Abbreviation	Meaning
MG	1000 Gallons
Kip	1000 Pounds
AM	12:00 Midnight Until 11:59 Noon
PM	12:00 Noon Until 11:59 Midnight
Abd.	Abandoned
Accel.	Acceleration
AC, Ac.	Acre
ABS	Acrylonitrite–Butadiene–Styrene Pipe
Act.	Actuated
Adh.	Adhesive
Adj.	Adjust
SF	Adjustment Factor In Percent, Silt Fence
Agg.	Aggregate
Ah.	Ahead
Alt.	Alternate
Al.	Aluminum
AASHTO	American Association Of State Highway And Transportation Officials
AASHO	American Association Of State Highway Officials
AAA	American Automobile Association
ACI	American Concrete Institute
AISC	American Institute Of Steel Construction
ANSI	American National Standards Institute
ARTBA	American Road & Transportation Builders Association
ASTM	American Society For Testing And Materials
AWS	American Welding Society
AWG	American Wire Gauge
ADA	Americans With Disabilities Act, The
AADT	Annual Average Daily Traffic
AOS	Apparent Opening Size
Appl.	Applied, Application
Apprh.	Approach
APL	Approved Products List
Approx.	Approximate
A	Area or Amperes
Artf.	Artificial
Asph.	Asphalt
ABC	Asphalt Base Course
ATPB	Asphalt Treated Permeable Base
AC or Asph. Conc.	Asphaltic Concrete
Assem.	Assembly
Assoc.	Associate, Association
Assn.	Association
Attn.	Attention
Attnuatr.	Attenuator
AFAD	Automated Flagger Assistance Device
Aux. or Auxil.	Auxiliary
Ave.	Avenue
ADT	Average Daily Traffic
Az	Azimuth
Bk.	Back
B/C, B.C.	Back Of Curb
B to B	Back to Back
BW	Barbed Wire, Bottom Width or Both Ways
Basc.	Bascule
BCWE	Base Clearance Water Elevation
BL, BLC, or ℄	Base Line, Base Line Control
BO	Basin Outlet
Brg.	Bearing
Bq.	Becquerel
Beg.	Begin
BLON	Begin Length Of Need
BOS	Beginning Of Survey

Abbreviation	Meaning
BM	Bench Mark
Bit.	Bituminous
BCPCMP	Bituminous Coated And Paved Corrugated Metal Pipe Culvert
BCPPA	Bituminous Coated And Paved Pipe Arch Culvert
BCCMP	Bituminous Coated Corrugated Metal Pipe Culvert
BCPA	Bituminous Coated Pipe Arch Culvert
Bd. or Bnd.	Bond or Bonded
Bdr.	Border
BP	Borrow Pit
BC	Bottle Cap or Bolt Circle
Bot.	Bottom
Blvd.	Boulevard
Bndry.	Boundary
Brkwy.	Breakaway
BCT	Breakaway Cable Terminal
Br.	Bridge
Bldg.	Building
Blkhd.	Bulkhead
BE	Buried Electric
BT	Buried Telephone Cable or Duct
Btfly.	Butterfly
CATV	Cable Television
cd	Candela
Ctlvr.	Cantilever
C	Cantilever Length, Cut, Colorless, Coulomb or Cycle Length
Cap.	Capacity
Caps.	Capital Letters
CIPL, C.I.P., C–I–P	Cast In Place
CI	Cast Iron
CIP	Cast Iron Pipe
CB	Catch Basin
°C	Celsius (degree)
Cem.	Cement or Cemetery
CTPB	Cement Treated Permeable Base
Cem'd.	Cemented
Ctr., Ctrs.	Center
CL, C/L or ℄	Center Line
CCEW	Center to Center Each Way
CC, C/C, C to C, or C.C.	Center to Center, Crash Cushion
Chg.	Changeable
Ch.	Channel
Chchg.	Channel Change
Ckt.	Circuit
circ.	Circumference
CRA	Clear Recovery Area
CT	Clear Trunk
Cl. or Clear	Clearance
CCTV	Closed–Circuit Television
CA	Coarse Aggregate
CFR	Code of Federal Regulations
Col.	Column
Com.	Commercial or Common
COMM	Committee or By Committee
Comp.	Composite
Conc.	Concrete
CBC	Concrete Box Culvert
CBS	Concrete Box Structure
CMB	Concrete Median Barrier
CM	Concrete Monument
CP	Concrete Pipe
CPT	Cone Penetration Test
Con.	Connect or Connection
Const.	Construct or Construction
Cont.	Continuation

Abbreviation	Meaning
Contr.	Contractor
CR	Control Radius or County Road
Contrl.	Controller
Coord.	Coordinate
X	Coordinate Value (East–West Direction) or Extra
Y	Coordinate Value (North–South Direction)
CU or Cu	Copper
Cor.	Corner
Corr.	Corrugated
CASP	Corrugated Aluminized Steel Pipe
CAP	Corrugated Aluminum Pipe
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
CPE	Corrugated Polyethylene Pipe
CSP	Corrugated Steel Pipe
CSIP	Cost Savings Initiative Proposal
Co.	County or Company
Crs. or Cse.	Course
CD	Cross Drain, Cross Direction (Geotextiles)
X Rd.	Cross Road
Xsec.	Cross Section
Xing.	Crossing
CFS	Cubic Feet Per Second
CY,Cu. Yd., CY, or C.Y.	Cubic Yard
Culv.	Culvert
C & G	Curb And Gutter
CS	Curve To Spiral
Cyl.	Cylindrical
Decel.	Deceleration
Deg.	Degree
DCS	Degree Of Curvature (Spiral)
D	Degree Of Curvature, Depth, Density, Distance, Diameter or Directional Distribution
Delin.	Delineators
Demobl.	Demobilization
Dept.	Department
DOT	Department Of Transportation
DGN or Dgn.	Design
DFE	Design Flood Elevation
DHW	Design High Water
K	Design Hour Factor
DHV	Design Hourly Volume
DR	Design Review
DSL	Design Service Life
DS	Design Speed
Det.	Detour, Detection, Detectable
D, Dia. or Ø	Diameter
DBH	Diameter At Breast Height
Dim.	Dimension
DDHV	Directional Design Hour Traffic
Disp.	Disposal
Dist.	Distance
DLS	District Location Surveyor
DTOE	District Traffic Operations Engineer
DT	Ditch
DBI	Ditch Bottom Inlet
DPI or D.P.I.	Ditch Point Intersection
DMM	Domestic Mail Manual
Dbl.	Double
Dr. or DR.	Drain, Drive or Design Review
DA	Drainage Area or Deflection Angle
Dwg.	Drawing
Driv.	Driven

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Abbreviation	Meaning
Drwy.	Driveway
DI	Drop Inlet
DD	Dry Density
EA or Ea.	Each
Esmt.	Easement
E	East or External Distance
EB	Eastbound
E.P. or EOP	Edge Of Pavement
Elast.	Elastomeric
Elec.	Electric
EIA	Electronic Industries Alliance
ETP	Electronic Tough Pitch
El. or Elev.	Elevation
Ellip.	Elliptical
Embk.	Embankment
Emul.	Emulsified
Encl.	Enclosure
EOS	End Of Survey or Equivalent Opening Size
E to E	End to End
EW	Endwall
Engr.	Engineer
Eq.	Equation or Equal
Equip.	Equipment
Est.	Establish or Established
Est. or Estm.	Estimate
Etc. or etc.	Et Cetera (And So Forth)
EPDM	Ethylene Propylene Diene Monomer
Exc. or Excav.	Excavation
Ex.	Except, Example
Exist.	Existing
Exp.	Expansion
Exwy.	Expressway
Ext.	Extension
I	External Angle (Delta), Interstate
F to F	Face to Face
Fed.	Federal
FA	Federal Aid or Fine Aggregate
FAP	Federal Aid Project
FHWA	Federal Highway Administration
FPM or fpm	Feet Per Minute
FPS or fps	Feet Per Second
Fert.	Fertilizer
FOC	Fiber Optics Cable
Fig.	Figure
F	Fill, Farad
F or Final	Final Quantity
Fin.	Finish
FH	Fire Hydrant
FES	Flared End Section
FETS	Flared End Terminal Section
Flex.	Flexible
FTB	Floating Turbidity Barrier
FE	Floor Elevation
FL, Fl. or Fla.	Florida
FAC	Florida Administrative Code
FDOT	Florida Department Of Transportation
F.S.	Florida Statutes
FTP	Florida Traffic Plans
FTBA	Florida Transportation Builder Association
F.L., FL or $\mathit{\mathfrak{L}}$	Flow Line
Ft.	Foot or Feet
Sq. Ft., SF, or S.F.	Foot, Squared
Fdn.	Foundation
FR or Fr.	Frame

Abbreviation	Meaning
Frang.	Frangible
FD	French Drain
Freq.	Frequency
FC	Friction Course
Furn.	Furnish
F & I	Furnish & Install
FNQ	Fuse (Type Slow Burn)
Ga. or Gal.	Gallon
Galv.	Galvanized
GIP	Galvanized Iron Pipe
GRC	Galvanized Rigid Steel Conduit
Gar.	Garage
GM	Gas Main
Ga.	Gauge or Gage
GRI	Geosynthetic Research Institute
G	Giga or Gauss
GP	Grade Point
Gr.	Grade, Guardrail or Grate
g	Gram or Gravity
Gr. or Gro.	Gross
gross km	Gross Kilometer
Gr. Wt. or gr. wt.	Gross Weight
Grd.	Ground
GFI	Ground Fault Interrupter
Gttr.	Gutter
GD	Gutter Drain
HOA	Hand/Off/Automatic
Hndrl	Handrail
HB	Hay Bales
HD or Hd.	Head
Hdwl.	Headwall
HH	Heavy Hex
ha	Hectare
h	Hecto
Ht.	Height
H	Henry
Hz	Hertz
HD	High Density or Heavy Duty
HDPE	High Density Polyethylene
HOT	High Occupancy Tolls
HOV	High Occupancy Vehicle
HP	High Pressure or Horsepower
HS	High Strength
HSHV	High Strength Horizontal Vertical
HW or H.W.	High Water or Hot Water
Hwy.	Highway
HAR	Highway Advisory Radio
Horiz. or Hor.	Horizontal
HC	Horizontal Clearance
Hr.	Hour
Hse.	House
Cwt.	Hundredweight
Hyd.	Hydraulic
IES	Illuminating Engineering Society
in.	Inch(s)
sq. in.	Inch, Squared
Incl. or Inc.	Included
Inc.	Incorporated or Including
Ind.	Industry or Industrial
ID, I.D.	Inside Diameter or Identification
Install.	Installed
ITE	Institute Of Transportation Engineers
THW or THWN	Insulation (Flame Retardant, Moisture And Heat Resistant Thermoplastic)
RHW	Insulation (Moisture & Heat Resistant Rubber)

Abbreviation	Meaning
ITS	Intelligent Transportation Systems
Intchg. or Ichg.	Interchange
IMC	Intermediate Metal Conduit
Isect.	Intersection
INV. or Inv.	Invert
IP	Iron Pipe
IR	Iron Rod
Isl.	Island
Jt.	Joint
J	Joule
Jct.	Junction
JB	Junction Box
K	Kelvin
k	Kilo (prefix)
kg	Kilogram
kg/m³	Kilogram Per Cubic Meter
kg/m	Kilogram Per Meter
kg/m²	Kilogram Per Square Meter
km	Kilometer
km/h	Kilometer Per Hour
kN	Kilonewton
kPa	Kilopascal
kV	Kilovolt
kVA	Kilovolt Ampere
kWh	Kilowatt-hour
ksi	Kips Per Square Inch
kn	Knot
Lat.	Lateral or Latitude
LEO	Law Enforcement With Flashing Lights And Radar
Lt.	Left
LT	Left Turn
Lgth.	Length
LS	Length Of Spiral
TSC	Length Of Tangent (Spiral Curve)
L	Length, Length Of Curve, Liter, Left
Ltd.	Lighted or Limited
L/W	Lightweight
Lmrk.	Lime rock
LBR	Lime rock Bearing Ratio
LOS	Limit Of Clear Sight
LA or L/A	Limited Access
Lin.	Linear
LFD	Load Factor Design
LRFD	Load Resistance Factor Design
Loc., LO	Location
LC	Long Chord
Long.	Longitude
lm	Lumen
Lum.	Luminaire
lx	Lux
Mach.	Machine
MD	Machine Direction (Geotextiles)
Maint.	Maintenance
MOT	Maintenance Of Traffic
MOTC	Maintenance Of Traffic Committee
MH, M.H.	Manhole or Mounting Height
MASH	Manual for Assessing Safety Hardware (AASHTO)
MUTCD	Manual On Uniform Traffic Control Device
MUTS	Manual On Uniform Traffic Studies
Mfg.	Manufactured or Manufacturer
M	Mass, Middle Ordinate Length or Mega
Matl.	Material
Max.	Maximum
MHW	Mean High Water

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Abbreviation	Meaning
MLW	Mean Low Water
MSL	Mean Sea Level
pH	Measure Of Acidity or Alkalinity
Med.	Median
MB	Median Barrier
MPa	Megapascal
Memb.	Member
Mess.	Message
m^3	Meter Cubed or Cubic Meter
m^3/m	Meter Cubed Per Meter
m	Meter or Milli
m^2	Meter Square
m/s	Meters Per Second
t	Metric Ton
µ	Micro
Mid.	Middle
Mi.	Mile
MP	Mile Post
MPH or mph	Miles Per Hour
Mil.	Military
mL	Milliliter
mm	Millimeter
Min.	Minimum or Minute
MSTCSD	Minimum Specifications For Traffic Control Signal Devices
Misc.	Miscellaneous
MES	Mitered End Section
Mobl.	Mobilization
Mod.	Modify or Modified
Mol	Mole
Mon.	Monument
MAS	Motorist Awareness System
Mtd.	Mounted
N & C	Nail & Cap
N & D	Nail & Disk
NHS	National Highway System
NAVD	National American Vertical Datum
NC	National Coarse or Normal Crown
NCHRP	National Cooperative Highway Research Program
NEMA	National Electrical Manufacturers Association
NGS	National Geodetic Survey
NGVD	National Geodetic Vertical Datum of 1929
NPT	National Pipe Thread
NDCBU	Neighborhood Delivery And Collection Box Unit
net km	Net Kilometer
NJ	New Jersey
Nm	Newton Meter
N/m^3	Newtons Per Cubic Meter
N/m	Newtons Per Meter
N/m^2	Newtons Per Square Meter
N/mm^2	Newtons Per Square Millimeter
Nom.	Nominal
NPS	Nominal Pipe Size
N.P.	Non Plastic
NS	Non Stress, Not Suitable or Near Side
NT, N&T	Non Traffic, Nail & Tin
NRCP	Non-Reinforced Concrete Pipe
Norm.	Normal
NHW	Normal High Water
N	North or Newton
NB	Northbound
NE	Northeast
NW	Northwest
NA or N/A	Not Available or Not Applicable
NIC	Not In Contract

Abbreviation	Meaning
NTS	Not To Scale
No.	Number
Ω	Ohm
OC or O.C.	On Center
Mega	One Million
Kilo	One Thousand
Micro	One-Millionth
Milli	One-Thousandth
Mil	One-Thousandth Of An Inch
Opt.	Option, Optional or Optically
O.B.G.	Optional Base Group
Oz.	Ounce
O to O, o to o or O.O.	Out to Out
OD or O.D.	Outside Diameter
OA	Overall
OH, OHD or Ohd.	Overhead
OE	Overhead Electric
OT	Overhead Telephone
Opass	Overpass
Pr.	Pair
Par.	Parallel
Pkg.	Parking
Pkwy.	Parkway
Part.	Participation or Partition
Pa	Pascal
Pa•s	Pascal Second
P	Passenger Car & Light Delivery Truck
Pavt.	Pavement
Q	Peak Discharge or Flow Volume
Ped	Pedestrian or Pedestal
Pen.	Penetration
PCE	Permanent Construction Easement
PRM	Permanent Reference Monument
Ph.	Phase
PPB	Pier Protection Barrier
P or Plan	Plan Quantity
PS & E	Plans, Specifications And Estimates
PCC	Point Of Compound Curvature or Plain Cement Concrete
PC	Point Of Curvature
PI	Point Of Intersection
PRC	Point Of Reverse Curvature
PT	Point Of Tangency or Pressure Treated
POC	Point On Curve
POST	Point On Semi-Tangent
POT	Point On Tangent
PVC	Polyvinyl Chloride
PCMS	Portable Changeable Message Sign
PRS	Portable Regulatory Sign
Lb.	Pound(s)
PSF or psf	Pounds Per Square Foot
PSI or psi	Pounds Per Square Inch
lb/sy	Pounds Per Square Yard
PP	Power Pole
Prcst.	Precast
PCBC	Precast Concrete Box Culvert
PW	Pressure Water
Prest.	Prestressed
Prob.	Probability
Prod.	Product, Production, Producer or Produced
PE	Professional Engineer
PG	Profile Grade
PGL	Profile Grade Line
Prog.	Program or Progression
Proj.	Project or Projection

Abbreviation	Meaning
PL or ÿþ□!	Property Line or Plate
Prop.	Proposed
Prov.	Provisions
QPL	Qualified Products List
RU	Rack Unit
RSDU	Radar Speed Display Unit
rad	Radian
rad/s	Radian Per Second
R or Rad.	Radius
RR	Railroad
RPM	Raised Reflective Pavement Markers
R or Rng.	Range
RX	Receive
Rec.	Recovery
Ref.	Reference
RM	Reference Monument
RP	Reference Point
Refl.	Reflective
Reg.	Region, Regular, Registered or Regulation
RCP	Reinforced Concrete Pipe
RCPA	Reinforced Concrete Pipe Arch
Reinf.	Reinforced or Reinforcing
Rejuv.	Rejuvenation
Reloc.	Relocated
Rem.	Removal
Repl.	Replace
Req. or Reqd.	Required
Res.	Residence or Residential
Rsf.	Resurface
Rect.	Reticuline or Rectangular
RC	Reverse Crown
rpm or r/min	Revolution Per Minute
r/s	Revolution Per Second
R, Rt.	Right
R/W, ROW	Right Of Way
RGS	Rigid Galvanized Steel
Rd.	Road or Round
Rdsd.	Roadside
Rdwy.	Roadway
RBAC	Rock Base Asphaltic Concrete
RBST	Rock Base Surface Treatment
SBRM	Sand Bituminous Road Mix
SAHM	Sand-Asphalt Hot Mix
SCST	Sand-Clay Surface Treatment
SAN or San.	Sanitary
SS	Sanitary Sewer
Sch.	Schedule
SC	Seal Coat
SHW	Seasonal High Water
Sec.	Second
Sect.	Section
Sed.	Sediment
WB40	Semi Trailer, Intermediate
WB62	Semi Trailer, Interstate
WB50	Semi Trailer, Large
WB67D	Semi Trailer, Tandem
Sep.	Separator
Seq.	Sequential
Serv.	Service
Sh. or Sht.	Sheet
SBAC	Shell Base Asphaltic Concrete
SBST	Shell Base Surface Treatment
Shldr.	Shoulder
SD	Side Drain, Storm Drain

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Abbreviation	Meaning
SW or Swk.	Sidewalk
Sv	Sievert
SU	Single Unit Trucks
SSMD	Solid State Modular Design
SB	Southbound
SE	Southeast
SW	Southwest
Spa., Spcg. or Sp.	Space(ing)
SG	Specific Gravity
Spec.	Specification
SLEO	Speed and Law Enforcement Officer
S or s	Speed, South, Siemens, Or Second
SRASP	Spiral Rib Aluminized Steel Pipe
SRAP	Spiral Rib Aluminum Pipe
SRSP	Spiral Rib Steel Pipe
SC	Spiral To Curve
Stab.	Stability or Stabilization
STB	Staked Turbidity Barrier
Std.	Standard
SPT	Standard Penetration Test
SR or S.R.	State Road
SRD	State Road Department
Sta.	Station
SIP	Stay In Place
Stl.	Steel
SRCP	Steel Reinforced Concrete Pipe
Stge.	Storage
Sty.	Story
St. or ST.	Street
Stg.	Strong
Str.	Structure
SG, Subgr.	Subgrade
Sub. or Subs.	Subsoil
Sub. or Subst.	Substitute
e	Superelevation rate
SP	Superpave
Suppts.	Supports
Surf.	Surface
ST	Surface Treatment or Spiral To Tangent
SUR or Sur.	Survey
Sym.	Symmetrical
Sys. or Syst.	System
tan.	Tangent
TC	Tangent To Curve
TS	Tangent To Spiral
T	Tangent, Length Of Curve, Percent Trucks, Tesla
L	Taper Length, Buffer Length or Taper Length plus Buffer Space
Tel.	Telephone
Temp.	Temperature or Temporary
TBM	Temporary Bench Mark
TCB	Temporary Concrete Barrier
TCE	Temporary Construction Easement
TTC	Temporary Traffic Control
TCP	Terra Cotta Pipe
Theo.	Theoretical
THRMPLSTC	Thermoplastic
Tk or Thick.	Thickness
MBM	Thousand (Feet) Board Measure
Tn.	Ton
T, TWP or Twp.	Township
Traf.	Traffic
TCP	Traffic Control Plan(s)
TCZ	Traffic Control Zone

Abbreviation	Meaning
TVSS	Transient Voltage Surge Suppression
Trans.	Transition, Transverse, Translate or Transportation
TX	Transmit
TDLC	Transportation Design For Livable Communities
Treat.	Treatment
Tk	Truck
TMA	Truck/Trailer Mounted Attenuator
2-L	Two-Lane
2L1W	Two-Lane One-Way
2L2W	Two-Lane Two-Way
Typ.	Typical
Ult.	Ultimate
UV	Ultraviolet
Undrdwy.	Under roadway
Unddr.	Underdrains
UG	Underground
Upass.	Underpass
UL	Underwriters Laboratories
UPS	Uninterruptible Power Supply
USPS	United States Postal Service
Ultd.	Unlimited
UNL or Undl.	Unloaded
Untr.	Untreated
USC & GS	US Coast and Geodetic Survey (now National Geodetic Survey)
USGS	US Geological Survey
Util.	Utilities
VW	Variable Width
Var.	Varies, Variable or Variance
Veh.	Vehicle
VPD or Vpd.	Vehicles Per Day
VPH or Vph.	Vehicles Per Hour
VPHPL or Vphpl.	Vehicles Per Hour Per Lane
Vh	Verified Horizontal Location
Vv	Verified Vertical Elevation
Vvh	Verified Vertical Elevation And Horizontal Location
Vert.	Vertical
VC	Vertical Curve
VF	Vertical Foot
VP	Vertical Panel
VCP	Vitrified Clay Pipe
V	Volt, Velocity, Volume or Hourly Volume
VRMS	Volts Root Mean Square
Vol.	Volume
WM	Water Main
WT	Water Table Or Weight
W/C	Water-Cement Ratio
Wb.	Weber
WWF	Welded Wire Fabric
WWR	Welded Wire Reinforcing
WB	Westbound
W	Width, Wide, West or Watt
W.P.I.	Work Program Item
Yd.	Yard
Sq. Yd., SY or S.Y.	Yard, Squared
Yr.	Year

The abbreviations listed are the standard for contract plans production. This list is not all inclusive. Other Department accepted abbreviations may be used when deemed more appropriate. Where special abbreviations are used a descriptive tabulation may be necessary in the plans.

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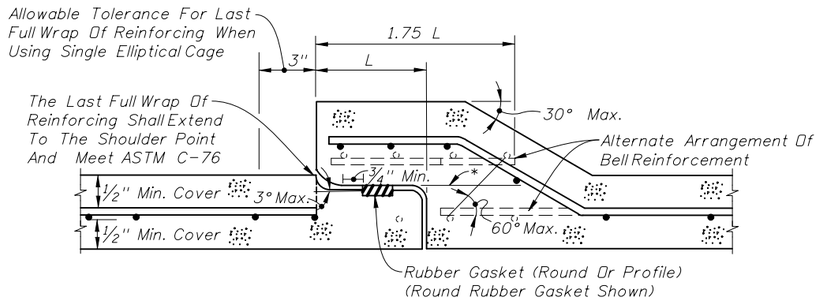
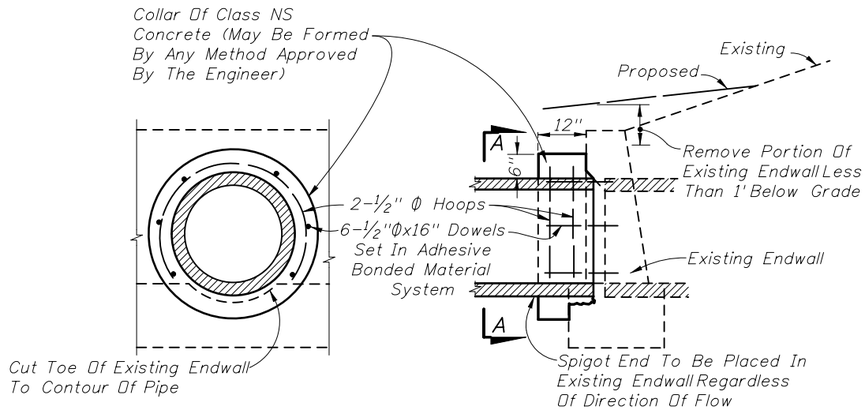
SCHEDULE OF BELL REINFORCEMENT Classes II,III,IV,V; Wall A,B,C		
Nominal Pipe Diameter	Design Bell Reinforcement	Maximum Reinforcement Under Tolerance
	in^2 per foot	in^2 per foot
15"	0.07	0.010
18"	0.07	0.010
24"	0.09	0.010
30"	0.12	0.010
36"	0.14	0.010
42"	0.16	0.010
48"	0.19	0.011
54"	0.21	0.012
60"	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

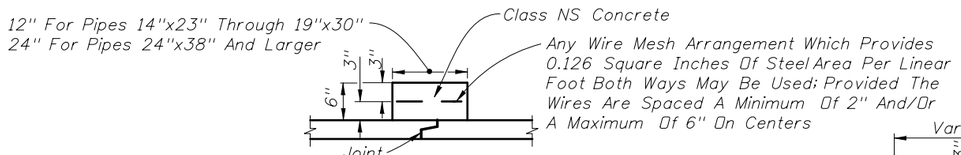
DETAIL OF BELL & SPIGOT CONCRETE PIPE JOINT USING ROUND OR PROFILE RUBBER GASKET



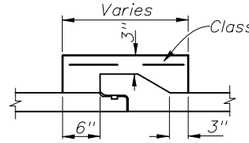
SECTION AA LONGITUDINAL SECTION

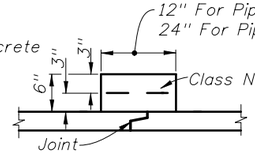
Note: Cost for removal and disposal of portions of top and toe of existing endwall and cost of concrete, reinforcing steel and construction of collar to be included in the contract unit price for pipe culvert.

CONCRETE COLLAR FOR EXTENSION OF EXISTING PIPE CULVERTS



CONCRETE JACKET

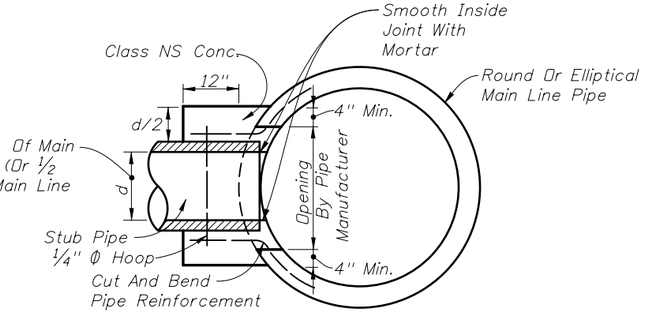




Note: For reinforcement see elliptical pipe concrete jacket. (All Pipe Sizes)

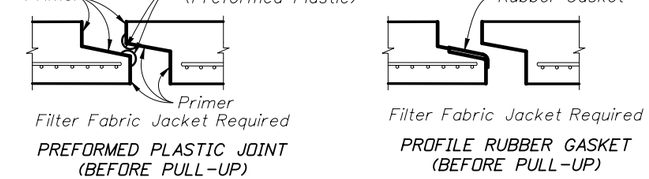
BELL AND SPIGOT TONGUE & GROOVE

DISSIMILAR JOINTS



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

CONCRETE COLLAR FOR JOINING MAINLINE PIPE AND STUB PIPE

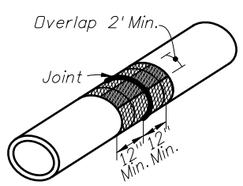


PREFORMED PLASTIC JOINT (BEFORE PULL-UP)

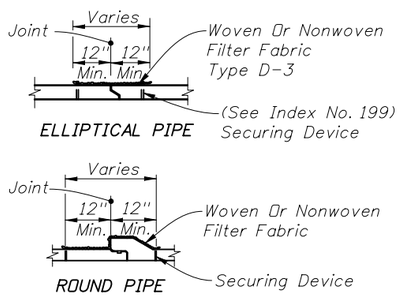
PROFILE RUBBER GASKET (BEFORE PULL-UP)

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

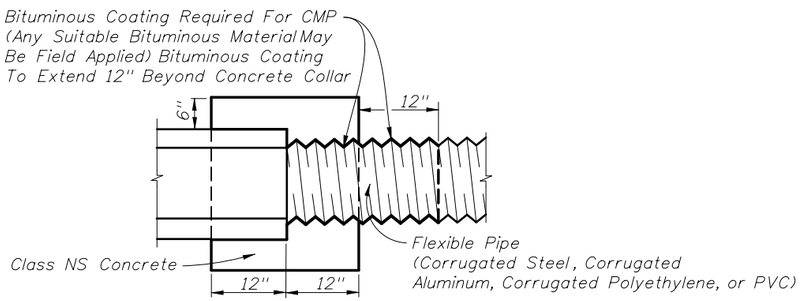


PIPE SECTIONS

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

FOR ALL PIPE TYPES - CONCRETE PIPE SHOWN

FILTER FABRIC JACKET



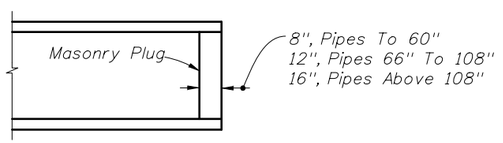
Note: Cost of concrete and bituminous coating to be included in contract unit price for either new pipe or Mitered End Section.

Alternate connection must be approved by the State Drainage Engineer.

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



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

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	MTP	Changed the Concrete Collar designation from Class I to Class NS.			

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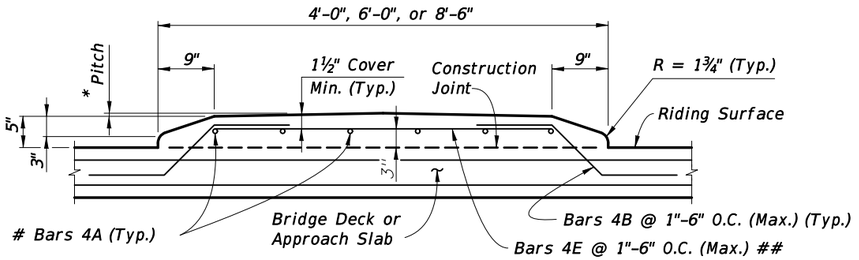
MISCELLANEOUS DRAINAGE DETAILS

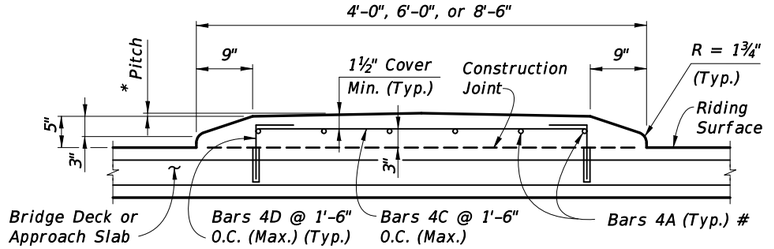
Interim Date 01/01/11

Sheet No. 1 of 3

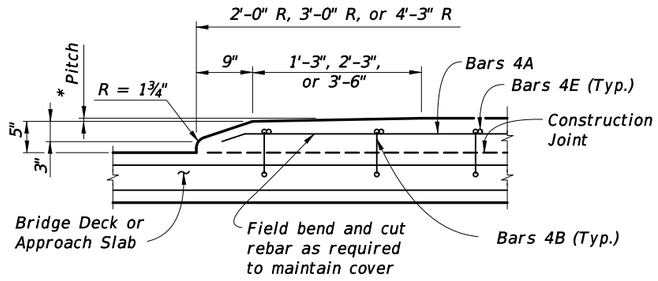
Index No. 280



TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)



TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)

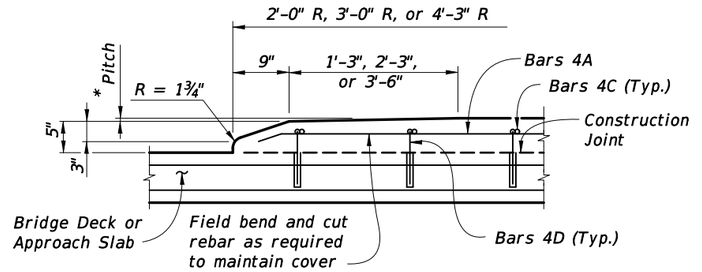


LONGITUDINAL SECTION THRU TRAFFIC SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)

 # For 4'-0" width : Bars 4A @ 3 equal spaces (continuous).
For 6'-0" width : Bars 4A @ 5 equal spaces (continuous).
For 8'-6" width : Bars 4A @ 7 equal spaces (continuous).

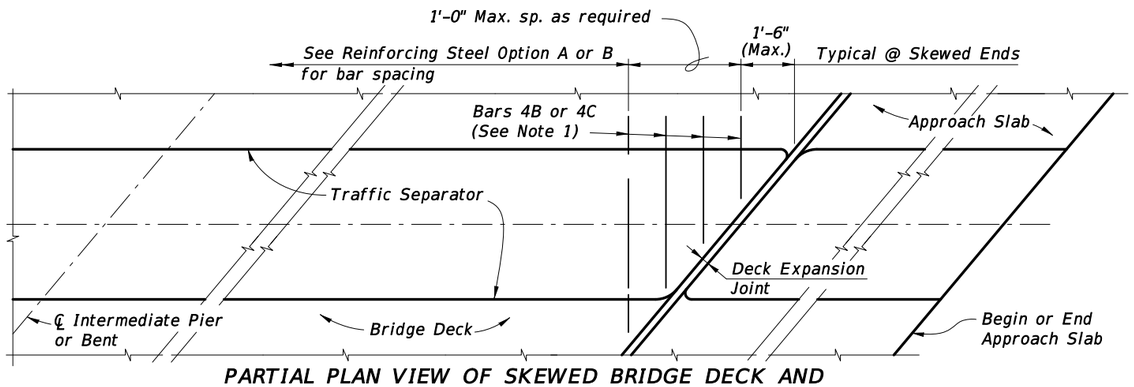
At the Contractor's option a one piece bar may be substituted for Bars 4B and 4E.

** Pitch:*
¼" For 4'-0" Separator
½" For 6'-0" Separator
¾" For 8'-6" Separator



LONGITUDINAL SECTION THRU TRAFFIC SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)

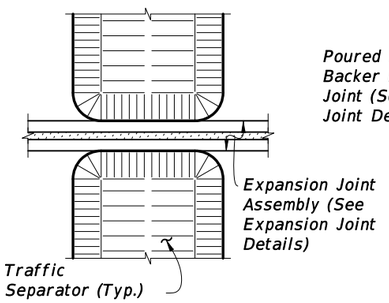
REINFORCING STEEL OPTION A



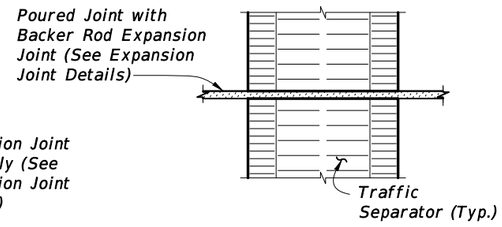
PARTIAL PLAN VIEW OF SKEWED BRIDGE DECK AND APPROACH SLAB WITH TRAFFIC SEPARATOR
(Deck Expansion Joint at Begin or End Bridge Shown, Expansion Joint at ℄ Pier or Intermediate Bents Similar)

Notes:
1) *Traffic Separator transverse reinforcement adjacent to deck expansion joints shall be field adjusted to maintain clearance and spacing. Bars shall be field cut as shown, bars may be rotated to maintain clearance.*
2) *Traffic Separator ends at deck expansion joints shall follow the deck joint limits. Drainage joints and ½" V-Grooves shall be placed perpendicular or radial to the ℄ of the Traffic Separator. See Structures Plans, Superstructure and Approach Slab Sheets for details.*
3) *See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation.*

REINFORCING STEEL OPTION B (NOT PERMITTED ON BRIDGE DECKS WITH PRESTRESSING STEEL)



DETAIL AT EXPANSION JOINTS
(Strip Seal Shown, Other Armored Joint Types Similar)



DETAIL AT POURED JOINT WITH BACKER ROD EXPANSION JOINTS

BRIDGE INSTALLATIONS - TYPE "E" CURB

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	Added Skew Treatment from Index 490.			

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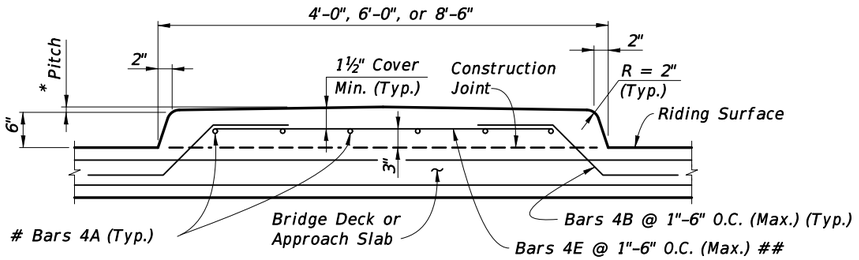
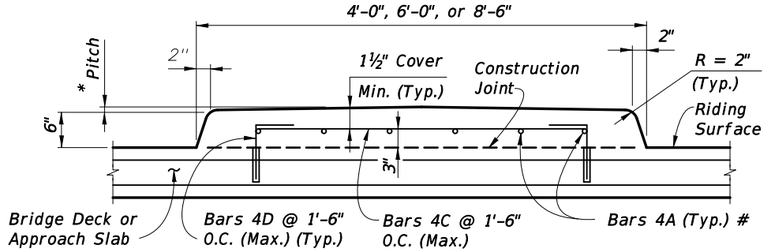
TRAFFIC SEPARATORS

Interim Date 01/01/11 | Sheet No. 2 of 4

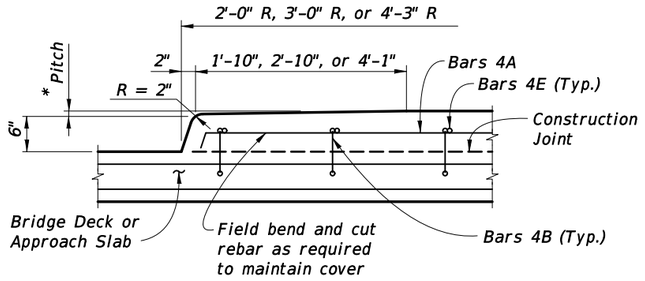
Index No. 302



TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)



TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)

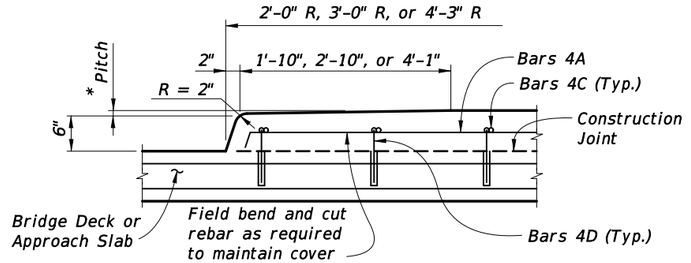


LONGITUDINAL SECTION THRU TRAFFIC SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)

 # For 4'-0" width : Bars 4A @ 3 equal spaces (continuous).
For 6'-0" width : Bars 4A @ 5 equal spaces (continuous).
For 8'-6" width : Bars 4A @ 7 equal spaces (continuous).

At the Contractor's option a one piece bar may be substituted for Bars 4B and 4E.

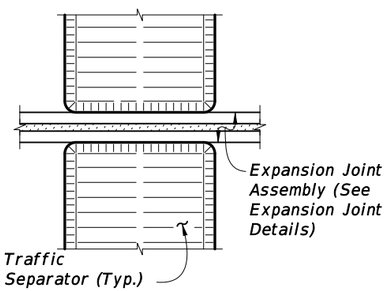
** Pitch:*
¼" For 4'-0" Separator
½" For 6'-0" Separator
¾" For 8'-6" Separator



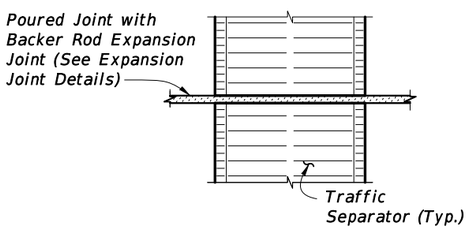
LONGITUDINAL SECTION THRU TRAFFIC SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)

REINFORCING STEEL OPTION A

REINFORCING STEEL OPTION B (NOT PERMITTED ON BRIDGE DECKS WITH PRESTRESSING STEEL)



DETAIL AT EXPANSION JOINTS
(Strip Seal Shown,
Other Armored Joint Types Similar)



DETAIL AT POURED JOINT WITH BACKER ROD EXPANSION JOINTS

Note:
Treatment of separators on straight bridges shown. For additional notes and treatment of separators on skewed bridges, see Sheet 2.

BRIDGE INSTALLATIONS - TYPE "F" CURB

REVISIONS

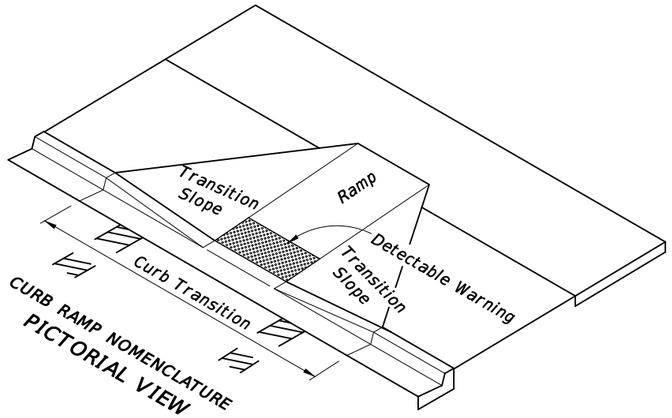
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	Changed Note reference from Index No. 490 to "Sheet 2"			

2010 Interim Design Standard

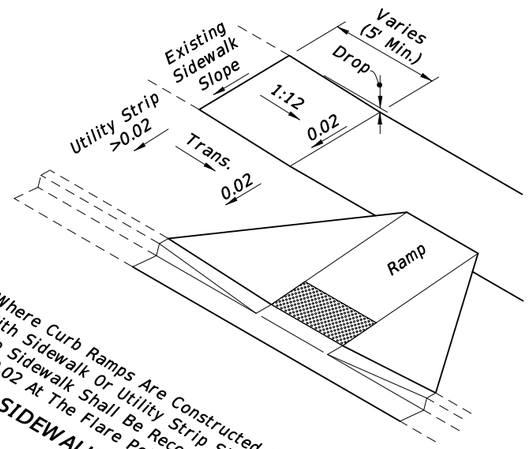
TRAFFIC SEPARATORS

Interim Date 01/01/11 | Sheet No. 3 of 4

Index No. 302

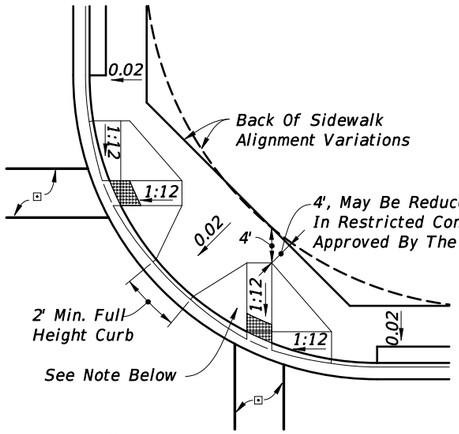


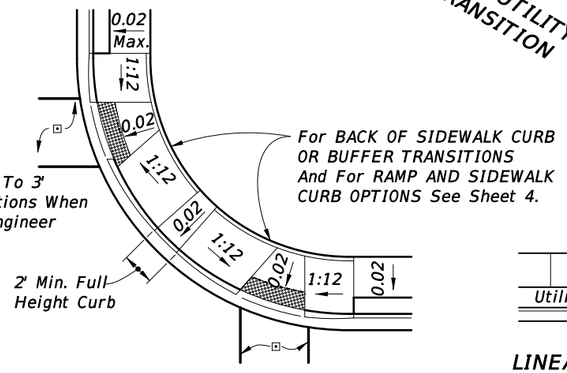
CURB RAMP NOMENCLATURE
PICTORIAL VIEW

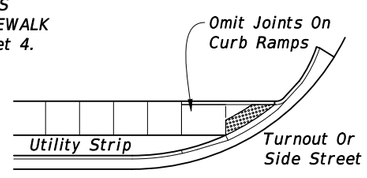


Where Curb Ramps Are Constructed In Existing Sidewalks With Sidewalk Or Utility Strip Slopes Greater Than 0.02, The Sidewalk Shall Be Reconstructed To Reduce The Slopes To 0.02 At The Flare Point.

SIDEWALK / UTILITY STRIP TRANSITION







LINEAR SIDEWALK RAMPS

Note: A portion of one or both ramps may extend outside the return.

Note:
When crosswalk markings are required, ramp runs must fall within crosswalk limits and where practical, be parallel with the projected crosswalk alignment. The bottom of the ramp beyond the curb line shall have a clear space 48" minimum within the markings of a marked crosswalk. If no crosswalk markings are present, the bottom of the ramp beyond the curb ramp shall have a clear space 48" minimum outside active traffic lanes.

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

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.

   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. Curb ramp detectable warning surfaces shall extend the full width of the ramp and 24" deep. Detectable warning surfaces shall be constructed in accordance with Specification 527. See Sheet 6 of 6 for detectable warning layouts. Transition slopes are not to have detectable warnings. Detectable warnings are required on sidewalks at intersecting roads, streets and railroads. For requirements for detectable warnings on sidewalks at intersecting driveways, see Index 310.

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. For details of Concrete Sidewalk See Index 310.

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.

9. Acceptance Criteria for Detectable Warnings:
   (a) The ramp detectable warning surface shall be complete and uniform in color and texture
   (b) 90% of the individual truncated domes must comply with the design criteria
   (c) There may be no more than 4 non-complying domes in any one square foot of surface
   (d) No two adjacent domes may be non-compliant
   (e) Surface may not deviate more than 0.10" from a true plane

10. All sidewalk surfaces, ramp surfaces, and landings with a cross slope shown in this Index to be 0.02 shall be 0.02 maximum. All ramp surfaces and ramp transition slopes with a slope shown in this Index to be 1:12 shall be 1:12 maximum.

TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS

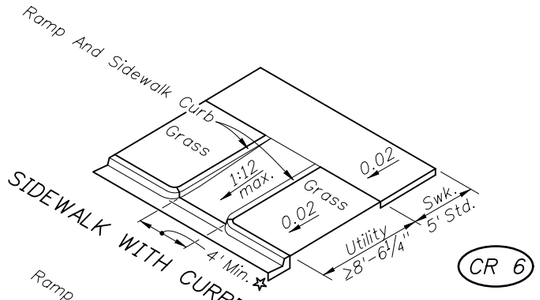
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	DP	Removed the 2' level landing from all details and notes.			

2010 Interim Design Standard

PUBLIC SIDEWALK CURB RAMPS

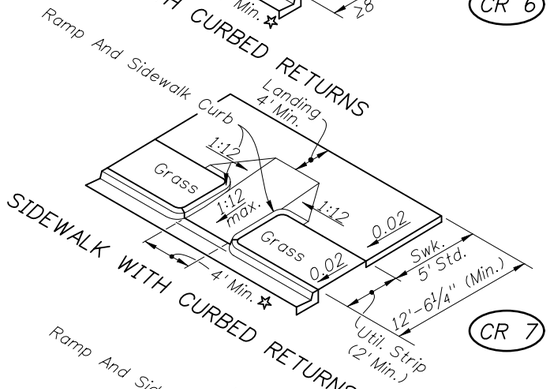
Interim Date 01/01/11

Index No. 304



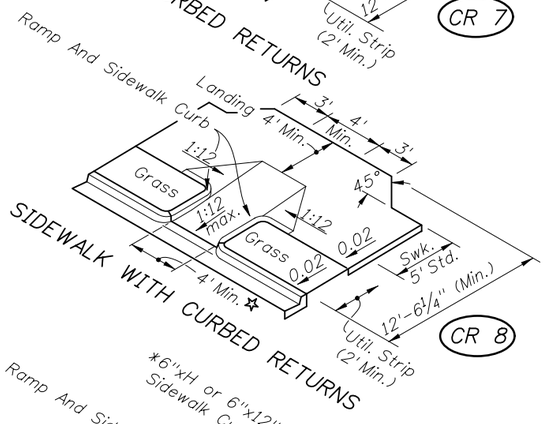
SIDEWALK WITH CURBED RETURNS

CR 6



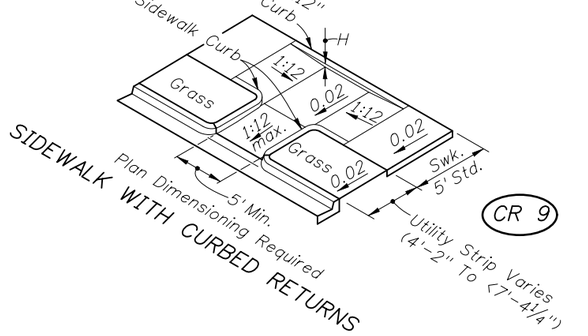
SIDEWALK WITH CURBED RETURNS

CR 7



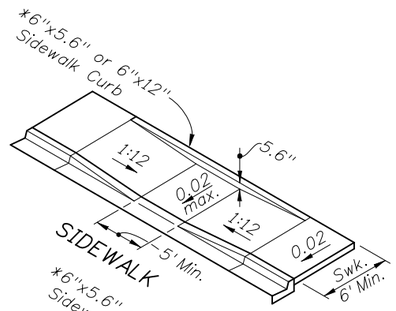
SIDEWALK WITH CURBED RETURNS

CR 8



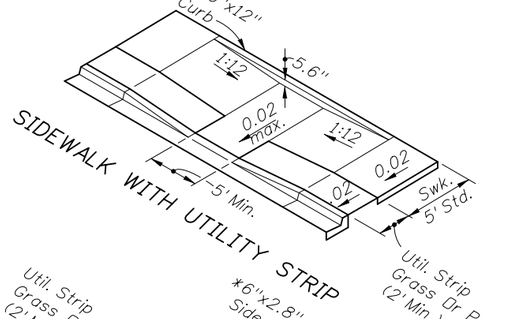
SIDEWALK WITH CURBED RETURNS

CR 9



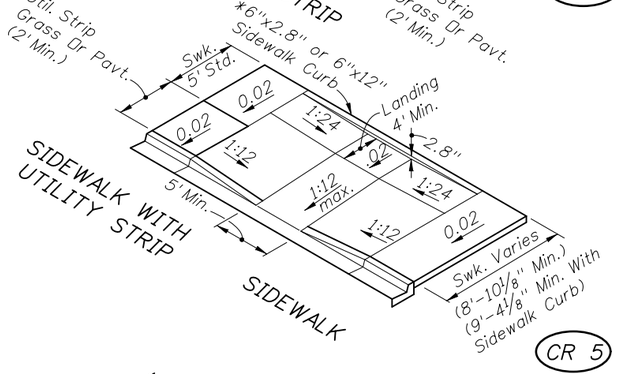
SIDEWALK

CR 3



SIDEWALK WITH UTILITY STRIP

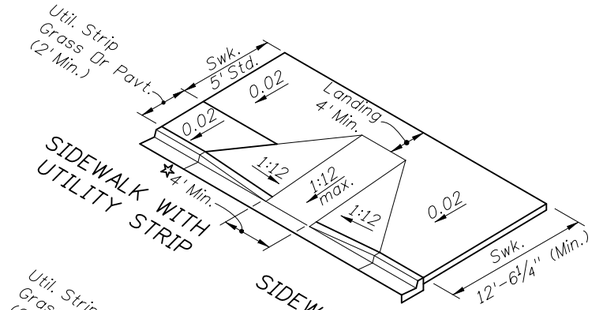
CR 4



SIDEWALK WITH UTILITY STRIP

SIDEWALK

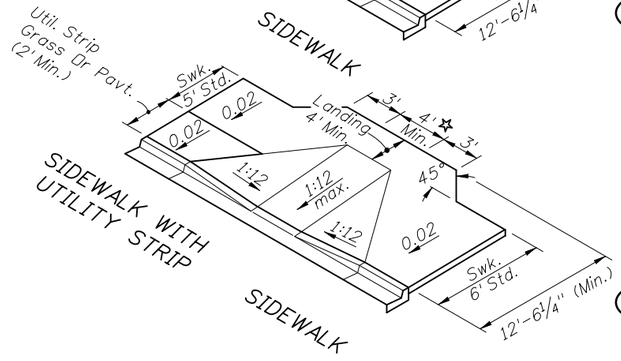
CR 5



SIDEWALK WITH UTILITY STRIP

SIDEWALK

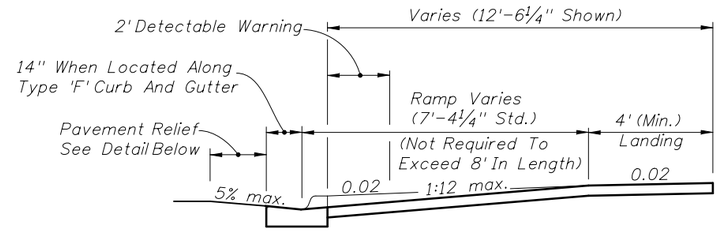
CR 1



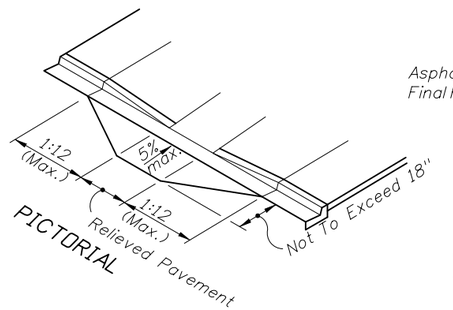
SIDEWALK WITH UTILITY STRIP

SIDEWALK

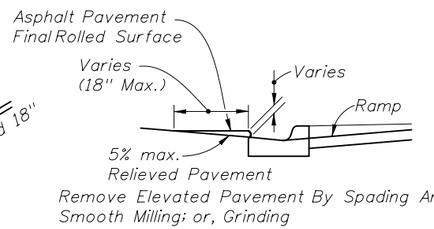
CR 2



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



PICTORIAL



Remove Elevated Pavement By Spading And Rolling; Smooth Milling; or, Grinding

SECTION

PAVEMENT RELIEF AT LIP OF CURB

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

☆ Ramp Widths For Curb Ramps CR 1, CR 2, CR 6, CR 7, And CR 8 May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer.

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

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	DP	Removed 2' level landing from all details and notes.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

PUBLIC SIDEWALK CURB RAMPS

Interim Date 01/01/11

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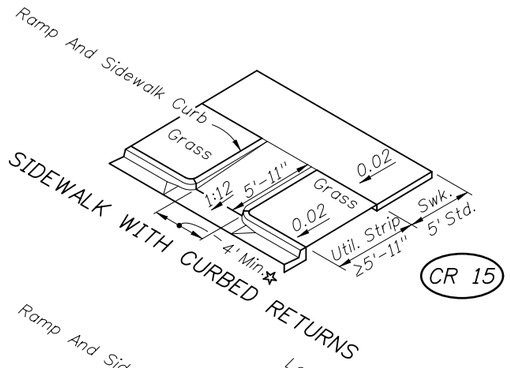
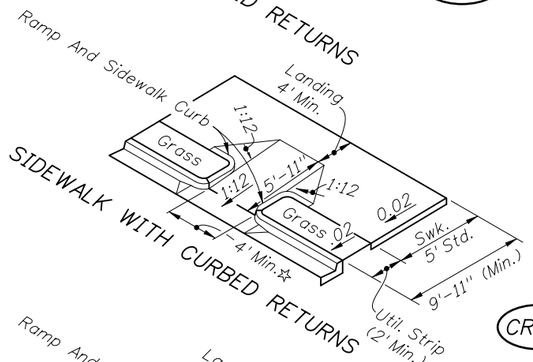


SIDEWALK WITH CURBED RETURNS

CR 15



SIDEWALK WITH CURBED RETURNS

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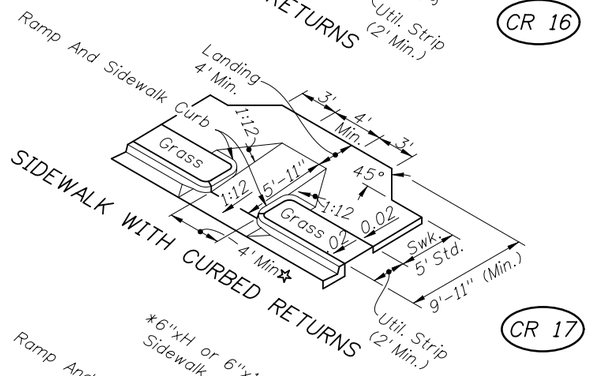
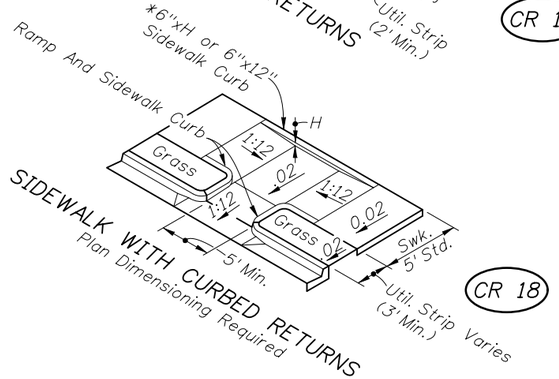


SIDEWALK WITH CURBED RETURNS

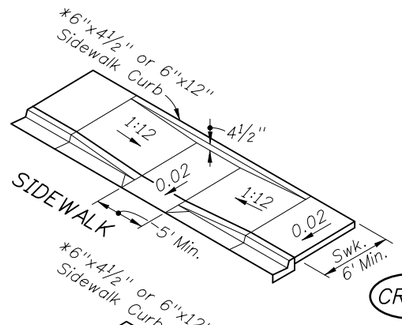
CR 17



SIDEWALK WITH CURBED RETURNS

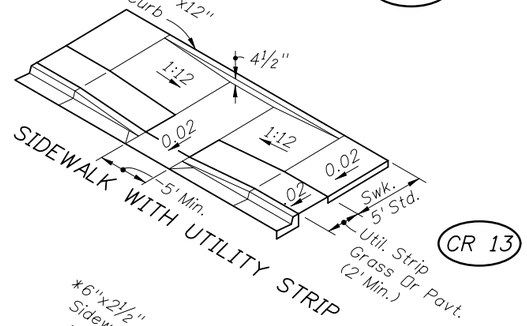
Plan Dimensioning Required

CR 18



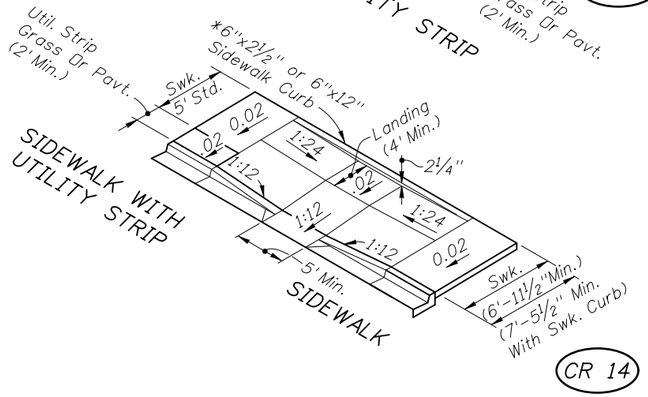
SIDEWALK

CR 12



SIDEWALK WITH UTILITY STRIP

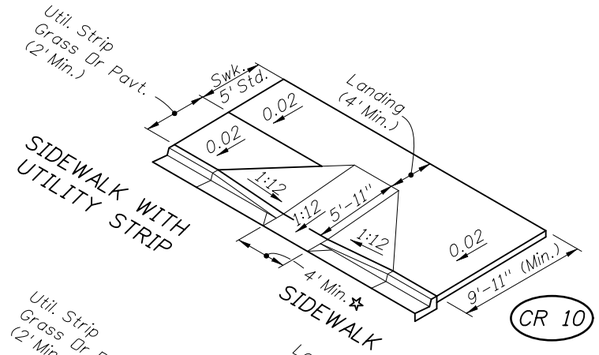
CR 13



SIDEWALK WITH UTILITY STRIP

SIDEWALK

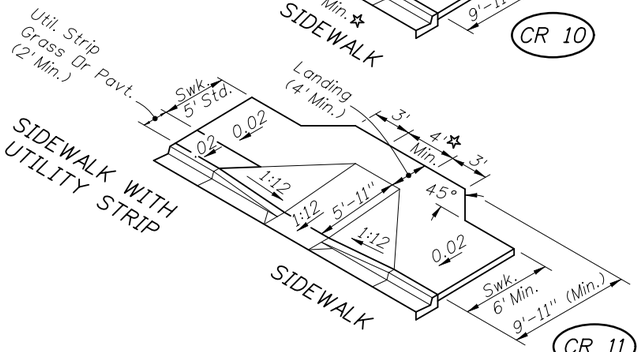
CR 14



SIDEWALK WITH UTILITY STRIP

SIDEWALK

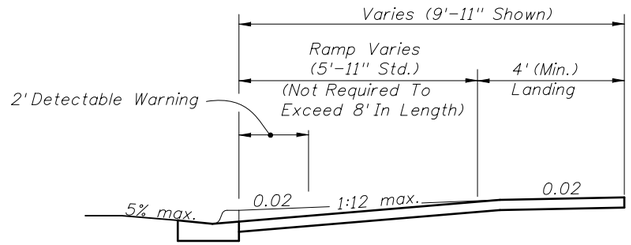
CR 10



SIDEWALK WITH UTILITY STRIP

SIDEWALK

CR 11



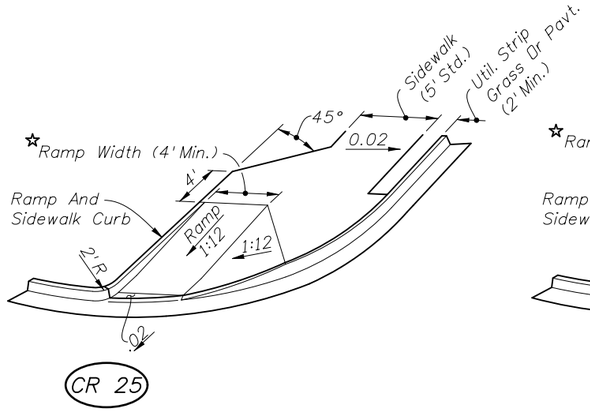
SECTION THROUGH RAMP RUN AND LANDINGS WITH UPPER LANDING AT NORMAL SIDEWALK ELEVATION

☆ Ramp Widths For Curb Ramps CR 10, CR 11, CR 15, CR 16, And CR 17 May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer.

* 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

REVISIONS						2010 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		01/01/11	3 of 6
01/01/11	DP	Revomed 2' level landing from all details and notes.				PUBLIC SIDEWALK CURB RAMPS	Index No.	304



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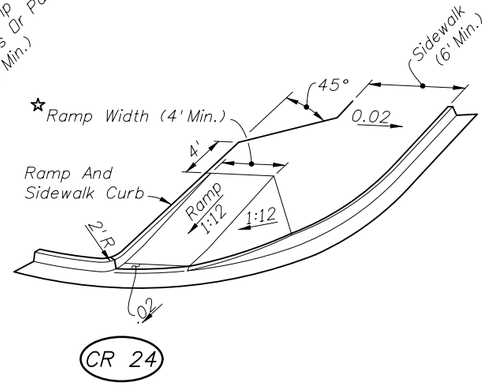

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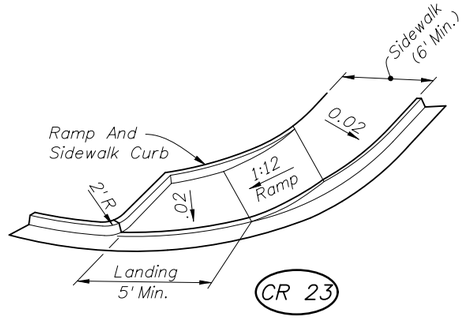

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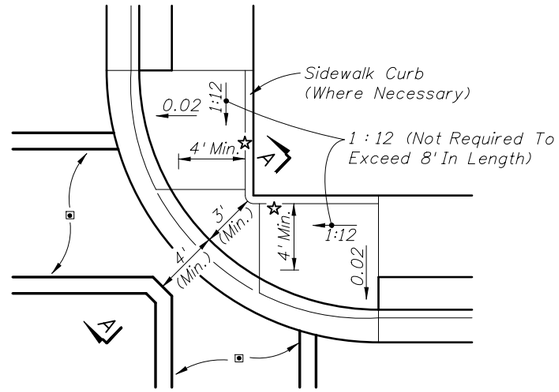
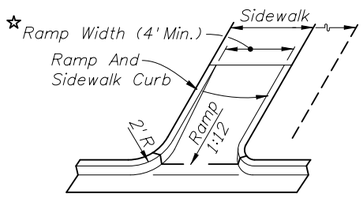


▣ Crosswalk width and configuration vary; must conform to Index No. 17344 and 17346.

PLAN



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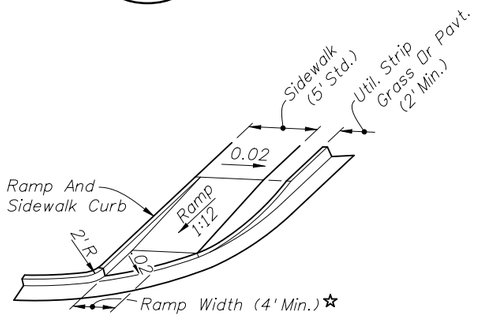

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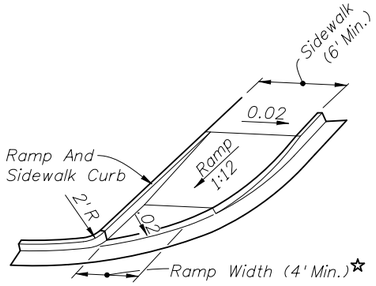
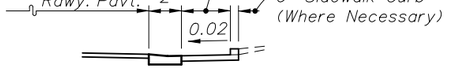


CR 20

DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS FOR LINEAR PEDESTRIAN TRAFFIC

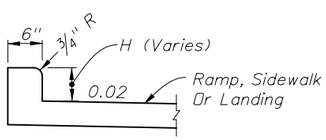


SECTION AA

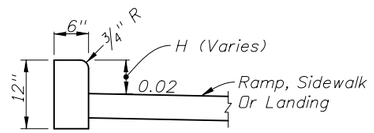
CR 26

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

☆ Ramp Widths For Curb Ramps CR 20, CR 21, CR 22, CR 24, CR 25 and CR 26 May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer.

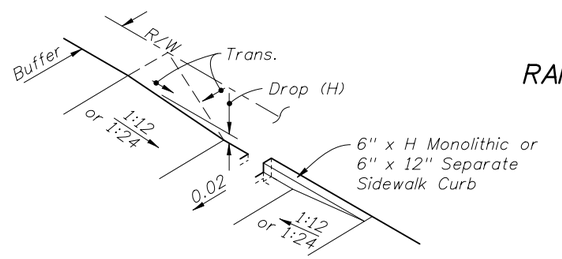


MONOLITHIC CAST CURB



SEPARATELY CAST CURB

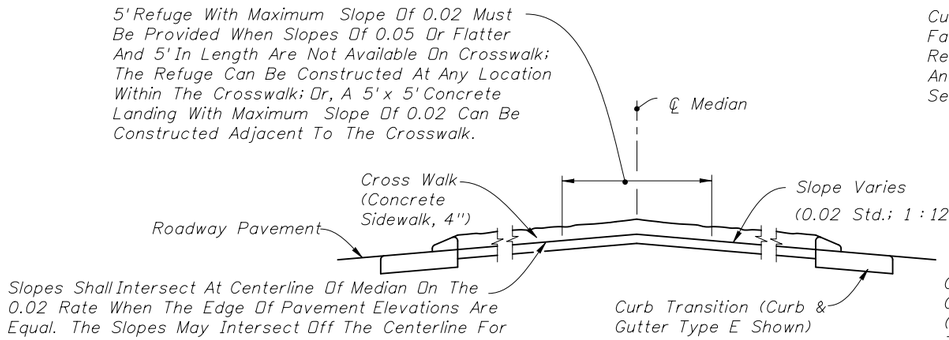
RAMP AND SIDEWALK CURB OPTIONS



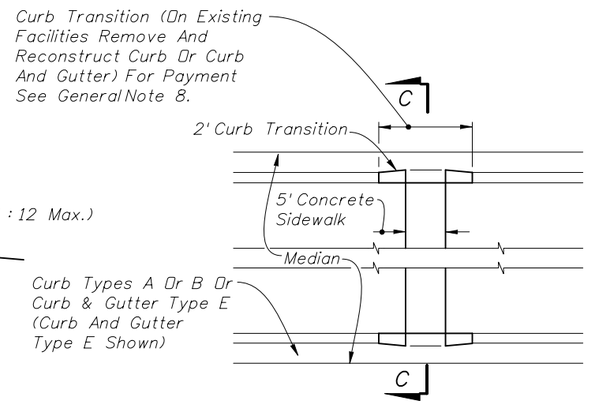
Construct Sidewalk Curb In Absence Of Adequate Buffer, Maintainable Surface Contour, Abuting Structure, Or When Called For In The Plans Or Standards

BACK OF SIDEWALK CURB OR BUFFER TRANSITION

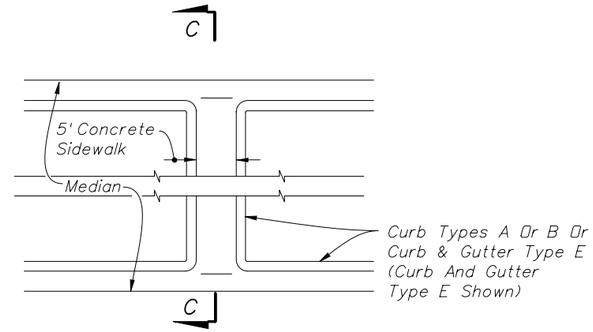
REVISIONS						2010 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	PUBLIC SIDEWALK CURB RAMPS	01/01/11	4 of 6
01/01/11	DP	Removed 2' level landing from all details.					Index No. 304	



SECTION CC

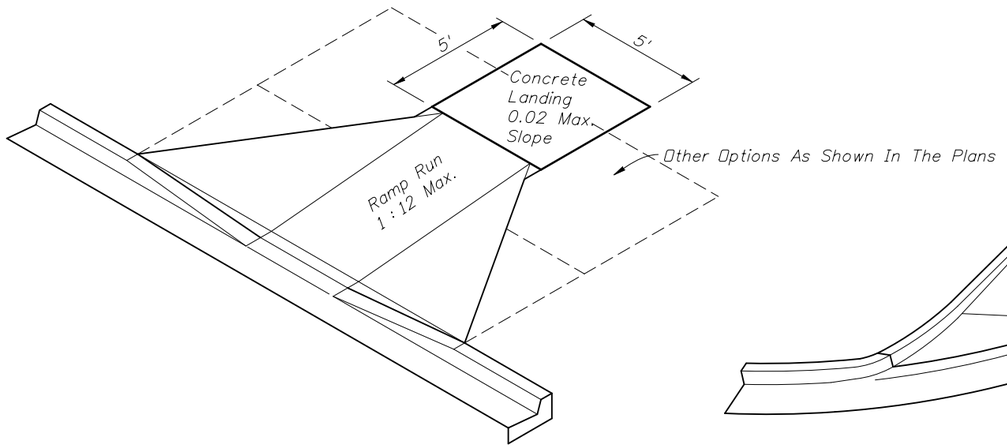


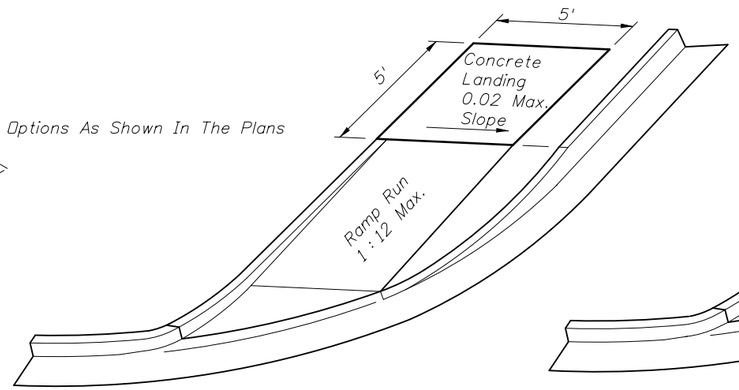
PLAN

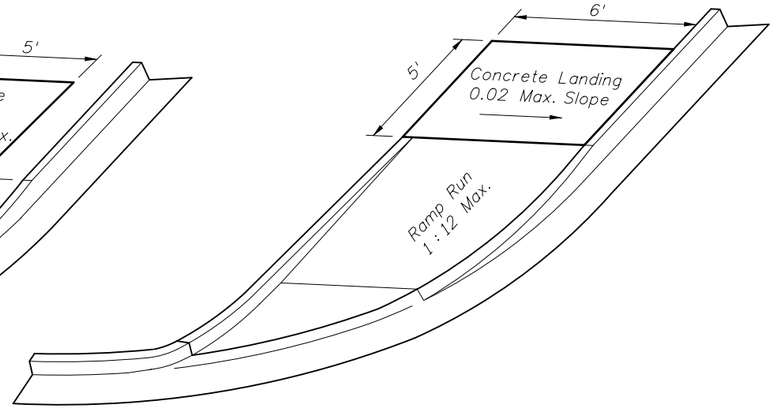


PLAN – (ALTERNATE DETAIL)

MEDIAN CROSSWALKS







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

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	DP	Removed 2' level landing from all details.			

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PUBLIC SIDEWALK CURB RAMPS

Interim Date 01/01/11

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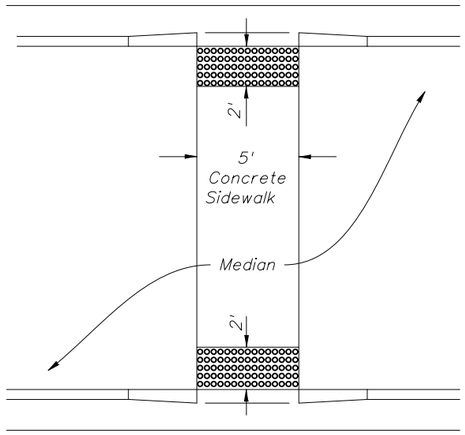
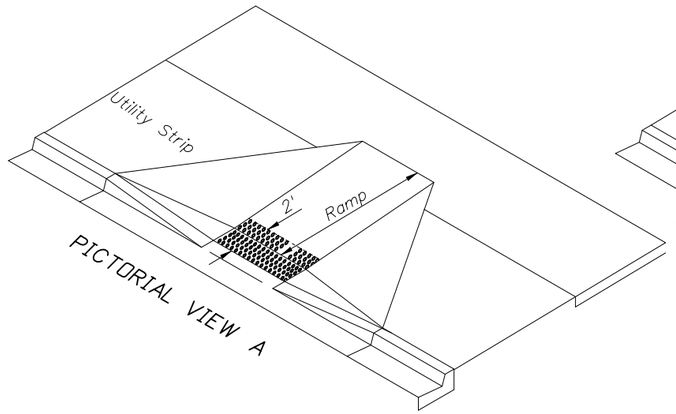
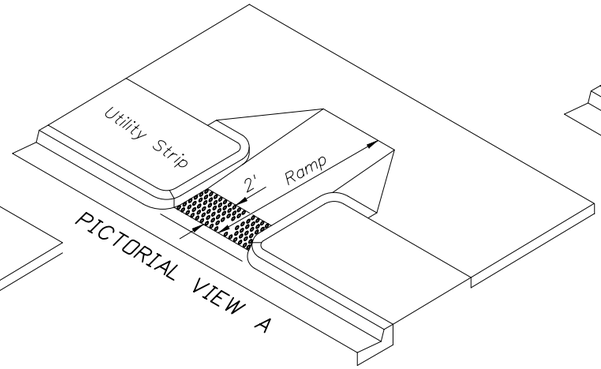


PLAN

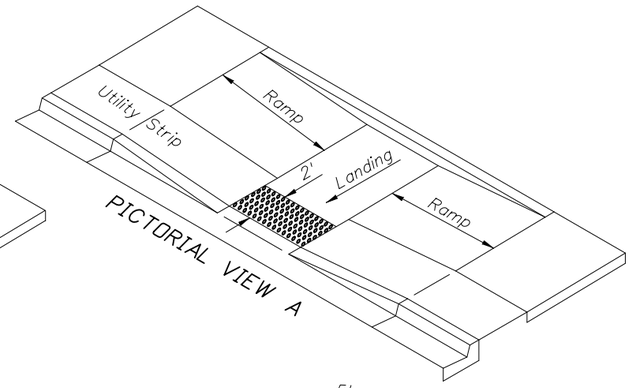
On curb ramps, landings and flush transitions perpendicular to the curb line: Rows of domes shall be aligned with the centerline of the ramp. (See Pictorial View A)



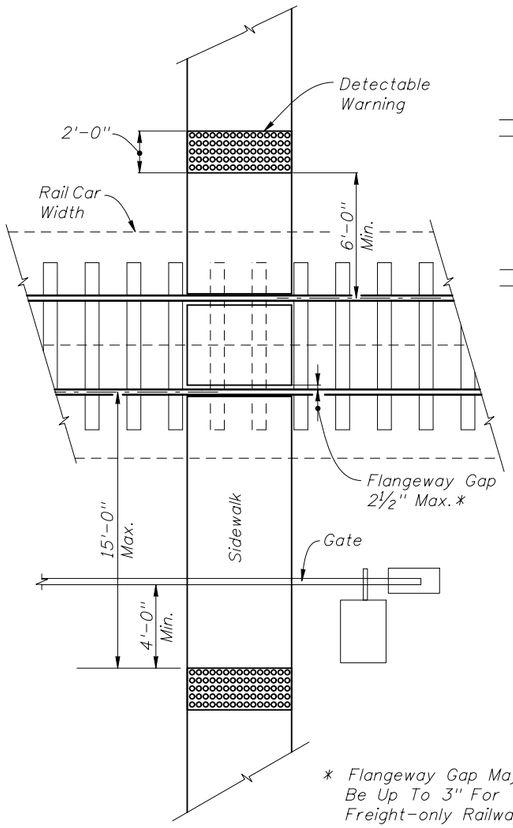
PICTORIAL VIEW A



PICTORIAL VIEW A



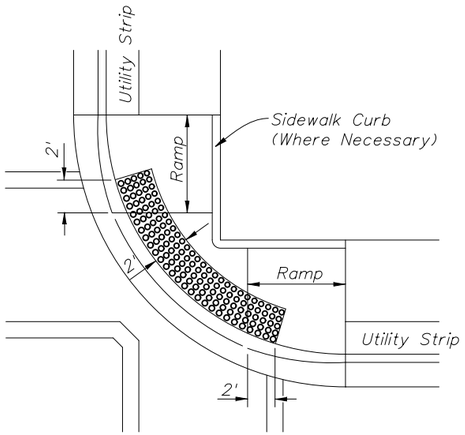
PICTORIAL VIEW A



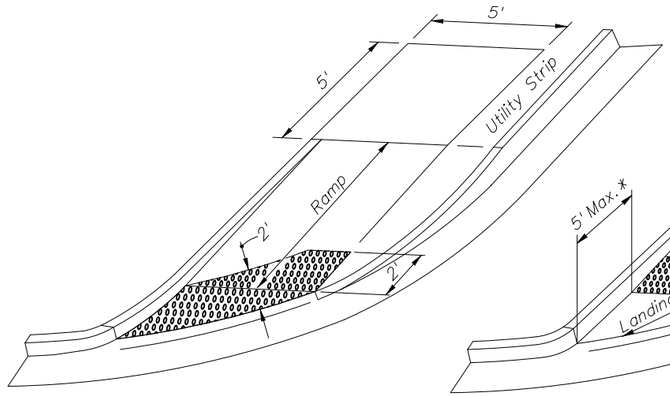
* Flangeway Gap May Be Up To 3" For Freight-only Railways

Rail Road Crossing

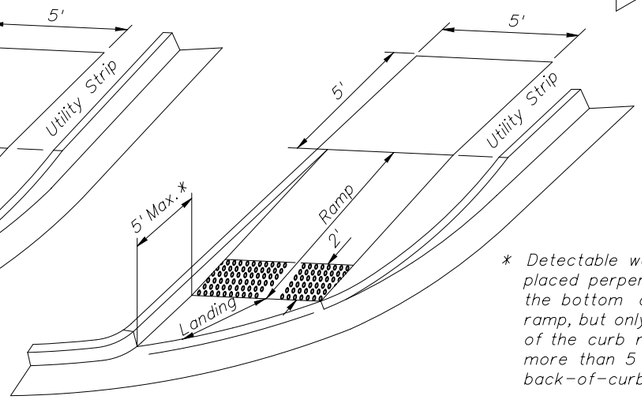
PLAN



PLAN

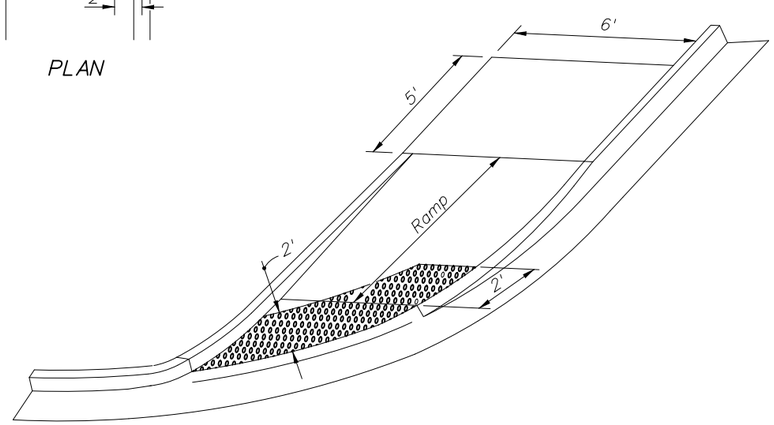


PICTORIAL VIEW B



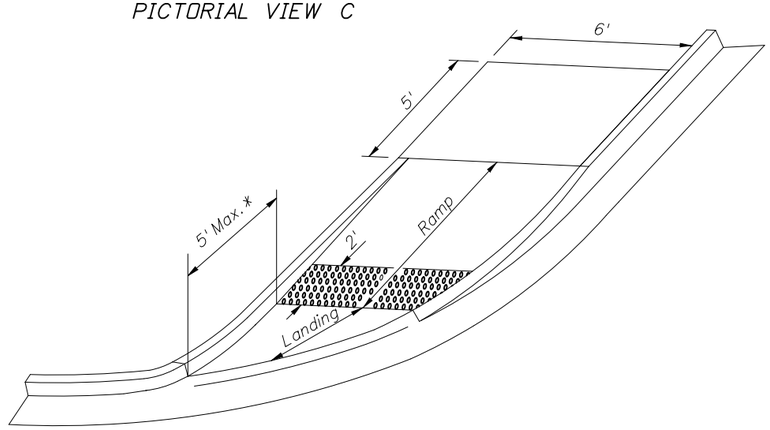
PICTORIAL VIEW C

* Detectable warnings may be placed perpendicular across the bottom of the curb ramp, but only if the bottom of the curb ramp is no more than 5 feet from the back-of-curb.



PICTORIAL VIEW B

On landings and flush transitions at radius returns: Rows of domes are not required to be aligned with the centerline of the ramp. (See Pictorial View B)



PICTORIAL VIEW C

On curb ramps at radius returns: Rows of domes shall be aligned with the centerline of the ramp. (See Pictorial View C)

TYPICAL PLACEMENT OF DETECTABLE WARNING AT CURB RAMPS

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PUBLIC SIDEWALK CURB RAMPS

Interim Date: 01/01/11

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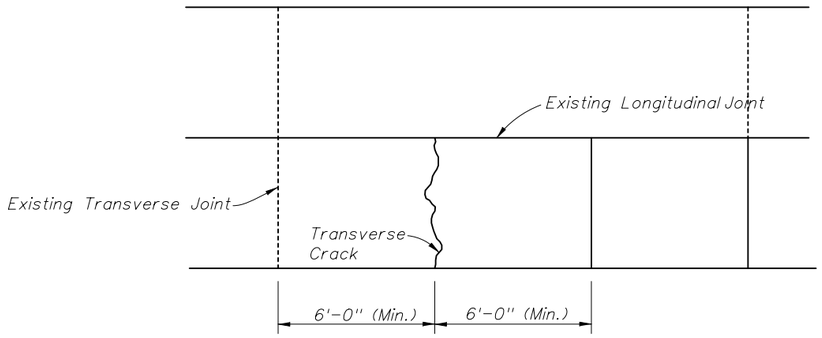


FIGURE 10.2 - REPAIR METHOD: NONE OR CLEAN AND SEAL

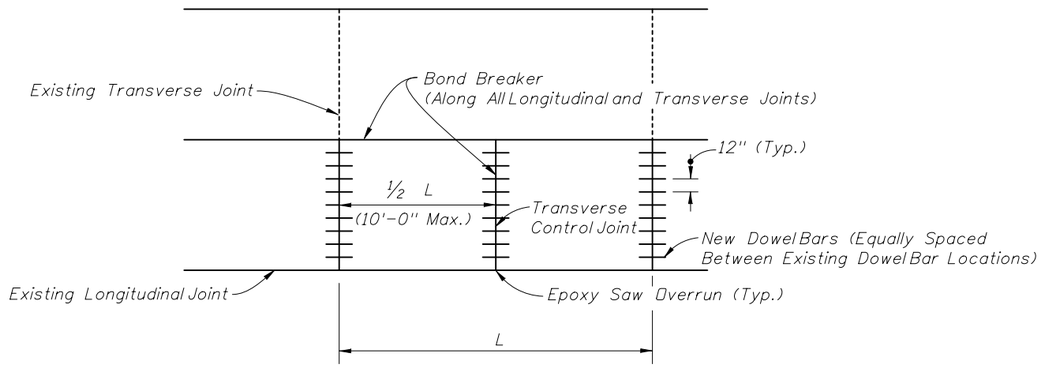


FIGURE 10.3 - FULL SLAB FULL DEPTH REPLACEMENT

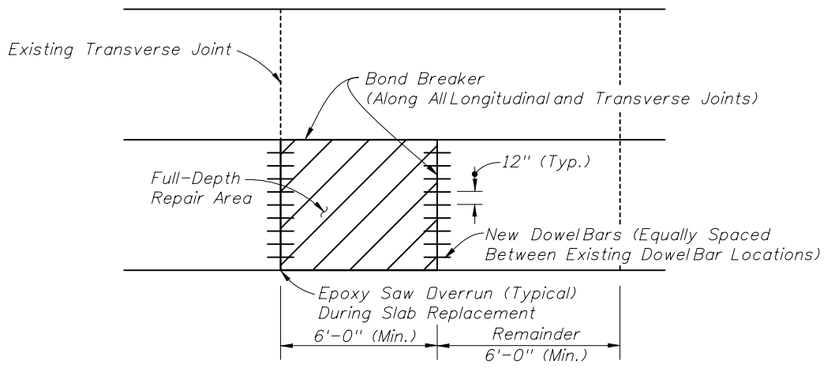


FIGURE 10.4 - PARTIAL SLAB FULL DEPTH REPLACEMENT

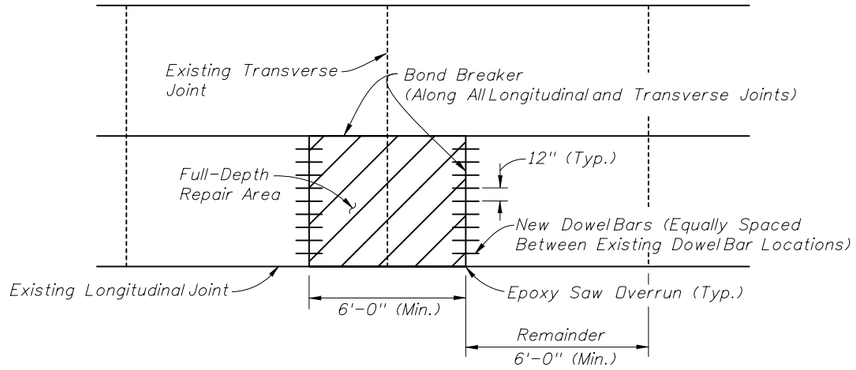


FIGURE 10.5 - FULL-DEPTH REPAIR ON BOTH SIDES OF THE JOINT

GENERAL NOTES

1. For Repair and Replacement Criteria see Sheet 2 of 2.

2. Full depth repairs consist of removing and replacing at least a portion of the existing slab to the bottom of the concrete.

3. Repair boundaries shall be sawed full-depth with diamond saw blades. On hot days, it may not be possible to make this cut without first making a wide, pressure relief cut within the repair boundaries. A carbide-tipped wheel saw may be used for this purpose, but the wheel saw must not intrude on the adjacent lane, unless the lane is slated for repair. The wheel saw cuts produce a ragged edge that promotes excessive spalling along joints. Hence, if wheel saw cuts are made, diamond saw cuts must be made 18 in. outside the wheel saw cuts. To prevent damage to the base, the wheel saw must not be allowed to penetrate more than 0.5 in. into the base.

4. No additional base or subgrade material shall be added and all loose base or subgrade material shall be removed prior to placement of the new concrete slab. The concrete slab shall be placed to the full depth of the material removed. No additional compensation will be allowed for additional concrete required to bring proposed concrete slab up to finished grade.

5. Removal of the damaged concrete pavement shall be by lifting. Any good concrete pavement which is damaged during removal of damaged areas shall be removed and replaced by the contractor at his expense.

6. If the roadway contract includes grinding, then the slab replacement shall be performed first.

7. During slab replacement operations, fill any saw cut over runs into adjacent slabs with epoxy.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	EU	FIGURES 10.3, 10.4 and 10.5 updated leader note to "Bond Breaker (Along All Longitudinal and Transverse Joints)"			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

CONCRETE SLAB REPLACEMENT

Interim Date 01/01/11

Sheet No. 1 of 2

Index No. 308

GENERAL NOTES

1. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific conditions 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 Figures 1 and 2, 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 spacing shall be 6'–3" except that reduced spacing shall be used for (a) transitions to anchorages at rigid structures such as bridges (See Detail J and Index No. 402) 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 spacing 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). For guardrail placed on slopes beyond the shoulder point, there shall be no deviation more than 1" below to 3" above the desired height within any 25 foot section of guardrail.

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.

   Guardrail end anchorage assemblies shall be of the type called for in the plans. If the plans call for end anchorage assembly "flared" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved flared assembly provided in this Index or identified on the Qualified Products List (QPL), subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

   If the plans call for end anchorage assembly "parallel" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved parallel assembly provided in this Index or identified on the QPL, subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

   If the plans call for a specific end anchorage assembly, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. Approved substitutions will not be eligible for CSIP consideration.

   When an end treatment is attached to guardrail with Pedestrian Safety Treatment, only end treatment systems with timber posts are to be used.

   Proprietary end anchorage systems must be identified on the QPL. Manufacturers seeking approval of proprietary end anchorage systems for inclusion on the QPL must submit application along with design documentation showing the end anchorage system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA for use as a guardrail end anchorage system, and is compatible with FDOT guardrail systems. System approvals will be contingent on FDOT's evaluation of crash test performance results for consistency with FDOT guardrail application and use. If approved, installation drawings signed and sealed by a professional engineer licensed in the State of Florida will be required.

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. 11 and the minimum offset table on Sheet 19. 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 roadside hazards or other areas where the Engineer has deemed guardrail necessary, guardrail should be considered on flush shoulder sections where fill slopes are steeper than 1:3 within the clear zone and fill heights are 6' or greater. Curbed sections where fill slopes are steeper than 1:3 and fill heights are 6' or greater within 22' of the traveled way should be evaluated for installation of guardrail. Additional guidance for evaluating the need for guardrail can be found in the Plans Preparation Manual.

9. The guardrail to bridge connections contained in this Index are for bridges with Test Level 4 traffic railing barriers. For guardrail to concrete barrier wall connections see Index No. 410. For existing bridges receiving retrofit traffic railing barriers see Index No. 402.

10. The W–beam guardrail system in this index is the standard system to be used on the State Highway System where a Test Level 3 semi–rigid barrier is required.

11. Thrie–beam guardrail panels shall be used in guardrail transitions to bridge traffic railing barriers, to concrete and certain water filled safety shaped barriers, certain crash cushions 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. 402, 410 and 414. The use of thrie–beam guardrail with standard offset blocks (Test Level 3 semi–rigid system) 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) Vehicle overriding W–beam is probable,
    (d) Drainage will be impeded or blocked by the use of concrete barrier wall (subject to deflection space requirements),
    (e) High frequency of repairs to W–beam,
    (f) Spandrel beam with low deflection needed around unrelocatable structure,
    (g) Accommodating passenger vehicles heavier or larger than the standard passenger car (e.g., passenger vans and small buses).

    The modified thrie–beam guardrail is a Test Level 4 semi–rigid system and may be used where a Test Level 4 guardrail is required.

12. 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.

13. 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.

14. 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.

15. 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. All other metallic components, hardware and accessories shall be in conformance with the appropriate current AASHTO requirements.

16. 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.

17. 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.

18. For guardrail reflector details see Sheet 17.

19. 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.

20. Substitutions between thrie–beam guardrail and concrete barrier wall are not eligible for CSIP consideration.

21. 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. The cost of the object marker shall be included in the cost of the guardrail.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	MTP	Deleted the note that allowed the use of recycled guardrail beams.Changed VECP (Value Engineering Change Proposal) to CSIP (Cost Savings Initiative Proposal)			

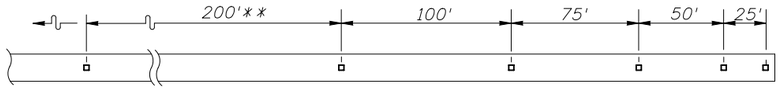
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

GUARDRAIL

Interim Date 01/01/11

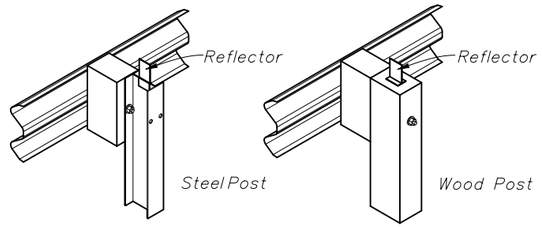
Index No. 400



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 one at the approximate center.

**For curves greater than 2° the spacing shall be reduced to 100' through the curve.

REFLECTOR SPACING

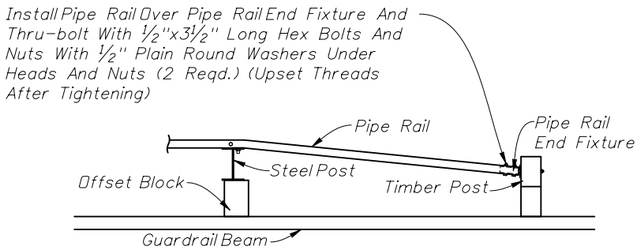


PICTORIAL VIEW
REFLECTOR MOUNTING

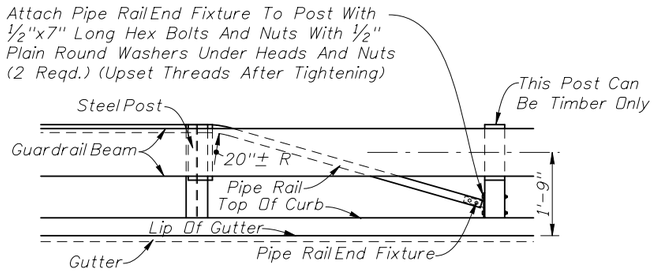
REFLECTOR NOTES

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. Reflectors installed on median guardrail shall have retro-reflective sheeting on both sides of the reflector.
4. The cost for reflectors shall be included in the contract unit price for Guardrail.

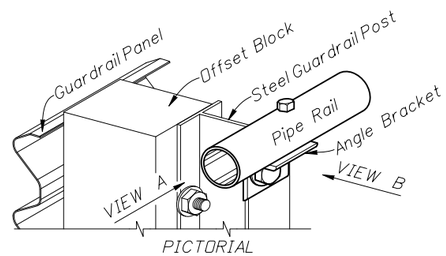
REFLECTORS-DETAIL M



PLAN



ELEVATION



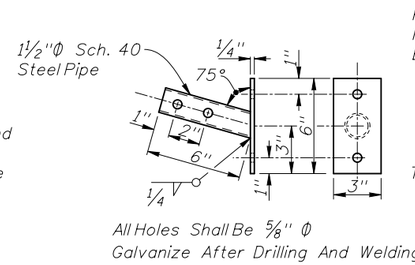
NOTES

1. Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Pipe rail shall not extend beyond the last post of the approach end anchorage assemblies. Begin and end the pipe rail in accordance with the Pipe Rail End detail.

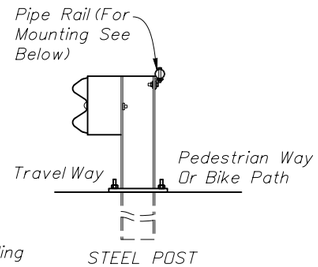
Refer to Sheet 1, Note 6 for guardrail end treatment requirements.

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 1½" deep or
   (c) Use of post bolts 15" in length with sleeve nuts and washers.

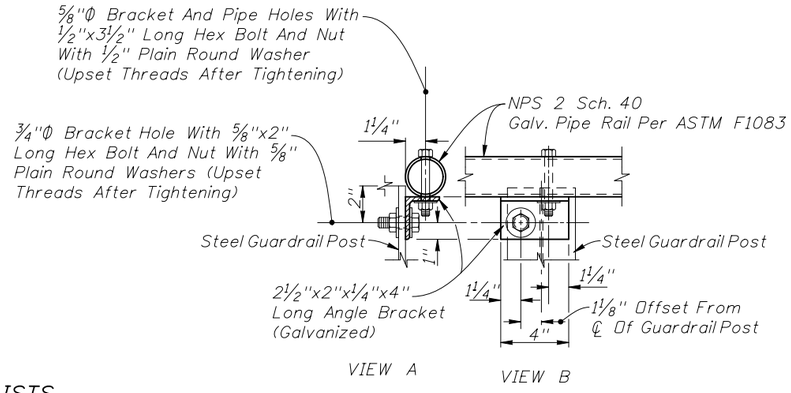
3. The cost for Pipe Rail, mounting components and installation shall be included in the contract unit price for guardrail. Bolt end treatment for timber post shall be included in the contract unit price for guardrail.



PIPE RAIL END FIXTURE



STEEL POST SECTION



PIPE RAIL MOUNTING

FOR LOCATIONS USED BY PEDESTRIANS OR CYCLISTS
PEDESTRIAN SAFETY TREATMENTS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	MTP	Changed 2" Nom. Diameter to NPS 2 Sch. 40 Galv. Pipe Rail Per ASTM F1083.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

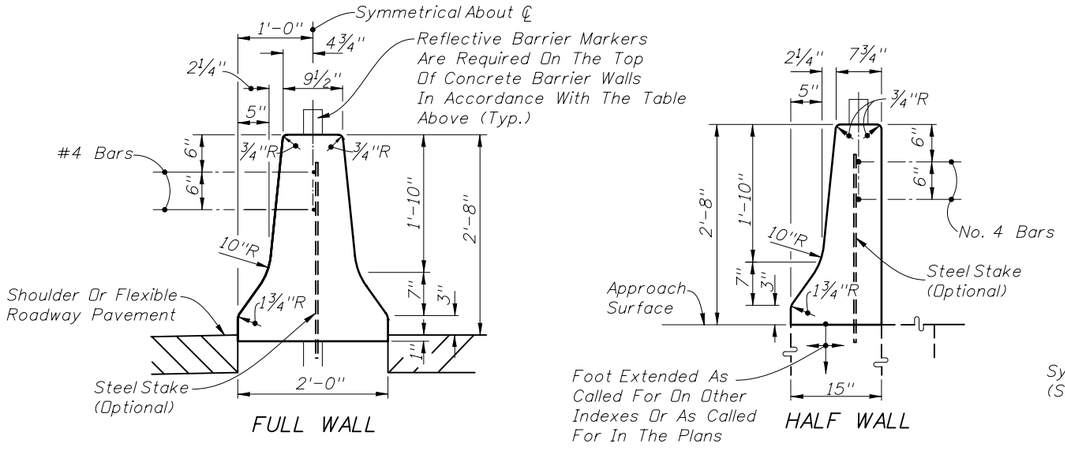
GUARDRAIL

Interim Date 01/01/11

Sheet No. 17 of 26

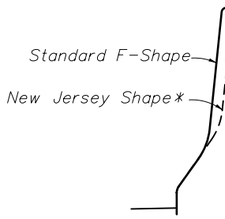
Index No. 400

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 of the Standard Specifications. 2. Reflector color (white or yellow) shall conform to the color of the near edgeline. 3. The cost for reflectors shall be included in the contract unit price for barrier wall.
4' to 8'	80'	
> than 8'	none required	



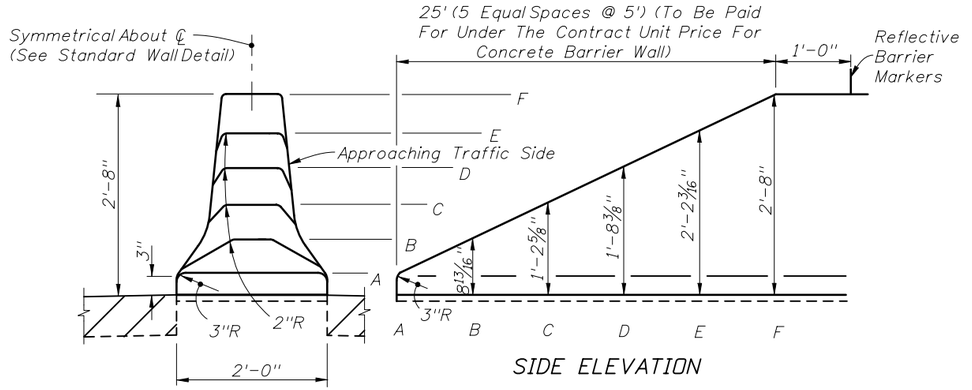
For concrete barrier wall details at piers, highway lighting and guardrail connections, see other sheets of this Index.
Standard barrier to be paid for under the contract unit price for Median Concrete Barrier Wall, LF.

STANDARD BARRIER WALL SECTIONS



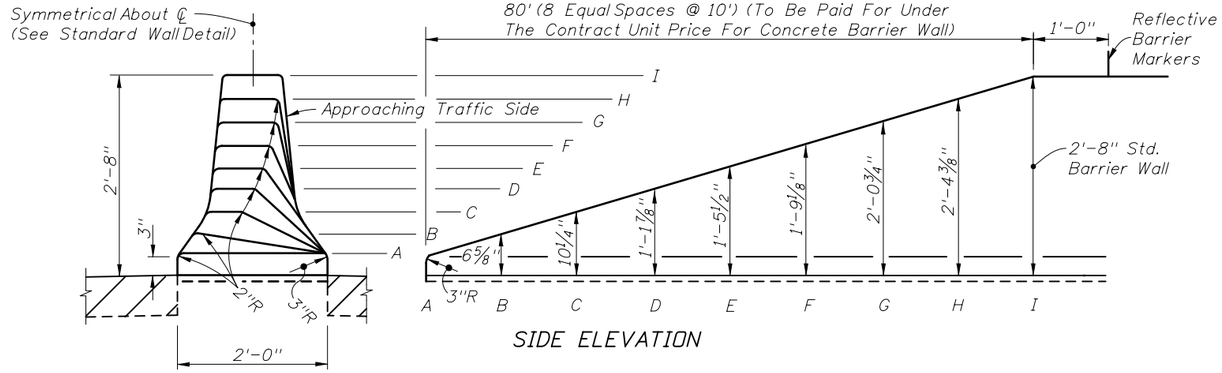
* Where standard F–Shape walls abut existing NJ Shape walls, face transitions of not less than 5' in length shall be constructed at the adjoining end of the F–Shape wall.

WALL FACE SAFETY SHAPES



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

GENERAL NOTES

1. Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls; except, in moderately and extremely aggressive environments, Class IV concrete shall be used. All reinforcing steel with undesignated size shall be #4 bars. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specifications, unless another finish is called for in the plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.

2. Concrete barrier wall terminal notes for design speeds ≥ 50 mph.
   a. Terminated outside clear zone of the approach traffic with 'Detail II' end treatment.
   b. Terminated within a shielded location.
   c. Terminal protection by the use of a crash cushion system.
   d. Terminated in conjunction with a suitably designed transition to another barrier.

3. 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.

4. 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.

5. For cast–in–place barrier wall segments constructed with the slip form method, score 3/8" deep crack control V–Grooves while the concrete is still plastic and mold them when walls are constructed with the stationary form method. All 3/8" deep V–Grooves shall be spaced at 20' intervals, the end of the side face grooves shall be in line with the ends of the top face groove and the long dimension of all grooves shall align at 90 degrees to the longitudinal axis of the wall. When wall segments are less than 40' in length, space the V–Groove equally between open joints. Dowel transverse construction joints for abutting segments less than 40' (See Detail B).

6. Precast construction is allowed as an alternate to cast–in–place construction. a. Wall segments < 40' in length shall be joined by a transverse joint in accordance with Details C & D on Sheet 2. The minimum segment length is 20'. b. Bedding of the precast sections shall be facilitated by the use of sand–cement grout or equal method to assure uniform bearing. c. Reinforcement may be required for handling stresses.

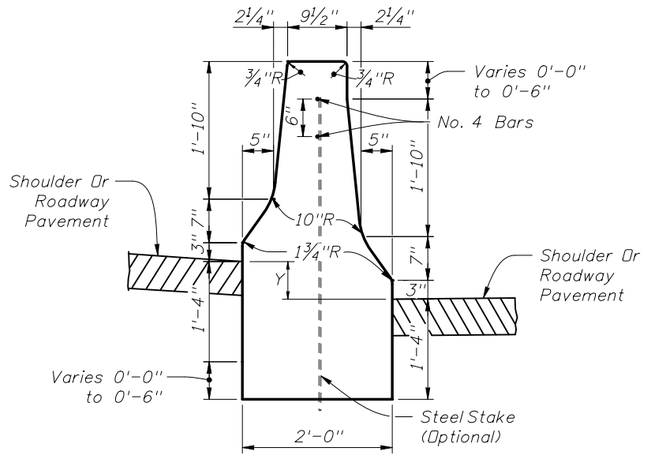
7. On roadways designated for reverse laning, all downstream ends that are not shielded or outside the clear zone shall be marked by Type 3 Object Markers.

8. 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.

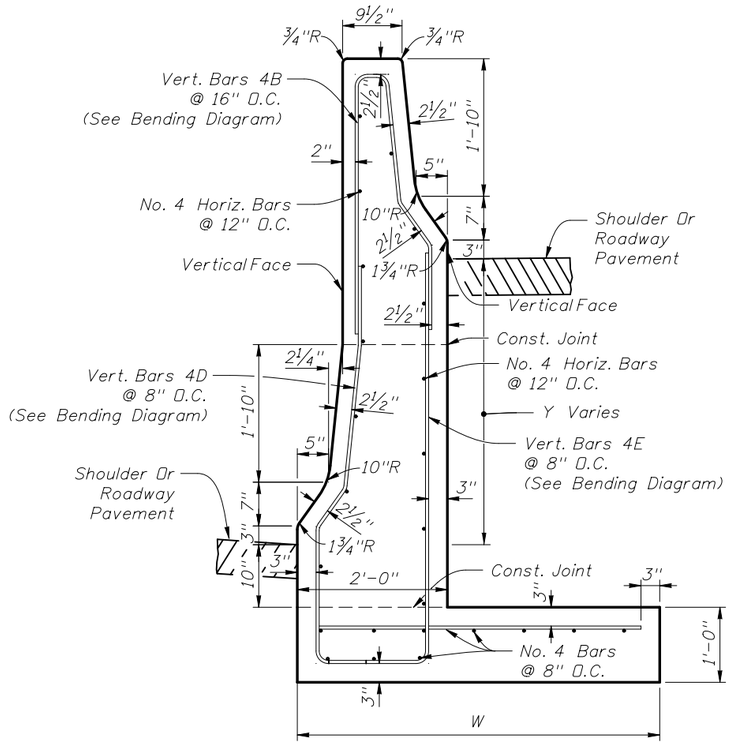
9. For barrier wall inlet details see Indexes Nos. 217, 218 and 219.

10. Concrete barrier wall with New Jersey Safety Shape may not be substituted for the Standard F Shape Barrier.

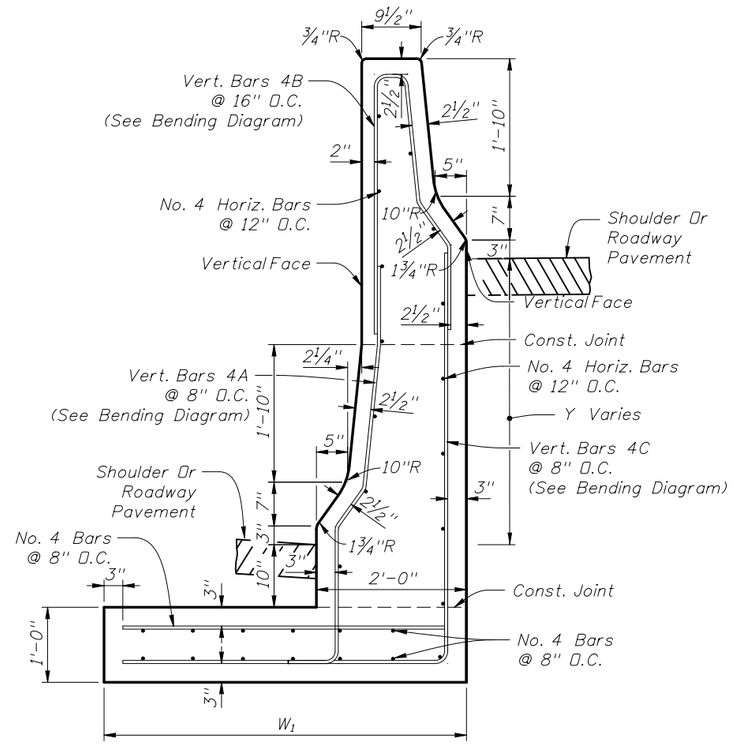
REVISIONS						2010 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	CONCRETE BARRIER WALL	01/01/11	1 of 25
01/01/11	MTP	Added: A 1 ft. offset dimension to the barrier marker. Changed: Note 5 to include 3/8" V–Grooves on both faces and the top of barrier wall. Adjusted Reflective Barrier markers within Details II and III.					Index No. 410	



F-SHAPE MEDIAN BARRIER
WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES

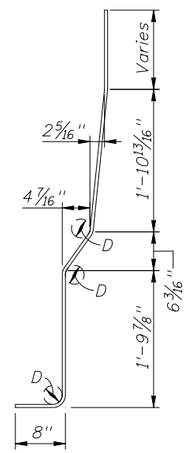


CANTILEVER WALL
SUPERELEVATED SECTION

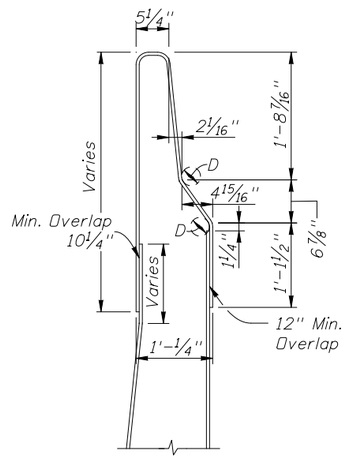


L-WALL
SUPERELEVATED SECTION

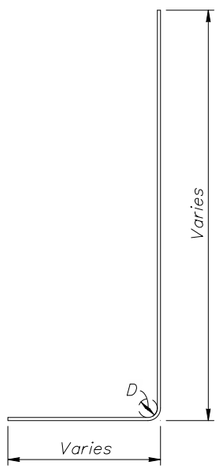
BENDING DIAGRAMS



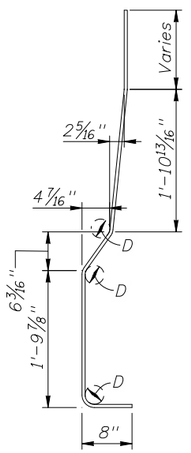
L-WALL
BAR 4A



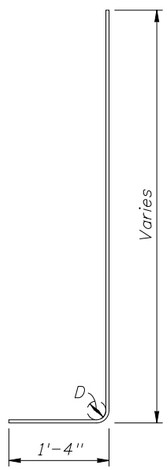
L-WALL & CANTILEVER WALL
BAR 4B



L-WALL
BAR 4C



CANTILEVER WALL
BAR 4D



CANTILEVER WALL
BAR 4E

Design Criteria:

This barrier wall has been structurally evaluated to be equivalent or greater in strength to other safety shapes which have been crash tested to NCHRP Report 350 TL-4 criteria.

Unless the plans stipulate a specific wall type, either the Cantilever wall or the "L" wall may be constructed at the Contractor's option.

Cost of the footing to be included in the contract unit price for Median Concrete Barrier Wall, LF.

Cantilever Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width W	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"	6'-6"
Min. Segment Wall Length		39'	35'	32'	29'	26'	24'	22'

"L" Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width W_1	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-6"	7'-0"
Min. Segment Wall Length		46'	44'	42'	41'	39'	36'	33'

MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS OR FOR VARIABLE ROADWAY PROFILE GRADES

REVISIONS

DATE	BY	DESCRIPTION
01/01/11	MTP	Added: A Const. Joint & Horiz. Bar to Cantilevered Wall Footing. Changed: The Bottom widths of Bars 4A & 4D from 6" to 8" The 3'-6" dimension to "Varies" in the 4C Bending Diagram.
01/01/11	MTP	Changed: The 3'-5" dimension to "Varies" in the Bar 4B diagram. Bar Bending Diagrams 4A, 4B, 4D & 4E. Deleted: The Min and Max. designations for X1, X, and Y

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

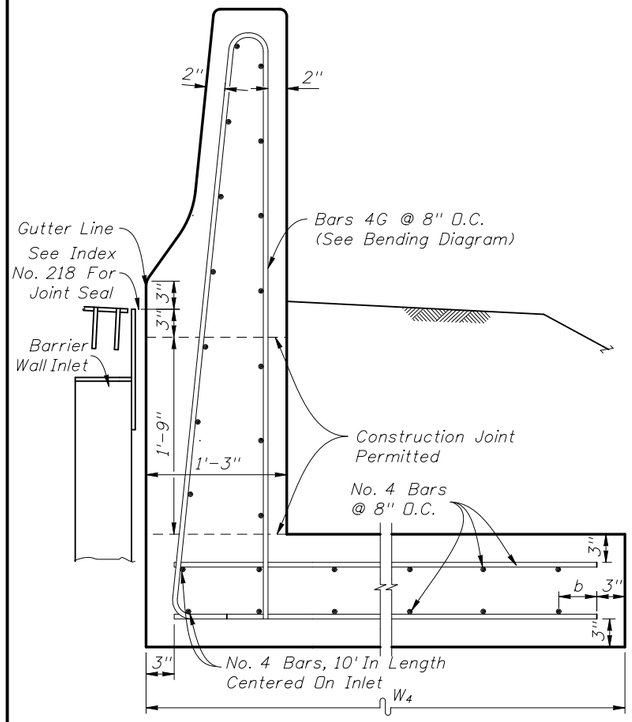
2010 Interim Design Standard

CONCRETE BARRIER WALL

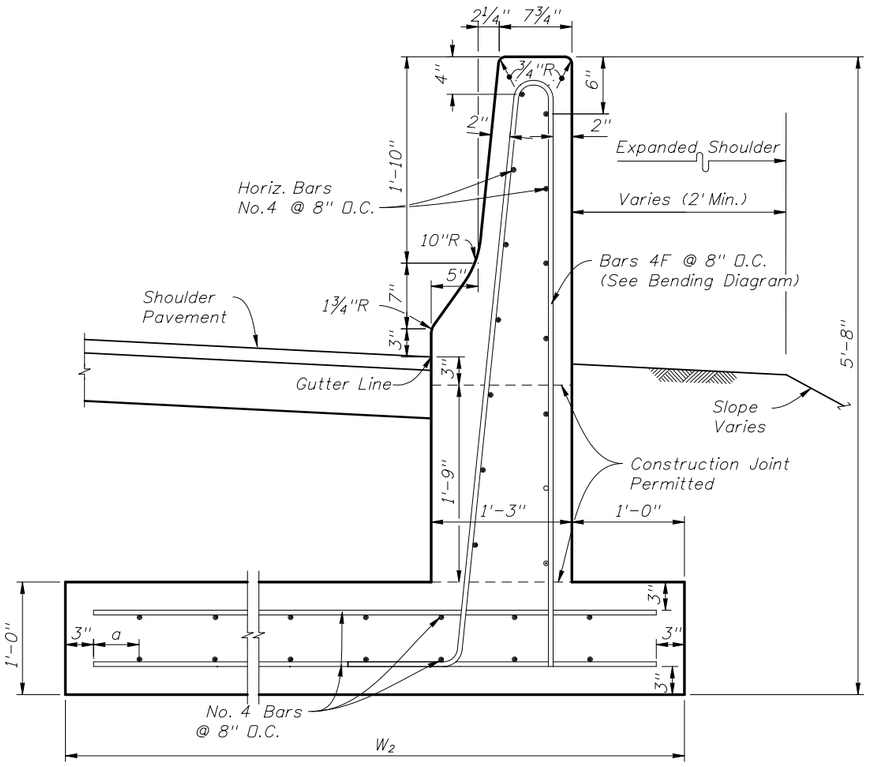
Interim Date 01/01/11

Sheet No. 3 of 25

Index No. 410

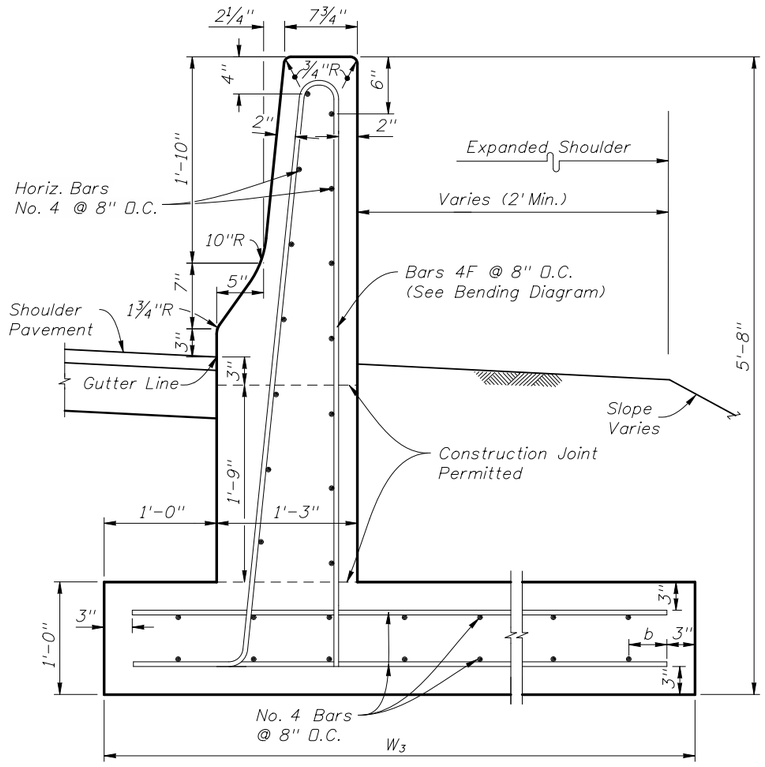


REINFORCING STEEL MODIFICATIONS
AT BARRIER WALL INLETS (INDEX NO. 218)



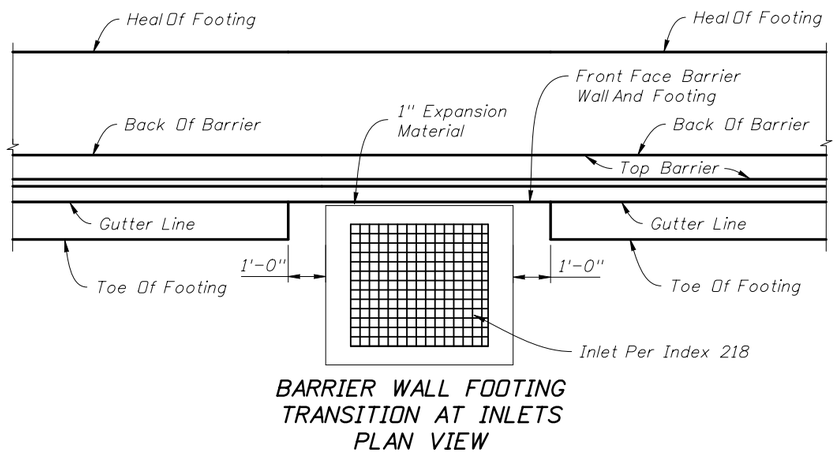
NOTE: All longitudinal reinforcement #4 bars.

CANTILEVER WALL



NOTE: All longitudinal reinforcement #4 bars.

L-WALL



BARRIER WALL FOOTING
TRANSITION AT INLETS
PLAN VIEW

GENERAL NOTES:

1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.

2. This barrier wall has been structurally evaluated to be equivalent or greater in strength to other safety shapes which have been crash tested to NCHRP Report 350 TL-4 criteria.

3. Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder), LF.

DIMENSIONS AND QUANTITIES

CANTILEVER WALL					L-WALL					
Length* Of Barrier Wall (LF)	W_2 (LF)	a	Class II Conc. CY Per LF	Rein. Steel Lbs. Per LF	Length* Of Barrier Wall	W_3 (LF)	W_4 (LF)	b	Class II Conc. CY Per LF	Rein. Steel Lbs. Per LF
≥ 65'	3'-3"	5"	0.30	31	≥60'	3'-6"	2'-6"	7"	0.31	32
57' to 64'	3'-9"	3"	0.32	33	50' to 59'	4'-0"	3'-0"	5"	0.33	34
50' to 56'	4'-3"	3"	0.33	35	40' to 49'	4'-9"	3'-9"	6"	0.35	37
41' to 49'	5'-0"	7"	0.36	38	35' to 39'	5'-3"	4'-3"	4"	0.37	39
36' to 40'	5'-6"	5"	0.38	40	30' to 34'	5'-9"	4'-9"	2"	0.39	42
28' to 35'	6'-6"	3"	0.42	44	25' to 29'	6'-6"	5'-6"	3"	0.42	44
25' to 27'	7'-0"	7"	0.44	46	20' to 24'	7'-6"	6'-6"	2"	0.45	49

Quantities shown are for information only. For method of payment see payment note. Barrier wall inlets (Index 218) shall be isolated from the barrier wall stem and footing by 1" expansion material.
* All walls 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. Segments shall have dimensions same as walls above.

REINFORCED CONCRETE BARRIER WALL (SHOULDER)

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	MTP	Added: Plan View at Barrier Wall Inlets; "Gutter Line" points; Dimensions for Barrier Wall Inlet detail & a dimension between const. joints. Within the table, a column for the Width (W_4) at the barrier wall inlet. Changed: The Crash Test criteria (Note 2)	01/01/11	MTP	Changed: The reinf. steel (lbs/lf) for L/Cantilever walls & the construction joint. The top footing conc. cover to 3". The width designations (W_2 & W_3) on both walls. Deleted: Barrier wall limitation note. Within the table, the "x" columns.

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CONCRETE BARRIER WALL

Interim Date 01/01/11

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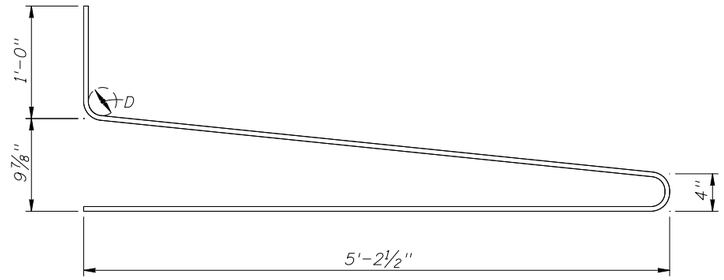
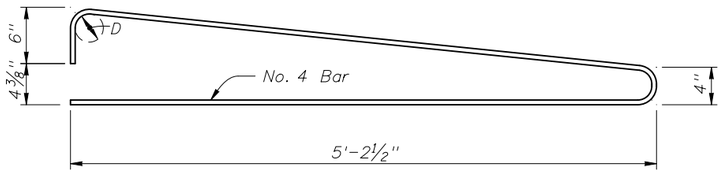
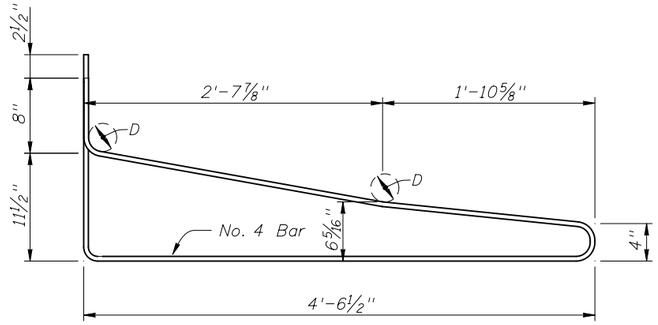


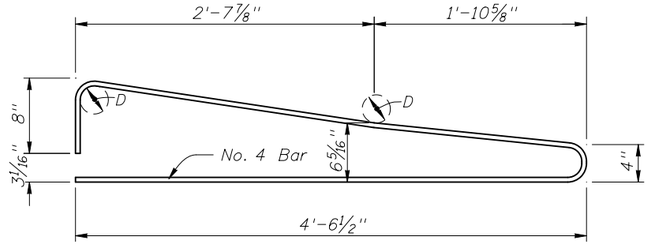
BAR 4F



BAR 4G



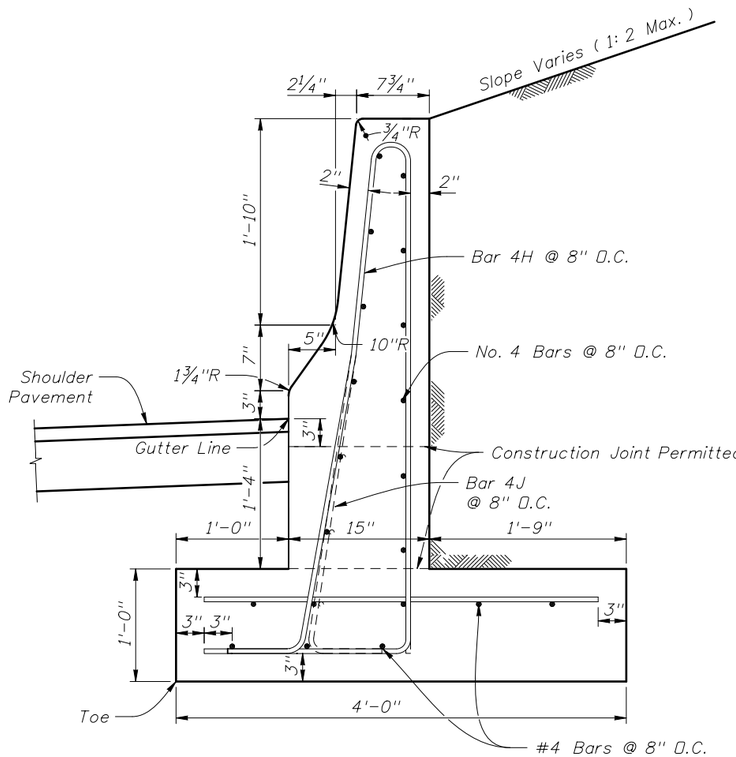
BAR 4H



For Use In Areas Where Obstructions Require Localized Omission Of Toe

BAR 4J

BENDING DIAGRAMS



Note: All longitudinal reinforcement No. 4 bars.
Minimum segment length for this wall is 20 feet.
Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Retaining), LF.

QUANTITIES: Class II Concrete 0.29 CY/LF
Reinforcing Steel (Bar 4H) 28.6 LBS/LF
Reinforcing Steel (Bar 4J) 26.8 LBS/LF

REINFORCED CONCRETE BARRIER WALL (RETAINING)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	MTP	Added: "Gutter Line" designation, "Bar 4H" & "Bar 4J" to Reinforcing Steel Quantities & a dimension to "Bar 4J." Changed: Rebar bending diagrams. Renamed "Bar 4H Modified" to "Bar 4J." The top footing conc. cover to 3".			

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CONCRETE BARRIER WALL

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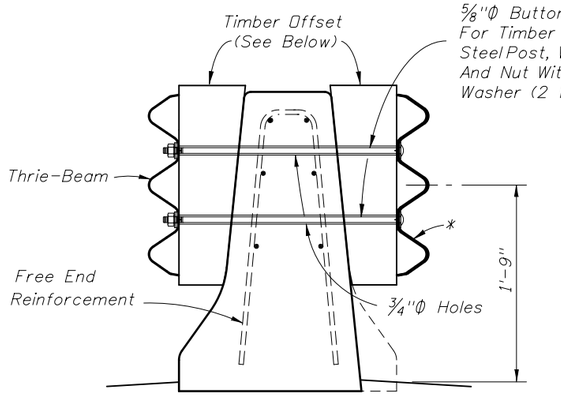
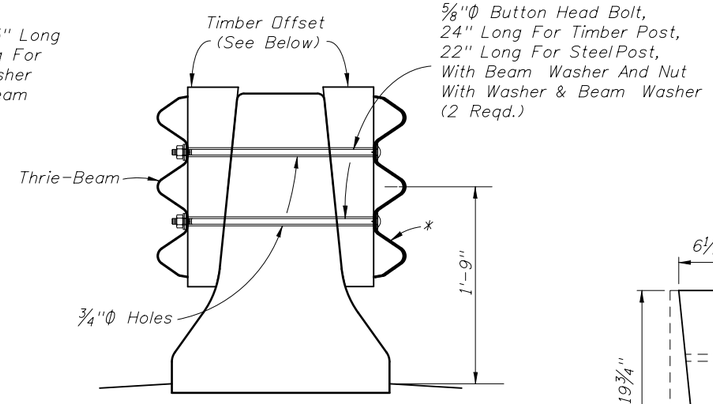
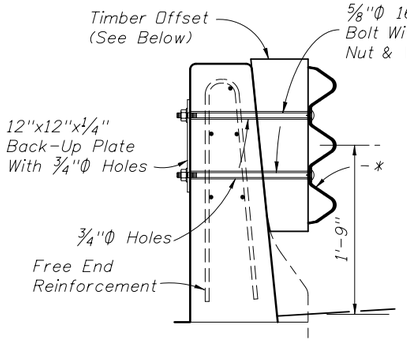


SECTION AA

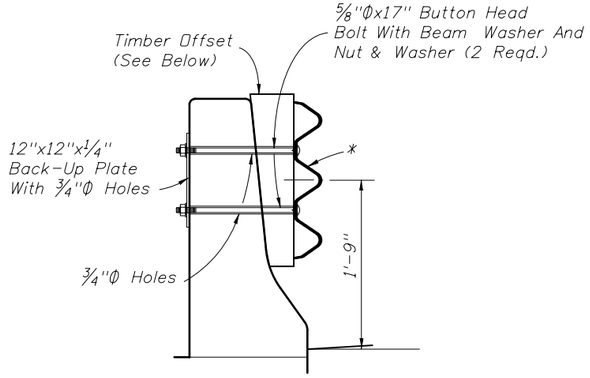


SECTION BB



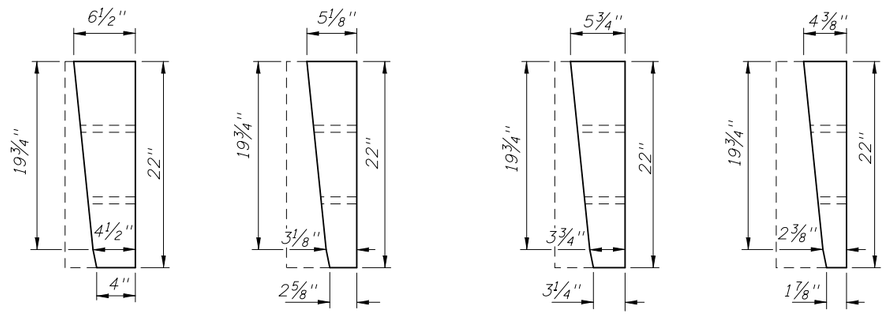
SECTION CC

* Single Thrie-Beam On Trailing Ends Of Barrier Wall; Nested Thrie-Beams On Approaches To Barrier Wall.



SECTION DD

NOTE: See Sheet 25 For Locations Of Sections.



AA & CC

BB & DD

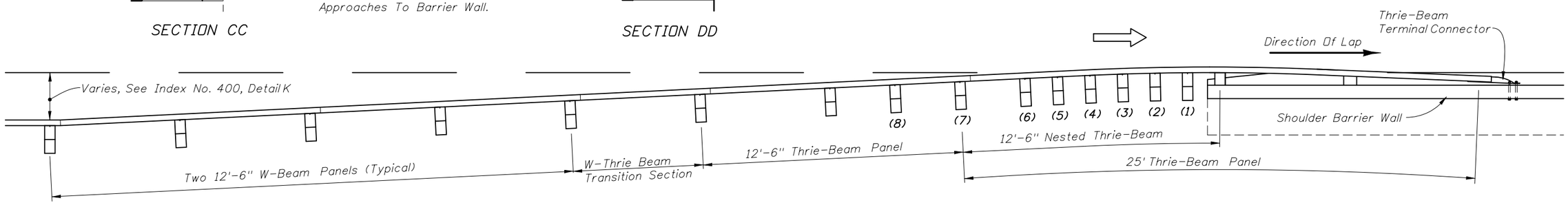
FOR DOUBLE FACED GUARDRAIL USING TIMBER POSTS AND FOR SINGLE FACED GUARDRAIL USING EITHER TIMBER OR STEEL POSTS

AA

BB

FOR DOUBLE FACED GUARDRAIL USING STEEL POSTS

STANDARD TIMBER OR PLASTIC OFFSET BLOCKS • FIELD TRIMMED FOR USE AT SECTIONS AA, BB, CC & DD



STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER

TRANSITION SECTION 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 Section 562 of the Standard Specifications.

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). (See Sheet 25)

7. For additional guardrail information refer to Index No. 400.

GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	MTP	Changed: Note 3, reference to "Index 400" with "Section 562 of the Standard Specifications." The "Notes" title to "Transition Section Notes."			

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CONCRETE BARRIER WALL

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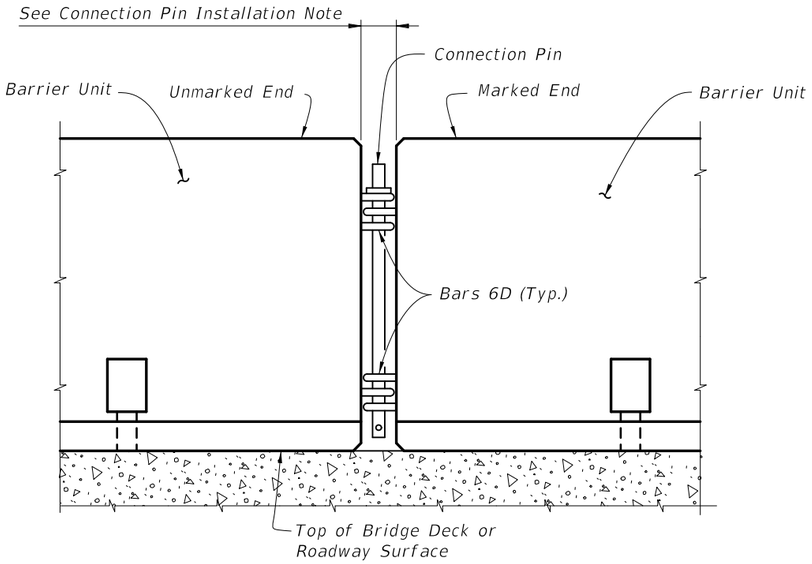
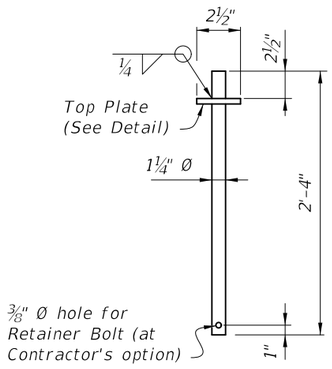
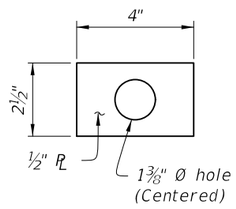


DETAIL OF CONNECTION BETWEEN BARRIER UNITS



CONNECTION PIN DETAIL



TOP PLATE DETAIL

NOTES FOR ALL INSTALLATIONS:

LIMITATION OF USE: This Temporary Concrete Barrier System is intended for work zone traffic control and other temporary applications. It shall not be used for permanent traffic railing construction unless specifically permitted by the Plans. Except as shown for the Back Filled Roadway Installations, the Barrier Units must be installed on a flexible pavement (asphalt) or rigid pavement (concrete) surface as shown with a cross slope of 1:10 or flatter. Except as shown for transition installations, Type K Barrier Units are not intended to be bolted down or staked down in locations where they can be impacted from the back side.

HANDLING: At no time shall the Barrier Units be lifted or moved by use of Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.

SURFACE PREPARATION: Except as shown for the Back Filled Roadway Installations, remove all debris, loose dirt and sand from the pavement, bridge deck or Asphalt Pad surface within the barrier footprint just prior to placement of the Barrier Units.

CONNECTION PIN ASSEMBLY: Steel for Connection Pin and Top Plate assemblies shall be in accordance with ASTM A36 or ASTM A709 Grade 36. Nondestructive testing of welds shall not be required. At the Contractor's option, a ⅜" diameter hole may be provided at the bottom of the Connection Pin, as shown, for the installation of a vandal resistance bolt.

CONNECTION PIN INSTALLATION: Initially set Barrier Units by using a 3⅝" wooden block between ends of adjacent units. Install Connection Pin between adjacent Barrier Units as shown, then pull newly placed Barrier Unit away from adjacent Barrier Unit to remove slack between Connection Pin and Bars 6D (except as shown on Sheet 5). Barrier Units shall not be used unconnected.

DELINEATION: Mount Type C Steady-Burn Lights on top of Barrier Units that are used as traffic barriers along travel ways in work zones. Space the lights at 50' centers in transitions, 100' centers on curves and 200' centers on tangent alignments. Refer to "Warning Lights" on Index No. 600 for additional information.

REUSE OF UNITS: Barrier Units may be reused provided they have the structural integrity and surface qualities of new units. Do not use Barrier Units without Marking Plates.

REUSE OF CONNECTION PINS: Connection pins may be reused if they have the structural integrity of new pins.

INSTALLATIONS ON CURVED ALIGNMENTS: The details presented in these Standards are shown for installations on tangent alignments. Details for horizontally curved alignments are similar.

TRANSITIONS: Transitions are required between freestanding, bolted down, staked down and back filled Type K Barrier installations, see Sheet 8 for transition requirements and details. Transitions are also required between installations of Type K Barrier and other types of temporary barrier, see Index No. 415 for transition requirements and details. Splices and transitions are required between installations of Type K Barrier and permanent Bridge or Roadway Traffic Railings, see Sheets 9 through 13 for transition requirements and details. Transitions are required between installations of Type K Barrier and Proprietary (QPL) Barrier Systems, See Sheets 14 and 15 for transition requirements and details.

PAYMENT: Barrier Units for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier Wall (Temporary) (F&I) (Type K), LF. Any relocation of the Barrier Units required for the project shall be paid for under the contract unit price for Barrier Wall (Temporary) (Relocate) (Type K), 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. The Contractor shall furnish Barrier Units 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. Unless otherwise noted on the Plans, the BarrierUnits shall become the property of the Contractor and shall be removed from the site prior to acceptance of the completed project.

NOTES FOR THRIE BEAM GUARDRAIL SPLICE INSTALLATIONS:

THRIE-BEAM GUARDRAIL: Provide Thrie-Beam Guardrail for splices in accordance with AASHTO M 180, Type II (Zinc coated) and as follows:
Two panels per splice (One panel per side) of Class B (10 Gauge), or
Four panels per splice (Two nested panels per side) of Class A (12 Gauge).
Guardrail panel length shall be 12'-6". Provide and install all other associated metallic guardrail components (Terminal Connectors, Shoulder Bolts, Hex Bolts and Nuts, Filler Plates, etc.) in accordance with Index No. 400.
Install five Guardrail Anchor Bolts at each end of each splice in any of the standard seven anchor bolt holes in the Thrie-Beam Terminal Connector. If reinforcing steel is encountered when drilling holes for Guardrail Anchor Bolts in Type K Barrier Units, shift Thrie-Beam Terminal Connector so as to clear reinforcing steel within the given tolerances or select a different bolt hole to use. Do not drill or cut through reinforcing steel within Type K Barrier Units. Drilling or cutting through reinforcing steel within permanent concrete traffic railings is permitted. Do not drill or cut through utilities or conduits within permanent concrete traffic railings.

GUARDRAIL OFFSET BLOCKS: Provide and install timber Offset Blocks meeting the material requirements of Index No. 400. Field trim Offset Blocks as required for proper fit. Utilize Offset Blocks as shown and required in order to prevent bending or kinking of Thrie-Beam Guardrail panels.

CONCRETE FOR FILLING TAPERED TRAFFIC RAILING TOES: Provide concrete for filling tapered toes of Traffic Railings as shown meeting the material requirements of Specification Section 346, any Class, or a commercially available prebagged concrete mix (3000 psi minimum compressive strength). Sampling, testing, evaluation and certification of the concrete in accordance with Specification Section 346 is not required. Saturate with water the surfaces upon and against which the concrete fill will be placed prior to placing concrete. Place and finish concrete fill using forms or by hand methods to the general configurations shown so as to provide a smooth shape transition between the Type K Barrier and the adjacent traffic railing. A low slump is desirable if placing and finishing concrete by hand methods. Cure the concrete fill by application of a curing compound, or by covering with a wet tarp or burlap for a minimum of 24 hours. Completely remove the concrete fill upon relocation or removal of the Type K Temporary Concrete Barrier.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Added language to TRANSITIONS note for QPL Barrier Systems			

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TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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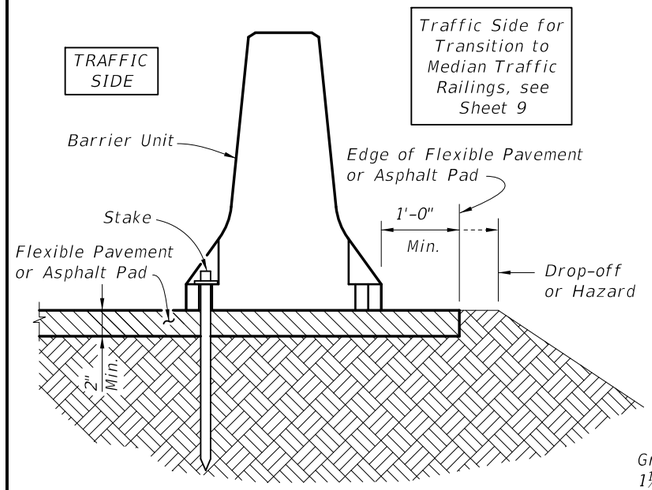
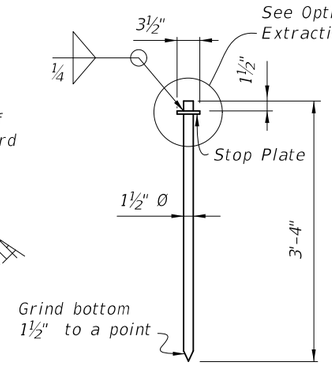
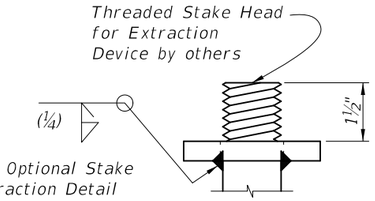


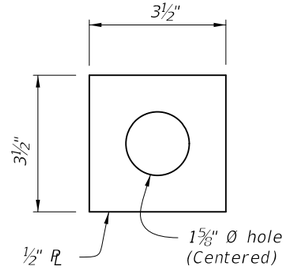
TYPICAL SECTION
(INSTALLATION ADJACENT TO DROP-OFF SHOWN, MEDIAN TRANSITION INSTALLATION SIMILAR)



STAKE DETAIL



OPTIONAL STAKE EXTRACTION DETAIL



STOP PLATE DETAIL

NOTES FOR STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS:

LIMITATION OF USE: This installation technique can only be used on flexible pavement or an Asphalt Pad as shown. Stakes must not be installed on both sides of the Barrier Units.

ASPHALT PAD: Where existing flexible pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

STAKES: Provide steel for Stake assemblies in accordance with ASTM A 36 or ASTM A 709 Grade 36. All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

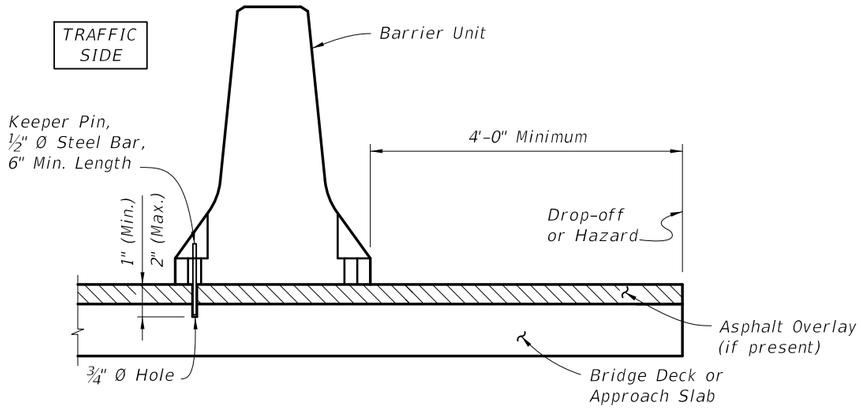
Install three (3) Stakes on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of stakes required in Transition Installations see Sheets 8 and 9 and Index No. 415. Install Stakes so that the Stop Plate is snug against the bottom of the Anchor Blockout.

BURIED UTILITIES: Prior to installation of Stakes verify locations of all adjacent buried utilities, drainage structures, pipes, etc. If conflicts between Stake locations and buried elements exist, a maximum of two (2) Stakes within a single Barrier Unit may be omitted if the adjacent Barrier Units are installed with the standard three (3) Stakes.

REMOVAL OF STAKES: Upon removal or relocation of Barrier Units, completely remove all Stakes and completely fill the remaining holes in flexible pavement that is to remain with hot or cold patch asphalt material.

REUSE OF STAKES: Stakes may be reused if they have the structural integrity of new stakes.

STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS



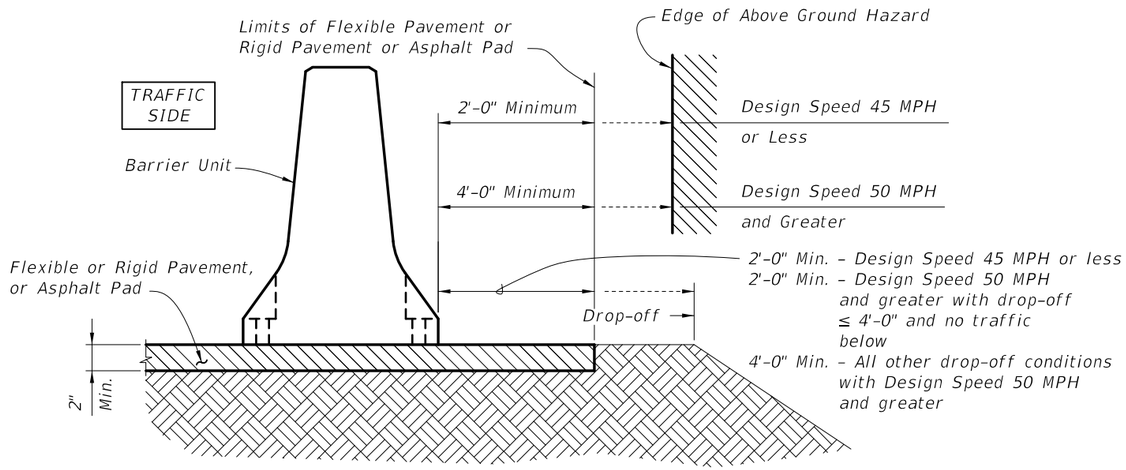
TYPICAL SECTION (BRIDGE DECK SHOWN, APPROACH SLAB SIMILAR)

NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB INSTALLATIONS:

KEEPER PINS: Keeper Pins shall be ½" diameter, smooth steel bar in accordance with ASTM A 36 or ASTM A 709 Grade 36. As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit on the traffic side of the Barrier Units as shown. Do not drill into or otherwise damage bridge deck expansion joints or drains.

REMOVAL OF KEEPER PINS: Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

FREESTANDING BRIDGE OR APPROACH SLAB INSTALLATIONS



TYPICAL SECTION

NOTES FOR FREE STANDING ROADWAY INSTALLATION:

LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement or on an Asphalt Pad as shown.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

FREESTANDING ROADWAY INSTALLATION

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Corrected weld symbol on STAKE DETAIL. Added OPTIONAL STAKE EXTRACTION DETAIL.			

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TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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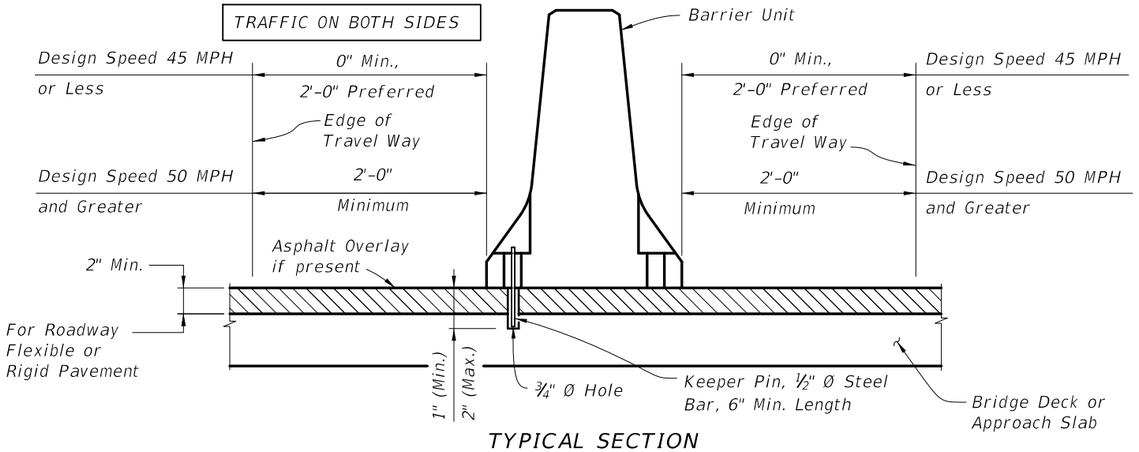


TYPICAL SECTION

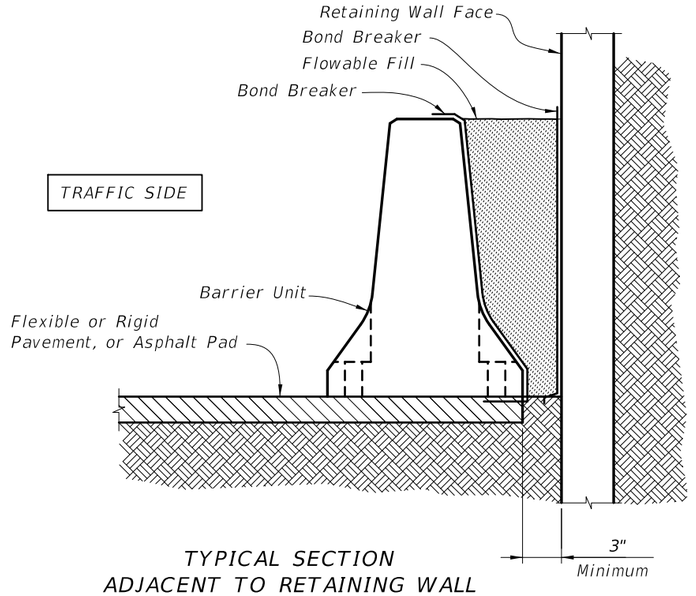
NOTES FOR FREESTANDING MEDIAN INSTALLATION:

KEEPER PINS: Required for Bridge Decks only, Keeper Pins shall be ½" diameter, smooth steel bar in accordance with ASTM A 36 or ASTM A 709 Grade 36. As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit as shown. Alternate Keeper Pin locations from side to side of Barrier Units along the length of the installation. Do not drill into or otherwise damage bridge deck expansion joints or drains. Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

FREESTANDING MEDIAN INSTALLATION

(BRIDGE DECK SHOWN, APPROACH SLAB, ASPHALT PAD, FLEXIBLE OR RIGID PAVEMENT SIMILAR)

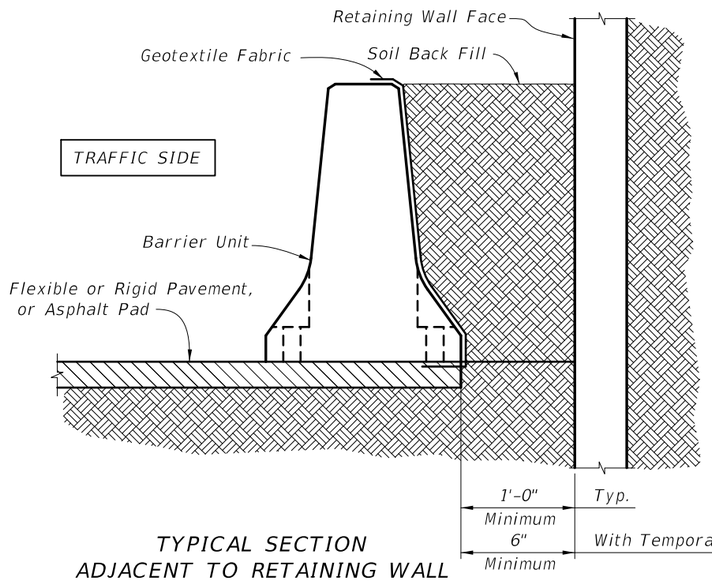


TYPICAL SECTION ADJACENT TO RETAINING WALL WITH FLOWABLE FILL BACK FILL

NOTES FOR FLOWABLE FILL BACK FILLED ROADWAY INSTALLATIONS:

FLOWABLE FILL: Provide Flowable Fill in accordance with Specification Section 121.

FLOWABLE FILL BACK FILL ROADWAY INSTALLATIONS

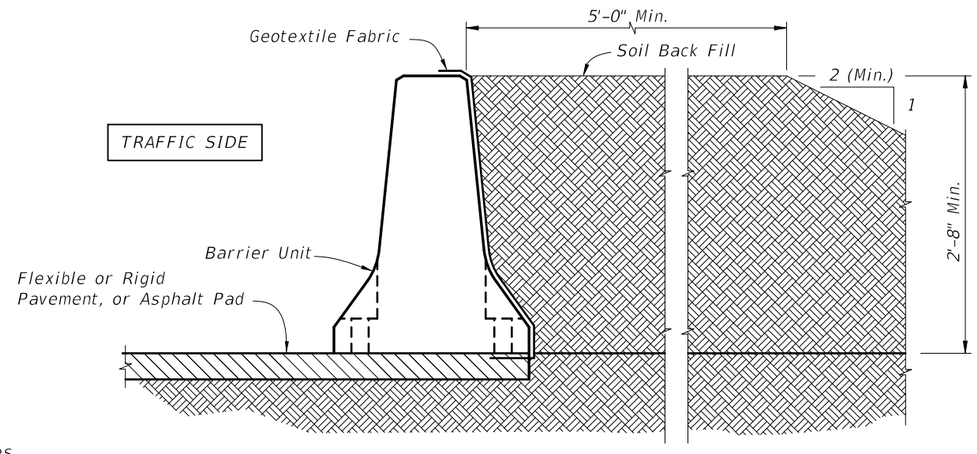


TYPICAL SECTION ADJACENT TO RETAINING WALL WITH SOIL BACK FILL

NOTES FOR SOIL BACK FILLED ROADWAY INSTALLATIONS:

SOIL BACK FILL MATERIAL: Provide Back Fill Material consisting of any available clean soil. Compact Back Fill Material until the soil mass is firm and unyielding. Provide erosion control as specified in the Plans. If none is specified in the Plans, provide erosion control as required to maintain the integrity of the Back Fill embankment.

GEOTEXTILE FABRIC: Provide Type D-5 Geotextile Fabric in accordance with Index No. 199 to contain Back Fill Material behind Barrier Units. Geotextile Fabric may be continuous over the length and height of the installation or may be individual pieces as required to cover the Lift / Drain Slots and open vertical joints between Barrier Units.



TYPICAL SECTION WITH SOIL BACK FILL

SOIL BACK FILLED ROADWAY INSTALLATIONS

REVISIONS

DATE	BY	DESCRIPTION
01/01/11	GJM	Combined "FREESTANDING MEDIAN INSTALLATION" Detail and notes; Added "FLOWABLE FILL BACK FILL ROADWAY INSTALLATION" Detail and Notes.
01/01/11	GJM	Added 6" min. Dimension to "TYPICAL SECTION ADJACENT TO RETAINING WALL WITH SOIL BACK FILL".

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TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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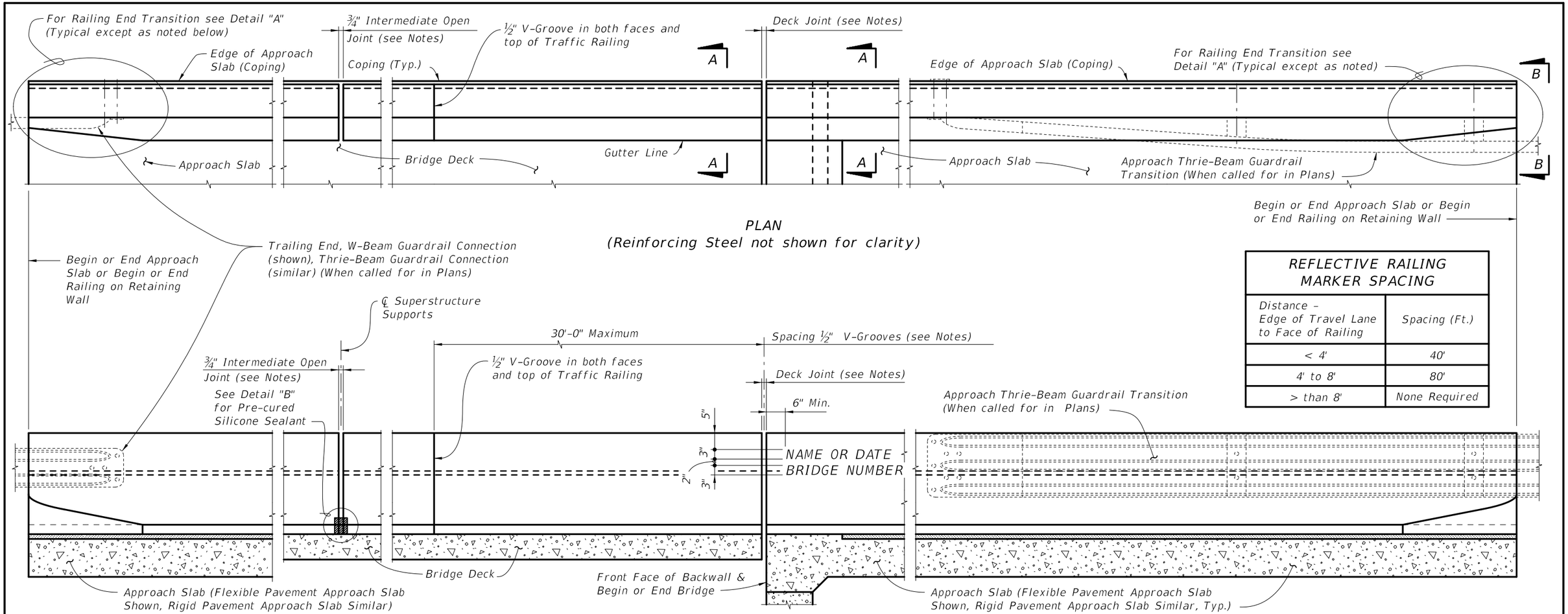

PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall similar)

CROSS REFERENCE:
For Section A–A, View B–B and Detail "A", see Sheet 2.
For Detail "B", see Sheet 3.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

GUARDRAIL : For Guardrail connection details see Index Nos. 400 and 410.

