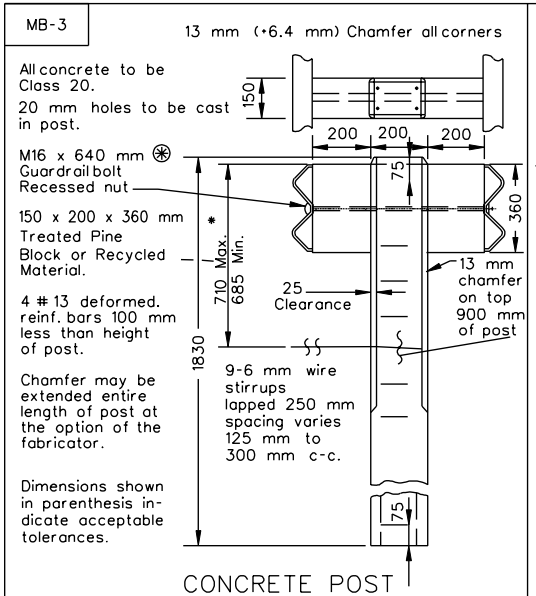
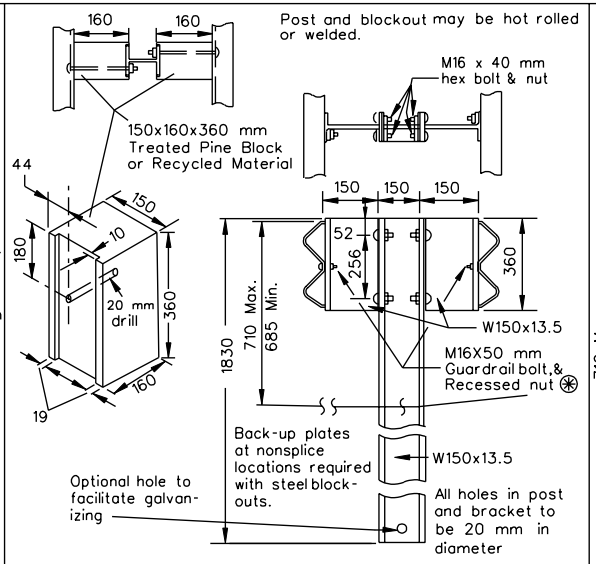
REVISED 8/97 REVISED 7/98

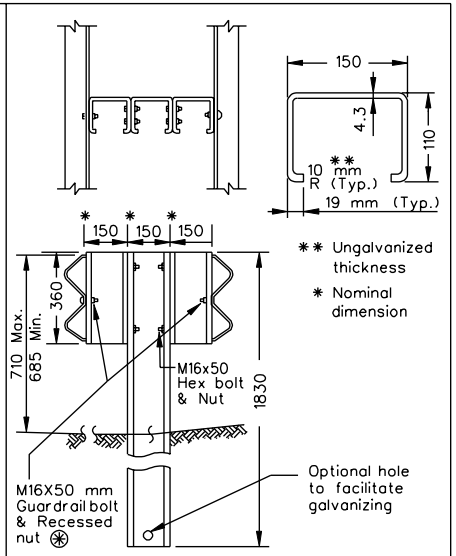
MB-3



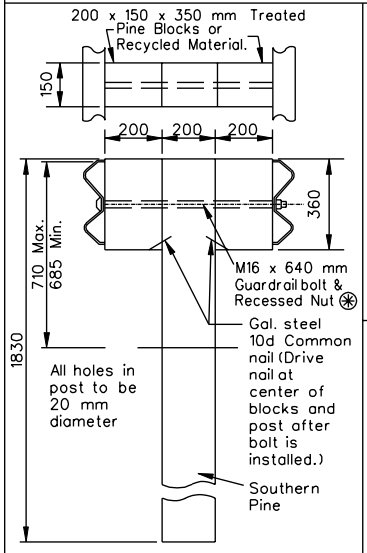
CONCRETE POST



STEEL POST



BENT PLATE POST



WOOD POST

Notes:

Standard MB-3 post spacing is 1.905 m.

For details of Rail Element, Rail Splice Joint, W Beam Back up Plate, and associated hardware see Sheet no. 501.01.

Alternate type posts and blockouts may be interchanged on any one project with the restriction that the same type of post and blockout must be used in any single run of median barrier.

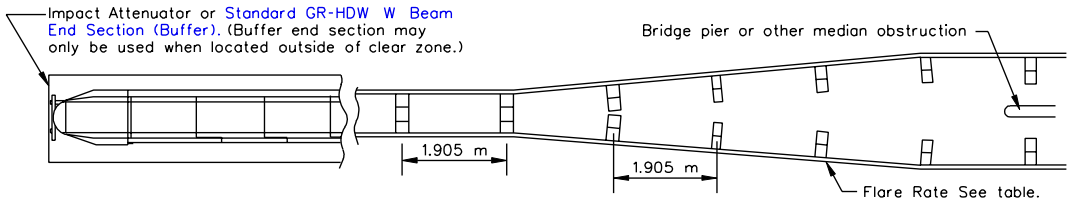
All bolts, nuts, washers, steel posts, bent plate post, and blockouts are to be galvanized.

The guardrail and median barrier components depicted in AASHTO - AGC - ARTBA "A Guide to Standardize Highway Barrier Hardware" may be substituted if interchangeable with the Standards for guardrail (GR) or median barrier (MB) and approved by the Engineer.

⊛ Standard washers are to be used on last 15.24 meters of Run off end.

FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/H	SHY LINE (m)	FLARE RATE	FLARE RATE
110	2.8	30:1	15:1 *
100	2.4	26:1	14:1 *
80	2.0	21:1	11:1 *
60	1.4	16:1	8:1 *
50	1.1	13:1	7:1 *

* Suggested maximum flare rate for semi-rigid barrier systems.



METHOD OF TREATMENT AT BRIDGE PIER OR MEDIAN OBSTRUCTION

BLOCKED-OUT W BEAM MEDIAN BARRIER

SPECIFICATION REFERENCE
221
505

501.38

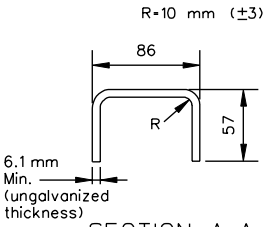
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

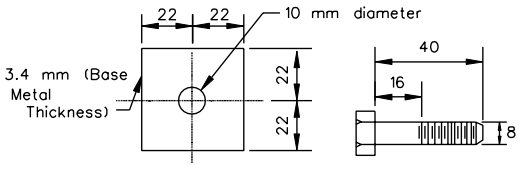
REVISED 2/01 REVISED 7/01

MB-5

✱ The guardrail and median barrier components depicted in AASHTO - AGC - ARTBA "A Guide to Standardize Highway Barrier Hardware may be substituted if interchangeable with the Standards for guardrail (GR)or median barrier (MB) and approved by the Engineer.



SECTION A-A

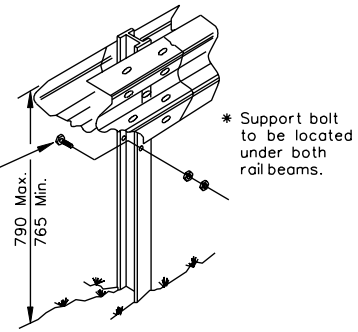


SQUARE WASHER

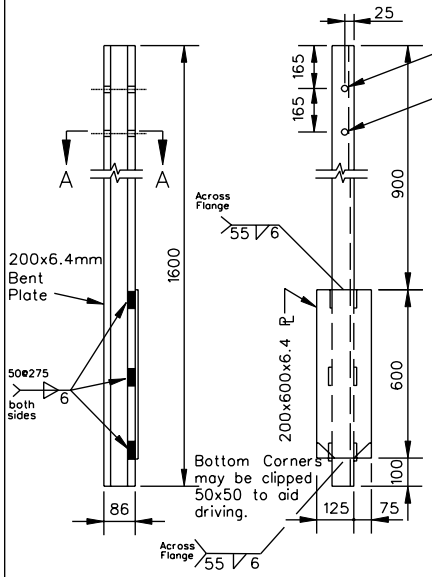
Bolt and nut shall have 17.8 kN min. tensile strength.

8 mm HEX BOLT AND NUT

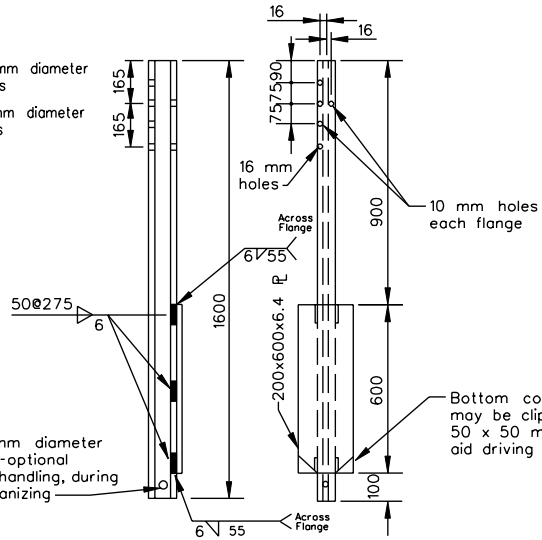
16 mm diameter hole for M14 support bolt 40 mm long, 2 nuts, no washer. No support bolts in the last three posts of each end of each installation.



TYPICAL INSTALLATION



BENT PLATE POST



For rock installation, 200x610x6.4 mm plate is to be eliminated. Drill or excavate hole for post, place and backfill with crusher run aggregate to level of rock.

S75 x 8.5 mm STEEL POST

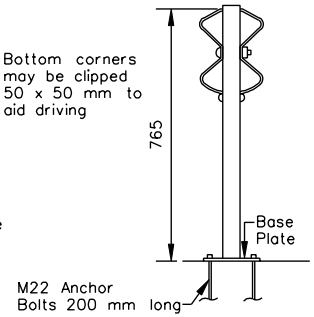
Notes:

Standard MB-5 post spacing is 3.810 m
Standard MB-5A post spacing is 1.905 m
Standard MB-5B post spacing is 0.9525 m
Standard MB-5 deflection is 2.15 m.

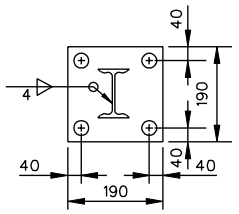
All posts, bolts, nuts and washers are to be galvanized.

Bent Plate post or S75 x 8.5 post may be interchanged on any one project with the restriction that the same type of post must be used in any single run of guard-rail.

For details of guardrail element, splice joint, hardware, etc. see Sheet No. 501.01.



All holes 25 mm diameter
All welds 5 mm
Plate is 12 mm thick



BASE PLATE

STRUCTURE MOUNTED BARRIER

Sheet 1 of 2

SPECIFICATION REFERENCE
221 505

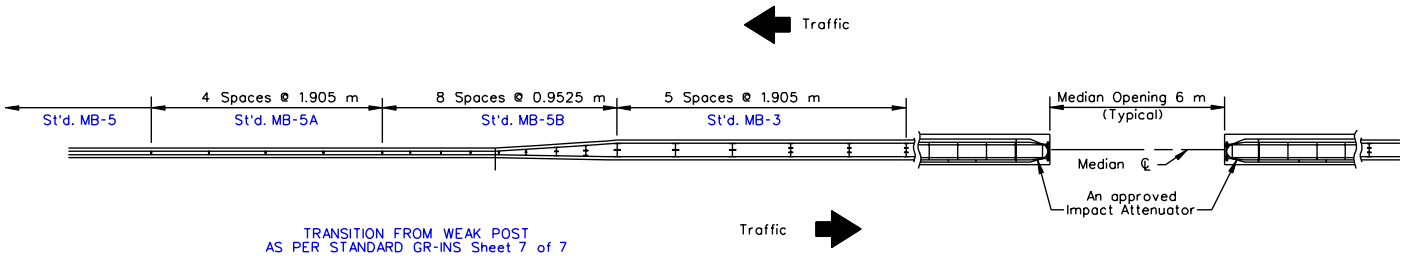
STANDARD W BEAM MEDIAN BARRIER (WEAK POST SYSTEM)

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

501.39

MB-5



TREATMENT FOR MEDIAN BARRIER CROSS-OVER

Sheet 2 of 2

STANDARD W BEAM MEDIAN (WEAK POST SYSTEM)

SPECIFICATION REFERENCE

221
505

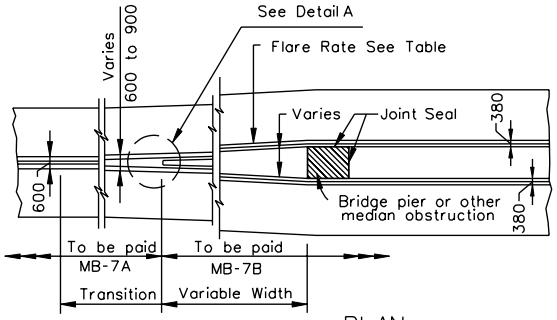
501.40

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

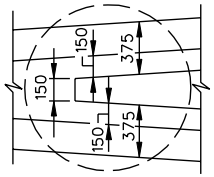
VIRGINIA DEPARTMENT OF TRANSPORTATION

VOID 1/1/00

MB-7A,7B,7C



PLAN

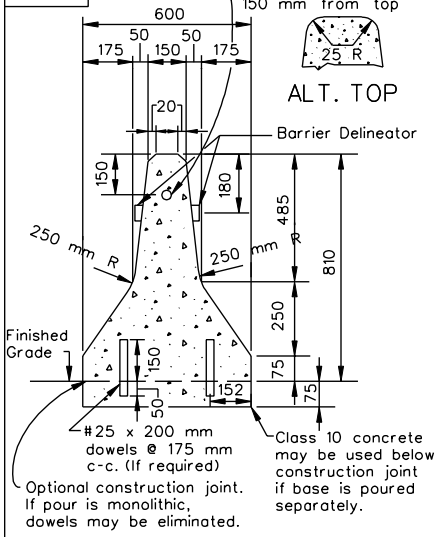


DETAIL A

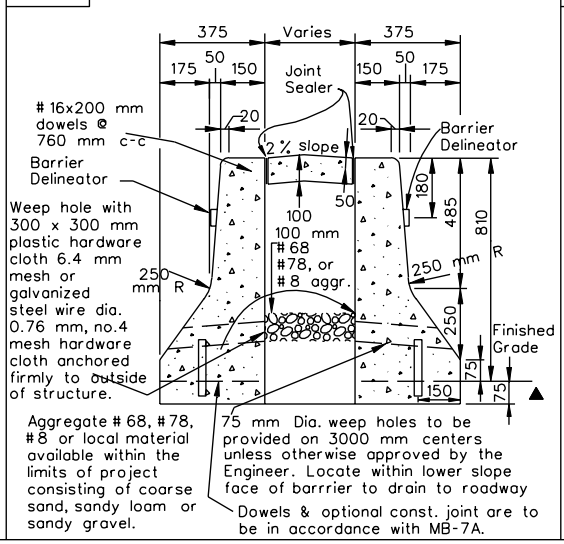
FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/h	SHY LINE m	FLARE RATE	FLARE RATE
110	2.8	30:1	20:1 *
100	2.4	26:1	18:1 *
80	2.0	21:1	14:1 *
60	1.4	16:1	10:1 *
50	1.1	13:1	8:1 *

* Suggested maximum flare rate for rigid barrier systems.

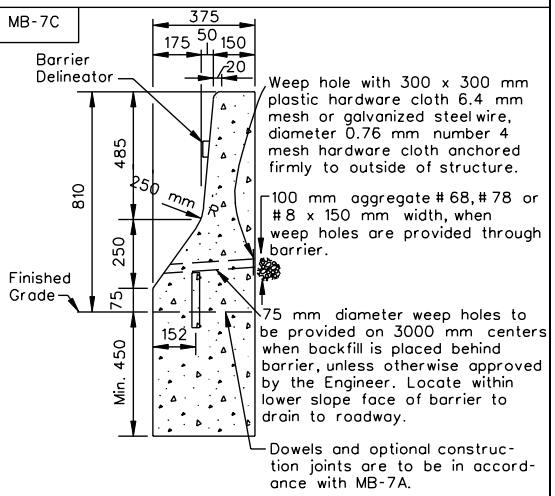
MB-7A



MB-7B



MB-7C



Notes:

If the Contractor elects to use the optional construction joint, transverse joints for crack control and expansion joints are to be provided in both footing and barrier at the same location.

Transverse joints are to coincide with joints in adjacent pavement with a maximum spacing of 6 meters c-c.

Concrete median barrier may be precast, cast in place or slip-formed.

Horizontal reinforcing steel bars are to be separated at all expansion and contraction joints. A 50 mm concrete cover is required over the ends of the reinforcing steel.

Barrier Delineator size, color, and spacing to be in accordance with the Specifications.

Cost of Delineator to be included in the price bid for Median Barrier.

Reflective surface of Barrier Delineator in all instances, to be facing oncoming traffic.

Alternate top design shown on MB-7A may also be applied to MB-7B and MB-7C.

Concrete to be Class 20 if cast in place, 30 MPa if precast.

▲ Depth of concrete base may be extended at the contractor's option to coincide with bottom of pavement course in which base terminates; however, the cost of additional concrete shall be included in unit price bid per linear meter of barrier.

SPECIFICATION REFERENCE
105
502

CONCRETE MEDIAN BARRIER

VIRGINIA DEPARTMENT OF TRANSPORTATION

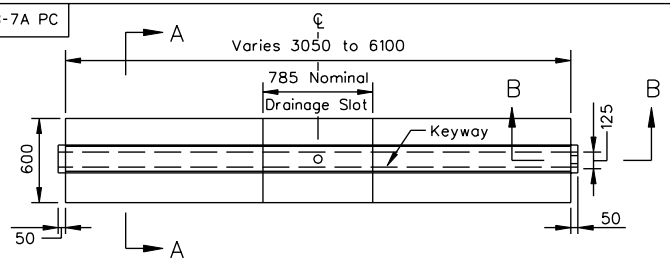
VOID 1/1/00

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

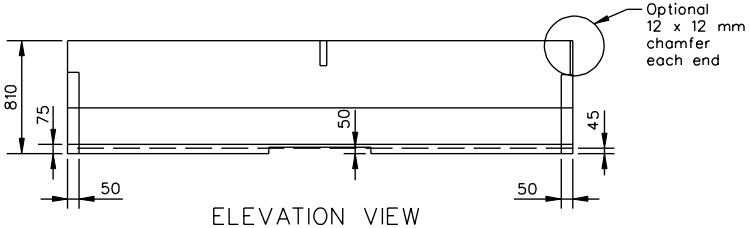
501.41

VOID 1/1/00

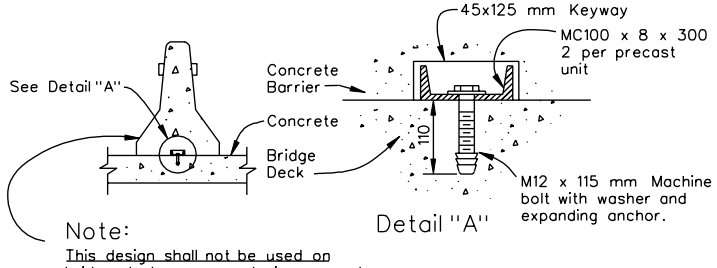
MB-7A PC



PLAN VIEW
(MALE SECTION)



ELEVATION VIEW
(FEMALE SECTION)



Detail "A"

Note:

This design shall not be used on bridge decks as an exterior parapet or railing.

