSTEM



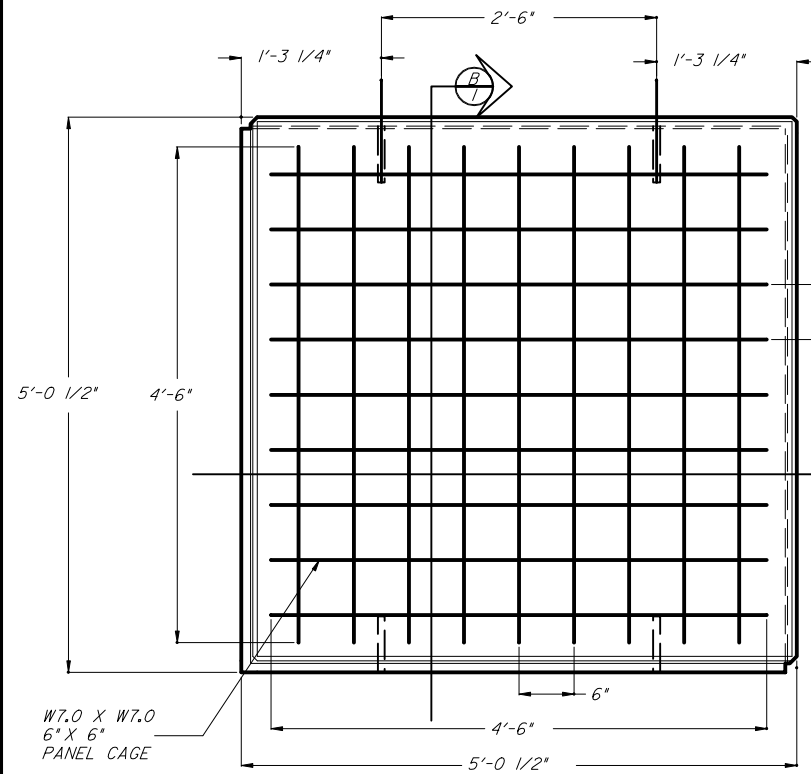
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
HILFIKER SQUARE PANEL

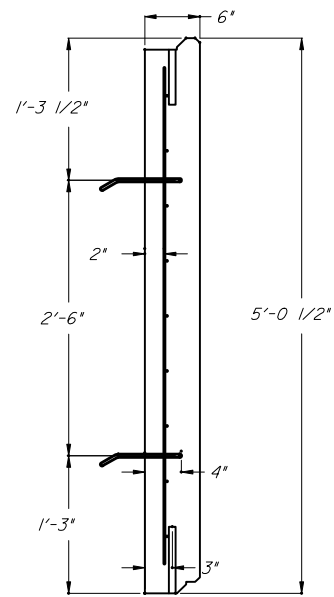
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Designed By			State Structures Design Engineer		
Drawn By	TPT	Revision	Sheet No.	Index No.	
Checked By	TBW	00	1 of 13	5021	

\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

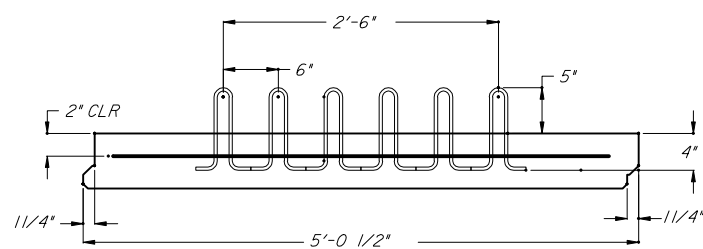




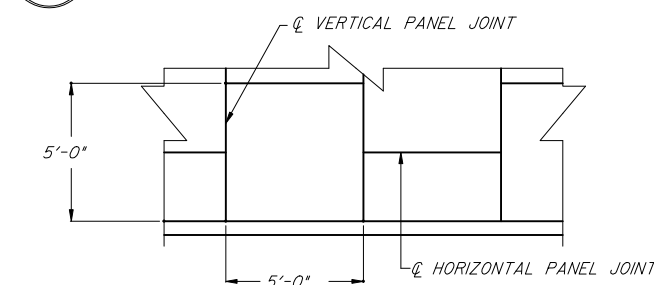
**A** STANDARD SQUARE PANEL  
TYPE G - FRONT FACE



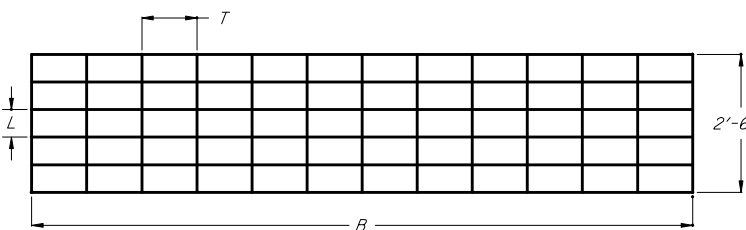
**B** STANDARD SQUARE PANEL  
TYPE G SECTION



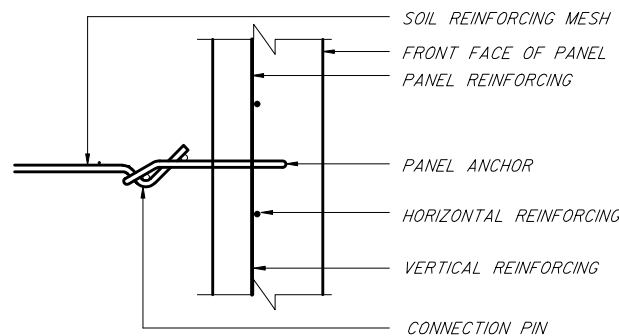
**E** STANDARD SQUARE PANEL  
TYPE B/G



**F** TYPICAL PANEL LAYOUT  
PARTIAL ELEVATION - FRONT FACE

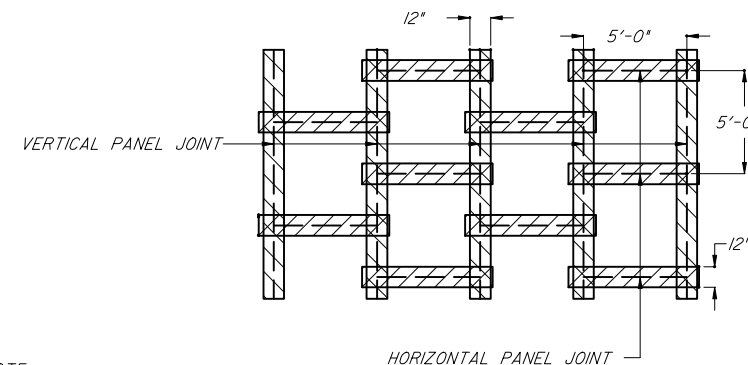


**G** SOIL REINFORCING ELEMENT  
MW45 MINIMUM WIRE SIZE



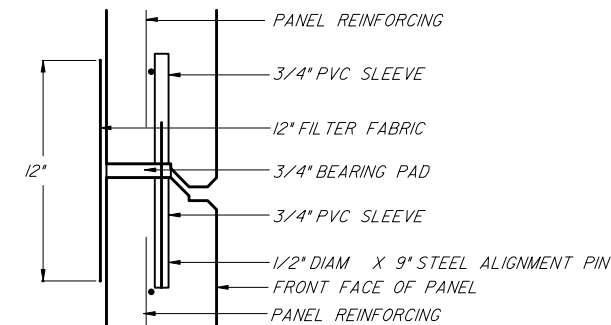
NOTE: ANCHOR SIZE SHALL BE MINIMUM SIZE OF ATTACHED SOIL REINFORCING

**H** CONNECTION DETAIL - TYP

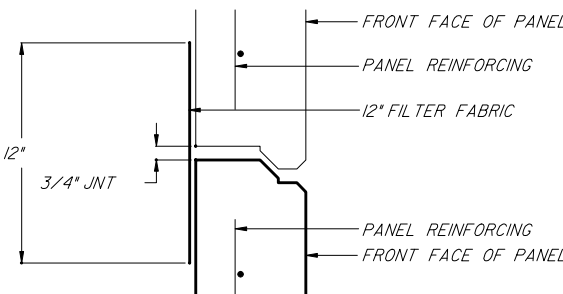


NOTE:  
1. FILTER FABRIC SHALL BE PLACED OVER ALL VERTICAL AND HORIZONTAL JOINTS  
2. FABRIC SHALL BE ADHERED TO BACK FACE OF PANEL WITH THE USE OF AN APPROVED CONSTRUCTION ADHESIVE  
3. MINIMUM OVER LAP OF 12\"/>

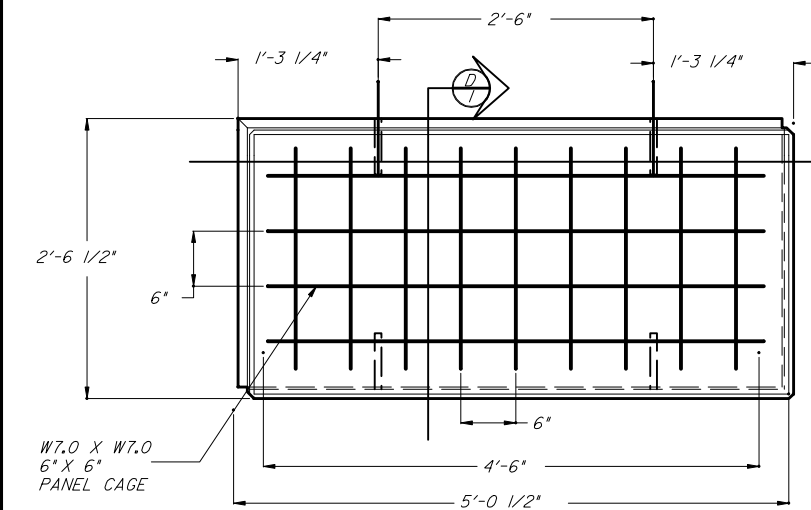
**J** FILTER CLOTH - JOINT DETAIL  
PARTIAL ELEVATION - BACK FACE



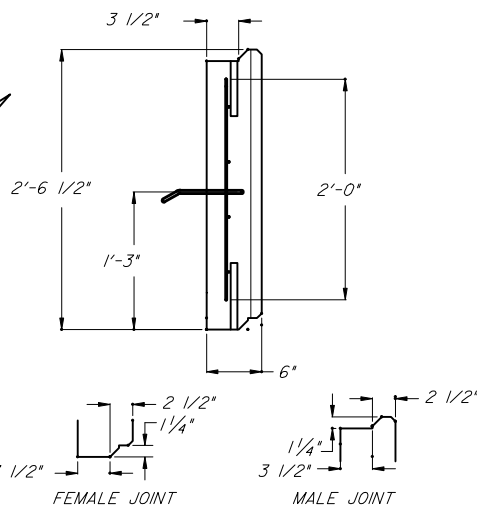
**K** HORIZONTAL JOINT DETAIL  
PARTIAL SECTION



**L** VERTICAL JOINT DETAIL  
PARTIAL SECTION



**C** STANDARD HALF PANEL  
TYPE B - FRONT FACE

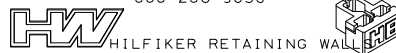


**D** STANDARD HALF PANEL  
TYPE B SECTION

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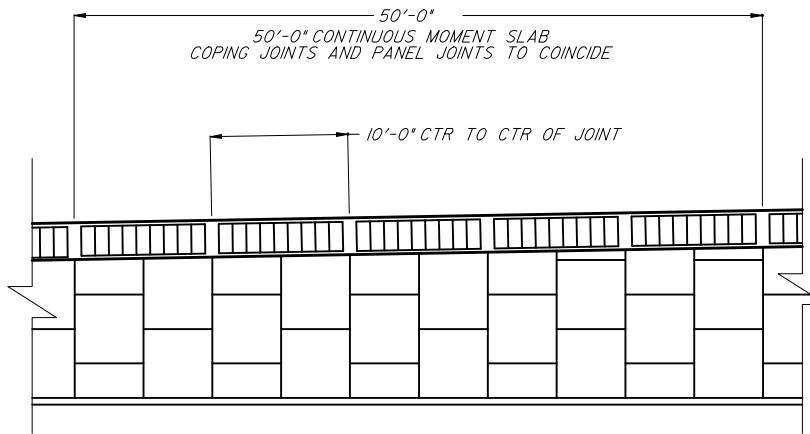


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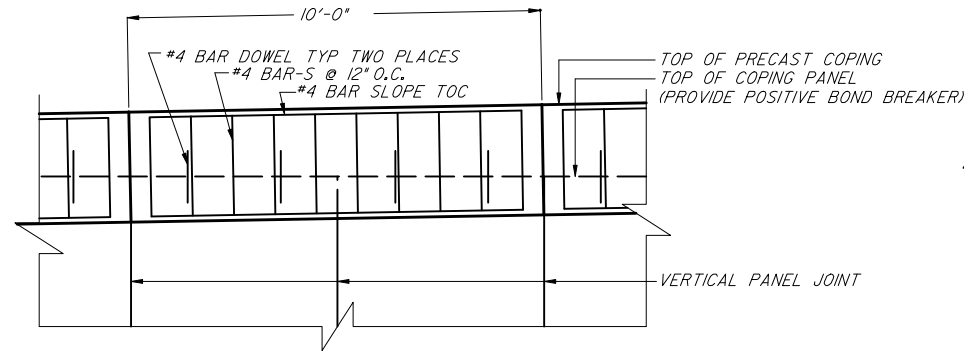
RETAINING WALL SYSTEM  
HILFIKER SQUARE PANEL

Names	Dates	Approved By			
Designed By		 State Structures Design Engineer			
Drawn By	TPT				
Checked By	TBM				
Revision	00				Sheet No.

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\*\*\*\*\*SYTIME\*\*\*\*\*

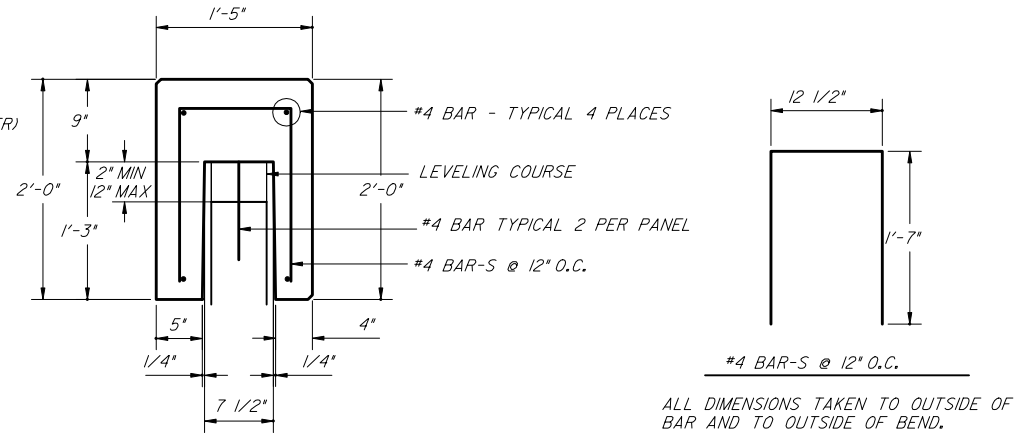


**A** PRECAST COPING ELEVATION  
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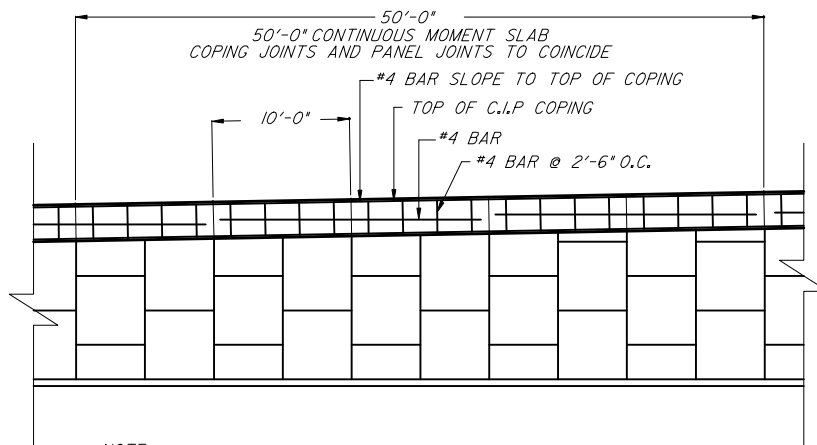


NOTE: PLACE PRE-CAST COPING SO JOINTS LINE UP WITH COPING PANEL BELOW. USE GROUT TO BRING TOP COPING PANEL TO GRADE.

**B** PRECAST COPING PARTIAL ELEVATION  
2

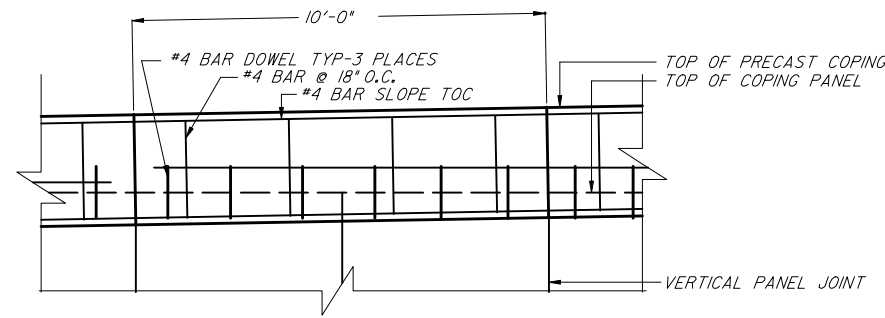


**C** PRECAST COPING  
2



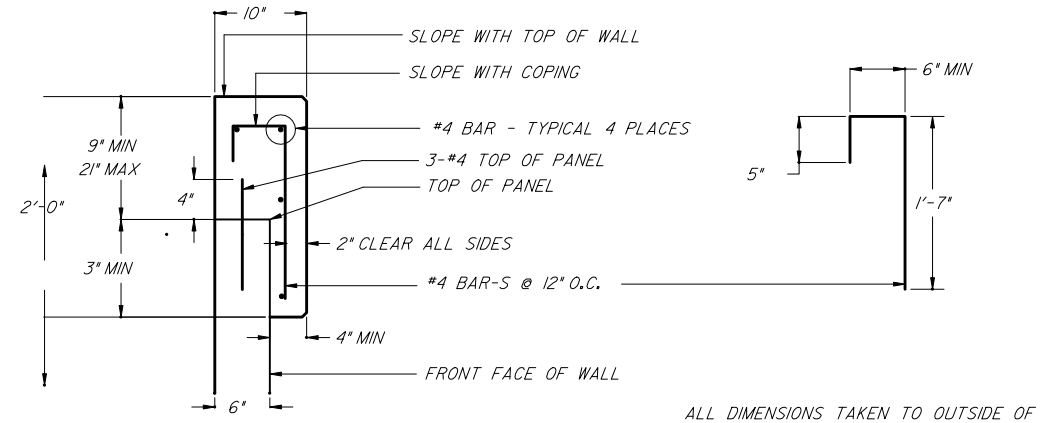
NOTE: JOINTS TO BE 10' O.C. AND SHALL LINE UP WITH THE PANEL JOINT BELOW

**D** C.I.P. COPING ELEVATION  
2



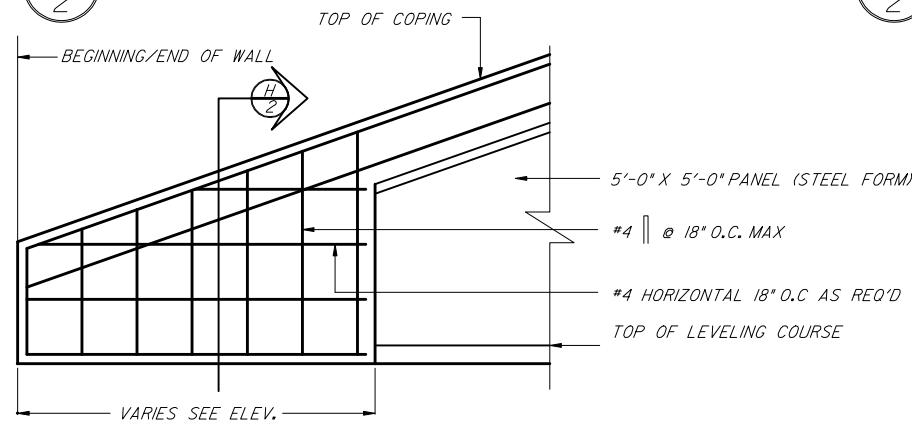
NOTE: PLACE PRE-CAST COPING SO JOINTS LINE UP WITH COPING PANEL BELOW. USE GROUT TO BRING TOP COPING PANEL TO GRADE.

**E** C.I.P. COPING PARTIAL ELEVATION  
2

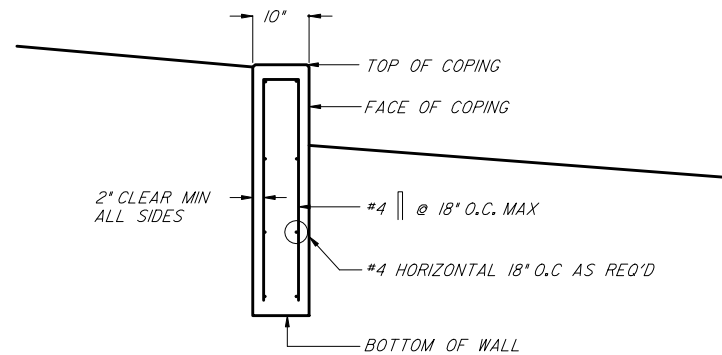


ALL DIMENSIONS AS SHOWN ARE MINIMUMS

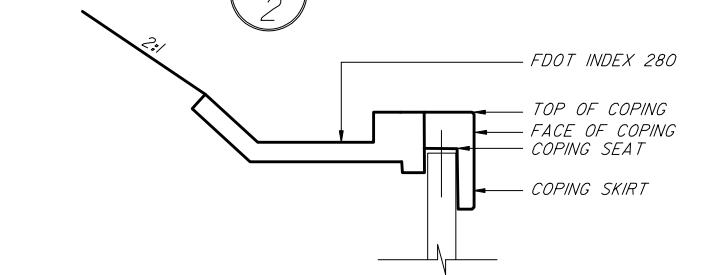
**F** C.I.P. COPING  
2



**G** COPING ENCLOSURE ELEVATION  
2



**H** COPING ENCLOSURE SECTION  
2

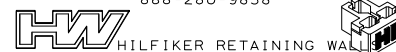


**I** COPING-DRAINAGE SECTION DETAIL  
2

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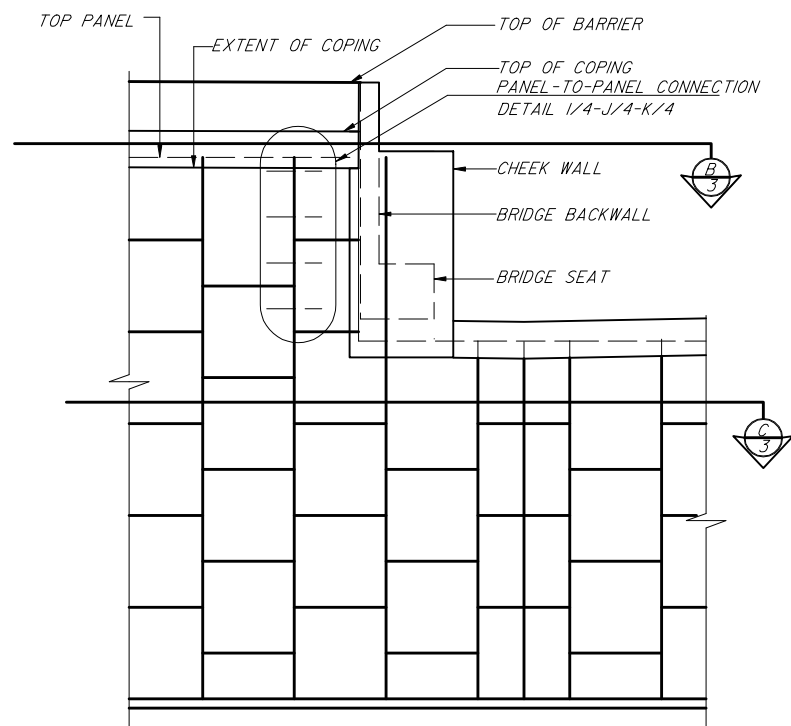
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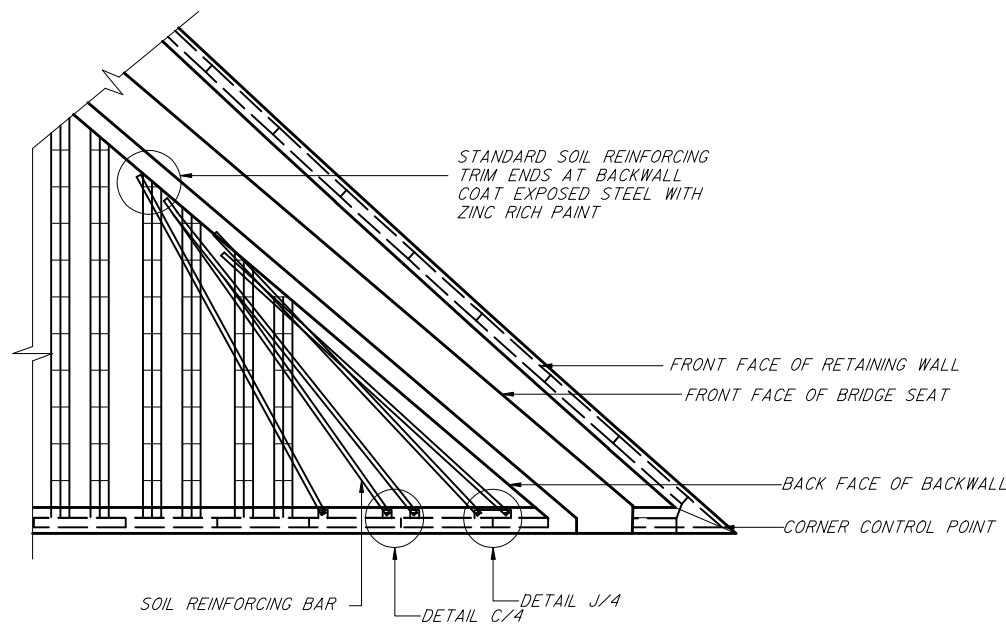


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM HILFIKER SQUARE PANEL				
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\*\*\*\*\*SYTIME\*\*\*\*\*

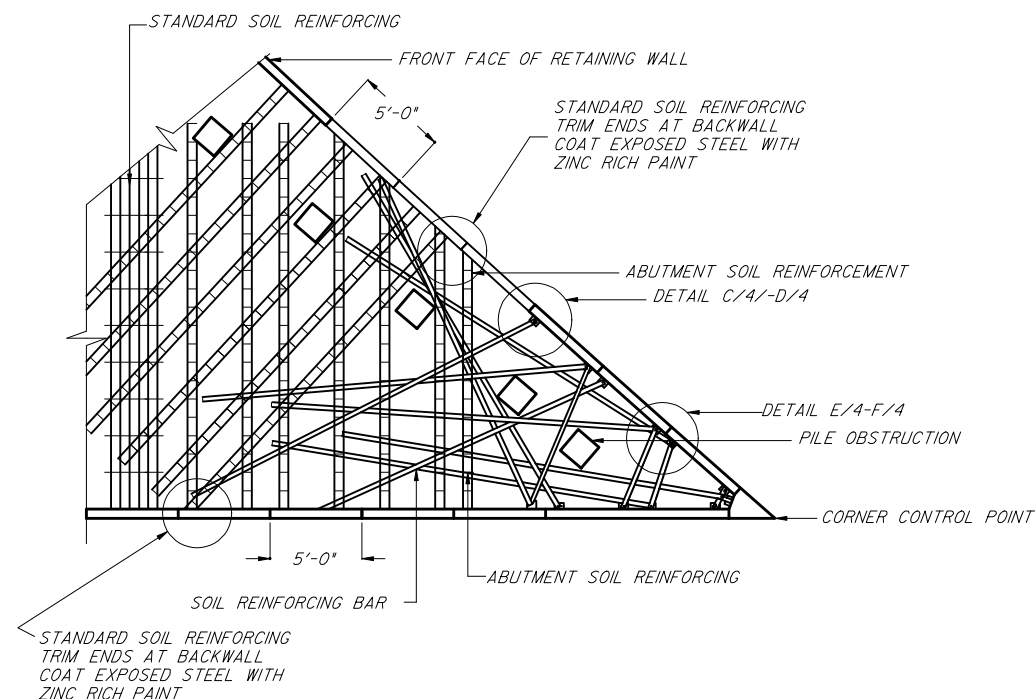


**A** ELEVATION ACUTE CORNER



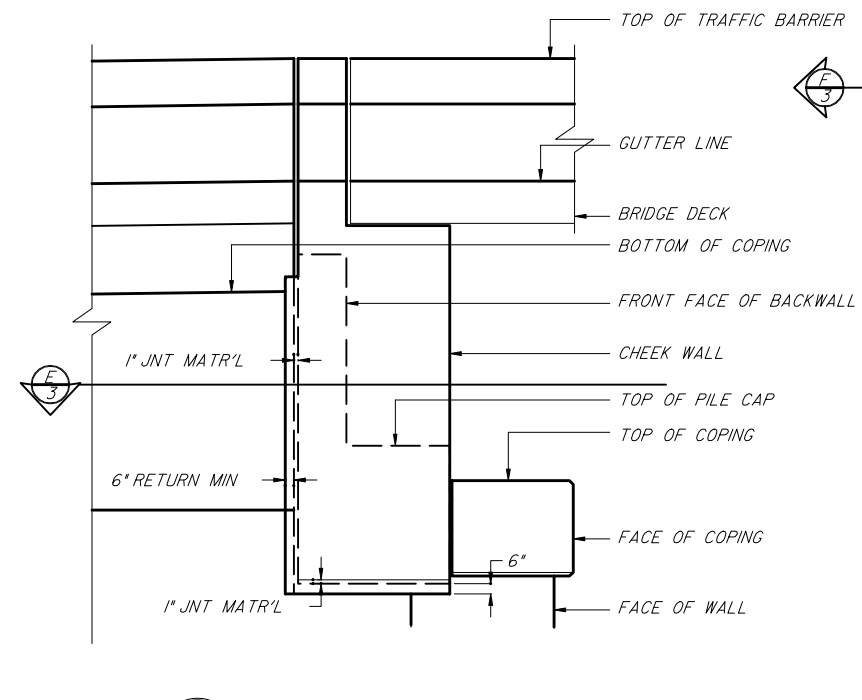
ABUTMENT RETAINING WALL SOIL REINFORCEMENT NOT SHOWN FOR CLARITY  
END BENT BACK WALL REINFORCING NOT SHOWN FOR CLARITY

**B** ACUTE CORNER PLAN SECTION

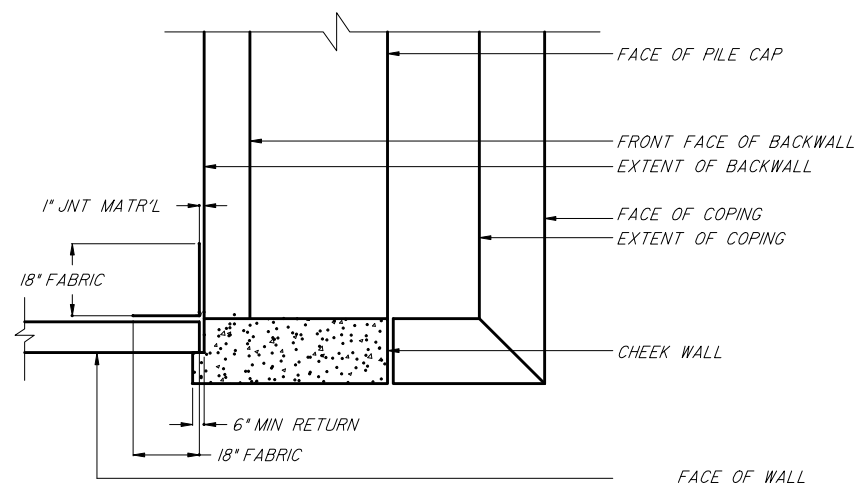


NOTE: REFERENCE DETAIL G/5 FOR ABUTMENT SOIL REINFORCEMENT SHOWN

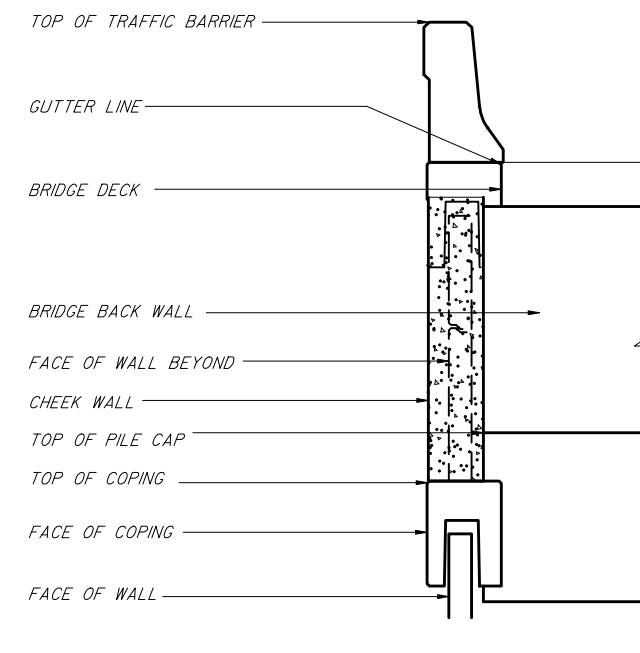
**C** ACUTE CORNER PLAN SECTION



**D** ELEVATION AT CHEEK WALL



**E** PLAN SECTION AT CHEEK WALL

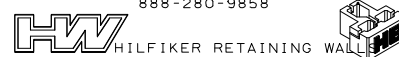


**F** SECTION AT CHEEK WALL

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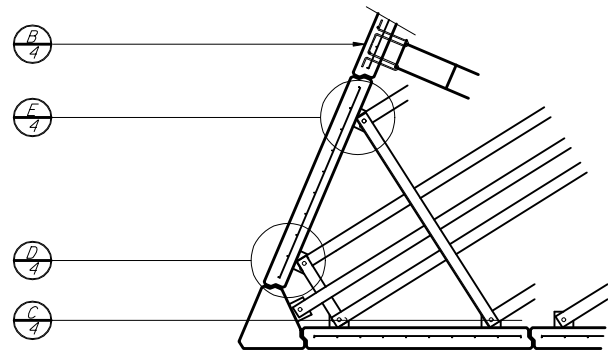


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

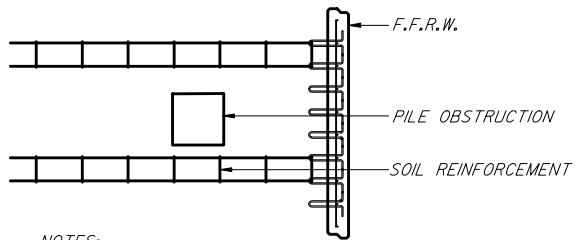
RETAINING WALL SYSTEM  
HILFIKER SQUARE PANEL

Designed By	Names	Dates	Approved By	State Structures Design Engineer	
Drawn By	TPT		W. J. [Signature]	Revision	Sheet No.
Checked By	TBW			00	4 of 13

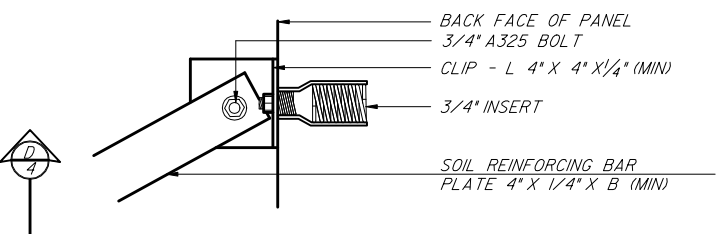
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



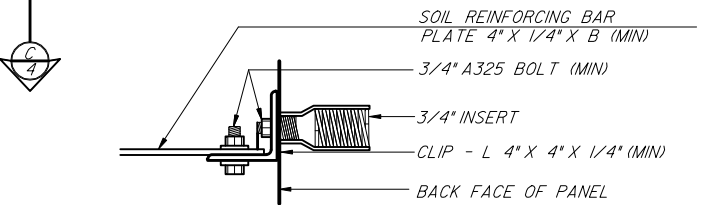
**A ACUTE CORNER DETAIL**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



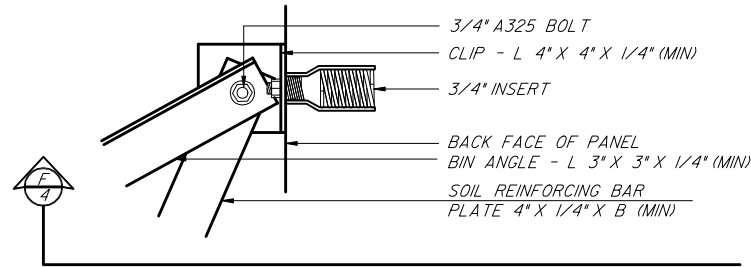
**B CONTINUOUS ANCHOR PLAN**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



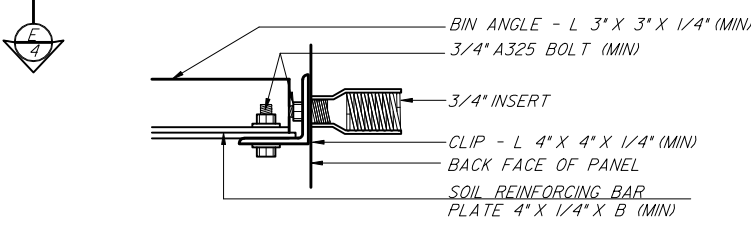
**C SOIL REINFORCING BAR PLAN**  
4



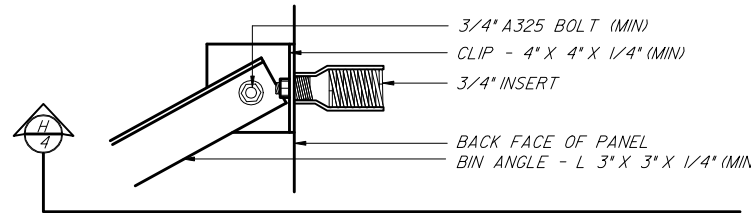
**D SOIL REINFORCING BAR DETAIL**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



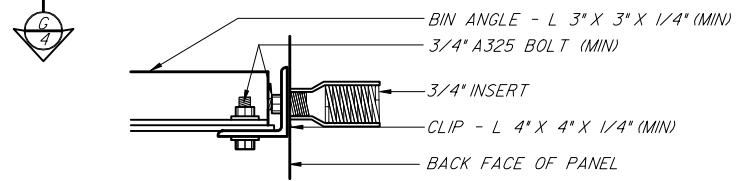
**E COMBINATION ANGLE/BAR PLAN**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



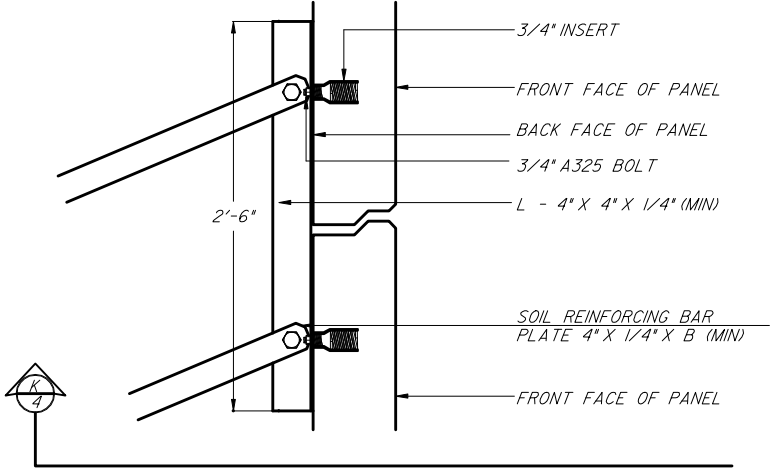
**F COMBINATION STRAP/BAR DETAIL**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



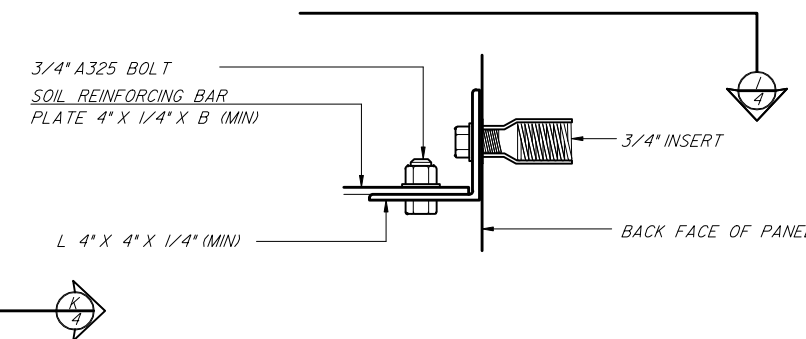
**G BIN CLIP PLAN DETAIL**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



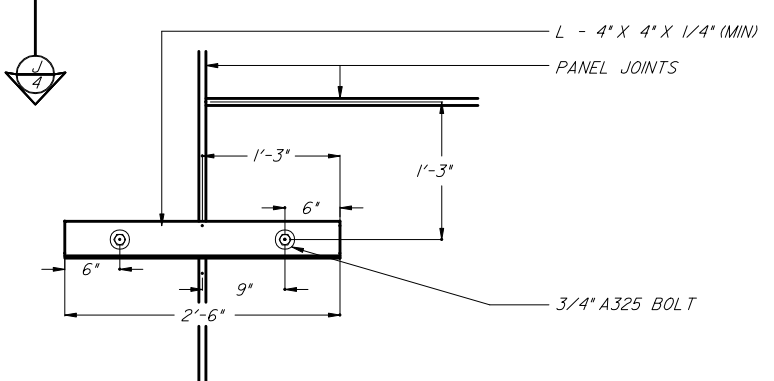
**H BIN CLIP SECTION DETAIL**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



**I PANEL-TO-PANEL CONNECTION PLAN**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



**J PANEL-TO-PANEL CONNECTION SECTION**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.



**K PANEL-TO-PANEL CONNECTION ELEVATION**  
4 ALL STEEL TO BE HOT DIP GALVANIZED U.N.O.

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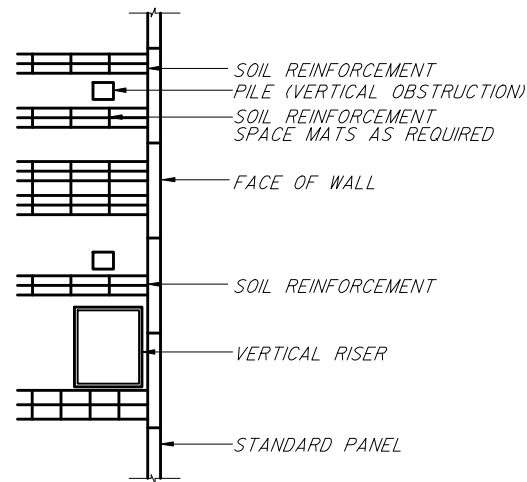
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HILFIKER RETAINING WALL

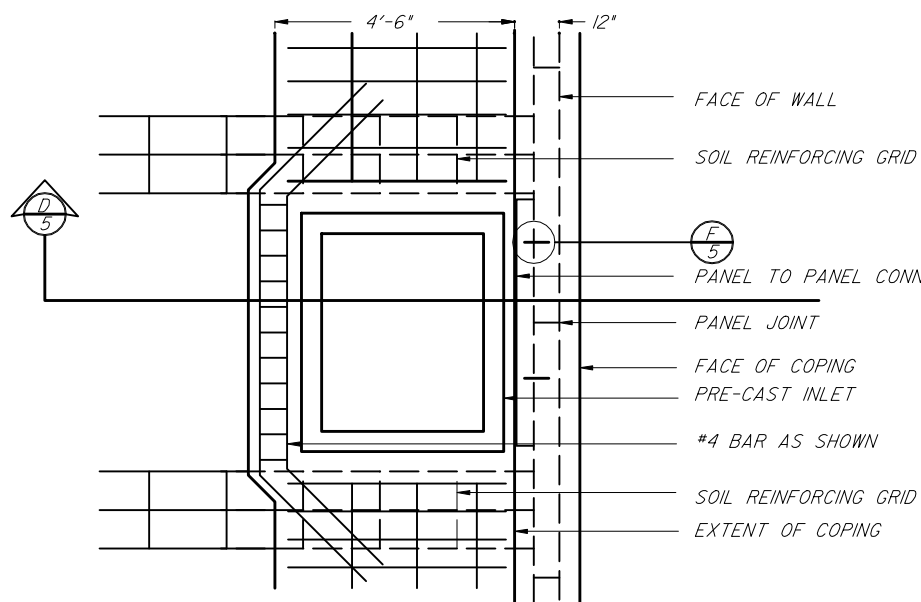
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM HILFIKER SQUARE PANEL</b>				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By	TPT		Revision	Sheet No. 5 of 13
Checked By	TBW		00	Index No. 5021

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



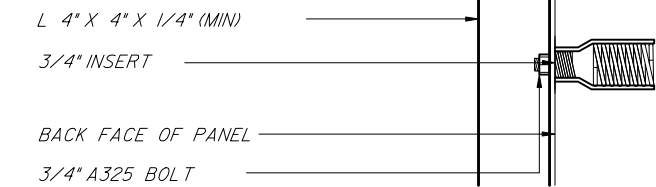
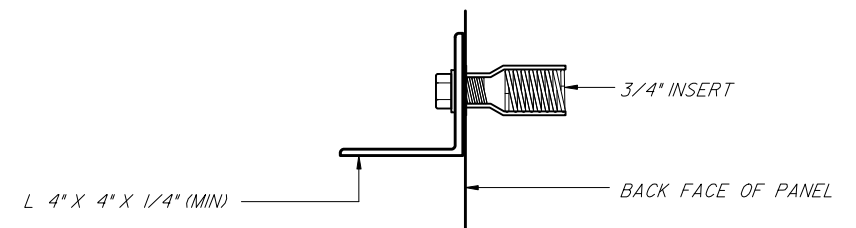
- NOTE:
1. VERTICAL OBSTRUCTIONS REQUIRE SPECIAL DESIGN CONSIDERATIONS
  2. THE DETAIL AS SHOWN IS FOR CONCEPT ONLY AND MAY VARY ON FINAL DESIGN
  3. REFERENCE SPECIAL DESIGN CALCULATIONS FOR DETAILS AND COMPONENT TYPE AND SIZE
  4. OBSTRUCTION SHALL BE INSTALLED BEFORE WALL

**A** VERTICAL OBSTRUCTION  
5

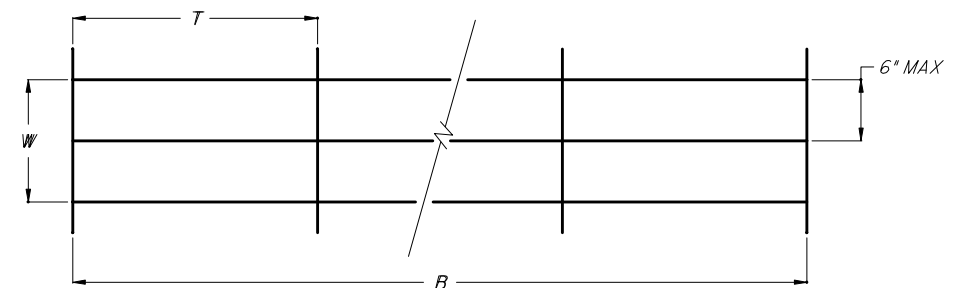


**C** VERTICAL OBSTRUCTION  
5

**E** PANEL-TO-PANEL CONNECTION DETAIL  
5 SECTION



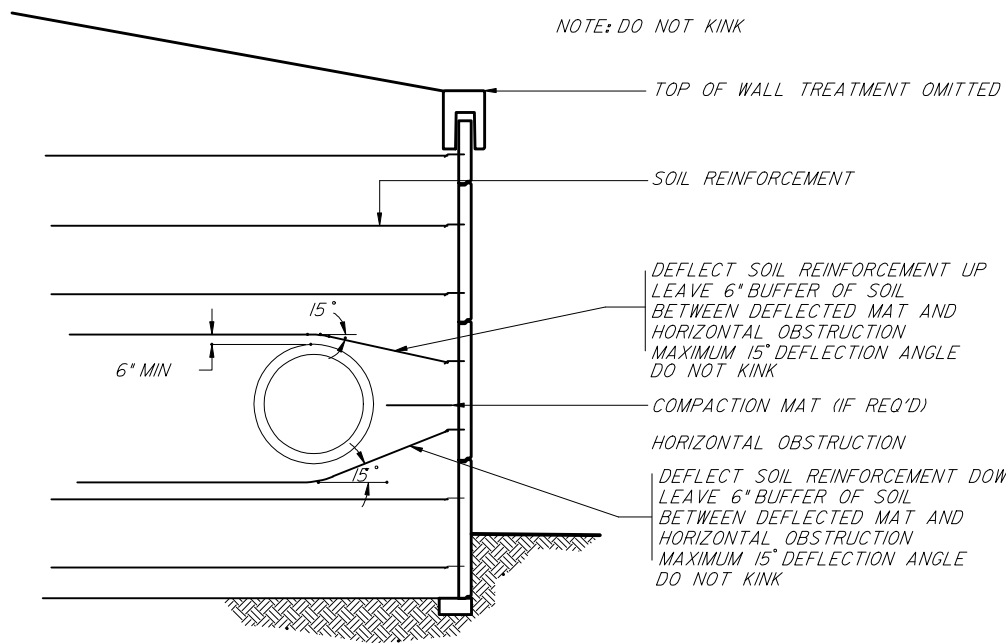
**F** PANEL-TO-PANEL CONNECTION DETAIL  
5 PLAN



B = SOIL REINFORCING LENGTH  
T = TRANSVERSE WIRE SPACING (2'-0" MAX)  
W = WIDTH OF SOIL REINFORCING ELEMENT

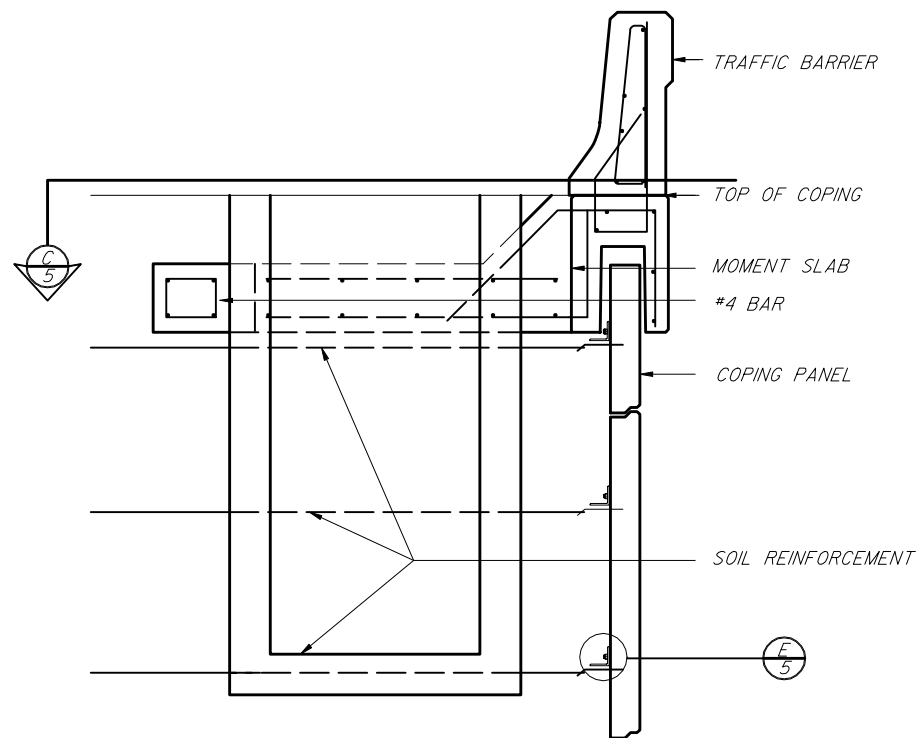
NOTE: THE MAT SHOWN IS USED TO PASS OBSTRUCTIONS AND TYPICALLY IS A WELDED WIRE MESH WITH LARGE DIAMETER WIRES. THE LONGITUDINAL WIRE SHALL BE EQUAL TO OR SMALLER THAN THE PANEL ANCHOR. A MINIMUM OF THREE LONGITUDINAL WIRES IS REQUIRED. THE MINIMUM WIRE SIZE SHALL BE AN W7.0

**G** OBSTRUCTION SOIL REINFORCING PLAN  
5 PLAN



- NOTE:
1. HORIZONTAL OBSTRUCTIONS REQUIRE SPECIAL DESIGN CONSIDERATIONS
  2. THE DETAIL AS SHOWN IS FOR CONCEPT ONLY AND MAY VARY ON FINAL DESIGN
  3. REFERENCE SPECIAL DESIGN CALCULATIONS FOR DETAILS AND COMPONENT TYPE AND SIZE

**B** HORIZONTAL OBSTRUCTION  
5



**D** PANEL-TO-PANEL CONNECTION DETAIL  
5

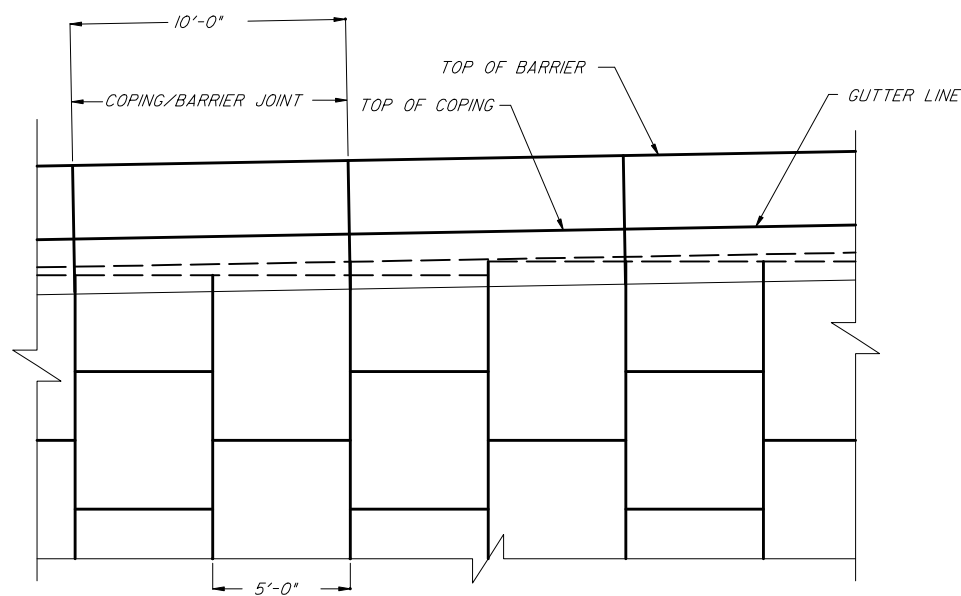
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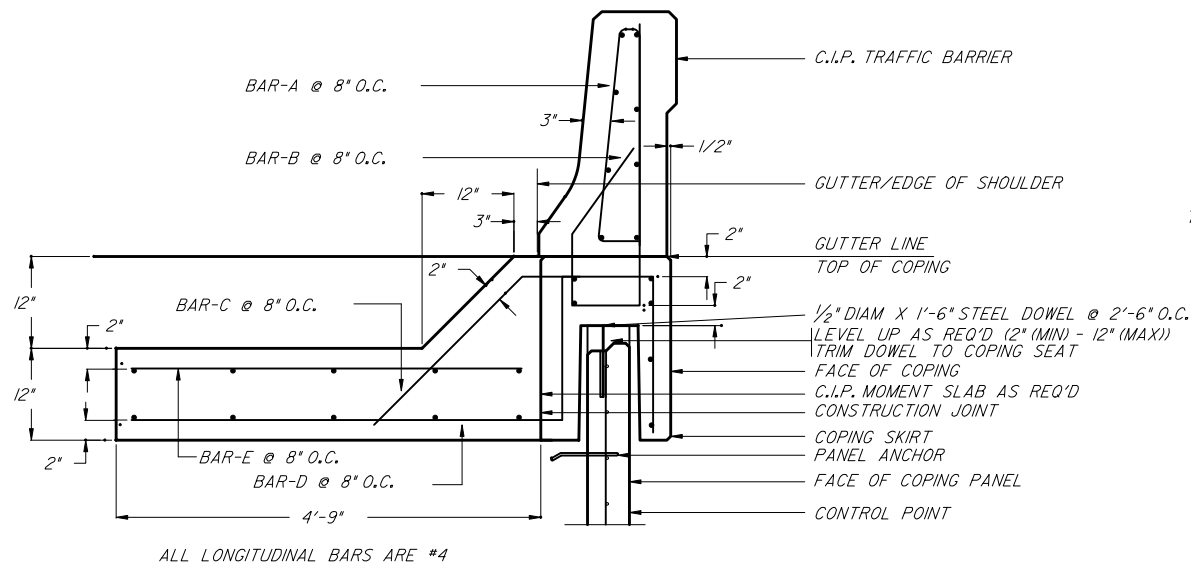
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM HILFIKER SQUARE PANEL</b>				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By	TPT		Revision	Sheet No. 6 of 13
Checked By	TBW		00	Index No. 5021

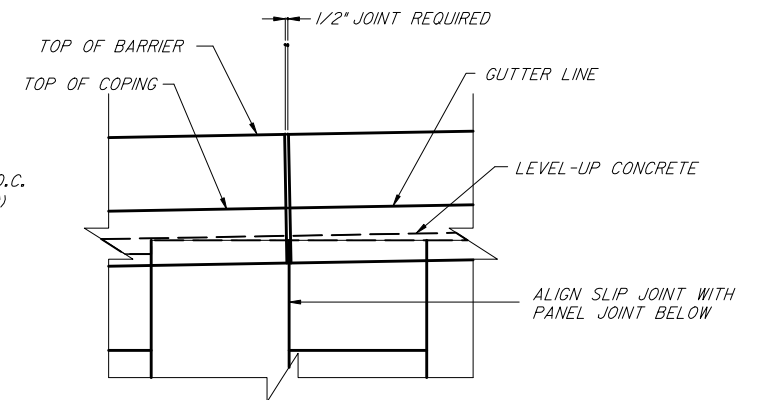
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



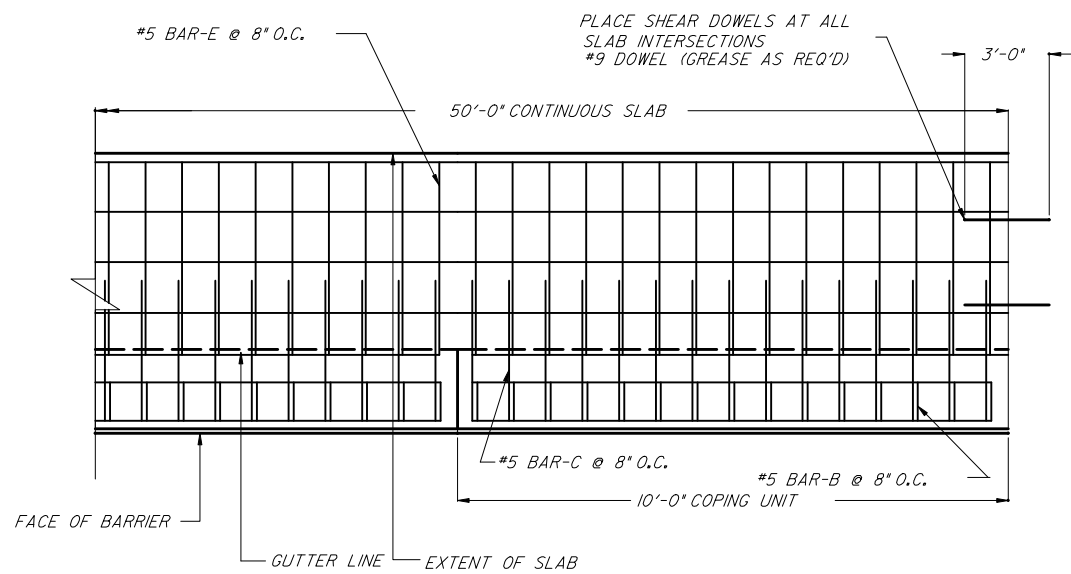
**A** PRECAST COPING WITH C.I.P. BARRIER ELEVATION



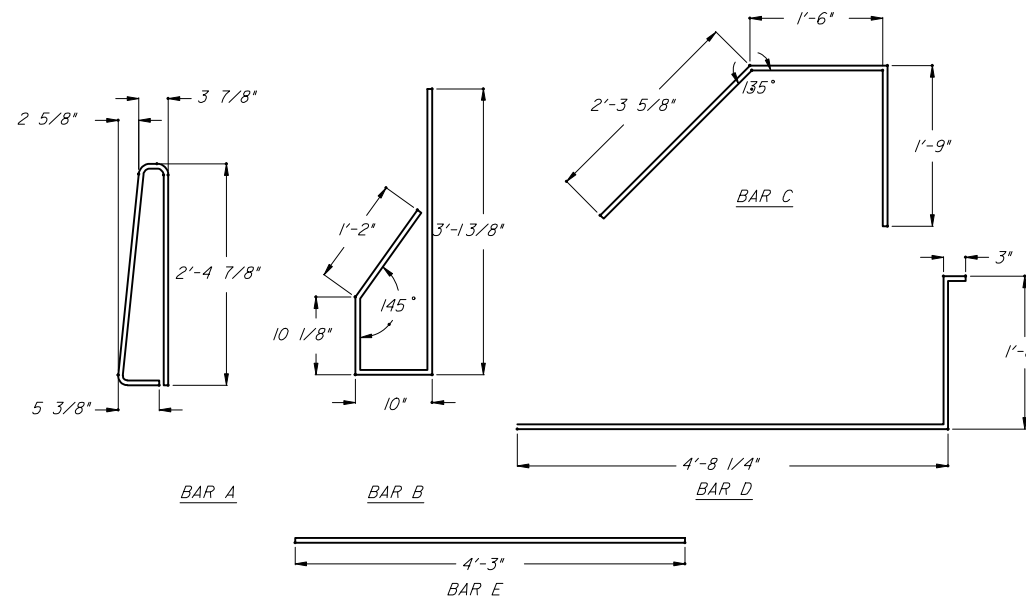
**C** PRECAST COPING WITH C.I.P. BARRIER AND C.I.P. JUNCTION SLAP



**E** TRAFFIC BARRIER SLIP JOINT



**B** PRECAST COPING WITH C.I.P. BARRIER PLAN

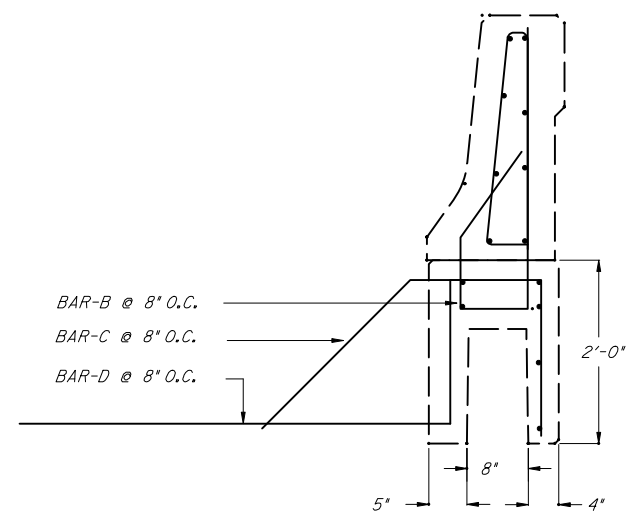


REBAR SCHEDULE

MARK	SIZE	QTY	LENGTH	BENDING
A	#5	11	AS DETAILED	AS DETAILED
B	#5	11	AS DETAILED	AS DETAILED
C	#5	11	AS DETAILED	AS DETAILED
D	#5	11	AS DETAILED	AS DETAILED

QUANTITIES SHOWN ARE FOR A 10'-0" COPING SECTION

**D** PRECAST BARRIER/COPING REINFORCING



**F** PRECAST COPING REBAR LAYOUT

REFERENCE FDOT INDEX 700 FOR BARRIER DIMENSIONS NOT SHOWN

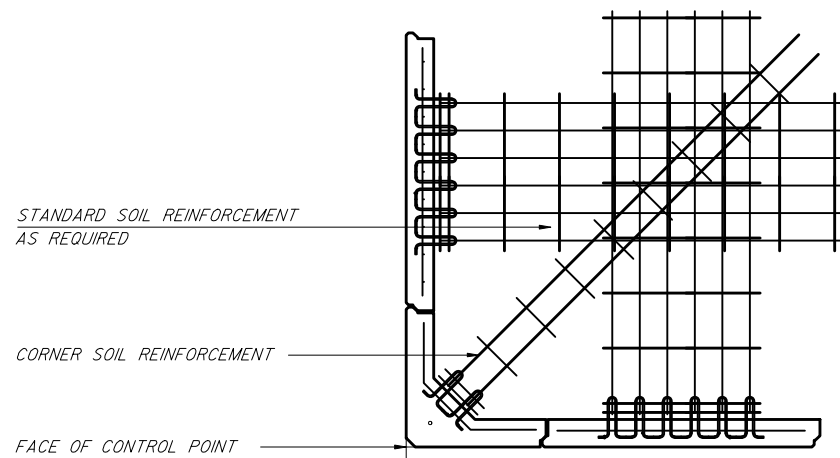
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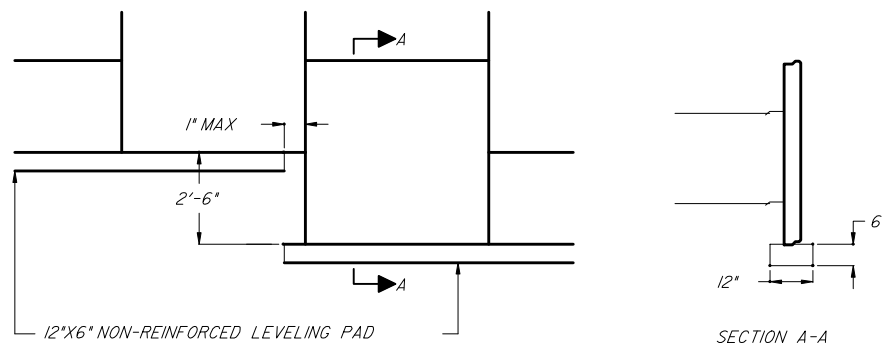
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RETAINING WALL SYSTEM HILFIKER SQUARE PANEL				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By	TPT		Revision	Sheet No. 7 of 13
Checked By	TBW		00	Index No. 5021

\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

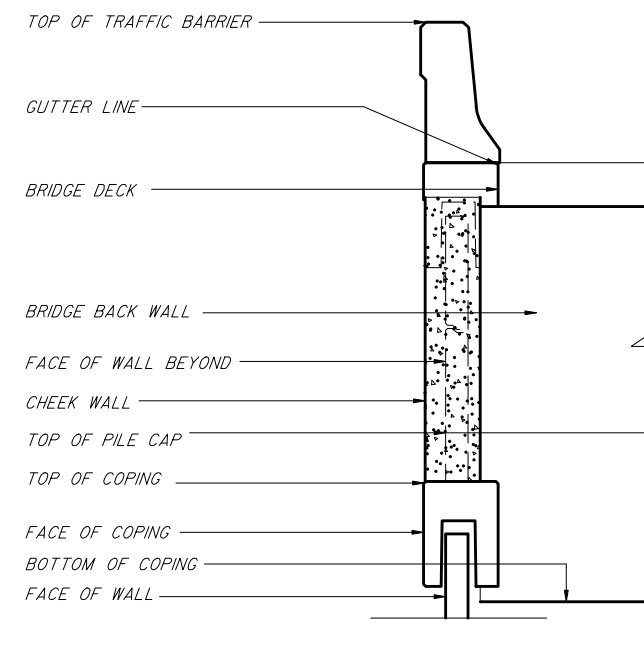


**A** 90° CORNER PLAN



NOTE: LEVELING COURSE SHALL BE PLACED TO THE ELEVATIONS AS SHOWN ON THE PLANS. TOLERANCE FOR ELEVATIONS SHALL BE PLUS-MINUS 1/8"

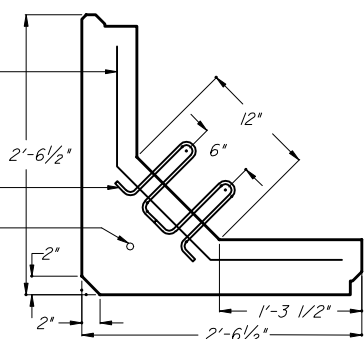
**D** LEVELING COURSE STEP ELEVATION



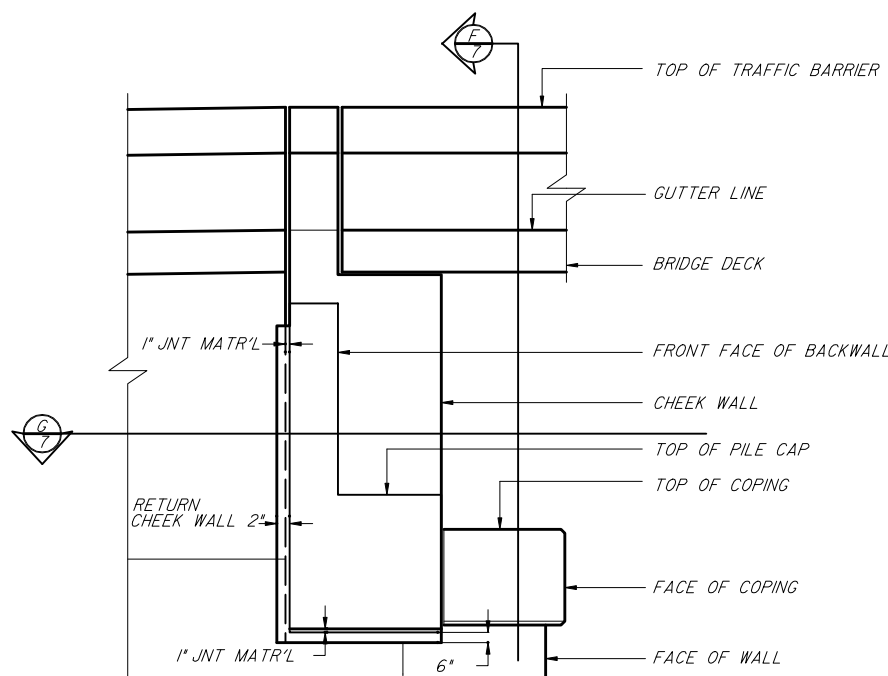
**F** SECTION AT CHEEK WALL

PANEL REINFORCEMENT  
WWF W7.0 X W7.0 - 6" X 6"

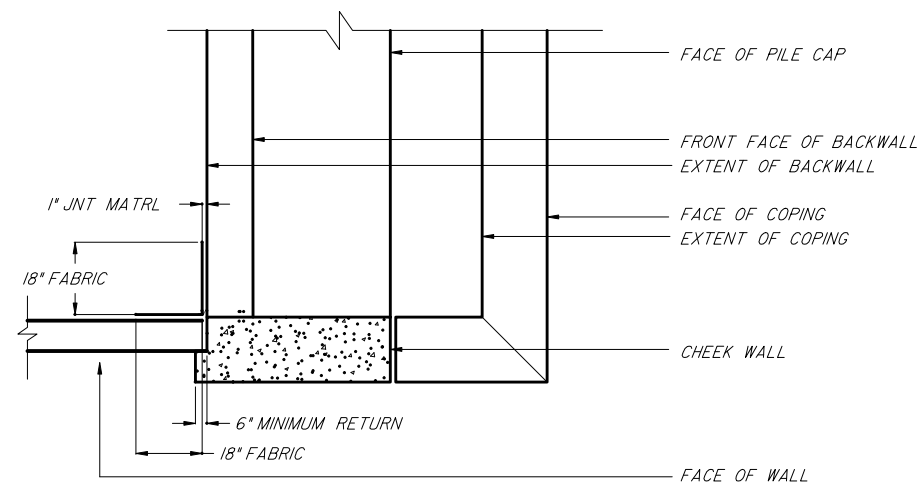
PANEL ANCHOR  
1/2" ALIGNMENT HOLE



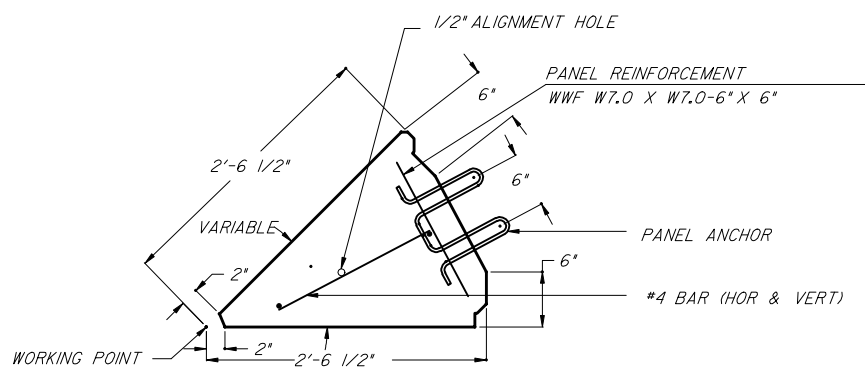
**B** ABTUSE CORNER PANEL  
PANEL ANGLE VARIES FROM 90° TO 180°



**E** ELEVATION AT CHEEK WALL



**G** PLAN SECTION AT CHEEK WALL

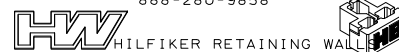


**C** ADJUSTABLE CORNER PANEL

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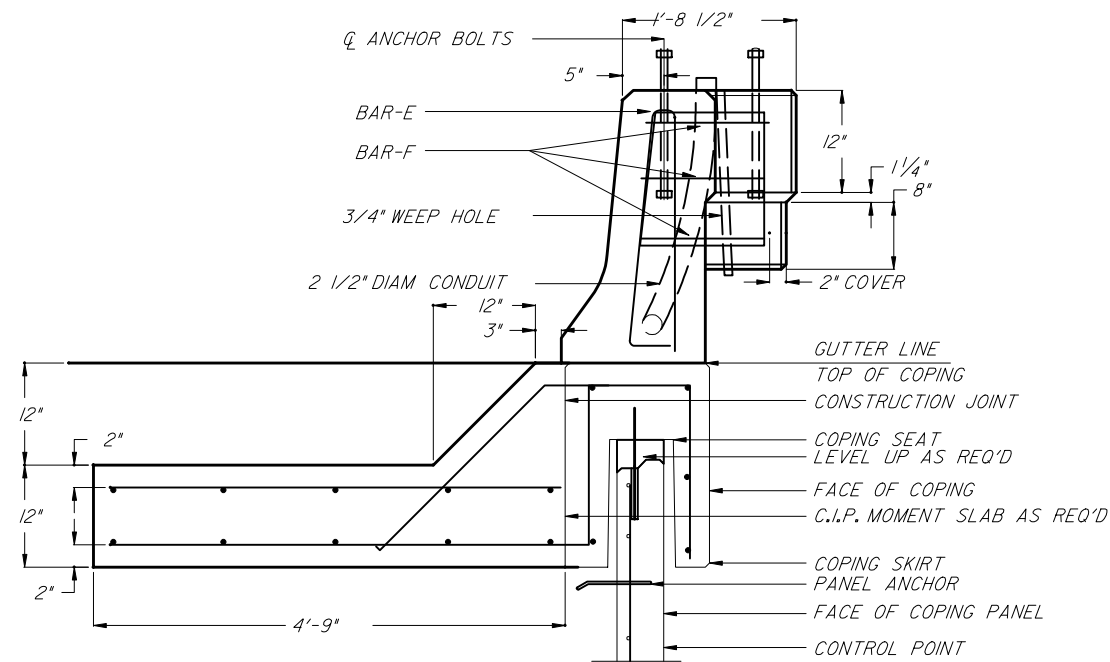


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
HILFIKER SQUARE PANEL

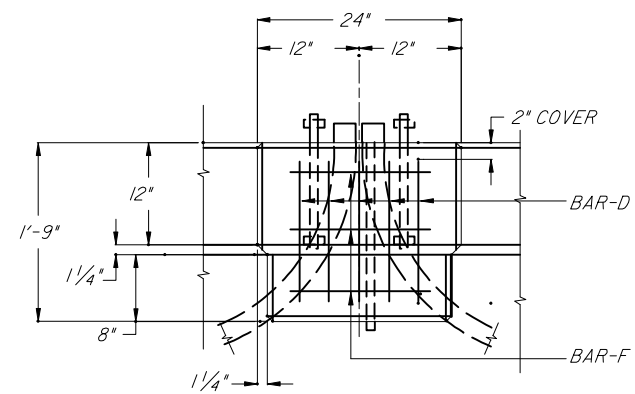
Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By	TPT			
Checked By	TBW	Revision	Sheet No.	Index No.
		00	8 of 13	5021

\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



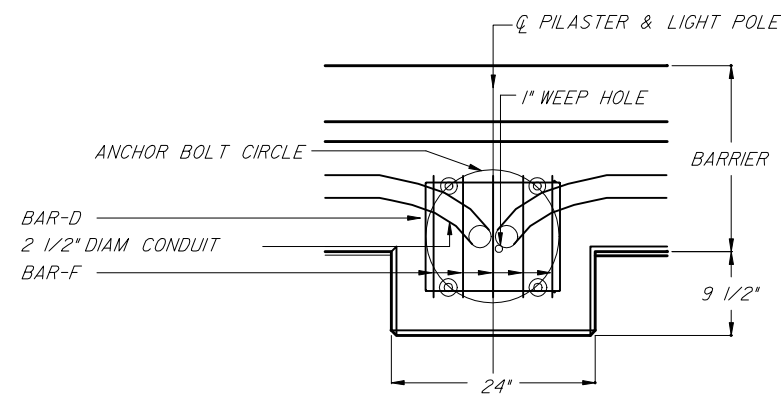
FOR ADDITIONAL DETAILS REFERENCE FDOT LIGHT POLE PILASTER SEE STRUCTURES STANDARD DRAWING 500  
FOR JUNCTION SLAB DIMENSIONS AND REINFORCING REFERENCE SHEET HW-6

**A** PRECAST COPING WITH PILASTER SECTION  
8



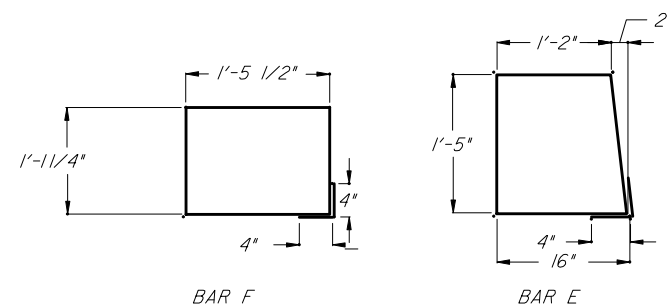
FOR ADDITIONAL DETAILS REFERENCE FDOT LIGHT POLE PILASTER SEE STRUCTURES STANDARD DRAWING 500

**C** PILASTER ELEVATION  
8



FOR ADDITIONAL DETAILS REFERENCE FDOT LIGHT POLE PILASTERS SEE STRUCTURES STANDARD DRAWING 500

**B** PILASTER PLAN VIEW  
8



REBAR SCHEDULE

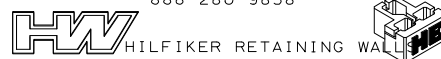
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D	#5	5	AS DETAILED	AS DETAILED
F	#5	3	AS DETAILED	AS DETAILED

**D** PILASTER REINFORCING SCHEDULE  
8

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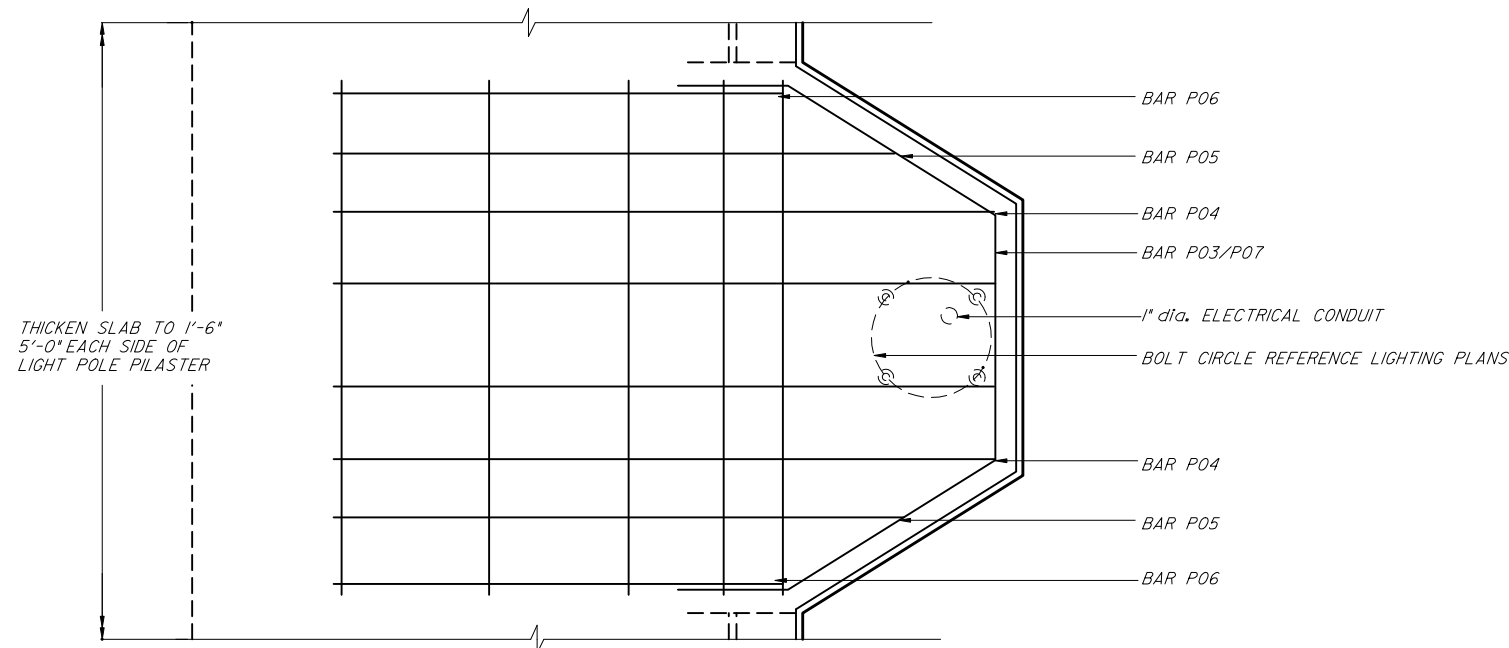
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM HILFIKER SQUARE PANEL				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By	TPT	Revision	Sheet No.	Index No.
Checked By	TBW	00	9 of 13	5021

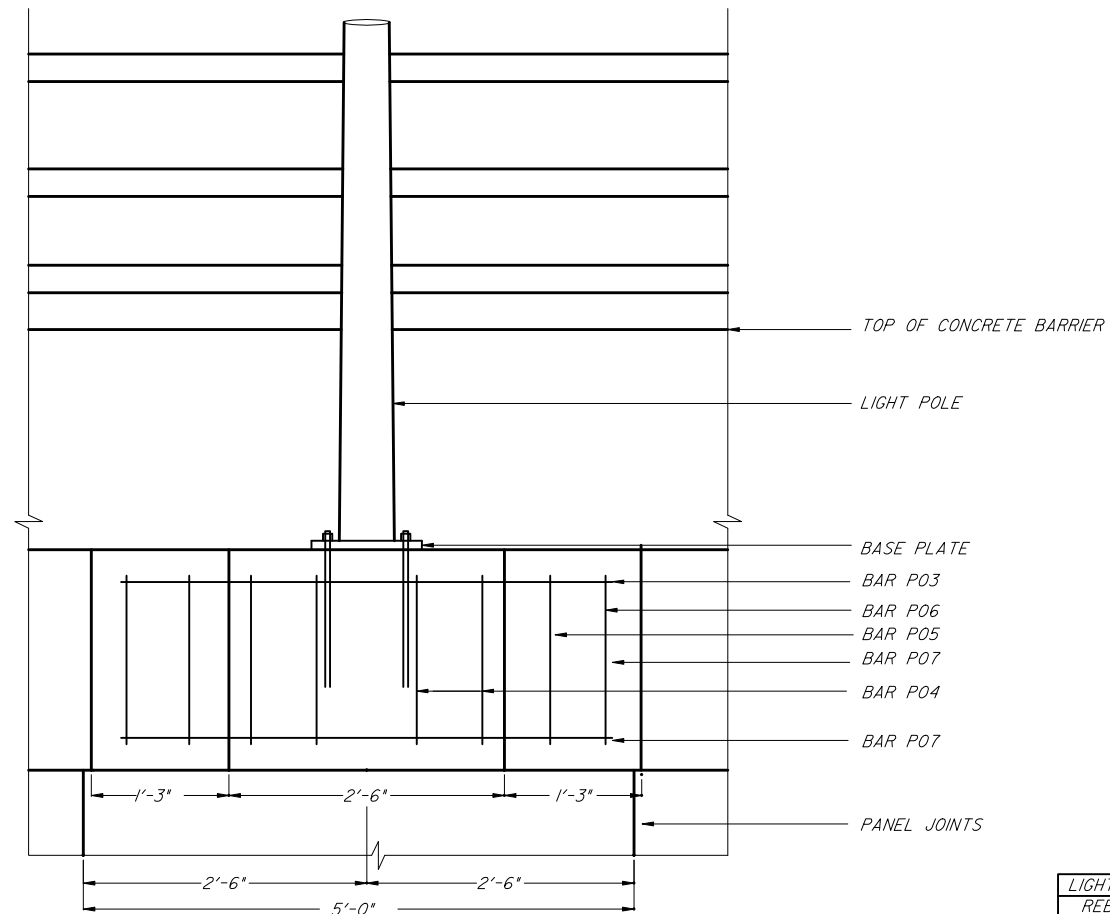
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*





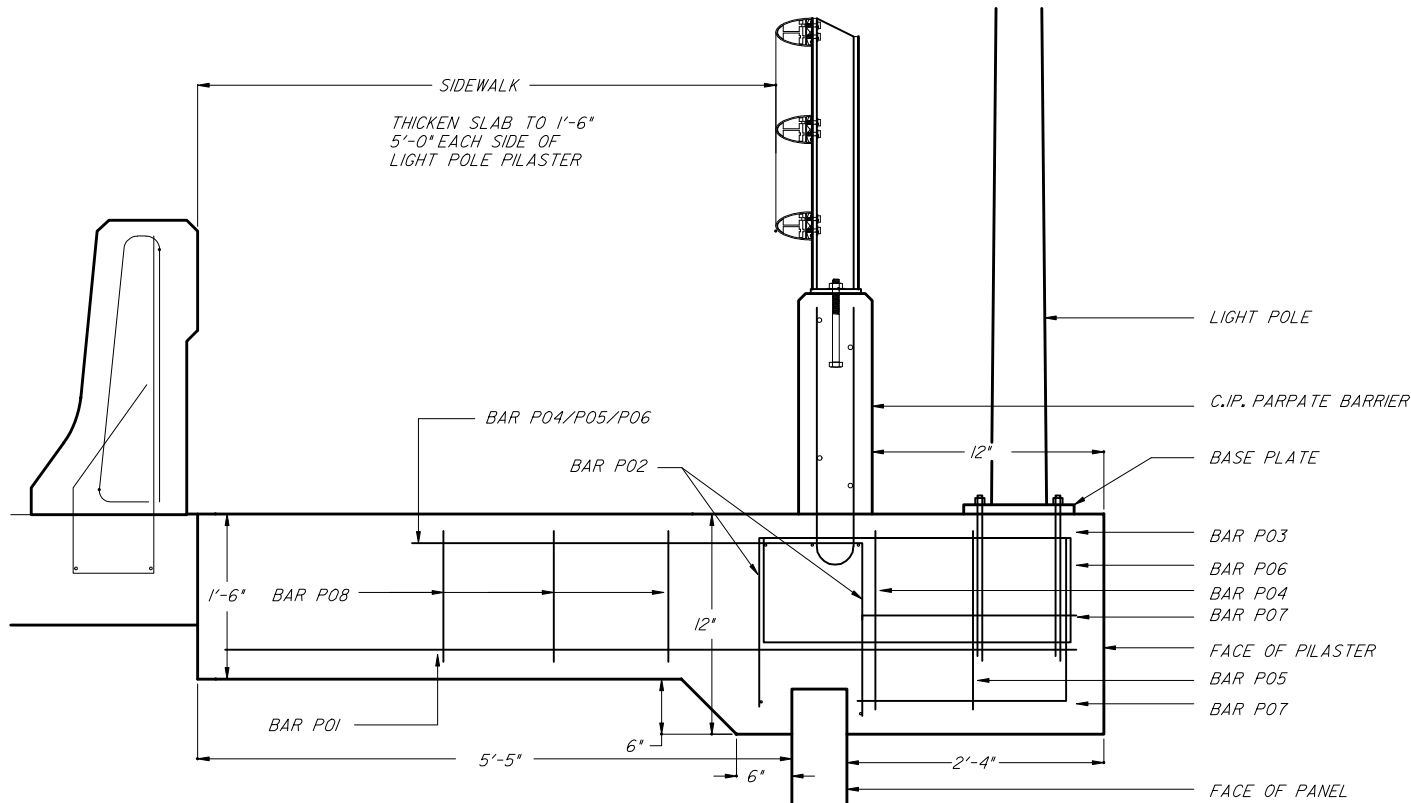
FOR ADDITIONAL DETAILS REFERENCE STRUCTURES STANDARD DRAWING 720

**A** PLAN BARRIER DETAIL @ LIGHT POLE  
 9 HORIZONTAL REINFORCING NOT SHOWN FOR CLARITY

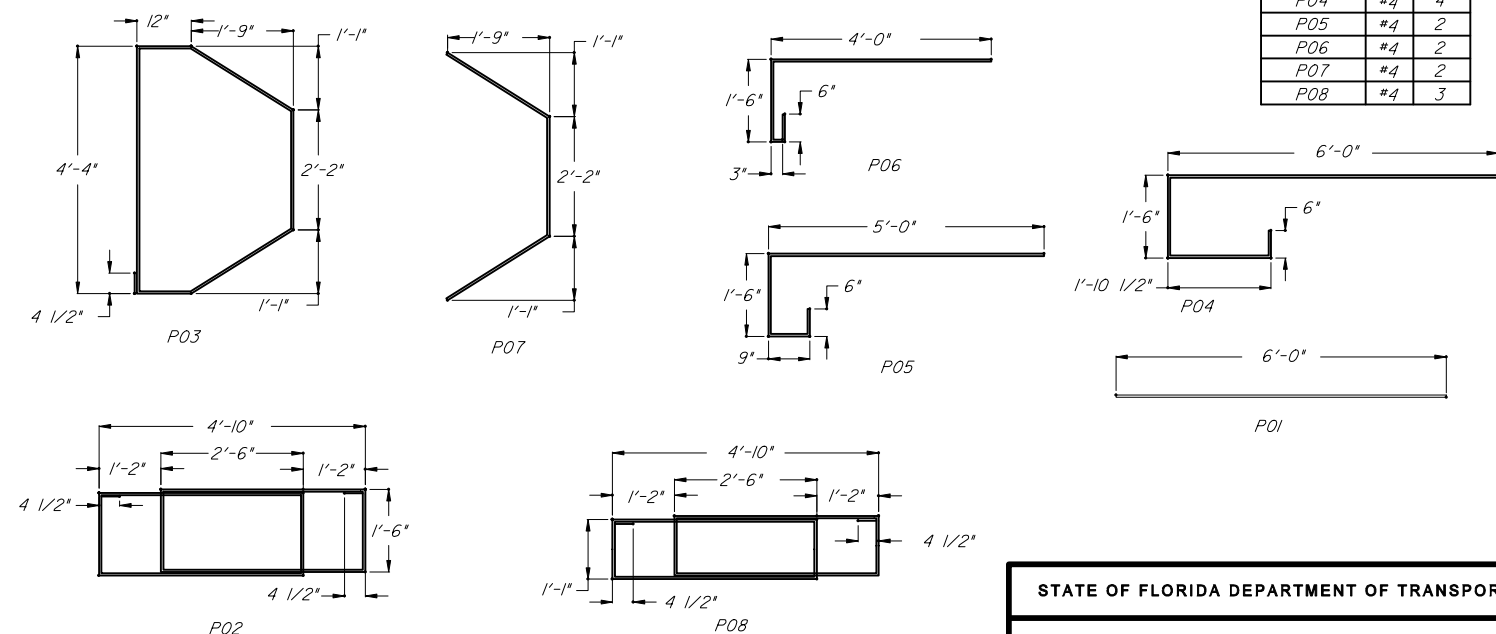


**B** ELEVATION BARRIER DETAIL @ LIGHT POLE  
 9

LIGHT POLE PILASTER REBAR SCHEDULE		
MARK	SIZE	QTY
P01	#4	6
P02	#4	2
P03	#4	1
P04	#4	4
P05	#4	2
P06	#4	2
P07	#4	2
P08	#4	3



**C** SECTION BARRIER DETAIL @ LIGHT POLE  
 9

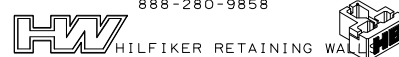


**D** LIGHT POLE PILASTER REINFORCING DETAIL  
 9

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 ENGINEERED STRUCTURES  
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 HURST, TEXAS 76053  
 888-280-9858

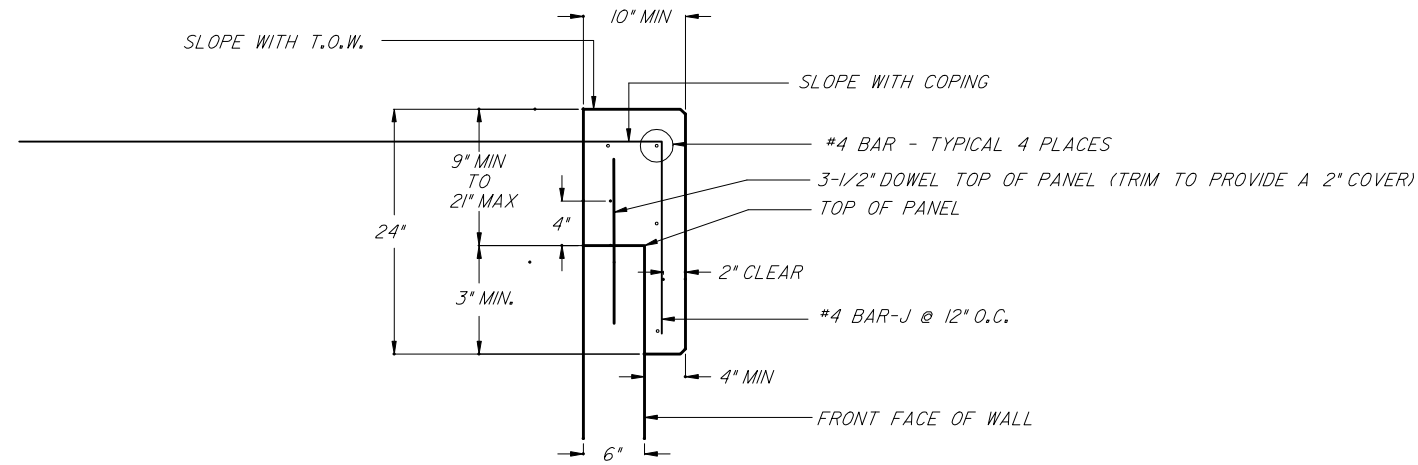


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

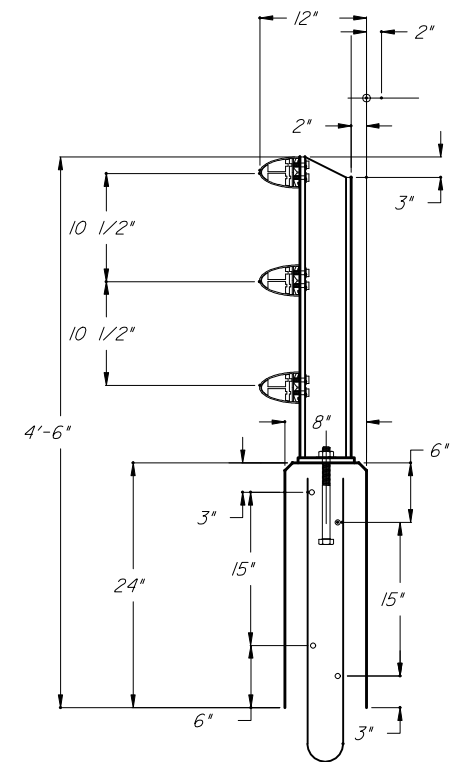
RETAINING WALL SYSTEM  
 HILFIKER SQUARE PANEL

Names	Dates	Approved By			
Designed By		 State Structures Design Engineer			
Drawn By	TPT				
Checked By	TBW				
Revision	00				Sheet No.

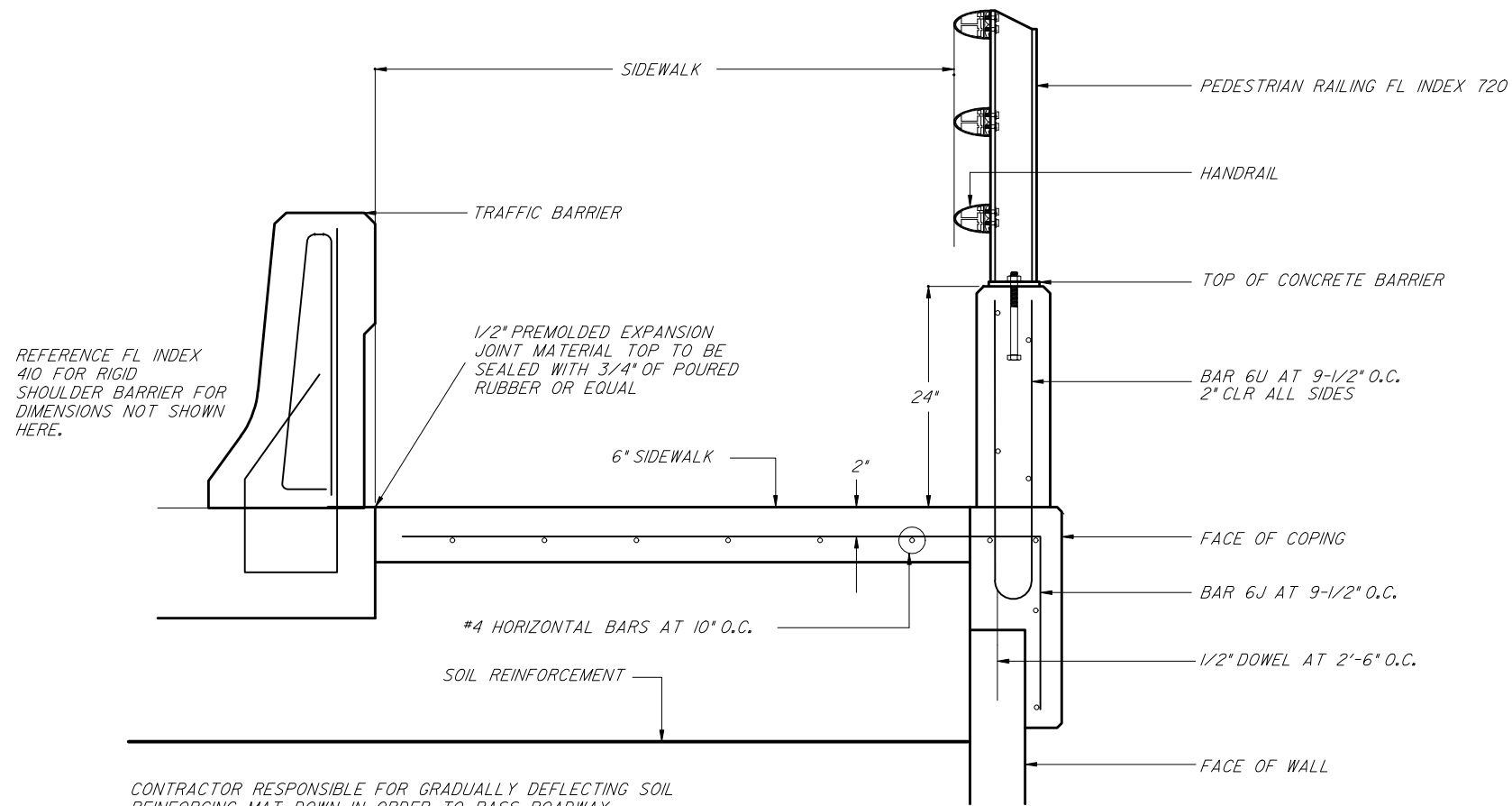
\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
 \*\*\*\*\*SYTIME\*\*\*\*\*



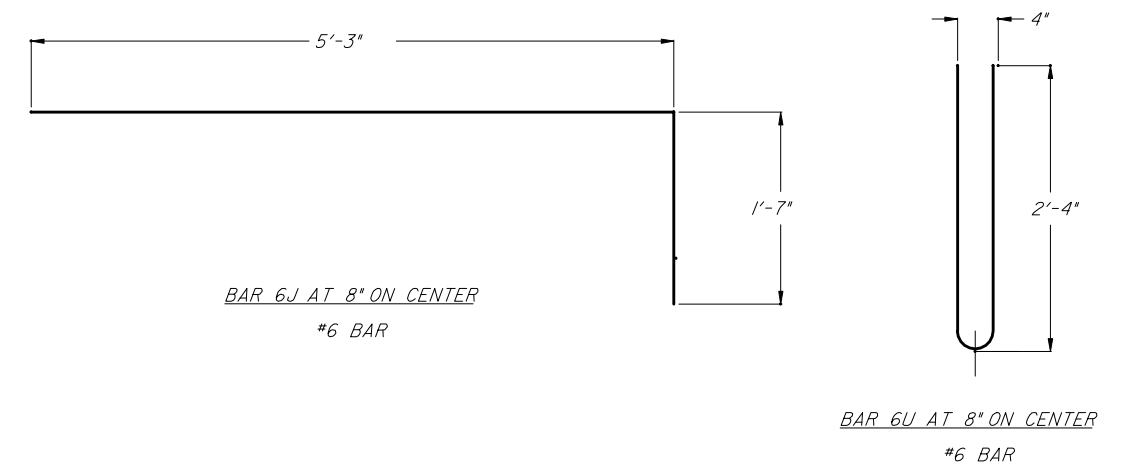
**A** SECTION C.I.P. PARAPET COPING  
 10 HORIZONTAL REINFORCING NOT SHOWN FOR CLARITY



**B** SECTION C.I.P. PEDESTRIAN BARRIER  
 10 REFERENCE STRUCTURES STANDARD DRAWING 720 FOR DETAILS NOT SHOWN



**C** SECTION C.I.P. BARRIER WITH PEDESTRIAN RAILING  
 10



**D** C.I.P. COPING WITH PEDESTRIAN BARRIER BAR DETAILS  
 10

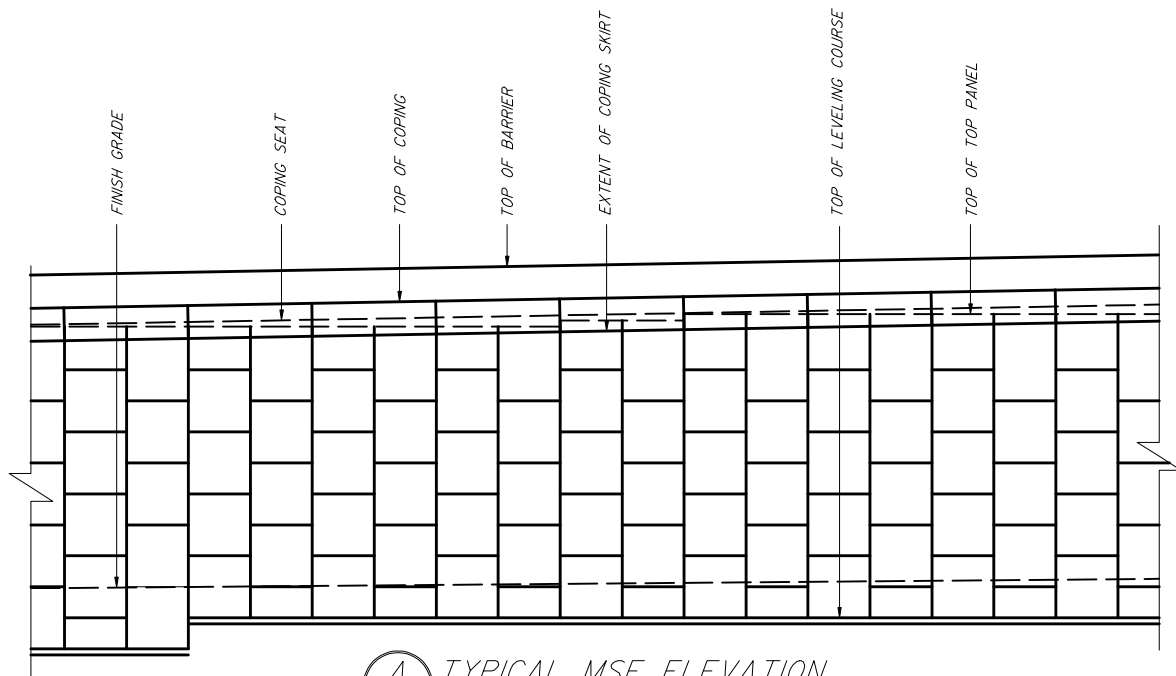
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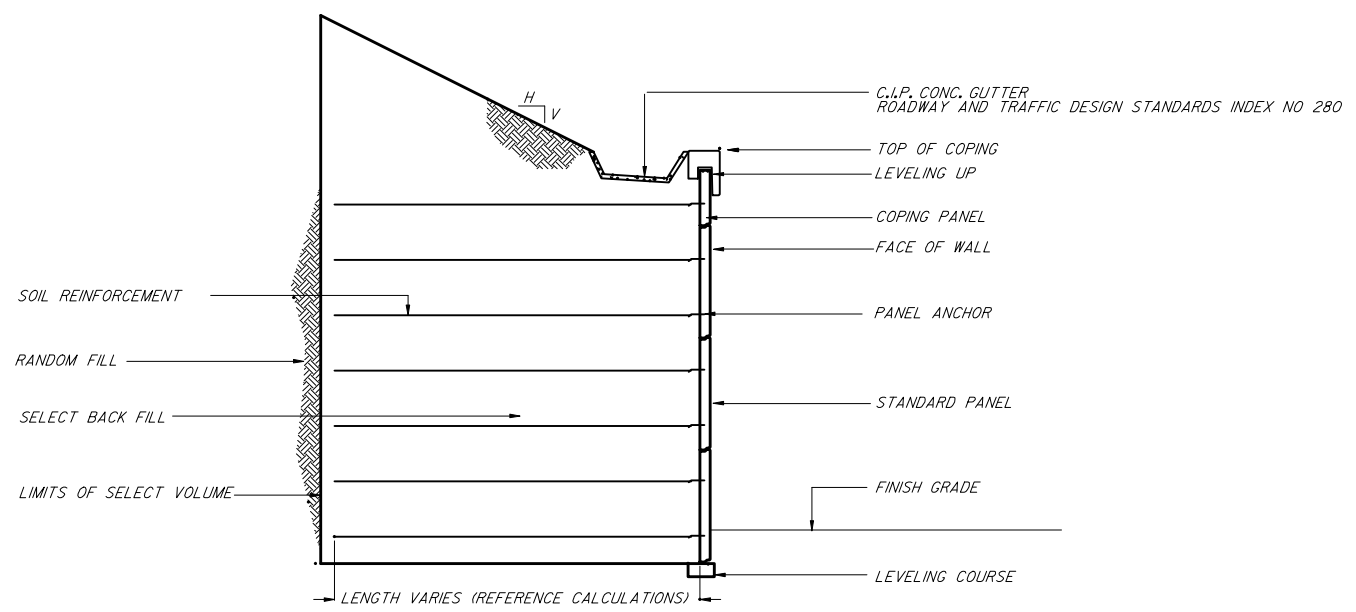
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM HILFIKER SQUARE PANEL				
Designed By	Names	Dates	Approved By	
Drawn By	TPT		Revision	Sheet No. 11 of 13
Checked By	TBW		00	Index No. 5021

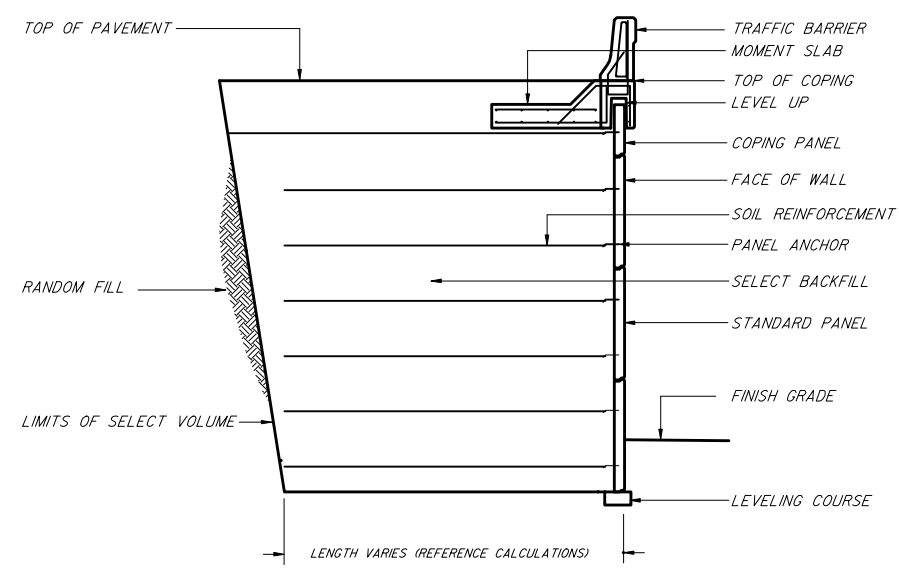




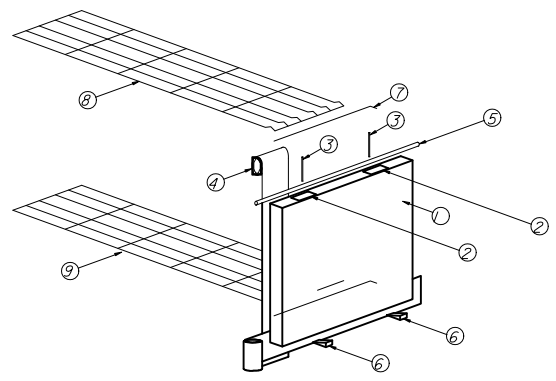
**A** TYPICAL MSE ELEVATION  
12



**B** TYPICAL MSE SECTION WITH SLOPE  
12

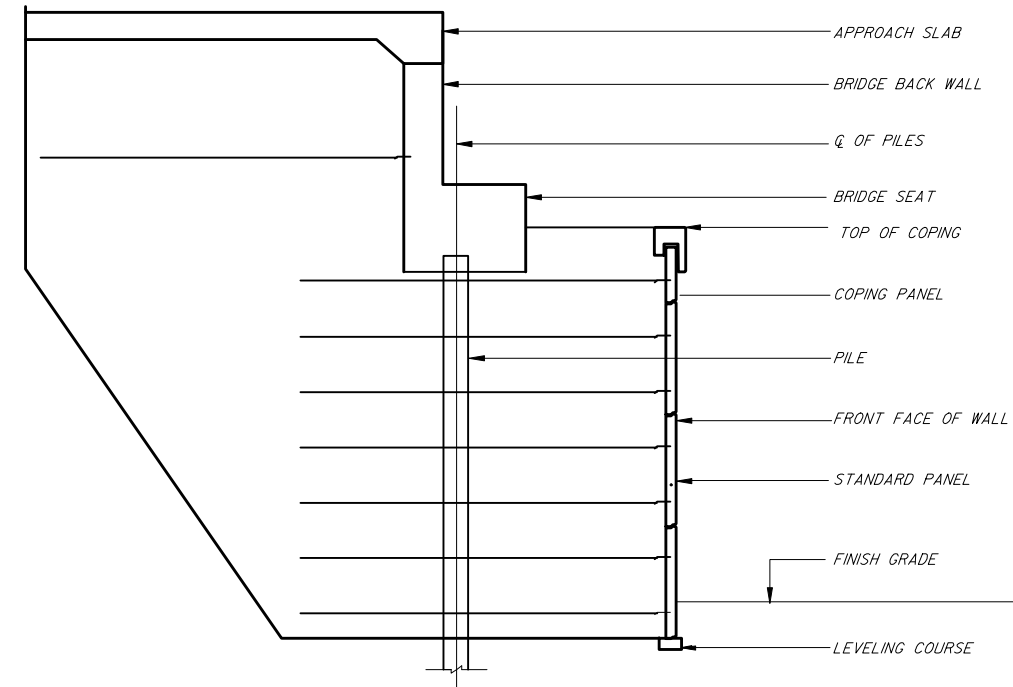


**C** TYPICAL MSE SECTION WITH BARRIER  
12



1. TYPICAL PRE-CAST PANEL WITH CAST IN PLACE ANCHORS
2. 3" X 8" X 3/4" NEOPRENE PAD 2 PER PANEL
3. 1/2" X 8" GALVANIZED STEEL ALIGNMENT PIN
4. 12" FILTER FABRIC
5. 3/4" BACKER ROD (OPTIONAL BY OTHERS)
6. HARD WOOD SHIMS (USE IF NECESSARY)
7. CONNECTION PIN - 1 PER SOIL REINFORCING MAT
8. WELDED WIRE GRID SOIL REINFORCING MAT (AS REQUIRED)
9. WELDED WIRE GRID SOIL REINFORCING MAT (AS REQUIRED)

**D** TYPICAL MATERIAL ISOMETRIC  
12



**E** TYPICAL MSE SECTION AT ABUTMENT  
12

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HILFIKER RETAINING WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM HILFIKER SQUARE PANEL</b>				
Designed By	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Drawn By	TPT		Revision	Sheet No. 13 of 13
Checked By	TBW		00	Index No. 5021

\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

**CONSTRUCTION NOTES FOR PLACEMENT OF TENSAR GEOGRIDS AND BACKFILL SOILS  
FOR TENSAR PRECAST CONCRETE REINFORCED WALLS  
TENSAR MSE RETAINING WALL SYSTEM**

1.0 MATERIALS

1.1 GEOGRID REINFORCING SHALL BE TENSAR BIAXIAL AND UNIAXIAL GEOGRIDS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.2 BODKIN BARS SHALL BE 1/2" x 1/4" HDPE BARS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.3 DRAINAGE MATERIALS

1.3.1 GEOTEXTILE TG600 FABRIC SHALL BE MANUFACTURED BY EVERGREEN TECHNOLOGIES, INC., EVERGREEN, ALABAMA, OR EQUIVALENT AS APPROVED BY THE ENGINEER.

2.0 TECHNICAL REQUIREMENTS

2.1 FILL MATERIALS SHALL BE PLACED FROM THE BACK FACE OF THE WALL TOWARDS THE TAILS OF THE GEOGRID TO ENSURE FURTHER TENSIONING.

2.2 FILL SHALL BE COMPACTED AS SPECIFIED IN SECTION 548 OF THE PROJECT SPECIFICATIONS.

2.3 AN APPROVED SET OF CONSTRUCTION DRAWINGS AND CONTRACT SPECIFICATIONS SHALL BE ON-SITE AT ALL TIMES, DURING CONSTRUCTION OF THE TENSAR RETAINING WALL.

3.0 TENSAR GEOGRID PLACEMENT

3.1 TENSAR GEOGRID SHALL BE PLACED AT THE LOCATIONS AND ELEVATIONS SHOWN ON THE SHOP DRAWINGS.

3.2 TENSAR GEOGRID LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS. REINFORCED FILL ZONE LENGTH IS MEASURED FROM THE BACK FACE OF THE CONCRETE PANEL, EXTENDING TO THE TAIL OF THE GEOGRIDS.

3.2.1 TENSAR GEOGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTH(S). THE BODKIN CONNECTION SHALL NOT BE UTILIZED UNLESS PRE-APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

3.2.2 IF PRE-APPROVED, TENSAR UNIAXIAL GEOGRIDS MAY BE SPLICED UTILIZING THE BODKIN CONNECTION DETAIL. NO MORE THAN ONE SPLICE SHALL BE ALLOWED IN ANY ONE LENGTH OF REINFORCING.

3.3 PRIOR TO PLACING FILL, THE GEOGRID MATERIALS SHALL BE CONNECTED TO THE PANELS PER PANEL CONNECTION DETAIL (SEE TYPICAL DETAILS) AND PULLED TAUT AND ANCHORED TO REMOVE ANY SLACK IN THE GEOGRIDS.

3.4 TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEOGRID. A MINIMUM FILL THICKNESS OF SIX INCHES IS REQUIRED FOR OPERATION OF TRACKED VEHICLES OVER THE GEOGRID. TURNING OF TRACKED VEHICLES SHOULD BE KEPT TO A MINIMUM TO PREVENT TRACKS FROM DISPLACING THE FILL AND/OR THE GEOGRID.

3.5 RUBBER-TIRED VEHICLES MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

3.6 TENSAR UNIAXIAL GEOGRID SHALL BE ROLLED OUT WITH THE LONG AXIS OF THE APERTURES (MACHINE DIRECTION) PERPENDICULAR TO THE WALL FACE. TENSAR BIAXIAL GEOGRIDS SHALL BE ROLLED OUT WITH THE MACHINE DIRECTION BAR PARALLEL TO THE WALL FACE.

4.0 CHANGES TO GEOGRID LAYOUT OR PLACEMENT

4.1 NO CHANGES TO THE TENSAR GEOGRID LAYOUT, INCLUDING, BUT NOT LIMITED TO, LENGTH, GEOGRID TYPE, OR ELEVATION, SHALL BE MADE WITHOUT THE EXPLICIT WRITTEN CONSENT OF TENSAR EARTH TECHNOLOGIES, INC.

5.0 DRAINAGE

5.1 AT THE END OF EACH WORK DAY, BACKFILL SURFACE SHALL BE GRADED AWAY FROM THE WALL FACE A MINIMUM OF 2 PERCENT SLOPE AND A TEMPORARY SOIL BERM SHALL BE CONSTRUCTED NEAR THE WALL CREST TO PREVENT SURFACE WATER RUNOFF FROM OVERTOPPING THE WALL.

5.2 AT THE END OF EACH WORK DAY, BACKFILL SURFACE SHALL BE COMPACTED WITH A SMOOTH WHEEL ROLLER TO MINIMIZE PONDING OF WATER AND SATURATION OF THE BACKFILL.

5.3 THE TENSAR WALL HAS BEEN DESIGNED ON THE ASSUMPTION THAT THE REINFORCED FILL MATERIAL SHALL BE FREE OF SUBSURFACE DRAINAGE OF WATER (SEEPAGE).

5.4 THE CONTRACTOR SHALL BE RESPONSIBLE FOR WATER RETENTION AS NEEDED DURING CONSTRUCTION.

6.0 DESIGN PARAMETERS

6.1 SOIL PARAMETERS

SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF FRICTION ANGLE, APPARENT COHESION AND UNIT WEIGHT SHALL BE PROVIDED IN THE SHOP DRAWINGS.

6.1.1 DESIGN:

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS. ON THE BASIS OF THIS INFORMATION, THE TENSAR CORPORATION IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

6.2 FACTORS OF SAFETY:

6.2.1 INTERNAL STABILITY:  
 MAXIMUM GEOGRID DESIGN STRENGTH = 0.19 ULT  
 MINIMUM FACTOR OF SAFETY FOR GEOGRID PULLOUT = 1.5  
 MINIMUM FACTOR OF SAFETY FOR SLIDING AT LOWEST GEOGRID = 1.5  
 SOIL-GEOGRID INTERACTION COEFFICIENT = 0.8  
 PERCENT COVERAGE OF GEOGRID:  
 (ONE ROLL WIDTHS) = 89%  
 (ONE-HALF ROLL WIDTH) = 44%

6.2.2 EXTERNAL STABILITY:

MINIMUM FACTOR OF SAFETY FOR SLIDING AT BASE = 1.5  
 MINIMUM FACTOR OF SAFETY FOR OVERTURNING = 2.0  
 MINIMUM FACTOR OF SAFETY FOR BEARING = 2.5

(EXTERNAL STABILITY, INCLUDING SLIDING, OVERTURNING, AND BEARING CAPACITY, IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR EXTERNAL STABILITY. (SEE NOTES 7.6 & 7.7))

6.2.3 GLOBAL STABILITY:

MINIMUM FACTOR OF SAFETY FOR GLOBAL STABILITY = 1.5

GLOBAL STABILITY IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR GLOBAL STABILITY. (SEE NOTES 7.6 & 7.7)

6.3 SURCHARGE LOADING = 250 psf

6.4 HYDROSTATIC DESIGN = NONE

6.5 SEISMIC DESIGN = NONE

6.6 GEOGRID LONG TERM ALLOWABLE DESIGN STRENGTH (LTADS): GEOGRID LTADS SHALL BE 19 PERCENT OF ULTIMATE GEOGRID STRENGTH AS DETERMINED IN ACCORDANCE WITH GEOSYNTHETIC RESEARCH INSTITUTE, (GRI), TEST METHOD GGI-87, SINGLE RIB TEST.

7.0 SPECIAL PROVISIONS

7.1 WALL ELEVATION VIEWS AND LOCATIONS AND GEOMETRY OF EXISTING STRUCTURES MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

7.2 TENSAR EARTH TECHNOLOGIES, INC. ASSUMES NO LIABILITY FOR INTERPRETATION OR VERIFICATION OF SUBSURFACE CONDITIONS, SUITABILITY OF SOIL DESIGN PARAMETERS AND INTERPRETATION OF SUBSURFACE GROUNDWATER CONDITIONS.

7.3 THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING AND VERIFYING THAT THE ACTUAL SITE CONDITIONS ARE AS DESCRIBED IN SECTION 6.0 PRIOR TO AND DURING CONSTRUCTION. THE ENGINEER SHALL BE ON-SITE TO ASSURE THE PROVISIONS IN THE CONSTRUCTION NOTES ARE FOLLOWED.

7.4 THE SOIL DESIGN PARAMETERS STATED IN SECTION 6.0 SHALL BE VERIFIED BY THE CONSTRUCTOR. WRITTEN VERIFICATION OF DESIGN PARAMETERS SHALL BE SUBMITTED TO TENSAR EARTH TECHNOLOGIES, INC. PRIOR TO COMMENCING WITH CONSTRUCTION.

7.5 ANY REVISIONS TO DESIGN PARAMETERS STATED IN SECTION 6.0 OR STRUCTURE GEOMETRY SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION

7.6 PER THE MSE RETAINING WALL GENERAL NOTES, TENSAR EARTH TECHNOLOGIES, INC HAS CONSIDER INTERNAL STABILITY OF THE RETAINING WALLS ONLY. EXTERNAL AND GLOBAL STABILITY OF THE WALL IS THE RESPONSIBILITY OF OTHERS.

7.7 DIFFERENTIAL SETTLEMENT AND ITS EFFECTS ON THE TENSAR RETAINING WALL SYSTEM SHALL BE THE RESPONSIBILITY OF OTHERS.

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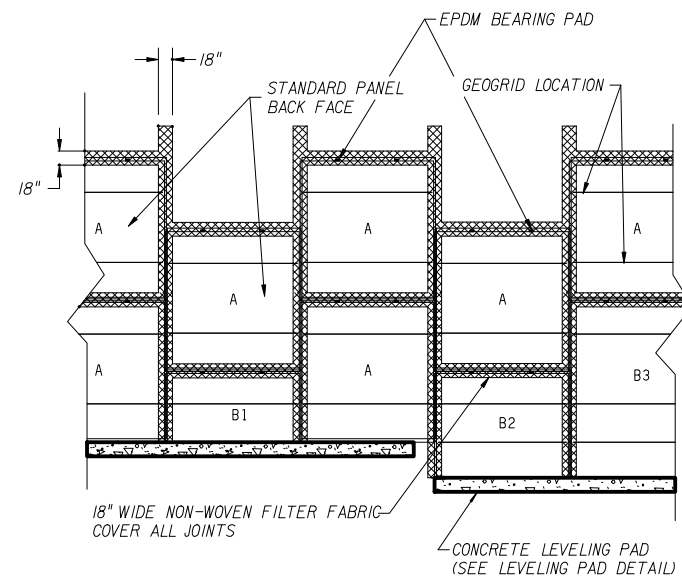
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EARTH TECHNOLOGIES, INC.**  
5775-B Glenridge Drive  
Lakeside Center Suite 450  
Atlanta, GA 30328  
(404) 250-1290



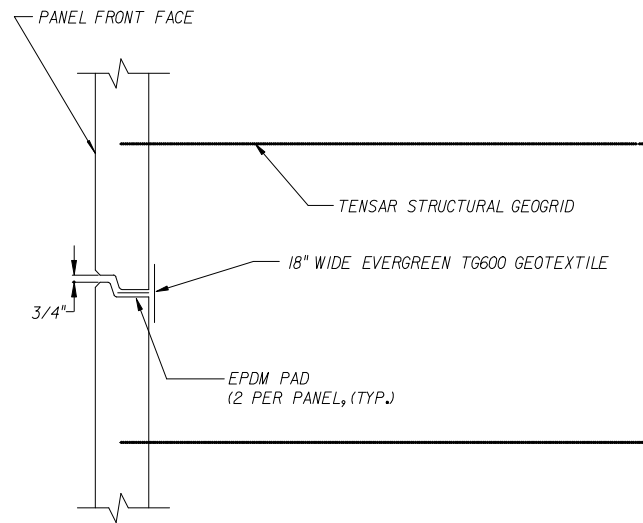
THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS AS NOTED IN THESE PLANS

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Names	Dates	Approved By 		
Designed By		State Structures Design Engineer		
Drawn By	JMS 8/14/98	Revision	Sheet No.	Index No.
Checked By		00	1 of 17	5025

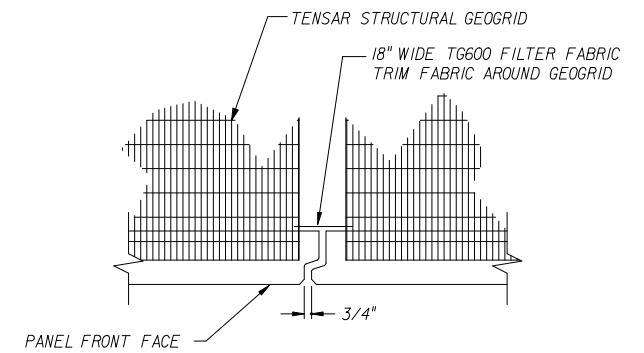
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\*\*\*\*\*SYTIME\*\*\*\*\*



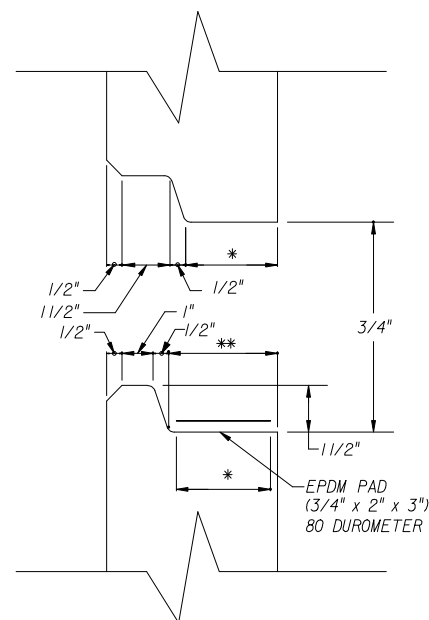
TYPICAL FILTER FABRIC COVERAGE DETAIL  
NOT TO SCALE



HORIZONTAL JOINT DETAIL  
NOT TO SCALE



VERTICAL JOINT DETAIL



PANEL JOINT DETAIL  
NOT TO SCALE

- \* - 3" FOR MODERATELY & SLIGHTLY AGGRESSIVE ENVIRONMENT  
- 4 1/2" FOR EXTREMELY AGGRESSIVE ENVIRONMENT
- \*\* - 3 1/2" FOR MODERATELY & SLIGHTLY AGGRESSIVE ENVIRONMENT  
- 4 3/4" FOR EXTREMELY AGGRESSIVE ENVIRONMENT

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

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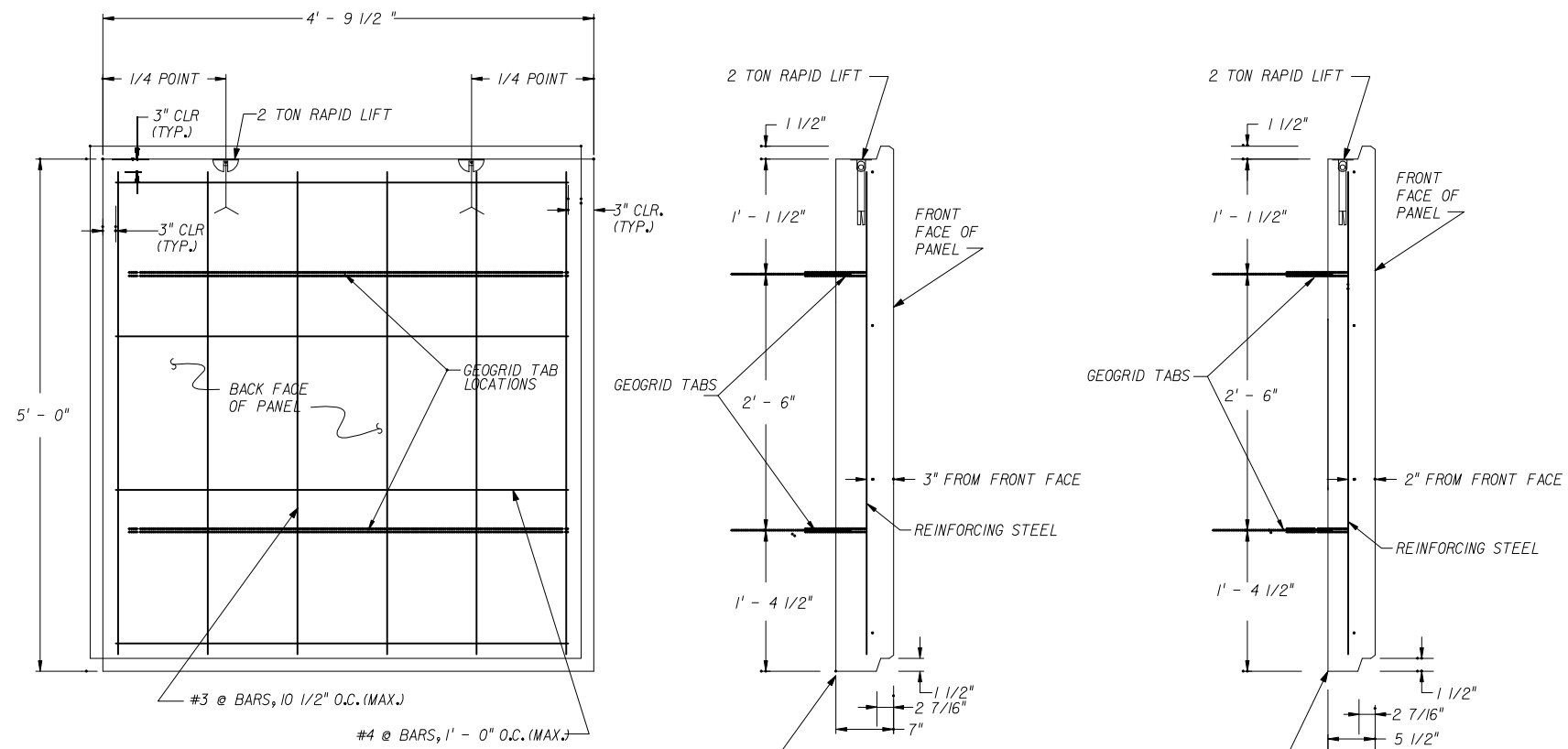
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<b>RETAINING WALL SYSTEM</b> <b>TENSAR EARTH TECHNOLOGIES</b> <b>MSE RETAINING WALL</b>				
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Checked By			Sheet No.	2 of 17
			Index No.	5025

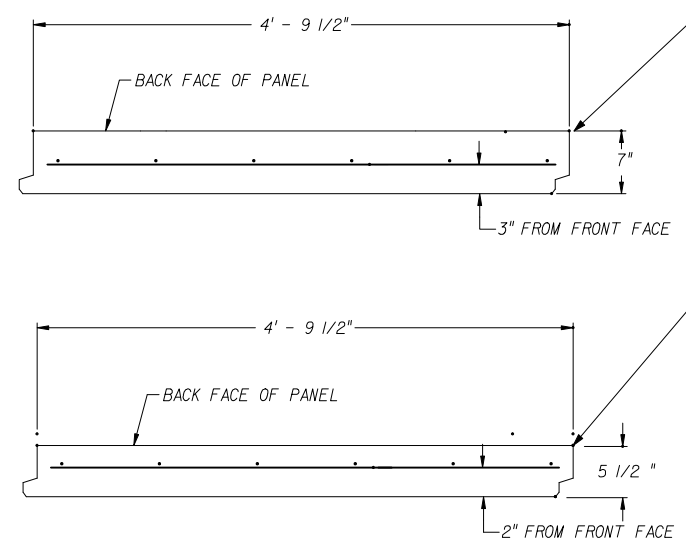
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



PANEL DETAIL FOR  
EXTREMELY AGGRESSIVE  
ENVIRONMENT

PANEL DETAIL FOR  
MODERATELY AND SLIGHTLY  
AGGRESSIVE ENVIRONMENT

REINFORCING STEEL REQUIREMENTS  
HORIZONTAL: 4 - #4 BARS @ 1' - 6" O.C.(MAX.)  
VERTICAL: 6 - #3 BARS @ 10 1/2" O.C.(MAX.)  
-OR-  
4X4 - W4.0xW4.0 WELDED WIRE MESH



TYPICAL PANEL DETAILS - STANDARD A PANEL

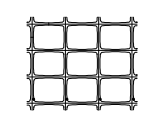
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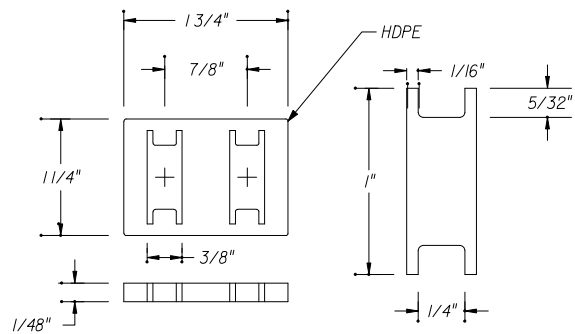
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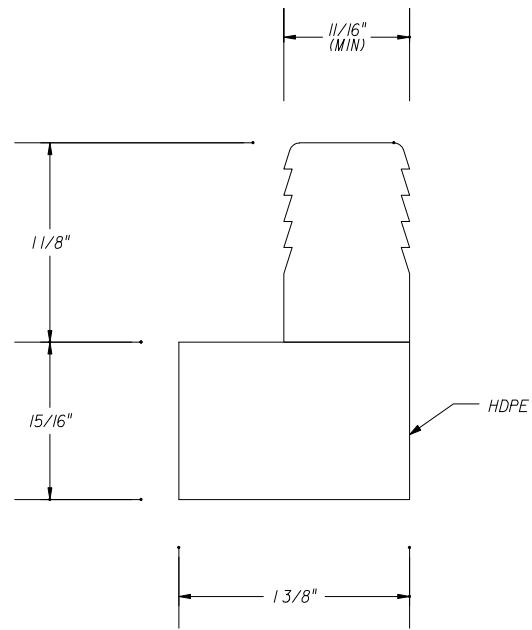


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES MSE RETAINING WALL</b>				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By	JMS	8/14/98	Revision	Sheet No. Index No.
Checked By			00	3 of 17 5025

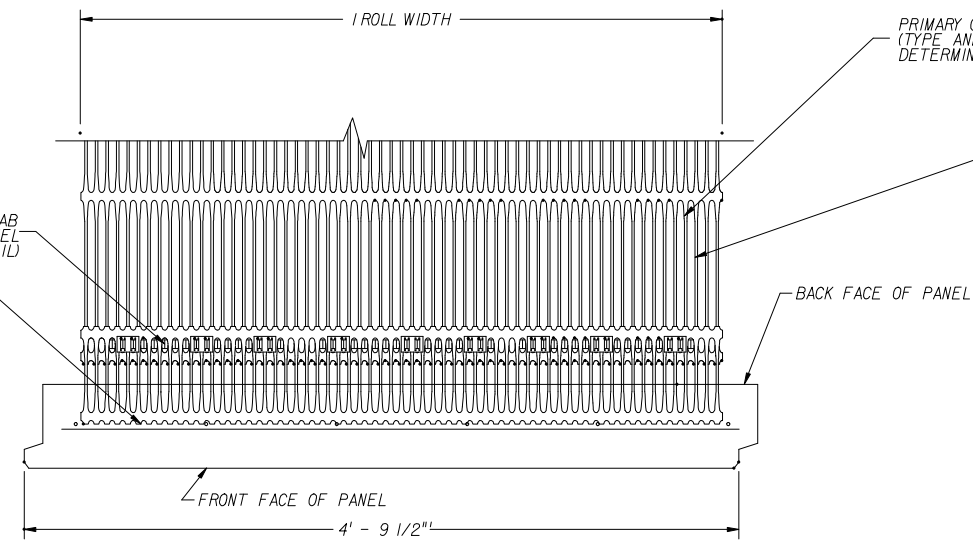
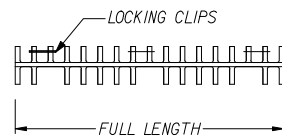
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



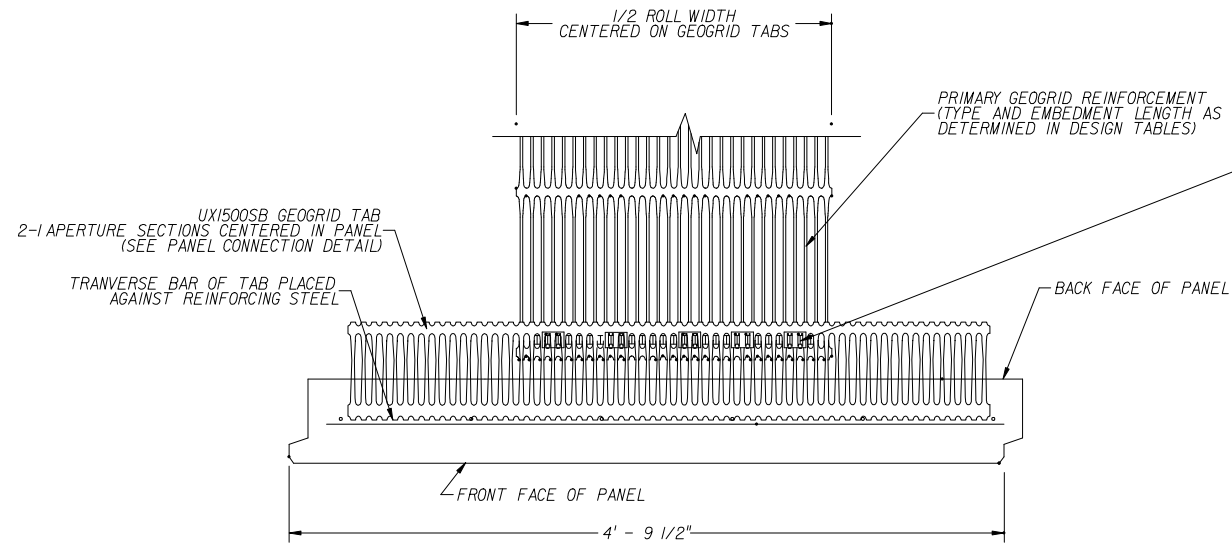
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NOT TO SCALE



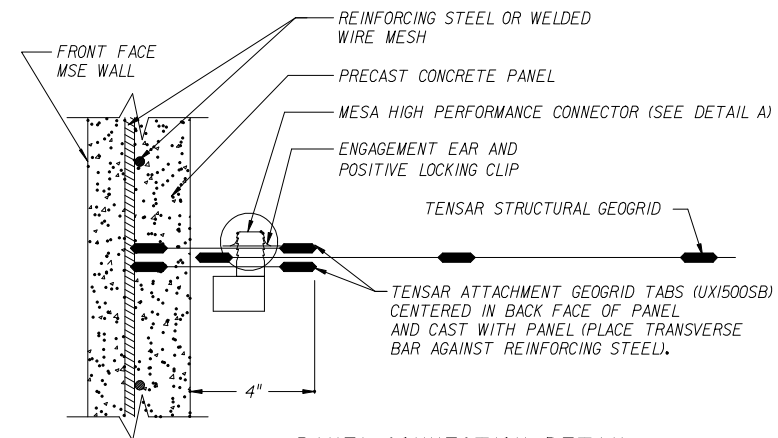
MESA HIGH PERFORMANCE CONNECTOR  
NOT TO SCALE



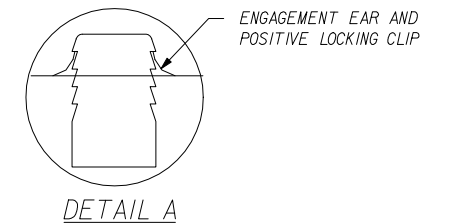
CONNECTION DETAIL PLAN VIEW (89% COVERAGE)  
MAXIMUM COVERAGE  
NOT TO SCALE



CONNECTION DETAIL PLAN VIEW (44% COVERAGE)  
NOT TO SCALE



PANEL CONNECTION DETAIL  
NOT TO SCALE



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Lakeside Center Suite 450  
Atlanta, GA 30328  
(404) 250-1290



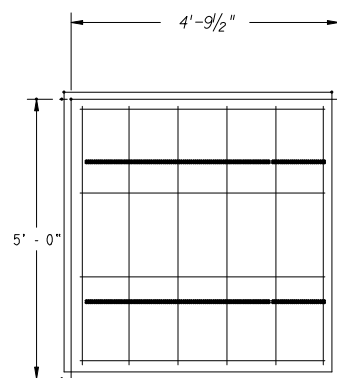
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
MSE RETAINING WALL

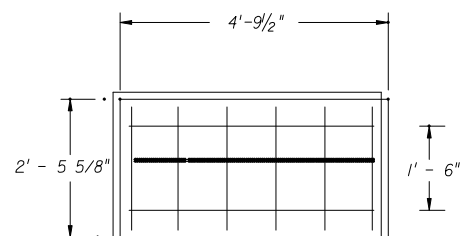
Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By	JMS 8/14/98			
Checked By		Revision	Sheet No.	Index No.
		00	4 of 17	5025

\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

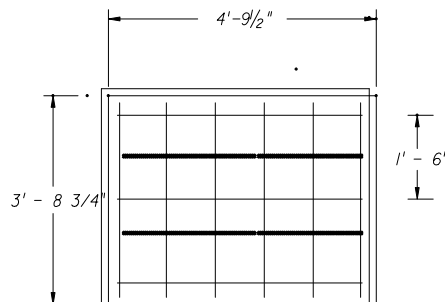




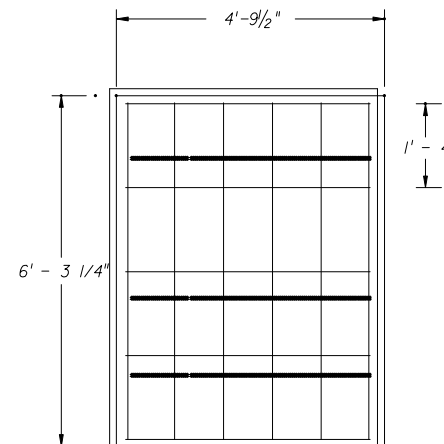
STANDARD A PANEL



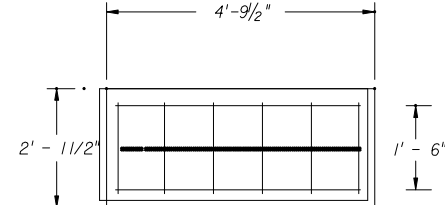
STANDARD B1 PANEL



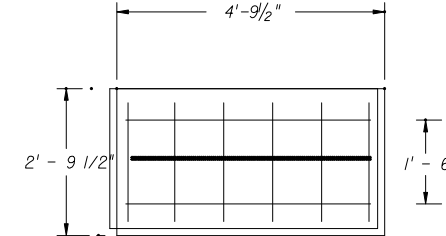
STANDARD B2 PANEL



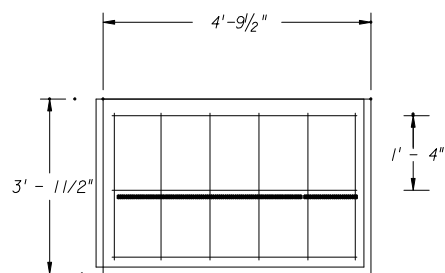
STANDARD B3 PANEL



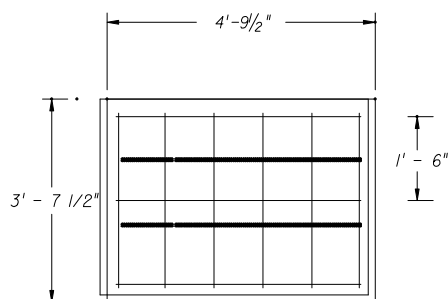
STANDARD T24 PANEL



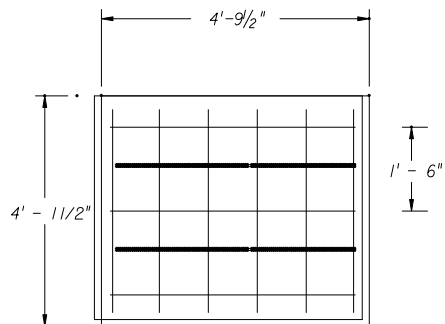
STANDARD T30 PANEL



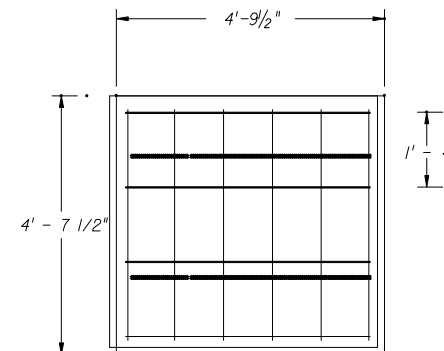
STANDARD T36 PANEL



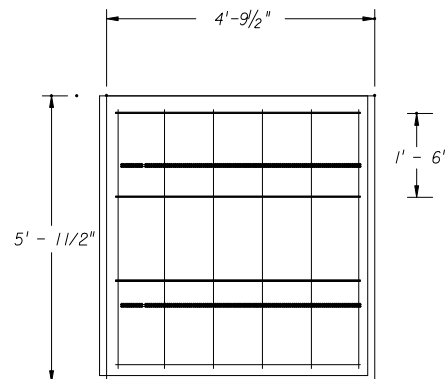
STANDARD T42 PANEL



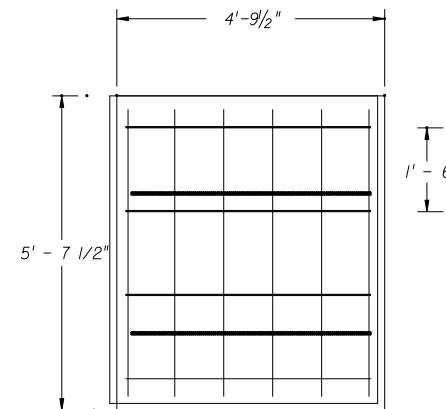
STANDARD T48 PANEL



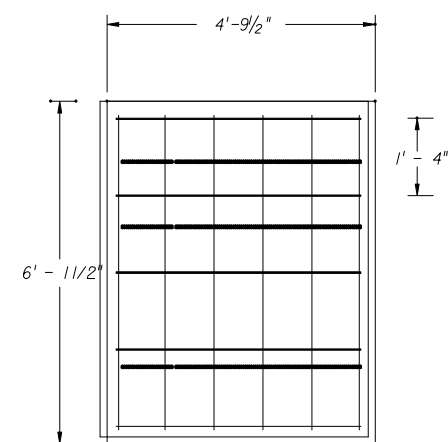
STANDARD T54 PANEL



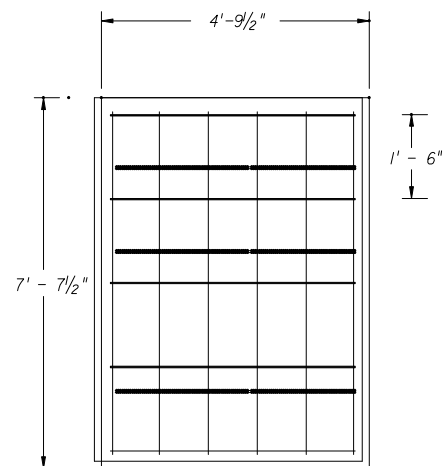
STANDARD T60 PANEL



STANDARD T66 PANEL



STANDARD T72 PANEL

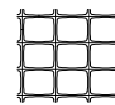


STANDARD T78 PANEL

ALL PANELS ARE SHOWN BACK FACE VIEW

STANDARD STEEL LAYOUT  
 REINFORCING STEEL REQUIREMENTS  
 HORIZONTAL: #4 BARS (60 KSI) @ 1' - 6" O.C. (MAX.)  
 VERTICAL: #3 BARS (60 KSI) @ 10 1/2" O.C. (MAX.)  
 OR  
 STANDARD WWF LAYOUT  
 REINFORCING STEEL REQUIREMENTS  
 4X4-W4.0XW4.0 WELDED WIRE MESH  
 FABRICATION PER ASTM A-185

— GEOGRID TAB LOCATIONS



THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

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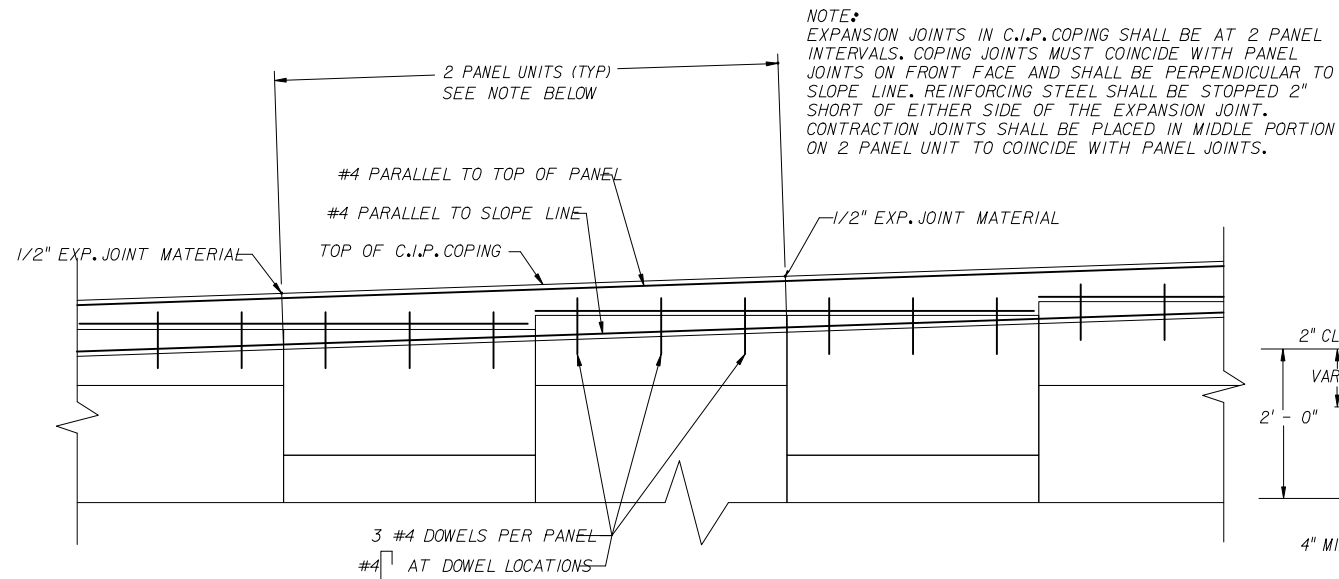
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
 TENSAR EARTH TECHNOLOGIES  
 MSE RETAINING WALL

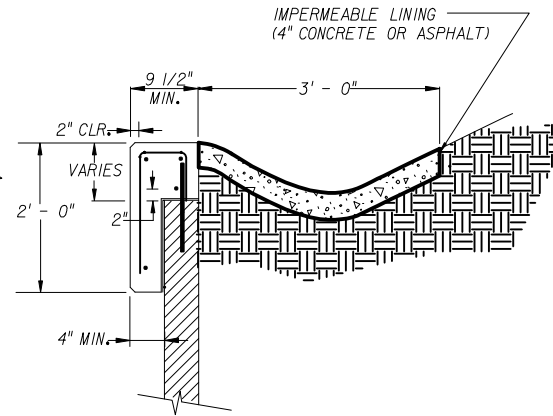
Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By	JWS 8/14/98			
Checked By		Revision	Sheet No.	Index No.
		00	5 of 17	5025

\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
 \*\*\*\*\*SYTIME\*\*\*\*\*

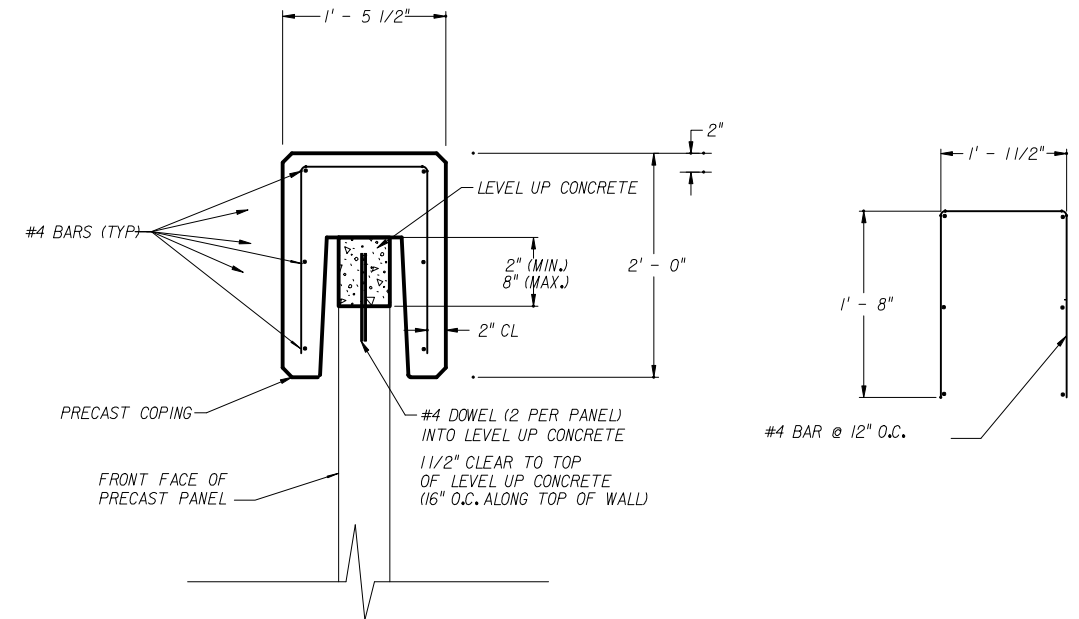


C.I.P. COPING PARTIAL ELEVATION VIEW  
NOT TO SCALE

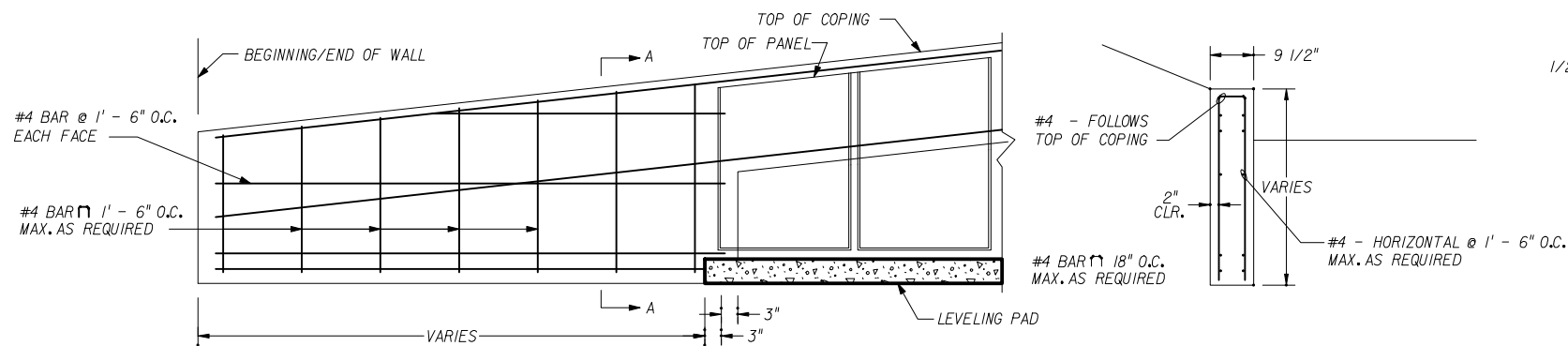
NOTE:  
EXPANSION JOINTS IN C.I.P. COPING SHALL BE AT 2 PANEL INTERVALS. COPING JOINTS MUST COINCIDE WITH PANEL JOINTS ON FRONT FACE AND SHALL BE PERPENDICULAR TO SLOPE LINE. REINFORCING STEEL SHALL BE STOPPED 2" SHORT OF EITHER SIDE OF THE EXPANSION JOINT. CONTRACTION JOINTS SHALL BE PLACED IN MIDDLE PORTION ON 2 PANEL UNIT TO COINCIDE WITH PANEL JOINTS.



C.I.P. COPING WITH SWALE  
NOT TO SCALE

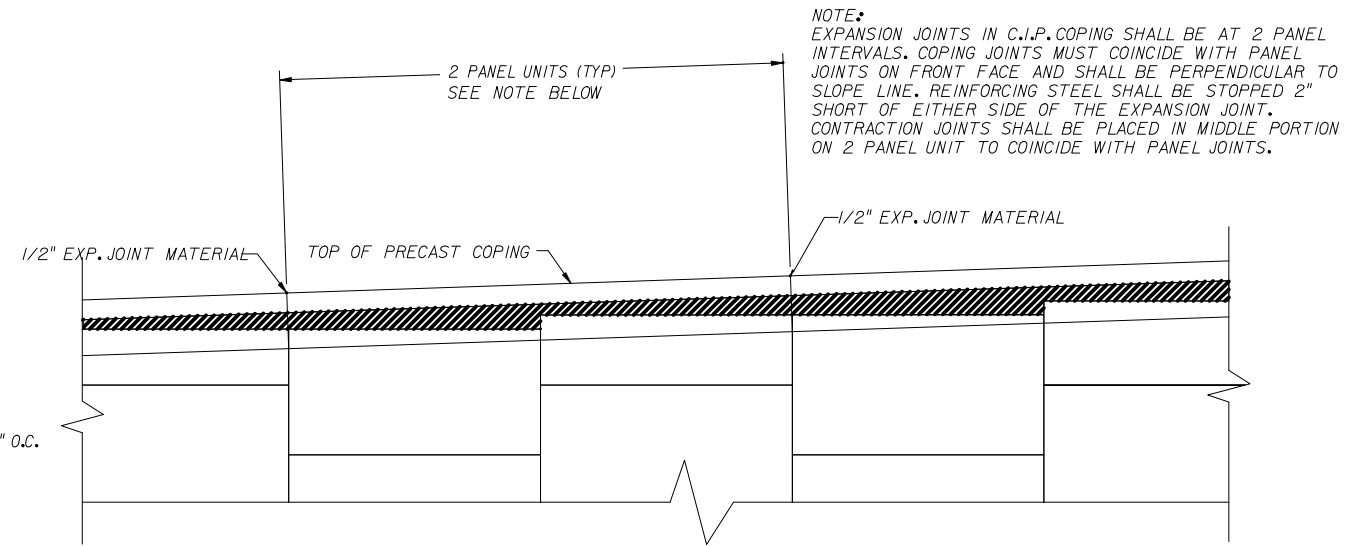


PRECAST COPING SECTION  
NOT TO SCALE



COPING ENCLOSURE DETAIL  
NOT TO SCALE

SECTION A-A



PRECAST COPING PARTIAL ELEVATION VIEW  
NOT TO SCALE

NOTE:  
EXPANSION JOINTS IN C.I.P. COPING SHALL BE AT 2 PANEL INTERVALS. COPING JOINTS MUST COINCIDE WITH PANEL JOINTS ON FRONT FACE AND SHALL BE PERPENDICULAR TO SLOPE LINE. REINFORCING STEEL SHALL BE STOPPED 2" SHORT OF EITHER SIDE OF THE EXPANSION JOINT. CONTRACTION JOINTS SHALL BE PLACED IN MIDDLE PORTION ON 2 PANEL UNIT TO COINCIDE WITH PANEL JOINTS.

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS

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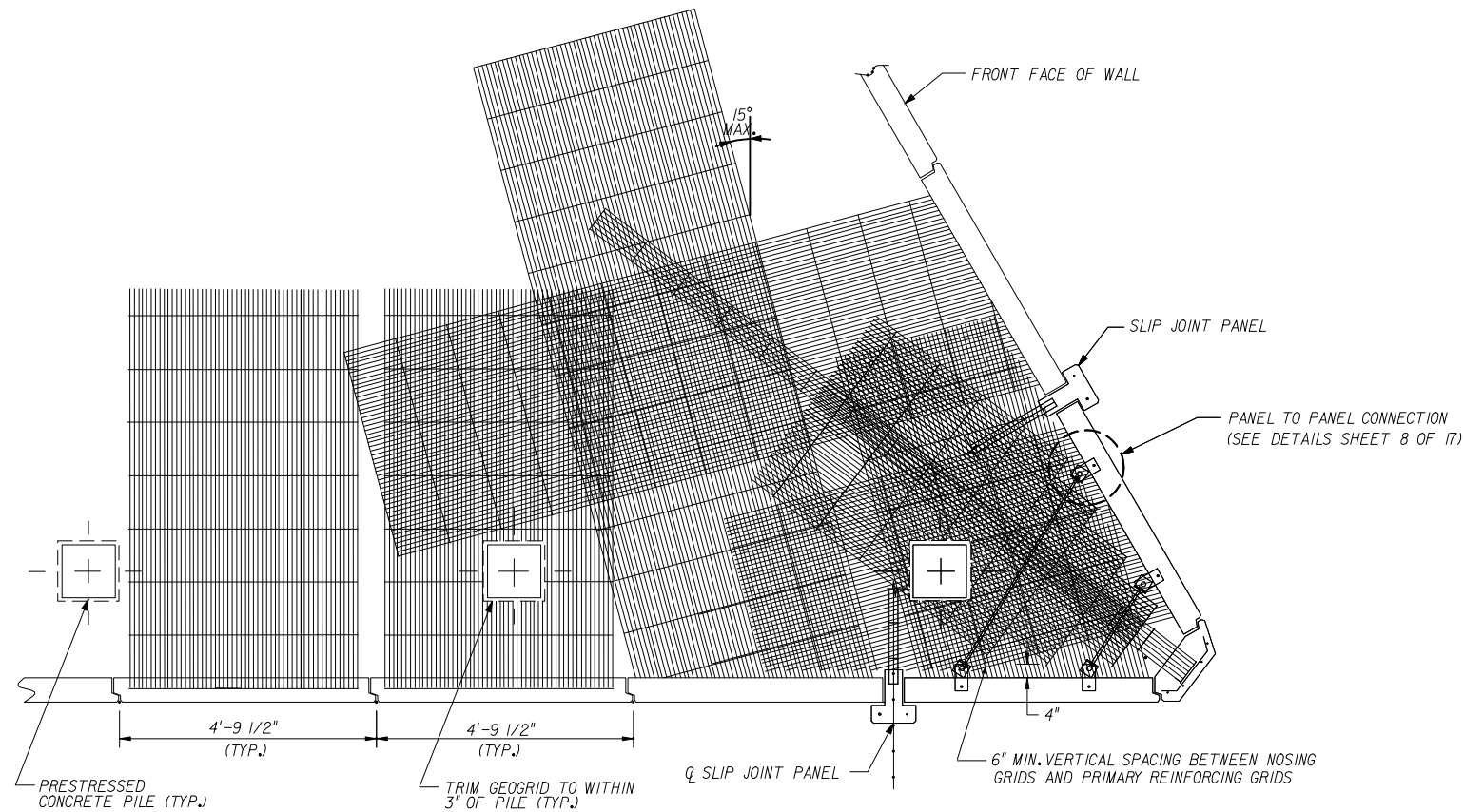
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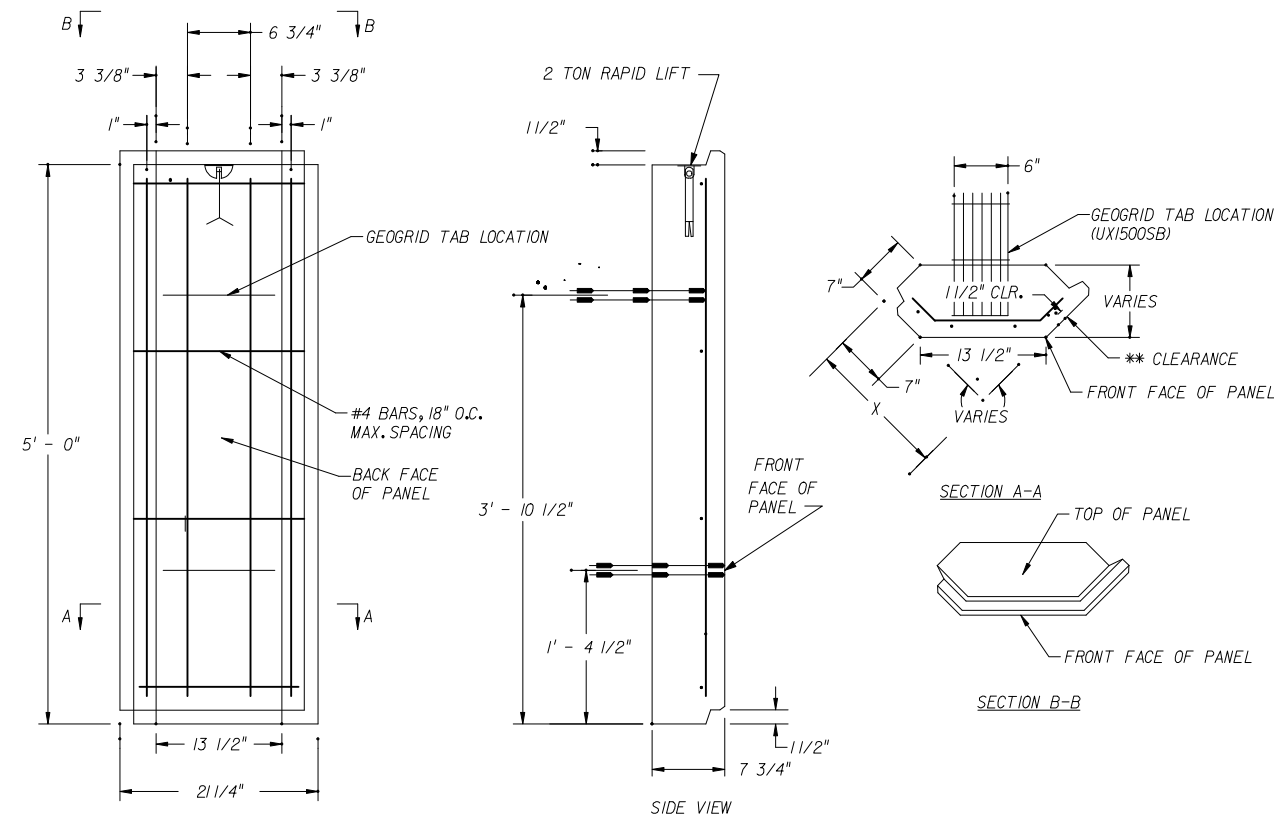


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM</b> <b>TENSAR EARTH TECHNOLOGIES</b> <b>MSE RETAINING WALL</b>				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By	JMS 8/14/98	Revision	Sheet No.	Index No.
Checked By		00	6 of 17	5025

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

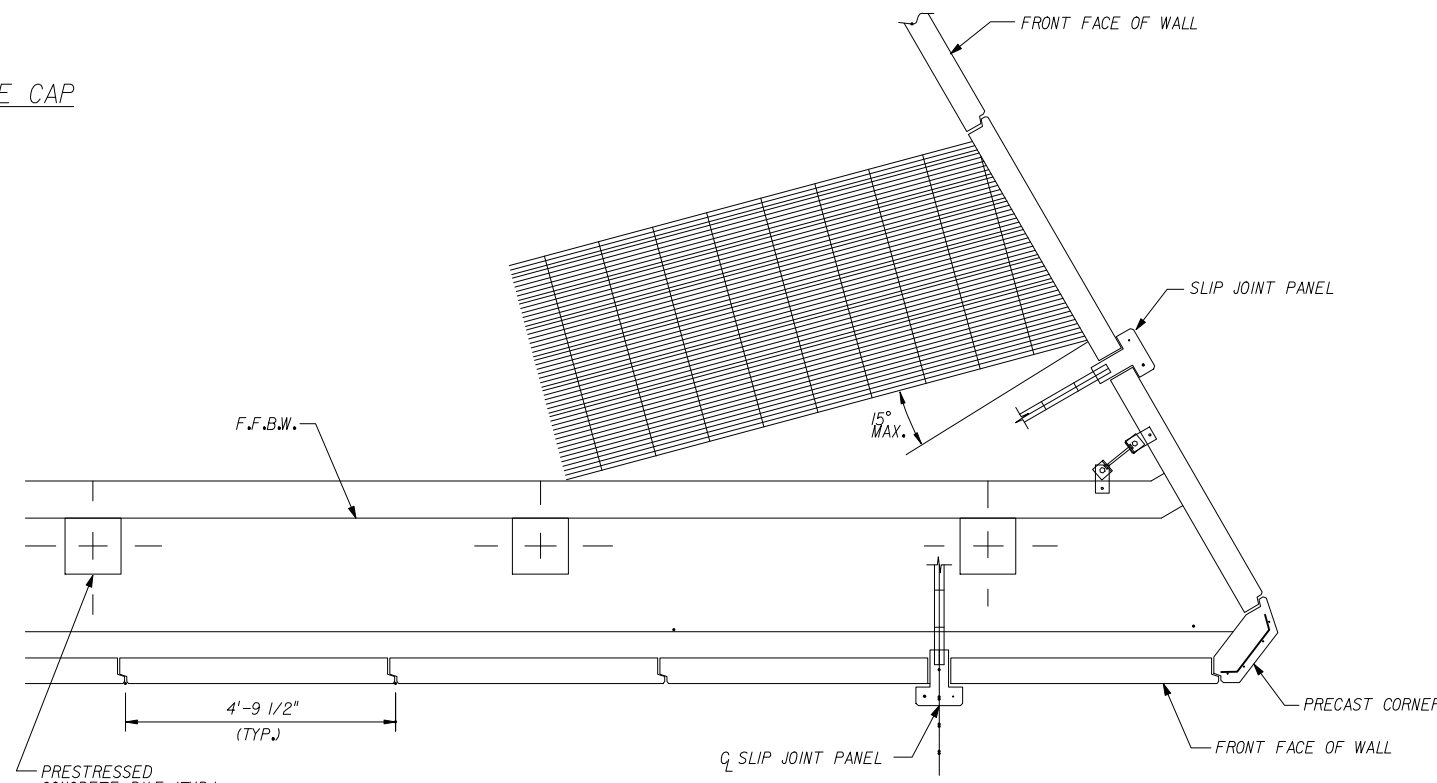


LESS THAN 75° ACUTE CORNER - SKEWED GEOGRID UNDER PILE CAP  
(SEE DETAIL BELOW FOR BIN REINFORCEMENT)



ACUTE CORNER ELEMENT DETAIL

\* SEE SHEET 3 OF 17 FOR PANEL THICKNESS  
\*\* VARIES  
3" FOR MARINE ENVIRONMENTS  
2" FOR MODERATELY OR SLIGHTLY AGGRESSIVE ENVIRONMENTS



EXAMPLE ACUTE CORNER - SKEWED GEOGRID AT ABUTMENT LEVEL

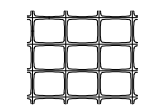
NOT TO SCALE

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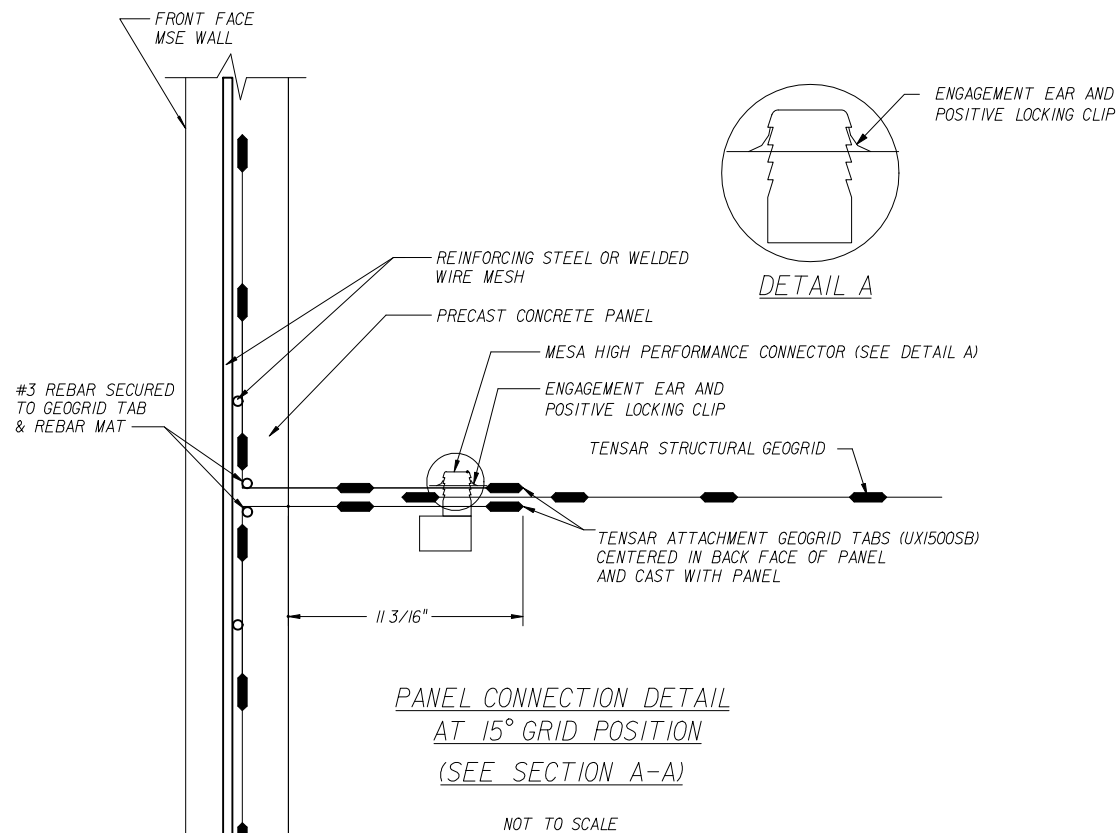
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THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

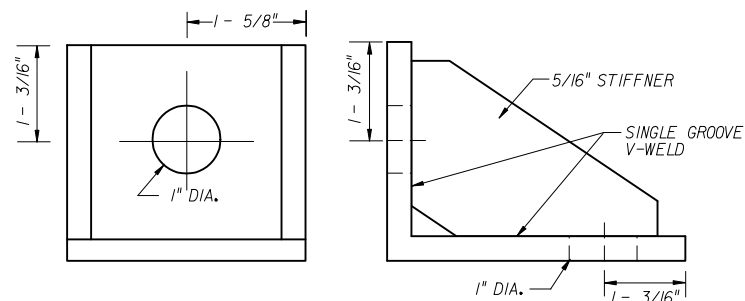
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RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES MSE RETAINING WALL				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By	JWS 8/14/98	Revision	Sheet No.	Index No.
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\*\*\*\*\*SYTIME\*\*\*\*\*



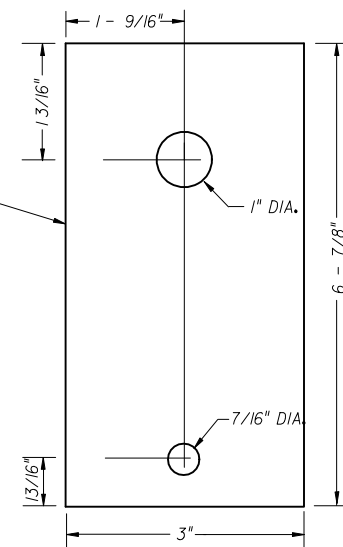
PANEL CONNECTION DETAIL AT 15° GRID POSITION (SEE SECTION A-A)

NOT TO SCALE

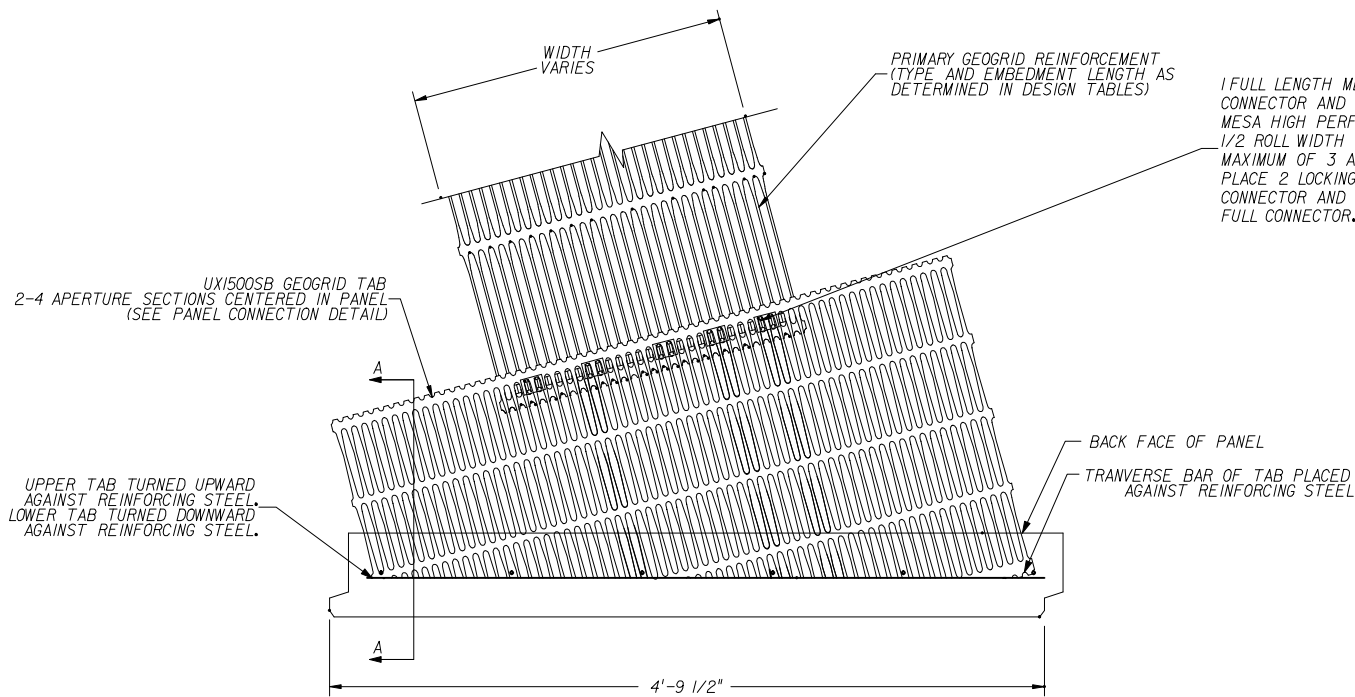


ANGLE: 3" X 4" X 5/16", HOT DIP GALVANIZED  
3" X 4" X 1/4", 316 L GRADE STAINLESS STEEL

CONNECTION BOX

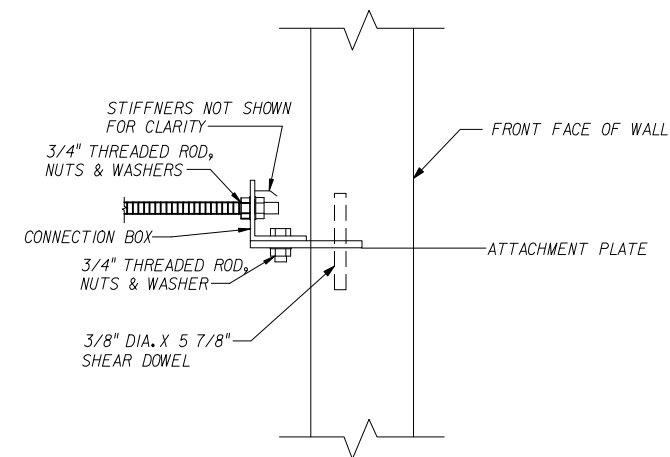


ATTACHMENT PLATE



CONNECTION DETAIL PLAN VIEW AT 15° GRID POSITION

NOT TO SCALE



PANEL TO PANEL ATTACHMENT

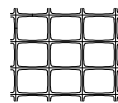
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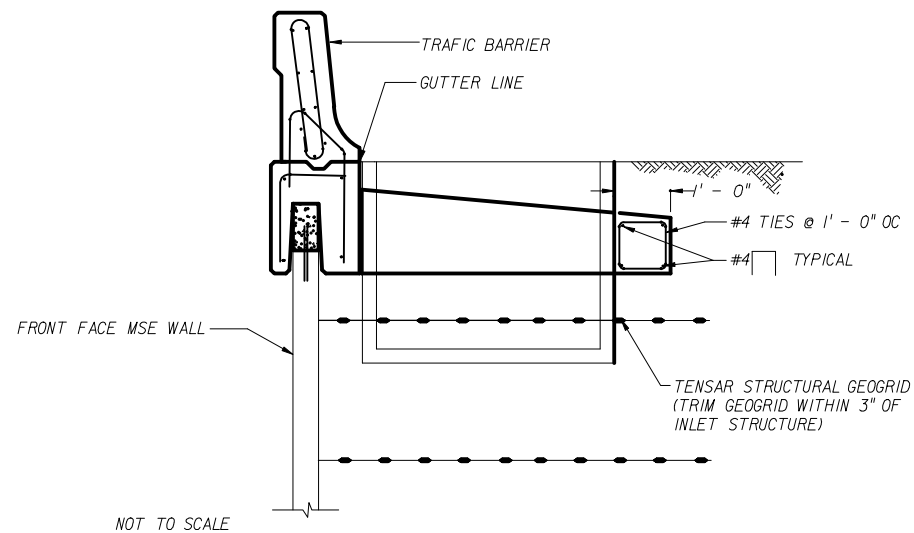


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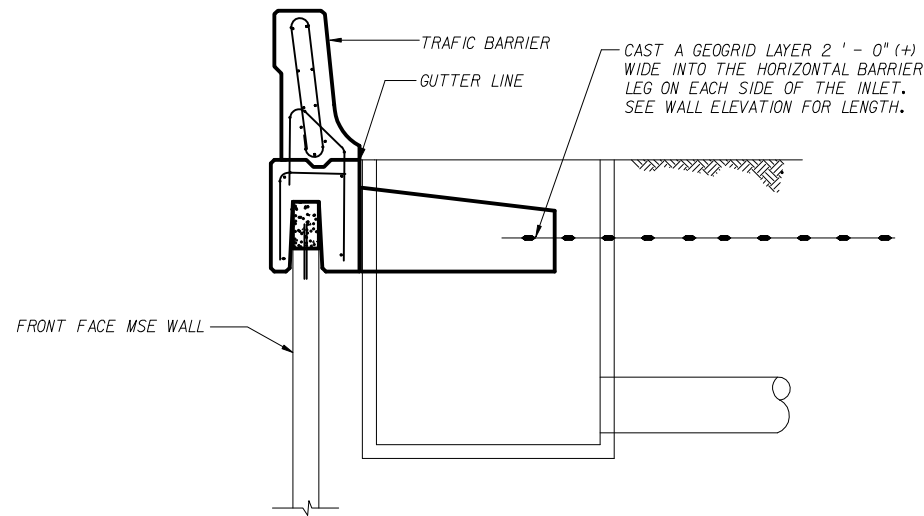
1. ALL PARTS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION FOR MODERATELY OR SLIGHTLY AGGRESSIVE ENVIRONMENTS.
2. ALL PARTS SHALL BE FABRICATED FROM 316 L GRADE STAINLESS STEEL FOR USE IN A SALT WATER

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES MSE RETAINING WALL				
Designed By	Names	Dates	Approved By <i>W. J. [Signature]</i>	
Drawn By	JWS	8/14/98	Revision	Sheet No. 8 of 17
Checked By			00	Index No. 5025

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

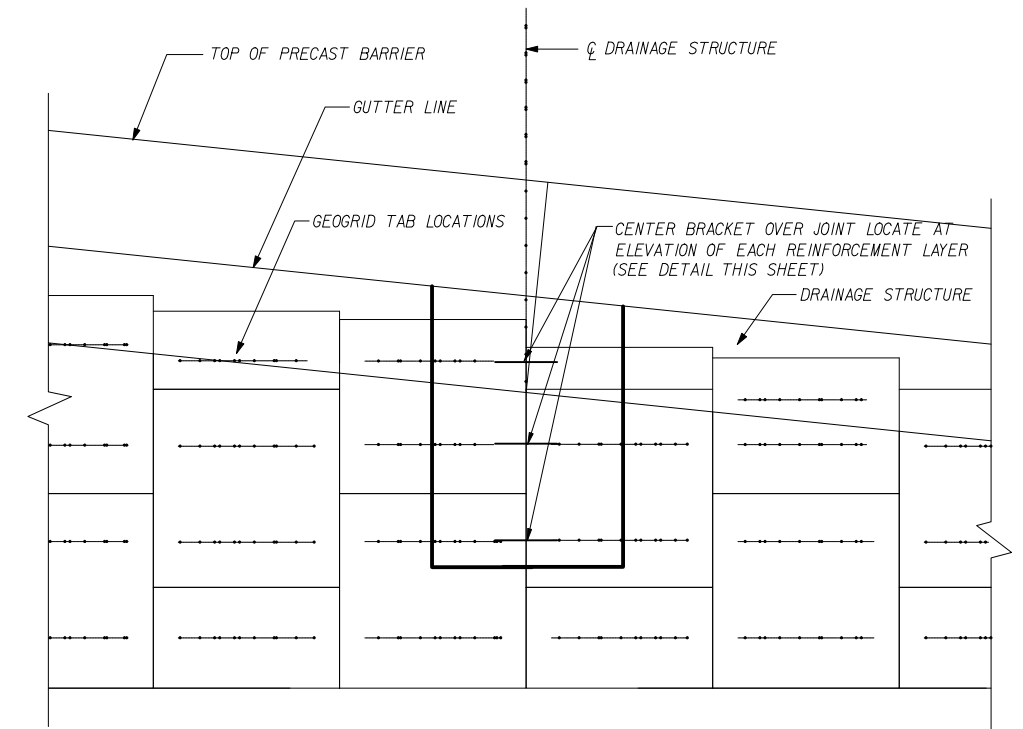


CONNECTION DETAILS



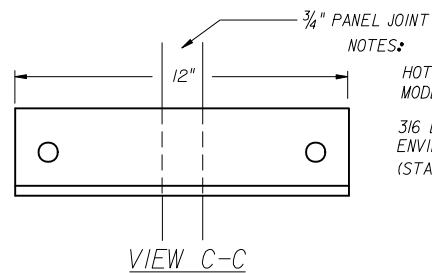
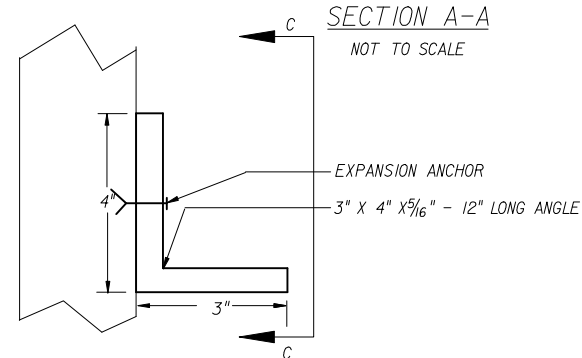
DETAIL OF TENSAR PANELS @ INLETS

SECTION B-B  
NOT TO SCALE



PARTIAL ELEVATION - WALL @ DRAINAGE INLET

NOT TO SCALE

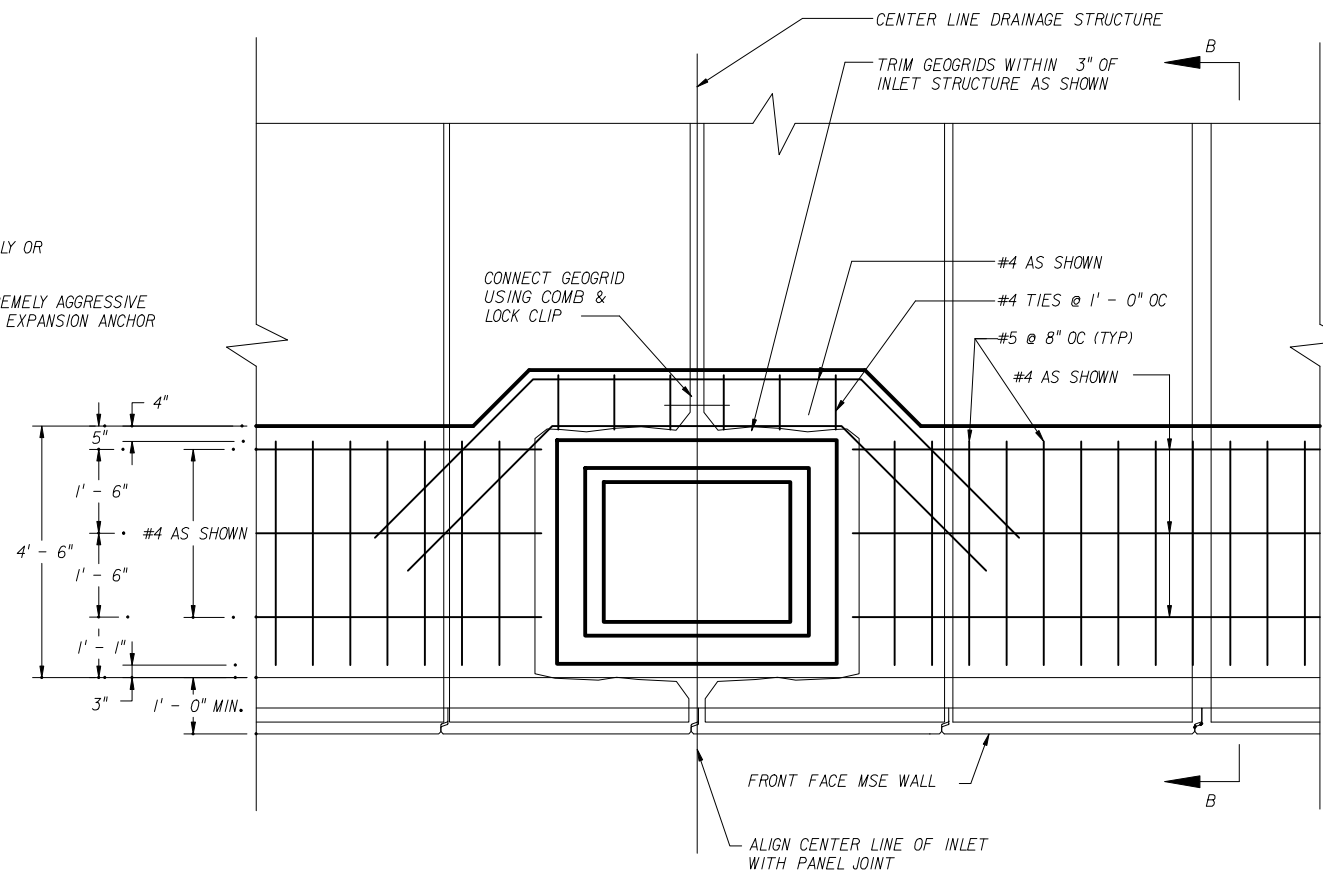


CENTER BRACKET OVER JOINT DETAIL

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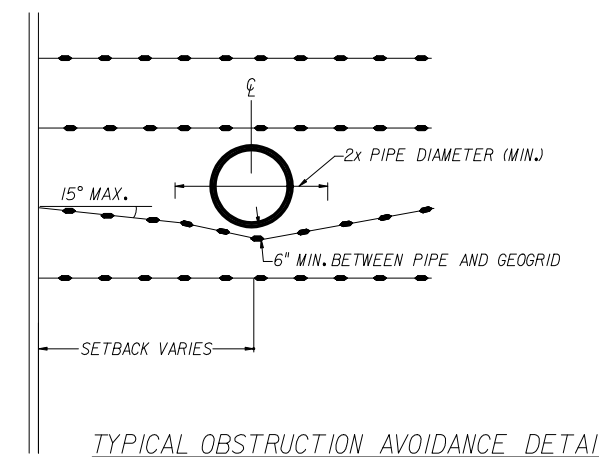
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PARTIAL PLAN - WALL @ DRAINAGE INLET

NOT TO SCALE



TYPICAL OBSTRUCTION AVOIDANCE DETAIL  
NOT TO SCALE

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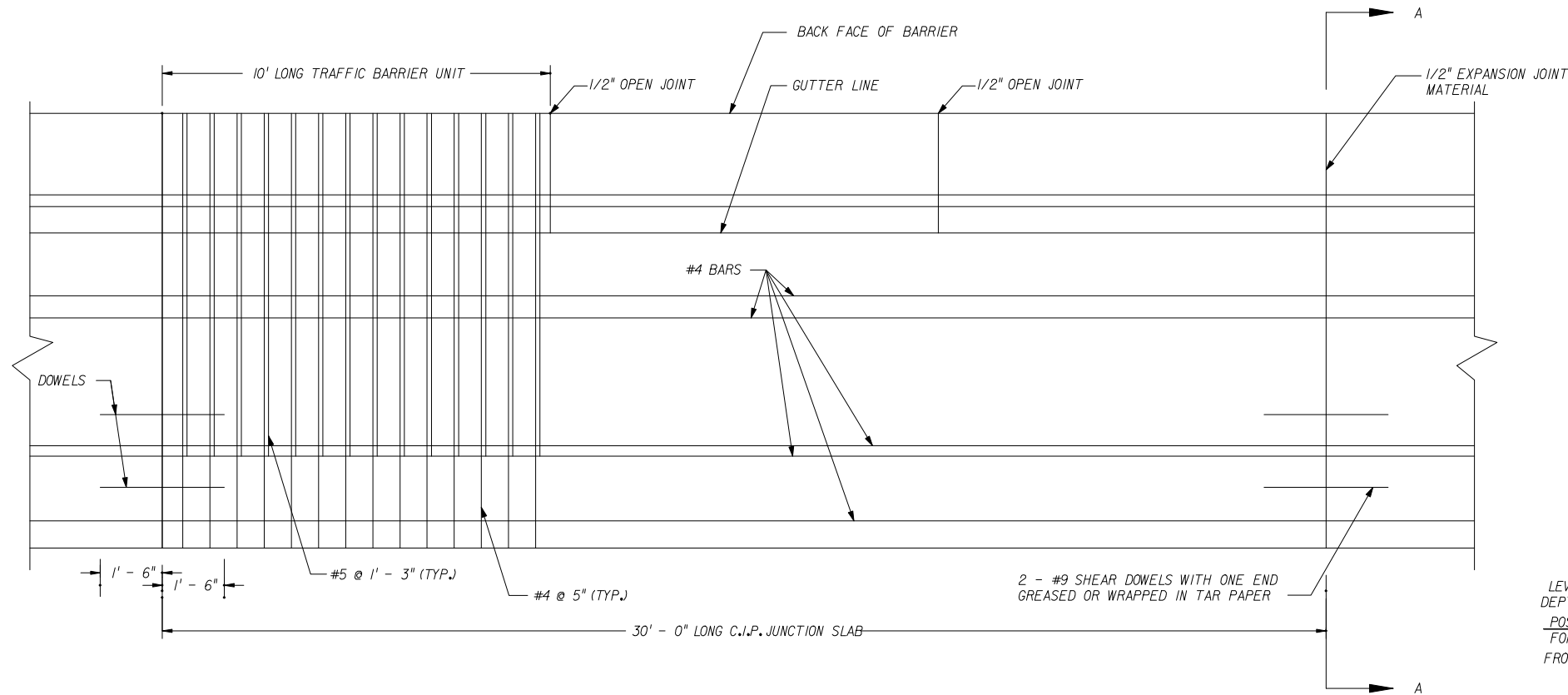


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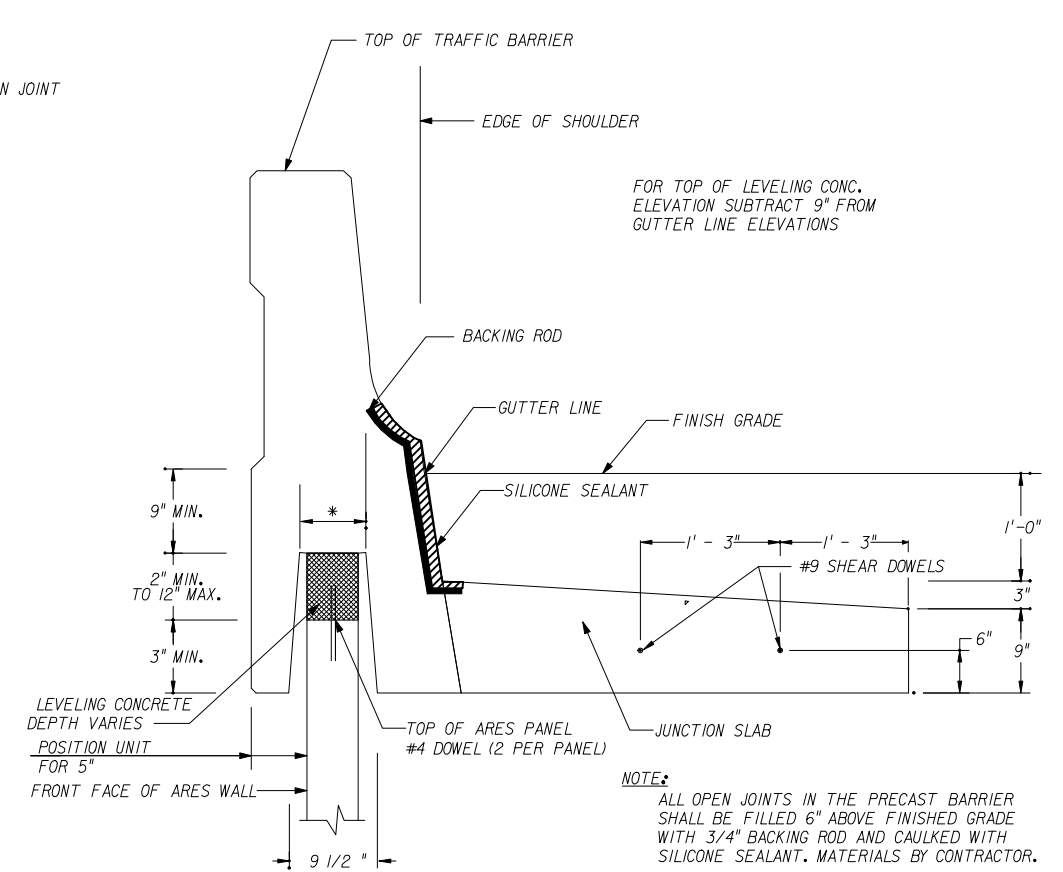
RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
MSE RETAINING WALL

Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By	JMS 8/14/98			
Checked By				
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\*\*\*\*\*SYTIME\*\*\*\*\*



PLAN VIEW  
 PRECAST TRAFFIC BARRIER  
 NOT TO SCALE

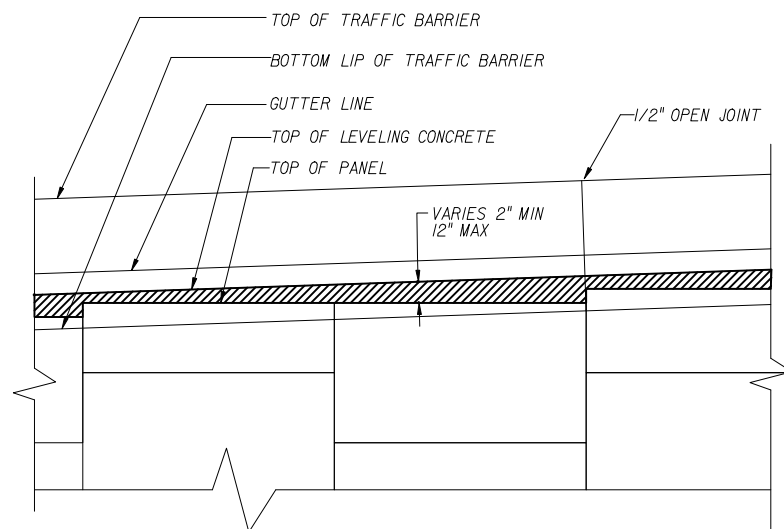


SECTION A-A AT APPROACH SLAB  
 NOT TO SCALE

FOR TOP OF LEVELING CONC.  
 ELEVATION SUBTRACT 9" FROM  
 GUTTER LINE ELEVATIONS

NOTE:  
 ALL OPEN JOINTS IN THE PRECAST BARRIER  
 SHALL BE FILLED 6" ABOVE FINISHED GRADE  
 WITH 3/4" BACKING ROD AND CAULKED WITH  
 SILICONE SEALANT. MATERIALS BY CONTRACTOR.

