



COMMONWEALTH of VIRGINIA

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

David S. Ekern, P.E.
COMMISSIONER

October 28, 2009

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
104.15	Clarified curb dimension
104.35	Clarified curb note
107.02	Clarified dimension location
300.01	Revised table of contents to reflect new pages
1001.01	Revised specification reference to 2007
1002.01	Revised specification reference to 2007
1003.02	Revised specification reference to 2007
1004.02	Revised specification reference to 2007
1004.22	Revised title of page
1004.23	Revised title of page
1005.02	Revised specification reference to 2007
1006.02	Revised specification reference to 2007
1006.09	Revised specification reference to 2007
1006.16	Revised specification reference to 2007
1006.23	Revised specification reference to 2007

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 11, 2010 and later.

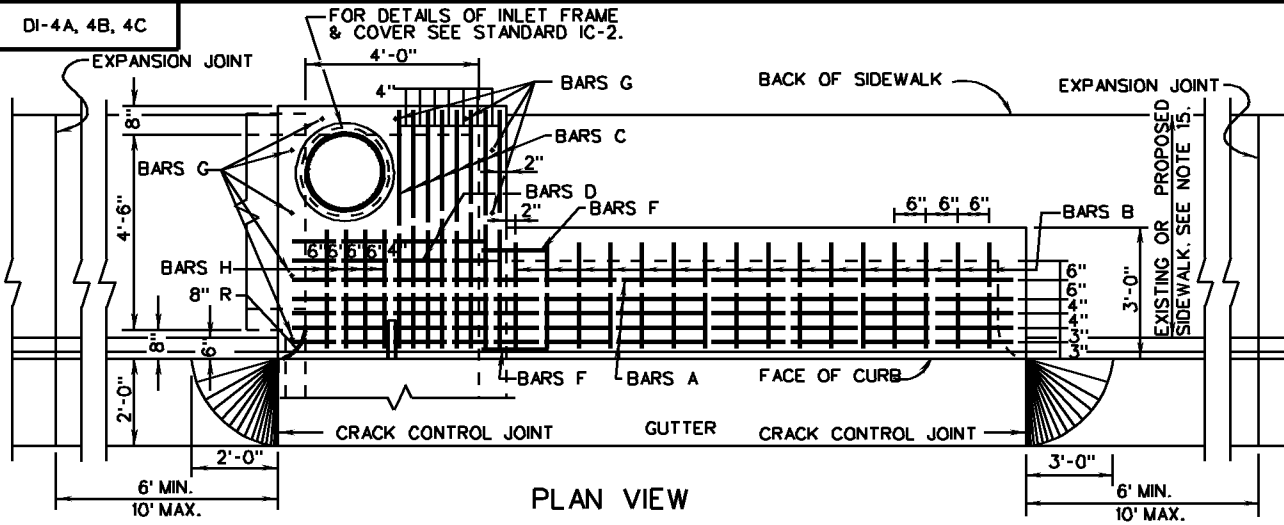
PAGE	INTERIM	STANDARD	REVISION
203.05	IIS02_01	CG-12	REVISED BUFFER STRIP WIDTH
203.06	IIS02_02	CG-12	REVISED BUFFER STRIP WIDTH
203.07	IIS02_03	CG-12	REVISED BUFFER STRIP WIDTH
203.08	IIS02_04	CG-12	REVISED BUFFER STRIP WIDTH
203.08A	IIS02_05	CG-12	CLARIFIED SECTIONS TO MEET ADA
304.01	IIS03_03	RS-1	REVISED NOTES
304.02	IIS03_04	RS-3	REVISED NOTES
304.03	IIS03_05	RS-4	NEW STANDARD
304.04	IIS03_06	RS-5	NEW STANDARD
1005.17	IIS10_01	BCQ-30	REVISED CONCRETE QUANTITY

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,

Signature on file: October 28, 2009
 Mohammad Mirshahi, P.E.
 State Location and Design Engineer

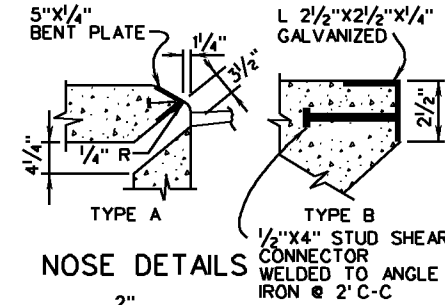
DI-4A, 4B, 4C



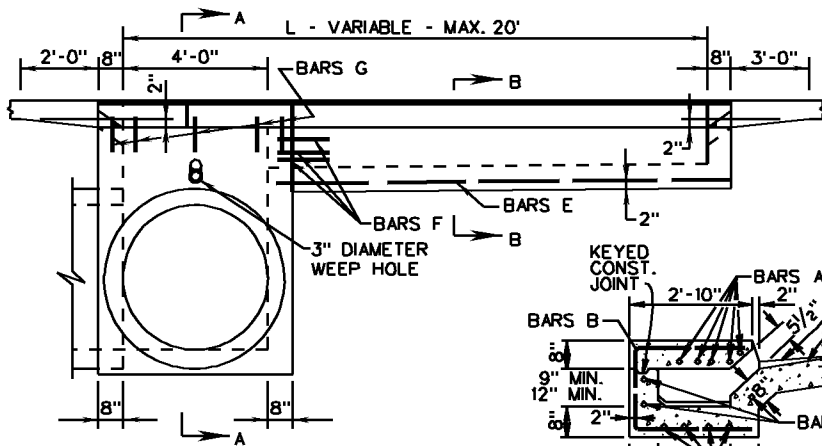
PLAN VIEW

GALVANIZED PLATE TO BE BENT ON AN ANGLE OF 68°30' AND IS TO BE ANCHORED WITH 1/2" X 4" STUD SHEAR CONNECTORS WELDED TO BENT PLATE AT 2'-0" C-C.

TYPE A NOSE DETAIL SHALL BE USED WITH CG-3 AND CG-7 STANDARDS. TYPE B NOSE DETAIL SHALL BE USED WITH CG-2 AND CG-6 STANDARDS.



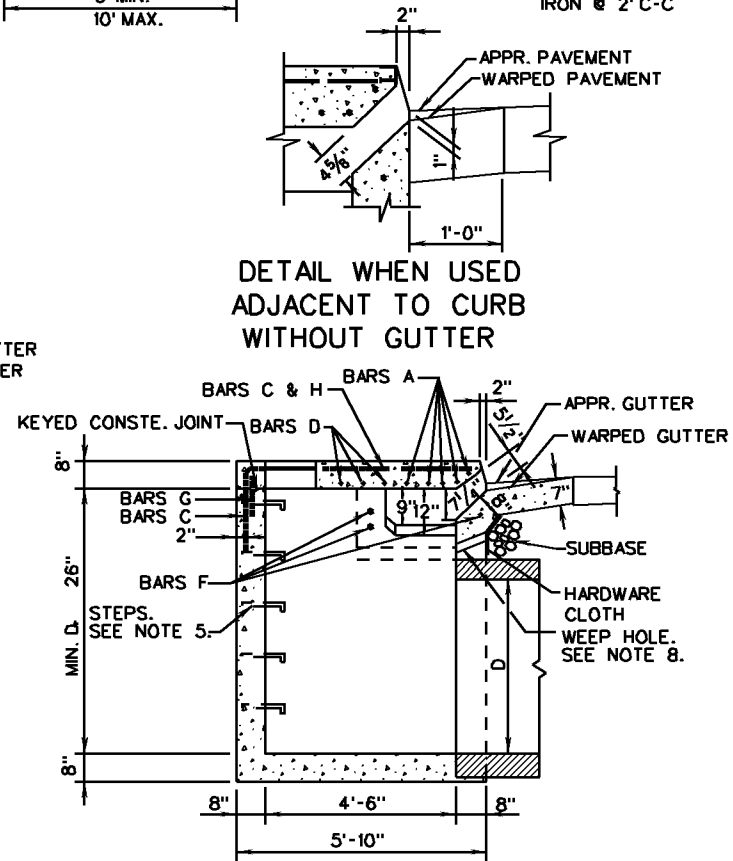
NOSE DETAILS



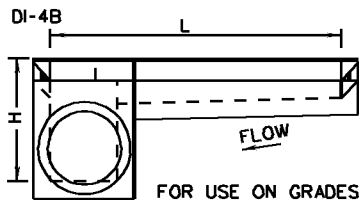
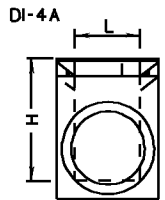
FRONT ELEVATION VIEW
(GUTTER REMOVED)

SECTION B-B

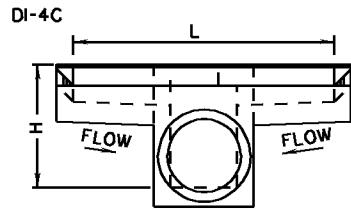
DETAIL WHEN USED
ADJACENT TO CURB
WITHOUT GUTTER



SECTION A-A



FOR USE ON GRADES



FOR USE IN SAGS
BOTH SIDES TO BE SYMMETRICAL



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2

REVISION DATE

104.15

10/09

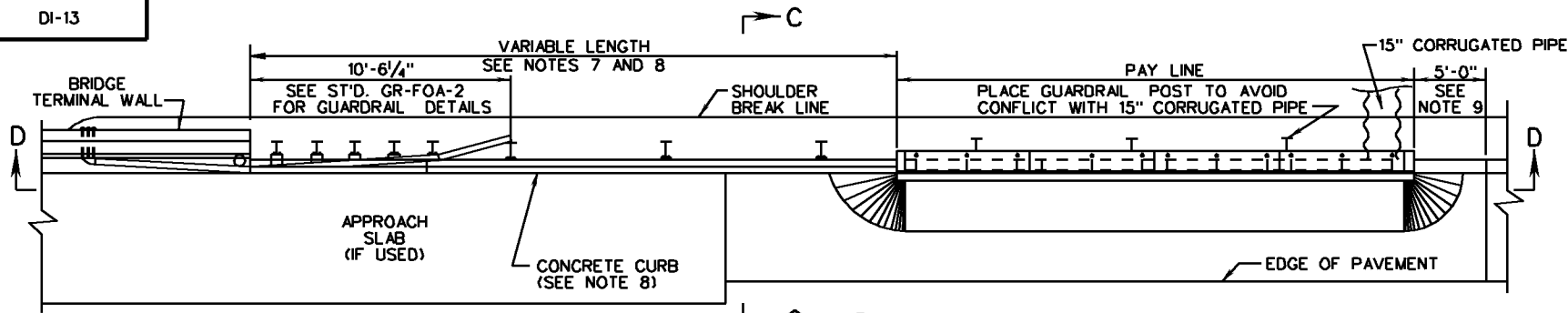
STANDARD CURB DROP INLET

36" - 48" PIPE: MAXIMUM DEPTH (H) = 8'

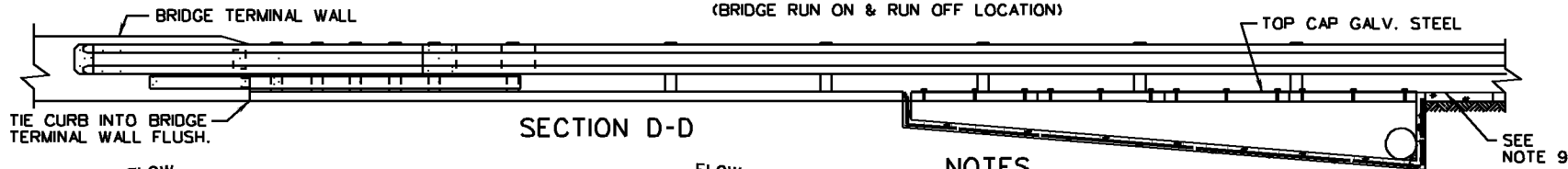
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

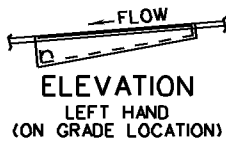
233
302



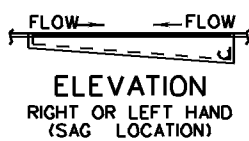
PLAN
(BRIDGE RUN ON & RUN OFF LOCATION)



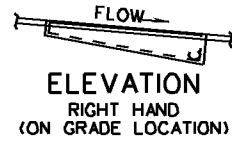
SECTION D-D



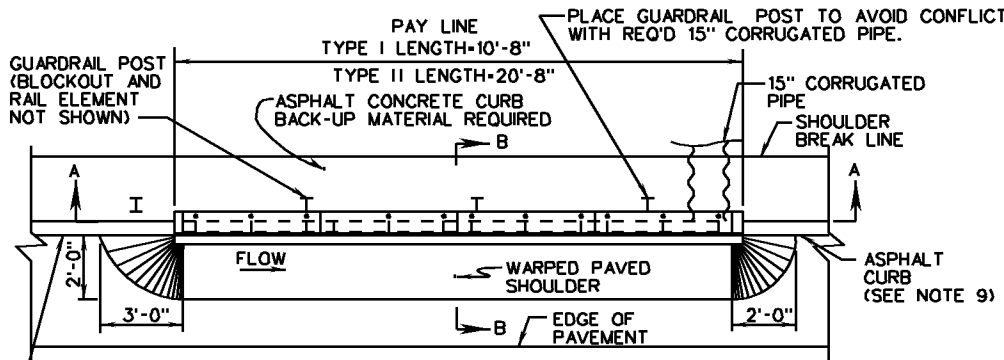
ELEVATION
LEFT HAND
(ON GRADE LOCATION)



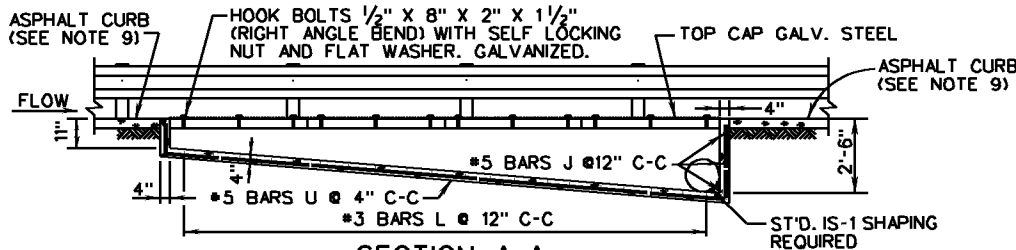
ELEVATION
RIGHT OR LEFT HAND
(SAG LOCATION)



