



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219 2000

Gregory A. Whirley
Acting Commissioner

September 17, 2010

MEMORANDUM

To: All Holders of the Virginia Department of Transportation's 2008 Road and Bridge Standards

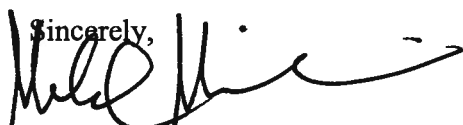
The following is a list of sheets contained in the 2008 Road and Bridge Standards that have been revised. Please add these pages to your copy of the standards. An interim standard sheet will not be required in plan assemblies for the following sheets only. Changes to these sheets will not affect the basis of payment or estimates.

PAGE	REVISION
104.09	Clarified Type B nose detail note
114.01	Corrected note callout
114.02	Corrected note callout
501.11	Clarified note C and section callouts
501.16	Clarified note C
501.18	Clarified direction of traffic
501.19	Corrected description for one way traffic
502.21	Changed note 5 from "shall be" to "may be"
502.22	Changed note 5 from "shall be" to "may be"
603.02	Clarified exit taper ratios

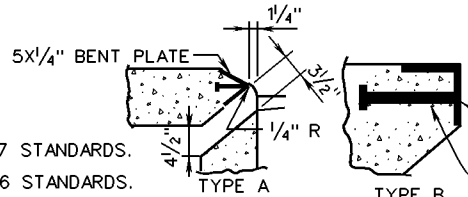
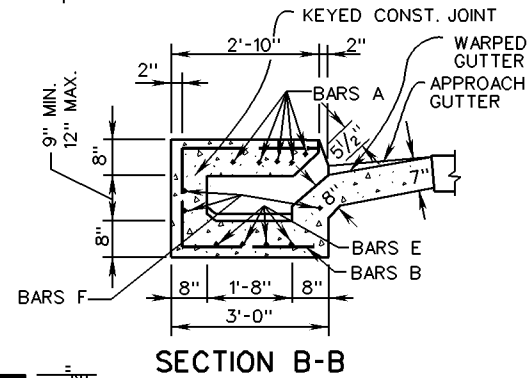
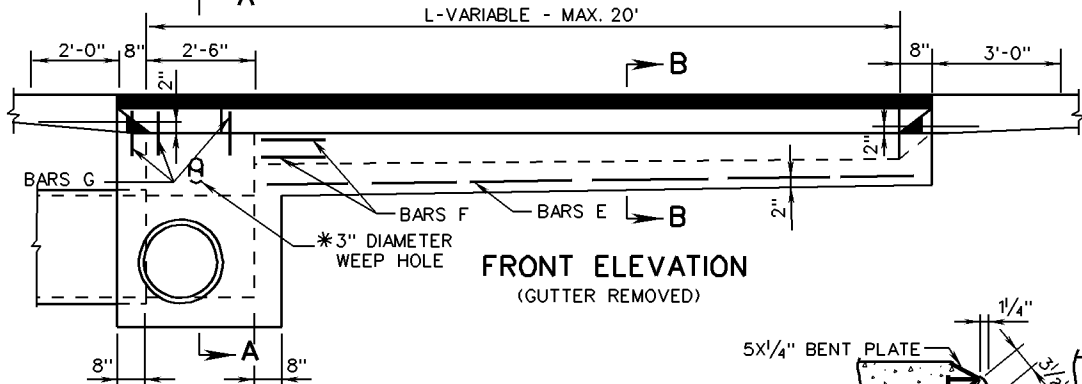
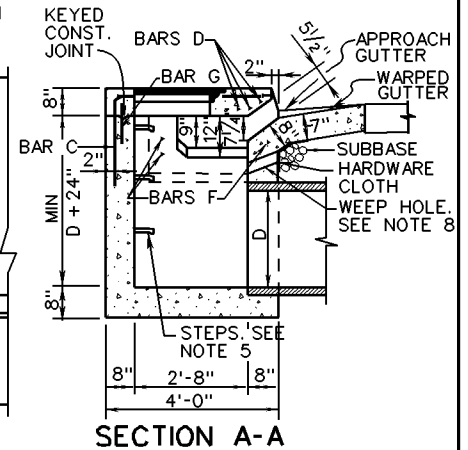
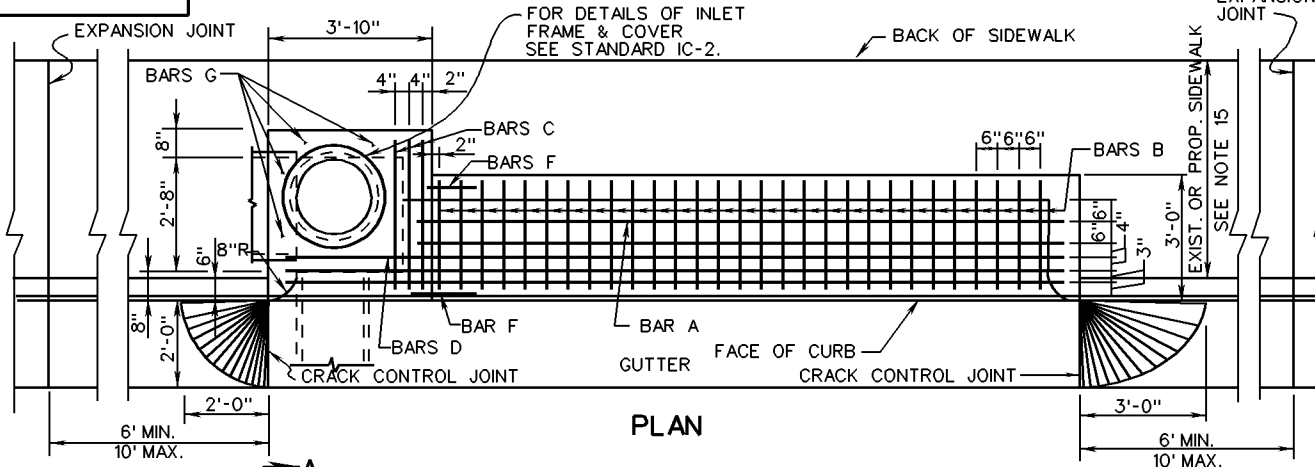
The following is a list of revised standards to the 2008 Road and Bridge Standards that require an interim standard sheet to be included in your plan assembly until the next edition of the imperial standards is published. Please add these pages to your copy of the standards. The respective interim standard sheet number has been placed with the revised standard. An interim standard sheet is available for each of these revised standards. The interim standard sheets are available on VDOT's web site, on the FTP server, and in Falcon DMS for VDOT personnel. These interim standard sheets will be required in plan assemblies for projects advertised May 10, 2011 and later.

PAGE	INTERIM	STANDARD	REVISION
203.08A	IIS02_05	CG-12	CLARIFIED SECTIONS TO SHOW CONCRETE SIDEWALK AND ADDED NOTE 5
304.03	IIS03_05	RS-4	REVISED FORMAT OF SHEET
304.04	IIS03_06	RS-5	REVISED FORMAT OF SHEET
305.01	IIS03_07	ACOT-1	NEW ASPHALT CONCRETE OVERLAY TRANSITION STANDARD REPLACES THE TPT-1 STANDARD
501.10	IIS05_07	GR-6	REVISED END ANCHORAGE BOLT SIZE TO MATCH CRASH TESTED TERMINAL
501.39	IIS05_08	GR-INS	REMOVED RADIAL GUARDRAIL, ADDED REQUIREMENT FOR GR-2A TO BE UTILIZED WITH CURB & GUTTER, ADDED DETAIL FOR MEASURING GUARDRAIL HEIGHT
601.05	IIS06_01	HR-1	REVISED STANDARD TO REFLECT PEDESTRIAN RAILINGS AND BICYCLE RAILINGS, ADDED GRIPPING RAIL DETAIL AND REQUIREMENT FOR SHOP DRAWINGS TO BE SUBMITTED
1005.17	IIS10_01	BCQ-30	REVISED FORMAT OF SHEET

If you have any questions or comments regarding this revision to the publication, please contact Chuck Patterson, at (804) 786-1805, of the Standards and Special Design Section.

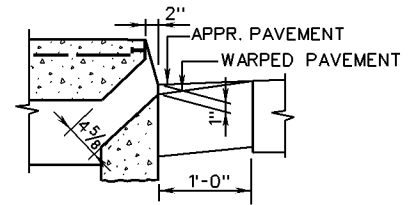
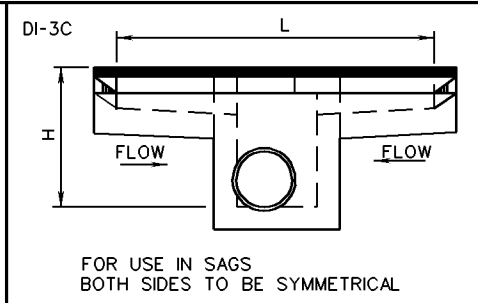
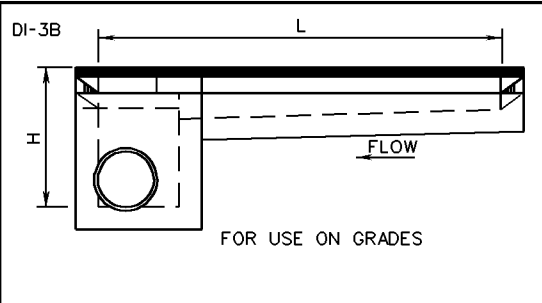
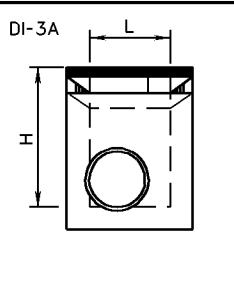
Sincerely,

 Mohammad Mirshahi, P.E.
 State Location and Design Engineer

DI-3A, 3B, 3C



TYPE A NOSE DETAIL SHALL BE USED WITH CG-3 & CG-7 STANDARDS.
 TYPE B NOSE DETAIL SHALL BE USED WITH CG-2 & CG-6 STANDARDS.
 GALVANIZED PLATE FOR TYPE A TO BE BENT ON AN ANGLE OF 68° 30' CONNECTORS AND IS TO BE ANCHORED WITH 1/2" X 4" STUD SHEAR WELDED TO BENT PLATE AT 2' C-C.

1/2" X 4" STUD SHEAR CONNECTOR WELDED TO ANGLE IRON AT 2' C-C.



DETAIL WHEN USED ADJACENT TO CURB WITHOUT GUTTER

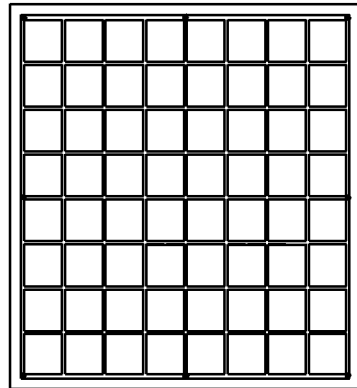
VDOT	
ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
104.09	08/10

STANDARD CURB DROP INLET

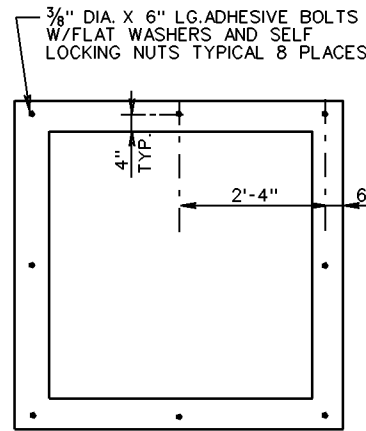
12" - 30" PIPE: MAXIMUM DEPTH (H) - 8'

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
233 302



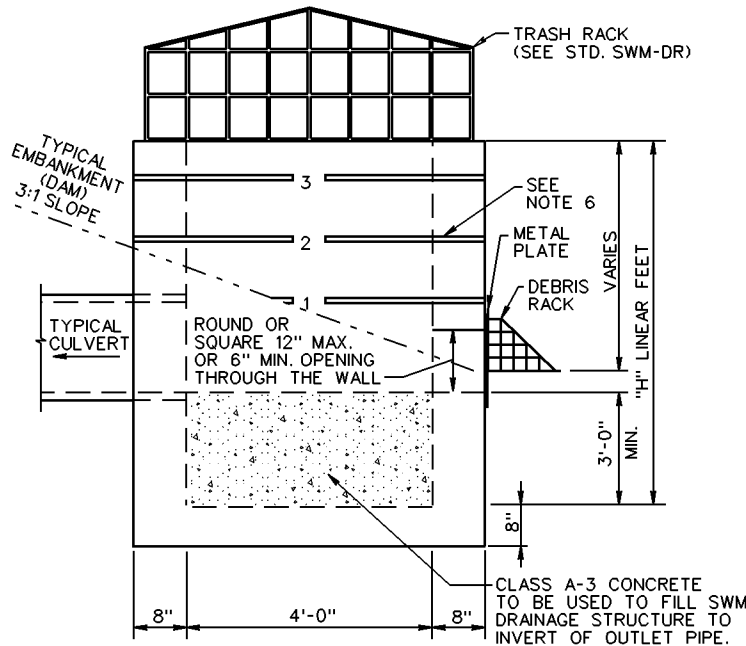
PLAN VIEW



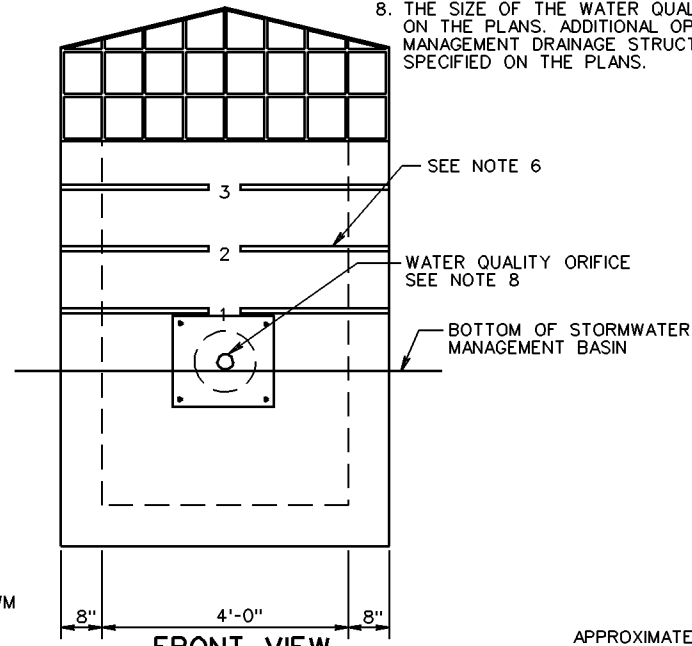
PLAN VIEW
(TRASH RACK NOT SHOWN)

NOTES:

1. COST OF TRASH RACK AND DEBRIS RACK ARE TO BE INCLUDED IN THE BID PRICE FOR THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE.
2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. SEE SHEET 2 OF 3 FOR DETAILS ON PRECAST STRUCTURE.
3. WEEP HOLES SHALL NOT BE PROVIDED.
4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 4'-0" OR GREATER ABOVE INVERT OF OUTLET PIPE. FOR STEP DETAILS SEE STANDARD ST-1.
5. FOR DETAILS ON METAL PLATE, DEBRIS RACK AND TRASH RACK SEE STANDARD SWM-DR.
6. MARK HEIGHT OF STRUCTURE, IN BLACK, WITH 4" HIGH NUMERALS AND 1" WIDE HORIZONTAL STRIPES AT 1' INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).
7. THE PERMANENT STORMWATER MANAGEMENT DRAINAGE STRUCTURE, STANDARD SWM-1 MAY BE MODIFIED WHERE THE STORMWATER MANAGEMENT BASIN IS TO BE USED AS A TEMPORARY SEDIMENT BASIN DURING PROJECT CONSTRUCTION. SEE STANDARD SWM-DR, SHEET 1 OF 5, FOR TEMPORARY MODIFICATION DETAILS.
8. THE SIZE OF THE WATER QUALITY ORIFICE SHALL BE SPECIFIED ON THE PLANS. ADDITIONAL OPENINGS IN THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE TO BE PROVIDED WHEN SPECIFIED ON THE PLANS.