\* 7 7/8" FOR PANELS IN SLIGHTLY TO MODERATELY  
 AGGRESSIVE ENVIRONMENTS  
 8 5/8" FOR SALT WATER ENVIRONMENTS



PRECAST TRAFFIC BARRIER PARTIAL ELEVATION VIEW  
 NOT TO SCALE

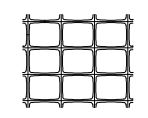
THIS SYSTEM WALL MAY BE USED IN ALL ENVIRONMENTS.

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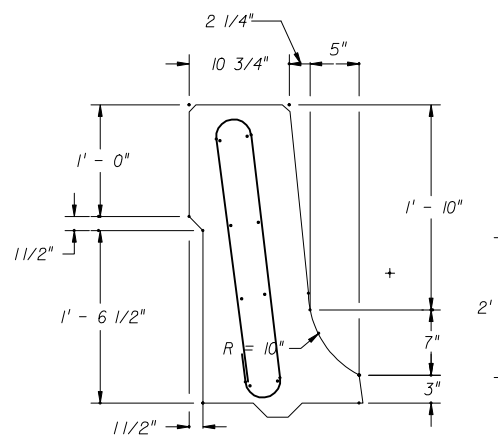
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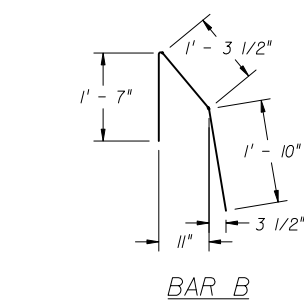


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES MSE RETAINING WALL				
Names	Dates	Approved By		
Designed By		State Structures Design Engineer		
Drawn By	JMS 8/14/98	Revision	Sheet No.	Index No.
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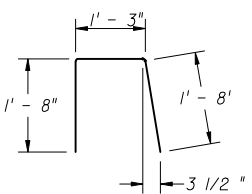
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
 \*\*\*\*\*SYTIME\*\*\*\*\*



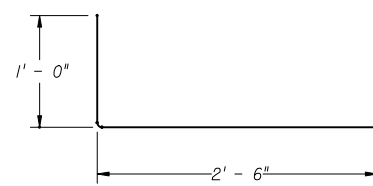
C.I.P. TRAFFIC BARRIER PARAPET  
NOT TO SCALE



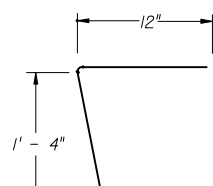
BAR B



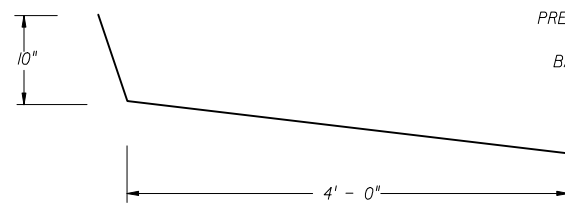
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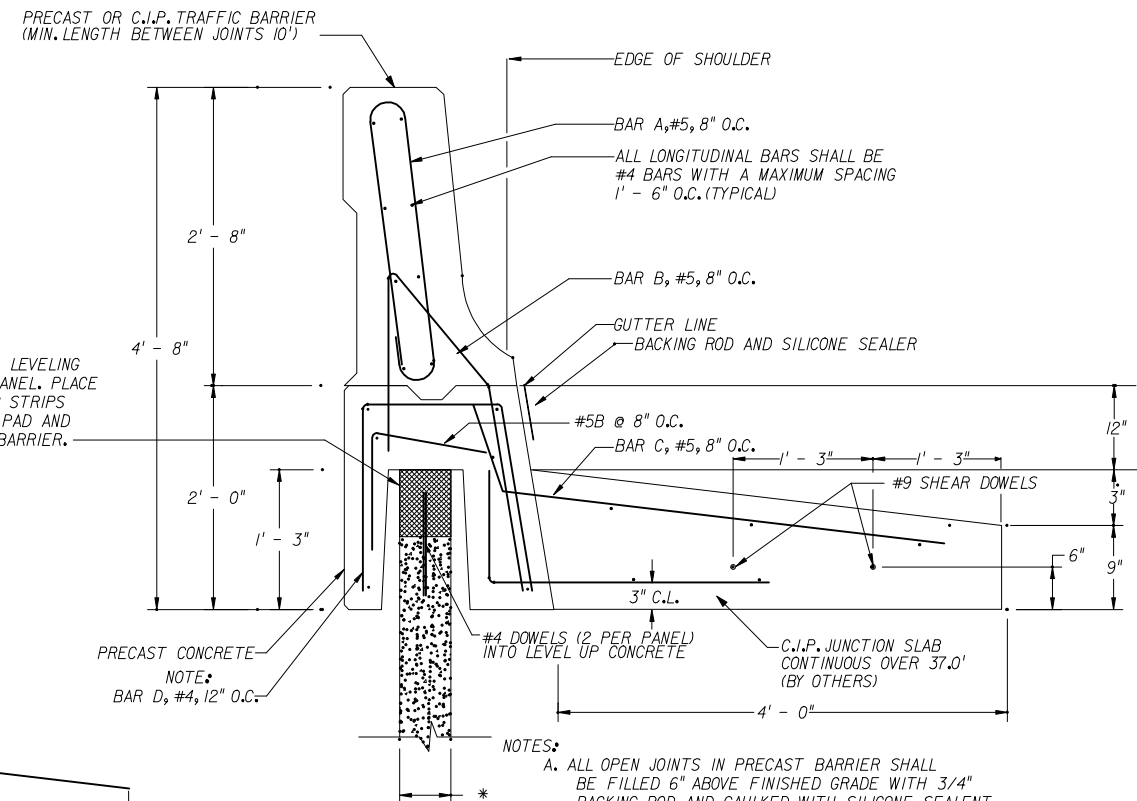
BAR 5A



BAR 5B



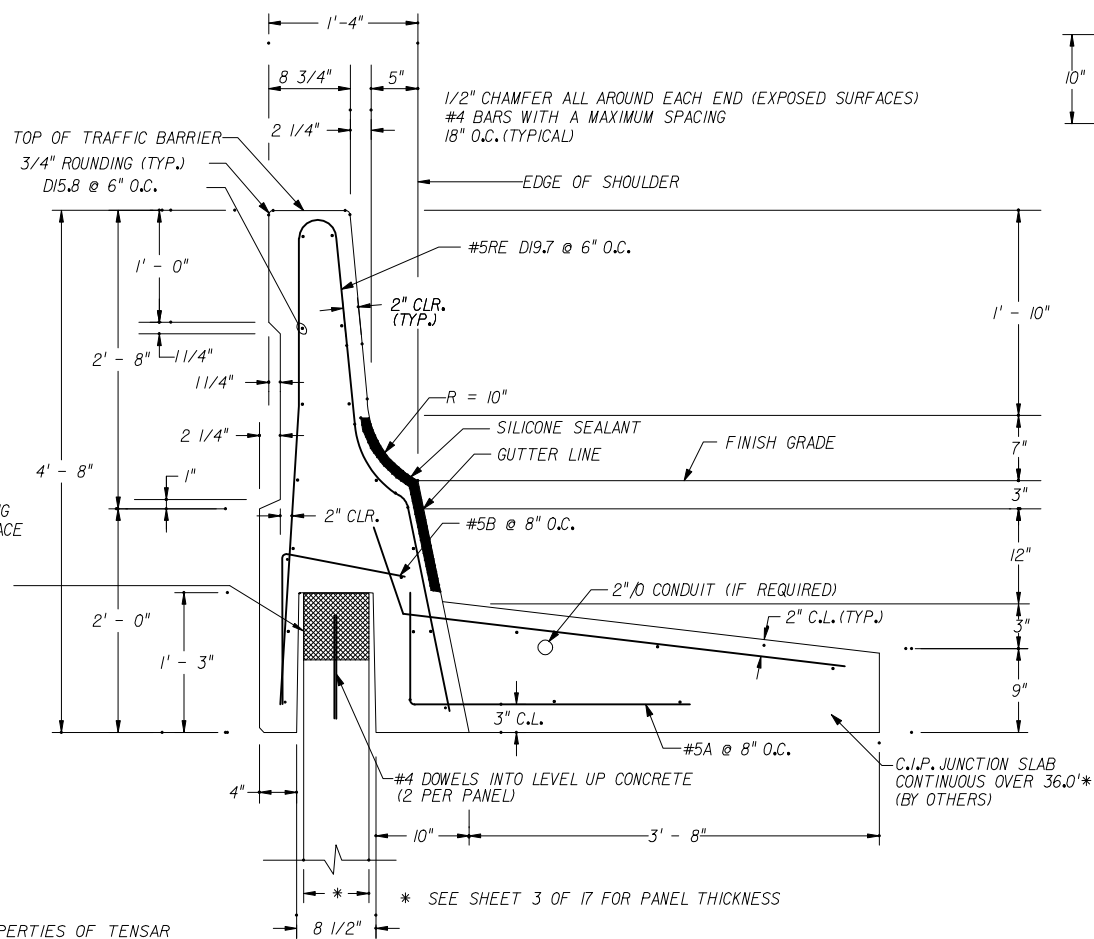
BAR 5C



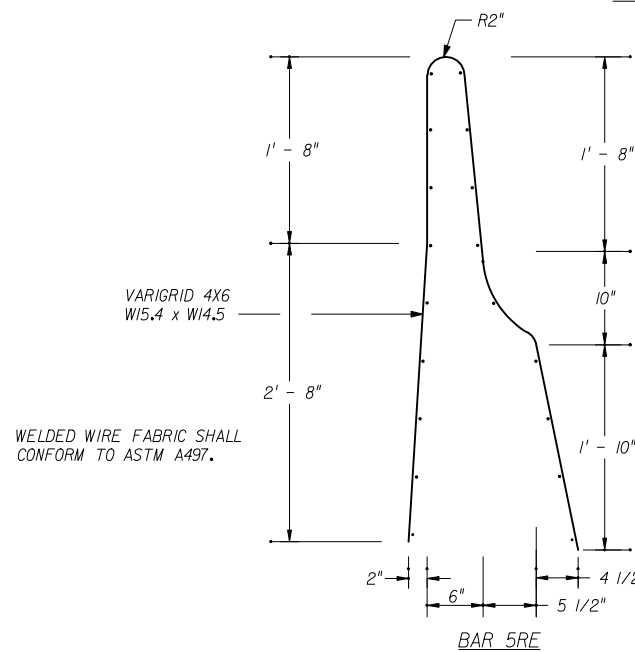
- NOTES:
- A. ALL OPEN JOINTS IN PRECAST BARRIER SHALL BE FILLED 6" ABOVE FINISHED GRADE WITH 3/4" BACKING ROD AND CAULKED WITH SILICONE SEALANT
  - B. 2" MIN. CLEARANCE ON ALL BARS EXCEPT WHERE SHOWN.

\* SEE SHEET 3 OF 17 FOR PANEL THICKNESS

PRECAST BARRIER - STANDARD REBAR REINFORCEMENT  
NOT TO SCALE



PRECAST BARRIER - VARIGRID REINFORCEMENT  
NOT TO SCALE



BAR 5RE

MARK	QUANTITY	REMARKS
5A	8	3'-6" LONG
5B	15	6'-6" LONG
A	VARIGARD	W14.5 @ 6" O.C.
B	VARIGARD	W15.4 @ 4" O.C.

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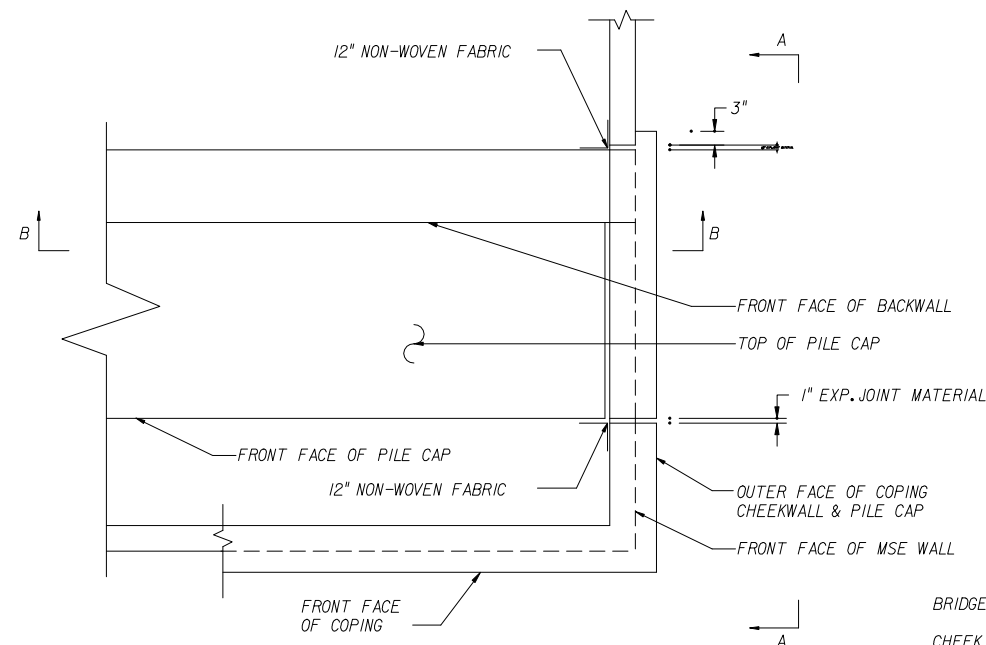
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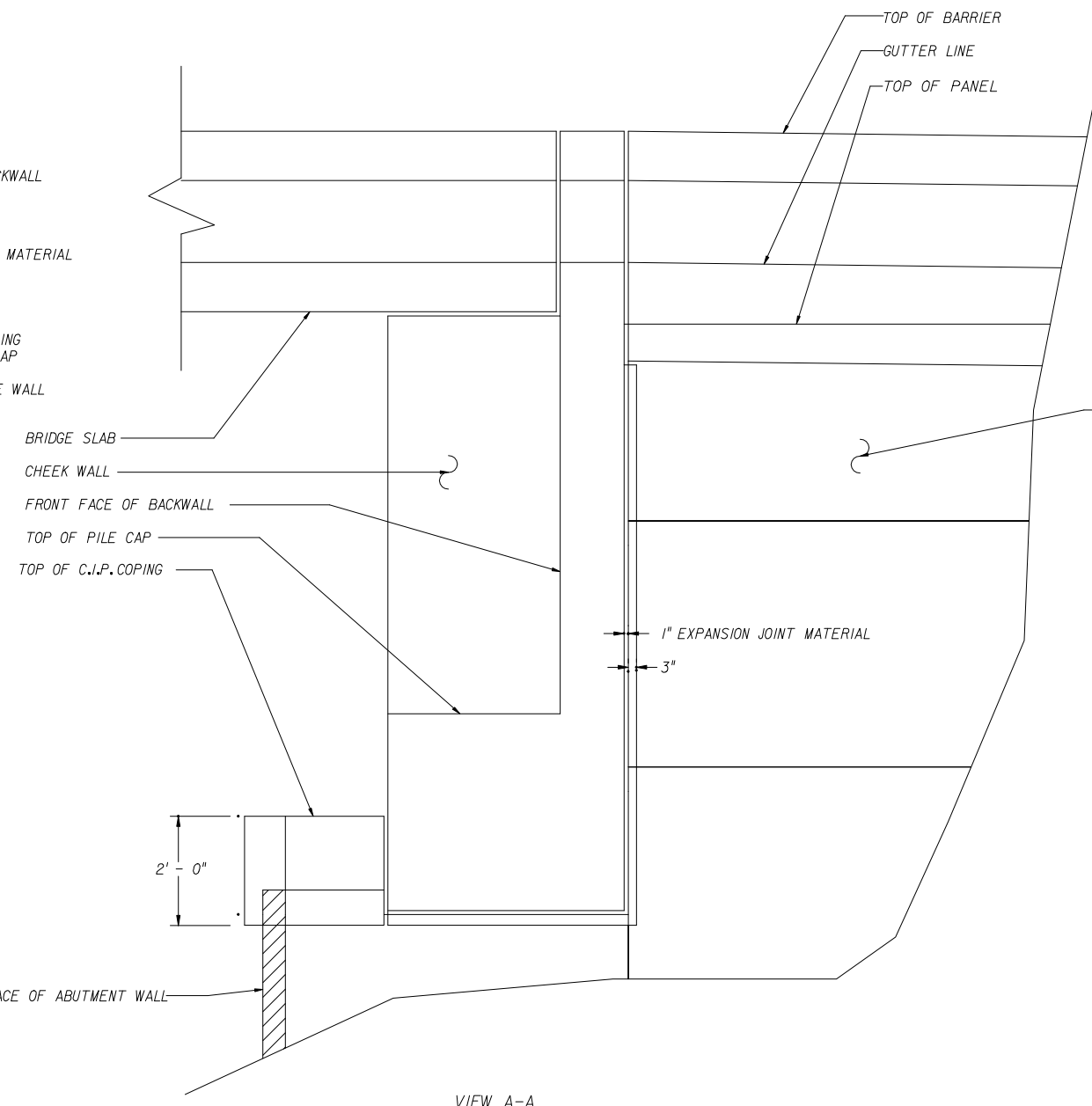
RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
MSE RETAINING WALL

Names	Dates	Approved By
Designed By		W. V. [Signature]
Drawn By	JMS 8/14/98	State Structures Design Engineer
Checked By		Revision
		Sheet No.
		Index No.
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		5025

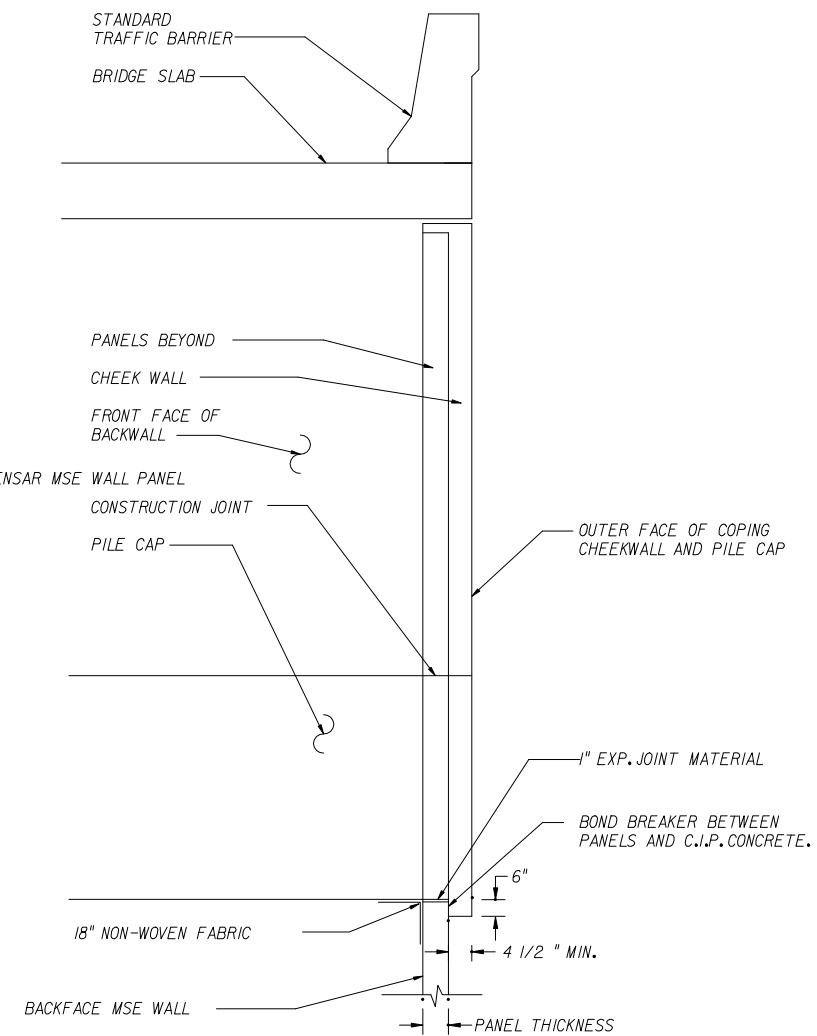
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



PLAN VIEW @ ENDBENT  
NOT TO SCALE



VIEW A-A



SECTION B-B

SECTIONS @ ENDBENT  
NOT TO SCALE

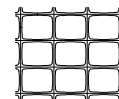
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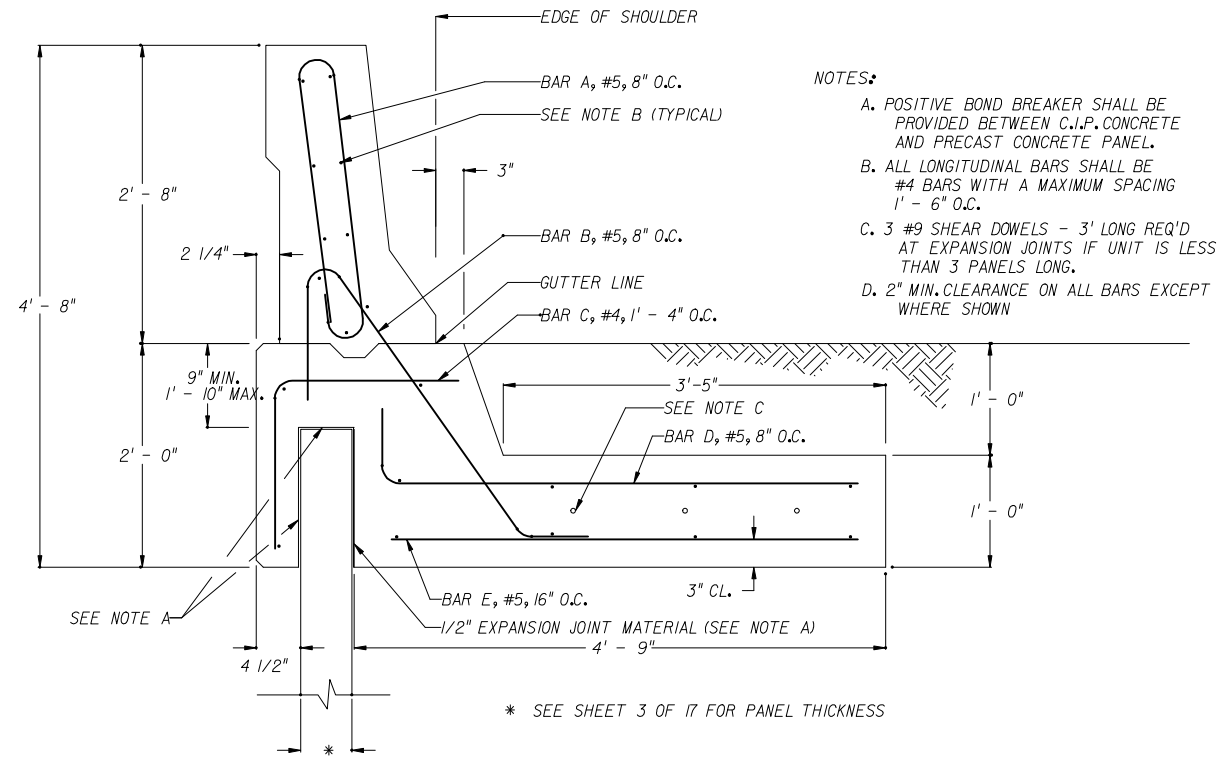
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<b>RETAINING WALL SYSTEM</b> <b>TENSAR EARTH TECHNOLOGIES</b> <b>MSE RETAINING WALL</b>				
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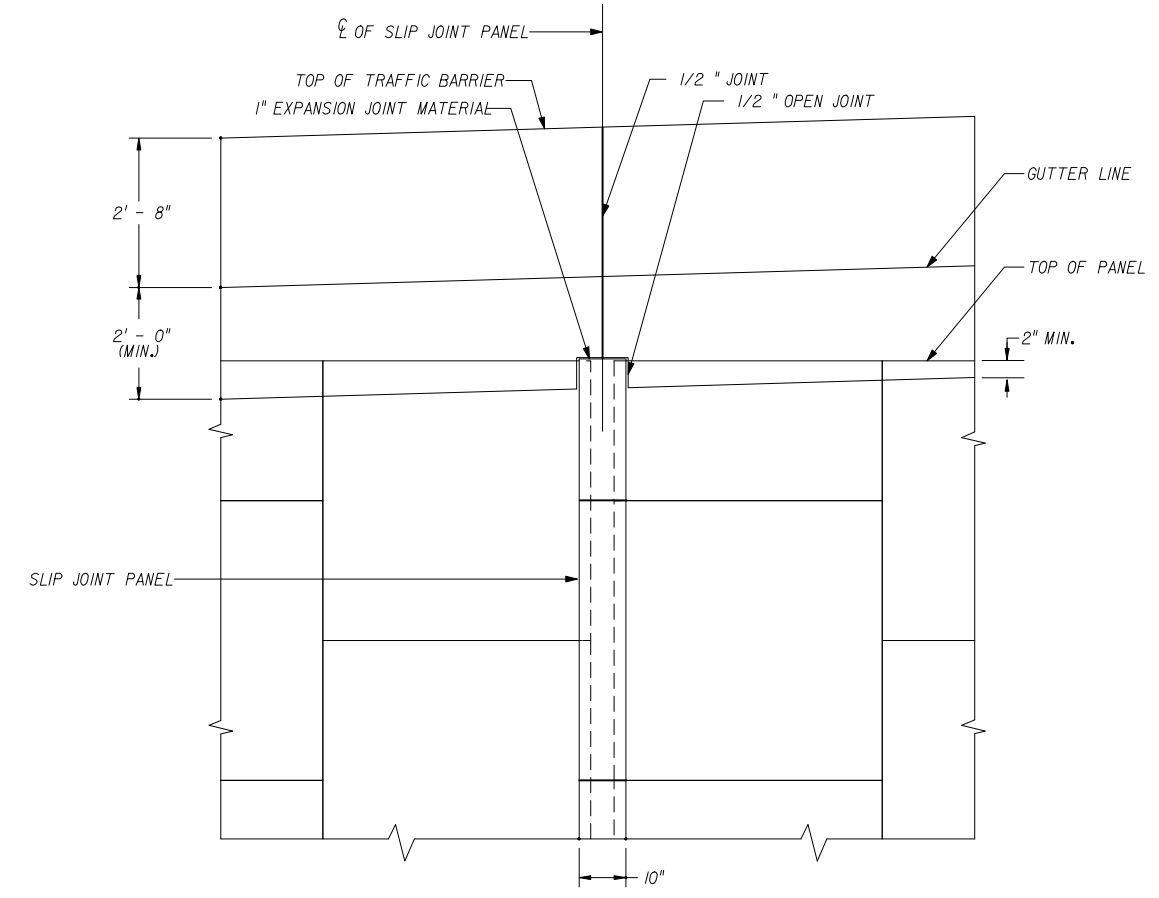
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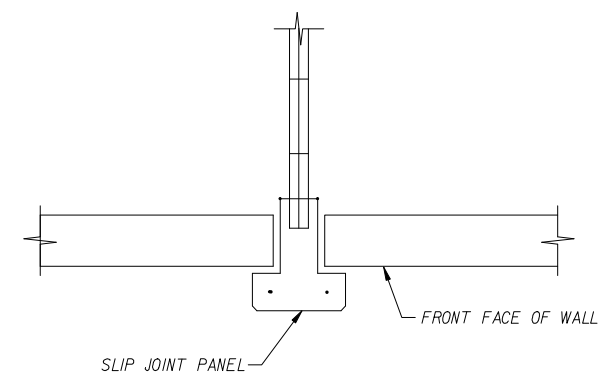


- NOTES:
- A. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN C.I.P. CONCRETE AND PRECAST CONCRETE PANEL.
  - B. ALL LONGITUDINAL BARS SHALL BE #4 BARS WITH A MAXIMUM SPACING 1' - 6\"/>

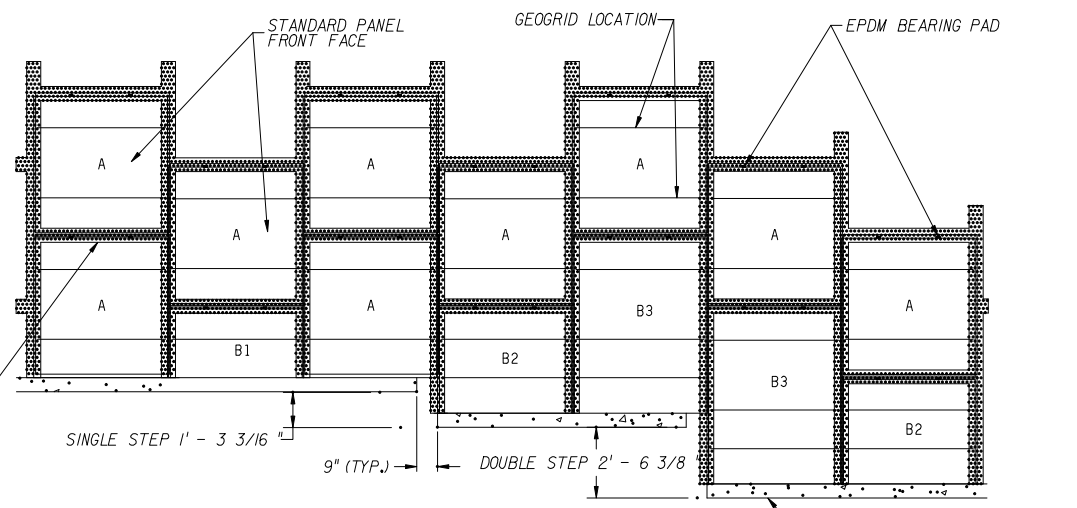
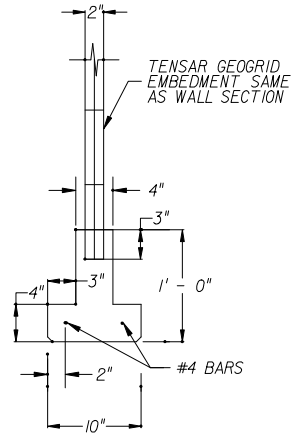
C.I.P. CONCRETE TRAFFIC BARRIER  
NOT TO SCALE



C.I.P. TRAFFIC BARRIER  
OVER SLIP JOINT PANEL



SLIP JOINT DETAIL  
NOT TO SCALE



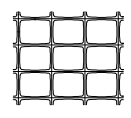
TYPICAL LEVELING PAD STEP DETAIL  
NOT TO SCALE

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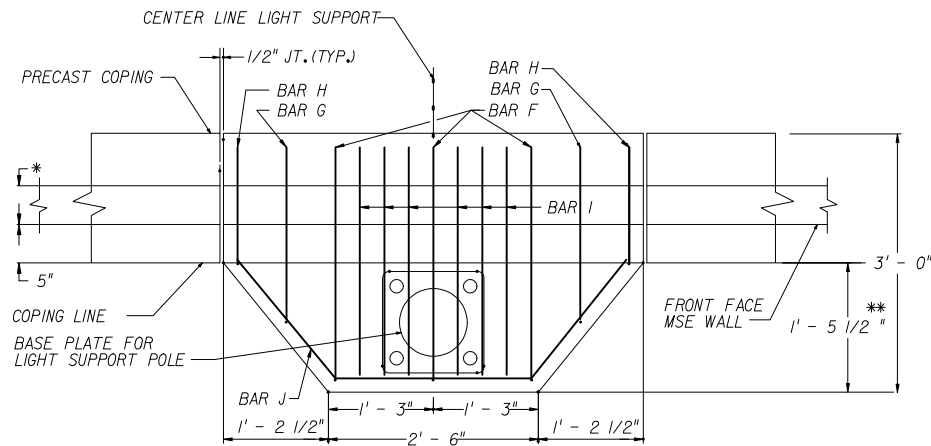
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
MSE RETAINING WALL

Names	Dates	Approved By			
Designed By		 State Structures Design Engineer			
Drawn By	JMS 8/14/98				
Checked By					
Revision	00				Sheet No.

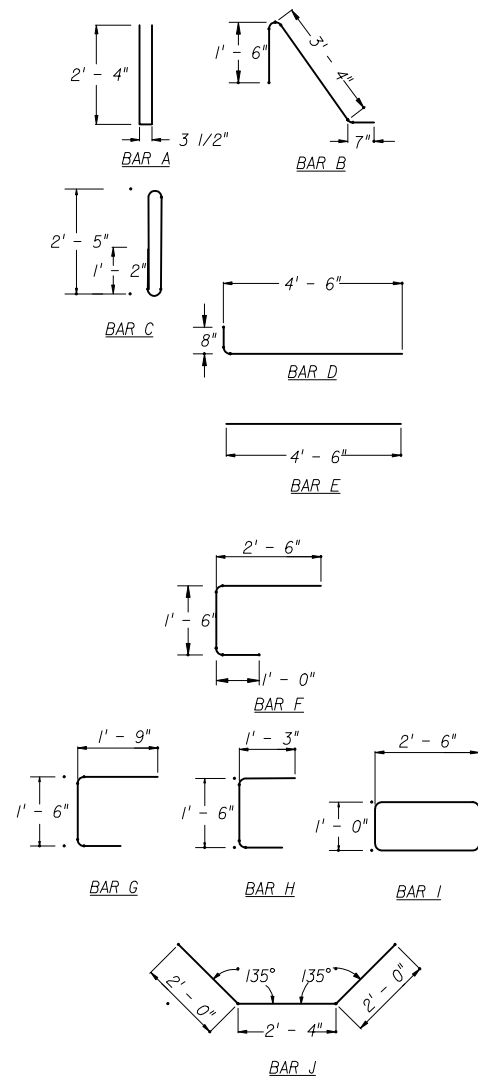
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\*\*\*\*\*SYTIME\*\*\*\*\*



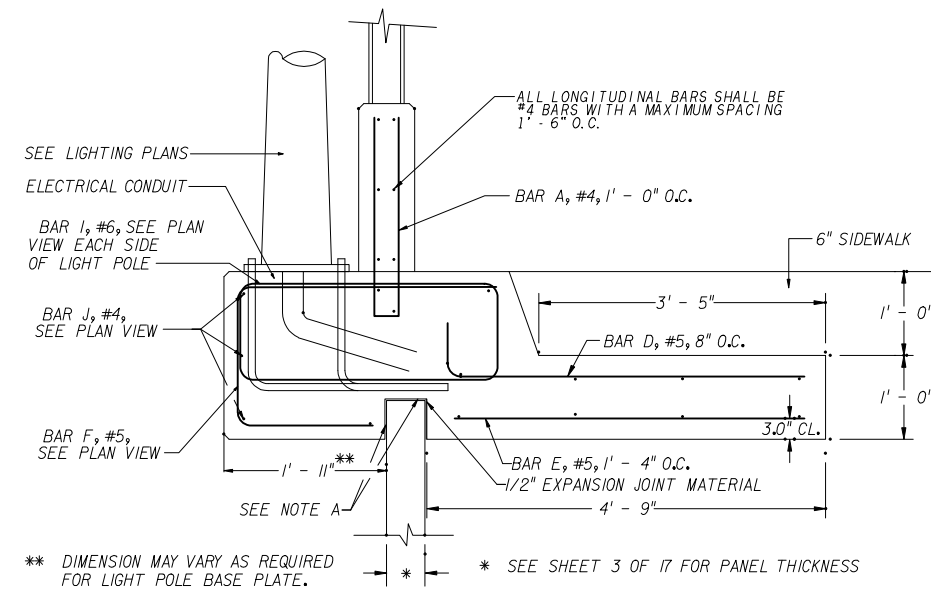
PLAN  
NOT TO SCALE

NOTE: REBAR IN BARRIER AND JUNCTION SLAB NOT SHOWN FOR CLARITY

NOTE: REFER TO LIGHT POLE PILASTER DETAILS IN BRIDGE PLANS FOR NOTES AND ADDITIONAL DETAILS (CONDUIT, JUNCTION BOXES, ETC.)

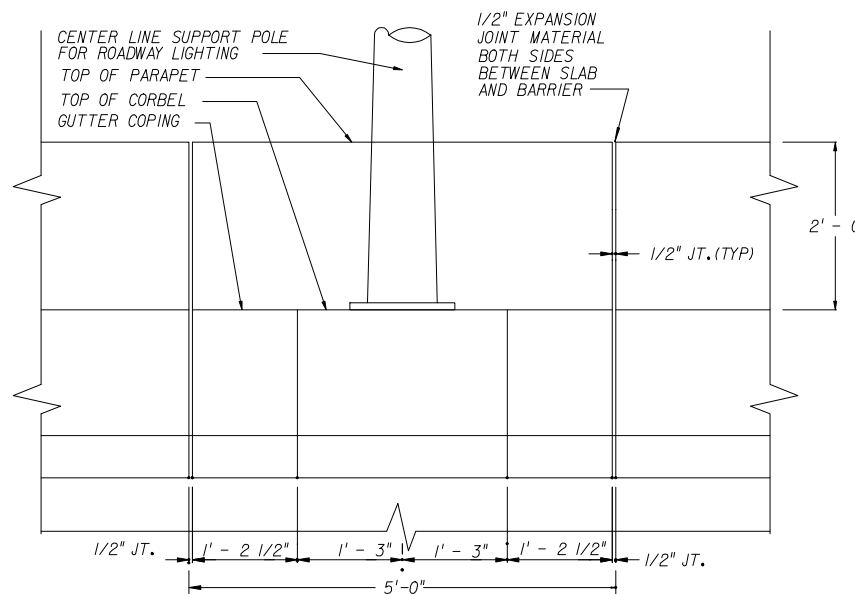


BAR BENDING DETAIL  
NOT TO SCALE



PARAPET DETAIL AT LIGHT POLE  
NOT TO SCALE

NOTES:  
A. POSITIVE BOND BREAKER (6 MIL. POLYETHYLENE OR APPROVED EQUAL) SHALL BE PROVIDED BETWEEN CAST-IN PLACE CONC. AND PRECAST CONC. PANEL.  
B. MAINTAIN A 2" MIN. CLEARANCE ON ALL BARS, EXCEPT WHERE NOTED OTHERWISE.



PARTIAL ELEVATION

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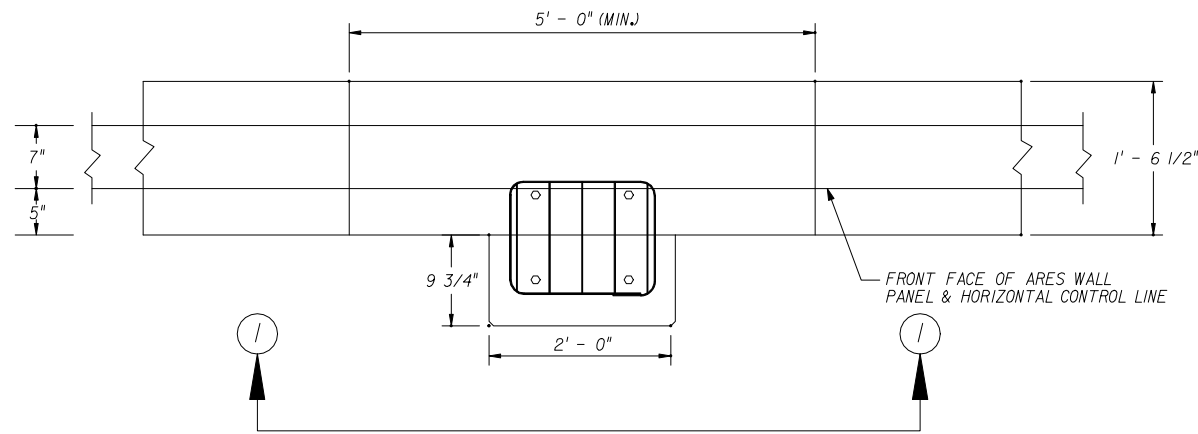
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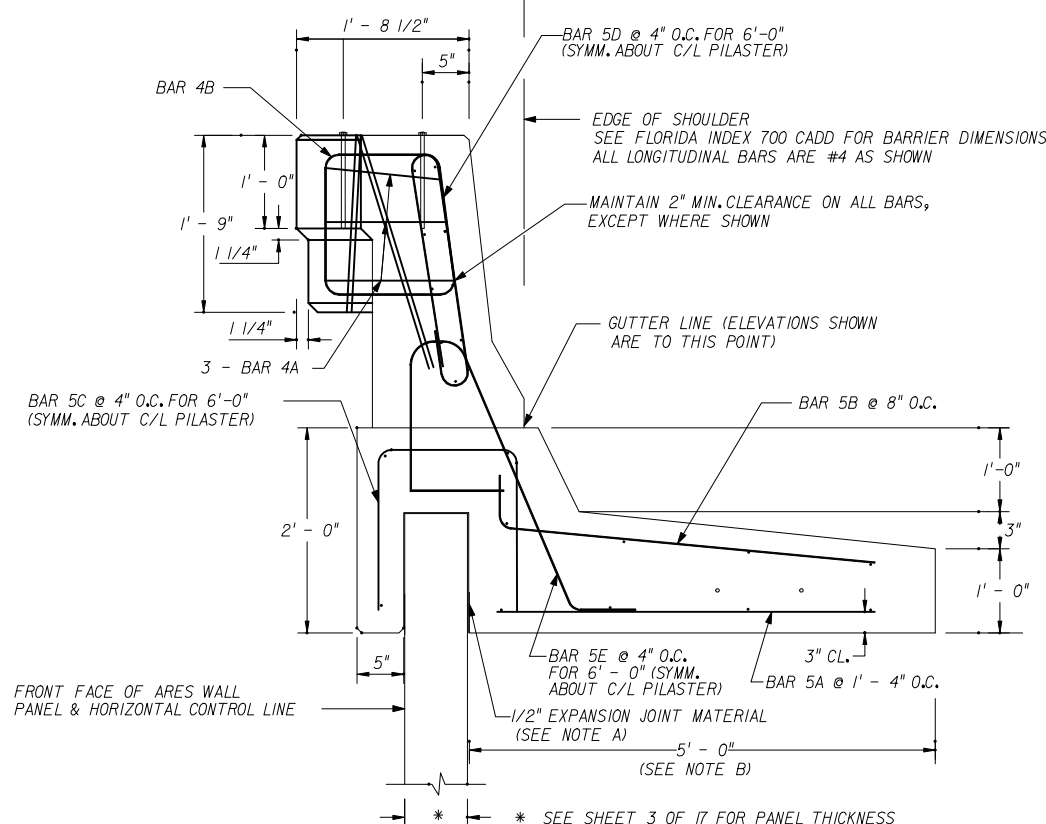
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES MSE RETAINING WALL				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By	JMS 8/14/98	Revision	Sheet No.	Index No.
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\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



2 PLAN  
NOT TO SCALE



3 BARRIER DETAIL AT LIGHT POLE  
NOT TO SCALE

NOTES:

- A. POSITIVE BOND BREAKER SHALL BE PROVIDED BETWEEN CAST IN PLACE CONCRETE AND PRECAST CONCRETE PANEL.
- B. THE BARRIER JUNCTION SLAB SHALL HAVE THESE DIMENSIONS FOR ONE PRECAST UNIT EITHER SIDE OF LIGHT POLE BARRIER LONGITUDINAL BARS SHALL BE AS SHOWN ABOVE.
- C. 2 - #9 SHEAR DOWELS - 3' - 0" LONG REFER TO PRECAST BARRIER SHEET.
- D. LIGHT POLE SUPPLIER IS RESPONSIBLE FOR PROVIDING ANCHOR BOLTS THAT EFFECTIVELY TRANSMIT THE LIGHT POLE LOADS TO THE PILASTER AND FIT THE REINFORCING CAGE.
- E. SEE STANDARD INDEX 500 FOR ADDITIONAL DETAILS.

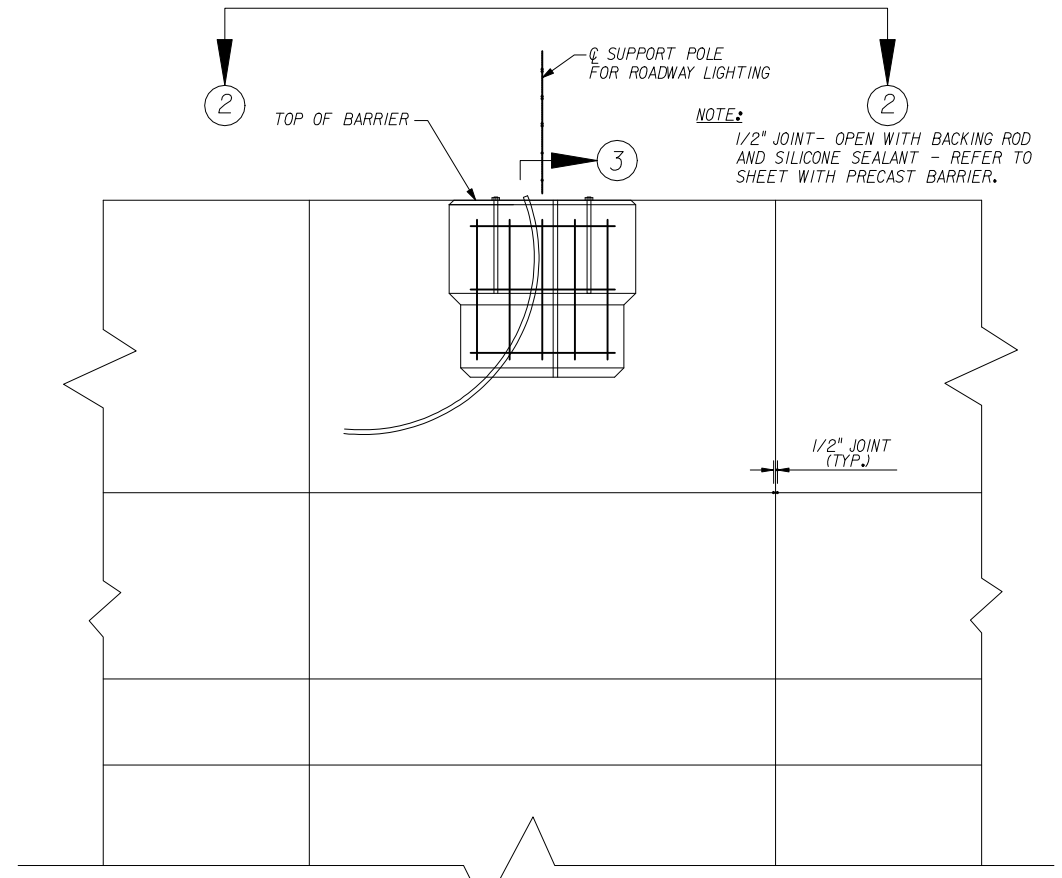
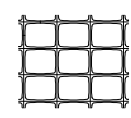
REBAR QUANTITY	
BAR	QTY
4A	3
4B	5
5A	18
5B	9
5C	18
5D	18
5E	18

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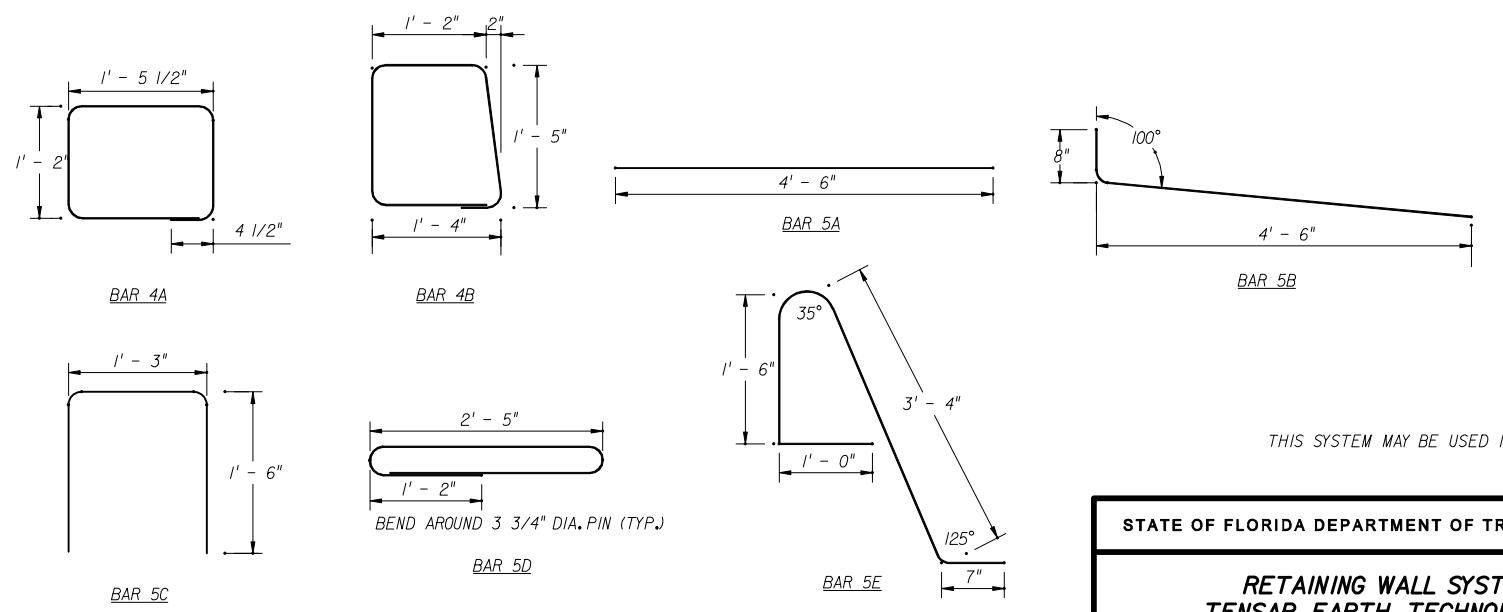
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1 PARTIAL ELEVATION  
NOT TO SCALE



4 BAR BENDING DETAIL  
NOT TO SCALE

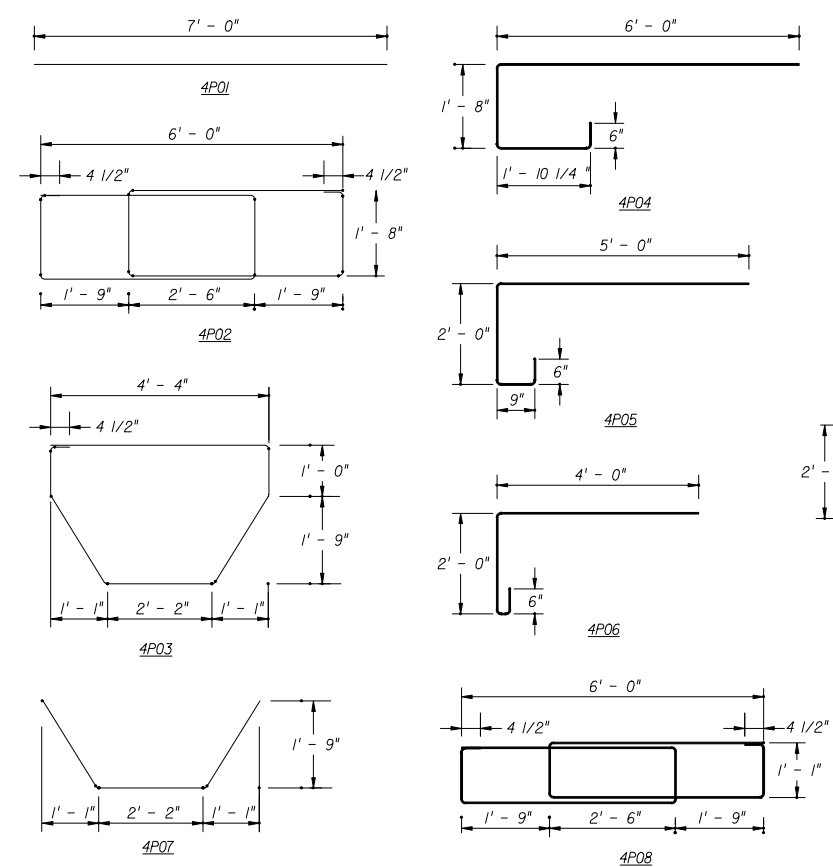
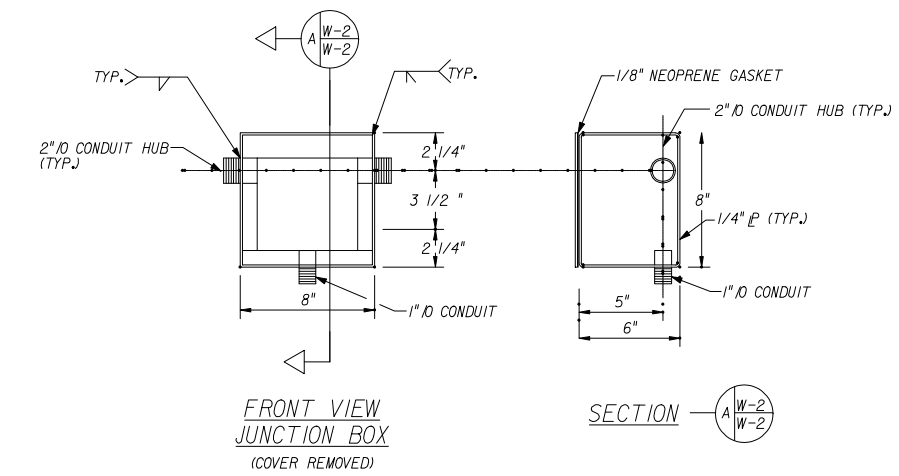
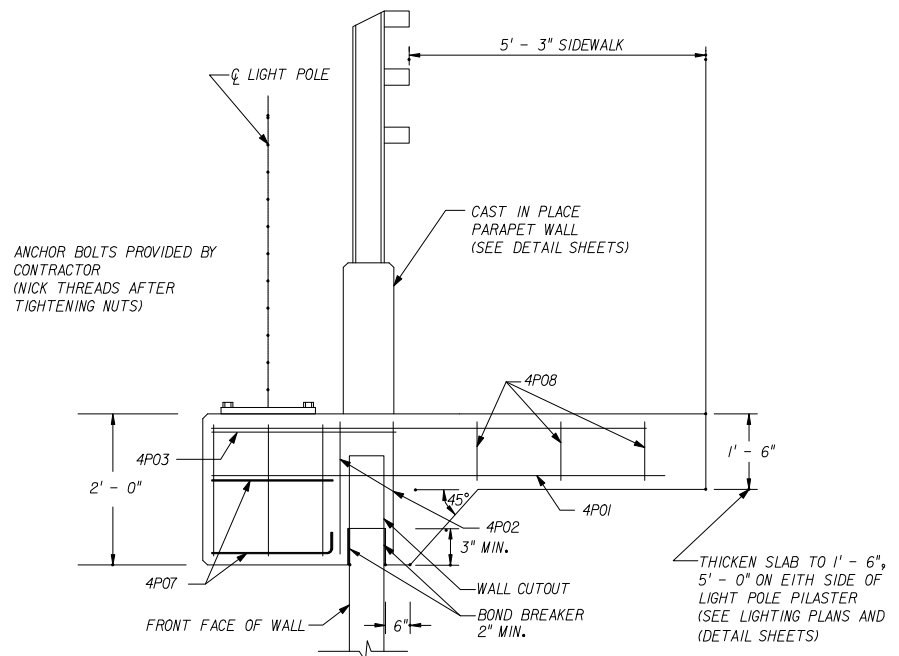
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RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
MSE RETAINING WALL

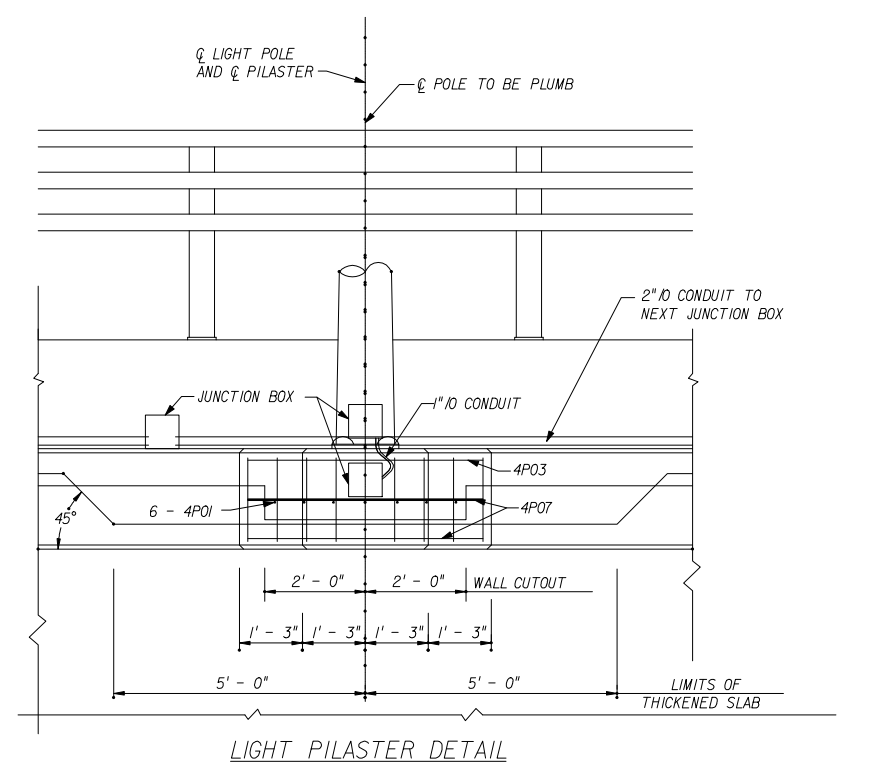
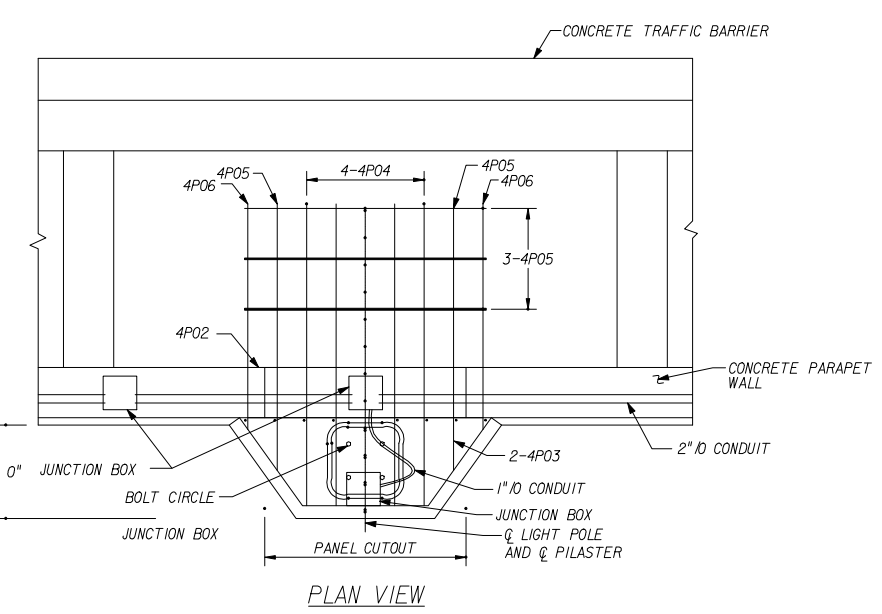
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Revision	00				Sheet No.

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\*\*\*\*\*SYTIME\*\*\*\*\*



**BILL OF REINFORCING STEEL**

MARK	SIZE	NO. REQUIRED	LENGTH
4P01	4	6	7' - 0"
4P02	4	2	24' - 5"
4P03	4	1	14' - 9"
4P04	4	4	9' - 8"
4P05	4	2	7' - 11"
4P07	4	2	6' - 2"
4P07	4	2	6' - 4"
4P08	4	3	22' - 1"

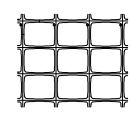


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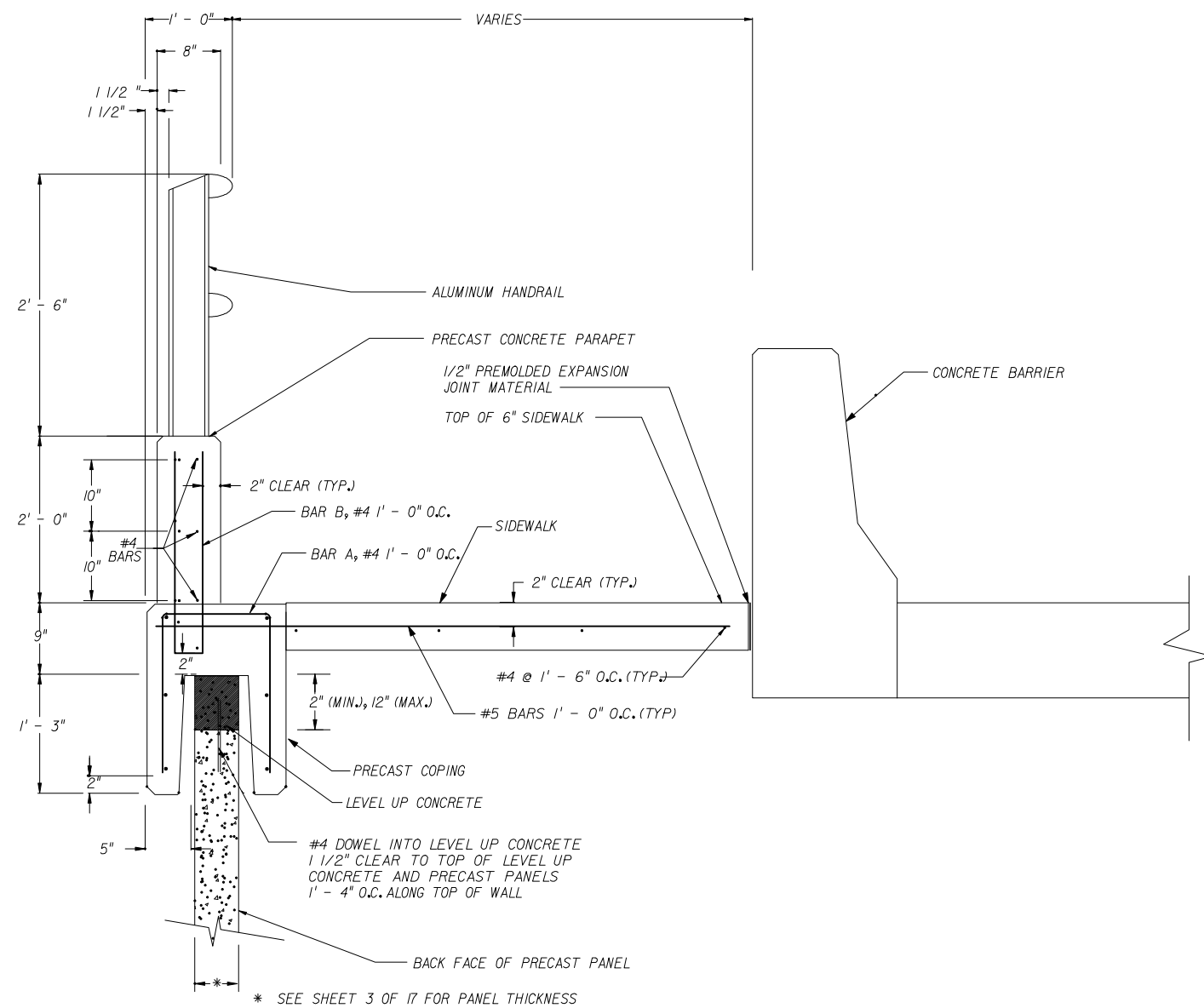
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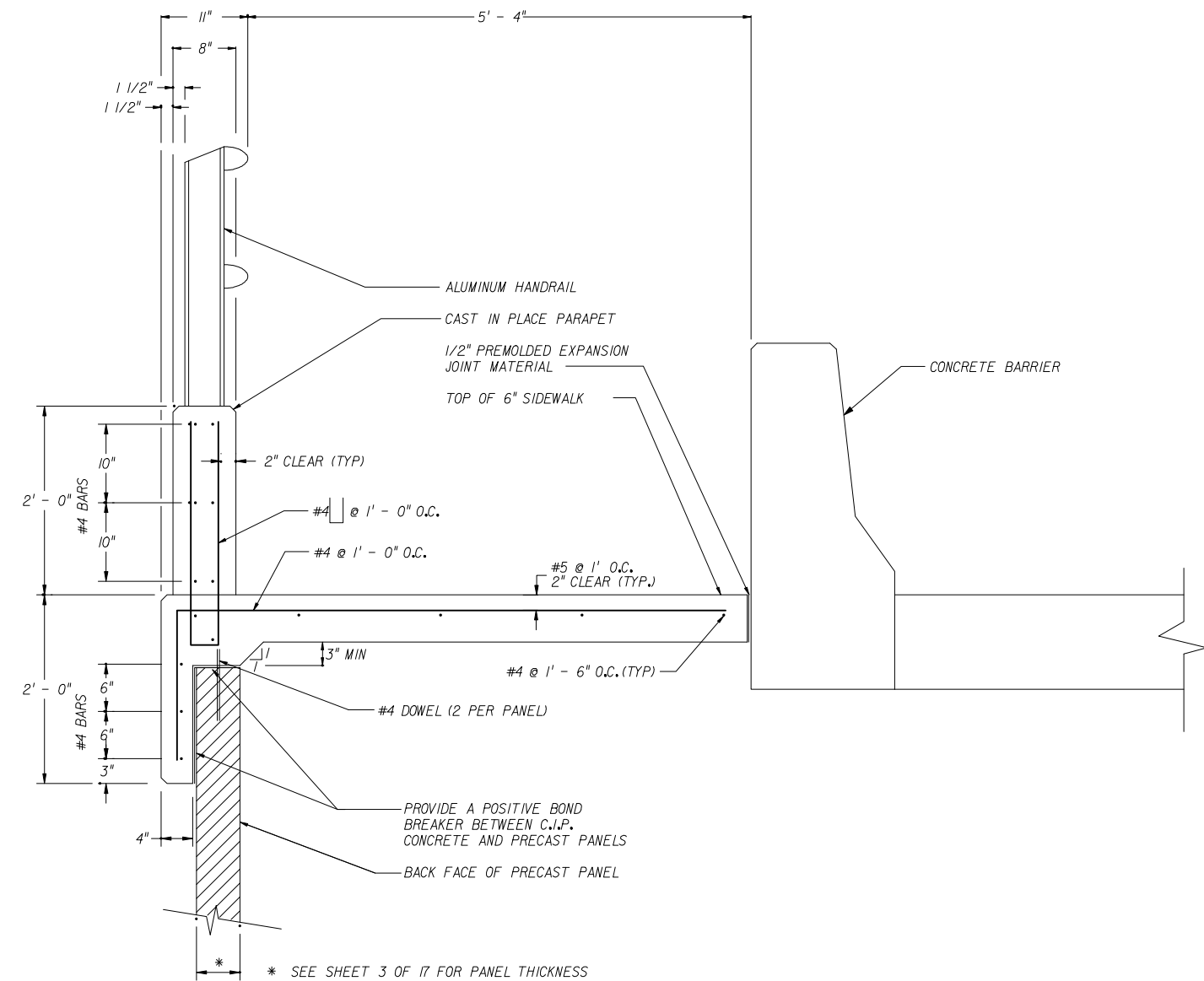
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<b>RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES MSE RETAINING WALL</b>				
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PRECAST PARAPET DETAIL  
NOT TO SCALE



C.I.P. PARAPET DETAIL  
NOT TO SCALE

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RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
MSE RETAINING WALL

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Telephone: (770) 446-3000  
Fax: (770) 242-7493

**GENERAL NOTES**

DESIGN CRITERIA

1. DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN THE REINFORCED EARTH VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO THE CONTRACTING AGENCY'S TECHNICAL SPECIFICATIONS FOR RETAINED EARTH WALLS.

2. FACTORS OF SAFETY

OVERTURNING 2.0  
INTERNAL PULLOUT 1.5 (ALLOW DEFORMATION 3/4")  
OVERALL STABILITY 1.5  
SLIDING 1.5  
BEARING 2.5

SOIL REINFORCEMENT MESH 0.47 Fy AT END OF DESIGN LIFE

3. SOIL CHARACTERISTICS ASSUMED FOR DESIGN:

SOIL PARAMETERS:

SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF  $\phi$ ,  $c$  AND  $\gamma$  SHALL BE PROVIDED IN THE SHOP DRAWINGS.

4. THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF OTHERS TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.

5. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED EARTH VOLUME, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.

WIRE FACING PANELS & REINFORCING ELEMENTS

6. REINFORCING MESH ELEMENTS SHALL BE SHOP FABRICATED FROM COLD DRAWN STEEL ROD CONFORMING TO THE MINIMUM REQUIREMENTS OF ASTM A-82 AND SHALL BE WELDED AT THE JUNCTIONS BETWEEN LONGITUDINAL AND TRANSVERSE WIRES IN ACCORDANCE WITH ASTM A-185. GALVANIZATION SHALL BE APPLIED AFTER MESH FABRICATION AND SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF ASTM A-123.

LOOP EMBEDS SHALL BE FABRICATED FROM COLD DRAWN STEEL ROD CONFORMING TO ASTM A-510 OR ASTM A-82. LOOP EMBEDS SHALL BE WELDED IN ACCORDANCE WITH ASTM A-185. LOOP EMBEDS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM B-633.

DESIGN:

7. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS. ON THE BASIS OF THIS INFORMATION, THE WALL COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

WALL CONSTRUCTION

8. RETAINED EARTH WALLS IN CURVES WILL FORM A SERIES OF SHORT CHORDS OF 10.0' EACH TO MATCH DESIRED WALL ALIGNMENT.

9. FOR LOCATION AND ALIGNMENT OF RETAINED EARTH WALLS, SEE RETAINING WALL CONTROL PLANS.

10. IF MANHOLES AND DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON WALL ELEVATIONS.

11. IF PILES ARE LOCATED WITHIN REINFORCED SOIL VOLUME, THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE REINFORCED EARTH WALL UNLESS A METHOD TO PROTECT THE STRUCTURE WHICH IS ACCEPTABLE TO THE ENGINEER AND FOSTER GEOTECHNICAL COMPANY AND IS PROPOSED AND APPROVED IN WRITING.

12. BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548 TO A LEVEL OF 2" (+/-) ABOVE THE TIE MESH EMBEDDED IN THE PANELS. INSTALLATION OF REINFORCING MESH SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.

13. WALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 548.

14. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY GUARDRAIL POSTS BEHIND RETAINED EARTH PANELS. PRIOR TO PLACEMENT OF THE TOP LAYER OF REINFORCING MESH, INDIVIDUAL REINFORCING MESH MAY BE SKEWED TO AVOID THE POST LOCATIONS IF AUTHORIZED BY THE ENGINEER (NO CUTTING OF SOIL REINFORCEMENT GRIDS ALLOWED UNLESS SHOWN ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER). ANY DAMAGE DONE TO THE REINFORCING MESH DUE TO THE INSTALLATION OF THE GUARDRAIL SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

15. IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR GUARDRAIL POSTS WHICH ARE WITHIN REINFORCED SOIL VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING MESH AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE WHAT COURSE OF ACTION SHOULD BE TAKEN.

16. FOR OTHER INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO FOSTER GEOTECHNICAL CONSTRUCTION MANUAL.

17. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING MESH DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPER ELEVATION AND/OR SOIL MIXING ARE ANTICIPATED.

MATERIALS NOTES

18. NOMINAL MESH LENGTHS

THE REINFORCING MESH LENGTH SHOWN ON THE PLANS, MEASURED FROM BACK FACE OF PANEL ARE THE NOMINAL LENGTHS REQUIRED BY CALCULATION. THE ACTUAL FABRICATED MESH LENGTHS ARE OFTEN LONGER (UP TO 6") DUE TO MANUFACTURING TOLERANCES. THE REQUIRED HORIZONTAL LIMIT OF GRANULAR BACKFILL IS EQUAL TO THE NOMINAL MESH LENGTH. ADDITIONAL GRANULAR BACKFILL BEYOND THE NOMINAL MESH LENGTH IS NOT REQUIRED BY CALCULATION.

19. SELECT BACKFILL QUANTITY

THE SELECT BACKFILL QUANTITY INDICATED BY FOSTER GEOTECHNICAL IS CALCULATED BY MULTIPLYING THE NOMINAL MESH LENGTHS SHOWN ON THE PLANS BY THEIR TRIBUTARY WALL SURFACE AREA AND CONVERTING THE RESULT TO A NEATER CUBIC METER QUANTITY. THIS INFORMATION IS FURNISHED FOR THE CONTRACTOR'S INFORMATION ONLY AND IS NOT INTENDED TO PRESENT THE ACTUAL QUANTITIES REQUIRED TO COMPLETE THE WORK. THE CONTRACTOR MUST CALCULATE HIS OWN EXCAVATION AND BACKFILL QUANTITIES BASED UPON THE SPECIFIC CONDITIONS OF THE PROJECT.

20. NOTE TO CONTRACTORS

ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY FOSTER GEOTECHNICAL

- PREFABRICATED FACING PANELS
- REINFORCING MESH
- NON-WOVEN FILTER CLOTH (FOR BEHIND FACING PANELS ONLY) (WEBTECH-TERRATEX N04 OR EQUAL)

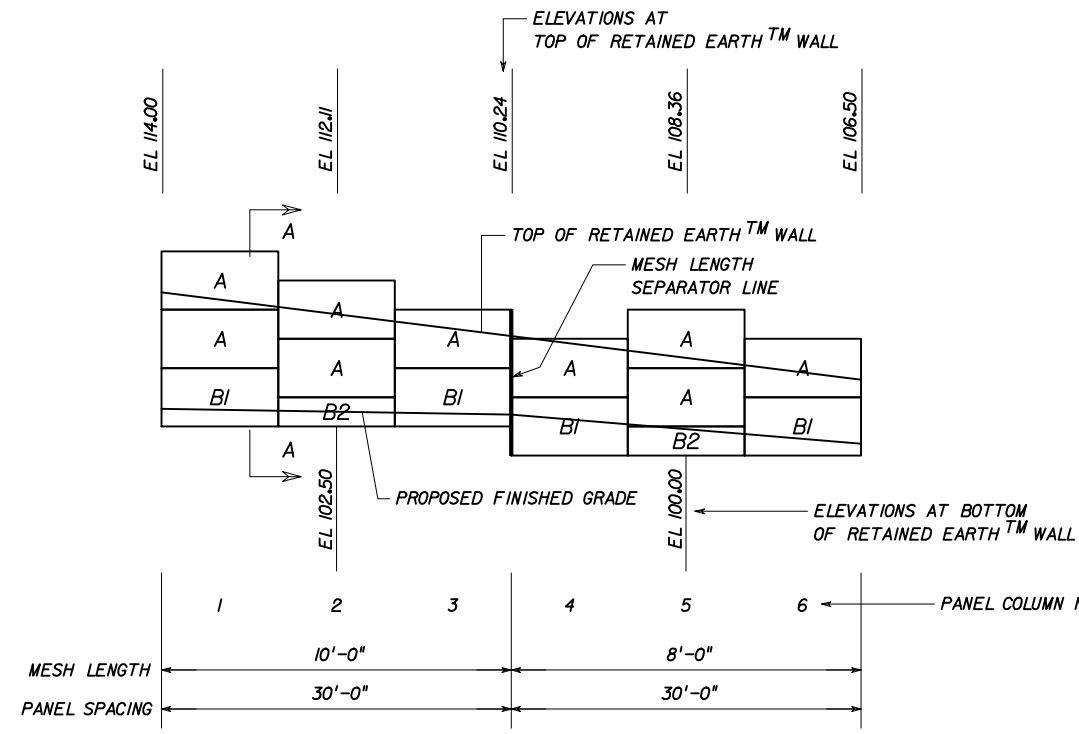
ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR. ANY JOINT MATERIALS SHOWN AT THE INTERFACE OF PRECAST PANELS AND CAST-IN-PLACE CONCRETE STRUCTURES ARE TO BE SUPPLIED BY THE ERECTION CONTRACTOR. ALL SANDBLASTING, PAINTING, SEALERS OR OTHER SPECIAL APPLIED COATINGS ARE ALSO SUPPLIED / INSTALLED BY THE CONTRACTOR IN THE FIELD FOLLOWING PANEL ERECTION.

21. FOSTER GEOTECHNICAL SUPPLIES PREFABRICATED WIRE FACING PANELS AND ACCESSORIES TO BE USED IN CONJUNCTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF RETAINED EARTH WALLS DETAILED HEREIN IN THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL FURNISHED BY FOSTER GEOTECHNICAL IS INTENDED TO PROVIDE A GENERAL EXPLANATION OF THE SYSTEM. IT IS THE CONTRACTOR'S OBLIGATION TO DEVISE AND EXECUTE A PROJECT SPECIFIC ERECTION SEQUENCE, PANEL UNLOADING, HANDLING AND BRACING SYSTEM, AND FALL PROTECTION SYSTEM. THE BRACING SYSTEM SHOWN IN THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL IS GENERAL IN NATURE AND DOES NOT ACCOUNT FOR PROJECT SPECIFIC CRITERIA COMPLIANCE WITH THE GUIDELINES IN THIS MANUAL DOES NOT RELIEVE THE CONTRACTOR OF ITS RESPONSIBILITY TO ADHERE TO THE PROJECT PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS OR COMPLIANCE WITH ALL FALL PROTECTION, SAFETY, LAWS, STANDARDS AND PROCEDURES AT THE JOBSITE. CONTRACTORS SHOULD TAKE SPECIAL PRECAUTIONS TO PREVENT THE PANELS FROM SHIFTING OR FALLING DURING THE ERECTION PROCESS.

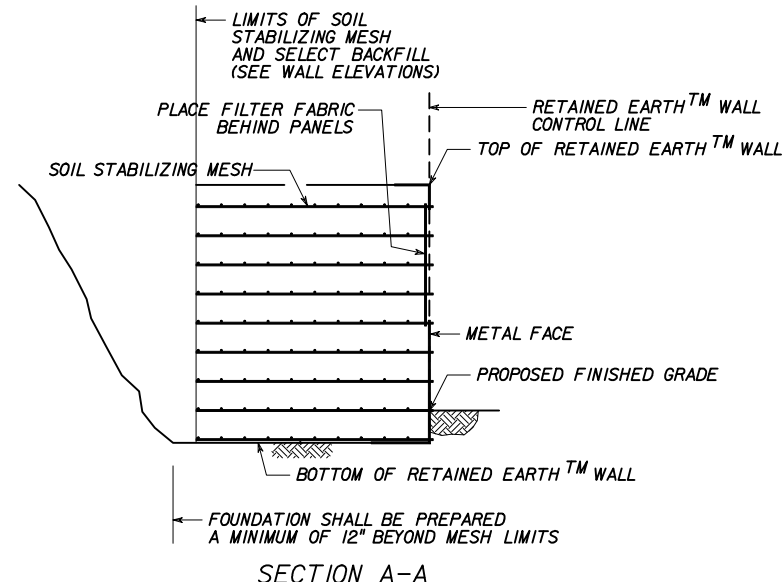
THIS SYSTEM MAY BE USED IN MODERATELY OR SLIGHTLY AGGRESSIVE ENVIRONMENTS ONLY.

WIRE FACED PANELS

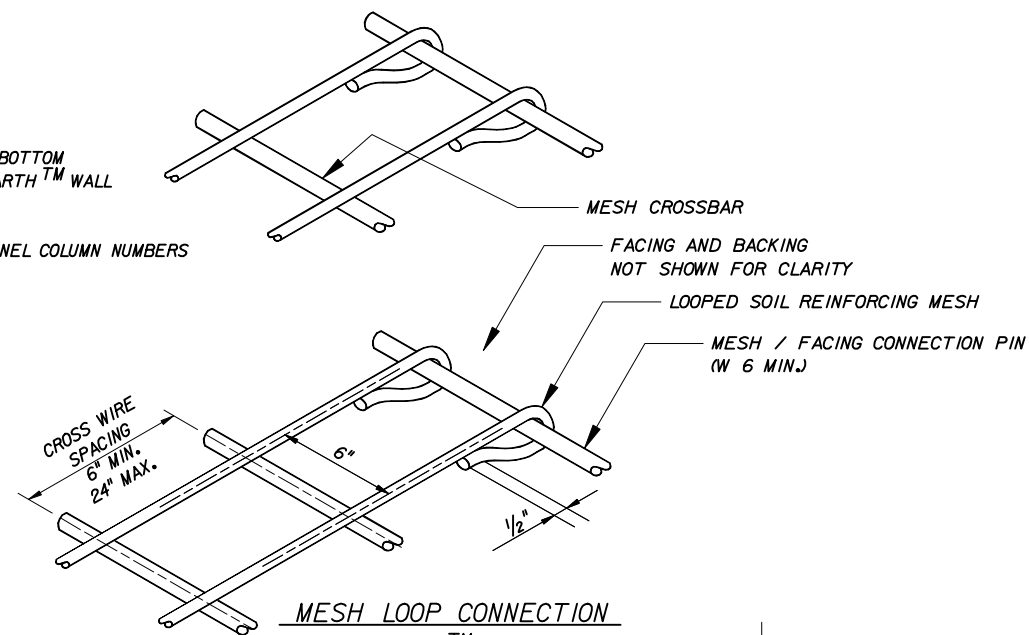
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL WIRE FACE WALL</b>					
	Names	Dates	Approved By <i>W. V. [Signature]</i>		
Designed By	TCNA	11/98	State Structures Design Engineer		
Drawn By	CAD	11/98	Revision	Sheet No.	Index No.
Checked By	GEO	11/98	00	1 of 3	5105



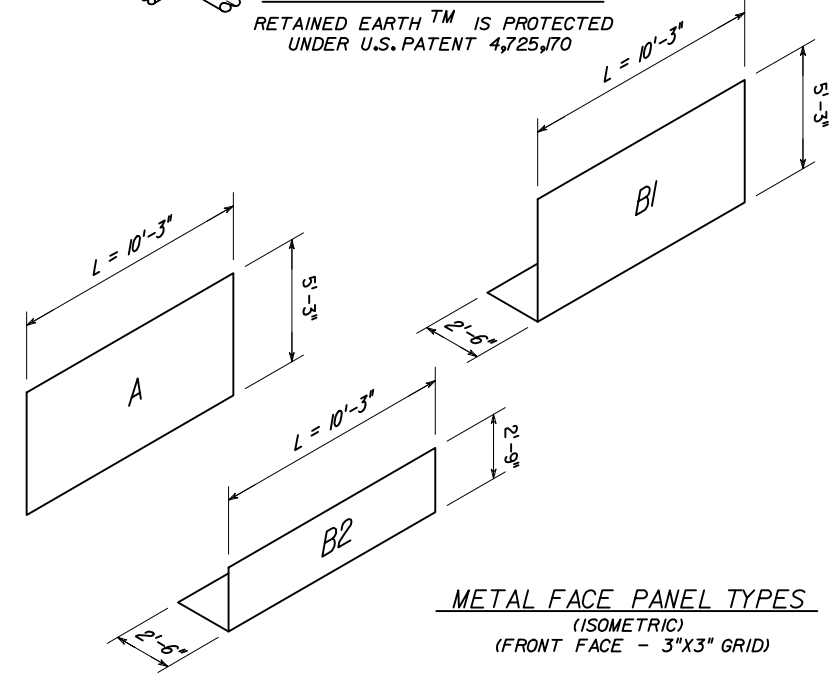
**WALL ELEVATION KEY**  
(FRONT FACE SHOWN)



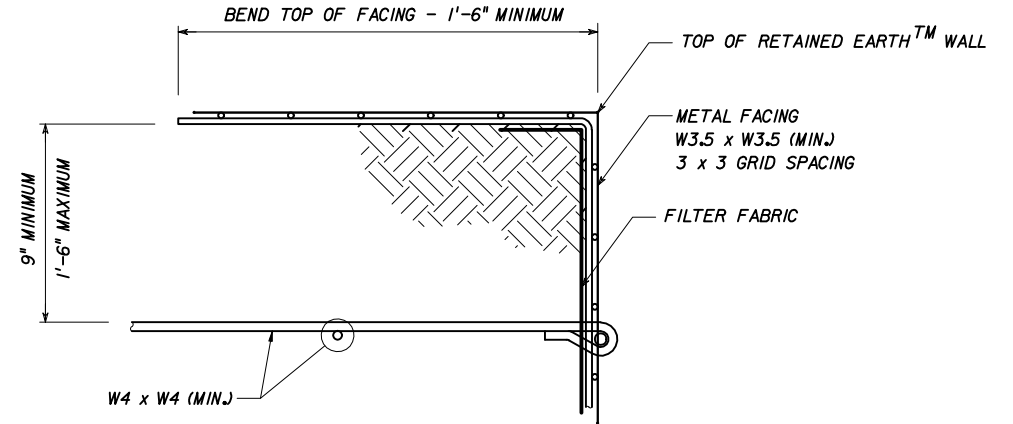
**SECTION A-A**



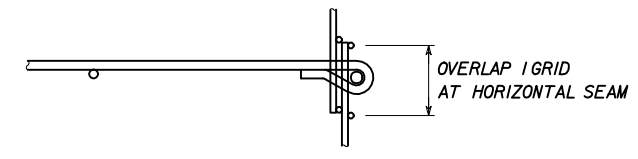
**MESH LOOP CONNECTION**  
RETAINED EARTH™ IS PROTECTED UNDER U.S. PATENT 4,725,170



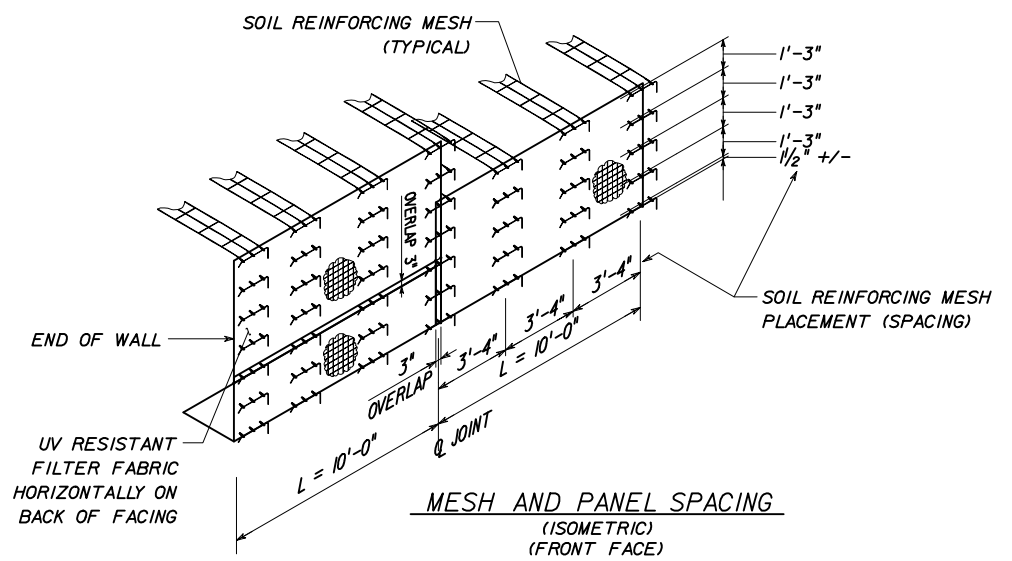
**METAL FACE PANEL TYPES**  
(ISOMETRIC)  
(FRONT FACE - 3"X3" GRID)



**TOP OF WALL DETAIL**



**DETAIL OF HORIZONTAL OVERLAP**  
(VERTICAL OVERLAP SIMILAR)

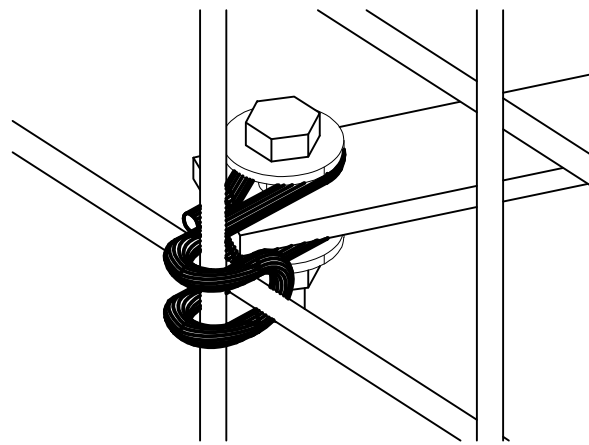


**MESH AND PANEL SPACING**  
(ISOMETRIC)  
(FRONT FACE)

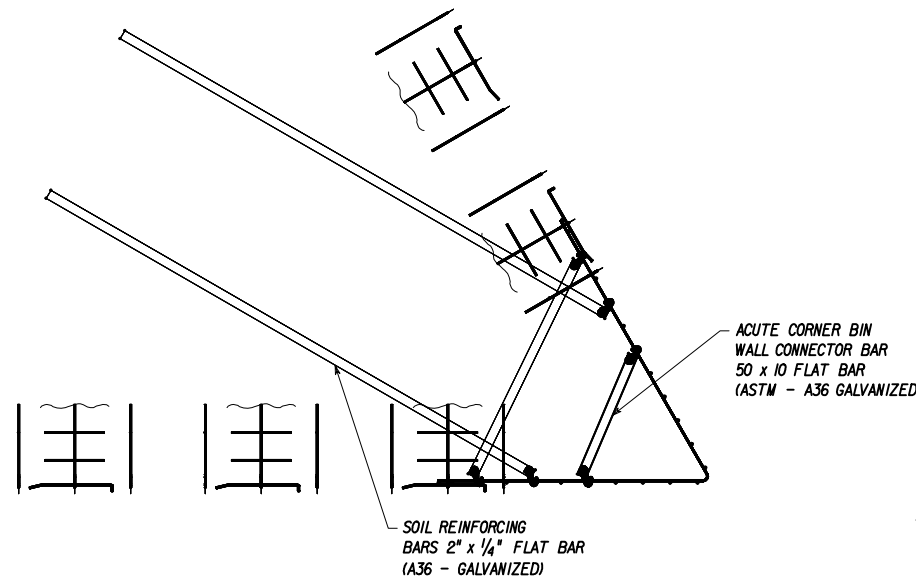
**WIRE FACED PANELS**

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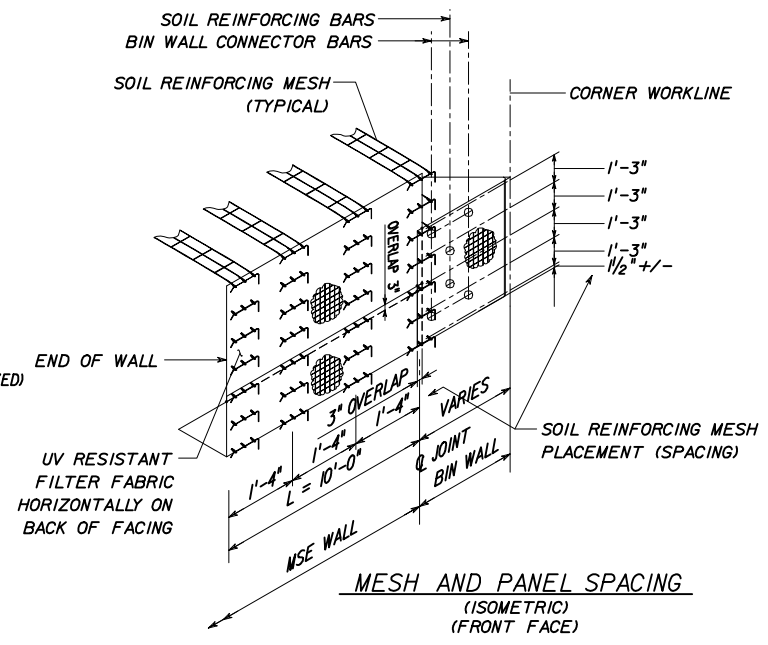
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM FOSTER GEOTECHNICAL WIRE FACE WALL</b>				
Designed By	TCNA	Dates	11/98	Approved By
Drawn By	CAD	Revision	11/98	State Structures Design Engineer
Checked By	GEO	Sheet No.	00	Index No.
		2 of 3		5105



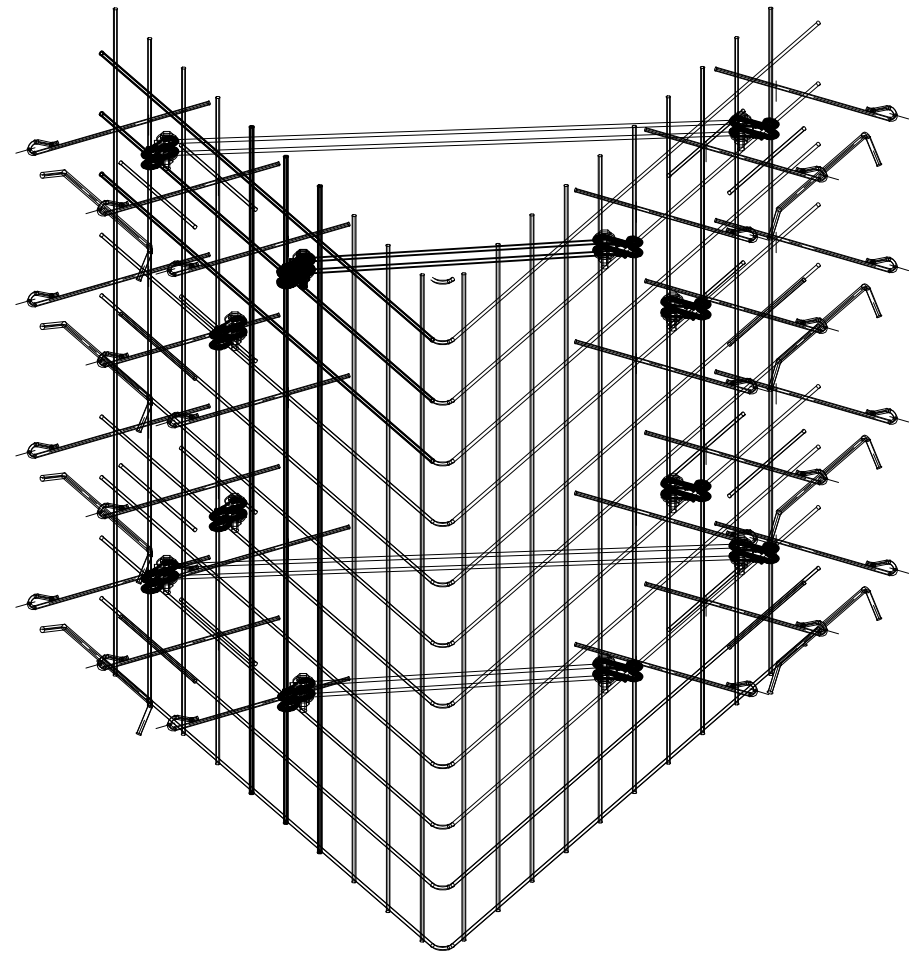
ISOMETRIC VIEW OF CONNECTION



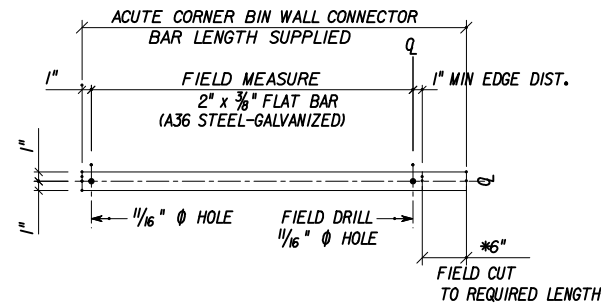
BIN WALL CONNECTOR & SOIL REINF. BAR LAYOUT



MESH AND PANEL SPACING  
(ISOMETRIC)  
(FRONT FACE)

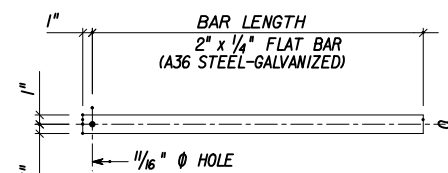


ISOMETRIC VIEW OF BIN WALL

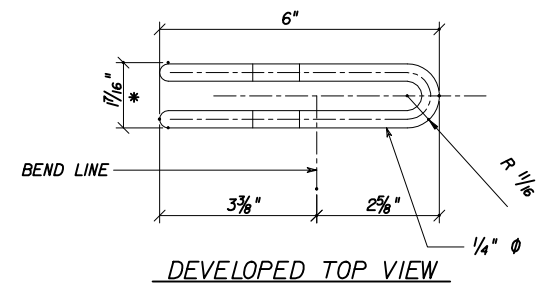


\* EXPOSED STEEL ON FIELD MODIFIED END SHALL BE COATED WITH ZINC RICH PAINT

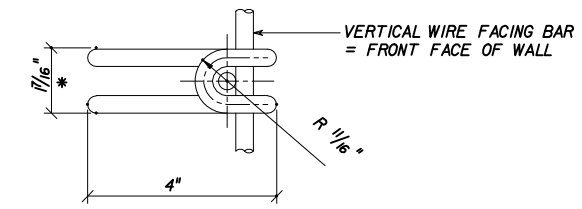
32 BIN WALL CONNECTOR BAR



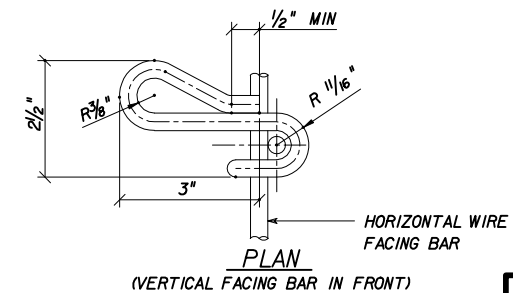
33 SOIL REINFORCING BAR



DEVELOPED TOP VIEW



ELEVATION



PLAN  
(VERTICAL FACING BAR IN FRONT)

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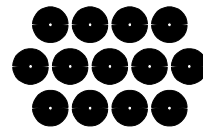
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
FOSTER GEOTECHNICAL WIRE  
FACE WALL

Names	Dates	Approved By		
Designed By	TCNA	11/98	State Structures Design Engineer	
Drawn By	CAD	11/98	Revision	Sheet No.
Checked By	GEO	11/98	00	3 of 3
				5105

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*





# TAI The Reinforced Earth Company

8614 WESTWOOD CENTER DRIVE SUITE 1100, VIENNA, VIRGINIA 22182 (703) 821-1175

## TERRATREL™ A WIRE FACED MSE WALL SYSTEM

### DESIGN CRITERIA

- DESIGN IS BASED ON THE ASSUMPTION THAT THE MATERIAL WITHIN, BEHIND, AND BENEATH THE REINFORCED VOLUME, METHODS OF CONSTRUCTION, AND QUALITY OF PREFABRICATED MATERIALS SHALL CONFORM TO SECTION 548.
- SOIL PARAMETERS:  
SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF FRICTION ANGLE ( $\phi$ ), COHESION ( $c$ ) AND TOTAL UNIT WEIGHT ( $\gamma$ ) SHALL BE PROVIDED IN THE SHOP DRAWINGS.
- THE MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS AS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE ENGINEER TO DETERMINE THAT THIS APPLIED BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.
- ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED VOLUME, AS DETERMINED BY THE ENGINEER, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL OR OTHERWISE STABILIZED AS DIRECTED BY THE ENGINEER.
- THE MINIMUM FACTORS OF SAFETY REQUIRED FOR DESIGN  
OVERTURNING = 2.0  
SLIDING = 1.5  
INTERNAL PULLOUT = 1.5  
(ALLOWABLE DEFORMATION = 0.75 INCH)  
BEARING CAPACITY = 2.5  
OVERALL STABILITY = 1.5  
STEEL SOIL REINFORCEMENT = 0.55F<sub>y</sub> AT END OF DESIGN LIFE AND 0.50 F<sub>u</sub> AT NET SECTION OF BOLTED CONNECTION  
MAXIMUM PULLOUT FACTOR  
FOR STRIPS f\* (FOR SAND) = 1.5  
(FOR LIMEROCK) = 2.0  
FOR LADDERS N<sub>p</sub>MAX = 30

### LAYOUT

- FOR LOCATION OF THE WALLS, SEE RETAINING WALL CONTROL PLANS.

### CONSTRUCTION

- BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548. INSTALLATION OF REINFORCING LADDERS SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL.
- IF STRUCTURES IN EXCESS OF 20' IN HEIGHT OCCUR, THE FINISHED GRADE IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS A HEIGHT OF 20'. FINISHED GRADE BACKFILL SHALL BE COMPACTED TO 95% OF AASHTO T-180 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

### CONFLICTING STRUCTURES

- IF MANHOLES AND DROP INLETS ARE PRESENT, THEY SHALL BE LOCATED AS SHOWN ON THE WALL ELEVATIONS.
- IF PILES ARE LOCATED WITHIN THE REINFORCED VOLUME, THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE WALL UNLESS A METHOD TO PROTECT THE STRUCTURE, WHICH IS ACCEPTABLE TO THE ENGINEER AND THE REINFORCED EARTH COMPANY, IS PROPOSED AND APPROVED IN WRITING.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY GUARDRAIL POSTS WITHIN THE REINFORCED VOLUME. PRIOR TO PLACEMENT OF THE TOP LAYERS OF REINFORCEMENTS, INDIVIDUAL REINFORCING LADDERS MAY BE SYSTEMATICALLY SHIFTED TO AVOID THE POST LOCATIONS IF AUTHORIZED BY THE ENGINEER. ANY DAMAGE DONE TO THE REINFORCING LADDERS DUE TO INSTALLATION OF GUARDRAIL POSTS SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
- IF EXISTING OR FUTURE STRUCTURES, PIPES, FOUNDATIONS OR GUARDRAIL POSTS WHICH ARE WITHIN THE REINFORCED VOLUME INTERFERE WITH THE NORMAL PLACEMENT OF REINFORCING LADDERS AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED ON THE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE WHAT COURSE OF ACTION SHOULD BE TAKEN, UNLESS SHOWN OTHERWISE.
- THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING UPPER REINFORCING LADDERS DOWNWARD TO AVOID CONFLICTS WITH PAVING AND SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPERELEVATION AND/OR SOIL MIXING ARE ANTICIPATED.

### MATERIALS NOTES

#### 14. SUPPLIES

ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:

- PREFABRICATED WIRE FACING PANELS
- WIRE REINFORCING LADDERS OR STRIPS
- HANDLE BAR CONNECTORS OR PINS
- MX4 SOIL RETENTION FABRIC OR EQUAL

ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR.

#### 15. LADDER OR STRIP LENGTH

THE REINFORCING LADDER LENGTHS SHOWN ON THE PLANS ARE MEASURED FROM THE BACK FACE OF THE WIRE FACING PANELS TO THE LIMIT OF THE SELECT BACKFILL MATERIAL, AND ARE THE LENGTHS USED IN THE REINFORCEMENT DESIGN CALCULATIONS.

- THE REINFORCED EARTH COMPANY SUPPLIES FACING PANELS AND ACCESSORIES TO BE USED IN CONJUNCTION WITH OTHER MATERIALS IN THE CONSTRUCTION OF THE REINFORCED EARTH® RETAINING WALLS DETAILED HEREIN. THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL FURNISHED BY THE REINFORCED EARTH COMPANY IS INTENDED TO PROVIDE A GENERAL EXPLANATION OF THE SYSTEM. IT IS THE CONTRACTOR'S OBLIGATION TO DEVISE AND EXECUTE A PROJECT SPECIFIC ERECTION SEQUENCE, PANEL UNLOADING, HANDLING AND BRACING SYSTEM, AND FALL PROTECTION SYSTEM. THE BRACING SYSTEM SHOWN IN THE CONSTRUCTION AND QUALITY CONTROL PROCEDURES MANUAL IS GENERAL IN NATURE AND DOES NOT ACCOUNT FOR PROJECT SPECIFIC CRITERIA. COMPLIANCE WITH THE GUIDELINES IN THIS MANUAL DOES NOT RELIEVE THE CONTRACTOR OF ITS RESPONSIBILITY TO ADHERE TO THE PROJECT PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS OR COMPLIANCE WITH ALL FALL PROTECTION, SAFETY, LAWS, STANDARDS AND PROCEDURES AT THE JOBSITE. CONTRACTORS SHOULD TAKE SPECIAL PRECAUTIONS TO PREVENT THE PANELS FROM SHIFTING OR FALLING DURING THE ERECTION PROCESS.
- THE REINFORCED EARTH COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.
- THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO THE REINFORCED EARTH COMPANY, AND IS BEING FURNISHED FOR THE USE OF FLORIDA DEPARTMENT OF TRANSPORTATION ONLY IN CONNECTION WITH FDOT PROJECTS, AND THE INFORMATION CONTAINED HEREIN IS NOT TO BE TRANSMITTED TO ANY OTHER ORGANIZATION UNLESS SPECIFICALLY AUTHORIZED IN WRITING BY THE REINFORCED EARTH COMPANY. THE REINFORCED EARTH COMPANY IS EXCLUSIVE LICENSEE IN THE UNITED STATES UNDER PATENTS ISSUED TO HENRY VIDAL, AND THE FURNISHING OF THIS DRAWING DOES NOT CONSTITUTE AN EXPRESSED OR IMPLIED LICENSE UNDER THE VIDAL PATENTS.
- THESE DRAWINGS ARE CERTIFIED WITH RESPECT TO THE INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY

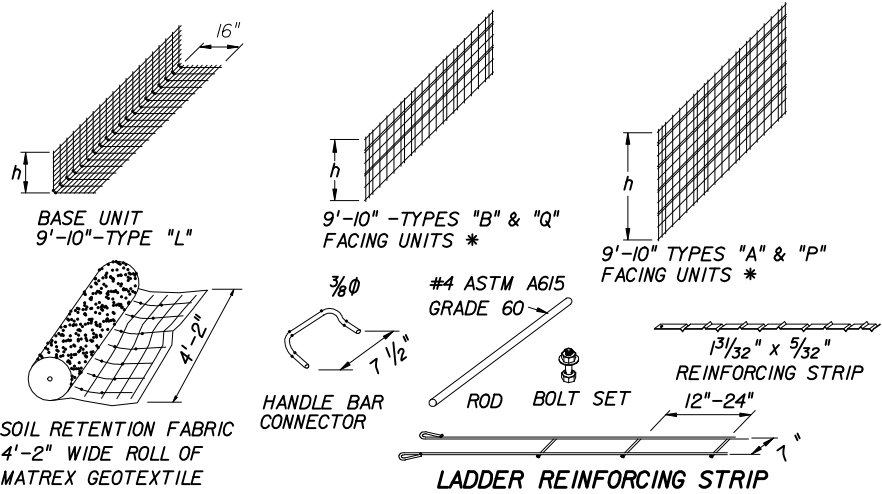
THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TERRATREL WIRE WALL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
THE REINFORCED EARTH COMPANY  
TERRATREL WIRE WALL

Names	Dates	Approved By		
Designed By			State Structures Design Engineer	
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 4	5115

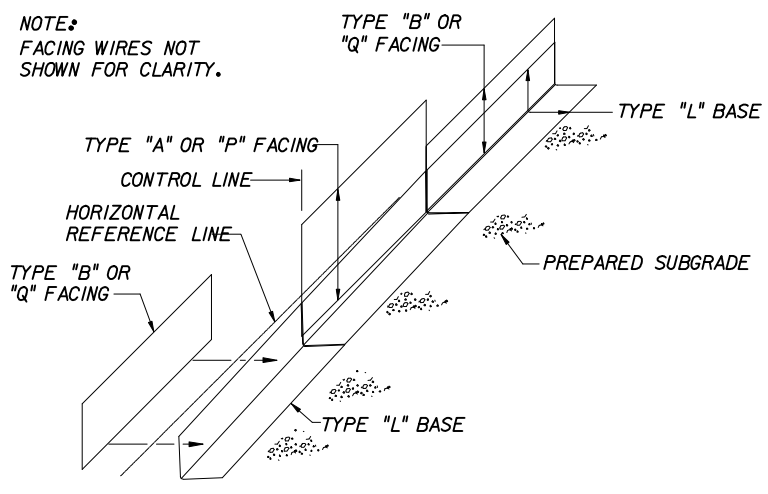
PANEL	ACTUAL HEIGHT
L	1'-4"
A	3'-11 1/4"
B	2'-3 9/16"
P	4'-9 1/16"
Q	3'-1 1/32"



TERRATREL WALL COMPONENTS

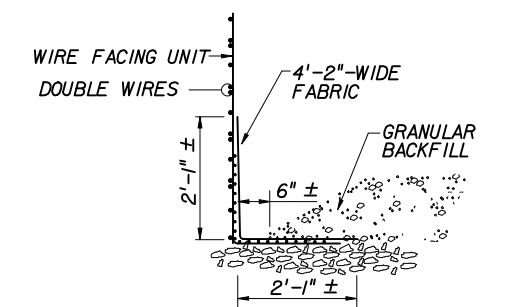
\* MINIMUM WIRE SIZE = W4  
MAXIMUM SPACING = 5 1/2"

NOTE:  
FACING WIRES NOT SHOWN FOR CLARITY.



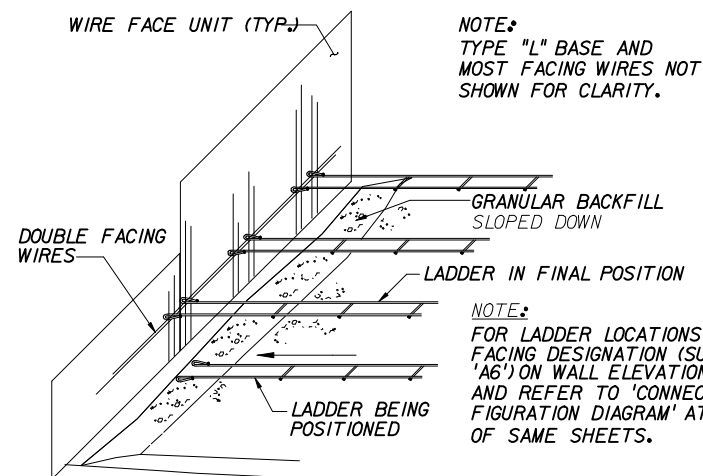
STEP 1: INSTALLATION OF BASE & 1st. FACING UNITS

- SET TYPE "L" BASE DIRECTLY ON SUBGRADE (FOLLOW SLOPE).
- ATTACH FIRST FACING UNITS TO TYPE "L" BASES. SET FACING UNITS HORIZONTALLY (EXCEPT WHEN NOTE ON ELEV. SHEETS REQUIRE UNITS TO FOLLOW SLOPE).
- ALIGN THE WIRES BETWEEN MATCHING GRIDS AND TIE-WIRE THE TWO ELEMENTS SECURELY TOGETHER.



- PLACE 4'-2"-WIDE FABRIC AS SHOWN.
- PLACE AND COMPACT FIRST GRANULAR BACKFILL. LIFT TO LEVEL OF FIRST DOUBLE WIRE LOCATION. FILL MUST BE SLOPED DOWN AS SHOWN.

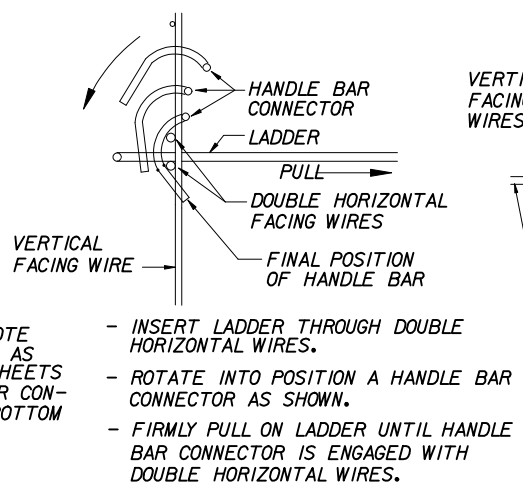
STEP 2: 1st. BACKFILL LIFT



STEP 3: INSTALLATION OF 1st. LADDERS

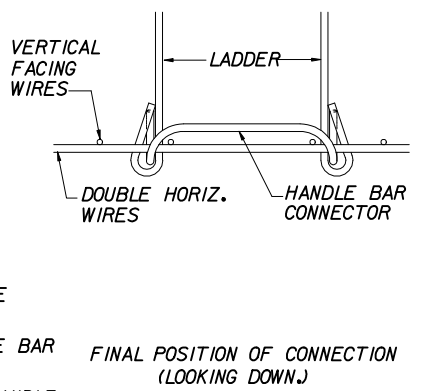
NOTE:  
TYPE "L" BASE AND MOST FACING WIRES NOT SHOWN FOR CLARITY.

NOTE:  
FOR LADDER LOCATIONS, NOTE FACING DESIGNATION (SUCH AS 'A6') ON WALL ELEVATION SHEETS AND REFER TO 'CONNECTOR CONFIGURATION DIAGRAM' AT BOTTOM OF SAME SHEETS.



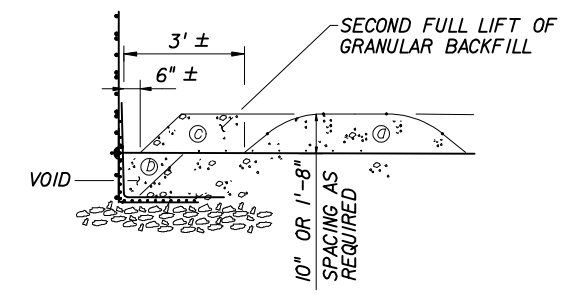
- INSERT LADDER THROUGH DOUBLE HORIZONTAL WIRES.
- ROTATE INTO POSITION A HANDLE BAR CONNECTOR AS SHOWN.
- FIRMLY PULL ON LADDER UNTIL HANDLE BAR CONNECTOR IS ENGAGED WITH DOUBLE HORIZONTAL WIRES.

SECTION DETAIL



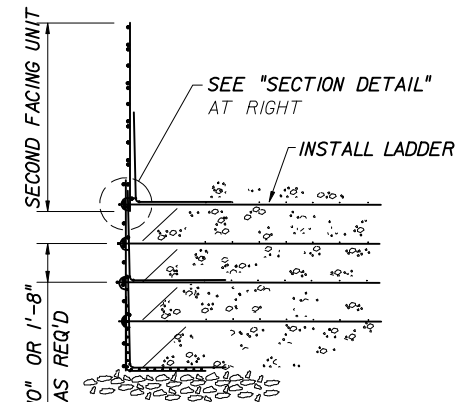
PLAN DETAIL

- PLACE ENOUGH BACKFILL OVER LADDERS TO SECURE POSITION AS SHOWN.
- THEN FILL VOID UNDER LADDERS NEAR FACING.
- THEN PLACE AND COMPACT SECOND GRANULAR BACKFILL LIFT TO NEXT LADDER LEVEL. FILL BEHIND WIRE FACING UNITS MUST BE SLOPED DOWN AS SHOWN.

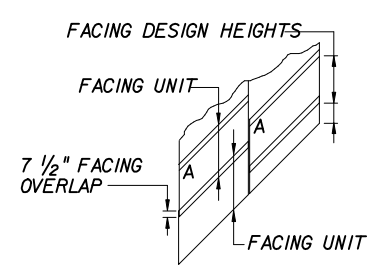


STEP 4: 2nd. BACKFILL LIFT

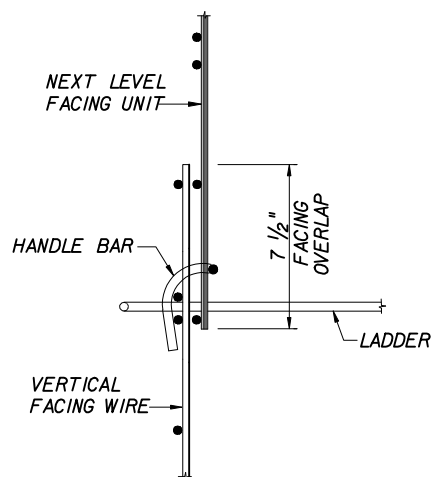
- POSITION SECOND FACING UNIT DIRECTLY BEHIND, AND OVERLAP, LOWER FACING UNIT. TIE ITS LOWER PORTION TO ADJACENT FACING UNITS.
- PLACE LADDERS AS PER "STEP 3."
- BACKFILL AS PER "STEP 4a AND 4b."
- PLACE 4'-2"-WIDE FABRIC AS SHOWN IN "STEP 2." NOTE: FABRIC MUST ALWAYS BE APPROX. 2'-1" VERTICAL. WHEN WALL ELEVATIONS CALL FOR 10" SPACING BETWEEN LADDERS, FABRIC MUST BE SLIT FOR PENETRATION OF MID-LEVEL LADDERS.
- BACKFILL AS PER "STEP 4c."



STEP 5: INSTALLATION OF 2nd. FACING UNITS

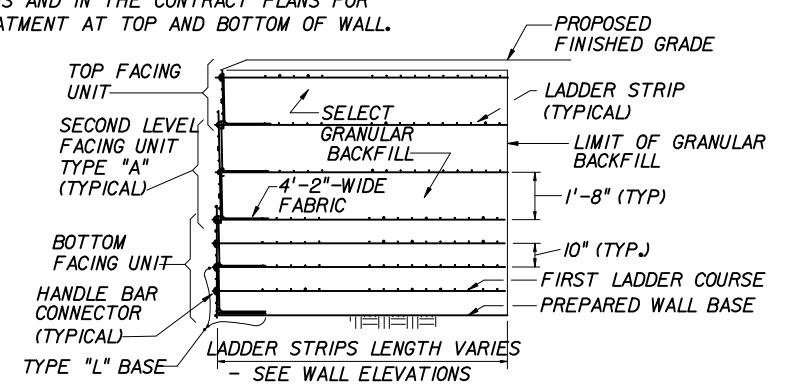


FACING DIAGRAM



SECTION DETAIL

NOTE:  
SEE TYPICAL "TYPICAL SECTION" IN THESE PLANS AND IN THE CONTRACT PLANS FOR TREATMENT AT TOP AND BOTTOM OF WALL.

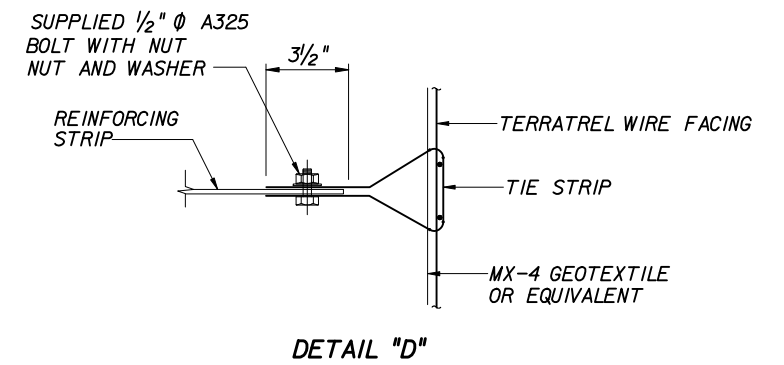
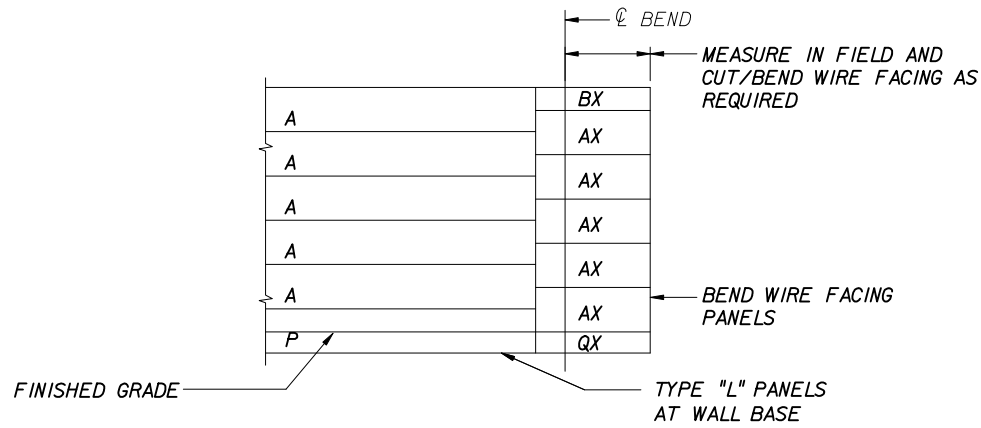
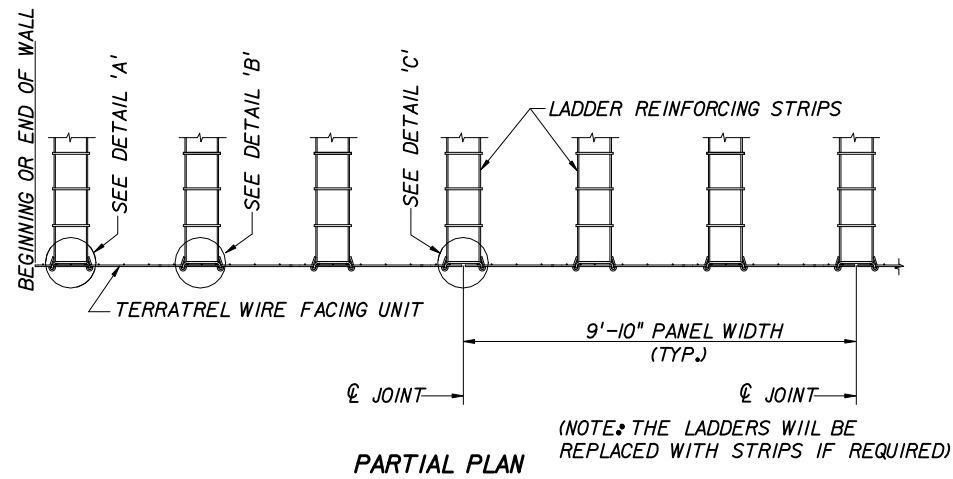


REPEAT "STEP 5" UNTIL WALL IS TOPPED OUT AS SHOWN ABOVE.  
COMPLETED TERRATREL WALL SECTION

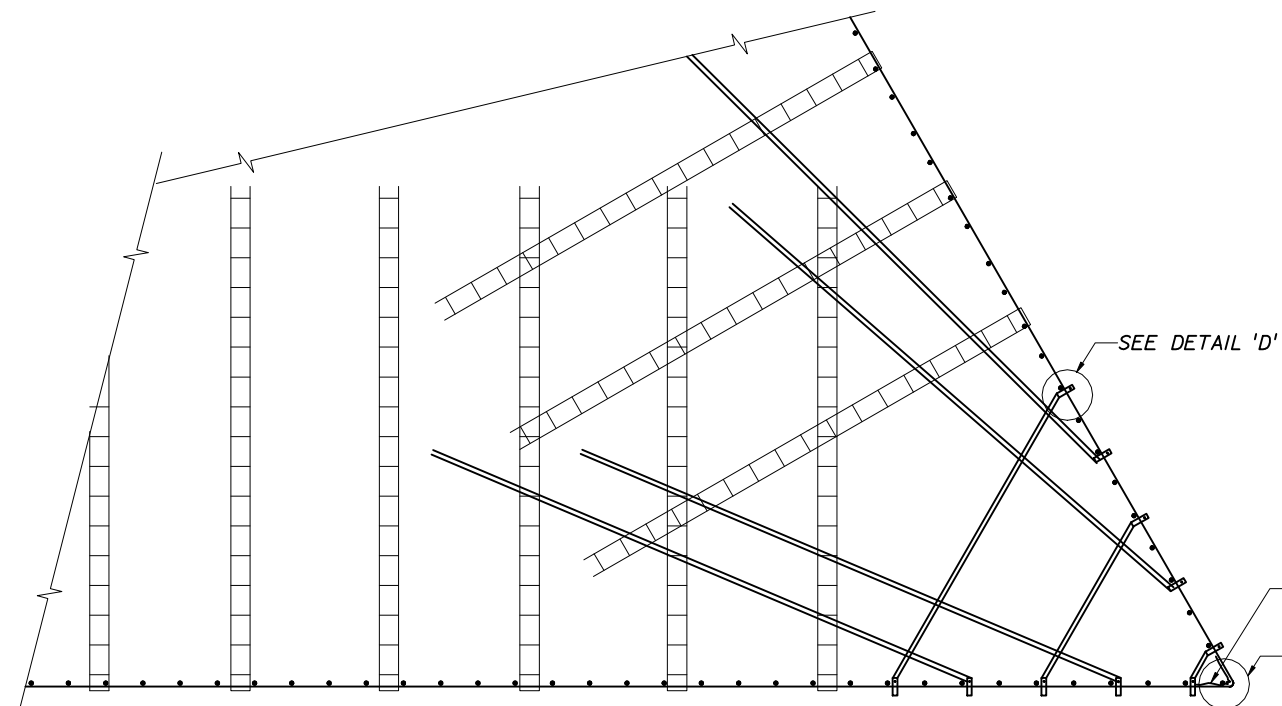
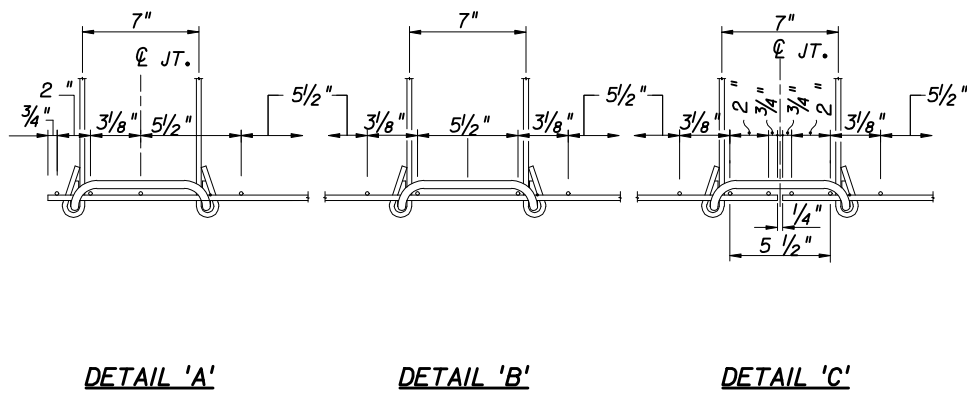
TEMPORARY TERRATREL WIRE WALL CONSTRUCTION PROCEDURE

THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TERRATREL WIRE WALL

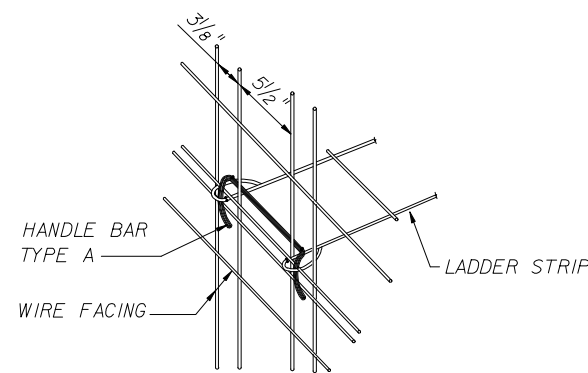
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE REINFORCED EARTH COMPANY TERRATREL WIRE WALL</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	2 of 4	5115



**WIRE FACING AT  
INSIDE AND OUTSIDE CORNERS**



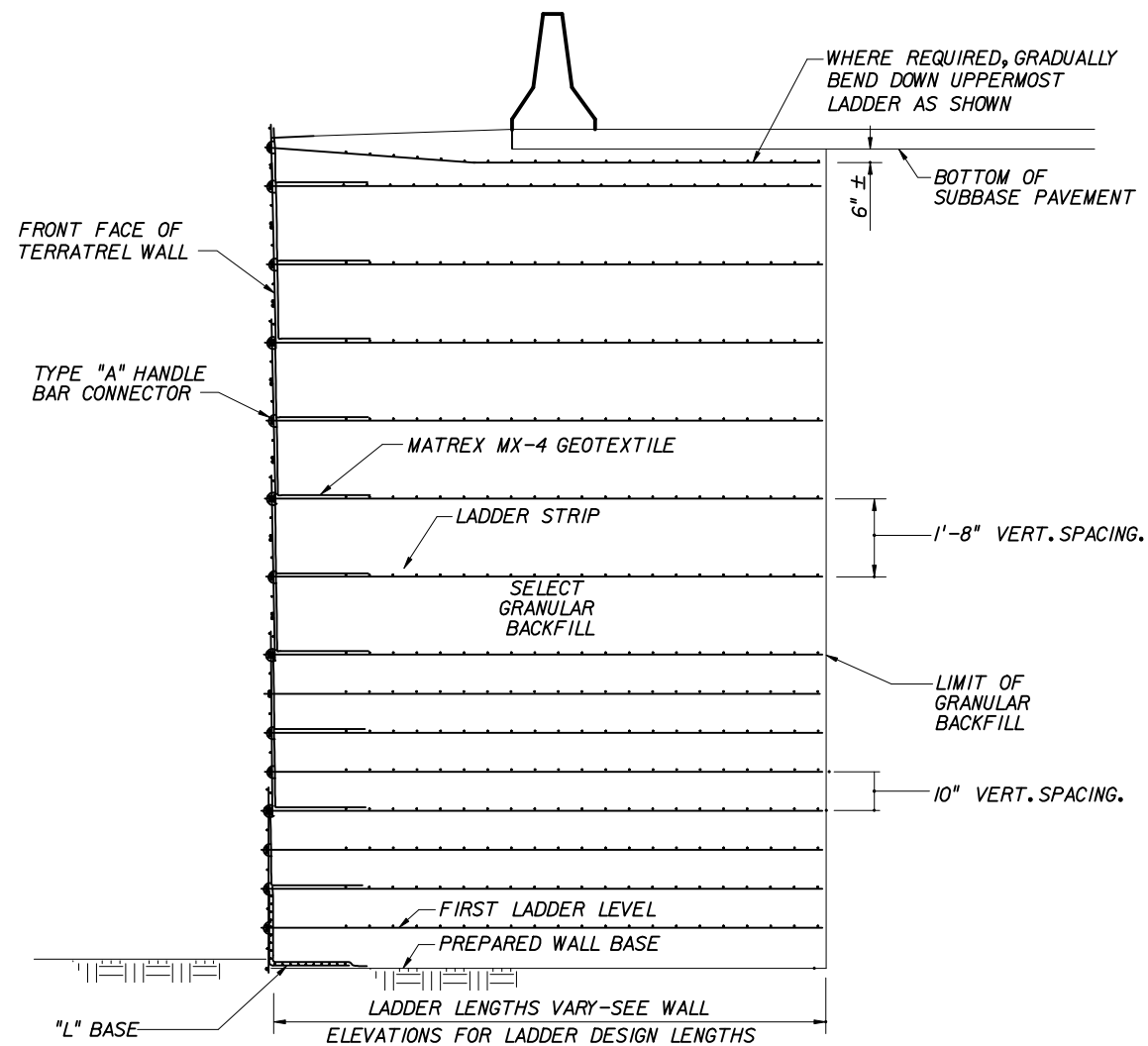
THIS SYSTEM SHALL BE USED IN SLIGHTLY OR MODERATELY AGGRESSIVE ENVIRONMENTS ONLY  
TERRATREL WIRE WALL



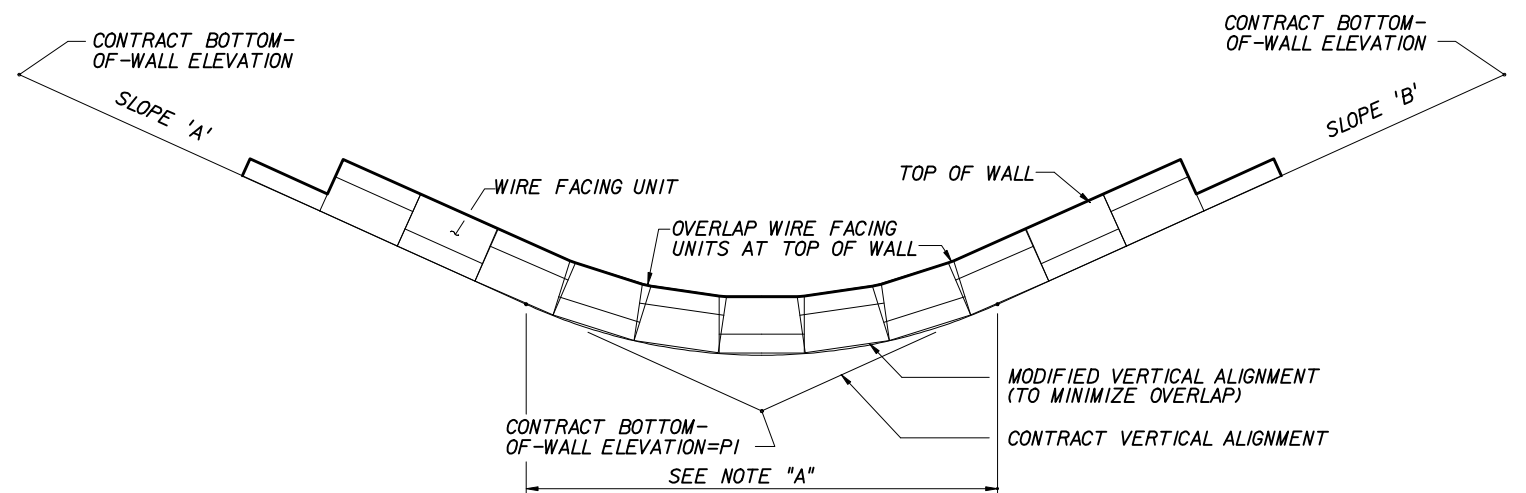
TYPE A HANDLE BAR CONNECTION IN PERSPECTIVE

TERRATREL TYPE A CONNECTION DETAILS

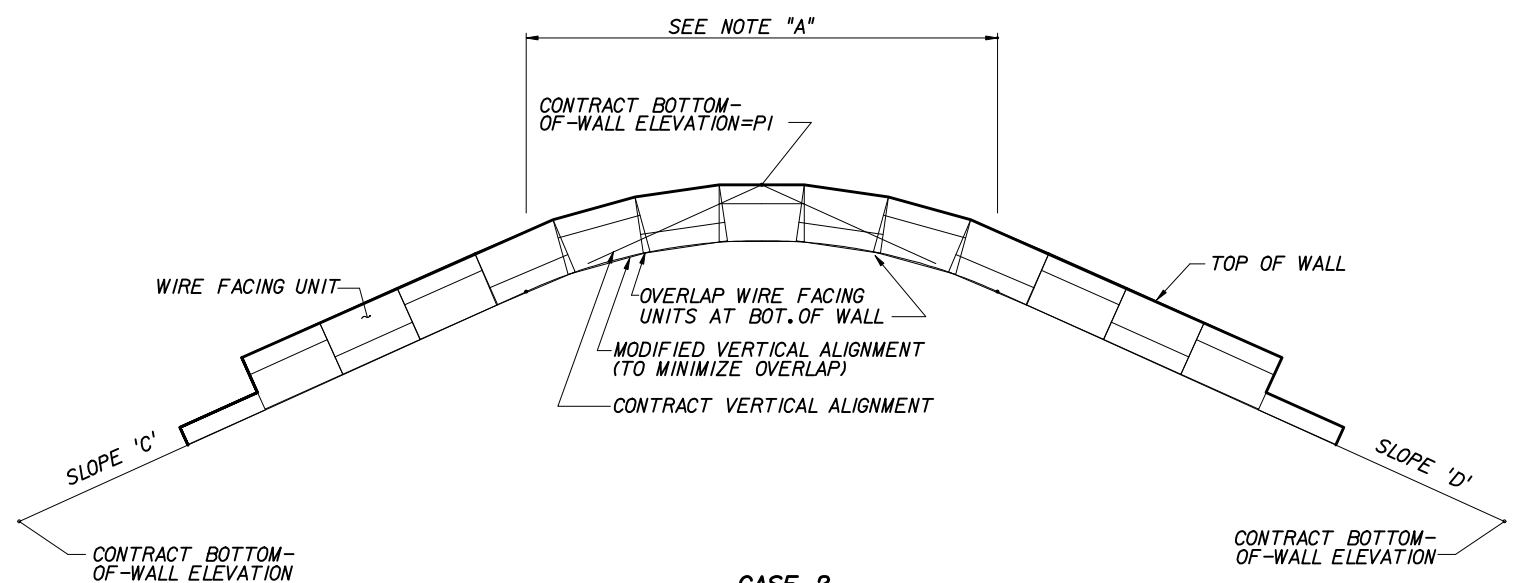
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE REINFORCED EARTH COMPANY TERRATREL WIRE WALL</b>				
Designed By		Names	Dates	Approved By <i>[Signature]</i>
Drawn By		Revision	Sheet No.	State Structures Design Engineer
Checked By		00	3 of 4	Index No. 5115



TYPICAL WALL SECTION



CASE 1



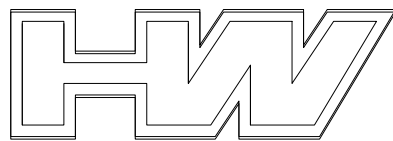
CASE 2

VERTICAL ALIGNMENT DIAGRAMS

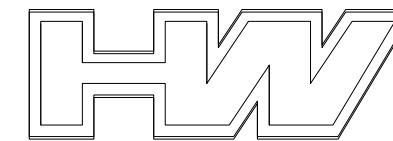
(SLOPES HAVE BEEN SHOWN EXAGGERATED FOR CLARITY)  
 ADDING THE CURVES TO THE VERTICAL ALIGNMENT IS OPTIONAL, AND WHEN USED,  
 MAY ELIMINATE OVERLAPPING FOR LOW WALLS (10 TO 15 FT. IN HEIGHT) WITH SMALL  
 CHANGES IN SLOPE UP TO 3%.

THIS SYSTEM SHALL BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM THE REINFORCED EARTH COMPANY TERRATREL WIRE WALL</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By			Revision	Sheet No. Index No.
			00	4 of 4 5115



# HILFIKER MSE WELDED WIRE WALL SYSTEM



## GENERAL NOTES

### DESIGN CRITERIA

- THE ATTACHED DETAILS ARE BASED ON THE ASSUMPTIONS THAT THE MATERIAL WITHIN THE REINFORCED VOLUME, METHODS OF CONSTRUCTION AND QUALITY OF PREFABRICATED COMPONENTS MEET THE GOVERNING AGENCIES SPECIFICATION FOR MECHANICALLY STABILIZED EARTH STRUCTURES
- MINIMUM DESIGN PARAMETERS  
REFERENCE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF THE INTERNAL FRICTION ANGLE  $\phi$ , THE COHESION,  $C$ , AND THE UNIT WEIGHT,  $\gamma$ , SHALL BE PROVIDED IN THE SHOP DRAWINGS.  
  
EXTERNAL STABILITY  
OVERTURNING  $\geq 2.0$   
SLIDING  $\geq 1.5$   
BEARING PRESSURE  $\geq 2.5$   
  
OVERALL STABILITY  $\geq 1.5$   
INTERNAL STABILITY  
PULLOUT  $\geq 1.5$   
STEEL YIELD STRESS =  $0.47 F_y$   
SERVICE LIFE = 75 YEARS  
LIVE LOAD SURCHARGE = 250 PSF
- THE MAXIMUM APPLIED BEARING PRESSURE AT THE INTERFACE OF THE FOUNDATION AND SELECT BACKFILL MATERIAL IS SHOWN ON THE PLANS. THE BEARING PRESSURE SHOWN IS THE MAXIMUM FOR THE GIVEN BASE MAT LENGTH. IT IS THE RESPONSIBILITY OF OTHERS TO DETERMINE THAT THE BEARING PRESSURE IS ALLOWABLE FOR THAT LOCATION.
- ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED VOLUME AS DETERMINED BY THE ENGINEER SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL AS DIRECTED BY THE ENGINEER.
- THE DESIGN CONTAINED ON THESE DRAWINGS ARE BASED ON INFORMATION PROVIDED BY OTHERS. ON THE BASIS OF THIS INFORMATION, T&B STRUCTURAL SYSTEMS IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

### WALL CONSTRUCTION

- WALLS FOUNDED ON CURVES SHALL HAVE THEIR PANELS DIMENSIONED AS A SERIES OF SHORT CORDS (AS DIMENSIONED) IN ORDER TO MATCH THE REQUIRED WALL RADIUS.
- FOR LOCATION AND ALIGNMENT OF THE MSE STRUCTURES REFERENCE THE RETAINING WALL CONTROL PLANS.
- IF MANHOLE AND DROP INLETS ARE REQUIRED, THEY SHALL BE LOCATED AS SHOWN ON THE RETAINING WALL ELEVATION DRAWINGS.
- IF PILES ARE LOCATED WITHIN THE REINFORCED VOLUME THEY SHALL BE DRIVEN PRIOR TO CONSTRUCTION OF THE WALL UNLESS AN ALTERNATE METHOD IS USED TO ISOLATE THE COLUMNS FROM THE REINFORCED VOLUME AS APPROVED BY THE ENGINEER.
- BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 548 TO A LEVEL 2" (PLUS OR MINUS) ABOVE THE ELEVATION OF THE SOIL REINFORCING ELEMENT. NO SOIL REINFORCEMENT SHALL BE ATTACHED TO ANY PANEL BEFORE THE BACKFILL IS PLACED AT THE REQUIRED ELEVATION AND IS COMPACTED.
- STRUCTURES GREATER THAN 20 FEET SHALL HAVE THE FINISHED GRADE PLACED AND COMPACTED AT THE FRONT FACE OF THE STRUCTURE BEFORE THE STRUCTURE HEIGHT EXCEEDS 20 FEET. THE FINISH GRADE SHALL BE COMPACTED TO 95 PERCENT OF AASHTO T-180 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ANY GUARDRAIL POSTS PRIOR TO PLACING THE TOP ROW OF SOIL REINFORCEMENT. THE POST SPACING SHALL BE ADJUSTED TO AVOID CONFLICTS WITH THE LONGITUDINAL SOIL REINFORCING WIRE. CUTTING OF THE LONGITUDINAL WIRE SHALL BE ALLOWED ONLY AS DIRECTED BY THE ENGINEER.
- IF EXISTING OR FUTURE STRUCTURES ARE TO BE PLACED IN THE REINFORCED VOLUME THAT INTERFERE WITH THE PROPER PLACEMENT OF THE SOIL REINFORCEMENT THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY FOR A COURSE OF ACTION.
- THE CAP MAT SHALL BE PLACED AS CLOSE TO THE TOP OF WALL LOCATION AS POSSIBLE THE REMAINING FACE PANEL ABOVE THE CAP MAT MAY BE CUT FREE
- FOR OTHER INFORMATION PERTAINING TO THE CONSTRUCTION OF THE HILFIKER RETAINING WALL PLEASE REFER TO T&B STRUCTURAL SYSTEMS ERECTION MANUAL.
- IT IS THE RESPONSIBILITY OF THE THE CONTRACTOR TO DEFLECT THE TOP CAP MAT OF THE SOIL REINFORCEMENT DOWNWARD SO AS TO NOT CONFLICT WITH ROADWAY MIXING OPERATIONS AND/OR ROADWAY CONSTRUCTION OPERATIONS. ANY SOIL REINFORCING MATERIAL THAT IS DAMAGED SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

### CONSTRUCTION NOTES

- NOMINAL SOIL REINFORCING GRID LENGTH  
  
THE WELDED WIRE MESH IS MANUFACTURED IN LENGTHS CORRESPONDING TO THE DIMENSION "B" AS GIVEN IN THE RETAINING WALL ELEVATIONS. THE ACTUAL LENGTH FROM THE FRONT FACE OF THE PANEL TO THE TAIL OF THE SOIL REINFORCING GRID IS PLUS 2'-4". THE FOUNDATION SHALL BE EXCAVATED TO AN EXTENT OF "B" PLUS 6".
- THE FOLLOWING MATERIALS ARE SUPPLIED BY T&B STRUCTURAL SYSTEMS
  - WELDED WIRE FACING PANEL
  - SOIL REINFORCING GRIDS
  - CAP MATS
  - CONNECTION PINS
  - SYNTHETIC INDUSTRIES GEOTEX 40NONWOVEN GEOTEXTILE FILTER FABRIC
 ANY OTHER MATERIAL REQUIRED TO BUILD THE MSE STRUCTURES ACCORDING TO THE GOVERNING SPECIFICATION SHALL BE SUPPLIED BY THE CONTRACTOR.
- T&B STRUCTURAL SYSTEM SUPPLIES MECHANICALLY STABILIZED EARTH STRUCTURAL COMPONENTS FOR USE WITH THE HILFIKER RETAINING WALL SYSTEMS FOR THE STRUCTURES DETAILED HEREIN. THE ERECTION MANUAL PROVIDED BY T&B STRUCTURAL SYSTEMS IS A GENERAL GUIDELINE FOR ERECTING THE HILFIKER RETAINING WALL SYSTEM. ALL QUALITY CONTROL PROCEDURES, STAGING PROCEDURES, MATERIAL HANDLING, AND SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE OBLIGATION TO CONSTRUCT THE RETAINING WALL ACCORDING TO THE PROJECT PLANS AND SPECIFICATIONS AND ALL LAWS OF THE GOVERNING STATE.

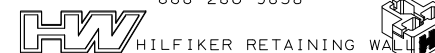
# ENGLISH

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS

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888-280-9858

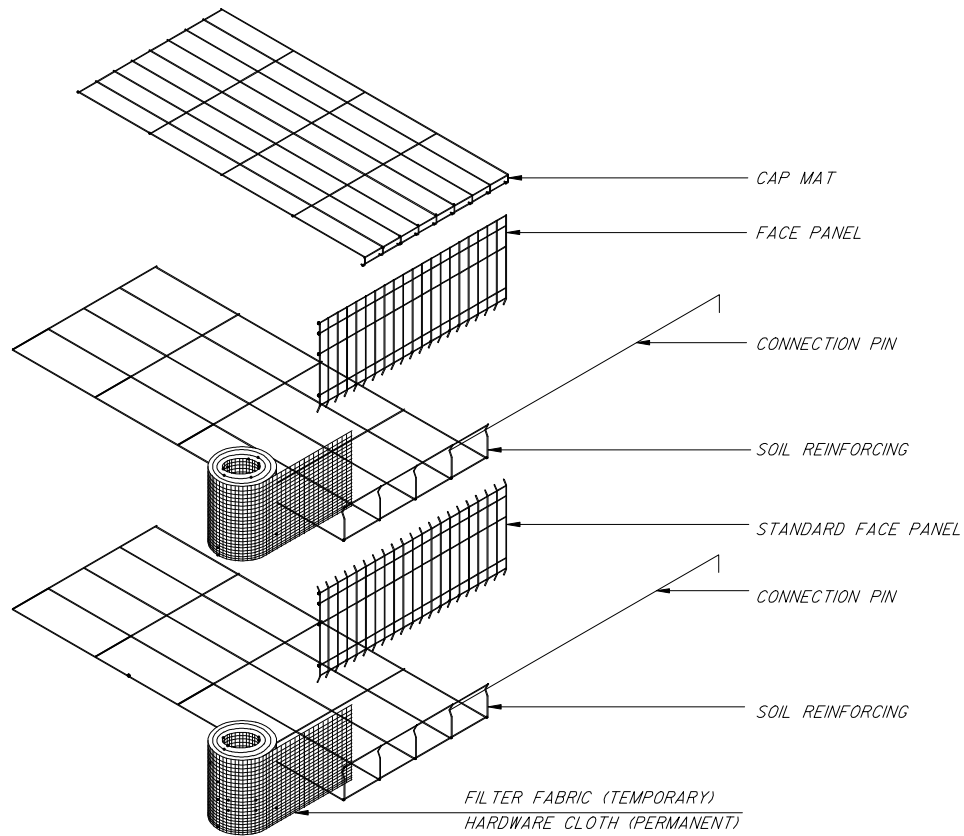


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

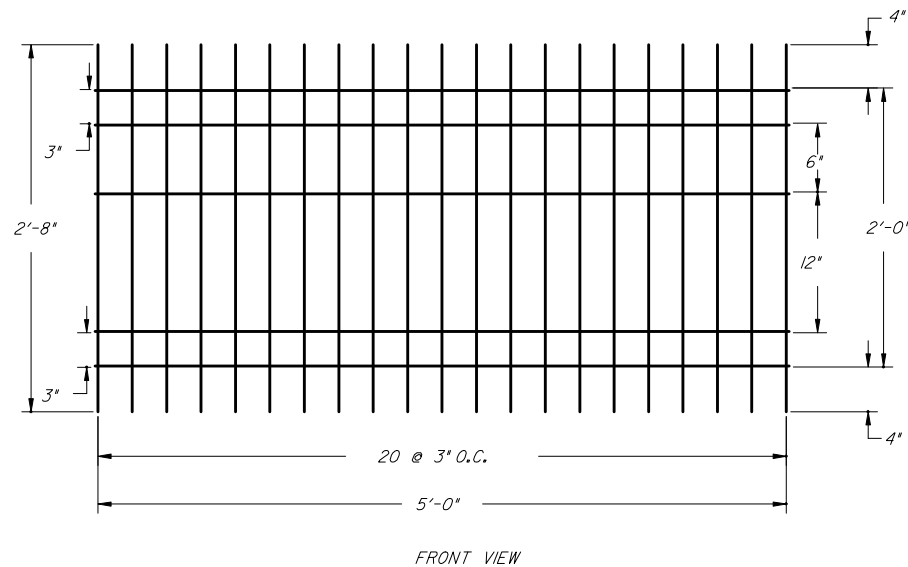
## RETAINING WALL SYSTEM HILFIKER WELDED WIRE WALL

Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By	TPT	Revision	Sheet No.	Index No.
Checked By	TBW	00	1 of 4	5120

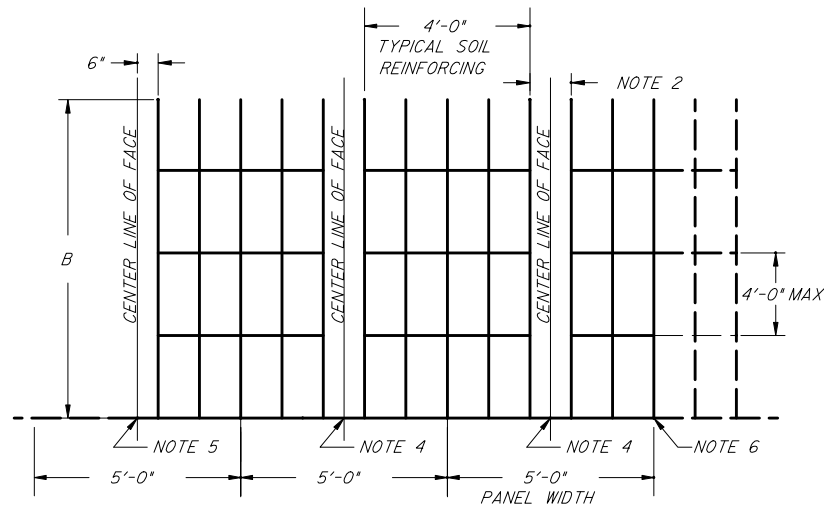
\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



**A** WELDED WIRE WALL COMPONENT ISOMETRIC



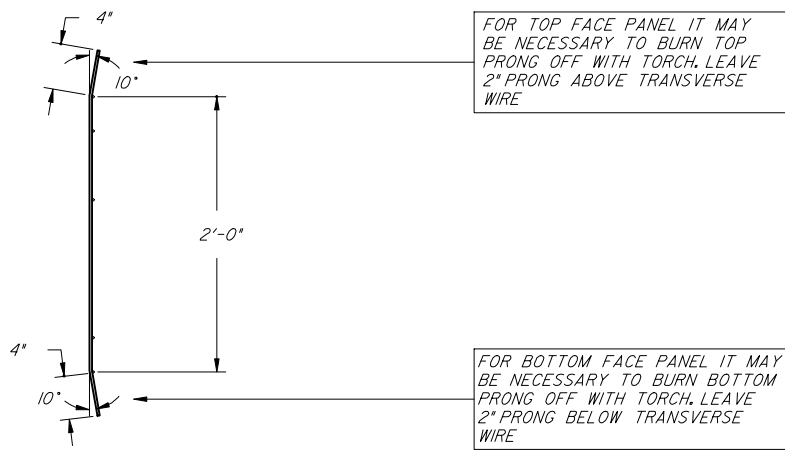
**B** FACE PANEL DETAIL  
MINIMUM WIRE SIZE IS W4.5 BOTH DIRECTIONS



**NOTE:**

1. SOIL REINFORCING MAT TO BE PLACED ON PREPARED SURFACE
2. 12" SPACE BETWEEN SOIL REINFORCING MAT U.N.O.
3. PLACE FACE PANEL AT MIDPOINT OF SOIL REINFORCING MAT
4. BUTT FACE PANEL TOGETHER AND SECURE WITH A HOG RING
5. AT START OF WALL PLACE SOIL MAT AND TRIM EXCESS FACE PANEL
6. AT END OF WALL PLACE SOIL MAT AND FACE PANEL AND TRIM EXCESS

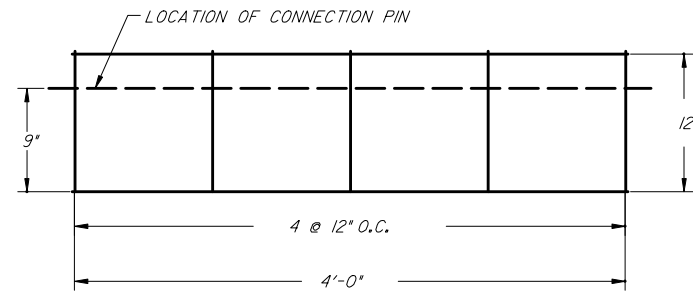
**C** SOIL REINFORCING LAYOUT PLAN



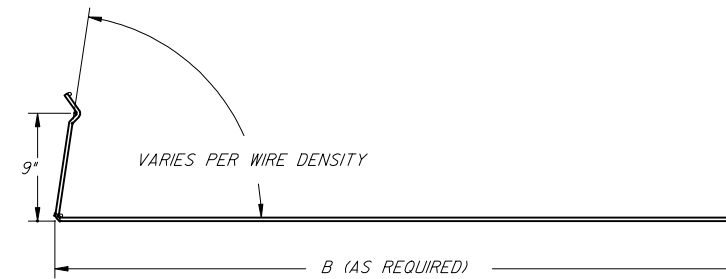
**NOTE:**

1. BOTTOM FACE PANEL MAY NEED TO HAVE PRONGS BURNED OFF IN FIELD
2. BURN PRONGS OFF 2" FROM TRANSVERSE WIRE
3. GALVANIZED FACE PANELS REQUIRE EXPOSED BLACK STEEL TO BE COATED WITH RICH ZINC PAINT OR APPROVED EQUAL
4. INTERSECTION OF ADJACENT FACE PANEL SECURE VERTICAL WIRES TOGETHER AT INTERFACE

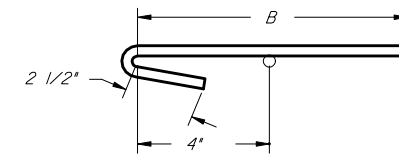
**D** FACE PANEL SECTION



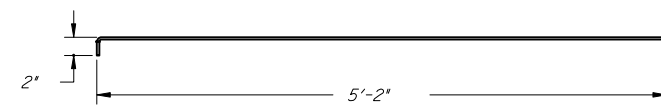
**E** SOIL REINFORCEMENT FRONT ELEVATION



**F** SOIL REINFORCEMENT SIDE ELEVATION  
MINIMUM WIRE SIZE IS W4.5



**G** CAP MAT DETAIL



**H** CONNECTION PIN DETAIL  
MINIMUM WIRE SIZE IS W4.5

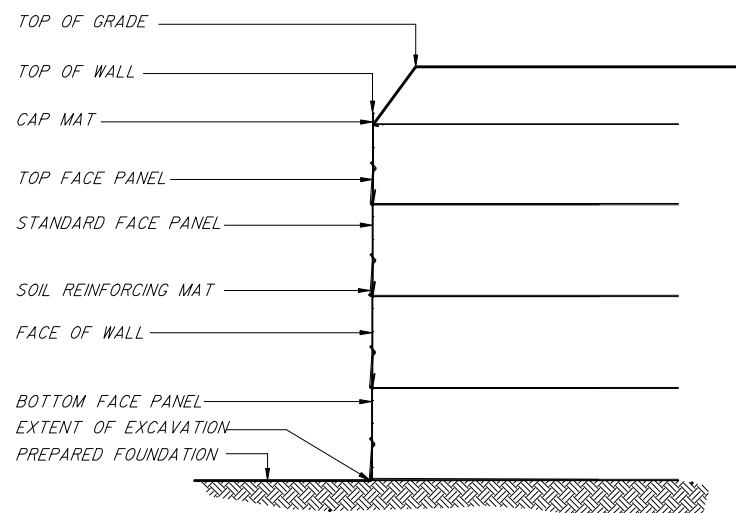
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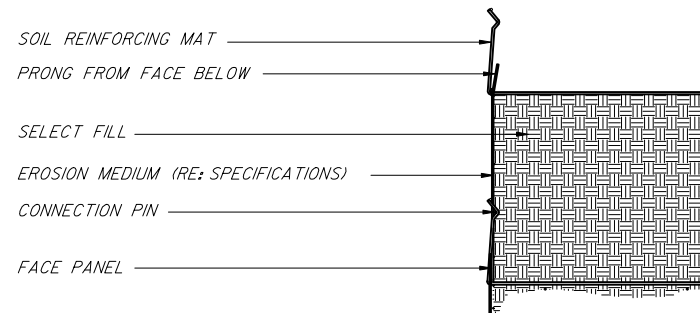
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**HW** HILFIKER RETAINING WALL

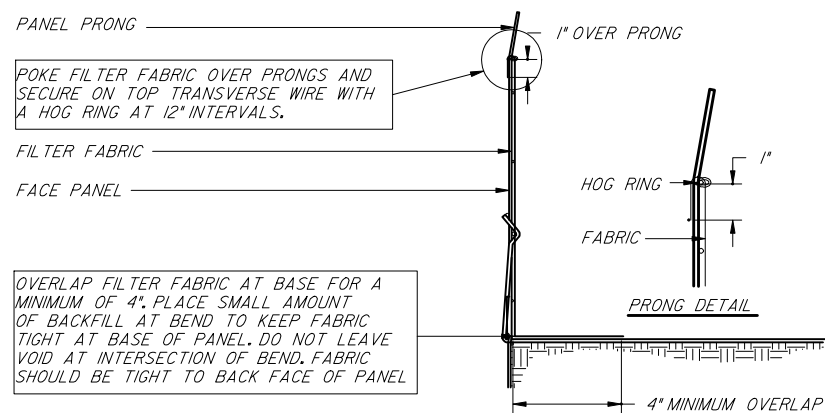
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM HILFIKER WELDED WIRE WALL</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By	TPT		State Structures Design Engineer	
Checked By	TBW		Revision	Sheet No. Index No.
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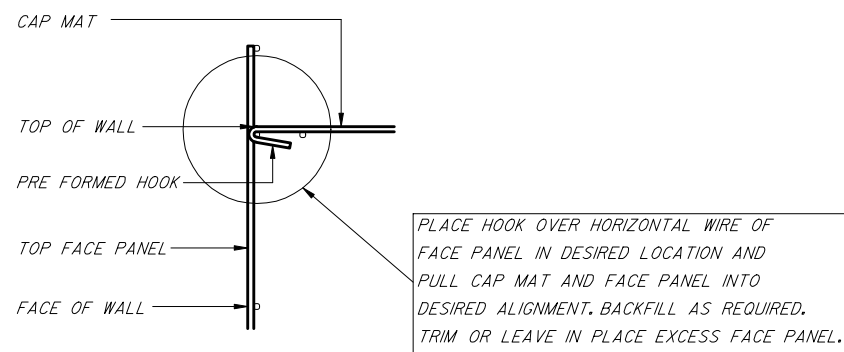
**A** TYPICAL SECTION WELDED WIRE WALL



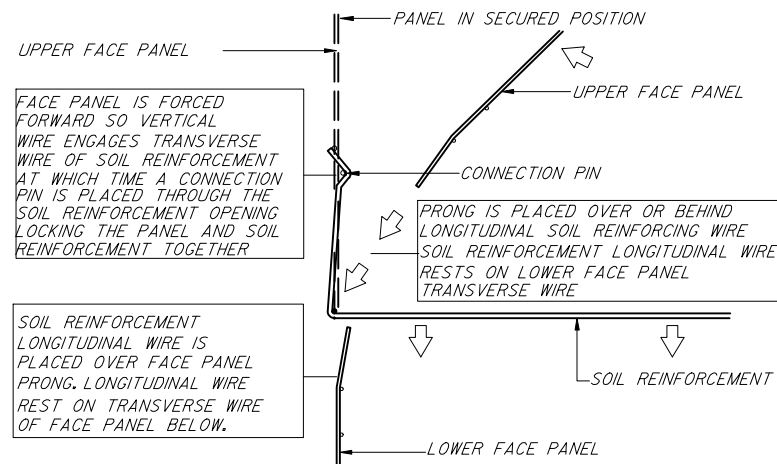
**B** WELDED WIRE WALL LIFT SECTION



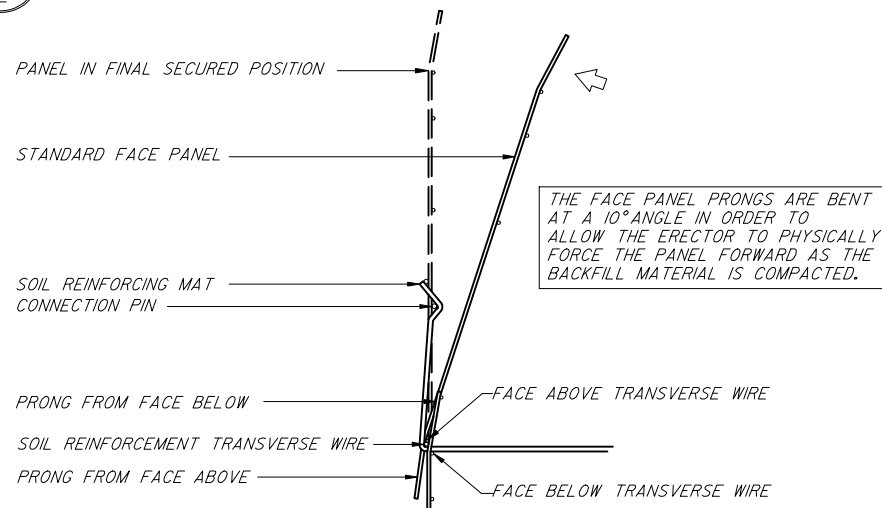
**C** FILTER FABRIC PLACEMENT



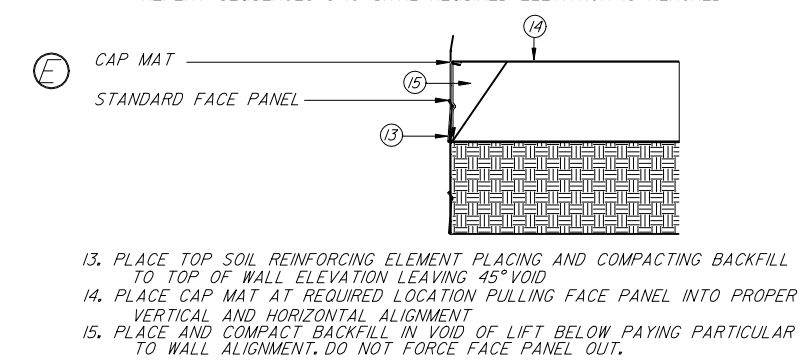
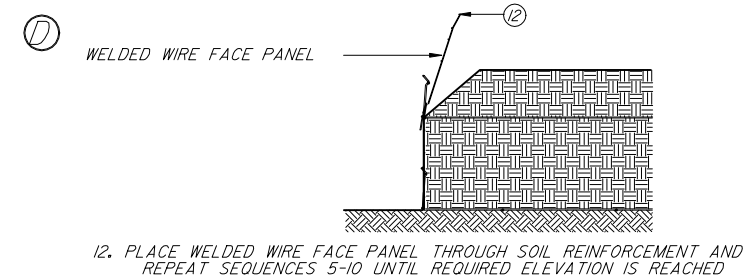
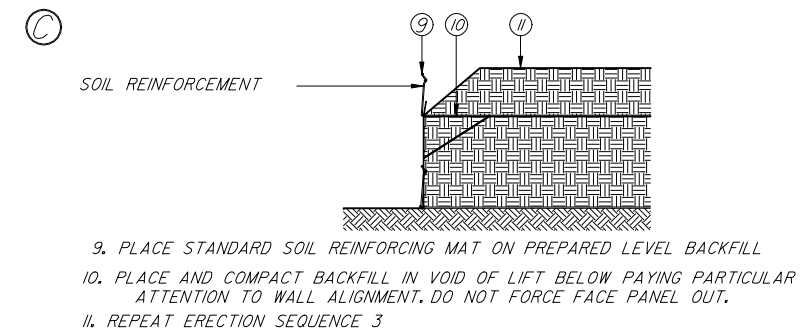
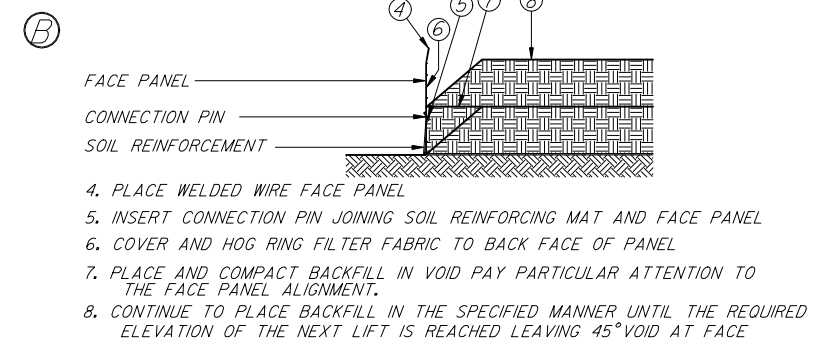
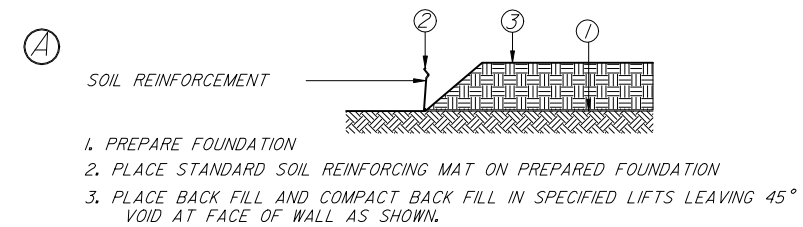
**D** CAP MAT CONNECTION DETAIL



**E** SOIL REINFORCEMENT CONNECTION SEQUENCE



**F** SOIL REINFORCEMENT CONNECTION SEQUENCE



**G** CONSTRUCTION SEQUENCE

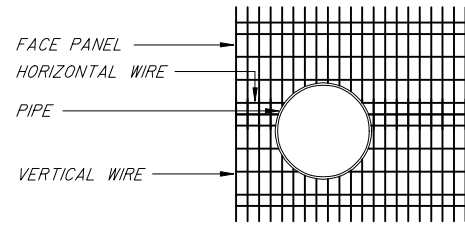
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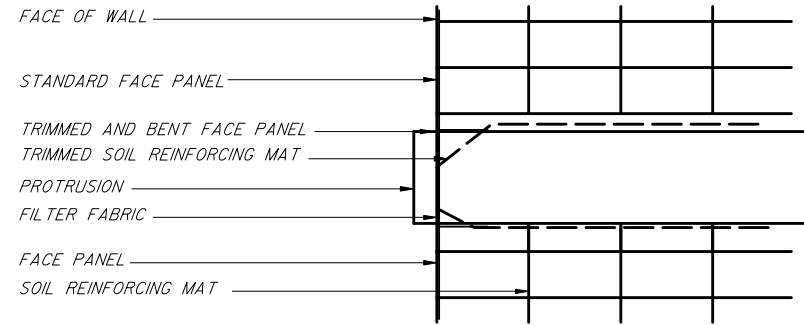
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<b>RETAINING WALL SYSTEM HILFIKER WELDED WIRE WALL</b>				
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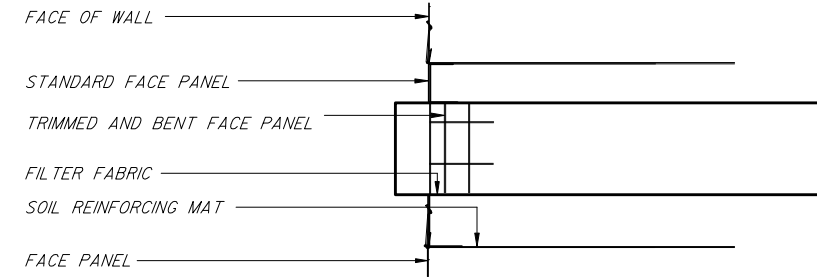
\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



NOTE:  
TRIM PROTRUSION AREA FROM FACE PANEL BY CUTTING HORIZONTAL WIRE BETWEEN EACH VERTICAL WIRE. BEND WIRES BACK INTO MSE MASS AND AS CLOSE TO PROTRUSION AS POSSIBLE. APPLY FILTER FABRIC OVER AND AROUND PROTRUSION MAKING SURE FACE PANEL IS COVERED. MAKE SURE THAT ALL GAPS BETWEEN FACE AND PROTRUSION ARE COVERED WITH FILTER FABRIC. IF PROTRUSION INTERFERES WITH SOIL REINFORCING MAT CUT TRANSVERSE WIRES OF MAT AND BEND LONGITUDINAL WIRE TO PASS PROTRUSION AND CONFORM TO THE PROTRUSIONS SHAPE.

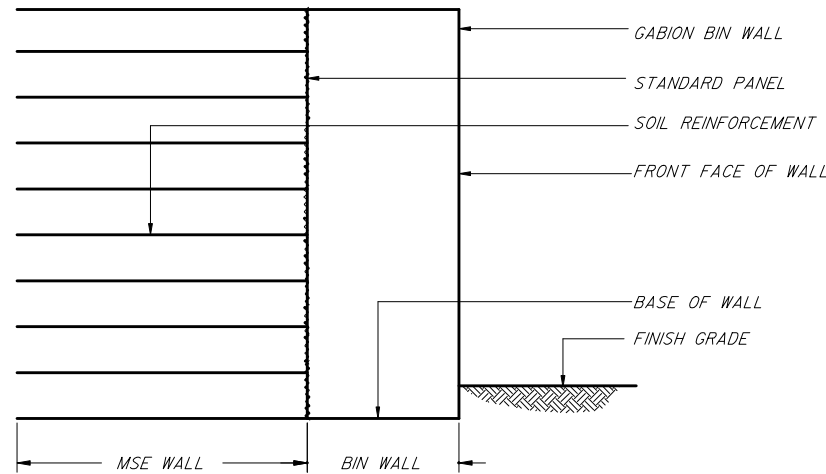


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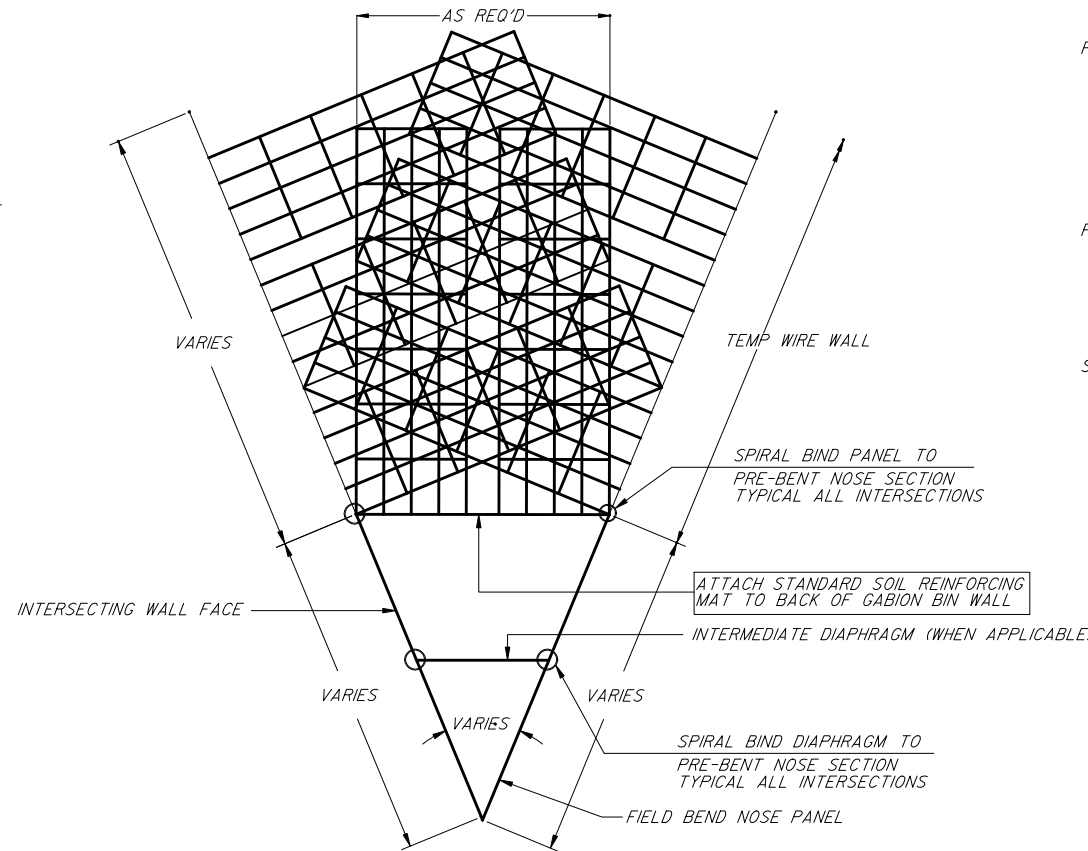


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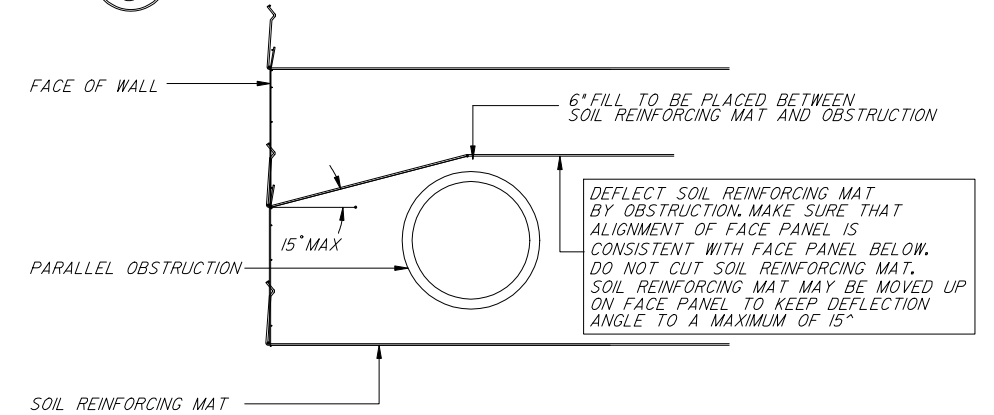
**A** TYPICAL ELEVATION THROUGH PENETRATION



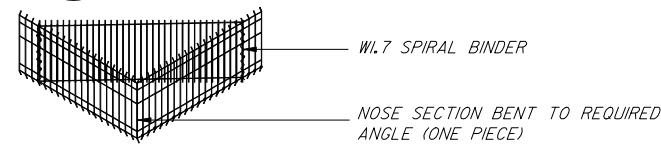
**D** TYPICAL PLAN VIEW THROUGH PENETRATION



**F** TYPICAL SECTION THROUGH PENETRATION



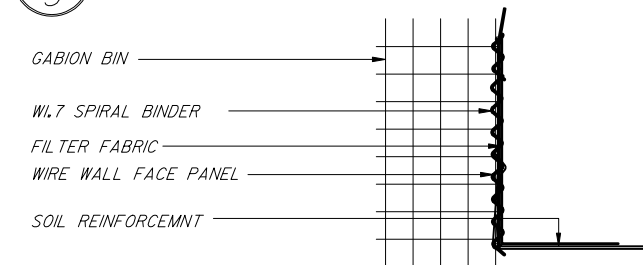
**B** TYPICAL SECTION THROUGH BIN



NOTE: 12 GAUGE GALVANIZED STEEL HOG RING MAY BE SUBSTITUED FOR SPIRAL BINDER. HOG RINGS TO BE ATTACHED AT 3" CENTERS TOP TO BOTTOM.

**C** ISOMETRIC OF BIN GABION NOSE SECTION

**G** SECTION AT PARALLEL OBSTRUCTION



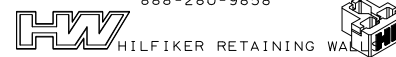
NOTE: 12 GAUGE GALVANIZED STEEL HOG RING MAY BE SUBSTITUED FOR SPIRAL BINDER. HOG RINGS TO BE ATTACHED AT 3" CENTERS

**H** SPIRAL BINDER CONNECTION

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
HILFIKER WELDED WIRE WALL

Names	Dates	Approved By		
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Drawn By	TPT			
Checked By	TBW	Revision	Sheet No.	Index No.
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\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



**CONSTRUCTION NOTES FOR THE PLACEMENT OF TENSAR GEOGRIDS AND BACKFILL SOILS FOR TENSAR WWF TEMPORARY RETAINING WALL**

**1.0 MATERIALS**

1.1 GEOGRID REINFORCING SHALL BE TENSAR UNIAXIAL GEOGRID AND BIAXIAL GEOGRIDS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.2 BODKIN BARS SHALL BE 1/2" X 1/4" HDPE BARS MANUFACTURED BY THE TENSAR CORPORATION, MORROW, GEORGIA.