Detail A shall be used on installations separating traffic lanes in opposite directions or on surfaces superelevated at a rate greater than 19 mm per meter.

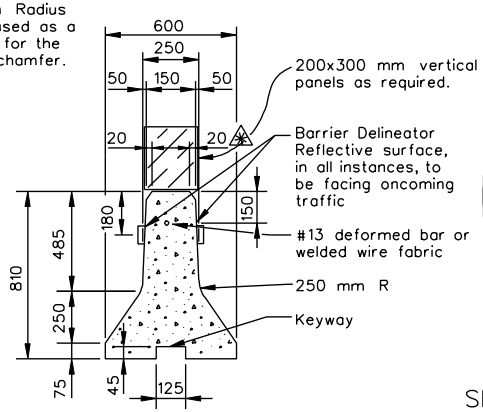
Note:

Machine bolts centered on channel sections are to be placed a min. of 600 mm from each end of the precast unit and are not to conflict with bridge expansion joints.

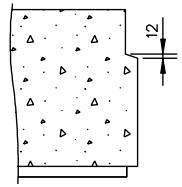
DETAIL FOR TEMPORARY
INSTALLATION ON BRIDGE DECK

Sheet 1 of 2

△ A 25 mm Radius may be used as a alternate for the 20 mm chamfer.



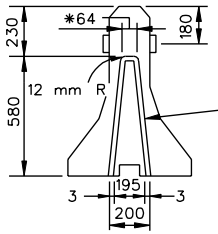
SECTION A-A



SECTION B-B

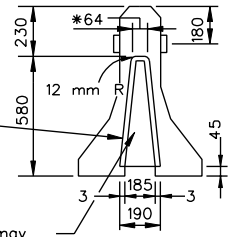
*TOLERANCES

Male End
+0 mm
-1.60 mm
Female End
-0 mm
+1.60 mm



END VIEW
(FEMALE SECTION)

Edges and fillets of keys have 12 mm R.



END VIEW
(MALE SECTION)

Optional tongue protector may be provided by the manufacturer. Tongue protector may be full or partial and must meet the approval of the Engineer.

Notes:

When barrier with male and female sections is located on vertical and/or horizontal curves, the opening at joints is not to exceed 25 mm.

At the option of the manufacturer, additional reinforcing may be added to the precast concrete barrier for handling.

Concrete to be 30 MPa minimum.

Barrier delineator size, color and spacing to be in accordance with the Specifications.

Cost of delineator to be included in the price bid for Median Barrier.

Approved alternates are an acceptable substitution for Standard.

FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/h	SHY LINE m	FLARE RATE	FLARE RATE
110	2.8	30:1	20:1
100	2.4	26:1	18:1
80	2.0	21:1	14:1
60	1.4	16:1	10:1
50	1.1	13:1	8:1

*Suggested maximum flare rate for rigid barrier systems.

VOID 1/1/00

PRECAST TRAFFIC BARRIER SERVICE CONCRETE

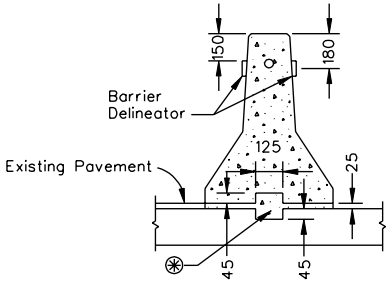
SPECIFICATION REFERENCE
105
512

501.42 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

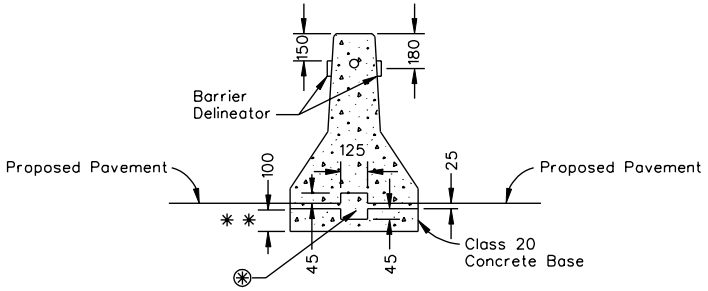
VIRGINIA DEPARTMENT OF TRANSPORTATION

VOID 1/1/00

MB-7A PC



DETAIL A
(EXISTING PAVEMENT LOCATION)



DETAIL B
(PROPOSED PAVEMENT LOCATION)

Notes:

⊛ High-strength grout or mortar to be in accordance with Section 218 of the Specifications.

* * 100 mm Minimum or variable to coincide with subgrade course.

When used as Median Barrier in a permanent location, drainage slots will be completely filled and sealed with mortar or grout unless unit is to be located over median drainage structure.

Barrier Delineator size, color, and spacing to be in accordance with the Specifications.
Cost of Delineator to be included in the price bid for Median Barrier.

Reflective surface of Barrier Delineator in all instances, to be facing oncoming traffic.

SPECIFICATION REFERENCE
105 512

PRECAST TRAFFIC BARRIER SERVICE CONCRETE PERMANENT INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

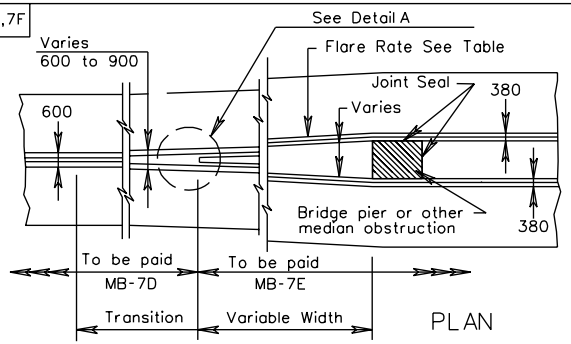
VOID 1/1/00

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

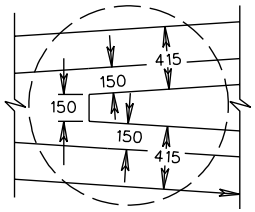
501.43

REVISED 8/97

MB-7D,7E,7F



PLAN

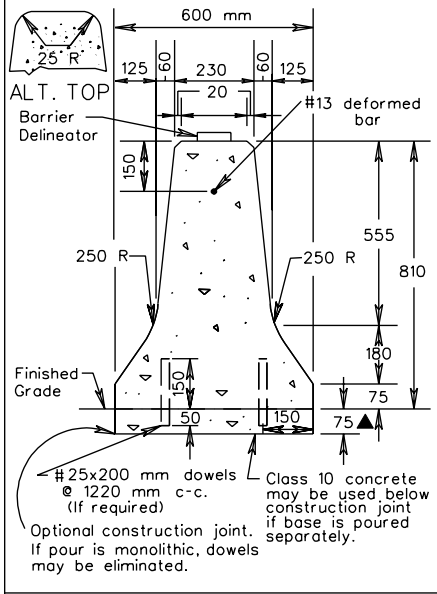


DETAIL A

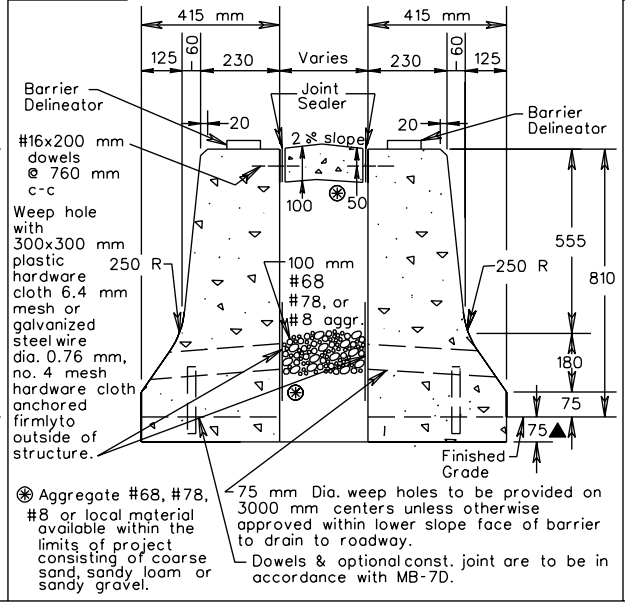
FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/h	SHY LINE m	FLARE RATE	FLARE RATE
110	2.8	30:1	20:1*
100	2.4	26:1	18:1*
80	2.0	21:1	14:1*
60	1.4	16:1	11:1*
50	1.1	13:1	8:1*

* Suggested maximum flare rate for rigid barrier systems.

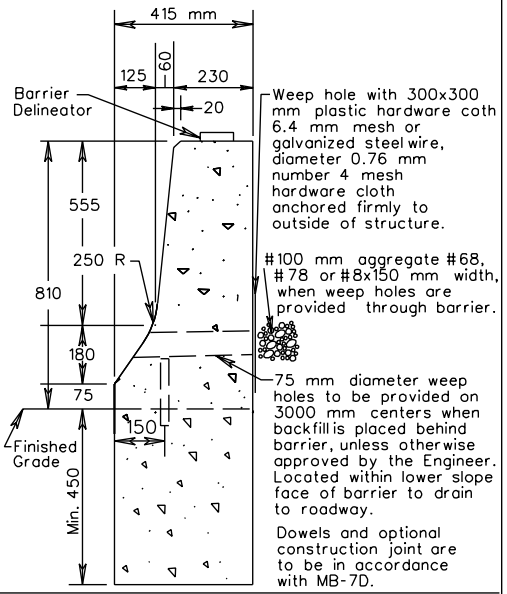
MB-7D



MB-7E



MB-7F



Notes:

If the Contractor elects to use the optional construction joint, transverse joints for crack control and expansion joints are to be provided in both footing and barrier at the same location.

Transverse joints are to coincide with joints in adjacent pavement with a maximum spacing of 6 meters c-c.

Concrete median barrier may be precast, cast in place or slip-formed.

Horizontal reinforcing steel bars are to be separated at all expansion and contraction joints. A 50 mm concrete cover is required over the ends of the reinforcing steel.

Barrier Delineator size, color, and spacing to be in accordance with the Specifications.

Cost of Delineator to be included in the price bid for Median Barrier.

Reflective surface of Barrier Delineator in all instances, to be facing oncoming traffic.

Alternate top design shown on MB-7D. may also be applied to MB-7E and MB-7F.

Concrete to be Class 20 if cast in place, 30 MPa if precast.

▲ Depth of concrete base may be extended at the contractor's option to coincide with bottom of pavement course in which base terminates; however, the cost of additional concrete shall be included in unit price bid per linear meter of barrier.

CONCRETE MEDIAN BARRIER

SPECIFICATION REFERENCE

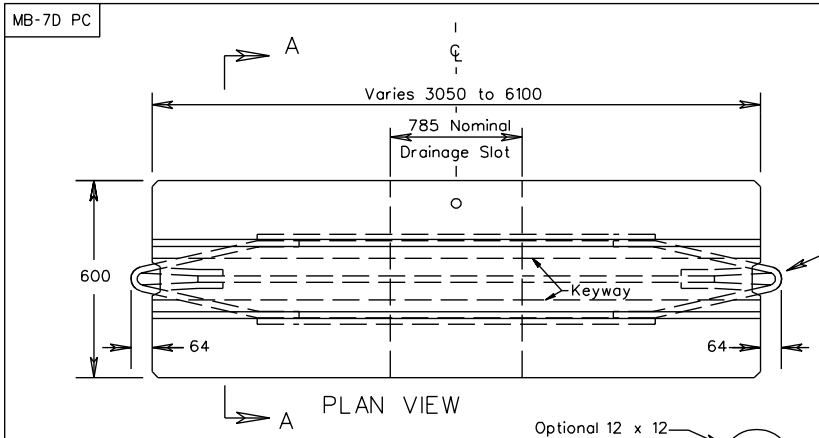
105
502

501.44 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

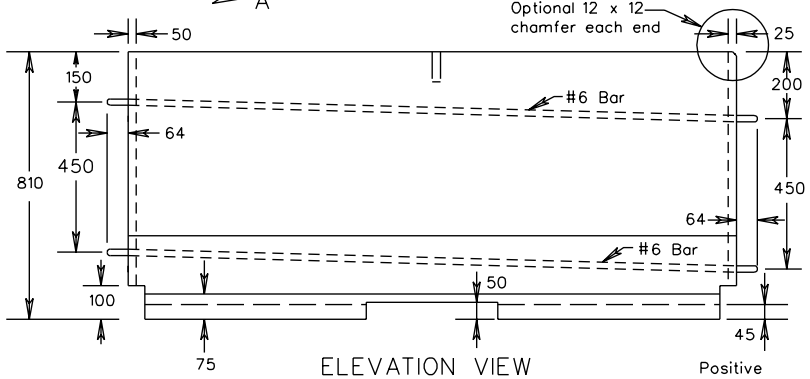
VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED 8/97 REVISED 12/99

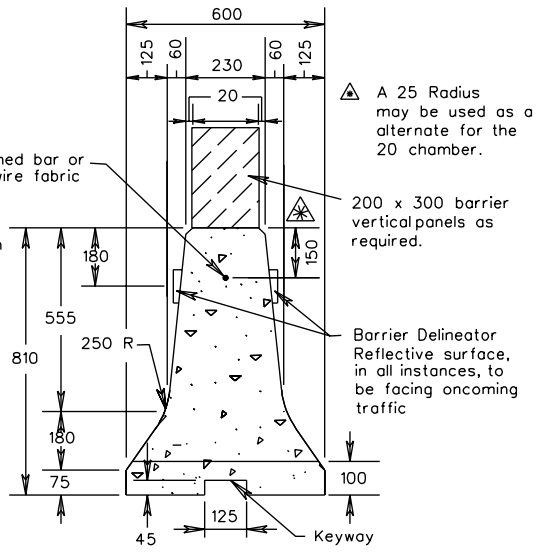
MB-7D PC



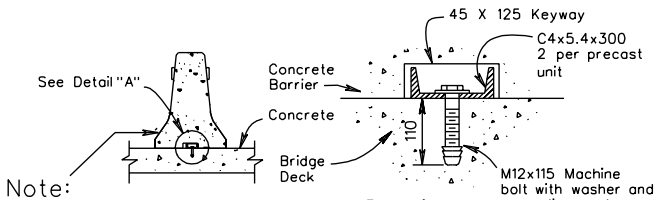
PLAN VIEW



ELEVATION VIEW



SECTION A-A



Detail "A"

Note:

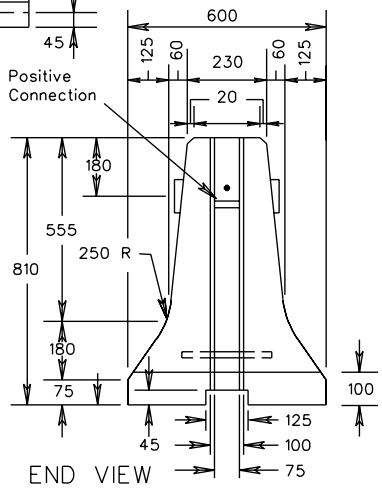
This design shall not be used on bridge decks as an exterior parapet or railing.

Detail "A" shall be used on installations separating traffic lanes in opposite directions or on surfaces superelevated at a rate greater then 20 per meter.

Note:

Machine bolts centered on channel sections are to be placed a min. of 600 from each end of the precast unit and are not to conflict with bridge expansion joints.

DETAIL FOR TEMPORARY INSTALLATION ON BRIDGE DECK



END VIEW

* Suggested maximum flare rate for rigid barrier systems.

FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/h	SHY LINE m	FLARE RATE	FLARE RATE
110	3.0	30:1	20:1
100	2.5	26:1	17:1
80	2.0	21:1	14:1
60	1.5	17:1	11:1
50	1.0	13:1	8:1

Notes:

For positive connection details and dimensions see Special Design Drawing No. A-105.

At the option of the manufacture, additional reinforcing may be added to the precast concrete barrier for handling.

Concrete to be 4000 P.S.I minimum.

Barrier delineator size, color and spacing to be in accordance with the Specifications.

Cost of delineator to be included in the price bid for Median Barrier.

Approved alternates are an acceptbale substitution for Standard.

Sheet 1 of 2

PRECAST TRAFFIC BARRIER SERVICE CONCRETE

SPECIFICATION REFERENCE

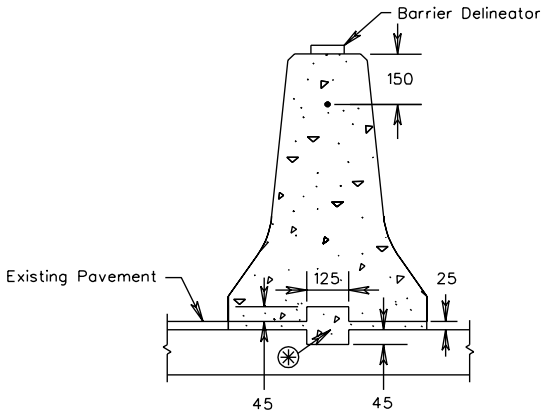
105
512

501.45 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

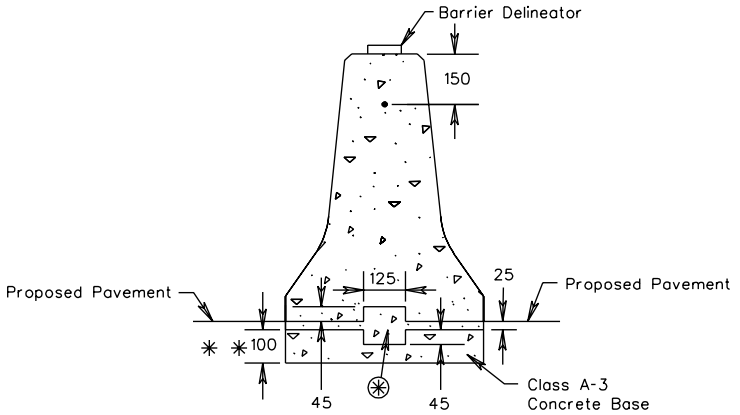
REVISED 12/99

MB-7D PC



DETAIL A

(EXISTING PAVEMENT LOCATION)



DETAIL B

(PROPOSED PAVEMENT LOCATION)

Notes:

⊛ High-strength grout or mortar to be in accordance with Section 218 of the Specifications.

✳ ✳ 100 Minimum or variable to coincide with subgrade course.

When used as Median Barrier in a permanent location, drainage slots will be completely filled and sealed with mortar or grout unless unit is to be located over median drainage structure.