SIDE VIEW
SWM DRAINAGE STRUCTURE



FRONT VIEW
(DEBRIS RACK NOT SHOWN)

APPROXIMATE QUANTITIES
CAST-IN-PLACE CLASS A-3 CONCRETE TO BE USED.
MAXIMUM DEPTH (H) TO BE 12'-8".

PIPE SIZE	12"	15"	18"	24"	30"	36"	42"
MINIMUM DEPTH H	5'-0"	5'-3/4"	5'-6 1/2"	6'-1"	6'-7 1/2"	7'-2"	7'-8 1/2"
CU. YDS. CONCRETE	2.665	2.773	2.878	3.078	3.624	3.437	3.598

INCREMENT PER FOOT OF ADDITIONAL DEPTH "H" = 0.461 CU. YDS.

SPECIFICATION REFERENCE

302

CAST IN PLACE STORMWATER MANAGEMENT DRAINAGE STRUCTURE

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

ROAD AND BRIDGE STANDARDS

REVISION DATE

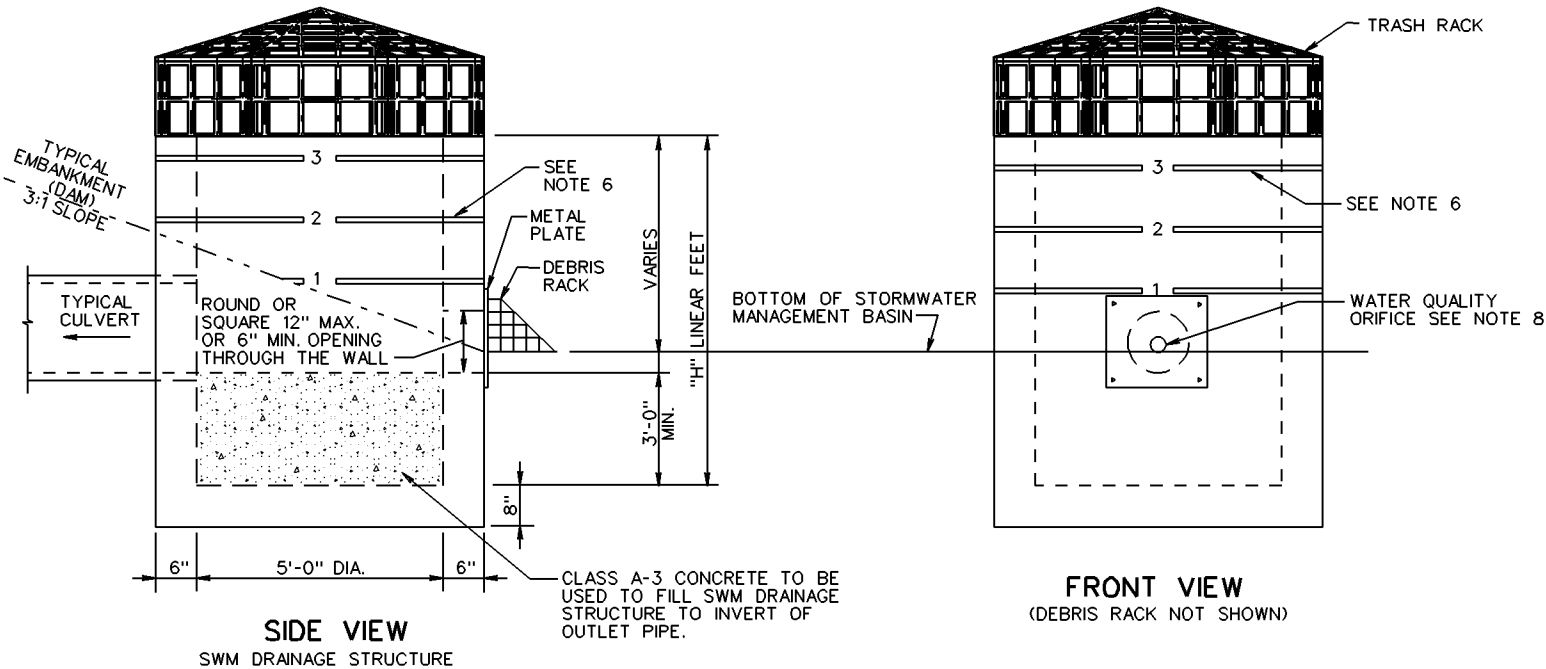
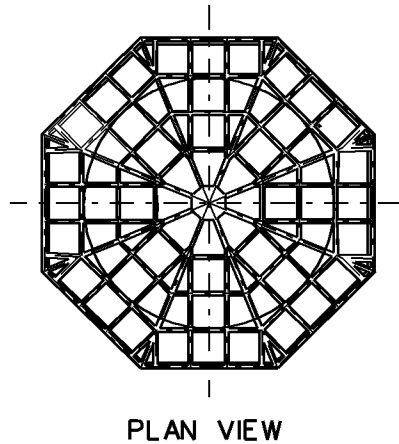
08/10

SHEET 1 OF 3

114.01

NOTES:

1. COST OF TRASH RACK AND DEBRIS RACK ARE TO BE INCLUDED IN THE PRICE BID FOR THE STORMWATER MANAGEMENT DRAINAGE STRUCTURE.
2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. SEE SHEET 1 OF 3 FOR DETAILS ON CAST IN PLACE STRUCTURE.
3. WEEP HOLES SHALL NOT BE PROVIDED. ANY LIFT HOLES SHALL BE PLUGGED.
4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 4'-0" OR GREATER ABOVE INVERT OF OUTLET PIPE. FOR STEP DETAILS SEE STANDARD ST-1.
5. SEE STANDARD SWM-DR FOR DETAILS ON PLATE, DEBRIS RACK AND TRASH RACK.
6. MARK HEIGHT OF STRUCTURE, IN BLACK, WITH 4" HIGH NUMERALS AND 1" WIDE HORIZONTAL STRIPES AT 1' INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).
7. THE PERMANENT STORMWATER MANAGEMENT DRAINAGE STRUCTURE, STANDARD SWM-1 MAY BE MODIFIED WHERE THE STORMWATER MANAGEMENT BASIN IS TO BE USED AS A TEMPORARY SEDIMENT BASIN DURING PROJECT CONSTRUCTION. SEE STANDARD SWM-DR, SHEET 1 OF 5 FOR TEMPORARY MODIFICATION DETAILS.
8. THE SIZE OF THE WATER QUALITY ORIFICE SHALL BE SPECIFIED ON THE PLANS. ADDITIONAL OPENINGS IN THE STORMWATER MANAGEMENT STRUCTURE TO BE PROVIDED WHEN SPECIFIED ON THE PLANS.

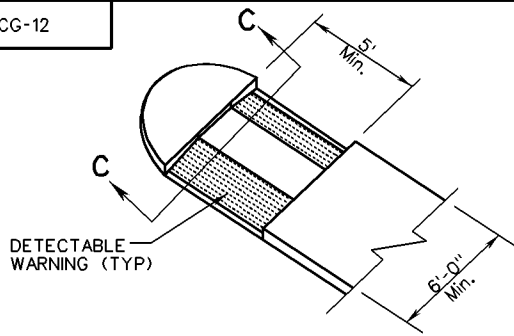


VDOT ROAD AND BRIDGE STANDARDS	
SHEET 2 OF 3	REVISION DATE
114.02	08/10

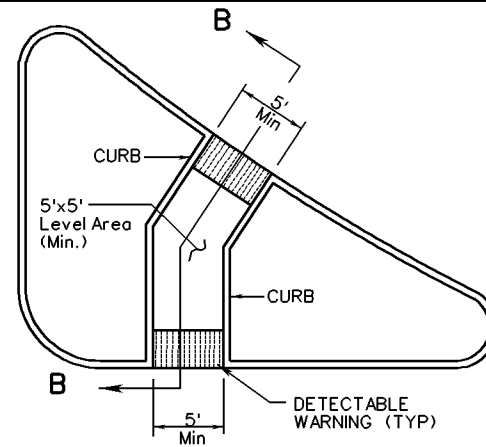
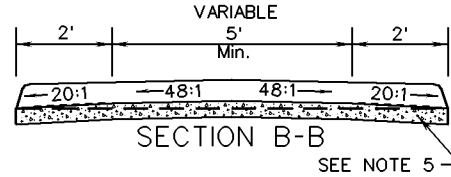
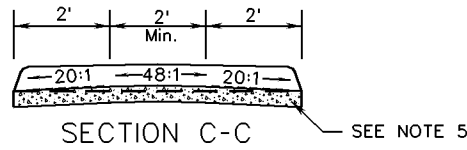
PRECAST STORMWATER MANAGEMENT DRAINAGE STRUCTURE

VIRGINIA DEPARTMENT OF TRANSPORTATION

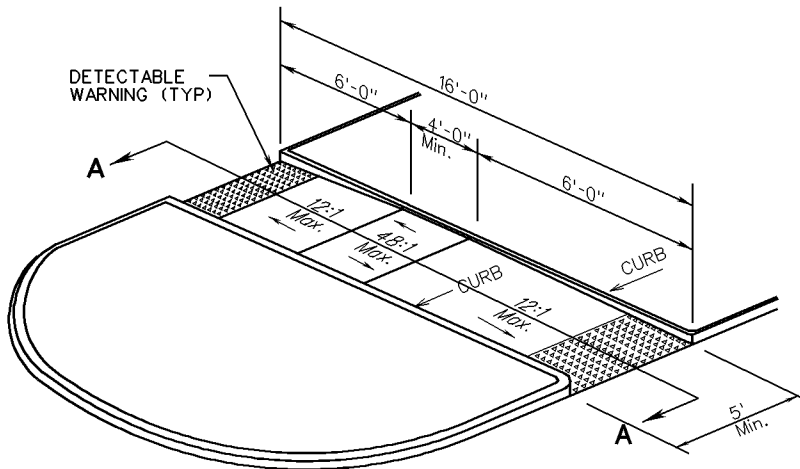
SPECIFICATION REFERENCE
105 302



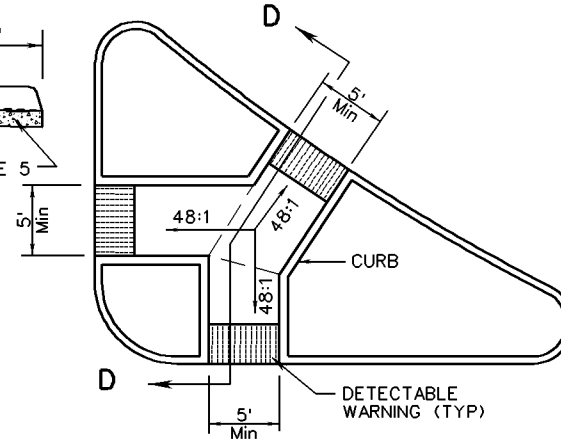
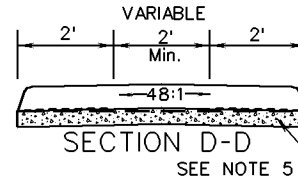
**MEDIAN WITH CUT-THROUGH
TYPE M2**



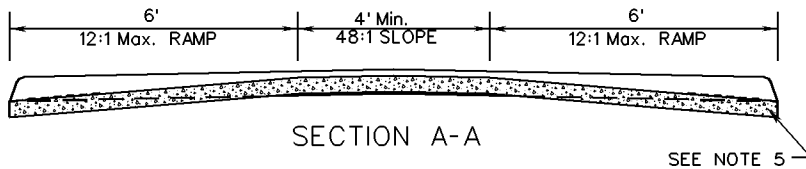
**REFUGE ISLAND WITH RAMPS
TYPE RI1**



**MEDIAN WITH RAMP
TYPE M1**



**REFUGE ISLAND CUT - THROUGH
TYPE RI2**



NOTES:

1. FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.
2. CURB SHALL BE SHAPED TO MATCH THE FACE OF ROADWAY CURB.
3. SEE ROADWAY PLANS FOR MEDIAN AND REFUGE ISLAND DIMENSIONS.
4. RAMPS AND CUT THROUGH'S SHALL BE ALIGNED WITH CROSSWALKS.
5. THE RAMPS AND CUT THROUGH'S SHALL BE INSTALLED AND PAID FOR AS 4" HYDRAULIC CEMENT CONCRETE SIDEWALK IN ACCORDANCE WITH SECTION 504 OF THE ROAD & BRIDGE SPECIFICATIONS. EXCAVATION OF MATERIAL FOR THE INSTALLATION OF THE SIDEWALK SHALL BE INCLUDED IN THE PRICE BID FOR 4" HYDRAULIC CEMENT CONCRETE SIDEWALK.