1.3 GEOTEXTILE FILTER FABRIC TG600 SHALL BE MANUFACTURED BY EVERGREEN TECHNOLOGIES, INC., EVERGREEN, ALABAMA OR EQUIVALENT AS APPROVED BY THE ENGINEER.

**1.4 WALL FACING**

1.4.1 FACING SHALL BE PRE-FABRICATED BLACK STEEL WELDED WIRE FORMS (WWF) 4" x 4" - W4.0 x W4.0 AND GEOTEXTILE FABRIC. WIRE FORM GEOMETRY SHALL BE AS DETAILED IN THE CONSTRUCTION DRAWINGS.

**2.0 TECHNICAL REQUIREMENTS**

2.1 FILL MATERIALS SHALL BE PLACED FROM THE BACK OF THE WELDED WIRE FACING FORMS TOWARDS THE ENDS OF THE GEOGRID TO ENSURE FURTHER TENSIONING.

2.2 WELDED WIRE FACING SHALL BE MONITORED DURING FILL PLACEMENT AND COMPACTION. COMPACTION EQUIPMENT AND OPERATION PROCEDURES MAY HAVE TO BE MODIFIED TO PREVENT EXCESSIVE DEFORMATION OF THE FLEXIBLE WELDED WIRE FACING.

2.3 TIE WIRES OR HOG RINGS MAY BE REQUIRED IF WWF MOVES DURING BACKFILL OPERATIONS.

**3.0 TENSAR GEOGRID PLACEMENT**

3.1 TENSAR GEOGRID SHALL BE PLACED AT THE SAME LOCATIONS AND ELEVATIONS SHOWN IN THE SHOP DRAWINGS.

3.2 TENSAR GEOGRID REINFORCEMENT SHALL BE CONTINUOUS THROUGHOUT THEIR EMBEDMENT LENGTH(S). THE BODKIN CONNECTION SHALL NOT BE UTILIZED UNLESS PRE-APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.

3.2.1 IF PRE-APPROVED, TENSAR UNIAXIAL GEOGRIDS MAY BE SPLICED UTILIZING THE BODKIN CONNECTION DETAIL. NO MORE THAN ONE SPLICE SHALL BE ALLOWED IN ANY ONE LENGTH OF REINFORCING AND NO SPLICES SHALL BE ALLOWED FOR GEOGRIDS LESS THAN 6 feet IN LENGTH (EACH). THE BODKIN CONNECTION SHALL NOT BE PLACED LESS THAN 6 feet BELOW PLANNED FINISHED GRADE, NOR HORIZONTALLY NOR VERTICALLY ADJACENT TO ANOTHER BODKIN CONNECTION.

3.3 PRIOR TO PLACING FILL, THE GEOGRID MATERIALS SHALL BE PLACED TO LAY FLAT AND PULLED TAUT TO REMOVE ANY SLACK IN THE GEOGRIDS.

3.4 TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE GEOGRID. A MINIMUM FILL THICKNESS OF 6 inches IS REQUIRED FOR OPERATION OF TRACKED VEHICLES OVER THE GEOGRID. TURNING OF TRACKED VEHICLES SHOULD BE KEPT TO A MINIMUM TO PREVENT TRACKS FROM DISPLACING THE FILL AND/OR THE GEOGRID.

3.5 RUBBER-TIRED VEHICLES MAY PASS OVER THE GEOGRID REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

3.6 TENSAR UNIAXIAL GEOGRIDS SHALL BE ROLLED OUT WITH THE LONG AXIS OF THE APERTURES (MACHINE DIRECTION) PERPENDICULAR TO THE WELDED WIRE FORM FACE. TENSAR BIAXIAL GEOGRIDS SHALL BE ROLLED OUT WITH THE MACHINE DIRECTION BAR PARALLEL TO THE WELDED WIRE FORM FACE.

3.6.1 UNIAXIAL (UX) GEOGRIDS SHALL BE CUT NEXT TO THE CROSS MACHINE DIRECTION BAR. UX GEOGRIDS SHALL BE UNROLLED PERPENDICULAR TO THE WALL FACE.

3.6.2 BIAXIAL GEOGRIDS SHALL BE CUT NEXT TO THE MACHINE DIRECTION BAR. BX GEOGRIDS SHALL BE UNROLLED PARALLEL TO THE WALL FACE.

3.7 GEOGRIDS SHALL BE CUT AND PLACED SO THAT A TRANSVERSE BAR IS EXTENDED TO THE BACK FACE OF THE WELDED WIRE FORM.

3.8 A MINIMUM OF 3 inches OF FILL MATERIAL SHALL BE REQUIRED BETWEEN LAYERS OF BIAXIAL, UNIAXIAL AND FILTER FABRIC, UNLESS OTHERWISE SHOWN.

**4.0 CHANGES TO GEOGRID LAYOUT OR PLACEMENT**

4.1 NO CHANGES TO THE TENSAR GEOGRID LAYOUT, INCLUDING, BUT NOT LIMITED TO, LENGTH, GEOGRID TYPE, OR ELEVATION, SHALL BE MADE WITHOUT THE EXPRESSED PRIOR WRITTEN CONSENT OF TENSAR EARTH TECHNOLOGIES, INC.

**5.0 DRAINAGE**

5.1 THE TENSAR REINFORCED WALL HAS BEEN DESIGNED ON THE ASSUMPTION THAT THE REINFORCED BACKFILL MATERIAL SHALL BE FREE OF SUBSURFACE DRAINAGE OF WATER (SEEPAGE).

**6.0 DESIGN PARAMETERS**

**6.1 SOIL PARAMETERS**

SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUES OF FRICTION ANGLE, APPARENT COHESION AND UNIT WEIGHT SHALL BE PROVIDED IN THE SHOP DRAWINGS.

**6.1.1 DESIGN**

THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS. ON THE BASIS OF THIS INFORMATION, THE TENSAR CORPORATION IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY DESIGN INCLUDING FOUNDATION AND SLOPE STABILITY IS THE RESPONSIBILITY OF OTHERS.

**6.2 FACTORS OF SAFETY:**

**6.2.1 INTERNAL STABILITY:**

MAXIMUM GEOGRID DESIGN STRENGTH = 0.29 ULT  
 MINIMUM FACTOR OF SAFETY FOR GEOGRID PULLOUT = 1.5  
 MINIMUM FACTOR OF SAFETY FOR SLIDING AT LOWEST GEOGRID = 1.5  
 GEOGRID-SOIL INTERACTION COEFFICIENT = 0.8  
 PERCENT COVERAGE OF GEOGRID = VARIES

**6.2.2 EXTERNAL STABILITY:**

MINIMUM FACTOR OF SAFETY FOR SLIDING = 1.5  
 MINIMUM FACTOR FOR SAFETY FOR OVERTURNING = 2.0  
 EXTERNAL STABILITY IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR GLOBAL STABILITY. (SEE SECTION 7.5)

**6.2.3 GLOBAL STABILITY:**

GLOBAL STABILITY IS THE RESPONSIBILITY OF OTHERS. TENSAR EARTH TECHNOLOGIES, INC. ACCEPTS NO LIABILITY OR RESPONSIBILITY FOR GLOBAL STABILITY. (SEE SECTION 7.5)

**7.0 SPECIAL PROVISIONS**

7.1 WALL ELEVATION VIEWS AND LOCATIONS AND GEOMETRY OF EXISTING STRUCTURES MUST BE VERIFIED BY THE CONTRACTOR BEFORE COMMENCEMENT OF SHOP DRAWINGS.

7.2 TENSAR EARTH TECHNOLOGIES, INC. ASSUMES NO LIABILITY FOR INTERPRETATION OR VERIFICATION OF SUBSURFACE CONDITIONS, SUITABILITY OF SOIL DESIGN PARAMETERS AND INTERPRETATION OF SUBSURFACE GROUNDWATER CONDITIONS.

7.3 ANY REVISIONS TO DESIGN PARAMETERS STATED ON CONTROL DRAWINGS OR STRUCTURE GEOMETRY SHALL REQUIRE DESIGN MODIFICATIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

7.4 THIS DESIGN IS ONLY VALID FOR THE INTERNAL STABILITY OF THE PROPOSED TENSAR REINFORCED RETAINING WALLS AS SHOWN HEREIN.

7.5 BEARING CAPACITY, TOTAL SETTLEMENT, DIFFERENTIAL SETTLEMENT, AND THEIR EFFECTS ON THE TENSAR REINFORCED RETAINING WALL SYSTEM SHALL BE THE RESPONSIBILITY OF OTHERS.

THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS (GEOGRIDS, DRAINAGE COMPOSITES AND EROSION MEDIA), WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION 1210 CITIZENS PARKWAY, MORROW GA, 30260. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN.

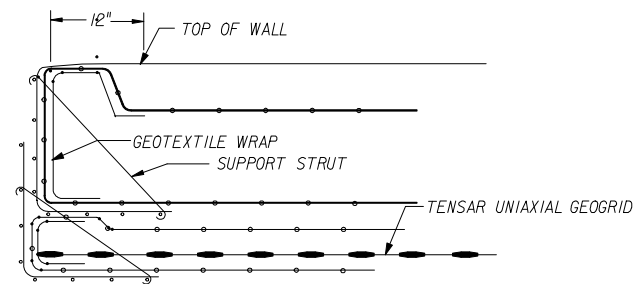
THIS DRAWING, DESIGN NOTES AND ASSOCIATED CALCULATIONS HAVE BEEN PREPARED BY TENSAR EARTH TECHNOLOGIES, INC. FOR PRELIMINARY DESIGN PURPOSES AND SHALL NOT BE USED FOR FINAL DESIGN OR CONSTRUCTION.

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Atlanta, GA 30328  
(404) 250-1290

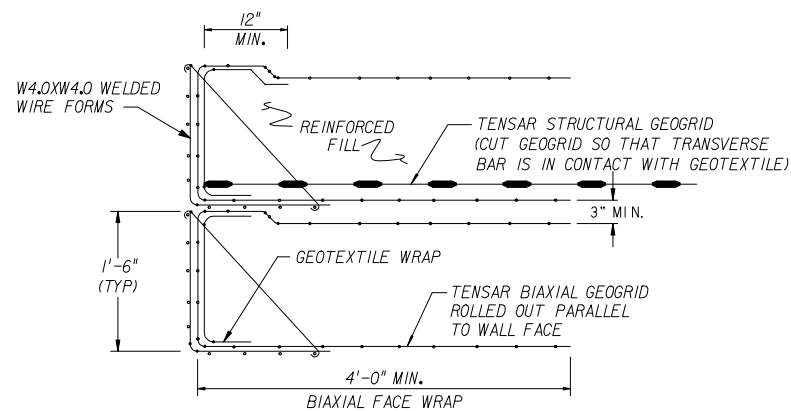


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM TENSAR EARTH TECHNOLOGIES TEMPORARY RETAINING WALL				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By	JMS	8/14/98	Revision	Sheet No. Index No.
Checked By			00	1 of 3 5125

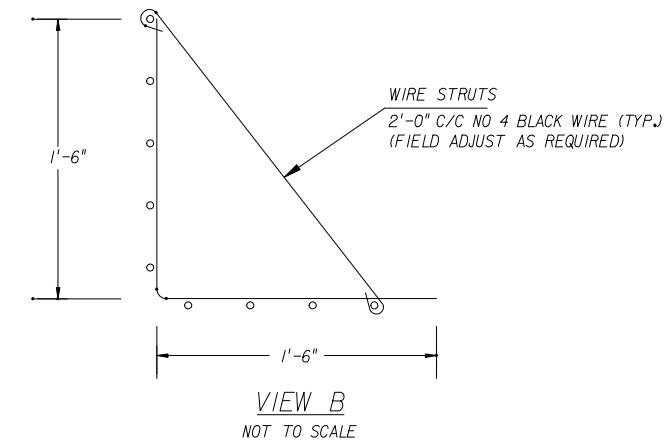
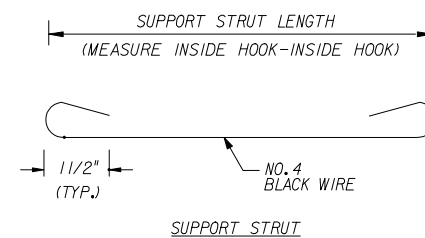


SET TOP MOST WIRE FORM INSIDE WIRE FORM BELOW TO FOLLOW GRADE.

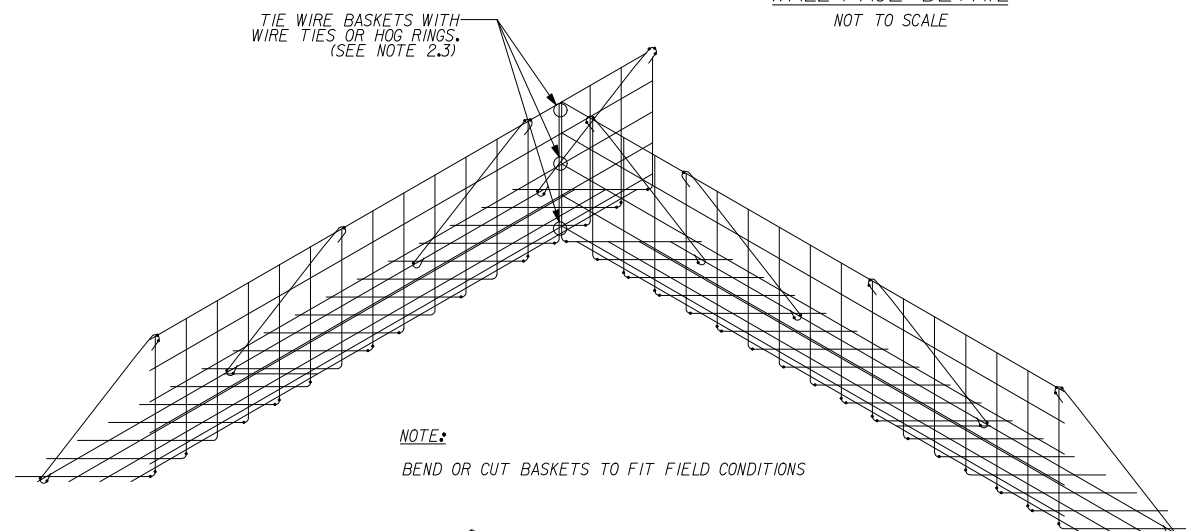
**TOP WIRE BASKET DETAIL**  
NOT TO SCALE



**WALL FACE DETAIL**  
NOT TO SCALE

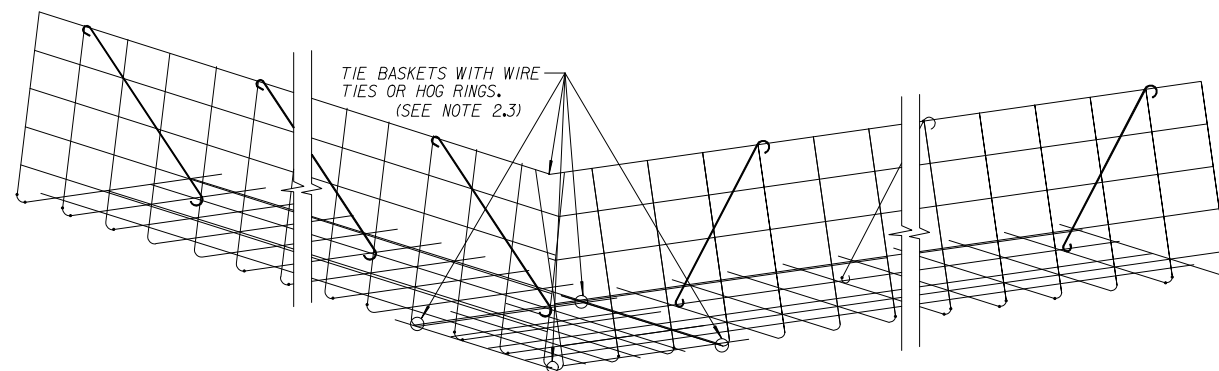


**VIEW B**  
NOT TO SCALE



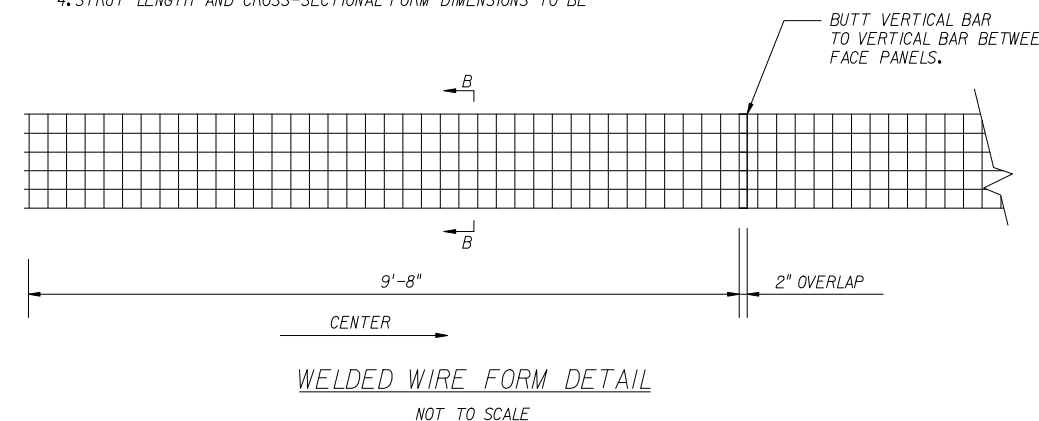
**NOTE:**  
BEND OR CUT BASKETS TO FIT FIELD CONDITIONS

**90° INSIDE CORNER DETAIL**  
NOT TO SCALE



**NOTE:**  
BEND OR CUT BASKETS TO FIT FIELD CONDITIONS AND ENSURE THAT GEOTEXTILE FILTER FABRIC T6600 AND BIAxIAL GEOGRID OVERLAP 1'-0" MINIMUM.

**90° OUTSIDE CORNER DETAIL**  
NOT TO SCALE



THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS (GEOGRIDS, DRAINAGE COMPOSITES AND EROSION MEDIA), WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION 1210 CITIZENS PARKWAY, MORROW GA. 30260. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN.

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**TENSAR**

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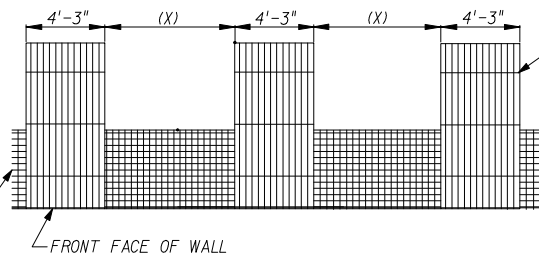


STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM**  
**TENSAR EARTH TECHNOLOGIES**  
**TEMPORARY RETAINING WALL**

Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By	JMS 8/14/98			
Checked By		Revision	Sheet No.	Index No.
		00	2 of 3	5125

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\*\*\*\*\*SYTIME\*\*\*\*\*

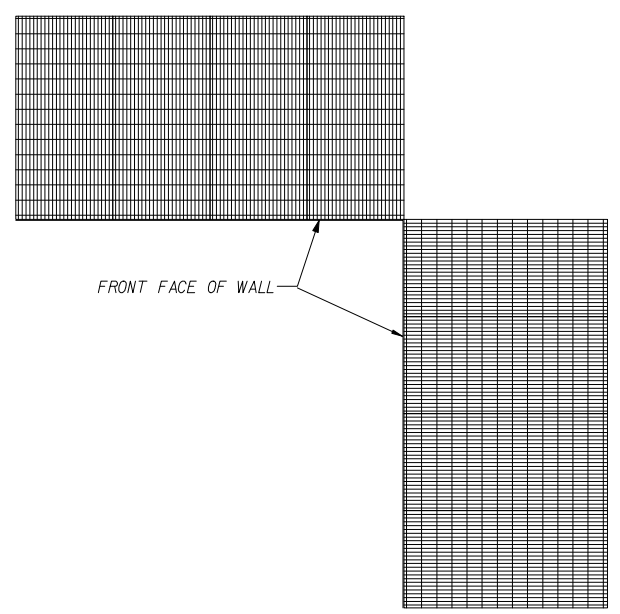


PERCENT COVERAGE	X
100	0
75	1'-5"
56	3'-4"

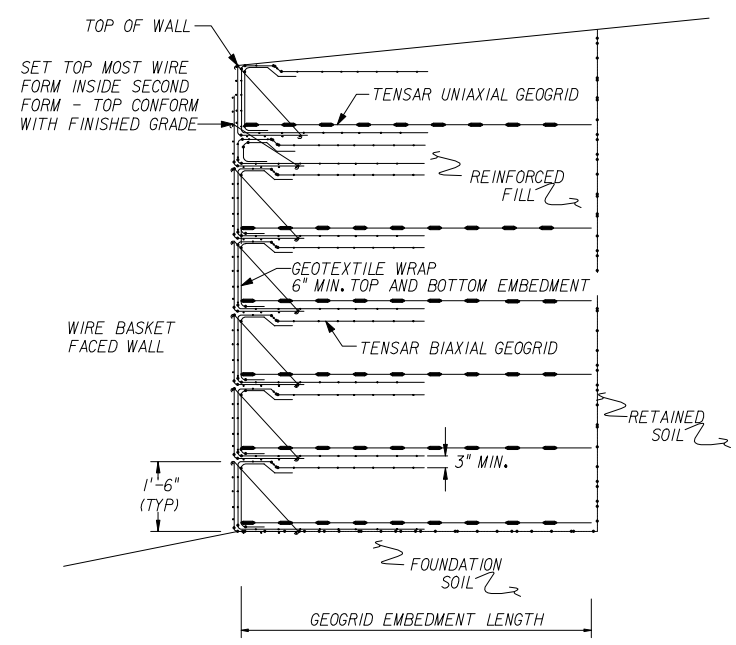
BIAXIAL (1/3 ROLL WIDTH) 4'-3" WIDE ROLLED OUT PARALLEL TO WALL FACE. BIAXIAL GEOGRID SHALL BE PROVIDED BETWEEN PRIMARY REINFORCEMENT ONLY WHEN 56% COVERAGE IS SPECIFIED.

**NOTE:**  
ALTERNATE LAYERS OF UNIAXIAL PRIMARY REINFORCEMENT SHALL BE PLACED IN STAGGERED PATTERN SUCH THAT THE LAYER ABOVE IS PLACED WITH THE CENTERLINE OF THE GEOGRID IN ALIGNMENT WITH THE CENTERLINE OF THE SPACE BELOW.

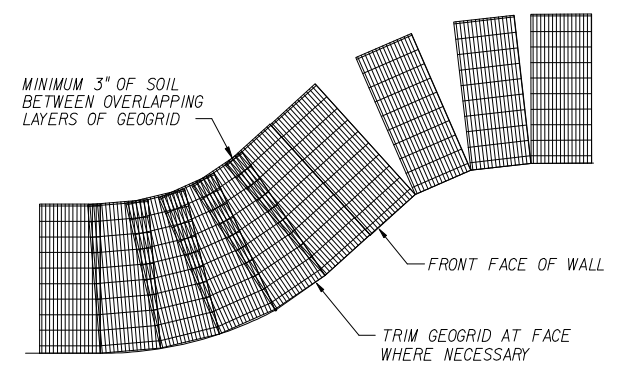
TYPICAL GEOGRID COVERAGE  
NOT TO SCALE



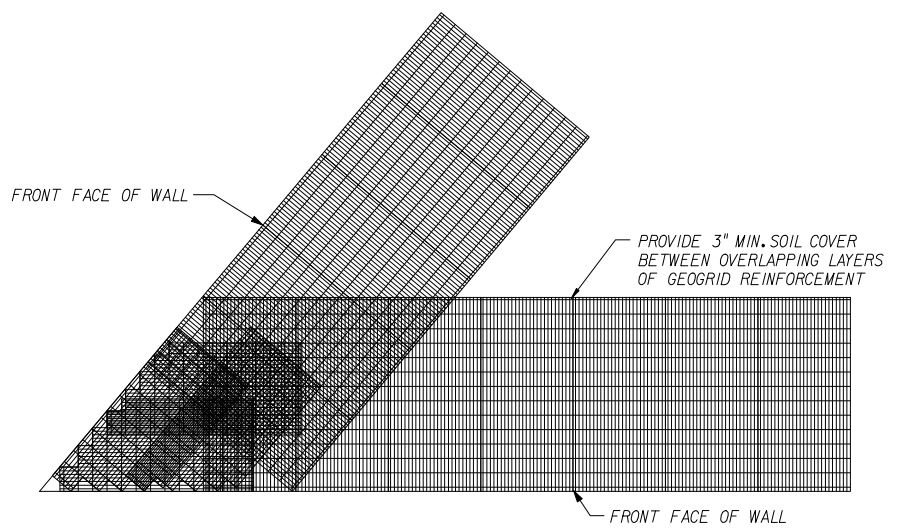
GEOGRID 90° INSIDE CORNER DETAIL  
NOT TO SCALE



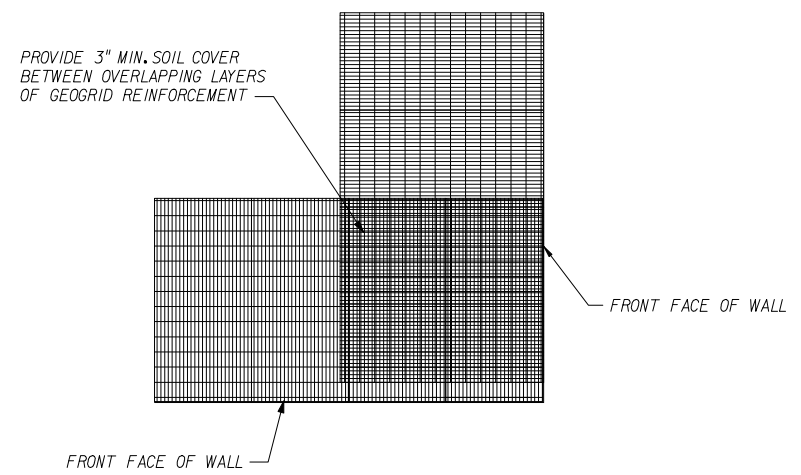
TYPICAL CROSS-SECTION  
NOT TO SCALE



GEOGRID PLACEMENT ON CURVES  
NOT TO SCALE



GEOGRID ACUTE CORNER DETAIL  
NOT TO SCALE



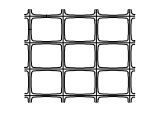
GEOGRID 90° OUTSIDE CORNER DETAIL  
NOT TO SCALE

THIS DESIGN IS BASED UPON SPECIFIC PROPERTIES OF TENSAR PRODUCTS (GEOGRIDS, DRAINAGE COMPOSITES AND EROSION MEDIA), WHICH ARE PROPRIETARY TO THE TENSAR CORPORATION 1210 CITIZENS PARKWAY, MORROW GA. 30260. ANY SUBSTITUTION OF THE SPECIFIED PRODUCTS WILL INVALIDATE THIS DESIGN.

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Atlanta, GA 30328  
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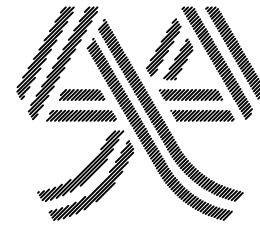
THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RETAINING WALL SYSTEM  
TENSAR EARTH TECHNOLOGIES  
TEMPORARY RETAINING WALL**

Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By	JMS 8/14/98			
Checked By		Revision	Sheet No.	Index No.
		00	3 of 3	5125

\*\*\*\*\*DGNSPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*



# TC Mirafi Engineering Services, Inc.

365 SOUTH HOLLAND DRIVE, PENDERGRASS, GA 30567 TEL (706) 693-2226

CONSTRUCTION NOTES FOR THE PLACEMENT OF MIRAFI REINFORCEMENT AND BACKFILL SOILS FOR TEMPORARY MECHANICALLY STABILIZED EARTH (MSE) WALLS

### 1.0 DESIGN CRITERIA

1.1 SOIL PARAMETERS:  
SEE WALL CONTROL DRAWINGS FOR SOIL CHARACTERISTICS OF FOUNDATION MATERIAL TO BE USED IN THE DESIGN OF THE WALL SYSTEM. THE CONTRACTOR SHALL PROVIDE SOIL DESIGN PARAMETERS FOR BACKFILL MATERIAL BASED ON THE ACTUAL SOIL CHARACTERISTICS UTILIZED AT THE SITE. THE VALUE OF  $\phi$ , C, AND  $\gamma$  SHALL BE PROVIDED IN THE SHOP DRAWINGS.

### 1.2 MINIMUM FACTOR OF SAFETY

#### 1.2.1 EXTERNAL STABILITY

SLIDING 1.5  
OVERTURNING 2.0  
BEARING CAPACITY 2.5

#### 1.2.2 INTERNAL STABILITY

RUPTURE 1.5  
PULLOUT 1.5

#### 1.2.3 GLOBAL STABILITY 1.5

#### 1.2.4 UNIFORM SURCHARGE 250 PSF

#### 1.2.5 HYDROSTATIC FORCES NONE

1.2.6 SEISMIC FORCES  
IN ACCORDANCE WITH AASHTO AND FDOT PLANS PREPARATION MANUAL.

### 2.0 MATERIALS

2.1 GEOSYNTHETIC REINFORCEMENT AND RETENTION FABRIC, MIRAFI 140N, SHALL BE MANUFACTURED BY TC MIRAFI, PENDERGRASS, GEORGIA.

2.2 REINFORCED BACKFILL SHALL MEET THE REQUIREMENTS IN FLORIDA DOT SPECIFICATIONS - SECTION 548 RETAINING WALL SYSTEMS.

2.3 WALL FACING SHALL BE PRE-FABRICATED STEEL WIRE FORMS COMPOSED OF A MINIMUM W3.5 SIZE STANDARD WIRE WELDED ORTHOGONALLY 4 INCHES ON CENTER. STEEL WIRE FORMS SHALL BE AS DETAILED IN THE DRAWINGS.

2.4 RING FASTENER SHALL BE BLAIR STYLE #3-LOXIT, 10 GAUGE GALVANIZED, MANUFACTURED BY DECKER MANUFACTURING CO. OR EQUIVALENT.

### 3.0 WALL CONSTRUCTION

3.1 FOR LOCATION AND ALIGNMENT OF REINFORCED SOIL STRUCTURES, SEE RETAINING WALL CONTROL PLANS.

3.2 STEEL WIRE FORMS, REINFORCEMENT, SOIL RETENTION FABRIC, AND COMPACTED FILL SHALL BE PLACED IN SUCCESSIVE LIFTS IN THE SEQUENCE SHOWN IN THE CONSTRUCTION DRAWINGS.

3.3 GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED AT THE ELEVATIONS, LOCATION, TYPE, ORIENTATION, AND TO THE LENGTHS SHOWN ON THE CONSTRUCTION DRAWINGS. THE REINFORCEMENT SHALL BE PLACED IN A MANNER SO AS TO AVOID SLACK OR WRINKLES. PINNING OR STAKES MAY BE REQUIRED TO MAINTAIN WRINKLE-FREE PLACEMENT DURING INSTALLATION.

3.4 AT EACH REINFORCEMENT ELEVATION, BACKFILL SOILS SHALL BE COMPACTED TO A LEVEL SURFACE BEFORE PLACING THE REINFORCEMENT. ALL REINFORCEMENT SHALL BE PLACED NORMAL TO THE FACE OF THE WALL.

3.5 ADJACENT WIRE FORMS SHALL BE CONNECTED ALONG VERTICAL AND HORIZONTAL SEAMS WITH GALVANIZED INTERLOCKING FASTENERS PLACED 8 INCHES ON CENTER.

3.6 BACKFILL MATERIAL SHALL BE COMPACTED IN ACCORDANCE WITH FDOT SPECIFICATIONS - SECTION 548.

3.7 TRACKED CONSTRUCTION EQUIPMENT SHALL NOT BE OPERATED DIRECTLY ON THE REINFORCEMENT. A MINIMUM FILL THICKNESS OF 6 INCHES IS REQUIRED FOR THE OPERATION OF TRACKED VEHICLES OVER THE REINFORCEMENT. TURNING OF TRACKED VEHICLES SHOULD BE AVOIDED TO PREVENT TRACKS FROM DISPLACING THE FILL AND THE REINFORCEMENT.

3.8 RUBBER Tired VEHICLES MAY PASS OVER THE REINFORCEMENT AT SLOW SPEEDS, LESS THAN 10 MPH. SUDDEN BRAKING AND SHARP TURNING SHALL BE AVOIDED.

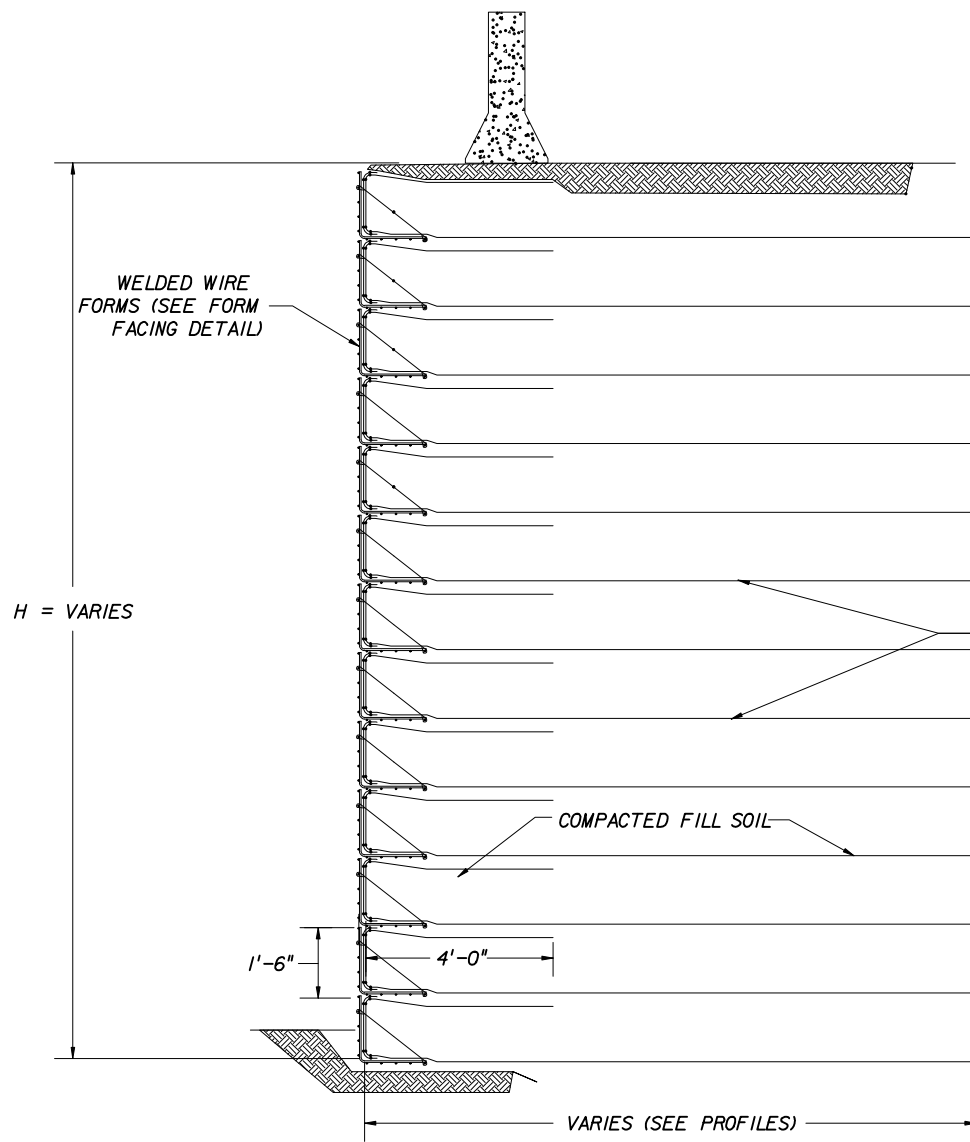
3.9 TC MIRAFI ENGINEERING SERVICES, INC. IS RESPONSIBLE FOR THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY IS THE RESPONSIBILITY OF OTHERS.

TC Mirafi  
Engineering  
Services, Inc.  
365 SOUTH HOLLAND DRIVE  
PENDERGRASS, GEORGIA 30567

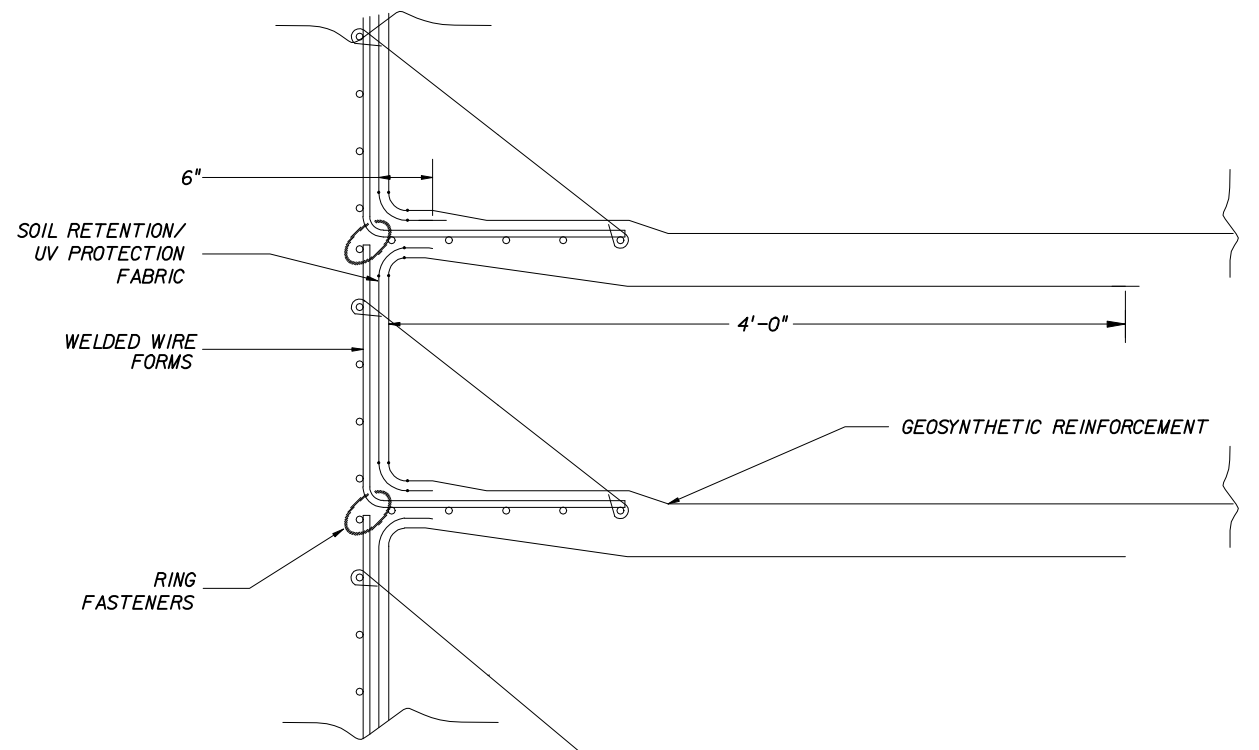


THIS SYSTEM SHALL NOT BE USED FOR ACUTE ANGLE BIN WALLS.  
THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
RETAINING WALL SYSTEM				
TC MIRAFI WIRE FORM TEMPORARY				
	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Designed By	NPA	11/5/98	State Structures Design Engineer	
Drawn By	CGA	11/5/98	Revision	Sheet No. Index No.
Checked By	NPA	11/5/98	00	1 of 4 5130

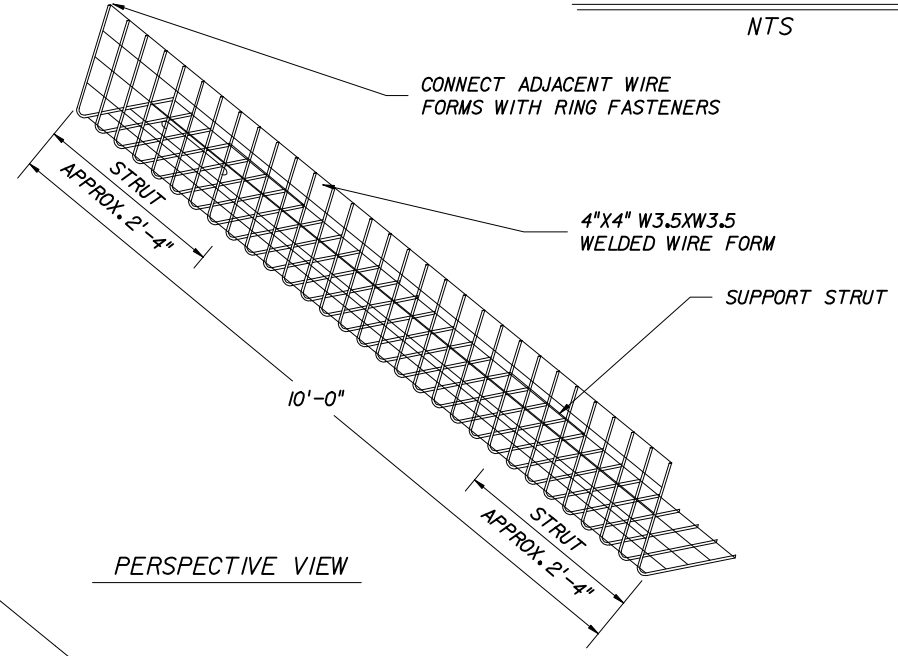


WIRE FORM  
TEMPORARY WALL SECTION  
NTS

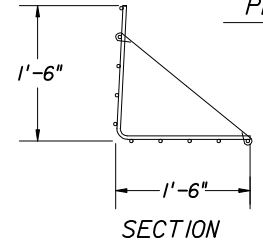


WIRE FORM FACING DETAIL  
NTS

MIRAFI GEOSYNTHETIC PRIMARY SOIL REINFORCEMENT (SEE WALL PROFILE FOR PLACEMENT DETAILS)

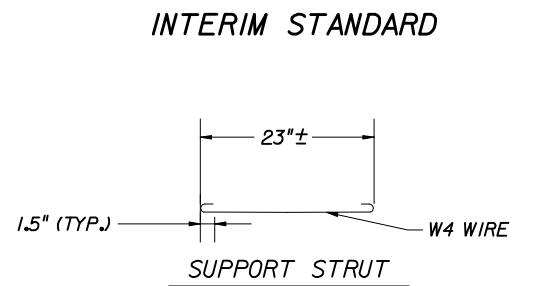


PERSPECTIVE VIEW



SECTION

WELDED WIRE FORM DETAIL  
NTS



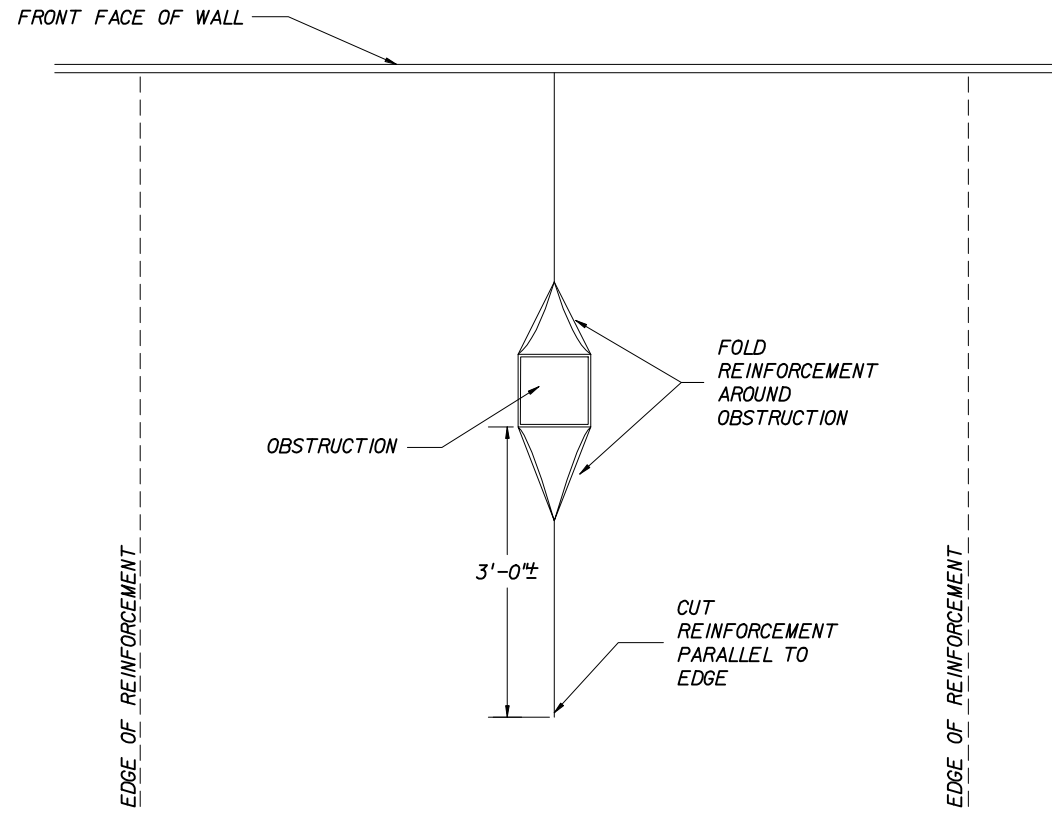
**TC Mirafi**  
Engineering  
Services, Inc.  
365 SOUTH HOLLAND DRIVE  
PENDERGRASS, GEORGIA 30567



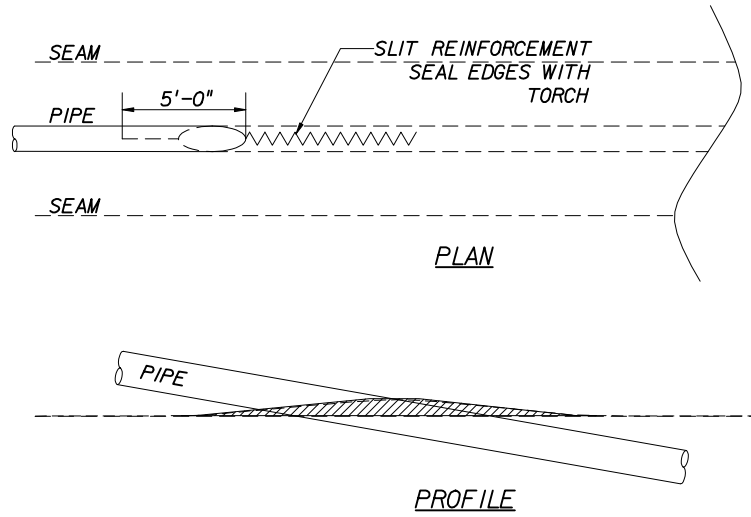
THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
<b>RETAINING WALL SYSTEM TC MIRAFI WIRE FORM TEMPORARY</b>				
Designed By	NPA	11/5/98	Approved By <i>W. V. [Signature]</i>	
Drawn By	CGA	11/5/98	Revision	Sheet No. Index No.
Checked By	NPA	11/5/98	00	2 of 4 5130

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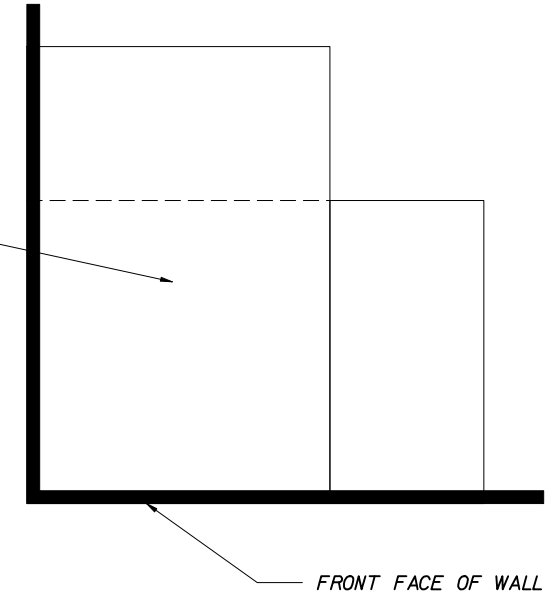
PLACEMENT AROUND OBSTRUCTIONS  
NTS



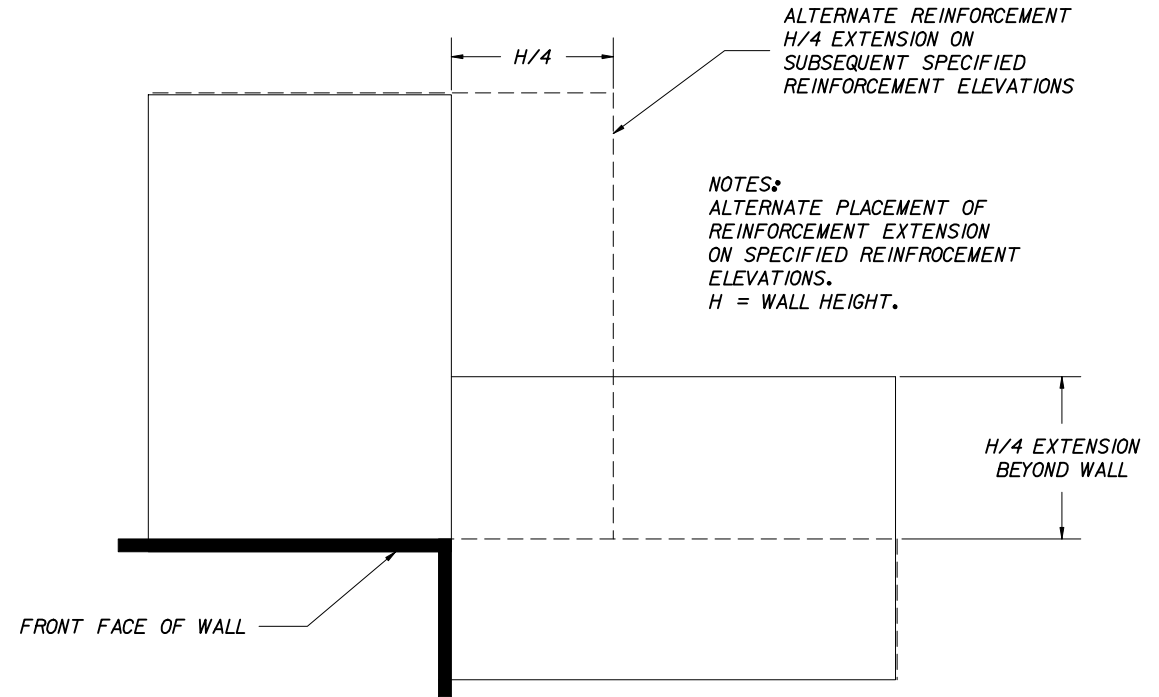
INSTALLATION AROUND PIPE RUNNING PARALLEL TO MACHINE (ROLL) DIRECTION OF REINFORCEMENT  
NTS

- o SLIT REINFORCEMENT FROM END CLOSEST TO PIPE TO 6 FEET BEYOND.
- o LAY REINFORCEMENT IN AROUND PIPE.

PROVIDED 6" MIN. OF SOIL BETWEEN OVERLAPPING LAYERS OF REINFORCEMENT FOR PROPER ANCHORAGE.



CONVEX CORNER DETAIL  
NTS



CONCAVE CORNER DETAIL  
NTS

**TC Mirafi**  
Engineering  
Services, Inc.  
365 SOUTH HOLLAND DRIVE  
PENDERGRASS, GEORGIA 30567

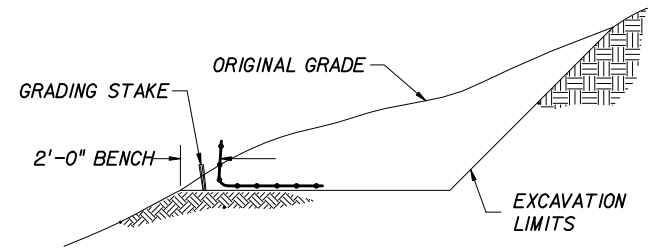


THIS SYSTEM MAY BE USED IN ALL ENVIRONMENTS.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RETAINING WALL SYSTEM</b> <b>TC MIRAFI WIRE FORM TEMPORARY</b>				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	NPA	11/5/98	State Structures Design Engineer	
Drawn By	CGA	11/5/98	Revision	Sheet No.
Checked By	NPA	11/5/98	00	3 of 4
				Index No. 5130

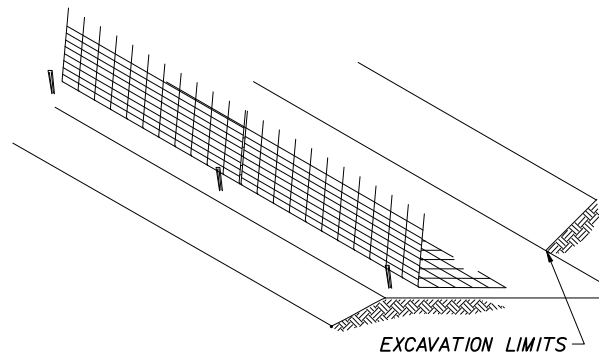
# CONSTRUCTION SEQUENCE

- EXCAVATE FOR LEVEL BASE TO A LENGTH ADEQUATE FOR REINFORCEMENT EMBEDMENT.
- SET GRADING STAKES AT A 6 INCHES OFFSET TO FACILITATE PROPER WIRE FORM ALIGNMENT.
- EMBED BOTTOM BASKET 6 INCHES BELOW FINISHED GRADE AT FRONT FACE OF WALL OR AS SHOWN ON WALL PROFILE.



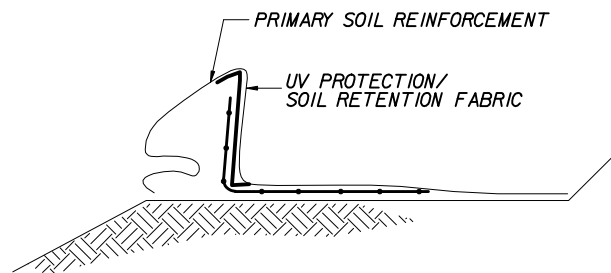
STEP 1

- FOR THE FIRST COURSE OF THE WALL, ALIGN BASKETS WITHOUT SPACES AND ATTACH WITH RING FASTENERS.
- INSTALL STRUTS AT ABOUT 5 FOOT SPACING.



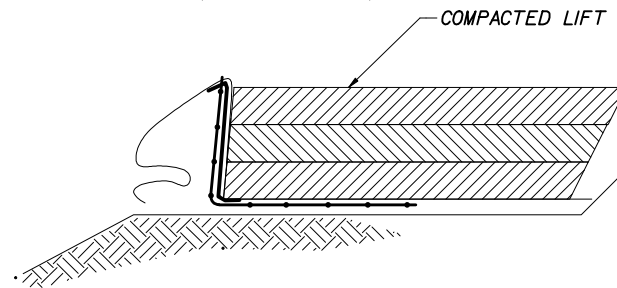
STEP 2

- PLACE UV PROTECTION/SOIL RETENTION FABRIC AT ELEVATIONS AS SHOWN.
- PLACE FACE FABRIC AGAINST WIRE FORM FACE.
- DRAPE FABRIC OVER WIRE FORM ALLOWING FOR THE REQUIRED WRAP EMBEDMENT.



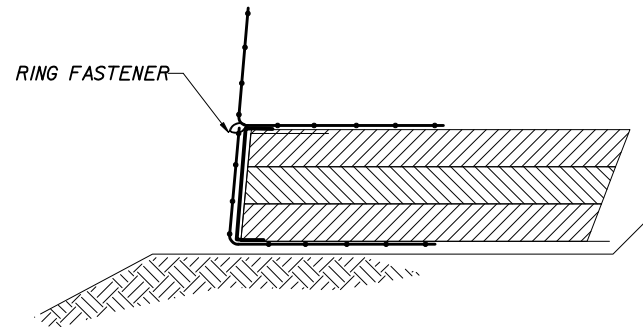
STEP 3

- PLACE BACKFILL SOIL IN 6 INCHES MAXIMUM LIFTS.
- COMPACT SOILS WITHIN 1M OF WIRE FORM USING LIGHT WEIGHT COMPACTION EQUIPMENT.
- COMPACT REMAINING BACKFILL SOILS WITH STANDARD COMPACTION EQUIPMENT TO REQUIRED DENSITY.



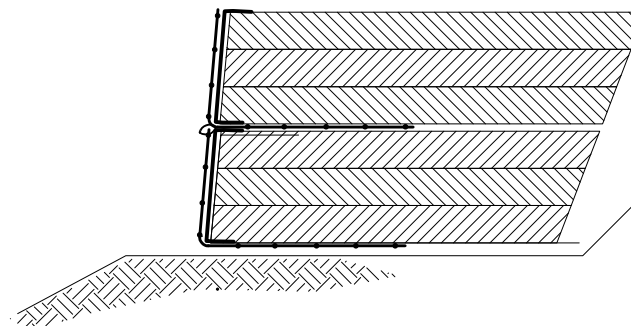
STEP 4

- PULL UV PROTECTION/SOIL RETENTION FABRIC AND PRIMARY REINFORCEMENT OVER COMPACTED FILL AND ANCHOR WITH SOIL.
- PLACE THE NEXT WIRE FORM AGAINST THE LOWER FORM AND ATTACH WITH RING FASTENERS.
- INSTALL STRUTS ON SUCCEEDING LIFT.

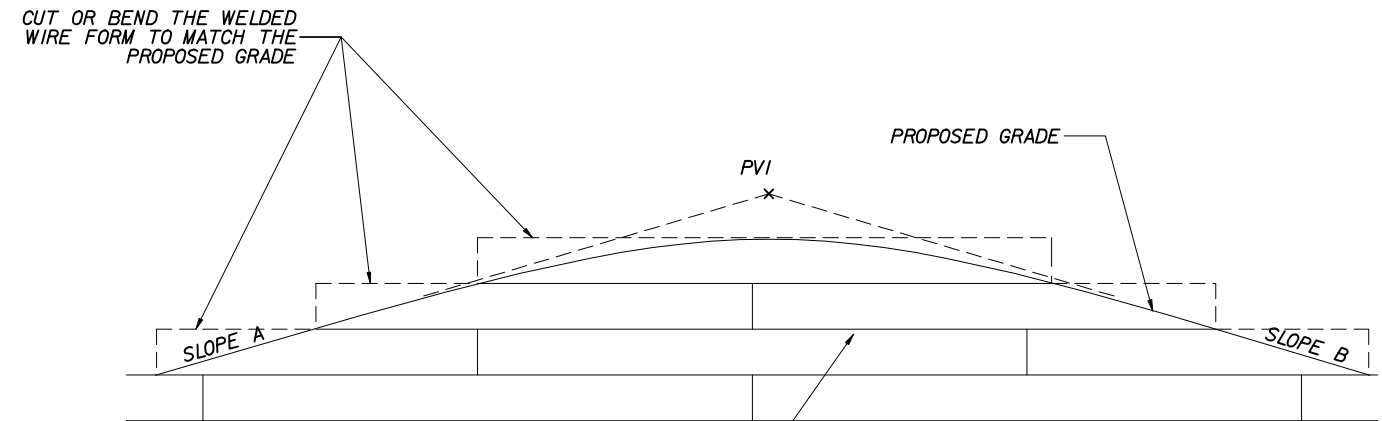


STEP 5

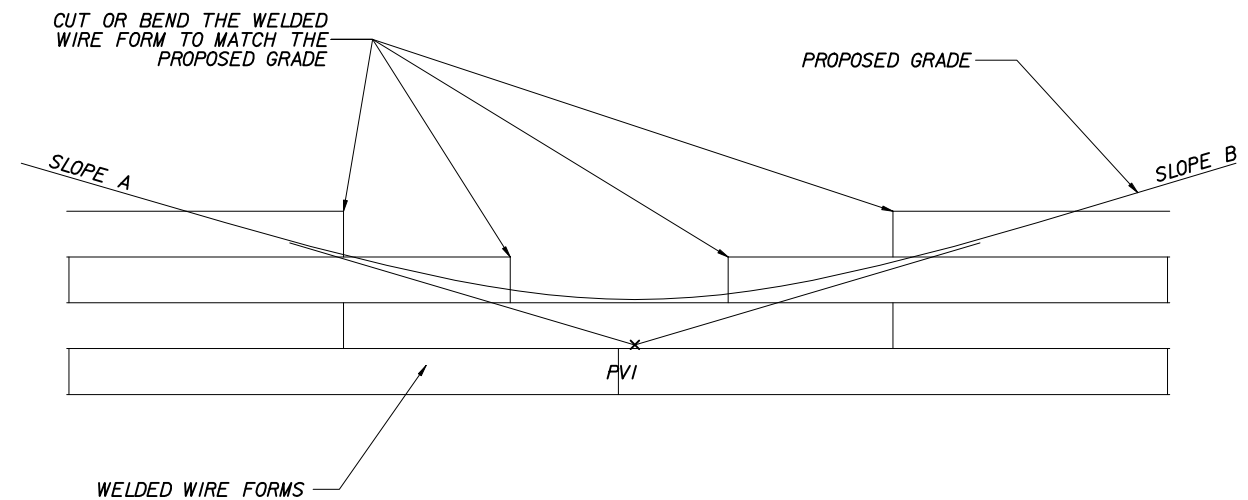
- REPEAT STEPS 2 THRU 5 UNTIL DESIRED HEIGHT OF WALL IS REACHED.



STEP 6



WELDED WIRE FORM ON VERTICAL CREST CURVE  
NTS




WELDED WIRE FORM ON VERTICAL SAG CURVE  
NTS

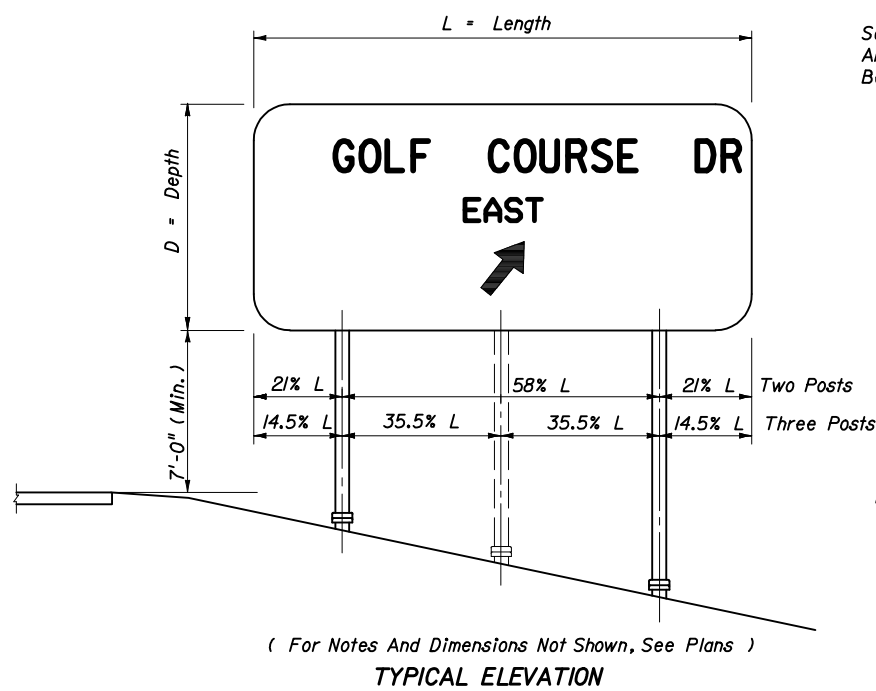
**TC Mirafi**  
Engineering  
Services, Inc.  
365 SOUTH HOLLAND DRIVE  
PENDERGRASS, GEORGIA 30567



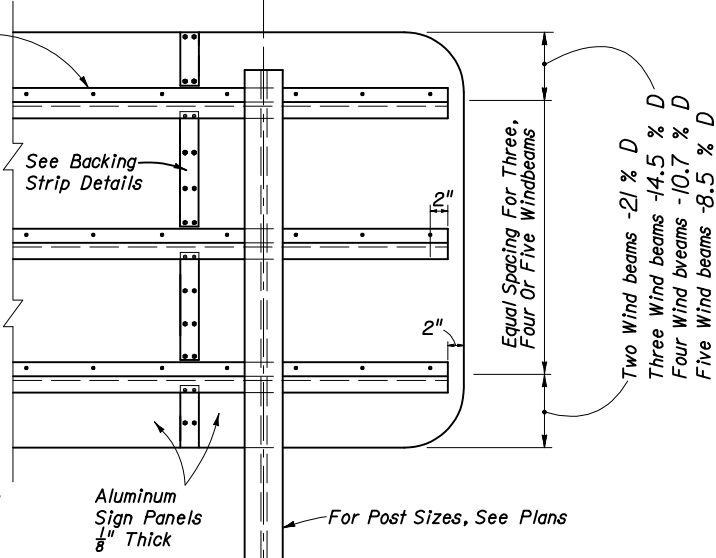
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

RETAINING WALL SYSTEM  
TC MIRAFI WIRE FORM TEMPORARY

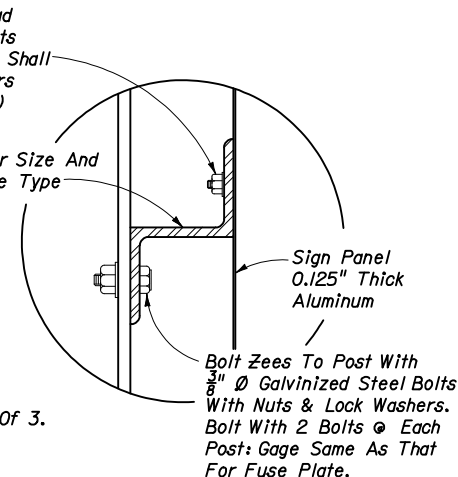
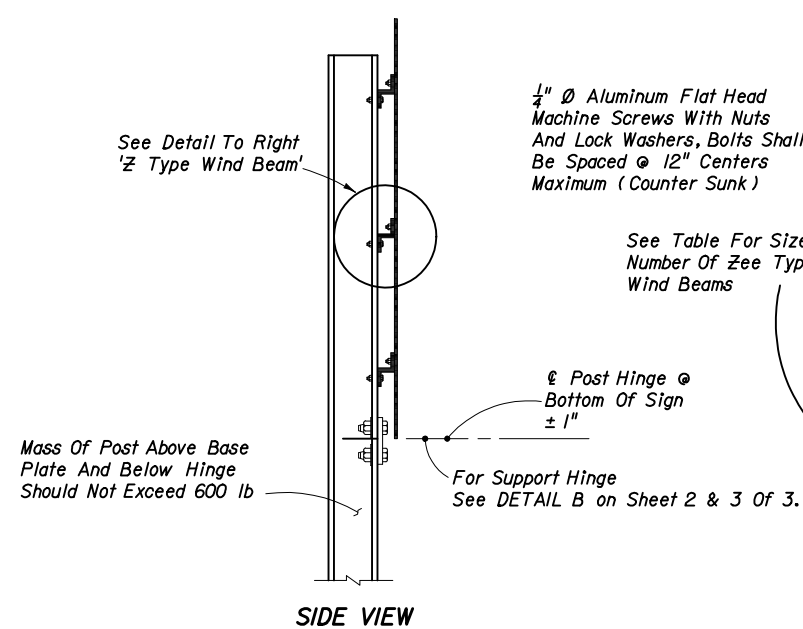
Names	Dates	Approved By			
Designed By	NPA 11/5/98	 State Structures Design Engineer			
Drawn By	CGA 11/5/98				
Checked By	NPA 11/5/98				
Revision	00				Sheet No.



See Tables For Size And Number Of Wind Beams



Note: It shall be the contractor's responsibility to determine the length of the column supports in the field prior to fabrication.



**GENERAL NOTES**

- DESIGN SPECIFICATION** Standard Specification for Structural Supports for Highway Signs, Luminaries and Traffic Signals, AASHTO 1994. For welding refer to the latest editions of the AWS Structural Welding Codes for Steel and Aluminum, the AASHTO Standard Specifications for Welding Structural Steel Highway Bridges, and the FDOT Standard Specifications with Supplement.
- DESIGN WIND LOAD** See Design Wind Speeds By County 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.
- ALUMINUM MATERIALS** All aluminum materials shall meet the requirements of the Aluminum Association's Alloy 6061-T6 and also the following ASTM specifications: Sheets and plates, B209; extruded tube, bars, rods & shapes, B221; and standard structural shapes, B308. Sheets are to be degreased, etched, neutralized and treated with Alodine 1200, Iridite 14-2, Bonderite 721, or equal. No stenciling permitted on sheets. Aluminum welding rods shall meet the requirements of Aluminum Association Alloy No. 5556 filler wire.
- STRUCTURAL STEEL** All structural steel shall meet the requirements of ASTM A709 Grade 36.
- ALUMINUM BOLTS, NUTS, & LOCKWASHERS** Aluminum bolts shall meet the requirements of Aluminum Association Alloy 2024-T4 (ASTM F468). The bolts shall have an anodic coating at least 0.0002" thick and be Chromate sealed. Lock washers shall meet the requirements of Aluminum Association Alloy 7075-T6 (ASTM B221). Nuts shall meet the requirements of Aluminum Association Alloy 6061-T6 or 6262-T9 (ASTM F467).
- STEEL BOLTS, NUTS, & WASHERS** All steel bolts, nuts and washers shall meet the requirements of ASTM A325 Types 1 & 2 and shall be galvanized in accordance with Standard Specifications 962-7.
- ALTERNATE MATERIAL** Material meeting the requirements of ASTM B209 or Aluminum Association Alloys 5154-H38 or 5052-H38 may be used for sheet and plate. Material meeting the requirements of Aluminum Association Alloy 6351-T5 and ASTM B221 may be used for extruded bars, rods, shapes and tubes.
- TOLERANCES** All above materials shall be in accordance with the governing ASTM specifications.
- GALVANIZING** All steel shapes, angles, tees, plates, bolts, nuts and washers shall be galvanized in accordance with Standard Specifications 962-7.
- BASE CONNECTION** High strength bolts L<sub>2</sub> in the base connection shall be tightened only to the torque shown in the tables on sheets 2 & 3 of 3. Overtightened base connections will not be accepted.
- FUSE PLATES** All holes in fuse plates 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.
- SHOP DRAWINGS** When ground sign supports are fabricated in accordance with these plans no shop drawings are required. Shop drawings will be required for approval when the column length exceeds the length shown in the plans by more than 2'-0". However, shop drawings for sign panels, messages, lettering and quantities shall be submitted to traffic plans for approval.
- FABRICATOR NOTE** All bolted connections, except L<sub>2</sub> bolts and Zee to Post bolts, shall be 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 attain in each bolt the residual tension specified in the tabulation below:
- FOUNDATION** Contractor may use precast foundations in pre-drilled holes a minimum of 12" larger than the foundation indicated on the plans in either wet or dry conditions. The holes shall be clean and without loose material. Temporary casing shall be required if the soil is unstable. The holes shall be filled with flowable concrete after the precast foundation is in place. The cost of flowable concrete, installing and removal of casing shall be included in the unit price of Sign Multi-Post.

Note: If the sign panels are deeper than 14', a Horizontal Panel Splice is allowed at an interior Z bar support, shop drawings shall be required. Minimum panel section width = 2'-6".

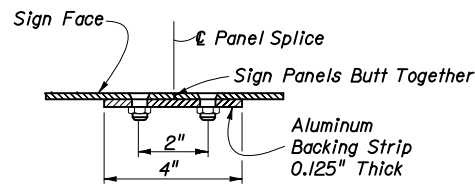
**DESIGN WIND SPEEDS BY COUNTY**

**ZONE NO. 1 (60 mph)**  
Alachua, Baker, Bay, Bradford, 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.

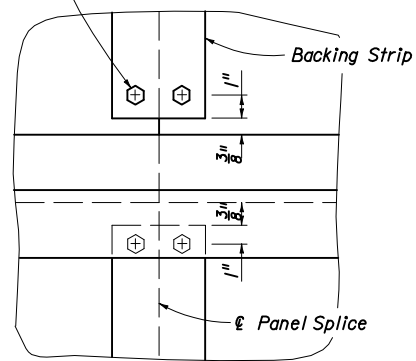
**ZONE NO. 2 (70 mph)**  
Citrus, Desoto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hardee, Hendry, Hernando, Highlands, Hillsborough, Levy, Nassau, Okeechobee, Orange, Osceola, Pasco, Pinellas, Polk, Seminole, St. Johns, Taylor and Wakulla Counties.

**ZONE NO. 3 (80 mph)**  
Brevard, Charlotte, Collier, Indian River, Lee, Manatee, Martin, Palm Beach, Sarasota, St. Lucie and Volusia Counties.

**ZONE NO. 4 (90 mph)**  
Broward, Dade and Monroe Counties.



Pairs Of 1/4" Ø Aluminum Flat Head Machine Screws With Nuts And Lock Washers Spaced At 1'-0" Centers Maximum



BACKING STRIP DETAIL

NUMBER OF WIND BEAMS FOR GIVEN DEPTH & WIND					
Wind	No. Beams	Max. Depth	Wind	No. Beams	Max. Depth
60	2	8'-0"	80	2	6'-8"
60	3	13'-4"	80	3	11'-4"
60	4	18'-0"	80	4	15'-4"
60	5	22'-8"	80	5	19'-0"
70	2	7'-0"	90	2	6'-0"
70	3	12'-0"	90	3	10'-4"
70	4	16'-4"	90	4	14'-0"
70	5	20'-8"	90	5	17'-8"

SIZE OF WIND BEAMS		
Size Of Zee*	Length Of Sign (Feet)	
	2 Posts	3 Posts
Z 1.75 x 1.75 x 1.08	0 - 11'-0"	0 - 17'-4"
Z 3 x 2.69 x 2.33	11'-1" - 19'-0"	17'-5" - 29'-6"
Z 3 x 2.69 x 3.38	19'-1" - 20'-8"	29'-7" - 31'-6"

\*Note: Zees Are Aluminum - No Steel Equivalent Available Designation Gives (Member Depth) x (Width) x (lb/ft)

**HIGH STRENGTH BOLTS (A-325) MINIMUM RESIDUAL TENSION**

BOLT SIZE TENSION (lb)

1/4"	19,200
3/8"	28,400
1/2"	39,250
5/8"	51,500
3/4"	56,450
7/8"	71,700

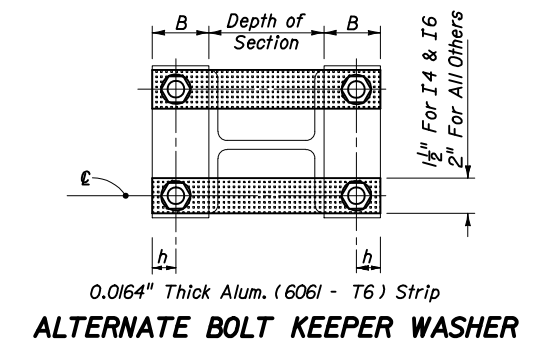
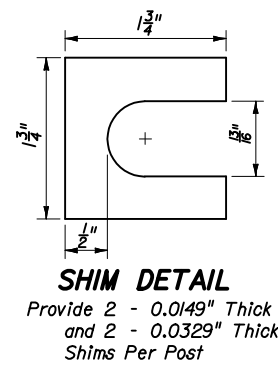
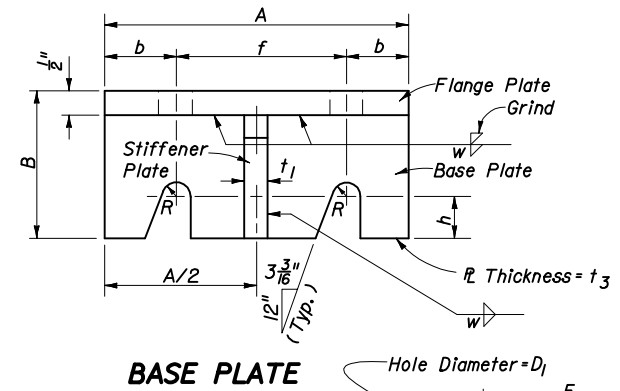
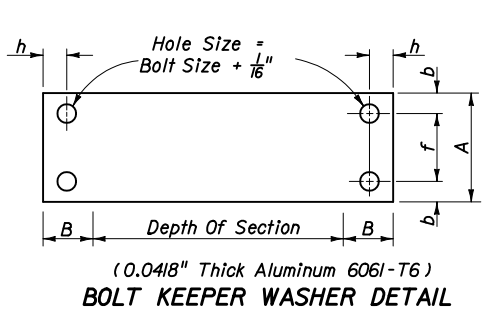
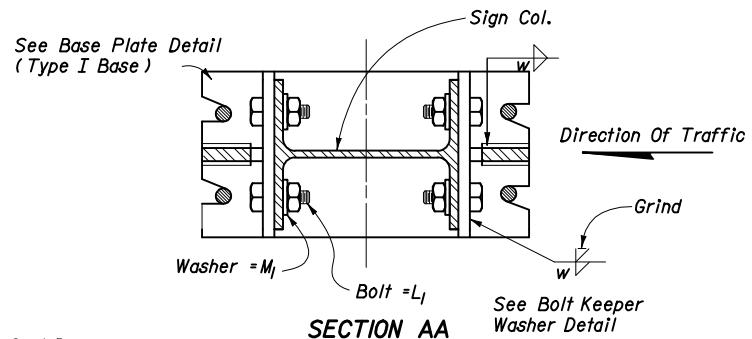
**SIGN PANEL AND WIND BEAMS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

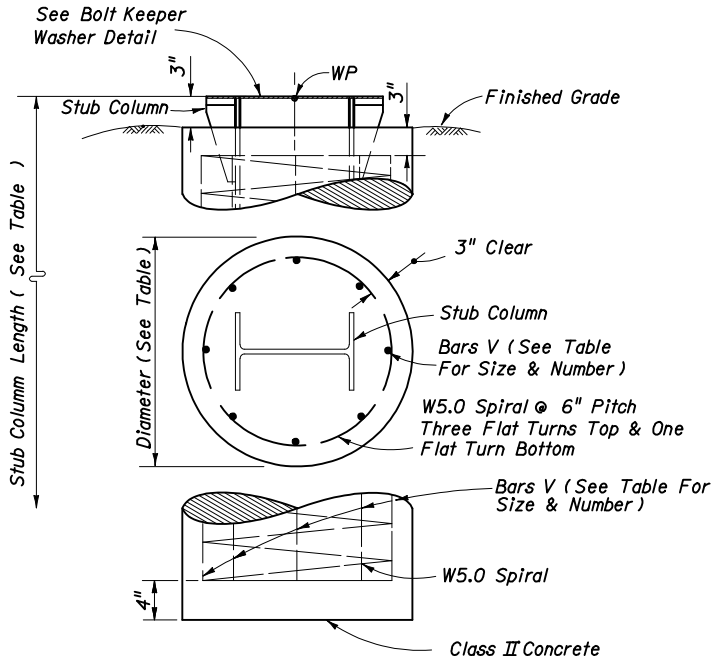
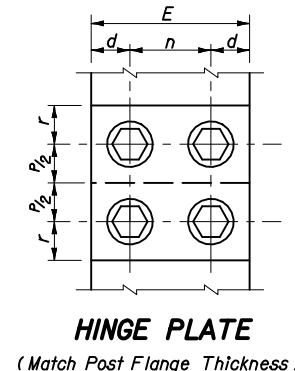
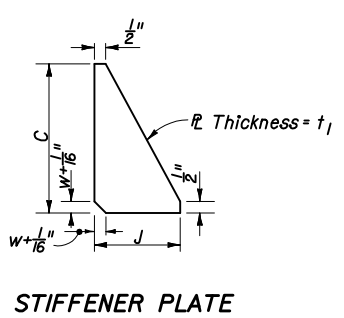
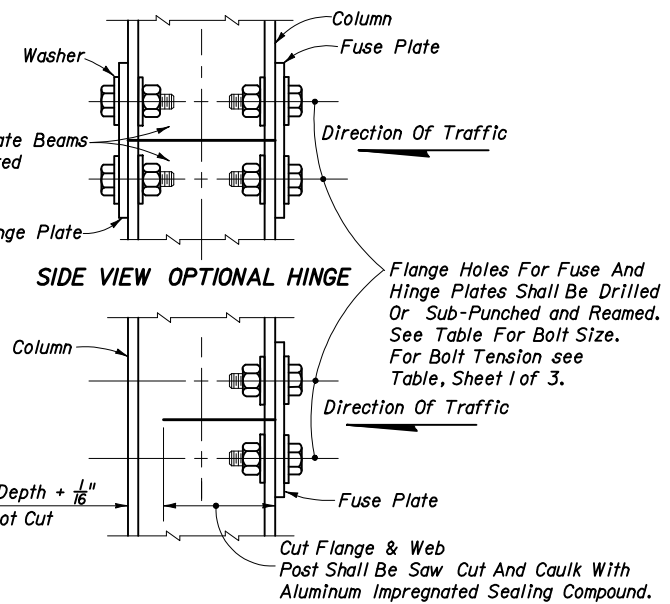
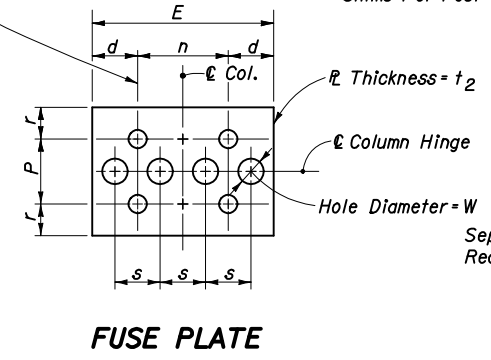
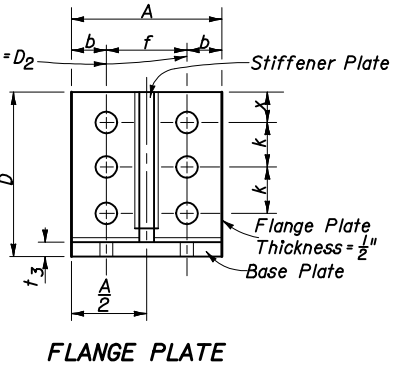
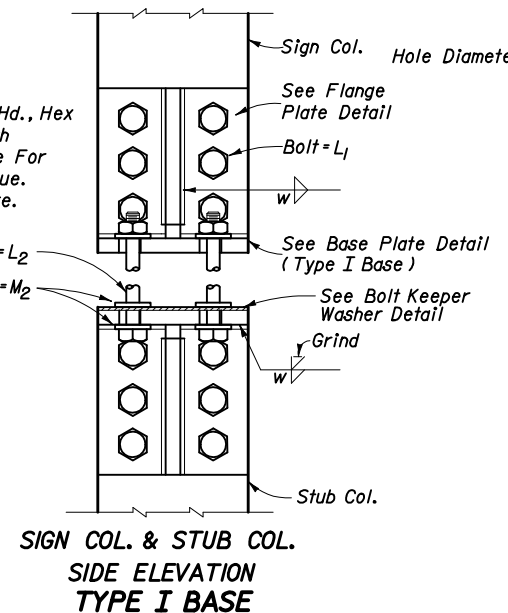
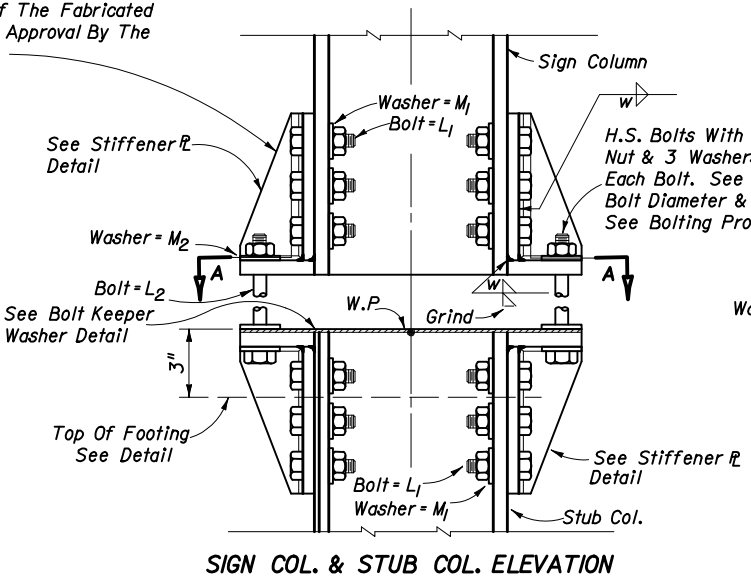
**STANDARD ROADSIDE SIGN BREAK-AWAY PANEL DETAIL**

Names	Dates	Approved By			
Designed By	RES	11-94			
Drawn By	DDDS	11-94			
Checked By	DER	11-94	Revision	Sheet No.	Index No.
			02	1 of 3	9535





An Alternate Cast Base Of Alloy 356 And T6 May Be Submitted For Consideration In Lieu Of The Fabricated Base For Approval By The Engineer.



Section*	BASE CONNECTION DATA TABLE																FUSE (HINGE) PLATE DATA TABLE										FOUNDATION DATA TABLE						
	A	B	C	D	J	L1 (Dia.)	Bolt Size (Dia.) & Torque (L2) (in-lb)	M1	M2	D2	R	x	b	f	h	k	t1	t3	w	Bolt Size	E	P	d1	d	n	r	s	t2	W	Dia.	Depth	Stub Length	Reinforcing Bars "V"
I 4x2.79	3 3/8"	2 1/8"	5 1/8"	6 3/8"	2 1/4"	3/8"	Ø 345	1 1/2"	1 1/8"	1 1/8"	3/8"	1 1/4"	1 1/8"	1 1/4"	1 1/8"	1 1/8"	3/8"	3/8"	3/8"	5/8"	3 3/8"	2 3/4"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1'-8"	4'-6"	1'-8"	10-#5
I 6x4.03	4 1/8"	2 3/8"	5 1/8"	6 3/8"	2 1/4"	3/8"	Ø 345	1 1/2"	1 1/8"	1 1/8"	3/8"	1 1/4"	1 1/8"	1 1/4"	1 1/8"	1 1/8"	3/8"	3/8"	3/8"	5/8"	4 1/8"	2 3/4"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	2'-0"	5'-9"	2'-2"	10-#7	
I 8x6.18	5 1/8"	2 3/8"	7 1/8"	7 1/8"	2 3/4"	3/8"	Ø 345	1 1/2"	1 1/8"	1 1/8"	3/8"	1 1/4"	1 1/8"	1 1/4"	1 1/8"	1 1/8"	3/8"	3/8"	3/8"	5/8"	5 1/8"	2 3/4"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	2'-0"	7'-6"	2'-8"	10-#7	
I 9x8.36	5 3/8"	3 1/8"	7 1/8"	8 1/8"	2 3/4"	3/8"	Ø 550	1 1/2"	1 1/8"	1 1/8"	3/8"	1 1/4"	1 1/8"	1 1/4"	1 1/8"	1 1/8"	3/8"	3/8"	3/8"	5/8"	5 3/8"	3 1/4"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	2'-4"	8'-0"	2'-8"	8-#8	
I 10x10.3	6"	3 3/8"	8 1/8"	9 1/8"	2 3/4"	1"	Ø 550	2"	1 1/2"	1 1/8"	3/8"	1 1/4"	1 1/8"	1 1/4"	1 1/8"	1 1/8"	3/8"	3/8"	3/8"	5/8"	6"	4 1/4"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	2'-4"	9'-6"	3'-3"	8-#8	
I 12x14.3	7 1/8"	3 3/8"	9 1/8"	10 3/8"	3"	1"	Ø 690	2 3/8"	2"	1 1/8"	3/8"	1 1/4"	1 1/8"	1 1/4"	1 1/8"	1 1/8"	3/8"	3/8"	3/8"	5/8"	7 1/8"	5 1/4"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	1 1/8"	2'-8"	11'-0"	3'-9"	10-#8	

\* All Shapes Listed are Aluminum Association I Beams. Designation Gives (Member Depth) x (lb/ft).

**PROCEDURE FOR ASSEMBLY OF BASE CONNECTION: FOR BOLTS L2**

1. Assemble post to stub with bolts and with one flat washer on each bolt between plates.
2. Shim as required to plumb post (See Shim Detail).
3. Tighten all bolts the maximum possible with 1'-0" to 1'-3" 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.

**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.

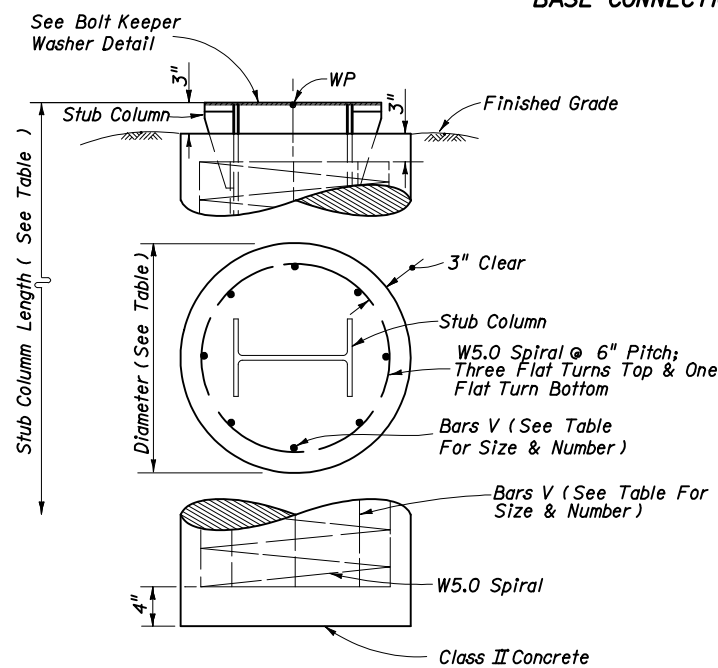
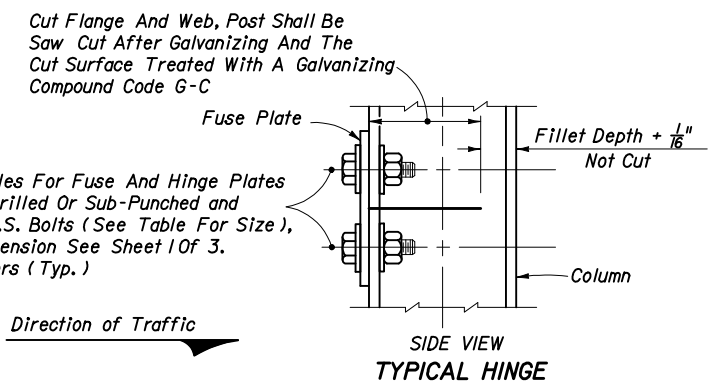
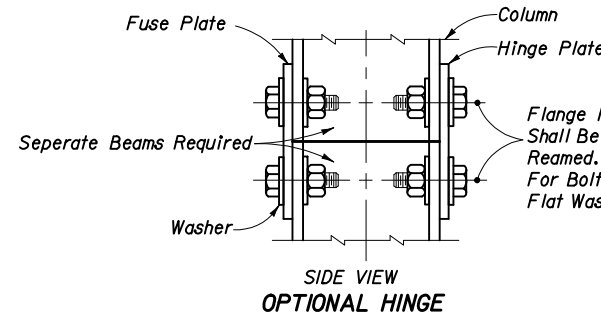
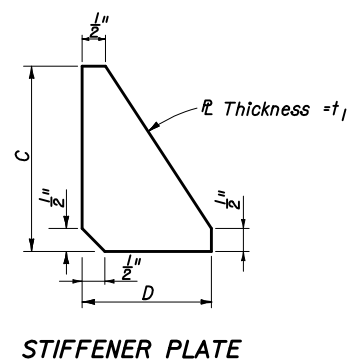
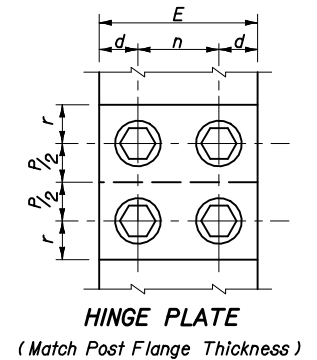
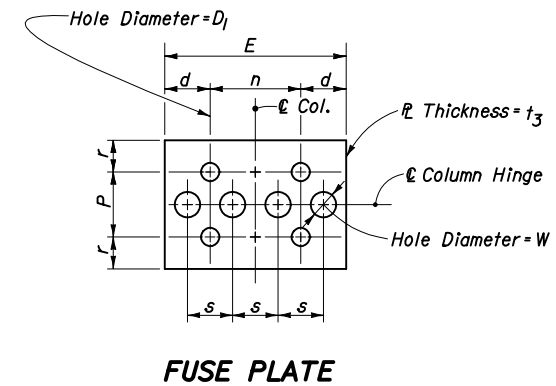
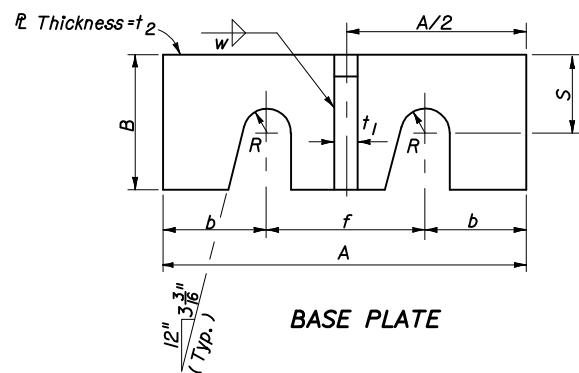
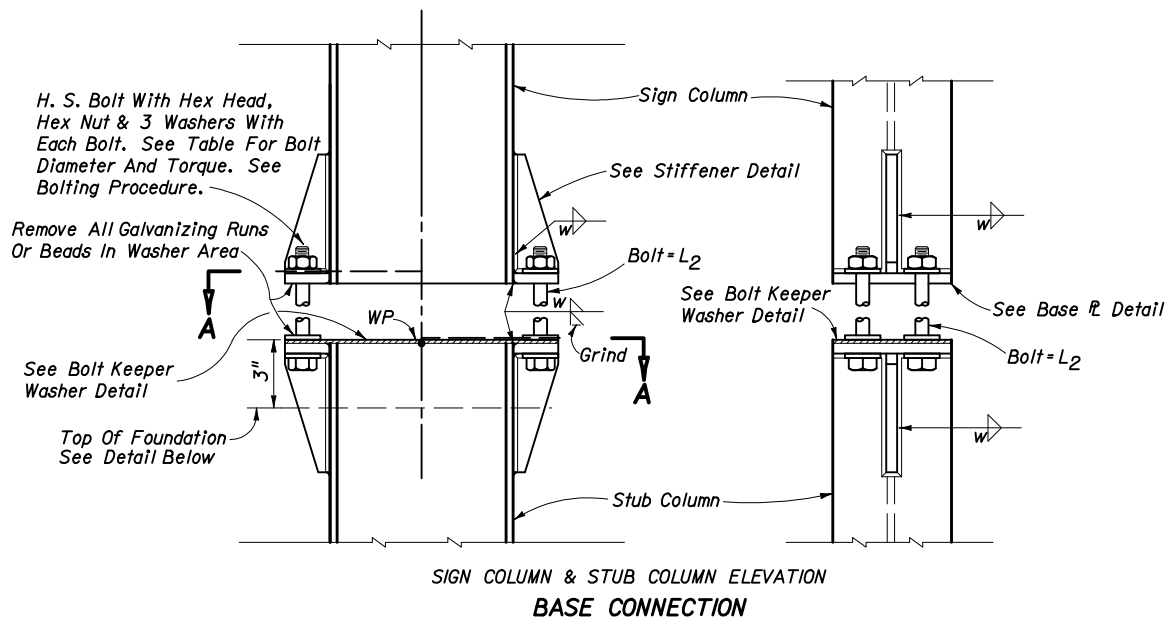
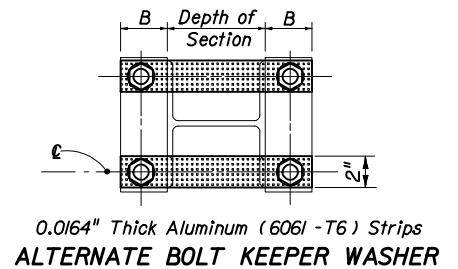
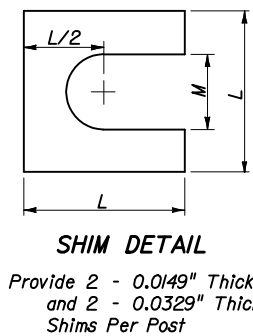
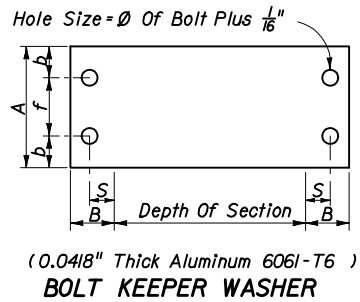
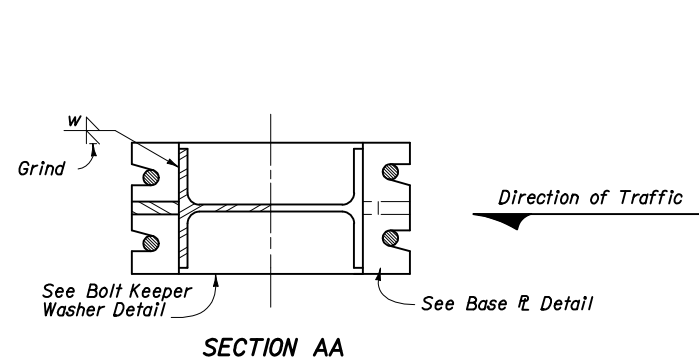
**NOTES:** To prevent galvanic corrosion, reinforcing steel shall not be in contact with the aluminum stud column. All reinforcing to be Grade 60.

**ALUMINUM POST, BASE, FOUNDATION & FUSE R DETAILS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STANDARD ROADSIDE SIGN BREAK-AWAY POST DETAILS**

Names	Dates	Approved By		
Designed By	RES	11-94	State Structures Design Engineer	
Drawn By	SGP	11-94	Revision	Sheet No.
Checked By	DER	11-94	00	2 of 3
			Index No. 9535	



Section*	BASE CONNECTION DATA													FUSE (HINGE) PLATE DATA										FOUNDATION DATA				SHIM	
	A	B	C	D	Bolt Size (Lp) & Torque (In-lb)	R	b	f	S	t1	t2	w	Bolt Size	E	P	D1	d	n	r	s	t3	W	Dia.	Depth	Stub Length	Reinf. Bars V	L	M	
W 6x12	4 3/4"	2"	5 1/8"	2"	5/8" Ø 345	3/8"	1 1/8"	2 1/2"	1 3/8"	9/16"	9/16"	1 1/4"	5/8"	4 1/4"	3"	1 1/8"	1 1/8"	2"	1 3/8"	1"	1 1/8"	1 1/8"	2'-0"	5'-6"	2'-4"	10-#7	1 3/8"	1 1/8"	
W 8x18	5 3/4"	2 1/8"	6 1/4"	2 1/4"	3/4" Ø 550	7/16"	1 1/2"	2 3/4"	1 3/8"	9/16"	9/16"	1 1/4"	1"	5 1/8"	3 3/4"	1 5/8"	1 1/2"	2 1/4"	1 3/8"	1 5/8"	3/8"	1 1/8"	2'-0"	7'-6"	2'-10"	10-#7	1 3/8"	1 1/8"	
W 10x22	6 1/2"	2 3/8"	8"	2 3/8"	7/8" Ø 640	1"	1 3/8"	3"	1 3/8"	9/16"	9/16"	1 1/4"	1"	6 3/8"	4 1/8"	1 3/4"	1 3/4"	2 1/4"	1 3/4"	1 1/2"	3/8"	1 1/8"	2'-4"	8'-6"	3'-4"	8-#8	2 3/8"	1 1/8"	
W 10x33	8"	2 3/4"	8"	2 3/4"	1 1/8" Ø 780	5/8"	2"	4"	1 9/16"	9/16"	9/16"	1 1/4"	1 1/8"	7 1/8"	5 1/8"	1 7/8"	2 1/4"	3 3/8"	2"	1 7/8"	1 1/2"	1 1/8"	2'-4"	10'-3"	4'-0"	8-#8	2 3/8"	1 1/8"	
W 12x40	8"	3"	8"	3"	1 1/8" Ø 780	5/8"	2"	4"	1 9/16"	9/16"	9/16"	1 1/4"	1 1/8"	8 3/8"	5 3/4"	1 7/8"	2 1/4"	3 3/8"	2 3/8"	2"	1 1/2"	1 1/8"	2'-8"	11'-3"	4'-8"	10-#8	2 3/8"	1 1/8"	

\* Designations Give (Nominal Depth) x (lb/ft)

**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 1'-0" to 1'-3" 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.

**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.

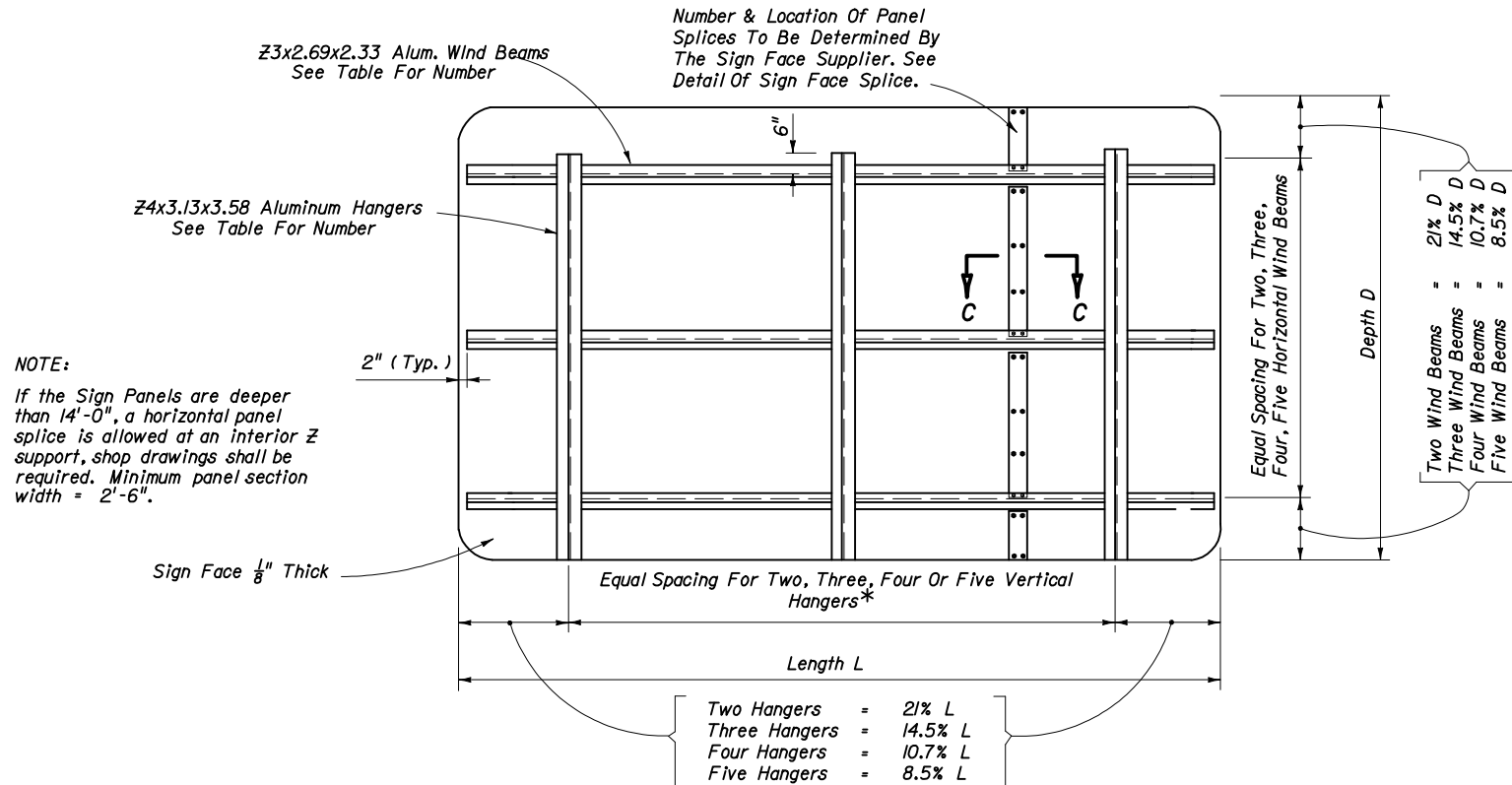
**STEEL POST, BASE, FOUNDATION & FUSE R DETAILS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STANDARD ROADSIDE SIGN BREAK-AWAY POST DETAILS**

Names	Dates	Approved By		
Designed By	RES	11-94	 State Structures Design Engineer	
Drawn By	SGF	11-94		
Checked By	DER	11-94		
Revision	00	Sheet No.		
		00	3 of 3	9535

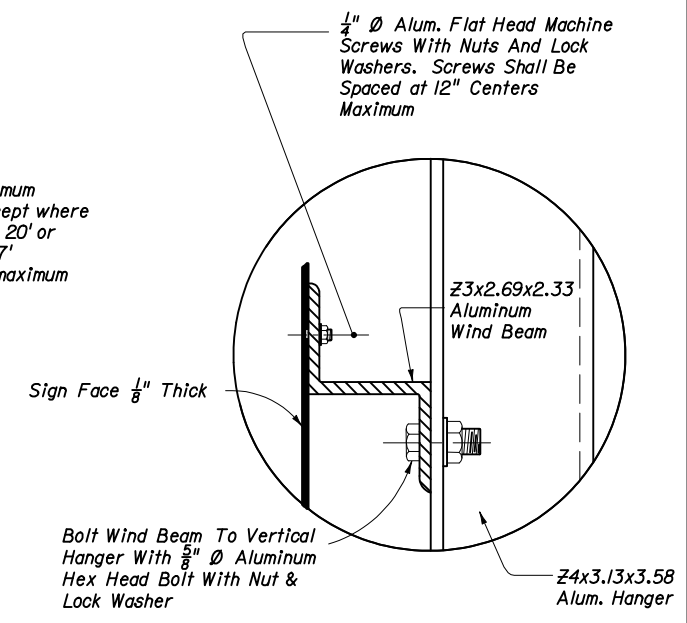
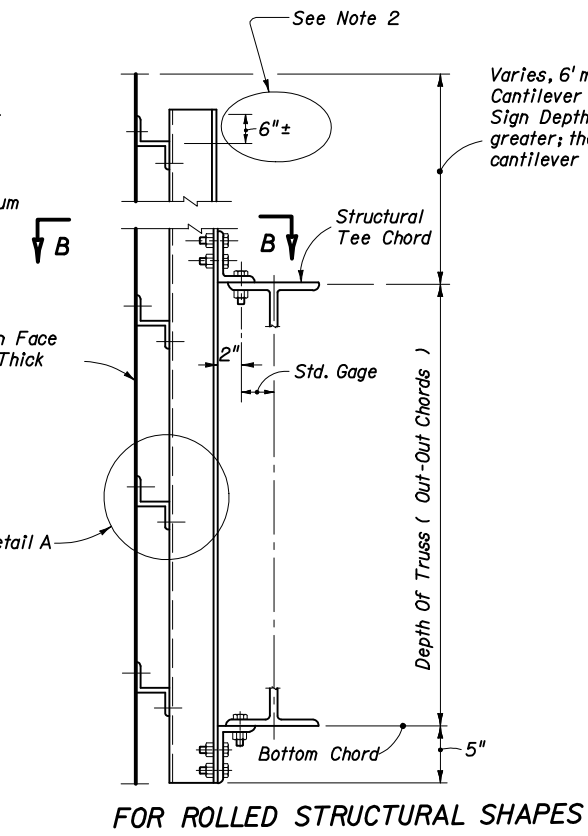
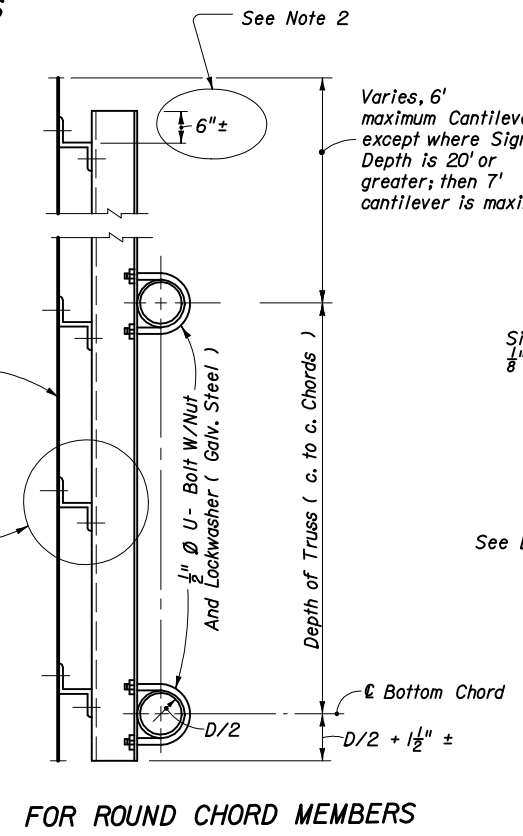
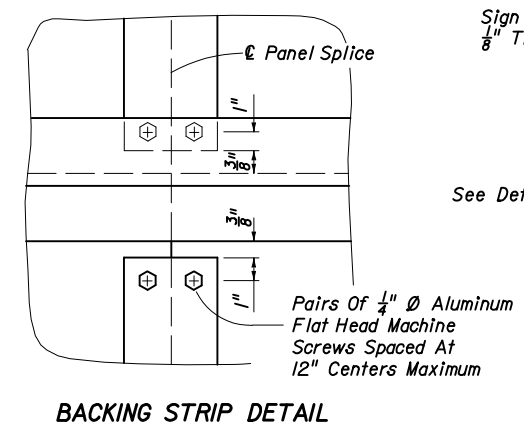
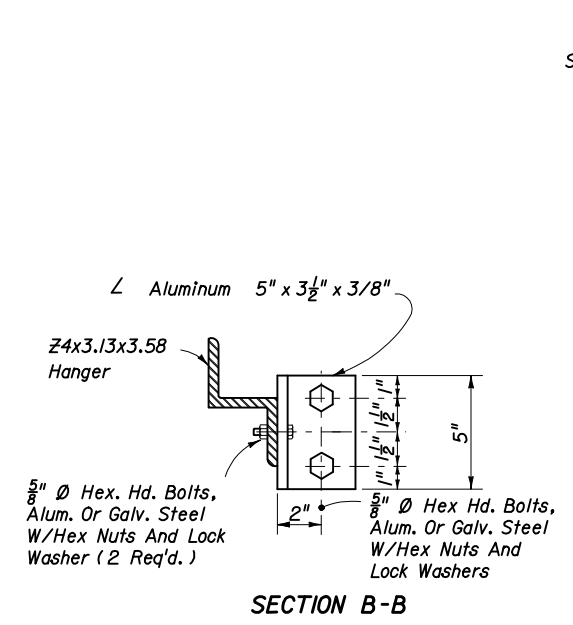
NOTE: All Reinforcing To Be Grade 60.



\*Note: Spacing of vertical hangers may be varied slightly or as necessary to clear the truss struts and diagonals at panel points.

**TYPICAL SIGN FACE ELEVATION FOR OVERHEAD TRUSS**

Wind M.P.H.	No. Beams	Max. Depth	Number Of Z4x3.13x3.58 Vertical Hanger Beams For Sign Length			
			2 Hangers Sign Length	3 Hangers Sign Length	4 Hangers Sign Length	5 Hangers Sign Length
110	2	5'-0"	0'-15'-0"	15'-1"-30'-0"	30'-1"-45'-0"	
110	3	8'-6"	0'-15'-0"	15'-1"-30'-0"	30'-1"-45'-0"	
110	4	11'-6"	0'-13'-0"	13'-1"-18'-3"	18'-4"-24'-9"	24'-10"-31'-4"
110	5	14'-0"	0'-13'-0"	13'-1"-18'-3"	18'-4"-24'-9"	24'-10"-31'-4"
100	2	5'-3"	0'-15'-0"	15'-1"-30'-0"	30'-1"-45'-0"	
100	3	8'-10"	0'-15'-0"	15'-1"-22'-3"	22'-4"-30'-0"	30'-1"-38'-0"
100	4	12'-0"	0'-15'-0"	15'-1"-22'-3"	22'-4"-30'-0"	30'-1"-38'-0"
100	5	15'-0"	0'-11'-7"	11'-8"-16'-4"	16'-5"-22'-2"	22'-3"-28'-0"
90	2	5'-6"	0'-15'-0"	15'-1"-30'-0"	30'-1"-45'-0"	
90	3	9'-6"	0'-15'-0"	15'-1"-27'-3"	27'-4"-37'-0"	
90	4	12'-9"	0'-15'-0"	15'-1"-27'-3"	27'-4"-37'-0"	
90	5	16'-0"	0'-14'-3"	14'-4"-20'-0"	20'-1"-27'-0"	27'-1"-34'-3"
80	2	6'-0"	0'-15'-0"	15'-1"-30'-0"	30'-1"-45'-0"	
80	3	10'-0"	0'-15'-0"	15'-1"-30'-0"	30'-1"-45'-0"	
80	4	14'-0"	0'-15'-0"	15'-1"-25'-9"	25'-10"-34'-10"	



**GENERAL NOTES**

(1) For "General Notes" covering Material Specifications; see Sheets 1 Of 3, Index 9535.

(2) This dimension shall be adjusted for porcelain enameled sign panel.

( LIGHTING NOT SHOWN )

**TYPICAL DETAILS OF SIGN & TRUSS CONNECTION**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**ALUMINUM & STEEL OVERHEAD SIGN STRUCTURES**

Names	Dates	Approved By		
Designed By	REB	11/94	State Structures Design Engineer	
Drawn By	DDDS	11/94	Revision	Sheet No.
Checked By	DER	11/94	00	1 of 1
			Index No.	11037

Main table containing 29 columns of sign specifications (SIGN, TYPE OF SIGN BRACKET, PROFILE, SIZE, SQ. FT., WIND ZONE, etc.) for various ground signs. Includes columns for Sign Identification Number and specific bracket types (60, 70, 80, 90).

NOTE:

- The Gore Exit Panel (FTP-31, Index 17355, Sheet 3), Sign Identification Number 88, can be installed on a single column with the following stipulations:
1. Maximum height to bottom of sign is 14'.
2. Column size is 6" aluminum round tube with 1/4" wall.
3. 3 Type II Brackets required for attachment.
4. For Type II Bracket details, Attachment and General Notes see Index No. 11860.
5. Footing shall be 2'-0" dia x 5'-0" deep.
6. Slip Base Details, see Index No. 11863.

Sign size is in inches unless otherwise specified.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
SINGLE COLUMN GROUND SIGNS
Approval table with fields for Names, Dates, Approved By, Designed By, Drawn By, Checked By, Revision, Sheet No., and Index No.

**GENERAL NOTES**

GENERAL SPECIFICATIONS : Florida Department of Transportation Standard Specifications for Road and Bridge Construction (1999) and Supplements thereto.

DESIGN SPECIFICATIONS : Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, AASHTO 1994.

ALUMINUM : Except as noted below, Aluminum Materials shall meet the requirements of Aluminum Association Alloy 6061-T6 (ASTM B209, B221, or B308).

1. Permitted Alternate for Sheets and Plates--- Alloy 5154-H38 (ASTM-B209)

CONCRETE : All concrete shall be Class I (Special), the specified compressive strength at 28 days (f'c) shall be 3 ksi min.

SIGN PANELS : Sign Panels shall be 0.08 inches min. thick Aluminum Plate with all corners rounded. See sign layout sheet. Panels are to be degreased, etched, neutralized and treated with Alodine 1200, Irdine 14-2, Bonderite 721 or equal. No stenciling permitted on panels.

ALUMINUM BOLTS, NUTS & LOCKWASHERS : Aluminum bolts shall meet the requirements of ASTM F468, Alloy 2024-T4. The Bolts shall have an Anodic Coating of at least 0.0002 inches thick and be chromate sealed. Lockwashers shall meet the requirements of Aluminum Association Alloy 7075-T6 (ASTM B221). Nuts shall meet the requirements of ASTM F-467, Alloy 6061-T6 or 6262-T9.

STAINLESS STEEL BOLTS, NUTS AND LOCKWASHERS : Stainless Steel Bolts, Nuts and Lockwashers conforming to ASTM F593 Alloy Group 2 Condition A, CW2, or SH4 may be provided in lieu of Aluminum Bolts, Nuts and Washers.

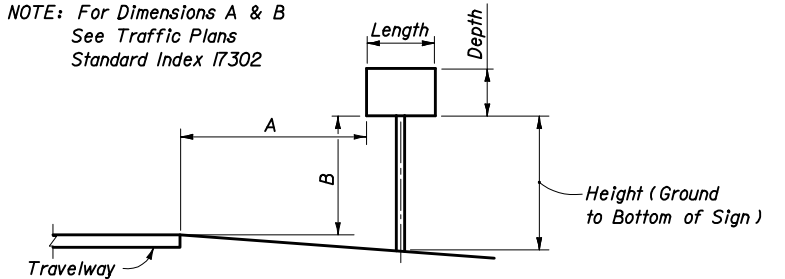
U-BOLTS, NUTS & LOCKWASHERS : U-Bolts, Nuts and Lockwashers shall meet the requirements of ASTM A307, Grade A and shall be galvanized in accordance with ASTM A153.

INSTALLING FRANGIBLE COLUMN SUPPORTS : Columns (Posts) may be installed by driving the columns in accordance with index Nos. 11861 thru 11865, or as an alternate method the contractor may set the columns (Posts) to the depth indicated in preformed holes backfilled with suitable material tamped in layers not thicker than 6" to provide adequate compaction.

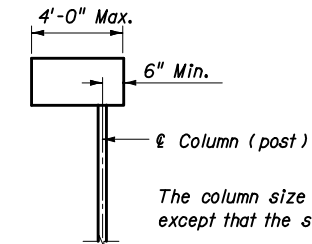
SHOP DRAWINGS : When Type C ground sign supports are furnished and fabricated in accordance with these plans, shop drawings will NOT be required for approval by the Engineer.

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 (Depth) is given first and the Horizontal Dimension (Length) is given last. For Column Sizes, Heights and Footings see appropriate (Wind Zone or Height =14' Max.) sheets titled "Column Sizes, Column Heights and Footings " Index Numbers 11861 thru 11865. No Shop or Field Splice is allowed in Sign Panels. All Panels shall be furnished in one piece.

NOTE: For Dimensions A & B See Traffic Plans Standard Index 17302



**TYPICAL SECTION**



The column size shall be as tabulated in the Standard except that the size shall not be smaller than 3 1/2" Ø.

Note: All cantilever sign installations shall comply with standard Index 17302. The sign shall be supported by an aluminum round column with concrete footing and breakaway support. All sign brackets shall be Type II.

**CANTILEVER SIGN**

**WIND SPEEDS BY COUNTY**

ZONE NO. 1 (60 M.P.H.)

Alachua, Baker, Bay, Bradford, 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, De Soto, 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.

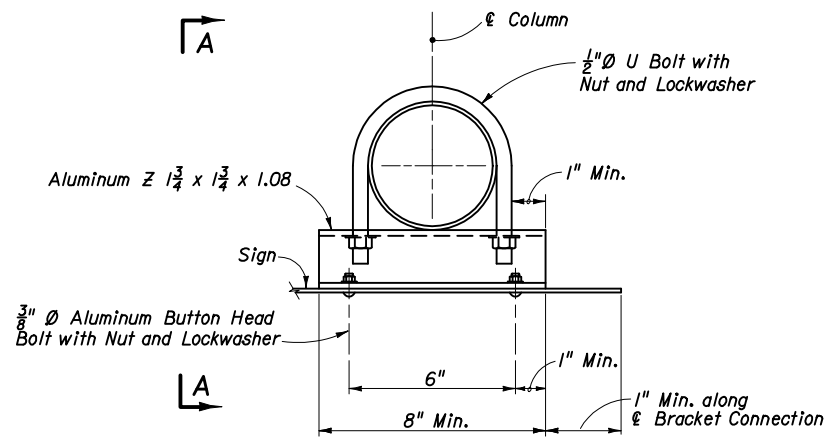
ZONE NO. 4 (90 M.P.H.)

Broward, Dade and Monroe Counties.

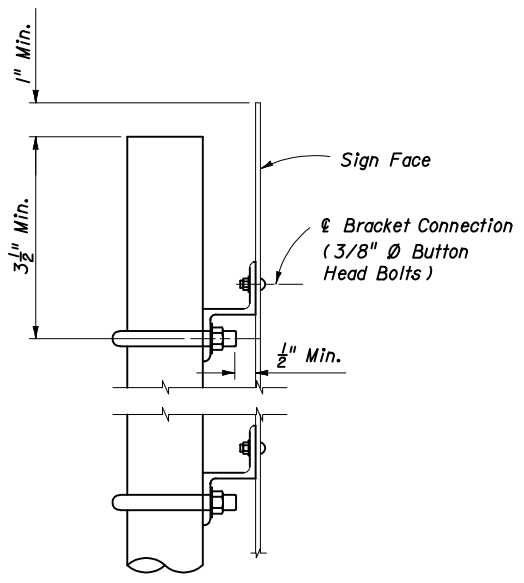
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SINGLE COLUMN GROUND SIGNS**

Names	Dates	Approved By <i>W. V. [Signature]</i>		
Designed By	RES	10/94	State Structures Design Engineer	
Drawn By	DDDS	10/94	Revision	Sheet No.
Checked By	DER	11/94	02	2 of 3
				Index No. 11860

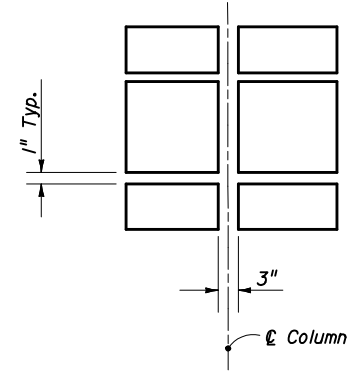


**TYPE I BRACKET**

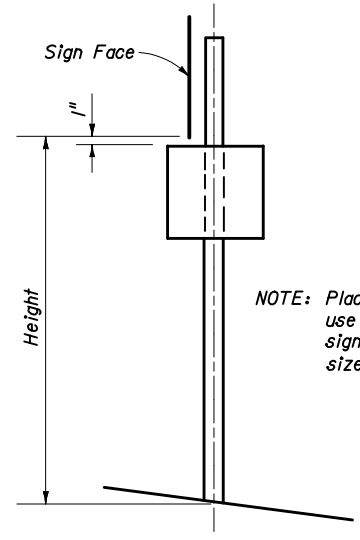


**VIEW AA**

NOTE: Use profile of largest sign and height to bottom of largest sign to determine column size.

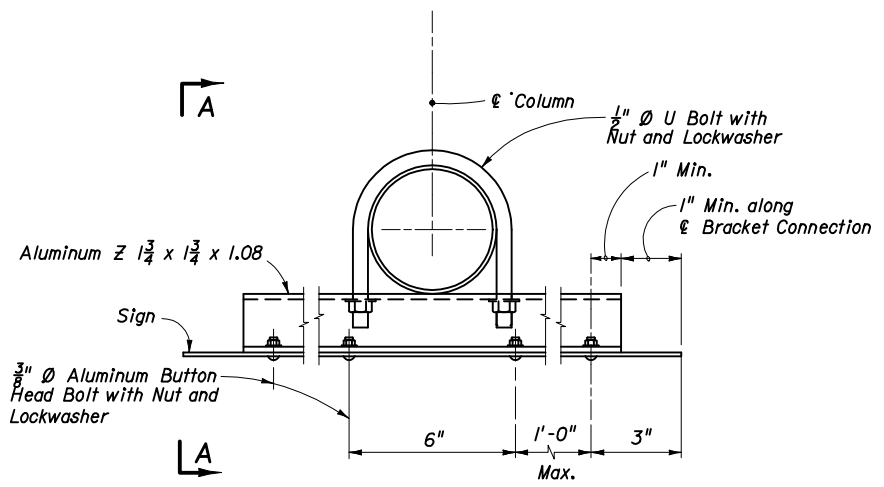


**SIGN CLEARANCE**

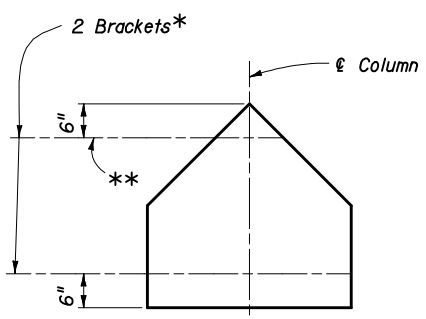


**SIGNS AT 90°**

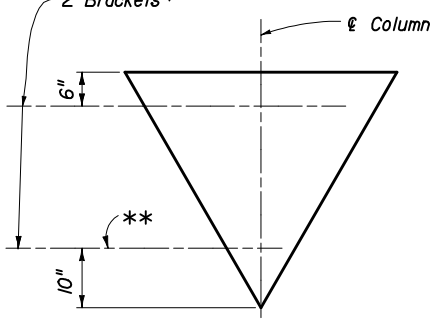
NOTE: Place largest sign on top, use profile of largest sign to determine column size.



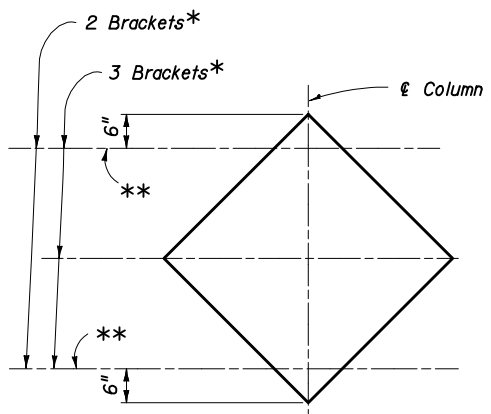
**TYPE II BRACKET (SINGLE SIGN)**



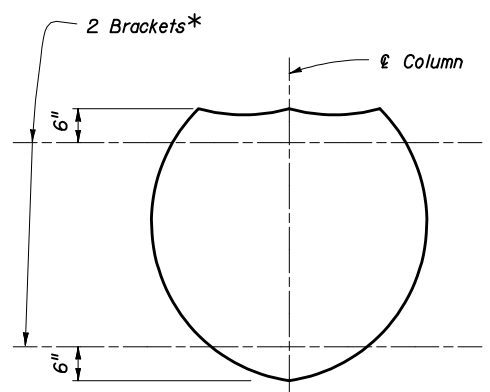
**SCHOOL**



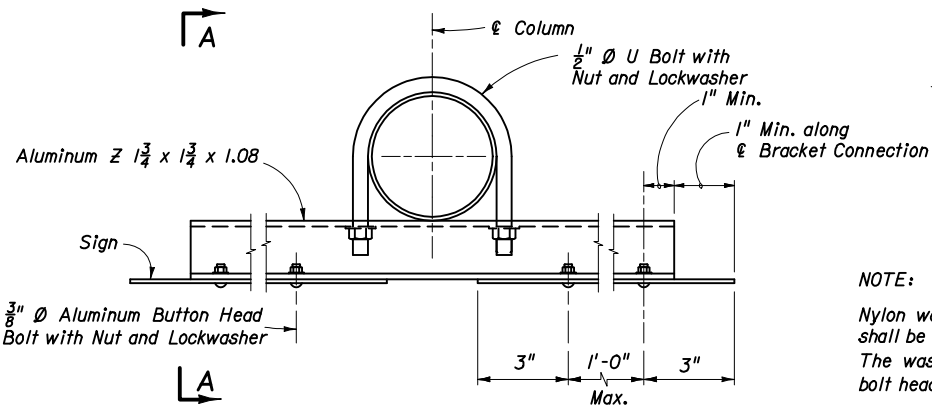
**YIELD**



**DIAMOND**

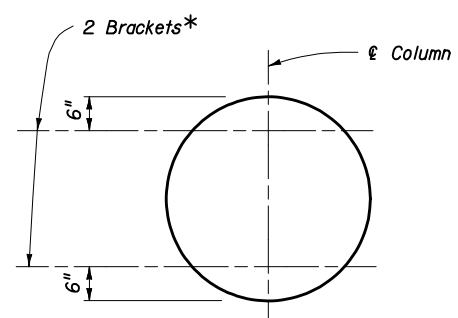


**SHIELD**

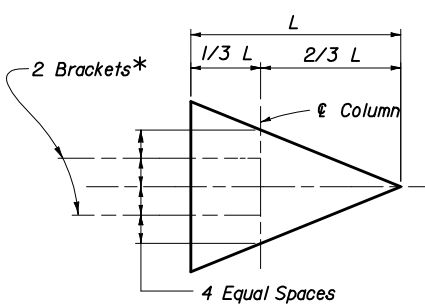


**TYPE II BRACKET (DOUBLE SIGNS)**

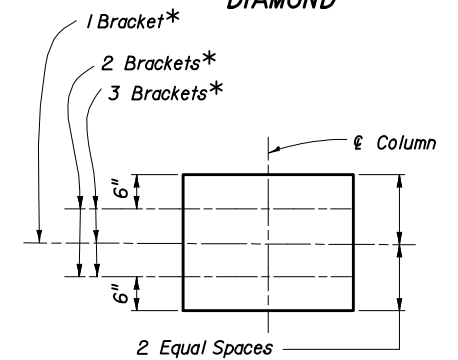
NOTE: 5/16 inch diameter Stainless Steel Hex Head Bolts with Flat Washer under Head and Lockwasher under Nut may be used in lieu of 3/8 inch diameter Aluminum Button Head Bolts.



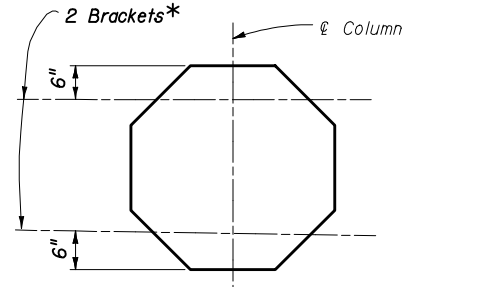
**RAILROAD**



**PENDANT**



**RECTANGLE**



**STOP**

NOTE: Nylon washers provided by the sheeting supplier shall be used on all ground mounted signs. The washers shall be installed under the sign bolt head to protect the sheeting.

**BRACKET LOCATIONS (SEE VIEW AA)**

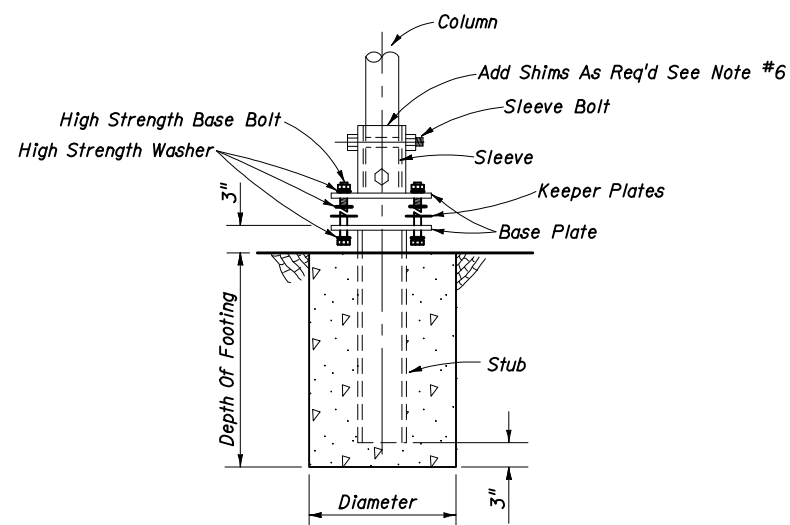
\* NOTE: The above Bracket locations apply at the center of Bracket-Sign Connection (3/8 inch diameter Button Head Bolts). See View AA. The locations also apply at Double Signs configurations. When installing back-to-back signs the topmost bracket location of one of the signs will require adjustment as shown on the above detail.

\*\* NOTE: Use Type I Bracket at the apex location (always).

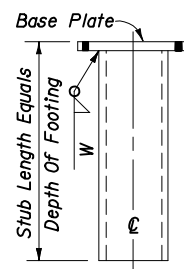
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SINGLE COLUMN GROUND SIGNS**

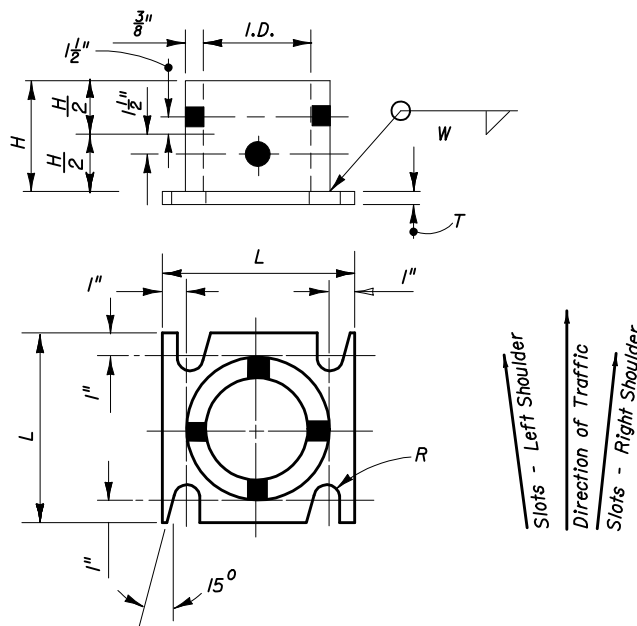
Designed By	RBS	10/94	Approved By	<i>[Signature]</i>	
Drawn By	DDDS	10/94	Revision	Sheet No.	Index No.
Checked By	DER	11/94	00	3 of 3	11860



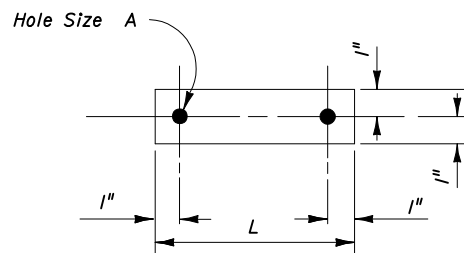
**SLIP BASE AND FOOTING DETAIL**



**Stub Size Equals Min. Sleeve Size Or Longer  
STUB DETAIL**



**SLEEVE & BASE PLATE DETAILS**



**0.04" Thick Alum. Strip-2 Req'd Per Base  
BOLT KEEPER DETAIL**

**SLIP BASE DETAILS**

Note: Unless noted otherwise, all dimensions are in inches

Column Size	Sleeve I.D. (Max)	Sleeve Height H	Weld W	Base Plate		Radius R	Base Bolt		Base Bolt Torque		Hole Size A
				L	T		Size	Length	Ft-lbs	In-lbs	
4 x 1/4	4 1/16	6	5/8	8	3/4	11/32	5/8	3	29	355	11/16
4 1/2 x 1/4	4 9/16	6	5/8	8	7/8	11/32	5/8	3 1/4	29	355	11/16
5 x 1/4	5 1/16	7	5/8	8	7/8	11/32	5/8	3 1/4	29	355	11/16
6 x 1/4	6 1/16	8	11/16	9	1	7/16	3/4	3 1/2	48	580	13/16
8 x 5/16	8 1/16	10	3/4	11	1	1/2	7/8	3 3/4	53	640	15/16

**NOTES**

- Work this Standard with Standard Index Numbers 11860 and 11865.
- To determine column (post) size and footing requirements use the required Sign Identification Number and Sign Height (H), Designs for Heights (H) lower than those listed in the Table are included in Standard Index Number 11865.
- Single Column installations are not allowed for heights (H) exceeding the maximum height shown in the Table, and for sign profiles (Sign Identification Numbers) without any design tabulated. In this event, the sign(s) will have to be supported by multiple columns (posts) featuring breakaway devices. See Standard Index Number 9535.
- The Column (Post) material shall be aluminum. The size is given as outside diameter and wall thickness. Columns (posts) larger than 3 1/2" x 3/16" are non-fragible and shall be installed with breakaway supports and will have concrete footings and slip bases.
- The foundation size is given as outside diameter and depth.
  - Frangible Supports: Foundations for Frangible Supports do not require concrete. The column (post) shall be driven into the ground to the depth indicated.
  - Breakaway Supports: Foundations for Breakaway Supports require concrete. The column support shall be set in a concrete foundation, sized as shown in the table. The first dimension indicates the diameter and the second dimension the depth into the ground. In all cases the ground is to be considered as undisturbed earth, road material, or properly compacted fill.
- SLIP BASE NOTES :
  - The Inside Diameter (I.D.) of the sleeve shall be no more than 1/16" larger than the Outside Diameter (O.D.) of the Column.
  - The sleeve bolts shall be 1/2" Ø with locknuts. The bolts shall be galvanized steel (ASTM A-307) or Aluminum Association Alloy 2024-T4 or 6061-T6 (ASTM B-211).
  - The base bolts, nuts and washers shall be high strength ASTM A-325 and shall have an electroplated zinc coating SC3, Type II applied in accordance with ASTM B633.
  - 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 :
    - Connect column to sleeve using two (2) 1/2" Ø machine bolts. Assemble top base plate to stub base plate using high strength bolts with three (3) hardened washers per bolt. One (1) washer per bolt and two (2) bolt keeper plates go between the base plates. Use shim stock as required to plumb the column. Tighten all bolts the maximum possible with a 12" to 15" wrench to bed the washers and shims and to clear the bolt threads. Loosen each bolt one (1) turn and retighten to the prescribed torque (see table). Bolts shall be tightened with properly calibrated wrenches under the supervision of the project engineer. Burr threads at junction with nut using a center punch to prevent nut loosening.
    - Use galvanized steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the 1/2" Ø sleeve bolts. The shim length shall be 1" shorter than the height of the sleeve.

**COLUMN SIZE, COLUMN HEIGHT & COLUMN FOOTINGS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SINGLE COLUMN GROUND SIGNS**

<b>60</b>	<b>M.P.H. WIND LOADING</b>		Names	Dates	Approved By	<i>W. V. [Signature]</i> State Structures Design Engineer
	Designed By	DER	10/94	Revision	Sheet No.	
	Drawn By	DDDS	10/94	1 of 2	Index No.	
	Checked By	RES	11/94	02	11861	

COL. SIZE	2 x 1/8	2 1/2 x 1/8	3 x 1/8	3 1/2 x 3/16	4 x 1/4	4 1/2 x 1/4	5 x 1/4	6 x 1/4	8 x 5/16	
FOUNDATION	0 x 4-0	0 x 4-3	0 x 4-9	0 x 5-3	2-0 x 3-9	2-0 x 4-0	2-0 x 4-3	2-0 x 4-9	2-0 x 4-9	
Sign Identification Number	HEIGHT (Feet)									
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to
1	15	15 20	20 25							
2		17	17 22	22 25						
3		13	13 18	18 25						
4		9	9 11	11 18	18 25					
5										
6		9	9 12	12 18	18 25					
7			6	6 12	12 23	23 25				
8	15	15 20	20 25							
9		15	15 20	20 25						
10		12	12 15	15 22	22 25					
11		9	9 12	12 18	18 25					
12				12	12 22	22 25				
13		12	12 14	14 22	22 25					
14			12	12 20	20 25					
15		11	11 13	13 20	20 25					
16		9	9 12	12 18	18 25					
17			9	9 13	13 25					
18				12	12 23	23 25				
19				9	9 18	18 23	23 25			
20										
21		8	8 11	11 17	17 25					
22			11	11 15	15 25					
23		7	7 11	11 16	16 25					
24			10	10 14	14 25					
25		11	11 13	13 20	20 25					
26		10	10 12	12 20	20 25					
27		9	9 12	12 18	18 25					
28		9	9 12	12 18	18 25					
29		9	9 12	12 18	18 25					
30		8	8 12	12 16	16 25					
31		6	6 10	10 14	14 25					
32			8	8 12	12 25					
33		7	7 11	11 16	16 25					
34		6	6 10	10 14	14 25					
35			10	10 14	14 25					
36			9	9 12	12 25					
37				11	11 21	21 25				
38				11	11 20	20 25	25 25			
39				9	9 18	18 23	23 25			
40										
41					14	14 18	18 23	23 25		
42					12	12 16	16 20	20 25		
43										
44	16	16 22	22 25							
45		16	16 21	21 25						
46		16	16 21	21 25						
47		16	16 21	21 25						
48		16	16 21	21 25						
49		14	14 18	18 25						
50		13	13 18	18 25						
51			18	18 25						
52		13	13 17	17 25						


COL. SIZE	2 x 1/8	2 1/2 x 1/8	3 x 1/8	3 1/2 x 3/16	4 x 1/4	4 1/2 x 1/4	5 x 1/4	6 x 1/4	8 x 5/16	
FOUNDATION	0 x 4-0	0 x 4-3	0 x 4-9	0 x 5-3	2-0 x 3-9	2-0 x 4-0	2-0 x 4-3	2-0 x 4-9	2-0 x 4-9	
Sign Identification Number	HEIGHT (Feet)									
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to
53		13	13 16	16 24	24 25					
54		13	13 16	16 24	24 25					
55		12	12 15	15 23	23 25					
56		11	11 13	13 21	21 25					
57		11	11 13	13 21	21 25					
58		11	11 13	13 20	20 25					
59		11	11 13	13 20	20 25					
60		10	10 12	12 20	20 25					
61		10	10 13	13 19	19 25					
62		9	9 12	12 17	17 25					
63			12	12 17	17 25					
64		8	8 12	12 17	17 25					
65			11	11 16	16 25					
66			11	11 15	15 25					
67		7	7 11	11 15	15 25					
68			10	10 14	14 25					
69			10	10 14	14 25					
70		6	6 10	10 14	14 25					
71										
72			9	9 14	14 25					
73			9	9 13	13 25					
74										
75			7	7 12	12 24	24 25				
76			7	7 12	12 23	23 25				
77				11	11 23	23 25				
78			7	7 12	12 24	24 25				
79										
80				10	10 19	19 23	23 25			
81				9	9 18	18 23	23 25			
82										
83										
84										
85										
86				15	15 19	19 23	23 25			
87				13	13 17	17 21	21 25			
88										
89										
90										
91										

The Column Size is O.D. x Wall Thickness in inches.  
The Foundation Size is O.D. x Depth in feet & inches.  
A zero O.D. means that a concrete foundation is not necessary.

**COLUMN SIZE, COLUMN HEIGHT & COLUMN FOOTINGS**

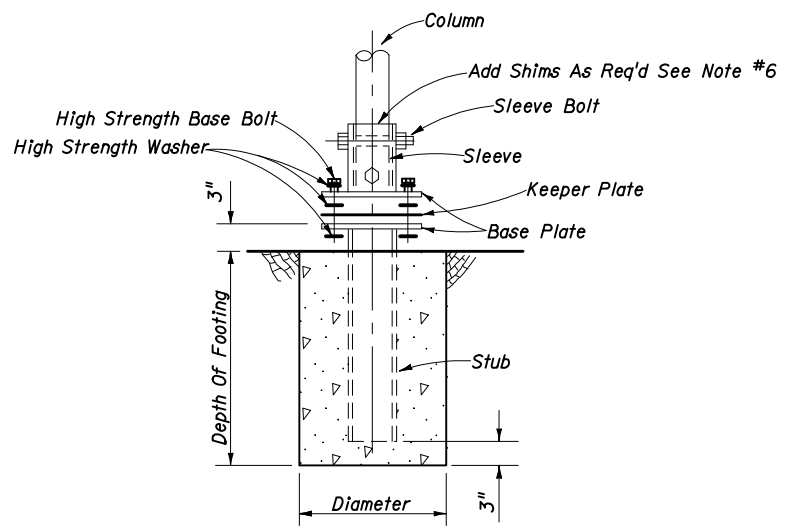
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SINGLE COLUMN GROUND SIGNS**

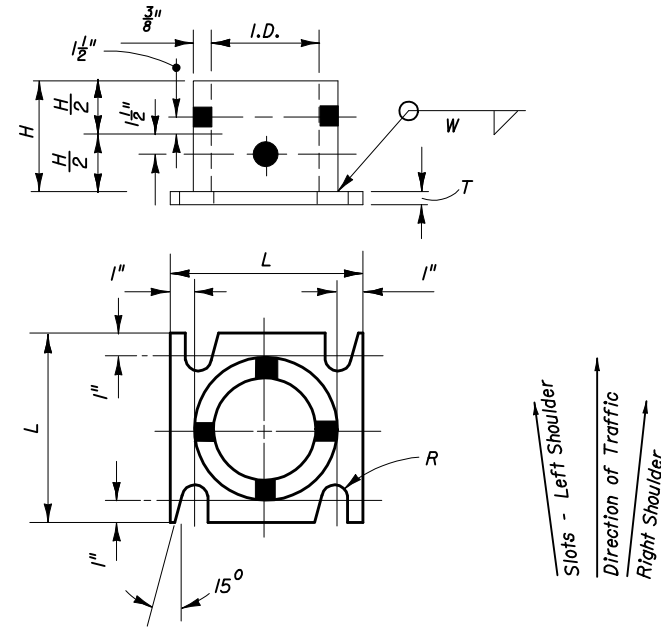
Designed By	DER	10/94	Approved By	
Drawn By	DDDS	10/94	State Structures Design Engineer	
Checked By	RES	11/94	Revision	02
			Sheet No.	2 of 2
			Index No.	11861

**60 M.P.H. WIND LOADING**

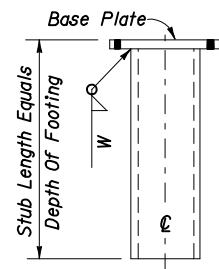




**BASE DETAIL**

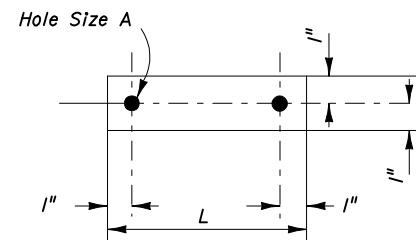


**SLEEVE & BASE PLATE DETAILS**



Stub Size Equals Min. Sleeve Size Or Longer

**STUB DETAIL**



0.040" Thick Alum. Strip-2 Req'd Per Base  
**BOLT KEEPER DETAIL**

**SLIP BASE DETAILS**

Note: Unless noted otherwise, all dimensions are in inches

Column Size	Sleeve I.D. (Max)	Sleeve Height H	Weld W	Base Plate		Radius R	Base Bolt		Base Bolt Torque		Hole Size A
				L	T		Size	Length	Ft-lbs	In-lbs	
4 x 1/4	4 1/16	6	5/8	8	3/4	11/32	5/8	3	29	355	11/16
4 1/2 x 1/4	4 9/16	6	5/8	8	7/8	11/32	5/8	3 1/4	29	355	11/16
5 x 1/4	5 1/16	7	5/8	8	7/8	11/32	5/8	3 1/4	29	355	11/16
6 x 1/4	6 1/16	8	11/16	9	1	7/16	3/4	3 1/2	48	580	13/16
8 x 5/16	8 1/16	10	3/4	11	1	1/2	7/8	3 3/4	53	640	15/16

**NOTES**

- Work this Standard with Standard Index Numbers 11860 and 11865.
- To determine column (post) size and footing requirements use the required Sign Identification Number and Sign Height (H), Designs for Heights (H) lower than those listed in the Table are included in Standard Index Number 11865.
- Single Column installations are not allowed for heights (H) exceeding the maximum height shown in the Table, and for sign profiles (Sign Identification Numbers) without any design tabulated. In this event, the sign(s) will have to be supported by multiple columns (posts) featuring breakaway devices. See Standard Index Number 9535.
- The Column (Post) material shall be aluminum. The size is given as outside diameter and wall thickness. Columns (posts) larger than 3 1/2" x 3/16" are non-fragible and shall be installed with breakaway supports and will have concrete footings and slip bases.
  - Frangible Supports: Foundations for Frangible Supports do not require concrete. The column (post) shall be driven into the ground to the depth indicated.
  - Breakaway Supports: Foundations for Breakaway Supports require concrete. The column support shall be set in a concrete foundation, sized as shown in the table. The first dimension indicates the diameter and the second dimension the depth into the ground. In all cases the ground is to be considered as undisturbed earth, road material, or properly compacted fill.
- SLIP BASE NOTES :
  - The Inside Diameter (I.D.) of the sleeve shall be no more than 1/16" larger than the Outside Diameter (O.D.) of the Column.
  - The sleeve bolts shall be 1/2" Ø with locknuts. The bolts shall be galvanized steel (ASTM A-307) or Aluminum Association Alloy 2024-T4 or 6061-T6 (ASTM B-211).
  - The base bolts, nuts and washers shall be high strength ASTM A-325 and shall have an electroplated zinc coating SC3, Type II applied in accordance with ASTM B633.
  - 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 :  
Connect column to sleeve using two (2) 1/2"Ø machine bolts.  
Assemble top base plate to stub base plate using high strength bolts with three (3) hardened washers per bolt. One (1) washer per bolt and two (2) bolt keeper plates go between the base plates.  
Use shim stock as required to plumb the column.  
Tighten all bolts the maximum possible with a 12" to 15" wrench to bed the washers and shims and to clear the bolt threads. Loosen each bolt one (1) turn and retighten to the prescribed torque (see table). Bolts shall be tightened with properly calibrated wrenches under the supervision of the project engineer.  
Burr threads at junction with nut using a center punch to prevent nut loosening.
  - Use galvanized steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the 1/2" Ø sleeve bolts. The shim length shall be 1" shorter than the height of the sleeve.

**COLUMN SIZE, COLUMN HEIGHT & COLUMN FOOTINGS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SINGLE COLUMN GROUND SIGNS**

<b>70</b> M.P.H. WIND LOADING	Names	Dates	Approved By <i>[Signature]</i>		
	Designed By	DER	10/94	State Structures Design Engineer	
	Drawn By	DDDS	10/94	Revision	Sheet No.
	Checked By	RES	11/94	02	1 of 2
					Index No. 11862

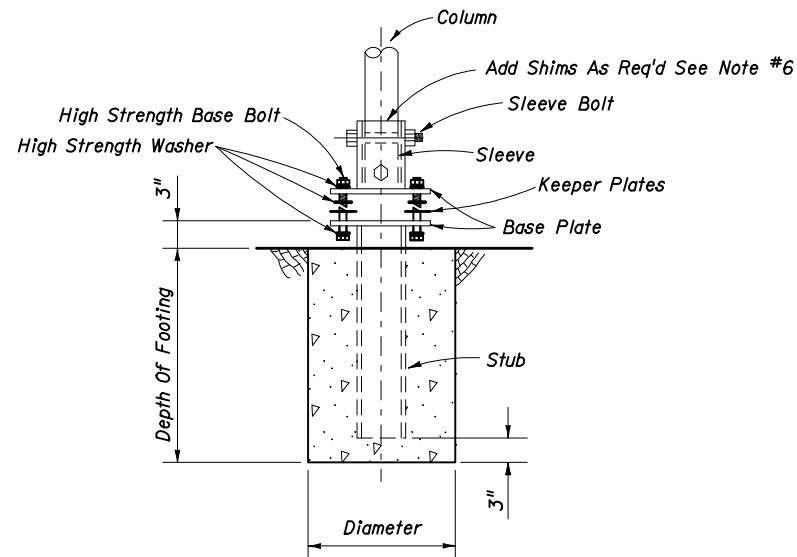
COL. SIZE	$2 \times \frac{1}{8}$	$2\frac{1}{2} \times \frac{1}{8}$	$3 \times \frac{1}{8}$	$3\frac{1}{2} \times \frac{3}{8}$	$4 \times \frac{3}{8}$	$4\frac{1}{2} \times \frac{1}{4}$	$5 \times \frac{1}{4}$	$6 \times \frac{1}{4}$	$8 \times \frac{5}{8}$				
FOUNDATION	0 x 4-3	0 x 4-3	0 x 4-9	0 x 6-0	2-0 x 4-0	2-0 x 4-0	2-0 x 4-3	2-0 x 5-0	2-0 x 5-0				
Sign Identification Number	HEIGHT (Feet)												
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to			
1		16	16	20	20	25							
2				17	17	24	24	25					
3				13	13	20	20	25					
4		6	6	9	9	13	13	25					
5	-----												
6				10	10	13	13	25					
7					9	9	17	17	21	21	25		
8		16	16	20	20	25							
9				15	15	22	22	25					
10				12	12	17	17	25					
11				9	9	13	13	25					
12					8	8	16	16	21	21	25		
13				12	12	17	17	25					
14				11	11	15	15	25					
15				12	12	15	15	25					
16				10	10	13	13	25					
17					11	11	20	20	25				
18					10	10	18	18	22	22	25		
19						14	14	17	17	21	21	25	
20	-----												
21		6	6	9	9	13	13	25					
22				7	7	11	11	23	23	25			
23				8	8	12	12	23	23	25			
24					11	11	21	21	25				
25				12	12	16	16	25					
26				11	11	15	15	25					
27				10	10	14	14	25					
28				10	10	14	14	25					
29				10	10	13	13	25					
30				8	8	12	12	24	24	25			
31				7	7	12	12	21	21	25			
32				6	6	11	11	20	20	24	24	25	
33				8	8	12	12	23	23	25			
34				7	7	11	11	21	21	25			
35				7	7	11	11	22	22	25			
36				6	6	11	11	20	20	24	24	25	
37					8	8	16	16	20	20	24	24	25
38					7	7	14	14	19	19	23	23	25
39					6	6	13	13	17	17	21	21	25
40	-----												
41					11	11	14	14	17	17	25		
42					10	10	12	12	15	15	22	22	25
43	-----												
44		17	17	21	21	25							
45				16	16	23	23	25					
46				16	16	23	23	25					
47				16	16	23	23	25					
48				16	16	23	23	25					
49				14	14	21	21	25					
50				14	14	20	20	25					
51				14	14	20	20	25					
52				13	13	20	20	25					

COL. SIZE	$2 \times \frac{1}{8}$	$2\frac{1}{2} \times \frac{1}{8}$	$3 \times \frac{1}{8}$	$3\frac{1}{2} \times \frac{3}{8}$	$4 \times \frac{3}{8}$	$4\frac{1}{2} \times \frac{1}{4}$	$5 \times \frac{1}{4}$	$6 \times \frac{1}{4}$	$8 \times \frac{5}{8}$					
FOUNDATION	0 x 4-3	0 x 4-3	0 x 4-9	0 x 6-0	2-0 x 4-0	2-0 x 4-0	2-0 x 4-3	2-0 x 5-0	2-0 x 5-0					
Sign Identification Number	HEIGHT (Feet)													
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to				
53				13	13	19	19	25						
54				12	12	18	18	25						
55				12	12	18	18	25						
56			8	8	12	12	17	17	25					
57				12	12	16	16	25						
58				12	12	16	16	25						
59				11	11	15	15	25						
60				11	11	19	19	25						
61				11	11	15	15	25						
62				9	9	13	13	25						
63				9	9	13	13	25						
64				9	9	12	12	24	24	25				
65				8	8	12	12	23	23	25				
66					12	12	23	23	25					
67				7	7	12	12	22	22	25				
68				7	7	12	12	22	22	25				
69				7	7	12	12	22	22	25				
70				6	6	11	11	21	21	25				
71	-----													
72					12	12	21	21	25					
73				6	6	11	11	20	20	24	24	25		
74	-----													
75					10	10	18	18	22	22	25			
76					10	10	18	18	22	22	25			
77					9	9	17	17	22	22	25			
78					10	10	18	18	22	22	25			
79	-----													
80						14	14	18	18	22	22	25		
81						13	13	17	17	21	21	25		
82	-----													
83	-----													
84	-----													
85	-----													
86						11	11	14	14	17	17	25		
87						11	11	12	12	16	16	23	23	25
88	----- SEE NOTE INDEX NO 11860 -----													
89	-----													
90	-----													
91	-----													

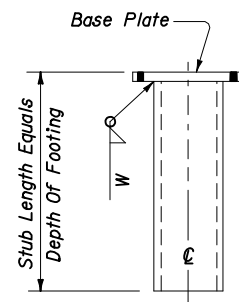
The Column Size is O.D. x Wall Thickness in inches.  
The Foundation Size is O.D. x Depth in feet & inches. A zero O.D. means that a concrete foundation is not necessary.

COLUMN SIZE , COLUMN HEIGHT & COLUMN FOOTINGS				
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
SINGLE COLUMN GROUND SIGNS				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	DER	10/94	State Structures Design Engineer	
Drawn By	DDDS	10/94	Revision	Sheet No.
Checked By	RES	11/94	02	2 of 2
				Index No. 11862

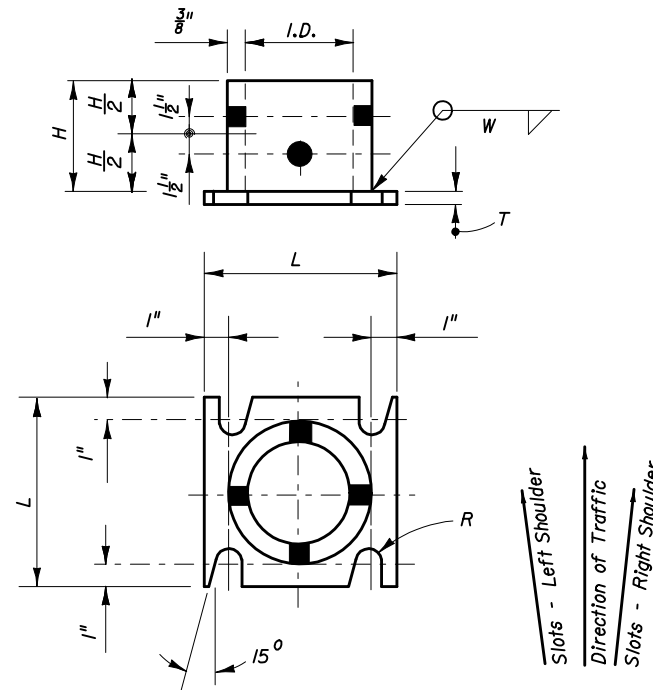
**70 M.P.H. WIND LOADING**



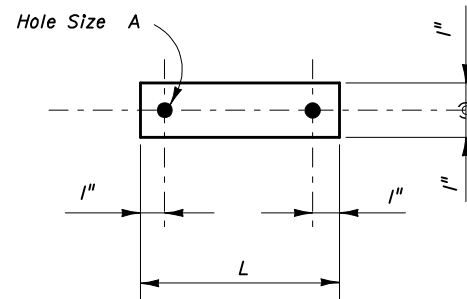
**SLIP BASE AND FOOTING DETAIL**



**Stub Size Equals Min. Sleeve Size Or Longer  
STUB DETAIL**



**SLEEVE & BASE PLATE DETAILS**



**0.04" Thick Alum. Strip-2 Req'd Per Base  
BOLT KEEPER DETAIL**

**SLIP BASE DETAILS**

Column Size	Sleeve I.D. (Max)	Sleeve Height H	Weld W	Base Plate		Radius R	Base Bolt		Base Bolt Torque		Hole Size A
				L	T		Size	Length	Ft-lbs	In-lbs	
4 x 1/4	4 1/16	6	5/8	8	3/4	3/32	5/16	3	29	355	11/16
4 1/2 x 1/4	4 9/16	6	5/8	8	7/8	3/32	5/16	3 1/4	29	355	11/16
5 x 1/4	5 1/16	7	5/8	8	7/8	1/32	5/16	3 1/4	29	355	11/16
6 x 1/4	6 1/16	8	11/16	9	1	7/16	3/4	3 1/2	48	580	13/16
8 x 5/16	8 1/16	10	3/4	11	1	1/2	7/8	3 3/4	53	640	15/16

Note: Unless noted otherwise, all dimensions are in inches.

**NOTES**

- Work this Standard with Standard Index Numbers 11860 and 11865.
- To determine column (post) size and footing requirements use the required Sign Identification Number and Sign Height (H), Designs for Heights (H) lower than those listed in the Table are included in Standard Index Number 11865.
- Single Column installations are not allowed for heights (H) exceeding the maximum height shown in the Table, and for sign profiles (Sign Identification Numbers) without any design tabulated. In this event, the sign(s) will have to be supported by multiple columns (posts) featuring breakaway devices. See Standard Index Number 9535.
- The Column (Post) material shall be aluminum. The size is given as outside diameter and wall thickness. Columns (posts) larger than 3 1/2" x 3/16" are non-fragible and shall be installed with breakaway supports and will have concrete footings and slip bases.
- The foundation size is given as outside diameter and depth.
  - Frangible Supports: Foundations for Frangible Supports do not require concrete. The column (post) shall be driven into the ground to the depth indicated.
  - Breakaway Supports: Foundations for Breakaway Supports require concrete. The column support shall be set in a concrete foundation, sized as shown in the table. The first dimension indicates the diameter and the second dimension the depth into the ground. In all cases the ground is to be considered as undisturbed earth, road material, or properly compacted fill.
- SLIP BASE NOTES :
  - The Inside Diameter (I.D.) of the sleeve shall be no more than 1/16" larger than the Outside Diameter (O.D.) of the Column.
  - The sleeve bolts shall be 12 Ø with locknuts. The bolts shall be galvanized steel (ASTM A-307) or Aluminum Association Alloy 2024-T4 or 6061-T6 (ASTM B-211).
  - The base bolts, nuts and washers shall be high strength ASTM A-325 and shall have an electroplated zinc coating SC3, Type II applied in accordance with ASTM B633.
  - 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 :
    - Connect column to sleeve using two (2) 1/2" Ø machine bolts.
    - Assemble top base plate to stub base plate using high strength bolts with three (3) hardened washers per bolt. One (1) washer per bolt and two (2) bolt keeper plates go between the base plates.
    - Use shim stock as required to plumb the column.
    - Tighten all bolts the maximum possible with a 12" to 15" wrench to bed the washers and shims and to clear the bolt threads. Loosen each bolt one (1) turn and retighten to the prescribed torque (see table). Bolts shall be tightened with properly calibrated wrenches under the supervision of the project engineer.
    - Burr threads at junction with nut using a center punch to prevent nut loosening.
    - Use galvanized steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the 1/2" Ø sleeve bolts. The shim length shall be 1" shorter than the height of the sleeve.

**80 WIND  
LOADING**

COLUMN SIZE, COLUMN HEIGHT & COLUMN FOOTINGS				
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
SINGLE COLUMN GROUND SIGNS				
Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	DER	10/94	State Structures Design Engineer	
Drawn By	DDDS	10/94	Revision	Sheet No.
Checked By	RES	11/94	02	1 of 2
				Index No. 11863

COL. SIZE	2 x $\frac{1}{8}$	2 $\frac{1}{2}$ x $\frac{1}{8}$	3 x $\frac{1}{8}$	3 $\frac{1}{2}$ x $\frac{3}{16}$	4 x $\frac{1}{4}$	4 $\frac{1}{2}$ x $\frac{1}{4}$	5 x $\frac{1}{4}$	6 x $\frac{1}{4}$	8 x $\frac{5}{16}$
FOUNDATION	0 x 4-6	0 x 4-9	0 x 4-9	0 x 6-0	2-0 x 4-0	2-0 x 4-0	2-0 x 4-3	2-0 x 5-0	2-0 x 5-6
Sign Identification Number	HEIGHT (FT)								
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to
1		14	14 17	17 24	24 25				
2			14	14 20	20 25				
3				17	17 25				
4			7	7 11	11 21	21 25			
5									
6				12	12 21	21 25			
7				6	6 14	14 17	17 21	21 25	
8			17	17 23	23 25				
9				19	19 25				
10				14	14 25				
11				12	12 21	21 25			
12					13	13 17	17 20	20 25	
13				14	14 25				
14				12	12 23	23 25			
15				12	12 24	24 25			
16				12	12 21	21 25			
17				8	8 16	16 20	20 24	24 25	
18					14	14 18	18 22	22 25	
19					11	11 14	14 17	17 25	
20									
21			7	7 11	11 21	21 25			
22				10	10 18	18 23	23 25		
23				11	11 19	19 23	23 25		
24				9	9 17	17 21	21 25		
25				12	12 24	24 25			
26				12	12 23	23 25			
27				12	12 21	21 25			
28				12	12 22	22 25			
29				12	12 21	21 25			
30				11	11 20	20 24	24 25		
31				9	9 17	17 21	21 25		
32				8	8 16	16 20	20 24	24 25	
33				11	11 19	19 23	23 25		
34				9	9 17	17 21	21 25		
35				10	10 18	18 22	22 25		
36				8	8 16	16 20	20 24	24 25	
37					12	12 16	16 20	20 25	
38					11	11 15	15 18	18 25	
39					11	11 13	13 17	17 25	
40									
41					10	10 11	11 13	13 20	20 25
42						10	10 11	11 18	18 25
43									
44		15	15 18	18 24	24 25				
45			14	14 20	20 25				
46				20	20 25				
47				20	20 25				
48				19	19 25				
49				18	18 25				
50				17	17 25				
51				17	17 25				
52				17	17 25				

COL. SIZE	2 x $\frac{1}{8}$	2 $\frac{1}{2}$ x $\frac{1}{8}$	3 x $\frac{1}{8}$	3 $\frac{1}{2}$ x $\frac{3}{16}$	4 x $\frac{1}{4}$	4 $\frac{1}{2}$ x $\frac{1}{4}$	5 x $\frac{1}{4}$	6 x $\frac{1}{4}$	8 x $\frac{5}{16}$		
FOUNDATION	0 x 4-6	0 x 4-9	0 x 4-9	0 x 6-0	2-0 x 4-0	2-0 x 4-0	2-0 x 4-3	2-0 x 5-0	2-0 x 5-6		
Sign Identification Number	HEIGHT (FT)										
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to		
53					16	16 25					
54					15	15 25					
55					14	14 25					
56				9	9 13	13 25					
57					13	13 24	24 25				
58					12	12 24	24 25				
59					12	12 23	23 25				
60					12	12 23	23 25				
61				8	8 13	13 22	22 25				
62					12	12 21	21 25				
63					12	12 21	21 25				
64				6	6 12	12 20	20 24	24 25			
65					11	11 19	19 24	24 25			
66					11	11 19	19 23	23 25			
67					10	10 18	18 22	22 25			
68					10	10 18	18 22	22 25			
69					10	10 18	18 22	22 25			
70					9	9 17	17 21	21 25			
71											
72					9	9 17	17 21	21 25			
73					8	8 16	16 20	20 24	24 25		
74											
75					7	7 14	14 18	18 22	22 25		
76					7	7 14	14 18	18 22	22 25		
77						13	13 17	17 21	21 25		
78					7	7 14	14 18	18 22	22 25		
79											
80						12	12 14	14 17	17 25		
81						11	11 13	13 16	16 24	24 25	
82											
83											
84											
85											
86					10	10 11	11 14	14 21	21 25		
87							11	11 12	12 19	19 25	
88					SEE NOTE INDEX NO 11860						
89											
90											
91											

The Column Size is O.D. x Wall Thickness in Inches  
The Foundation Size is O.D. x Depth in feet & Inches.  
A zero O.D. means that a concrete foundation is not necessary.

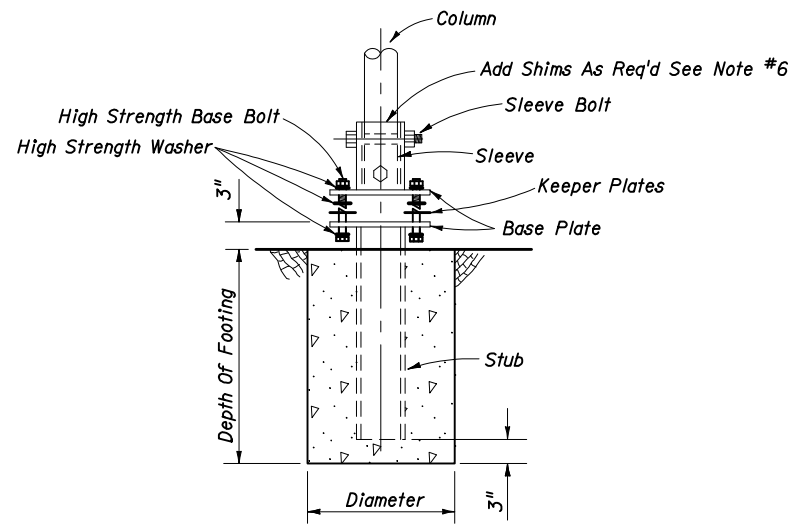
**COLUMN SIZE , COLUMN HEIGHT & COLUMN FOOTINGS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

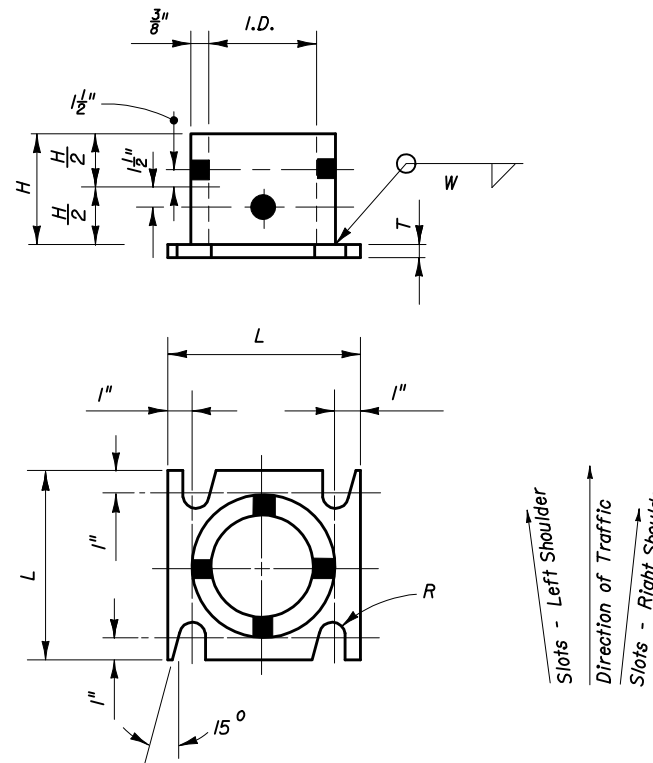
**SINGLE COLUMN GROUND SIGNS**

Names	Dates	Approved By <i>W. J. [Signature]</i>		
Designed By	DER	10/94	State Structures Design Engineer	
Drawn By	DDDS	10/94	Revision	Sheet No.
Checked By	RES	11/94	02	2 of 2
		Index No.		11863

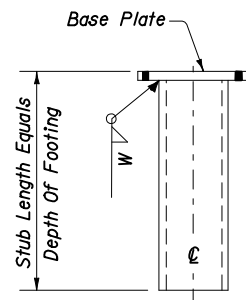
**80** M.P.H. WIND LOADING



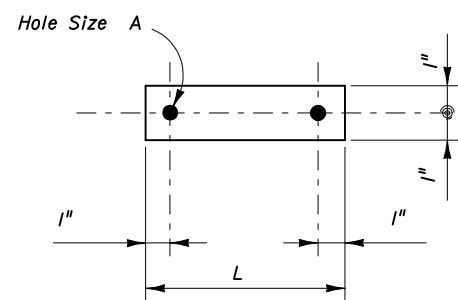
**SLIP BASE AND FOOTING DETAIL**



**SLEEVE & BASE PLATE DETAILS**



**Stub Size Equals Min. Sleeve Size Or Longer  
STUB DETAIL**



**0.04" Thick Alum. Strip-2 Req'd Per Base  
BOLT KEEPER DETAIL**

**SLIP BASE DETAILS**

Column Size	Sleeve I.D. (Max)	Sleeve Height H	Weld W	Base Plate		Radius R	Base Bolt		Base Bolt Torque		Hole Size A
				L	T		Size	Length	Ft-lbs	In-lbs	
4 x 1/4	4 1/16	6	5/8	8	3/4	11/32	5/8	3	29	355	11/16
4 1/2 x 1/4	4 9/16	6	5/8	8	7/8	11/32	5/8	3 1/4	29	355	11/16
5 x 1/4	5 1/16	7	5/8	8	7/8	11/32	5/8	3 1/4	29	355	11/16
6 x 1/4	6 1/16	8	11/16	9	1	7/16	3/4	3 1/2	48	580	13/16
8 x 5/16	8 1/16	10	3/4	11	1	1/2	7/8	3 3/4	53	640	15/16

Note: Unless noted otherwise, all dimensions are in inches.

**NOTES**

- Work this Standard with Standard Index Numbers 11860 and 11865.
- To determine column (post) size and footing requirements use the required Sign Identification Number and Sign Height (H), Designs for Heights (H) lower than those listed in the Table are included in Standard Index Number 11865.
- Single Column installations are not allowed for heights (H) exceeding the maximum height shown in the Table, and for sign profiles (Sign Identification Numbers) without any design tabulated. In this event, the sign(s) will have to be supported by multiple columns (posts) featuring breakaway devices. See Standard Index Number 9535.
- The Column (Post) material shall be aluminum. The size is given as outside diameter and wall thickness. Columns (posts) larger than 3 1/2" x 3/16" are non-fragible and shall be installed with breakaway supports and will have concrete footings and slip bases.
- The foundation size is given as outside diameter and depth.
  - Fragible Supports: Foundations for Fragible Supports do not require concrete. The column (post) shall be driven into the ground to the depth indicated.
  - Breakaway Supports: Foundations for Breakaway Supports require concrete. The column support shall be set in a concrete foundation, sized as shown in the table. The first dimension indicates the diameter and the second dimension the depth into the ground. In all cases the ground is to be considered as undisturbed earth, road material, or properly compacted fill.
- SLIP BASE NOTES :
  - The Inside Diameter (I.D.) of the sleeve shall be no more than 1/16" larger than the Outside Diameter (O.D.) of the Column.
  - The sleeve bolts shall be 1/2" Ø with locknuts. The bolts shall be galvanized steel (ASTM A-307) or Aluminum Association Alloy 2024-T4 or 6061-T6 (ASTM B-211).
  - The base bolts, nuts and washers shall be high strength ASTM A-325 and shall have an electroplated zinc coating SC3, Type II applied in accordance with ASTM B633.
  - 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 :
    - Connect column to sleeve using two (2) 1/2" Ø machine bolts.
    - Assemble top base plate to stub base plate using high strength bolts with three (3) hardened washers per bolt. One (1) washer per bolt and two (2) bolt keeper plates go between the base plates.
    - Use shim stock as required to plumb the column.
    - Tighten all bolts the maximum possible with a 12" to 15" wrench to bed the washers and shims and to clear the bolt threads. Loosen each bolt one (1) turn and retighten to the prescribed torque (see table). Bolts shall be tightened with properly calibrated wrenches under the supervision of the project engineer.
    - Burr threads at junction with nut using a center punch to prevent nut loosening.
    - Use galvanized steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the 1/2" Ø sleeve bolts. The shim length shall be 1" shorter than the height of the sleeve.

Slots - Left Shoulder  
Direction of Traffic  
Slots - Right Shoulder

**COLUMN SIZE, COLUMN HEIGHT & COLUMN FOOTINGS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SINGLE COLUMN GROUND SIGNS**

**90 M.P.H. WIND LOADING**

Names	Dates	Approved By
Designed By	DER 10/94	[Signature] State Structures Design Engineer
Drawn By	DDDS 10/94	
Checked By	RES 11/94	
Revision	02	Sheet No. 1 of 2
Index No.		11864

COL. SIZE	2 x 1/8	2 1/2 x 1/8	3 x 1/8	3 1/2 x 3/8	4 x 1/4	4 1/2 x 1/4	5 x 1/4	6 x 1/4	8 x 5/8									
FOUNDATION	0 x 4-6	0 x 4-9	0 x 4-9	0 x 6-0	2-0 X 4-0	2-0 X 4-0	2-0 X 4-3	2-0 X 5-0	2-0 X 6-0									
Sign Identification Number	HEIGHT (Feet)																	
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to								
1				15	15	20	20	25										
2						17	17	25										
3						14	14	25										
4						10	10	18	18	22	22	25						
5	-----																	
6						10	10	18	18	22	22	25						
7								12	12	14	14	18	18	25				
8			14	14	20	20	25											
9						16	16	25										
10						12	12	22	22	25								
11						10	10	17	17	21	21	25						
12								12	12	13	13	17	17	24	24	25		
13						12	12	21	21	25								
14						11	11	19	19	23	23	25						
15						12	12	20	20	24	24	25						
16						10	10	18	18	22	22	25						
17								13	13	16	16	20	20	25				
18								12	12	14	14	18	18	25				
19								10	10	11	11	14	14	21	21	25		
20	-----																	
21						9	9	17	17	21	21	25						
22						8	8	15	15	19	19	23	23	25				
23						8	8	16	16	19	19	24	24	25				
24						7	7	14	14	18	18	22	22	25				
25						12	12	20	20	24	24	25						
26						11	11	19	19	23	23	25						
27						10	10	18	18	22	22	25						
28						10	10	18	18	22	22	25						
29						10	10	17	17	21	21	25						
30						9	9	16	16	20	20	24	24	25				
31						7	7	14	14	17	17	22	22	25				
32						6	6	13	13	16	16	20	20	25				
33						8	8	16	16	19	19	24	24	25				
34						7	7	14	14	18	18	22	22	25				
35						7	7	14	14	18	18	22	22	25				
36						6	6	13	13	16	16	20	20	25				
37										11	11	13	13	16	16	24	24	25
38										11	11	12	12	15	15	22	22	25
39										10	10	11	11	13	13	20	20	25
40	-----																	
41										10	10	11	11	16	16	25		
42												10	10	14	14	25		
43	-----																	
44						16	16	21	21	25								
45										17	17	25						
46										17	17	25						
47										16	16	25						
48										16	16	25						
49										15	15	25						
50										14	14	25						
51										14	14	25						
52										14	14	24	24	25				

COL. SIZE	2 x 1/8	2 1/2 x 1/8	3 x 1/8	3 1/2 x 3/8	4 x 1/4	4 1/2 x 1/4	5 x 1/4	6 x 1/4	8 x 5/8									
FOUNDATION	0 x 4-6	0 x 4-9	0 x 4-9	0 x 6-0	2-0 X 4-0	2-0 X 4-0	2-0 X 4-3	2-0 X 5-0	2-0 X 6-0									
Sign Identification Number	HEIGHT (Feet)																	
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to								
53								13	13	23	23	25						
54								13	13	23	23	25						
55								12	12	22	22	25						
56								12	12	21	21	25						
57								12	12	20	20	24	24	25				
58								12	12	20	20	24	24	25				
59								12	12	20	20	24	24	25				
60								11	11	19	19	23	23	25				
61								11	11	19	19	23	23	25				
62								10	10	17	17	21	21	25				
63								10	10	17	17	21	21	25				
64								9	9	17	17	21	21	25				
65								8	8	16	16	20	20	24	24	25		
66										15	15	19	19	23	23	25		
67								8	8	15	15	19	19	23	23	25		
68								7	7	14	14	18	18	22	22	25		
69								8	8	14	14	18	18	22	22	25		
70								7	7	14	14	18	18	22	22	25		
71	-----																	
72										14	14	17	17	21	21	25		
73								6	6	13	13	16	16	20	20	25		
74	-----																	
75										12	12	15	15	19	19	25		
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78										12	12	15	15	19	19	25		
79	-----																	
80										10	10	12	12	14	14	21	21	25
81										9	9	11	11	13	13	20	20	25
82	-----																	
83	-----																	
84	-----																	
85	-----																	
86										10	10	11	11	17	17	25		
87												11	11	15	15	25		
88																		
89																		
90																		
91																		

The Column Size is O.D. x Wall Thickness in inches.

The Foundation Size is O.D. x Depth in feet & inches.  
A zero O.D. means that a concrete foundation is not necessary.

COLUMN SIZE , COLUMN HEIGHT & COLUMN FOOTINGS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SINGLE COLUMN GROUND SIGNS

**90** M.P.H. WIND LOADING

Names		Dates		Approved By <i>W. J. [Signature]</i>	
Designed By	DER	10/94	State Structures Design Engineer		
Drawn By	DDDS	10/94	Revision	Sheet No.	Index No.
Checked By	RES	11/94	02	2 of 2	11864

COL. SIZE	2x½	2x½	2x½	2½x½	2½x½	2½x½	3x½	3x½	3x½	*	COL. SIZE	2x½	2x½	2x½	2½x½	2½x½	2½x½	3x½	3x½	3x½	*	ALUMINUM	
FOUNDATION	0x2-0	0x2-0	0x2-0	0x2-3	0x2-3	0x2-3	0x2-6	0x2-6	0x2-6	*	FOUNDATION	0x2-0	0x2-0	0x2-0	0x2-3	0x2-3	0x2-3	0x2-6	0x2-6	0x2-6	*	ROUND POST	
COL. SIZE	2.5 #/FT	2.5 #/FT	3.0 #/FT	4.0 #/FT	4.0 #/FT	N/A	N/A	N/A	N/A	*	COL. SIZE	2.5 #/FT	2.5 #/FT	3.0 #/FT	4.0 #/FT	4.0 #/FT	N/A	N/A	N/A	N/A	*	STEEL FLANGED	
FOUNDATION	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	N/A	N/A	N/A	N/A	*	FOUNDATION	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	N/A	N/A	N/A	N/A	*	CHANNEL POST	
COL. SIZE	W = 1½	W = 1¾	W = 1¾	W = 2	W = 2¼	W = 2¼	W = 2¼	W = 2½	N/A	*	COL. SIZE	W = 1½	W = 1¾	W = 1¾	W = 2	W = 2¼	W = 2¼	W = 2¼	W = 2½	N/A	*	STEEL SQUARE	
FOUNDATION	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	N/A	*	FOUNDATION	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	0x3-0	N/A	*	TUBE POST	
Sign Identification Number	HEIGHT ( FT )											Sign Identification Number	HEIGHT ( FT )										
	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	(+) to	
1	To 8		8 - 10	10 - 13			13 - 14																
2	To 6	6 - 7	7 - 8	8 - 12		12 - 13	13 - 14																
3		To 6	6 - 7	7 - 9	9 - 11		11 - 12	12 - 13															
4																							
5																							
6					To 6		6 - 8	8 - 9															
7																							
8	To 8	8 - 9	9 - 10	10 - 13		13 - 14																	
9		To 7	7 - 8	8 - 11	11 - 12	12 - 13		13 - 14															
10				To 8	8 - 9		9 - 10	10 - 12															
11					To 6		6 - 7	7 - 9															
12																							
13					To 8		8 - 9	9 - 11	11 - 12														
14				To 6	6 - 7		7 - 8	8 - 10	10 - 11														
15				To 6	6 - 7		7 - 8	8 - 10															
16					To 6		6 - 7	7 - 9															
17																							
18																							
19																							
20																							
21							To 6																
22																							
23								To 6															
24																							
25				To 6	6 - 7		7 - 9	9 - 11															
26				To 6			6 - 8	8 - 9															
27					To 6		6 - 7	7 - 9															
28					To 6		6 - 7	7 - 9															
29							To 7	7 - 8															
30							To 6	6 - 8															
31								To 6															
32								To 6															
33							To 6	6 - 7															
34								To 6															
35								To 7															
36								To 6															
37																							
38																							
39																							
40																							
41																							
42																							
43																							
44	To 9		9 - 10	10 - 13		13 - 14																	
45	To 6	6 - 7	7 - 9	9 - 11	11 - 12	12 - 13	13 - 14																
46	To 6	6 - 7	7 - 9	9 - 11	11 - 12	12 - 13	13 - 14																

\* Aluminum Round Post dimensions are given in inches. The size is shown as outside diameter times wall thickness.

Steel Flanged Channel Post sizes are given in lb/ft. Section definitions and properties are shown on Sheet 2 of 2, (See QPL for approved posts).

Steel Square Tube Post dimensions for "W" are given in inches. The "W" dimension is defined on Section F-F. (See QPL for approved posts).

Foundation dimensions shown are given in feet & inches. The dimension shown is the minimum embedment of the driven post.

**NOTES**

- This Standard Index 11865 provides designs for driven single post sign installations for implementation at all locations within the State of Florida. The designs adhere to the following criteria:
  - Mounting Height = 14' Maximum
  - Sign(s) Area = 25 sq. ft. Maximum
  - Sign(s) Width: Single = 36" Maximum  
Dual = 48" Maximum (See Detail "A")
  - Driven Post only
- Designs exceeding above criteria or requiring concrete footings are included on Index 11861 thru 11864.
- Specifications for Aluminum materials, Sign Panel Details, etc. are shown on standard Index 11860. Additional information and details are shown on Index 11861 thru 11864. Therefore, work this Standard Index 11865 with Standard Indices 11860 to 11864.
- Sign Bracket requirements are shown on Index 11860 (80 mph WIND ZONE). If Flanged Channels or Square Tubes are used, substitute two 5/16" bolts for each Type I Bracket. See Detail "B".
- All posts shall be installed Plumb.
- Steel for Flanged Channel Posts shall conform with ASTM A499 Grade 60, or ASTM A576 Grade 1080.
- Steel for fabrication of square Tubes shall conform with ASTM A653 or ASTM A570. HOWEVER, STEEL FROM THE FABRICATED SQUARE TUBES MUST MEET A CERTIFIED MINIMUM YIELD STRENGTH OF 55 ksi.
- Steel Flanged Channel Posts with a 4 lb/ft are non-frangible and shall be installed with approved breakaway (frangible) bases. See Detail "C". The base and the sign posts shall be same size and type and the splice shall be 6" long and fastened with two bolts, 4" apart. The bolts shall be wrench-tightened sufficiently to clamp splice assembly tightly together. Bolts shall conform with ASTM A 354 Grade DH or SAE J995 Grade 8. Washers and spacers shall conform with ASTM A307 or A36.
- Steel Flanged Channel Posts with masses of 2.5 lb/ft and 3 lb/ft, all Aluminum Round Posts and all Steel Square Tubes included in this standard are frangible and do not require breakaway (frangible) bases. However, the contractor may mount frangible posts on approved breakaway bases.
- Bolts, Nuts and washers not included in note 8 above, shall conform with ASTM A307.
- Steel Posts shall be selected from the Department's book of Qualified Product List (QPL).
- All steel posts, and hardware shall be galvanized in accordance with ASTM A123 or A153, or AASHTO M181 Grade 2.
- Shop Drawings: If the contractor proposes to utilize sign panel connections and/or breakaway devices not shown in this standard or in the above referenced standards, the Contractor shall submit shop drawings for approval.
- All dimensions are in inches, unless otherwise noted.