ELEVATION
RIGHT HAND
(ON GRADE LOCATION)



PLAN
(ROADWAY LOCATION)



SECTION A-A

NOTES

1. THIS UNIT MAY BE PRECAST OR CAST IN PLACE. CAST IN PLACE CONCRETE IS TO BE CLASS A3 (3000 PSI). PRECAST CONCRETE IS TO BE 4000 PSI.
2. ALL REINFORCING STEEL IS TO BE GRADE 60.
3. PIPES ARE TO BE PLACED ON THE DOWN GRADE OR LOWER END OF INLET.
4. PRECAST UNITS MUST BE FURNISHED WITH PIPES PLACED TO THE RIGHT OR LEFT ACCORDING TO THE FLOW DOWN GRADE, WHEN FACING THE INLET FROM THE CENTER OF THE ROAD.
5. WHEN THIS INLET IS USED IN A SAG LOCATION EITHER A RIGHT HAND OR A LEFT HAND UNIT MAY BE USED.
6. BACKFILL TO BE PLACED AND COMPACTED IN ACCORDANCE WITH SECTION 303.09 OF THE ROAD AND BRIDGE SPECIFICATIONS.
7. DI-13 STRUCTURE SHALL BE LOCATED A MINIMUM OF 11 FEET FROM THE END OF THE BRIDGE TERMINAL WALL. IN LOCATIONS THAT INCLUDE AN APPROACH SLAB EXTENDING BEYOND THE END OF THE BRIDGE TERMINAL WALL, THE DI13 STRUCTURE SHALL BE PLACED A MINIMUM OF 5 FEET BEYOND THE END OF THE APPROACH SLAB.
8. STANDARD CG-3 CONCRETE CURB SHALL BE PLACED FROM THE END OF THE INLET TO THE BEGINNING OF THE BRIDGE TERMINAL WALL. ASPHALT CONCRETE CURB BACK UP MATERIAL SHALL BE PLACED BEHIND CG-3 AS SHOWN IN SECTION C-C. THE COST OF CG-3 CURB AND ASPHALT CONCRETE CURB BACK UP MATERIAL SHALL BE PAID FOR SEPERATELY FROM THE DI-13 STRUCTURE.
9. STANDARD MC-3B ASPHALT CURB SHALL BE EXTENDED 5 FEET PAST THE END OF THE INLET AND TRANSITION DOWN TO GRADE LEVEL. LONGER LENGTHS OF CURB MAY BE NEEDED BEYOND THIS LIMIT AND THEN TRANSITIONED DOWN IN 5 FEET. SEE THE ROADWAY PLANS FOR THE REQUIRED LENGTH OF CURB. THE COST OF MC-3B CURB AND ASPHALT CONCRETE CURB BACKUP MATERIAL SHALL BE PAID FOR SEPERATELY FROM THE DI-13 STRUCTURE.
10. FOR DETAILS OF SLOT INLET AND PIPE INSTALLATION, SEE SECTION B-B ON SHEET 2 OF 2.



ROAD AND BRIDGE STANDARDS

SHOULDER SLOT INLET

SPECIFICATION
REFERENCE

SHEET 1 OF 2

REVISION DATE

VIRGINIA DEPARTMENT OF TRANSPORTATION

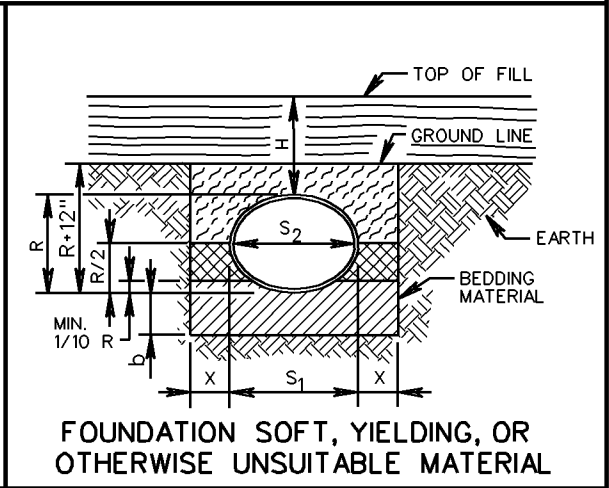
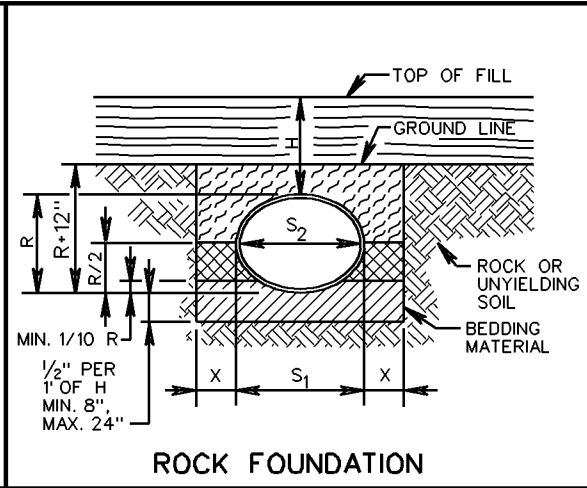
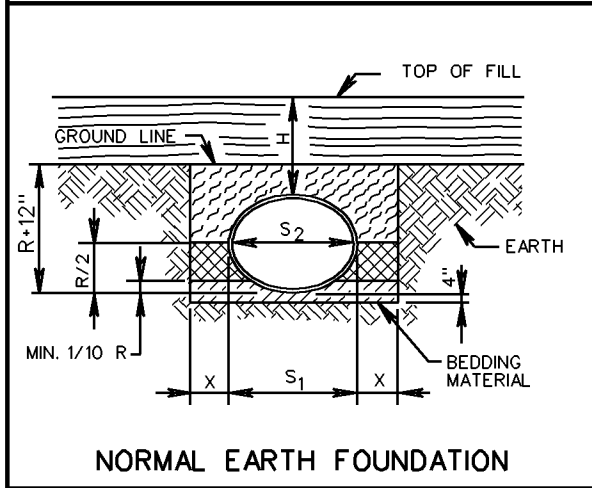
233
302

104.35

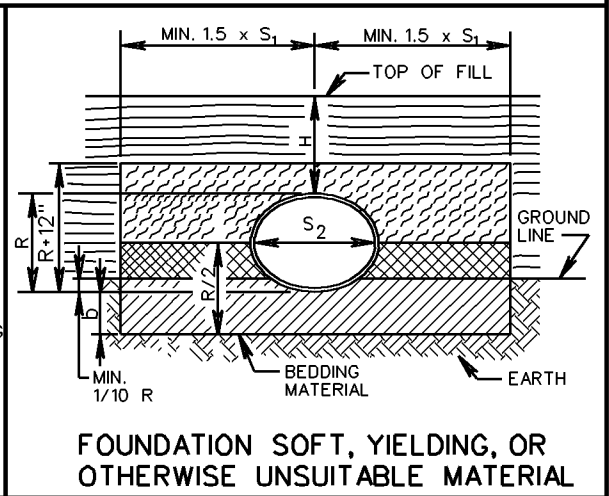
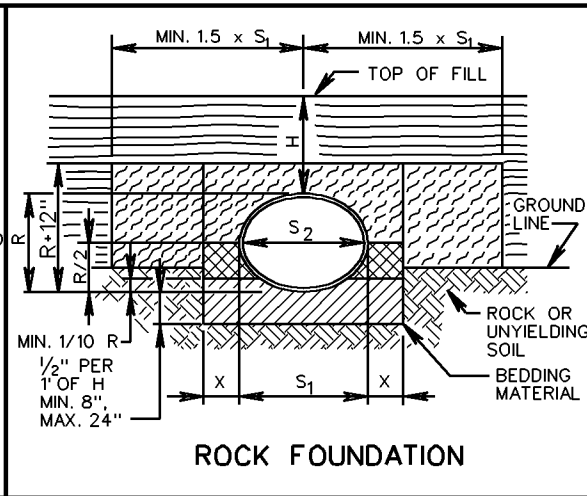
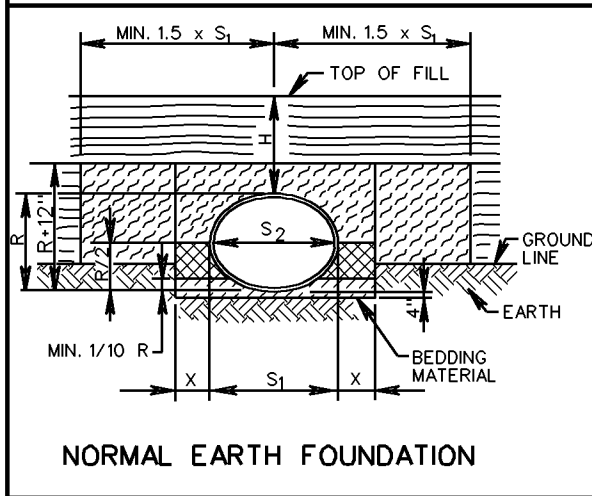
10/09





NO PROJECTION OF PIPE ABOVE GROUND LINE

PB-1



PIPE PROJECTION ABOVE GROUND LINE



-  BEDDING MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.
-  CLASS I BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.
-  REGULAR BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.
-  EMBANKMENT

NOTES:

FOR GENERAL NOTES ON PIPE BEDDING, SEE INSTALLATION OF PIPE CULVERTS AND STORM SEWERS GENERAL NOTES ON SHEET 107.00.
 CRUSHED GLASS CONFORMING TO THE SIZE REQUIREMENTS FOR CRUSHER RUN AGGREGATE SIZE 25 AND 26 MAY BE USED IN PLACE OF CLASS I BACKFILL.

SPECIFICATION REFERENCE
302 303

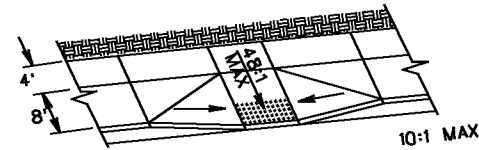
**INSTALL. OF PIPE CULVERTS AND STORM SEWERS
 ELLIP. PIPE BEDDING AND BACKFILL - METHOD "A"**

VIRGINIA DEPARTMENT OF TRANSPORTATION

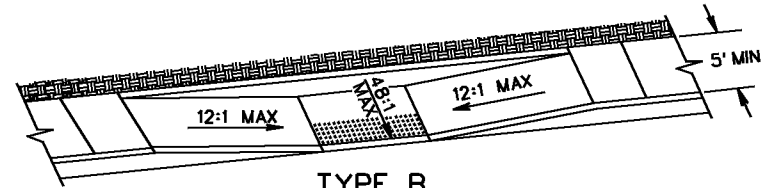
VDOT	
ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 2 OF 4
10/09	107.02

GENERAL NOTES:

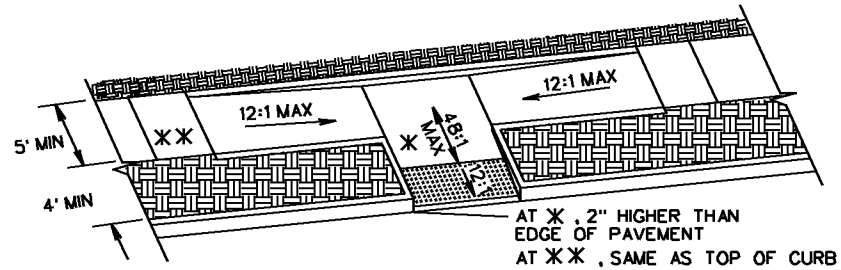
1. THE DETECTABLE WARNING SHALL BE PROVIDED BY TRUNCATED DOMES.
2. DETECTABLE WARNING TO BE CLASS A-3 CONCRETE (CLASS A-4 IF PRECAST) WITH SLIP RESISTANT INTEGRAL SURFACE COVERING THE FULL WIDTH OF THE RAMP FLOOR BY 2 FOOT IN LENGTH IN THE DIRECTION OF PEDESTRIAN TRAVEL. OTHER TYPES OF MATERIAL WITH THE TRUNCATED DOMES DETECTABLE WARNING MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
3. SLOPING SIDES OF CURB RAMP MAY BE POURED MONOLITHICALLY WITH RAMP FLOOR OR BY USING PERMISSIBLE CONSTRUCTION JOINT WITH REQUIRED BARS.
4. IF RAMP FLOOR IS PRECAST, HOLES MUST BE PROVIDED FOR DOWEL BARS SO THAT ADJOINING FLARED SIDES CAN BE CAST IN PLACE AFTER PLACEMENT OF PRECAST RAMP FLOOR. PRECAST CONCRETE SHALL BE CLASS A-4.
5. REQUIRED BARS ARE TO BE NO. 5 X 8" PLACED 1' CENTER TO CENTER ALONG BOTH SIDES OF THE RAMP FLOOR, MID-DEPTH OF RAMP FLOOR. MINIMUM CONCRETE COVER 1/2".
6. CURB / CURB AND GUTTER SLOPE TRANSITIONS ADJACENT TO CURB RAMPS ARE INCLUDED IN PAYMENT FOR CURB / CURB AND GUTTER.
7. CURB RAMPS ARE TO BE LOCATED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THEY ARE TO BE PROVIDED AT INTERSECTIONS WHEREVER AN ACCESSIBLE ROUTE WITHIN THE RIGHT OF WAY OF A HIGHWAY FACILITY CROSSES A CURB REGARDLESS OF WHETHER SIDEWALK IS EXISTING, PROPOSED, OR NONEXISTENT. THEY MUST BE LOCATED WITHIN PEDESTRIAN CROSSWALKS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER, AND SHOULD NOT BE LOCATED BEHIND VEHICLE STOP LINES, EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. ACCESSIBLE ROUTES PROVIDE A CONTINUOUS UNOBSTRUCTED, STABLE, FIRM AND SLIP RESISTANT PATH CONNECTING ALL ACCESSIBLE ELEMENTS OF A FACILITY THAT CAN BE APPROACHED, ENTERED AND USED BY PEDESTRIANS.
8. RAMPS MAY BE PLACED ON RADIAL OR TANGENTIAL SECTIONS PROVIDED THAT THE CURB OPENING IS PLACED WITHIN THE LIMITS OF THE CROSSWALK AND THAT THE SLOPE AT THE CONNECTION OF THE CURB OPENING IS PERPENDICULAR TO THE CURB.
9. TYPICAL CONCRETE SIDEWALK IS 4" THICK. WHEN THE ENTRANCE RADIICANNOT ACCOMMODATE THE TURNING REQUIREMENTS OF ANTICIPATED HEAVY TRUCK TRAFFIC, REFER TO STANDARD CG-13, COMMERCIAL ENTRANCE (HEAVY TRUCK TRAFFIC) FOR CONCRETE DEPTH.
10. WHEN CURB RAMPS ARE USED IN CONJUNCTION WITH A SHARED USE PATH, THE MINIMUM WIDTH SHALL BE THE WIDTH OF THE SHARED USE PATH
11. WHEN ONLY ONE CURB RAMP IS PROVIDED FOR TWO CROSSINGS (DIAGONAL), A 4' x 4' LANDING AREA SHALL BE PROVIDED TO MANEUVER A WHEELCHAIR INTO THE CROSSWALK WITHOUT GOING INTO THE TRAVELWAY. THIS 4' x 4' LANDING AREA MAY INCLUDE THE GUTTER PAN.



