STANDARD PLANS
for
ROAD CONSTRUCTION

New Hampshire DOT
Department of Transportation

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

April 1, 2023
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MATCH DEPTH OF WEARING COURSE PAVEMENT TYPE 'B' (4" REVEAL) ITEM 609.811
NOTE: TO BE USED ONLY WHEN CALLED FOR ON PLANS. NOTE: NORMALLY USED UNDER GUARDRAIL, SEE PLATE 2 FOR PLACEMENT DETAIL.

 ITEM 609.01123 - STRAIGHT GRANITE CURB, 12" HIGH 3" X 3" X BEVELED MOUNTABLE EDGE

 ITEM 609.0133 - STRAIGHT GRANITE CURB, 12" HIGH 3" X 3" X BEVELED MOUNTABLE EDGE

THE INTENT OF THIS ITEM IS TO PROVIDE A SMOOTH TRANSITION BETWEEN STRAIGHT GRANITE CURB AND SLOPE CURB WITHOUT REQUIRING FIELD CHIPPING DURING INSTALLATION. THE SLOPE CURB MAY REQUIRE ADJUSTMENTS TO MEET THE TRANSITION PIECE HEIGHT AND BEVEL THAT ARE NOT STANDARD DOT PRACTICE. TRANSITION SLOPE CURB TO STANDARD REVEAL AS QUICKLY AS POSSIBLE TO PROVIDE FOR THIS SMOOTH TRANSITION.
DELINER SPACING

APPROXIMATE SPACING FOR DELINERATORS ON HORIZONTAL CURVES

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<tbody>
<tr>
<td>≤ 50</td>
<td>20</td>
<td>18.75</td>
</tr>
<tr>
<td>&gt; 50 but ≤ 115</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>&gt; 115 but ≤ 180</td>
<td>35</td>
<td>36</td>
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<td>&gt; 180 but ≤ 250</td>
<td>50</td>
<td>50</td>
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<tr>
<td>&gt; 250 but ≤ 300</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>&gt; 300 but ≤ 400</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>&gt; 400 but ≤ 500</td>
<td>100</td>
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<td>&gt; 500 but ≤ 600</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>&gt; 600 but ≤ 700</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>&gt; 700 but ≤ 1,000</td>
<td>250</td>
<td>250</td>
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<tr>
<td>&gt; 1,000</td>
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TYPICAL INSTALLATION

ITEM 621.31

RETEROREFLECTIVE BEAM GUARDRAIL DELINERATOR

ITEM 621.21

RETEROREFLECTIVE BEAM GUARDRAIL DELINERATOR

DELINERATOR WITHIN GUARDRAIL SECTION

GENERAL NOTES

1. UNLESS OTHERWISE ORDERED, DELINERATORS SHALL BE MOUNTED ALONG THE RIGHT SIDE OF ALL ROADS WHERE TYPICAL DELINERATORS MAY ALSO BE USED ON THE LEFT SIDE OF DIVIDED HIGHWAYS WHERE NEEDED FOR CLEAR INDICATION OF THE ALIGNMENT.

2. DELINERATORS LOCATED BEHIND GUARDRAIL SHALL BE INSTALLED SO THAT THE DELINERATOR POST IS ALIGNED TO THE TRAILING EDGE OF THE NEAREST GUARDRAIL POST.

3. WHEN DELINERATION IS USED ONLY ON CURVES, THREE DELINERATORS SHALL BE PLACED BEFORE AND AFTER THE CURVE.

4. WHEN DELINERATION IS USED ON TANGENTS, THE SPACING SHALL BE 20 FEET.

5. DELINERATOR COLORS SHALL BE IN ALL CASES CONFORM TO THE COLORS ON THE GUARDRAIL POST.

6. DELINERATORS WILL NOT BE PLACED BEHIND SIDEWALK.

BARRIER DELINERATION

GENERAL NOTES

A. THIS DELINERATOR IS TO BE PLACED ON TOP OF CONCRETE BARRIER.

B. IF GLASS SCREEN IS PLACED ON TOP OF THE CONCRETE BARRIER, THEN DELINERATORS ARE ATTACHED TO EITHER SIDE OF THE BARRIER AND DO NOT NEED TO BE RETRO-REFLECTORIZED ON BOTH SIDES. THE UPPER EDGE OF THE DELINERATOR IS TO BE PLACED VERTICALLY 5/8 INCH DOWN FROM THE TOP OF THE BARRIER.