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.

PEDESTRIAN AND BICYCLE RAILING : See Index Nos. 821 and 822 for Notes, Details and post spacings for Traffic Railings with Aluminum Pedestrian /Bicycle Bullet Railings.

V-GROOVES : Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Sheet No. 3.

Provide ¾" Intermediate Open Joints at :

(1) – Superstructure supports where slab is continuous.

(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS and Joints notes.			
01/01/11	CMH	Changed JOINTS Note reference from Index 490 to Sheet No. 3 for skew details treatment, and Mortar Plug to Pre-cured Silicone Sealant in ELEVATION.			

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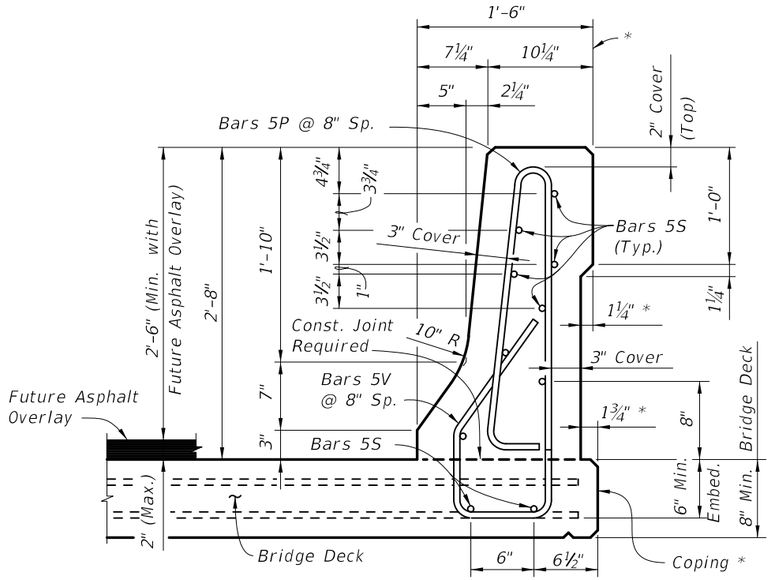
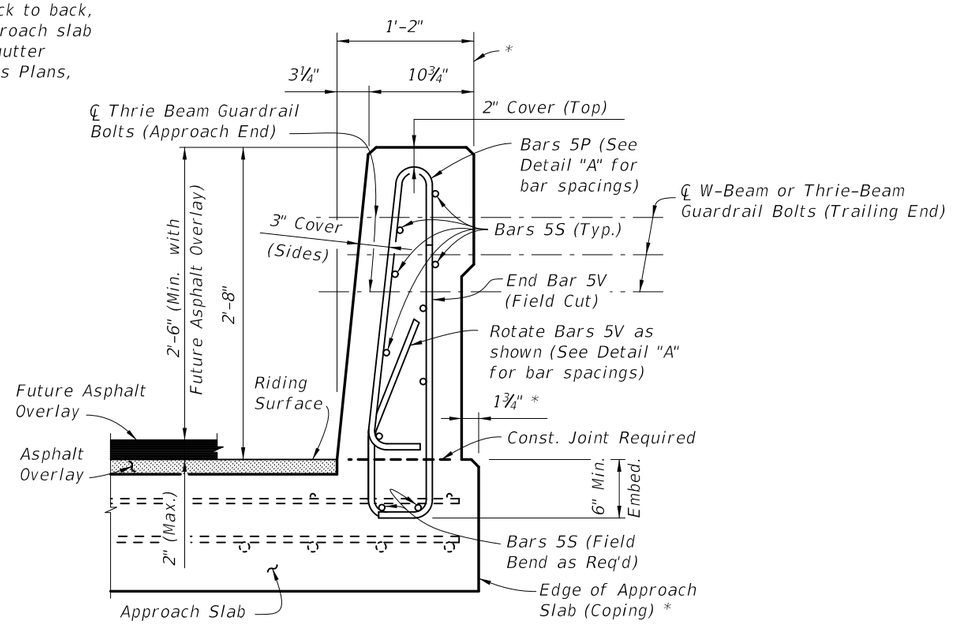
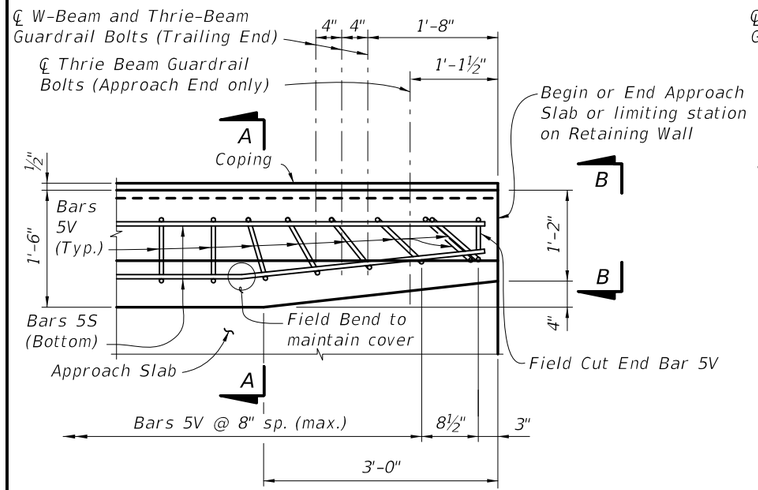
* *Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck/approach slab may coincide along a plane centered 1'-6" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.*



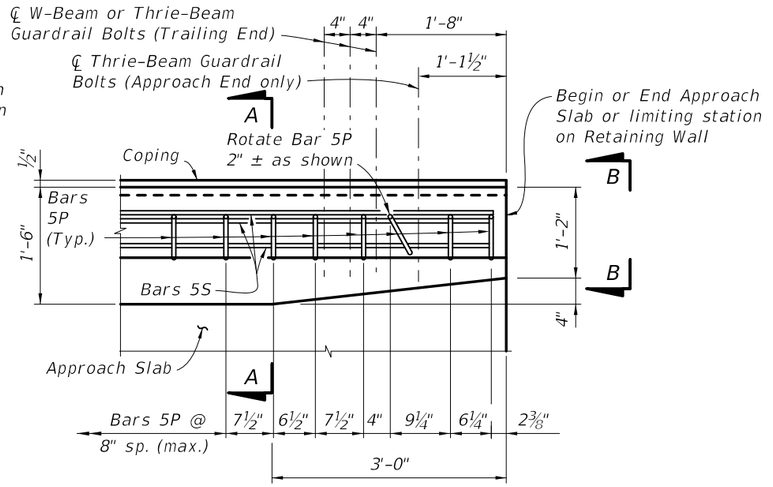
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(Section thru Bridge Deck shown, Section thru Approach Slab and Retaining Walls similar)



VIEW B-B
(Section thru Approach Slab shown, Section thru Retaining Walls similar)



PLAN - Railing End Transition
(Showing Bars 5V and 5S)



PLAN - Railing End Transition
(Showing Bars 5P and 5S)

DETAIL "A"

(Railing on Approach Slab shown, Railing on Retaining Wall similar)

NOTE: Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5P and 5V at 8" (Typ.)

NOTES:
Rotate Bars 5V in Railing End Transition to maintain cover. Begin placing Railing Bars 5P and 5V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.

CROSS REFERENCE:
For locations of Section A-A and View B-B see Sheet 1.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note.			
01/01/11	CMH	Changed Sheet No. to "2 of 4"			

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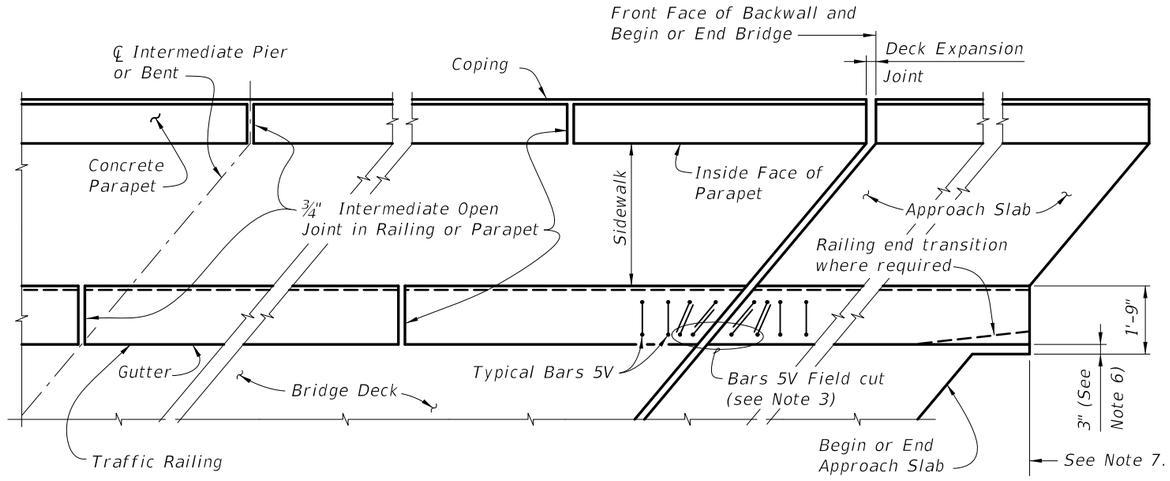
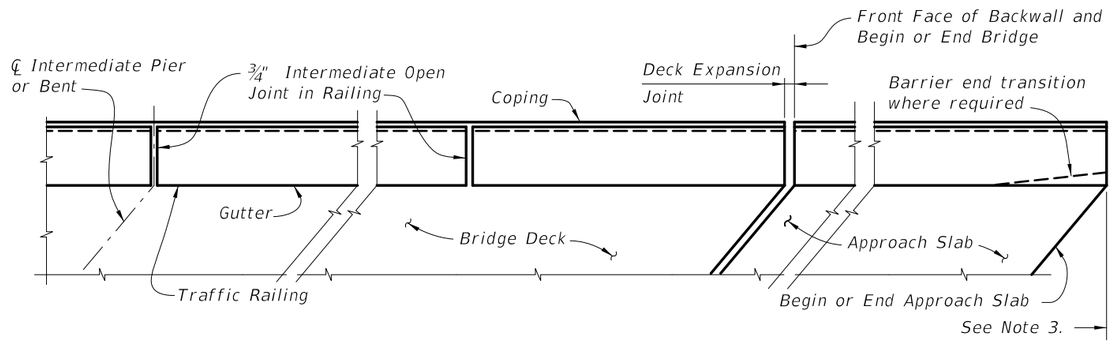
Sheet No. 2 of 4

Index No. 420



PARTIAL PLAN VIEW OF SKEWED BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK, F SHAPE TRAFFIC RAILING AND PEDESTRIAN/BICYCLE RAILING INDEX NO. 820, 825 or 826, OTHER TRAFFIC RAILINGS SIMILAR

NOTES:
1) Concrete Parapet reinforcement is not effected by skew angle, see Index No. 820 for details.
2) Parapet expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure Sheets for details.
3) Traffic Railing reinforcement vertical Bars 5V & 5P may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement. Bars 5V adjacent to expansion joints shall be field adjusted to maintain clearance and spacing, extra Bars 5V will be required. Bars 5V bottom horizontal portion shall be cut so as to maintain maximum bottom horizontal length of bar to each vertical leg being placed, the remainder of bar shall be discarded. Cut Bars 5V may be rotated to maintain clearance.
4) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
5) ¾" Intermediate Open Joints and V-Grooves in railing and parapet shall be placed perpendicular or radial to the gutter line or inside face of parapet line. See Structures Plans, Superstructure Sheets for locations.
6) At begin or end approach slab extend slab at the railing ends 3" (gutter side or back face of railing as required) as shown to provide a base for casting of the railing.
7) Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW OF SKEWED BRIDGE DECK AND APPROACH SLAB WITH F SHAPE TRAFFIC RAILING, OTHER TRAFFIC RAILINGS SIMILAR

NOTES:
1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure Sheets for details.
2) ¾" Intermediate Open Joints and ½" V-Grooves in railing shall be placed perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for locations.
3) Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.

GENERAL NOTES:
1) Work this Sheet with Traffic Railing, Pedestrian/Bicycle Railing, and Approach Slab Indexes as applicable.
2) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.
3) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.
4) Railings on Raised Sidewalks shall be treated similar to the Partial Plan View of Bridge Deck with Traffic Railing.
5) If Welded Wire Reinforcement is used in lieu of conventional reinforcement, placement of the WWR vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible. When clipping is required, supplement horizontal elements by lap splicing with deformed bars having an equivalent area of steel.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	Added Index No. 490 Sheet 1 of 2 as Sheet 3 of 4 – Deleted Index 490.			

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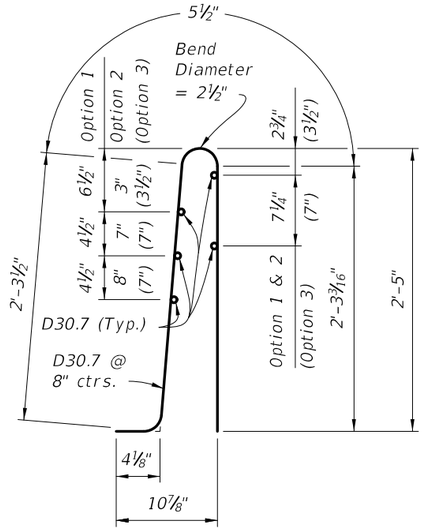
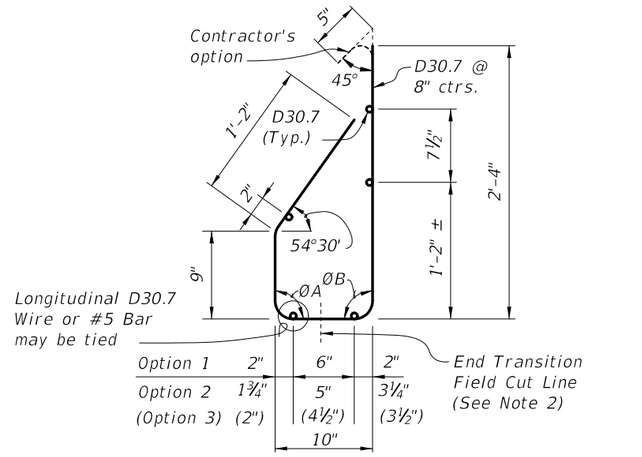
Sheet No. 3 of 4

Index No. 420

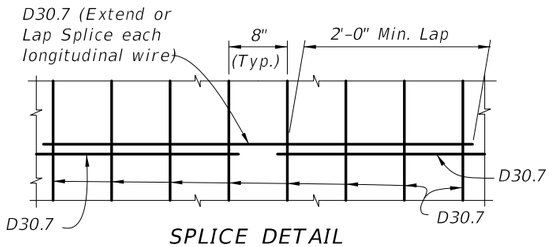
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



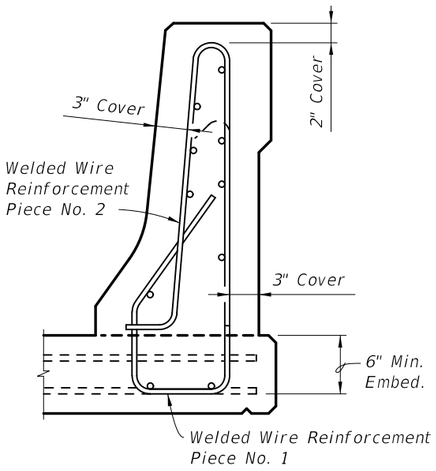
Welded Wire Reinforcement (WWR) Piece No. 2



Welded Wire Reinforcement (WWR) Piece No. 1



SPLICE DETAIL
(Between WWR Sections)



WELDED WIRE REINFORCEMENT NOTES:

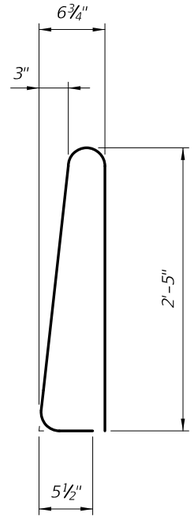
1. At the option of the Contractor Welded Wire Reinforcement (WWR) may be utilized in lieu of all Bars 5P, 5S and 5V. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The vertical wires (D30.7) in Piece 1 shall be cut as shown and the gutter side portion bent inward as required to allow placement.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

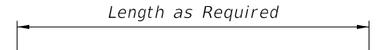
ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	ØA	ØB	ØA	ØB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

ØA and ØB shall be 90° if Contractor elects to place railing perpendicular to the deck and approach slabs.

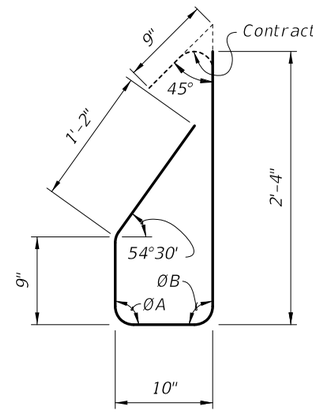
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	5'-7"
S	5	As Reqd.
V	5	5'-1"



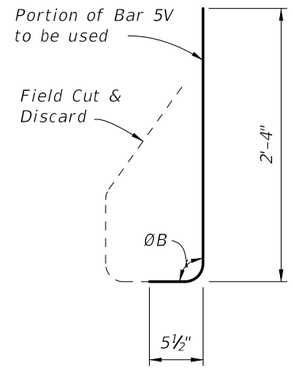
STIRRUP BAR 5P



BAR 5S



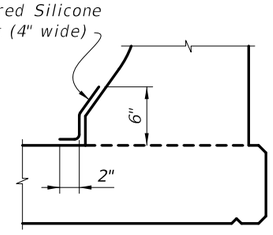
STIRRUP BAR 5V



END STIRRUP BAR 5V
To Be Field Cut
(One Required per
Railing End Transition)

REINFORCING STEEL NOTES:

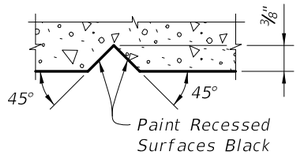
1. All bar dimensions in the bending diagrams are out to out.
2. The 9" and the 2'-4" vertical dimensions shown for Bar 5V are based on a bridge deck without a raised sidewalk. If a raised sidewalk is to be provided, increase these dimensions to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
3. The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 8" deck with ØA = ØB = 90°
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED
"V" GROOVE TO FORM INSCRIBED
LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.104
Reinforcing Steel	LB/LF	27.12

(The above quantities are based on a 2% deck cross slope; railing on low side of deck.)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	Change Sheet No. to "4 of 4" and DETAIL "B" to Pre-cured Silicone Sealant.			

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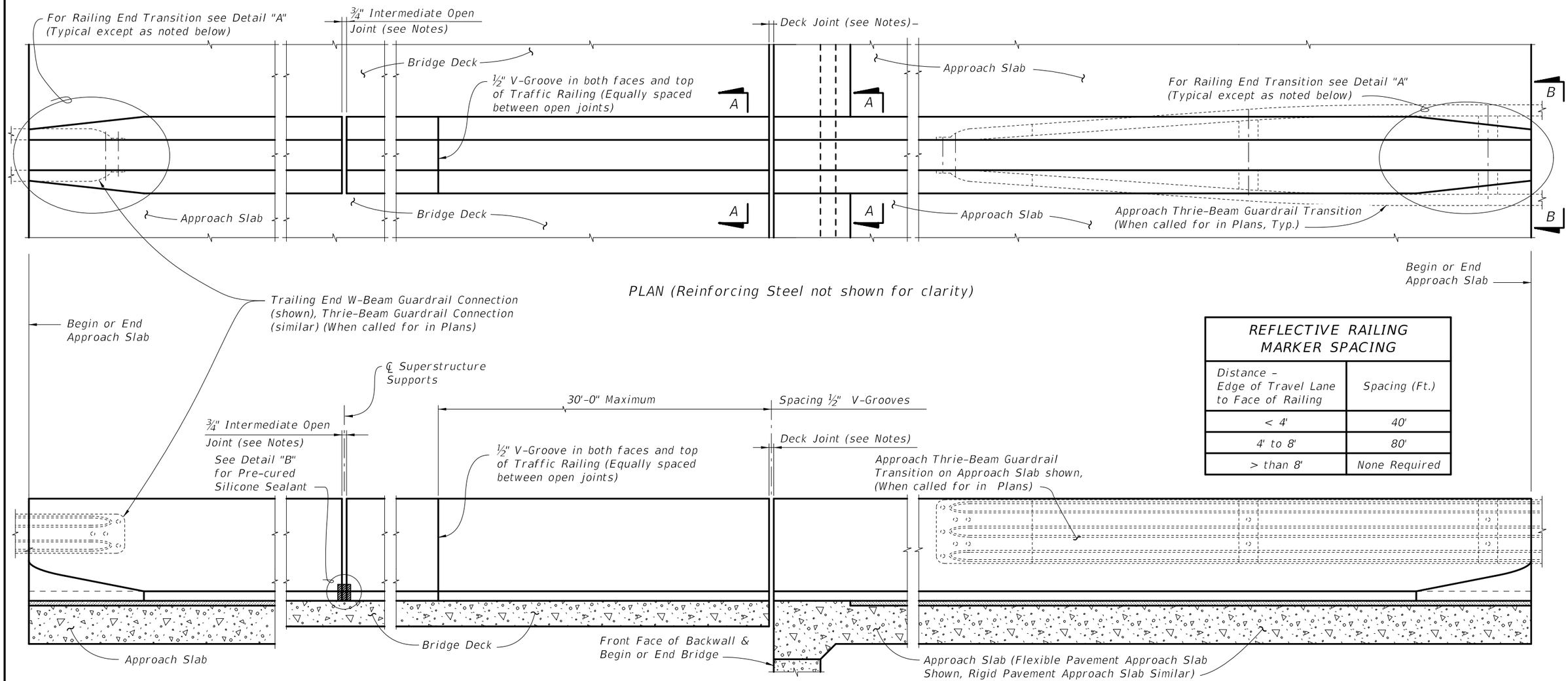

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

CROSS REFERENCE:
For Section A-A, View B-B and Detail "A" see Sheet 2.

For Detail "B" see Sheet 3.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.
GUARDRAIL : For Guardrail connection details see Index No. 400.
SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing along the centerline at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Sheet No. 3.

Provide ¾" Intermediate Open Joints at :
(1) – Superstructure supports where slab is continuous.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed Joints note.			
01/01/11	CMH	Changed JOINTS note reference from Index 490 for Skew Treatment to Sheet No. 3, and Mortar Plug to Pre-cured Silicone Sealant.			

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TRAFFIC RAILING - (MEDIAN 32" F SHAPE)

Interim Date 01/01/11

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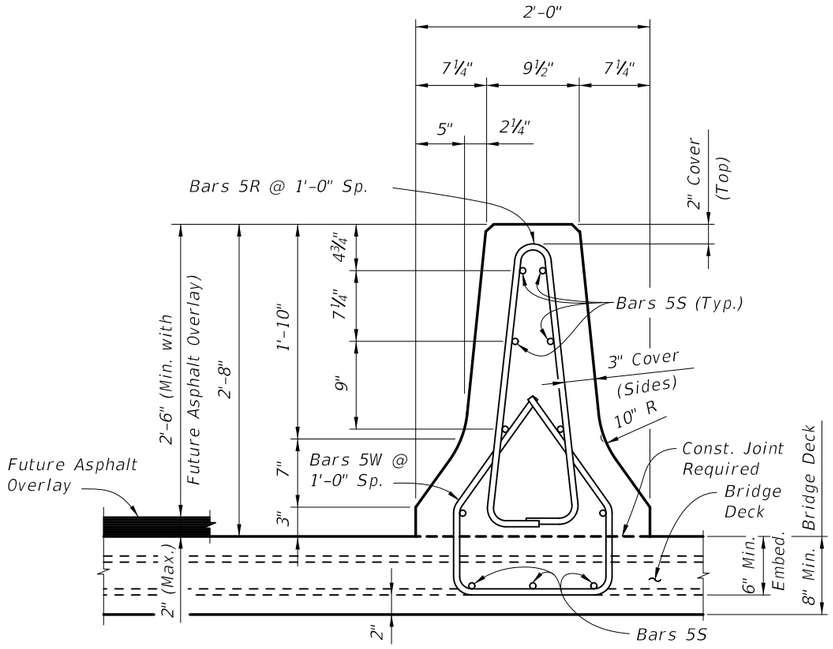
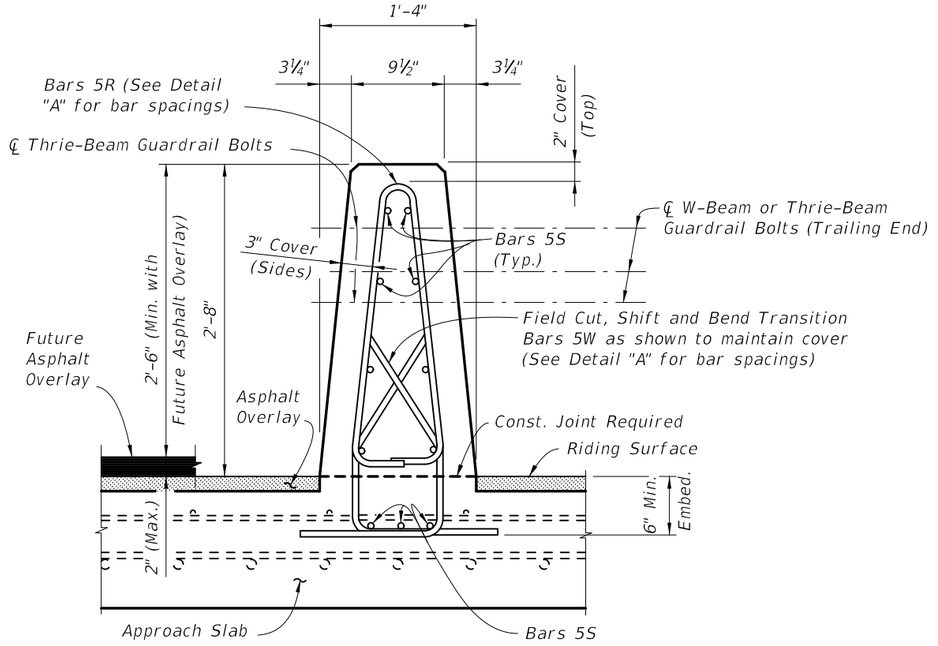
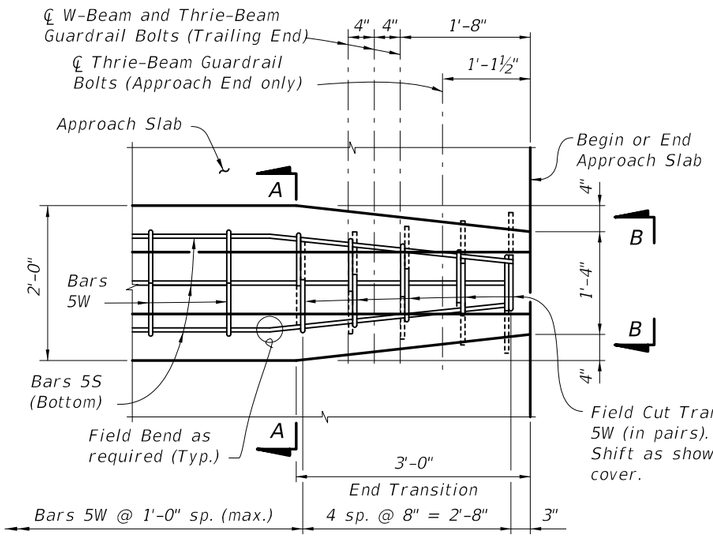


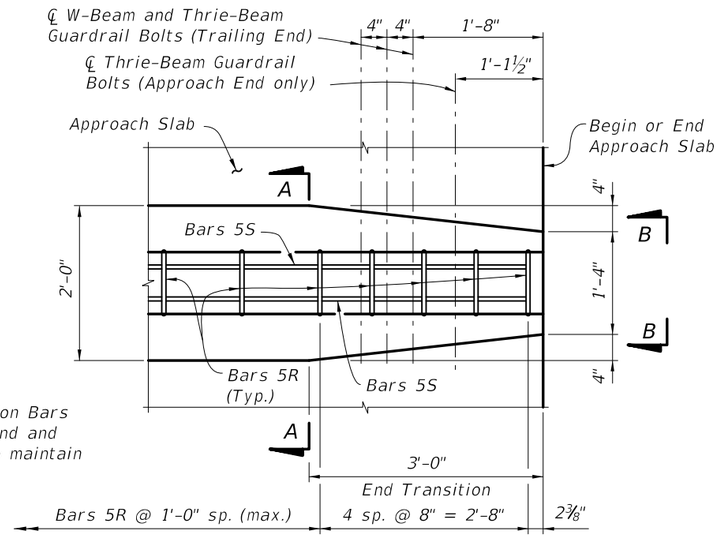
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN -
SECTION THRU APPROACH SLAB SIMILAR)



VIEW B-B



PLAN - Railing End Transition
(Showing Bars 5W and 5S)



PLAN - Railing End Transition
(Showing Bars 5R and 5S)

NOTE:
Begin placing Railing Bars 5R and 5W on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5R and 5W shall be made immediately adjacent to Begin or End Bridge.Shift and rotate Bars 5R and 5W as required to maintain cover in Railing End Transition.

Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to the end of Approach Slab and space Bars 5R and 5W at 1'-0" (Typ.)

DETAIL "A"

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note.			
01/01/11	CMH	Change Sheet No. to "2 of 4"			

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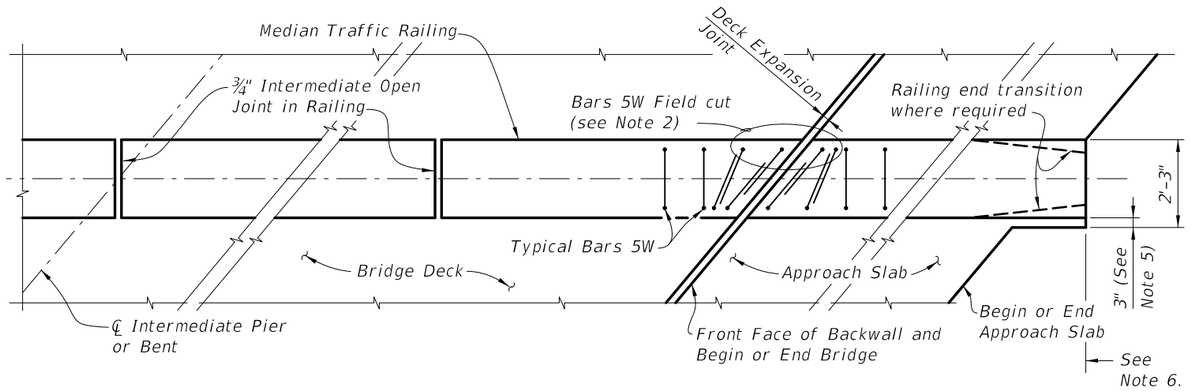


PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH MEDIAN TRAFFIC RAILING

NOTES:

1) Median Traffic Railing reinforcement vertical Bars 5W may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement.

2) Transition Stirrup Bars 5W shall be used as required at railing ends adjacent to expansion joints to facilitate placement of bars in acute corners. Place Transition Bars 5W in a fan pattern to maintain spacing. Rotate bars in 10° (Max.) increments as required.

3) Median Traffic Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. See Structures Plans, Superstructure and Approach Slab Sheets for Details.

4) ¾" Intermediate Open Joints and " V-Grooves in railing shall be placed perpendicular or radial to the ℄ of the median railing. See Structures Plans, Superstructure and Approach Slab Sheets for locations.

5) At begin or end approach slab extend slab at the median railing ends 3" (open side) as shown to provide a base for casting of the railing.

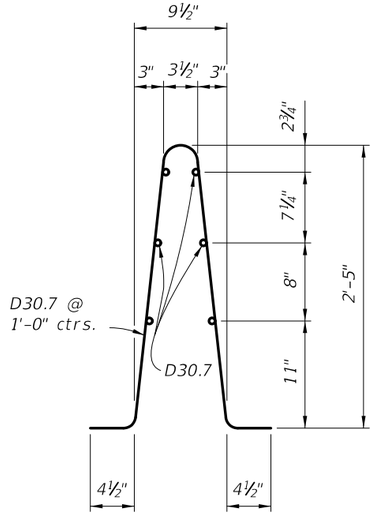
6) Work this Sheet with Approach Slab Indexes as applicable.

7) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.

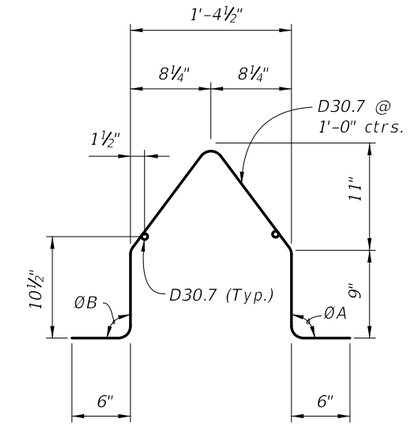
8) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.

9) If Welded Wire Reinforcement is used in lieu of conventional reinforcement, placement of the WWR vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible. Where clipping is required, supplement horizontal elements by lap splicing deformed bars with an equivalent area of steel.

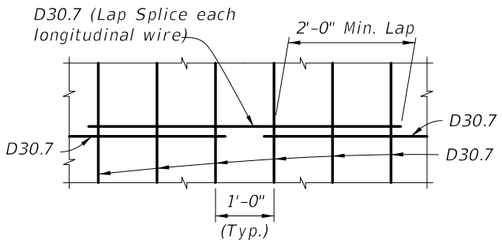
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



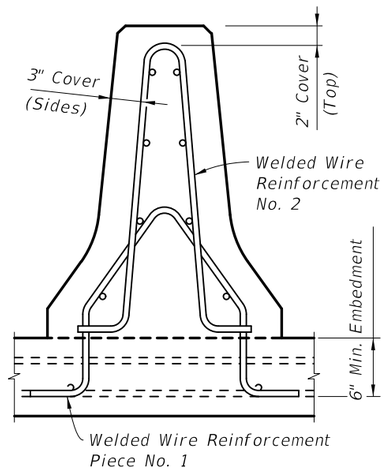
Welded Wire Reinforcement (WWR)
Piece No. 2



Welded Wire Reinforcement (WWR)
Piece No. 1



SPLICE DETAIL
(Between WWR Sections)



WELDED WIRE REINFORCEMENT NOTES:

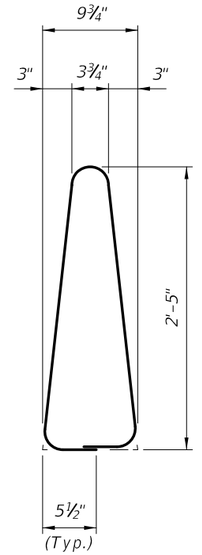
1. At the option of the Contractor Welded Wire Reinforcement may be utilized in lieu of all Bars 5R, 5S and 5W. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The top of Piece 1 shall be cut to allow overlap.
3. Place WWR panels so as to minimize the end overhang of longitudinal wires at Railing Ends and Open Joints. Overhangs greater than 6" are not permitted.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

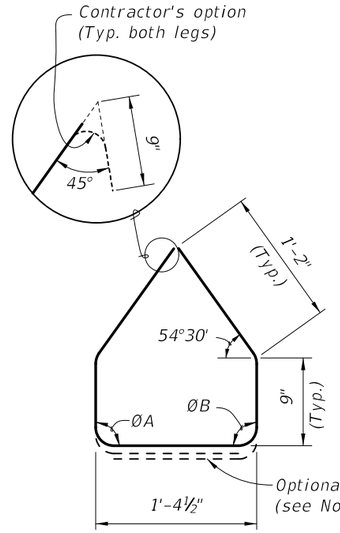
ROADWAY CROSS-SLOPE	ON SLOPE		AT CROWN	
	ØA	ØB	ØA	ØB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	90°	90°
6% to 10%	96°	84°	90°	90°

ØA and ØB shall be 90° if Contractor elects to place railing perpendicular to the deck, and approach slabs.

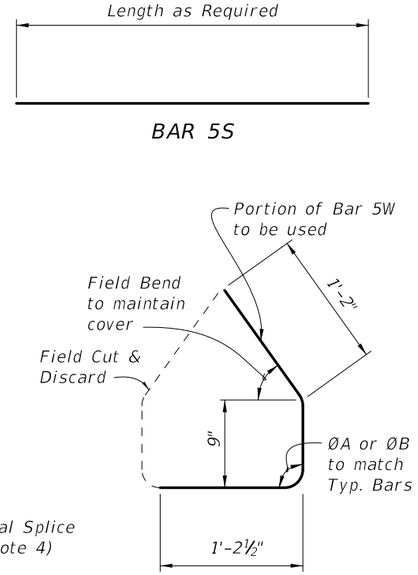
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
R	5	6'-1"
S	5	As Reqd.
W	5	5'-3"



STIRRUP BAR 5R



STIRRUP BAR 5W

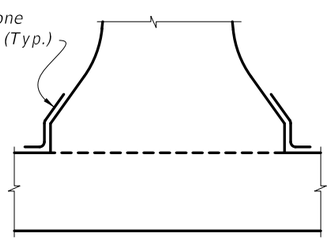


BAR 5S

TRANSITION STIRRUP BAR 5W
To Be Field Cut and Bent
(10 required per Railing
End Transition)

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints shall have a 2" minimum cover.
3. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
4. At the Contractor's option, Bars 5W may be fabricated as a two piece bar with a 1'-2" lap splice of the bottom legs.



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.120
Reinforcing Steel	LB/LF	23.29

(The above quantities are based on a crowned roadway, with a 2% cross slope)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	Changed Sheet No. to "4 of 4", and DETAIL "B" to Pre-cured Silicone Sealant.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

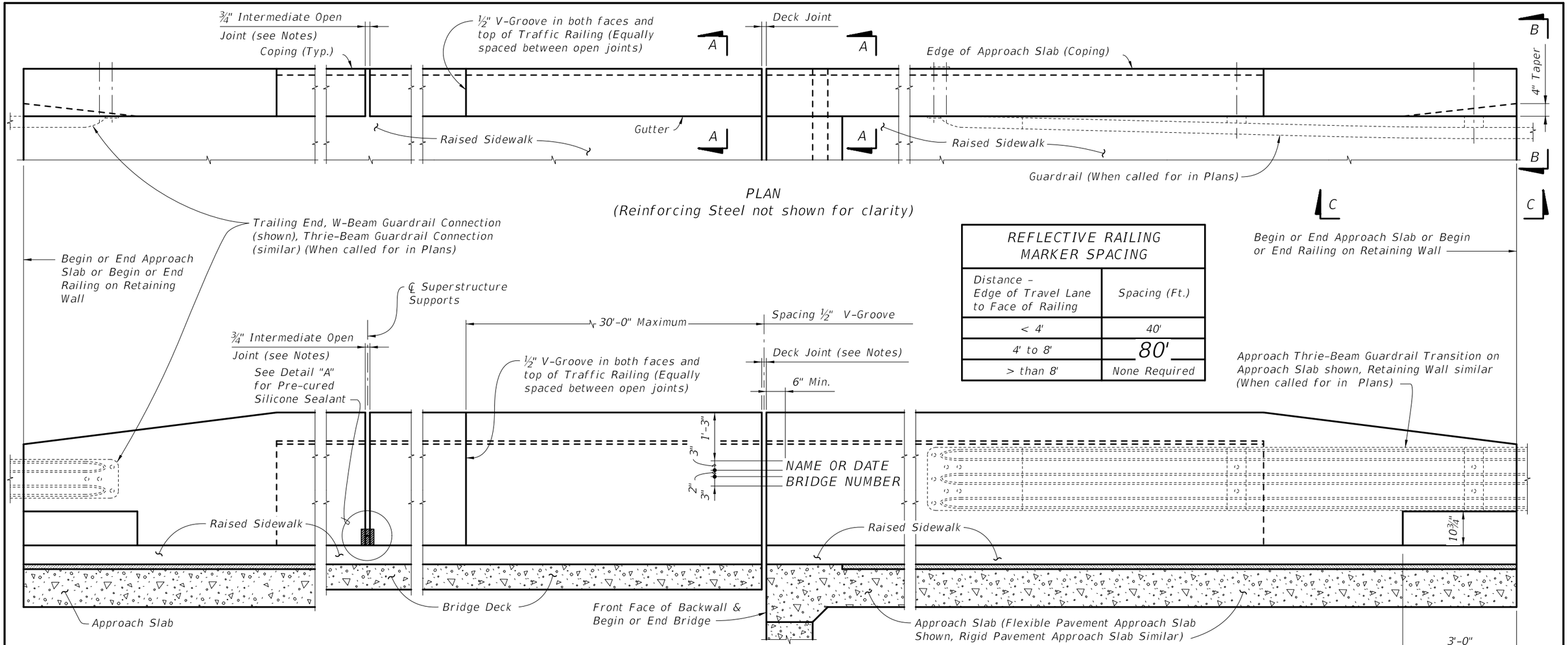
2010 Interim Design Standard

TRAFFIC RAILING - (MEDIAN 32" F SHAPE)

Interim Date 01/01/11

Sheet No. 4 of 4

Index No. 421



PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

CROSS REFERENCE:
For Section A-A, Detail "A", View B-B and View C-C, see Sheet 2.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Index No. 422, Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-Groove shall apply.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

V-GROOVES : Construct ½" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420.

Provide ¾" Intermediate Open Joints at :
(1) – Superstructure supports where slab is continuous.
(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS and JOINTS notes.			
01/01/11	CMH	Changed JOINTS note reference for Skew Treatment to Index No. 420, and Mortar Plug to Pre-cured Silicone Sealant in ELEVATION.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

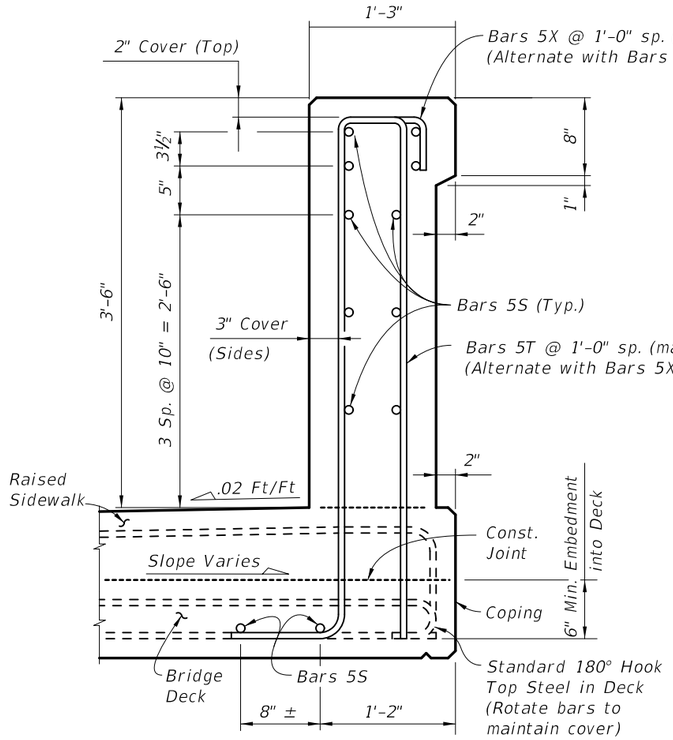
2010 Interim Design Standard

TRAFFIC RAILING - (42" VERTICAL SHAPE)

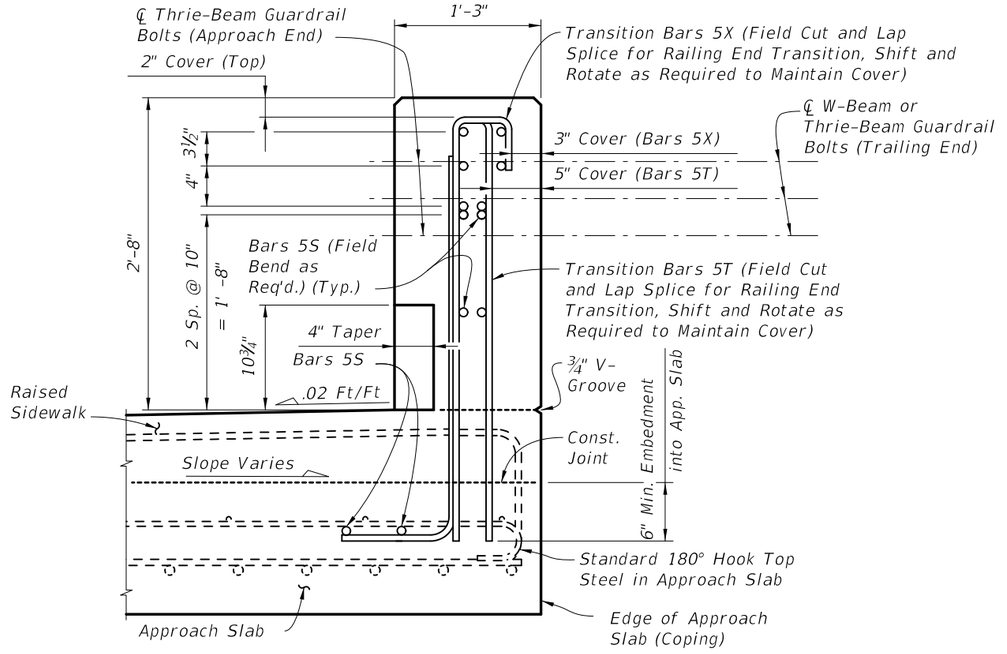
Interim Date 01/01/11

Sheet No. 1 of 3

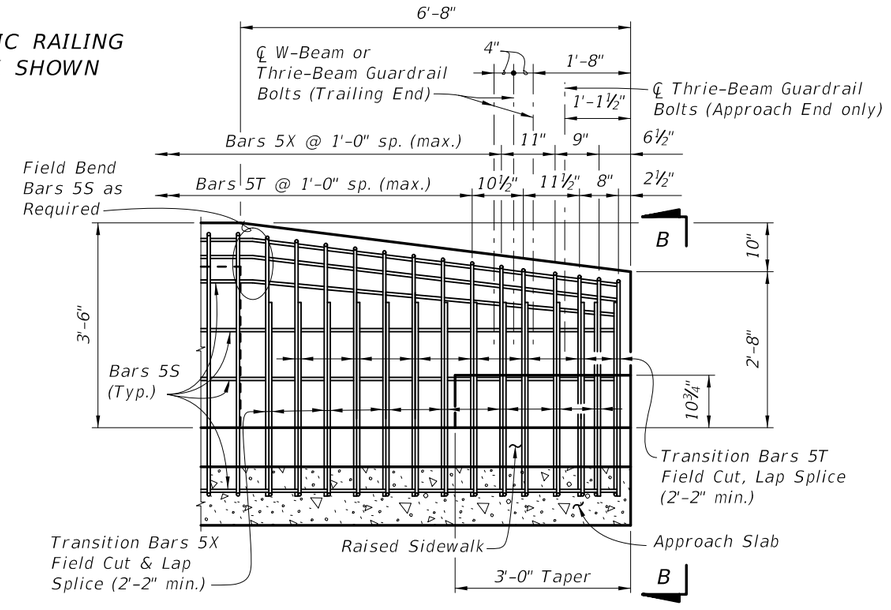
Index No. 422



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN



VIEW B-B
(End View of Traffic Railing, Approach Slab shown,
Retaining Wall Junction Slab similar)



VIEW C-C
RAILING END TRANSITION
(Guardrail Not Shown For Clarity)

CROSS REFERENCE:
For location of Section A-A, Detail "A" and View B-B, see Sheet 1.

NOTES:

Begin placing Railing Bars 5T and 5X on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X as required to maintain cover in Railing End Transition.

Omit Railing Taper, End Transition and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Taper and Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5T and 5X at 1'-0" (Typ.)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note. Added ¾" V-Groove to VIEW B-B.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

TRAFFIC RAILING - (42" VERTICAL SHAPE)

Interim Date: 01/01/11

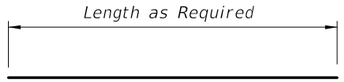
Sheet No.: 2 of 3

Index No.: 422

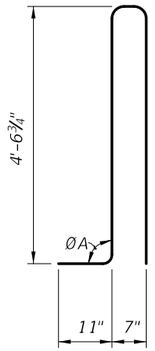
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	10'-8"
X	5	6'-9"

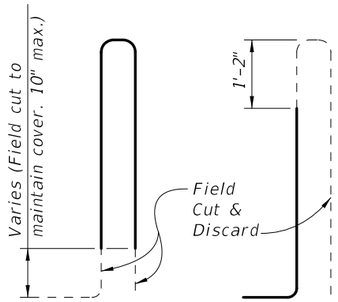
ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	83°
6% to 10%	84°	96°



BAR 5S

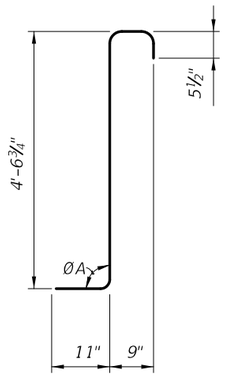


STIRRUP BAR 5T

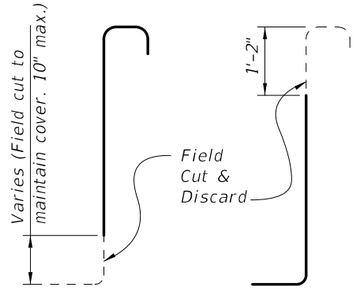


TRANSITION STIRRUP BARS 5T

To Be Field Cut (7 of each required per Railing End Transition)



STIRRUP BAR 5X

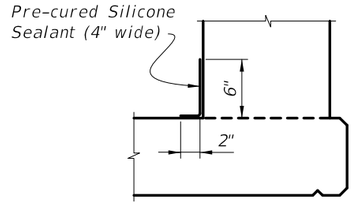


TRANSITION STIRRUP BARS 5X

To Be Field Cut (7 of each required per Railing End Transition)

REINFORCING STEEL NOTES:

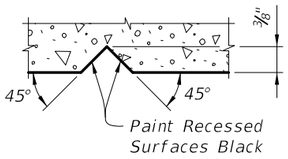
1. All bar dimensions in the bending diagrams are out to out.
2. The 4'-6¾" vertical dimension shown for Bars 5T and 5X is based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slope vary from the above amounts, adjust this dimension accordingly to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
3. The reinforcement for the railing on a retaining wall shall be the same as detailed above with ØA = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
6. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED "V" GROOVE
TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.145
Reinforcing Steel	LB/LF	30.68

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed DETAIL "A" to Pre-cured Silicone Sealant.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

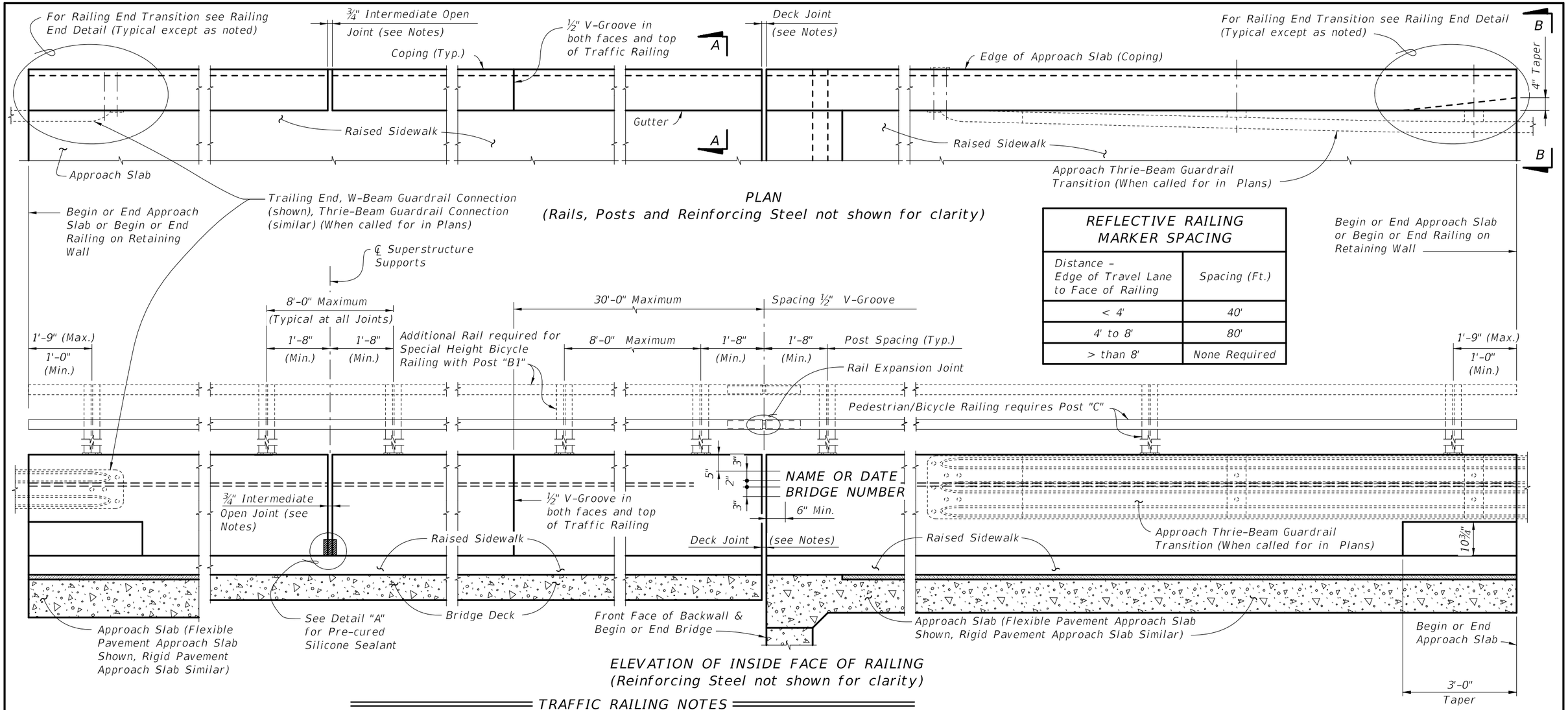
2010 Interim Design Standard

TRAFFIC RAILING - (42" VERTICAL SHAPE)

Interim Date 01/01/11

Sheet No. 3 of 3

Index No. 422



PLAN
(Rails, Posts and Reinforcing Steel not shown for clarity)

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

PEDESTRIAN/BICYCLE RAILING AND SPECIAL HEIGHT BICYCLE RAILING DETAILS : See Index No. 822 for Post, Rail and Rail Expansion Joint fabrication and installation Details and Notes.

V-GROOVES : Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-Groove shall apply.

NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes of the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

OPEN JOINTS : See Structures Plans, Superstructure, Approach Slab Sheets and Retaining Walls for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420.

Provide ¾" Intermediate Open Joints at :

(1) – Superstructure supports where slab is continuous.

(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

CROSS REFERENCE:
For Section A-A and View B-B, see Sheet 2.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS and JOINTS notes.			
01/01/11	CMH	Changed JOINTS note reference for Skew Treatment to Index No. 420, and Mortar Plug to Pre-cured Silicone Sealant in ELEVATION.			

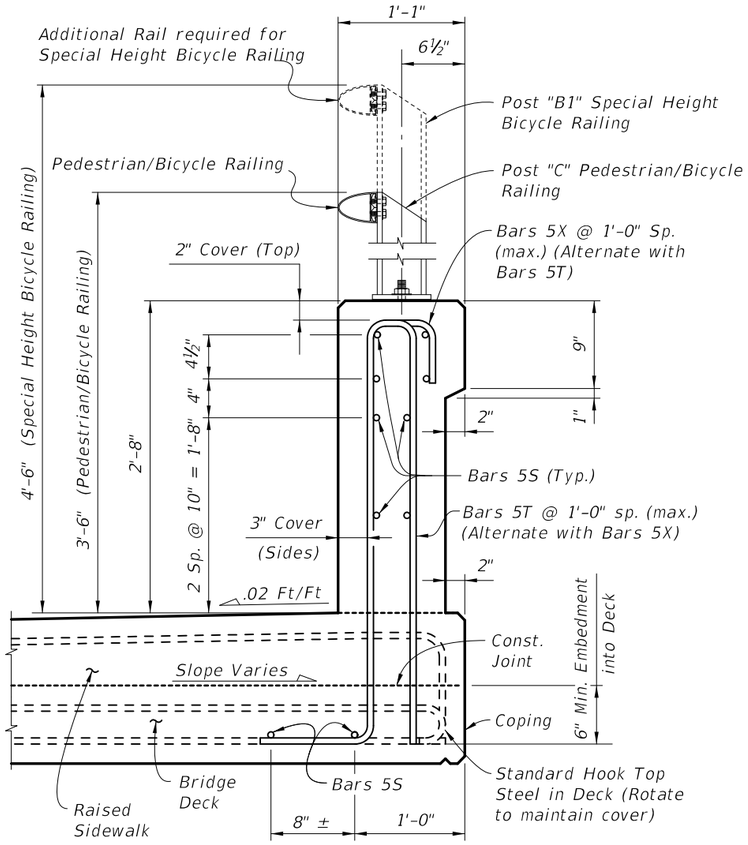
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

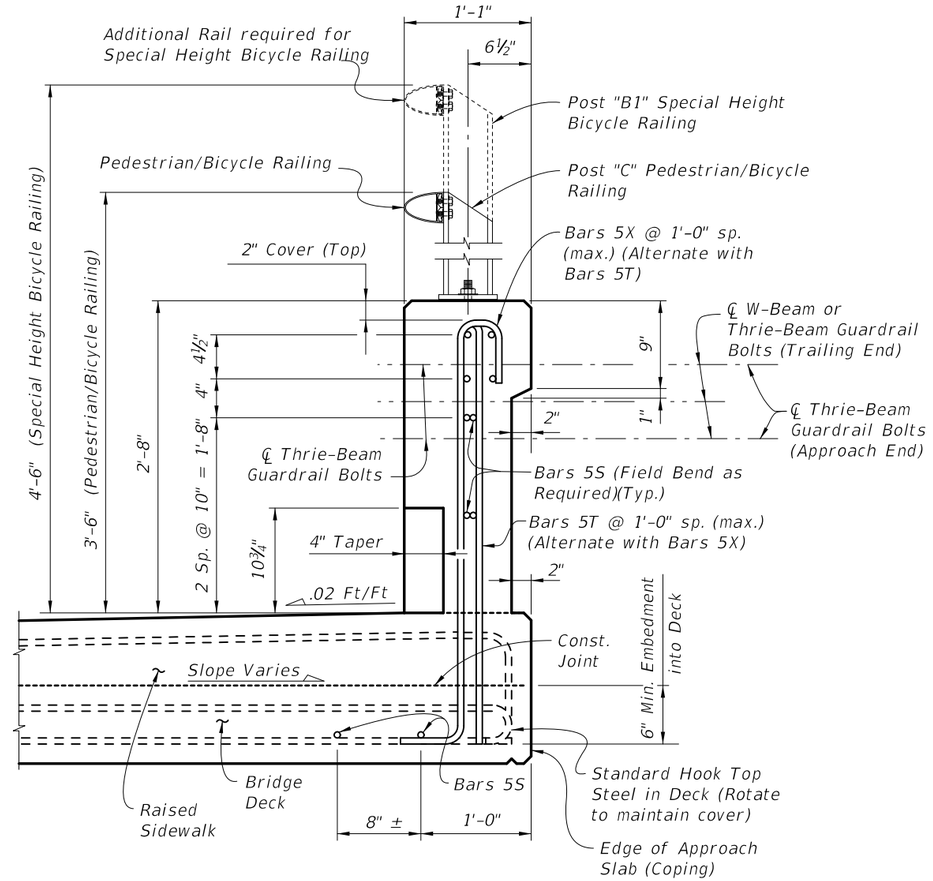
TRAFFIC RAILING - (32" VERTICAL SHAPE)

Interim Date: 01/01/11

Index No. 423



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN

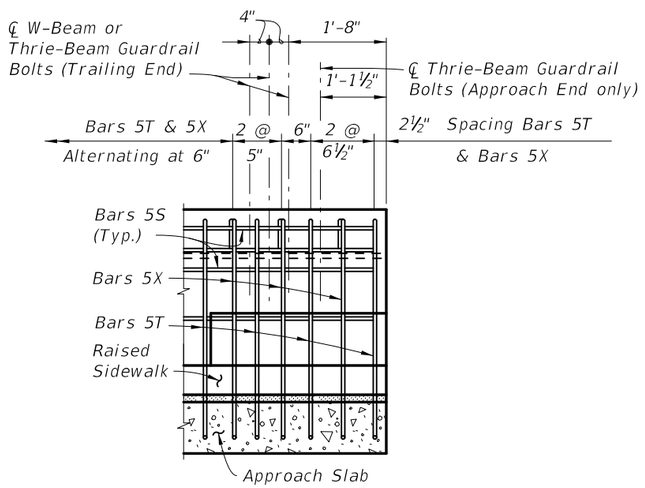


VIEW B-B
APPROACH SLAB END VIEW
OF TRAFFIC RAILING

CROSS REFERENCE:
For location of Section A-A and View B-B see Sheet 1.

NOTE: For Post "B1", Post "C" and Rail Details, see Index No. 822.

NOTES:
Omit Railing End Taper and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Taper is omitted, extend Typical Section to the end of the Approach Slab. Begin placing Railing Bars 5T and 5X on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X on Approach Slab in end taper section as required to maintain cover.



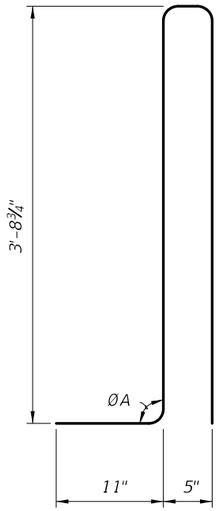
RAILING END DETAIL

REVISIONS						2010 Interim Design Standard	Interim Date 01/01/11	Sheet No. 2 of 3
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNER" note.				*TRAFFIC RAILING - (32" VERTICAL SHAPE)*	Index No. 423	

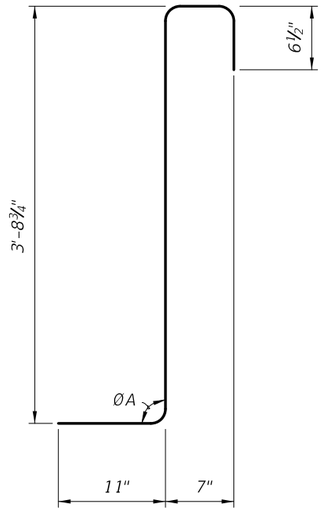
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	9'-0"
X	5	5'-10"

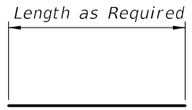
ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	93°
6% to 10%	84°	96°



STIRRUP BAR 5T



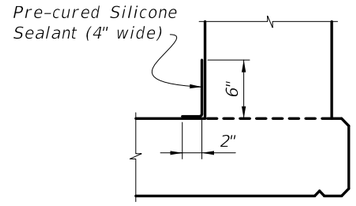
STIRRUP BAR 5X



BAR 5S

REINFORCING STEEL NOTES:

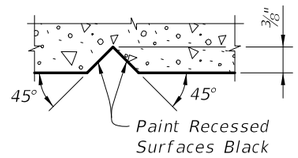
1. All bar dimensions in the bending diagrams are out to out.
2. The 3'-8¾" vertical dimensions shown for Bars 5T and 5X are based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slopes vary from the above amounts, adjust these vertical dimensions accordingly to achieve a 6" minimum embedment into the bridge deck.
3. The reinforcement for the railing on a Retaining Wall shall be the same as detailed with ØA = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
6. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED "V" GROOVE
TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.095
Reinforcing Steel	LB/LF	25.90

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope.)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed High Gutter Angle from "83°" to "93°" in Bending Diagram table.			
01/01/11	SJN	Changed DETAIL "B" to Pre-cured Silicone Sealant.			

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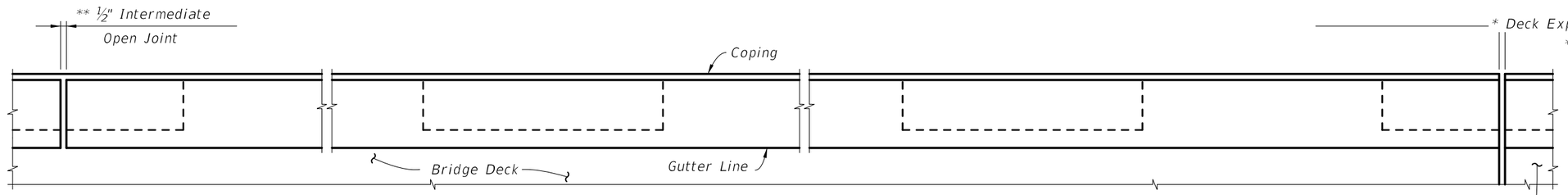
TRAFFIC RAILING - (32" VERTICAL SHAPE)

Interim Date 01/01/11

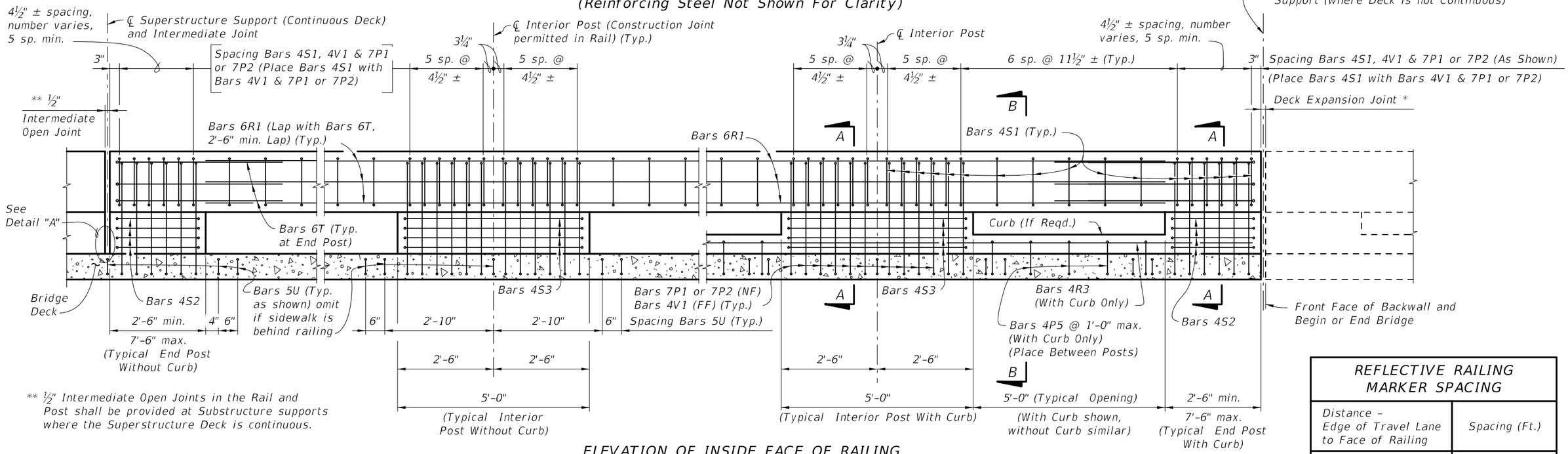
Sheet No. 3 of 3

Index No. 423



* See Structures Plans Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint. See Sheets 6 and 7 for details at Skewed Deck Joints.

PLAN OF RAILING ON BRIDGE DECK (WITHOUT SIDEWALK SHOWN, WITH SIDEWALK SIMILAR)
(APPROACH SLAB WITHOUT GUARDRAIL WITH OR WITHOUT SIDEWALK SIMILAR)
(Reinforcing Steel Not Shown For Clarity)



** ½" Intermediate Open Joints in the Rail and Post shall be provided at Substructure supports where the Superstructure Deck is continuous.

NOTE:
End Post dimensions for a given span shall match.

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(BRIDGE DECK SHOWN,
APPROACH SLAB WITHOUT GUARDRAIL OR ADJACENT TO ROADWAY BARRIER SIMILAR)

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans General Notes.
AGGREGATE LIMITATION: The aggregate used in the concrete mix shall be a #67 aggregate.
MARKERS : Elevation markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.
GUARDRAIL : For Guardrail connection details see Index No. 400.
SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.

RETAINING WALL : If the Traffic Railing Barrier is to be provided on a retaining wall, the railing sections will be the same as on Sheets 3 and 4. See Retaining Wall Plans for payment.
NAME, DATE AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

NOTES:
(NF) means Near Face, (FF) means Far Face.

CROSS REFERENCES:
For Sections see Sheets 3 and 4.
For Detail "A" see Sheet 3.
For Quantities and Quantity Breakdown see Sheet 5.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS note. Deleted INSTRUCTION TO DESIGNER.			
01/01/11	SJN	Added CROSS REFERENCE for Detail "A".			

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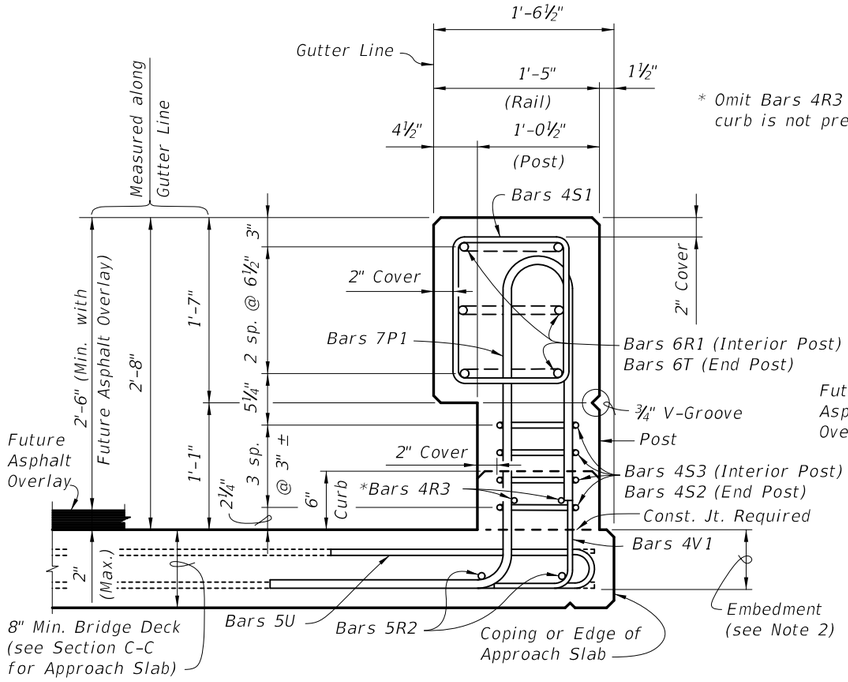
TRAFFIC RAILING - (CORRAL SHAPE)

Interim Date 01/01/11

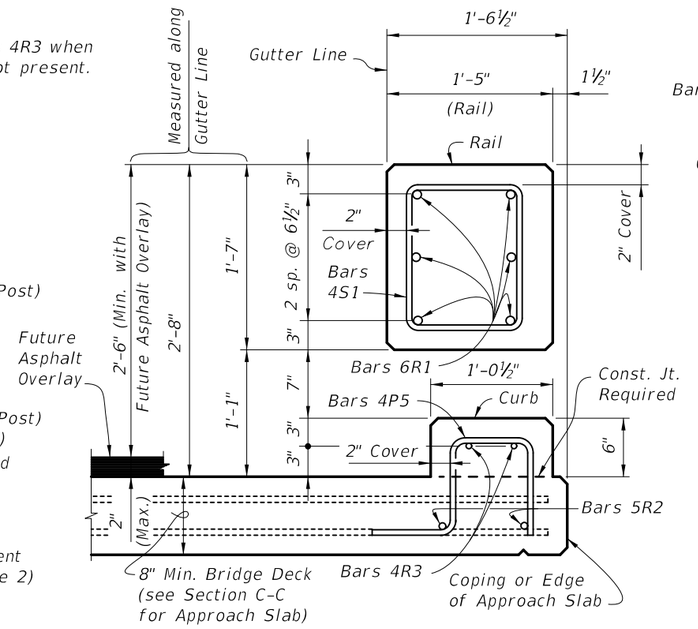
Sheet No. 1 of 7

Index No. 424

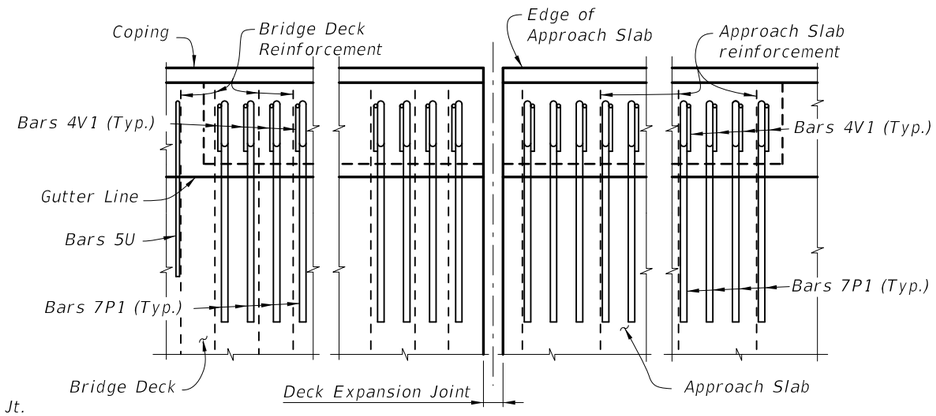


* Omit Bars 4R3 when curb is not present.

SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



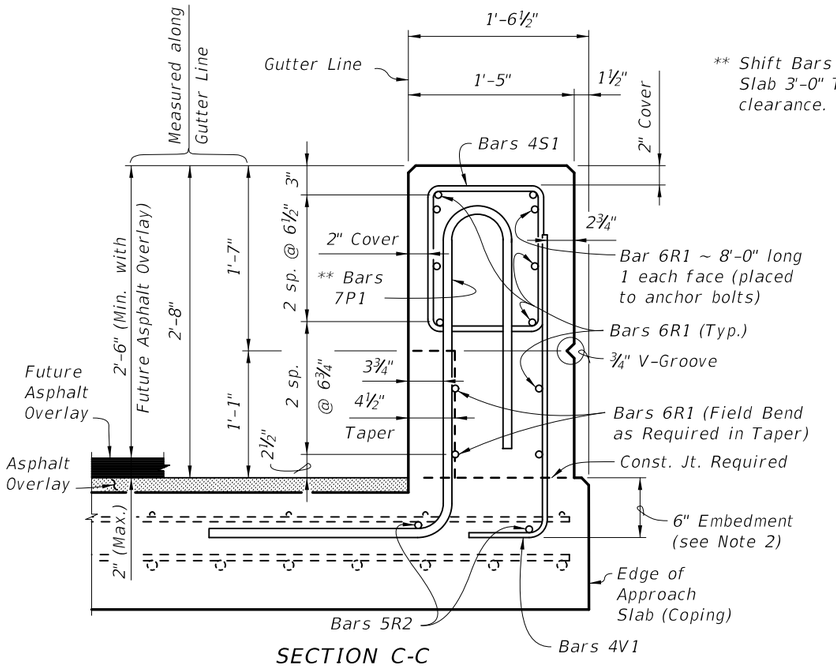
SECTION B-B (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB
(END POST SHOWN, INTERIOR POST SIMILAR)
(Bars R, S and T not shown for clarity)

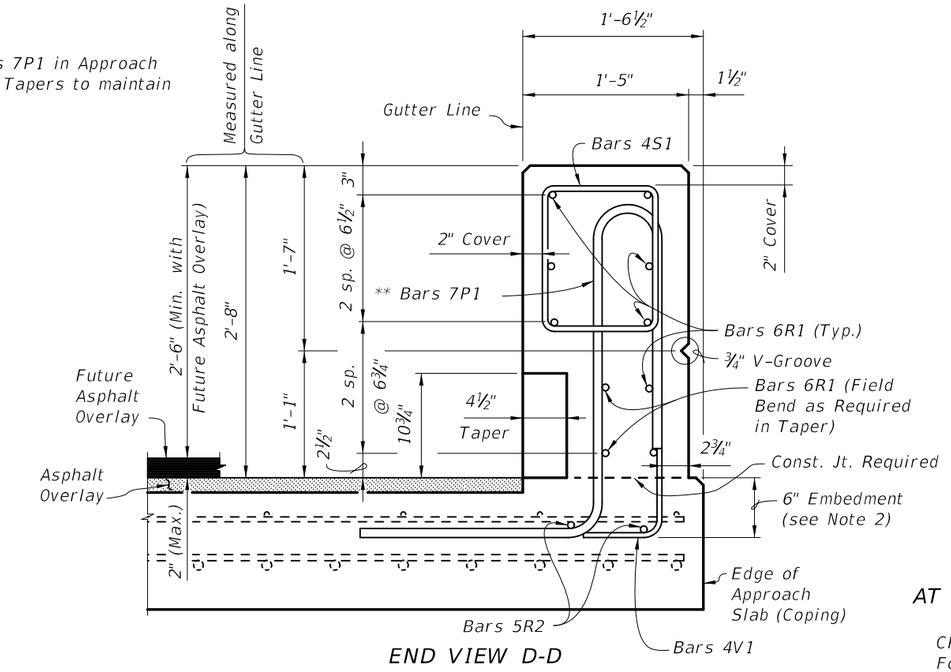
NOTES:
1) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.
2) For decks to 8½" place Bars 7P1 & 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8½" place Bars 7P1 and 4V with 6" embedment. At skewed joints, place Bars 7P3 and 4V with 5" embedment.

TYPICAL SECTIONS THRU RAILING (BRIDGE DECK SHOWN, APPROACH SLAB SIMILAR)

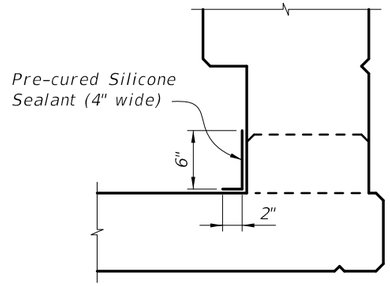


** Shift Bars 7P1 in Approach Slab 3'-0" Tapers to maintain clearance.

SECTION C-C



END VIEW D-D



INTERMEDIATE JOINT SEAL NOTES:
1. At Intermediate Open Joints in Curb Sections, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.

DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT WITH CURB

CROSS REFERENCES:
For Locations of Sections and Detail "A", see Sheets 1 and 2.
For Quantities and Rebar Details see Sheet 5.

TYPICAL SECTIONS THRU RAILING END SECTIONS ON APPROACH SLAB WITH GUARDRAIL
(APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Added DETAIL "A".			

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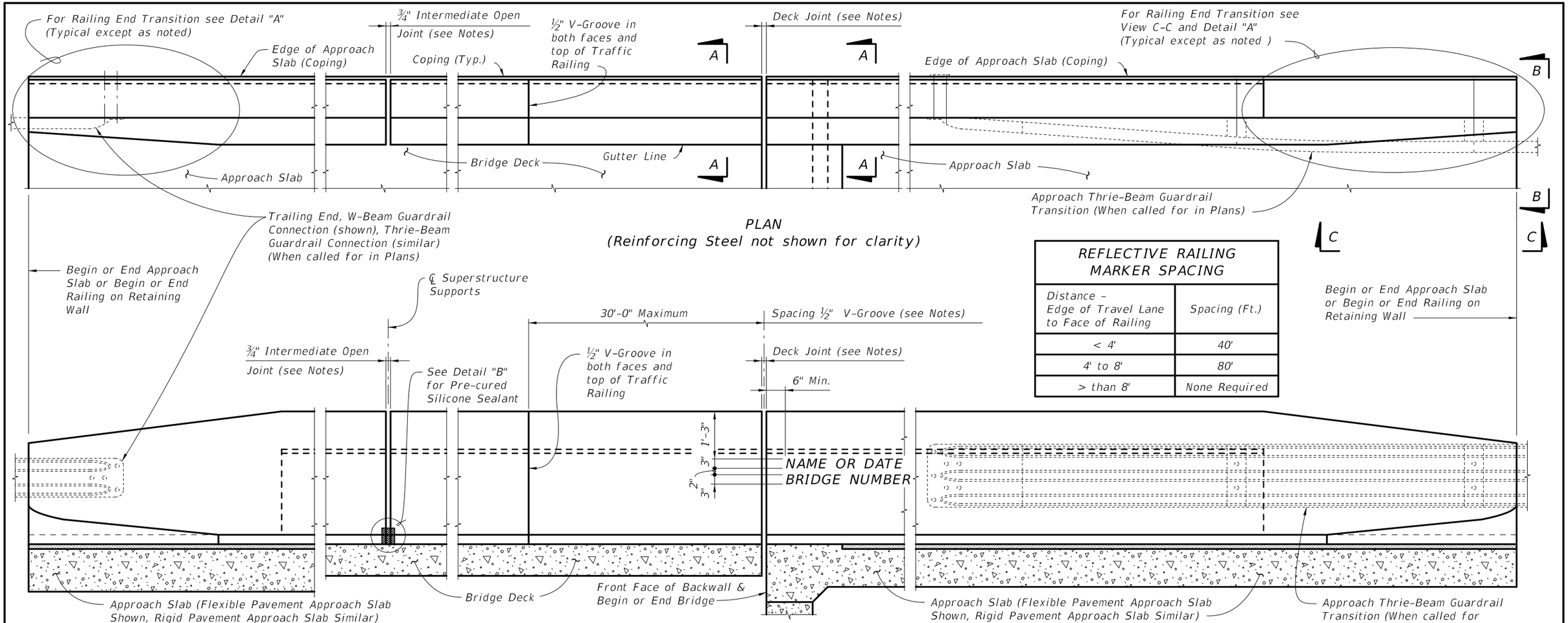
TRAFFIC RAILING - (CORRAL SHAPE)

Interim Date 01/01/11

Index No. 424



REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall Similar)

CROSS REFERENCE:
For Section A-A, End View B-B and Detail "A" see Sheet 2.
For Detail "B" see Sheet 3.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-5 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-groove shall apply.

V-GROOVES : Construct ½" V-Grooves plumb,. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

JOINTS : See Structures Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420.

Provide ¾" Intermediate Open Joints shall be provided at :
(1) – Superstructure supports where slab is continuous.
(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS and JOINTS notes.			
01/01/11	CMH	Changed JOINTS note reference for Skew Treatment to Index No. 420, and Mortar Plug to Pre-cured Silicone Sealant in ELEVATION.			

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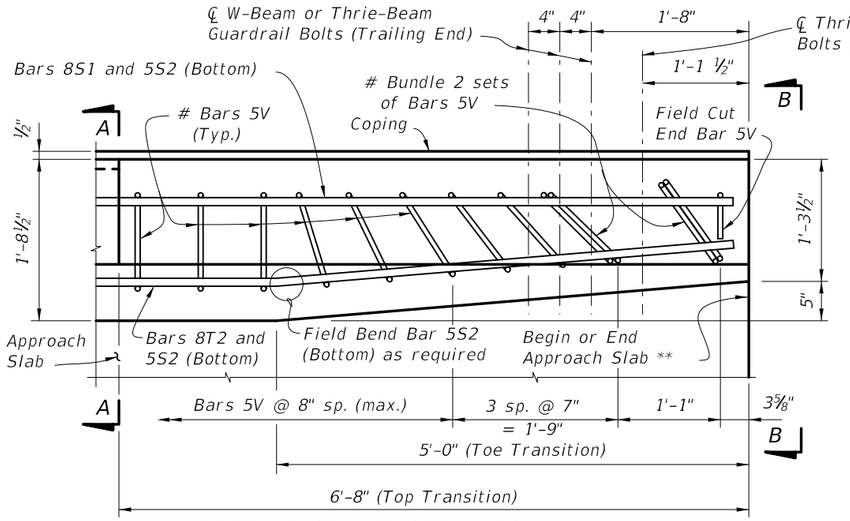
TRAFFIC RAILING - (42" F SHAPE)

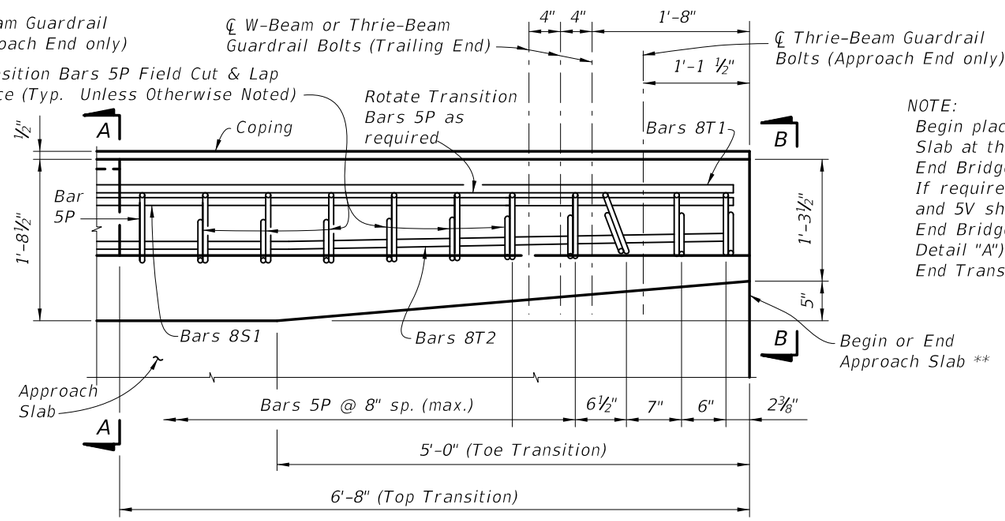
Interim Date 01/01/11

Index No. 425



PLAN - Railing End Transition
(Showing Bars 5V, 8S1, 5S2 and 8T2)

Rotate Bars 5V as shown to maintain clearance.



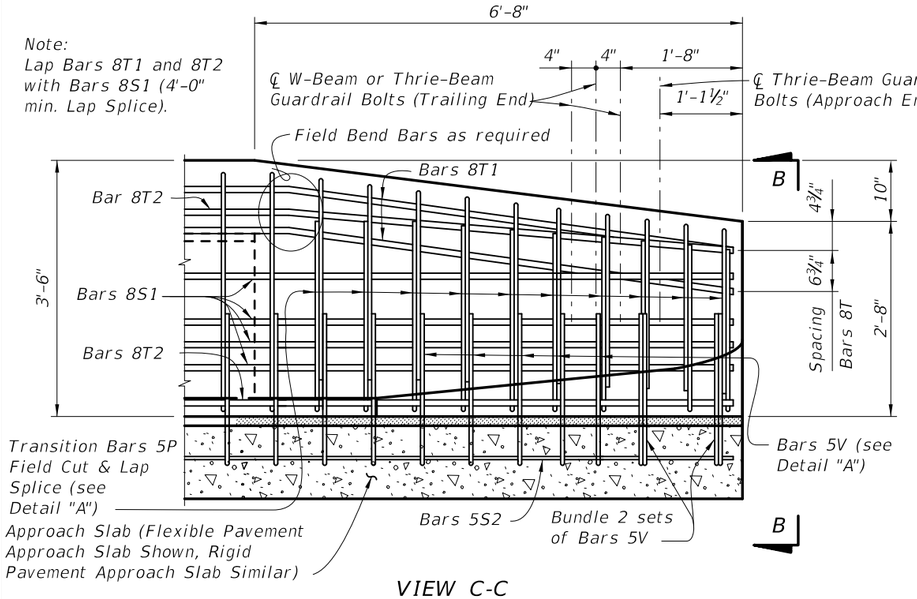
PLAN - Railing End Transition
(Showing Transition Bars 5P and Bars 8S1, 8T1 & 8T2)

NOTE:
Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5P and 5V (see Detail "A") as required to maintain cover in Railing End Transition.

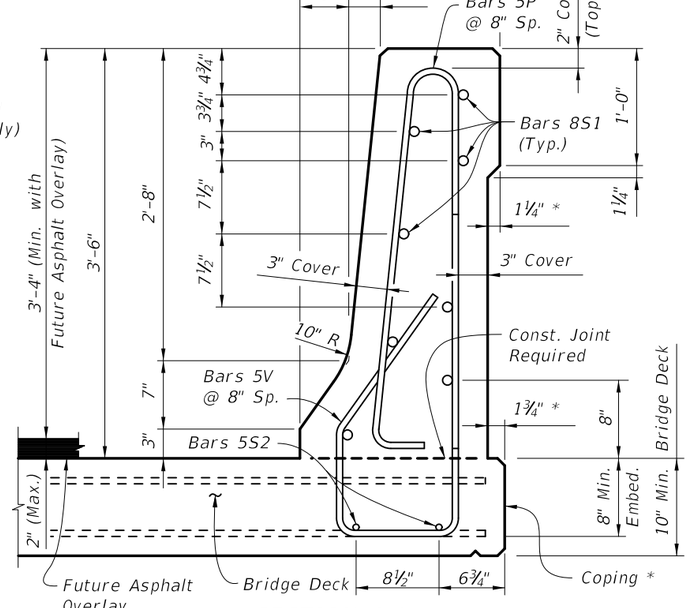
** See joint orientation note on Sheet 1.

DETAIL "A"

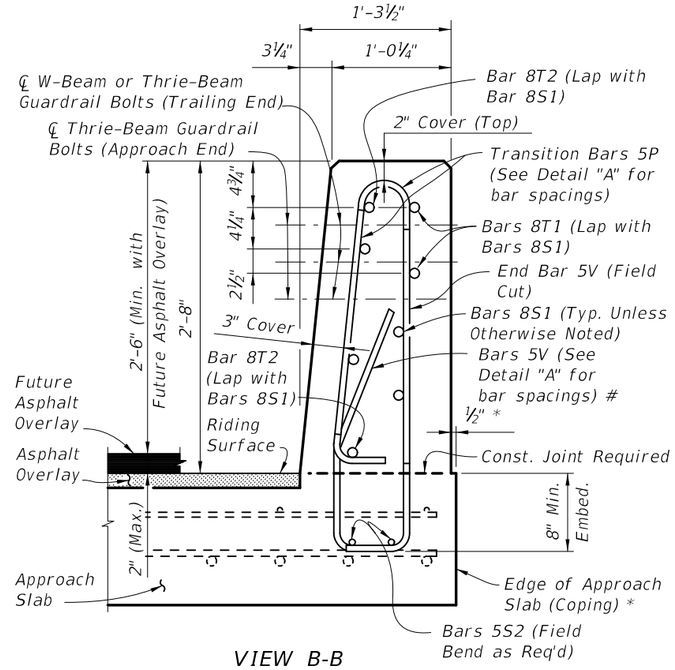
* Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck may coincide along a plane centered 1'-8½" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.



VIEW C-C
ELEVATION - RAILING END TRANSITION
(Guardrail and back leg of Stirrups not shown for clarity)



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN -
SECTION THRU APPROACH SLAB SIMILAR)



VIEW B-B
(Section thru Approach Slab shown,
Section thru Retaining Walls similar)

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNER" note.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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TRAFFIC RAILING - (42" F SHAPE)

Interim Date 01/01/11

Sheet No. 2 of 3

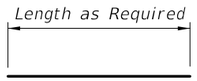
Index No. 425

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

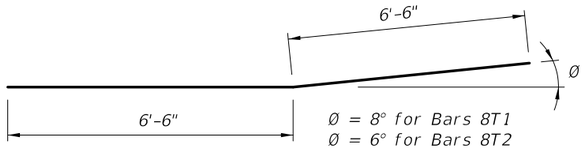
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	7'-5"
S1	8	As Reqd.
S2	5	As Reqd.
T1 & T2	8	13'-0"
V	5	6'-2"

ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	ØA	ØB	ØA	ØB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

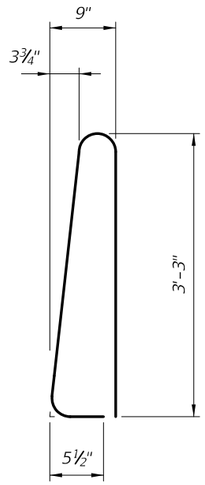
ØA and ØB shall be 90° if Contractor elects to place Railing perpendicular to the Deck.



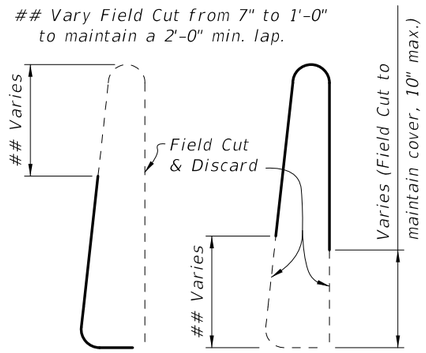
BARS 8S1 & 5S2



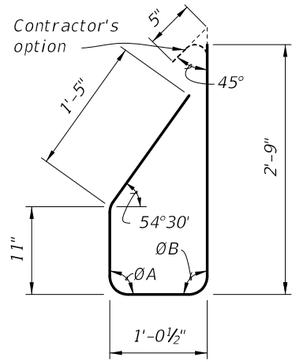
TRANSITION BARS 8T1 & 8T2
(2 of each required per Railing End Transition)



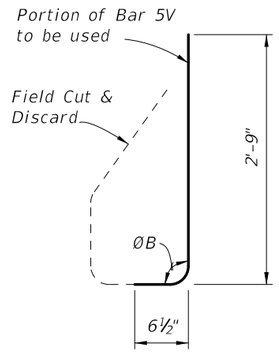
STIRRUP BAR 5P



TRANSITION STIRRUP BARS 5P
To Be Field Cut (10 of each required per Railing End Transition)

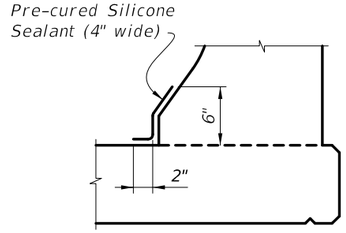


STIRRUP BAR 5V



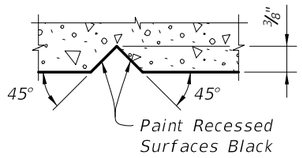
END STIRRUP BAR 5V
To Be Field Cut
(One required per Railing End Transition)

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 10" deck with ØA = ØB = 90°.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 8S1 may be continuous or spliced at the construction joints. Lap splices for Bars 8S1 and 5S2 shall be a minimum of 4'-0" and 2'-0", respectively.
5. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:
1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED
"V" GROOVE TO FORM INSCRIBED
LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.154
Reinforcing Steel	LB/LF	44.71

Note:
The estimated railing quantities are based on a 2% deck cross slope; railing on low side of deck.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed DETAIL "B" to Pre-cured Silicone Sealant.			

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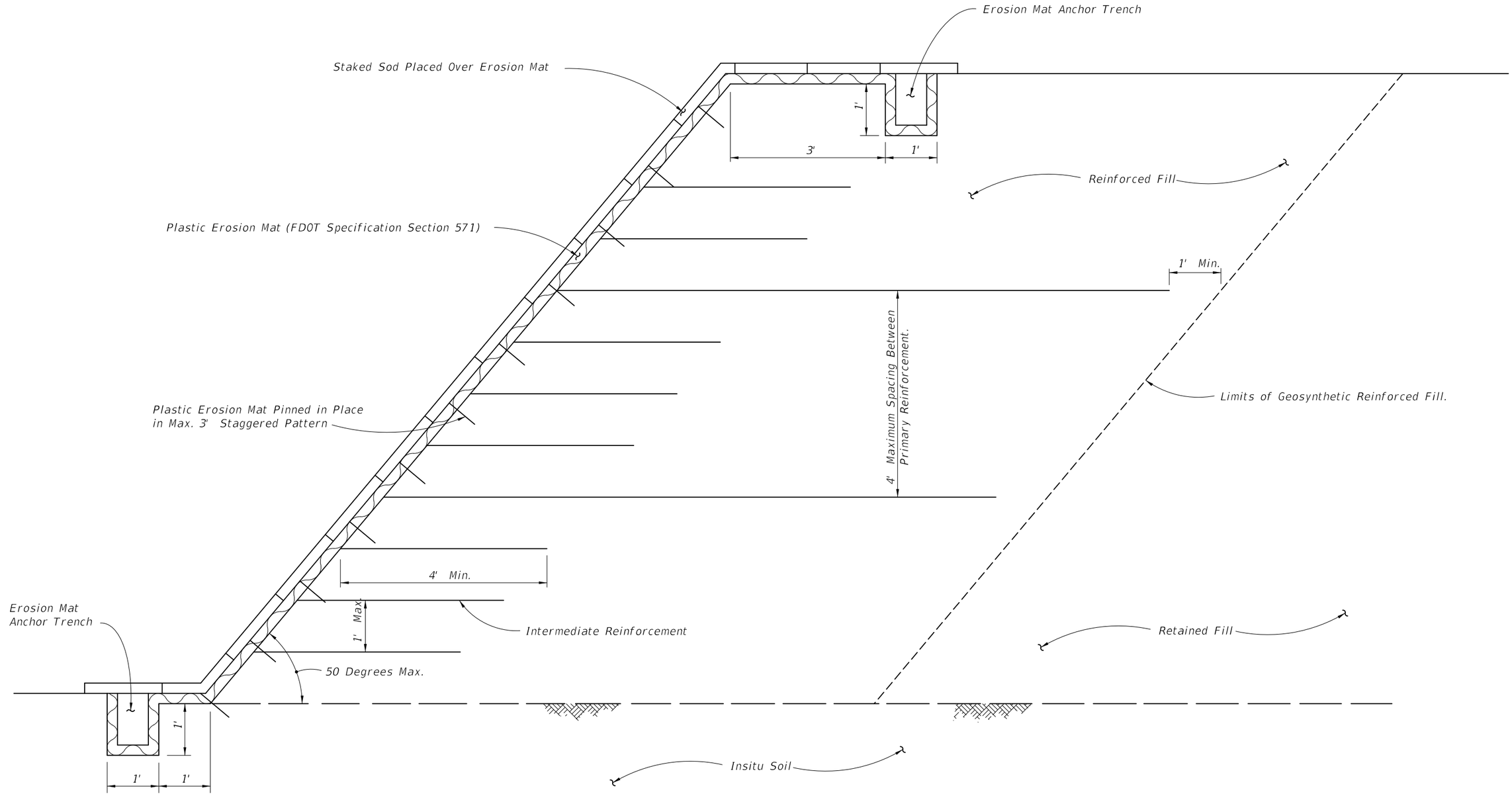
TRAFFIC RAILING - (42" F SHAPE)

Interim Date 01/01/11

Sheet No. 3 of 3

Index No. 425



GEOSYNTHETIC REINFORCED SOIL SLOPES

GENERAL NOTES

1. All Designs shall meet the requirements shown on this sheet and the contract documents.
2. $T_a = \dfrac{T_{ult}}{RF_c\ RF_d\ RF_j\ RF_{LT} CRF}$
3. Intermediate reinforcement shall be rolled out parallel to slope face.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	LEJ	Added RF_{LT} factor in Note 2; Changed Sheet No. from "1 of 10" to "1 of 12".			

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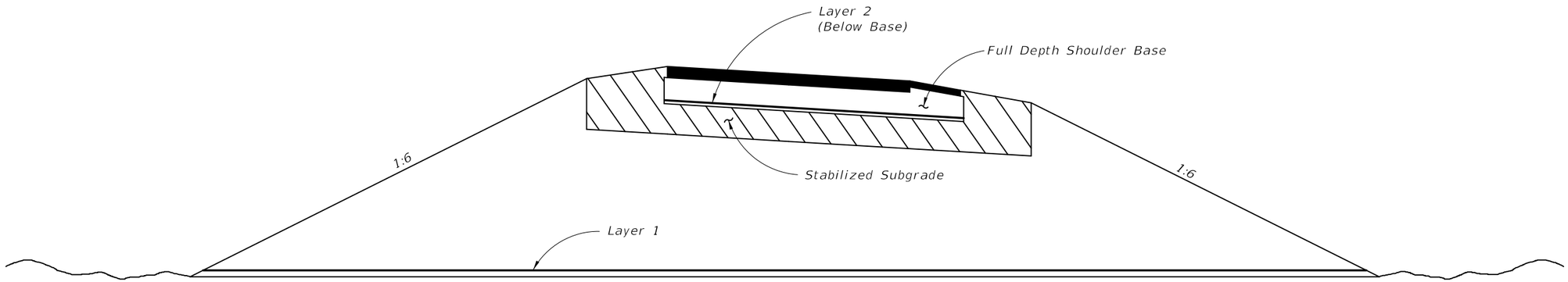
GEOSYNTHETIC REINFORCED SOILS

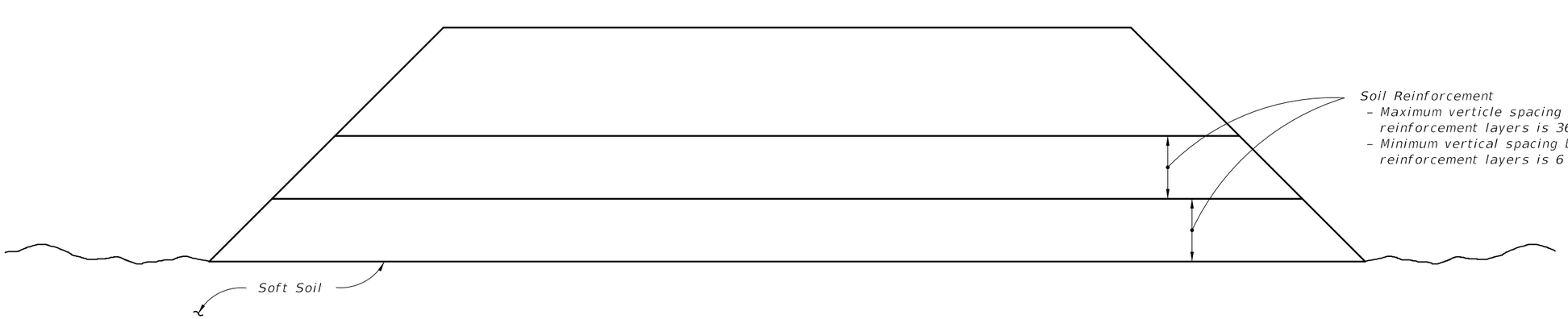
Interim Date 01/01/11

Sheet No. 1 of 12

Index No. 501



REINFORCED EMBANKMENT



GEOSYNTHETIC REINFORCED FOUNDATIONS CONSTRUCTED ON SOFT SOILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	RH	Changed Sheet No. from "2 of 9" to "2 of 12".			

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TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY		REQUIRED TEST METHOD	MIRAFI GEOLON HP 370	MIRAFI GEOLON HP 570	MIRAFI GEOLON HP 665	MIRAFI GEOLON HP 770	MIRAFI GEOLON HS 400	MIRAFI GEOLON HS 600	MIRAFI GEOLON HS 800	MIRAFI GEOLON HS 1150	MIRAFI MIRAMESH GR
Permittivity (0.05 sec^{-1} Min.)		ASTM D 4491	0.52	0.40	0.26	0.23	0.1	0.32	0.20	0.32	———
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	50%	50%	50%	50%	90%
Burst Strength (psi)		ASTM D 6241	800	1,200	1,200	1,200	———	———	———	———	———
Grab Strength (lb.)		ASTM D 4632	400 x 250	475 x 440	600 X 700	550 x 450	———	———	———	———	———
A.O.S. (in.)		ASTM D 4751	0.0236	0.0236	0.0167	0.0236	0.0167	0.0335	0.0335	0.0236	0.120 x 0.120
Tensile Strength (lb./ft.)		ASTM D 4595									
Machine Direction	Ultimate (T_{Ult})		3,240	4,800	4,800	7,200	4,800	7,200	9,600	13,800	1,440
	2% Strain		540	960	———	780	———	———	———	———	———
	5% Strain		1,356	2,400	1,200	3,600	1,080	2,400	3,600	4,800	———
Cross Direction	Ultimate		2,700	4,800	6,600	4,800	4,800	3,600	3,600	3,600	1,733
	2% Strain		540	1,320	———	1,320	———	———	———	———	———
	5% Strain		1,560	2,604	4,200	3,600	2,400	———	———	———	———
Strain @ Ultimate Tensile Strength		ASTM D 4595	14%	10%	12%	12%	15%	15%	10%	12%	6%
Secant Modulus @ (lb./ft.)	2% Strain		27,000	48,000	———	39,000	———	———	———	———	———
	5% Strain		27,120	48,000	24,000	72,000	21,600	48,000	72,000	96,000	———
	10% Strain		24,000	48,000	30,000	66,000	33,600	57,600	96,000	120,000	———
Seam Breaking Strength (lb./ft.)		ASTM D 4884	1,688	3,000	3,600	3,000	2,400	2,400	2,400	2,400	———
Puncture Resistance (lb.)		ASTM D 4833	180	195	280	160	———	———	———	———	———
Tear Strength (lb.)	Machine Direction	ASTM D 4833	170	180	180	250	———	———	———	———	———
	Cross Direction	ASTM D 4833	110	180	275	300	———	———	———	———	———
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep}(lb./ft.)		ASTM D 5262	———	———	———	———	2,880	4,320	5,760	8,280	471 x 566
Creep Reduction Factor (T_{ult}/T_{creep})			3.5	3.5	3.5	3.5	1.67	1.67	1.67	1.67	3.0
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.15	1.15	1.10	1.10	1.05
	Limestone		1.25	1.25	1.25	1.25	1.25	1.25	1.20	1.20	1.10
Durability (RF_d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF_j)	Mechanical	ASTM D 4595, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	1,4

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOTEXTILE)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength.			
01/01/11	RH	Changed Sheet No. from "3 of 10" to "3 of 12".			

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TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY		REQUIRED TEST METHOD	MIRAFI BXG11	MIRAFI BXG12	MIRAFI GEOLON HS 2400	MIRAFI GEOLON HS 3000	COMTRAC 70.70	GEOTEX 315ST	GEOTEX 2x2HF	GEOTEX 3x3HF	GEOTEX 4x4	GEOTEX 4x4HF	GEOTEX 4X6
Permittivity (0.05 sec^{-1} Min.)		ASTM D 4491	———	———	0.02	0.02	0.20	0.04	0.65	0.18	0.15	0.40	0.26
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Burst Strength (psi)		ASTM D 6241	———	———	———	———	———	1,000	1,100	1,000	1,500	1,200	1,500
Grab Strength (lb.)		ASTM D 4632	———	———	———	———	———	315	315	450/350	600/500	475/440	600/700
A.O.S. (in.)		ASTM D 4751	1.0 x 1.0	1.0 x 1.0	0.0118	0.0118	0.0181	0.0167	0.0167	0.0236	0.0236	0.533	0.312
Tensile Strength (lb./ft.)		ASTM D 4595											
Machine Direction	Ultimate (T_{ult})		2,000	2,000	28,800	36,000	4,800	2,100	2,400	3,600	4,800	4,800	4,800
	2% Strain		500	500	———	———	———	156	276	400	456	960	700
	5% Strain		920	920	14,400	18,000	2,196	564	744	1,392	1,452	2,400	1,200
Cross Direction	Ultimate		2,000	4,000	3,600	3,600	3,600	2,100	2,400	3,600	4,800	4,800	6,600
	2% Strain		500	750	———	———	———	576	660	400	1,380	1,320	1,000
	5% Strain		920	1,350	———	———	———	1,104	1,404	1,740	2,604	2,400	2,640
Strain @ Ultimate Tensile Strength			12%	12%	10%	10%	9%	15%	10%	10%	10%	8%	8%
Secant Modulus @ (lb./ft.)	2% Strain	ASTM D 4595	25,000	25,000	———	———	———	7,800	13,800	27,000	22,800	48,000	48,000
	5% Strain		18,400	18,400	288,000	360,000	24,400	11,280	14,880	27,000	29,040	48,000	48,000
	10% Strain		———	———	288,000	360,000	24,400	10,440	12,480	24,000	31,200	48,000	48,000
Seam Breaking Strength (lb./ft.)		ASTM D 4884			3,600	3,600	2,400	———	———	———	———	———	———
Puncture Resistance (lb.)		ASTM D 4833	———	———	———	———	———	120	120	180	170	190	280
Tear Strength (lb.)	Machine Direction	ASTM D 4833	———	———	———	———	———	120	120	180	250	180	180
	Cross Direction	ASTM D 4833	———	———	———	———	———	120	120	110	250	180	250
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.9	0.65	0.65	0.65	0.65	0.65	0.65
Creep Resistance-T_{creep}(lb./ft.)		ASTM D 5262	———	———	17,280	21,600	———	600	———	———	———	———	———
Creep Reduction Factor (T_{ult}/T_{creep})			1.6	1.6	1.67	1.67	1.67	3.5	5.0	5.0	5.0	5.0	5.0
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.05	1.05	1.1	1.1	1.2	1.4	1.4	1.4	1.4	1.4	1.4
	Limestone		1.10	1.10	1.20	1.20	1.5	1.4	1.4	1.5	1.4	1.4	1.4
Durability (RF_d)	Chemical	ASTM D 5322	1.1	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	1.1	1.1	1.1	1.1	1.1	1.1
Joint Strength (RF_j)	Mechanical	ASTM D 4595, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.0	1.2	1.0	1.2
Approved Application Usage			3, 4	3, 4	3, 4	3, 4	3	2	2	2	2	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
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOTEXTILE)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength. Changed Properties for Comtrac 70.70.
01/01/09	LJ	Deleted AMOCO 2006, 2016 and 2040. Added GEOTEX 315ST, 2x2HF, 3X3HF, 4x4, 4x4HF and 4x6.
01/01/11	RH	Changed Sheet No. from "4 of 10" to "4 of 12".

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TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY		REQUIRED TEST METHOD	TENCATE HP270	TENCATE HP370	TENCATE HP570	TENCATE HP665	TENCATE HP770	TENCATE MMESH/GR	TENCATE MMESH/SG	TENCATE HS400	TENCATE HS600	TENCATE HS800	TENCATE HS1150
Permittivity (0.05 sec^{-1} Min.)		ASTM D 4491	0.5	0.52	0.4	0.26	0.23	--	--	0.1	0.32	0.2	0.32
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	80%	80%	80%	70%	80%	90%	90%	50%	50%	50%	50%
Burst Strength (psi)		ASTM D 6241	--	--	--	--	--	--	--	--	--	--	--
Grab Strength (lb.)		ASTM D 4632	290/255	400/250	475/440	600/700	550/450	--	--	--	--	--	--
A.O.S. (in.)		ASTM D 4751	0.0236	0.0236	0.0236	0.0167	0.0236	--	--	0.0169	0.0335	0.0335	0.0236
Tensile Strength (lb./ft.)		ASTM D 4595											
Machine Direction	Ultimate (T_{ult})		2640	3600	4800	4800	7200	1440	1440	4800	7200	9600	13800
	2% Strain		480	540	960	300	1140	--	--	--	--	--	--
	5% Strain		1212	1500	2400	1200	3600	--	--	1080	2400	3600	6000
Cross Direction	Ultimate		2460	2700	4800	6600	5760	1733	1733	4800	3600	3600	3600
	2% Strain		588	540	1320	1740	1560	--	--	--	--	--	--
	5% Strain		1356	1560	2700	4200	3600	--	--	2400	1800	1200	--
Strain @ Ultimate Tensile Strength			10%	10%	10%	10%	10%	6%	6%	10%	10%	10%	10%
Secant Modulus @ (lb./ft.)	2% Strain	ASTM D 4595	24000	27000	48000	48000	57000	--	--	--	--	--	--
	5% Strain		24240	30000	48000	48000	72000	--	--	21600	48000	72000	120000
	10% Strain		23400	--	--	50400	66000	--	--	33600	--	90000	--
Seam Breaking Strength (lb./ft.)		ASTM D 4884	1260	1260	3000	3600	3000	--	--	2400	2400	2400	2400
Puncture Resistance (lb.)		ASTM D 4833	--	180	--	1650	--	--	--	--	--	--	--
Tear Strength (lb.)	Machine Direction	ASTM D 4833	120	170	180	180	250	--	--	--	--	--	--
	Cross Direction	ASTM D 4833	140	125	180	275	300	--	--	--	--	--	--
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	900	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	660	900	900	1650	1800	471	471	2880	4320	5760	8280
Creep Reduction Factor (T_{ult}/T_{creep})			4	4	4	4	4	3.7	3.7	1.67	1.67	1.67	1.67
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.1	1.1	1.1	1.1	1.1	1.05	1.05	1.15	1.15	1.15	1.15
	Limestone		1.5	1.5	1.5	1.5	1.5	1.1	1.1	1.25	1.25	1.25	1.25
Durability (RF_d)	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_j)	Mechanical	ASTM D 4595, GRI : GG4 & GT7	--	--	--	--	--	--	--	--	--	--	--
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--	--
Approved Application Usage			3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	1, 4, 5	1, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOTEXTILE)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	RH	New Sheet.			

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TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	MIRAFI MG 2XT	MIRAFI MG 3XT	MIRAFI MG 5XT (Matrex 30)	MIRAFI MG 7XT	MIRAFI MG 8XT	MIRAFI MG 10XT (Matrex 60)	MIRAFI MG 18XT (Matrex 90)	MIRAFI MG 20XT (Matrex 120)	MIRAFI MG 22XT (Matrex 180)	MIRAFI MG 24XT (Matrex 240)
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637										
Machine Direction	Ultimate (T_{ult})		2,000	3,150	4,300	5,700	7,000	9,500	9,360	12,420	17,760	25,380
	2% Strain		———	———	———	———	———	———	———	———	———	———
	5% Strain		1,000	1,056	1,740	2,160	2,520	3,120	3,250	5,340	6,700	7,000
Cross Direction	Ultimate		2,000	———	———	———	———	———	———	———	———	———
	2% Strain		———	———	———	———	———	———	———	———	———	———
	5% Strain		———	———	———	———	———	———	———	———	———	———
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Secant Modulus @ (lb./ft.)	2% Strain		———	———	———	———	———	———	———	———	———	———
	5% Strain		20,000	21,120	34,800	43,200	50,400	62,400	65,000	106,800	134,000	140,000
	10% Strain		———	———	———	———	———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	———	———	———	———	———	———	———	———	———	———
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	1,250	1,969	2,688	3,563	4,375	5,938	5,850	7,221	10,326	14,756
Creep Reduction Factor (T_{ult} / T_{creep})			1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.72	1.72	1.72
Installation Damage (RF_C)	Sand	GRI : GG4 & GT7	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	Limestone		1.5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Durability (RF_d)	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_J)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
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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5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOGRID)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	LJ	Correct "MARAFI" to "MIRAFI".			
01/01/11	RH	Changed Sheet No. from '5 of 10' to '6 of 12'.			

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TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	RAUGRID 3/3	RAUGRID 4/2	RAUGRID 6/3	RAUGRID 8/3	RAUGRID 10/3	FORNIT 20	FORNIT 30
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	95%	95%	95%	95%	95%	92%	92%
Tensile Strength (lb./ft.)		ASTM D 6637							
Machine Direction	Ultimate (T_{ult})		2,233	2,843	4,350	5,288	6,590	1,159	1,890
	2% Strain		———	———	———	———	———	360	600
	5% Strain		712	767	1,144	1,165	1,582	774	1,390
Cross Direction	Ultimate		2,213	1,459	1,959	2,089	2,192	1,641	2,466
	2% Strain		———	———	———	———	———	543	778
	5% Strain		541	356	452	507	521	1,111	1,719
Strain @ Ultimate Tensile Strength		ASTM D 6637	10.8%	11.8%	13.1%	12.2%	11.5%	6%	6%
Secant Modulus @ (lb./ft.)	2% Strain		———	———	———	———	———	18,000	30,000
	5% Strain		———	———	———	———	———	15,480	27,800
	10% Strain		———	———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	N/A	100%	100%	100%	100%	30	32.2
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.9	0.9
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	1,466	1,870	2,862	3,479	4,335	355	588
Creep Reduction Factor (T_{ult} /T_{creep})			1.52	1.52	1.52	1.52	1.52	3.5	3.5
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Limestone		1.17	1.17	1.17	1.17	1.17	1.10	1.10
Durability (RF_d)	Chemical	ASTM D 5322	1.15	1.15	1.15	1.15	1.15	1.10	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.15	1.15	1.15	1.15	1.15	1.0	1.0
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	———	———	———	———	———	1.0	1.1
Approved Application Usage			2, 5	2, 5	2, 5	2, 5	2, 5	2, 4, 5	2, 4, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
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** Minimum 3' Overlap*

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOGRID)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	LJ	Added FORNIT 30. Added Creep Resistance, Creep Reduction and Application Usage "4" to FORNIT 20.			
01/01/11	RH	Changed Sheet No. from '7 of 10' to '7 of 12'.			

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TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	STRATAGRID MICROGRID	STRATAGRID SG 150	STRATAGRID SG 200	STRATAGRID SG 350	STRATAGRID SG 500	STRATAGRID SG 550	STRATAGRID SG 600	STRATAGRID SG 700
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637	———	———	———	———	———	———	———	———
Machine Direction	Ultimate (T_{ult})		2,000	1,875	3,400	4,800	6,300	7,800	8,700	11,750
	2% Strain		———	———	———	———	———	———	———	———
	5% Strain		600	450	700	750	1,150	1,200	1,400	1,700
Cross Direction	Ultimate		2,000	1,875	———	———	———	———	———	———
	2% Strain		———	———	———	———	———	———	———	———
	5% Strain		450	———	———	———	———	———	———	———
Strain @ Ultimate Tensile Strength		ASTM D 6637	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	18.0%	18.0%
Secant Modulus @ (lb./ft.)	2% Strain		———	———	———	———	———	———	———	———
	5% Strain		12,000	9,000	14,000	15,000	23,000	24,000	24,000	34,000
	10% Strain		———	———	———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	———	———	———	———	———	———	———	———
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	1,149	1,210	2,194	3,097	4,065	5,032	5,613	7,581
Creep Reduction Factor (T_{ult}/T_{creep})			1.74	1.55	1.55	1.55	1.55	1.55	1.55	1.55
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.20	1.10	1.10	1.05	1.05	1.05	1.05	1.05
	Limestone		1.90	1.20	1.20	1.20	1.15	1.15	1.15	1.15
Durability (RF_d)	Chemical	ASTM D 5322	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Approved Application Usage			3, 4, 5	3, 4, 5	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOGRID)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	LJ	New Sheet Added			
01/01/11	RH	Changed Sheet No. from '8 of 10' to '8 of 12'.			

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TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	SYNTEEN SF 11	SYNTEEN SF 12	SYNTEEN SF 20	SYNTEEN SF 35	SYNTEEN SF 40	SYNTEEN SF 50	SYNTEEN SF 55	SYNTEEN SF 80	SYNTEEN SF 110
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637									
Machine Direction	Ultimate (T_{ult})		2,388	2,388	1,672	2,627	3,050	3,731	3,774	5,583	7,462
	2% Strain		526	526	370	462	488	791	736	1,016	1,186
	5% Strain		990	1,042	670	725	970	922	1,159	1,273	1,684
Cross Direction	Ultimate		3,870	5,268	1,630	2,556	3,050	3,933	2,499	2,206	2,179
	2% Strain		578	797	370	399	430	630	604	882	1,274
	5% Strain		792	1,129	670	583	765	815	796	1,563	1,581
Strain @ Ultimate Tensile Strength		ASTM D 6637	12.6%	13.0%	9.4%	14.1%	9.9%	14.2%	11.5%	13.9%	18.8%
Secant Modulus @ (lb./ft.)	2% Strain		26,300	26,300	18,494	23,114	24,408	39,551	36,799	50,807	59,298
	5% Strain		15,840	20,840	13,397	14,499	19,404	18,432	23,174	25,459	33,712
	10% Strain		———	———	15,206	15,234	22,089	18,432	27,137	37,910	27,380
Junction Strength (lb./ft.)		GRI : GG2	354	320	———	———	———	———	———	———	———
Soil-Geosynthetic Friction		ASTM D 6706	1.0	1.0	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	4,029
Creep Reduction Factor (T_{ult}/T_{creep})			———	———	1.66	1.73	2.00	1.70	1.67	1.75	2.02
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.18	1.06	1.05	1.15	1.15	1.08	1.08	1.08	1.08
	Limestone		1.31	1.20	1.75	1.70	1.60	1.55	1.55	1.55	1.35
Durability (RF_d)	Chemical	ASTM D 5322	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Approved Application Usage			2, 5	2, 5	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
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOGRID)
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REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	LJ	Added Application Usage 2 for SYNTEEN SF 11 & SF 12.			
01/01/11	RH	Changed Sheet No. from '6 of 10' to '9 of 12'.			

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TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENCATE BXG11	TENCATE BXG12	TENCATE 2XT	TENCATE 3XT	TENCATE 5XT	TENCATE 7XT	TENCATE 8XT	TENCATE 10XT	TENCATE 20XT	TENCATE 22XT	TENCATE 24XT
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637											
Machine Direction	Ultimate (T_{ult})		2500	2500	2000	3500	4700	5900	7400	9500	13705	17760	27415
	2% Strain		625	625	--	--	--	--	--	--	--	--	--
	5% Strain		1000	1000	950	1056	1740	2160	2520	3120	5340	6700	7000
Cross Direction	Ultimate		2500	4500	2000	--	--	--	--	--	--	--	--
	2% Strain		625	840	--	--	--	--	--	--	--	--	--
	5% Strain		1000	1350	--	--	--	--	--	--	--	--	--
Strain @ Ultimate Tensile Strength		ASTM D 6637	12%	12%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Secant Modulus @ (lb./ft.)	2% Strain		31250	31250	--	--	--	--	--	--	--	--	--
	5% Strain		20000	20000	19000	21120	34800	43200	50400	62400	106800	134000	140000
	10% Strain		--	--	--	--	--	--	--	--	--	--	--
Junction Strength (lb./ft.)		GRI : GG2	--	--	--	--	--	--	--	--	--	--	--
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	--	--	1266	2115	2975	3734	4684	6013	8674	9732	17351
Creep Reduction Factor (T_{ult} / T_{creep})			1.6	1.6	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	Limestone		1.1	1.1	1.5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Durability (RF_d)	Chemical	ASTM D 5322	1.1	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	1.0
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	--	--	--	--	--	--	--	--	--	--	--
	Overlap *	ASTM D 6706	--	--	--	--	--	--	--	--	--	--	--
Approved Application Usage			3, 4, 5	3, 4, 5	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
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5 = Construction Expedient
** Minimum 3' Overlap*

APPROVED GEOSYNTHETIC PRODUCTS
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REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	RH	New Sheet.			

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TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENSAR BX 4100	TENSAR BX 4200	TENSAR BX 1100	TENSAR BX 1120	TENSAR BX 1200	TENSAR BX 1220	TENSAR BX 1500
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	90%	90%	90%	100%	90%	100%	90%
Tensile Strength (lb./ft.)		ASTM D 6637							
Machine Direction	Ultimate (T_{ult})		860	1,270	850	850	1,315	1,315	1,790
	2% Strain		240	370	280	280	410	410	580
	5% Strain		480	705	580	580	810	810	1,200
Cross Direction	Ultimate		875	1,370	1,300	1,300	1,975	1,975	2,055
	2% Strain		300	500	450	450	670	670	685
	5% Strain		635	960	920	920	1,360	1,360	1,370
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	10%	10%	10%
Secant Modulus @ (lb./ft.)	2% Strain		11,995	18,506	14,000	14,000	20,500	20,500	29,000
	5% Strain		9,596	14,092	11,600	11,600	16,200	16,200	27,400
	10% Strain		———	———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	90%	90%	790/1,210	93%	93%	93%	93%
Soil-Geosynthetic Friction		ASTM D 6706	———	0.95	0.90	0.90	0.90	0.90	0.90
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	250	420	280	280	425	425	575
Creep Reduction Factor (T_{ult}/T_{creep})			3.5	3.27	3.1	3.1	3.1	3.1	3.1
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Limestone		1.43	1.35	1.35	1.35	1.35	1.35	1.35
Durability (RF_d)	Chemical	ASTM D 5322	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
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
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* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(EXTRUDED GEOGRID)
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REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	LJ	Changed Sheet No. from "8 of 9" to "9 of 10".			
01/01/11	RH	Changed Sheet No. from "9 of 10" to "11 of 12".			

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TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENSAR UX 1400 HS UX 1400 MSE UX MESA 3	TENSAR UX 1500 HS UX 1500 MSE UX MESA 4	TENSAR UX 1600 HS UX 1600 MSE UX MESA 5	TENSAR UX 1700 HS UX 1700 MSE UX MESA 6	TENAX MS 220	TENAX MS 330	COMBIGRID 30/30 Q1 151 GRK 3	SECUGRID 20/20 Q1	SECUGRID 30/30 Q1
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	90%	90%	90%	90%	85%	85%	90%	90%	90%
Tensile Strength (lb./ft.)		ASTM D 6637									
Machine Direction	Ultimate (T_{ult})		4,790	7810	9,860	11,980	925	1,370	2,055	1,646	2,055
	2% Strain		1,100	1,850	2,330	2,740	300	418	686	549	686
	5% Strain		2,130	3,560	3,980	5,140	615	925	1,475	1,029	1,475
Cross Direction	Ultimate		———	———	———	———	1,400	2,100	2,055	1,646	2,055
	2% Strain		———	———	———	———	445	616	686	549	686
	5% Strain		———	———	———	———	890	1,340	1,475	1,029	1,475
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	12%	12%	8%	9%	7.5%
Secant Modulus @ (lb./ft.)	2% Strain		55,000	92,500	116,500	137,000	15,000	20,900	34,300	27,450	34,300
	5% Strain		42,600	71,200	79,600	102,800	12,330	18,500	29,500	20,580	29,500
	10% Strain		———	———	———	———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	90%	90%	90%	90%	835	1,230	337	549	617
Soil-Geosynthetic Friction		ASTM D 6706	0.462	0.462	0.462	0.462	———	———	0.65	0.93	0.93
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	1,970	3,000	3,960	4,975	———	———	726	581	726
Creep Reduction Factor (T_{ult}/T_{creep})			2.43	2.60	2.49	2.41	3.5	3.5	2.83	2.83	2.83
Installation Damage (RF_C)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.1	1.1	1.1	1.1	1.1
	Limestone		1.20	1.20	1.20	1.20	1.1	1.1	1.1	1.1	1.1
Durability (RF_d)	Chemical	ASTM D 5322	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
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	1.0	1.0	1.0	1.0	1.0	1.0	———	———	———
	Overlap *	ASTM D 6706	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	2, 5	2, 5	2, 5	2, 5	2, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(EXTRUDED GEOGRID)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	LJ	Changed Sheet No. from "9 of 9" to "10 of 10".			
01/01/11	RH	Changed Sheet No. from "10 of 10" to "12 of 12".			

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CLEAR ZONE WIDTHS FOR WORK ZONES

The term 'clear zone' describes the unobstructed relatively flat area, impacted by construction, extending outward from the edge of the traffic 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, Chapter 4, Section 4.2 and Exhibit 4-A and 4-B of the Plans Preparation Manual.

CLEAR ZONE WIDTHS FOR WORK ZONES		
WORK ZONE SPEED (MPH)	TRAVEL LANES & MULTILANE RAMPS (feet)	AUXILIARY LANES & SINGLE LANE RAMPS (feet)
60-70	30	18
55	24	14
45-50	18	10
30-40	14	10
ALL SPEEDS CURB & GUTTER	4' BEHIND FACE OF CURB	4' BEHIND FACE OF CURB

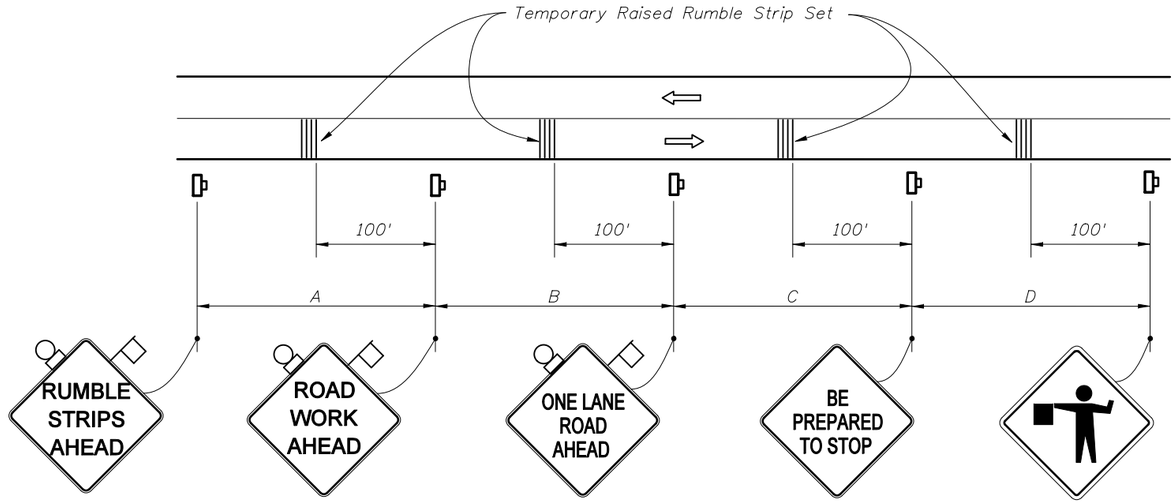
SUPERELEVATION

Horizontal curves constructed in conjunction with work zone traffic control should have the required superelevation applied to the design radii. Under conditions where normal crown controls curvature, the minimum radii that can be applied are listed in the table below.

MINIMUM RADII FOR NORMAL CROWN	
DESIGN SPEED	MINIMUM RADIUS
MPH	feet
65	3130
60	2400
55	1840
50	1390
45	1080
40	820
35	610
30	430
Superelevate When Smaller Radii is Used	

LENGTH OF LANE CLOSURES

Lane closures shall not exceed 2 miles in total length (taper, buffer space and work space) in any given direction on the Interstate or on state highways with a posted speed of 55 MPH or greater.



TYPICAL PLACEMENT OF TEMPORARY RAISED RUMBLE STRIPS

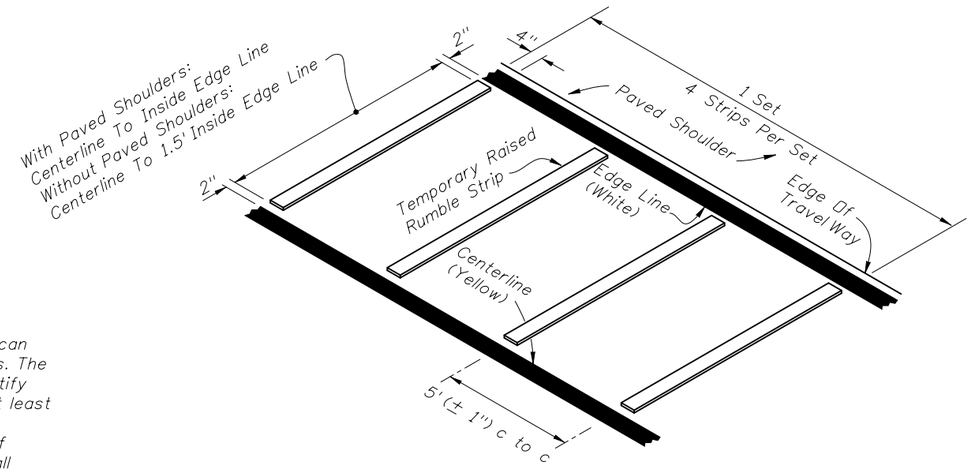
DISTANCE BETWEEN SIGNS				
Speed (mph)	Spacing (ft.)			
	A	B	C	D
40 or less	200	200	200	100
45	350	350	350	175
50	500	500	500	250
55 or greater	500	1640	1000	500

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) 410-5777, at least seven calendar 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.



TEMPORARY RAISED RUMBLE STRIP SET
(PAVED SHOULDER SHOWN)

GENERAL NOTES

1. Temporary raised rumble strips sets shall be placed in advance of each flagging station when called for in the plans.
2. Temporary raised rumble strip sets are used to supplement a series of advanced warning signs and shall be installed and removed when the signs are installed and removed.
3. Remove the temporary raised rumble strips prior to removing the advance warning signs.

LENGTH OF LANE CLOSURES

Lane closures shall not exceed 2 miles in total length (taper, buffer space and work space) in any given direction on the Interstate or on state highways with a posted speed of 55 MPH or greater.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CA	Added RUMBLE STRIPS AHEAD sign and Chart for DISTANCE BETWEEN SIGNS, and deleted "Color:White (Typical)" from TEMPORARY RAISED RUMBLE STRIP SET (PAVED SHOULDER SHOWN)			

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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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SIGN MATERIALS

Mesh signs may be used only for Daylight Operations.

Vinyl signs may be used for Day or Night Operations not to exceed 1 day except as noted in the standards.

Rigid or Lightweight sign panels may be used in accordance with the vendor drawing for the sign stand to which they are attached.

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.

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:

(A) For scheduled projects the engineer in responsible charge of project design will resolve anticipated work zone conflicts during the development of the project traffic control plan. This may entail revision of plans on preceding projects and coordination of plans on concurrent projects.

(B) Unanticipated conflicts arising between adjoining in progress highway construction projects will be resolved by the Resident Engineer for projects under his residency, and, by the District Construction Engineer for in progress projects under adjoining residencies.

(C) The District Maintenance Engineer will resolve anticipated and occurring conflicts within scheduled maintenance operations.

(D) The Unit Maintenance Engineer will resolve conflicts that occur within routine maintenance works; between routine maintenance work, unscheduled work and/or permitted work; and, between unit controlled maintenance works and highway construction projects.

SIGN COVERING AND INTERMITTENTWORK STOPPAGE SIGNING

Existing or temporary traffic control signs that are no longer applicable or are inconsistent with intended travel paths shall be removed or fully covered.

Sign blanks or other available coverings must completely cover the existing sign. Rigid sign coverings shall be the same size as the sign it is covering, and bolted in a manner to prevent movement.

Sign covers are incidental to work operations and are not paid for separately.

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 reverse curve (W1-4) warning sign should be used for the advanced warning for a lane shift. A diversion should be signed as a lane shift.

EXTENDED DISTANCE ADVANCE WARNING SIGN

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 multilane divided highways where vehicle speed is generally in the higher range (45 MPH or more).

UTILITY WORK AHEAD SIGN

The UTILITY WORK AHEAD (W21-7) sign may be used as an alternate to the ROAD WORK AHEAD or the ROAD WORK XX FT (W20-1) sign for utility operations on or adjacent to a highway.

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.

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT SIGN

The SPEEDING FINES DOUBLED WHEN WORKERS PRESENT sign should be installed on all projects, but may be omitted if the work operation is less than 1 day. The placement should be 500 feet beyond the ROAD WORK AHEAD sign or midway to the next sign whichever is less.

GROOVED PAVEMENT AHEAD SIGN

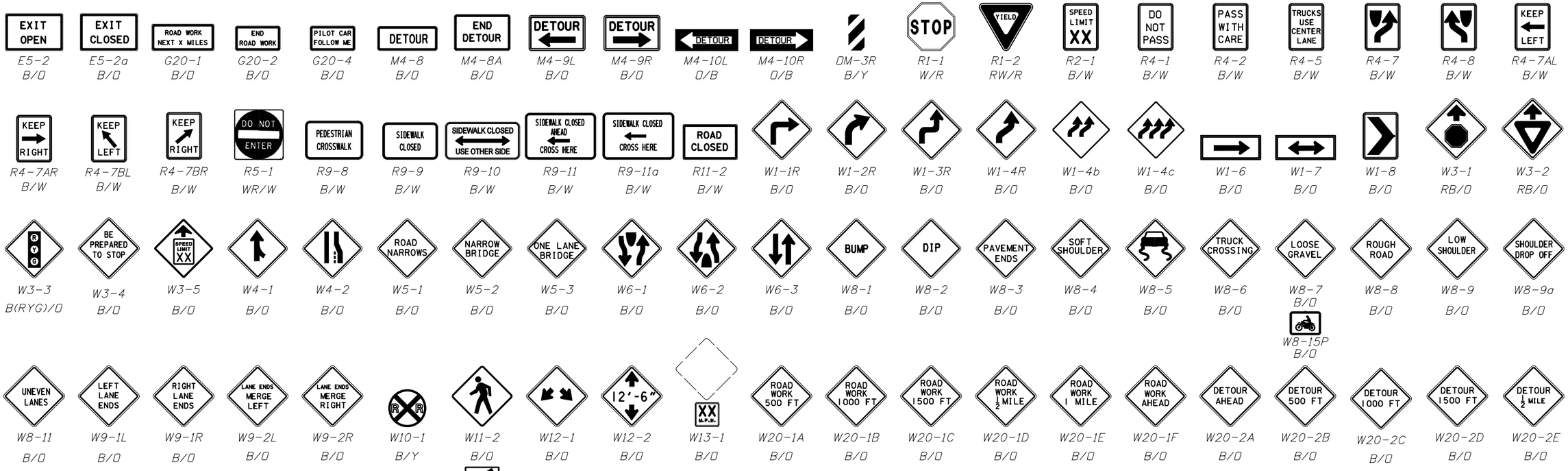
The GROOVED PAVEMENT AHEAD sign is required 500 feet in advance of a milled or grooved surface open to traffic.

END ROAD WORK SIGN

The END ROAD WORK sign (G20-2) should be installed on all projects, but may be omitted where the work operation is less than 1 day. The sign should be placed approximately 500 feet beyond the end of a construction or maintenance project unless other distance is 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.

PROJECT INFORMATION SIGN

The Project information sign shall be installed when called for in the plans.



Notes:

1. The size of diamond shaped Temporary Traffic Control (TTC) warning signsshall be a minimum of 48" X 48".
2. Fluorescent orange shall be used for all orange colored work zone signs.
3. When standard orange flags or flashing warning lights are used in conjunction with signs, they shall not block the sign face.
4. 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. 17355 for MOT sign details.

COLOR CODES
Legend and/or Symbol Background

O-Orange (Reflectorized)
B-Black (Non-Reflectorized)
W-White (Reflectorized)
R-Red (Reflectorized)
Y-Yellow (Reflectorized)
G-Green (Reflectorized)

COMMONLY USED WARNING AND REGULATORY SIGNS IN WORK ZONES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CA	Added RUMBLE STRIPS AHEAD sign MOT-18-06, BE PREPARED TO STOP sign W3-4 and Motorcycle Plaque W8-15P; per MUTCD WORKERS symbol and text signs changed designations.			

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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

Interim Date 01/01/11

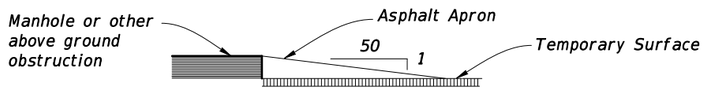
Sheet No. 8 of 13

Index No. 600

MANHOLES/CROSSWALKS/JOINTS

Manholes extending 1" or more above the travel lane and crosswalks having an uneven surface greater than ¼" shall have a temporary asphalt apron constructed as shown in the diagram below.

All transverse joints that have a difference in elevation of 1" or more 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, LS.

TRUCK/TRAILER-MOUNTED ATTENUATORS

Truck/Trailer-mounted attenuators (TMA) can be used for moving operations and short-term stationary operations. For moving operations, see Index Nos. 607 and 619. For short-term, stationary operations, see Part VI of the MUTCD.

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. Painting over existing pavement markings with black paint or spraying with asphalt shall not be accepted as a substitute for removal or obliteration. Full pavement width overlays of either a structural or friction course are 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.

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 and Index 600 requirements.

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.

WARNING LIGHTS

Warning lights shall be in accordance with 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.

For post-mounted signs, 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. The light shall be mounted on the channel post or on the upper edge of the sign nearest the traffic.

Type B High Intensity Flashing Warning Lights are not to be placed on temporary portable sign supports.

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 travel 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.

STANDARD ORANGE FLAG

For post-mounted signs a standard orange flag 18"x 18" (min.) 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. The flag shall be mounted on the channel post or on the upper edge of the sign furthest from traffic.

Standard orang flags are not to be placed on temporary portable sign supports except to enhance the SURVEY CREW AHEAD sign where dual orange flags shall be used at all times.

PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS)

The PCMS can be used to:
(1) Supplement standard signing in construction or maintenance work zones.
(2) Reinforce static advance warning messages.
(3) Provide motorists with updated guidance information.

PCMS 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 PCMS 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 Plans Preparation Manual, Volume I, Chapter 10.

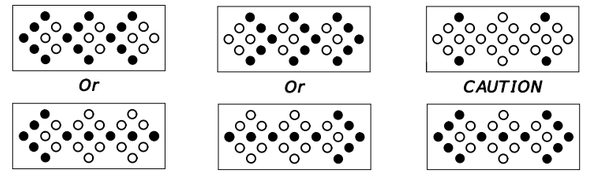
ADVANCE WARNING ARROW PANELS

An arrow panel in the arrow or chevron mode shall be used only for stationary or moving lane closures on multilane roadways.

For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow panel shall be used only in the caution mode.

A single arrow panel shall not be used to merge 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.

When Advance Warning Arrow Panels are used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.



● Minimum Required Lamps
○ Additional Lamps Allowed

MODES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CAV	Added notes to WARNING LIGHTS and STANDARD ORANGE FLAG sections.			

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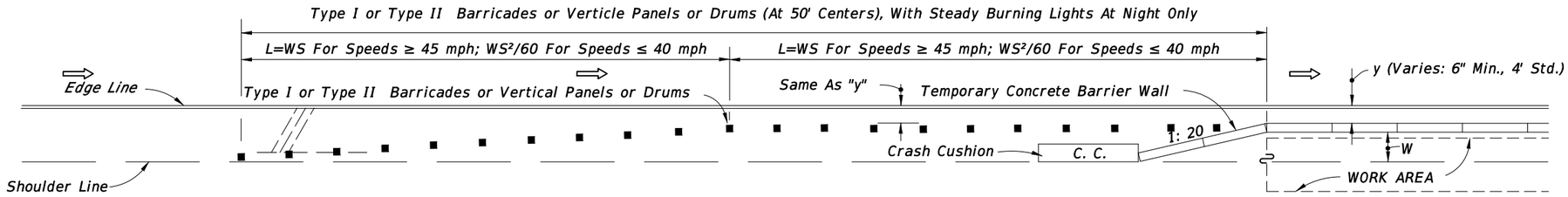
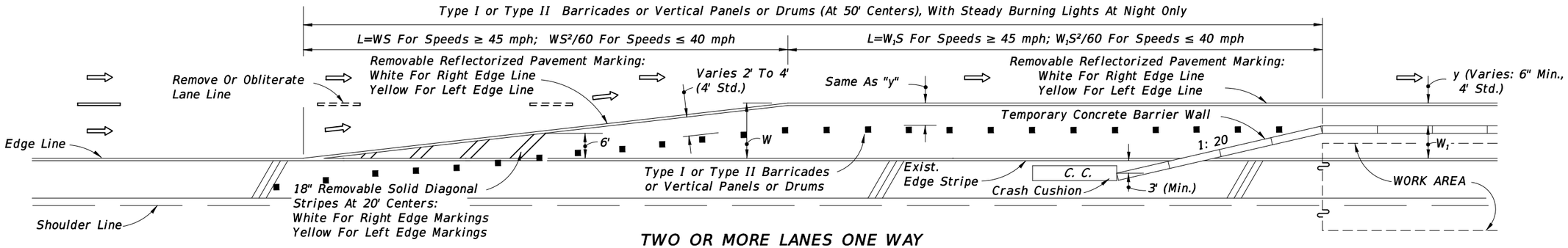
GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

Interim Date 01/01/11

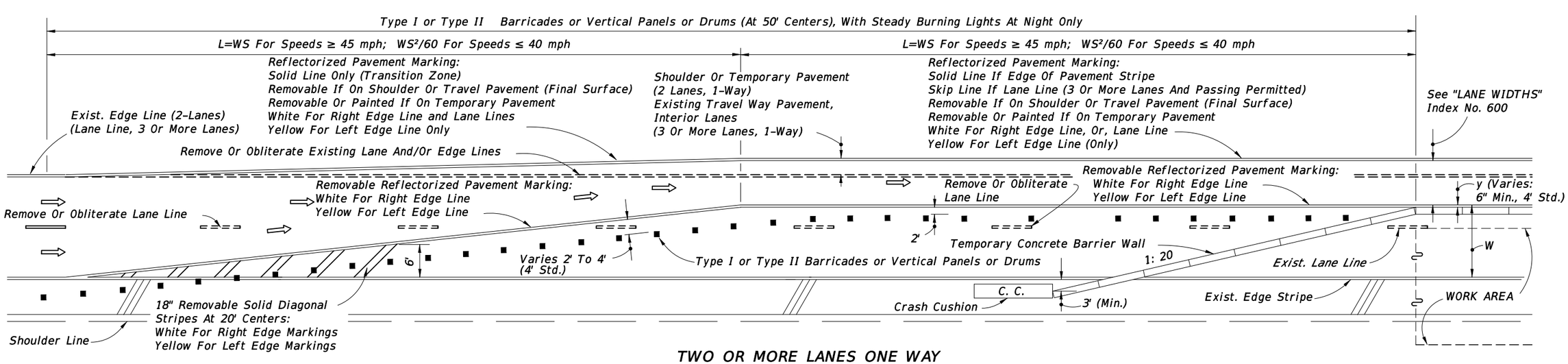
Index No. 600



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

SYMBOLS

⇨ *Lane Identification + Direction of Traffic*

■ *Channelizing Device (See Index No. 600)*

GENERAL NOTES

1. *For signing information see the Plans, Specifications, MUTCD and other TCZ Standards.*
2. *Where W=width of lateral transition in feet, S=posted speed limit.*

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CVA	Correctedf offset in detail TWO OR MORE LANES ONE WAY LANE DROP AND LANE SHIFTS- PLAN SHOWN FOR RIGHT LANE MERGBE LEFT-INTERED PLAN FOR LEFT LANE MERGE RIGHT			

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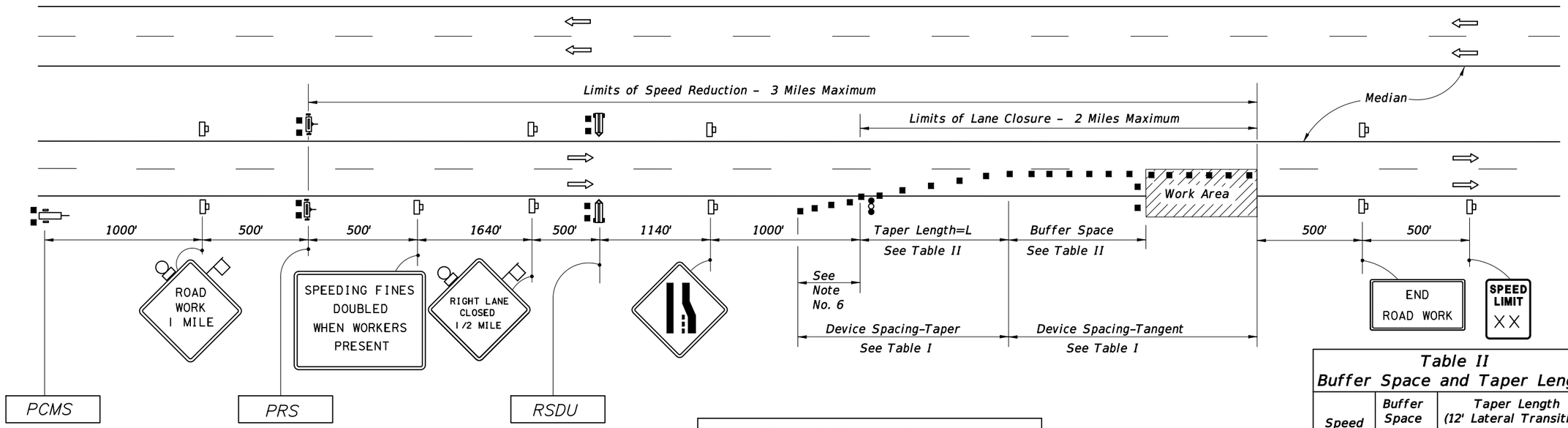
TRANSITIONS FOR TEMPORARY CONCRETE BARRIER WALL ON FREEWAY FACILITIES

Interim Date: 01/01/11

Sheet No.: 1 of 1

Index No.: 642



See General Note No. 1

Typical PCMS Display

With speed reduction:
Message 1: WORKERS PRESENT AHEAD
Message 2: SPEED REDUCED NEXT 3MI

Without speed reduction:
Message 1: WORKERS PRESENT AHEAD
Message 2: NEXT 3 MILES

Table I Device Spacing

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Table II Buffer Space and Taper Length

Speed (mph)	Buffer Space	Taper Length (12' Lateral Transition)	
	Dist. (ft.)	L (ft.)	Notes (Merge)
25	155	125	$L=\frac{WS^2}{60}$
30	200	180	
35	250	245	
40	305	320	
45	360	540	L=WS
50	425	600	
55	495	660	
60	570	720	
65	645	780	
70	730	840	

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column.
Where:
L= Length of taper in feet
W= Width of lateral transition in feet
S= Posted speed limit (mph)

SYMBOLS

- Work Area
- Sign With 18"x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic
- (1) PCMS= Portable Changeable(Variable) Message Sign
- (2) PRS= Portable Regulatory Sign– Speed Limit When Flashing
- (2) RSDU= Radar Speed Display Unit

GENERAL NOTES

1. At lane closures where workers are present, reduce the posted speed limit (speed limit that existed prior to construction) by 10 MPH using the Portable Regulatory Sign (PRS), but not less than 55 MPH or to a speed warranted by geometric condition, whichever is lower. Taper lengths, buffer space and device spacing shall be selected using the posted speed, not the reduced speed.
2. All Arrow Panels, Portable Changeable Message Signs, Portable Regulatory Signs and Radar Speed Display Trailers, shall be turned off and moved outside the clear zone or be shielded by a barrier or crash cushion when not in use.
3. Work operations shall be confined to one traffic lane, leaving the adjacent lane(s) open to traffic.
4. 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.
5. When work is being performed on a multilane undivided roadway, the signs and traffic control devices normally placed in the median (as shown) shall be omitted.
6. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index No. 612 for shoulder taper formulas.
7. For general TCZ requirements and additional information, refer to Index No. 600.

CONDITIONS

The MAS shall be used if all the following conditions exists:

MULTILANE FACILITY

POSTED SPEED LIMIT IS 55 MPH OR GREATER

WORK ACTIVITY REQUIRES A LANE CLOSURE FOR MORE THAN 5 DAYS (CONSECUTIVE OR NOT)

WORKERS ARE PRESENT

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	RJK	Corrected reference in detail to Note 6			

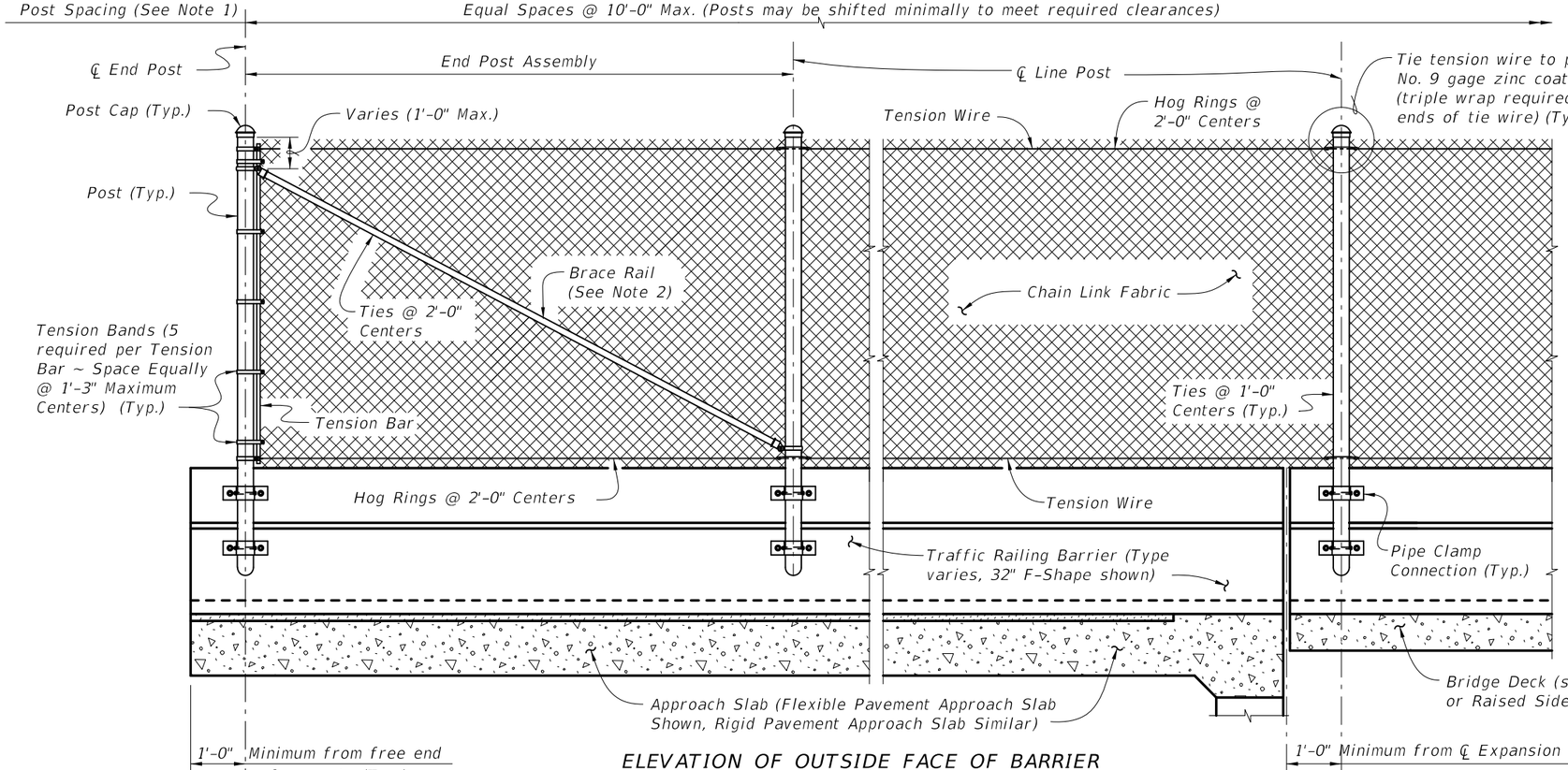
2010 Interim Design Standard

MOTORIST AWARENESS SYSTEM

Interim Date 01/01/11

Sheet No. 1 of 1

Index No. 670



ELEVATION OF OUTSIDE FACE OF BARRIER
(Traffic Railing Barrier Shown, Concrete Parapet Similar (See Note 3))

TYPICAL SECTION ON TRAFFIC RAILING BARRIER

TYPICAL SECTION ON CONCRETE PARAPET

NOTES:

1. *A Pull Post Assembly is required at maximum intervals of 500'-0". See Sheet Nos. 3 of 4 or 4 of 4.*
2. *Brace rails are only required for vertical fence installations on Traffic Railing Barriers.*
3. *Provide horizontal rails for vertical fence installations on Concrete Parapets in lieu of tension wire. Locate horizontal rails as shown in the Typical Section for Concrete Parapets at right.*

FENCING NOTES

FENCE INSTALLATION:
Install posts plumb (within a tolerance of ± 1½"). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

TRAFFIC RAILING BARRIER DETAILS:
See Superstructure Sheets for Traffic Railing Barrier details.

CONCRETE PARAPET DETAILS:
See Index No. 820 – Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown on Index No. 820.

LIMITS OF FENCING:
Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

PAYMENT:
Payment will be made under Fencing, Type R. Payment includes posts, horizontal and expansion rails, brace rails and bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, tension wire, ties, hog rings, tension bars and bands, post and loop caps, pipe clamps, base plates, anchor rods, bolts, nuts, washers, shim plates, spacers, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

CROSS REFERENCE:
For Table of Fence Components, Table of Post Attachment Components, View A-A and Detail "A" see Sheet No. 2 of 4.
For Pull Post Assembly Detail for Traffic Railing Barriers see Sheet No. 3 of 4.
For Pull Post Assembly Detail for Concrete Parapets and Detail "B" see Sheet No. 4 of 4.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed cut angle at bottom of post to 45°.			

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BRIDGE FENCING (VERTICAL)

Interim Date 01/01/11

Sheet No. 1 of 4

Index No. 810

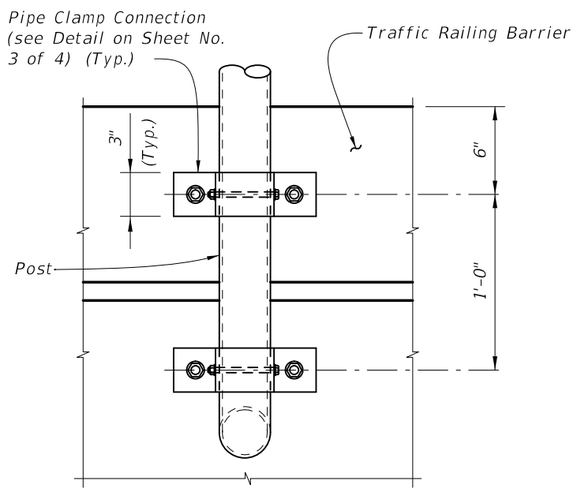
TABLE OF CHAIN LINK FENCE COMPONENTS

COMPONENT		ASTM DESIGNATION	COMPONENT INFORMATION
Traffic Railing Barriers and Concrete Parapets	Posts	F 1083	Galvanized Steel Pipe – 3" NPS, Schedule 40 (3.500" Outside Diameter, 0.216" Wall Thickness)
	Chain Link Fabric (2" mesh with twisted top and knuckled bottom selvage)	A 392	Zinc Coated Steel – No. 9 gage (coated wire diameter), Class 2 Coating
		A 491	Aluminum Coated Steel – No. 9 gage (coated wire diameter)
		F 668	Polyvinyl Chloride (PVC) Coated Steel – No. 9 gage Zinc Coated Wire (metallic–coated core wire diameter) ~ Specify the color of the polymer coating in the General Notes
	Tie Wires	F 626	Zinc Coated Steel Wire – No. 9 gage
	Brace Bands	F 626	No. 12 Gage (min. thickness) x ¾" (min. width) Steel Bands (Beveled or Heavy)
	Tension Bars	F 626	3/16" (min. thickness) x ¾" (min. width) x 5'–10" (min. height) Steel Bars
	Tension Bands	F 626	No. 14 Gage (min. thickness) x ¾" (min. width) Steel Bands
	Miscellaneous Fence Components	F 626	Zinc Coated Steel ~ (includes post or loop caps, horizontal and brace rail ends, combination rail ends, boulevard clamps and all other miscellaneous fittings & hardware)
Concrete Parapets	Horizontal Rails	F 1083	Galvanized Steel Pipe – 2½" NPS, Schedule 40 (2.875" Outside Diameter, 0.203" Wall Thickness)
	Expansion Rails	F 1083	Galvanized Steel Pipe – 2" NPS, Schedule 40 (2.375" Outside Diameter, 0.154" Wall Thickness)
	Bolts	A 307	¼" Ø x 4¼" Hex Head Bolts for Expansion Rail Connections
	Nuts	A 563	Hex Nuts for Expansion Rail Connections
	Washers	F 436	Flat Washers for Expansion Rail Connections
Traffic Railing Barriers	Tension Wire	A 824 & A 817	Type II (Zinc Coated Steel Wire) – No. 7 gage, Class 4 Coating
			Type I (Aluminum Coated Steel Wire) – No. 7 gage
	Hog Rings	F 626	Zinc Coated Steel Wire – No. 12 gage
	Brace Rails	F 1083	Galvanized Steel Pipe – 1¼" NPS, Schedule 40 (1.660" Outside Diameter, 0.140" Wall Thickness)

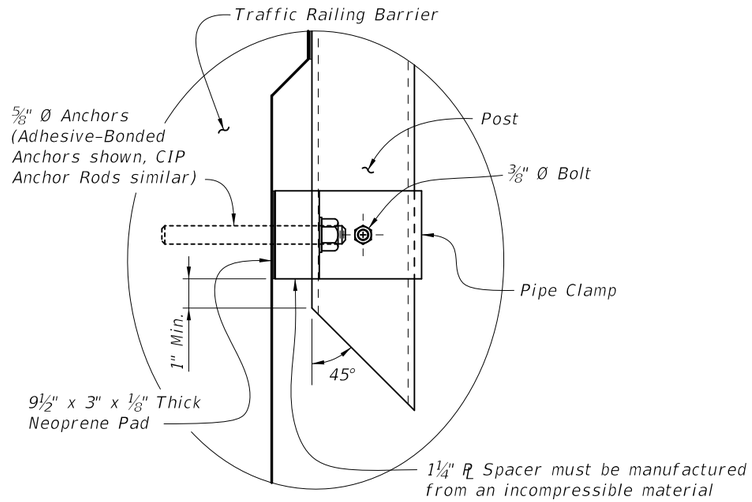
LEGEND: NPS = Nominal Pipe Size

TABLE OF POST ATTACHMENT COMPONENTS

COMPONENT		ASTM DESIGNATION	COMPONENT INFORMATION
Pipe Clamps		A 36 or A 709 Grade 36	¼" Steel PL
Base Plates		A 36 or A 709 Grade 36	¾" Steel PL
Shim Plates		A 36 or A 709 Grade 36 or B 209 Alloy 6061–T6 or B 221 Alloy 6063–T5	Plate thicknesses as required; Holes in shim plates will be ¾" Ø
Spacers		–	1¼" PL for all materials
Pipe Clamp Connection	Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods ~ ⅝" Ø x 6" (no spacer) or ⅝" Ø x 7¼" (with spacer)
	CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods ~ ⅝" Ø x 6" (no spacer) or ⅝" Ø x 7¼" (with spacer)
Base Plate Connection	Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods ~ ⅞" Ø x 14½"
	CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods ~ ⅞" Ø x 14½"
Bolts		A 307	⅜" Ø x 4¾" Hex Head Bolts for Pipe Clamp Connections to Posts
Nuts		A 563	Hex Nuts for Pipe Clamp and Base Plate Connections
Washers		F 436	Flat Washers for Pipe Clamp and Base Plate Connections
Neoprene Pads		–	In accordance with Specification Section 932



VIEW A-A



DETAIL "A"

POST ATTACHMENT NOTES

ANCHOR RODS, NUTS AND WASHERS:
After the nuts have been tightened, distort the Anchor Rod threads to prevent removal of the nuts. Coat distorted threads and exposed trimmed ends of anchors with a galvanizing compound in accordance with Specification Section 975.