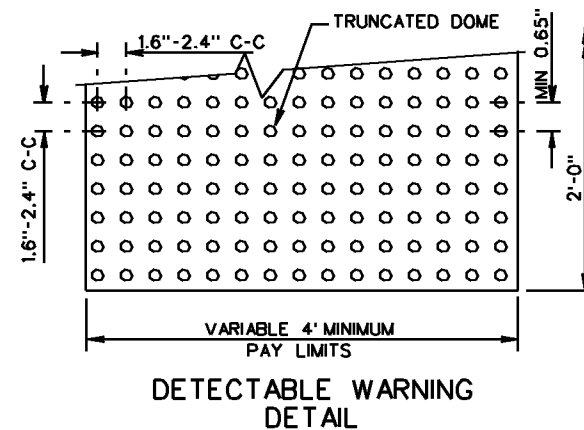
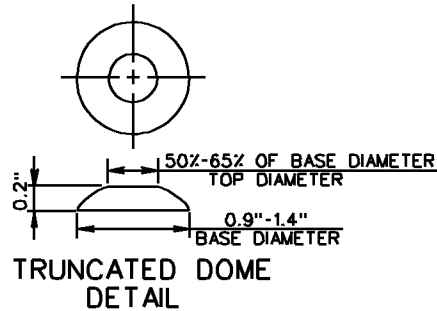
**TYPE A
PERPENDICULAR**



**TYPE B
PARALLEL**



**TYPE C
PARALLEL & PERPENDICULAR**



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 5

REVISION DATE

203.05

10/09

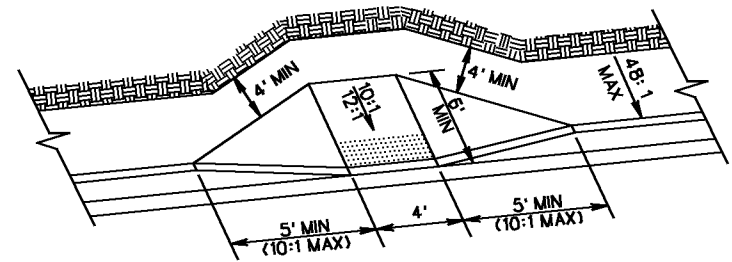
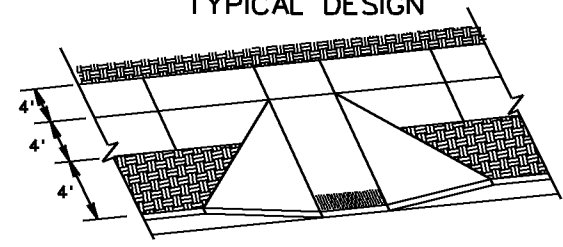
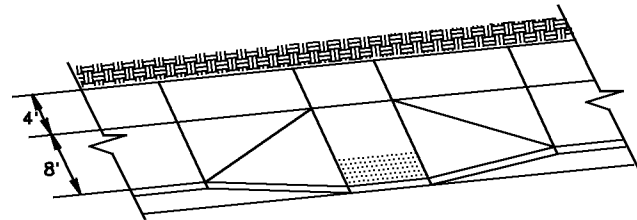
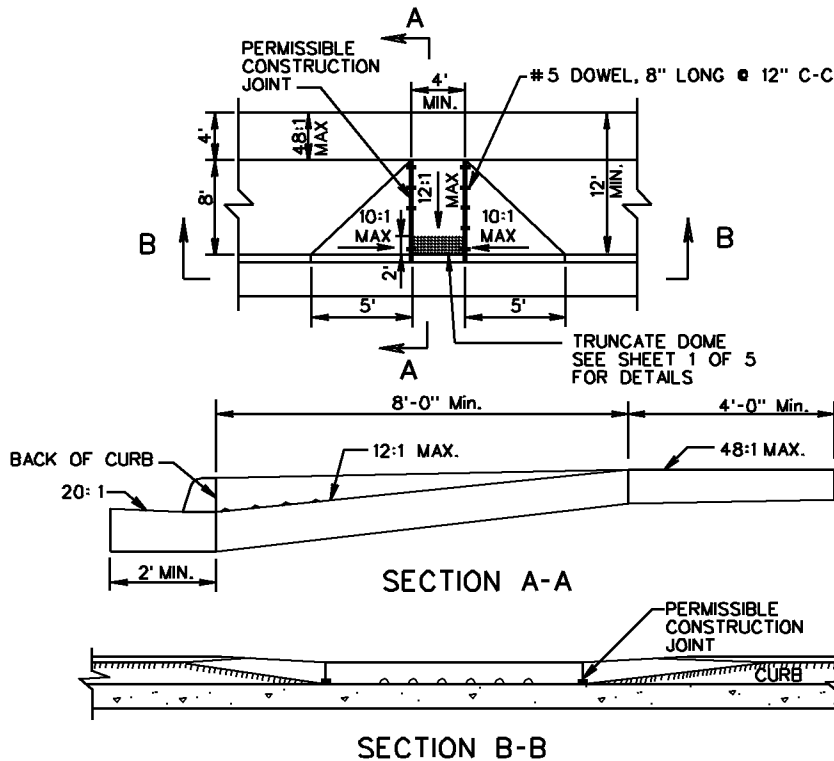
CG-12 DETECTABLE WARNING SURFACE

(GENERAL NOTES)

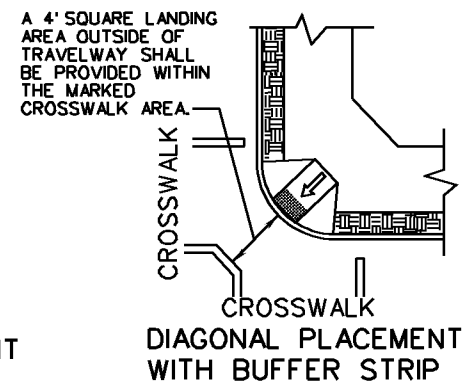
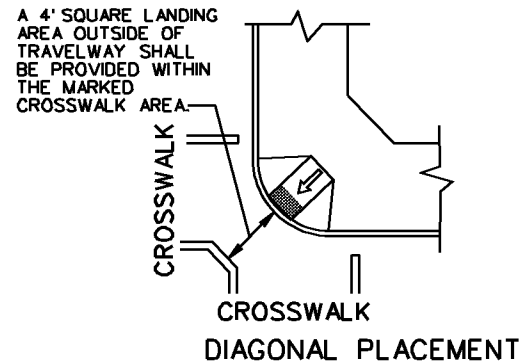
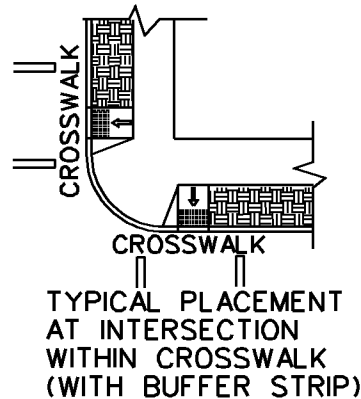
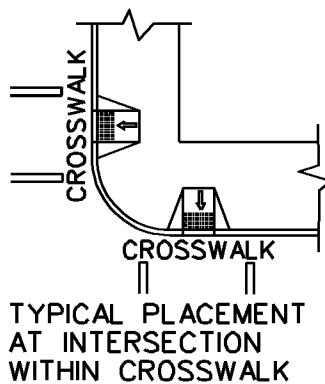
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

105
502



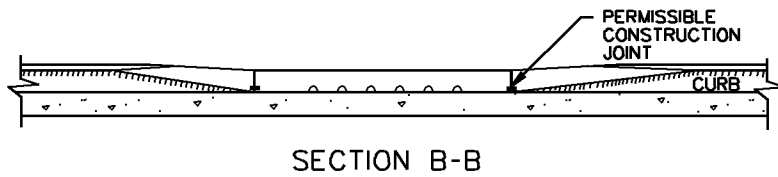
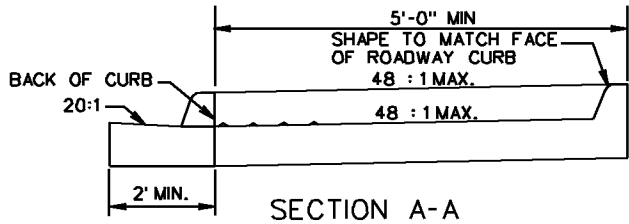
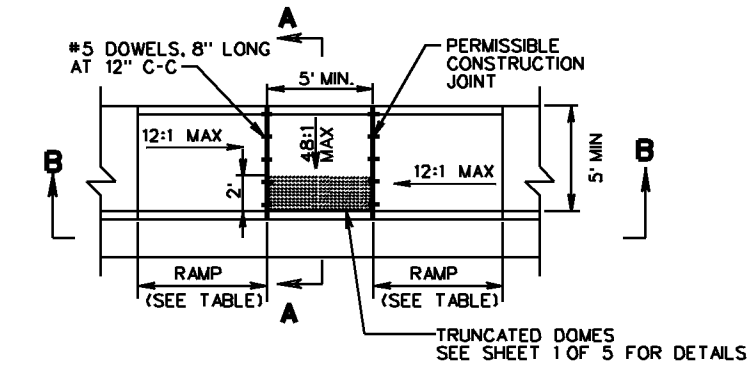
NOTES:
 FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.
 THIS DESIGN TO BE USED FOR CONSTRUCTION THAT INCORPORATES WIDER SIDEWALK. LANDING (4' WIDE) REQUIRED AT TOP OF CURB RAMP. MINIMUM CURB RAMP LENGTH 8 FEET FOR NEW CONSTRUCTION, 6 FEET FOR ALTERATIONS.



SPECIFICATION REFERENCE
105 502

CG-12 DETECTABLE WARNING SURFACE
 TYPE A (PERPENDICULAR) APPLICATION
 VIRGINIA DEPARTMENT OF TRANSPORTATION

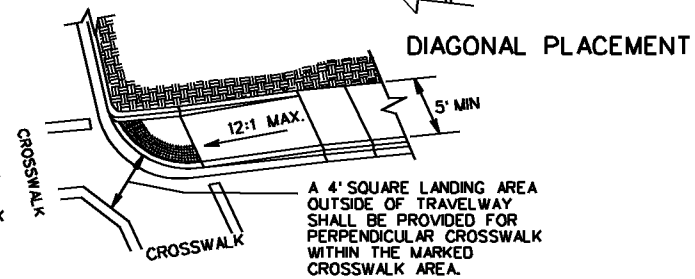
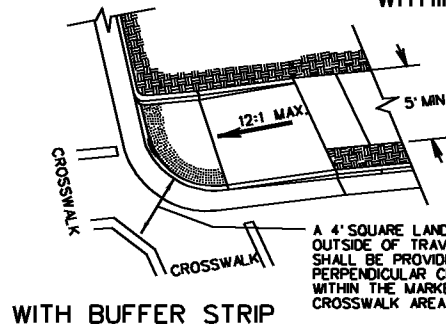
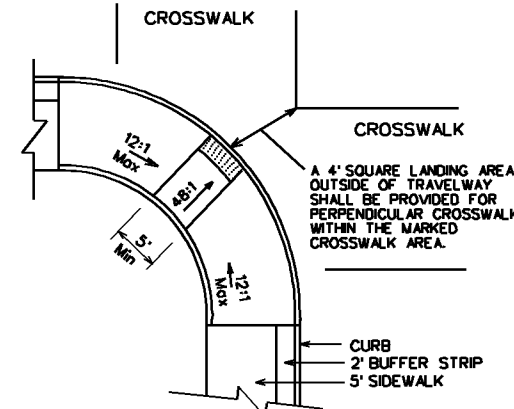
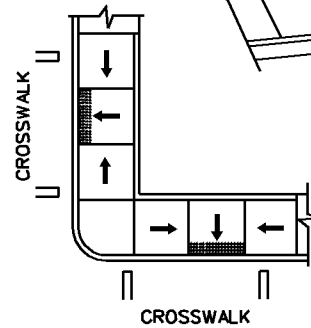
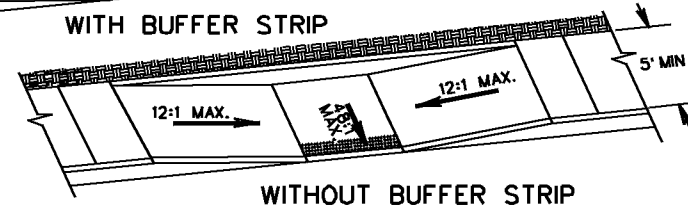
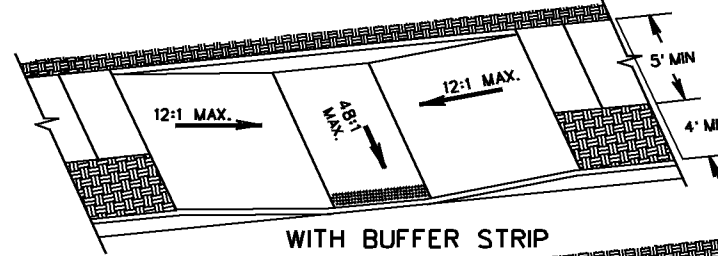
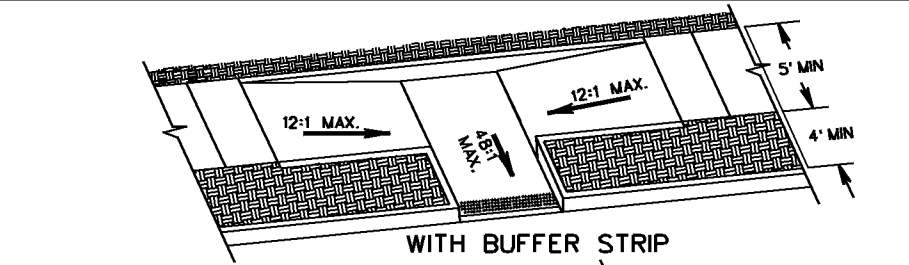
VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE 10/09	SHEET 2 OF 5 203.06



NOTES: FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.

