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## MDSHA BOOK OF STANDARD FOR HIGHWAYS, INCIDENTAL STRUCTURES AND TRAFFIC CONTROL APPLICATIONS

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NOTES

1. ALL POSTS SHALL BE 6', EXCEPT THOSE THAT CAN MEET **.
2. THE SLOPE BACK FILL MATERIAL SHALL BE COMPACTED FIRMLY TO THE ESTABLISHED SLOPE AND STABILIZED AS DIRECTED BY THE ENGINEER.
3. THE CONTRACTOR SHOULD CONSTRUCT THE END ANCHORAGE TERMINAL AS SHOWN ON STD. MD 605.01-02.
4. LOW SPEED INSTALLATIONS REQUIRE 50 FEET (MINIMUM) LON.
5. RAIL PAID FOR PER LINEAR FOOT OF “TRAFFIC BARRIER W-BEAM USING 6' POST” (FROM POST AT A-A TO POST C, BUT NOT INCLUDE POST C)
6. FOR ALTERNATIVE OFFSET BLOCKS, SEE STD. MD 605.21.
THE SLOPE BACK FILL MATERIAL SHALL BE COMPACTED FIRMLY TO THE ESTABLISHED SLOPE AND STABILIZED AS DIRECTED BY BURIED-IN-BACKSLOPE END TREATMENT (TYPE A) TRAFFIC BARRIER W-BEAM.

**NOTES**

1. ALL POSTS SHALL BE 8', EXCEPT THOSE THAT CAN MEET **.
2. THE BOTTOM RAIL SHALL BE TUCKED BEHIND AND BOLTED TO POST A-A USING A 5/8" DIA. HEX. HEAD BOLT.
3. OFFSET BLOCKS ARE NOT USED FOR THE BOTTOM RAIL.
4. MAINTAIN HEIGHT OF TOP RAIL ON THE FRONT SLOPE RELATIVE TO EDGE OF SHOULDER UNTIL A MAXIMUM HEIGHT OF 46" ABOVE GROUND IS REACHED.
5. THE SLOPE BACK FILL MATERIAL SHALL BE COMPACTED FIRMLY TO THE ESTABLISHED SLOPE AND STABILIZED AS DIRECTED BY THE ENGINEER.
6. THE CONTRACTOR SHOULD CONSTRUCT THE END ANCHORAGE TERMINAL AS ShOWN ON STD. MD 605.01-02.
7. LOW SPEED INSTALLATIONS REQUIRE 50 FEET (MINIMUM) LON.
8. TOP RAIL PAID FOR PER LINEAR FOOT OF "TRAFFIC BARRIER W-BEAM USING 8' POST" (FROM POST AT A-A TO POST 3), BUT NOT INCLUDE POST 3. BOTTOM RAIL PAID FOR PER LINEAR FOOT OF "TRAFFIC BARRIER W-BEAM PANEL." THE BURIED-IN-BACKSLOPE END TREATMENT PAID FOR PER EACH.
9. FOR ALTERNATIVE OFFSET BLOCKS, SEE STD. MD 605.21.
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER W-BEAM
BURIED-IN-BACKSLOPE END TREATMENT
(TYPE A) – ANCHORAGE

STANDARD NO.  MD 605.01-02

1. THE 1⁄4" STEEL PLATE SHALL CONFORM TO THE REQUIREMENTS OF A-36. THE PLATE MAY BE WELDED OR BOLTED TO POSTS 1, 2 AND 3 BURIED IN THE CUT SLOPE.

2. FIELD DRILLED HOLES AND WELDED AREAS SHALL BE COATED WITH ZINC RICH PAINT.

3. FOR STANDARD MD 605.01, POSTS SHALL BE 6′, EXCEPT THOSE THAT CAN MEET ** ON MD 605.01.

FOR STANDARD MD 605.01-01, POSTS SHALL BE 8′, EXCEPT THOSE THAT CAN MEET ** ON MD 605.01-01.

NOTE: THREE (3) 1″ DIA. HOLE TO BE FIELD DRILLED IN W-BEAM ELEMENT AND ATTACHED WITH 1/4″ DIA. HEX. HEAD BOLTS 1 1/2″ LONG EACH WITH ONE SQUARE WASHER AND HEX NUT.

WELDED OR BOLTED TO POSTS 1, 2 AND 3 BURIED IN BACK SLOPE

1″ DIAMETER HOLE TO BE FIELD DRILLED THROUGH W-BEAM AND THROUGH POST FLANGE. ATTACH W-BEAM WITH 1/4″ HEX. HEAD BOLT 2″ LONG WITH ONE SQUARE WASHER AND HEX NUT.

DRILL EXTRA 1/4″ DIA. HOLE IN POST FLANGE. (HOLE NOT NEEDED WHEN PLATE IS TO BE WELDED TO POST)

1/2″ STEEL PLATE

1/4″ STEEL PLATE

1″ STEEL PLATE ATTACHED TO POSTS 1, 2 AND 3

WELDED OR BOLTED TO POSTS 1, 2 AND 3 BURIED IN BACK SLOPE

FOR LENGTH SEE NOTE 3

ELEVATION VIEW (FRONT)

ELEVATION VIEW (SIDE)

BOLT PLATE TO POST WITH FOUR (4) 1/4″ DIA. HEX. HEAD BOLTS EACH 1/2″ LONG WITH HEX. NUTS.

THESE DETAILS ARE APPLICABLE TO POSTS 1, 2 AND 3 ONLY.

SEE ELEVATION VIEW ON 605.01-01 FOR POST 3 WITH BOTTOM RAIL.
NOTES
1. 4:1 grading is allowable behind barrier only when 4:1 grading is not feasible.
2. Flared terminal installation shall only be used when the grading is as shown and the required length of need is provided (150' minimum prior to the obstacle to be shielded).
3. System must be installed at a height of 31".
4. For delineation, see STD. MD 605.14.
5. This drawing is schematic only for illustration purpose. See MDOT SHA QPL for approved systems that are 2016 MASH compliant.

TRAFFIC BARRIER W-BEAM ONE-SIDED FLARED END TREATMENT (TYPE B)

STANDARD NO. MD 605.02
1. When the traffic barrier post is placed less than 4’ from the edge of shoulder/pavement, the end treatment shall be flared at a rate of 50:1 over the full length and on a straight line.
2. An effective run of 34” shall be included in the end treatment payment.
3. System must be installed at a height of 31”.
5. This drawing is schematic only for illustration purpose. See MDOT SHA QPL for approved systems that are 2016 MASH compliant.
1. SURFACE ADJUSTMENT SHALL BE STABILIZED WITHIN 48 HOURS OR PER STABILIZATION REQUIREMENTS OF CONTRACT DOCUMENTS, WHICHEVER IS LESS.

2. FOR USE ON RESURFACE, REHABILITATION, AND RESTORATION PROJECTS ONLY.
NOTES

1. ALL W-BEAM AND HARDWARE COMPONENTS ACCORDING TO AASHTO SPEC. M 180.
2. FOUNDATION TUBE SHALL BE MANUFACTURED USING ASTM A500B STEEL AND SHALL CONFORM TO ASTM A500 GRADE B MATERIAL.
3. ONE-SIDED DOWNSTREAM END TREATMENT (TYPE K) NOT TO BE USED WHERE THERE IS OPPOSING TRAFFIC WITHIN 30 FT. OF THE END TREATMENT.

BEGIN STANDARD TRAFFIC BARRIER W-BEAM. SEE STD. MD 605.23
25'-0" MINIMUM TO DOWNSTREAM END OF LENGTH OF NEED.

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER W-BEAM ONE-SIDED DOWNSTREAM END TREATMENT (TYPE K)

STANDARD NO. MD 605.10
WIRE ROPE IS 3,000 LB. WIRE ROPE IS TO BE TAUT ACCORDING TO ASTM A123. THREADED STUD SHALL CONFORM TO ASTM A325 OR SAE GRADE 5. MINIMUM BREAKING STRENGTH OF END FITTING SHALL BE MACHINED FROM HOT-ROLLED CARBON STEEL CONFORMING TO ASTM A576 GRADE 1035 AND GALVANIZED.

1. BCT ANCHOR CABLE IS 3⁄8" DIA. 6X19 IWRC IPS GALVANIZED WIRE ROPE. THE SWAGED FITTINGS AND STUD ARE REQUIRED.

NOTES

1. BCT ANCHOR CABLE IS 3⁄8" DIA. 6X19 IWRC IPS GALVANIZED WIRE ROPE. THE SWAGED FITTINGS AND STUD ARE REQUIRED. END FITTING SHALL BE MACHINED FROM HOT-ROLLED CARBON STEEL CONFORMING TO ASTM A576 GRADE 1035 AND GALVANIZED ACCORDING TO ASTM A123. THREADED STUD SHALL CONFORM TO ASTM A325 OR SAE GRADE 5. MINIMUM BREAKING STRENGTH OF WIRE ROPE IS 3,000 LB. WIRE ROPE IS TO BE TAUT.
** SEE MD STD. 605.14

# THE REQUIRED WIDTH OF THE UNIT VARIES DEPENDING UPON THE SYSTEM AND THE HAZARD TO BE SHIELDED. ATTACH END TREATMENT TO BARRIER ACCORDING TO MANUFACTURER’S SPECIFICATIONS.

1. FOR THE ANCHORING PAD DIMENSIONS AND MATERIALS AND TO ANCHOR THE UNIT TO EXISTING PAVEMENT, REFER TO THE MANUFACTURER’S PRODUCT MANUAL OR INSTRUCTIONS.

2. THE COST OF THE ANCHOR PAD, EXCAVATION, DRILLED HOLES, EPOXY, BOLTS, AND ALL LABOR AND MATERIALS NECESSARY TO ANCHOR THE UNIT SHALL BE INCIDENTAL TO TRAFFIC BARRIER END TREATMENT INSTALLATION.


4. THIS SCHEMATIC DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. SEE MDOT SHA QPL FOR APPROVED SYSTEMS THAT ARE 2016 MASH COMPLIANT.
NOTES

1. THE USE OF THIS END TREATMENT IS LIMITED TO ROADWAYS WITH POSTED SPEEDS OF 40 MPH OR LESS AND ADT LESS THAN 10,000.
2. ALL ITEMS (ANCHOR PLATE, CABLE, ROD, DRILLED HOLES, NUTS, BOLTS, ETC) NECESSARY FOR THE ANCHOR SHALL BE MEASURED AND PAID PER EACH OF "TRAFFIC BARRIER W-BEAM ONE-SIDED RADIUS END TREATMENT".
3. THE RADIUS END TREATMENT IS PERMITTED WITHIN A SINGLE RUN OF TRAFFIC BARRIER AS SHOWN. IF A RADIUS END TREATMENT IS USED, THE DOWNSTREAM END TREATMENT IS ONLY REQUIRED ON THE TRAFFIC BARRIER END IF WITHIN 30' OF OPPOSITE DIRECTION OF TRAFFIC.
4. THE GROUND STRUT AS SHOWN IN STD. MD 605.10 AND MD 605.10-01 IS NOT REQUIRED IN THE RADIUS END TREATMENT.
1. Delineation must meet the requirements in MUTCD sections 2C.64 and 2C.65.
2. Delineation shall be Type IX or XI reflective sheeting with black stripes on fluorescent yellow.
3. When placing sheeting on bare metal, metal should be cleaned as per manufacturer’s recommendations prior to application of sheeting.
4. Sheeting should extend to top and bottom and full width of terminal. Size may be adjusted as necessary to fit different manufacturer’s terminals.
5. Delineation will be incidental to the appropriate traffic barrier end treatment.

**TWO SIDED END TREATMENTS**

**ONE SIDED END TREATMENTS**
NOTES
1. WOOD OFFSET BLOCKS 6"x8"x14" TO BE USED UNLESS OTHERWISE SPECIFIED OR DIRECTED BY THE ENGINEER.
2. FOR BOLT AND BOLT NUT DETAILS, SEE STD. MD 605.23.
3. COMPOSITE OFFSET BLOCKS THAT ARE APPROVED BY THE ADMINISTRATION MAY BE USED IN LIEU OF WOOD OFFSET BLOCKS (EITHER DUE TO CONTRACTOR'S CHOICE OR WHEN SPECIFIED IN THE CONTRACT DOCUMENTS). REFER TO QPL FOR APPROVED SUBSTITUTES.
NOTES

1. W-BEAM RAIL IS FURNISHED SHOP CURVED, CONCAVE OR CONVEX TO RADII BETWEEN 20'-150'.
2. W-BEAM RAIL SECTIONS SHALL BE 12'-6" OR 25'-0" LENGTHS UNLESS SPECIFIED OTHERWISE.
**NOTES**

1. FOR COMPOSITE OFFSET BLOCKS SEE NOTE 5 ON STD. MD 605.21.
2. THE CONTRACTOR HAS THE OPTION TO USE SHORTER BOLTS WITH A MINIMUM OF 1⁄2" PROTRUSION BEYOND NUT.
3. WITH ENGINEER'S APPROVAL, ONE POST CAN BE OMITTED WITHOUT OTHER CHANGES. A MINIMUM OF EIGHT POSTS MUST BE INSTALLED BETWEEN OMITTED POSTS.

---

**ELEVATION VIEW**

**SIDE VIEW**

**FRONT VIEW**

**WOOD OFFSET BLOCK**

SEE STD. MD 605.21

**TRAFFIC BARRIER POST**

SEE STD. MD 605.23-01

**BOLT**

L=1 1/2" FOR SPLICE BOLT
FULL LENGTH THREADS
L=2" FOR SPLICE WITH NESTED RAIL BOLT
FULL LENGTH THREADS
L=10" FOR STEEL POST WITH 8" BLOCKOUT BOLT
SEE NOTE
L=14" FOR STEEL POST WITH 12" BLOCKOUT BOLT

**SIDE VIEW**

**FRONT VIEW**

**POST WITH W-BEAM RAIL**

(BOLT NOT SHOWN)

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**SPECIFICATION 605**

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**STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES**

**TRAFFIC BARRIER W-BEAM, W-BEAM SPLICES AND WOOD OFFSET BLOCK**

**STANDARD NO.**

**MD 605.23**
4"
1"
2"
3/8"

WELDED W6x8.5 STEEL POST

A 769 HIGH FREQUENCY RESISTANCE WELD. THE WELD JOINT MUST DEVELOP STRENGTH EQUAL TO OR EXCEEDING THE FULL STRENGTH OF THE WEB MATERIAL (MATERIAL GRADE A 36) GALVANIZED COATING SHALL BE AS PER AASHTO M 111.

NOTES
1. 8' POST SHALL BE USED ONLY WHEN SPECIFIED.
2. W6X9 POSTS ARE OPTIONAL SUBSTITUTE FOR W6X8.5 POST.
NOTES
1. THE TRAFFIC BARRIER W-BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
2. FOR OMITTING ONE POST, SEE STD. MD 605.23.
3. AT LEAST 62½ FT OF TRAFFIC BARRIER, INCLUDING END ANCHORAGE, SHALL BE INSTALLED BOTH UPSTREAM AND DOWNSTREAM FROM THE CRT POSTS.

NOTES
**TRAFFIC BARRIER W-BEAM**

**DOUBLE FACED MEDIAN BARRIER**

**NOTES**

1. FOR SPLICES, SPLICE BOLTS, AND OTHER DETAILS, SEE STD. MD 605.23.

2. FOR TRAFFIC BARRIER W-BEAM RAIL DETAIL, SEE STD. MD 605.22.

3. THE PAYMENT FOR THE SYSTEM, INCLUDING W-BEAM, HARDWARE, DRILLED HOLES, LABOR AND TOOLS, SHALL BE MEASURED AND PAID FOR PER LINEAR FOOT FOR THE ITEM “TRAFFIC BARRIER W-BEAM MEDIAN BARRIER.”

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**SPECIFICATION 605**

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**STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES**

**TRAFFIC BARRIER W-BEAM**

**DOUBLE FACED MEDIAN BARRIER**

**STANDARD NO.** MD 605.28
NOTES

1. FOR SPLICES, SPLICE BOLTS AND OTHER DETAILS, SEE STD. MD 605.23.
2. FOR TRAFFIC BARRIER W-BEAM RAIL DETAIL, SEE STD. MD 605.22.
3. THE PAYMENT FOR THE SYSTEM, INCLUDING W-BEAM, HARDWARE, DRILLED HOLES, LABOR AND TOOLS, SHALL BE MEASURED AND PAID FOR PER LINEAR FOOT FOR THE ITEM "TRAFFIC BARRIER W-BEAM MEDIAN BARRIER WITH BOTTOM RAIL."
1. Steel post shall conform to A36 and shall be galvanized in accordance with A123.