COATINGS:
Hot–dip galvanize all Nuts, Washers, Bolts, CIP Anchor Rods, Adhesive Anchors and Fence Framework (Posts, Internal Sleeves, Shim Plates, Base Plates, Pipe Clamps and Spacers) in accordance with Specification Section 962. Hot–dip galvanize Fence Framework after fabrication.

ADHESIVE–BONDED ANCHORS AND DOWELS:
Adhesive Bonding Material Systems for Anchors and Dowels will comply with Specification Section 937 and be installed in accordance with Specification Section 416. Cutting of reinforcing steel is permitted for drilled hole installation.

WELDING:
All welding will be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal will be E60XX or E70XX. Nondestructive testing of welds is not required.

CROSS REFERENCE:
For location of View A–A and Detail "A" see Sheet No. 1 of 4.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Added 45° cut to bottom of post and 1" Min. dimension.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

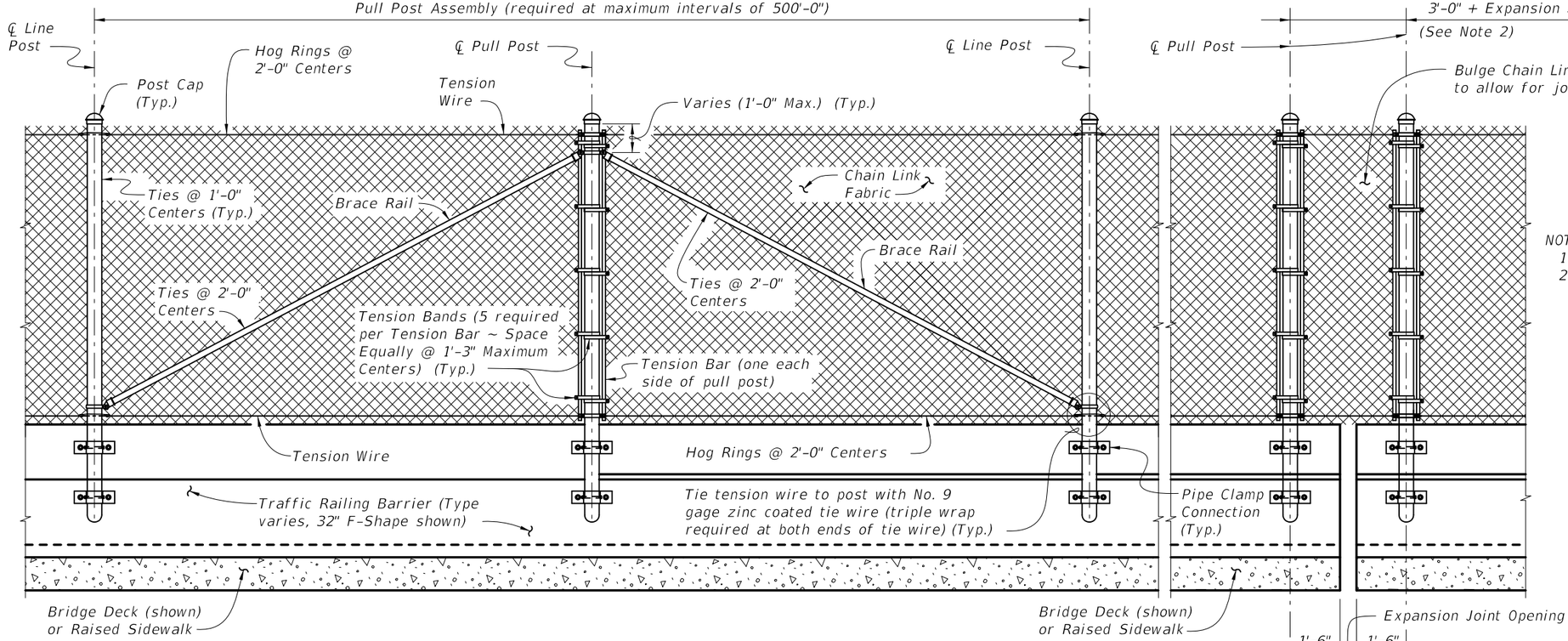
2010 Interim Design Standard

BRIDGE FENCING (VERTICAL)

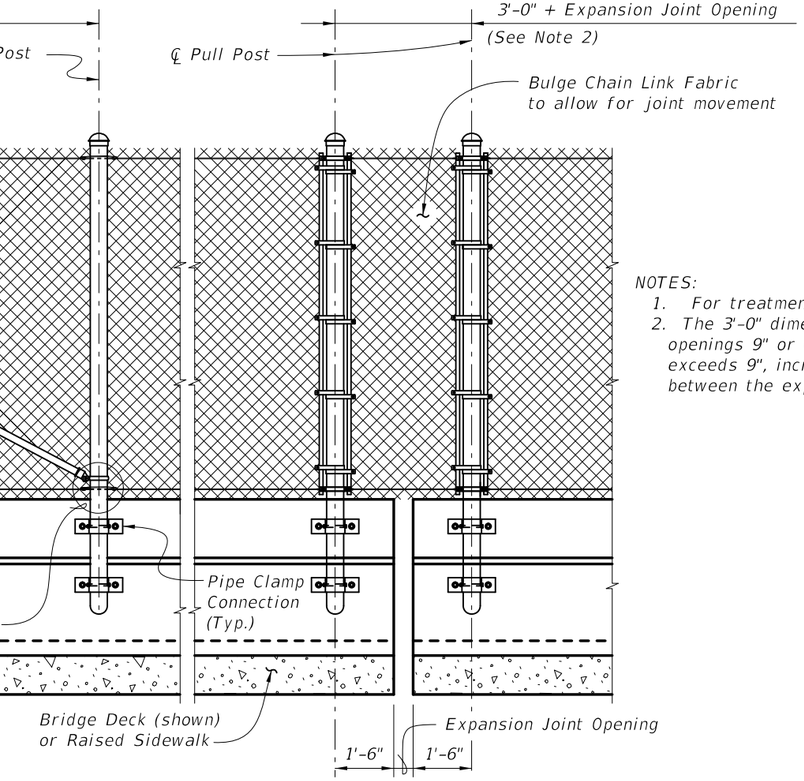
Interim Date 01/01/11

Sheet No. 2 of 4

Index No. 810



PULL POST ASSEMBLY DETAIL FOR TRAFFIC RAILING BARRIERS

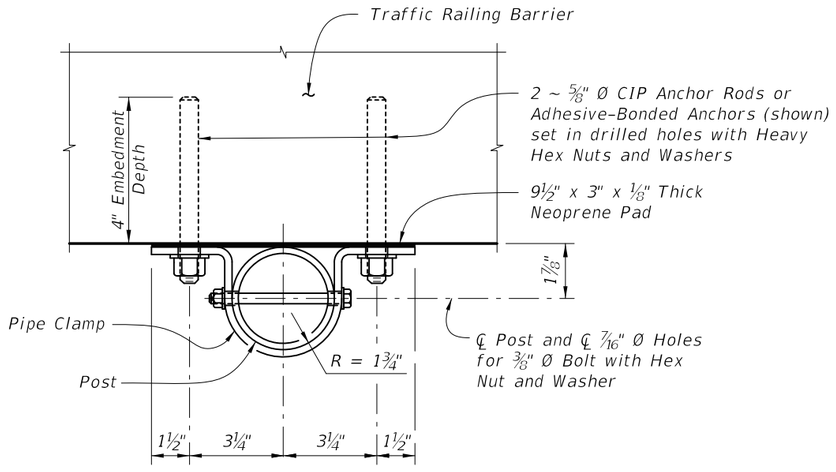


EXPANSION ASSEMBLY DETAIL

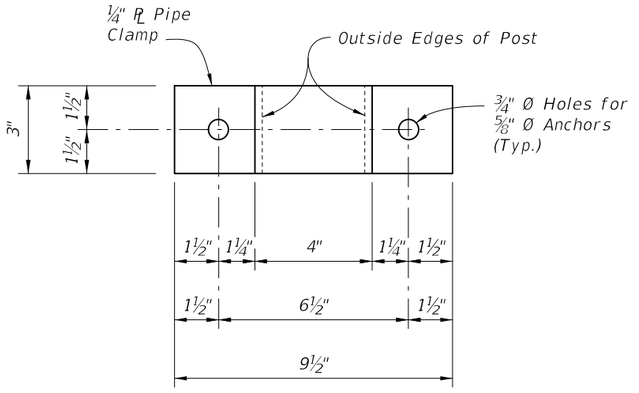
(Required only at expansion joint locations where total movement exceeds 6")

NOTES:

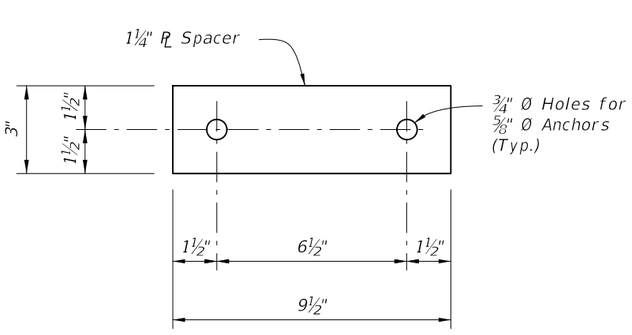
1. For treatment at bridge ends, see Sheet No. 1 of 4.
2. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".



PIPE CLAMP CONNECTION DETAIL
(Connection without spacer shown, Connection with spacer similar)



PIPE CLAMP DETAIL



SPACER DETAIL

(Must be manufactured from an incompressible material (i.e., steel or aluminum))

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed cut at bottom of post to 45°.			

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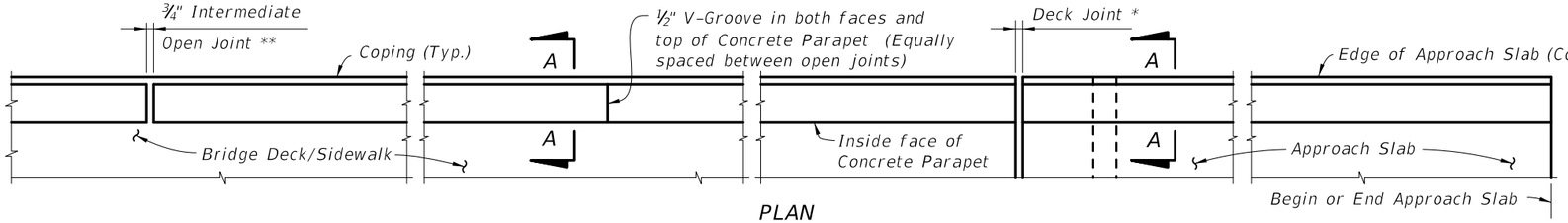
BRIDGE FENCING (VERTICAL)

Interim Date 01/01/11

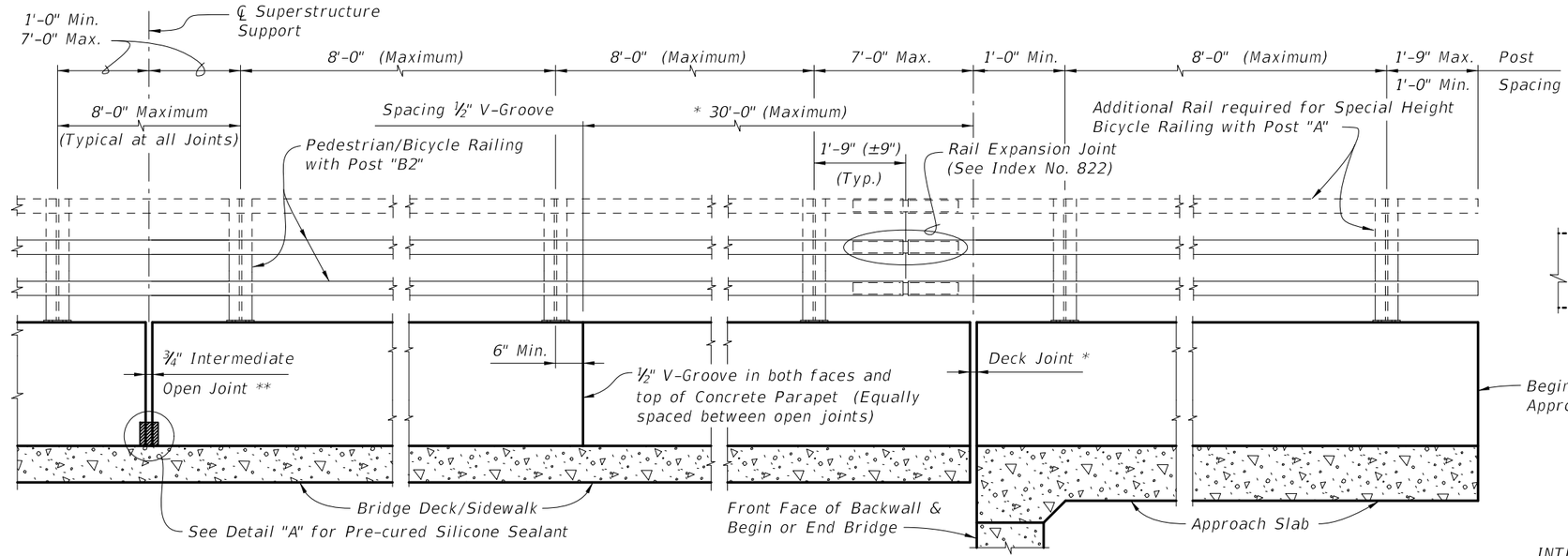
Sheet No. 3 of 4

Index No. 810



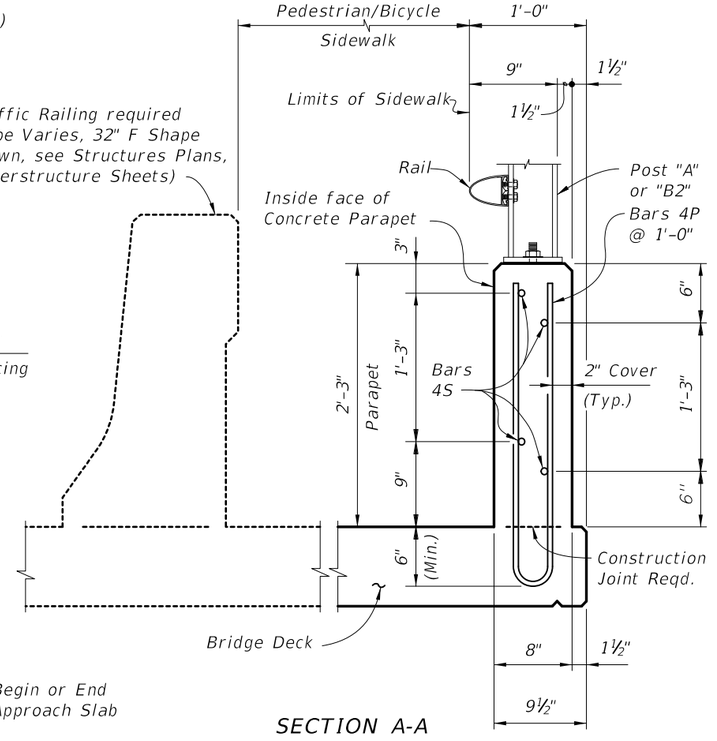
PLAN
(Rails, Posts & Reinforcing Steel not shown for clarity)

** ¾" Intermediate Open Joints shall be provided at locations coinciding with ¾" Joints for the Traffic Railing.



* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at ℄ Pier or Intermediate Bent similar.

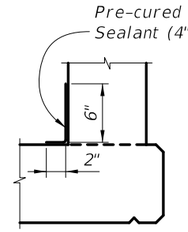
ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)



SECTION A-A
(Typical Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)

INTERMEDIATE JOINT SEAL NOTE:

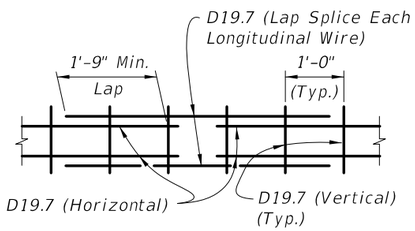
1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Concrete Parapet.



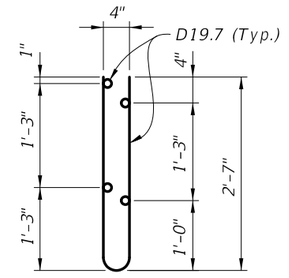
DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4¾" are not permitted.



SPLICE DETAIL
(Between WWR Sections)

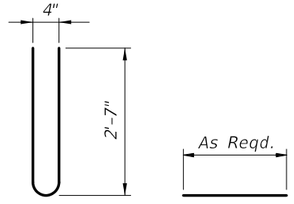


WELDED WIRE REINFORCEMENT (WWR)

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	4	5'-5"
S	4	As Reqd.



BAR 4P BAR 4S

ESTIMATED CONCRETE PARAPET QUANTITIES

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.056
Reinforcing Steel	LB/LF	6.29

(The above quantities are based on a deck with a 2% cross slope)

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the parapet on a retaining wall shall be the same as detailed above for a 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
5. At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.

PEDESTRIAN/BICYCLE RAILING NOTES:

CONCRETE PARAPET: Concrete parapet shall be placed vertical and top surface shall be level transversely.
RAIL AND POST DETAILS: For Rail, Post, Rail Expansion Joint fabrication and installation details and notes see Index No. 822.
BRIDGE FENCING: For Bridge Fencing see Index Nos. 810, 811 or 812 in lieu of Posts and Rails on Index No. 822.
PAYMENT: Concrete Parapet shall be paid for under the contract unit price for 27" Concrete Parapet (Pedestrian/Bicycle), LF, and Rails shall be paid for under Aluminum Bullet Railings, LF.

REVISIONS

DATE	BY	DESCRIPTION
01/01/10	SJN	Changed Post offset dimensions to Joints.
07/01/10	SJN	Added "PAYMENT" note to "PEDESTRIAN/BICYCLE NOTES." Deleted Intermediate Open Joints in Concrete Parapet.
01/01/11	CMH	Changed * note reference for Skew Treatment to Index No. 420, and Mortar Plug to Pre-cured Silicone Sealant in ELEVATION and DETAIL "A".

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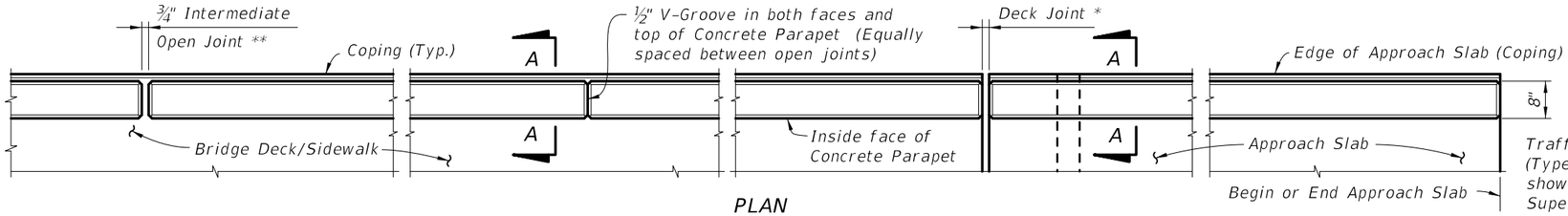
2010 Interim Design Standard

BRIDGE PEDESTRIAN/BICYCLE BULLET RAILING

Interim Date 01/01/11

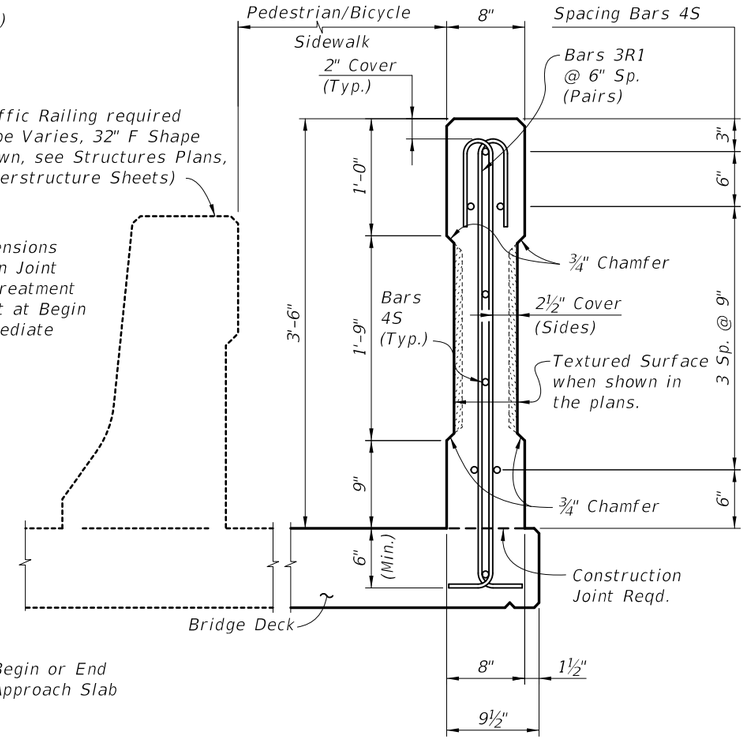
Sheet No. 1 of 1

Index No. 820

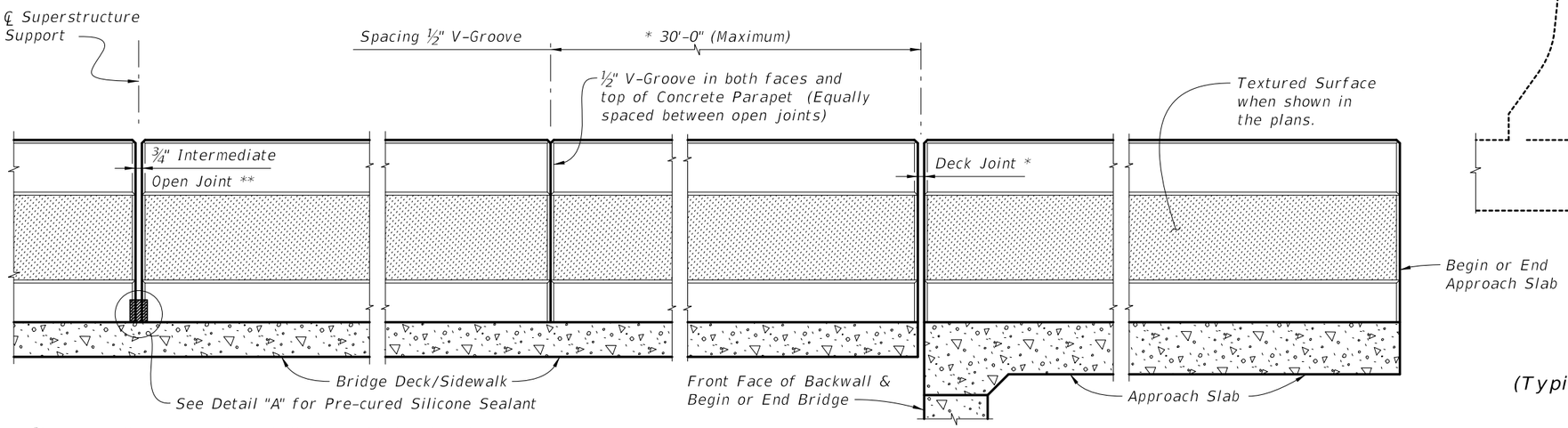


PLAN
(Reinforcing Steel not shown for clarity)

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at ℄ Pier or Intermediate Bent similar.



SECTION A-A
(Typical C.I.P. Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)

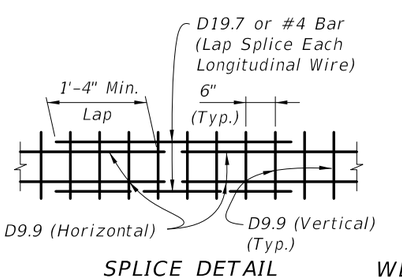


** ¾" Intermediate Open Joints shall be provided at locations coinciding with ¾" Joints for the Traffic Railing.

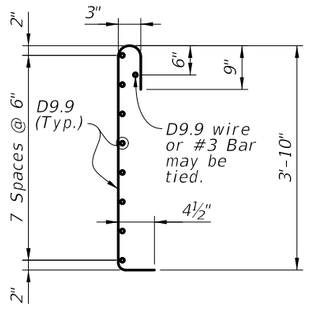
ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to ensure vertical wire is within 4" of open joints.



SPLICE DETAIL
(Between WWR Sections)

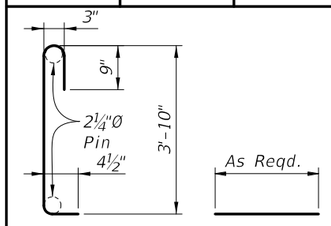


WELDED WIRE REINFORCEMENT
(WWR)
(2 Pieces Req'd.)

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

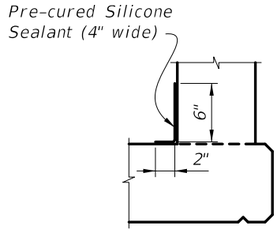
MARK	SIZE	LENGTH
R1	3	5'-2"
S	4	As Reqd.



BAR 3R1 BAR 4S

INTERMEDIATE JOINT SEAL NOTE:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Concrete Parapet.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

ESTIMATED CONCRETE PARAPET QUANTITIES

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.079
Reinforcing Steel	LB/LF	13.12

(The above quantities are based on a deck with a 2% cross slope)

CROSS REFERENCES:
See Sheet 2 for notes on Reinforcing Steel, Concrete Parapet, and Precast Panel Option.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			
01/01/11	CMH	Changed * note reference for Skew Treatment to Index 420, and DETAIL "A" to Pre-cured Silicone Sealant.			

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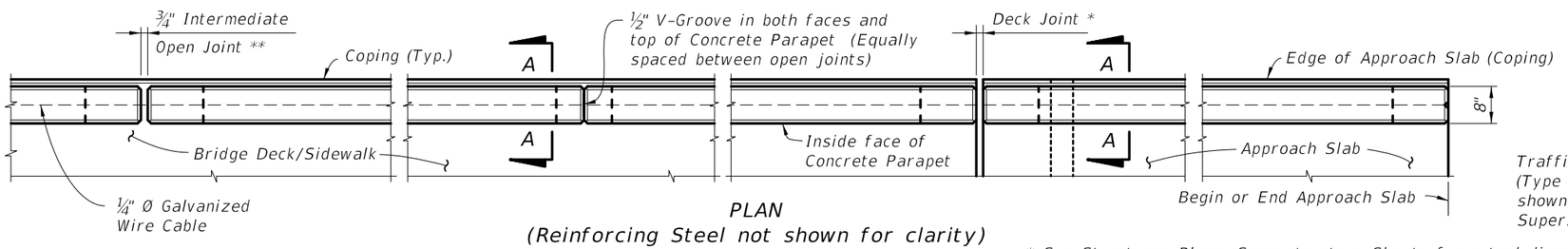
2010 Interim Design Standard

42" CONCRETE PEDESTRIAN/ BICYCLE RAILING

Interim Date 01/01/11

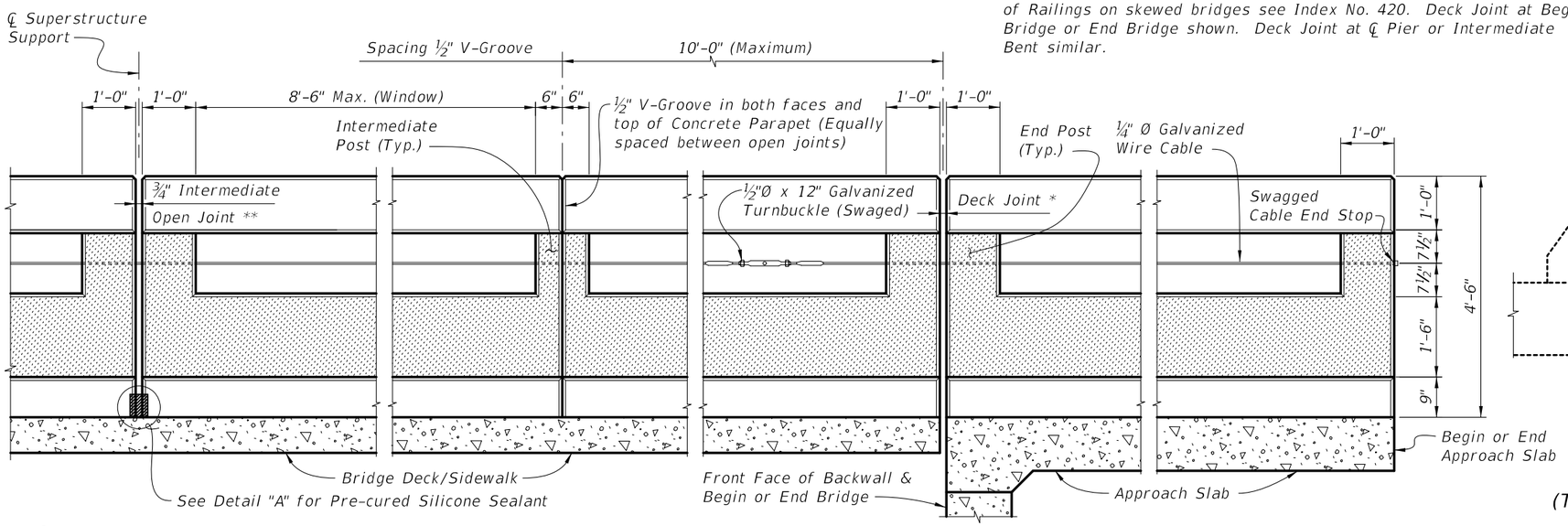
Sheet No. 1 of 2

Index No. 825



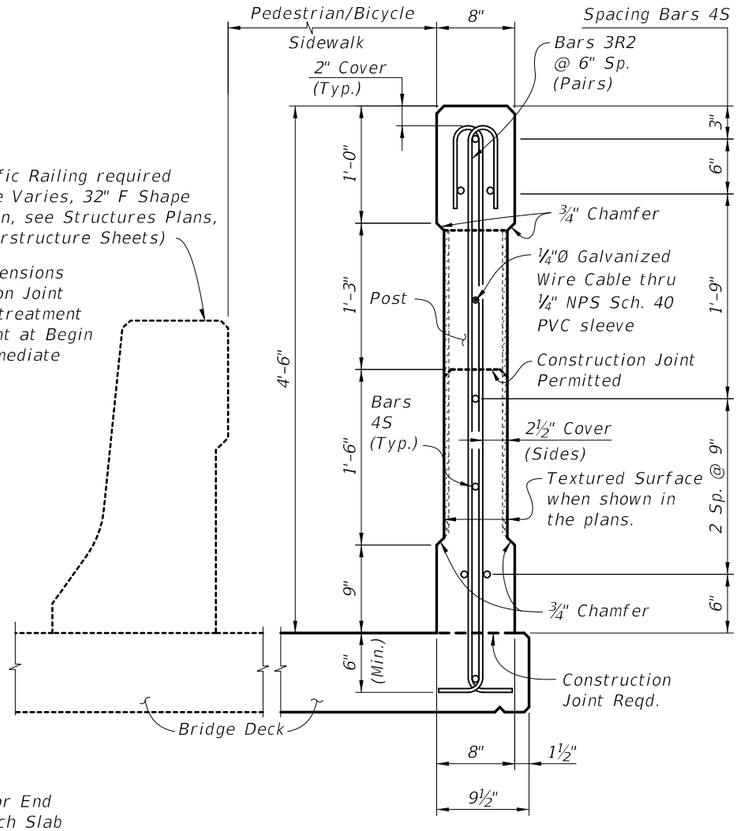
PLAN
(Reinforcing Steel not shown for clarity)

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at ℄ Pier or Intermediate Bent similar.



** ¾" Intermediate Open Joints shall be provided at locations coinciding with ¾" Joints for the Traffic Railing.

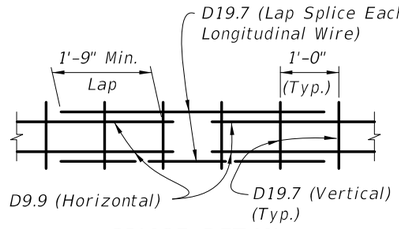
ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)



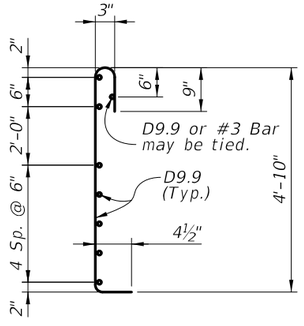
SECTION A-A
(Typical C.I.P. Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to ensure vertical wire is within 4" of open joints.



SPLICE DETAIL
(Between WWR Sections)

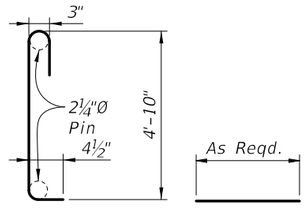


WELDED WIRE REINFORCEMENT
(WWR)
(2 Pieces Req'd.)

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

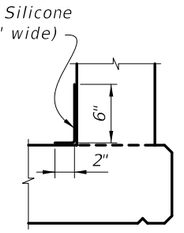
MARK	SIZE	LENGTH
R2	3	6'-2"
S	4	As Reqd.



BAR 3R2 BAR 4S

INTERMEDIATE JOINT SEAL NOTE:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Concrete Parapet.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

ESTIMATED CONCRETE PARAPET QUANTITIES

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.077
Reinforcing Steel	LB/LF	14.62

(The above quantities are based on a deck with a 2% cross slope)

CROSS REFERENCES:
See Sheet 2 for notes on Reinforcing Steel, Concrete Parapet, Galvanized Wire Cable and Precast Panel Option.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			
01/01/11	CMH	Changed * note reference for SkewTreatment to Index No. 420, and DETAIL "A" to Pre-cured Silicone Sealant.			

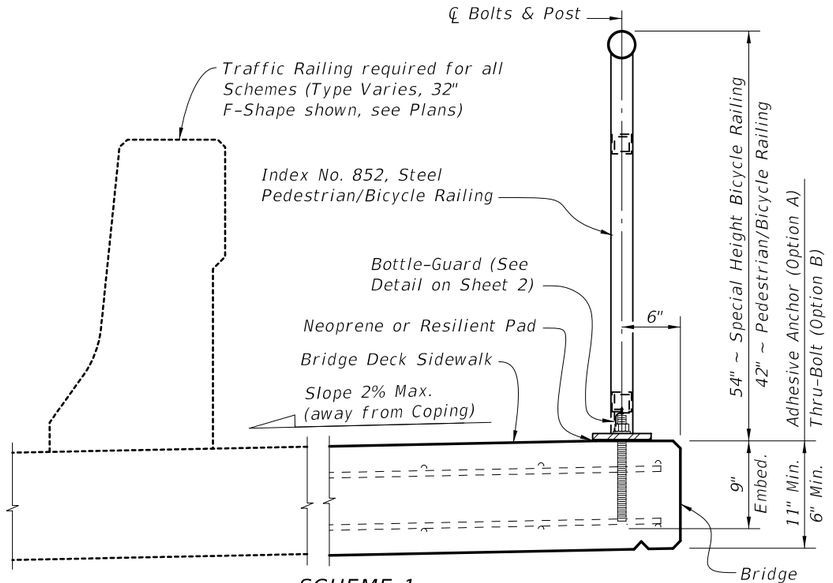
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

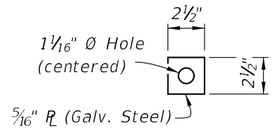
54" CONCRETE PEDESTRIAN/BICYCLE RAILING

Interim Date 01/01/11

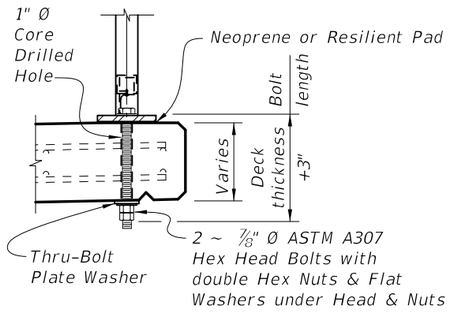
Index No. 826



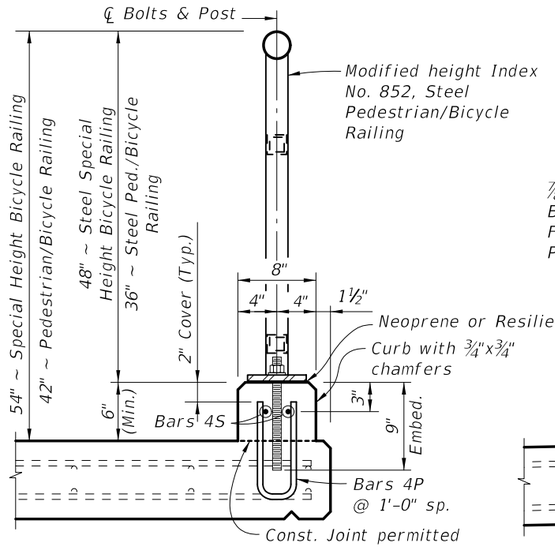
SCHEME 1 -
TYPICAL SECTION THROUGH DECK MOUNTED RAILING
(Adhesive Anchor Option shown - SCHEME 1A)



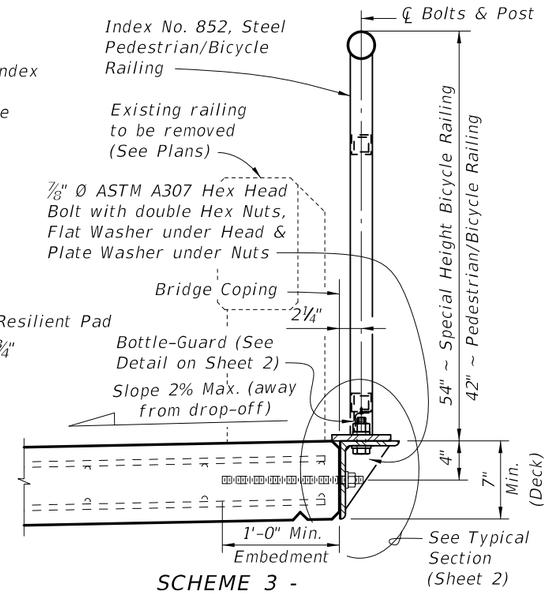
THRU-BOLT PLATE WASHER DETAIL



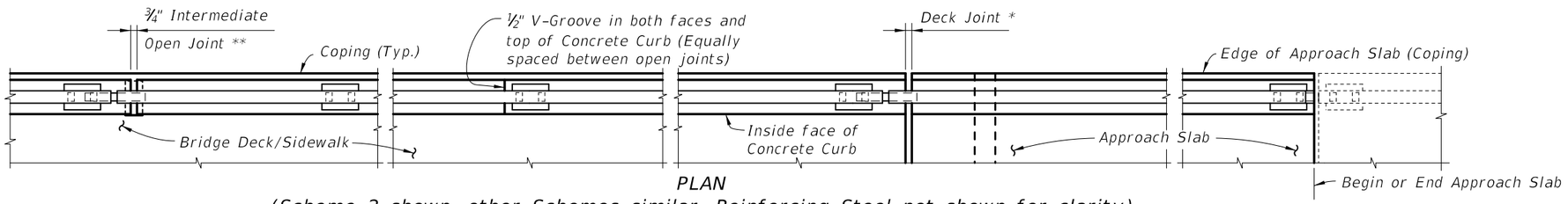
SCHEME 1B - DETAILS
(Thru-Bolt Option)



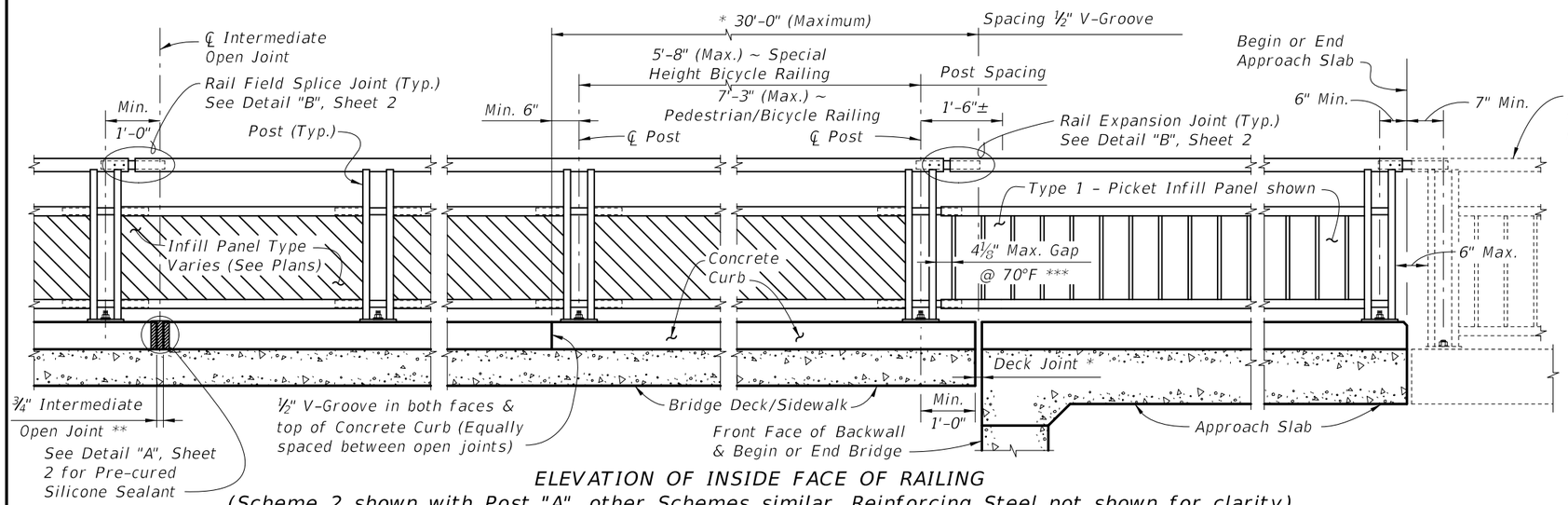
SCHEME 2 -
TYPICAL SECTION THROUGH
CURB MOUNTED RAILING



SCHEME 3 -
TYPICAL SECTION THROUGH
SIDE MOUNTED RAILING (RETROFIT)



PLAN
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)



ELEVATION OF INSIDE FACE OF RAILING
(Scheme 2 shown with Post "A", other Schemes similar, Reinforcing Steel not shown for clarity)

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Curb Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at ℄ Pier or Intermediate Bent similar.

** ¾" Intermediate Open Joints shall be provided at locations coinciding with ¾" Joints for the Traffic Railing.

*** Clear opening between adjacent pickets or panel at Rail Expansion Joints, above Deck Expansion Joints with a total thermal movement greater than 4", must be reduced to 3½".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Deleted "INSTRUCTION TO DESIGNERS" Note; Changed Railing Type to match Index No. 852			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

BRIDGE PEDESTRIAN/BICYCLE RAILING (STEEL)

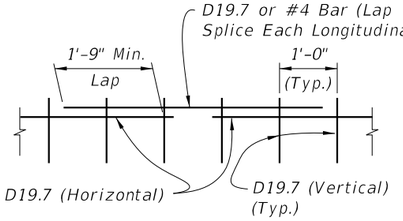
Interim Date 01/01/11

Sheet No. 1 of 3

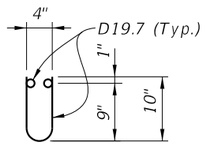
Index No. 851

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4¾" are not permitted.



SPLICE DETAIL
(Between WWR Sections)

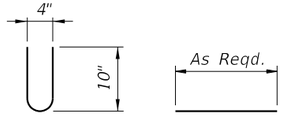


WELDED WIRE REINFORCEMENT (WWR)

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

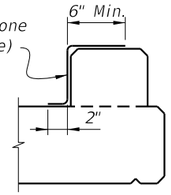
MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Reqd.



BAR 4P BAR 4S

CURB REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
5. At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

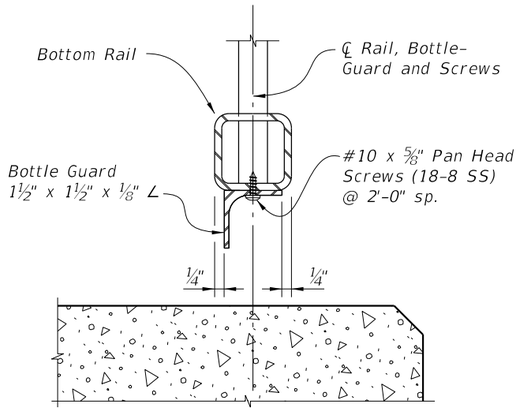
INTERMEDIATE JOINT SEAL NOTE:

At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.

ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)

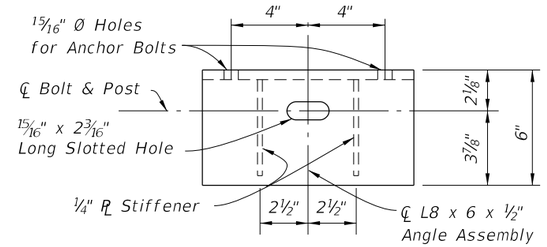
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01

SCHEME 2 - CONCRETE CURB DETAILS



TYPICAL SECTION THROUGH BOTTOM RAIL
(Post Not Shown for Clarity)

SCHEME 1 - BOTTLE GUARD DETAIL



PLAN VIEW

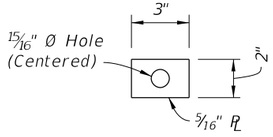
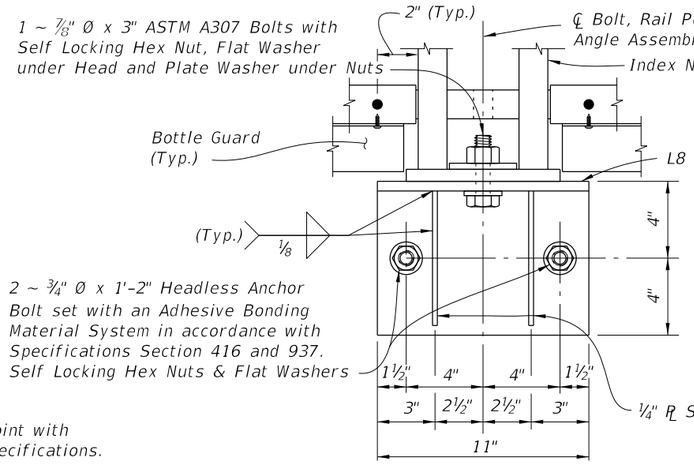
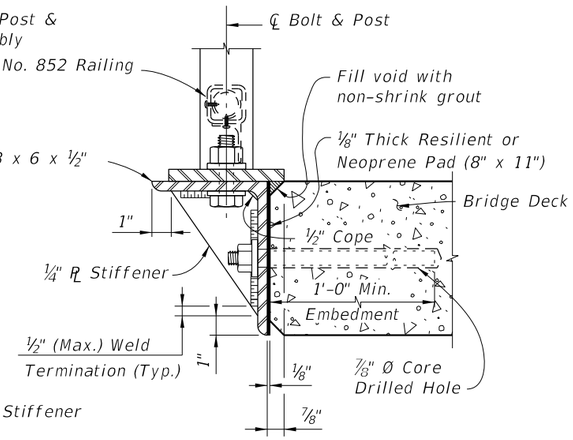


PLATE WASHER DETAIL

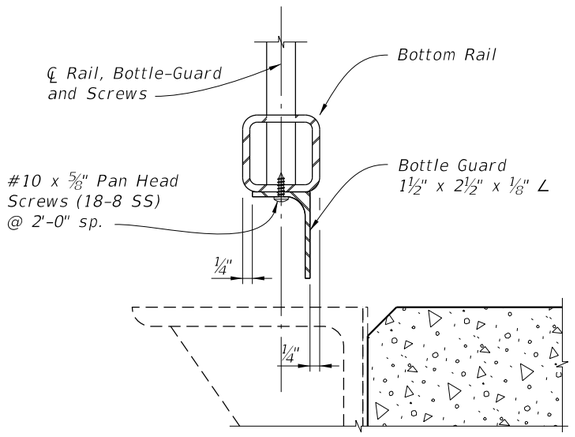


ELEVATION VIEW



TYPICAL SECTION

SCHEME 3 - SIDE-MOUNTED SUPPORT BRACKET DETAILS



CROSS REFERENCE:

See Sheet 3 for Bridge Railing Notes.

TYPICAL SECTION THROUGH BOTTOM RAIL
(Post Not Shown for Clarity)

SCHEME 3 - BOTTLE GUARD DETAIL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed DETAIL "A", and SIDE-MOUNTED SUPPORT BRACKET; Added Bottle-Guard Detail; Moved DETAIL "B" and NOTES to Sheet 3.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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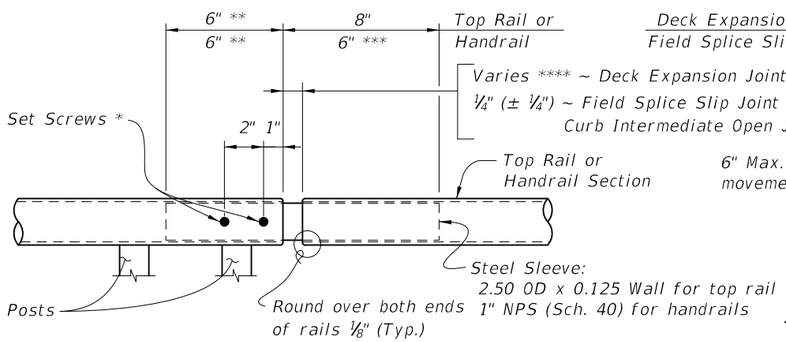
BRIDGE PEDESTRIAN/BICYCLE RAILING (STEEL)

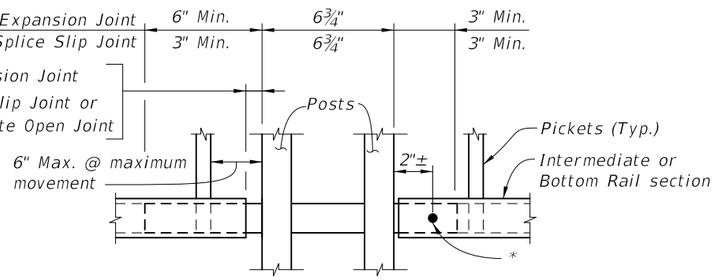
Interim Date 01/01/11

Sheet No. 2 of 3

Index No. 851



ROUND RAILS - TOP RAIL OR HANDRAIL



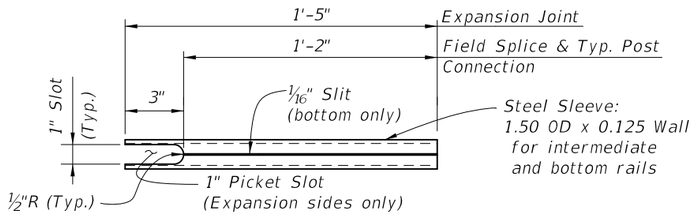
SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL

* ¼" Ø x ¾" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws along outside face of railing. Set screws must be set flush against the rail surface. A ¾" Ø plug weld may be substituted for the two set screws at expansion joints.

** Embedded length may be 4" for plug welded connection.

*** Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".

**** Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".



INTERMEDIATE OR BOTTOM RAIL - Steel SLEEVE DETAIL (Bottom Side Shown)

DETAIL "B" EXPANSION JOINT (FIELD SPLICE SIMILAR)

BRIDGE RAILING NOTES:

APPLICABILITY NOTE: Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

RAILING DETAILS: For Railing fabrication and installation details and notes see Index No. 852, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely, unless otherwise shown in the Contract Plans.

BOTTLE-GUARD (Schemes 1 & 3): L-Shape shall be in accordance with ASTM A36.

CONCRETE CURB (Scheme 2): Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

SIDE MOUNTED SUPPORT BRACKET (Scheme 3): L-Shape and Stiffener Plate shall be in accordance with ASTM A36. Welding shall be in accordance with the American Society of Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required. The bracket shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications.

PAYMENT: Railing shall be paid per linear foot (Item No. 515-2-abb) for the steel railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, bottle-guards, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Sheet; Changed Expansion Joint Detail "B" to match Index No. 862.			

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BRIDGE PEDESTRIAN/BICYCLE RAILING (STEEL)

Interim Date 01/01/11

Index No. 851

3D VIEW OF RAILING WITH TYPE 1 - PICKET INFILL PANEL
(42" Height shown, 54" Height Similar)

TABLE 1 - RAILING MEMBERS			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Post "A"	HSS2x2x$\frac{1}{8}$	2.00" x 2.00"	0.125"
Post "B"	HSS2x2x$\frac{3}{16}$	2.00" x 2.00"	0.188"
Top Rail	2$\frac{1}{2}$" NPS (Sch. 10)	2.875"	0.120"
	HSS3.000x0.120	3.000"	0.120"
End Hoops	2$\frac{1}{2}$" NPS (Sch. 10)	2.875"	0.120"
	HSS3.000x0.120	3.000"	0.120"
Top Rail Joint/Splice Sleeves	HSS2.500x0.125	2.500"	0.125"
Intermediate & Bottom Rail	HSS2x2x$\frac{3}{16}$	2.00" x 2.00"	0.188" (1)
Int. & Bottom Rail Post Connection Sleeve	HSS1.500x0.125	1.500"	0.125" (1)
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1$\frac{1}{2}$" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	$\frac{3}{4}$" Ø Round Bar	0.750"	N/A
Pickets (Type 1 Infill Panel)	$\frac{3}{4}$" Ø Round Bar	0.750"	N/A
Infill Panel Members (Types 2 – 5)	Varies (See Details)	Varies	Varies

TABLE 1 NOTES:
(1) 0.125" wall thickness permitted for rails with post spacings less than 5'–8", except that Post Connection Sleeve must be 1$\frac{1}{4}$" NPS (Sch. 40).

NOTES

DESIGN LOADS, GEOMETRY AND APPLICABILITY:
See the Instructions for Design Standards for the design loads, geometry and applicability requirements.

GENERAL:
Adequate foundation support shall be provided for anchorage and stability against overturning. See Index No. 851 for special requirements and modifications for use on bridges. The railing shown on these drawings requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA).

RAILS, PANELS AND POSTS:
Pipe Rails and Pickets shall be in accordance with ASTM A500 Grade B, C or D, or ASTM A53 Grade B for standard weight pipe (Schedule 40) or ASTM A36 for bars. Structural Tube shall be in accordance with ASTM A500 Grade A, B, C or D, or ASTM A501. Perforated panels (Type 5), U–Channels and filler plates shall be ASTM A36 or A1011 (Grade 36). Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'–6" above the foundation. Pickets and vertical panel elements shall be fabricated parallel to the posts, except that Type 2, 3 & 5 panel infills may be fabricated parallel to the longitudinal grade. Corners and changes in tangential longitudinal alignment shall be made continuous with a 9" bend radius or terminate at adjoining sections with mitered end sections when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'–0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

BASE PLATES AND RAIL CAPS:
Base Plates and Rail Cap Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

SHIM PLATES:
Shim Plates shall be steel in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than $\frac{1}{8}$". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of $\frac{1}{2}$", unless longer anchor bolts are provided for the exposed thread length.

ANCHOR BOLTS:
Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. Expansion Anchors are not permitted. All anchor bolts shall have single self–locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self–locking nuts. All nuts shall be in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only), shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RESILIENT AND NEOPRENE PADS:
Resilient and Neoprene pads shall be in accordance with Specification Section 932 except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 to 80.

JOINTS:
All welded joints are to be ground smooth. Expansion joints shall be spaced at a maximum 40'–0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate handling, but top rail must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the top rail continuous for unforeseen field adjustments.

WELDING:
All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

COATINGS:
The steel railing shall be hot–dip galvanized after fabrication in accordance with Section 962 of the Specifications mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot–dip galvanized in accordance with Section 962 of the Specifications.

SHOP DRAWINGS:
Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, post and panel type, anchor bolt installation "Case" or lengths, must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

PAYMENT:
Railing shall be paid for per linear foot (Item No. 515–2–abb). Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, panels, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Design Standard			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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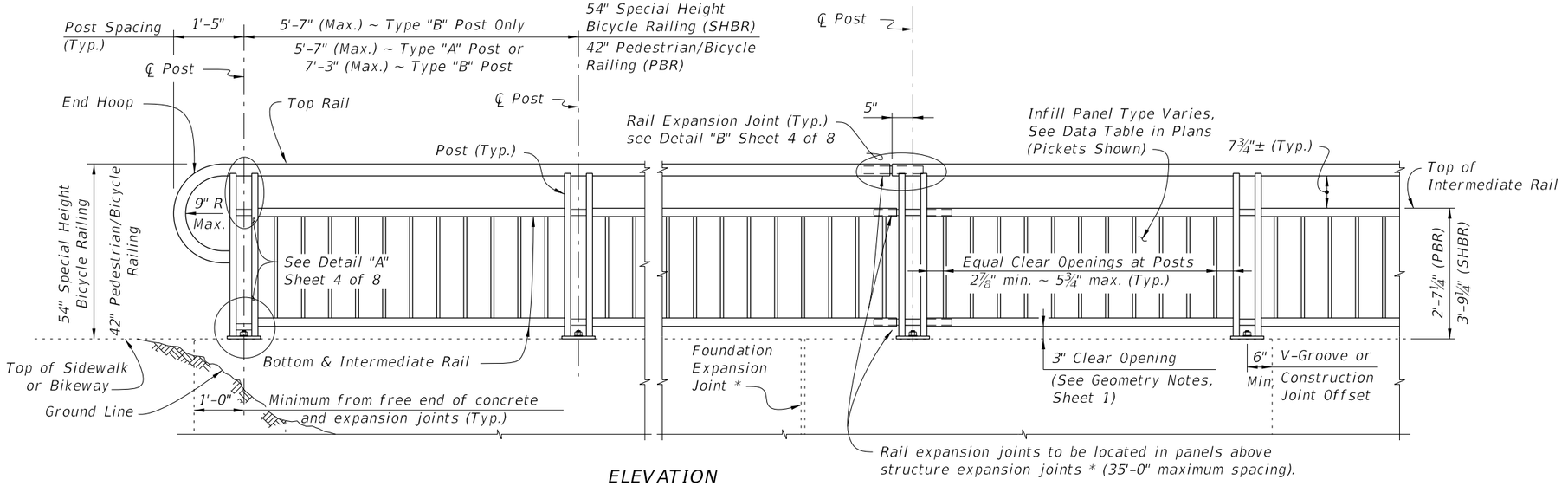
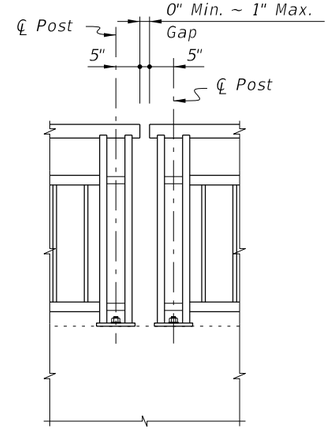
STEEL PEDESTRIAN/BICYCLE RAILING

Interim Date 01/01/11

Index No. 852



ELEVATION
(Showing Outside Face of Railing with Type "A" Posts)



Note: Non-continuous corners are permitted when handrails are not required.

EXPANDED ELEVATION AT CORNERS

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

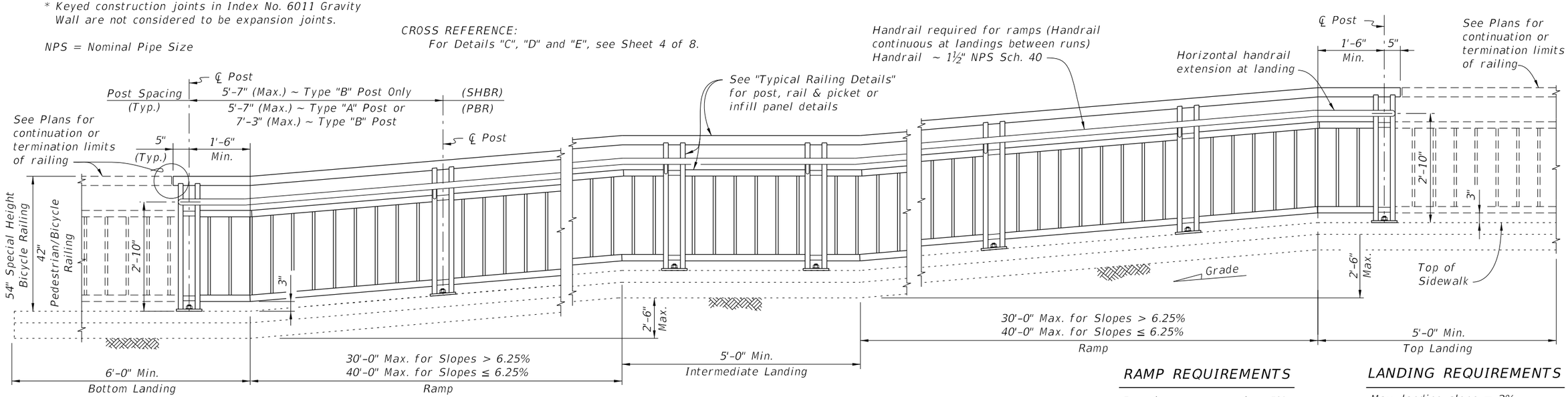
(Type 1 - Picket Railing Shown, Other Types Similar)

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:
* Keyed construction joints in Index No. 6011 Gravity Wall are not considered to be expansion joints.

NPS = Nominal Pipe Size

CROSS REFERENCE:
For Details "C", "D" and "E", see Sheet 4 of 8.



ELEVATION
(Showing Inside Face of Railing with Type "A" Posts)

RAMP REQUIREMENTS

For slopes greater than 5%:
Max. ramp slope = 8.33%
Max. ramp cross-slope = 2.0%

LANDING REQUIREMENTS

Max. landing slope = 2%
Max. landing cross-slope = 2%

RAILINGS ON GRADES STEEPER THAN 5%

(Type 1 - Picket Railing Shown, Other Types Similar)

REVISIONS

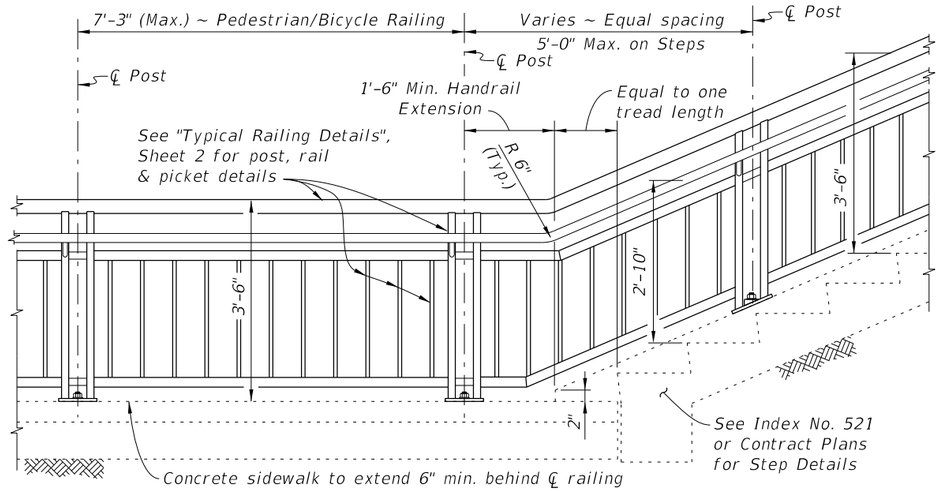
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Design Standard			

2010 Interim Design Standard

STEEL PEDESTRIAN/BICYCLE RAILING

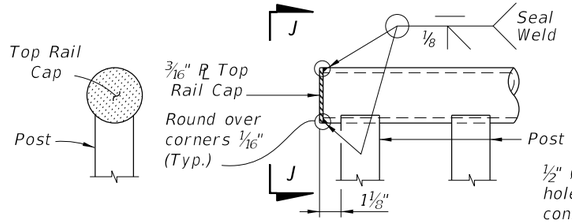
Interim Date 01/01/11

Index No. 852

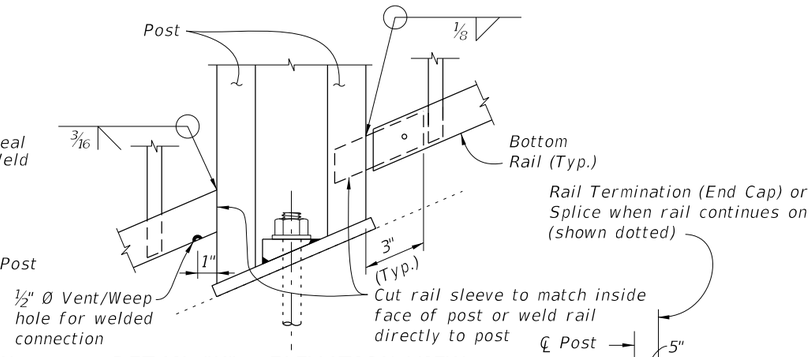


RAILING CONTINUATION BEYOND STEPS OR STAIRS
(Bottom shown, Top similar)

DETAIL "L" - PLAN VIEW
HANDRAIL TERMINATION

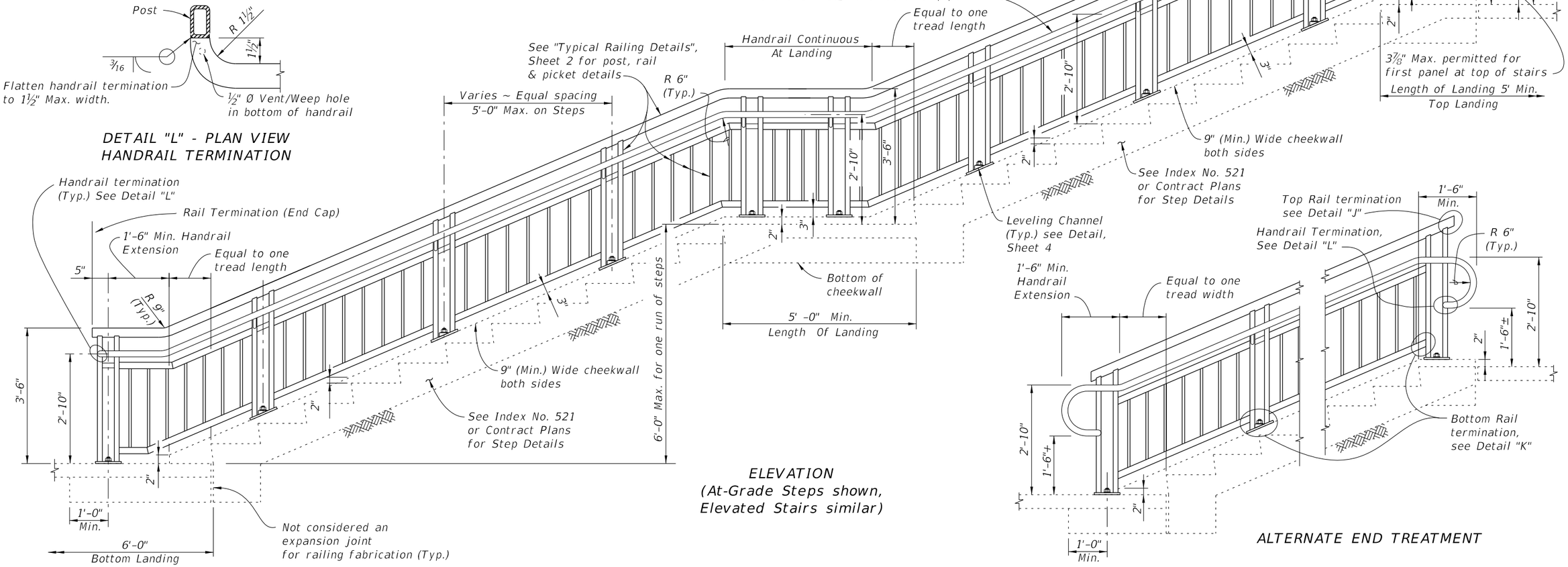


VIEW J-J DETAIL "J" - ELEVATION VIEW
TOP RAIL TERMINATION



DETAIL "K" - ELEVATION VIEW
BOTTOM RAIL CONNECTION

RAIL TERMINATION DETAILS



ELEVATION
(At-Grade Steps shown,
Elevated Stairs similar)

ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Design Standard			

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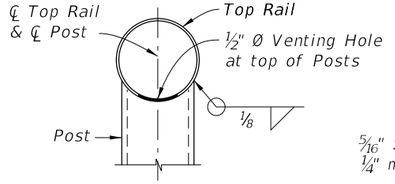
STEEL PEDESTRIAN/BICYCLE RAILING

Interim Date 01/01/11

Sheet No. 3 of 8

Index No. 852



SECTION A-A
(Top Rail Connection)

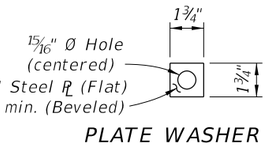
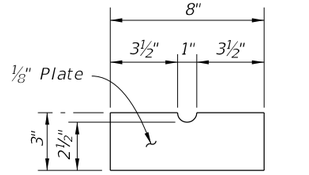
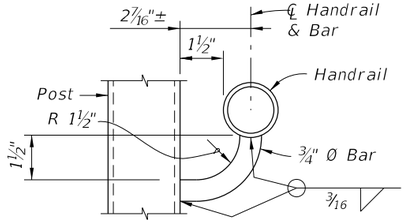


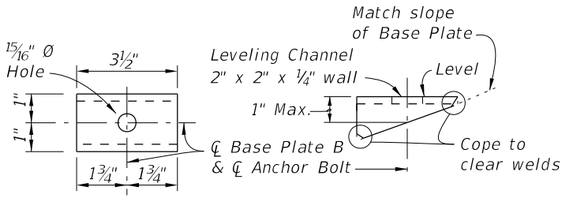
PLATE WASHER
DETAIL



SHIM PLATE DETAIL

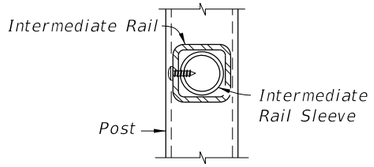


SECTION B-B
(Handrail Connection)

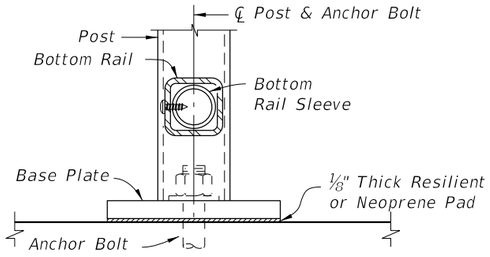


TOP VIEW SIDE VIEW

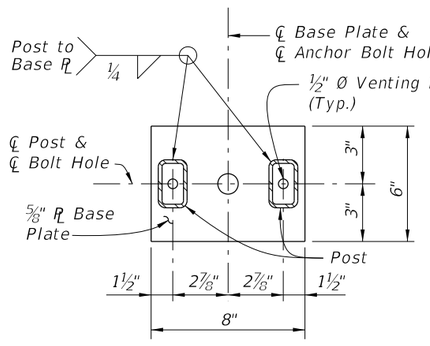
LEVELING CHANNEL DETAIL



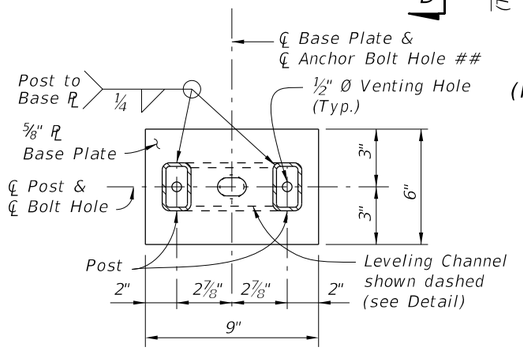
SECTION C-C
(Intermediate Rail Connection)



SECTION D-D
(Bottom Rail Connection)

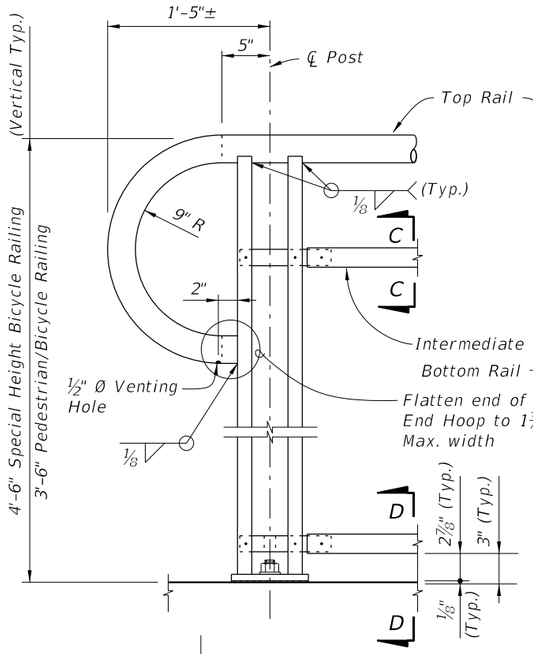


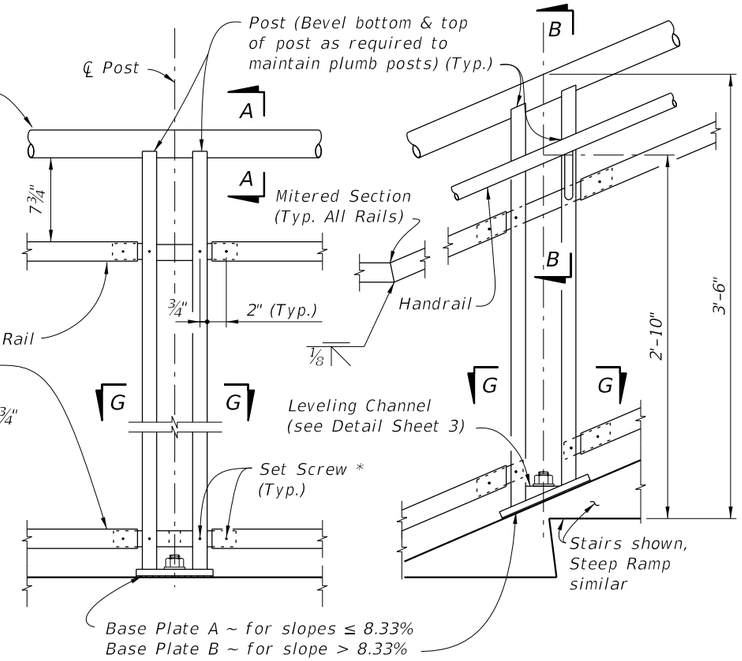
BASE PLATE A



BASE PLATE B

SECTION G-G - BASE PLATE DETAILS





DETAIL "A" - RAIL CONNECTIONS
(Pickets/Panels Not Shown for Clarity)

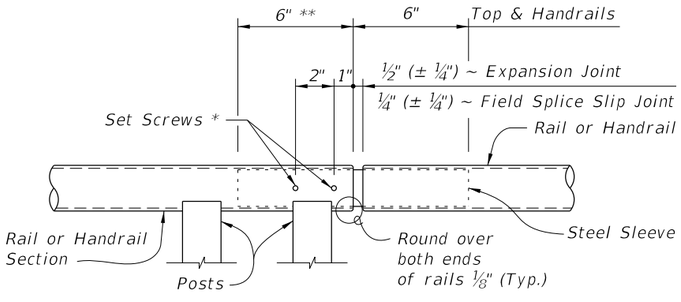
NOTES:

\# Base Plate A (Ramps – Bolts normal) use 1 1⁄16" Ø Holes for Anchor Bolts with Flat Washers for slopes ≤ 8.33%.

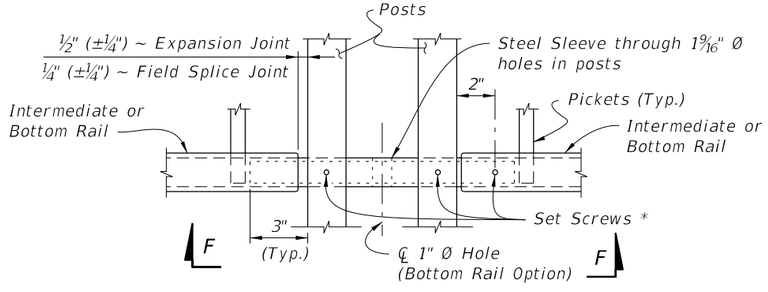
Base Plate B (Stairs – Bolts plumb) use 1¼" Ø Holes for Anchor Bolts with Beveled Plate and Washers for slopes > 8.33% to ≤ 15%; use 15⁄16" x 1½" Slotted Holes with Leveling Channel for slopes > 15%.

* ¼" Ø x ¾" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws. Screws must be set flush against the outside face of rails & posts and underside of handrails. ½" Ø plug welds may be substituted for the Set Screws.

** Embedded length may be 4" for plug welded connection.

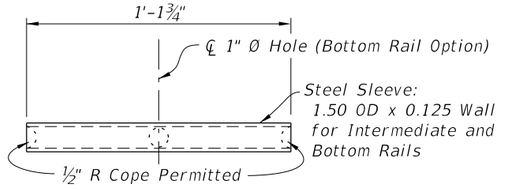


ROUND RAILS - TOP RAIL OR HANDRAIL
(Top Rail at Expansion Joint Shown)



SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL
(Bottom Rail Shown at Expansion Joint Shown)

DETAIL "B" - EXPANSION JOINT (FIELD SPLICE SLIP JOINT SIMILAR)



VIEW F-F
INTERMEDIATE OR BOTTOM RAIL -
STEEL SLEEVE DETAIL (Bottom Side Shown)

CROSS REFERENCE:

For location of Details "B", See Sheet 2.

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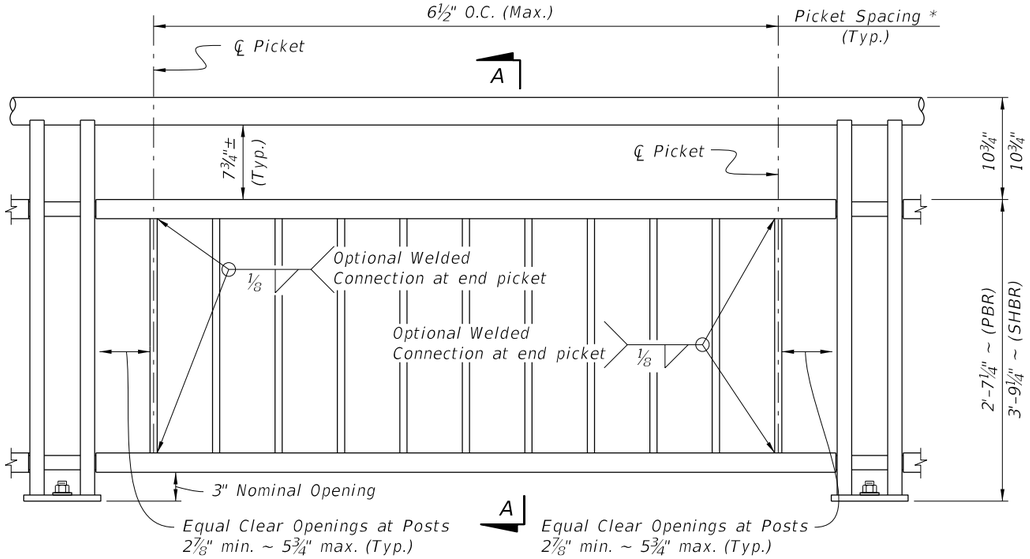
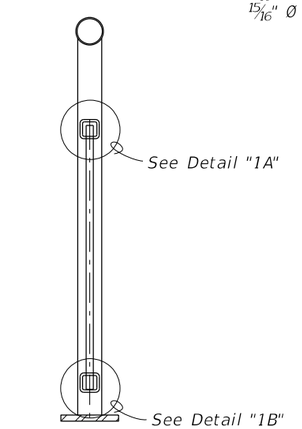
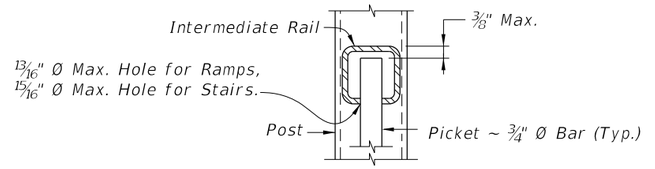


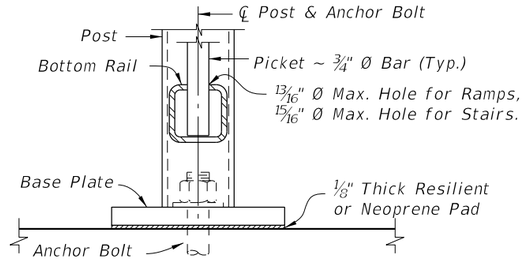
TYPE 1 - PICKET INFILL PANEL



SECTION A-A



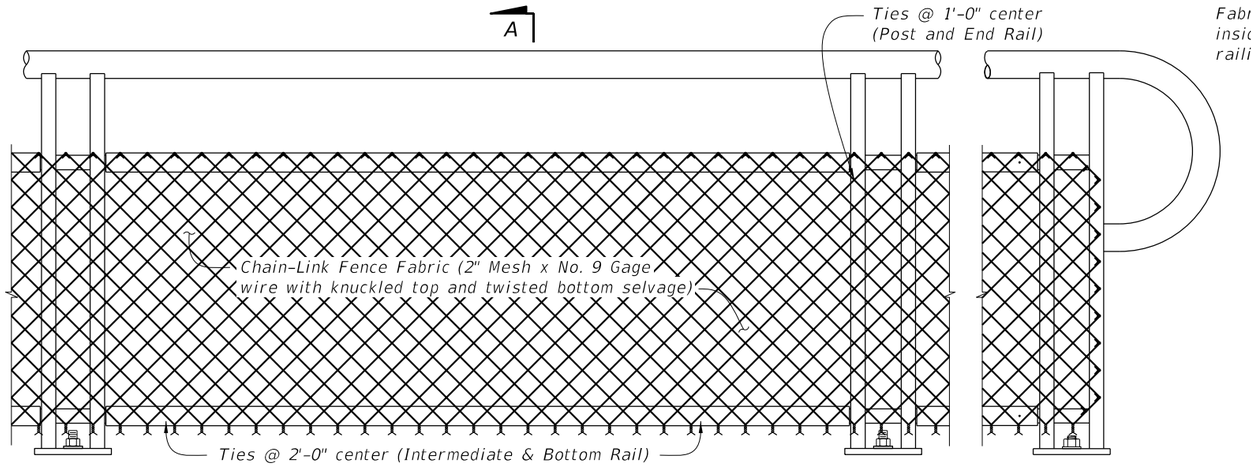
DETAIL "1A"
(Top of Picket Connection)



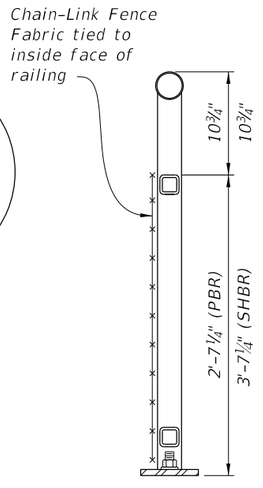
DETAIL "1B"
(Bottom of Picket Connection)

PICKET NOTES:

* Picket Spacing of 6½" centers is based on a ¾" NPS for standard applications. When shown in the Contract Plans a 4½" picket spacing may be required. If an alternate design is used, maintain a maximum clear opening of 5⅞" for standard installations and 3⅞" for special conditions.



TYPE 2 - CHAIN-LINK (Continuous Infill Panel)



SECTION A-A

TABLE 2 - CHAIN-LINK PANEL COMPONENT MATERIALS		
COMPONENT	ASTM	COMPONENT INFORMATION
Chain-Link Fence Fabric (2" mesh with twisted bottom and knuckled top selvage)	A 392	Zinc-Coated Steel – No. 9 gage (coated wire diameter), Class 2 Coating
	A 491	Aluminum-Coated Steel – No. 9 gage (coated wire diameter)
	F 668	Polyvinyl Chloride (PVC) Coated Steel – No. 9 gage Zinc-Coated Wire (metallic-coated core wire diameter) ~ See Plans for specified color of PVC.
Tie Wires	F 626	Zinc-Coated Steel Wire – No. 9 gage with coating to match Chain-Link Fence Fabric.
Tension Bars	F 626	3⁄16" (min. thickness) x ¾" (min. width) x 2'-3' (min. height) Steel Bars
Miscellaneous Fence Components	F 626	Zinc-Coated Steel

CHAIN-LINK PANEL NOTE:

Chain-Link Fence Fabric shall be continuous along limits of railing. Splicing of Chain-Link panels using Tension Bars at 20'-0" minimum increments is permitted.

NOTES:

1. See Plans for Infill Panel option required.

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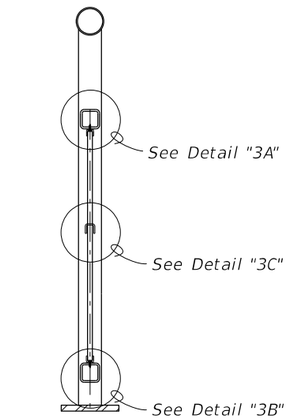
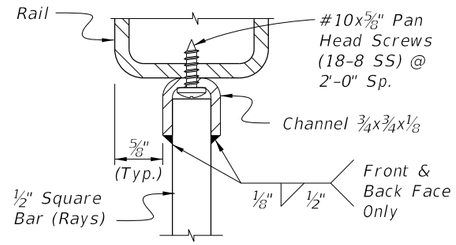
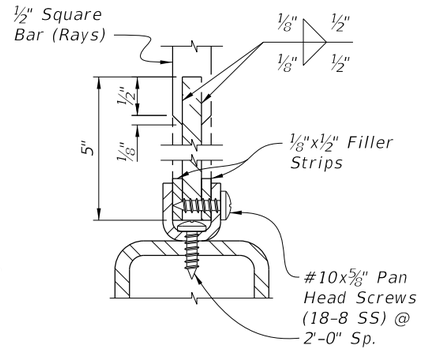
TYPE 3 - SUNSHINE INFILL PANEL



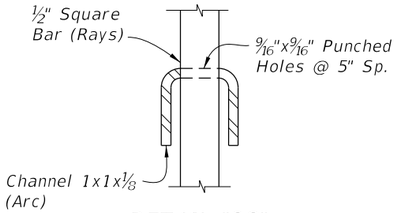
SECTION A-A



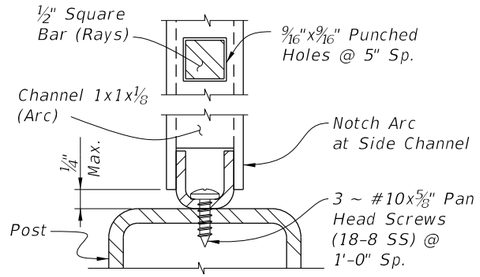
DETAIL "3A"
INTERMEDIATE RAIL/RAY CONNECTION



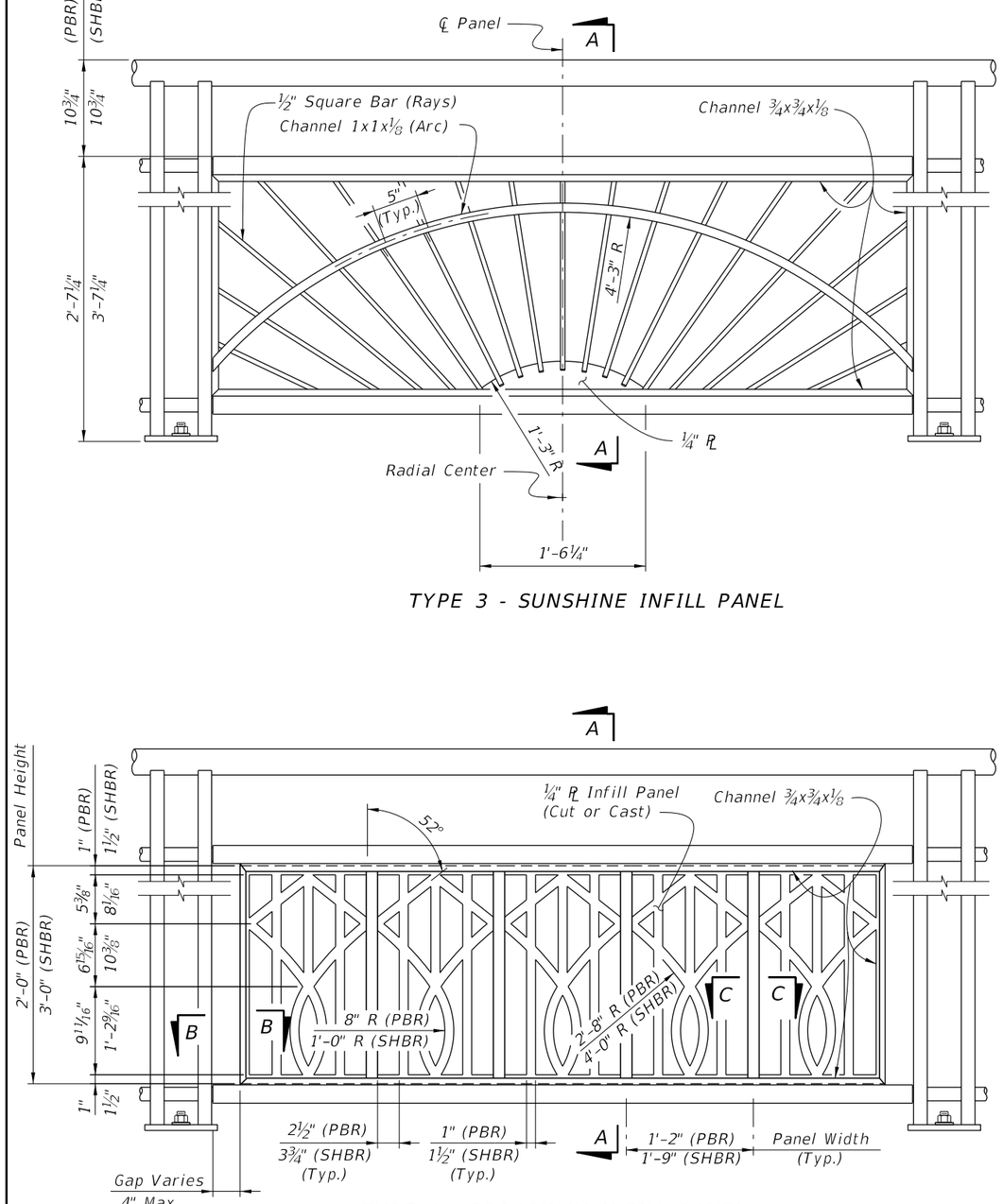
DETAIL "3B"
BOTTOM RAIL/RAY CONNECTION



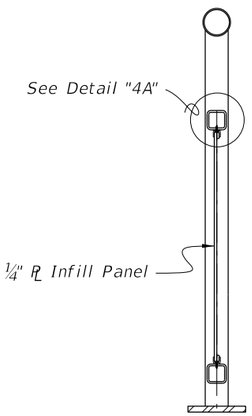
DETAIL "3C"
RAY/ARC CONNECTION



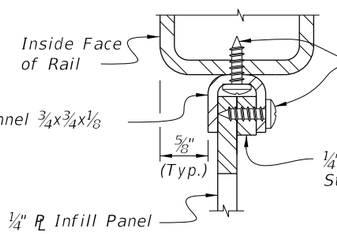
DETAIL "3D"
ARC/POST CONNECTION



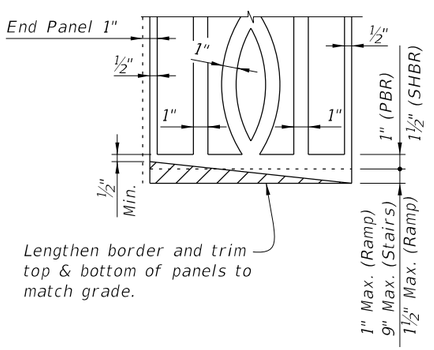
TYPE 4 - BROADWAY INFILL PANEL



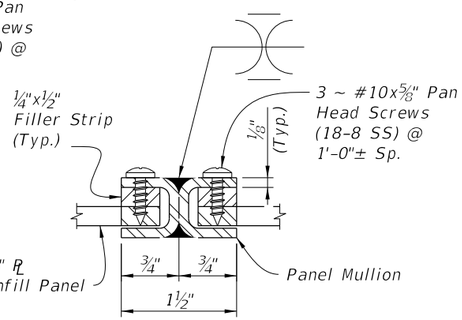
SECTION A-A



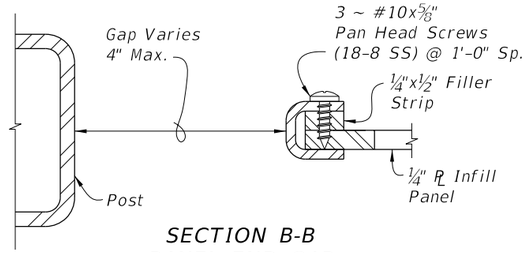
DETAIL "4A"
PANEL/RAIL CONNECTION
(Top Shown, Bottom Similar)



PANEL ADJUSTMENT FOR RAILINGS ON GRADES



SECTION C-C
PANEL/SPLICE CONNECTION



SECTION B-B
PANEL END CAP

NOTES:

1. See Plans for Infill Panel Option required.

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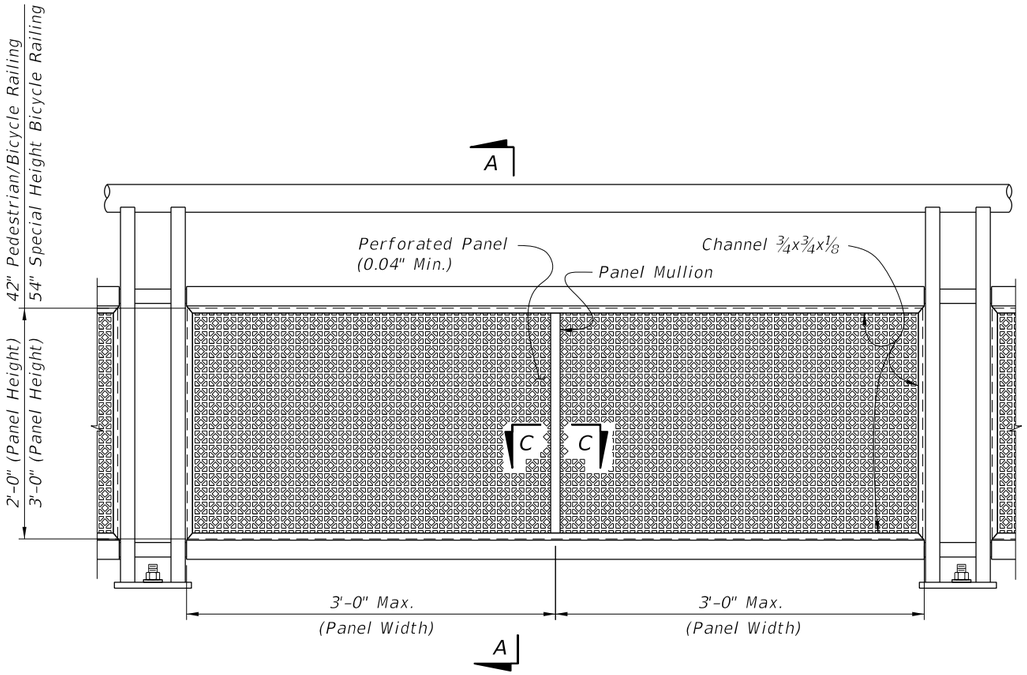
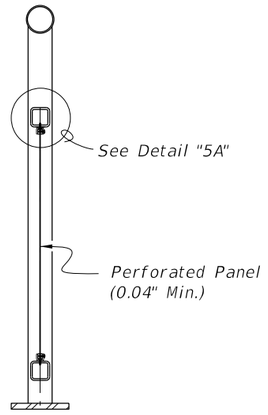
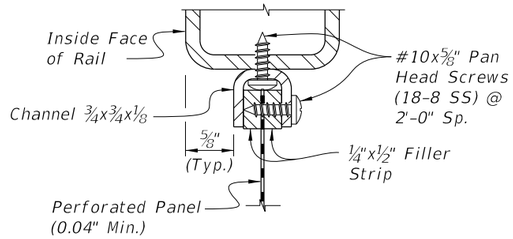


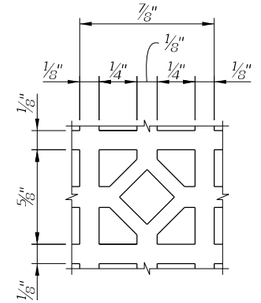
TYPE 5 - PERFORATED INFILL PANEL



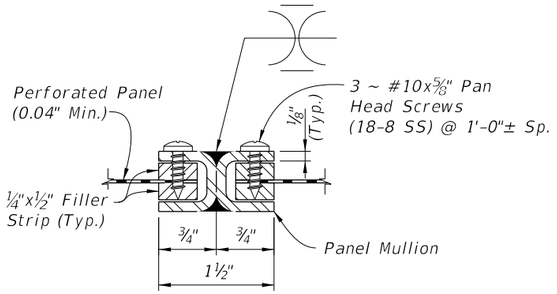
SECTION A-A



DETAIL "5A"
PANEL/RAIL CONNECTION
(Top Shown, Bottom & Sides Similar)



REPEATING PATTERN DETAIL
FOR PEFORATED PANEL



SECTION C-C
PANEL/SPLICE CONNECTION

NOTES:

1. See Plans for Infill Panel Type required.

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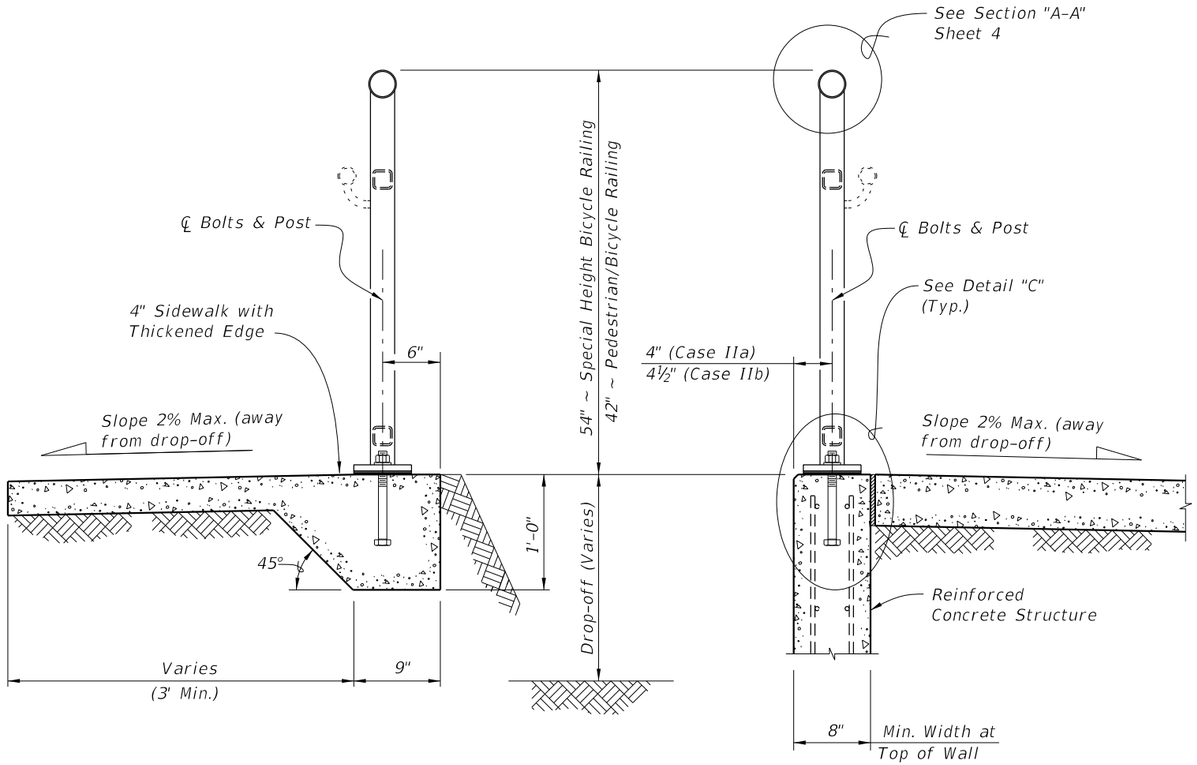
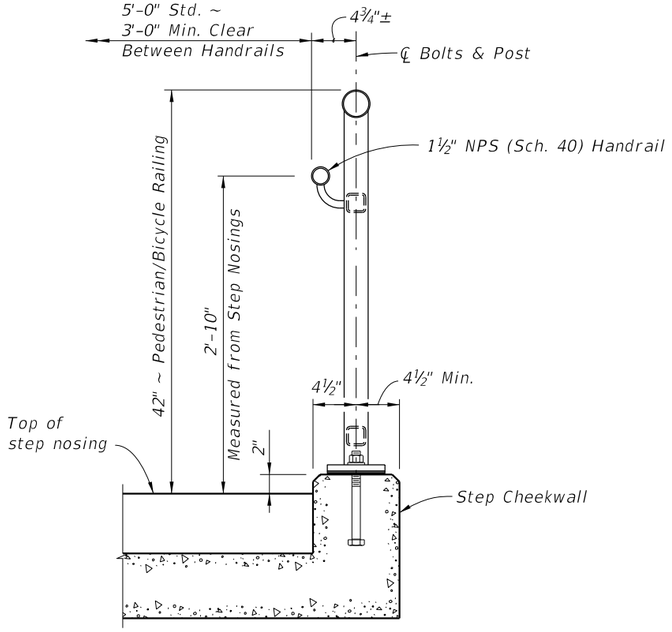
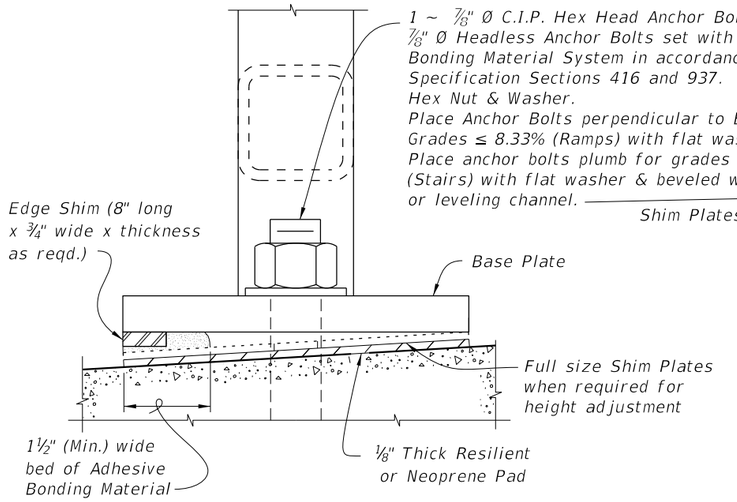


TYPICAL SECTION ON CONCRETE SIDEWALK
(Case I)

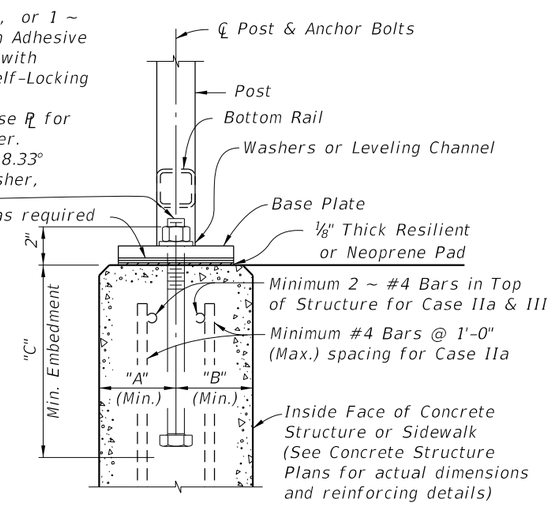
TYPICAL SECTION ON RETAINING WALL
(Case II)



TYPICAL SECTION ON STEPS & STAIRS
(Case III)



DETAIL "D" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION)
(Used in lieu of Beveled Shim Plates)



DETAIL "C"
(Cast-In-Place Anchor Bolts shown, Adhesive Anchors similar)

ANCHOR BOLT TABLE

CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10½"	11"	⅞" Ø
IIa	Reinforced Concrete	4"	4"	9"	10½"	11"	⅞" Ø
IIb	Gravity Wall Index No. 6011	4½"	3½" @ top	1'-0" *	1'-1½"	1'-2"	⅞" Ø
III	Step Cheekwall	4½"	4½"	9"	10½"	11"	⅞" Ø

* Embedment length "C" may be reduced to 9" for the 42" height railings for Case IIb, when the post spacing does not exceed 5'-0".

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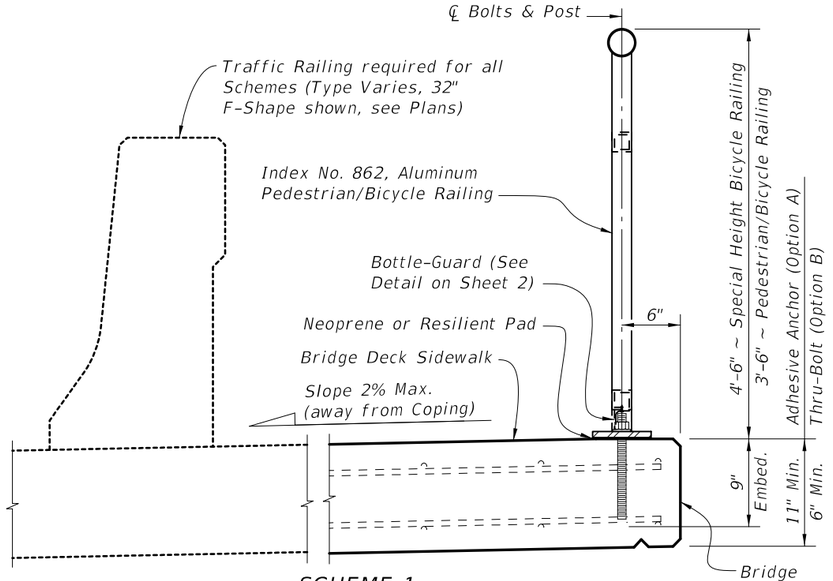
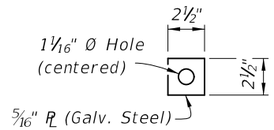
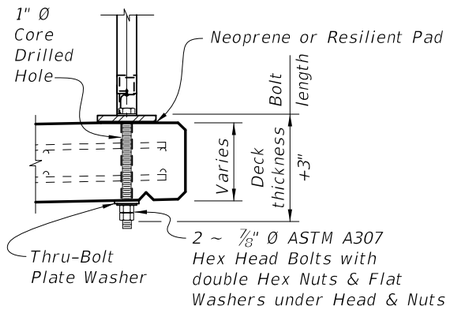


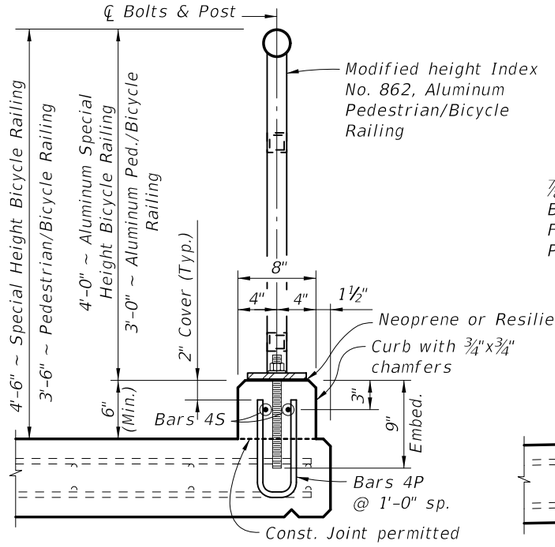
SCHEME 1 -
TYPICAL SECTION THROUGH DECK MOUNTED RAILING
(Adhesive Anchor Option shown - SCHEME 1A)



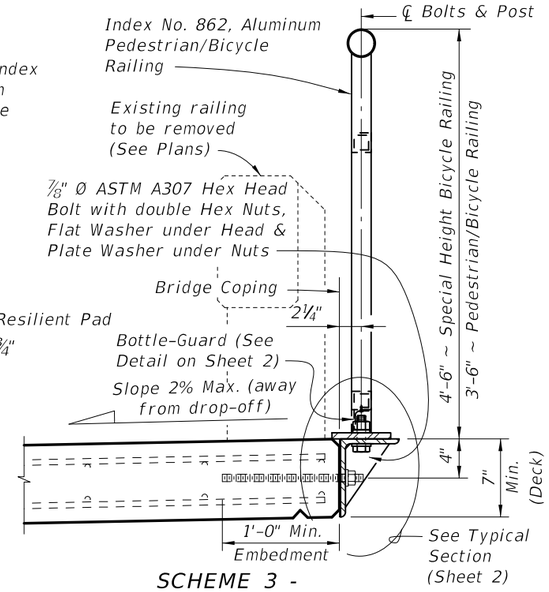
THRU-BOLT PLATE WASHER DETAIL



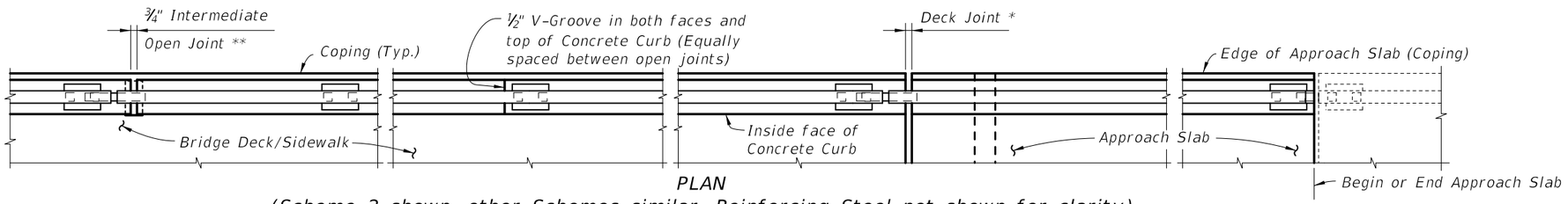
SCHEME 1B - DETAILS
(Thru-Bolt Option)



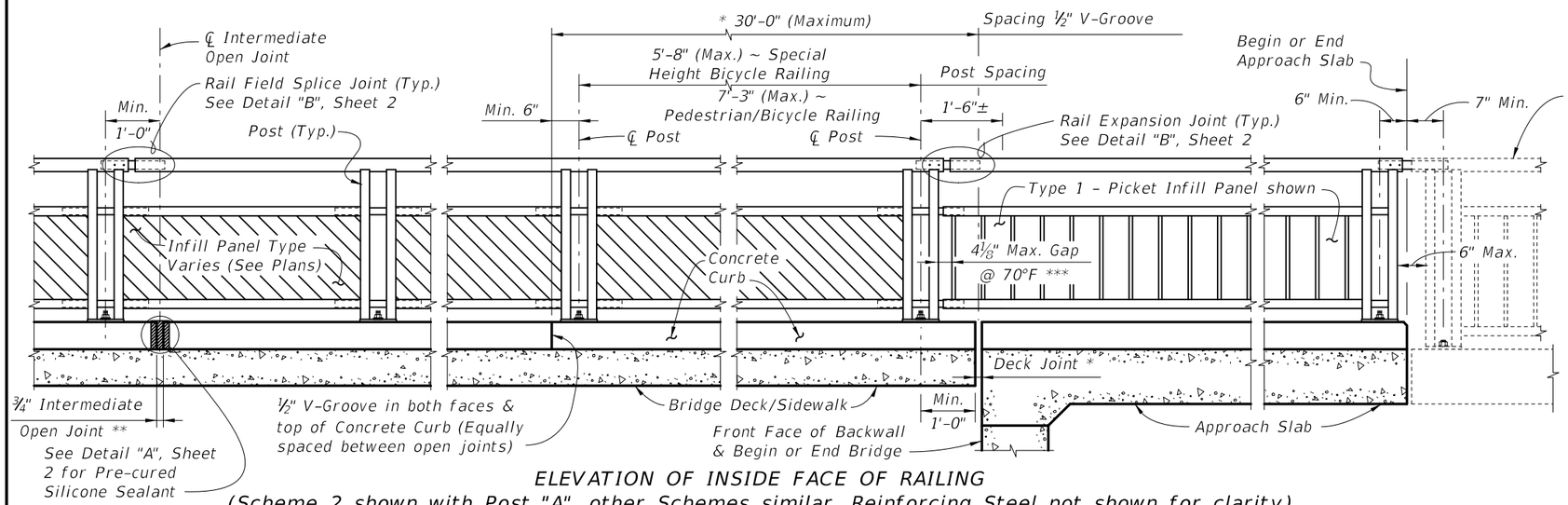
SCHEME 2 -
TYPICAL SECTION THROUGH
CURB MOUNTED RAILING



SCHEME 3 -
TYPICAL SECTION THROUGH
SIDE MOUNTED RAILING (RETROFIT)



PLAN
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)



ELEVATION OF INSIDE FACE OF RAILING
(Scheme 2 shown with Post "A", other Schemes similar, Reinforcing Steel not shown for clarity)

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Curb Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at ℄ Pier or Intermediate Bent similar.

** ¾" Intermediate Open Joints shall be provided at locations coinciding with ¾" Joints for the Traffic Railing.

*** Clear opening between adjacent pickets or panel at Rail Expansion Joints, above Deck Expansion Joints with a total thermal movement greater than 4", must be reduced to 3½".

REVISIONS

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BRIDGE PEDESTRIAN/BICYCLE RAILING (ALUMINUM)

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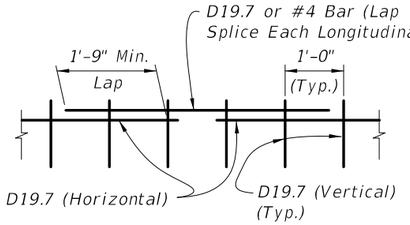
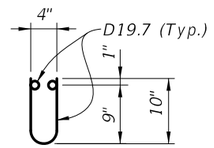
ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4¾" are not permitted.



SPLICE DETAIL
(Between WWR Sections)

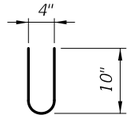


WELDED WIRE REINFORCEMENT (WWR)

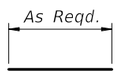
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Reqd.



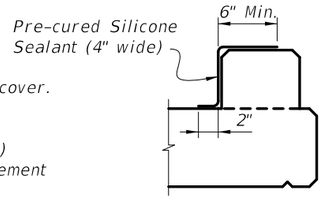
BAR 4P



BAR 4S

CURB REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
5. At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

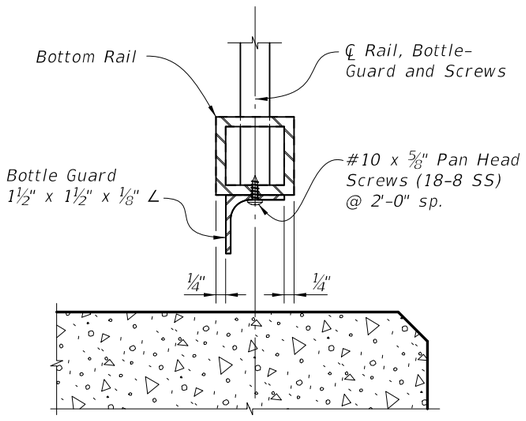
INTERMEDIATE JOINT SEAL NOTE:

At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.

ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)

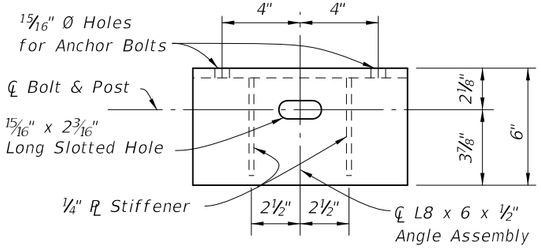
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01

SCHEME 2 - CONCRETE CURB DETAILS



TYPICAL SECTION THROUGH BOTTOM RAIL
(Post Not Shown for Clarity)

SCHEME 1 - BOTTLE GUARD DETAIL



PLAN VIEW

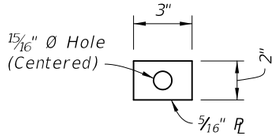
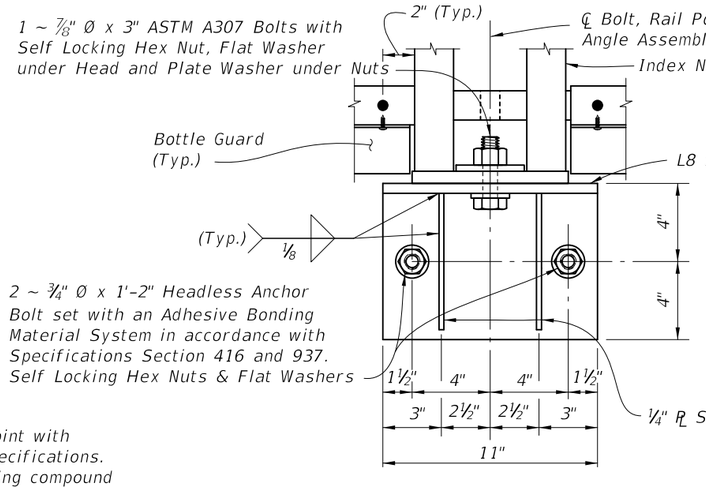
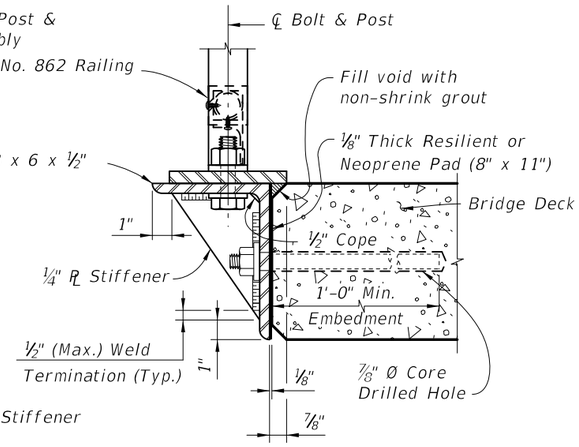


PLATE WASHER DETAIL

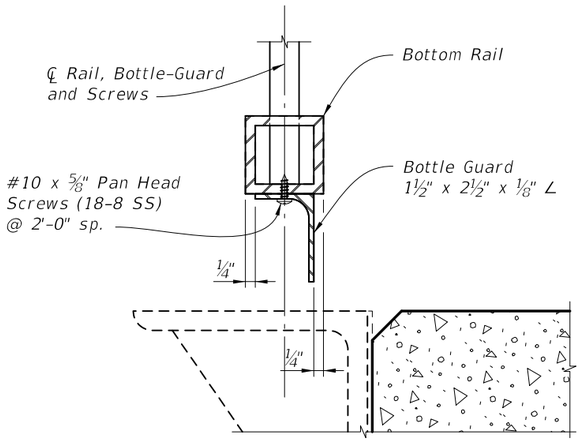


ELEVATION VIEW



TYPICAL SECTION

SCHEME 3 - SIDE-MOUNTED SUPPORT BRACKET DETAILS



TYPICAL SECTION THROUGH BOTTOM RAIL
(Post Not Shown for Clarity)

SCHEME 3 - BOTTLE GUARD DETAIL

CROSS REFERENCE:

See Sheet 3 for Bridge Railing Notes.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Added Bottle-Guard Details; Changed DETAIL "A", Scheme 3 – Support Bracket Detail and Index No. 860 to 862.			

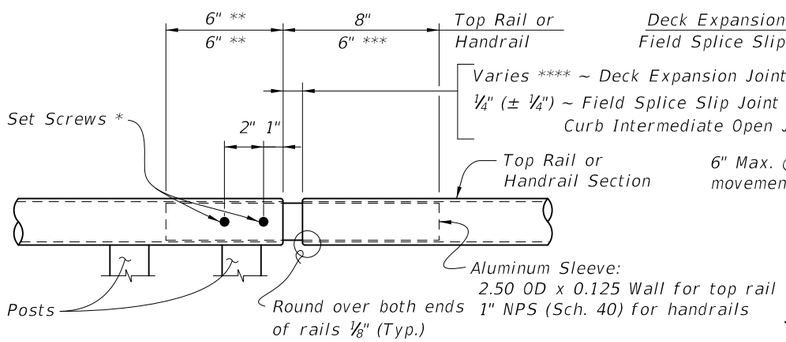
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

BRIDGE PEDESTRIAN/BICYCLE RAILING (ALUMINUM)

Interim Date 01/01/11

Index No. 861



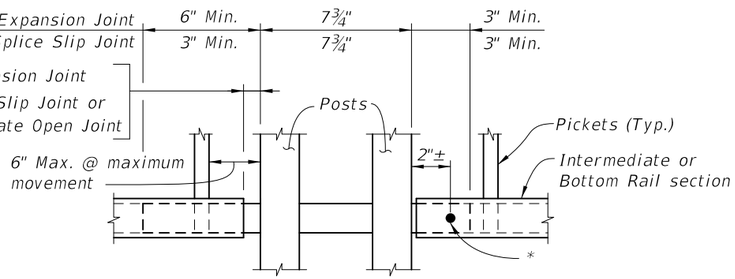
ROUND RAILS - TOP RAIL OR HANDRAIL

* ¼" Ø x ¾" Pan Head Aluminum (Alloy 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws along outside face of railing. Set screws must be set flush against the rail surface. A ¾" Ø plug weld may be substituted for the two set screws at expansion joints.

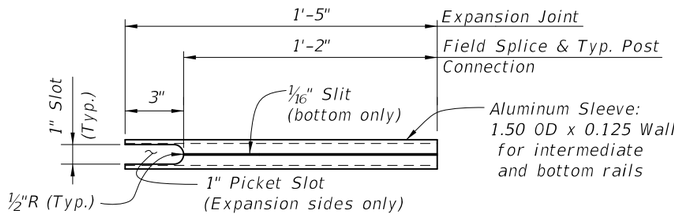
** Embedded length may be 4" for plug welded connection.

*** Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".

**** Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".



SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL



INTERMEDIATE OR BOTTOM RAIL - ALUMINUM SLEEVE DETAIL (Bottom Side Shown)

DETAIL "B" EXPANSION JOINT (FIELD SPLICE SIMILAR)

BRIDGE RAILING NOTES:

APPLICABILITY NOTE: Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

RAILING DETAILS: For Railing fabrication and installation details and notes see Index No. 862, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely, unless otherwise shown in the Contract Plans.

BOTTLE-GUARD (Schemes 1 & 3): L-Shape shall be in accordance with ASTM B209, Alloy 6063-T5 or 6061-T6.

CONCRETE CURB (Scheme 2): Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

SIDE-MOUNTED SUPPORT BRACKET (Scheme 3): L-Shape and Stiffener Plate shall be in accordance with ASTM B209, Alloy 6061-T6. Welding shall be in accordance with the American Society of Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER4043, ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required.

PAYMENT: Railing shall be paid per linear foot (Item No. 515-2-abb) for the aluminum railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, bottle-guards, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Sheet; Changed Expansion Joint Detail "B" to match Index No. 862.			

2010 Interim Design Standard

BRIDGE PEDESTRIAN/BICYCLE RAILING (ALUMINUM)

Interim Date 01/01/11

Sheet No. 3 of 3

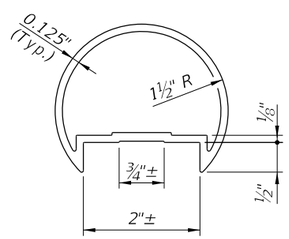
Index No. 861

3D VIEW OF RAILING WITH TYPE 1 - PICKET INFILL PANEL
(42" Height shown, 54" Height Similar)

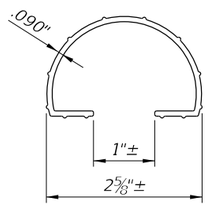
TABLE 1 - RAILING MEMBERS

MEMBER	ALLOY(1)	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	6061-T6	RT 2x2x.250	2.00" x 2.00"	0.250"
Top Rail	6061-T6	2½" NPS (Sch. 10)	2.875"	0.120"
		3" Round Top Cap Rail	3.000"	0.082"
End Hoops	6063-T5	2½" NPS (Sch. 10)	2.875"	0.120"
		3.00 OD x 0.125 Wall	3.000"	0.125"
Top Rail Joint/Splice Sleeves	6063-T5	2.50 OD x 0.125 Wall	2.500"	0.125"
		Top Cap Rail Inner Sleeve	2.800"	0.090"
Intermediate & Bottom Rail	6061-T6	RT 2x2x.250	2.00" x 2.00"	0.250"(2)
Int. & Bottom Rail Post Connection Sleeve	6063-T5	1.50 OD x 0.125 Wall	1.500"	0.125"
Handrail Joint/Splice Sleeves	6063-T5	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	6061-T6	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	6061-T6	¾" Ø Round Bar	0.750"	N/A
Pickets (Type 1 Infill Panel)	6061-T6	¾" Ø Round Bar	0.750"	N/A
Infill Panel Members (Types 2 – 5)	6063-T5	Varies (See Details)	Varies	Varies

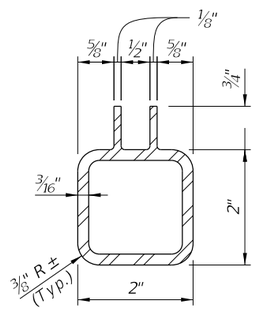
TABLE 1 NOTES:
(1) Alloy 6061-T6 or 6063-T52 & T6 may be substituted for Alloy 6063-T5.
(2) 0.188" wall thickness permitted for rails with post spacings less than 5'-9".



3" ROUND TOP CAP RAIL



TOP CAP RAIL INNER SPLICE SLEEVE



ALTERNATIVE BOTTOM & INTERMEDIATE RAIL SECTION FOR TYPE 3, 4 & 5 RAILINGS

ALTERNATE TOP RAIL SECTION

NOTES

DESIGN LOADS, GEOMETRY AND APPLICABILITY:
See the Instructions for Design Standards for the design loads, geometry and applicability requirements.

GENERAL:
Adequate foundation support shall be provided for anchorage and stability against overturning. See Index No. 861 for special requirements and modifications for use on bridges. The railing shown on these drawings requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA).

RAILS, PANELS AND POSTS:
Structural Extrusions, Tube, Pipe and Bar shall be in accordance with Table 1 and ASTM B221 or ASTM B429. Top, bottom and intermediate rail corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Perforated panels (Type 5) shall be Alloy 3003-H14. Posts shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets and vertical panel elements shall be fabricated parallel to the posts, except that Type 2, 3 & 5 panel infills may be fabricated parallel to the longitudinal grade. Corners and changes in tangential longitudinal alignment shall be made continuous with a 9" bend radius or terminate at adjoining sections with mitered end sections when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

BASE PLATES AND RAIL CAPS:
Base Plates and Post Cap plates shall be in accordance with ASTM B209, Alloy 6061-T6.

SHIM PLATES:
Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

ANCHOR BOLTS:
Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. Expansion Anchors are not permitted. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only), shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RESILIENT AND NEOPRENE PADS:
Resilient and Neoprene pads shall be in accordance with Specification Section 932 except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 to 80.

JOINTS:
All welded joints are to be ground smooth. Expansion joints shall be spaced at a maximum 35'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate handling, but top rail must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the top rail continuous for unforeseen field adjustments.

WELDING:
All welding shall be in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required. Filler metal for plug welds and bend splices may be ER4043.

COATINGS:
The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

SHOP DRAWINGS:
Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, post and panel type, anchor bolt installation "Case" or lengths, must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

PAYMENT:
Railing shall be paid for per linear foot (Item No. 515-2-abb). Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, panels, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.

REVISIONS

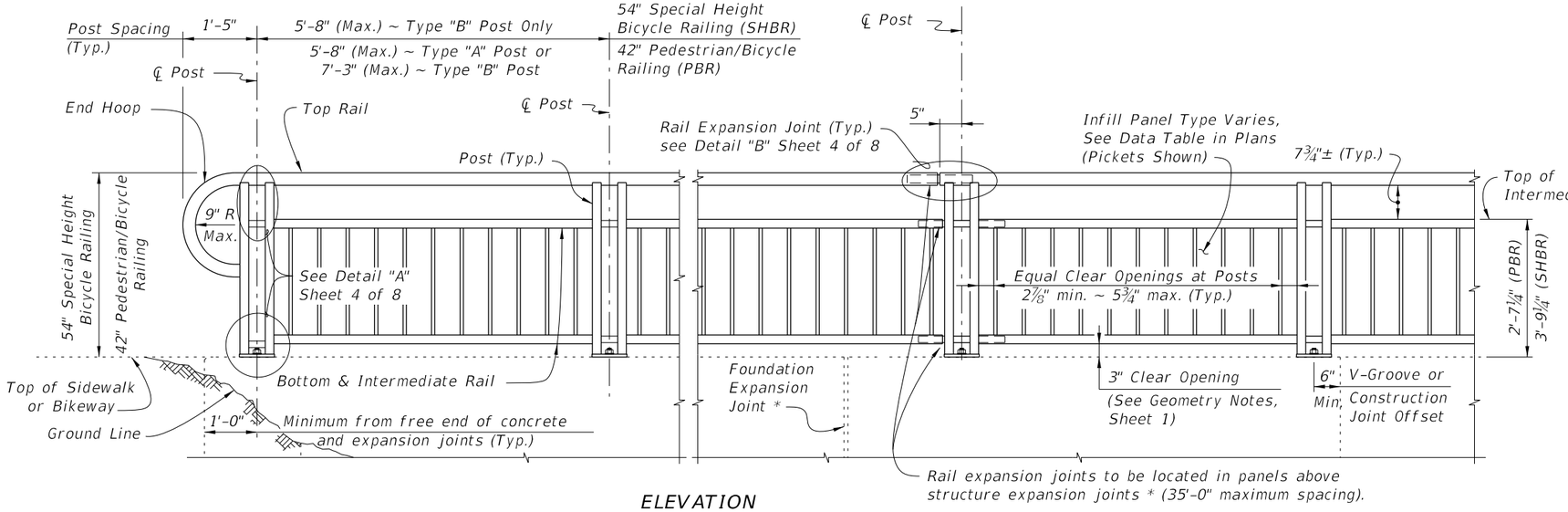
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Design Standard			

2010 Interim Design Standard

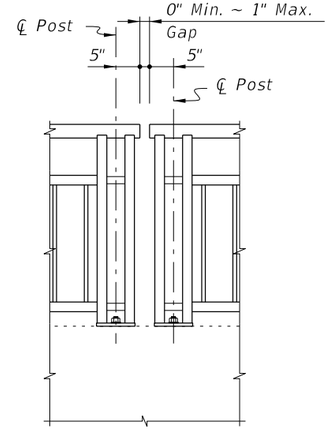
ALUMINUM PEDESTRIAN/BICYCLE RAILING

Interim Date 01/01/11

Index No. 862



ELEVATION
(Showing Outside Face of Railing with Type "A" Posts)



Note: Non-continuous corners are permitted when handrails are not required.

EXPANDED ELEVATION AT CORNERS

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

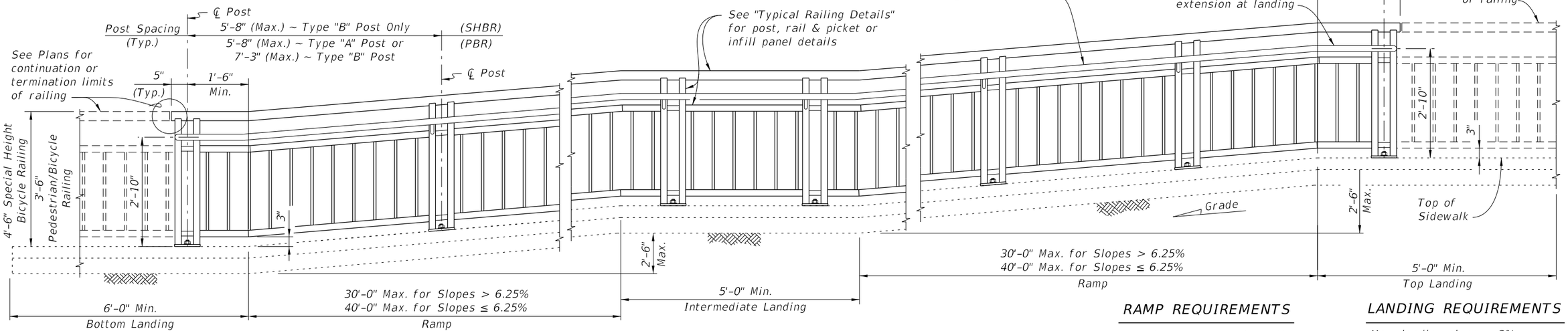
(Type 1 - Picket Railing Shown, Other Types Similar)

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:
* Keyed construction joints in Index No. 6011 Gravity Wall are not considered to be expansion joints.

NPS = Nominal Pipe Size

CROSS REFERENCE:
For Details "C", "D" and "E", see Sheet 4 of 8.



ELEVATION
(Showing Inside Face of Railing with Type "A" Posts)

RAMP REQUIREMENTS

For slopes greater than 5%:
Max. ramp slope = 8.33%
Max. ramp cross-slope = 2.0%

LANDING REQUIREMENTS

Max. landing slope = 2%
Max. landing cross-slope = 2%

RAILINGS ON GRADES STEEPER THAN 5%

(Type 1 - Picket Railing Shown, Other Types Similar)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Design Standard			

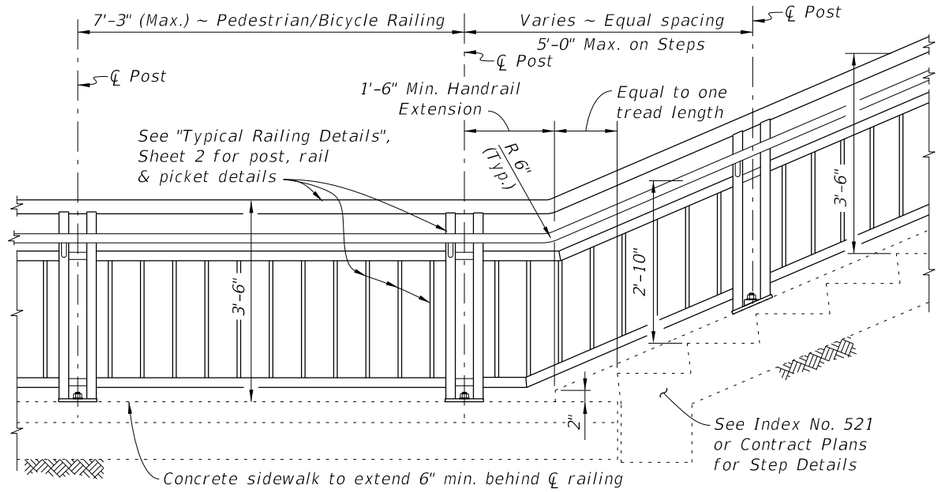
2010 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE RAILING

Interim Date 01/01/11

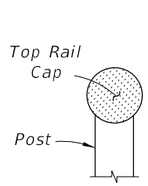
Sheet No. 2 of 8

Index No. 862

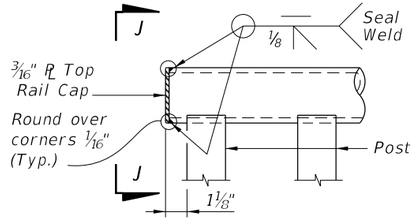


RAILING CONTINUATION BEYOND STEPS OR STAIRS
(Bottom shown, Top similar)

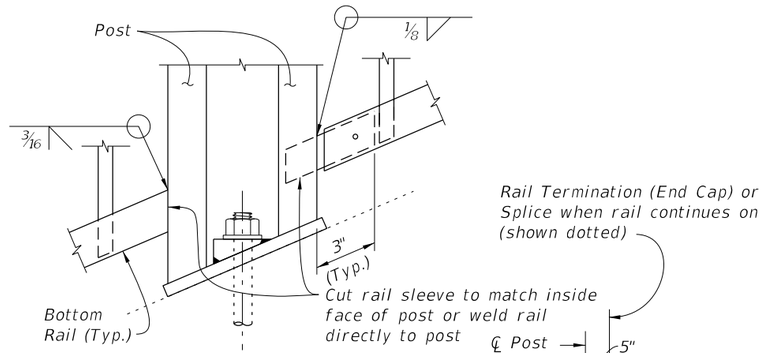
DETAIL "L" - PLAN VIEW
HANDRAIL TERMINATION



VIEW J-J

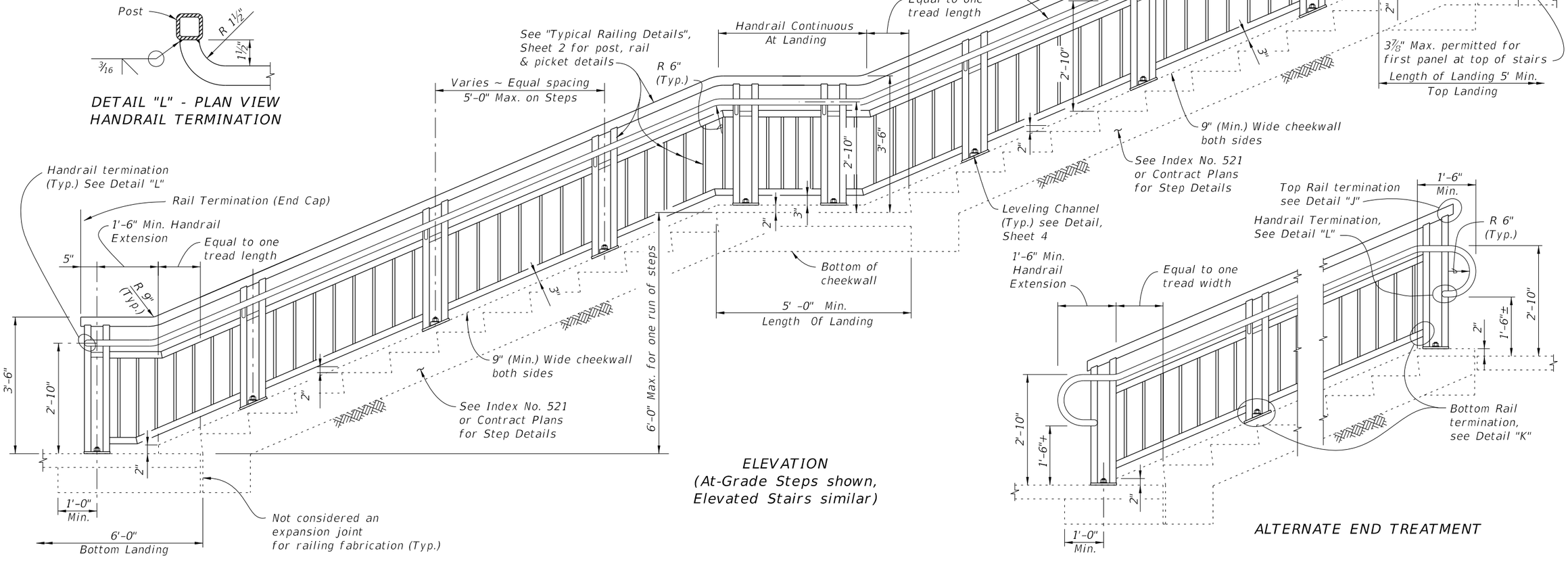


DETAIL "J" - ELEVATION VIEW
TOP RAIL TERMINATION



DETAIL "K" - ELEVATION VIEW
BOTTOM RAIL CONNECTION

RAIL TERMINATION DETAILS



ELEVATION
(At-Grade Steps shown,
Elevated Stairs similar)

ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Design Standard			

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ALUMINUM PEDESTRIAN/BICYCLE RAILING

Interim Date 01/01/11

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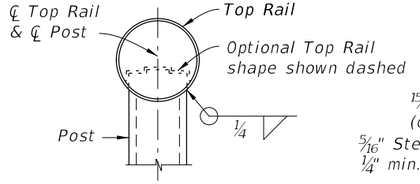


SECTION A-A
(Top Rail Connection)

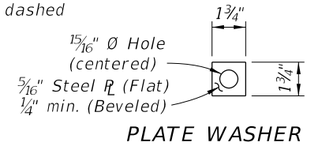
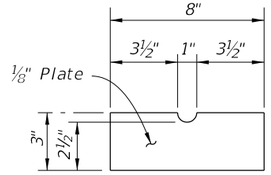
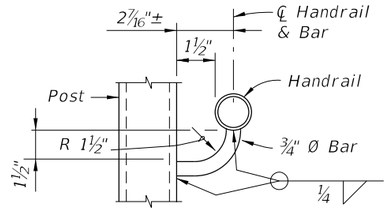


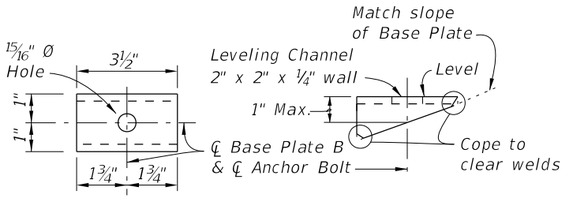
PLATE WASHER
DETAIL



SHIM PLATE DETAIL

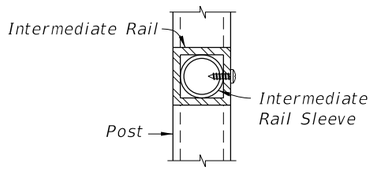


SECTION B-B
(Handrail Connection)

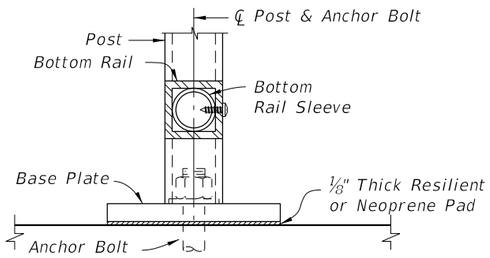


TOP VIEW SIDE VIEW

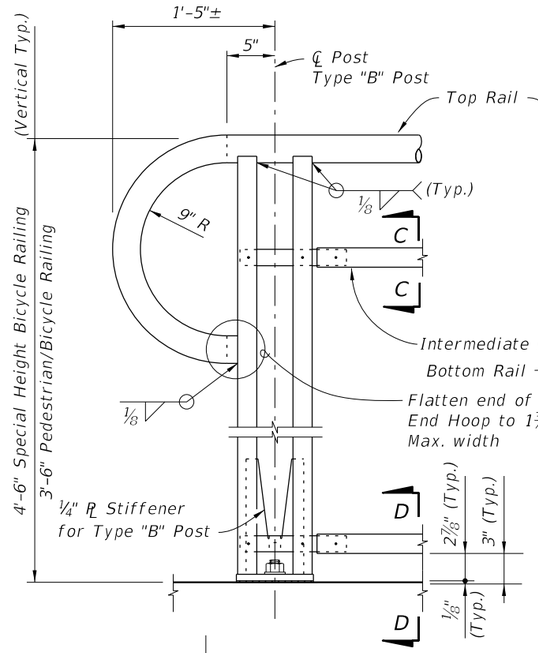
LEVELING CHANNEL DETAIL

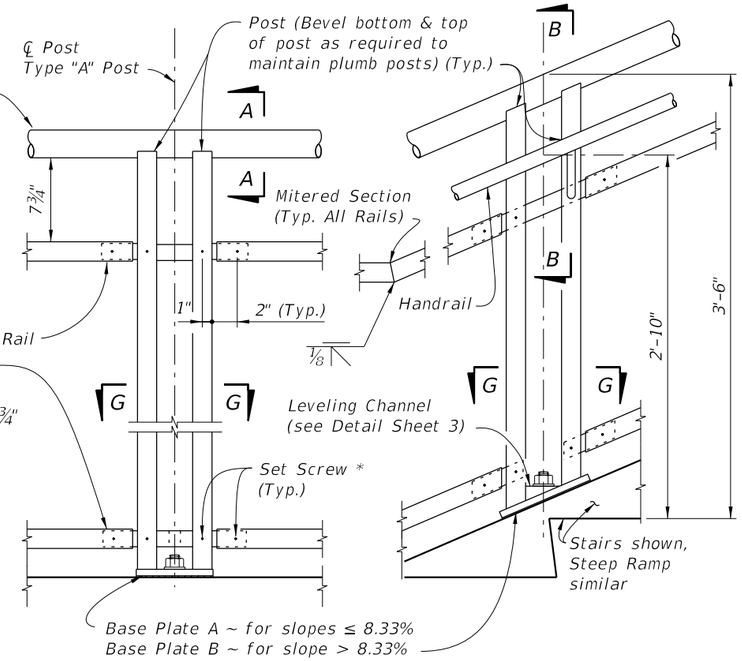


SECTION C-C
(Intermediate Rail Connection)

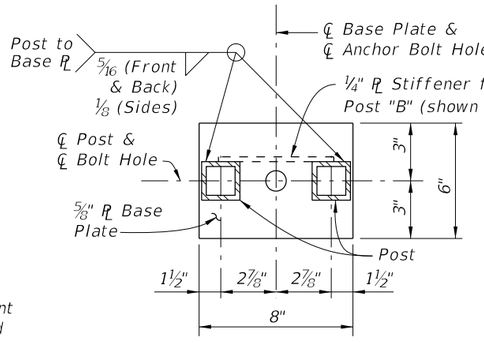


SECTION D-D
(Bottom Rail Connection)

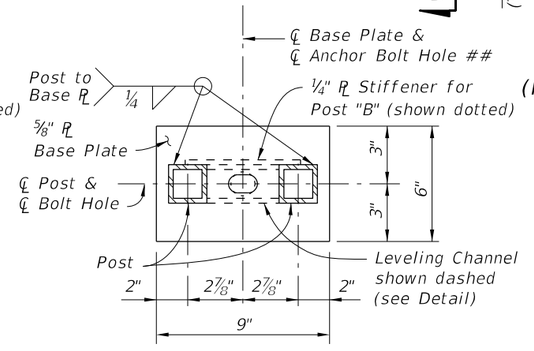




DETAIL "A" - RAIL CONNECTIONS
(Pickets/Panels Not Shown for Clarity)

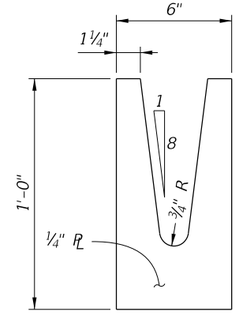


BASE PLATE A



BASE PLATE B

SECTION G-G - BASE PLATE DETAILS



POST "B" STIFFENER
DETAIL

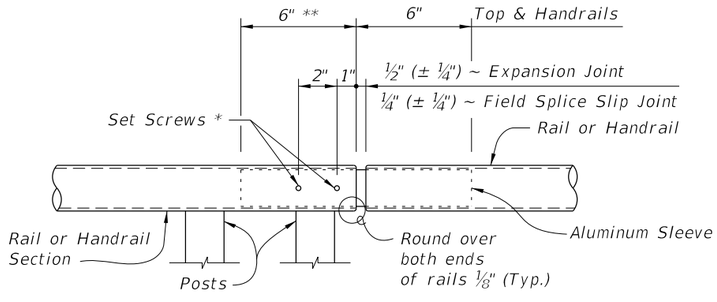
NOTES:

\# Base Plate A (Ramps – Bolts normal) use 1 1⁄16" Ø Holes for Anchor Bolts with Flat Washers for slopes ≤ 8.33%.

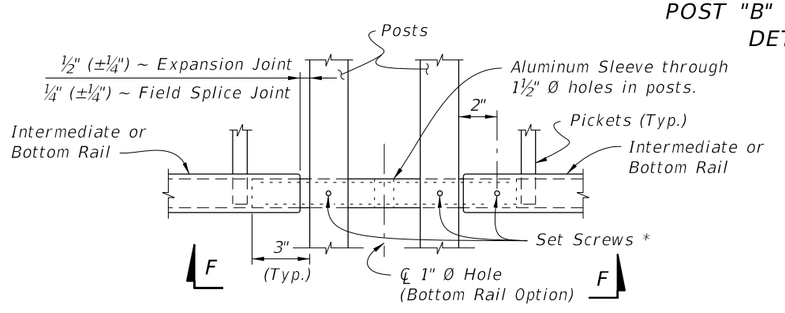
Base Plate B (Stairs – Bolts plumb) use 1¼" Ø Holes for Anchor Bolts with Beveled Plate and Washers for slopes > 8.33% to ≤ 15%; use 15⁄16" x 1½" Slotted Holes with Leveling Channel for slopes > 15%.

* ¼" Ø x ¾" Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws. Screws must be set flush against the outside face of rails & posts and underside of handrails. A single ¾" Ø plug weld may be substituted for the Set Screws.

** Embedded length may be 4" for plug welded connection.

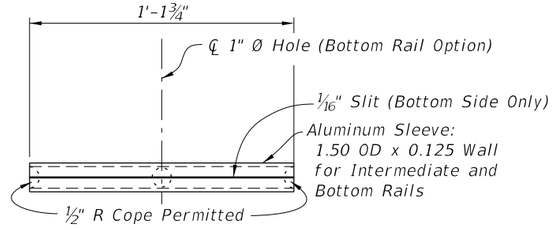


ROUND RAILS - TOP RAIL OR HANDRAIL
(Top Rail at Expansion Joint Shown)



SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL
(Bottom Rail Shown at Expansion Joint Shown)

DETAIL "B" - EXPANSION JOINT (FIELD SPLICE SLIP JOINT SIMILAR)



VIEW F-F
INTERMEDIATE OR BOTTOM RAIL -
ALUMINUM SLEEVE DETAIL (Bottom Side Shown)

CROSS REFERENCE:

For location of Details "B", See Sheet 2.

REVISIONS					
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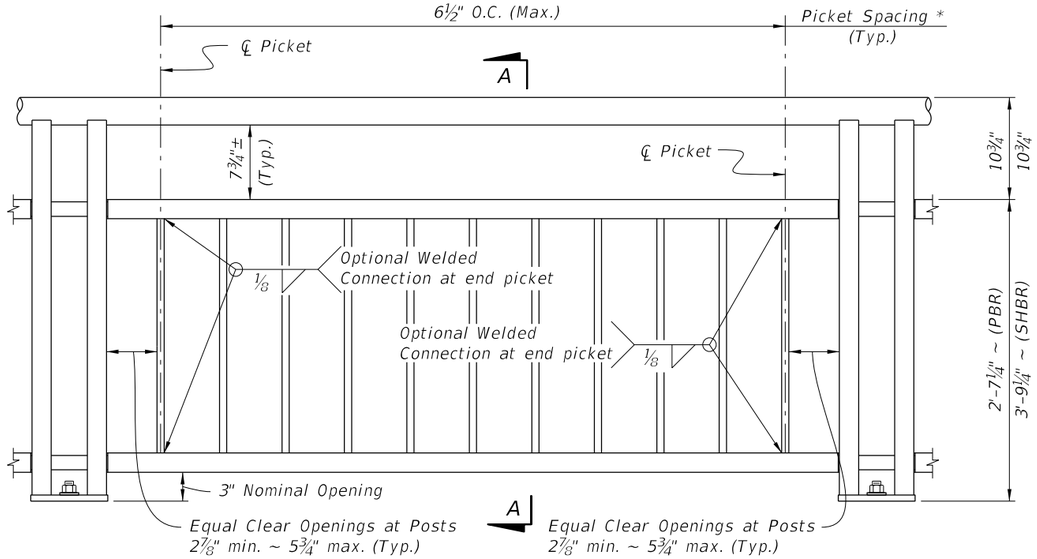
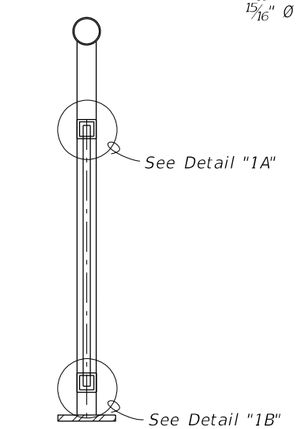
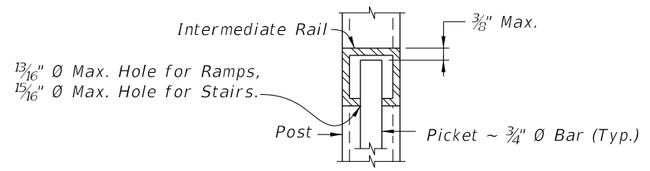


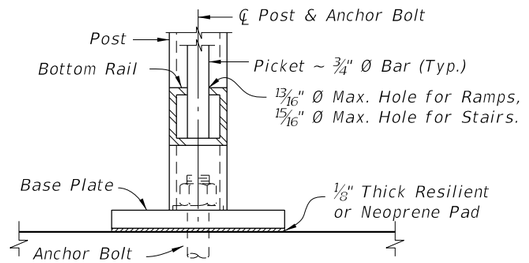
TYPE 1 - PICKET INFILL PANEL



SECTION A-A



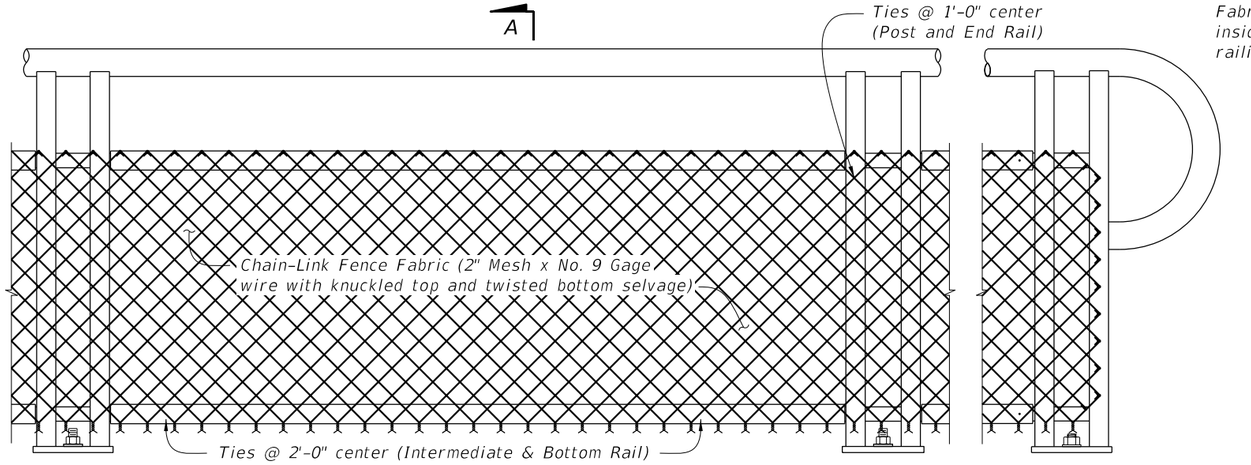
DETAIL "1A"
(Top of Picket Connection)



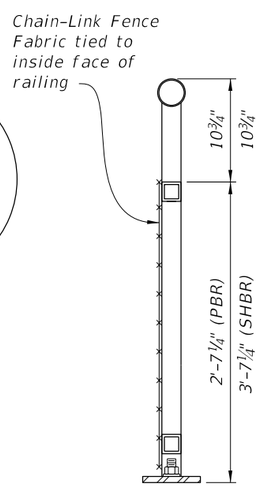
DETAIL "1B"
(Bottom of Picket Connection)

PICKET NOTES:

* Picket Spacing of 6½" centers is based on a ¾" NPS for standard applications. When shown in the Contract Plans a 4½" picket spacing may be required. If an alternate design is used, maintain a maximum clear opening of 5⅞" for standard installations and 3⅞" for special conditions.



TYPE 2 - CHAIN-LINK (Continuous Infill Panel)



SECTION A-A

TABLE 2 - CHAIN-LINK PANEL COMPONENT MATERIALS		
COMPONENT	ASTM	COMPONENT INFORMATION
Chain-Link Fence Fabric (2" mesh with twisted bottom and knuckled top selvage)	A 392	Zinc-Coated Steel – No. 9 gage (coated wire diameter), Class 2 Coating
	A 491	Aluminum-Coated Steel – No. 9 gage (coated wire diameter)
	F 668	Polyvinyl Chloride (PVC) Coated Steel – No. 9 gage Zinc-Coated Wire (metallic-coated core wire diameter) ~ See Plans for specified color of PVC.
Tie Wires	F 626	Zinc-Coated Steel Wire – No. 9 gage with coating to match Chain-Link Fence Fabric.
Tension Bars	F 626	3⁄16" (min. thickness) x ¾" (min. width) x 2'-3' (min. height) Steel Bars
Miscellaneous Fence Components	F 626	Zinc-Coated Steel

CHAIN-LINK PANEL NOTE:

Chain-Link Fence Fabric shall be continuous along limits of railing. Splicing of Chain-Link panels using Tension Bars at 20'-0" minimum increments is permitted.