Barrier Delineator size, color, and spacing to be in accordance with the Specifications.
Cost of Delineator to be included in the price bid for Median Barrier.

Reflective surface of Barrier Delineator in all instances, to be facing oncoming traffic.

SPECIFICATION REFERENCE
105 512

PRECAST TRAFFIC BARRIER SERVICE CONCRETE PERMANENT INSTALLATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

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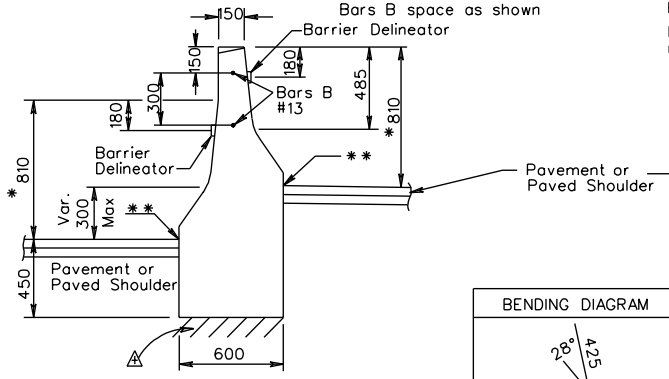
501.46

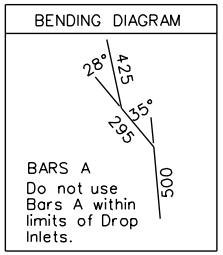
VOID 1/1/00

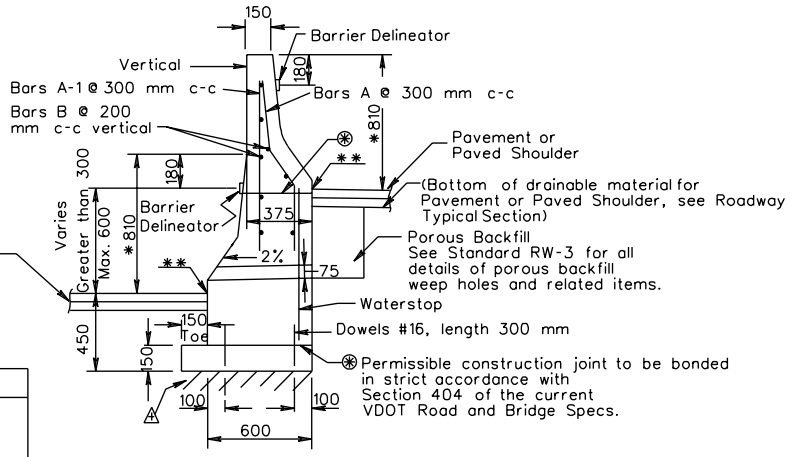
MB-8



TYPE I

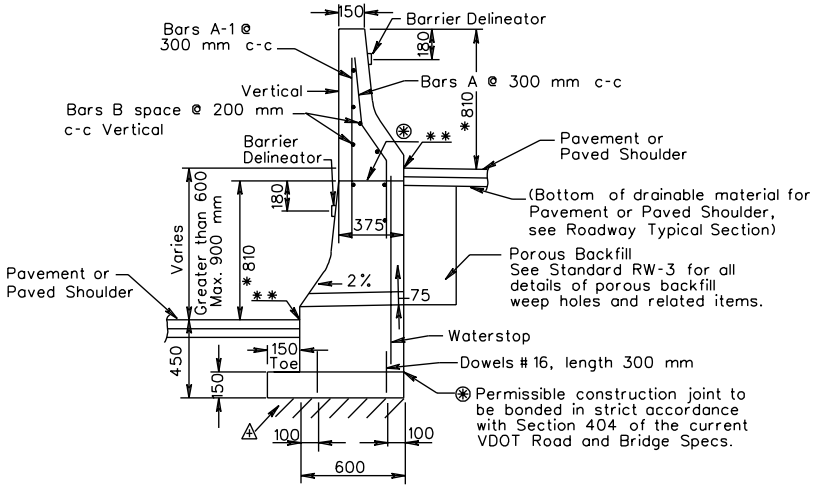
TYPE I (Greater than 0 mm height, difference maximum 300 mm)





TYPE II

TYPE II (Greater than 300 mm height difference, maximum 600 mm)



TYPE III

TYPE III (Greater than 600 mm height difference, maximum 900 mm)

* Standard MB-7 Barrier Face
(See Road Designsand Standard for details.)

** Denotes finished grade elevation

△ Foundation material under special design median barrier is to becompacted.

NOTES:

Reinforcing Steel Bars shown are based on a 6 m panel length.

All Reinforcing Bars are to be size #13 epoxy coated Grade 400 Steel with a Minimum 40 mm concrete cover.

The typical joint spacing for construction joints is 6.0 m and 24.0 m for expansion joints for Type II and III barriers.

For details of how joints are to be formed & water stops see standard RW-3.

Transverse joints for Type I barriers shall be constructed in accordance with the Road and Bridge specifications except no scoring or sawing will be allowed.

Horizontal reinforcing steel Bars B are to be separated at all expansion & contraction joints. A 50 mm concrete cover is required over the ends of reinforcing steel.

REINFORCING STEEL SCHEDULE

	Bars "A"		Bars A-1		Bars "B"		Dowels	
Panel	No.	Length	No.	Length	No.	Length	No.	Length
TYPE I					2	5900		
TYPE II	20	1220	20	1220	9	5900	40	300
TYPE III	20	1220	20	1220	9	5900	40	300

VOID 1/1/00

CONCRETE MEDIAN BARRIER TYPE I, II or III

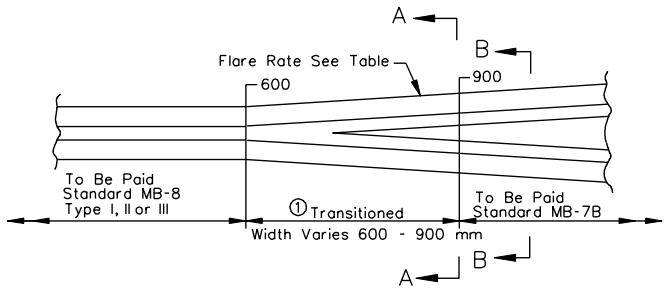
VIRGINIA DEPARTMENT OF TRANSPORTATION

501.47 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

SPECIFICATION REFERENCE

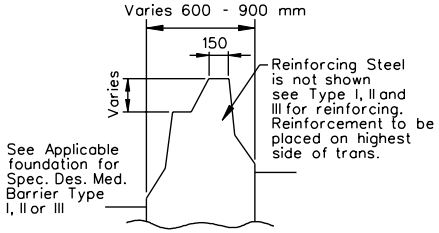
105
404
502

VOID 1/1/00

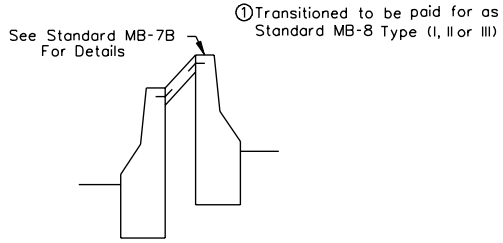


FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/h	SHY LINE m	FLARE RATE	FLARE RATE
110	2.8	30:1	20:1 ②
100	2.4	26:1	18:1 ②
80	2.0	21:1	14:1 ②
60	1.4	16:1	10:1 ②
50	1.1	13:1	8:1 ②

② maximum flare rate for rigid barrier systems.



Section A-A
(Foundation Not Shown)



Section B-B
(Standard MB-7B)

SPECIFICATION REFERENCE

CONCRETE MEDIAN BARRIER TYPE I, II or III

VIRGINIA DEPARTMENT OF TRANSPORTATION

VOID 1/1/00

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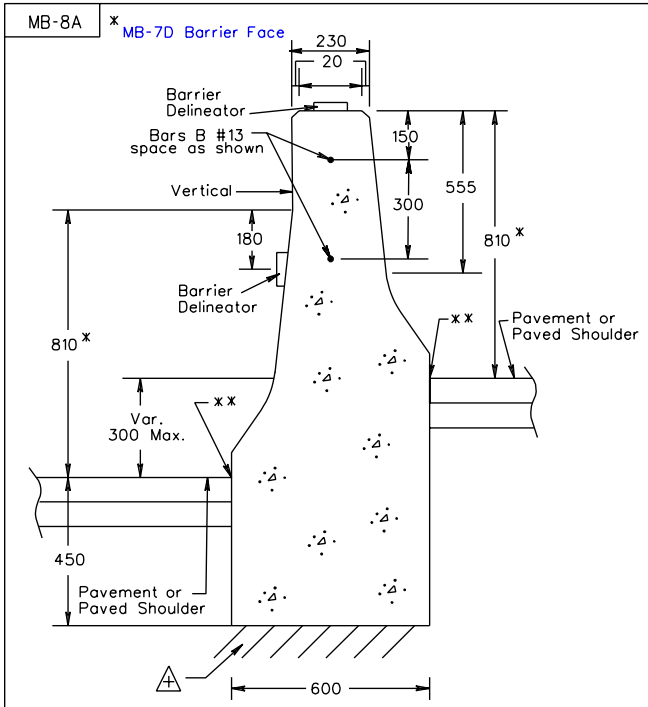
501.48

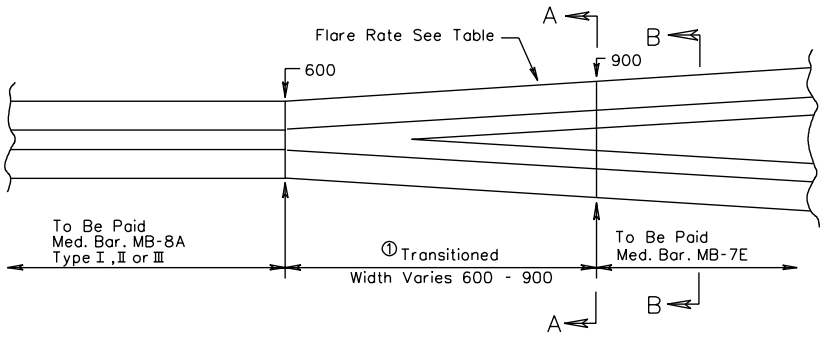
REVISED 8/97

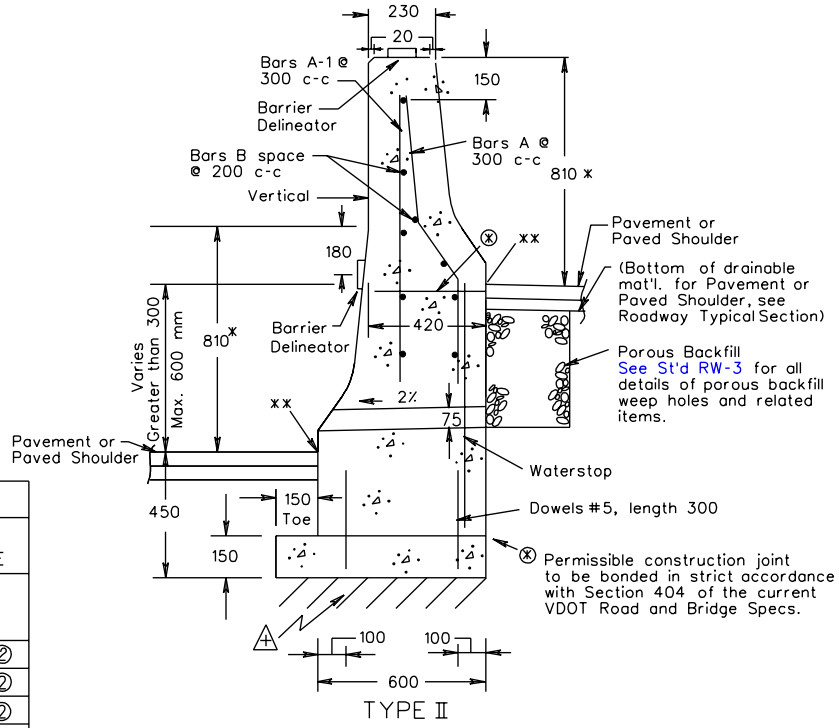
MB-8A



TYPE I

TYPE I (Greater than 0 mm ht. diff., max. 300 mm)

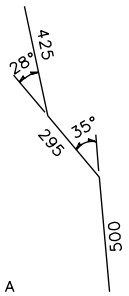




TYPE II

TYPE II (Greater than 300 diff., max. 600 mm)

BENDING DIAGRAM



BARS A

Do not use Bent Bars A within limits of Drop Inlets.

FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
KM/M	SHY LINE M	FLARE RATE	FLARE RATE
110	2.8	28 : 1	20 : 1 ②
100	2.4	26 : 1	18 : 1 ②
80	2.0	21 : 1	14 : 1 ②
60	1.4	16 : 1	10: 1 ②
50	1.1	13 : 1	8 : 1 ②

② maximum flare rate for rigid barrier systems.

Sheet 1 of 2

CONCRETE MEDIAN BARRIER TYPE I, II or III

501.49 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

105
404
502

Note: Reinforcing Steel Bars shown are based on a 6100 panel length.

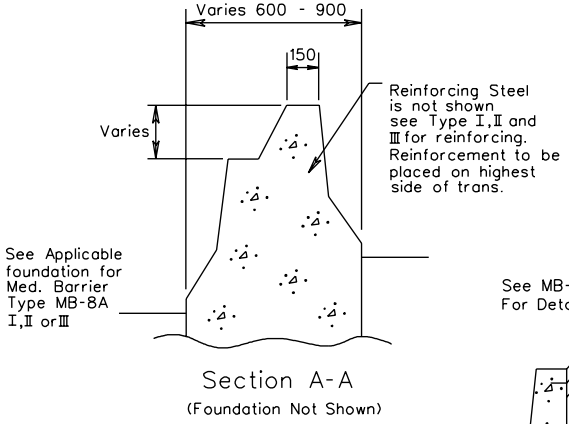
All Reinforcing Bars are to be size #4 epoxy coated Grade 60 Steel with a Minimum 140 concrete cover.

The typical joint spacing for construction joints is 6100 and 24385 for expansion joints for Type Ⅱ and Ⅲ barriers.

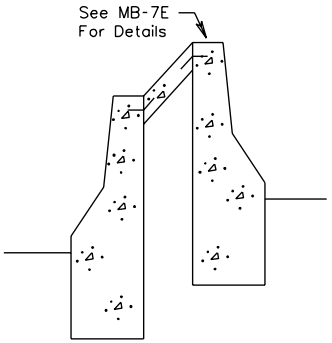
For details of how joints are to be formed & water stops see st'd. RW-3.

Transverse joints for Type I barriers shall be constructed in accordance with the Road and Bridge specifications except no scoring or sawing will be allowed.

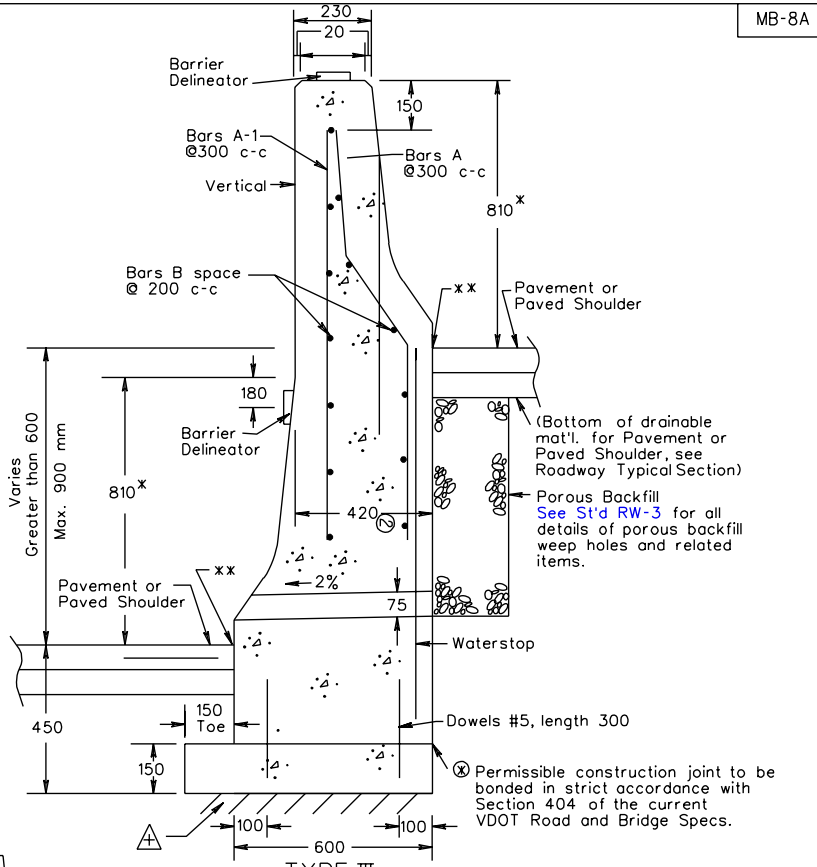
Horizontal reinforcing steel Bars B are to be separated at all expansion & contraction joints. A 50 concrete cover is required over the ends of reinforcing steel.



Section A-A
(Foundation Not Shown)



Section B-B
(Std. MB-7E)



TYPE Ⅲ (Greater than 600 diff., max. 900 mm)

REINFORCING STEEL SCHEDULE

	Bars "A"		Bars A-1		Bars "B"		Dowels	
Panel	No.	Length	No.	Length	No.	Length	No.	Length
TYPE I					2	5900		
TYPE Ⅱ	20	1220	20	1220	9	5900	40	300
TYPE Ⅲ	20	1220	20	1220	9	5900	40	300

** DENOTES FINISHED GRADE ELEVATION

⊕ FOUNDATION MATERIAL UNDER MEDIAN BARRIER IS TO BE COMPACTED.

MEASUREMENT AND PAYMENT

Median Barrier MB-8A Type I, Ⅱ or Ⅲ will be paid for at the Contract Unit Price per meter, which shall be full compensation for furnishing and installing Class 20 Conc., Reinforcing Steel, Porous Backfill and all tools, labor, equipment and incidentals necessary to complete the work. Any additional excavation, backfill with suitable material and compaction work necessary for the Concrete Median Barrier installation is to be considered incidental in the price bid for the Concrete Median Barrier.