C. YELLOW DELINERATOR FOR MEDIAN BARRIERS SHALL BE PLACED ON THE LEFT SIDE OF THE MEDIAN RAMP FACE TRAFFIC IN BOTH DIRECTIONS, AND SHALL HAVE RETROREFLECTIVE MATERIAL ON BOTH SIDES, BEGINNING AT THE FIRST FULL HEIGHT OF THE MEDIAN BARRIER SPACED ACCORDING TO CHART FOR BEAM GUARDRAIL DELINERATORS.

DELINERATION STANDARD

ROADSIDE DELINERATION
GENERAL NOTES

1. AT INTERCHANGE RAMPS, DELINEATORS SHALL BE LOCATED ALONG THE OUTSIDE OF THE CURVES. THIS DOES NOT PRECLUDE THEIR USE ON BOTH SIDES WHERE NEEDED FOR CLEAR INDICATION OF THE Alignment.

2. CONTINUE NORMAL DELINEATOR SPACING ON RIGHT SIDE OF RAMPS IF RADIUS OF CURVES ARE GREATER THAN 1000 FT OR FAVORABLE (SEE STD. NO. DL-1).

3. WHEN THE RADIUS OF RIGHT HAND CURVES ON RAMPS AND LOOP IS LESS THAN 1000 FT, DELINEATE THE LEFT SIDE OUTSIDE OF CURVES OF EACH RAMP OR LOOP FROM THE PC TO THE PT OR CARRY DELINEATION ON THE RIGHT SIDE FOR A MINIMUM OVERLAP OF 2 DELINEATORS, WHERE DELINEATION IS TERMINATED ON THE LEFT SIDE, REJOIN DELINEATION AGAIN ON THE RIGHT SIDE WITH A MINIMUM OVERLAP OF 2 DELINEATORS. WHEN THE GAP ON THE RIGHT SIDE IS LESS THAN 500 FT, CONTINUE THE DELINEATORS ON THE RIGHT SIDE THROUGH THE CURVE.

4. ON SPEED CHANGE LANES THE DELINEATORS SHALL BE INSTALLED ON THE RIGHT FOR RIGHT HAND CONNECTIONS, AND ON THE LEFT FOR LEFT HAND CONNECTIONS. DOUBLE DELINEATORS SHALL BE INSTALLED AT 100 FT, INTERVALS ALONG ACCELERATION AND DECELERATION LANES.

DELINEATION STANDARD

INTERCHANGE DELINEATION
GENERAL NOTES

1. CENTERLINE RUMBLE STRIPES SHALL BE CONTINUED THROUGHOUT ALL PASSING ZONES.

2. WHERE AT-GRADE BRIDGES ARE PRESENT, RUMBLE STRIPES SHALL END/BEGIN 30 FEET BEYOND THE EXISTING BRIDGE DECK JOINTS.

3. RUMBLE STRIPES SHALL HAVE A FINISHED DIMENSION OF 1" WIDE IN THE DIRECTION OF TRAVEL AND HAVE A MINIMUM OF 12" LONG MEASURED PERPENDICULAR TO THE DIRECTION OF TRAVEL.

4. THE DEPRESSIONS SHALL GENERALLY HAVE A CONCAVE CIRCULAR SHAPE WITH A 3/8" MINIMUM TO 5/8" MAXIMUM DEPTH AT THE CENTER.