DETAIL "B" (See Note No. 4)

SIGN MOUNTING USING CHANNELS OR SQUARE TUBES

**COLUMN SIZE , COLUMN HEIGHT & COLUMN FOOTINGS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SINGLE COLUMN GROUND SIGNS**

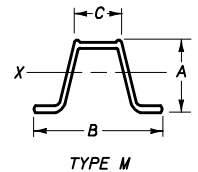
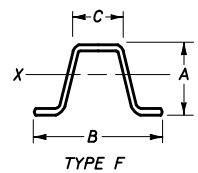
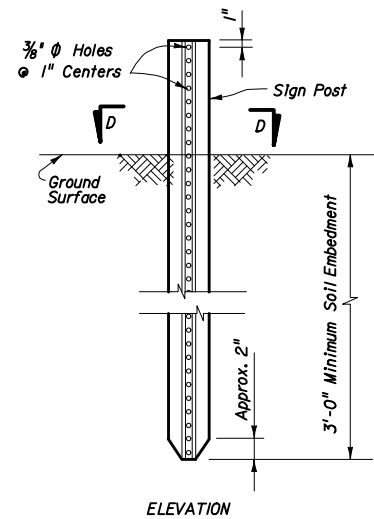
Names	Dates	Approved By	
Designed By JMD	4-94	State Structures Design Engineer	
Drawn By SHM	4-94	Revision	Sheet No.
Checked By AJG	4-94	02	1 of 2
		Index No. <b>11865</b>	

**HEIGHT = 14' MAX. (ALL WIND ZONES)**

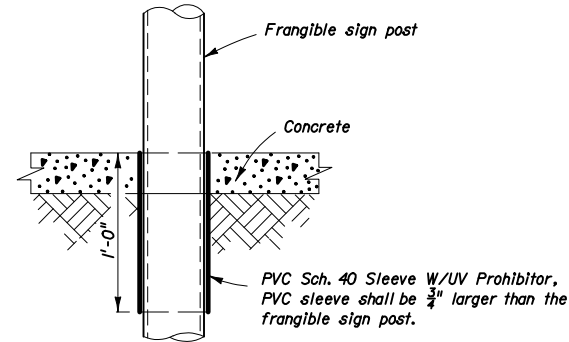
\*\*\*\*\*SYTIME\*\*\*\*\*

APPROVED STEEL FLANGED CHANNEL POSTS					
lb/ft*	Type	A (in)	B (in)	C (in)	Sx (in <sup>3</sup> )
2.50	F	1.562	3.125	1.250	.310
2.50	M	1.500	3.063	1.281	.313
3.00	F	1.750	3.500	1.625	.430
3.00	M	1.875	3.500	1.313	.447
4.00	F	1.750	3.500	1.671	.560
4.00	M	1.938	3.500	1.313	.625

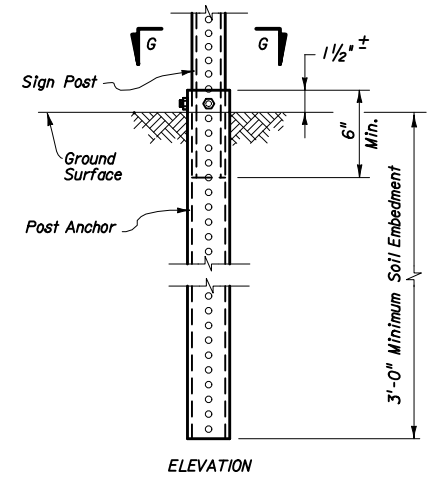
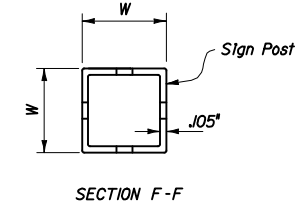
\* ± 4 %



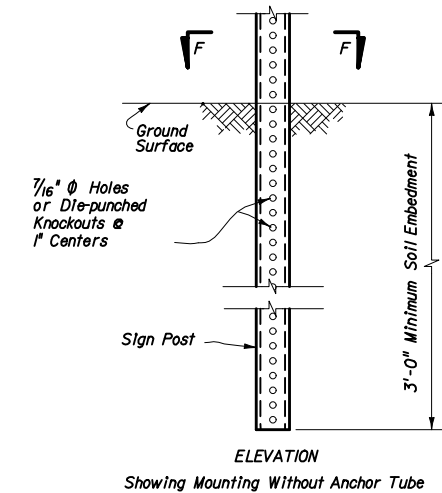
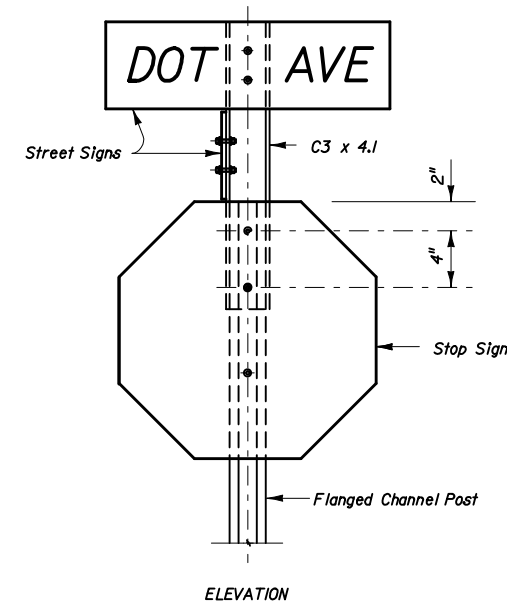
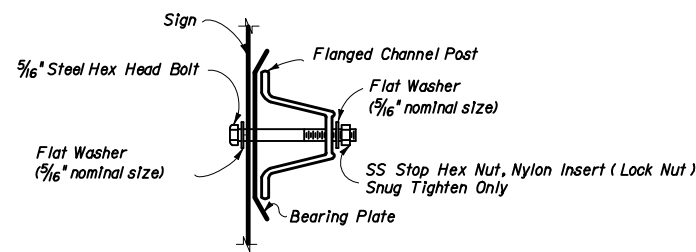
SECTION D-D



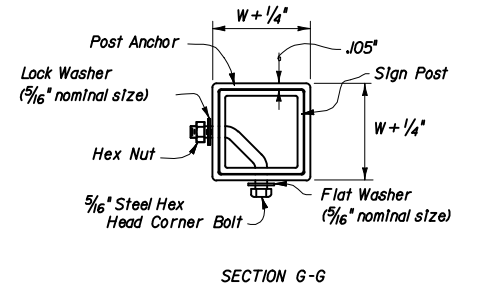
SIGN POST IN CONCRETE  
(CROSSOVERS, MEDIANS, & SIDEWALKS)



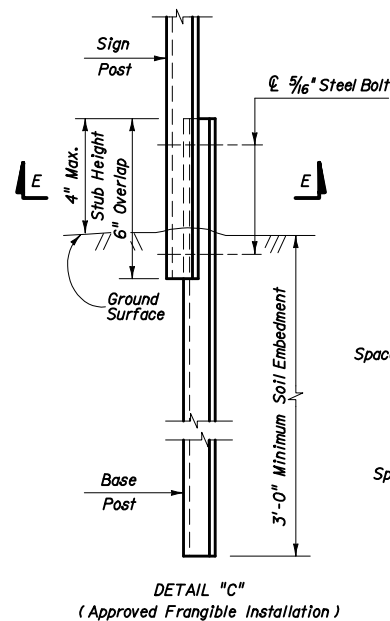
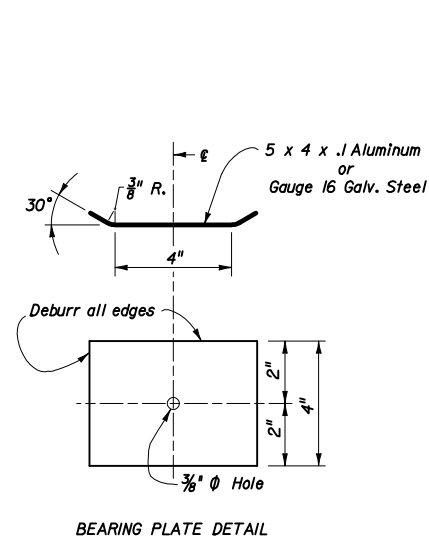
Showing Mounting Using Optional Anchor Tube



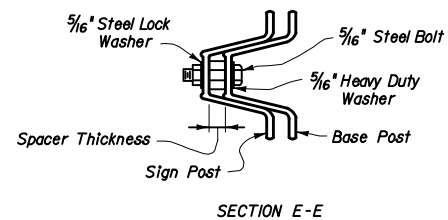
Showing Mounting Without Anchor Tube



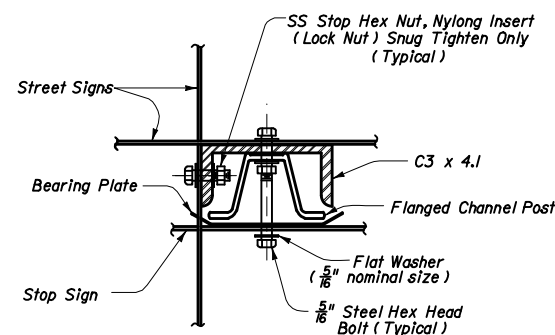
SIGN ATTACHMENT DETAIL



STEEL FLANGED CHANNEL POST DETAILS



Spacer Thickness shall be as follows:  
2.5 lb/ft Type M posts shall use 5/16" spacer.  
Other posts shall use 3/8" spacer (or two 5/16").



NOTE: All dimensions are in inches, unless otherwise noted.

HEIGHT = 14' MAX.  
(ALL WIND ZONES)

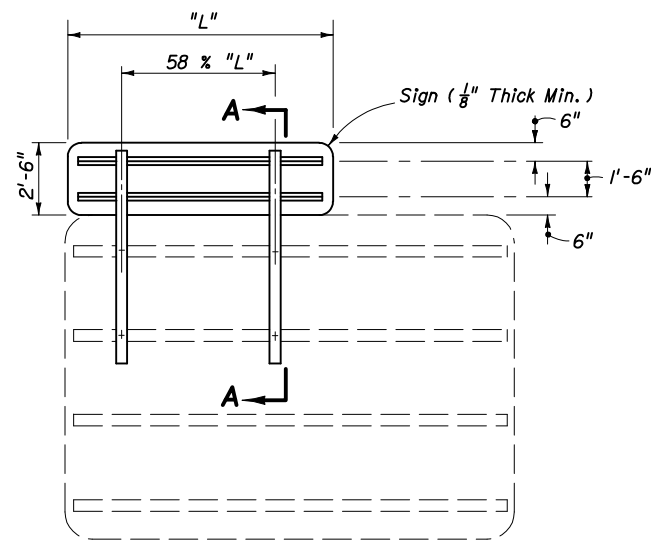
COLUMN SIZE, COLUMN HEIGHT & COLUMN FOOTINGS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SINGLE COLUMN GROUND SIGNS

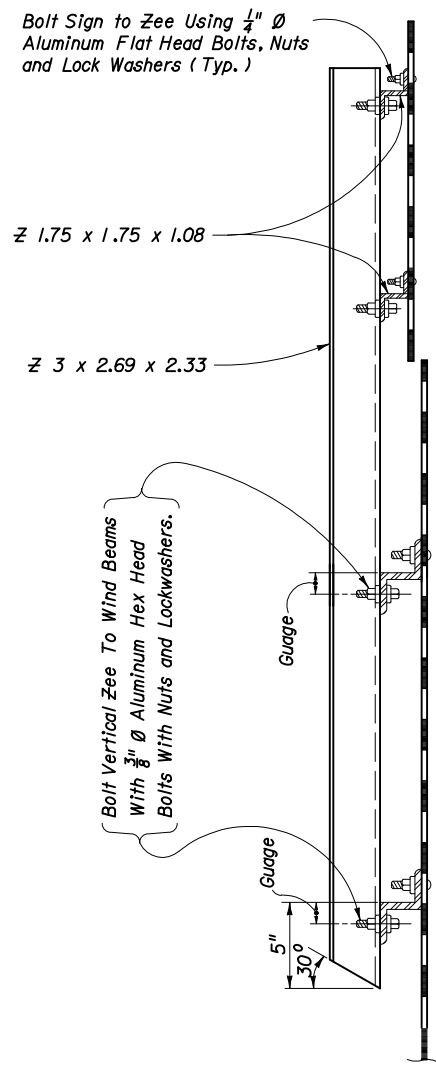
Names	Dates	Approved By		
Designed By	JMD/TJB 6/99	 State Structures Design Engineer		
Drawn By	JP 6/99			
Checked By	TJB 6/99			
Revision	02			
		2 of 2	11865	





NOTE: Exit numbering panel shall be located to the right side for right exit and to the left for left exit.

Mounting of Exit Numbering Panels To Highway Signs  
**ELEVATION**



**SECTION AA**

**GENERAL NOTES**

DESIGN SPECIFICATION: Latest Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, AASHTO 1994.

SHEETS AND PLATES: Material used shall meet the requirements of Aluminum Association Alloy 6061-T6 and ASTM B209. Sheets are to be degreased, etched, neutralized and treated with Alodine 11200, Iridite 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: Sheets and plates B209; extruded shapes B221 and standard structural shapes B308.

ALUMINUM BOLTS, NUTS & LOCK WASHERS: Aluminum bolts shall meet the requirements of the Aluminum Association Alloy 2024-T4 or 6061-T6 (ASTM B211). The bolts shall have an anodic coating of at least .0002" thick and be chromate sealed. Lockwashers shall meet the requirement of Aluminum Association Alloy 7075-T6 (ASTM B221). 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. AASHTO for all materials shown in the plans.

For mounting details refer to Index No. 11037.

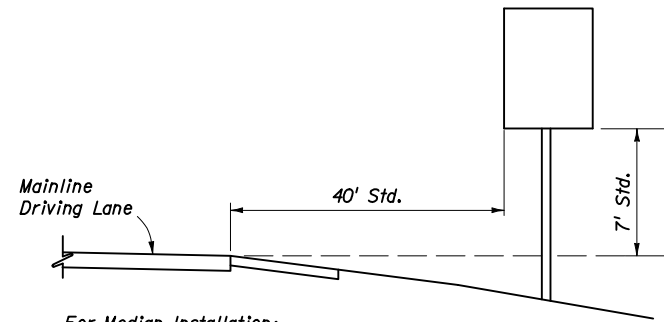
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**MOUNTING EXIT NUMBERING PANELS TO HIGHWAY SIGNS**

Designed By	CK/CWB	Dates	7-82	Approved By	<i>W. V. [Signature]</i>
Drawn By		Revision		State Structures Design Engineer	
Checked By	CK	7-82	02	Sheet No.	1 of 1
				Index No.	13417

**CASE I**

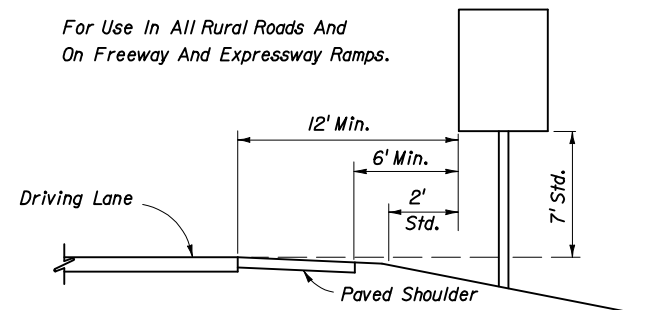
For use on Freeway and Expressway systems for signs on mainline.



For Median Installation:  
If Median Width Does Not Allow Std. Offset From Both Roadways, Center Sign In Median.

**CASE II**

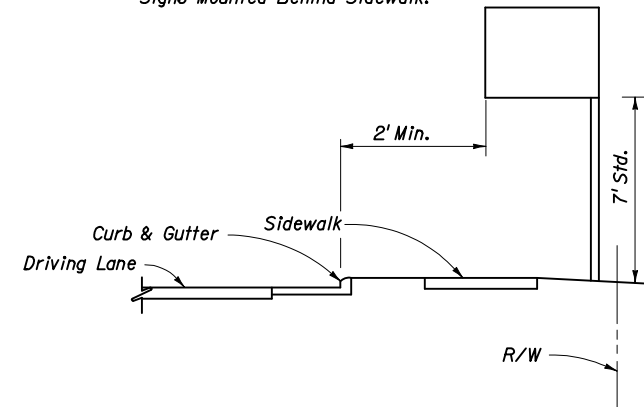
For Use In All Rural Roads And On Freeway And Expressway Ramps.



14' Horizontal Clearance Standard On All Freeway And Expressway Ramps  
For Sections Without Paved Shoulder The 6' Min Does Not Apply.

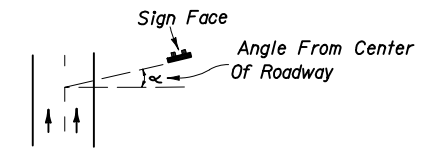
**CASE III**

For Use On All Roads With Signs Mounted Behind Sidewalk.



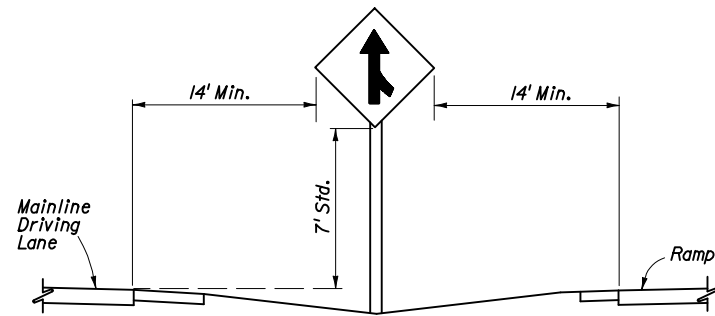
**GENERAL NOTES:**

1. The typical sections shown hereon serve as a guide for 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.
2. It shall be the CONTRACTORS responsibility to verify the length of sign supports in the field prior to fabrication.
3. Roadside signs shall be installed at an angle of 1 to 4 degrees away from the traffic flow (see illustration). Shoulder mounted signs shall be rotated counterclockwise and median mounted signs rotated clockwise. Signs on curves shall be mounted as noted above from the perpendicular to the motorist line of sight.



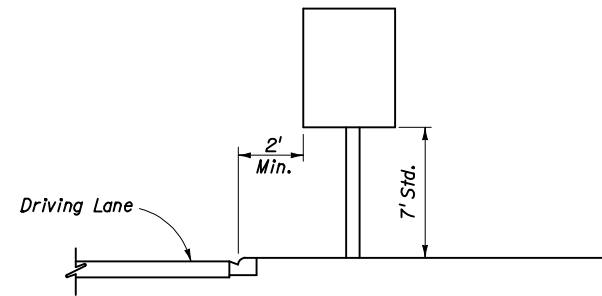
**CASE IV (Merge Sign)**

For Use On All Rural, Freeway And Expressway Systems.



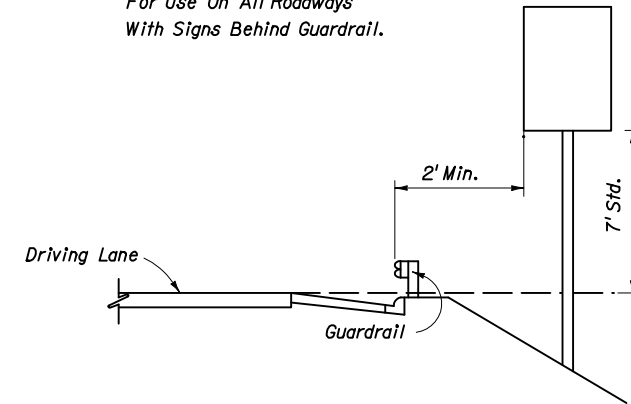
**CASE V**

For Use In Business Or Residential Areas Only.



**CASE VI**

For Use On All Roadways With Signs Behind Guardrail.



4. The setback for stop and yield signs may be reduced to 3' minimum from the driving lane if required for visibility in business or residential sections with no curb and speeds of 30 MPH or less.
5. The mounting heights are measured from the bottom of the sign panel to a horizontal line extended from the edge of the driving lane. If the standard heights cannot be met, the minimum heights are as follows:

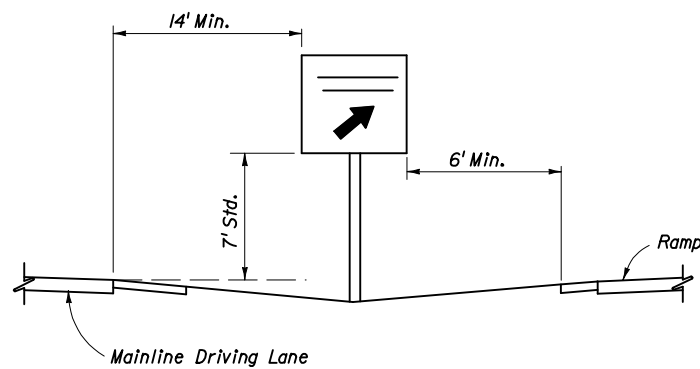
Expressway & Freeway Systems	7'
Other Roadway Systems	
Rural	5'
Urban (including residential with parking and /or pedestrian activity)	7'

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' for expressway & freeway systems and for other systems the height to the secondary sign shall be at least 4' for rural and 6' for urban sections.

6. Sign supports should never be placed in the bottom of ditches where erosion might affect the proper operation of the breakaway feature.

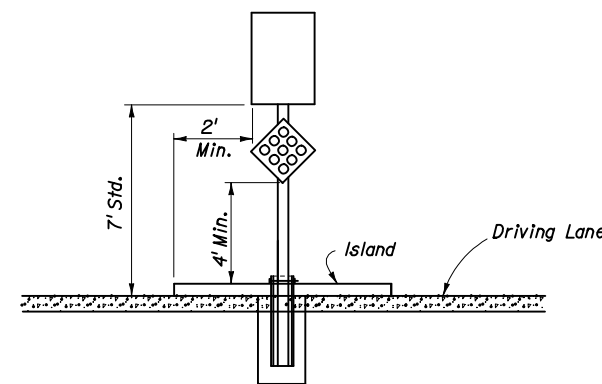
**CASE VII (REST AREA & EXIT GORE SIGNS)**

For Use On All Freeway And Expressway Systems



**CASE VIII**

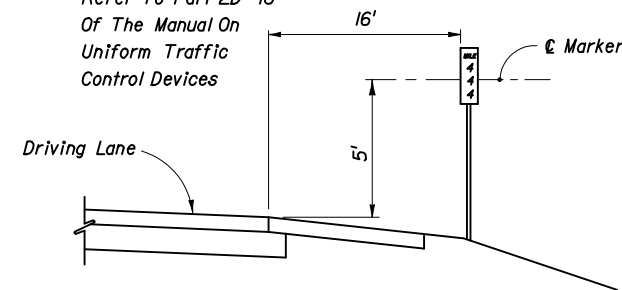
Sign On Island



Center Sign Column On Island

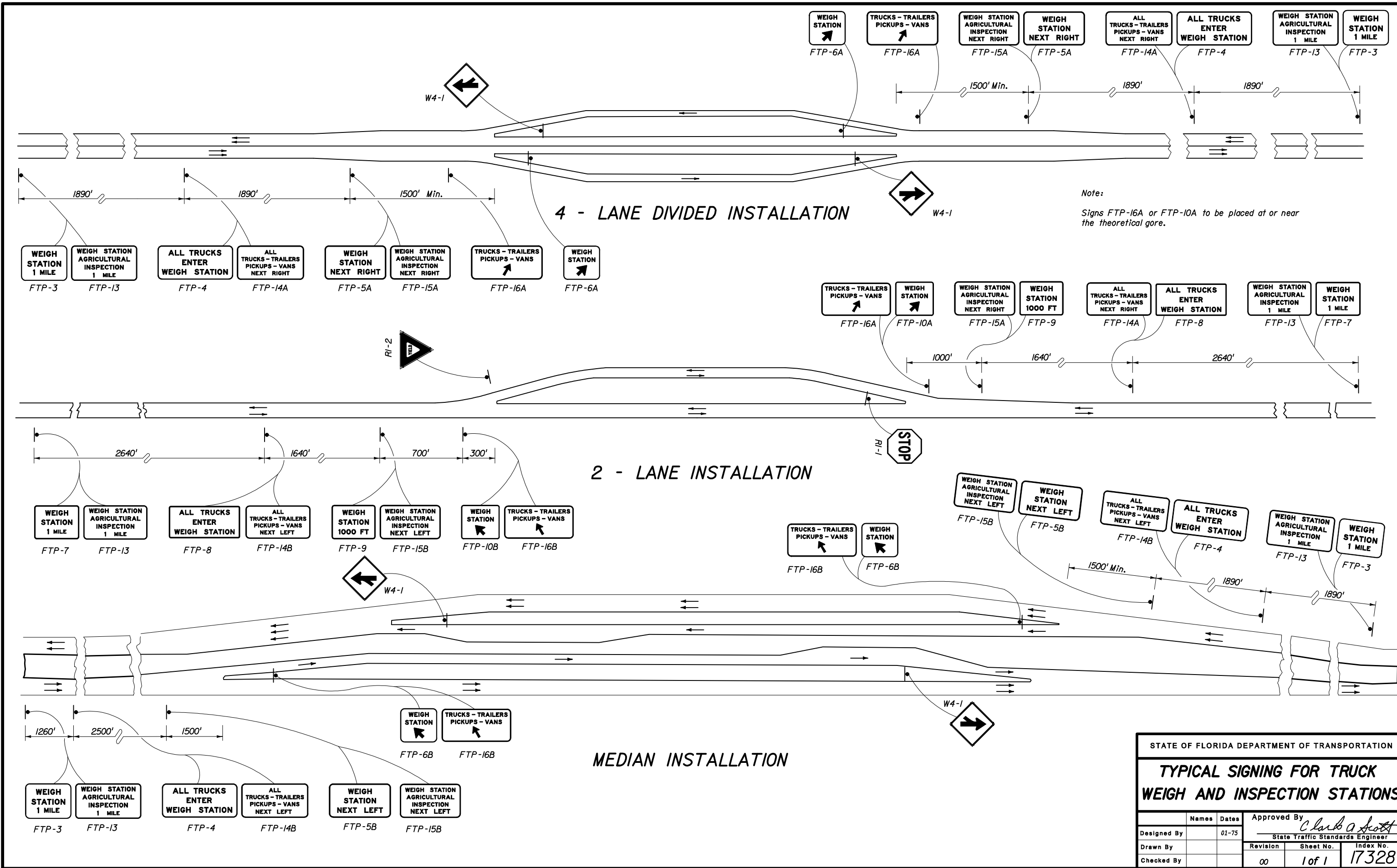
**CASE IX (MILE POST MARKER)**

For More Information Refer To Part 2D-46 Of The Manual On Uniform Traffic Control Devices



7. Sign supports shall not reduce the accessible route /continuous passage to less than 3' min. clear width as required by the Americans with Disabilities Act (ADA) Accessibility Guidelines.

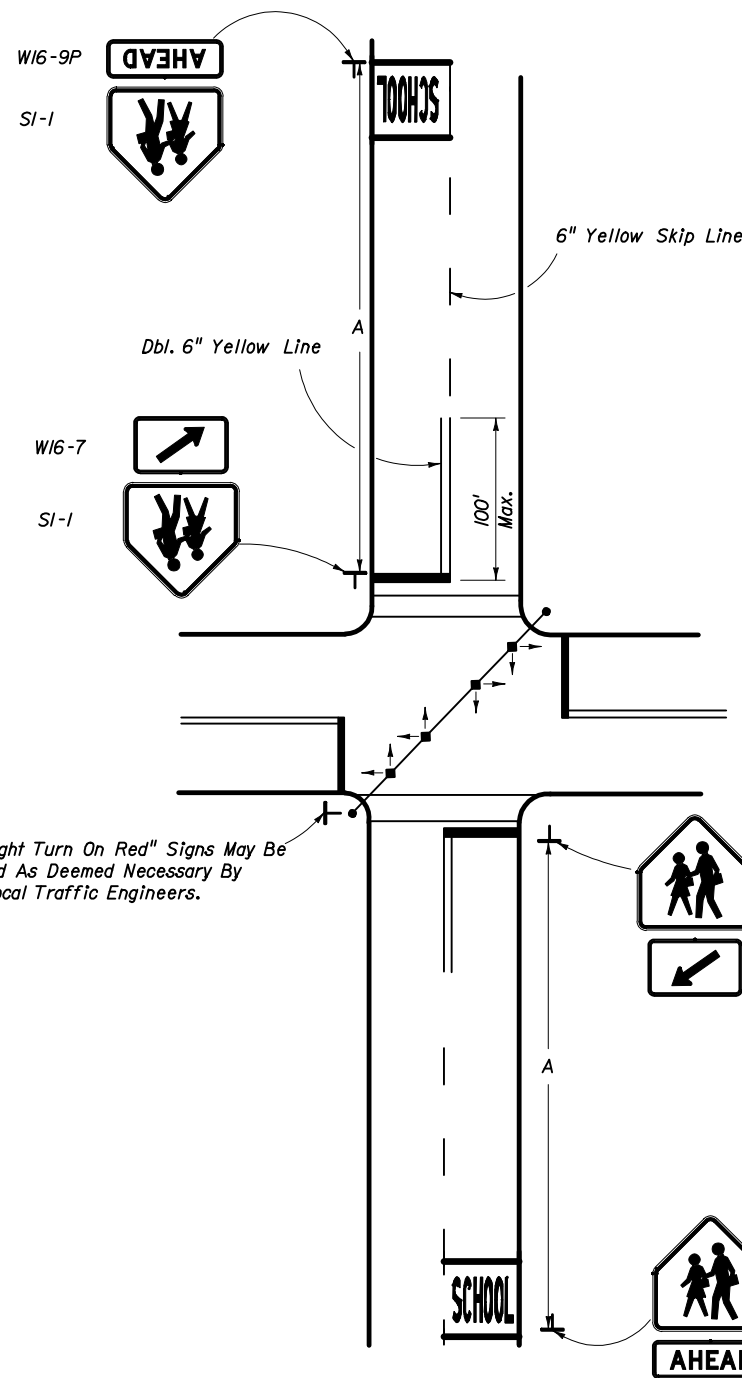
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TYPICAL SECTIONS FOR PLACEMENT OF SINGLE &amp; MULTI-COLUMN SIGNS</b>				
Names	Dates	Approved By <i>Clark A. Scott</i>		
Designed By	3-75	State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 1	17302



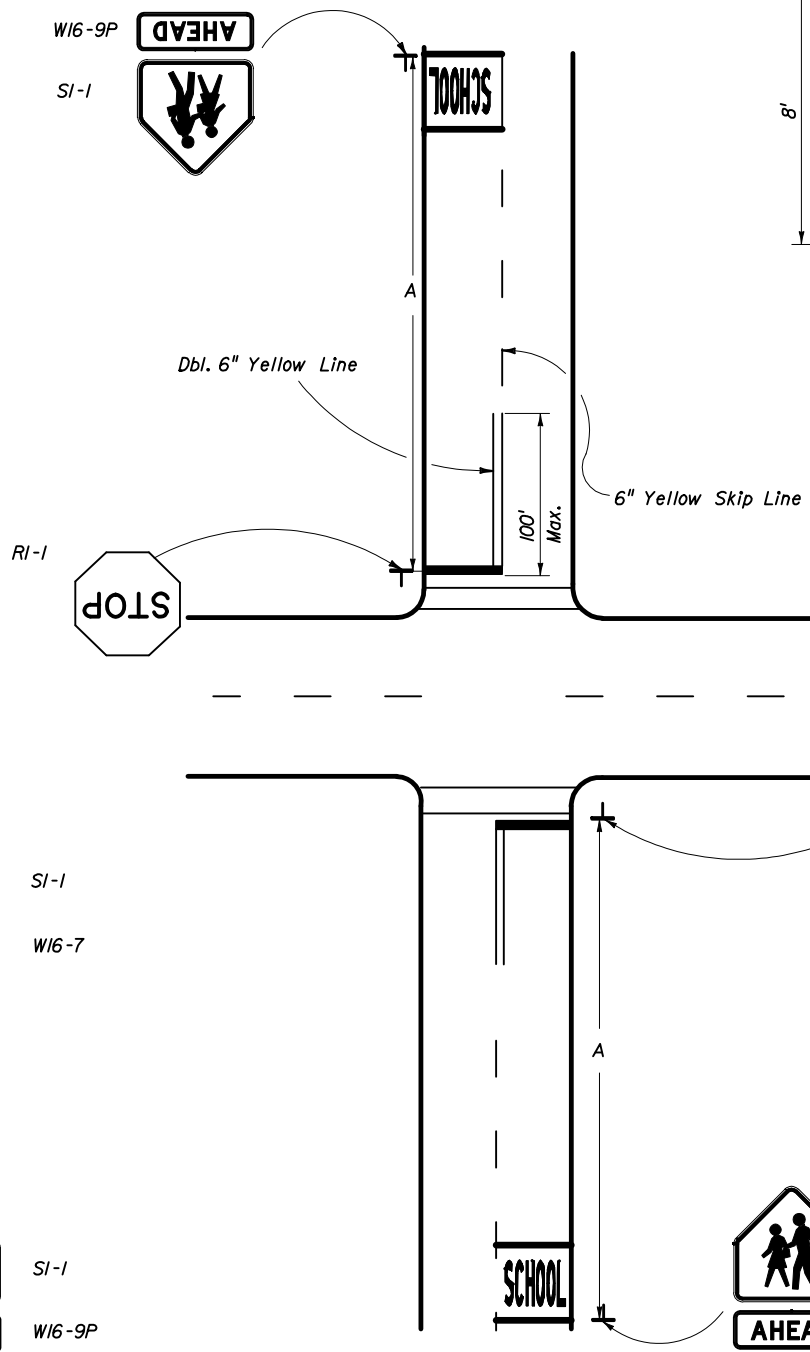
Note:  
Signs FTP-16A or FTP-10A to be placed at or near the theoretical gore.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		01-75	<i>Clark A. Scott</i> State Traffic Standards Engineer	
Checked By		00	Revision	Sheet No. Index No.
			1 of 1	17328

Approach Speed (MPH)	Distance A (FT)
25 To 35	200
36 To 45	350
46 To 55	500

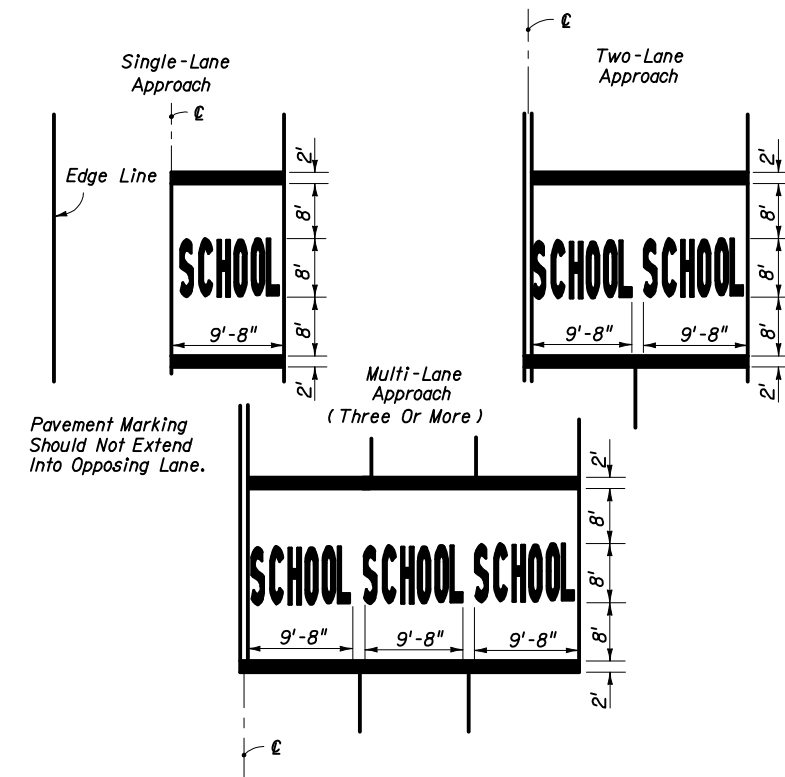
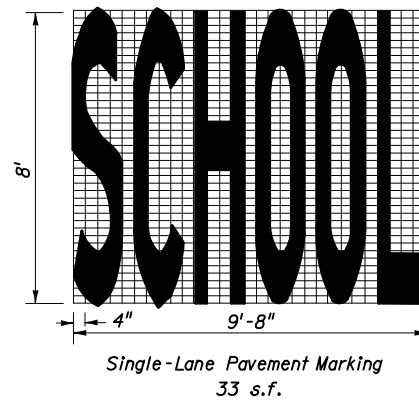


1. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A SIGNALIZED INTERSECTION



2. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A STOP CONTROLLED INTERSECTION

Note: Special speed restrictions are not normally applicable to these two cases.



PAVEMENT MARKINGS

Notes

Signs shall be erected in accordance with Index No. 17302.

When computing pavement message quantities do not include transverse lines.

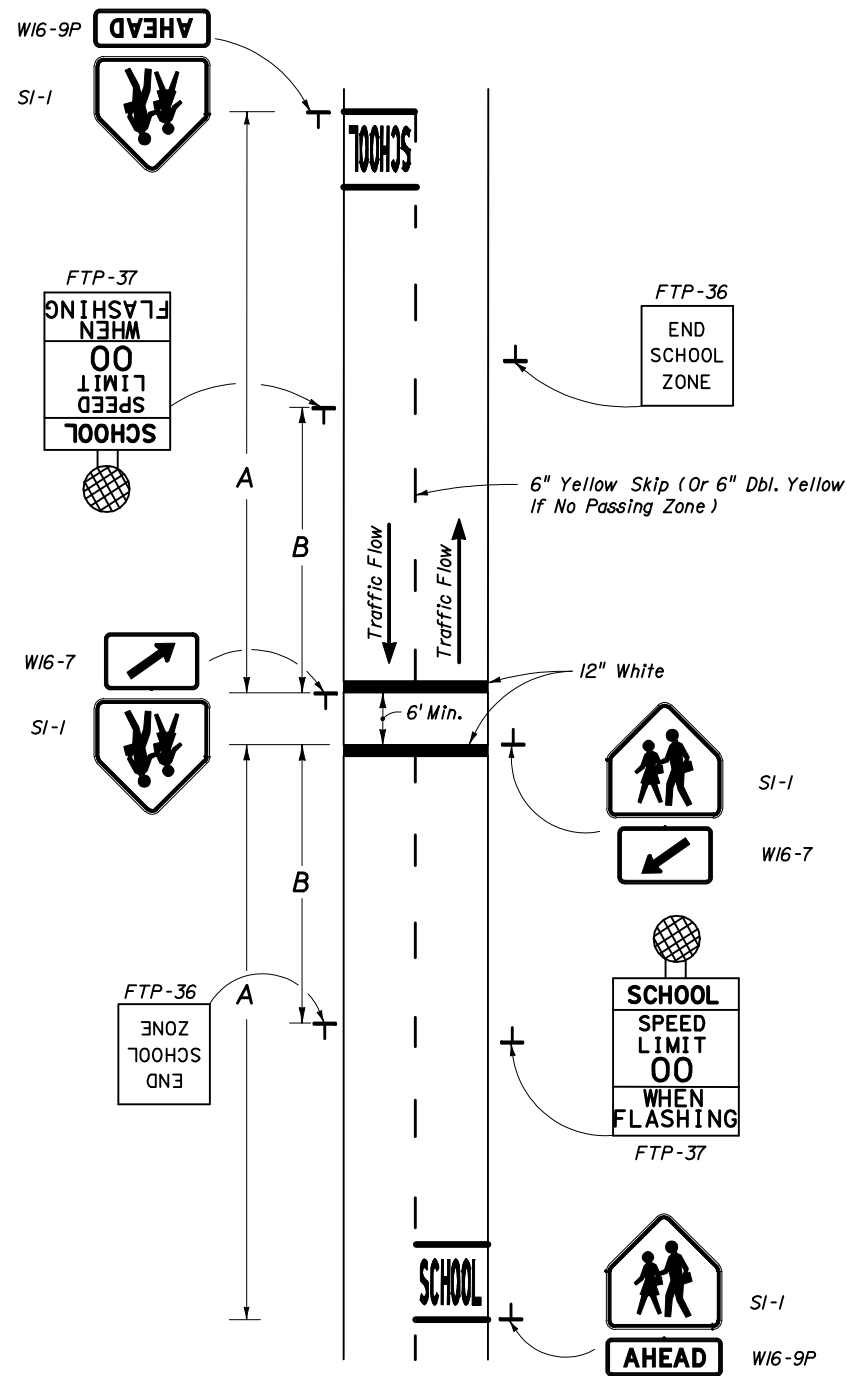
All school signs shall be reflective.

School crosswalk width shall be 6' min. 10' std. without public sidewalk curb ramps 10' min. with public sidewalk curb ramps. See Index No. 17346 sheet 9 of 13.

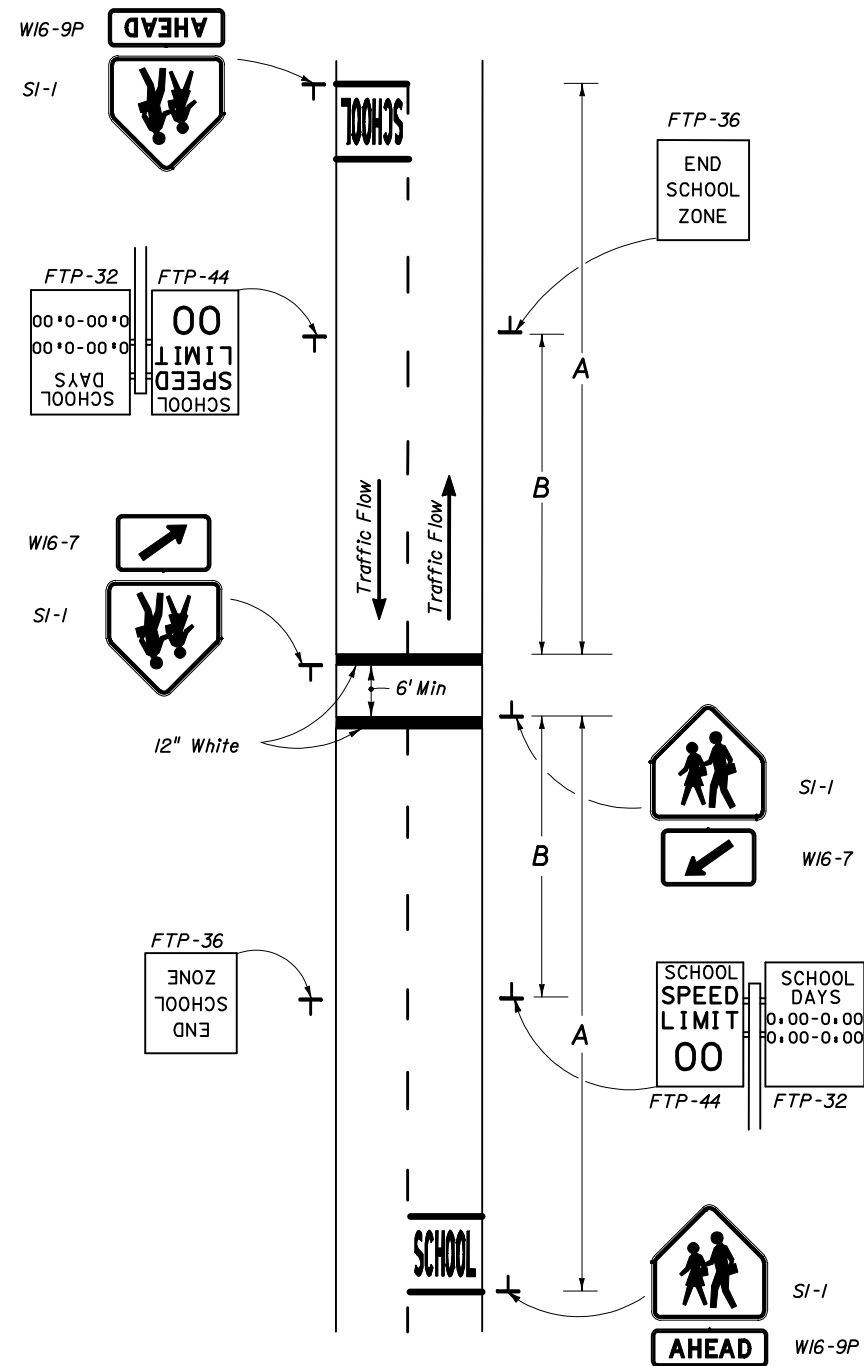
For signalized intersections or mid-block signalized crossings where flashing beacon speed limit signs (post mounted or overhead) are installed, the minimum distance from the speed limit sign to the stop line shall be 100'. The sign shall not block the view of the signal.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SCHOOL SIGNS &amp; MARKINGS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		7-76	<i>Charles A. Scott</i> State Traffic Standards Engineer	
Checked By		7-76	Revision	Sheet No.
			02	1 of 6
				Index No.
				17344

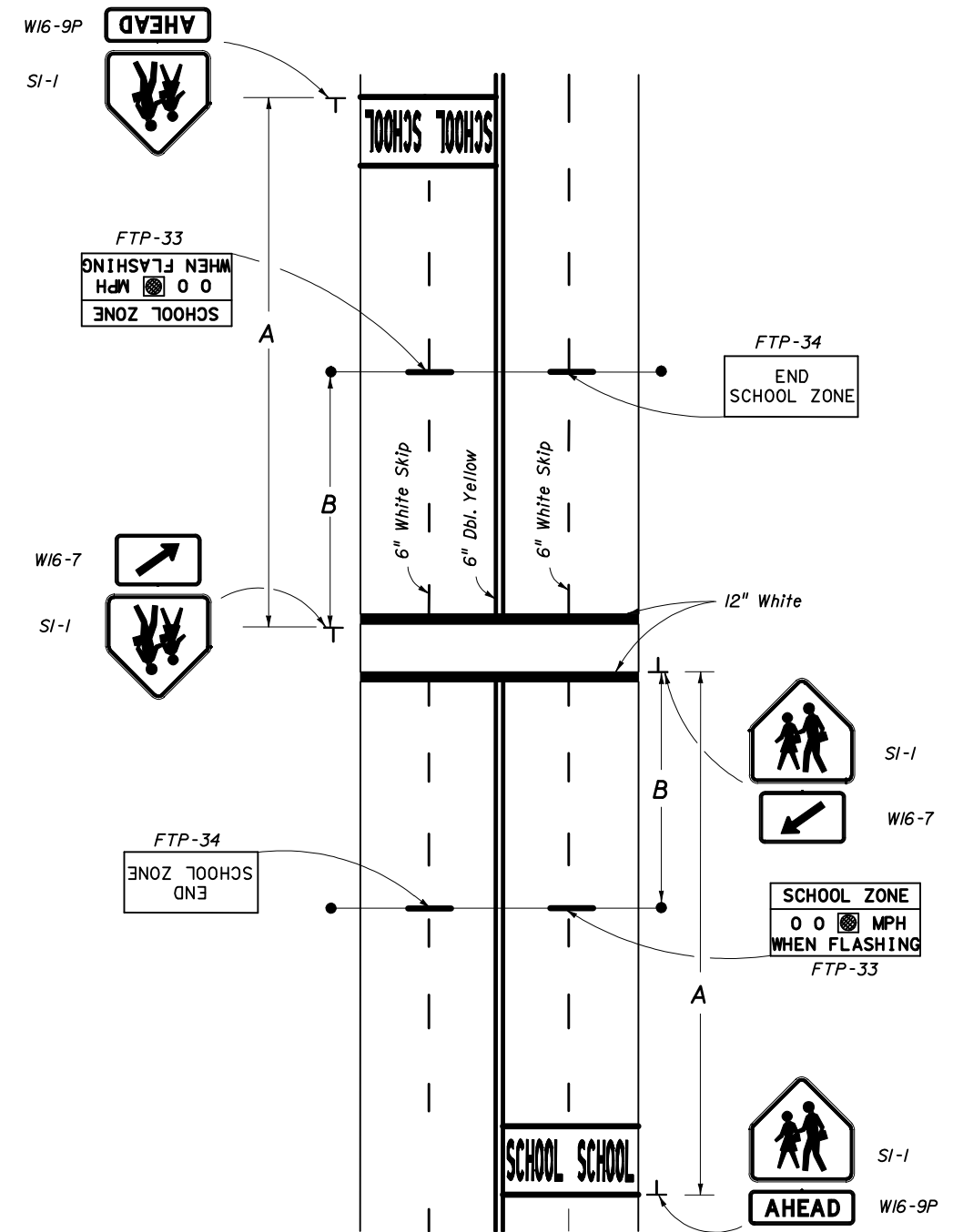
**3. TRAFFIC CONTROL DEVICES WITH FLASHING BEACON FOR REDUCED SPEED ZONE AT A SCHOOL CROSSWALK (2 LANES - 2 WAY TRAFFIC)**  
 (MIDBLOCK OR ON THRU STREET AT AN INTERSECTION)



**4. TRAFFIC CONTROL DEVICES FOR A REDUCED SPEED ZONE AT A SCHOOL CROSSWALK (NO FLASHING BEACON)**  
 (2 LANES - 2 WAY TRAFFIC)  
 (MIDBLOCK OR ON THRU STREET AT AN INTERSECTION)



**5. TRAFFIC CONTROL DEVICES FOR A REDUCED SPEED ZONE AT A SCHOOL CROSSWALK WITH OVERHEAD FLASHING BEACON SPEED LIMIT SIGNS**  
 (4 LANES UNDIVIDED - 2 WAY TRAFFIC)  
 (MIDBLOCK OR ON THRU STREET AT AN INTERSECTION)



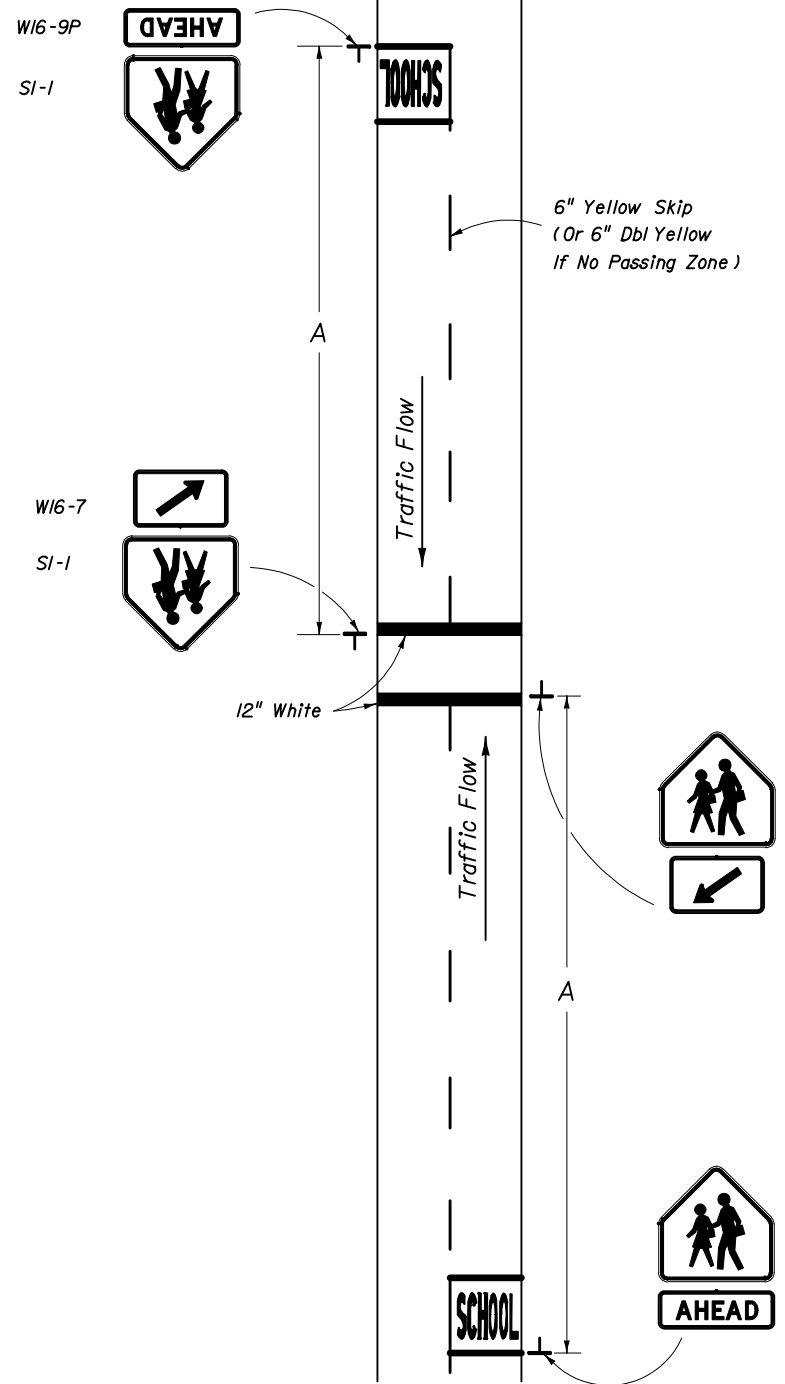
APPROACH SPEED MPH	SUGGESTED DISTANCE IN FEET	
	A	B
25 To 35	200	50
36 To 45	350	65
46 To 55	500	80

School crosswalk width shall be 6' min.  
 10' std. without public sidewalk curb ramps.  
 10' min. with public sidewalk curb ramps.  
 See Index No. 17346 sheet 9 of 13.

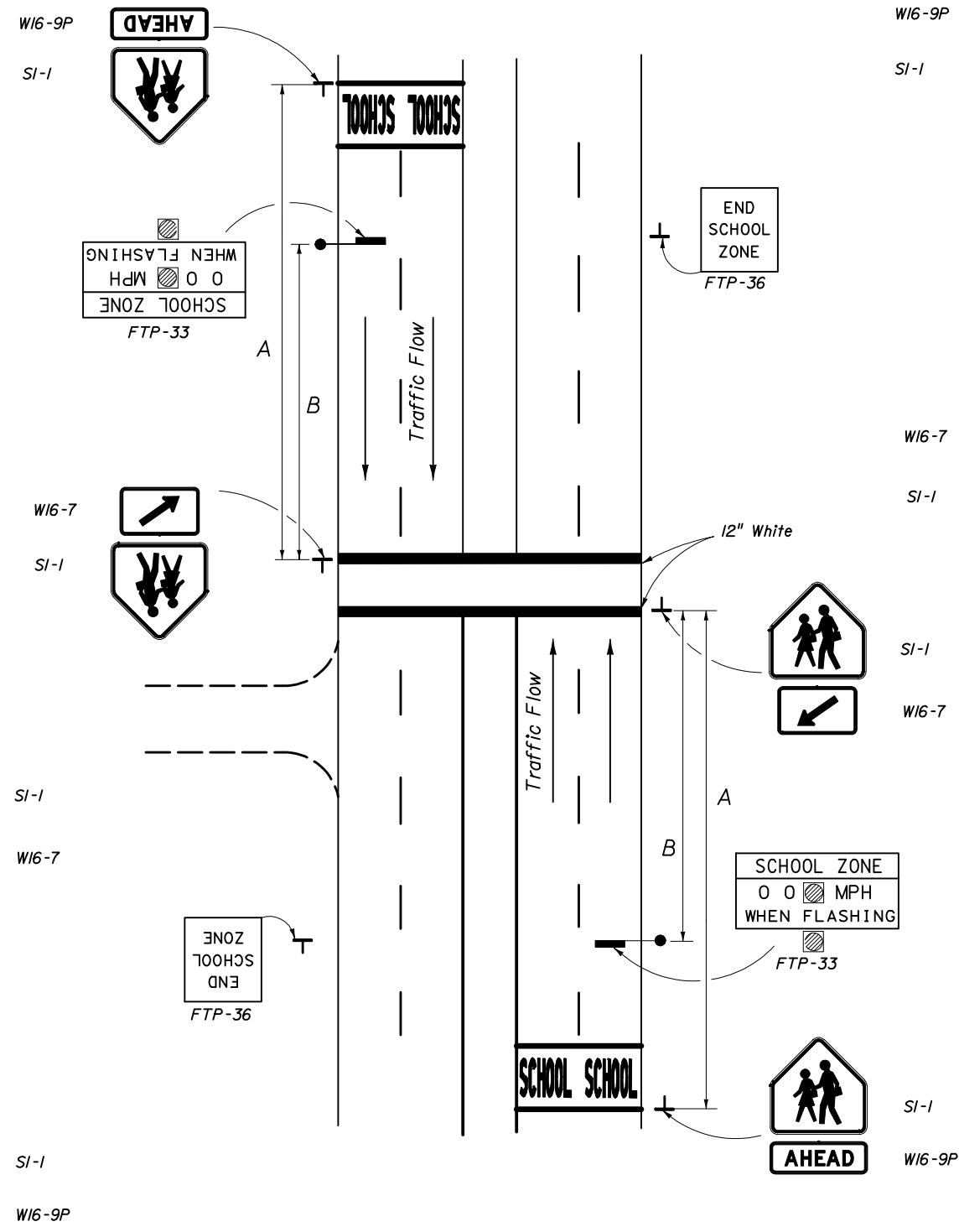
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SCHOOL SIGNS & MARKINGS**

Designed By	Names	Dates	Approved By
Drawn By		7-76	<i>Charles Scott</i>
Checked By		7-76	State Traffic Standards Engineer
	Revision	Sheet No.	Index No.
	02	2 of 6	17344



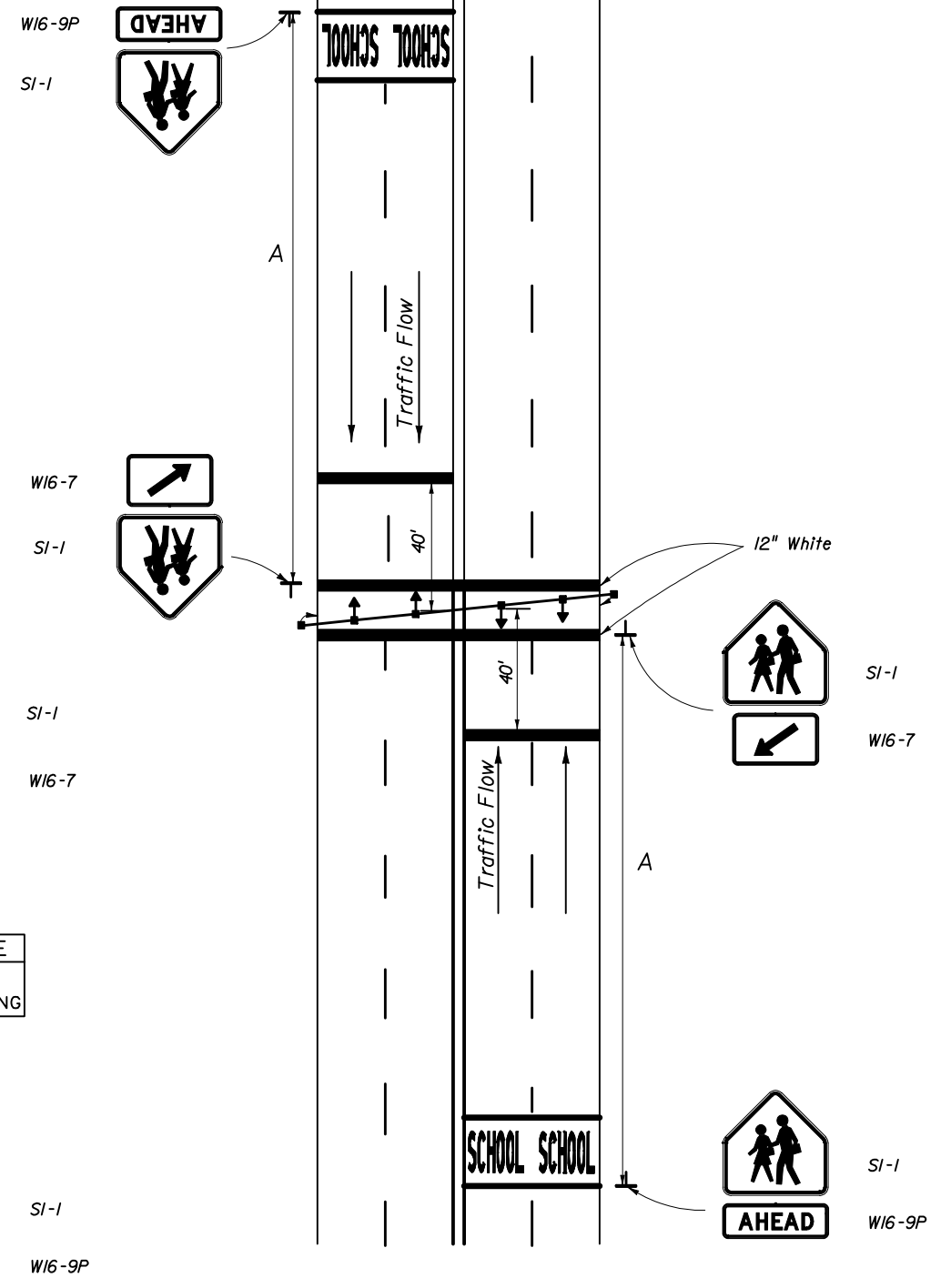
6. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK WITHOUT A SPEED REDUCTION (2 LANES - 2 WAY TRAFFIC)



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	200	50
36 To 45	350	65
46 To 55	500	80

School crosswalk width shall be 6' min. 10' std. without public sidewalk curb ramps. 10' min. with public sidewalk curb ramps. See Index No. 17346 sheet 9 of 13.



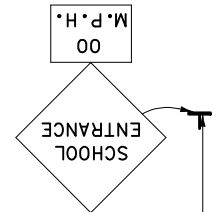
8. TRAFFIC CONTROL DEVICES FOR SIGNALIZED MIDBLOCK SCHOOL CROSSWALK

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

## SCHOOL SIGNS & MARKINGS

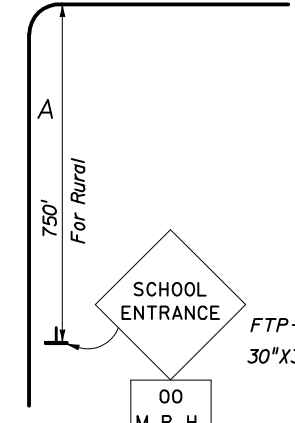
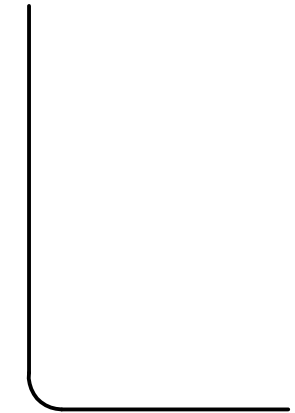
	Names	Dates	Approved By <i>Charles A. Scott</i>	
Designed By		7-76	State Traffic Standards Engineer	
Drawn By			Revision	Sheet No. Index No.
Checked By		7-76	02	3 of 6 17344

24"X24"  
W13-1



30"X30"  
FTP-35

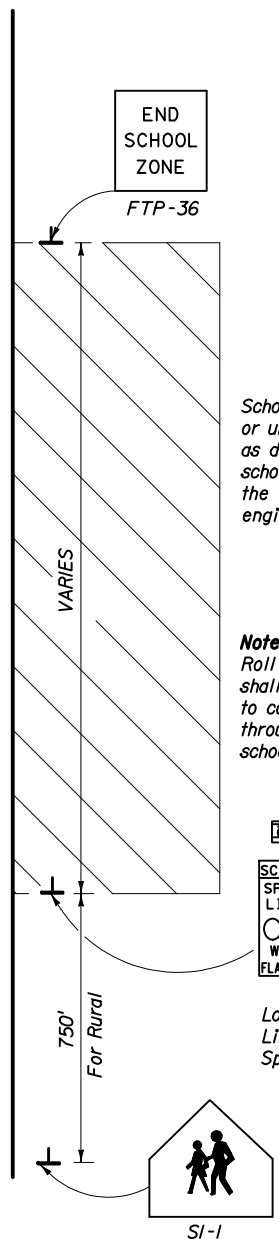
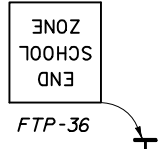
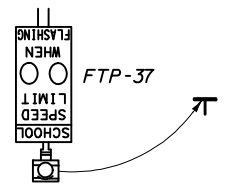
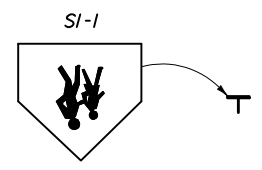
750' For Rural  
A



SCHOOL ENTRANCE  
FTP-35  
30"X30"  
00  
M.P.H.  
W13-1  
24"X24"

**9. TRAFFIC CONTROL DEVICES AT SCHOOL ENTRANCES WITH LOW VOLUMES OF 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.

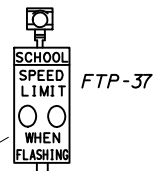


END SCHOOL ZONE  
FTP-36

VARIES

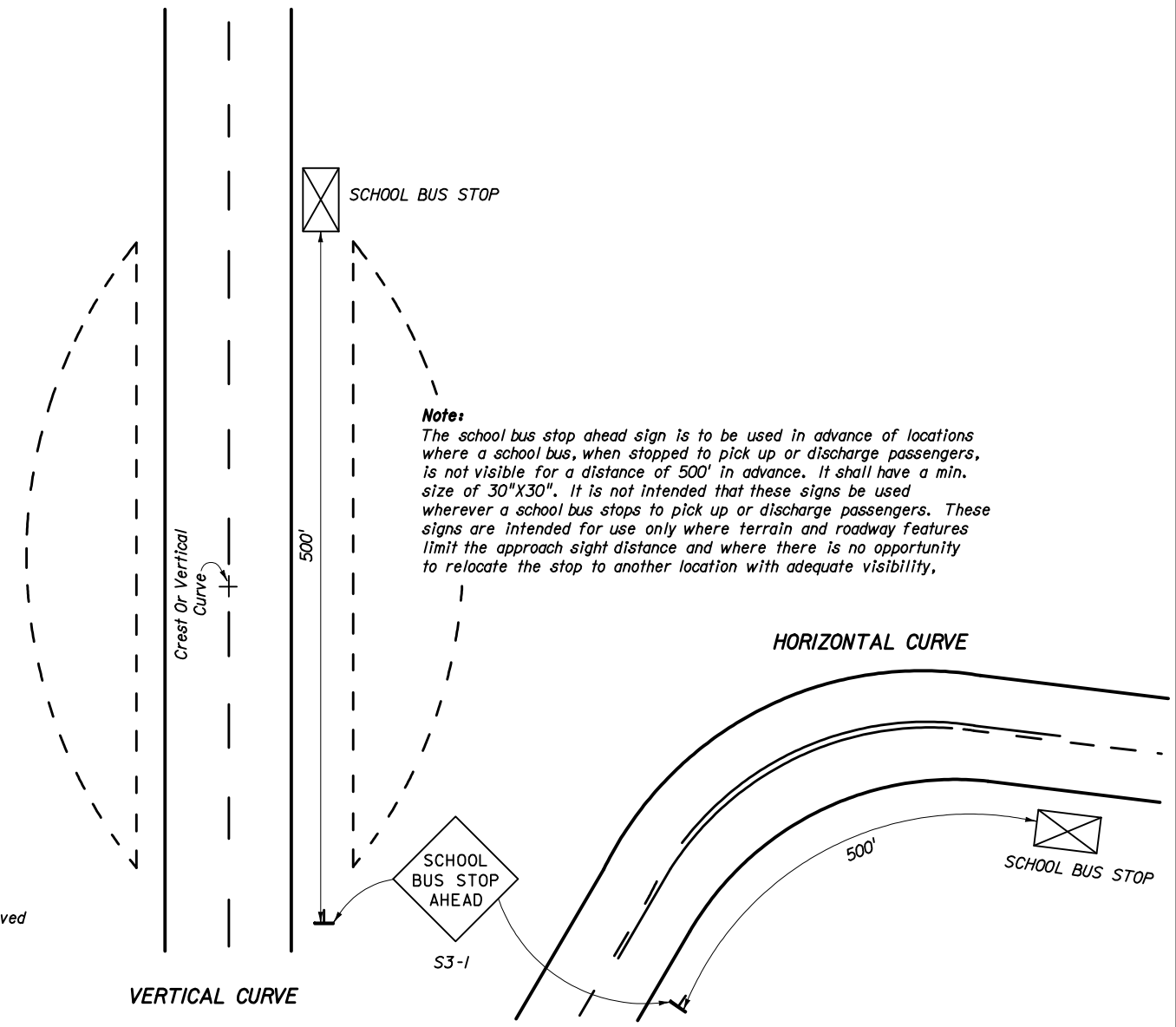
School zone limits or unprotected activity as defined by local school board through the local traffic engineers

Note:  
Roll out school signs shall not be utilized to control traffic through an established school zone



Location Of School Speed Limit Sign When A Reduced Speed Limit Has Been Approved

**10. TRAFFIC CONTROL DEVICES FOR A TYPICAL SCHOOL ZONE FRONTING THE SCHOOL PROPERTY**



SCHOOL BUS STOP

Note:

The school bus stop ahead sign is to be used in advance of locations where a school bus, when stopped to pick up or discharge passengers, is not visible for a distance of 500' in advance. It shall have a min. size of 30"X30". It is not intended that these signs be used wherever a school bus stops to pick up or discharge passengers. These signs are intended for use only where terrain and roadway features limit the approach sight distance and where there is no opportunity to relocate the stop to another location with adequate visibility.

Crest Or Vertical Curve

VERTICAL CURVE

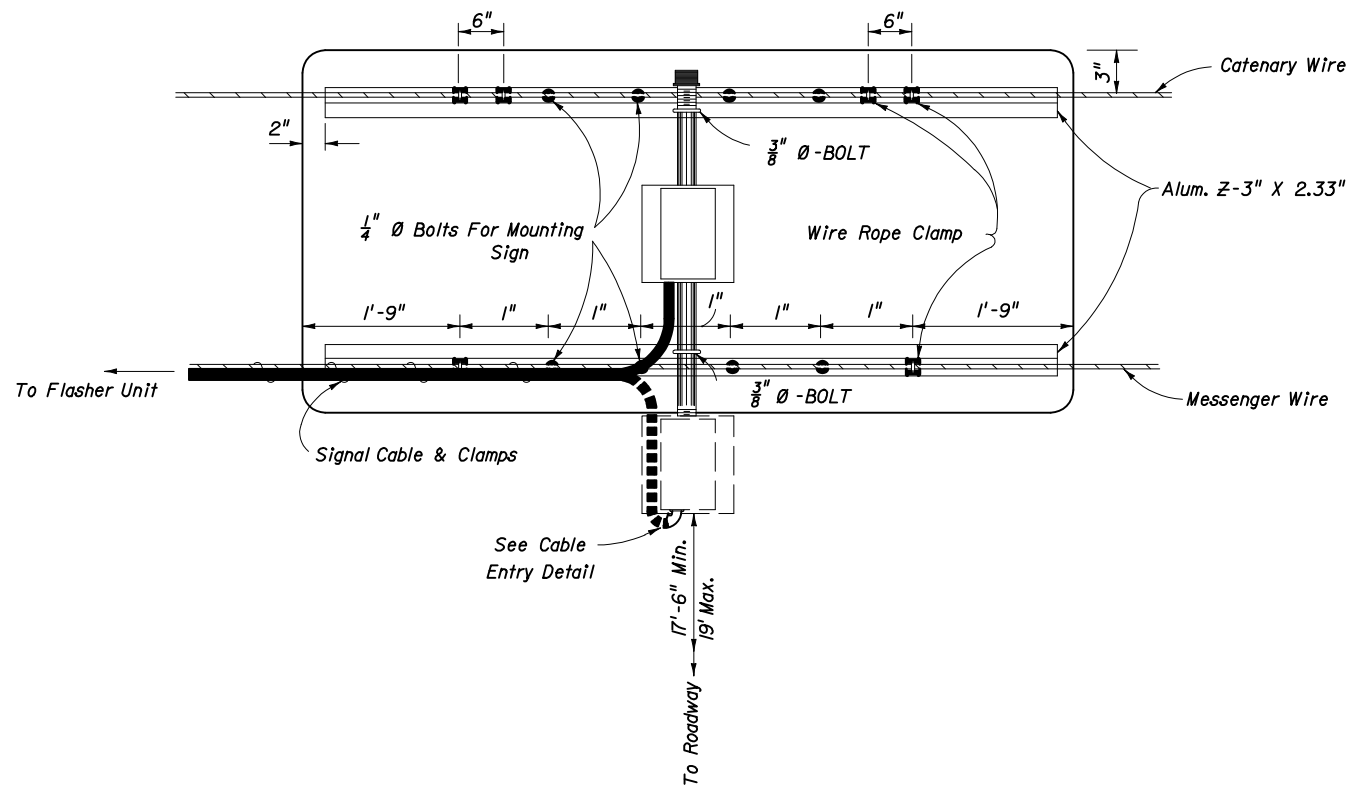
HORIZONTAL CURVE

**II. SCHOOL BUS STOP**

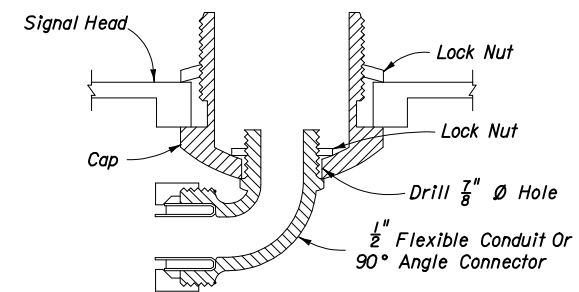
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SCHOOL SIGNS & MARKINGS**

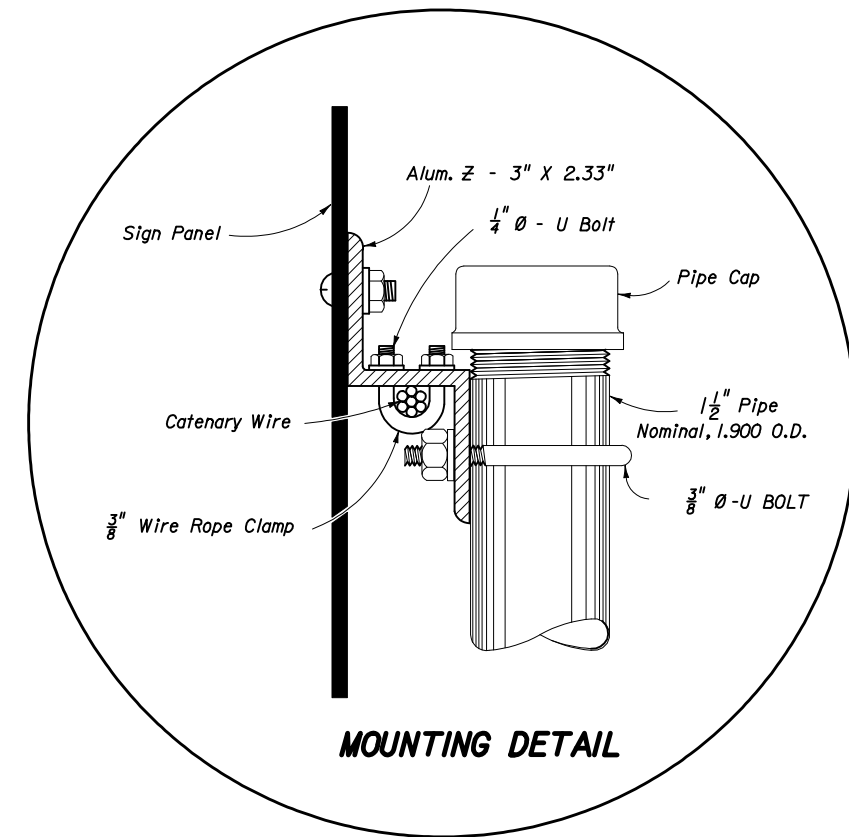
Names	Dates	Approved By	
Designed By	7-76	Charles Scott State Traffic Standards Engineer	
Drawn By			
Checked By	7-76		
Revision	00	Sheet No.	Index No.
		4 of 6	17344



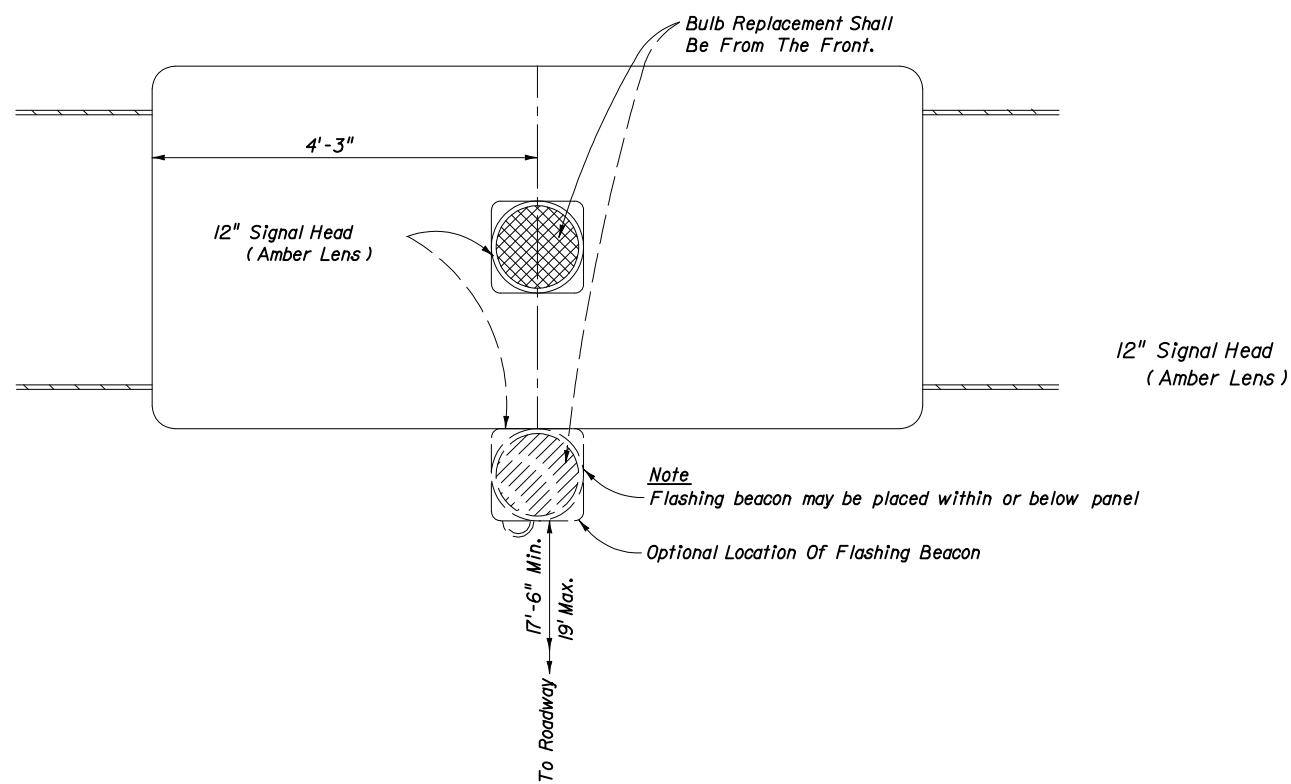
**REAR VIEW**



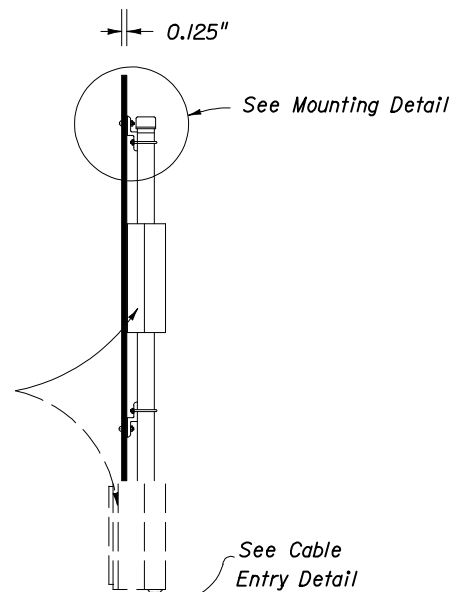
**CABLE ENTRY DETAIL**



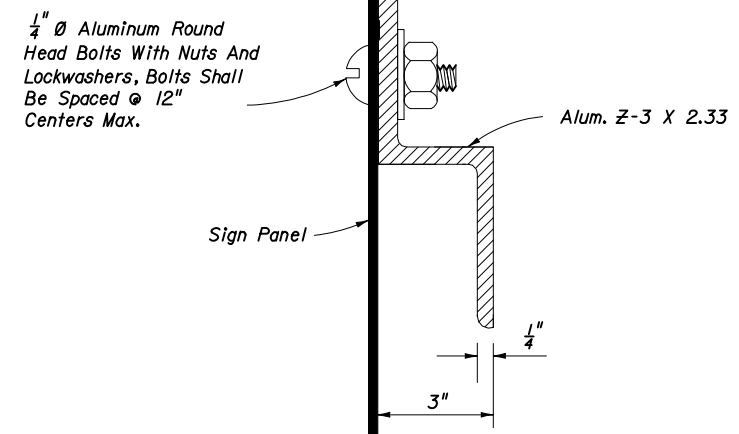
**MOUNTING DETAIL**



**FRONT VIEW**



**SIDE VIEW**

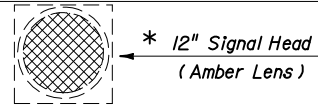
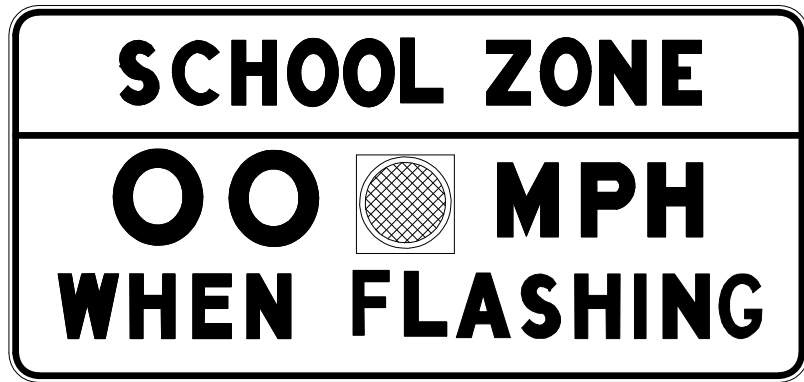


**Z SECTION DETAIL**

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.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SCHOOL SIGNS &amp; MARKINGS</b>				
Designed By		Dates	Approved By <i>Charles Scott</i>	
Drawn By			State Traffic Standards Engineer	
Checked By		7-76	Revision	Sheet No. Index No.
			00	5 of 6 17344





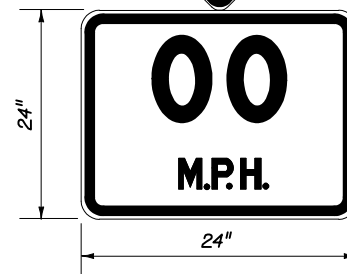
FTP - 33

**OVERHEAD STANDARD**

\* Flashing Beacon May Be Placed Within Or Below Panel

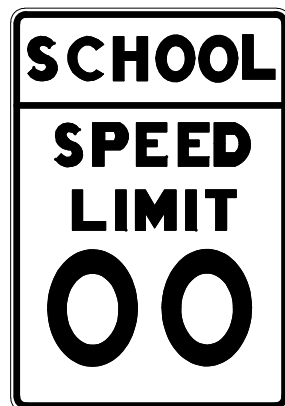


FTP - 35

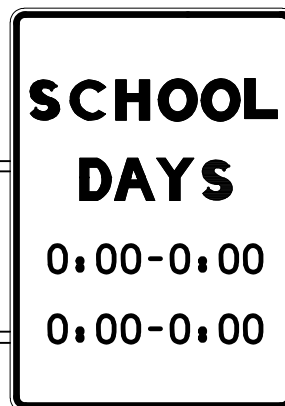


W13 - 1

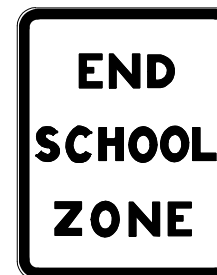
**SPEED LIMIT ASSEMBLY**



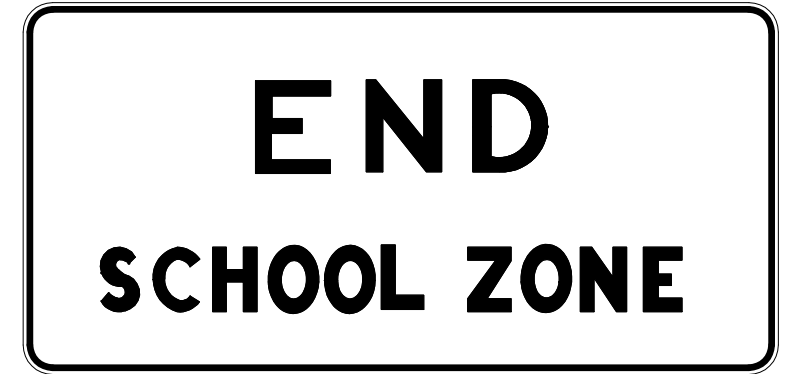
FTP-44



FTP - 32



FTP - 36



FTP - 34

12" Signal Head (Amber Lens)



FTP - 37

**Ground Mount Standard**

Note:  
Existing ground mount school speed limit signs utilizing a single 8" min. size beacon or two 6" min. size beacons inside the sign border are considered 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.

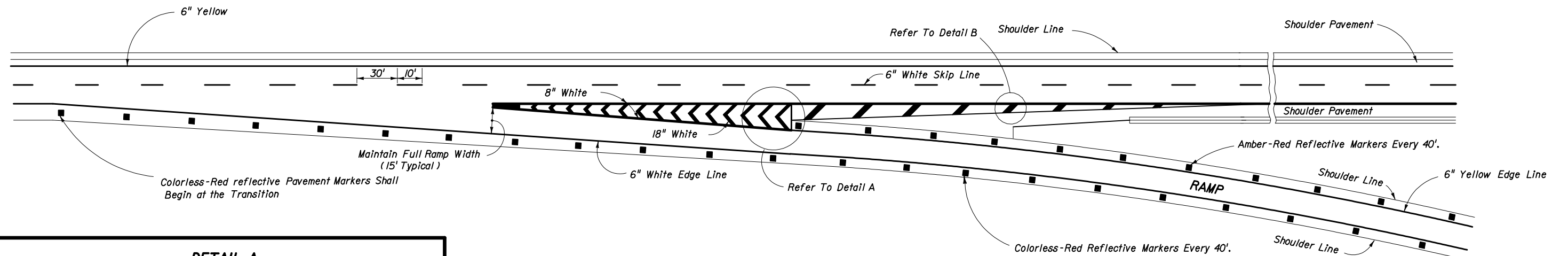
Notes:

1. 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.
2. 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. as set by law.
3. See Index No. 17355 for sign details.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SCHOOL SIGNS & MARKINGS**

Designed By		Dates	7-76	Approved By	<i>Charles A. Scott</i>
Drawn By		Revision		State Traffic Standards Engineer	
Checked By		Sheet No.	6 of 6	Index No.	17344

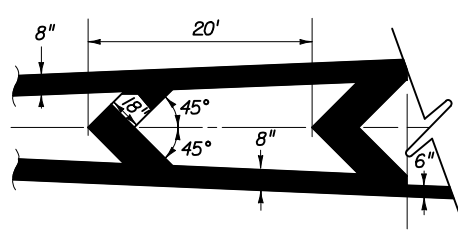


**NORMAL TAPERED EXIT  
(TWO THRU LANES)**

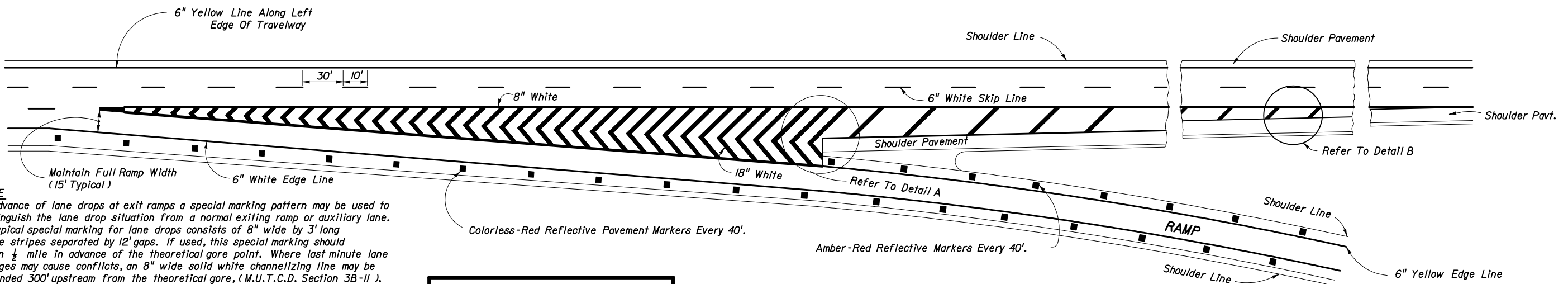
Note:  
Reflective pavement markers  
are installed adjacent to the  
edge line.

**DETAIL A**

For RPM Location Refer To Index 17352.



**NOTE**  
In advance of lane drops at exit ramps a special marking pattern may be used to distinguish the lane drop situation from a normal exiting ramp or auxiliary lane. A typical special marking for lane drops consists of 8" wide by 3' long white stripes separated by 12' gaps. If used, this special marking should begin 1/2 mile in advance of the theoretical gore point. Where last minute lane changes may cause conflicts, an 8" wide solid white channelizing line may be extended 300' upstream from the theoretical gore. (M.U.T.C.D. Section 3B-11).

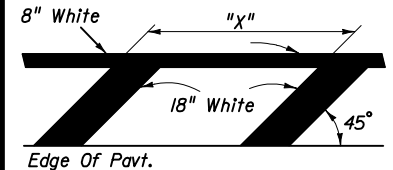


**NORMAL TAPERED EXIT ONLY  
(TWO THRU LANES - THREE APPROACH LANES)**

**DETAIL B**

"S" MPH	30	35	40	45	50	55
"X" Ft.	20	20	40	40	60	60

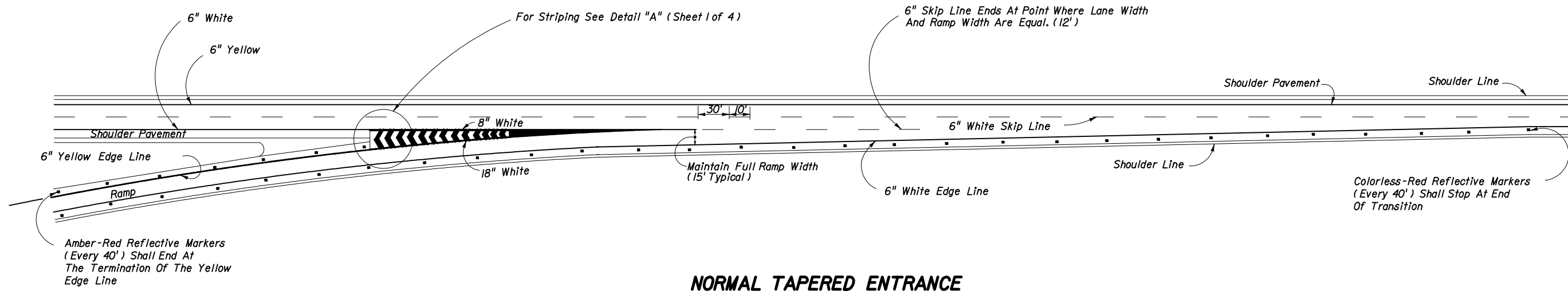
Passenger Car, Daytime, Posted Speeds  
Or 85th Percentile (Use Higher Value)



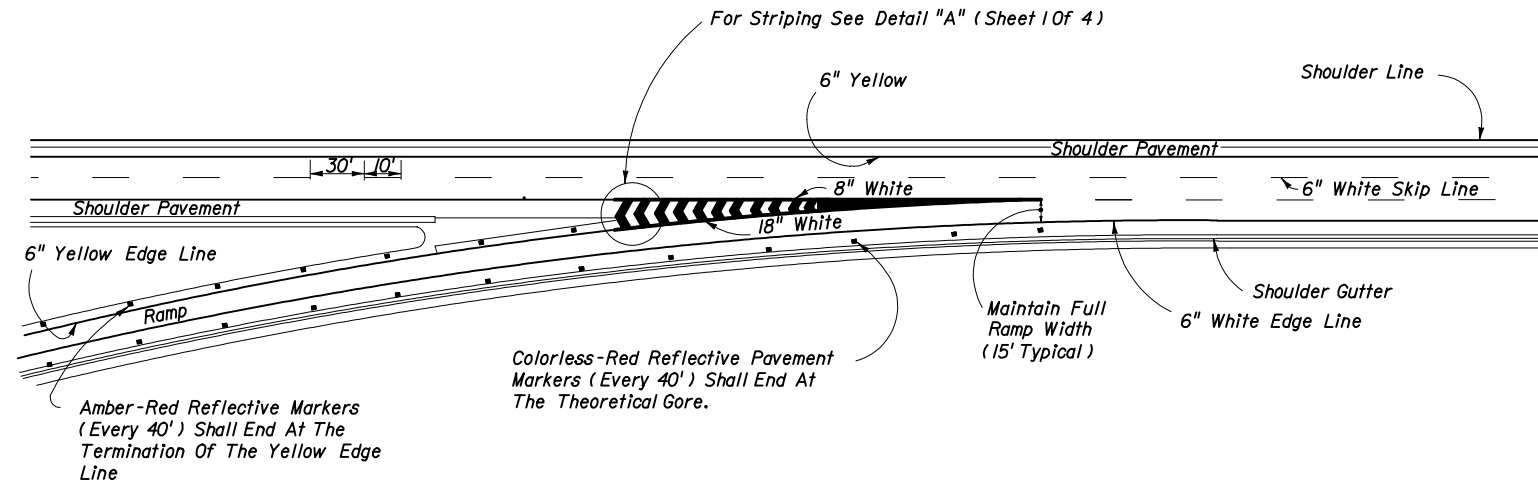
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**INTERCHANGE MARKINGS**

Names	Dates	Approved By		
Designed By	9-73	Charles Scott State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By	9-73	00	1 of 4	17345



**NORMAL TAPERED ENTRANCE**

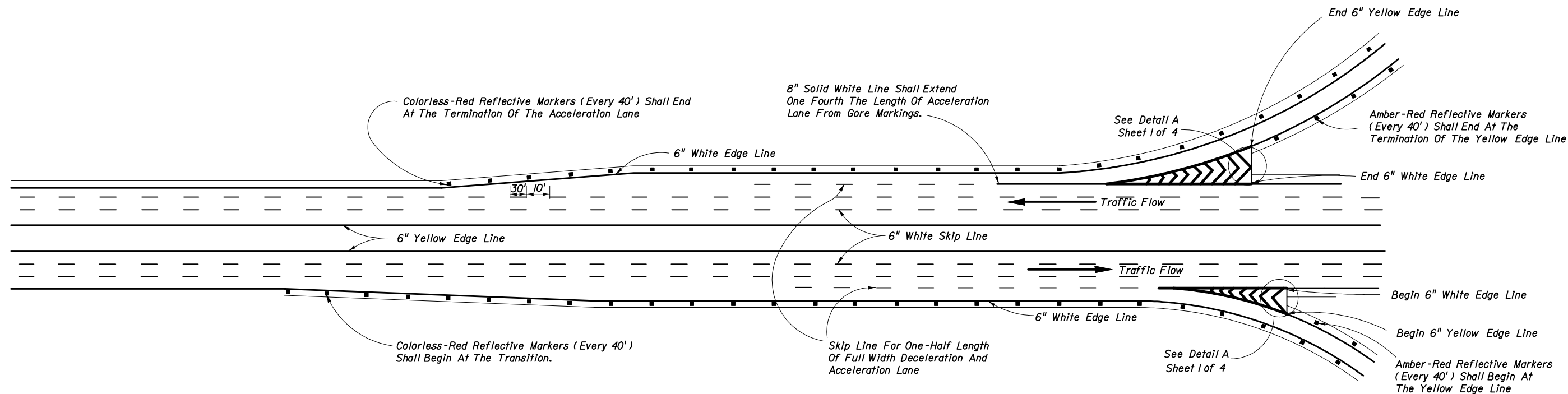


**NORMAL TAPERED ENTRANCE WITH ADDED LANE**

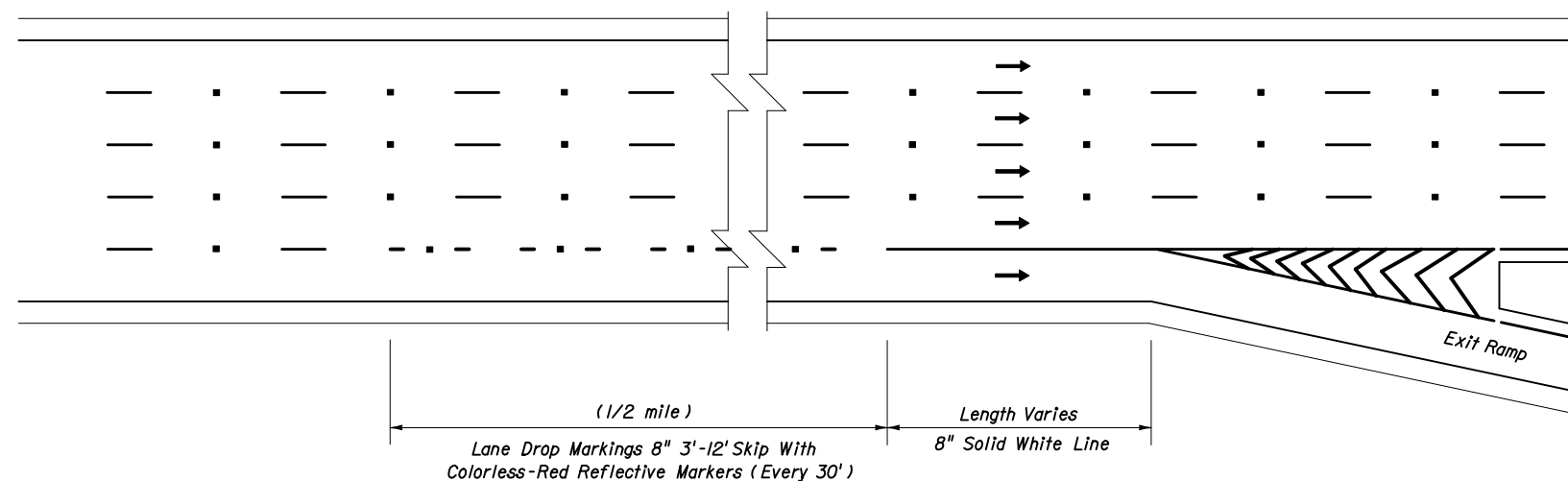
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**INTERCHANGE MARKINGS**

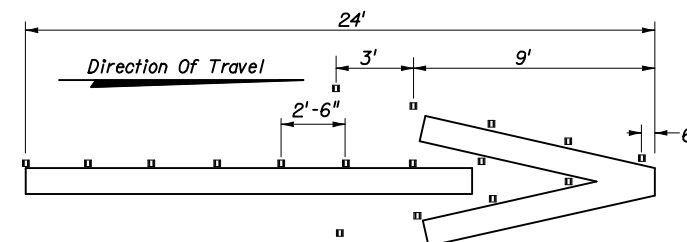
Designed By		Dates	7-73	Approved By	<i>Charles A. Scott</i>
Drawn By		Revision		State Traffic Standards Engineer	
Checked By		7-73	00	Sheet No.	2 of 4
				Index No.	17345



**PARALLEL ACCELERATION AND DECELERATION LANE**



**TYPICAL LANE DROP MARKINGS AT EXIT RAMP**



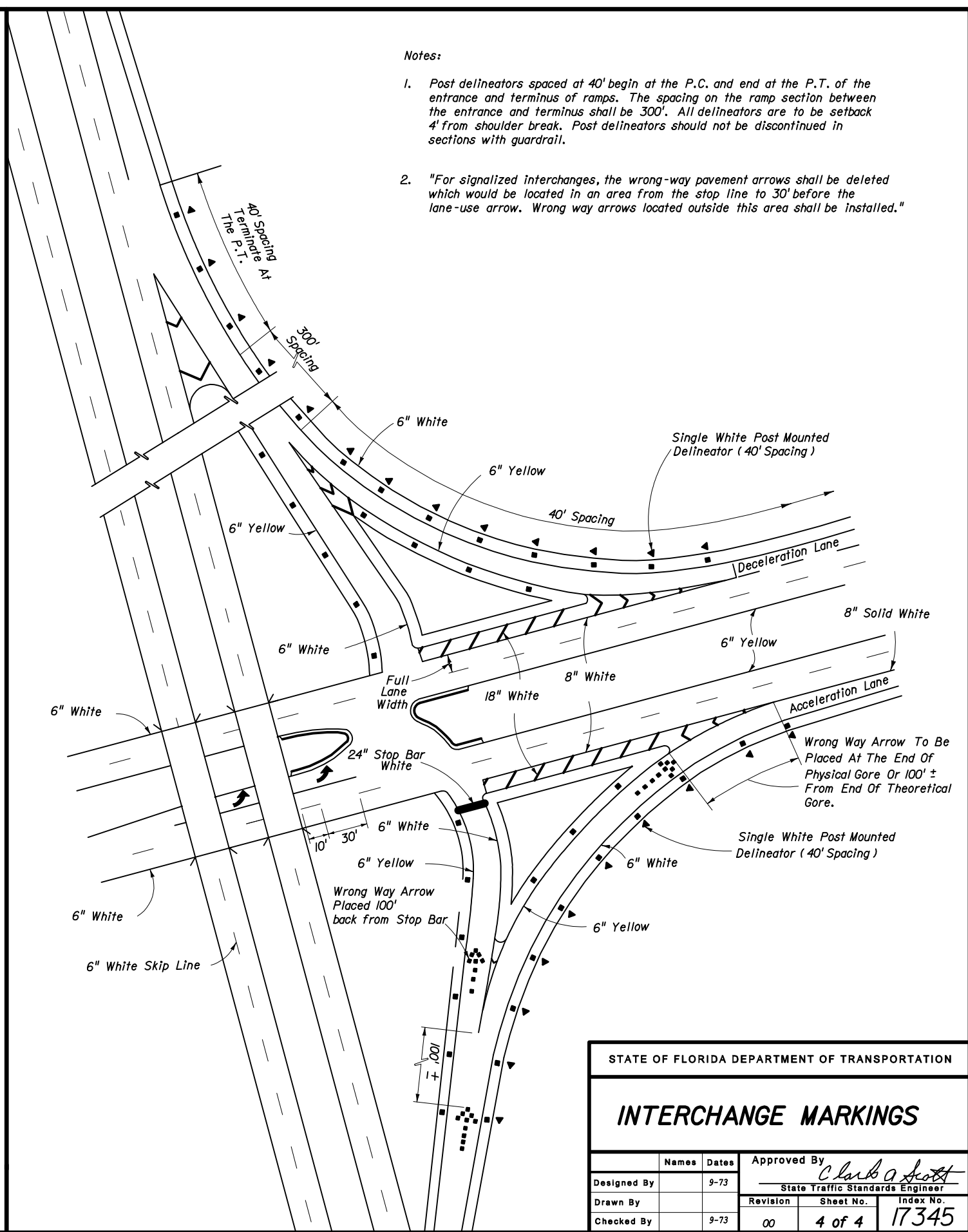
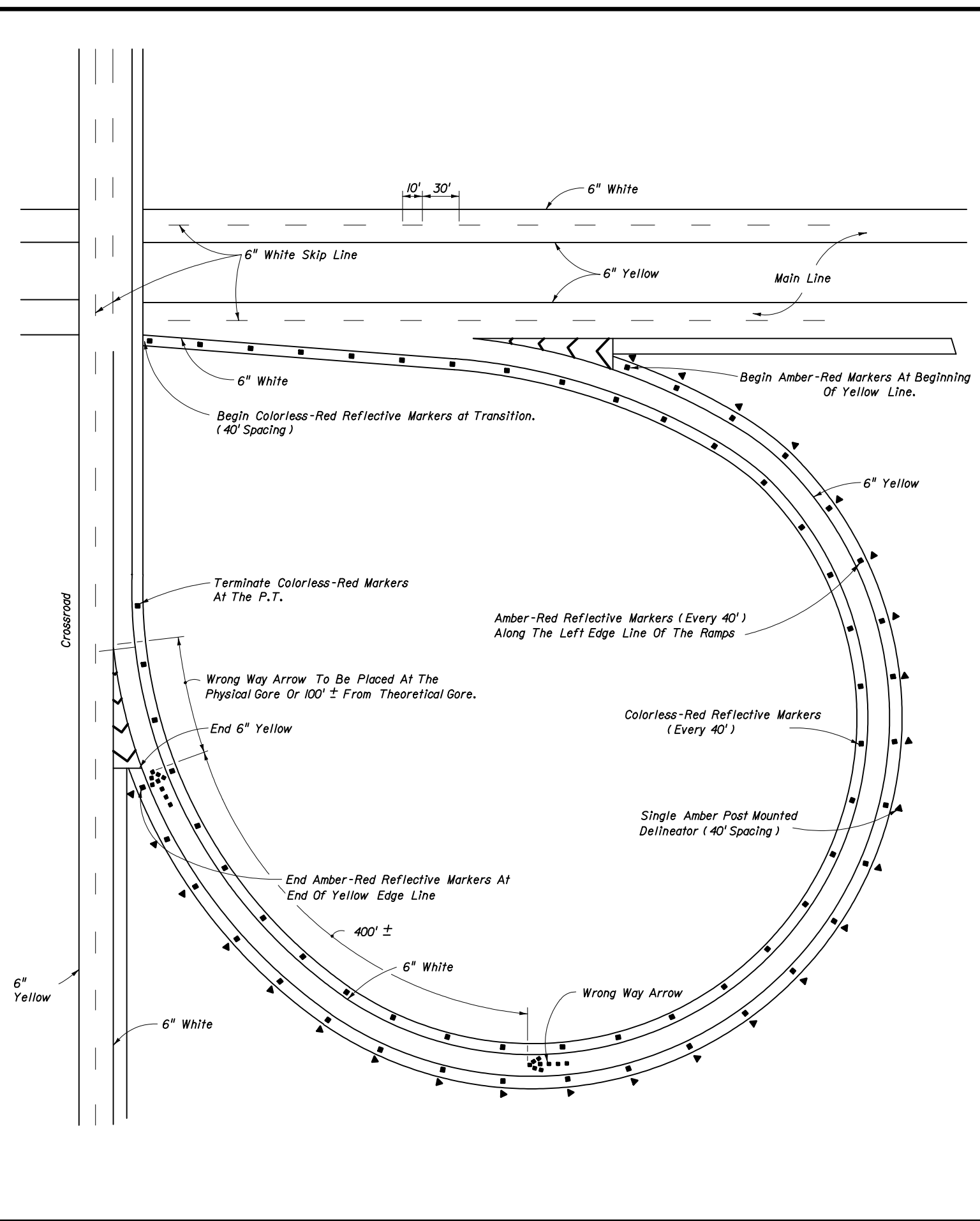
White Arrow With Colorless-Red Reflective Markers For Arrow details see Index No. 17346 sheet 1 of 13.

**WRONG WAY ARROW**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

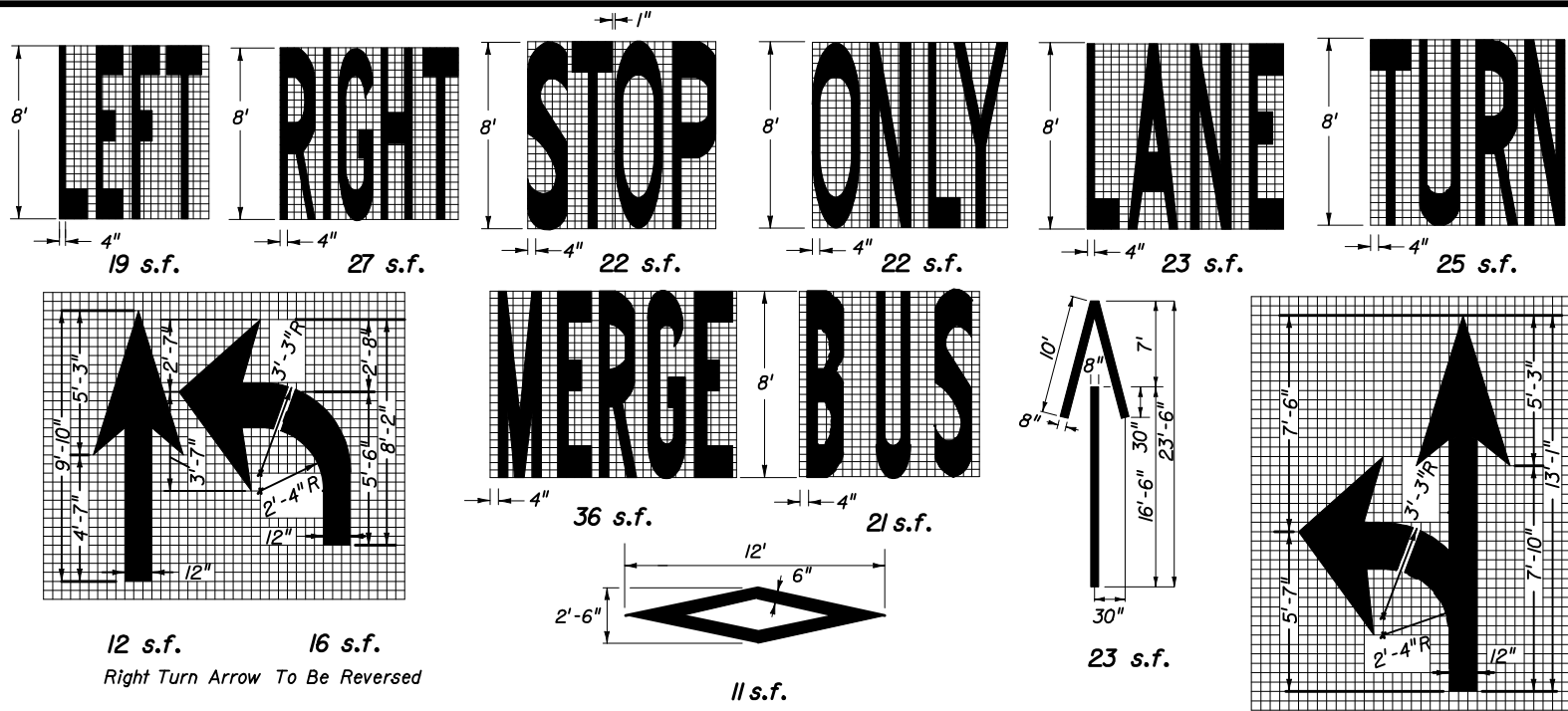
**INTERCHANGE MARKINGS**

Names		Dates		Approved By		
Designed By		9-73		C. Clark Scott State Traffic Standards Engineer		
Drawn By			Revision	Sheet No.	Index No.	
Checked By		9-73	02	3 of 4	17345	



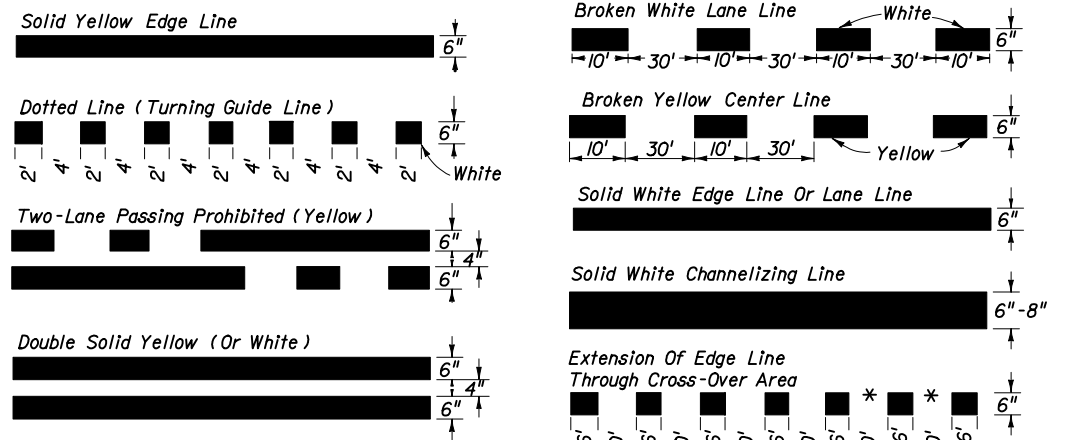
- Notes:
1. Post delineators spaced at 40' begin at the P.C. and end at the P.T. of the entrance and terminus of ramps. The spacing on the ramp section between the entrance and terminus shall be 300'. All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.
  2. "For signalized interchanges, the wrong-way pavement arrows shall be deleted which would be located in an area from the stop line to 30' before the lane-use arrow. Wrong way arrows located outside this area shall be installed."

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>INTERCHANGE MARKINGS</b>				
Designed By		Dates	Approved By <i>Charles Scott</i>	
Drawn By			State Traffic Standards Engineer	
Checked By		9-73	Revision	Sheet No. Index No.
			00	4 of 4 17345



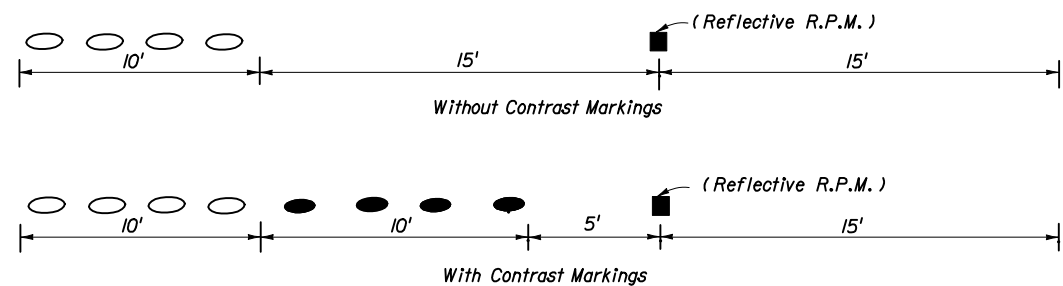
NOTE: When arrow and pavement message are used together, the arrow shall be located down stream of the pavement message and shall be separated from the pavement message by a distance of 25' (Base of the arrow to the base of the message).  
 DIMENSIONS ARE WITHIN 1" ±

**PAVEMENT ARROW AND MESSAGE DETAILS**



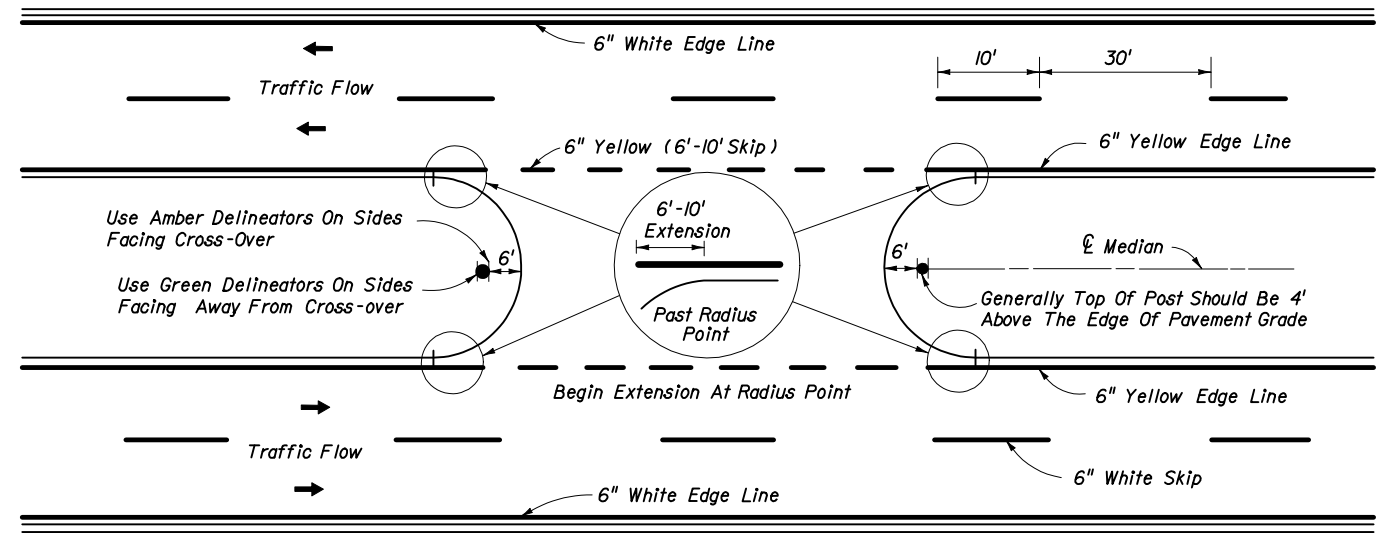
**TYPES OF PERMANENT LONGITUDINAL LINES**

**BASIC COLOR RULE**  
 White lines separate traffic in the same direction.  
 Yellow lines separate traffic in opposing directions.  
 Yellow dotted lines may be used in special cases.



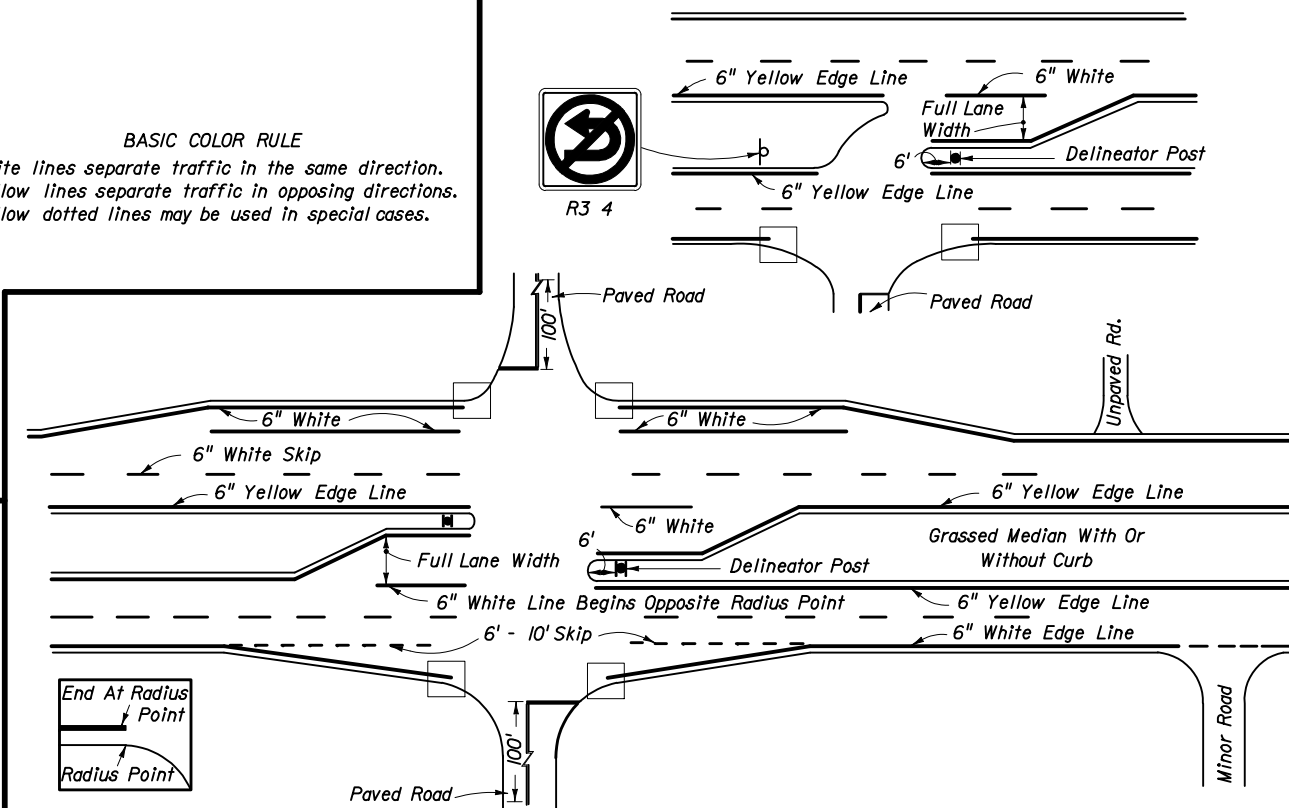
NOTE: Ceramic Markers should not be installed unless specifically called for in the plans. Use is limited to high volume sections with ADT's greater than 50,000 where lane changing is to be discouraged or other areas where channelization is required.

**NON-REFLECTIVE CERAMIC PAVEMENT MARKER PLACEMENT**

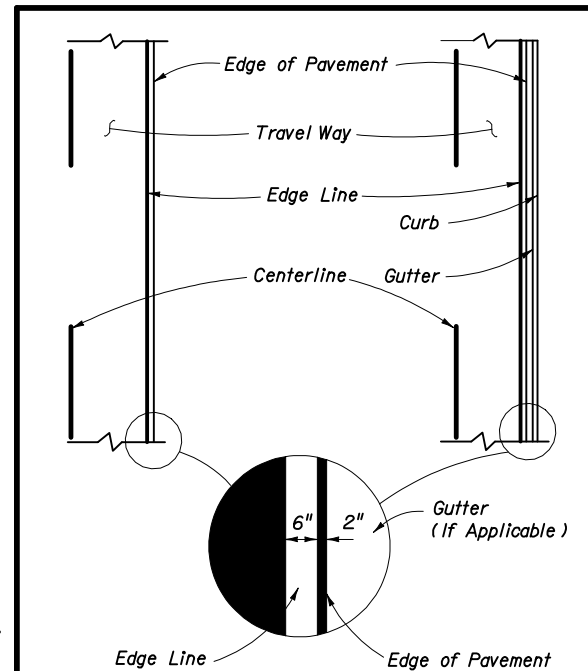


**PAVEMENT MARKINGS AND DELINEATORS FOR MEDIAN CROSS-OVER**

NOTE:  
 Markings applied to median noses shall be yellow in color.



**PAVEMENT MARKINGS FOR INTERSECTIONS WITH MAJOR AND MINOR ROADS**

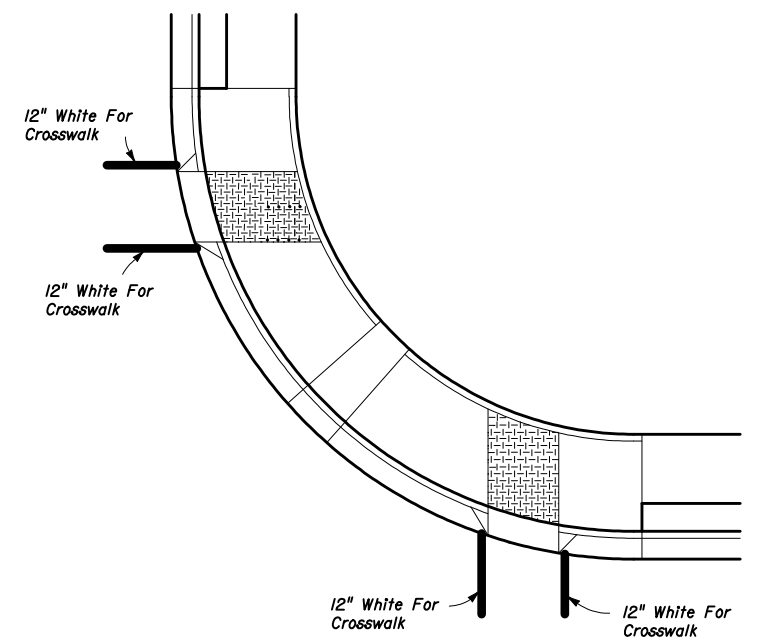
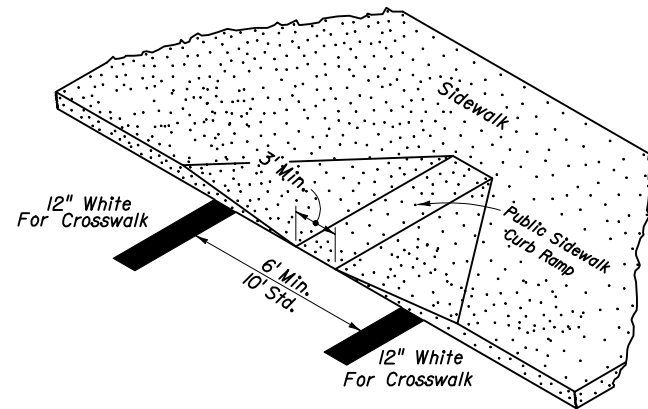
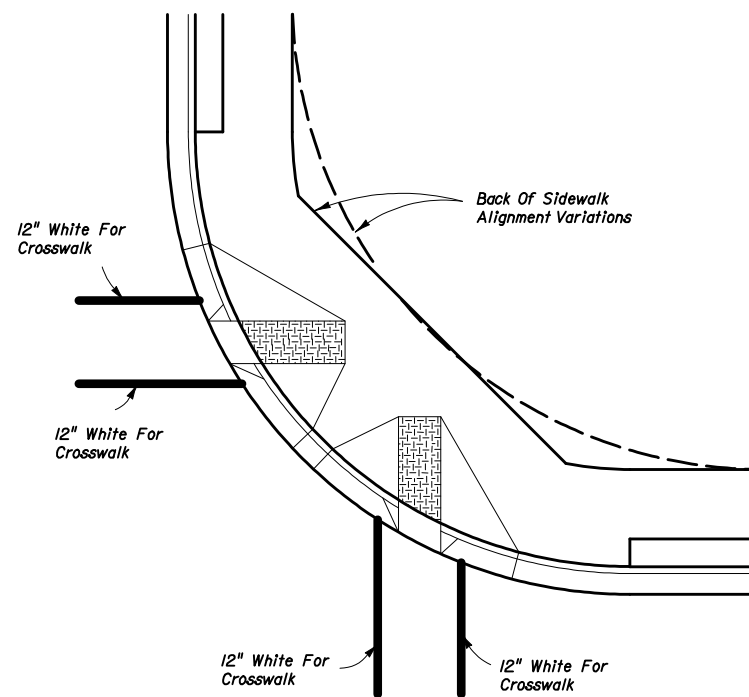


**PLACEMENT OF EDGE LINES**

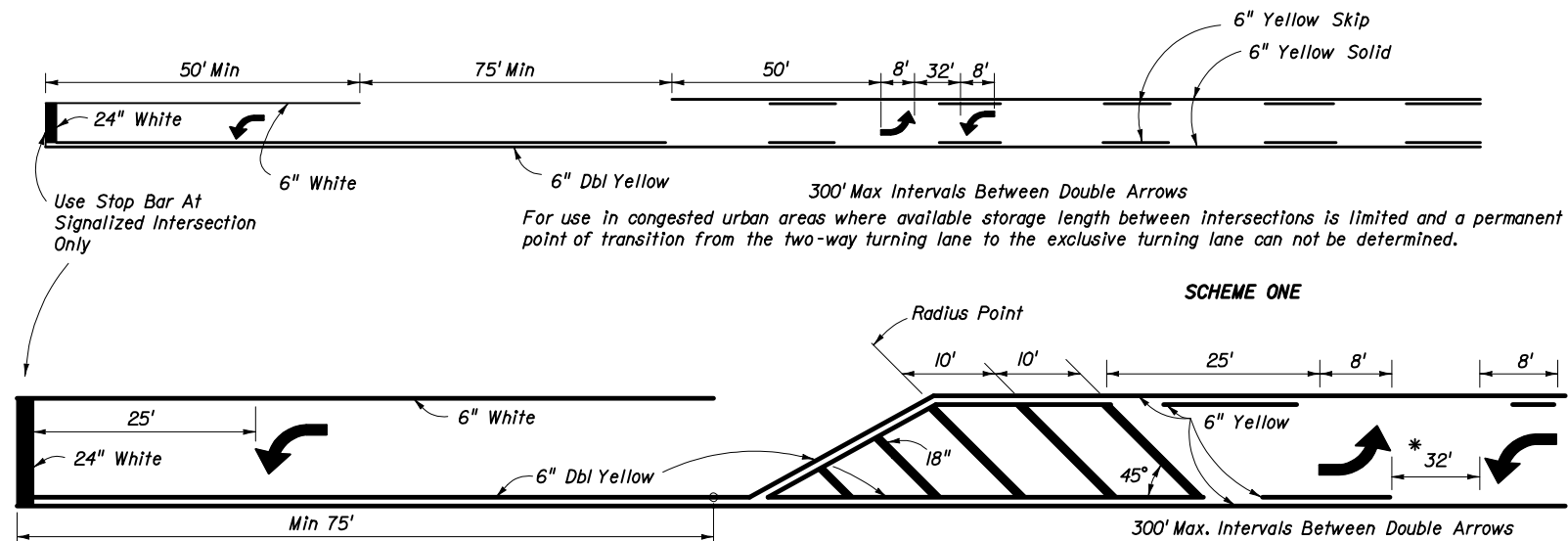
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SPECIAL MARKING AREAS**

Names	Dates	Approved By		
Designed By	8-78	C. Clark & Scott		
Drawn By		Revision	Sheet No.	Index No.
Checked By	8-78	00	1 of 13	17346



**TYPICAL CROSSWALK MARKINGS FOR CURB RAMPS**

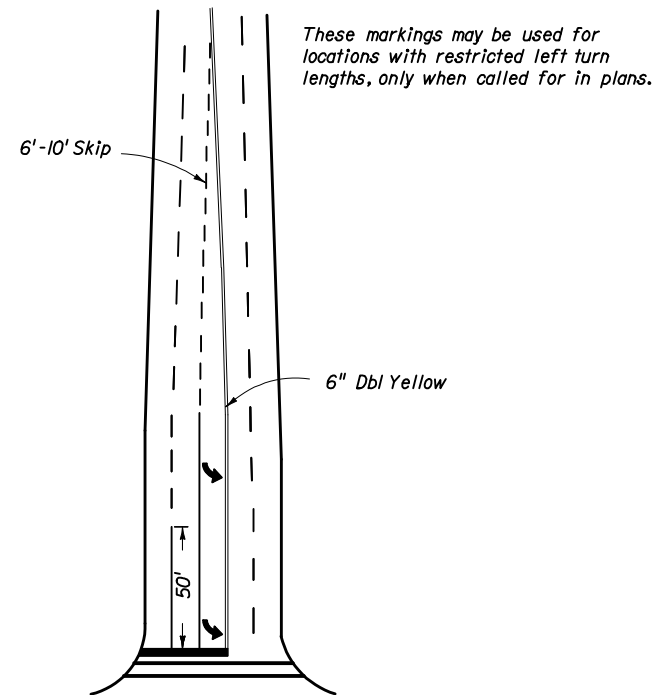


**SCHEME ONE**

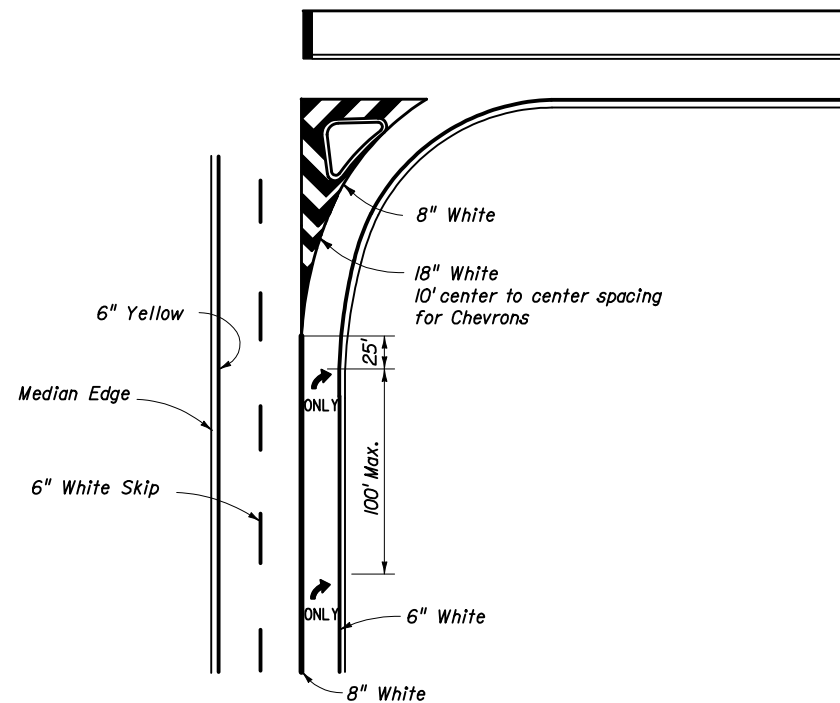
**SCHEME TWO**

**(WITH SINGLE LANE LEFT TURN CHANNELIZATION)  
TWO WAY LEFT TURN LANE**

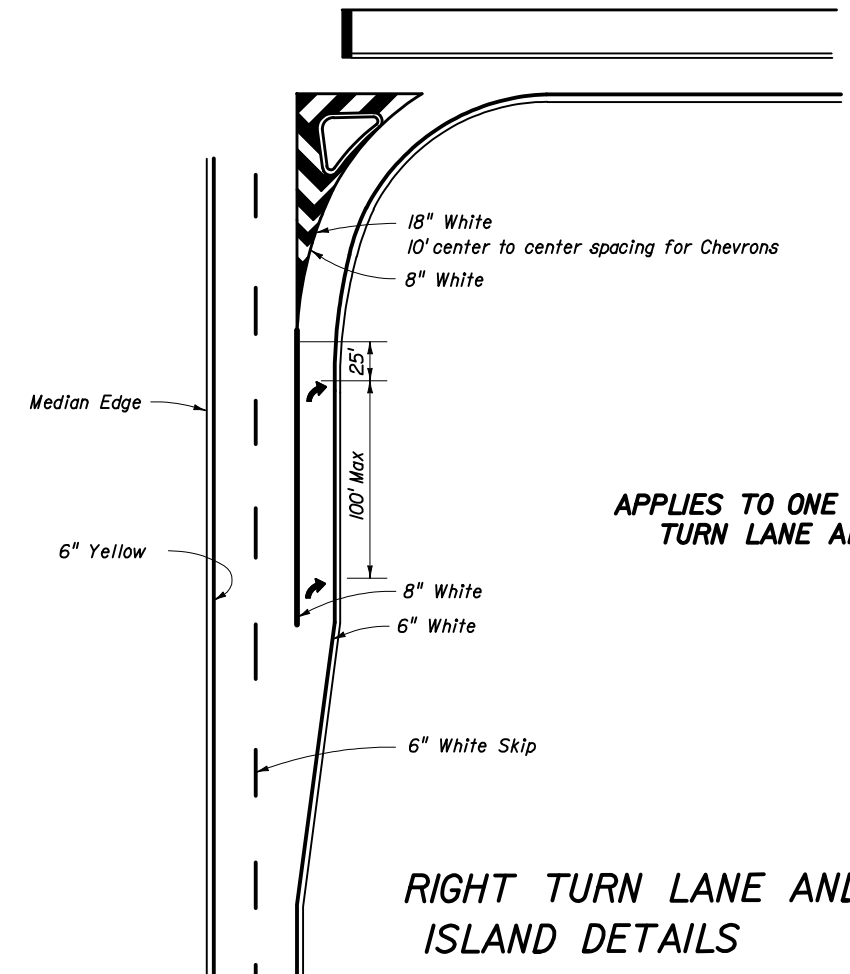
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SPECIAL MARKING AREAS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		9-76	<i>Charles Scott</i> State Traffic Standards Engineer	
Checked By		9-76	Revision	Sheet No. Index No.
			02	2 of 13 17346



**RESTRICTED LEFT TURN MARKING**



**RIGHT TURN LANE DROP AND ISLAND DETAILS  
LEFT TURN LANE DROP IS MIRROR IMAGE**

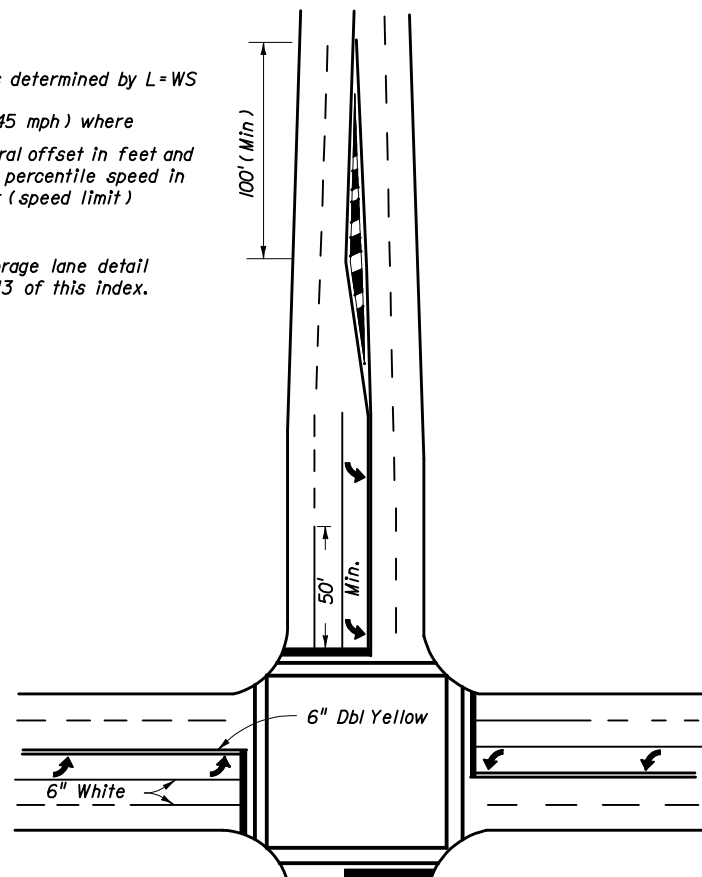


**APPLIES TO ONE WAY LEFT  
TURN LANE ALSO**

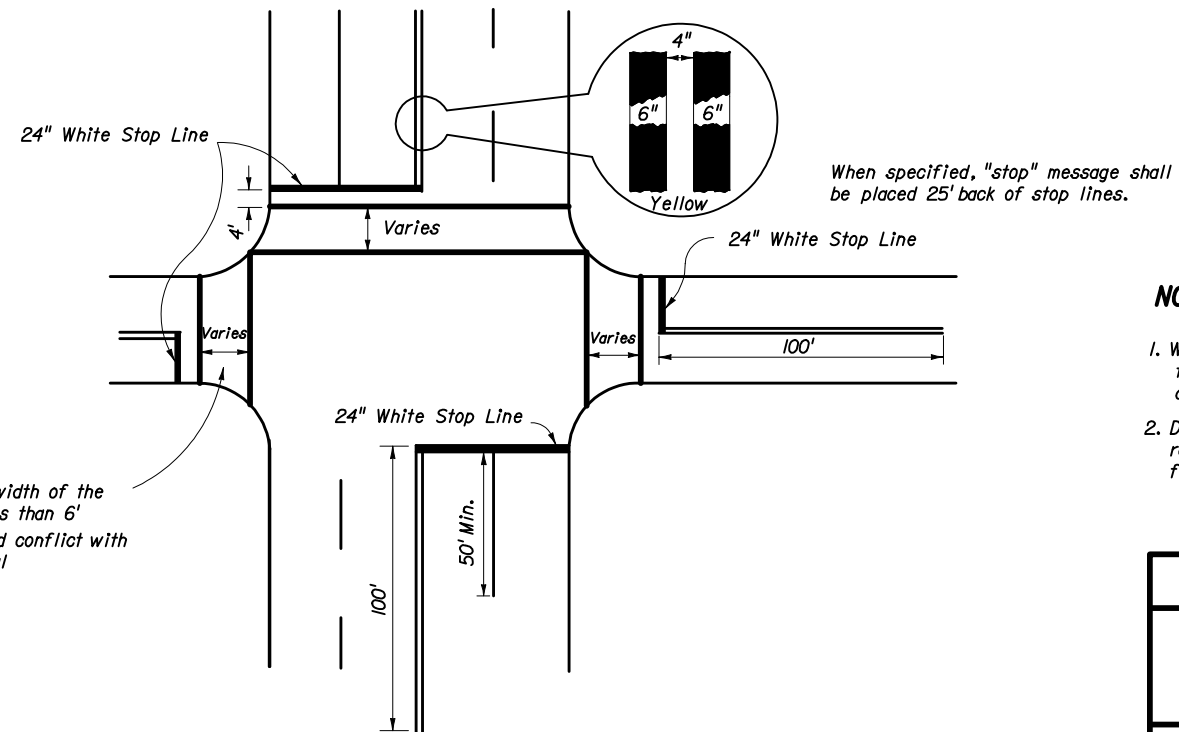
**RIGHT TURN LANE AND  
ISLAND DETAILS**

100' Minimum or as determined by  $L = WS$   
 $(L = \frac{WS^2}{60} < 45 \text{ mph})$  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  
 see sheet 2 of 13 of this index.



**TYPICAL INTERSECTION 2 THRU LANES  
PLUS LEFT TURN LANE, WITH CROSSWALK**



Width of crosswalk to equal width of the adjacent sidewalk, but not less than 6'  
 Crosswalk locations shall avoid conflict with drainage inlets when practical

**STOP BARS, CROSSWALKS AND DOUBLE CENTER LINE DETAILS**

**NOTES:**

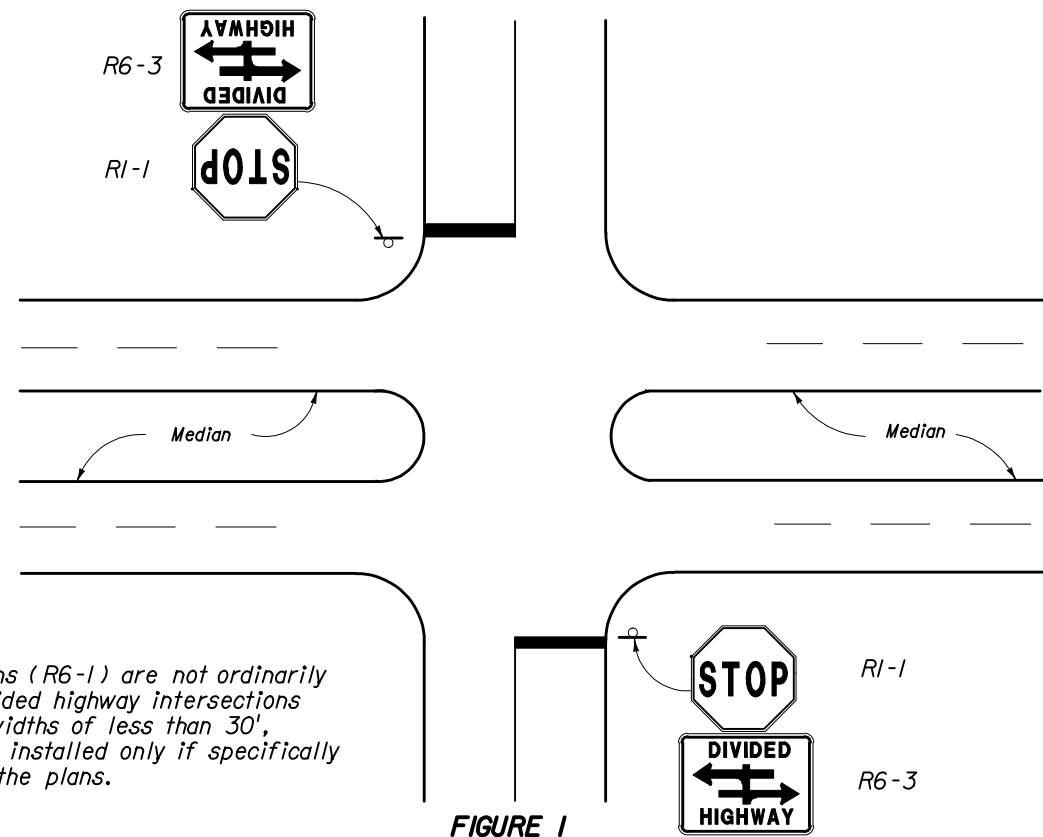
1. When public sidewalk curb ramps are present, refer to sheet 2 of 13 & 7 of 13 of this Index 17346 and Index No. 304 for crosswalk widths.
2. Double yellow longitudinal center lines on all roadway approaches shall be extended back 100' for projects involving intersection improvements only.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SPECIAL MARKING AREAS**

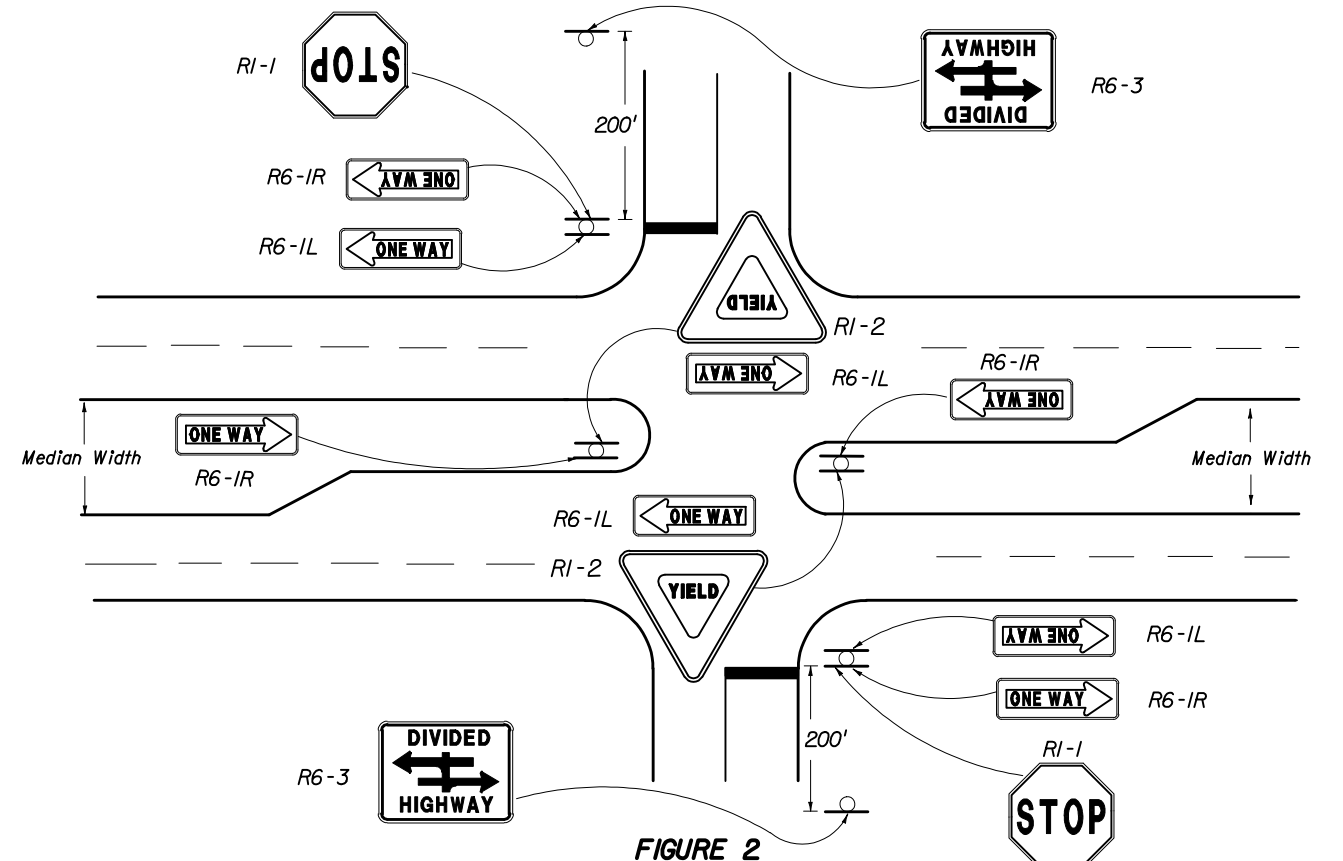
Names	Dates	Approved By		
Designed By	9-76	C. L. Scott State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By	9-76	00	3 of 13	17346





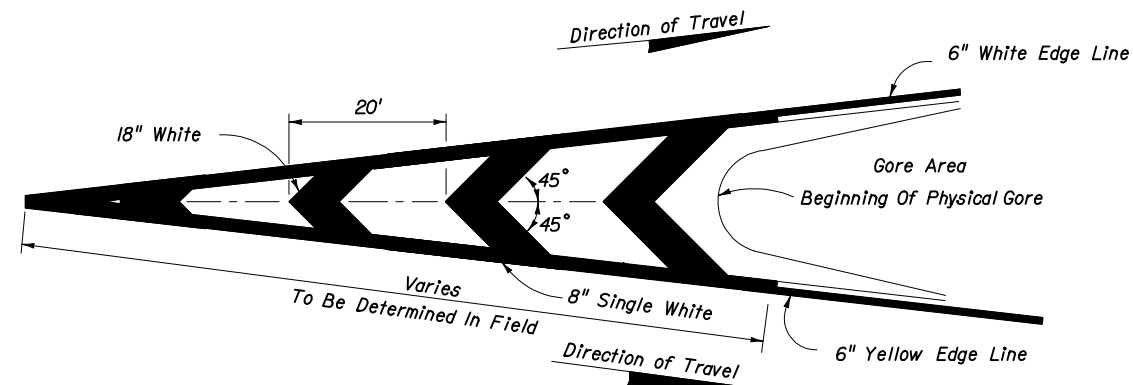
ONE WAY signs (R6-1) are not ordinarily needed at divided highway intersections with median widths of less than 30', and should be installed only if specifically called for in the plans.

FIGURE 1  
MEDIAN WIDTHS UNDER 30'

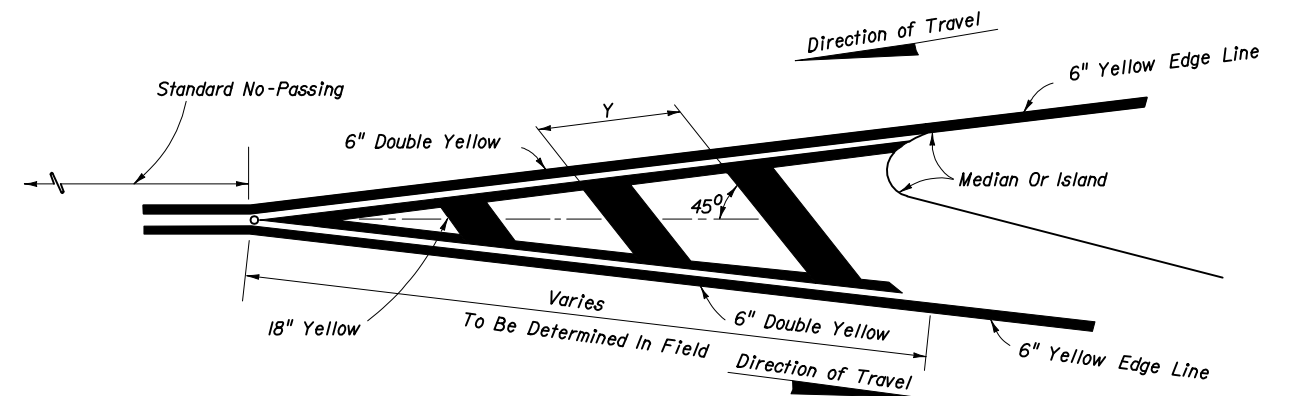


ONE-WAY SIGNS ON DIVIDED HIGHWAY INTERSECTIONS

FIGURE 2  
MEDIAN WIDTHS 30' AND GREATER



PAVEMENT MARKINGS FOR TRAFFIC CHANNELIZATION AT GORE  
(TRAFFIC FLOWS IN SAME DIRECTION)



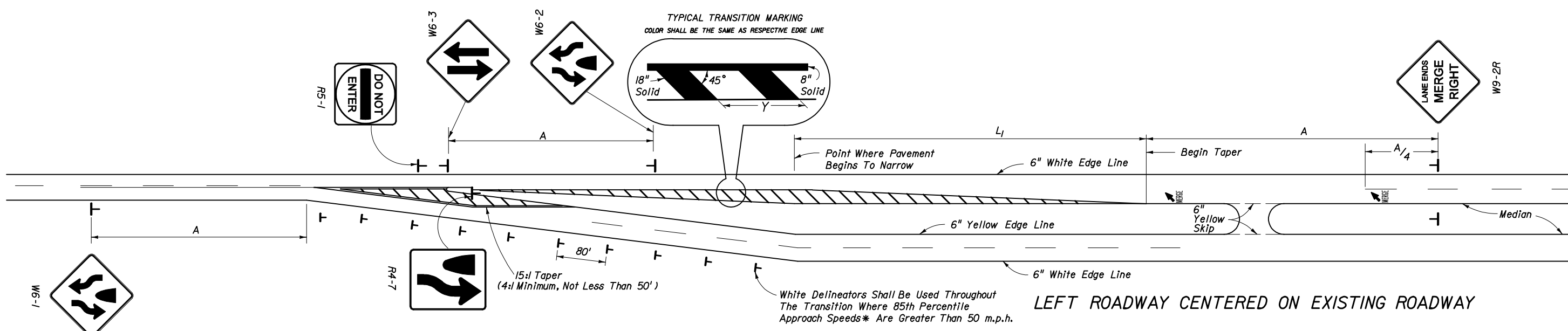
PAVEMENT MARKING FOR TRAFFIC SEPARATION  
(TRAFFIC FLOWS IN OPPOSING DIRECTIONS)

POSTED (DAY) SPEED LIMIT M.P.H.	"y" ft
30 OR LESS	10
35	20
40	20
45	30
50 OR MORE	40

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SPECIAL MARKING AREAS

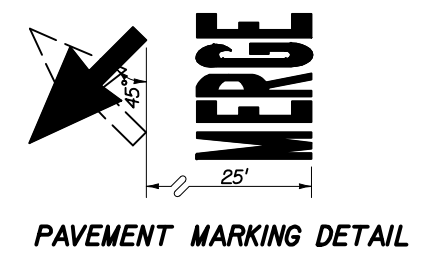
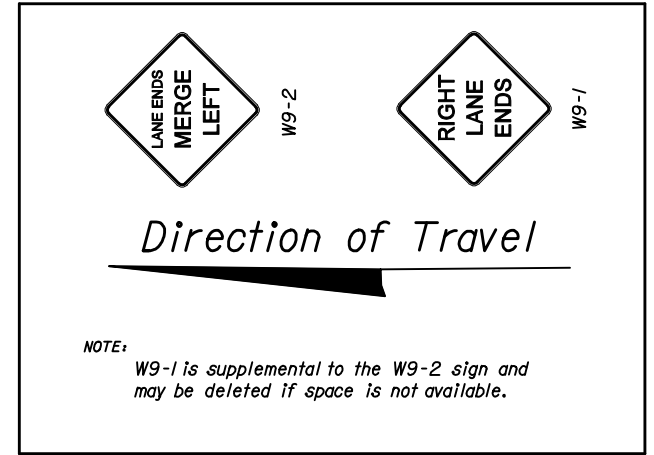
Names	Dates	Approved By		
Designed By	8-78	Charles A. Scott State Traffic Standards Engineer		
Drawn By				
Checked By	8-78	Revision	Sheet No.	Index No.
		02	4 of 13	17346



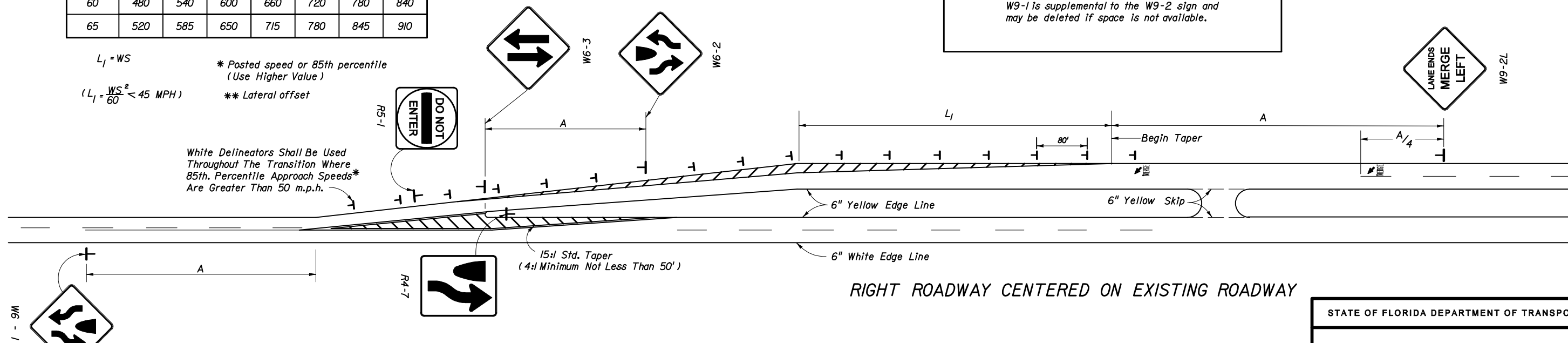
* S	TRANSITION DISTANCE L <sub>1</sub> (FEET)							
	** W	8	9	10	11	12	13	14
30	120	135	150	165	180	195	210	
35	165	185	205	225	245	265	285	
40	215	240	270	295	320	350	375	
45	360	405	450	495	540	585	630	
50	400	450	500	550	600	650	700	
55	440	495	550	605	660	715	770	
60	480	540	600	660	720	780	840	
65	520	585	650	715	780	845	910	

SPEED M.P.H.*	"A" (FT.)
55	700
50	625
45	550
40	475
30	325

POSTED (DAY) SPEED LIMIT M.P.H.	"y" (FT.)
30 OR LESS	10
35	20
40	20
45	30
50 OR MORE	40



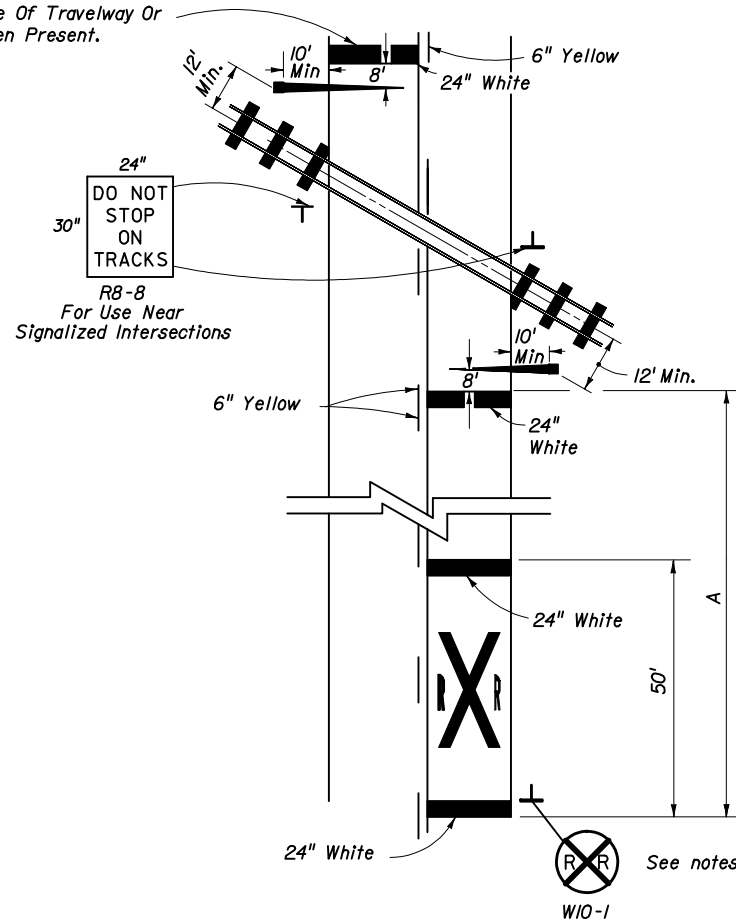
$L_1 = WS$   
 \* Posted speed or 85th percentile (Use Higher Value)  
 (\*\*  $L_1 = \frac{WS^2}{60} < 45 \text{ MPH}$ )  
 \*\* Lateral offset



SCHMES FOR TRANSITION - 2 LANE / 4 LANE ROADWAY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SPECIAL MARKING AREAS</b>				
Designed By	Names	Dates	Approved By	
Drawn By			<i>Charles A. Scott</i> State Traffic Standards Engineer	
Checked By	Revision	Sheet No.	Index No.	
	8-78	02	5 of 13	17346

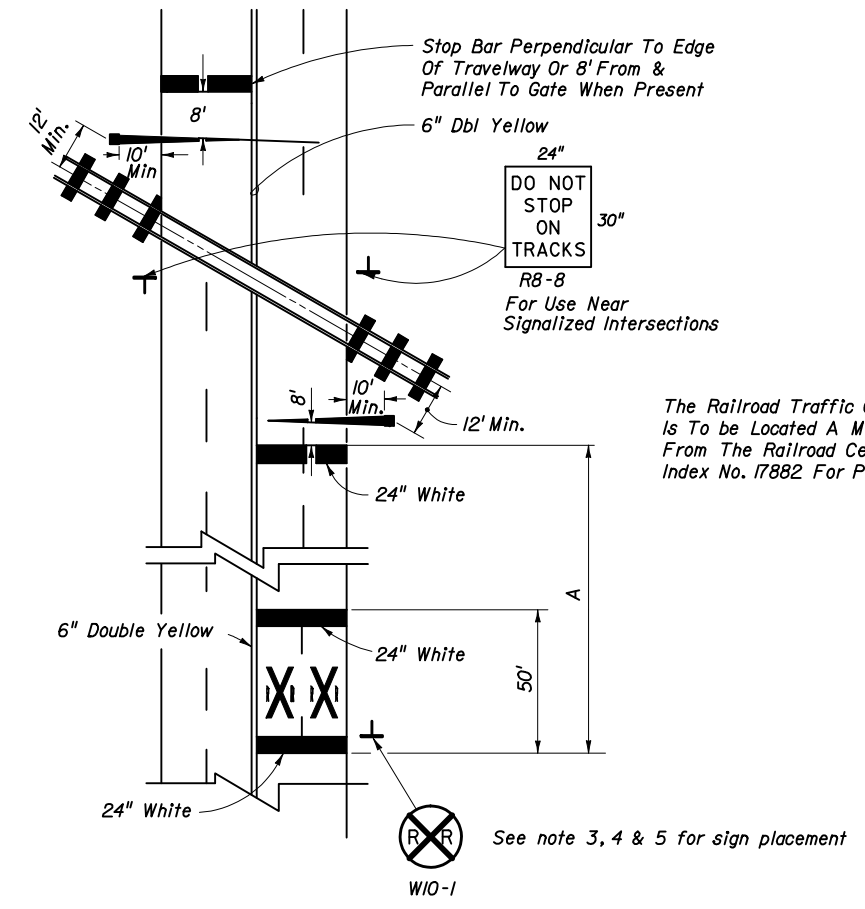
Stop Bar Perpendicular To Edge Of Travelway Or 8' From & Parallel To Gate When Present.



The Railroad Traffic Control Device Is To Be Located A Minimum Of 12' From The Railroad Centerline. See Index No. 17882 For Protection Devices.

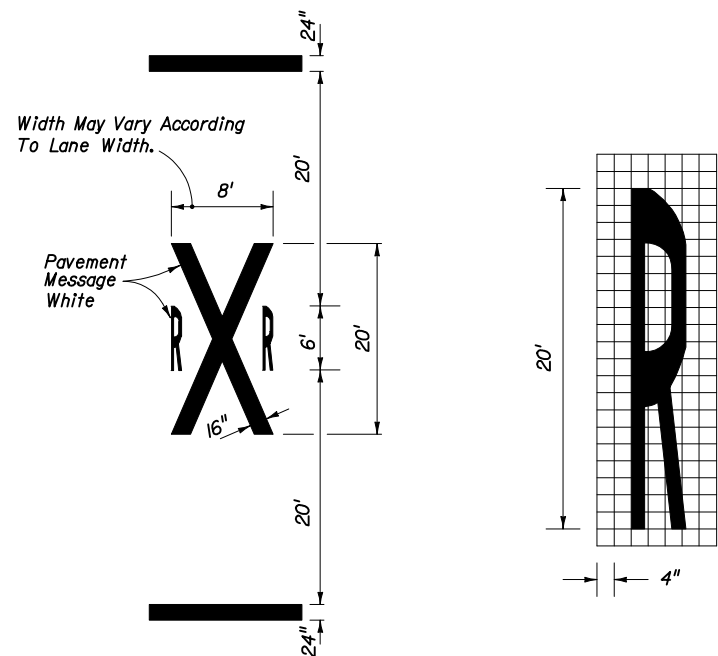
**RAILROAD CROSSING AT 2-LANE ROADWAY**

Stop Bar Perpendicular To Edge Of Travelway Or 8' From & Parallel To Gate When Present



The Railroad Traffic Control Device Is To Be Located A Minimum Of 12' From The Railroad Centerline. See Index No. 17882 For Protection Devices.

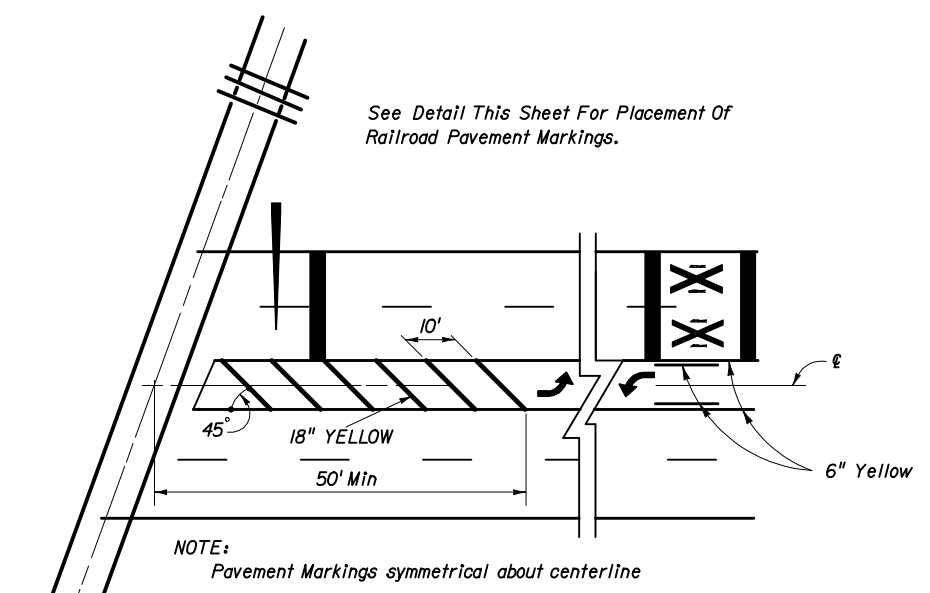
**RAILROAD CROSSING AT 4-LANE ROADWAY**



89 s.f.\*

\*Does not include 24" bars.

**TYPICAL PAVEMENT MARKINGS FOR R/R CROSSING**



**PAVEMENT MARKINGS FOR TERMINATION OF TWO WAY LEFT TURN AT R/R CROSSINGS**

**NOTES:**

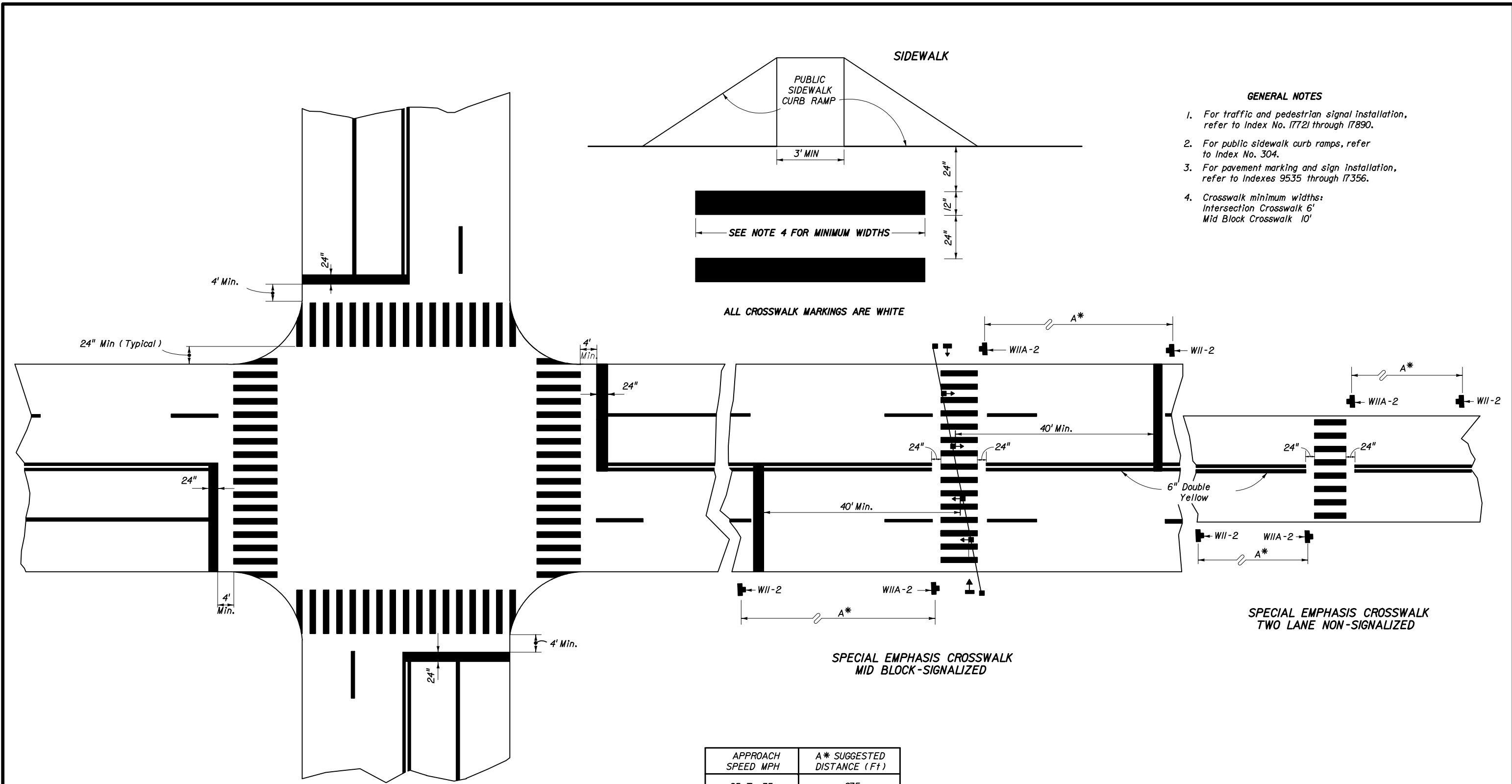
1. When computing pavement messages, quantities do not include transverse lines.
2. When dynamic devices are not present or are to be installed, the crossbuck shall be located at the future location of the RR gate or signal and gate in accordance with Index No. 17882.
3. Placement of sign W10-1 in a residential or business district, where low speeds are prevalent, the W10-1 sign may be placed a minimum distance of 100' from the crossing. Where street intersections occur between the RR pavement message and the tracks an additional W10-1 sign & additional pavement message should be used.
4. Recommended location for FTP-38 or FTP 38B sign, 100' urban & 300' rural in advanced of the crossing.
5. A portion of the pavement marking symbol should be directly opposite the W10-1 sign.

SPEED MPH	A (Ft)
65	650
60	550
55	450
50	375
45	300
40	225
35	150
30	100
Urban	50 Min.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SPECIAL MARKING AREAS**

Names	Dates	Approved By		
Designed By	6-76	Charles A. Scott State Traffic Standards Engineer		
Drawn By				
Checked By	6-76	Revision	Sheet No.	Index No.
		00	6 of 13	17346

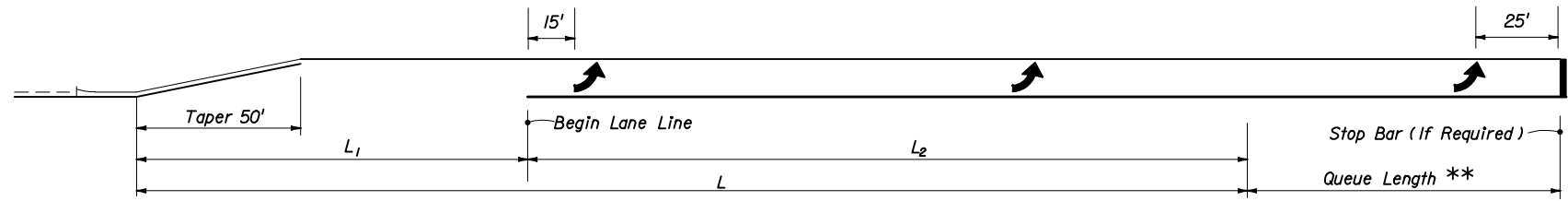


- GENERAL NOTES**
1. For traffic and pedestrian signal installation, refer to Index No. 17721 through 17890.
  2. For public sidewalk curb ramps, refer to Index No. 304.
  3. For pavement marking and sign installation, refer to Indexes 9535 through 17356.
  4. Crosswalk minimum widths:  
Intersection Crosswalk 6'  
Mid Block Crosswalk 10'

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

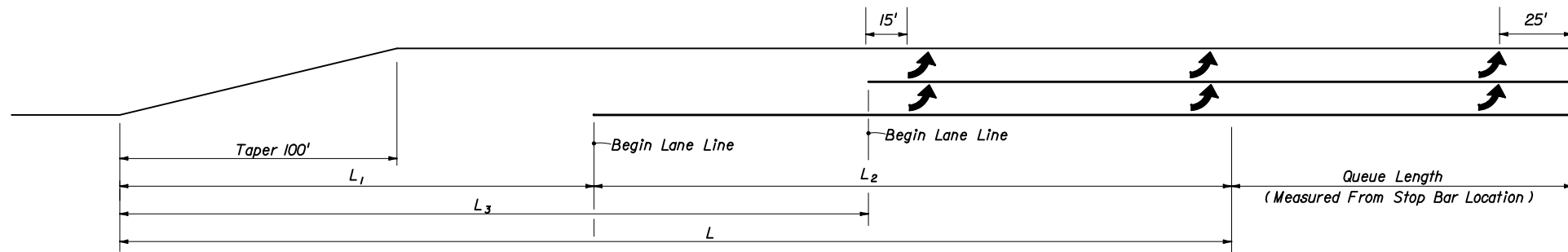
**SPECIAL MARKING AREAS**

Designed By	Names	Dates	Approved By
Drawn By		3-83	<i>Charles Scott</i> State Traffic Standards Engineer
Checked By	Revision	Sheet No.	Index No.
	00	7 of 13	17346

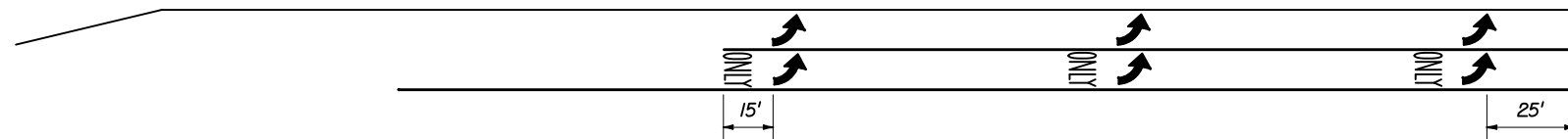


**SINGLE LEFT TURNS**

\*\* Queue Length Is Measured From The Median Nose Radial Point Or, When A Stop Bar Is Required, From The Stop Bar.

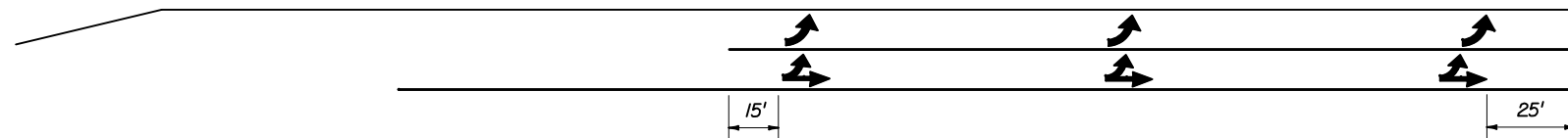


**DOUBLE LEFT TURNS**



Through Lane Becomes Exclusive Left Turn

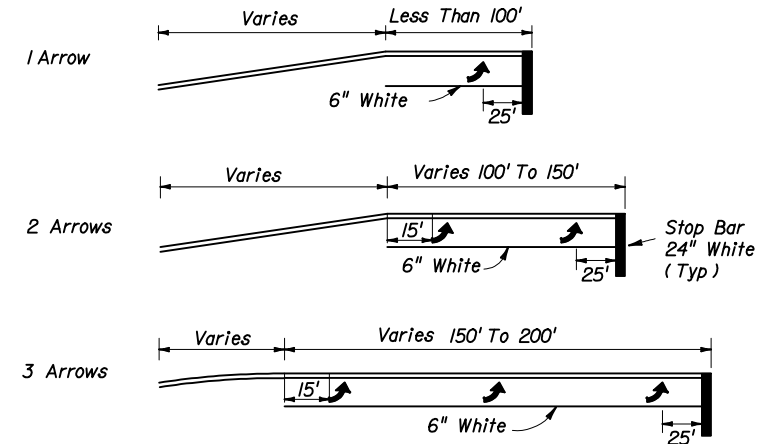
Pavement message ONLY is not required for created (shadowed) turn lanes, single or dual, where the driver must exit the thru lane to enter a turn lane.



Through Lane Becomes Optional Left Turn

**DOUBLE LEFT TURN MARKINGS**

TURN LANES - CURBED AND UNCURBED MEDIANS							
Design Speed (mph)	Clearance Distance L <sub>1</sub>	URBAN CONDITITONS			RURAL CONDITITONS		
		Brake To Stop Distance L <sub>2</sub>	Total Decel. Distance L	Clearance Distance L <sub>3</sub>	Brake To Stop Distance L <sub>2</sub>	Total Decel. Distance L	Clearance Distance L <sub>3</sub>
35	70'	75'	145'	110'	---	---	---
40	80'	75'	155'	120'	---	---	---
45	85'	100'	185'	135'	---	---	---
50	105'	135'	240'	160'	215'	320'	160'
55	125'	---	---	---	260'	385'	195'
60	145'	---	---	---	310'	455'	230'
65	170'	---	---	---	350'	520'	270'



Arrow should be evenly spaced between first and last arrow. Turn lanes longer than 200' add one arrow for each 100' additional length.

**ARROW SPACING**

**NOTES:**

- The "Begin Lane Line" locations are based on the standard lengths shown in Design Standard 301. These locations must be adjusted on a case by case basis for turn lanes not meeting the standard lengths.
- Yellow left turn edge marking may be used adjacent to raised curb or grass medians if lane use is not readily apparent to drivers approaching a left turn storage lane.

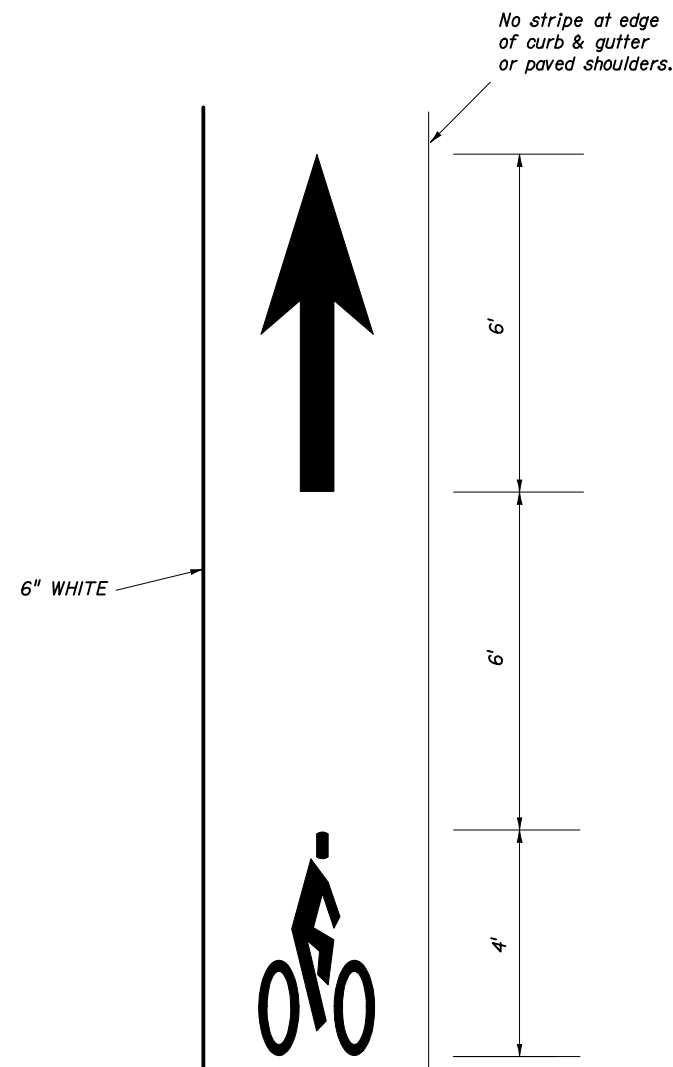
Refer to Design Standard 301 for Roadway Details.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

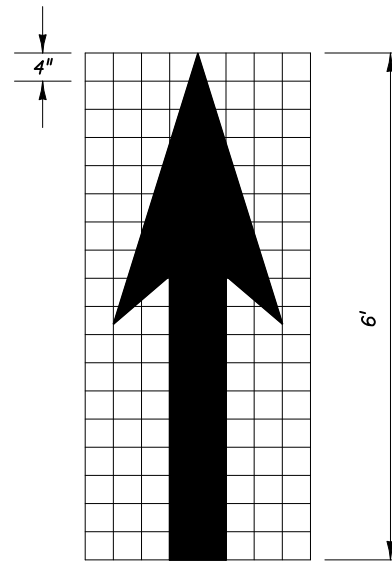
**SPECIAL MARKING AREAS**

Designed By	CAS	3-02	Approved By <i>Charles A. Scott</i> State Traffic Standards Engineer		
Drawn By	CAS	3-02	Revision	Sheet No.	Index No.
Checked By			02	8 of 13	17346

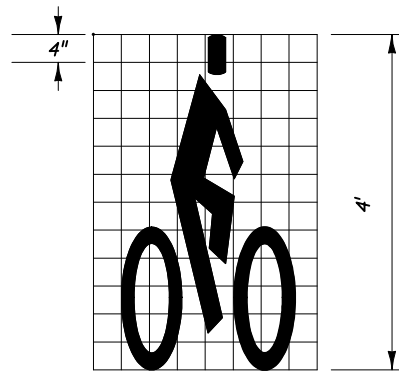
1. Recommended spacing of symbols: Immediately after intersections and major driveways and at a maximum spacing of 600 feet for urban sections and 1320 feet for rural sections.
2. Raised pavement markings and raised barriers can cause steering difficulties and should not be used to delineate bicycle lanes. All pavement markings and pavement messages shall be white.



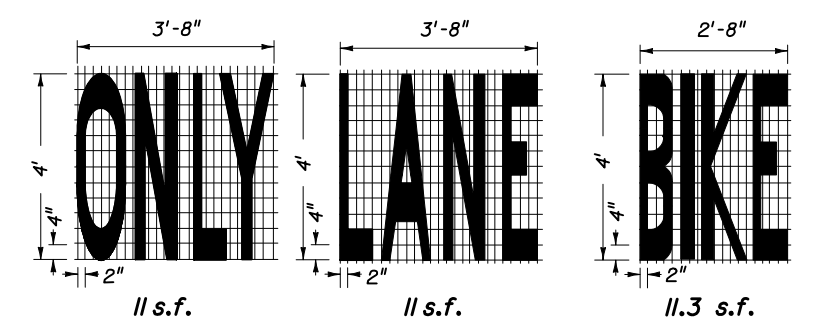
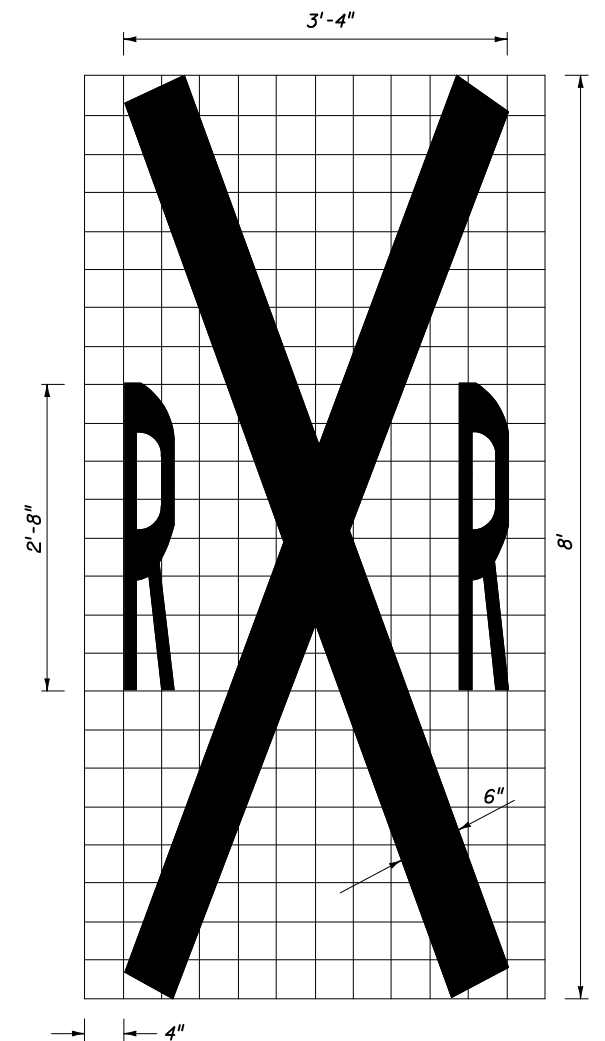
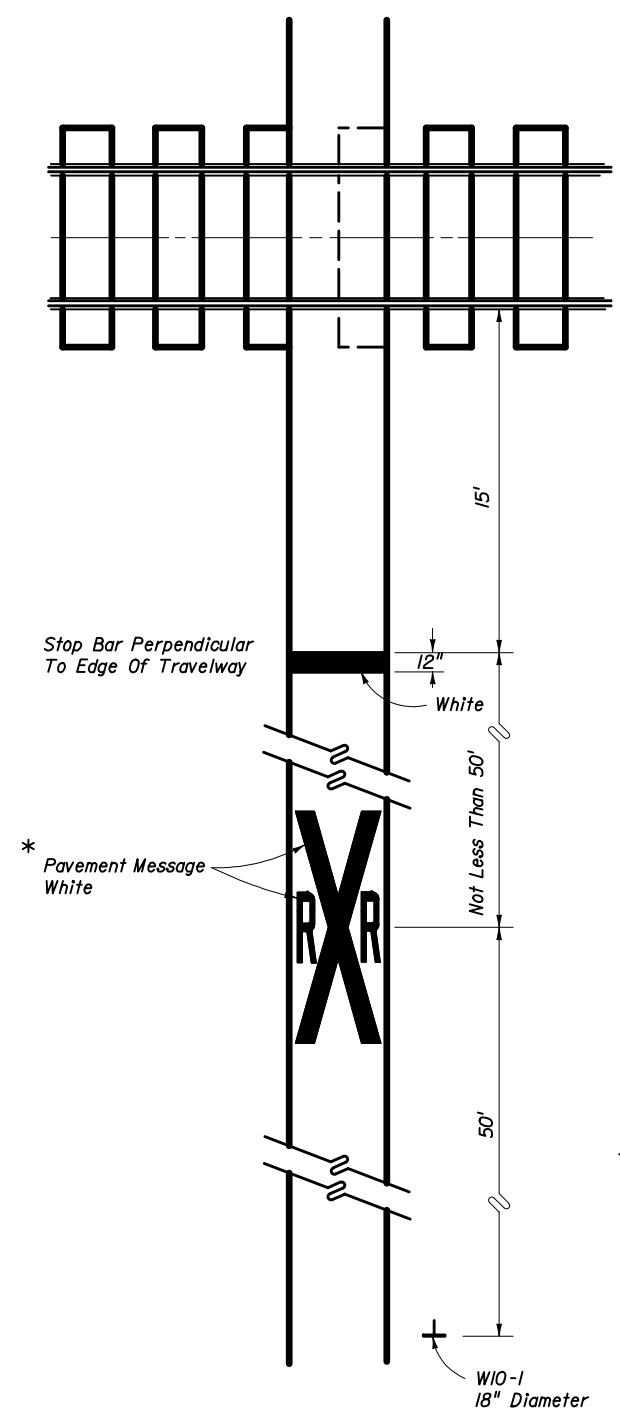
DETAIL OF BIKE LANE MARKINGS



4.2 s.f.



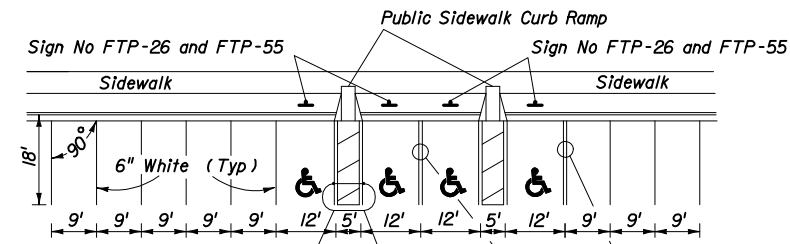
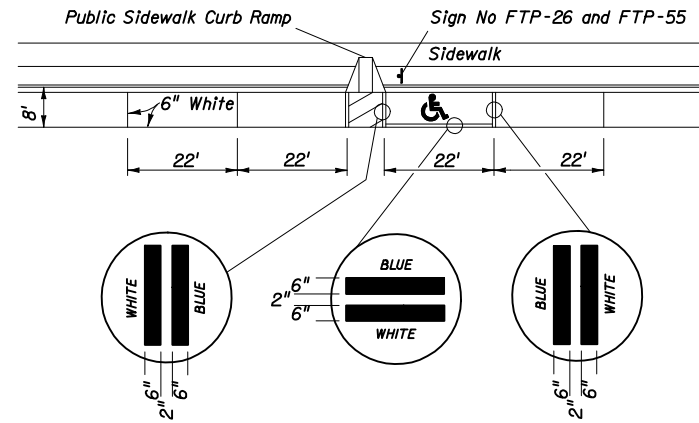
2.3 s.f.



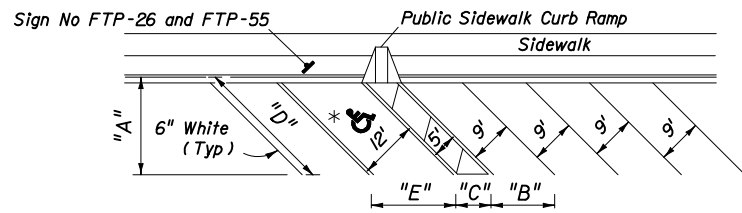
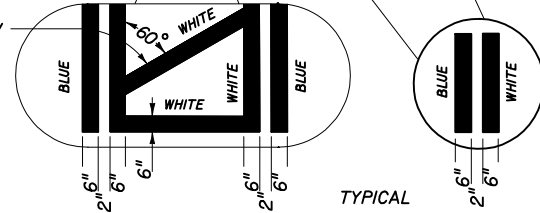
PAVEMENT MESSAGE DETAILS

\*NOTE  
3. When used on a bike lane (adjacent to vehicle lane) markings shall be placed adjacent to markings for vehicles & W10-1 sign shall be sized and placed for vehicles.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SPECIAL MARKING AREAS (BICYCLE)</b>				
Designed By	Names	Dates	Approved By	
Drawn By		8-84	<i>Clark A. Scott</i> State Traffic Standards Engineer	
Checked By	Revision	Sheet No.	Index No.	
	02	9 of 13	17346	



3-6" white chevrons equally spaced per aisle.

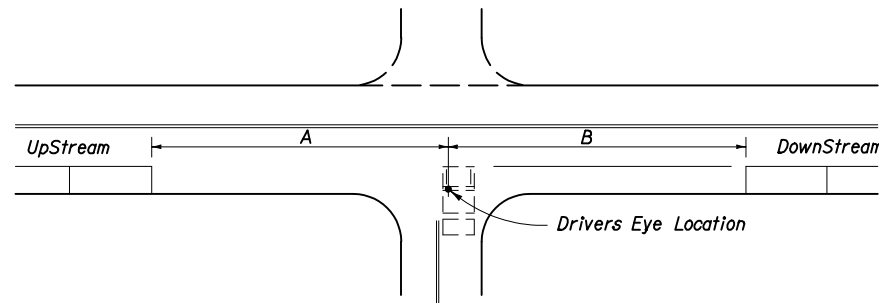


\* FOR ACCESSIBLE MARKINGS - SEE ABOVE

"DIMENSIONS"					
△°	"A"	"B"	"C"	"D"	"E"
45°	19'-1"	12'-9"	7'-0"	27'-0"	17'-0"
60°	20'-1"	10'-5"	5'-9"	23'-2"	13'-10"

- NOTES:
- Dimensions are to the centerline of markings.
  - An Access Aisle is required for each accessible space when angle parking is used.
  - Criteria for pavement markings only, not public sidewalk curb ramp locations. For ramp locations refer to plans.
  - Blue pavement markings shall be tinted to match shade 15180 of Federal Standards 595a.
  - The FTP-55 panel shall be mounted below the FTP-26 sign.