SPECIFICATION REFERENCE
105 404 502

CONCRETE MEDIAN BARRIER TYPE I, Ⅱ or Ⅲ

VIRGINIA DEPARTMENT OF TRANSPORTATION

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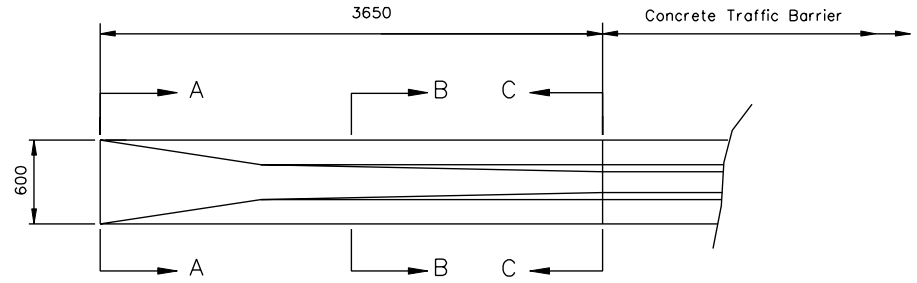
501.50

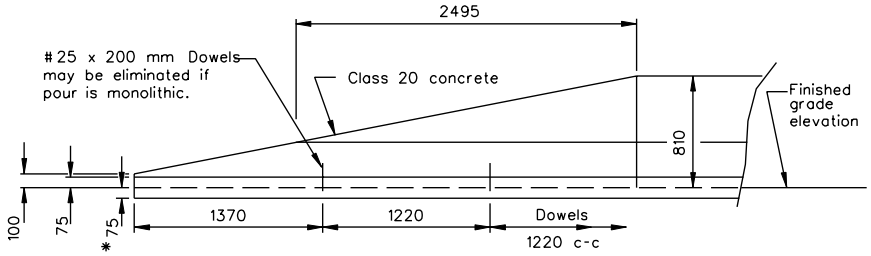
VOID 1/1/00

MB-9

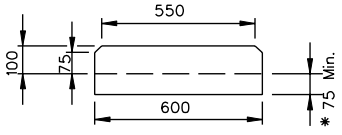
CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION



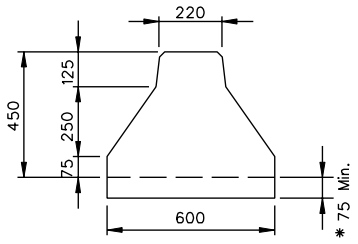
PLAN VIEW



ELEVATION VIEW



SECTION A-A



SECTION B-B

Notes:

Concrete Median Barrier Terminal Sections are not to be used within the Clear Zone.

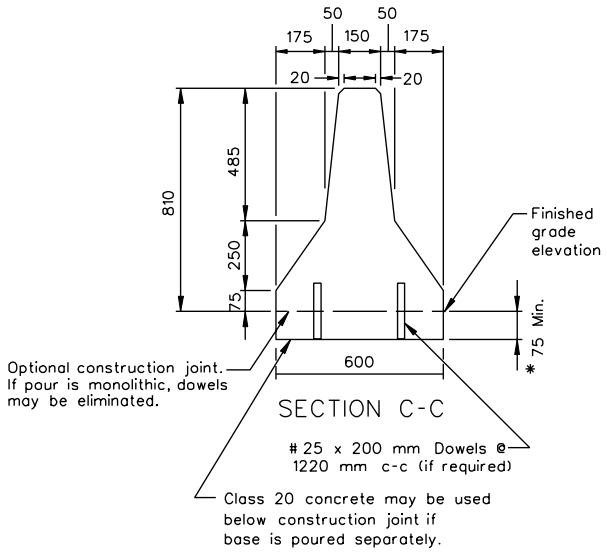
Concrete Median Barrier 3.65 m Terminal section may be precast or cast-in-place.

Concrete to be Class 20 if cast-in-place; Concrete to be 30 MPa if precast.

For use where the operating speed is 60 km/h or less.

Location of the Barrier End sections to be as noted on plans or as approved by the Engineer.

* Depth of concrete base may be extended at the contractor's option to coincide with bottom of pavement course in which base terminates; however, the cost of additional concrete shall be included in unit price bid per meter of barrier.



SECTION C-C

VOID 1/1/00

CAST IN PLACE CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION

SPECIFICATION REFERENCE

501.51

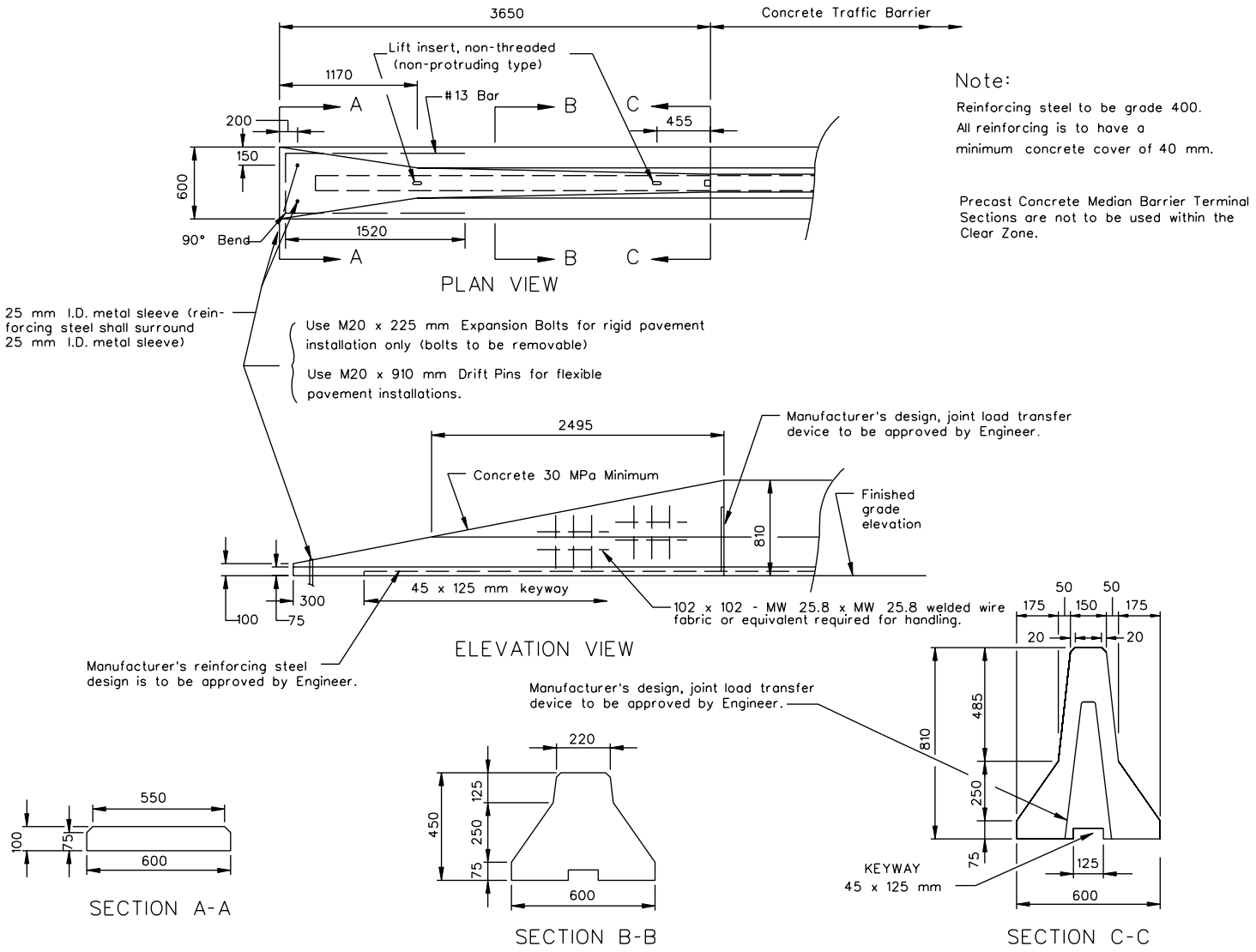
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VOID 1/1/00

MB-9 PC

CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION



Note:

Reinforcing steel to be grade 400.
All reinforcing is to have a minimum concrete cover of 40 mm.

Precast Concrete Median Barrier Terminal Sections are not to be used within the Clear Zone.

SPECIFICATION REFERENCE

PRECAST CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION

VOID 1/1/00

VIRGINIA DEPARTMENT OF TRANSPORTATION

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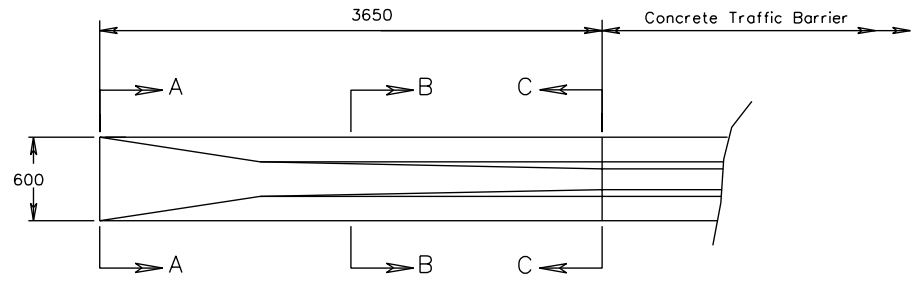
501.52

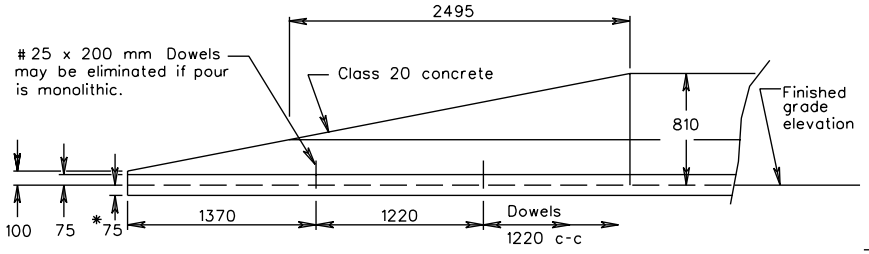
REVISED 8/97

MB-9A

CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION



PLAN VIEW



ELEVATION VIEW

Notes:

Concrete Median Barrier Terminal Sections are not to be used within the Clear Zone.

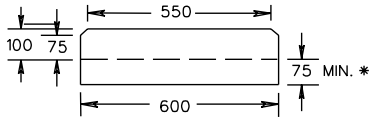
Concrete Median Barrier 3.65 m Terminal section may be precast or cast-in-place.

Concrete to be Class 20 if cast-in-place; Concrete to be 30 MPa if precast.

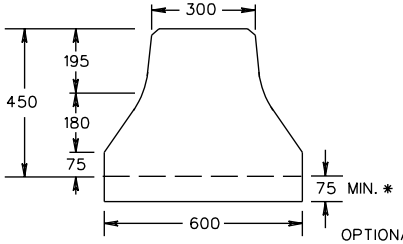
For use where the operating speed is 60 km/h or less.

Location of the Barrier End sections to be as noted on plans or as approved by the Engineer.

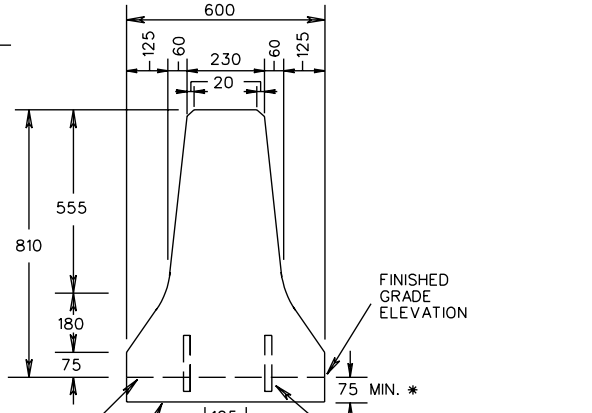
* Depth of concrete base may be extended at the contractor's option to coincide with bottom of pavement course in which base terminates; however, the cost of additional concrete shall be included in unit price bid per meter of barrier.



SECTION A-A



SECTION B-B



SECTION C-C

Sheet 1 0f 2

CAST IN PLACE CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION

SPECIFICATION REFERENCE

501.53

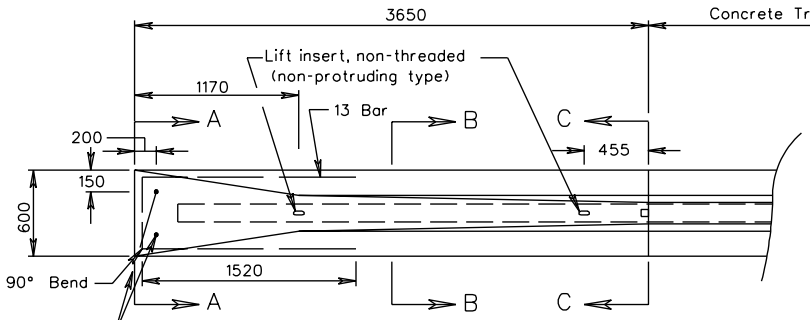
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED 8/97

MB-9A PC

CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION

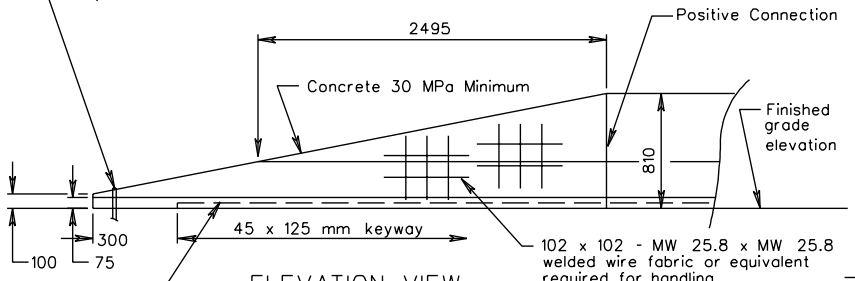


PLAN VIEW

25 mm I.D. metal sleeve (reinforcing steel shall surround 25 mm I.D. metal sleeve)

Use M20 x 225 mm Expansion Bolts for rigid pavement installation only (bolts to be removable)

Use M20 x 910 mm Drift Pins for flexible pavement installations.



ELEVATION VIEW

Manufacturer's reinforcing steel design is to be approved by Engineer.

Note:

Reinforcing steel to be grade 400.

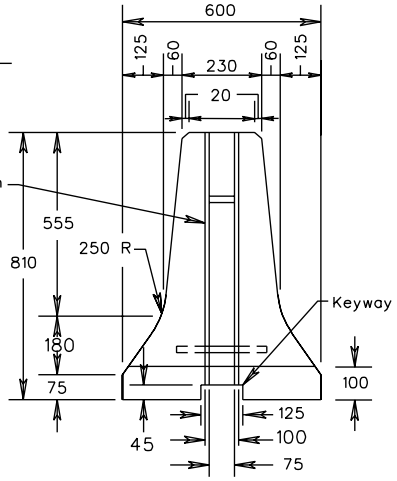
All reinforcing is to have a minimum concrete cover of 40 mm.

Basis of pavement, concrete median barrier 3.65 meter terminal section is to be measured and paid for in meters of St'd MB-7D or meters of traffic barrier service.

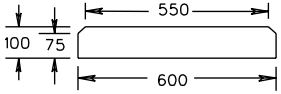
For positive connection details and dimensions see Special Design Drawing No. A-105.

Precast Concrete Median Barrier Terminal Sections are not to be used within the Clear Zone.

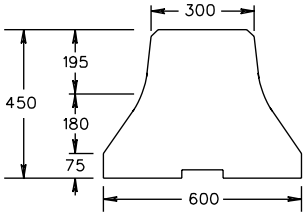
ALT. TOP



SECTION C-C



SECTION A-A



SECTION B-B

Sheet 2 Of 2

SPECIFICATION REFERENCE

PRECAST CONCRETE MEDIAN BARRIER 3.65 m TERMINAL SECTION

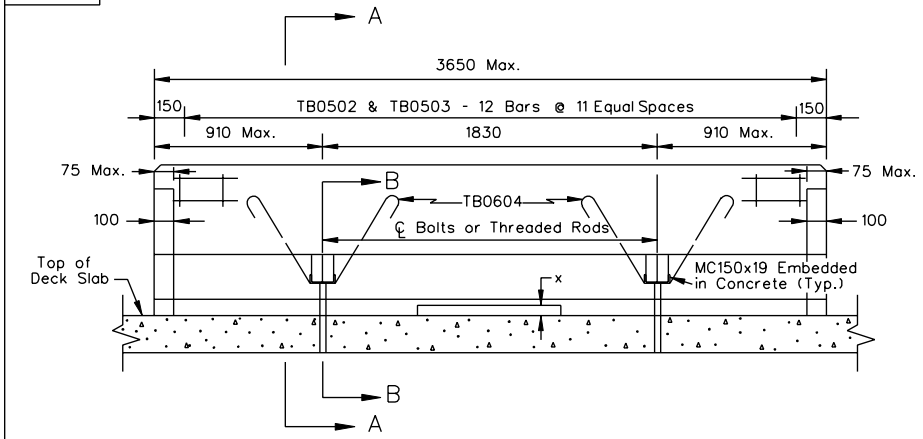
VIRGINIA DEPARTMENT OF TRANSPORTATION

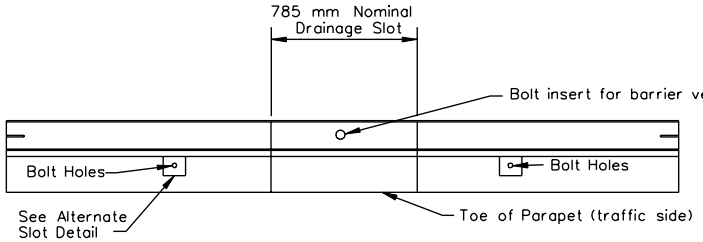
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

501.54

VOID 1/1/00

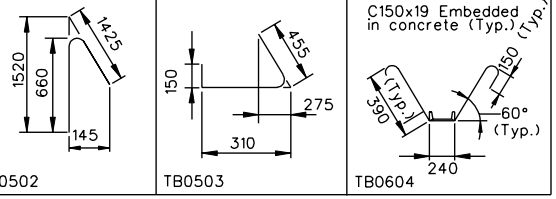
MB-10



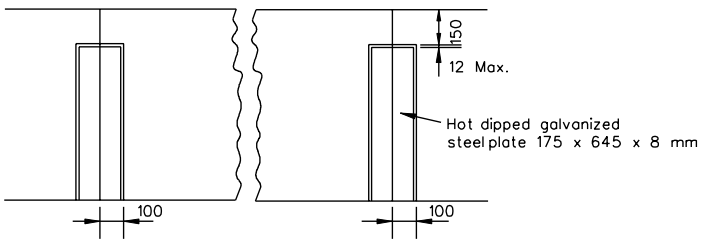


PLAN VIEW

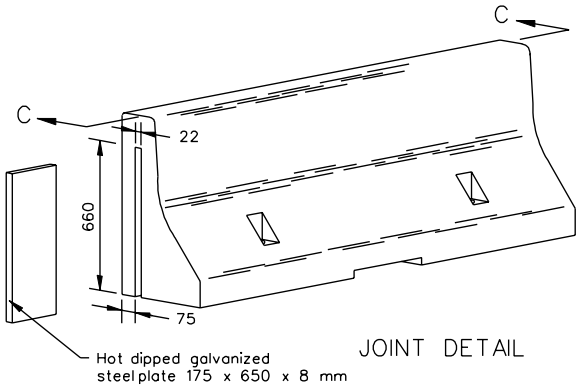
REINFORCING STEEL SCHEDULE					
FOR ONE (1) SECTION					
Mark	No.	Size	Length	Pin Ø	Location
TB0401	8	# 13	3480	——	Temp. Parapet
TB0502	12	# 16	1295	63	"
TB0503	12	# 16	810	63	"
TB0604	4	# 20	1420	115	"
BENDING DIAGRAM					



Dimensions in bending diagrams are out-to-out of bars, except as shown.
Kilograms of Reinforcing Steel = 80 kg.
Reinforcing schedule based on 3650 mm unit length.