NOTES:

1. See Plans for Infill Panel option required.

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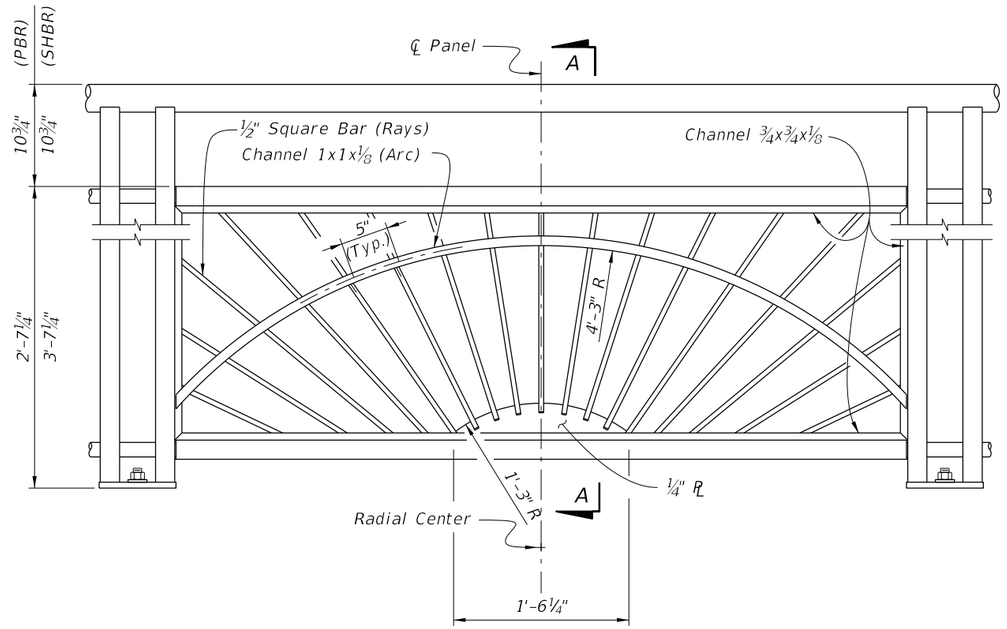
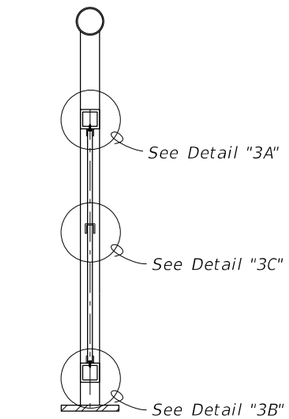
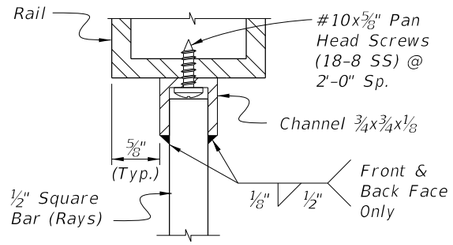


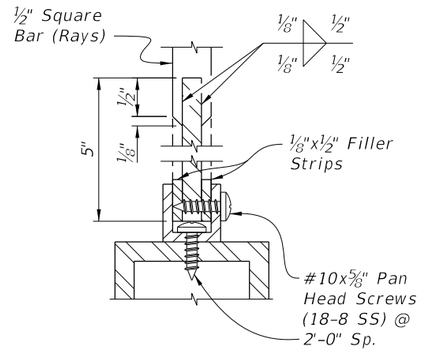
TYPE 3 - SUNSHINE INFILL PANEL



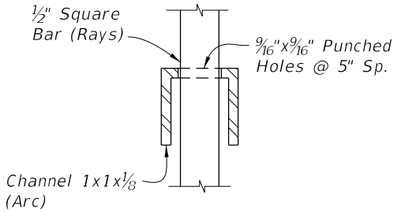
SECTION A-A



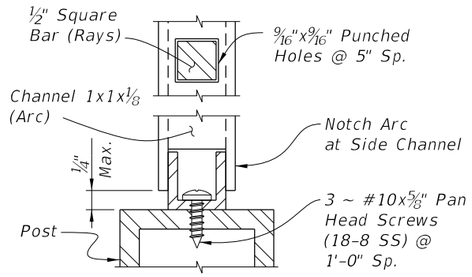
DETAIL "3A"
INTERMEDIATE RAIL/RAY CONNECTION



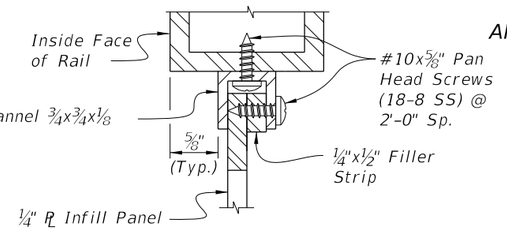
DETAIL "3B"
BOTTOM RAIL/RAY CONNECTION



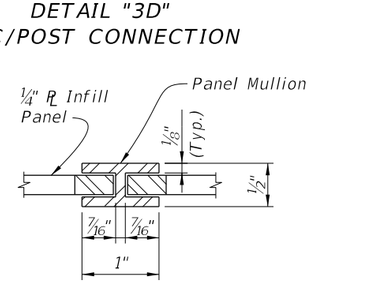
DETAIL "3C"
RAY/ARC CONNECTION



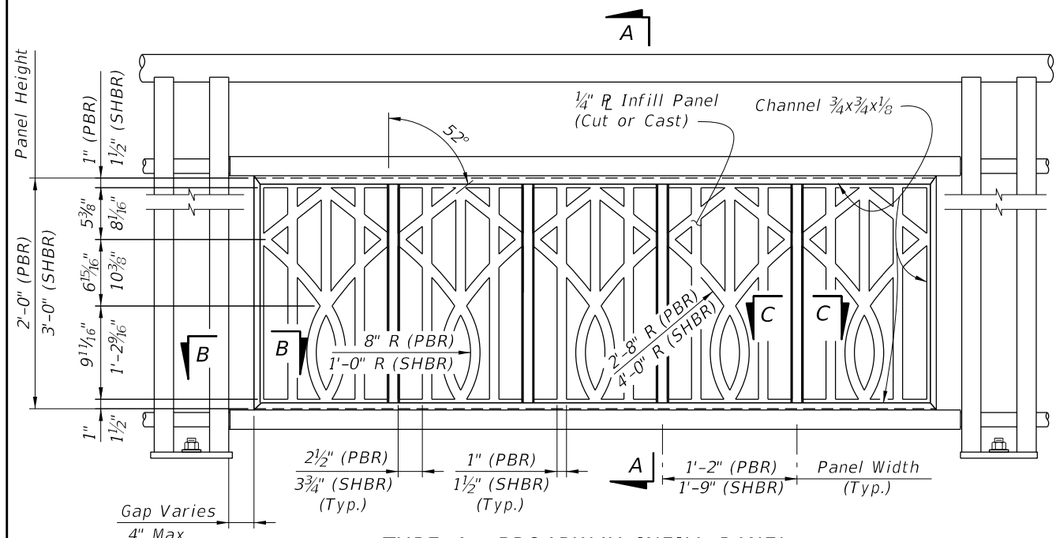
DETAIL "3D"
ARC/POST CONNECTION



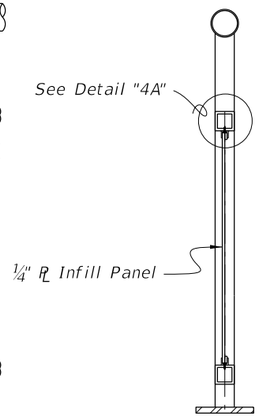
DETAIL "4A"
PANEL/RAIL CONNECTION
(Top Shown, Bottom Similar)



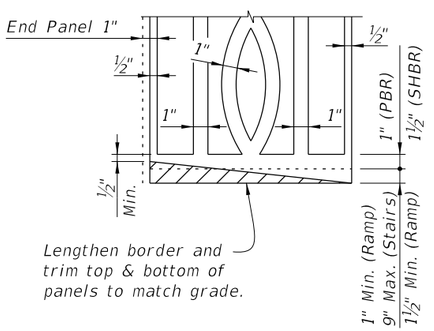
SECTION C-C
PANEL/SPLICE CONNECTION



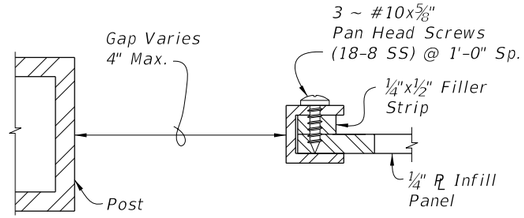
TYPE 4 - BROADWAY INFILL PANEL



SECTION A-A



PANEL ADJUSTMENT FOR RAILINGS ON GRADES



SECTION B-B
PANEL END CAP

NOTES:

1. See Plans for Infill Panel Option required.

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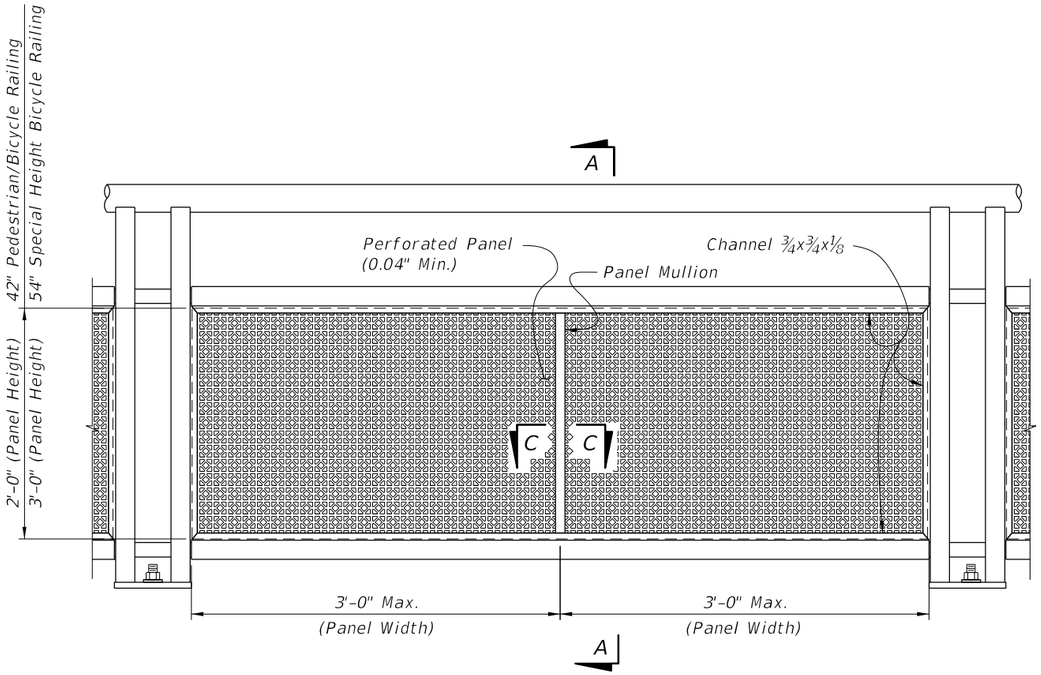
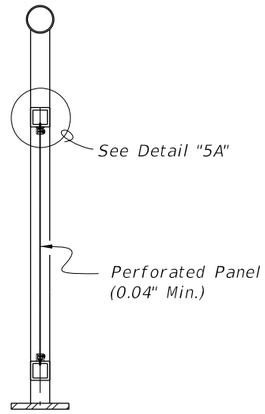
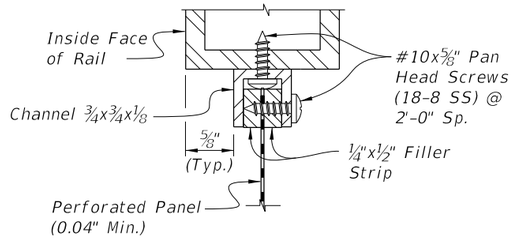


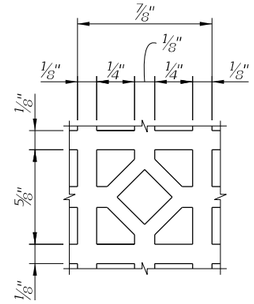
TYPE 5 - PERFORATED INFILL PANEL



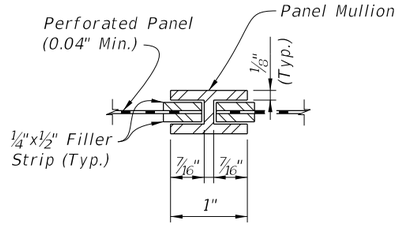
SECTION A-A



DETAIL "5A"
PANEL/RAIL CONNECTION
(Top Shown, Bottom & Sides Similar)



REPEATING PATTERN DETAIL
FOR PEFORATED PANEL



SECTION C-C
PANEL/SPLICE CONNECTION

NOTES:

1. See Plans for Infill Panel Type required.

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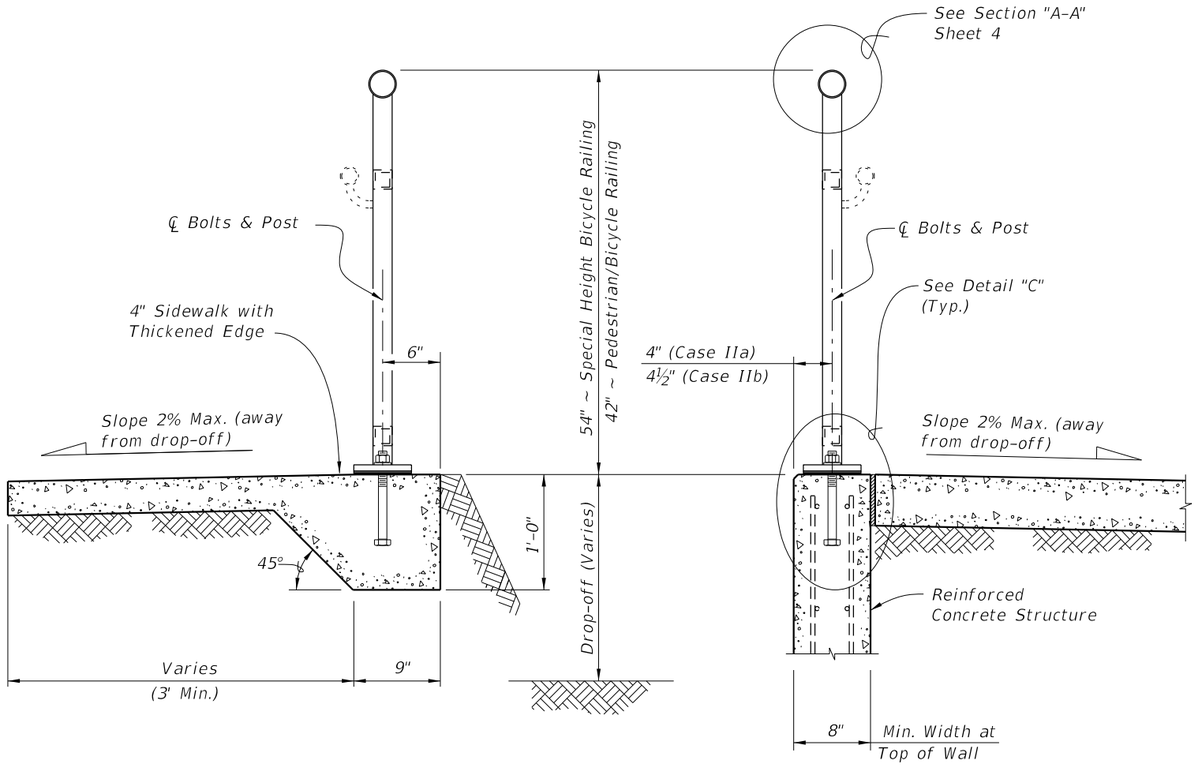
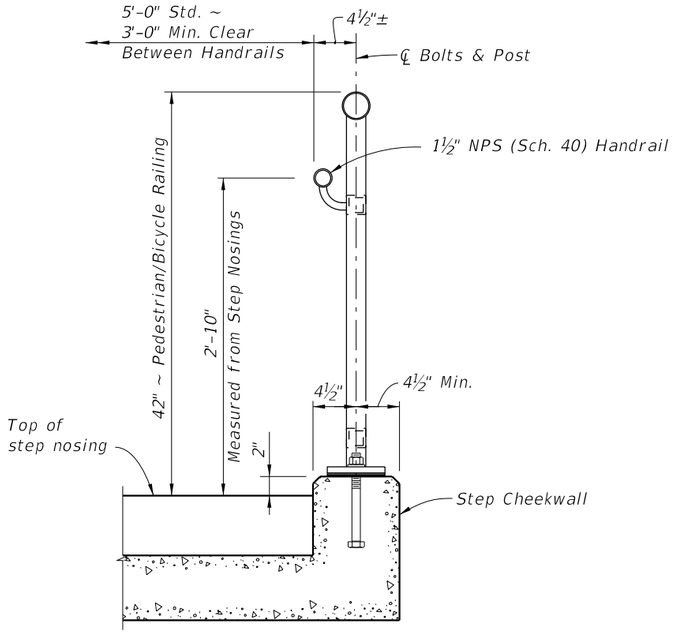
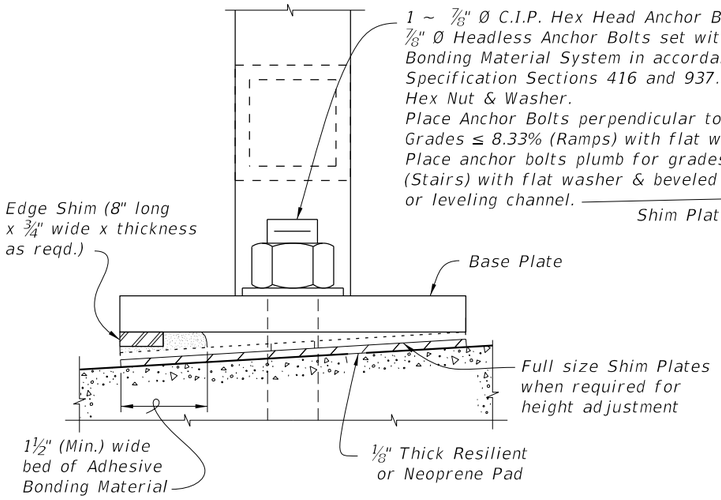


TYPICAL SECTION ON CONCRETE SIDEWALK
(Case I)

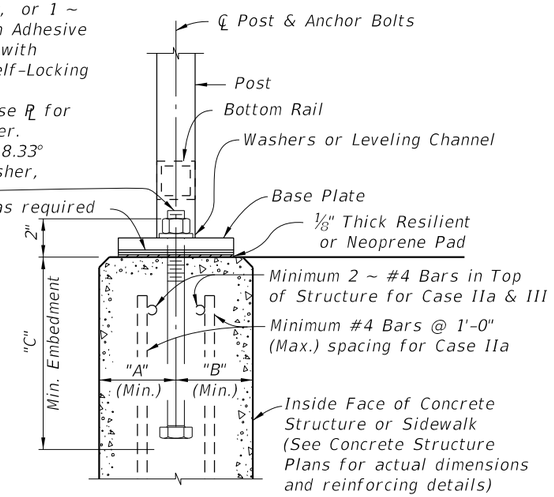
TYPICAL SECTION ON RETAINING WALL
(Case II)



TYPICAL SECTION ON STEPS & STAIRS
(Case III)



DETAIL "D" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION)
(Used in lieu of Beveled Shim Plates)



DETAIL "C"
(Cast-In-Place Anchor Bolts shown, Adhesive Anchors similar)

ANCHOR BOLT TABLE

CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10½"	11"	⅞" Ø
IIa	Reinforced Concrete	4"	4"	9"	10½"	11"	⅞" Ø
IIb	Gravity Wall Index No. 6011	4½"	3½" @ top	1'-0" *	1'-1½"	1'-2"	⅞" Ø
III	Step Cheekwall	4½"	4½"	9"	10½"	11"	⅞" Ø

* Embedment length "C" may be reduced to 9" for the 42" height railings for Case IIb, when the post spacing does not exceed 5'-0".

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01/01/11	SJN	New Design Standard			

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NOTES

ALTERNATE DESIGN:

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1½" at midspan of the top rail. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1½" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

PIPE RAILING & POSTS:

Structural Tube, Pipe and Bar shall be in accordance with ASTM B221 or ASTM B429, Alloy 6061-T6. End Rail 90° bends and corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE

MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1½" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

BASE PLATES:

Base Plates shall be in accordance with ASTM B209, Alloy 6061-T6.

SHIM PLATES:

Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". Field trim shim plates when necessary to match the contours of the foundation. Bevelled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

COATINGS:

The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

ANCHOR BOLTS:

Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only), shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RESILIENT AND NEOPRENE PADS:

Resilient and Neoprene pads shall be in accordance with Specification Section 932, except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

JOINTS:

All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

WELDING:

All welding shall be in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required.

SHOP DRAWINGS:

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

PAYMENT:

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Aluminum), LF (Item No. 515-1-2). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Deleted Design Criteria Notes.			
01/01/11	SJN	Deleted APPLICABILITY NOTE TO DESIGNER.			

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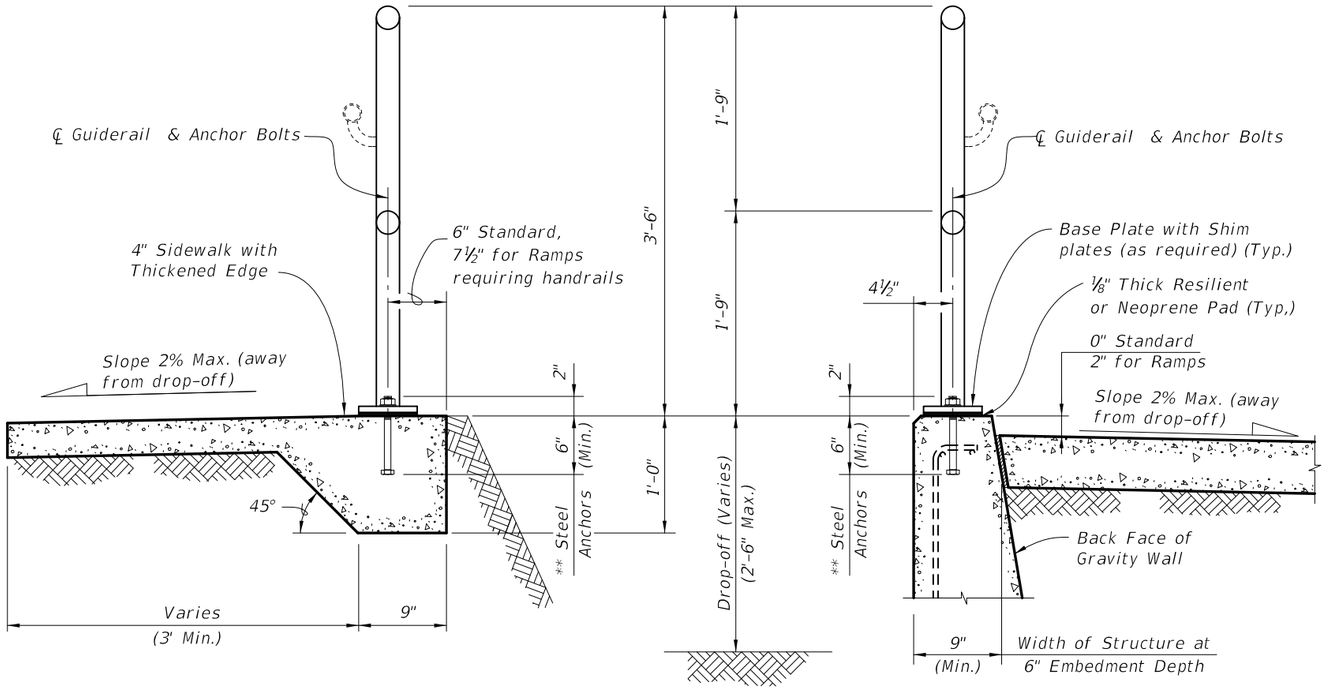
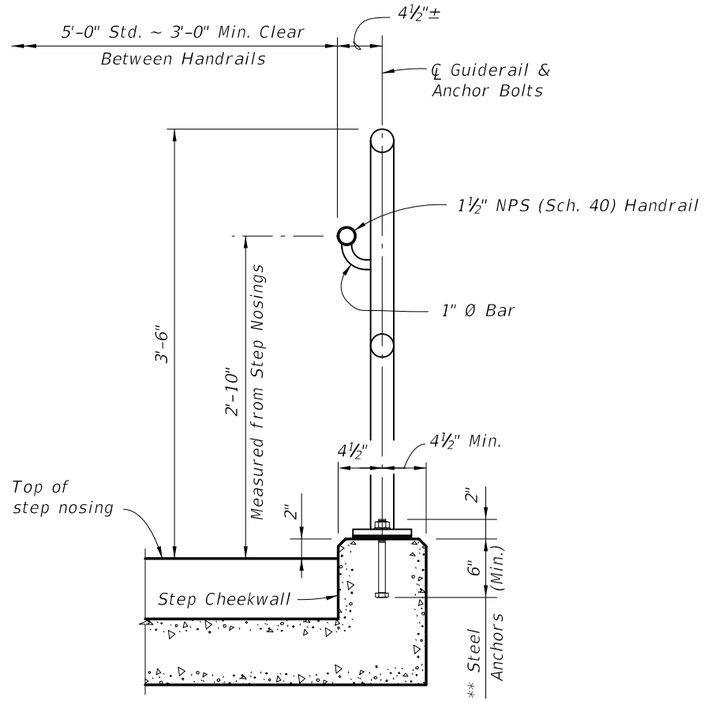
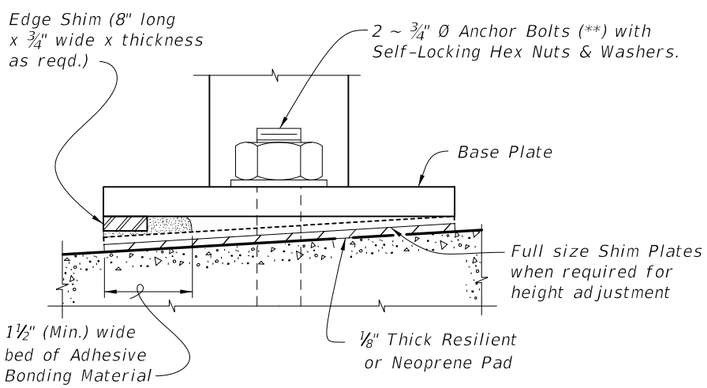


TYPICAL SECTION ON CONCRETE SIDEWALK

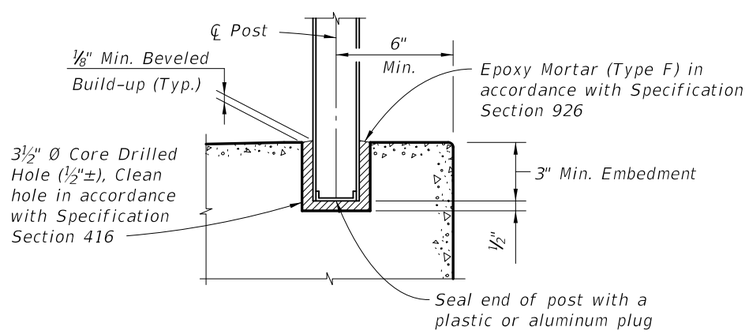


TYPICAL SECTION ON STEPS & STAIRS

TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



DETAIL "F" (OPTIONAL SHIMMING DETAIL
FOR CROSS SLOPE CORRECTION)
(Used in lieu of Beveled Shim Plates)



OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:
** 2 ~ ¾" Ø x 8" Steel Anchors:
Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (***); Expansion Anchors Not Permitted.
*** Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.			
01/01/11	SJN	Changed TYPICAL SECTION ON GRAVITY WALL to show 2" curb for Ramps.			

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NOTES

ALTERNATE DESIGN:

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1½" at midspan of the top rail. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1½" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

PIPE RAILING & POSTS:

Pipe Rails and Posts shall be in accordance with ASTM A53 Grade B for standard weight pipe and ASTM A500 Grade B, C or D or ASTM A501 for structural tube. Bars for handrail supports shall be ASTM A36. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE

MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1½" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

BASE PLATES:

Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

SHIM PLATES:

Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". Field trim shim plates when necessary to match the contours of the foundation. Bevelled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

COATINGS:

The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

ANCHOR BOLTS:

Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only), shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RESILIENT AND NEOPRENE PADS:

Resilient and Neoprene pads shall be in accordance with Specification Section 932, except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

JOINTS:

All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

WELDING:

All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

SHOP DRAWINGS:

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

PAYMENT:

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Steel), LF (Item No. 515-1-1). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Deleted Design Criteria Notes.			
01/01/11	SJN	Deleted APPLICABILITY NOTE TO DESIGNER.			

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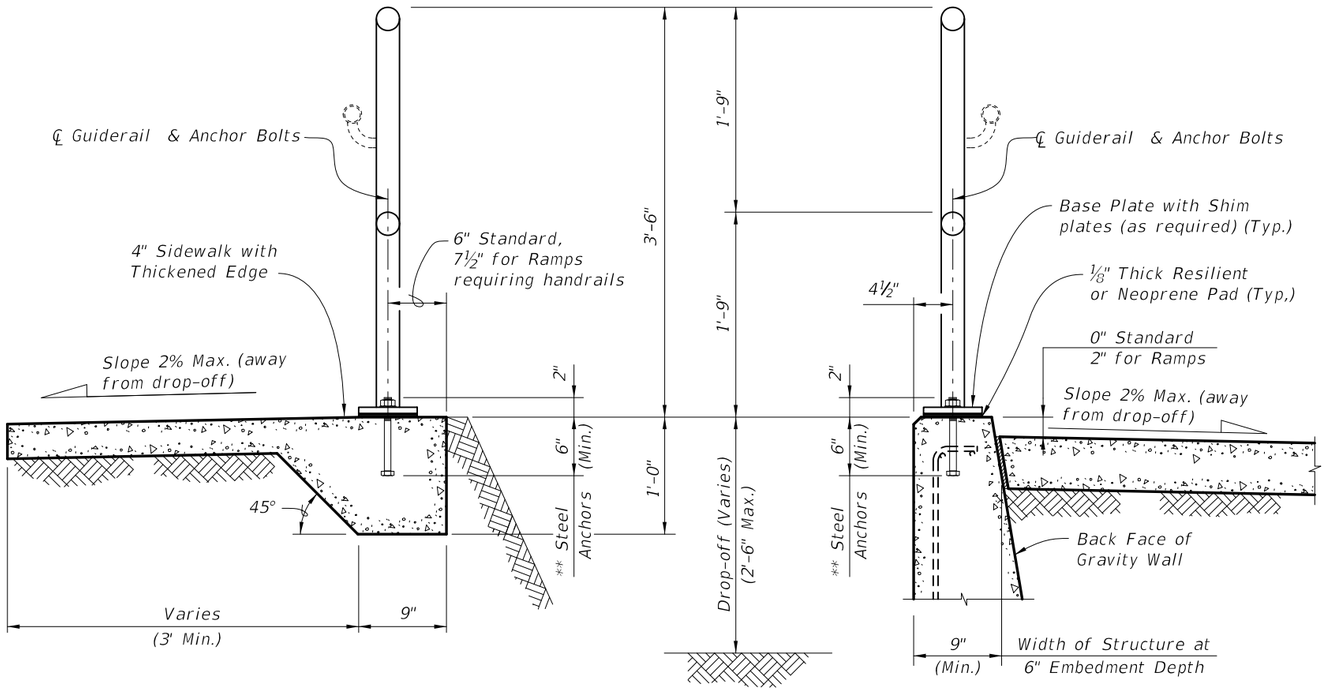
STEEL PIPE GUIDERAIL

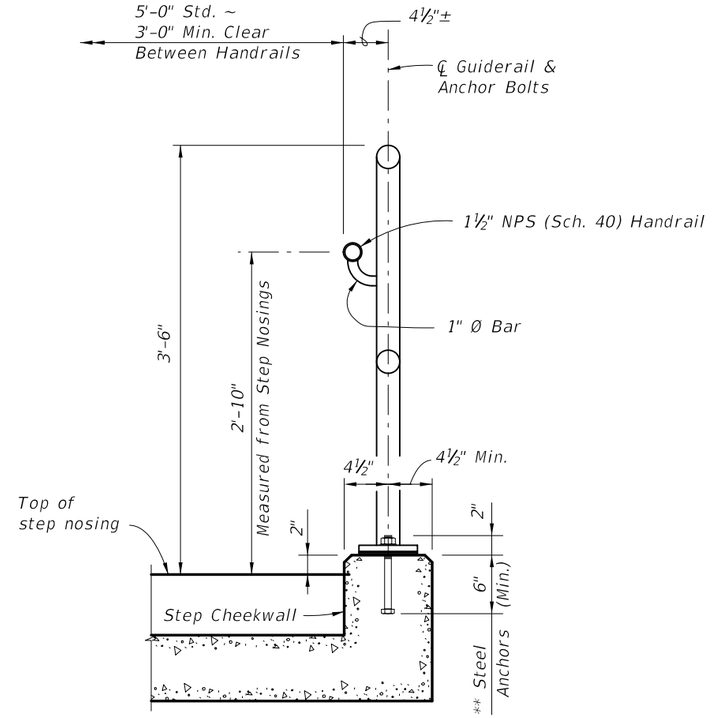
Interim Date 01/01/11

Index No. 880

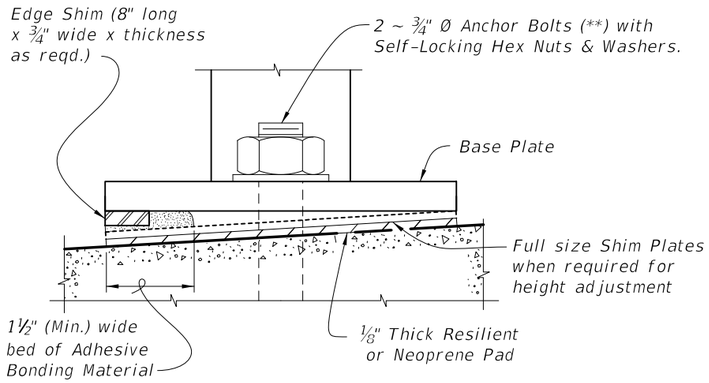


TYPICAL SECTION ON CONCRETE SIDEWALK

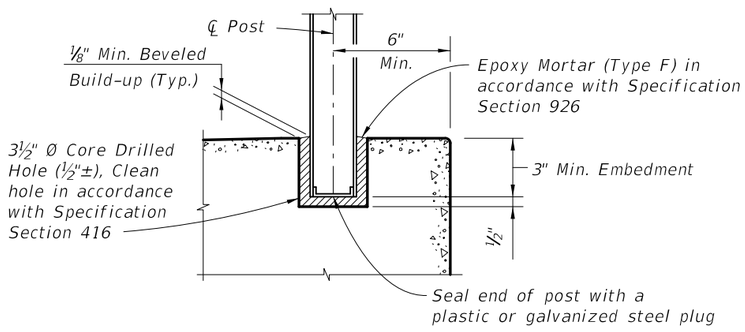
TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



DETAIL "F" (OPTIONAL SHIMMING DETAIL
FOR CROSS SLOPE CORRECTION)
(Used in lieu of Beveled Shim Plates)



OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:

** 2 ~ ¾" Ø x 8" Steel Anchors:
Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (***); Expansion Anchors Not Permitted.

*** Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.			
01/01/11	SJN	Changed TYPICAL SECTION ON GRAVITY WALL to show 2" curb for Ramps.			

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STEEL PIPE GUIDERAIL

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Index No. 880

NOTES

A. DESIGN SPECIFICATIONS:
1. AASHTO Standard Specifications for Highway Bridges (17th Edition).
2. AASHTO Guide Specifications for Structural Design of Sound Barriers (1989 Edition with 1992 and 2002 Interims).
3. FDOT Structures Manual (Current Edition).
4. Florida Department of Transportation's Plans Preparation Manual, Volume I (Current Edition).

B. DESIGN CRITERIA:
The Precast Sound Barriers are pre-designed and based on the criteria in the Structures Manual, Volume I.

C. CONCRETE AND GROUT:
1. Concrete Class and Compressive Strength:
   a. Cast-in-Place Collars: Class IV ($f'c$ = 5500 psi)
   b. Precast Panels, Collars and Post Caps: Class IV ($f'c$ = 5500 psi)
   c. Posts: Class IV ($f'c$ = 5500 psi)
2. Grout for Auger Cast Piling:
   a. Maximum Working Compressive Strength = 2200 psi
   b. Minimum 28 Day Strength = 5500 psi
3. Minimum Compressive Strength for Form Removal and Handling of Posts and Panels:
   a. 2,500 psi for horizontally cast post and panels.
   b. 2,000 psi for vertically cast panels or when tilt-up form tables are used for horizontally cast panels.

D. REINFORCING STEEL:
1. Reinforcing steel shall conform to ASTM A 615, Grade 60.
2. Welded wire reinforcement shall conform to ASTM A 185 (smooth wire) or ASTM A497 (deformed wire).
3. Concrete Cover of 2" shall be provided, unless otherwise noted.
4. In addition to the requirements of Specification Section 415, tie post and pile stirrups at the following locations as a minimum:
   a. Post Stirrups – Tie at all four corner bars and at every third interior bar intersection.
   b. Pile Stirrups – Tie to the main vertical reinforcing at alternate intersections for circular configurations and for rectangular configurations at the four corners and at every third interior bar intersection.

E. SURFACE FINISHES:
Provide a Class 5 Finish in accordance with Specification Section 400, unless otherwise shown on the Wall Control Drawings. See Sheet No. 2 for texture finish options.

F. PILING:
Construct Auger Cast Piling in accordance with the Plans and Specification Section 455.

G. UTILITIES:
Field verify the locations of all overhead and underground utilities shown in the Wall Control Drawings.

H. NEOPRENE PADS AND RESILIENT PADS:
1. Neoprene Pads for Panel Bearing Points Between the Stacked Panels:
   The Neoprene pads for the panel bearing points shall be Plain Pads, Grade 50 durometer hardness in accordance with Specifications Sections 932-2.1.
2. Neoprene Pads for Collar Bearing Points:
   Neoprene Pads shall be Fiber Reinforced Pads, with a durometer hardness between Grade 50 and Grade 80, in accordance with Specification Section 932-2.1. Plain Pads may be substituted for Fiber Reinforced Pads when sufficient bearing area is available on the concrete collar, as follows:
   a. 10' post spacing: 4" x 4" x ½" Plain Pads, Grade 50 durometer hardness.
   b. 20' post spacing and < 18' wall height: 4" x 4" x ½" Plain Pads, Grade 50 durometer hardness.
   c. 20' post spacing and ≥ 18' wall height: 4" x 5" x ½" Plain Pads, Grade 50 durometer hardness.

J. CASTING TOLERANCES:
1. Overall Height & Width: +/- ¼"
2. Thickness: +/- ¼"
3. Plane of side mold: +/- 1/16"
4. Openings: +/- ½"
5. Out of Square: ⅛" per 6 ft., but not more than ⅜" total along any side
6. Warping: 1/16" per foot distance to nearest corner
7. Bowing: 1/240 panel dimension
8. Surface Smoothness for Type "A" (Smooth) Surface Texture Option: +/- 1/16" along a 10 ft. straightedge.

K. SOUND BARRIER WALL NOTES:
1. Distance between piles shall be a maximum of 20 ft. from centerline to centerline. These Sound Barrier Wall Standard Indexes allow for either 10 or 20 ft. post spacing. The panel system depicted is based on a 20 ft. post spacing.
2. Walls greater than 12 ft. in height shall consist of 2 or 3 stacked panels (upper and lower), each less than 12 ft. in height. The height of the upper panel shall be a minimum 8 ft. or greater as necessary to any graphic relief (if applicable). The lower panel(s) shall be not less than 4 ft. in height. Walls equal to or less than 12 ft. in height shall consist of either a single panel or 2 stacked panels with an 8 ft. upper panel provided that any graphic relief (if applicable) will fit within the upper panel.
3. Horizontal panel joints shall be located outside of the graphic relief (if applicable). Horizontal panel joints shall be held at a constant elevation for a given wall, where possible.
4. Posts shall be "H" type cross-section with panels installed from above.
5. All posts shall be held plumb in auger cast piles with an installation template. The template shall be adjustable for horizontal placement, vertical placement and plumbness of posts. The template shall be such that the installation tolerances can be held. Template shall remain in place for a minimum of 12 hours after post installation.
6. The Contractor shall be responsible for meeting OSHA requirements. Any utility adjustments, charges for power stoppages, all realignments, special erection methods, etc. to meet these requirements shall be included in bid.
7. Shimming of wall panels above the pile collar, beneath the bearing pads is permitted up to a maximum of 1½" height. Shims must be either stainless steel (Type 304 or 316) or engineered polymer (copolymer or multipolymer) plastic. Plastic shims must have a minimum compressive strength of 8,000 psi without any fractures. Stacking of shims is permitted as follows:
   a. For shimming height of 1" or less, provide up to 4 ~ ¼" shims;
   b. For shimming heights greater than 1", use a minimum ¾" thick single shim and up to 3 ~ ¼" shims.
   Stacked shim plates must be bonded together with a compatible epoxy adhesive.

L. CSIP OR CONTRACTOR REDESIGN:
1. In no case will CSIP (Cost Savings Initiative Proposal) or Contractor Redesigns be allowed to modify foundation designs, or post spacing.
2. Substitution of proprietary panels or systems not listed in the Wall Control Drawings will not be allowed.

M. QUALIFIED PRODUCTS LIST:
Manufacturers seeking approval of proprietary sound barrier panels, posts and foundations or systems for inclusion on the Qualified Products List as pre-approved suppliers must submit a QPL Product Evaluation Application along with design documentation, vendor drawings and other information as required in the Sound Barrier QPL Acceptance Criteria showing the proprietary product is designed to meet all specified requirements. Project specific Shop Drawings are required for sound barrier projects in accordance with Specification Section 534.

N. ALTERNATES:
The Contractor shall construct the standard precast 20'-0" panel option depicted in the plans or shall construct one of the proprietary sound barrier panel or proprietary system options (panel and foundation) listed in the Wall Control Drawings.

O. FINISH COATING:
All wall areas not shown to receive an anti-graffiti coating shall be coated in accordance with Specification Section 400 of the Specifications with a Class 5 Applied Finish Coating. The color of the system shall be same as the anti-graffiti system or as directed by the Engineer.

P. TEST WALL:
The Contractor shall construct a test wall at the beginning of the project consistent with Specification Section 534. The Contractor shall demonstrate that all casting and erection tolerances can be met in order to assure that the prefabricated elements fit together as intended.

REVISIONS

DATE	BY	DESCRIPTION
01/01/10	CMH	Changed Note K. 4. Added patent information to Note K. 5.
07/01/10	CMH	Changed Note B and Note H.2.
01/01/11	CMH	Changed Title and Sheet No. to 1 of 15; Notes E, K, & O to remove foundation and post "Options"; Note L from VECP to CSIP, and Note B from PPM to SDG.

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PRECAST SOUND BARRIERS - GENERAL NOTES

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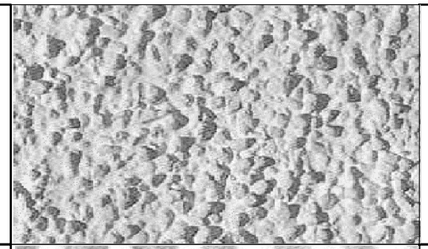
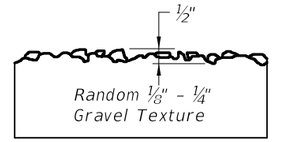
Sheet No. 1 of 15

Index No. 5200

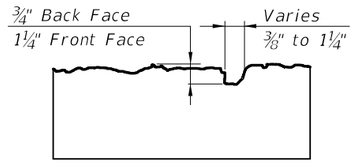
Type "A"
SMOOTH

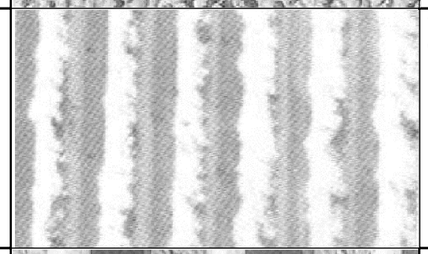


Type "F"
PEA GRAVEL

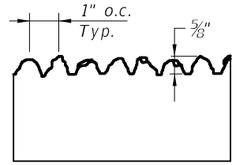


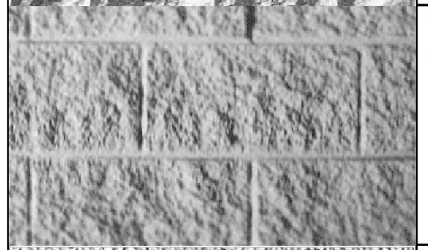
Type "B"
ASHLAR STONE



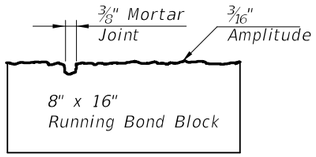


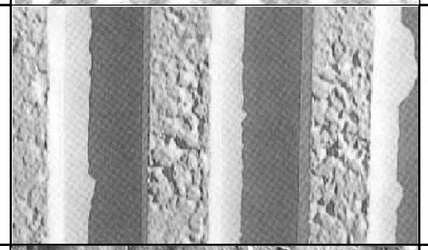
Type "G"
VERTICAL FRACTURED FIN



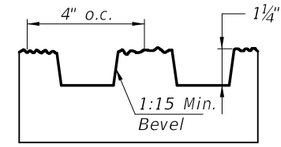


Type "C"
SPLIT FACE RUNNING BOND BLOCK

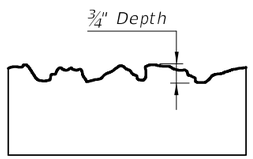


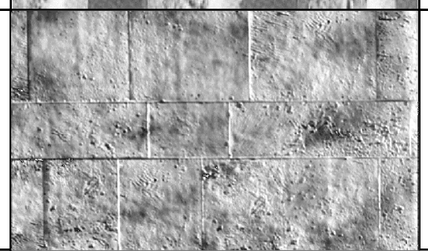


Type "H"
TRAPEZOID VERTICAL FINS W/ FRACTURED FACE (COLORADO DRAG AGGREGATE)

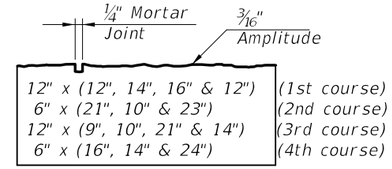


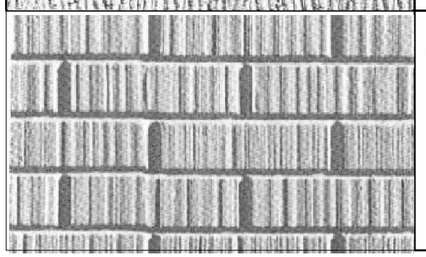
Type "D"
FRACTURED GRANITE



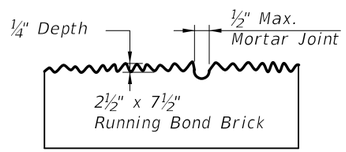


Type "I"
CUT CORAL BLOCK (RUNNING BOND)





Type "E"
WIRE-CUT BRICK



NOTES:

1. Surfaces shall be formed, rolled, or pressed using form liners in accordance with the Plans and Specifications (Class 3 Surface Finish).

2. See Wall Control Drawings for project aesthetic requirements.

TEXTURE OPTIONS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5201.			

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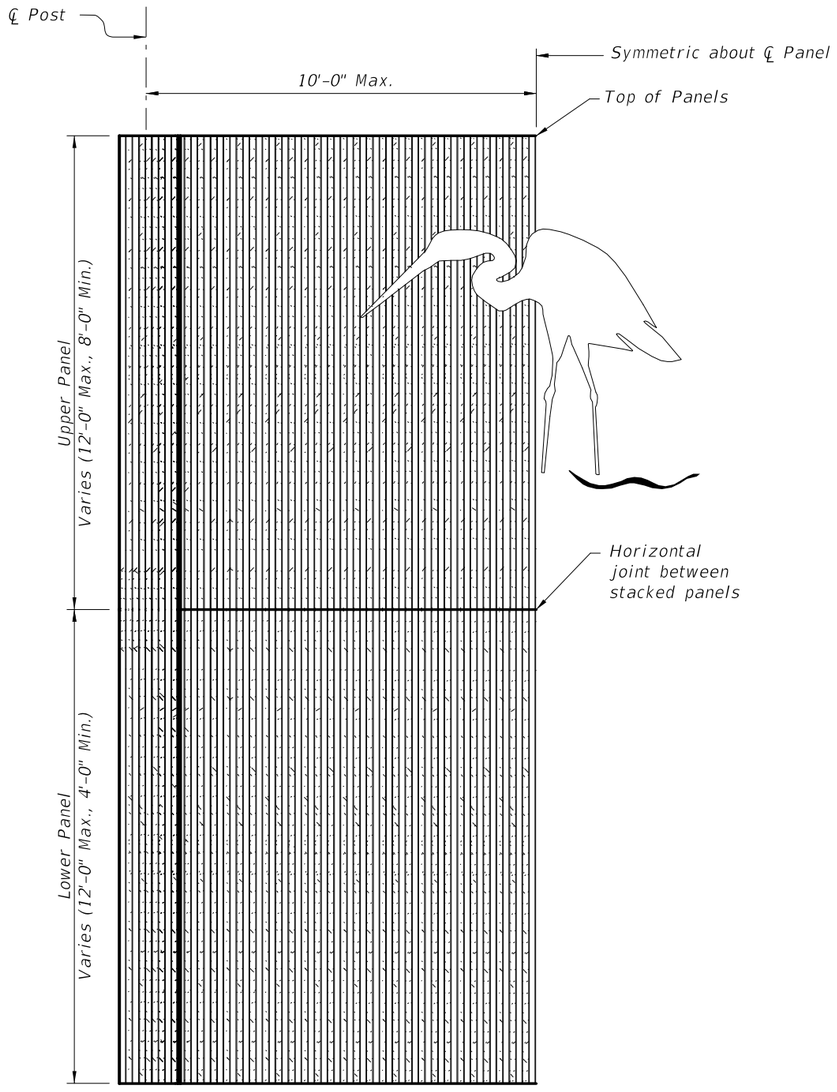
PRECAST SOUND BARRIERS

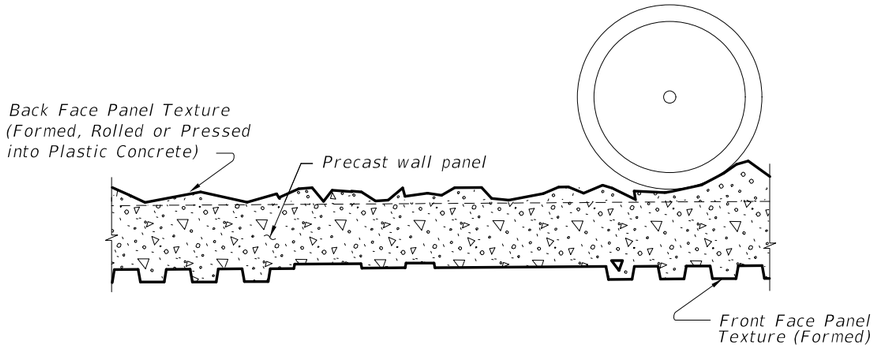
Interim Date 01/01/11

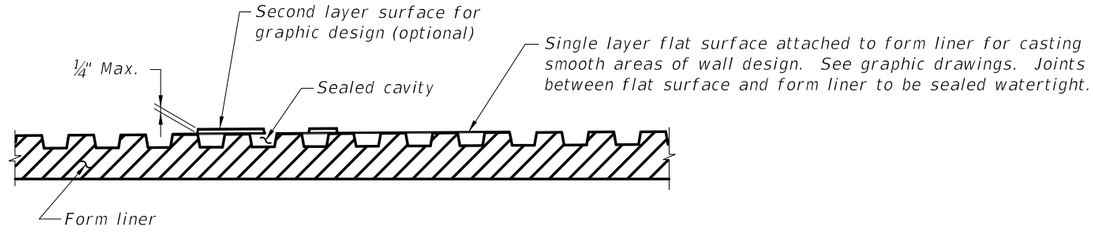
Sheet No. 2 of 15

Index No. 5200



HALF ELEVATION
(Front Face Panel Texture Type "H" and Front Face Post Texture Type "H" Shown.)
(Graphic Type SE-2 Shown.)
(Two stacked panels shown, 3 stacked panels similar)





TYPICAL FORMING DETAIL
(Front Face Panel Texture Type "H" shown)
(Back Face Panel Texture Type "D" shown)

NOTES:

1. *Contractor shall submit specific form liner samples for approval by the Engineer.*
2. *Textures and graphics shown are for demonstration purposes only. See Wall Control Drawings for project specific texture and graphic requirements.*

GRAPHICS & TEXTURE DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5202 (Sheet 6 of 6).			

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PRECAST SOUND BARRIERS

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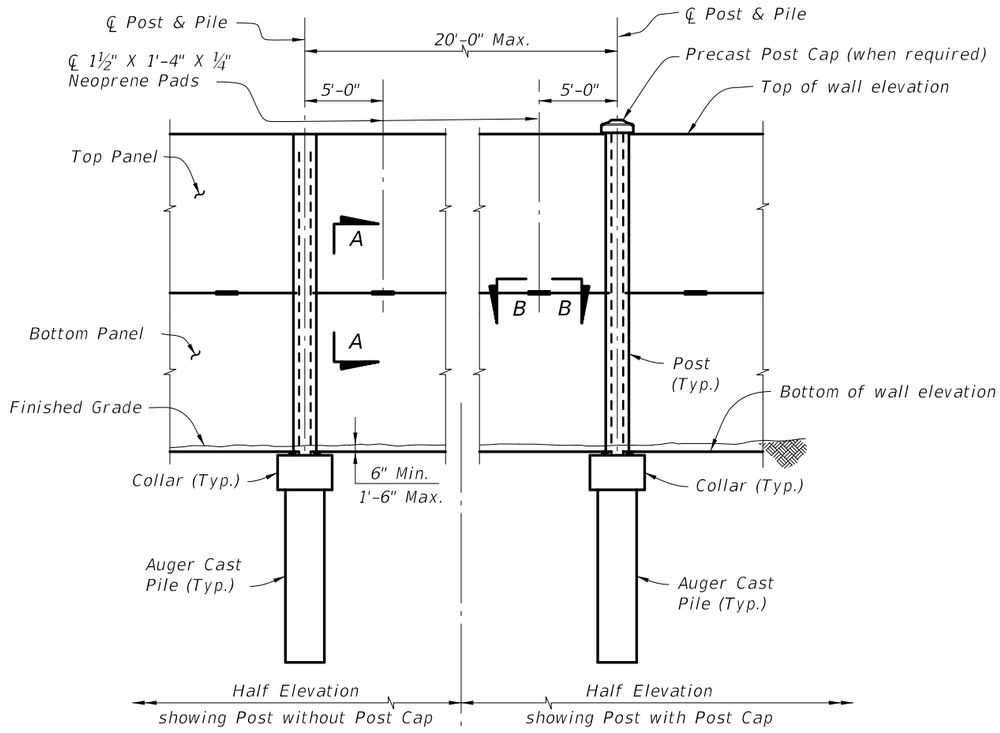
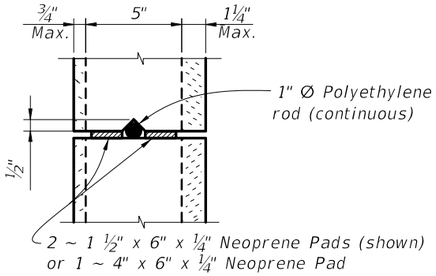
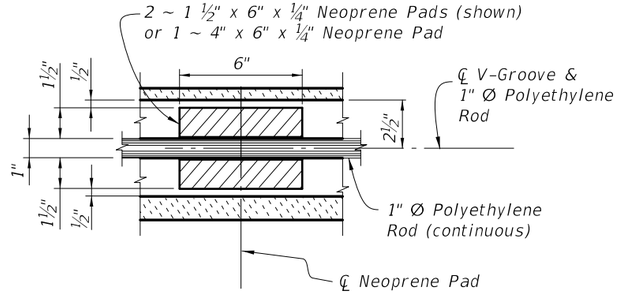
Index No. 5200



TYPICAL ELEVATION



SECTION A-A



SECTION B-B

TYPICAL DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet. TYPICAL ELEVATION, SECTION A-A & SECTION B-B copied from 5202-1of6.			

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PRECAST SOUND BARRIERS

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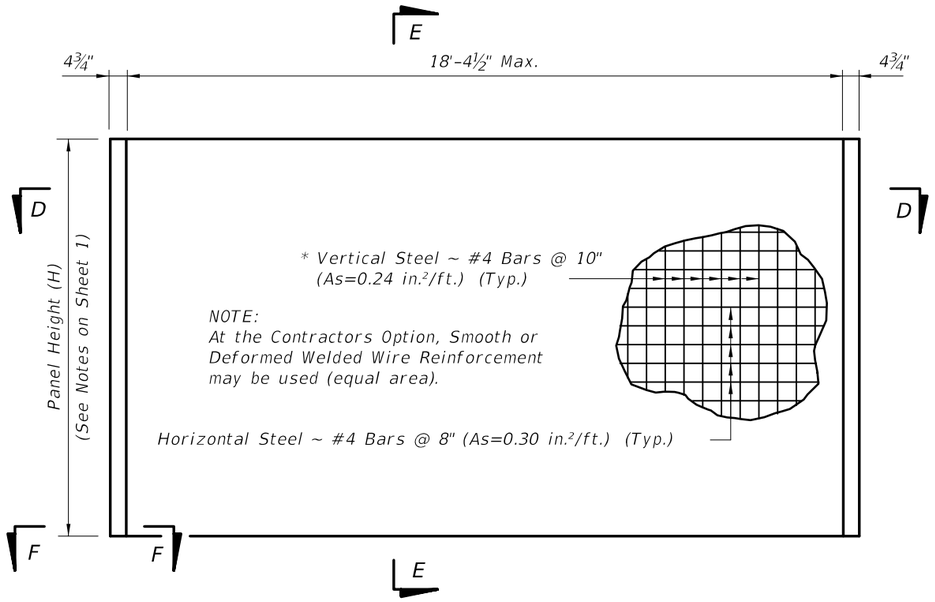
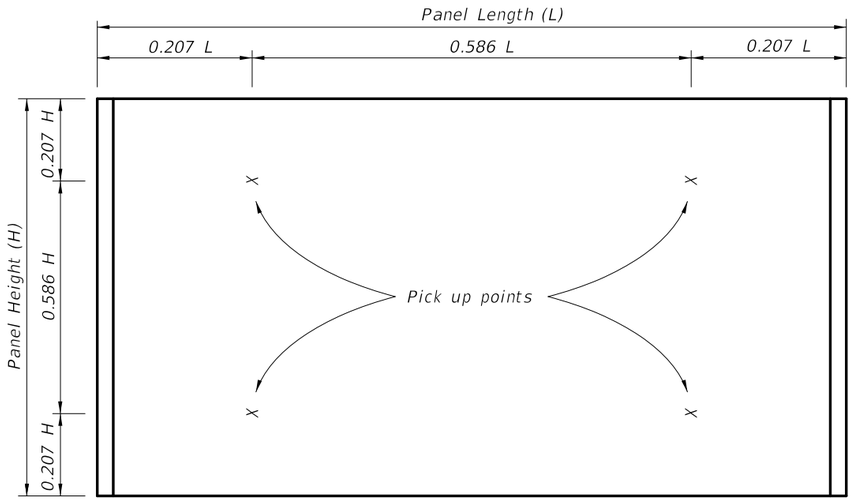
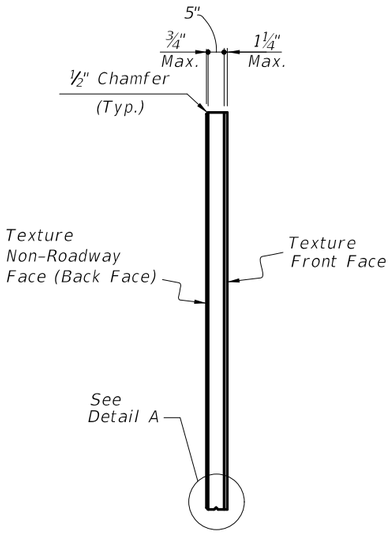


TYPICAL PANEL ELEVATION

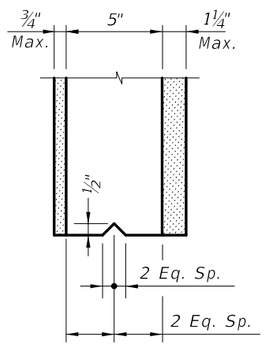
* In lieu of utilizing the pick up points below, panels may be cast vertically or cast horizontally then tilted upright using tilt-tables prior to lifting from form. In this case, the vertical steel may be reduced to #4 Bars @ 1'-3" (As=0.15 in.²/ft.).



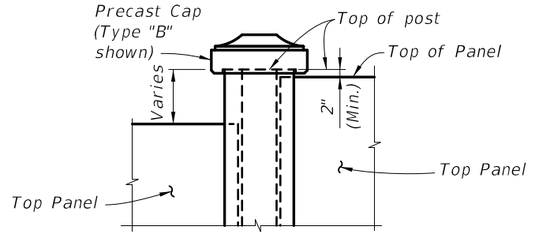
REQUIRED PICK UP POINTS FOR PANELS
(Panels shall be rotated about long axis only)



SECTION E-E

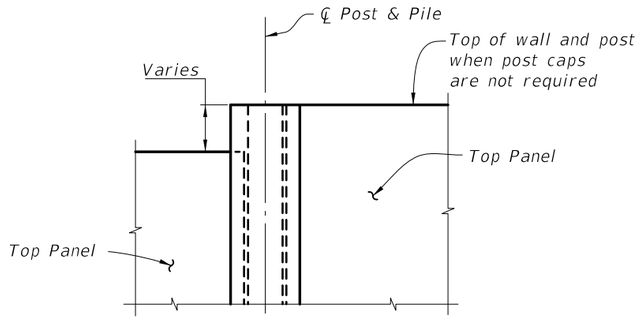


DETAIL A

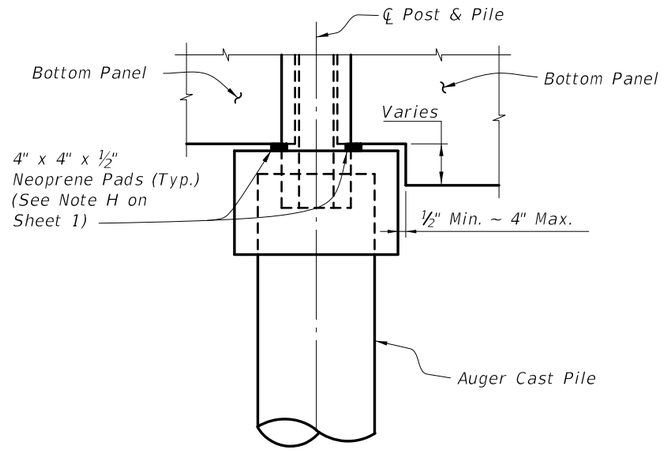


PRECAST POST CAP DETAIL

NOTE: See plans for Post Cap requirements.
See Sheet 13 for Post Cap details.



ELEVATION STEP AT TOP OF WALL



ELEVATION STEP AT BOTTOM OF WALL

TYPICAL PANEL DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet. TYPICAL PANEL ELEVATION, REQUIRED PICK UP POINTS FOR PANELS, SECTION E-E & DETAIL A copied from 5202-2of6.	01/01/11	CMH	PRECAST POST CAP DETAIL, ELEVATION STEP AT TOP OF WALL & ELEVATION STEP AT BOTTOM OF WALL copied from 5202-1of6.

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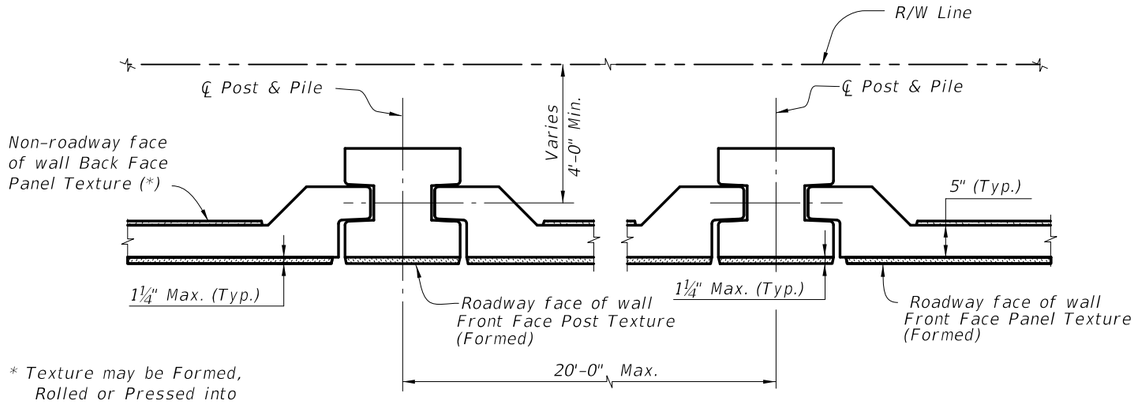
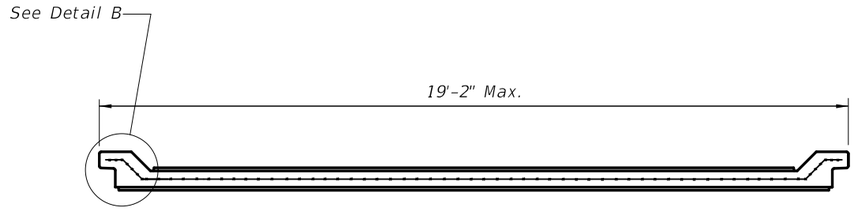
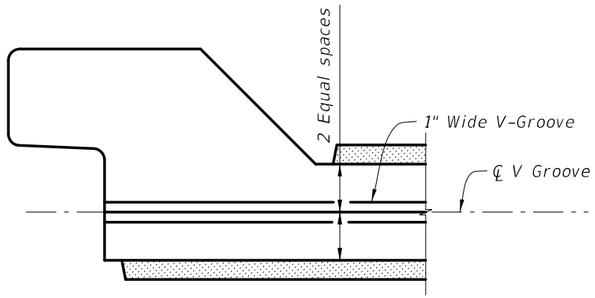


* Texture may be Formed, Rolled or Pressed into Plastic Concrete.

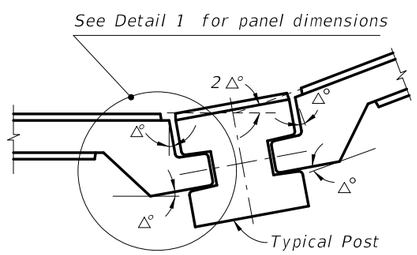
PLAN



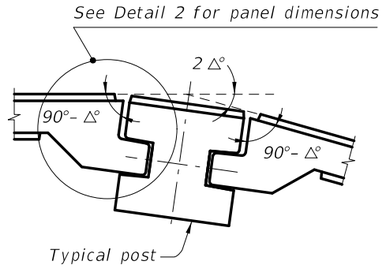
SECTION D-D



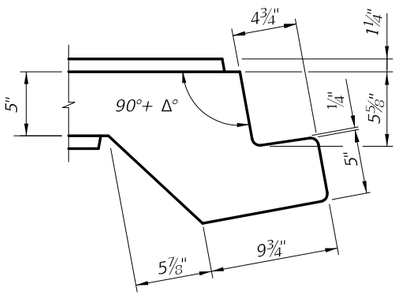
SECTION F-F



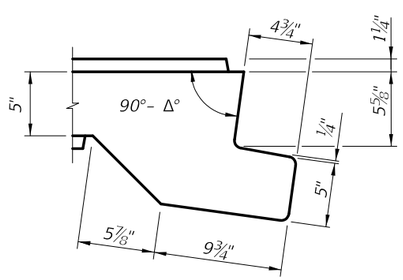
CASE 1
(Interior Angle)



CASE 2
(Exterior Angle)



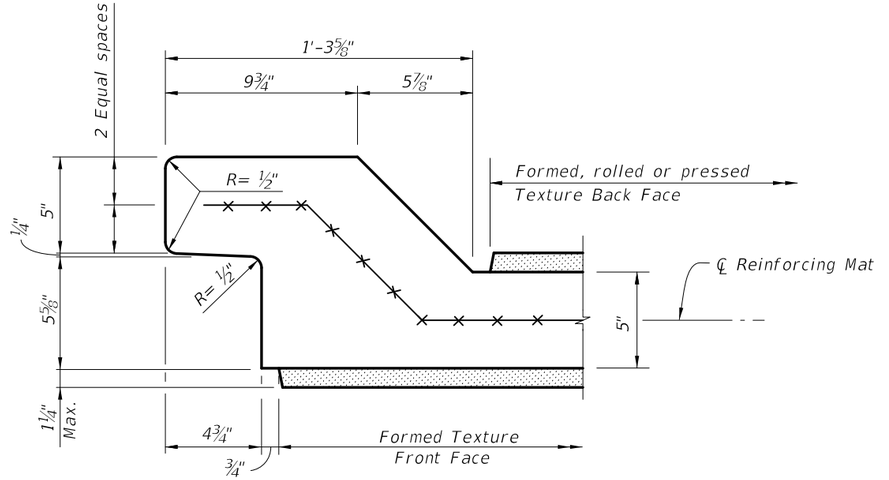
DETAIL 1



DETAIL 2

PIVOTING POINT DETAILS

NOTE: The shop drawings shall include specific pivoting point details of panel ends at locations where the deflection angle (2Δ) between panels exceeds 7°.



DETAIL B
(Typical both ends)

FLUSH PANEL END DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet. PLAN copied from 5202-1of6. PIVOTING POINT DETAILS copied from 5202-3of6. SECTION D-D, SECTION F-F & DETAIL B copied from 5202-2of6.			

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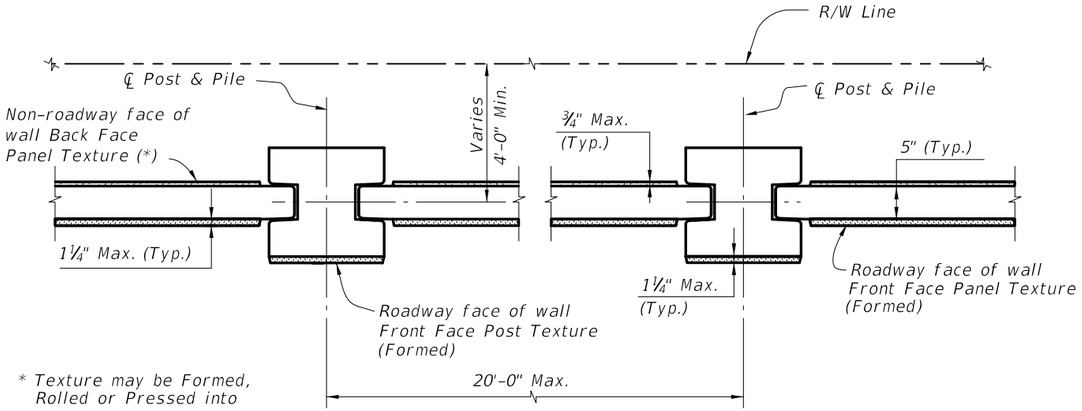
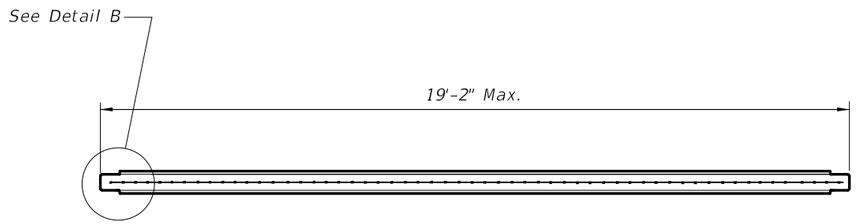
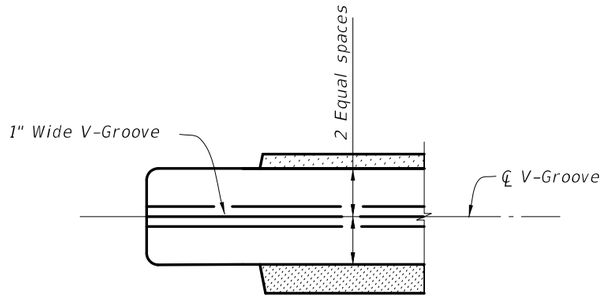


* Texture may be Formed, Rolled or Pressed into Plastic Concrete.

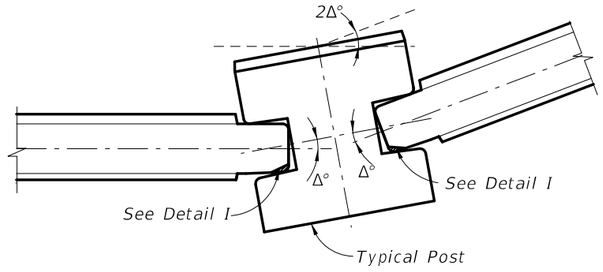
PLAN



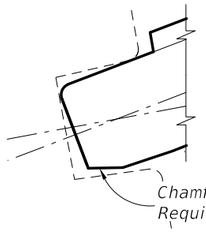
SECTION D-D



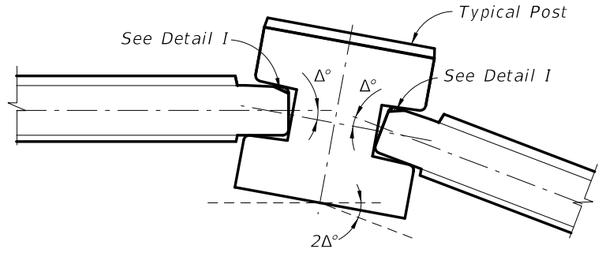
SECTION F-F



CASE 1
(Interior Angle)



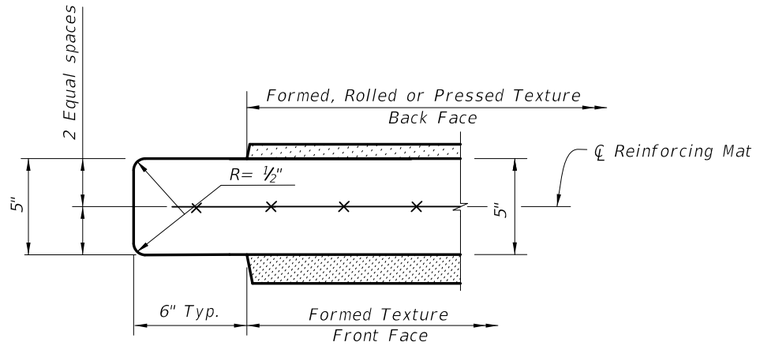
DETAIL I
(Back Face Chamfer Shown
Front Face Chamfer Similar)



CASE 2
(Exterior Angle)

NOTE:
The shop drawings shall include specific pivoting point details of panel ends at locations where the deflection angle (2Δ°) between panels exceeds 20°.

PIVOTING POINT DETAILS



DETAIL B
(Typical both ends)

RECESSED PANEL END DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet. PLAN copied from 5203-1of6. SECTION D-D, SECTION F-F & DETAIL B copied from 5203-2of6. PIVOTING POINT DETAILS copied from 5203-3of6.			

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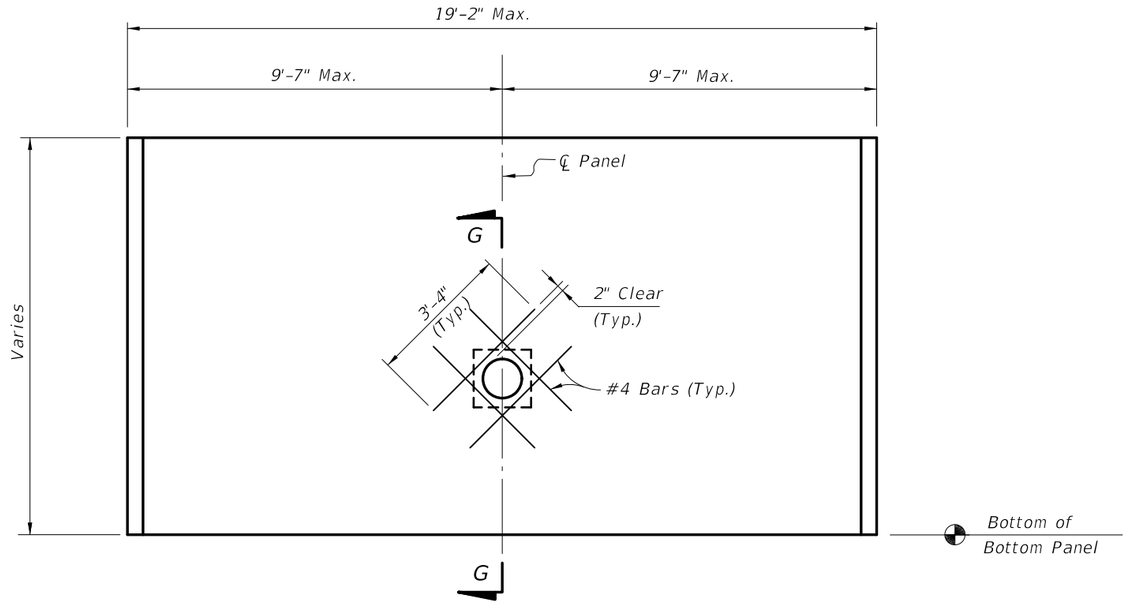
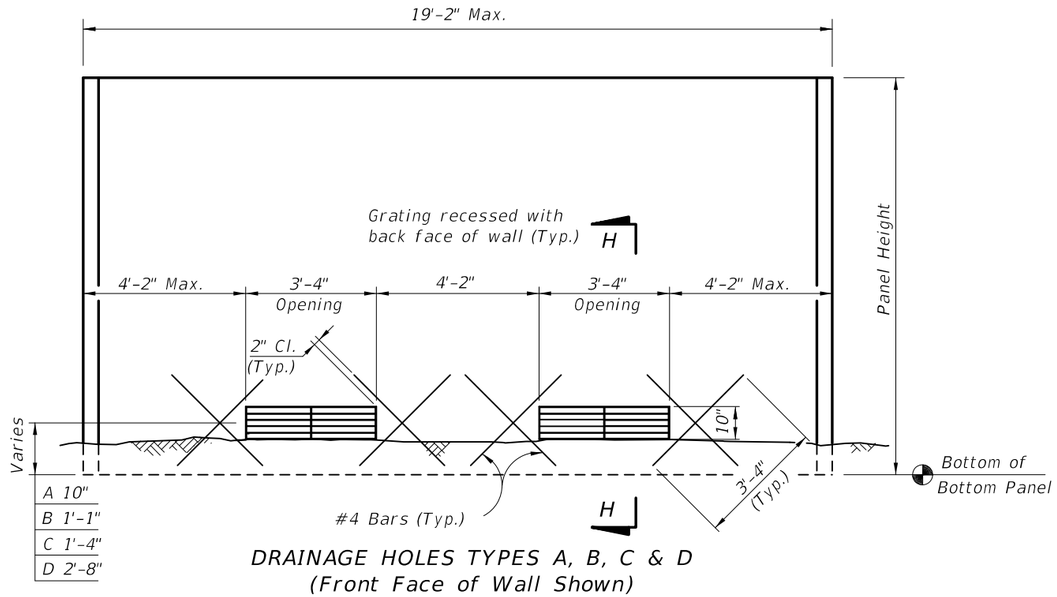


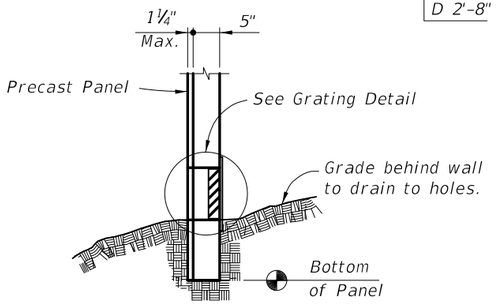
FIRE HOSE ACCESS HOLE TYPICAL DETAIL
(Front Face of Wall Shown)
(Flush Panel Option Shown
Recessed Panel Option Similar)

NOTE: Fire Hose Access Point to be located at or near fire hydrants

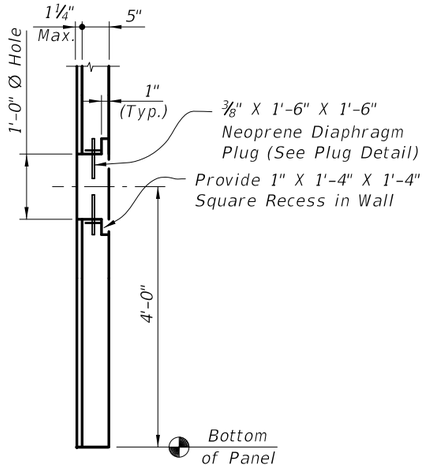


DRAINAGE HOLES TYPES A, B, C & D
(Front Face of Wall Shown)
(Flush Panel Option Shown
Recessed Panel Option Similar)

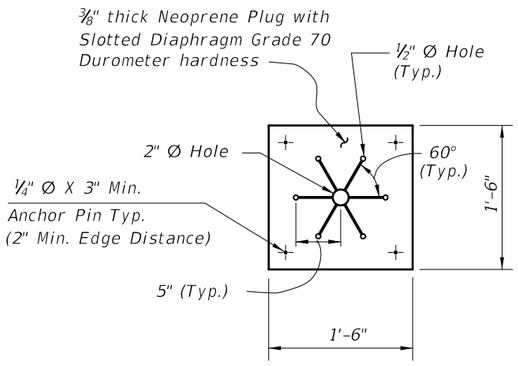
NOTE: Hole Types A, B, C and D refer to distance from bottom of panel to center of opening. See Wall Control Drawings.



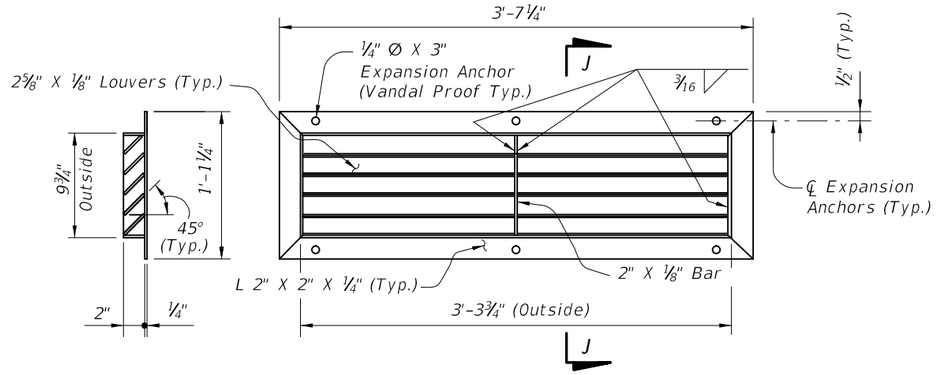
SECTION H-H
(Flush Panel Option Shown
Recessed Panel Option Similar)



SECTION G-G
(Flush Panel Option Shown
Recessed Panel Option Similar)



PLUG DETAIL



SECTION J-J

GRATING DETAIL

NOTES:
Grating shall be ASTM A 36 steel and shall be hot dip galvanized after assembly in accordance with ASTM Specification A 123.

Expansion anchors shall be in accordance with ASTM A 307 (Galvanized).

Welding shall be in accordance with the current edition of the ANSI/AWS D1.1 Welding Code.

FIRE HOSE ACCESS HOLE & DRAINAGE DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5204 (Sheet 1 of 1).			

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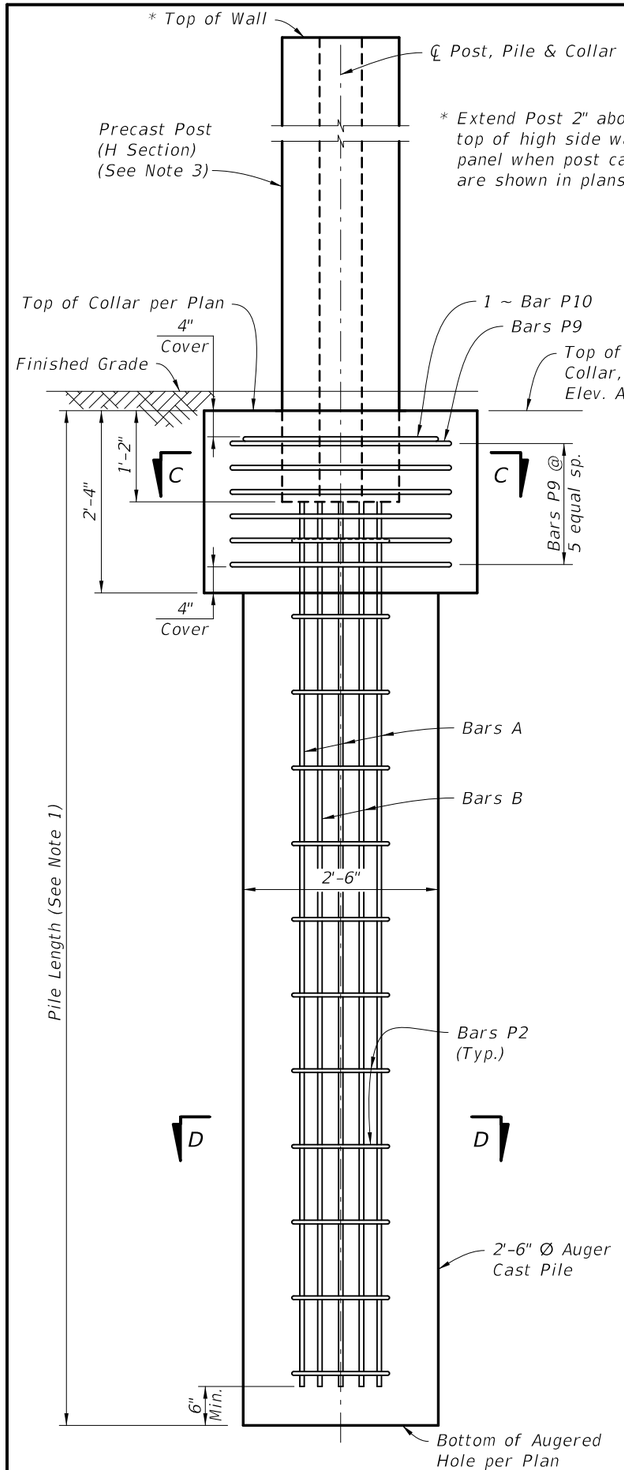
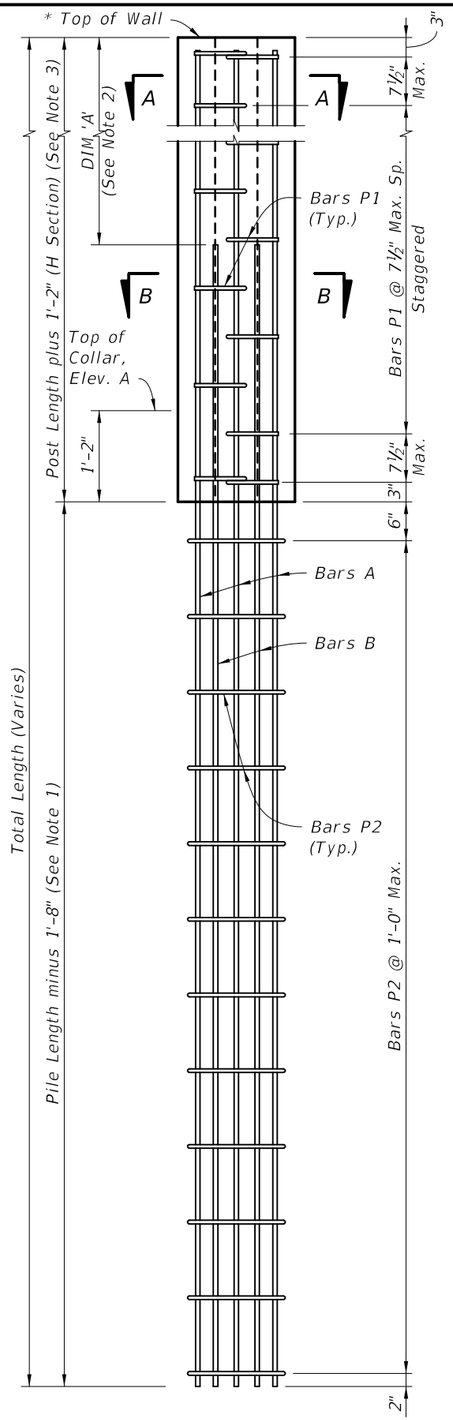
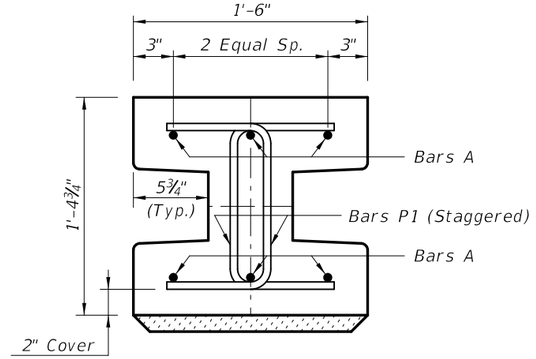


POST IN AUGERED HOLE

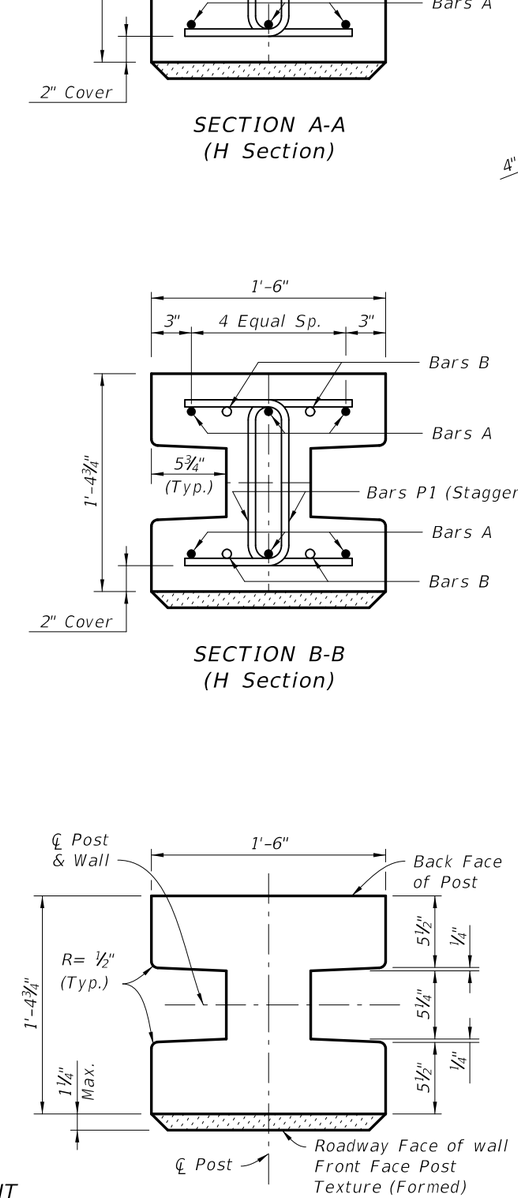


GROUND MOUNTED POST REINFORCEMENT
(Prior to placement in augered hole)

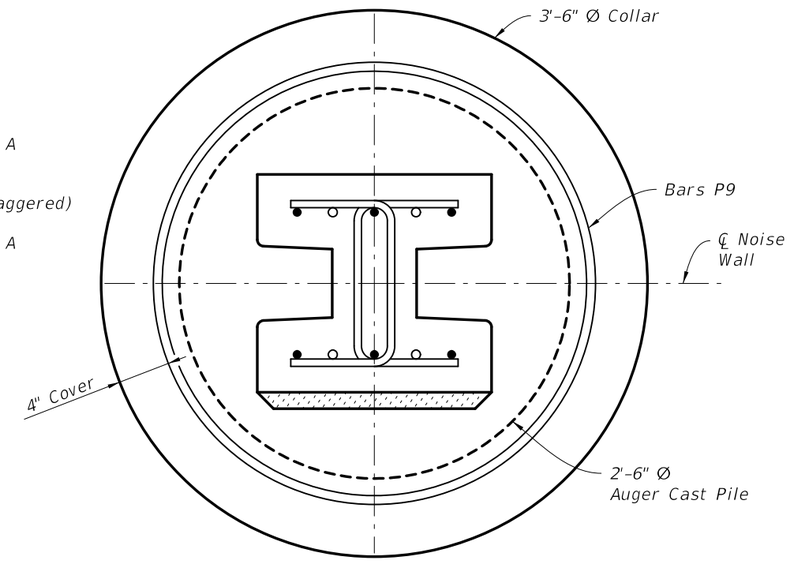


SECTION A-A
(H Section)

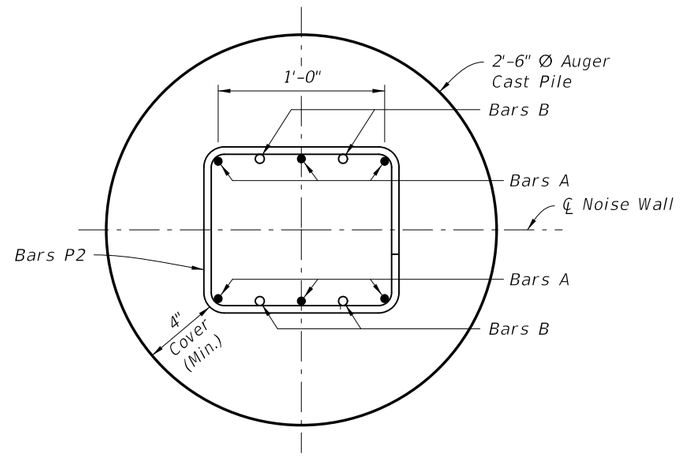
SECTION B-B
(H Section)



TYPICAL POST SECTION
(H Section)



SECTION C-C



SECTION D-D

NOTES:
1. For Table of Reinforcing Steel Sizes and Post & Pile Lengths, see Sheet Nos. 14 & 15.
2. For Dim 'A', see Sheet Nos. 14 & 15.
3. For Precast Collar Option, see Sheet No. 10.

PILE & POST REINFORCING STEEL (CAST-IN-PLACE COLLAR OPTION)

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5205 (Sheet 6 of 7). Redrawn to scale, revised.			

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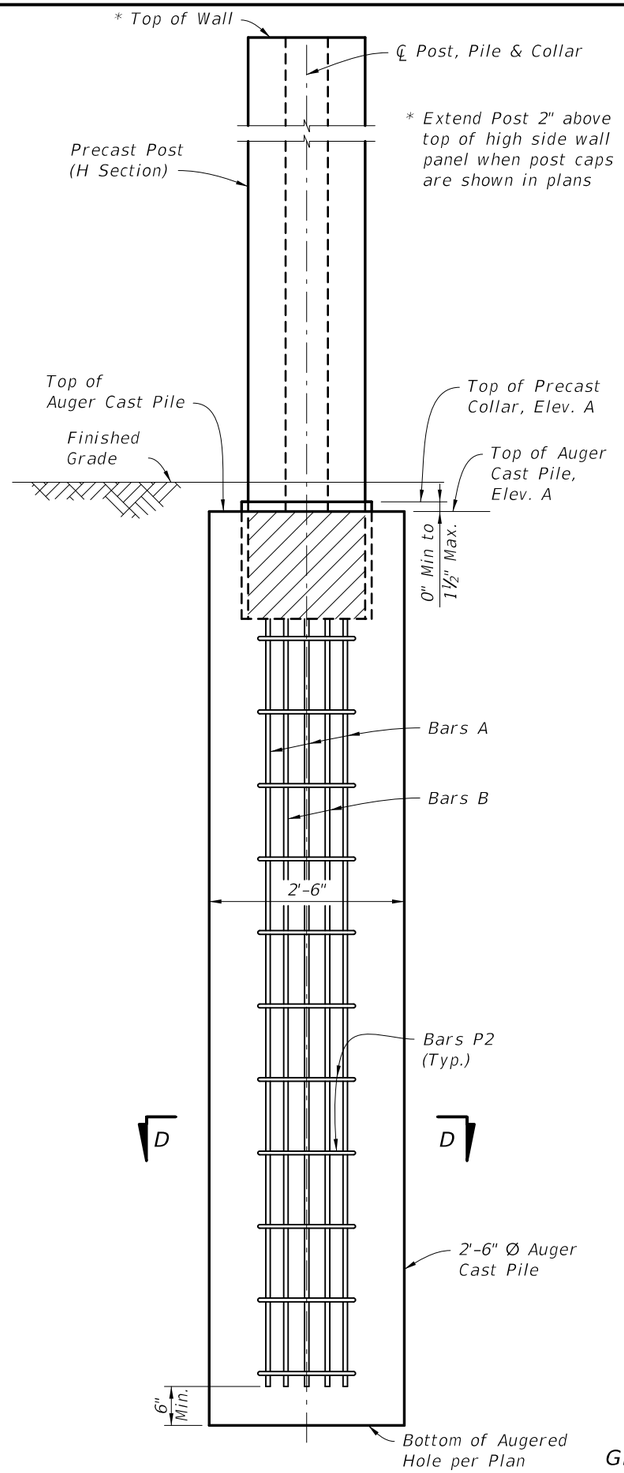
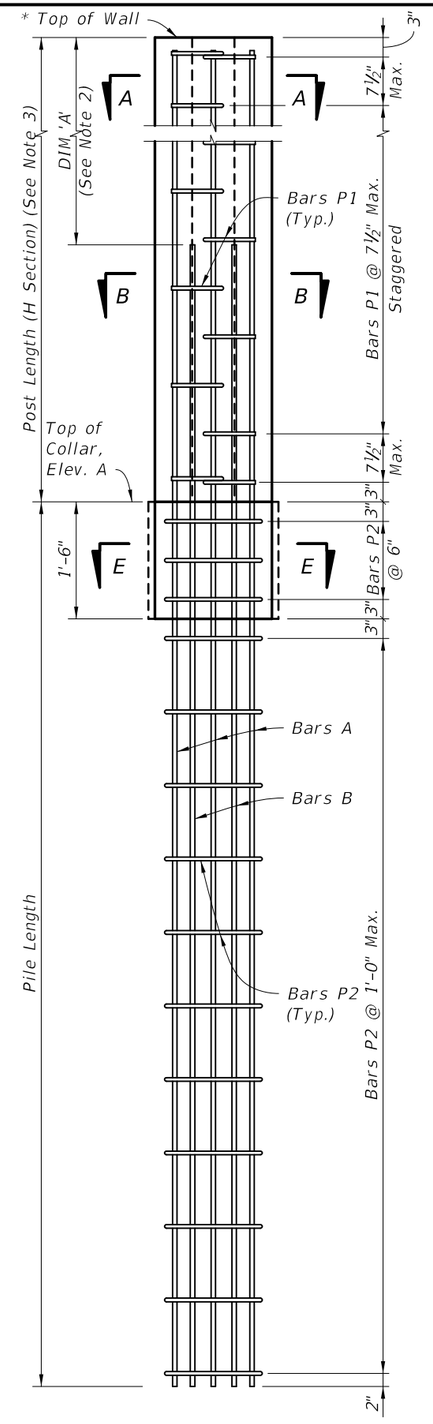
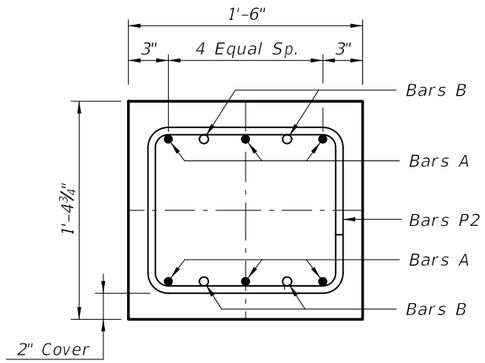


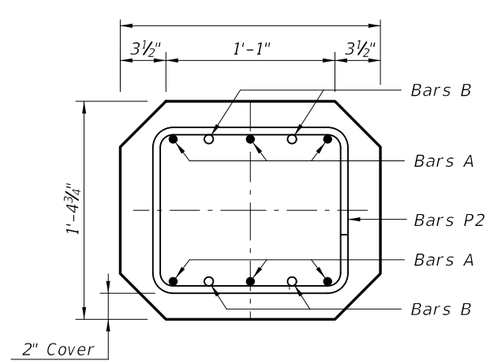
PRECAST COLLAR IN AUGER CAST PILE



GROUND MOUNTED POST REINFORCEMENT
(Prior to placement in augered hole)



SECTION E-E
(Rectangular Precast Collar)



SECTION E-E
(Octagonal Precast Collar)

NOTES:
1. For Table of Reinforcing Steel Sizes and Post & Pile Lengths, see Sheet Nos. 14 & 15.
2. For Dim 'A', see Sheet Nos. 14 & 15.
3. For Sections A-A, B-B & D-D see Sheet No. 9.

PILE & POST REINFORCING STEEL (PRECAST COLLAR OPTION)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5205 (Sheet No. 7 of 7).			

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PRECAST SOUND BARRIERS

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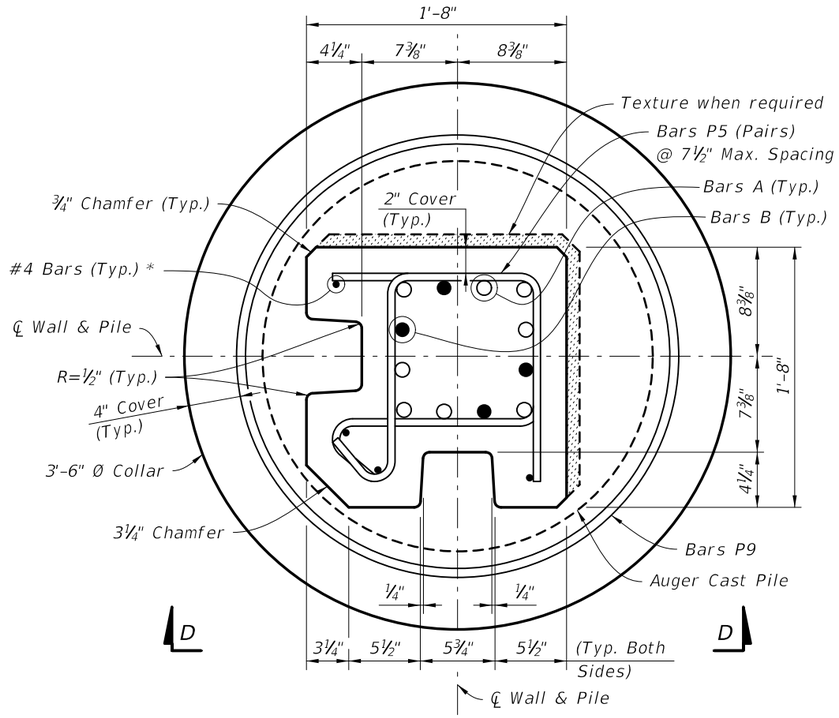
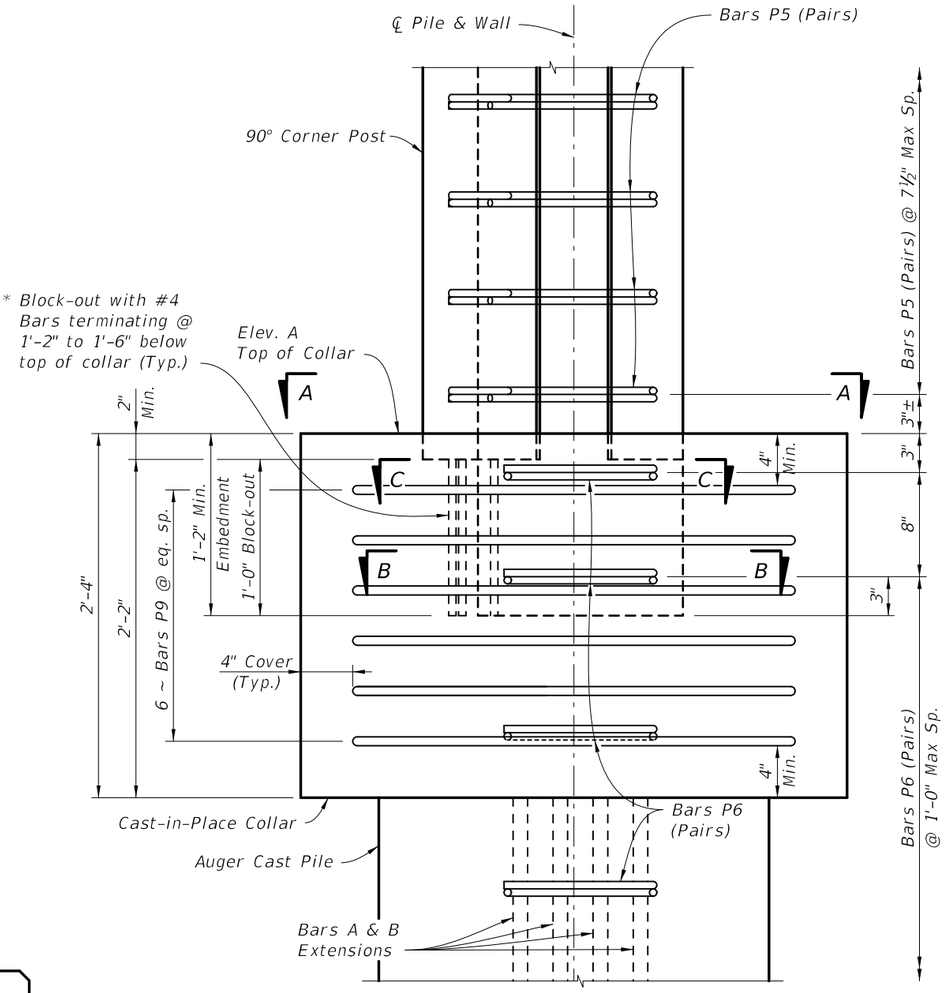
Sheet No. 10 of 15

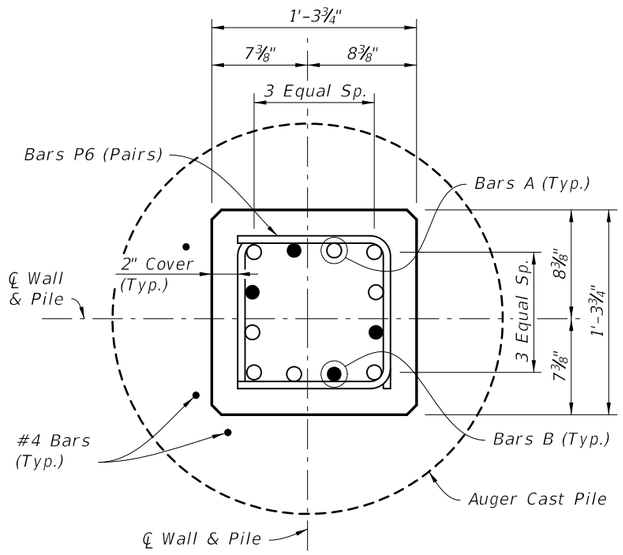
Index No. 5200



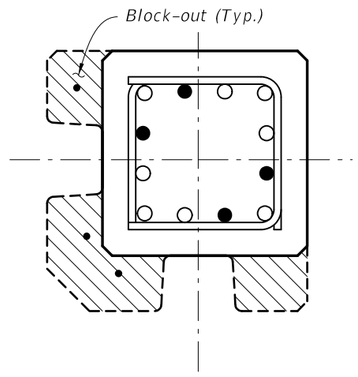
SECTION A-A
TYPICAL SECTION ABOVE PILE



VIEW D-D
PARTIAL ELEVATION OF POST
(Vertical Reinforcing not shown for clarity)



SECTION B-B
(Modified Base Section)



SECTION C-C
(Showing 1'-0" Block-out)

NOTES:
1. Use 3'-6" CIP Collar for all 90° corner posts, Bars P10 not required for 90° corner pile collar.
2. For Post & Pile Lengths, see Sheet Nos. 14 &15.
3. For Table of Reinforcing Steel, see Sheet Nos. 14 & 15.
4. Reduce standard panel length or adjust post spacing by 3½" at each 90° Corner Post to accommodate the Special Post dimensions.

SPECIAL 90° CORNER POST

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5202 (Sheet 4 of 6). Deleted Options A B & E. Added Block-out Detail.			

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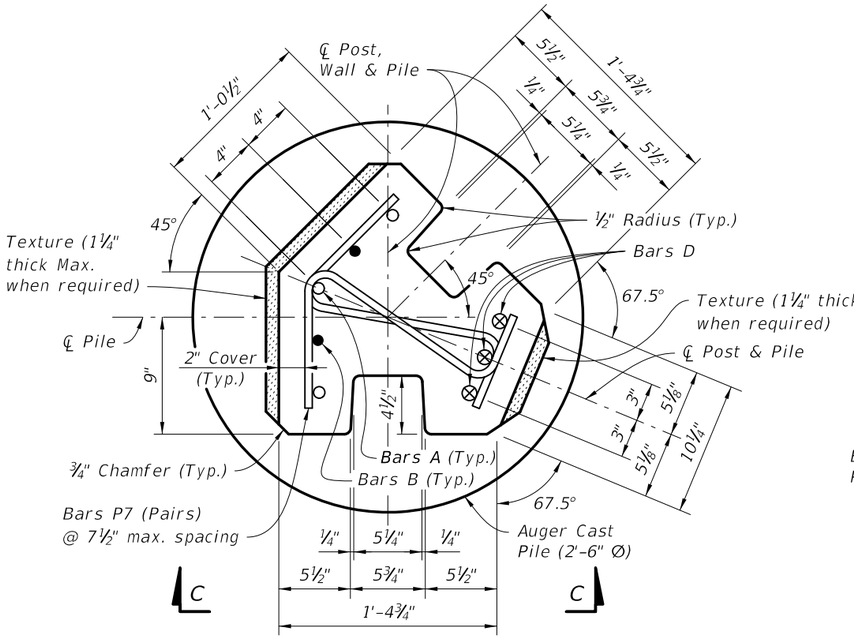
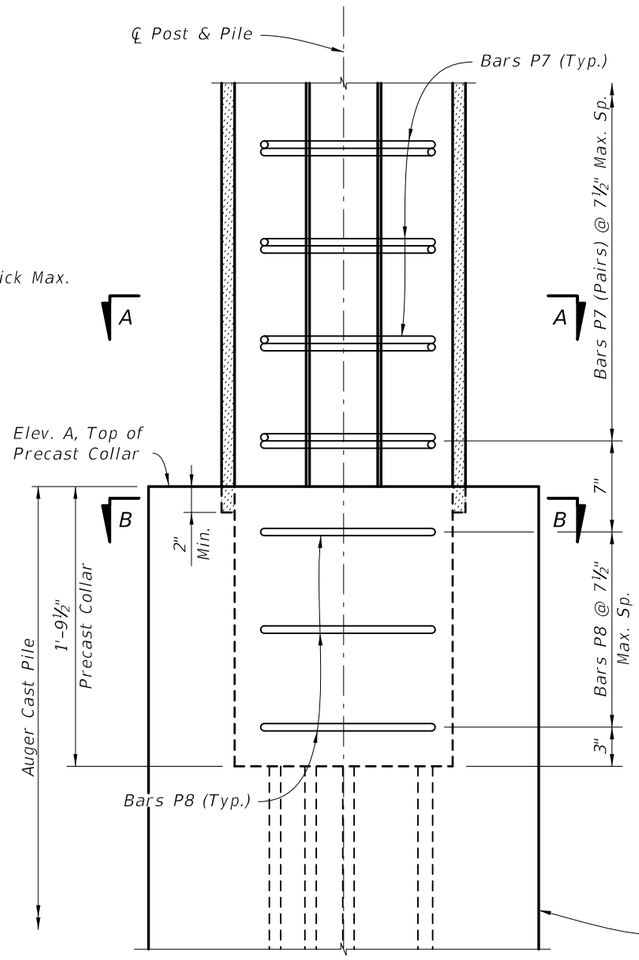
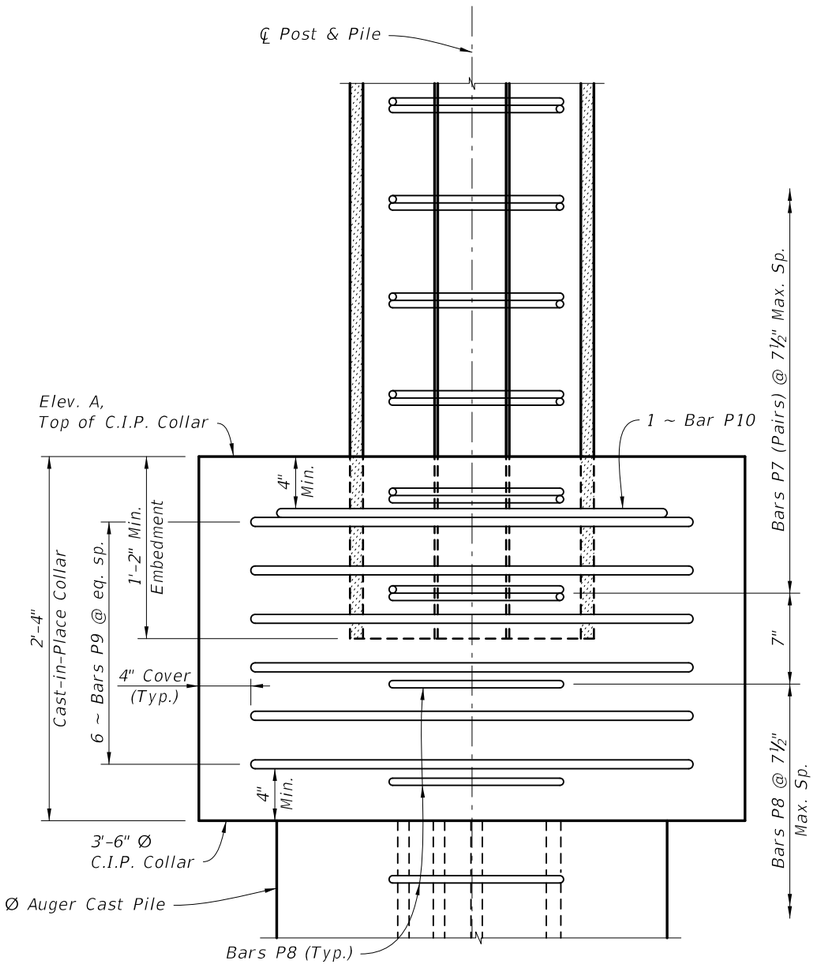


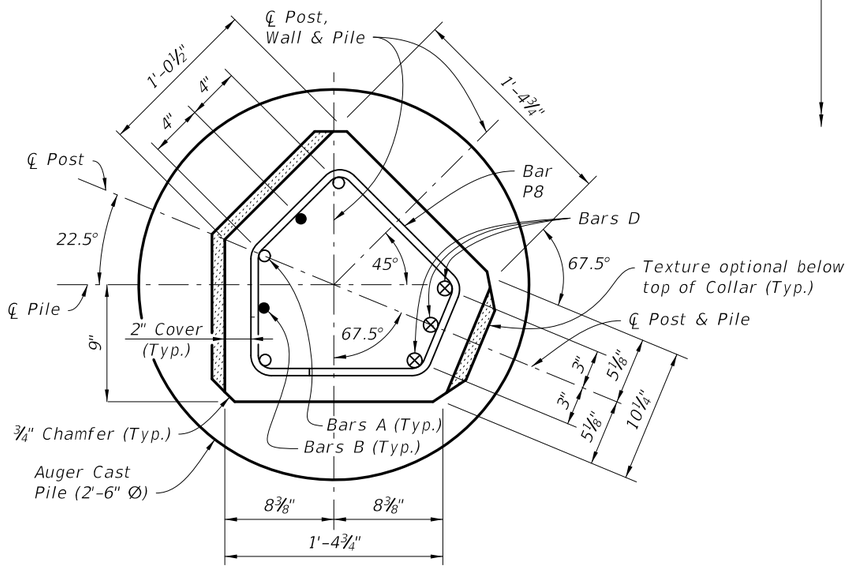
SECTION A-A
TYPICAL SECTION ABOVE PILE



VIEW C-C (PARTIAL ELEVATION)
PRECAST COLLAR
(Only Front Face shown for Clarity)



PARTIAL ELEVATION
3'-6" Ø CAST-IN-PLACE COLLAR
(Only Front Face shown for Clarity)



SECTION B-B
PRECAST COLLAR SECTION

NOTE:
For Table of Reinforcing Steel Sizes and Post & Pile Lengths, see Sheet Nos. 14 & 15.

SPECIAL 45° CORNER POST

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5202 (Sheet 5 of 6). Deleted Options A, B, C & D.			

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PRECAST SOUND BARRIERS

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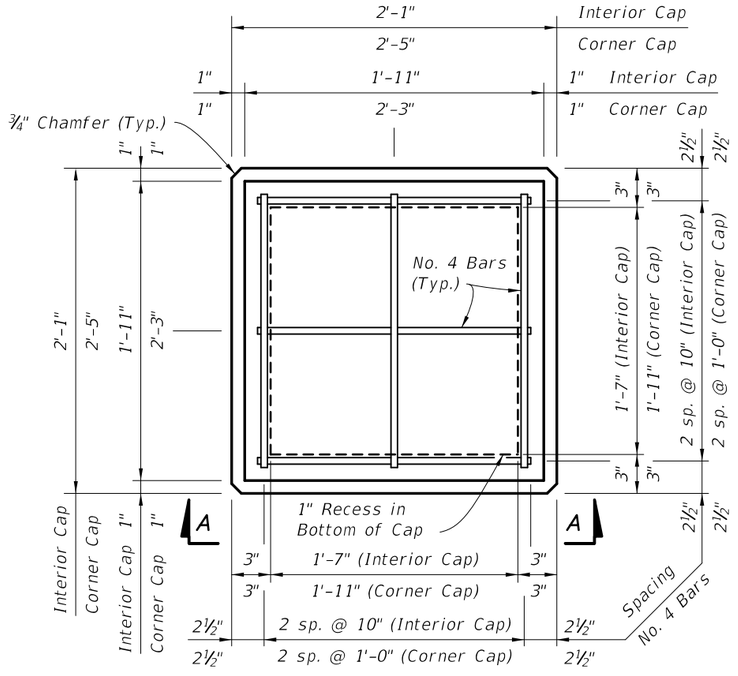
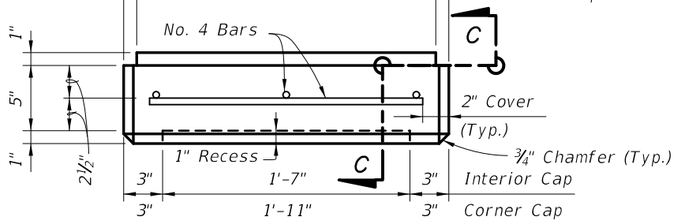
Sheet No. 12 of 15

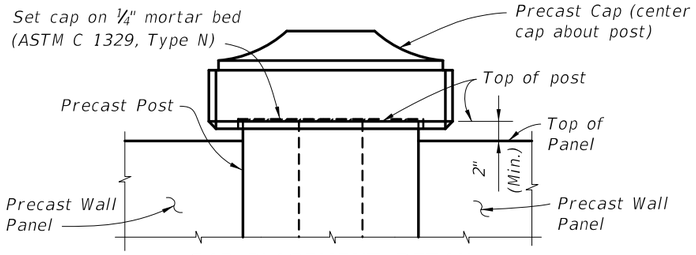
Index No. 5200



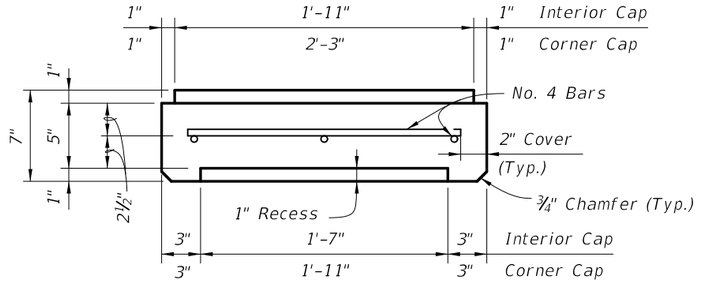
PLAN VIEW
(Type "A" Cap Shown, Type "B" & "C" Caps Similar)



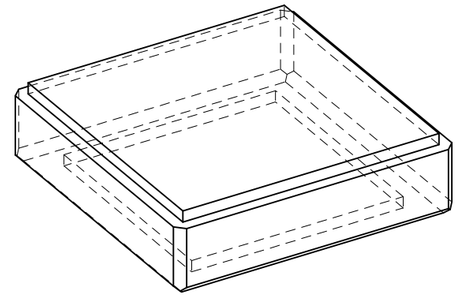
VIEW A-A SHOWN, VIEW B-B SIMILAR
(Type "A" Cap Shown, Type "B" & "C" Caps Similar)



CAP PLACEMENT DETAIL
(Type "B" Cap Shown, Type "A" & "C" Caps Similar)

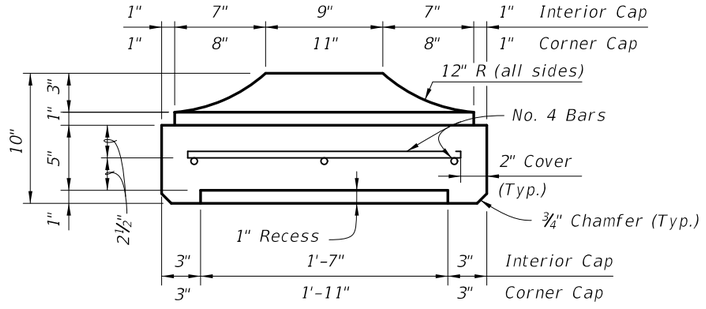


SECTION C-C

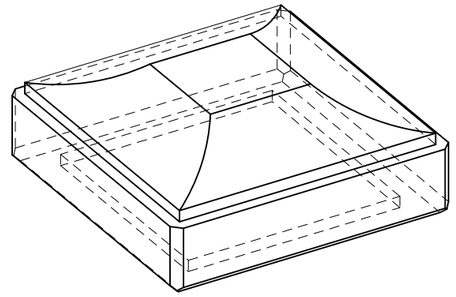


PICTORIAL VIEW

TYPE "A" CAP DETAILS

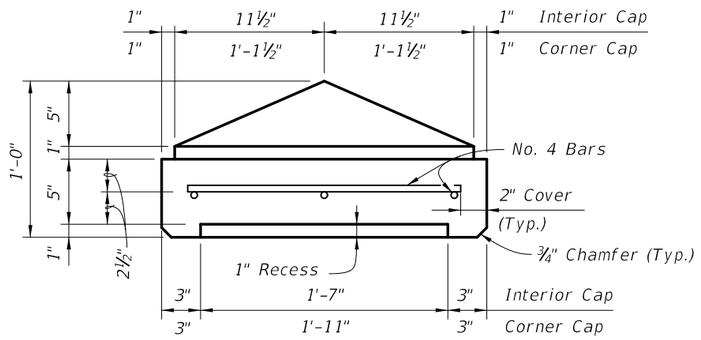


SECTION C-C

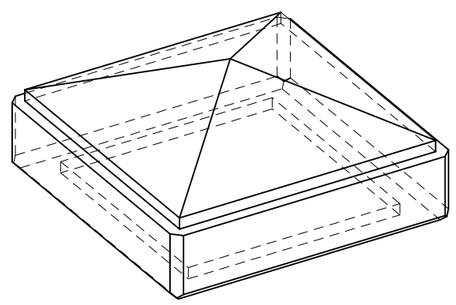


PICTORIAL VIEW

TYPE "B" CAP DETAILS



SECTION C-C



PICTORIAL VIEW

TYPE "C" CAP DETAILS

PRECAST POST CAPITAL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. from 5207.			

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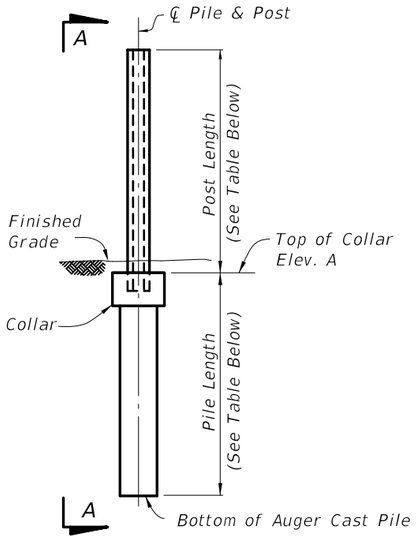
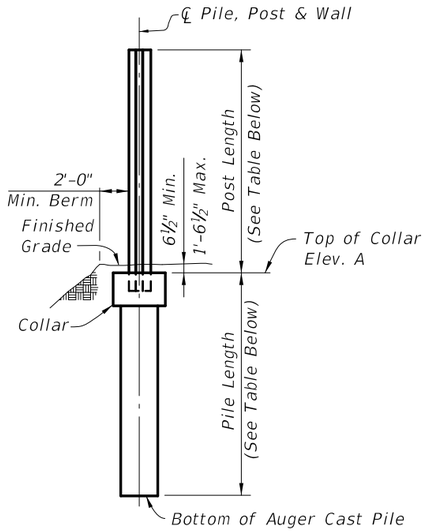


PILE/POST ELEVATION



VIEW A-A

NOTES:

Bars P5 & P6 are only used in 90° Corner Posts.

Bars P7, P8 & D are only used in 45° Corner Posts.

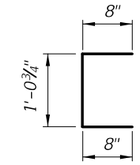
Bars P9 & P10 are used in the Cast-In-Place Collar Option.

For Bar Designations, see Sheet Nos. 9 - 12.

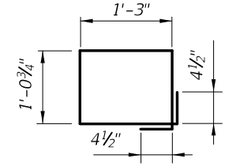
BAR BENDING DETAILS

All bar dimensions in bending diagrams are out-to-out. All bars not shown in the bending diagrams are straight.

POST & PILE

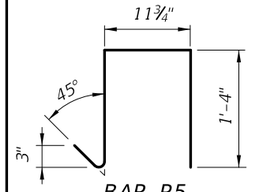


BAR P1
Bar Length = 2'-5"

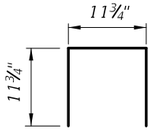


BAR P2
Bar Length = 5'-5"

90° CORNER POST & PILE

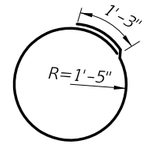


BAR P5
Bar Length = 4'-0"

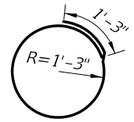


BAR P6
Bar Length = 2'-11¼"

CAST-IN-PLACE COLLAR

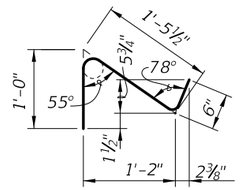


BAR P9
Bar Length = 10'-2"

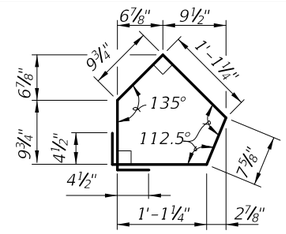


BAR P10
Bar Length = 9'-2"

45° CORNER POST & PILE



BAR P7 (POST)
Bar Length = 2'-8"



BAR P8 (PILE)
Bar Length = 5'-0¼"

TABLE 1 - FOUNDATIONS FOR MEDIUM DENSE GRANULAR SOILS (Soil SPT N_{60} Values between 10 and 40)

POST AND PILE DIMENSIONS					TABLE OF REINFORCING STEEL									
					PILE/POST REINFORCING								CAST-IN-PLACE COLLAR	
					10'-0" POST SPACING				20'-0" POST SPACING					
WALL TYPE	POST LENGTH WITHOUT CAP	POST LENGTH WITH CAP	PILE LENGTH 10'-0" POST SPACING	PILE LENGTH 20'-0" POST SPACING	BARS A	BARS B		BARS D	BARS A	BARS B		BARS D	BARS P1, P2, P5, P6, P7 & P8	BARS P9	BARS P10
					SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE	SIZE
A	12'-0½"	12'-2½"	12'-0"	15'-0"	#4	#4	10'-0"	#4	#5	#5	9'-0"	#6	#4	#5	#5
B	13'-0½"	13'-2½"	12'-0"	16'-0"	#4	#4	10'-7"	#5	#5	#5	8'-10"	#7	#4	#5	#5
C	14'-0½"	14'-2½"	13'-0"	17'-0"	#4	#4	10-5"	#5	#6	#6	10'-4"	#7	#4	#5	#5
D	15'-0½"	15'-2½"	13'-0"	18'-0"	#5	#5	12'-11"	#6	#6	#6	10'-3"	#8	#4	#5	#5
E	16'-0½"	16'-2½"	14'-0"	18'-0"	#5	#5	12'-9"	#6	#7	#7	11'-10"	#8	#4	#5	#5
F	17'-0½"	17'-2½"	14'-0"	19'-0"	#5	#5	12'-7"	#6	#7	#7	11'-8"	#9	#4	#5	#5
G	18'-0½"	18'-2½"	15'-0"	20'-0"	#6	#6	14'-11"	#7	#8	#8	13'-1"	#10	#4	#5	#5
H	19'-0½"	19'-2½"	15'-0"	21'-0"	#6	#6	14'-10"	#7	#8	#8	13'-0"	#10	#4	#5	#5
I	20'-0½"	20'-2½"	16'-0"	22'-0"	#6	#6	14'-9"	#8	#9	#9	14'-3"	#11	#4	#5	#5
J	21'-0½"	21'-2½"	16'-0"	24'-0"	#6	#6	14'-8"	#8	#9	#9	14'-2"	#11	#4	#5	#5
K	22'-0½"	22'-2½"	17'-0"	26'-0"	#7	#7	17'-1"	#8	#9	#9	14'-1"	2~ #14 & 1 ~ #9	#4	#5	#5

PILE DEPTH & REINFORCING SUMMARY

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5206 (Sheet 1 of 2). Deleted Options A, B, C & D.			

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TABLE 2 - FOUNDATIONS FOR LOOSE GRANULAR SOILS (SPT N_{60} Values between 4 and 9)

POST AND PILE DIMENSIONS					TABLE OF REINFORCING STEEL										
WALL TYPE	POST LENGTH WITHOUT CAP	POST LENGTH WITH CAP	PILE LENGTH		PILE/POST REINFORCING									CAST-IN-PLACE COLLAR	
					10'-0" POST SPACING				20'-0" POST SPACING				BARS P1, P2, P5, P6, P7 & P8	BARS P9	BARS P10
			10'-0" POST SPACING	20'-0" POST SPACING	BARS A	BARS B		BARS D	BARS A	BARS B		BARS D			
					SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE	SIZE
A	12'-0½"	12'-2½"	13'-0"	17'-0"	#4	#4	10'-0"	#4	#5	#5	9'-0"	#6	#4	#5	#5
B	13'-0½"	13'-2½"	14'-0"	18'-0"	#4	#4	10'-7"	#5	#5	#5	8'-10"	#7	#4	#5	#5
C	14'-0½"	14'-2½"	14'-0"	19'-0"	#4	#4	10-5"	#5	#6	#6	10'-4"	#7	#4	#5	#5
D	15'-0½"	15'-2½"	15'-0"	20'-0"	#5	#5	12'-11"	#6	#6	#6	10'-3"	#8	#4	#5	#5
E	16'-0½"	16'-2½"	16'-0"	21'-0"	#5	#5	12'-9"	#6	#7	#7	11'-10"	#8	#4	#5	#5
F	17'-0½"	17'-2½"	16'-0"	22'-0"	#5	#5	12'-7"	#6	#7	#7	11'-8"	#9	#4	#5	#5
G	18'-0½"	18'-2½"	17'-0"	23'-0"	#6	#6	14'-11"	#7	#8	#8	13'-1"	#10	#4	#5	#5
H	19'-0½"	19'-2½"	18'-0"	25'-0"	#6	#6	14'-10"	#7	#8	#8	13'-0"	#10	#4	#5	#5
I	20'-0½"	20'-2½"	18'-0"	26'-0"	#6	#6	14'-9"	#8	#9	#9	14'-3"	#11	#4	#5	#5
J	21'-0½"	21'-2½"	19'-0"	29'-0"	#6	#6	14'-8"	#8	#9	#9	14'-2"	#11	#4	#5	#5
K	22'-0½"	22'-2½"	19'-0"	*	#7	#7	17'-1"	#8	#9	#9	14'-1"	2~ #14 & 1 ~ #9	#4	#5	#5

* Do not use for walls with 30" dia. foundations, 20' spacing, & greater than 21' high.

PILE DEPTH & REINFORCING SUMMARY

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	New Sheet from Index No. 5206 (Sheet 2 of 2). Deleted Options A, B, C & D.			

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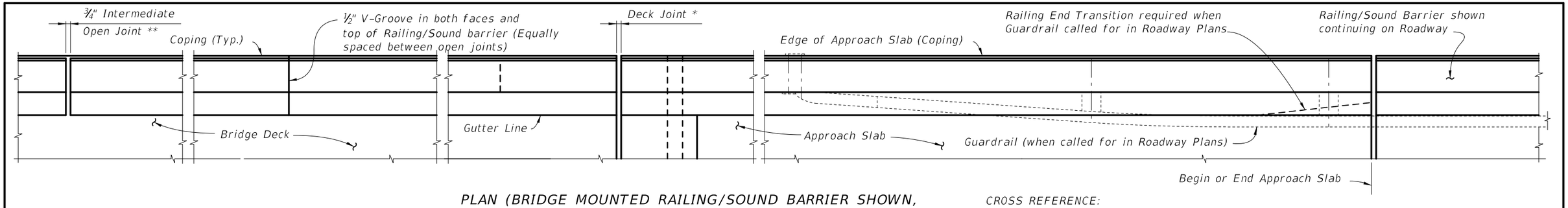
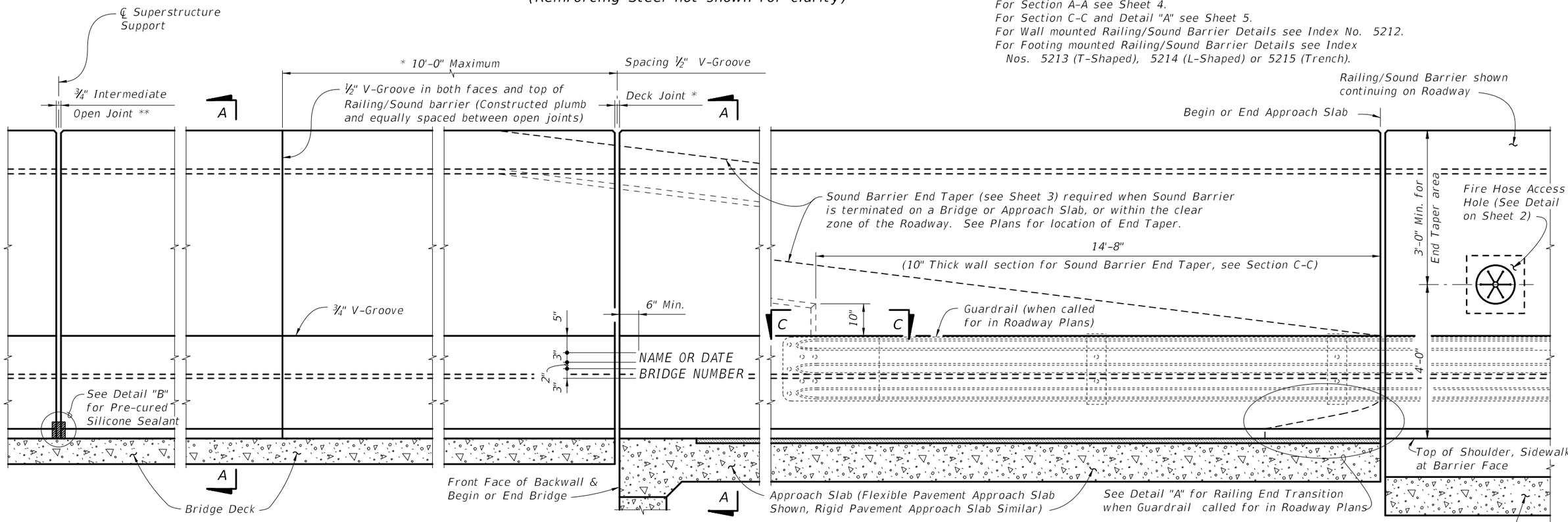
Sheet No. 15 of 15

Index No. 5200



PLAN (BRIDGE MOUNTED RAILING/SOUND BARRIER SHOWN, WALL OR FOOTING MOUNTED RAILING/SOUND BARRIER SIMILAR) (Reinforcing Steel not shown for clarity)

CROSS REFERENCE:
For Detail "B" and V-Groove Lettering Detail see Sheet 2.
For Section A-A see Sheet 4.
For Section C-C and Detail "A" see Sheet 5.
For Wall mounted Railing/Sound Barrier Details see Index No. 5212.
For Footing mounted Railing/Sound Barrier Details see Index Nos. 5213 (T-Shaped), 5214 (L-Shaped) or 5215 (Trench).



ELEVATION OF INSIDE FACE OF RAILING/SOUND BARRIER (BRIDGE MOUNTED RAILING/SOUND BARRIER SHOWN, WALL OR FOOTING MOUNTED RAILING/SOUND BARRIER SIMILAR) (Reinforcing Steel not shown for clarity)

** On Bridges see Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Open Railing/Sound Barrier Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railing/Sound Barrier walls on skewed bridges see Index No. 420. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent, Junction Slab or Footing similar.*

*** ¾" Intermediate Open Joints shall be constructed plumb and provided at :*
(1) – Superstructure supports where slab is continuous.
(2) – Construction Joints for Junction Slabs and Footings.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Deleted INSTRUCTIONS TO DESIGNER. Changed spacing of V-Grooves and Intermediate Open Joint.			
01/01/11	SJN	Changed note * reference to Index 490 and Mortar Plug to Pre-cured Silicone Sealant in ELEVATION.			

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TRAFFIC RAILING/SOUND BARRIER (8'-0")

Interim Date 01/01/11

Index No. 5210

TRAFFIC RAILING/SOUND BARRIER NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to a safety shape/sound barrier combination railing which has been crash tested to NCHRP Report 350 TL-4 Criteria. The Transverse Design Force for the design of bridge deck overhang shall be 54 kips applied horizontally at 3'-6" height above the deck.

CONSTRUCTION REQUIREMENTS : The Traffic Railing/Sound Barrier and joints shall be constructed plumb, they shall not be constructed perpendicular to the roadway surface. Slip forming is not permitted.

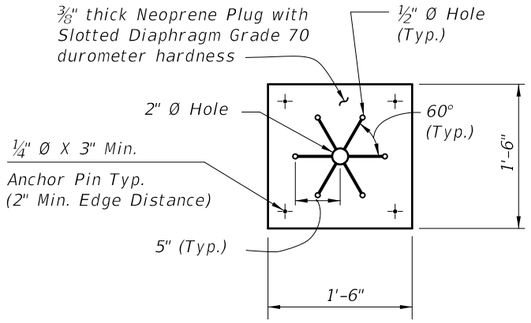
CONCRETE AND REINFORCING STEEL : For Railing/Sound Barrier on bridges see General Notes. For Wall and Footing mounted Railing/Sound Barrier, concrete shall be Class II for slightly aggressive environments and Class IV for moderately or extremely aggressive environments. All reinforcing steel shall be Grade 60.

NAME, DATE AND BRIDGE NUMBER : For Railing/Sound Barrier on bridges, the Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

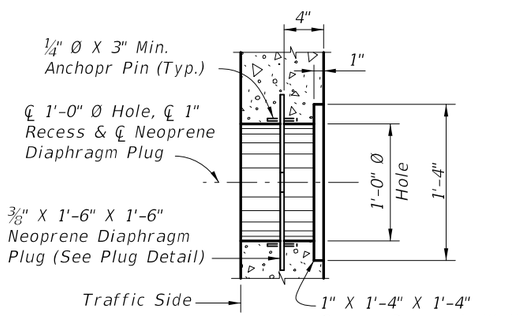
MARKERS : For Railing/Sound Barrier on bridges, Elevation Markers shall be placed on top of the Traffic Railing/Sound Barrier or Bridge Deck at the end bents as directed by the Engineer. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Railing/Sound Barrier.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers 2'-4" above the riding surface at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing/Sound Barrier.

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required



NEOPRENE DIAPHRAGM PLUG DETAIL

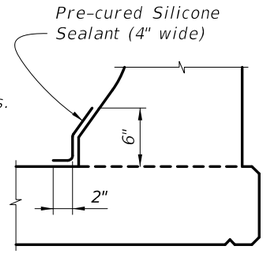


TYPICAL SECTION
FIRE HOSE ACCESS DETAIL

NOTE:
Fire hose access holes are required at or near fire hydrant locations. Field cut reinforcement as required to maintain 2" minimum cover at access holes. Locate fire hose access holes a minimum of 10'-0" from ¾" open joints when possible.

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Section 932 of the Specifications.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



DETAIL "B" - SECTION AT INTERMEDIATE OPEN JOINT

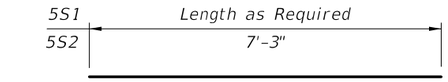
ESTIMATED TRAFFIC RAILING/SOUND BARRIER QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete (Railing)	CY/LF	0.104
Concrete (Sound Barrier)	CY/LF	0.145
Reinforcing Steel (Typical)	LB/LF	78.57
Additional Reinf. @ Open Joint	LB	430.24

(The above quantities are based on the bridge mounted typical section, 2% deck cross slope and railing on low side of deck.)

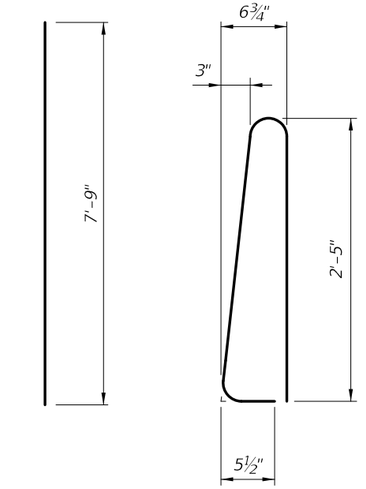
REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	5'-7"
R	5	7'-9"
S1	5	As Reqd.
S2	5	7'-3"
V (Bridge and Wall)	5	5'-1"
V (Footing)	5	7'-7"

BRIDGE CROSS-SLOPE		LOW GUTTER ØA	LOW GUTTER ØB	HIGH GUTTER ØA	HIGH GUTTER ØB
BRIDGE MOUNTED	0% to 2%	90°	90°	90°	90°
	2% to 6%	93°	87°	87°	93°
	6% to 10%	96°	84°	84°	96°
WALL & FOOTING MOUNTED		90°	90°	90°	90°

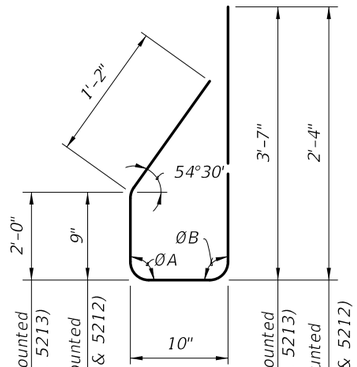


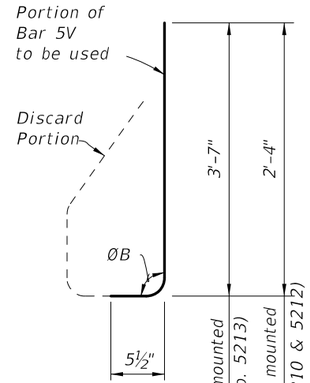
BARS 5S1 & 5S2



BAR 5R (Field Cut for End Taper)

STIRRUP BAR 5P



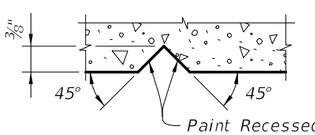


STIRRUP BAR 5V

END STIRRUP BAR 5V
To Be Field Cut (One Required per Railing End Transition)

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints shall have a 2" minimum cover.
3. Bars 5S1 may be continuous or spliced at the construction joints. Lap splices for Bars 5S1 shall be a minimum of 2'-2".
4. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.
5. Bars 5R shall be one continuous bar. No mechanical couplers or lap splices are permitted.
6. See Index Nos. 5214 and 5215 for Bars 5V and 5T in L-shaped and Trench footings.



SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED LETTERS AND FIGURES

CROSS REFERENCE:
For locations of Detail "B", see Sheet 1.

REVISIONS

DATE	BY	DESCRIPTION
01/01/09	SJN	Changed "NAME, DATE AND BRIDGE NUMBER" note and "Ribbed" to "Slotted" in NEOPRENE DIAPHRAGM PLUG DETAIL. Added "REFLECTIVE RAILING" note and "REFLECTIVE RAILING MARKER SPACING" table.
01/01/11	SJN	Changed Detail "B" to Pre-cured Silicone Sealant.

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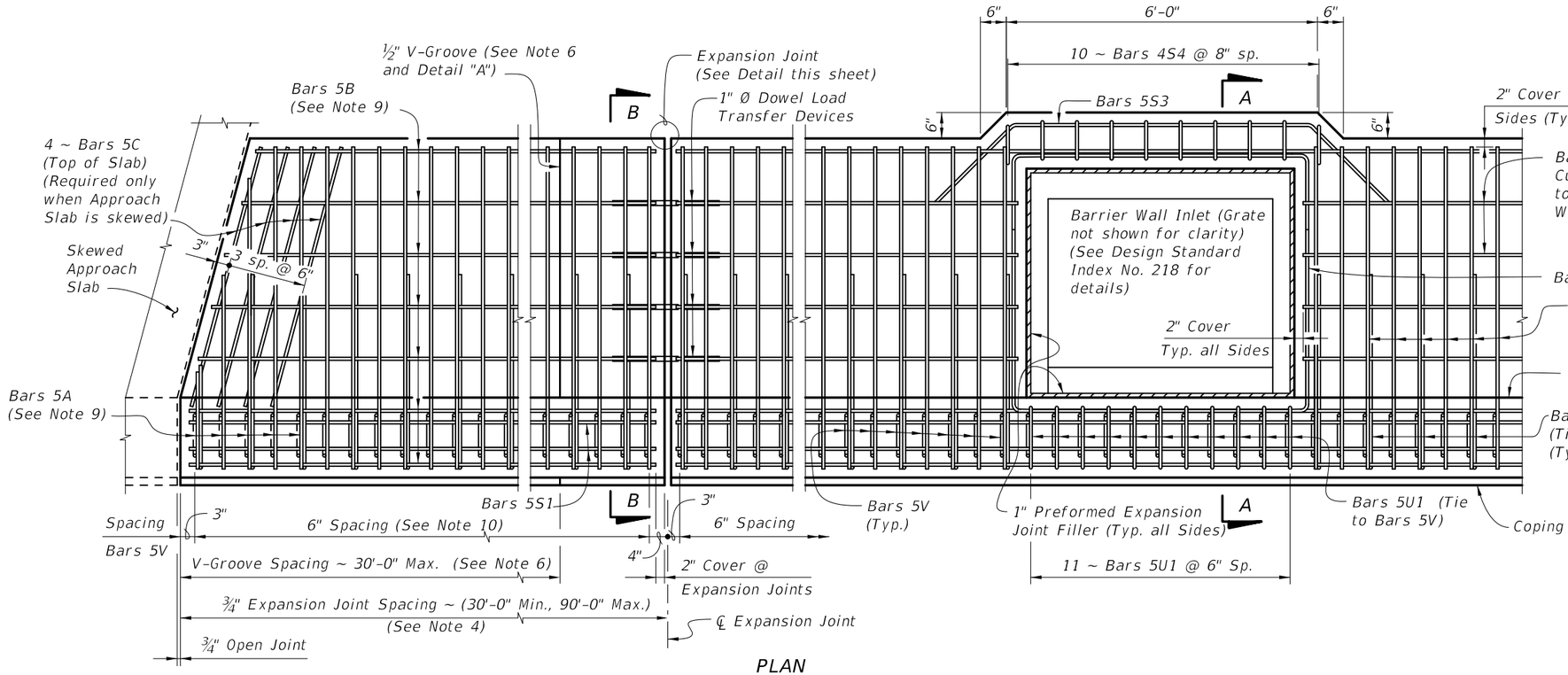
TRAFFIC RAILING/SOUND BARRIER (8'-0")

Interim Date 01/01/11

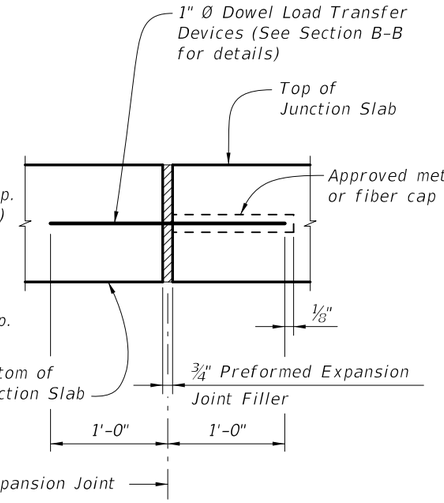
Sheet No. 2 of 5

Index No. 5210



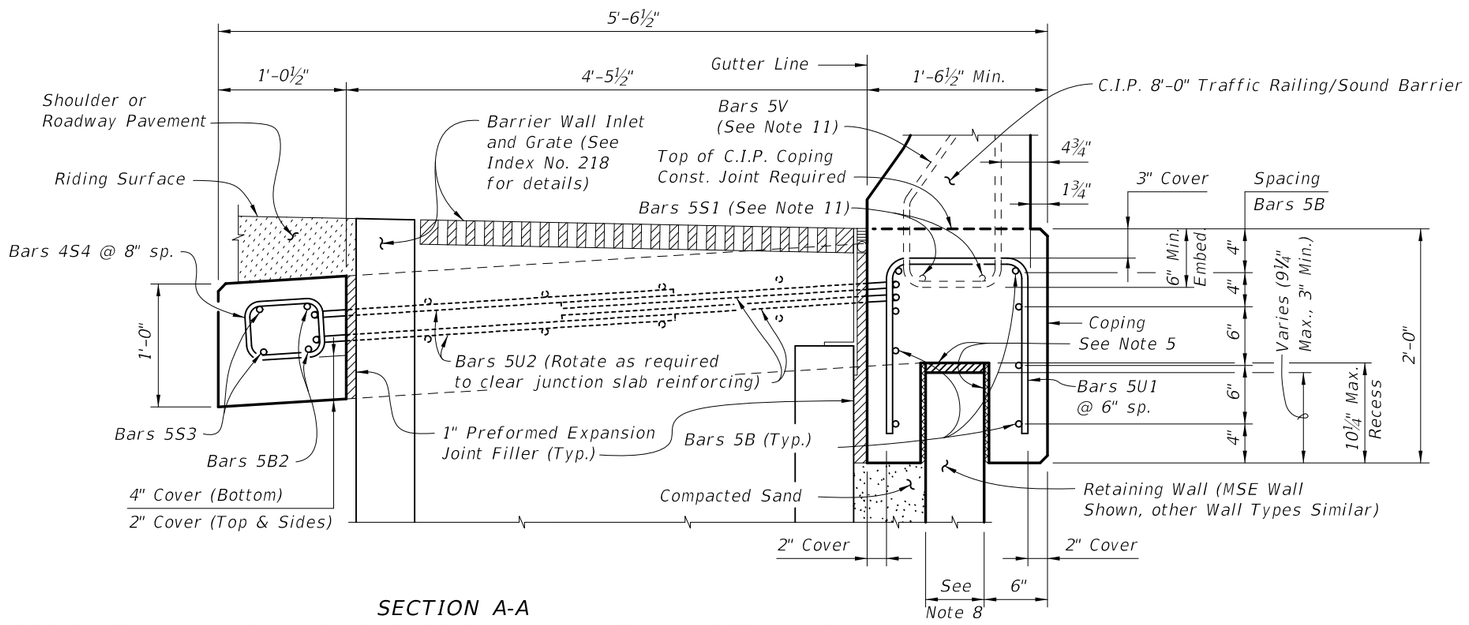
PLAN

JUNCTION SLAB ADJACENT TO SKEWED APPROACH SLAB AND WITH BARRIER WALL INLET



EXPANSION JOINT DETAIL

(Junction Slab expansion joints are required at ¾" open joints in Traffic Railing Railing/Sound Barrier)



SECTION A-A

SECTION THRU JUNCTION SLAB, BARRIER WALL INLET AND RETAINING WALL

NOTES

1. CONSTRUCTION REQUIREMENTS: Construct the Junction Slab level transversely and expansion joints plumb; do not construct the junction slab perpendicular to the roadway surface. Slip forming is not permitted.
2. CONCRETE: Use Class II concrete for slightly aggressive environments. Use Class IV concrete for moderately or extremely aggressive environments. Concrete will be in accordance with Specification Section 346.
3. REINFORCING STEEL: Provide Grade 60 reinforcing steel in accordance with Specification Section 931. Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
4. EXPANSION JOINTS: Construct ¾" Expansion Joints plumb and perpendicular or radial to Gutter Line. Provide at 90'-0" maximum intervals as shown.
5. Provide Preformed Expansion Joint Filler (1" thick) on top and Expanded Polystyrene (½" thick) on sides.
6. V-GROOVES: Construct ½" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between ¾" Expansion Joints and/or Begin or End Junction Slab. V-Groove locations are to coincide with V-Groove locations in the Railing/Sound Barrier.
7. FILL REQUIREMENTS: Shoulder or Roadway Pavement or Fill is required on top of the junction slab for its entire length on the traffic side of the Railing/Sound Barrier. See Section B-B for details.
8. Actual location & width vary depending on type of Retaining Wall used.
9. Field cut Bars 5A and 5B as required to maintain minimum cover for skewed Approach Slab.
10. Spacing shown is along the Gutter Line.
11. See Index No. 5210 for Bars 5V and 5S1.
12. Work this Index with the following:
    Index No. 5210 – Traffic Railing/Sound Barrier (8'-0").

CROSS REFERENCE:

For Section B-B and Detail "A", see Sheet 2.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed Junction Slab details.			

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TRAFFIC RAILING/SOUND BARRIER (8'-0") JUNCTION SLAB

Interim Date 01/01/11

Sheet No. 1 of 2

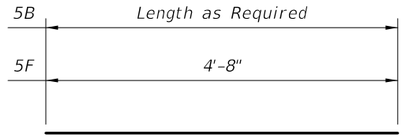
Index No. 5212

REINFORCING STEEL BENDING DIAGRAMS

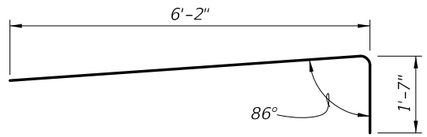
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
A	5	7'-9"
B	5	AS REQ'D.
L	5	4'-5"
S3	5	10'-0"
S4	4	3'-1"
U1	5	4'-1"
U2	5	12'-10"
DOWEL	1" Ø Smooth Bar	2'-0"

REINFORCING STEEL NOTES:

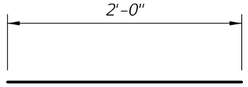
1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints will have a 2" minimum cover.
3. Lap splices for Bars 5B will be a minimum of 2'-0".
4. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



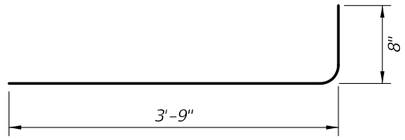
BARS 5B & 5F



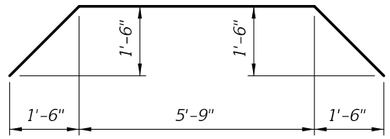
BAR 5A



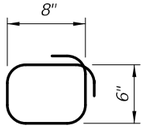
1" Ø DOWEL



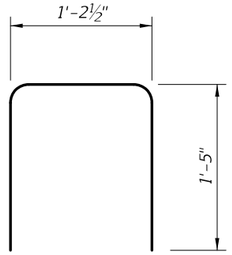
BAR 5L



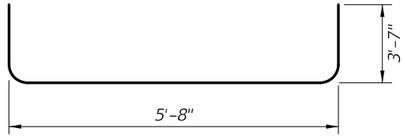
BAR 5S3



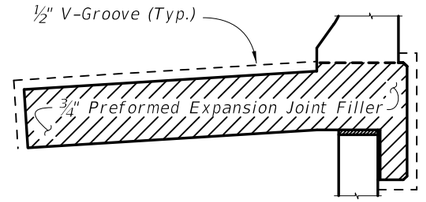
BAR 4S4



BAR 5U1

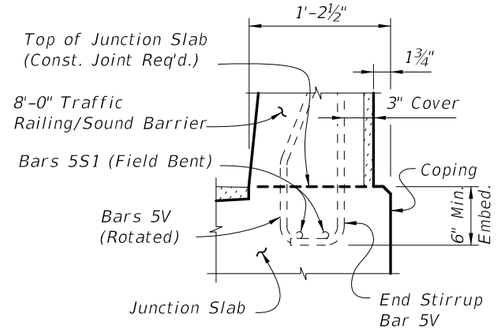


BAR 5U2



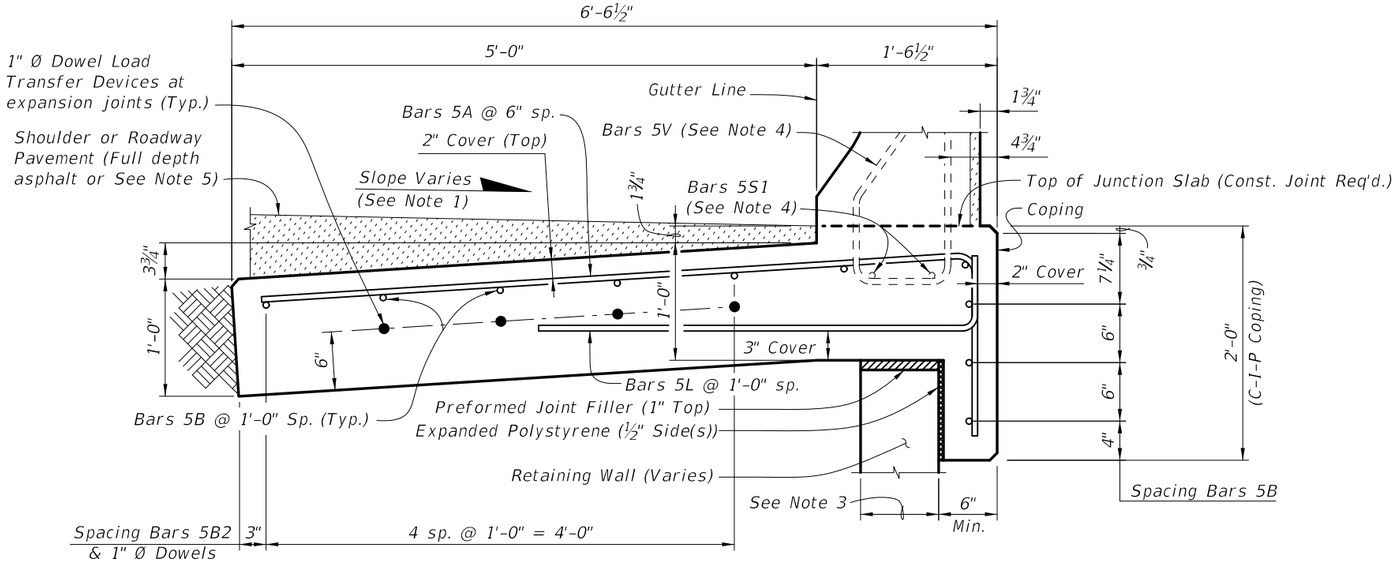
DETAIL "A"

(Showing Locations of ½" V-Grooves and ¾" Preformed Expansion Joint Filler)



PARTIAL END VIEW OF RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5V and Bars 5S1)

NOTE: See Index No. 5210, Detail "A" for details.



SECTION B-B
TYPICAL SECTION THRU JUNCTION SLAB AND RETAINING WALL

ESTIMATED JUNCTION SLAB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete (Junction Slab)	CY/FT.	0.264
Reinforcing Steel (Typical)	LB/FT.	30.39
Additional Reinf. @ Expansion Joint	LB.	21.36

(The above concrete quantities are based on a superelevation of 6.25%.)

NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. The 3¾" dimension corresponds to a superelevation of 6.25%. For superelevations exceeding 6.25%, increase this dimension as required to match roadway superelevation.
3. Actual width varies depending on type of Retaining Wall used.
4. See Index No. 5210 for Bars 5V and 5S1.
5. For Rigid Pavement (Concrete), Junction Slab may be thickened to match finished grade.

CROSS REFERENCE:
For location of Section B-B, see Sheet 1.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed Junction Slab Detail.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

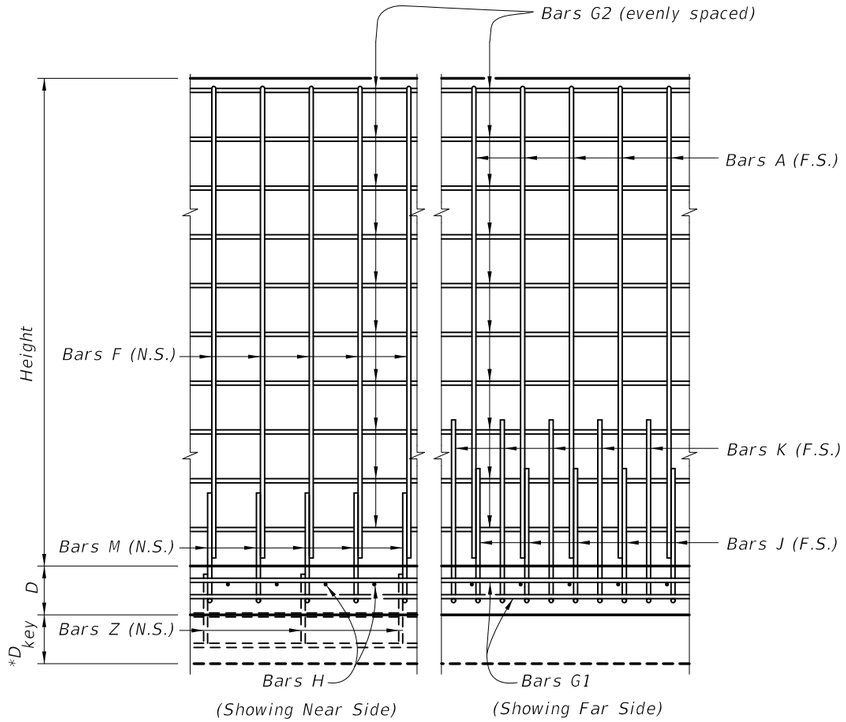
2010 Interim Design Standard

TRAFFIC RAILING/SOUND BARRIER (8'-0") JUNCTION SLAB

Interim Date 01/01/11

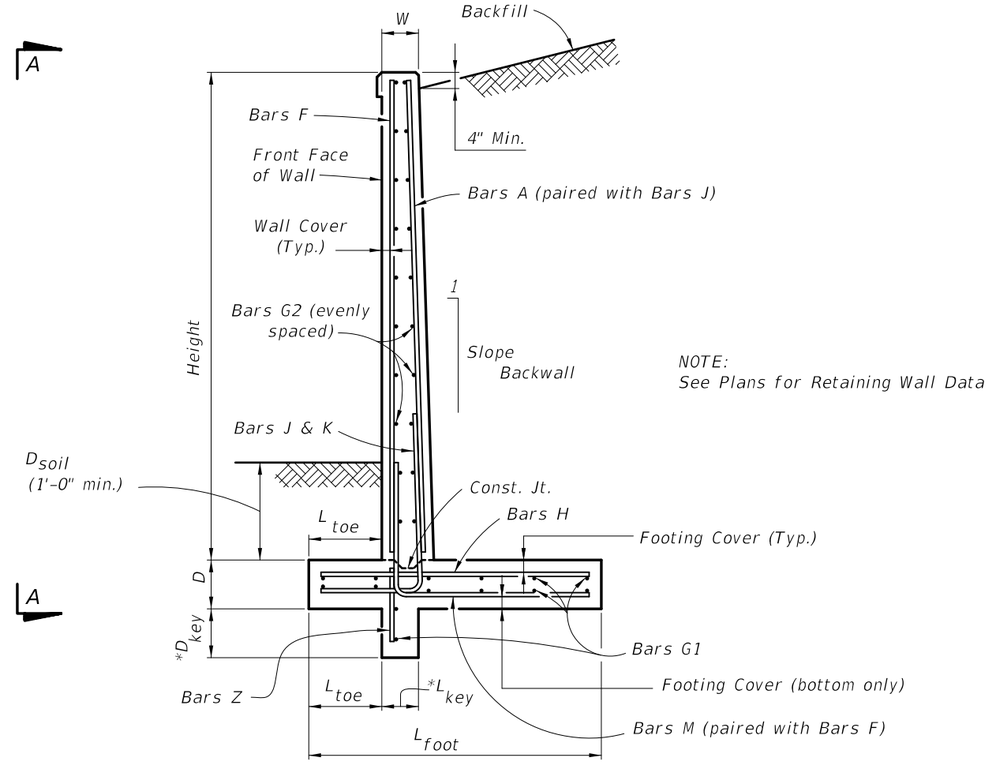
Sheet No. 2 of 2

Index No. 5212



VIEW A-A

(Shear key shown dashed)



* Shear Key is required only when specified by the Engineer

TYPICAL SECTION

NOTES

DESIGN SPECIFICATIONS:
Design according to FDOT Structures Manual (current edition).