NOTES

WOOD OFFSET BLOCK

TOP VIEW

WOOD OFFSET BLOCK

SIDE VIEW

THRIE-BEAM DETAIL

FRONT VIEW

6"x8"x19" OR 6"x12"x19"

STANDARD POST

FRONT VIEW

6"x12"x19"

SPLICE JOINT

BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO VERTICAL AXIS OF THE POST.

ALL HORIZONTAL HOLE ARE TOLERANCE ± 1/16" DIA.

STEEL POST*

* W6X15 OR W6X8.5 (W6X9) POST

FOR BOLTS AND BOLT NUTS, SEE STD.

MO 605.23

NOTES

1. Steel post shall conform to A36 and shall be galvanized in accordance with A123.

WOOD OFFSET BLOCK

TOP VIEW

WOOD OFFSET BLOCK

SIDE VIEW

THRIE-BEAM DETAIL

FRONT VIEW

6"x8"x19" OR 6"x12"x19"

STANDARD POST

FRONT VIEW

6"x12"x19"

SPLICE JOINT

BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO VERTICAL AXIS OF THE POST.

ALL HORIZONTAL HOLE ARE TOLERANCE ± 1/16" DIA.

STEEL POST*

* W6X15 OR W6X8.5 (W6X9) POST

FOR BOLTS AND BOLT NUTS, SEE STD.

MO 605.23

NOTES

1. Steel post shall conform to A36 and shall be galvanized in accordance with A123.
NOTES

1. FOR STEEL POSTS, WOOD OFFSET BLOCKS, SPLICES, THRIE-BEAM, AND RECTANGULAR PLATE WASHERS, SEE STD. MD 605.29.
NOTES

1. THE MINIMUM OFFSET DIMENSION SHOWN CAN BE REDUCED BY STIFFENING THE TRAFFIC BARRIER SYSTEM. SEE STD MD 605.31-01.

2. 8'-0" LONG POSTS ARE TO BE USED WHEN THE DISTANCE FROM THE BACK OF THE W BEAM POST TO THE HINGE POINT IS LESS THAN 2' AND THE SLOPE BEYOND THE HINGE IS STEEPER THAN 4:1.


4. WHEN SLOPE IS STEEPER THAN 6:1, THE FACE OF THE BARRIER MUST BE ALIGNED WITH THE EDGE OF SHOULDER.

5. SLOPE IN FRONT OF BARRIER INSTALLED 2' OFFSET FROM SHOULDER EDGE MUST BE 10:1 OR SHALLOWER.
1. The Traffic Barrier W-Beam sections shall be lapped in the direction of traffic.

**NOTES**

**PLAN VIEW**

**HALF POST SPACING**

- Minimum Offset to Hazard
  - 3'-1" Post Spacing (Half Post)
  - Starting 25' in advance of the roadside hazard

**QUARTER POST SPACING**

- Minimum Offset to Hazard
  - 1'-6" Post Spacing (Quartermaster)
  - Starting 50' in advance of the roadside hazard

**STANDARD NO.** MD 605.31-01
**FLARE RATES**

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**NOTE**


**ELEVATION VIEW W-BEAM HEIGHT TRANSITION**

**NOTE**

1. FOR CHANGES IN W-BEAM INSTALLATION HEIGHT, WHEN TYING IN TO EXISTING, UNDAMAGED TRAFFIC BARRIER THAT IS NOT BEING REPLACED AS PART OF THE CONTRACT, USE A MAXIMUM TRANSITION OF 2 INCHES IN HEIGHT PER 12’-6” PANEL OF W-BEAM INSTALLED.

2. FOR TRANSITIONS TO BARRIER CONFIGURATIONS WITH SPLICES AT THE POST RATHER THAN THE MID-SPAN, DELETE FINAL POST AS SHOWN.
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER THRIE-BEAM ANCHORAGE TO VERTICAL FACE

1. ALL BLOCKOUTS TO BE EITHER 6" X 12" X 19" (THRIE-BEAM) OR 6" X 12" X 14" (W-BEAM) SHAL L BE PLACED ON SLOPES 10:1 OR FLATTER.
2. THRIE-BEAM TERMINAL CONNECTORS, THRIE-BEAM SECTIONS, AND W-BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
3. FOR THRIE-BEAM DETAIL INCLUDING STEEL POSTS, WOOD OFFSET BLOCKS, AND SPLICES, SEE STD. MD 605.29.
4. FOR TERMINAL CONNECTOR AND TRANSITION SECTION, SEE STD. MD 605.41-02.
5. CURB MAY BE ADDED BELOW THE TRAFFIC BARRIER THRIE-BEAM SYSTEM.

STANDARD NO. 605.41

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

DIRECTOR - OFFICE OF HIGHWAY DEVELOPMENT

APPROVAL:
SHA: 2-23-20
FEDERAL HIGHWAY ADMINISTRATION: 2-24-20

REVISED:
SHA: REVISED
FEDERAL HIGHWAY ADMINISTRATION: REVISED

APPROVED: 6-01-20

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER THRIE-BEAM ANCHORAGE TO VERTICAL FACE

NOTES
NOTES
1. ALL BLOCKOUTS TO BE EITHER 6"X12"X19" (THREE-BEAM) OR 6"X12"X14" (W-BEAM).
2. THREE-BEAM TERMINAL CONNECTOR, THREE-BEAM SECTIONS, AND W-BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.
3. THE TRAFFIC BARRIER THREE-BEAM ANCHORAGE AT BRIDGE END POSTS SHALL BE PLACED ON SLOPES 10:1 OR FLATTER.
4. FOR THREE-BEAM DETAILS, INCLUDING STEEL POSTS, WOOD OFFSET BLOCKS, AND SPLICES, SEE STD. MD 605.29.
5. FOR TERMINAL CONNECTOR AND TRANSITION SECTION, SEE STD. MD 605.41-02.
6. A 4" CURB MAY BE ADDED BELOW THE TRAFFIC BARRIER THREE-BEAM SYSTEM.
7. FOR THIS OVERLAY STANDARD, AN ASYMMETRIC TRANSITION REPLACES THE SYMMETRIC TRANSITION AND THE ADJACENT W-BEAM IS RAISED 3" ON THE POSTS TO MAINTAIN A 31" TOP MOUNTING HEIGHT.
8. OVERLAY SHALL EXTEND LATERALLY AT LEAST TO THE FACE OF THE HAIL. OVERLAY SHALL NOT EXTEND BEYOND FACE OF POSTS.
RECTANGULAR PLATE WASHER

THRIE-BEAM TERMINAL CONNECTOR

POST BOLT SLOT 3/4" x 2 1/2" (TYP.)

SPLICE BOLT SLOT 2 1/2" x 1 3/8" (TYP.)

POST BOLT SLOT 3/4" x 2 1/2" (TYP.)

SPLICE BOLT SLOT 2 1/2" x 1 3/8" (TYP.)

SYMMETRIC

W-BEAM – THRIE-BEAM TRANSITION SECTION

ASYMMETRIC

W-BEAM – THRIE-BEAM TRANSITION SECTION

NOTE

1. RECTANGULAR PLATE WASHERS SHALL BE MADE OF STEEL MEETING THE REQUIREMENTS OF ASTM A 36 AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 123. HOLE MAY BE PUNCHED OR DRILLED.

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER TERMINAL CONNECTOR
AND W-BEAM TO THRIE-BEAM TRANSITION SECTION

STANDARD NO. MD 605.41-02
TRAFFIC BARRIER W BEAM PLACEMENT OR APPROPRIATE END TREATMENT OR W BEAM TO BARRIER CONNECTION

AREA BEHIND TRAFFIC BARRIER W BEAM TO BE MAINTAINED FREE OF FIXED OBJECTS OR OTHER HAZARDS.

RADIUS | MIN. REQUIRED AREA FREE OF FIXED OBJECTS
--- | ---
8'-6" | 25' x 15'
11'-0" | 30' x 15'
25'-6" | 40' x 20'
35'-0" | 50' x 20'

PLAN

8" x 8" POST & OFFSET BLOCK

SEE ANCHOR PLATE DETAIL

6'-3" 5'-6"

2'-6" x 2'-6" x 2'-6"
CONCRETE ANCHOR

ENTRANCE SPECIAL END ANCHORAGE

1. NO WASHERS ARE USED ON THE RAIL SIDE OF THE LONG WOOD BREAKAWAY POSTS.
2. THE CURVED TRAFFIC BARRIER W BEAM SECTION SHALL BE SHIP BENT.
3. PLACE TRAFFIC BARRIER W BEAM DELIMITERS AT THE INTERVALS SPECIFIED IN THE MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
4. IF CURB [5'-0"] IN CONJUNCTION WITH CURVED TRAFFIC BARRIER W BEAM SECTION, THE CURB CANNOT BE HIGHER THAN 2'.
5. ON THE 8'-6" RADIUS SYSTEM ONLY, THE RAIL IS NOT TO BE BOLTED TO THE CENTER POST.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

TRAFFIC BARRIER W BEAM, SHORT RADIUS

STANDARD NO. MD 605.52
SHORT WOOD BREAKAWAY POST

OFFSET BLOCK, OPTION 1

OFFSET BLOCK, OPTION 2

SOIL PLATE

LONG WOOD BREAKAWAY POST

STEEL TUBE

NOTES
1. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
2. ALL WOOD SIZES ARE NOMINAL DIMENSIONS.
3. POSTS SHOULD BE PLACED SO THE BREAKAWAY HOLES ARE NO LOWER THAN GROUND LEVEL AND NO HIGHER THAN 8" ABOVE GROUND LEVEL.
4. LOWER BREAKAWAY HOLE ONLY NEEDED ON BURIED END SECTION.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

TRAFFIC BARRIER W BEAM, SHORT RADIUS POST & SOIL PLATE

STANDARD NO. MD 605.52-01
SWAGED CABLE ASSEMBLY AND RELATED HARDWARE ASSEMBLY

POST SLEEVE

SWAGED CONNECTION SLEEVE

END PLATE

ANCHOR PLATE TO W-BEAM

SECTION A-A

NOTES
1. TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION, 2-10D GALVANIZED STEEL NAILS SHALL BE DRIVEN IN THE SHORT TIMBER BREAKAWAY POST, AND BENT OVER BEARING PLATE.
2. TIGHTEN ASSEMBLY UNTIL CABLE IS TIGHT.
3. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
TYPE 'A'
COMBINATION CURB & GUTTER
DESIGN SPEED ≤ 45 MPH

TYPE 'B'
COMBINATION CURB & GUTTER
DESIGN SPEED 50 MPH

1. SLOPE GUTTER PAN 1/4" PER FOOT TOWARDS FLOW LINE ON ALL ROADWAYS INCLUDING SUPERELEVATED SECTIONS, EXCEPT INTERCHANGE RAMPS.
2. ROADWAY PAVEMENT SLOPE.
3. ROADWAY PAVEMENT CONSTRUCTION JOINT.
4. PROVIDE LONGITUDINAL TIE DEVICE "J" BAR MODIFIED. REFER TO STANDARD NO. MD 572.61.
5. FLOW LINE.

NOTES
A. RIGID PAVEMENT ROADWAY ADJACENT TO COMBINATION CURB AND GUTTER AND CLOSED SECTION ROADWAY USING RIGID PAVEMENT WITH COMBINATION CURB AND GUTTER SHALL BE TIED AT THE ROADWAY PAVEMENT CONSTRUCTION JOINT. REFER TO STANDARD MD 572.61 FOR METHOD OF LONGITUDINAL TIE DEVICES. SPACING OF THE TIE BARS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS. RIGID PAVEMENT AND CURB SHALL BE CONSTRUCTED AS INDICATED. TIE DEVICES ARE NOT REQUIRED WHEN USING FLEXIBLE PAVEMENT FOR ROADWAY.
B. MAXIMUM JOINT SPACING FOR CONCRETE CURB AND COMBINATION CURB & GUTTER IS 10'. SEE SPECIFICATION FOR LOCATIONS AND DESCRIPTION OF TREATMENT FOR THE TYPES OF JOINTS USED.
C. TYPE A OR B COMBINATION CURB AND GUTTER SHALL BE USED FOR ALL APPLICABLE NEW CONSTRUCTION AND IN THOSE AREAS WHERE THE COMBINATION CURB AND GUTTER IS TO BE REPLACED IN KIND.
D. TYPE A OR B CURB SHALL BE USED FOR THE REPLACEMENT OF LIKE KIND OF CURB ONLY. NOT TO BE USED FOR NEW CONSTRUCTION EXCEPT WHERE INDICATED ON APPROPRIATE INLET STANDARDS.
TYPE 'C'
Combination Curb & Gutter
To be used for design speed 60 MPH

Slope gutter pan 1/2" per foot toward flow line on all roadways including superelevated sections, except interchange ramps.

Roadway pavement slopes.

Roadway pavement construction joint.

Provide longitudinal tie device "J" bar modified; refer to standard MD MD 572.61.

Flow line.

NOTES

A. Rigid pavement roadway adjacent to combination curb and gutter and closed section roadway using rigid pavement with combination curb and gutter shall be tied at the roadway pavement construction joint; refer to standard MD 572.61 for method of longitudinal tie devices. Spacing of the tie bars shall be in accordance with the specifications. Rigid pavement and curb shall be constructed as indicated. Tie devices are not required when using flexible pavement for roadway.

B. Maximum joint spacing for concrete curb and combination curb & gutter is 10'. See specification for locations and description of treatment for the types of joints used.

C. Type C or D combination curb and gutter shall be used for all applicable new construction and in those areas where the combination curb and gutter is to be replaced in kind.

D. Type C or D curb shall be used for the replacement of like kind of curb only. Not to be used for new construction except where indicated on appropriate inlet standards.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
STANDARD TYPES C AND D
CONCRETE CURB AND COMBINATION CURB & GUTTER
STANDARD NO. MD 620.02-01
1. Slope gutter pan 1/8" per foot toward flow line on all roadways including superelevated sections, except interchange ramps.
2. Roadway pavement slope.
4. Provide longitudinal tie device "J" bar modified. Refer to standard no MD 572.61.
5. Flow line.

NOTES

A. Rigid pavement roadway adjacent to combination curb and gutter and closed section roadway using rigid pavement with combination curb and gutter shall be keyed and tied at the roadway pavement construction joint. Refer to standard no MD 572.61 for method of keyway and longitudinal tie devices. Spacing of the tie bars shall be in accordance with the specifications. Rigid pavement and curb shall be constructed as indicated. Tie devices and keys are not required when using flexible pavement for roadway.

B. Maximum joint spacing for concrete curb and combination curb & gutter is 10'. See specification for locations and description of treatment for the type of joints used.

C. Payment for depressing the curb will be incidental to the contract unit price bid per linear foot for the item concrete curb or combination concrete curb and gutter, as specified in the contract documents.
NOTES

1. FOR USE IN AREAS WHERE THERE IS SIDEWALK ADJACENT TO THE BACK OF CURB OR WHERE IT IS EXPECTED THAT SIDEWALK WILL BE ADDED IN THE FUTURE.

2. WHEN AN EXISTING ENTRANCE IS LESS THAN 20' IN WIDTH A UNIFORM TAPER SHALL BE CONSTRUCTED TO TIE INTO THE EXISTING ENTRANCE AS DIRECTED BY THE ENGINEER.

3. EXPANSION JOINT MATERIAL TO BE INSTALLED IN ACCORDANCE WITH STD. MD-655.01.

4. WHERE 60" SIDEWALK CAN NOT BE PROVIDED, 36" MIN. MAY BE USED AS LONG AS PASSING ZONES ARE PROVIDED IN ACCORDANCE WITH STD. MD-655.02.

5. TYPE A AND B CURB AND THE CURB FOR TYPE A, B, AND C COMBINATION CURB AND GUTTER SHALL BE DEPRESSED AS SHOWN ON STD. 620.02-01 TYPE C PAYMENT FOR DEPRESSING THE CURB SHALL BE AS SPECIFIED ON STD. 620.03 NOTE C.