SECTION C-C



JOINT DETAIL

Sheet 1 of 2

VOID 1/1/00

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (SINGLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

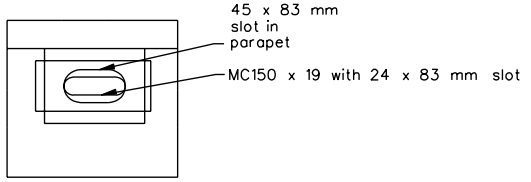
501.55 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

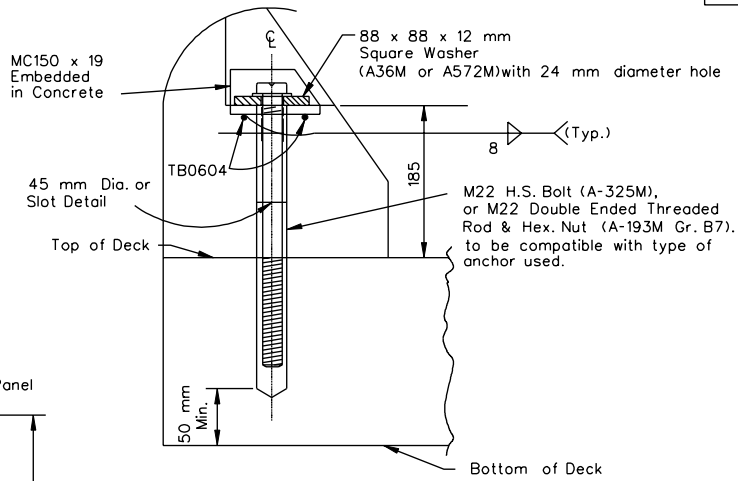
SPECIFICATION REFERENCE
105
502

REVISED 8/97 VOID 1/1/00

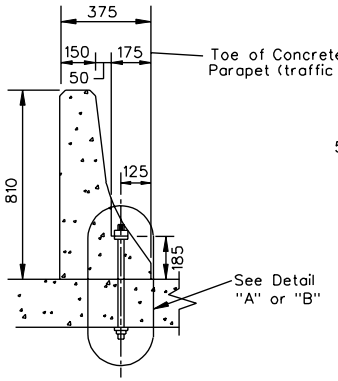
MB-10



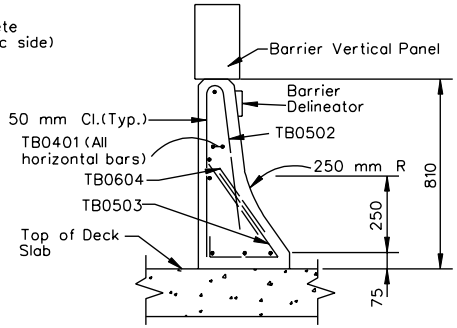
ALTERNATE SLOT DETAIL



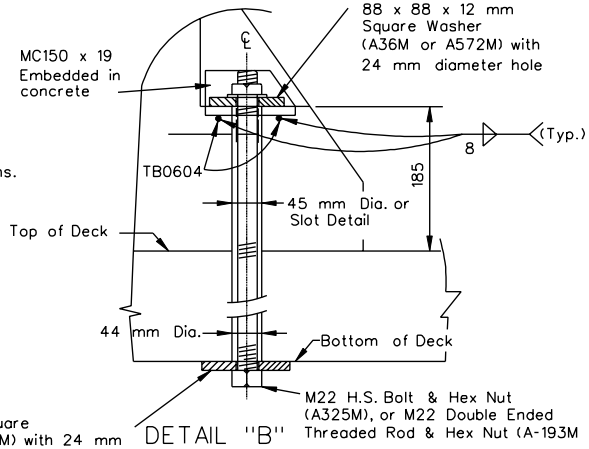
DETAIL "A"



SECTION B-B



SECTION A-A



DETAIL "B"

Notes:

Barrier delineator to be spaced in accordance with Section 702, of the Road and Bridge Specifications.

Barrier Vertical Panels to be spaced in accordance with Virginia Work Area Protection Manual.

Δ Reflective surface, in all instances, to be facing oncoming traffic.

Concrete 30 MPa (Min.) Reinforcing Steel, Grade 400.

After removing temporary barrier, cut M22 bolt or threaded rod as low as practical below roadway surface and fill recess with epoxy bonding compound EP-4 (Detail "A") or remove M22 bolts or threaded rods and fill holes with grout bonded with epoxy bonding compound EP-4 (Detail "B").

Anchor system shown in Detail "A" shall be tested to provided a minimum pullout of 142.4 kN. and installed according to manufacturer's recommendations.

Cost of Barrier Delineator and Barrier Vertical Panels to be included in price bid per meter of barrier service.

When barrier is located on vertical and/or horizontal curves, the opening at joints is not to exceed 25 mm.

Design features relating to construction or to regulation and control of traffic may be subject to change as deemed necessary by the department.

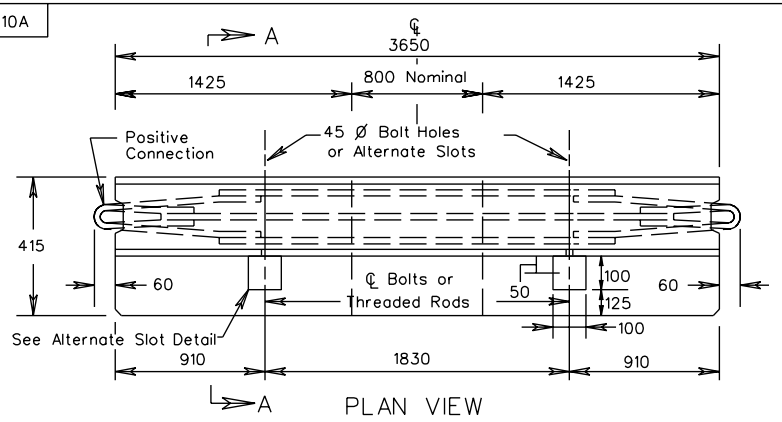
88 x 88 x 12 mm Square Washer (A36M or A572M) with 24 mm diameter hole. At the discretion of the Engineer, a larger washer size may be required if spalling is evident at bottom of deck.

VOID 1/1/00

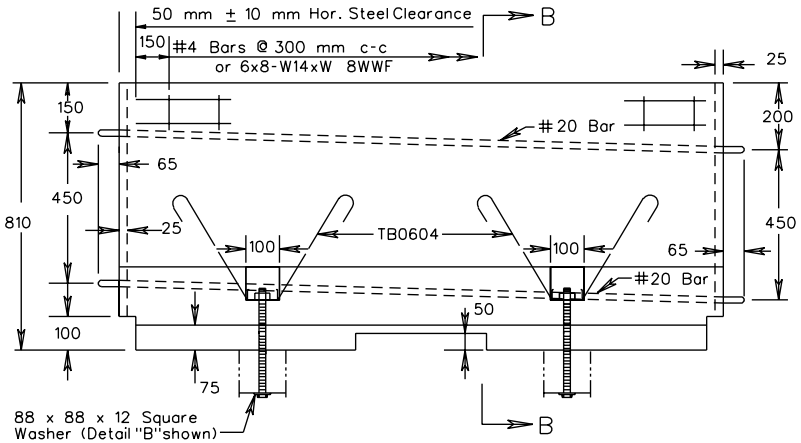
SPECIFICATION REFERENCE	TRAFFIC BARRIER SERVICE CONCRETE PARAPET (SINGLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)	
105 502	VIRGINIA DEPARTMENT OF TRANSPORTATION	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS — 501.56

REVISED 4/98 REVISED 7/02

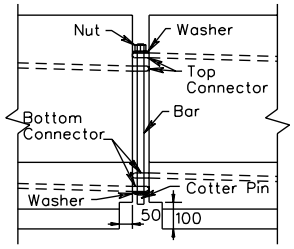
MB-10A



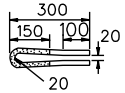
PLAN VIEW



ELEVATION VIEW

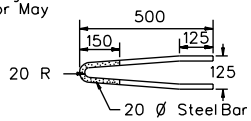


ELEVATION OF CONNECTION



TOP CONNECTOR

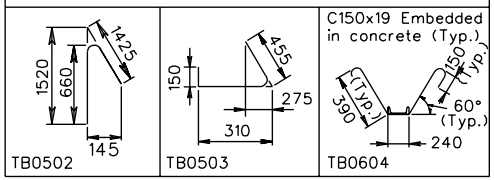
Galvanize After Forming
Note: Entire Connector May Be Galvanized.



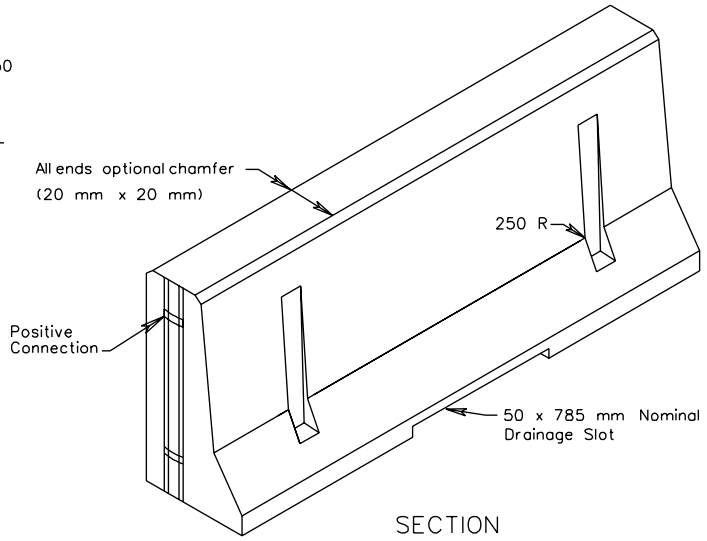
BOTTOM CONNECTOR

REINFORCING STEEL SCHEDULE					
FOR ONE (1) SECTION					
Mark	No.	Size	Length	Pin Ø	Location
TB0401	8	13	3480	———	Temp. Parapet
TB0502	12	16	1295	63	"
TB0503	12	16	810	63	"
TB0604	4	20	1420	115	"

BENDING DIAGRAM



Dimensions in bending diagrams are out-to-out of bars, except as shown.
Kilograms of Reinforcing Steel = 80 kg.
Reinforcing schedule based on 3650 unit length.



SECTION

Sheet 1 of 2

TRAFFIC BARRIER SERVICE CONCRETE PARAPET(SINGLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

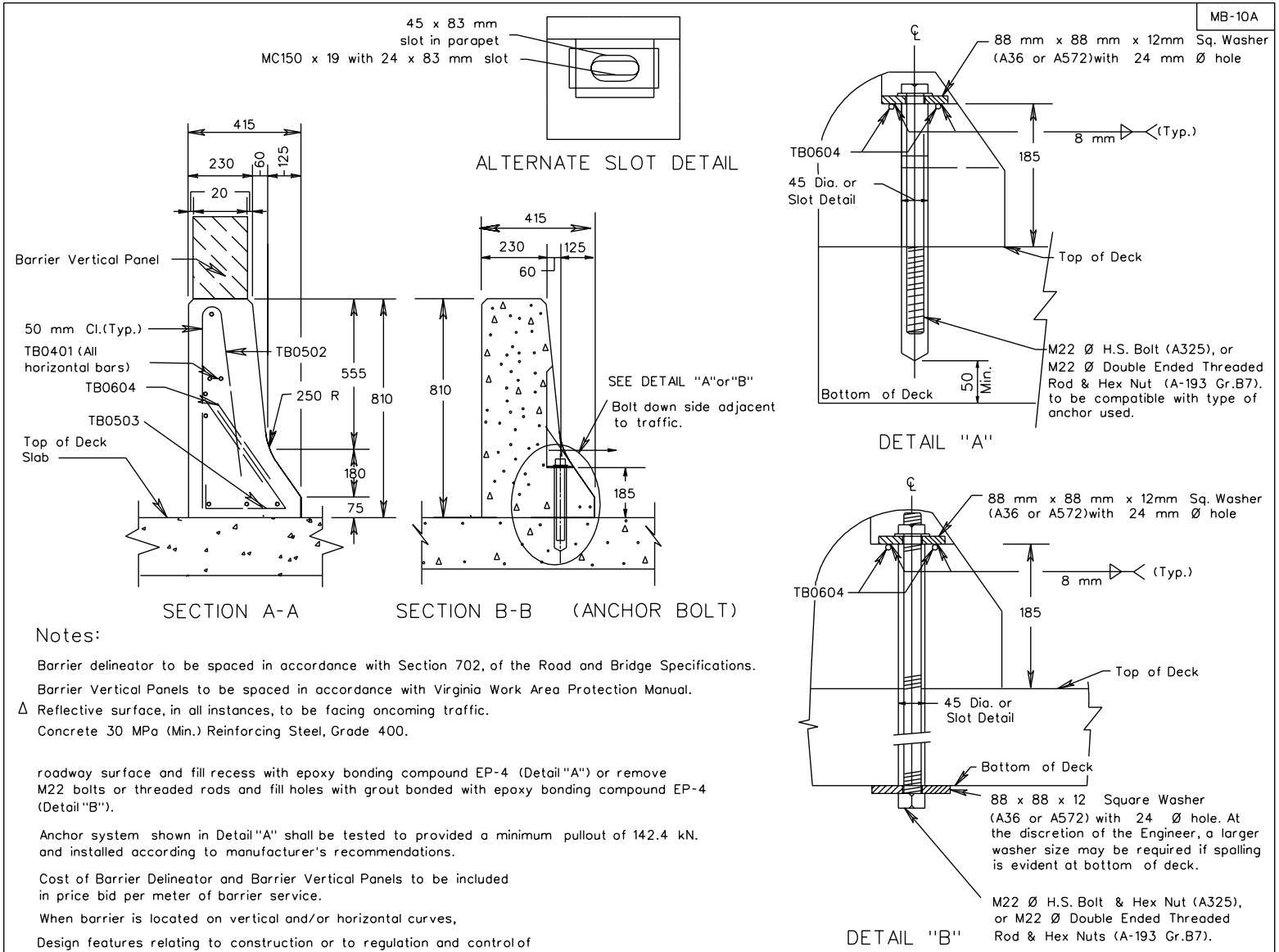
SPECIFICATION REFERENCE
105
502

501.57 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED 8/97 REVISED 4/98 REVISED 7/02

MB-10A



Notes:

Barrier delineator to be spaced in accordance with Section 702, of the Road and Bridge Specifications.

Barrier Vertical Panels to be spaced in accordance with Virginia Work Area Protection Manual.

Δ Reflective surface, in all instances, to be facing oncoming traffic.

Concrete 30 MPa (Min.) Reinforcing Steel, Grade 400.

roadway surface and fill recess with epoxy bonding compound EP-4 (Detail "A") or remove M22 bolts or threaded rods and fill holes with grout bonded with epoxy bonding compound EP-4 (Detail "B").

Anchor system shown in Detail "A" shall be tested to provided a minimum pullout of 142.4 kN. and installed according to manufacturer's recommendations.

Cost of Barrier Delineator and Barrier Vertical Panels to be included in price bid per meter of barrier service.

When barrier is located on vertical and/or horizontal curves,

Design features relating to construction or to regulation and control of traffic may be subject to change as deemed necessary by the Department.

For positive connection details see and dimensions see Special Design Drawing No. 105.

SPECIFICATION REFERENCE
105 502

TRAFFIC BARRIER SERVICE CONCRETE PARAPET(SINGLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

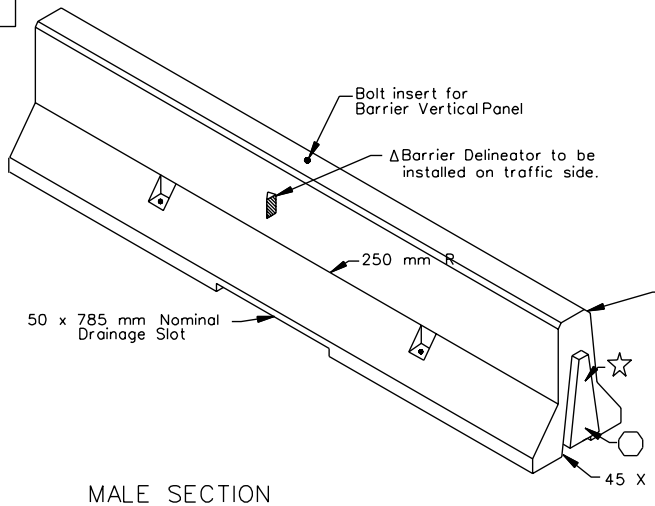
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