MATERIALS:
All reinforcing steel shall conform to ASTM A615 Grade 60.

SURFACE FINISH:
A Class 5 Applied Finish Coating shall be applied to the top of the wall and the exposed face above ground line.

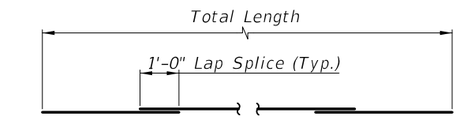
ARCHITECTURAL SURFACE TEXTURES:
Alternate Architectural Surface Textures may be substituted for the Striated Pattern shown when approved by the Engineer. Concrete required for Architectural Surface Textures is not included in the quantities.

TRAFFIC RAILING BARRIER:
If there is a Traffic Railing Barrier on the wall, Wall Joints and Barrier V-Grooves shall align and Wall Expansion Joints and Barrier Open Joints shall align.

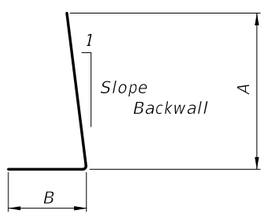
FOUNDATION: Prepare the soil below the footing in accordance with the requirements for spread footings in Specification Section 455.

PAYMENT:
All Retaining Wall costs, including all miscellaneous costs, shall be paid for at the unit contract price for either Class II, III or IV Concrete (Retaining Walls) (CY) and Reinforcing Steel (Retaining Walls) (LBS). Retaining Wall quantities shall not include concrete nor reinforcing steel for Traffic Railings/Junction Slab. Traffic Railing/Junction Slab shall be paid for under Concrete Traffic Railing Barrier with Junction Slab.

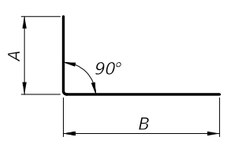
BENDING DIAGRAM



BARS G1



BARS J & K



BARS M

NOTE:
All bar dimensions are out-to-out

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index 5100); Added Shear Key to VIEW A-A; Changed "Architectural Treatment" to "Architectural Surface Textures" in Notes.			

2010 Interim Design Standard

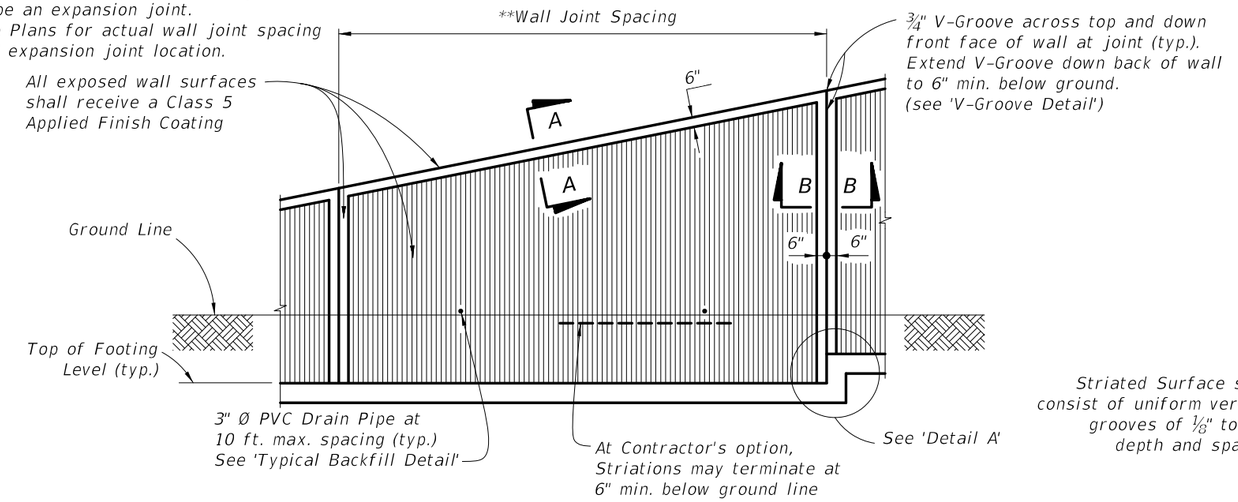
C-I-P CANTILEVER RETAINING WALL

Interim Date 01/01/11

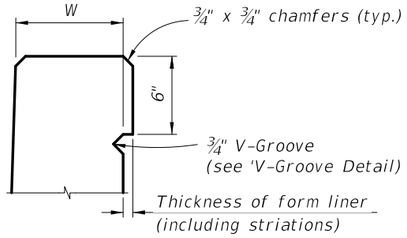
Sheet No. 1 of 2

Index No. 6010

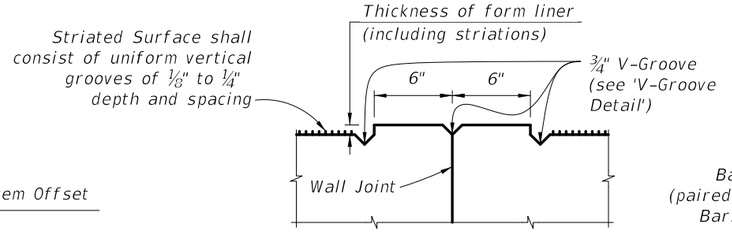
**Wall joint spacing 25 ft. maximum.
At minimum, every fourth wall joint to be an expansion joint.
See Plans for actual wall joint spacing and expansion joint location.



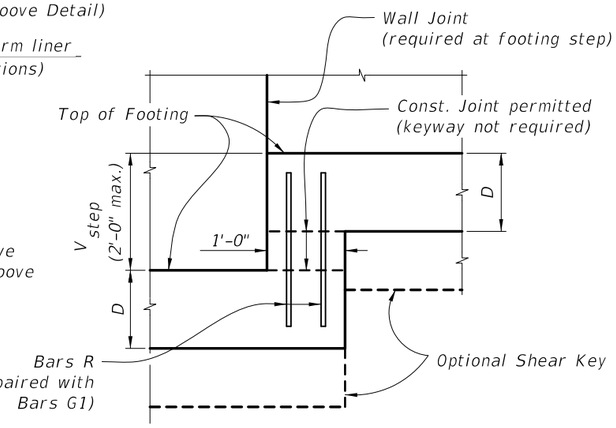
FRONT ELEVATION



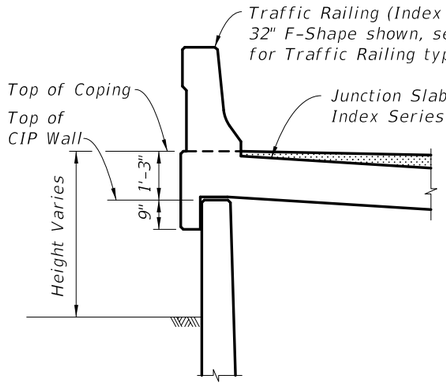
SECTION A-A



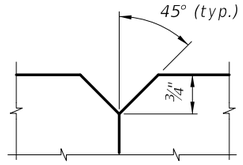
SECTION B-B



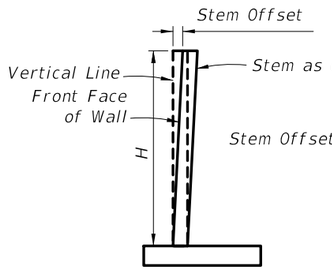
DETAIL A



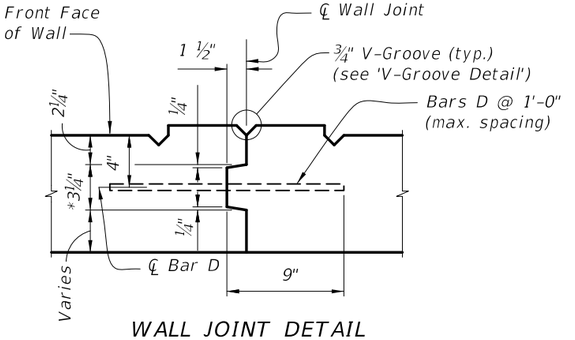
TRAFFIC RAILING/JUNCTION SLAB DETAIL
(32" F-Shape Shown, other Traffic Railings similar)
(for 32" F-Shape Traffic Railing (as shown), see Index No. 420;
for 32" Vertical Shape Traffic Railing, see Index No. 423;
for 42" Vertical Shape Traffic Railing, see Index No. 422)



V-GROOVE DETAIL

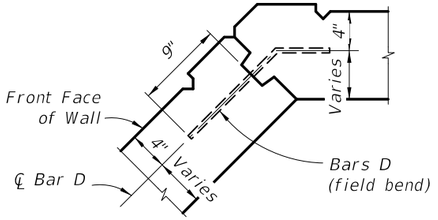


STEM OFFSET VALUES
(for H < 20 ft.)

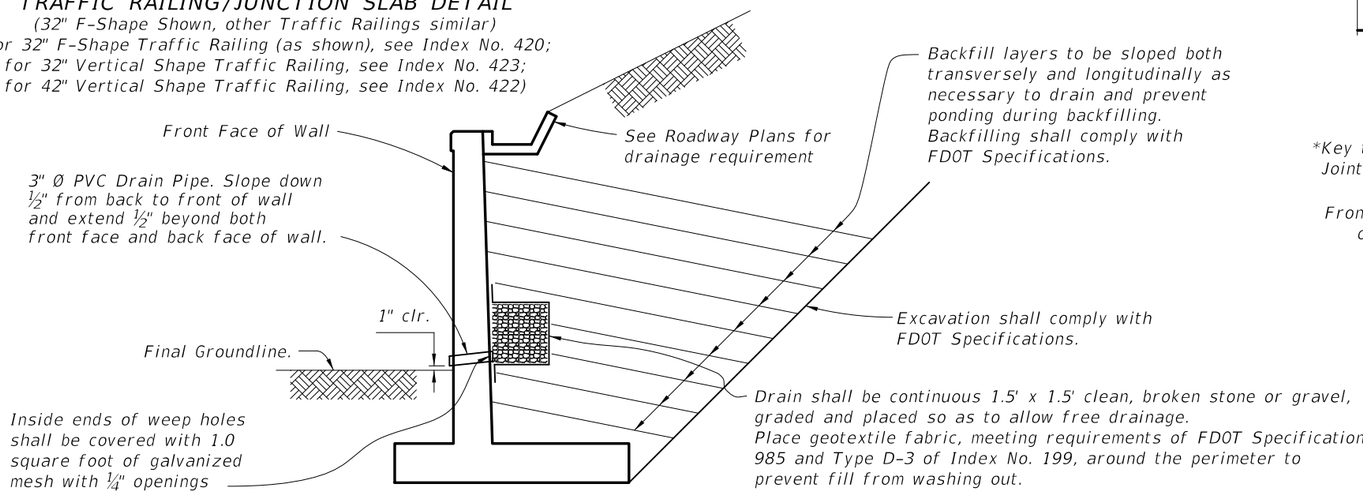


WALL JOINT DETAIL

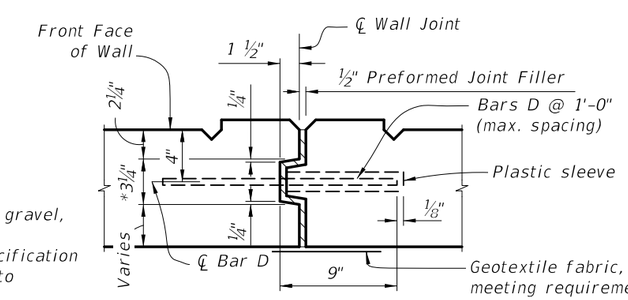
*Key to stop at top of footing and 6" from top of wall.
Joint across footing and top of wall to be straight line.



TYPICAL CORNER JOINT DETAIL



TYPICAL BACKFILL DETAIL



EXPANSION JOINT DETAIL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index Number (Previously Index 5100), Changed Traffic Railing attachment detail.			

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C-I-P CANTILEVER RETAINING WALL

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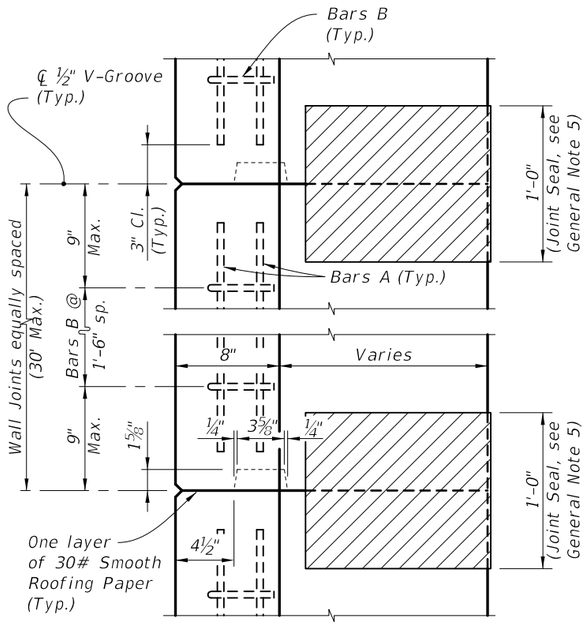
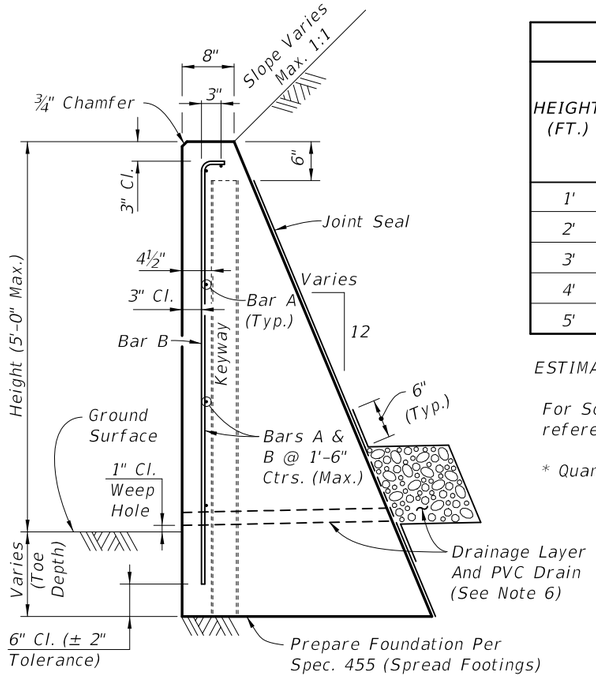
Sheet No. 2 of 2

Index No. 6010



KEYWAY & WALL JOINT DETAIL
(TOP VIEW)



TYPICAL SECTION

ESTIMATED QUANTITIES FOR WALL

HEIGHT (FT.)	PER LINEAR FOOT OF WALL				WEEP HOLES & DRAIN REQD.
	CLASS NS CONCRETE (CY)			REINF. STEEL (LB.)	
	SCHEME 1	SCHEME 2	SCHEME 3		
1'	0.08	0.11 (0.20*)	0.03	3 (4*)	No
2'	0.14	0.20 (0.32*)	0.09	4 (5*)	No
3'	0.22	0.32 (0.47*)	0.29	5 (6*)	Yes
4'	0.32	0.47 (0.65*)	0.43	6 (7*)	Yes
5'	0.43	0.65 (0.85*)	0.60	7 (8*)	Yes

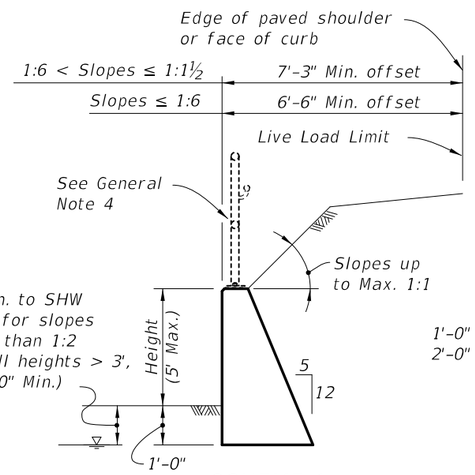
ESTIMATED QUANTITIES NOTES:

For Scheme 3 Junction Slab and Traffic Railing see the referenced Design Standards for estimated quantities.

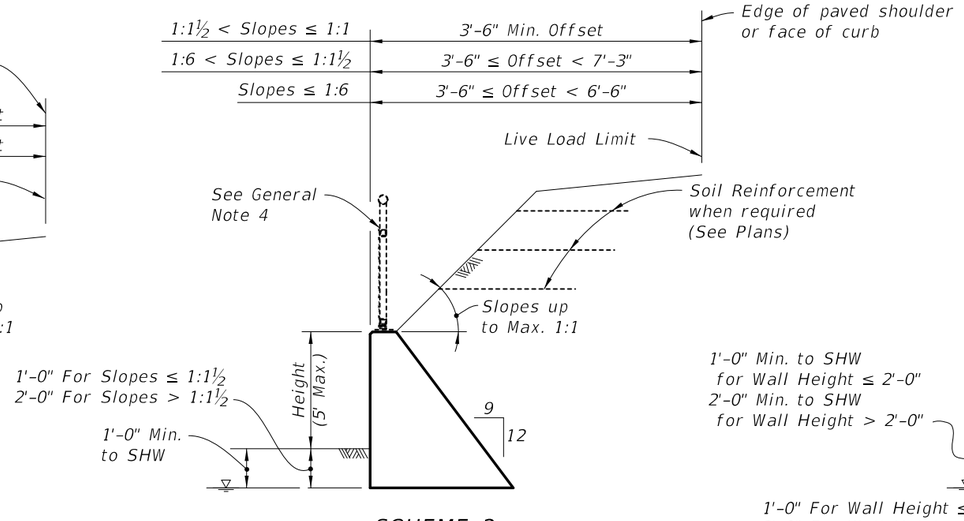
* Quantity for 2'-0" Toe Depth in Scheme 2.

GENERAL NOTES

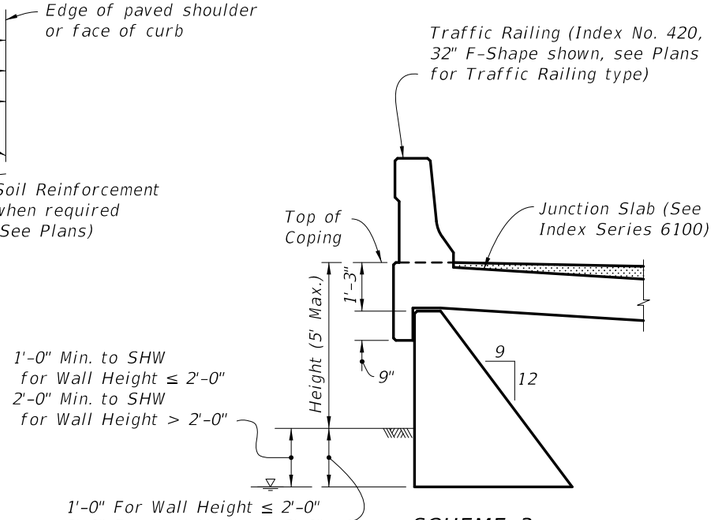
1. Gravity walls constructed as extensions of reinforced concrete retaining walls, except walls of proprietary designs, shall have the same face texture and finish as the reinforced concrete retaining wall.
2. Concrete for Gravity Wall shall be Class NS per Section 347. Concrete for Scheme 3 Junction Slab and Traffic Railing shall be Class II per Section 346, unless otherwise specified in the plans.
3. Reinforcing steel shall be ASTM A615, Grade 40 or 60 provided at the max. spacings shown. ASTM A185 Smooth or ASTM A497 Deformed Welded Wire Fabric (WWF) may be substituted on an equal area basis. Do not increase bar/wire spacing for Grade 60 reinforcing steel or WWF.
4. When required, for adjunct guiderail see the plans, Index No. 870 or 880 as appropriate. For adjunct Type B fence see Index No. 802.
5. Joint seal to be two layers of 30# smooth roofing paper or Type D-5 geotextile fabric in accordance with Index No. 199. Mop all contact surfaces of concrete and roofing paper or geotextile fabric with cut-back asphalt. Stop roofing paper or geotextile fabric 6" below top of wall).
6. Provide a continuous 1'x1' clean gravel or crushed rock drain for wall heights 3 ft. and higher. Wrap drainage layer as shown, with Type D-3 geotextile fabric in accordance with Index No. 199. Provide 8"x8" galvanized mesh with ¼" openings, at the inside end of the PVC Drain Pipe. Provide 2" Ø PVC Drain Pipe (Sch. 40) at 10 ft. max. spacing (When Drainage Layer required). Locate minimum 2'-0" clear of wall joints.
7. Cost of reinforcing steel, face texture, finish, joint seal, drain pipes, drainage layer, galvanized mesh and geotextile fabric to be included in the Contract Unit Price for Concrete Class NS, Gravity Wall. Cost of concrete for Junction Slab in Scheme 3, to be included in Contract Unit Price for Concrete Traffic Railing Barrier With Junction Slab. Adjunct railings or fences to be paid for separately.



SCHEME 1
(No Traffic Loading Effects)



SCHEME 2
(With Traffic Loading or Slopes > 1:1½)

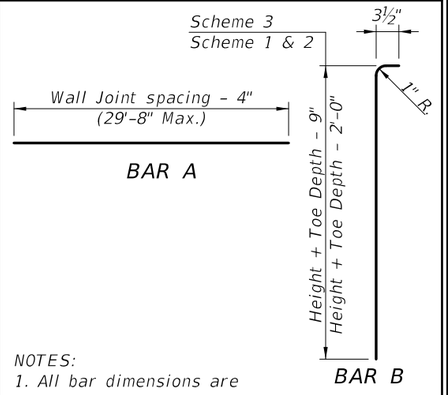


SCHEME 3
(With Traffic Railing)

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
A	4	As Reqd.
B	4	As Reqd.

BAR BENDING DIAGRAM



NOTES:
1. All bar dimensions are out to out.
2. Lap splices for Bars A must be a minimum of 1'-6".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index 520); Changed Junction Slab detail in Scheme 3, and concrete cover to 3".			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

C-I-P GRAVITY WALL

Interim Date 01/01/11

Sheet No. 1 of 1

Index No. 6011

NOTES

SPECIFICATIONS:

1. General Specifications:
   The Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", Current Edition and Supplements as Amended.
2. Design Specifications:
   a. Florida Department of Transportation (FDOT) "Structures Design Guidelines", Current Edition.
   b. American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Current Edition.
   c. AASHTO-AGC-ARTBA Task Force 27 (Ground Modification Techniques), "Insitu Soil Improvement Techniques", January 1990.

DESIGN CRITERIA:

1. Design is based on the assumption that the material contained within the reinforced soil volume, methods of construction and quality of prefabricated materials are in accordance with Specification Section 548 and Chapter 3 of the FDOT's Structures Design Guidelines.
2. It is the responsibility of the Engineer of Record to determine that the maximum factored bearing pressure shown for the wall does not exceed the factored bearing resistance of the foundation for that specific wall location.
3. The Wall Company is responsible for internal stability of the wall. External stability design, including foundation and slope stability, is the responsibility of the Engineer of Record.
4. If there are manholes and/ or drop inlets present, design and analysis for both internal and external stability shall be considered.

SOIL PARAMETERS:

1. See Wall Control Drawings for soil characteristics of foundation material to be used in the design of the wall system.
2. The Contractor will provide soil design parameters for backfill material based on the actual soil characteristics utilized at the site.

MATERIALS:

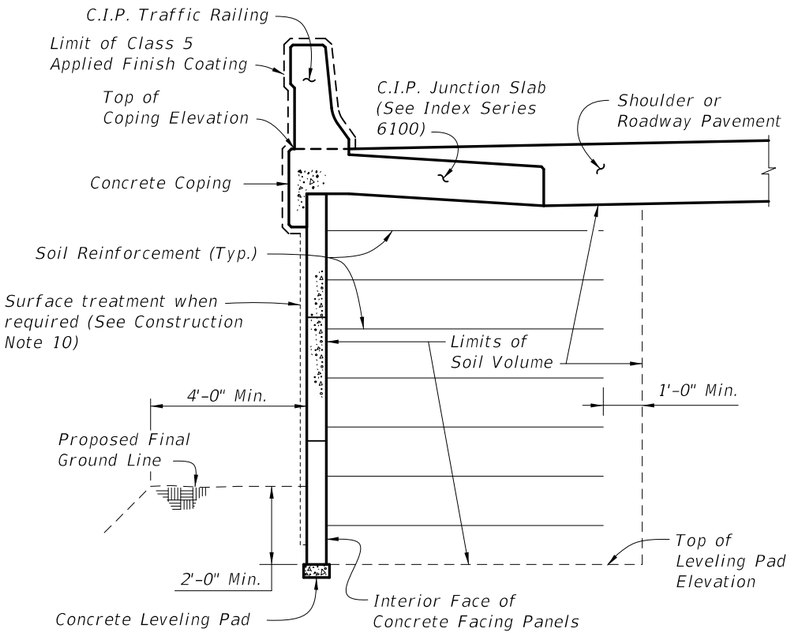
1. Concrete Class: See Wall Control Drawings.
2. See Specification Section 548 for material requirements.
3. For additional material requirements see the Wall Company's General Notes.

CONSTRUCTION:

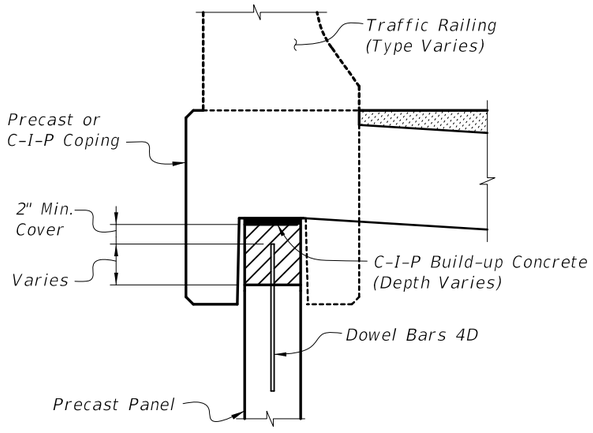
1. Walls will be constructed in accordance with Specification Section 548 and the Wall Company's instructions.
2. For location and alignment of retaining walls, see Wall Control Drawings.
3. If present, consider in design and analysis and locate manholes and drop inlets as shown on wall elevations.
4. Refer to Wall Control Drawings of individual walls for minimum reinforcement strip/mesh length, factored bearing resistance's, minimum wall embedment and anticipated long term and differential settlements.
5. The Contractor is responsible for controlling water during storm events as needed during construction.
6. It is the Contractor's responsibility to determine the location of any guardrail posts behind retaining wall panels. Prior to placement of the top layer of soil reinforcement, individual reinforcing strips/mesh may be skewed (15° maximum) to avoid the post locations if authorized by the Engineer. No cutting of soil reinforcement is allowed unless shown on Shop Drawings and approved by the Engineer. Any damage done to the soil reinforcement due to installation of the guardrail will be repaired by the Contractor at the Contractor's expense. Repair method will be approved by the Engineer.
7. If existing or future structures, pipes, foundations or guardrail posts within the reinforced soil volume interfere with the normal placement of soil reinforcement and specific directions have not been provided on the plans, the Contractor will notify the Engineer to determine what course of action shall be taken.
8. The Contractor is responsible for gradually displacing upper layer(s) of soil reinforcement downward (15° maximum from horizontal) to avoid cutting soil reinforcement and conflicts with paving and subgrade preparation. The Contractor's attention is directed especially to situations where roadway superelevation and/or soil mixing are anticipated.
9. All exposed concrete surfaces will receive a Class 5 Applied Finish Coating in accordance with Specification Section 400. Refer to Typical Section on this sheet and the following notes for limits of applied finish:
   a. The inside, backside and top of Traffic Railings and Pedestrian/Bicycle Railings.
   b. Exposed surfaces of coping on top of retaining wall. Other coatings, colors or textures will be applied as required in the Wall Control Drawings.
10. For concrete facing panel surface treatment, see Wall Control Drawings. Extend surface treatment a minimum of 6" below final ground line.
11. Drive piles located within the soil volume prior to construction of the retaining wall, unless a method to protect the structure, acceptable to both the Engineer and Wall Company, is proposed and approved in writing. The portion of piles or drilled shafts extensions within the soil volume will be wrapped with polyethylene sheeting in accordance with Specification Section 459.
12. A structural extension of the connection of the retaining wall panel to soil reinforcement will be used whenever necessary to avoid cutting or excessive skewing (greater than 15°) of the soil reinforcement around obstructions (i.e., piles, pipes, manholes, drop inlets, etc.).
13. Steps in leveling pads will occur at MSE Wall panel interfaces. Panels will not cantilever more than 2" past the end of the upper tier leveling pad.
14. The top of the leveling pad or footing will be 2'-0" minimum below final ground line.
15. Top of leveling pad elevations shown in the Wall Control Drawings are maximum elevations. The constructed leveling pad elevations may be deeper based on the panel layout shown in the shop drawings.
16. The height of panels in the bottom course of MSE Walls must not be less than half the height of a standard panel.
17. Work this Index with Index 6100 & 6200 Series.

SHOP DRAWING REQUIREMENTS:

See Specification Section 548 for shop drawing requirements.



TYPICAL MSE RETAINING WALL SECTION
WITH A TRAFFIC RAILING
(Showing Limits of the Reinforced Soil Volume)



TYPICAL BUILD-UP DETAIL FOR
COPING/JUNCTION SLAB

FDOT MSE RETAINING WALL CLASSIFICATION TABLE

Durability Requirements					Other Allowable FDOT Wall Types					
Applicable FDOT Wall Type *	Concrete Cover (in.)	Concrete Class for Panels	Pozzolan Additions? **	Soil Reinforcement Type	2A	2B	2C	2D	2E	2F
Type 2A	2	II	No	Metal		✔	✔	✔	✔	✔
Type 2B	2	IV	No	Metal			✔	✔	✔	✔
Type 2C	3	IV	No	Metal				✔	✔	✔
Type 2D	3	IV	Yes	Metal					✔	✔
Type 2E	3	IV	No	Plastic						✔
Type 2F	3	IV	Yes	Plastic						

* See Data Table in Contract Plans.

** Silica fume, metakaolin or ultrafine fly ash.

GENERAL NOTES AND DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index 5300, Sheet 1 of 19); Changed Materials Notes, Construction Notes 11 & 14 and Shop Drawing note; Deleted Construction Note 9 and QPL Notes.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

PERMANENT MSE RETAINING WALL SYSTEMS

Interim Date 01/01/11

Sheet No. 1 of 1

Index No. 6020

NOTES

SPECIFICATIONS:

1. General Specifications:
   The Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", Current Edition and Supplements as Amended.
2. Design Specifications:
   a. Florida Department of Transportation (FDOT) "Structures Design Guidelines", Current Edition.
   b. American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Current Edition.
   c. AASHTO-AGC-ARTBA Task Force 27 (Ground Modification Techniques), "Insitu Soil Improvement Techniques", January 1990.

DESIGN CRITERIA:

1. Design is based on the assumption that the material contained within the reinforced soil volume, methods of construction and quality of prefabricated materials are in accordance with Specification Section 548 and FDOT Structures Design Guidelines Section 3.13.2.
2. It is the responsibility of the Engineer to determine that the factored bearing pressure shown for the wall does not exceed the factored bearing resistance of the foundation for that specific wall location.
3. The Wall Company is responsible for internal stability of the wall. External stability design, including foundation and slope stability, is the responsibility of the Engineer.
4. If present, consider in design and analysis and locate manholes and drop inlets as shown on wall elevations.

SOIL PARAMETERS:

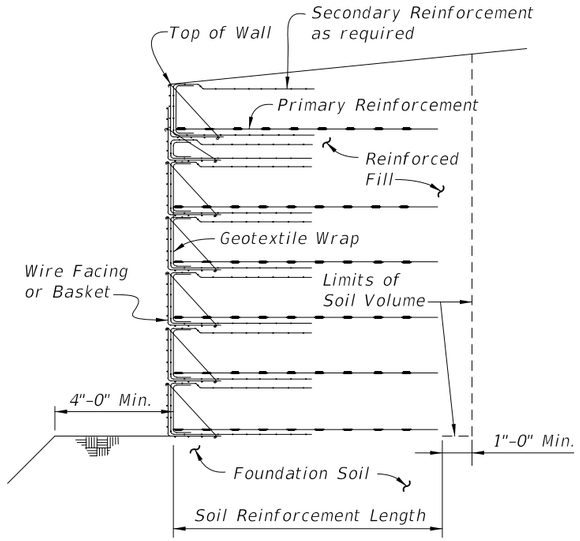
1. See wall control drawings for soil characteristics of foundation material to be used in the design of the wall system. The Contractor must provide soil design parameters for backfill material based on the actual soil characteristics utilized at the site. Provide the values of unit weight, cohesion and internal friction angle in the Shop Drawings.

MATERIALS:

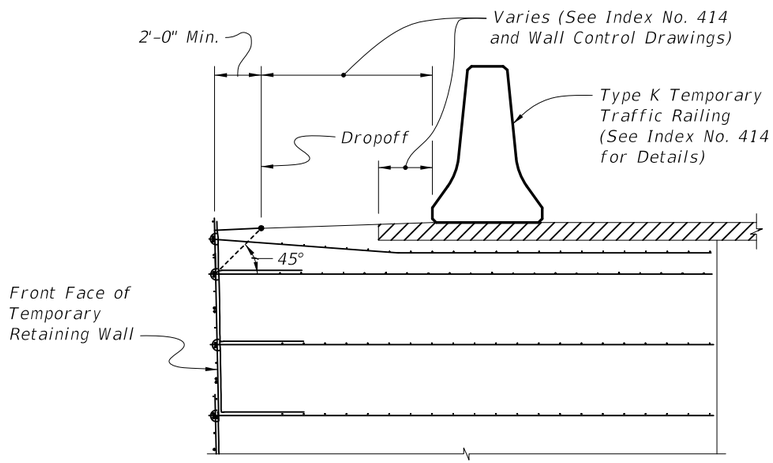
1. Provide soil reinforcement in accordance with Specification Section 548.
2. For additional material notes, see Wall Company General Notes.

CONSTRUCTION:

1. Walls must be constructed in accordance with Specification Section 548 and the Wall Company's instructions.
2. For location and alignment of retaining walls, see Wall Control Drawings.
3. Refer to Plan and Elevation sheets of individual walls for minimum reinforcement strip/mesh length, factored bearing resistance's, minimum wall embedment and anticipated long term and differential settlements.
4. If existing or future structures, pipes, foundations or guardrail posts within the reinforced soil volume interfere with the normal placement of soil reinforcement and specific directions have not been provided on the plans, the Contractor must notify the Engineer to determine what course of action should be taken.
5. The Contractor is responsible for gradually deflecting upper layer(s) of soil reinforcement downward (15° maximum from horizontal) to avoid cutting soil reinforcement and conflicts with paving and subgrade preparation. The Contractor's attention is directed especially to situations where roadway superelevation and/or soil mixing are anticipated.



TYPICAL RETAINING WALL SECTION
(Showing Limits of the Reinforced Soil Volume)



TEMPORARY TRAFFIC RAILING
PLACEMENT DETAIL

GENERAL NOTES AND DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. (Previously Index 5301)			

2010 Interim Design Standard

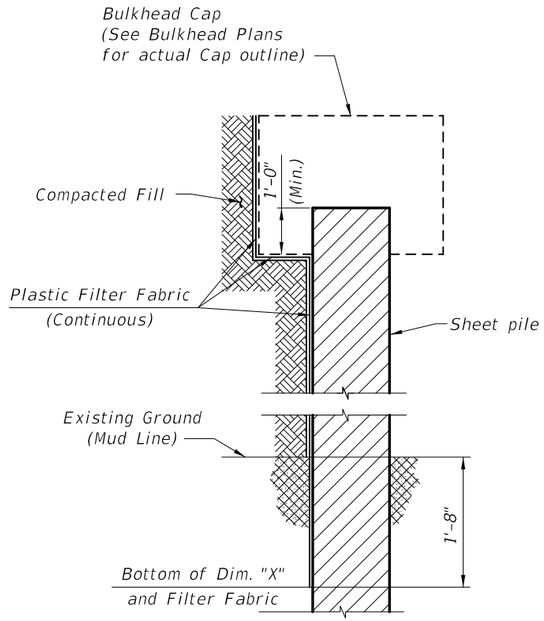
TEMPORARY MSE RETAINING WALL SYSTEMS

Interim Date: 01/01/11

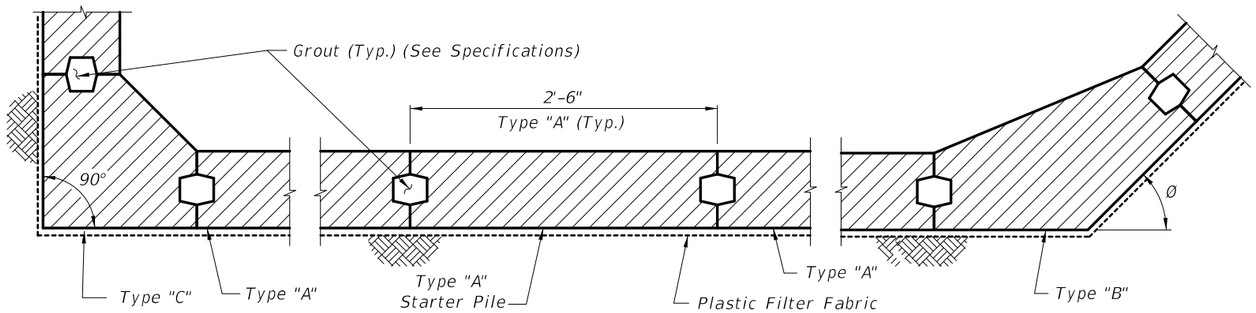
Sheet No.: 1 of 1

Index No.: 6030

CROSS REFERENCES:
For Dimensions L and X see Sheet Pile Data Table in Structures Plans.

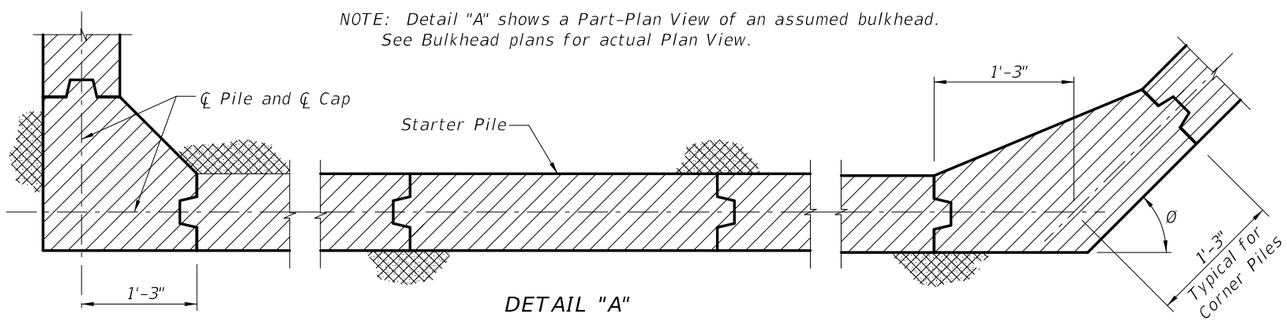


SECTION THRU BULKHEAD
(Showing Plastic Filter Fabric)



DETAIL "A"
(Cap and Anchoring System Not Shown)
(Section Taken Above Dimension "X")

NOTE: Detail "A" shows a Part-Plan View of an assumed bulkhead.
See Bulkhead plans for actual Plan View.



DETAIL "A"
(Section Taken Below Dimension "X")

SHEET PILE DESIGN CRITERIA AND NOTES

DESCRIPTION:
This Design Standard includes details for three types of piles with two thicknesses. Types "B" and "C" piles (corner piles) are of reinforced concrete construction, and Type "A" is of prestressed concrete construction. The piles shall be manufactured, cured and installed in accordance with the requirements of the contract documents.

MATERIALS: (for materials not listed refer to the Specifications)
CONCRETE

Class:	V (Special) for slightly and moderately aggressive environments V (Special w/ Silica Fume) for extremely aggressive environment
Unit weight:	150 pcf
Modulus of Elasticity:	Based on the use of Florida limerock concrete

REINFORCING STEEL
Grade: 60,000 psi ASTM A615

PRESTRESSING STEEL
Grade: 270,000 psi (Low-Relaxation Strand)

DESIGN PARAMETERS:
Type "A"

Concrete Compressive Strength at release of prestressing:	4000 psi minimum
Uniform compression after prestressing losses:	1000 psi minimum
Pick-up, Storage and Transportation:	0.0 psi tension with 1.5 times pile self weight

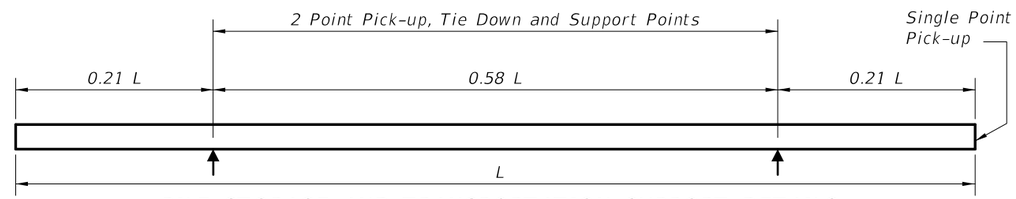
Types "B" & "C"
Pick-up, Storage and Transportation: Minimum compressive strength $f'ci \geq 4000$ psi required.

ENVIRONMENT:
The pile designs are applicable to all Environments.

PLASTIC FILTER FABRIC:
The plastic filter fabric shall extend to the bottom of the "X" dimension.

PILE PICK-UP AND HANDLING:
Type "A"
Pick-up of pile may be either a single point pick-up or a two point pick-up as shown below.
Types "B" & "C"
Two point pick-up for lifting out of forms & two point support for storage & transportation.
Single point pick-up for installation only.

PILE FIT-UP:
The 2'-6" Sheet Pile dimension is nominal. This dimension may be shortened by the Manufacturer up to ½" to allow for Sheet Pile fit-up in its final position. Minimum Sheet Pile width is 2'-5½". No changes shall be made to the tongues or grooves.



PILE STORAGE AND TRANSPORTATION SUPPORT DETAILS

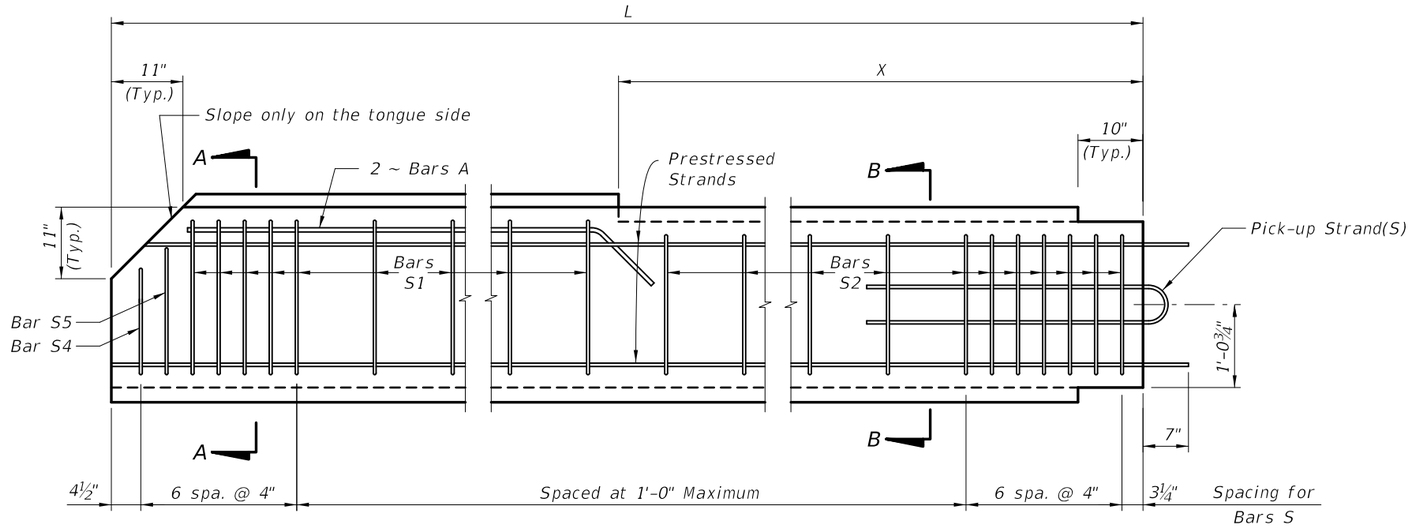
NOTES AND DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index Number (Previously Index 20400)			

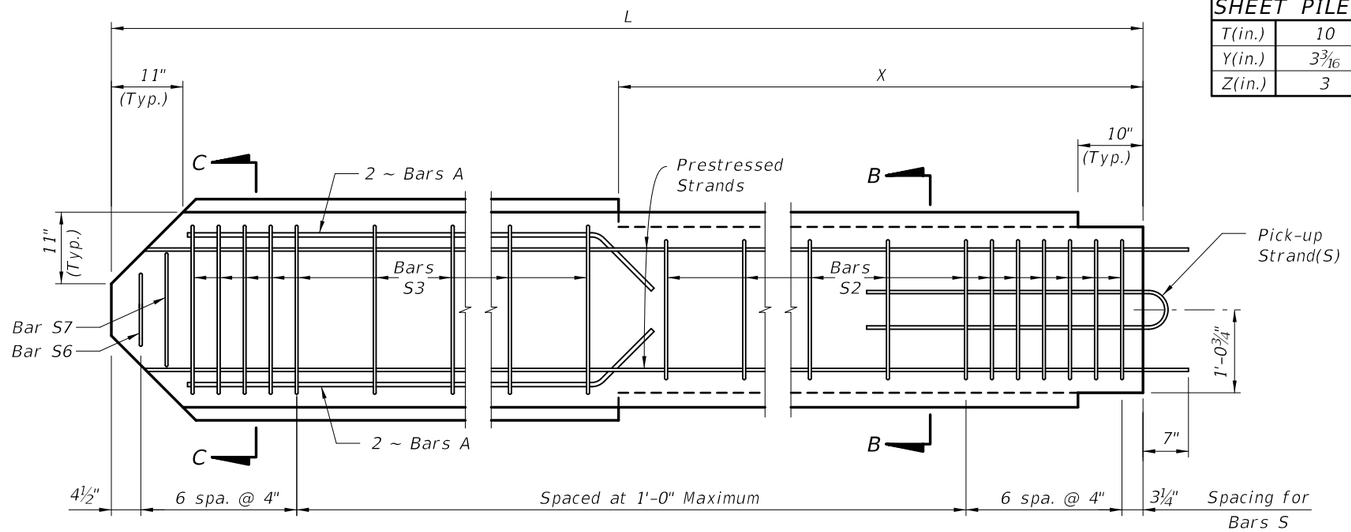
2010 Interim Design Standard

PRECAST CONCRETE SHEET PILE WALL

Interim Date 01/01/11
Sheet No. 1 of 4
Index No. 6040



TYPICAL PILE



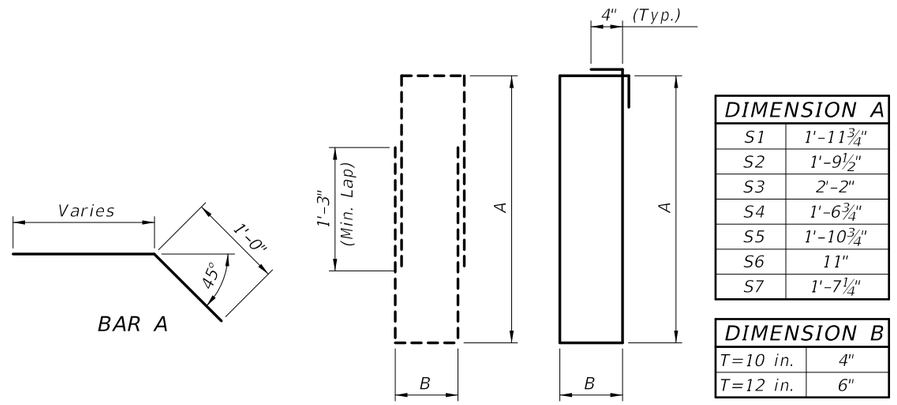
STARTER PILE

Wall Thickness	STRAND DIA. (in.)	MAXIMUM L	n	D (in.)	TOTAL # OF STRANDS	SECTION MODULUS (in.³)	* STRESS (PSI)
T=10 in.	0.5	28'-0"	6	3¼	14	500	1150
	0.6	27'-0"	4	5	10	500	1160
T=12 in.	0.5	31'-0"	7	2⅞	16	720	1100
	0.6	30'-0"	5	4	12	720	1160

* Unit Prestress after losses.

SHEET PILE DIMENSIONS		
T(in.)	10	12
Y(in.)	3 3/16	4 3/16
Z(in.)	3	4

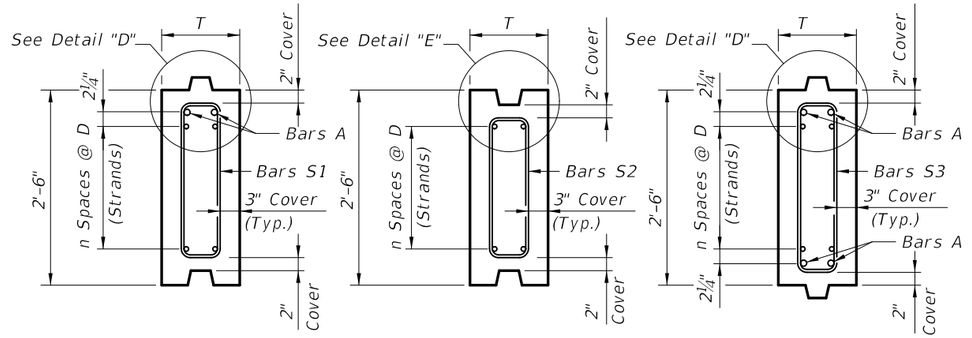
BAR BENDING DIAGRAMS

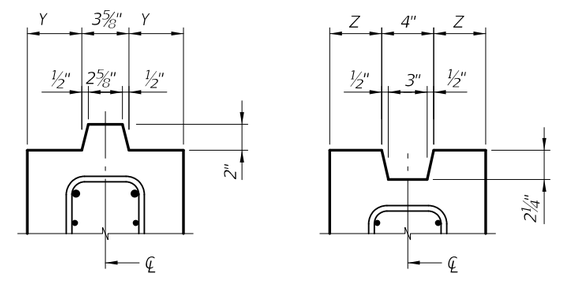


DIMENSION A	
S1	1'-11¾"
S2	1'-9½"
S3	2'-2"
S4	1'-6¾"
S5	1'-10¾"
S6	11"
S7	1'-7¼"

DIMENSION B	
T=10 in.	4"
T=12 in.	6"

NOTES:
1. Intermediate Prestress Strands not shown in Elevations and Sections.
2. All bar dimensions are out-to-out.
3. Bars A are #5 and Bars S are #4.
4. At the Contractor's option Bars S may be fabricated as a two piece bar as shown in the Bar Bending Diagram.
5. The Contractor may use Deformed Welded Wire Reinforcement conforming to specification ASTM A497 in lieu of Bars A and Bars S if the wire size and spacing provide the same area of reinforcing steel per foot as the Bars shown.
6. For Dimensions L and X see Sheet Pile Data Table in Structures Plans.





TYPE "A" STANDARD SECTION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index Number (Previously Index No. 20410 & 20412)			

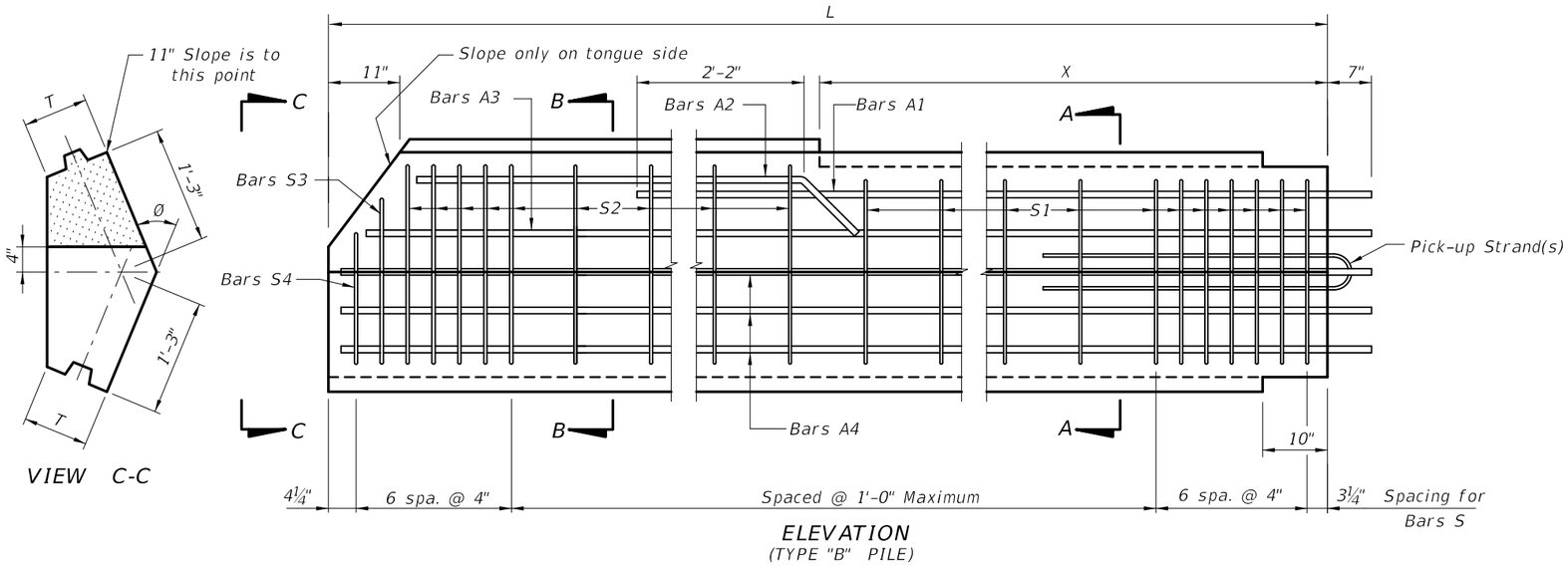
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

PRECAST CONCRETE SHEET PILE WALL

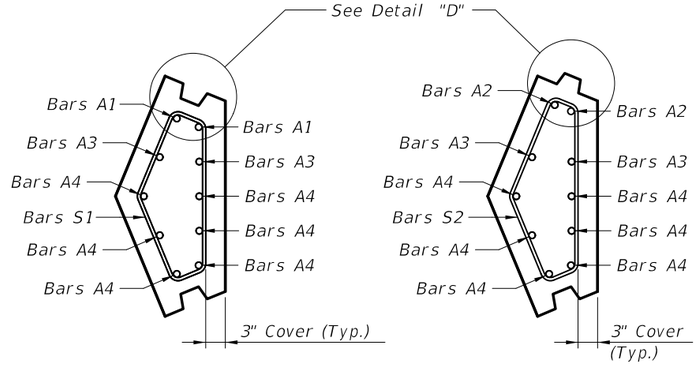
Interim Date 01/01/11

Index No. 6040



VIEW C-C

ELEVATION
(TYPE "B" PILE)



SECTION A-A

SECTION B-B

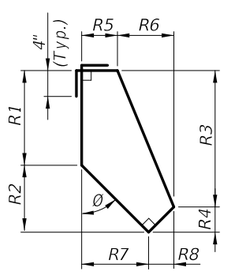
BAR BENDING DIAGRAMS

STIRRUP DIMENSIONS (T = 10")

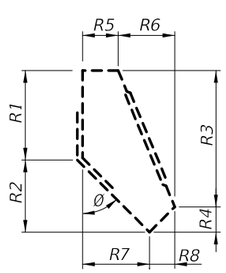
Ø	BAR MARK	R1	R2	R3	R4	R5	R6	R7	R8
30°	S1	11¼"	9¾"	1'-6½"	2½"	5"	4¾"	5½"	4¼"
	S2	1'-1½"	9¾"	1'-8¾"	2½"	4½"	5½"	5¾"	4¼"
	S3	11¼"	8"	1'-6"	1¼"	5"	4½"	4½"	5"
	S4	11¼"	4¼"	1'-1¾"	1¾"	5"	3¾"	2½"	6¼"
45°	S1	11½"	8"	1'-4"	4"	5½"	6½"	8"	4"
	S2	1'-1¾"	8"	1'-5¾"	4"	4½"	7½"	8"	4"
	S3	11½"	6¾"	1'-4"	2¼"	5½"	6¾"	6¾"	5½"
	S4	11½"	3½"	1'-0"	3"	5½"	5"	3½"	7"
60°	S1	1'-0"	6"	1'-0¾"	5¼"	6"	7¼"	10¼"	3"
	S2	1'-2"	6"	1'-2¾"	5¼"	4¾"	8¾"	10½"	3"
	S3	1'-0"	4¾"	1'-1½"	3¼"	6"	8"	8¾"	5¼"
	S4	1'-0"	2½"	10"	4½"	6"	5¾"	4"	7½"

STIRRUP DIMENSIONS (T = 12")

Ø	BAR MARK	R1	R2	R3	R4	R5	R6	R7	R8
30°	S1	11½"	10"	1'-6"	3½"	7"	4¾"	5¾"	6"
	S2	1'-1¾"	10"	1'-8¼"	3½"	6½"	5¼"	5¾"	6"
	S3	11½"	8¼"	1'-5¾"	2"	7"	4¾"	4½"	7¼"
	S4	11½"	4"	1'-1¼"	2¼"	7"	3¾"	2½"	8¼"
45°	S1	1'-0"	8½"	1'-3¼"	5¼"	7½"	6¼"	8½"	5¼"
	S2	1'-2¼"	8½"	1'-5½"	5¼"	6½"	7¼"	8½"	5¼"
	S3	1'-0"	7"	1'-4"	3"	7½"	6¾"	7"	7¼"
	S4	1'-0"	3½"	11¾"	3¾"	7½"	5"	3½"	9"
60°	S1	1'-0½"	6¼"	11¾"	7"	8"	6¾"	10¾"	4"
	S2	1'-2¾"	6¼"	1'-2"	7"	6¾"	8"	10¾"	4"
	S3	1'-0½"	5"	1'-1½"	4"	8"	8"	9"	7"
	S4	1'-0½"	2½"	9½"	5½"	8"	5½"	4¼"	9¼"

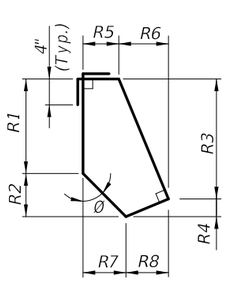


1 - PIECE

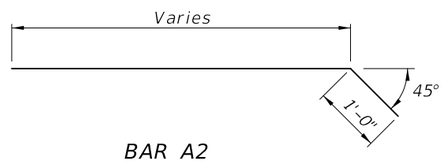


2 - PIECE

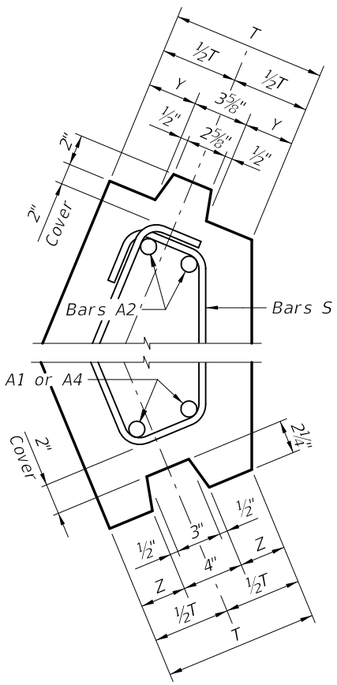
BARS S1 & S2



BARS S3 & S4



BAR A2



DETAIL D

SHEET PILE DIMENSIONS		
T (in.)	10	12
Y (in.)	3⅜16	4⅜16
Z (in.)	3	4

NOTES:

1. This drawing includes details for precast concrete corner piles for 10" and 12" thick sheet pile systems. The details apply equally to both thicknesses.
2. The bar configurations shown in Sections A-A and B-B shall be used for Ø angles between 15° and 75°. For Ø angles not shown, the reinforcing bar dimensions may be interpolated or extrapolated from the stirrup dimensions shown.
3. All bar dimensions are out-to-out.
4. Bars A are #8 and Bars S are #4.
5. Values for Stirrup Dimensions are shown for Ø equal to 30°, 45° & 60° only.
6. At the Contractor's option Bars S may be fabricated as a 2 piece bar with a minimum lap length of 1'-6", as shown in Bar Bending Diagrams.
7. If Type "B" pile is used as a Starter Pile show tongue on both sides of pile from Dim. "X" down. Show dimensions for Bars S2, S3 & S4 in shop drawings.
8. If tongue must be on the opposite side from that shown all dimensions and Bars A, S2, S3 and S4 will be the same but opposite hand.
9. For Dimensions L , X and Ø Angle see Sheet Pile Data Table in Structures Plans.

TYPE "B" - VARIABLE ANGLE CORNER PILE

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index Number (previously Index No. 20430)			

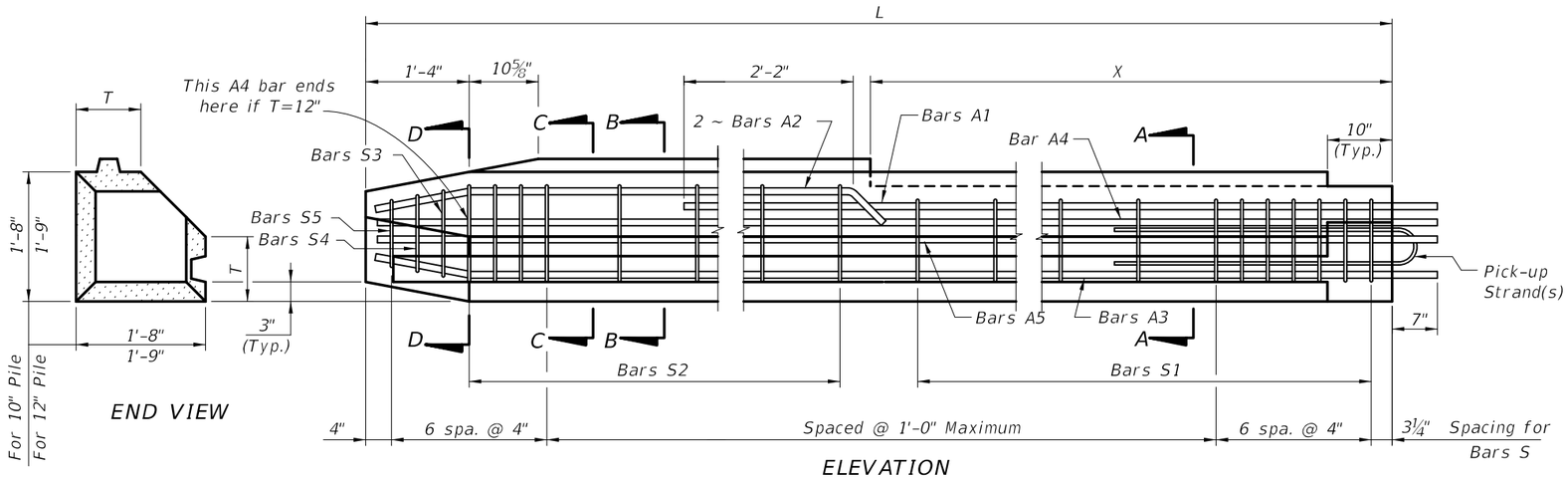
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

PRECAST CONCRETE SHEET PILE WALL

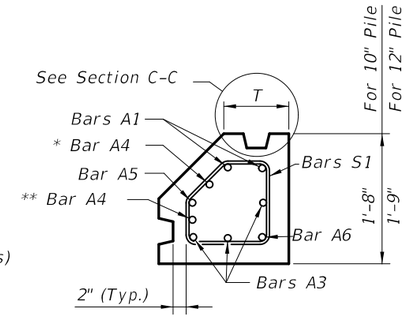
Interim Date 01/01/11

Index No. 6040

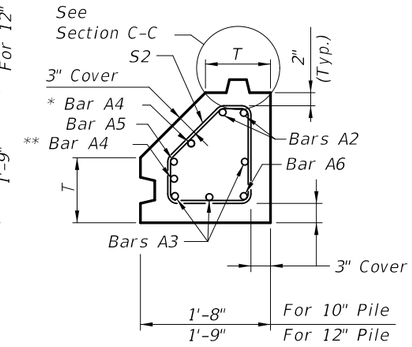


END VIEW

ELEVATION
(TYPE "C" PILE)



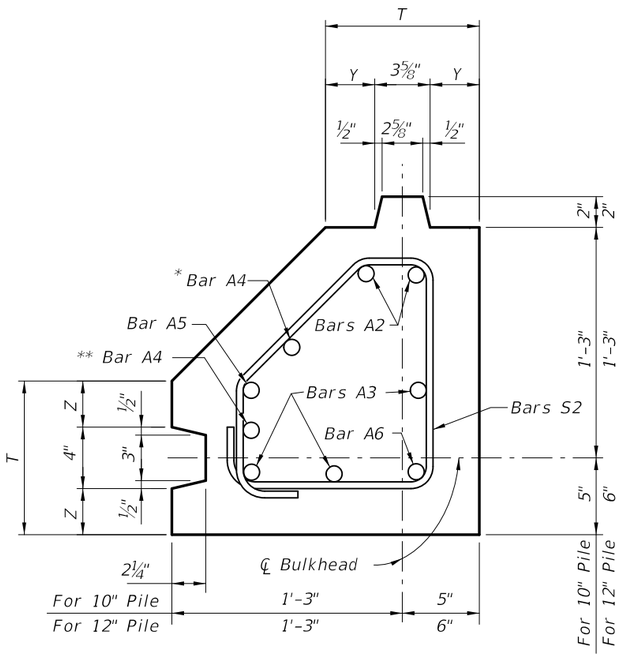
SECTION A-A



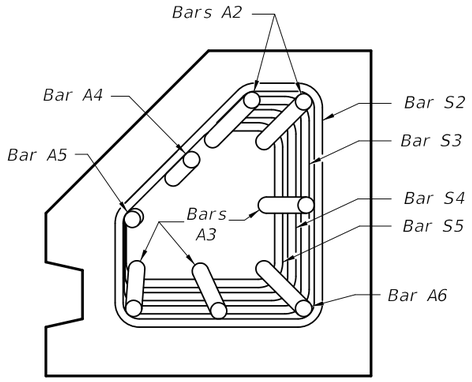
SECTION B-B

* This Bar A4 shall be 1'-2" shorter than other A4 bars for T = 12".

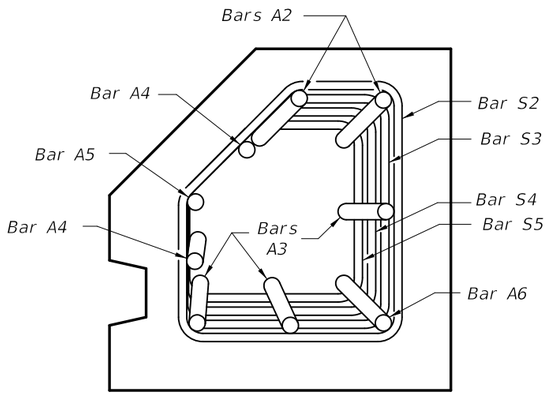
** This Bar A4 (not shown in elevation) is included only if T = 12".



SECTION C-C (T=10" or 12")



SECTION D-D (T=10")

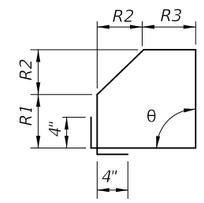


SECTION D-D (T=12")

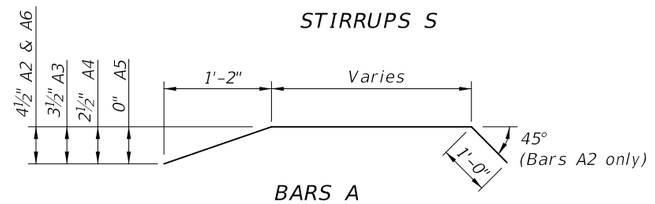
STIRRUP DIMENSIONS					
θ	T (in.)	BAR MARK	R1	R2	R3
90°	10	S1	7"	5¾"	7"
		S2	7"	8"	4¾"
		S3	6¼"	7¼"	4¾"
		S4	5½"	6½"	4¾"
		S5	4¾"	5¾"	4¾"
	12	S1	9"	4¾"	9"
		S2	9"	7"	6¾"
		S3	8¼"	6¼"	6¾"
		S4	7½"	5½"	6¾"
		S5	6¾"	4¾"	6¾"

SHEET PILE DIMENSIONS		
T (in.)	10	12
Y (in.)	3 3/16	4 3/16
Z (in.)	3	4

BAR BENDING DIAGRAMS



STIRRUPS S



BARS A

Note: All Bar dimensions are out-to-out.

NOTES:
1. All bar dimensions are out-to-out.
2. Bars A are #8 and Bars S are #4.
3. This drawing includes information for precast Corner Piles for 10" and 12" thick Sheet Pile systems. The details apply to both thicknesses but the bar configurations change slightly according to the thickness values used.
4. If Type "C" pile is used as a Starter Pile show tongue on both sides of pile from Dim. "X" down. Show dimensions for Bars S2, S3, S4 & S5 in shop drawings.
5. If tongue must be on opposite side (Groove Side) from that shown, all dimensions and reinforcement shall follow the corresponding Tongue or Groove side.
6. For Dimensions L and X see Sheet Pile Data Table in Structures Plans.

TYPE "C" - RIGHT ANGLE CORNER PILE

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index Number (Previously Index No. 20440)			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

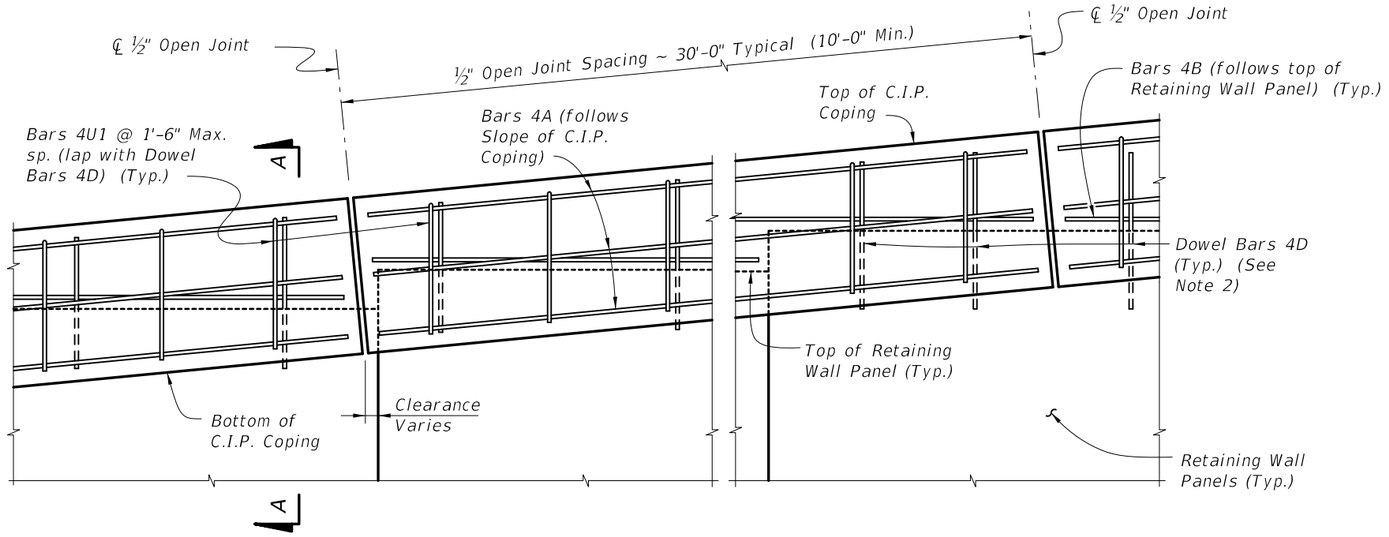
2010 Interim Design Standard

PRECAST CONCRETE SHEET PILE WALL

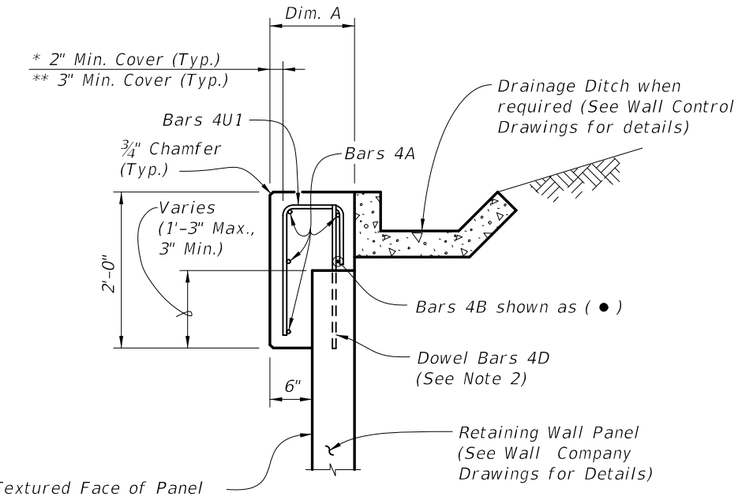
Interim Date 01/01/11

Sheet No. 4 of 4

Index No. 6040



C.I.P. COPING - PARTIAL ELEVATION VIEW

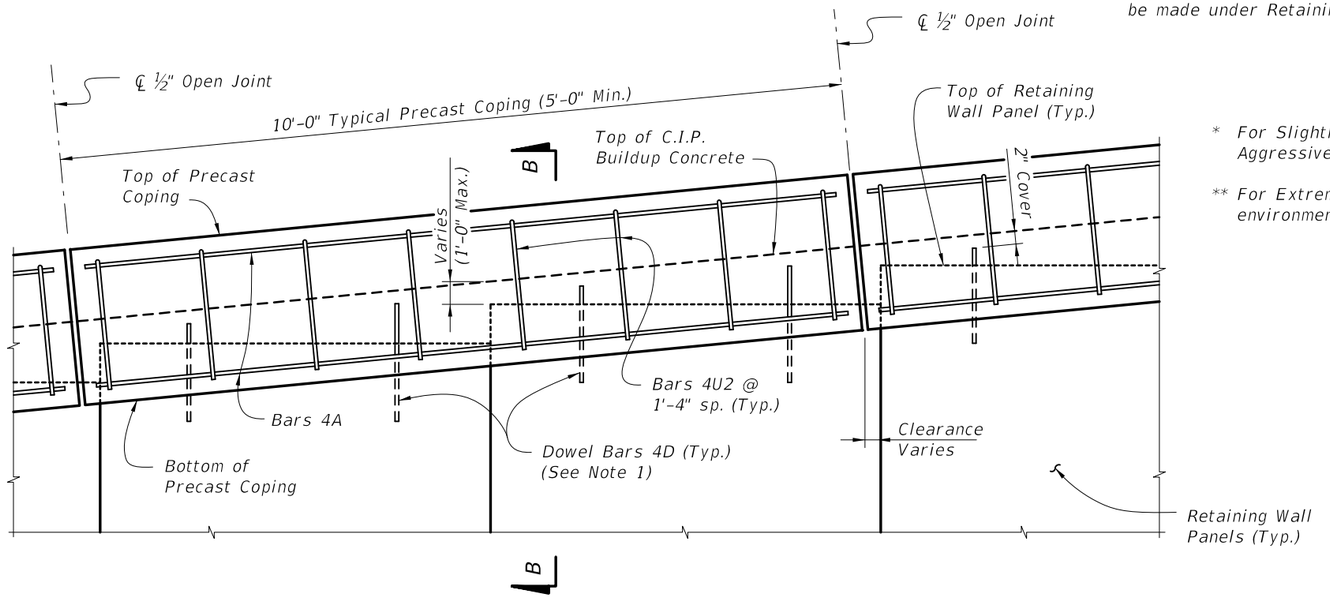


SECTION A-A
C.I.P. COPING

PRECAST AND C.I.P. COPING NOTES:

1. Provide Class II concrete for slightly aggressive environments or Class IV for moderately or extremely aggressive environments.
2. Dowel Bars 4D extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
3. Payment for Dowel Bars 4D, Buildup Concrete and Coping will be made under Retaining Wall System (Permanent).

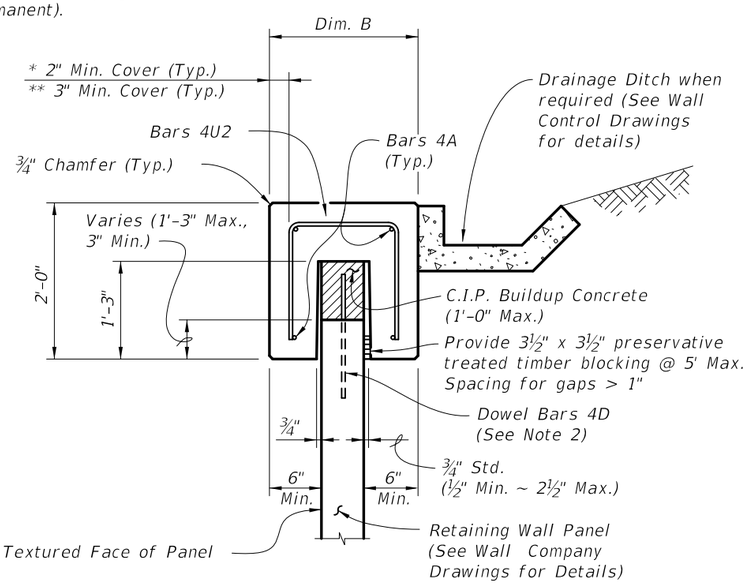
Dim. A	Panel width + 6"
Dim. B	Panel width + 1'-0" Min.



PRECAST COPING - PARTIAL ELEVATION VIEW

* For Slightly and Moderately Aggressive environments

** For Extremely Aggressive environments.



SECTION B-B
PRECAST COPING

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index 5300, Sheet 3 of 19).			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

MSE WALL COPING (PRECAST OR C-I-P)

Interim Date: 01/01/11

Sheet No.: 1 of 2

Index No.: 6100

REINFORCING STEEL BENDING DIAGRAMS - PRECAST AND C.I.P. COPINGS

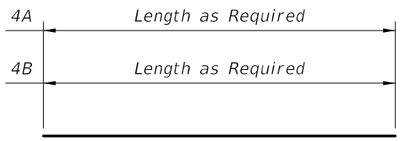
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH # S or M	LENGTH # E
A	4	AS REQD.	AS REQD.
B	4	AS REQD.	AS REQD.
D	4	2'-0"	2'-0"
U1	4	Panel width + 4"	Panel width + 3"
U2	4	Panel width + 8"	Panel width + 6"
U3	4	Panel width + 4"	Panel width + 3"

REINFORCING STEEL NOTES:

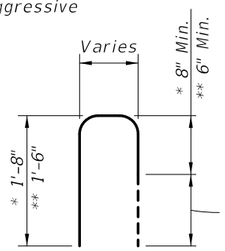
1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints will have a 2" minimum cover.
3. Bars 4A may be continuous or spliced at the construction joints. Lap splices for Bars 4A will be a minimum of 1'-8".
4. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

# S = Slightly Aggressive
M = Moderately Aggressive
E = Extremely Aggressive

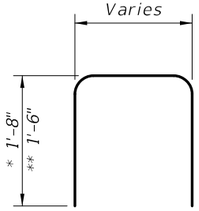


BARS 4A & 4B

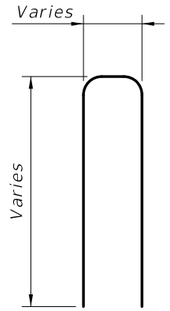
DOWEL BAR 4D



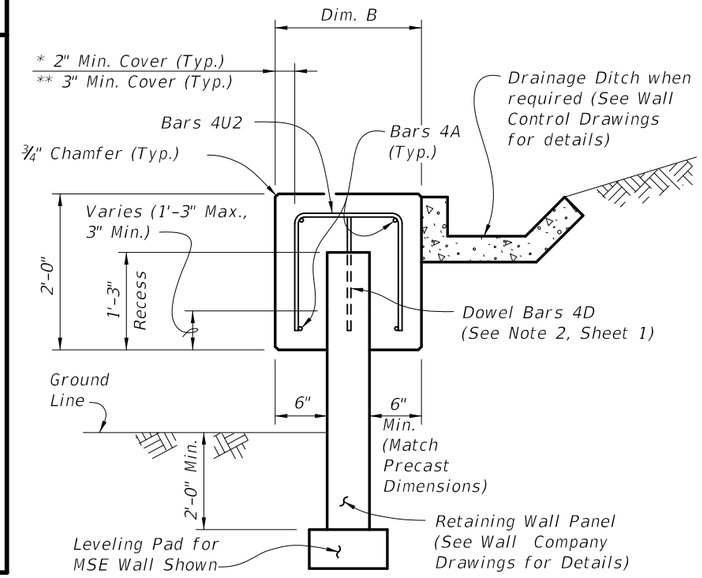
BAR 4U1



BAR 4U2

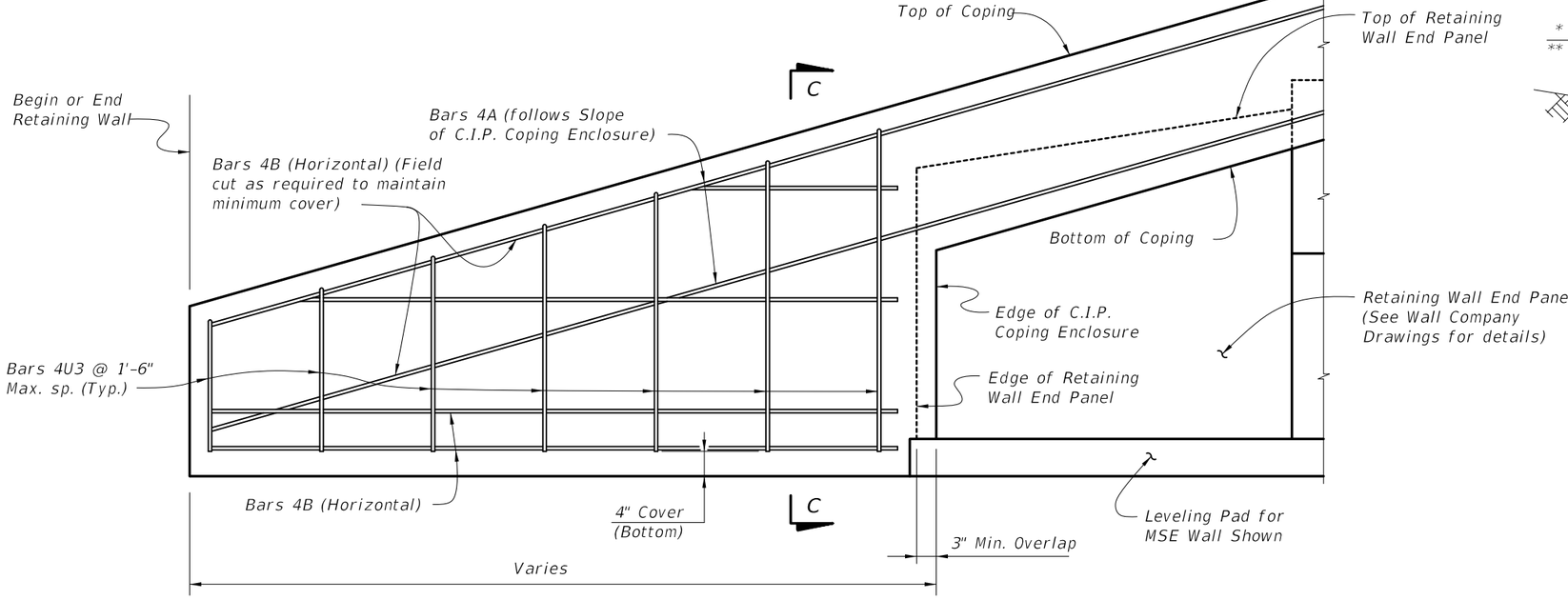


BAR 4U3

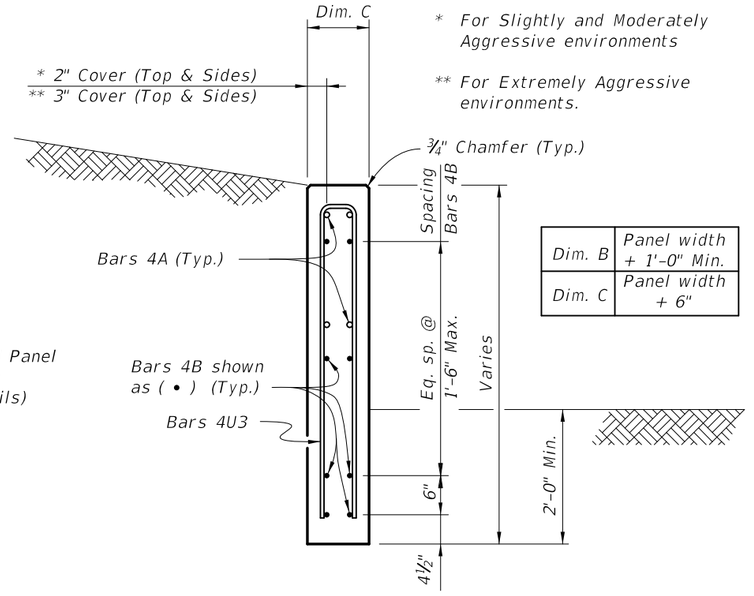


C.I.P. COPING USED WITH PRECAST COPING

Note: When precast coping units do not fit the entire length of the retaining wall, use this similar C.I.P. coping for short portions between precast coping units. This C.I.P. coping may also be used for vertical copings.



C.I.P. COPING ENCLOSURE DETAIL



SECTION C-C

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index 5300, Sheet 4 of 19)			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

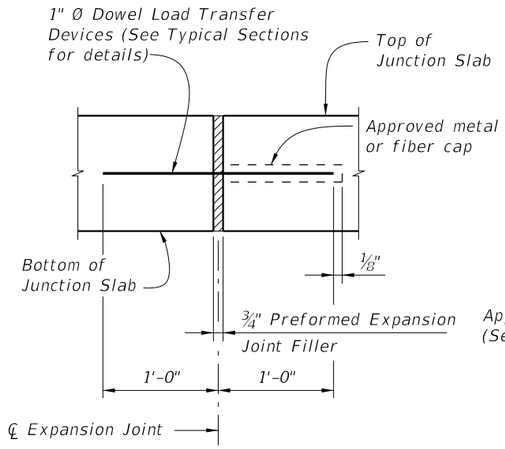
2010 Interim Design Standard

MSE WALL COPING (PRECAST OR C-I-P)

Interim Date 01/01/11

Sheet No. 2 of 2

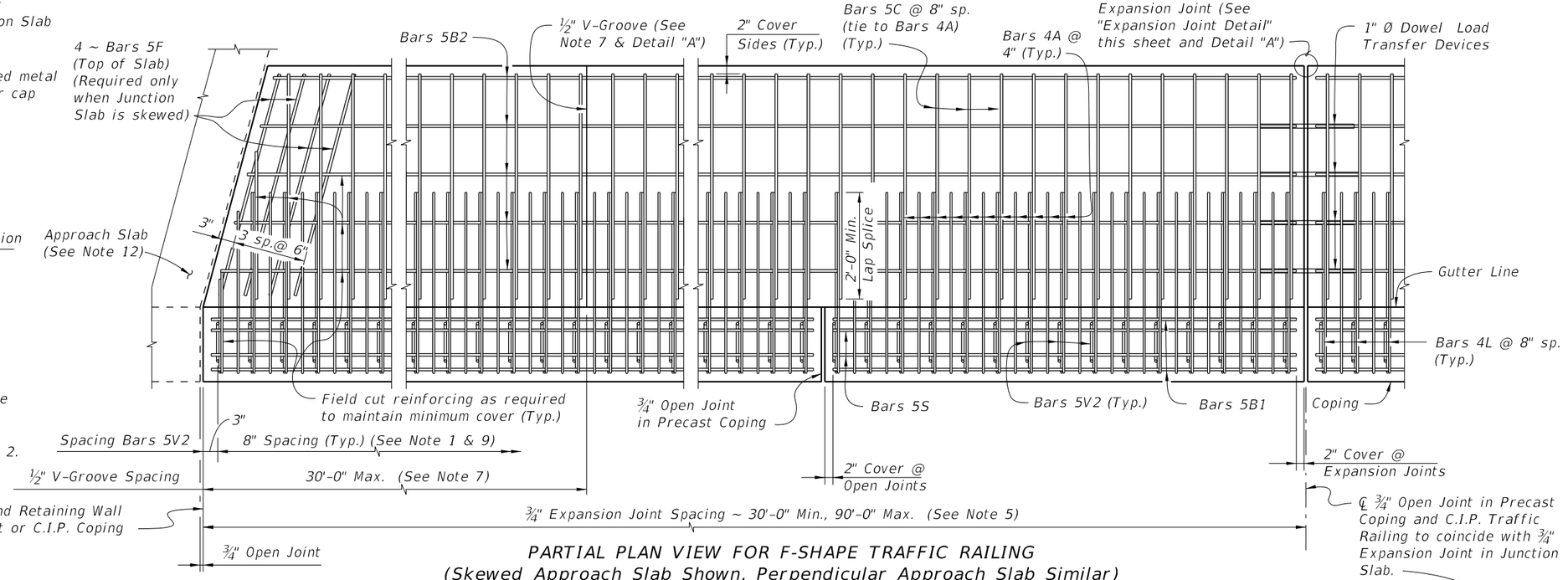
Index No. 6100



EXPANSION JOINT DETAIL

(Junction Slab expansion joints are to coincide with ¾" open joints in Traffic Railing)

CROSS REFERENCE: For Detail "A", see Sheet 2.

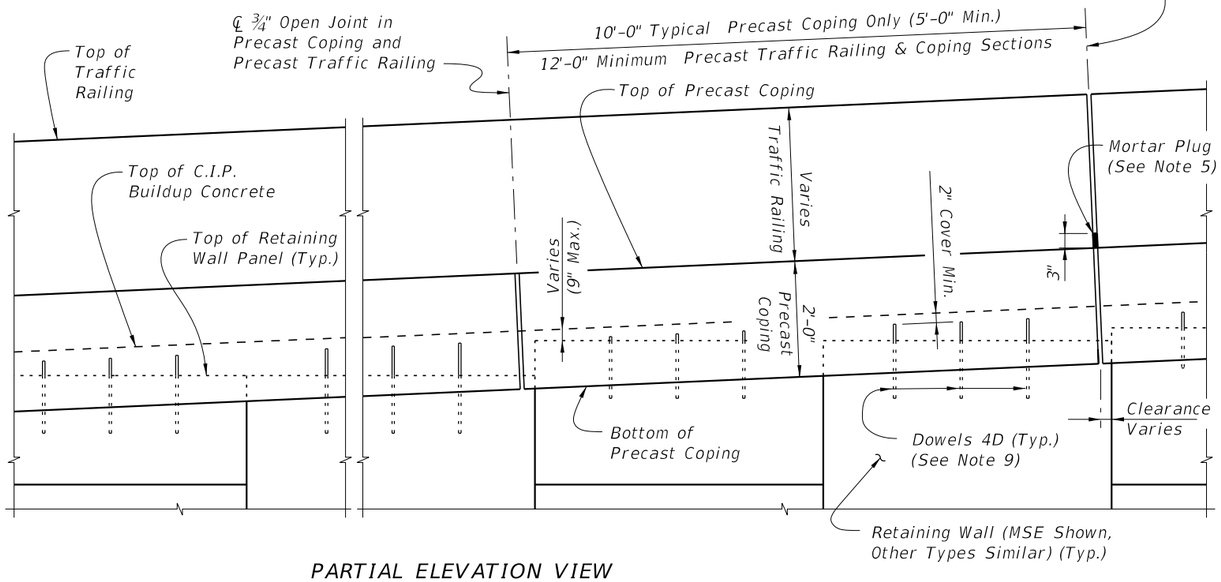


PARTIAL PLAN VIEW FOR F-SHAPE TRAFFIC RAILING

(Skewed Approach Slab Shown, Perpendicular Approach Slab Similar)
(Precast Coping Shown, C.I.P. Coping Similar) (Traffic Railing not Shown for Clarity)

JUNCTION SLAB NOTES:

1. *APPLICATIONS: This junction slab is only applicable for a TL-4 crash test rating. For TL-5 crash test rating increase Expansion Joint Spacing to 60'-0" minimum and provide Bars 5C at 6" spacing within 6'-0" of Open Joints for precast coping with the 42" F-Shape Traffic Railing.*
2. *CONSTRUCTION REQUIREMENTS: Construct the Junction Slab level transversely and expansion joints plumb; do not construct the junction slab or C.I.P. coping perpendicular to the roadway surface. Slip forming is not permitted.*
3. *Provide Class II concrete for moderately aggressive environments or Class IV for moderate or extremely aggressive environments.*
4. *Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.*
5. *Construct ¾" Expansion Joints in junction slabs and C.I.P. copings plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown. Provide 3"x3" Mortar plugs in open joints at the base of traffic railings to contain runoff.*
6. *Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.*
7. *Construct ½" V-Grooves in junction slabs and C.I.P. copings plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between ¾" Expansion Joints and/or Begin or End Junction Slab. V-Groove locations are to coincide with V-Groove locations in the Traffic Railing.*
8. *Shoulder or Roadway Pavement is required on top of the junction slab for its entire length on the traffic side of the Traffic Railing. See Typical Sections on Sheet Nos. 2 and 3 for details.*
9. *Spacing shown is along the Gutter Line.*
10. *On MSE Walls provide, Dowel Bars 4D and extend to 7" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.*
11. *Work this Index with the following:*
    Index No. 420 – Traffic Railing – (32" F-Shape)
    Index No. 425 – Traffic Railing – (42" F-Shape).
12. *The following Indexes contain details of the intersection of the retaining wall at approach slabs:*
    Index No. 20900 – Approach Slabs (Flexible Pavement Approaches)
    Index No. 20910 – Approach Slabs (Rigid Pavement Approaches)



PARTIAL ELEVATION VIEW

(Precast Coping and Junction Slab Reinforcing not Shown for Clarity)
(Precast Coping Shown, C.I.P. Coping Similar)

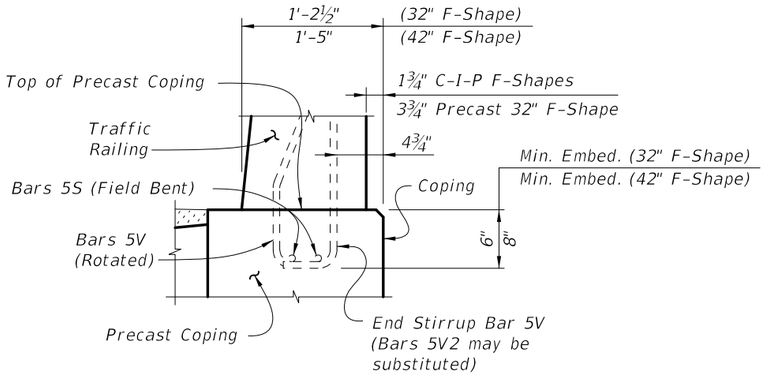
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index No. 5300, Sheet 5 of 19) Changed junction slab Note 1, 5, 8, & 10. Added Note 3 and Precast Traffic Railing option.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

WALL COPING WITH TRAFFIC RAILING/JUNCTION SLAB

Interim Date	Sheet No.
01/01/11	1 of 6
Index No.	
6110	

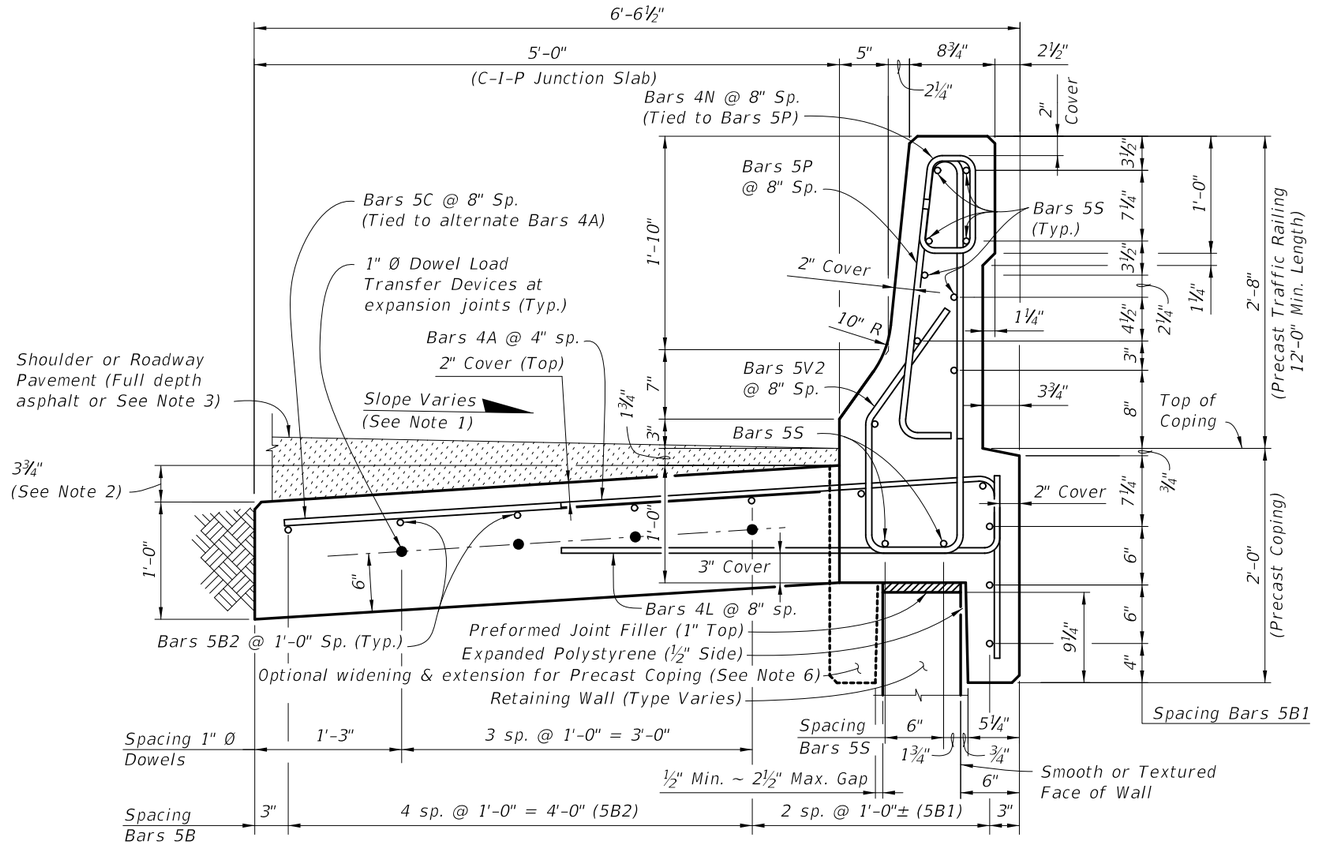


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5V and Bars 5S) (Precast Coping Shown, C.I.P. Coping Similar)

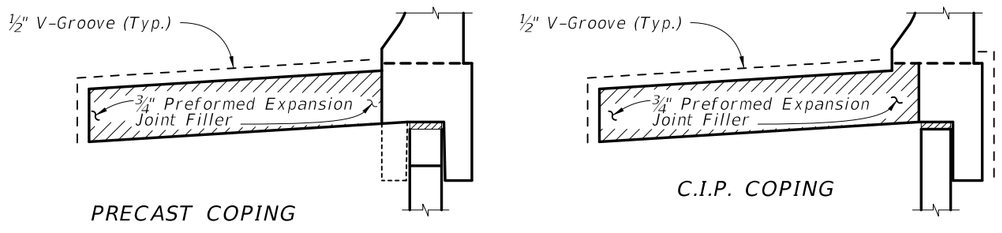
NOTE: See Index No. 420 and Index No. 425, Detail "A" for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping Only)	CY/FT	0.079
Concrete (Precast Barrier & Coping)	CY/FT	0.165
Concrete (C.I.P. Junction Slab)	CY/FT	0.185
Reinforcing Steel (Precast Coping & Traffic Railing)	LB/FT	52.17
Reinforcing Steel (C.I.P. Junction Slab) (Typ.)	LB/FT	12.52
Additional Reinf. @ Expansion Joints	LB	21.36

(The above concrete quantities are based on a max. superelevation of 6.25% and a 32" F-Shape Traffic Railing.



TYPICAL SECTION THRU PRECAST 32" F-SHAPE TRAFFIC RAILING, COPING & C-I-P JUNCTION SLAB



DETAIL "A"

(Showing Locations of ½" V-Grooves and ¾" Preformed Expansion Joint Filler)

JUNCTION SLAB NOTES:

1. *Match Cross Slope of Travel Lane or Shoulder.*
2. *The 3¾" dimension corresponds to a maximum superelevation of 6.25%. For steeper superelevations increase this dimension to match roadway superelevation.*
3. *For Rigid Pavement (Concrete), Junction Slab may be thickened to match finish grade.*
4. *Minimum length of Junction Slab between expansion joints is 30'-0".*
5. *At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Mechanical couplers shall develop 125% of the bar yield strength.*
6. *Contractor to maintain stability of precast coping/traffic railing prior to junction slab completion.*

F-SHAPE TRAFFIC RAILINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 6 of 19) Changed Junction Slab; Added Precast Traffic Railing.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

WALL COPING WITH TRAFFIC RAILING/JUNCTION SLAB

Interim Date 01/01/11

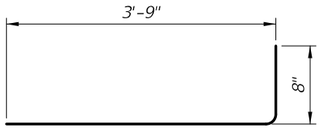
Sheet No. 2 of 6

Index No. 6110

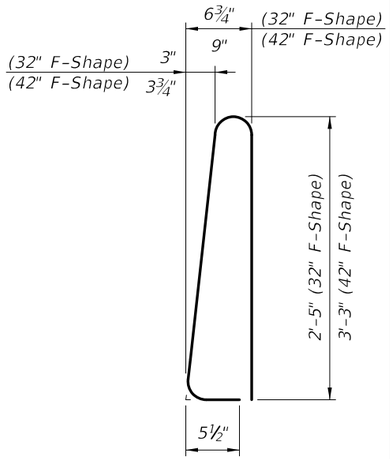
REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

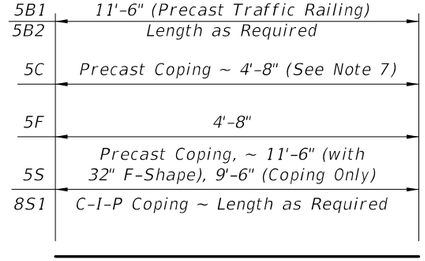
MARK	SIZE	LENGTH		
		PRECAST COPING & 32" F-SHAPE	COPING	
			C-I-P	Precast
A	4	5'-4"	7'-9"	5'-4"
B1	5	11'-6"	N/A	9'-6"
B2	5	AS REQD.	AS REQD.	AS REQD.
C	5	4'-8"	N/A	4'-8"
F	5	4'-8"	4'-8"	4'-8"
L	4	4'-5"	4'-5"	4'-5"
N	4	2'-6"	N/A	N/A
P	5	5'-7"	5'-7"	5'-7"
S	5	11'-6"	AS REQD.	9'-6"
S1	8	N/A	AS REQD.	9'-6"
V2	5	5'-10"	5'-10"	5'-10"
1" Ø Dowel	Smooth Bar	2'-0"	2'-0"	2'-0"



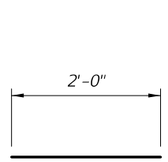
BARS 4L



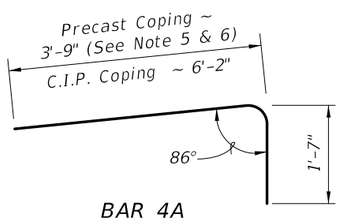
STIRRUP BAR 5P



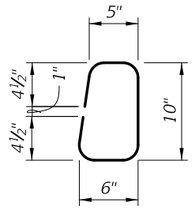
BARS 5B, 5C, 5F & 5S



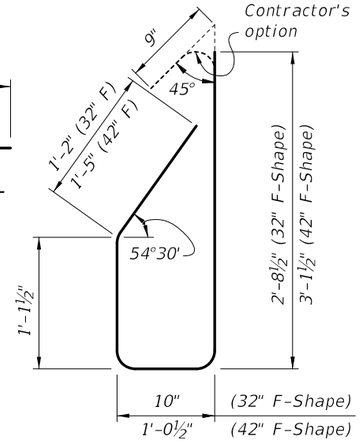
1" Ø DOWEL



BAR 4A



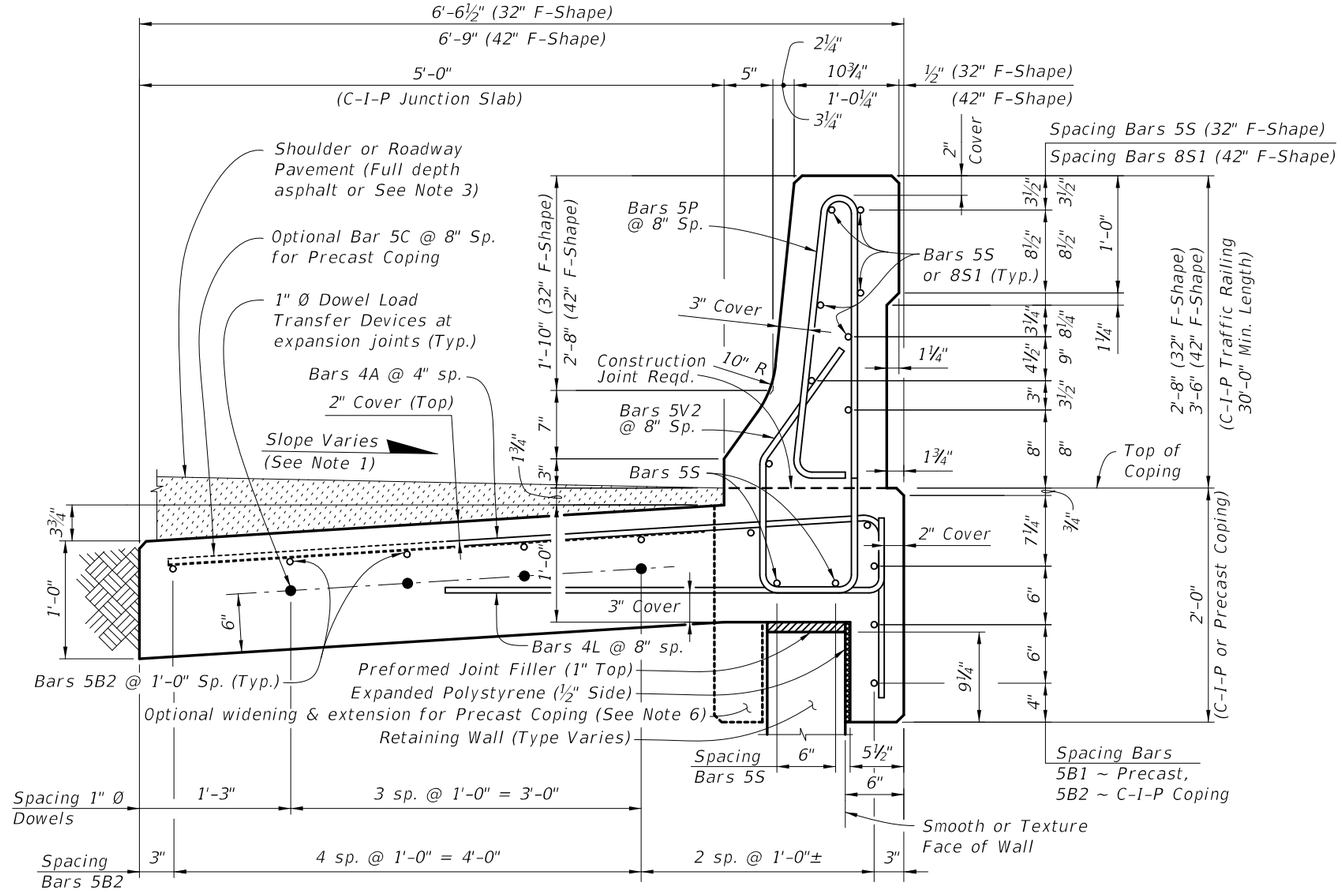
STIRRUP BAR 4N



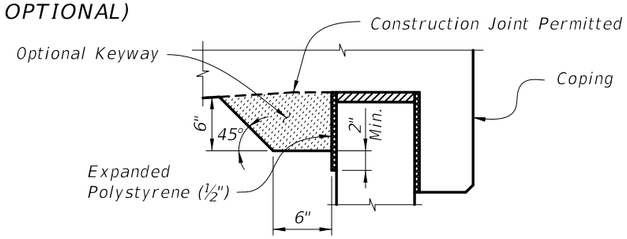
STIRRUP BAR 5V2

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at expansion and open joints will have a 2" minimum cover.
3. Lap splices for Bars 5B & 5S will be a minimum of 2'-0".
4. For Precast Copings only, lap splice Bars 4A with Bars 5C. Lap splices will be a minimum of 2'-0".
5. The Contractor may use either full length Bars 4A or lap splice with Bars 5C at alternate Bars 4A for C-I-P Copings.
6. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 1'-4½" (32" F-Shape) or 1'-7" (42" F-Shape).
7. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 4'-8".
8. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



TYPICAL SECTION THRU C-I-P TRAFFIC RAILING & JUNCTION SLAB (PRECAST COPING OPTIONAL)



OPTIONAL C-I-P JUNCTION SLAB KEYWAY

ESTIMATED QUANTITIES FOR C.I.P. COPING		
ITEM	UNIT	QUANTITY
Concrete (Traffic Railing not Included)	CY/FT	0.264
Reinforcing Steel (Typical) excluding Bars 5V2 and 5S (Typ.)	LB/FT	30.39
Additional Reinf. @ Expansion Joint	LB/FT	21.36

(The above concrete quantities are based on a max. superelevation of 6.25%, beneath a 32" F-Shape Traffic Railing).

JUNCTION SLAB NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. The 3¾" dimension corresponds to a maximum superelevation of 6.25%. For steeper superelevations increase this dimension to match roadway superelevation.
3. For Rigid Pavement (Concrete), Junction Slab may be thickened to match finish grade.
4. Minimum length of Junction Slab between expansion joints is 30'-0".
5. See Index No. 420 & 425 for additional Traffic Railing Details.
6. Contractor to maintain stability of precast coping prior to junction slab completion.

F-SHAPE TRAFFIC RAILINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 7 of 19). Changed junction slab.			

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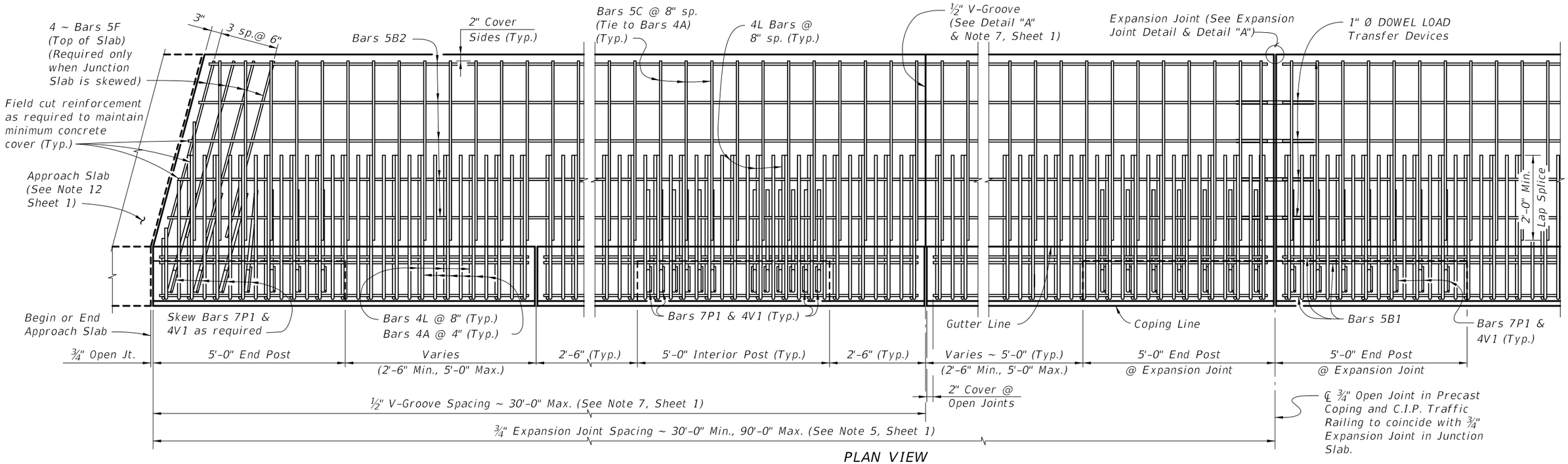
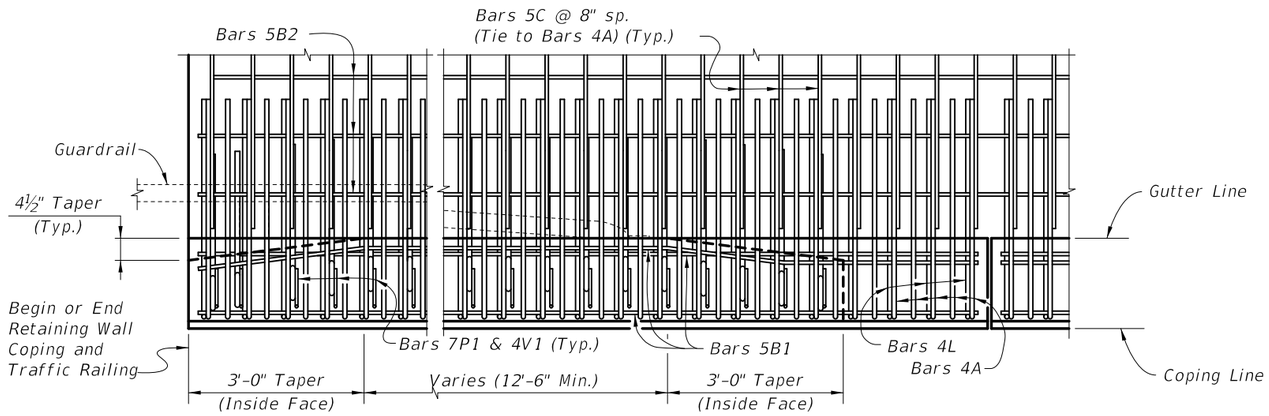
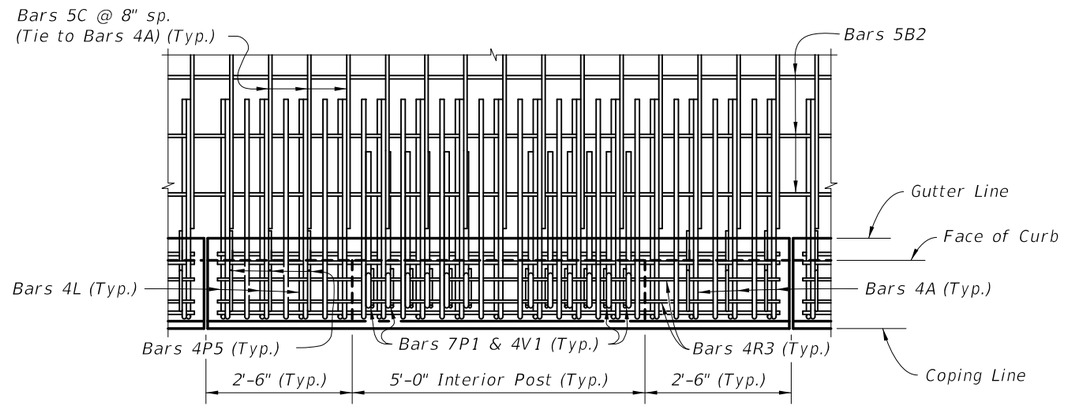


PLAN VIEW
(Skewed Approach Slab shown, Perpendicular Approach Slab similar)
(Precast Coping shown, C.I.P. Coping similar)
(Traffic Railing reinforcement not shown, except for Bars 7P1 & 4V1)

CROSS REFERENCES:
1. *For Detail "A" see Sheet 2.*
2. *For "Expansion Joint Detail" see Sheet 1.*
3. *For "Junction Slab Notes" see Sheet 1.*



PARTIAL PLAN VIEW OF GUARDRAIL TRANSITION AT BEGIN OR END RETAINING WALL
(Precast Coping shown, C.I.P. Coping similar)
(Traffic Railing reinforcement not shown, except for Bars 7P1 & 4V1)



PARTIAL PLAN VIEW OF COPING WITH CURB
(Precast Coping shown, C.I.P. Coping similar)
(Traffic Railing reinforcement not shown, except for Bars 4P5, 4R3, 7P1 & 4V1)

CORRAL SHAPE TRAFFIC RAILINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 8 of 19); Changed Junction Slab.			

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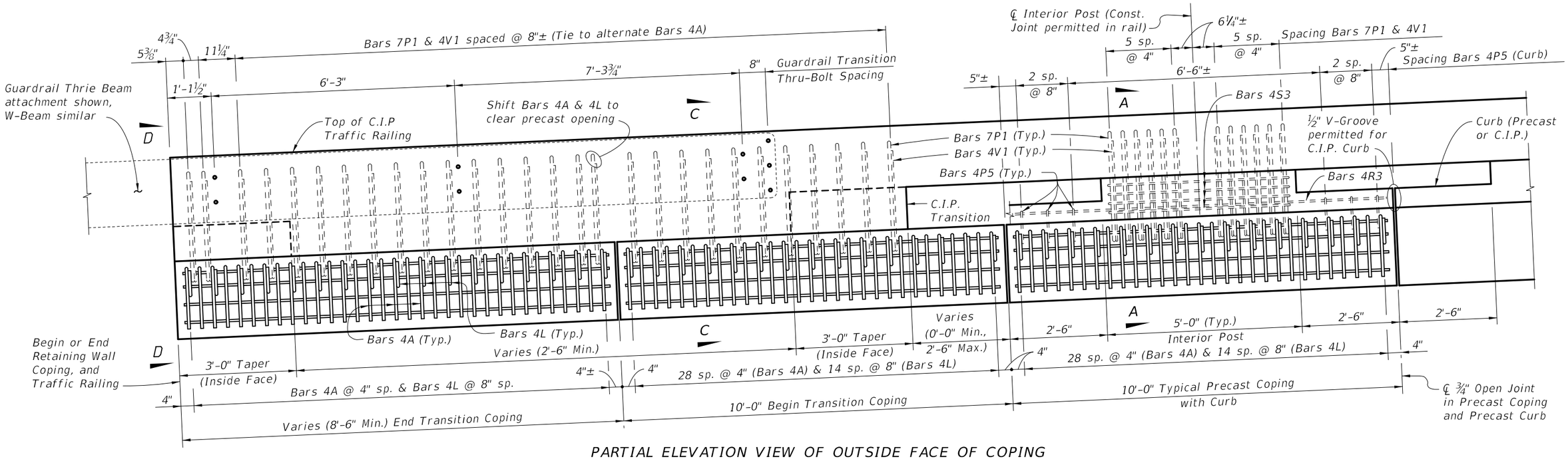
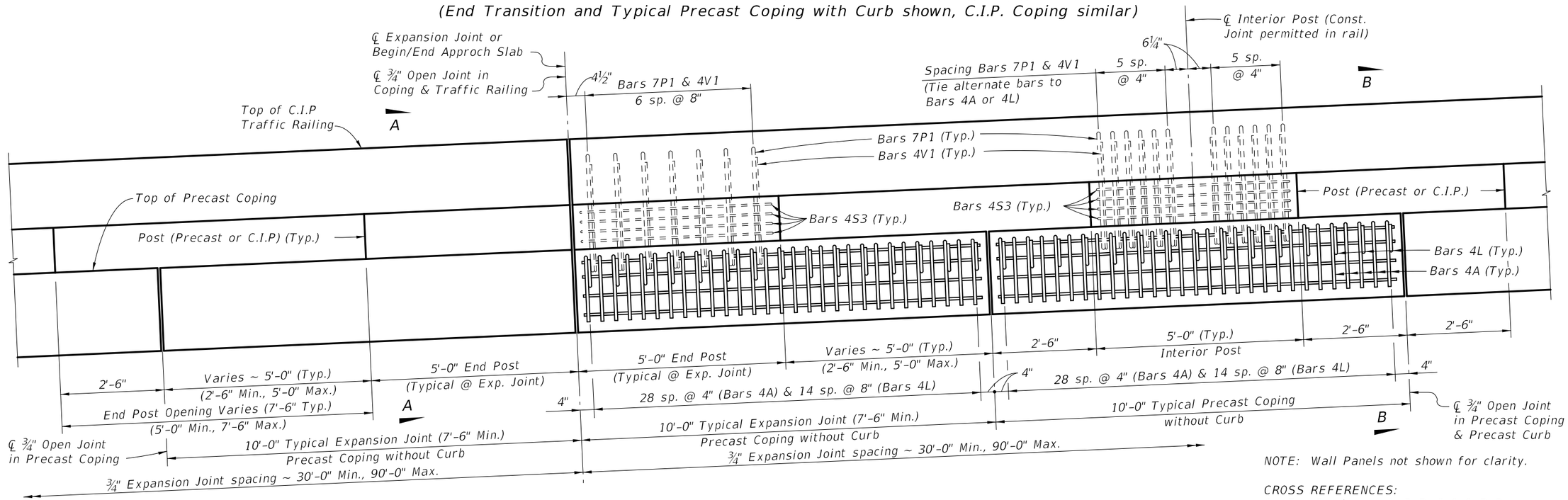


PARTIAL ELEVATION VIEW OF OUTSIDE FACE OF COPING
(End Transition and Typical Precast Coping with Curb shown, C.I.P. Coping similar)



PARTIAL ELEVATION VIEW OF OUTSIDE FACE OF COPING
(Precast Coping at Expansion Joint and Typical Precast Coping without Curb shown, C.I.P. Coping similar)

NOTE: Wall Panels not shown for clarity.

CROSS REFERENCES:
1. *For Sections A-A, B-B, C-C & D-D, see Sheet 6.*
2. *For Junction Slab Notes, see Sheet 1.*

CORRAL SHAPE TRAFFIC RAILINGS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 9 of 19); Changed coping reinforcing.			

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WALL COPING WITH TRAFFIC RAILING/JUNCTION SLAB

Interim Date 01/01/11

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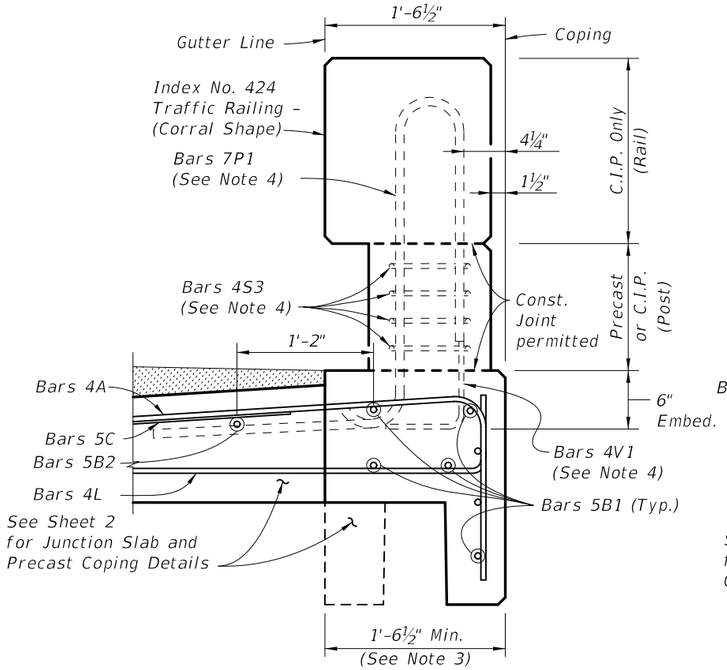
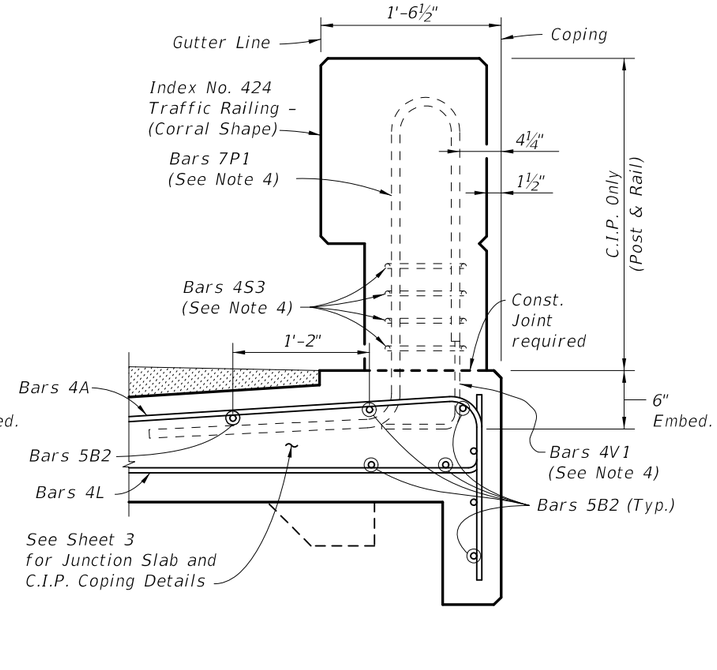
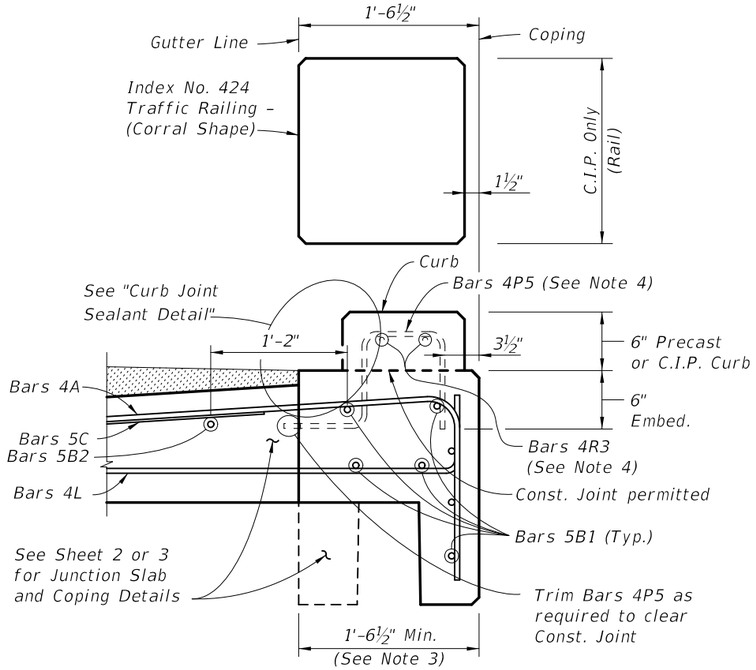


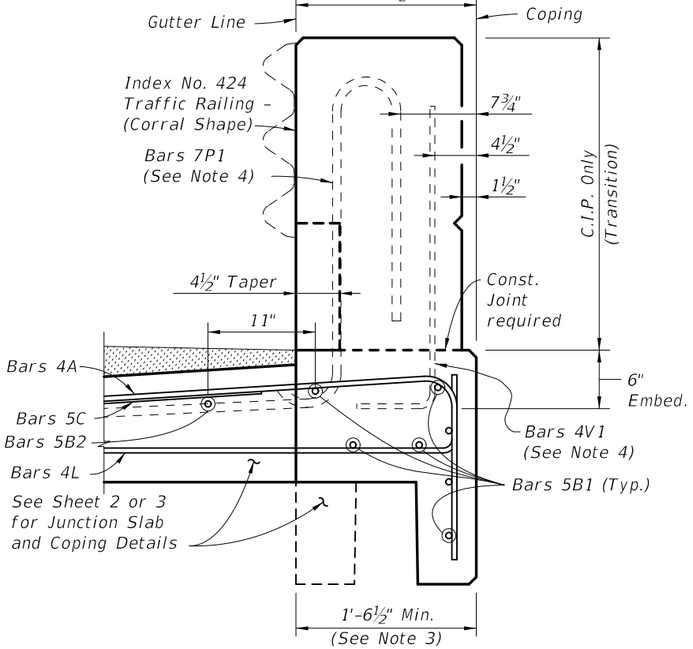
SECTION A-A
(TYPICAL SECTION PRECAST COPING WITHOUT CURB)



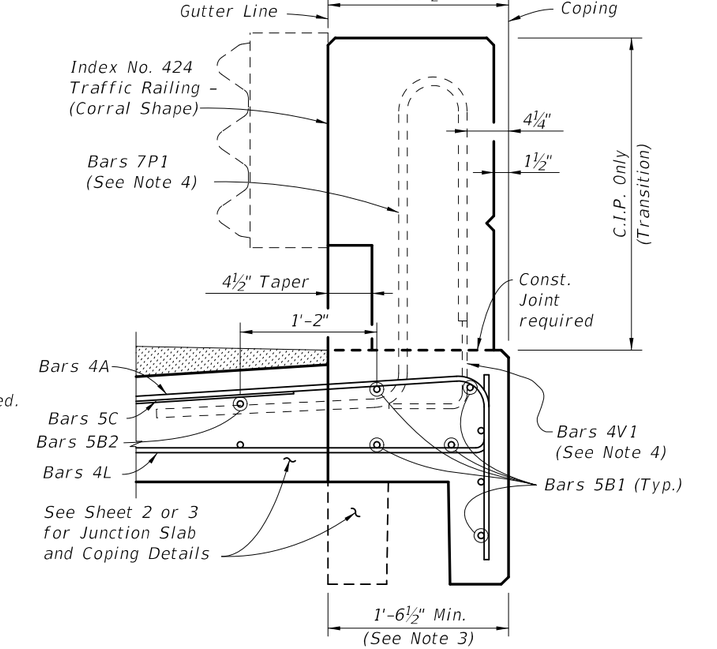
SECTION A-A
(TYPICAL SECTION C.I.P. COPING WITHOUT CURB)



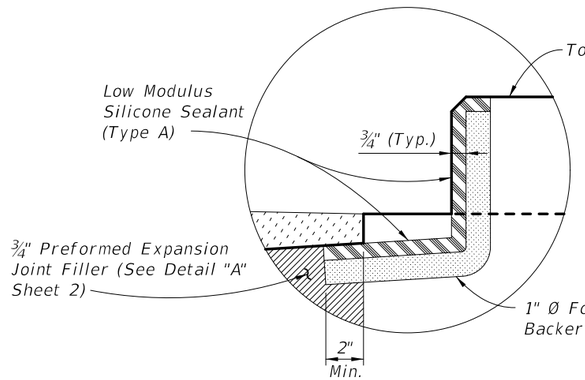
SECTION B-B
(TYPICAL SECTION WITH CURB)
(Precast Coping Shown, C.I.P. Coping Similar)



SECTION C-C
(TYPICAL SECTION TRANSITION COPING)
(Precast Coping shown, C.I.P. Coping similar)



END VIEW D-D
(TYPICAL SECTION TRANSITION COPING)
(Precast Coping shown, C.I.P. Coping similar)



JOINT NOTE:
Joint sealant required at all expansion joints and between precast and C.I.P. curb openings.

CURB JOINT SEALANT DETAIL

NOTES:
1. See Sheets 2 & 3 for Junction Slab and additional Coping details.
2. Slip Forming of C.I.P. Traffic Railiing is not permitted.
3. Actual width varies depending on type of Retaining Wall used.
4. See Index No. 424 for Traffic Railing details and Bars 7P1, 4P5, 4R3, 4S3 & 4V1. Bars 5R2 and 5U are not required in Retaining Wall Coping.

CORRAL SHAPE TRAFFIC RAILINGS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 10 of 19). Changed Junction Slab.			

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Interim Date: 01/01/11

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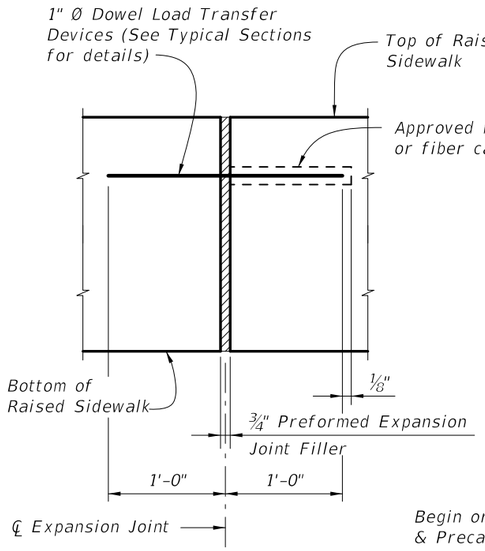
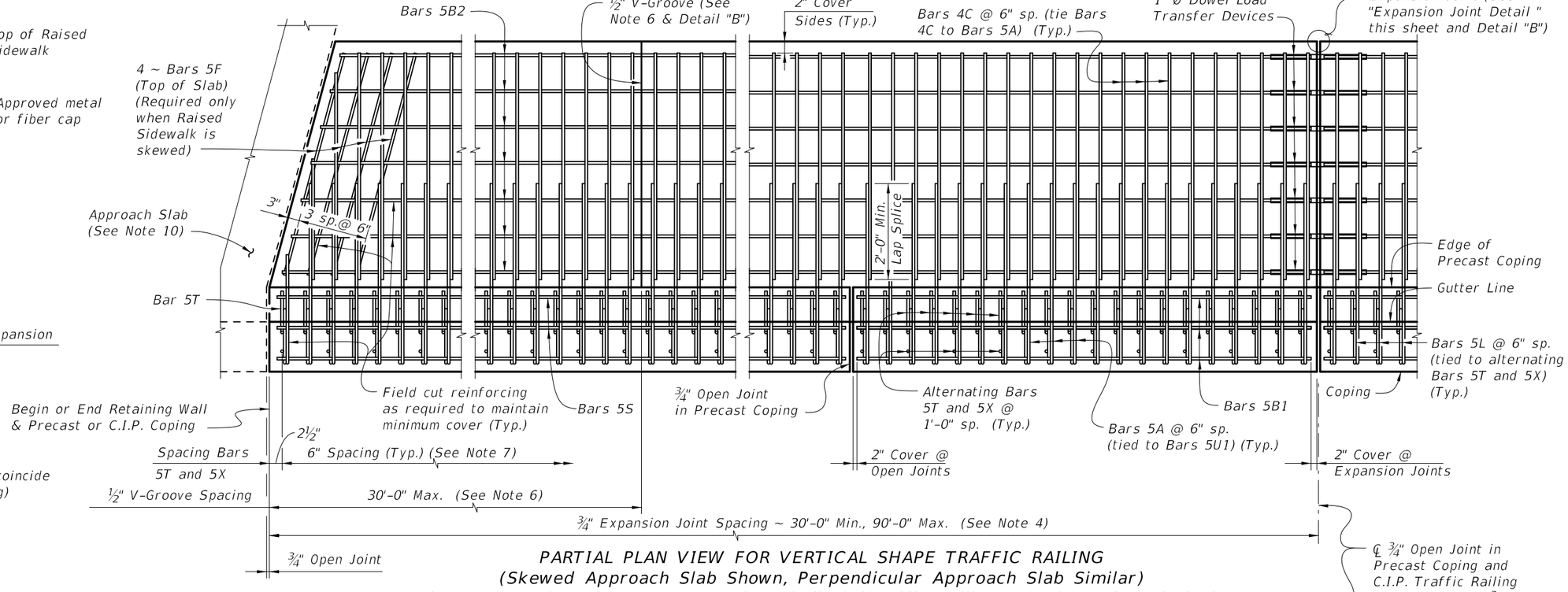
Index No.: 6110



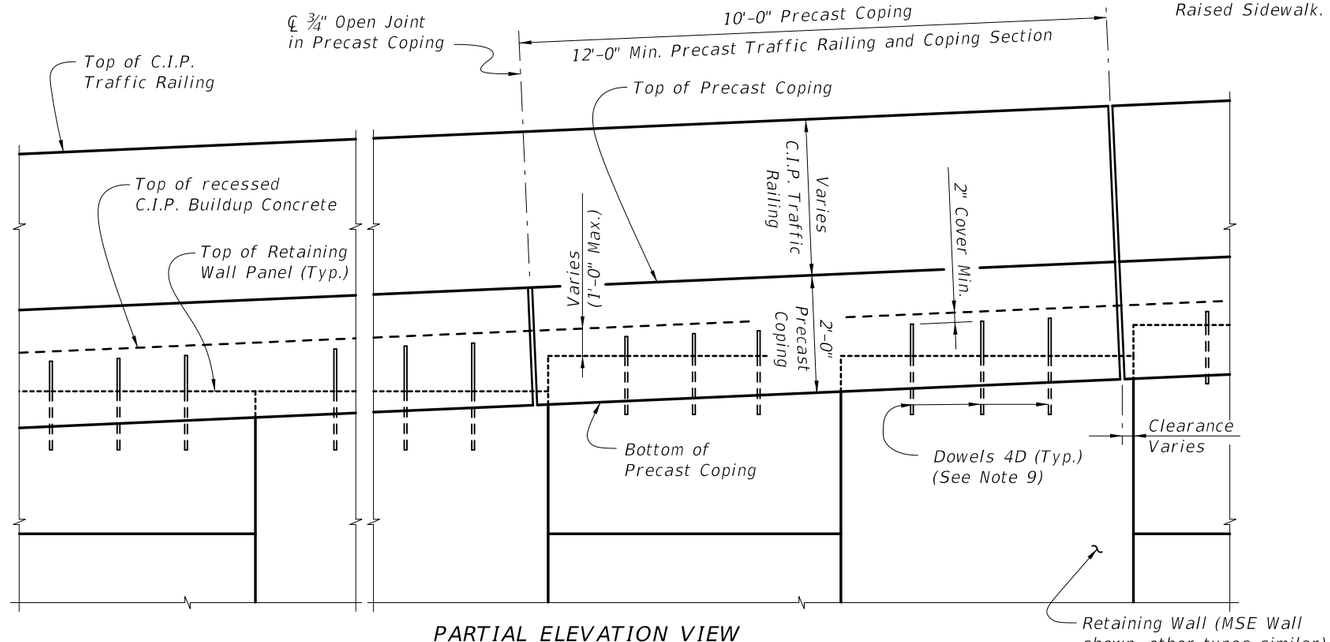
EXPANSION JOINT DETAIL

(Raised Sidewalk expansion joints are to coincide with ¾" open joints in Traffic Railing)



PARTIAL PLAN VIEW FOR VERTICAL SHAPE TRAFFIC RAILING

(Skewed Approach Slab Shown, Perpendicular Approach Slab Similar)
(Precast Coping Shown, C.I.P. Coping Similar) (Traffic Railing not Shown for Clarity)



PARTIAL ELEVATION VIEW

(Precast Coping & Raised Sidewalk Reinforcing not Shown for Clarity)
(Precast Coping Shown, C.I.P. Coping Similar)

RAISED SIDEWALK NOTES:

1. *APPLICATIONS: This raised sidewalk is only applicable for a TL-4 crash test rating. For TL-5 crash test rating increase Expansion Joint spacing to 60'-0" minimum and Bars 4C to Bars 5C or provide Bars 4C @ 4" spacing with the 42" Vertical Shape Traffic Railing.*
2. *CONSTRUCTION REQUIREMENTS: Construct the raised sidewalk level transversely and expansion joints plumb; do not construct the raised sidewalk or C.I.P. coping perpendicular to the roadway surface. Slip forming is not permitted.*
3. *Provide Class II concrete for slightly aggressive environments or Class IV for moderately or extremely aggressive environments.*
4. *Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.*
5. *Construct ¾" Expansion Joints in raised sidewalk and C.I.P. copings plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown.*
6. *Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.*
7. *Construct ½" V-Grooves in raised sidewalk and C.I.P. coping plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between ¾" Expansion Joints and/or Begin or End Raised Sidewalk. V-Groove locations are to coincide with V-Groove locations in the Traffic Railing.*
8. *Spacing shown is along the Gutter Line.*
9. *For MSE Walls, provide Dowel Bars 4D and extend 8" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.*
10. *Finish Sidewalks in accordance with Specification Section 522.*
11. *Work this Index with the following:*
    Index No. 422 – Traffic Railing – (42" Vertical Shape)
    Index No. 423 – Traffic Railing – (32" Vertical Shape)
12. *The following Indexes contain details of the intersection of the retaining wall at approach slabs:*
    Index No. 20900 – Approach Slabs (Flexible Pavement Approaches)
    Index No. 20910 – Approach Slabs (Rigid Pavement Approaches)

CROSS REFERENCE: For Detail "B", see Sheet 2.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 11 of 19); Changed Notes 1 & 9; Added Notes 3 & 10. Redesigned Raised Sidewalk.			

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WALL COPING WITH TRAFFIC RAILING/RAISED SIDEWALK

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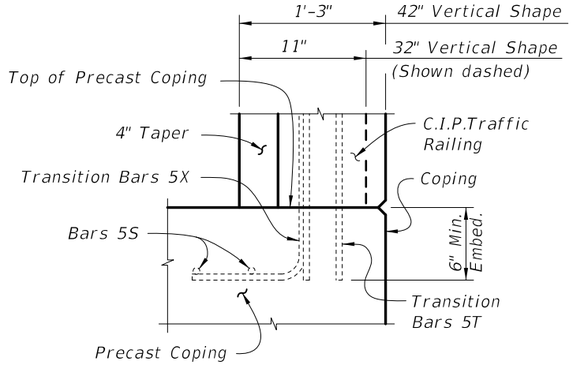
Index No. 6120

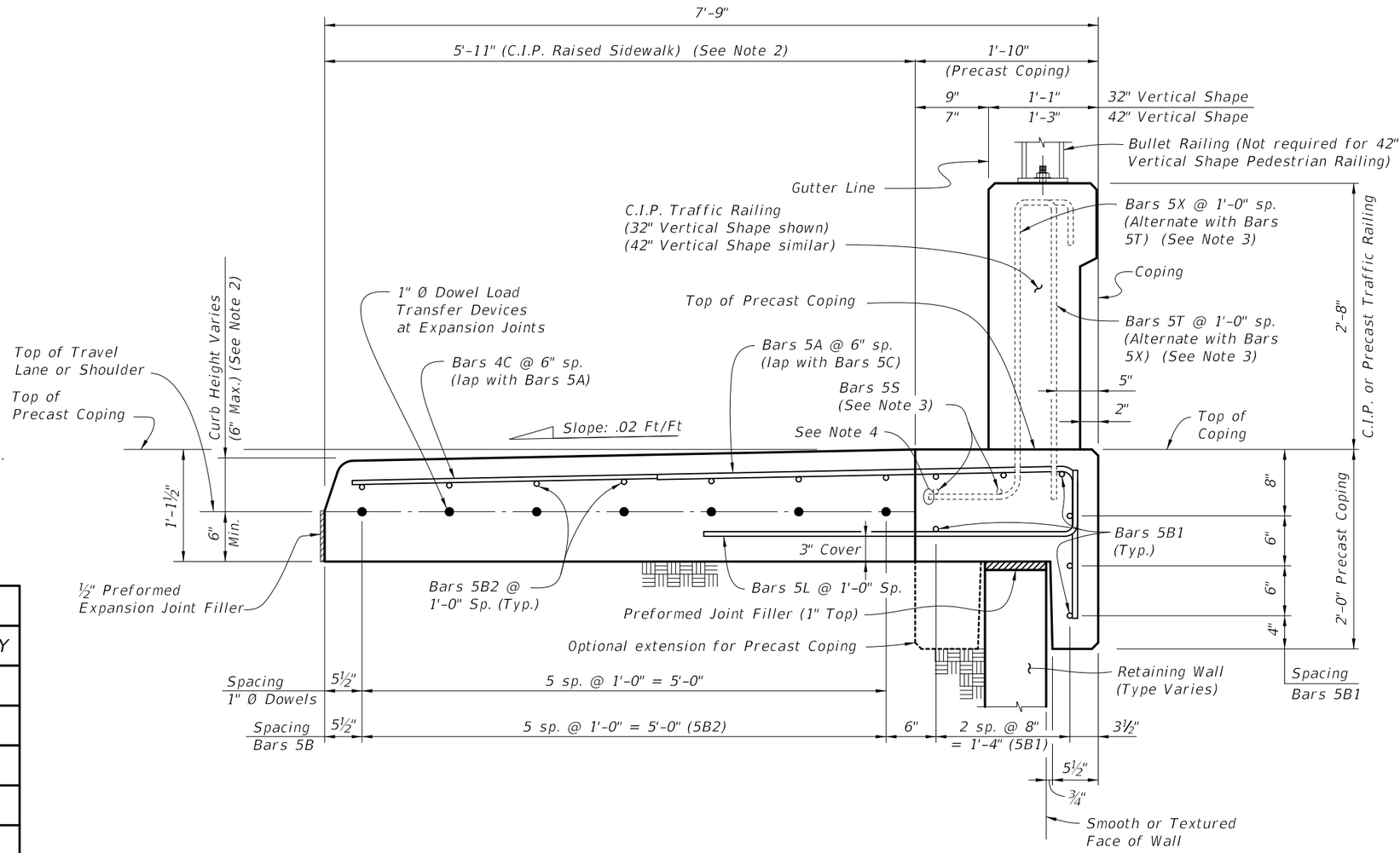


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5S, Bars 5T and Bars 5X) (Precast Coping Shown, C.I.P. Coping Similar)

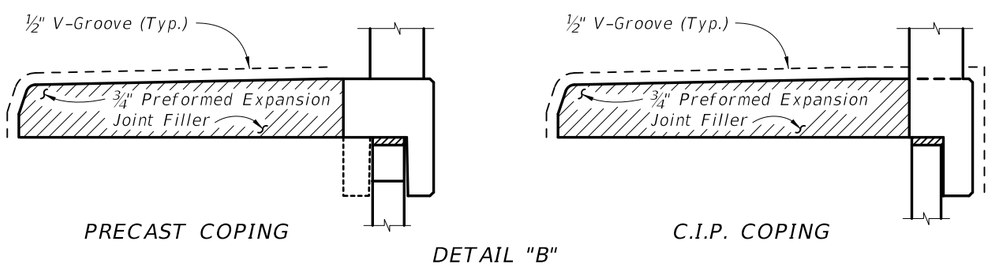
NOTE: See Index No. 422 and Index No. 423, Railing End Detail for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping)	CY/FT	0.091
Concrete (C.I.P. Raised Sidewalk)	CY/FT	0.232
Reinforcing Steel (Precast Coping) excluding Bars 5T, 5X and 5S (Typ.)	LB	21.47
Reinforcing Steel (C.I.P. Raised Sidewalk) (Typ.)	LB/FT	11.92
Additional Reinf. @ Expansion Joints	LB	32.04

The above concrete quantities are based on a Type D Concrete Curb (See Note 2).



TYPICAL SECTION THRU PRECAST COPING WITH C.I.P. RAISED SIDEWALK AND RETAINING WALL AT EXPANSION JOINTS



DETAIL "B"

(Showing Locations of ½" V-Grooves and ¾" Preformed Expansion Joint Filler)

RAISED SIDEWALK NOTES:

1. Actual width varies depending on type of Retaining Wall used.
2. Match roadway curb shape (Type) and height. See Roadway Plans and Index No. 300. 5'-11" dimension is based on a 32" Vertical Shape Traffic Railing with a Type D curb adjacent to a 6'-0" wide sidewalk. Adjust this dimension as required for other curb types or transitions at Begin or End Retaining Wall.
3. See Index No. 422 and Index No. 423 for Bars 5S, 5T & 5X and Bullet Railing details. Adjust vertical dimension of Bars 5T and 5X, see Reinforcing Steel Note 5.
4. Trim end of Bars 5T and 5X to clear construction joint for 42" Vertical Shape Traffic Railing.
5. At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Mechanical couplers shall develop 125% of the bar yield strength.
6. Contractor to maintain stability of precast coping prior to junction slab completion.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 12 of 19); Deleted Note 1 & 4; Redesigned Raised Sidewalk.			

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WALL COPING WITH TRAFFIC RAILING/RAISED SIDEWALK

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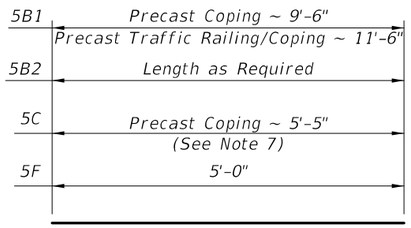
Sheet No. 2 of 3

Index No. 6120

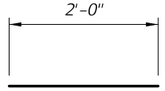
REINFORCING STEEL BENDING DIAGRAMS - RAISED SIDEWALK

BILL OF REINFORCING STEEL

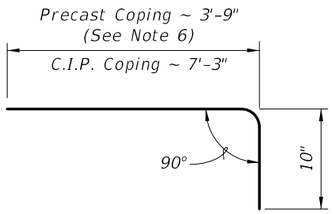
MARK	SIZE	LENGTH	
		PRECAST COPING/ RAILING	C.I.P. COPING
A	5	4'-7"	8'-1"
B1	5	9'-6"/11'-6"	N/A
B2	5	AS REQD.	AS REQD.
C	4	5'-5"	N/A
F	5	5'-0"	5'-0"
L	5	4'-5"	4'-5"
1" Ø Dowel	Smooth Steel Bar	2'-0"	2'-0"



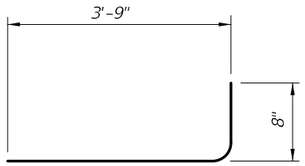
BARS 5B1, 5B2, 5C & 5F



1" Ø DOWEL



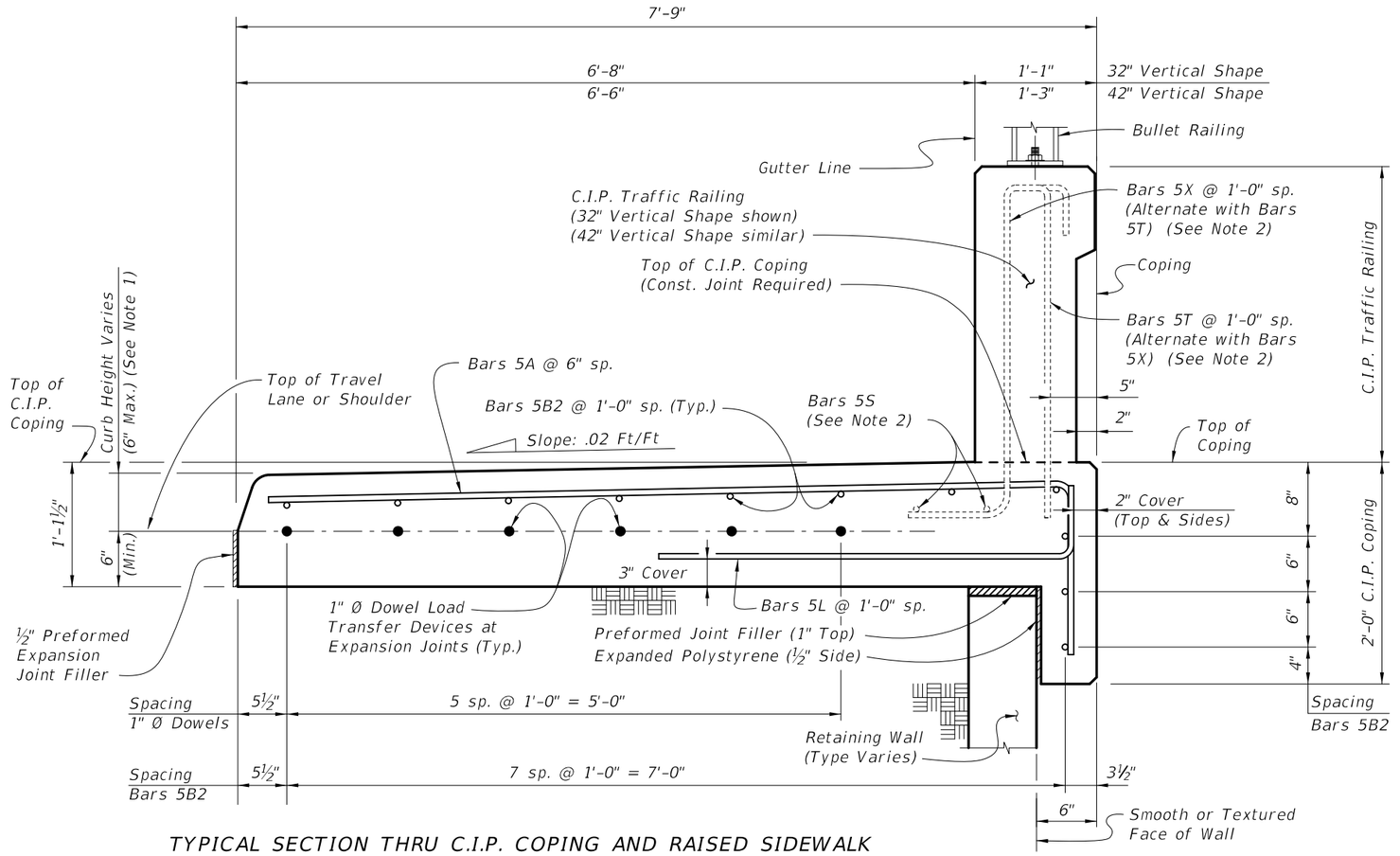
BAR 5A



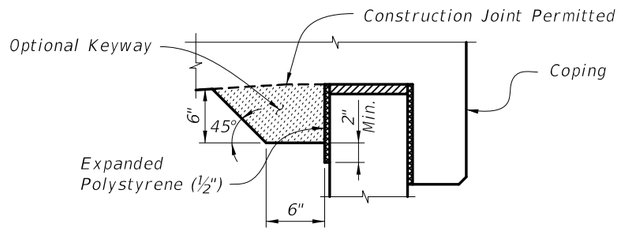
BAR 5L

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at expansion joints will have a 2" minimum cover.
3. Lap splices for Bars 5B will be a minimum of 2'-2".
4. Lap splice Bars 5A with Bars 5C. Lap splices will be a minimum of 2'-2".
5. See Index No. 422 and Index No. 423 for Bars 5S, 5T and 5X. Adjust vertical dimensions of Stirrup Bars 5T and 5X to 3'-0" for 32" Vertical Shape or 3'-10" for 42" Vertical Shape.
6. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 1'-8".
7. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 5'-8".
8. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



TYPICAL SECTION THRU C.I.P. COPING AND RAISED SIDEWALK AND RETAINING WALL AT EXPANSION JOINTS



OPTIONAL C-I-P COPING KEYWAY

RAISED SIDEWALK NOTES:

1. Match roadway curb shape (Type) and height. See Roadway Plans and Index No. 300. 6'-8" dimension is based on a 32" Vertical Shape Traffic Railing with a Type D curb adjacent to a 6'-0" wide sidewalk. Adjust this dimension as required for other curb types or transitions at Begin or End Retaining Wall.
2. See Index No. 422 and Index No. 423 for Bars 5S, 5T & 5X and Bullet Railing details. Adjust vertical dimension of Bars 5T and 5X, see Reinforcing Steel Note 5.

ESTIMATED QUANTITIES FOR C.I.P. COPING

ITEM	UNIT	QUANTITY
Concrete	CY/FT	0.322
Reinforcing Steel (Typical) excluding Bars 5T, 5X and 5S (Typ.)	LB/FT	28.33
Additional Reinf. @ Expansion Joints	LB	32.04

The above concrete quantities are based on a Type D Concrete Curb (See Note 1).

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 13 of 19), Redesigned Raised Sidewalk; Deleted Note 1 & 4.			