ROAD AND BRIDGE STANDARDS

SHEET 5 OF 5

REVISION DATE

203.08A

08/10

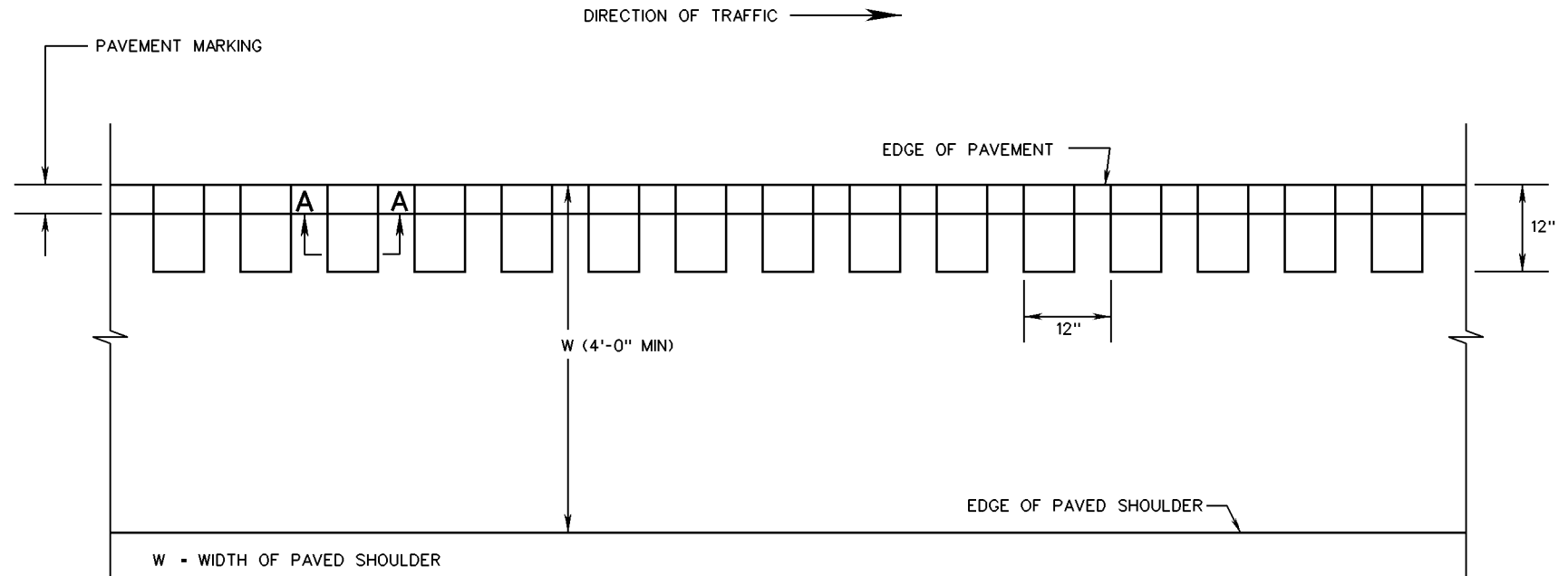
CG-12 DETECTABLE WARNING SURFACE

MEDIAN AND REFUGE ISLAND APPLICATIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

105
502

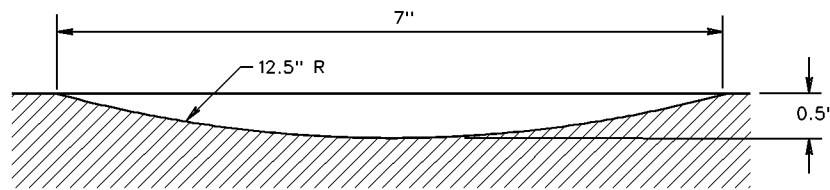


W - WIDTH OF PAVED SHOULDER

PLAN VIEW

NOTES

1. RUMBLE STRIPES SHALL BE PLACED CONTINUOUSLY AS DIRECTED BY THE ENGINEER.
2. RUMBLE STRIPES SHALL NOT BE PLACED WITHIN LIMITS OF BRIDGE DRAINAGE APRONS OR SPECIAL DESIGN SHOULDER SLOT INLETS.
3. RUMBLE STRIPES SHALL BE PLACED ON MAINLINE SHOULDERS ONLY.
4. FOLLOWING CUTTING AND CLEANING DEPRESSIONS OF WASTE MATERIAL IN ASPHALT CONCRETE PAVEMENT THAT IS BEEN IN PLACE MORE THAN ONE YEAR, THE ENTIRE RUMBLE STRIP AREA SHALL BE COATED WITH LIQUID ASPHALT COATING (EMULSION) USING A PRESSURE DISTRIBUTOR AT AN APPROXIMATE RATE OF 0.05 GALLONS PER SQUARE YARD. OVERSPRAY SHALL NOT EXTEND MORE THAN 2 INCHES BEYOND THE WIDTH OF CUT AND/OR SHALL NOT COME IN CONTACT WITH PAVEMENT MARKINGS.
5. RUMBLE STRIPES SHALL NOT BE PLACED WITHIN 50 FEET OF ANY INTERSECTION, TURN LANE, ACCELERATION/DECELERATION LANE OR GORE AREA.
6. PAVEMENT MARKINGS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.



SECTION A-A

SPECIFICATION REFERENCE

310
315

A COPY OF THE ORIGINAL SEALED AND SIGNED STANDARD DRAWING IS ON FILE IN THE CENTRAL OFFICE
CONTINUOUS SHOULDER RUMBLE STRIPES

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

ROAD AND BRIDGE STANDARDS

REVISION DATE

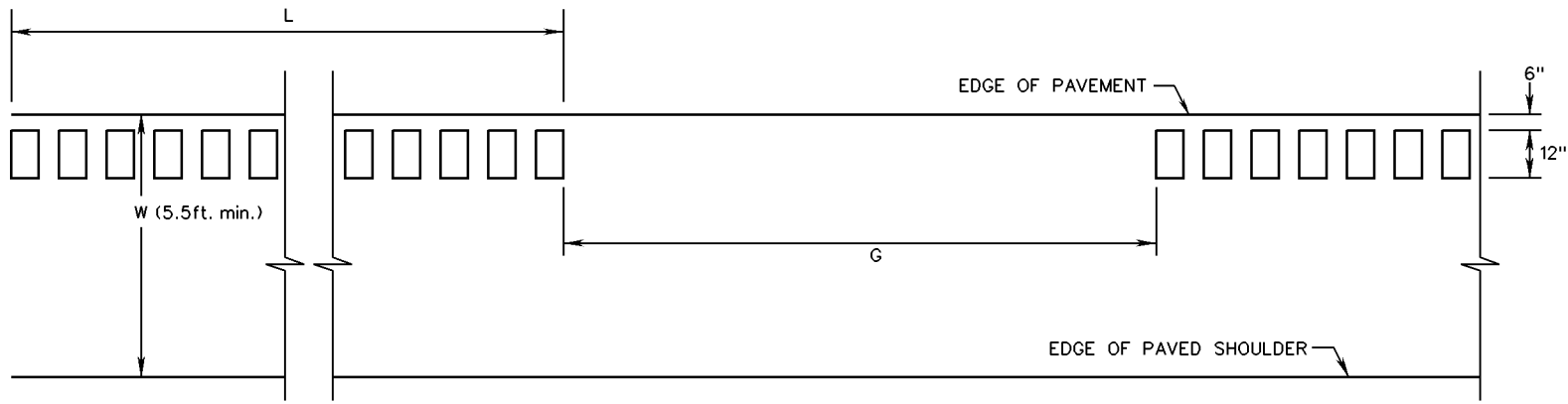
08/10

SHEET 1 OF 1

304.03

RS-5

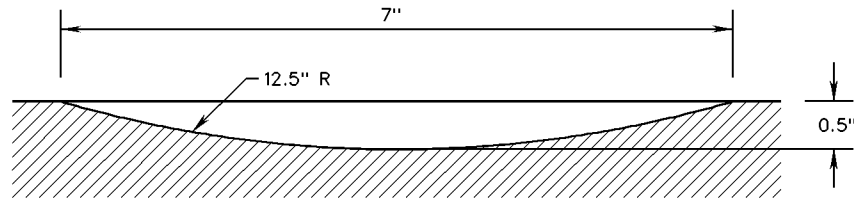
DIRECTION OF TRAFFIC →



W = WIDTH OF PAVED SHOULDER

PLAN VIEW

	L	G
ROADWAY DOWN GRADE LESS THAN 6%	48 ft.	12 ft.
ROADWAY DOWN GRADE EQUAL TO 6% AND GREATER	52 ft.	16 ft.



SECTION A-A

NOTES

1. RUMBLE STRIPS SHALL BE PLACED WITH AN INTERMITTENT PATTERN AS SHOWN IN THE PLAN VIEW AND SHALL BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
2. RUMBLE STRIPS SHALL NOT BE PLACED WITHIN LIMITS OF BRIDGE DRAINAGE APRONS OR SPECIAL DESIGN SHOULDER SLOT INLETS.
3. RUMBLE STRIPS SHALL BE PLACED ON MAINLINE SHOULDERS ONLY.
4. INTERMITTENT RUMBLE STRIPS SHALL BE PLACED ON OUTSIDE SHOULDERS ONLY.
5. FOLLOWING CUTTING AND CLEANING DEPRESSIONS OF WASTE MATERIAL, THE ENTIRE RUMBLE STRIP AREA SHALL BE COATED WITH LIQUID ASPHALT COATING (EMULSION) USING A PRESSURE DISTRIBUTOR AT AN APPROXIMATE RATE OF 0.1 GALLON PER SQUARE YARD. OVERSPRAY SHALL NOT EXTEND MORE THAN 2 INCHES BEYOND THE WIDTH OF CUT AND/OR SHALL NOT COME IN CONTACT WITH PAVEMENT MARKINGS.
6. RUMBLE STRIPS SHALL NOT BE PLACED WITHIN 50 FEET OF ANY INTERSECTION, TURN LANE, ACCELERATION/DECELERATION LANE OR GORE AREA.
7. PAVEMENT MARKINGS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.



ROAD AND BRIDGE STANDARDS

A COPY OF THE ORIGINAL SEALED AND SIGNED STANDARD DRAWING IS ON FILE IN THE CENTRAL OFFICE

INTERMITTENT SHOULDER RUMBLE STRIPS

SPECIFICATION REFERENCE

SHEET 1 OF 1

REVISION DATE

304.04

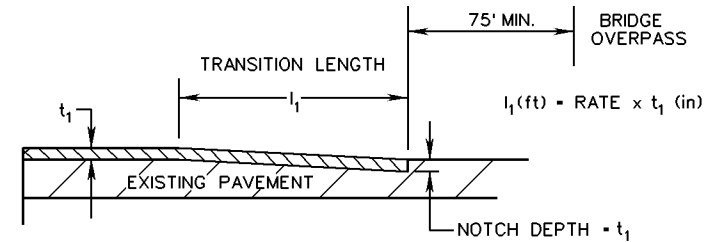
08/10

VIRGINIA DEPARTMENT OF TRANSPORTATION

310
315

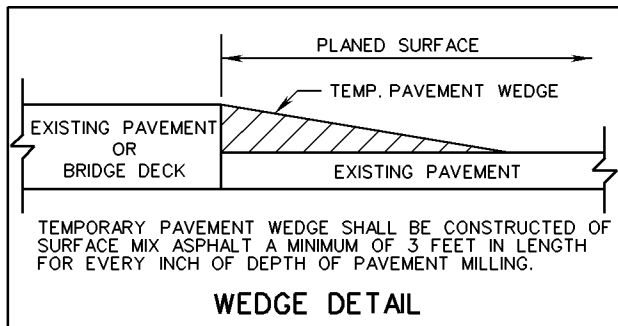
NOTES

1. ASPHALT OVERLAY TRANSITION SHALL BE USED TO PROVIDE A SMOOTH TRANSITION BETWEEN ASPHALT CONCRETE OVERLAY AND EXISTING PAVEMENT SURFACE, BRIDGE DECKS, AND BRIDGE OVERPASSES WITH AT LEAST 1" OF GRADE CHANGE, AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.
2. TOP COURSE SHALL BE NOTCHED. SUBLAYERS SHALL BE FEATHERED WHEN OVERLAYING CONCRETE PAVEMENTS. SUBLAYERS MAY BE NOTCHED WHEN OVERLAYING ASPHALT PAVEMENTS.
3. ASPHALT CONCRETE OVERLAY TRANSITION SHALL END/BEGIN A MINIMUM OF 75 FEET FROM THE VERTICAL PROJECTION OF THE NEAREST OUTER FACE OF THE BRIDGE STRUCTURE OF THE OVERPASS.
4. THE ASPHALT CONCRETE OVERLAY TRANSITION SHALL CONFORM TO THE REQUIREMENTS OF THE ASPHALT FINISHING SECTIONS OF THE CURRENT ROAD AND BRIDGE SPECIFICATIONS.
5. NO OVERLAY SHALL BE PERMITTED ON THE BRIDGE DECK (OVERLAY OR MILL/REPLACE) WITHOUT THE PRIOR WRITTEN APPROVAL FROM THE DISTRICT BRIDGE ENGINEER.

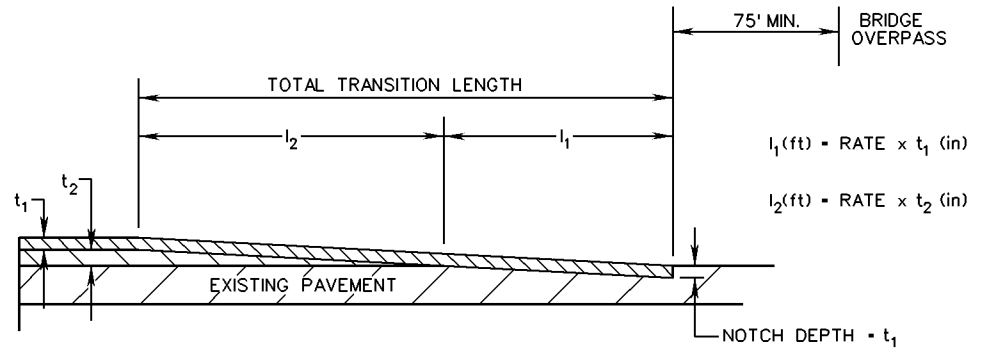


SINGLE COURSE OVERLAY TRANSITION GEOMETRY

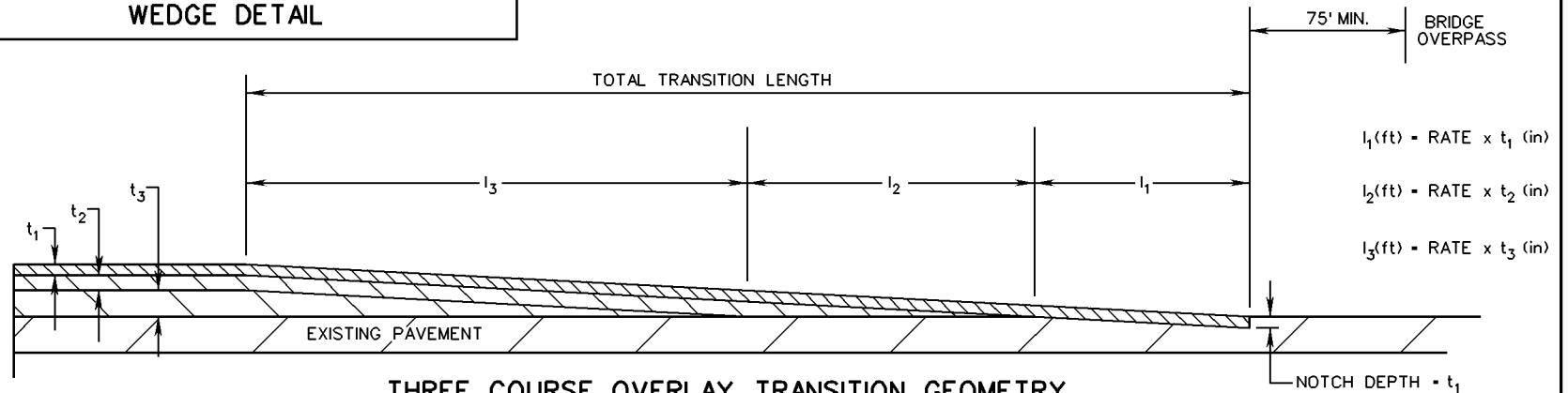
TRANSITION RATE		POSTED SPEED MPH					
		25	35	45	55	65	70
RATE (FT/INCH)		20	25	35	40	45	50