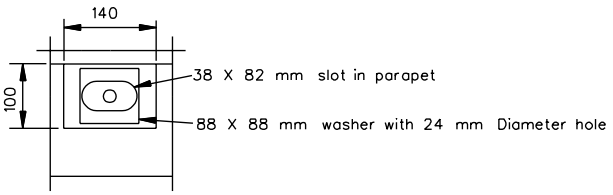
501.58

VOID 1/1/00

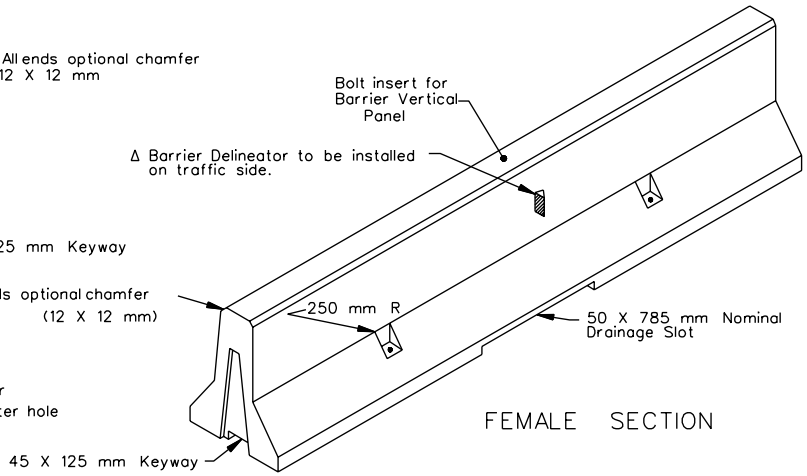
MB-11



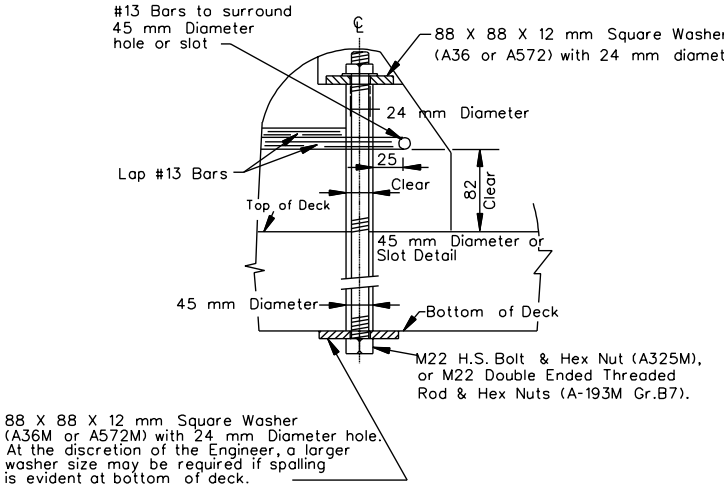
MALE SECTION



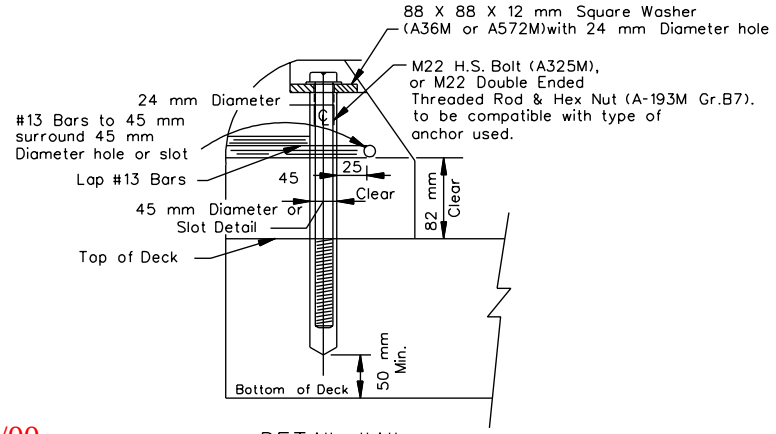
ALTERNATE SLOT DETAIL



FEMALE SECTION



DETAIL "B"



DETAIL "A"

VOID 1/1/00

Sheet 1 of 3

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

SPECIFICATION REFERENCE
105 502

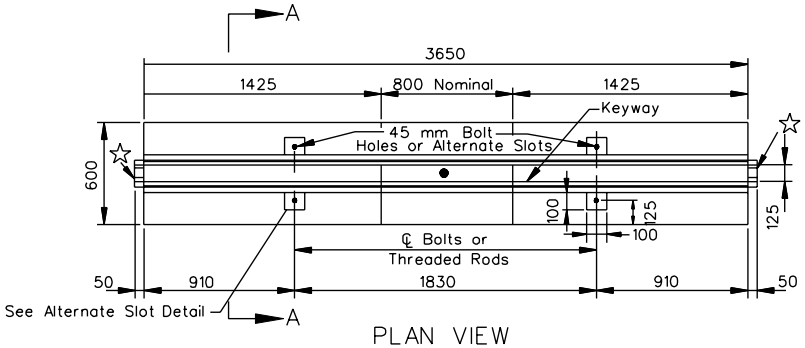
501.59

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

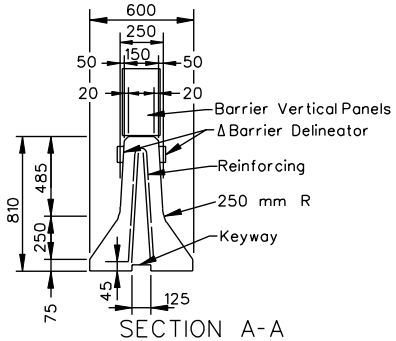
VIRGINIA DEPARTMENT OF TRANSPORTATION

VOID 1/1/00

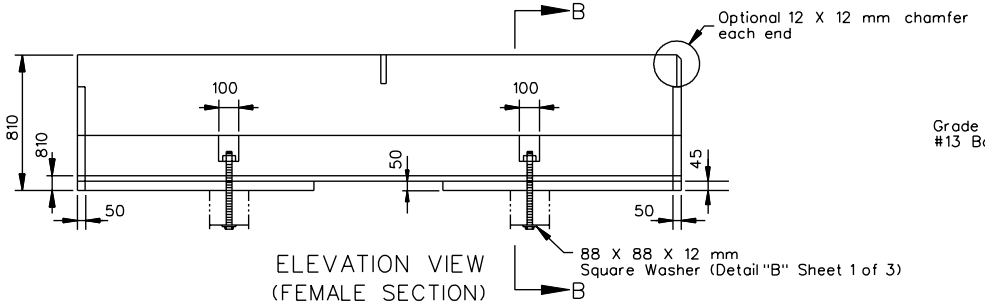
MB-11



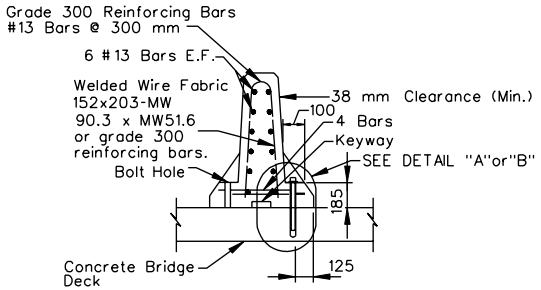
PLAN VIEW
(MALE SECTION)



SECTION A-A
(BARRIER VERTICAL PANEL &
BARRIER DELINEATOR SHOWN)

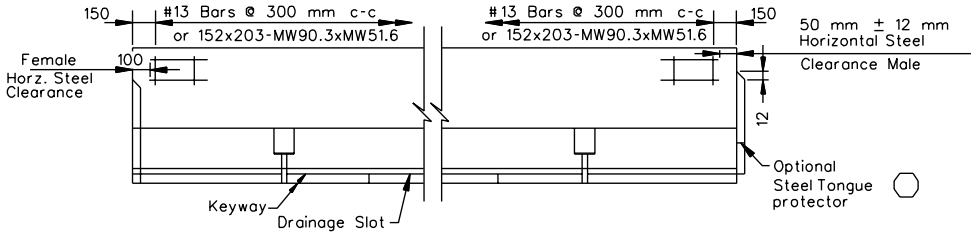


ELEVATION VIEW
(FEMALE SECTION)



SECTION B-B
(ANCHOR BOLT)

Bolt down side
adjacent to traffic.



(HALF SIDE VIEW)
FEMALE SECTION
REINFORCING

(HALF SIDE VIEW)
MALE SECTION
REINFORCING

VOID 1/1/00

Sheet 2 of 3

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE)
(FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

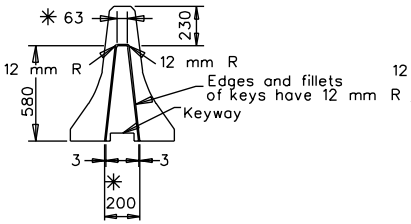
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

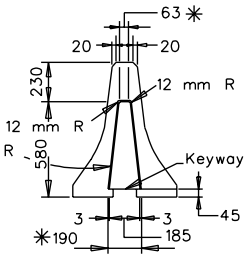
501.60

VOID 1/1/00

MB-11



END VIEW
FEMALE SECTION



END VIEW
MALE SECTION

Notes:

Barrier Delineator is to be spaced in accordance with Section 702 of the Road and Bridge Specifications. Barrier Vertical Panels are to be spaced in accordance with the Virginia Work Area Protection Manual.

Cost of Barrier Delineator and Barrier Vertical Panels to be included in price bid per linear foot of Barrier Service.

Anchor bolts shall be installed on traffic side.

△ Reflective surface, in all instances, to be facing oncoming traffic.

☆ Edges of male section to be rounded to prevent chipping during placement. (Approx. 12 mm Radius)

✳ Male End-1.5 + 0 mm tolerance and Female End-0 + 1.5 mm tolerance.

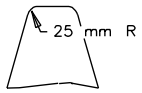
⬡ Optional tongue protector may be provided by the manufacturer. The tongue protector may be full or partial and must meet the approval of the Engineer.

Concrete 30 MPa (Min.)

Welded Wire Fabric may be one sheet bent to fit configuration or two separate sheets-one on each face.

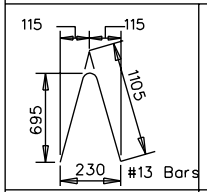
Anchor system shown in detail "A" shall be tested to provide a minimum pullout of 142.4 kN and installed according to manufacturer's recommendations.

After removing temporary barrier, cut M22 bolt or threaded rod as low as practical below roadway surface and fill recess with epoxy bonding compound EP-4 (Detail "A") or remove M22 bolts or threaded rods and fill holes with grout bonded with epoxy bonding compound EP-4 (Detail "B").

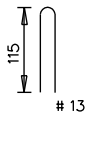


ALTERNATE TOP

BENDING DIAGRAM



1420 mm Length,
63 mm Pin Diameter



910 mm Length
114 mm Pin Diameter

Dimensions in bending diagrams are out-to-out of Bar.

VOID 1/1/00

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
105
502

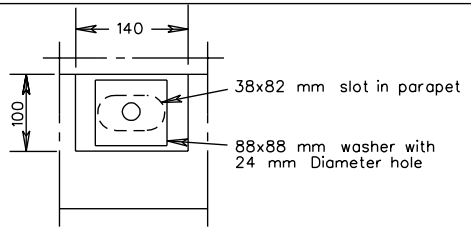
501.61

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

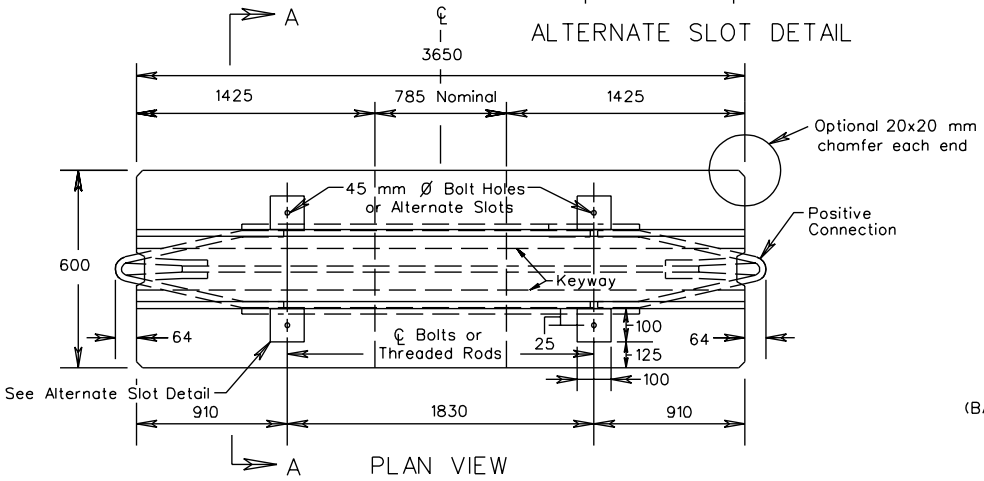
REVISED 12/99 REVISED 2/01

MB-11A

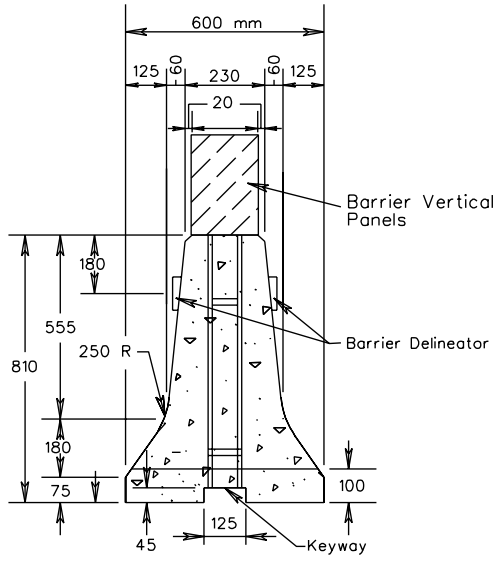
ALTERNATE TOP



ALTERNATE SLOT DETAIL

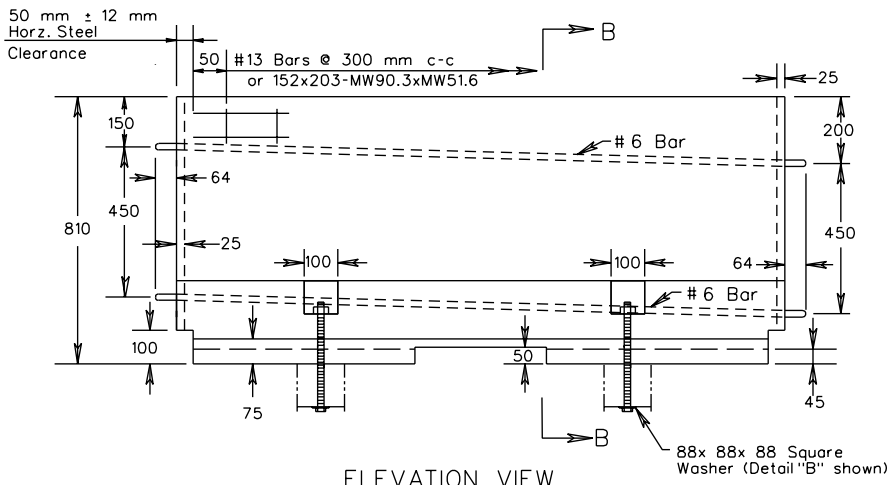


PLAN VIEW

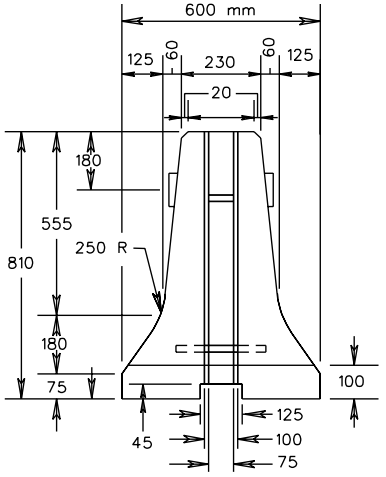


SECTION A-A

(BARRIER VERTICAL PANEL & BARRIER DELINEATOR SHOWN)



ELEVATION VIEW



END VIEW

Sheet 1 of 2

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

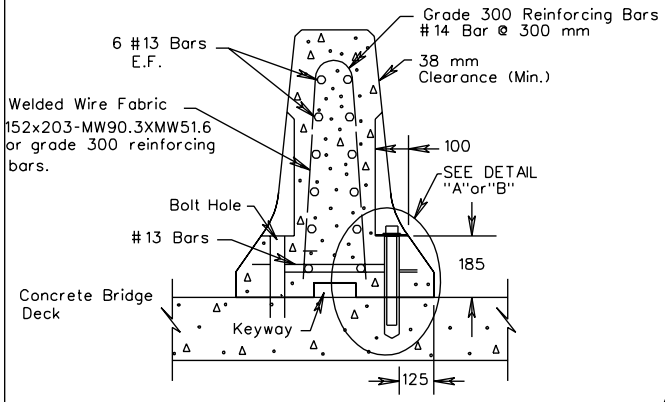
SPECIFICATION REFERENCE
105 502

501.62 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED 12/99

MB-11A

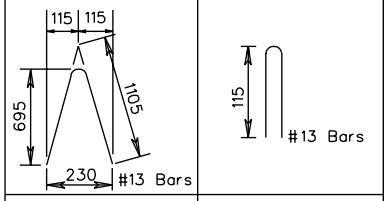


SECTION B-B

(ANCHOR BOLT)

Bolt down side adjacent to traffic

BENDING DIAGRAM



1420 mm Length, 63 mm Pin Diameter	910 mm Length, 114 mm Pin Diameter

Dimensions in bending diagrams are out-to-out of Bar.

SECTION

NOTES:

Barrier Delineator is to be spaced in accordance with Section 702 of the Road and Bridge Specifications. Barrier Vertical Panels are to be spaced in accordance with the Virginia Work Area Protection Manual.

Cost of Barrier Delineator and Barrier Vertical Panels to be included in price bid per linear foot of Barrier Service.

Anchor bolts shall be installed on traffic side.

Reflective surface, in all instances, to be facing oncoming traffic.

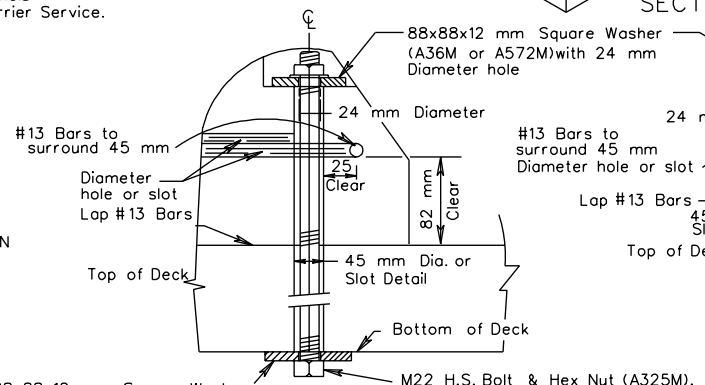
Conc. 30 MPa (Min.)

Welded Wire Fabric may be one sheet bent to fit configuration or two separate sheets-one on each face.

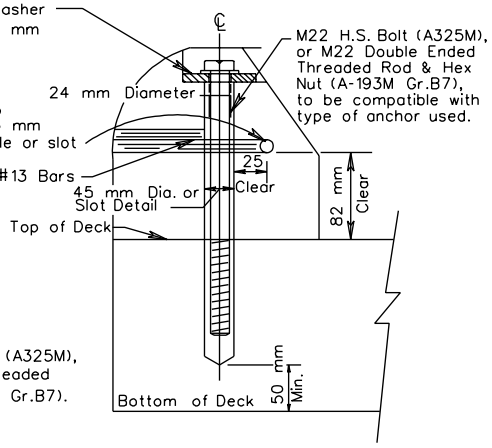
Anchor system shown in detail "A" shall be tested to provide a minimum pullout of 142.4 kN and installed according to manufacturer's recommendations.

After removing temporary barrier, cut M22 bolt or threaded rod as low as practical below roadway surface and fill recess with epoxy bonding compound EP-4 (Detail "A")or remove M22 bolts or threaded rods and fill holes with grout bonded with epoxy bonding compound EP-4 (Detail "B").

For positive connection details and dimensions see Special Design Drawing No. A-105.