THE REQUIRED LENGTH OF A PARALLEL RAMP IS LIMITED TO 15 FEET, REGARDLESS OF THE SLOPE.

TYPE B PARALLEL APPLICATION		
ROADWAY GRADE IN PERCENT	MINIMUM RAMP LENGTH IN FEET	
	4" CURB	6" CURB
0	4	6
1	5	7
2	5	8
3	6	9
4	8	12
5	10	15
6	14	15



ROAD AND BRIDGE STANDARDS

SHEET 3 OF 5

REVISION DATE

203.07

10/09

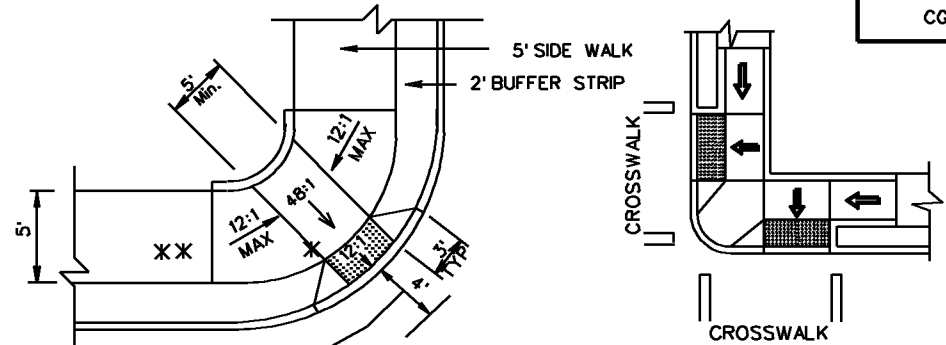
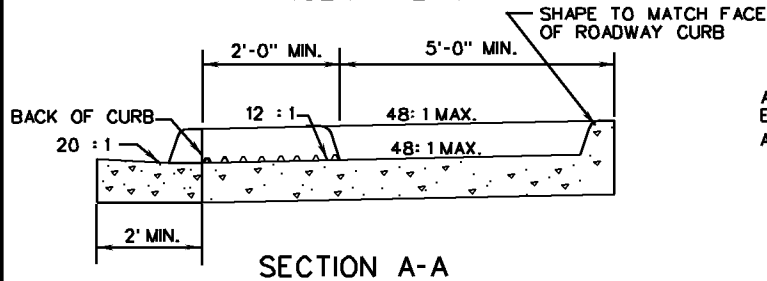
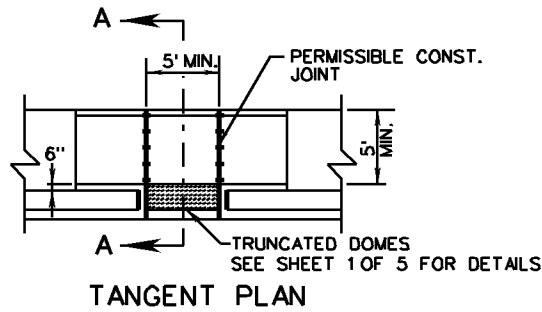
CG-12 DETECTABLE WARNING SURFACE

TYPE B (PARALLEL) APPLICATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

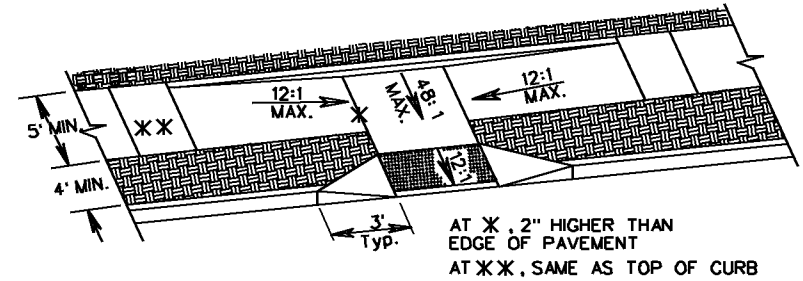
105
502



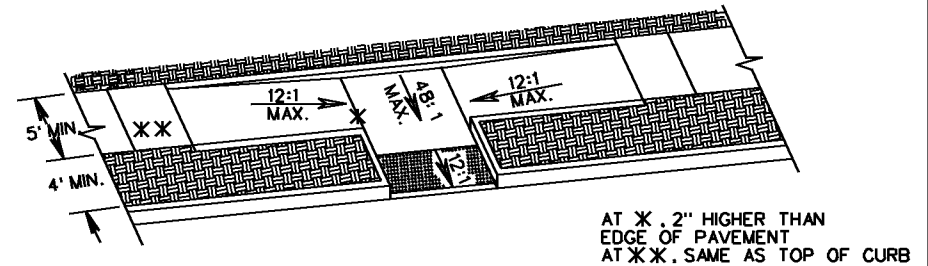
A 4' SQUARE LANDING AREA OUTSIDE OF TRAVELWAY SHALL BE PROVIDED WITHIN THE MARKED CROSSWALK AREA.

AT X, 2" HIGHER THAN EDGE OF PAVEMENT
 AT X X, SAME AS TOP OF CURB

TYPICAL PLACEMENT AT INTERSECTION WITH BUFFER STRIP



AT X, 2" HIGHER THAN EDGE OF PAVEMENT
 AT X X, SAME AS TOP OF CURB



AT X, 2" HIGHER THAN EDGE OF PAVEMENT
 AT X X, SAME AS TOP OF CURB

TYPE C PARALLEL & PERPENDICULAR APPLICATION		
ROADWAY GRADE IN PERCENT	MINIMUM RAMP LENGTH IN FEET	
	4" CURB	6" CURB
0	2	4
1	2	5
2	3	5
3	3	6
4	4	8
5	5	10
6	7	14
7	13	15
8	15	15

THE REQUIRED LENGTH OF A PARALLEL RAMP IS LIMITED TO 15 FEET, REGARDLESS OF THE SLOPE.

NOTES: FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.

THE SELECTION OF CURB TYPE AND THE CONFIGURATION OF THE BUFFER STRIP MAY VARY TO MEET EXISTING FIELD CONDITIONS AND ROADWAY GEOMETRICS PROVIDING THE DIMENSIONS AND SLOPES ARE AS NOTED.

THIS COMBINED (PARALLEL & PERPENDICULAR) DESIGN CAN BE USED WITH ADJOINING BUFFER STRIP. LANDING AT BOTTOM OF TWO SLOPING SIDES WITH 5' X 5' MIN. DIMENSIONS. THE SHORT PERPENDICULAR RUN TO THE STREET CAN BE PROTECTED BY A LANDSCAPED SETBACK OR CONNECTED TO THE SIDEWALK WITH A WARPED SURFACE.

SPECIFICATION REFERENCE

105
502

CG-12 DETECTABLE WARNING SURFACE

TYPE C (PARALLEL & PERPENDICULAR) APPLICATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

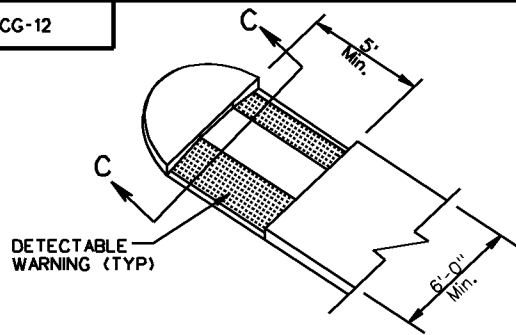
ROAD AND BRIDGE STANDARDS

REVISION DATE

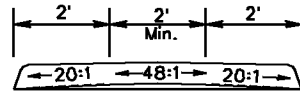
10/09

SHEET 4 OF 5

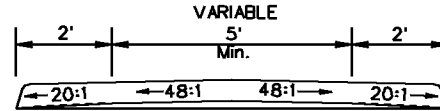
203.08



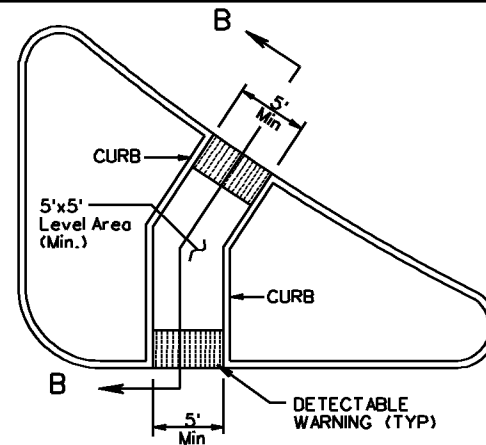
MEDIAN WITH CUT-THROUGH
TYPE M2



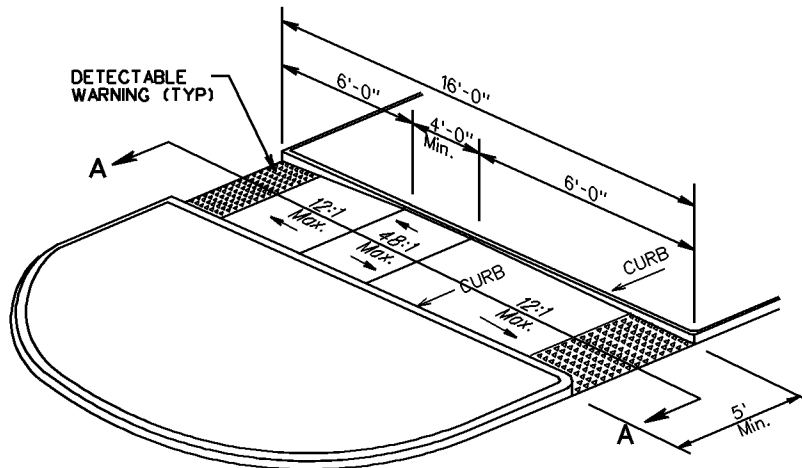
SECTION C-C



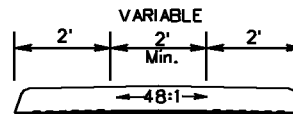
SECTION B-B



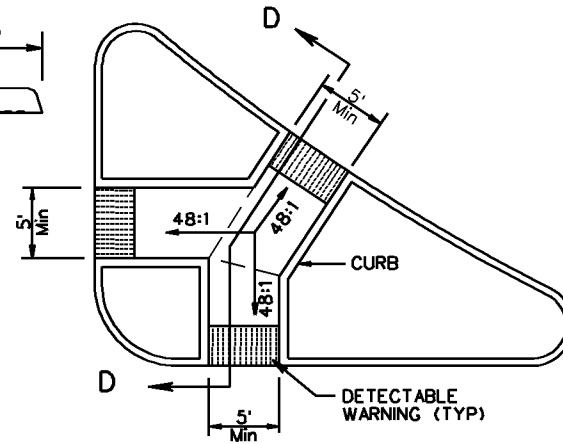
REFUGE ISLAND WITH RAMPS
TYPE RI1



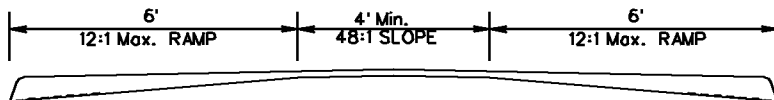
MEDIAN WITH RAMP
TYPE M1



SECTION D-D



REFUGE ISLAND CUT - THROUGH
TYPE RI2



SECTION A-A

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 THROUGHS SHALL BE ALIGNED WITH CROSSWALKS.