WEDGE DETAIL



TWO COURSE OVERLAY TRANSITION GEOMETRY



THREE COURSE OVERLAY TRANSITION GEOMETRY

SPECIFICATION REFERENCE

- 210
- 315
- 515

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

ASPHALT CONCRETE OVERLAY TRANSITION

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

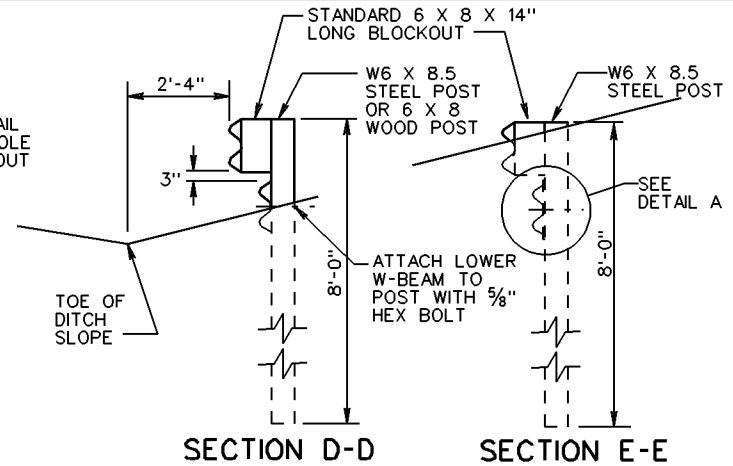
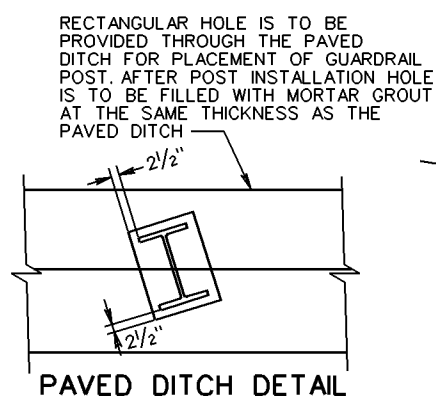
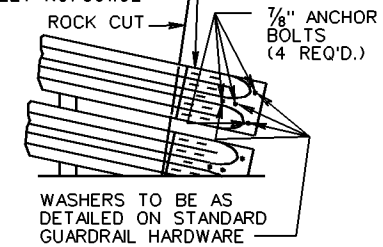
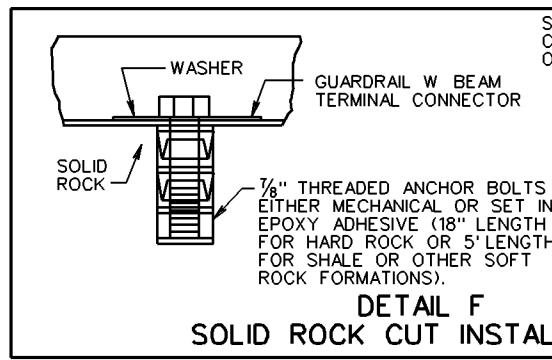
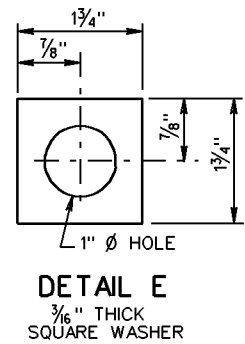
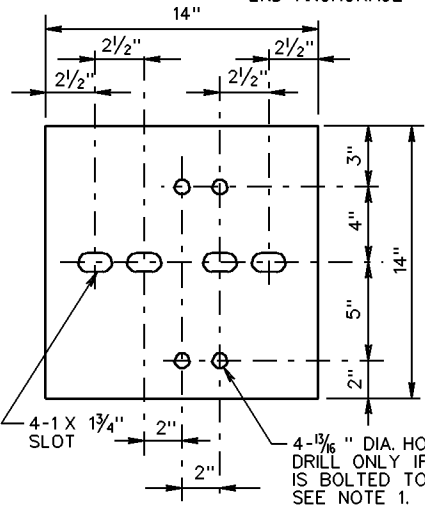
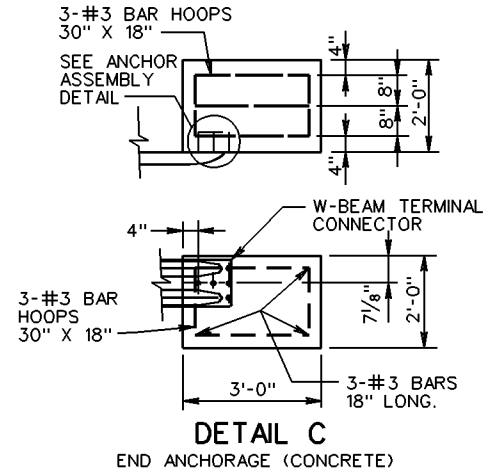
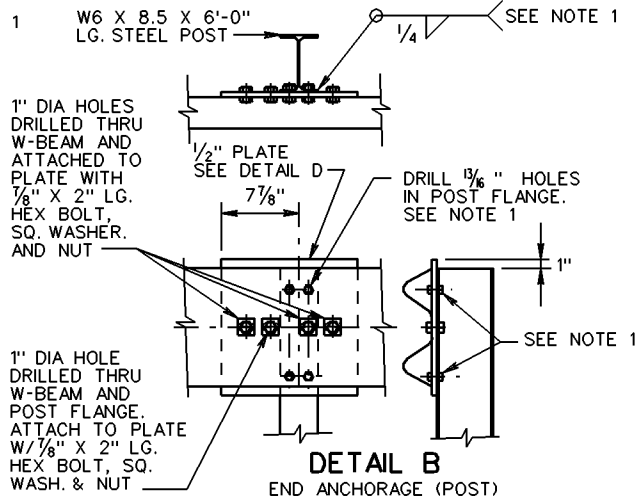
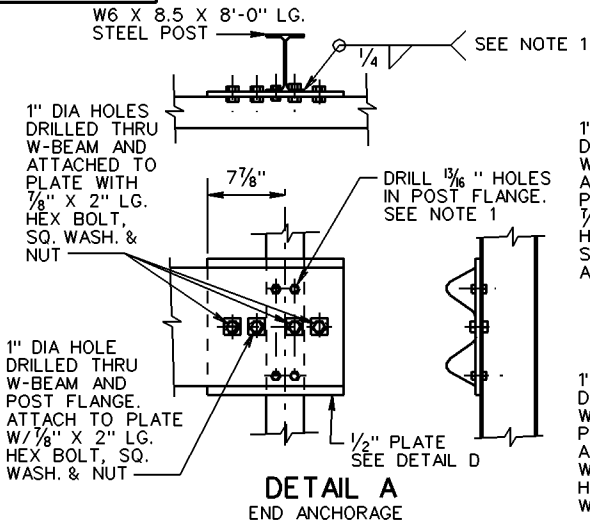
ROAD AND BRIDGE STANDARDS

REVISION DATE

08/10

SHEET 1 OF 1

305.01



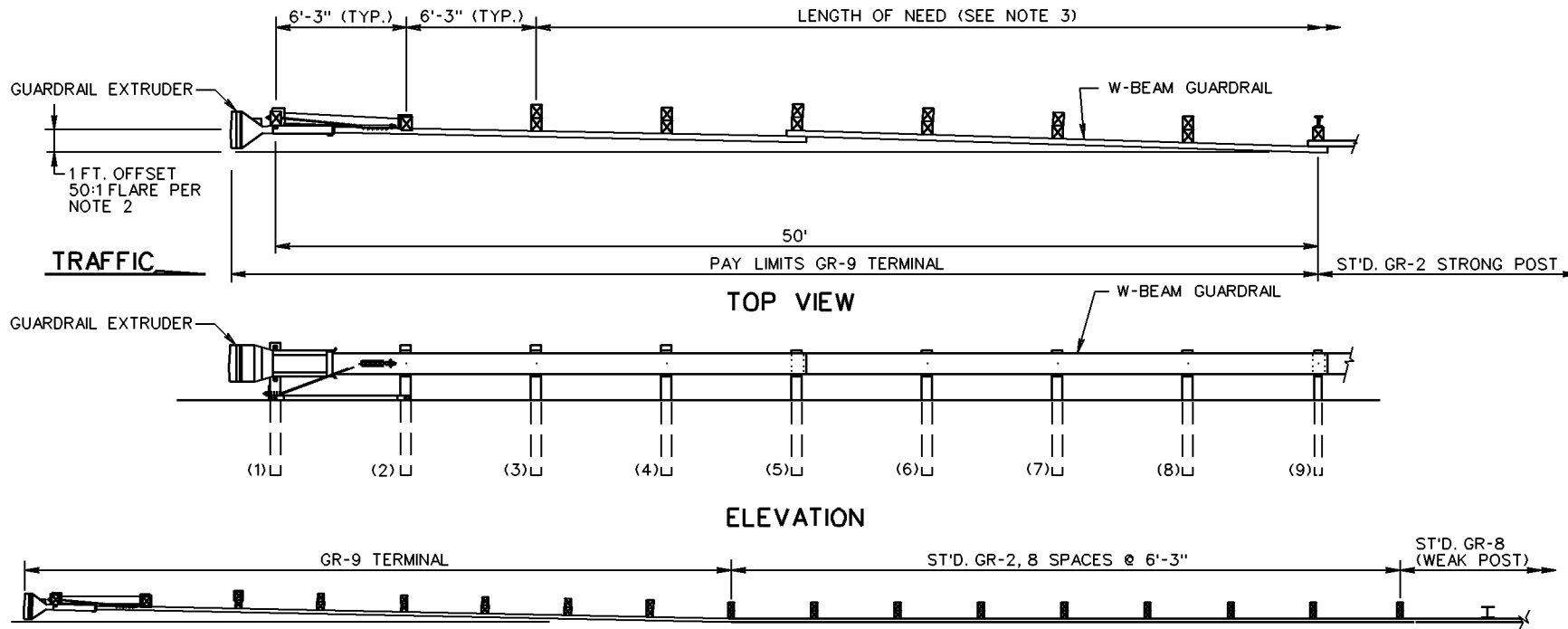
- NOTE:**
- 1/2" STEEL PLATE MAY BE WELDED OR BOLTED TO POST. IF PLATE IS BOLTED TO POST USE 4 - 5/8" X 1 1/2" LG. HEX HEAD BOLTS W/ HEX NUTS. IF PLATE IS WELDED TO POST DO NOT DRILL 13/16" HOLES IN PLATE OR IN POST FLANGES.
 - CONCRETE END ANCHORAGE MAY BE USED IN PLACE OF STEEL POST AT 8'-0" OFFSET.

VDOT	
ROAD AND BRIDGE STANDARDS	
SHEET 2 OF 2	REVISION DATE
501.10	08/10

TERMINAL TREATMENT FOR W-BEAM GUARDRAIL

SPECIFICATION REFERENCE
221
505

GR-9



TRANSITION FROM GR-9 TERMINAL TO WEAK POST (STANDARD GR-8) GUARDRAIL

NOTES:

1. ALTERNATE BREAKAWAY CABLE TERMINAL (GR-9) IS TO BE ET-2000 (SIMILAR TO AS SHOWN), OR CAT (ST'D. MB-3 TERMINAL OPTION) AS MANUFACTURED BY SYRO STEEL COMPANY, BRAKEMASTER (ST'D. MB-3 TERMINAL OPTION) AS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC., THE SKT-350 AS MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER VDOT APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA.
2. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURE'S INSTALLATION INSTRUCTIONS AND THE FOLLOWING VDOT REQUIREMENTS:
 - A. ALL STANDARD GR-9 TERMINALS (SIMILAR TO AS SHOWN ABOVE) SHALL BE INSTALLED WITH A 1 FT. OFFSET ACCOMPLISHED WITH A 50:1 FLARE TO PREVENT THE GUARDRAIL EXTRUDER FROM ENCRDACHING ON THE SHOULDER FOR 3R WORK WHERE RIGHT OF WAY IS LIMITED, THE OFFSET CAN BE DECREASED AS DIRECTED BY THE ENGINEER.
 - B. DIRECTION OF THE REFLECTIVE TAPE ON THE EXTRUDER SHALL CONFORM TO MUTCD APPLICATION FOR DIAGONAL STRIPES ON OBJECT MARKERS AND BRIDGE END PANELS. COLOR OF TAPE SHALL BE AMBER (YELLOW).
 - C. DO NOT CHANGE THE LAPPING OF TERMINAL FOR ANY INSTALLATIONS. INSTALL AS SHOWN ABOVE REGARDLESS OF ADJACENT TRAFFIC DIRECTION.
3. IF THE CALCULATED LENGTH OF NEED CANNOT BE MET FOR THE SITES OF RETROFIT, MAINTENANCE, OR UPGRADE OF TERMINALS, PROVIDE AS MUCH DISTANCE AS POSSIBLE TO THE HAZARD.
4. THIS DRAWING IS REPRESENTATIONAL ONLY. DETAILS, DIMENSIONS, QUANTITIES, AND OTHER INFORMATION NOT SHOWN WILL VARY FOR EACH MANUFACTURER. SEE INDIVIDUAL MANUFACTURER'S PLANS FOR THIS INFORMATION.