DETAIL "B"



DETAIL "A"

Sheet 2 of 2

SPECIFICATION REFERENCE
105 502

TRAFFIC BARRIER SERVICE CONCRETE PARAPET (DOUBLE FACE) (FOR TEMPORARY INSTALLATION ON BRIDGE DECK EXTERIOR)

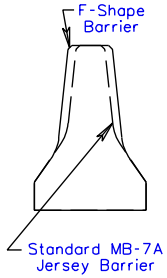
VIRGINIA DEPARTMENT OF TRANSPORTATION

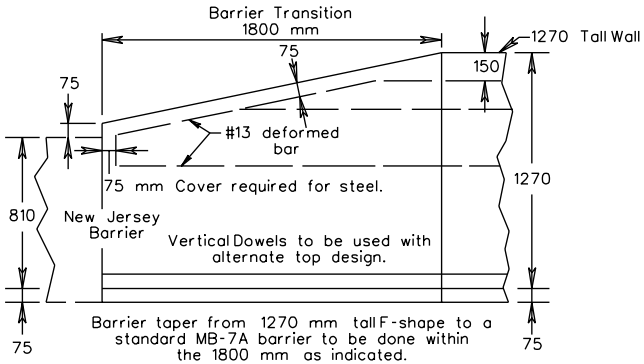
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

501.63

REVISED 2/01

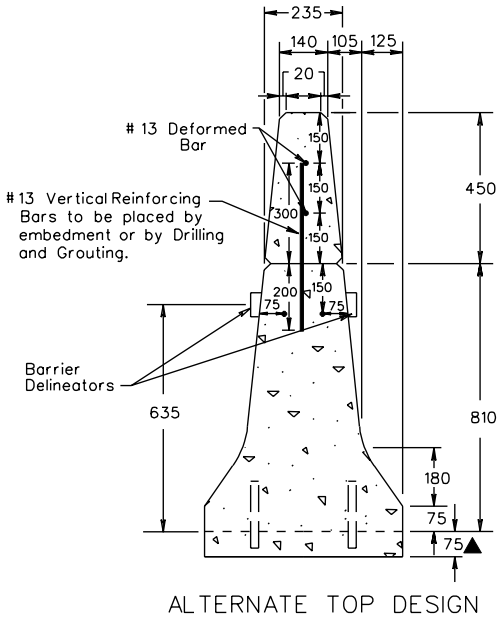
MB-12A,12B,12C





TRANSITION FROM 1270 mm TALL WALL TO 810 mm JERSEY BARRIER

MB-12A



ALTERNATE TOP DESIGN

If barrier extension is constructed as a separate item, all joints are to be constructed at the same interval as concrete barrier. All vertical bars are # 13 at 600 mm max. spacing. Length of dowels shall be 500 mm. Vertical bars may be placed in the concrete concrete or bonded into drilled holes in hardened concrete. When holes are drilled non-shrink grout shall be used to bond the bars in place.

DETAIL B

The alternate design of 25 R may also be used for MB-12A, 12B or 12C.

▲ Depth of concrete base may be extended at the contractor's option to coincide with bottom of pavement course in which base terminates; however, the cost of additional concrete shall be included in unit price bid per meter of barrier.

Sheet 1 of 2

CONCRETE MEDIAN BARRIER (TALL WALL)

SPECIFICATION REFERENCE

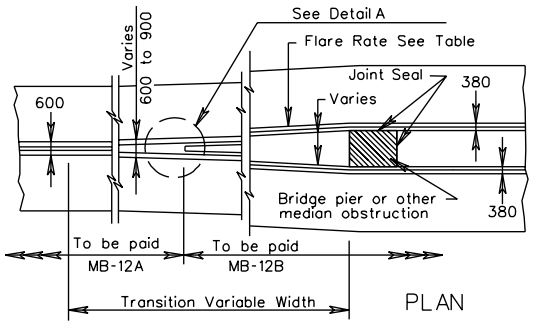
105
502

501.64 | UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

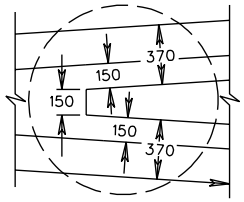
VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED 2/01

MB-12A,12B,12C



PLAN

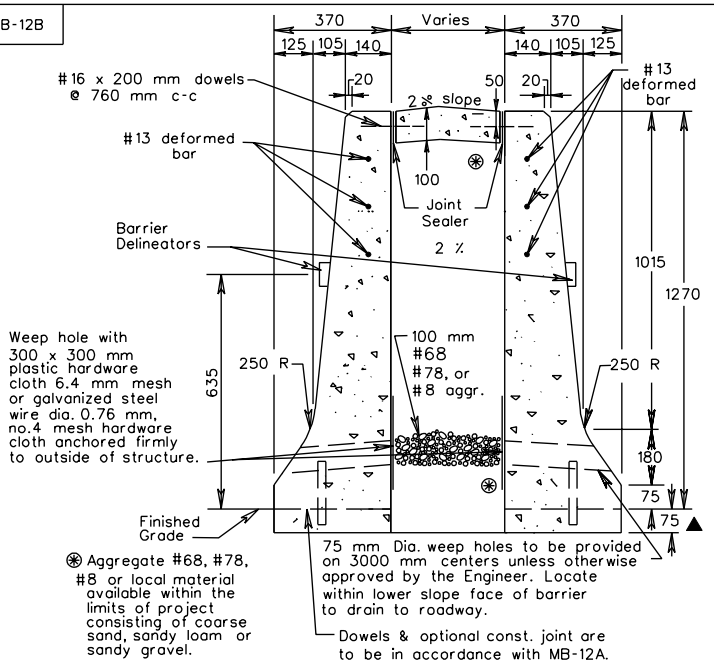


DETAIL A

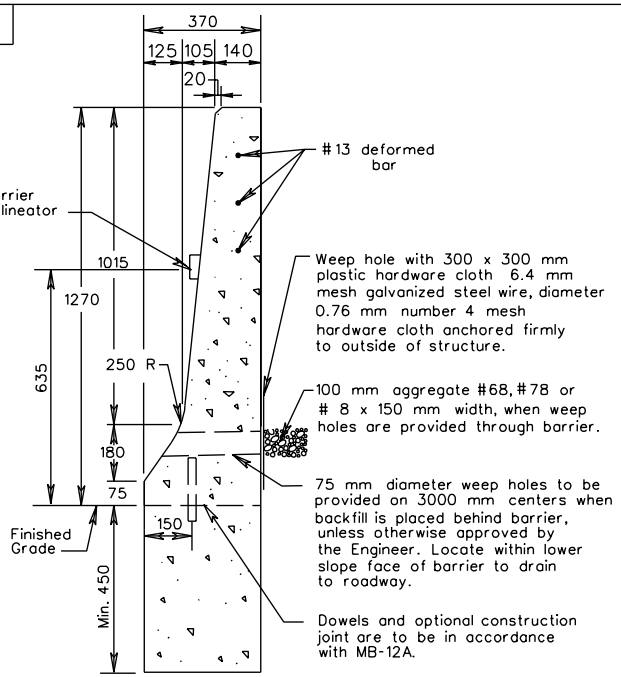
FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/h	SHY LINE m	FLARE RATE	FLARE RATE
110	2.8	30:1	20:1*
100	2.4	26:1	18:1*
80	2.0	21:1	14:1*
60	1.4	16:1	10:1*
50	1.1	13:1	8:1*

* Suggested maximum flare rate for rigid barrier systems.

MB-12B



MB-12C



NOTES:

If the Contractor elects to use the optional construction joint, transverse joints for crack control and expansion joints are to be provided in both footing and barrier at the same location.

Transverse joints are to coincide with joints in adjacent pavement with a maximum spacing of 6 meters c-c.

Concrete median barrier may be precast, cast in place or slip-formed.

Horizontal reinforcing steel bars are to be separated at all expansion and contraction joints. A 50 mm concrete cover is required over the ends of the reinforcing steel.

Barrier Delineator size, color, and spacing to be in accordance with the Specifications. Cost of Delineator to be included in the price bid for Median Barrier. Reflective surface of Barrier Delineator in all instances, to be facing oncoming traffic.

Concrete to be Class 20 if cast in place, 30 MPa if precast.

▲ Depth of concrete base may be extended at the contractor's option to coincide with bottom of pavement course in which base terminates; however, the cost of additional concrete shall be included in unit price bid per linear meter of barrier.

SPECIFICATION REFERENCE

105
502

CONCRETE MEDIAN BARRIER (TALL WALL)

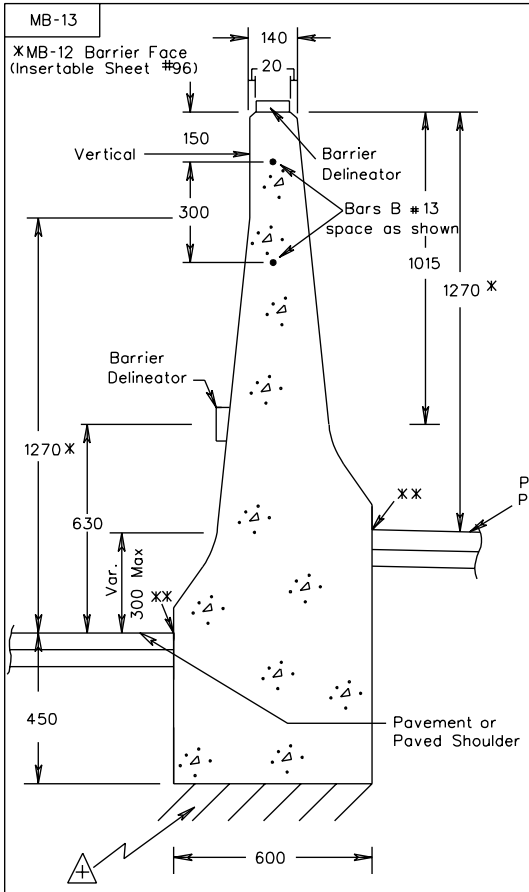
VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

501.65

REVISED 8/97 REVISED 2/01

MB-13

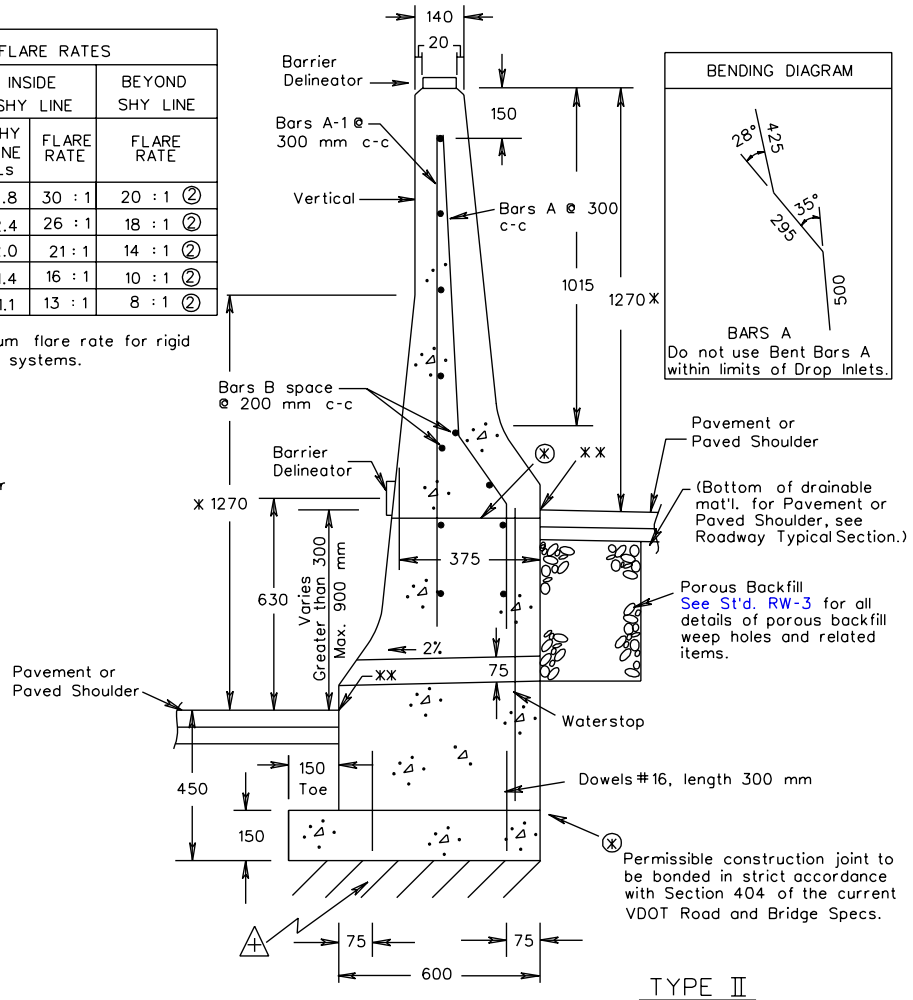


TYPE I

TYPE I (Greater than 0 ht. diff., max. 300 mm)

FLARE RATES			
DESIGN SPEED	INSIDE SHY LINE		BEYOND SHY LINE
km/h	SHY LINE Ls	FLARE RATE	FLARE RATE
110	2.8	30 : 1	20 : 1 ②
100	2.4	26 : 1	18 : 1 ②
80	2.0	21 : 1	14 : 1 ②
60	1.4	16 : 1	10 : 1 ②
50	1.1	13 : 1	8 : 1 ②

② maximum flare rate for rigid barrier systems.



TYPE II

TYPE II (Greater than 300 mm. diff., max. 900 mm)

BENDING DIAGRAM

BARS A
Do not use Bent Bars A within limits of Drop Inlets.

MEASUREMENT AND PAYMENT

Median Barrier MB-13 Type I, II or III will be lin. foot, which shall be full compensation for furnishing and installing Class A3 Conc., Reinforcing for at the Contract Unit Price per meter, which shall be full compensation for furnishing and installing Class A3 Conc., Reinforcing Steel, Porus Backfill and all Tools , labor, equipment and incidentals necessary to complete the work. Any additional excavation, backfill with necessary for the Concrete Median Barrier intallation is to be considered .

REINFORCING STEEL SCHEDULE								
	Bars "A"		Bars A-1		Bars "B"		Dowels	
Panel	No.	Length	No.	Length	No.	Length	No.	Length
TYPE I					2	5900		
TYPE II	20	1220	20	1220	9	5900	40	300
TYPE III	20	1220	20	1220	9	5900	40	300

** DENOTES FINISHED GRADE ELEVATION

FOUNDATION MATERIAL UNDER CONCRETE MEDIAN BARRIER IS TO BE COMPACTED.

Sheet 1 of 2

CONCRETE MEDIAN BARRIER (TALL WALL) TYPE I, II or III

MB-13

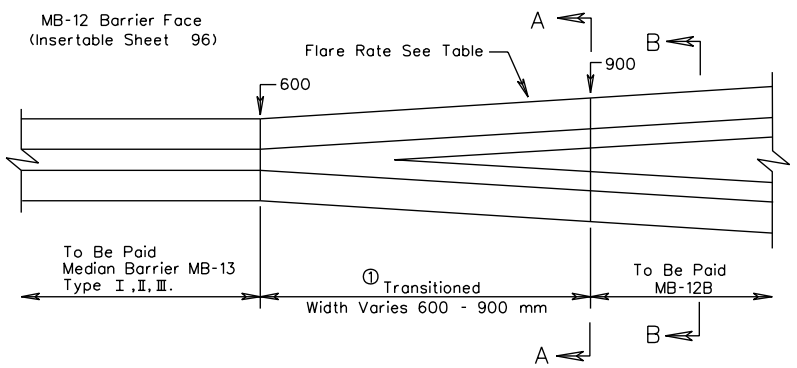
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
105
404
502

501.66 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

REVISED 2/01

MB-13



Reinforcing Steel Bars shown are based on a 6 m panel length.

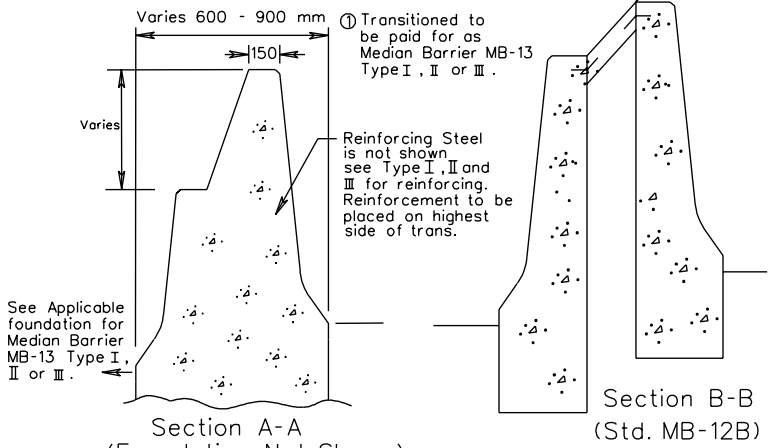
All Reinforcing Bars are to be size #13 epoxy coated Grade 400 Steel with a Minimum 40 m concrete cover.

The typical joint spacing for construction joints is 6.0 and 24.0 m for expansion joints for Type II and III barriers.

For details of how joints are to be formed & water stops see st'd. RW-3.

Transverse joints for Type I barriers shall be constructed in accordance with the Road and Bridge specifications except no scoring or sawing will be allowed.

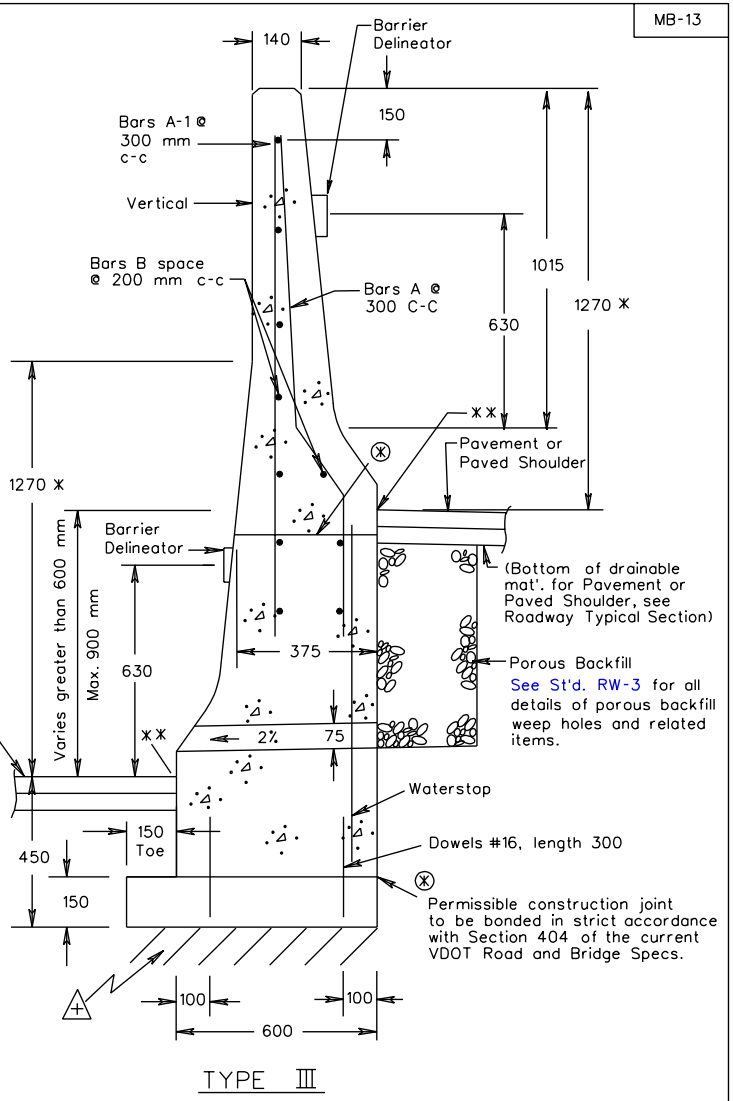
Horizontal reinforcing steel Bars B are to be separated at all expansion & contraction joints. A 50 mm concrete cover is required over the ends of reinforcing steel.