DETAILS OF DEPRESSION

TYPICAL CENTERLINE INSTALLATION DETAIL

NO RUMBLE STRIPES TO BE CONSTRUCTED THROUGH THIS AREA

25 25' FROM TERMINUS OF CL PAVEMENT MARKING RADIUS POINT TO RADIUS POINT 25 25' FROM TERMINUS OF CL PAVEMENT MARKING

TYPICAL "T" INTERSECTION

NO RUMBLE STRIPES TO BE CONSTRUCTED THROUGH THIS AREA

25 25' FROM TERMINUS OF CL PAVEMENT MARKING RADIUS POINT TO RADIUS POINT 25 25' FROM TERMINUS OF CL PAVEMENT MARKING

TYPICAL INTERSECTION

DELINÉATION STANDARD
MILLED RUMBLE STRIPES (CENTERLINE)
TYPICAL APPLICATION NEAR RAISED MEDIAN ISLANDS

Rumble stripes shall be constructed on centerline through passing or climbing lanes (except for entrances, intersections, and intersections).

TYPICAL PASSING OR CLIMBING LANES
ANCHOR BOLT & LOCATION

- ALL HOMES 5/16" X 1" TO BE DRILLED OR PUNCHED PRIOR TO COATING PIPE. DRILLED IF CHANGES ORDERED.
- BOLTS TO BE SPACED APPROX. 18" C-C.
- TACK WELD WHEN USED IN A VERTICAL POSITION

DESIGN WITH LOW HEADWALL

ANCHOR BOLTS FOR CORRUGATED STEEL PIPE AND PIPE-ARCH

ANCHOR BOLTS FOR STRUCTURAL STEEL PLATE PIPE AND PIPE-ARCH
GENERAL NOTES

1. ALL DIMENSIONS ARE NOMINAL.
2. FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED.
   PROVIDE PROVIDE MEETS OR EXCEEDS SPECIFICATIONS OR MATHING.
3. THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES
   BENDIN THE SAME TO ALLOW CONTINUITY OF THE EXISTING
   PROVIDE THE EXISTING FRAMES ALLOW, WITHOUT SHIMS OR
   OTHER MODIFICATIONS OR ACCOMMODATIONS.
4. ALL OTHER PERMITTED MODIFICATIONS ARE MAINTAINED.
5. FRAME AVAILABLE IN 4" OR 8" HEIGHTS.
6. FREE OPEN AREA = 2.55 S.F.
7. USE 3-FLANGE FRAME IF INSTALLED ADJACENT TO GRANITE CURB.

SECTION A-A

PIPE DIAMETER INCHES

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<tr>
<td>ONE THROAT</td>
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<tr>
<td>12&quot;</td>
</tr>
<tr>
<td>15&quot;</td>
</tr>
<tr>
<td>18&quot;</td>
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<tr>
<td>24&quot;</td>
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PLAN

IN A SERIES OF CONNECTING
1. BARS IS OR 0.15". THE OUTLET
   PIPES MAY INCREASE IN
   DIAMETER, BUT THE SURFACE
   THROAT OPENINGS ARE NOT AFFECTED.

SECTION C-C

TO BE USED IN BERM DITCHES AND AT LOCATIONS
INACCESSIBLE TO VEHICULAR TRAFFIC

SECTION B-B

PLATE

GENERAL NOTES

1. ALL DIMENSIONS ARE NOMINAL.
2. NOT TO BE USED WHEN BICYCLE
   TRAFFIC IS ANTICIPATED.
3. USE 3-FLANGE FRAME IF INSTALLED
   ADJACENT TO GRANITE CURB.
4. FREE OPEN AREA = 1.80 S.F.
GENERAL NOTES
1. All dimensions are nominal.
2. See DR-6 for additional notes.
3. Frame shall be used with #2 slab top and be inset 1/4" subsidiary.
4. Free open area = 5.4 sq ft.
5. To be used on pavement where high capacity is needed and bicycle traffic is anticipated.
**General Notes**

1. Shaded area represents approximate limits of pavement depression.
2. Grate shall be placed 1" below and parallel to the normal pavement grade.
3. Freshly placed pavement shall be removed before compacting depressed area.

**Section A-A**

- 26'-0" wide median drainage details
- Concrete median barrier
- Drainage standard
- DRAINAGE DETAILS

**Plan**

- Top of grate elevation to be 1" below normal, at elevation of grate.
- Typical shoulder slope.
- Staggered locations to provide for a 4'-0" minimum length of pipe.