**PAVEMENT MARKING FOR PUBLIC SIDEWALK CURB RAMPS IN REST AREAS**

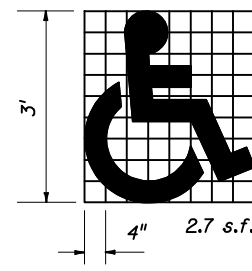
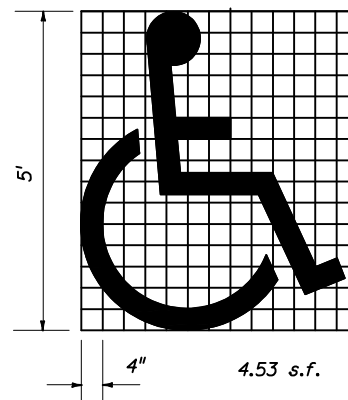


SPEED MPH	UP STREAM (A)	DOWN STREAM (B)	
		2 LANE	4 LANE
0-30	85'	60'	45'
35	100'	70'	50'

NOTES

- Distances measured longitudinally along the street from driver location of entering vehicle to end of parking restriction.
- Distances applicable to intersecting street, major driveways and other driveways to the extent practical.
- For non-signalized intersections, the values above shall be compared with the values for signalized intersections and the maximum restrictions implemented. These restrictions apply to both accessible and non-accessible parking.

**MINIMUM PARKING RESTRICTION FOR NON-SIGNALIZED INTERSECTIONS**

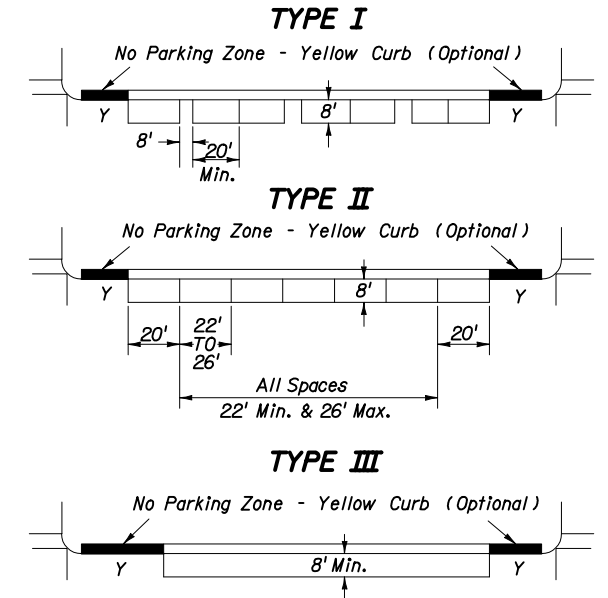


Use of pavement symbol in accessible parking spaces is optional, when used the symbol shall be 3' or 5' high and white in color.

**"UNIVERSAL SYMBOL OF ACCESSIBILITY"**

**GENERAL NOTES (Signalized & Non-signalized)**

- For entrances to a one-way street, the downstream restriction may be reduced to 20'.
- Parking shall not be allowed within 20' of a crosswalk.
- All parking lane markings shall be 6" white.
- Parking lane lines shall be broken at driveways.
- Refer to Chapter 316, Fla. statutes, for laws governing parking spaces.
- Where curb and gutter is used, the gutter pan width may be included as part of the minimum width of parking lane, but desirably the lane width should be in addition to that of the gutter pan.



SPEED LIMIT MPH	SIGNALIZED INTERSECTIONS	DISTANCE FROM CURB RADIUS (Y)
0 - 30	30	
35	50	

**PARKING RESTRICTION (FT.) FOR SIGNALIZED INTERSECTION**

NOTES:

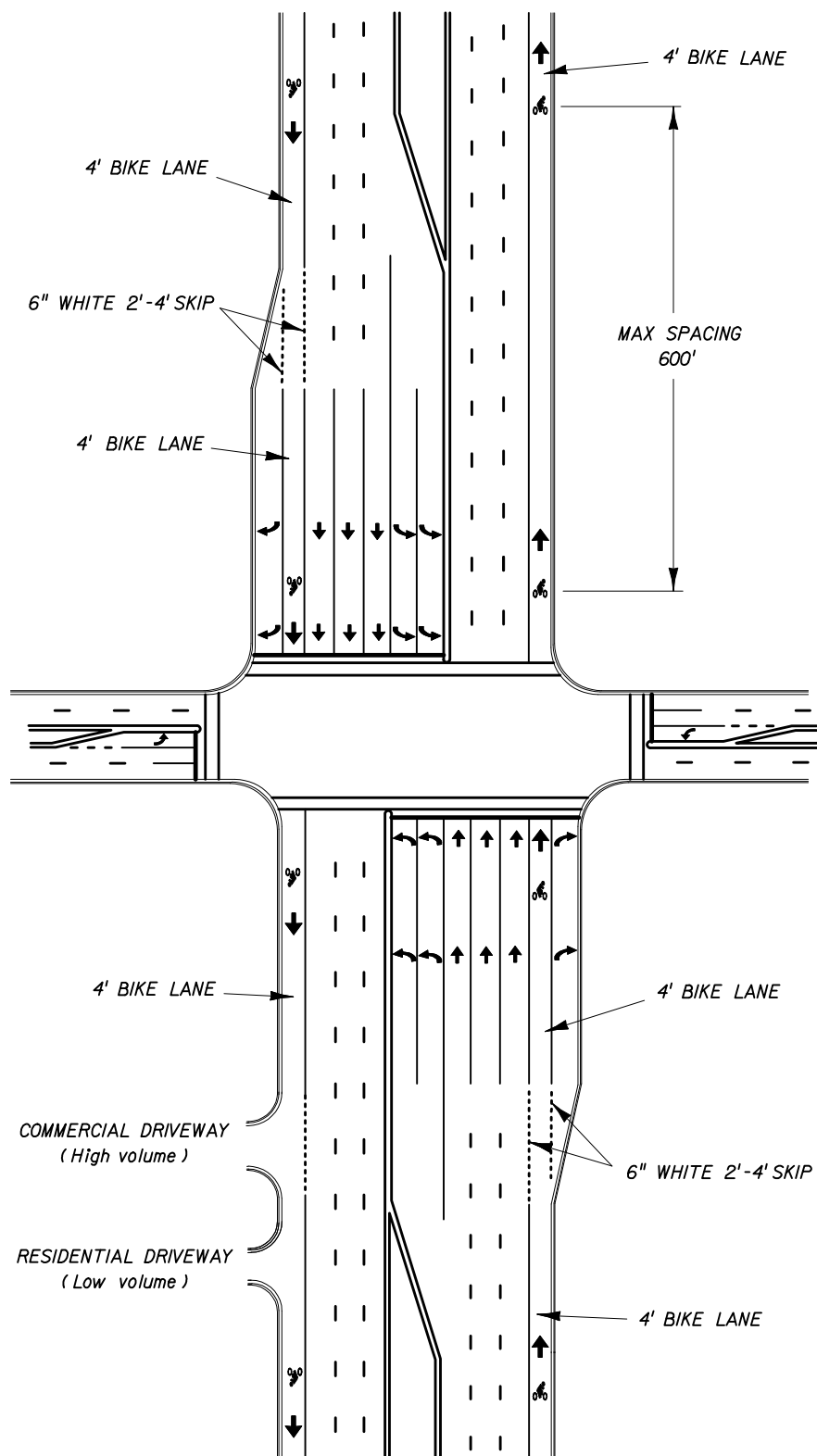
- Parking restrictions measured from curb radius point.
- Restrictions for accessible parking are the same as those applied to non-signalized intersections.

**MINIMUM PARKING RESTRICTION FOR SIGNALIZED INTERSECTION**

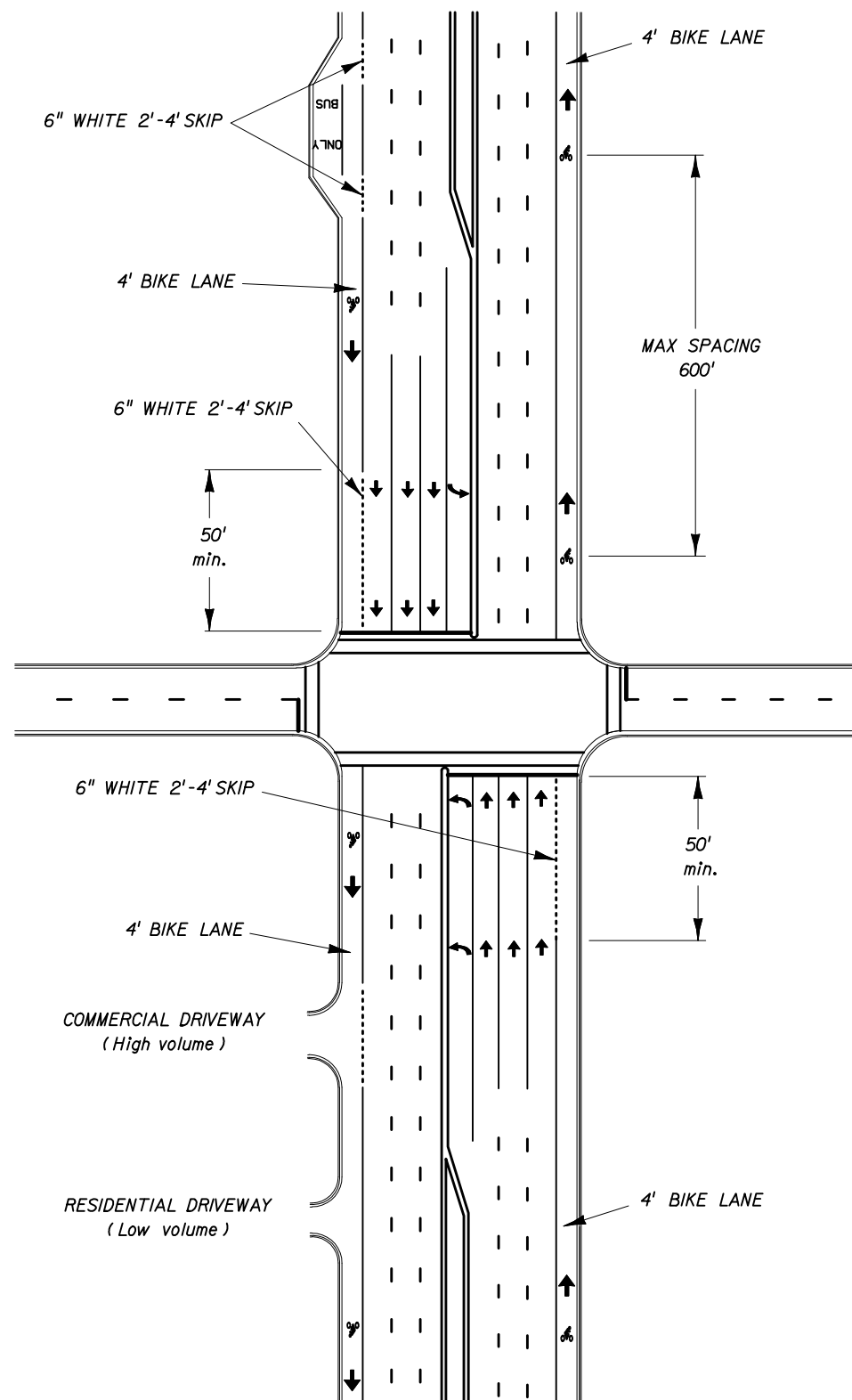
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SPECIAL MARKING AREAS (PARKING)**

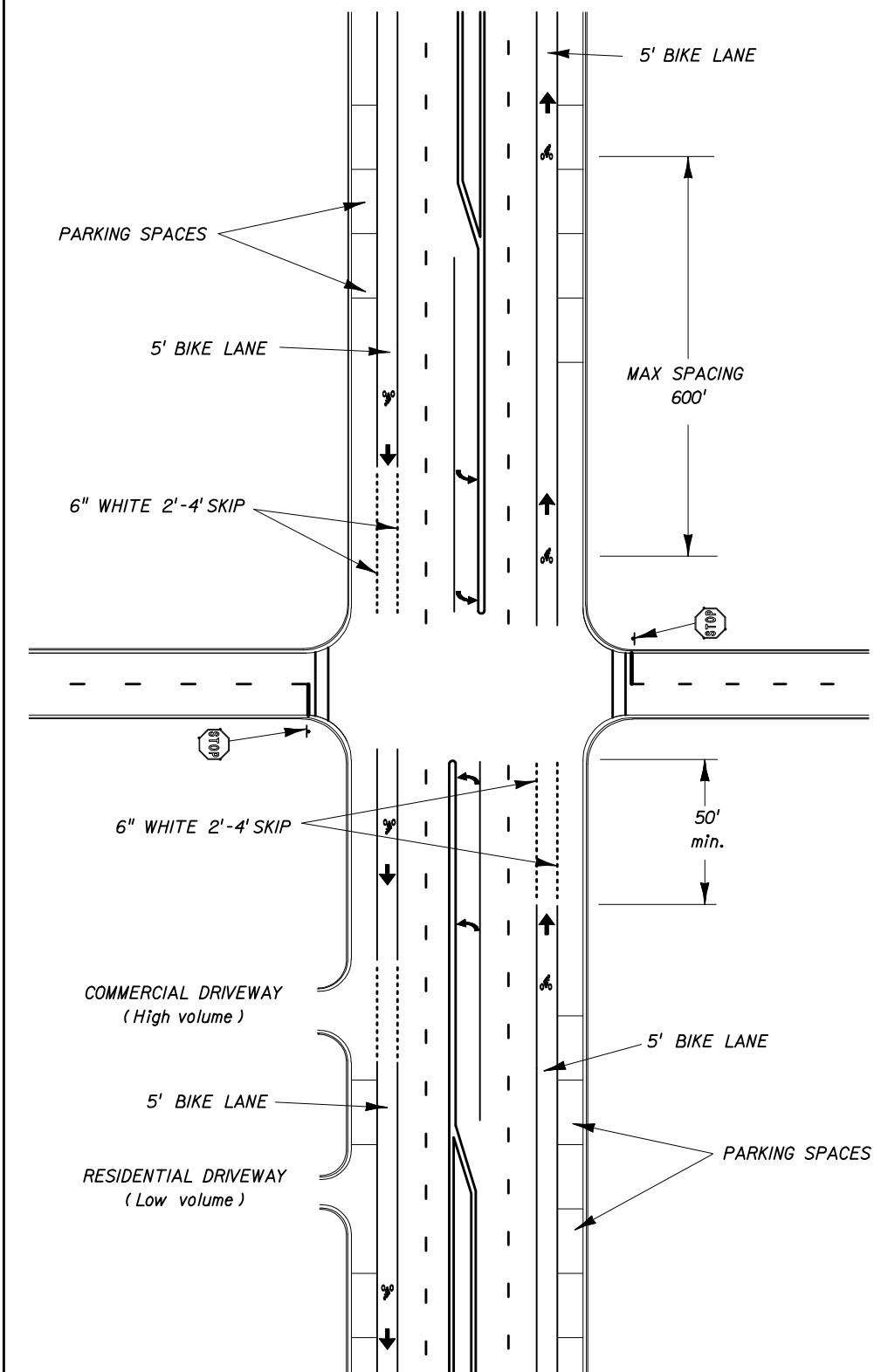
Names	Dates	Approved By
Designed By	8-86	Charles A. Scott State Traffic Standards Engineer
Drawn By		Revision Sheet No. Index No.
Checked By	8-86	02 10 of 13 17346



MAJOR INTERSECTION WITH SEPARATE RIGHT TURN LANE URBAN TYPICAL SECTION (CURB AND GUTTER)



MAJOR INTERSECTION, NO RIGHT TURN LANE PLUS BUSBAY URBAN TYPICAL SECTION (CURB AND GUTTER)



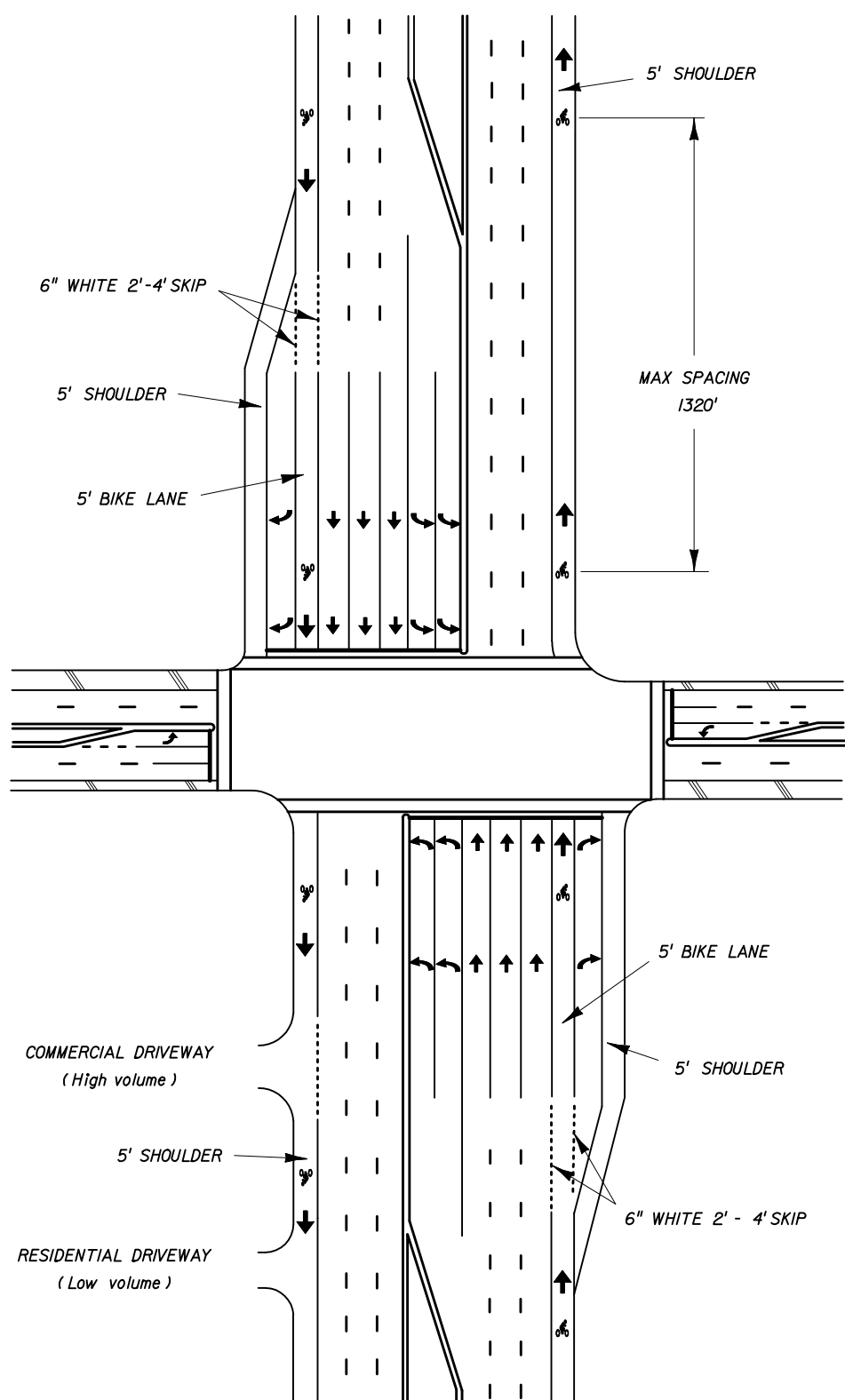
MAJOR WITH LOCAL STREET INTERSECTION, NO RIGHT TURN LANE, ON STREET PARKING URBAN TYPICAL SECTION (CURB AND GUTTER)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

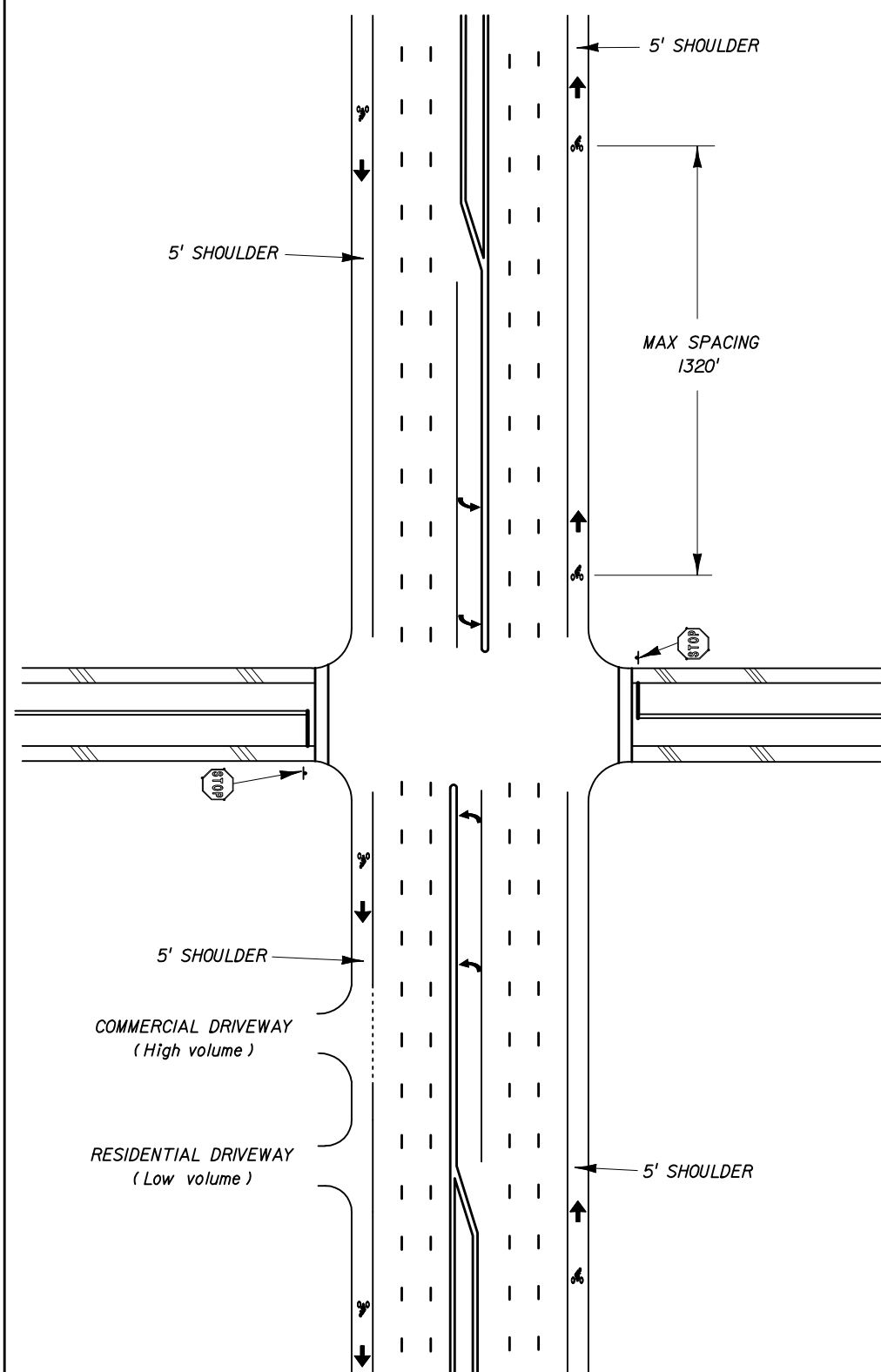
**SPECIAL MARKING AREAS (BICYCLE)**

Names	Dates	Approved By		
Designed By		<i>Charles Scott</i>	State Traffic Standards Engineer	
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	11 of 13	17346

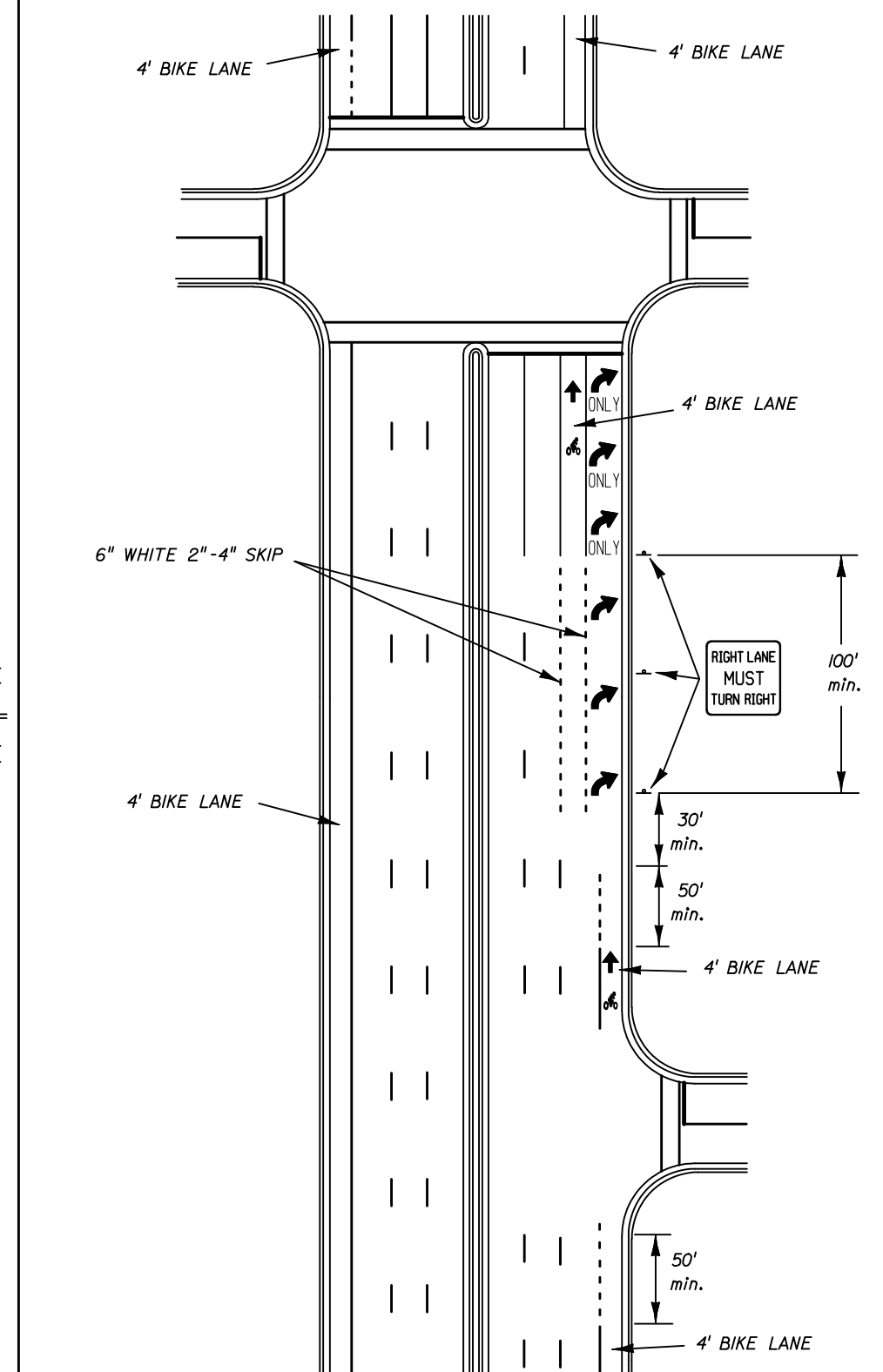




MAJOR INTERSECTION WITH DESIGNATED SHOULDER, AND SEPARATE RIGHT TURN LANE RURAL TYPICAL SECTION (PAVED SHOULDER)



MAJOR WITH LOCAL STREET INTERSECTION, DESIGNATED SHOULDER, AND NO RIGHT TURN LANE RURAL TYPICAL SECTION (PAVED SHOULDER)

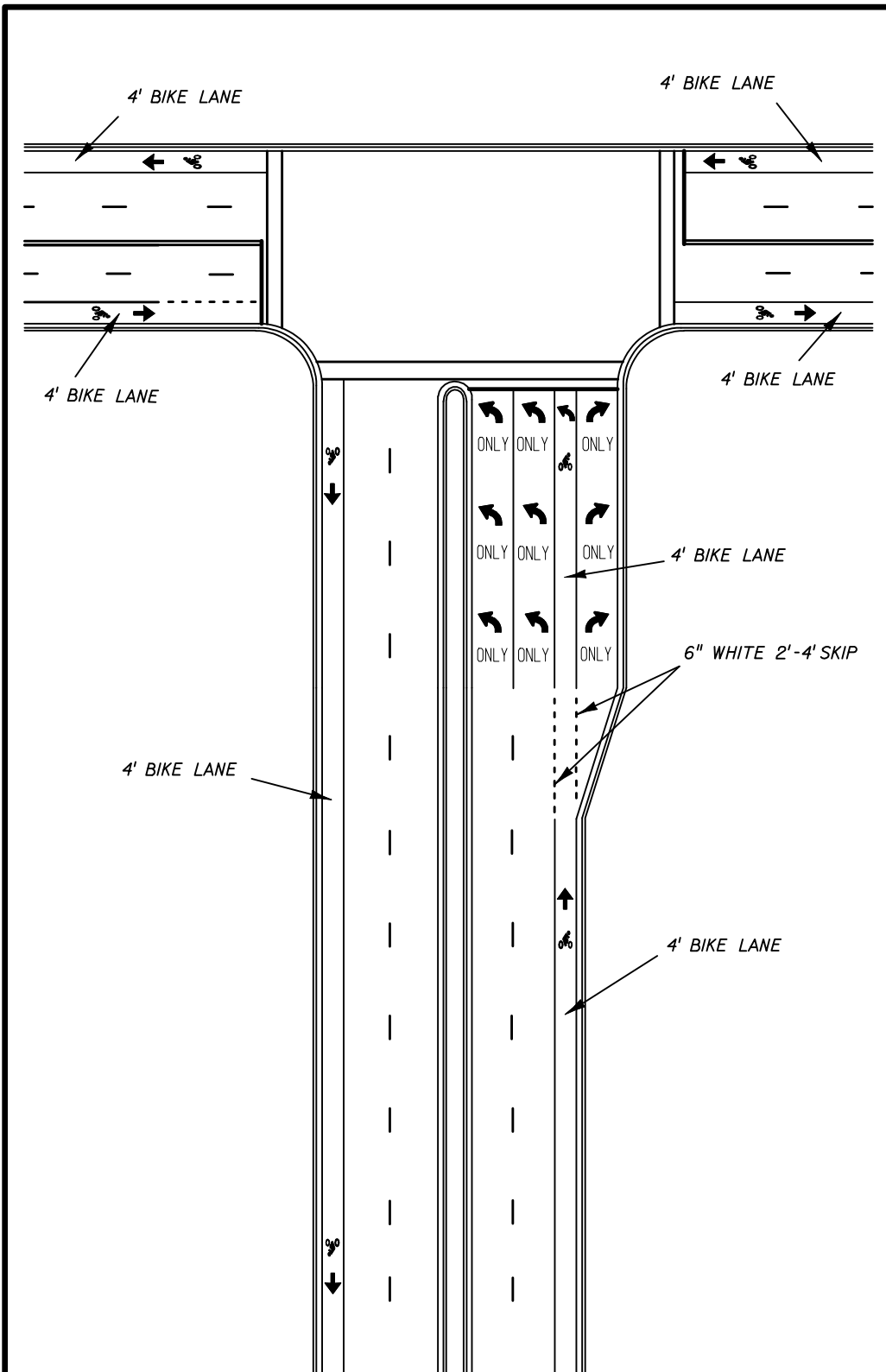


MAJOR INTERSECTION WITH RIGHT TURN DROP LANE AND DESIGNATED OR UNDESIGNATED BIKE LANE URBAN TYPICAL SECTION (CURB AND GUTTER)

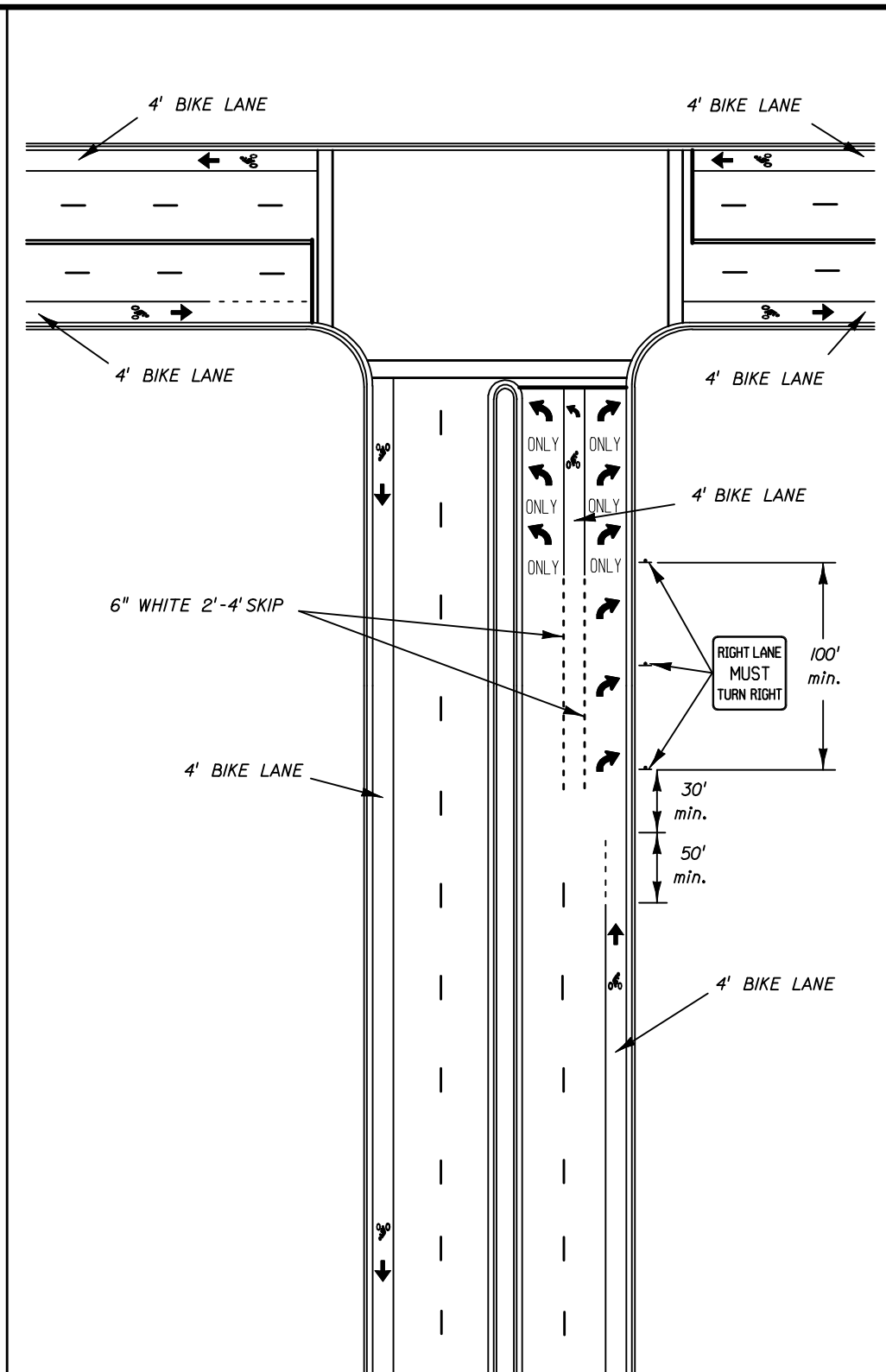
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SPECIAL MARKING AREAS (BICYCLE)**

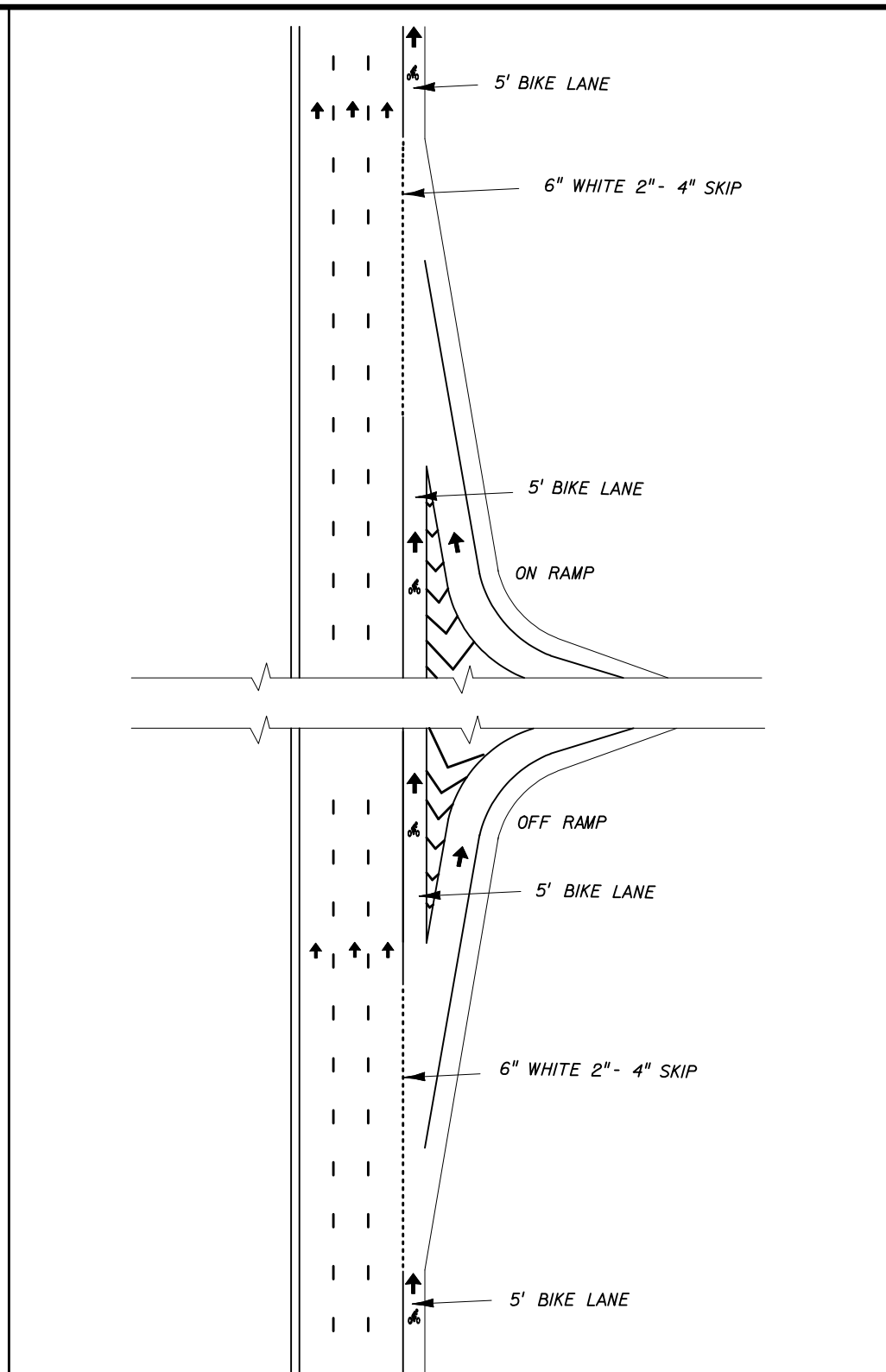
Names	Dates	Approved By		
Designed By		<i>Charles A. Scott</i>	State Traffic Standards Engineer	
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	12 of 13	17346



"TEE" INTERSECTION WITH SEPARATE RIGHT TURN LANE URBAN TYPICAL SECTION (CURB & GUTTER)



"TEE" INTERSECTION WITH RIGHT TURN DROP LANE URBAN TYPICAL SECTION (CURB & GUTTER)



INTERCHANGE RAMPS RURAL TYPICAL SECTION (PAVED SHOULDER)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SPECIAL MARKING AREAS (BICYCLE)**

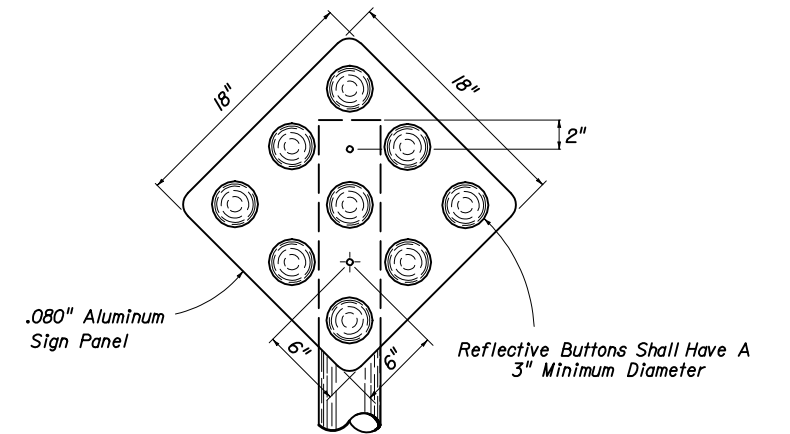
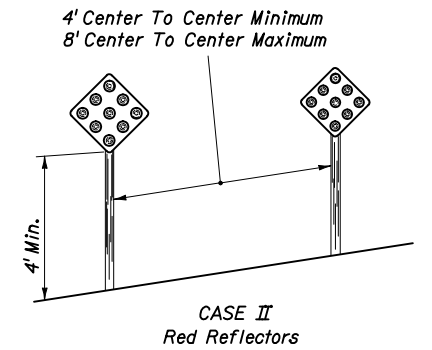
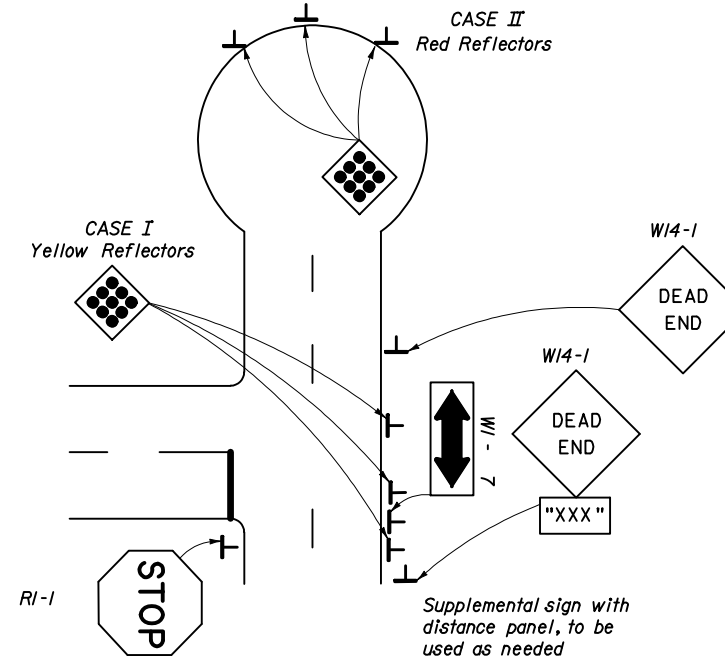
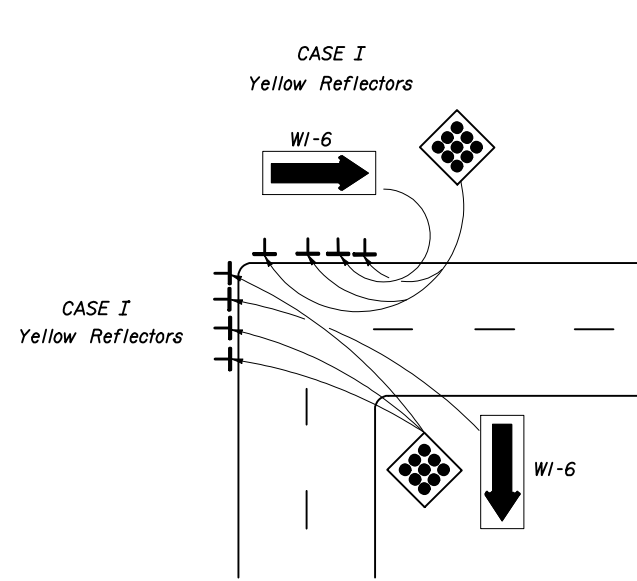
Names	Dates	Approved By		
Designed By		<i>Clark A. Scott</i>	State Traffic Standards Engineer	
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	13 of 13	17346

**CASE I** Type I Object Markers shall consist of nine yellow reflectors mounted on a yellow reflective background or consist of a reflective panel of the same size with Type III-A, III-B or III-C yellow sheeting.

**CASE II** End of Road Markers shall consist of nine red reflectors mounted on a red reflective background or consist of a reflective panel of the same size with Type III-A, III-B or III-C red sheeting.

**NOTES:**

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 are optional. The need should be based on a review of each location.
3. For additional details on aluminum round post, steel flanged channel post, sign panel material and bolts, nuts and washers see Index Nos. 11860 and 11865.
4. Case I Installation - The arrow panels and object markers shall be located approximately 20', but not less than 12' from the edge of the travel lane.
5. Dead end sign shall be posted a sufficient advance distance to permit the vehicle operator to avoid the dead end by turning off, if possible, at the nearest intersecting street.
6. For pavement marking see index no. 17346
7. No guardrail is required unless special field conditions require its use.

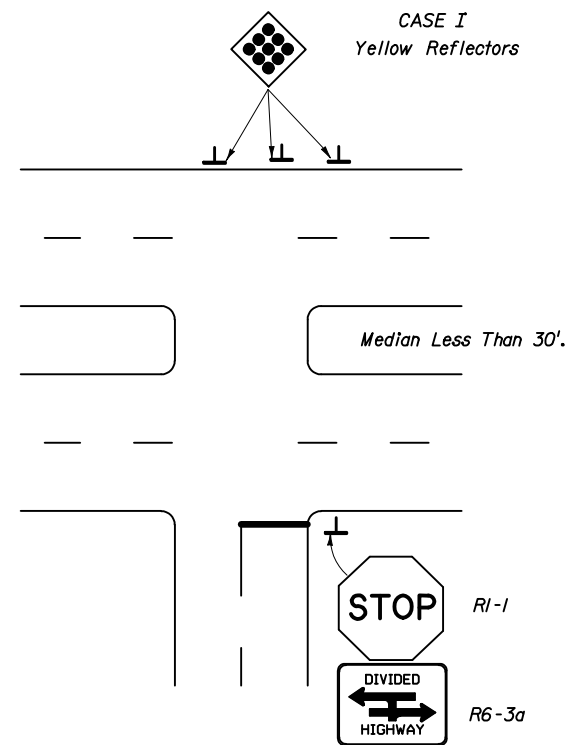
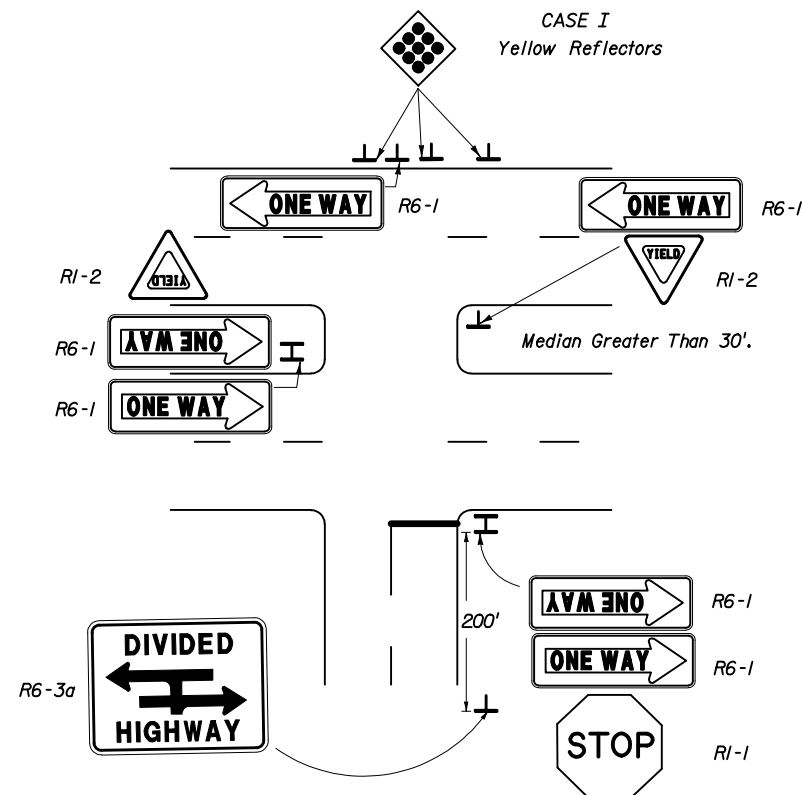


Supports shall be driven 3' into the ground.

2" Ø X 1/8" Aluminum Round Post or 2.5 #/Ft. Steel Flanged Channel Post.

Aluminum Post: 3/8" Ø Aluminum Button Head Bolt with Nut and Lockwasher or 1/8" Ø Stainless Steel Hex Head Bolt with Flat Washer under Head and Lockwasher under Nut.

Channel Post: Provide Attachment in Accordance with the "Sign Attachment Detail" on Index No. 11865.



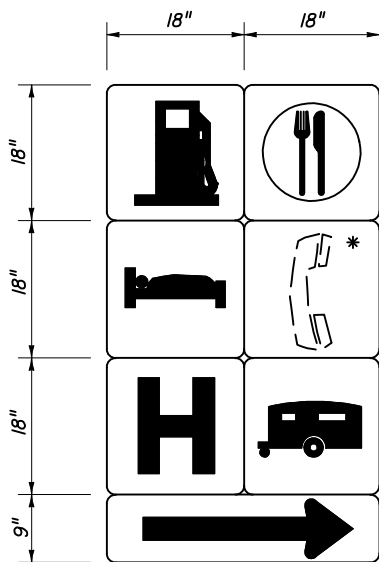
ONE WAY signs (R6-1) are not ordinarily needed at divided highway intersections with median widths of less than 30', and should be installed only if specifically called for in the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC CONTROLS FOR STREET TERMINATIONS				
Names	Dates	Approved By		
Designed By	11 74	C. L. Scott State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By	11 74	00	1 of 1	17349

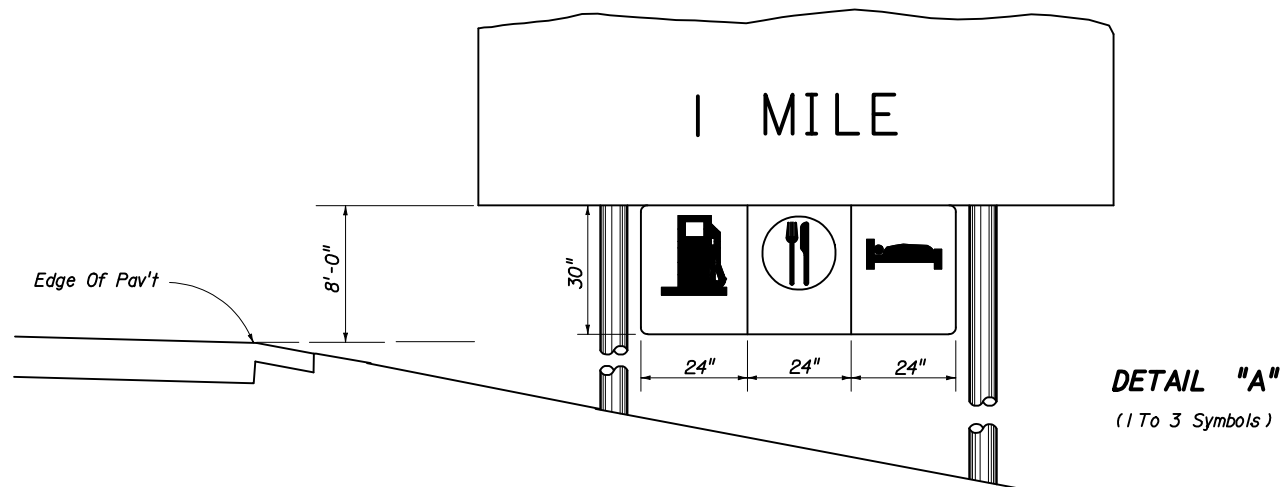
**\*\* Note:**

Two assemblies are required; one for each side of the ramp, showing those services in each particular direction from the ramp terminal.

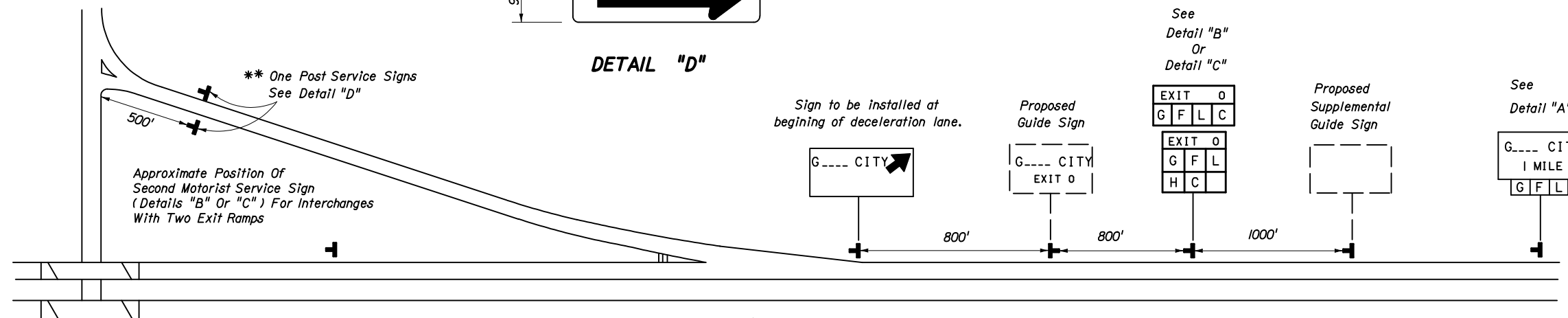
Ramp mounted signs shall be installed to avoid conflict with existing signs and in no case should they be placed within 100' of another sign.



**DETAIL "D"**



**DETAIL "A"**  
(1 To 3 Symbols)



\*\* One Post Service Signs See Detail "D"

Approximate Position Of Second Motorist Service Sign (Details "B" Or "C") For Interchanges With Two Exit Ramps

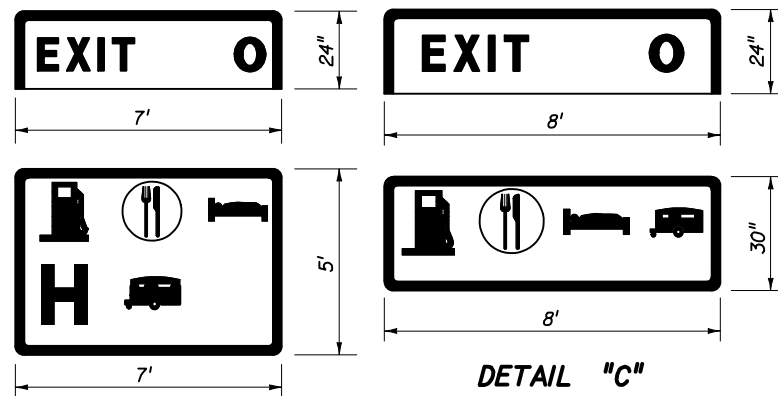
Sign to be installed at beginning of deceleration lane.

Proposed Guide Sign

See Detail "B" Or Detail "C"

Proposed Supplemental Guide Sign

See Detail "A"



**DETAIL "B"**  
(4 To 6 Symbols)

**DETAIL "C"**  
(4 Symbols)

**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' between the level of the pavement edge and the bottom of the guide sign, prior to mounting the supplementary panel.

**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 Legend and Border with Blue Background.

4 - For mounting details see Index 9535 for Type "A" breakaway or Index 11860 for Type "C" Frangibility.

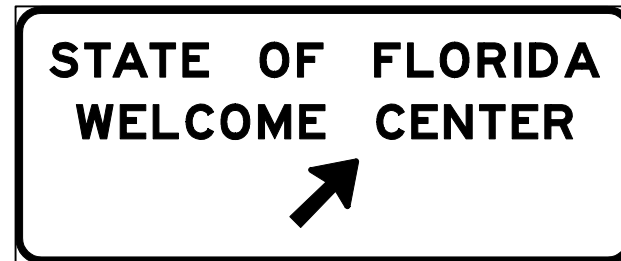
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SIGNING FOR MOTORIST SERVICES**

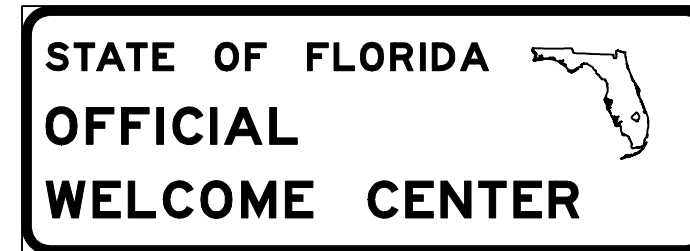
Designed By		Dates	3-76	Approved By	<i>Charles Scott</i>		
Drawn By		Revision	3-76	State Traffic Standards Engineer	Sheet No.	Index No.	
Checked By			3-76		00	1 of 1	17350



Sign No. FTP-17



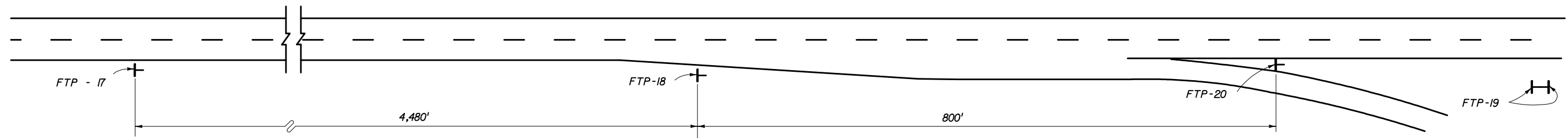
Sign No. FTP-18



Sign No. FTP-19



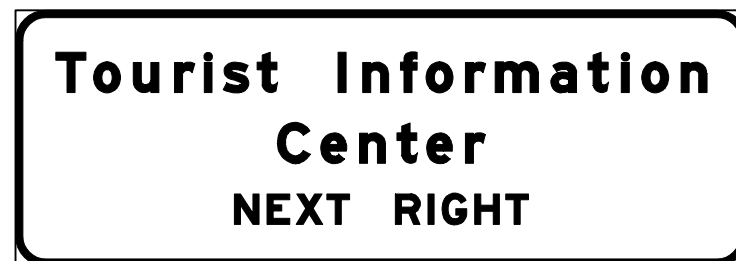
Sign No. FTP-20



Note : Roadway not drawn to scale  
Distances shown are adequate for driver communication  
but may be altered slightly if conditions require.

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 roadway as possible ( 2 signs back to back ).
- (3) Sign FTP-17, 18, 19 shall be located on limited access highways only.
- (4) All legend to be Series E.
- (5) See Index 17355 for sign details.



Sign No. FTP-21

Note: 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 )

**FOR LIMITED ACCESS HIGHWAYS**

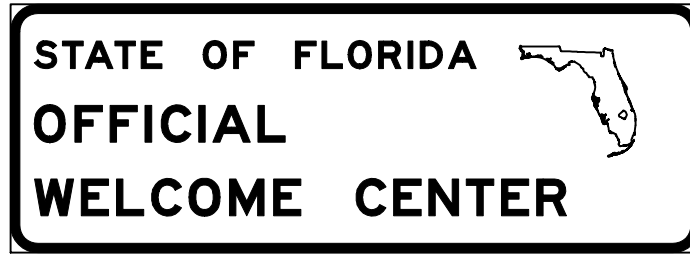
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**WELCOME CENTER SIGNING**

Designed By	Names	Dates	Approved By <i>Charles A. Scott</i>		
Drawn By		6-75	State Traffic Standards Engineer		
Checked By		6-75	Revision	Sheet No.	Index No.
		6-75	00	1 of 2	17351



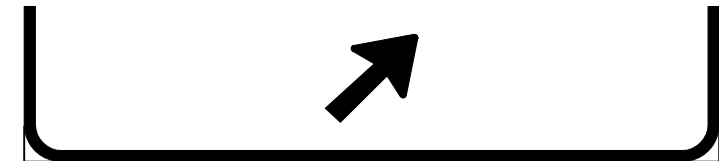
SIGN NO. FTP-22A



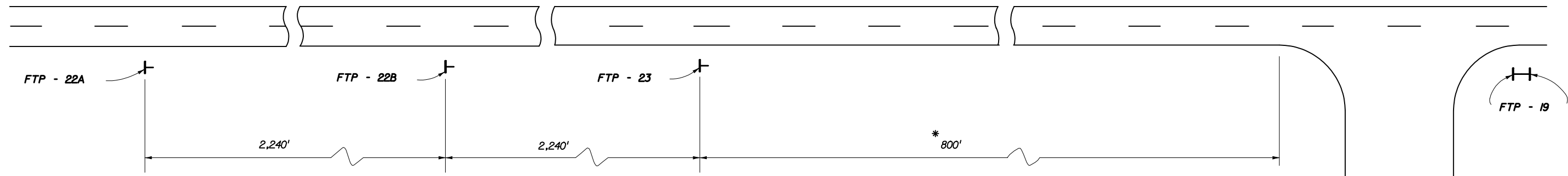
SIGN NO. FTP-19



SIGN NO. FTP-22B



SIGN NO. FTP-23



Note :  
One sign FTP-22A or 22B should be used depending on speed, roadside development & geometric conditions.

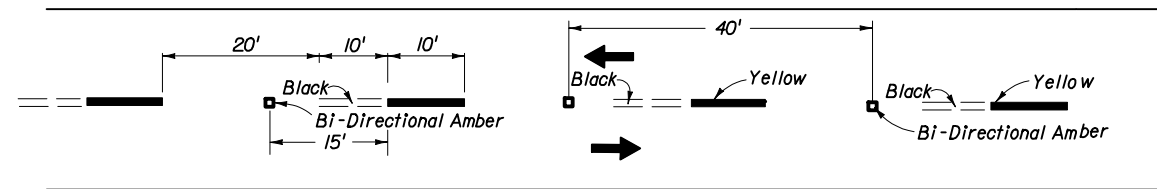
NOTE :  
Roadway not drawn to scale

\* 800' Maximum For Rural Conditions  
50' Minimum For Congested Areas

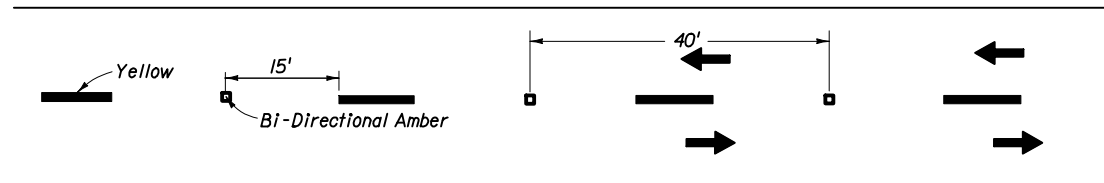
- Notes
- (1) Signs and sign structures shall be erected in accordance with the details shown on Index 9535.
  - (2) Sign FTP-19 shall be located on the Welcome Center grounds in proximity to the building and as far from the Main Line Roadway as possible (2 signs back to back)
  - (3) All legend to be Series E.

**FOR PRIMARY HIGHWAYS**

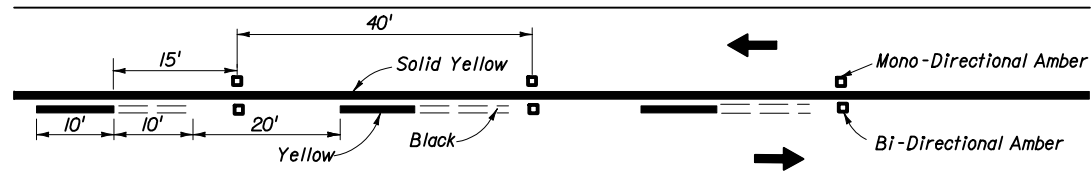
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>WELCOME CENTER SIGNING</b>				
Designed By	Names	Dates	Approved By	
Drawn By		6-75	<i>Charles Scott</i> State Traffic Standards Engineer	
Checked By		6-75	Revision	Sheet No. Index No.
		6-75	00	2 of 2 17351



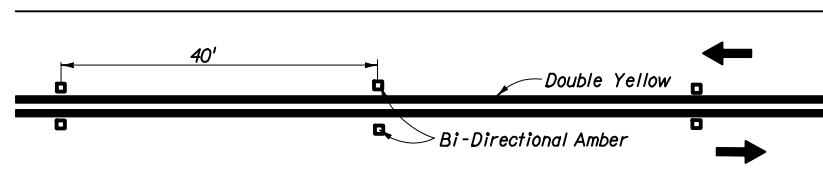
**ALTERNATING SKIP LINE**



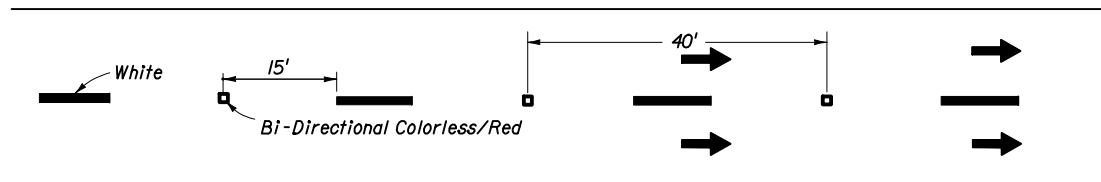
**SKIP LINE**



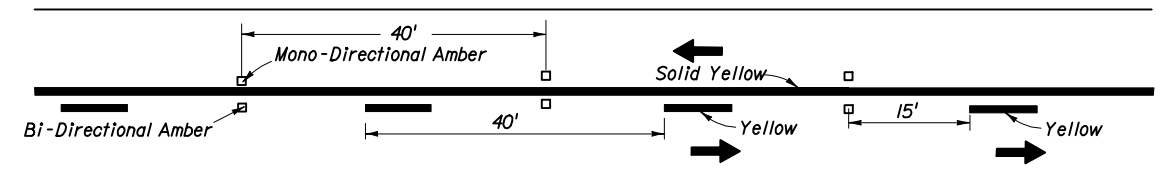
**SOLID LINE WITH ALTERNATING SKIP**



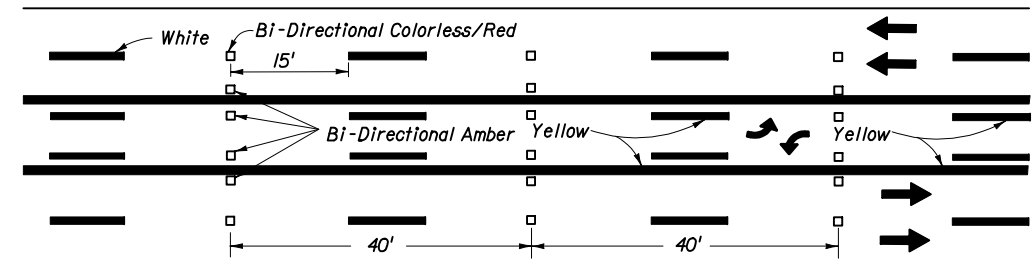
**DOUBLE SOLID LINE**



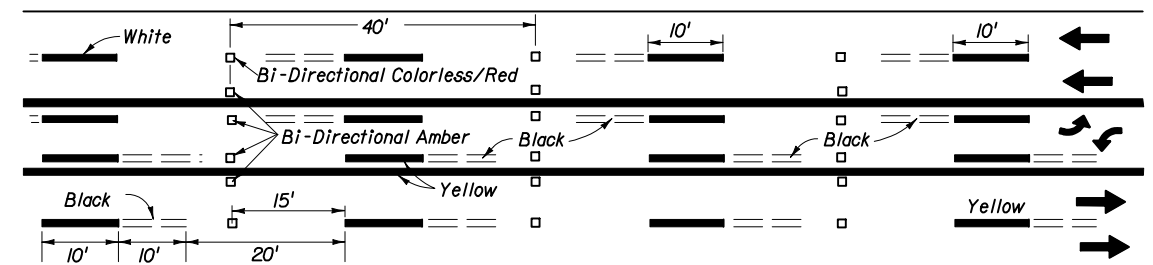
**MULTI-LANE**



**SOLID LINE WITH SKIP**



**SKIP LINE WITH TWO WAY LEFT TURN LANE**



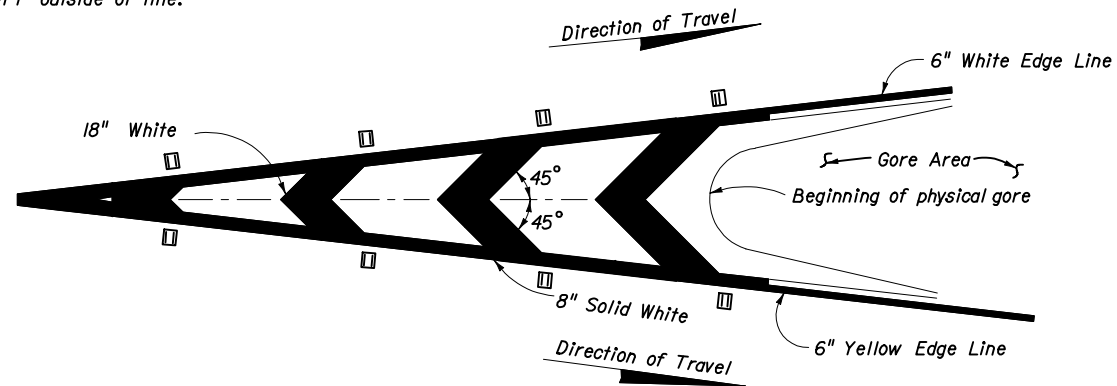
**ALTERNATING SKIP LINE WITH TWO WAY LEFT TURN LANE**

1. Reflective Pavement Markers shall be spaced at 40' on all skip lane lines and skip center lines. This spacing may be reduced to 20' if specifically called for in the plans.
2. The spacing on solid lines and solid/skip combination lines shall be 40'.
3. All R.P.M.s shall be offset 1" from solid lines.
4. These spacings may be reduced for sharp curves if required.
5. All R.P.M.s shall be class "B".

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TYPICAL PLACEMENT OF REFLECTIVE PAVEMENT MARKERS</b>				
Designed By	Names	Dates	Approved By	
Drawn By		10-87	<i>Charles A. Scott</i> State Traffic Standards Engineer	
Checked By		10-87	Revision	Index No.
			00	1 of 2
				17352

**NOTE**

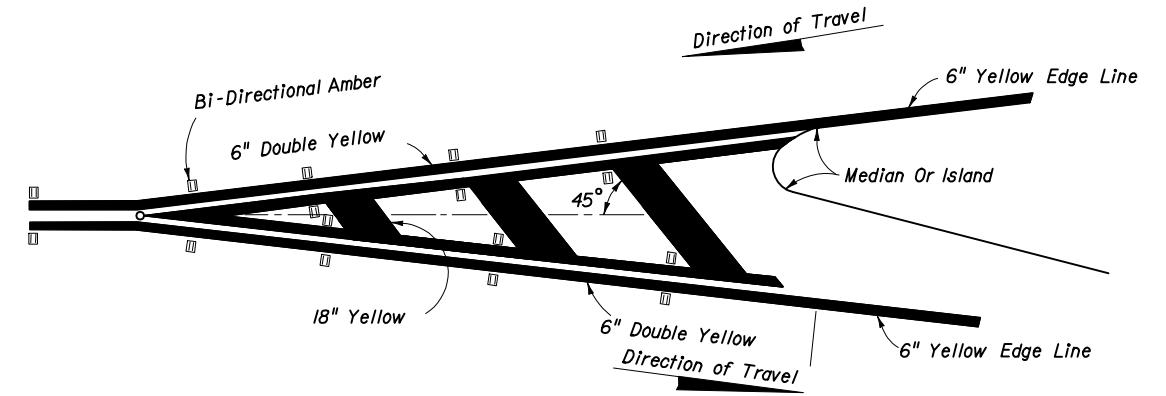
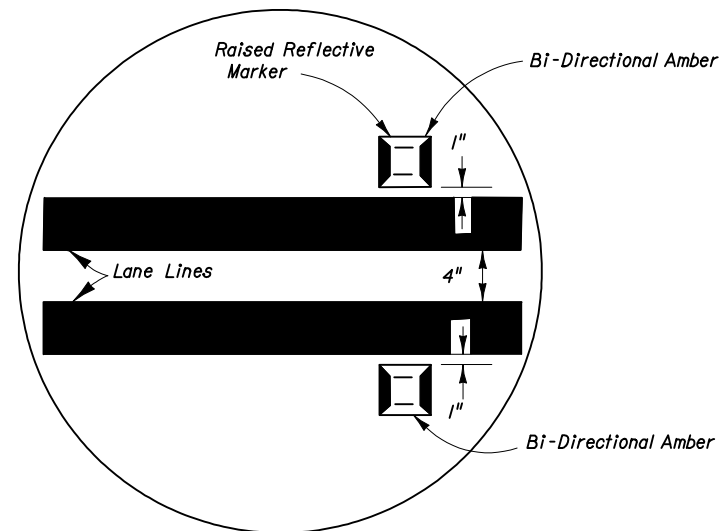
Raised pavement markers shall be set 1" outside of line.



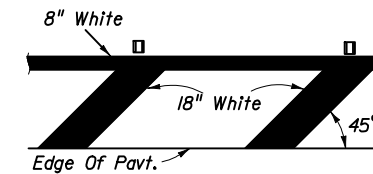
**RPM PLACEMENT FOR TRAFFIC CHANNELIZATION AT GORE  
(TRAFFIC FLOWS IN SAME DIRECTION)**

**NOTE**

Raised pavement markers (Bi-Directional Colorless/Red) should be used in all gores of this type



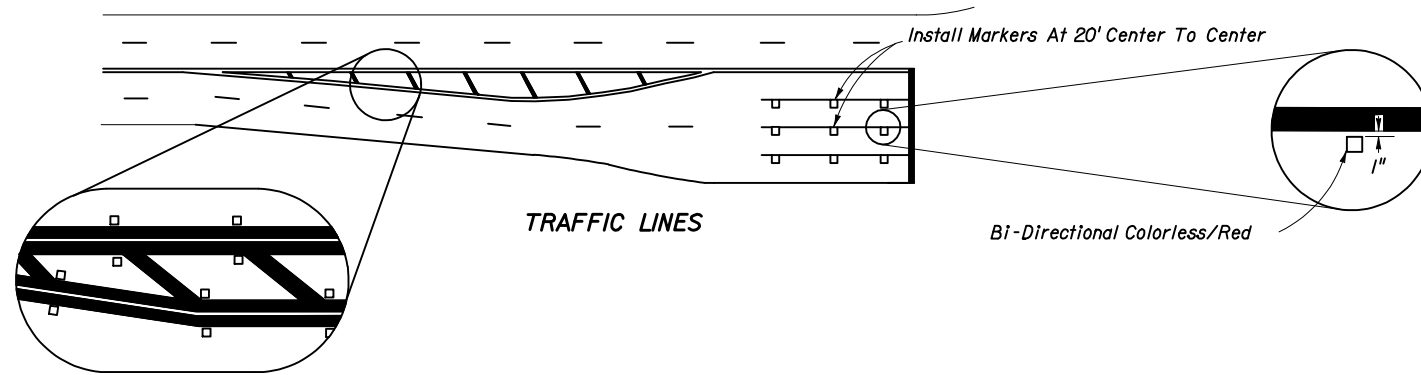
**RPM PLACEMENT FOR TRAFFIC SEPARATION  
(TRAFFIC FLOWS IN OPPOSITE DIRECTION)**



**PLACEMENT OF RPMS ON SHOULDER MARKINGS**

Shoulder Markings For Left Side Of Roadway Shall Be Yellow.

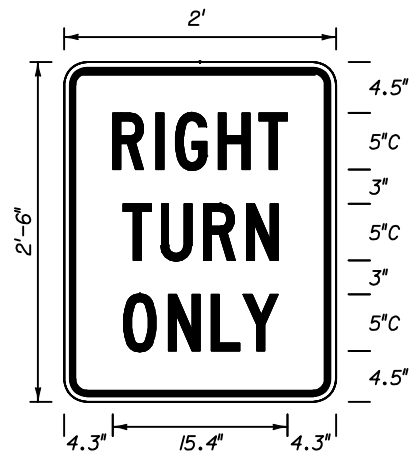
For Placement Of RPMS On Ramps See Index 17345.



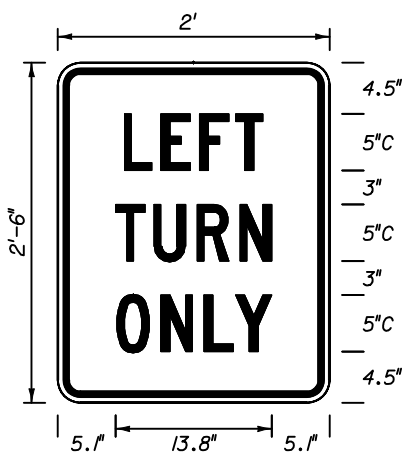
Reflective Pavt. Markers To Be Bi-Directional Amber

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TYPICAL PLACEMENT OF REFLECTIVE PAVEMENT MARKERS</b>				
Names	Dates	Approved By <i>Clark A. Scott</i>		
Designed By	10-75	State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By	10-75	00	2 of 2	17352

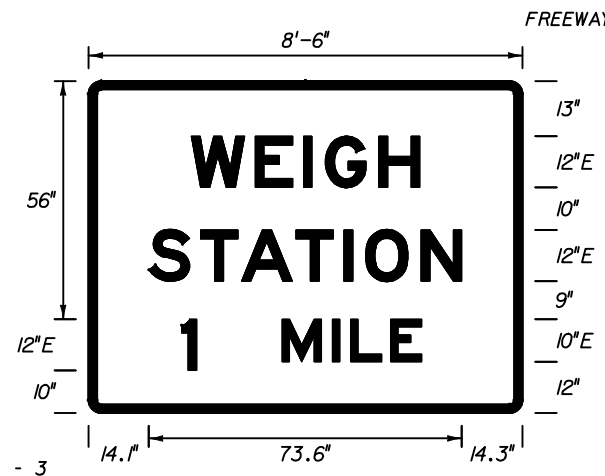




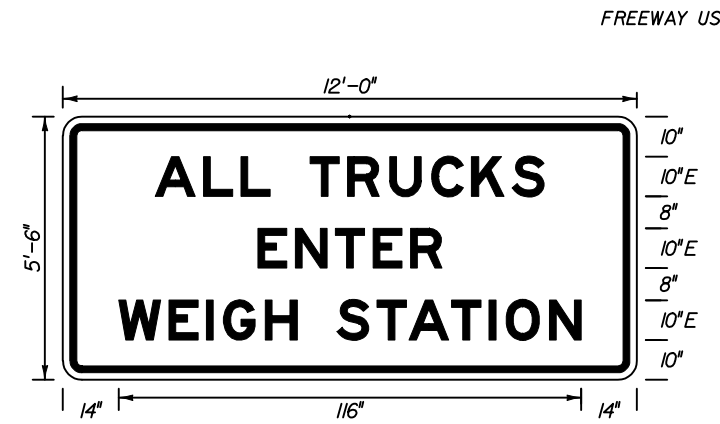
FTP - 1  
2' X 2'-6"  
1 1/2" Radii 3/4" Border  
5" Series C Legend  
White Background  
Black Legend & Border



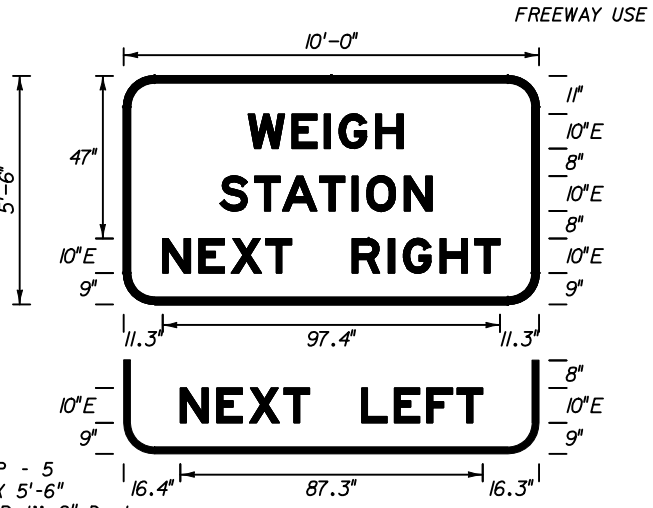
FTP - 2  
2' X 2'-6"  
1 1/2" Radii 3/4" Border  
5" Series C Legend  
White Background  
Black Legend & Border



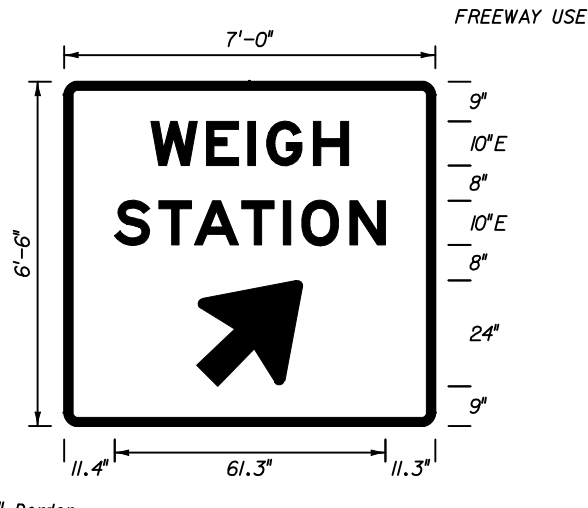
FTP - 3  
8'-6" X 56"  
3" Radii 2" Border  
Series E Legend  
Green Background  
White Legend & Border



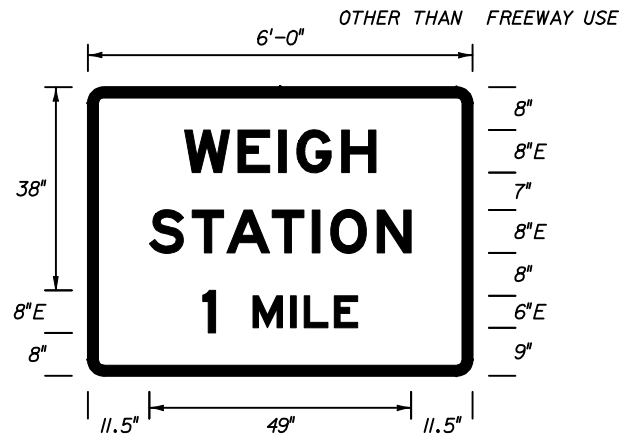
FTP - 4  
12' X 5'-6"  
3" Radii 2" Border  
10" Series E Legend  
White Background  
Black Legend & Border



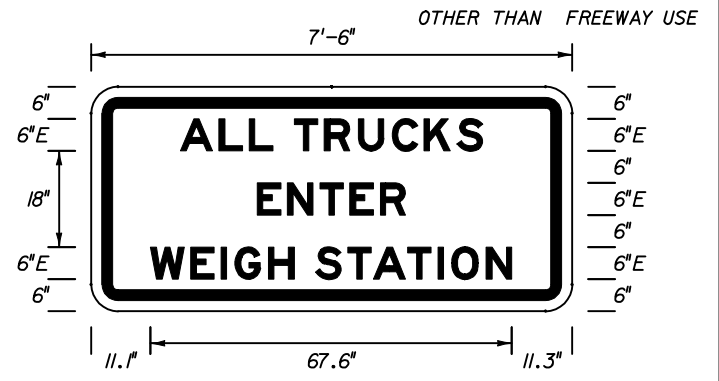
FTP - 5  
10' X 5'-6"  
3" Radii 2" Border  
10" Series E Legend  
Green Background  
White Legend & Border



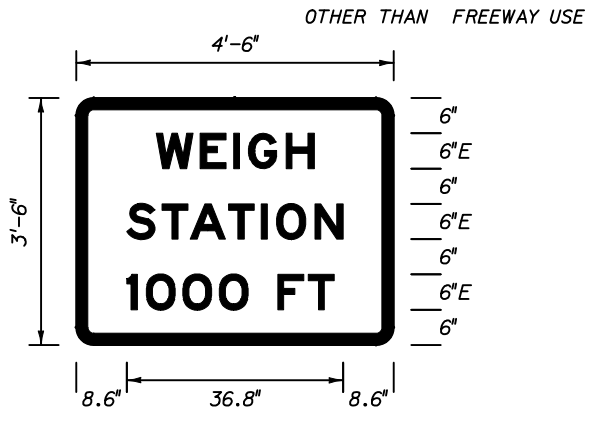
FTP - 6  
7' X 6'-6"  
3" Radii 2" Border  
10" Series E Legend  
Green Background  
White Legend & Border



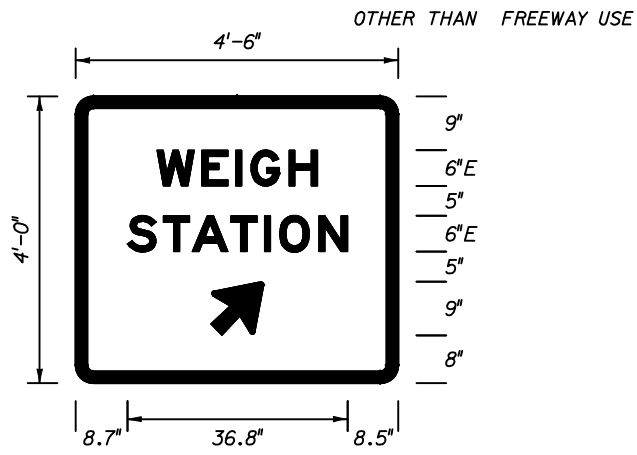
FTP - 7  
6' X 4'-6"  
3" Radii 2" Border  
Series E Legend  
Green Background  
White Legend & Border



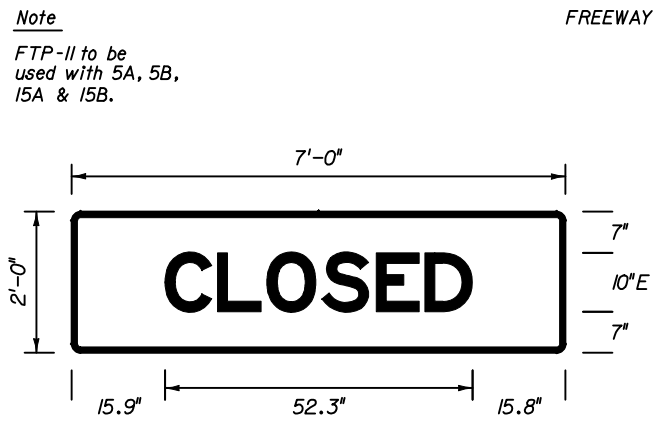
FTP - 8  
7'-6" X 6'-6"  
3" Radii 2" Border  
6" Series E Legend  
White Background  
Black Legend & Border



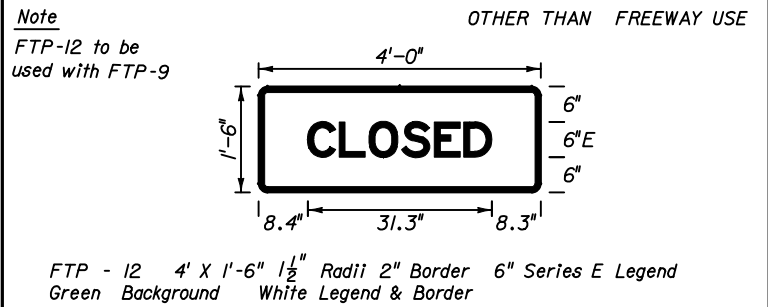
FTP - 9  
4'-6" X 3'-6"  
3" Radii 2" Border  
6" Series E Legend  
Green Background  
White Legend & Border



FTP - 10  
4'-6" X 4'-0"  
3" Radii 2" Border  
6" Series E Legend  
Green Background  
White Legend & Border  
FTP - 10A - Right Arrow  
FTP - 10B - Left Arrow

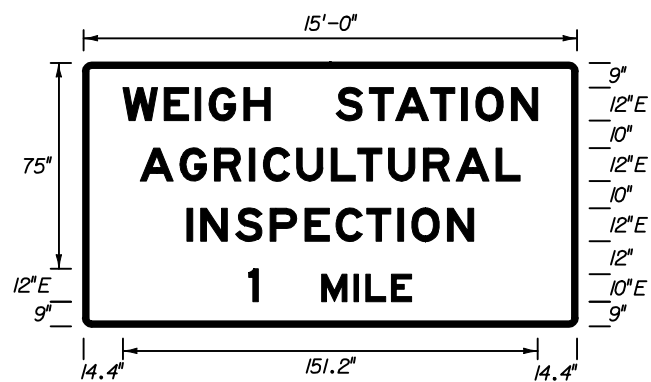


FTP - 11  
7' X 2'  
1 1/2" Radii 2" Border  
10" Series E Legend  
Green Background  
White Legend & Border

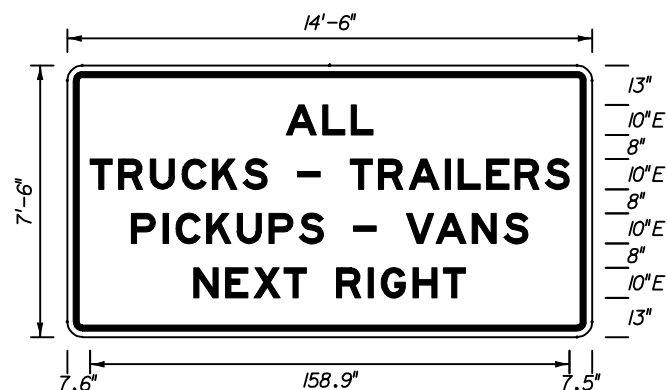


FTP - 12  
4' X 1'-6"  
1 1/2" Radii 2" Border  
6" Series E Legend  
Green Background  
White Legend & Border

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
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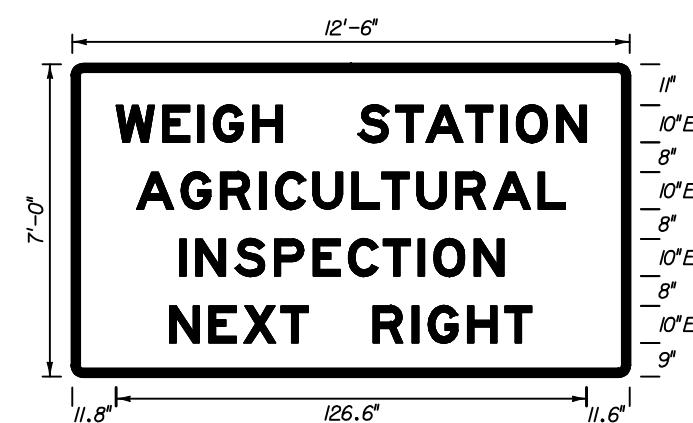
FTP - 13  
15' X 8'  
3" Radii 2" Border  
Series E Legend  
Green Background  
White Legend & Border



FTP - 14A  
14'-6" X 7'-6"  
3" Radii 2" Border  
10" Series E Legend  
White Background  
Black Legend & Border  
On Interstate Station,  
Delete Pickups-Vans,  
and reduce Sign height  
accordingly.



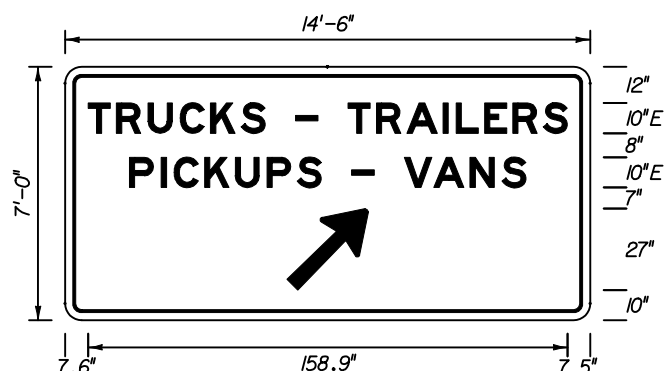
FTP - 14B  
14'-6" X 7'-6"  
3" Radii 2" Border  
10" Series E Legend  
White Background  
Black Legend & Border



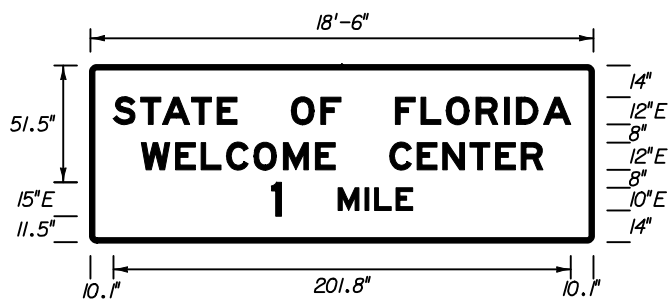
FTP - 15A  
12'-6" X 7'  
3" Radii 2" Border  
10" Series E Legend  
Green Background  
White Legend & Border



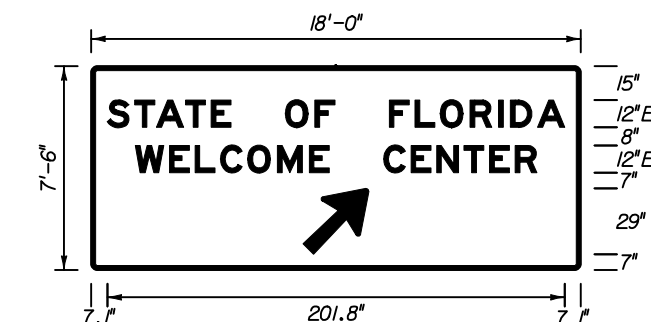
FTP - 15B  
12'-6" X 7'  
3" Radii 2" Border  
Series E Legend  
Green Background  
White Legend & Border



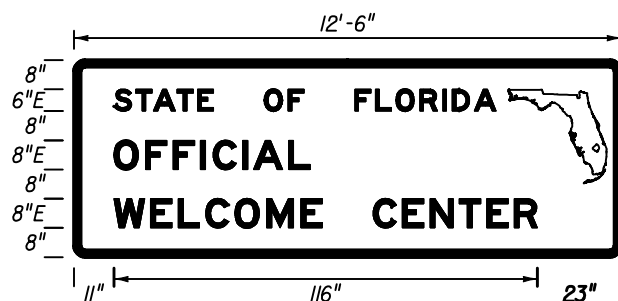
FTP - 16  
14'-6" X 7'  
3" Radii 2" Border  
Series E Legend  
Blue Background  
White Legend & Border  
FTP - 16A - RIGHT ARROW  
FTP - 16B - LEFT ARROW



FTP - 17  
18'-6" X 6'-6"  
3" Radii 2" Border  
Series E Legend  
Blue Background  
White Legend & Border



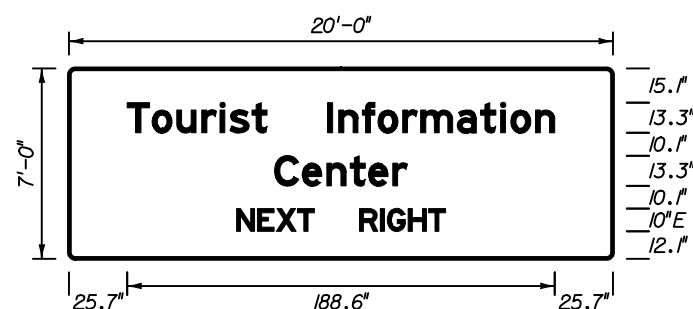
FTP - 18  
18' X 7'-6"  
3" Radii 2" Border  
Series E Legend  
Blue Background  
White Legend & Border



FTP - 19  
12'-6" X 4'-6"  
3" Radii 2" Border  
Series E Legend  
Blue Background  
White Legend & Border

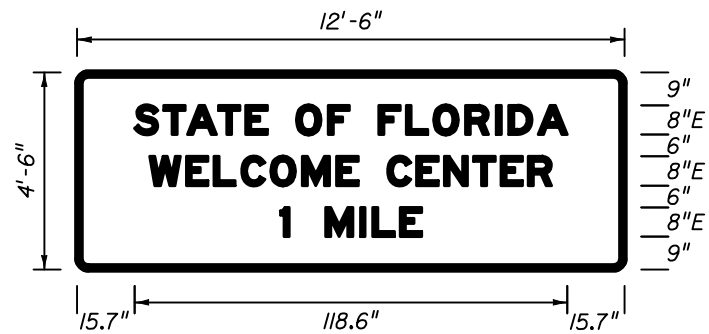


FTP - 20  
6'-6" X 5'-6"  
3" Radii 2" Border  
Series E Legend  
Blue Background  
White Legend & Border

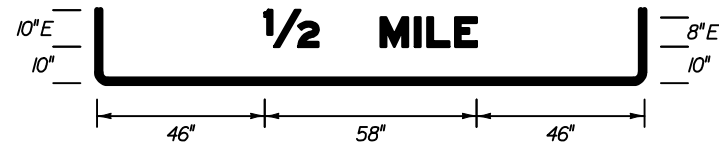


FTP - 21  
20' X 7'  
3" Radii 2" Border  
Blue Background  
White Legend & Border

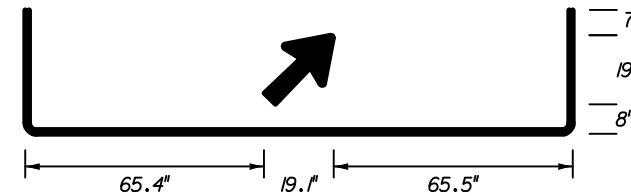
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SPECIAL SIGN DETAILS</b>				
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Designed By		State Traffic Standards Engineer		
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FTP - 22A  
12'-6" X 4'-6"  
3" Radii 2" Border  
8" Series E Legend  
Blue Background  
White Legend & Border



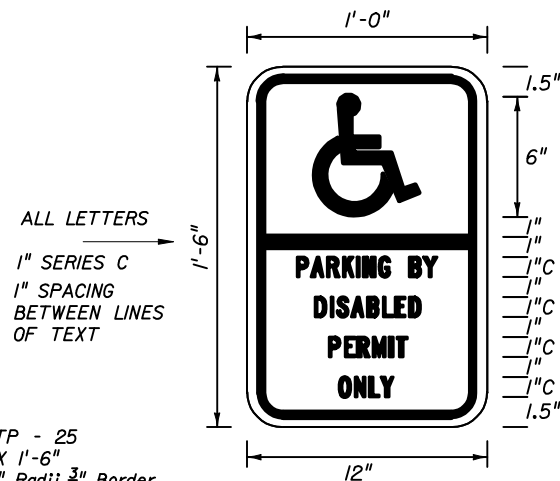
FTP - 22B  
12'-6" X 5'  
3" Radii 2" Border  
8" Series E Legend  
Blue Background  
White Legend & Border



FTP - 23  
12'-6" X 5'-6"  
3" Radii 2" Border  
Blue Background  
White Legend & Border

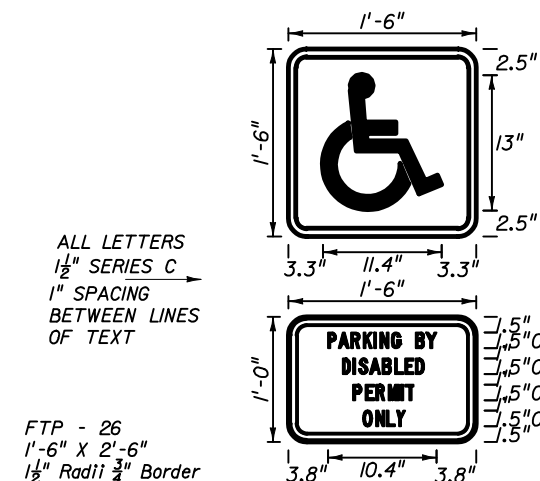


FTP - 24  
1' X 1'-6"  
1/2" Radii 3/4" Border  
White Background  
Green Legend & Border



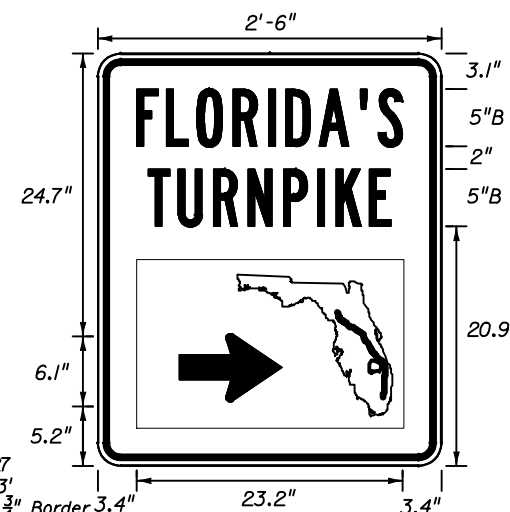
FTP - 25  
1' X 1'-6"  
1/2" Radii 3/4" Border  
1" Series C Legend  
Color  
Background  
Legend and Border

Top Blue  
Bottom White  
White Black

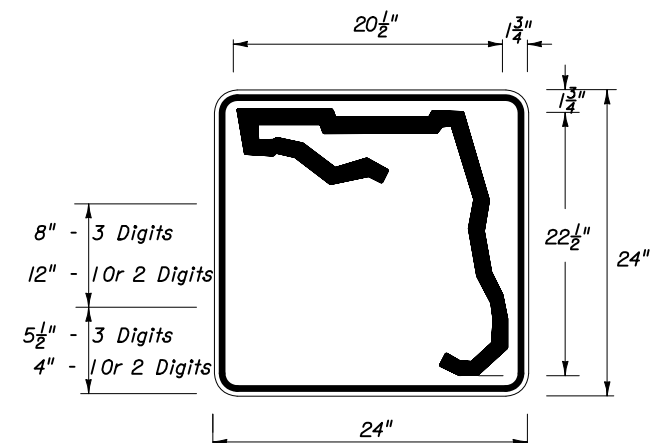


FTP - 26  
1'-6" X 2'-6"  
1/2" Radii 3/4" Border  
1/2" Series C Legend  
Color  
Background  
Legend and Border

Top Blue  
Bottom White  
White Black



FTP - 27  
2'-6" X 3'  
1/2" Radii 3/4" Border 3.4"  
Green Background  
White Legend & Border



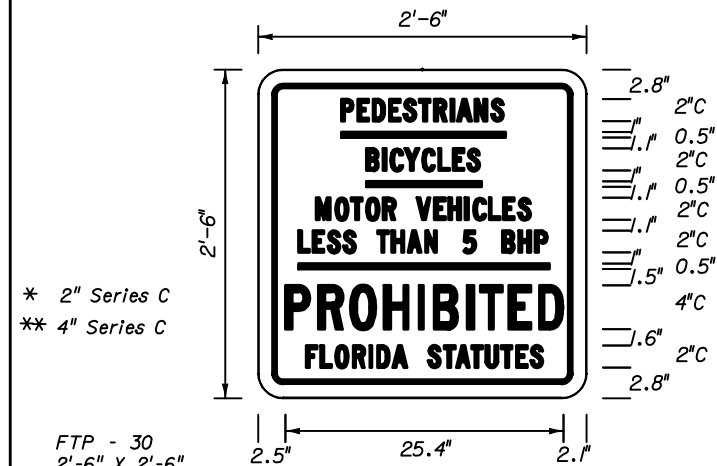
FTP - 28  
2' X 2'  
1/2" Radii 3/4" Border  
White Background  
Black Legend & Border

See Sheet 4 For Additional Details



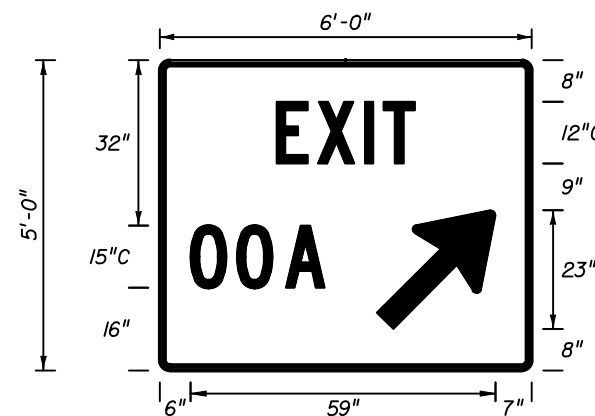
FTP - 29  
Blue Background  
Yellow Legend & Border

SEE SHEET 4 FOR DETAILS.

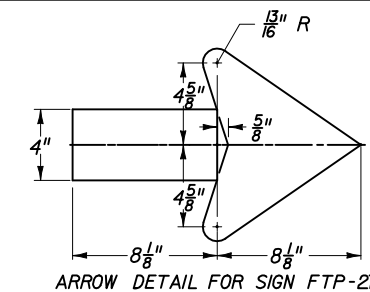


\* 2" Series C  
\*\* 4" Series C

FTP - 30  
2'-6" X 2'-6"  
1/2" Radii 3/4" Border  
White Background  
Black Legend & Border



FTP - 31  
6' X 5'  
3" Radii 2" Border  
Series C Legend  
Green Background  
White Legend & Border

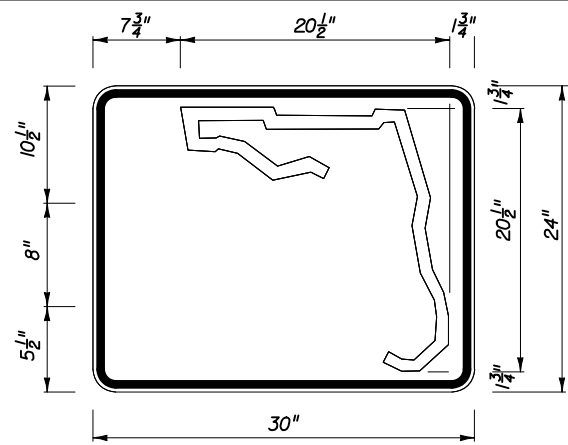


ARROW DETAIL FOR SIGN FTP-27

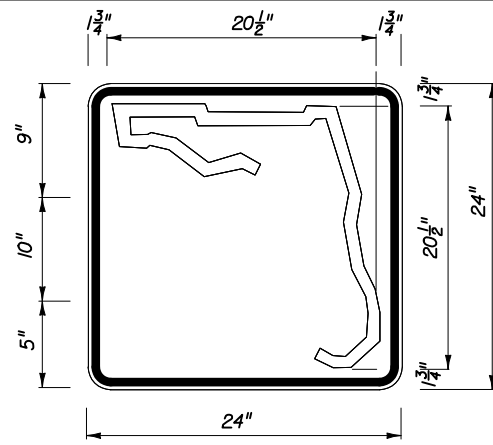
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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Designed By				Charles A. Scott	
Drawn By				State Traffic Standards Engineer	
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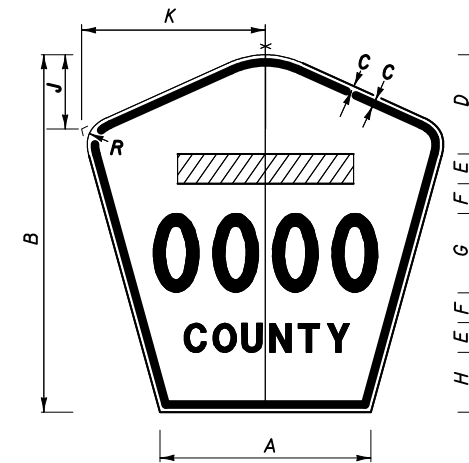


3 or 4 DIGITS



1 or 2 DIGITS

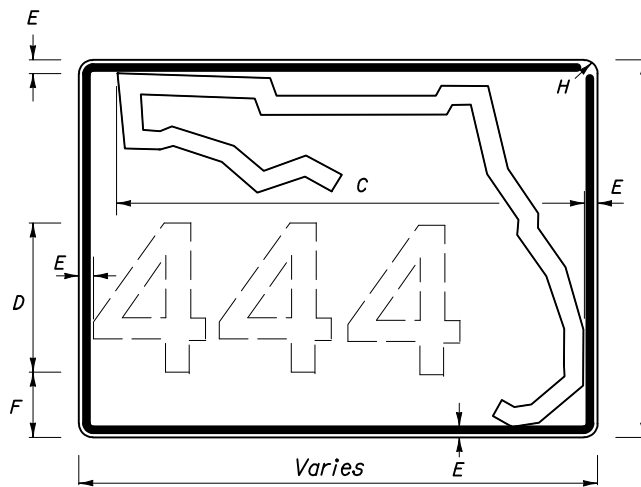
DIGITS	NUMERAL SIZE	SERIES	PANEL SIZE
1-2	10"	D	24" x 24"
3	8"	C	24" x 30"
4	8"	C	24" x 30"



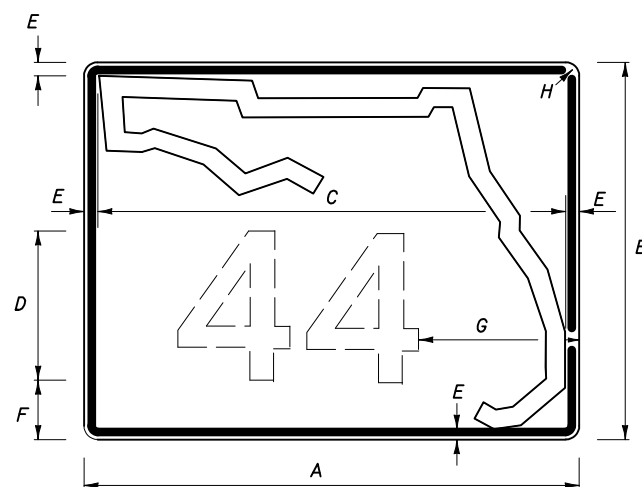
- Notes :
- All Legend Series "D".
  - Color: Yellow Legend and Border on Blue Background.
  - When used on a guide sign, marker must be overlaid on a rectangular Yellow Background as shown in chart. \*\*

INDEPENDENT USE OTHER THAN FREEWAY

SIGN	DIMENSIONS												**
	A	B	C	D	E	F	G	H	J	K	R	S	
1 & 2 DIGIT POST MOUNTED	14 3/16"	24"	1/2"	5"	2"	2"	8"	3"	5 1/8"	12 3/8"	1 1/4"	5 5/8"	
3 DIGIT POST MOUNTED	17 3/4"	30"	1/2"	7 1/4"	2 1/2"	2 1/2"	8"	4 3/4"	6 1/2"	15 1/2"	1 1/4"	6 5/8"	
4 DIGIT POST MOUNTED	21 1/4"	36"	1/2"	8"	3"	3"	8"	8"	7 1/2"	18 1/2"	1 3/8"	7 1/2"	
2 DIGIT OVERHEAD	21 1/4"	36"	3/4"	8"	3"	3"	12"	4"	7 1/2"	18 1/2"	1 3/8"	7 1/2"	*** 40" x 41"
3 DIGIT OVERHEAD	29 1/4"	36"	3/4"	8"	3"	3"	12"	4"	8"	21 3/8"	2 1/4"	8 1/4"	*** 40" x 44"
4 DIGIT OVERHEAD	36 3/4"	42"	3/4"	11"	3"	3"	12"	7"	10 1/2"	26"	2 1/4"	8 1/2"	*** 42" x 52"



3 OR MORE DIGITS



1 OR 2 DIGITS

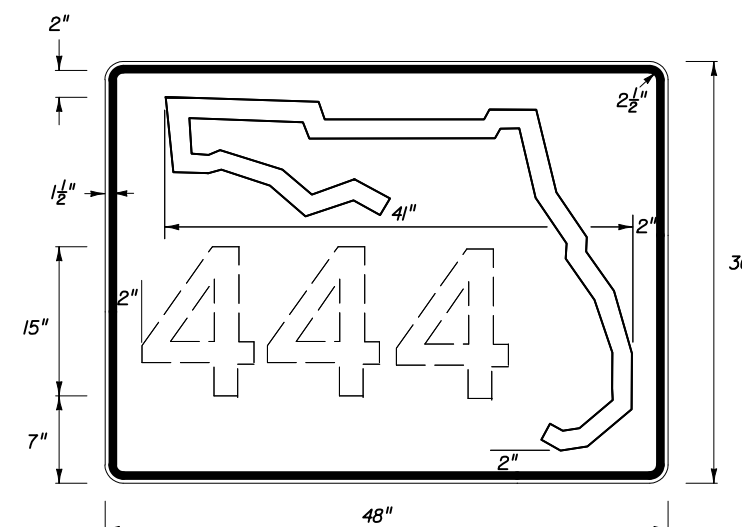
A	B	C	D	E	F	G	H
30"	24"	26"	12"	1 1/4"	2 3/4"	8 1/4"	1 1/4"
36"	30"	32"	15"	1 1/4"	3 1/4"	8 3/4"	1 1/4"
42"	36"	38"	15"	1 1/4"	6 1/4"	11"	1 1/4"

GUIDE SIGN USE

- Notes: 1. Florida marker shall have Black Legend with White Background.  
 2. Stroke width of State outline to be 1" for independent use and 1 1/4" for Guide Sign.  
 3. Numbers are series D.

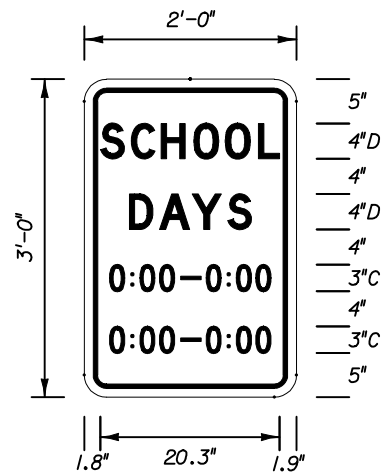
FLORIDA ROUTE MARKER  
FTP - 28

COUNTY ROUTE MARKER DETAIL  
FTP - 29

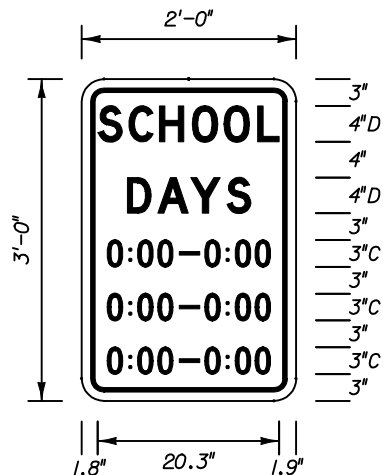


1-3 DIGITS 15" SERIES C  
 4 DIGITS 12" SERIES C  
 INDEPENDENT USE FOR FREEWAY

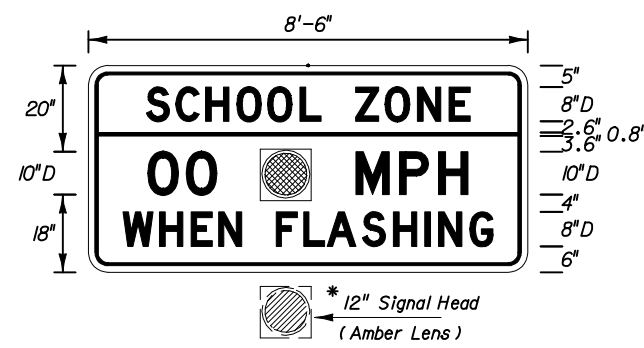
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
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FTP - 32  
2' X 3'  
1 1/2" Radii 3/4" Border  
White Background  
Black Legend & Border

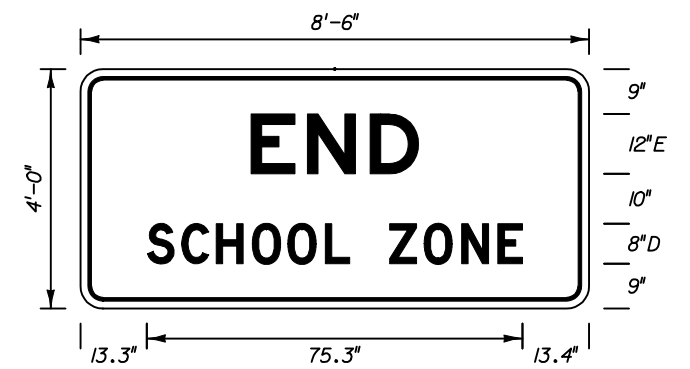


FTP - 32A  
2' X 3'  
1 1/2" Radii 3/4" Border  
White Background  
Black Legend & Border

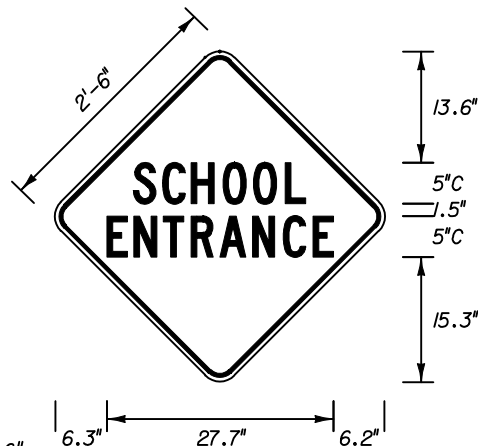


FTP - 33  
8'-6" X 4'  
3" Radii 2" Border  
Series D Legend  
Yellow Background Top White Background Bottom  
Black Legend & Border

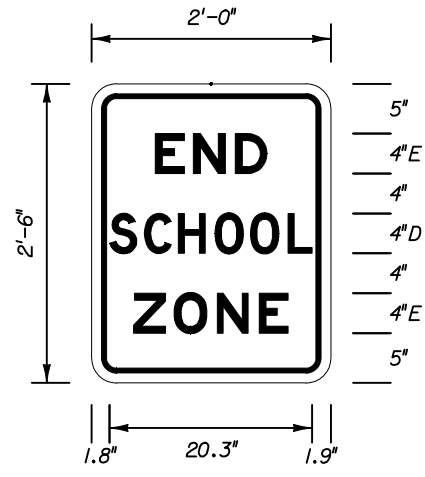
\* Note:  
Flashing beacon may  
be placed within or  
below panel.



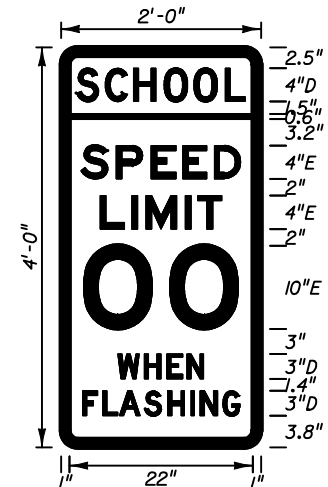
FTP - 34  
8'-6" X 4'  
3" Radii 3/4" Border  
White Background  
Black Legend & Border



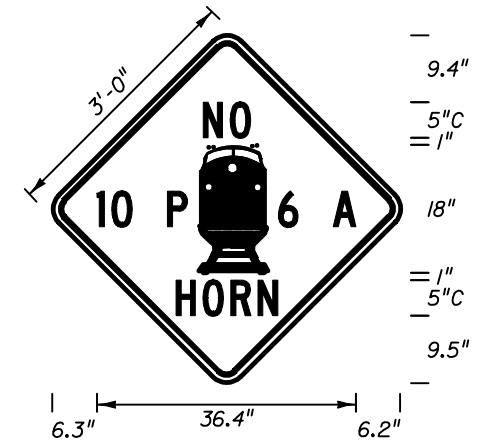
FTP - 35  
2'-6" X 2'-6"  
5" Series C Legend  
2" Radii 3/4" Border  
Yellow Background  
Black Legend & Border



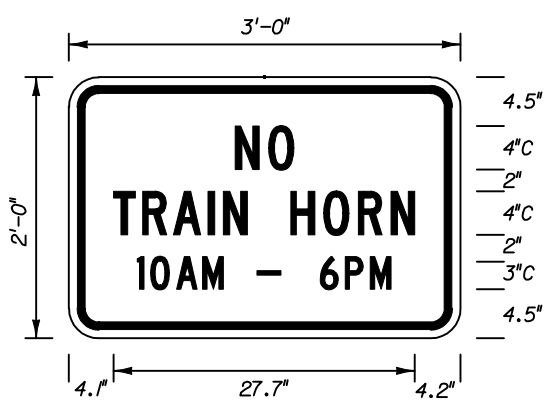
FTP - 36  
2' X 2'-6"  
4" Series D and E Legend  
1 1/2" Radii 3/4" Border  
White Background  
Black Legend & Border



FTP - 37  
2' X 4'  
1 1/2" Radii 3/4" Border  
Top Background Yellow Bottom Background White  
Black Legend & Border Top and Bottom



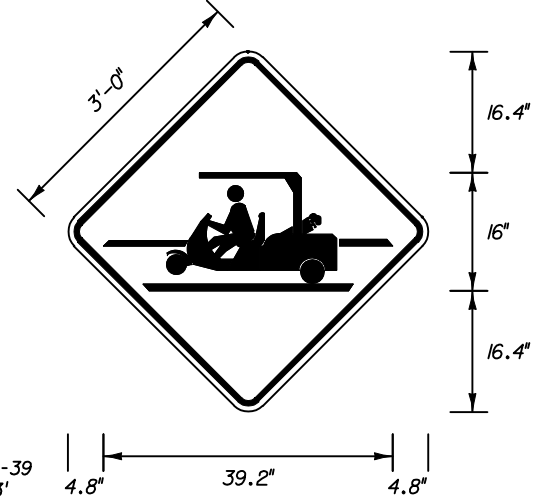
FTP - 38  
3' X 3'  
2" Radii 3/4" Border  
5" Series C Legend  
Yellow Background  
Black Legend & Border



FTP - 38A  
3' X 2'  
Series C Legend  
2" Radii 3/4" Border  
Yellow Background  
Black Legend & Border

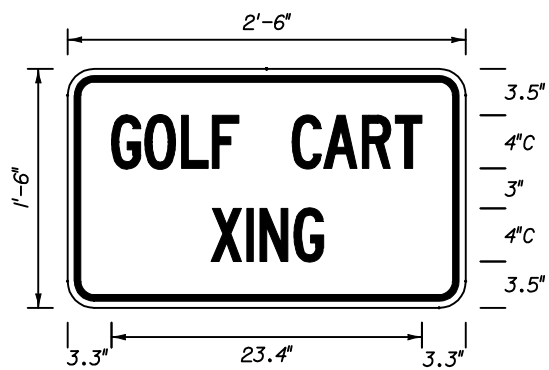


FTP - 38B  
3' X 3'  
Series C Legend  
2" Radii 3/4" Border  
Yellow Background  
Black Legend & Border



FTP - 39  
3' X 3'  
2" Radii 3/4" Border  
Yellow Background  
Black Legend & Border

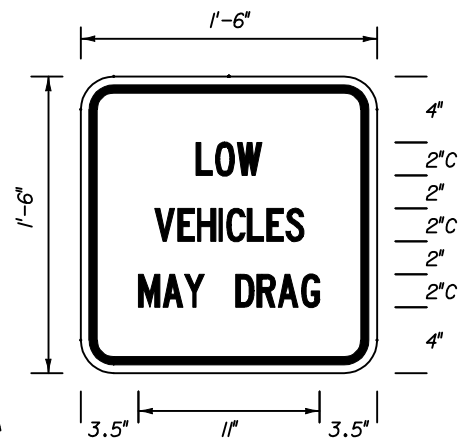
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>SPECIAL SIGN DETAILS</b>				
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Drawn By			State Traffic Standards Engineer	
Checked By	Revision	Sheet No.	Index No.	
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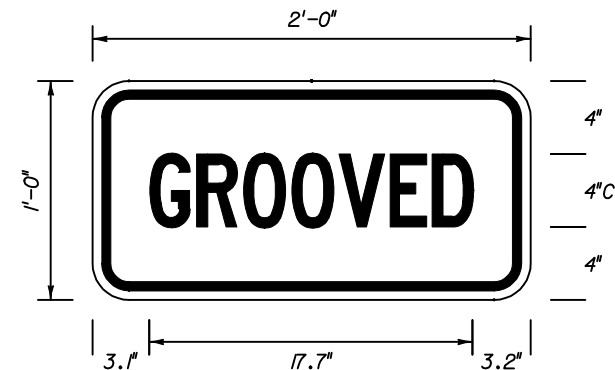
FTP - 39A  
2'-6" X 1'-6"  
1/2" Radii 3/4" Border  
4" Series C Legend  
Yellow Background  
Black Legend & Border



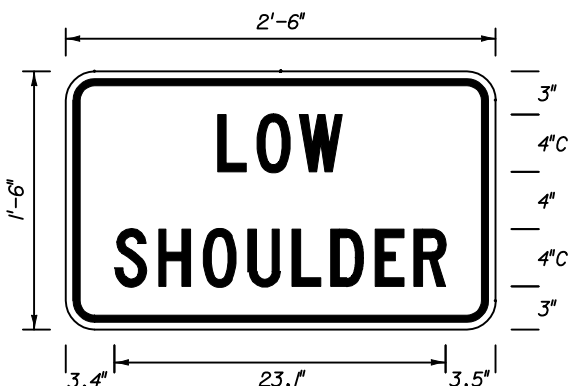
FTP - 40  
3' X 3'  
2" Radii 3/4" Border  
Yellow Background  
Black Legend & Border



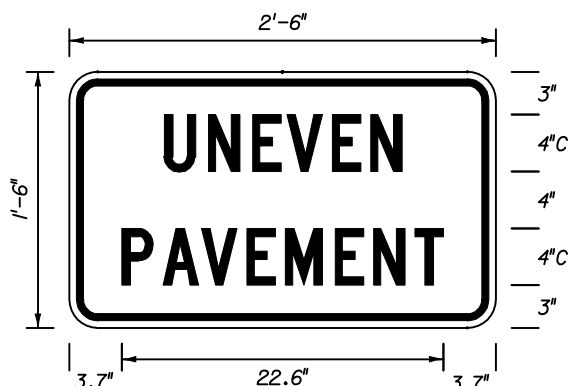
FTP - 40A  
1'-6" X 1'-6"  
1/2" Radii 3/4" Border  
2" Series C Legend  
Yellow Background  
Black Legend & Border



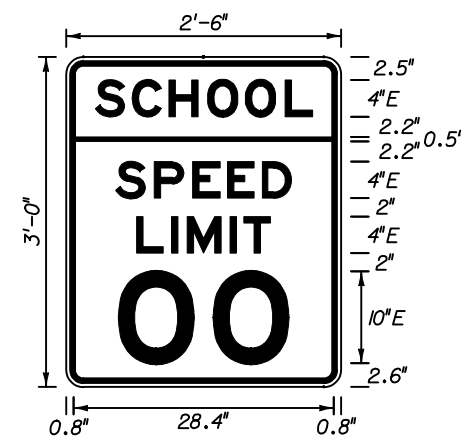
FTP - 41  
2' X 1'  
1/2" Radii 3/4" Border  
4" Series C Legend  
Yellow Background  
Black Legend & Border



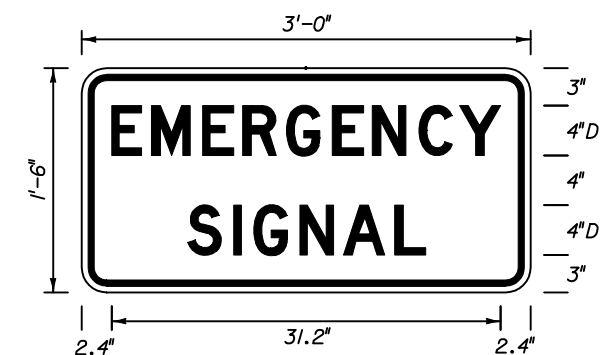
FTP - 42  
2'-6" X 1'-6"  
1/2" Radii 3/4" Border  
4" Series C Legend  
Yellow Background  
Black Legend & Border



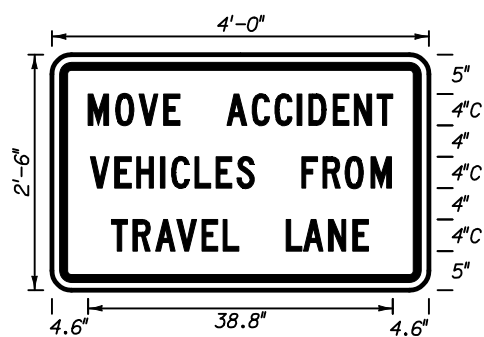
FTP - 43  
2'-6" X 1'-6"  
1/2" Radii 3/4" Border  
4" Series C Legend  
Yellow Background  
Black Legend & Border



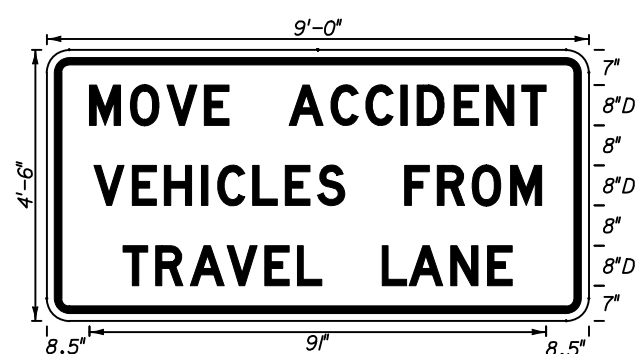
FTP - 44  
2'-6" X 3'  
1/2" Radii 3/4" Border  
Series E Legend  
Yellow Background Top White Background Bottom  
Black Legend & Border



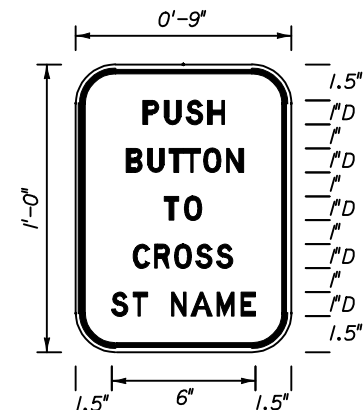
FTP - 45  
3' X 1'-6"  
1/2" Radii 3/4" Border  
4" Series D Legend  
Yellow Background  
Black Legend & Border



FTP - 46  
4' X 2'-6"  
2" Radii 3/4" Border  
4" Series C Legend  
White Background  
Black Legend & Border

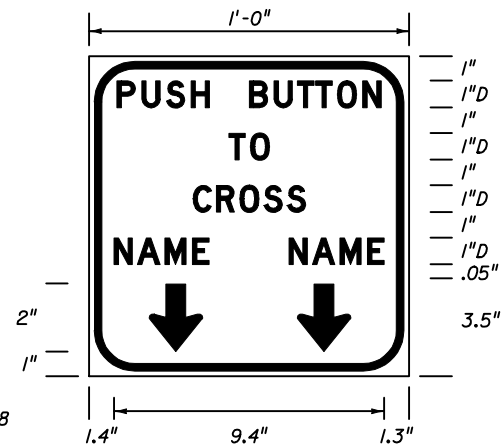


FTP - 46A  
9' X 4'-6"  
3" Radii 3/4" Border  
8" Series D Legend  
White Background  
Black Legend & Border

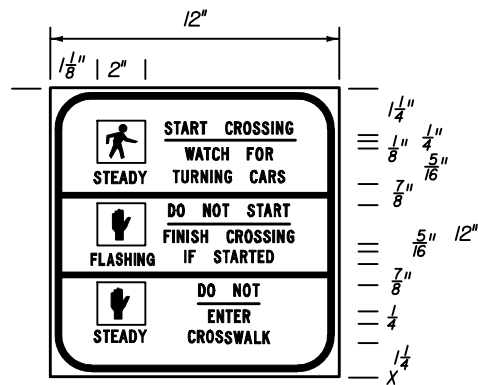


FTP - 47  
9" X 12"  
1/2" Radii 3/4" Border  
1" Series D Legend  
White Background  
Black Legend & Border

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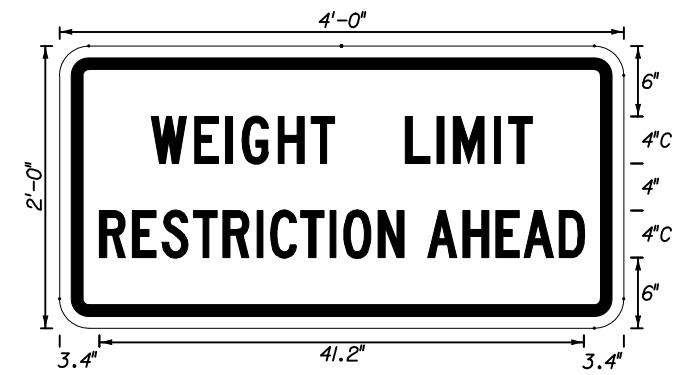
FTP - 48  
1' X 1'  
1/2" Radii 3/4" Border  
1" Series D Legend  
White Background  
Black Legend & Border



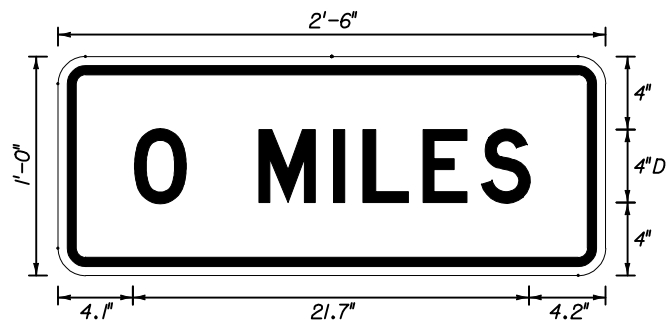
FTP - 49  
1' X 1'  
1/2" Radii 3/4" Border  
Series C Legend  
White Background  
Black Legend & Border

Notes for FTP 49:

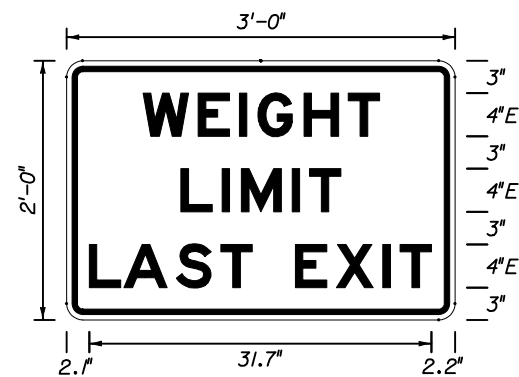
1. Text for FTP 49 shall be 1/2".
2. Spacing between lines of legend shall be 5/16" except as noted.
3. Underbar spacing as detailed.
4. Colors shall be White background with Black legend and border.  
International Walk Symbol White on Black background.  
International Don't Walk Symbol Orange on Black background.



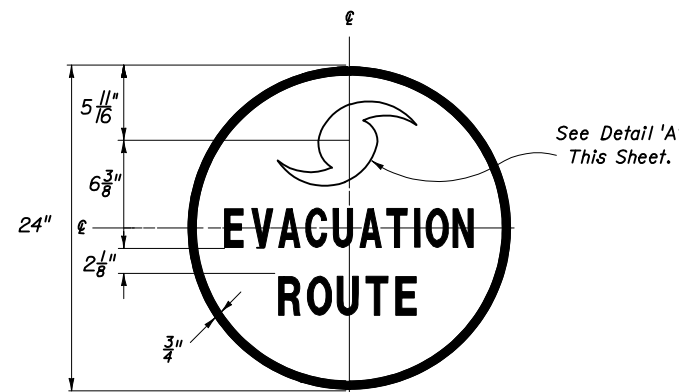
FTP - 50  
4' X 2'  
1/2" Radii 3/4" Border  
4" Series C  
Yellow Background  
Black Legend & Border



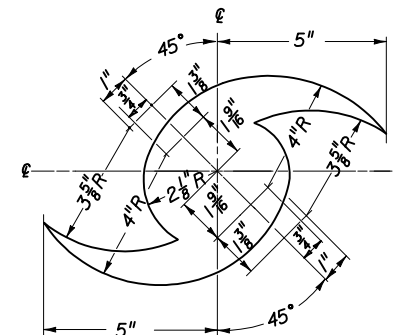
FTP - 51  
2'-6" X 1'  
1/2" Radii 3/4" Border  
4" Series D  
White Background  
Black Legend & Border



FTP - 52  
3' X 2'  
1/2" Radii 3/4" Border  
4" Series E  
White Background  
Black Legend & Border

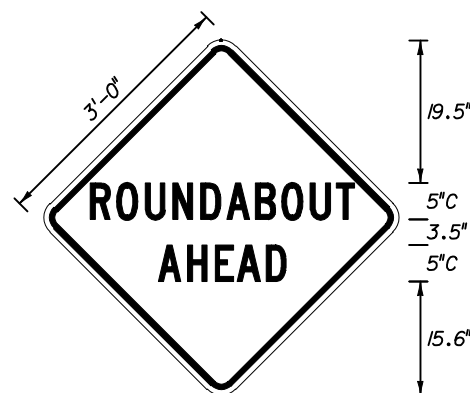


FTP - 53  
2' Diameter  
3/4" Border  
3" Series C  
Blue Background  
White Legend, Border & Symbol

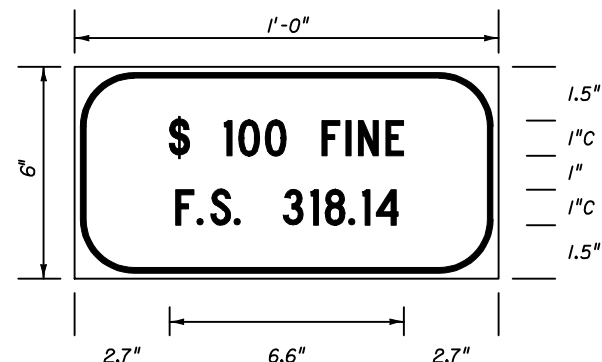


DETAIL 'A' for FTP - 53

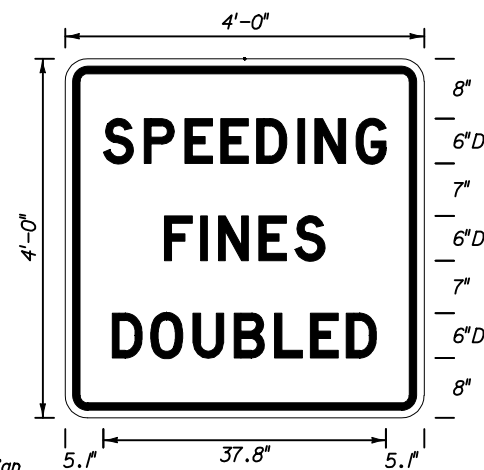
Symbol



FTP - 54  
3' X 3'  
2" Radii 3/4" Border  
5" Series D  
Yellow Background  
Black Legend & Border

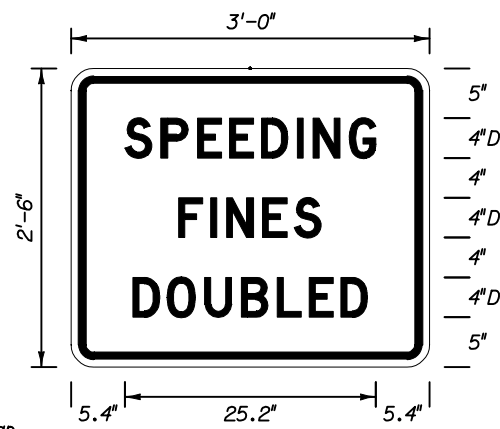


FTP - 55  
1' X 6"  
1/2" Radii 3/4" Border  
1" Series C  
White Background  
Black Legend & Border  
Supplemental panel for the FTP-25 and FTP-26 signs

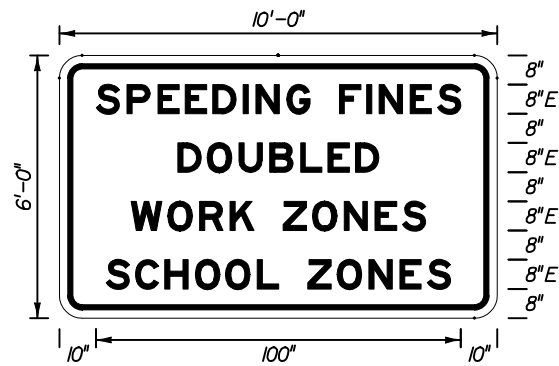


FTP - 56  
Freeway Sign  
4' X 4'  
3" Radii 3/4" Border  
6" Series D  
White Background  
Black Legend & Border

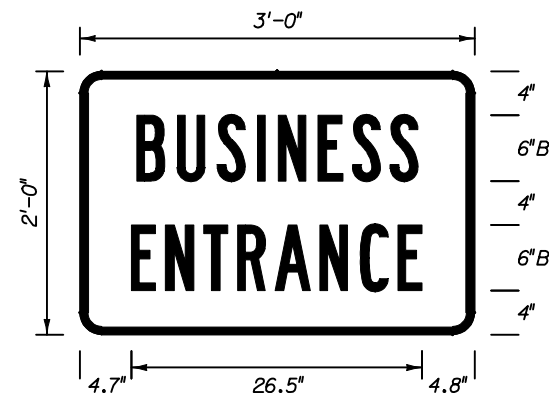
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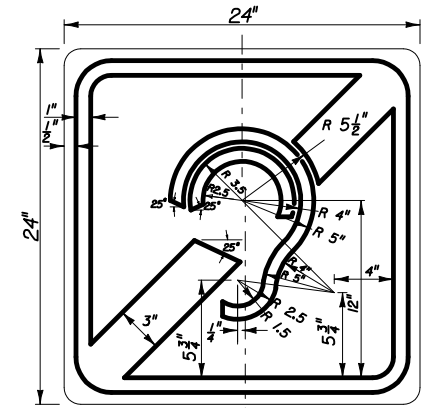
FTP - 57  
Arterial Sign  
3' X 2'-6"  
2" Radii 3/4" Border  
4" Series D  
White Background  
Black Legend & Border



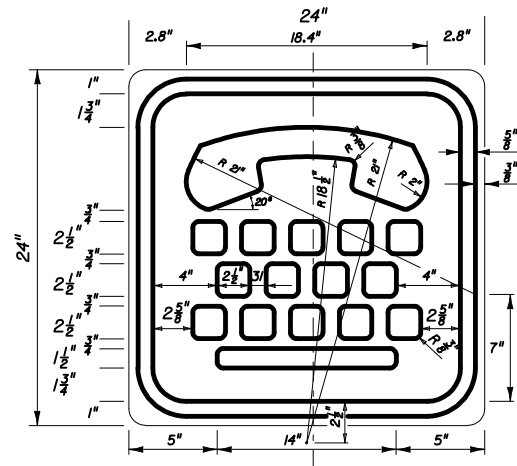
FTP - 58  
State Line Sign  
10' X 6'  
3" Radii 2" Border  
8" Series E  
White Background  
Black Legend & Border



FTP - 59  
3' X 2'  
1 1/2" Radii 3/4" Border  
6" Series B  
Blue Background  
White Legend & Border

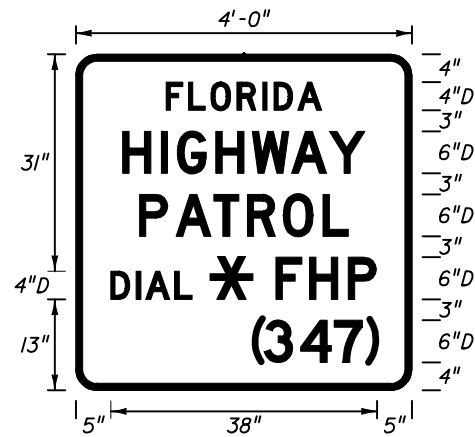


FTP - 60 INTERNATIONAL SYMBOL OF ACCESS FOR HEARING LOSS  
24" X 24"  
1 1/2" Radii 3/4" Border  
Blue Background  
White Legend & Border

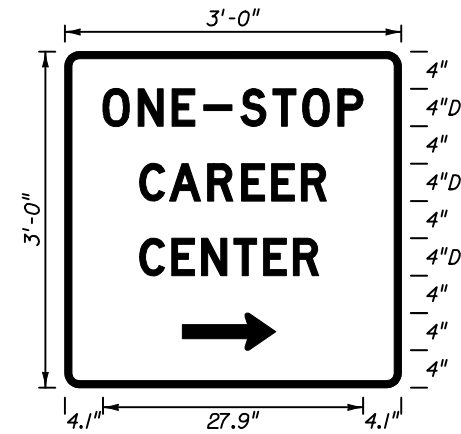


FTP - 61  
2' X 2'  
1 1/2" Radii 3/4" Border  
Blue Background  
White Legend & Border

INTERNATIONAL TDD SYMBOL



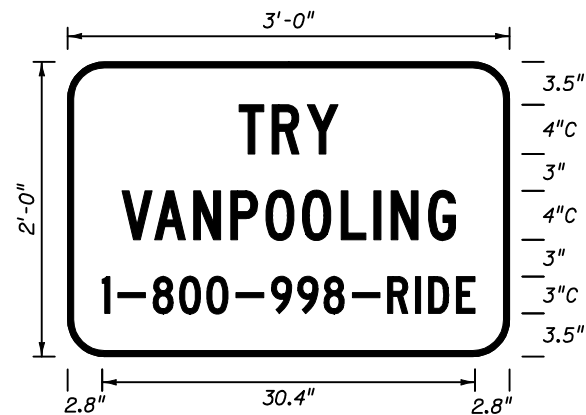
FTP - 62  
4' X 4'  
3" Radii 1" Border  
Series D  
Blue Background  
White Legend & Border



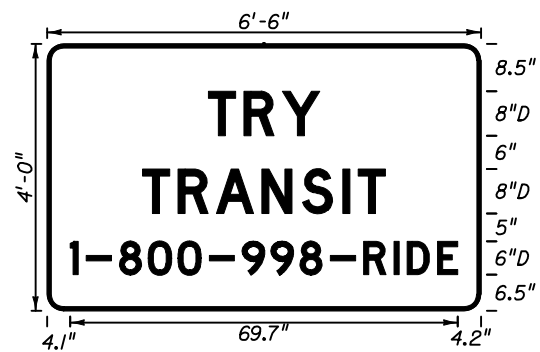
FTP - 63  
3' X 3'  
1 1/2" Radii  
4" Series D  
Green Background  
White Legend & Border



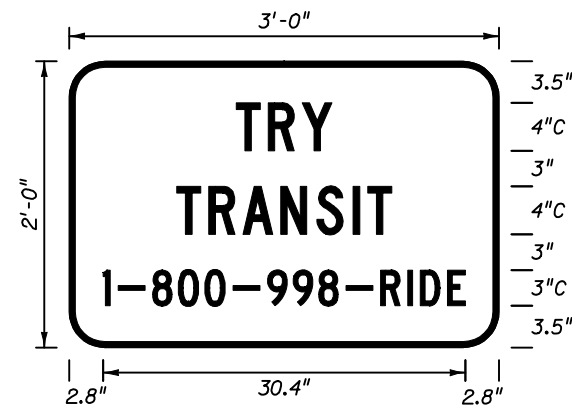
FTP - 64  
6'-6" X 4'  
3" Radii  
8" Series D  
6" Series D  
Blue Background  
White Legend & Border



FTP - 65  
3' X 2'  
3" Radii  
4" Series C  
3" Series C  
Blue Background  
White Legend & Border



FTP - 66  
6'-6" X 4'  
3" Radii  
8" Series D  
6" Series D  
Blue Background  
White Legend & Border



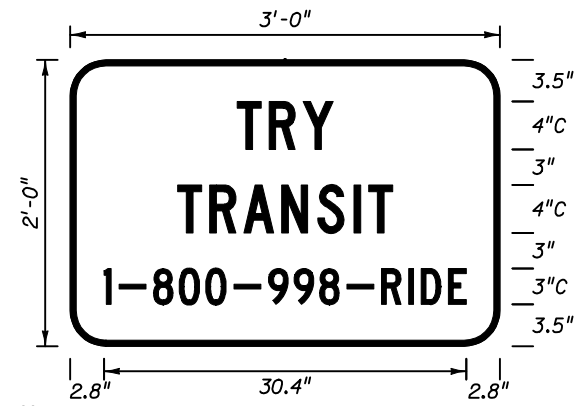
FTP - 67  
3' X 2'  
3" Radii  
4" Series C  
3" Series C  
Blue Background  
White Legend & Border

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FTP - 68  
6'-6" X 4'  
3" Radii  
8" Series D  
6" Series D  
Blue Background  
White Legend & Border



FTP - 69  
3' X 2'  
3" Radii  
4" Series C  
3" Series C  
Blue Background  
White Legend & Border



FTP - 70  
3'-6" X 4'  
1 1/2" Radii 3/4" Border  
3" Series C  
6" Series C  
White Background  
Black Legend & Border



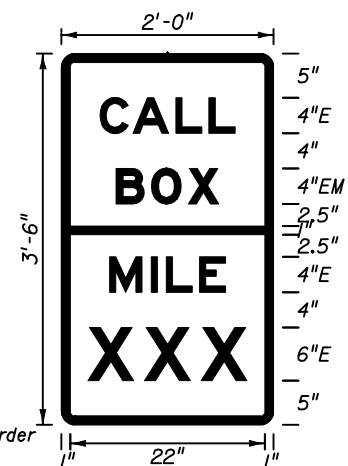
FTP - 71  
2'-6" X 3'  
1 1/2" Radii 3/4" Border  
2" Series C  
4" Series C  
White Background  
Black Legend & Border



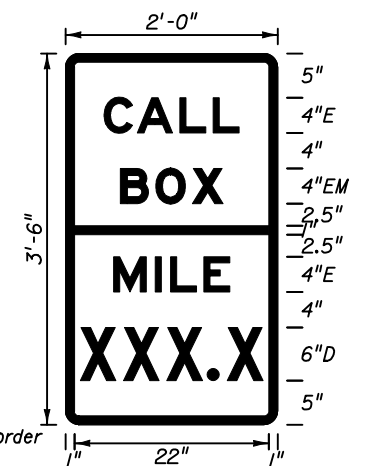
FTP - 72  
9' X 6'  
9" Radii 3/4" Border  
8" Series D  
White Background  
Black Legend & Border



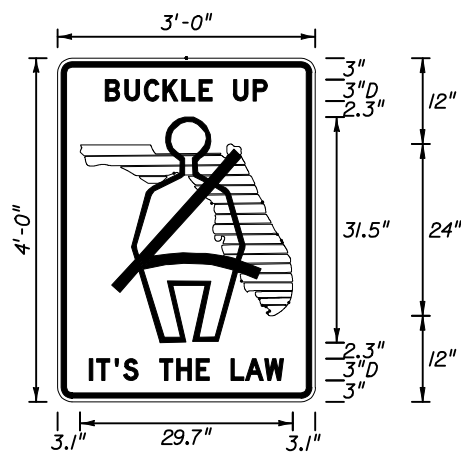
FTP - 73  
4' X 3'  
1 1/2" Radii 3/4" Border  
4" Series C  
White Background  
Black Legend & Border



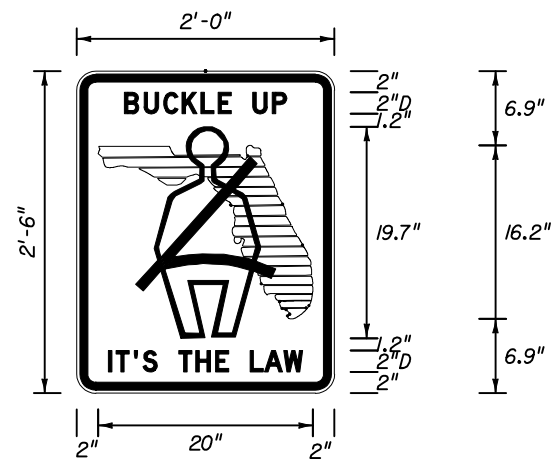
FTP - 74  
2' X 3'-6"  
1 1/2" Radii  
Top  
4" Series E  
4" Series EM  
Blue Background  
White legend & Border  
Bottom  
4" Series E  
6" Series E  
Green Background  
White Legend & Border



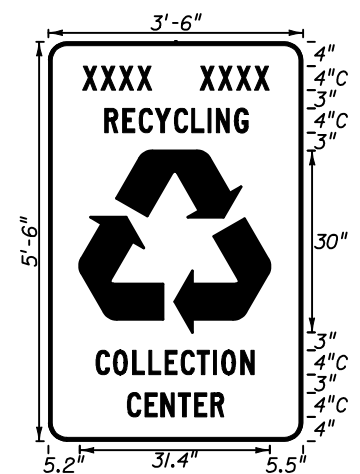
FTP - 75  
2' X 3'-6"  
1 1/2" Radii  
Top  
4" Series E  
4" Series EM  
Blue Background  
White legend & Border  
Bottom  
4" Series E  
6" Series D  
Green Background  
White Legend & Border



FTP - 76  
3' X 4'  
1 1/2" Radii 3/4" Border  
3" Series D  
White Background  
Black Legend, Border & Man Belt Symbol  
Florida Shield Green



FTP - 77  
3' X 4'  
1 1/2" Radii 3/4" Border  
2" Series D  
White Background  
Black Legend, Border & Man Belt Symbol  
Florida Shield Green



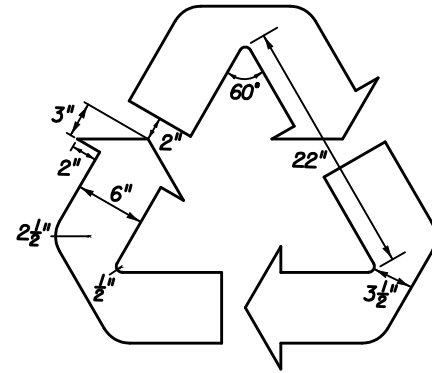
FTP - 78  
3'-6" X 5'-6"  
3" Radii  
4" Series C  
Green Background  
White Legend, Border & Symbol  
Municipality Name Optional

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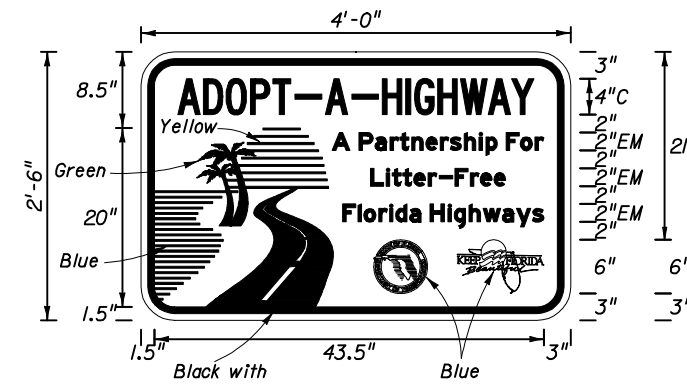


See Detail 'B'  
This Sheet.

FTP - 79  
3'-6" X 5'  
3" Radii  
4" Series C  
Green Background  
White Legend, Border & Symbol

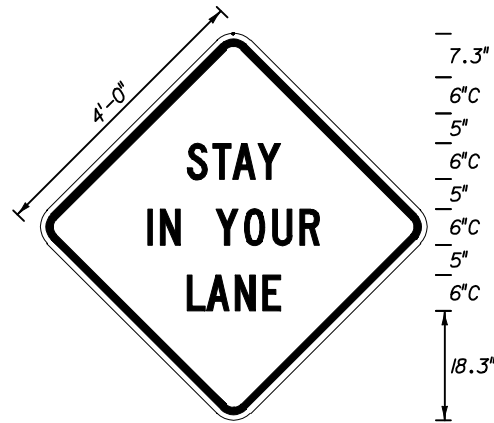


DETAIL 'B' for FTP - 79

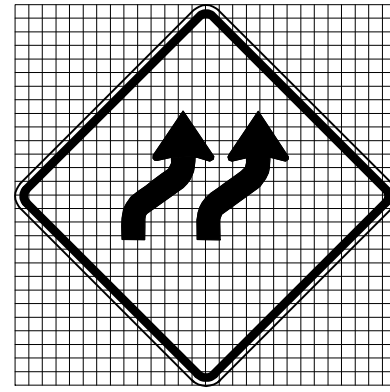


FTP - 80  
4" X 2"-6"  
3" Radii  
4" Series C  
2" Series EM  
White Background  
Blue Legend & Border

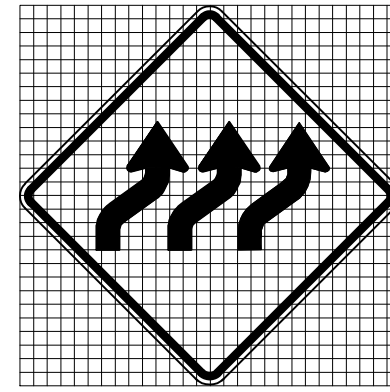
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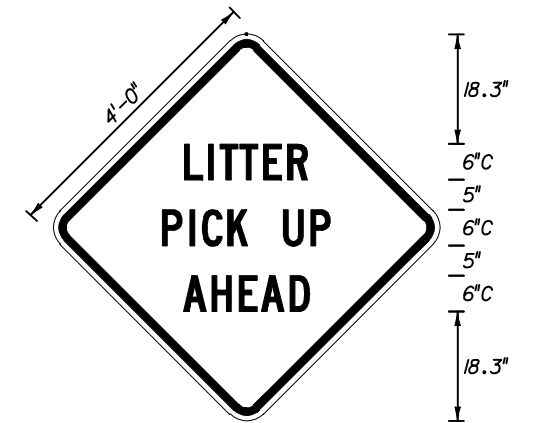
MOT - 1  
4' X 4'  
3" Radii 3/4" Border  
6" Series C Legend  
Orange Background  
Black Legend & Border



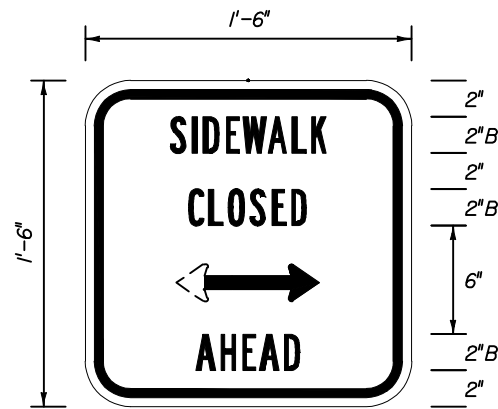
MOT - 2  
4' X 4'  
3" Radii 3/4" Border  
Grid = 2" X 2"  
Orange Background  
Black Arrows & Border



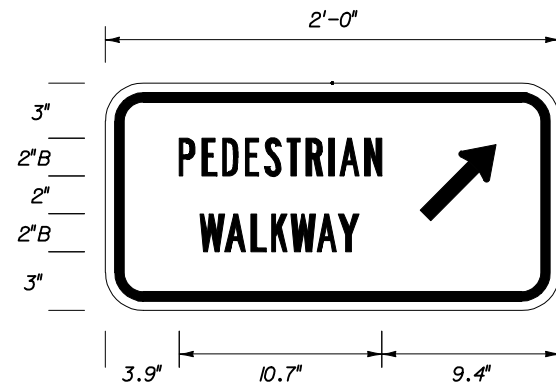
MOT - 3  
4' X 4'  
3" Radii 3/4" Border  
Grid = 2" X 2"  
Orange Background  
Black Arrows & Border



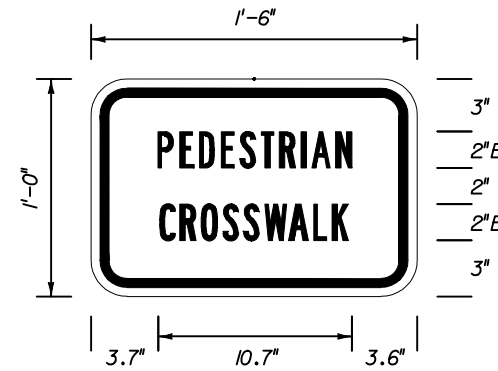
MOT - 4  
4' X 4'  
3" Radii 3/4" Border  
Orange Background  
Black Arrows & Border



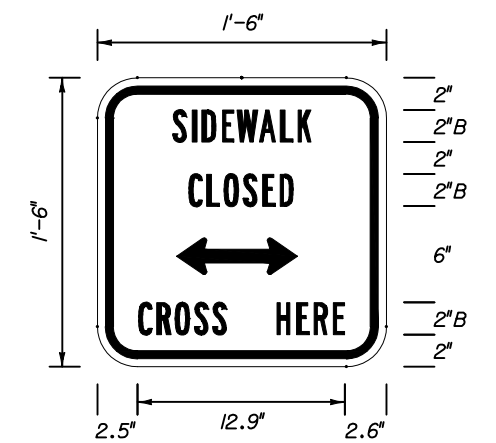
MOT - 5  
1'-6" X 1'-6"  
2" Radii 3/4" Border  
2" Series B Legend  
White Background  
Black Legend & Border



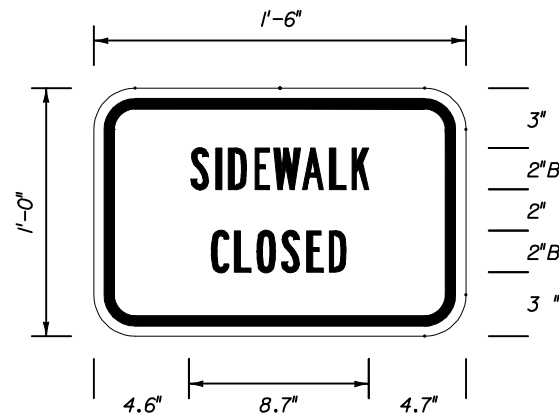
MOT - 6  
2' X 1'  
1 1/2" Radii 3/4" Border  
2" Series B Legend  
White Background  
Black Legend & Border



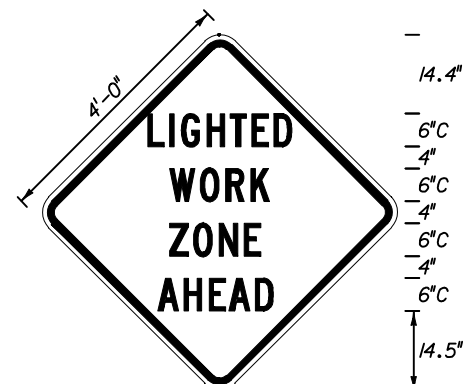
MOT - 7  
1'-6" X 1'  
1 1/2" Radii 3/4" Border  
2" Series B Legend  
White Background  
Black Legend & Border



MOT - 8  
1'-6" X 1'-6"  
2 1/4" Radii 3/4" Border  
2" Series B Legend  
White Background  
Black Legend & Border



MOT - 9  
1'-6" X 1'  
1 1/2" Radii 3/4" Border  
2" Series B Legend  
White Background  
Black Legend & Border

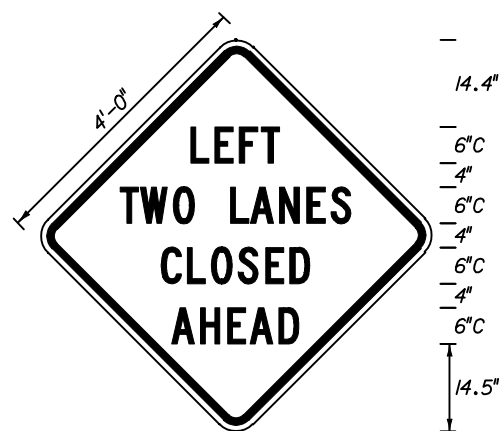


MOT - 10  
4' X 4'  
3" Radii 3/4" Border  
6" Series C Legend  
Orange Background  
Black Legend & Border

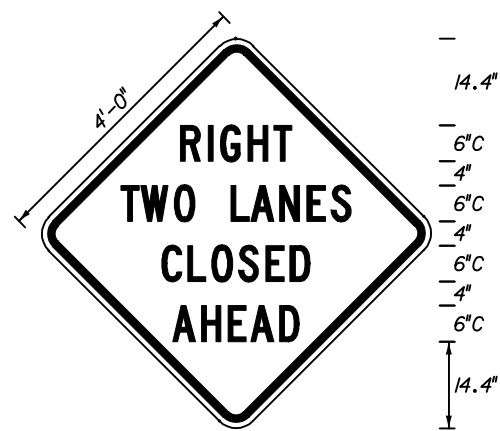


MOT - 11  
4' X 4'  
3" Radii 3/4" Border  
6" Series C Legend  
Orange Background  
Black Legend & Border

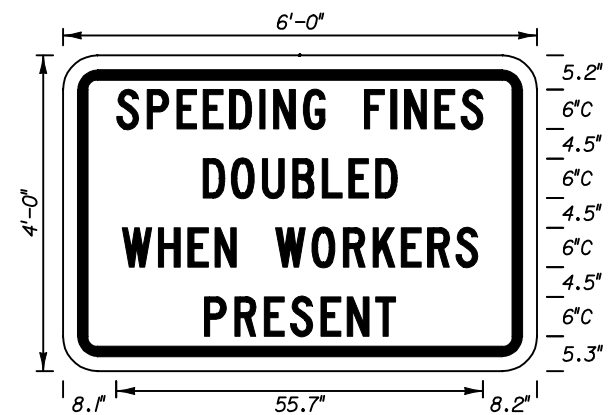
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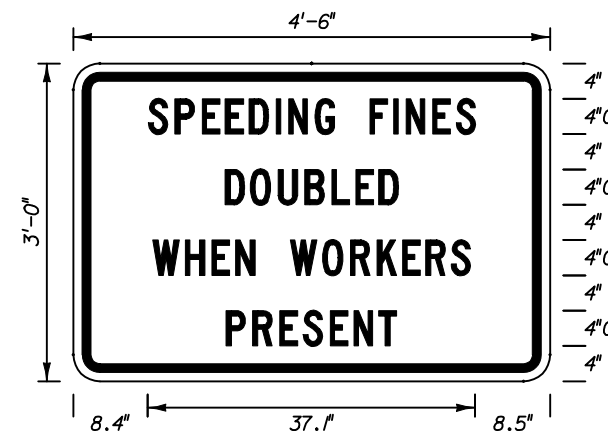
MOT - 12  
4' X 4'  
3" Radii  $\frac{3}{4}$ " Border  
6" Series C Legend  
Orange Background  
Black Legend & Border



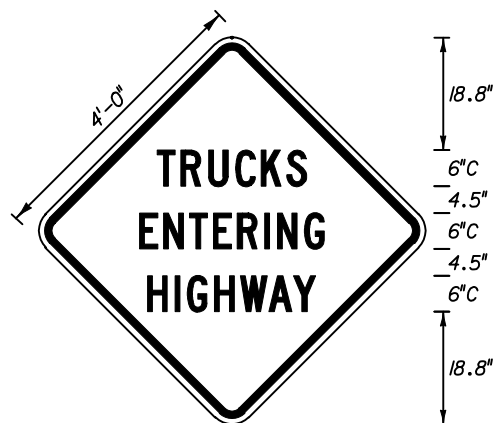
MOT - 13  
4' X 4'  
3" Radii  $\frac{3}{4}$ " Border  
6" Series C Legend  
Orange Background  
Black Legend & Border



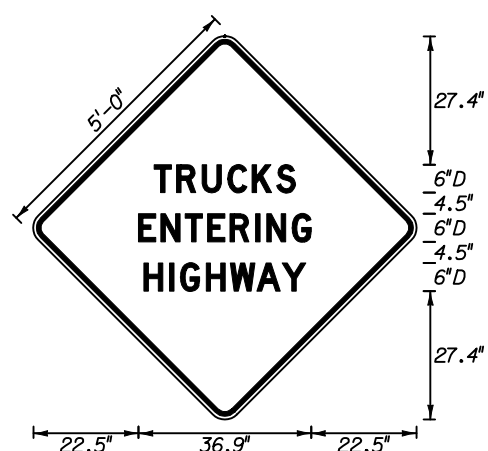
MOT - 14  
6' X 4'  
3" Radii  $\frac{3}{4}$ " Border  
6" Series C Legend  
White Background  
Black Legend & Border



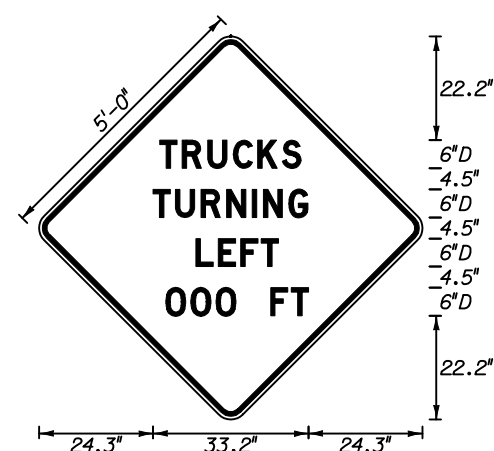
MOT - 15  
4'-6" X 3'  
3" Radii  $\frac{3}{4}$ " Border  
4" Series C Legend  
White Background  
Black Legend & Border



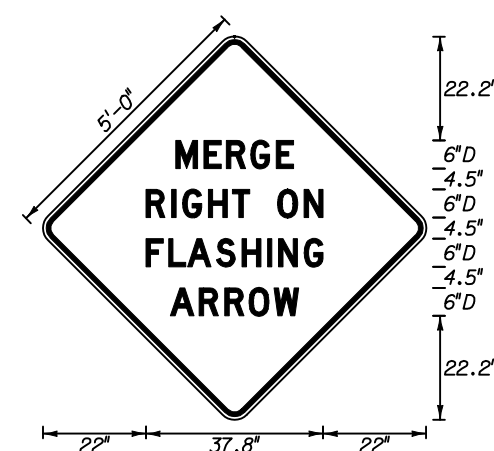
MOT - 16  
4' X 4'  
3" Radii  $\frac{3}{4}$ " Border  
6" Series C Legend  
Orange Background  
Black Legend & Border



MOT - 17  
5' X 5'  
3" Radii 1" Border  
6" Series D Legend  
Orange Background  
Black Legend & Border

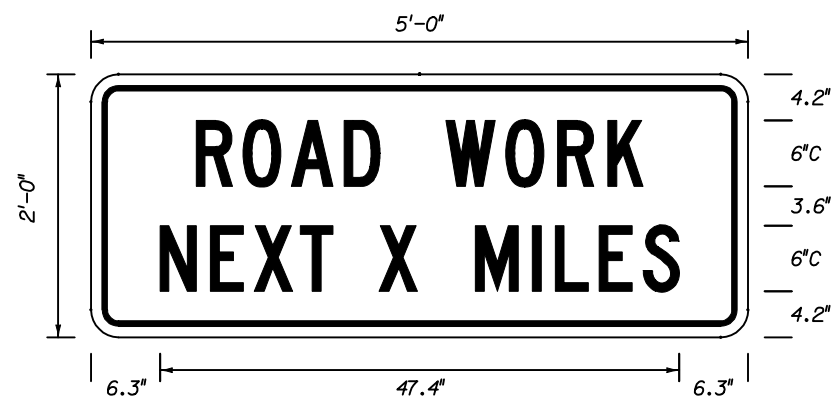


MOT - 18  
5' X 5'  
3" Radii 1" Border  
6" Series D Legend  
Orange Background  
Black Legend & Border

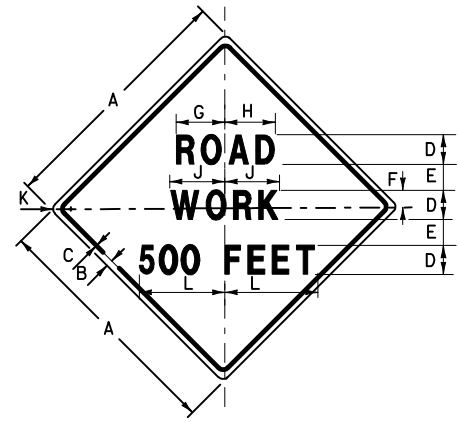


MOT - 19  
5' X 5'  
3" Radii 1" Border  
6" Series D Legend  
Orange Background  
Black Legend & Border

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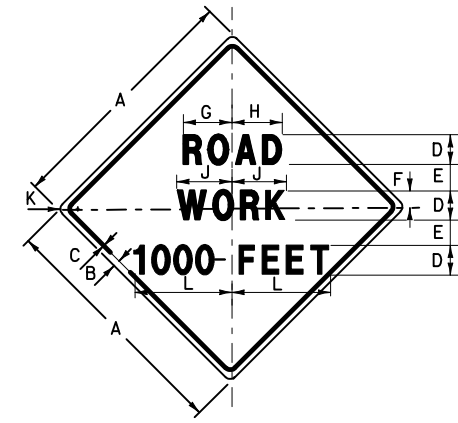


G20-1  
5' X 2'  
1.5 Radii .75 Border  
6" Series C Legend  
Orange Background  
Black Legend & Border



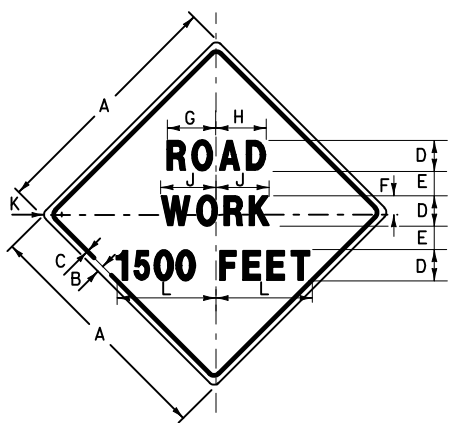
W20-1A  
LEGEND AND BORDER: BLACK  
BACKGROUND: ORANGE

DIMENSIONS IN INCHES										
A	B	C	D	E	F	G	H	J	K	L
36	$\frac{5}{8}$	$\frac{7}{8}$	5D	$3\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{3}{8}$	$8\frac{7}{8}$	9	$2\frac{1}{4}$	$17\frac{1}{4}$
48	$\frac{3}{4}$	$1\frac{1}{4}$	7D	$4\frac{3}{4}$	$4\frac{1}{2}$	$11\frac{11}{16}$	$12\frac{7}{16}$	$12\frac{5}{8}$	3	24



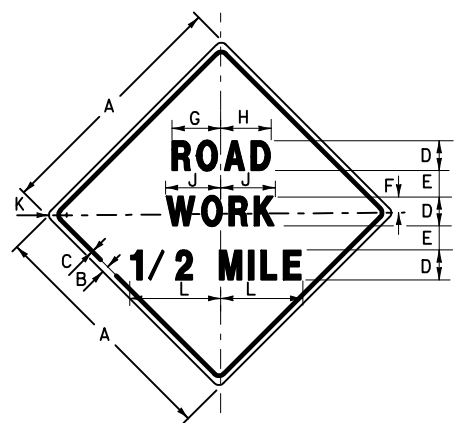
W20-1B  
LEGEND AND BORDER: BLACK  
BACKGROUND: ORANGE

DIMENSIONS IN INCHES										
A	B	C	D	E	F	G	H	J	K	L
36	$\frac{5}{8}$	$\frac{7}{8}$	5D	$3\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{3}{8}$	$8\frac{7}{8}$	9	$2\frac{1}{4}$	$18\frac{3}{8}$
48	$\frac{3}{4}$	$1\frac{1}{4}$	7D	$4\frac{3}{4}$	$4\frac{1}{2}$	$11\frac{11}{16}$	$12\frac{5}{8}$	$12\frac{5}{8}$	3	$25\frac{7}{8}$



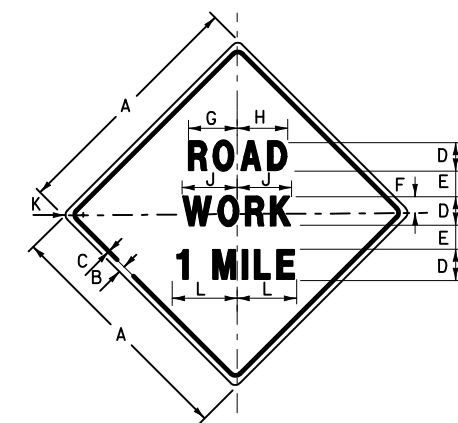
W20-1C  
LEGEND AND BORDER: BLACK  
BACKGROUND: ORANGE

DIMENSIONS IN INCHES										
A	B	C	D	E	F	G	H	J	K	L
36	$\frac{5}{8}$	$\frac{7}{8}$	5D	$3\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{3}{8}$	$8\frac{7}{8}$	9	$2\frac{1}{4}$	$18\frac{3}{8}$
48	$\frac{3}{4}$	$1\frac{1}{4}$	7D	$4\frac{3}{4}$	$4\frac{1}{2}$	$11\frac{11}{16}$	$12\frac{7}{16}$	$12\frac{5}{8}$	3	$25\frac{3}{4}$



W20-1D  
LEGEND AND BORDER: BLACK  
BACKGROUND: ORANGE

DIMENSIONS IN INCHES										
A	B	C	D	E	F	G	H	J	K	L
36	$\frac{5}{8}$	$\frac{7}{8}$	5D	$3\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{3}{8}$	$8\frac{7}{8}$	9	$2\frac{1}{4}$	$16\frac{3}{4}$
48	$\frac{3}{4}$	$1\frac{1}{4}$	7D	$4\frac{3}{4}$	$4\frac{1}{2}$	$11\frac{11}{16}$	$12\frac{7}{16}$	$12\frac{5}{8}$	3	22



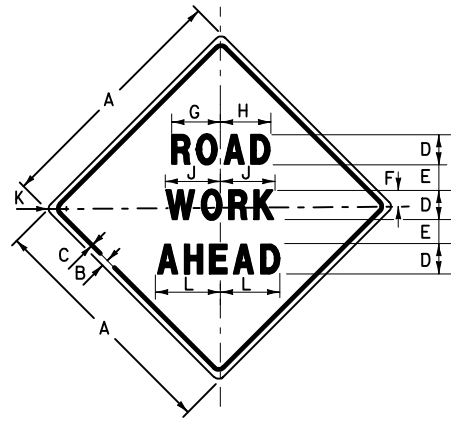
W20-1E  
LEGEND AND BORDER: BLACK  
BACKGROUND: ORANGE

DIMENSIONS IN INCHES										
A	B	C	D	E	F	G	H	J	K	L
36	$\frac{5}{8}$	$\frac{7}{8}$	5D	$3\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{3}{8}$	$8\frac{7}{8}$	9	$2\frac{1}{4}$	$11\frac{3}{8}$
48	$\frac{3}{4}$	$1\frac{1}{4}$	7D	$4\frac{3}{4}$	$4\frac{1}{2}$	$11\frac{11}{16}$	$12\frac{5}{8}$	$12\frac{5}{8}$	3	$15\frac{7}{8}$

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SPECIAL SIGN DETAILS**

Names	Dates	Approved By	<i>Charles Scott</i>	
Designed By		State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	13 of 14	17355



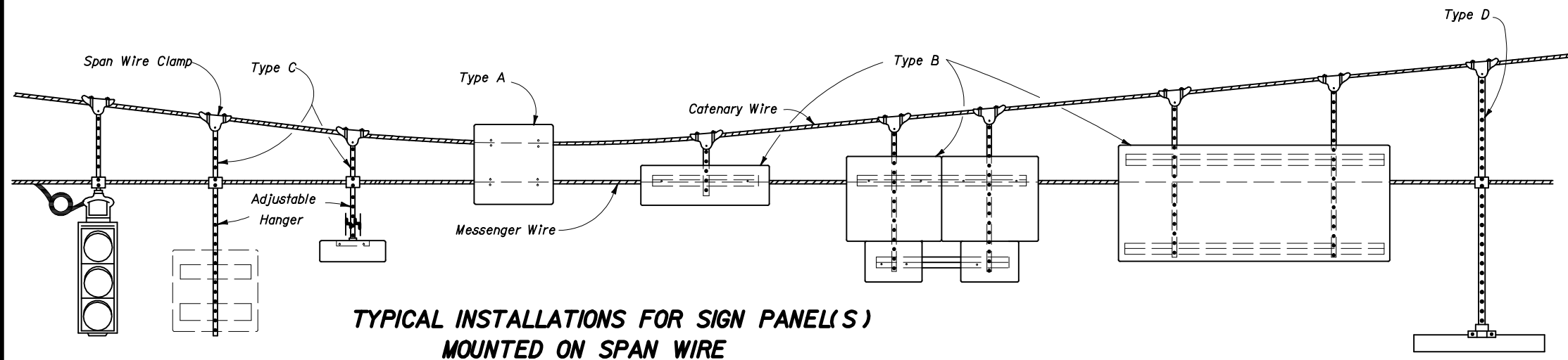
W20-IF  
 LEGEND AND BORDER: BLACK  
 BACKGROUND: ORANGE

DIMENSIONS IN INCHES										
A	B	C	D	E	F	G	H	J	K	L
36	$\frac{5}{8}$	$\frac{7}{8}$	5D	$3\frac{1}{2}$	$3\frac{1}{4}$	$8\frac{3}{8}$	$8\frac{7}{8}$	9	$2\frac{1}{4}$	11
48	$\frac{3}{4}$	$1\frac{1}{4}$	7D	$4\frac{3}{4}$	$4\frac{1}{2}$	$11\frac{11}{16}$	$12\frac{7}{16}$	$12\frac{5}{8}$	3	$15\frac{1}{4}$

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

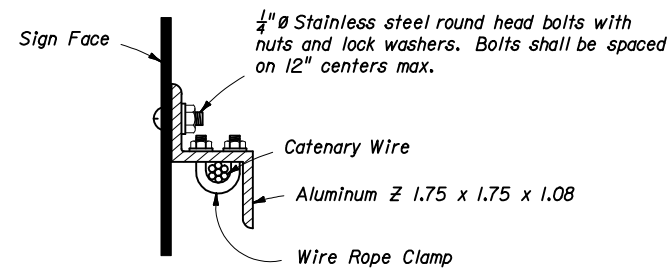
**SPECIAL SIGN DETAILS**

Designed By	Names	Dates	Approved By
Drawn By			<i>Charles Scott</i> State Traffic Standards Engineer
Checked By			Revision
			Sheet No.
			Index No.
			00
			14 of 14
			17355

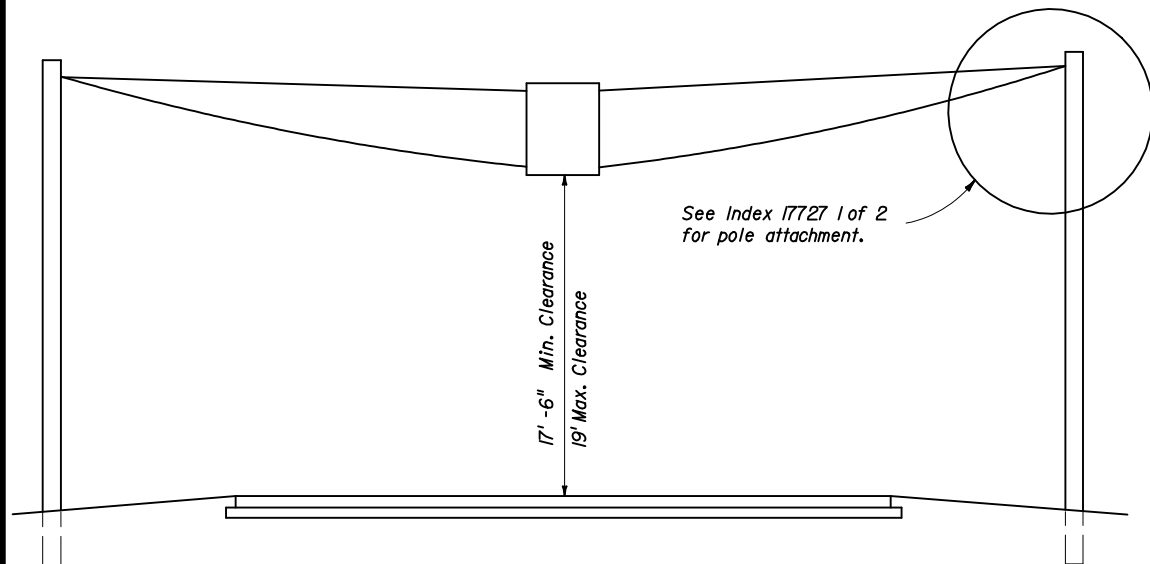


**TYPICAL INSTALLATIONS FOR SIGN PANEL(S)  
MOUNTED ON SPAN WIRE**

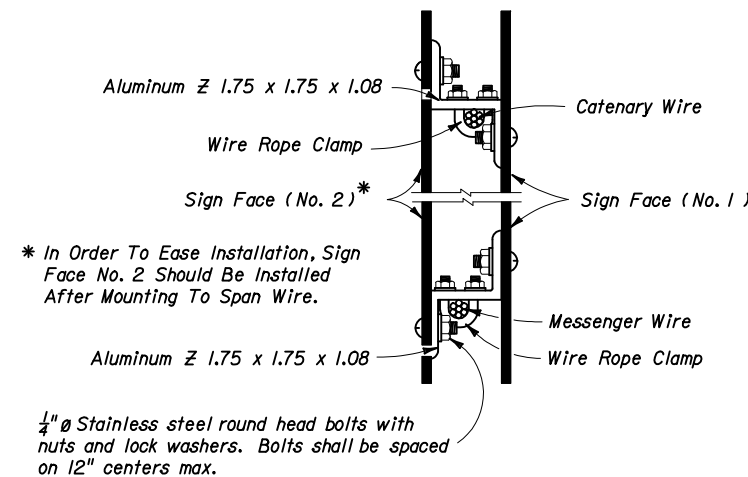
- Notes :
1. Bottom edge of signs shall be approximately at the same elevation.
  2. Span wire installations that support only signs should be provided with a minimum panel weight of 7 PSF.
  3. Type B & C attachments with one hanger shall have wind beams for signs wider than 3½'. The beams shall extend to within 6" of the sign edge.
  4. Type B & C attachments for signs 4' and wider shall have 2 hangers. Signs 7' and wider shall have wind beams that extend to within 6" of the sign edge.
  5. Type D attachments shall be for signs 3½' wide or less.
  6. Sign panels shall meet the requirements of Index 9535.
  7. Refer to section 634 of the Standard Specifications For Road And Bridge Construction.
  8. All bolts, nuts, and washers shall be passivated stainless steel, AISI 300 series, commercial grade, type 316.



**SIGN MOUNTING DETAIL**



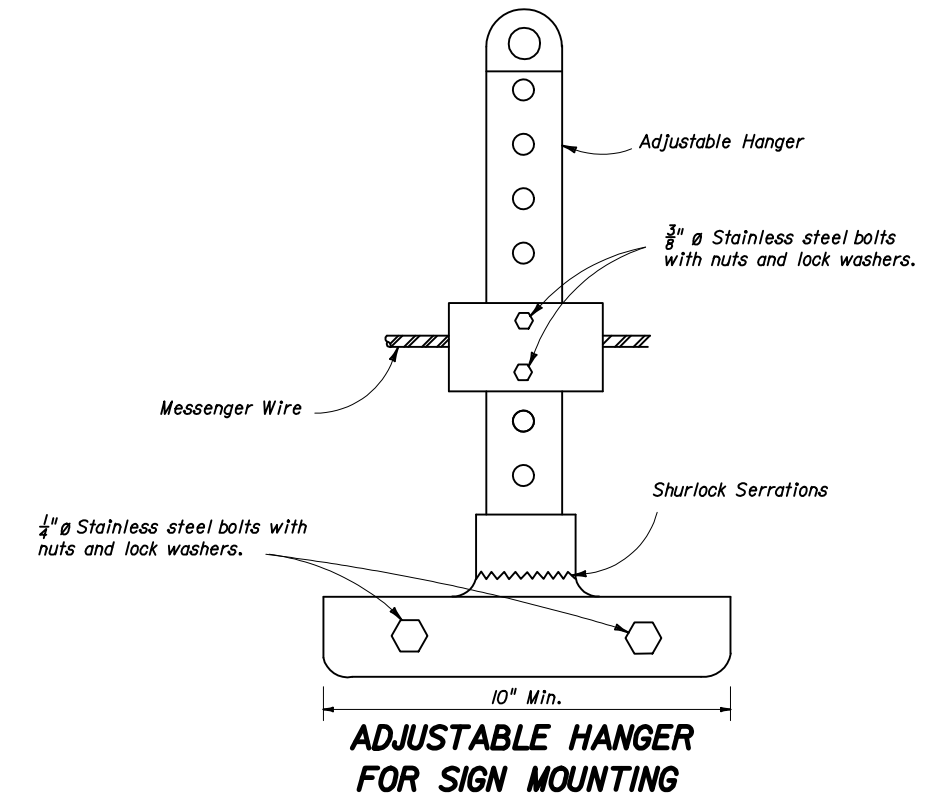
**TYPICAL SPAN WIRE INSTALLATION**



\* In Order To Ease Installation, Sign Face No. 2 Should Be Installed After Mounting To Span Wire.

The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing between bolts of 2".