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2

REVISION DATE

501.16

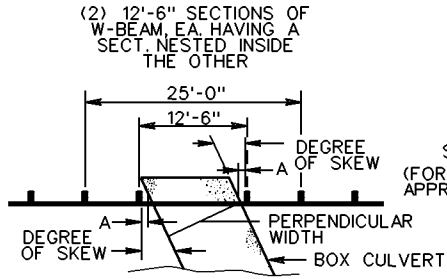
08/10

**ALTERNATE BREAKAWAY CABLE TERMINAL
NO FLARE**

VIRGINIA DEPARTMENT OF TRANSPORTATION

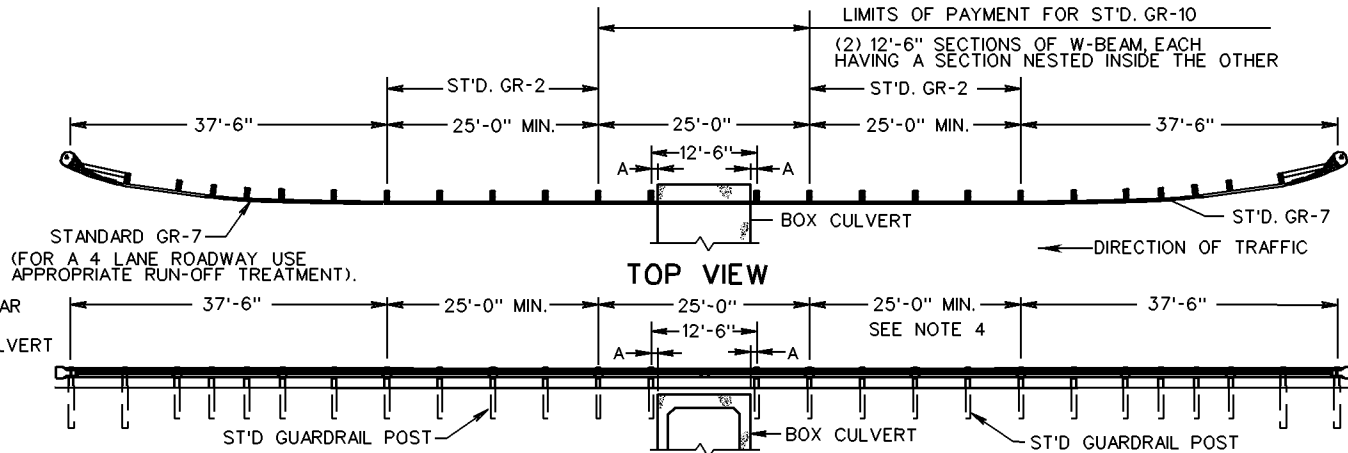
SPECIFICATION
REFERENCE

505



ONE POST OMITTED TOP VIEW

FOR DETAILS OF GUARDRAIL POSTS AND BLOCKOUTS, SEE STANDARD GR-2, 2A.



ELEVATION TYPE I-ONE POST OMITTED

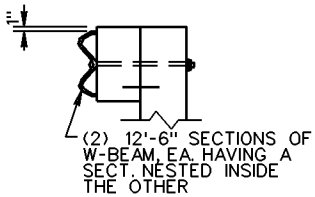
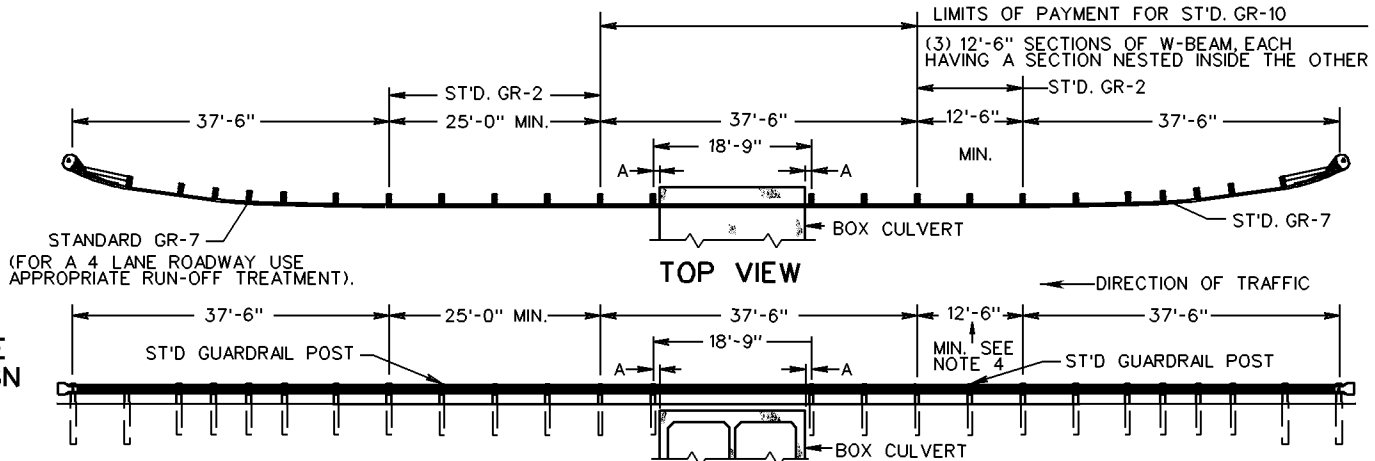


TABLE OF MAXIMUM ALLOWABLE STRUCTURE WIDTHS FOR THIS DESIGN

* "A" THE MINIMUM ALLOWABLE DISTANCE BETWEEN CLOSEST POINT OF POST TO STRUCTURE.



ELEVATION TYPE II-TWO POSTS OMITTED

TYPE I- ONE POST OMITTED			TYPE II- TWO POST OMITTED		
SKEW	A*	MAX. PERPENDICULAR WIDTH (FEET)	SKEW	A*	MAX. PERPENDICULAR WIDTH (FEET)
0°	9"	10.5	0°	9"	16.75
5°	9"	10.4	5°	9"	16.6
10°	9"	10.2	10°	9"	16.4
15°	9"	10.0	15°	9"	16.0
20°	9"	9.6	20°	9"	15.5
25°	9"	9.2	25°	9"	14.9
30°	9"	8.8	30°	9"	14.2
35°	9"	8.2	35°	9"	13.2
40°	9"	7.6	40°	9"	12.4
45°	9"	7.0	45°	9"	11.4

- NOTES:**
1. THIS SHEET IS APPLICABLE WHEN GUARDRAIL IS REQUIRED AND THE DEPTH OF FILL ABOVE THE TOP SLAB OF THE BOX CULVERT IS LESS THAN 4'-0".
 2. GUARDRAIL INSTALLATION SHALL BE IN ACCORDANCE WITH SECTION 505 OF THE SPECIFICATIONS. MATERIAL REQUIREMENT FOR COMPONENTS SHALL BE IN ACCORDANCE WITH SECTION 221 OF THE SPECIFICATIONS.
 3. GUARDRAIL POST SPACING SHALL BE IN ACCORDANCE WITH STANDARD GR-2.
 4. THIS DISTANCE SHALL BE IN ACCORDANCE WITH VDOT POLICY ON DETERMINING THE LENGTH OF NEED FOR GUARDRAIL WITH A MINIMUM DISTANCE AS SHOWN.
 5. ALL SPLICES IN NESTED W-BEAM SECTIONS MUST COINCIDE AT A COMMON POINT AND BE BOLTED TOGETHER USING ONE SET OF BOLTS AT EACH SPLICE.



ROAD AND BRIDGE STANDARDS

GUARDRAIL AT LOW-FILL CULVERTS

SPECIFICATION REFERENCE

SHEET 1 OF 2

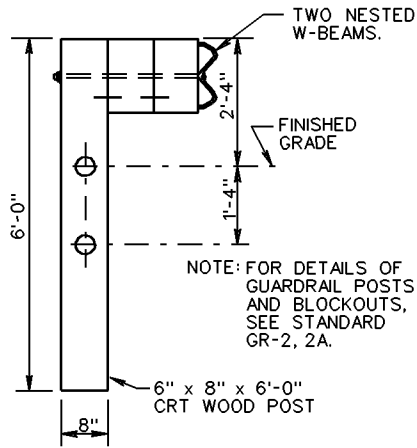
REVISION DATE

VIRGINIA DEPARTMENT OF TRANSPORTATION

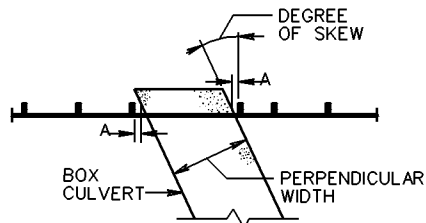
501.18

08/10

221
505



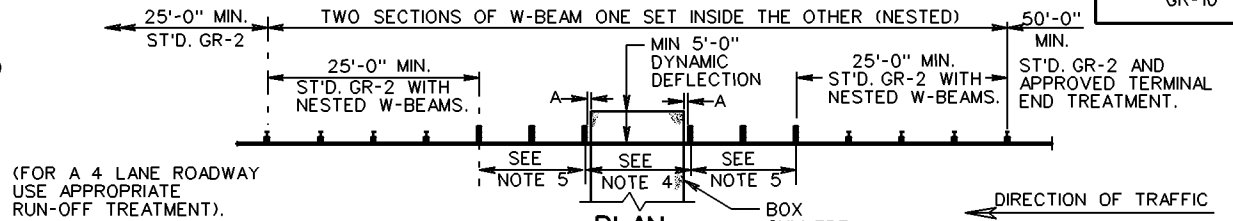
CRT POST WITH DOUBLE BLOCKOUTS



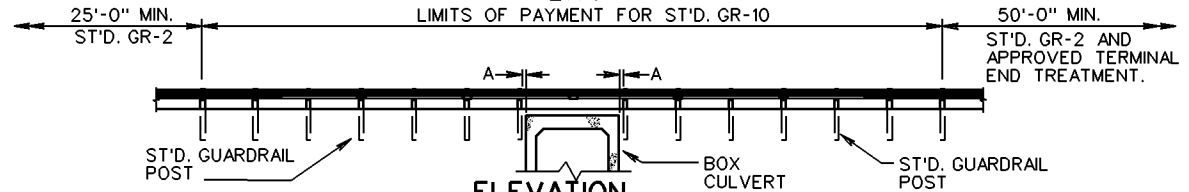
THREE POSTS OMITTED TOP VIEW

TYPE III-THREE POSTS OMITTED		
SKEW	A*	MAX. PERPENDICULAR WIDTH (FEET)
0°	9"	23.00
5°	9"	22.90
10°	9"	22.60
15°	9"	22.10
20°	9"	21.40
25°	9"	20.60
30°	9"	19.60
35°	9"	18.40
40°	9"	17.10
45°	9"	15.60

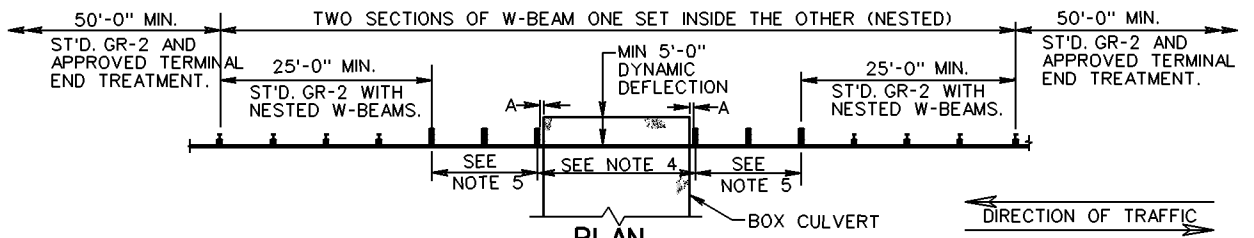
* "A" THE MINIMUM ALLOWABLE DISTANCE BETWEEN CLOSEST POINT OF POST TO STRUCTURE.



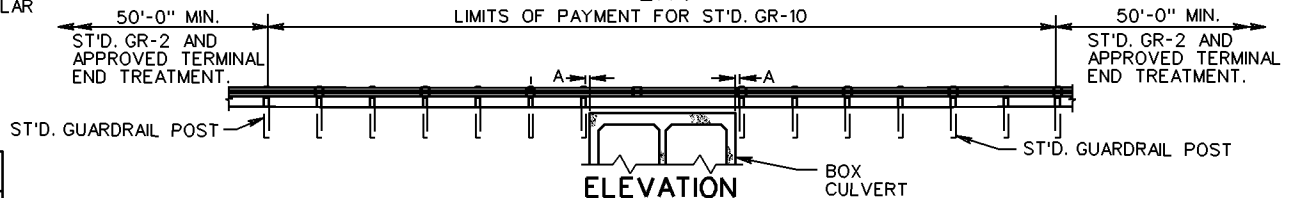
PLAN



ELEVATION ONE WAY TRAFFIC TYPE III THREE POSTS OMITTED



PLAN



ELEVATION TWO WAY TRAFFIC TYPE III THREE POSTS OMITTED

NOTES:

1. THIS SHEET IS APPLICABLE WHEN GUARDRAIL IS REQUIRED AND THE DEPTH OF FILL ABOVE THE TOP SLAB OF THE BOX CULVERT IS LESS THAN 4'-0".
2. GUARDRAIL INSTALLATION SHALL BE IN ACCORDANCE WITH SECTION 505 OF THE SPECIFICATIONS. MATERIAL REQUIREMENT FOR COMPONENTS SHALL BE IN ACCORDANCE WITH SECTION 221 OF THE SPECIFICATIONS.
3. GUARDRAIL POST SPACING SHALL BE IN ACCORDANCE WITH STANDARD GR-2.
4. TWO NESTED W-BEAM GUARDRAILS, SEE TABLE FOR ALLOWABLE WIDTHS (25'-0" MAXIMUM).
5. TWO NESTED W-BEAM GUARDRAILS, CRT WOODPOST, 6'-3" SPACING, WITH TWO 6"x8"x14" WOOD OR RECYCLED MATERIAL BLOCKOUTS.
6. ALL SPLICES IN NESTED W-BEAM SECTIONS MUST COINCIDE AT A COMMON POINT AND BE BOLTED TOGETHER USING ONE SET OF BOLTS AT EACH SPLICE.