**Elevation**

- Top of grate elevation to be 1" below normal, at elevation of grate.
- Typical shoulder slope.
- Staggered locations to provide for a 4'-0" minimum length of pipe.

**Details**

- Concrete median barrier
- CB-B or DI-B w/ eccentric cone
- Grate
- Pavement depression
- 10'-0" wide median drainage details

**Notes**

- SAG - Versal curve.
- CB-B or DI-B w/ eccentric cone.
- Grate shall be placed 1" below and parallel to the normal pavement grade.

**STANDARD PLANS**

- Standard No. DR-3
- Revision Date: 06-16-2010
- Electronic File Name: DR-3.en
GENERAL NOTES

1. POLYETHYLENE LINER (ITEM 604.0007) SHALL BE FABRICATED AT THE SHOP. DOWNSPOUT SHALL BE EXTRUSION FILLET WELDED TO THE POLYETHYLENE SHEET.

2. PLACE A CONTINUOUS BAND OF AN APPROVED SILICONE SEALANT (SUBSIDIARY TO ITEM 604.0007) BETWEEN FRAME AND POLYETHYLENE SHEET (SEE SECTION 4-4, PLATE 4).

3. PLACE CONCRETE AA CAST-IN-PLACE OR PRECAST BASE CAST-IN-PLACE OR PRECAST CONCRETE CLASS AA.

4. USE ON DRAINAGE STRUCTURES 4" MIN. DIAMETER ONLY.

5. TRIM POLYETHYLENE SHEET A MAXIMUM OF 4" OUTSIDE THE FLANGE ON THE FRAME FOR THE CATCH BASIN BEFORE PLACING CONCRETE (EXCEPT AS SHOWN WHEN USED WITH 3-FLANGE FRAME AND CURB).

6. THE CENTER OF THE GRATE FRAME MAY BE SHIFTED A MAXIMUM OF 6" FROM THE CENTER OF THE DOWNSPOUT IN ANY DIRECTION.

7. PLACED ONLY IN DRAINAGE STRUCTURES IN PAVEMENT.
**STANDARD NO. DR-5**

**REVISION DATE**
07-13-2001

06-16-2010

**FILE NAME**
DR-5

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**GENERAL NOTES**

1. **ITEM NUMBERS:** C.B. = 604.1XXX, D.I. = 604.2XXX, M.H. = 604.3XXX

2. **FITTING FRAME TO GRADE MAY BE DONE WITH PREFABRICATED ADJUSTMENT RINGS OR CLAY BRICKS 12 COURSES MAX.**

3. **CB & DI GRATES IN PAVED AREAS SHALL BE SET ACCORDING TO THE PAVEMENT DEPRESSION DETAIL SHOWN ON PLATE 4 OF STANDARD NO. DR-2.**

4. **CORE SECTIONS MAY BE EITHER CONCENTRIC OR ECCENTRIC, OR FLAT SLAB TOPS MAY BE USED WHERE PIPE WOULD OTHERWISE ENTER INTO THE CONE SECTION OF THE STRUCTURE AND WHERE PERMITTED.**

5. **FOR STRUCTURES WITH DIAMETERS GREATER THAN 4", THE DIAMETER MAY BE CONSTANT FROM TOP TO BOTTOM WITH A FLAT SLAB TOP, OR A RISER SECTION THAT TRANSITIONS FROM A STANDARD 4" CONE SECTION TO THE LARGER DIAMETER RISER OR BASE SECTION MAY BE USED.**

6. **PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.**

7. **OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.**

8. **PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.**

9. **ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES; NO MORE THAN 15% OF A HORIZONTAL CROSS-SECTION SHALL BE HOLES; AND THERE SHALL BE NO HOLES CLOSER THAN 3" TO JOINTS.**

---

**DRAINAGE STANDARD**

**PRECAST REINFORCED CONCRETE**

C.B., D.I. AND M.H.
PAYMENT LIMITS FOR MUCK EXCAVATION
- ITEM 203.4 (UNLESS OTHERWISE ORDERED OR SHOWN ON THE PLANS)