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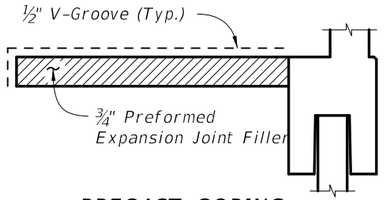
2010 Interim Design Standard

WALL COPING WITH TRAFFIC RAILING/RAISED SIDEWALK

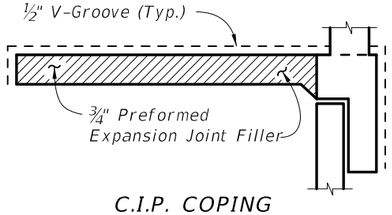
Interim Date 01/01/11

Sheet No. 3 of 3

Index No. 6120



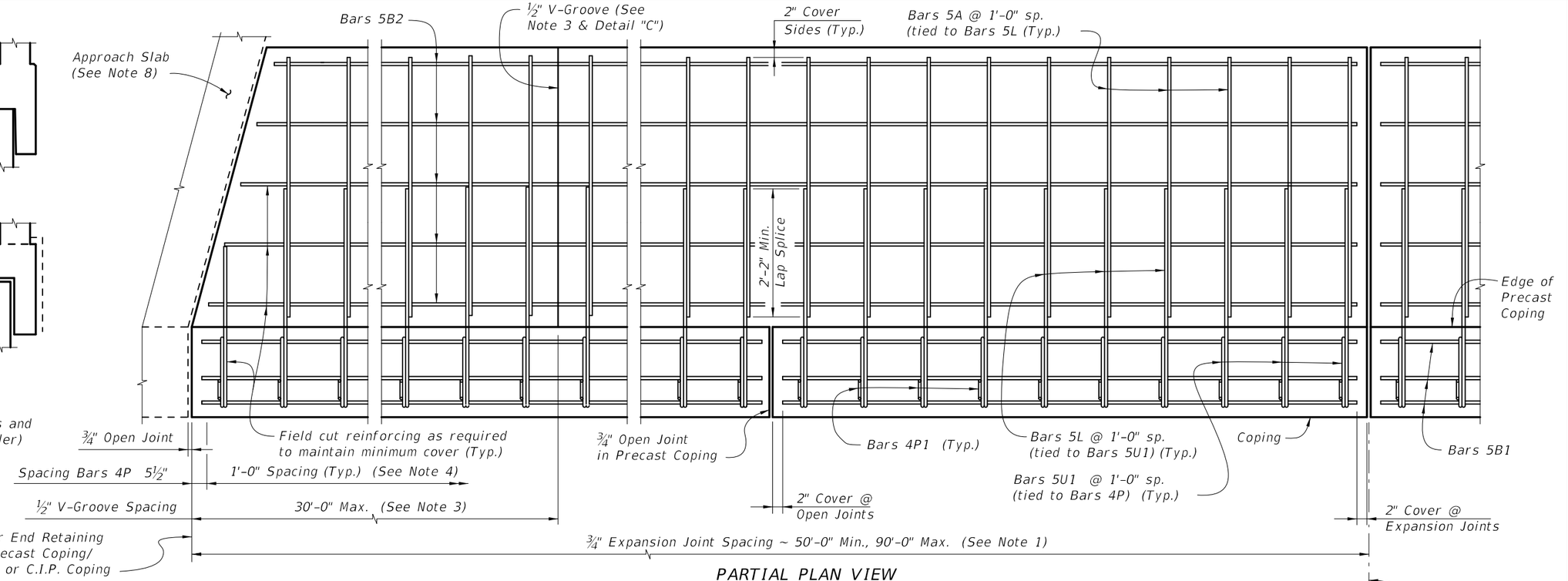
PRECAST COPING



C.I.P. COPING

DETAIL "C"

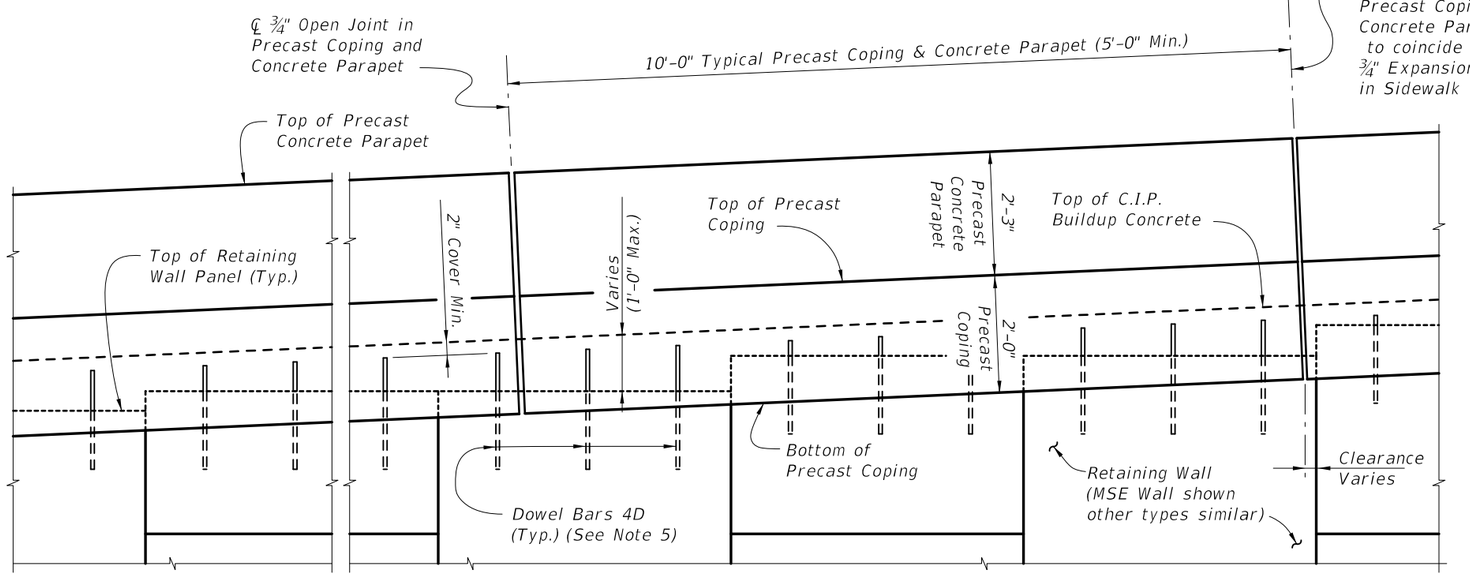
(Showing Locations of ½" V-Grooves and ¾" Preformed Expansion Joint Filler)



PARTIAL PLAN VIEW

(Skewed Approach Slab Shown, Perpendicular Approach Slab Similar)

(Precast Coping Shown, C.I.P. Coping Similar) (Concrete Parapet not Shown for Clarity)



PARTIAL ELEVATION VIEW

(Precast Coping and Sidewalk Reinforcing not Shown for Clarity)

(Precast Coping Shown, C.I.P. Coping Similar)

PRECAST COPING/PARAPET AND SIDEWALK NOTES:

1. Provide Class II concrete for slightley aggressive environments or Class IV for moderately or extremely aggressive environments.
2. Construct ¾" Expansion Joints in sidewalk and C.I.P. coping plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown.
3. Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
4. Construct ½" V-Grooves in sidewalk and C.I.P. coping plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between ¾" Expansion Joints and/or Begin or End Sidewalk. For C.I.P. Coping only, V-Groove locations are to coincide with V-Groove locations in the Concrete Parapet.
5. Spacing shown is along the Gutter Line.
6. For Precast Coping only, Dowel Bars 4D are to extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
7. Work this Index with the following:
   Index No. 410 – Concrete Barrier Wall
8. For C.I.P. Coping only, work this Index with the following:
   Index No. 820 – Pedestrian/Bicycle Railing.
9. Finish Sidewalks in accordance with Specifications Section 522.
10. The following Indexes contain details of the intersection of the retaining wall at approach slabs:
    Index No. 20900 – Approach Slabs (Flexible Pavement Approaches)
    Index No. 20910 – Approach Slabs (Rigid Pavement Approaches)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index No. 5300, Sheet 14 of 19); Added Notes 1 & 9.			

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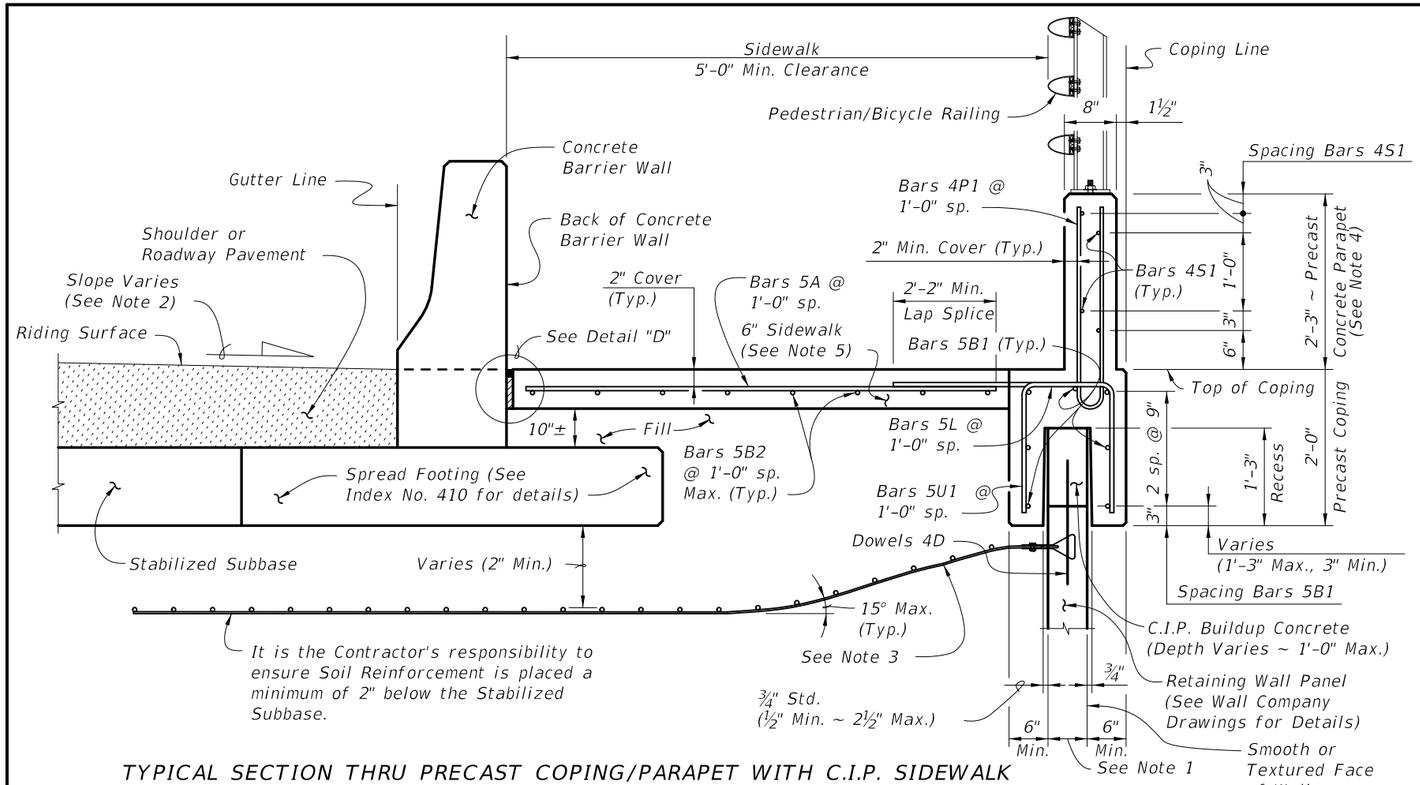
2010 Interim Design Standard

WALL COPING/PARAPET WITH C-I-P SIDEWALK

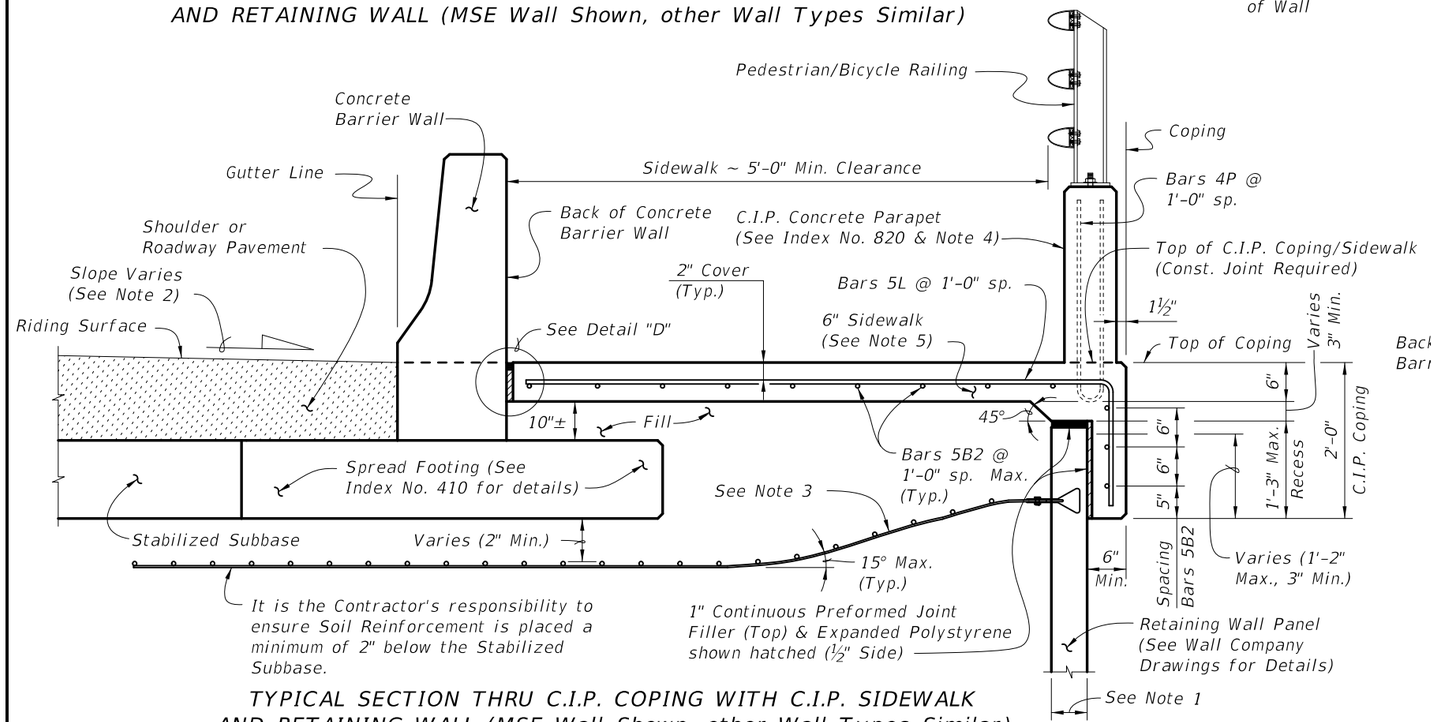
Interim Date 01/01/11

Sheet No. 1 of 2

Index No. 6130



TYPICAL SECTION THRU PRECAST COPING/PARAPET WITH C.I.P. SIDEWALK AND RETAINING WALL (MSE Wall Shown, other Wall Types Similar)

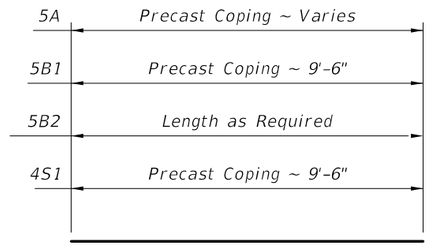


TYPICAL SECTION THRU C.I.P. COPING WITH C.I.P. SIDEWALK AND RETAINING WALL (MSE Wall Shown, other Wall Types Similar)

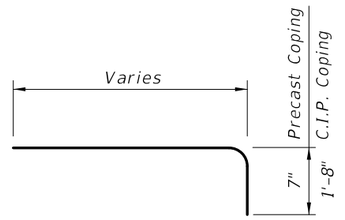
REINFORCING STEEL BENDING DIAGRAMS - COPING/PARAPET AND SIDEWALK

BILL OF REINFORCING STEEL

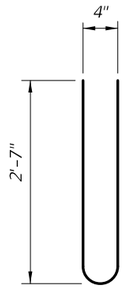
MARK	SIZE	LENGTH	
		PRECAST COPING	C.I.P. COPING
A	5	VARIES	N/A
B1	5	9'-6"	N/A
B2	5	AS REQD.	AS REQD.
D	4	2'-0"	N/A
L	5	VARIES	VARIES
P1	4	5'-5"	N/A
S1	4	9'-6"	N/A
U1	5	VARIES	N/A



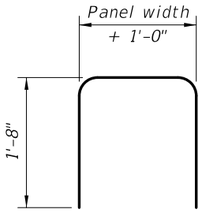
BARS 5A, 5B1, 5B2 & 4S1



BAR 5L

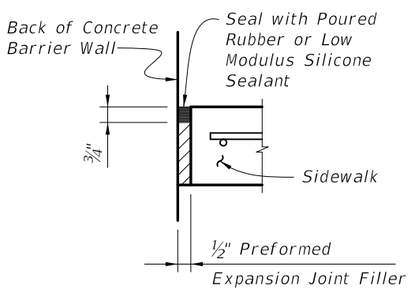


BAR 4P1



BAR 5U1

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at expansion joints will have a 2" minimum cover.
3. Lap splices for Bars 5B2 will be a minimum of 2'-2".
4. For Precast Coping only, lap splice Bars 5L with Bars 5A. Lap splices will be a minimum of 2'-2".
5. For C.I.P. only, see Index No. 820 for Bars 4P and 4S.
6. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement must conform to ASTM A 497.



DETAIL "D"

PRECAST COPING/PARAPET AND SIDEWALK NOTES:
1. Actual width varies depending on type of Retaining Wall used.
2. Match Cross Slope of Travel Lane or Shoulder.
3. Gradually deflect/displace Soil Reinforcement downward as required. Soil Reinforcement is shown deflected downward for illustrative purposes only and is not to scale. See Wall Company Drawings for details.
4. Concrete Parapet shown, Concrete Pedestrian/Bicycle Railing (Index No. 825 & 826) similar. Complete details and dimensions of Concrete Pedestrian/Bicycle Railing are required in the Shop Drawings.
5. Match cross slope of connecting sidewalk or as shown in the Wall Control Drawings.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Index No. & Title (Previously Index No. 5300, Sheet 15 of 19); Changed Note 4.			

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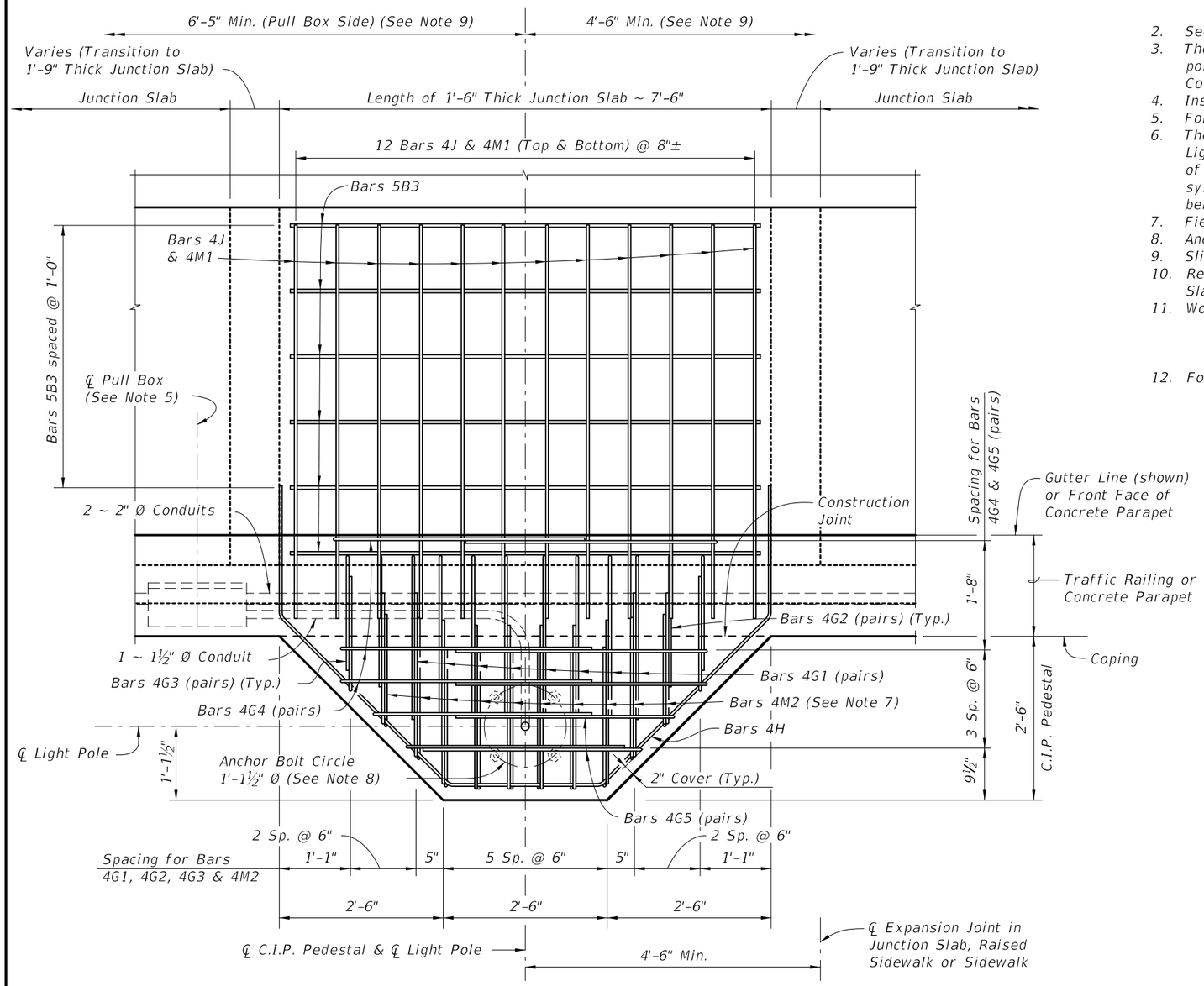
WALL COPING/PARAPET WITH C-I-P SIDEWALK

Interim Date 01/01/11

Sheet No. 2 of 2

Index No. 6130



PLAN VIEW
(Junction Slab reinforcing not shown for clarity)
(Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)

LIGHT PEDESTAL NOTES:

1. *The pedestal and junction slab are designed to resist the following working loads from the light pole applied at the top of the Pedestal:*

Axial Deadload	=	*1.560 kip*
Windload Moment about Transverse Axis (*)	=	*40.60 kip-ft*
Windload Moment about Longitudinal Axis (*)	=	*28.30 kip-ft*
Deadload Moment about Longitudinal Axis (*)	=	*1.690 kip-ft*
Maximum Shear	=	*1.380 kip*
Torsion about Pole Axis	=	*3.560 kip-ft*

   (*) - Axis refers to Bridge Axis.
2. *See Index No. 21200 for anchor bolt design and notes.*
3. *The Contractor is responsible for ensuring the anchor bolt design is compatible with the light pole base plate. Modifications to the anchor bolt design must be signed and sealed by the Contractor's Specialty Engineer and submitted to the Engineer for approval prior to construction.*
4. *Install Anchor Bolts plumb.*
5. *For conduit, pull box and expansion/deflection fitting details, see Utility Conduit Detail Drawings.*
6. *The cost of anchor bolts, nuts, washers and anchor plates will be included in the Bid Price for Light Poles. Include the cost of all labor, concrete and reinforcing steel required for construction of the pedestals, pull boxes and miscellaneous hardware required for the completion of the electrical system in the Bid Price for either the Traffic Railing or Concrete Parapet that the pedestal is behind.*
7. *Field Cut Bars 4M2 as required to maintain clearance.*
8. *Anchor Bolt pattern orientation will be as shown.*
9. *Slip Forming Method of construction requires the Engineer's approval within the limits shown.*
10. *Reinforcing shown for light pole pedestals is in addition to typical reinforcing for C.I.P. Junction Slabs and Raised Sidewalks.*
11. *Work this Index with the following as appropriate:*
    Index No. 6110
    Index No. 6120
    Index No. 6130
12. *For Estimated Quantities, see Sheet No. 3.*

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 16 of 19); Changed width of junction slab, Note 10 & "pilaster" to "pedestal".			

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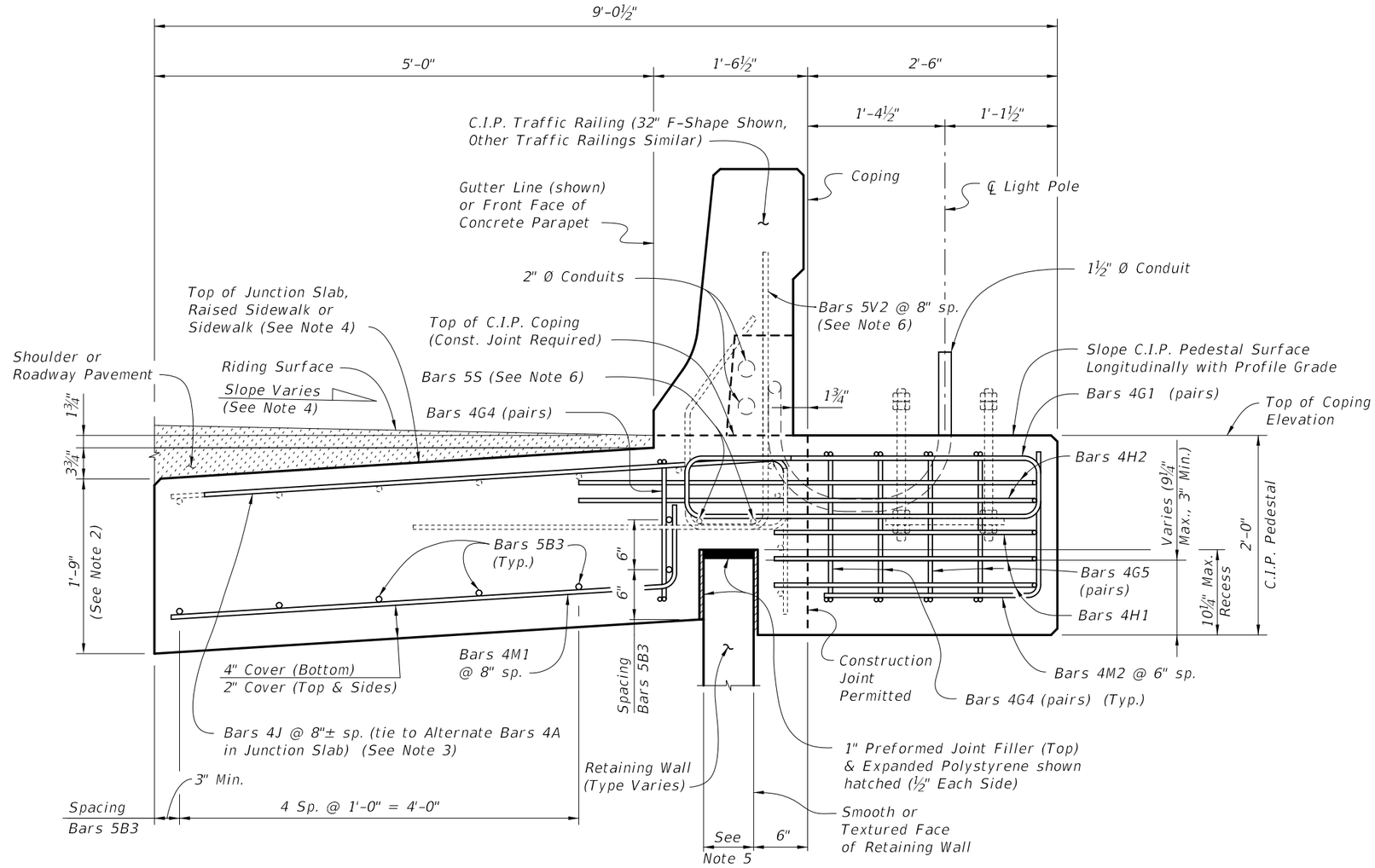
COPING MOUNTED LIGHT POLE PEDESTAL

Interim Date 01/01/11

Sheet No. 1 of 3

Index No. 6200



TYPICAL SECTION AT LIGHT POLE PEDESTAL
(Traffic Railing Shown, Concrete Parapet Similar)
(Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)

NOTES:

1. Provide Concrete Class to match adjacent coping.
2. For junction slabs, increase the 1'-0" depth dimension to 1'-9". For sidewalks see Index No. 6130 for C.I.P. Coping, but increase 6" depth dimension to 1'-6". The minimum length of the Junction Slabs, Raised sidewalks and Sidewalks is 30'-0", measured along the Gutter Line.
3. Bars 4J are only required when pedestals are behind a Traffic Railing.
4. Match the slope of the adjoining junction slab and shoulder or roadway pavement, raised sidewalk or sidewalk.
5. Actual width varies depending on type of Retaining Wall used.
6. See Index No. 6110 for Bars 5V2 and 5S.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 17 of 19). Changed Junction Slab.			

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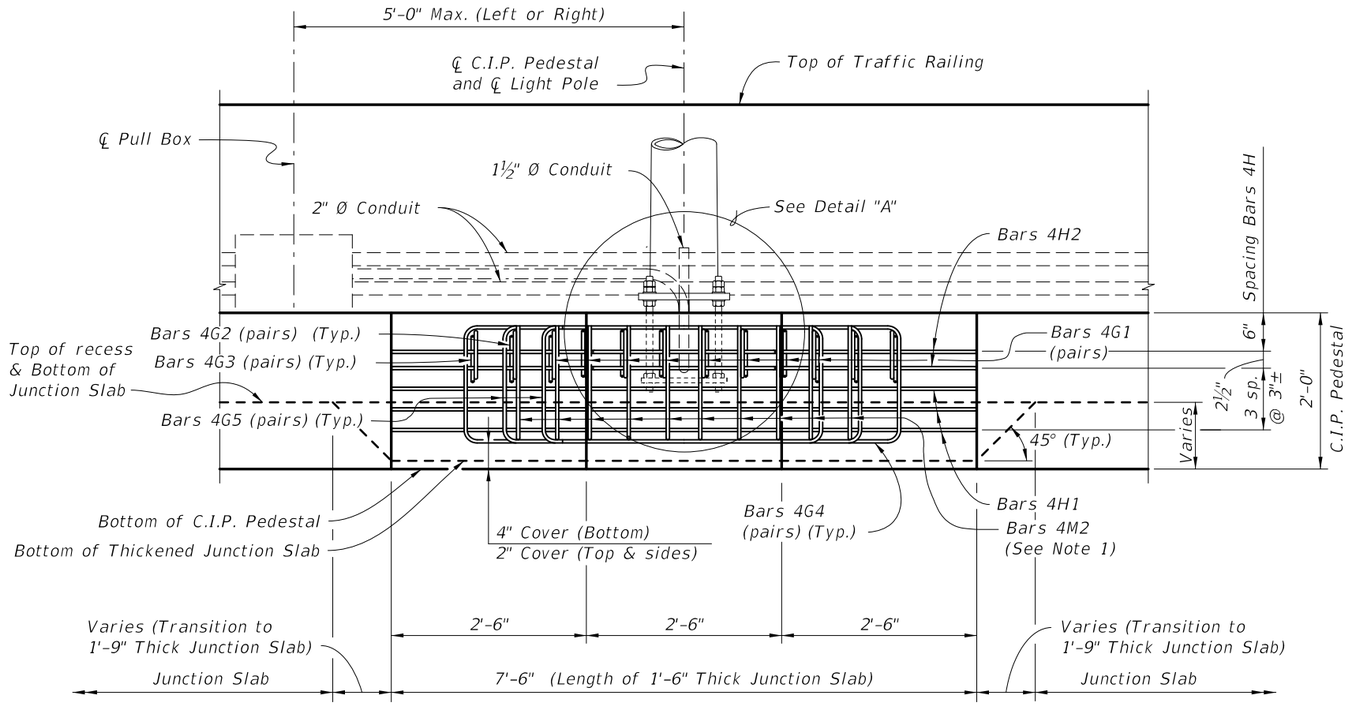
2010 Interim Design Standard

COPING MOUNTED LIGHT POLE PEDESTAL

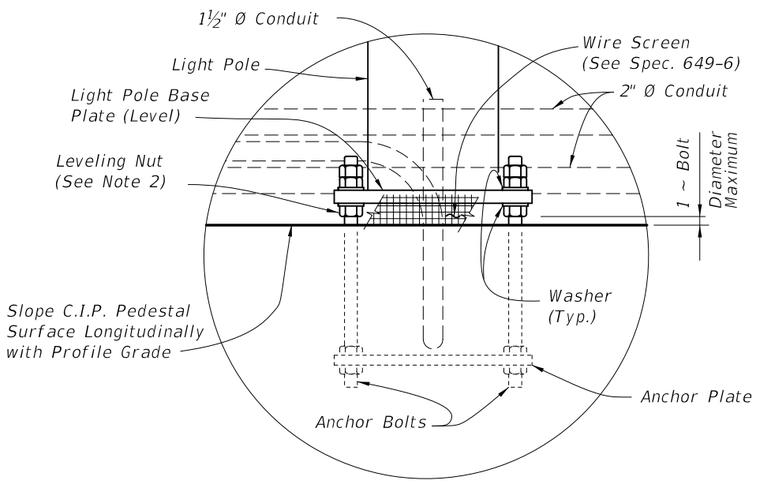
Interim Date 01/01/11

Sheet No. 2 of 3

Index No. 6200



ELEVATION VIEW
(Junction Slab Reinforcing & Bars 4J not Shown for Clarity)
(Traffic Railing Shown, Concrete Parapet Similar)
(Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)



DETAIL "A"

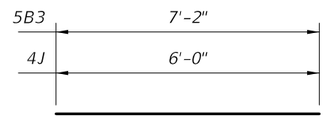
NOTES:
1. *Field Cut Bars 4M2 as required to maintain minimum cover.*
2. *Maximum clearance between leveling nut and top of pedestal will not exceed anchor bolt diameter.*

ESTIMATED QUANTITIES		
ITEM	*UNIT*	*QUANTITY*
Concrete (Pedestal)	*CY*	*0.926*
Concrete (Thickened Junction Slab)	*CY*	*1.222*
Reinforcing Steel	*Lb.*	*349*

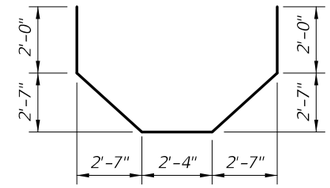
(The quantities above are for one C.I.P. Light Pole Pedestal. The concrete quantity for the thickened junction slab is based on a 6" increase in thickness and a 5" wide retaining wall panel. Adjust thickened concrete quantity as required for raised sidewalks and sidewalks.)

REINFORCING STEEL BENDING DIAGRAMS - LIGHT POLE PEDESTAL

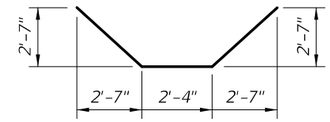
BILL OF REINFORCING STEEL			
MARK	*SIZE*	*NO. REQD.*	*LENGTH*
B3	*5*	*7*	*7'-2"*
G1	*4*	*16*	*5'-8"*
G2	*4*	*4*	*4'-8"*
G3	*4*	*4*	*4'-2"*
G4	*4*	*6*	*8'-10"*
G5	*4*	*4*	*7'-4"*
H1	*4*	*3*	*9'-8"*
H2	*4*	*2*	*13'-8"*
J	*4*	*12*	*6'-0"*
M1	*4*	*12*	*5'-10"*
M2	*4*	*10*	*3'-8"*



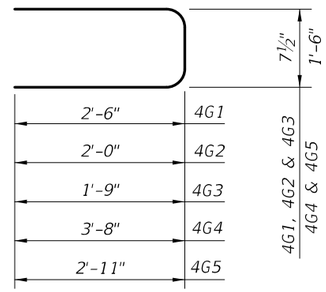
BARS 5B3 & 4J



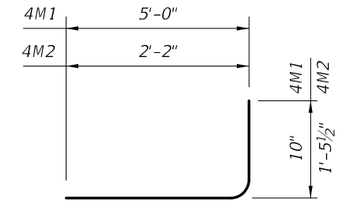
BAR 4H2



BAR 4H1



BARS 4G1, 4G2, 4G3, 4G4 & 4G5



BAR 4M1 & 4M2

REINFORCING STEEL NOTES:
1. *All bar dimensions in the bending diagrams are out to out.*
2. *Lap splices for Bars 4G1, 4G2 & 4G3 will be a minimum of 1'-4". Lap splices for Bars 4G4 & 4G5 will be a minimum of 1'-8".*
3. *The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.*

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	*SJN*	*New Index Number (Previously Index No. 5300, Sheet 18 of 19); Changed number of Bars 5B3 & 4J, length of Bars 4M1 and ESTIMATED QUANITITIES.*			

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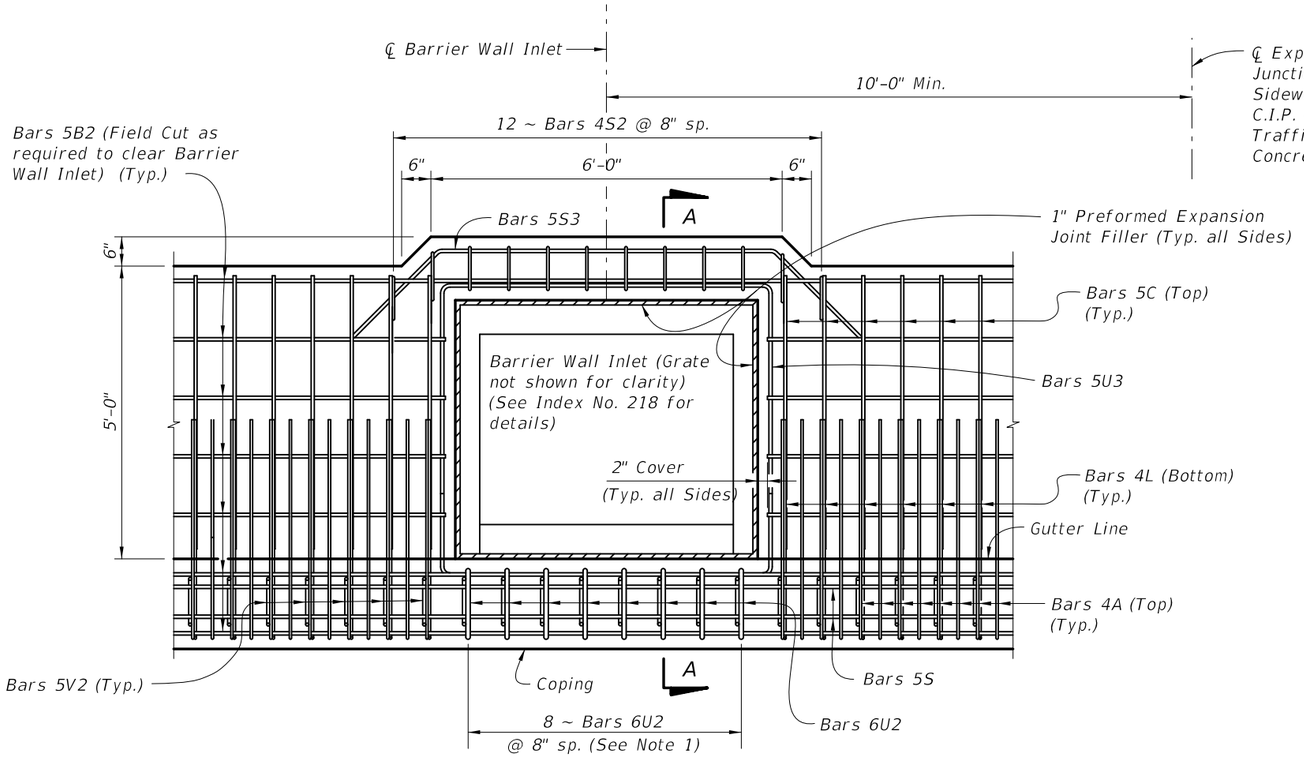
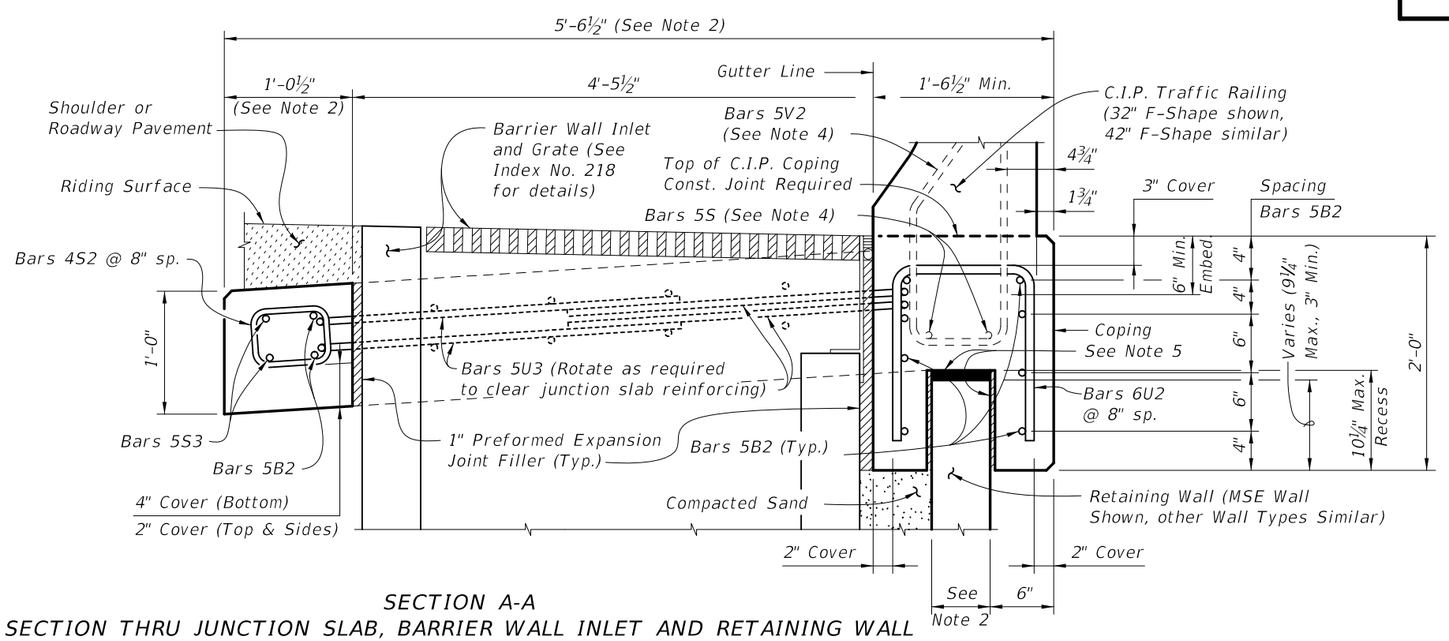
COPING MOUNTED LIGHT POLE PEDESTAL

Interim Date	Sheet No.
01/01/11	3 of 3

Index No. 6200



PLAN VIEW
(Junction Slab Shown, Raised Sidewalk Similar)

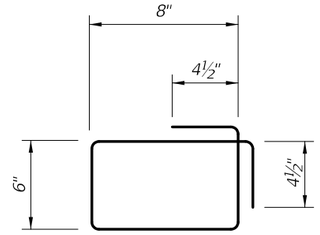


SECTION A-A
SECTION THRU JUNCTION SLAB, BARRIER WALL INLET AND RETAINING WALL
(Junction Slab Shown, Raised Sidewalk Similar)

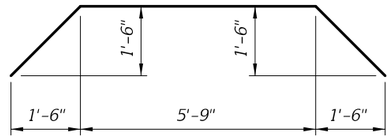
REINFORCING STEEL BENDING DIAGRAMS - DRAINAGE

BILL OF REINFORCING STEEL

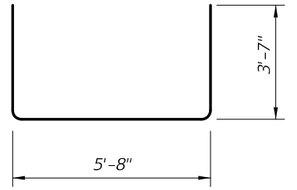
MARK	REQD.	SIZE	LENGTH
S2	12	4	3'-1"
S3	2	5	10'-0"
U2	8	6	VARIES
U3	4	5	12'-10"



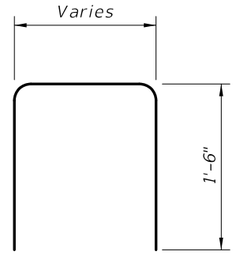
STIRRUP BAR 4S2



BAR 5S3



BAR 5U3



BAR 6U2

REINFORCING STEEL NOTES:

1. *All bar dimensions in the bending diagrams are out to out.*
2. *All reinforcing steel at open joints will have a 2" minimum cover.*
3. *See Index Nos. 6110, 6120 & 6130 for Bars 4A (or 5A), 5B, 5C and 4L (or 5L).*
4. *The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.*

NOTES:

1. *Spacing shown is along the Gutter Line. Spacing shown is for C.I.P. Junction Slab. For C.I.P. Raised Sidewalks or Sidewalks, match bar spacing and size shown in Typical Sections (i.e., 11 ~ Bars 5U2 and 15 ~ Bars 4S2 @ 6" spacing for Raised Sidewalks).*
2. *Dimensions shown are for junction slab. Increase width as required for C-I-P Raised Sidewalk and Sidewalks.*
3. *Actual location & width vary depending on type of Retaining Wall used.*
4. *See Index No. 6110 for Bars 5V2 and 5S.*
5. *1" Preformed Joint Filler (Top) & Expanded Polystyrene shown hatched (½" Each Side).*
6. *Locate ℄ Barrier Wall Inlet a minimum of 10'-0" away from ℄ Expansion Joints in Junctions Slab, Raised Sidewalk or Sidewalk, C.I.P. Coping and Traffic Railing or Concrete Parapet.*
7. *Work this Index with the following as appropriate:*
   Index No. 6110
   Index No. 6120
   Index No. 6130

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	New Index No. & Title (Previously Index No. 5300, Sheet 19 of 19); Changed junction slab notes & Bar S2; Added Bar 5S3.			

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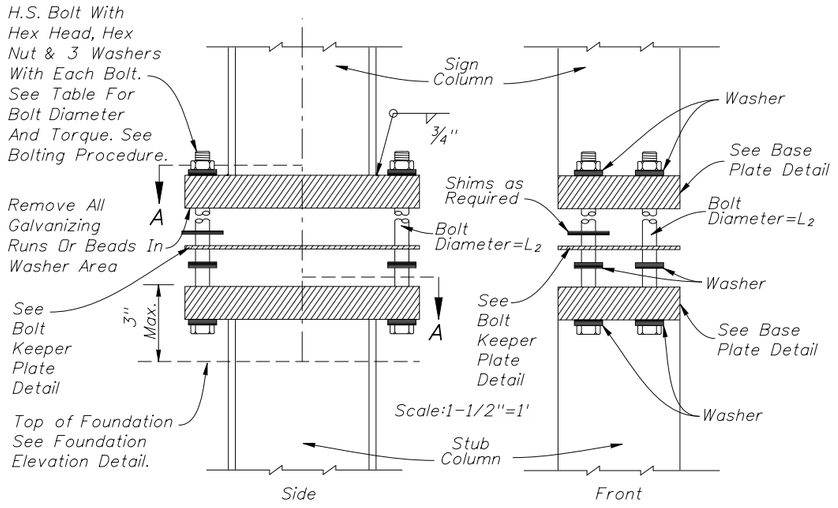
JUNCTION SLAB AT DRAINAGE INLET OPENINGS

Interim Date 01/01/11

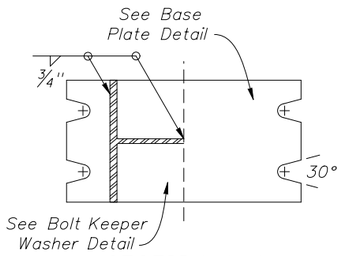
Sheet No. 1 of 1

Index No. 6201

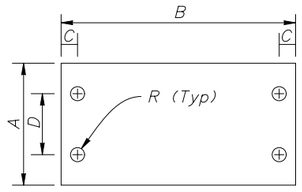


SIGN COLUMN & STUB COLUMN ELEVATION

BASE CONNECTION

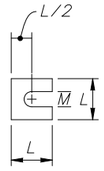


SECTION A-A

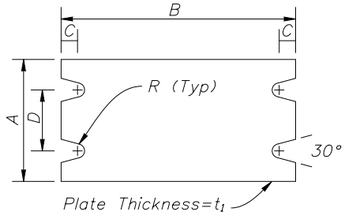


BOLT KEEPER PLATE

Provide 2- 0.0149" Thick (28 guage) and 2- 0.0329" Thick (21 guage) Per Post.



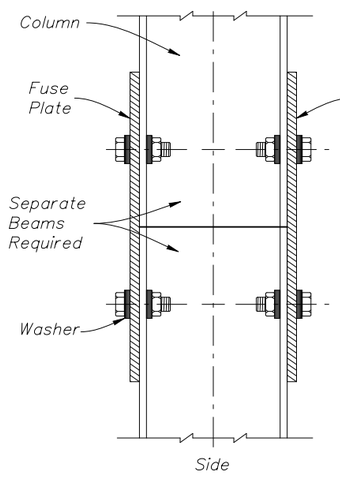
SHIM DETAIL



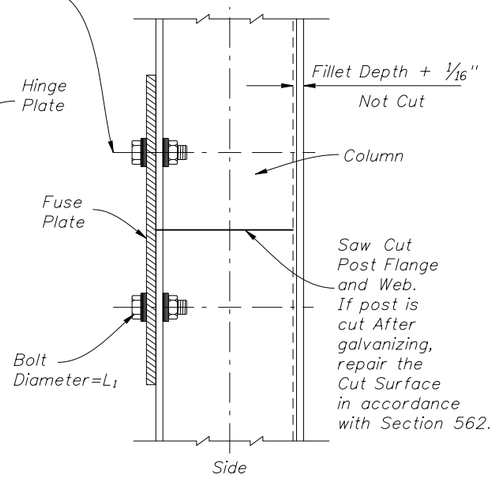
BASE PLATE

Direction of Traffic

Flange Holes For Fuse And Hinge Plate Shall Be Drilled Or Sub-Punched and Reamed. H.S. Bolts (See Table For Size), For Bolt Tension See the Specification. Flat Washers (Typ.)



OPTIONAL HINGE Elevation

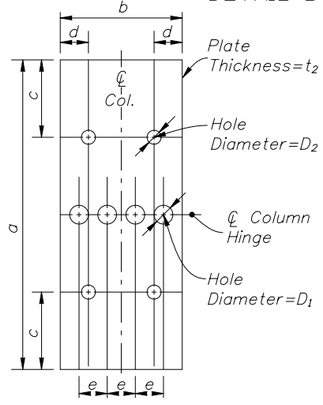


TYPICAL HINGE Elevation

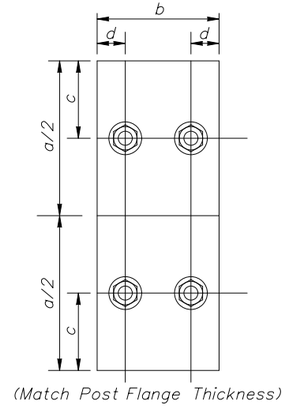
FUSE & HINGE PLATES

(See Fabricator Note on Sheet 1 of 2)

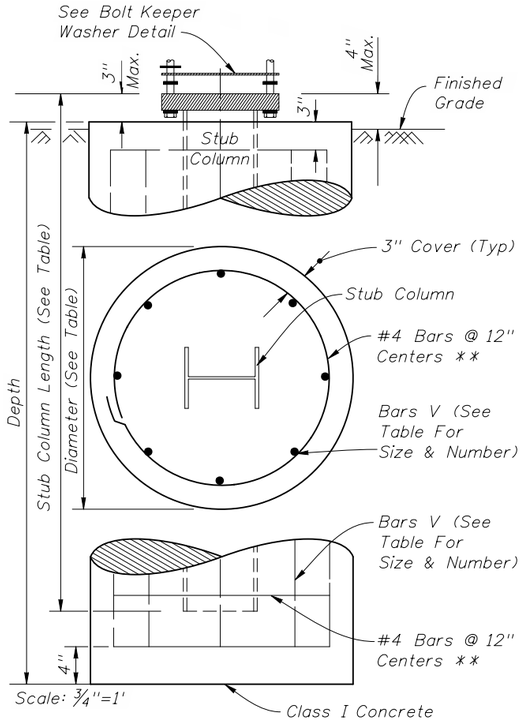
DETAIL B



FUSE PLATE



HINGE PLATE



FOUNDATION ELEVATION

NOTE: All Reinforcing To Be Grade 60.

** At the Option of the Contractor, D10 Spiral Wire @ 6" Pitch, Three Flat Turns Top and One Flat Turn Bottom may be Utilized in Lieu of Specified.

Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:

1. The reinforcing bars conform to ASTM Specification A706/706M.
2. The holding wires conform to ASTM Specification A1064.
3. The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
4. Quality control test are preformed on shop-welded specimens and the test results are available, upon request, to the Engineer.

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

1. Assemble post to stub with bolts and flat washers as shown.
2. Shim as required to plumb post (see shim detail).
3. Tighten all L_2 bolts the maximum possible with 1'-0" to 1'-3" wrench to bed washers and shims and to clean bolt threads.
4. Burr threads at junction with nut using a center punch to prevent nut loosening.

BASE CONNECTION DATA									FUSE (HINGE) PLATE DATA									SHIM		FOUNDATION DATA			
Section*	A	B	C	D	R	t_1	L_2	Torque (lbf*in)	a	b	c	d	e	t_2	D_1	D_2	L_1	L	M	Dia.	Depth	Stub Length	Reinf. Bars V
S 3x5.7	4"	7"	3/4"	2"	5/16"	1"	1/2"	90 ± 20	7-1/4"	2-3/8"	1-1/4"	1/2"	9/16"	3/8"	7/16"	9/16"	1/2"	1-1/4"	9/16"	2'-0"	4'-0"	3'-0"	10-#6
W 6x12	4"	10"	3/4"	2"	3/8"	1-5/8"	5/8"	270 ± 45	7-1/4"	4"	1-1/4"	7/8"	15/16"	3/8"	13/16"	11/16"	5/8"	1-3/8"	11/16"	2'-0"	6'-0"	3'-0"	10-#6
W 8x18	5-1/4"	11-1/4"	7/8"	2-3/4"	7/16"	1-3/4"	3/4"	445 ± 75	8-1/4"	5-1/4"	1-3/8"	1-1/8"	1-1/4"	3/8"	1"	13/16"	3/4"	1-3/4"	13/16"	2'-4"	7'-6"	4'-0"	8-#8
W 8x24	6-1/2"	12-1/2"	7/8"	3-1/4"	7/16"	1-3/4"	3/4"	445 ± 75	8-1/4"	6-1/2"	1-3/8"	1-1/2"	1-1/2"	1/2"	1"	13/16"	3/4"	2-1/8"	13/16"	2'-4"	8'-6"	4'-0"	8-#8
W 10x33	8"	16"	1-1/4"	4-3/4"	9/16"	2"	1"	580 ± 90	9-1/4"	8"	2"	1-3/4"	1-3/4"	5/8"	1-1/8"	1-1/16"	1"	2-3/8"	1-1/16"	2'-4"	10'-3"	4'-0"	8-#8
W 12x45	10"	18"	1-1/4"	6"	9/16"	2"	1"	580 ± 90	11"	8"	2"	1-3/4"	1-3/4"	3/4"	1-5/16"	1-1/16"	1"	2-3/4"	1-1/16"	2'-8"	11'-3"	5'-0"	10-#8

* Designations: Normal Depth in inches and weight in pounds per linear foot.

STEEL POST, BASE, FOUNDATION & FUSE PLATE DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
04/27/10	DYW	Weld symbol revised. Detail B revised.			
06/15/10	DYW	Brass Shims added to Shim Detail.			
01/01/11	DYW	Added W 8x18 to table and updated values.			

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MULTI-COLUMN GROUND SIGN

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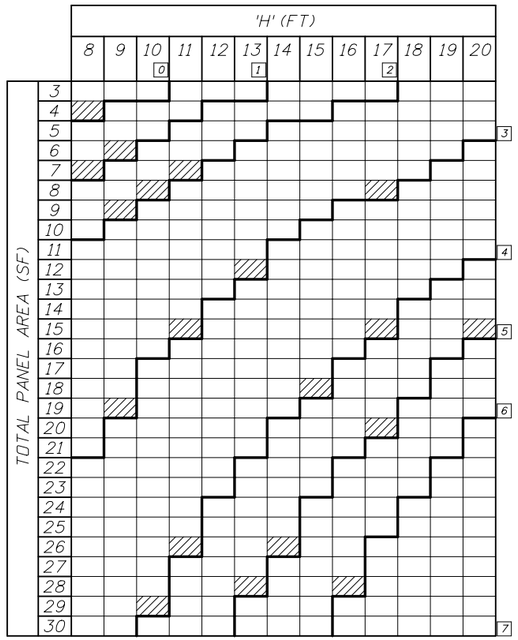
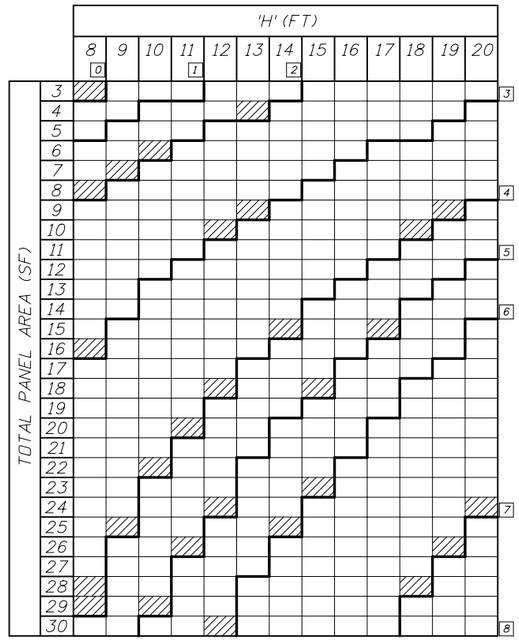
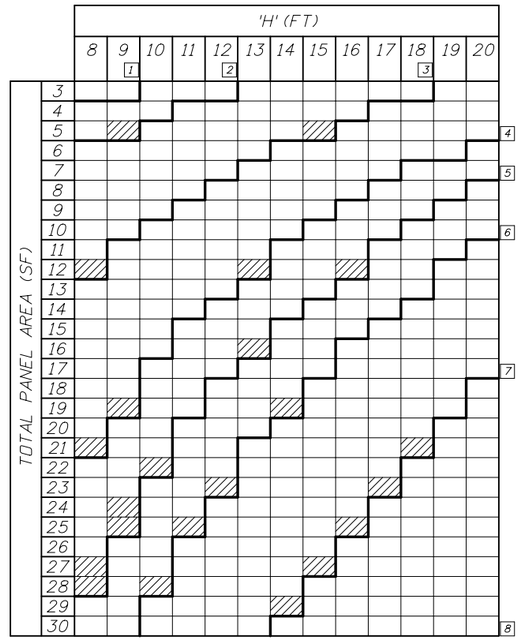
ALUMINUM COLUMN (POST) SELECTION TABLE (WIND SPEED = 110 MPH)



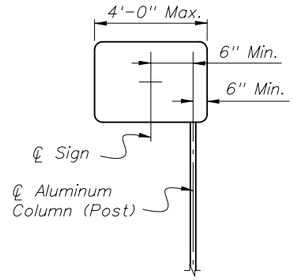
ALUMINUM COLUMN (POST) SELECTION TABLE (WIND SPEED = 130 MPH)



ALUMINUM COLUMN (POST) SELECTION TABLE (WIND SPEED = 150 MPH)



▨ = If CANTILEVER SIGN configuration (see Cantilever Sign Details) falls in this region, use next larger post size than that indicated.



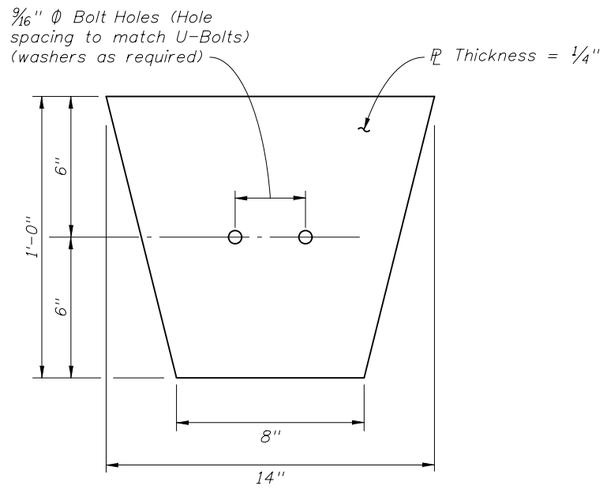
CANTILEVER SIGN

NOTE:
All cantilever sign installations shall comply with Standard Index 17302.

POST AND FOUNDATION TABLE

	Foundation Alternatives						
	Post Size		Driven Post *		Concrete (Class I)		
			Depth (FT)				
	Diameter (IN)	Wall (IN)	without Soil Plate	with Soil Plate	Diameter (FT)	Depth (FT)	Stub Length (FT)
0	2.0	1/8	4.5	2.5	2.0	2.0	2.0
1	2.5	1/8	5	3	2.0	2.0	2.0
2	3.0	1/8	5	3.5	2.0	2.5	2.5
3	3.5	3/16	6	4.5	2.0	3.0	3.0
4	4.0	1/4	---	---	2.0	4.0	3.0
5	4.5	1/4	---	---	2.0	4.0	3.0
6	5.0	1/4	---	---	2.0	4.5	3.0
7	6.0	1/4	---	---	2.0	5.0	3.0
8	8.0	5/16	---	---	2.0	5.5	3.0

* INSTALLING FRANGIBLE COLUMN SUPPORTS:
Columns (posts) may be installed by driving the columns in accordance with this Index, or as an alternate method, the columns (posts) may be set to the depth indicated in preformed holes backfilled with suitable material tamped in layers not thicker than 6" to provide adequate compaction or filled with flowable fill or bagged concrete.



ALUMINUM SOIL PLATE DETAILS

NOTES:
1. Align Soil Plate bottom at 2/3 of foundation depth.
2. Slot up to 1" long is allowed to accommodate various post sizes.
3. Rectangular soil plate of size 1'-2" x 1'-0" may be used as an alternative.

POST AND FOUNDATION TABLES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	DYW	Added Stub Length to POST AND FOUNDATIN TABLE and Note 3.			

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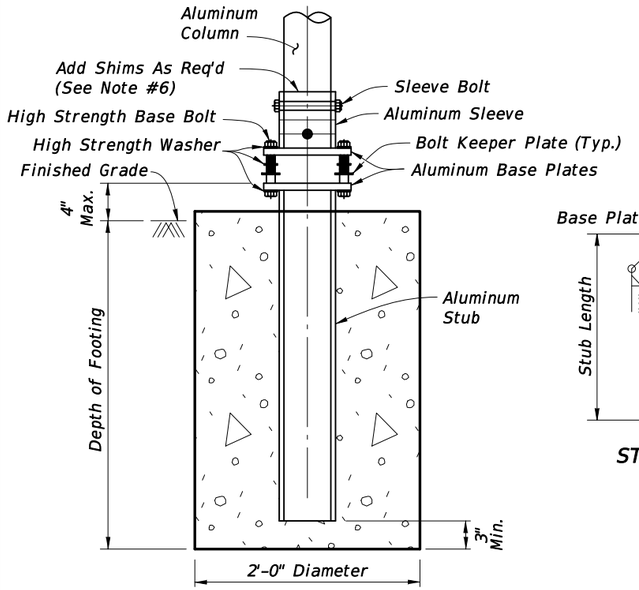
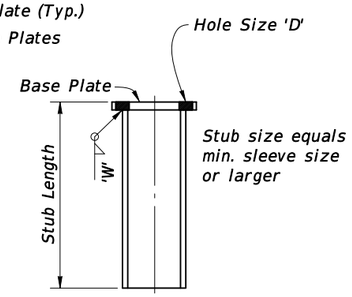


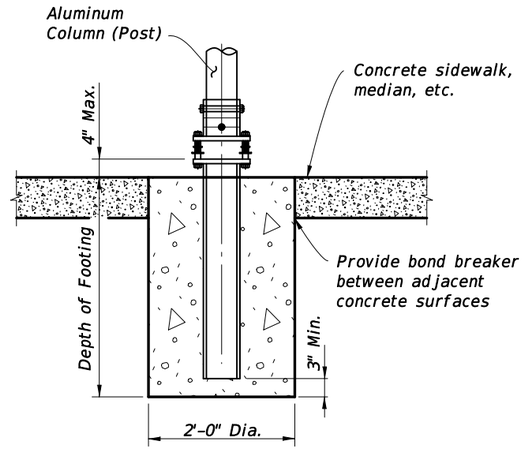
SLIP BASE AND FOOTING DETAIL
(non-frangible post)



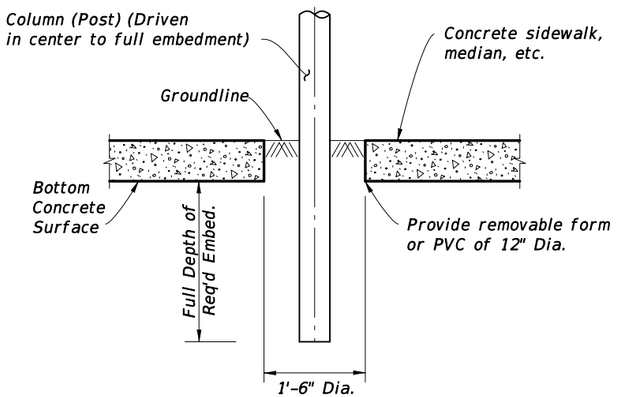
STUB DETAIL

SLIP BASE NOTES:

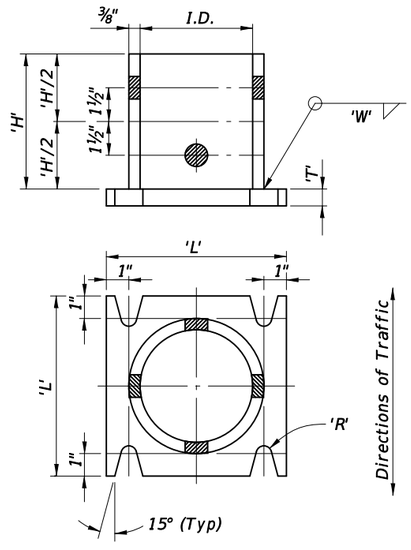
1. Use sleeves with an inside diameter (I.D.) no more than 1/16" larger than the outside diameter (O.D.) of the column.
2. Sleeve Bolts: ASTM A-307, ½" Ø galvanized steel bolt (with lock nuts) or Alloy 2024-T4 or 6061-T6 (ASTM B-211).
3. Base bolts, Nuts, and Washers: high strength ASTM A-325 with ASTM B633 SC3, Type II electroplated zinc coating.
4. Base plates may have either single or double beveled slots.
5. An alternate cast base plate of aluminum alloy 356 and T6 temper in lieu of the fabricated base plate may be submitted for approval. If a cast base plate is used, the stub will be the same size as the column and will be bolted to the casting.
6. Assemble the slip base connection in the following manner:
   a. Connect column to sleeve using two ½" Ø machine bolts.
   b. Assemble top base plate to stub base plate using high strength bolts with three hardened washers per bolt. One of the three washers per bolt and two bolt keeper plates go between the base plates. Orient the bolt keeper plates in the Directions of Traffic.
   c. Use shim stock as required to plumb the column.
   d. Tighten all bolts to the maximum possible with a 12" to 15" wrench. (This will bed the washers and shims and clear the bolt threads.)
   e. Loosen each bolt one turn and using a calibrated wrench retighten to the prescribed torque (see table) under the supervision of the Project Engineer.
   f. Burr threads at junction with nut using a center punch to prevent nut loosening.
7. Use galvanized steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the ½" Ø sleeve bolts. Use shims that are 1" shorter than the height of the sleeve.
8. Both fabricated and cast base assemblies were impact tested by the Texas Transportation Institute, College Station, TX on February 10, 2003, and both alternate assemblies were determined to be compliant with the performance recommendations of the National Cooperative Highway Research Program (NCHRP) report 350.



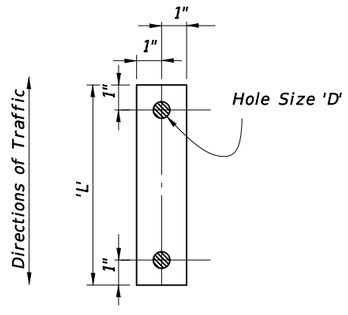
SLIP BASE AND FOOTING DETAIL IN CONCRETE
(non-frangible post in crossovers, medians, & sidewalks)



DRIVEN POST DETAIL IN CONCRETE
(frangible post in crossovers, medians, & sidewalks)



ALUMINUM SLEEVE & BASE PLATE DETAILS
(DOUBLE BEVELED SLOTS)



0.0149" Thick Alum. Strip - 2 Req'd Per Base

BOLT KEEPER PLATE DETAIL

SLIP BASE DETAILS

Column Size	Sleeve I.D. (Max)	Sleeve Height 'H'	Weld 'W'	Base Plate 'L'	Base Plate 'T'	Radius 'R'	Base Bolt Size	Base Bolt Length	Base Plate Torque ft-lbs	Base Plate Torque in.-lbs	Hole Size 'D'
4 x ¼	4 1/16	6	5/8	8	¾	11/32	5/8	3	29	345	1 1/16
4½" ¼	4 9/16	6	5/8	8	7/8	11/32	5/8	3¼	29	345	1 1/16
5 x ¼	5 1/16	7	5/8	8	7/8	11/32	5/8	3¼	29	345	1 1/16
6 x ¼	6 1/16	8	11/16	9	1	13/32	¾	3½	46	554	1 3/16
8 x 5/16	8 1/16	10	¾	11	1	15/32	7/8	3¾	53	640	1 5/16

Note: Unless noted otherwise, all dimensions are in inches.

BASE AND FOUNDATION DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	DYW	Changed Note 6.b.			
07/01/10	DYW	Added 8" column to SLIP BASE DETAILS table.			
01/01/11	DYW	Changed dimensions in details.			

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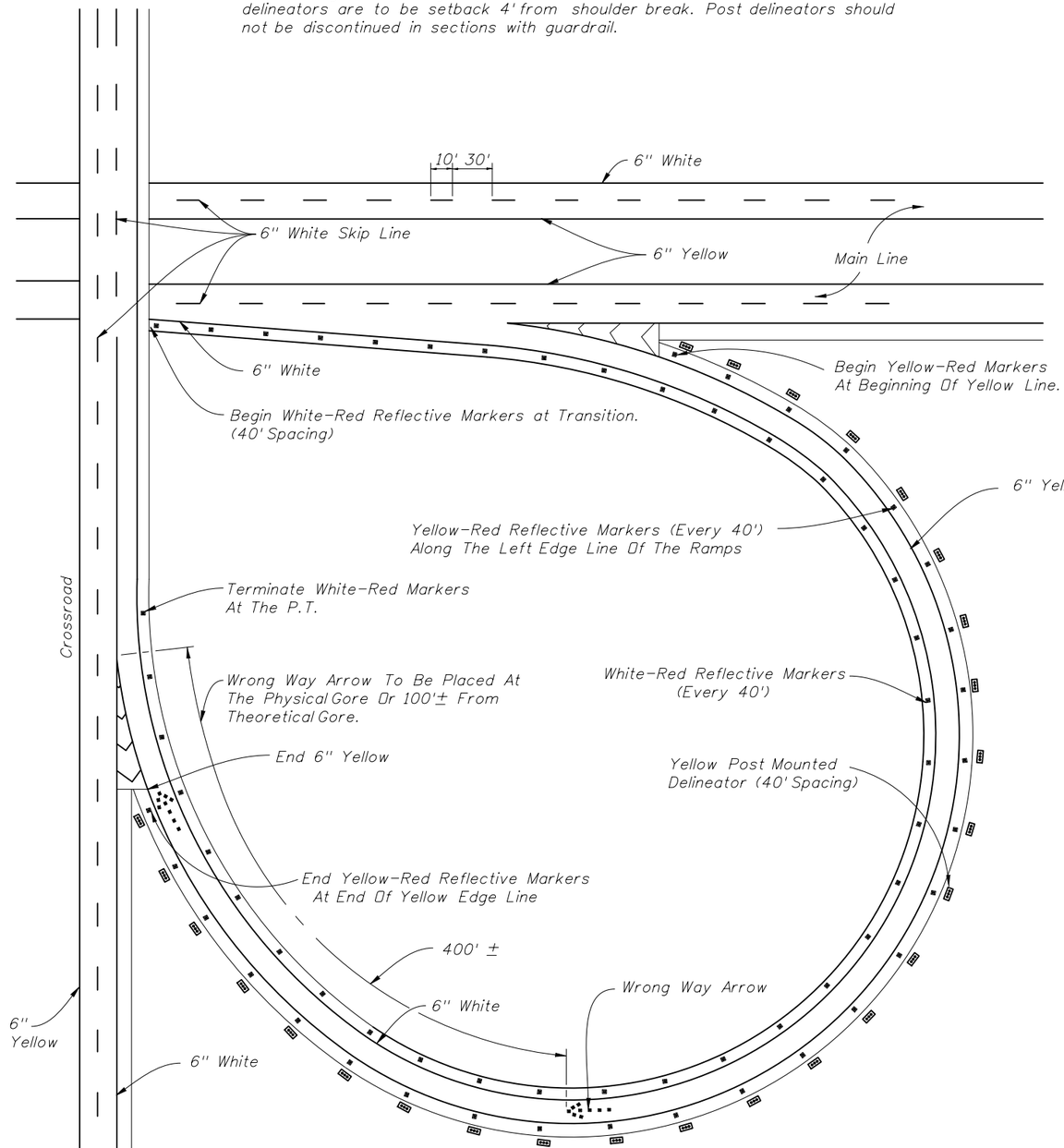
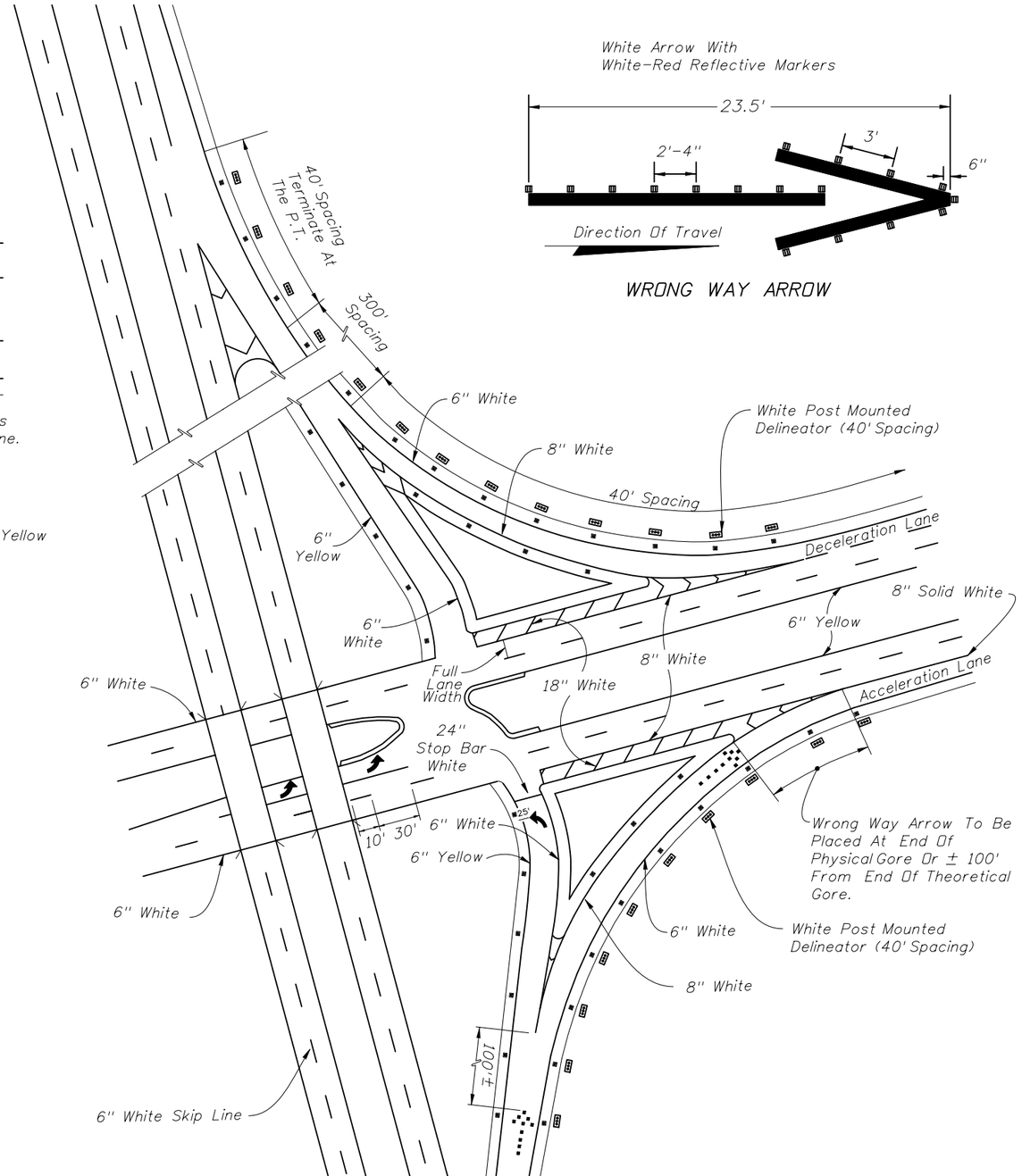
Notes:

1. Post delineators spaced at 40' on curves of the entrance and exit of ramps. The spacing on the tangent portion of the ramp section shall be 300'. All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.



WRONG WAY ARROW



REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
09/30/10	C.H.	Wrong Way Arrow Revised RPM's respaced.			

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INTERCHANGE MARKINGS

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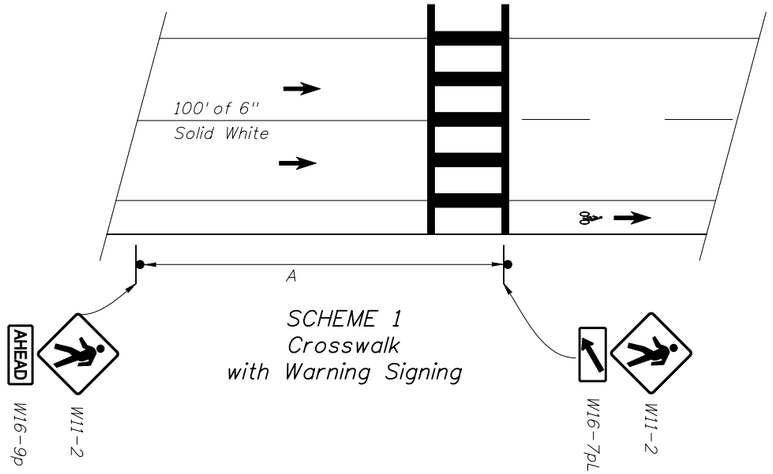
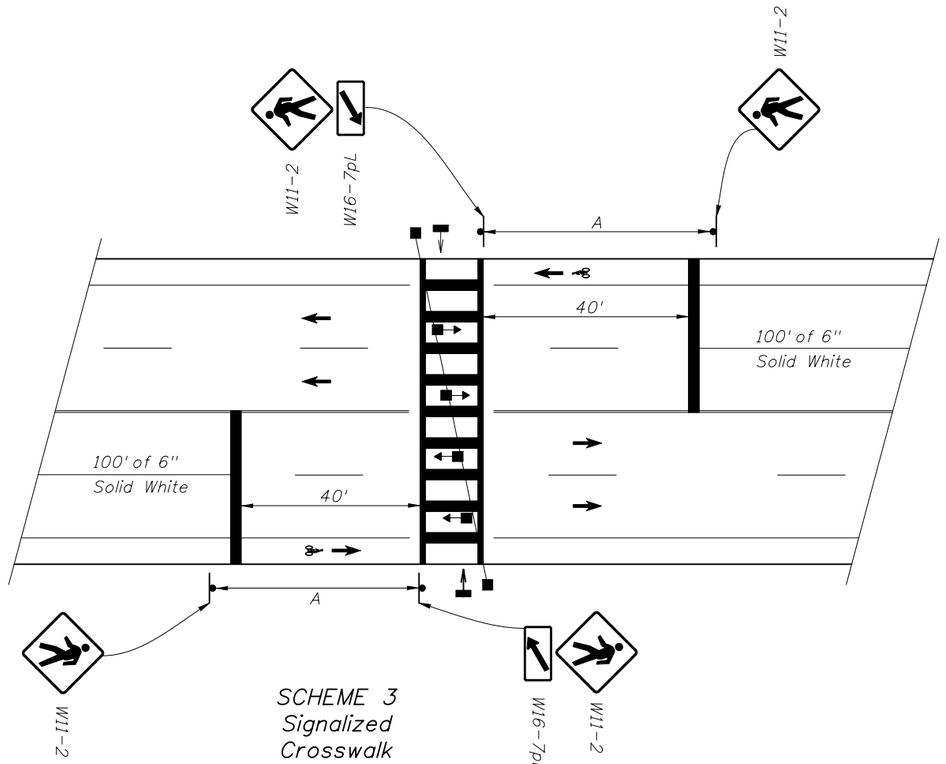
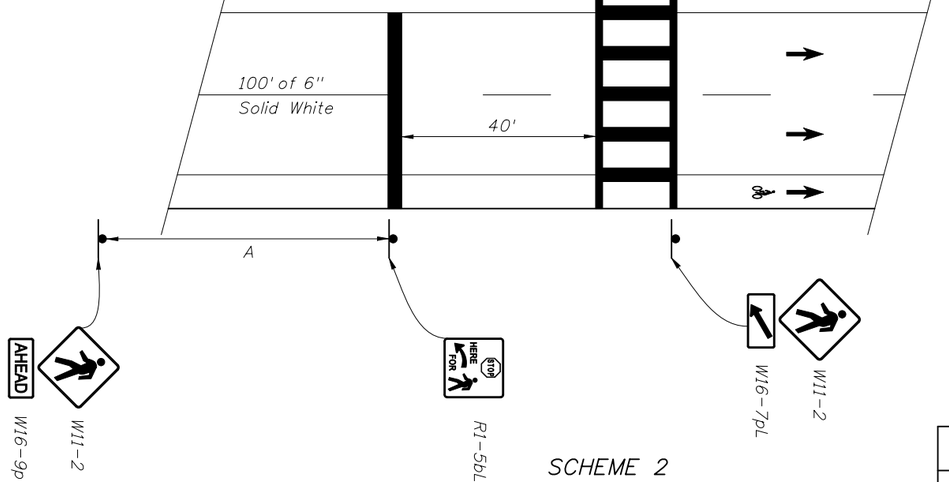


SCHEME 1
Crosswalk
with Warning Signing



SCHEME 3
Signalized
Crosswalk



SCHEME 2
Crosswalk
with Stop Signing

APPROACH SPEED MPH	A-SUGGESTED DISTANCE (Ft.)
25 Or Less	200
26 To 35	250
36 To 45	300

1. Plans shall indicate which crosswalk scheme is to be used.
2. The details shown do not depict the signing and markings for multi-lane roadways with divided medians. For these applications, additional signs shall be installed on the median side. Minimum width of Mid-Block Crosswalks is 10'.
3. All mid-block crosswalks shall use special emphasis crosswalk markings.
4. Crosswalk marking should utilize preformed marking materials.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
09/28/10	C.H.	Current MUTCD changes added Note 100' of Solid White added to details. Signs rotated 90 degrees. Chart revised and note 3 high changed to special.			

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SPECIAL MARKING AREAS

Interim Date 01/01/11

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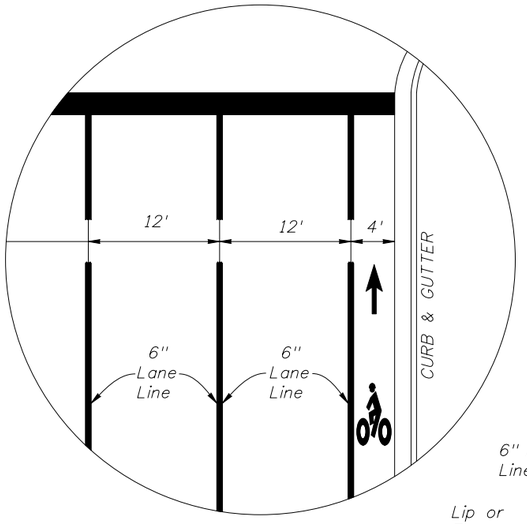
1. Recommended spacing of bike lane symbols: Immediately after intersections and major driveways and at a maximum spacing of 600 feet for urban sections and 1320 feet for rural sections.

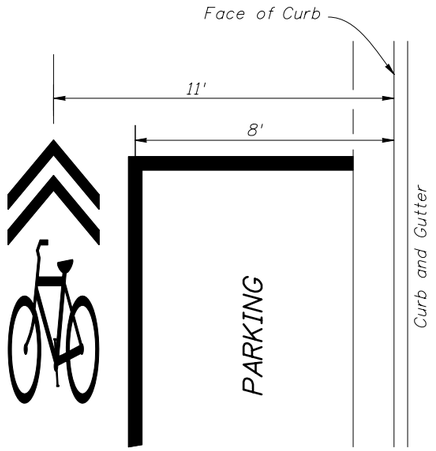
2. Recommended spacing for shared lane marking symbols: Immediately after intersections and at a maximum spacing of 250 feet for urban roadways and 600 feet for roadways in non-urban areas.

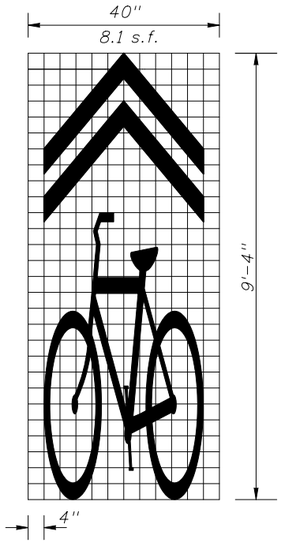
3. All pavement markings and pavement messages shall be White.

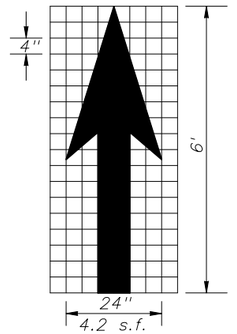
4. All pavement messages shall be preformed thermoplastic.

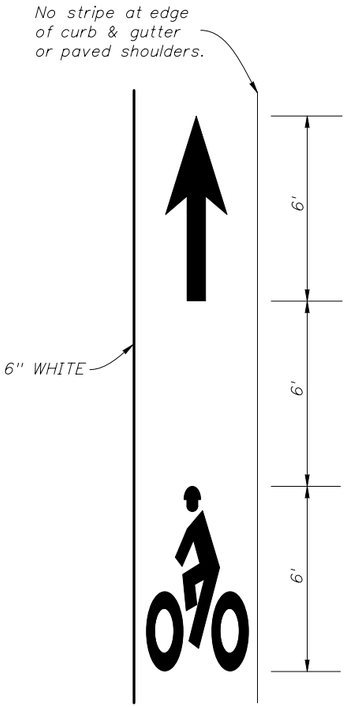
5. Bike lane signs (R3-17, R3-17a, R3-17b) are not required.

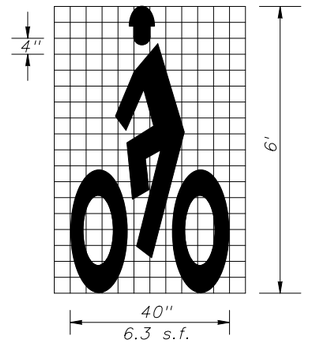


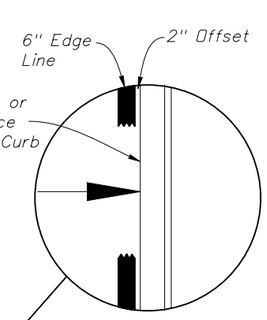


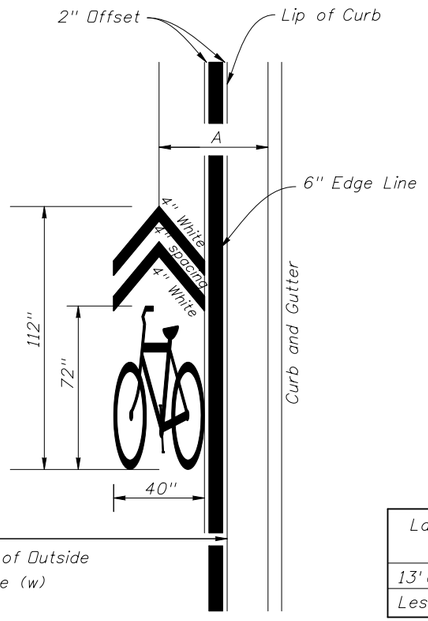


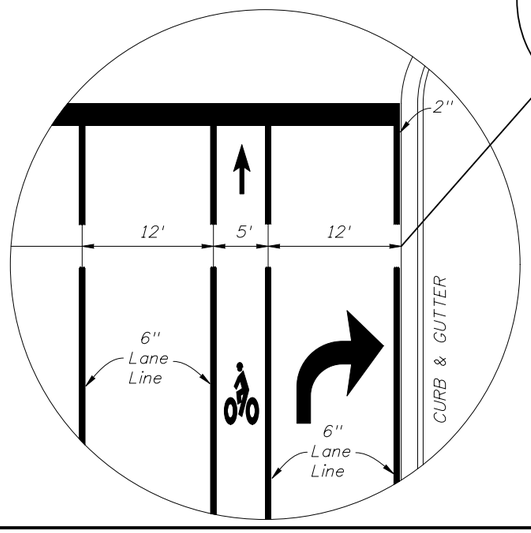






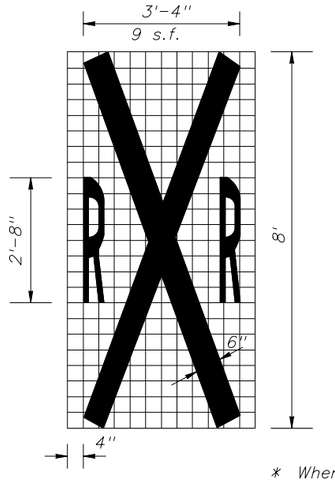


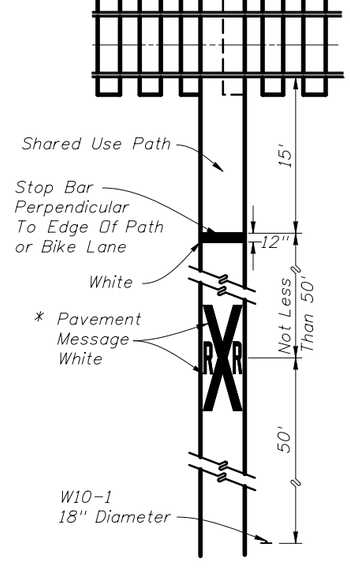




Lane Width Measured From Lip or Face of Curb

Lane Width (w)	Sharrow ℄ (A)
13' or Greater	4'
Less Than 13'	5½'





BIKE LANE MARKINGS

* When used in bike lane, markings shall be placed adjacent to markings in travel lane and W10-1 sign shall be deleted.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
10/05/10	C.H.	Sheet completely revised.			

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BICYCLE MARKINGS

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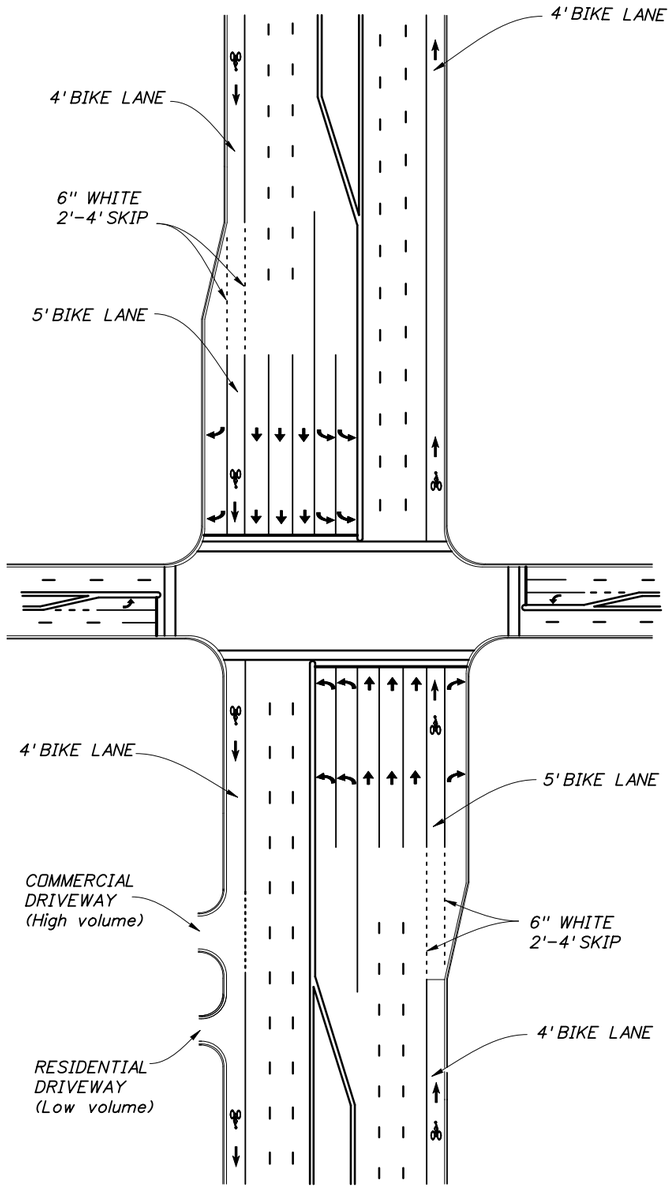
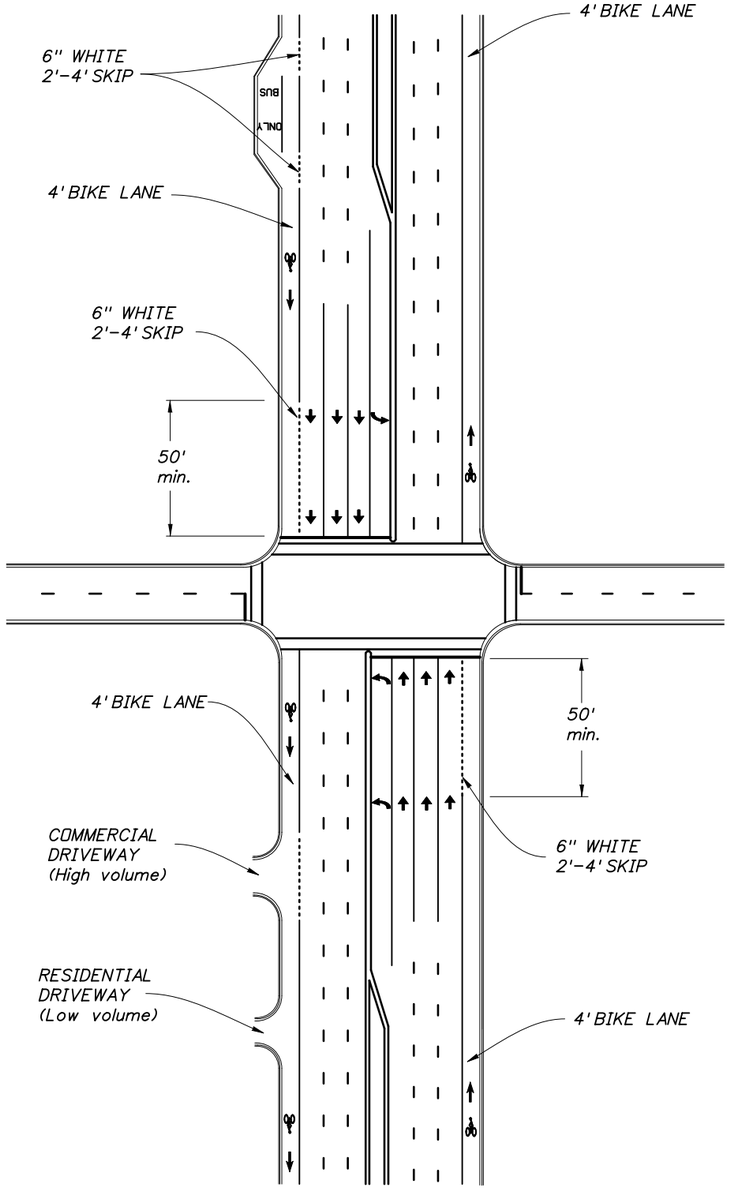
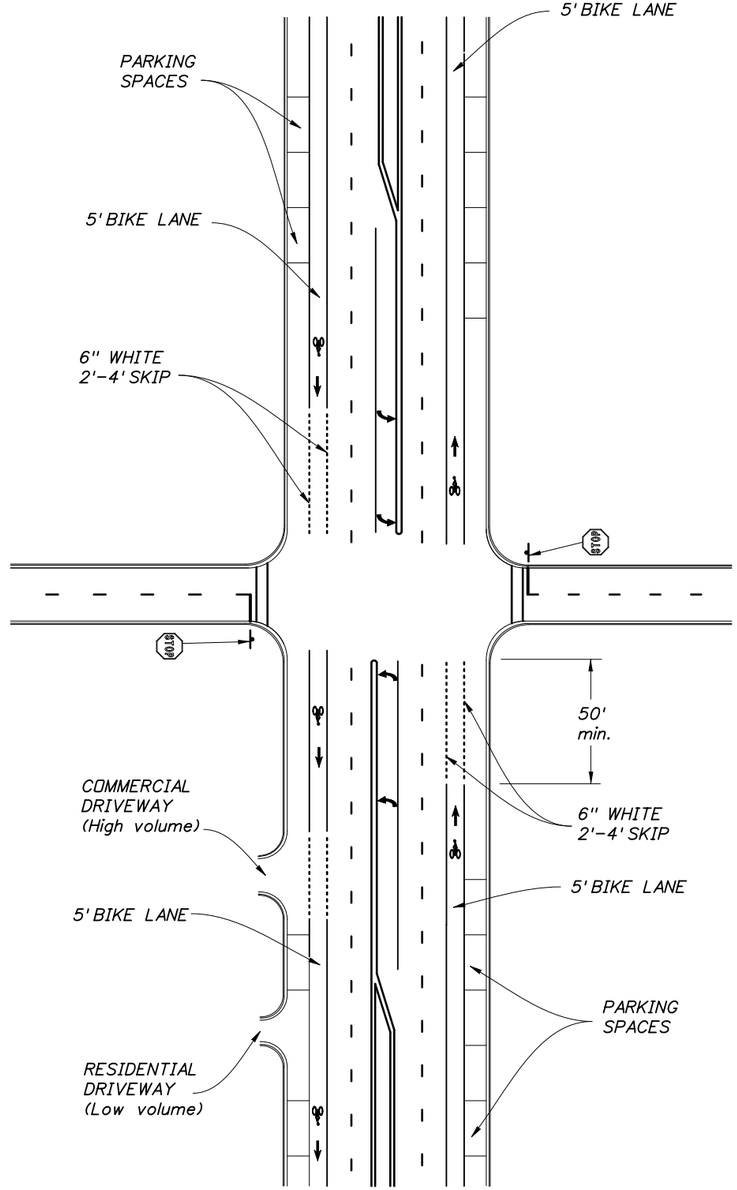


MAJOR INTERSECTION WITH SEPARATE RIGHT TURN LANE URBAN TYPICAL SECTION (CURB AND GUTTER)



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)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
08/05/10	C.H.	4' bike lane width removed, notes revised.			

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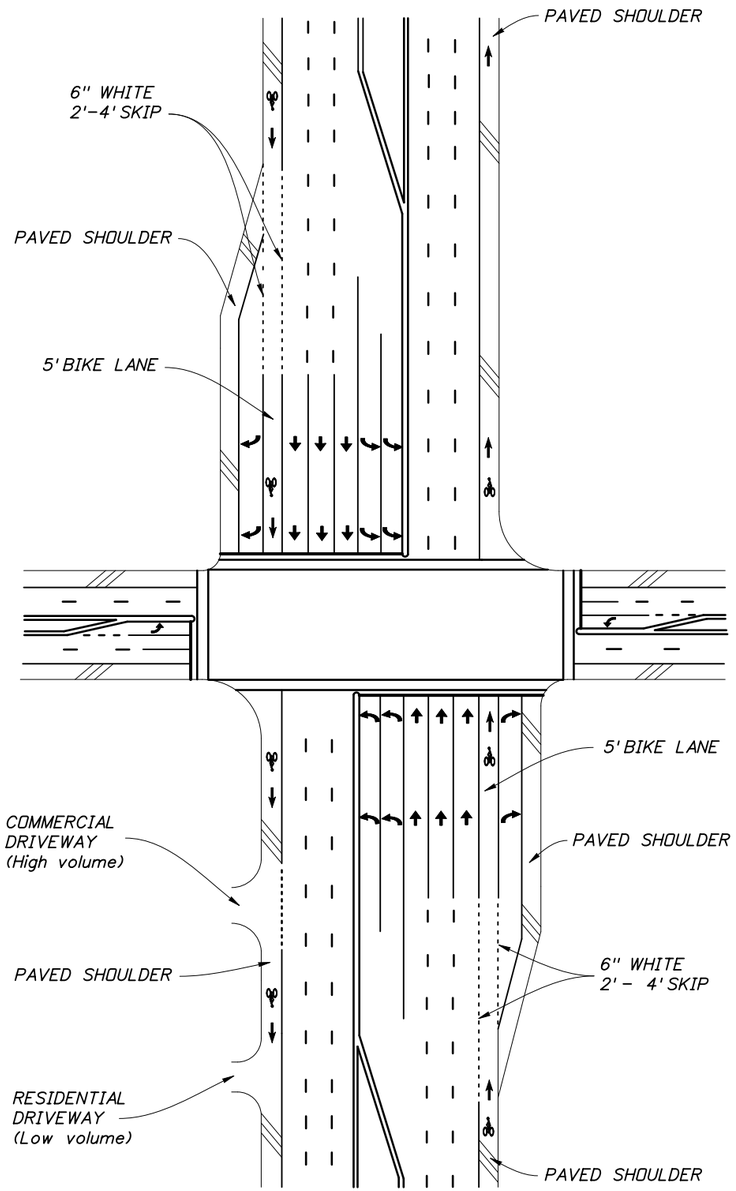
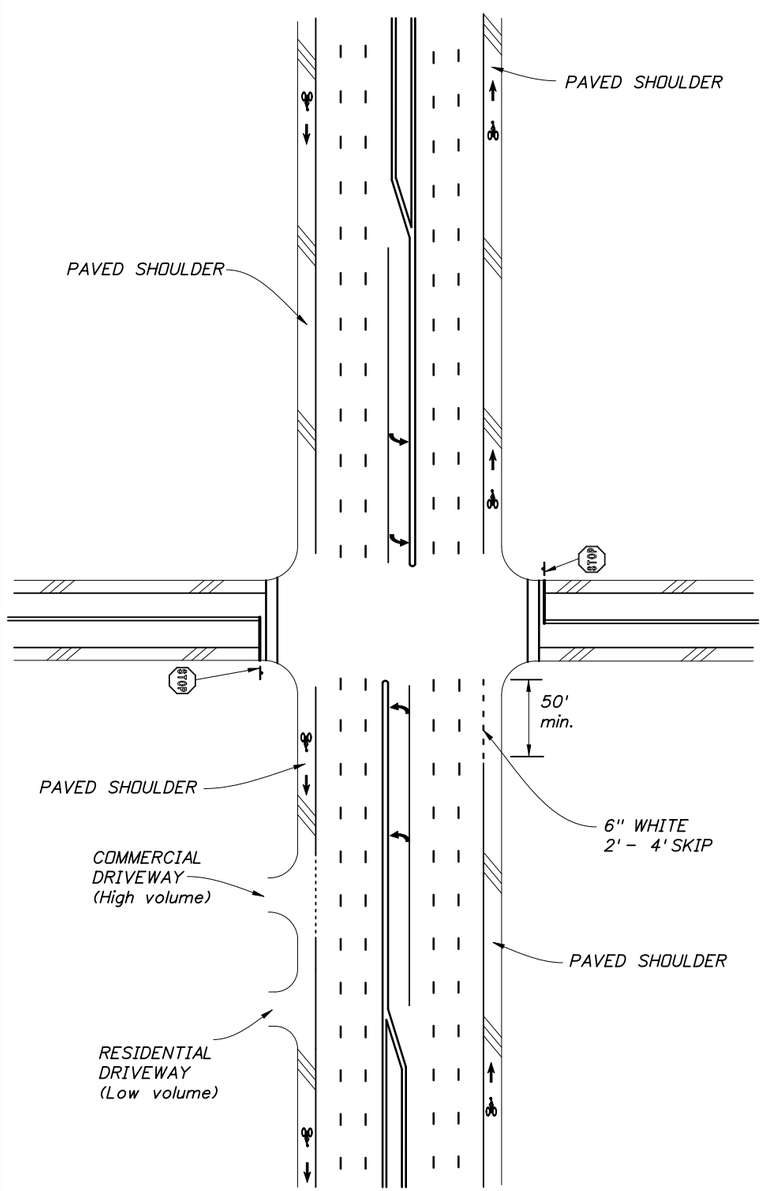
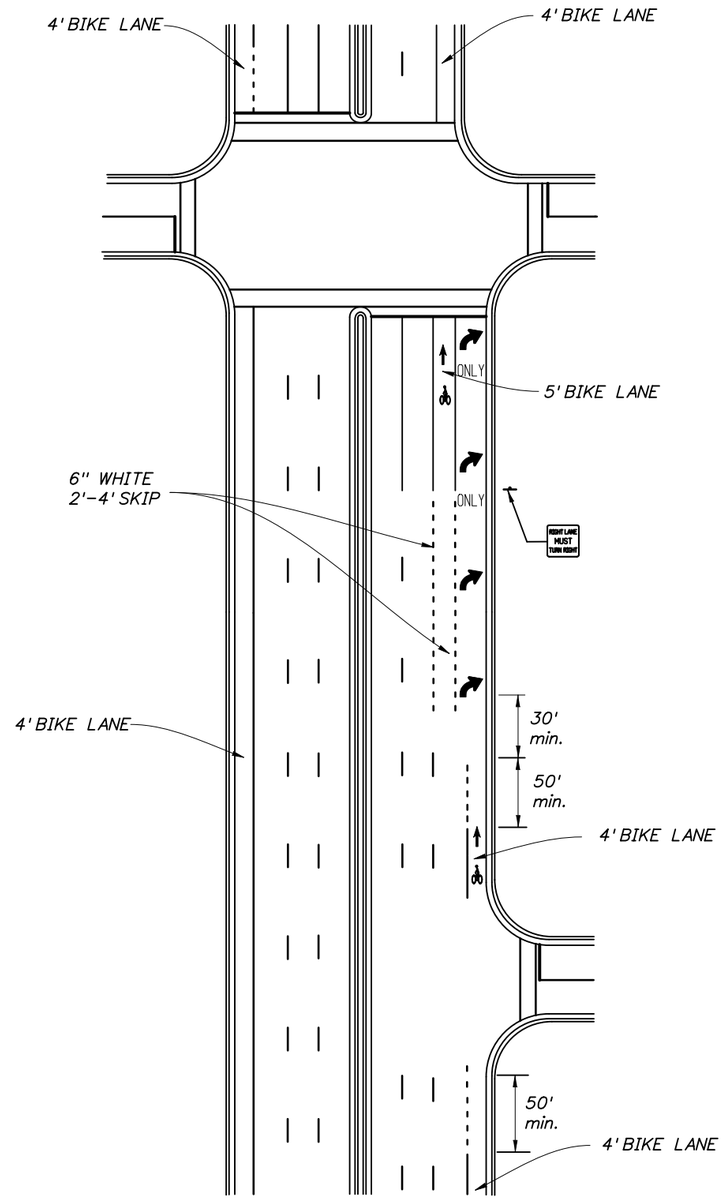


MAJOR INTERSECTION WITH DESIGNATED SHOULDER, AND SEPARATE RIGHT TURN LANE RURAL TYPICAL SECTION (PAVED SHOULDER)



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)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
08/05/10	C.H.	4' Minimum bike lane width removed, notes revised.			

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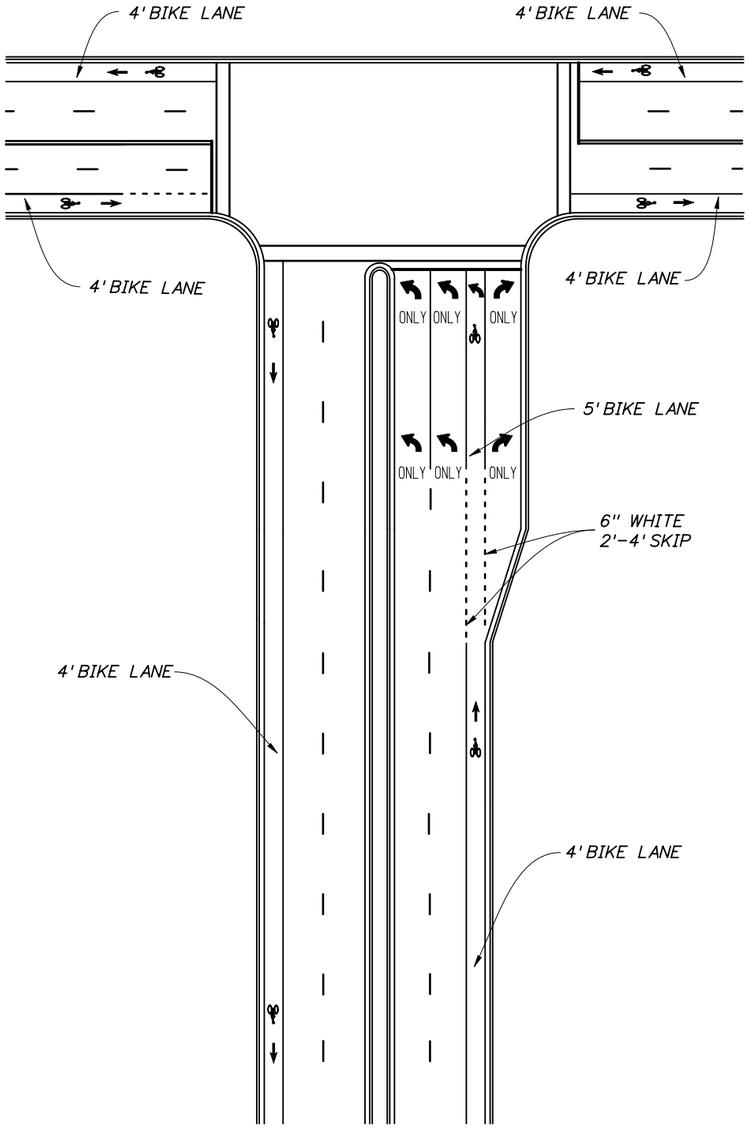
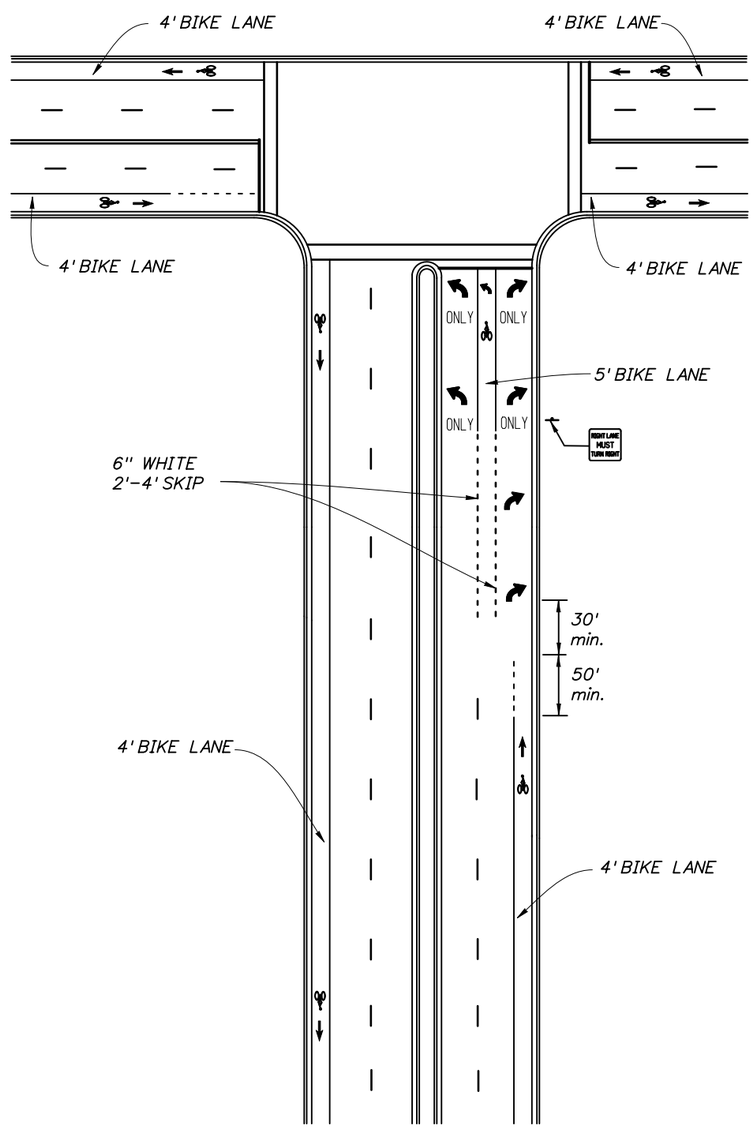
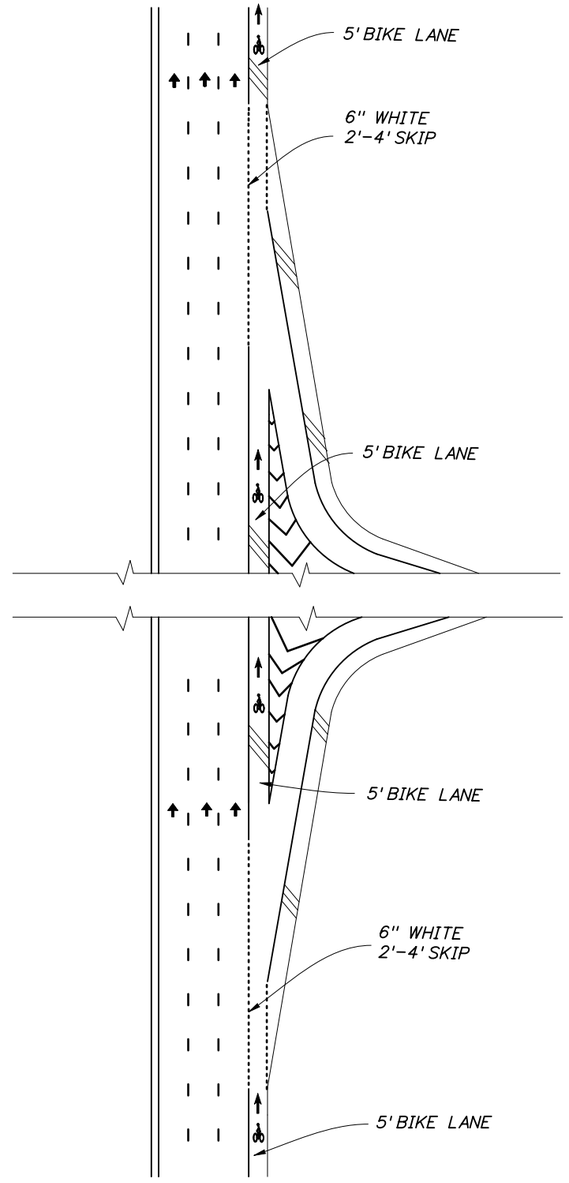


"TEE" INTERSECTION WITH SEPARATE RIGHT TURN LANE URBAN TYPICAL SECTION (CURB & GUTTER)



"TEE" INTERSECTION WITH RIGHT TURN DROP LANE URBAN TYPICAL SECTION (CURB & GUTTER)



INTERCHANGE RAMPS RURAL TYPICAL SECTION (PAVED SHOULDER)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
08/05/10	C.H.	4'Minimum bike lane width removed, notes revised.			

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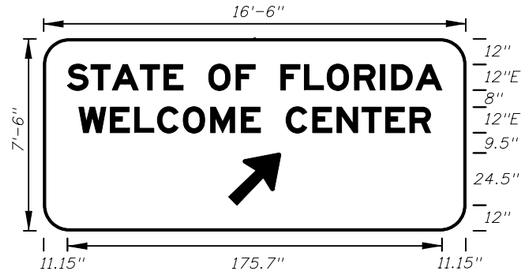
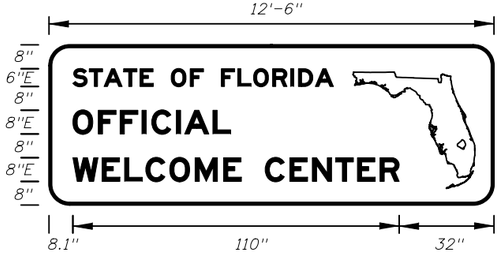
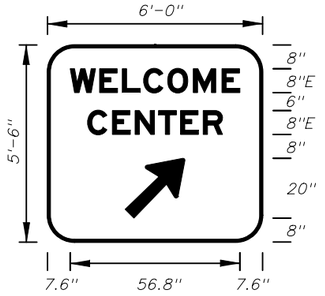


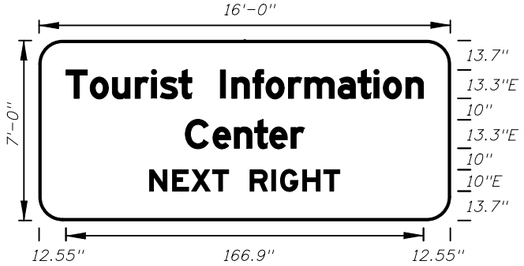
FTP-11-06
16'-6" X 7'-6"
12" Radii 2" Border
12" Series E Legend
Blue Background
White Legend and Border



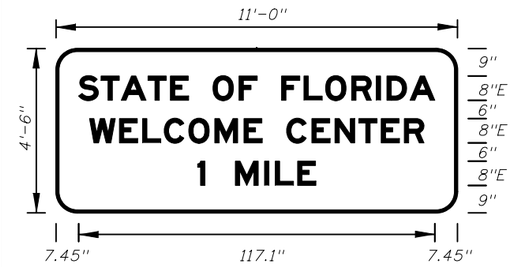
FTP-12-06
12'-6" X 4'-6"
7" Radii 2" Border
6" and 8" Series E Legend
Blue Background
White Legend and Border



FTP-13-06
6'0" X 5'-6"
9" Radii 2" Border
8" Series E Legend
Blue Background
White Legend and Border

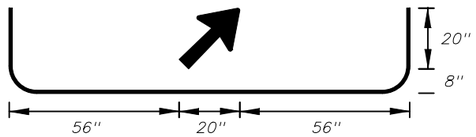


FTP-14-06
16'-0" X 7'-0"
11" Radii 2" Border
13.3 and 10" Series E Legend
Blue Background
White Legend and Border

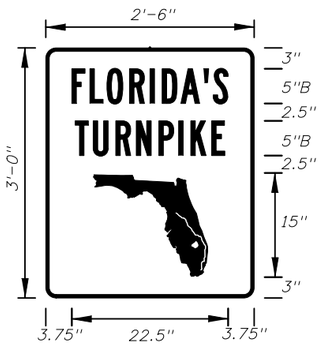


FTP-15A-06
11'-0" X 4'-6"
7" Radii 2" Border
8" Series E Legend
Blue Background
White Legend and Border

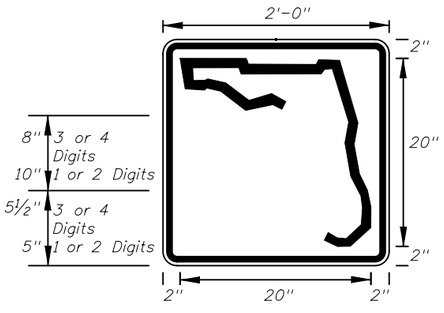
FTP-15B-06
11'-0" X 5'-0"
8" Radii 2" Border
8" and 12" Series E Legend
Blue Background
White Legend and Border



FTP-15C-06
11'-0" X 5'-6"
9" Radii 2" Border
8" Series E Legend
Blue Background
White Legend and Border



FTP-16-10
2'-6" X 3'-0"
1.5" Radii 3/4" Border
5" Series B Legend
Green Background
White Legend, Border, and Florida Symbol



FTP-17-06
2' X 2'
1.13" Radii .0521" Border
White Background
Black Legend and Border

See Sheet 3 of 11
For Additional Details

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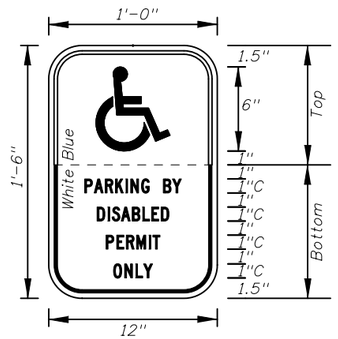
REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
08/19/10	C.H.	Sign Detail FTP-16-06 was completely revised details were removed new removed new design was added as shown in FTP-16-10.			

FTP-19-06
1'X 1'-6"
4" Radii 3/8" Border
Top 4" Series D
Bottom 2" Series C
White Background
Green Legend and Border

All Letters

1" Series C
1" Spacing
Between Lines
of Text

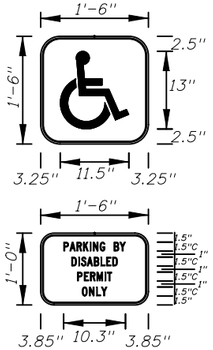


FTP-20-06
1'X 1'-6"
2" Radii 3/8" Border
1" Series C Legend

Color	Top	Bottom
Background	Blue	White
Legend and Border	White	Black

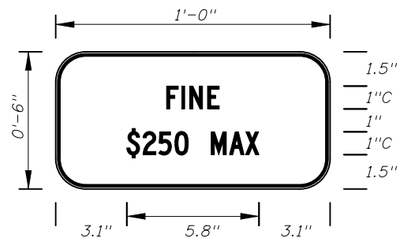
All Letters

1.5" Series C
1" Spacing
Between Lines
of Text



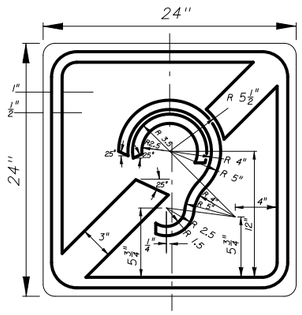
FTP-21-06
1'-6" X 2'-6"
2" Radii 3/8" Border
1.5" Series C Legend

Color	Top	Bottom
Background	Blue	White
Legend and Border	White	Black



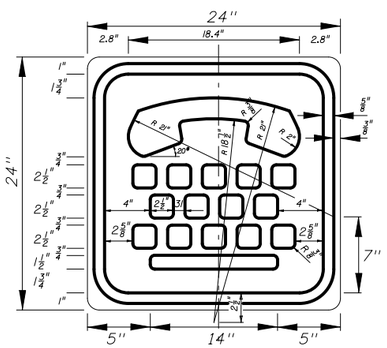
FTP-22-06
1'X 6"
1" Radii 3/8" Border
1" Series C Legend
White Background
Black Legend and Border

Supplemental Panel
for the FTP-20-06
and FTP-21-06 signs

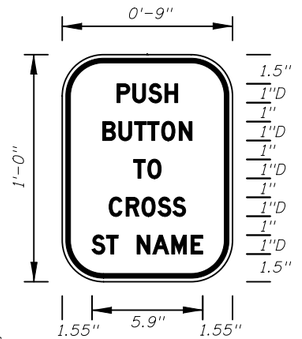


INTERNATIONAL SYMBOL OF
ACCESS FOR HEARING LOSS

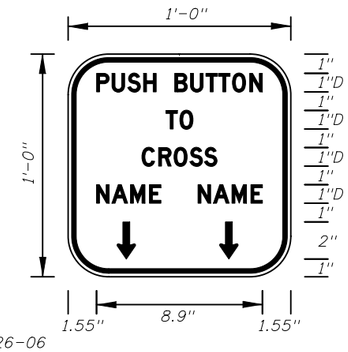
FTP-23-06
2'X 2'
1.5" Radii 5/8" Border
Blue Background
White Legend and Border



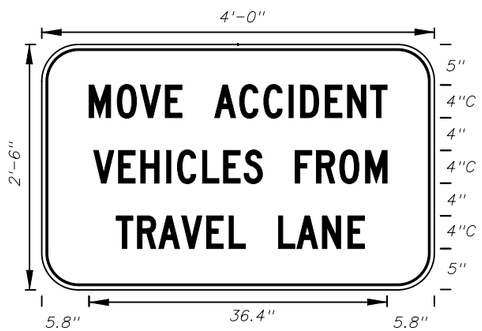
FTP-24-06 INTERNATIONAL TDD SYMBOL
2'X 2'
1.5" Radii 5/8" Border
Blue Background
White Legend and Border



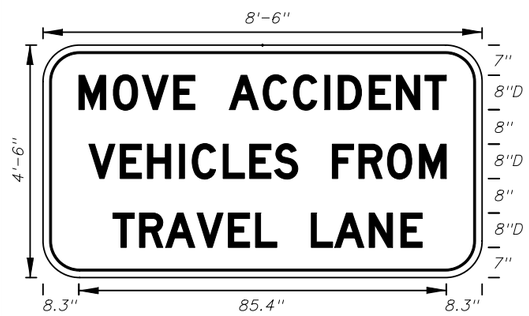
FTP-25-06
9" X 1'-0"
2" Radii 3/8" Border
1" Series D Legend
White Background
Black Legend and Border



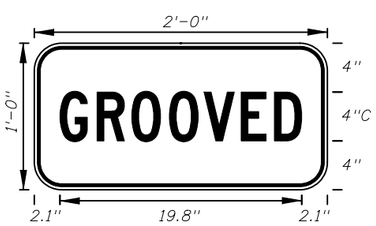
FTP-26-06
1' X 1'
2" Radii 3/8" Border
1" Series D Legend
White Background
Black Legend and Border



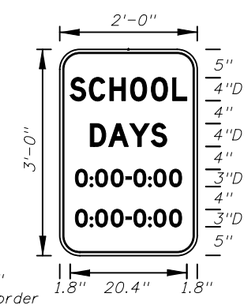
FTP-27-06
4'X 2'-6"
4" Radii 3/4" Border
4" Series C Legend
White Background
Black Legend and Border



FTP-28-06
8'-6" X 4'-6"
7" Radii 3/4" Border
8" Series D Legend
White Background
Black Legend and Border



FTP-29-06
2'-0" X 1'-0"
2" Radii 5/8" Border
4" Series C Legend
Yellow Background
Black Legend and Border



FTP-30-06
2'-0" X 3'-0"
3" Radii 5/8" Border
White Background
Black Legend and Border

Top 4" Series D Legend
Bottom 3" Series C Legend

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
08/05/10	C.H.	Changed Message on Sign No. FTP-22-06			

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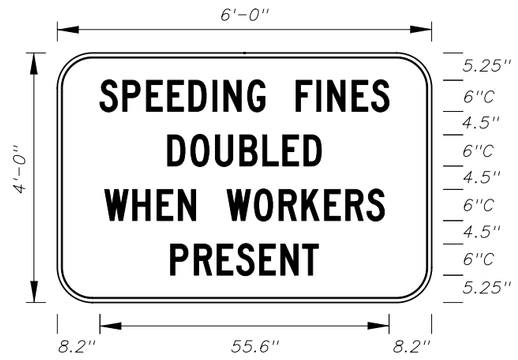
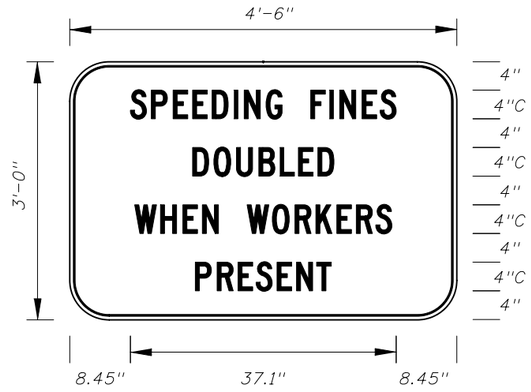


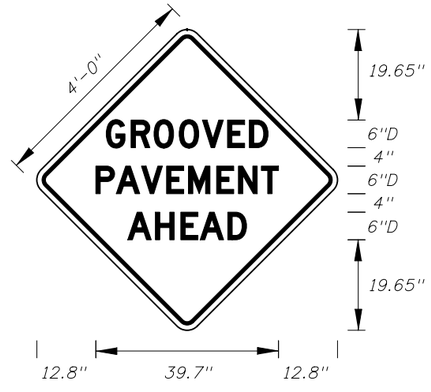
MOT-13-06 Freeway Sign
6'X 4'
6" Radii ¾" Border

6" Series C Legend
White Background
Black Legend and Border



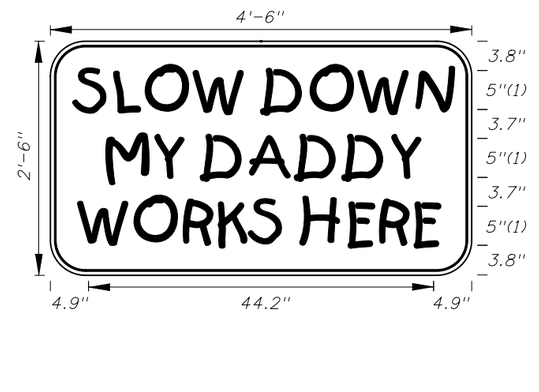
MOT-14-06 Arterial Sign
4'-6" X 3'
5" Radii ¾" Border

4" Series C Legend
White Background
Black Legend and Border



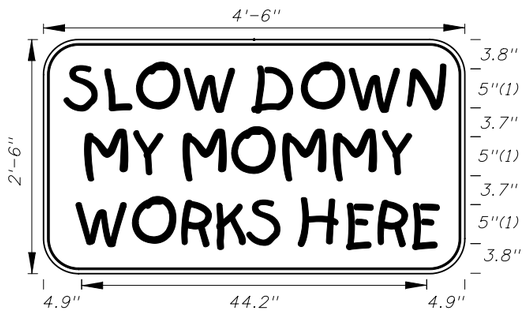
MOT-15-06
4'X 4'
2" Radii ¾" Border

6" Series D Legend
Orange Background
Black Legend and Border



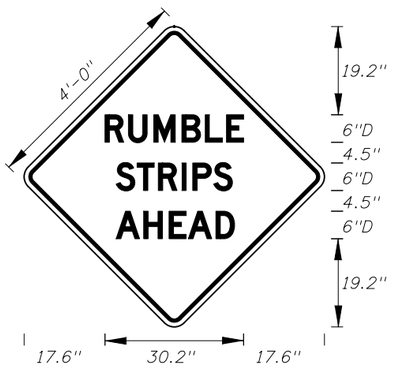
MOT-16-06
4'-6" X 2'-6"
4" Radii ¾" Border

5" Kids Series Legend
Orange Background
Black Legend and Border



MOT-17-06
4'-6" X 2'-6"
4" Radii ¾" Border

5" Kids Series Legend
Orange Background
Black Legend and Border



MOT-18-10
4'X 4'
2" Radii ¾" Border

6" Series D Legend
Orange Background
Black Legend and Border

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CA	Added sign MOT-18-10, RUMBLE STRIPS AHEAD.			

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HIGHMAST LIGHTING NOTES:

1) *High Mast materials:*
   a. *Pole: ASTM A1011 Grade 50, 55, 60 or 65 (Less than ¼") or ASTM A572 Grade 50, 55, 60, or 65 (¼" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).*

   b. *Steel Plates: ASTM A709 Grade 36 or ASTM A36*

   c. *Weld Metal: E70XX*

   d. *Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563, Grade A heavy-hex nuts and plate washer.*

   e. *Handhole: ASTM A709 Grade 36 or ASTM A36 Frame with ASTM A36 cover.*

   f. *Caps: ASTM A1011 Grade 50, 55, 60 or 65 or ASTM B209.*

   g. *Nut Covers: ASTM B26 (319-F)*

   h. *Stainless Steel Screws: AISI Type 316*

2) *Reinforcing steel: ASTM A615, Grade 60.*

3) *Concrete: Class IV (Drilled Shaft) with a minimum 4,000 psi compressive strength at 28 days for all environmental classifications.*

4) *Welding: American Welding Society Structural Welding Code (Steel) ANSI/AWS DI.1 (Current edition).*

5) *Galvanization:*

   a. *Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329.*

   b. *Other items (Including Pole): ASTM A123*

6) *Hole diameters for anchor bolts: not greater than the bolt diameter plus ½".*

7) *Poles: Tapered with the diameter changing at a rate of 0.14 inch per foot with a minimum 16-sided pole shaft and only one longitudinal seam weld. Circumferentially welded pole shaft butt splices and laminated pole shafts are not permitted. Longitudinal seam welds within 6 inches of pole to base must be complete penetration welds. Longitudinal seam welds at telescopic field joints must be complete penetration welds for the splice length plus 6 inches. Fillet weld socket connections with unequal leg welds with the long weld leg along the shaft. Terminate the long weld leg along the shaft at approximately a 30 degree angle.*

8) *One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.*

9) *Furnish each pole with a 2"x4" (Max.) aluminum identification tag. Submit details for approval. Secure to pole with 0.124" stainless steel rivets or screws. Locate identification tag on the inside of pole and visible from handhole. Include the following information:*
   Financial Project ID,
   Pole Mounting Height,
   Manufacturer's Name, F_y of Steel and
   Base Wall Thickness.

10) *Shop drawings are only required for additions, deletions, or modifications to this Design Standard.*

11) *Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location ± two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.*

DESIGN CRITERIA:

1) *Designed in accordance with the FDOT Structures Manual.*

2) *Poles are designed to support the following:*
   a. *(1) cylindrical head assembly with a maximum effective projected area of 6 sq ft (Cd=1) and 340 lbs (Max).*
   b. *(8) cylindrical luminaires with a maximum effective projected area of 3.0 sq ft (Cd=0.5) and 77 lbs. each.*

3) *Foundation design based upon the following soil criteria:*
   Classification = Cohesionless (Fine Sand)
   Friction Angle = 30 Degrees (30°)
   Unit Weight = 50 pcf (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 other purposes may be used to confirm the assumed soil properties.

4) *Foundation applies only to slopes of 1:4 or flatter. Provide a minimum 24" shaft projection on the high side.*

5) *Poles are designed for 6 mil galvanization thickness.*

STANDARD POLE DESIGN NOTES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	DYW	Modified washer specification.			
01/01/11	DYW	Changed Notes 7, 9 and 10.			

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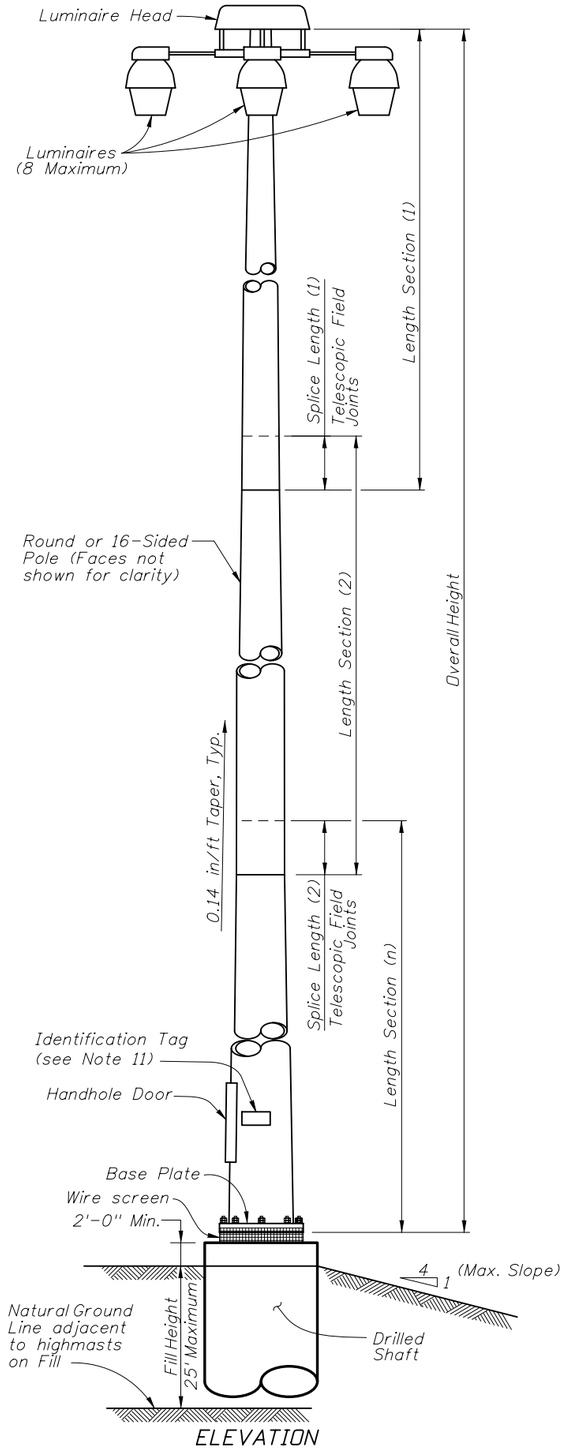

ELEVATION

POLE DESIGN TABLE*																
DESIGN WIND SPEED	POLE OVERALL HEIGHT	SECTION 1 (TOP)					SECTION 2					SECTION 3				
		Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)	Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)	Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)
110 mph	80 ft	42'-0"	0.250	2'-0"	5.313	11.219	40'-0"	0.250		10.375	16.000					
	100 ft	24'-6"	0.179	2'-0"	6.406	9.844	40'-0"	0.250	2'-6"	9.188	14.781	40'-0"	0.250		13.875	19.5
	120 ft	44'-9"	0.250	2'-0"	6.250	12.531	40'-0"	0.250	2'-9"	11.688	17.313	40'-0"	0.313		16.375	22.0
130 mph	80 ft	42'-0"	0.250	2'-0"	5.281	11.188	40'-0"	0.313		10.375	16.000					
	100 ft	24'-6"	0.179	2'-0"	6.906	10.344	40'-0"	0.250	2'-6"	9.656	15.281	40'-0"	0.313		14.375	20.0
	120 ft	45'-6"	0.250	2'-6"	9.250	15.625	40'-0"	0.250	3'-0"	14.719	20.344	40'-0"	0.313		19.375	25.0
150 mph	80 ft	42'-3"	0.250	2'-3"	7.281	13.219	40'-0"	0.313		12.375	18.000					
	100 ft	24'-6"	0.250	2'-0"	8.188	11.625	40'-0"	0.313	2'-6"	10.781	16.406	40'-0"	0.375		15.375	21.0
	120 ft	46'-6"	0.250	3'-0"	12.406	18.938	40'-0"	0.313	3'-6"	17.938	23.563	40'-0"	0.375		22.375	28.0

* Diameter Measured Flat to Flat

BASE PLATE AND BOLTS DESIGN TABLE									
DESIGN WIND SPEED	POLE OVERALL HEIGHT	Base Plate Diameter (in.)	Base Plate Thickness (in.)	"TW" (in.)	"BW" (in.)	Bolt Circle (in.)	No. Bolts	Bolt Diameter (in.)	Bolt Embedment (in.)
110 mph	80 ft	30.0	3.0	0.375	0.188	23.0	8	1.75	38
	100 ft	33.5	3.0	0.375	0.188	26.5	8	1.75	42
	120 ft	36.0	3.0	0.375	0.250	29.0	8	1.75	45
130 mph	80 ft	30.0	3.0	0.438	0.250	23.0	8	1.75	43
	100 ft	34.0	3.0	0.438	0.250	27.0	8	1.75	50
	120 ft	41.0	3.5	0.500	0.250	33.0	8	2.00	52
150 mph	80 ft	32.0	3.0	0.500	0.250	25.0	8	1.75	49
	100 ft	37.0	3.0	0.563	0.313	29.0	8	2.00	53
	120 ft	46.0	3.5	0.563	0.313	37.0	10	2.25	57

SHAFT DESIGN TABLE				
DESIGN WIND SPEED	POLE OVERALL HEIGHT	Shaft Diameter	Shaft Length	Longitudinal Reinforcement
110 mph	80 ft	4'-0"	13'-0"	14- #11
	100 ft	4'-6"	14'-0"	16- #11
	120 ft	4'-6"	16'-0"	16- #11
130 mph	80 ft	4'-0"	14'-0"	14- #11
	100 ft	4'-6"	16'-0"	16- #11
	120 ft	5'-0"	17'-0"	18- #11
150 mph	80 ft	4'-6"	15'-0"	16- #11
	100 ft	4'-6"	17'-0"	16- #11
	120 ft	5'-0"	20'-0"	18- #11

POLE DESIGN TABLES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/09	CBH	Deleted grout pad, added wire screen, changed drilled shaft reinforcing.			
01/01/11	CBH	Updated values in BASE PLATE AND BOLTS DESIGN TABLE and SHAFT DESIGN TABLE.			

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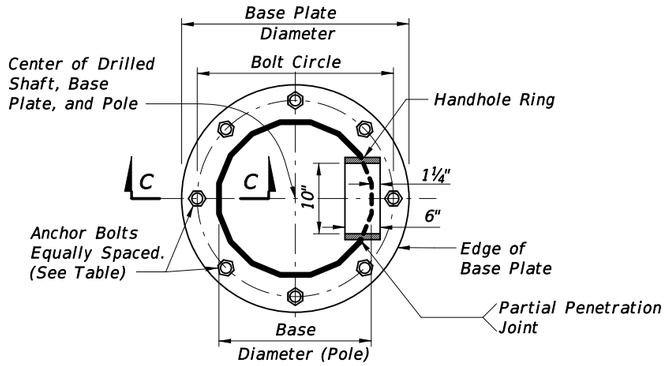
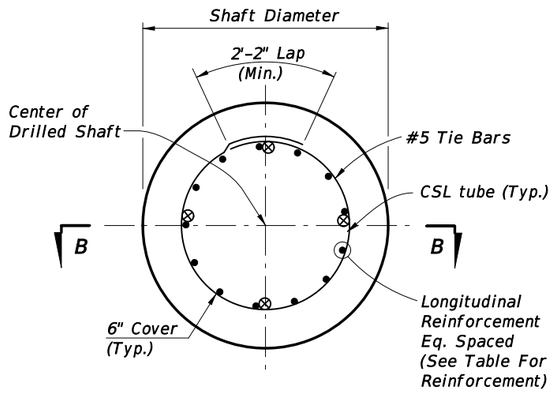


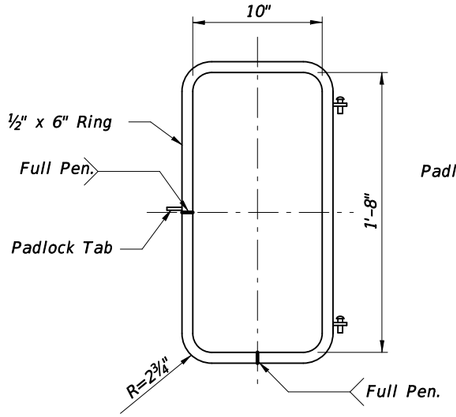
(T = Wall Thickness)

SECTION A-A

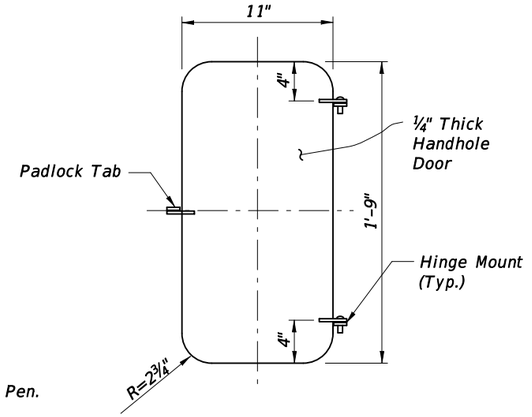


FOUNDATION PLAN

(Anchor Bolts and Conduits Not Shown)



HANDHOLE RING



HANDHOLE DOOR

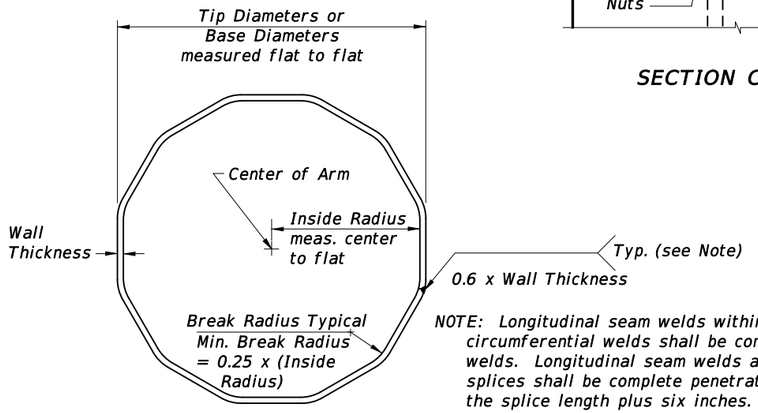
BASE PLATE AND ANCHORAGE ELEVATION

(Conduits Not Shown)

SECTION B-B

(Conduits Not Shown)

SECTION C-C



SECTION E-E

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.

POLE FOUNDATION

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	DYW	Modified longitudinal seam weld note & ℄ washer thickness.			
01/01/11	CBH	Revised SECTION B-B Tie Spacing			

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ALUMINUM LIGHT POLE GENERAL NOTES

1) Designed in accordance with FDOT Structures Manual.

2) All tables were developed assuming the following Luminaire properties: Effective Projected Area of 1.55 ft.(includes wind drag coefficient) and 75 pounds (max.)

3) Perform all welding in accordance with the American Welding Society Structural Welding Code Aluminum ANSI/AWS D1.2 (current edition).

4) See Standard Index No. 17500 for grounding and wiring details.

5) Light Pole Specifications:
   a. Poles: ASTM B221, Alloy 6063-T6.
   b. Arm Tube Extrusions: ASTM B221 - Alloy 6063-T6.
   c. Finish: For pole and arms: 50 grit satin rubbed finish.
   d. Pole Connection Extrusions, Bars and Plates: ASTM B221 - Alloy 6063-T6.
   e. Aluminum Caps and Covers: ASTM B-26(319-F).
   f. Weld Metal: ER4043.
   g. Stainless Steel Fasteners and Hardware: AISI Grade 304.
   h. Aluminum alloy 6063: T4 condition and heat treated in accordance with ASTM B597 to T6.
   i. Frangible Base: ASTM B26 Alloy 356-T6 or ASTM 108 Alloy 356-T6.

6) Provide "J", "S" or "C" hook at top of pole for electrical cable.

7) Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to Transformer Base with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of base and visible from the door opening. Include the following information: Financial Project ID, Pole Height and Manufacturer's Name.

8) For Clamp and Frangible Transformer Base Design, certify that the components are capable of providing the required capacity. Certify that the frangible Transformer Base conforms to the current FHWA required AASHTO Frangibility Requirements, tested under NCHRP Report 350 Guidelines (eg. Akron Foundry TB1-17).

9) For Median Barrier Mounted Aluminum Light Pole design, submit test results showing that pole will not buckle at pole shape transition area. Demonstrate in the tests that the poles will achieve full ultimate moment capacity of 36 k-ft in the strong axis and 30 k-ft in the weak axis respectively for the 0.25" thick poles, and 44 k-ft in the strong axis and 37 k-ft in the weak axis respectively for the 0.313" thick poles. Submit complete details and calculations for the reinforced 4"x6" (min.) handhole located 1'-6" above the base plate.

ROADWAY ALUMINUM LIGHTING POLE NOTES

1) Foundation Materials:
   a. Reinforcing Steel: ASTM A615 Grade 60.
   b. Concrete: Class I.
   c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).

2) Shoe Base and Frangible/Breakaway Transformer Base Casting Specifications.
   a. Shoe Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
   b. Frangible/Breakaway Transformer Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
   c. Shoe Base Connection Bolts: ASTM A325 Type 1 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).

3) Pole Notes:
   a. 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.
   b. Transverse welds are allowed only at the base.
   c. Poles constructed out of two or more sections with overlapping splices are not permitted.
   d. Equip poles with a vibration damper at locations per Specification Section 715.

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

1) Foundation Materials:
   a. Reinforcing Steel: ASTM A615 Grade 60.
   b. Concrete: Class I.
   c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM A36 Plate Washer or ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329). Coupler shall be in accordance with AASHTO 5.11.5.2.2.

2) Base Connection Materials:
   a. Aluminum Base Plate and Stiffener: Alloy 6061-T6.
   b. Backer Ring: ASTM B221, Alloy 6063-T6.
   c. Bearing Plate for Anchor Bolts: ASTM A709 Grade 36 or ASTM A36.

3) Pole Notes:
   a. Tapered as required to provide a 6" (O.D.) round top with a 11"x7" (O.D.) oblong base. Portions of the shaft near the base and at the arm connections may be held constant at 11"x7" oblong and 6" round respectively to simplify fabrication.
   b. Transverse welds are allowed only at the base.
   c. Poles constructed out of two or more sections with overlapping splices are not permitted.
   d. Equip poles with a damping device.

FOUNDATION NOTES

The foundations for Standard Roadway Aluminum Light Poles are pre-designed and are based upon the following conservative soil criteria which covers the 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. Borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

PULL BOX NOTES

1) Fabricate pull boxes from ASTM A 36 steel and hot-dip galvanized in accordance with ASTM A 123 after fabrication. All seams shall be continuously welded and ground smooth. Provide watertight cover with neoprene gasket and secure cover with galvanized screws.

2) Completed pull box and conduit risers are incidental to the cost of concrete barrier wall.

NOTES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	DYW	Changed 'ROADWAY ALUMINUM LIGHTING POLE NOTES' Note 3) d.			
01/01/11	DYW	Changed 'ALUMINUM LIGHT POLE GENERAL NOTES' Notes 5, 7 and 8.			

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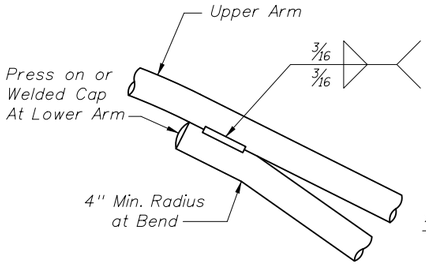
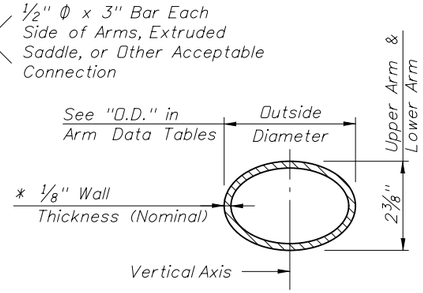
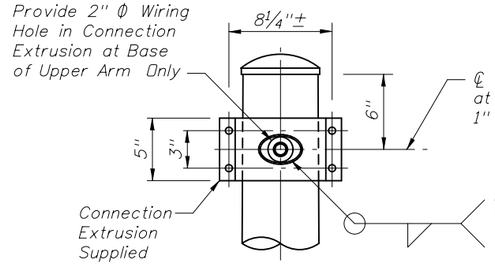


½" Ø x 3" Bar Each Side of Arms, Extruded Saddle, or Other Acceptable Connection

ARM CONNECTION DETAIL

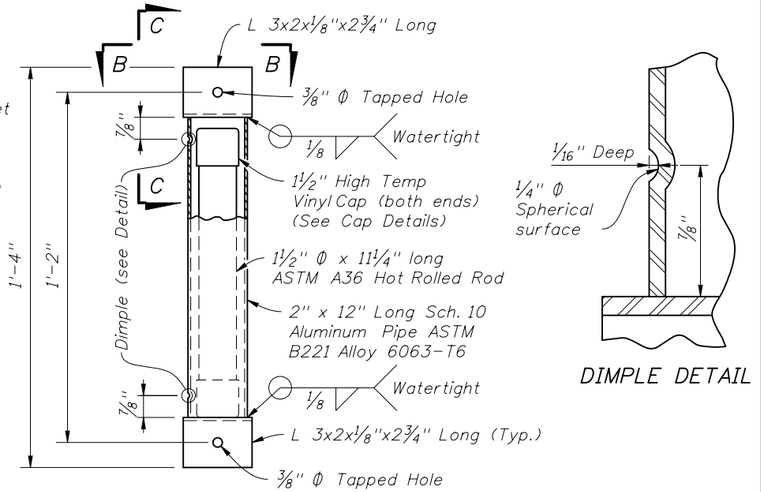


ARM SECTION



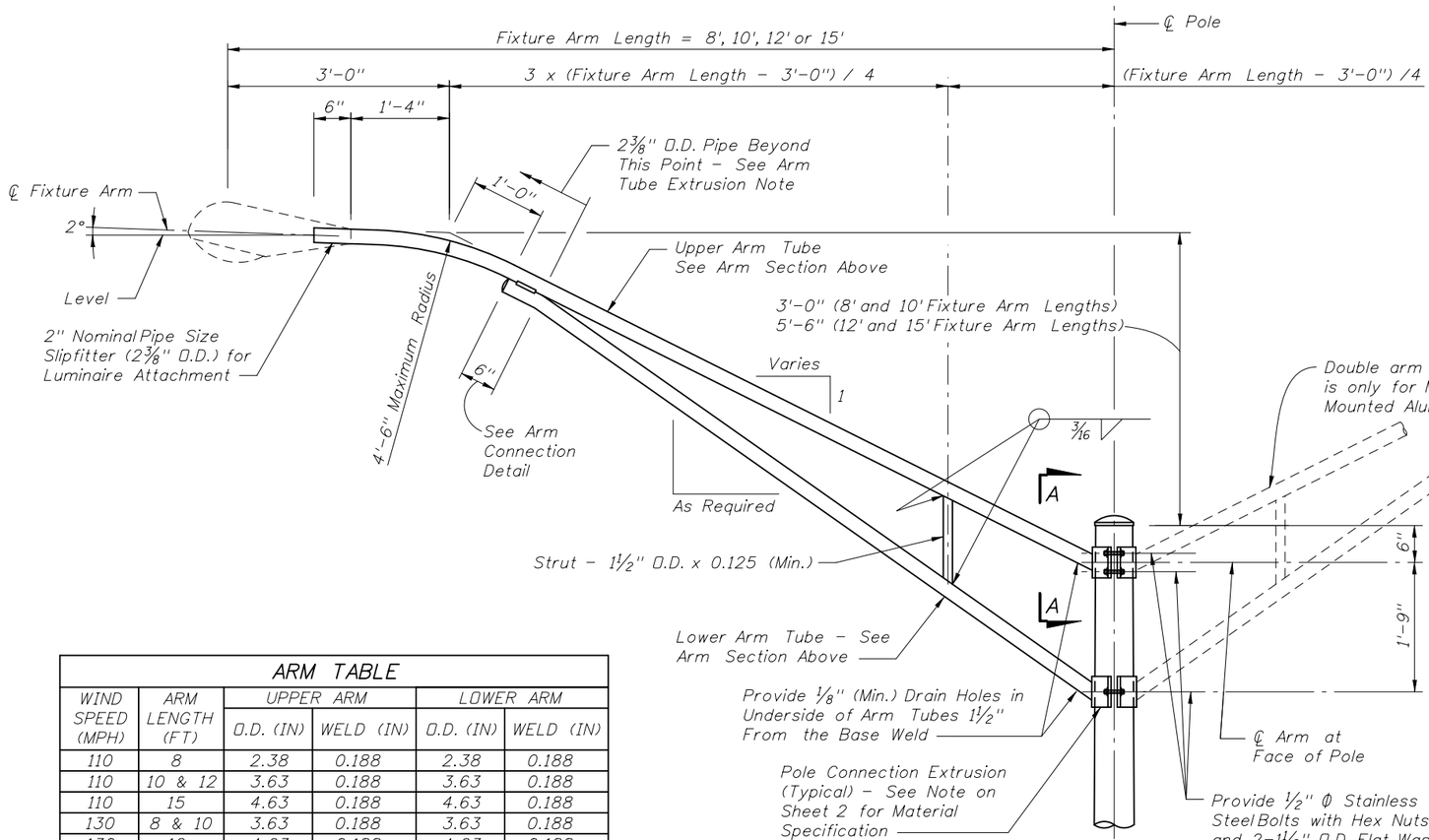
SECTION A-A

(Connection At Lower Arm Similar)



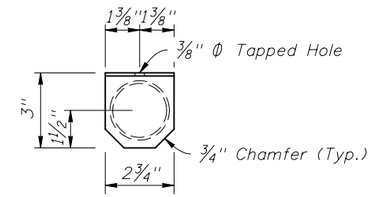
VIBRATION DAMPER ELEVATION

DIMPLE DETAIL

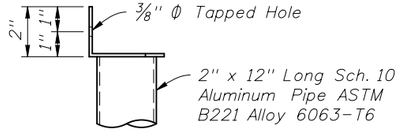


ARM ELEVATION

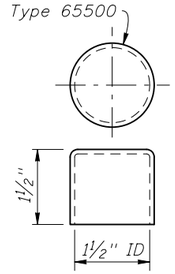
Double arm configuration is only for Median Barrier Mounted Aluminum Light Poles



VIEW B-B



VIEW C-C



HIGH TEMP VINYL CAP DETAIL

ARM TABLE					
WIND SPEED (MPH)	ARM LENGTH (FT)	UPPER ARM		LOWER ARM	
		O.D. (IN)	WELD (IN)	O.D. (IN)	WELD (IN)
110	8	2.38	0.188	2.38	0.188
110	10 & 12	3.63	0.188	3.63	0.188
110	15	4.63	0.188	4.63	0.188
130	8 & 10	3.63	0.188	3.63	0.188
130	12	4.63	0.188	4.63	0.188
130	15	4.63	0.25	4.63	0.25
150	8	3.63	0.188	3.63	0.188
150	10	3.63	0.250	3.63	0.250
150	12	4.63	0.250	4.63	0.250
150	15	4.63	0.313	4.63	0.313

* Increase Member Wall Thickness as Necessary to Meet Minimum Requirements of the Welding Code for the Connection Weld Sizes Shown in the Arm and Pole Tables.

ARM TUBE EXTRUSIONS NOTES:

At the pole connections, provide arm tube extrusions with dimensions as shown in the ARM SECTION and as tabulated in the ARM DATA Tables. Uniformly transition elliptical section to a cylindrical section at the arm connection.

The 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 provide minimum wall thickness of ⅛" nominal and within the Aluminum Association Tolerances.

The outside diameter about the minor axis should be held at 2⅜" at the upper and lower arms.

ARM & DAMPER DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	DYW	Changed Fixture Arm Length and added Damper Details			
01/01/11	DYW	Added Dimensions to SECTION AA.			

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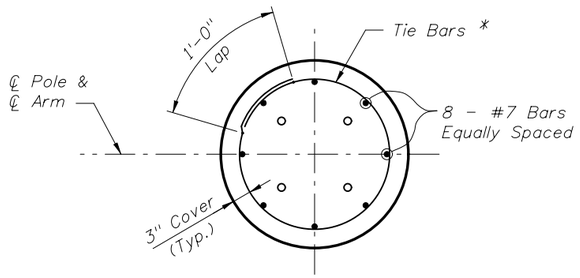
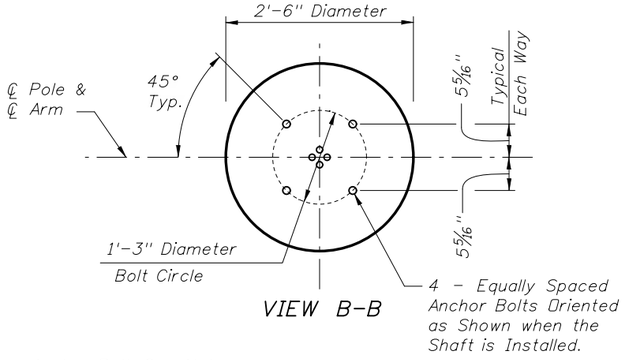
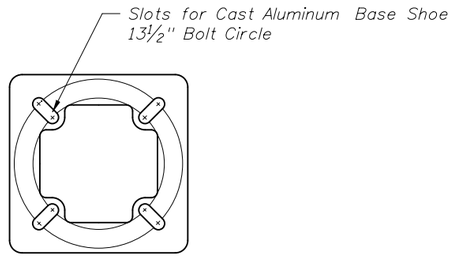


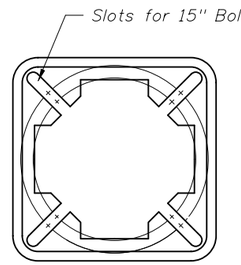
SECTION C-C



VIEW B-B



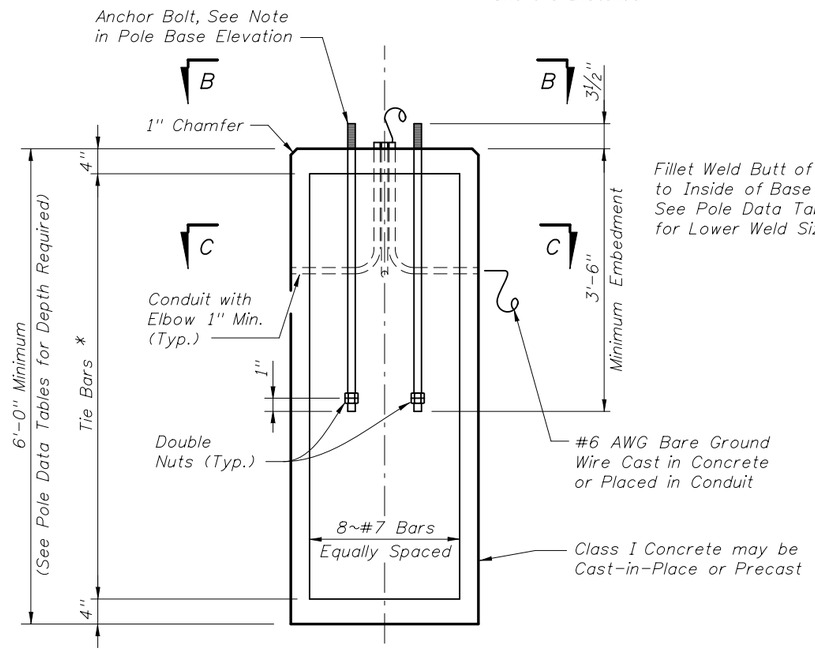
TOP VIEW
TRANSFORMER BASE



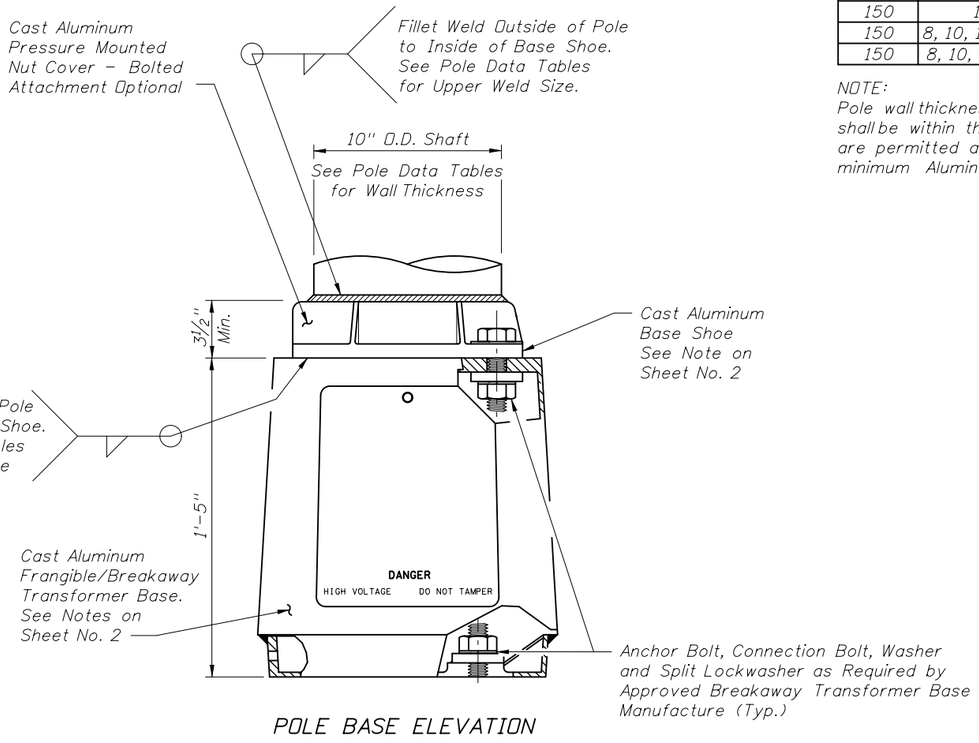
BOTTOM VIEW
TRANSFORMER BASE

POLE TABLE					
WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	UPPER WELD (IN)	LOWER WELD (IN)
110	8, 10, 12 & 15	40 & 45	0.156	0.156	0.156
110	8, 10, 12 & 15	50	0.188	0.188	0.188
130	8, 10 & 12	40	0.156	0.156	0.156
130	15	40	0.188	0.188	0.188
130	8, 10, & 12	45	0.188	0.188	0.188
130	15	45	0.250	0.250	0.250
130	8, 10, 12 & 15	50	0.250	0.250	0.250
150	8, 10, & 12	40	0.188	0.188	0.188
150	15	40	0.250	0.250	0.250
150	8, 10, 12 & 15	45	0.250	0.250	0.250
150	8, 10, 12 & 15	50	0.313	0.313	0.313

NOTE:
Pole wall thicknesses shown in the POLE TABLE 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.