ROAD AND BRIDGE STANDARDS

SHEET 5 OF 5

REVISION DATE

203.08A

10/09

CG-12 DETECTABLE WARNING SURFACE

MEDIAN AND REFUGE ISLAND APPLICATIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

105
502

STANDARD	TITLE	PAGE
PR-2	PLAIN AND REINFORCED CONCRETE PAVEMENT SHOWING REINFORCEMENT, LONGITUDINAL AND TRANSVERSE JOINTS	301.01
	PLAIN AND REINFORCED CONCRETE PAVEMENT SHOWING REINFORCEMENT, LONGITUDINAL AND TRANSVERSE JOINTS	301.02
	PLAIN AND REINFORCED CONCRETE PAVEMENT SHOWING REINFORCEMENT, LONGITUDINAL AND TRANSVERSE JOINTS	301.03
	STANDARD LOAD TRANSFER ASSEMBLY CONTRACTION JOINT	301.04
	STANDARD LOAD TRANSFER ASSEMBLY EXPANSION JOINT	301.05
PR-3	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (WIRE MESH REINFORCEMENT)	301.06
	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (STEEL BAR REINFORCEMENT)	301.07
	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (FOR USE WITH BAR OR WIRE MESH REINFORCEMENT)	301.08
	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (LEAVE OUT JOINT DETAIL)	301.09
PR-4	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (STEEL BAR REINFORCEMENT)	301.10
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (FOR USE WITH BAR REINFORCEMENT ONLY)	301.11
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (LEAVE OUT JOINT DETAIL)	301.12
PR-5	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.13
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.14
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.15
PR-6	10" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.16
	10" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.17
	10" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.18
PR-7	11" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.19
	11" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.20
	11" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.21
PR-8	12" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.22
	12" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.23
	12" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.24
PR-9	13" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.25
	13" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.26
	13" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.27
XJ-1	BRIDGE APPROACH EXPANSION JOINT (FOR WIDENING OR MAINTENANCE OR EXISTING XJ-1 ONLY)	302.01
	BRIDGE APPROACH EXPANSION JOINT (INSTALLATION CRITERIA)	302.02
WP-1	METHOD OF WIDENING BRIDGE APPROACH PAVEMENT	303.01
WP-2	PAVEMENT WIDENING	303.02
RS-1	CONTINUOUS SHOULDER RUMBLE STRIPS	304.01
RS-3	CENTERLINE RUMBLE STRIPS	304.02
RS-4	CONTINUOUS SHOULDER RUMBLE STRIPES	304.03
RS-5	INTERMITTENT SHOULDER RUMBLE STRIPS	304.04
TPT-1	TRANSVERSE PAVEMENT TIE-IN	305.01

INDEX OF SHEETS
SECTION 300-PAVEMENT ITEMS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

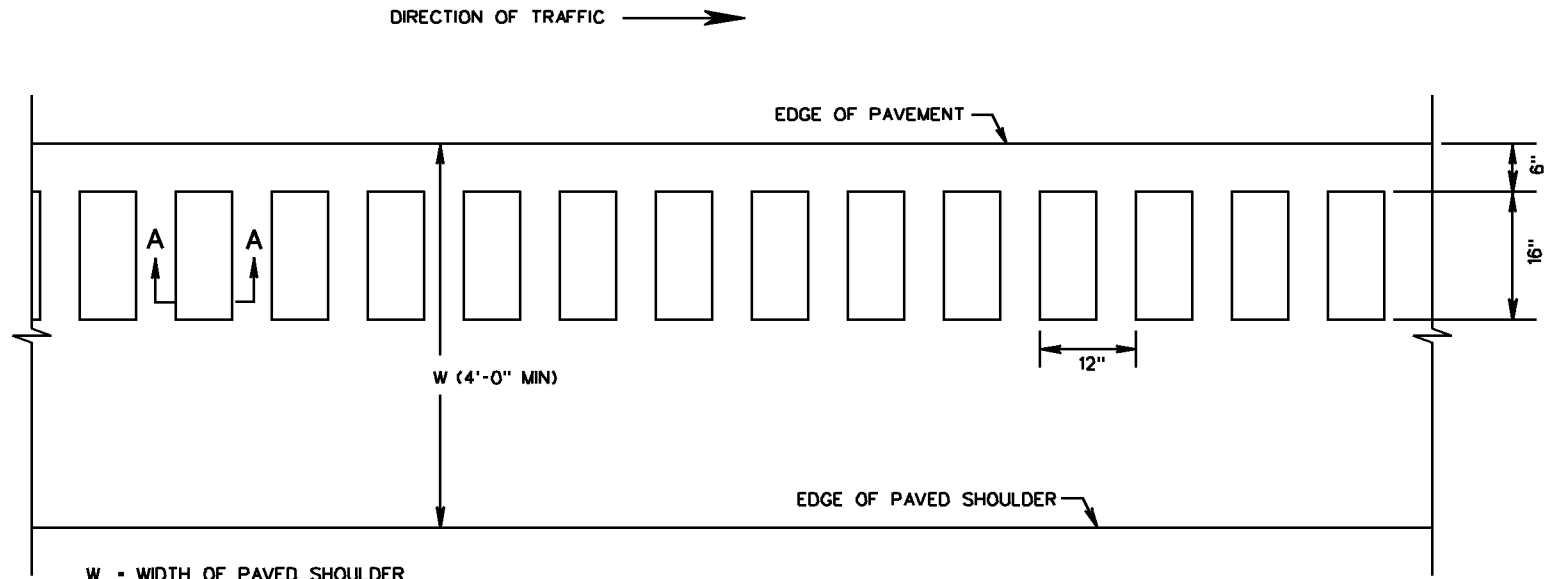
ROAD AND BRIDGE STANDARDS

REVISION DATE

10/09

SHEET 1 OF 1

300.01

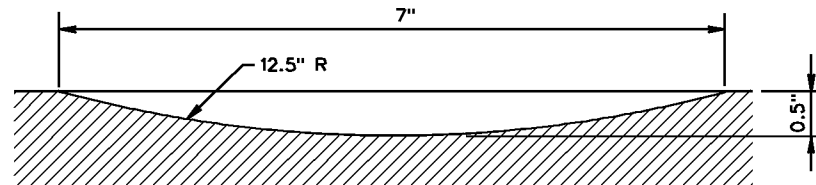


W - WIDTH OF PAVED SHOULDER

PLAN VIEW

NOTES

1. RUMBLE STRIPS SHALL BE PLACED CONTINUOUSLY 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. 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.
5. RUMBLE STRIPS 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

CONTINUOUS SHOULDER RUMBLE STRIPS

VIRGINIA DEPARTMENT OF TRANSPORTATION

 ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 1 OF 1
10/09	304.01

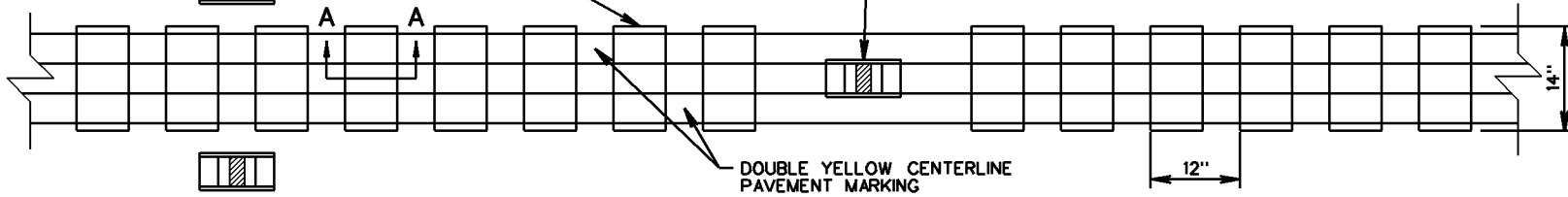
← DIRECTION OF TRAFFIC

RAISED PAVEMENT MARKER
(SEE NOTE 5)

RAISED PAVEMENT MARKER
(SEE NOTE 5)

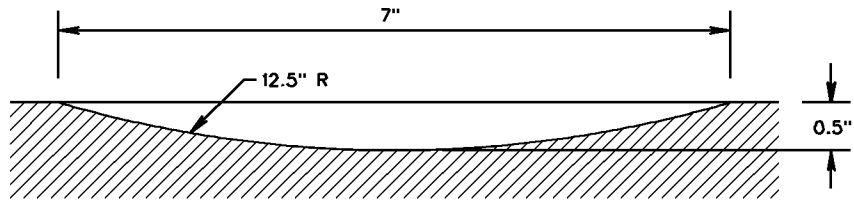
CENTERLINE RUMBLE STRIP

DOUBLE YELLOW CENTERLINE
PAVEMENT MARKING



DIRECTION OF TRAFFIC →

PLAN VIEW



SECTION A-A

NOTES

1. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED WITHIN THE LIMITS OF BRIDGES.
2. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED ON SUBDIVISION STREETS OR IN NARROW UNMARKED ROAD SECTIONS WITHOUT PAVEMENT MARKINGS.
3. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED WITHIN THE LIMITS OF CENTER TWO-WAY TURN LANES.
4. CENTERLINE RUMBLE STRIPS SHALL NOT BE INSTALLED IN PASSING ZONES EXCEPT AS DIRECTED BY THE TRAFFIC ENGINEER. THE DEPTH OF CENTERLINE RUMBLE STRIPS IN PASSING ZONES SHALL BE 3/8".
5. USE OF RAISED PAVEMENT MARKERS IS OPTIONAL. SEE STANDARD PM-9 FOR DETAILS ON RAISED PAVEMENT MARKER PLACEMENT. WHEN NECESSARY TO ACCOMMODATE THE PM-9 STANDARD TWO GROVES SHALL BE OMITTED EVERY 40' TO ALLOW FOR A CENTERLINE RAISED PAVEMENT MARKER.
6. WHERE A LEFT-TURN LANE IS MARKED, THE CONTINUOUS CENTERLINE RUMBLE STRIPS SHALL FOLLOW THE DOUBLE YELLOW MARKINGS OF THE OPPOSING LANES AND SHALL STOP 50 FEET FROM THE EDGE OF THE INTERSECTING DRIVEWAY OR ROADWAY.
7. 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.
8. PAVEMENT MARKINGS SHALL BE PLACED AS DIRECTED BY THE ENGINEER.



ROAD AND BRIDGE STANDARDS

CENTERLINE RUMBLE STRIPS

SPECIFICATION
REFERENCE

SHEET 1 OF 1

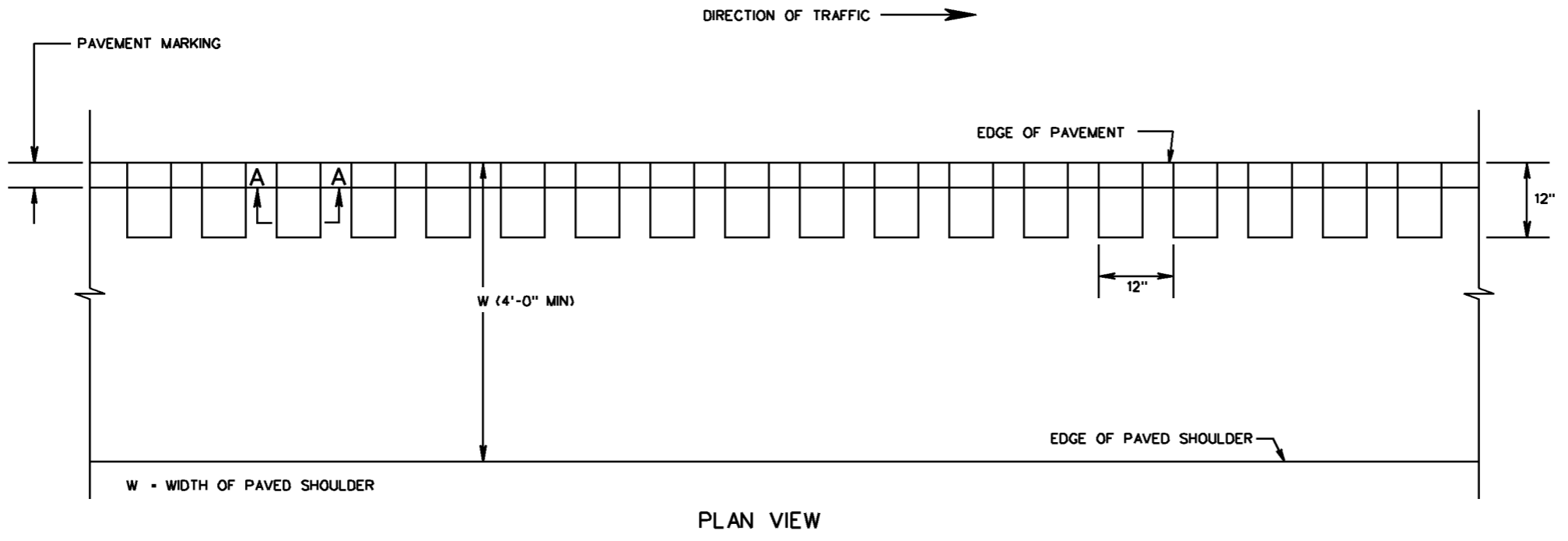
REVISION DATE

304.02

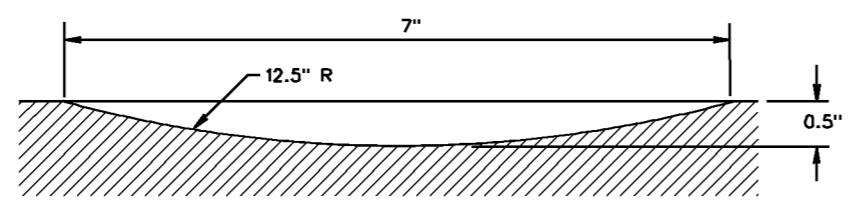
10/09

VIRGINIA DEPARTMENT OF TRANSPORTATION

310
315



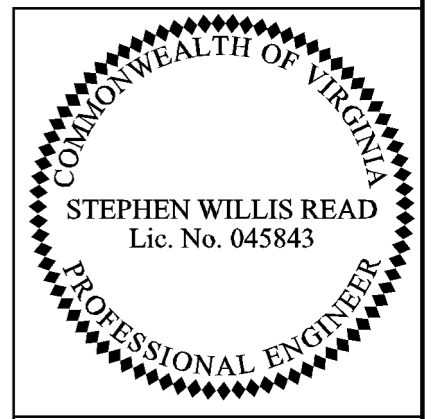
PLAN VIEW



SECTION A-A

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.