6. TRANSITION PANELS TO TIE INTO EXISTING SIDEWALK MUST BE A MINIMUM OF 5' IN LENGTH.


8. USE MIX 9 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
**NOTES**

1. FOR USE IN AREAS WHERE THERE IS SIDEWALK SEPARATED FROM THE BACK OF CURB BY 24' OR MORE, OR WHERE IT IS EXPECTED THAT SIDEWALK WILL BE ADDED IN THE FUTURE.

2. WHEN AN EXISTING ENTRANCE IS LESS THAN 20' IN WIDTH A UNIFORM TAPER SHALL BE CONSTRUCTED TO TIE INTO THE EXISTING ENTRANCE AS DIRECTED BY THE ENGINEER.

3. EXPANSION JOINT MATERIAL TO BE INSTALLED IN ACCORDANCE WITH STD. MD-655.01.

4. WHERE 60" SIDEWALK CAN NOT BE PROVIDED, 36" MIN. MAY BE USED AS LONG AS PASSING ZONES ARE PROVIDED IN ACCORDANCE WITH STD. MD-655.02.

5. TRANSITION PANELS TO TIE INTO EXISTING SIDEWALK MUST BE A MINIMUM OF 5' IN LENGTH.

6. USE MIX 9 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.


**Maryland Department of Transportation**

**STATE HIGHWAY ADMINISTRATION**

**STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES**

**STANDARD ENTRANCE CONSTRUCTION**

**RESIDENTIAL & COMMERCIAL METHOD NO.2**

**STANDARD NO. MD 630.02**
NOTES
1. FOR USE ONLY WHERE ENTRANCE DOES NOT CROSS SIDEWALK.
2. WHEN AN EXISTING ENTRANCE IS LESS THAN 20' IN WIDTH A UNIFORM TAPER SHALL BE CONSTRUCTED TO TIE INTO THE EXISTING ENTRANCE AS DIRECTED BY THE ENGINEER.
3. EXPANSION JOINT MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH STD. MD-655.01.
4. USE MIX 9 UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
1. PRECAST CONCRETE WHEEL STOP SHALL BE LOCATED AS SHOWN ON THE PLANS, THEN SECURED IN PLACE WITH TWO (2) NO. 7 REINFORCEMENT BARS PER WHEEL STOP.

2. COST OF THE REINFORCEMENT BARS WILL BE INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER EACH FOR THE WHEEL STOPS.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

PRECAST CONCRETE WHEEL STOP

STANDARD NO. MD 634.04
Maryland Department of Transportation

STATE HIGHWAY ADMINISTRATION

STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

SINGLE AND DOUBLE MAILBOX ASSEMBLIES TYPE A

STANDARD NO. MD 635.02
NOTE

THE COST OF THE CONCRETE GUTTER & SOD WILL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER EACH STANDARD CURB OPENING.

ON GRADE

LIMITS OF PAYMENT PER EACH 10'-0"

GRADE

LIMIT OF PAYMENT FOR CURB

DOWELED JOINT

Pavement SlopE

NORMAL DESIGN

SECTION

LIMIT OF PAYMENT FOR CURB

NOSE DOWN CURB TO CONCRETE GUTTER

15° MIN.

45° MIN.

SLOPE 4.0 %

MIN.

DITCH LINE

LIMIT OF PAYMENT FOR CURB

Pavement SlopE

NORMAL DESIGN

SECTION

LIMIT OF PAYMENT FOR CURB

DOWELED JOINT

Nose Down Curb To Concrete Gutter

4° R

SLOPE 4.0 %

MIN.

AT LOW POINT

VARIABLE

THICKNESS AS DESIGNED OR SAME AS MAIN LINE PAVEMENT.

SECTION A-A

TYPE A, B, OR C CURB FOR DETAILS SEE STANDARD MD 620.02 AND 620.02-01

GUTTER LENGTH MAY BE VARIED AS DIRECTED

SECTION B-B

FOR DETAILS OF JOINTS & TOE WALL SEE LONGITUDINAL TIE DEVICES STANDARD WD 572.61 AND 389.02, RESPECTIVELY.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
STANDARD CURB OPENING DETAILS FOR CONCRETE CURB

STANDARD NO. MD 640.01
Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

STANDARD CURB OPENING DETAILS
FOR COMBINATION CURB & GUTTER

STANDARD NO. MD 640.02
NOTE

1. UNLESS OTHERWISE SPECIFIED, LONITUDINAL TIE BAR DEVICES, TYPE 'A' OR TYPE 'B', PLACED AT MIDDLE OF KEYWAY A SPACED ACCORDING TO SPECIFICATIONS FOR CONCRETE PAVEMENT SHALL BE USED AT CONSTRUCTION JOINT BETWEEN MONOLITHIC CONCRETE MEDIAN (OR GUTTER PAN) AND CONCRETE PAVEMENT. SEE STANDARD MD 572.61. SOLID BAR AND SLEEVE MAY BE REPLACE BY TUBE WITH INTERNAL THREAD.

2. JOINT SPACING WILL BE A MAXIMUM OF 10'-0" APART, SEE SPECIFICATIONS FOR LOCATION AND DESCRIPTION OF TREATMENT FOR THE TYPES OF JOINTS USED. CONCRETE PAVEMENT, JOINTS SHALL MATCH PAVEMENT JOINTS.

3. ALLOW 4' 0" HOLES IN MEDIAN FOR SIGNS, SPACED AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
STANDARD MONOLITHIC CONCRETE MEDIAN
TYPE 'A'

STANDARD NO. MD 645.01
NOTES
1. UNLESS OTHERWISE SPECIFIED, LONGITUDINAL TIE BAR DEVICE, TYPE ‘A’ OR TYPE ‘B’, PLACED AT MIDDLE OF KEYWAY & SPACED ACCORDING TO SPECIFICATIONS FOR CONCRETE PAVEMENT SHALL BE USED AT CONSTRUCTION JOINT BETWEEN MONOLITHIC CONCRETE MEDIAN (OR GUTTER PAN) AND CONCRETE PAVEMENT. SEE STANDARD MD 572.61. SOLID BAR AND SLEEVE MAY BE REPLACE BY TUBE WITH INTERNAL THREAD.

2. JOINT SPACING WILL BE A MAXIMUM OF 10'-0" APART. SEE SPECIFICATIONS FOR LOCATION AND DESCRIPTION OF TREATMENT FOR THE TYPES OF JOINTS USED. CONCRETE PAVEMENT JOINTS SHALL MATCH PAVEMENT JOINTS.

3. ALLOW 4" Ø HOLES IN MEDIAN FOR SIGNS, SPACED AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
3. **NOTES**

1. **UNLESS OTHERWISE SPECIFIED, LONGITUDINAL TIE BAR DEVICE**: TYPE 'A' OR TYPE 'B', PLACED AT MIDDLE OF KEYWAY & SPACED ACCORDING TO SPECIFICATIONS FOR CONCRETE PAVEMENT SHALL BE USED AT CONSTRUCTION JOURNT BETWEEN MONOLITHIC CONCRETE MEDIAN (FOR GUTTER PAN) AND CONCRETE PAVEMENT. SEE STANDARD MD 572.61. SOLID BAR AND SLEEVE MAY BE REPLACE BY TUBE WITH INTERNAL THREAD.

2. **JOINT SPACING WILL BE A MAXIMUM OF 10'-0" APART. SEE SPECIFICATIONS FOR LOCATION AND DESCRIPTION OF TREATMENT FOR THE TYPES OF JOINTS USED. CONCRETE PAVEMENT, JOINTS SHALL MATCH PAVEMENT JOINTS.**

3. **ALLOW 4" Ø HOLES IN MEDIAN FOR SIGNS, SPACED AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.**

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**Maryland Department of Transportation**

**STATE HIGHWAY ADMINISTRATION**

**STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES**

**STANDARD MONOLITHIC CONCRETE MEDIAN TYPE 'C'**

**STANDARD NO.** MD 645.03
TYPICAL SECTION

REINFORCEMENT:
VERTICAL REINFORCEMENT SHALL BE NO. 4 BARS BENT AND SPACED AT 18" C/C. HORIZONTAL REINFORCEMENT SHALL BE 2 CONTINUOUS NO. 5 BARS SPACED AS SHOWN. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD, EXTRA DIAGONAL NO. 4 BARS ARE REQUIRED. SEE STD. MD 648.05 FOR THE DIAGONAL BAR DETAILS.

SEE NOTE 4

ROUGHEN CONSTRUCTION JOINT
BARRIER FOOTER

2'-3"
1'-5"
2'-0"
7"
5"
4"
6"
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TYPICAL SECTION

THIS BARRIER IS TO BE USED WHEN THE BARRIER IS FREE STANDING (NO BACKING) AT THE TOP OF FILL SLOPES.
(SEE STD. MD 648.01 FOR CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1 WITH EARTH BACKING AT TOP OF FILL SLOPES)
(SEE STD. MD 648.03 FOR CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3 FUNCTIONING AS A RETAINING WALL)

NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD. IN EITHER CASE THE FOOTER AND THE BARRIER SHALL BE CAST SEPARATELY.
2. THE BARRIER AND FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 (4500 PSI) CONTINUOUSLY PLACED.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. VERTICAL NO. 4 BARS SHALL BE GRADE 40.
4. THE VERTICAL WALL FOR THE FOOTER ADJACENT TO THE PAVEMENT SHALL BE FORMED TO PROVIDE A NEAT VERTICAL FACE FOR THE PAWEMENT. THE FOOTER WALL MAY BE FORMED OR THE CONCRETE PLACED AGAINST THE VERTICAL EARTH SIDE IF APPROVED BY THE ENGINEER. NO ADDITIONAL COMPENSATION FOR ADDITIONAL CONCRETE WILL BE PAID IF CONCRETE IS PLACED AGAINST THE EARTH WALL. THE BARRIER FOOTER SHALL HAVE CONSTRUCTION JOINTS TO COINCIDE WITH THE BARRIER JOINTS. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAWEMENT. THE FOOTER FORM AT THE PAWEMENT EDGE SHALL BE REMOVED BEFORE PLACING PAWEMENT.
5. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF THE CONSTRUCTION METHOD.
6. COST OF THE EXCAVATION AND CONCRETE FOR THE FOOTER (FORMED OR NON-FORMED) AND ALL REINFORCEMENT SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 2.
7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".
8. CONDUIT: IF REQUIRED REFER TO STD. MD 648.06 FOR PROPOSED LOCATION.

JERSEY SHAPE - FOR REPLACEMENT PURPOSES ONLY
TYPICAL SECTION

This barrier is to be used when the barrier is functioning as a retaining wall at the bottom of the cut or the toe of fill slopes. (See Std. MD 648.01 for concrete traffic barrier single face Type 1 with earth backing at top of fill slopes)

(See Std. MD 648.02 for concrete traffic barrier single face Type 2 free standing at top of fill slopes)

NOTES

1. The barrier and footer shall be cast using the fixed form or the slip form construction method. In either case the footer and the barrier shall be cast separately.

2. The barrier and footer shall be constructed using concrete mix No. 6 (4500 psi) continuously placed.

3. All reinforcement bars, including ends, shall be epoxy coated. Bars shall be bent before applying epoxy coating. All bar laps to be 30 bar diameters. TIE bars together. Vertical No. 4 bars shall be grade 40.

4. The vertical wall for the footer adjacent to the pavement shall be formed to provide a neat vertical face for the pavement. The footer rear vertical wall may be formed or the concrete placed against the vertical earth side if approved by the engineer. No additional compensation for additional concrete will be paid if concrete is placed against the earth wall. The barrier footer shall have construction joints to coincide with the barrier joints. The contractor has the option to construct the barrier footer and barrier after construction of the pavement. The footer form at the pavement edge shall be removed before placing pavement.

5. Limits of excavation: When the barrier is at the bottom of a cut slope the excavation limits shall be the lines indicating the barrier footer and a vertical line extending from the heel of the footer to its intersection with the cut slope. When the barrier is at the toe of a fill slope the excavation limits shall be the lines indicating the barrier footer.

6. Spacing of contraction joints shall be 20 feet regardless of the construction method.

7. Cost of the concrete footer (formed or non-formed), reinforcement, drainage appurtenances, excavation, geotextile, and backfilling using borrow excavation shall be incidental to the contract unit price per linear foot for concrete traffic barrier single face Type 3.

8. Tolerances in dimensions shown shall be within 1/4.

9. Conduit: If required refer to Std. MD 648.06 for proposed location.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
CONCRETE JERSEY SHAPE TRAFFIC BARRIER SINGLE FACE TYPE 3 (BOTTOM OF CUT OR TOE OF FILL)
STANDARD NO. MD 648.03
NOTES

1. THE PREFABRICATED LONGITUDINAL EDGE DRAIN MAY BE USED AS AN ALTERNATE DRAINAGE SYSTEM IN LIEU OF THE DRAINAGE SHOWN ON STD. MD 648.03 CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3 (BOTTOM OF CUT OR TOE OF FILL).

2. COST OF THE PREFABRICATED LONGITUDINAL EDGE DRAIN IS INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3.

3. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".

4. FOR LIMITS OF EXCAVATION REFER TO STD. MD 648.03 NOTE 5.

JERSEY SHAPE – FOR REPLACEMENT PURPOSES ONLY
NOTES

1. THE BARRIER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 CONTINUOUSLY PLACED.
2. THE BARRIER SHALL BE CAST USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 10 BAR DIAMETERS. TIE BARS TOGETHER. VERTICAL NO. 4 BARS SHALL GRADE 40.
4. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.
5. COST OF LABOR, ALL REINFORCEMENT, DRILLED HOLES, GROUT, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE TRAFFIC BARRIER SINGLE FACE CONSTRUCTED ON EXISTING CONCRETE PAVEMENT.
6. TO BE USED AS FREE STANDING BARRIER ONLY (NO BACKING).
7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN ¼”.
8. CONDUIT: IF REQUIRED REFER TO STD. MD 648.06 FOR LOCATION.
DIAGONAL NO. 4 BARS PLACED AND TIED AS SHOWN FOR THE LENGTH OF THE BARRIER.

CONTINUOUS NO. 5 BARS

TIE

TIE

DIAGONAL NO. 4 BAR

BEGINNING OR END OF BARRIER

VARIIES MAX. 18" C/C MIN. 2" CL.

% OF BARRIER

ELEVATION

SECTION A-A

NOTES

1. APPLICABLE TO SLIP FORM CONSTRUCTION METHOD ONLY.
2. FOR BARRIER TYPES 1, 2, 3 AND BARRIERS CONSTRUCTED ON EXISTING RIGID PAVEMENT.
3. DIAGONAL NO.4 BARS SHALL BE GRADE 40.

JERSEY SHAPE – FOR REPLACEMENT PURPOSES ONLY
NOTES

1. THE JUNCTION BOXES SHALL BE LOCATED EVERY 750 FEET OR AS DIRECTED BY THE ENGINEER.
2. THE COST OF THE CONDUITS, JUNCTION BOXES, AND ALL APPURTENANCES SHALL BE INCLUDED IN THE COST OF THE BARRIER UNLESS OTHERWISE SPECIFIED.
3. IN INSTANCES WHERE THE BARRIER CONNECTS TO A BRIDGE PARAPET CONTAINING CONDUIT SHALL ALIGN.
4. CAP CONDUIT, COVER WITH 1" CONCRETE AND MARK FOR FUTURE REFERENCE, OR PROVIDE END TREATMENT AS DIRECTED BY THE ENGINEER OR AS SHOWN ON THE PLANS.
5. REFER TO SECTION BOS FOR CONDUIT, ETC.

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STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
CONDUIT AND JUNCTION BOX LOCATION
FOR CONCRETE JERSEY SHAPE TRAFFIC BARRIER SINGLE FACE - ALL TYPES

STANDARD NO. MD 648.06
1. The traffic barrier end transition and barrier footer shall be constructed using the fixed form method. See STDs. MD 648.01, MD 648.02, and MD 648.03 for barrier footer details. The barrier and footer shall be cast separately. Monolithic placement not permitted.

2. The traffic barrier end transition and barrier footer shall be constructed using concrete mix No. 6 (4500 psi).

3. All reinforcement bars, including ends and ties shall be epoxy coated. All bar laps to be 30 bar diameters. Tie bars together.

4. This traffic barrier end transition is prohibited when the design speed is 45 mph or greater. The Engineer must determine the type of end treatment required for design speeds over 45 mph.

5. The cost of the barrier end transition toe, reinforcement, drilled holes, grout, labor, tools, equipment, etc., shall be incidental to the contract unit price per each for the concrete traffic barrier single face end transition.