**DETAIL OF OPPOSING  
SIGNS SPAN WIRE MOUNTED**

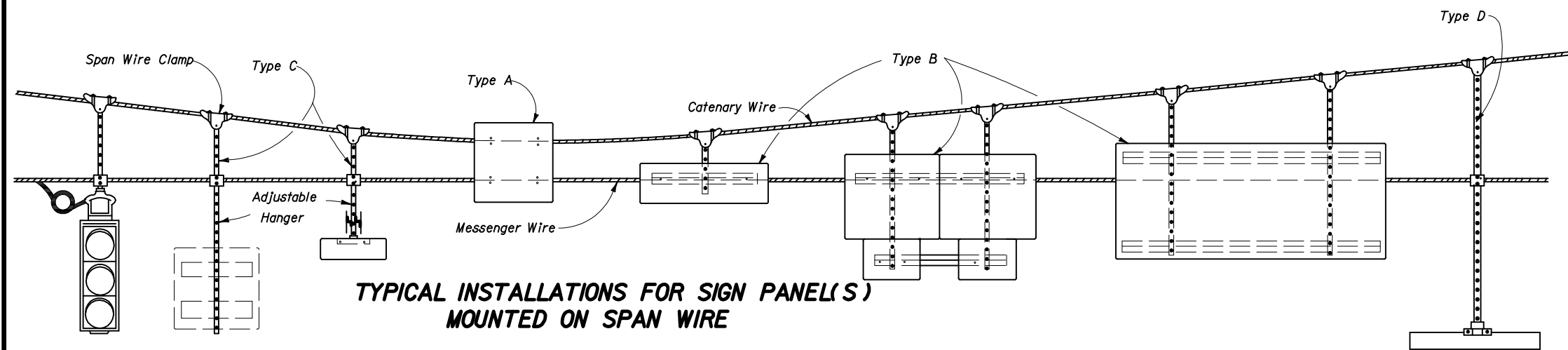


**SINGLE POINT ATTACHMENT**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

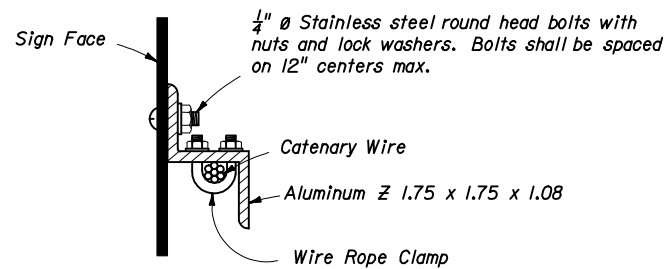
**SPAN WIRE MOUNTED  
SIGN DETAILS**

Names	Dates	Approved By		
Designed By		Charles A. Scott		
Drawn By		State Traffic Standards Engineer		
Checked By		Revision	Sheet No.	Index No.
		00	1 of 2	17356

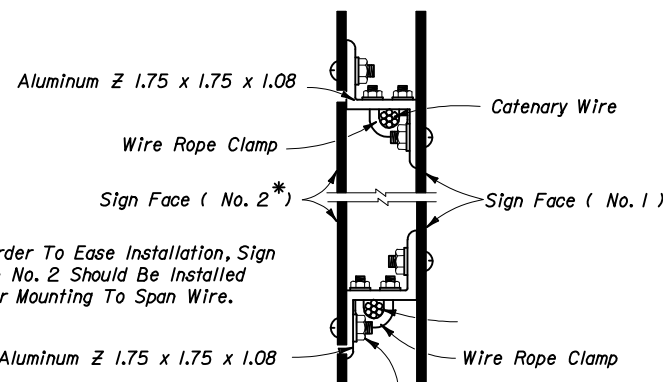


**TYPICAL INSTALLATIONS FOR SIGN PANEL(S)  
MOUNTED ON SPAN WIRE**

- Notes :
1. Bottom edge of signs shall be approximately at the same elevation.
  2. Type B & C attachments with one hanger shall have wind beams for signs wider than 3½'. The beams shall extend to within 6" of the sign edge.
  3. Type B & C attachments for signs 4' and wider shall have 2 hangers. Signs 7' and wider shall have wind beams that extend to within 6" of the sign edge.
  4. Type D attachments shall be for signs 3½' wide or less.
  5. Sign panels shall meet the requirements of Index 9535.
  6. Refer to section 634 of the Standard Specifications For Road And Bridge Construction.
  7. All bolts, nuts, and washers shall be passivated stainless steel, AISI 300 series, commercial grade, type 316.



**SIGN MOUNTING DETAIL**

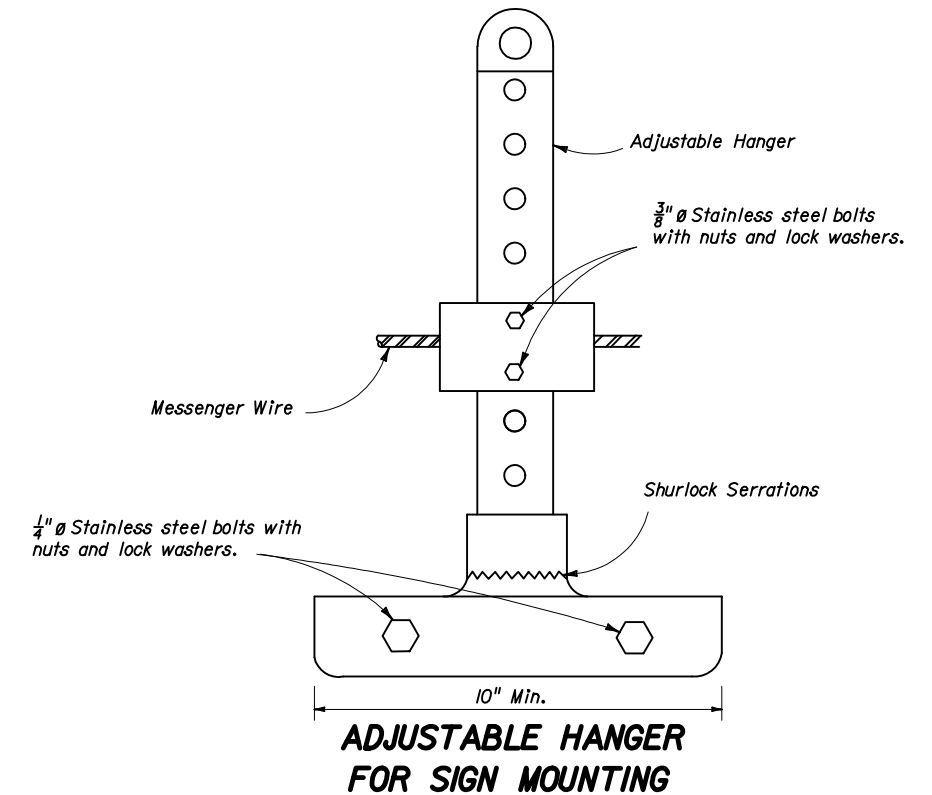


\* In Order To Ease Installation, Sign Face No. 2 Should Be Installed After Mounting To Span Wire.

1/4" Ø Stainless steel round head bolts with nuts and lock washers. Bolts shall be spaced on 12" centers max.

The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing between bolts of 2".

**DETAIL OF OPPOSING  
SIGNS SPAN WIRE MOUNTED**



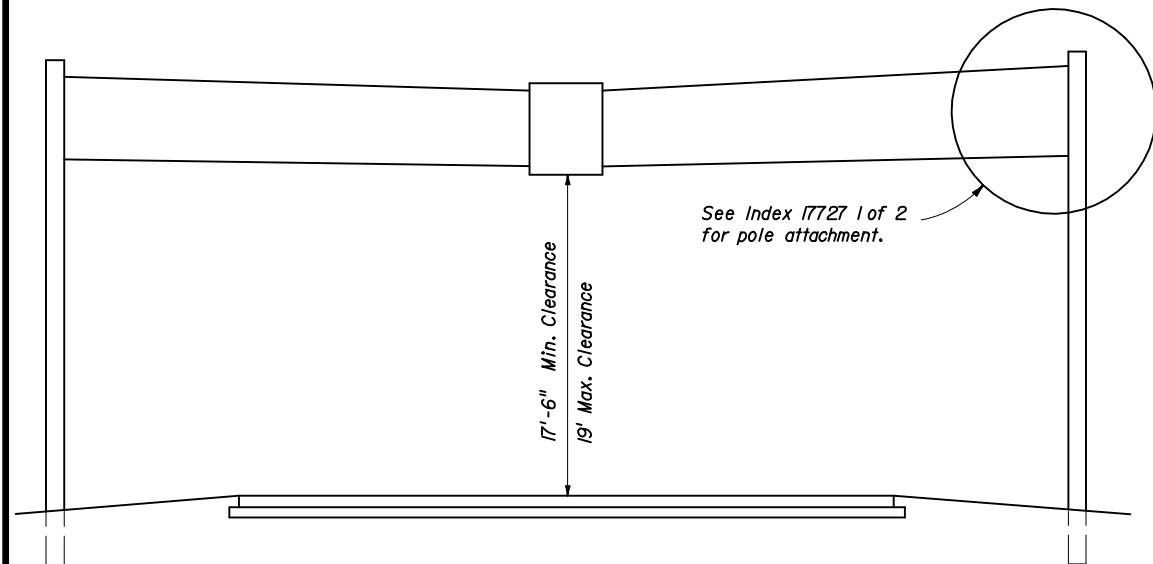
**ADJUSTABLE HANGER  
FOR SIGN MOUNTING**

**TWO POINT ATTACHMENT**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

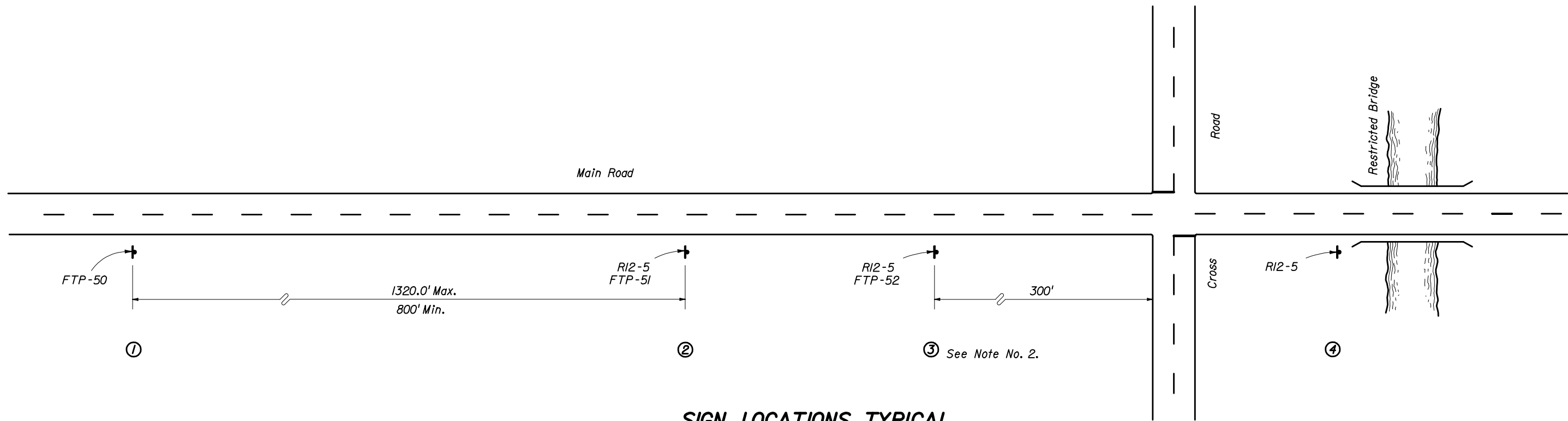
**SPAN WIRE MOUNTED  
SIGN DETAILS**

Names	Dates	Approved By <i>Charles A. Scott</i> State Traffic Standards Engineer		
Designed By		Revision	Sheet No.	Index No.
Drawn By		00	2 of 2	17356
Checked By				

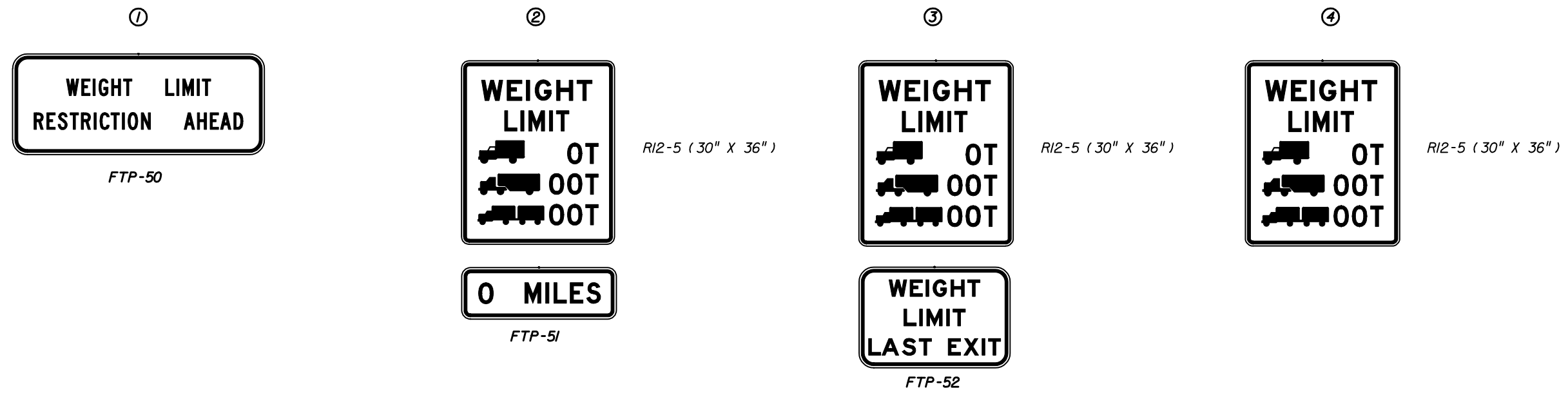


**TYPICAL SPAN WIRE INSTALLATION**



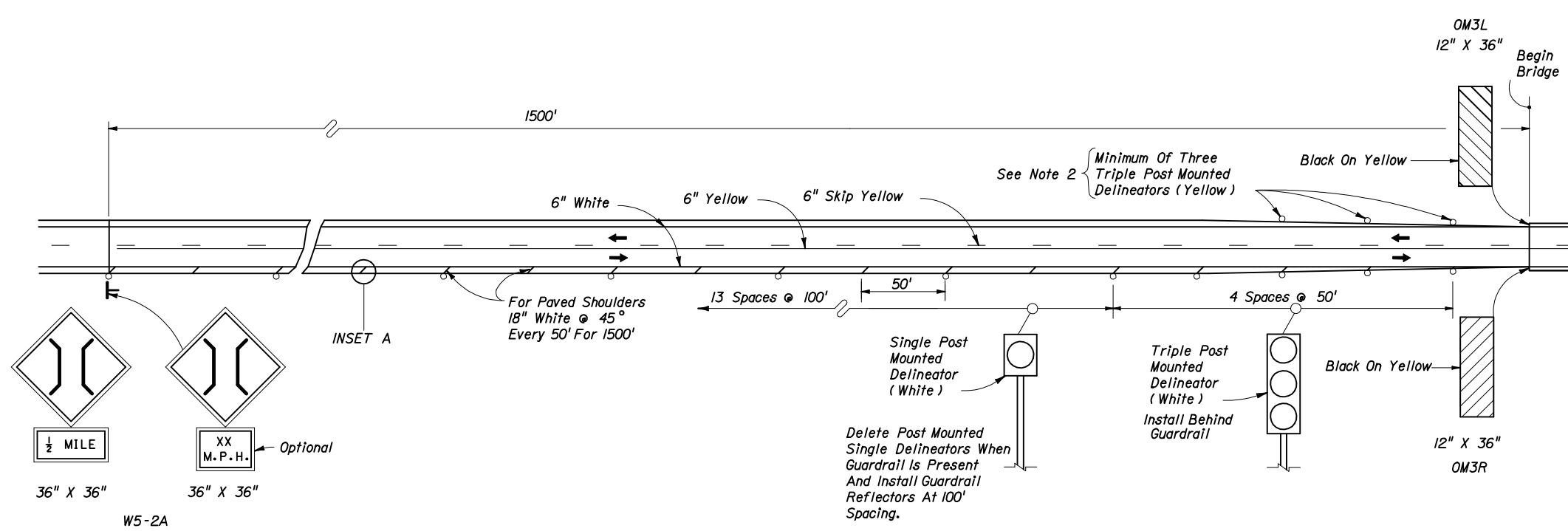


**SIGN LOCATIONS TYPICAL**

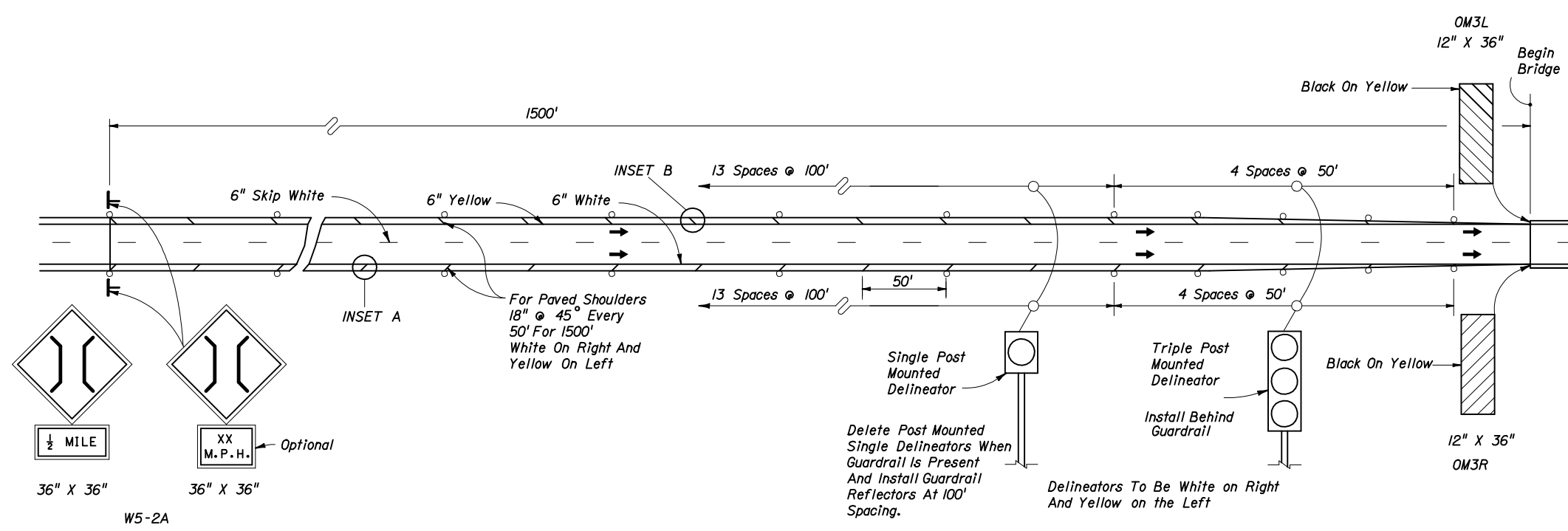


1. See Standard Highway Signs dated 1979 for sign R12-5 detail.
2. Sign locatin No. 3 may require some field adjustment.
3. The Cross Road is the last detour around the restricted bridge.
4. Sign location No. 2 should be established from the Cross Road the following approximate distances; Interstate-1 Mile Non- Interstate-1/2 Mile.
5. See Index 17355 for sign details.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>BRIDGE WEIGHT RESTRICTIONS</b>				
Designed By	Names	Dates	Approved By <i>Clark A. Scott</i> State Traffic Standards Engineer	
Drawn By			Revision	Sheet No. Index No.
Checked By			02	1 of 1 17357



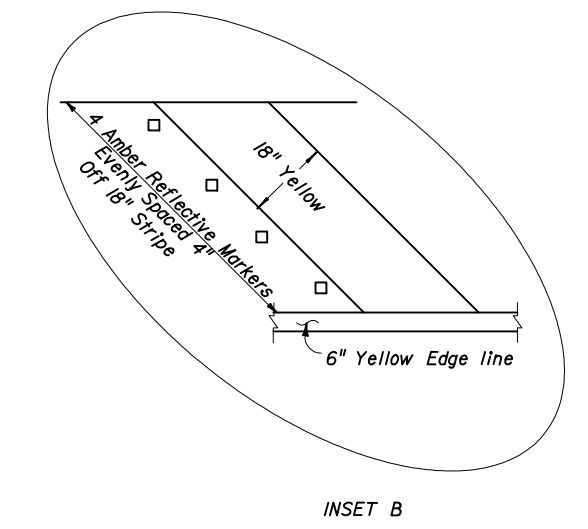
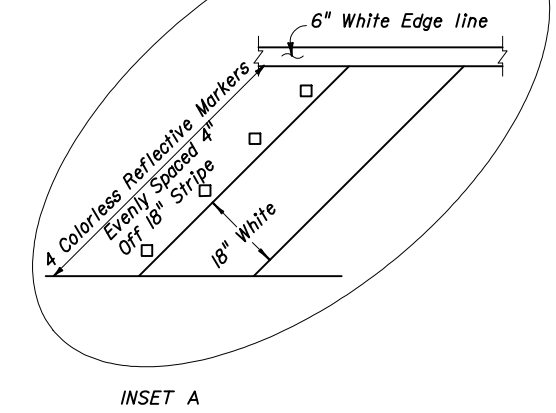
**TWO - WAY TRAFFIC**



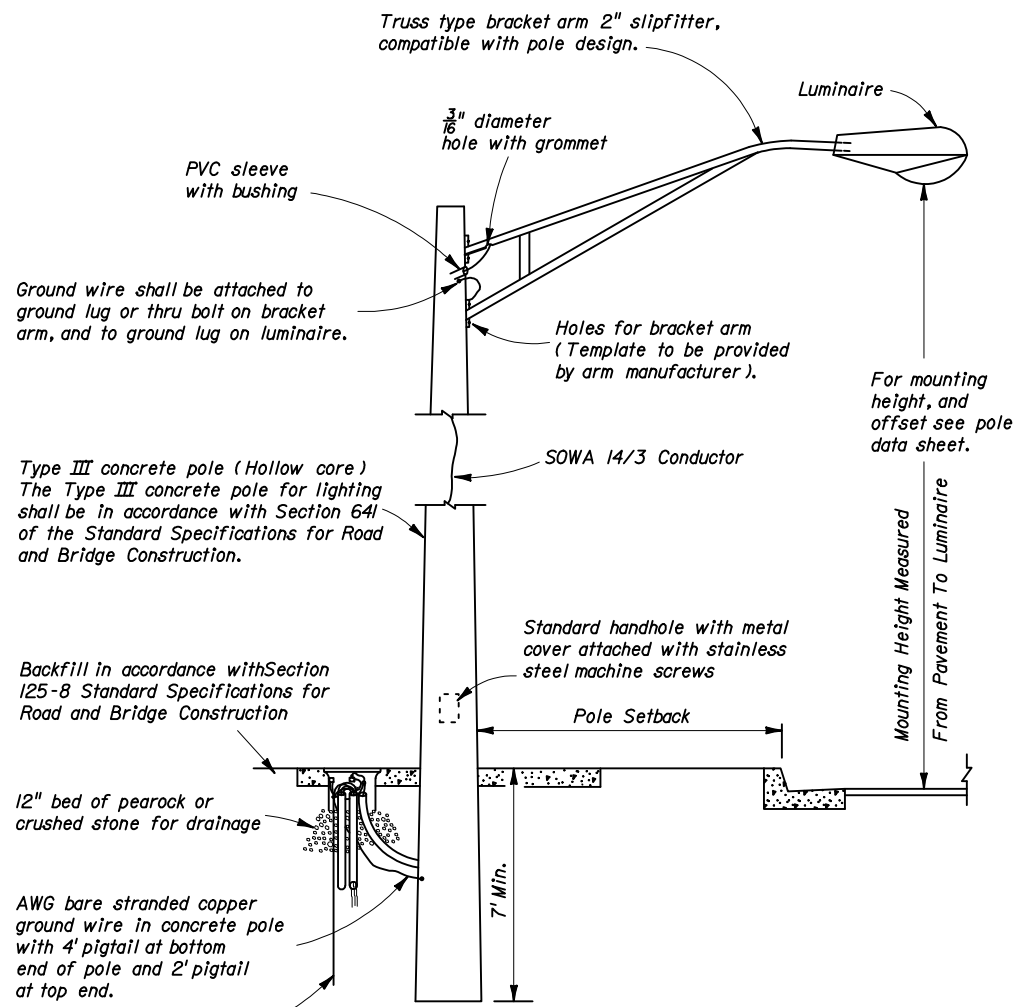
**ONE - WAY TRAFFIC**

**NOTES:**

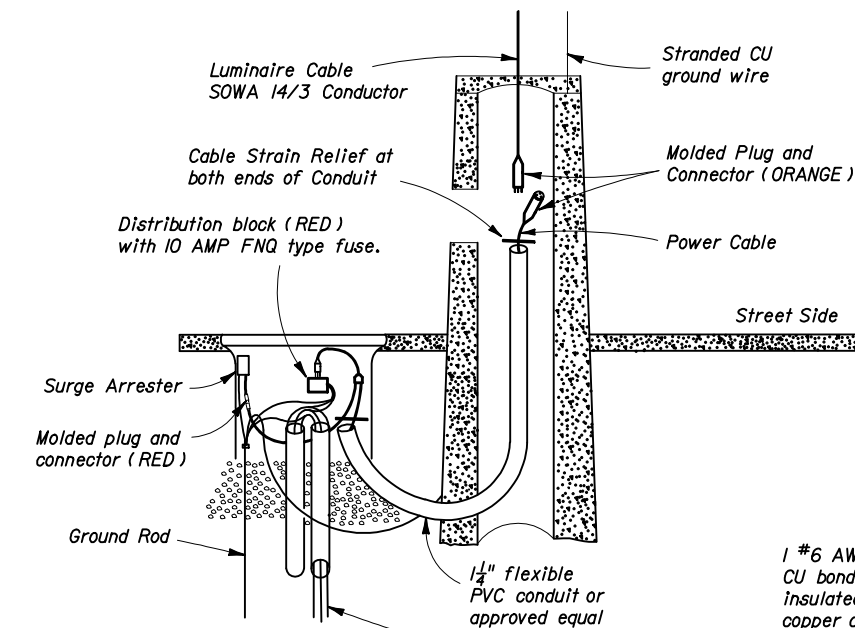
- Bridges should be marked as narrow bridges under the following conditions:
  - For approach roadways with paved shoulders when the bridge width including shoulders is less than the width of the approach roadway including paved shoulders.
  - For approach roadways without paved shoulders when the bridge shoulder width is less than 2'.
- Roadways with two-way traffic:
  - No passing zone should be extended 1500' in advance of narrow bridge.
  - 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.
- Delineators on both sides of roadway shall face traffic approaching bridge.
- Delineators to be placed not less than 2' or more than 8' outside the outer edge of pavement.
- The OM-3R & OM-3L mounting height shall be 4' above the roadway edge. The panels may be post mounted at the bridges.



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION					
<b>RURAL NARROW BRIDGE TREATMENT</b>					
Designed By	Names	Dates	Approved By <i>Charles A. Scott</i> State Traffic Standards Engineer		
Drawn By			Revision	Sheet No.	Index No.
Checked By			00	1 of 1	17359

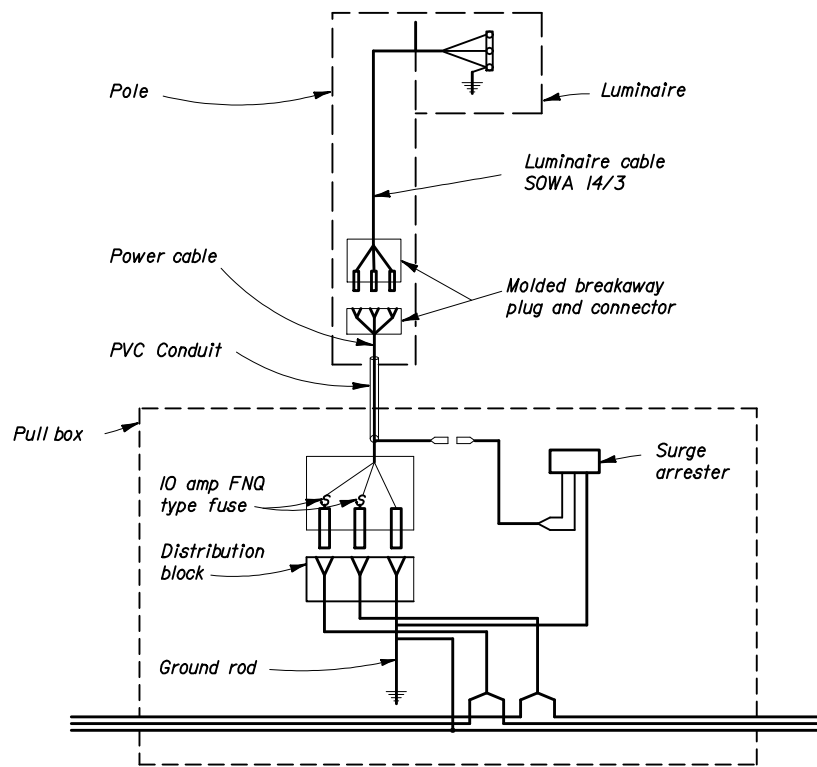


CONCRETE POLE DETAIL

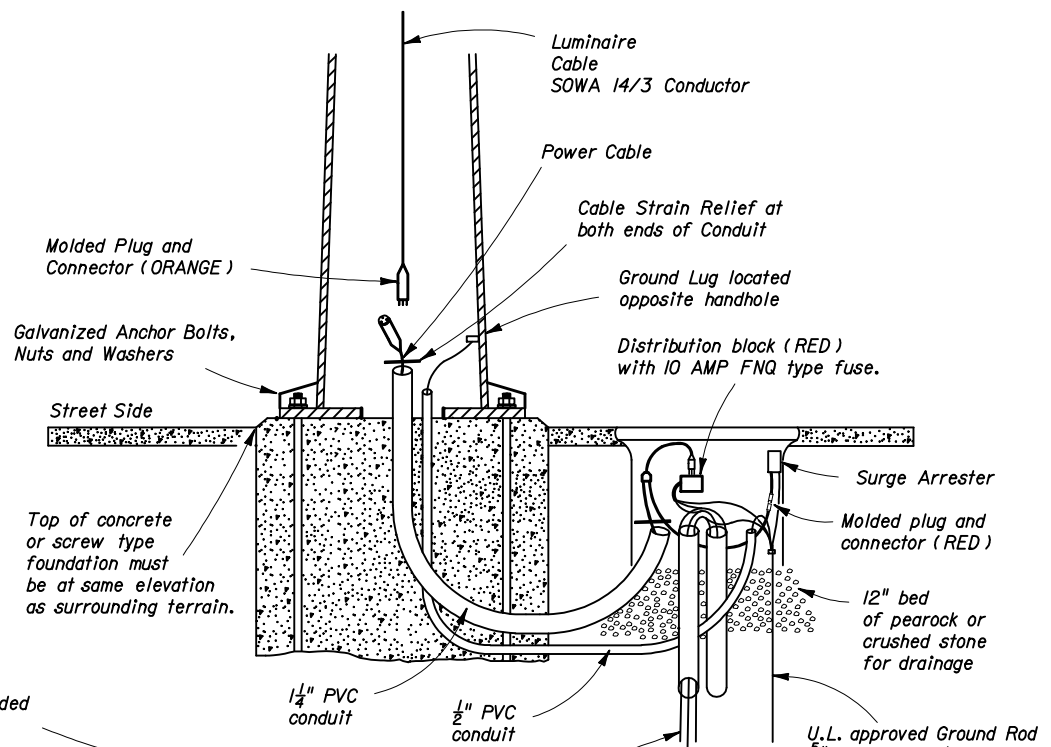


CONCRETE POLE WIRING DETAIL

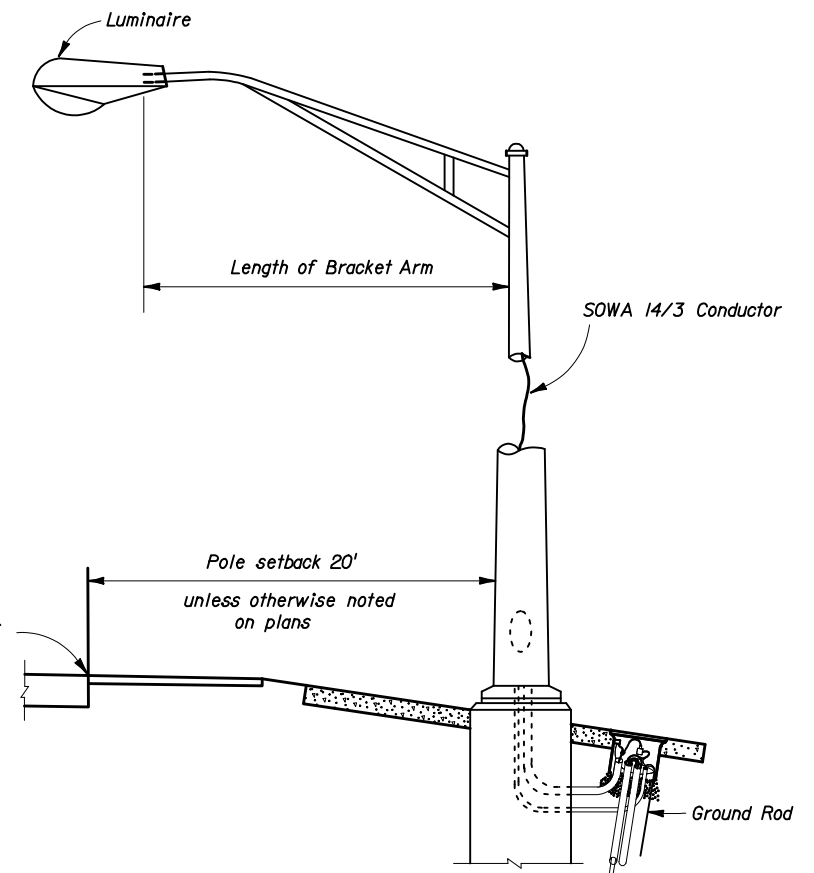
1 #6 AWG insulated (TW Green) stranded CU bond wire connecting all poles, and insulated (THW or THWN) stranded copper circuit conductors in schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans. (Typical)



WIRING DIAGRAM



METAL POLE WIRING DETAIL



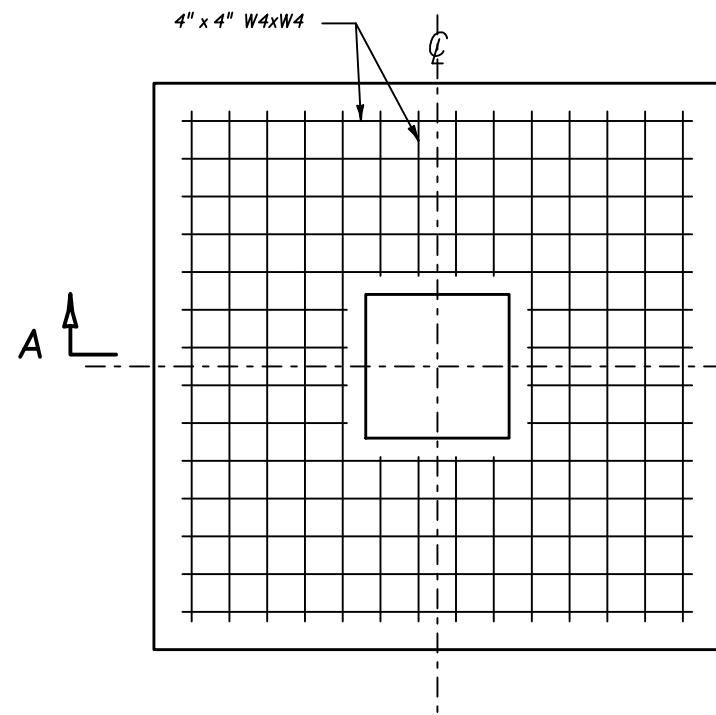
METAL POLE DETAIL

NOTES:

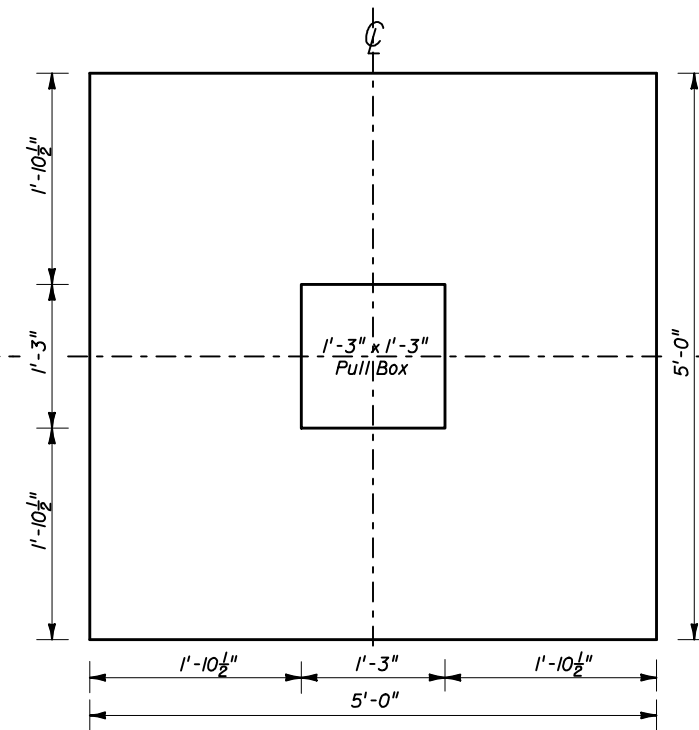
1. The Duraline Division of the J.B. Nottingham Company (Duraline) claims exclusive rights to the wiring diagram illustrated in this drawing under U. S. Patent 5,335,160. Any infringement on the rights claimed by Duraline shall be the sole responsibility of the contractor or supplier infringing on the rights of Duraline.
2. Barrier wall or bridge mounted poles: The wiring shall be in accordance with Section 992 of the Standard Specifications.

LIGHTING POLE DETAILS

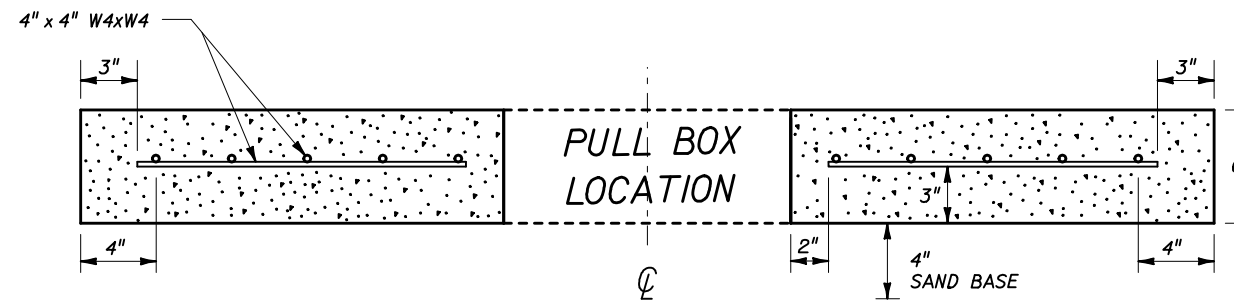
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CONVENTIONAL LIGHTING</b>				
Designed By	Names	Dates	Approved By	
Drawn By			<i>Charles A. Scott</i> State Traffic Standards Engineer	
Checked By			Revision	Sheet No. Index No.
			02	1 of 3 17500



REINFORCEMENT LAYOUT



SLAB DIMENSIONS



SECTION A-A

**NOTES:**

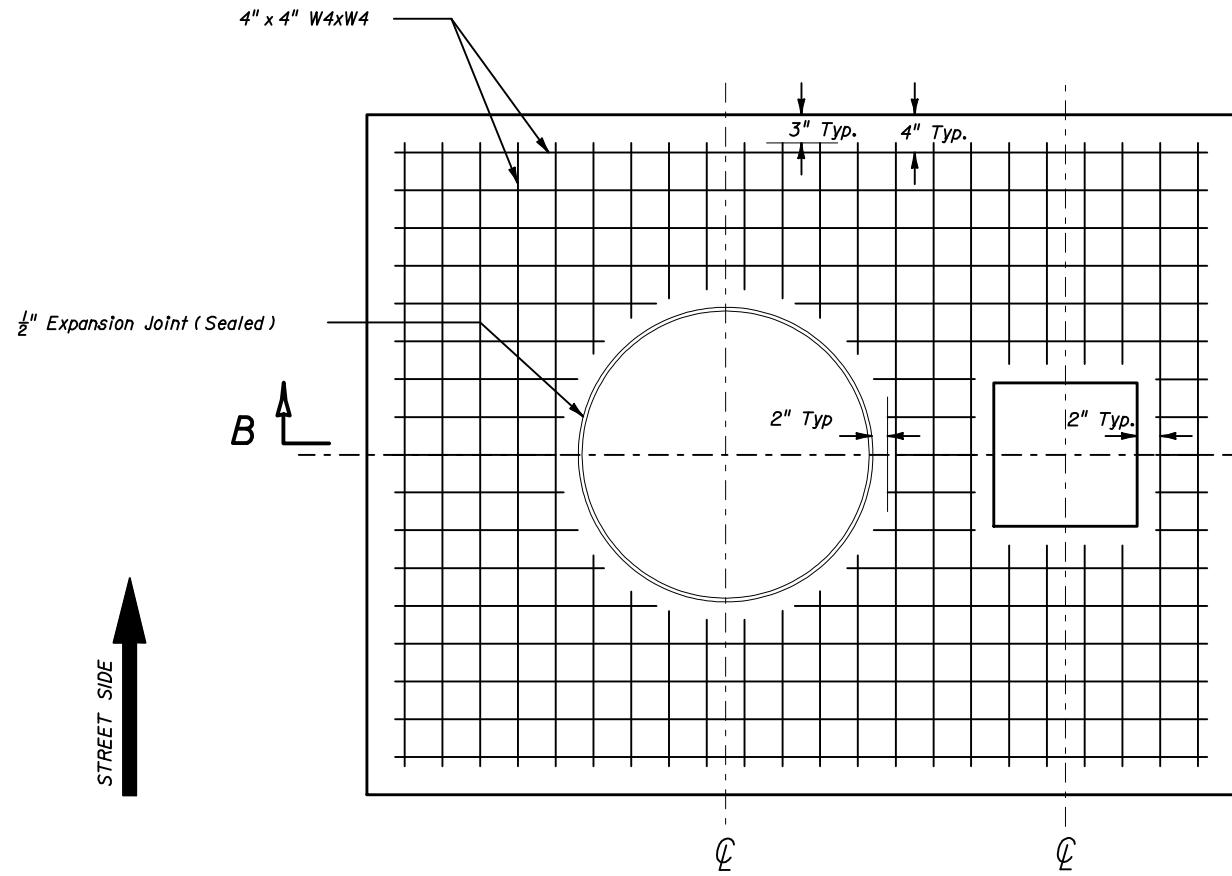
1. Use clean free draining sand < 5% passing No. 200 sieve for base.
2. Welded wire fabric shall meet the requirements of ASTM A185.
3. Concrete strength at 28 days shall be  $f'c = 3$  ksi
4. Outside edges of slab shall be cast against formwork.
5. The pull box shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.

LIGHTING GENERAL NOTES AND SLAB DETAILS FOR PULLBOX LOCATIONS

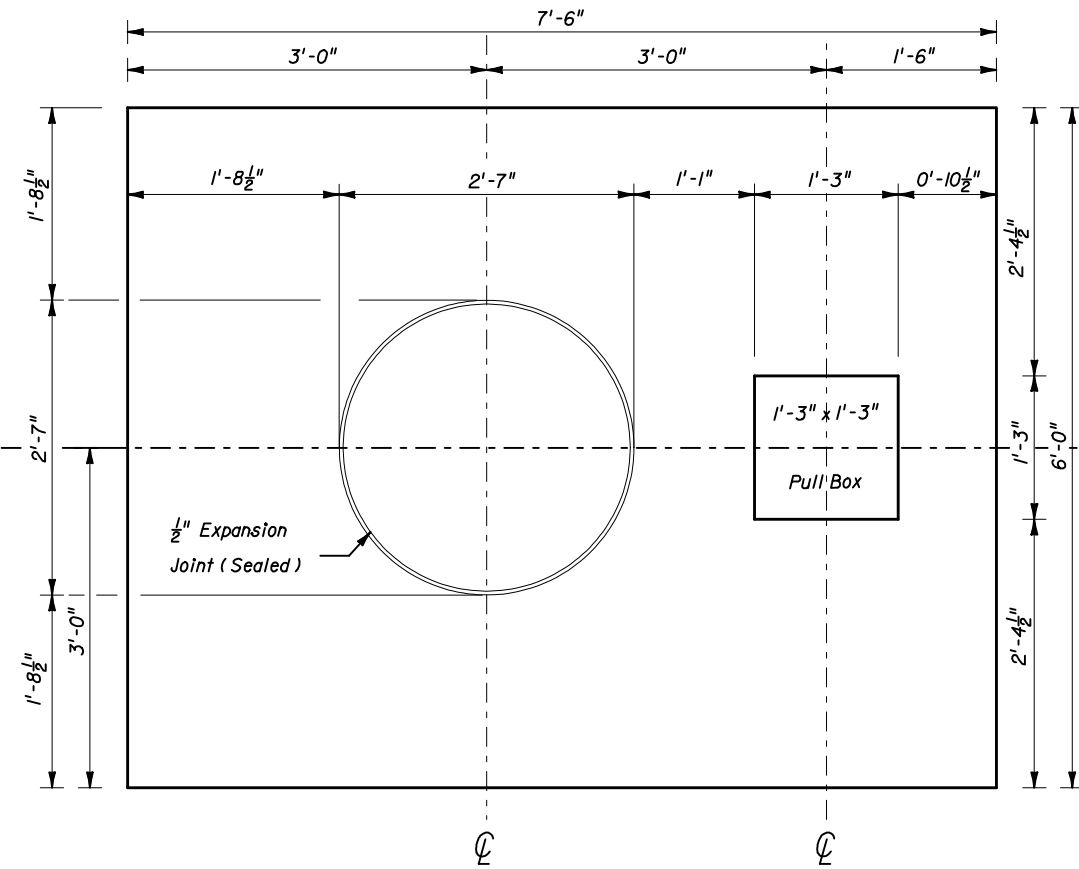
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONVENTIONAL LIGHTING**

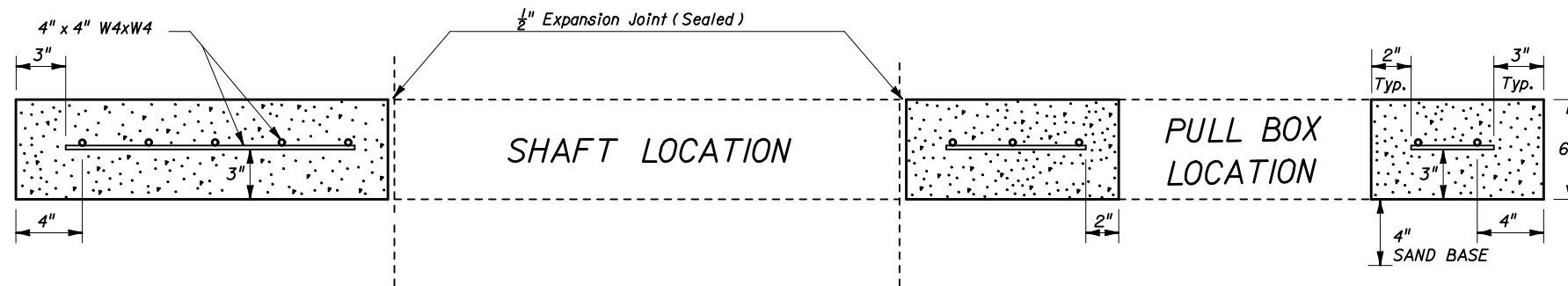
Names	Dates	Approved By <i>Charles A. Scott</i>		
Designed By		State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	2 of 3	17500



REINFORCEMENT LAYOUT



SLAB DIMENSIONS



SECTION B-B

NOTES:

1. Use clean free draining sand < 5% passing No. 200 sieve for base (4").
2. Welded wire fabric shall meet the requirements of ASTM A185.
3. Concrete strength at 28 days shall be  $f'c = 3$  ksi.
4. Outside edges of slab shall be cast against formwork.

5. The  $\frac{1}{2}$ " thick expansion joint between shaft and slab shall be sealed with a hot poured elastic joint sealer.
6. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
7. The pull box shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.

SLAB DETAILS FOR POLE AND PULL BOX LOCATIONS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONVENTIONAL LIGHTING

Names	Dates	Approved By <i>Charles A. Scott</i> State Traffic Standards Engineer		
Designed By		Revision	Sheet No.	Index No.
Drawn By		00	3 of 3	17500
Checked By				

- 1) All grounding system connections shall be exothermically welded. This includes all cable connections, ground rod connections, rod to rod connections, and splices. Method of Measurement and Basis of Payment as per Section 620 of the Standard Specifications.
- 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 the AASHTO 'Standard Specifications For Structural Supports For Highway Signs, Luminaires And Traffic Signals'. The calculations shall be based on the actual projected area of the luminaire or 3.0 square feet whichever is greater.
- 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 of 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'.
- 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 sodded.
- 13) All splices shall be made in pullboxes or the pole base. No splices shall be made inside the conduit. The wires at pullboxes shall have sufficient length to completely remove connectors to the outside of 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 or THWN insulation.
- 16) 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.
- 17) 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 makers, or pullboxes to mark the location of the ends of the conduits.
- 18) Pull boxes shall be located at ends of conduit crossing roadways, and as necessary for the completion of the project.
- 19) These plans represent minimum acceptable criteria. The inspection per these drawings represent the minimum base of acceptance.
- 20) All material, unless otherwise specified, shall be Underwriters Laboratory approved.
- 21) Pull boxes shall meet the requirements of Section 635 of the 'Standard Specifications For Road And Bridge Construction' and Section 635 of the 'Minimum Specifications For Traffic Control Signals And Devices'.
- 22) A pull box shall be installed at each pole location. Pull boxes should be located 2' max from pole unless otherwise directed by the project engineer. Metal pull box covers shall be grounded. See General Requirements Section 635-4 of the Standard Specifications for Road and Bridge Construction.
- 23) At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications for Road and Bridge Construction.
- 24) Luminaire shall be supplied with a regulator type ballast 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 disconnect plug.
- 25) All mounting heights are  $\pm 2'-6"$  unless otherwise noted in plans.
- 26) A handhole is required in all poles. Handhole should be located opposite approaching traffic with cover fastened with Stainless Steel Screws. The handhole opening shall be at least 20 square inches.
- 27) The luminaire and arm on JOINT USE POLES shall be grounded.
- 28) Concrete slabs around poles and pull boxes shall be paid for under the contract unit price for Class I Concrete (Miscellaneous); the cost of reinforcing steel fabric shall be included in the price for Class I Concrete (Miscellaneous).

### 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 the AASHTO 'Standard Specifications For Structural Supports For Highway Signs, Luminaires and Traffic Signals'. The contractor (supplier) shall submit copies of test reports as evidence the breakaway feature meets the above specifications and calculations to verify the design will meet the AASHTO wind loading specified in the contract plans. No poles are to be installed prior to approval of submittal data.

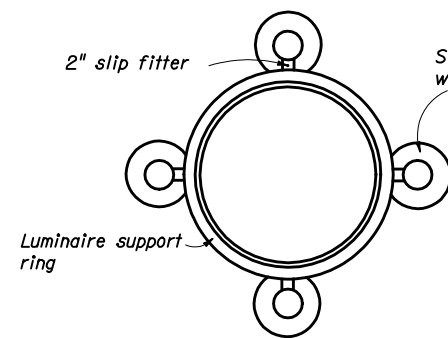
Any substantial remains of a breakaway support, when it is broken away, should not project more than 4" as discussed in Section 7 of the above AASHTO specifications, and, Chapter 4, Section 4.2 of the AASHTO 'Roadside Design Guide'.

Poles behind bridge rail or barrier wall mounted, shall be non-frangible.

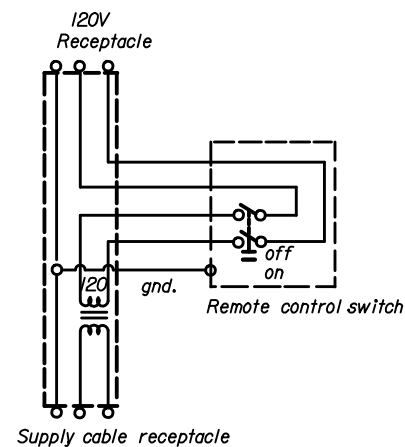
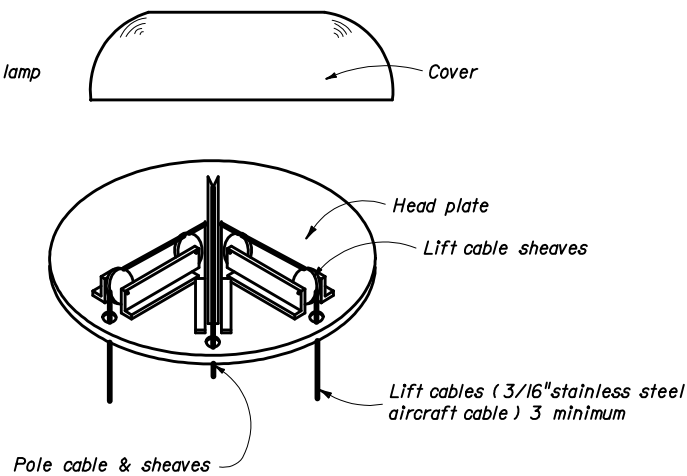
### SURGE PROTECTOR SPECIFICATIONS

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 1,100 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.

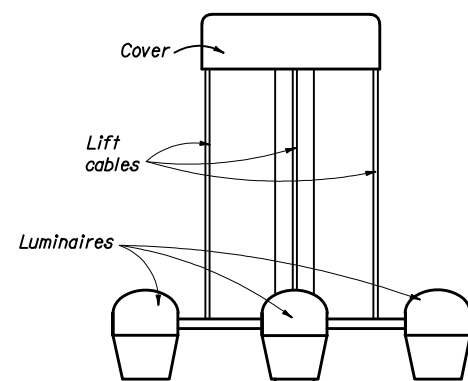
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>HIGHWAY LIGHTING GENERAL NOTES</b>				
	Names	Dates	Approved By	
Designed By			<i>Charles A. Scott</i> State Traffic Standards Engineer	
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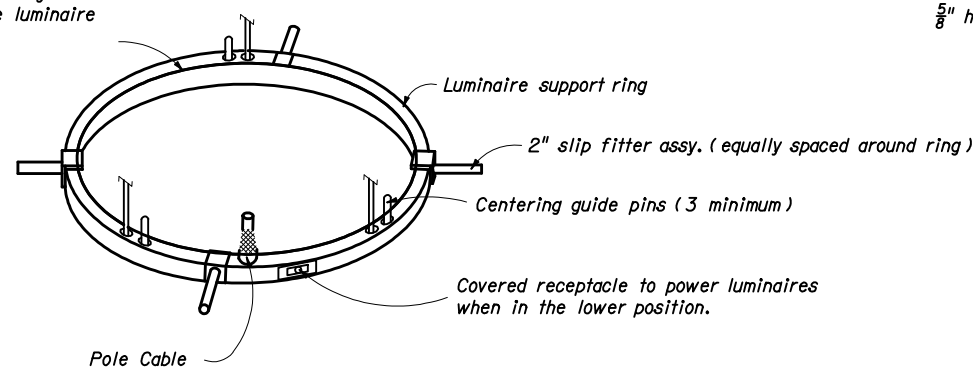
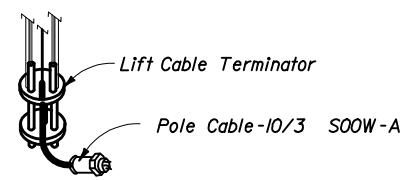
See legend for number of luminaires, lamp wattage and light distribution.



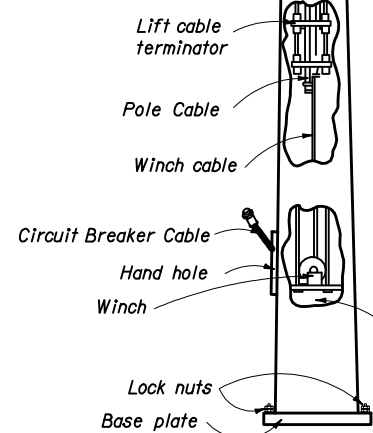
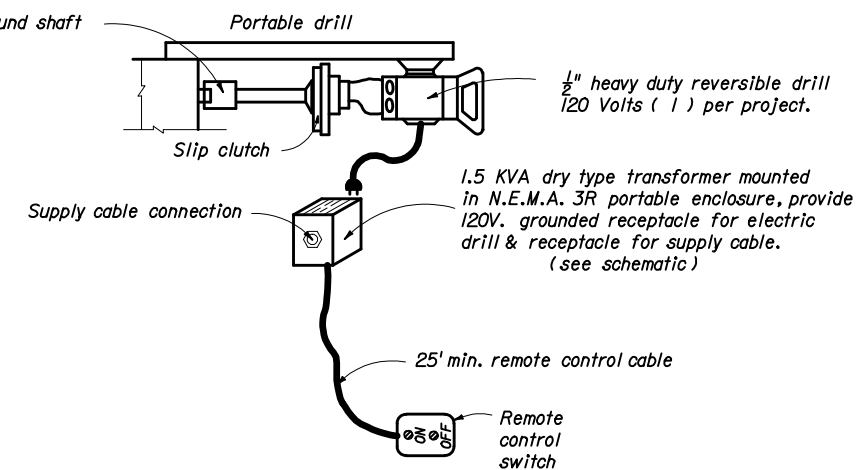
SCHEMATIC OF REMOTE AUXILIARY POWER UNIT



Spring supported centering arms provided to center the luminaire ring.

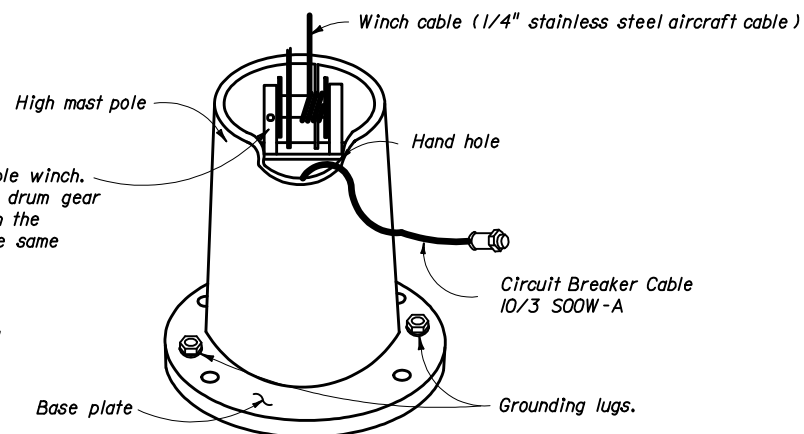


5/8" hex drive 3/4" round shaft



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.



POLE DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

HIGHMAST LIGHTING

Names		Dates	Approved By		
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**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 2" 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 ensure 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 allow 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's Specifications. Submittals shall be supplied to the engineer of record 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 A153 or by the nature of the material used in their fabrication.

**LOWERING SYSTEM SPECIFICATIONS**

The lowering system shall consist of the following:

- A. Head frame and cover
- B. Luminaire ring
- C. Cables
- D. Winch
- E. 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 5" nominal steel cable sheaves grooved to the exact cable diameter, for 180° cable bearing surface. The sheave shall be zinc electroplated to ASTM 164 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  $\frac{3}{16}$ " or greater diameter shall be provided.

The pole cable shall be attached to the luminaire ring with a waterproof connector capable of withstanding the pull of the weight of the pole 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 20% of the wire rope manufacturer's rated ultimate stress.

Drum design shall cause level wind of wire rope. The power cord shall travel on sheave (s) or a combination of rollers providing a radius for the cord of 6" 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 steel channel galvanized in accordance with ASTM A123 Class "B" steel channel with the appropriate number of 2" 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 weathertight wiring chamber with weathertight cable connectors. A 600 volt terminal block, completely prewired shall be included in the weathertight 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 12' 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 designated 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 25' from the pole, Stainless Steel 7 x 19 aircraft cables of  $\frac{1}{4}$ " 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 1' above the base plate. The handhole shall be 10" wide by 20" 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 deal 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)  $\frac{5}{8}$ " diameter holes 180 degrees apart through total thickness of base plate. Tap top of hole for  $\frac{5}{8}$ " x  $\frac{3}{4}$ " 11NC stainless steel hex head bolt.

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.

**ALTERNATE POLE**

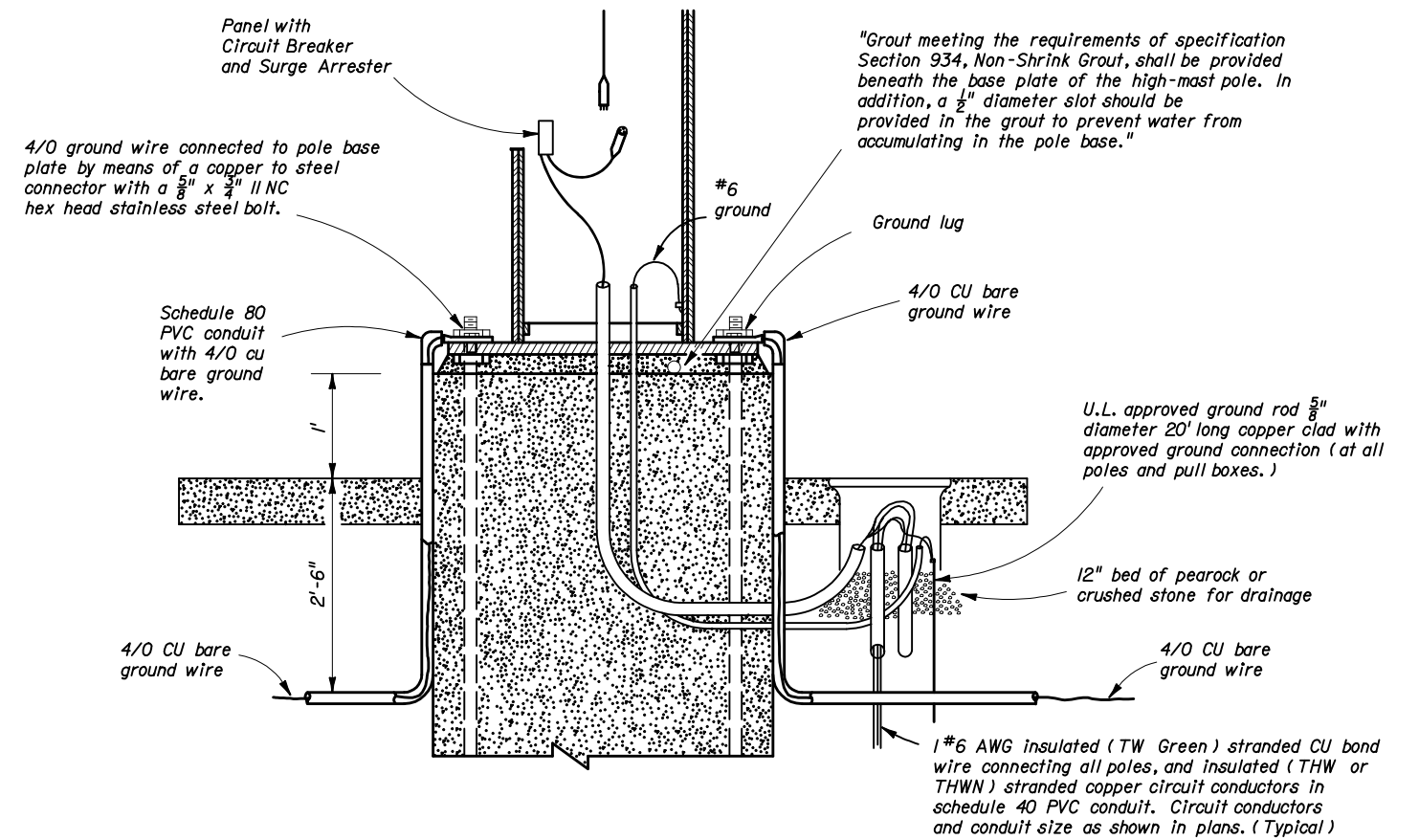
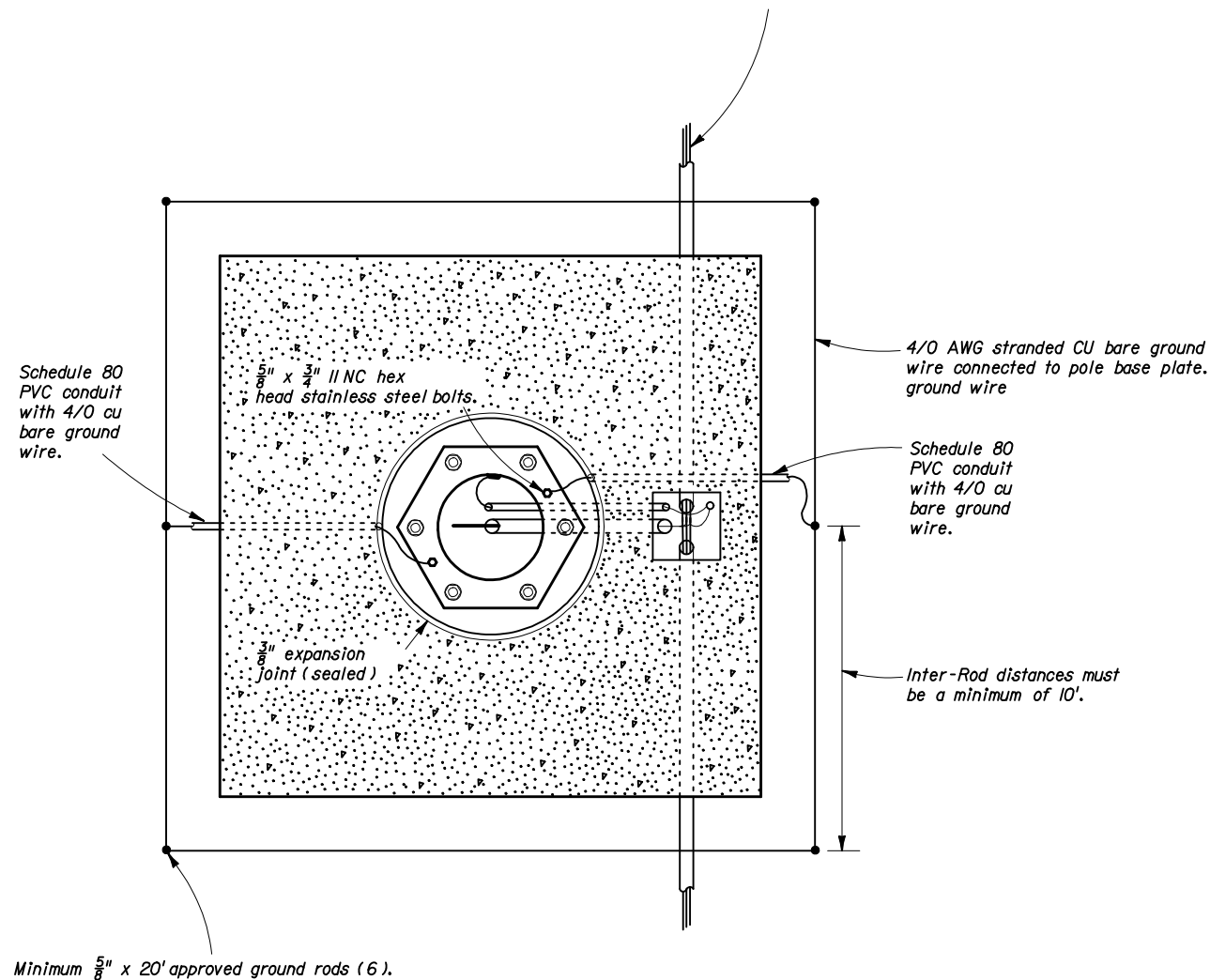
A spun high mast prestressed concrete pole listed on the Qualified Products List may be substituted for a steel pole with approved shop drawings and calculations. If the concrete pole is provided as a substitute for the steel pole, payment will be made under the items bid for steel poles and associated foundations and plan quantity of these items will be the basis for payment.

**NOTES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>HIGHMAST LIGHTING</b>				
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Designed By		8-78	<i>Charles A. Scott</i> State Traffic Standards Engineer	
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1#6 AWG insulated (TW Green) stranded CU bond Wire connecting all poles, and insulated (THW or THWN) stranded copper circuit conductors in schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans. (Typical)

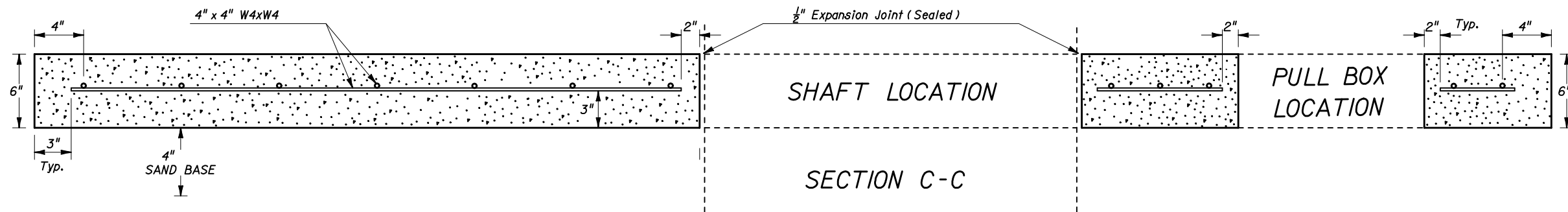
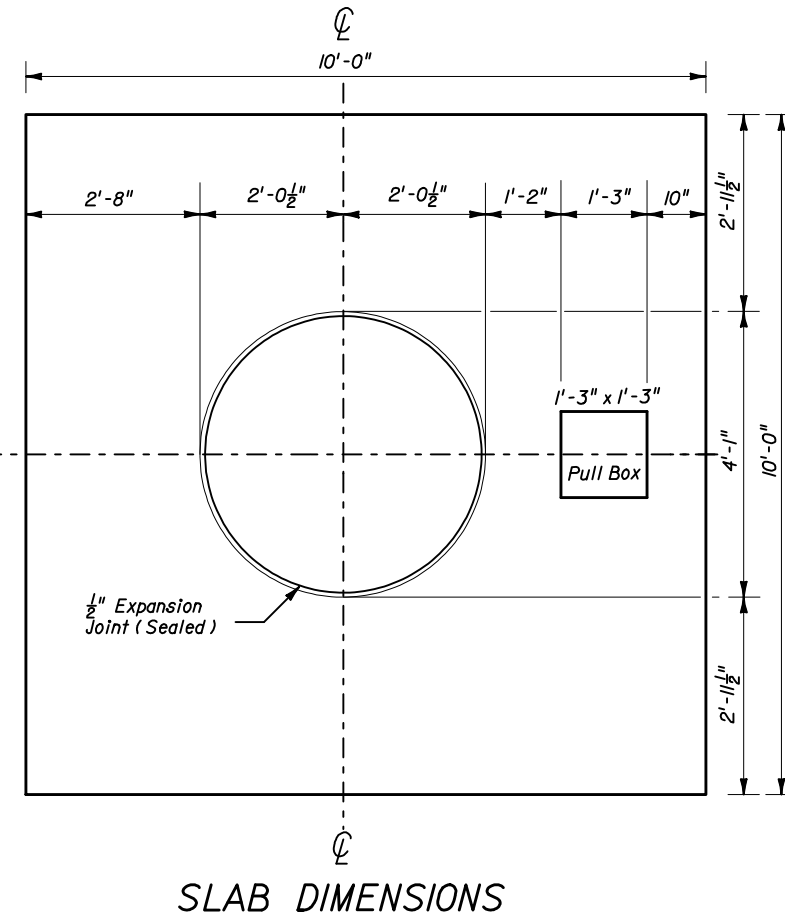
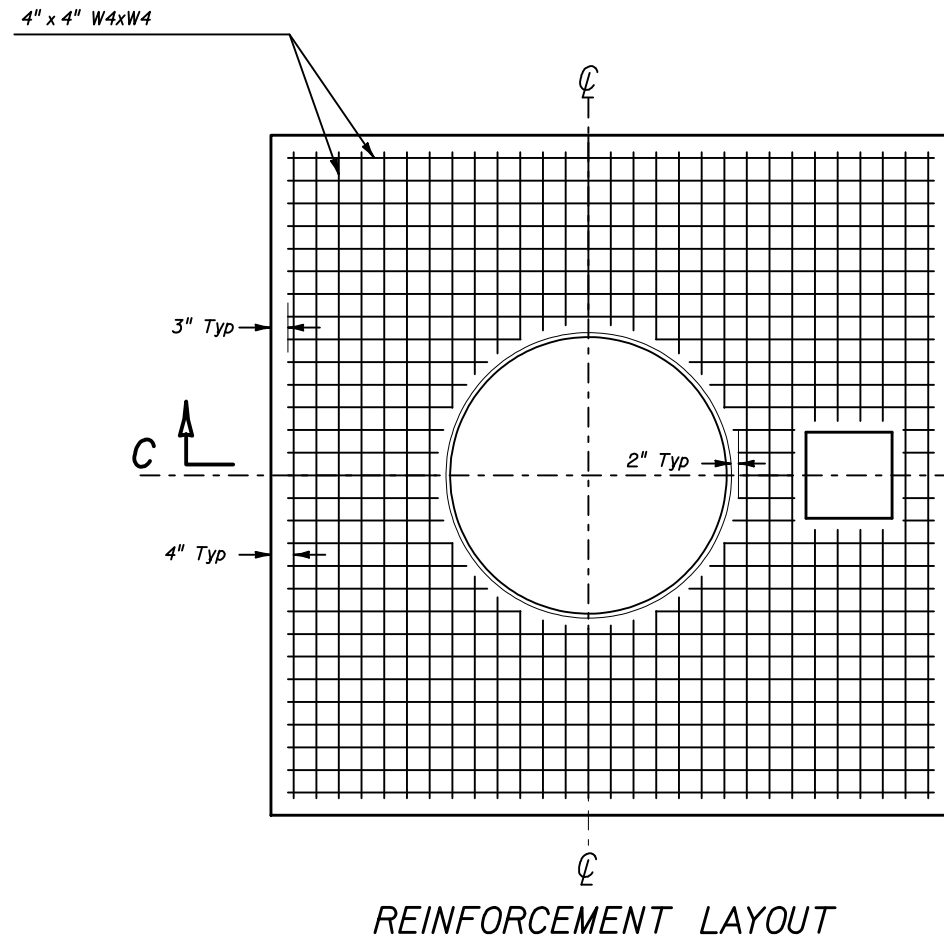


Notes:

1. At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of The Standard Specifications For Road And Bridge Construction.
2. 1# 6 AWG insulated (TW Green) stranded CU bond wire connecting all poles, and insulated (THW or THWN) stranded copper circuit conductors in schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans. (Typical)
3. Slabs to be placed around all Poles and Pull Boxes.
4. For Pull Boxes between Poles refer to index 17500 sheet 2 of 3.

WIRING DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>HIGHMAST LIGHTING</b>				
Names	Dates	Approved By		
Designed By		<i>Clark A. Scott</i> State Traffic Standards Engineer		
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**NOTES:**

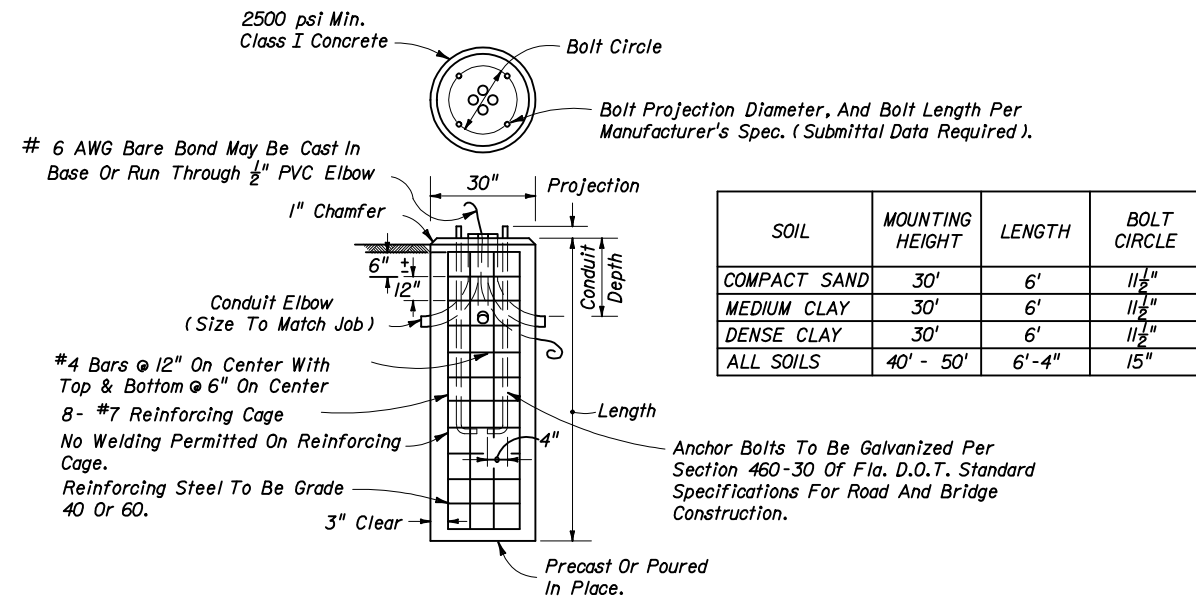
1. Use clean free draining sand < 5% passing No. 200 sieve for base (4").
2. Welded wire fabric shall meet the requirements of ASTM A185.
3. Concrete strength at 28 days shall be  $f'c=3$  ksi.
4. Outside edges of slab shall be cast against formwork.

5. The 1/2" thick expansion joint between shaft and slab shall be sealed with a hot poured elastic joint sealer.
6. Concrete slabs around poles and pull boxes shall be paid for under the contract unit price for Class I Concrete (Miscellaneous); the cost for reinforcing steel fabric shall be included in the price for Class I Concrete (Miscellaneous).
7. The pull box shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.

**SLAB DETAILS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>HIGHMAST LIGHTING</b>				
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Designed By		<i>Clark A. Scott</i> State Traffic Standards Engineer		
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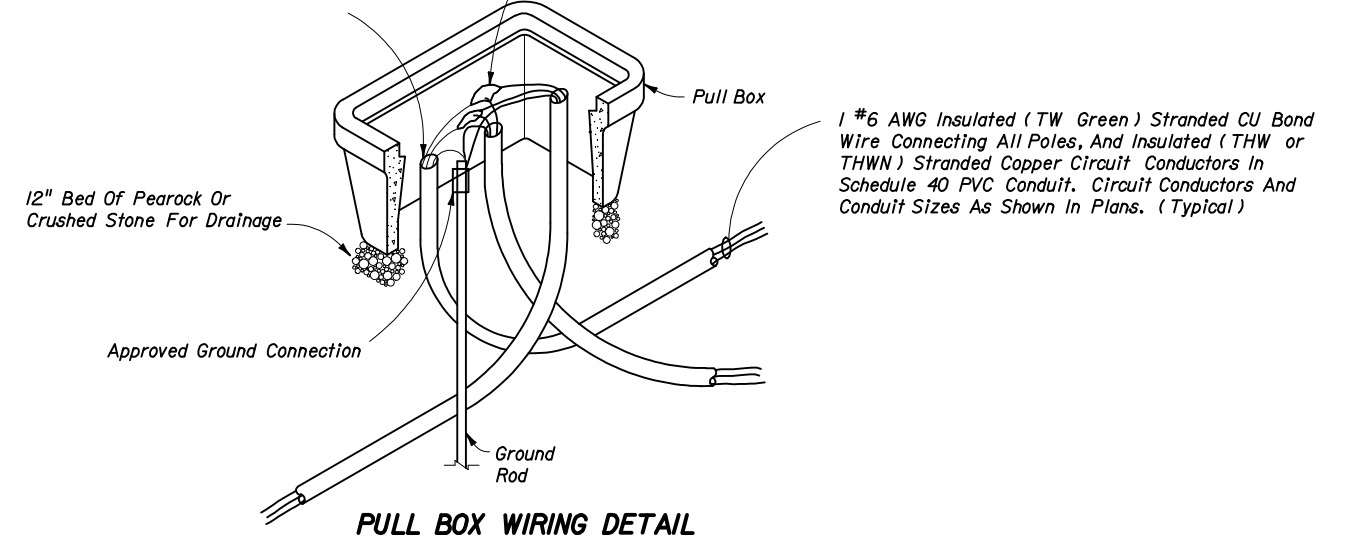
Foundations apply only to slopes of 1:4 or flatter.



**METAL POLE CONCRETE FOUNDATION DETAIL**

At All Pull Boxes, And Pole Bases, Ends Of Conduit Shall Be Sealed In Accordance With Section 630 Of The Standard Specifications For Road And Bridge Construction.

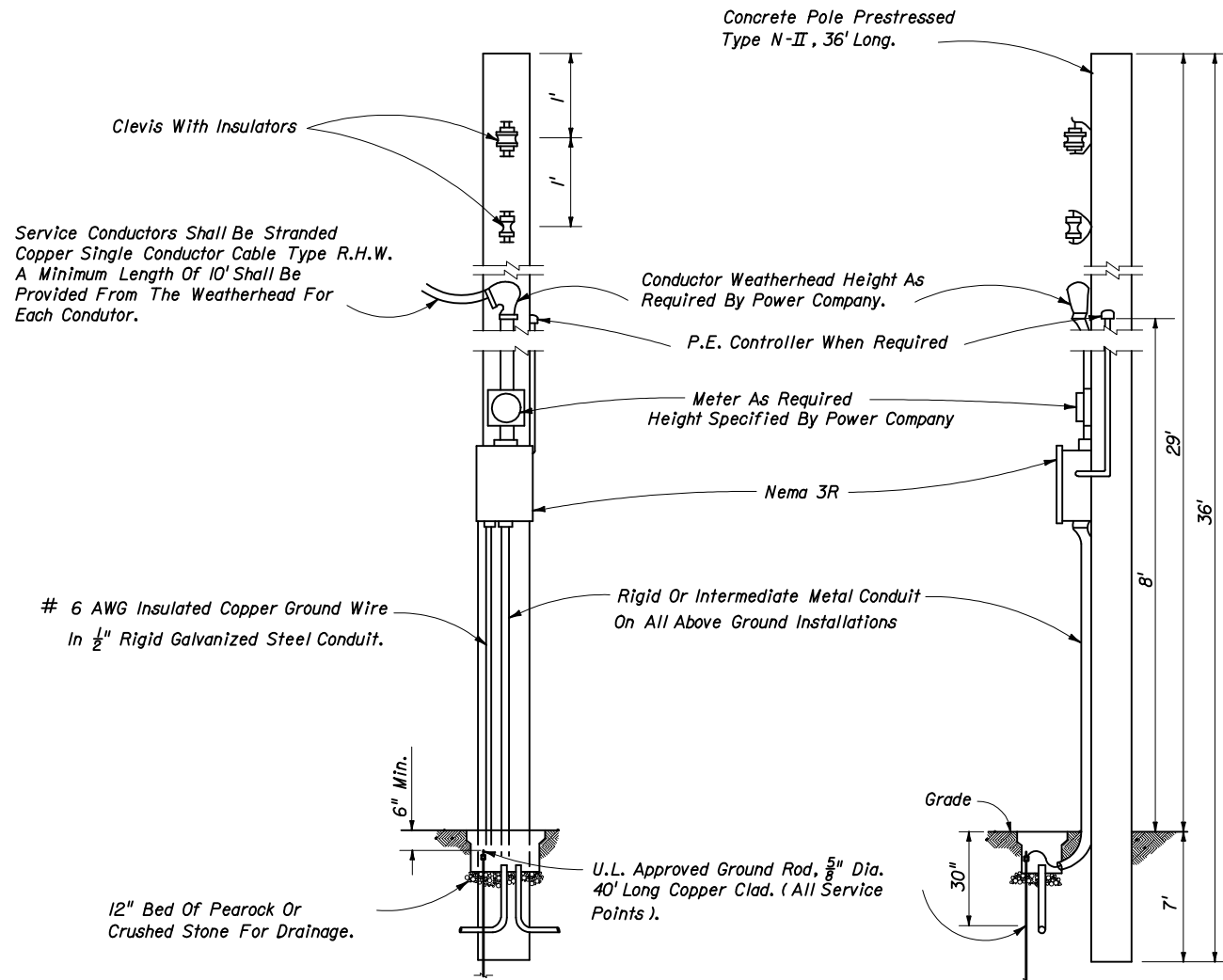
All Splices Shall Be Made In Pull Box Or Pole Base With Compression Sleeves Or Split Bolt Connectors Properly Taped And Weatherproofed.



**PULL BOX WIRING DETAIL**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>ROADWAY LIGHTING DETAILS</b>				
Designed By	Names	Dates	Approved By <i>Charles A. Scott</i> State Traffic Standards Engineer	
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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**

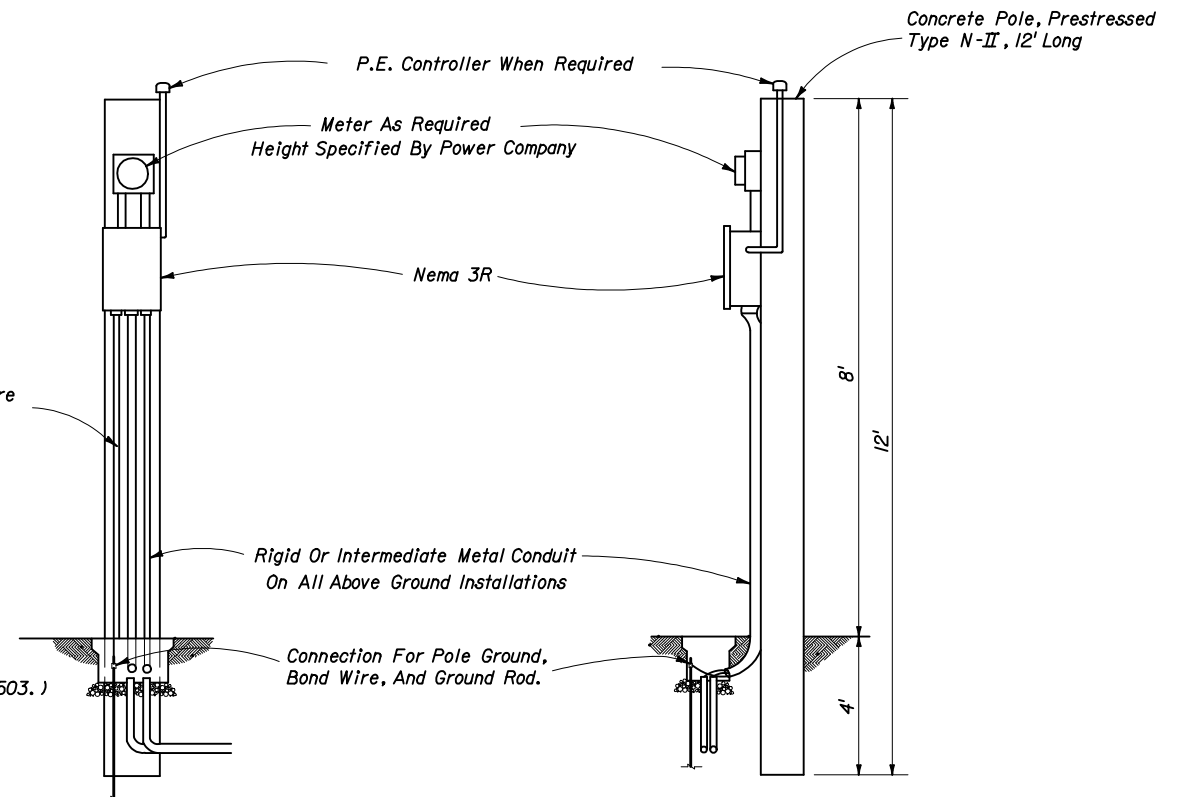
- Notes:
1. Photo electric control as required.
  2. All neutral wires to have white insulation, do not use white or green insulated wires for ungrounded conductors.
  3. A pull box is required at each service point.

**SERVICE SPECIFICATIONS**

1. The enclosure shall be NEMA 3R, pole mounted, rain-tight.
2. The enclosure door shall be lockable by padlock and four keys provided to the maintaining agency. The door shall have a minimum of three hinges and be latchable. No screws to be used to attach door.
3. 480 V minimum rating bolt-in type breakers shall be used.
4. Busbar to be copper coated and have a minimum rating of 100 amps. When main breaker exceeds 100 amps busbar to match breaker amperage.
5. Locate contactor, transformer, and H.O.A. switch inside enclosure. The enclosure to be sized to accommodate as many breakers as called for and all other service equipment.
6. The Enclosure to be rigidly attached to the pole face.
7. A 600 V lightning protector shall be wired inside the enclosure.
8. A main breaker is required in all service panels with 2 or more feeder breakers.
9. All service equipment shall be U.L. approved.

# 6 AWG Insulated Copper Ground Wire  
 In 1/2" Rigid Galvanized Steel Conduit.

Pull Box  
 (See Detail Index 17503.)

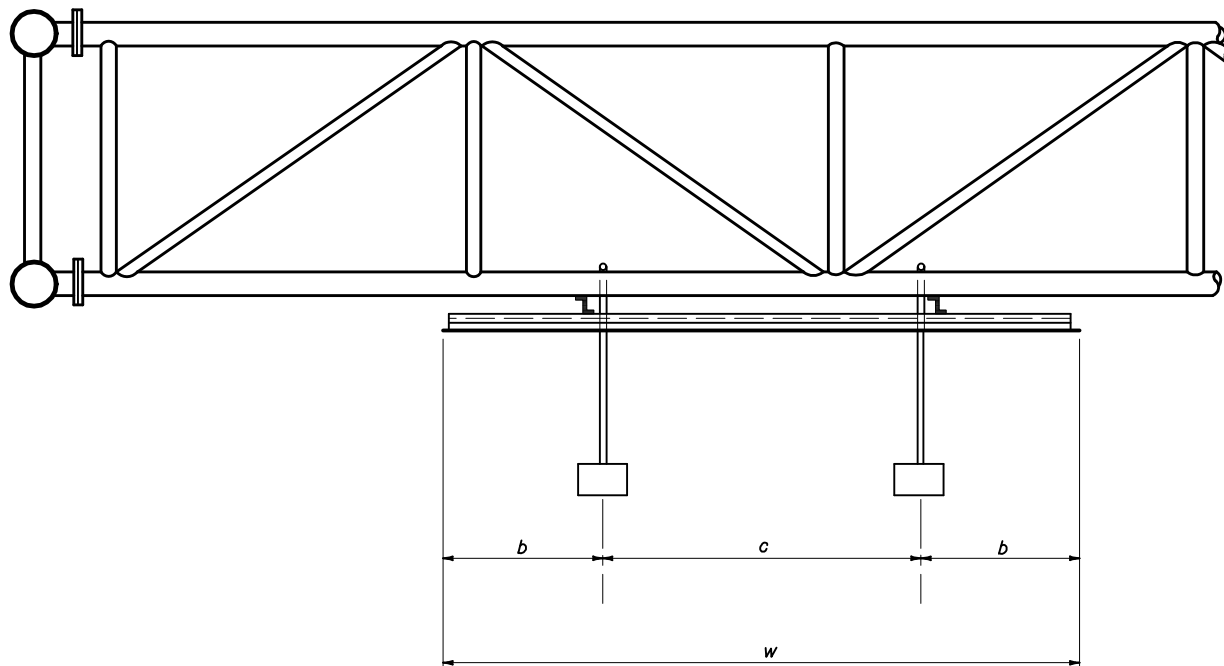


**DETAIL B**  
**UNDERGROUND FEED**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SERVICE POINT DETAILS**

Designed By	Names	Dates	Approved By		
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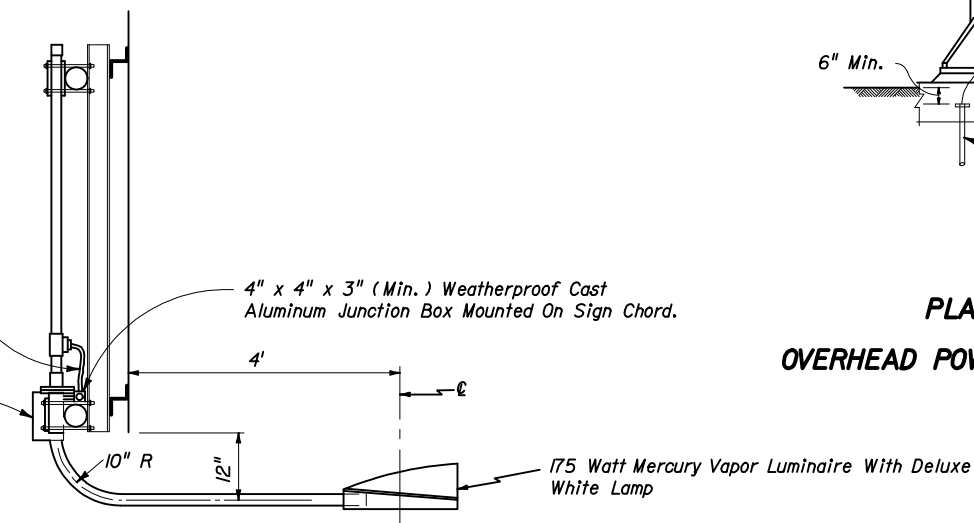
WIDTH OF SIGN FACE	To 10'	To 21'-6"	To 32'-6"	To 43'-4"
NUMBER OF FIXTURES	ONE	TWO	THREE	FOUR
EQUATIONS FOR PLACING FIXTURES ALONG SIGN WIDTH	$W = 2b$ $c = 0$	$W = 2b + c$ $c = 2.2b$	$W = 2b + 2c$ $c = 2.2b$	$W = 2b + 3c$ $c = 2.2b$

**PLACEMENT OF SIGN LIGHTS**

- 1- Luminaire shall be mounted so the lamp center is 4' in front of the sign face.
- 2- Luminaire shall be mounted so the back of the fixture is placed 1' below the bottom edge of the sign face.
- 3- Luminaires from manufacturers who recommended 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 District 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. (Submittal Data Required)



**SIGN LIGHTING INSTALLATION**

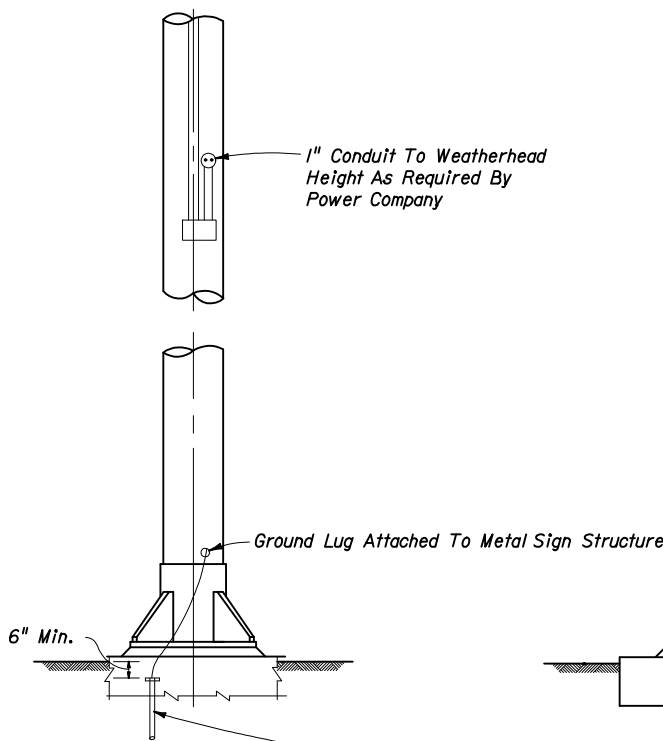
Roadway Lighting included in contract:

The power for the sign lighting shall be provided from the roadway lighting circuit. The lighting plans shall indicate the sign location and a pull-box location for connection to the sign lights. The lighting contractor shall install pull-box and loop 2' of lighting circuit conductors in the pull-box for connection by the signing contractor

The signing contractor shall furnish and install luminaires, Nema 3R enclosure, 30 amp breaker, conduit, conductors and all other electrical equipment necessary for connection to the lighting circuit.

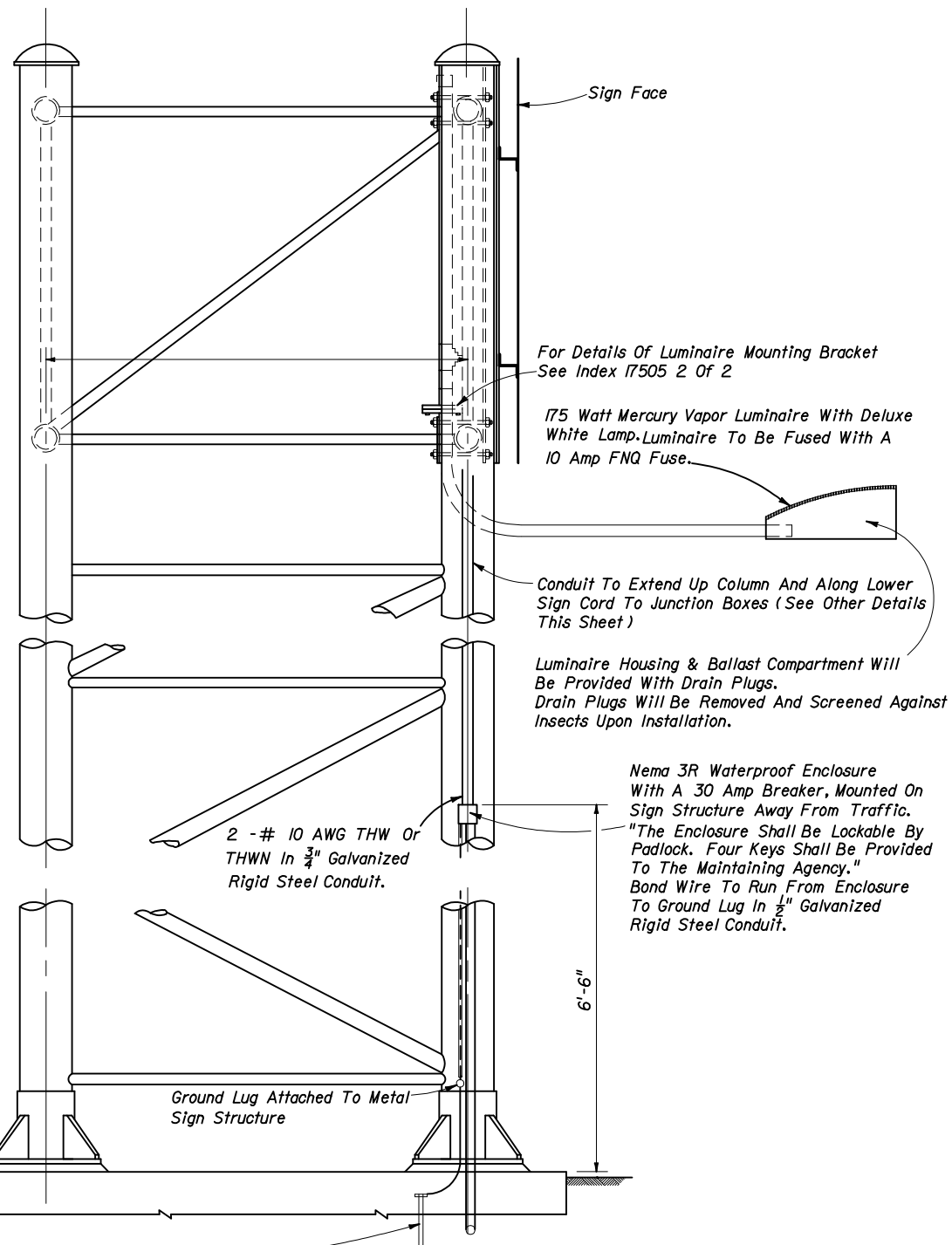
Roadway Lighting not included in contract:

The signing plans shall include pay item numbers to furnish and install conduit, conductors, ground rods, pull-boxes and service point equipment. The signing plans shall indicate the location of the service point equipment and circuit runs. The signing contractor shall provide all electrical equipment necessary for connection of the sign lights.

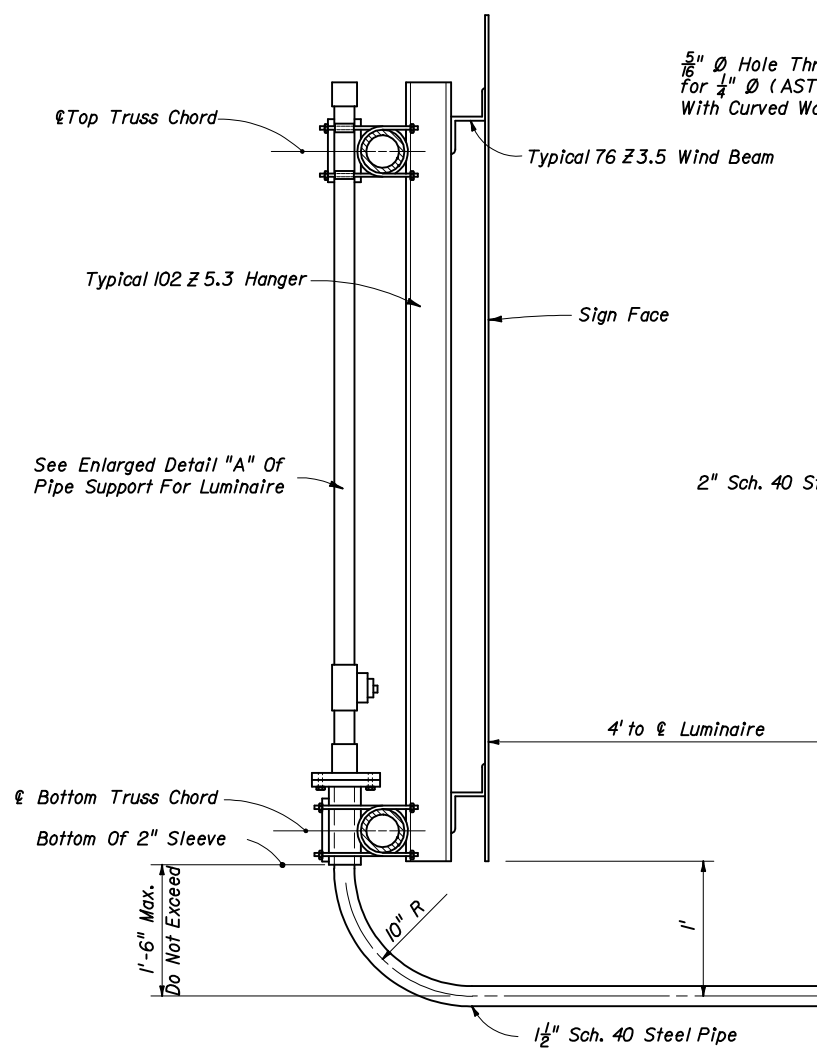
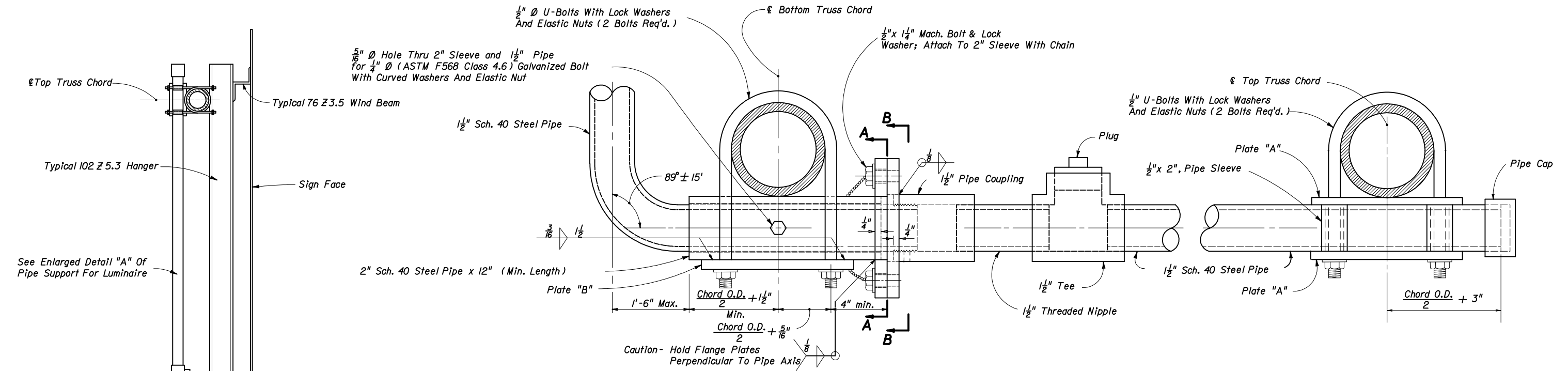


**PLAN OVERHEAD POWER SUPPLY**

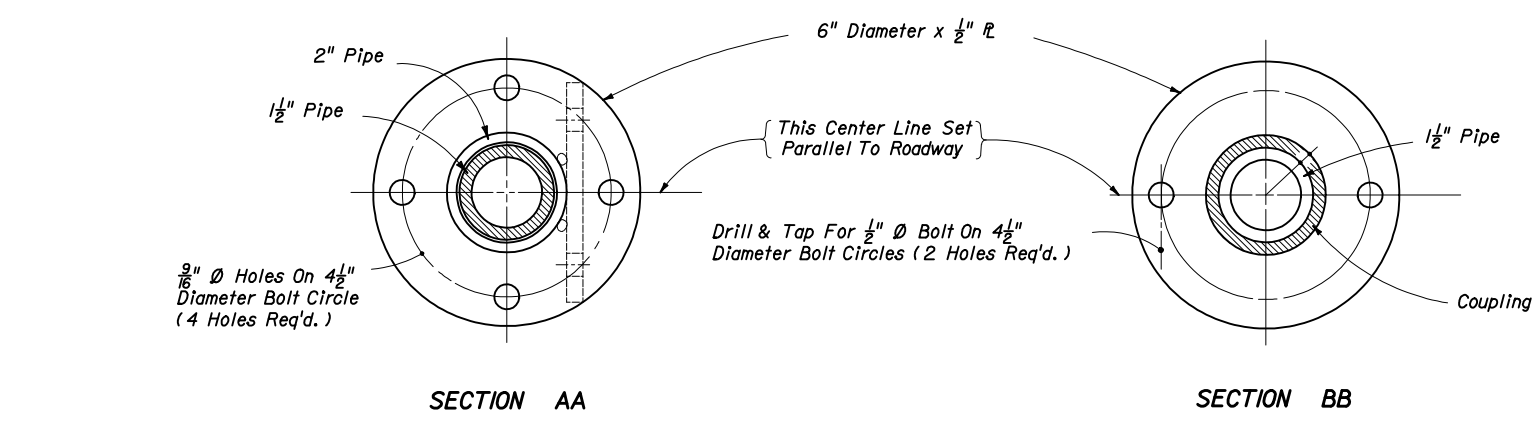
U.L. Approved Ground Rod 5/8" x 20' Copper Clad With Approved Ground Connection To Be Placed In Pull Box For Inspection Purposes. Splices To Be Made With Compression Sleeves Then Properly Insulated & waterproofed



STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>EXTERNAL LIGHTING FOR SIGN (MERCURY VAPOR)</b>				
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SECTION THROUGH SIGN SUPPORT AT LUMINAIRE



SECTION AA

SECTION BB

DETAIL "A"

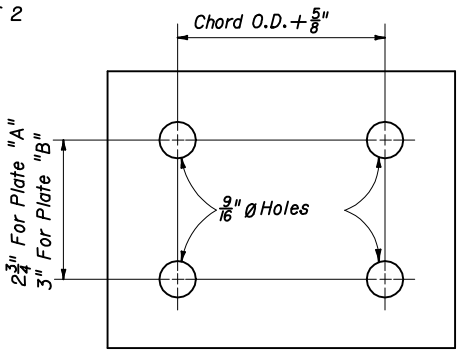
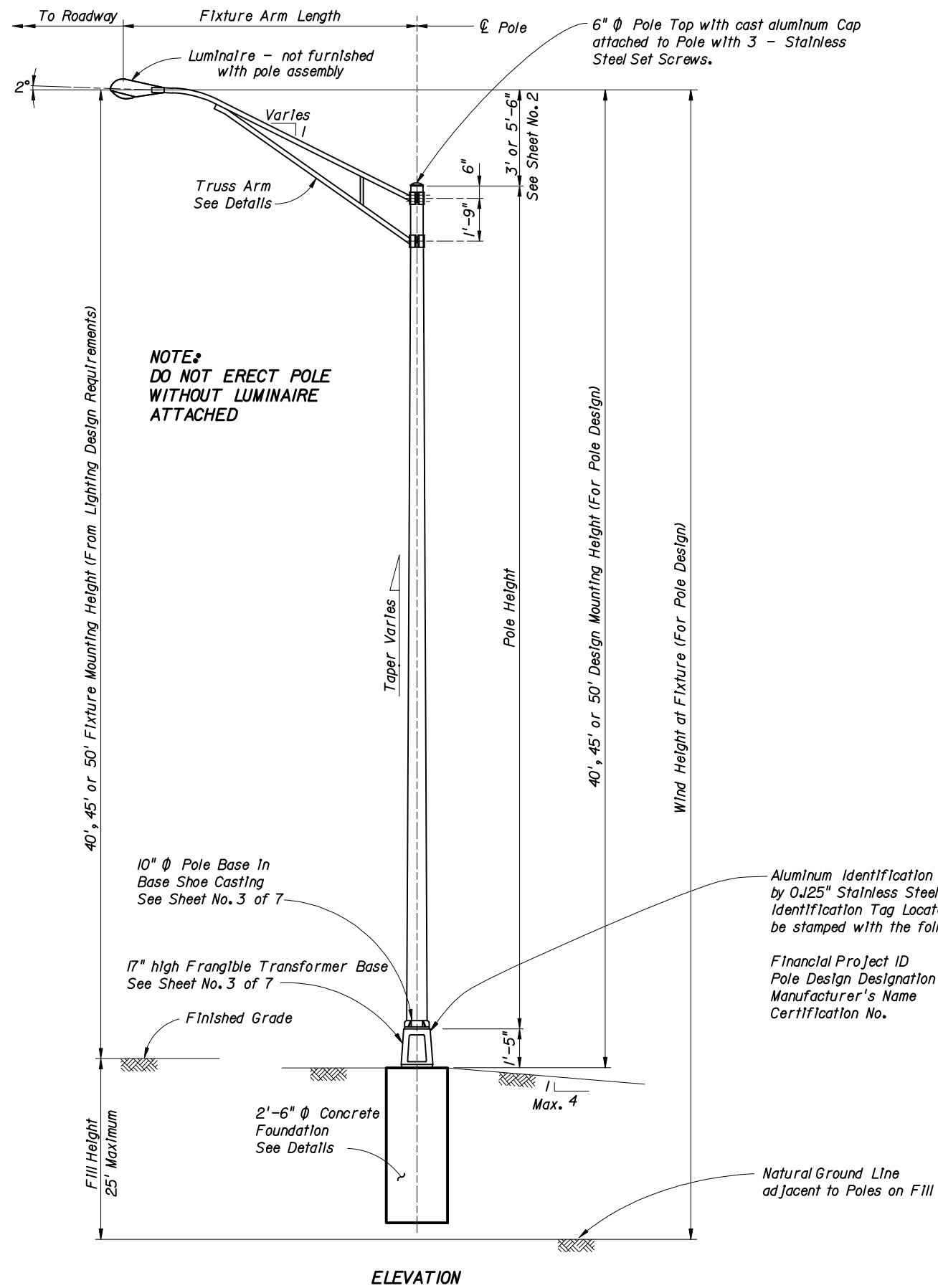


Plate "A":  $\frac{1}{4} \times 4\frac{3}{4} \times \text{Chord O.D.} + 2\frac{1}{2}$   
 Plate "B":  $\frac{3}{8} \times 5 \times \text{Chord O.D.} + 2\frac{1}{2}$

NOTES

- 1- Dimension "A" to be established by type and make of luminaire to be purchased and used on the project.
- 2- The center lines of both flange plates and the luminaire support arm are to be set parallel to the roadway before the set screw is seated.
- 3- Minor adjustments in the horizontal location of the luminaire support arm along the bottom chord of the truss will be allowed so that the flange plates will clear the truss web members.
- 4- All steel pipe shall meet the strength requirements of ASTM Specification A53 Grade "A" or Grade "B". Steel plates shall meet the requirements of A36 and bolts, nuts and washers shall meet the requirements of ASTM F568 Class 4.6.
- 5- All items shall be hot dip galvanized after fabrication in accordance with the requirements of ASTM A123 and /or A153.
- 6- Luminaire support arm shall be free to rotate in a clockwise or counter clockwise direction. When service or maintenance is required for sign face or vertical face of truss; Support arm shall be capable of being locked in a position 90° from parallel to the roadway for unobstructed working clearance.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>EXTERNAL LIGHTING FOR SIGNS (MERCURY VAPOR)</b>				
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### ALUMINUM LIGHT POLE NOTES

- Light Pole Materials shall be as follows:
  - Poles
    - > ASTM B221 - ALLOY 6063-T6
    - > ASTM B221 - ALLOY 6063-T6
  - Arm Pipes or Pipe Extrusions
    - > ASTM B221 - ALLOY 6061-T6
  - Arm Connection Extrusions, Bars and Plates
    - > ASTM B26 - ALLOY 356-T6
  - Shoe Base Casting
    - > or ASTM B108 - ALLOY 356-T6
  - Aluminum Caps and Covers
    - > ASTM B26
  - Frangible Transformer Base Casting
    - > ASTM B26 - ALLOY 356-T6
    - > or ASTM B108 - ALLOY 356-T6
  - Weld Metal
    - > ER4043
  - Anchor Bolts
    - > ASTM F1554 Grade 55
  - Shoe Base Connection Bolts
    - > ASTM A325 Type 1
  - Nuts for Connection Bolts and Anchor Bolts
    - > ASTM A563 Grade DH
  - Washers for Connection Bolts and Anchor Bolts
    - > ASTM F436 Type 1
  - Stainless Steel Fasteners and Hardware
    - > A.I.S.I. Grade 304
- Aluminum alloy 6063 is to be furnished in T4 condition and heat treated in accordance with ASTM B597
- Shoe Base Connection Bolts, Anchor Bolts, Nuts and Washers shall be galvanized in accordance with ASTM A153. Lock Washers shall galvanized in accordance with ASTM B695 Class 50
- Foundation concrete shall be Class I (Special) with a minimum 28-day Compressive Strength (f'c) of 3,000 psi for all environmental classifications.
- Reinforcing Steel shall be ASTM A615-96 Grade 60.
- A design wind speed of 80 or 100 mph with a 30% gust factor for wind loading on the pole is included in the design.
- The pole shall be tapered as required to provide a top outside diameter (O.D.) of 6" with a base O.D. of 10". Portions of the shaft near the base shoe and at the arm connections may be held constant at 10" and 6" respectively to simplify fabrication.
- The pole shall be free of transverse welds except at the base.
- Poles constructed out of two or more sections with overlapping splices are not permitted.
- All welding shall conform to American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition).
- See Standard Index No. 17500 for grounding and wiring details.
- The pole and arms shall be furnished with a 50 grit satin rubbed finish.
- All designs to be in accordance with the 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
- All Light Poles within 5 miles of the coastline shall be equipped with a damping device. Information, details and performance data on the damping device shall be included with the Manufacturer's Qualified Products List (QPL) application.
- The manufacturer's Qualified Product List (QPL) application shall include test reports certifying that the Arm and Base Connection components, including the breakaway transformer base, are capable of resisting the forces (axial, shear, torsion, and moment, as applicable) shown in the data tables for the arm and pole.

Aluminum Identification Tag Not to Exceed 2" x 4". Secure to Transformer Base by 0.125" Stainless Steel rivets or screws. Fabricator to provide details for approval. Identification Tag Located on Inside of base visible from door opening. Tag to be stamped with the following information:

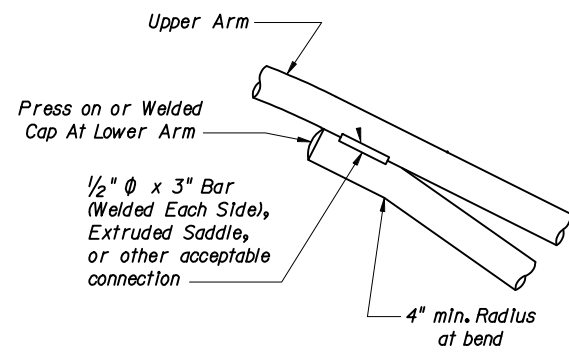
Financial Project ID  
 Pole Design Designation (i.e. Pole Pay Item Number)  
 Manufacturer's Name  
 Certification No.

### ELEVATION AND NOTES

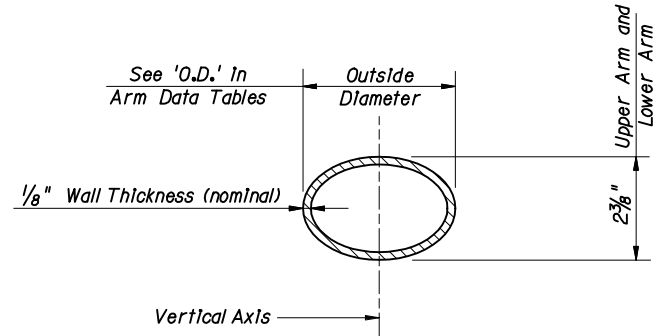
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

## ALUMINUM LIGHT POLE

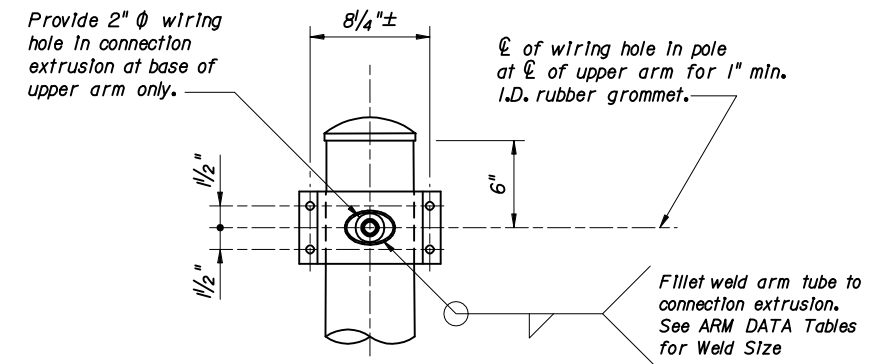
Names	Dates	Approved By
Designed By		<i>Robert E. Nichols</i> State Structures Design Engineer
Drawn By		Revision
Checked By		Sheet No. 1 of 7
		Index No. 17515



ARM CONNECTION DETAIL



ARM SECTION



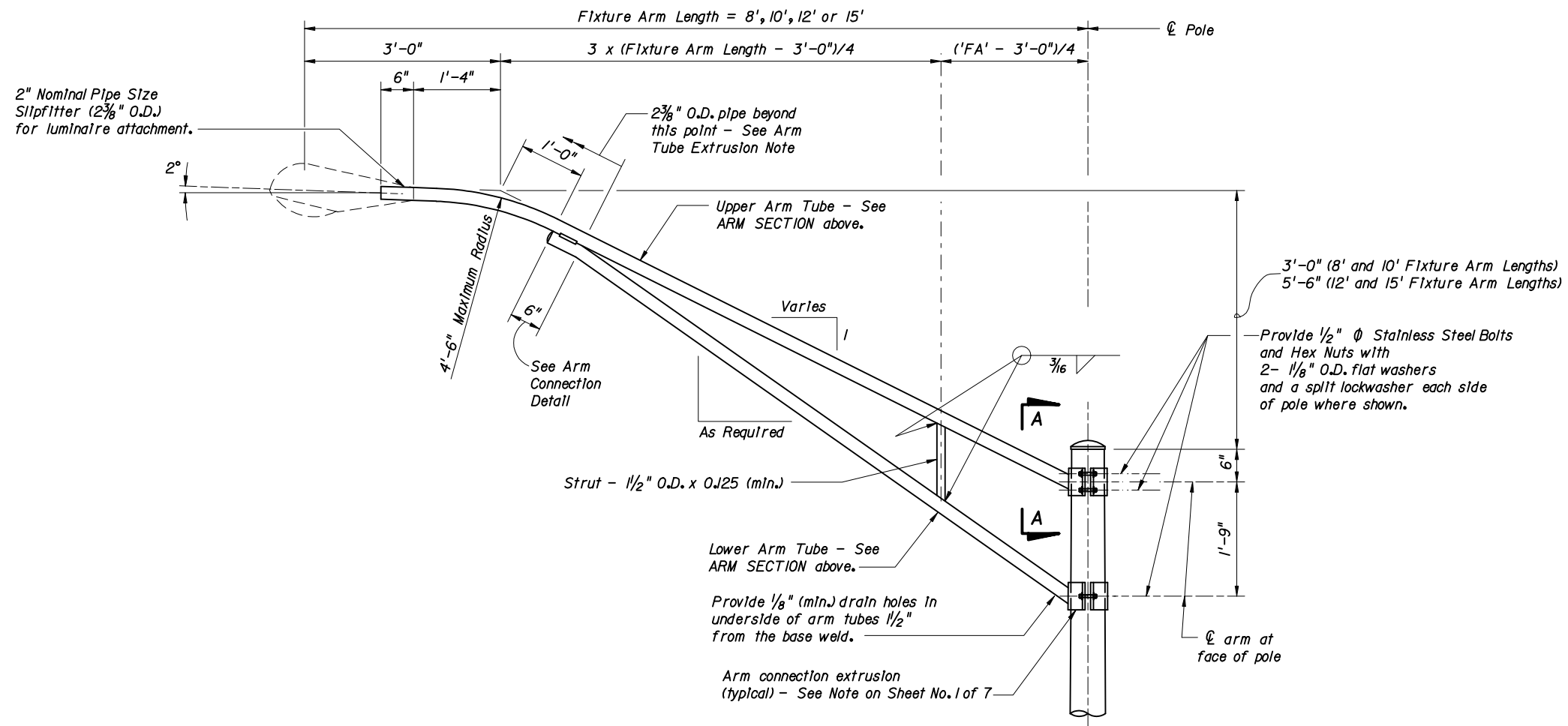
SECTION A-A  
(Connection At Lower Arm Similar)

ARM TUBE EXTRUSIONS NOTES:

At the pole connection, provide arm extrusions with dimensions as shown in the ARM SECTION and as tabulated in the ARM DATA Tables. Uniformly transition elliptical extrusions to a cylindrical section at the arm connection.

The pole fabricator may substitute elliptical cross sections other than those tabulated, provided the section properties about the vertical axis and the area of the section equal or exceed that of the required section, and provided the wall thickness is a minimum of 1/8" nominal and within the Aluminum Association Tolerances.

The outside diameter about the minor axis should be held at 2 3/8" at the upper and lower arms.



ARM ELEVATION

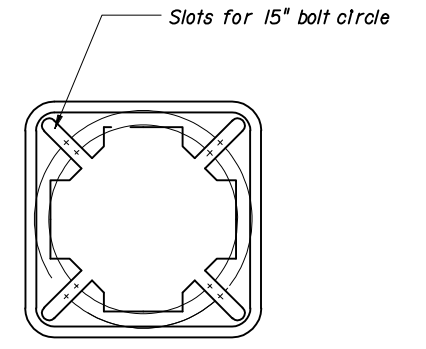
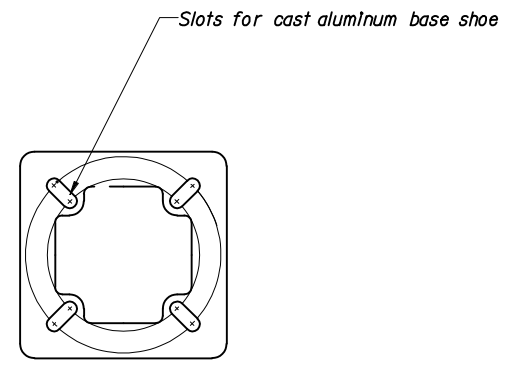
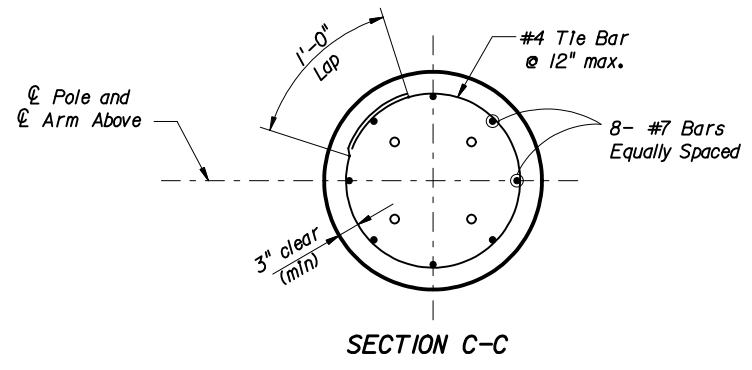
ARM DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

ALUMINUM LIGHT POLE

Designed By	Names	Dates	Approved By		
Drawn By			<i>Robert E. Nichols</i>	State Structures Design Engineer	
Checked By			Revision	Sheet No.	Index No.
			02	2 of 7	17515

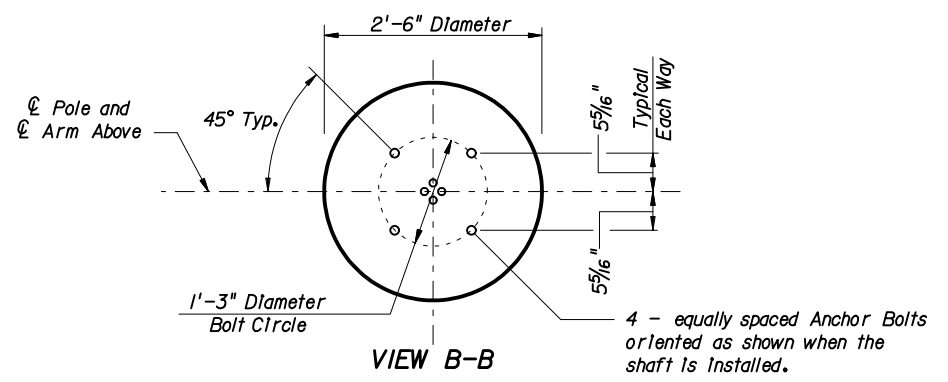




**FOUNDATION NOTES:**  
 The foundations for Aluminum Light Poles are pre-designed and are based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:

- Classification = Cohesionless (Fine Sand)
- Friction Angle = 30 Degrees (30°)
- Unit Weight = 50 lbs./cu. ft. (assumed saturated) for poles on fill ≤ 6 feet.
- Unit Weight = 112 lbs./cu. ft. (assumed dry) for poles on fill > 6 feet.

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for the other purposes may be used to confirm the assumed soil properties. In any event only the soil identification is required.



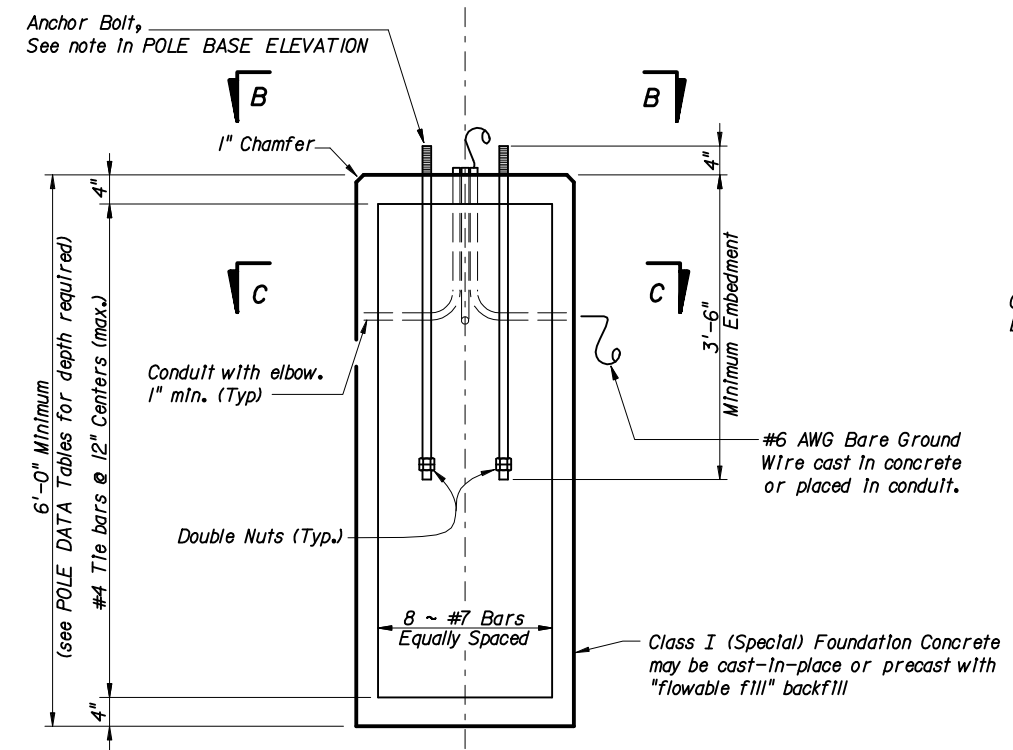
Cast aluminum pressure mounted nut cover - bolted attachment optional

Fillet weld butt of pole to inside of base shoe. See POLE DATA Tables for weld size.

Cast aluminum base shoe See Note on Sheet No. 1 of 7

10" O.D. Shaft See POLE DATA Tables for wall thickness

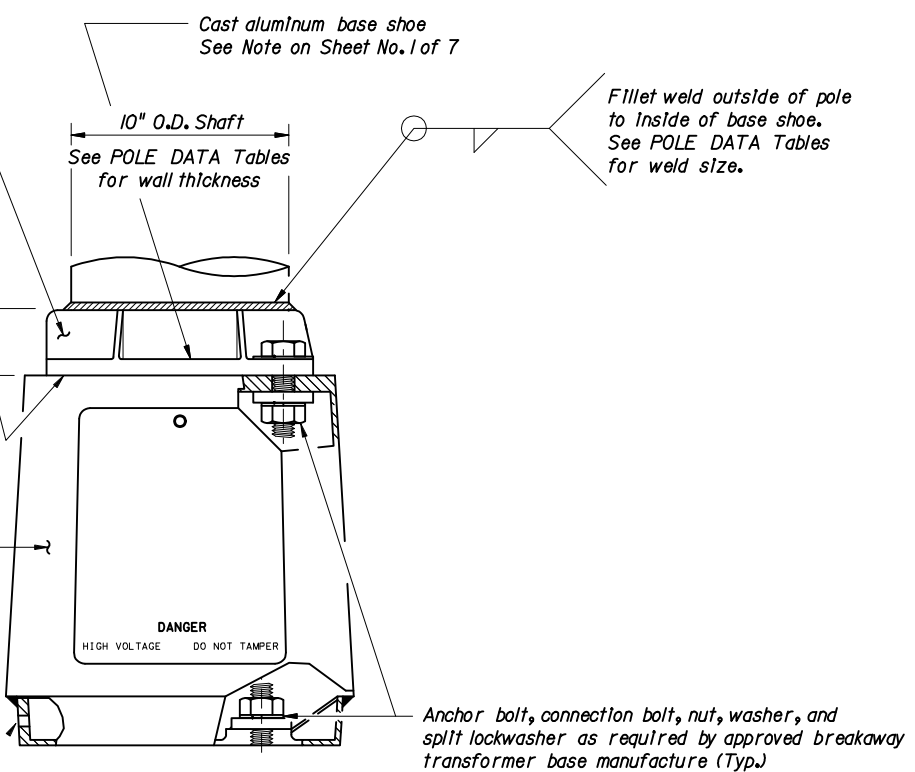
Fillet weld outside of pole to inside of base shoe. See POLE DATA Tables for weld size.



Cast aluminum breakaway transformer base. See Note on Sheet No. 1 of 7

3/2" Min.

1'-5"



Anchor bolt, connection bolt, nut, washer, and split lockwasher as required by approved breakaway transformer base manufacture (Typ.)

**BASE DETAILS**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>ALUMINUM LIGHT POLE</b>				
Designed By	Names	Dates	Approved By	
Drawn By			Robert S. Nichols State Structures Design Engineer	
Checked By	Revision	Sheet No.	Index No.	
	02	3 of 7	17515	

8 FT. ARM DATA												
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	UPPER ARM					LOWER ARM				
			O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)	O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)
1	40	80	2.375	0.250	0.392	0.100	0.162	2.375	0.188	0.218	0.056	0.090
2	40	100	3.625	0.250	0.755	0.178	0.212	2.375	0.188	0.152	0.036	0.043
3	45	80	2.375	0.250	0.392	0.100	0.162	2.375	0.188	0.218	0.056	0.090
4	45	100	3.625	0.250	0.755	0.178	0.212	2.375	0.188	0.152	0.036	0.043
5	50	80	2.375	0.250	0.424	0.104	0.162	2.375	0.250	0.236	0.058	0.090
6	50	100	3.625	0.250	0.819	0.186	0.212	2.375	0.188	0.165	0.037	0.043
7	55	100	3.625	0.250	0.857	0.200	0.212	2.375	0.188	0.173	0.040	0.043
8	60	100	3.625	0.250	0.857	0.200	0.212	2.375	0.188	0.173	0.040	0.043
9	65	100	3.625	0.250	0.857	0.200	0.212	2.375	0.188	0.173	0.040	0.043
10	70	100	3.625	0.250	0.857	0.200	0.212	2.375	0.188	0.173	0.040	0.043
11	75	100	3.625	0.250	0.857	0.200	0.212	2.375	0.188	0.173	0.040	0.043

10 FT. ARM DATA												
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	UPPER ARM					LOWER ARM				
			O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)	O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)
1	40	80	3.625	0.188	0.669	0.134	0.269	2.375	0.188	0.150	0.030	0.060
2	40	100	3.625	0.188	0.651	0.118	0.182	3.625	0.188	0.556	0.101	0.155
3	45	80	3.625	0.188	0.669	0.134	0.269	2.375	0.188	0.150	0.030	0.060
4	45	100	3.625	0.188	0.651	0.118	0.182	3.625	0.188	0.556	0.101	0.155
5	50	80	3.625	0.250	0.720	0.138	0.269	2.375	0.188	0.161	0.031	0.060
6	50	100	3.625	0.250	0.703	0.123	0.182	3.625	0.250	0.601	0.105	0.155
7	55	100	3.625	0.250	0.739	0.133	0.182	3.625	0.250	0.632	0.114	0.155
8	60	100	3.625	0.250	0.739	0.133	0.182	3.625	0.250	0.632	0.114	0.155
9	65	100	3.625	0.250	0.739	0.133	0.182	3.625	0.250	0.632	0.114	0.155
10	70	100	3.625	0.250	0.739	0.133	0.182	3.625	0.250	0.632	0.114	0.155
11	75	100	3.625	0.250	0.739	0.133	0.182	3.625	0.250	0.632	0.114	0.155

12 FT. ARM DATA												
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	UPPER ARM					LOWER ARM				
			O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)	O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)
1	40	80	3.625	0.188	0.593	0.099	0.235	3.625	0.188	0.486	0.081	0.192
2	40	100	4.625	0.250	1.150	0.179	0.299	3.625	0.188	0.518	0.081	0.135
3	45	80	3.625	0.188	0.593	0.099	0.235	3.625	0.188	0.486	0.081	0.192
4	45	100	4.625	0.250	1.150	0.179	0.299	3.625	0.188	0.518	0.081	0.135
5	50	80	3.625	0.188	0.634	0.102	0.235	3.625	0.188	0.520	0.084	0.192
6	50	100	4.625	0.250	1.230	0.185	0.299	3.625	0.188	0.554	0.084	0.135
7	55	100	4.625	0.313	1.300	0.201	0.299	3.625	0.250	0.588	0.091	0.135
8	60	100	4.625	0.313	1.300	0.201	0.299	3.625	0.250	0.588	0.091	0.135
9	65	100	4.625	0.313	1.300	0.201	0.299	3.625	0.250	0.588	0.091	0.135
10	70	100	4.625	0.313	1.300	0.201	0.299	3.625	0.250	0.588	0.091	0.135
11	75	100	4.625	0.313	1.300	0.201	0.299	3.625	0.250	0.588	0.091	0.135

15 FT. ARM DATA												
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	UPPER ARM					LOWER ARM				
			O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)	O.D. (IN.)	WELD (IN.)	MOMENT (FT.KIP)	SHEAR (KIP)	N * (KIP)
1	40	80	4.625	0.250	1.02	0.137	0.388	3.625	0.188	0.484	0.065	0.184
2	40	100	4.625	0.250	1.15	0.145	0.293	4.625	0.250	1.170	0.146	0.296
3	45	80	4.625	0.250	1.02	0.137	0.388	3.625	0.188	0.484	0.065	0.184
4	45	100	4.625	0.250	1.15	0.145	0.293	4.625	0.250	1.170	0.146	0.296
5	50	80	4.625	0.250	1.09	0.140	0.388	3.625	0.188	0.514	0.066	0.184
6	50	100	4.625	0.250	1.23	0.149	0.293	4.625	0.313	1.240	0.151	0.296
7	55	100	4.625	0.313	1.31	0.162	0.293	4.625	0.313	1.330	0.164	0.296
8	60	100	4.625	0.313	1.31	0.162	0.293	4.625	0.313	1.330	0.164	0.296
9	65	100	4.625	0.313	1.31	0.162	0.293	4.625	0.313	1.330	0.164	0.296
10	70	100	4.625	0.313	1.31	0.162	0.293	4.625	0.313	1.330	0.164	0.296
11	75	100	4.625	0.313	1.31	0.162	0.293	4.625	0.313	1.330	0.164	0.296

Note:  
All tables were developed assuming the following Luminaire properties:  
Area = 1.5 ft<sup>2</sup> (Includes wind drag coefficient)  
Weight = 51 pounds

\* 'N' equals force normal to face of connection due to axial force in the arm - tension upper arm - compression lower arm.

ARM DATA

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
<b>ALUMINUM LIGHT POLE</b>					
Designed By	Names	Dates	Approved By <i>Robert E. Nichols</i> State Structures Design Engineer		
Drawn By			Revision	Sheet No.	Index No.
Checked By			4 of 7		17515

DATA FOR POLE WITH 8 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	40	80	0.156	0.188	0.156	13.5	0.522	0.611	0.227	6
2	40	100	0.156	0.188	0.156	17.6	0.690	0.907	0.229	7
3	45	80	0.156	0.188	0.156	13.8	0.539	0.611	0.227	6
4	45	100	0.156	0.188	0.156	18.0	0.713	0.907	0.229	7
5	50	80	0.156	0.188	0.156	14.3	0.563	0.660	0.227	6
6	50	100	0.156	0.188	0.156	18.6	0.747	0.985	0.229	6
7	55	100	0.156	0.188	0.156	19.7	0.790	1.030	0.229	6
8	60	100	0.188	0.188	0.188	20.1	0.805	1.030	0.261	6
9	65	100	0.188	0.188	0.188	20.4	0.825	1.030	0.261	6

DATA FOR POLE WITH 10 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	40	80	0.156	0.188	0.156	13.7	0.528	0.819	0.233	6
2	40	100	0.156	0.188	0.156	17.8	0.694	1.210	0.236	7
3	45	80	0.156	0.188	0.156	14.0	0.545	0.819	0.233	6
4	45	100	0.156	0.188	0.156	18.2	0.717	1.210	0.236	7
5	50	80	0.156	0.188	0.156	14.5	0.569	0.881	0.233	6
6	50	100	0.156	0.188	0.156	18.8	0.751	1.300	0.236	6
7	55	100	0.188	0.188	0.188	19.9	0.795	1.370	0.268	6
8	60	100	0.188	0.188	0.188	20.3	0.810	1.370	0.268	6
9	65	100	0.188	0.188	0.188	20.6	0.830	1.370	0.268	6

DATA FOR POLE WITH 12 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	40	80	0.156	0.188	0.156	13.1	0.514	1.08	0.232	6
2	40	100	0.156	0.188	0.156	17.9	0.699	1.66	0.235	7
3	45	80	0.156	0.188	0.156	13.4	0.530	1.08	0.232	6
4	45	100	0.156	0.188	0.156	18.2	0.721	1.66	0.235	7
5	50	80	0.156	0.188	0.156	13.8	0.553	1.15	0.232	6
6	50	100	0.156	0.188	0.156	18.9	0.753	1.78	0.235	6
7	55	100	0.188	0.188	0.188	19.9	0.796	1.89	0.265	6
8	60	100	0.188	0.188	0.188	20.4	0.814	1.89	0.265	6
9	65	100	0.188	0.188	0.188	20.7	0.832	1.89	0.265	6

DATA FOR POLE WITH 15 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	40	80	0.156	0.188	0.156	13.9	0.533	1.51	0.242	6
2	40	100	0.156	0.188	0.156	19.1	0.728	2.32	0.246	7
3	45	80	0.156	0.188	0.156	14.2	0.550	1.51	0.242	6
4	45	100	0.188	0.188	0.188	19.4	0.750	2.32	0.276	7
5	50	80	0.156	0.188	0.156	14.6	0.572	1.60	0.242	6
6	50	100	0.188	0.188	0.188	20.1	0.782	2.46	0.276	6
7	55	100	0.188	0.188	0.188	21.3	0.829	2.63	0.276	6
8	60	100	0.188	0.188	0.188	21.7	0.847	2.63	0.276	6
9	65	100	0.188	0.188	0.188	22.0	0.865	2.63	0.276	6

NOTE:  
Pole wall thicknesses shown in the POLE DATA TABLES are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

POLE DATA - 40 FT. MOUNTING HEIGHT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
<b>ALUMINUM LIGHT POLE</b>				
Designed By	Names	Dates	Approved By <i>Robert E. Nichols</i> State Structures Design Engineer	
Drawn By			Revision	Sheet No. 5 of 7
Checked By				Index No. 17515

DATA FOR POLE WITH 8 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	45	80	0.156	0.188	0.156	16.6	0.582	0.611	0.249	6
2	45	100	0.188	0.188	0.188	21.5	0.767	0.907	0.288	7
3	50	80	0.156	0.188	0.156	17.2	0.608	0.660	0.249	7
4	50	100	0.188	0.188	0.188	22.4	0.803	0.985	0.288	7
5	55	100	0.250	0.188	0.250	23.6	0.844	1.030	0.359	6
6	60	100	0.250	0.188	0.250	24.2	0.876	1.030	0.359	6
7	65	100	0.250	0.188	0.250	24.6	0.894	1.030	0.359	6
8	70	100	0.250	0.188	0.250	24.9	0.913	1.030	0.359	6

DATA FOR POLE WITH 10 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	45	80	0.156	0.188	0.156	16.9	0.588	0.819	0.255	7
2	45	100	0.188	0.188	0.188	21.8	0.771	1.210	0.294	7
3	50	80	0.156	0.188	0.156	17.5	0.614	0.881	0.255	7
4	50	100	0.250	0.188	0.250	22.6	0.807	1.300	0.366	7
5	55	100	0.250	0.188	0.250	23.9	0.849	1.370	0.366	6
6	60	100	0.250	0.188	0.250	24.4	0.881	1.370	0.366	6
7	65	100	0.250	0.188	0.250	24.8	0.899	1.370	0.366	6
8	70	100	0.250	0.188	0.250	25.2	0.917	1.370	0.366	6

DATA FOR POLE WITH 12 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	45	80	0.156	0.188	0.156	16.2	0.573	1.08	0.255	6
2	45	100	0.188	0.188	0.188	21.9	0.775	1.66	0.291	7
3	50	80	0.156	0.188	0.156	16.7	0.594	1.15	0.255	7
4	50	100	0.250	0.188	0.250	22.7	0.804	1.78	0.358	7
5	55	100	0.250	0.188	0.250	23.9	0.851	1.89	0.358	6
6	60	100	0.250	0.188	0.250	24.5	0.884	1.89	0.358	6
7	65	100	0.250	0.188	0.250	24.9	0.898	1.89	0.358	6
8	70	100	0.250	0.188	0.250	25.2	0.918	1.89	0.358	6

DATA FOR POLE WITH 15 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	45	80	0.156	0.188	0.156	17.1	0.592	1.51	0.264	7
2	45	100	0.250	0.188	0.250	23.2	0.804	2.32	0.370	7
3	50	80	0.156	0.188	0.156	17.6	0.613	1.60	0.264	7
4	50	100	0.250	0.188	0.250	24.0	0.833	2.46	0.370	7
5	55	100	0.250	0.188	0.250	25.4	0.885	2.63	0.370	6
6	60	100	0.250	0.250	0.250	26.0	0.918	2.63	0.370	6
7	65	100	0.250	0.250	0.250	26.4	0.931	2.63	0.370	6
8	70	100	0.250	0.250	0.250	26.7	0.952	2.63	0.370	6

NOTE:  
Pole wall thicknesses shown in the POLE DATA TABLES are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

POLE DATA - 45 FT. MOUNTING HEIGHT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
ROAD DESIGN

ALUMINUM LIGHT POLE

Designed By	Names	Dates	Approved By
Drawn By			<i>Robert E. Nichols</i> State Structures Design Engineer
Checked By			Revision
			Sheet No.
			Index No.
			6 of 7
			17515

DATA FOR POLE WITH 8 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	50	80	0.188	0.188	0.188	20.4	0.650	0.660	0.312	7
2	50	100	0.250	0.250	0.250	26.4	0.856	0.985	0.394	8
3	55	100	0.250	0.250	0.250	27.9	0.899	1.030	0.394	8
4	60	100	0.250	0.250	0.250	28.5	0.930	1.030	0.394	6
5	65	100	0.250	0.250	0.250	29.1	0.965	1.030	0.394	6
6	70	100	0.250	0.250	0.250	29.5	0.981	1.030	0.394	6
7	75	100	0.250	0.250	0.250	29.8	0.998	1.030	0.394	6

DATA FOR POLE WITH 10 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	50	80	0.188	0.188	0.188	20.7	0.656	0.881	0.317	7
2	50	100	0.250	0.250	0.250	26.7	0.860	1.300	0.400	8
3	55	100	0.250	0.250	0.250	28.1	0.904	1.370	0.400	8
4	60	100	0.250	0.250	0.250	28.8	0.934	1.370	0.400	6
5	65	100	0.250	0.250	0.250	29.4	0.970	1.370	0.400	6
6	70	100	0.250	0.250	0.250	29.8	0.986	1.370	0.400	6
7	75	100	0.250	0.250	0.250	30.1	1.000	1.370	0.400	6

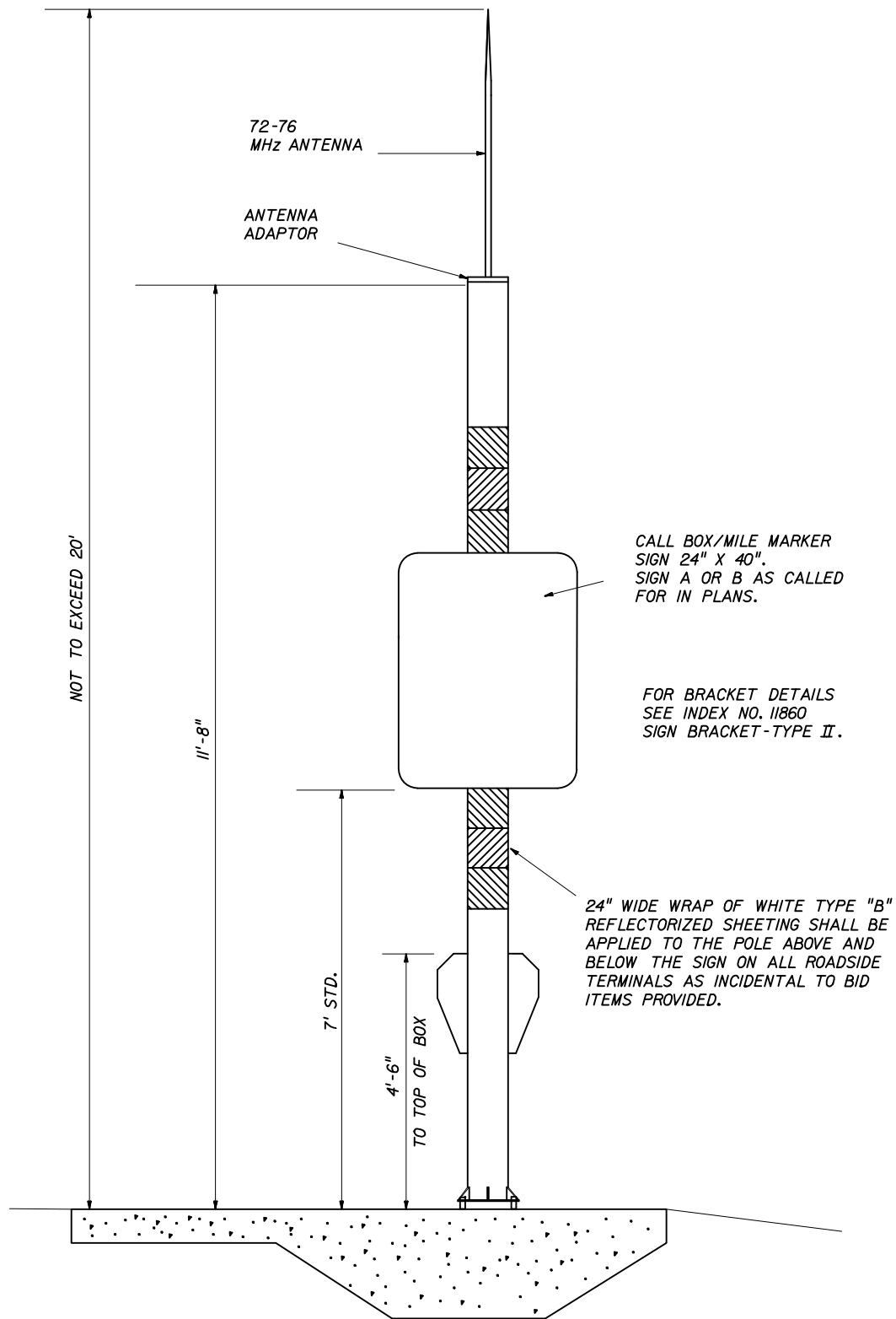
DATA FOR POLE WITH 12 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	50	80	0.188	0.188	0.188	19.9	0.640	1.15	0.315	7
2	50	100	0.250	0.250	0.250	26.8	0.863	1.78	0.393	8
3	55	100	0.250	0.250	0.250	28.2	0.906	1.89	0.393	8
4	60	100	0.250	0.250	0.250	28.8	0.935	1.89	0.393	6
5	65	100	0.250	0.250	0.250	29.5	0.972	1.89	0.393	6
6	70	100	0.250	0.250	0.250	29.9	0.987	1.89	0.393	6
7	75	100	0.250	0.250	0.250	30.1	1.000	1.89	0.393	6

DATA FOR POLE WITH 15 FT. ARM										
CASE NO.	WIND HEIGHT (FT.)	WIND SPEED (MPH)	POLE WALL (IN.)	UPPER WELD (IN.)	LOWER WELD (IN.)	BASE FORCES				FOUND. DEPTH (FT.)
						MOMENT (FT.KIP)	SHEAR (KIP)	TORSION (FT.KIP)	AXIAL (KIP)	
1	50	80	0.188	0.188	0.188	20.9	0.660	1.60	0.324	7
2	50	100	0.250	0.250	0.250	28.2	0.892	2.46	0.404	8
3	55	100	0.250	0.250	0.250	29.9	0.940	2.63	0.404	8
4	60	100	0.313	0.250	0.313	30.5	0.968	2.63	0.479	6
5	65	100	0.313	0.250	0.313	31.2	1.000	2.63	0.479	6
6	70	100	0.313	0.250	0.313	31.5	1.020	2.63	0.479	6
7	75	100	0.313	0.250	0.313	31.8	1.040	2.63	0.479	6

NOTE:  
Pole wall thicknesses shown in the POLE DATA TABLES are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

POLE DATA - 50 FT. MOUNTING HEIGHT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN				
<b>ALUMINUM LIGHT POLE</b>				
Designed By	Names	Dates	Approved By <i>Robert E. Nichols</i> State Structures Design Engineer	
Drawn By	Revision	Sheet No.	Index No.	
Checked By		7 of 7	17515	

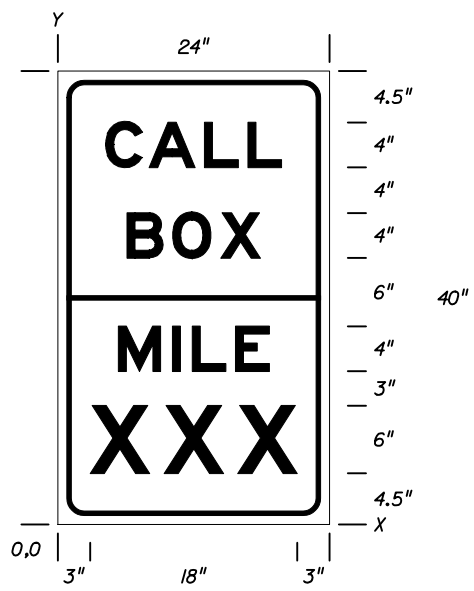


CALL BOX/MILE MARKER SIGN 24" X 40". SIGN A OR B AS CALLED FOR IN PLANS.

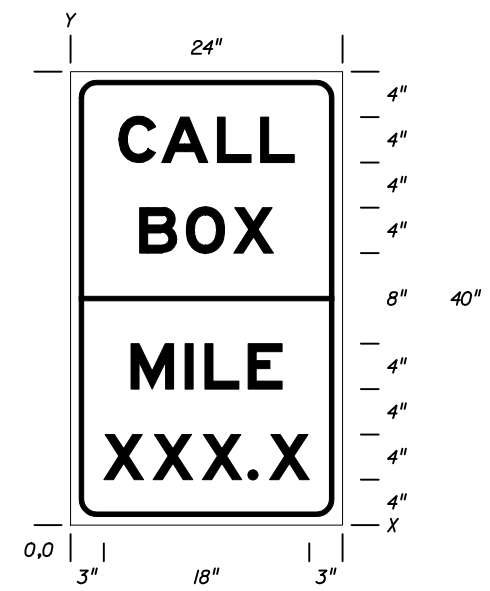
FOR BRACKET DETAILS SEE INDEX NO. 11860 SIGN BRACKET-TYPE II.

SEE SHEET 2 OF 2 FOR CONCRETE PAD DETAILS.

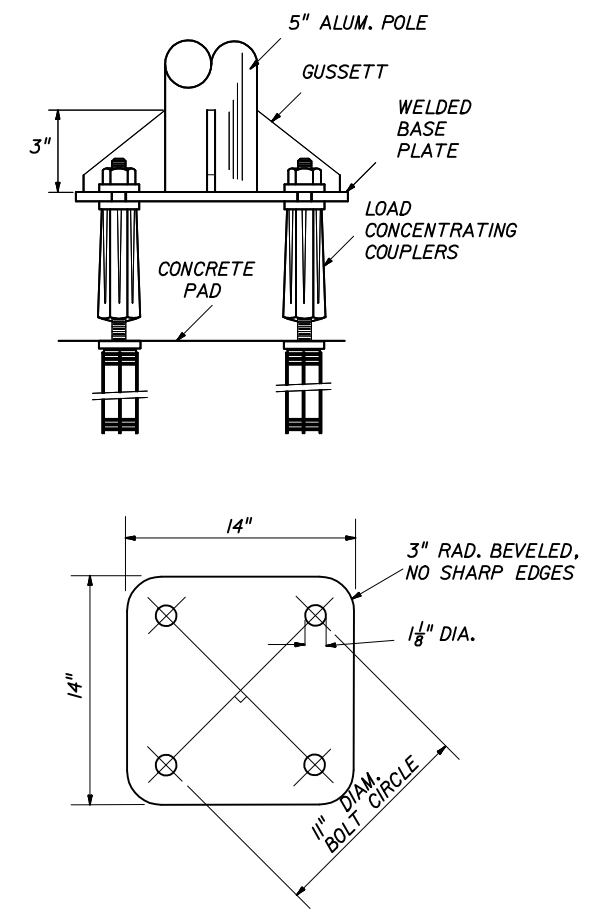
TYPICAL MOTORIST AID CALL BOX TERMINAL



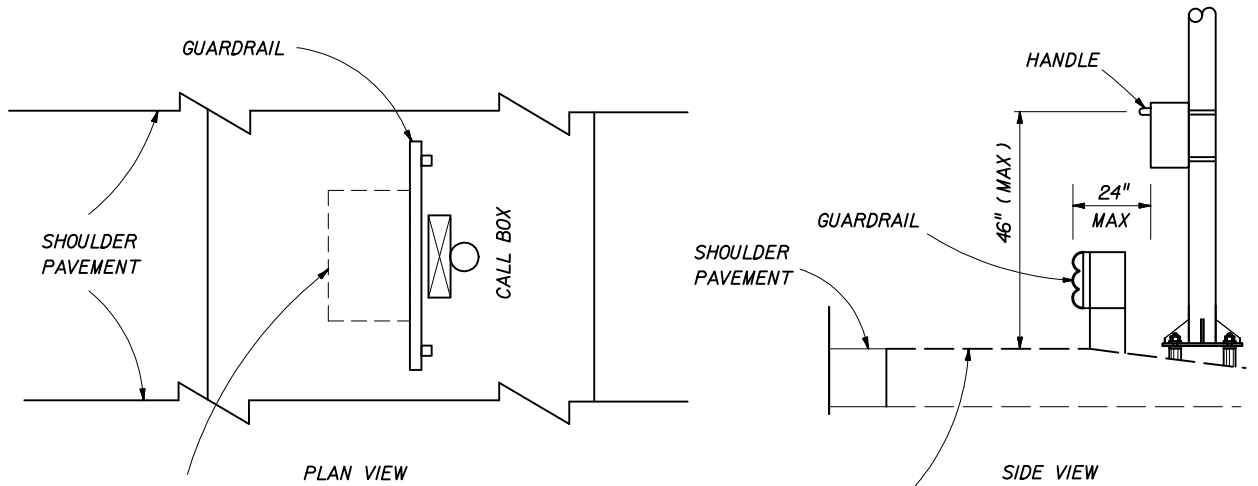
SIGN A



SIGN B



BASE PLATE & BOLT PATTERN



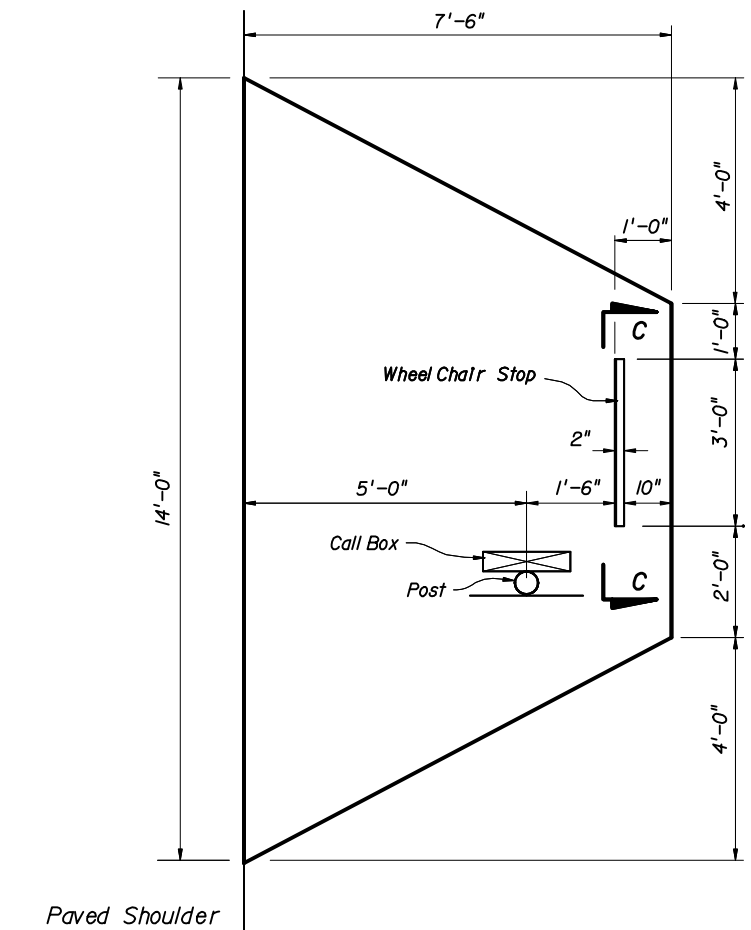
A 30"X 48" MANEUVERING SPACE WITH A 2% MAX SLOPE IN ANY DIRECTION, CENTERED IMMEDIATELY IN FRONT OF THE CALL BOX AND MEASURED FROM THE GRIP POINT OF THE UNIT IS REQUIRED.

NO MORE THAN 2% SLOPE IN ANY DIRECTION

CALL BOX DETAIL BEHIND GUARDRAIL

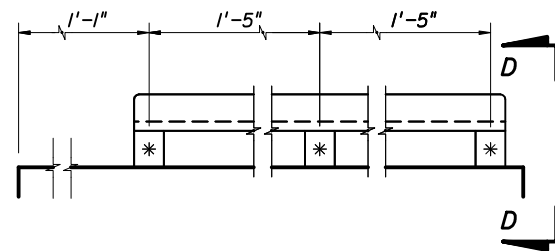
TERMINALS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MOTORIST AID CALL BOX</b>				
Designed By	CAS	5-98	Approved By <i>Charles A. Scott</i> State Traffic Standards Engineer	
Drawn By	LW	5-98	Revision	Sheet No. Index No.
Checked By	CAS	5-98	02	1 of 2 17600



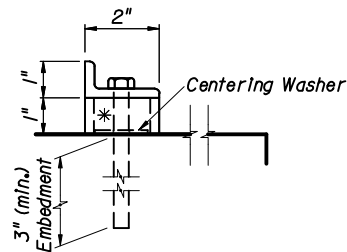
PLAN

Call Box Attachment To Slab  
As Per Manufacturer's Recommendation.



SECTION C-C

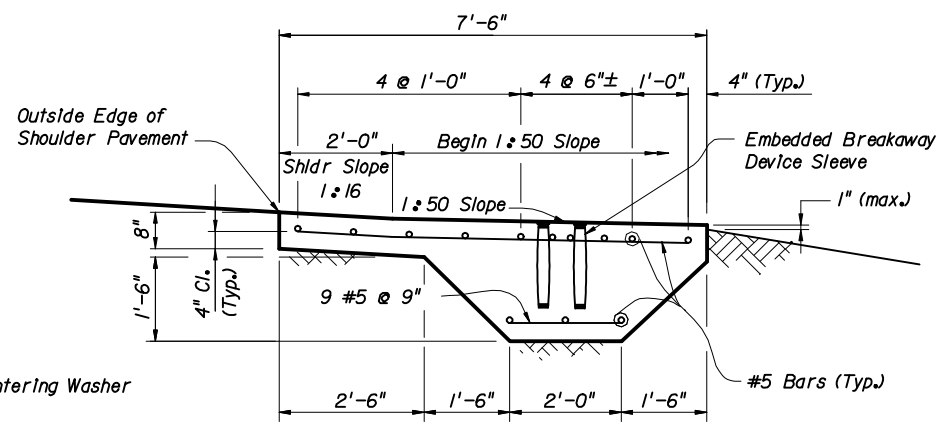
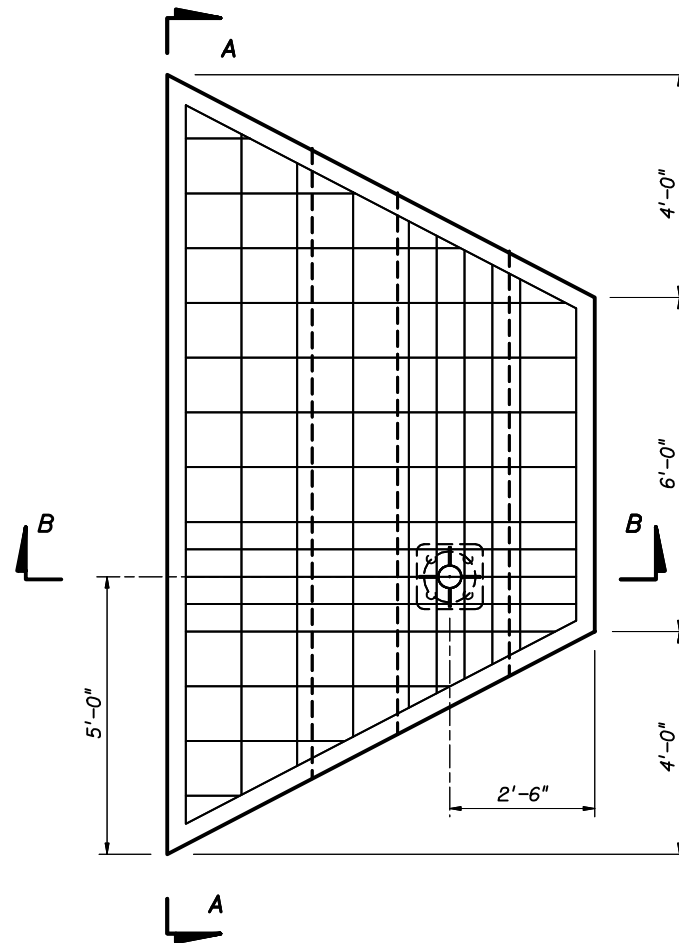
2" x 1" x 1/4" Galv. Angle And  
3-3/8" Ø x 5" Galvanized Steel Expansion  
Anchor Bolt With 3" Min. Embedment



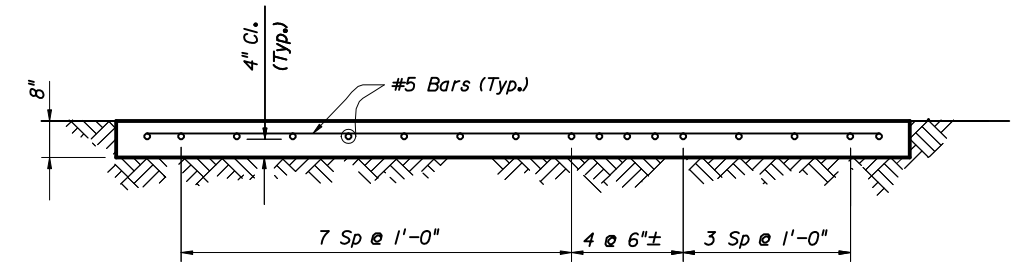
VIEW D-D

\* 1/2" Ø x 1" High  
Galvanized Steel Pipe Spacer

WHEEL CHAIR STOP DETAIL



SECTION B-B



SECTION A-A

MOTORIST AID CALL BOX CONCRETE PAD QUANTITIES

Concrete : 3.5 c.y. (each)

Reinforcing Steel : 243 lb (each)

GENERAL NOTES

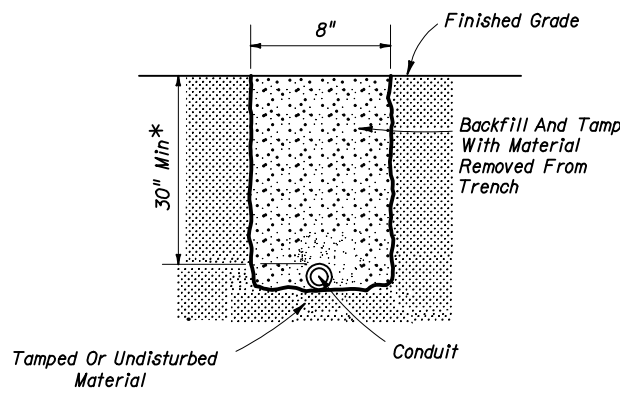
1. General Specifications: FDOT Standard Specifications for Road and Bridge Construction (Current Edition) and Supplements thereto.
2. Design Specifications: AASHTO Standard Specifications For Highway Bridges (Current Edition and approved revisions thereto).
3. Concrete: Concrete strength shall be Class II ( $f'c=3,400$  psi).
4. Reinforcing Steel: Reinforcing Steel shall conform to ASTM A615-96a, Grade 60.
5. Payment : Motorist Aid Call Box Concrete Pads shall be paid for under the contract unit price for Class II Concrete (Miscellaneous), c.y. and shall include all labor, materials, and installation of embedded breakaway device sleeves, and miscellaneous galvanized steel for wheel chair stop and attachments.
6. Breakaway Device shall be paid for under Call Box Assembly.

CONCRETE PAD

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

MOTORIST AID CALL BOX

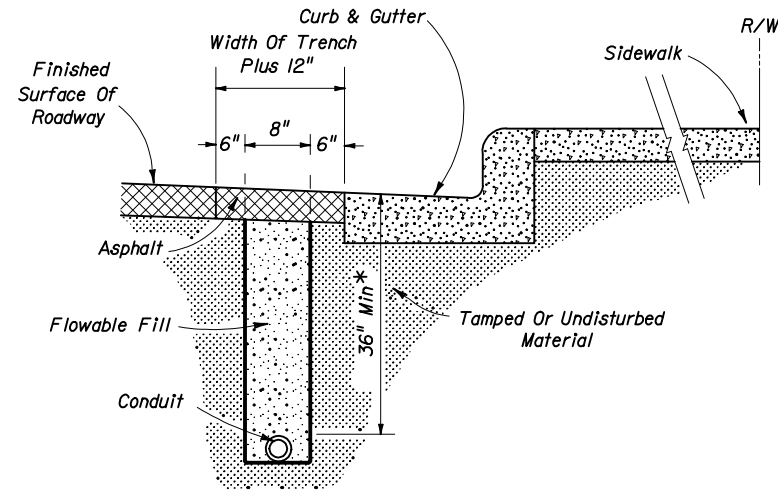
Names	Dates	Approved By		
Designed By	TJB	4-98	 State Structures Design Engineer	
Drawn By	SHW	4-98		
Checked By	TJB	4-98		
Revision	00	2 of 2	Index No.	17600



FOR USE IN AREAS NOT EXPOSED TO VEHICULAR TRAFFIC AND UNDER DRIVEWAYS

**FIGURE A**

\*May be adjusted due to field conditions upon approval of project engineer.

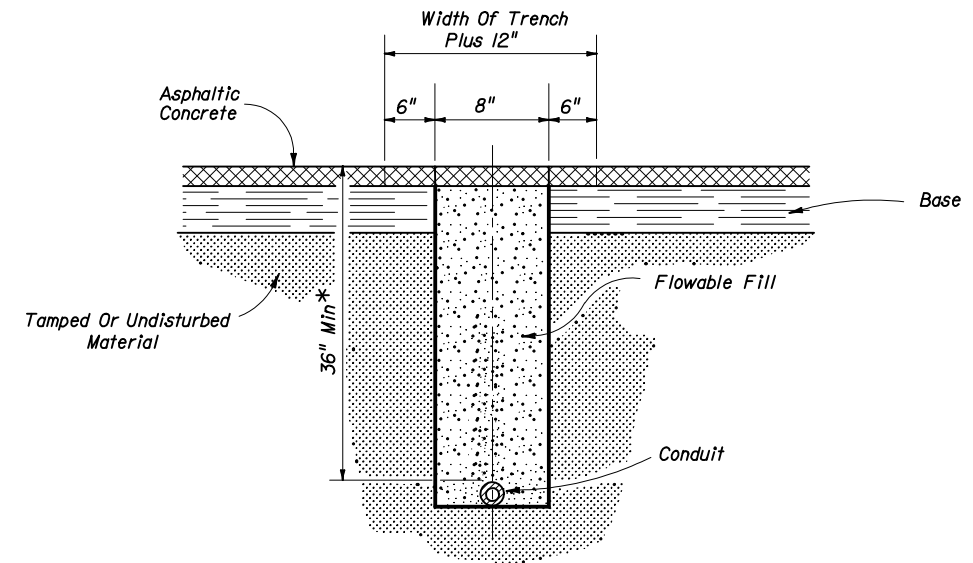


FOR USE IN ASPHALT ROADWAY ADJACENT TO GUTTER WHEN PLACEMENT OUTSIDE OF THE PAVEMENT IS NOT FEASIBLE.

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 B**

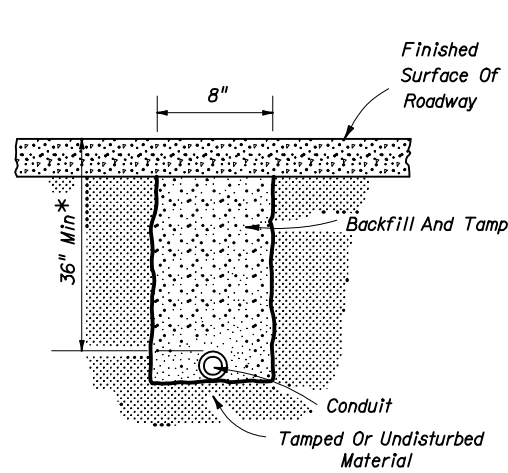


FOR USE IN INSTALLING CONDUIT UNDER EXISTING ASPHALT PAVEMENT NOT ADJACENT TO GUTTER WHEN JACKING IS NOT FEASIBLE

Note:

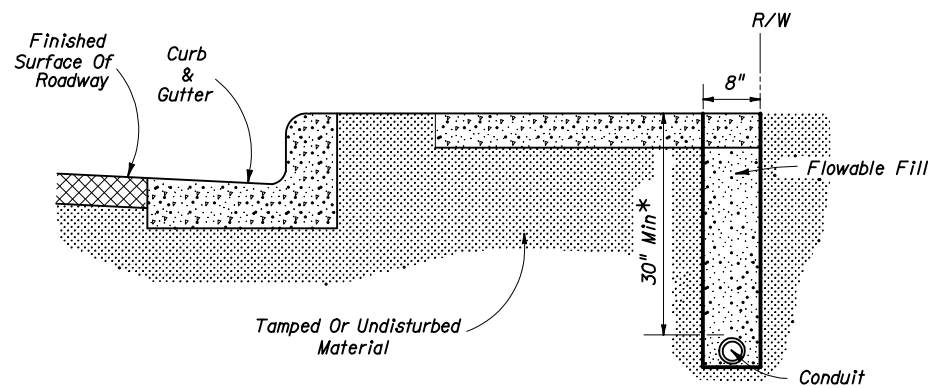
1. Rigid conduit must be used when jacking under existing pavement at 36" minimum depth.
2. Asphalt to be sawcut at the edges of the trench.
3. The removal and replacement of the additional pavement width (6") will not be required when the trench can be constructed without disturbing the asphalt surface on either side.

**FIGURE C**



FOR USE INSTALLING CONDUIT UNDER A NEW ROADWAY PRIOR TO INSTALLATION OF CURBS, BASE AND PAVEMENT

**FIGURE D**



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 Flowable Fill.

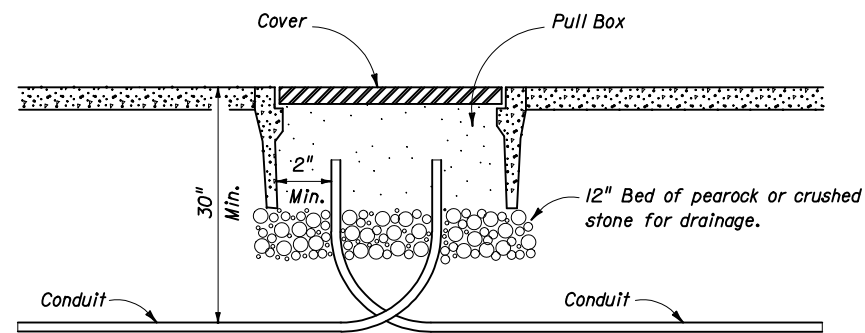
**FIGURE E**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONDUIT INSTALLATION DETAILS**

Names	Dates	Approved By		
Designed By	2-75	 State Traffic Standards Engineer		
Drawn By				
Checked By	2-75	Revision	Sheet No.	Index No.
		00	1 of 2	17721

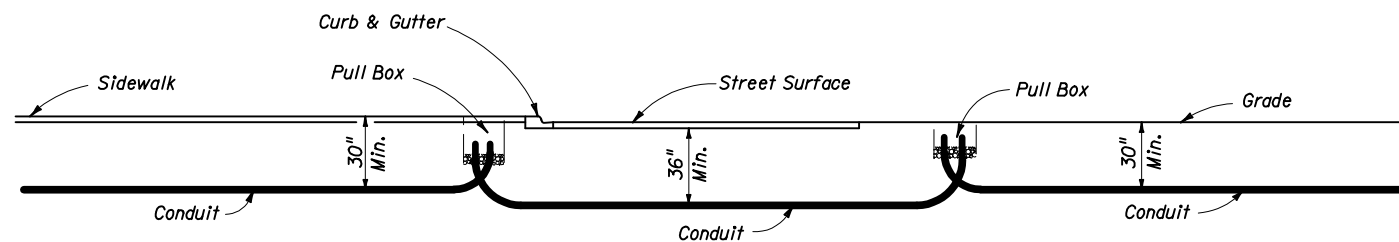
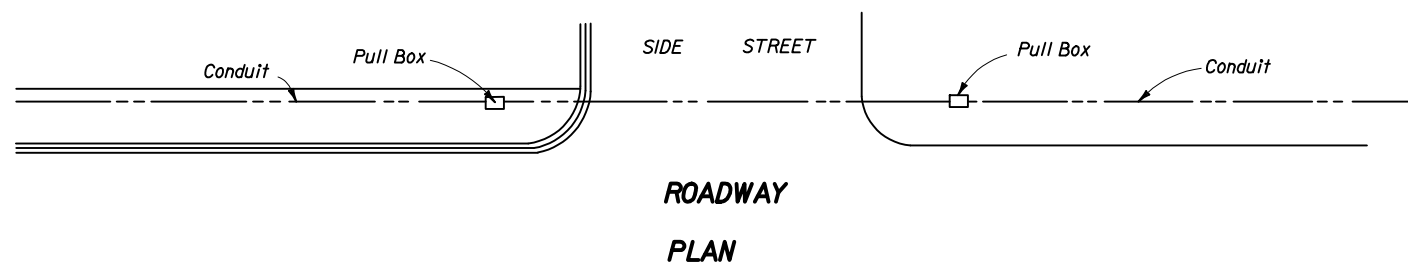




PULL BOX ENTRY OF CONDUIT UNDER SIDEWALKS

FIGURE A

Note:  
Ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications for Road and Bridge Construction.



UNDER SIDEWALK

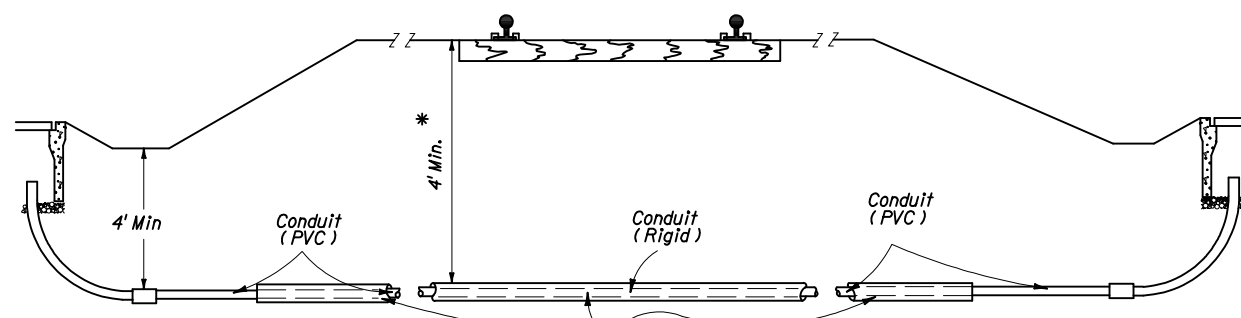
UNDER ROADWAY

UNDER NON-TRAFFIC BEARING SURFACE

SECTION

FIGURE B

Note:  
One run of conduit (between pull boxes) shall not contain more than 360° of bend including pull box bends.



\* Note

Conduit depth to be at R/R requirement but not less 4'.

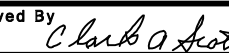
After jacking, leave rigid conduit as a sleeve extending to R/R right of way limits.

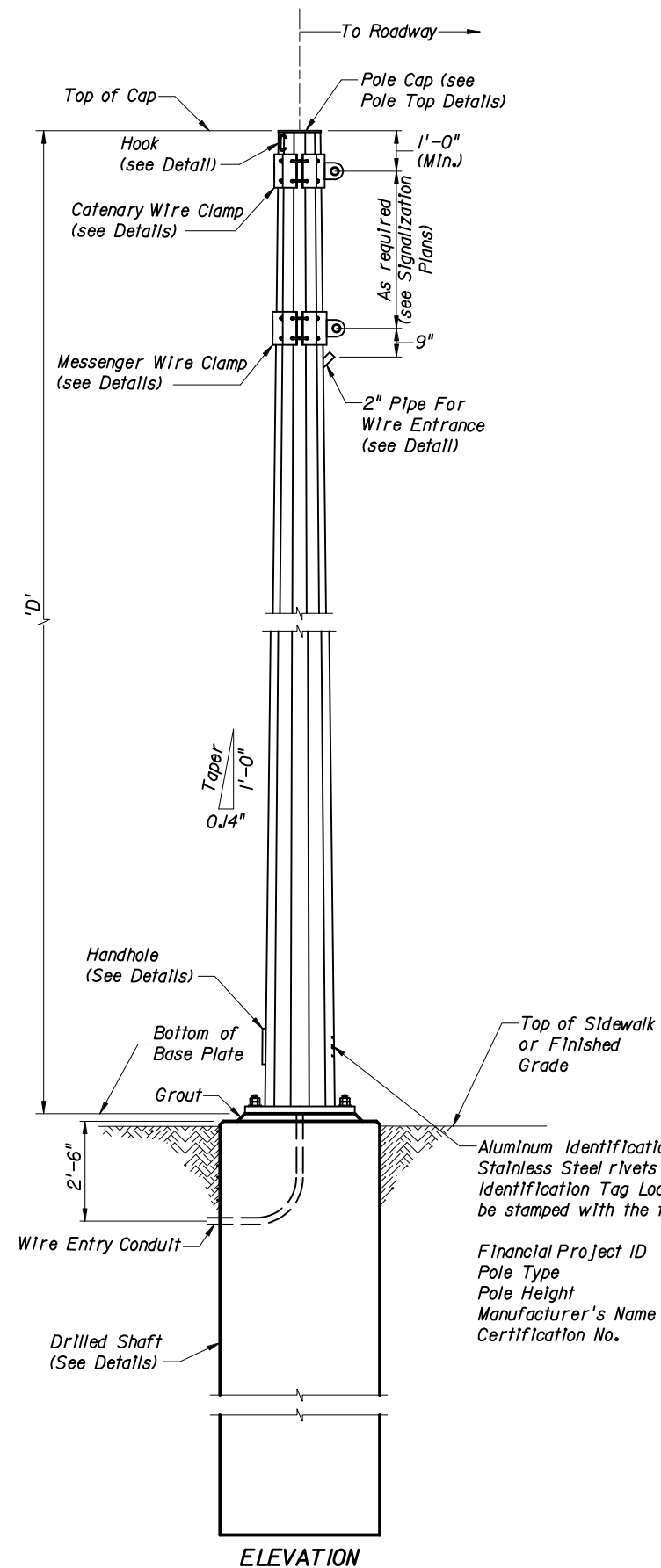
FOR USE UNDER RAILROADS

FIGURE C

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

CONDUIT INSTALLATIONS  
DETAILS

Names	Dates	Approved By		
Designed By		 State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	2 of 2	17721



**SELECTION PROCEDURE**

- Determine the required pole height and bending moment at the pole base using a design wind speed in conformance with the "Plans Preparation Manual", Chapter 29, with a 30 percent gust factor.
- Enter the Pole Moment Capacity Table, and determine the required Pole Type and wall thickness.
- Enter the Pole Type and height designation in the signalization Plans for each strain pole.  
Example: From design: required height = 23'-6",  
base moment = 198.0 kip-ft  
From table: use NS-VII-24
- Refer to the Table of Variables for the required pole diameter, base plate and drilled shaft dimensions.

MINIMUM REQUIRED MOMENT CAPACITY (kip-ft)							
D (ft.)	TYPE OF POLE						
	NS-IV	NS-V	NS-VI	NS-VII	NS-VIII	NS-IX	NS-X
20	33.0	106.0	152.0	210.0	266.0	330.0	390.0
22	36.8	111.2	158.7	218.0	274.9	340.3	401.7
24	40.6	116.4	165.3	226.0	283.9	350.7	413.3
26	44.4	121.6	172.0	234.0	292.8	361.0	425.0
28	48.2	126.8	178.7	242.0	301.7	371.3	436.7
30	52.0	132.0	185.3	250.0	310.7	381.7	448.3
32	55.8	137.2	192.0	258.0	319.6	392.0	460.0
34	59.6	142.4	198.7	266.0	328.5	402.3	471.7
36	63.4	147.6	205.3	274.0	337.5	412.7	483.3
38	67.2	152.8	212.0	282.0	346.4	423.0	495.0
40	71.0	158.0	218.7	290.0	355.3	433.3	506.7
42	74.8	163.2	225.3	298.0	364.3	443.7	518.3
44	78.6	168.4	232.0	306.0	373.2	454.0	530.0
46	82.4	173.6	238.7	314.0	382.1	464.3	541.7
48	86.2	178.8	245.3	322.0	391.1	474.7	553.3
50	90.0	184.0	252.0	330.0	400.0	485.0	565.0

0.239 Inch Wall Thickness

0.313 Inch Wall Thickness

**STEEL STRAIN POLE NOTES**

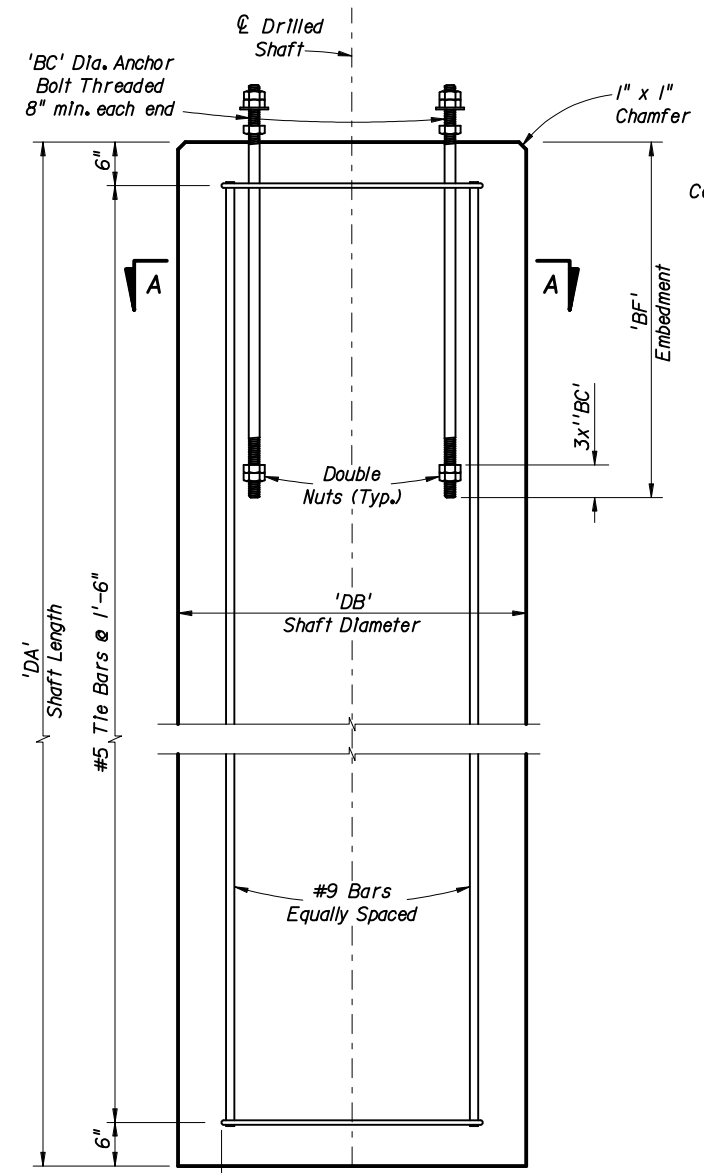
- Signal Structure Materials shall be as follows:
  - Poles --> ASTM A607 Grade 50, 55 or 60 (less than 1/4") or ASTM A572 Grade 50 or 60 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
  - Steel Plates --> ASTM A709 Grade 36
  - Weld Metal --> E70XX
  - Bolts (except Anchor Bolts) --> ASTM A325, Type 1
  - Anchor Bolts --> ASTM F1554 Grade 55
  - Nuts for Anchor Bolts --> ASTM A563 Grade A Heavy Hex
  - Washers for Anchor Bolts --> ASTM F436 Type 1
  - Handhole Frame --> ASTM A709 Grade 36
  - Handhole Cover --> ASTM A607 Grade 50, 55 or 60
  - Aluminum Caps and Covers --> ASTM B26 (356-T6)
  - Stainless Steel Screws --> AISI Type 316
- All Steel Items shall be Galvanized as follows:
  - All Nuts, Bolts and Washers --> ASTM A153 Class C or D depending on size
  - All other Steel Items --> ASTM A123
- Concrete shall be Class IV (Drilled Shaft) with a minimum 28-day Compressive Strength (f'c) of 4,000 psi for all environmental classifications.
- Reinforcing Steel shall be ASTM A615-96 Grade 60.
- Grout shall have a minimum 28-day Compressive Strength of 5,000 psi and shall meet the requirements of Section 934. Grout after pole is set and properly plumbed.
- A design wind speed of 100 mph with a 30% gust factor for wind loading on the pole was included in the design.
- The Pole shall be tapered with the diameter changing at a rate of 0.4 Inch per foot.
- Except for anchor bolts, all bolt hole diameters shall be equal to the bolt diameter plus 1/16", prior to galvanizing. Hole diameters for anchor bolts shall not exceed the bolt diameter plus 1/2".
- The foundation for the Strain Pole Structure shall be constructed in accordance with Section 455 of the FDOT Specifications except that no payment for the foundation shall be made under Section 455. The cost of providing the foundation shall be included in the pay item for providing the complete Strain Pole Structure. For foundation design assumptions, refer to the Foundation Notes
- The pole shall be free of transverse welds except at the base.
- Poles constructed out of two or more sections with overlapping splices are not permitted.
- The strain pole shall not be erected until the foundation concrete has been allowed to cure for a minimum of seven days.
- No field welding on any part of the pole is permitted.
- For clamp spacing, cable sizes and forces, signal and sign mounting locations and details see the Signalization Plans.
- All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
- See Standard Index No. 17727 for grounding detail and span wire installation details.
- Locate handhole 180° from 2 inch wire entrance pipe.
- Paint Steel Strain Poles in accordance with Section 649, Mast Arm Assemblies.