FOUNDATION



POLE BASE ELEVATION

FOUNDATION TABLE		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	TOTAL DEPTH (FT) **
110	40	7
110	45 & 50	8
130	40 & 45	8
130	50	9
150	40 & 45	9
150	50	10

** Depths shown in table are for grades flatter than 1:4, for grades up to 1:2 add 2'-6" to foundation depths shown in table.

* 1. Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:
   a. The reinforcing bars conform to ASTM Specification A706/706M.
   b. The holding wires conform to ASTM Specification A1064.
   c. The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
   d. Quality control tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.
2. #4 Tie Bars @ 12" centers (max.) or D10 (or W10) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

BASE DETAILS FOR ROADWAY ALUMINUM LIGHT POLE

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	DYW	Changed * note 1. ASTM Specification			

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STANDARD ALUMINUM LIGHTING

Interim Date 01/01/11

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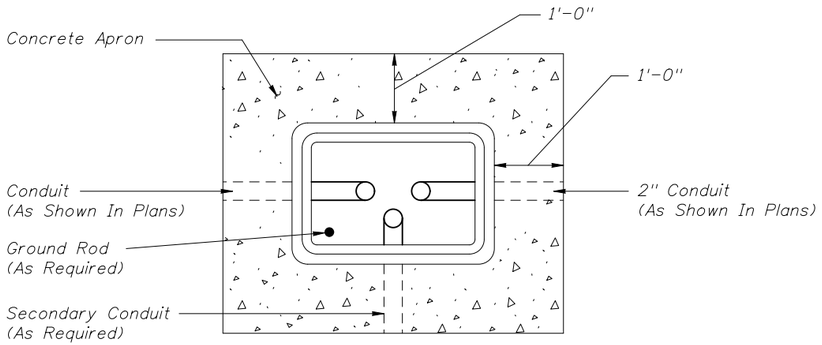
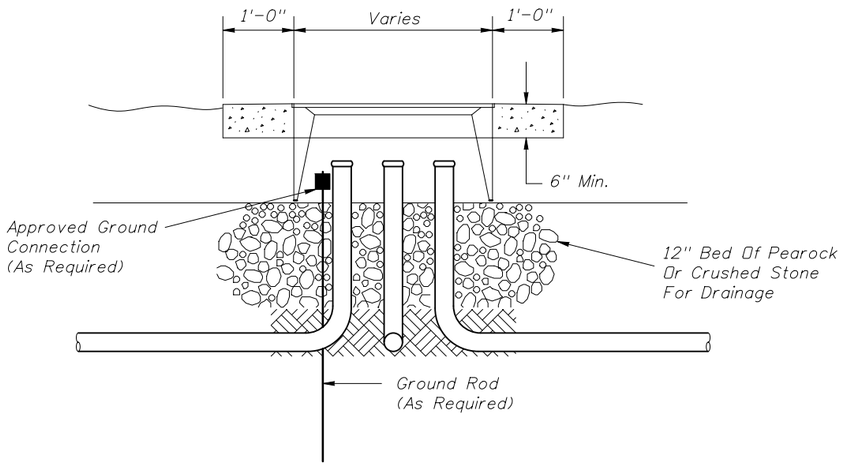
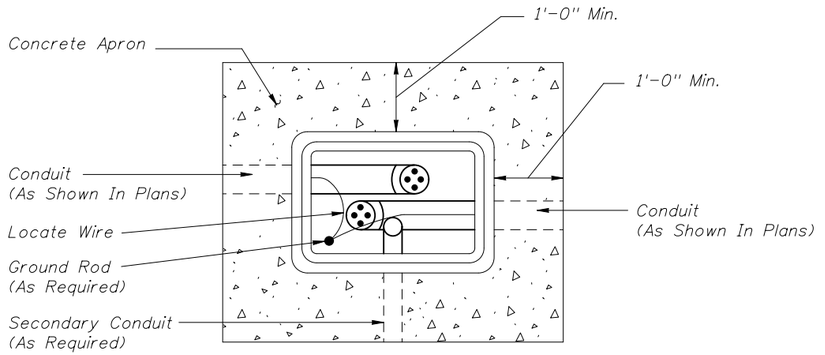
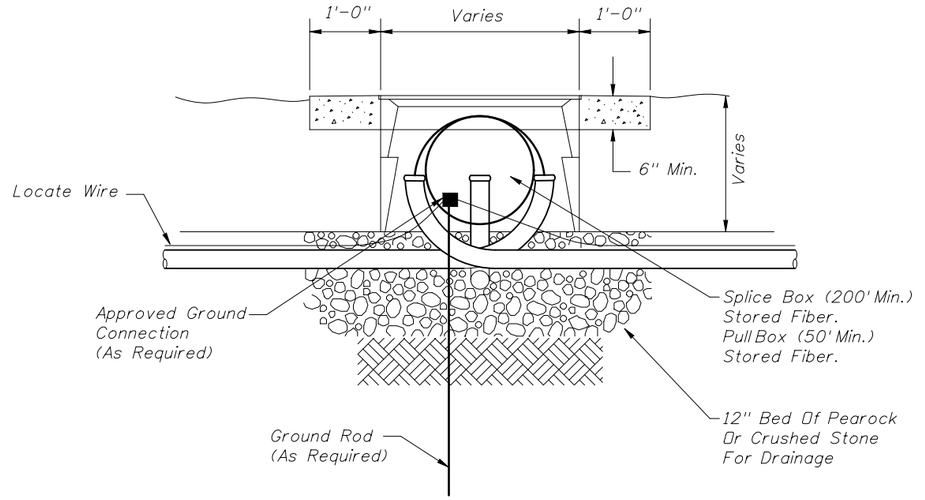
Index No. 17515





PULL BOX





FIBER OPTIC BOX

1. Boxes shall not be installed in roadways or driveways.
2. Boxes shall be on the Approved Product List (APL).
3. Boxes shall be installed flush with the finished grade surface.
4. Fiber Optic splice boxes shall be provided with cable hanger racks designed to support cables and splice enclosures. Cost of racks to be included in cost of splice box.
5. Fiber optic boxes shall contain only Fiber Optic Cable, Conduit, and Locate Wire.
6. Conduit center line shall be aligned to top edge of box to facilitate cable pulling.
7. All boxes shall have 1'-0" wide (min) concrete apron. Concrete for concrete aprons shall be Class NS with a minimum strength at 28 days of f'c=2.5 Ksi. Aprons shall be sloped away from box. Cost of apron to be included in the cost of each box.
8. Prevent the ingress of Water, Dirt, Sand, and other foreign materials into the conduit prior to, during and after construction using a foam-sealing material, rubber plug, or other device designed for this application and approved.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	CH	New sheet added to Standards (07/01/10)			
01/01/11	CH	Revisions to notes and minor detail changes.			

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PULL, SPLICE AND JUNCTION BOX DETAILS

Interim Date 01/01/11

Sheet No. 1 of 1

Index No. 17700

STEEL STRAIN POLE NOTES

1) Designed in accordance with FDOT Structures Manual.

2) Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). No Field welding is permitted on any part of the pole.

3) See Standard Index No. 17727 for grounding and span wire details.

4) Foundation Materials:
   a. Reinforcing Steel: ASTM A615 Grade 60.
   b. Concrete: Class IV, (Drilled Shaft) 4,000 psi (f'c) minimum Compressive Strength at 28-days for all environmental classifications.
   c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade A heavy-hex nuts and plate washers (all galvanized in accordance with ASTM F2329).

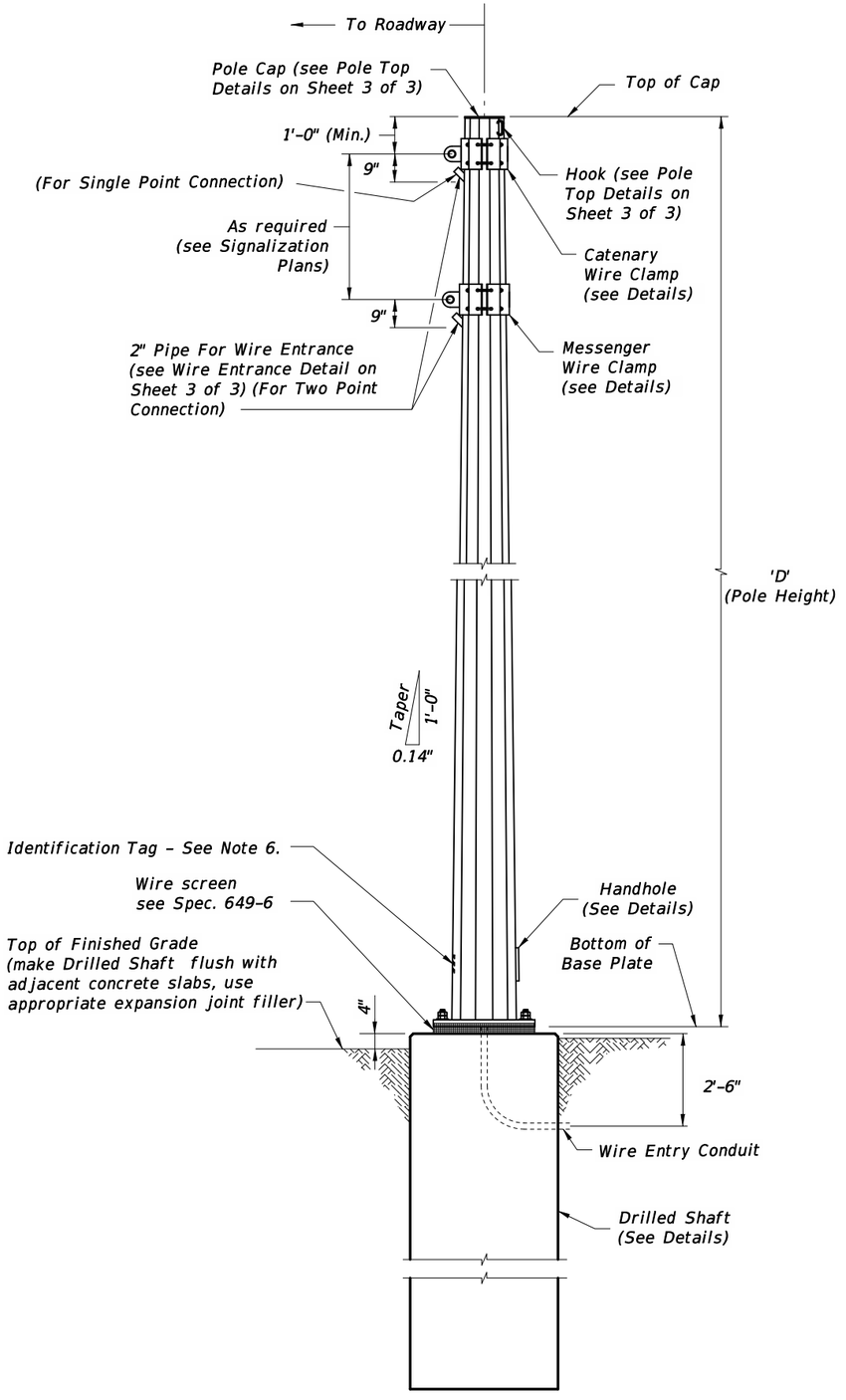
5) Strain Pole Specifications:
   a. Poles: ASTM A1011 Grade 50, 55, 60 or 65 (less than ¼") or ASTM A572 Grade 50, 55, 60, or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
   b. Steel Plates: ASTM A36.
   c. Weld Metal: E70XX.
   d. Bolts: A325, Type 1. Hole Diameter: Bolt diameter plus 1/16".
   e. Base Plate: Hole Diameter; anchor bolt diameter plus ½".
   f. Handhole: Frame; ASTM A709 Grade 36 or ASTM A36, Cover; ASTM A1011 Grade 50, 55, 60 or 65.
   g. Aluminum Caps and Covers: ASTM B-26 (319-F).
   h. Stainless Steel Screws: AISI Type 316.
   i. Galvanization: All nuts, bolts and washers; ASTM F2329, All other steel; ASTM A123.

6) Pole Notes:
   a. See the Signalization Plans for clamp spacing, cable sizes and forces, signal and sign mounting locations and details.
   b. Tapered with the diameter changing at a rate of 0.14 inch per foot.
   c. Transverse welds are allowed only at the base.
   d. Fillet weld socket connections with unequal leg welds with the long weld leg along the shaft. Terminate the long weld leg along the shaft at approximately a 30 degree angle.
   e. Poles constructed out of two or more sections with overlapping splices are not permitted.
   f. Locate the handhole 180 degrees from 2-inch wire entrance pipe.
   g. Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to pole with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of pole and visible from handhole. Include the following information:
      Financial Project ID, Pole Type, Pole Height,
      Manufacturer's Name, F_y of Steel and Base Wall Thickness.

7) One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.

8) Shop drawings are only required for additions, deletions, or modifications to this Design Standard.

9) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location ± two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.



ELEVATION

ELEVATION AND NOTES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Added "(current edition)" and deleted edition number for Design Specification in Note 1.			
07/01/10	DYW	Modified washer specifications.			
01/01/11	DYW	Changed Notes 6 and 8.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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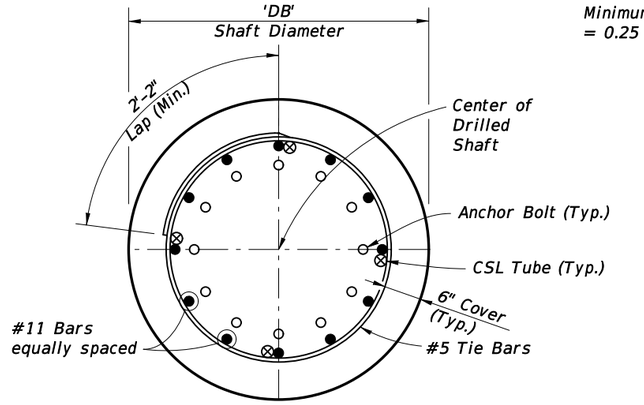
STEEL STRAIN POLE

Interim Date 01/01/11

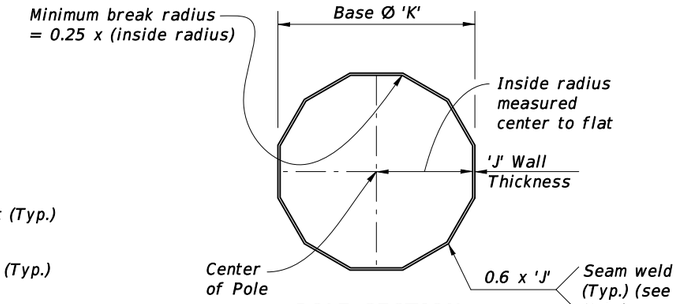
Sheet No. 1 of 3

Index No. 17723



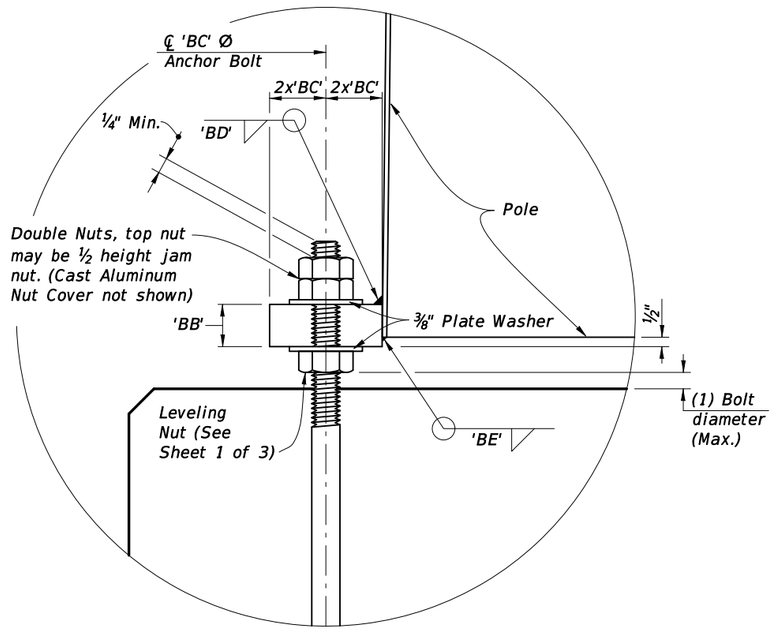
SECTION A-A

(Number of bars shown is for illustration purposes only)

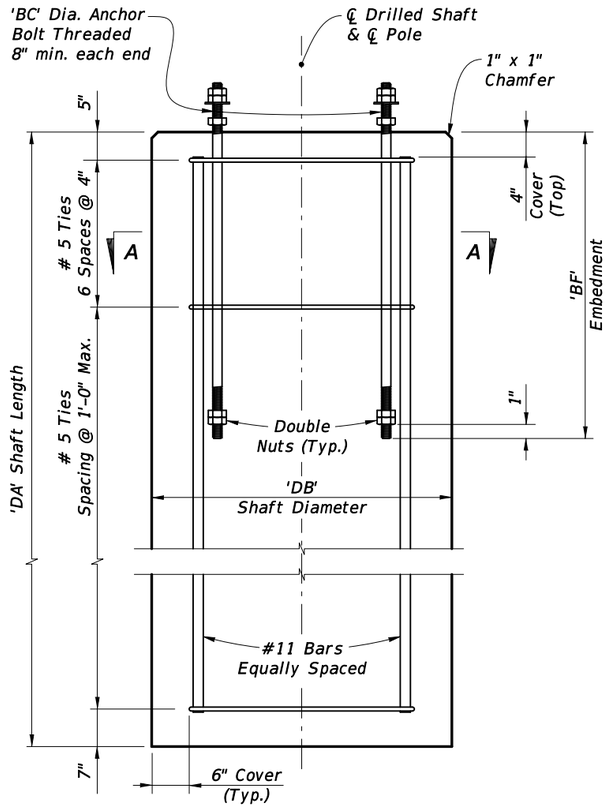


POLE SECTION

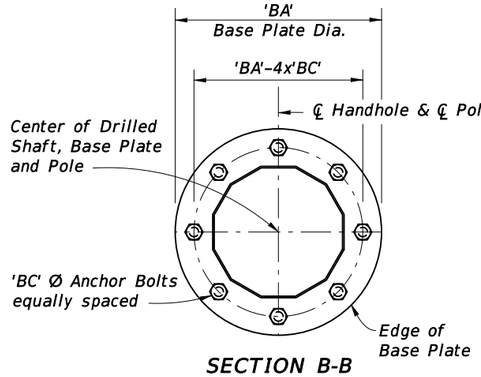
NOTE:
Longitudinal seam welds within 6" of circumferential welds shall be complete penetration welds.



DETAIL C

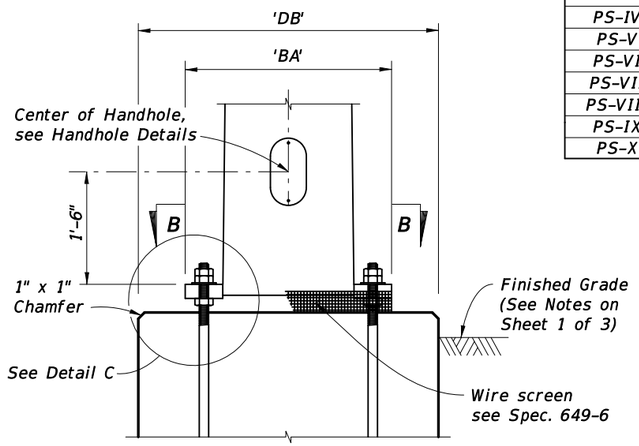


DRILLED SHAFT ELEVATION



SECTION B-B

NOTE:
Number of bolts shown for illustration purposes only.



PARTIAL ELEVATION

(Showing Base Plate, Anchor bolts and Handhole)

TABLE OF STRAIN POLE VARIABLES

POLE TYPE	MAXIMUM ALLOWABLE MOMENT (kip-ft)	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 #11 bars
PS-IV	95.4	0.250	14	8	25	2.50	1 3/8	7/16	3/16	60	14	4	14
PS-V	158.9	0.313	16	10	28	2.50	1 1/2	1/2	1/4	60	15	4	14
PS-VI	203.6	0.313	18	12	30	2.50	1 1/2	1/2	1/4	60	16	4	14
PS-VII	280.3	0.313	21	14	33	2.50	1 1/2	9/16	1/4	60	16	4.5	16
PS-VIII	338.0	0.313	23	16	35	2.50	1 1/2	9/16	1/4	60	17	4.5	16
PS-IX	400.9	0.313	25	12	39	3.00	1 3/4	9/16	1/4	60	17	5	18
PS-X	469.1	0.313	27	14	41	3.00	1.75	9/16	1/4	60	18	5	18

FOUNDATION NOTES:
The foundations for Steel Strain Poles are designed 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 pcf (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 other purposes may be used to confirm the assumed soil properties.

BASE AND FOUNDATION DETAILS AND TABLE OF VARIABLES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	DYW	Revised ℄ washer thickness.			
01/01/11	CBH	Revised Table Of Strain Pole Variables and in DRILLED SHAFT ELEVATION Detail Tie Spacing			

2010 Interim Design Standard

STEEL STRAIN POLE

Interim Date 01/01/11 | Sheet No. 2 of 3

Index No. 17723

POLE SELECTION TABLE – SINGLE ARM – WITH & WITHOUT LUMINAIRE					
ARM TYPE	D1	D3	D5	D6	D7
POLE TYPE	S1 & S21 Lum	S2 & S22 Lum	S3 & S23 Lum	S4 & S24 Lum	S6

POLE SELECTION TABLE – DOUBLE ARM – WITHOUT LUMINAIRE										
ARM TYPE	D1 - D1	D3 - D1	D5 - D2	D6 - D2	D4 - D4	D5 - D4	D6 - D4	D5 - D5	D6 - D5	D6 - D6
POLE TYPE	S1	S2	S3	S4	S3	S4	S4	S4	S4	S5

Arm 1 is listed first

ARM DESIGN TABLE – ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
D1	36'-0"	36	8.96	14	0.1793					20	25	2.5	0.125	0.313
D2	36'-0"	36	8.96	14	0.1793					30	36	3	0.125	0.313
D3	46'-0"	36.3	8.92	14	0.1793	11.7	13.36	15	0.313	20	25	2.5	0.25	0.375
D4	46'-0"	36.3	8.92	14	0.1793	11.7	13.36	15	0.313	30	36	3	0.25	0.375
D5	60'-0"	36	7.96	13	0.1793	26	12.36	16	0.375	30	36	3	0.313	0.563
D6	70'-6"	39.4	9.49	15	0.1793	33.1	14.37	19	0.375	30	36	3	0.313	0.563
D7	78'-0"	40	8.44	14	0.1793	40	13.40	19	0.375	30	34	3	0.313	0.625

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)	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	RC	RD (in)
S1	24	12.64	16	0.375		6	30	2.5	1.75	0.375	0.313	36	20	25	0.75	0.438	15.5	1	2	8	0.438	12	4	11	14	10	12
S2	24	14.64	18	0.375		6	32	2.5	1.75	0.375	0.313	36	20	25	0.75	0.438	15.5	1	2	8	0.438	12	4.5	11	16	10	12
S3	24	17.64	21	0.375		6	37	2.5	2	0.375	0.313	40	30	36	0.75	0.438	22	1.25	2.5	12.5	0.438	15	4.5	11	16	10	8
S4	24	22.64	26	0.375		6	42	2.5	2	0.375	0.313	40	30	36	0.75	0.438	22	1.25	2	12.5	0.438	17	5	11	18	10	8
S5	24	23.64	27	0.375		6	45	2.5	2.25	0.375	0.313	45	30	36	0.75	0.438	22	1.25	2	12.5	0.438	18	5	11	18	10	8
S6	24	21.64	25	0.375		6	41	2.5	2	0.375	0.313	40	30	34	0.75	0.5	16.5	1.25	2	12.5	0.5	15	5	11	18	10	8
S21 Lum	39	10.54	16	0.375	37.5	6	30	2.5	1.75	0.375	0.313	40	20	25	0.75	0.438	11.5	1	2	8	0.438	12	4	11	14	10	12
S22 Lum	39	12.54	18	0.375	37.5	6	32	2.5	1.75	0.375	0.313	40	20	25	0.75	0.438	12.5	1	2	8	0.438	12	4.5	11	16	10	12
S23 Lum	39	15.54	21	0.375	37.5	6	37	2.5	2	0.375	0.313	40	30	36	0.75	0.438	15	1.25	2.5	12.5	0.438	14	4.5	11	16	10	8
S24 Lum	39	20.54	26	0.375	37.5	6	42	2.5	2	0.375	0.313	40	30	36	0.75	0.438	17	1.25	2	12.5	0.438	15	5	11	18	10	8

LUMINAIRE AND LUMINAIRE CONNECTION											
LA (ft)	LB (ft)	LC (in)	LD (in)	LE	LF (ft)	LG (in)	LH (in)	LJ (in)	LK (in)	LL (deg)	UG (ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

Notes:
1. Work this Index with Index No. 17745.
2. Design Speed = 150 mph with Signal Backplates.

"D" MAST ARMS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Updated assembly dimensions.			
01/01/09	CBH	Changed drilled shaft reinforcing.			
01/01/11	CBH	Added dimensions for RC and RD, deleted Note 2.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

STANDARD MAST ARM ASSEMBLIES

Interim Date 01/01/11

Sheet No. 1 of 3

Index No. 17743

POLE SELECTION TABLE – SINGLE ARM – WITH & WITHOUT LUMINAIRE					
ARM TYPE	E1	E3	E5	E6	E7
POLE TYPE	T1 & T21 Lum	T2 & T22 Lum	T3 & T23 Lum	T4 & T24 Lum	T6

POLE SELECTION TABLE – DOUBLE ARM – WITHOUT LUMINAIRE										
ARM TYPE	E1 - E1	E3 - E1	E5 - E2	E6 - E2	E4 - E4	E5 - E4	E6 - E4	E5 - E5	E6 - E5	E6 - E6
POLE TYPE	T1	T2	T3	T4	T3	T4	T4	T4	T4	T5

Arm 1 is listed first

ARM DESIGN TABLE – ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
E1	36'-0"	36.0	5.96	11	0.25					22	22	2	0.187	0.313
E2	36'-0"	36.0	5.96	11	0.25					30	32	2.75	0.187	0.313
E3	46'-0"	36.3	7.06	12.14	0.25	11.7	11.36	13	0.313	22	23	2	0.25	0.375
E4	46'-0"	36.3	7.06	12.14	0.25	11.7	11.36	13	0.313	30	32	2.75	0.25	0.375
E5	60'-0"	36.0	6.10	11.14	0.25	26	10.36	14	0.375	30	32	2.75	0.313	0.5
E6	70'-6"	39.4	6.63	12.15	0.25	33.1	11.37	16	0.375	30	32	2.75	0.313	0.563
E7	78'-0"	40.0	7.50	13.10	0.1793	40	12.40	18	0.375	30	32	2.5	0.313	0.563

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)	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	RC	RD (in)
T1	24	10.64	14	0.375		6	26	2.50	1.5	0.375	0.313	36	22	22	0.5	0.375	14	1	2.0	9	0.375	11	4	11	14	10	12
T2	24	12.64	16	0.375		6	28	2.50	1.5	0.375	0.313	36	22	23	0.5	0.375	14	1	2.0	9	0.375	12	4	11	14	10	12
T3	24	15.64	19	0.375		6	35	2.50	2	0.375	0.313	40	30	32	0.75	0.375	19.5	1.25	2.25	12.5	0.375	12	4.5	11	16	10	12
T4	24	18.64	22	0.5		6	38	2.50	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	15	4.5	11	16	10	8
T5	24	18.64	22	0.5		6	38	2.50	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	16	4.5	11	16	10	8
T6	24	18.64	22	0.375		6	38	2.50	2	0.375	0.313	40	30	32	0.75	0.438	15	1.25	2.0	12.5	0.438	14	4.5	11	16	10	8
T21 Lum	39	8.54	14	0.375	37.5	6	26	2.50	1.5	0.375	0.313	40	22	22	0.5	0.375	10	1	2.0	9	0.375	11	4	11	14	10	12
T22 Lum	39	10.54	16	0.375	37.5	6	30	2.50	1.75	0.375	0.313	40	22	22	0.5	0.375	11	1	2.0	9	0.375	12	4	11	14	10	12
T23 Lum	39	13.54	19	0.375	37.5	6	35	2.50	2	0.375	0.313	40	30	32	0.75	0.375	13	1.25	2.25	12.5	0.375	12	4.5	11	16	10	12
T24 Lum	39	16.54	22	0.375	37.5	6	38	2.50	2	0.375	0.313	40	30	32	0.75	0.375	15	1.25	2.0	12.5	0.375	14	4.5	11	16	10	12

LUMINAIRE AND LUMINAIRE CONNECTION											
LA (ft)	LB (ft)	LC (in)	LD (in)	LE	LF (ft)	LG (in)	LH (in)	LJ (in)	LK (in)	LL (deg)	UG (ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

Notes:
1. Work this Index with Index No. 17745.
2. Design Speed = 130 mph with Signal Backplates or 150 mph without Signal Backplates

"E" MAST ARMS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CH	Updating table values			

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STANDARD MAST ARM ASSEMBLIES

Interim Date 01/01/11

Index No. 17743

POLE SELECTION TABLE – SINGLE ARM – WITH & WITHOUT LUMINAIRE					
ARM TYPE	F1	F3	F5	F6	F7
POLE TYPE	W1 & W21 Lum	W2 & W22 Lum	W3 & W23 Lum	W4 & W24 Lum	W6

POLE SELECTION TABLE – DOUBLE ARM – WITHOUT LUMINAIRE										
ARM TYPE	F1 - F1	F3 - F1	F5 - F2	F6 - F2	F4 - F4	F5 - F4	F6 - F4	F5 - F5	F6 - F5	F6 - F6
POLE TYPE	W1	W2	W3	W4	W3	W4	W4	W4	W4	W5

Arm 1 is listed first

ARM DESIGN TABLE – ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
F1	36'-0"	36	5.96	11	0.1793					20	20	2	0.125	0.25
F2	36'-0"	36	5.96	11	0.1793					29	29	2.25	0.125	0.25
F3	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	20	20	2	0.188	0.313
F4	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	29	29	2.25	0.188	0.313
F5	60'-0"	36	5.96	11	0.1793	26	10.36	14	0.313	29	29	2.25	0.25	0.375
F6	70'-6"	39.4	5.49	11	0.1793	33.1	10.37	15	0.313	29	29	2.25	0.25	0.438
F7	78'-0"	40	6.43	12	0.1793	40	11.26	17	0.313	29	29	2.25	0.25	0.438

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)	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	RC	RD (in)
W1	24	9.64	13	0.375		6	25	2.5	1.5	0.375	0.313	36	20	20	0.5	0.313	13	0.75	2.0	8.5	0.313	10	4	11	14	10	12
W2	24	11.64	15	0.375		6	27	2.5	1.5	0.375	0.313	36	20	20	0.5	0.313	14	0.75	2.0	8.5	0.313	11	4	11	14	10	12
W3	24	14.64	18	0.375		6	32	2.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	11	4.5	11	16	10	12
W4	24	17.64	21	0.375		6	35	2.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	13	4.5	11	16	10	12
W5	24	17.64	21	0.375		6	35	2.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	14	4.5	11	16	10	12
W6	24	17.64	21	0.375		6	35	2.5	1.75	0.375	0.313	36	29	29	0.5	0.375	14	1.25	2.0	12	0.375	12	4.5	11	16	10	12
W21 Lum	39	7.54	13	0.375	37.5	6	25	2.5	1.5	0.375	0.313	36	20	20	0.5	0.313	9	0.75	2.0	8.5	0.313	10	4	11	14	10	12
W22 Lum	39	9.54	15	0.375	37.5	6	27	2.5	1.5	0.375	0.313	36	20	20	0.5	0.313	10	0.75	2.0	8.5	0.313	11	4	11	14	10	12
W23 Lum	39	12.54	18	0.375	37.5	6	32	2.5	1.75	0.375	0.313	36	29	29	0.5	0.313	11.5	1	2.0	12.5	0.313	11	4.5	11	16	10	12
W24 Lum	39	15.54	21	0.375	37.5	6	35	2.5	1.75	0.375	0.313	36	29	29	0.5	0.313	13	1	2.0	12.5	0.313	12	4.5	11	16	10	12

LUMINAIRE AND LUMINAIRE CONNECTION											
LA (ft)	LB (ft)	LC (in)	LD (in)	LE	LF (ft)	LG (in)	LH (in)	LJ (in)	LK (in)	LL (deg)	UG (ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

Notes:

1. Work this Index with Index No. 17745.
2. Design Speed = 110 mph with Signal Backplates or 130 mph without Signal Backplates.

"F" MAST ARMS

REVISIONS

DATE	BY	DESCRIPTION
07/01/08	DYW	Updated assembly dimensions.
01/01/09	CBH	Changed drilled shaft reinforcing.
01/01/11	CBH	Added dimensions for RC and RD, deleted Note 2.
03/09/11	CBH	Revised Pole, Connection and Shaft Design Table– Single & Double Arm, under Upright Base Connection columns BB and BC.

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STANDARD MAST ARM ASSEMBLIES

Interim Date 01/01/11

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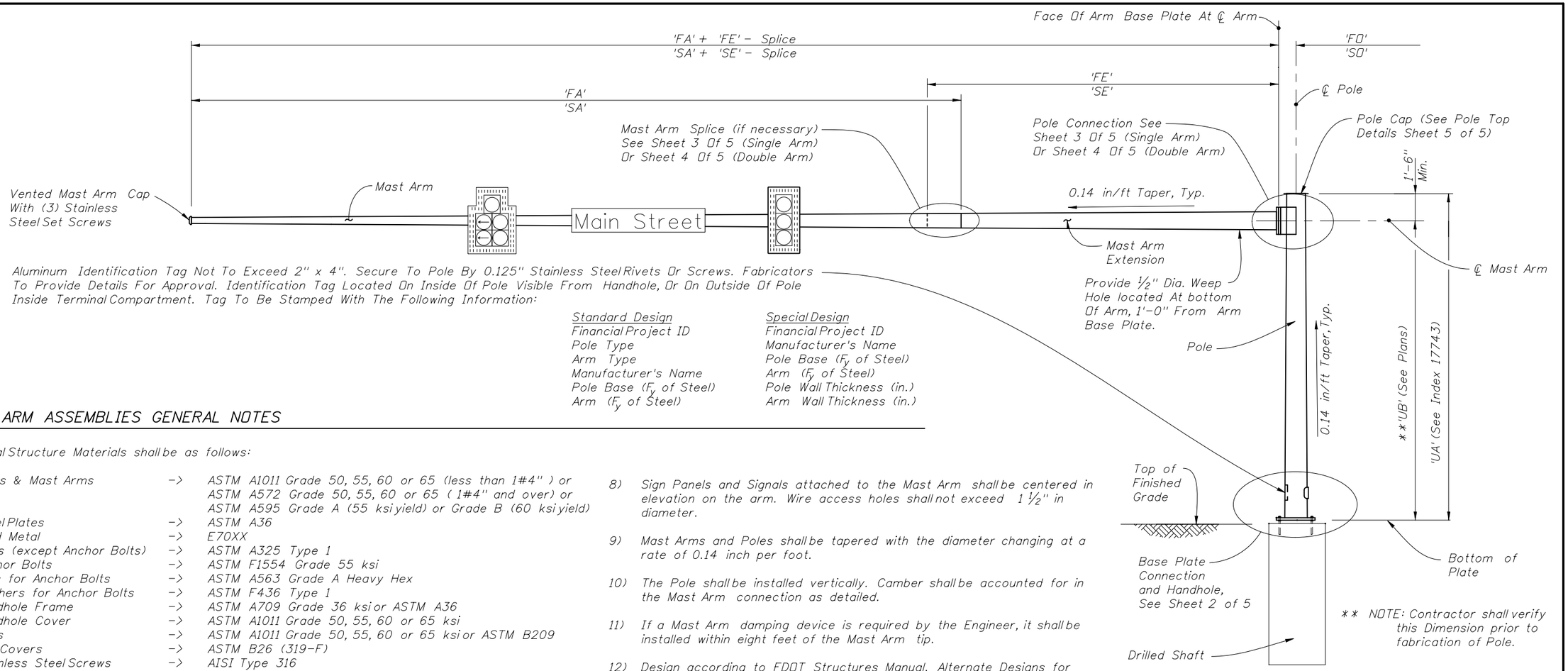

** NOTE: Contractor shall verify this Dimension prior to fabrication of Pole.

ELEVATION VIEW

(Single Arm Shown, Double Arm Similar)
(Luminaire Arm Not Shown)

Aluminum Identification Tag Not To Exceed 2" x 4". Secure To Pole By 0.125" 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:

Standard Design	Special Design
Financial Project ID	Financial Project ID
Pole Type	Manufacturer's Name
Arm Type	Pole Base (F_y of Steel)
Manufacturer's Name	Arm (F_y of Steel)
Pole Base (F_y of Steel)	Pole Wall Thickness (in.)
Arm (F_y of Steel)	Arm Wall Thickness (in.)

MAST ARM ASSEMBLIES GENERAL NOTES

1) Signal Structure Materials shall be as follows:

Poles & Mast Arms	–>	ASTM A1011 Grade 50, 55, 60 or 65 (less than 1#4") or ASTM A572 Grade 50, 55, 60 or 65 (1#4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
Steel Plates	–>	ASTM A36
Weld Metal	–>	E70XX
Bolts (except Anchor Bolts)	–>	ASTM A325 Type 1
Anchor Bolts	–>	ASTM F1554 Grade 55 ksi
Nuts for Anchor Bolts	–>	ASTM A563 Grade A Heavy Hex
Washers for Anchor Bolts	–>	ASTM F436 Type 1
Handhole Frame	–>	ASTM A709 Grade 36 ksi or ASTM A36
Handhole Cover	–>	ASTM A1011 Grade 50, 55, 60 or 65 ksi
Caps	–>	ASTM A1011 Grade 50, 55, 60 or 65 ksi or ASTM B209
Nut Covers	–>	ASTM B26 (319-F)
Stainless Steel Screws	–>	AISI Type 316
Threaded Bars/Studs	–>	ASTM A36 or ASTM A307

2) Reinforcing Steel shall be ASTM A615 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) All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Fillet weld socket connections with unequal leg welds with the long weld leg along the shaft. Terminate the long weld leg along the shaft at approximately a 30 degree angle.

5) All steel items shall be galvanized as follows:
All Nuts, Bolts, Washers and Threaded Bars/Studs –> F2329
All other steel items
(including Pole & Mast Arm) –> ASTM A123

6) 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.

7) 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 ½".

8) Sign Panels and Signals attached to the Mast Arm shall be centered in elevation on the arm. Wire access holes shall not exceed 1 ½" in diameter.

9) Mast Arms and Poles shall be tapered with the diameter changing at a rate of 0.14 inch per foot.

10) The Pole shall be installed vertically. Camber shall be accounted for in the Mast Arm connection as detailed.

11) If a Mast Arm damping device is required by the Engineer, it shall be installed within eight feet of the Mast Arm tip.

12) Design according to FDOT Structures Manual. Alternate Designs for Special Mast Arm Assemblies are not allowed.

13) Provide "J","S" or "C"-Hook at top of pole for signal cable support.

14) First and Second Arm Camber Angle = 2°.

15) Details for Signal and Sign Locations, Signal Head attachment, Sign Attachment, Pedestrian Head Attachment, and Foundation Conduit are not shown for clarity.

16) One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.

17) Shop drawings are only required for additions, deletions, or modifications to this Design Standard.

18) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location +/- two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

TYPICAL ELEVATION AND NOTES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/09/10	DYW	Modified notes 8 and 15. Modified 'UB' dimension.			
01/01/11	CH	Modified Notes 4 and 17.			

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MAST ARM ASSEMBLIES

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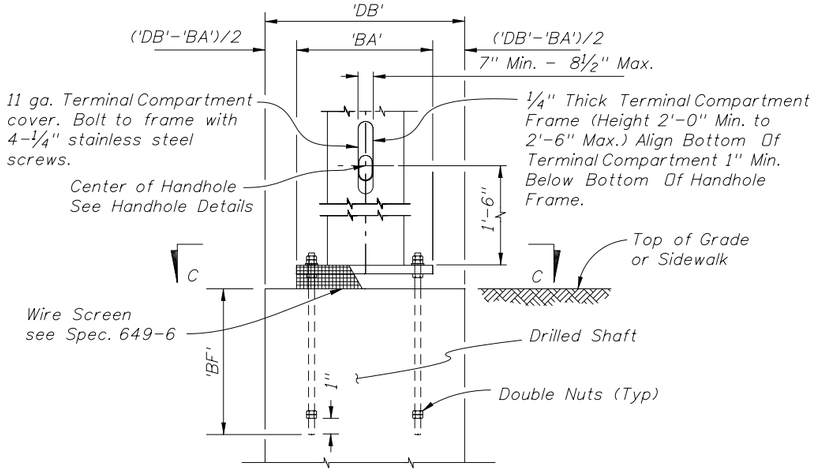
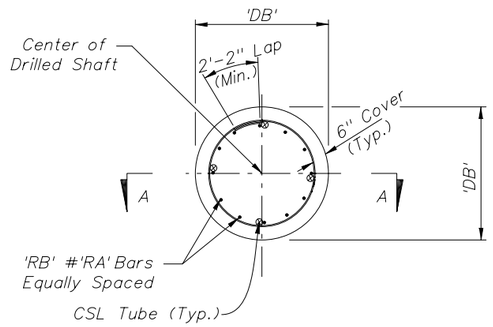
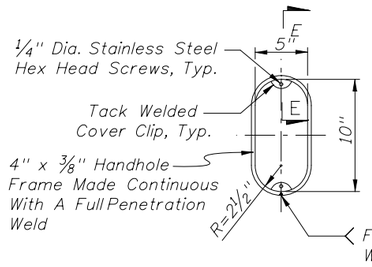


BASE PLATE AND ANCHORAGE ELEVATION

(Reinforcement Not Shown)

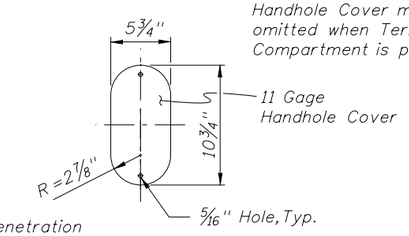


FOUNDATION PLAN



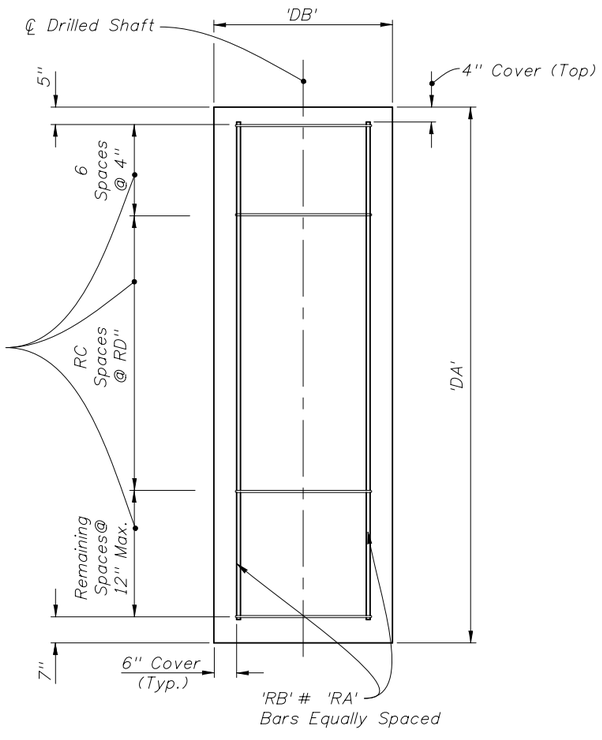
HANDHOLE FRAME

(w/Terminal Compartment Omitted)

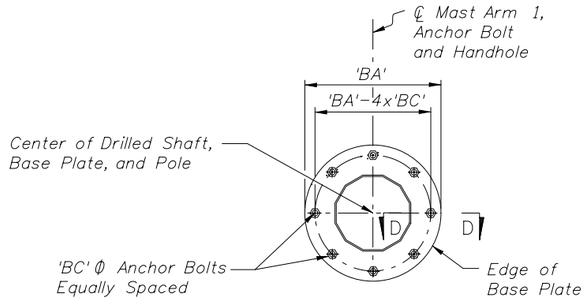


HANDHOLE COVER

Note:
Handhole Cover may be omitted when Terminal Compartment is provided.



SECTION A-A

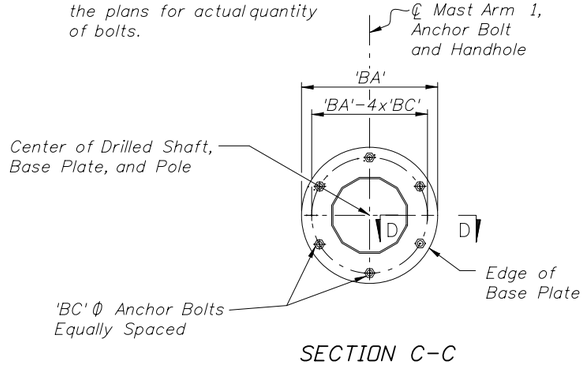


SECTION C-C

Alternate Detail

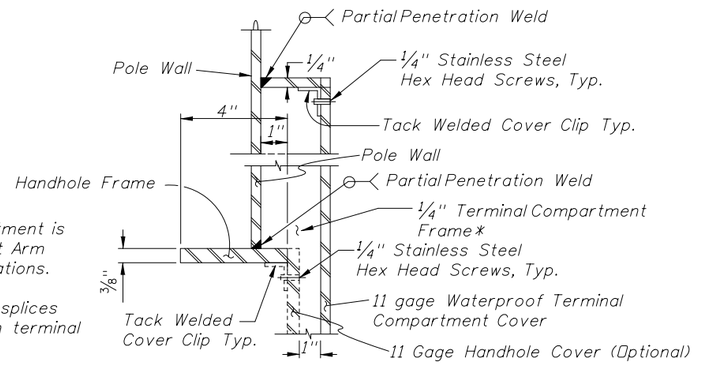
(8 Anchor Bolts)

NOTE: See Index No. 17743 and the plans for actual quantity of bolts.



SECTION C-C

(6 Anchor Bolts)

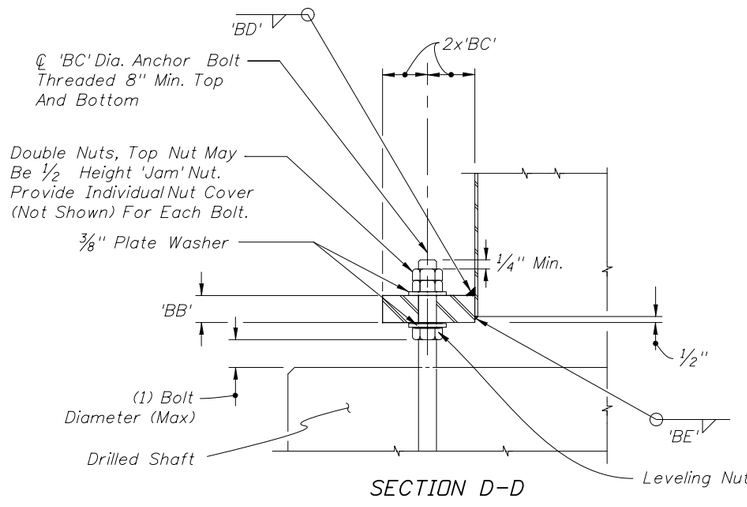


*Terminal Compartment is optional. See Mast Arm Tabulation for locations.

**Water proof all splices or use gasket with terminal compartment.

SECTION E-E

(Thru Handhole & Terminal Compartment)



SECTION D-D

TYPICAL FOUNDATION AND BASE PLATE DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/14/10	CH	Modified anchor bolt standoff details.			
07/01/10	DYW	Modified plate washer detail.			
01/01/11	CH	Modified SECTION A-A, to include RC and RD dimensions and SECTION D-D location of 'BB' dimensions.			

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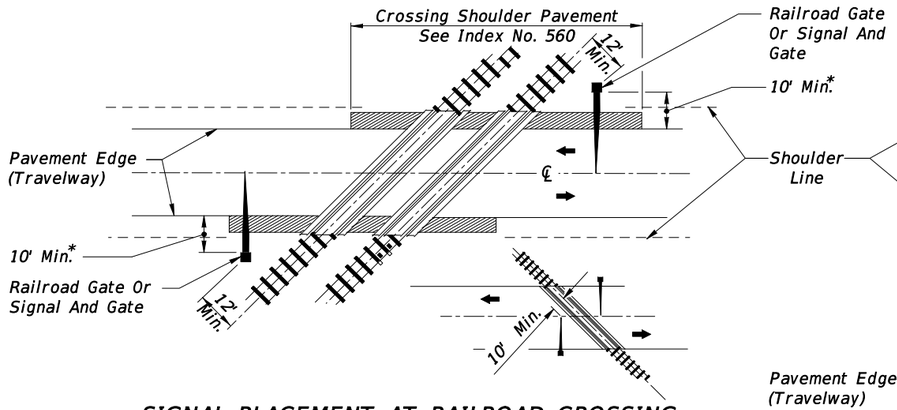
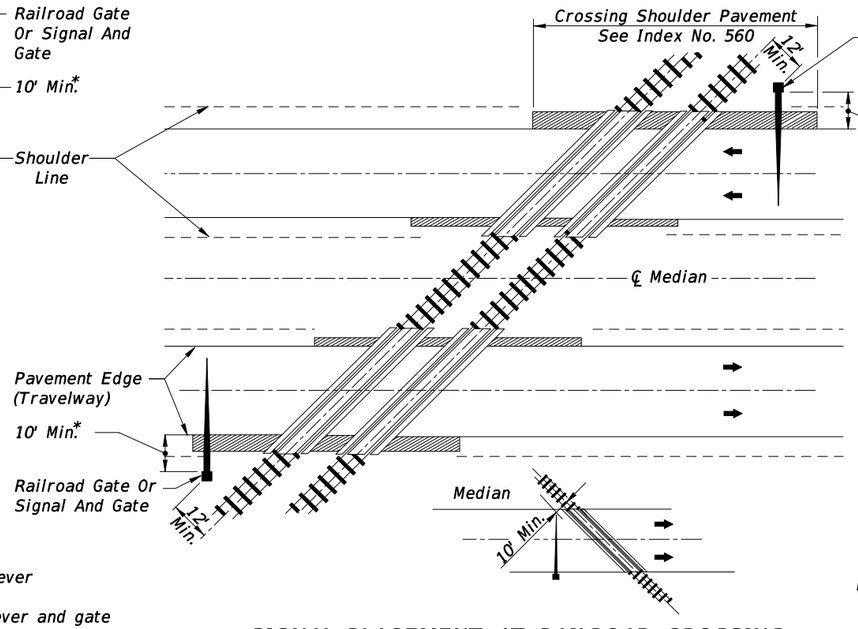
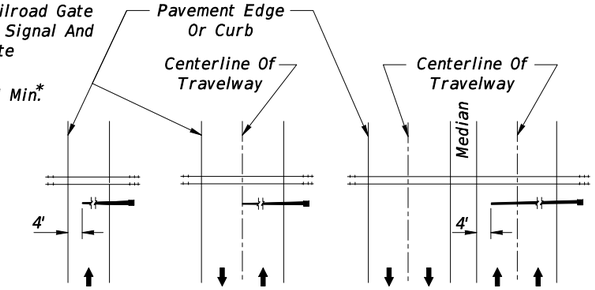


SIGNAL PLACEMENT AT RAILROAD CROSSING
(2 - LANE DESIGN)



SIGNAL PLACEMENT AT RAILROAD CROSSING
(4 - LANE DESIGN)



Note:
Arrows denote direction of travel not pavement markings.

FIGURE 1

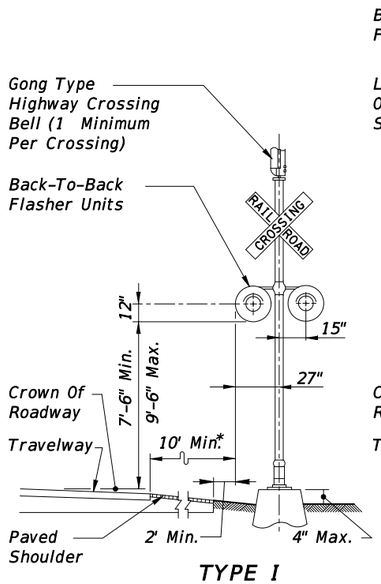
Gate Length Requirements
See Note 5 Sheet 3

General Notes

1. No guardrail is proposed for signals; however, some form of impact attenuation device may be specified for certain locations.
2. Advance flasher to be installed when and if called for in plans or specifications.
3. Top of foundation shall be no higher than 4" above finished shoulder grade.
4. Type of traffic control device
   I Flashing signals
   II Flashing signals with cantilever
   III Flashing signals with gate
   IV Flashing signals with cantilever and gate
   V Gate
5. Class of traffic control devices
   I Flashing signals–one track
   II Flashing signals–multiple tracks
   III Flashing signals and gates–one track
   IV Flashing signals and gates–multiple tracks

Note:
Two separate foundations may be required (one for signals, one for gate), depending on type of equipment used.

* When 10' is deemed impracticle 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.



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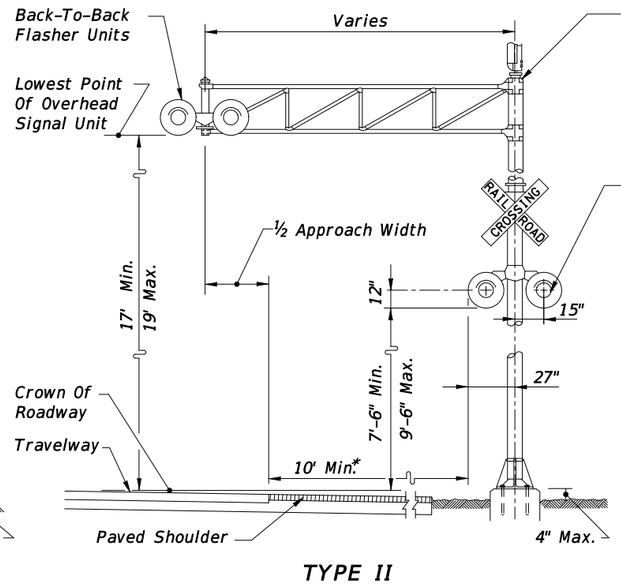

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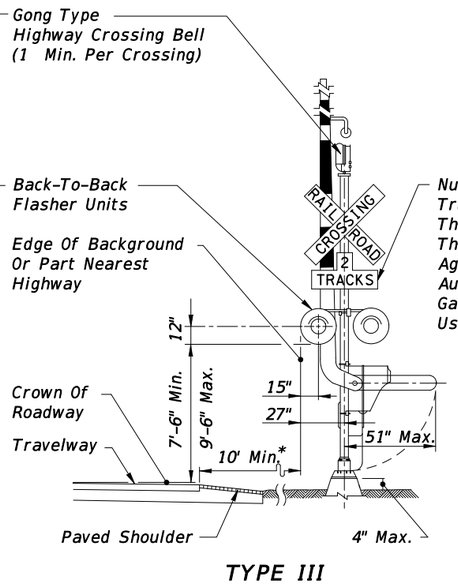

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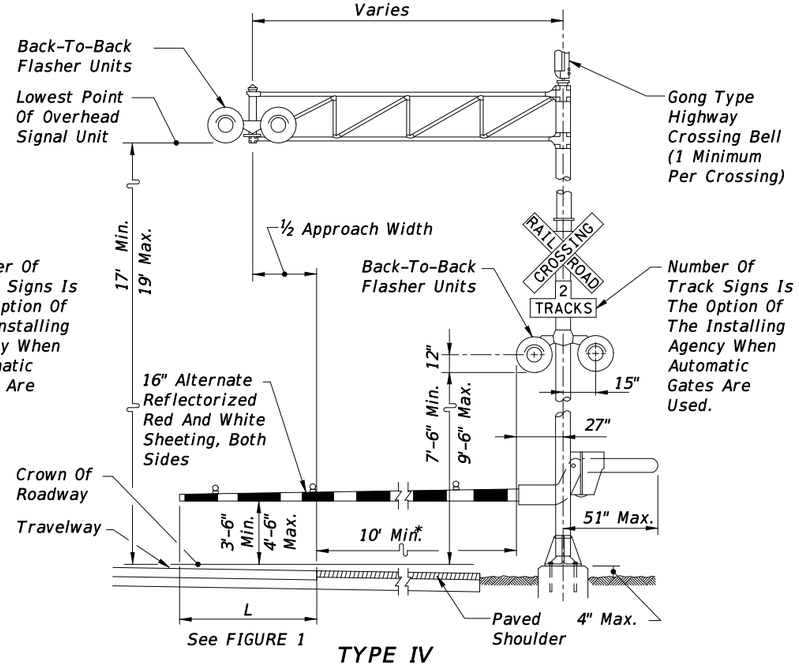

TYPE IV

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SA	Added description for Lowest Point of Overhead Signal Unit and changed dimension from 57" Max. to 51" Max. for Types II & IV			

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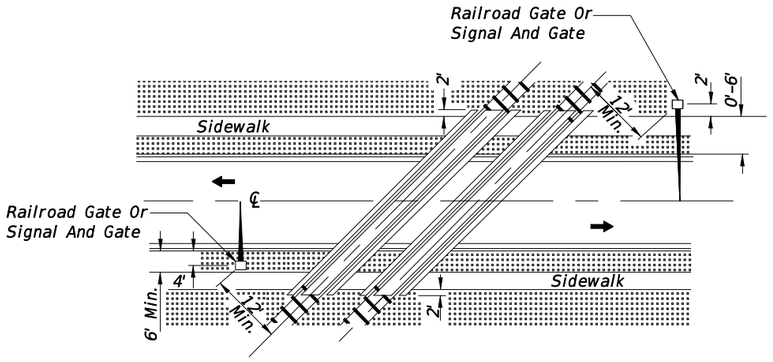
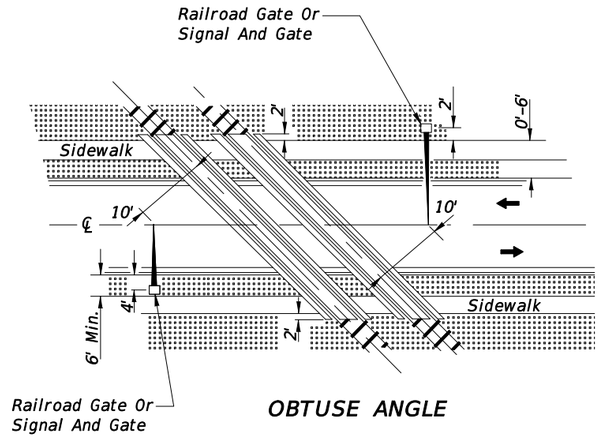


ACUTE ANGLE (AND RIGHT ANGLE)

SIGNAL PLACEMENT AT RAILROAD CROSSING (2 LANES, CURB & GUTTER)

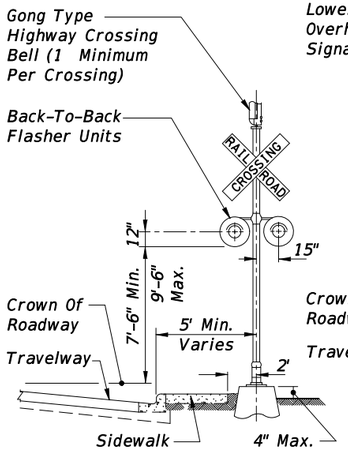


OBTUSE ANGLE

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.*
5. *When a cantilevered-arm flashing-light signal is used, the minimum vertical clearance shall be 17' from above the Crown of Roadway to the Lowest Point of the Overhead Signal Unit.*



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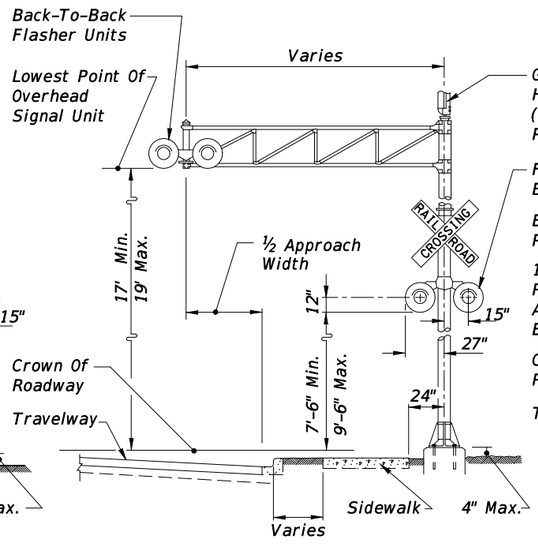

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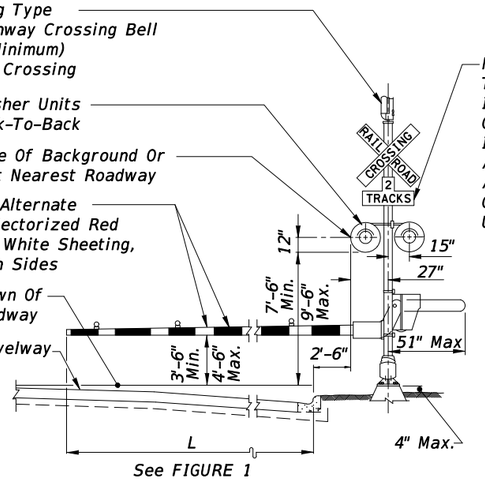
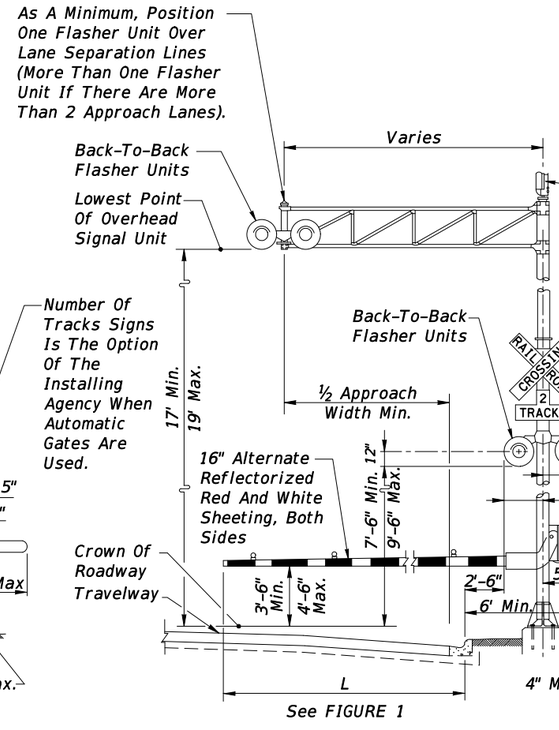
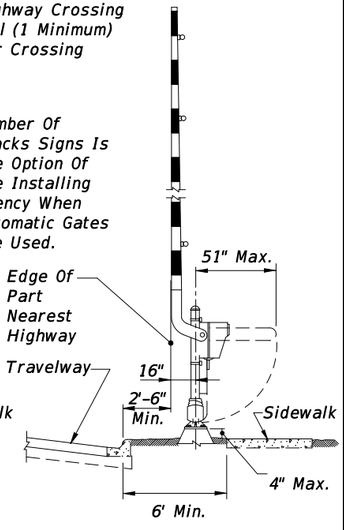


TYPE III



TYPE IV



TYPE V

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SA	Added description for Lowest Point of Overhead Signal Unit & changed dimension from 57" Max. to 51" Max. for Types III, IV & V			

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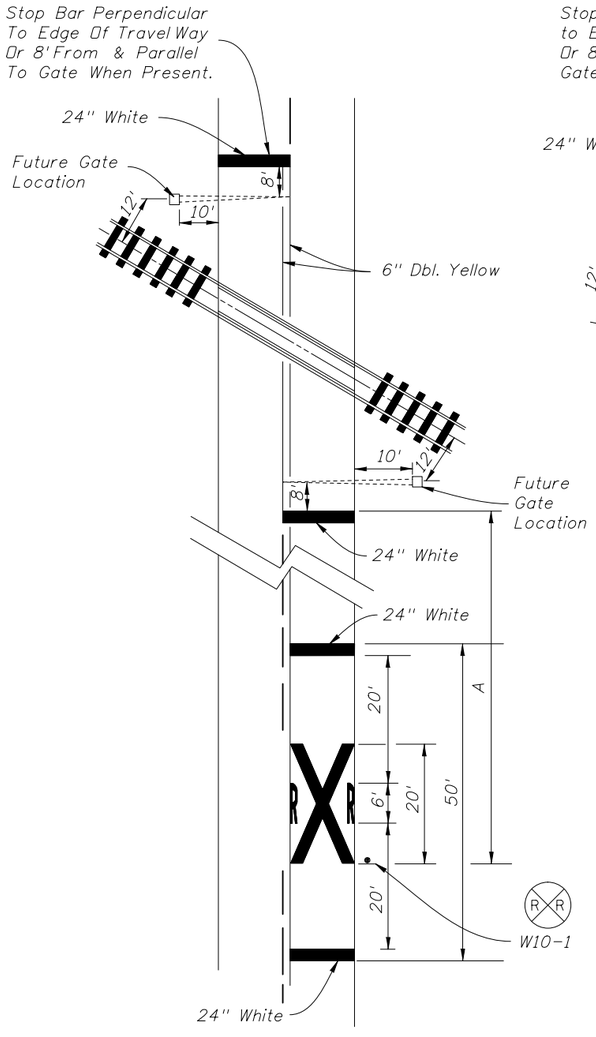
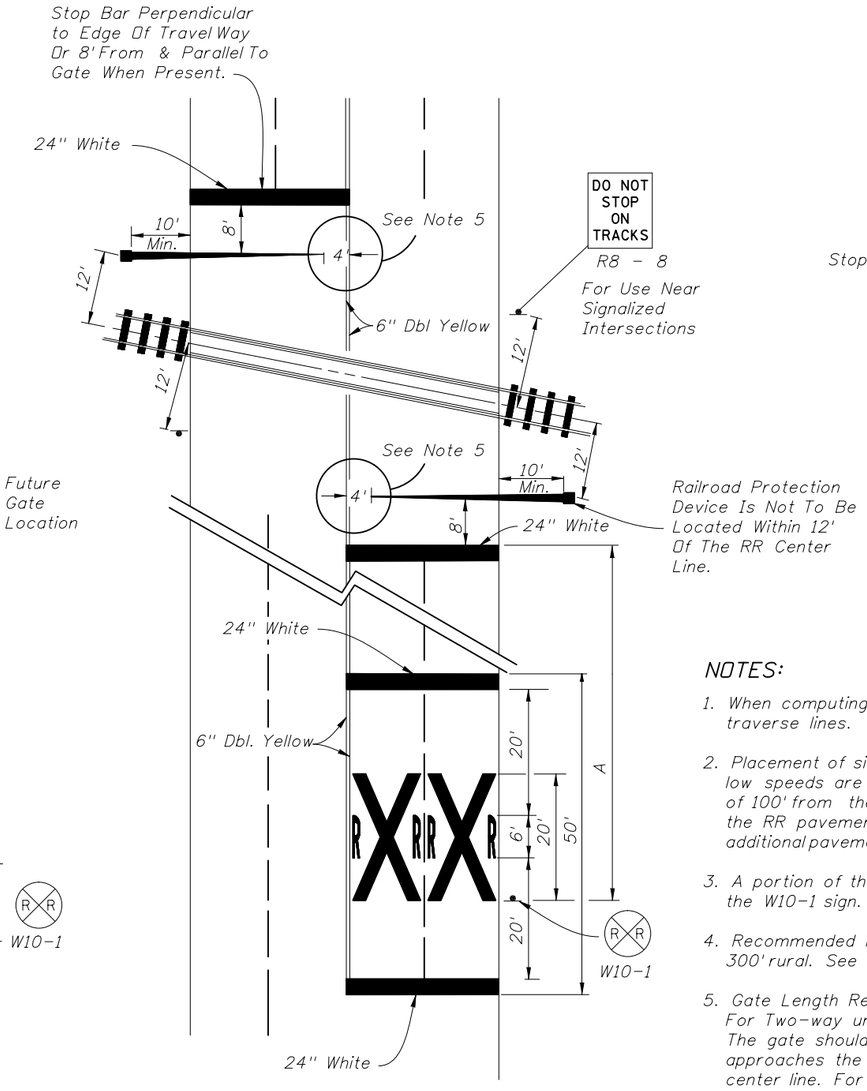
17882	

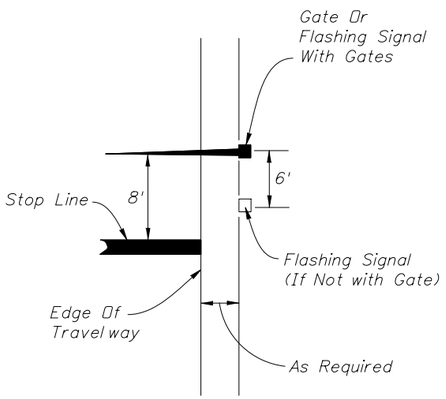
RAILROAD CROSSING AT TWO (2)-LANE ROADWAY

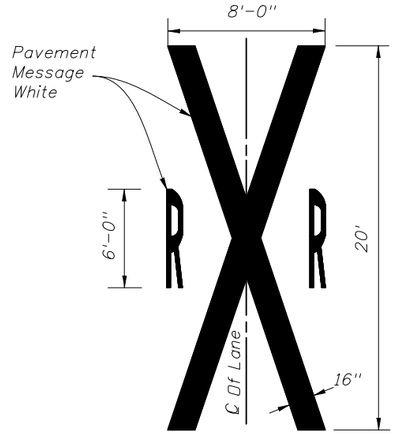


RAILROAD CROSSING AT MULTILANE ROADWAY



RELATIVE LOCATION OF CROSSING TRAFFIC CONTROL DEVICES



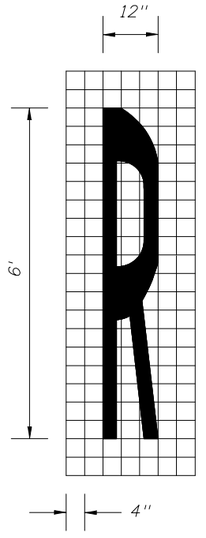


SPEED MPH	" A " IN FT.
60	400
55	325
50	250
45	175
40	125
35	100
URBAN	85 MIN.

NOTES:

1. When computing pavement message, quantities do not include traverse 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 RR pavement message and the tracks an additional W10-1 sign and additional pavement message should be used.
3. A portion of the pavement markings symbol should be directly opposite the W10-1 sign.
4. Recommended location for FTP-61-06 or FTP-62-06 signs, 100' urban and 300' rural. See Index 17355 for sign details.
5. Gate Length Requirements:
   For Two-way undivided sections:
   The gate should extend to within 1' of the center line. On multiple 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'.

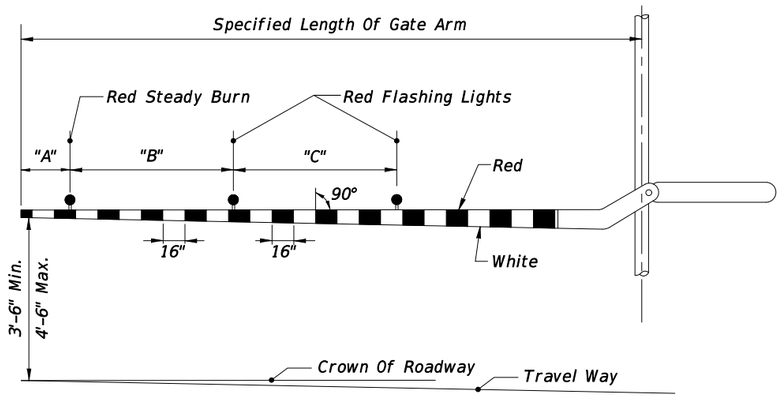


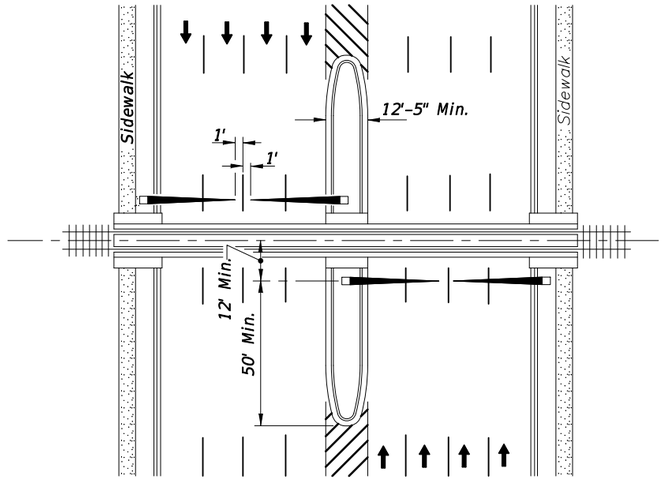
2010 Interim Design Standard

RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES

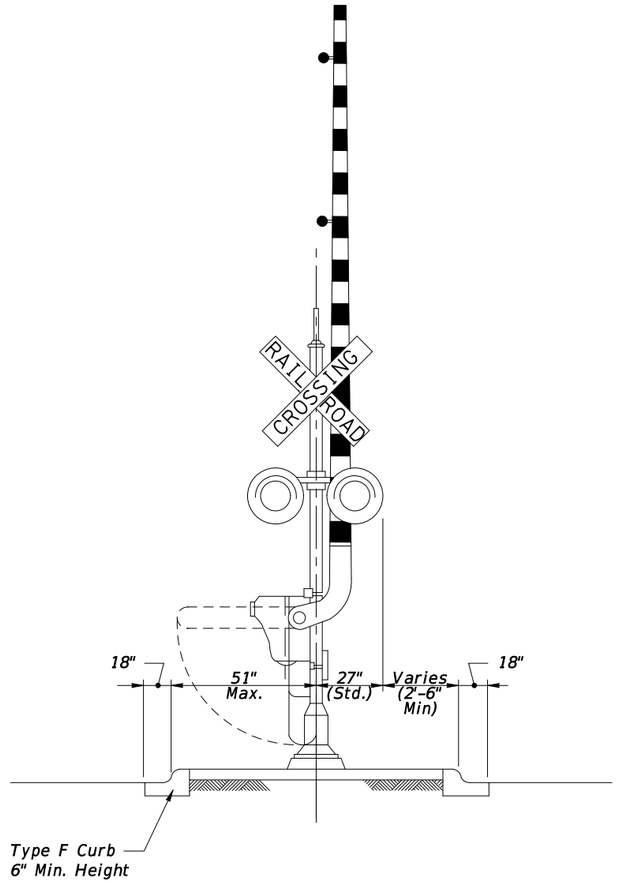
Interim Date 07/01/10 | Sheet No. 3 of 4

Index No. 17882





PLAN



MEDIAN SECTION AT SIGNAL GATES

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'

NOTE:
For additional information see the "Manual On Uniform Traffic Control Devices", Part 8; The "Traffic Control Handbook" , Part VIII; and AASHTO "A Policy On Geometric Design Of Streets And Highways".

MEDIAN SIGNAL GATES FOR MULTILANE UNDIVIDED URBAN SECTIONS (THREE OR MORE DRIVING LANES IN ONE DIRECTION, 45 MPH OR LESS)

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SA	Updating dimensions and striping on gate arm per MUTCD			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

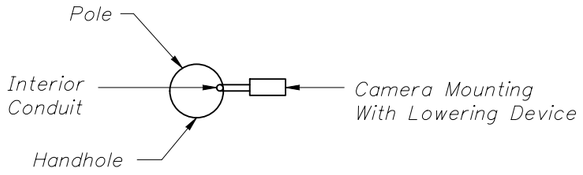
2010 Interim Design Standard

RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES

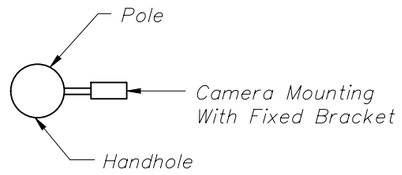
Interim Date 01/01/11

Sheet No. 4 of 4

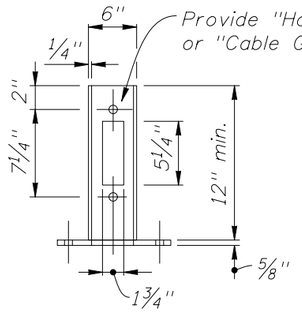
Index No. 17882



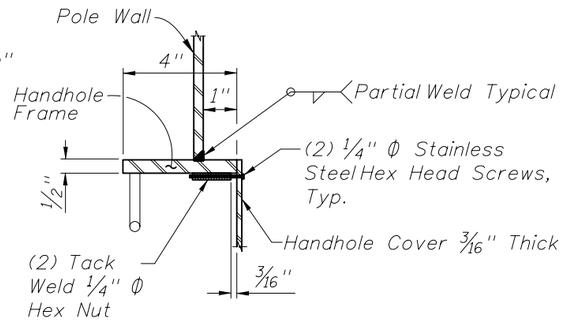
ORIENTATION VIEW



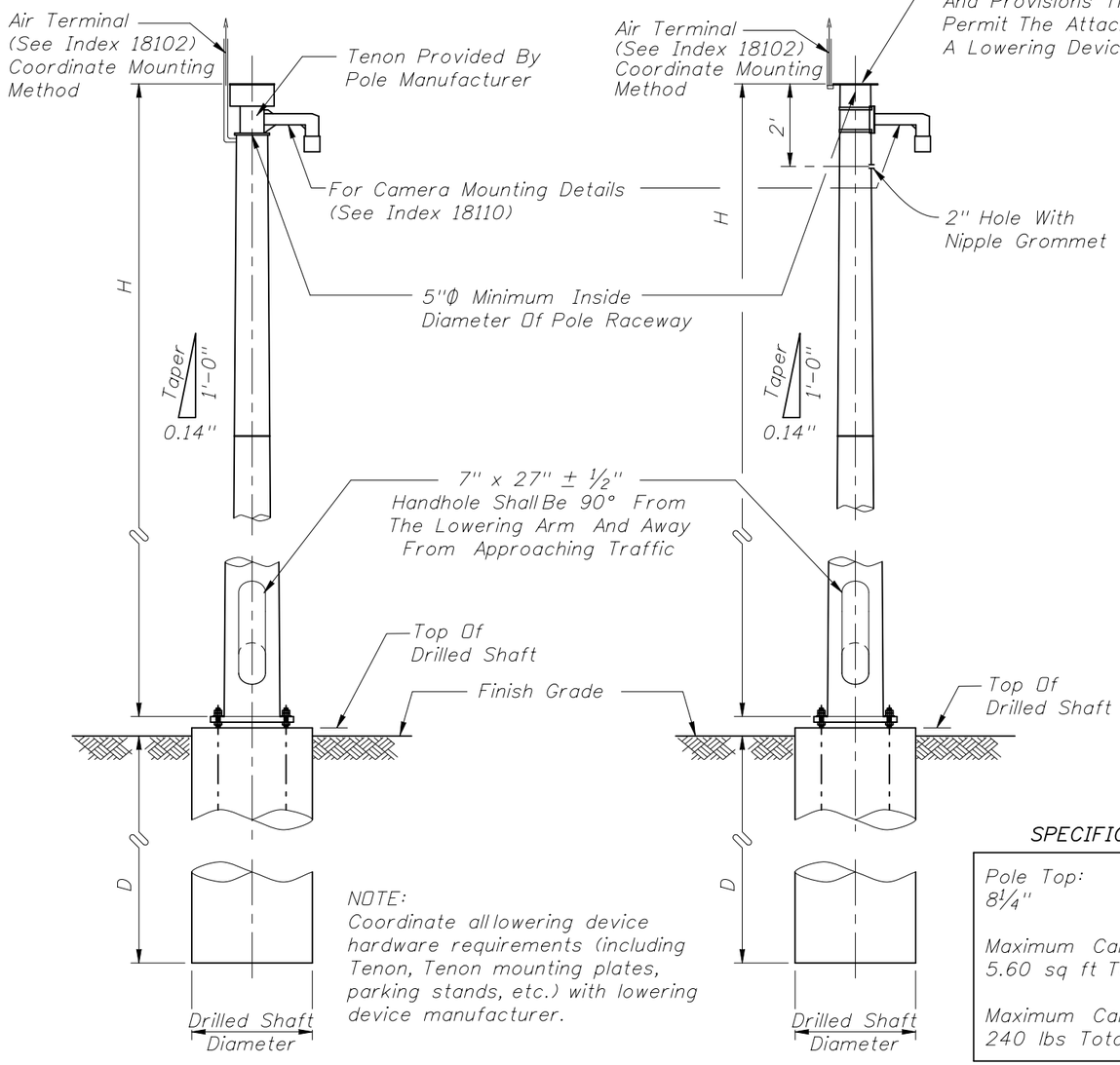
ORIENTATION VIEW



TENON DETAIL

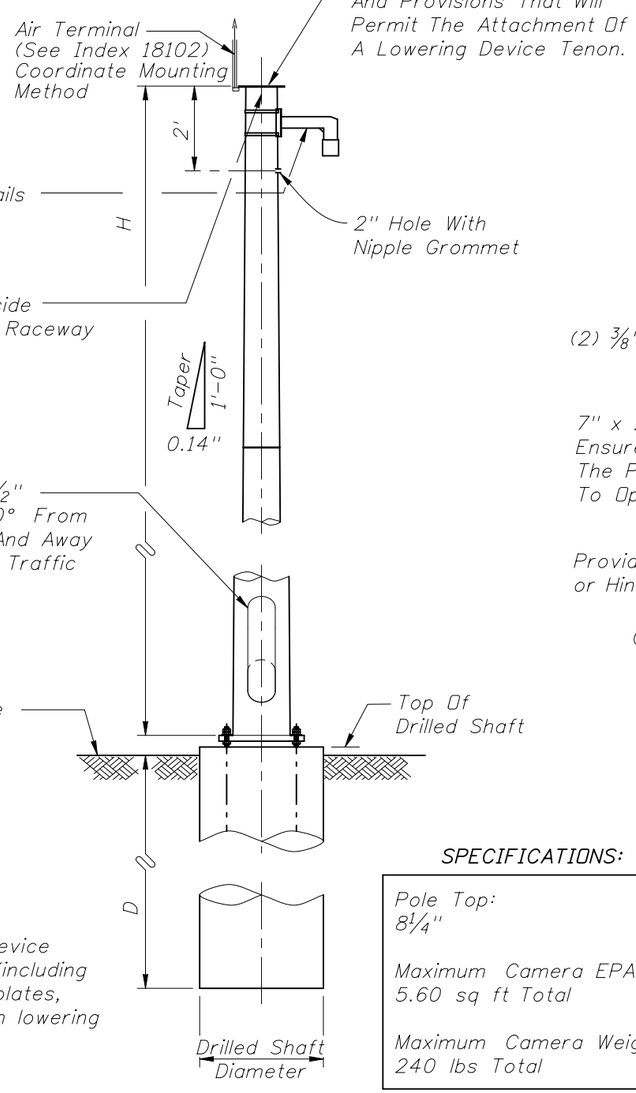


SECTION A-A



NOTE:
Coordinate all lowering device hardware requirements (including Tenon, Tenon mounting plates, parking stands, etc.) with lowering device manufacturer.

WITH LOWERING DEVICE



WITHOUT LOWERING DEVICE

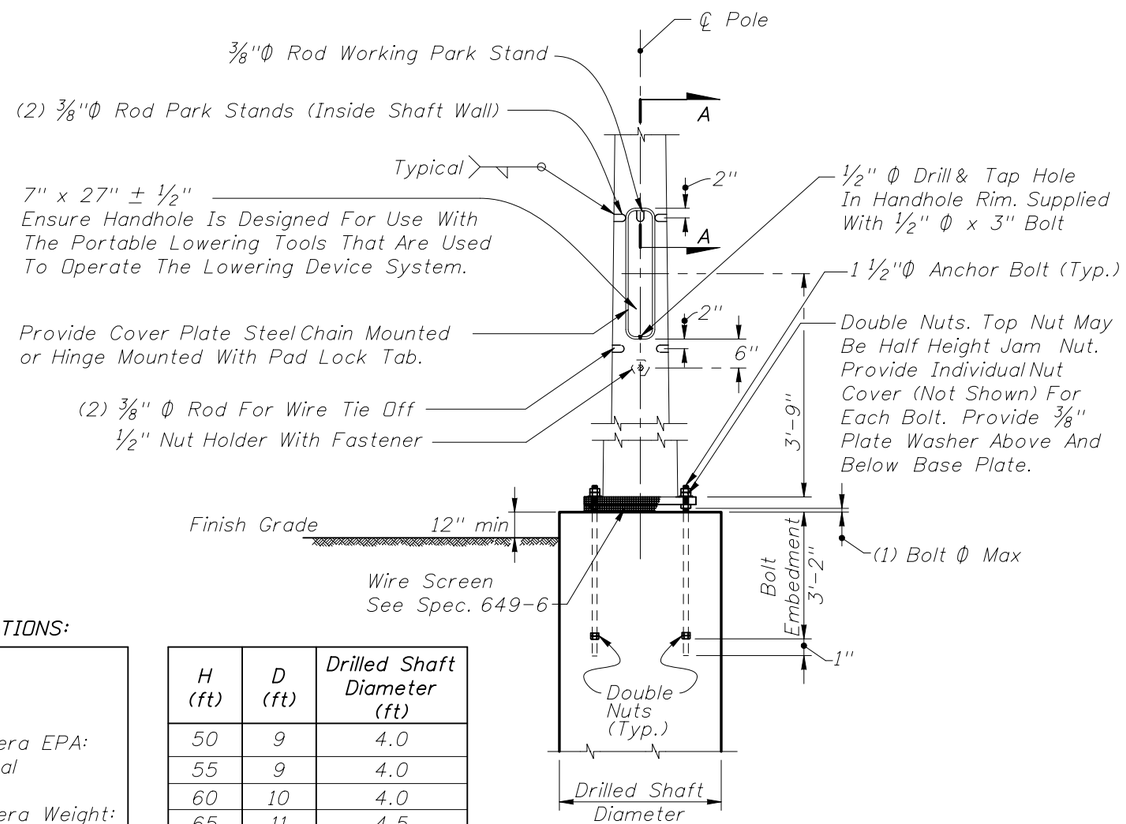
SPECIFICATIONS:

Pole Top:
8 1/4"

Maximum Camera EPA:
5.60 sq ft Total

Maximum Camera Weight:
240 lbs Total

H (ft)	D (ft)	Drilled Shaft Diameter (ft)
50	9	4.0
55	9	4.0
60	10	4.0
65	11	4.5
70	11	4.5



FOUNDATION AND HANDHOLE DETAIL

Not To Scale

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	RM	FOUNDATION AND HANDHOLE DETAIL, Changed Plate Washer requirements.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

STEEL CCTV POLE

Interim Date 01/01/11

Sheet No. 1 of 2

Index No. 18111

DESIGN NOTES:

Design according to FDOT Structures Manual.

Maximum 1" deflection in 40mph wind (3 second gust).

Manufacturers seeking approval for inclusion on the Qualified Products List (QPL) must submit a QPL Production Application along with design documentation and drawings showing pole and foundation meet all specified requirements of this Standard. Provide documentation that certifies and demonstrates that pole is designed to accommodate and be compatible with a lowering device listed on the Approved Product List.

Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).

Foundation materials:

Reinforcing Steel: ASTM A615 Grade 60
Concrete: Class IV (Drilled Shaft) with a minimum 4,000 psi compressive strength at 28 days for all environment classifications.
Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade A heavy-hex nuts.
ASTM F436 Type 1 washers.
ASTM F2329 galvanization.

Foundation design based upon the following soil criteria:
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 other purposes may be used to confirm the assumed soil properties.

INSTALLATION NOTES:

Cable Supports: Electrical Cable Guides and Eyebolts.
Locate top and bottom electrical guides within the pole aligned with each other.
Position one cable guide 2" below the handhole.
Position other cable guide 1" directly below the top of the tenon.
Position eyebolt 2-3/4" below the top of the handhole.
Install pole plumb.

Lowering Device Installation Notes:

Design tenon dimensions to facilitate lowering device component installation. Locate slots parallel to the pole centerline for mounting the lowering device. Bolt a tenon to the pole top with mounting holes and slot as required for the mounting of the lowering device.

Place the lowering cable that moves within the pole in an interior conduit to prevent it from tangling or interfering with any electrical wire that is in the pole. Ensure that any electrical wire within the pole is routed securely and free from slack.

Mount lowering arm perpendicular to the roadway or as shown in the plans. Position CCTV pole so that the camera can be safely lowered without requiring lane closures.

POLE GENERAL NOTES:

16 sided or more or round.
Tapered 0.14 inches per foot.
Transverse welds only allowed at the base.
One or Two sections (with telescopic field splice) is allowed.
No laminated tubes.
Only one longitudinal seam weld permitted.
Longitudinal seam welds within 6" 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. All other areas, size the partial penetration welds to at least 60% of the pole tube thickness.
Identification tag:

Aluminum, secured to pole with stainless steel screws.
Locate inside pole and visible from handhole.
Provide Financial Project ID, pole height, manufacturer's name, QPL Number, F_y of Steel and Base Wall Thickness.

Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).

Refer to Index No. 18108 for conduit and cabinet mounting details.

Provide fourteen #11 longitudinal bars for 4'-0" diameter drilled shafts and sixteen #11 longitudinal bars for 4'-6" diameter drilled shafts. Provide seven #5 stirrups spaced at 4" from the top of the drilled shaft and #5 stirrups spaced at 1'-6" (max.) for the rest of drilled shaft. Provide 4" cover for the top of drilled shaft and 6" cover for sides and bottom. Coordinate anchor bolt design with the shaft reinforcement and CSL tube details.

POLE SPECIFICATIONS:

ASTM A1011 Grade 50, 55, 60 or 65 (less than 1#4")or
ASTM A572 Grade 50, 60 or 65 (greater than 1#4")or
ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
Steel Plates and Pole Cap: ASTM A36.
Weld Metal: E70XX.
Bolts: ASTM A325, Type 1.
Handhole frame: ASTM A709 Grade 36 or ASTM A36.
Handhole cover: ASTM A1011 Grade 50, 55, 60 or 65.
Stainless steel screws: AISI Type 316.
Galvanization:

Nuts, bolts and washers: ASTM F2329.
All other steel: ASTM A123.

One hundred percent of full-penetration groove welds and a random 25% of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CH	Removed QPL language from sheet.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

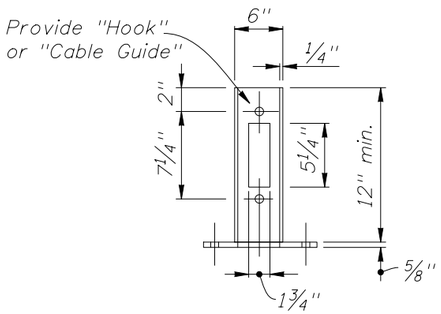
2010 Interim Design Standard

STEEL CCTV POLE

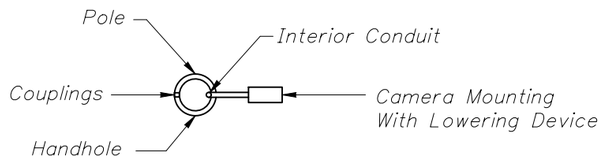
Interim Date 01/01/11

Sheet No. 2 of 2

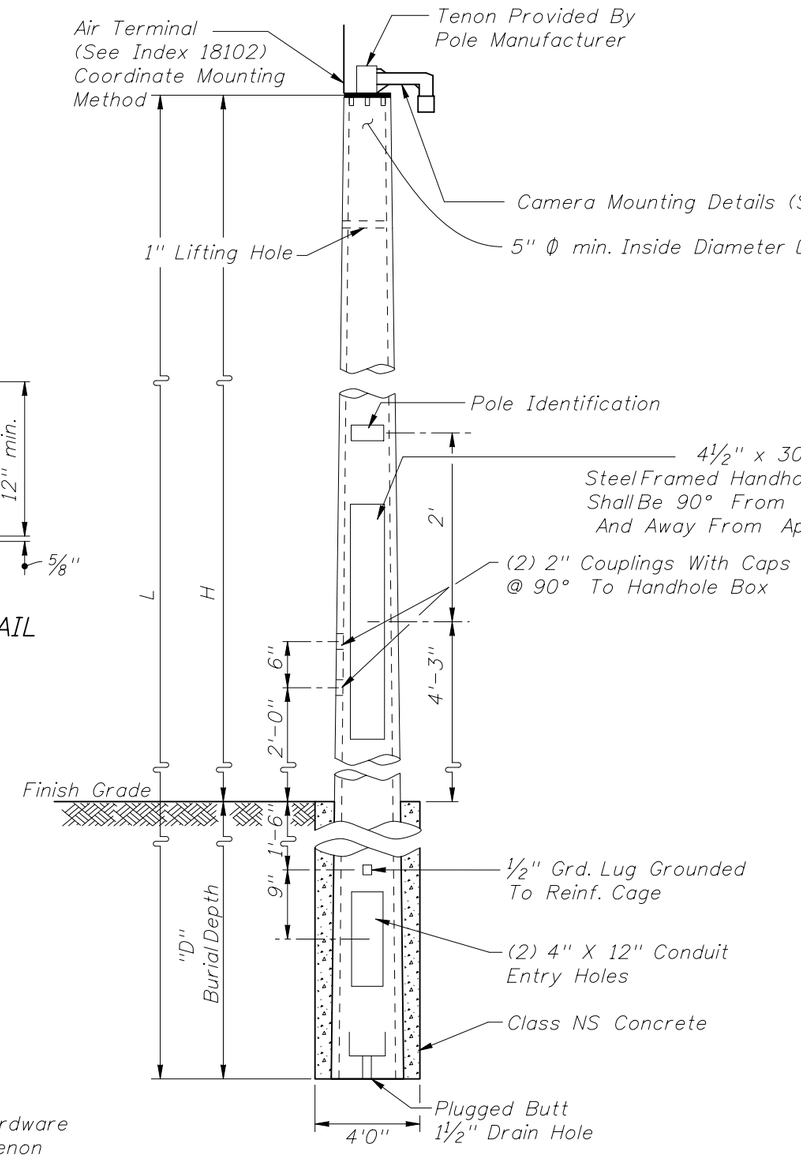
Index No. 18111



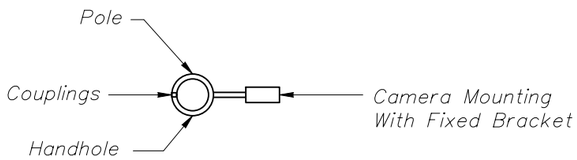
TENON DETAIL



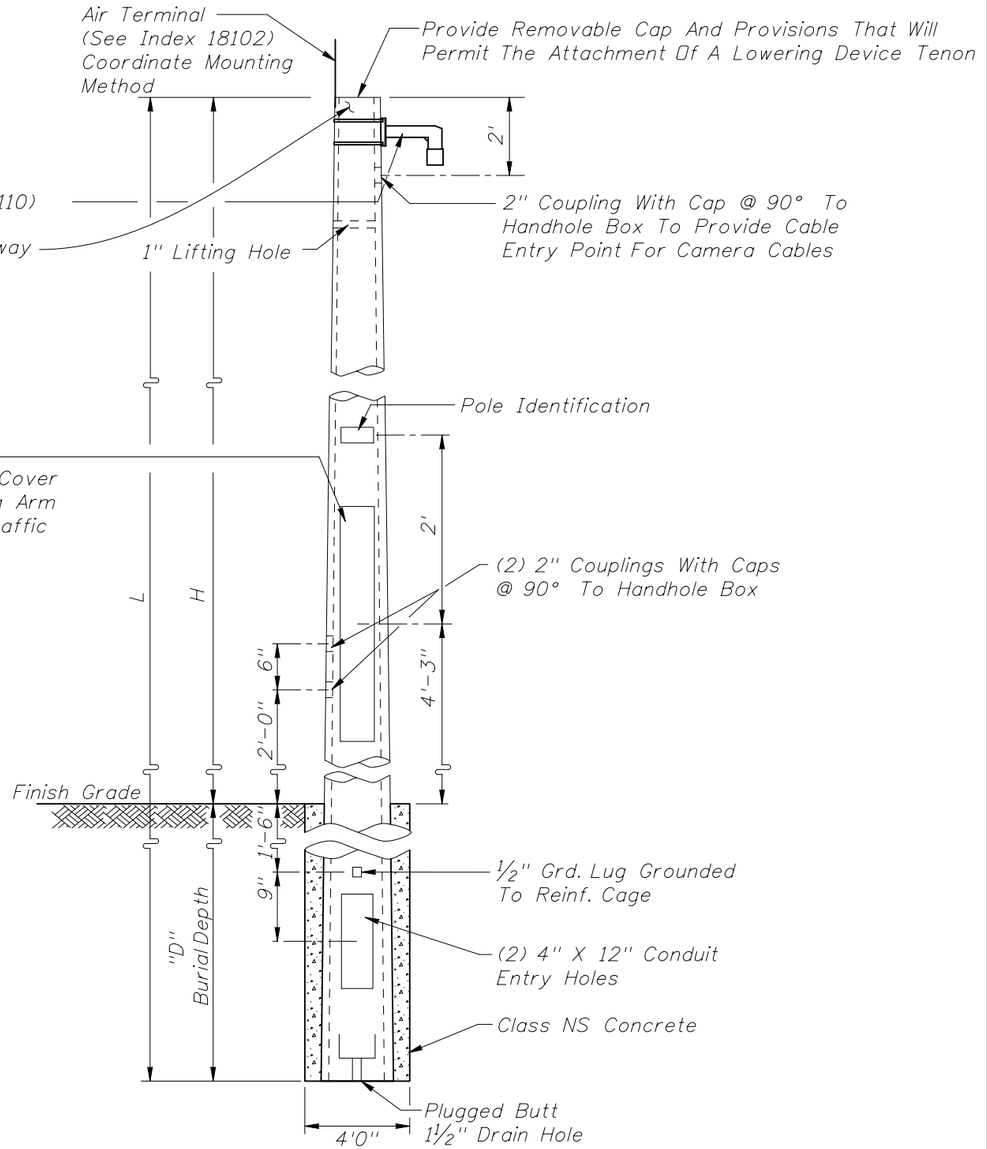
ORIENTATION VIEW



WITH LOWERING DEVICE



ORIENTATION VIEW



WITHOUT LOWERING DEVICE

NOTE:
Coordinate all lowering device hardware requirements (including Tenon, Tenon mounting plates, parking stand, etc.) with lowering device manufacturer.

Not To Scale

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	RM	Revised location of couplings.			

2010 Interim Design Standard

CONCRETE CCTV POLE

Interim Date 01/01/11

Sheet No. 1 of 2

Index No. 18113

GENERAL NOTES:

Design according to FDOT Structures Manual current edition.

Manufacturers seeking approval for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Standard. Provide documentation that certifies and demonstrates that the pole is designed to accommodate and be compatible with a lowering device listed on the Approved Product List.

Place prestressing symmetrically about both axis.

Use Class V Special Concrete or Class VI Concrete with 4 ksi minimum strength of transfer.

Use ASTM A615 Grade 60 reinforcing steel. Provide a minimum of non-prestressed reinforcement equal to 0.33% of the concrete area.

Use ASTM A416 Grade 270 stress relieved or low-lax prestressing strands.

One turn required for spiral splices and two turns required at the top and bottom of poles. Manufacture spirals from cold-drawn ASTM A82 steel wire.

Identify poles as to manufacturer, pole length, certification number and QPL 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.

Provide a 1" minimum cover.

Foundation design based upon the following soil criteria:

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 other purposes may be used to confirm the assumed soil properties.

LOWERING DEVICE INSTALLATION NOTES:

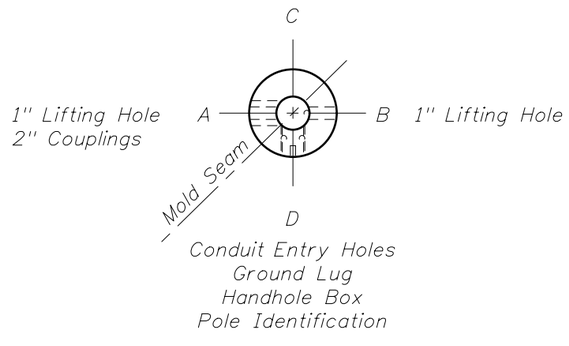
Design tenon dimensions to facilitate lowering device component installation. Locate slots parallel to the pole centerline for mounting the lowering device. Bolt a tenon to the pole top with mounting holes and slot as required for the mounting of the lowering device.

Place the lowering cable that moves within the pole in an interior conduit to prevent it from tangling or interfering with any electrical wire that is in the pole. Ensure that any electrical wire within the pole is routed securely and free from slack.

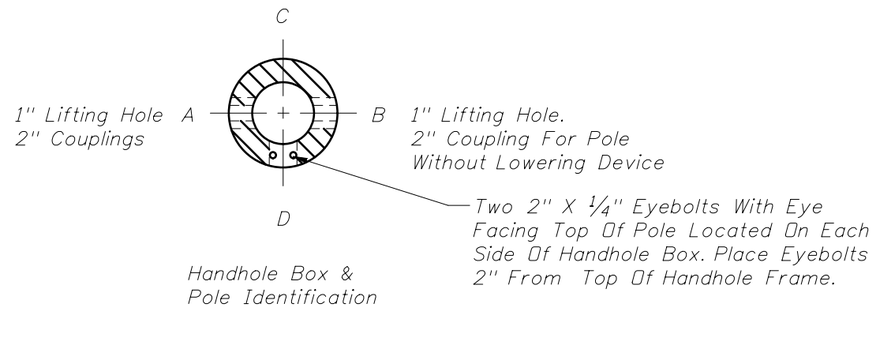
Mount lowering arm perpendicular to the roadway or as shown in the plans. Position CCTV pole so that the camera can be safely lowered without requiring lane closures.

SPECIFICATIONS:

Pole Top:	10 ½" Diameter minimum
Pole Taper:	0.2 in./ft. nominal
Defl Spec:	1" max. In 40 mph Wind (3 second gust)
Max. Camera EPA:	5.60 sq. ft. Total
Max. Camera Wgt:	240 lbs. Total



TOP VIEW



SECTIONAL VIEW THROUGH HAND HOLE BOX

L (ft)	H (ft)	D (ft)
63	50	13
69	55	14
75	60	15
80	65	15
86	70	16

Not To Scale

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	RM	Revised Pole Burial Depth Table.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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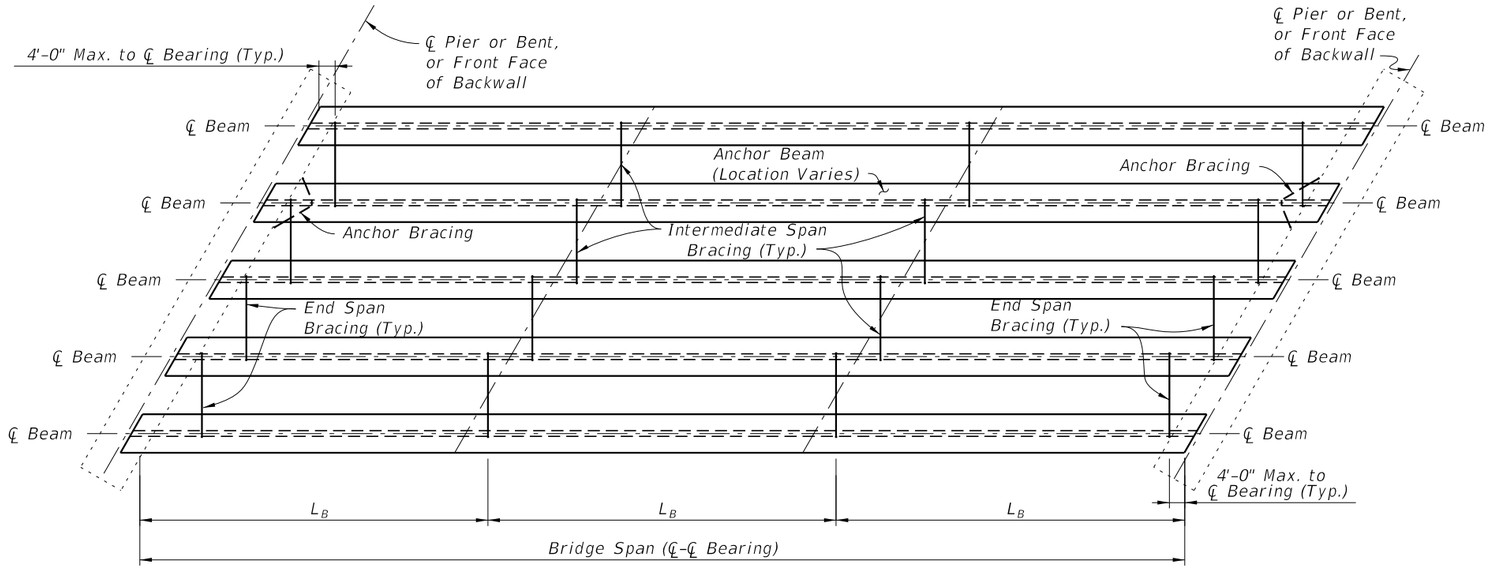
CONCRETE CCTV POLE

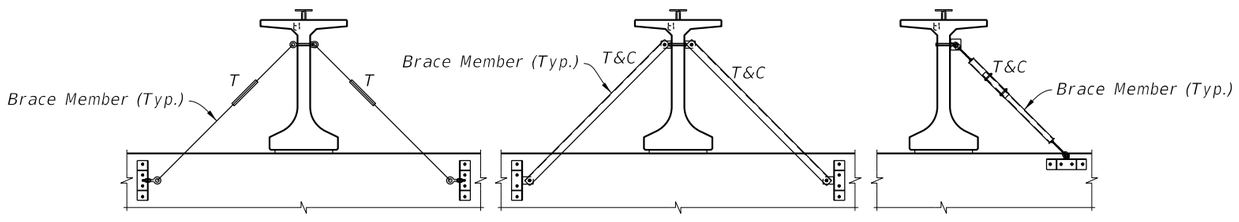
Interim Date 01/01/11

Sheet No. 2 of 2

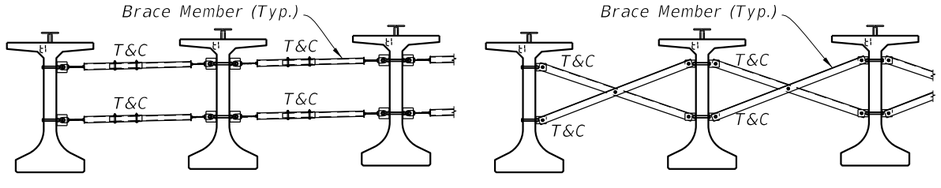
Index No. 18113



PRESTRESSED BEAM TEMPORARY BRACING PLAN VIEW
(Skewed Condition Shown, Non-skewed Condition Similar)



EXAMPLE ANCHOR BRACING TYPICAL SECTIONS
(Beam Ends Only)



EXAMPLE END SPAN/INTERMEDIATE BRACING TYPICAL SECTIONS

NOTES:

1. *The 'PRESTRESSED BEAM TEMPORARY BRACING PLAN' is to be used in conjunction with the 'TABLE OF TEMPORARY BRACING VARIABLES' in the Structures Plans. The brace locations and quantities shown in the plan view are schematic only, and the actual brace locations and quantities should be determined from the 'TABLE OF TEMPORARY BRACING VARIABLES' in the Structures Plans.*

2. *The bracing members shown in the sections are schematic only, and are meant to show geometry in which bracing should be placed. The bracing members and connections shall be designed and detailed by the Contractor. Any of the geometric configurations shown in the bracing sections are acceptable. The bracing may be attached through the web or to the flanges of the beam, as necessary. The bracing shall be positively and securely connected to each beam, and shall not be designed to exert any vertical force on the outer edge of the top flange. All bolt holes in beams are to be preformed and filled after use. All bracing is to be placed perpendicular to beams.*

3. *The anchor beam is a beam which has anchor bracing at its support locations. It is to be set first, and its location may vary. All subsequent beams are to be braced against the Anchor Beam sequentially. The Anchor brace may be located at an exterior girder provided that all required bolt clear distances are met and overhang bracing is not impacted. Anchor bracing may be inclined, as shown in the plan view, or may be installed vertically.*

4. *Overhang bracing requirements are neither specified here nor in the 'TABLE OF TEMPORARY BRACING VARIABLES.' It is the Contractor's responsibility to design overhang bracing which does not cause excessive deflection or rotation of the exterior girder, or cause the girder stresses to exceed stress limits per the FDOT Structures Manual.*

5. *The Contractor shall submit documentation required by the Specifications for Road and Bridge Construction, Section 5 for 'Beam and Girder Temporary Bracing.' If the Contractor elects to use the bracing requirements shown in the 'TABLE OF TEMPORARY BRACING VARIABLES,' the documentation shall include signed and sealed certification that the construction loads do not exceed those shown in the 'TABLE OF ASSUMED CONSTRUCTION LOADS' and signed and sealed design of bracing members and connections. If the Contractor elects to use a bracing scheme different from those shown in the 'TABLE OF TEMPORARY BRACING VARIABLES,' the documentation shall include signed and sealed calculation of the bracing requirements and design of bracing members and connections.*

LEGEND:

T = Tension Member
T&C = Tension & Compression Member

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Added "I-" to title.			

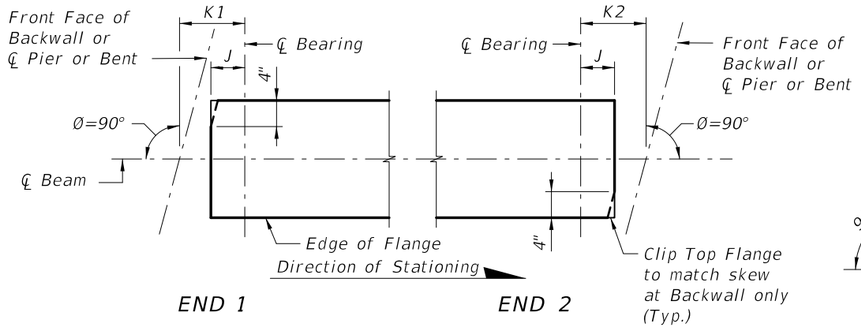
2010 Interim Design Standard

PRESTRESSED I-BEAM TEMPORARY BRACING

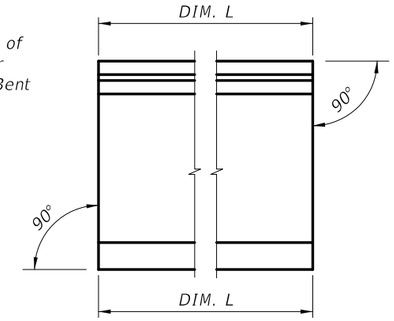
Interim Date 01/01/11

Sheet No. 1 of 1

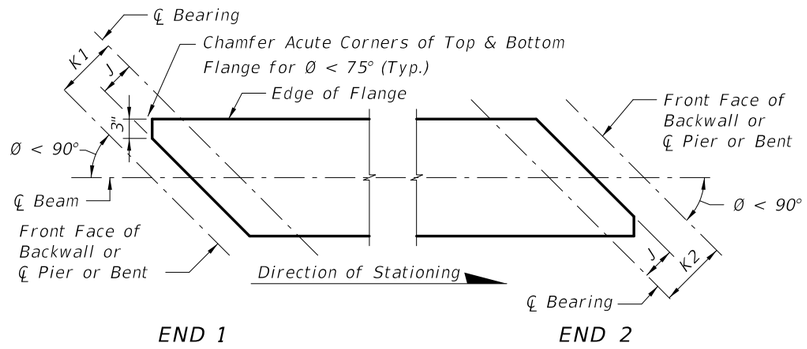
Index No. 20005



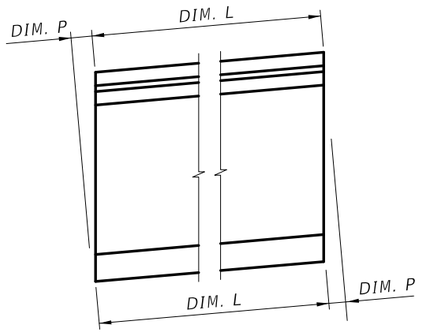
CASE 1
(Standard Orientation for New Construction)



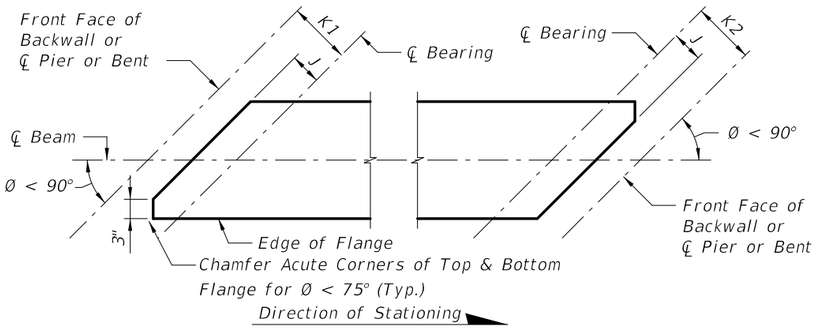
CONDITION 1
(P = 0.0)



CASE 2
(Special Orientation for Widenings)

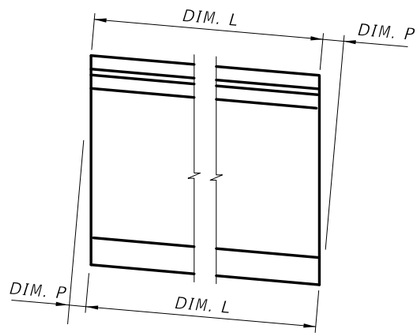


CONDITION 2



CASE 3
(Special Orientation for Widenings)

SCHEMATIC PLAN VIEWS AT BEAM ENDS



CONDITION 3

SCHEMATIC END ELEVATIONS OF BEAMS
(Showing Vertical Bevel of Beam End)

BEAM NOTES

1. All bar dimensions are out-to-out.
2. Place one (1) Bar 5K or 5Z at each location as detailed alternating the direction of the ends for each bar (see "ELEVATION AT END OF BEAM", Index Nos. 20036, 20045, 20054, 20063, 20072 and 20078).
3. Strands N shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands $\frac{3}{8}$" Ø or larger, stressed to 10,000 lbs. each.
4. Cut wedge to recess Prestressing Strands at the end of the beam after detensioning without damaging the surrounding concrete. See STRAND RECESS DETAIL on Sheet 2.
5. Epoxy coat ends of beams, including clipped and chamfer surfaces, with two layers of Type F-1 epoxy compound within 7 days of detensioning. Prepare concrete surface and apply in accordance with the manufacturer's recommendations. The finish thickness of the epoxy coating must be a minimum $\frac{1}{16}$".
6. Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2".
7. At the Contractor's option, welded deformed wire reinforcement may be used in lieu of Bars 3D, 5K, 4M, and 5Z as shown on the Standard Details for each beam size. Welded deformed wire reinforcement shall conform to AASHTO M221, with a minimum yield strength of 75 ksi.
8. Install Safety Sleeves approximately 2'-0" from ends of beam and spaced on 8'-0" (Max.) centers. Safety Sleeves shall be 2$\frac{1}{2}$" NPS x 5" Sch. 40 PVC Pipe with Cap. Holes shall be free of debris and water prior to casting deck.
9. For beams with skewed end conditions, the end reinforcement, defined as Bars 3C1, 3C2, 3D1, 3D2, 5K, 4M1, 4M2, 5Y and 5Z placed within the limits of the spacing for Bars 3C in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 3D3, 5K and 4M3 located beyond the limits of Bars 3C shall be placed perpendicular to the longitudinal axis of the beam. Fan Bars as needed to avoid overlapping bars at the transition to Bars 3D3 and 4M3, and field cut to maintain minimum cover. Provide additional Bars 4M1, 4M2, 3D1 and 3D2 as required; additional bars are not included in the Number Required on the "BILL OF REINFORCING STEEL". For placement locations, see "SKEWED BEAM END DETAILS". Adjust the dimensions of Bars 3C1, 3C2, 3D1, 3D2, 4M1 and 4M2 as shown on the "BENDING DIAGRAM" for skewed end conditions.
10. Placement of Bars 3C1, 3D1 and 4M1 correspond to END 1, and Bars 3C2, 3D2 and 4M2 correspond to END 2. END 1 and END 2 are shown on the beam "ELEVATION".
11. For Beams with vertically beveled end conditions, place first row of Bars 3C1, 3C2, 3D1, 3D2, 5K, 5Y and 5Z parallel to the end of the beam. Progressively rotate remaining bars within the limits of Bars 5Z until vertical by adjusting the spacing at the top of beam up to a maximum of 1". For welded deformed wire reinforcement, cut top cross wire and rotate bars as required or reduce end cover at top of the beam to minimum 1".
12. For beams with skewed end conditions, welded deformed wire reinforcement shall not be used for end reinforcement (Bars 3D1, 3D2, 4M1 and 4M2) .
13. Bars 5K and 5Z shall be placed and tied to the fully bonded strands in the bottom or center row (see "STRAND PATTERN" on the Table of Beam Variables in Structures Plans). At the Contractor's option the length of the bottom legs of Bars 5K and 5Z may be extended to facilitate tying to the exterior strands. For welded deformed wire reinforcement, supplemental transverse #4 bars are permitted to support Pieces K & S under the cross wires on the bottom row of strands.
14. At the Contractor's option, Bars 3D1, 3D2 and 3D3 may be fabricated as a single bar with a 1'-0" minimum lap splice of the top legs, or the length of the bottom legs may be extended to facilitate tying to the exterior strands.
15. For referenced Dimensions, Angles and Case Numbers, see the Table of Beam Variables in Structures Plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard			
07/01/10	SJN	Changed SCHEMATIC PLAN VIEWS AT BEAM ENDS, Notes 3, 4, and 5. Deleted INSTRUCTIONS TO DESIGNER.			
01/01/11	GJM	Changed Note 4.			

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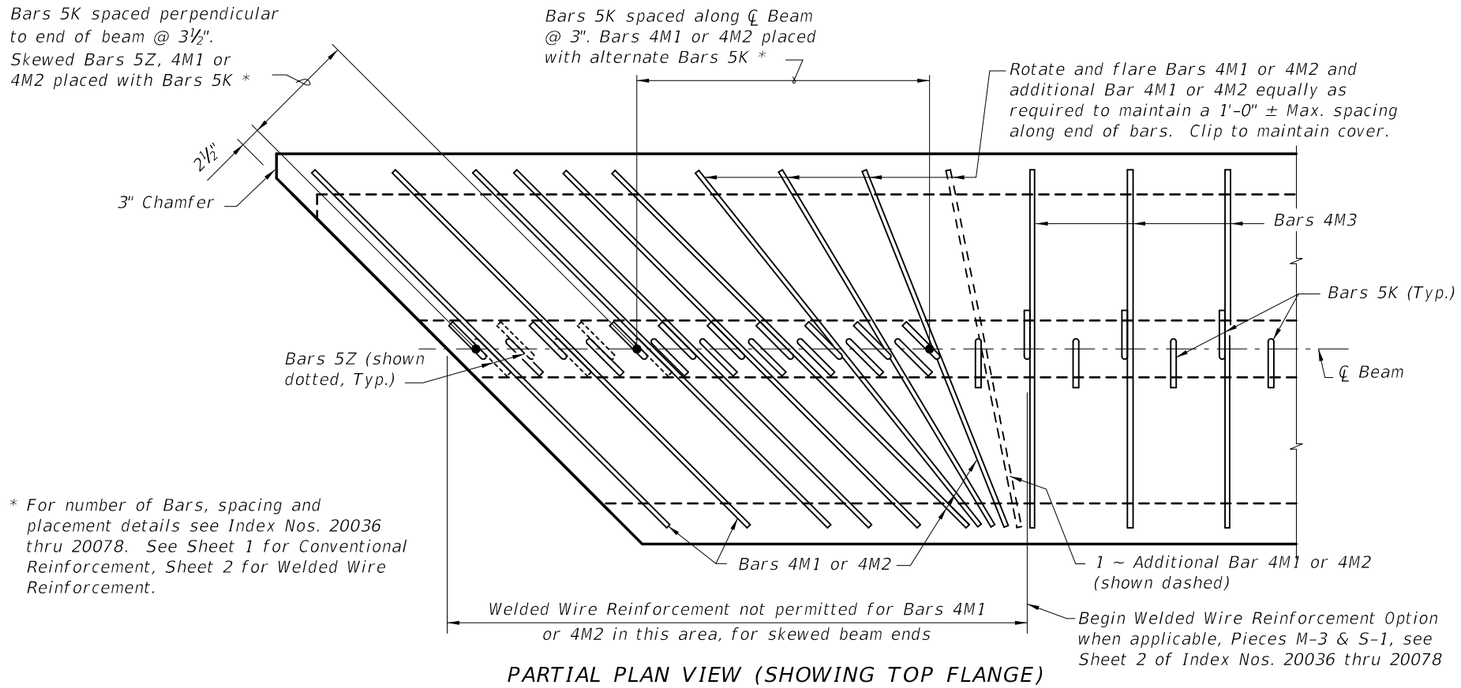
TYPICAL FLORIDA-I BEAM DETAILS AND NOTES

Interim Date 01/01/11

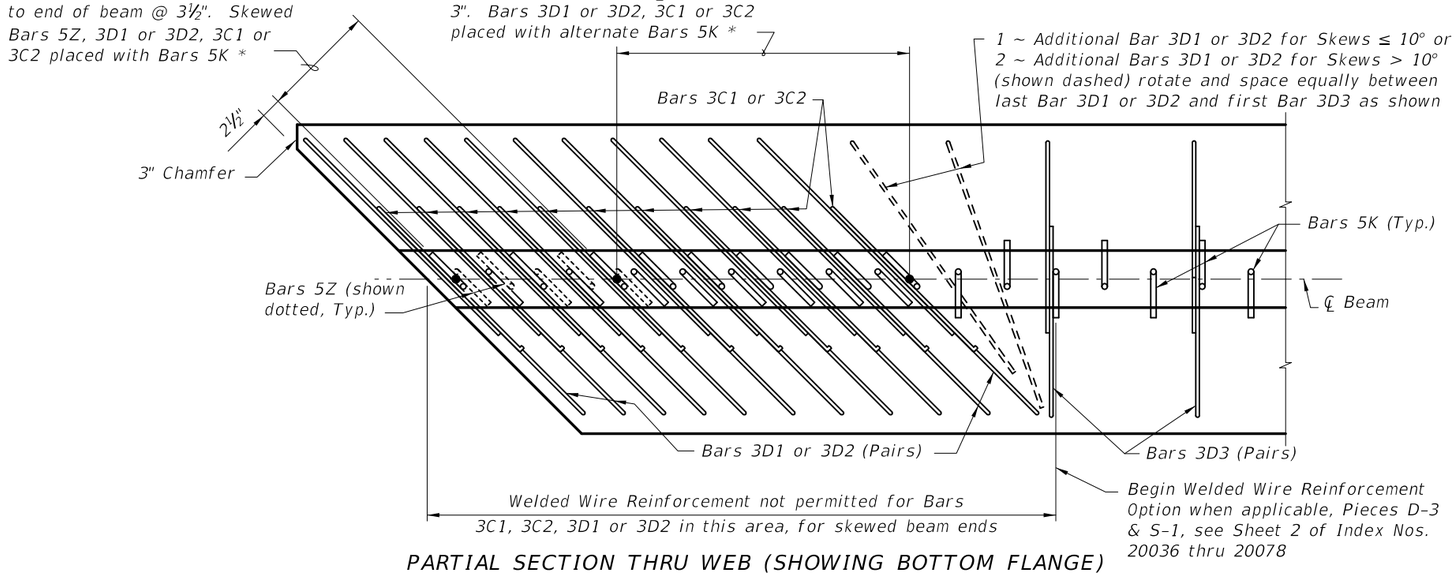
Sheet No. 1 of 2

Index No. 20010



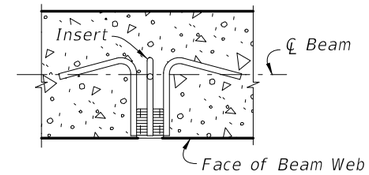
* For number of Bars, spacing and placement details see Index Nos. 20036 thru 20078. See Sheet 1 for Conventional Reinforcement, Sheet 2 for Welded Wire Reinforcement.

PARTIAL PLAN VIEW (SHOWING TOP FLANGE)
(End 1 Shown, End 2 Similar)
(Bars 5A, 4L, 5Y & Strands N not shown for clarity)



PARTIAL SECTION THRU WEB (SHOWING BOTTOM FLANGE)
(End 1 Shown, End 2 Similar)
(Bars 4L, Bars 5Y & Strands not shown for clarity)

SKEWED BEAM END DETAILS FOR WIDENING EXISTING BRIDGES
(Florida-I 36 Beam shown, others similar)

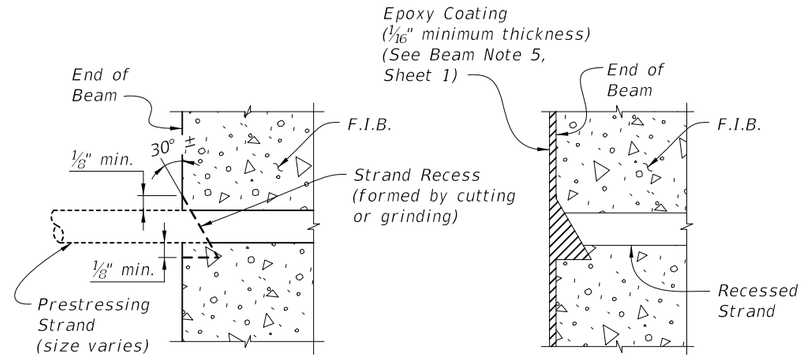


PLAN SECTION THRU BEAM WEB AT INSERT FOR DIAPHRAGM REINFORCING
(When Intermediate Diaphragms are Required by Design)

INSERT NOTES

1. Provide 1" Ø, zinc-electroplated, ferrule wing nut or coil inserts, UNC threads, 1/0 minimum gage wire, not more than 4" in depth with a minimum ultimate tensile strength of 11,400 lbs. in 4,000 p.s.i. concrete.
2. If inserts are needed on both sides (faces) of beam webs, an assembly as long as the thickness of the beam web, consisting of two (2) ferrule or coil inserts attached by two (2) or more struts may be utilized. The connecting struts shall have a minimum ultimate tensile strength of 11,400 lbs.
3. Inserts for diaphragm reinforcing are required at each end of each intermediate diaphragm shown on the Beam Framing Plan and may be required at the end of the beams when end diaphragms are shown. See Superstructure and Beam Framing Plans for longitudinal location of inserts for each face of beam.

INSERT DETAIL



TYPICAL SECTION SHOWING STRAND RECESS LIMITS

TYPICAL SECTION AFTER EPOXY COATING

STRAND RECESS DETAIL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard			
07/01/10	SJN	Added RECESSED STRAND GROMMET DETAIL AT BEAMS ENDS. Changed first sentence of INSERT NOTE 3.			
01/01/11	GJM	Changed STRAND RECESS DETAIL.			

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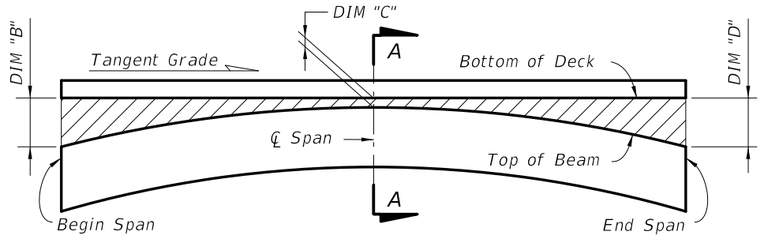
TYPICAL FLORIDA-I BEAM DETAILS AND NOTES

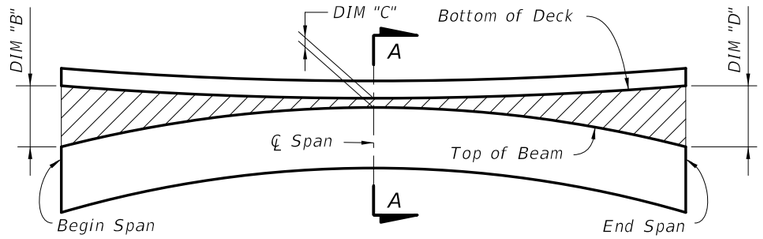
Interim Date 01/01/11

Sheet No. 2 of 2

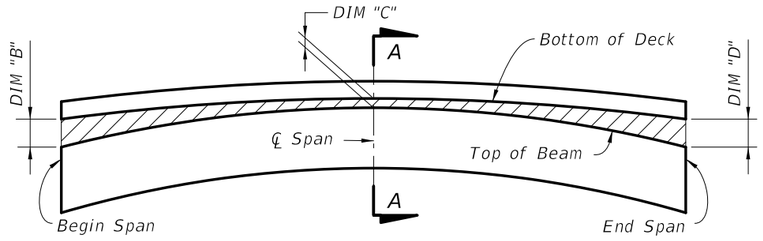
Index No. 20010



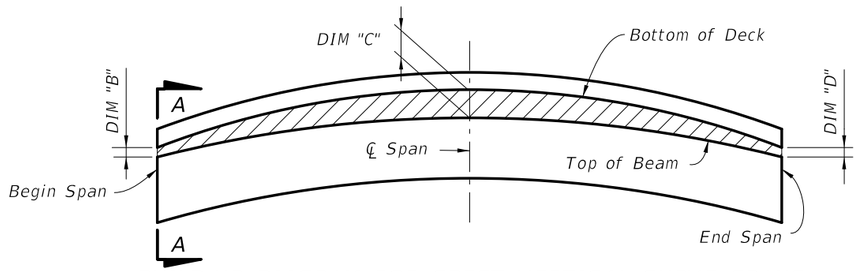
BUILD-UP DIAGRAM FOR TANGENT SPANS
(ALONG ℄ BEAM) (CASE 1)



BUILD-UP DIAGRAM FOR SAG VERTICAL CURVE SPANS
(ALONG ℄ BEAM) (CASE 2)



BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT ℄ SPAN
(ALONG ℄ BEAM) (CASE 3)

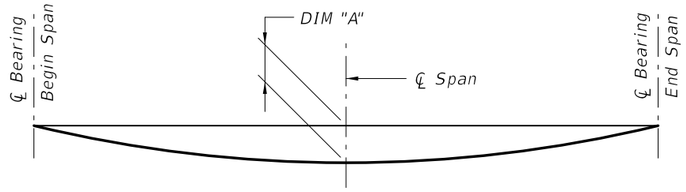


BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT BEGIN OR END SPAN
(ALONG ℄ BEAM) (CASE 4)

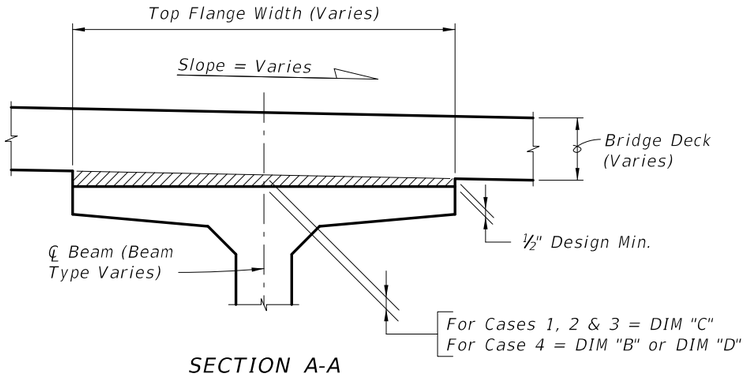
BEAM CAMBER AND BUILD-UP NOTES:

The build-up values given in the table are based on theoretical beam cambers. The Contractor shall monitor beam cambers for the purpose of predicting camber values at the time of the deck pour. If the predicted cambers based on field measurements differ more than +/- ½" from the theoretical "Net Beam Camber @ 120 Days" shown in the Data Table, obtain approval from the Engineer to modify the build-up dimensions as required. When the measured beam cambers create a conflict with the bottom mat of deck steel, notify the Engineer a minimum of 21 days prior to casting.

DIM "A" includes the weight of the Stay-In-Place Formwork.



DEAD LOAD DEFLECTION DIAGRAM



SECTION A-A
BUILD-UP OVER BEAMS

NOTE:
Work this Index with the Build-up and Deflection Data Table for AASHTO, Bulb-T and Florida-I Beams in Structures Plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	GJM	Added FLORIDA-I BEAMS to the Standard Title Block and Note. Changed the beam section to Florida-I Beam in the BUILD UP OVER BEAMS detail.	01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note. Added SECTION A-A location to BUILD-UP DIAGRAMS; Changed note at ℄ Beam in SECTION A-A.

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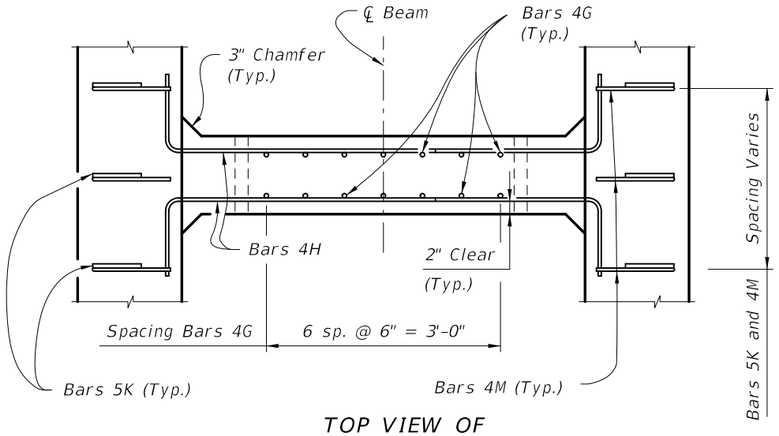
BUILD-UP & DEFLECTION DATA FOR AASHTO, BULB-T AND FLORIDA-I BEAMS

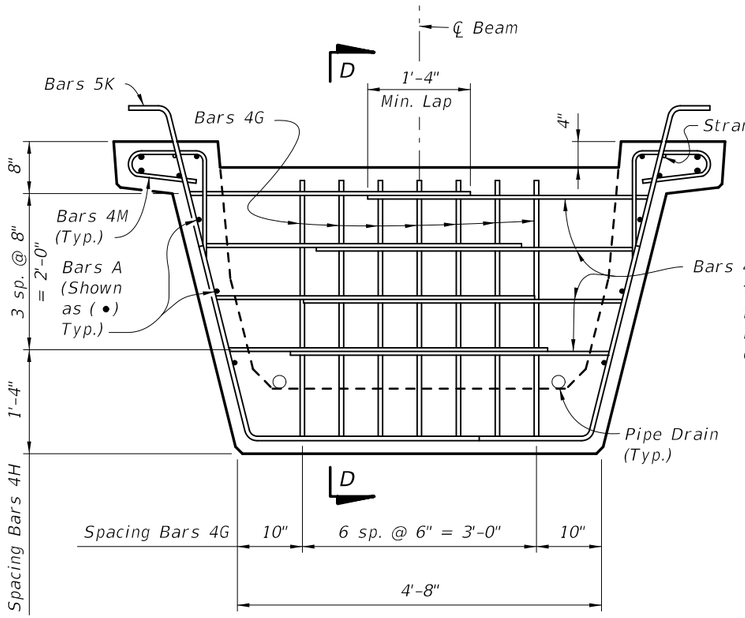
Interim Date 01/01/11

Sheet No. 1 of 1

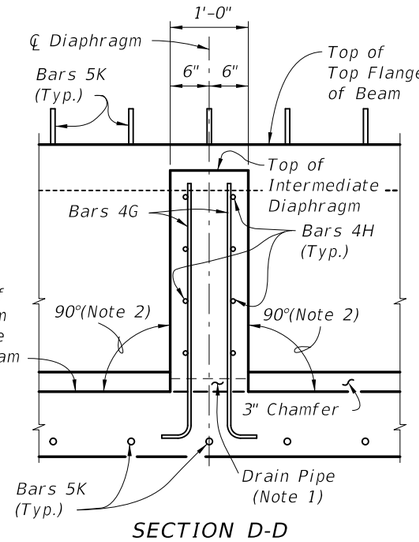
Index No. 20199



TOP VIEW OF INTERMEDIATE DIAPHRAGM



SECTION AT INTERMEDIATE DIAPHRAGM



SECTION D-D

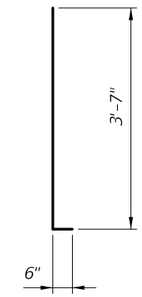
NOTES:

1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

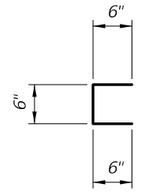
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

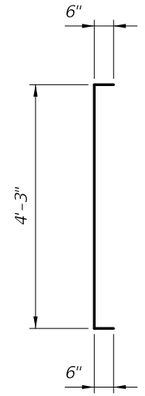
MARK	SIZE	NO. REQD.	LENGTH
A1	6	4	DIM L - 4"
A2	4	10	DIM L - 4"
B	5	12	4'-1"
C	4	16	5'-1"
D1	3	156	1'-6"
D2	3	26	4'-6"
E	5	24	5'-3"
F	4	20	6'-2"
G	4	See Table	4'-0"
H	4	See Table	4'-7"
K	5	See Table	8'-0"
L	5	20	14'-0"
M	4	See Table	3'-11"
N	3/8" Ø Strand	2	DIM L - 3"



Bars 5B



Bars 3D1



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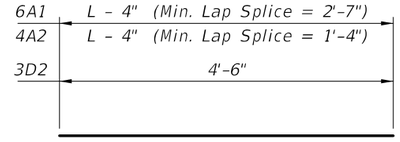
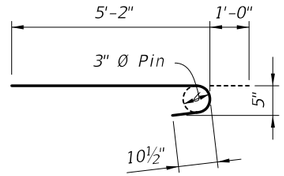
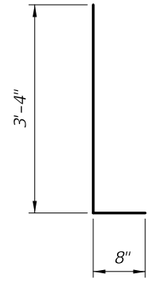


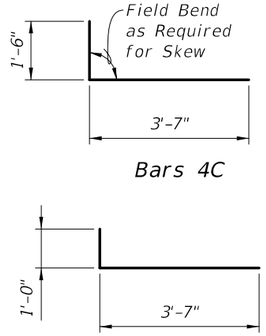
Bars 6A1, 4A2 and 3D2



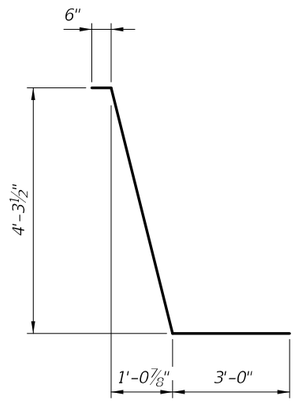
Bars 4F



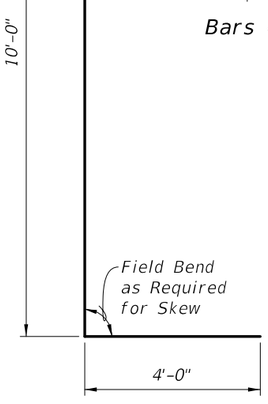
Bars 4G



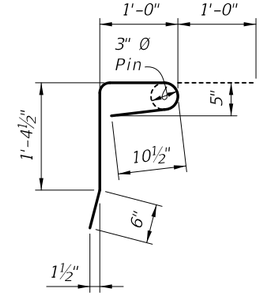
Bars 4C Bars 4H



Bars 5K



Bars 5L



Bars 4M

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed No. Required Bars 3D1 and 3D2 in BILL OF REINFORCING STEEL.			

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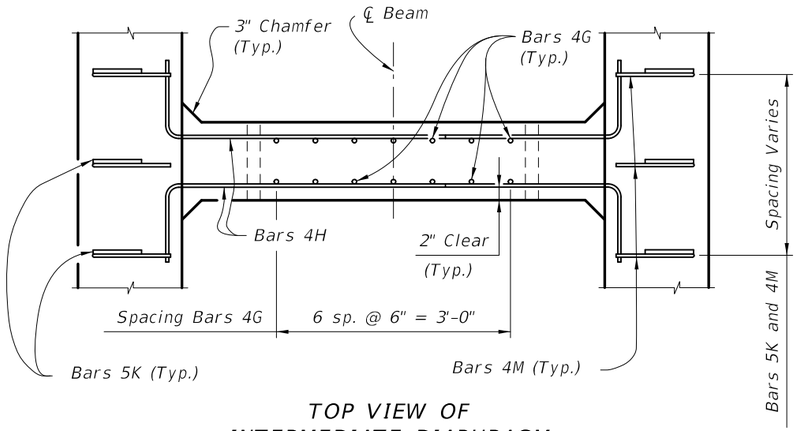
FLORIDA U 48 BEAM - STANDARD DETAILS

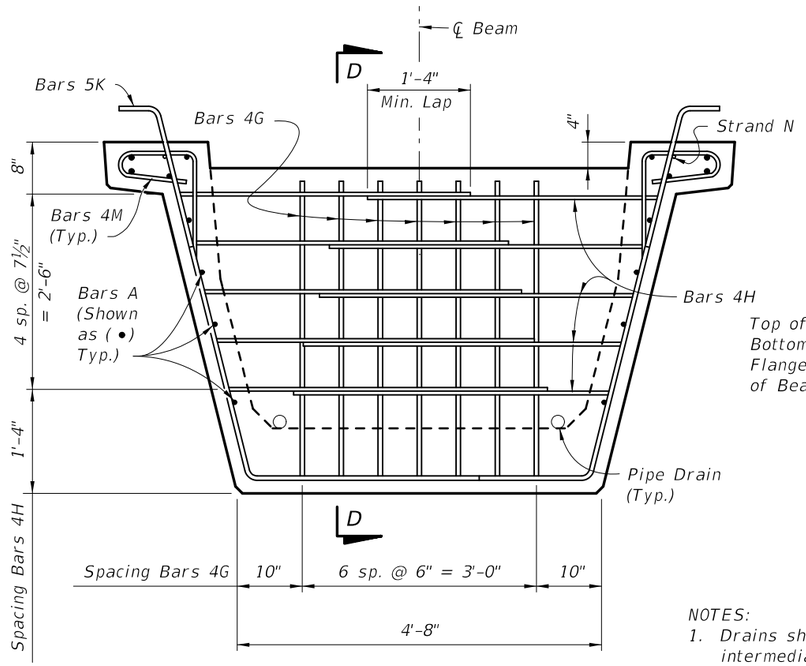
Interim Date 01/01/11

Sheet No. 3 of 3

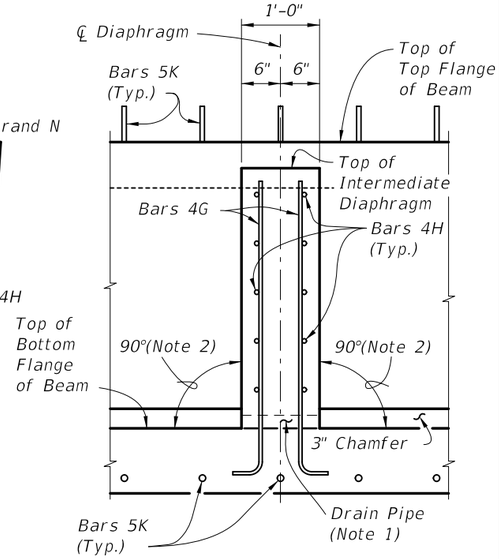
Index No. 20248



TOP VIEW OF INTERMEDIATE DIAPHRAGM



SECTION AT INTERMEDIATE DIAPHRAGM



SECTION D-D

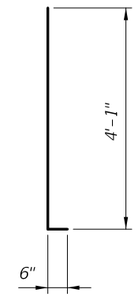
NOTES:

1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

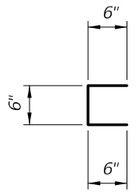
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

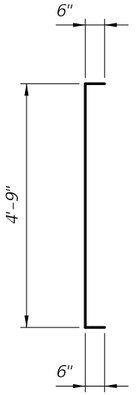
MARK	SIZE	NO. REQD.	LENGTH
A1	6	4	DIM L - 4"
A2	4	12	DIM L - 4"
B	5	12	4'-7"
C	4	20	5'-3"
D1	3	180	1'-6"
D2	3	30	4'-6"
E	5	24	5'-9"
F	4	20	6'-4"
G	4	See Table	4'-6"
H	4	See Table	4'-9"
K	5	See Table	8'-6"
L	5	24	16'-2"
M	4	See Table	3'-11"
N	⅜" Ø Strand	2	DIM L - 3"



Bars 5B



Bars 3D1



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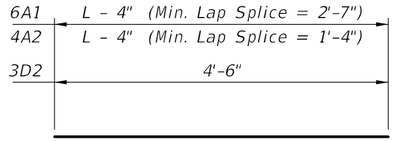
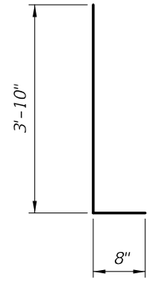


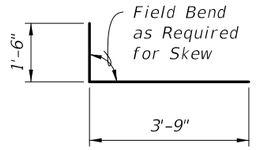
Bars 6A1, 4A2 and 3D2

Bars 4F

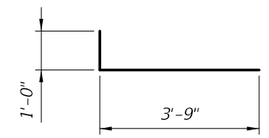
Bars 5L



Bars 4G



Bars 4C



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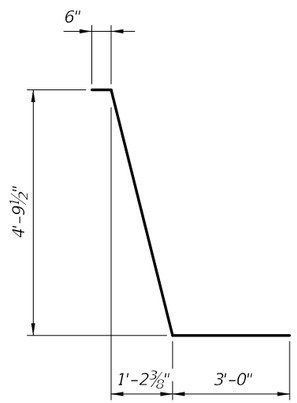
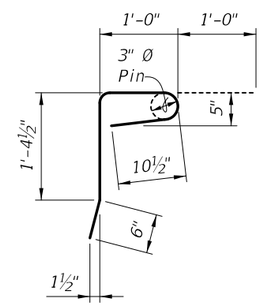


Bars 5K



Bars 4M

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed No. Required Bars 3D1 and 3D2 in BILL OF REINFORCING STEEL.			

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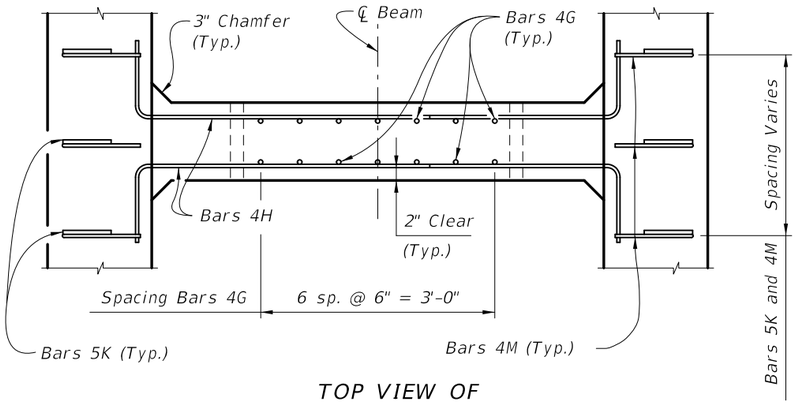
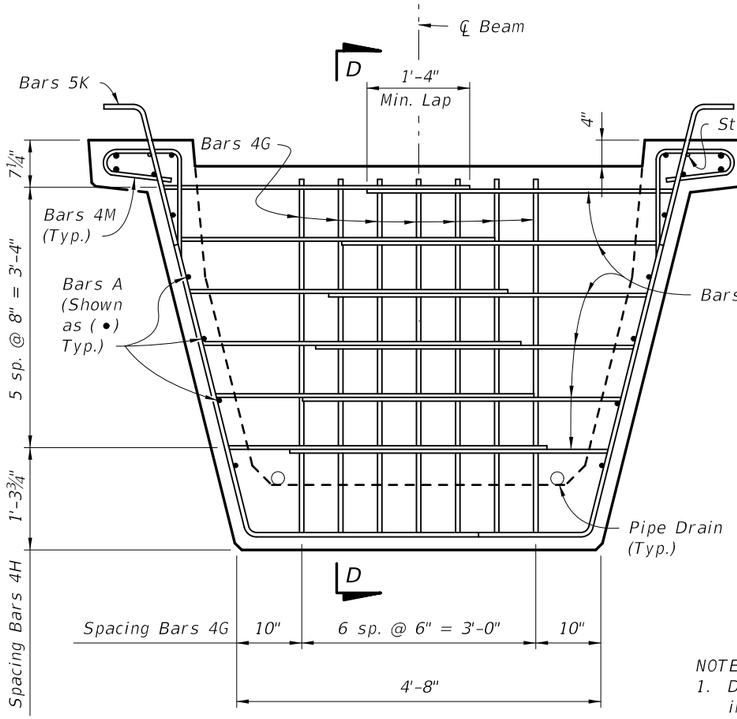
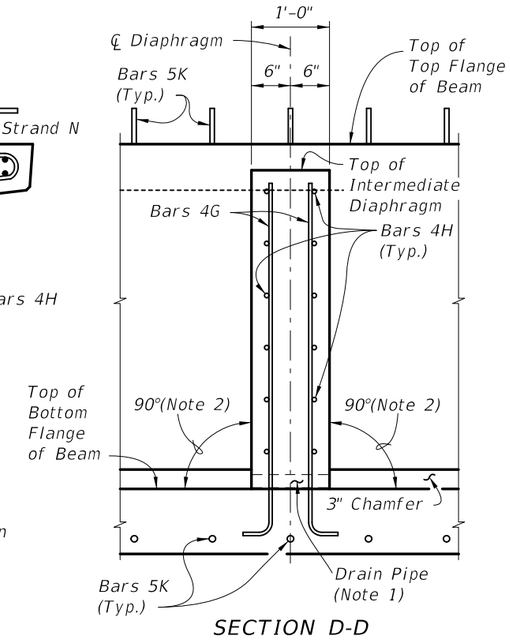
Index No. 20254



TOP VIEW OF
INTERMEDIATE DIAPHRAGM



SECTION AT INTERMEDIATE DIAPHRAGM



SECTION D-D

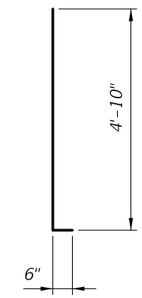
NOTES:

1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

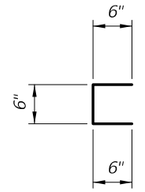
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

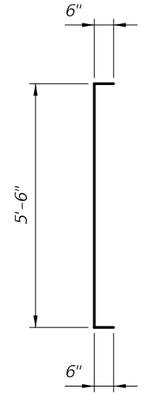
MARK	SIZE	NO. REQD.	LENGTH
A1	6	4	DIM L - 4"
A2	4	12	DIM L - 4"
B	5	12	5'-4"
C	4	24	5'-5"
D1	3	204	1'-6"
D2	3	34	4'-6"
E	5	24	6'-6"
F	4	28	6'-6"
G	4	See Table	5'-3"
H	4	See Table	4'-11"
K	5	See Table	9'-2½"
L	5	28	17'-8"
M	4	See Table	3'-11"
N	⅜" Ø Strand	2	DIM L - 3"



Bars 5B



Bars 3D1



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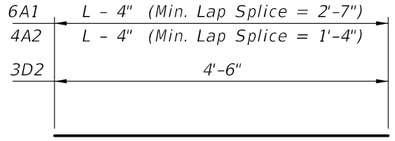
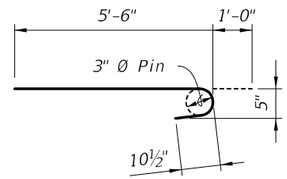
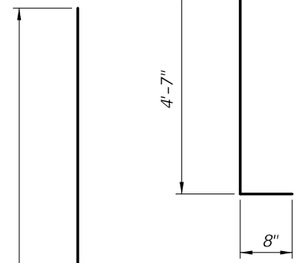


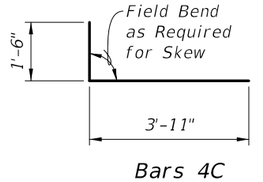
Bars 6A1, 4A2 and 3D2



Bars 4F

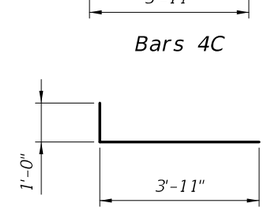


Bars 5L

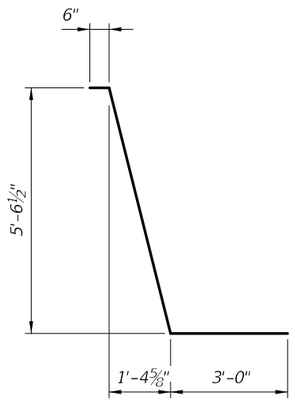


Bars 4C

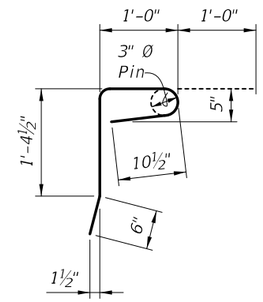
Bars 4G



Bars 4H



Bars 5K



Bars 4M

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Changed No. Required Bars 3D1 and 3D2 in BILL OF REINFORCING STEEL.			

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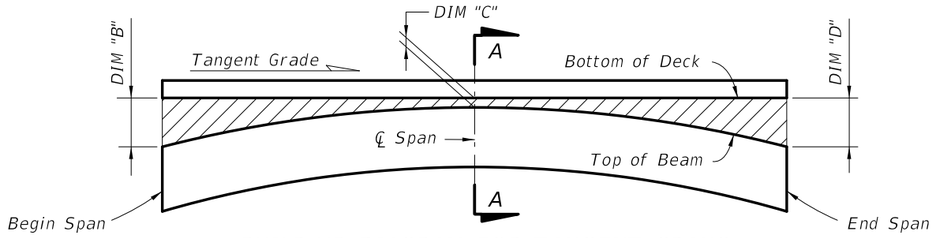
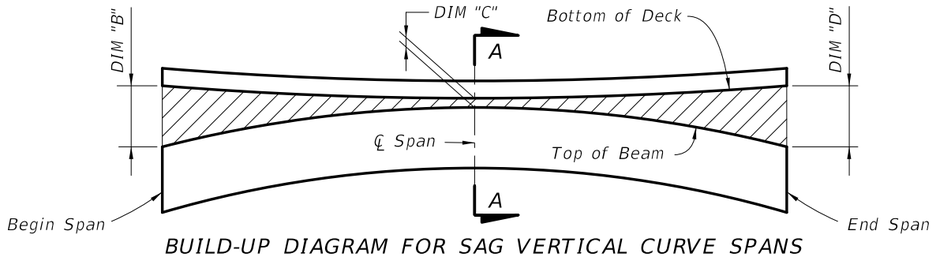
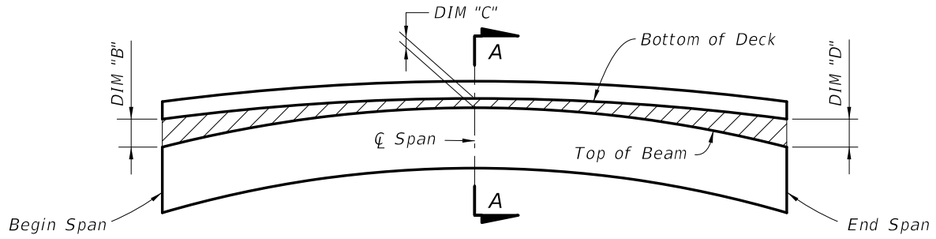


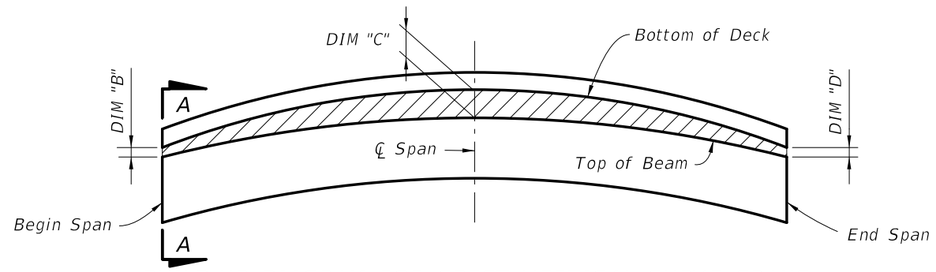
BUILD-UP DIAGRAM FOR TANGENT SPANS
(ALONG ℄ FLANGE) (CASE 1)



BUILD-UP DIAGRAM FOR SAG VERTICAL CURVE SPANS
(ALONG ℄ FLANGE) (CASE 2)



BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT ℄ SPAN
(ALONG ℄ FLANGE) (CASE 3)

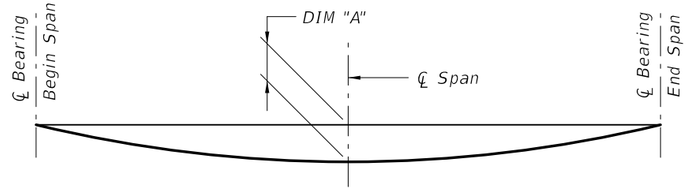


BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT BEGIN OR END SPAN
(ALONG ℄ FLANGE) (CASE 4)

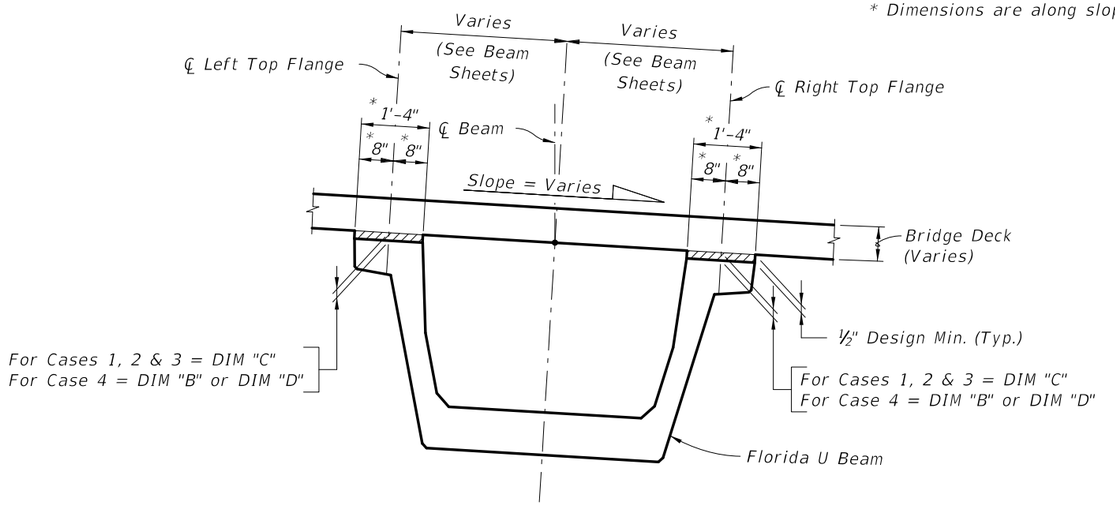
BEAM CAMBER AND BUILD-UP NOTES:

The build-up values given in the table are based on theoretical beam cambers. The Contractor shall monitor beam cambers for the purpose of predicting camber values at the time of the deck pour. If the predicted cambers based on field measurements differ more than +/- ½" from the theoretical "Net Beam Camber @ 120 Days" shown in the Data Table, obtain approval from the Engineer to modify the build-up dimensions as required. When the measured beam cambers create a conflict with the bottom mat of deck steel, notify the Engineer a minimum a 21 days prior to casting.

DIM "A" includes the weight of the Stay-In-Place Formwork.



DEAD LOAD DEFLECTION DIAGRAM
(ALONG ℄ BEAM)



SECTION A-A
BUILD-UP OVER BEAMS
(LOOKING AHEAD STATION)

NOTE:
Work this Index with the Build-up and Deflection Data Table for Florida U Beams in Structures Plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note. Added SECTION A-A location to BUILD-UP DIAGRAMS; Changed note at ℄ Flanges in SECTION A-A.			