6. Tolerances in dimensions shown shall be within 1/4".
REINFORCEMENT:
VERTICAL REINFORCEMENT SHALL BE NO. 4 BARS BENT AND SPACED AT 18" C.C. HORIZONTAL REINFORCEMENT SHALL BE 3 CONTINUOUS NO. 5 BARS SPACED AS SHOWN. SEE NOTE 4.

CONSTRUCTION ON EXISTING RIGID PAVEMENT
(BARRIER FOOTER IS REQUIRED FOR EXISTING FLEXIBLE PAVEMENT)

NEW CONSTRUCTION

NOTES
1. THE BARRIER AND FOOTER SHALL BE CAST USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD. IN EITHER CASE THE FOOTER AND BARRIER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED.
2. THE BARRIER AND FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 (4500 PSI) CONTINUOUSLY PLACED.
3. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORMS, IF REQUIRED, SHALL BE REMOVED BEFORE PLACING PAVEMENT.
4. WHEN THE BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD EXTRA DIAGONAL NO. 4 REINFORCEMENT BARS ARE REQUIRED. SEE STD. MD 648.15 FOR THE DIAGONAL BAR ARRANGEMENT DETAILS.
5. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. ALL BAR LAPS TO BE 20 BAR DIAMETERS. TIE BARS TOGETHER. VERTICAL NO. 4 BARS SHALL BE GRADE 40.
6. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.
7. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT AND EXCAVATION SHALL BE INCIDENTAL TO BE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE MEDIAN TRAFFIC BARRIER TYPE A.
8. WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT THE COST OF ALL REINFORCEMENT, DRILLED HOLES, GROUT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE MEDIAN TRAFFIC BARRIER TYPE A.
9. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".

JERSEY SHAPE – FOR REPLACEMENT PURPOSES ONLY

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CONCRETE JERSEY SHAPE MEDIAN TRAFFIC BARRIER TYPE A

STANDARD NO. MD 648.12
TYPICAL SECTION

NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD. IN EITHER CASE THE FOOTER AND BARRIER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED.

2. THE BARRIER AND FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO.6 (4500 PS) CONTINUOUSLY PLACED.

3. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORMS, IF REQUIRED, SHALL BE REMOVED BEFORE PLACING PAVEMENT.

4. WHEN THE BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD EXTRA DIAGONAL NO. 4 REINFORCEMENT BARS ARE REQUIRED. SEE STD. MD 648.15 FOR THE DIAGONAL BAR ARRANGEMENT DETAILS.

5. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. ALL BAR LAPS TO BE 3D BAR DIAMETERS. TIE BARS TOGETHER. VERTICAL NO.4 BARS SHALL BE GRADE 40.

6. SPACING OF CONTRACTION JOINTS SHALL BE 30 FEET REGARDLESS OF CONSTRUCTION METHOD.

7. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE MEDIAN TRAFFIC BARRIER TYPE B.

8. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".

JERSEY SHAPE - FOR REPLACEMENT PURPOSES ONLY

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
CONCRETE JERSEY SHAPE MEDIAN TRAFFIC BARRIER TYPE B

STANDARD NO. MD 648.13
NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD. IN EITHER CASE OF THE FOOTER AND BARRIER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED.

2. THE BARRIER AND FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 (4500 PSI) CONTINUOUSLY PLACED.

3. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORMS, IF REQUIRED, SHALL BE REMOVED BEFORE PAVING PAVEMENT.

4. WHEN THE BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD EXTRA DIAGONAL NO. 4 REINFORCEMENT BARS ARE REQUIRED. SEE STD. NO. 648-15 FOR THE DIAGONAL BAR ARRANGEMENT DETAILS.

5. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. VERTICAL NO. 4 BARS SHALL BE GRADE 40.

6. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.

7. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT, AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE MEDIAN TRAFFIC BARRIER TYPE C.

8. WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT THE COST OF ALL REINFORCEMENT, DRILLED HOLES, CEMENT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE MEDIAN TRAFFIC BARRIER TYPE C.

9. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4"
NOTES

1. APPLICABLE TO SLIP FORM CONSTRUCTION METHOD ONLY.  
2. FOR BARRIER TYPES A, B & C AND BARRIERS CONSTRUCTED ON EXISTING RIGID PAVEMENT. 
3. DIAGONAL NO. 4 BARS SHALL BE GRADE 40.

JERSEY SHAPE – FOR REPLACEMENT PURPOSES ONLY
NORMAL MEDIAN BARRIER  
SEE STD. MD 648.12

BARRIER END  
TRANSITION

FOOTER

END  
TRANSITION
TOE

ISOMETRIC

PLAN

TOP OF BARRIER FOOTER
TRAFFIC BARRIER END TRANSITION TOE POURED MONOLITHIC WITH THE TRAFFIC BARRIER END TRANSITION

BARRIER FOOTER (SEE NOTE 1)

ELEVATION

ROUGHEN CONSTR.  
JOINT. (TYPICAL FOR  
CONSTR. ON BARRIER  
FOOTER & EXIST.  
RIGID PAVEMENT)

NOTE:

1. THE TRAFFIC BARRIER END TRANSITION SHALL BE CONSTRUCTED USING THE FIXED FORM METHOD.  
   NO FOOTER IS REQUIRED WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT.  
   BARRIER AND FOOTER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED.  
   SEE STD. MD 648.13 FOR BARRIER FOOTER DETAILS.

2. THE TRAFFIC BARRIER END TRANSITION AND BARRIER FOOTER SHALL BE CONSTRUCTED USING  
   CONCRETE MIX NO. 6 (4500 psi).

3. ALL REINFORCEMENT BARS, INCLUDING ENDS AND TIES, SHALL BE EPOXY COATED. ALL BARS  
   LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER.

4. THIS TRAFFIC BARRIER END TRANSITION IS PROHIBITED WHEN THE DESIGN SPEED IS  
   45 MPH OR GREATER. THE ENGINEER MUST DETERMINE THE TYPE OF END TREATMENT  
   FOR DESIGN SPEEDS OVER 45 MPH.

5. COST OF THE CONCRETE BARRIER FOOTER (IF REQUIRED) SHALL BE INCIDENTAL TO THE CONTRACT  
   UNIT PRICE PER EACH FOR THE CONCRETE MEDIAN TRAFFIC BARRIER END TRANSITION.

6. WHEN THE BARRIER END TRANSITION IS CONSTRUCTED ON EXISTING RIGID PAVEMENT THE COST OF  
   ROUGHENING THE PAVEMENT SURFACE, EXCAVATION FOR TRANSITION TOE, REINFORCEMENT, DRILLED  
   HOLES, GROUT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT  
   PRICE PER EACH FOR THE ITEM SPECIFIED IN NOTE 5.

7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN ³⁄₄".

REINFORCEMENT STEEL DETAILS

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

CONCRETE JERSEY SHAPE MEDIAN TRAFFIC BARRIER END TRANSITION

STANDARD NO.  MD 648.18
NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING CONCRETE MIX NO. 6 (4500 PSI). MONOLITHIC PLACEMENT NOT PERMITTED.

2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. FOOTER FORM SHALL BE REMOVED BEFORE PLACING PAVEMENT.

3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER.

4. COST OF CONCRETE FOOTER, ALL REINFORCEMENT, AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE MEDIAN TRAFFIC BARRIER TYPE D.

5. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".

JERSEY SHAPE – FOR REPLACEMENT PURPOSES ONLY
NOTES
1. BARRIER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 (4500 PSI) AND THE FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 2 (3000 PSI). BARRIER AND FOOTER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED.
2. ALL LONGITUDINAL BARS SHOWN WITHOUT SIZE SPECIFIED SHALL BE NO. 4 BARS AT 1'-6" C/C.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. IT IS BONNY TO BE AT 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615, GRADE 60.
4. SEE STANDARD NO. MD 648.26 FOR CONTRACTION AND EXPANSION JOINTS.
5. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT, DRAINAGE APPURTEINCES, JOINT MATERIAL, -EXCAVATION, GEOTEXTILE AND BACKFILLING SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR CONCRETE MEDIAN TRAFFIC BARRIER TYPE E.
6. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".

JERSEY SHAPE - FOR REPLACEMENT PURPOSES ONLY

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

CONCRETE JERSEY SHAPE MEDIAN TRAFFIC BARRIER TYPE E

STANDARD NO. MD 648.24
NOTES

1. EXPANSION JOINTS SHALL BE PLACED AT THE END OF EACH DAYS CONCRETE PLACEMENT REGARDLESS OF LENGTH AND REGARDLESS OF THE CONSTRUCTION METHOD.

2. HORIZONTAL REINFORCEMENT SHALL NOT PASS THROUGH CONTRACTION OR EXPANSION JOINTS.

3. SEE STANDARD NO 648.24 FOR DETAILS OF CONCRETE MEDIAN TRAFFIC BARRIER TYPE E.

4. JOINT MATERIAL SHALL BE HELD IN PLACE BY NAILS, WATERPROOF ADHESIVE OR OTHER MEANS, AS APPROVED BY THE ENGINEER.

JERSEY SHAPE – FOR REPLACEMENT PURPOSES ONLY
NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO. 6 (4500 PSI).

2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORMS, IF USED, SHALL BE REMOVED IF THE BARRIER AND FOOTER ARE CONSTRUCTED BEFORE THE PAVEMENT.

3. WHEN THE BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO. 4 REINFORCEMENT BARS ARE REQUIRED. SEE STD. MD 648.44-04.

4. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615, GRADE 60.

5. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.

6. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT, AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 34 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER.

7. WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT THE COST OF ALL REINFORCEMENT, DRILLED HOLES, GROUT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE PRICE PER LINEAR FOOT FOR THE ITEM SPECIFIED IN NOTE 6.

8. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".
NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO. 6 (4500 PSI).

2. THE BARRIER FOOTER FORMS SHALL BE REMOVED BEFORE PLACING PAVEMENT.

3. WHEN THE BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD, DIAGONAL NO. 4 REINFORCEMENT BARS ARE REQUIRED. SEE STD. MD 648.44-04.

4. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL REINFORCEMENT BARS SHALL BE ASTM A 615, GRADE 60.

5. SPACING OF CONTRACT JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.

6. COST OF CONCRETE FOOTER, ALL REINFORCEMENT, AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 34 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER BIFURCATED FROM 6 INCH TO 1 FOOT 6 INCHES.

7. WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT THE COST OF ALL REINFORCEMENT, DRILLED HOLES, GROUT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE PRICE PER LINEAR FOOT FOR THE ITEM SPECIFIED IN NOTE 6.

8. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".

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STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
34 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER BIFURCATED
0 INCH TO 1 FOOT 6 INCHES
STANDARD NO. MD 648.33-01
1. The barrier and footer shall be cast separately using the fixed form or slip form construction method using concrete mix no. 6 (4500 psi).

2. The barrier footer forms shall be removed before placing pavement.

3. When the barrier is constructed using the slip form method diagonal no. 4 reinforcement bars are required.

   See MD. MD 648.44-04.

4. All reinforcement bars, including ends, shall be epoxy coated. All bars shall be bent before applying epoxy coating. All bar laps to be 30 bar diameters. Tie bars together. All bars shall be ASTM A 615, grade 60.

5. Spacing of contraction joints shall be 20 feet regardless of construction method.

6. Cost of the concrete footer, all reinforcement, and excavation shall be incidental to the contract unit price per linear foot for 34 inch F shape concrete median traffic barrier bifurcated from 1 foot 6 inches to 4 feet 0 inches.

7. When the barrier is constructed on existing rigid pavement the cost of all reinforcement, drilled holes, grout, labor, tools equipment, etc., shall be incidental to the price per linear foot for the item specified in note 6.

8. Tolerances in dimensions shown shall be within 1/4"
NOTES

1. BARRIER SHALL BE CONSTRUCTED USING CONCRETE MIX NO.6 (4500 PSI) AND THE FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO.2 (3000 PSI). BARRIER AND FOOTER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED.

2. ALL LONGITUDINAL BARS SHOWN WITHOUT SIZE SPECIFIED SHALL BE NO.4 BARS AT 1-6" C/C.

3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BARS SHALL BE BENT BEFORE APPLYING EPOXY COATING. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER.

4. SEE STANDARD MD 648.44-05 FOR CONTRACTION AND EXPANSION JOINTS.

5. COST OF THE CONCRETE FOOTER, REINFORCEMENT, DRAINAGE APPURTEANCES, GEOTEXTILE, LABOR, TOOLS, EQUIPMENT, JOINT MATERIAL, EXCAVATION, BACKFILL, AND ALL INCIDENTALS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 34 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER BIFURCATED 4 FEET 0 INCHES TO 8 FEET 0 INCHES.

6. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".

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STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
34 INCH F SHAPE CONCRETE MEDIAN
TRAFFIC BARRIER BIFURCATED
4 FEET 0 INCHES TO 8 FEET 0 INCHES
STANDARD NO. MD 648.33-03
NOTES

1. THE TRAFFIC BARRIER END TRANSITION SHALL BE CONSTRUCTED USING THE FIXED FORM METHOD. NO FOOTER IS REQUIRED WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT. BARRIER AND FOOTER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED. SEE STD. MD 648.44 FOR BARRIER FOOTER DETAILS.

2. THE TRAFFIC BARRIER END TRANSITION AND BARRIER FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 (4500 PSI).

3. ALL REINFORCEMENT BARS, INCLUDING ENDS AND TIES, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER.

4. THIS TRAFFIC BARRIER END TRANSITION IS PROHIBITED WHEN THE DESIGN SPEED IS 45 MPH OR GREATER. THE ENGINEER MUST DETERMINE THE TYPE OF END TREATMENT FOR DESIGN SPEEDS OVER 45 MPH.

5. COST OF THE CONCRETE BARRIER FOOTER (IF REQUIRED) SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER EACH FOR THE 34 INCH OR 42 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER END TRANSITION.

6. WHEN THE BARRIER END TRANSITION IS CONSTRUCTED ON EXISTING RIGID PAVEMENT THE COST OF ROUGHENING THE PAVEMENT SURFACE, EXCAVATION FOR TRANSITION TOE, REINFORCEMENT, DRILLED HOLES, GROUT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER EACH FOR THE ITEM SPECIFIED IN NOTE 5.

7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN \( \pm \frac{1}{4} \) INCH.
1. The barrier and footer shall be cast separately using the fixed form or the slip form construction method using concrete mix No. 6 (4500 psi).

2. The contractor has the option to construct the barrier footer and barrier after construction of the pavement. The footer forms, if used, shall be removed if the barrier and footer are constructed before the pavement.

3. When the barrier is constructed using the slip form method diagonal No. 4 reinforcement bars are required. See Std. No. 648.44-04.

4. All reinforcement bars, including ends, shall be epoxy coated. All bar laps to be 30 bar diameters. Tie bars together. All reinforcement bars shall be ASTM A 615, Grade 60.

5. Spacing of contraction joints shall be 20 feet regardless of construction method.

6. Cost of the concrete footer, all reinforcement, and excavation shall be incidental to the contract unit price per linear foot for 42 inch f shape concrete median traffic barrier.

7. When the barrier is constructed on existing rigid pavement the cost of all reinforcement, drilled holes, grout, labor, tools, equipment, etc., shall be incidental to the price per linear foot for the item specified in note 6.

8. Tolerances in dimensions shown shall be within ±4".

9. When the barrier is to be constructed on existing flexible pavement the width for the concrete footer shall be as indicated. The cost for all saw cuts, pavement removal, and all incidentals and labor shall be incidental to the price per linear foot for the item specified in note 6.

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STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

42 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER

STANDARD NO. MD 648.44
NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO. 6 (4500 PSI).

2. THE BARRIER FOOTER AND BARRIER FORMS SHALL BE REMOVED BEFORE PLACING PAVEMENT.

3. WHEN THE BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD, DIAGONAL NO. 4 REINFORCEMENT BARS ARE REQUIRED. SEE STD. MD 648.44-04.

4. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER.

5. REINFORCEMENT BARS SHALL BE ASTM A 615, GRADE 60.

6. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.

7. WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT, THE COST OF ALL REINFORCEMENT, DRILLED HOLES, GROUT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 42 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER BIFURCATED 0 INCHES TO 1 FOOT 6 INCHES.

8. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".