Section A-A
(Foundation Not Shown)

See MB-12
For Details

Section B-B
(Std. MB-12B)



TYPE III

TYPE III (Greater than 600 mm ht. diff., max. 900 mm)

Sheet 2 of 2

SPECIFICATION REFERENCE
105 404 502

CONCRETE MEDIAN BARRIER (TALL WALL) TYPE I, II or III

MB-13

VIRGINIA DEPARTMENT OF TRANSPORTATION

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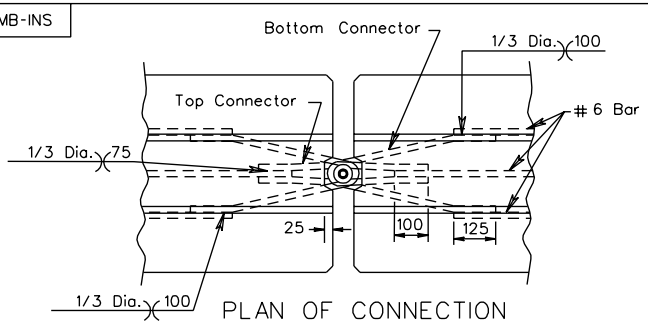
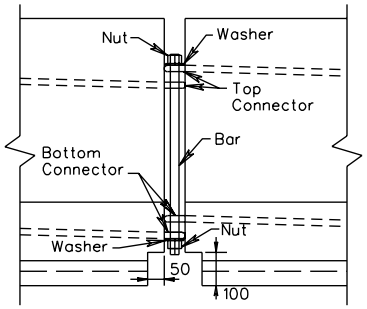
501.67

REVISED 8/97 REVISED 3/98 REVISED 2/01

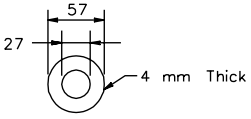
MB-INS



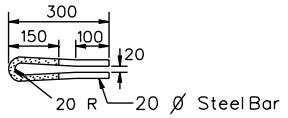
PLAN OF CONNECTION



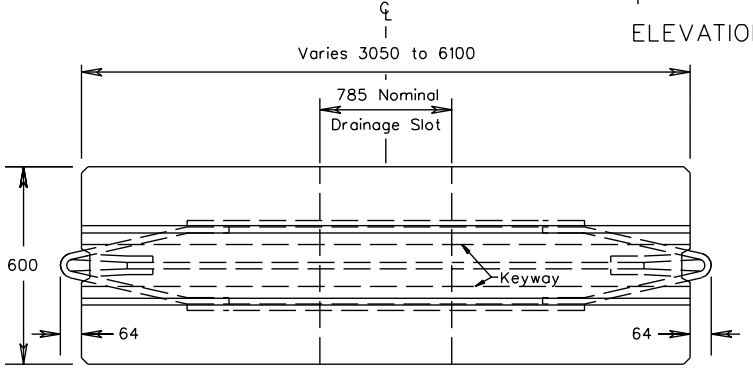
ELEVATION OF CONNECTION



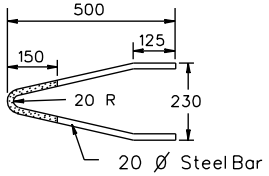
PLAIN GALVANIZED STEEL WASHER FOR 25 mm PIN



TOP CONNECTOR



PLAN VIEW



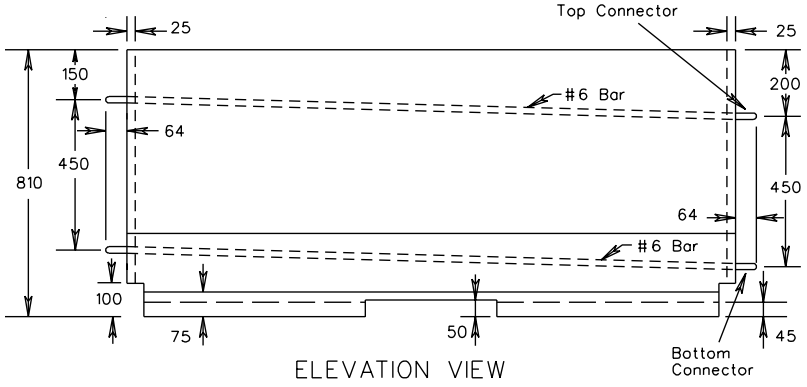
BOTTOM CONNECTOR

Galvanize After Forming
Note: Entire Connector May Be Galvanized.

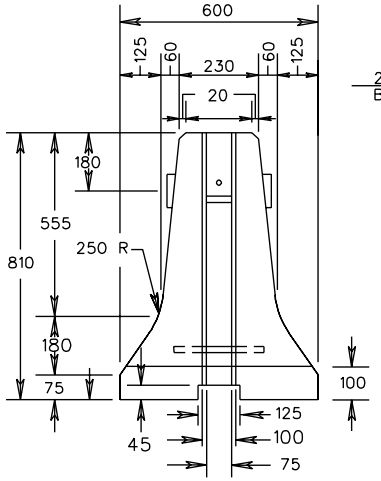
Notes:

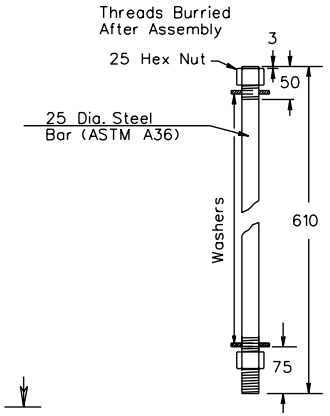
Pin and Connectors to be ASTM A-36 Reinforcing steel bars to be ASTM A 615, Grade 60 One Connector Pin Assembly with each Barrier section.

Other approved Positive Connections such as Channel Splice, Vertical I Beam, or Lapped Joint as shown in AASHTO's Roadside Design Guide may be used.



ELEVATION VIEW





CONNECTOR PIN ASSEMBLY

Galvanized after fabrication.

PIN & LOOP DETAILS

Sheet 1 Of 4

PRECAST CONCRETE MEDIAN BARRIER
POSITIVE CONNECTION OPTIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

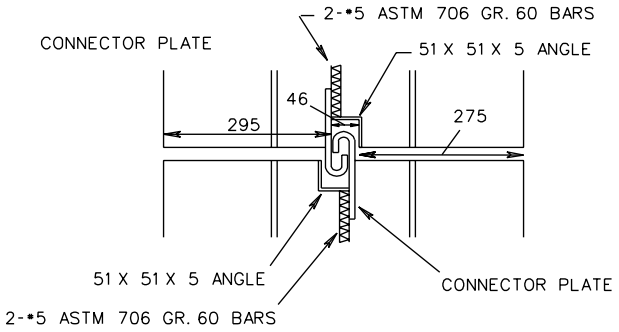
SPECIFICATION REFERENCE

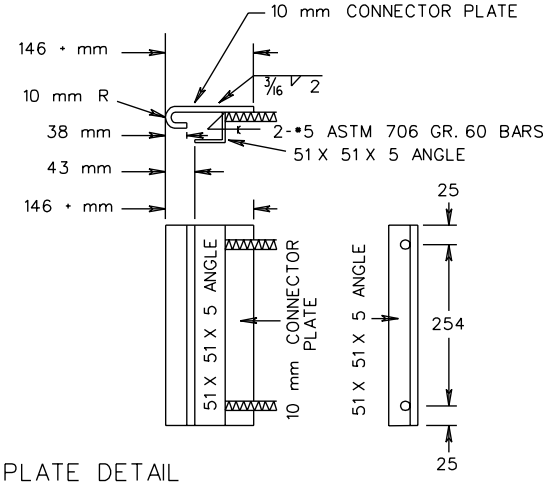
501.68

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

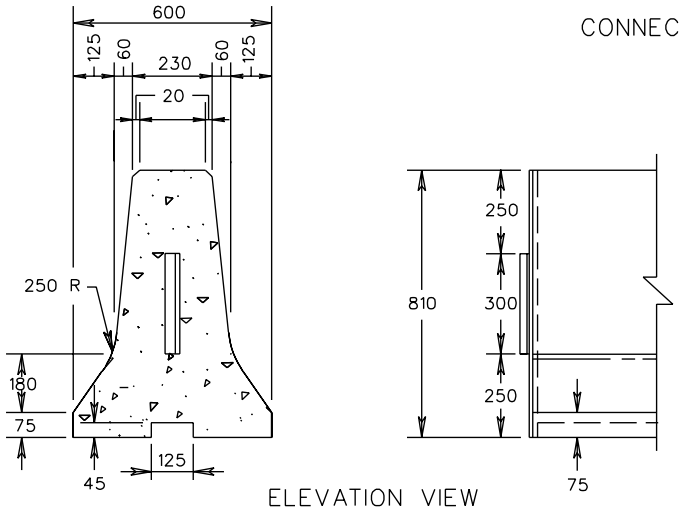
REVISED 3/98 REVISED 12/99

MB-INS

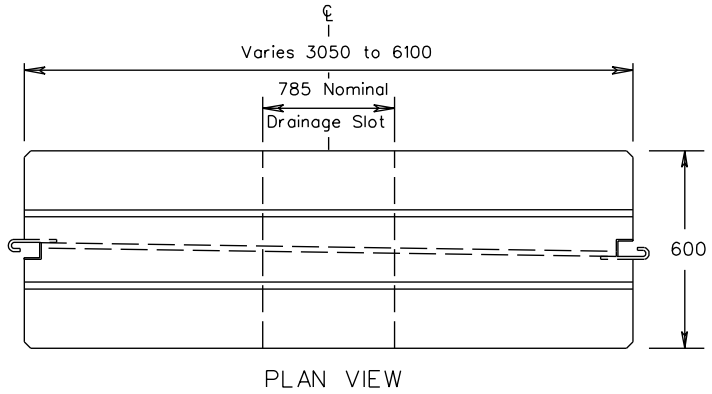




CONNECTOR PLATE DETAIL



ELEVATION VIEW



PLAN VIEW

Other approved Positive Connections such as Channel Splice, Vertical I Beam, or Lapped Joint as shown in AASHTO's Roadside Design Guide may be used.

Notes:

All exposed metal to be galvanized.
J-J Hook as manufactured by Smith Midland.

J-J HOOK DETAILS

Sheet 2 of 4

SPECIFICATION REFERENCE

PRECAST CONCRETE MEDIAN BARRIER POSITIVE CONNECTION OPTIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

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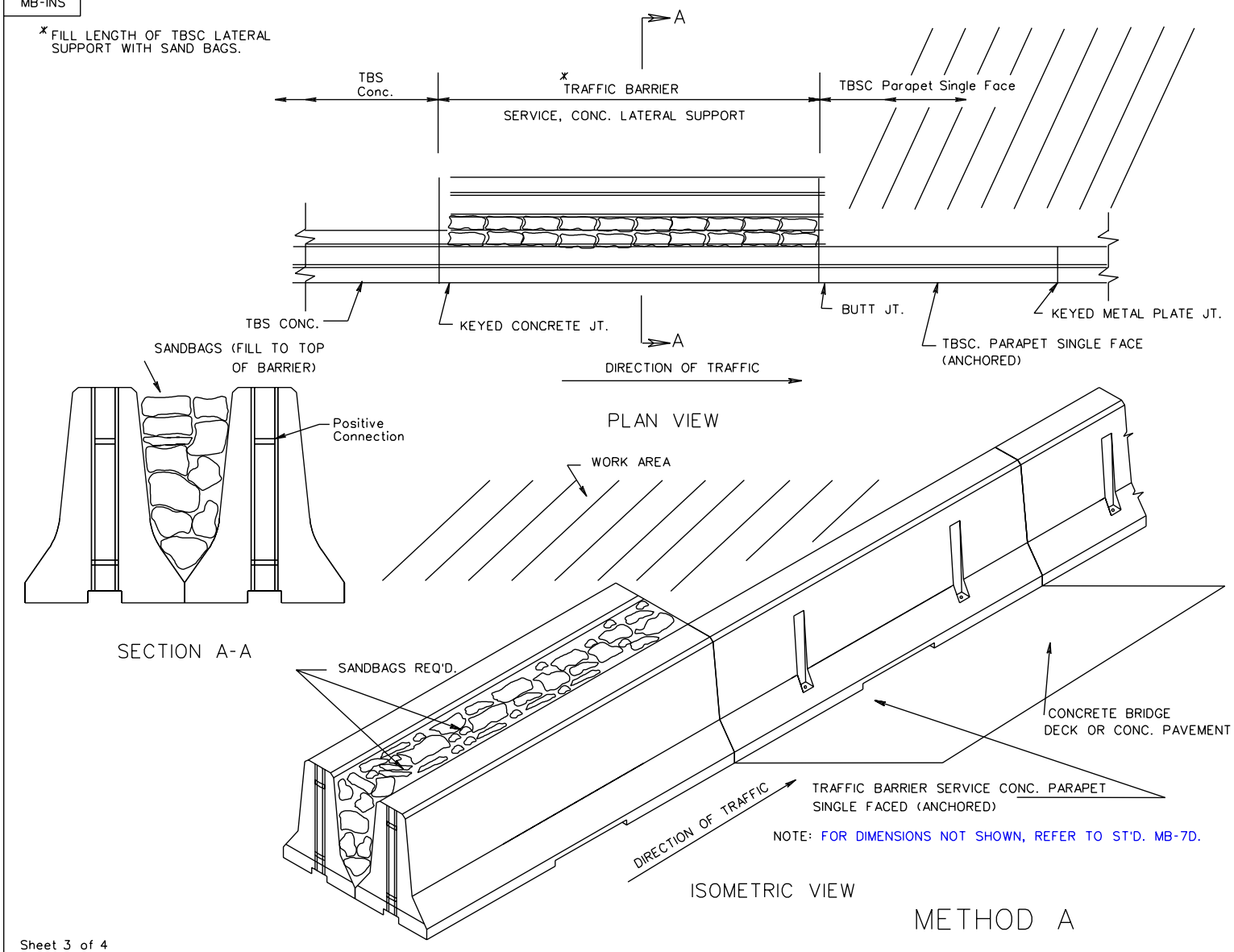
501.69

REVISED 8/00 REVISED 7/02

MB-INS

* FILL LENGTH OF TBSC LATERAL SUPPORT WITH SAND BAGS.



NOTE: FOR DIMENSIONS NOT SHOWN, REFER TO ST'D. MB-7D.

METHOD A

Sheet 3 of 4

BUTTING TRAFFICE BARRIER SERVICE TO SINGLE FACE PARAPET SERVICE

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

501.70

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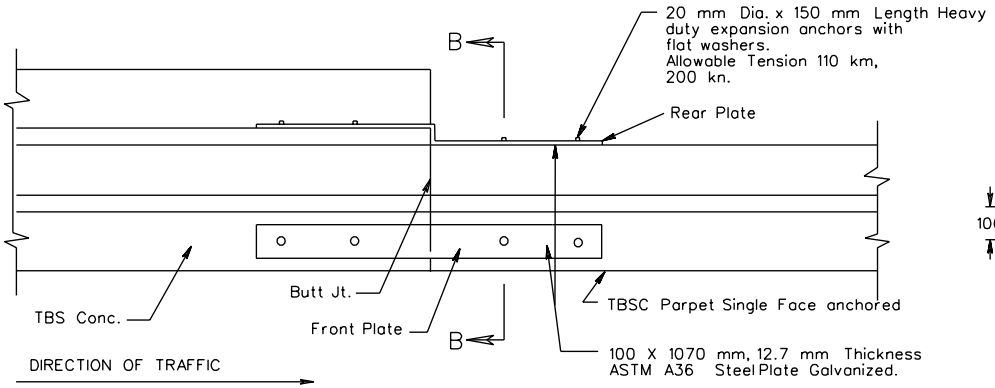
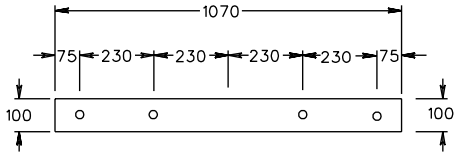
REVISED 8/00 REVISED 7/02

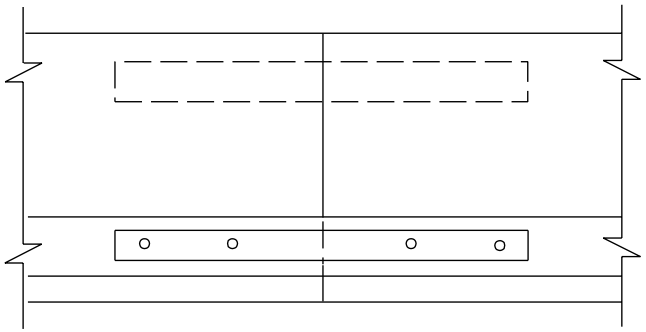
MB-INS



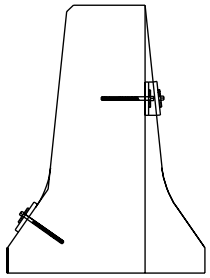
PLAN VIEW



FRONT PLATE



ELEVATION



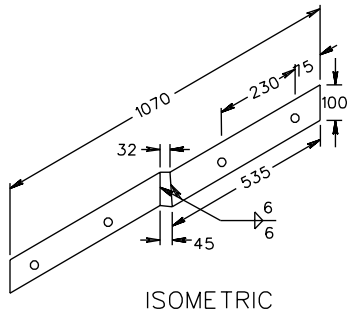
SECTION B-B

Basis of Payment:
Traffic Barrier Service Lateral Support will be measured and paid for in units of each, complete in place and shall include furnishing and placing (Method A) Precast Concrete Barriers (TBS Conc.) sand bags or (Method B) front and rear steel plates, maintenance, removal when no longer necessary, and all materials, labor, tools, equipment and incidentals necessary to complete the work.

Note: A set of Front and Rear Plates constitute one unit.

Plates to be Galvanized after Fabrication. Galvanize Plates in accordance with section 233 of the Road and Bridge Specifications

For positive connection details and dimensions see Special Design Drawing No. A-105.



ISOMETRIC (REAR PLATE)

METHOD B

Sheet 4 of 4

SPECIFICATION REFERENCE

BUTTING TRAFFICE BARRIER SERVICE TO SINGLE FACE PARAPET SERVICE

VIRGINIA DEPARTMENT OF TRANSPORTATION

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501.71