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BUILD-UP & DEFLECTION DATA FOR FLORIDA U BEAMS

Interim Date 01/01/11

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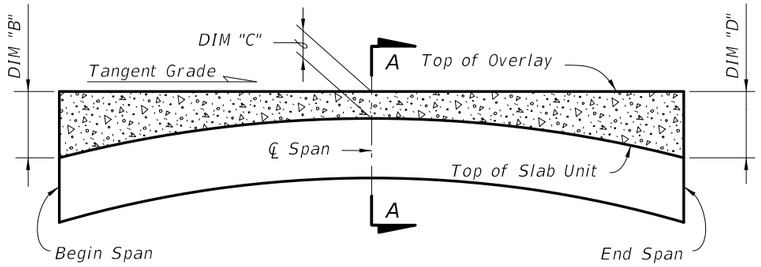
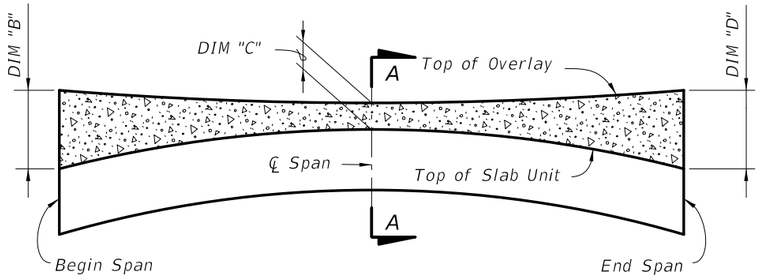
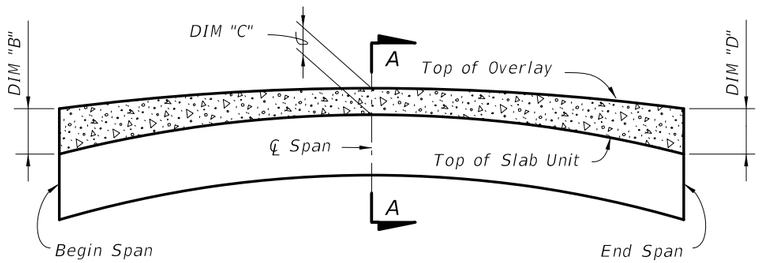


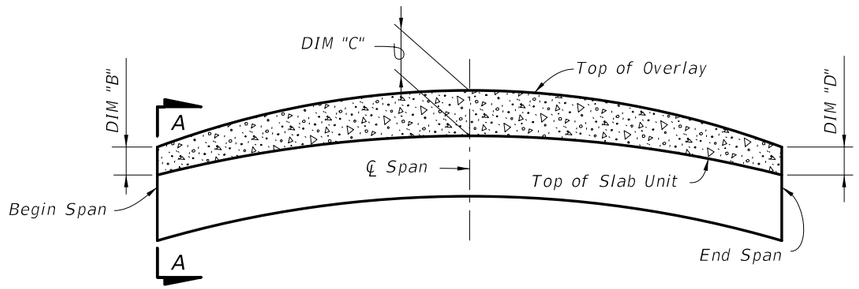
OVERLAY DIAGRAM FOR TANGENT SPANS
(ALONG ℄ SLAB UNIT) (CASE 1)



OVERLAY DIAGRAM FOR SAG VERTICAL CURVE SPANS
- CONTROL AT ℄ SPAN
(ALONG ℄ SLAB UNIT) (CASE 2)



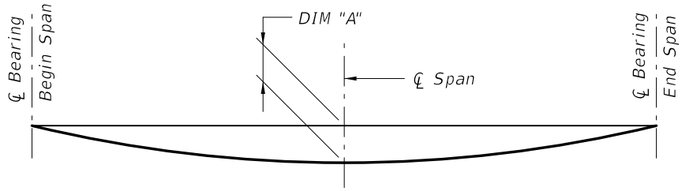
OVERLAY DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT ℄ SPAN
(ALONG ℄ SLAB UNIT) (CASE 3)



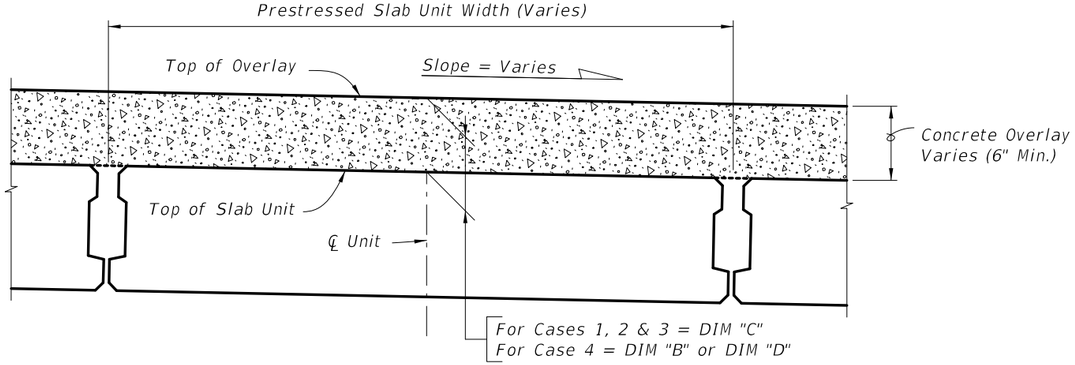
OVERLAY DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT BEGIN OR END SPAN
(ALONG ℄ SLAB UNIT) (CASE 4)

PRESTRESSED SLAB UNIT CAMBER AND OVERLAY NOTES:

The overlay values given in the table are based on theoretical unit cambers. The Contractor shall monitor unit cambers for the purpose of predicting camber values at the time of the deck pour. If the predicted cambers based on field measurements differ more than ± ½" from the theoretical "Net Unit Camber @ 120 Days" shown in the table, propose modifed overlay dimensions as required and submit to the Engineer for approval a minimum of 21 days prior to casting overlay concrete.



DEAD LOAD DEFLECTION DIAGRAM



SECTION A-A
OVERLAY ON SLAB UNITS

NOTE:
Work this Index with the Overlay and Deflection Data Table for Prestressed Slab Units in Structures Plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	GJM	New Design Standard.			
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note. Added SECTION A-A location to BUILD-UP DIAGRAMS; Changed note at ℄ Slab in SECTION A-A.			

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OVERLAY & DEFLECTION DATA FOR PRESTRESSED SLAB UNITS

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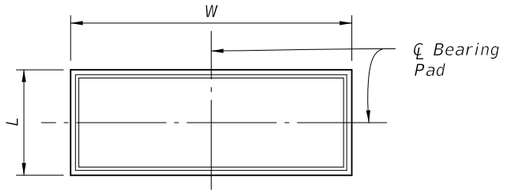
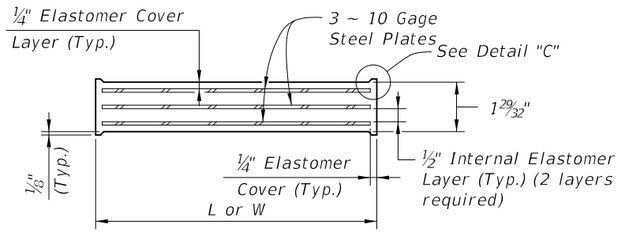
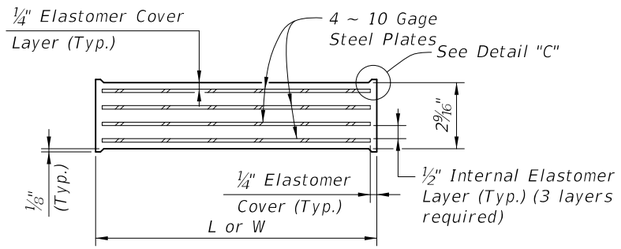


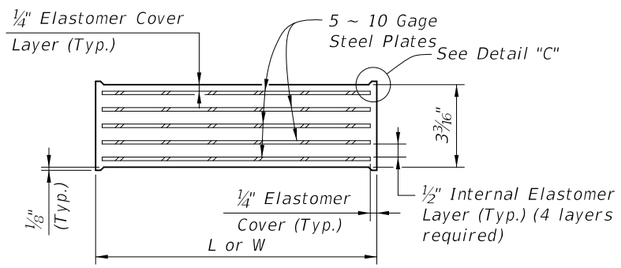
PLAN



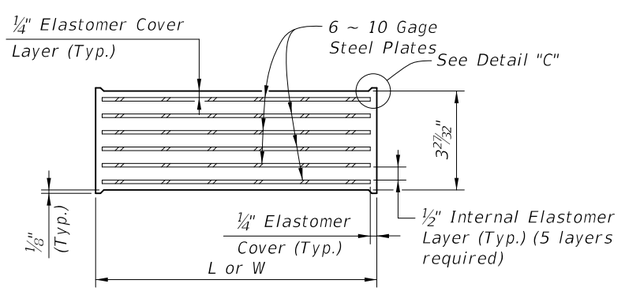
TYPICAL SECTION TYPE D & E PAD



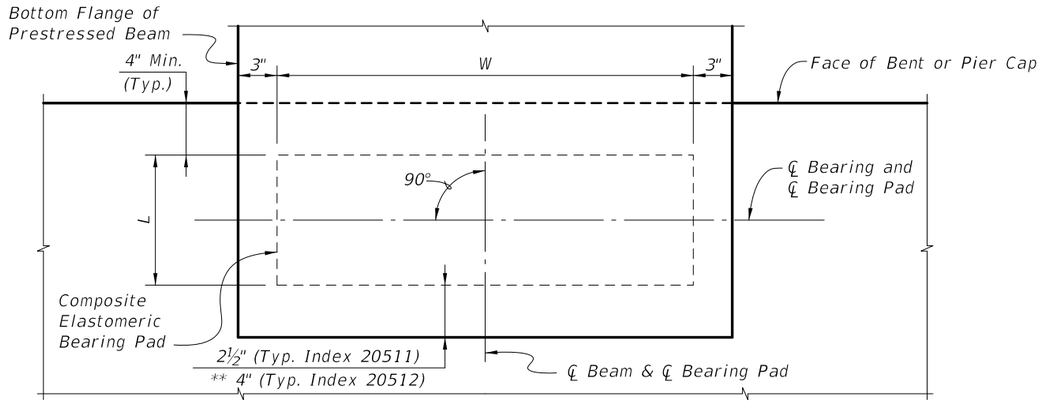
TYPICAL SECTION TYPE F & G PAD



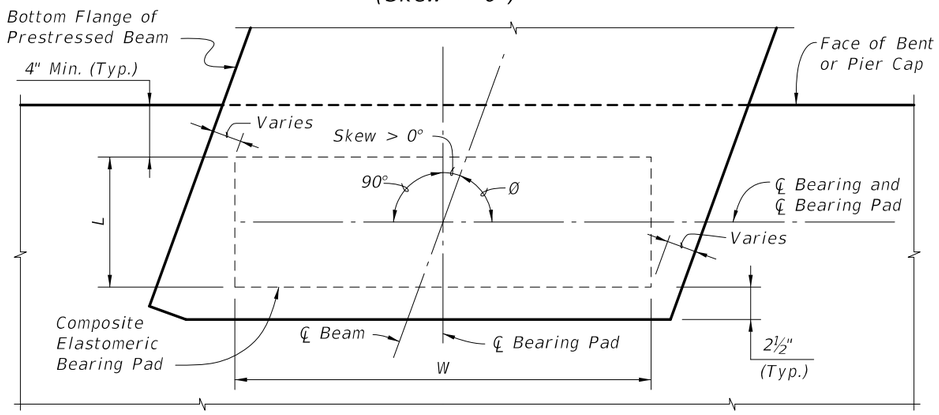
TYPICAL SECTION TYPE H PAD



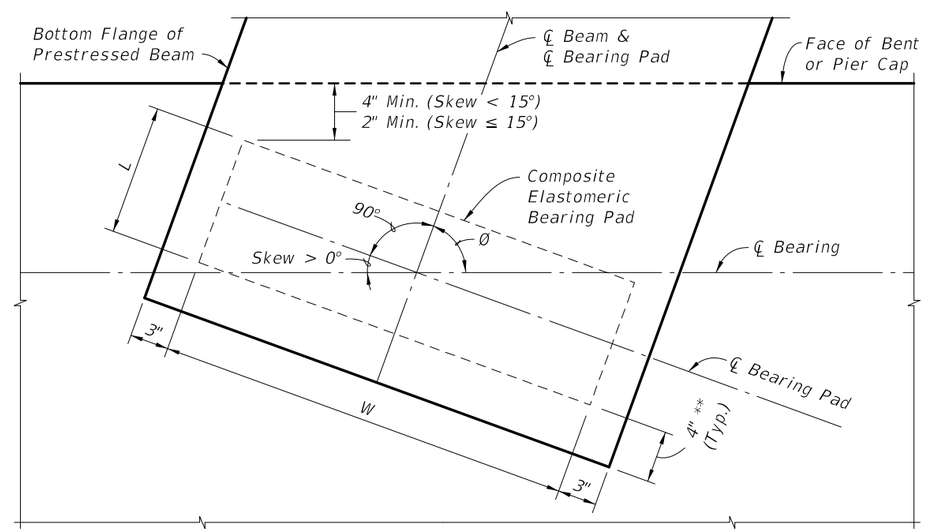
TYPICAL SECTION TYPE J & K PAD



PARTIAL PLAN
(Skew = 0°)



PARTIAL PLAN WITH FULL DEPTH END DIAPHRAGM (Use Index 20511)
(Skew > 0°)

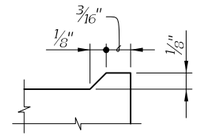


PARTIAL PLAN WITHOUT FULL DEPTH END DIAPHRAGM (Use Index 20512)
(Skew > 0°)

	BEARING PAD DIMENSIONS		*BEVELED BEARING PLATE DIMENSIONS	
PAD TYPE (See Note 1)	L	W	C	D
D (G=110psi)	8"	32"	12"	36"
E (G=110psi)	10"	32"	12"	36"
F (G=110psi)	10"	32"	12"	36"
G (G=150psi)	10"	32"	12"	36"
H (G=150psi)	10"	32"	12"	36"
J (G=150psi)	10"	32"	12"	36"
K (G=150psi)	12"	32"	13½"	36"

* Work this sheet with Index No. 20511 or 20512 – Bearing Plate Details and BEARING PAD DATA TABLE in the Structures Plans. See TABLE OF BEAM VARIABLES and BEARING PLATE DATA TABLE in the Structures Plans for locations where beveled bearing plates are required.

** Offset to End of Beam is reduced to 2" for Type K Pad using Index No. 20512.



DETAIL "C"

BEARING PAD NOTES:

1. Neoprene in Type D, E & F bearing pads shall have a shear modulus (G) of 110 psi. Neoprene in Type G, H, J & K bearing pads shall have a shear modulus (G) of 150 psi.

2. Steel Plates in bearing pads shall conform to ASTM A1011 Grade 36, Type 1.

3. Unless otherwise shown in the Structures Plans:
   (a) For beam grades less than 0.5%, finish the Beam Seat level.
   (b) For beam grades between 0.5% and 2%, finish the Beam Seat parallel to the bottom of the beam in both transverse and longitudinal directions.
   (c) For beam grades greater than 2% finish the Beam Seat level and provide Beveled Bearing Plates.

4. See Bearing Pad Data Table in Structures Plans for quantities of Type D, E, F, G, H, J and/or K Bearing Pads.

REVISIONS

DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard.
07/01/10	CJF	Added offsets & references to Index No. 20512; deleted PARTIAL SIDE ELEVATION detail; changed dimension 'C' for Type K Pad.
01/01/11	SJN	Added usage reference to PARTIAL PLAN details for Skew > 0°.

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COMPOSITE ELASTOMERIC BEARING PADS - PRESTRESSED FLORIDA-I BEAMS

Interim Date 01/01/11

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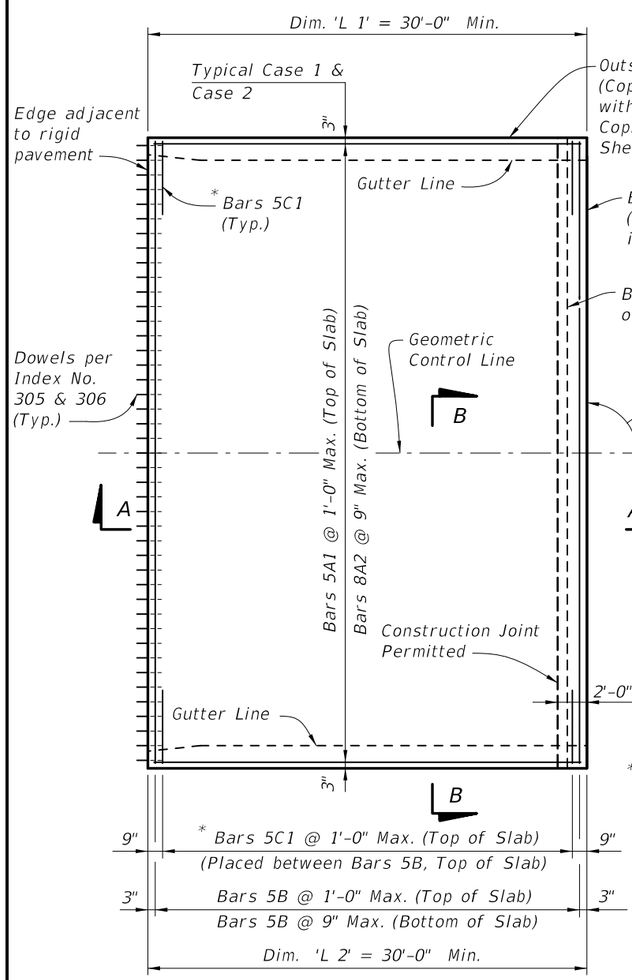
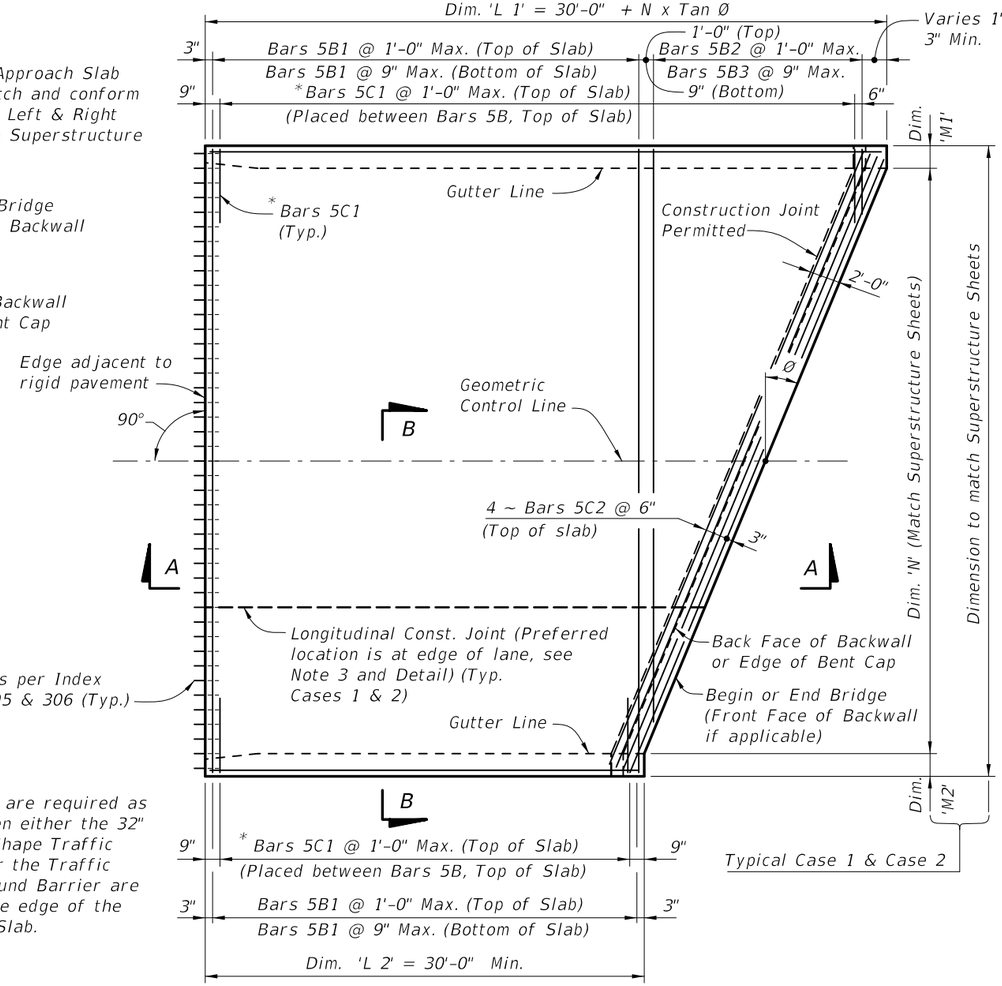
Index No. 20510



* NOTE:
Bars 5C1 are required as shown when either the 32" or 42" F-Shape Traffic Railings or the Traffic Railing/Sound Barrier are used at the edge of the Approach Slab.



GENERAL NOTES

1. SURFACE TREATMENT: Apply a Class 4 Floor Finish (Grooved) to the riding surface from begin or end approach slab joint to begin or end bridge. See Bid Item Notes. Apply a broomed finish to sidewalk areas.
2. UTILITIES: If required, see Structures Plans, Utility Conduit Detail Sheet for details.
3. When a longitudinal construction joint is necessary or allowed by the Engineer, the transverse steel shall be extended as shown in the Longitudinal Construction Joint Detail.
4. The plan view for CASE 1 applies when the skew angle (Ø) = 0°. Relevant details also apply to CASE 2.
5. The plan view for CASE 2 applies where the skew angle (Ø) is > 0°. The slab shown represents a skew to the right for an approach slab at begin bridge; approach slab at the end of bridge or a left skew shall be treated similarly. The shown reinforcement shall be utilized, and Dowels shall be provided in accordance with Index Nos. 305 and 306.
6. Railings, parapets and traffic separators shall be provided as shown in Structures Plans. Payment for these items shall be included in the pay item for the required item. Raised sidewalks shall be provided as shown in Structures Plans. Payment shall be included in the pay items for approach slab concrete and reinforcement. Welded Wire Reinforcement for the edge of Approach Slabs on retaining wall is not included in the estimated quantity for reinforcing steel and is considered incidental to the work. Welded Wire Reinforcement shall conform to ASTM A185.
7. PROFILOGRAPH: If profilograph requirements apply, planing may be required. The permitted construction joint shown in Section A-A will facilitate the placement of the expansion joint.
8. Approach slabs shown in Plan View Cases 1 and 2 represent a typical approach slab with edge barriers and no sidewalks. See additional approach slab sheets for sidewalk and other pertinent details.
9. CONCRETE: Provide Class II (Bridge Deck) concrete for approach slabs.

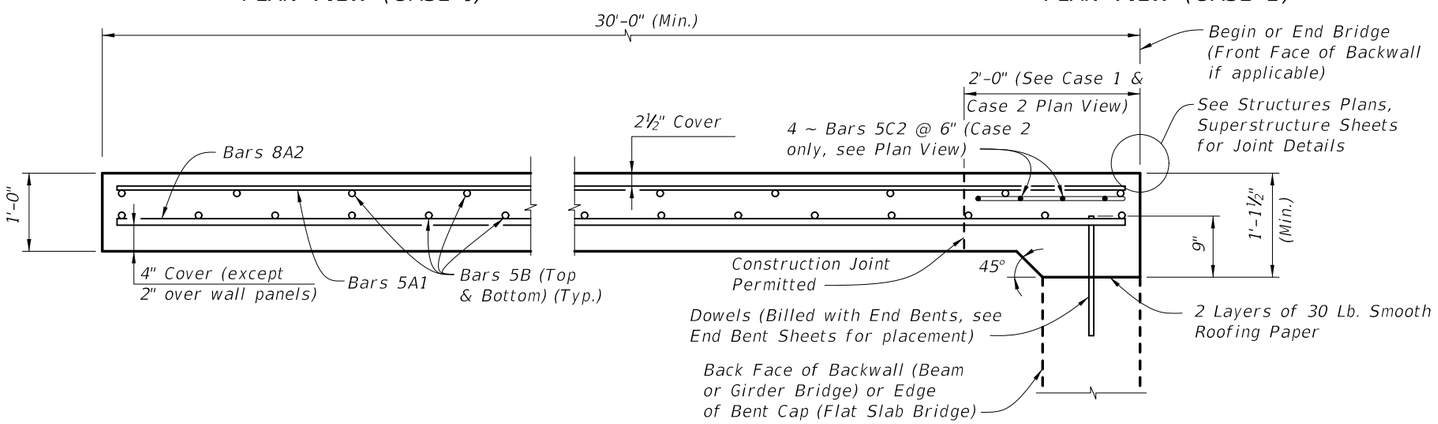
CROSS REFERENCES:

For Section B-B, Longitudinal Construction Joint Detail and Approach Slab Details see Index No. 20910, Sheet 2.

For Estimated Quantities see Structures Plans.

PLAN VIEW (CASE 1)

PLAN VIEW (CASE 2)



SECTION A-A

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note. Added Bars 5B2 (Top) and Bars 5B3 (Bottom) for skewed end, and Dowels in PLAN VIEWS.			

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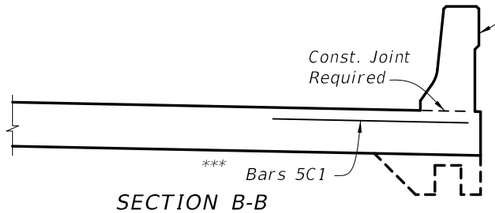
APPROACH SLABS (RIGID PAVEMENT APPROACHES)

Interim Date 01/01/11

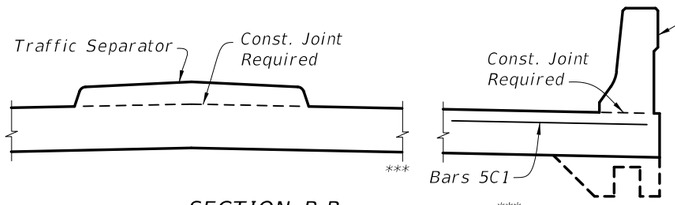
Sheet No. 1 of 2

Index No. 20910



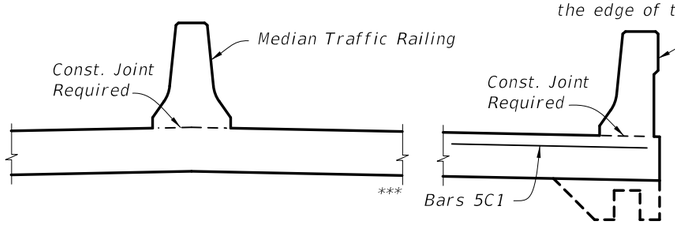
NOTE:
Geometry of Traffic Railings, Pedestrian/Bicycle Railings, Traffic Separators and Sidewalks to match those on adjoining bridge.

SECTION B-B
STANDARD APPROACH SLAB

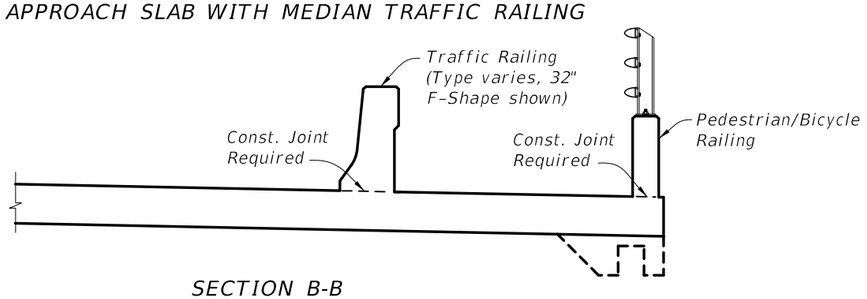


SECTION B-B
APPROACH SLAB WITH TRAFFIC SEPARATOR

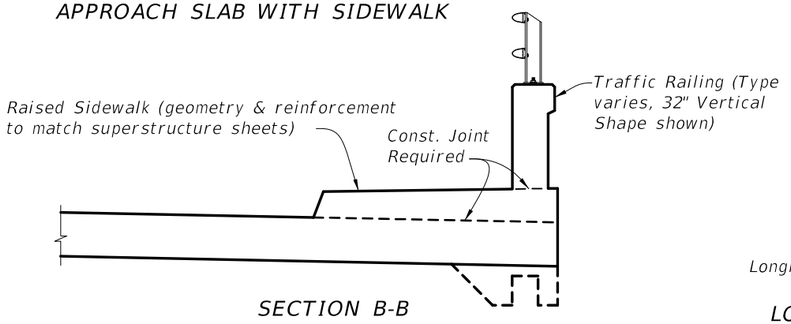
NOTE: Bars 5C are required as shown when either the 32" or 42" F-Shape Traffic Railing or the Traffic Railing/Sound Barrier are used at the edge of the Approach Slab.



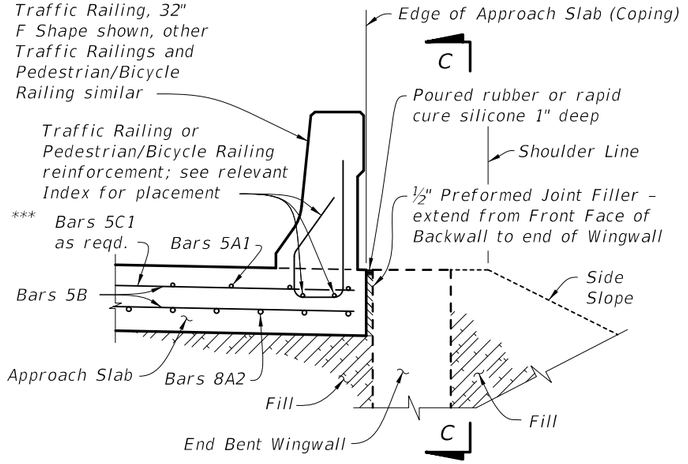
SECTION B-B
APPROACH SLAB WITH MEDIAN TRAFFIC RAILING



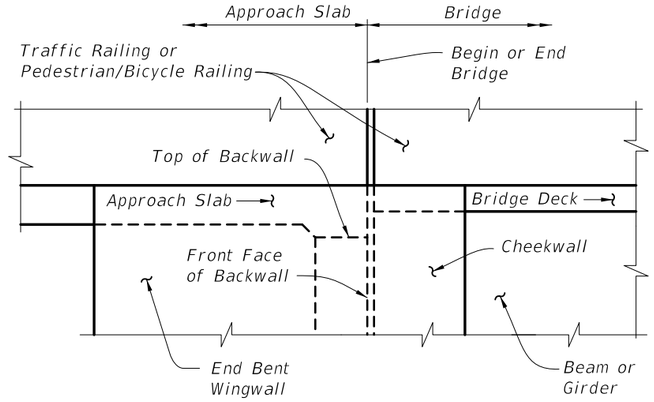
SECTION B-B
APPROACH SLAB WITH SIDEWALK



SECTION B-B
APPROACH SLAB WITH RAISED SIDEWALK

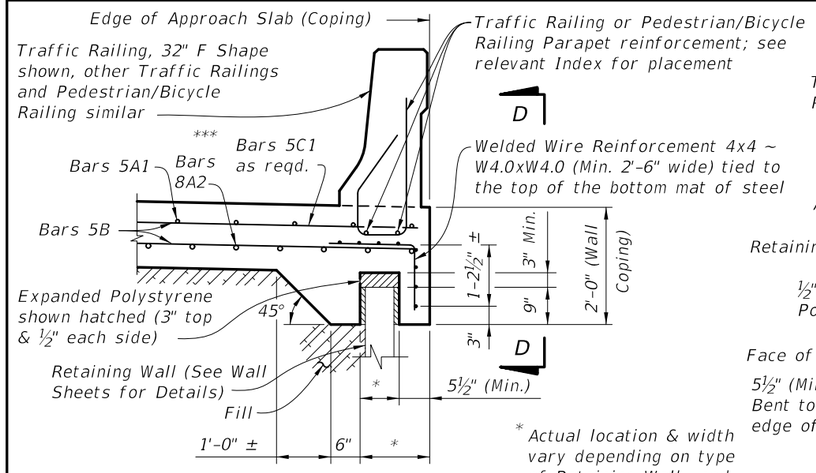


SECTION THRU APPROACH SLAB
AND END BENT WINGWALL



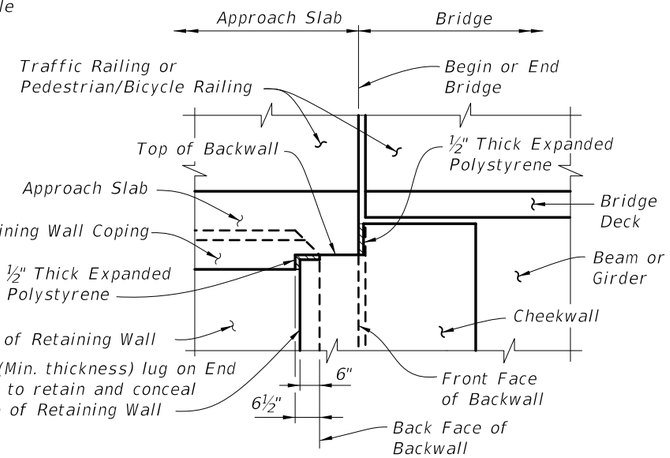
VIEW C-C AT BEGIN OR END BRIDGE (BEAM BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH WINGWALL DETAILS



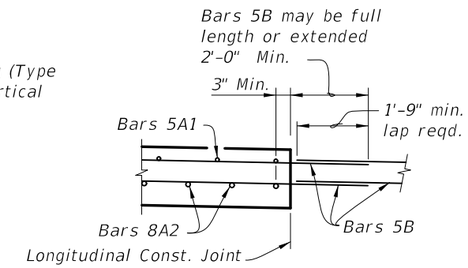
* Actual location & width vary depending on type of Retaining Wall used

SECTION THRU APPROACH SLAB
AND RETAINING WALL



VIEW D-D AT BEGIN OR END BRIDGE (BEAM BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH RETAINING WALL DETAILS



LONGITUDINAL CONSTRUCTION
JOINT DETAIL

CROSS REFERENCES:

For location of Section B-B and Longitudinal Construction Joint Detail see Index No. 20910, Sheet 1.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted diaphragm line in VIEW C-C.			

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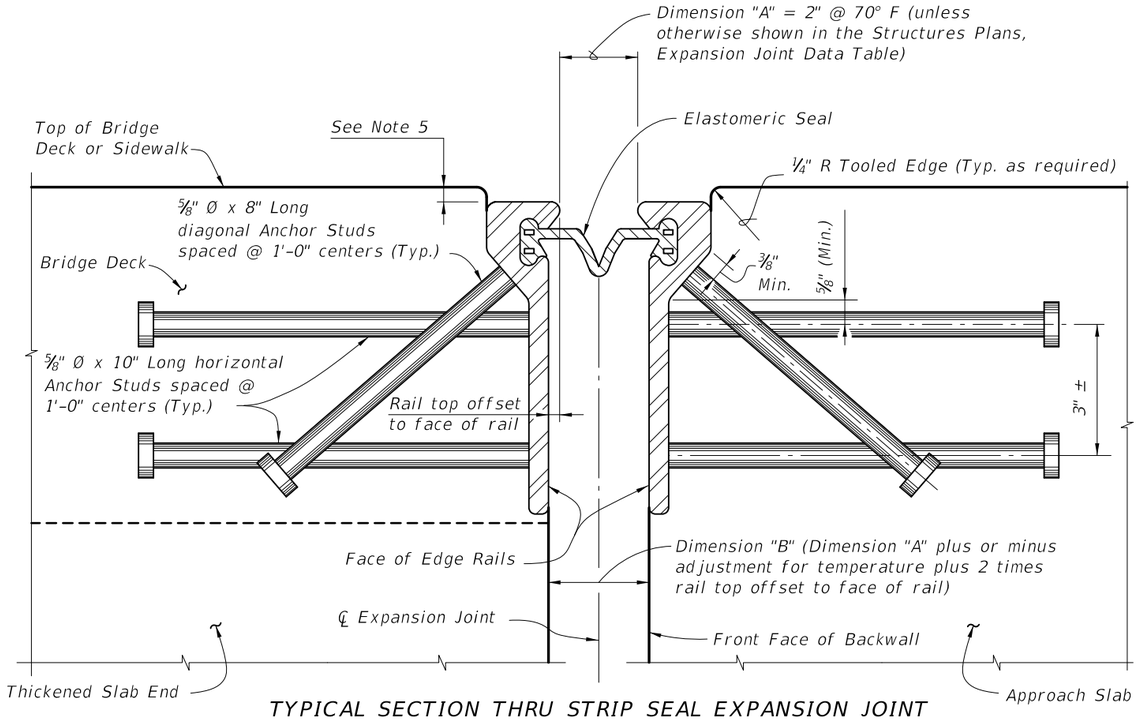
APPROACH SLABS
(RIGID PAVEMENT APPROACHES)

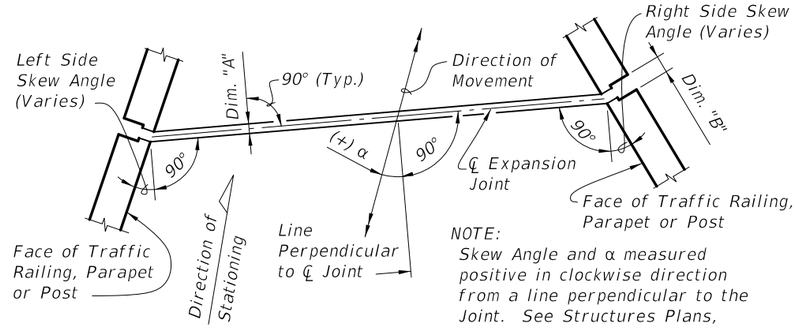
Interim Date 01/01/11

Sheet No. 2 of 2

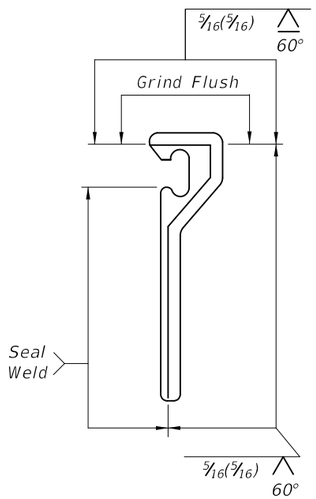
Index No. 20910



TYPICAL SECTION THRU STRIP SEAL EXPANSION JOINT
(Begin or End Concrete Girder Bridge shown,
Intermediate Supports and Steel Girder Bridge similar.
Reinforcing Steel and Girder details not shown for clarity.)



MOVEMENT SCHEMATIC



SHOP SPLICE DETAIL

GENERAL NOTES:

1. *Furnish Strip Seal Expansion Joint Systems in accordance with Specification Section 458.*
2. *Shape of Edge Rail shown is representative, minor variations depending on manufacturer are permitted.*
3. *Recess the Edge Rail below the concrete surface in accordance with Specification Section 458.*
4. *Refer to Specification 458 and the Expansion Joint Data Table in the Structures Plans for installation and fabrication requirements and adjustments to Dimension "A".*
5. *Manufacturers seeking approval of Strip Seal Expansion Joint Systems for inclusion on the Qualified Products List as pre-approved designs must submit application along with design documentation showing the expansion joint meets the specification, geometric and material requirements specified herein. Include installation details consisting of temporary or sacrificial support brackets, bolts, clamps, etc. that are compatible with decks constructed with or without blockouts.*

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Deleted INSTRUCTIONS TO DESIGNER & Diaphragm related details.			
01/01/11	CMH	Deleted Notes 3 & 4; Changed Notes 1 & 2; Moved MOVEMENT SCHEMATIC from sheet 2 to sheet 1.			

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STRIP SEAL EXPANSION JOINT

Interim Date 01/01/11

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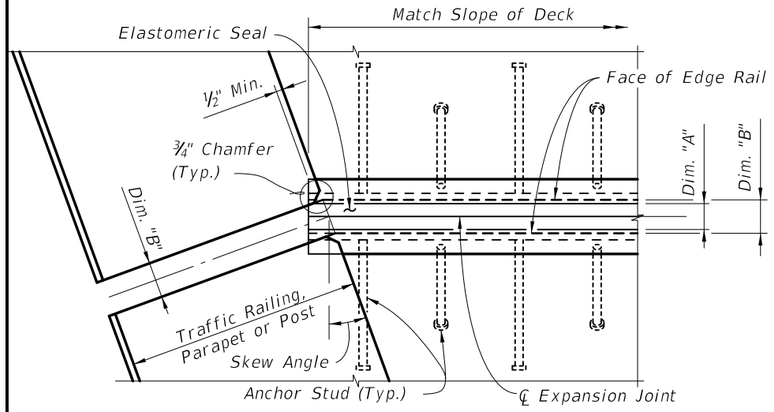
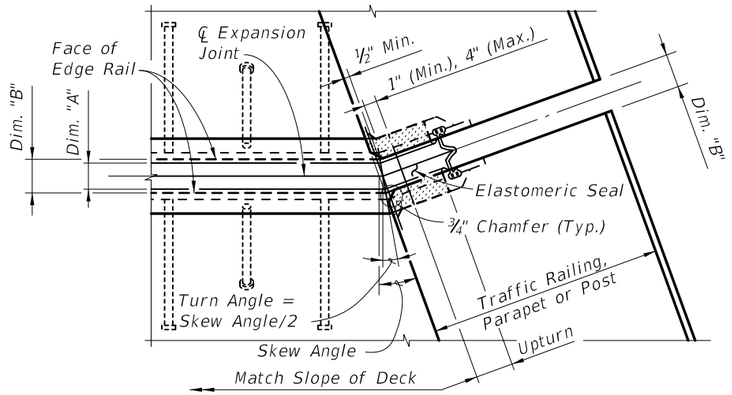
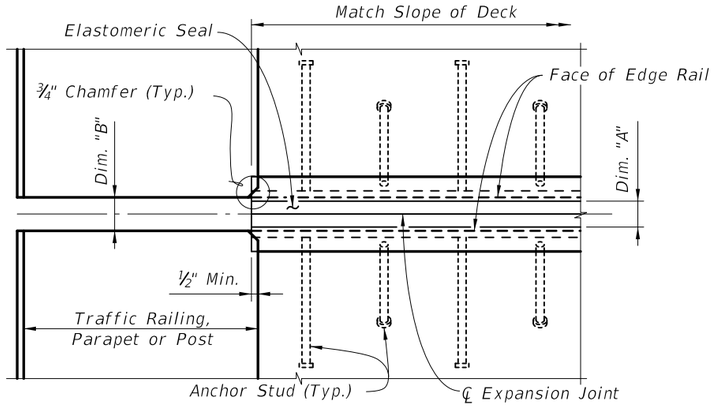


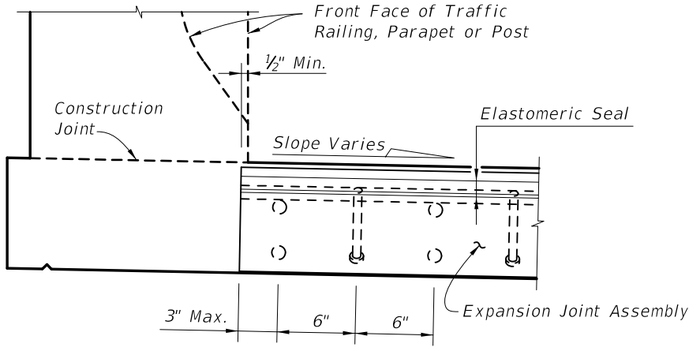
PARTIAL PLAN VIEW OF SKEWED JOINTS



PARTIAL PLAN VIEW OF JOINTS SKEWED GREATER THAN 6°



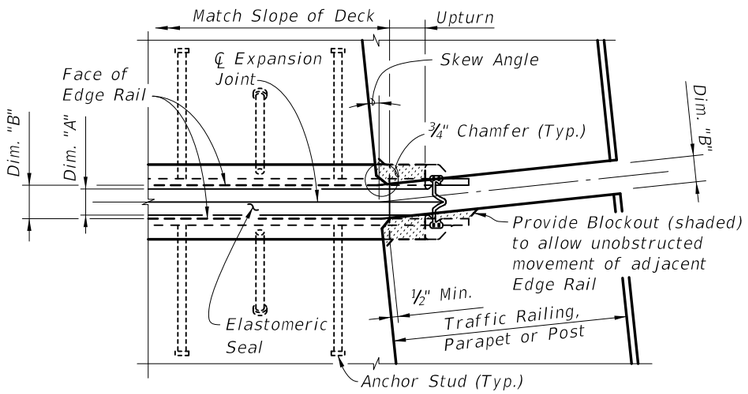
PARTIAL PLAN VIEW OF NONSKEWED JOINTS



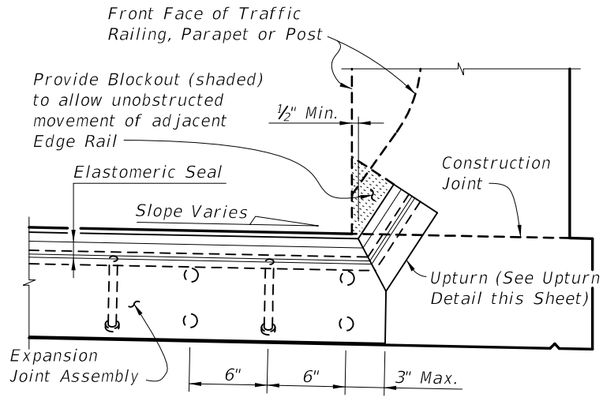
PARTIAL SECTION ALONG ℄ JOINT

JOINT TREATMENT AT HIGH SIDE OF DECK WITH SLOPE ≥ 2%

(Sidewalk Cover Plate where applicable not shown for clarity)



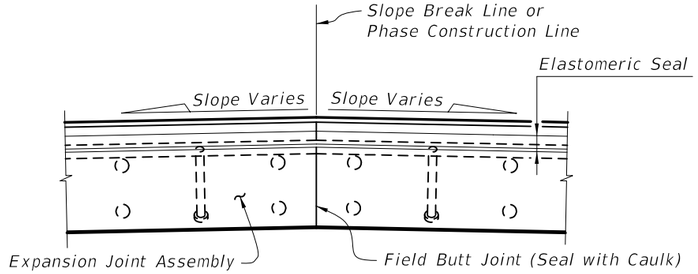
PARTIAL PLAN VIEW OF NONSKEWED JOINTS & JOINTS SKEWED 6° OR LESS



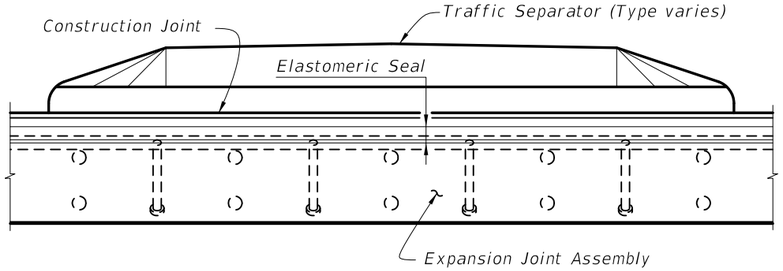
PARTIAL SECTION ALONG ℄ JOINT

JOINT TREATMENT AT LOW SIDE OF DECK & HIGH SIDE OF DECK WITH SLOPE < 2%

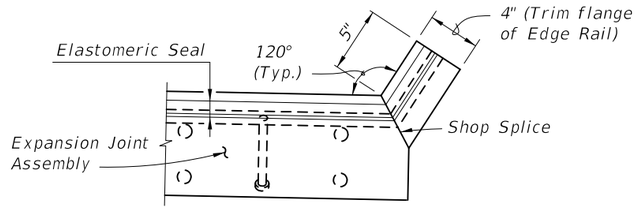
(Sidewalk Cover Plate where applicable not shown for clarity)



PARTIAL SECTION ALONG ℄ JOINT AT FIELD BUTT JOINT LOCATION (CROWNED DECK OR SLAB SHOWN)



PARTIAL SECTION ALONG ℄ JOINT THRU TRAFFIC SEPARATOR



UPTURN DETAIL

(TYPICAL AT TRAFFIC BARRIERS AND PARAPETS)

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	Changed MOVEMENT SCHEMATIC detail.			
01/01/11	CMH	Moved MOVEMENT SCHEMATIC detail to sheet 1.			

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STRIP SEAL EXPANSION JOINT

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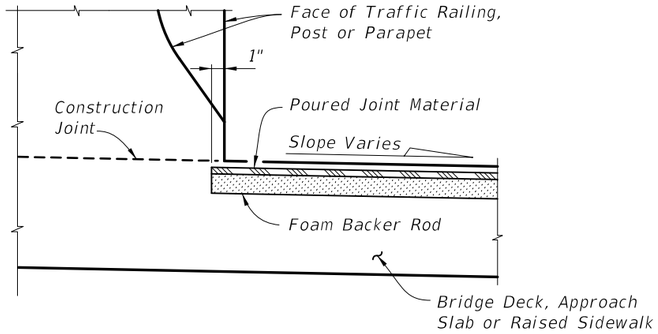
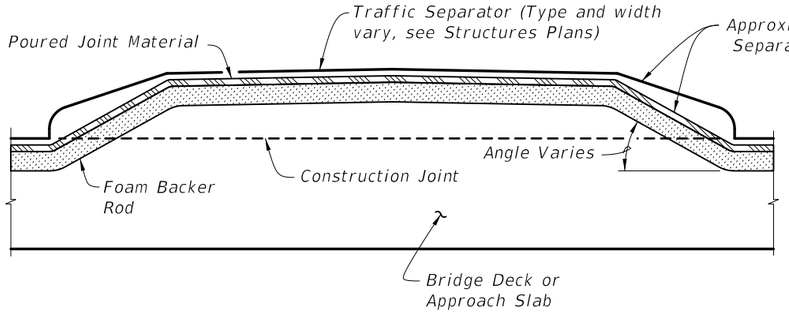
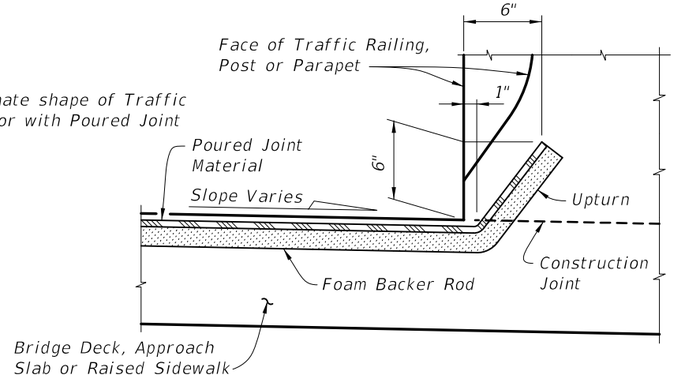


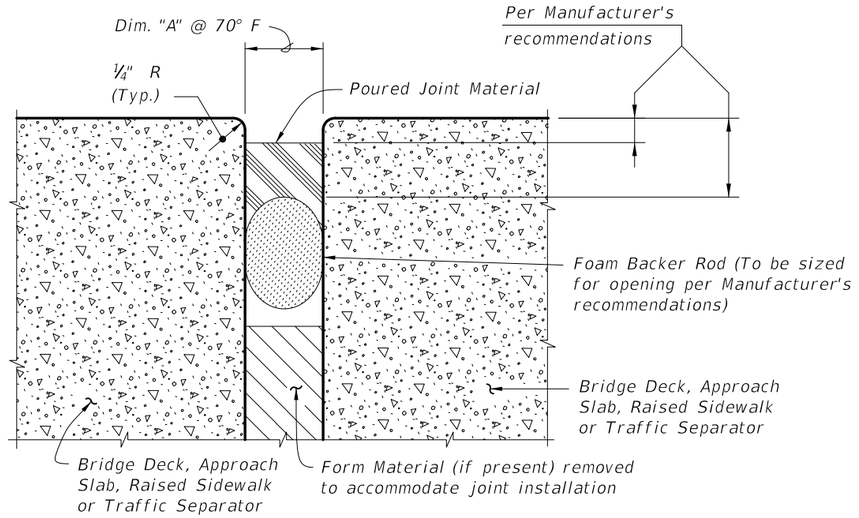
PARTIAL SECTION ALONG ℄ JOINT
JOINT TREATMENT AT HIGH SIDE OF
DECK WITH SLOPES 2% OR GREATER



PARTIAL SECTION ALONG ℄ JOINT,
JOINT TREATMENT AT TRAFFIC SEPARATOR



PARTIAL SECTION ALONG ℄ JOINT
JOINT TREATMENT AT LOW SIDE OF DECK OR
HIGH SIDE OF DECK WITH SLOPES < 2%



TYPICAL SECTION THRU JOINT

GENERAL NOTES:

1. Furnish Poured Joint With Backer Rod Expansion Joint Systems in accordance with Specification Section 458 and 932.
2. Submit shop drawings for Sidewalk Cover Plates showing all materials and project specific details and dimensions.
3. Refer to Specification Section 458 for installation and construction requirements.
4. Refer to the Structures Plans, Poured Expansion Joint Data Table for Dim. "A" @ 70° F.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CMH	Deleted "INSTRUCTION TO DESIGNERS" note, and Notes 2, 3 & 5.			

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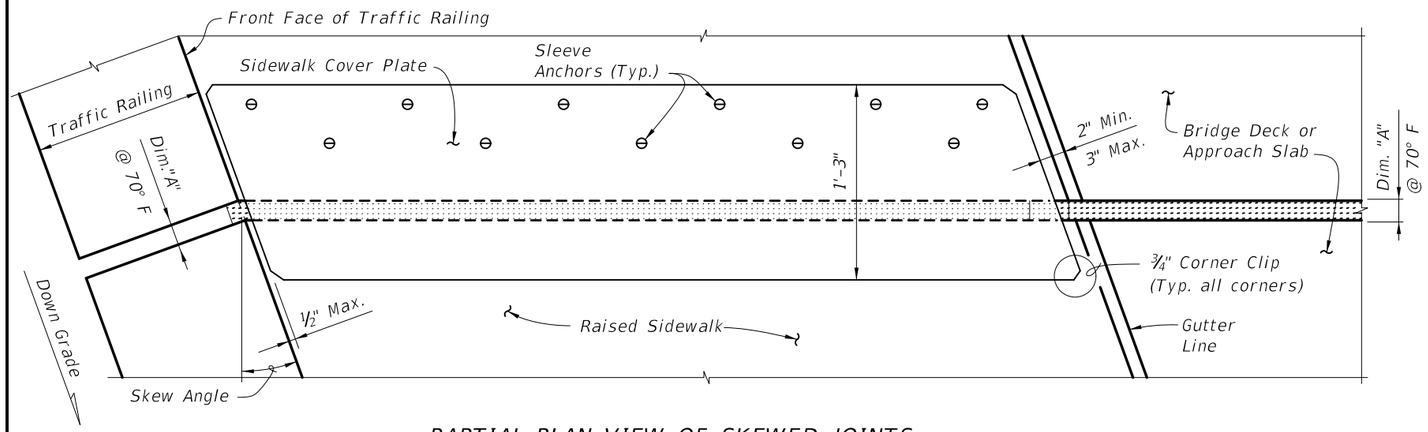
POURED JOINT WITH BACKER ROD EXPANSION JOINT SYSTEM

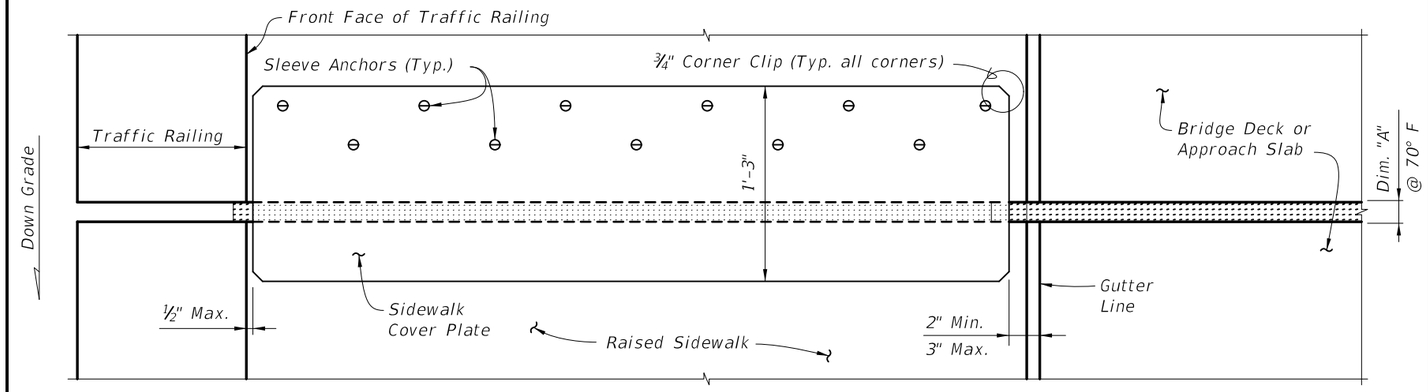
Interim Date 01/01/11

Sheet No. 1 of 2

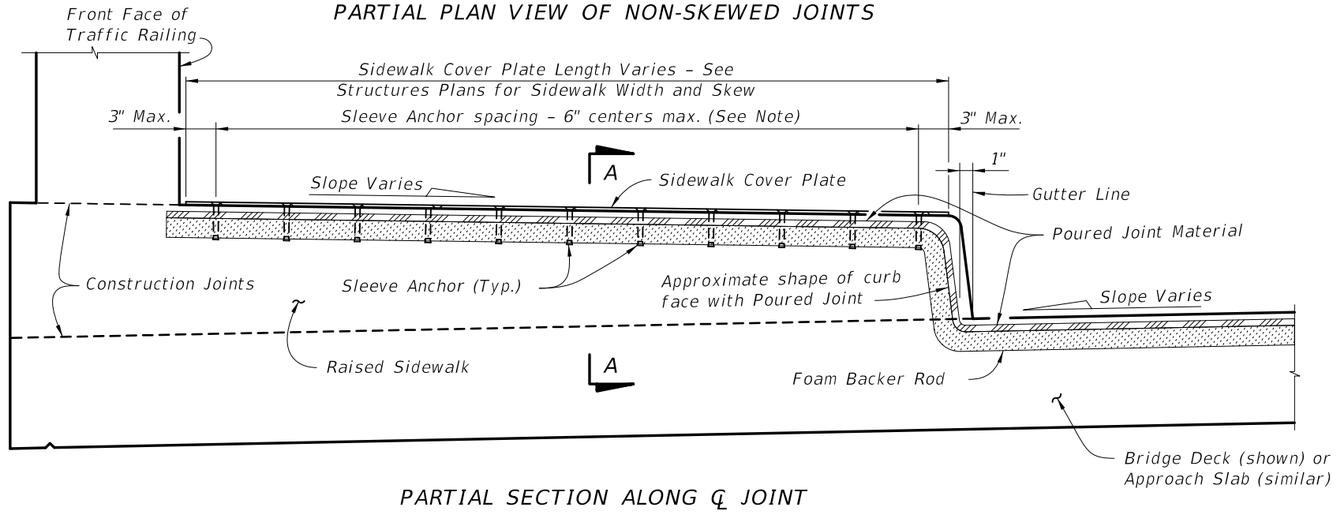
Index No. 21110



PARTIAL PLAN VIEW OF SKEWED JOINTS

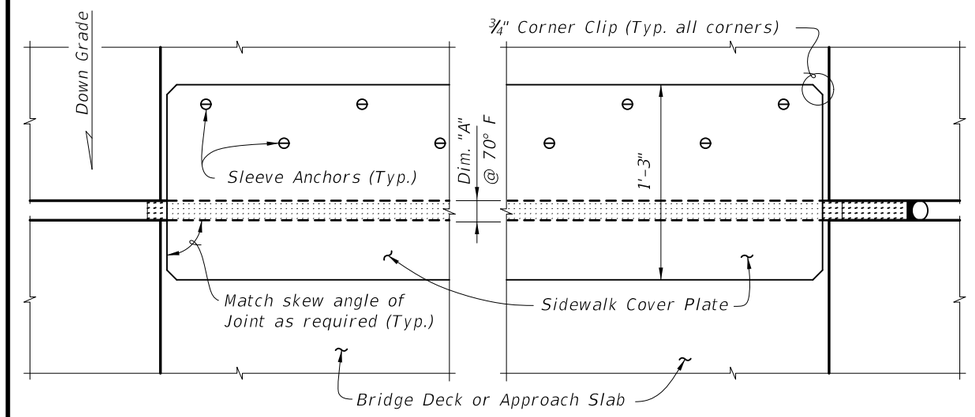


PARTIAL PLAN VIEW OF NON-SKEWED JOINTS

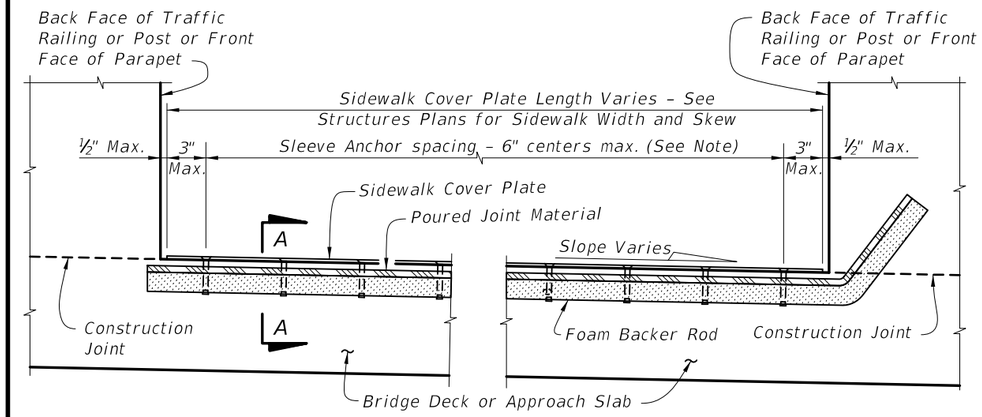


PARTIAL SECTION ALONG ℄ JOINT

RAISED SIDEWALK DETAIL

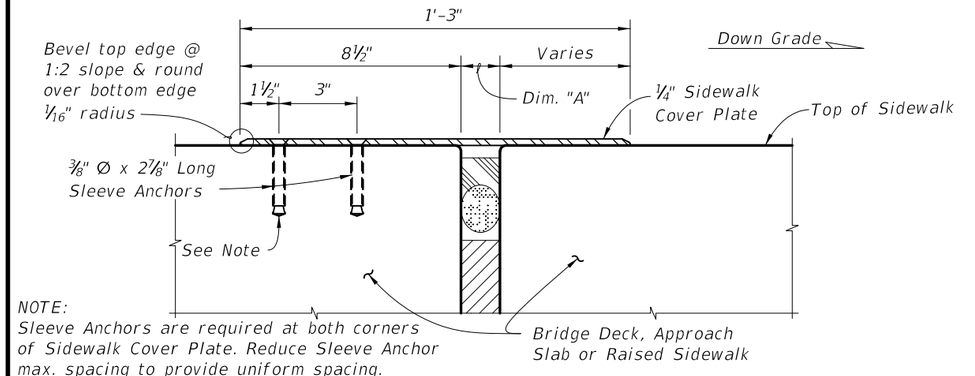


PARTIAL PLAN VIEW



PARTIAL SECTION ALONG ℄ JOINT

FLUSH SIDEWALK DETAIL



SECTION A-A

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	SJN	Added Note to Section A-A.			

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POURED JOINT WITH BACKER ROD EXPANSION JOINT SYSTEM

Interim Date 01/01/11

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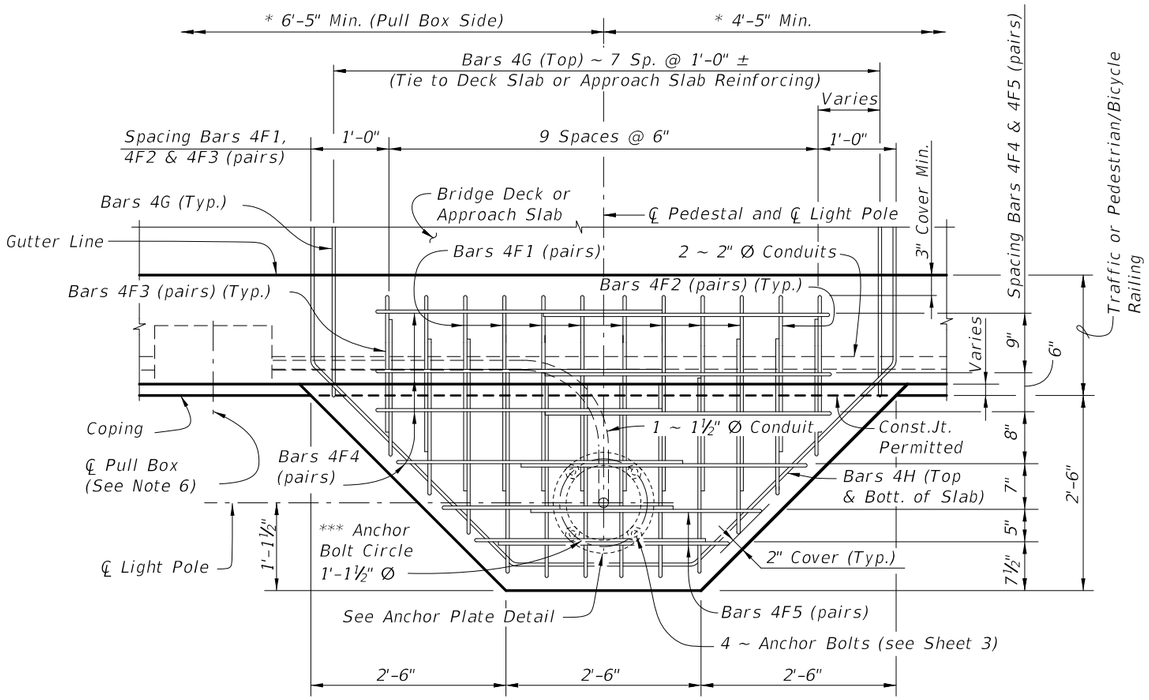
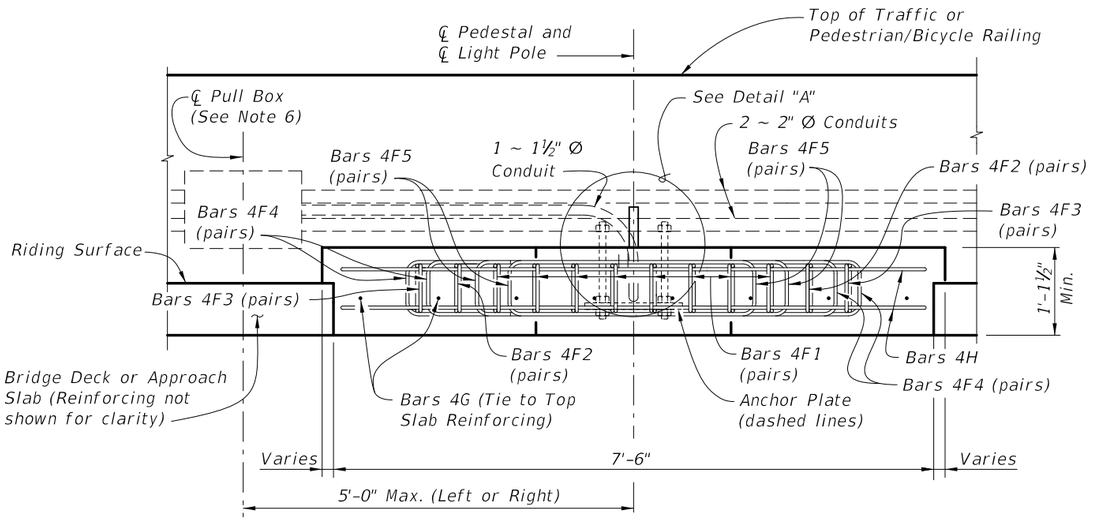
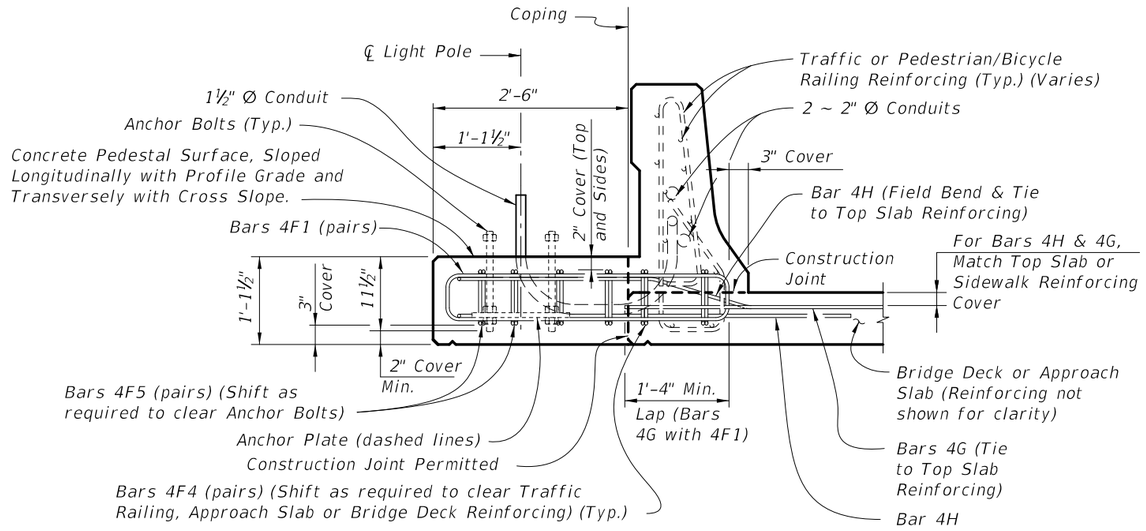


* Slip Forming Method of Construction requires the Engineer's approval within the limits shown.
** For Index No. 820 – Pedestrian/Bicycle Railing, this dimension is 3½". For all other Railings, this dimension is 1'-0" Max.
*** Anchor Bolt pattern orientation shall be as shown.

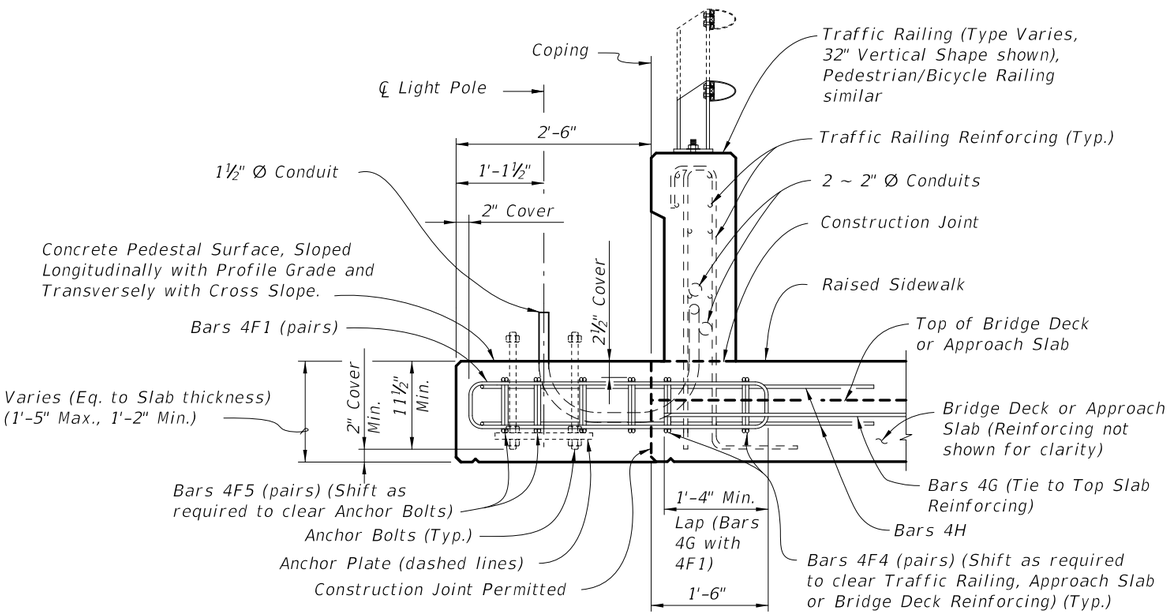
PLAN VIEW



ELEVATION VIEW



TYPICAL SECTION AT LIGHT POLE PEDESTAL FOR APPROACH SLAB OR BRIDGE DECK THICKNESS LESS THAN 1'-1½" AT COPING



TYPICAL SECTION AT LIGHT POLE PEDESTAL FOR APPROACH SLAB OR BRIDGE THICKNESS LESS THAN 1'-5½" AT COPING

CROSS REFERENCE:
For Detail "A", Anchor Plate Detail and Light Pole Pedestal Notes, see Sheet 3.

NOTE: Anchor Bolt, Nuts, Washers and Anchor Plate are dashed for clarity.

LIGHT POLE PEDESTAL FOR APPROACH SLAB OR BRIDGE DECK THICKNESS LESS THAN 1'-5½" AT COPING

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	Revised Typical Sections and "*" Slip Form Note. Deleted 1" Ø Weep Hole (PVC Conduit), Anchor Bolt size, 2 ~ Bars 4F4, and Bars 4G in bottom of deck slab. Changed spacing of Bars 4F. Added Lap Length for Bars 4G with 4F1.	01/01/11	GJM	Changed "Pilaster" to "Pedestal".

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LIGHT POLE PEDESTAL

Interim Date 01/01/11

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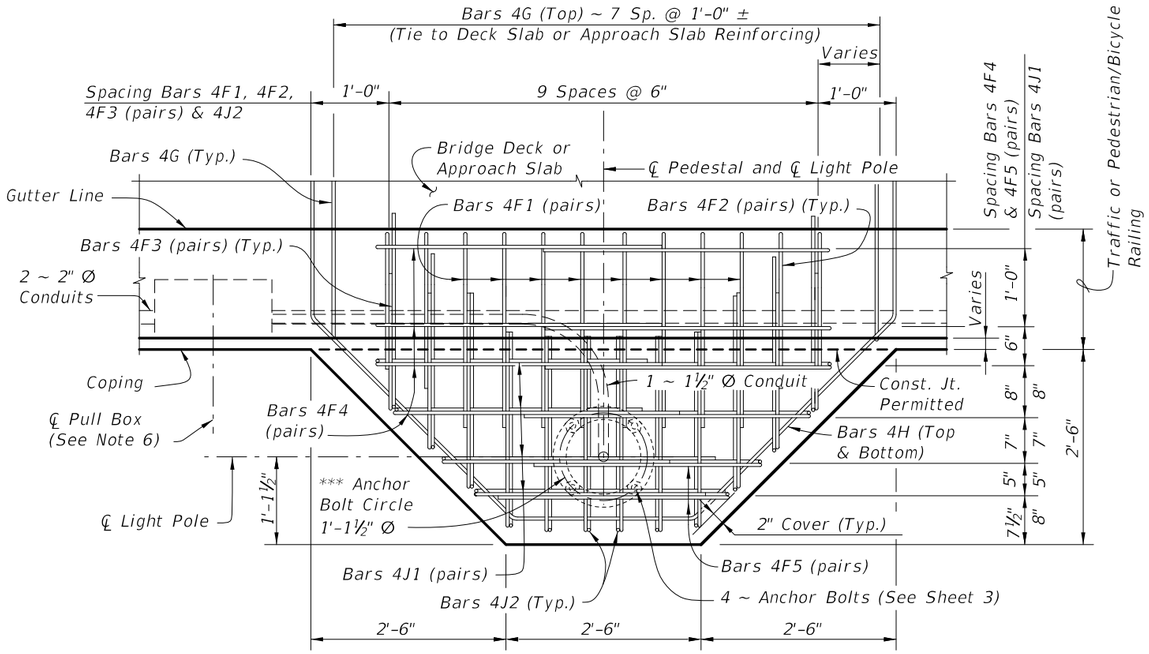
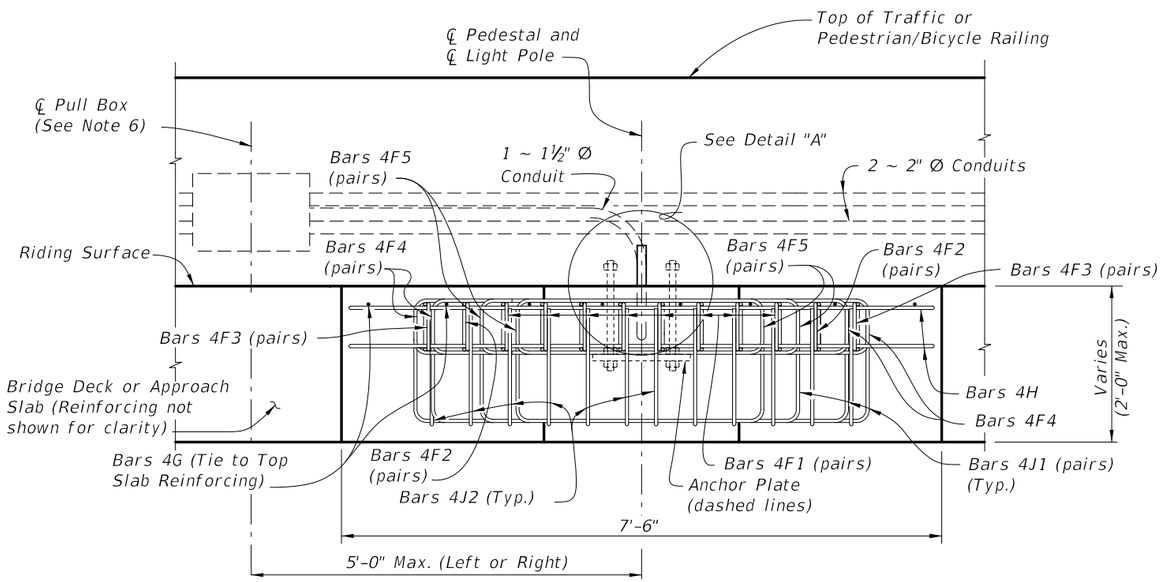
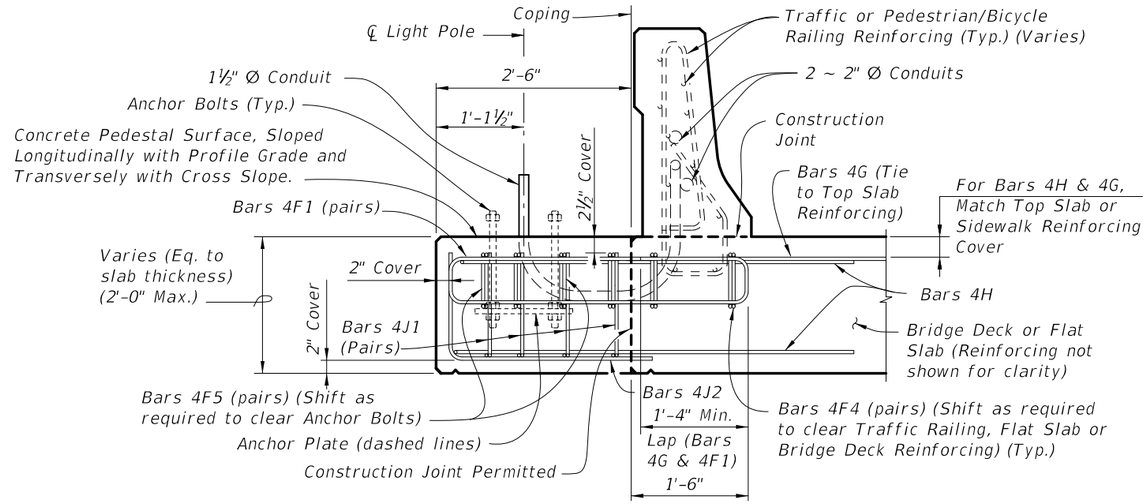


*** Anchor Bolt pattern orientation shall be as shown.

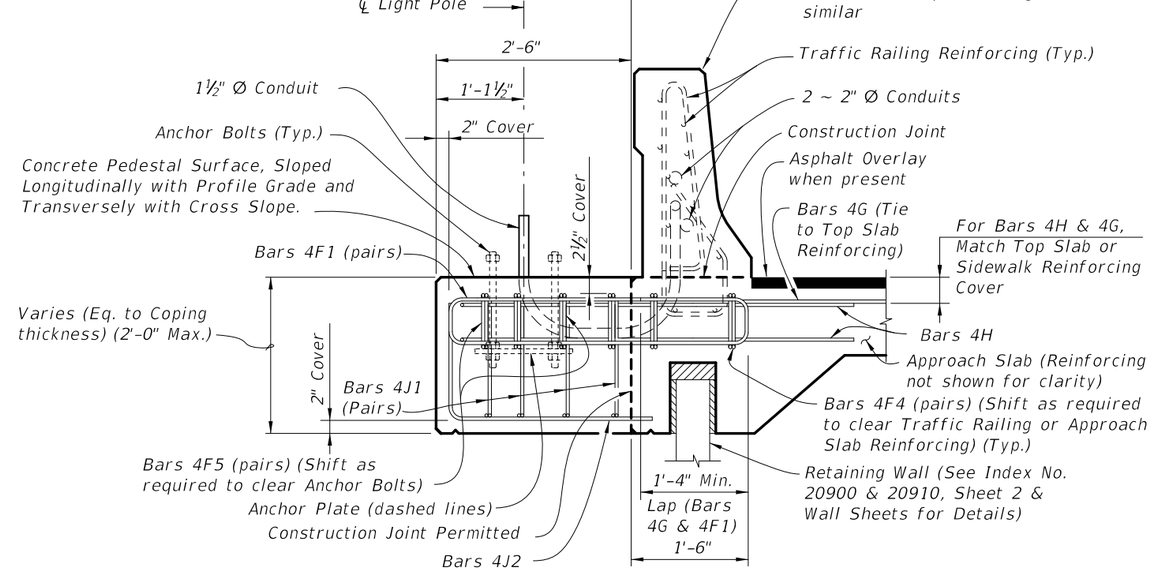
PLAN VIEW



ELEVATION VIEW



TYPICAL SECTION AT LIGHT POLE PEDESTAL FOR FLAT SLAB OR BRIDGE DECK THICKNESS AT COPING 1'-5½" OR GREATER



TYPICAL SECTION AT LIGHT POLE PEDESTAL FOR APPROACH SLAB ON RETAINING WALL

CROSS REFERENCE:
For Detail "A", Anchor Plate Detail and Light Pole Pedestal Notes, see Sheet 3.

NOTE: Anchor Bolt, Nuts, Washers and Anchor Plate are dashed for clarity.

LIGHT POLE PEDESTAL FOR APPROACH SLAB OR BRIDGE DECK THICKNESS AT COPING 1'-5½" OR GREATER

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Sheet Added			
01/01/11	GJM	Changed "Pilaster" to "Pedestal".			

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2010 Interim Design Standard

LIGHT POLE PEDESTAL

Interim Date 01/01/11

Sheet No. 2 of 3

Index No. 21200

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

REINFORCING STEEL NOTES:

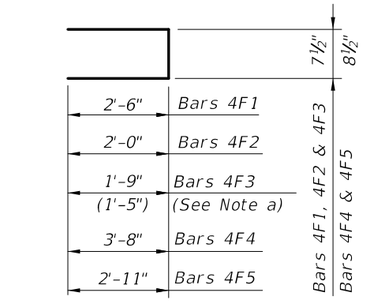
a. When Pedestal is attached to Pedestrian/Bicycle Railing – Index No. 820 and the Bridge Deck or Approach Slab thickness is less than 1'-1½", Bars 4F3 shall have leg length and bar length shown in parentheses.

b. The number of bars shown in parentheses is for Bars 4F4 when Pedestal is attached to Pedestrian/Bicycle Railing – Index No. 820, and the Bridge Deck or Approach Slab thickness is less than 1'-1½".

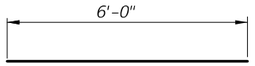
c. Lap Splices for Bars 4F1, 4F2 & 4F3 shall be a minimum of 1'-4". Lap Splices for Bars 4F4 & 4F5 shall be minimum of 1'-8".

d. Bars 4J1 and 4J2 are not required when Pedestal thickness is less than 1'-5½". Field trim height of bars to maintain cover when Pedestal thickness is less than 2'-0". Field trim length of Bars 4J2 on Retaining Wall Coping to maintain cover.

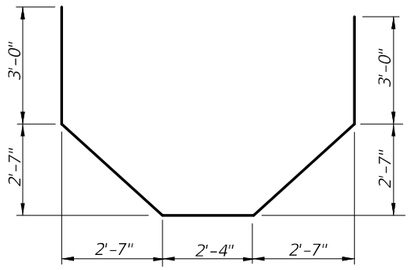
e. All bar dimensions in the bending diagrams are out to out.



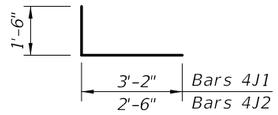
BARS 4F1, 4F2, 4F3, 4F4 & 4F5



BAR 4G



BAR 4H

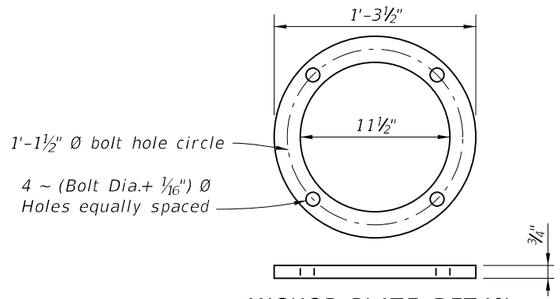


BARS 4J1 & 4J2

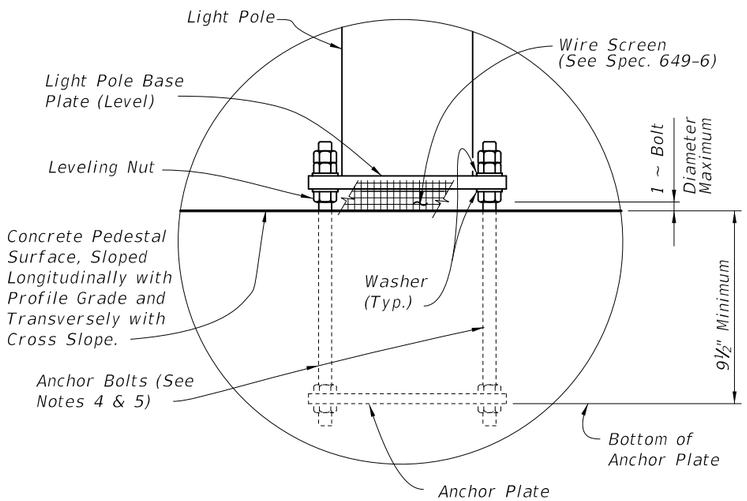
BILL OF REINFORCING STEEL

MARK	SIZE	NO. REQD.	LENGTH	NOTES
F1	4	16	5'-8"	c
F2	4	4	4'-8"	c
F3	4	4	4'-2" (3'-6")	a, c
F4	4	8 (6)	8'-3"	b, c
F5	4	4	6'-7"	c
G	4	8	6'-0"	–
H	4	2	15'-8"	–
J1	4	8	4'-8"	d
J2	4	12	4'-0"	d

( ) See Reinforcing Steel Note a & b.



ANCHOR PLATE DETAIL



DETAIL "A"

CROSS REFERENCE:
For location of Detail "A" see Sheets 1 and 2.

LIGHT POLE PEDESTAL NOTES

1. Concrete and Reinforcing Steel required for the construction of the Pedestal shall meet the same requirements as the Traffic Railing or Pedestrian/Bicycle Railing the Pedestal is attached to.

2. Light Pole Pedestal may be used with the following:
   Index No. 420 – Traffic Railing (32" F Shape),
   Index No. 422 – Traffic Railing (42" Vertical Shape),
   Index No. 423 – Traffic Railing (32" Vertical Shape),
   Index No. 424 – Traffic Railing (Corral Shape),
   Index No. 425 – Traffic Railing (42" F Shape),
   Index No. 820 – Pedestrian/Bicycle Railing,
   Index No. 821 – Aluminum Pedestrian/Bicycle Bullet Railing for Traffic Railing (32" F Shape), or
   Index No. 5210 – Traffic Railing /Sound Barrier (Bridge).
   Unless otherwise noted, Traffic Railing (32" F Shape) is shown in all Views and Sections. The Pedestal details for other Traffic Railings or Pedestrian/Bicycle Railing are similar.

3. The Pedestal and Deck are designed to resist the following Working Loads from the Light Pole applied at the top of the Pedestal:
   Axial Dead Load = 1.56 Kip
   Wind Load Moment about Transverse Axis = 40.60 Kip-Ft.
   Wind Load Moment about Longitudinal Axis = 28.30 Kip-Ft.
   Deadload Moment about Longitudinal Axis = 1.69 Kip-Ft.
   Maximum Shear = 1.38 Kip
   Torsion about Pole Axis = 3.56 Kip-Ft.

TABLE 1 - DESIGN LIMITATIONS FOR 1" Ø ANCHOR BOLTS (LOAD CASE 1)

WIND SPEED (MPH)	ARM LENGTH (Ft.)	BRIDGE DECK HEIGHT (Ft.)* DESIGN MOUNTING HEIGHT 40 Ft.	45 Ft.	50 Ft.
110	≤ 15	75	75	75
130	8 & 10	75	75	75
130	12	75	75	70
130	15	75	75	40
150	8	75	75	10
150	10	75	50	n/a
150	12	75	45	n/a
150	15	75	30	n/a

* Above natural ground or MLW.

4. ANCHOR BOLT DESIGN:
   Anchor Bolt design is based on the standard Roadway Aluminum Light Pole configurations shown on Index No. 17515 and the following design limitations:
   Load Case 1: See Table 1
   Load Case 2: 150 mph Design Wind Speed, 15' arm length, 50' Design Mounting Height with a 75' bridge deck height above natural ground, or MLW.

   Anchor Bolt Diameter: 1" Ø (Load Case 1), 1 ¼" Ø (Load Case 2).
   Anchor Bolts: ASTM F1554 Grade 55.
   Nuts: ASTM A563 Grade A, Heavy-Hex.
   Washers: ASTM F436 Type 1.
   Anchor Plate: ASTM A709 (Grade 36) or ASTM A36.
   All Nuts, Bolts and Washes shall be galvanized by ASTM F2329.

   The Contractor is responsible for ensuring the anchor bolt configuation is compatible with the light pole base plate. Submit modifications of the anchor bolt design to the Engineer for approval.

5. Anchor Bolts must be installed plumb.

6. For Conduit, Pull Box, Expansion/Deflection Fitting and adjacent Reinforcing Steel Details, see Utility Conduit Detail Sheets.

7. PAYMENT: The cost of Wire Screen, Anchor Bolts, Nuts, Washers and Anchor Plates shall be included in the Bid Price for Light Poles. The cost of all Labor, Concrete and Reinforcing Steel required for the Construction of the Pedestals, Pull Boxes, and Miscellaneous Hardware required for the completion of the Electrical System, shall be included in the Bid Price for the Traffic Railing or Pedestrian/Bicycle Railing the Pedestal is attached to.

ESTIMATED LIGHT POLE PEDESTAL QUANTITIES PER LIGHT POLE PEDESTAL

ITEM	UNIT	QUANTITY
Concrete Per Pedestal Thickness	CY/In.	0.040
Reinforcing Steel	Lb.	195 (182)

(The Reinforcing Steel quantity shown in parenthesis is for a Pedestal attached to Pedestrian/Bicycle Railing – Index No. 820 with Bridge Deck or Approach Slab thinner than 1'-1½". Add 59 Lbs. for Bars 4J1 & 4J2 when Pedestal Thickness is greater than 1'-5")

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Deleted "INSTRUCTION TO DESIGNERS" note; Changed "Pilaster" to "Pedestal".			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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LIGHT POLE PEDESTAL

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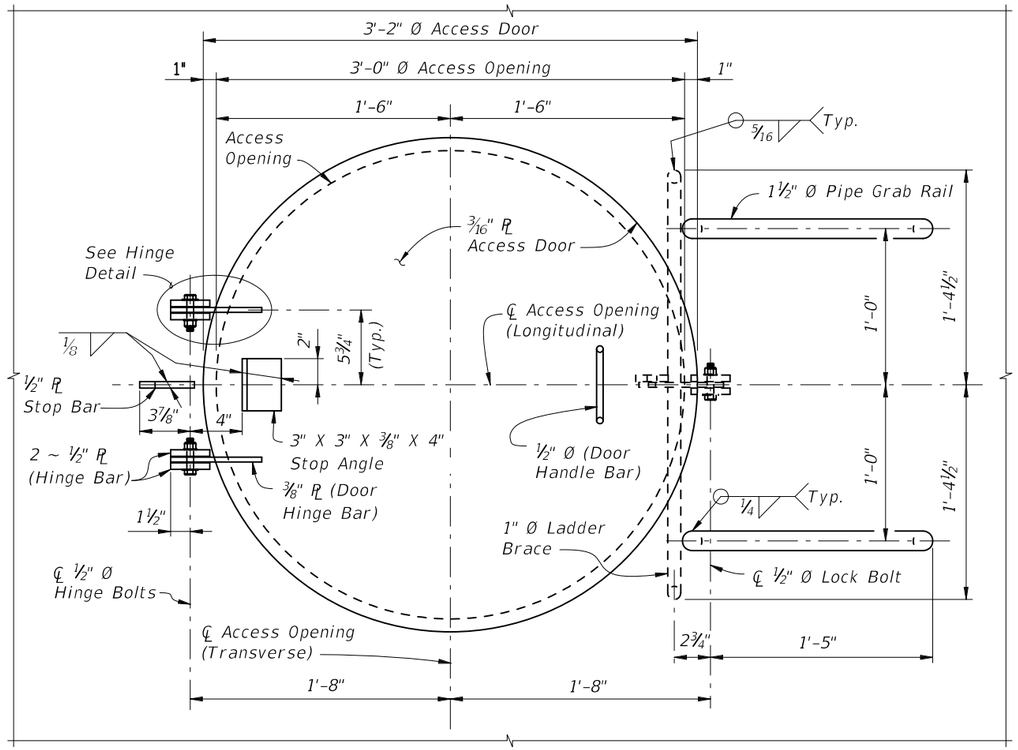
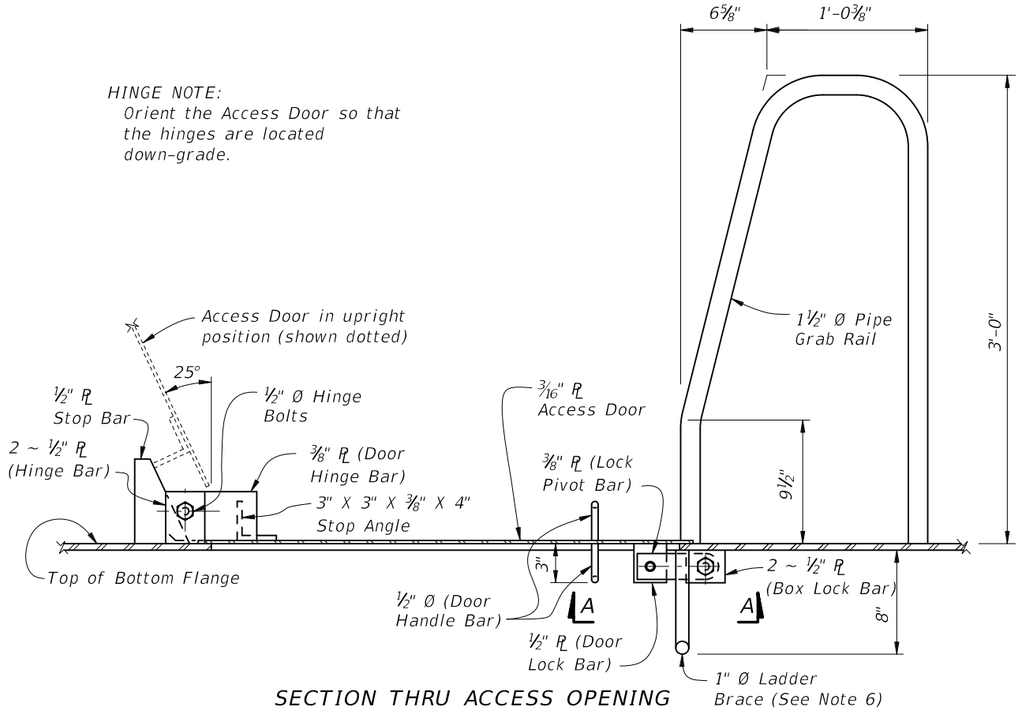
Sheet No. 3 of 3

Index No. 21200

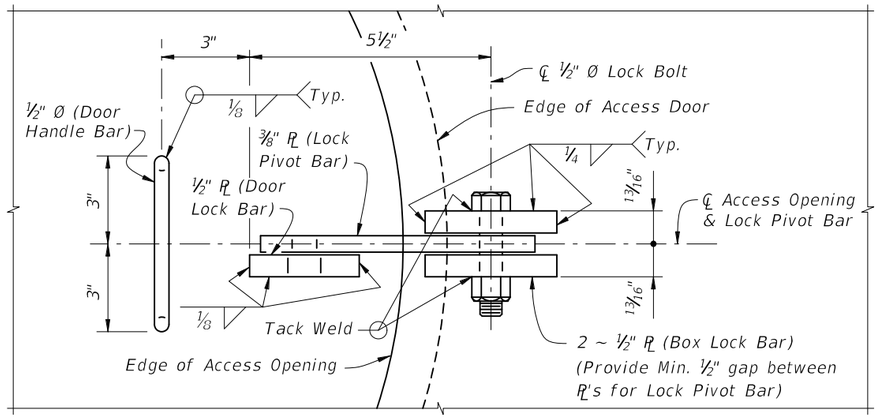


PLAN VIEW OF ACCESS HATCH ASSEMBLY

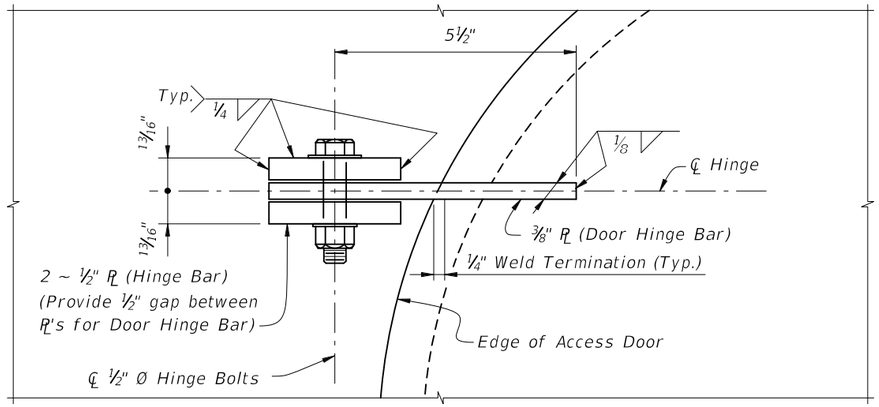
HINGE NOTE:
Orient the Access Door so that the hinges are located down-grade.



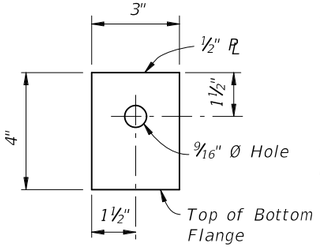
SECTION THRU ACCESS OPENING



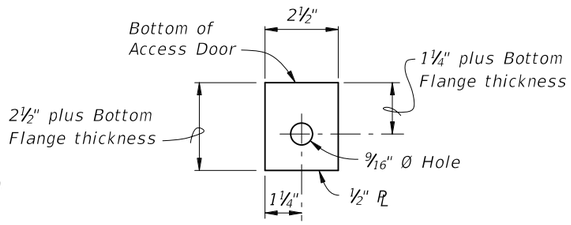
BOTTOM VIEW A-A



HINGE DETAIL

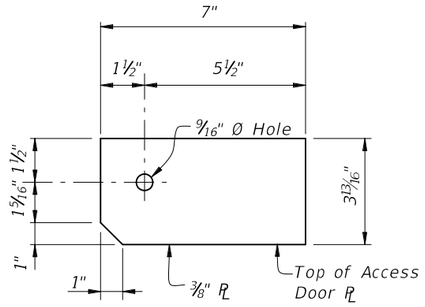


HINGE BAR DETAIL

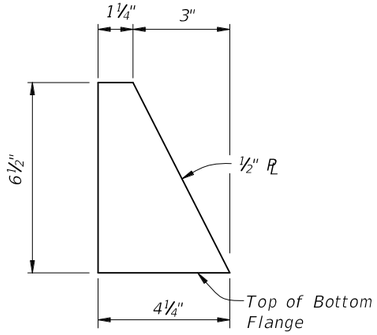


DOOR LOCK BAR DETAIL

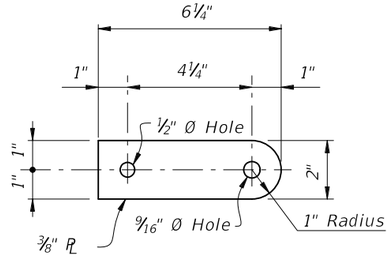
NOTES:
1. All Structural Steel material in Access Door Assemblies shall conform to ASTM A709 Grade 36.
2. 1½" Ø Pipe Grab Rail shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40).
3. ½" Ø Door Handle Bar and 1" Ø Ladder Brace shall be in accordance with ASTM A36.
4. All bolts shall conform to ASTM A307 or A449. All nuts shall conform to ASTM A563 and all washers shall conform to ASTM F-436.
5. All exposed edges of plates and openings shall be ground smooth.
6. Place Ladder Brace near the End Bents exclusively and only when the height is reasonable for access by a Ladder.
7. See Framing Plan sheets for locations of Access Door Openings.
8. Coat structural steel in accordance with Section 560 of the Standard Specifications.
9. All costs associated with Access Hatch Assembly and incidental items will be paid for under the Access Hatch Assembly pay item. No separate payment will be made for coating structural steel.



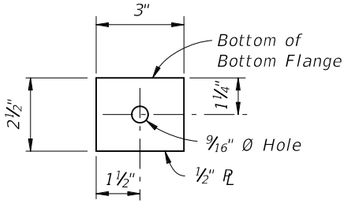
DOOR HINGE BAR DETAIL



STOP BAR DETAIL



LOCK PIVOT BAR DETAIL



BOX LOCK BAR DETAIL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Design Standard.			

2010 Interim Design Standard

ACCESS HATCH ASSEMBLY FOR STEEL BOX SECTIONS

Interim Date	Sheet No.
01/01/11	1 of 1
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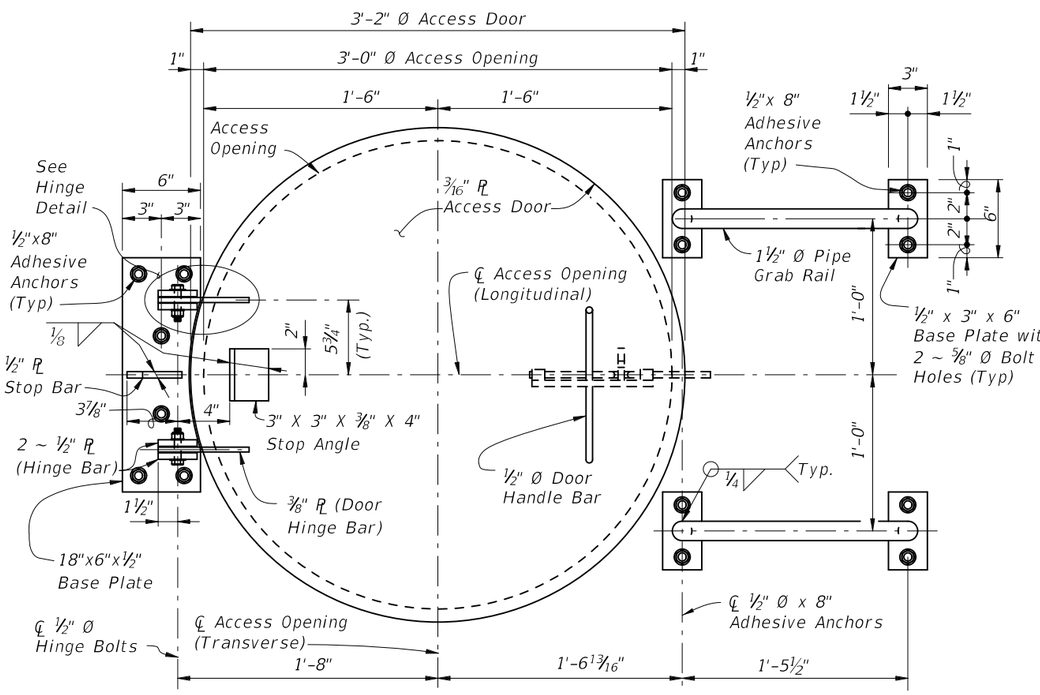
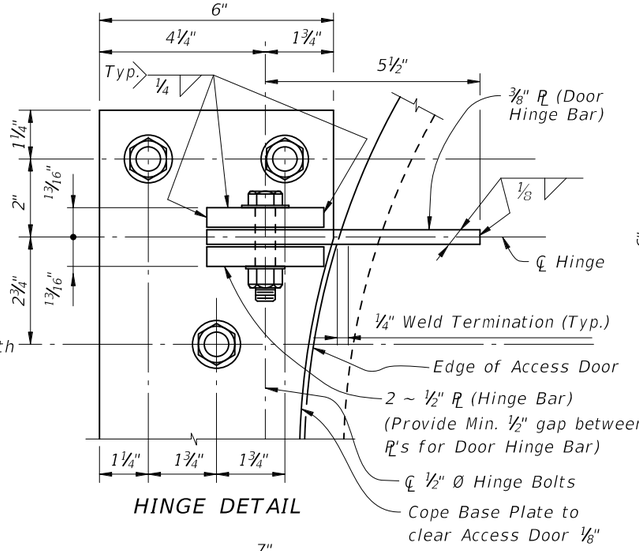
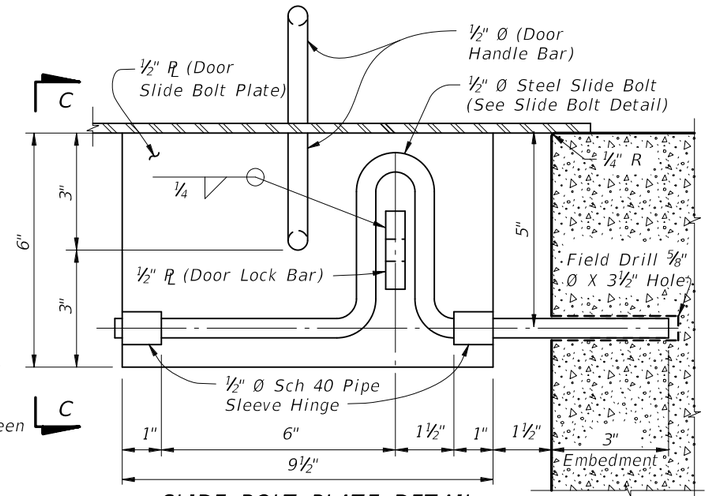
21250	



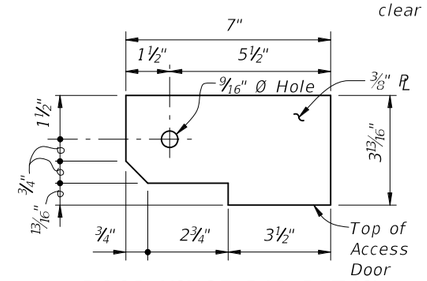
PLAN VIEW OF ACCESS HATCH ASSEMBLY



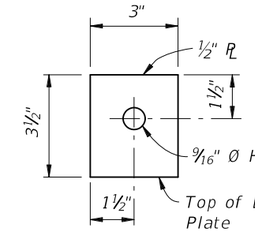
HINGE DETAIL



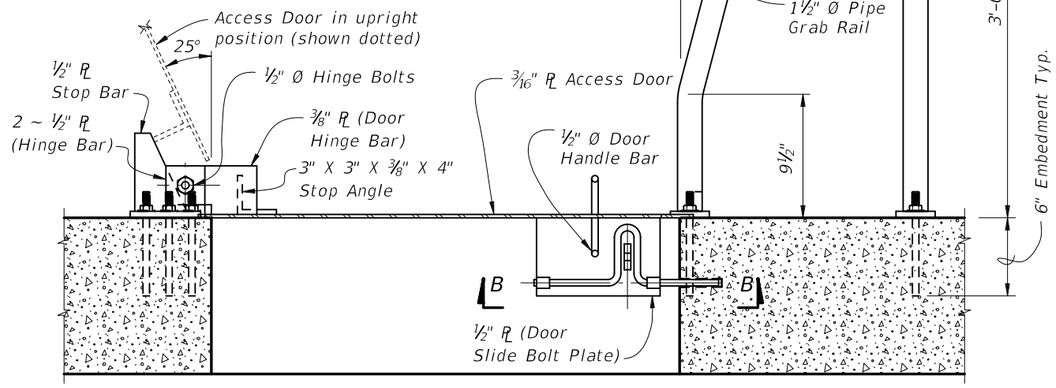
SLIDE BOLT PLATE DETAIL



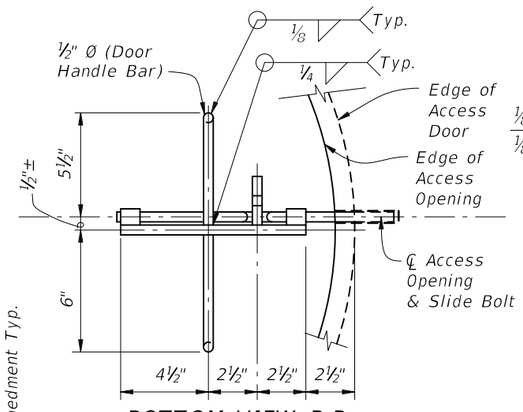
DOOR HINGE BAR DETAIL



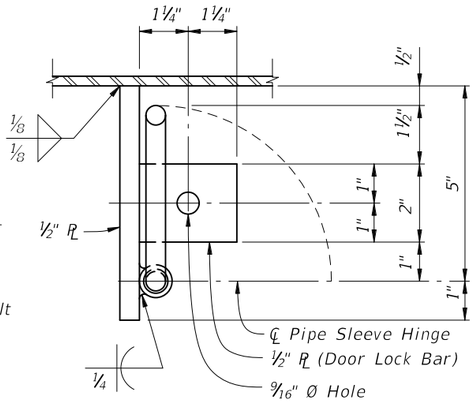
HINGE BAR DETAIL



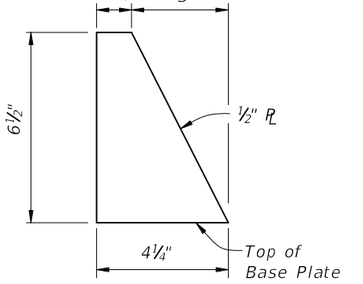
SECTION THRU ACCESS OPENING



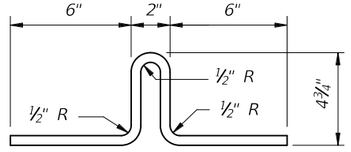
BOTTOM VIEW B-B



VIEW C-C



STOP BAR DETAIL



SLIDE BOLT DETAIL

NOTES:
1. All Structural Steel material in Access Door Assemblies shall conform to ASTM A709 Grade 36.
2. 1½" Ø Pipe Grab Rail shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40).
3. ½" Ø Door Handle Bar shall be in accordance with ASTM A36.
4. All bolts shall conform to ASTM A307 or A449. All nuts shall conform to ASTM A563 and all washers shall conform to ASTM F-436.
5. All exposed edges of plates and openings shall be ground smooth.
6. See Framing Plan sheets for locations of Access Door Openings.
7. Coat structural steel in accordance with Section 560 of the Standard Specifications.
8. All costs associated with Access Hatch Assembly and incidental items will be paid for under the Access Hatch Assembly pay item. No separate payment will be made for coating structural steel.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	New Design Standard			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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ACCESS HATCH ASSEMBLY FOR CONCRETE BOX SECTIONS

Interim Date 01/01/11

Sheet No. 1 of 1

Index No. 21251

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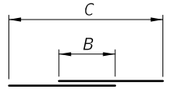

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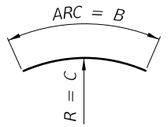

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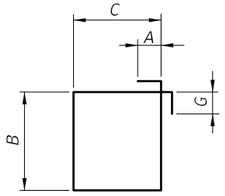

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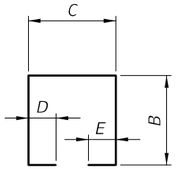

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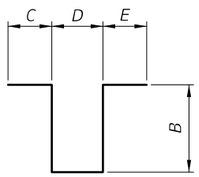

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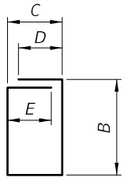

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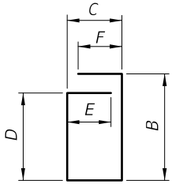

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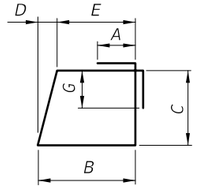

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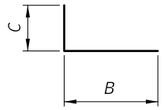

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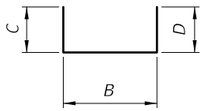

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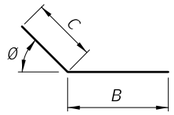

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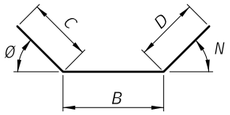
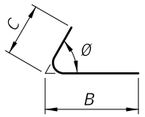


TYPE 13



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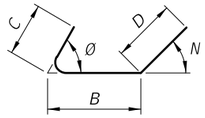
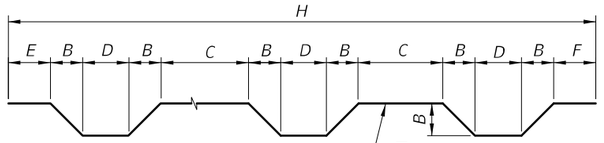
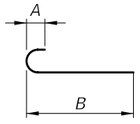


TYPE 15

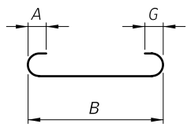


TYPE 16

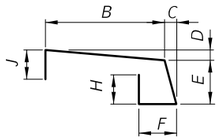
Number of Beams or Walls = N
Number of D's = N-1
Number of B's = 2N-2
Number of C's = N-2
45° Typical



TYPE 17



TYPE 18



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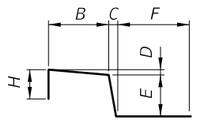

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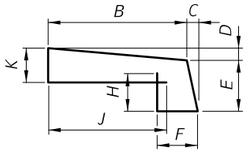

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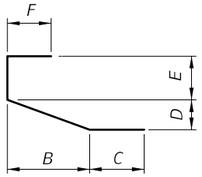

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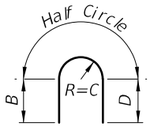
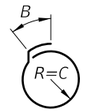
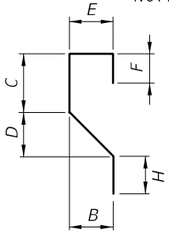


TYPE 23



TYPE 24

NOTE: Type 17 Bars used in Superstructures shall be tilted to obtain Minimum cover.



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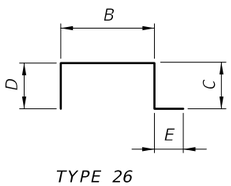

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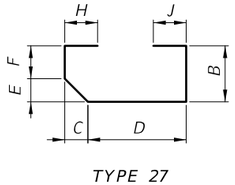
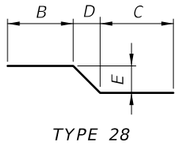
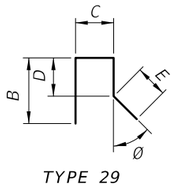


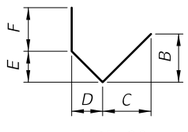
TYPE 27



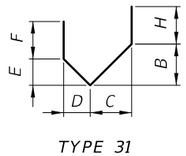
TYPE 28



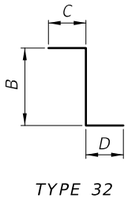
TYPE 29



TYPE 30



TYPE 31



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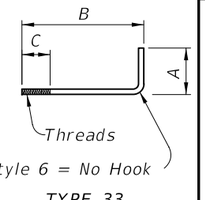
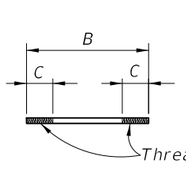


Style 6 = No Hook

TYPE 33



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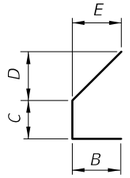

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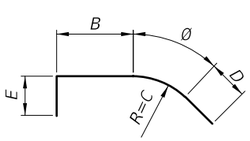

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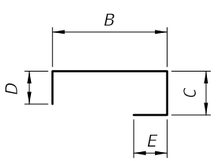

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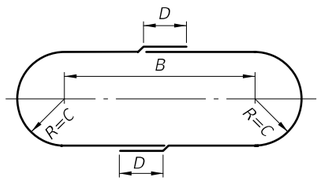
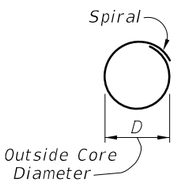
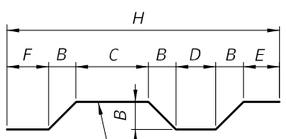


TYPE 38



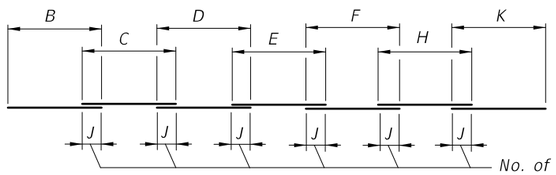
TYPE 39

C = Pitch
B = Overall Height
Ø = Spirals shall be made of ASTM A615 Grade 60 billet steel using either plain or deformed bars ASTM A615 or Cold drawn steel wire ASTM A82.
N = Total number of closed turns at Top and Bottom of columns
Splices may be accomplished by lapping 1.5 turns. Cost of Channel Spacers and Splices shall be included in the Contract Unit Price for Reinf. Steel (Substructure)

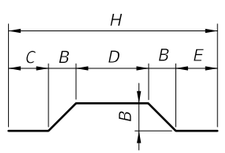


Number of Beams or Walls = N
Number of D's = N-1
Number of B's = 2N-1
Number of C's = N-1
45° Typical

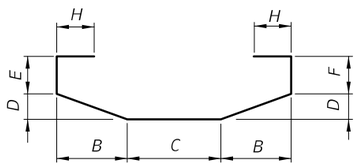
TYPE 40



TYPE 41

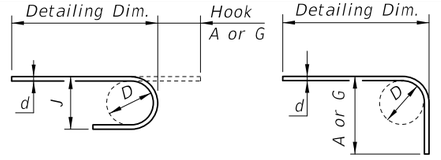


TYPE 42



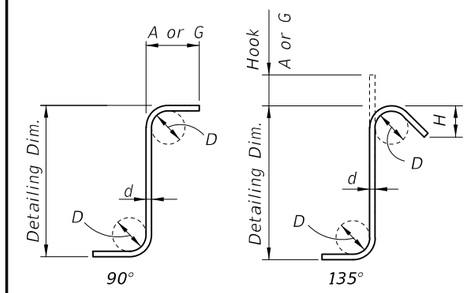
TYPE 43

HOOK DETAILS



180° 90°

BAR SIZE	D	180° HOOKS A OR G	180° HOOKS J	90° HOOKS A OR G
#3	2¼"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3¾"	7"	5"	10"
#6	4½"	8"	6"	1'-0"
#7	5¼"	10"	7"	1'-2"
#8	6"	11"	8"	1'-4"
#9	9½"	1'-3"	11¾"	1'-7"
#10	10¾"	1'-5"	1'-1¼"	1'-10"
#11	12"	1'-7"	1'-2¾"	2'-0"
#14	18¼"	2'-3"	1'-9¾"	2'-7"
#18	24"	3'-0"	2'-4½"	3'-5"
STYLE		1		3



90° 135°

STIRRUPS (TIES SIMILAR)

RECOMMENDED STIRRUP & TIE HOOK DIMENSIONS

BAR SIZE	D	90° HOOKS A or G	135° HOOKS A or G	135° HOOKS H *
#3	1½"	4"	4"	2½"
#4	2"	4½"	4½"	3"
#5	2½"	6"	5½"	3¾"
#6	4½"	1'-0"	8"	4½"
#7	5¼"	1'-2"	9"	5¼"
#8	6"	1'-4"	10½"	6"
STYLE		4	5	

STYLE 6 = NO HOOK

* Dimension is approximate.

Hook Styles Detailed on this sheet are for Illustration Only.

Actual Hook Style for any particular bar will be shown under A or G Heading on REINFORCING BAR LIST sheet(s) in Structures Plans.

All Dimensions are out-to-out.

NOTE: For Bar Dimensions See REINFORCING BAR LIST Sheet(s) in Structures Plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Added dimension "H" to Bar TYPE 25			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

STANDARD BAR BENDING DETAILS

Interim Date 01/01/11

Sheet No. 1 of 1

Index No. 21300

GENERAL NOTES:

This Standard is only applicable to the current FDOT inventory of temporary bridge components which are manufactured in accordance with Acrow Series 300, Double Wide design. See the associated Instructions for Design Standards (IDS) for more information.

Work this Standard with Index Nos. 21610, 21620 and 21630.

STRUCTURAL STEEL:
Steel Plates and Rolled Sections shall be ASTM A 709 Grade 36.
Pipe piles shall be ASTM A 252 Grade 2, Fy = 35 ksi.

BOLTS, LAG SCREWS AND THREADED BOLT STOCK:
Furnish high strength bolts in accordance with ASTM A325. Furnish Threaded Stock in accordance with ASTM A36. Furnish Lag Screws in accordance with ASTM A307. Furnish steel washers and nuts compatible with Bolts, Threaded Stock and Lag Screws.

TIMBER AND LAGGING:
Timber and Lagging shall be No. 1 Southern Yellow Pine.

BACKWALL BENT PILES:
Timber Piles:
10' Minimum Embedment into compacted backfill or into soil having a blow count greater than 6 (N>6).
Ultimate Capacity greater than 18 tons.
Splices are not allowed on any timber piles.

H-Piles:
12' Minimum Embedment into compacted backfill or into soil having a blow count greater than 6 (N>6).
Ultimate Capacity greater than 18 tons.

Shims admissible between backwall pile and cap.
Test piles are not required for backwall piles.

EXPANSION BEARINGS:
Inspect the PTFE (Teflon) layer and stainless steel plate prior to installation.
Do not use bearings that have a severely damaged or unbonded PTFE layer.
Clean PTFE of all grit and grime prior to installation.
Clean Stainless steel plate of all grit and grime prior to installation and finish to a smooth buffed surface.

DISTRIBUTING BEAMS:
Longitudinal stops restraining the distributing beams may be lengthened or shortened to center the distributing beam bearing on the cap beam.
The longitudinal stops are to bear on the distributing beam end frame.

EXPANSION JOINT SETTINGS:
Install the expansion joint considering the total continuous bridge length, location of fixed bearings and ambient temperature at the time of installation, assume a 1" expansion joint opening at 70 degrees F.

STORAGE FACILITY:
Contact
FDOT Statewide Aluminum Shop
2590 Camp Rd.
Oviedo, Fl.
407-977-6520
For shipping weights and dimensions of Temporary Bridge elements.

SHIPPING WEIGHTS AND DIMENSIONS:

Decking Sizes:

Type	Length	Width	Weight (lbs.)
Curb	5'	6'-9"	800
Curb	10'	6'-9"	1420
Curb	15'	6'-9"	2200
Curb	20'	6'-9"	2800
NonCurb	5'	5'-3"	650
NonCurb	10'	5'-3"	1000
NonCurb	15'	5'-3"	1600
NonCurb	20'	5'-3"	2100

Shipping weights and dimensions of other bridge components can be referenced in "Acrow Panel Bridging, Series 300, Technical Handbook".

PAYMENT:
Temporary Detour Bridge is to be paid for under Contract Unit Price for Special Detour. If a temporary bridge system other than that shown herein is used, the Contractor is responsible for renting or purchasing their own system.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	GJM	Added Payment and Applicability notes. Moved "INSTRUCTION TO DESIGNERS" note to IDS.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

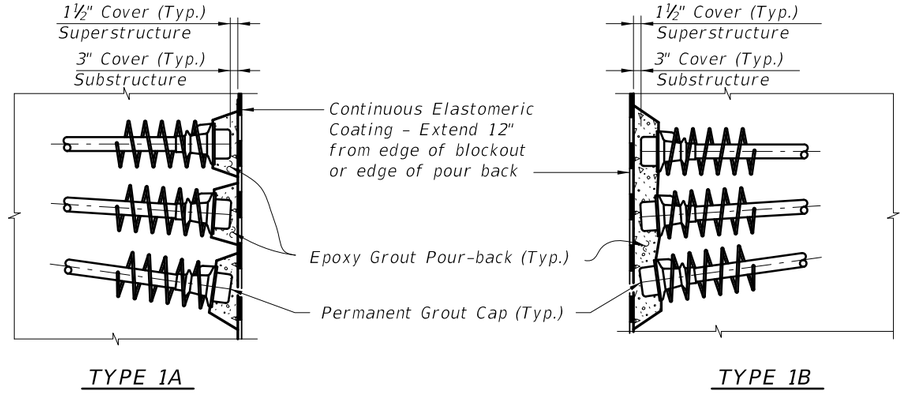
2010 Interim Design Standard

TEMPORARY DETOUR BRIDGE GENERAL NOTES AND DETAILS

Interim Date 01/01/11

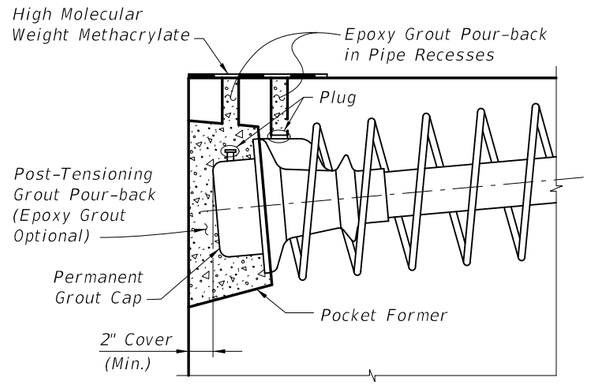
Sheet No. 1 of 7

Index No. 21600



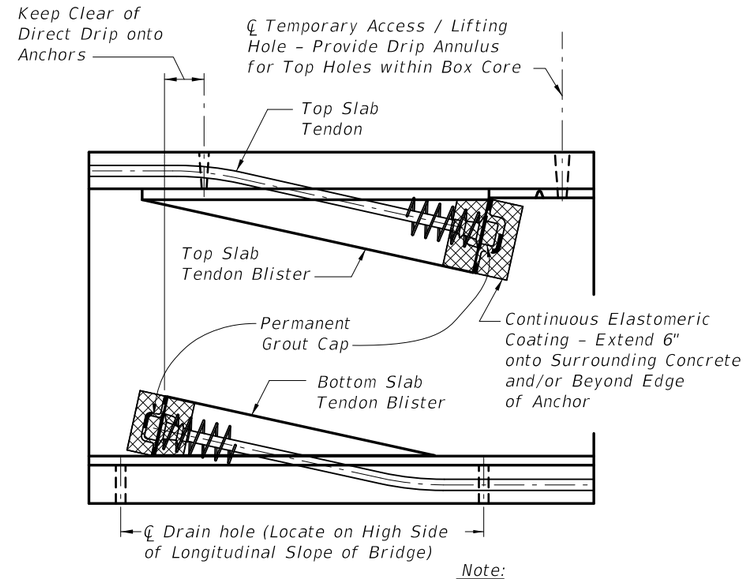
TYPE 1A TYPE 1B

TYPICAL ALTERNATE POUR-BACK TREATMENTS FOR ANCHOR PROTECTION ON EXPOSED SURFACES AND EXPANSION JOINTS



TYPE 2

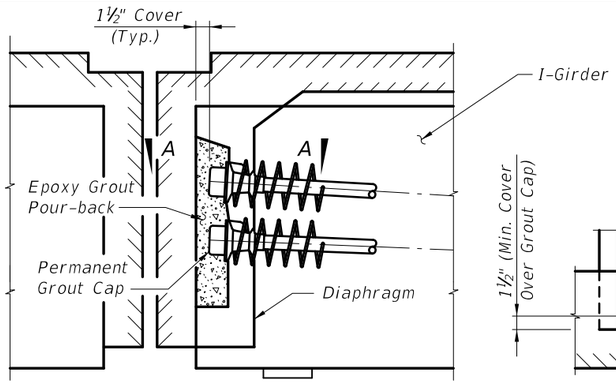
TOP INSPECTED ANCHOR PROTECTION



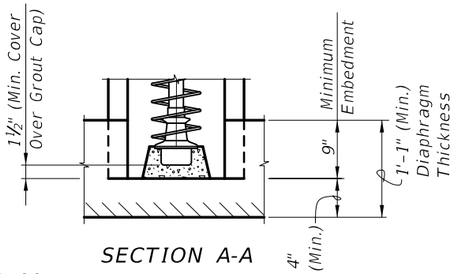
Note:
Pour-backs not Required for Interior Anchors on Blisters or Pier Segments

TYPE 3

ANCHOR PROTECTION FOR INTERIOR ANCHORS IN CELLULAR BOXES ON BLISTERS OR PIER SEGMENTS (NOT FOR USE IN EXPANSION JOINTS)

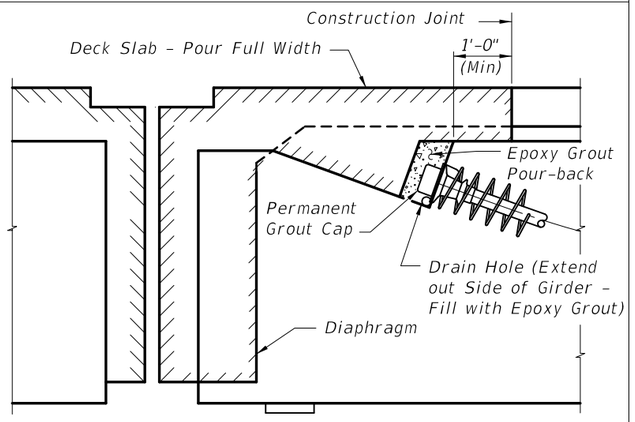


ELEVATION



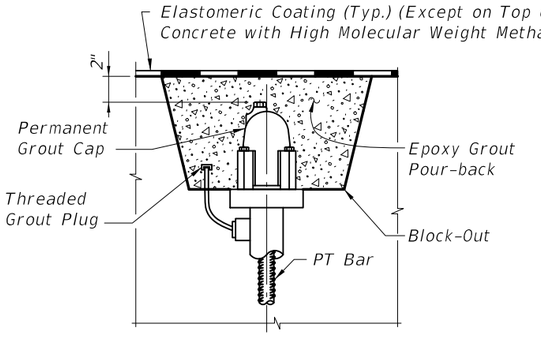
SECTION A-A

TYPE 4A

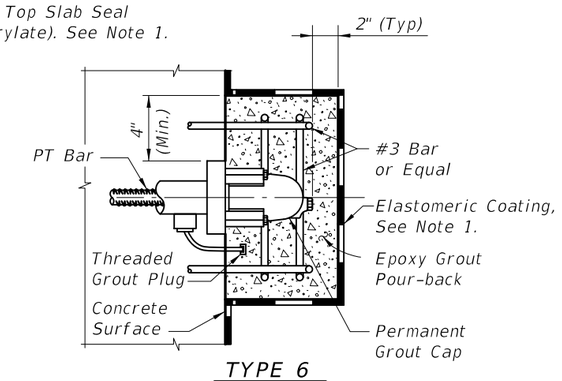


TYPE 4B

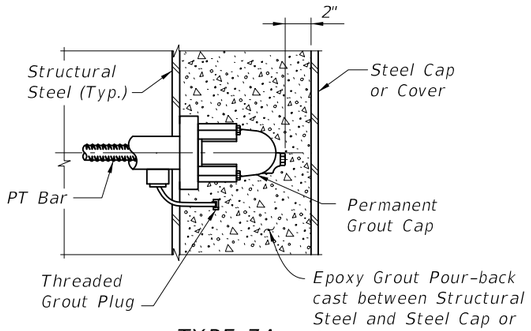
ANCHOR PROTECTION FOR POST-TENSIONED I-GIRDERS



TYPE 5

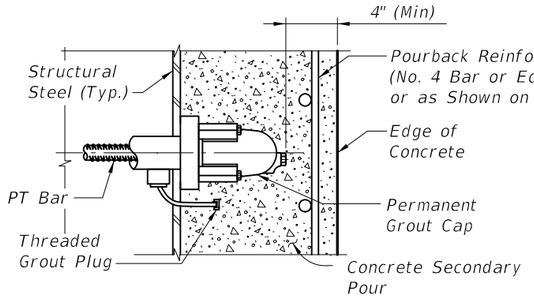


TYPE 6



TYPE 7A

See Note 2.



TYPE 7B

(Shear Studs not Shown for Clarity)
See Note 2.

Notes:
1. Extend elastomeric coating 12" onto concrete edges or 12" beyond edge of anchor pour-back.
2. Use for integral caps only. For integral cap with strand, use Type 1A or 1B.

ANCHOR PROTECTION FOR PT BARS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	JVH	Changed Anchor & Grout Cap details for Type 5, 6, & 7. Added 7B & moved 8 & 9 to Sheet 2 of 2.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

POST-TENSIONING ANCHORAGE PROTECTION

Interim Date 01/01/11

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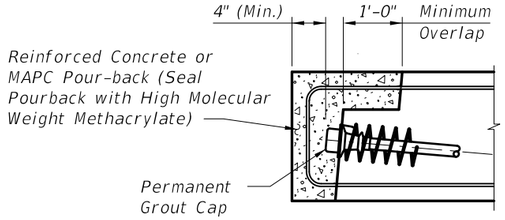
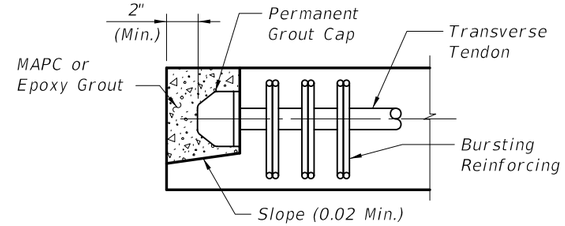


TYPE 8

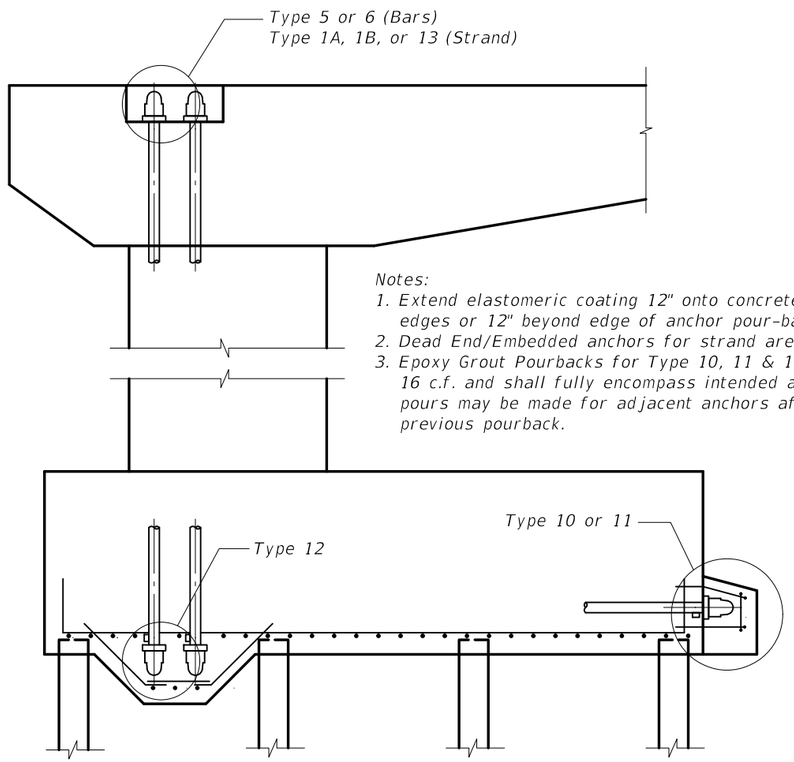
FLAT SLAB
ANCHOR PROTECTION



Notes:
1. Traffic or Pedestrian/Bicycle Railing Not Shown for Clarity.
2. Where Pourback is not Protected by Traffic or Pedestrian/Bicycle Railing, Coat Pourback with High Molecular Weight Methacrylate.

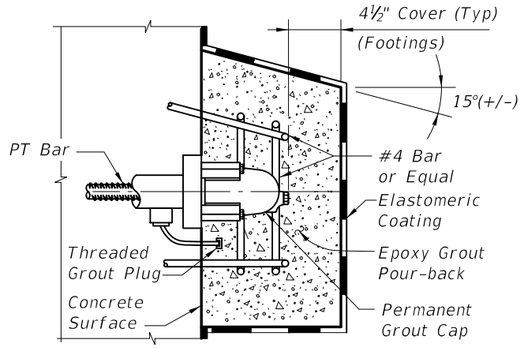
TYPE 9

TRANSVERSE TENDON
ANCHOR PROTECTION

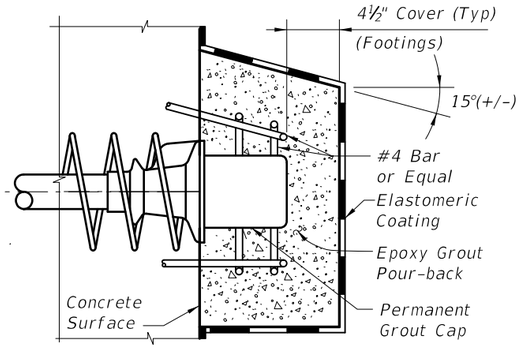


Notes:
1. Extend elastomeric coating 12" onto concrete edges or 12" beyond edge of anchor pour-back.
2. Dead End/Embedded anchors for strand are not allowed.
3. Epoxy Grout Pourbacks for Type 10, 11 & 13 shall not exceed 16 c.f. and shall fully encompass intended anchor(s). Adjacent pours may be made for adjacent anchors after initial cure of previous pourback.

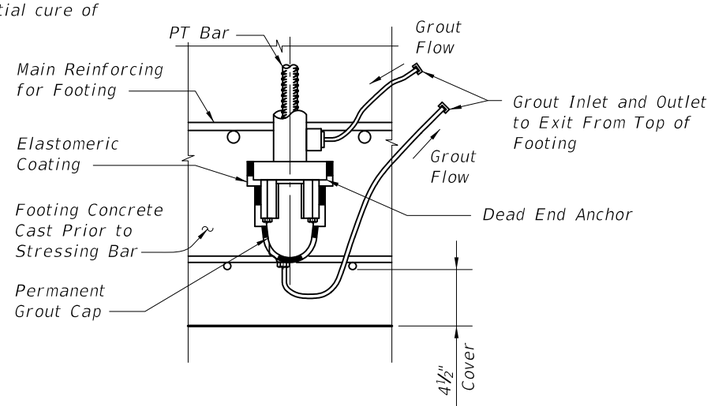
FOOTING/PIER SCHEMATIC



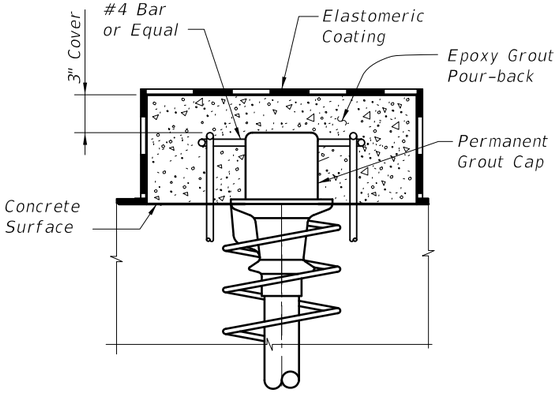
TYPE 10



TYPE 11



TYPE 12



TYPE 13

ANCHOR PROTECTION FOR PT BARS/STRAND FOR POST-TENSIONED FOOTINGS/PIERS/C-PIERS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	JVH	New sheet added.			

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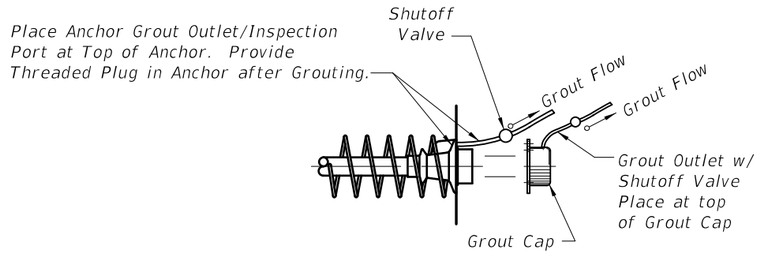
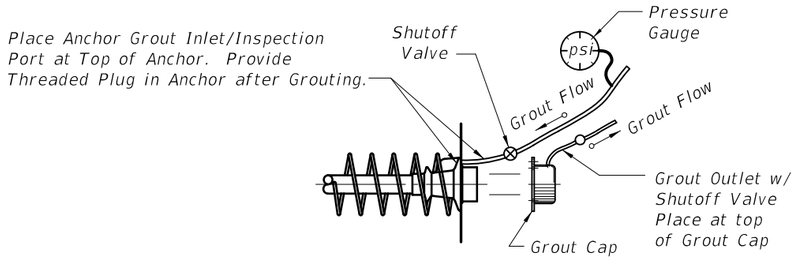
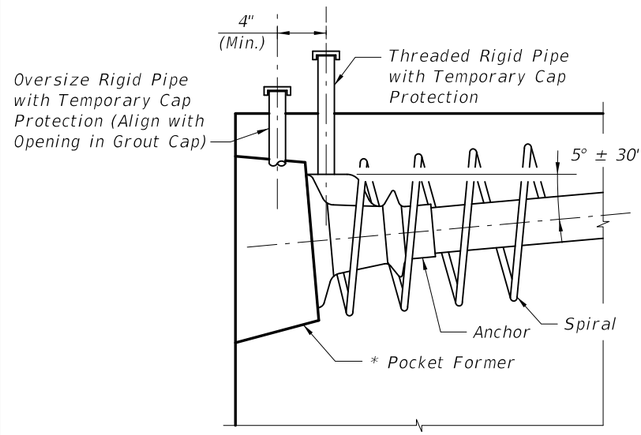
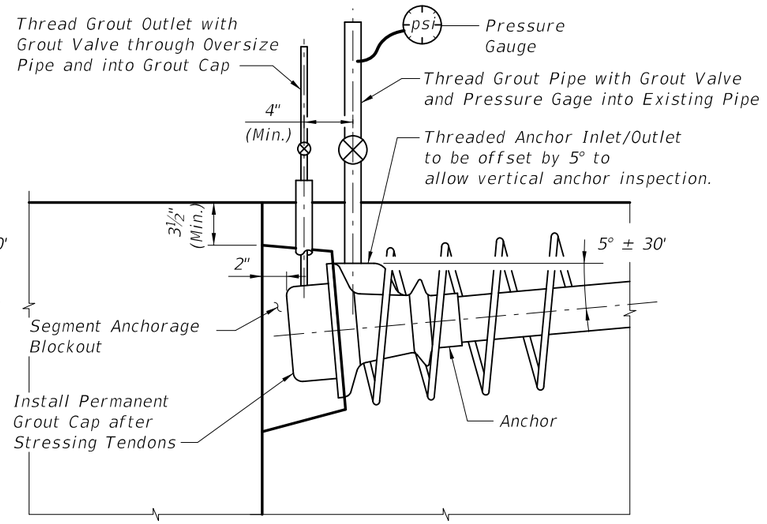


DETAIL A - FACE INSPECTED
ANCHOR WITH GROUT OUTLET



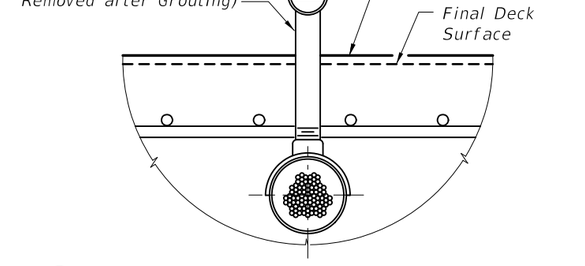
FACE INSPECTED
ANCHOR WITH GROUT INLET



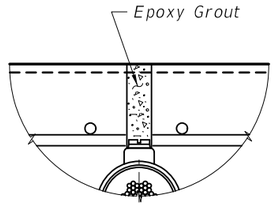


1 INSTALLATION & SHIPPING

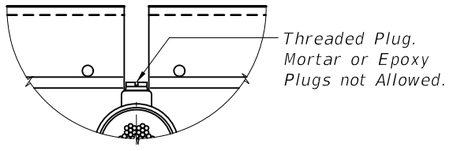
2 GROUTING



1 GROUT OUTLET CONNECTION TO TENDON



3 FILLING POCKET

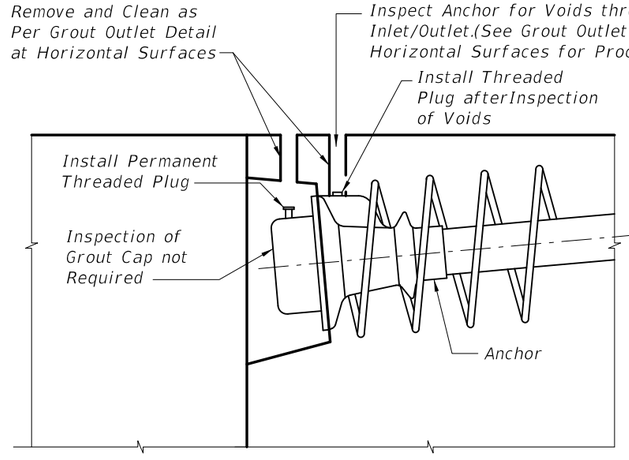


2 POCKET PREPARATION

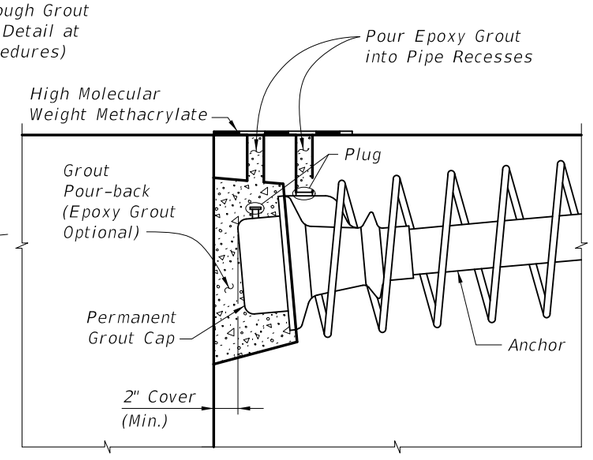
PROCEDURE

1. Remove Rigid Grout Pipe.
2. Inspect Tendon for Voids as Necessary.
3. Vacuum Grout as Required and Allow Grout to Cure. Remove Pipe used for Vacuum Grouting.
4. Clean Threads and Rethread as Required.
5. Install Threaded Plug into Outlet to Form a Tight Fit.
6. Over-Ream Hole (¼" Ø Over-Ream) Clean and Roughen Sides.
7. Fill Pocket with Epoxy Grout.

GROUT OUTLET DETAIL AT HORIZONTAL SURFACES



3 INSPECTION



4 PROTECTION

NOTES

1. Holes used for the Inspection and Grout Inlets/Outlets may be Formed using Tapered Pipes or Mandrels.

TOP INSPECTED ANCHOR WITH GROUT INLET
INSTALLATION, GROUTING, INSPECTION & PROTECTION

* Round ◯ Pocket Former – Gravity Fed Placement of Grout Acceptable
Modified Square ⬠ Pocket Former – Gravity Fed Placement of Grout Acceptable
Square □ Pocket Former – Vacuum Grouting Required

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CEB	Revised Top Inspected Anchor with Grout Inlet details.			

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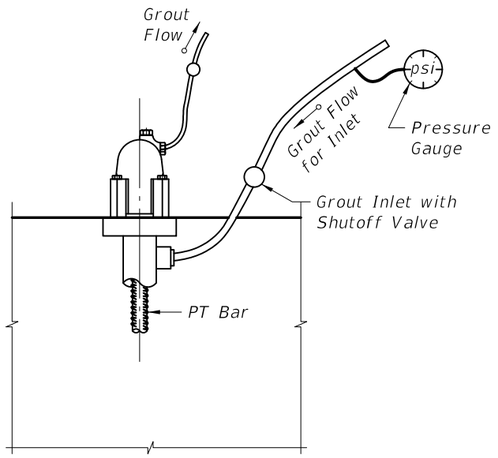
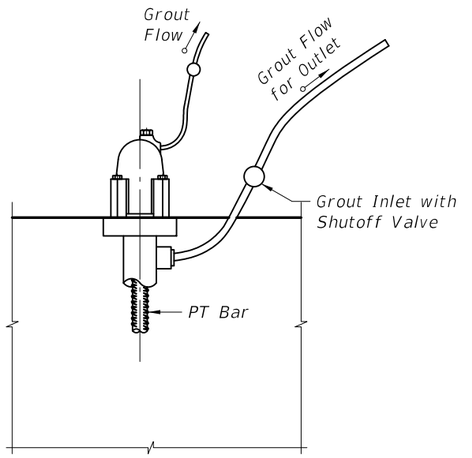


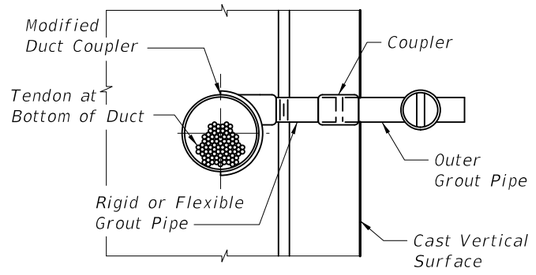
INLET END



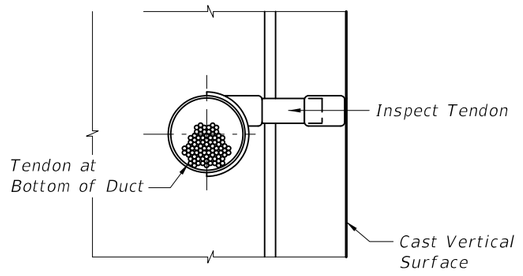
NOTE:
Anchor or Nut to allow for Flow of Grout into Cap.

OUTLET END

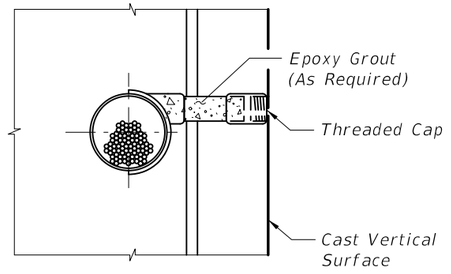
GROUT INLET AND OUTLET DETAILS FOR PT BARS



1 GROUT OUTLET CONNECTION TO TENDON



2 POCKET PREPARATION

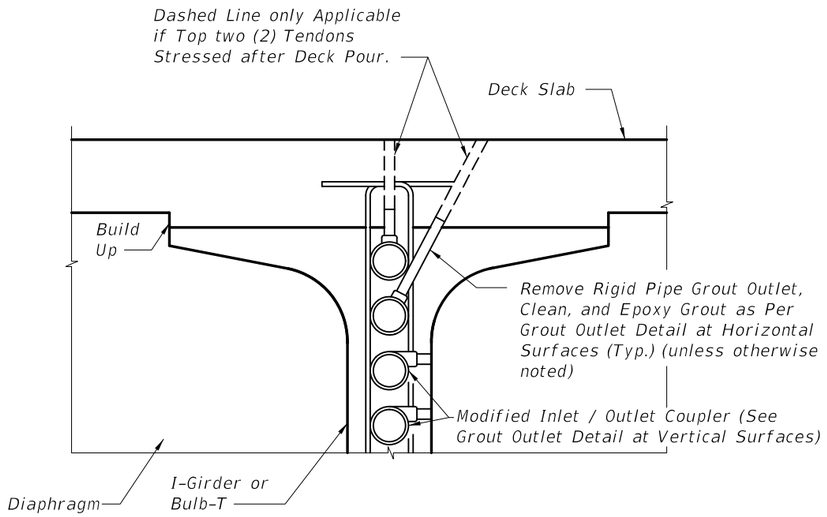


3 FILLING POCKET

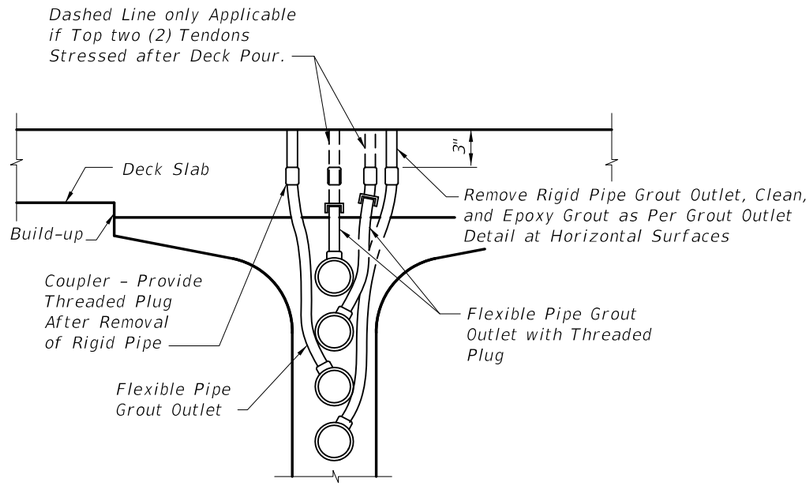
PROCEDURE

1. Remove Rigid Grout Pipe.
   or Drill Grout in Flexible Pipe.
2. Inspect Tendon for Voids as Necessary.
3. Vacuum Grout as Required and Allow Grout to Cure for 24 hr. (min.).
   Remove Pipe used for Vacuum Grouting.
4. Plug Recess with Threaded Cap on Inside Surfaces of Box Sections and Inside (nonfascia) Surfaces of I-Girders. For all other Surfaces, Plug Recess with both Threaded Cap and Epoxy Grout.

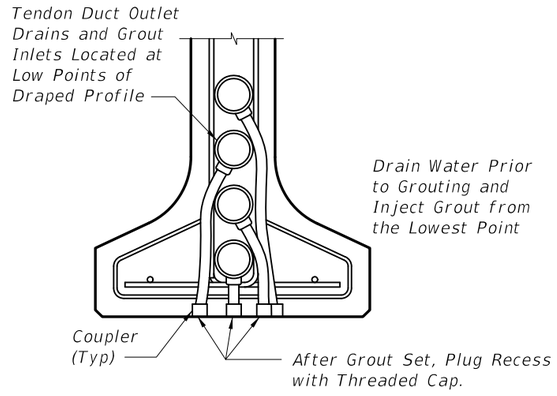
GROUT OUTLET DETAIL AT VERTICAL SURFACES



HIGH POINT INSPECTION
LOCATION AT GROUT OUTLET



TENDONS AT 3' TO 6'
FROM HIGH POINTS (GROUT OUTLET)



TENDONS AT LOW POINTS
(GROUT INLET / DRAIN)

GROUT INLET AND OUTLET DETAILS FOR I-GIRDERS/BULB-T'S

Details for C.I.P. Boxes with Internal Tendons Similar. Web Reinforcing not Shown for Clarity.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	JVH	Added Grout Outlet to PT Bar Inlet Detail & revised PT Bar Grouting Details.			

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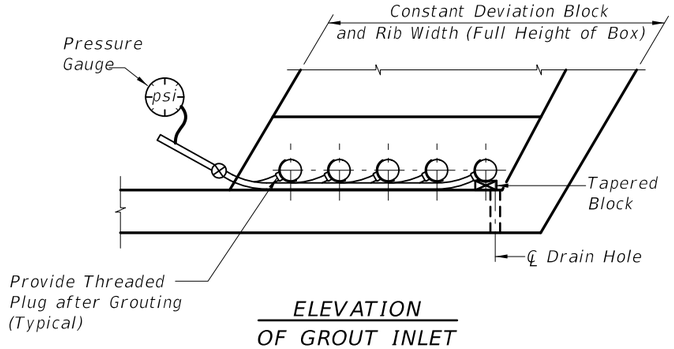
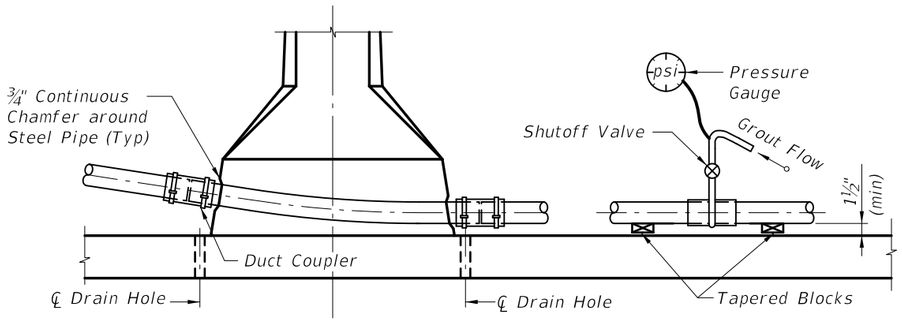


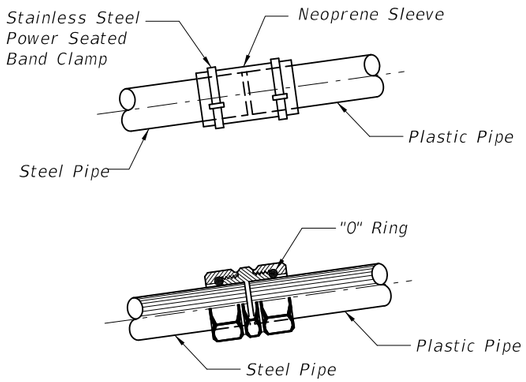
ELEVATION
OF GROUT INLET

NOTES:
Place Tapered Blocks Under Each Tendon to be Grouted to Raise Duct off Tendon Strands. Center Strands within Duct before Grouting Blocks Shall be Removed after Grout has Set. Blocks Shall not Damage or Permanently Deform Duct.

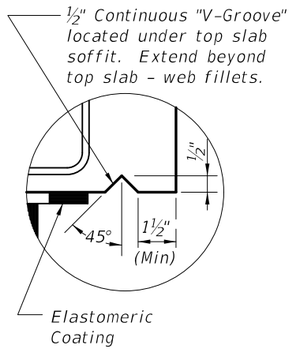


SECTION

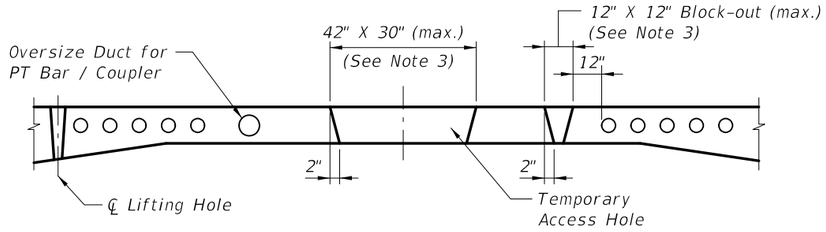
GROUTING FOR SPAN BY SPAN CONSTRUCTION



DUCT COUPLER DETAIL



DETAIL OF DRIP
LEDGE AT ABUTMENTS AND
EXPANSION JOINTS FOR SEGMENTAL
AND CAST-IN-PLACE BOX CONSTRUCTION



TEMPORARY ACCESS HOLES

Notes: Temporary Access Holes

1. Temporary access holes to facilitate access for erection, jacking and grouting operations inside the box during construction are allowed. The access holes shall be limited to a maximum size of 42" wide x 30" long and shall be limited to (1) per span.
2. Slab block-outs for temporary / permanent longitudinal post-tensioning bars are not allowed. Temporary / permanent PT bars in the top slab shall be placed in oversized ducts in the slab to accommodate both the bar and coupler.
3. In lieu of (1) 42" x 30" temporary access hole, a maximum of 2 top slab blockouts (12" x 12" (max.)) between the webs is allowed for construction per span. Block-outs shall be a minimum of 12" from the nearest duct or anchor and shall be located as to prevent direct drip onto bottom slab anchors.

Notes: Repair of Temporary Access Holes, Block-outs, and Lifting Holes

1. Form all large blockouts with tapered sides.
2. Immediately before casting the concrete, mechanically clean the mating concrete surfaces to remove any laitance and to expose small aggregate.
3. Repair all holes and blockouts with Magnesium Ammonium Phosphate Concrete within 24 hours of cleaning concrete.
4. After completion of the deck grooving, coat the repaired and surrounding concrete surfaces with High Molecular Weight Methacrylate.
5. Alternately, epoxy grout may be used to repair holes. High Molecular Weight Methacrylate is not required with epoxy grout.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/11	CEB	Added title "Grouting for Span by Span Construction".			

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