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STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
42 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER BIFURCATED 0 INCH TO 1 FOOT 6 INCHES
STANDARD NO. MD 648.44-01
NOTES
1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FROM CONSTRUCTION METHOD USING CONCRETE MIX NO. 6 (4500 PSI).
2. THE BARRIER FOOTER AND BARRIER FORMS SHALL BE REMOVED BEFORE PLACING PAVEMENT.
3. WHEN THE BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO. 4 REINFORCEMENT BARS ARE REQUIRED. SEE STD. MD 648.44-04.
4. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL REINFORCEMENT BARS SHALL BE ASTM A 615, GRADE 60.
5. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.
6. COST OF CONCRETE FOOTER, ALL REINFORCEMENT, AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 42 INCH F SHAPE CONCRETE MEDIUM TRAFFIC BARRIER BIFURCATED 1 FOOT 6 INCHES TO 4 FEET 0 INCHES.
7. WHEN THE BARRIER IS CONSTRUCTED ON EXISTING RIGID PAVEMENT THE COST OF ALL REINFORCEMENT, DRILLED HOLES, GROUT, LABOR, TOOLS, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE PRICE PER LINEAR FOOT FOR THE ITEM SPECIFIED IN NOTE 6.
8. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
42 INCH F SHAPE CONCRETE MEDIAN TRAFFIC BARRIER BIFURCATED 1 FOOT 6 INCHES TO 4 FEET 0 INCHES
STANDARD NO. MD 648.44-02
1. BARRIER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 (4500 PSI) AND THE FOOTER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 2 (3000 PSI). BARRIER AND FOOTER SHALL BE CAST SEPARATELY. MONOLITHIC PLACEMENT NOT PERMITTED.

2. ALL LONGITUDINAL BARS SHOWN WITHOUT SIZE SPECIFIED SHALL BE NO. 4 BARS AT 1'-6" C/C.

3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615, GRADE 60.

4. SEE STANDARD MD 648.44-05 FOR CONTRACTION AND EXPANSION JOINTS.

5. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT, DRAINAGE APPURTENANCES, GEOTEXTILE, JOINT MATERIAL, EXCAVATION, BACKFILL, LABOR, TOOLS, EQUIPMENT, ETC., AND ALL INCIDENTALS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 42 INCH F SHAPE CONCRETE MEDIUM TRAFFIC BARRIER BIFURCATED 4 FEET 0 INCHES TO 8 FEET 0 INCHES.

6. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
42 INCH F SHAPE CONCRETE MEDIUM TRAFFIC BARRIER BIFURCATED
4 FEET 0 INCHES TO 8 FEET 0 INCHES
STANDARD NO. MD 648.44-03
NOTES

1. APPLICABLE TO SLIP FORM CONSTRUCTION METHOD ONLY.
2. REFER TO STANDARDS FOR SPACING OF VERTICAL AND HORIZONTAL REINFORCEMENT.
3. DIAGONAL NO.4 BARS SHALL BE ASTM A 615, GRADE 60.
4. ALL REINFORCEMENT BARS, INCLUDING ENDS AND TIES, SHALL BE EPOXY COATED.
1. Expansion joints shall be placed at the end of each day's concrete placement regardless of length and regardless of the construction method.

2. Horizontal reinforcement shall not pass through contraction or expansion joints.

3. See standard no. 648.44-03 for 42 inch F shape concrete median traffic barrier bifurcated 4 feet 0 inches to 8 feet 0 inches.

4. Joint material shall be held in place by nails, waterproof adhesive or other means, as approved by the engineer.
TYPICAL SECTION

TO BE USED WITH EARTH BACKING AT THE TOP OF FILL SLOPES.
(SEE STD. MD 648.46 FOR 34" TYPE F CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 2 FREE STANDING AT TOP OF FILL SLOPES)
(SEE STD. MD 648.47 FOR 34" TYPE F CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3 FUNCTIONING AS A RETAINING WALL)

NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO. 6 CONTINUOUSLY PLACED.

2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORM AT THE PAVEMENT EDGE SHALL BE REMOVED BEFORE PLACING PAVEMENT.

3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED, ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615 GRADE 60.

4. THE FOOTER REAR VERTICAL WALL SHALL BE FORMED OR THE CONCRETE PLACED AGAINST THE VERTICAL EARTH SIDE IF APPROVED BY THE ENGINEER. NO ADDITIONAL COMPENSATION FOR ADDITIONAL CONCRETE WILL BE PAID IF CONCRETE IS PLACED AGAINST THE EARTH. THE BARRIER FOOTER SHALL HAVE CONSTRUCTION JOINTS TO COINCIDE WITH THE BARRIER JOINTS.

5. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.

6. COST OF THE CONCRETE FOOTER. ALL REINFORCEMENT AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 34 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1. FILL MATERIAL IN BACK OF THE BARRIER IS INCLUDED IN THE EMBANKMENT QUANTITY.

7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".

8. CONDUITS, IF REQUIRED, REFER TO STD. MD 648.50 FOR LOCATION.

9. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO. 4 BARS ARE REQUIRED. SEE STD. MD 648.49.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
34 INCH F SHAPE
CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1 (WITH EARTH BACKING IN FILL)
STANDARD NO. MD 648.45
TYPICAL SECTION

TO BE USED WHEN THE BARRIER IS FREE STANDING (NO BACKING) AT THE TOP OF FILL SLOPES.
(SEE STD. MD 648.45 FOR 34" F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1 WITH EARTH BACKING AT TOP OF FILL SLOPES)
(SEE STD. MD 648.47 FOR 34" F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3 FUNCTIONING AS A RETAINING WALL)

NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO.6 CONTINUOUSLY PLACED.

2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT.

3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 3D BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615 GRADE 60.

4. THE REAR VERTICAL WALL SHALL BE FORMED OR THE CONCRETE PLACED AGAINST THE VERTICAL EARTH SIDE IF APPROVED BY THE ENGINEER. NO ADDITIONAL COMPENSATION FOR ADDITIONAL CONCRETE WILL BE PAID IF CONCRETE IS PLACED AGAINST THE EARTH. THE BARRIER FOOTER SHALL HAVE CONSTRUCTION JOINTS TO COINCIDE WITH THE BARRIER JOINTS.

5. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF THE CONSTRUCTION METHOD.

6. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 34 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 2.

7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".

8. CONDUIT, IF REQUIRED REFER TO STD. MD 648.50 FOR LOCATION.

9. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO.4 BARS ARE REQUIRED. SEE STD. MD 648.49.
TO BE USED WHEN THE BARRIER IS FUNCTIONING AS A RETAINING WALL AT THE BOTTOM OF THE CUT OR FILL SLOPES.
(SEE STD. MD 648.45 FOR 34" F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1 WITH EARTH BACKING AT TOP OF FILL SLOPES)
(SEE STD. MD 648.46 FOR 34" F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 2 FREE STANDING AT TOP OF FILL SLOPES)

NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO. 6 CONTINUOUSLY PLACED.
2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORMS, IF USED, SHALL BE REMOVED BEFORE PLACING PAVEMENT.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615 GRADE 60.
4. THE REAR VERTICAL WALL SHALL BE FORMED OR THE CONCRETE PLACED AGAINST THE VERTICAL EARTH SIDE IF APPROVED BY THE ENGINEER. NO ADDITIONAL COMPENSATION FOR ADDITIONAL CONCRETE WILL BE PAID IF CONCRETE IS PLACED AGAINST THE EARTH. THE BARRIER FOOTER SHALL HAVE CONSTRUCTION JOINTS TO COINCIDE WITH THE BARRIER JOINTS.
6. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF THE CONSTRUCTION METHOD.
7. COST OF THE CONCRETE FOOTER (FORMED OR NON-FORMED), REINFORCEMENT, DRAINAGE APPURTENANCES, EXCAVATION, GEOTEXTILE, AND BACKFILLING USING SELECT BORROW SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 34 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3.
8. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".
9. CONDUITS, IF REQUIRED REFER TO STD. MD 648.50.
10. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO. 4 BARS ARE REQUIRED. SEE STD. MD 648.49.
NOTES

1. THE PREFABRICATED LONGITUDINAL EDGE DRAIN MAY BE USED AS AN ALTERNATE DRAINAGE SYSTEM IN LIEU OF THE DRAINAGE SHOWN ON STD. MD 648.47 34 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3 (BOTTOM OF CUT OR TOE OF FILL).
2. COST OF THE PREFABRICATED LONGITUDINAL EDGE DRAIN IS INCIDENTAL TO THE PRICE PER LINEAR FOOT FOR THE ITEM IN NOTE 7 STD. MD 648.47.
3. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/16".
4. FOR LIMITS OF EXCAVATION REFER TO STD. MD 648.47 NOTE 5.
NOTES

1. THE BARRIER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 CONTINUOUSLY PLACED.
2. THE BARRIER SHALL BE CAST USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615 GRADE 60.
4. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.
5. COST OF LABOR, ALL REINFORCEMENT, DRILLED HOLES, GROUT, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 34 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE CONSTRUCTED ON EXISTING CONCRETE PAVEMENT.
6. TO BE USED AS FREE STANDING BARRIER ONLY (NO BACKING).
7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".
8. CONDUIT: IF REQUIRED REFER TO STD. MD 648.50 FOR LOCATION.
9. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD, DIAGONAL NO. 4 BARS ARE REQUIRED. SEE STD. MD 648.49.
NOTES

1. APPLICABLE TO SLIP FORM CONSTRUCTION METHOD ONLY.
2. FOR BARRIER TYPES 1, 2, 3 AND BARRIERS CONSTRUCTED ON EXISTING RIGID PAVEMENT.
3. DIAGONAL NO. 4 BARS SHALL BE ASTM A 615 GRADE 60.
4. ALL REINFORCEMENT BARS INCLUDING ENDS AND TIES SHALL BE EPOXY COATED.
5. REFER TO STANDARDS FOR SPACING OF VERTICAL AND HORIZONTAL REINFORCEMENT.
1. The junction boxes shall be located every 750 feet or as directed by the engineer.
2. The cost of the conduits, junction boxes, and all appurtenances shall be included in the cost of the barrier unless otherwise specified.
3. In instances where the barrier connects to a bridge parapet containing conduit shall align.
4. Cap conduit, cover with 1" concrete and mark for future reference, or provide end treatment as directed by the engineer or as shown on the plans.
5. Refer to Section 805 for conduit, etc.
1. **The Traffic Barrier End Transition and Barrier Footer Shall be Constructed Using the Fixed Form Method. See Stds. MD 648.45, MD 648.46, MD 648.47, MD 648.52, MD 648.53, and MD 648.54 for Barrier Footer Details. The Barrier and Footer Shall be Cast Separately. Monolithic Placement Not Permitted.**

2. **The Traffic Barrier End Transition and Barrier Footer Shall be Constructed Using Concrete Mix No. 6 (4500 psi).**

3. **All Reinforcement Bars, Including Ends, and Ties Shall Be Epoxy Coated. All Bar Laps to Be 30 Bar Diameters. Tie Bars Together.**

4. **This Traffic Barrier End Transition Is Prohibited When the Design Speed is 45 MPH or Greater. The Engineer Must Determine the Type of End Treatment Required for Design Speeds Over 45 MPH.**

5. **The Cost of the Barrier End Transition Toe, Reinforcement, Drilled Holes, Grout, Labor, Tools, Equipment, etc., Shall be Incidental to the Contract Unit Price Per Each for the 34 Inch or 42 Inch F Shape Concrete Traffic Barrier Single Face End Transition.**

6. **Tolerances in Dimensions Shown Shall Be Within 1/8.”**

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**Maryland Department of Transportation**

**State Highway Administration**

**Standards for Highways and Incidental Structures**

**34 Inch and 42 Inch F Shape Concrete Traffic Barrier Single Face End Transition**

**Standard No. MD 648.51**
TO BE USED WITH EARTH BACKING AT THE TOP OF FILL SLOPES.
(SEE STD. MD 648.02 FOR 42" TYPE F CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 2 FREE STANDING AT TOP OF FILL SLOPES)
(SEE STD. MD 648.03 FOR 42" TYPE F CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3 FUNCTIONING AS A RETAINING WALL)

NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO.6 CONTINUOUSLY PLACED.

2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORM AT THE PAVEMENT EDGE SHALL BE REMOVED BEFORE PLACING PAVEMENT.

3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615 GRADE 60.

4. THE FOOTER REAR VERTICAL WALL SHALL BE FORMED OR THE CONCRETE PLACED AGAINST THE VERTICAL EARTH SIDE IF APPROVED BY THE ENGINEER. NO ADDITIONAL COMPENSATION FOR ADDITIONAL CONCRETE WILL BE PAID IF CONCRETE IS PLACED AGAINST THE EARTH. THE BARRIER FOOTER SHALL HAVE CONSTRUCTION JOINTS TO COINCIDE WITH THE BARRIER JOINTS.

5. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.

6. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 42 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1. FILL MATERIAL IN BACK OF THE BARRIER IS INCLUDED IN THE EMBANKMENT QUANTITY.

7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".

8. CONDUIT, IF REQUIRED, REFER TO STD. MD 648.50 FOR LOCATION.

9. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO.4 BARS ARE REQUIRED. SEE STD. MD 648.49.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
42 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1 (WITH EARTH BACKING IN FILL)
STANDARD NO. MD 648.52
TYPICAL SECTION

TO BE USED WHEN THE BARRIER IS FREE STANDING (NO BACKING) AT THE TOP OF FILL SLOPES.
(SEE STD. MD 648.52 FOR 42" F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1 WITH EARTH BACKING AT TOP OF FILL SLOPES)
(SEE STD. MD 648.54 FOR 42" F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3 FUNCTIONING AS A RETAINING WALL)

NOTES

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO.6 CONTINUOUSLY PLACED.
2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT. THE FOOTER FORMS, IF USED, SHALL BE REMOVED BEFORE PLACING PAVEMENT.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615 GRADE 60.
4. THE REAR VERTICAL WALL SHALL BE FORMED OR THE CONCRETE PLACED AGAINST THE VERTICAL EARTH SIDE IF APPROVED BY THE ENGINEER. NO ADDITIONAL COMPENSATION FOR ADDITIONAL CONCRETE WILL BE PAID IF CONCRETE IS PLACED AGAINST THE EARTH. THE BARRIER FOOTER SHALL HAVE CONSTRUCTION JOINTS TO COINCIDE WITH THE BARRIER JOINTS.
5. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF THE CONSTRUCTION METHOD.
6. COST OF THE CONCRETE FOOTER, ALL REINFORCEMENT AND EXCAVATION SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 42 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 2.
7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 4".
8. CONDUIT: IF REQUIRED REFER TO STD. MD 648.50 FOR LOCATION.
9. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO.4 BARS ARE REQUIRED. SEE STD. MD 648.49.
TO BE USED WHEN THE BARRIER IS FUNCTIONING AS A RETAINING WALL AT THE BOTTOM OF THE CUT OR FILL SLOPES.  
(SEE STD. MD 648.52 FOR 42" F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 1 WITH EARTH BACKING AT TOP OF FILL SLOPES)  
(SEE STD. MD 648.53 FOR 42" F SHAPE CONCRETE BARRIER SINGLE FACE TYPE 2 FREE STANDING AT TOP OF FILL SLOPES)

NOTES:

1. THE BARRIER AND FOOTER SHALL BE CAST SEPARATELY USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD USING CONCRETE MIX NO.6 CONTINUOUSLY PLACED.
2. THE CONTRACTOR HAS THE OPTION TO CONSTRUCT THE BARRIER FOOTER AND BARRIER AFTER CONSTRUCTION OF THE PAVEMENT, THE FOOTER FORMS, IF USED, SHALL BE REMOVED BEFORE PLACING PAVEMENT.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPoxy COATED, ALL BAR LAPS TO BE 30 BAR DIAMETERS, TIE BARS TOGETHER, ALL BARS SHALL BE HOT A 615 GRADE 60.
4. THE REAR VERTICAL WALL SHALL BE FORMED OR THE CONCRETE PLACED AGAINST THE VERTICAL EARTH SIDE IF APPROVED BY THE ENGINEER. NO ADDITIONAL REINFORCEMENT FOR ADDITIONAL CONCRETE WILL BE PAID IF CONCRETE IS PLACED AGAINST THE EARTH. THE BARRIER FOOTER SHALL HAVE CONSTRUCTION JOINTS TO COINCIDE WITH THE BARRIER JOINTS.
6. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF THE CONSTRUCTION METHOD.
7. COST OF THE CONCRETE FOOTER (FORMED OR NON-FORMED), REINFORCEMENT, DRAINAGE APPURtenANCES, EXCAVATION, GEOTEXTILE, AND BACKFILLING USING SELECT BORROW SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 42 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TYPE 3.
8. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/4".
9. CONDUITS: IF REQUIRED REFER TO STD. MD 648.50.
10. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGNAL NO.4 BARS ARE REQUIRED. SEE STD. MD 648.49.
NOTES