Aluminum Identification Tag Not to Exceed 2" x 4". Secure to Shaft by 0.125" Stainless Steel rivets or screws. Fabricators to provide details for approval. Identification Tag Located on Inside of Pole visible from handhole. Tag to be stamped with the following information:

- Financial Project ID
- Pole Type
- Pole Height
- Manufacturer's Name
- Certification No.

**ELEVATION AND NOTES**

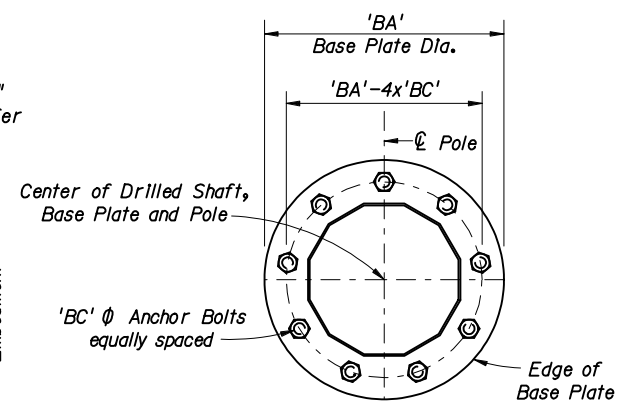
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>STEEL STRAIN POLE</b>				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 3	17723



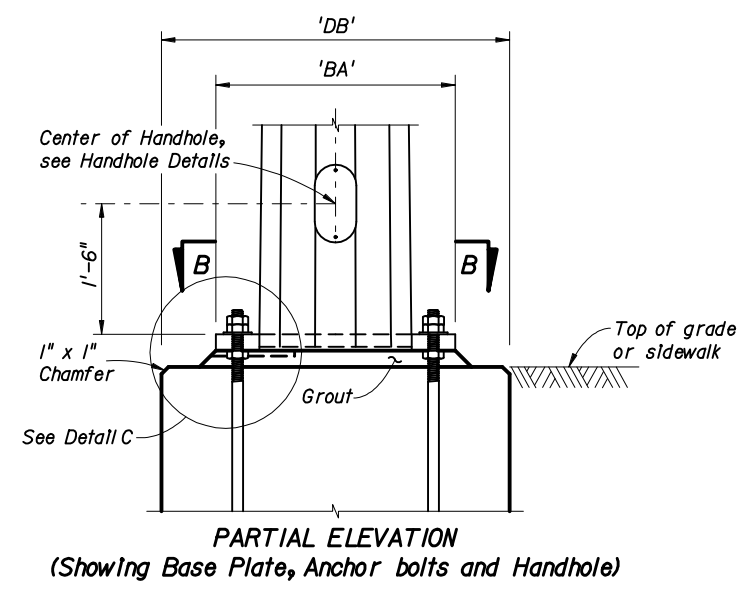
**DRILLED SHAFT ELEVATION**  
(See Table for number of #9 bars.)

**FOUNDATION NOTES:**  
The foundations for Steel Strain Poles are pre-designed and are based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:  
Classification = Cohesionless (Fine Sand)  
Friction Angle = 30 Degrees (30°)  
Unit Weight = 50 lbs./cu. ft. (assumed saturated)

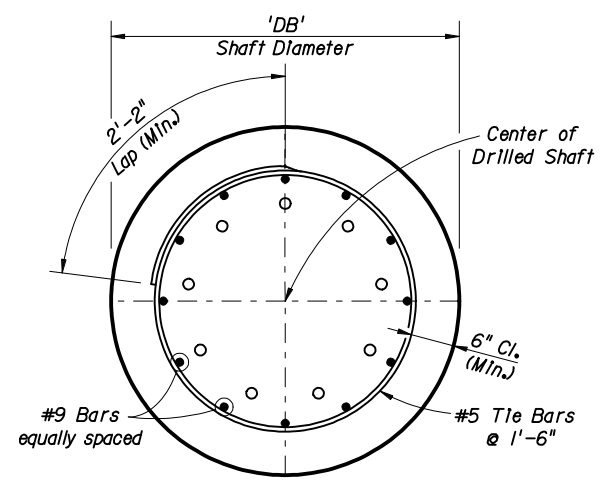
Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for the other purposes may be used to confirm the assumed soil properties.



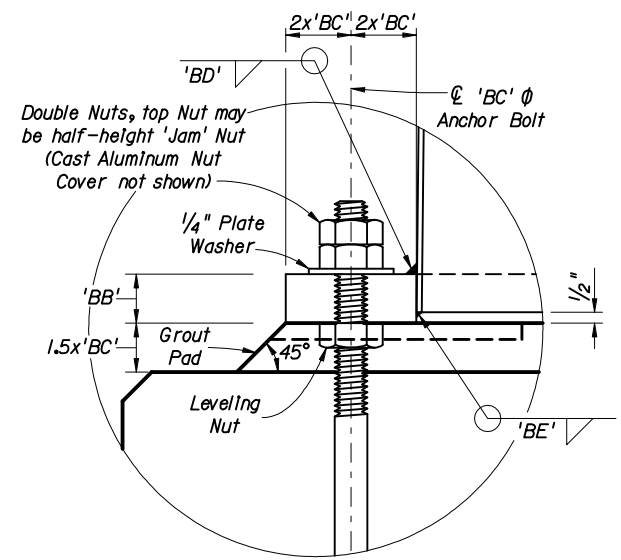
**VIEW B-B**  
NOTE: Number of bolts shown for illustration purposes only. (See Table for actual quantity)



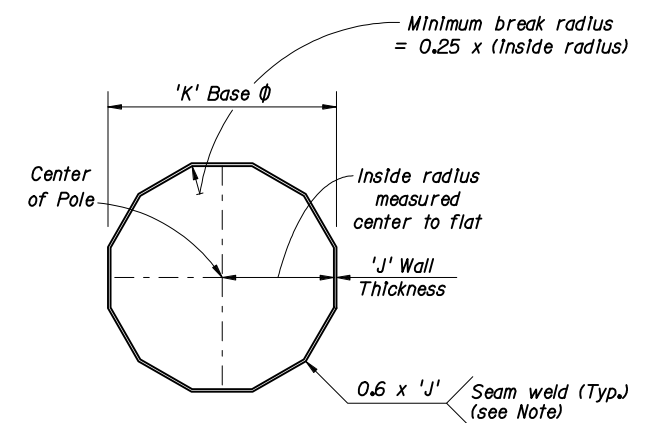
**PARTIAL ELEVATION**  
(Showing Base Plate, Anchor bolts and Handhole)



**SECTION A-A**



**DETAIL C**



**POLE SECTION**

NOTE: Longitudinal seam welds within 6" of circumferential welds shall be complete penetration welds.

POLE TYPE	TABLE OF STRAIN POLE VARIABLES											
	POLE		BASE CONNECTION							SHAFT		
	J (In.)	K (In.)	No. of Bolts	BA (In.)	BB (In.)	BC (In.)	BD (In.)	BE (In.)	BF (In.)	DA (ft)	DB (ft)	No. of #9 bars
NS-IV	J = 0.239	14	6	25	2.125	1.375	0.313	0.188	36	10	3.5	14
NS-V		16	8	27	2.250	1.375	0.375	0.188	47	12.5	3.5	14
NS-VI		18	8	30	2.375	1.500	0.438	0.188	54	14	3.5	14
NS-VII		21	10	33	2.250	1.500	0.375	0.188	49	15	4	19
NS-VIII		23	12	34	2.250	1.375	0.375	0.188	52	16	4	19
NS-IX		25	12	37	2.250	1.500	0.375	0.188	50	16	4.5	23
NS-X		27	12	39	2.375	1.500	0.375	0.188	52	17	4.5	23
NS-V	J = 0.313	16	8	28	2.375	1.500	0.438	0.250	47	12.5	3.5	14
NS-VI		18	10	30	2.375	1.500	0.500	0.250	54	14	3.5	14
NS-VII		21	12	33	2.375	1.500	0.500	0.250	49	15	4	19
NS-VIII		23	12	35	2.500	1.500	0.500	0.250	52	16	4	19
NS-IX		25	12	39	2.625	1.750	0.500	0.250	50	16	4.5	23
NS-X		27	12	41	2.750	1.750	0.500	0.250	52	17	4.5	23

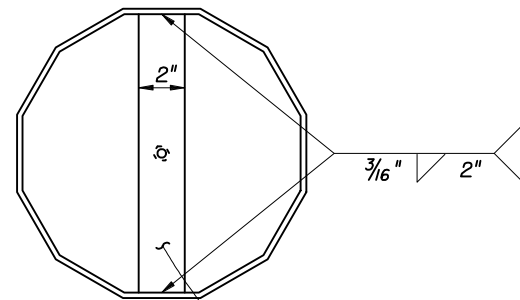
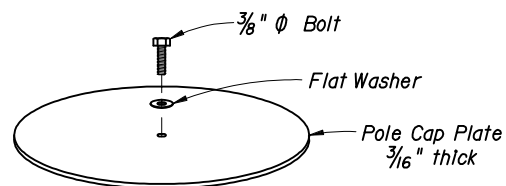
Note: Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted, provided the outside diameter and well thickness are not reduced.

**BASE DETAILS AND TABLE OF VARIABLES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

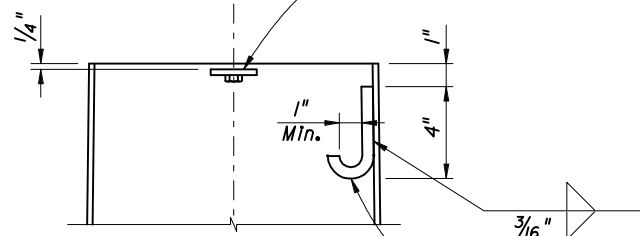
**STEEL STRAIN POLE**

Names	Dates	Approved By	State Structures Design Engineer	
Designed By		[Signature]	Revision	Sheet No.
Drawn By			02	2 of 3
Checked By			Index No.	17723



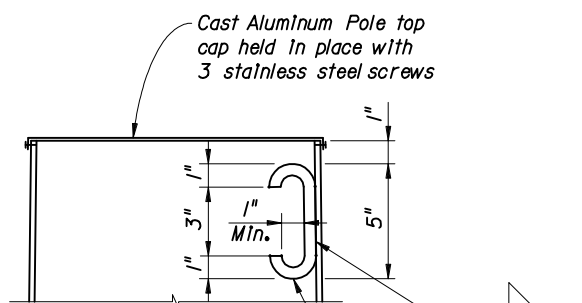
TOP VIEW

1/4" x 2" Lifting Bar with 5/16"  $\phi$  hole and 3/8" Nut tack welded to underside of bar



POLE TOP CUT-AWAY (Option 'a')

'J' Hook for wiring, 1/2"  $\phi$  commercial grade hot rolled bar welded to inside of pole.

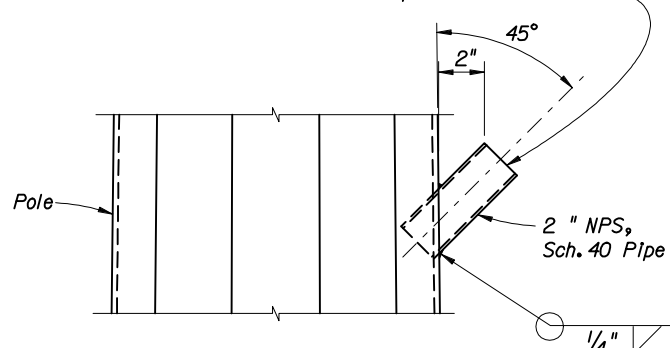


POLE TOP CUT-AWAY (Option 'b')

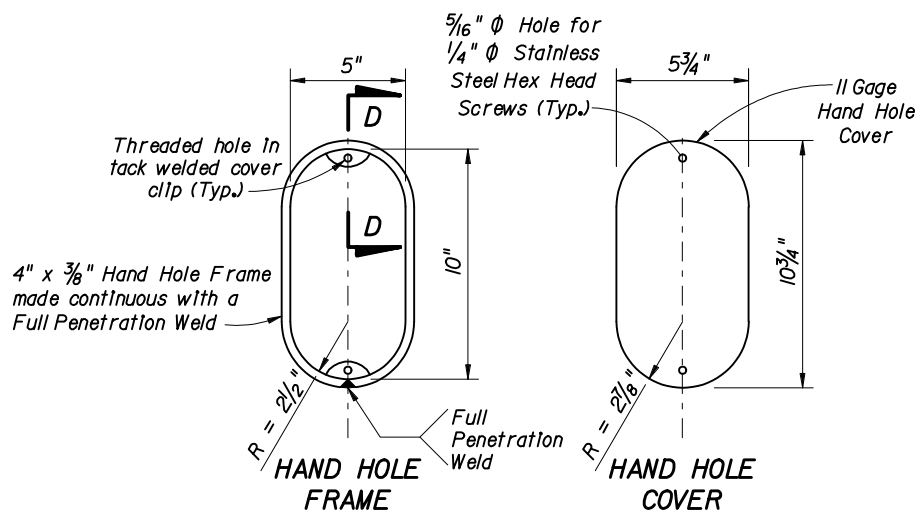
'C' Hook for wiring and lifting, 1/2"  $\phi$  commercial grade hot rolled bar welded to inside of pole.

POLE TOP NOTE:  
Any combination of the above two options may be used, provided both lifting and wiring is accommodated.

NOTE: A properly sized Service Head (Weather Head), shall be installed and fastened securely on to the standard pipe for each pole location. At locations other than service entrance, the service head face is to be left closed to outside atmosphere. Service entrance installation per Index No. 17727.

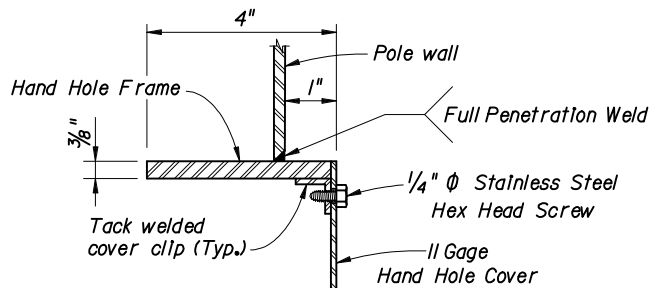


WIRE ENTRANCE DETAILS

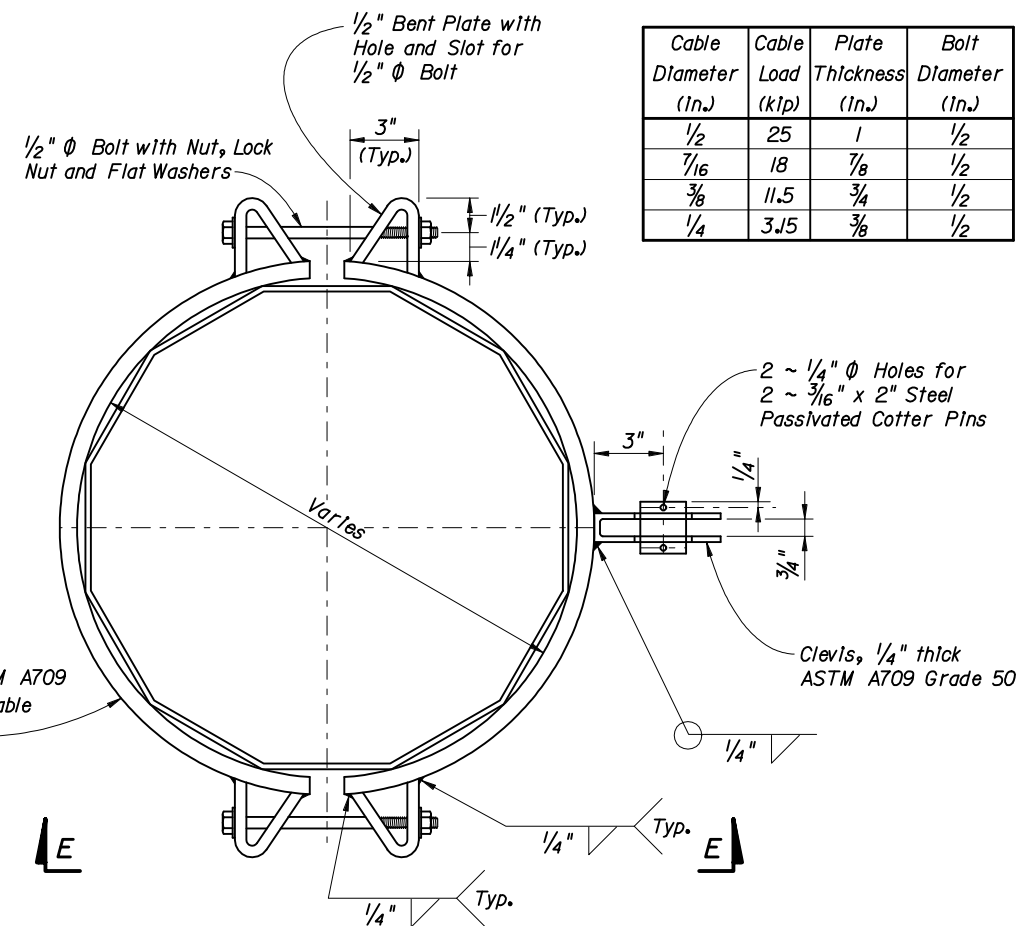


HAND HOLE FRAME

HAND HOLE COVER

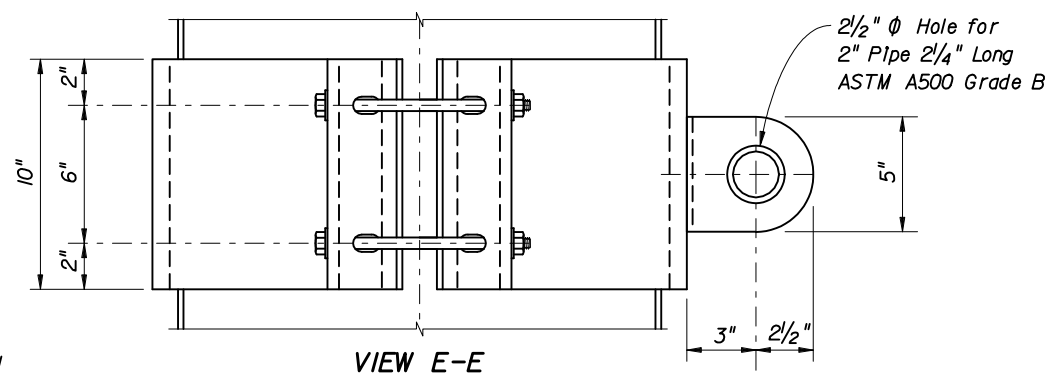


SECTION D-D (thru Hand Hole)



CATENARY AND MESSENGER WIRE CLAMPS

NOTE: Clamps have been sized for Design Cable Loads shown in the Table, and a Maximum Pole Diameter at the Clamp location of 2'-1".



VIEW E-E

ATTACHMENT DETAILS

Cable Diameter (In.)	Cable Load (kip)	Plate Thickness (In.)	Bolt Diameter (In.)
1/2	25	1	1/2
7/16	18	7/8	1/2
3/8	11.5	3/4	1/2
1/4	3.15	3/8	1/2

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STEEL STRAIN POLE

Names	Dates	Approved By
Designed By		W. J. [Signature]
Drawn By		State Structures Design Engineer
Checked By		Revision Sheet No. Index No.
	02	3 of 3 17723

**NOTES:**

Design Poles (Concrete and Steel Poles) in accordance with the latest edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" and Supplement thereto. For allowable unit stresses, meet the requirements of Section 6.

Place the prestressing symmetrically. Supply a sufficient amount of prestressing to provide a calculated compressive stress of 2.2 ksi for Type N-II and 3 ksi for Type N-III at the top of pole after all losses.

Concrete Strength shall be 6 ksi minimum at 28 days and 4 ksi minimum at transfer of the Prestressing force.

Reinforcing steel shall be A615 Grade 60. Provide a minimum area of non-prestressed reinforcement equal to 0.33% of the concrete area.

Prestressed Strands shall be A416 Grade 270 stress relieved or low relaxation.

One turn required for spiral splices and two turns required at the top and bottom of poles. Spiral shall be manufactured from cold-drawn steel wire meeting the requirements of ASTM A82.

Attach span wire assemblies (consisting of the catenary wire, the messenger wire, and the tether wire) to the concrete poles in accordance with Section 634.

If a two point attachment is required by the plans, provide an eye bolt hole for the messenger wire, or field drill one at the location indicated in the plans. Field drill the eye bolt hole for the tether wire, when required, prior to installation.

Use cover plates made of non-corrosive materials and attached to the pole using lead anchors or threaded inserts embedded in the pole and round head chrome plated screws.

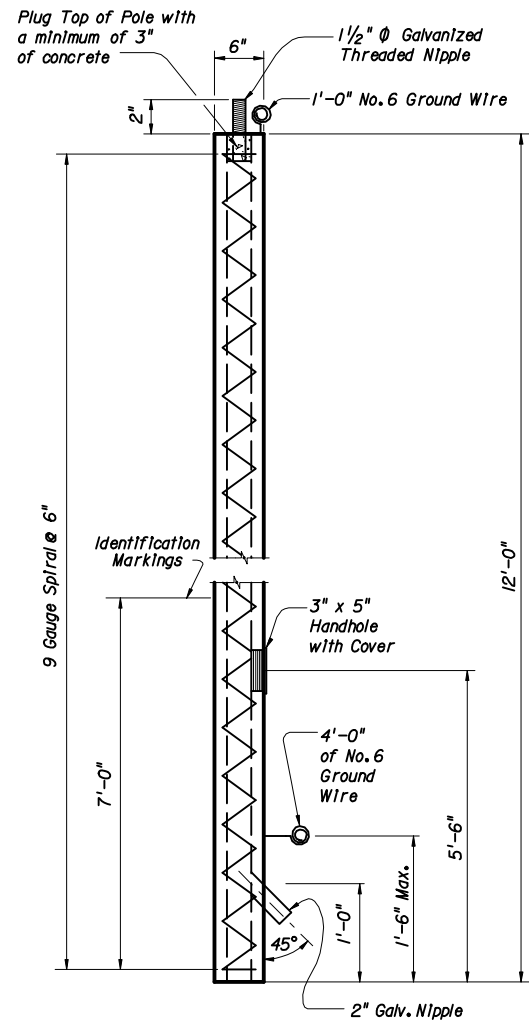
Attach ground wires to the reinforcing steel in the pole as necessary to prevent the ground wire from being displaced during concreting operations.

Identify concrete poles as to pole manufacturer, Department's pole type, length and Qualified Product List qualification number by inset numerals 1" in height inscribed on the same face of the pole as the handhole and ground wire.

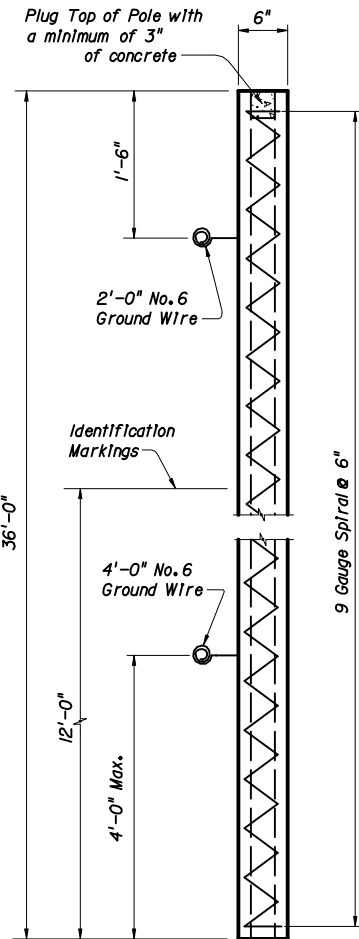
Provide a Class 3 Surface Finish as Specified in 400-15.2.4.

Provide a minimum cover of 1".

Provide all poles with total taper of 0.52 IN/FT.

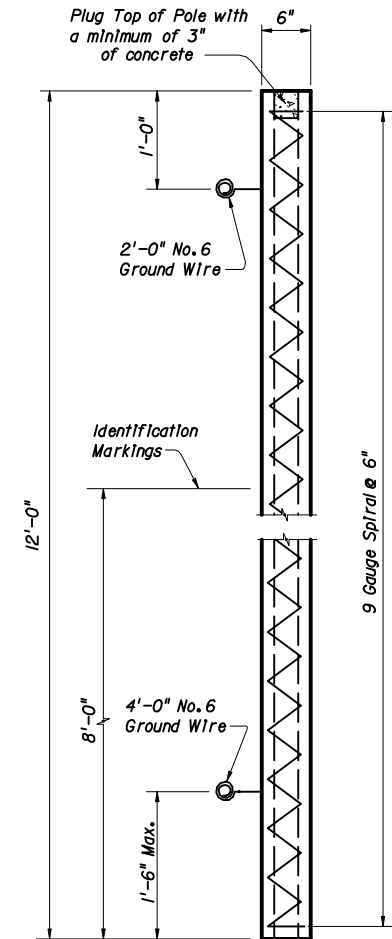


**TYPE N-II POLE ON CONCRETE PEDESTAL**



**SERVICE POLES - TYPE N-II**

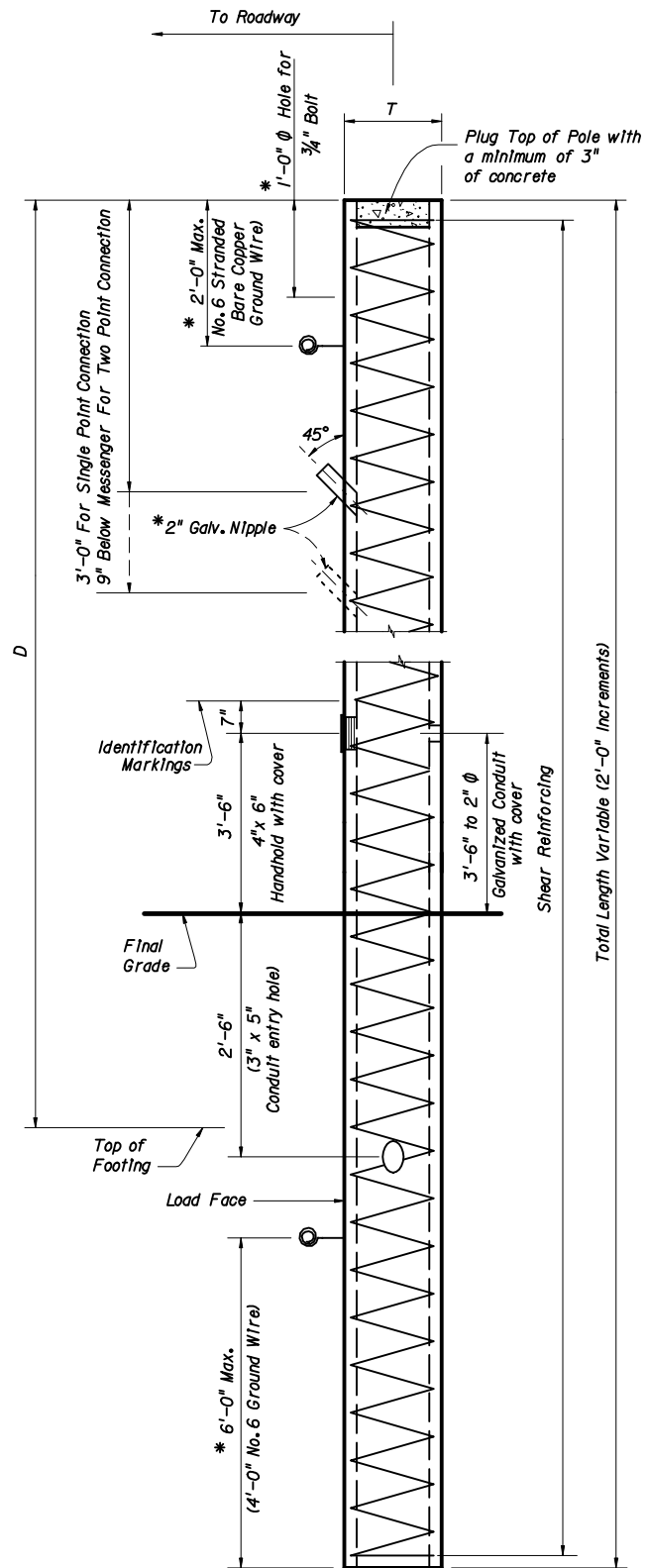
(For Installation, refer to Roadway and Traffic Design Standard, Index No. 17504)



**POLE TYPES N-III THROUGH N-VIII**

\* Do not apply these items to Type N-III. Establish bolt hole locations, ground wire location and conduit location as shown in the plans.

Ref. Index 17900 and Sec. 744 for modifications to Type N-III poles used at traffic monitoring sites.



**MINIMUM REQUIRED MOMENT CAPACITY					
D (feet)	TYPE OF POLE				
	N-IV (k-ft)	N-V (k-ft)	N-VI (k-ft)	N-VII (k-ft)	N-VIII (k-ft)
20	33	106	152	210	266
22	37	111	159	218	275
24	41	116	163	226	284
26	44	121	172	234	293
28	48	127	179	242	302
30	52	132	185	250	311
32	56	137	192	258	320
34	60	142	199	266	329
36	63	148	205	274	338
38	67	153	212	282	346
40	71	158	219	290	355
42	75	163	225	298	364
44	79	168	232	306	373
46	82	173	239	314	382
48	86	177	245	322	391
50	90	180	252	330	400

\*\* Service Conditions: Design poles to carry the "Minimum Required Moment Capacity." These moments are based on a dead load plus wind load combinations, therefore obtain the allowable stresses by multiplying those for normal exposure conditions given in Section 6 by the applicable factor from Section 2 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

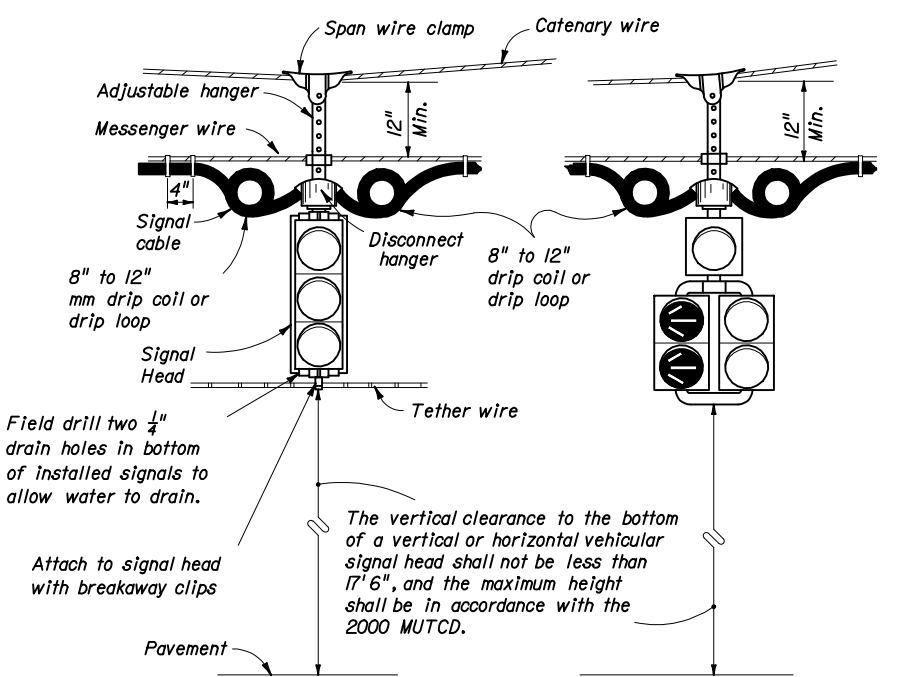
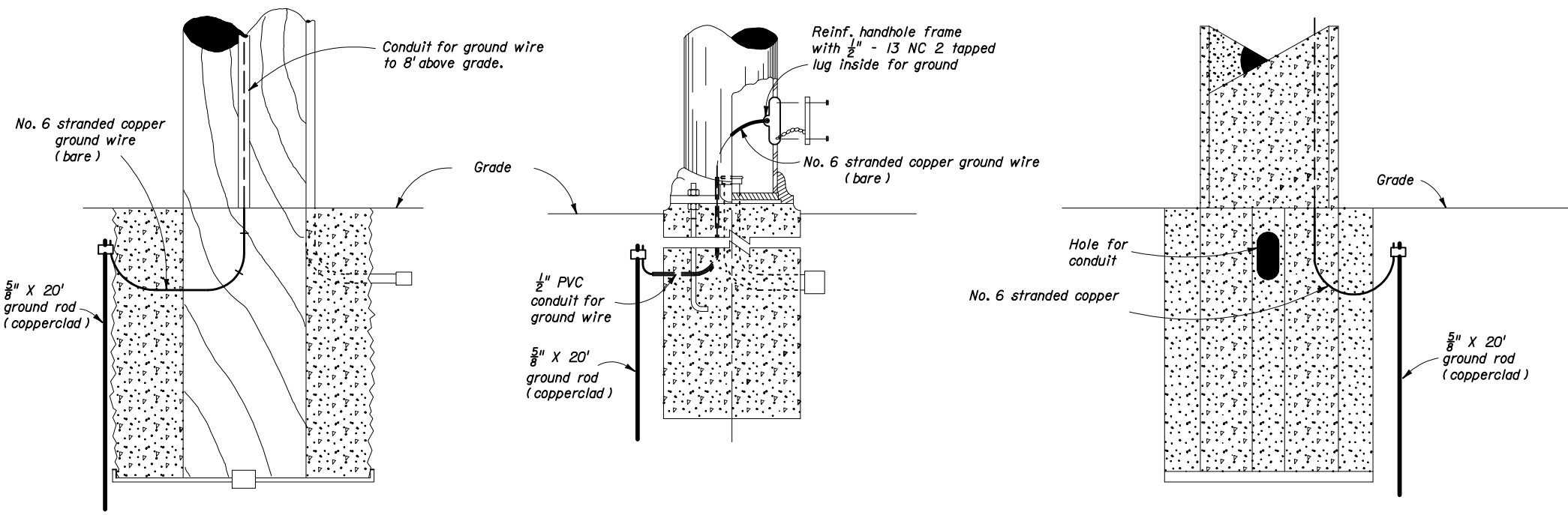
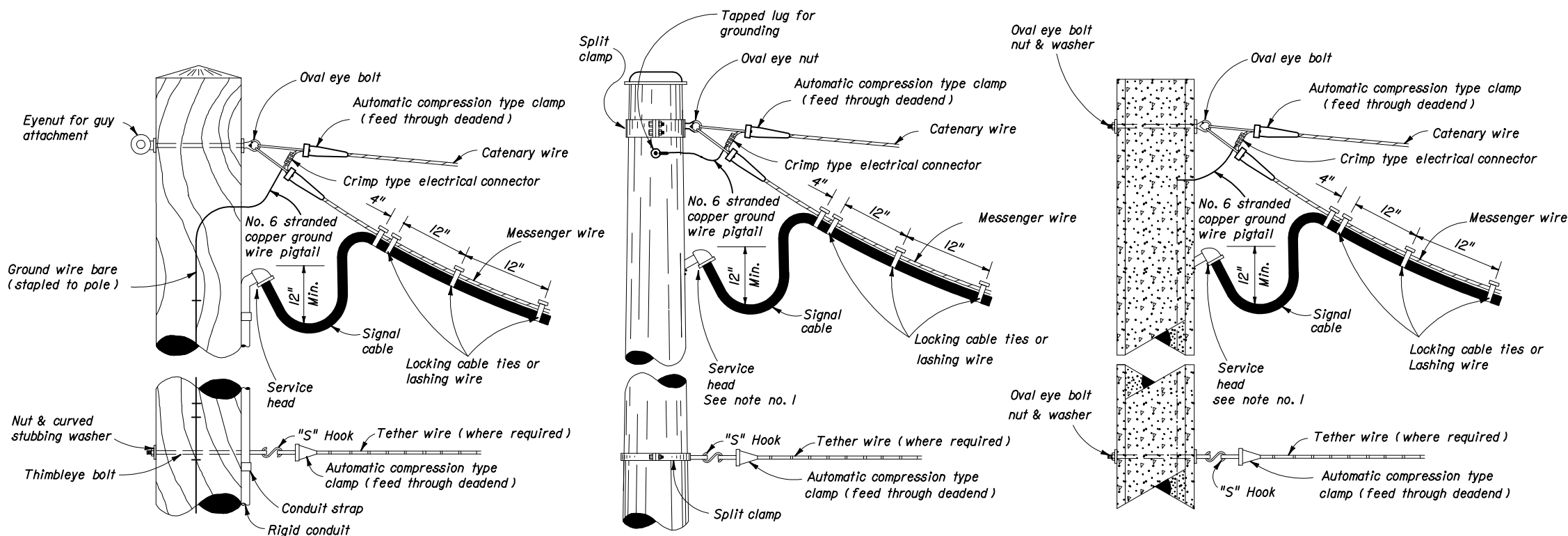
The ultimate moment capacity of each pole shall be a minimum of 1.3 times the "Minimum Required Moment Capacity."

TYPE OF POLE	CONCRETE POLE	
	SIZE AT TOP (T)	SHEAR REINFORCING
Type II	6" x 6"	9 Gauge Spiral @ 6"
Type III	6" x 6"	6 Gauge Spiral @ 6"
Type IV	8" x 8"	5 Gauge Spiral @ 6"
Type V	10" x 10"	5 Gauge Spiral @ 6"
Type VI	12" x 12"	5 Gauge Spiral @ 6"
Type VII	14" x 14"	5 Gauge Spiral @ 6"
Type VIII	16" x 16"	5 Gauge Spiral @ 6"

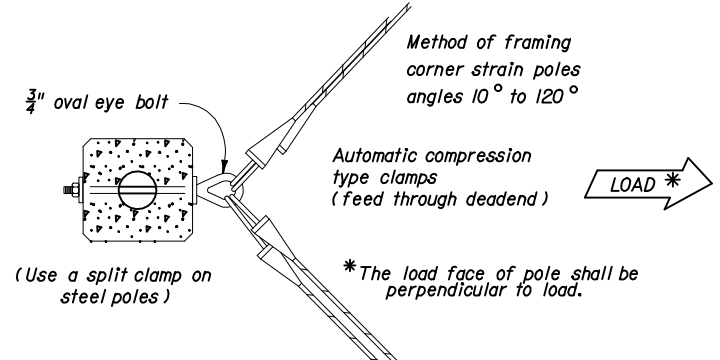
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**CONCRETE POLES**

Names	Dates	Approved By	[Signature]		
Designed By		State Structures Design Engineer			
Drawn By	JP	10/99	Revision	Sheet No.	Index No.
Checked By	TJB	10/99	02	1 of 1	17725



- Notes:
1. With the approval of the resident engineer, 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' or greater.
  3. The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing of 2" between bolts.
  4. Meet all grounding requirements of Section 620 of the Standard Specifications.

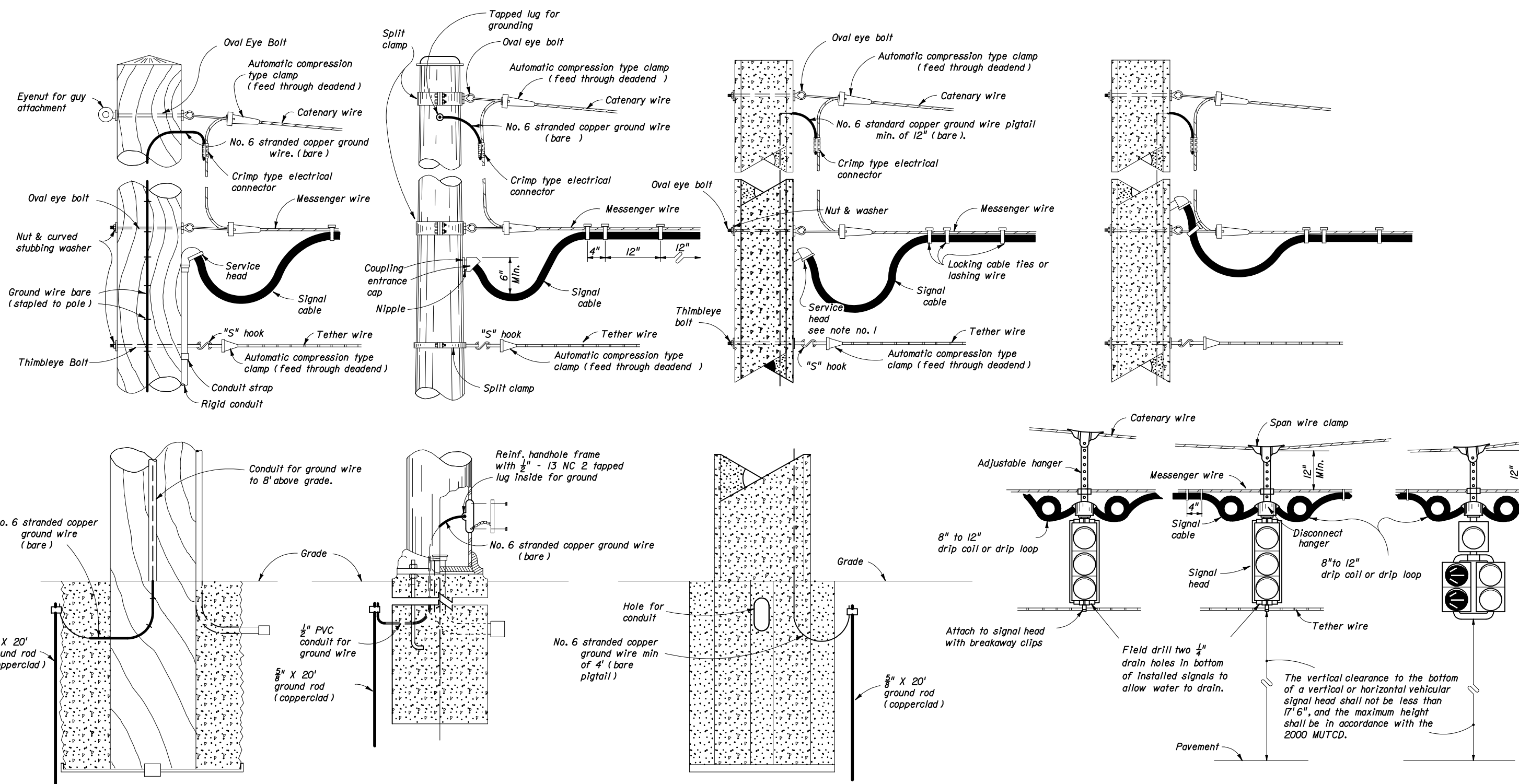


**SINGLE POINT ATTACHMENT**

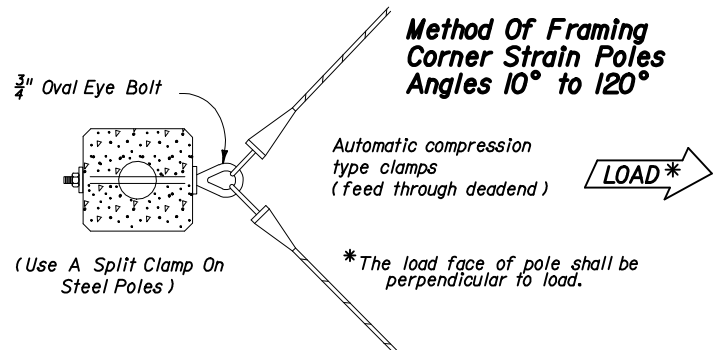
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SIGNAL CABLE & SPAN WIRE  
INSTALLATION DETAILS**

Names	Dates	Approved By		
Designed By		 State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 2	17727



- Notes:
1. With the approval of the resident engineer. 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' or greater.
  3. The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing of 2" between bolts.
  4. Meet all grounding requirements of Section 620 of the Standard Specifications.

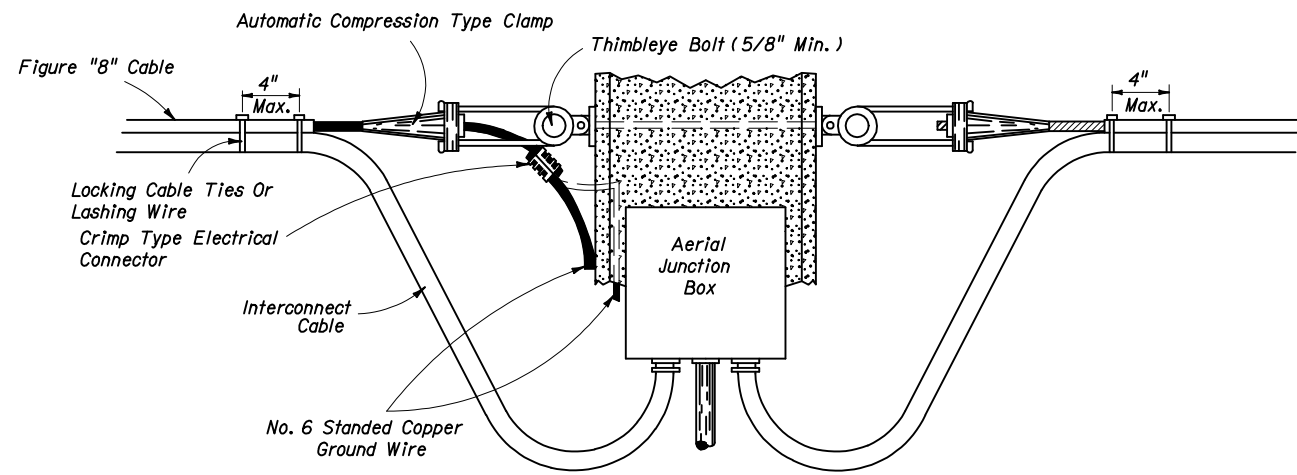


**TWO POINT ATTACHMENT**

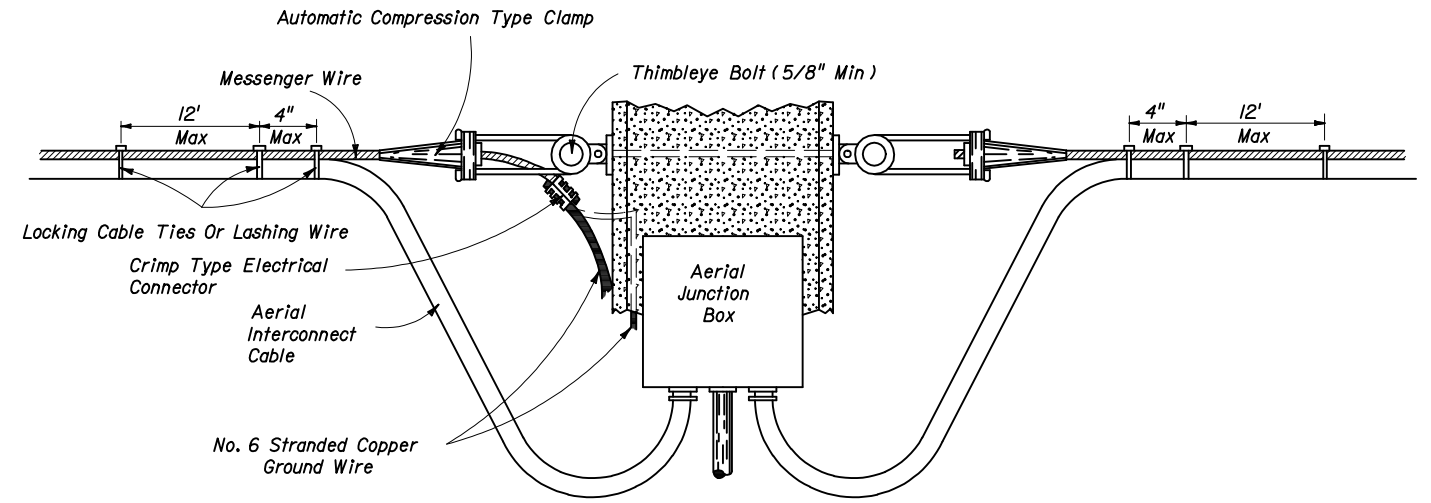
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**SIGNAL CABLE & SPAN WIRE  
INSTALLATION DETAILS**

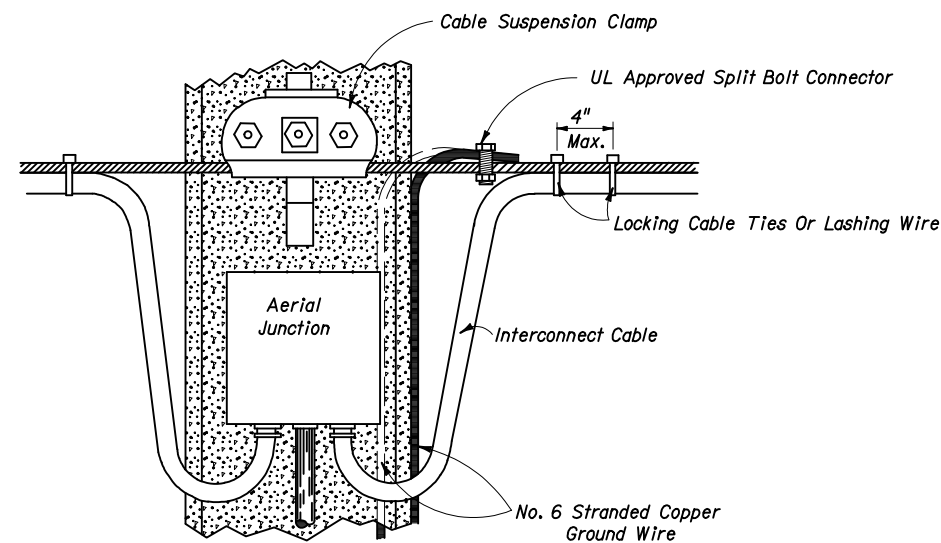
Names	Dates	Approved By		
Designed By		State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	2 of 2	17727



**FIGURE A**  
**CABLE DROP AND**  
**TERMINATION DETAIL**  
**AERIAL INTERCONNECT FIGURE "8"**



**FIGURE B**  
**CABLE DROP AND**  
**TERMINATION DETAIL**  
**AERIAL INTERCONNECT MESSENGER**  
**WIRE WITH CLAMPS**



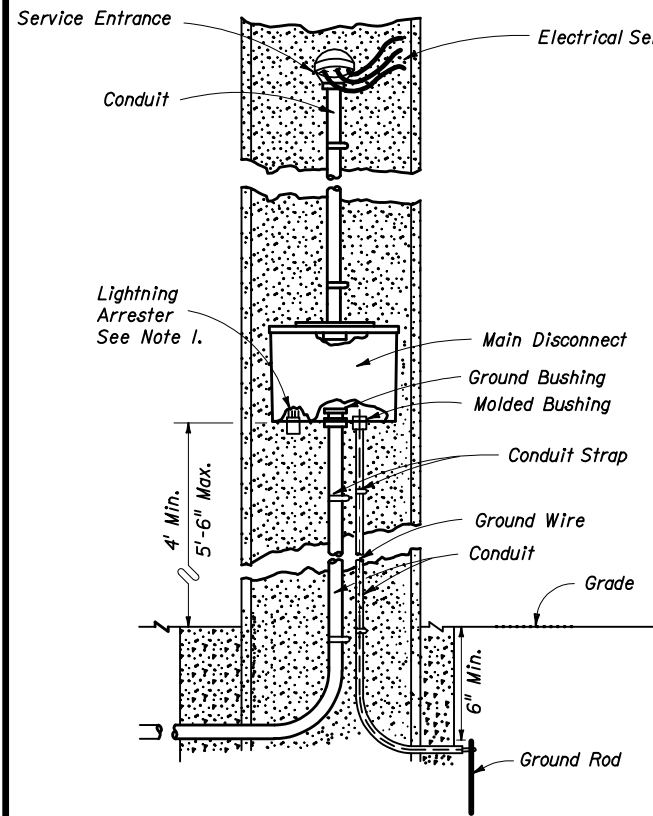
**FIGURE C**  
**CABLE DROP DETAIL**  
**AERIAL INTERCONNECT MESSENGER**  
**WIRE WITH CLAMPS**

**Notes:**

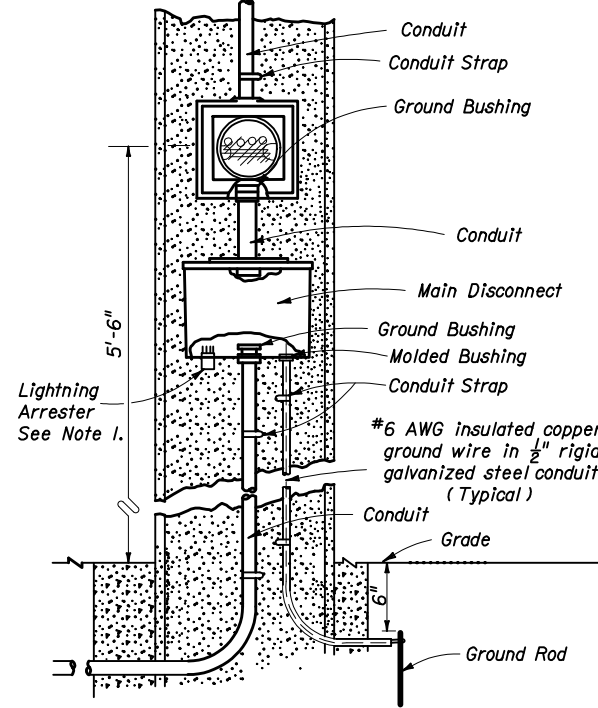
1. The messenger wire of the interconnect cables shall be grounded to the copper ground wire of the pole or to the external wire extending down the pole.
2. When utilizing the external ground wire to the pole, a piece of  $\frac{1}{2}$ " conduit shall extend up the pole externally to a point 8' above finish grade to protect the ground wire connecting the messenger wire to the ground rod.
3. Locking cable ties or lashing wire when used shall be placed no further than 12" 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 4" (max) from that tie. When using figure "8" interconnect cable only the locking 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' or greater.
6. Meet all grounding requirements of Section 620 of the Standard Specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>AERIAL INTERCONNECT</b>				
Names	Dates	Approved By		
Designed By		<i>Charles A. Scott</i> State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 1	17733

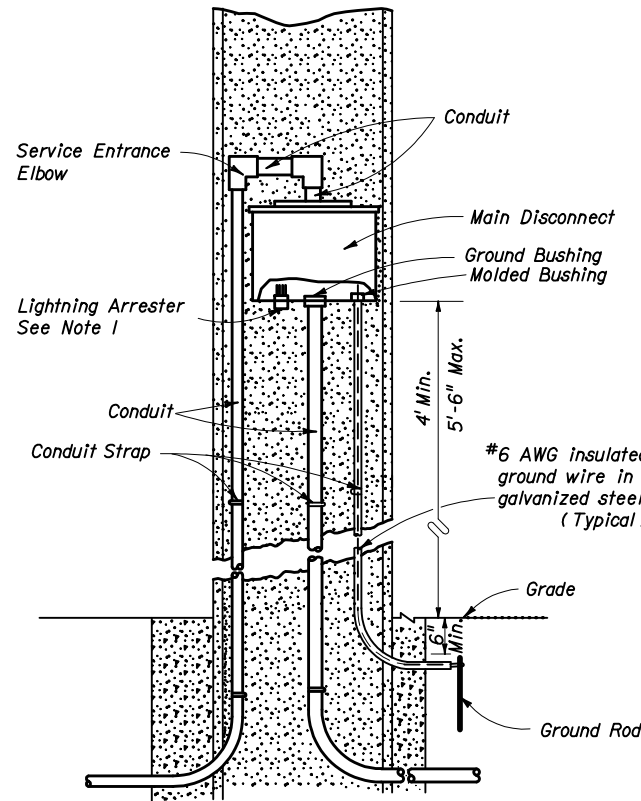




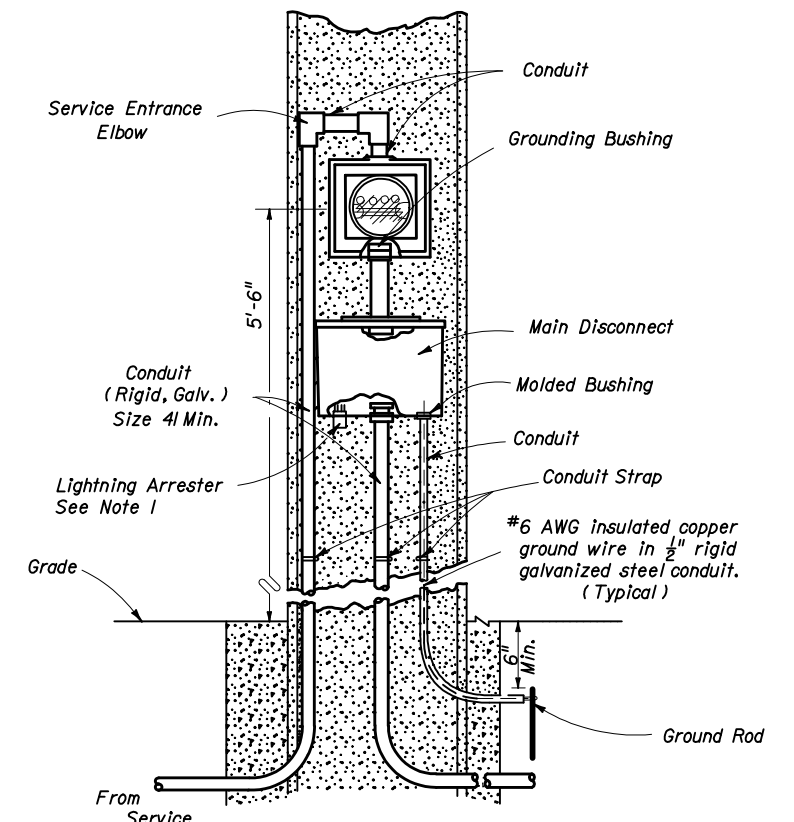
**FIGURE A**  
AERIAL FEED  
(NO METER USED)



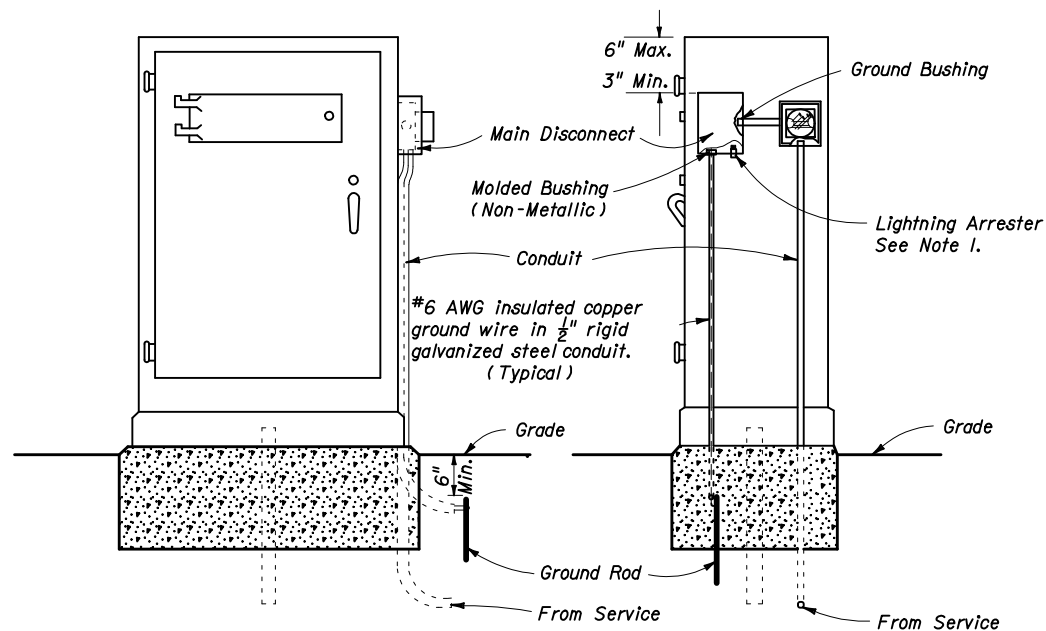
**FIGURE B**  
AERIAL FEED  
(METER USED)



**FIGURE C**  
UNDERGROUND FEED  
(NO METER USED)



**FIGURE D**  
TYPE "B" UNDERGROUND FEED  
(METER USED)



**FIGURE E**  
UNDERGROUND CABINET MOUNTED  
(METER USED)

**NOTES:**

1. The lightning arrester can be located on the side or bottom of the main disconnect enclosure at the Contractor's Option.
2. Liquidtight flexible conduit is approved for use from the electrical disconnect to the cabinet when both are installed on the same pole.
3. Bond all elements together to form an Intersection Grounding Network in accordance with Section 620 of the Department's current Standard Specifications for Road and Bridge Construction. The bond wire shall be run in conduit with the Electrical Service Wire or Signal Cable.
4. Meet all grounding requirements of Section 620 of the Standard Specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**ELECTRIC POWER SERVICE**

Names	Dates	Approved By		
Designed By	9-80	Charles Scott State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	1 of 1	17736

**INSTRUCTIONAL NOTES FOR DESIGNERS AND FABRICATORS**

1. This Index, I7740, is for use in preparing signalization plans when single arm and double arm mast arm assemblies are required. This standard establishes the requirements of mast arm components listed on the Qualified Products List (QPL). When using components on the QPL, the "Mast Arm Assemblies Design Table", will be the only information required in the Contract Plans, and shop drawings are not required.

2. If a mast arm configuration does not meet the requirements stated below, a special design and shop drawing submittal is required. For Special Designs, Structures Standard Drawing S-1710 must be completed and included in the Contract Plans.

3. The "Standard Mast Arm Assemblies Design Table" on Structures Standard Drawing S-1700 is to be filled out in accordance with the following instructions and examples on Sheet No. 2 of 2 and included in the Contract Plans.

4. The Data for Standard Mast Arm Assemblies on Index No. I7742, includes four different mast arm types and eleven different pole types. The arm classes are used regardless of single or double arm configurations. The poles are for either single or double arm configurations without luminaires or single arm configurations with luminaires.

5. Four standard arm configurations are provided. The standard arm lengths and the signal and sign locations used for design of the arm are shown on the mast arm design loading trees on this sheet. If the same arrangement of signals and signs is used with one or more signals or signs closer to the pole, the standard arm may be used. If the same arrangement is used but one or more signals or signs are further from the pole, or if a different configuration of signals and signs is used, a special design is required. The Arm Design Table on Index No. I7742 shows the variables for standard arm types A1 through A4.

6. The arm types shall be specified in the "Standard Mast Arm Assemblies Design Table". If the standard arm length is used, no further entries are required under the arm columns. If necessary, a shorter arm length may be obtained by removing length from the arm tip. In this case, enter the actual arm length (FAA) and actual tip diameter (FBA) under the appropriate arm in the "Standard Mast Arm Assemblies Design Table".

7. If a double arm structure is required, both arm types and the angle between the arms (UF) shall be entered in the "Standard Mast Arm Assemblies Design Table". The angle between arms is measured counterclockwise from the first arm and shall be either 90° or 270°. If the angle between the arms is not 90° or 270°, a special design is required.

8. Eleven standard poles are provided. Pole types P1 through P7 may be used with both single arm and double arm structures without luminaires. Pole types P21 Lum through P24 Lum are intended for single arm structures with luminaires. Use the Pole Selection Table to select the pole type to be used with any combination of arm types. The pole, connection plate, base plate variables and drilled shaft variables are shown in the "Pole, Connection and Shaft Design Table" on Index No. I7742.

9. The connection plate variables are constant for all arms used with each pole type. If a double arm structure is used, the same connection plate variables are to be used for each arm.

10. The pole type and arm mounting height (UB) shall be specified in the "Standard Mast Arm Assemblies Design Table". The arm mounting height (UB) shall be between 18' and 22'. A Special Design is required for arm mounting heights greater than 22'. Standard poles P1 through P7 are available in the 24 foot height. If the standard height is used, no further entries are required under the pole information. If necessary, a shorter pole may be obtained by removing height from the pole tip. In this case, enter the actual pole height (UAA) and the actual pole tip diameter (UCA) in the "Standard Mast Arm Assemblies Design Table".

11. Poles P21 Lum through P24 Lum are designed for a luminaire mounted 10 feet off the face of upright at a 40 foot mounting height with a 37.5 foot arm connection height. Differing arm configurations or pole mounting heights will require a Special Pole Design.

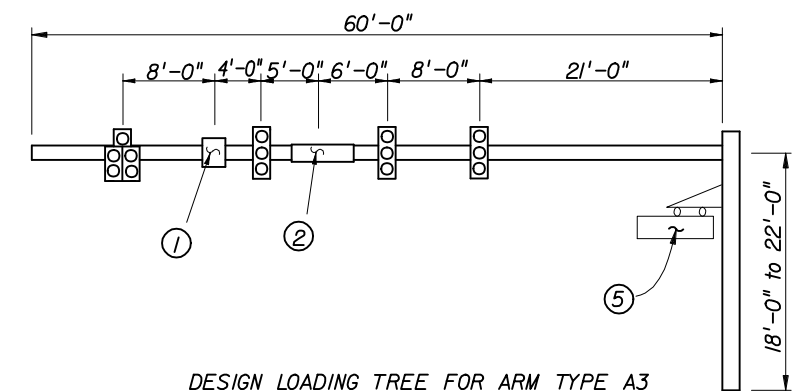
12. Component type numbers shall be entered in the Assembly Numbers column using the following format:

Single Arm: A#-P# = Arm Type - Pole Type  
 Double Arm: A#-A#-P# = First Arm Type - Second Arm Type - Pole Type

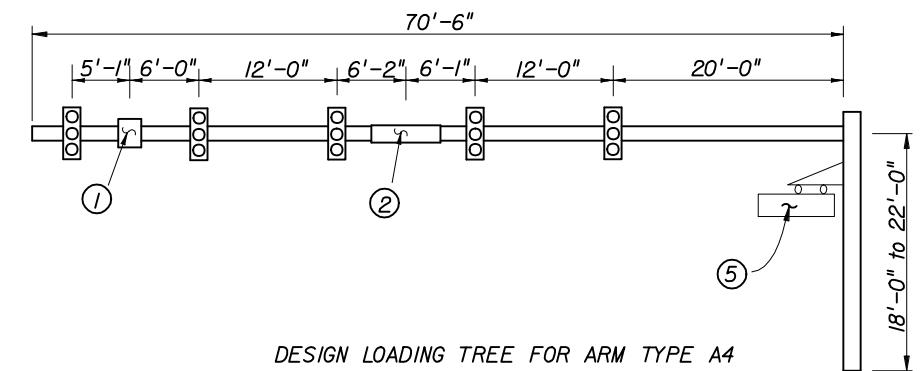
13. The foundations for Standard Mast Arm Assemblies are pre-designed and are based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:

Classification = Cohesionless (Fine Sand)  
 Friction Angle = 30 Degree (30°)  
 Unit Weight = 50 lbs./cu. ft. (assumed saturated)

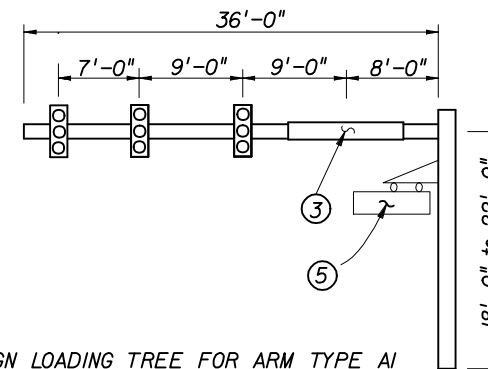
Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for the other purposes may be used to confirm the assumed soil properties.



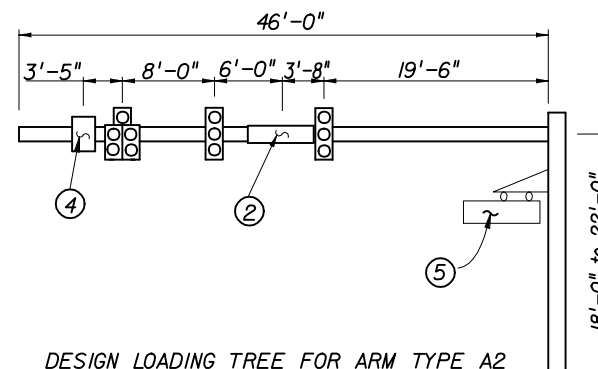
DESIGN LOADING TREE FOR ARM TYPE A3



DESIGN LOADING TREE FOR ARM TYPE A4



DESIGN LOADING TREE FOR ARM TYPE A1



DESIGN LOADING TREE FOR ARM TYPE A2

- ① Denotes a 2'-0" x 2'-6" Sign.
- ② Denotes a 1'-6" x 6'-0" Sign.
- ③ Denotes a 1'-6" x 10'-0" Sign.
- ④ Denotes a 2'-0" x 3'-0" Sign.
- ⑤ Denotes a 12 sq. ft. (max) Internally Illuminated sign on a hinged bracket attached to pole. See Index I7744, Sheet No. 1 of 5, for limitations on use.

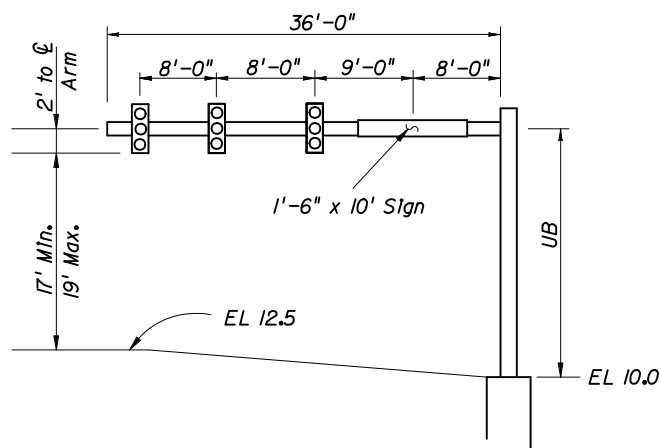
**Signal Notes:**

- 1. Signal Backplates are included in the design of Standard Arms
- 2. Signal Heads are shown mounted vertically; however, heads may be mounted horizontally when so indicated in the plans.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>INSTRUCTIONS AND EXAMPLES FOR DESIGNERS AND FABRICATORS OF STANDARD MAST ARM ASSEMBLIES</b>				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 2	I7740

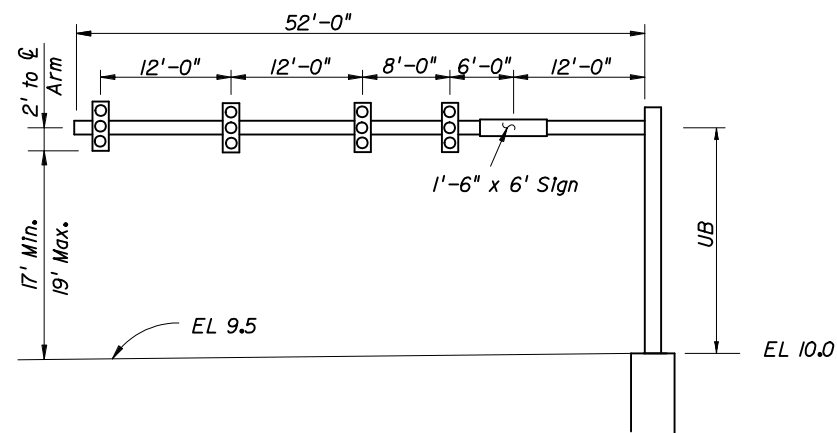
**EXAMPLE 1**

Single Arm Structure as shown



**EXAMPLE 2**

First Arm Structure as shown  
Second Arm same as Example 1



**EXAMPLE 2 INSTRUCTIONS**

- Select First Arm Type**  
Designate longest Arm as First Arm. For a 52' Arm, Investigate Arm A3 (Maximum Arm Length = 60') As In Example 1, compare attachment sizes and locations with design loading tree. In this case, all attachments are no larger than and are closer to the pole than shown in the design loading tree. Select and enter Arm Type A3 under the First Arm in the "Standard Mast Arm Assemblies Design Table" on Index No. S-1700.
- Specify shorter Arm.**  
Since the full 60' of Standard Arm 'A3' is not required, provide the required 52' arm by entering an actual length of 28' under 'FAA' for the first Arm ('FAA' + 'FE'-Splice = 28' + 26'-2'=52'). Determine actual tip diameter 'FBA' for Arm shortened by 8'.  
 $FBA = FB + (60' - 52')(0.4"/ft)$   
 $FBA = 9.75" + 8'(0.4"/ft) = 10.87"$   
Enter 10.87" for FBA under First Arm.
- Select Second Arm Type - See Example Arm.**
- Enter angle between arms as 'UF' in "Standard Mast Arm Assemblies Design Table".** The angle is measured counter-clockwise from the First Arm and must be either 90° or 270°.
- Select Pole Type**  
Use Pole Selection Table (Double Arm) with Arm Types 'A3' and 'A1', and select Pole Type 'P3'. Enter Pole Type 'P3' in the "Standard Mast Arm Assemblies Design Table".
- Determine Arm Mounting Height 'UB'.**  
 $'UB' + 10' = 9.5' + 17' (Min.) + 2'$   
 $'UB' = 18.5' Min. Use 20'$   
Enter  $UB = 20'-0"$  in the "Standard Mast Arm Assemblies Design Table"
- Specify shorter Pole height.**  
This procedure is similar to specifying a shorter Arm. Select actual height of 22' and enter under 'UAA' in the "Mast Arm Assemblies Design Table". Determine actual tip diameter 'UCA' for shortened Type 'P3' Pole.  
 $UCA = 17.75" + (24' - 22')(0.4"/ft) = 18.03"$   
Enter 18.03 under "UCA" in the "Standard Mast Arm Assemblies Design Table".
- Enter Assembly Numbers**  
A3 - A1 - P3  
First Arm Type - Second Arm Type - Pole Type

**EXAMPLE 1 INSTRUCTIONS**

- Select Arm Type**  
Compare attachment sizes and locations with design loading trees. In this case, all signals and signs are no farther from the pole than shown in the loading tree. A 36' Arm is adequate. Enter Arm Type A1 in the "Standard Mast Arm Assemblies Design Table" on Index No. S-1700.
- Select Pole Type**  
Use Pole Selection Table (Single Arm) with Arm Type A1, and select Pole Type 'P1'. Enter Pole Type 'P1' in the "Mast Arm Assemblies Design Table".
- Determine Arm Mounting Height 'UB'.**  
 $'UB' + 10' = 12.5' + 17' (Min.) + 2'$   
 $'UB' = 21.5' Min. Use 22'$   
Enter  $UB = 22'-0"$  in the "Standard Mast Arm Assemblies Design Table"
- Enter Assembly Numbers**  
A1 - P1  
Arm Type - Pole Type

**STANDARD MAST ARM ASSEMBLIES DESIGN TABLE**

STRUCTURE ID NUMBERS	ASSEMBLY NUMBERS (1)	FIRST ARM			SECOND ARM			UF (deg)	POLE			SPECIAL DRILLED SHAFT DATA <sup>(4)</sup>				
		ARM TYPE	FAA (ft.) <sup>(2)</sup>	FBA (in.) <sup>(2)</sup>	ARM TYPE	FAA (ft.) <sup>(2)</sup>	FBA (in.) <sup>(2)</sup>		POLE TYPE	UAA (ft.) <sup>(3)</sup>	UB (ft.)	UCA (in.) <sup>(3)</sup>	DA (ft.)	DB (ft.)	RA	RB
Example 1	A1 - P1	A1						P1		22						
Example 2	A3 - A1 - P3	A3	28	10.87	A1			270	P3	22	20	18.03				
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

**TABLE NOTES:**

(1) Assembly Number Legend

Single Arm

A# - P# = Arm Number - Pole Number

Double Arm

A# - P# = First Arm Number - Second Arm Number - Pole Number

(2) If an entry appears in columns "FAA" and "FBA", a shorter arm is required.

This is obtained by removing length from the arm tip. For these cases the mast arm length shall be shortened from "FA" to "FAA" and the arm tip diameter shall be increased from "FB" to "FBA".

(3) If an entry appears in columns "UAA" and "UCA", a shorter pole is required. This is obtained by removing length from the pole tip. For these cases the pole height shall be shortened from "UA" to "UAA" and the pole tip diameter shall be increased from "UC" to "UCA".

(4) The foundations for Standard Mast Arm Assemblies are pre-designed and are based upon the following conservative soil criteria which covers the great majority of soil types found in Florida. Only complete the "Special Drilled Shaft Data" information if site conditions dictate drilled shafts with additional foundation capacity.

Classification = Cohesless (Fine Sand)  
Friction Angle = 30 Degrees (30°)  
Unit Weight = 50 lbs./cu. ft. (assumed saturated)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**INSTRUCTIONS AND EXAMPLES FOR DESIGNERS AND FABRICATORS OF STANDARD MAST ARM ASSEMBLIES**

Names	Dates	Approved By	State Structures Design Engineer	
Designed By		[Signature]	Revision	Sheet No.
Drawn By			02	2 of 2
Checked By				Index No.
				17740

POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE				
Arm Length	A1	A2	A3	A4
Pole Type	P1 & P2 Lum	P2 & P22 Lum	P3 & P23 Lum	P4 & P24 Lum

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Lengths *	A1 - A1	A2 - A1	A3 - A1	A4 - A1	A2 - A2	A3 - A2	A4 - A2	A3 - A3	A4 - A3	A4 - A4
Pole Type	P1	P2	P3	P5	P3	P4	P5	P5	P6	P7

\* Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES											
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS	
		FA(ft)	FB(In)	FC(In)	FD(In)	FE(ft)	FF(In)	FG(In)	FH(In)	FM/SM(In)	FQ/SQ(In)
A1	36'-0"	36	7.5	12.5	0.793	0	0	0	0	0.25	0.313
A2	46'-0"	36	7.9	13	0.793	12	12.38	14	0.2391	0.188	0.438
A3	60'-0"	36	9.75	14.75	0.793	26	14.2	17.75	0.25	0.188	0.438
A4	70'-6"	39.5	9.25	14.88	0.793	33	14.25	18.75	0.313	0.313	0.438

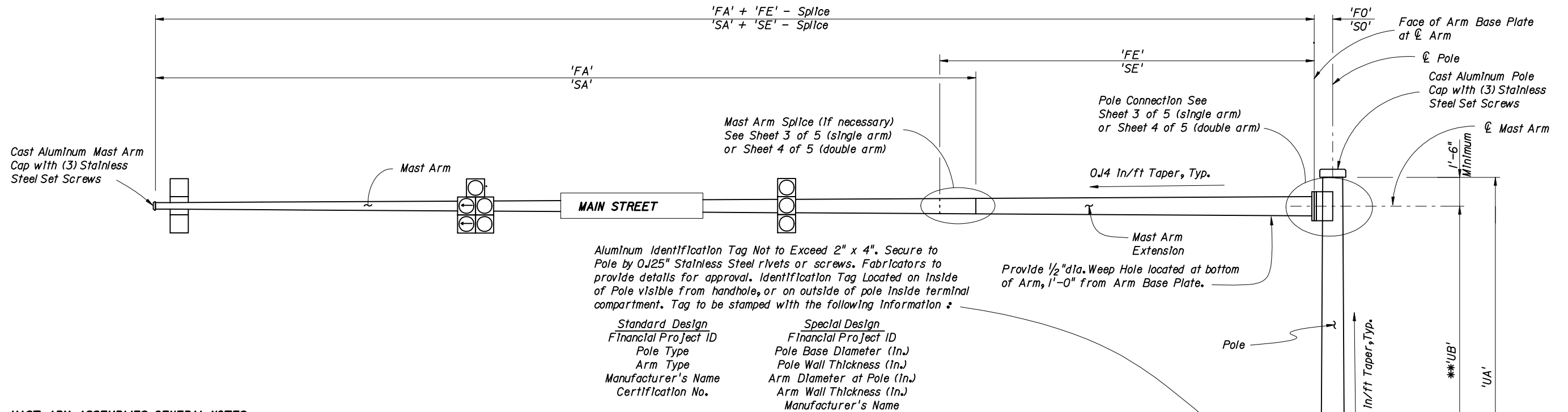
Arm Camber Angle = 2 degrees.

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																										
POLE TYPE	UA(ft)	UC(In)	UD(In)	UE(In)	UG(ft)	UPRIGHT BASE CONNECTION							CONNECTION PLATE DATA										DRILLED SHAFT DATA			
						No. Bolts	BA (In)	BB (In)	BC (In)	BD (In)	BE (In)	BF (In)	HT (In)	FJ/SJ (In)	FK/SK (In)	FL/SL (In)	FN/SN (In)	FO/SO (In)	FP/SP (In)	FR/SR (In)	FS/SS (In)	FT/ST (In)	DA(ft)	DB(ft)	RA	RB
P1	24	13.75	17	0.2391	-	6	29	2.25	1.5	0.313	0.188	36	17.5	22	1.5	0.375	0.25	13.00	0.75	1.25	7.25	0.313	13	4	9	19
P2	24	15.75	19	0.2391	-	6	33	2.25	1.75	0.313	0.188	36	23.5	26	2.25	0.438	0.313	15.25	1	1.625	9.75	0.313	13	4	9	19
P3	24	17.75	21	0.313	-	6	35	2.25	1.75	0.375	0.313	36	26	30	2.375	0.563	0.375	17.00	1.25	1.625	10.5	0.375	16	4	9	19
P4	24	19.75	23	0.313	-	8	37	2.375	1.75	0.375	0.313	36	30	32	2.5	0.563	0.438	18.25	1.25	1.75	12.5	0.438	19	4	9	19
P5	24	20.75	24	0.313	-	8	38	2.25	1.75	0.375	0.313	36	30	33	2.75	0.563	0.438	18.75	1.25	1.75	12.5	0.438	17	4.5	9	23
P6	24	21.75	25	0.313	-	8	39	2.25	1.75	0.375	0.313	36	30	34	2.375	0.625	0.375	19.25	1.25	1.75	12.5	0.375	18	4.5	9	23
P7	24	23.75	27	0.313	-	8	41	2.25	1.75	0.375	0.313	36	30	36	2.5	0.625	0.375	20.75	1.25	1.75	12.5	0.375	19	4.5	9	23
P21 Lum	39	11.625	17	0.2391	37.5	6	29	2.25	1.5	0.313	0.188	36	17.5	22	1.5	0.375	0.25	13.00	0.75	1.25	7.25	0.313	13	4	9	19
P22 Lum	39	13.625	19	0.2391	37.5	6	33	2.25	1.75	0.313	0.188	36	23.5	26	2.25	0.438	0.313	15.25	1	1.625	9.75	0.313	13	4	9	19
P23 Lum	39	15.625	21	0.313	37.5	6	35	2.25	1.75	0.375	0.313	36	26	30	2.375	0.563	0.375	17.00	1.25	1.625	10.5	0.375	16	4	9	19
P24 Lum	39	17.625	23	0.313	37.5	8	37	2.375	1.75	0.375	0.313	36	30	32	2.5	0.563	0.438	18.25	1.25	1.75	12.5	0.438	19	4	9	19

LUMINAIRE AND LUMINAIRE CONNECTION										
LA(ft)	LB(ft)	LC(In)	LD(In)	LE	LF(ft)	LG(In)	LH(In)	LJ(In)	LK(In)	UG(ft)
40.0	10.0	3.0	0.25	0.50	8.0	0.375	0.625	0.250	0.188	37.5

GENERAL NOTE  
1. Work this Index with Index No. 17744.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>COMPONENT DATA FOR STANDARD MAST ARM ASSEMBLIES</b>				
Names	Dates	Approved By <i>W. V. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 1	17742



**MAST ARM ASSEMBLIES GENERAL NOTES**

- 1) Signal Structure Materials shall be as follows:
  - Poles & Mast Arms --> ASTM A607 Grade 50, 55 or 60 (less than 1/4") or ASTM A572 Grade 50 or 60 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
  - Steel Plates --> ASTM A709 Grade 36
  - Weld Metal --> E70XX
  - Bolts (except Anchor Bolts) --> ASTM A325, Type I
  - Anchor Bolts --> ASTM F1554 Grade 55 ksi
  - Nuts for Anchor Bolts --> ASTM A563 Grade A Heavy Hex
  - Washers for Anchor Bolts --> ASTM F436 Type I
  - Handhole Frame --> ASTM A709 Grade 36 ksi
  - Handhole Cover --> ASTM A607 Grade 50, 55, or 60 ksi
  - Aluminum Caps and Covers --> ASTM B26 (356-T6)
  - Stainless Steel Screws --> AISI Type 316
- 2) Reinforcing Steel shall be ASTM A615-96, Grade 60 ksi.
- 3) Concrete shall be Class IV (Drilled Shaft) with a minimum 28-day compressive strength of 4,000 psi for all environmental classifications.
- 4) Grout shall have a minimum 28-day compressive strength of 5,000 psi and shall meet the requirements of Section 934.
- 5) All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
- 6) All steel items shall be galvanized as follows:
  - All Nuts, Bolts and Washers --> ASTM A153 Class C or D depending on size
  - All other steel items --> ASTM A123 (Including Pole & Mast Arm)
- 7) Locate handhole 180° from arm on single arm poles or 180° from first arm of double arm poles or see special instructions on Mast Arm Tabulation Sheet.
- 8) Except for Anchor Bolts, all bolt hole diameters shall be equal to the bolt diameter plus 1/16", prior to galvanizing. Hole diameters for Anchor Bolts shall not exceed the bolt diameter plus 1/2".
- 9) Sign Panels and Signals attached to the Mast Arm shall be centered in elevation on the arm. Sign Panels shall be aluminum. Wire access holes shall not exceed 3/4" in diameter.

- 10) Mast Arms and Poles shall be tapered with the diameter changing at a rate of 0.14 Inch per foot.
- 11) Design Wind Speeds:
  - Standard Mast Arm Assemblies = 110 mph with a 30% gust factor
  - Special Mast Arm Assemblies = 90 or 110 mph (see Plans Preparation Manual, Chapter 29) with a 30% gust factor.
- 12) The Pole shall be installed vertically. Camber shall be accounted for in the Mast Arm connection as detailed.
- 13) If a Mast Arm damping device is required by the Engineer, it shall be installed within eight feet of the Mast Arm tip.
- 14) Alternate Designs for Special Mast Arm Assemblies are not allowed.
- 15) Provide "J"-Hook at top of pole for signal cable support.
- 16) Do not erect pole until foundation concrete has cured for a minimum of seven days.
- 17) First and Second Arm Camber Angle = 2°.
- 18) Each standard Mast Arm pole has been designed for one free swinging internally illuminated street sign which is acceptable by Contractor Certification provided it meets the applicable requirements of Specification Section 699, weighs no more than 75 lbs. and is no more than 12 Sq. Ft. in area.

Notes: Details for the Ground Rod, Signal and Sign Locations, Signal Head Attachment, Sign Attachment, Pedestrian Head Attachment, and Foundation Conduit are not shown for clarity.

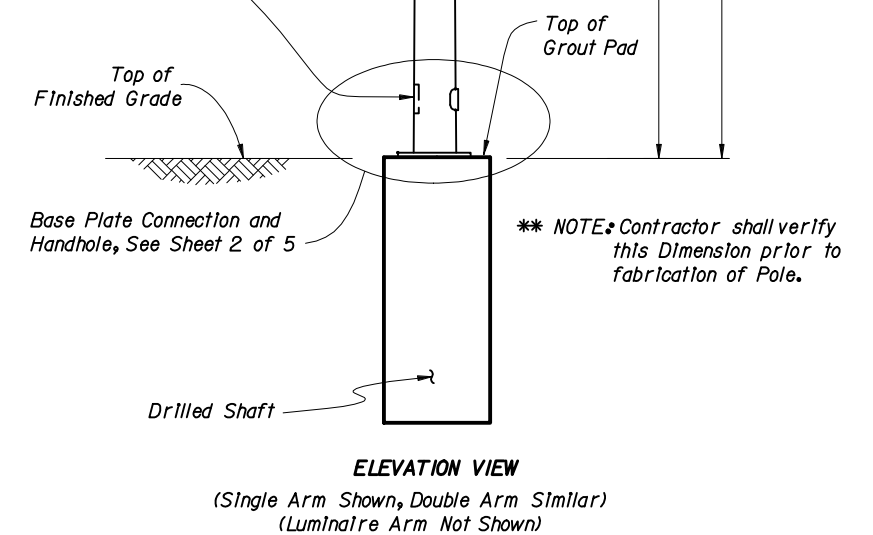
**NOTES FOR DOUBLE MAST ARMS**

1. Work this Drawing with Sheets Nos. 2 and 4 of 5, Indices I7740 and I7742, and Structures Standard Drawings S-1700 and S-1710 as necessary.

**NOTES FOR SINGLE MAST ARMS WITH LUMINAIRE**

1. Work this Drawing with Sheets Nos. 2, 3 and 5 of 5, Indices I7740 and I7742, and Structures Standard Drawings S-1700 and S-1710 as necessary.

**TYPICAL ELEVATION AND NOTES**

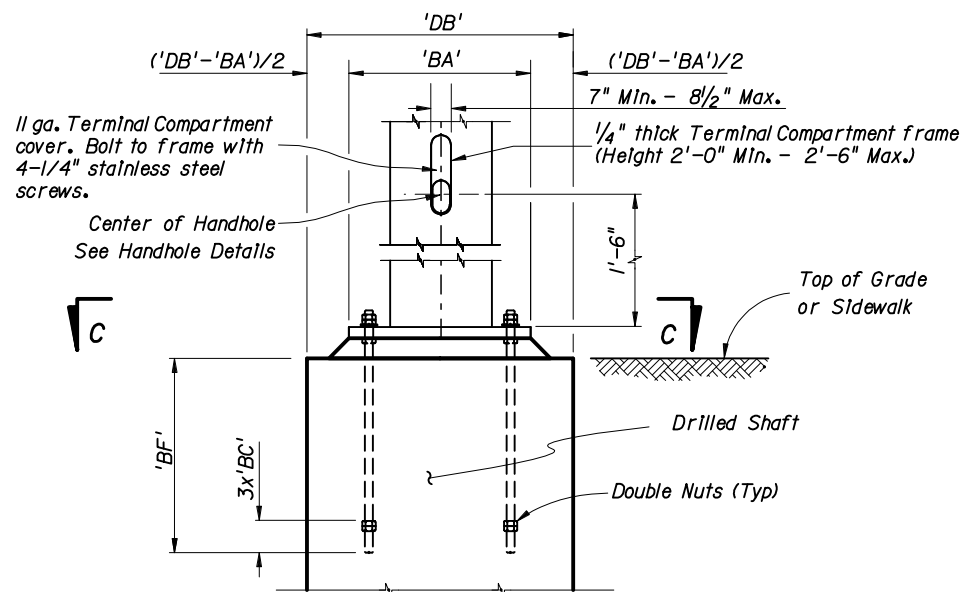


**ELEVATION VIEW**

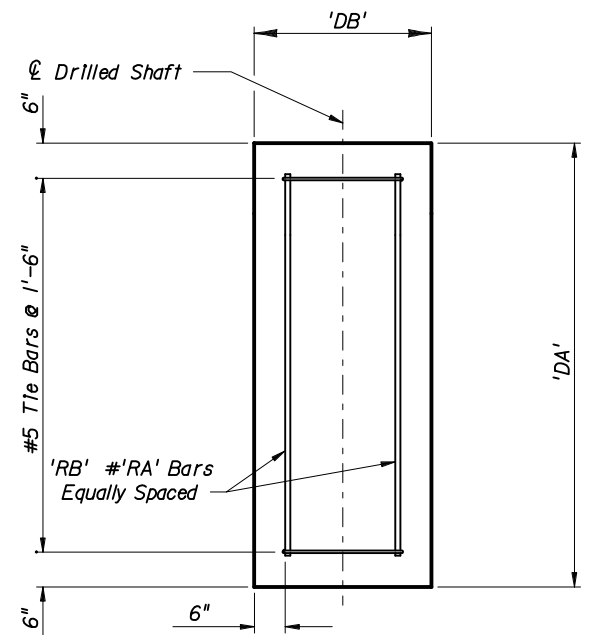
(Single Arm Shown, Double Arm Similar)  
(Luminaire Arm Not Shown)

\*\* NOTE: Contractor shall verify this Dimension prior to fabrication of Pole.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MAST ARM ASSEMBLIES</b>				
Designed By	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By	Revision	Sheet No.	Index No.	
	02	1 of 5	I7744	



**BASE PLATE AND ANCHORAGE ELEVATION**  
(Reinforcement Not Shown)



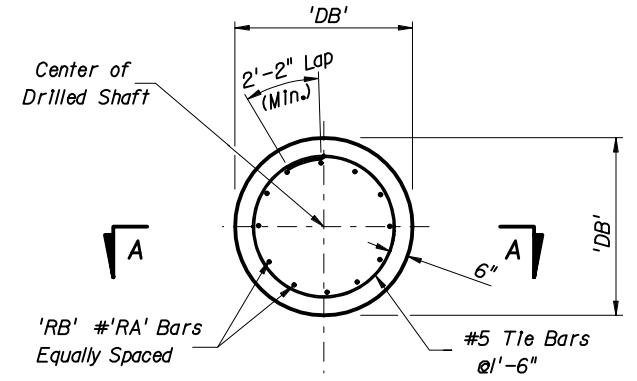
**SECTION A-A**

NOTES FOR DOUBLE MAST ARMS

1. Work this Drawing with Sheets Nos. 1 and 4 of 5, Indices I7740 and I7742, and Structures Standard Drawings S-1700 and S-1710 as necessary.

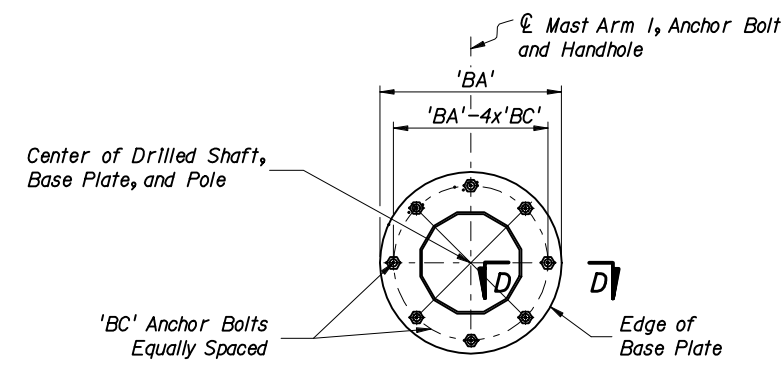
NOTES FOR SINGLE MAST ARMS WITH LUMINAIRE

1. Work this Drawing with Sheets Nos. 1, 3 and 5 of 5, Indices I7740 and I7742, and Structures Standard Drawings S-1700 and S-1710 as necessary.



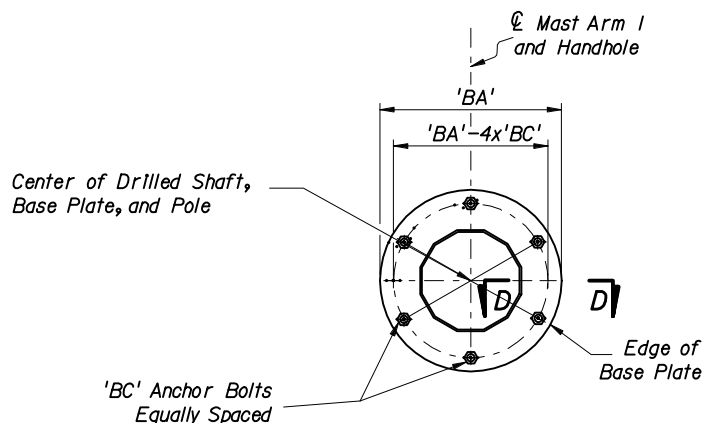
**FOUNDATION PLAN**

Note: 6" min. cover on Shaft Reinforcement



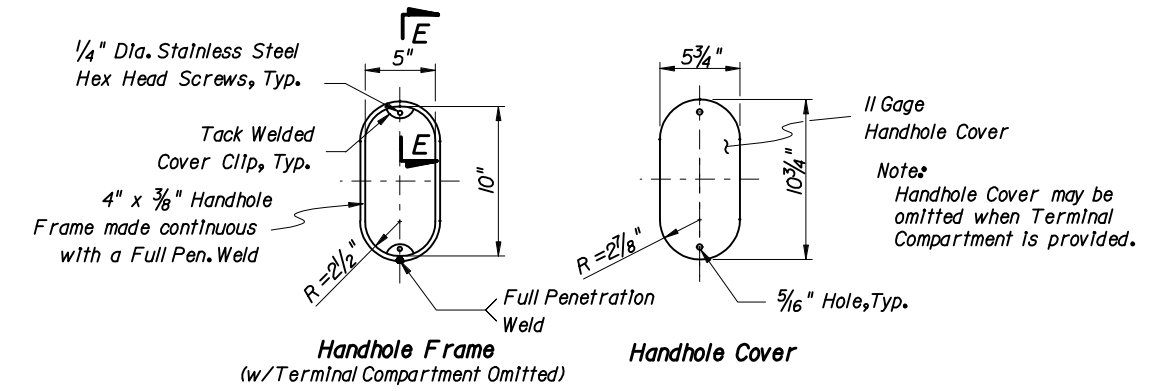
**SECTION C-C**

(8 Anchor Bolts shown, See Structures Standard Drawings S-1700 or S-1710 for actual quantity of bolts)



**SECTION C-C**

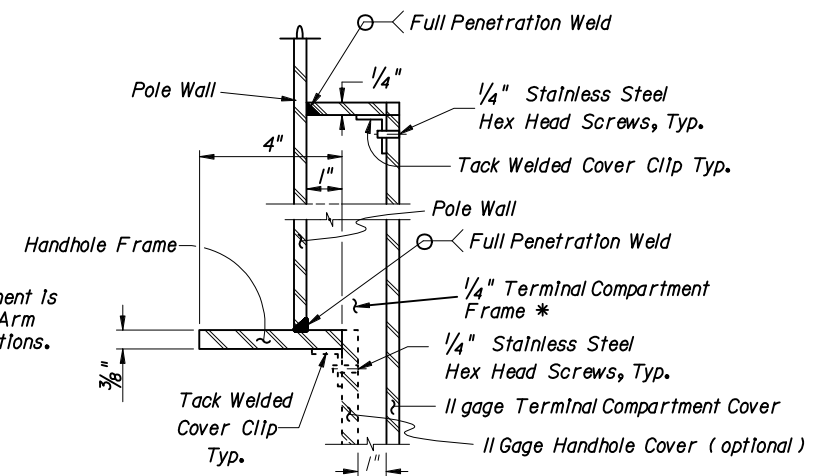
(6 Anchor Bolts)



**Handhole Frame**  
(w/Terminal Compartment Omitted)

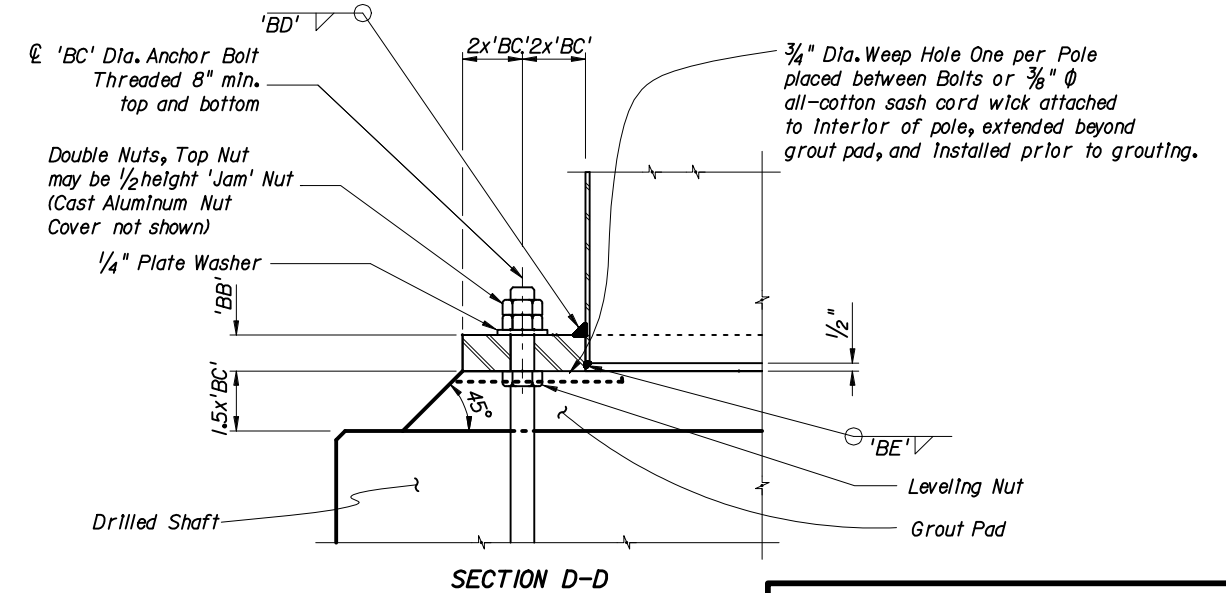
**Handhole Cover**

Note:  
Handhole Cover may be omitted when Terminal Compartment is provided.



**SECTION E-E**  
(thru Handhole & Terminal Compartment)

\*Terminal Compartment is optional. See Mast Arm Tabulation for locations.



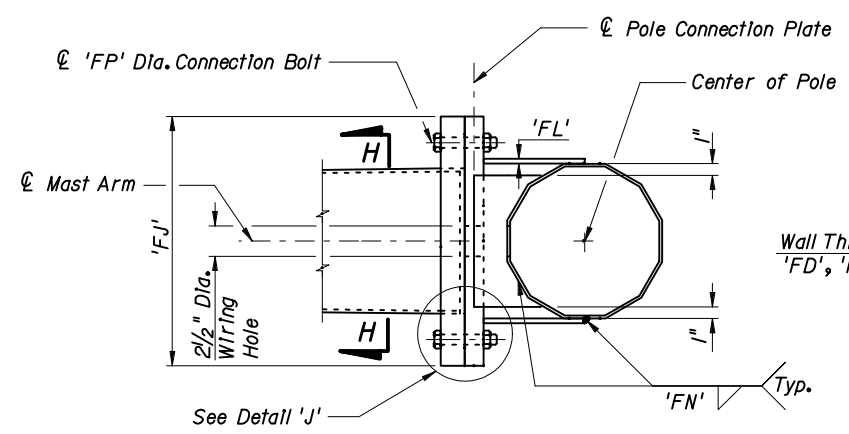
**SECTION D-D**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

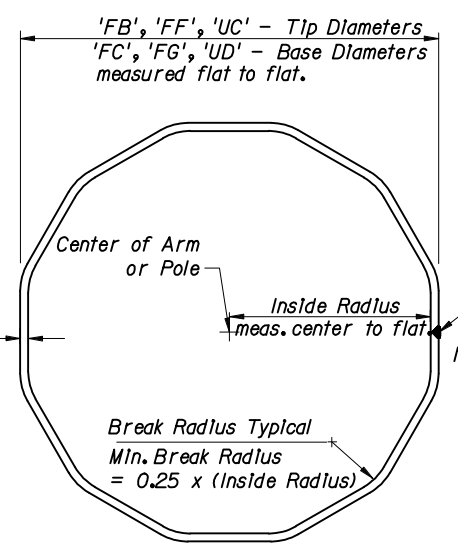
**MAST ARM ASSEMBLIES**

Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By				
Checked By				
		Revision	Sheet No.	Index No.
		02	2 of 5	I7744

**TYPICAL FOUNDATION AND BASE PLATE DETAILS**

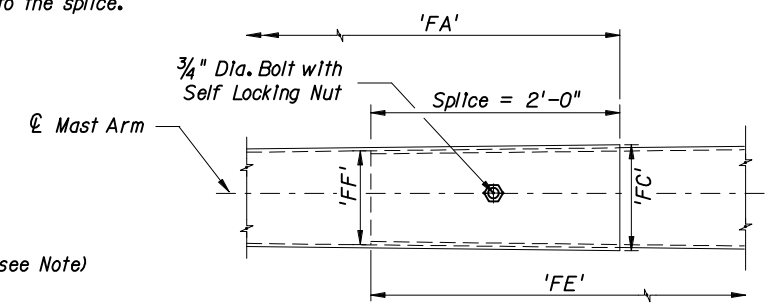


SECTION F-F



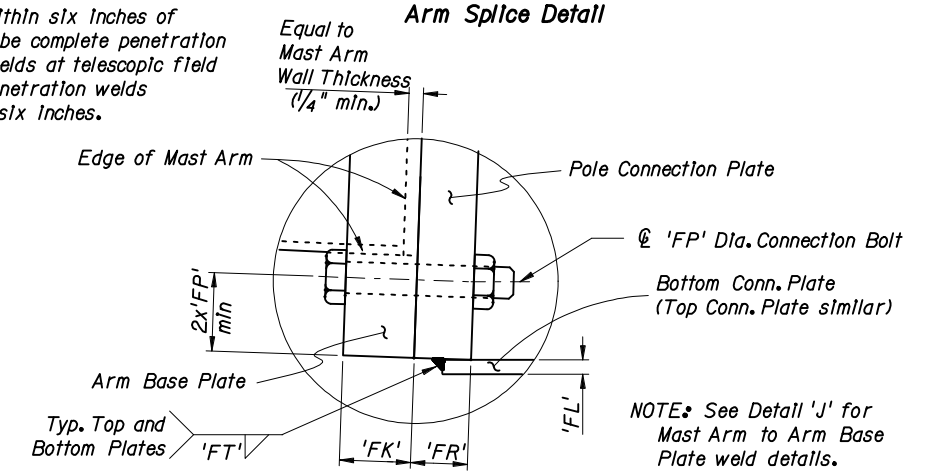
SECTION H-H

The 'Slip Joint' splice shall be a tight fit with no change in the Mast Arm slope due to the splice.

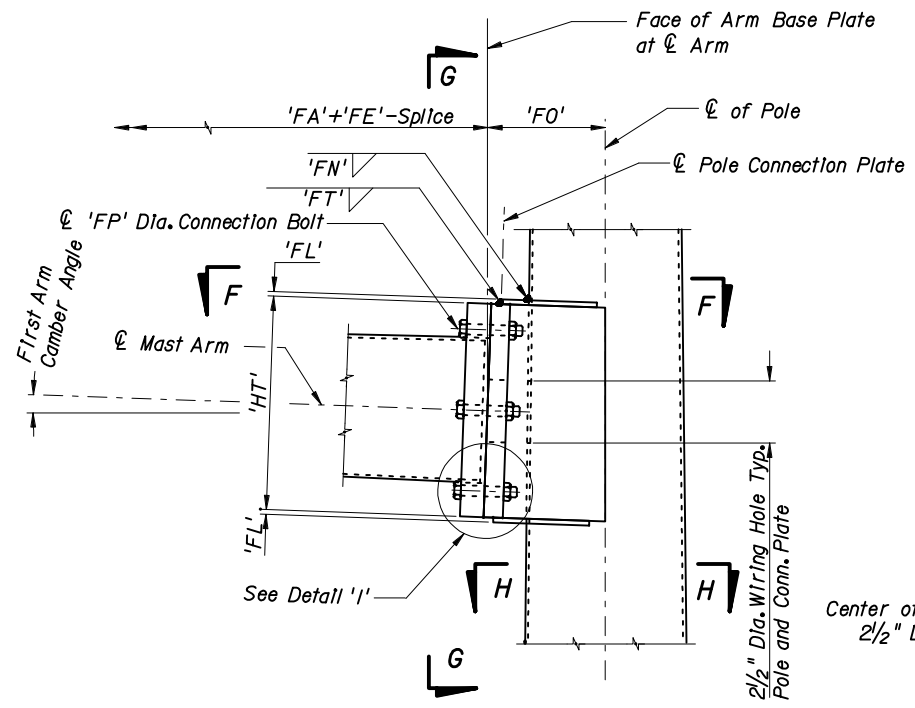


Arm Splice Detail

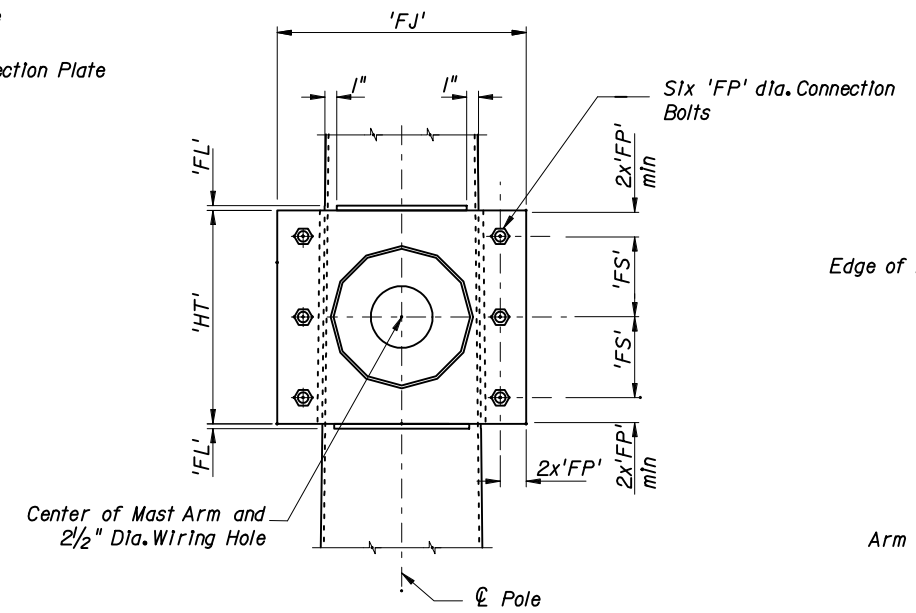
NOTE: Longitudinal seam welds within six inches of circumferential welds shall be complete penetration welds. Longitudinal seam welds at telescopic field splices shall be complete penetration welds for the splice length plus six inches.



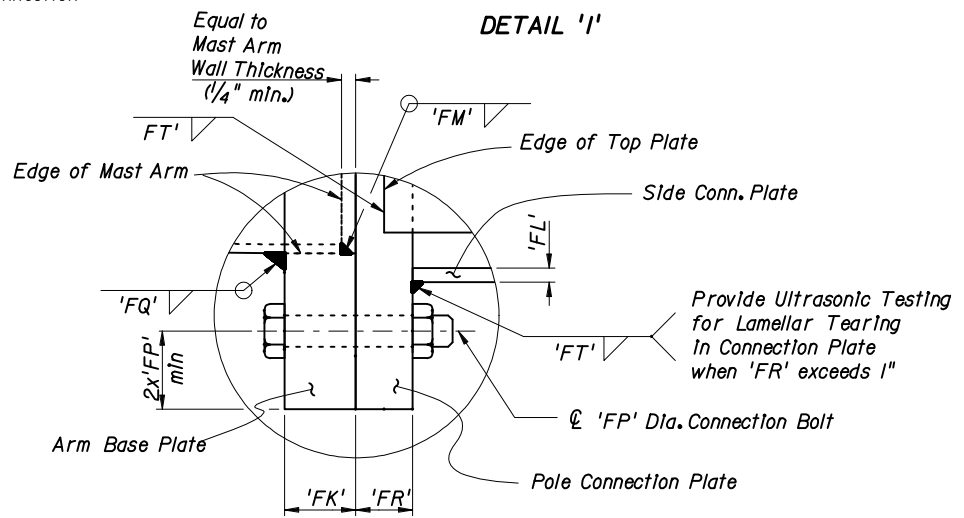
DETAIL 'I'



ELEVATION  
(Single Arm Connection)



SECTION G-G



DETAIL 'J'

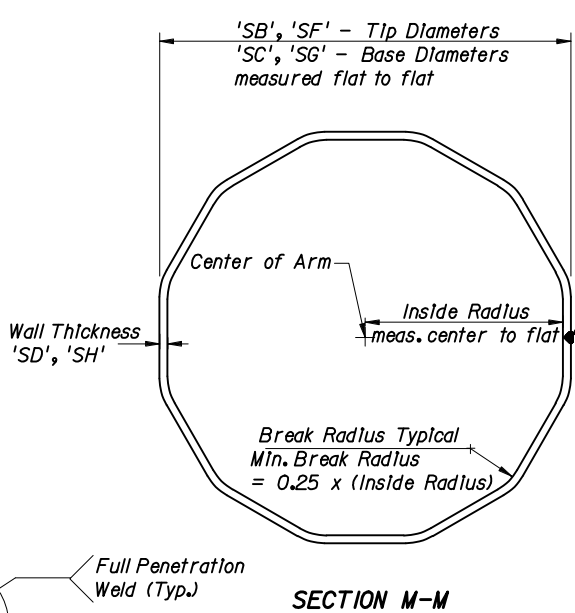
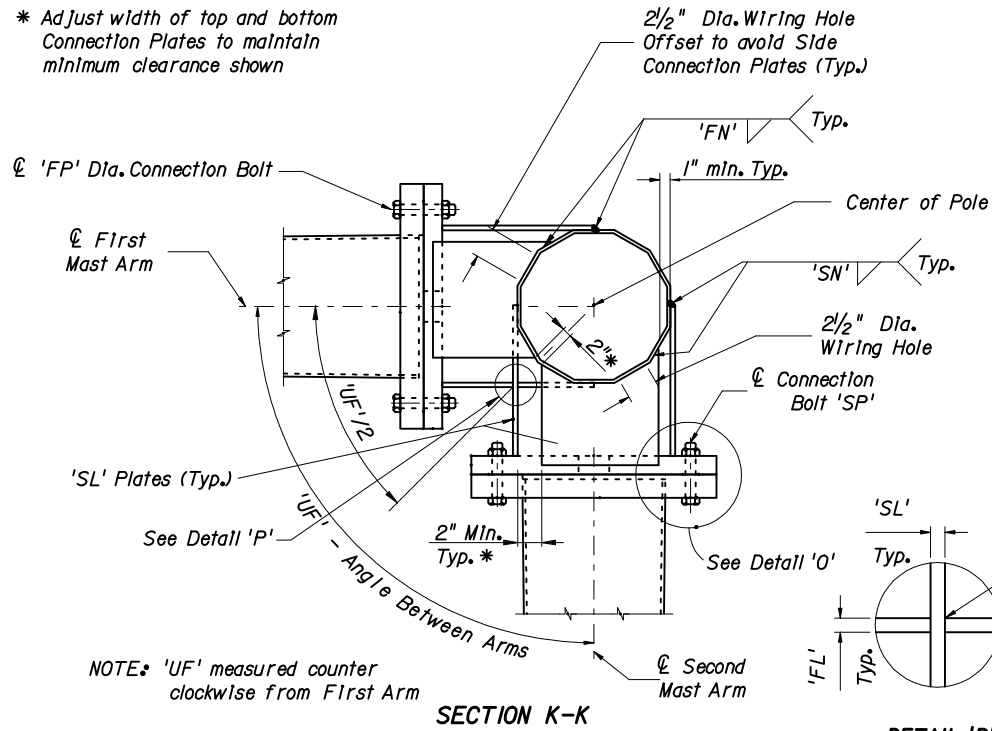
NOTE:  
1. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.  
2. Mast Arm and Connection Plates shall be match marked to ensure proper assembly.

NOTE FOR SINGLE MAST ARMS WITH LUMINAIRE:  
Work this Drawing with Sheets Nos. 1, 2 and 5 of 5, Indices I7740 and I7742, and Structures Standard Drawings S-1700 and S-1710 as necessary.

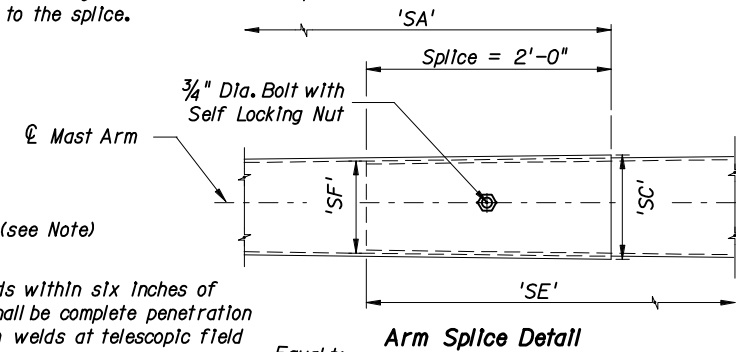
## TYPICAL SINGLE ARM CONNECTION DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MAST ARM ASSEMBLIES</b>				
Names	Dates	Approved By <i>W. V. [Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	3 of 5	I7744

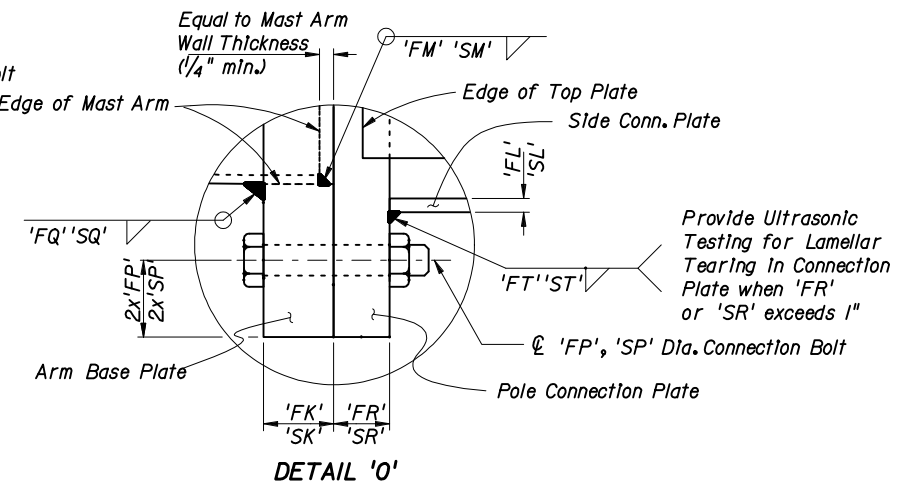
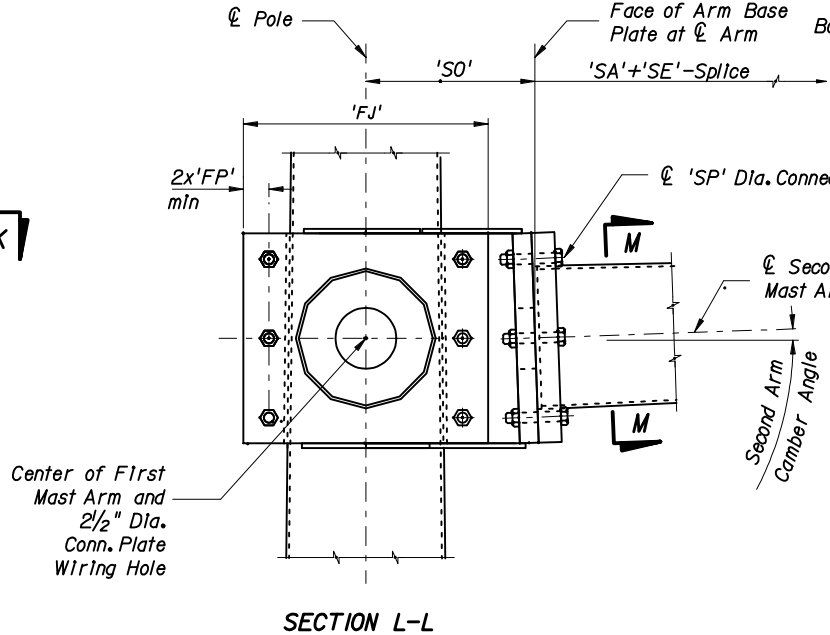
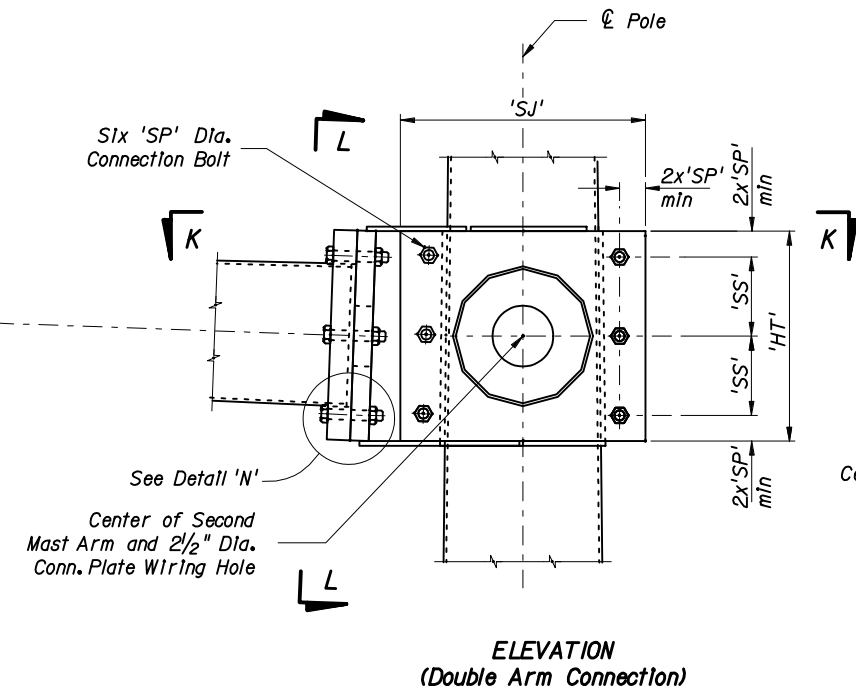
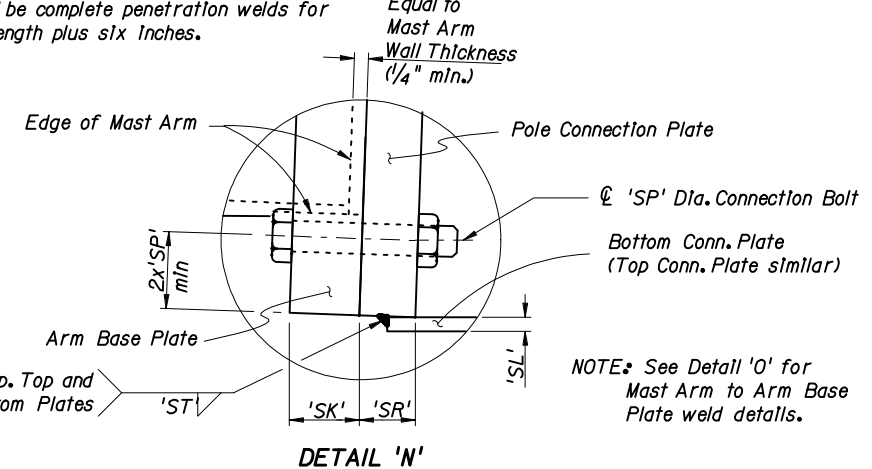
\* Adjust width of top and bottom Connection Plates to maintain minimum clearance shown



The 'Slip Joint' splice shall be a tight fit with no change in the Mast Arm slope due to the splice.



NOTE: Longitudinal seam welds within six inches of circumferential welds shall be complete penetration welds. Longitudinal seam welds at telescopic field splices shall be complete penetration welds for the splice length plus six inches.



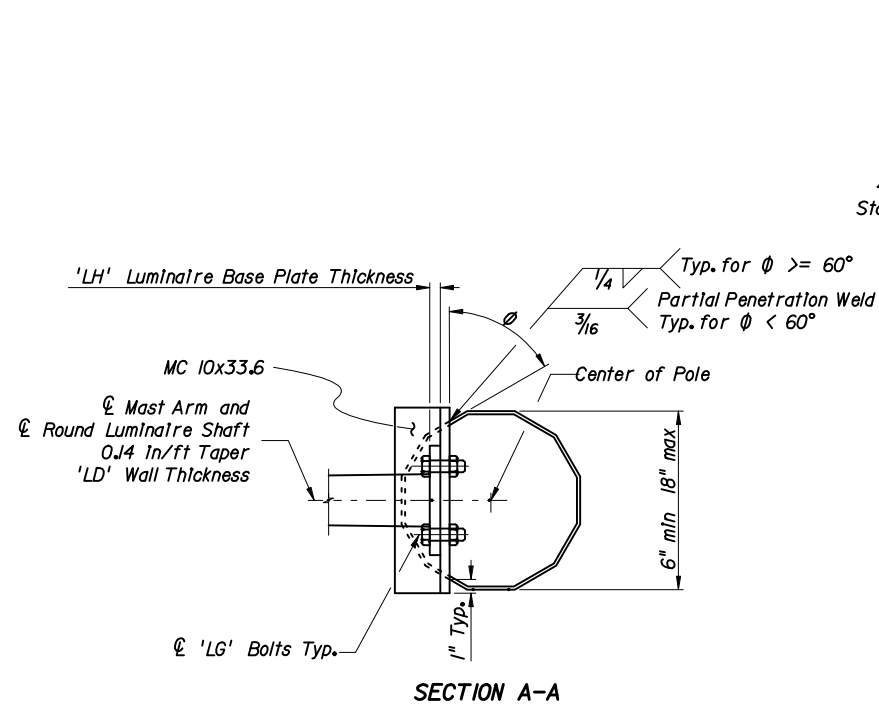
NOTE:  
1. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.  
2. Mast Arm and Connection Plates shall be match marked to ensure proper assembly.

NOTE FOR DOUBLE MAST ARMS:  
Work this Drawing with Sheets Nos. 1, 2 and 3 of 5, Indices I7740 and I7742, and Structures Standard Drawings S-1700 and S-1710 as necessary.

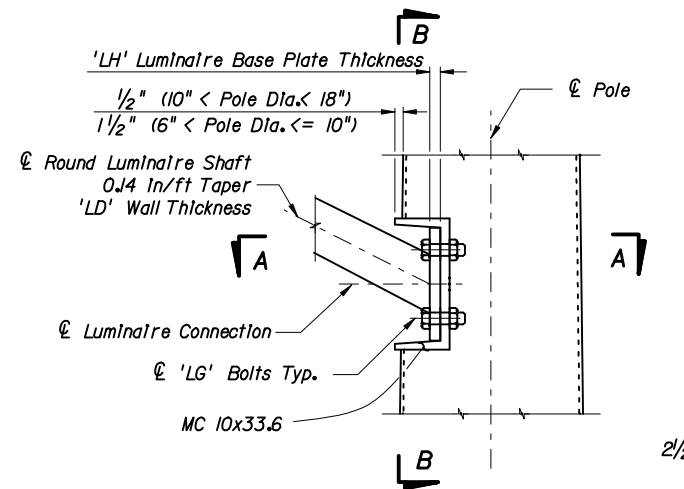
## TYPICAL DOUBLE ARM CONNECTION DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MAST ARM ASSEMBLIES</b>				
Designed By	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By			Revision	Sheet No. Index No.
			02	4 of 5 17744

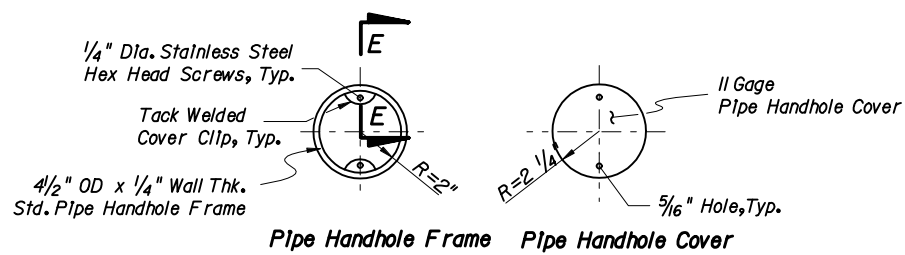




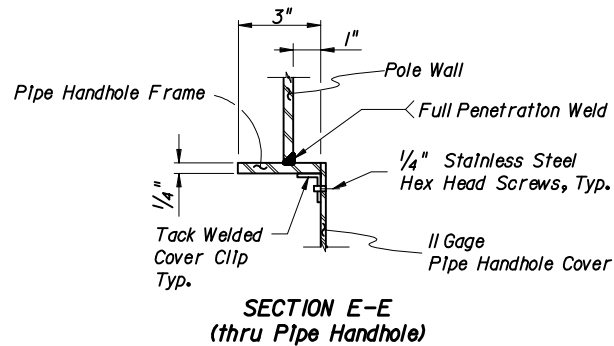
SECTION A-A



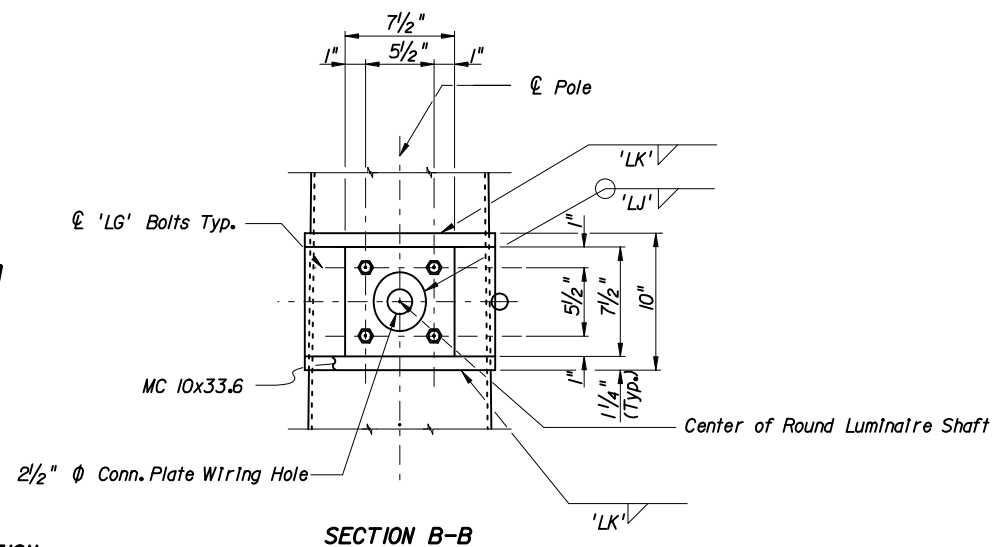
LUMINAIRE CONNECTION ELEVATION



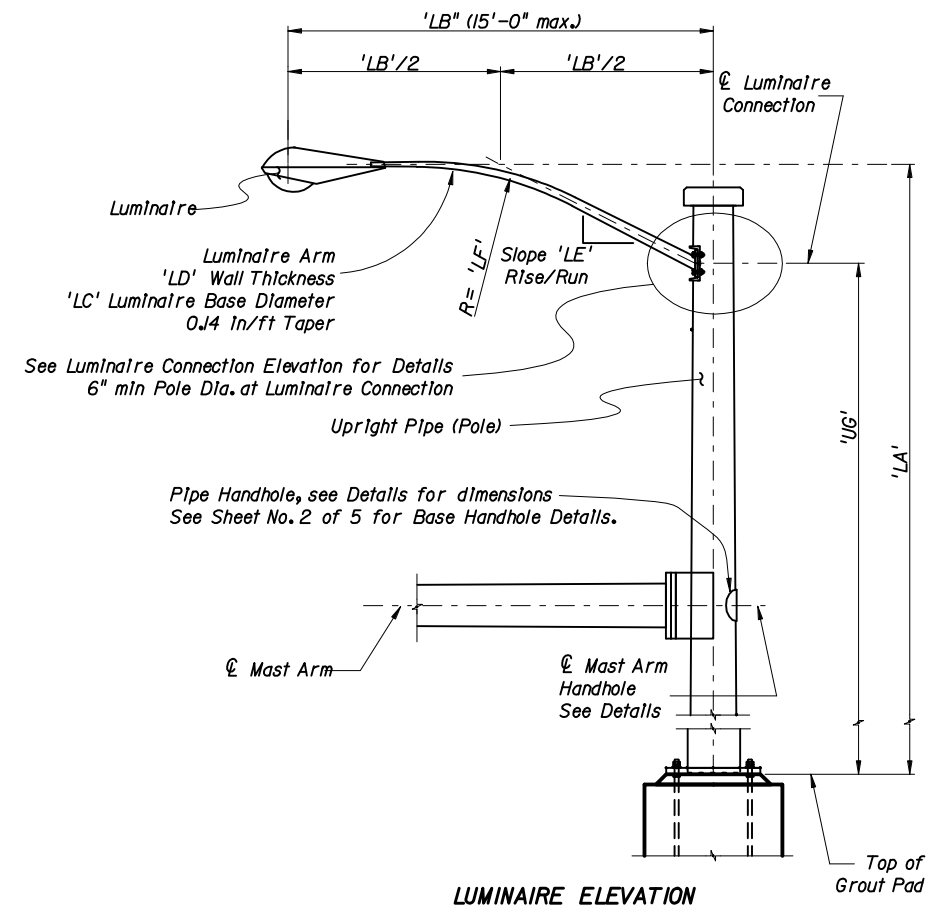
Pipe Handhole Frame Pipe Handhole Cover



SECTION E-E (thru Pipe Handhole)



SECTION B-B



LUMINAIRE ELEVATION

NOTE: The Pole shown on this sheet is a 12 sided section. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced

NOTE: The Fabricator may substitute a 1/2" thick bent plate with the same flange width, height, and length as the MC 10x33.6 Channel section.

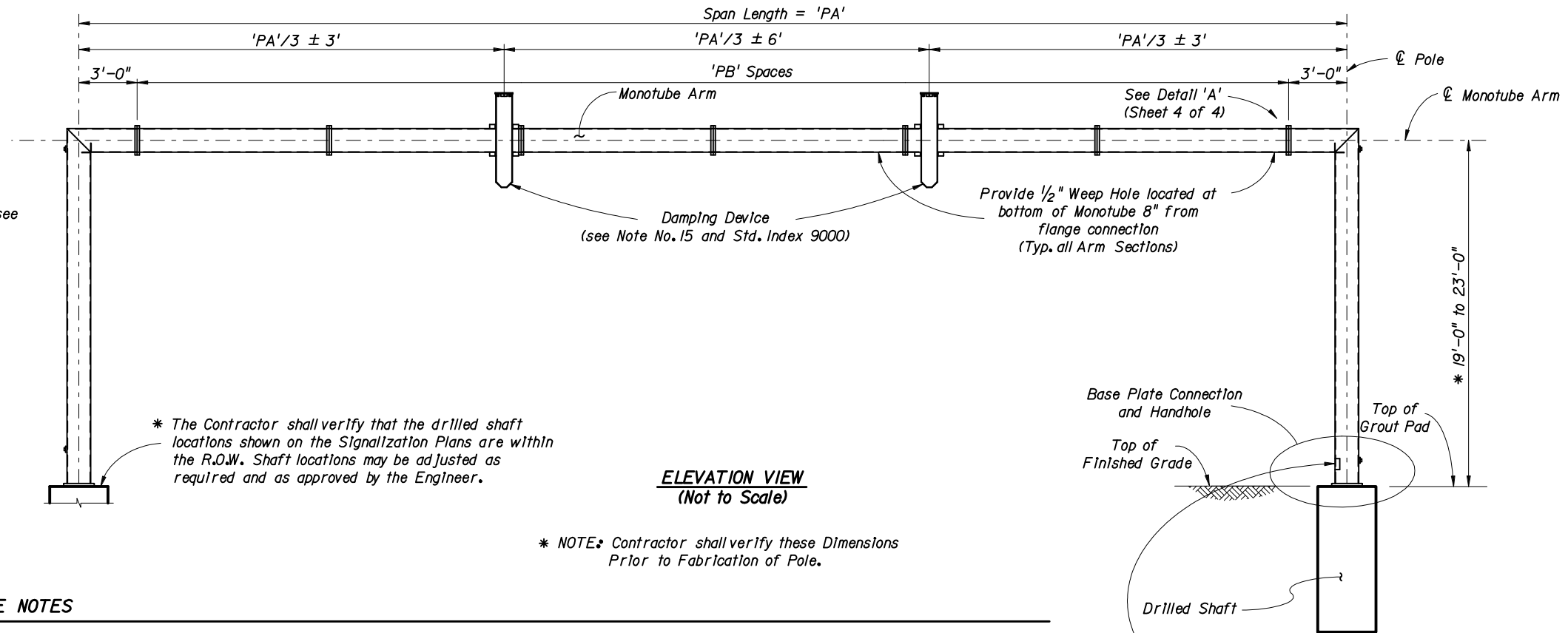
NOTES:

1. Work this Drawing with Sheet Nos. 1, 2 and 3 of 5, Indices 17740 and 17742, and Structures Standard Drawings S-1700 and S-1710 as necessary.
2. Luminaire type and Luminaire to Arm Connection Details can be found elsewhere.
3. Align Luminaire Arm with single Mast Arm or Primary Arm of Double Mast Arm Assembly.

TYPICAL LUMINAIRE ARM AND CONNECTION DETAILS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MAST ARM ASSEMBLIES</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By			Revision	Sheet No. Index No.
			02	5 of 5 17744

Notes: For referenced dimensions see Index 17746 Sheet 4 of 4.



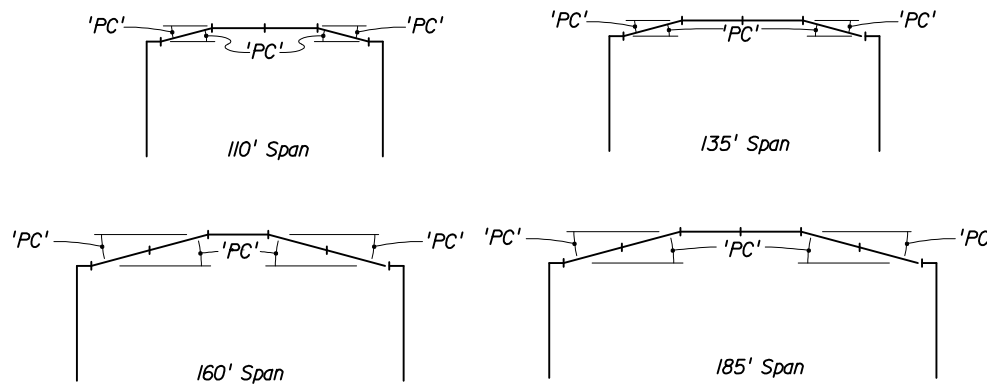
**ELEVATION VIEW**  
(Not to Scale)

\* NOTE: Contractor shall verify these Dimensions Prior to Fabrication of Pole.

**MONOTUBE SIGNAL STRUCTURE NOTES**

- 1) Signal Structure Materials shall be as follows:
  - Poles & Monotube Arm → API-5L-X42 (42 ksi yield) or ASTM A618 Grade II
  - Handhole Frame → ASTM A709 Grade 36
  - Handhole Cover → ASTM A607, Grade 50, 55 or 60 ksi
  - Steel Plates → ASTM A709 Grade 50
  - Weld Metal → E70XX
  - Bolts (except Anchor Bolts) → ASTM A325 Type I
  - Anchor Bolts → ASTM F1554 Grade 55 ksi
  - Nuts for Anchor Bolts → ASTM A563 Grade A Heavy Hex
  - Washers for Anchor Bolts → ASTM F436 Type I
  - Stainless Steel Screws → AISI Type 316
  - Aluminum Nut Cover → ASTM B26 (356-T6)
- 2) Reinforcing Steel shall be ASTM A615-96, Grade 60 ksi.
- 3) Concrete shall be Class IV (Drilled Shaft) with a minimum 28-day compressive strength of 4,000 psi for all environmental classifications.
- 4) Grout shall have a minimum 28-day compressive strength of 5,000 psi and shall meet the requirements of Section 934 of the Specifications. Grout at the base of uprights shall be installed a minimum of 7 days prior to the installation of signals or sign panels.
- 5) All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
- 6) All Steel Items shall be galvanized as follows:
  - All Nuts, Bolts and Washers → ASTM A153 Class C or D depending on size
  - All other steel Items → ASTM A123 (Including Pole & Monotube Arm)
- 7) The Design Wind Speed is 110mph with a 30 percent gust factor.
- 8) Alternate Designs for this Structure are not allowed.
- 9) Except for Anchor Bolts, all bolt hole diameters shall be equal to the bolt diameter plus 1/16", prior to galvanizing. Hole diameters for Anchor Bolts shall not exceed the bolt diameter plus 1/2".

- 10) Sign Panels and Signals attached to the Monotube shall be located as shown on the Traffic Signal Plans. Wire access holes shall not exceed 3/4" in diameter.
- 11) The Pole shall be installed vertically. Arm Camber shall be accounted for in the Flange Connections.
- 12) Locate handhole 180° from monotube arm.
- 13) All signals shall be installed vertically.
- 14) Monotube Arm & Poles shall be fabricated from round pipe.
- 15) If damping devices are required by the Engineer, they shall be installed within 3'-0" ± of the third points of the Span Length.
- 16) Each Standard Monotube Signal Structure has been designed for two free swinging internally illuminated street signs, per pole, which are acceptable by Contractor Certification provided they meet the applicable requirements of Specification Section 699, weigh no more than 75 lbs. (each) and are no more than 12 sq. ft in area (each).



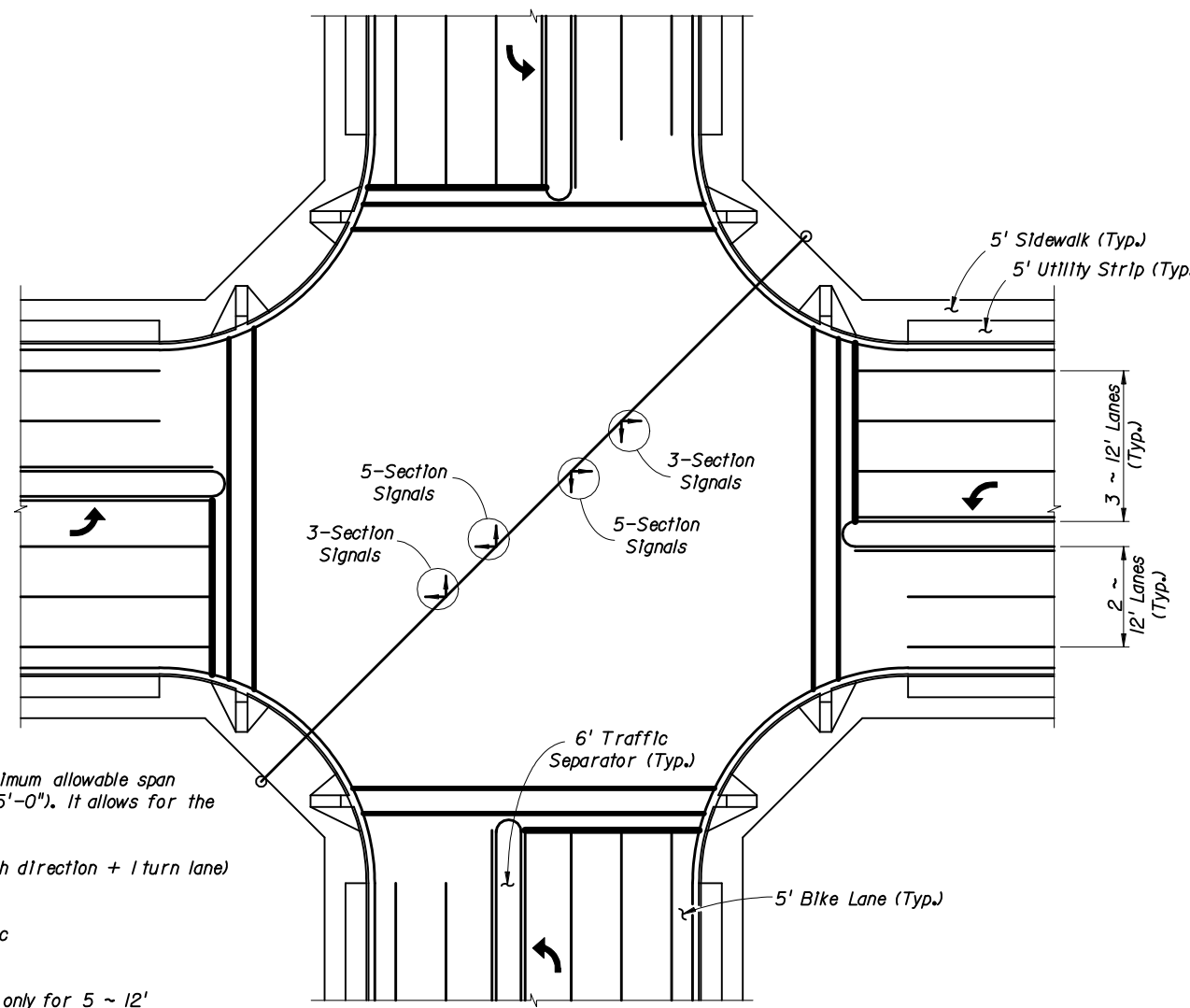
**CAMBER DETAILS**

Notes: Fabricate with rolling camber up.

Aluminum Identification Tag Not to Exceed 2" x 4". Secure to Shaft by 0J25" Stainless Steel rivets or screws. Fabricators to provide details for approval. Identification Tag Located on Inside of Pole visible from handhole, or on outside of pole inside terminal compartment. Tag to be stamped with the following information:

<p><i>Standard Design</i></p> <p>Financial Project ID</p> <p>Span Length</p> <p>Manufacturer's Name</p> <p>Certification No.</p>	<p><i>Special Design</i></p> <p>Financial Project ID</p> <p>Pole Diameter (In.)</p> <p>Pole Wall Thickness (In.)</p> <p>Arm Diameter (In.)</p> <p>Arm Wall Thickness (In.)</p> <p>Manufacturer's Name</p>
--	---

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MONOTUBE SIGNAL STRUCTURE ELEVATION, NOTES AND CAMBER DETAILS</b>				
	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Designed By			State Structures Design Engineer	
Drawn By			Revision	Sheet No.
Checked By			02	1 of 4
				Index No. 17746



**PLAN VIEW - MONOTUBE DESIGN INTERSECTION**

**Notes:**

The signal configuration shown represents the maximum allowable span for which this monotube standard is applicable (185'-0"). It allows for the following components:

- a. 5 ~ 12' traffic lanes (2 thru lanes in each direction + 1 turn lane)
- b. 1 ~ 6' traffic separator
- c. 1 ~ 5' bike lane per direction of traffic
- d. 1 ~ 5' utility strip per direction of traffic
- e. 1 ~ 5' sidewalk per direction of traffic

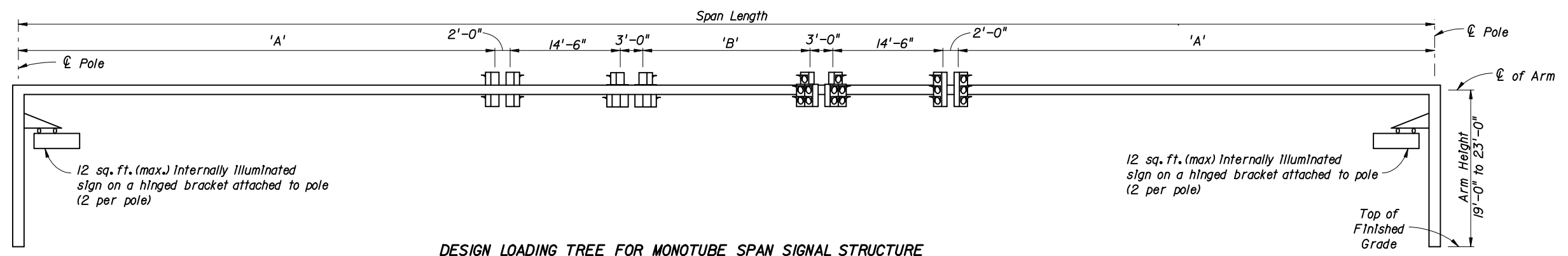
The minimum monotube design span (110'-0") allows only for 5 ~ 12' traffic lanes (item "a" above). It is assumed that for this case there are no traffic separators, bike lanes, utility strips or sidewalks.

**INSTRUCTIONAL NOTES:**

1. This Index, 17746, is for use in preparing signalization plans when monotube assemblies are required. This standard establishes the requirements of monotube components listed on the Qualified Products List (QPL). When using components on the QPL, the span length and heights of each pole will be the only information required in the Contract Plans, and Shop Drawings are not required.
2. If a monotube configuration does not meet the requirements stated below, a special design and shop drawing submittal is required.
3. Four standard monotube configurations are provided. The standard arm length and the signal locations used for design of the arm are shown on the monotube design loading tree on this sheet. If the same arrangement of signals is used with one or more signals closer to the nearest pole, the standard monotube may be used. If the same arrangement is used but one or more signals are further from the nearest pole, or if a different configuration of signals is used, a special design is required. If any signs are to be attached to the monotube arm, a special design is required.
4. Standard monotube span lengths of 110'-0", 135'-0", 160'-0" and 185'-0" are shown. For other required span lengths with the same configuration of signals in the same locations or closer to the poles, the standard monotube design with the next largest standard span length may be used. The difference in length shall be removed from the center horizontal segment(s) of the span. If a span longer than 185'-0" is to be used, a special design is required.
5. The standard monotube is valid for arm heights between 19' and 23', inclusive. A special design is required for all heights greater than 23'. If an arm height of less than 19' is to be utilized with the same configuration of signals in the same locations or closer to the poles, the standard monotube may be used, provided that minimum required clearances to the roadway are maintained.
6. The foundations for the standard monotube are pre-designed and are based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:

Classification = Cohesionless (Fine Sand)  
 Friction Angle = 30 Degrees (30°)  
 Unit Weight = 50 lbs./cu.ft. (assumed saturated)

Only in cases where the Designer considers the soil types of the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

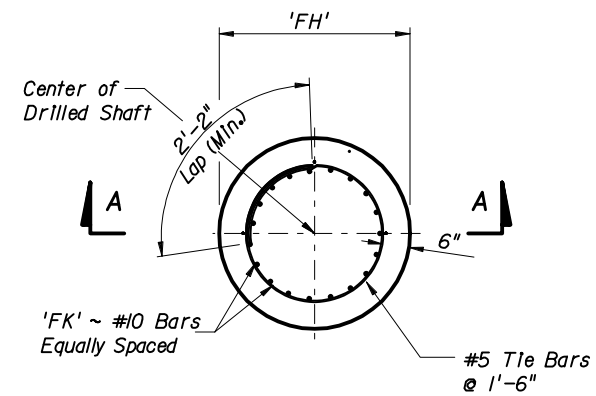


**DESIGN LOADING TREE FOR MONOTUBE SPAN SIGNAL STRUCTURE**

Note: Signal Backplates on 4 of the 8 signals are included in the design of Standard Arms.

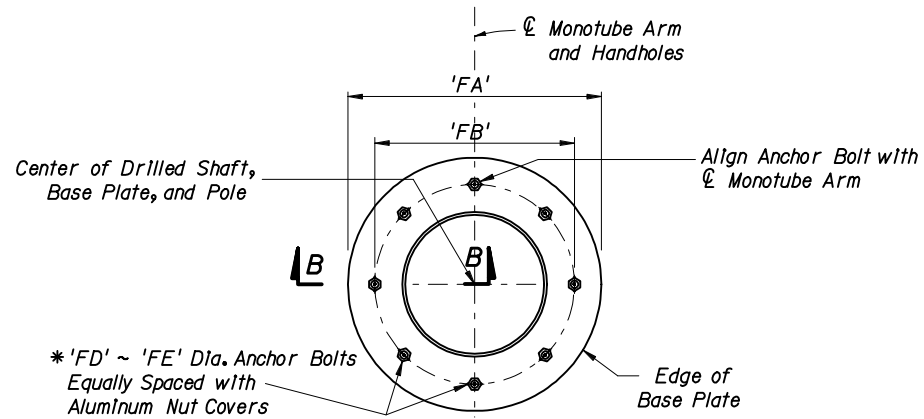
Note: For referenced dimensions see Index 17746 Sheet 4 of 4.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>MONOTUBE SIGNAL STRUCTURE DESIGN INTERSECTION AND DESIGN LOAD TREE</b>				
Names	Dates	Approved By <i>[Signature]</i>		
Designed By		State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	2 of 4	17746



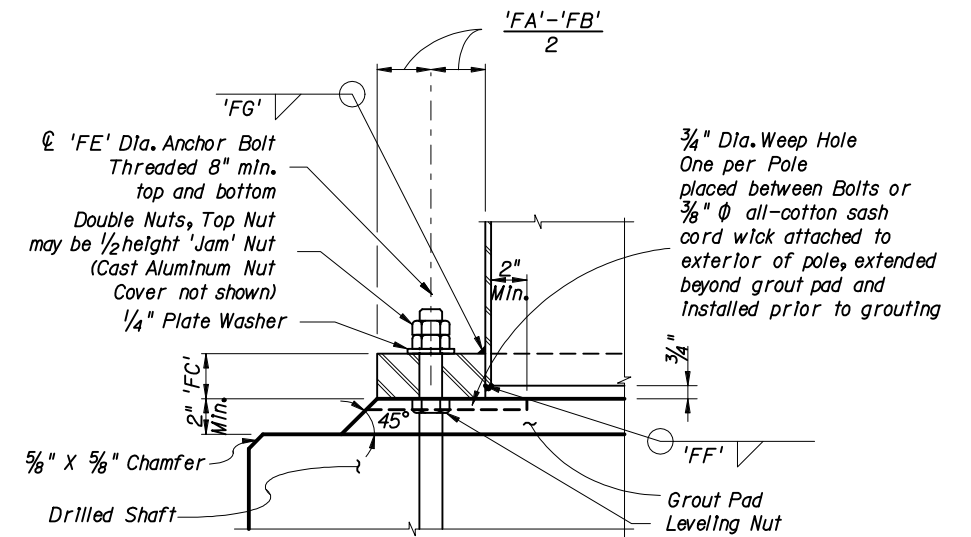
**FOUNDATION PLAN**

Notes: 6" min. cover on Shaft Reinforcement



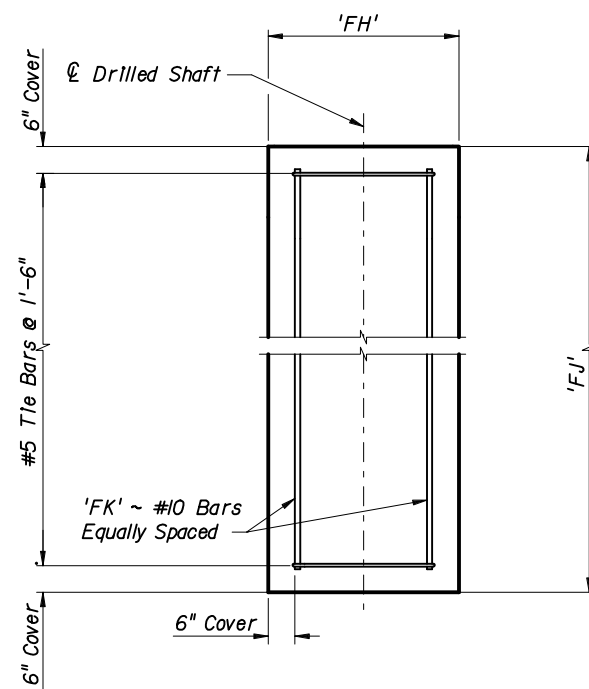
**SECTION C-C**

Notes: Concrete and Reinforcement not shown.  
 \* Anchor Bolt Group locations may be  $\pm 1/2$ " in the direction of the span

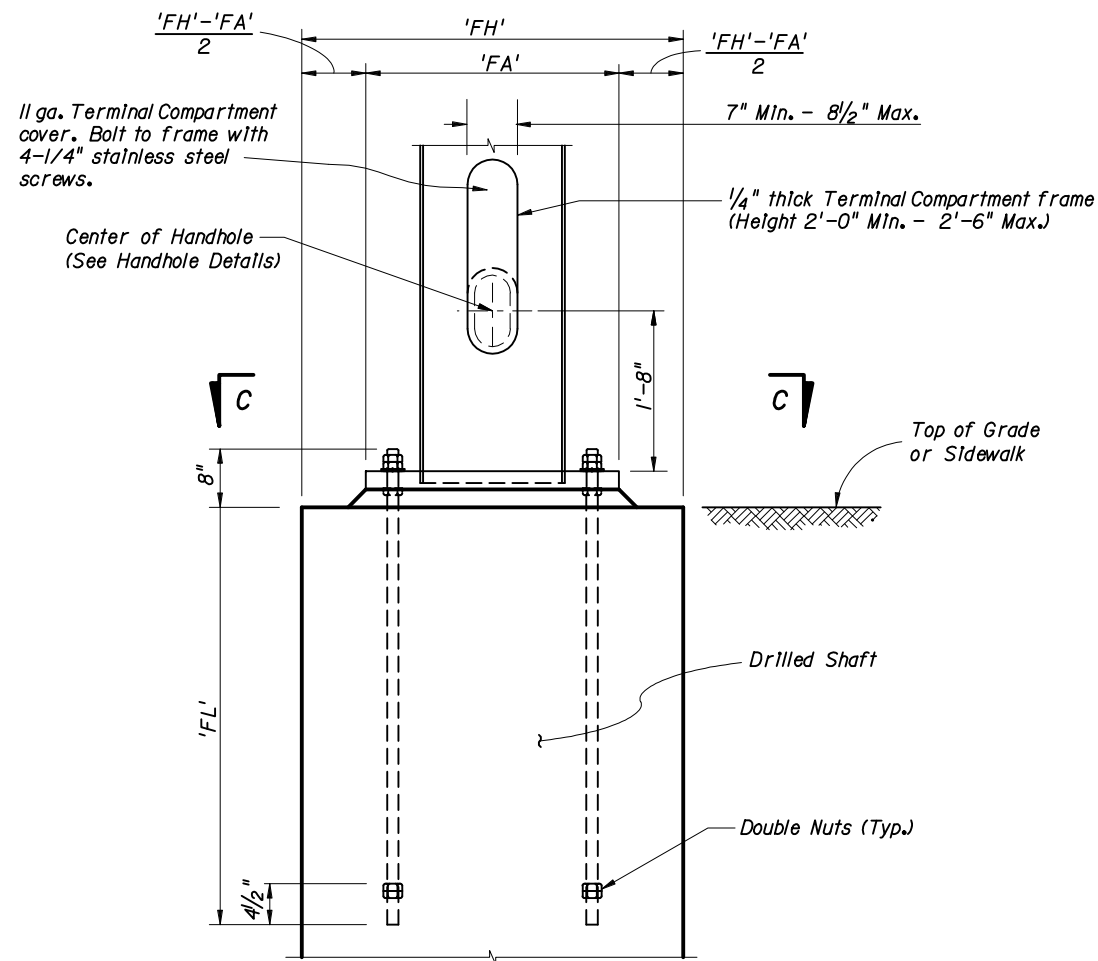


**SECTION B-B**


Notes: For referenced dimensions see Index 17746 Sheet 4 of 4.

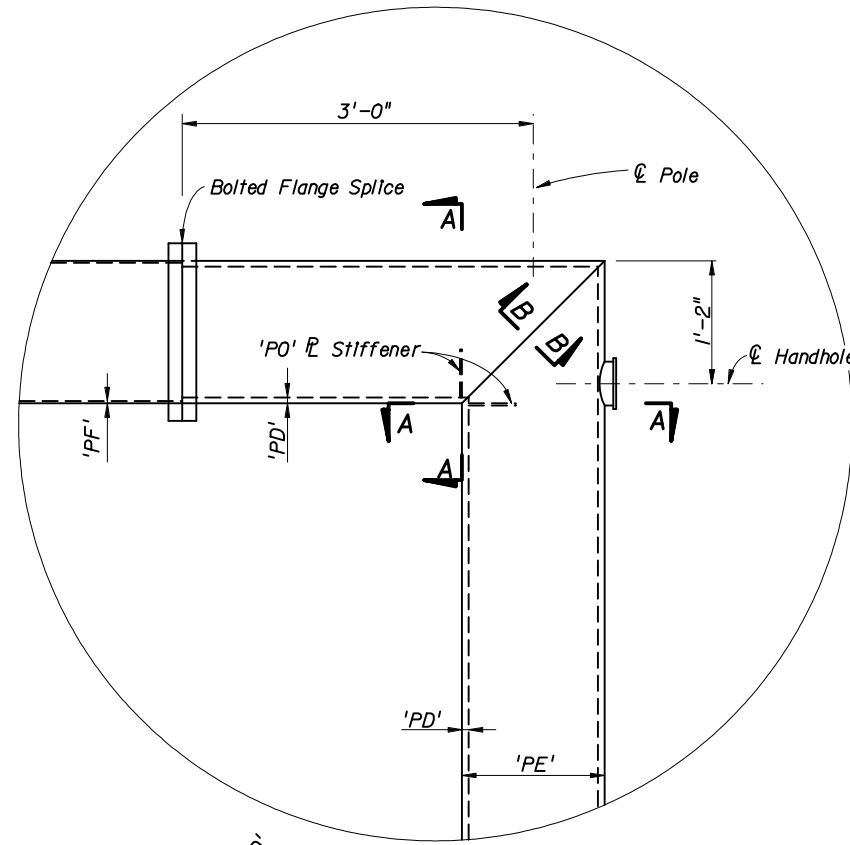


**SECTION A-A**

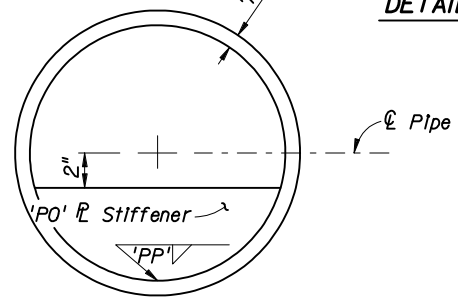


**BASE PLATE AND ANCHORAGE ELEVATION**

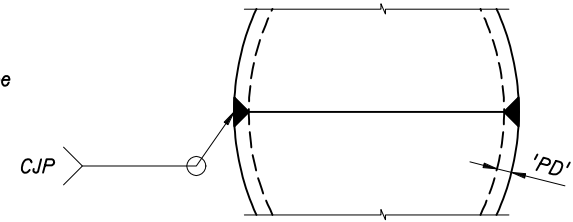
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
MONOTUBE SIGNAL STRUCTURE FOUNDATION AND BASE PLATE DETAILS				
Names	Dates	Approved By		
Designed By		 State Structures Design Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	3 of 4	17746



DETAIL 'A'

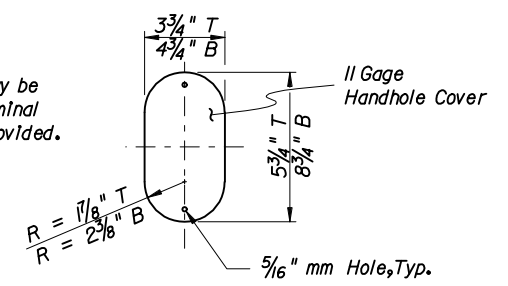


SECTION A-A

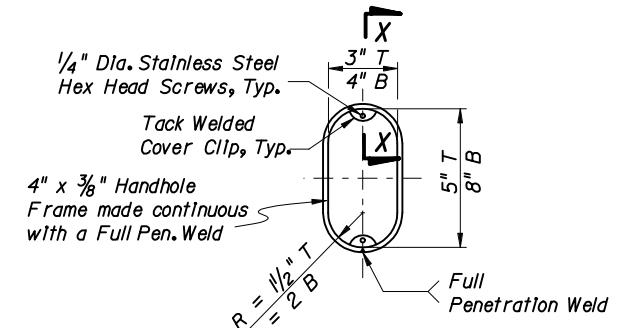


SECTION B-B

Notes:  
Handhole Cover may be omitted when Terminal Compartment is provided.

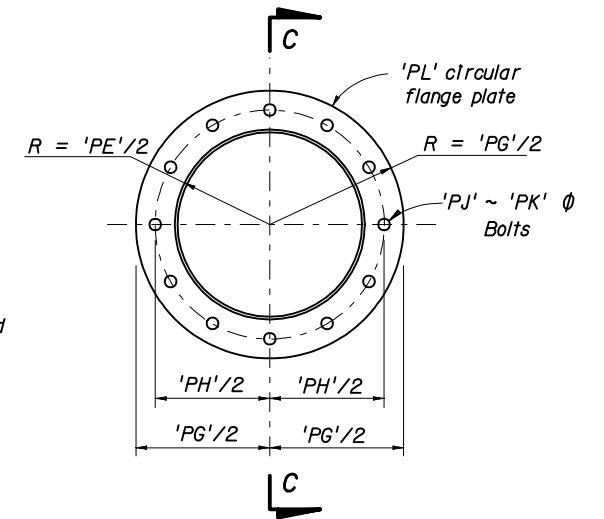


HANDHOLE COVER

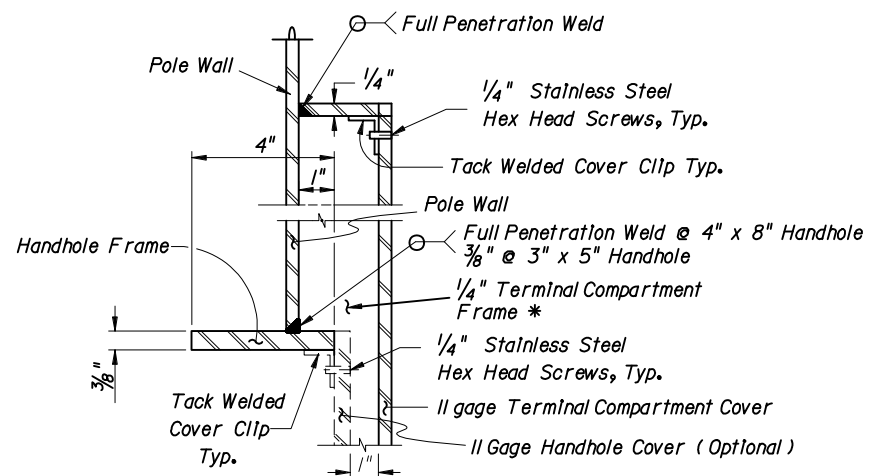


HANDHOLE FRAME  
(w/ Terminal Compartment omitted)

T - denotes top 3" x 5" handhole  
B - denotes bottom 4" x 8" handhole

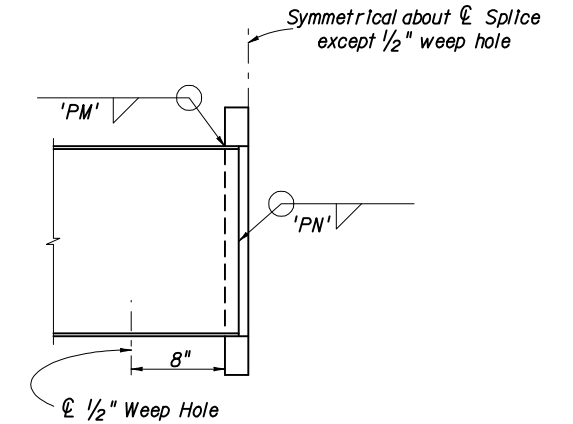


FLANGE SPLICE DETAILS



SECTION E-E  
(thru Handhole & Terminal Compartment)

\*Terminal Compartment is optional. See Monotube Tabulation for locations.



SECTION C-C

TABLE OF MONOTUBE VARIABLES

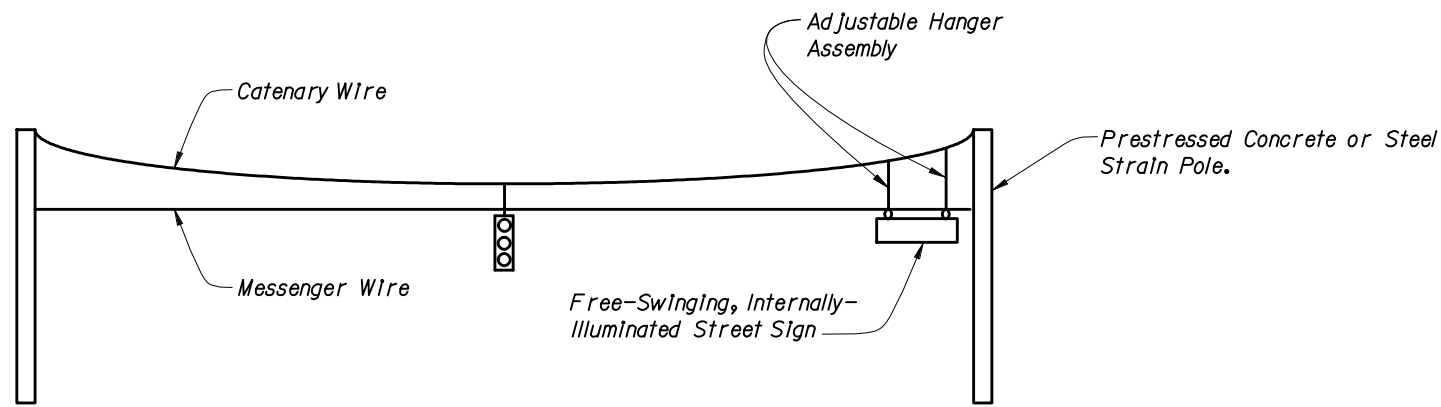
MONOTUBE ARM & POLES														FOUNDATION & BASE PLATE										SIGNAL LAYOUT			
'PA'	'PB'	'PC'	'PD'	'PE'	'PF'	'PG'	'PH'	'PJ'	'PK'	'PL'	'PM'	'PN'	'PO'	'PP'	'FA'	'FB'	'FC'	'FD'	'FE'	'FF'	'FG'	'FH'	'FJ'	'FK'	'FL'	Dim. 'A'	Dim. 'B'
(ft)		(deg)	(In)	(In)	(In)	(In)	(In)		(In)	(In)	(In)	(In)	(In)	(In)	(In)	(In)	(In)		(In)	(In)	(In)	(ft)	(ft)	(In)	(ft)	(ft)	(ft)
110	4	1.5	1.093	14	3/8	21 1/2	17 3/4	8	1 1/4	2/4	5/16"	5/16"	1/4"	3/16"	21 1/2	17 3/4	1 7/8	8	1 1/2"	5/16"	5/16"	3	12	45	29	13	
135	4	1.5	1.031	16	3/8	23 1/2	19 3/4	10	1 1/4	2/4	5/16"	5/16"	1/4"	3/16"	23 1/2	19 3/4	2	8	1 1/2"	5/16"	5/16"	3.5	13	45	40	16	
160	5	1.25	1.156	18	3/8	25 1/2	21 3/4	12	1 1/4	2/4	5/16"	5/16"	1/4"	3/16"	25 1/2	21 3/4	2 1/8	8	1 1/2"	5/16"	5/16"	3.5	14	45	51	19	
185	6	1.75	1.125	22	3/8	29 1/2	25 3/4	14	1 1/4	2/4	5/16"	5/16"	1/4"	3/16"	29 1/2	25 3/4	2 1/4	10	1 1/2"	5/16"	5/16"	4	16	45	62	22	

Notes: For additional variable definitions see Sheets 1 and 3 of 4.

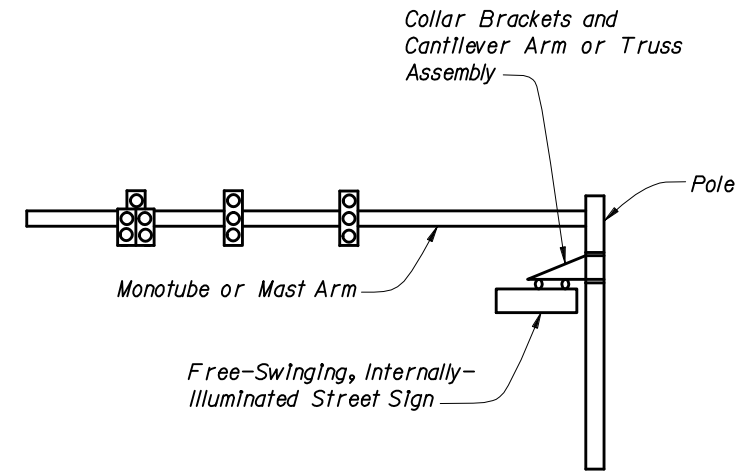
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**MONOTUBE SIGNAL STRUCTURE  
ARM CONNECTION DETAILS  
& TABLE OF VARIABLES**

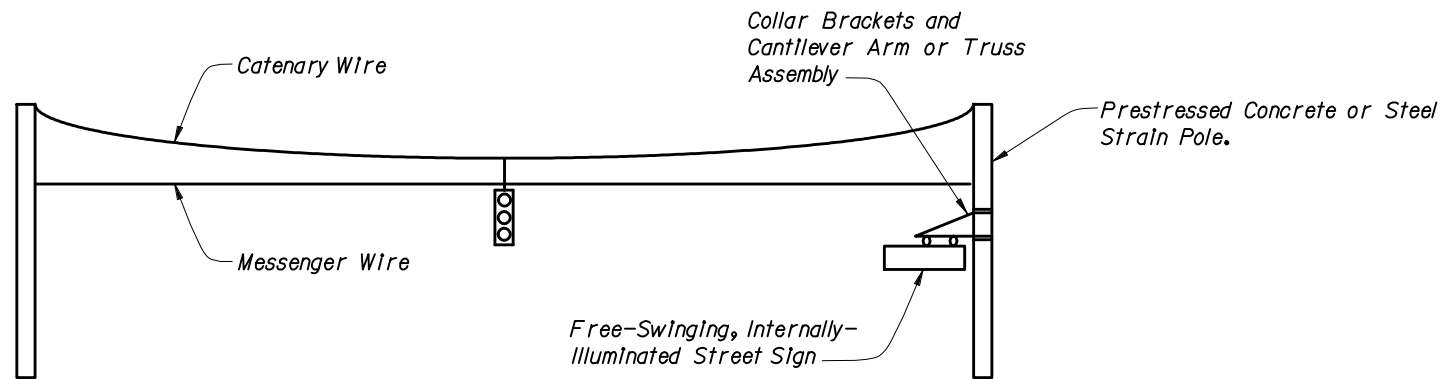
Names	Dates	Approved By	State Structures Design Engineer		
Designed By		[Signature]	Revision	Sheet No.	Index No.
Drawn By			02	4 of 4	17746
Checked By					



**OPTION 1**  
(For Span Wire Assembly)



**OPTION 3**  
(For Mast Arm Assembly and Monotube Signal Structure)

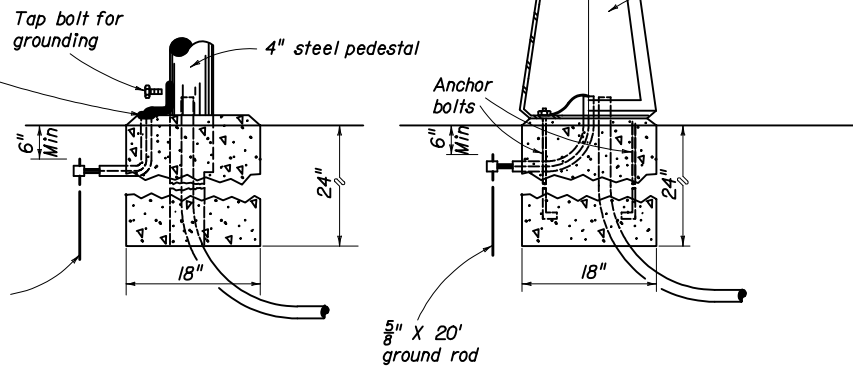
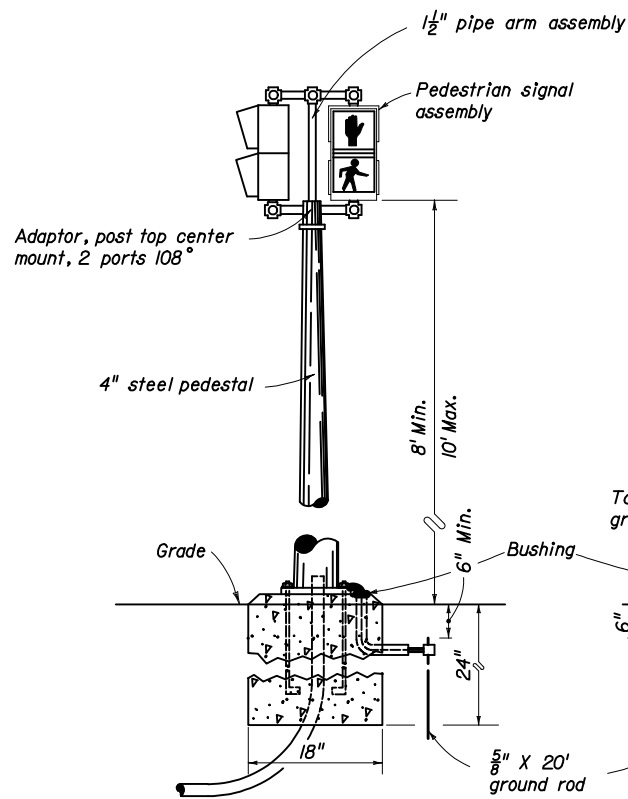


**OPTION 2**  
(For Span Wire Assembly)

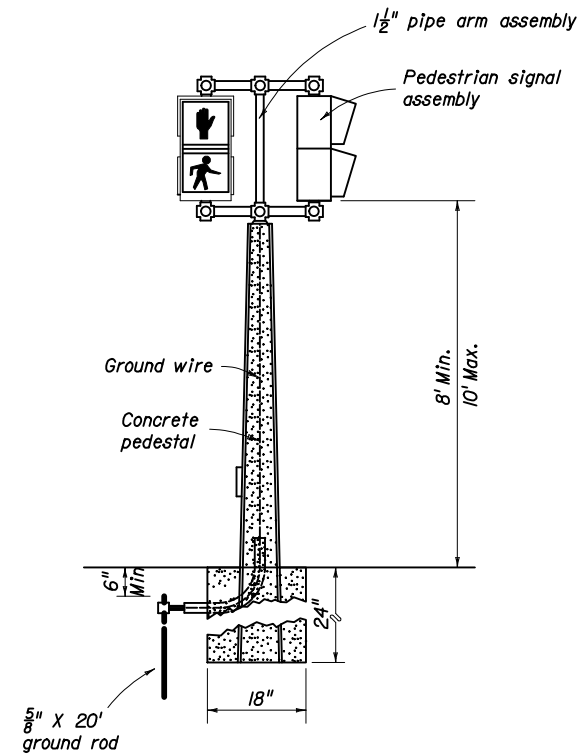
**NOTES:**

1. Free-swinging, internally-illuminated street signs shall be installed on signal structures only at one of the optional locations shown on this drawing, unless a special design is completed for the support structure.
2. Free-swinging, internally-illuminated street signs shall meet the requirements of Section 699 of the Standard Specifications for Road and Bridge Construction.
3. Pole attachments and cantilever arm (or truss) assemblies may be accepted by Contractor certification provided the signs being supported meet the weight and area limitations included in Section 699 for "Acceptance by Certification".
4. Pole attachments and cantilever arm (or truss) assemblies supporting signs not meeting the weight or area limitations included in Section 699 for "Acceptance by Certification" require the submittal of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>FREE-SWINGING, INTERNALLY-ILLUMINATED STREET SIGN ASSEMBLIES</b>				
Designed By	Names	Dates	Approved By <i>W. V. [Signature]</i>	
Drawn By			State Structures Design Engineer	
Checked By			Revision	Sheet No. Index No.
			02	1 of 1 17748



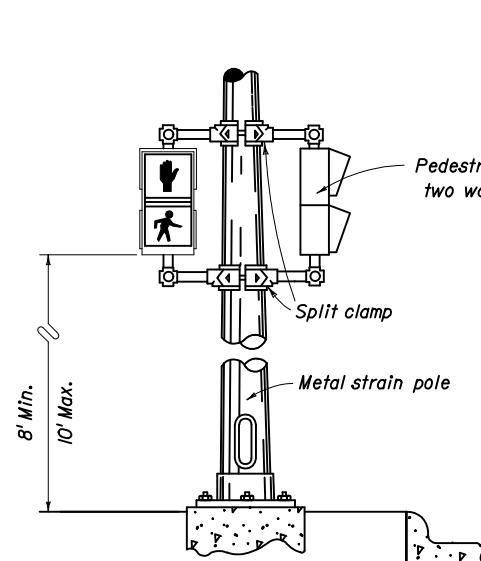
**FIGURE A**



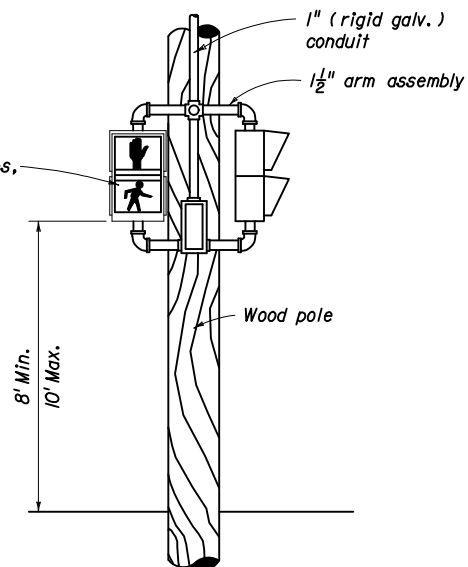
Notes:

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 construction. Grommets or bushings shall be installed in holes.
3. Meet all grounding requirements of Section 620 of the Standard Specifications.

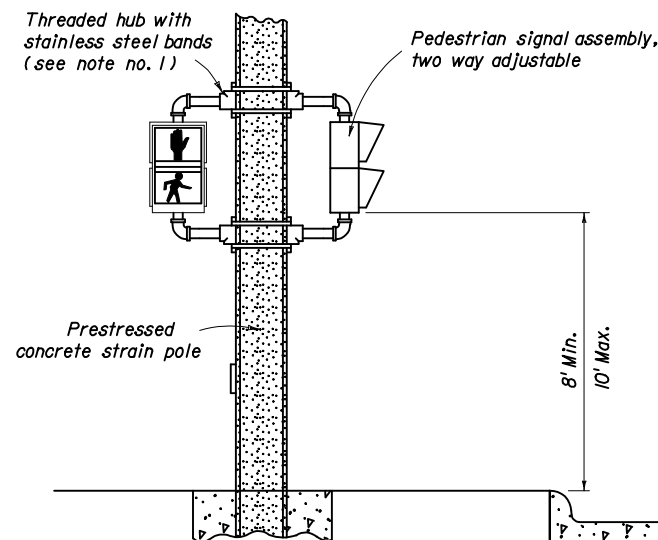
**FIGURE B**



**FIGURE C**



**FIGURE D**



**FIGURE E**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
**PEDESTRIAN CONTROL SIGNAL  
 INSTALLATION DETAILS**

Names	Dates	Approved By		
Designed By	9-80	<i>Charles A. Scott</i>	State Traffic Standards Engineer	
Drawn By		Revision	Sheet No.	Index No.
Checked By		02	1 of 1	17764

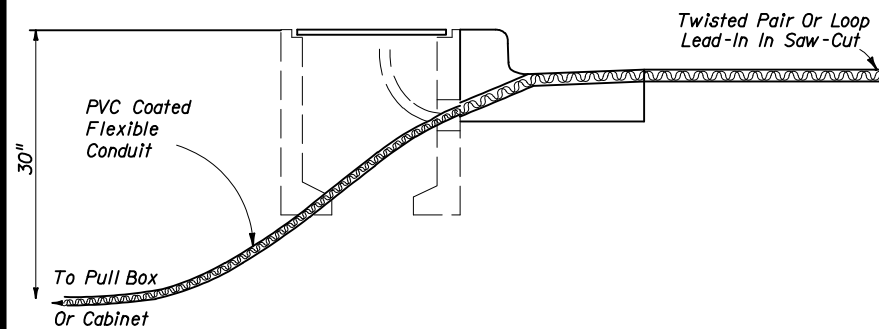
## GENERAL NOTES

1. If the loop lead-in is 75' or less from the edge of the loop 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.
2. The width of all saw cuts shall be sufficient to allow unforced placement of loop wires or lead-in cables into the saw cut. The depth of all saw cuts, except across expansion joints, shall be 3" standard with a maximum of 4".
3. On resurfacing or new roadway construction projects, the loop wires and lead-in cables may be installed in the asphalt structural course prior to the placement of the final asphalt wearing course. The loop wires and lead-in cables shall be placed in a saw cut in the structural course. The depth of the cables below the top of the final surface shall comply with note 2.
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 12" intervals around loops and 24" intervals on lead-ins.
5. The minimum distance between the twisted pairs of loop lead-in wire is 6" from the loop to 12" from the pavement edge or curb.
6. Splice connections in pull boxes with U.L. listed, watertight, insulated enclosures. Place one enclosure over the end of each conductor and place a third enclosure over the exposed end of the shielded cable.
7. As an alternate, a larger diameter enclosure that will accommodate both the splices of the conductors and the exposed end of the shielded cable may be used.
8. The maximum area of asphalt to be disturbed shall be 6"x 6". This area shall be restored as directed by the Engineer.

## TWISTED PAIR AND LOOP LEAD-IN INSTALLATION WITH CURB & GUTTER

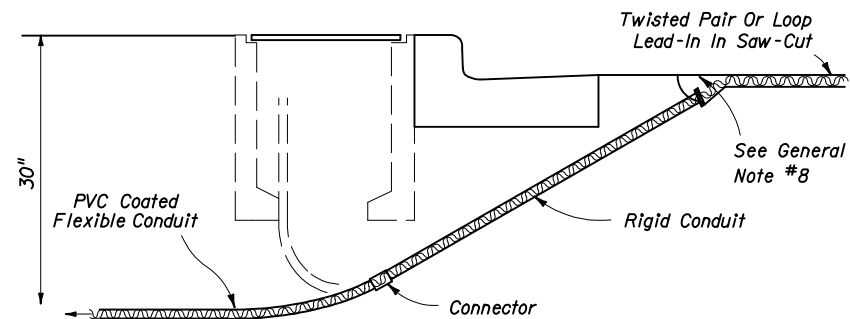
### ALTERNATIVE 1

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

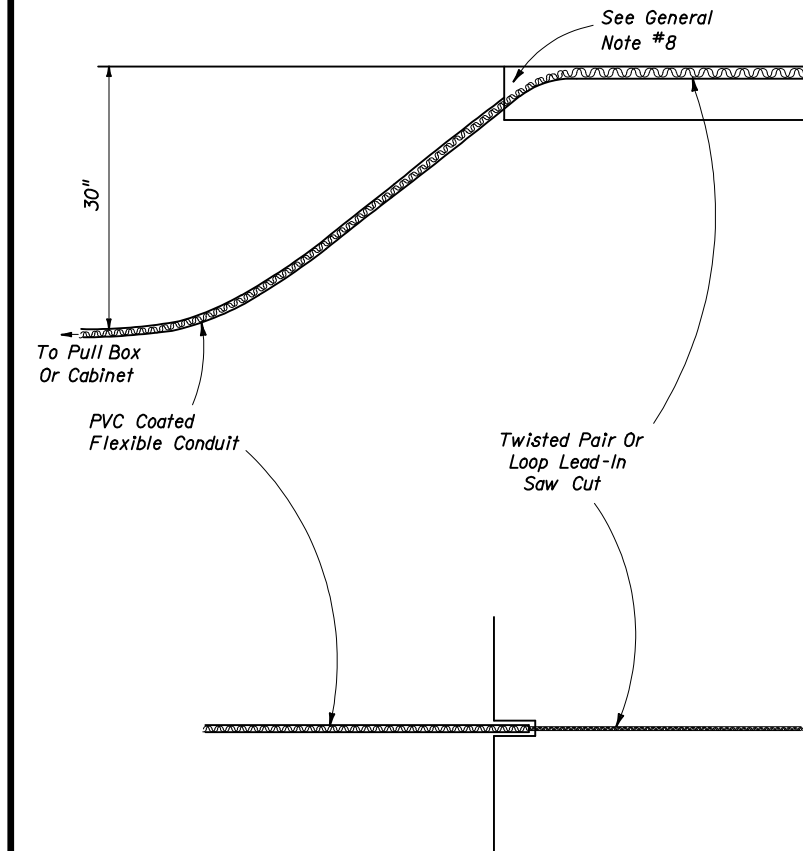
Drill A Hole  $\frac{1}{2}$ " To 1" Larger In Diameter Than The Rigid Conduit To Be Used Through The Roadway Asphalt (Or Concrete) Surface And Base At An Appropriate Angle To Intercept The Trench Or Pull Box Hole. Place A Predetermined Length Of Rigid Conduit In The Hole And Drive The Conduit Into The 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  $\approx$  2" Below The Top Of The Roadway Surface. The Departure Angle Of The Conduit From The Roadway Shall Be 30° To 45°.