TYPICAL HALF-SECTION SHOWING
MUCK TO BE REMOVED PER SECTION 203.
GENERAL NOTES

1. ALL END POSTS SHALL HAVE ONE BRACE; ALL CORNER AND INTERMEDIATE
   BRACE OR PULL POSTS SHALL HAVE TWO BRACES.
2. INTERMEDIATE OR LINE POSTS SHALL BE STANDARD STUDDED TEE POSTS.
3. END POSTS, CORNER POSTS AND PULL POSTS SHALL BE AN ANGLE POST DETAILED
   IN PLATE 3. BRACES SHALL BE AN ANGLE POST DETAILED IN PLATE 4.
4. WHERE GROUND CONDITION PERMITS, FORMS FOR FOOTING WILL NOT BE REQUIRED.
5. CONCRETE SHALL BE CLASS A.
GENERAL NOTES

1. ALL END POSTS SHALL HAVE ONE BRACE. (SEE DETAIL PLATE 2).

2. ALL CORNER AND INTERMEDIATE BRACE OR PULL POSTS SHALL HAVE TWO BRACES.


4. FENCE DETAILS ARE FOR STEEL, ALUMINUM, OR VINYL COATED FENCING. FOR ADDITIONAL DETAILS AND NOTES, SEE PLATES 2, 3, & 4.

END CORNER AND FULL POST

FOOTING DETAILS

WITH FORM

CONCRETE CLASS A

ALUMINUM

OVER 6' TO 12'

OVER 12' TO 24'

OVER 24' TO 36'

OVER 36' TO 44'

OVER 44' TO 60'

CONCRETE CLASS A

CONCRETE CLASS A

CONCRETE CLASS A

CONCRETE CLASS A
STANDARD NO. GR-1

GENERAL NOTES:
1. THE DEFINITION OF ROADSIDE BARRIER IS PER THE LATEST AASHTO ROADSIDE DESIGN GUIDELINES.
2. ITEMS IN BRACKETS [ ] ARE STANDARD ELEMENTS DESCRIBED IN AASHTO'S "A GUIDE TO STANDARD HIGHWAY GUARDRAIL.
3. ONLY RECTANGULAR PLATE WASHERS [FBB03] WHERE SHOWN ON THE OTHER SHEETS OF APPROVED HARDWARE.
4. USE 12"-6" LENGTH RAIL ELEMENTS IN RAIL CURVES OF LESS THAN 100." RADIUS.
5. USE OF POSTS SHORTER THAN 4', BUT NOT LESS THAN 6" LENGTH, IS ONLY ALLOWED UNDER THE FOLLOWING CONDITIONS:
   a) WHERE THERE IS A MINIMUM DISTANCE OF 1' FROM THE BACK OF THE GUARDRAIL POST ALONG A 1:1 OR FLATTER SLOPE TO THE SLOPE BREAK OF A 4:1 OR FLATTER SLOPE OR
   b) WHERE THERE IS A MINIMUM DISTANCE OF 2' FROM THE BACK OF THE GUARDRAIL POST ALONG A 1:1 OR FLATTER SLOPE TO THE SLOPE BREAK OF A 2:1 OR FLATTER SLOPE AND THE FACE OF RAIL IS AT THE BACK OF A CURVED STRUCTURAL SHAPE ELEMENT.
6. SHEET THICKNESS TO CAUSE 10:15:15
7. USE OF POSTS SHORTER THAN 1' BUT NOT LESS THAN 6" LONG, IS ONLY ALLOWED UNDER THE FOLLOWING CONDITIONS:
   a) WHERE THERE IS A MINIMUM DISTANCE OF 1' FROM THE BACK OF THE GUARDRAIL POST ALONG A 1:1 OR FLATTER SLOPE TO THE SLOPE BREAK OF A 4:1 OR FLATTER SLOPE OR
   b) WHERE THERE IS A MINIMUM DISTANCE OF 2' FROM THE BACK OF THE GUARDRAIL POST ALONG A 1:1 OR FLATTER SLOPE TO THE SLOPE BREAK OF A 2:1 OR FLATTER SLOPE AND THE FACE OF RAIL IS AT THE BACK OF A CURVED STRUCTURAL SHAPE ELEMENT.
8. THE FORM HAS LISTED OFFSET BLOCKS ON THEIR WEBSITE THAT ARE ELIGIBLE FOR FEDERAL PARTICIPATION FOR NORMAL WIDTH TERMS (3 CRITERIA). OTHERS MAY BE ADDED UNDER MASH AT TEST LEVEL 3. CRITERIA. OTHERS MAY BE ADDED UNDER MASH AT TEST LEVEL 5 OR HIGHER IN THE FUTURE. SOME OF THESE OTHER OFFSET BLOCKS HAVE OR MAY HAVE DIMENSIONS THAT VARY MORE THAN WOULD BE CONSIDERED WITHIN THE NORMAL CONTINUITY OF NOMINAL DIMENSIONS OF THE GUARDRAIL. OTHER THAN THE NOMINAL DIMENSIONS AS SHOWN ON THE PLANS, THE FOLLOWING APPLIES:
   a) THE FACE OF RAIL SHALL REMAIN AT THE EDGE OF PAVEMENT FOR THE INDICATED LOCATION/ARNON THE PLANS.
   b) THE DISTANCE FROM THE BACK OF THE POST TO THE BREAK IN THE SLOPE SHALL NOT BE LESS THAN WHAT IS SHOWN ON THE PLANS BUT IT MAY BE MORE.
   c) ALL OTHER REQUIREMENTS OF THE PERMITTED SPECIFICATIONS AND DETAILS REMAIN IN FORCE.
9. THE GUARDRAIL SYSTEM HAS RECEIVED A FEDERAL ELIGIBILITY LETTER FOR MASH AT TEST LEVEL 3.