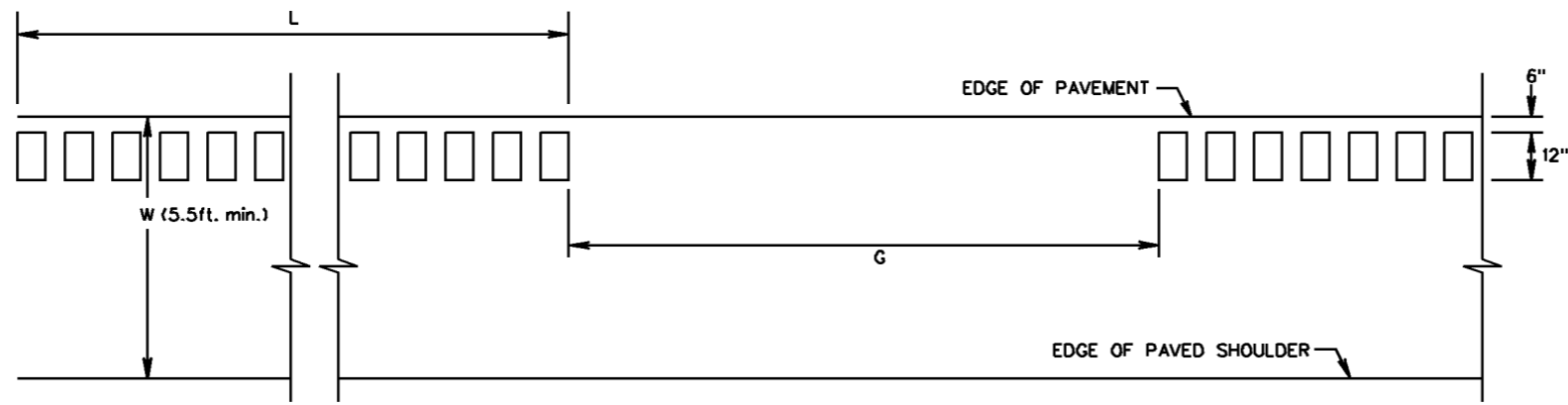
VDOT - Traffic Engineering
Richmond, Virginia
Traffic Engineer

VDOT ROAD AND BRIDGE STANDARDS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

CONTINUOUS SHOULDER RUMBLE STRIPES

STANDARD	REVISION DATE	SPECIFICATION REFERENCE	SHEET 1 OF 1
RS-4		310 315	304.03

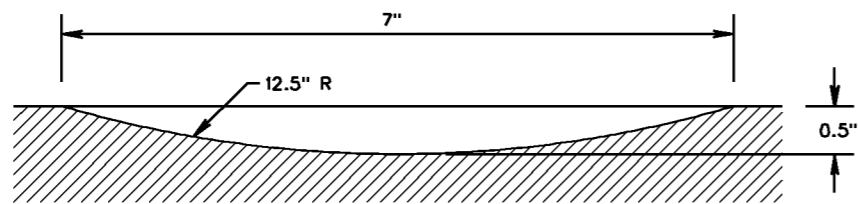
DIRECTION OF TRAFFIC →



W - WIDTH OF PAVED SHOULDER

PLAN VIEW

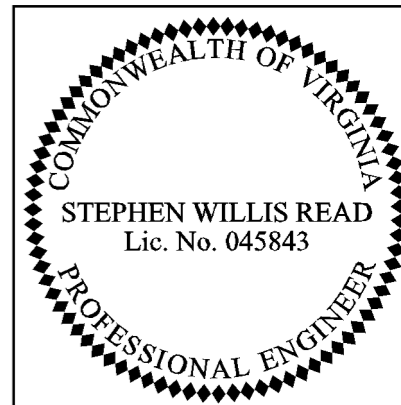
	L	G
ROADWAY DOWN GRADE LESS THAN 6%	48 ft.	12 ft.
ROADWAY DOWN GRADE EQUAL TO 6% AND GREATER	52 ft.	16 ft.



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.



VDOT - Traffic Engineering
Richmond, Virginia
Traffic Engineer

VDOT ROAD AND BRIDGE STANDARDS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

INTERMITTENT SHOULDER RUMBLE STRIPS

STANDARD	REVISION DATE	SPECIFICATION REFERENCE	SHEET 1 OF 1
RS-5		310 315	304.04

GENERAL NOTE

CAPACITY: HS20-44 LOADING AND ALTERNATE MILITARY LOADING.

SPECIFICATIONS:

CONSTRUCTION - VA. DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, 2007.

DESIGN - AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1983, INCLUDING INTERIM SPECIFICATIONS, 1984, 1985 AND VDOT MODIFICATIONS, USING LOAD FACTOR DESIGN.

ALL CONCRETE SHALL BE CLASS A4.

DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60. ALL REINFORCING BAR DIMENSIONS ON THE DETAILED DRAWINGS ARE TO CENTERS OF BARS EXCEPT WHERE OTHERWISE NOTED AND ARE SUBJECT TO FABRICATION AND CONSTRUCTION TOLERANCES.

CONSTRUCTION JOINTS SHALL BE CONSTRUCTED AND BONDED IN ACCORDANCE WITH THE CURRENT ROAD AND BRIDGE SPECIFICATIONS.

BARRELS MORE THAN 35' IN LENGTH SHALL BE POURED IN SECTIONS BY PROVIDING VERTICAL CONSTRUCTION JOINTS, NOT EXCEEDING 25' BETWEEN JOINTS NOR MORE THAN 30' FROM ENDS OF BARRELS.

**** BARS BH1 & BH3 SHALL HAVE A PIN DIAMETER OF 24 BAR DIAMETERS.**

DIMENSIONS ON BAR DIAGRAMS ARE OUT-TO-OUT OF BARS. BARS ARE STRAIGHT AND #4 IN SIZE UNLESS OTHERWISE SHOWN. BL2 SHALL BE #3 IN SIZE.

THE NUMBER OF BL1 & BL2 BARS SHOWN IN THE TABLE IS THE NUMBER OF LONGITUDINAL BARS SHOWN IN THE TYPICAL SECTION AND MAY NOT EQUAL THE TOTAL NUMBER OF BARS REQUIRED. BL1 & BL2 SHALL HAVE A LAP OF 30 BAR DIAMETERS AT SPLICES. AT CONSTRUCTION JOINTS, FIRST PLACED BARS SHALL PROJECT 30 BAR DIAMETERS BEYOND THE JOINT. ESTIMATED QUAN./LF SHOWN FOR REINFORCING STEEL DOES NOT INCLUDE QUANTITY FOR LAPS OF BL1 & BL2 BARS. THE ADDITIONAL WEIGHT PER LONGITUDINAL LAP IS SHOWN IN THE TABLE.

THE CENTERS OF MAIN REINFORCING BARS SHALL BE 2" FROM THE FACE OF THE CONCRETE.

WHEN CONCRETE PROTECTIVE COATING IS REQUIRED, ALL STEEL SHALL BE EPOXY-COATED. ALL REINFORCING STEEL FOR CULVERTS UNDER 0 TO 2 FOOT FILLS SHALL BE EPOXY-COATED.

AT THE CONTRACTOR'S OPTION, BV1 BARS MAY BE SPLICED AT THE PERMISSIBLE CONSTRUCTION JOINT IN ORDER TO FACILITATE CONSTRUCTION. NO ADDITIONAL COMPENSATION SHALL BE PROVIDED FOR THE INCREASE IN REINFORCING STEEL QUANTITY DUE TO THE SPLICES.

HEADWALL QUANTITIES SHOWN ASSUME WINGWALLS ARE TO BE BUILT AT A 45° ANGLE TO THE HEADWALL.

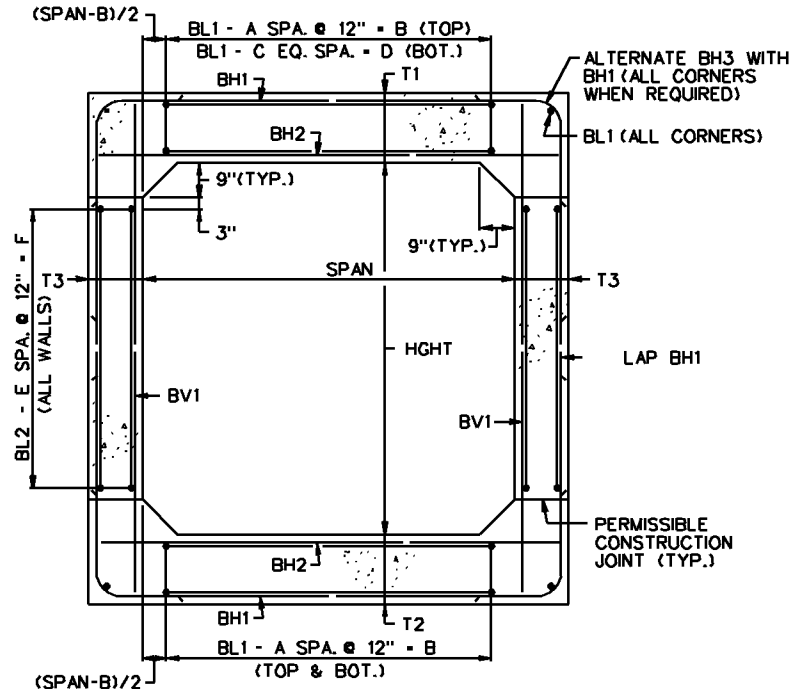
THE DESIGNS ARE APPLICABLE TO THE FILL HEIGHT AND OTHER CONDITIONS INDICATED. ANY CHANGE IN THE CONDITIONS INVALIDATES THESE DESIGNS.

WINGWALLS REFERENCED BY LETTER APPLY WHEN THE ACCEPTABLE FOUNDATION LEVEL IS THE SAME FOR BOTH BOX AND WINGS. IF FOUNDATION LEVELS ARE DIFFERENT, THE HEIGHT OF THE WINGWALL SHALL BE ADJUSTED BY SELECTION OF ANOTHER LETTERED WINGWALL OF APPROPRIATE HEIGHT. FOR WINGWALL DETAILS, REFER TO STANDARD SERIES BCW FOR THE APPROPRIATE FILL SLOPE.

FOR DETAILS OF EXTENDING EXISTING BOXES, REFER TO STANDARD BCE-01.

FOR MODIFICATION OF DETAILS FOR SKEWED CULVERTS, SEE THE SKEWED BOX DETAILS INCLUDED IN THE ROAD PLANS.

THIS STANDARD SHALL BE USED WITH THE BCB STANDARD SERIES.



TYPICAL SECTION

SPECIFICATION REFERENCE

OVERSIZE BOX CULVERTS

STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT	
ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 1 OF 2
10/09	1001.01

GENERAL NOTE

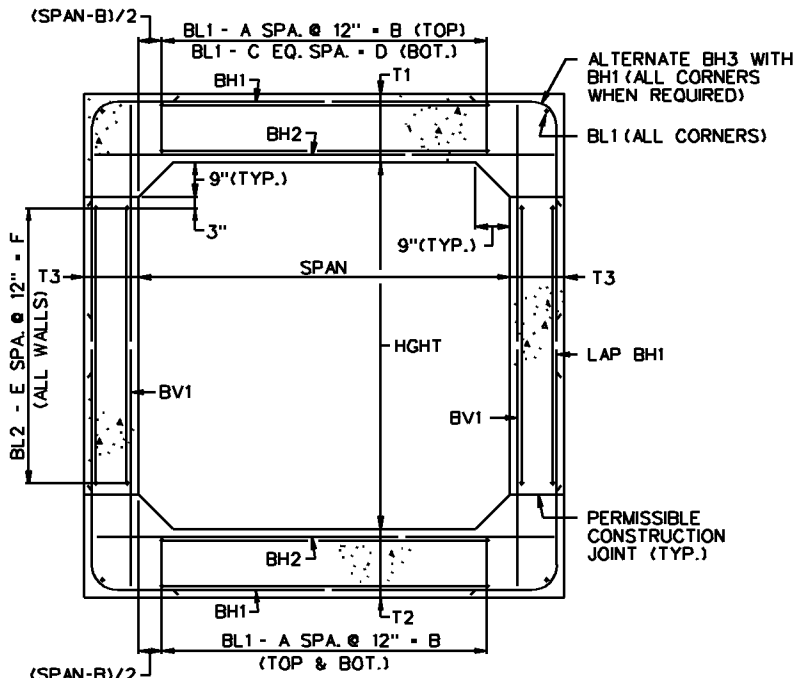
CAPACITY: HS20-44 LOADING AND ALTERNATE MILITARY LOADING

SPECIFICATIONS:

CONSTRUCTION - VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, 2007

DESIGN - AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 1983, INCLUDING INTERIM SPECIFICATIONS, 1984, 1985, AND VDOT MODIFICATIONS, USING LOAD FACTOR DESIGN.

ALL CONCRETE SHALL BE CLASS A4



TYPICAL SECTION

DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60. ALL REINFORCING BAR DIMENSIONS ON THE DETAILED DRAWINGS ARE TO CENTERS OF BARS EXCEPT WHERE OTHERWISE NOTED AND ARE SUBJECT TO FABRICATION AND CONSTRUCTION TOLERANCES.

CONSTRUCTION JOINTS SHALL BE CONSTRUCTED AND BONDED IN ACCORDANCE WITH THE CURRENT ROAD AND BRIDGE SPECIFICATIONS.

BARRELS MORE THAN 35' IN LENGTH SHALL BE POURED IN SECTIONS BY PROVIDING VERTICAL CONSTRUCTION JOINTS, NOT EXCEEDING 25' BETWEEN JOINTS NOR MORE THAN 30' FROM ENDS OF BARRELS.

** BARS BH1 & BH3 SHALL HAVE A PIN DIAMETER OF 24 BAR DIAMETER.

DIMENSIONS ON BAR DIAGRAMS ARE OUT-TO-OUT OF BARS. BARS ARE STRAIGHT AND #4 IN SIZE UNLESS OTHERWISE SHOWN. BL2 SHALL BE #3 IN SIZE.

THE NUMBER OF BL1 & BL2 BARS SHOWN IN THE TABLE IS THE NUMBER OF LONGITUDINAL BARS SHOWN IN THE TYPICAL SECTION AND MAY NOT EQUAL THE TOTAL NUMBER OF BARS REQUIRED. BL1 & BL2 SHALL HAVE A LAP OF 30 BAR DIAMETERS AT SPLICES. AT CONSTRUCTION JOINTS, FIRST PLACED BARS SHALL PROJECT 30 BAR DIAMETERS BEYOND THE JOINT. ESTIMATED QUAL./LF SHOWN FOR REINFORCING STEEL DOES NOT INCLUDE QUANTITY FOR LAPS OF BL1 & BL2 BARS. THE ADDITIONAL WEIGHT PER LONGITUDINAL LAP IS SHOWN IN THE TABLE.

THE CENTERS OF MAIN REINFORCING BARS SHALL BE 2" FROM THE FACE OF THE CONCRETE.

WHEN CONCRETE PROTECTIVE COATING IS REQUIRED, ALL STEEL SHALL BE EPOXY-COATED. ALL REINFORCING STEEL FOR CULVERTS UNDER 0 TO 2 FOOT FILLS SHALL BE EPOXY-COATED.