1. THE BARRIER SHALL BE CONSTRUCTED USING CONCRETE MIX NO. 6 CONTINUOUSLY PLACED.
2. THE BARRIER SHALL BE CAST USING THE FIXED FORM OR THE SLIP FORM CONSTRUCTION METHOD.
3. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED. ALL BAR LAPS TO BE 30 BAR DIAMETERS. TIE BARS TOGETHER. ALL BARS SHALL BE ASTM A 615 GRADE 60.
4. SPACING OF CONTRACTION JOINTS SHALL BE 20 FEET REGARDLESS OF CONSTRUCTION METHOD.
5. COST OF LABOR, ALL REINFORCEMENT, DRILLED HOLES, GROUT, EQUIPMENT, ETC., SHALL BE INCIDENTAL TO THE CONTRACT UNIT PRICE PER LINEAR FOOT FOR 42 INCH F SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE CONSTRUCTED ON EXISTING CONCRETE PAVEMENT.
6. TO BE USED AS FREE STANDING BARRIER ONLY (NO BACKING).
7. TOLERANCES IN DIMENSIONS SHOWN SHALL BE WITHIN 1/8".
8. CONDUIT: IF REQUIRED REFER TO STD. MD 648.50 FOR LOCATION.
9. WHEN BARRIER IS CONSTRUCTED USING THE SLIP FORM METHOD DIAGONAL NO. 4 BARS ARE REQUIRED. SEE STD. MD 648.49.
Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

SIDEWALK EXPANSION JOINTS

STANDARD NO. MD 655.01
NOTES
1. WHERE THE CONTINUOUS WIDTH FOR TRAVEL IS LESS THAN 60', SIDEWALK PASSING ZONES SHALL BE PROVIDED AT AN INTERVAL NOT TO EXCEED 200'. USE OF ENTRANCES AND LEADER WALKS AS PASSING ZONES IS ACCEPTABLE PROVIDED THAT THE GEOMETRY MEETS THE REQUIREMENTS OF THIS STANDARD.
2. SIDEWALK PASSING ZONES SHALL BE LOCATED AS INDICATED ON DRAWINGS. HOWEVER EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. MAY AFFECT PLACEMENT.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
SIDEWALK PASSING ZONES
STANDARD NO. MD 655.02
NOTES
1. TO BE USED ON WIDE SIDEWALKS OR SIDEWALKS WITH SIGNIFICANT SEPARATION FROM THE ROADWAY WHERE THE GEOMETRY SPECIFIED IN THE DETAILS ABOVE CAN BE SATISFIED. MAY BE MODIFIED TO SUIT A PARTICULAR LOCATION.
2. WHERE 60° CURB CAN NOT BE PROVIDED, A DESIGN WAIVER MUST BE REQUESTED
3. NO TRAVERSABLE SLOPE ON THE RAMP OR SIDEWALK SHALL EXCEED 12:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL, OR 48:1 PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.
4. EXPANSION JOINT MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH STD. MD-655.01.
5. SIDEWALK RAMPS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE RAMP ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED RAMP VARIES FROM STANDARD CASES.
6. TRANSITION PANELS TO TIE INTO EXISTING SIDEWALK MUST BE A MINIMUM OF 5' IN LENGTH.
NOTES
1. TO BE USED WHERE SIDEWALK IS ADJACENT TO THE CURB. THIS STANDARD MAY BE MODIFIED TO SUIT A PARTICULAR LOCATION.
2. WHERE 60° SIDEWALK CAN NOT BE PROVIDED, A DESIGN WAIVER MUST BE REQUESTED.
3. NO TRAVERSABLE SLOPE ON THE RAMP OR SIDEWALK SHALL EXCEED 12:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL, OR 48:1 PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL. THE CROSS-SLOPE OF THE LANDING AREA CANNOT EXCEED GRADE OF ROADWAY.
4. EXPANSION JOINT MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH STD. MO-655-01.
5. SIDEWALK RAMPS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE RAMP ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED RAMP VARIES FROM STANDARD CASES.
6. TRANSITION PANELS TO TIE INTO EXISTING SIDEWALK MUST BE A MINIMUM OF 5' IN LENGTH.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
SIDEWALK RAMPS PARALLEL
STANDARD NO. MD 655.12
1. To be used where at least 7'-6" exists between the back of curb and the back of sidewalk. This standard may be modified to suit a particular location.

2. Where 60" sidewalk cannot be provided, a design waiver must be requested.

3. No traversable slope on the ramp or sidewalk shall exceed 12:11 in the direction of pedestrian travel, or 48:1 perpendicular to the direction of pedestrian travel.

4. Expansion joint material shall be installed in accordance with Standard MD-655.01.

5. Sidewalk ramps to be shown on plans symbolically and referenced with the center of the ramp aligned to a station on the construction centerline. Separate details shall be shown where proposed ramp varies from standard cases.

6. For buffer widths less than 24", widen sidewalk to back of curb as shown for the special case, then build parallel ramp using standard MD-655.12.

7. Transition panels to tie into existing sidewalk must be a minimum of 5' in length.

8. If the buffer area is greater than or equal to 4' the landing area must be 2' x 2'. If the buffer area is less than 4' the landing area cross-slope cannot exceed the grade of the road.

NOTES

AVERAGE TOTAL CUBIC YARDAGE

*H = HEIGHT OF CURB
B = BUFFER WIDTH (BACK OF CURB TO FRONT OF SIDEWALK)
T = TRANSITION LENGTH (LENGTH OF RAMP FROM SIDEWALK TO LANDING)
T = [12 x H] - B
ALL MEASUREMENTS IN INCHES

 Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

SIDEWALK RAMPS COMBINATION

STANDARD NO. MD 655.13

SPECIFICATION 603 & 611
CATEGORY CODE ITEMS
APPROVED

[Signature]

SHA
State Highway Administration

APPROVAL SHA REVISIONS
APPROVAL 2-10-04 APPROVAL 3-31-04
REVISED 8-25-08 REVISED 4-5-06
REVISED 6-2-14 REVISED 5-20-14

REVISED

[Printed Signature]
NOTES

1. TO BE USED WHERE A STREET-LEVEL PEDESTRIAN CROSSING IS REQUIRED THROUGH RAISED MEDIAN OR RAISED ISLANDS AND THERE IS INSUFFICIENT WIDTH TO PROVIDE A RAMPS MEDIAN OR ISLAND OPENING (STO. MD-655.22).

2. EXPANSION JOINT MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD MD-655.01.

3. CUT-THROUGH MEDIAN AND ISLAND OPENINGS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE OPENING ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED OPENING VARIES FROM STANDARD METHODS.

4. WHERE 60" CUT THROUGHS CAN NOT BE PROVIDED A DESIGN WAIVER MUST BE REQUESTED.
NOTES

1. TO BE USED WHERE A PEDESTRIAN ACCESS ROUTE CROSSES RAISED MEDIAN OR RAISED ISLANDS AND THERE IS
   SUFFICIENT WIDTH TO SATISFY THE GEOMETRY OUTLINED IN THIS STANDARD.

2. EXPANSION JOINT MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD MD-655.01.

3. RAMPED MEDIAN AND ISLAND OPENINGS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER
   OF THE OPENING ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE
   PROPOSED OPENING VARIES FROM STANDARD METHODS.

4. WHERE 60" OPENINGS CAN NOT BE USED A DESIGN WAIVER MUST BE REQUESTED.
NOTES
MAT DETAILS
SEE PLACEMENT GUIDELINES BELOW

DOME SPACING

DOME SECTION

PLACEMENT GUIDELINES

WHERE ISLANDS OR MEDIANS ARE LESS THAN 6 FEET WIDE, THE DETECTABLE WARNING SHOULD EXTEND ACROSS THE FULL LENGTH OF THE CUT THROUGH THE ISLAND OR MEDIAN

NOTES
1. THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS 6 TO 8 INCHES FROM THE FACE OF CURB.
2. FOR SKEWED APPLICATIONS DETECTABLE WARNING SHALL BE PLACED SUCH THAT THE DOMES CLOSEST TO THE BACK OF CURB ARE NO LESS THAN 0.5" AND NO MORE THAN 3.0" FROM THE BACK OF CURB. TRUNCATED DOME SURFACES SHALL BE FABRICATED TO PROVIDE FULL DOMES ONLY.
3. DETECTABLE WARNING SURFACE SHALL BE PAID FOR IN ACCORDANCE WITH SECTION 611 OF THE SPECIFICATIONS.
4. DETECTABLE WARNING SURFACES ARE REQUIRED AT STREET CROSSING & SIGNALIZED INTERSECTIONS.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

DETECTABLE WARNING SURFACES

STANDARD NO. MD 655.40
NOTE: ALL REINFORCING TO BE #4 BARS, CONFORMING TO A.S.T.M. DESIGNATION A-615 GRADE 40. 1" COVER. (1 TP1)

FRONT VIEW

ELEVATION

RISER DETAIL

STANDARD SLOPES, DIMENSIONS & FORMULAS

<table>
<thead>
<tr>
<th>SLOPE RATIO</th>
<th>S:1</th>
<th>R</th>
<th>T</th>
<th>F</th>
<th>H₁</th>
<th>X</th>
<th>Y</th>
<th>H</th>
<th>V₁</th>
<th>V₂</th>
<th>D₁</th>
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<tr>
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CONCRETE REQUIRED FOR STANDARD STAIRWAYS

TABLE OF UNIT QUANTITIES

<table>
<thead>
<tr>
<th>ITEM - UNIT OF STAIRWAY</th>
<th>SLOPE RATIO &amp; T:R</th>
<th>VOLUMES PER STAIRWAY</th>
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<tbody>
<tr>
<td></td>
<td>1:2</td>
<td>2:1</td>
</tr>
<tr>
<td></td>
<td>11:7</td>
<td>12:16</td>
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<tr>
<td>VOL. OF 1 STEP + BOTTOM SLAB PER 1&quot; WIDTH OF W</td>
<td>.0655</td>
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<tr>
<td>VOL. OF 2 SIDEWALLS PER STEP OR TREAD</td>
<td>1.7377</td>
<td>1.7870</td>
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<tr>
<td>VOL. OF UPPER &amp; LOWER FOOTINGS PER 1&quot; OF TOTAL WIDTH</td>
<td>.1012</td>
<td>.1150</td>
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<tr>
<td>VOL. OF 2 UPPER SIDE WALL CUT-OFFS TO DEDUCT</td>
<td>-.3403</td>
<td>.3333</td>
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</tbody>
</table>

CONCRETE=MIX NO. 2 (VOLUMES SHOWN IN TABLE ABOVE ARE IN CUBIC FEET)  NUMBER OF STEPS OR TREADS=N  TOTAL VOLUME IN CUBIC YARDS/STAIRWAY= A+B+C-D  TREAD WIDTH (IN INCHES)=W

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

STANDARD STAIRWAYS

STANDARD NO. MD 657.00
NOTES

1. ALL DIMENSIONS ARE SUBJECT TO MFG. TOLERANCES.
2. POST TO BE 6'-0" LONG, SPACED AT 6'-3" C/C.
3. BACK-UP PLATE (12" LENGTH OF BEAM) CENTERED ON OFFSET BRACKET BOLT TO BE PLACED WHERE NO OVERLAP OF RAIL SPLICE OCCURS.
4. MATERIAL = ASTM A-570 WITH MECHANICAL PROPERTIES EQUAL TO AASHTO M-183.
5. GALVANIZING = AASHTO M-111 ASTM A-123.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

TRAFFIC BARRIER W BEAM
ALTERNATE 'C' SHAPE STRONG POST

STANDARD NO. MD 660.04
1. APPROACH END: FIRST 25'-0" OF TRAFFIC BARRIER AFFIXED TO BRIDGE STRUCTURE SHALL HAVE THE FIRST POST PLACED AT A MAXIMUM OF 1'-6" FROM THE BRIDGE AND THE NEXT SEVEN POSTS SPACED AT 3'-1½" C/C. WHERE NECESSARY, AN ADDITIONAL OFFSET BRACKET MAY BE INSTALLED AT THE FOURTH AND FIFTH POSTS FROM THE BRIDGE TO AVOID CONFLICT WITH THE DRAINAGE INLETS. THIS TYPE OF "ANCHORAGE AT STRUCTURES" SHALL BE APPLIED TO ALL FOUR CORNERS OF THE BRIDGE STRUCTURE WHEREVER THERE IS TWO-WAY TRAFFIC, UNDIVIDED SECTION, OR NARROW DIVIDED SECTION WHEREBY AN ERRANT VEHICLE MAY REACH THE OPPOSITE CORNER OF THE BRIDGE STRUCTURE. WHEREVER THERE IS A BARRIER-DIVIDED SECTION OR WIDE DIVIDED SECTION WHETHER AN ERRANT VEHICLE COULD NOT REACH THE OPPOSITE CORNER OF THE BRIDGE STRUCTURE, THIS TYPE OF "ANCHORAGE AT STRUCTURES" SHALL BE APPLIED ONLY AT THE APPROACH END WITH THE TRAILING ENDS TO BE TREATED AS DESIGNATED IN THE FOLLOWING NOTE.

2. TRAILING END: USE NORMAL POST SPACING, WHERE NECESSARY AN ADDITIONAL OFFSET BRACKET MAY BE INSTALLED AT THE SECOND POST TO AVOID CONFLICT WITH DRAINAGE INLETS.

3. ADDITIONAL OFFSET BRACKETS SHALL NOT EXCEED A MAXIMUM OF TWO PER POST IN ALL CASES.

4. COST OF ADDITIONAL POSTS AND OFFSET BRACKETS TO BE INCLUDED IN BID PRICE PER LINEAR FOOT OF TRAFFIC BARRIER WITH BEAM.

5. THE CONTRACTOR SHALL FURNISH AND INSTALL FOUR (4) 1¾" Ø HEAVY HEX. HEAD GALV. BOLTS WITH GALV. HEX. HEAD NUT AND GALV. RECTANGULAR WASHER CAST IN BRIDGE END POST. ATTACH W BEAM WITH GALV. RECTANGULAR WASHER AND HEX. NUT OR AS ALTERNATE THE CONTRACTOR SHALL FURNISH AND INSTALL FOUR (4) GALV. THREADED STUDS WITH GALV. RECTANGULAR WASHER AND TWO (2) GALV. HEX. NUTS CAST IN BRIDGE END POST. ATTACH W BEAM WITH GALV. RECTANGULAR WASHER AND GALV. HEX. NUT AS SHOWN IN ALTERNATE ANCHORAGE STUD DETAIL. STEEL SHALL CONFIRM TO ASTM-A367 AND IS NOT NIPPED GALV. TO ASTM-A123 AFTER FABRICATION.
**NOTES**

1. ALL POSTS AND OFFSET BRACKETS SHALL BE 6x9 AS SHOWN ON STANDARDS MD 605.22 AND MD 605.23.

2. THE W BEAM TERMINAL CONNECTOR AND W BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.

3. THE COST FOR THE PRECAST TEMPORARY CONCRETE TRAFFIC BARRIER TERMINAL END IS INCIDENTAL TO THE CONTRACT PRICE PER LINEAR FOOT FOR THE PRECAST TEMPORARY CONCRETE TRAFFIC BARRIER.
Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER W BEAM MEDIAN BARRIER
ANCHORAGE AT PERCAST TEMPORARY CONCRETE TRAFFIC BARRIER TERMINAL END
STANDARD NO. MD 660.78
NOTES

1. THE TRAFFIC BARRIER THRIE BEAM ANCHORAGE AT BRIDGE END POSTS SHALL BE PLACED ON SLOPES 10:1 OR FLATTER.

2. THIS TYPE OF ANCHORAGE SHALL APPLY TO ALL FOUR CORNERS OF THE BRIDGE WHERE APPLICABLE.

3. THE WOOD POSTS AND BLOCKS SHALL HAVE A STRESS GRADE OF 1200 PSI OR MORE.

4. RECTANGULAR WASHERS SHALL BE USED AT THE TERMINAL CONNECTOR AND POSTS A THROUGH F.

5. DETAILS OF THE THRRIE BEAM, SPLICE, TERMINAL CONNECTOR, TRANSITION SECTION, SQUARE PLATE WASHERS, RECTANGULAR PLATE WASHERS AND SECTION C-C ARE SHOWN ON STD. MD 661.02.