STANDARD SECTION - STEEL POSTS & HARDWARE DETAILS

GUARDRAIL STANDARD
3/4" MID-SPLICE BEAM GUARDRAIL

NOTE: SEE SPECIAL DETAILS FOR OFFSET END-EARS.
NOTE:

SAMPLE GUARDRAIL INSTALLATION LAYOUT

GENERAL NOTES
1. THE DEFINITION OF ROADSIDE BARRIER IS PER THE LATEST ADOPTED EDITION OF THE ASHRAE ROADSIDE DESIGN GUIDE. EXCLUDED FROM THIS IS THE GATING PORTION OF A GUARDRAIL TERMINAL UNIT OR CRASH CUSHION AS WELL AS THE ENTIRE 3'-0" TERMINAL UNIT.

2. ITEMS IN BRACKETS [ ] ARE STANDARD ELEMENTS DESCRIBED IN ASHRAE'S "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE".

3. ONLY USE RECTANGULAR PLATE WASHERS [FBB03] WHERE SHOWN ON THE OTHER STANDARD SHEETS OR AS REQUIRED BY THE MANUFACTURERS FOR THEIR PROPRIETARY PRODUCTS.

4. USE 12'-6" LENGTH RAIL ELEMENTS IN RAIL CURVES OF LESS THAN 100'-0"

5. ESTABLISH RAIL HEIGHT AS FOLLOWS:
   a) SET THE HEIGHT OF RAIL FROM THE EDGE OF THE PAVEMENT (EP) OR THE FACE OF RAIL AT THE ELEVATION OF THE FACE OF RAIL.
   b) SET THE HEIGHT OF RAIL FROM THE GROUND AT THE FACE OF RAIL WHEN:
      i) THE FACE OF RAIL IS OFFSET FROM THE EP AND THE CROSS SLOPE FROM THE EP TO THE FACE OF RAIL IS 1:01 OR FLATTER OR
      ii) THE FACE OF RAIL IS AT THE BACK OF A CURBED SIDEWALK AND THE CURB IS AT THE FACE OF PAVEMENT.
   c) WHEN SITUATIONS OTHER THAN THOSE DESCRIBED ABOVE ARE ENCOUNTERED, ESTABLISH RAIL HEIGHT THROUGH AN ENGINEERING REVIEW TO ENSURE APPROPRIATE SYSTEM PERFORMANCE.