SPECIFICATION REFERENCE

221
505

GUARDRAIL AT LOW-FILL CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

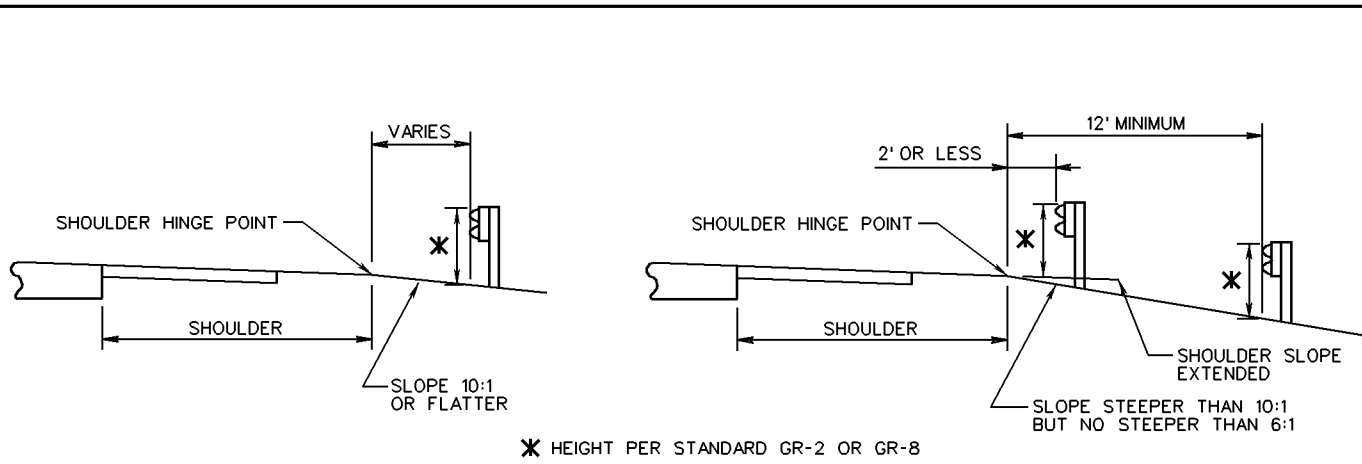
ROAD AND BRIDGE STANDARDS

REVISION DATE

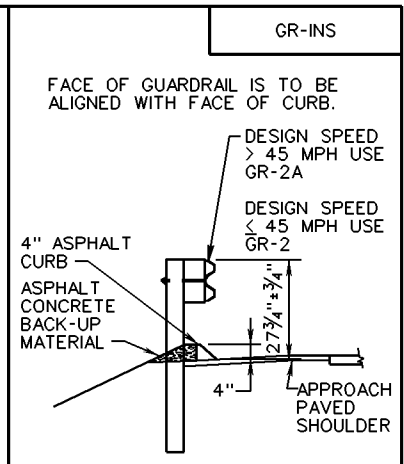
08/10

SHEET 2 OF 2

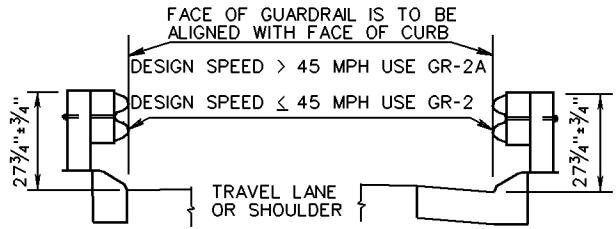
501.19



MEASURING GUARDRAIL HEIGHT ON FRONT SLOPE RELATIVE TO SHOULDER HINGE POINT



ASPHALT CURB SECTION



GR-2A INSTALLATION WITH CG-3 OR CG-7 CURB

FOR GUARDRAIL DESIGN POLICIES USING CG-2 AND CG-6 OR URBAN DESIGNS WITH SIDEWALK OR SIDEWALK SPACE SEE APPENDIX A OF THE ROAD DESIGN MANUAL

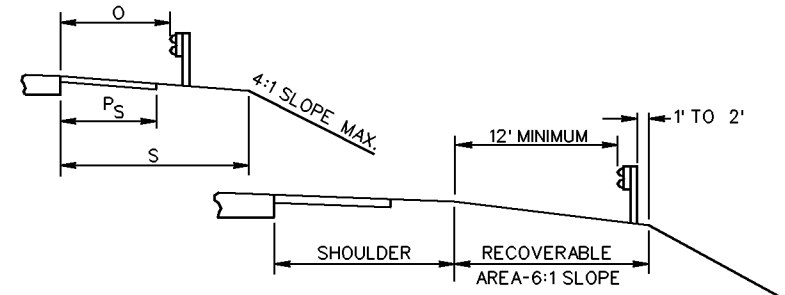


TABLE II

NORMAL GUARDRAIL LOCATION-THROUGH TRAFFIC LANES RIGHT OF TRAFFIC

TOTAL SHOULDER WIDTH (S) (PAVED & GRADING)	PAVED SHOULDER WIDTH (Ps)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
17'	12'	14'
15'	6' or 10'	12'
13'	8'	10'
11'	0, 3', 4' or 6'	8'
9'	0, 3' or 4'	6'
8'	3'	5'
7'	2'	4'
5'	0	2'

GUARDRAIL LOCATION ON RECOVERABLE SLOPE

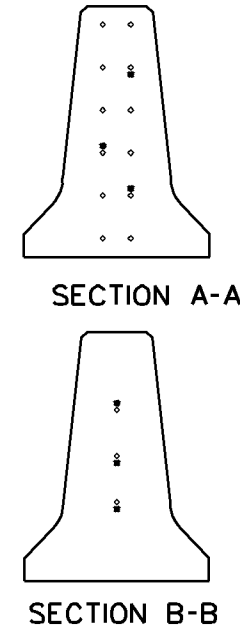
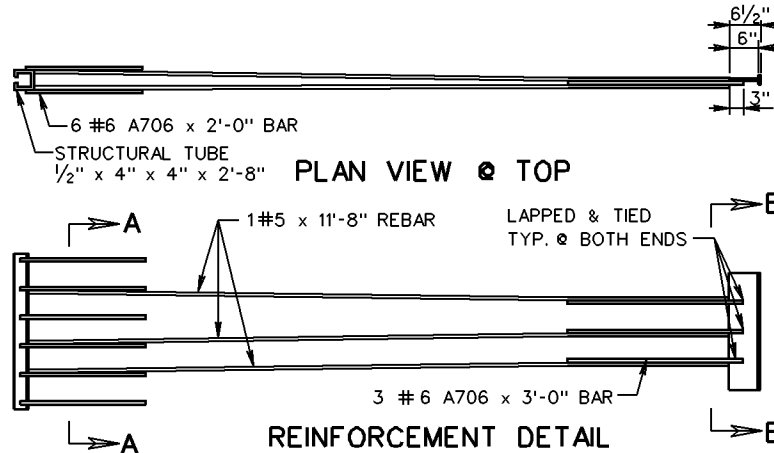
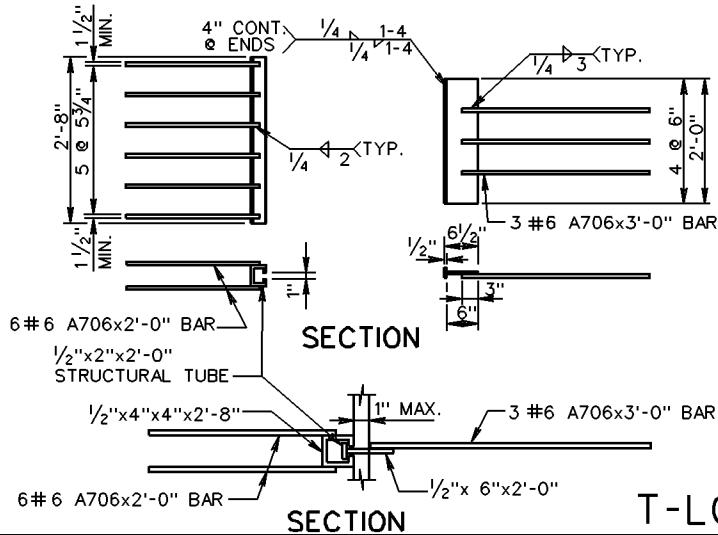
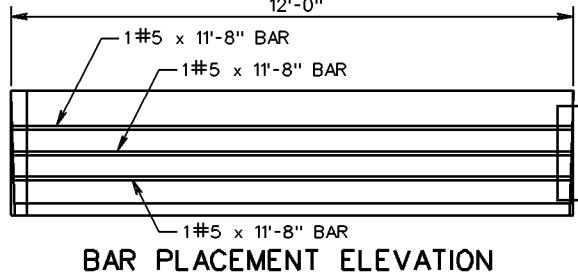
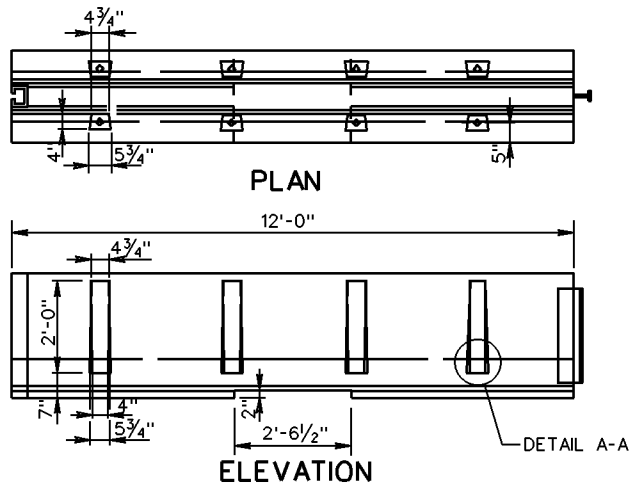
TABLE I
NORMAL GUARDRAIL LOCATION-THROUGH TRAFFIC LANES LEFT OF TRAFFIC

TOTAL SHOULDER WIDTH (S) (PAVED & GRADING)	PAVED SHOULDER WIDTH (Ps)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
17'	12'	14'
15'	3', 4', OR 10'	12'
13'	3'	10'
11'	3'	8'
8' (MED.)	3' or 4'	5'

SPECIFICATION REFERENCE
221
505

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.
W-BEAM GUARDRAIL INSTALLATION CRITERIA
VIRGINIA DEPARTMENT OF TRANSPORTATION

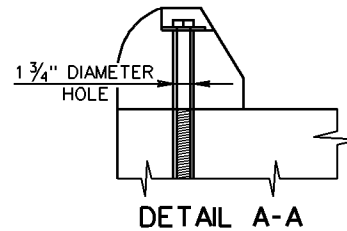
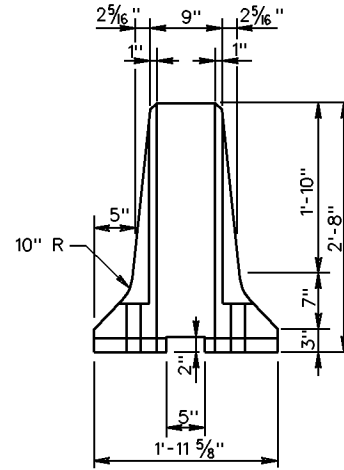
VDOT
ROAD AND BRIDGE STANDARDS
REVISION DATE 08/10
SHEET 6 OF 9
501.39



LEGEND	
■	11'-8" BAR
◇	2' AND 3' BAR

NOTES:

1. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT THE AGE OF 28 DAYS SHALL BE 4000 PSI.
2. ALL REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
3. STANDARD BARRIER SECTIONS SHALL BE 12'-0" AS SHOWN OR 18'-0". SHORTER SECTIONS SHALL BE CAST IN REQUIRED LENGTHS AS ONE UNIT. LONGER SECTIONS SHALL BE CAST TO REQUIRED DIMENSIONS IN TWO UNITS.
4. ALL EXPOSED METAL IS TO BE GALVANIZED FOR PERMANENT LOCATIONS.
5. ALL EXPOSED METAL MAY BE GALVANIZED FOR TEMPORARY LOCATIONS.
6. T-LOK AS MANUFACTURED BY ROCKINGHAM PRECAST
7. BEGINNING WITH JANUARY 2000 ADVERTISEMENT ALL POSITIVE CONNECTIONS MUST BE APPROVED BY THE FHWA IN ACCORDANCE WITH NCHRP 350 TEST REQUIREMENTS.
8. REFER TO MANUFACTURER FOR TEMPORARY INSTALLATION DETAILS.



WHEN USING T-LOK BARRIER, ALLOW FOR A 3'-10" DYNAMIC DEFLECTION. PROVIDE MINIMUM 60' OF BARRIER UPSTREAM AND DOWNSTREAM OF WORK ZONE FOR ANCHORAGE.

T-LOK® DETAILS

**PRECAST CONCRETE MEDIAN BARRIER
POSITIVE CONNECTION OPTIONS**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE



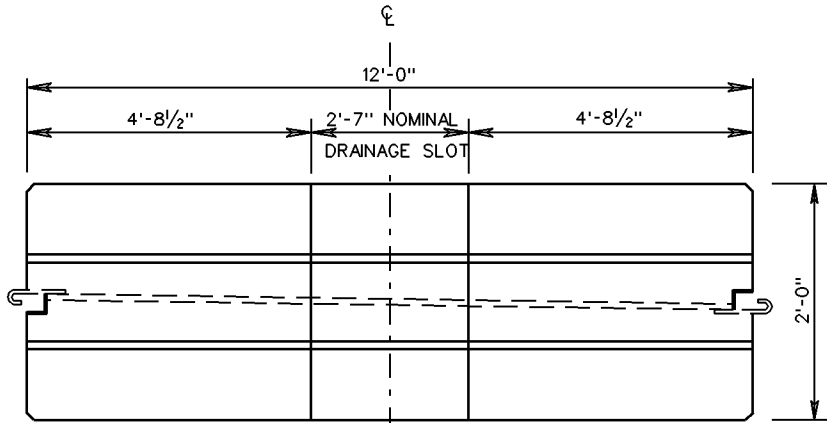
ROAD AND BRIDGE STANDARDS

SHEET 2 OF 5

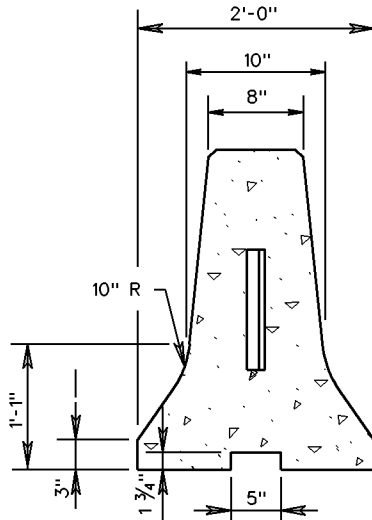
REVISION DATE

502.21

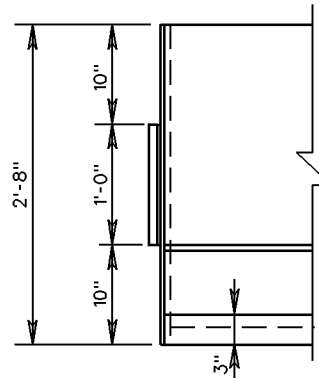
08/10



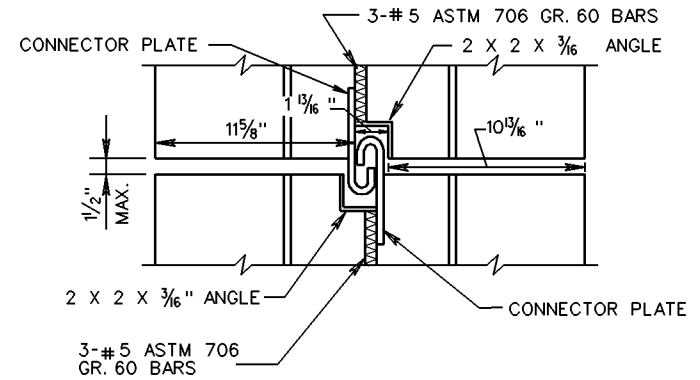
PLAN VIEW



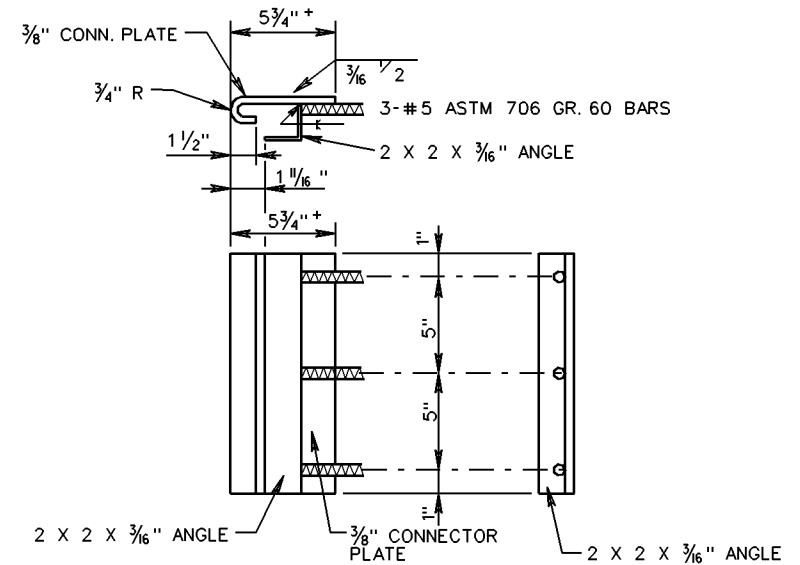
ELEVATION VIEW



SIDE VIEW



PLAN VIEW



ELEVATION VIEW SIDE VIEW
CONNECTOR PLATE DETAIL

NOTES:

1. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT THE AGE OF 28 DAYS SHALL BE 4000 PSI.
2. ALL REINFORCEMENT SHALL CONFORM TO TO ASTM A615, GRADE 60.
3. ALL EXPOSED METAL TO BE GALVANIZED FOR PERMANENT LOCATIONS.
4. ALL EXPOSED METAL MAY BE GALVANIZED FOR TEMPORARY LOCATIONS.
5. J-J HOOK AS MANUFACTURED BY SMITH-MIDLAND.
6. BEGINNING WITH JANUARY 2000 ADVERTISEMENT ALL POSITIVE CONNECTIONS MUST BE APPROVED BY THE FHWA IN ACCORDANCE WITH NCHRP 350 TEST REQUIREMENTS.
7. REFER TO MANUFACTURER FOR TEMPORARY INSTALLATION DETAILS.

WHEN USING J-J HOOK BARRIER, ALLOW FOR A 4'-4" DYNAMIC DEFLECTION. PROVIDE A MIN. 69'-7" OF BARRIER UPSTREAM AND DOWNSTREAM OF WORK ZONE FOR ANCHORAGE.

J-J HOOKTM DETAILS

PRECAST CONCRETE MEDIAN BARRIER
POSITIVE CONNECTION OPTIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

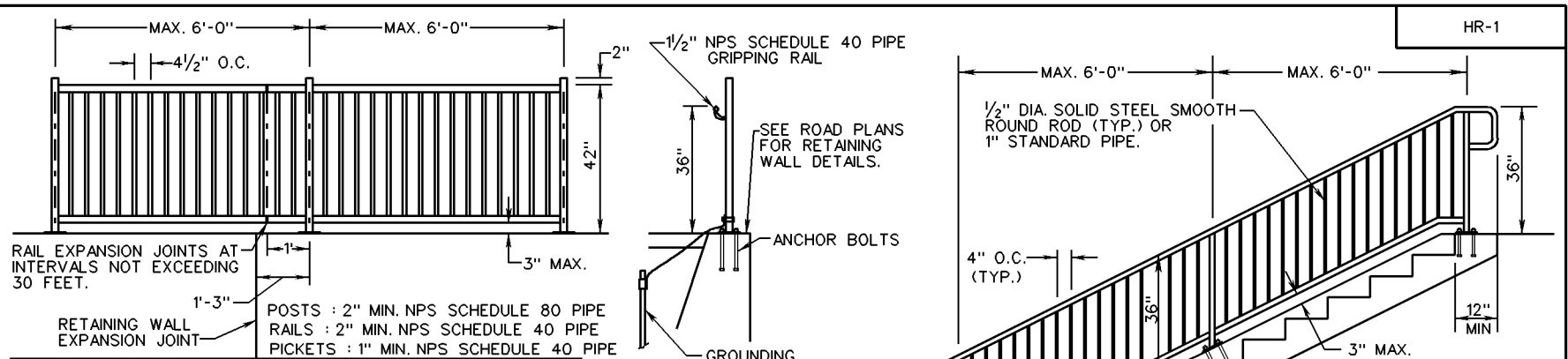
ROAD AND BRIDGE STANDARDS

REVISION DATE

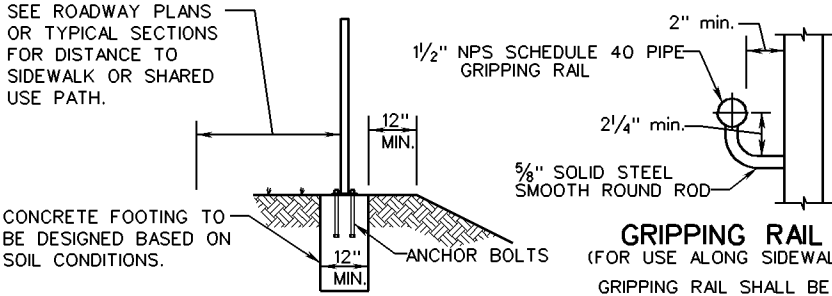
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SHEET 3 OF 5

502.22



HR-1 TYPE II PEDESTRIAN RAILING
(FOR USE ALONG SIDEWALKS AND RAMPS)



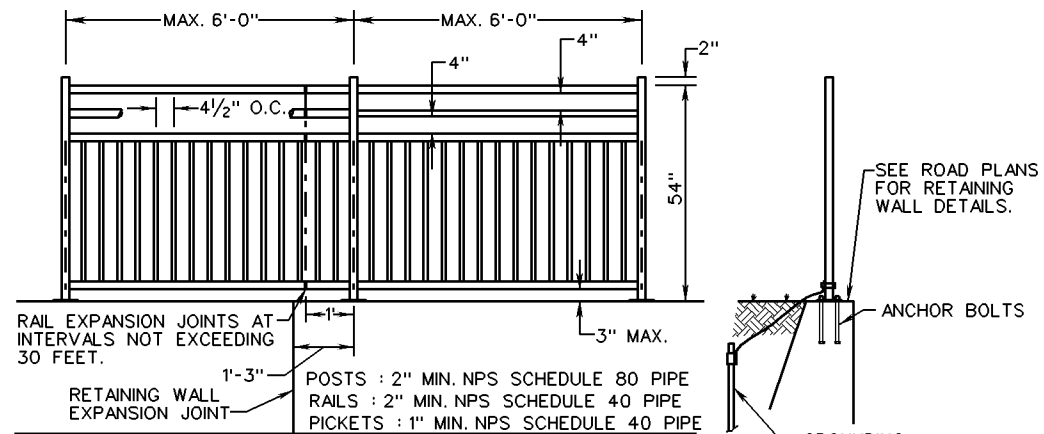
HR-1 TYPE I HANDRAIL
(FOR USE ALONG STEPS)

NOTES

1. SHOP DRAWINGS DETAILING ALL ASPECTS OF FABRICATION AND INSTALLATION OF RAILING, INCLUDING CONCRETE FOUNDATIONS SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. SHOP DRAWINGS SHALL BE SIGNED AND SEALED IN ACCORDANCE WITH SECTION 105.10 OF THE CURRENT ROAD AND BRIDGE SPECIFICATIONS.
2. ALL RAILING COMPONENTS AND FASTENERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE CURRENT ROAD AND BRIDGE SPECIFICATIONS. TO ACHIEVE A UNIFORM COATING ON ALL SURFACES VENTING AND DRAINAGE HOLES FOR GALVANIZING SHALL BE INCLUDED IN THE SHOP DRAWINGS.
3. ALL FASTENERS SHALL BE IN ACCORDANCE WITH ASTM A307, ASTM A563, AND ASTM F844. ALL ANCHOR BOLTS SHALL BE IN ACCORDANCE WITH AASHTO M314, GRADE 36.
4. A CHEMICAL ANCHOR SYSTEM FROM VDOT'S APPROVED MATERIAL LIST MAY BE USED IN LIEU OF CAST IN PLACE ANCHORS AND SHALL BE INCLUDED IN THE SHOP DRAWINGS.
5. POSTS SHALL BE MITERED TO MATCH GRADE OF RAMPS, SIDEWALKS, AND STEPS.
6. HANDRAILS SHALL MATCH GRADE OF RAMPS SIDEWALKS AND STEPS.
7. ALL POSTS AND PICKETS SHALL BE SET PLUMB.
8. RAILINGS SHALL BE GROUNDED AND EFFECTIVELY BONDED. GROUNDING MATERIALS INSTALLATION TO BE IN ACCORDANCE WITH S'D. FE-6.
9. COMMERCIALY AVAILABLE RAILING SYSTEMS MAY BE USED IN LIEU OF DESIGNING AND FABRICATING THE RAILING. DOCUMENTATION FROM THE MANUFACTURER VERIFYING THAT PROJECT REQUIREMENTS ARE MET WITH THE RAILING SYSTEM SHALL BE SUBMITTED WITH THE INSTALLATION DRAWINGS AND APPROVED BY THE ENGINEER IN ACCORDANCE WITH NOTE 1.
10. HANDRAIL TO BE IN ACCORDANCE WITH THE LATEST EDITION OF THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE.
11. THIS HANDRAIL IS TO BE USED ONLY AS A PROTECTION FOR PEDESTRIANS AND SHOULD NOT BE PLACED IN ANY LOCATION WHERE IT MIGHT BE SUBJECT TO ANY VEHICULAR IMPACT. FOR VEHICULAR PROTECTION STANDARD GUARDRAIL SHOULD BE USED.

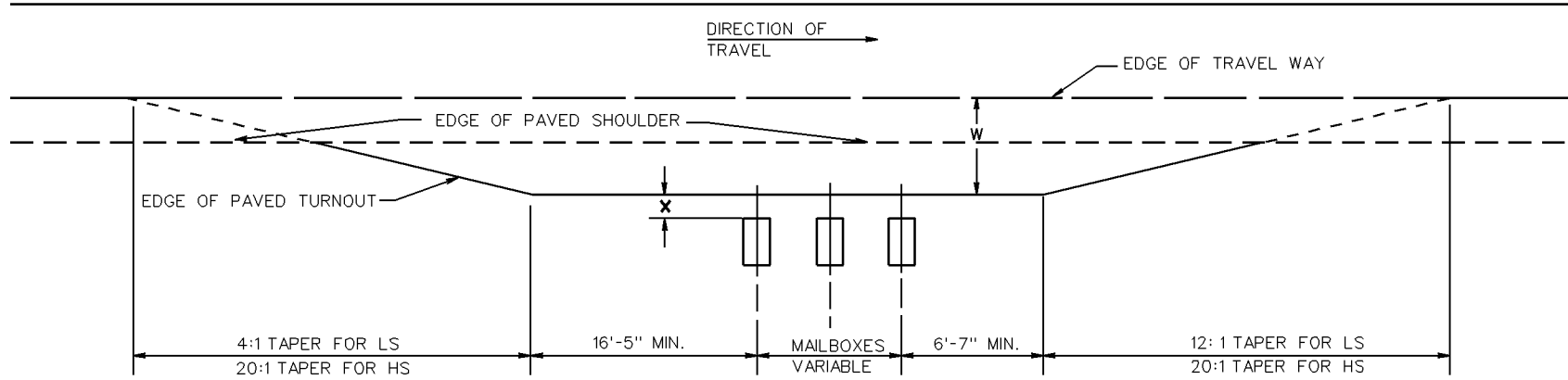
EARTH FOUNDATION DETAIL
(FOR USE WITH TYPE II & III RAILINGS)

GRIPPING RAIL DETAIL
(FOR USE ALONG SIDEWALKS AND RAMPS)



HR-1 TYPE III BICYCLE RAILING
(FOR USE ALONG SHARED USE PATHS)

SPECIFICATION REFERENCE 105 238 504	A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.		VDOT ROAD AND BRIDGE STANDARDS
	STANDARD HANDRAIL METHOD OF LOCATING AND ERECTING VIRGINIA DEPARTMENT OF TRANSPORTATION		
			SHEET 1 OF 1 601.05



LS = A MINIMUM DESIGN FOR ROADS CARRYING LOW-SPEED TRAFFIC AND FOR LOCAL AND COLLECTOR ROADS.
 HS = FOR ROADS CARRYING HIGH-SPEED TRAFFIC.
 W = FOR SUGGESTED WIDTHS, SEE TABLE.
 MAILBOXES = FOR MAILBOX SPACING AND VARIABLE LENGTH, SEE SHEET 603.01
 X = 0" - 12" MAILBOX FACE OFFSET. SEE TABLE.

HIGHWAY TYPE AND ADT, (vpd)	WIDTH (W) OF ALL-WEATHER SURFACE TURNOUT OR AVAILABLE SHOULDER AT MAILBOX, (FT.) (SEE NOTE 1)		DISTANCE (X) FROM FACE OF MAILBOX IS TO BE OFFSET FROM EDGE OF TURNOUT OR USEABLE SHOULDER, (IN.)	
	PREFERRED	MINIMUM	PREFERRED	MINIMUM
RURAL HIGHWAY OVER 10,000	12	8	8 TO 12	0
RURAL HIGHWAY OVER 1,500 to 10,000	12	8		
RURAL HIGHWAY 400 to 1,500	10	8		
RURAL HIGHWAY UNDER 400	8	6 (SEE NOTE 2)		10 (SEE NOTE 3)
RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER	6	0.00		
CURBED RESIDENTIAL STREET	NOT APPLICABLE		8 TO 12 (SEE NOTE 4)	6 (SEE NOTE 4)

ADT=AVERAGE DAILY TRAFFIC
 vpd=VEHICLES PER DAY

NOTES:

- IF THERE IS A NEED TO PROVIDE FOR INCREASED ACCESS, THE FOLLOWING MAY BE CONSIDERED IN CONJUNCTION WITH THE LOCAL POSTMASTER
 - PROVIDE A LEVEL CLEAR FLOOR SPACE 30" X 48" CENTERED ON THE BOX FOR EITHER SIDE OR FORWARD APPROACH.
 - PROVIDE AN ACCESSIBLE PASSAGE TO AND FROM THE MAILBOX AND PROJECTION INTO A CIRCULATION ROUTE (NO MORE THAN 4" IF BETWEEN 28" AND 80" AFF) SO THAT THE MAILBOX DOES NOT BECOME A PROTRUDING OBJECT FOR PEDESTRIANS WITH IMPAIRED VISION.
- STRIVE FOR A 6 FEET MIN.; HOWEVER, IN SOME SITUATIONS THIS MAY NOT BE PRACTICAL. IN THOSE CASES, PROVIDE AS MUCH AS POSSIBLE.
- IF A TURNOUT IS PROVIDED, THIS MAY REDUCE TO ZERO.
- BEHIND TRAFFIC-FACE OF CURB.