SECTION A-A

TWO SECTIONS OF THRRIE BEAM FASTENED W/ 3/8" GALV. BUTTON HEAD BOLTS, RECTANGULAR WASHERS 1 3/4" D.O.D. WASHERS & NUTS.

SECTION B-B

SECURE BLOCK FROM ROTATION WITH 100 GALVANIZED NAIL

ONE SECTION OF W BEAM FASTENED W/ 3/8" GALV. BUTTON HEAD BOLT, RECTANGULAR WASHER, 1 3/4" D.O.D. WASHER & NUT

WOOD POST & BLOCK DIMENSIONS:

- 10" x 10" x 6'-0"
- 8" x 8" x 6'-0"
- 6" x 8" x 22'-2"
- 6" x 8" x 14"

SLOPE 10:1 OR FLATTER

LOCATION OF 3/4" x 2 1/2" SLOTS IN THRRIE BEAM & TERMINAL CONNECTOR

SQUARE PLATE WASHERS SEE NOTE 5

RECTANGULAR PLATE WASHERS SEE NOTE 5

THRIE BEAM TERMINAL CONNECTOR WITH 5-3/8" H.S. (GALV) THROUGH BOLTS, NUTS AND SQUARE & RECTANGULAR PLATE WASHERS. HOLES IN BRIDGE END POST SHALL BE CORED BY THE BRIDGE CONTRACTOR.

BASIS OF PAYMENT PER EACH FOR TRAFFIC BARRIER THRRIE BEAM ANCHORAGE AT BRIDGE END POSTS

ELEVATION

PLAN

32'-9 1/2"
**Thrie Beam Splice**

- **TOLERANCE** 4/32" (0".0 + 3/32")

**Thrie Beam Terminal Connector**

- 2 1/2" x 2 1/2" POST BOLT SLOT (OPTIONAL)
- 2 1/2" x 1 1/2" SLOTS
- 8 HOLES (TYP.)

**End View**

- STANDARD THRIE BEAM SECTION
- 2" MIN.
- POST BOLT SLOT
- 1 1/2" x 1 1/2" (TYP.)
- SPICE BOLT SLOT
- 1 1/2" x 1 1/2" (TYP.)

**Rectangular Plate Washer**

- (GALVANIZED)

**Section C-C**

- FOR USE WITH BRIDGE END POSTS WITH VERTICAL REAR FACE
- SLOPE SAME AS BRIDGE END POST

**Square Plate Washers**

**Note**

- THE SQUARE AND RECTANGULAR PLATE WASHERS SHALL BE MADE OF STEEL MEETING THE REQUIREMENTS OF ASTM A 36 AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 123.
- HOLES MAY BE PUNCHED OR DRILLED. WHEN INSTALLED, THE TOP EDGE OF THE SQUARE PLATE WASHERS SHALL BE PARALLEL WITH THE TOP EDGE OF THE BRIDGE END POST.

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**Maryland Department of Transportation**

**State Highway Administration**

**Standards for Highways and Incidental Structures**

**Traffic Barrier Thrie Beam Anchorage at Bridge End Posts Details**

**Standard No. MD 661.01-01**
1. THREBEAM TERMINAL CONNECTOR. THREBEAM SECTIONS AND W BEAM SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC.

2. THE WOOD POSTS AND BLOCKS SHALL HAVE A STRESS GRADE OF 1200 PSI OR MORE.

3. RECTANGULAR WASHERS SHALL BE USED AT THE THREBEAM TERMINAL CONNECTOR AND POSTS A THROUGH F.

4. SEE STD. MD 661.01-01 FOR DETAILS OF THREBEAM SPLICE TERMINAL CONNECTOR, TRANSITION SECTIONS, SQUARE PLATE AND RECTANGULAR WASHERS.

WOOD POST & BLOCK DIMENSIONS

- 10" x 10" x 6'-0"  
- 8" x 8" x 6'-0"  
- 6" x 8" x 22 1/2"  
- 6" x 8" x 14"  

BEGIN STANDARD TRAFFIC BARRIER W BEAM
SEE STD. MD 605.22 FOR DETAILS (DO NOT USE RECTANGULAR WASHERS)

CONCRETE JERSEY SHAPE TRAFFIC BARRIER SINGLE FACE TERMINAL END & FOOTER - SEE STD. MD 661.21 DETAILS

TRAFFIC BARRIER THREBEAM ANCHORAGE AT CONCRETE TRAFFIC BARRIER SINGLE FACE TERMINAL END

INCIDENTAL TO THE COST OF CONCRETE

32' -9 1/2" BASIS OF PAYMENT PER EACH FOR

CONCRETE TRAFFIC BARRIER SINGLE FACE TERMINAL END & FOOTER - SEE STD. MD 661.21-01 FOR DETAILS
VERTICAL NO. 5 BARS SPACED AT 1'-0" C/C
2" CL. HORIZONTAL NO. 5 BARS
TYPICAL BOTH ENDS

PLAN
(SHOWING WITHOUT THRIE BEAM ANCHORAGE)

CONCRETE TRAFFIC BARRIER SINGLE FACE TERMINAL END

ELEVATION

5 - 1/4" Ø HEX BOLTS (THROUGH BARRIER)
AND NUTS WITH 5 TECTANGULAR WASHERS

NOTES
1. THE CONCRETE TRAFFIC BARRIER SINGLE FACE TERMINAL END AND THE CONCRETE FOOTER SHALL BE CAST SEPARATELY USING CONCRETE MIX NO. 6 (4500 PSI)
2. ALL REINFORCEMENT BARS, INCLUDING END, SHALL BE EPOXY COATED.
3. SEE STANDARD NO 661.21 FOR POST LAYOUT.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER THRIE BEAM ANCHORAGE AT JERSEY SHAPE CONCRETE TRAFFIC BARRIER SINGLE FACE TERMINAL END
STANDARD NO. MD 661.21-01
NOTES

1. THE CONCRETE MEDIAN TRAFFIC BARRIER TERMINAL END AND CONCRETE FOOTER SHALL BE CAST SEPARATELY USING CONCRETE MIX NO. 6 (4500 PSI).
2. ALL REINFORCEMENT BARS, INCLUDING ENDS, SHALL BE EPOXY COATED.
3. SEE STANDARD MD 661.41 FOR THRIE BEAM AND W BEAM POST LAYOUT.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
TRAFFIC BARRIER THRIE BEAM MEDIAN BARRIER ANCHORAGE AT CONCRETE MEDIAN TRAFFIC BARRIER TERMINAL END
STANDARD NO. MD 661.42
POST MOUNTED DELINEATORS

- Refer to SHA "ROADWAY DELINEATION POLICY" for application and placement guidelines.
- Plastic posts should be used at all new installations. Wood posts should only be used as snow stakes.
- Plastic posts are gray in color; wood posts are highway yellow in color. Blue delineator posts, with 3" x 9" blue reflective sheeting mounted back to back on the post, may be used to identify hydrant connections in noise barriers.
- Reflectorization is high intensity white, yellow, blue or green reflective sheeting applied to center-mount delineators for wood posts; and applied directly to the plastic posts.
- Center-mount delineators are round having a 4" diameter (0.063" thick aluminum) and are placed singly or doubly (vertically).
- Reflective sheeting applied to plastic posts, for a single reflective unit, consists of a pattern that is 3" wide by 4" high; and for a double reflective unit, consists of two patterns 3" wide by 4" high, placed vertically with a 2" space between them.
- Wood posts are driven into the ground while plastic posts are inserted into a footing that is driven into the ground, flush with the surface. Footing should be as per manufacturers specifications.
- Refer to the SHA Office of Traffic and Safety approved product list for acceptable models.
- Refer to standards 665.02 through 665.06 that follow regarding location and installation of post mounted delineators.
- Utility identification markers (UIM's): UIM's are the same size as delineators and are used to identify existing facilities as follows:
  1. Blue - to identify water sources (fire hydrants, streams, ponds, etc.)
  2. Green - to identify drainage inlets, drainage pipes and culvert crossings
- Multiple delineators located on the same post shall be positioned from top to bottom as follows:
  1. Color of adjacent paving marker
  2. Blue (as necessary)
  3. Green (as necessary)

Notes
1. Sketches are descriptive only, not to scale. Indicated heights are general. See STD. 665.04 for specific height information.
2. Delineator color is to be the same as the adjacent edge line (yellow on the left and white on the right).

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

POST MOUNTED DELINEATORS

STANDARD NO. MD 665.01

SPECIFICATION
604, 605

CATEGORY CODE ITEMS

APPROVED
EXECUTIVE OFFICE OF HIGHWAY DEVELOPMENT

FEDERAL APPROVAL

APPROVAL
7-1-94

REVISED
10-25-06
11-08-06

STATE HIGHWAY ADMINISTRATION

DIRECTOR - OFFICE OF HIGHWAY DEVELOPMENT

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Administration
1. BARRIER MARKERS SHALL BE YELLOW IN COLOR WHEN PLACED ON LEFT MEDIAN-SIDE BARRIER, WHITE WHEN PLACED ON RIGHT SHOULDER-SIDE BARRIER.
2. SEE S.H.A. LIST FOR APPROVED MODELS AND NEEDED PARTS.
3. REFER TO STDS. 665.03 THRU 665.06 FOR PLACEMENT, SPACING AND MOUNTING HEIGHT.
DELINEATION PLACEMENT

TYPICAL SPACING FOR POST MOUNTED DELINEATORS

MAINLINE - 264'
ACCEL/DECEL AND C/D/ ROADS - 100' (DOUBLE DELINEATORS) REFER TO STD. MD 665.05
RAMPS - REFER TO STD. MD 665.06

TYPICAL SPACING FOR PERMANENT BARRIER WALL MOUNTED MARKERS

(FOR ALL BARRIER WALLS WITHIN 15' OF THE TRAVEL LANE)
MAINLINE - 100'
NOTE: SPACING SHOULD BE REDUCED TO 75' IN CURVES WITH A RADIUS LESS THAN 1000' AND 50' IN CURVES WITH A RADIUS LESS THAN 500'.
ACCEL/DECEL AND C/D/ ROADS - 100' (DOUBLE DELINEATORS) REFER TO STD. MD 665.05
RAMPS - REFER TO STD. MD 665.06

TYPICAL SPACING FOR W-BEAM MOUNTED DELINEATORS

(FOR ALL W-BEAM BARRIERS WITHIN 6' OF THE SHOULDER)
MAINLINE - 100'
NOTE: SPACING SHOULD BE REDUCED TO 50' IN CURVES WITH A RADIUS LESS THAN 1000' AND IN TANGENT SECTIONS LESS THAN 500' IN LENGTH.
ACCEL/DECEL AND C/D/ ROADS - 100' (DOUBLE DELINEATORS) REFER TO STD. MD 665.05
RAMPS - REFER TO STD. MD 665.06

NOTE
DELINEATORS LOCATED WITHIN 50’ OF A UTILITY SHOULD BE INSTALLED AT THE UTILITY AND COMBINED WITH THE APPROPRIATE UIM(S).
PLACEMENT OF BARRIER WALL MOUNTED MARKERS

SINGLE FACE BARRIER WALL

TOP OF MARKER

2'-8" REFLECTIVE FACE PERPENDICULAR TO TOP OF BARRIER WALL (SEE NOTE 1)

BIPURCATED BARRIER WALL

TOP OF MARKER

VARIES

2'-8" (SEE NOTES 1 & 2)

PLACEMENT OF POST MOUNTED DELINEATORS

OPEN SECTION

EDGE OF PAVED SHOULDER

2'-8"

ABOVE NEAREST PAVEMENT SURFACE (SEE NOTE 1)

AS PER MANUFACTURERS SPECIFICATIONS

CURBED SECTION

CURB

2'-8"

ABOVE NEAREST PAVEMENT EDGE (SEE NOTE 1)

AS PER MANUFACTURERS SPECIFICATIONS

PLACEMENT OF W-BEAM & WOOD POST DELINEATORS

TRAFFIC BARRIER (SEE NOTE 1)

32" (SEE NOTE 1)

TRAFFIC BARRIER

WOOD SNOW GUIDE STAKE

EDGE OF PAVED SHOULDER

2'-0"

ABOVE NEAREST PAVEMENT SURFACE (SEE NOTE 1)

AS PER MANUFACTURERS SPECIFICATIONS

NOTES:

1. THE HEIGHT OF THE DELINEATOR SHOULD BE WITHIN 2 INCHES OF THE DIMENSIONS SHOWN.

2. BARRIER MARKERS SHOULD BE TOP AND SIDE MOUNTED IN CONSTRUCTION ZONES. PERMANENT INSTALLATIONS SHOULD BE SIDE MOUNTED ONLY.

3. HEIGHT OF DELINEATOR MAY BE INCREASED AS NECESSARY IN AREAS HAVING EXCESSIVE PLOWED SNOW STORAGE.

4. W-BEAM MARKERS SHALL BE FASTENED TO WOOD OFFSET BLOCKS BY GALVANIZED & PENNY NAILS.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

PLACEMENT OF DELINEATORS AND MARKERS

STANDARD NO. MD 665.04
ACCEL/DECEL LANE DELINEATION

- MILEPOST MARKERS ARE SUBSTITUTED FOR DELINEATORS IN TYPICAL SPACING.

SPACING
- MAINLINE - 264'
- ACCEL/DECEL - 100'

NOTE DOUBLE DELINEATOR INSTALLATIONS CONTINUE THREE INSTALLATIONS BEYOND PHYSICAL GORE.

REFER TO STD MD 665.06 FOR SPACING AND CONTINUATION

LEGEND
- SINGLE WHITE
- DOUBLE WHITE
- SINGLE YELLOW

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

ACCEL/DECEL LANE DELINEATION
STANDARD NO. MD 665.05
RAMP DELINEATION

LOOP RAMP

NON-LOOP RAMP

REFER TO STD 665.05

LEGEND
- SINGLE YELLOW
- SINGLE WHITE
- DOUBLE WHITE

RAMP MARKERS AND DELINEATORS SHALL BE PLACED ON
- THE RIGHT SIDE OF TANGENT SECTIONS
- THE OUTSIDE OF CURVED SECTIONS
- BOTH SIDES OF THE RAMP (THREE INSTALLATIONS) WHERE THE CURVE ENTERS A TANGENT SECTION OR REVERSES

RAMP DELINEATOR SPACING
- SPACING SHOULD BE AS SPECIFIED IN MUTCD TABLE III-1.
CROSS-SECTION VIEW – INTERSTATES AND EXPRESSWAYS

A. 6” TO 12”, OFFSET FROM PAVEMENT MARKING OR PAVEMENT JOINT TO EDGE OF RUMBLE STRIP. REFER TO STANDARDS FOR DETAILS.

B. RUMBLE STRIP WIDTH. REFER TO STANDARDS FOR DETAILS.

C. OFFSET FROM RUMBLE STRIP TO EDGE OF SHOULDER/PAVEMENT. REFER TO STANDARDS FOR DETAILS.

D. EDGELINE OR PAVEMENT JOINT.

PLAN VIEW – INTERSTATES AND EXPRESSWAYS

NOTES

1. THE RUMBLE STRIPS ARE FOR USE ON NEW OR EXISTING ASPHALT OR CONCRETE SHOULDERS. THE PATTERN IS DESIGNED SO THAT IT CAN BE WILLED OR GROWN INTO THE SHOULDER. SEE SPECIFICATIONS.

2. THE LEADING EDGE OF A RUMBLE STRIP SHOULD NOT BE CLOSER THAN 6” TO ANY JOINT, TRANSVERSE OR LONGITUDINAL, IN CONCRETE SHOULDERS.
NOTES

1. SEE STANDARDS FOR RUMBLE STRIP DETAILS.

2. AT ENTRANCE AND EXIT TERMINALS, THE OUTSIDE SHOULDER PATTERN SHOULD BE EXTENDED TOWARD THE RAMP JUNCTURE AS FAR AS POSSIBLE, AND THEN SHIFTED OVER TO THE OUTSIDE SHOULDER OF THE TERMINAL AREA. THE PHYSICAL GORE OF AN ENTRANCE OR EXIT TERMINAL IS A LOGICAL REFERENCE POINT. ON EITHER TERMINAL EXTEND THE PATTERN 100' INTO THE TERMINAL AREA AND THEN TRANSFER TO THE OUTSIDE SHOULDER.