6. USE OF POSTS SHORTER THAN 7'-0" BUT NOT LESS THAN 6'-0" LONG IS ONLY ALLOWED UNDER THE FOLLOWING CONDITIONS:
   a) WHERE THERE IS A MINIMUM DISTANCE OF 1' FROM THE BACK OF THE GUARDRAIL POST ALONG A 1:01 OR FLATTER SLOPE TO THE SLOPE BREAK OF A 4:1 OR FLATTER SLOPE OR
   b) WHERE THERE IS A MINIMUM DISTANCE OF 2' FROM THE BACK OF THE GUARDRAIL POST ALONG A 1:01 OR FLATTER SLOPE TO THE SLOPE BREAK OF A STEEPER THAN 4:1 SINGLE SIDED OR STONE LINED SLOPE.
   THE TERM STABLE INCLUDES NOT SHOWING SIGNS OF SLOPE MOVEMENT SUCH AS DEPRESSIONS, CRACKS PARALLEL TO THE ROADWAY, ETC. OR ACTIVE EROSION.

7. THE FHWA HAS LISTED OFFSET BLOCKS ON THEIR WEBSITE THAT ARE ELIGIBLE FOR FEDERAL PARTICIPATION PER NCHP 350 TEST LEVEL 3 OR HIGHER IN THE FUTURE. SOME OF THESE OFFSET BLOCKS WERE OF MORE DIMENSIONS THAT VARY MORE THAN 1/8". OTHER THAN THE NOMINAL DIMENSIONS AS SHOWN ON THE PLANS, THE FOLLOWING APPLIES:
   a) THE FACE OF RAIL SHALL REMAIN AT THE EDGE OF PAVEMENT OR THE INDIICATED LOCATION AS SHOWN ON THE PLANS AND
   b) THE DISTANCE FROM THE BACK OF THE POST TO THE RAIL IN THE SLOPE SHALL NOT BE LESS THAN WHAT IS SHOWN ON THE PLANS BUT MAY BE MORE.

C. ALL OTHER REQUIREMENTS OF THE PERTINENT SPECIFICATIONS AND DETAILS REMAIN IN FORCE.
**STANDARD GUARDRAIL**

**TERMINAL UNIT TYPE E-2**

**GENERAL NOTES**

1. This terminal is designed for use primarily at sites where the terrain varies abruptly from a cut to a cut tier slope, and where the theoretical length of need would exceed the cut determination. This terminal is primarily intended for use where the maximum offset from the ditch edge is less than 18'.

2. See standard no. 04-4 for E-2 hardware details. See standard nos. 05-1 or 05-2 for additional details of common hardware.

3. A rub rail is required when the bottom of the W-beam is greater than 18' above the ground, and for offset greater than 15'.

4. The ditch line shall be 2:1 back slope for slopes exceeding 5%, unless otherwise noted.

5. For installations in rock cut, earth berms, excavate a sufficient quantity of rock to permit proper driving, and anchor the terminal by any of the following methods:

   a. Excavate rock, install W-beam terminal connector directly to rock face by an approved rock bolt method (subject to item 06-1.169.1).
   b. Install W-beam terminal connector to a concrete guideway.
   c. Attach W-beam terminal connector directly to rock face by an approved rock bolt method (subject to item 06-1.169.1).

6. Any additional fill shall be placed in the ditch with compacted fill for shoulder leveling required. The rock fill shall be placed as directed on the plans or proposal.
SECTION TYPE E-2 MODIFIED

TERMINAL SECTION

ELEVATION

30 MPH - 7:1 TAPER RATE

GENERAL NOTES

1. This terminal is designed for use primarily at sites where the terrain changes abruptly and from one end of the span to the other, where topographical length of need would extend into the cut section for a considerable distance. The design speed for this terminal is 30 mph.

2. See Standard No. GR-6 for E-2 HARDWARE DETAILS. See Standards No. GR-4 and No. GR-5 for E-2 TERMINAL SECTION DETAILS. See Standard No. GR-6 for E-2 HARDWARE DETAILS.

3. At the beginning or end of standard section guardrail:

   (a) Construct outlet ditch to fit site conditions or use drop inlet and pipe if large flows are anticipated or if ditching becomes flatter than 0.5% (2:1).