AT THE CONTRACTOR'S OPTION, BV1 BARS MAY BE SPLICED AT THE PERMISSIBLE CONSTRUCTION JOINT IN ORDER TO FACILITATE CONSTRUCTION. NO ADDITIONAL COMPENSATION SHALL BE PROVIDED FOR THE INCREASE IN REINFORCING STEEL QUANTITY DUE TO THE SPICES.

HEADWALL QUANTITIES SHOWN ASSUME WINGWALLS ARE TO BE BUILT AT A 45° ANGLE TO THE HEADWALL.

THE DESIGNS ARE APPLICABLE TO THE FILL HEIGHT AND OTHER CONDITIONS INDICATED. ANY CHANGE IN THE CONDITIONS INVALIDATES THESE DESIGNS.

WINGWALLS REFERENCED BY LETTER APPLY WHEN THE ACCEPTABLE FOUNDATION LEVEL IS THE SAME FOR BOTH BOX AND WINGS. IF FOUNDATION LEVELS ARE DIFFERENT, THE HEIGHT OF THE WINGWALL SHALL BE ADJUSTED BY SELECTION OF ANOTHER LETTERED WINGWALL OR APPROPRIATE HEIGHT. FOR WINGWALL DETAILS, REFER TO STANDARD SERIES BCW FOR THE APPROPRIATE FILL SLOPE.

FOR DETAILS OF EXTENDING EXISTING BOXES, REFER TO STANDARD BCE-01.

FOR MODIFICATIONS OF DETAILS FOR SKEWED CULVERTS, SEE THE SKEWED BOX DETAILS INCLUDED IN THE ROAD PLANS.

THIS STANDARD SHALL BE USED WITH THE BCS STANDARD SERIES.



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2

REVISION DATE

1002.01

10/09

**SINGLE BOX CULVERTS
STANDARD DETAILS**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

GENERAL NOTE

Capacity: HS20-44 Loading and Alternate Military Loading.

Specifications:

Construction - Va. Department of Transportation Road and Bridge Specifications 2007.

Design - AASHTO Standard Specifications for Highway Bridges, 1983, including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60.

All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** All bends shall be made with a pin diameter as listed in TABLE A except for Bars BH3 & BH4 which shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight and #4 in size unless otherwise shown. BL2 shall be #3 in size.

The number of BL1 & BL2 bars shown in the table is the number of longitudinal bars shown in the Typical Section and may not equal the total number of bars required. BL1 & BL2 shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include quantity for laps of BL1 & BL2 bars. The additional weight per longitudinal lap is shown in the table.

The centers of main reinforcing bars shall be 2" from the face of the concrete.

When concrete protective coating is required, all steel shall be epoxy-coated. All reinforcing steel for culverts under 0 to 2 foot fills shall be epoxy-coated.

At the Contractor's option, BV1 & BV2 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Bar HW2 shall be 4" less than culvert height in length.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation level is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to Standard BCE-01.

For modification of details for skewed culverts, see the Skewed Box

Details included in the road plans.

This standard shall be used with the BCD standard series.

SPECIFICATION REFERENCE

DOUBLE BOX CULVERTS STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT	
ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 2 OF 3
10/09	1003.02

GENERAL NOTE

Capacity: HS20-44 Loading and Alternate Military Loading.

Specifications:

- Construction - Va. Department of Transportation Road and Bridge Specifications, 2007.
- Design - AASHTO Standard Specifications for Highway Bridges, 1983, including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** All bends shall be made with a pin diameter as listed in TABLE A except for Bars BH3 & BH4 which shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight and #4 in size unless otherwise shown. BL2 shall be #3 in size.

The number of BL1 & BL2 bars shown in the table is the number of longitudinal bars shown in the Typical Section and may not equal the total number of bars required. BL1 & BL2 shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include quantity for laps of BL1 & BL2 bars. The additional weight per longitudinal lap is shown in the table.

The centers of main reinforcing bars shall be 2" from the face of the concrete.

When concrete protective coating is required, all steel shall be epoxy-coated. All reinforcing steel for culverts under 0 to 2 foot fills shall be epoxy-coated.

At the Contractor's option, BV1 & BV2 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Bar HW2 shall be 4" less than culvert height in length.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation levels is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to Standard BCE-01.

For modification of details for skewed culverts, see the Skewed Box Details included in the road plans.

This standard shall be used with the BCT standard series.

SPECIFICATION REFERENCE

TRIPLE BOX CULVERTS
STANDARD DETAILS
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE 10/09	SHEET 2 OF 3 1004.02

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. JT)	CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G HEADWALL LENGTH	HW1 SIZE	HW1 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 3/4"	0'- 4 3/4"	1'- 6 3/8"	0'- 6 1/4"	0'- 4"	11'- 3 3/8"	1'- 5 5/8"	11'-11"	44	16	42.388	1.006	119.910	13'- 2"	6	12'-10"	2	8	1.823	102.932	1.804	77.103	A
3	4	4	12"	2'- 8 3/4"	0'- 4 3/4"	1'- 6 3/8"	0'- 6 1/4"	0'- 4"	11'- 3 3/8"	1'- 5 5/8"	11'-11"	44	24	45.212	1.105	128.262	13'- 2"	6	12'-10"	2	10	1.928	109.835	1.896	77.103	C
4	3	4	12"	3'- 5 1/4"	0'- 7"	1'- 9"	0'- 9 3/8"	0'- 6 1/4"	14'- 4"	1'-10 1/2"	15'- 2"	56	16	52.408	1.362	132.045	16'- 2"	6	15'-10"	2	8	2.085	120.956	2.076	95.127	B
4	4	4	12"	3'- 5 1/4"	0'- 7"	1'- 9"	0'- 9 3/8"	0'- 6 1/4"	14'- 4"	1'-10 1/2"	15'- 2"	56	24	55.232	1.460	140.397	16'- 2"	6	15'-10"	2	10	2.190	127.859	2.168	95.127	D
4	5	4	12"	3'- 5 1/8"	0'- 7 1/4"	1'- 8 3/4"	0'- 9 3/4"	0'- 6 1/2"	14'- 4"	1'-10 1/4"	15'- 3"	56	32	58.056	1.581	148.861	16'- 2"	6	15'-10"	2	12	2.289	134.761	2.255	95.127	F
4	6	4	12"	3'- 5 1/8"	0'- 7 1/4"	1'- 8 3/4"	0'- 9 3/4"	0'- 6 1/2"	14'- 4"	1'-10 1/4"	15'- 3"	56	40	60.880	1.678	169.692	16'- 2"	6	15'-10"	2	14	2.394	141.664	2.347	95.127	H
5	3	4	10"	4'- 1 1/8"	0'- 9"	1'-11 3/4"	1'- 1/4"	0'- 8 1/4"	17'- 4"	2'- 3 3/4"	18'- 6"	68	16	62.428	1.772	170.945	19'- 2"	6	18'-10"	2	8	2.295	138.980	2.296	113.151	B
5	4	4	10"	4'- 1 1/8"	0'- 9"	1'-11 3/4"	1'- 1/4"	0'- 8 1/4"	17'- 4"	2'- 3 3/4"	18'- 6"	68	24	65.252	1.870	179.564	19'- 2"	6	18'-10"	2	10	2.401	145.883	2.389	113.151	D
5	5	4	10"	4'- 1 1/8"	0'- 9"	1'-11 3/4"	1'- 1/4"	0'- 8 1/4"	17'- 4"	2'- 3 3/4"	18'- 6"	68	32	68.076	1.968	188.184	19'- 2"	6	18'-10"	2	12	2.506	152.785	2.481	113.151	F
5	6	4	10"	4'- 1 1/8"	0'- 9"	1'-11 3/4"	1'- 1/4"	0'- 8 1/4"	17'- 4"	2'- 3 3/4"	18'- 6"	68	40	70.900	2.066	196.803	19'- 2"	6	18'-10"	2	14	2.611	159.688	2.574	113.151	H
5	7	4	10"	4'- 1 1/8"	0'- 9"	1'-11 3/4"	1'- 1/4"	0'- 8 1/4"	17'- 4"	2'- 3 3/4"	18'- 6"	68	48	73.724	2.162	225.486	19'- 2"	6	18'-10"	2	16	2.716	166.591	2.667	113.151	J
6	4	4	9"	4'-10 3/8"	0'-11 1/4"	2'- 2 1/4"	1'- 3 3/8"	0'-10 1/2"	20'- 4"	2'- 8 3/4"	21'- 9"	80	24	75.272	2.384	237.810	22'- 2"	6	21'-10"	2	10	2.563	163.907	2.561	131.175	D
6	5	4	9"	4'-10 3/8"	0'-11 1/4"	2'- 2 1/4"	1'- 3 3/8"	0'-10 1/2"	20'- 4"	2'- 8 3/4"	21'- 9"	80	32	78.096	2.482	246.608	22'- 2"	6	21'-10"	2	12	2.668	170.809	2.654	131.175	F
6	6	4	9"	4'-10 3/8"	0'-11 1/4"	2'- 2 1/4"	1'- 3 3/8"	0'-10 1/2"	20'- 4"	2'- 8 3/4"	21'- 9"	80	40	80.920	2.580	255.405	22'- 2"	6	21'-10"	2	14	2.773	177.712	2.746	131.175	H
6	7	4	9"	4'-10 3/8"	0'-11 1/4"	2'- 2 1/4"	1'- 3 3/8"	0'-10 1/2"	20'- 4"	2'- 8 3/4"	21'- 9"	80	48	83.744	2.677	281.845	22'- 2"	6	21'-10"	2	16	2.878	184.615	2.839	131.175	J
6	8	4	9"	4'-10 3/8"	0'-11 1/4"	2'- 2 1/4"	1'- 3 3/8"	0'-10 1/2"	20'- 4"	2'- 8 3/4"	21'- 9"	80	56	86.568	2.774	304.790	22'- 2"	6	21'-10"	2	18	2.983	191.517	2.932	131.175	L
7	4	5	9"	5'- 6 3/4"	1'- 1 1/8"	2'- 4 5/8"	1'- 7"	1'- 1"	23'- 4 1/8"	3'- 1 3/8"	25'- 1"	92	24	85.292	3.018	295.429	25'- 2"	6	24'-10"	2	10	2.689	181.931	2.697	149.199	E
7	6	4	9"	5'- 6 3/4"	1'- 1 3/4"	2'- 4 5/8"	1'- 6 3/8"	1'- 1"	23'- 4 1/8"	3'- 1 3/8"	25'- 1"	92	40	90.940	3.214	309.518	25'- 2"	6	24'-10"	2	14	2.899	195.736	2.882	149.199	I
7	8	4	9"	5'- 6 3/4"	1'- 1 3/4"	2'- 4 5/8"	1'- 6 3/8"	1'- 1"	23'- 4 1/8"	3'- 1 3/8"	25'- 1"	92	56	96.588	3.408	363.278	25'- 2"	6	24'-10"	2	18	3.109	209.541	3.068	149.199	M
7	10	4	9"	5'- 7 3/4"	1'- 1 3/4"	2'- 4 5/8"	1'- 6 3/8"	1'- 1"	23'- 6 1/8"	3'- 1 3/8"	25'- 3"	92	72	102.236	3.681	410.043	25'- 2"	6	24'-10"	2	22	3.241	223.347	3.174	149.199	Q
8	4	5	8"	6'- 3 1/4"	1'- 3 3/8"	2'- 7 3/8"	1'- 9 3/8"	1'- 3"	26'- 3 3/8"	3'- 6 3/8"	28'- 5"	104	24	95.312	3.660	384.188	28'- 2"	6	27'-10"	2	10	2.781	199.955	2.799	167.223	E
8	6	5	8"	6'- 3 1/4"	1'- 3 3/8"	2'- 7 3/8"	1'- 9 3/8"	1'- 3"	26'- 3 3/8"	3'- 6 3/8"	28'- 5"	104	40	100.960	3.858	377.182	28'- 2"	6	27'-10"	2	14	2.991	213.760	2.985	167.223	I
8	8	5	8"	6'- 3 3/8"	1'- 3 3/8"	2'- 7 5/8"	1'- 9 1/2"	1'- 2 3/4"	26'- 3 3/8"	3'- 6 3/8"	28'- 4"	104	56	106.608	4.011	425.598	28'- 2"	6	27'-10"	2	18	3.217	227.565	3.186	167.223	M
8	10	5	8"	6'- 4 1/4"	1'- 3 3/8"	2'- 7 3/8"	1'- 9 3/8"	1'- 3"	26'- 5 3/8"	3'- 6 3/8"	28'- 7"	104	72	112.256	4.324	513.594	28'- 2"	6	27'-10"	2	22	3.331	241.371	3.274	167.223	Q
9	4	5	9"	6'-11 1/8"	1'- 5 3/8"	2'-10 1/4"	2'- 5 3/8"	1'- 5"	29'- 4"	3'-11 3/4"	31'- 8"	116	24	105.332	4.377	458.279	31'- 2"	6	30'-10"	2	10	2.855	217.979	2.883	185.247	F
9	6	5	9"	6'-11 1/8"	1'- 5 3/8"	2'-10 1/4"	2'- 5 3/8"	1'- 5"	29'- 4"	3'-11 3/4"	31'- 8"	116	40	110.980	4.573	478.066	31'- 2"	6	30'-10"	2	14	3.065	231.784	3.068	185.247	J
9	8	5	9"	6'-11 1/8"	1'- 5 3/8"	2'-10 1/4"	2'- 5 3/8"	1'- 5"	29'- 4"	3'-11 3/4"	31'- 8"	116	56	116.628	4.766	534.043	31'- 2"	6	30'-10"	2	18	3.275	245.589	3.254	185.247	N
9	10	5	9"	7'- 7/8"	1'- 5 3/8"	2'-10 1/4"	2'- 5 3/8"	1'- 5"	29'- 6"	3'-11 3/4"	31'-10"	116	72	122.276	5.042	598.272	31'- 2"	6	30'-10"	2	22	3.403	259.395	3.356	185.247	R
9	12	5	9"	7'- 2 1/4"	1'- 6 1/8"	2'-10"	2'- 1"	1'- 5 1/4"	29'- 9"	3'-11 1/2"	32'- 1"	116	88	127.924	5.437	673.368	31'- 2"	6	30'-10"	2	26	3.439	273.200	3.366	185.247	V
10	4	6	9"	7'- 8 1/2"	1'- 8"	3'- 1"	2'- 3 3/8"	1'- 7"	32'- 4"	4'- 5"	34'-11"	128	24	115.352	5.167	542.758	34'- 2"	6	33'-10"	2	10	2.873	236.003	2.911	203.271	F
10	8	6	9"	7'- 8 1/2"	1'- 8"	3'- 1"	2'- 3 3/8"	1'- 7"	32'- 4"	4'- 5"	34'-11"	128	40	121.000	5.363	563.235	34'- 2"	6	33'-10"	2	14	3.083	249.808	3.097	203.271	J
10	8	6	9"	7'- 8 1/2"	1'- 8"	3'- 1"	2'- 3 3/8"	1'- 7"	32'- 4"	4'- 5"	34'-11"	128	56	126.648	5.557	614.472	34'- 2"	6	33'-10"	2	18	3.294	263.613	3.282	203.271	N
10	10	6	9"	7'- 9 1/2"	1'- 8"	3'- 1"	2'- 3 3/8"	1'- 7"	32'- 6"	4'- 5"	35'- 1"	128	72	132.296	5.836	673.740	34'- 2"	6	33'-10"	2	22	3.419	277.419	3.382	203.271	R
10	12	6	9"	7'-10 3/8"	1'- 8 1/4"	3'- 3/4"	2'- 4"	1'- 7 1/4"	32'- 9"	4'- 4 3/4"	35'- 5"	128	88	137.944	6.238	745.759	34'- 2"	6	33'-10"	2	26	3.450	291.224	3.387	203.271	V
12	6	6	8"	9'- 1 1/8"	2'- 1/4"	3'- 6 3/8"	2'- 9 5/8"	1'-11 1/4"	38'- 4 1/8"	5'- 3 3/8"	41'- 6"	152	40	141.040	7.222	782.525	40'- 2"	6	39'-10"	2	14	3.003	285.856	3.036	239.319	K
12	8	6	8"	9'- 1 5/8"	2'- 1/4"	3'- 6 3/8"	2'- 9 5/8"	1'-11 1/4"	38'- 4 1/8"	5'- 3 3/8"	41'- 6"	152	56	146.688	7.415	839.828	40'- 2"	6	39'-10"	2	18	3.213	299.661	3.221	239.319	O
12	10	6	8"	9'- 2 1/8"	2'- 1/4"	3'- 6 3/8"	2'- 9 5/8"	1'-11 1/4"	38'- 6 3/8"	5'- 3 3/8"	41'- 9"	152	72	152.336	7.725	848.516	40'- 2"	6	39'-10"	2	22	3.312	313.467	3.294	239.319	S
12	12	6	8"	9'- 4 1/8"	2'- 1/4"	3'- 6 3/8"	2'- 9 5/8"	1'-11 1/4"	38'- 9 1/8"	5'- 3 3/8"	41'-11"	152	88	157.984	8.059	933.076	40'- 2"	6	39'-10"	2	26	3.379	327.272	3.336	239.319	W