TURNOUT DETAIL

SPAN		HIGHT		REINFORCING STEEL											QUAN./LF			HEADWALLS						WINGWALL		
(FT.)	(FT.)	SIZE	SPACING C-C	a	b	c	d	e	f	g	LENGTH	NO. BL1 BARS	NO. BL2 BARS	REINFORCING STEEL (LBS/LONG. FT)	CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	HEADWALL LENGTH	SIZE	LENGTH	NO. HW2 BARS	NO. HW3 BARS	INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)		OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)
3	3	4	12"	2'- 8 7/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 3/8"	0'- 3 3/4"	14'- 11 7/8"	1'- 5 1/8"	15'- 9"	60	20	57.160	1.284	141.899	16'- 10"	6	16'- 6"	3	12	2.222	137.876	2.191	99.132	A
3	4	4	12"	2'- 8 7/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 3/8"	0'- 3 3/4"	14'- 11 7/8"	1'- 5 1/8"	15'- 9"	60	30	60.690	1.406	152.339	16'- 10"	6	16'- 6"	3	15	2.333	148.230	2.284	99.132	C
4	3	4	12"	3'- 6 1/4"	0'- 5"	1'- 11"	0'- 6 1/2"	0'- 4 1/4"	19'- 0"	2'- 1/2"	19'- 10"	76	20	70.520	1.539	169.287	20'- 10"	6	20'- 6"	3	12	2.606	161.908	2.589	123.164	A
4	4	4	12"	3'- 6 1/4"	0'- 5"	1'- 11"	0'- 6 1/2"	0'- 4 1/4"	19'- 0"	2'- 1/2"	19'- 10"	76	30	74.050	1.661	179.727	20'- 10"	6	20'- 6"	3	15	2.718	172.262	2.682	123.164	C
4	5	4	12"	3'- 6 1/4"	0'- 5"	1'- 11"	0'- 6 1/2"	0'- 4 1/4"	19'- 0"	2'- 1/2"	19'- 10"	76	40	77.580	1.784	190.167	20'- 10"	6	20'- 6"	3	18	2.829	182.616	2.774	123.164	E
4	6	4	12"	3'- 6 1/4"	0'- 5"	1'- 11"	0'- 6 1/2"	0'- 4 1/4"	19'- 0"	2'- 1/2"	19'- 10"	76	50	81.110	1.907	200.607	20'- 10"	6	20'- 6"	3	21	2.940	192.970	2.867	123.164	G
5	3	4	12"	4'- 3"	0'- 6 3/4"	2'- 2"	0'- 9"	0'- 6"	23'- 0"	2'- 6"	24'- 3"	92	20	83.880	1.998	205.949	24'- 10"	6	24'- 6"	3	12	2.932	185.940	2.927	147.196	B
5	4	4	12"	4'- 3 1/8"	0'- 6 1/2"	2'- 2 1/4"	0'- 8 5/8"	0'- 5 3/4"	23'- 0"	2'- 6 1/4"	24'- 2"	92	30	87.410	2.085	215.832	24'- 10"	6	24'- 6"	3	15	3.056	196.294	3.033	147.196	D
5	5	4	12"	4'- 3"	0'- 6 3/4"	2'- 2"	0'- 9"	0'- 6"	23'- 0"	2'- 6"	24'- 3"	92	40	90.940	2.243	226.829	24'- 10"	6	24'- 6"	3	18	3.154	206.648	3.113	147.196	F
5	6	4	12"	4'- 3 1/8"	0'- 6 1/2"	2'- 2 1/4"	0'- 8 5/8"	0'- 5 3/4"	23'- 0"	2'- 6 1/4"	24'- 2"	92	50	94.470	2.329	242.135	24'- 10"	6	24'- 6"	3	21	3.279	217.002	3.219	147.196	H
5	7	4	12"	4'- 3 1/8"	0'- 6 1/2"	2'- 2 1/4"	0'- 8 5/8"	0'- 5 3/4"	23'- 0"	2'- 6 1/4"	24'- 2"	92	60	98.000	2.452	252.575	24'- 10"	6	24'- 6"	3	24	3.390	227.356	3.311	147.196	J
6	4	4	10"	4'- 11 3/4"	0'- 8 1/2"	2'- 5"	0'- 11 1/2"	0'- 7 3/4"	27'- 0"	2'- 11 1/2"	28'- 7"	108	30	100.770	2.665	262.804	28'- 10"	6	28'- 6"	3	15	3.307	220.326	3.297	171.228	D
6	5	4	10"	4'- 11 5/8"	0'- 8 3/4"	2'- 4 3/4"	0'- 11 3/8"	0'- 8"	27'- 0"	2'- 11 1/4"	28'- 8"	108	40	104.300	2.830	274.090	28'- 10"	6	28'- 6"	3	18	3.402	230.680	3.373	171.228	F
6	6	4	10"	5'- 0"	0'- 8"	2'- 5 1/2"	0'- 10 3/4"	0'- 7 1/4"	27'- 0"	3'- 0"	28'- 6"	108	50	107.830	2.826	283.640	28'- 10"	6	28'- 6"	3	21	3.562	241.034	3.515	171.228	H
6	7	4	10"	5'- 0"	0'- 8"	2'- 5 1/2"	0'- 10 3/4"	0'- 7 1/4"	27'- 0"	3'- 0"	28'- 6"	108	60	111.360	2.948	303.672	28'- 10"	6	28'- 6"	3	24	3.673	251.388	3.607	171.228	J
6	8	4	10"	4'- 11 7/8"	0'- 8 1/4"	2'- 5 1/4"	0'- 11 1/8"	0'- 7 1/2"	27'- 0"	2'- 11 3/4"	28'- 6"	108	70	114.890	3.112	324.650	28'- 10"	6	28'- 6"	3	27	3.768	261.742	3.684	171.228	L
7	4	4	9"	5'- 8 3/4"	0'- 9 3/4"	2'- 8 5/8"	1'- 1 1/4"	0'- 9"	31'- 1/8"	3'- 5 3/8"	32'- 10"	124	30	114.130	3.200	313.216	32'- 10"	6	32'- 6"	3	15	3.565	244.358	3.569	195.260	D
7	6	4	9"	5'- 8 3/4"	0'- 9 3/4"	2'- 8 5/8"	1'- 1 1/4"	0'- 9"	31'- 1/8"	3'- 5 3/8"	32'- 10"	124	50	121.190	3.443	365.987	32'- 10"	6	32'- 6"	3	21	3.788	265.066	3.754	195.260	H
7	8	4	9"	5'- 8 3/4"	0'- 9 3/4"	2'- 8 5/8"	1'- 1 1/4"	0'- 9"	31'- 1/8"	3'- 5 3/8"	32'- 10"	124	70	128.250	3.687	403.333	32'- 10"	6	32'- 6"	3	27	4.011	285.774	3.940	195.260	L
7	10	4	9"	5'- 8 3/4"	0'- 9 3/4"	2'- 8 5/8"	1'- 1 1/4"	0'- 9"	31'- 1/8"	3'- 5 3/8"	32'- 10"	124	90	135.310	3.929	459.978	32'- 10"	6	32'- 6"	3	33	4.233	306.482	4.125	195.260	P
8	4	4	9"	6'- 5 3/8"	0'- 11 1/2"	2'- 11 5/8"	1'- 3 3/4"	0'- 10 3/4"	34'- 11 7/8"	3'- 10 3/8"	37'- 3"	140	30	127.490	3.901	416.231	36'- 10"	6	36'- 6"	3	15	3.749	268.390	3.765	219.292	D
8	6	4	9"	6'- 5 3/8"	0'- 11 1/2"	2'- 11 5/8"	1'- 3 3/4"	0'- 10 3/4"	34'- 11 7/8"	3'- 10 3/8"	37'- 3"	140	50	134.550	4.146	438.001	36'- 10"	6	36'- 6"	3	21	3.971	289.098	3.951	219.292	H
8	8	4	9"	6'- 5 1/4"	0'- 11 3/4"	2'- 11 3/8"	1'- 4 1/8"	0'- 11"	34'- 11 7/8"	3'- 10 5/8"	37'- 3"	140	70	141.610	4.444	476.814	36'- 10"	6	36'- 6"	3	27	4.190	309.806	4.133	219.292	M
8	10	4	9"	6'- 5 3/8"	0'- 11 1/2"	2'- 11 5/8"	1'- 3 3/4"	0'- 10 3/4"	34'- 11 7/8"	3'- 10 3/8"	37'- 3"	140	90	148.670	4.632	534.161	36'- 10"	6	36'- 6"	3	33	4.417	330.514	4.322	219.292	P
9	4	5	9"	7'- 2"	1'- 1 5/8"	3'- 2 1/2"	1'- 6 5/8"	1'- 3 3/4"	39'- 0"	4'- 4"	41'- 7"	156	30	140.850	4.747	544.856	40'- 10"	6	40'- 6"	3	15	3.882	292.422	3.912	243.324	E
9	6	5	9"	7'- 2"	1'- 1 5/8"	3'- 2 1/2"	1'- 6 5/8"	1'- 3 3/4"	39'- 0"	4'- 4"	41'- 7"	156	50	147.910	4.992	566.626	40'- 10"	6	40'- 6"	3	21	4.104	313.130	4.097	243.324	I
9	8	5	9"	7'- 2"	1'- 1 5/8"	3'- 2 1/2"	1'- 6 5/8"	1'- 3 3/4"	39'- 0"	4'- 4"	41'- 7"	156	70	154.970	5.236	610.906	40'- 10"	6	40'- 6"	3	27	4.327	333.838	4.283	243.324	M
9	10	5	9"	7'- 2"	1'- 1 5/8"	3'- 2 1/2"	1'- 6 5/8"	1'- 3 3/4"	39'- 0"	4'- 4"	41'- 7"	156	90	162.030	5.481	631.448	40'- 10"	6	40'- 6"	3	33	4.550	354.546	4.468	243.324	Q
9	12	5	9"	7'- 2 1/2"	1'- 1 5/8"	3'- 2 1/2"	1'- 6 5/8"	1'- 3 3/4"	39'- 1"	4'- 4"	41'- 8"	156	110	169.090	5.768	713.655	40'- 10"	6	40'- 6"	3	39	4.727	375.254	4.608	243.324	U
10	4	6	9"	7'- 10 7/8"	1'- 3 1/4"	3'- 5 3/4"	1'- 8 7/8"	1'- 2 1/4"	43'- 0"	4'- 9 3/4"	45'- 11"	172	30	154.210	5.559	655.664	44'- 10"	6	44'- 6"	3	15	4.004	316.454	4.047	267.356	E
10	6	5	9"	7'- 10 7/8"	1'- 3 1/8"	3'- 5 3/4"	1'- 8 3/4"	1'- 2 1/4"	43'- 0"	4'- 9 3/4"	45'- 11"	172	50	161.270	5.805	675.010	44'- 10"	6	44'- 6"	3	21	4.227	337.162	4.233	267.356	I
10	8	6	9"	7'- 10 3/4"	1'- 3 1/2"	3'- 5 1/2"	1'- 9 1/4"	1'- 2 1/2"	43'- 0"	4'- 9 1/2"	45'- 11"	172	70	168.330	6.115	718.045	44'- 10"	6	44'- 6"	3	27	4.421	357.870	4.390	267.356	M
10	10	6	9"	7'- 10 3/4"	1'- 3 1/2"	3'- 5 1/2"	1'- 9 1/4"	1'- 2 1/2"	43'- 0"	4'- 9 1/2"	45'- 11"	172	90	175.390	6.358	779.808	44'- 10"	6	44'- 6"	3	33	4.643	378.578	4.575	267.356	Q
10	12	5	9"	7'- 11 1/4"	1'- 3 3/8"	3'- 5 1/2"	1'- 9 1/8"	1'- 2 1/2"	43'- 1"	4'- 9 1/2"	46'- 1"	172	110	182.450	6.645	862.627	44'- 10"	6	44'- 6"	3	39	4.820	399.286	4.714	267.356	U
12	6	6	8"	9'- 4 1/2"	1'- 6 1/2"	4'- 1/8"	2'- 1 1/2"	1'- 5 1/2"	51'- 1/8"	5'- 8 7/8"	54'- 7"	204	50	187.990	7.729	935.948	52'- 10"	6	52'- 6"	3	21	4.344	385.226	4.377	315.420	J
12	8	6	8"	9'- 4 1/2"	1'- 6 1/2"	4'- 1/8"	2'- 1 1/2"	1'- 5 1/2"	51'- 1/8"	5'- 8 7/8"	54'- 7"	204	70	195.050	7.972	983.064	52'- 10"	6	52'- 6"	3	27	4.567	405.934	4.562	315.420	N
12	10	6	8"	9'- 4 1/2"	1'- 6 1/2"	4'- 1/8"	2'- 1 1/2"	1'- 5 1/2"	51'- 1/8"	5'- 8 7/8"	54'- 7"	204	90	202.110	8.214	1,050.040	52'- 10"	6	52'- 6"	3	33	4.789	426.642	4.748	315.420	R
12	12	6	8"	9'- 5"	1'- 6 1/2"	4'- 1/8"	2'- 1 1/2"	1'- 5 1/2"	51'- 1/8"	5'- 8 7/8"	54'- 8"	204	110	209.170	8.504	1,114.396	52'- 10"	6	52'- 6"	3	39	4.964	447.350	4.885	315.420	V

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SPECIFICATION REFERENCE	QUADRUPLE BOX CULVERTS		VDOT ROAD AND BRIDGE STANDARDS
	25 TO 30 FT. FILLS		
	VIRGINIA DEPARTMENT OF TRANSPORTATION		
	REVISION DATE	SHEET 2 OF 2	
	08/10	1005.17	