3. RUMBLE STRIPS, WHEN USED IN ADVANCE OF CRITICAL LOCATIONS, SUCH AS APPROACHES TO NARROW BRIDGES, IN GORE AREAS, AND AHEAD OF TRAFFIC BARRIER END TREATMENTS, SHOULD BE PLACED AS SHOWN.
NOTES
1. SEE SHOULDER RUMBLE STRIP AND RUMBLE STRIPE STANDARDS FOR MORE INFORMATION.
NOTES
1. SEE SHOULDER RUMBLE STRIP AND RUMBLE STRIPE
   STANDARDS FOR MORE INFORMATION.
1. REFER TO INSIDE/OUTSIDE SHOULDER RUMBLE STRIP DETAILS TYPICAL LAYOUT FOR RUMBLE STRIP DEPTH AND SECTION DETAILS.

2. EFFECTIVE LANE WIDTH IS MEASURED AS CLEAR DISTANCE BETWEEN OUTSIDE RUMBLE STRIP (TRAFFIC SIDE EDGE) AND INSIDE PAVEMENT MARKING (TRAFFIC SIDE EDGE) OR RUMBLE STRIP (TRAFFIC SIDE EDGE).

3. G = PAVEMENT MARKING WIDTH (TYPICALLY 5" OR 10"). RUMBLE STRIP WIDTH (B) VARIATES ACCORDINGLY 16" FOR 5" MARKINGS, 12" FOR 10" MARKINGS. SEE SHOULDER RUMBLE STRIP AND RUMBLE STRIPE DETAILS FOR MORE INFORMATION.

4. SEE SHOULDER RUMBLE STRIP AND RUMBLE STRIPE DETAILS FOR MORE INFORMATION.

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

RUMBLE STRIPE DETAILS
TYPICAL LAYOUT

STANDARD NO. MD 670.04
### OUTSIDE SHOULDER RUMBLE STRIP APPLICATION

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<th>ROADWAY TYPE</th>
<th>OFFSET FROM PAVEMENT MARKING TO RUMBLE STRIP</th>
<th>RUMBLE STRIP WIDTH</th>
<th>OFFSET FROM RUMBLE STRIP TO EDGE OF SHOULDER/PAVEMENT</th>
<th>RUMBLE STRIP LENGTH</th>
<th>RUMBLE STRIP DEPTH</th>
<th>OFFSET FROM PAVEMENT MARKING TO PAVEMENT MARKING</th>
<th>MINIMUM SHOULDER PAVEMENT WIDTH</th>
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<tbody>
<tr>
<td>INTERSTATES OR EXPRESSWAYS * (POSTED SPEED 40 MPH OR GREATER)</td>
<td>6&quot; MIN. 12&quot; MAX.</td>
<td>6&quot; ABSOLUTE MIN. 12&quot; PREFERENCES</td>
<td>7&quot;</td>
<td>1/8&quot; MIN. 3/8&quot; MAX.</td>
<td>1&quot; MIN. 2&quot; STD.</td>
<td>25&quot;</td>
<td></td>
</tr>
<tr>
<td>ALL OTHER HIGHWAYS * (POSTED SPEED 40 MPH OR GREATER)</td>
<td>6&quot; MIN. 12&quot; MAX.</td>
<td>6&quot; MIN. 12&quot; STD.</td>
<td>48&quot; MIN. REQUIRED</td>
<td>6&quot; MIN.</td>
<td>7&quot; STD.</td>
<td>3/8&quot; MIN. FOR 5&quot; LENGTH</td>
<td>1/2&quot; MIN. - 3/8&quot; MAX. FOR 7&quot; LENGTH</td>
</tr>
</tbody>
</table>

### INSIDE SHOULDER RUMBLE STRIP APPLICATION

<table>
<thead>
<tr>
<th>ROADWAY TYPE</th>
<th>OFFSET FROM PAVEMENT JOINT TO RUMBLE STRIP</th>
<th>RUMBLE STRIP WIDTH</th>
<th>OFFSET FROM RUMBLE STRIP TO EDGE OF SHOULDER/PAVEMENT</th>
<th>RUMBLE STRIP LENGTH</th>
<th>RUMBLE STRIP DEPTH</th>
<th>OFFSET FROM PAVEMENT MARKING TO PAVEMENT MARKING</th>
<th>MINIMUM SHOULDER PAVEMENT WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERSTATES OR EXPRESSWAYS * (POSTED SPEED 40 MPH OR GREATER)</td>
<td>6&quot; MIN. 12&quot; MAX.</td>
<td>12&quot; MIN. 16&quot; STD.</td>
<td>6&quot; ABSOLUTE MIN. 12&quot; PREFERENCES</td>
<td>7&quot;</td>
<td>1/8&quot; MIN. 3/8&quot; MAX.</td>
<td>1&quot; MIN. 2&quot; STD.</td>
<td>30&quot;</td>
</tr>
<tr>
<td>ALL OTHER HIGHWAYS * (POSTED SPEED 40 MPH OR GREATER)</td>
<td>6&quot; MIN. 12&quot; MAX.</td>
<td>6&quot; MIN. 12&quot; STD.</td>
<td>6&quot; ABSOLUTE MIN. 12&quot; PREFERENCES</td>
<td>5&quot; MIN. 7&quot; STD.</td>
<td>3/8&quot; MIN. FOR 5&quot; LENGTH</td>
<td>1/2&quot; MIN. - 3/8&quot; MAX. FOR 7&quot; LENGTH</td>
<td>1&quot; MIN. 2&quot; STD.</td>
</tr>
</tbody>
</table>

### RUMBLE STRIPE APPLICATION

<table>
<thead>
<tr>
<th>ROADWAY TYPE</th>
<th>OFFSET FROM PAVEMENT MARKING TO RUMBLE STRIP</th>
<th>RUMBLE STRIP WIDTH</th>
<th>RUMBLE STRIP LENGTH</th>
<th>RUMBLE STRIP DEPTH</th>
<th>PAVEMENT MARKING WIDTH</th>
<th>MINIMUM EFFECTIVE LANE WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERSTATES OR EXPRESSWAYS * (POSTED SPEED 40 MPH OR GREATER)</td>
<td>6&quot; STD.</td>
<td>6&quot; FOR MARKINGS</td>
<td>7&quot;</td>
<td>1/8&quot; MIN. 3/8&quot; MAX.</td>
<td>TYPICALLY 5&quot; OR 10&quot;</td>
<td>9'-4&quot; MIN. REQUIRED</td>
</tr>
<tr>
<td>ALL OTHER HIGHWAYS * (POSTED SPEED 40 MPH OR GREATER)</td>
<td>6&quot; STD.</td>
<td>6&quot; FOR MARKINGS</td>
<td>5&quot; MIN. 7&quot; STD.</td>
<td>3/8&quot; MIN. FOR 5&quot; LENGTH</td>
<td>TYPICALLY 5&quot; OR 10&quot;</td>
<td>9'-4&quot; MIN. REQUIRED</td>
</tr>
</tbody>
</table>

### NOTES
1. BICYCLES ARE ASSUMED TO BE PROHIBITED FROM ALL INTERSTATE AND EXPRESSWAYS AS PER MD VEHICLE LAW.
2. IF BICYCLES ARE PERMITTED ON SEGMENTS OF INTERSTATES AND EXPRESSWAYS, REGARDLESS OF POSTED SPEED, RUMBLE STRIPS SHALL BE INSTALLED AS PER THE 'ALL OTHER HIGHWAYS' REQUIREMENTS.
**- Rumble strip width may be reduced to 12" for roadways that have adjacent travel lanes that are less than 12’ in width to provide more effective lane width

TYPICAL SPACING DETAIL
(PLAN VIEW)

NON-PASSING LAYOUT WITH RPM SPACING

SINGLE DIRECTION PASSING ZONE LAYOUT WITH RPM SPACING

TWO-WAY PASSING ZONE LAYOUT WITH RPM SPACING

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

CENTERLINE RUMBLE STRIP DETAILS
AND TYPICAL LAYOUT

STANDARD NO. MD 670.06
ROUND TERMINAL POST CAP

2" MESH WIRE GAUGE PER SPECIFICATIONS CHAIN LINK FENCE

PUBLIC WORKS DEPARTMENT

ALTERNATE TERMINAL POST SQUARE

BARBED SELVAGE

SPACE UNDER FABRIC

BRACE RAIL
1.66" O.D. PIPE
CLASS 1-2.27 #/FT. OR
CLASS 2-1.84 #/FT.

NO CAPS ON 'H' BEAM & 'C' LINE POSTS

TENSION WIRE

TRUSS ROD
SEE STANDARDS
MD 690.11 ROUND CONSTRUCTION
MD 690.12 SQUARE CONSTRUCTION

KNUCKLED SELVAGE

TIE WIRES
#13 GAUGE STEEL

CONCRETE FOOTING

DRIVE ANCHOR
SQUARE OR ROUND TERMINAL POST CONSTRUCTION
ALTERNATE TO CONCRETE FOOTING
SEE DETAIL STANDARD MD 690.21.
MD 690.23, MD 690.24, OR MD 690.25.

NOTES
1. ALL ROUND LINE POSTS TO BE CAPPED WITH LOOP
   CAPS. TENSION WIRE TO RUN THROUGH LOOPS.
   CAPS TO BE FASTENED TO ALL TERMINAL POSTS
   WITH TENSION BANDS.
2. FASTEN FABRIC TO TENSION WIRE WITH HOG RINGS
   #10 x 2 C/C. HOG RINGS TO BE 12\(\frac{1}{4}\) GAUGE
   GALVANIZED STEEL WIRE.
3. MATERIALS TO MEET REQUIREMENTS OF AASHTO
   M 181.
4. REFER TO SPECIFICATION 914.01 WHEN VINYL IS
   SPECIFIED.
5. THE COLOR OF THE COATING SHALL BE AS SPECIFIED
   IN THE CONTRACT DOCUMENTS.
FENCING AT GRADE CHANGES

NOTE
PULL POSTS SHALL BE INSTALLED AT SHARP BREAKS IN VERTICAL ALIGNMENT AND ON APPROXIMATE 500’ CENTERS IN STRAIGHT RUNS OF FENCE OR AS DIRECTED BY THE ENGINEER. ALL TERMINAL, PULL POSTS & CORNER POSTS SHALL BE BRACED AS SHOWN.

FENCING AT DEPRESSIONS OVER 6” DEEP

ATTACH BARBED WIRE TO LINE POSTS WITH NO. 9 GAUGE GALV. STEEL CLIPS AS SHOWN IN THE DETAILS FOR "TIE WIRE ATTACHMENT FOR LINE POST" ON STANDARD MD 690.21.
MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

4'-0" FARM TYPE FENCE

STANDARD NO. MD 690.03
TRUSS BRACE ATTACHMENT FOR ROUND CONSTRUCTION

BRACE BANDS

\frac{3}{8}\text{"} \times 1\text{"} GALVANIZED STEEL

\frac{1}{4}\text{"} DIA. \times 1\frac{1}{4}\text{"} GALVANIZED CARRIAGE
BOLT & NUT

GALVANIZED MALLEABLE IRON

LINE POST

OR

TERMINAL POST

ATTACHMENT FOR BARB WIRE OR TENSION WIRE

STRETCHER ROD ATTACHMENT

CHAIN LINK BANDS

\frac{1}{4}\text{"} \times 1\text{"} GALVANIZED STEEL

\frac{1}{4}\text{"} DIA. \times 1\frac{1}{4}\text{"} GALVANIZED CARRIAGE
BOLT & NUT

STRETCHER BAR

\frac{3}{8}\text{"} \times \frac{3}{8}\text{"} GALVANIZED STEEL

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
CHAIN LINK FENCE
BRACE & ROD ATTACHMENTS—ROUND CONSTRUCTION
STANDARD NO. MD 690.11
ALTERNATE TRUSS BRACE ATTACHMENT FOR SQUARE CONSTRUCTION

STRETCHER ROD CLIP 0.3125" DIA. GALVANIZED WIRE

STRETCHER BAR 3/8" x 3/4" GALVANIZED STEEL

5/16" DIA. GALVANIZED STEEL THREADED ONE END HOOK BOLT

ALTERNATE ATTACHMENT FOR BARE WIRE OR TENSION WIRE

ALTERNATE BRACE RAIL ATTACHMENT FOR SQUARE CONSTRUCTION

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
CHAIN LINK FENCE
BRACE & ROD ATTACHMENTS-SQUARE CONSTRUCTION

STANDARD NO. MD 690.12
'C' POST OR 'ROUND' POST

-TIE WIRE ATTACHMENT FOR LINE POST-

LINE POST TIES ON 12" ± C/C
#9 GAUGE GALVANIZED STEEL CLIP

'H' POST

GALVANIZED PRESSURED STEEL OR
GALVANIZED MALLEABLE IRON
SLOTTED ATTACHMENT BOLTED
AROUND POST.

DRIVE ANCHOR BLADE
GALVANIZED STEEL
ANGLE
1/2" x 11 1/2" x 30" LONG OR
1" x 13/16" x 36" LONG OR
1 1/4" x 1 1/2" x 30" LONG
DRIVEN PARALLEL OR
PERPENDICULAR TO
FENCE LINE.

LINE POST

3'-3" 2

ALTERNATE POST ATTACHMENT AT BRIDGE END

DRIVE ANCHOR FOR LINE POST
ALTERNATE TO CONCRETE FOOTING

OUTSIDE

3/8" X 3" X 3" X 3" LG ANGLE CLIP
3/8" X 1 1/4" BAND
1/2" Ø CARRIAGE BOLT & NUT

1/2" Ø CONCRETE EXPANSION ANCHOR
OR APPROVED EQUIVALENT IN 1 1/2"
DRILLED HOLE WITH 3/4" O HEAVY HEX.
HEAD BOLT 2 3/4" LONG, UNC. CLASS 2A
& 2B WITH WASHER AND NUT.

INSIDE

TERMINAL POST

5'-3" (6 FT. FENCE)
8'-3" (8 FT. FENCE)

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
CHAIN LINK FENCE
DRIVE ANCHOR & POST ATTACHMENT
AT BRIDGE

STANDARD NO. MD 690.21
2-7/8"x5" GALVANIZED CARRIAGE BOLTS & NUTS

LINE OF FENCE

PLAN

NOTE
DOUBLE DRIVE ANCHOR TO BE USED AT ALL TERMINAL POSTS.

SECTION A-A & SECTION B-B SIMILAR ELEVATION

GALVANIZED STEEL DRIVE ANCHOR BLADES
1-1/2"x1-1/2"x30" LONG
OR 1-1/2"x1-1/2"x36" LONG

2.875" TERMINAL POST

GALVANIZED MALLEABLE IRON DRIVE ANCHOR SHOE

3'-11"

FENCE TREATMENT AT CONCRETE DITCHES

TERMINAL POSTS OR LINE POSTS

1-1/2" O.D. PIPE
2.27 LB/FT OR
1.84 LB/FT

FENCE FABRIC

BRACE RAILS
WELDED TOGETHER

CONCRETE GUTTER

TYPICAL

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

CHAIN LINK FENCE
DOUBLE DRIVE ANCHOR & DITCH TREATMENT

STANDARD NO. MD 690.23
ANCHOR SHOE DETAILS

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES
CHAIN LINK FENCE
DRIVE ANCHOR SHOE ASSEMBLY
STANDARD NO. MD 690.24
CHAIN LINK FABRIC
TO BE SAME AS FENCE

GATE FRAME
1.90" O.D. PIPE-2.72 LB/FT
OR 2.28 LB/FT

END POST
5'-0". 6'-0" OR 8'-0" HEIGHT
12' OPENING DOUBLE GATES
2.875" O.D. PIPE-5.79 LB/FT
OR 4.64 LB/FT

Hinge
2 1/2" (FOR ROUND POST)

GATE FRAME
1 1/4" SQ. FRAME-2.03 LB/FT

END POST
5'-0". 6'-0" OR 8'-0" HEIGHT
6' OPENING GATE

Hinge
2 1/2" (FOR ROUND POST)

ECCENTRIC

SQUARE POST HINGE

ROUND POST HINGE

Maryland Department of Transportation
STATE HIGHWAY ADMINISTRATION
STANDARDS FOR HIGHWAYS AND INCIDENTAL STRUCTURES

CHAIN LINK FENCE
GATE DETAILS

STANDARD NO. MD 692.01