SPECIFICATION REFERENCE

TRIPLE BOX CULVERTS
40 TO 45 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT
ROAD AND BRIDGE STANDARDS
REVISION DATE 10/09
SHEET 2 OF 2
1004.23

GENERAL NOTE

Capacity: HS20-44 Loading and Alternate Military Loading.

Specifications:

- Construction - Va. Department of Transportation Road and Bridge Specifications, 2007.
- Design - AASHTO Standard Specifications for Highway Bridges, 1983, including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** All bends shall be made with a pin diameter as listed in TABLE A except for Bars BH3 & BH4 which shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight and #4 in size unless otherwise shown. BL2 shall be #3 in size.

The number of BL1 & BL2 bars shown in the table is the number of longitudinal bars shown in the Typical Section and may not equal the total number of bars required. BL1 & BL2 shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include quantity for laps of BL1 & BL2 bars. The additional weight per longitudinal lap is shown in the table.

The centers of main reinforcing bars shall be 2" from the face of the concrete.

When concrete protective coating is required, all steel shall be epoxy-coated. All reinforcing steel for culverts under 0 to 2 foot fills shall be epoxy-coated.

At the Contractor's option, BV1 & BV2 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Bar HW2 shall be 4" less than culvert height in length.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation levels is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to Standard BCE-01.

For modification of details for skewed culverts, see the Skewed Box Details included in the road plans.

This standard shall be used with the BCQ standard series.

SPECIFICATION REFERENCE

**QUADRUPLE BOX CULVERTS
STANDARD DETAILS**

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE

10/09

SHEET 2 OF 3

1005.02

GENERAL NOTE**Specifications:**

Construction - Va. Department of Transportation Road and Bridge Specifications, 2007.

Design - AASHTO Standard Specifications for Highway Bridges, 1983, including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawing are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The centers of main reinforcing bars shall be 2" from the face of the concrete unless otherwise shown.

At the Contractor's option, WV Series bars may be spliced at the top of footing in order to facilitate construction. Splice lengths shall be in accordance with TABLE C. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

When concrete protective coating is required, all steel shall be epoxy-coated.

Bearing capacity of foundations shall be 1.5 Tons/Sq. Ft. minimum for wings A - X and 2 Tons/Sq. Ft. minimum for wings Y - EE.

Weepholes shall be placed at lowest point feasible for free drainage away from wing.

Four Type I Wings are to be used for straight crossings and skews up to 20°. Two Type I & two Type II Wings are to be used for skews from 25° to 45°. For skews above 45°, special design wings are required. The wingwall to be used for each culvert is shown on the BC series sheets.

The designs shown are applicable for a 45° skew with the roadway and other conditions indicated. Any change in these conditions invalidates these designs.

Quantities shown are for one wing.

WING	Quantity (One Wing)	
	Concrete Cu. Yd.	Reinforcing Steel Lbs.
A	1.692	102.747
B	2.086	134.045
C	2.498	158.678
D	2.627	171.704
E	3.187	202.147
F	3.669	225.269
G	4.084	256.122
H	4.630	287.351
I	5.395	345.119
J	6.163	386.348
K	7.093	447.595
L	7.394	485.032
M	8.090	549.490
N	8.735	601.075
O	9.496	662.513
P	10.480	972.915
Q	10.995	1009.521
R	12.071	1141.937
S	12.962	1028.293
T	16.931	1149.082
U	17.605	1533.982
V	19.070	1841.681
W	20.946	2596.967
X	22.546	2009.473
Y	24.453	1968.517
Z	26.215	2385.838
AA	27.508	3913.960
BB	28.542	2710.731
CC	29.932	3799.925
DD	36.104	4040.276
EE	37.813	4568.249

SPECIFICATION
REFERENCE

WING DETAILS

1½:1 FILL SLOPE - TYPE I

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

ROAD AND BRIDGE STANDARDS

REVISION DATE

10/09

SHEET 2 OF 7

1006.02

GENERAL NOTE

Specifications:

Construction - Va. Department of Transportation Road and Bridge Specifications, 2007.
 Design - AASHTO Standard Specifications for Highway Bridges, 1983, including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawing are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The centers of main reinforcing bars shall be 2" from the face of the concrete unless otherwise shown.

At the Contractor's option, WV Series bars may be spliced at the top of footing in order to facilitate construction. Splice lengths shall be in accordance with TABLE C. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

When concrete protective coating is required, all steel shall be epoxy-coated.

Bearing capacity of foundations shall be 1.5 Tons/Sq. Ft. minimum for wings A - X and 2 Tons/Sq. Ft. minimum for wings Y - EE.

Weepholes shall be placed at lowest point feasible for free drainage away from wing.

Four Type I Wings are to be used for straight crossings and skews up to 20°. Two Type I & two Type II Wings are to be used for skews from 25° to 45°. For skews above 45°, special design wings are required. The wingwall to be used for each culvert is shown on the BC series sheets.

The designs shown are applicable for a 45° skew with the roadway and other conditions indicated. Any change in these conditions invalidates these designs.

Quantities shown are for one wing.

WING	Quantity (One Wing)	
	Concrete Cu. Yd.	Reinforcing Steel Lbs.
A	2.110	133.183
B	2.504	165.003
C	2.916	188.084
D	3.347	211.979
E	3.796	248.635
F	4.424	276.524
G	4.923	318.386
H	5.836	360.316
I	6.392	388.442
J	7.186	454.546
K	8.026	511.375
L	8.913	572.281
M	9.582	626.003
N	10.546	702.040
O	11.825	879.295
P	12.580	964.846
Q	13.679	1063.138
R	14.810	1350.012
S	17.199	1225.256
T	19.817	1532.432
U	21.317	1745.661
V	22.858	2152.605
W	23.964	1823.343
X	25.975	2817.287
Y	28.546	2310.426
Z	30.359	3017.503
AA	32.262	3328.030
BB	34.212	3818.744
CC	35.571	4104.313
DD	37.575	5249.194
EE	40.334	4171.222

SPECIFICATION REFERENCE

WING DETAILS
 1 1/2:1 FILL SLOPE - TYPE II
 VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE 10/09	SHEET 2 OF 7 1006.09

GENERAL NOTE**Specifications:**

Construction - Va. Department of Transportation Road and Bridge Specifications, 2007.

Design - AASHTO Standard Specifications for Highway Bridges, 1983, Including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawing are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The centers of main reinforcing bars shall be 2" from the face of the concrete unless otherwise shown.

At the Contractor's option, WV Series bars may be spliced at the top of footing in order to facilitate construction. Splice lengths shall be in accordance with TABLE C. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

When concrete protective coating is required, all steel shall be epoxy-coated.

Bearing capacity of foundations shall be 1.5 Tons/Sq. Ft. minimum for wings A - X and 2 Tons/Sq. Ft. minimum for wings Y - EE.

Weepholes shall be placed at lowest point feasible for free drainage away from wing.

Four Type I Wings are to be used for straight crossings and skews up to 20°. Two Type I & two Type II Wings are to be used for skews from 25° to 45°. For skews above 45°, special design wings are required. The wingwall to be used for each culvert is shown on the BC series sheets.

The designs shown are applicable for a 45° skew with the roadway and other conditions indicated. Any change in these conditions invalidates these designs.

Quantities shown are for one wing.

WING	Quantity (One Wing)	
	Concrete Cu. Yd.	Reinforcing Steel Lbs.
A	2.334	146.814
B	2.741	179.226
C	3.208	202.300
D	3.658	227.238
E	4.174	268.139
F	4.665	294.699
G	5.412	348.564
H	6.153	378.666
I	6.798	431.368
J	7.621	479.805
K	8.567	531.895
L	9.236	601.618
M	10.275	652.010
N	10.623	706.389
O	11.644	765.083
P	12.804	868.664
Q	13.615	938.923
R	14.852	1247.994
S	16.063	1193.231
T	17.077	1263.468
U	18.343	1566.661
V	19.708	2817.906
W	21.169	1838.465
X	24.710	2352.406
Y	29.398	2856.703
Z	31.458	2680.408
AA	33.355	3557.475
BB	36.175	3205.508
CC	38.270	3362.599
DD	45.675	4925.833
EE	48.208	5122.544

SPECIFICATION
REFERENCE

WING DETAIL
2:1 FILL SLOPE - TYPE I
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

ROAD AND BRIDGE STANDARDS

REVISION DATE

10/09

SHEET 2 OF 7

1006.16

GENERAL NOTE

Specifications:

Construction - Va. Department of Transportation Road and Bridge Specifications, 2007.
 Design - AASHTO Standard Specifications for Highway Bridges, 1983, including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawing are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The centers of main reinforcing bars shall be 2" from the face of the concrete unless otherwise shown.

At the Contractor's option, WV Series bars may be spliced at the top of footing in order to facilitate construction. Splice lengths shall be in accordance with TABLE C. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

When concrete protective coating is required, all steel shall be epoxy-coated.

Bearing capacity of foundations shall be 1.5 Tons/Sq. Ft. minimum for wings A - X and 2 Tons/Sq. Ft. minimum for wings Y - EE.

Weepholes shall be placed at lowest point feasible for free drainage away from wing.

Four Type I Wings are to be used for straight crossings and skews up to 20°. Two Type I & two Type II Wings are to be used for skews from 25° to 45°. For skews above 45°, special design wings are required. The wingwall to be used for each culvert is shown on the BC series sheets.

The designs shown are applicable for a 45° skew with the roadway and other conditions indicated. Any change in these conditions invalidates these designs.

Quantities shown are for one wing.

WING	Quantity (One Wing)	
	Concrete Cu. Yd.	Reinforcing Steel Lbs.
A	2.917	182.454
B	3.499	233.188
C	3.939	252.894
D	4.573	286.711
E	5.233	341.981
F	6.145	383.724
G	6.881	445.681
H	7.910	489.811
I	8.512	517.004
J	9.643	613.342
K	10.529	655.405
L	11.777	771.234
M	13.099	837.992
N	14.106	919.335
O	15.275	1017.802
P	16.355	1093.189
Q	17.891	1292.357
R	19.035	1525.633
S	20.691	1704.239
T	21.910	1952.852
U	23.368	2116.654
V	24.678	2112.153
W	28.412	2270.223
X	32.434	3904.347
Y	35.972	2730.572
Z	37.707	2849.343
AA	39.857	3392.164
BB	42.547	3594.334
CC	46.155	4755.614
DD	49.940	5500.464
EE	51.922	6808.705

SPECIFICATION REFERENCE	<h2 style="margin: 0;">WING DETAILS</h2> <h3 style="margin: 0;">2:1 FILL SLOPE - TYPE II</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	ROAD AND BRIDGE STANDARDS				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">REVISION DATE</td> <td style="width: 50%;">SHEET 2 OF 7</td> </tr> <tr> <td style="text-align: center;">10/09</td> <td style="text-align: center;">1006.23</td> </tr> </table>	REVISION DATE	SHEET 2 OF 7	10/09	1006.23
REVISION DATE	SHEET 2 OF 7					
10/09	1006.23					