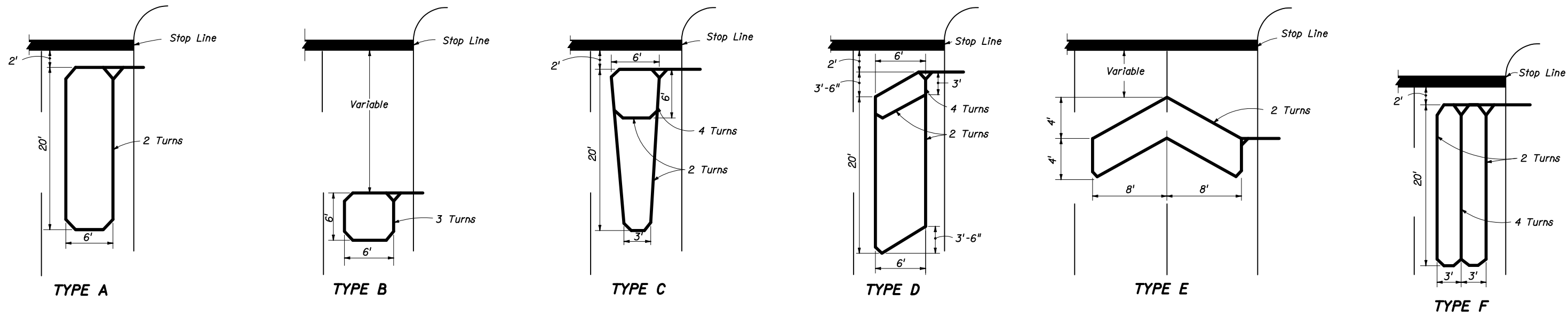
Note  
Other alternatives may be approved by the State Traffic Operations Engineer.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

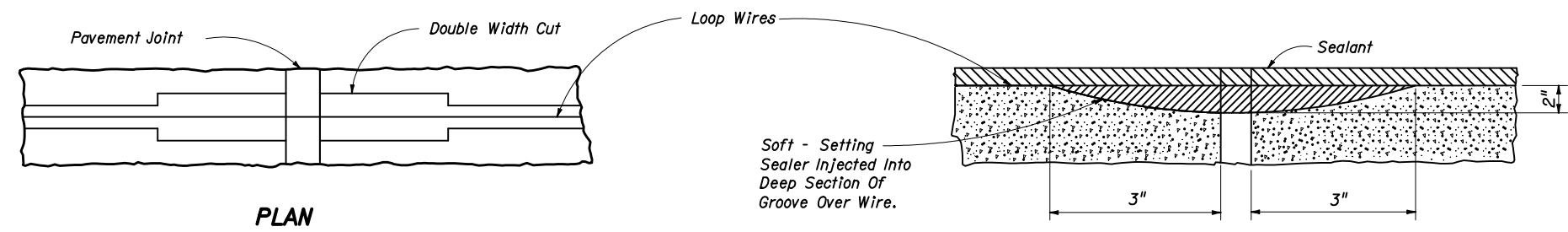
## VEHICLE LOOP INSTALLATION DETAILS

Names	Dates	Approved By		
Designed By		 State Traffic Standards Engineer		
Drawn By				
Checked By		Revision	Sheet No.	Index No.
		02	1 of 2	17781



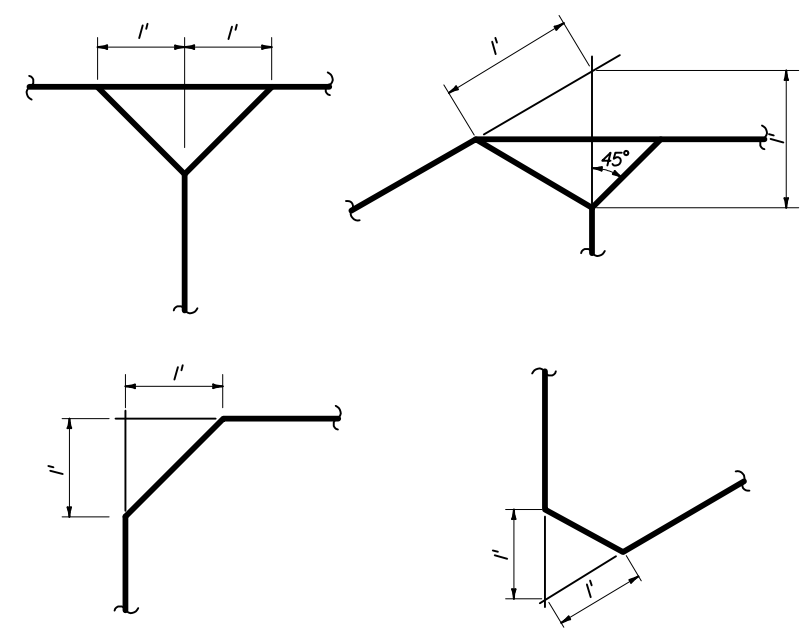
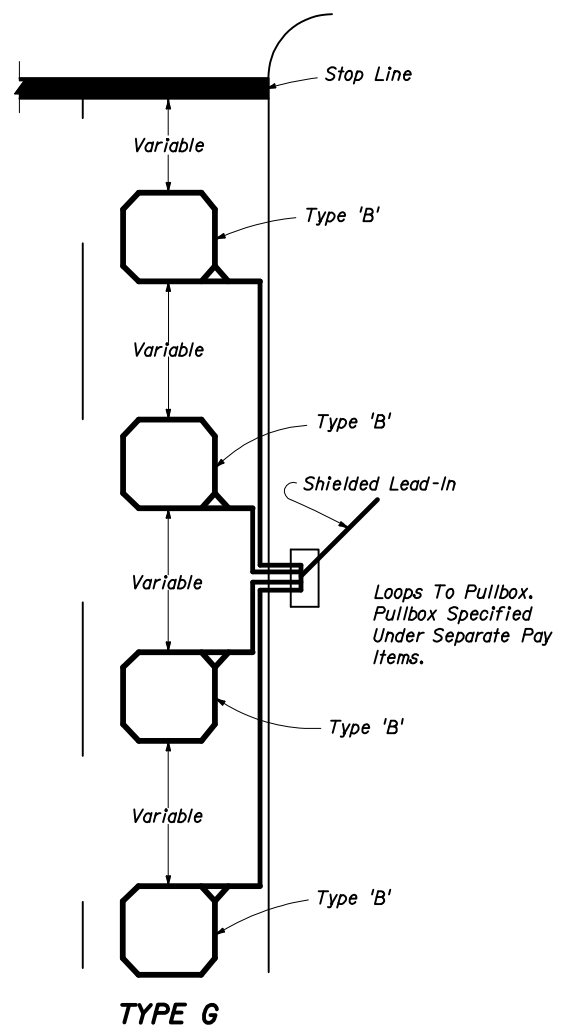


Note: Loop conductors must follow saw-cut to bottom forming slack section at joint.



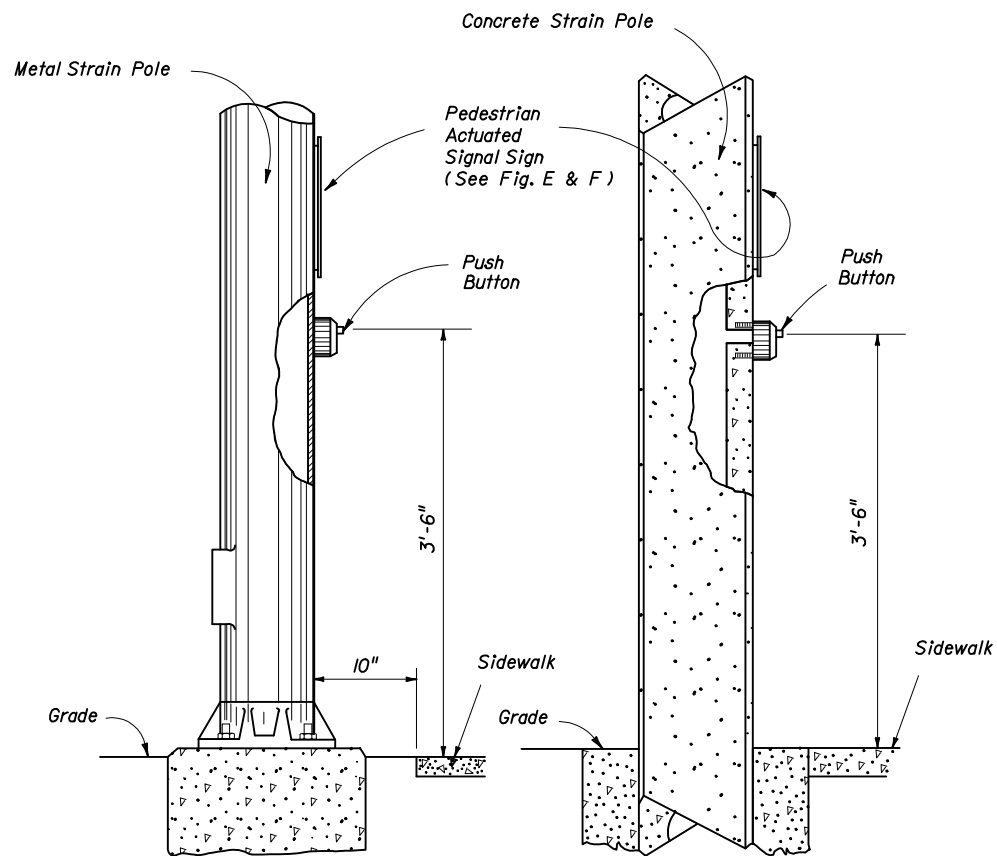
**CONCRETE PAVEMENT EXPANSION JOINTS**

- 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 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 on two lanes.
  4. The number of individual loops in the Type G loop may vary up to a maximum of four (4).
  5. Lead-in may be connected to either end of loop.
  6. The leading edge of loop Types A,C,D,& F may extend past the stop line a maximum of 10'. The length of these loops may be extended to a maximum of 60'. Each intersection should be individually designed and if the modifications noted above is required it must be noted or detailed in the plans.
  7. Loop lead-in wires should not be installed in the same pull box with signal power cable.

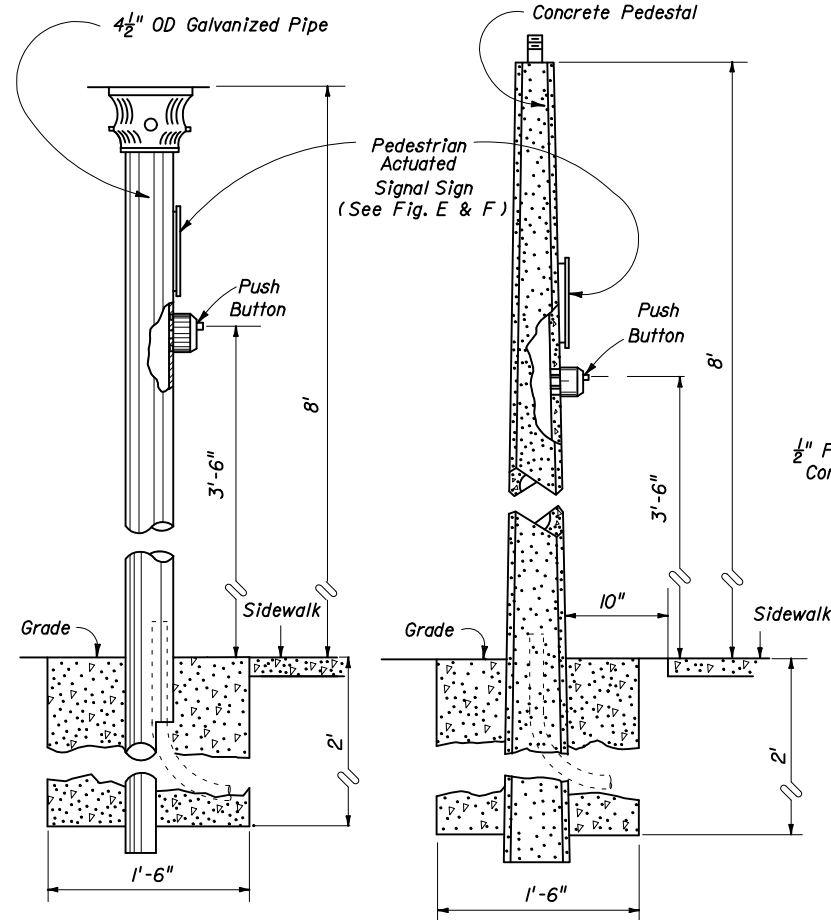


**LOOP CORNER AND LEAD-IN DETAILS**

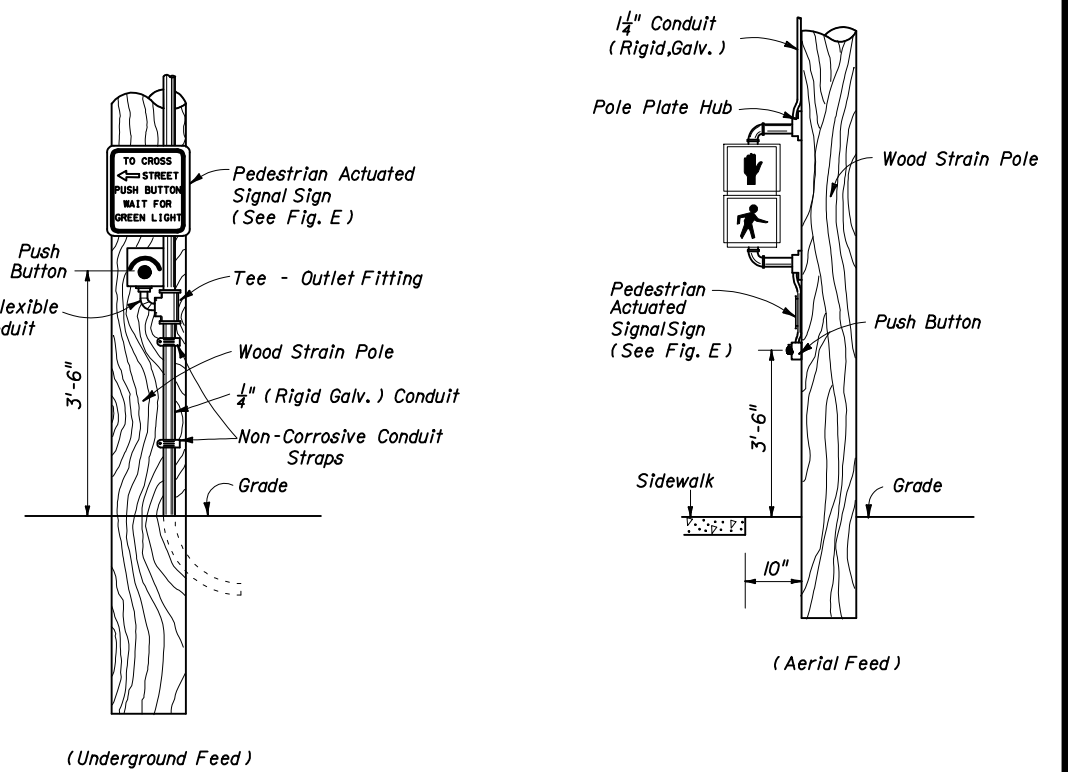
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>VEHICLE LOOP INSTALLATION DETAILS</b>				
Names	Dates	Approved By <i>Charles A. Scott</i>		
Designed By		State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By		00	2 of 2	17781



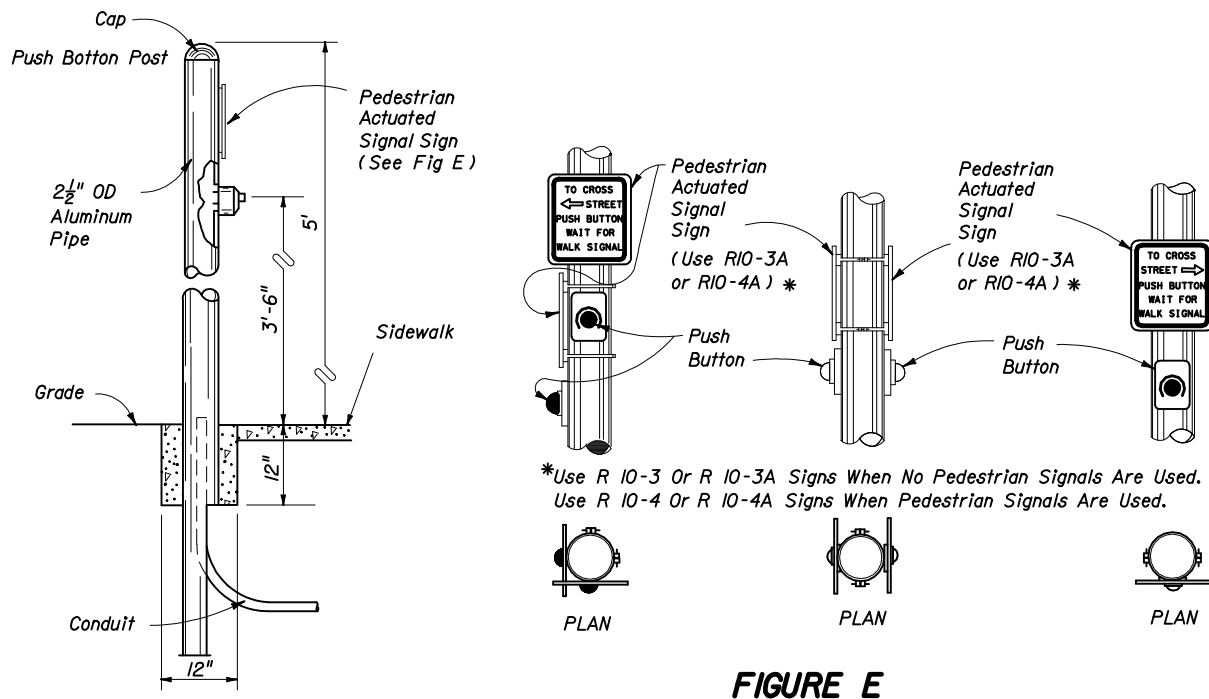
**FIGURE A**  
POLE MOUNTED  
DETECTOR STATION



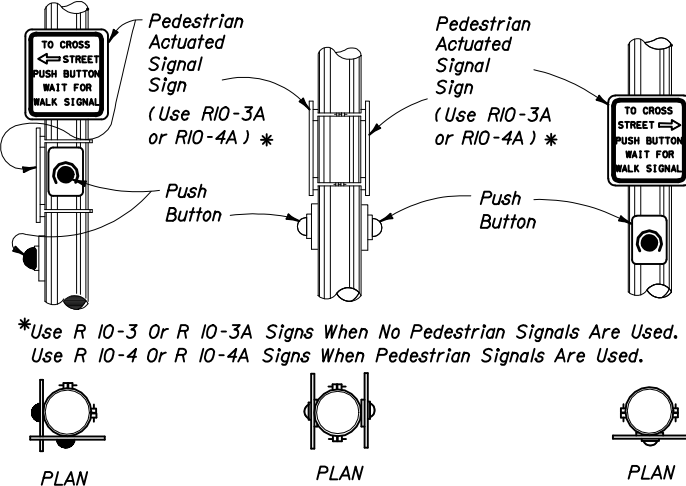
**FIGURE B**  
PEDESTAL STATION  
DETECTOR STATION



**FIGURE C**  
WOOD POLE MOUNTED  
DETECTOR STATION

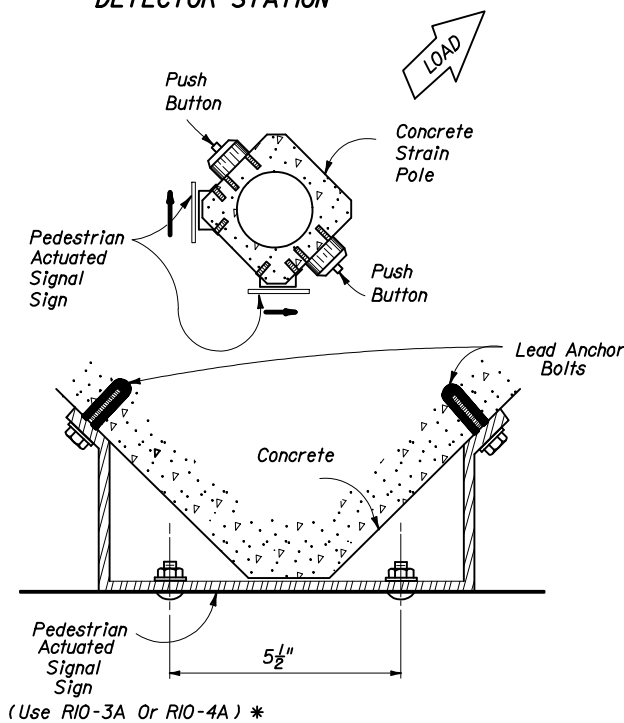


**FIGURE D**  
POST DETECTOR STATION  
DETECTOR STATION



**FIGURE E**

\*Use R 10-3 Or R 10-3A Signs When No Pedestrian Signals Are Used.  
Use R 10-4 Or R 10-4A Signs When Pedestrian Signals Are Used.

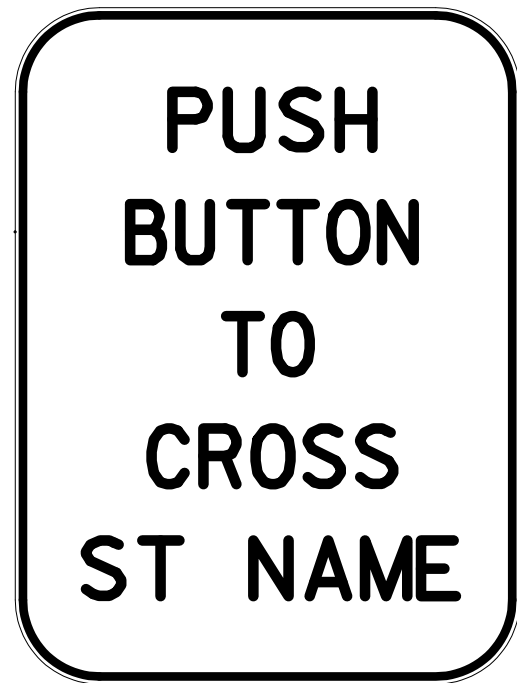


**FIGURE F**

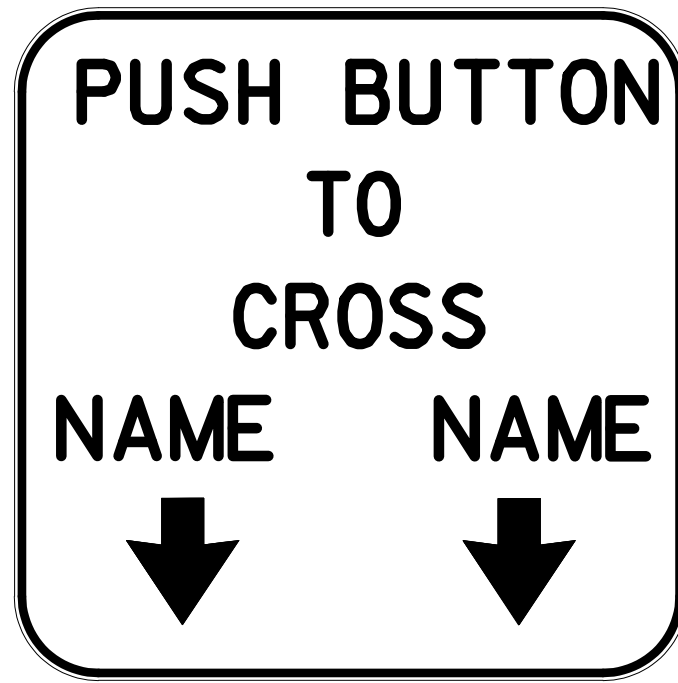
**Notes:**

- 1 Signs (R10-3A & R10-4A) shall be mounted above detectors, explaining their purpose and use.
- 2 The positioning of pedestrian push button should clearly indicate which cross-walk signal is actuated by each push button.
- 3 Push buttons and signs are to be mounted in accordance with Standard Specifications, section 665.
- 4 Meet all grounding requirements of Section 620 of the Standard Specifications.

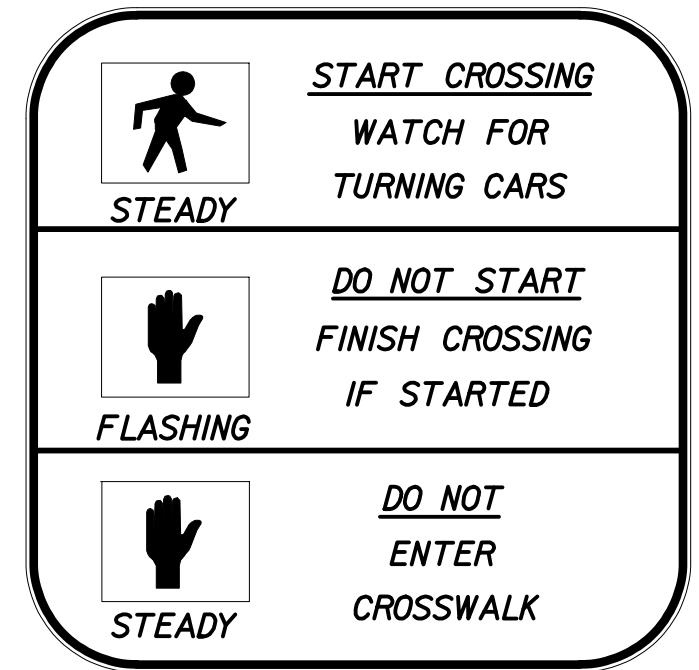
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
PEDESTRIAN DETECTOR ASSEMBLY INSTALLATION DETAILS				
Names	Dates	Approved By		
Designed By		 State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
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FTP-47



FTP-48



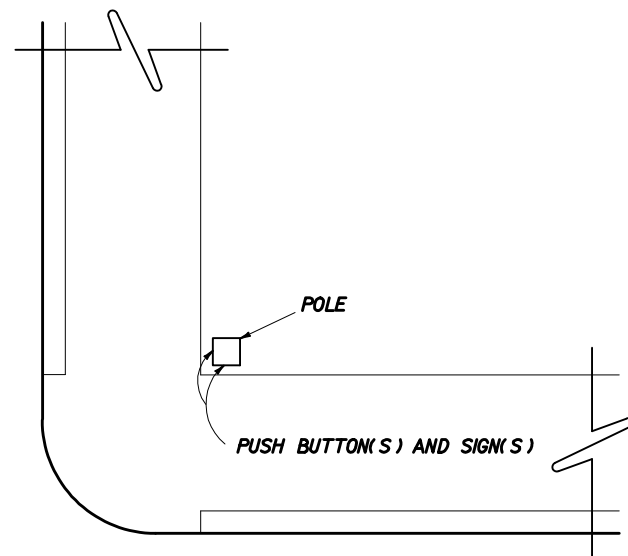
FTP-49

SIGN COLORS WHITE BACKGROUND WITH BLACK LEGEND AND BORDER

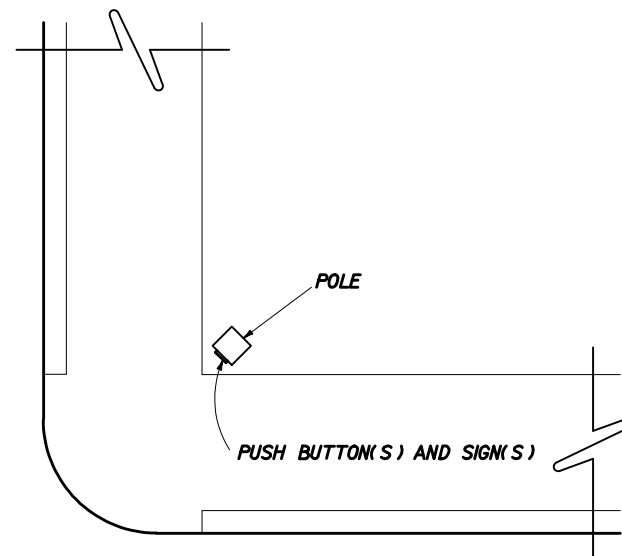
INTERNATIONAL WALK SYMBOL  WHITE ON BLACK BACKGROUND.

INTERNATIONAL DONT WALK SYMBOL  ORANGE ON BLACK BACKGROUND.

Note: 1. See Index 17355 for sign details.

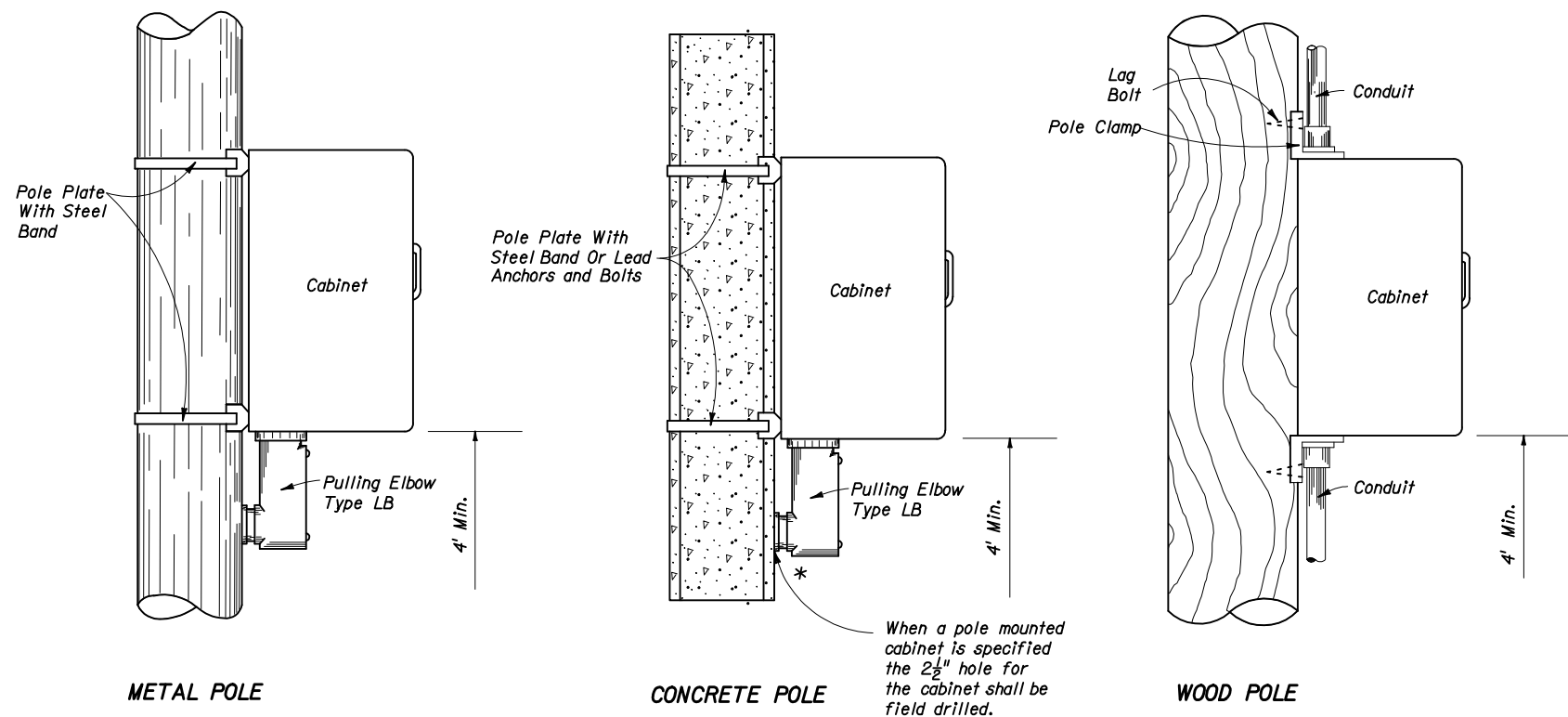


CASE I  
POLE PARALLEL TO CURBLINE  
ALTERNATE TO FIGURE F



CASE II  
POLE DIAGONAL TO CURBLINE

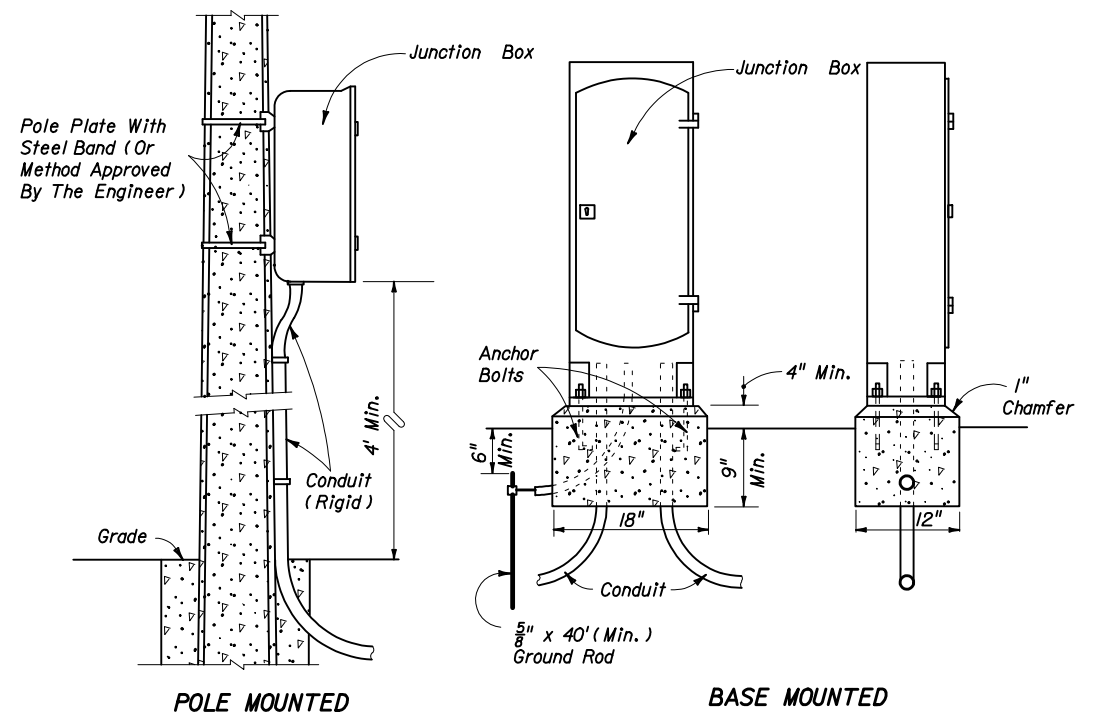
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>PEDESTRIAN DETECTOR ASSEMBLY INSTALLATION DETAILS</b>				
Designed By	Names	Dates	Approved By <i>Clark A. Scott</i>	
Drawn By			State Traffic Standards Engineer	
Checked By	Revision	Sheet No.	Index No.	
	02	2 of 2	17784	



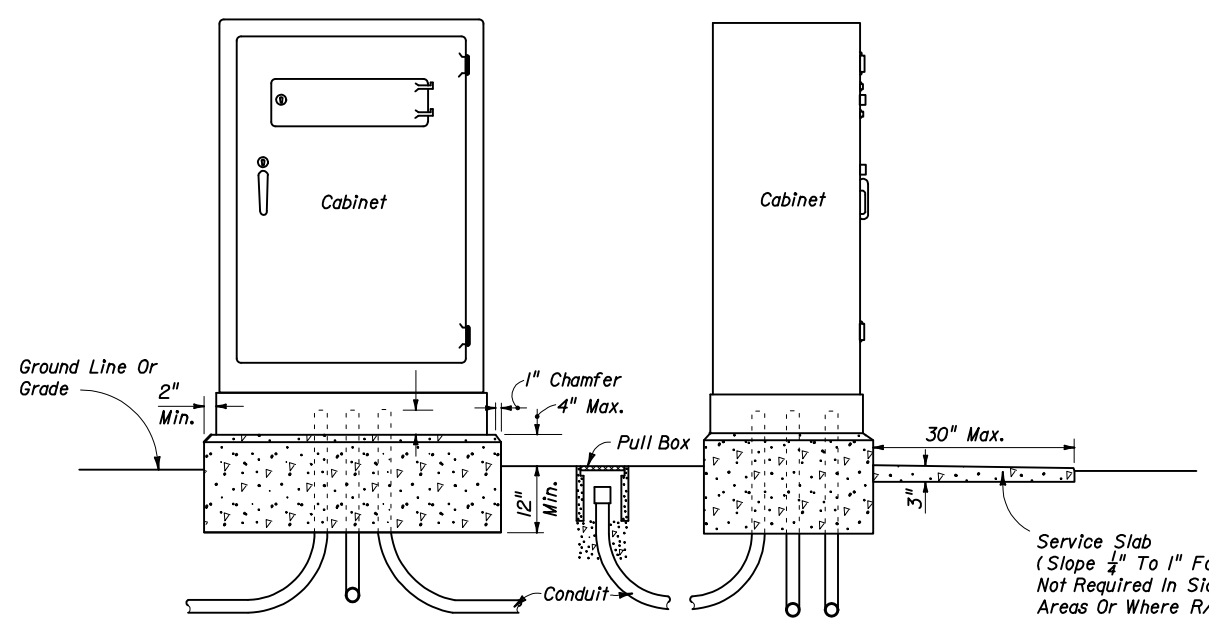
Liquid tight flexible conduit is approved for use from the electrical disconnect to the cabinet when both are installed on the same pole.

**POLE MOUNTED CABINET**

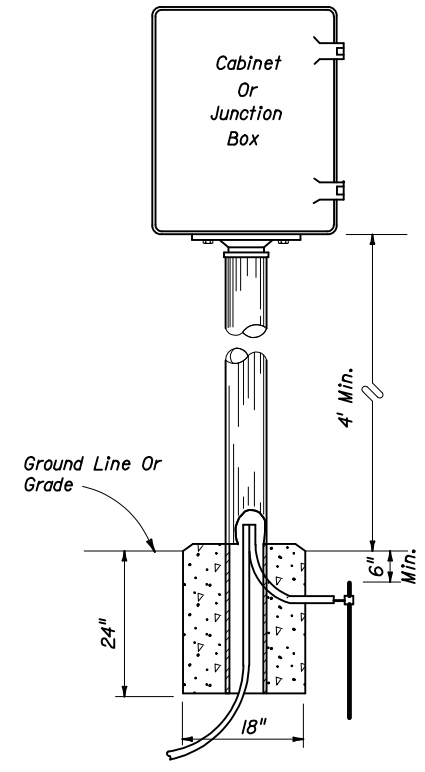
\* If holes for cabinet mounting require relocation, original holes shall be filled in with concrete or covered with a non corrosive cover plate.



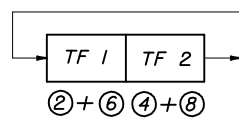
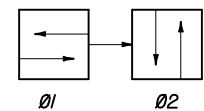
**INTERCONNECT JUNCTION BOX**



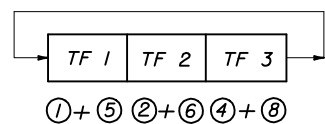
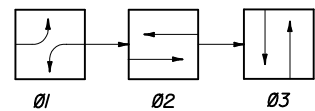
- Notes:
- The number, size and orientation of conduit sweep will vary according to site condition or locations. Two spare 2" PVC conduits shall be provided in all bases. The spares shall exit in the direction of the center rear of the cabinet base, into a pull box and capped with a weather tight fitting. 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 conduits will have to be approved by the project engineer. All spare conduit sweeps shall be capped with a weather proof fitting.
  - Meet all grounding requirements of Section 620 of the Standard Specifications.



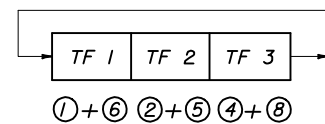
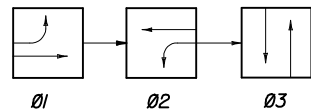
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>CABINET INSTALLATION DETAILS</b>				
Designed By	Names	Dates	Approved By <i>Charles A. Scott</i>	
Drawn By			State Traffic Standards Engineer	
Checked By			Revision	Sheet No. Index No.
			02	1 of 1 17841



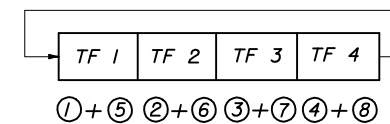
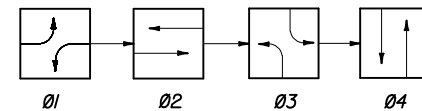
SOP 1



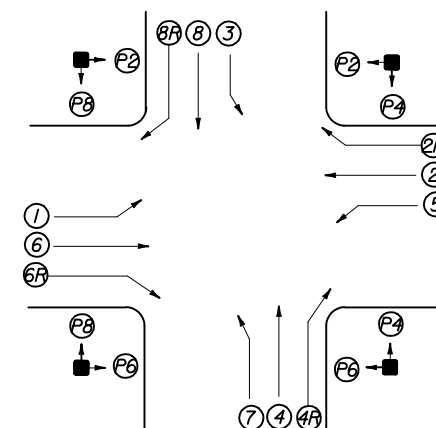
SOP 2



SOP 3



SOP 4

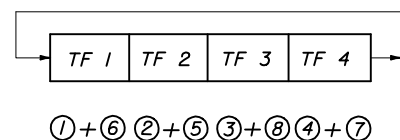
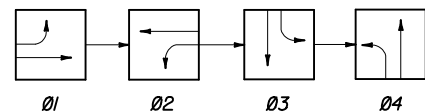


**SIGNALIZED INTERSECTION**

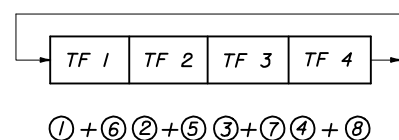
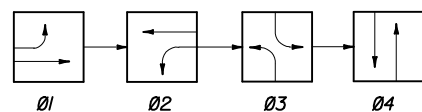
Vehicle movements & signal head number assignments are not directionally oriented but shall maintain their relative orientation about the intersection (I.E. movements 7 and 4 are always to the right of movements 1 and 6 etc.)

**LEGEND**

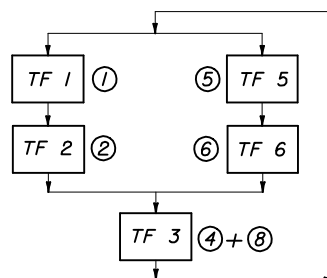
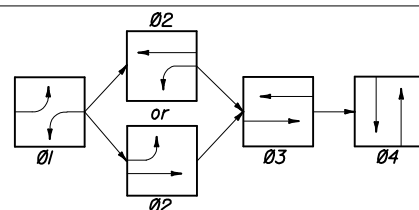
- (X) Vehicle Movement Number
- (P) Pedestrian Movement Number
- TF Timing Function Number
- 0X Phase Number
- ↔ Green Arrow (Left or Right)
- ↔ Red Arrow
- ↔ Yellow Arrow



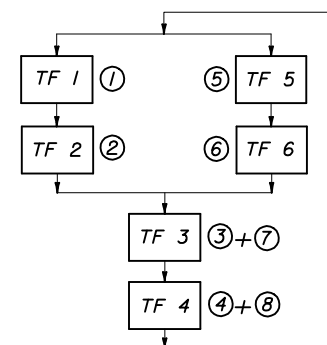
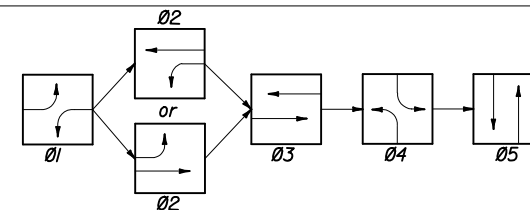
SOP 5



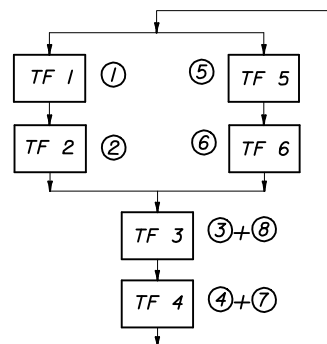
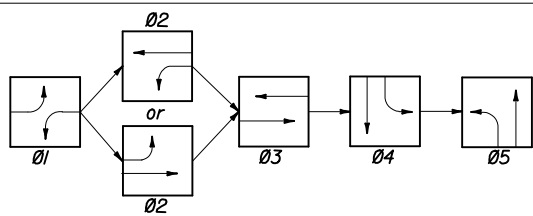
SOP 6



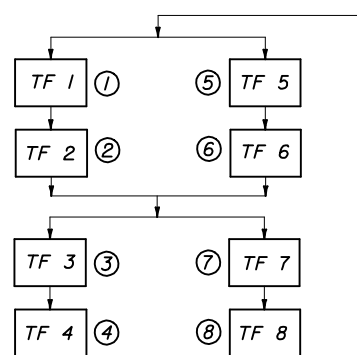
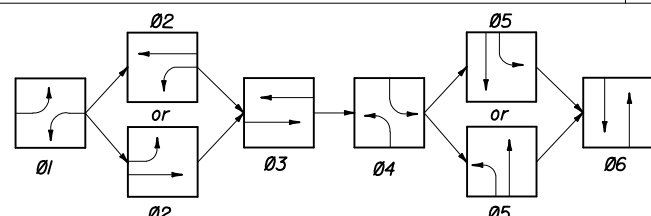
SOP 7



SOP 8



SOP 9



SOP 10

**SIGNAL CLEARANCE TABLE**  
(Blank Indicates No Clearance Required)

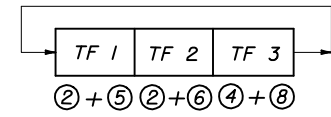
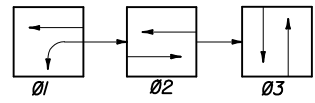
From \ To		SIGNAL INDICATIONS							
		R	R	G	G	G*	G	WALK	DONT WALK
S I G N A L  I N D I C A T I O N S	R			Y	Y	Y	Y		
	R			Y	Y	Y	Y		
	G				Y	Y			
	G								
	G*								
	G								
	WALK								
	DONT WALK								Flash DONT WALK

\* Clearance Indication When Yellow Arrow Is Used.

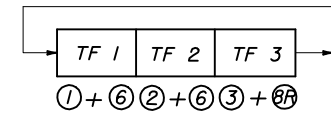
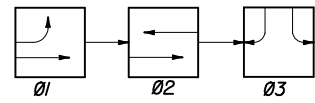
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STANDARD SIGNAL OPERATING PLANS**

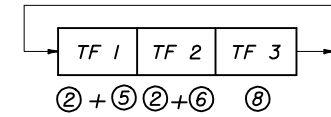
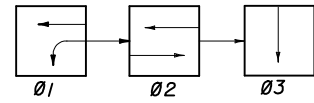
Names	Dates	Approved By
Designed By	4-79	<i>Charles Scott</i>
Drawn By		State Traffic Standards Engineer
Checked By		Revision Sheet No. Index No.
		00 1 of 2 17870



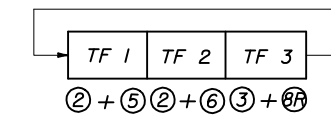
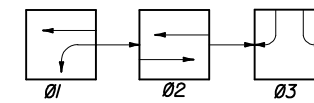
SOP 11



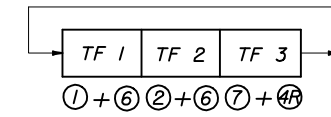
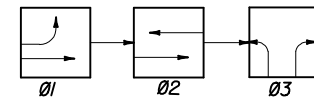
SOP 12



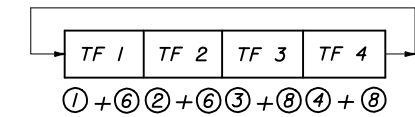
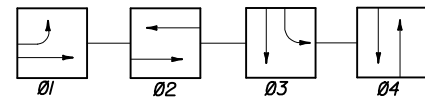
SOP 13  
(ONE-WAY STREET INTERSECTION)



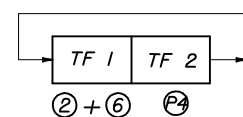
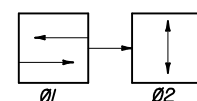
SOP 14  
(DIAMOND INTERCHANGE OPERATION)



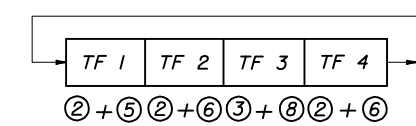
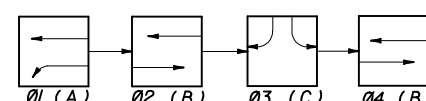
SOP 15  
(DIAMOND INTERCHANGE OPERATION)



SOP 16

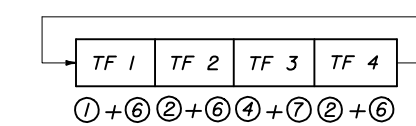
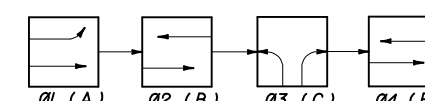


SOP 17  
(MID-BLOCK)



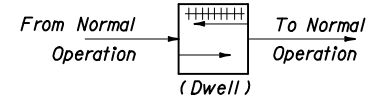
NOTE:  
Only Ø2 Or Ø4 Used, Not Both To Obtain  
ABC, Or ACB Operation.

SOP 18  
(DIAMOND INTERCHANGE OPERATIONS)

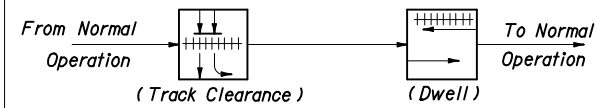


NOTE:  
Only Ø2 Or Ø4 Used, Not Both To Obtain  
ABC, Or ACB Operation.

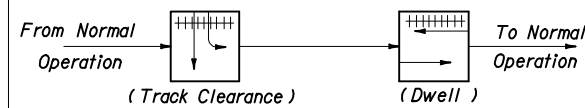
SOP 19  
(DIAMOND INTERCHANGE OPERATIONS)



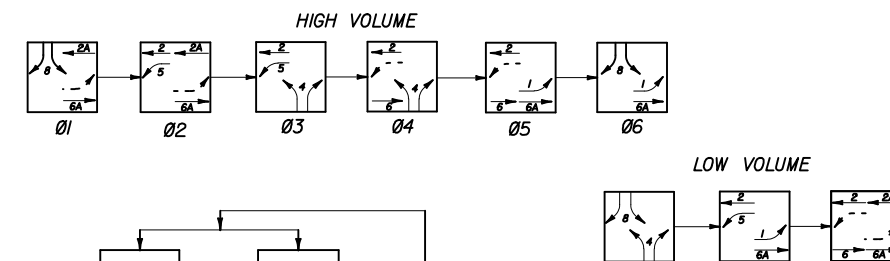
POP 1



POP 2



POP 3

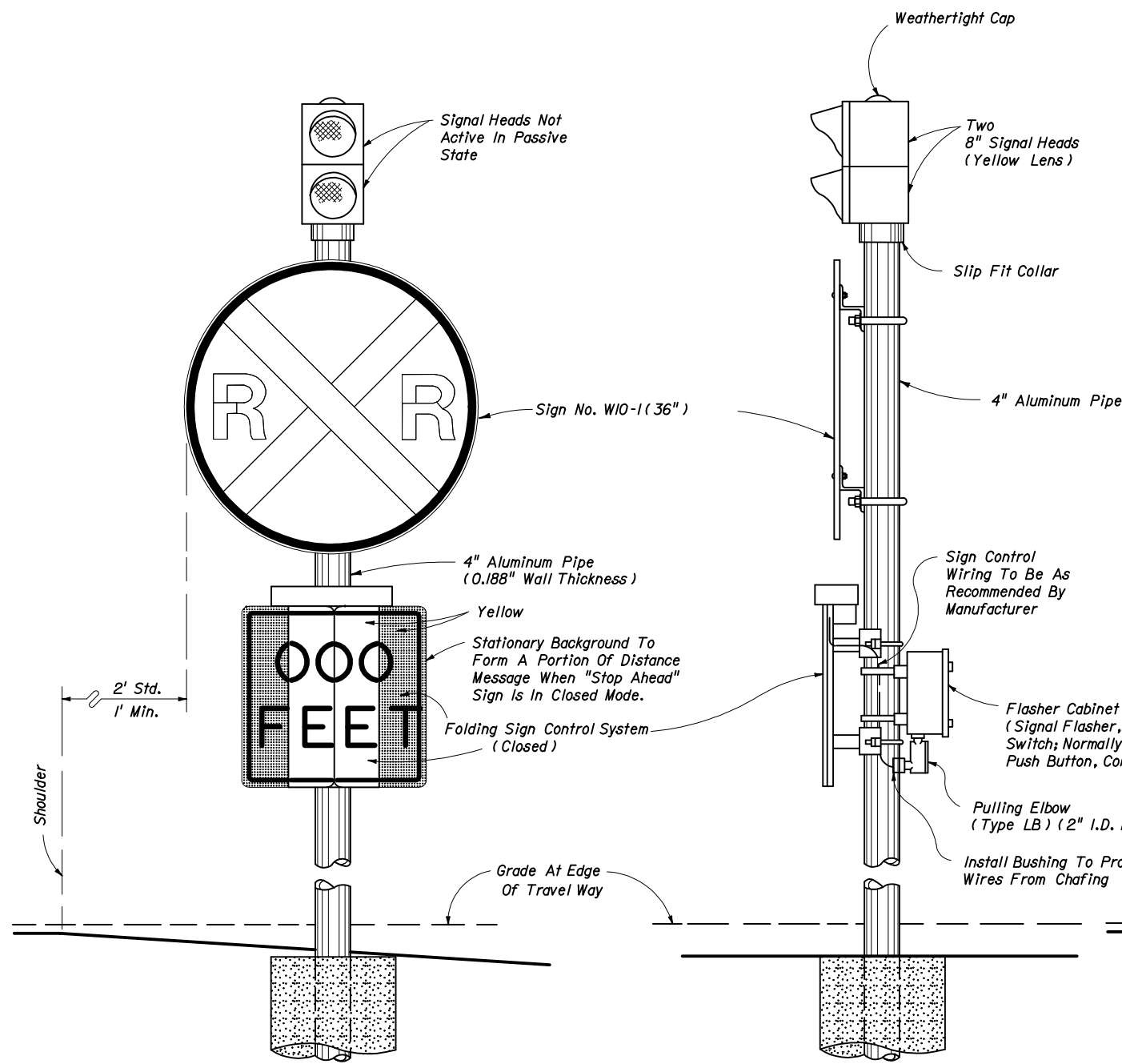


SOP 20  
(DIAMOND INTERCHANGE OPERATIONS)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**STANDARD SIGNAL  
OPERATING PLANS**

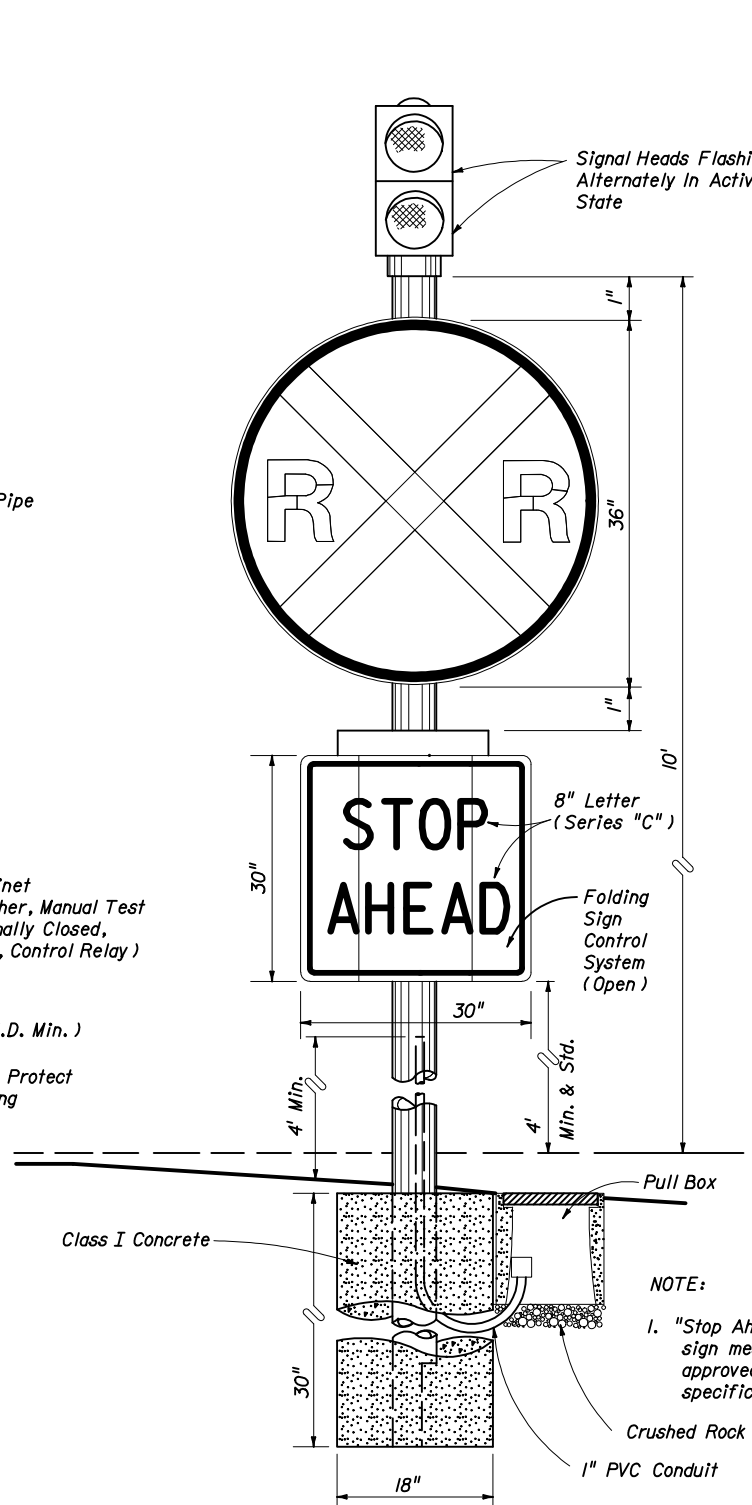
Names	Dates	Approved By	
Designed By	9-79	Charles A. Scott	
Drawn By		Revision	Sheet No.
Checked By		00	2 of 2
			Index No.
			17870



**FRONT VIEW**

**SIDE VIEW**

**PASSIVE STATE**  
(TRAIN CIRCUIT NOT ACTUATED)



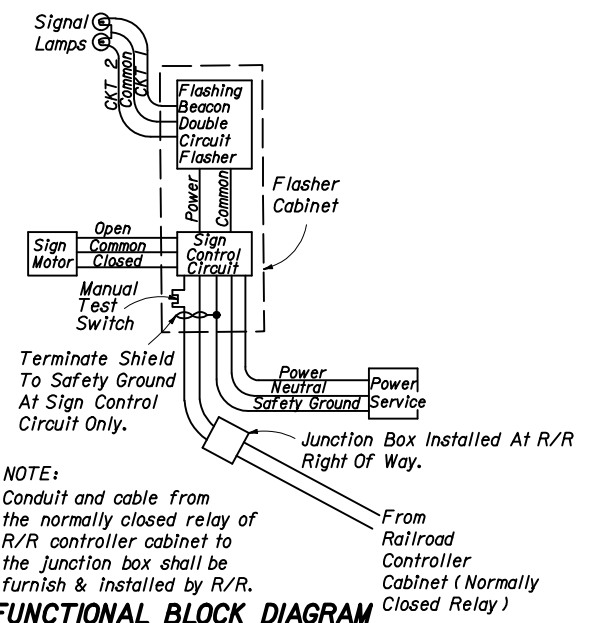
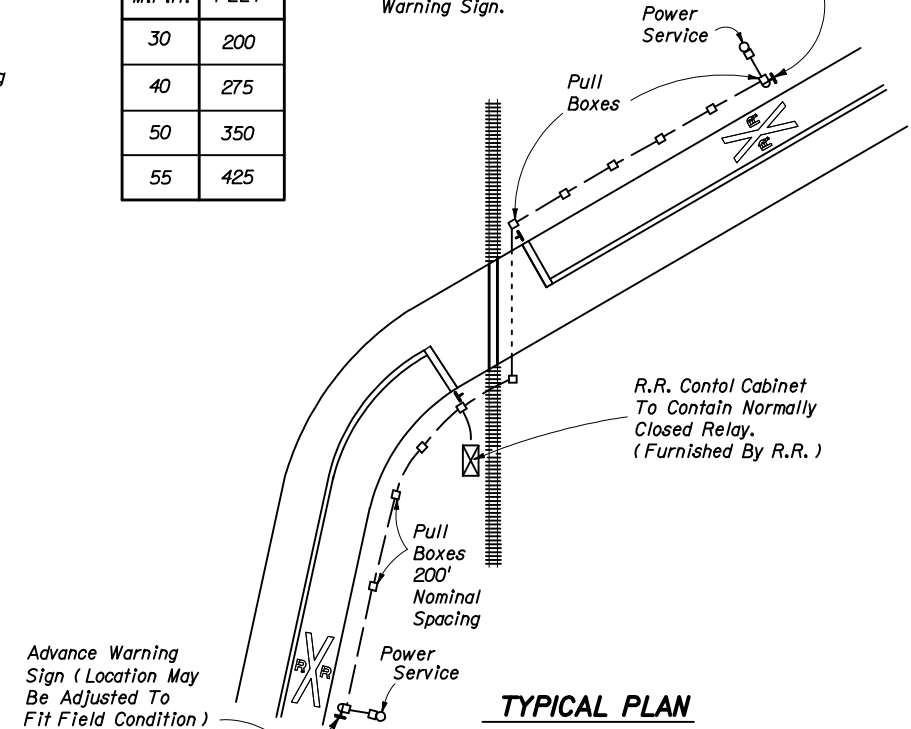
**FRONT VIEW**

**ACTIVE STATE**  
(TRAIN CIRCUIT ACTUATED)

**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.

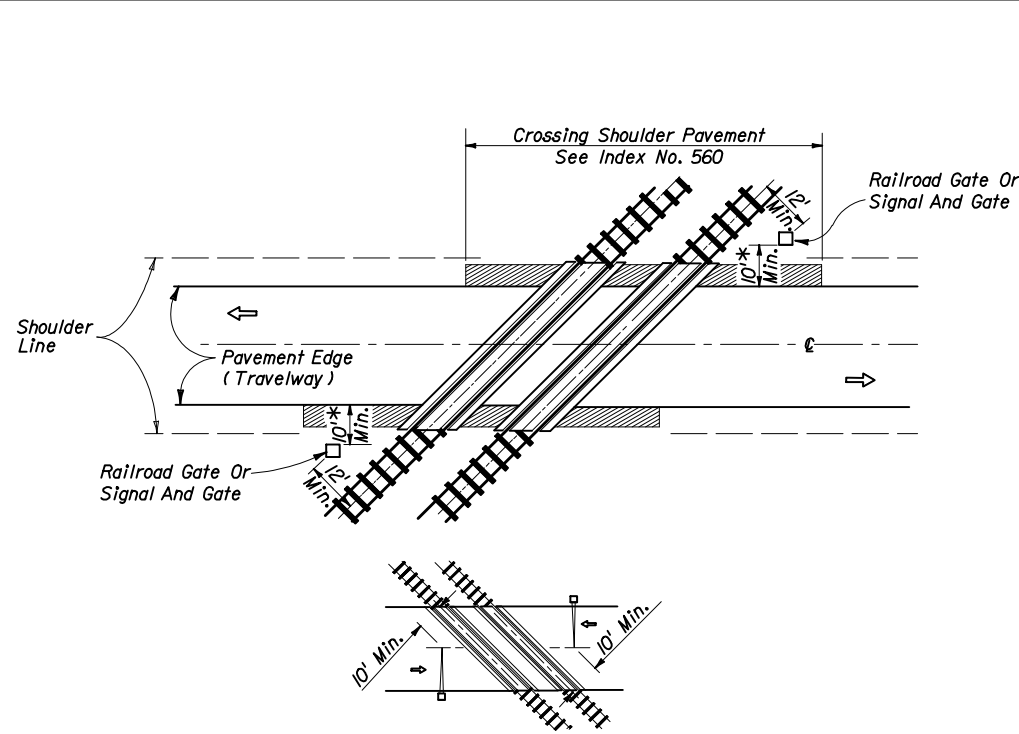


**NOTE:**  
Conduit and cable from the normally closed relay of R/R controller cabinet to the junction box shall be furnished & installed by R/R.

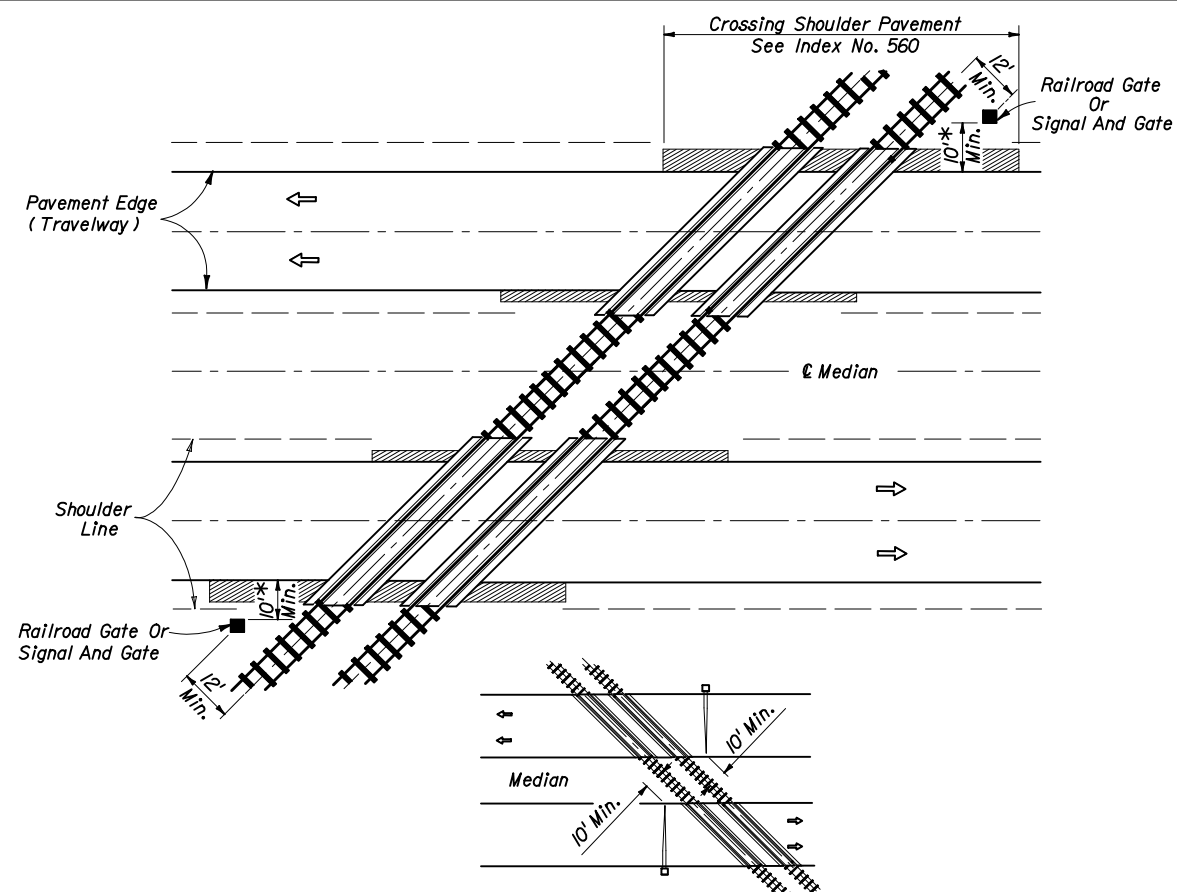
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**ADVANCE WARNING FOR R.R. CROSSING**

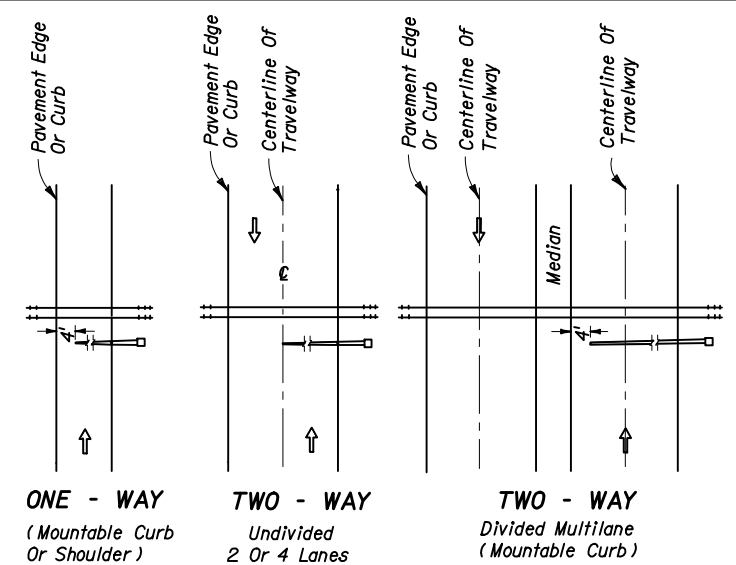
Names	Dates	Approved By		
Designed By	12-75	 State Traffic Standards Engineer		
Drawn By				
Checked By	12-75	Revision	Sheet No.	Index No.
		00	1 of 1	17881



**SIGNAL PLACEMENT AT RAILROAD CROSSING  
(2 - LANE DESIGN)**

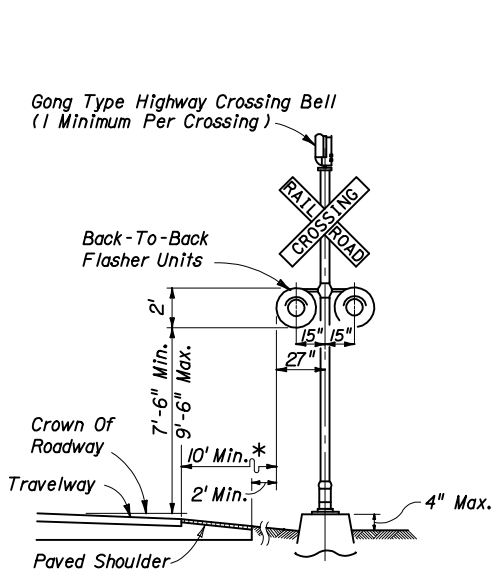


**SIGNAL PLACEMENT AT RAILROAD CROSSING  
(4 - LANE DESIGN)**

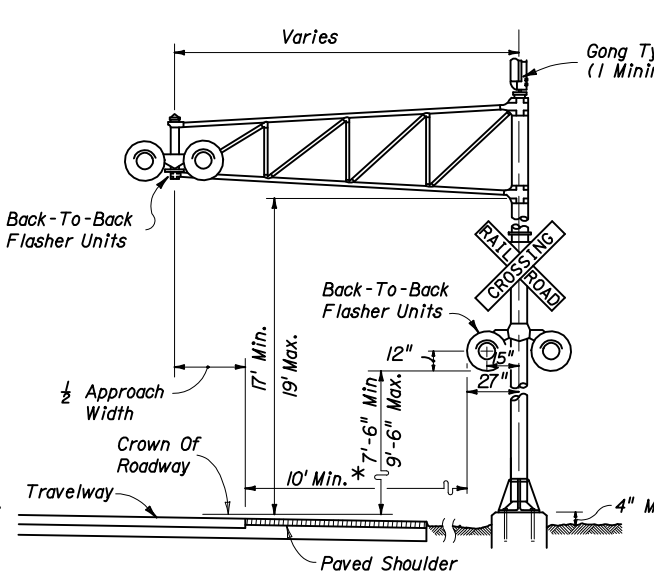


Note :  
Arrows denote direction of travel not lane indication

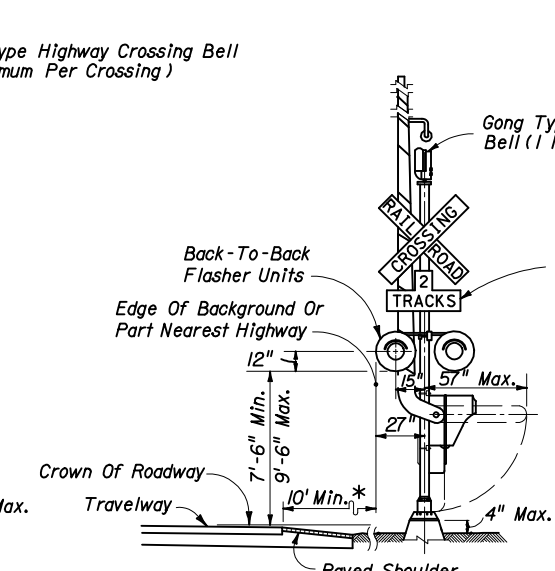
**FIGURE 1**  
**Gate Length Requirements**  
See Note 6 Sheet 3



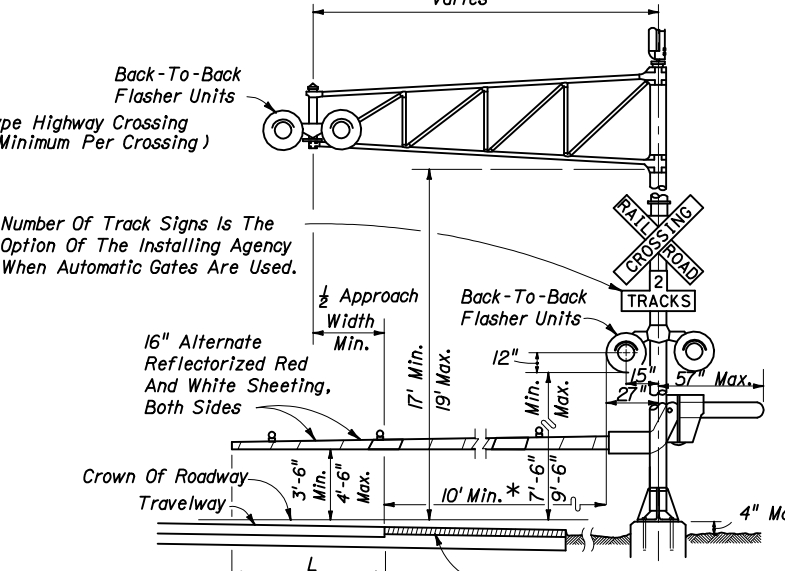
**TYPE I**



**TYPE II**



**TYPE III**



**TYPE IV**

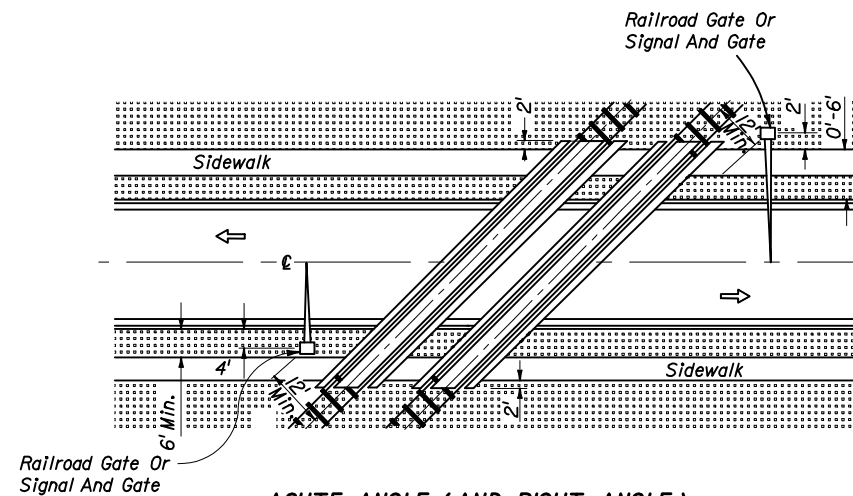
\* When 10' is deemed impracticable the control device can be located as close as 2' from the edge of a paved shoulder but not less than 6' from the edge of the near traffic lane.

Note :  
Two separate foundations may be required (one for signals, one for gate), depending on type of equipment used.

- 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 higher than 4" above finished shoulder grade.
  - Type of traffic control device
    - Flashing signals
    - Flashing signals with cantilever
    - Flashing signals with gate
    - Flashing signals with cantilever & gate
    - Gate
  - Class of traffic control devices
    - Flashing signals - one track
    - Flashing signals - multiple tracks
    - Flashing signals and gates - one track
    - Flashing signals and gates - multiple tracks

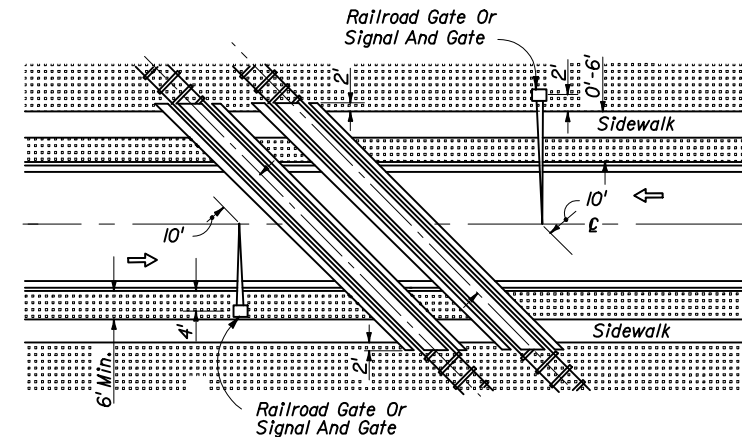
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES</b>				
Names	Dates	Approved By		
Designed By	4-76	<i>Charles Scott</i> State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
Checked By	4-76	00	1 of 4	17882





ACUTE ANGLE (AND RIGHT ANGLE)

**SIGNAL PLACEMENT AT RAILROAD CROSSING  
(2 LANES, CURB & GUTTER)**

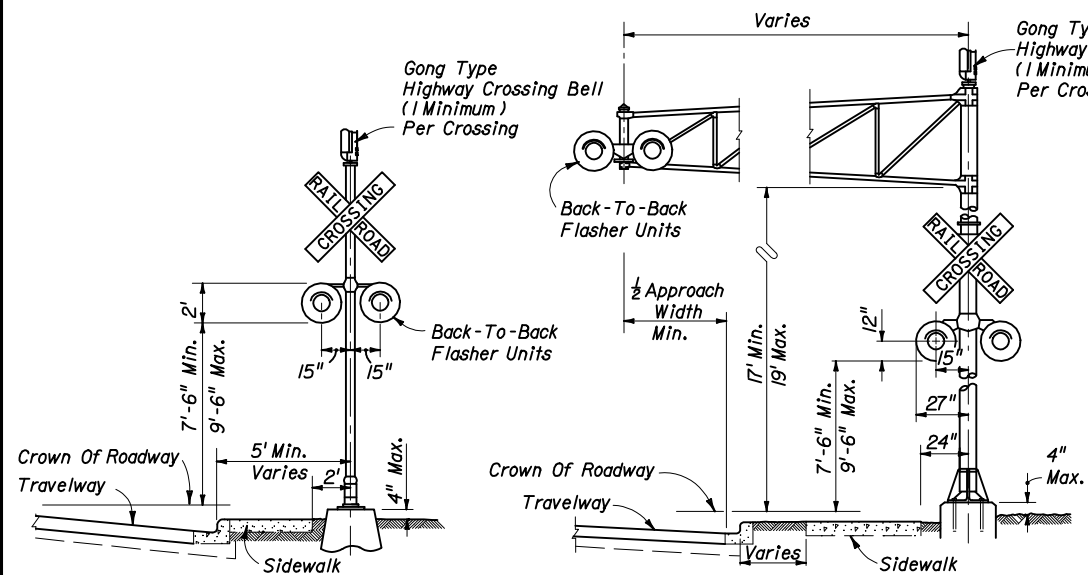


OBTUSE ANGLE

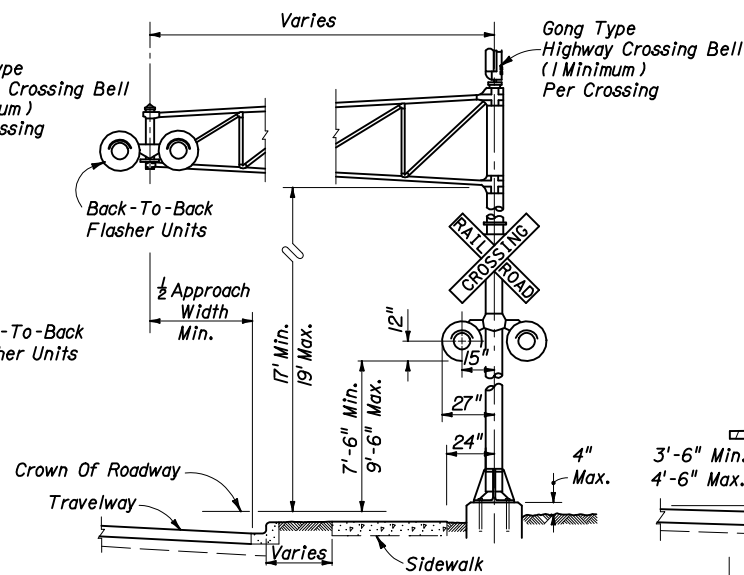
**SIGNAL PLACEMENT AT RAILROAD CROSSING  
(2 LANES, CURB & GUTTER)**

**GENERAL NOTES**

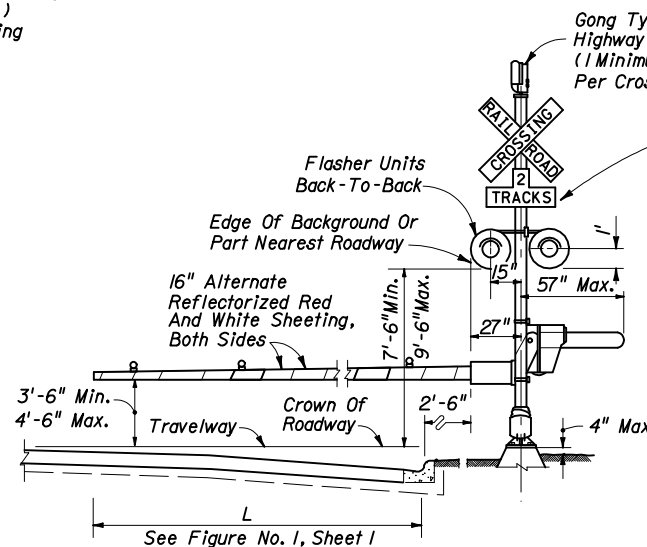
1. The location of flashing signals and stop lines shall be established based on future (or present) installation of gate with appropriate track clearances.
2. Where plans call for railroad traffic control devices to be installed in curbed medians, the minimum median width shall be 12'-6".
3. Location 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.
4. Stop line to be perpendicular to edge of roadway, approx. 15' from nearest rail; or 8' from and parallel to gate when present.



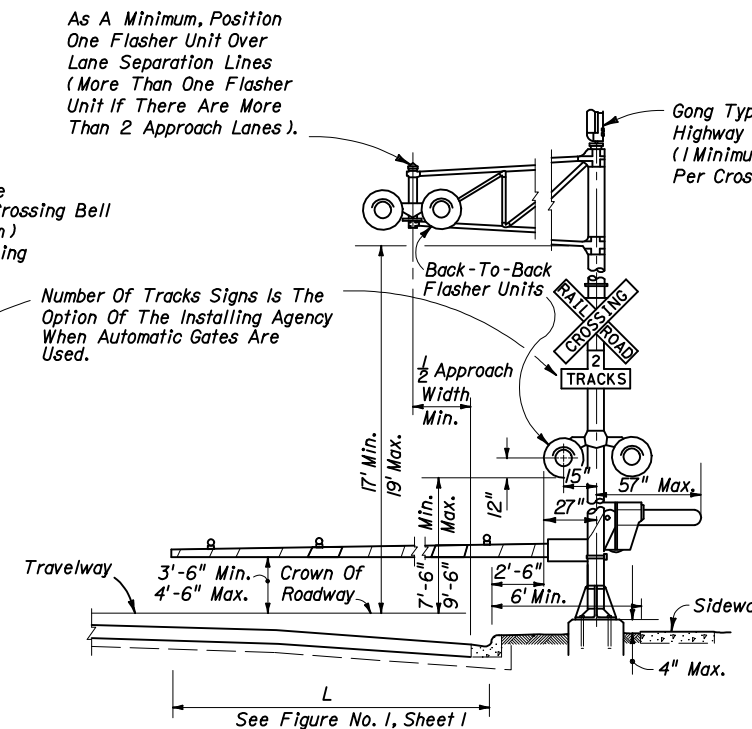
**TYPE I**



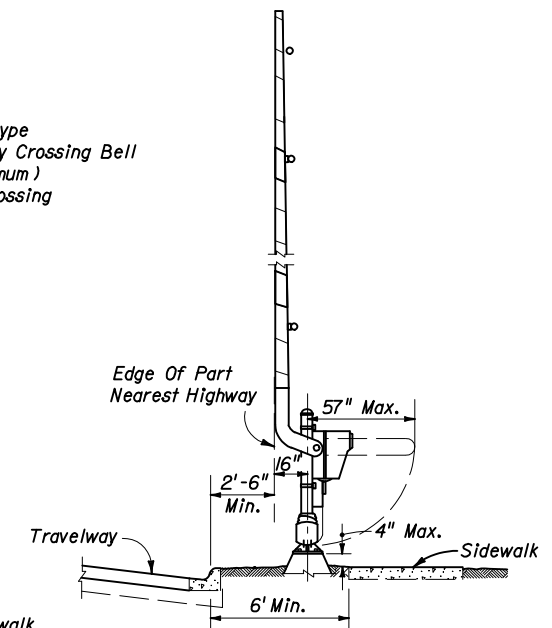
**TYPE II**



**TYPE III**



**TYPE IV**



**TYPE V**

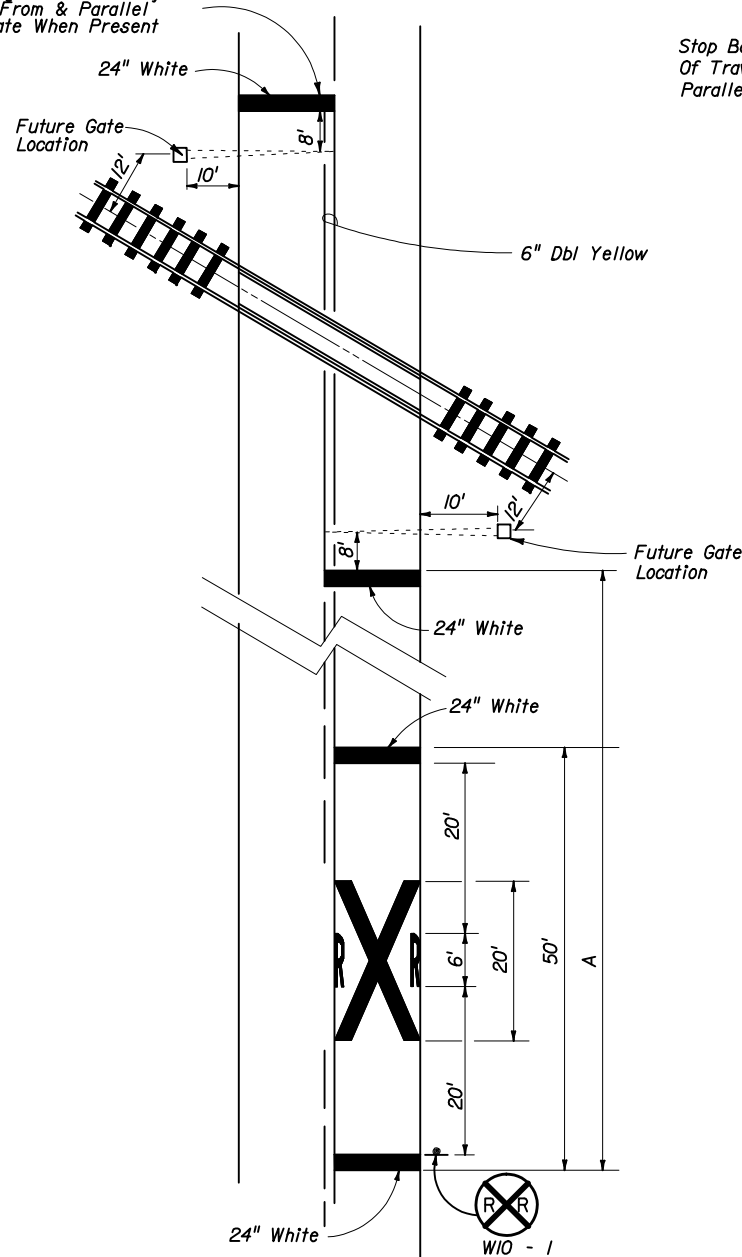
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**RAILROAD GRADE CROSSING  
TRAFFIC CONTROL DEVICES**

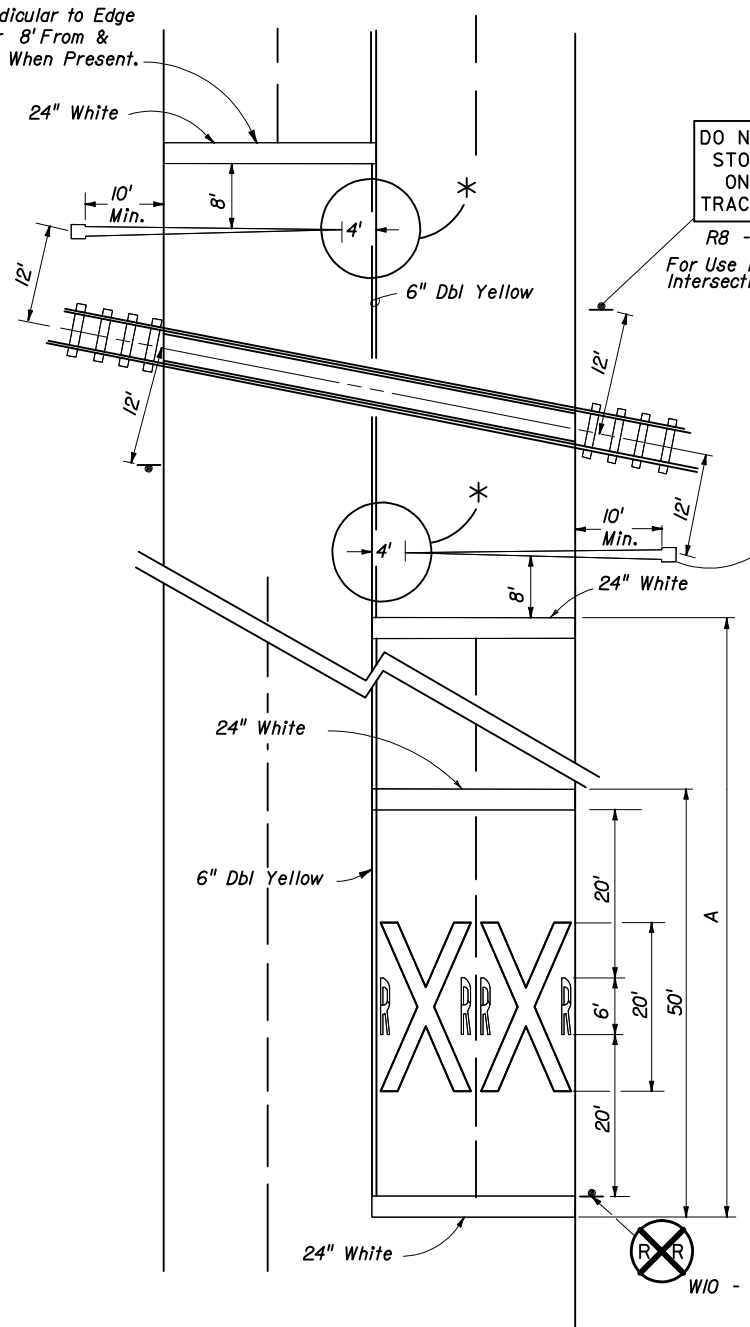
Names	Dates	Approved By		
Designed By	4-76	Charles A. Scott		
Drawn By		Revision	Sheet No.	Index No.
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### RAILROAD CROSSING AT TWO (2) - LANE ROADWAY

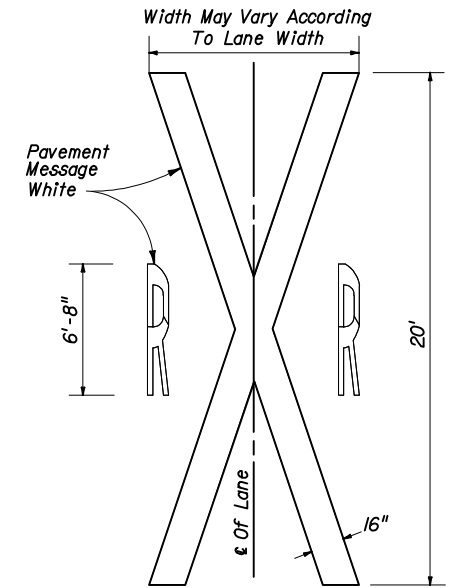
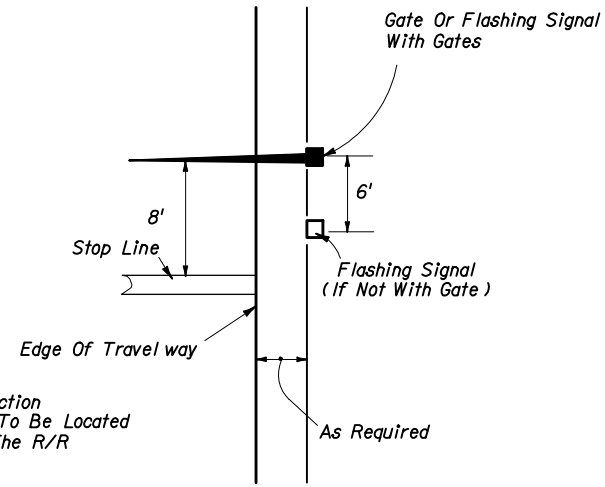
Stop Bar Perpendicular To Edge Of Travel Way Or 8' From & Parallel To Gate When Present



Stop Bar Perpendicular to Edge Of Travel Way Or 8' 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' from the crossing. Where street intersections 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' Urban & 300' 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.

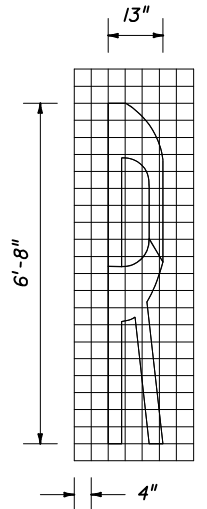
#### \* 6. Gate Length Requirements

For two-way undivided sections:

The gate should extend to within 1' of the center line. On multilane approaches the maximum gate length may not reach to within 1' of the center line. For those cases, the distance from the gate to the center line shall be a maximum of 4'.

For one-way or divided sections:

The gate shall be of sufficient length such that the distance from the gate tip to the inside edge of pavement is a maximum of 4'.

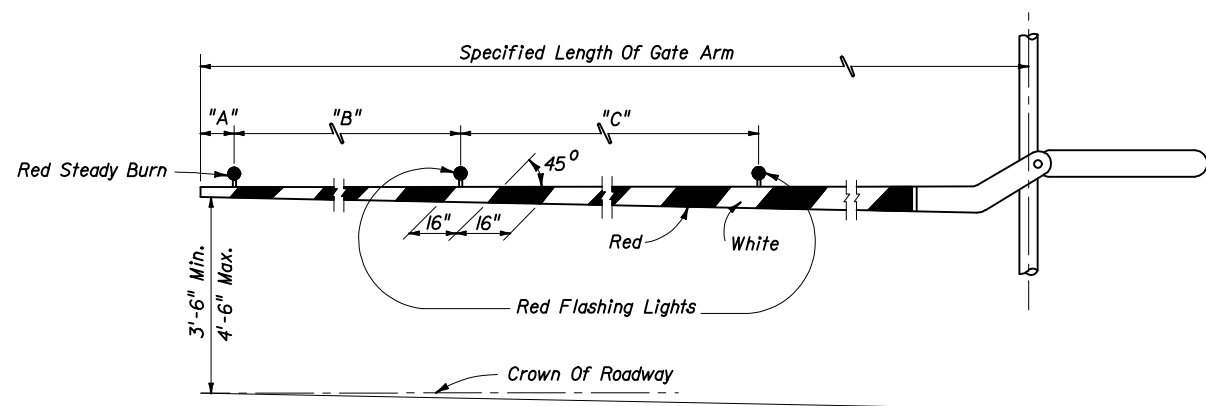


SPEED MPH	"A" IN FT
60	550
55	450
50	375
45	300
40	225
35	150
30	100
<b>URBAN</b>	<b>50 MIN.</b>

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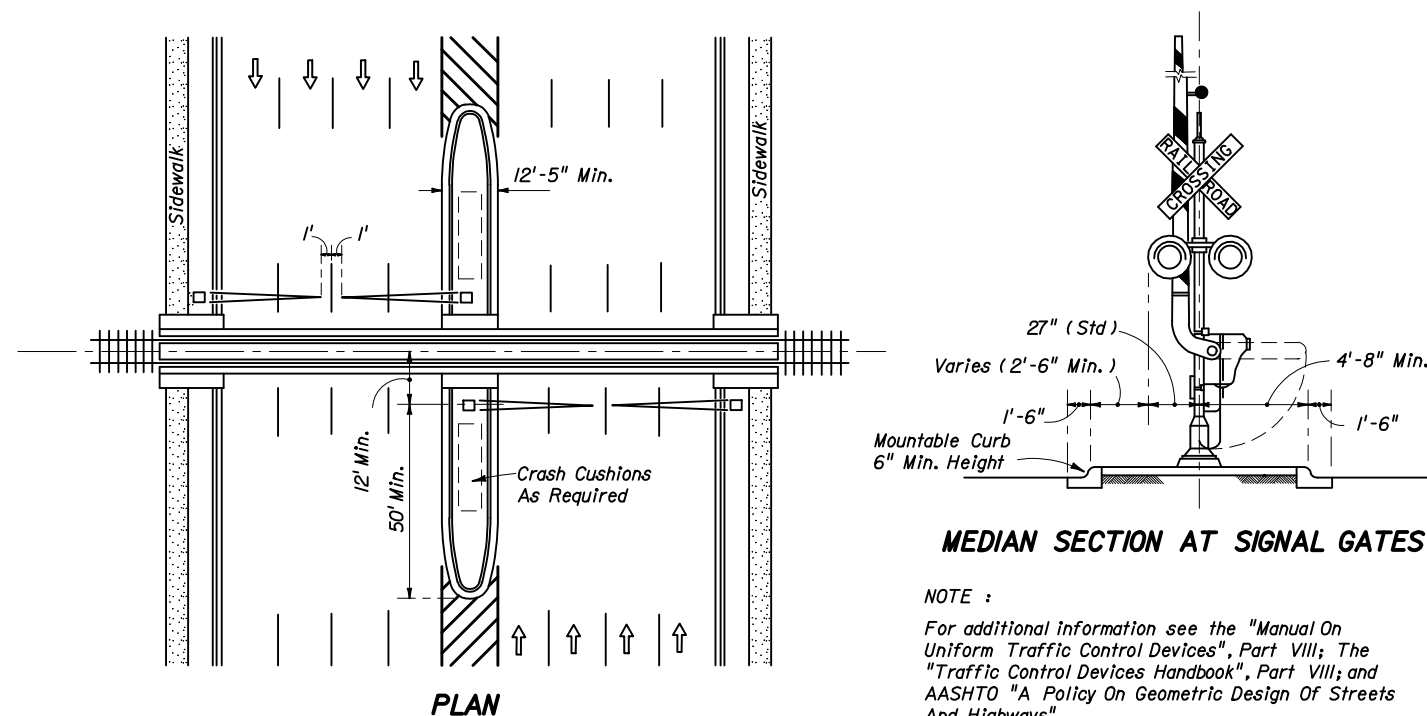
### RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES

Names	Dates	Approved By
Designed By	10-77	<i>Charles A. Scott</i> State Traffic Standards Engineer
Drawn By		Revision
Checked By		Sheet No. 3 of 4
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**RAILROAD GATE ARM LIGHT SPACING**

Specified Length Of Gate Arm	Dimension "A"	Dimension "B"	Dimension "C"
14 Ft.	6"	36"	5'
15 Ft.	18"	36"	5'
16-17 Ft.	24"	36"	5'
18-19 Ft.	28"	41"	5'
20-23 Ft.	28"	4'	5'
24-28 Ft.	28"	5'	5'
29-31 Ft.	36"	6'	6'
32-34 Ft.	36"	7'	7'
35-37 Ft.	36"	9'	9'
38 And Over	36"	10'	10'



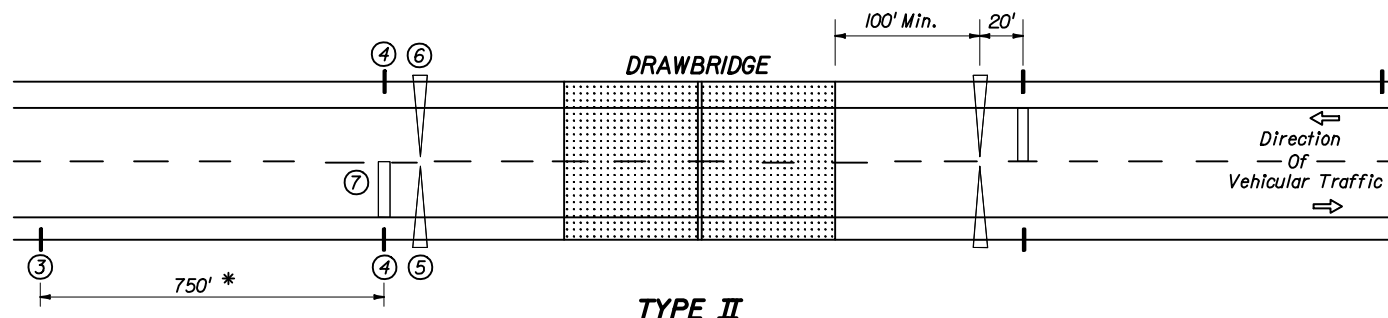
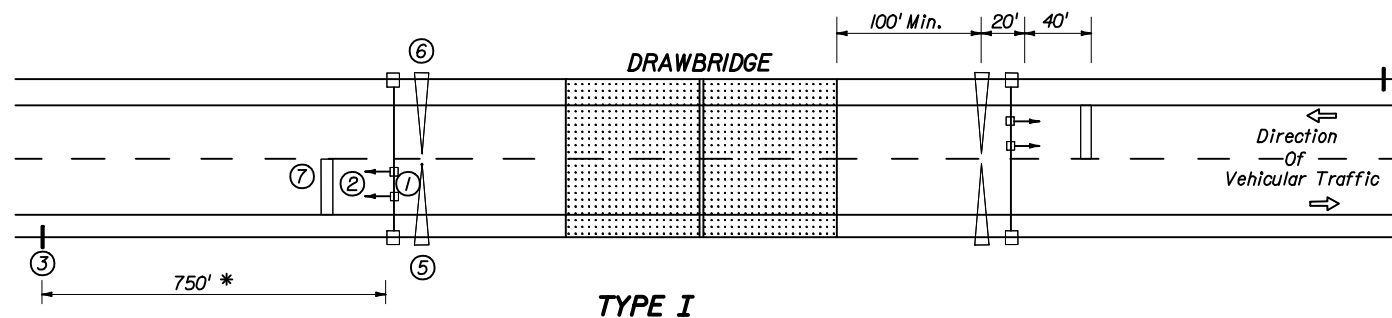
**MEDIAN SECTION AT SIGNAL GATES**

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".

**MEDIAN SIGNAL GATES FOR  
 MULTI LANE UNDIVIDED URBAN SECTIONS**  
 (THREE OR MORE DRIVING LANES IN ONE DIRECTION, 45 mph OR LESS)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES</b>				
Names	Dates	Approved By		
Designed By	10-85	<i>Charles A. Scott</i> State Traffic Standards Engineer		
Drawn By	10-85	Revision	Sheet No.	Index No.
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# TYPICAL BRIDGE MOUNTS



\* Field conditions may require adjustment of this standard distance.

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")

## SEQUENCE CHART

SIGNALS & SIGNS	SIGNAL SWITCH	OFF	ON	OFF
	FLASHING BEACON DRAWBRIDGE AHEAD SIGN (See Note 9)	BLANK	FLASHING YELLOW	BLANK
	STOP HERE ON RED (Type II only)	BLANK	FLASHING RED	BLANK
	TRAFFIC SIGNALS (Type I only)	GREEN	YELLOW	RED
GATES	ENTRANCE GATES	RAISED	LOWERED	RAISED
	EXIT GATES		LOWERED	RAISED
TIMING		Variable Time (See Note No. 3)	5 Sec. Min. Variable Time (See Note No. 4)	Variable Time (See Note No. 5)
		Normal Operation	Operation During Bridge Preemption	

Per Note 7

- LEGEND**
- ① TRAFFIC SIGNALS } Mast Arm Mounted (Off Bridge)
  - ② DRAWBRIDGE SIGN } Monotube 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 flashers, 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 seconds.
10. Requirements on gate installation are contained in Section 4E-14 through 4E-17 of the Manual on Uniform Traffic Control Devices.

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**TRAFFIC CONTROL DEVICES FOR MOVABLE SPAN BRIDGE SIGNALS**

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Drawn By	4-75	Revision	Sheet No.	Index No.
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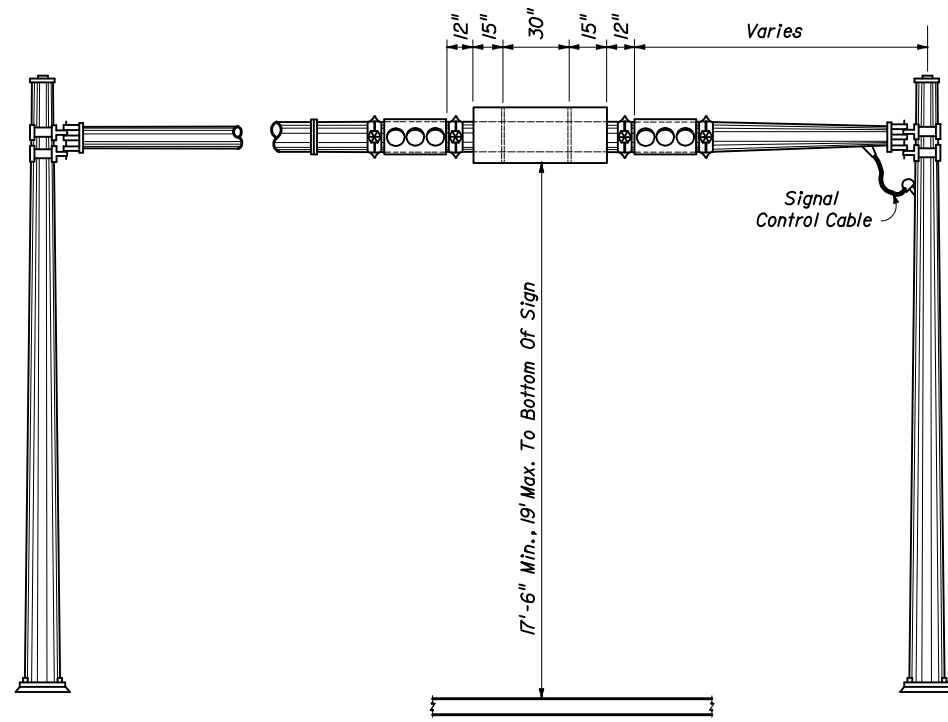
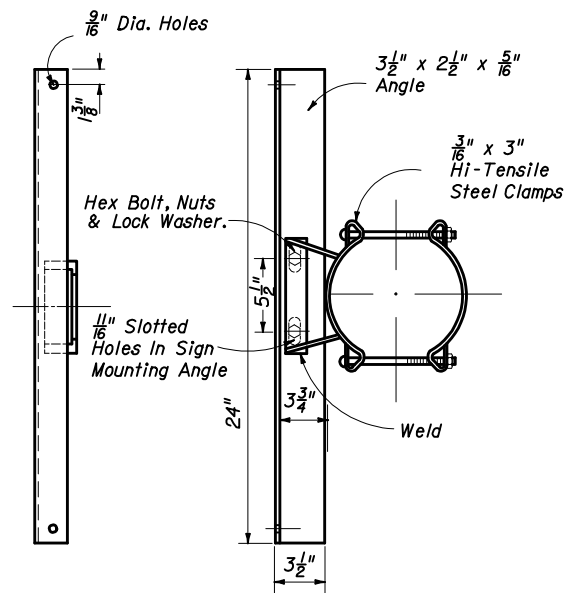


FIGURE - A

MONOTUBE SUPPORT MOUNTING



SIGN PANEL MOUNTING ASSEMBLY

FIGURE - B

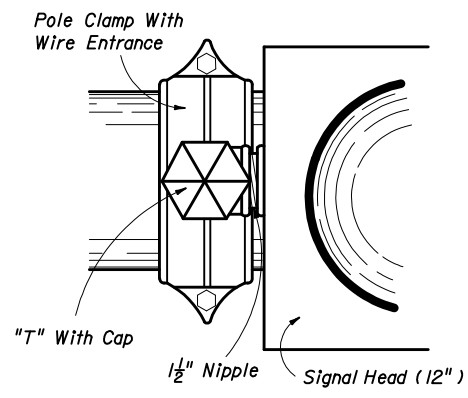


FIGURE - C

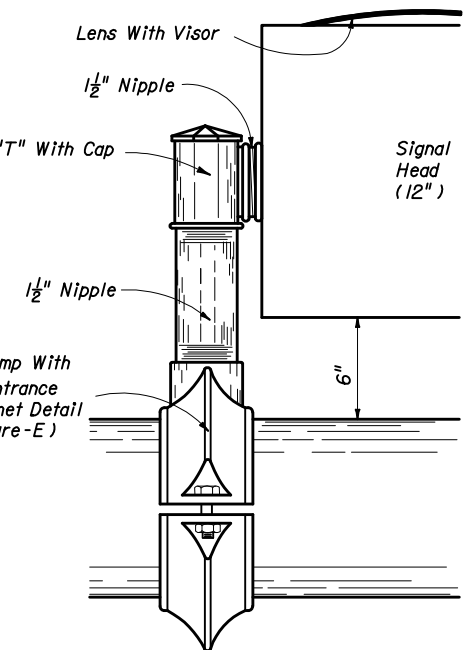


FIGURE - D

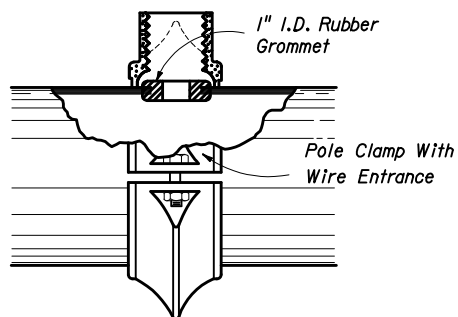


FIGURE - E

SIGNAL HEAD MOUNTING ASSEMBLY

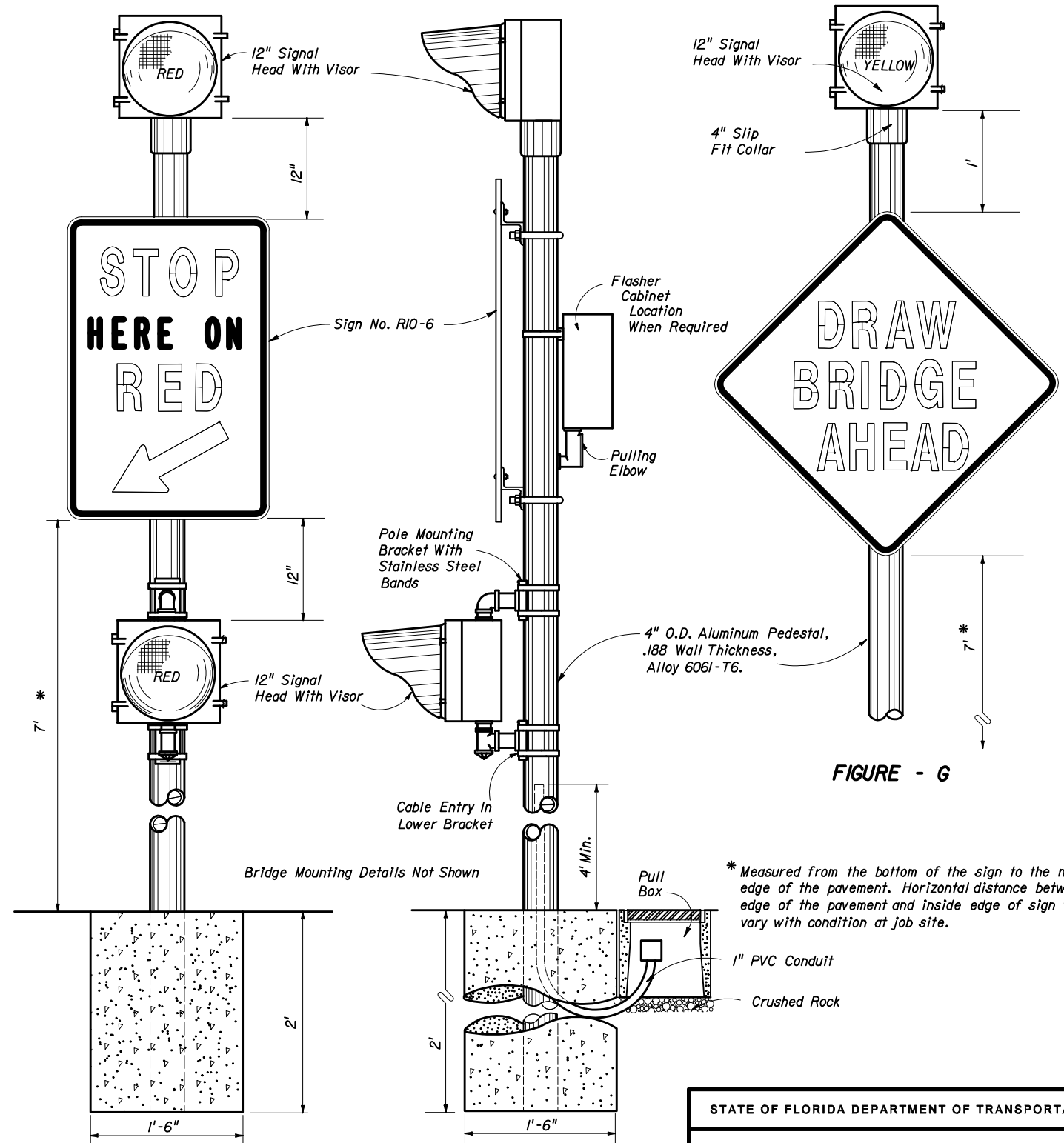
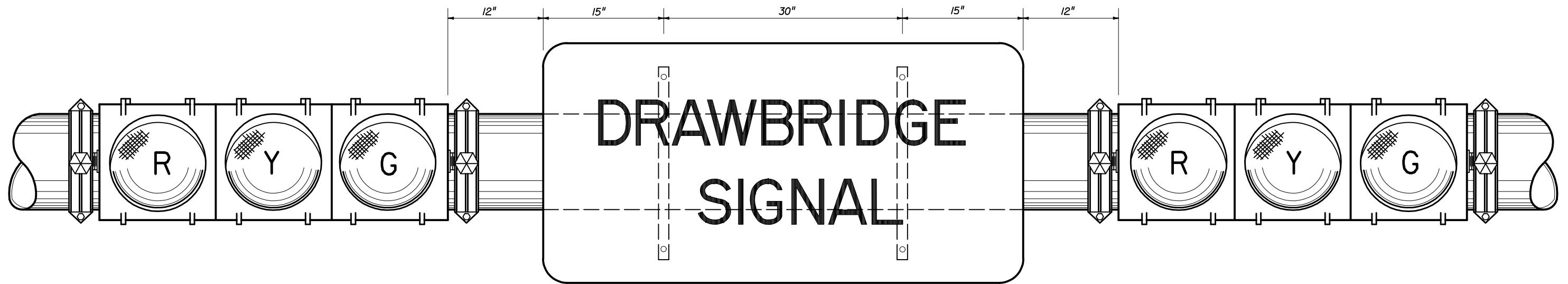


FIGURE - F

\* 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.

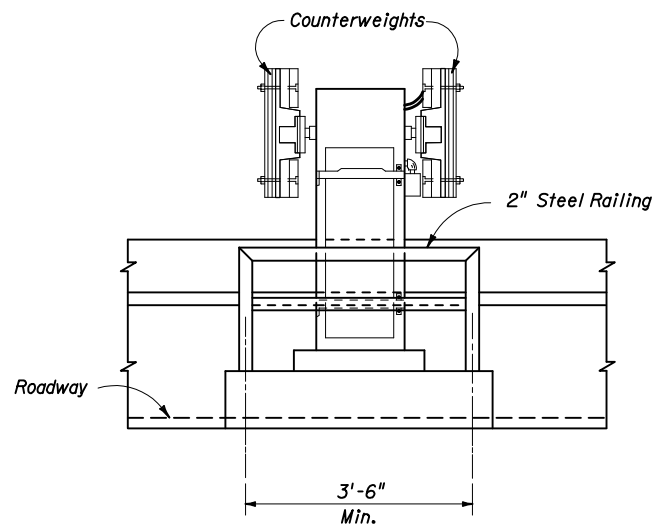
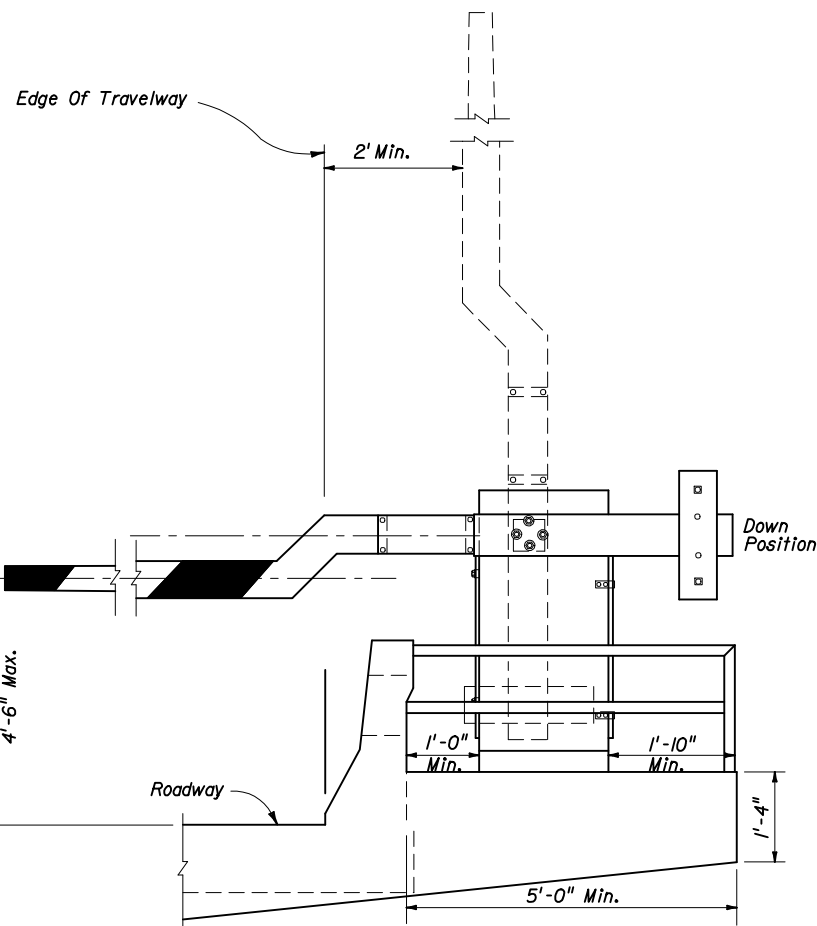
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC CONTROL DEVICES FOR MOVABLE SPAN BRIDGE SIGNALS</b>				
Designed By	Names	Dates	Approved By <i>Charles A. Scott</i>	
Drawn By		4-75	State Traffic Standards Engineer	
Checked By		4-75	Revision 00	Sheet No. 2 of 3
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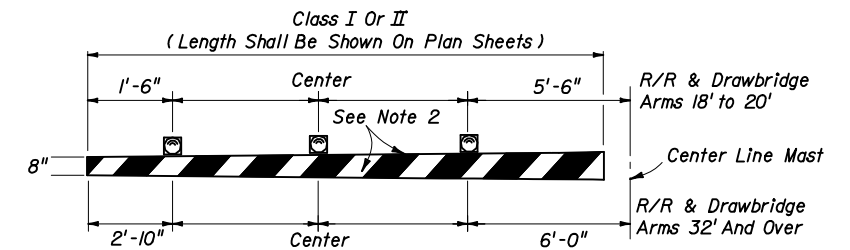
5' x 2'-6"  
 2" Border-4" Radius  
 6" Series "D" Letters

**BLACK OPAQUE LEGEND AND BORDER ON REFLECTORIZED YELLOW BACKGROUND**

TO BE USED WITH TYPE I OPERATION, AS SHOWN  
 ON PREVIOUS SHEET  
**MONOTUBE SUPPORT MOUNTING**



**GATE & ARM DETAIL**



- Note :
- 12 volt flashing red lights shall be mounted on gate arm and shall operate in the flashing mode only when gate arm is in the lower position or in the process of being lowered. The number of lights shall vary accordingly to length of the gate arm.
  - 16" alternate diagonal fully reflectORIZED red and white stripes.

**TYPICAL LAMP PLACEMENT**

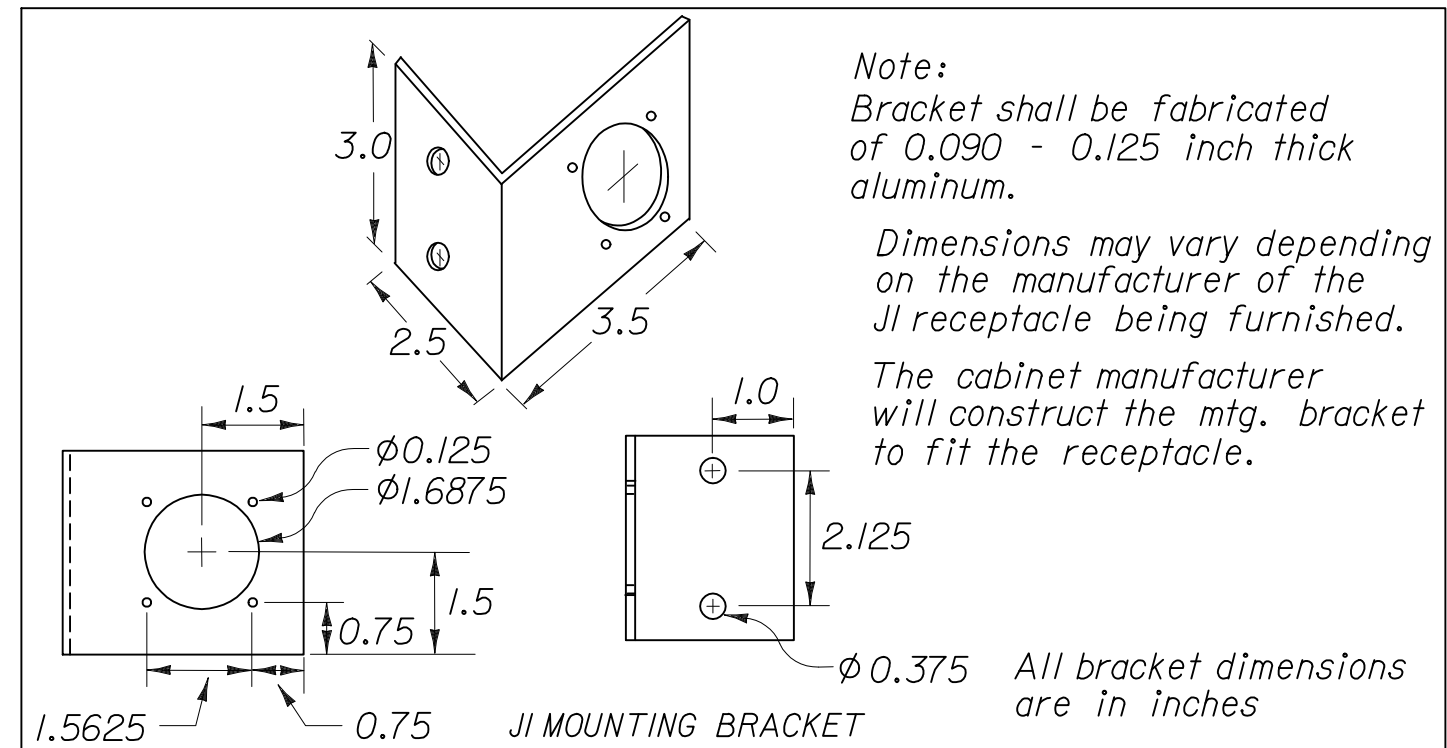
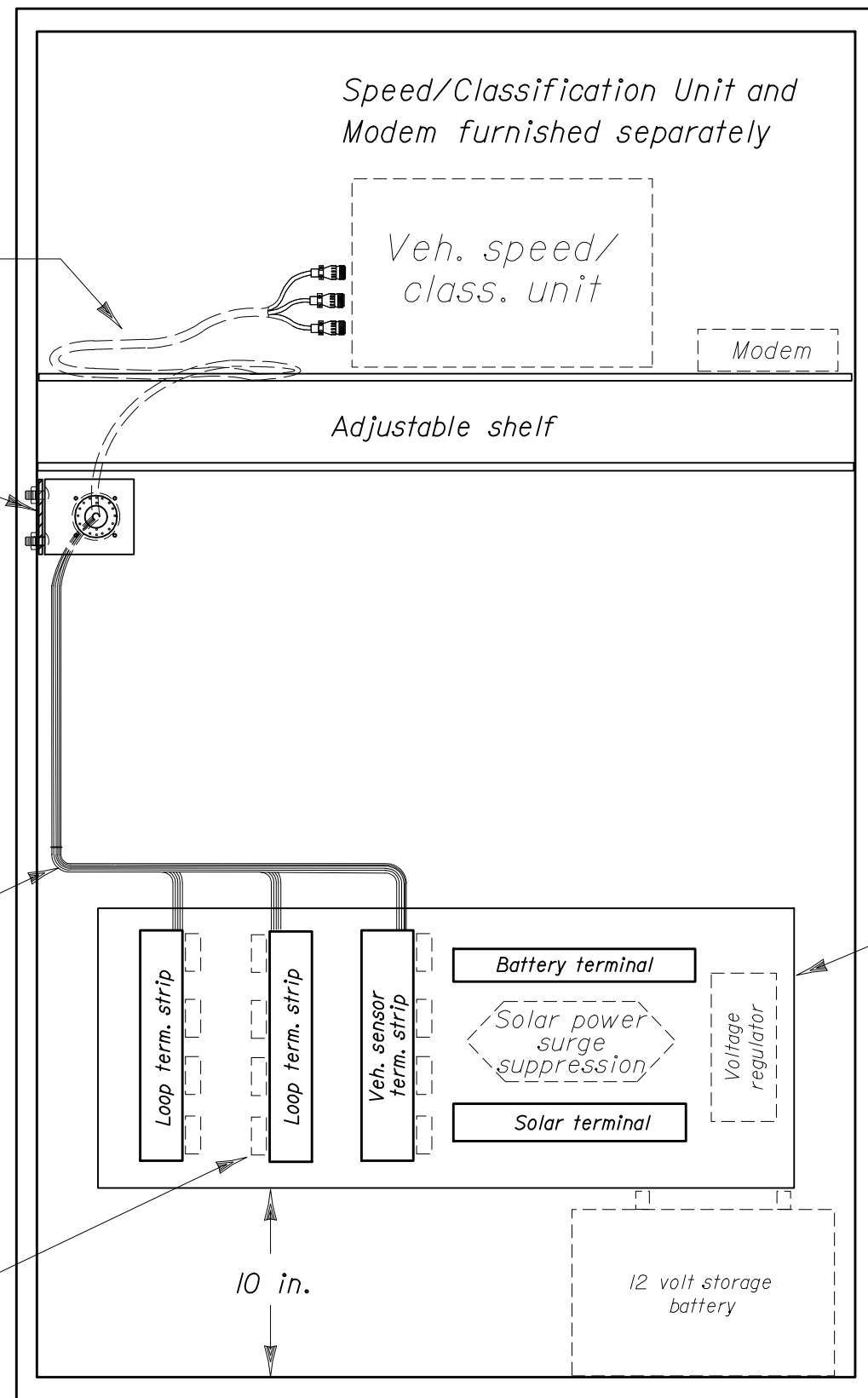
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC CONTROL DEVICES FOR MOVABLE SPAN BRIDGE SIGNALS</b>				
Names	Dates	Approved By <i>Charles A. Scott</i>		
Designed By		State Traffic Standards Engineer		
Drawn By		Revision	Sheet No.	Index No.
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Equipment Cable, 5 ft. long, furnished separately (ref. sheet no. 4)

J1 recept. with alum. mtg. bracket for lanes 1 to 4

Cabinet cable

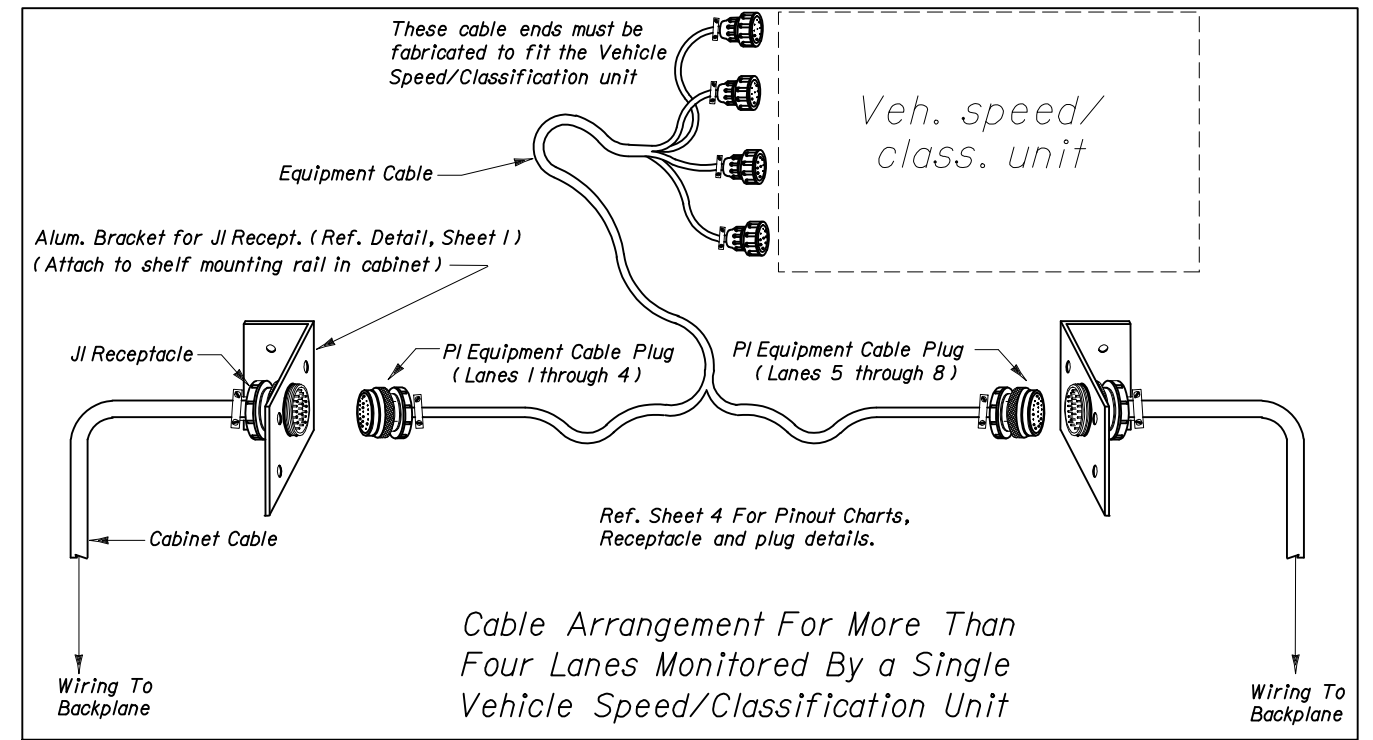
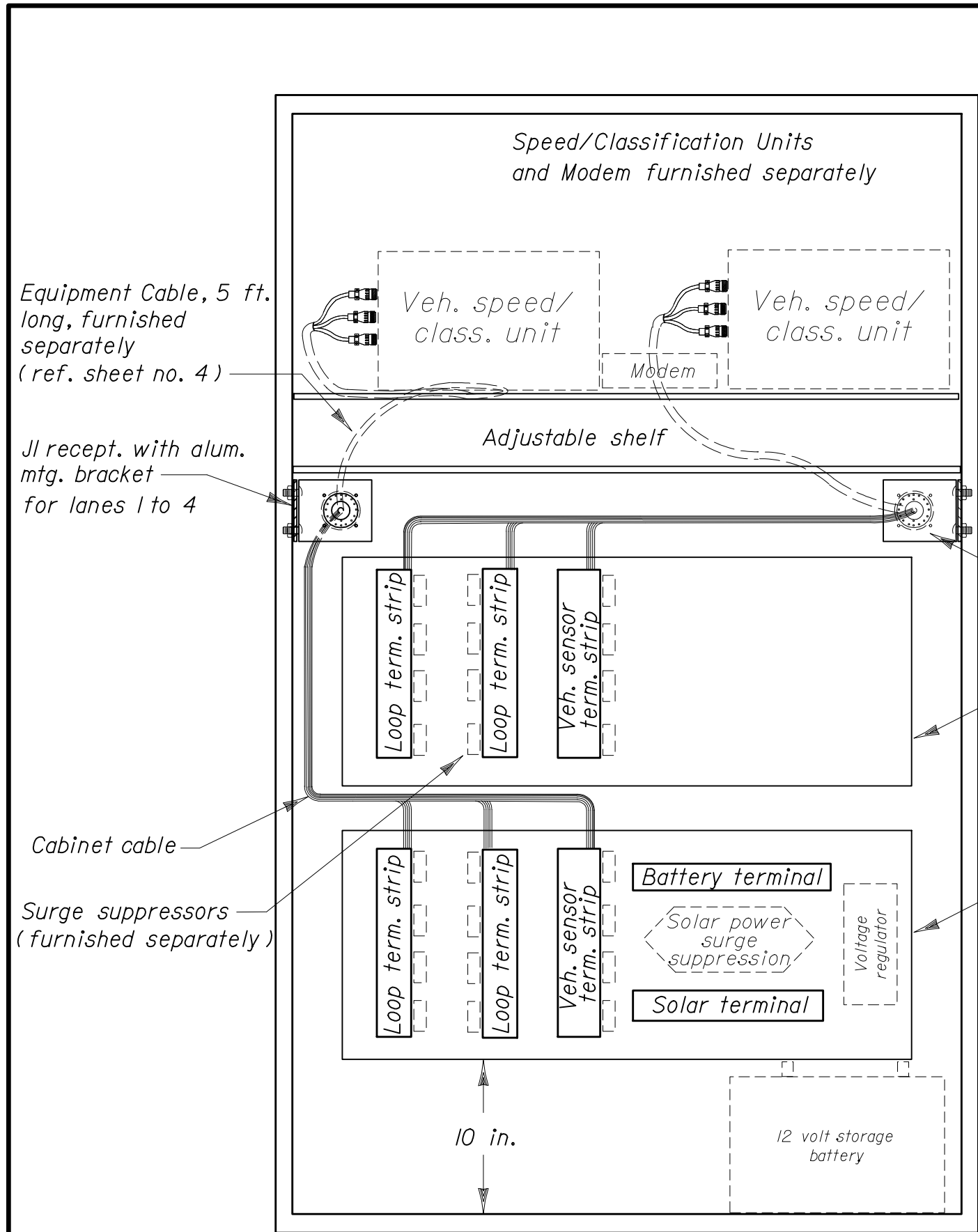
Surge suppressors (furnished separately)



- Traffic monitoring site cabinet includes:
  - One adjustable shelf;
  - One backplane ass'y;
  - One J1 receptacle with mounting bracket;
  - All associated wiring and wiring harnesses.
- Basic backplane assembly consists of:
  - Two inductive loop terminal strips;
  - One vehicle sensor terminal strip;
  - One battery terminal strip;
  - One solar panel terminal strip.
- When piezoelectric axle sensors are used, the shields must be connected to earth ground.

**CABINET LAYOUT DETAIL**  
(For Up To Four Lanes)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC MONITORING SITE</b>				
Designed By	Names	Dates	Approved By <i>A. Sawc</i>	
Drawn By			Mgr Of Transportation Statistics	
Checked By			Revision	Sheet No. Index No.
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Equipment Cable, 5 ft. long, furnished separately (ref. sheet no. 4)

JI recept. with alum. mtg. bracket for lanes 1 to 4

Cabinet cable

Surge suppressors (furnished separately)

JI recept. with alum. mtg. bracket for lanes 5 to 8

Backplane for lanes 5 to 8 (Does not require battery terminal, solar terminal, voltage regulator, or solar power surge suppressor.)

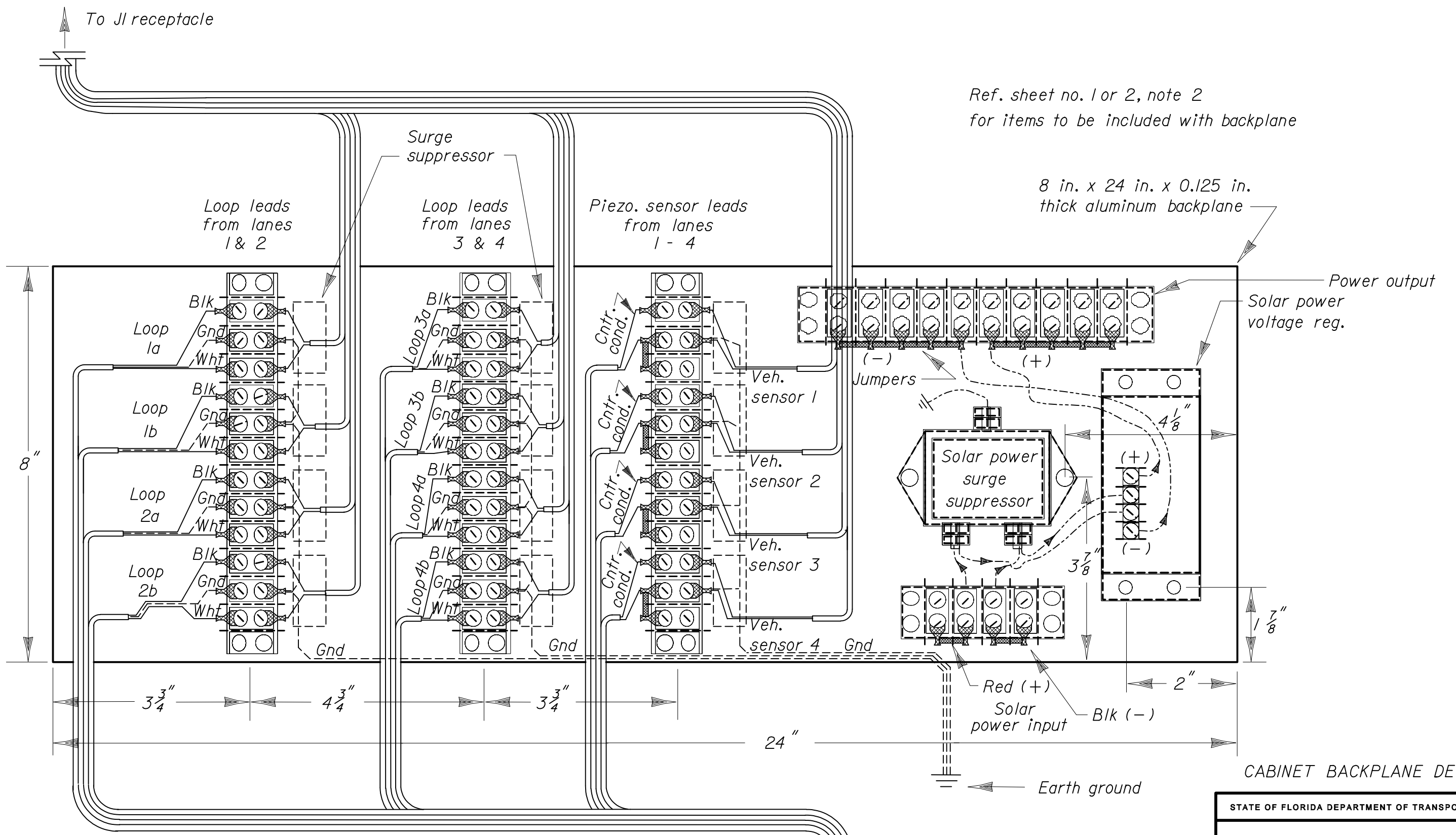
Backplane for lanes 1 to 4

1. Traffic monitoring site cabinet includes:
  - A. One adjustable shelf;
  - B. Two backplane assemblies (equipped as shown);
  - C. Two JI receptacles with mtg. brackets;
  - D. All associated wiring and wiring harnesses.
2. Basic backplane assembly consists of:
  - A. Two inductive loop terminal strips;
  - B. One vehicle sensor terminal strip;
  - C. One battery terminal strip;
  - D. One solar panel terminal strip.
3. When piezoelectric axle sensors are used, the shields must be connected to earth ground.

CABINET LAYOUT DETAIL  
(For More Than Four Lanes And Up to Eight Lanes)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC MONITORING SITE</b>				
Designed By	Names	Dates	Approved By <i>[Signature]</i>	
Drawn By			Mgr Of Transportation Statistics	
Checked By	Revision	Sheet No.	Index No.	
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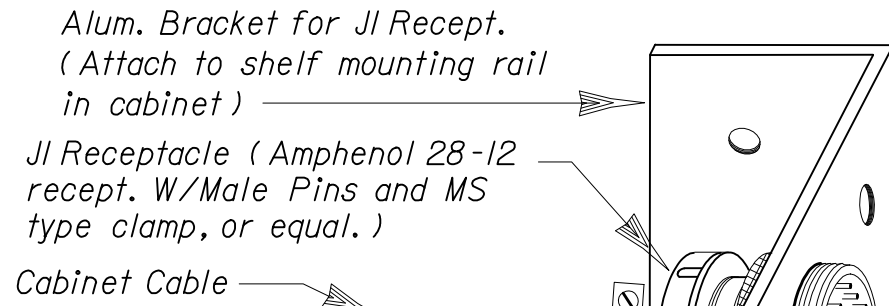


All terminal strip contacts are on 9/16 inch centers (Cinch 142 Series or equal) Use insulated fork wire terminations

Inductive loop lead-in and vehicle sensor leads from roadway

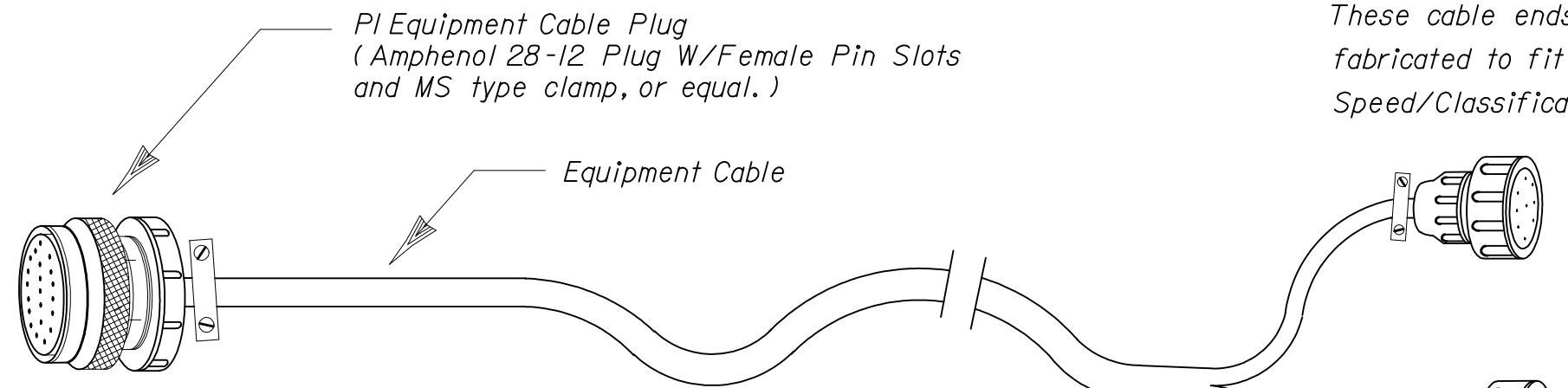
CABINET BACKPLANE DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC MONITORING SITE</b>				
Names	Dates	Approved By <i>[Signature]</i>		
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J1 Receptacle Pinout	
26 Recessed Male Pins	
A	Loop 1a (5a) yellow
B	Loop 1a (5a) purple
C	Loop 1b (5b) gray
D	Loop 1b (5b) pink
E	Loop 2a (6a) brown
F	Loop 2a (6a) blue
G	Loop 2b (6b) orange
H	Loop 2b (6b) tan
J	Loop 3a (7a) white
K	Loop 3a (7a) green
L	Loop 3b (7b) red
M	Loop 3b (7b) black
N	Gnd
P	Loop 4a (8a) w/yellow
R	Loop 4a (8a) w/purple
S	Loop 4b (8b) w/gray
T	Loop 4b (8b) w/brown
U	Piezo 1(5) (+) w/blue
V	Piezo 1(5) sh w/orange
W	Piezo 2 (6) (+) w/green
X	Piezo 2 (6) sh w/red
Y	Piezo 3 (7) (+) w/black
Z	Piezo 3 (7) sh w/red/blk
a	Piezo 4 (8) (+) red/green
b	Piezo 4 (8) sh red/orange
d	Gnd red/black

Wiring To Backplane



PI Equipment Cable Plug	
26 Female Pin Slots	
A	Loop 1a (5a)
B	Loop 1a (5a)
C	Loop 1b (5b)
D	Loop 1b (5b)
E	Loop 2a (6a)
F	Loop 2a (6a)
G	Loop 2b (6b)
H	Loop 2b (6b)
N	Gnd
J	Loop 3a (7a)
K	Loop 3a (7a)
L	Loop 3b (7b)
M	Loop 3b (7b)
P	Loop 4a (8a)
R	Loop 4a (8a)
S	Loop 4b (8b)
T	Loop 4b (8b)
d	Gnd
U	Piezo 1(5) (+)
V	Piezo 1 sh
W	Piezo 2 (6) (+)
X	Piezo 2 sh
Y	Piezo 3 (7) (+)
Z	Piezo 3 sh
a	Piezo 4 (8) (+)
b	Piezo 4 sh

Connects to electronics unit

**NOTE:**

The equipment cable can accommodate up to four lanes of inductive loop and vehicle sensor inputs. (Ref. Sheet No. 1 for cabinet layout)

For more than four lanes and up to eight lanes of inputs, the following options are available:

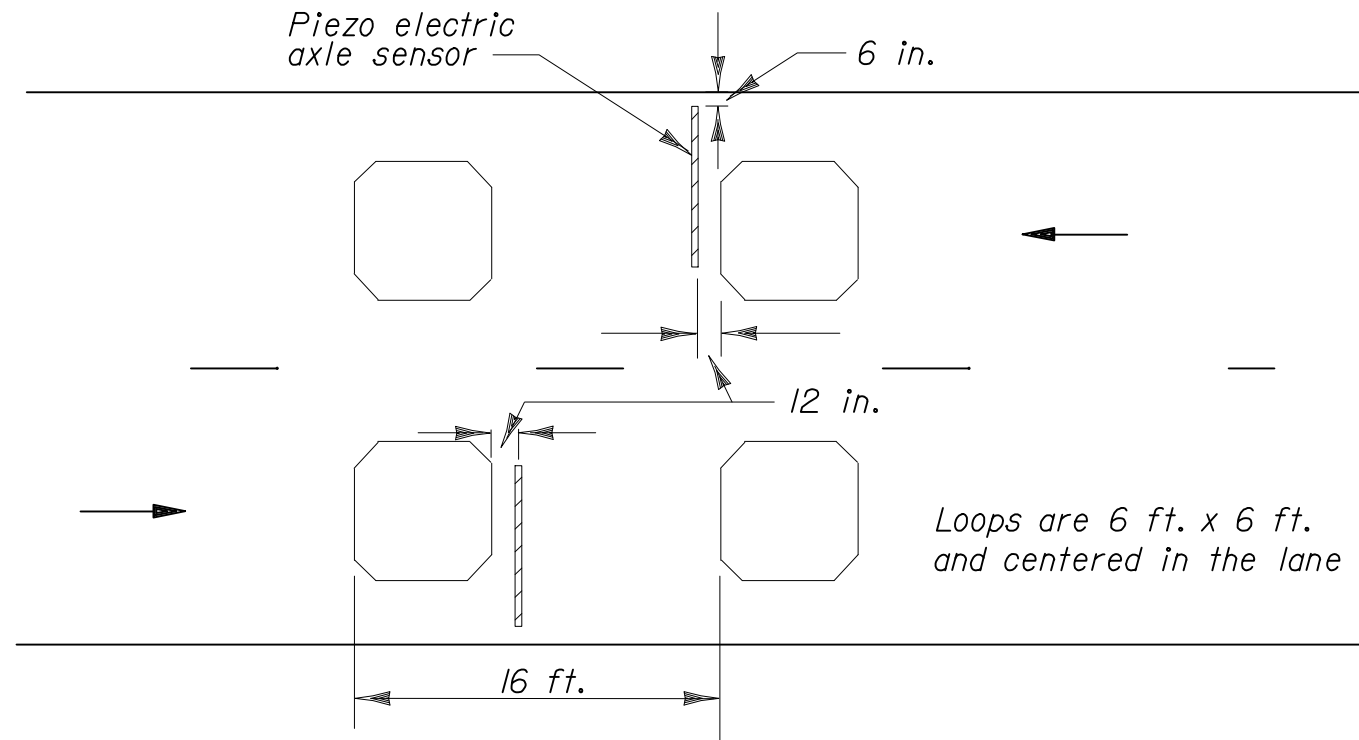
1. A second Vehicle Speed/Class. Unit and separate equipment cable connecting to a second J1 receptacle; or
2. A single Vehicle Speed/Class. Unit capable of up to eight lanes of inputs and a single equipment cable with split ends to fit two J1 receptacles. (Ref. Sheet 2 detail)

Numbers in parenthesis in the pinout chart identify lane numbers when a second backplane for lanes 5 through 8 is required.

EQUIPMENT CABLE DETAIL

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<b>TRAFFIC MONITORING SITE</b>				
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TRAFFIC MONITORING SITE LOOP ASSEMBLY WITH AXLE SENSOR PLACEMENT DETAIL



Loops are 6 ft. x 6 ft. and centered in the lane

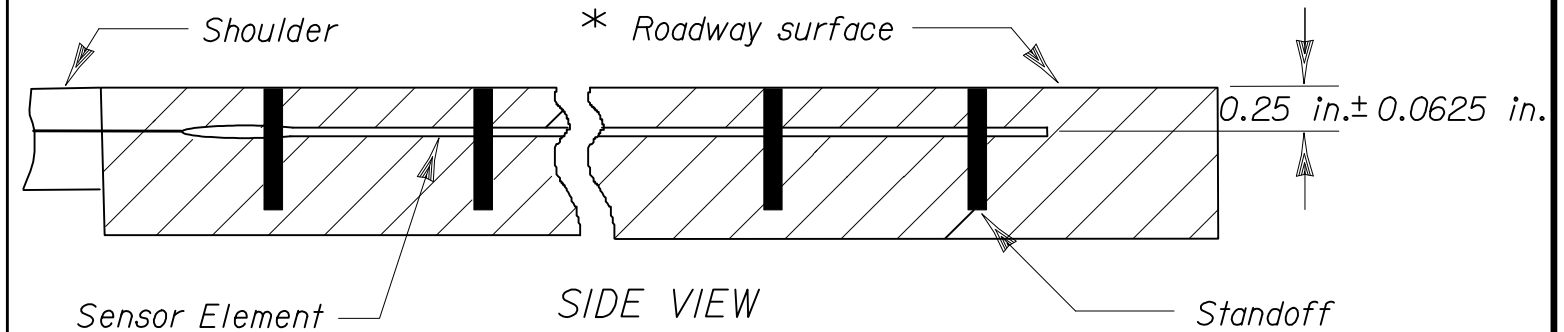
Note:

Loop slots shall be 0.25 inches wide (approx.) by 1.5 inches to 2 inches deep. Three turns of #12 AWG, type XHHW stranded copper wire shall be placed in the slot. Backer rod shall be used to hold the loop wire in the bottom of the slot.

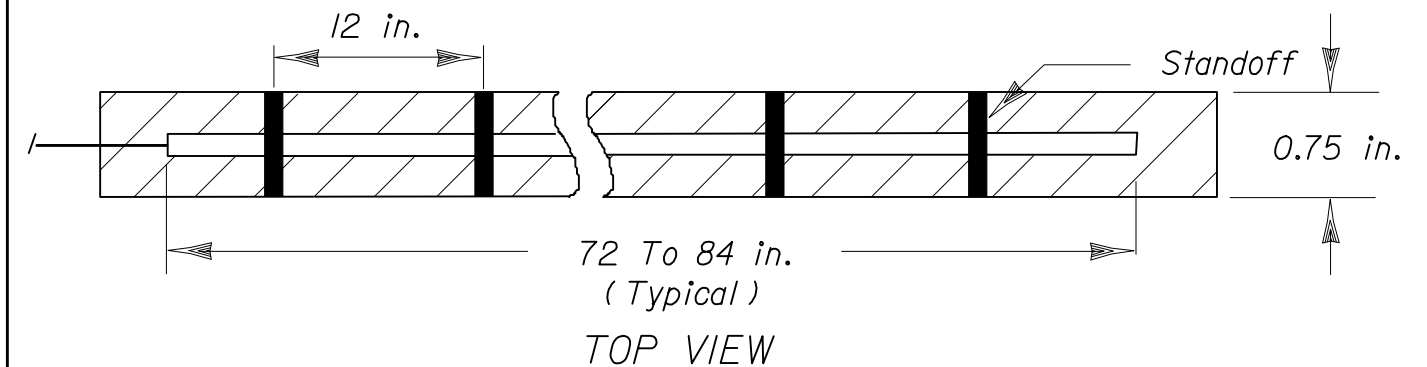
Loop leads shall be twisted at the rate of 10 to 12 twists per foot. The twisted pair shall extend to the pull box with three feet of spare length coiled in the pull box.

All leads ( inductive loop & vehicle sensor ) shall be identified according to the lane numbering convention shown on sheet 8 and 9.

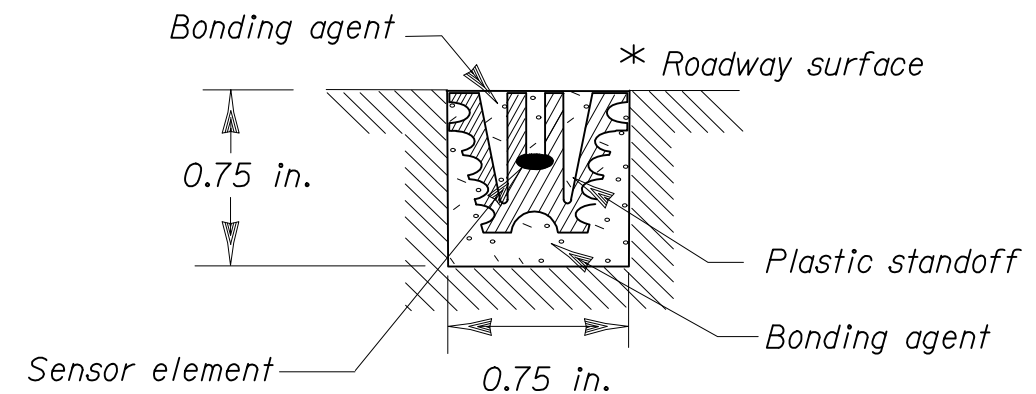
TYPICAL UNENCAPSULATED CLASS II VEHICLE SENSOR



Sensor Element SIDE VIEW Standoff



TOP VIEW



END VIEW

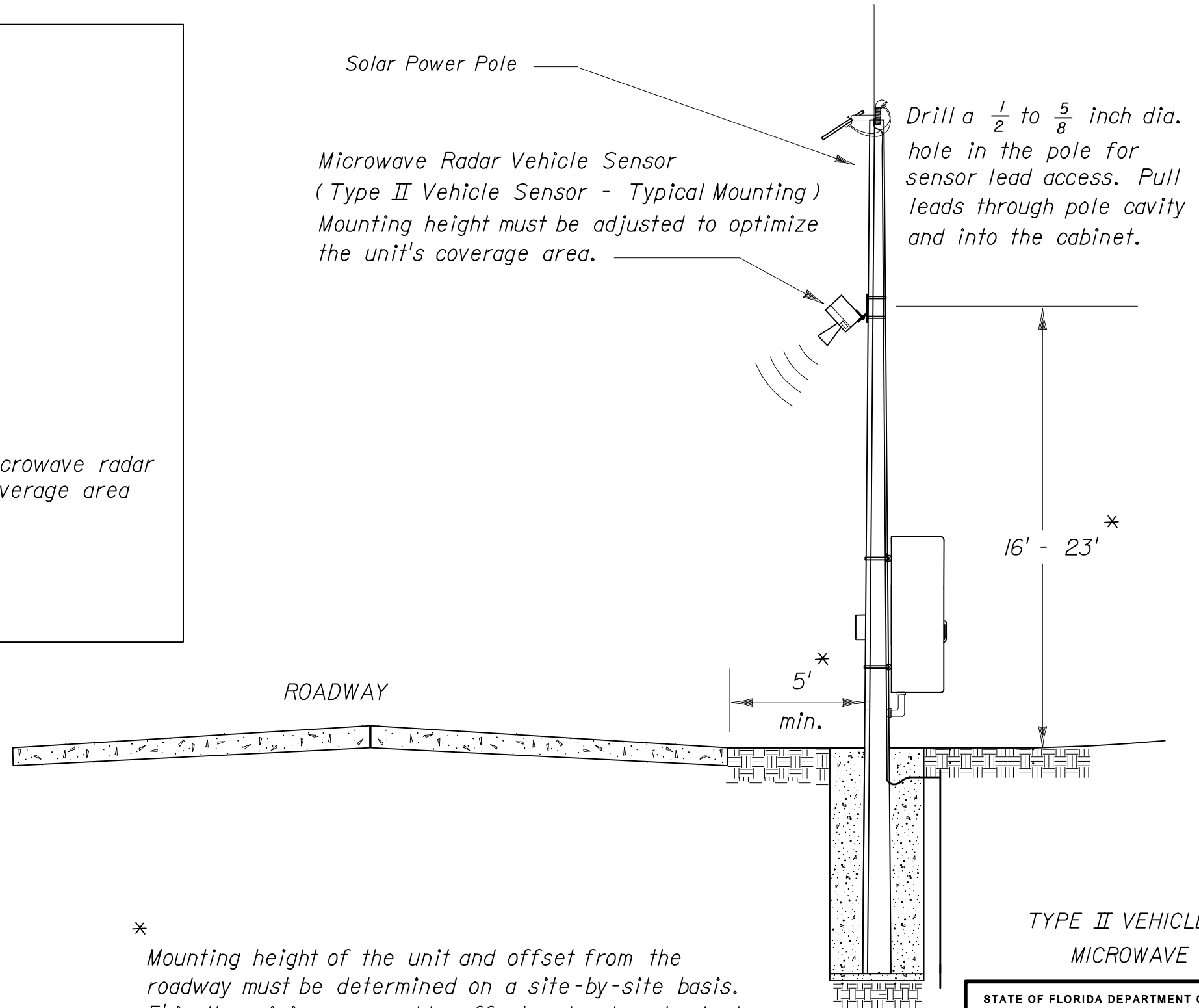
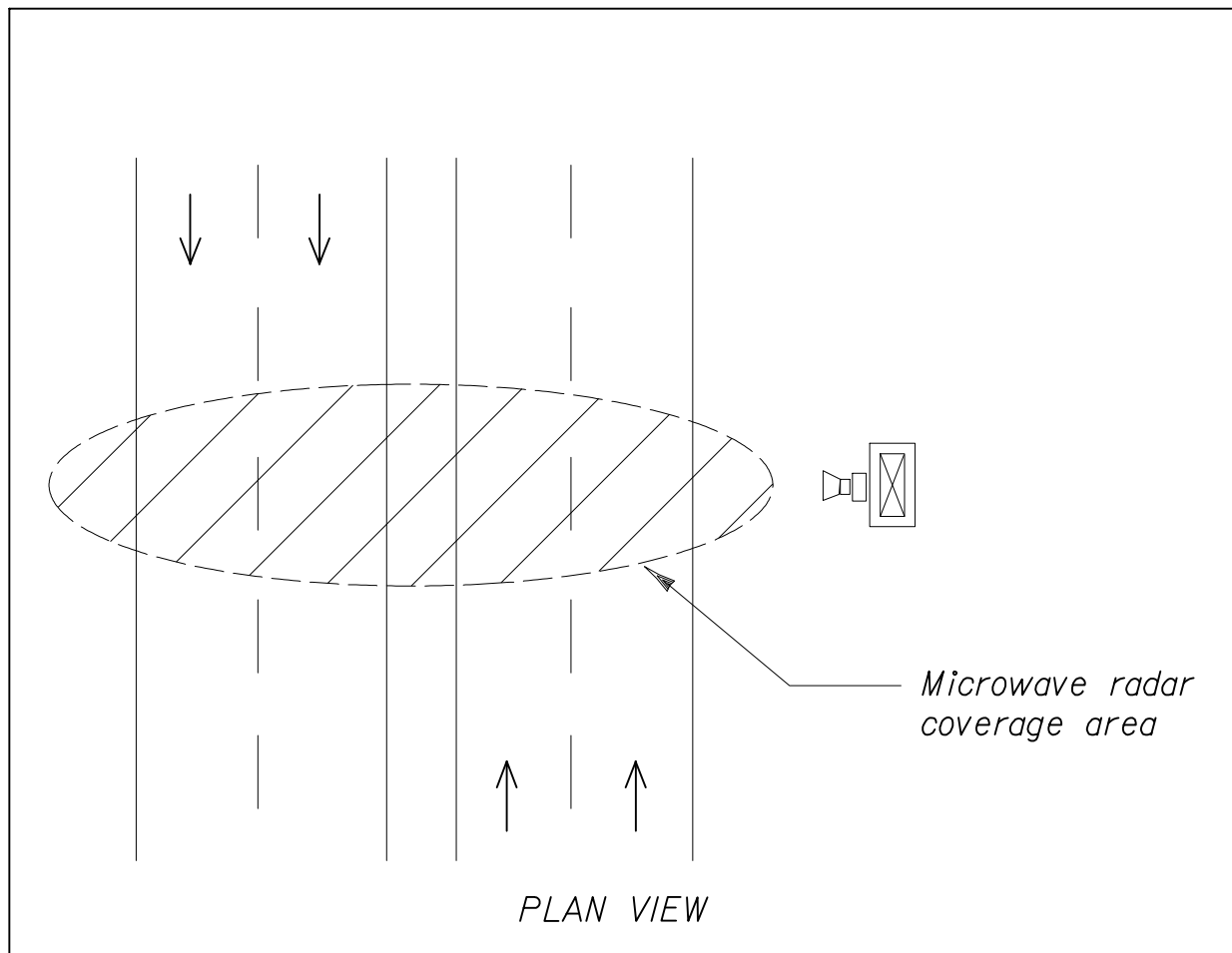
\* Some installations may require axle sensors to be placed in the structural course, prior to placement of the friction course.

Note:

These are typical dimensions. actual dimensions, element cross-sections and standoffs may vary depending on manufacturer and model.

LOOP AND PIEZOELECTRIC VEHICLE SENSOR DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
TRAFFIC MONITORING SITE				
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Designed By		MGR OF TRANSPORTATION STATISTICS		
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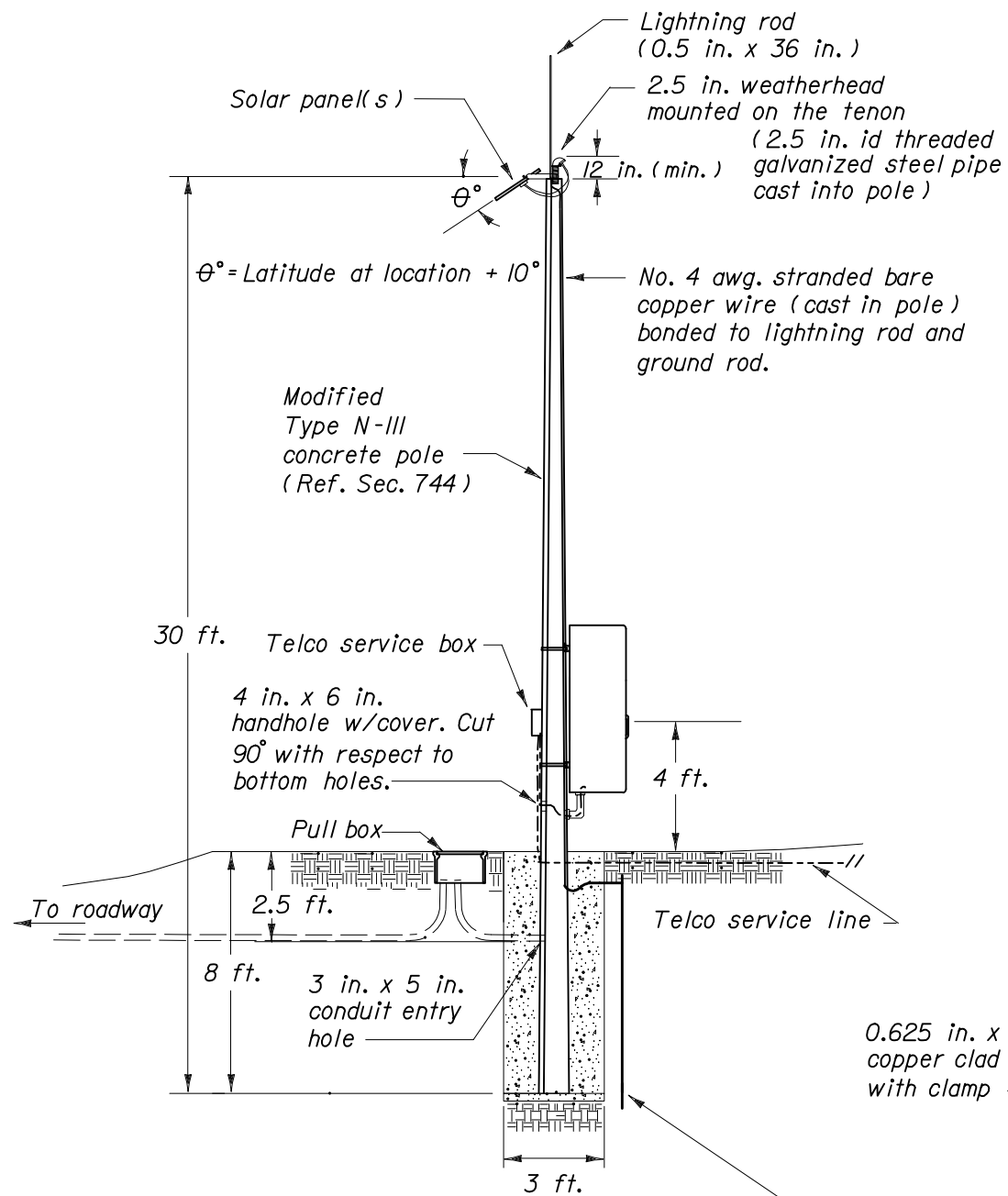
TYPE II VEHICLE SENSOR  
MICROWAVE RADAR

The unit must be capable of detecting up to eight lanes of traffic (in either or both directions) when mounted perpendicular to the roadway.

Coverage area of the unit is affected by the roadway geometry: distance from the travel lanes, median type and width, barrier walls, etc.

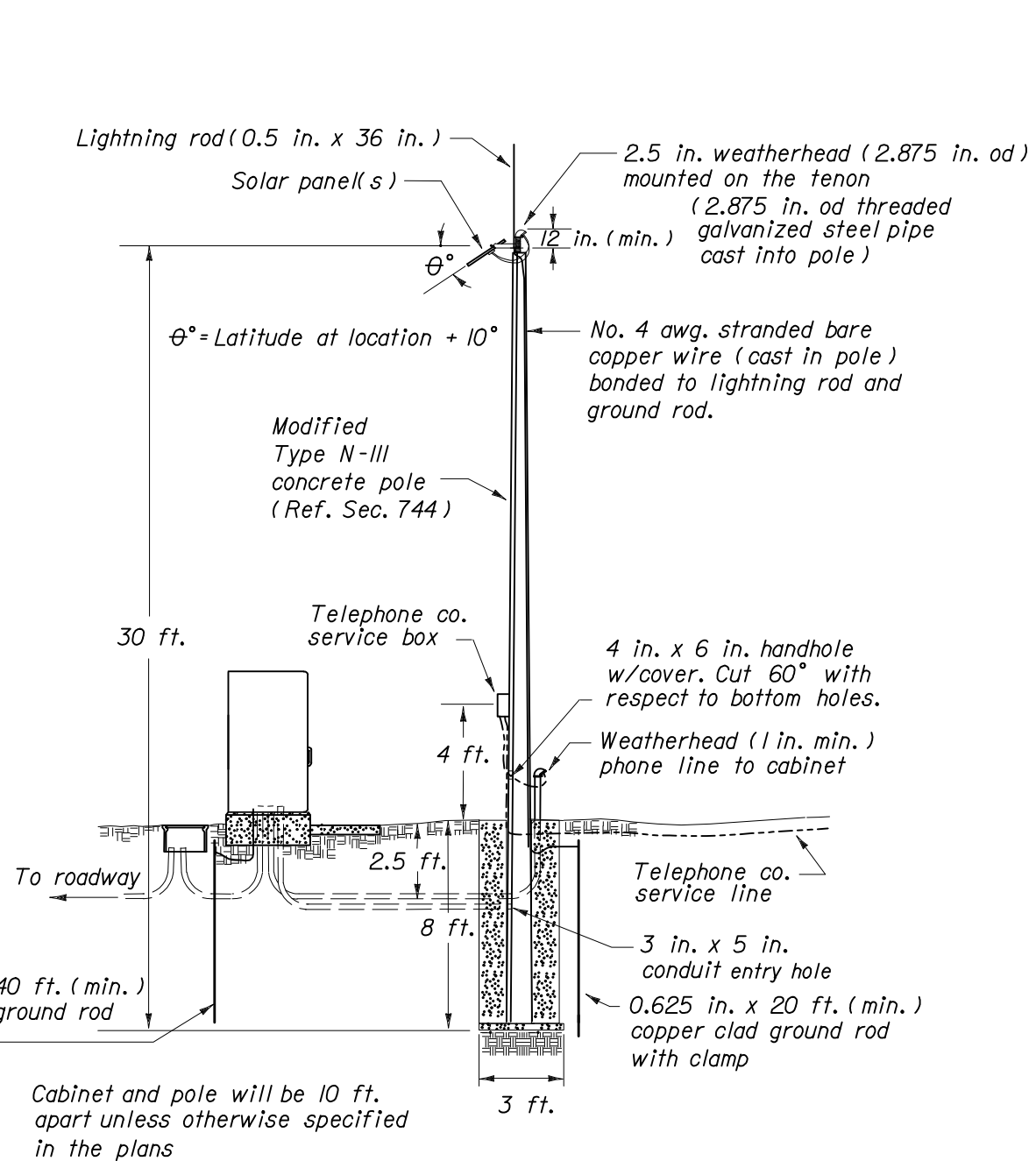
\* Mounting height of the unit and offset from the roadway must be determined on a site-by-site basis. 5' is the minimum operable offset and not a standard.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC MONITORING SITE</b>				
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Drawn By		Revision	Sheet No.	Index No.
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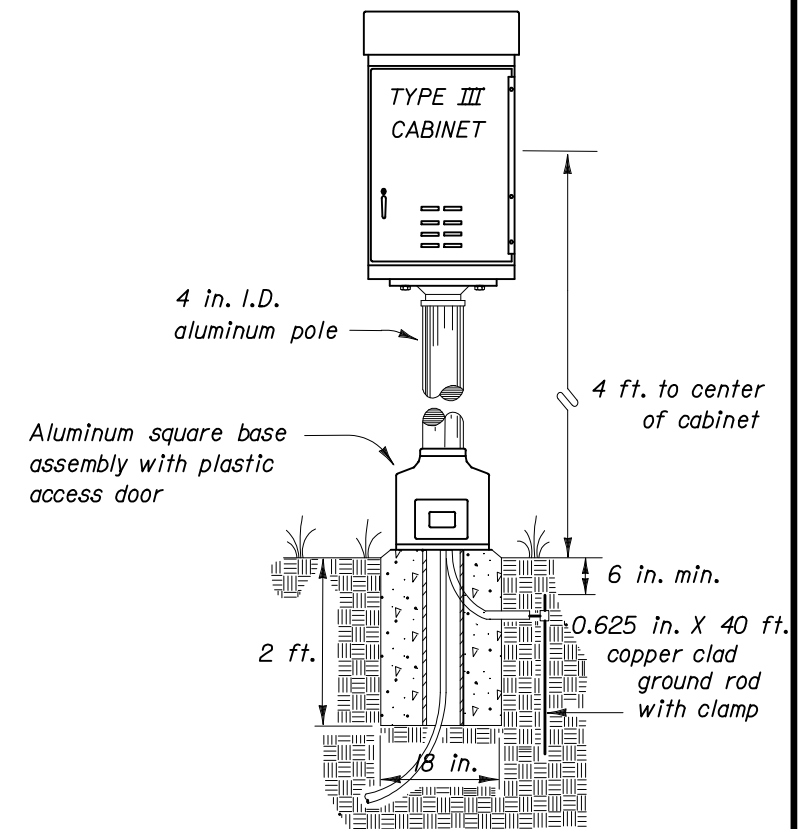


0.625 in. x 40 ft. (min.) copper clad ground rod w/clamp

SOLAR POWER POLE WITH POLE MTD. CABINET



SOLAR POWER POLE WITH BASE MTD. CABINET



PEDESTAL MTD. CABINET

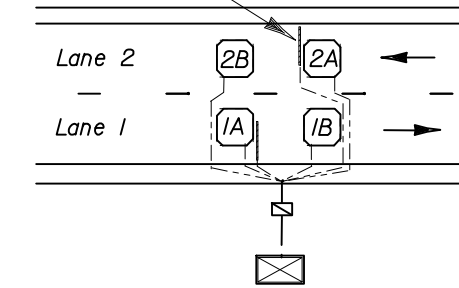
SOLAR POWER POLE DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				
<b>TRAFFIC MONITORING SITE</b>				
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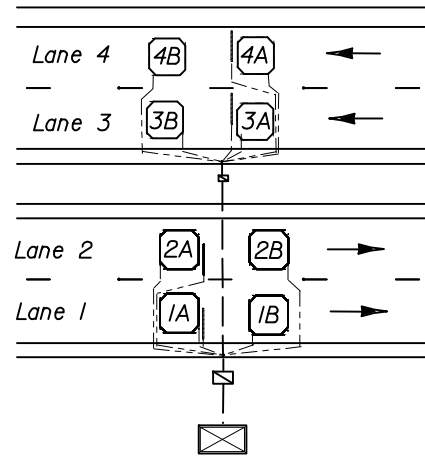
SINGLE CABINET CONFIGURATION

Vehicle sensors will be identified by, and leads marked with, the letters "VS" followed with the lane number.

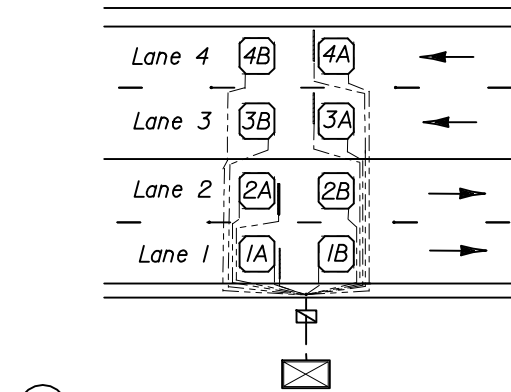
Example: "VS2"



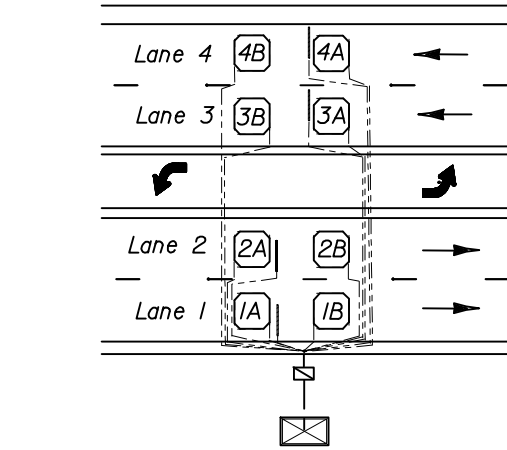
(A) TWO LANE - TWO WAY



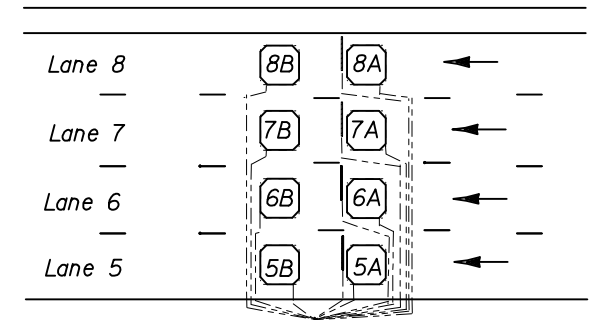
(B) FOUR LANE, DIVIDED - TWO WAY



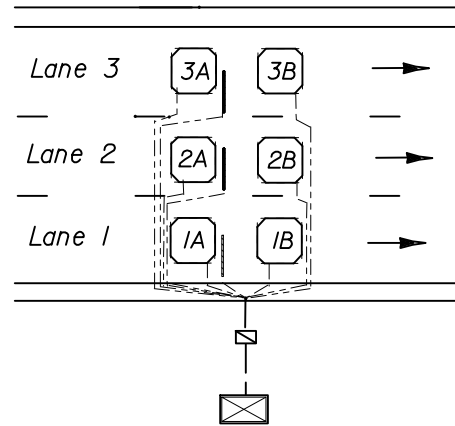
(C) FOUR LANE, UNDIVIDED - TWO WAY



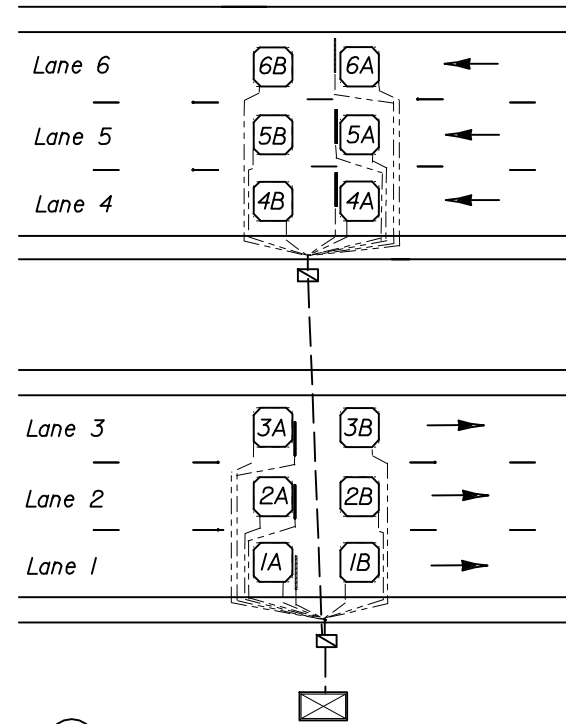
(D) FOUR LANE/CONTINUOUS LEFT TURN LANE



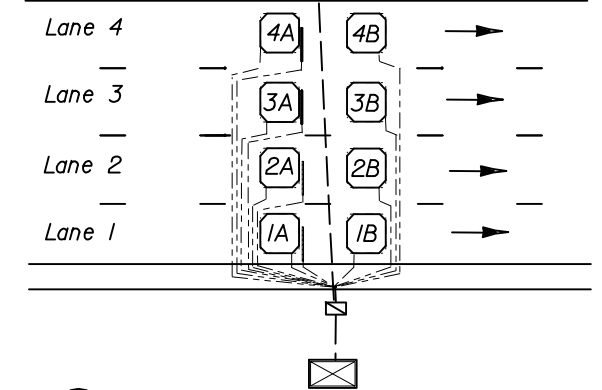
(E) TWO LANE - ONE WAY



(F) THREE LANE - ONE WAY



(G) SIX LANE, DIVIDED - TWO WAY



(H) SIX LANE, DIVIDED - TWO WAY

LANE NUMBERING CONVENTION DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

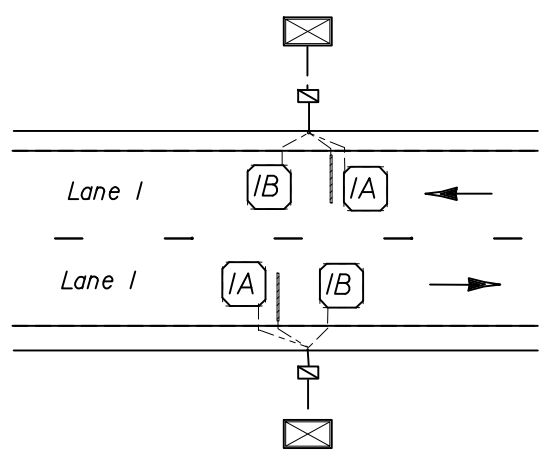
TRAFFIC MONITORING SITE

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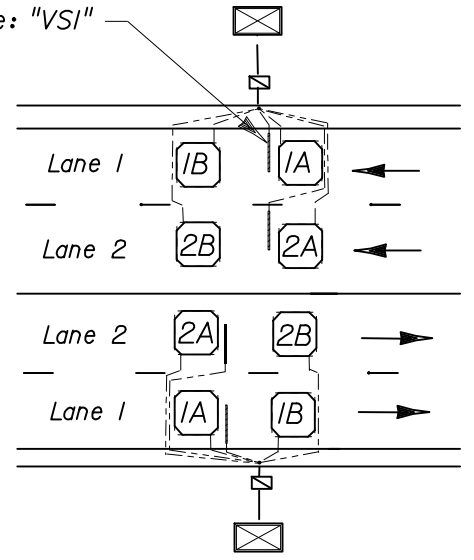
Vehicle sensors will be identified by, and leads marked with, the letters "VS" followed with the lane number.

**TWO CABINET CONFIGURATION**

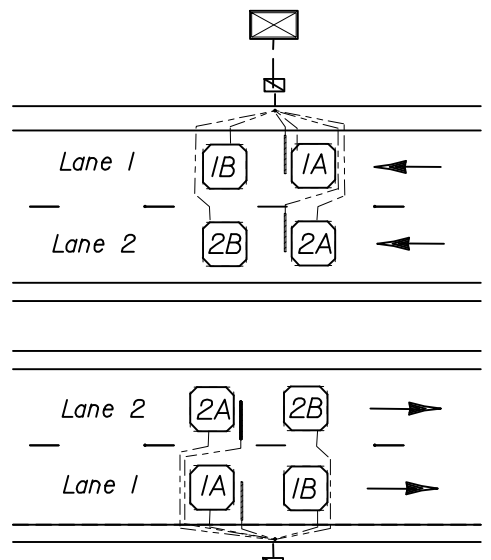
Example: "VS1"



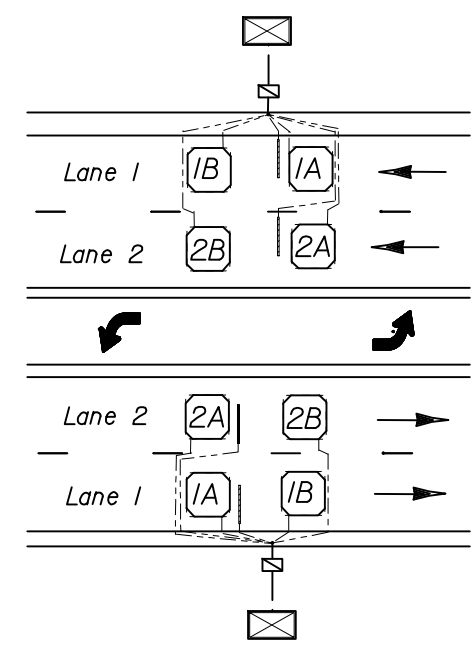
(A) TWO LANE - TWO WAY



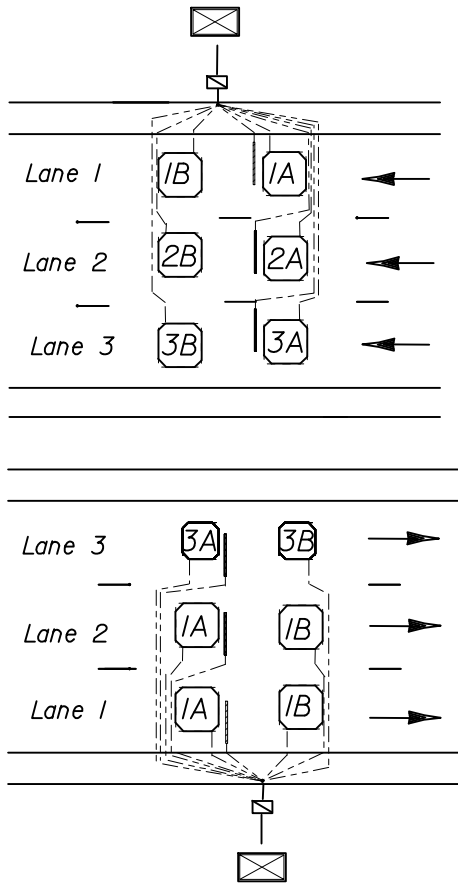
(B) FOUR LANE, UNDIVIDED TWO WAY



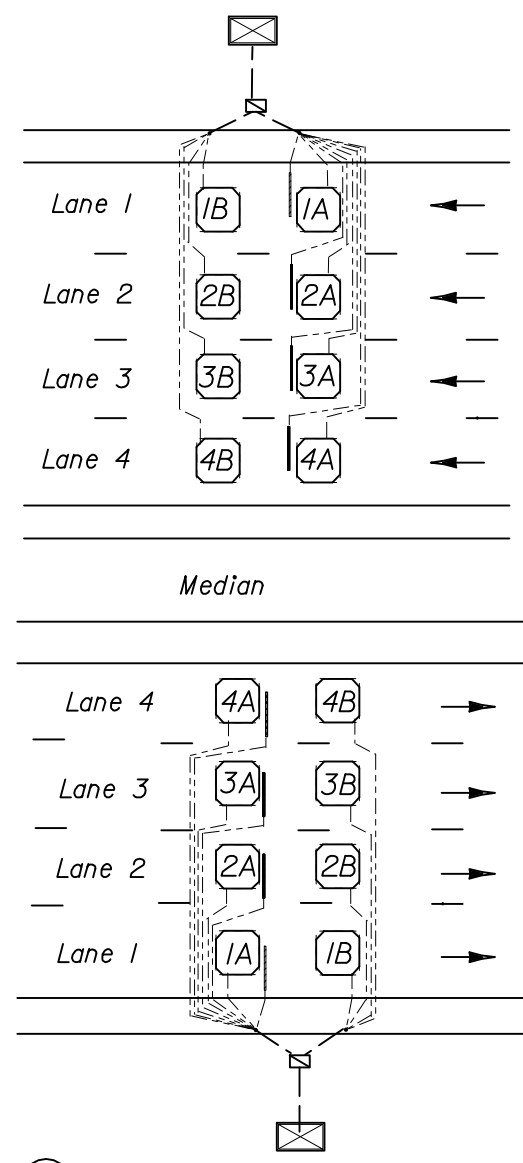
(C) FOUR LANE, DIVIDED - TWO WAY



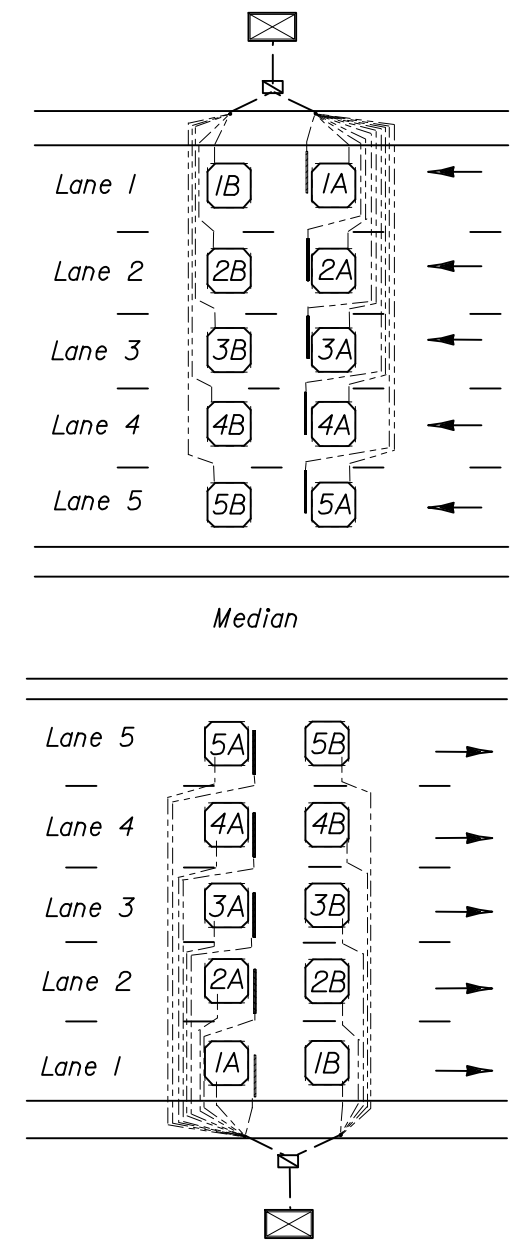
(D) FOUR LANE/CONTINUOUS LEFT TURN LANE



(E) SIX LANE, DIVIDED - TWO WAY



(F) EIGHT LANE, DIVIDED TWO WAY



(G) TEN LANE, DIVIDED TWO WAY

**LANE NUMBERING CONVENTION DETAIL**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**TRAFFIC MONITORING SITE**

Names	Dates	Approved By <i>[Signature]</i>		
Designed By		Mgr Of Transportation Statistics		
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