4. Where required, construct outlet ditch to fit site conditions or use drop inlet and pipe if large flows are anticipated or if ditching becomes flatter than 0.5% (2:1).

5. FOR INSTALLATIONS IN ROCK CUT EARTH BANKS, EXCAVATE A SUFFICIENT QUANTITY OF ROCK TO PREVENT POST DRIVING, AND ANCHOR POSTS IN OR UTILITY, OR ONE SLOPE OF THE EMBANKMENT.

6. Any common excavation, embankment in-place, and crushed gravel, for shoulder leveling required will be paid under item 216.2 Rock Structure Excavation will be paid as Item 216.2 Rock Structure Excavation.

7. The back slope shall be 2:1 or 1:1.5 if the posts approach the anchor. It is not the intent to flatten an existing back slope that is greater than 2:1 or 1:1.5 on the plans or proposal.
TYPICAL SECTION

CALCULATED RAIL LENGTH

STANDARD NO. GR-9

REVISED DATE 01-01-2006

STANDARD PLANS

GUARDRAIL STANDARD

SECTION TYPE E-2 MODIFIED 45

GENERAL NOTES

1. THIS TERMINAL IS DESIGNED FOR USE PRIMARILY AT SITES WHERE THE TERMINAL LENGTHS ARE SHORTENED FOR A CONSIDERABLE DISTANCE - THE DESIGN SPEED FOR THIS TERMINAL IS 45 MPH.

2. SEE STANDARD NO. GR-4 FOR E-2 HARDWARE DETAILS - SEE STANDARD NO. GR-4-1 OR GR-4-2 FOR ADDITIONAL DETAILS OF CONCRETE BASAL.

3. A RUB RAIL IS REQUIRED WHEN THE BOTTOM OF THE W-BEAM IS GREATER THAN 18 IN. ABOVE E.P., USE AT BEGINNING OR END OF RUB RAIL LENGTH. SET 30" ABOVE THE EDGE OF PAVEMENT.

4. INSTALLATIONS IN ROCK CUTS REQUIRE THE CONTACT FLAT BOTTOMED DITCH TO THE 2:1 BACKSLOPE.

5. FOR INSTALLATIONS IN ROCK CUTS OR SLOPES, USE GRAVEL.

6. ALL HATCHED AREAS ARE TO BE CONSTRUCTED OR USED IN PLACE.

7. HUMUS Varies WITH TYPICAL SECTION

8. A CRUSHED GRAVEL FOR SHOULDER LEVELING. ACRUSHED GRAVEL FOR SHOULDER LEVELING.

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GENERAL NOTES

1. 25'-0" RAIL PANELS MAY BE USED IN PLACE OF 12'-6" PANELS, EXCEPT ON CURVES WITH A RAIL RADIUS OF LESS THAN 300 FT.

2. GUARDRAIL HEIGHT SHALL BE SET FROM THE GRADE AT THE FACE OF RAIL.

3. DESIGNATIONS PROVIDED IN BRACKETS [ ] REFERENCE STANDARD ELEMENTS DETAINED IN 'A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE, LATEST ADOPTED VERSION: AASHO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.'

4. SEE STD. NO. DL-1 FOR BEAM GUARDRAIL DELINEATORS.

5. PAID FOR UNDER APPROPRIATE 606 ITEMS, AS SHOWN ON PLANS.
**ELEVATION VIEW**

- LAP RAIL IN DIRECTION OF TRAFFIC
- PLATE WASHERS (TYP.)
- POST BOLT SLOT

**SIDE VIEW AT SPLICE POST**

- SPLICE BOLT (FBB01)
- ROUND WASHER (FWC01a)
- POST BOLT (FBB03)
- PLATE WASHER (FWC03)

**BEAM SPLICE**

- SPLICE BOLT SLOT
- POST ASSEMBLY SLOT

**STRUCTURAL SHAPE STEEL POST & BLOCK**

- BEAM GUARDRAIL THRIE BEAM DOUBLE-FACED (STEEL)

**GENERAL NOTES**

1. 25'-0" RAIL PANELS MAY BE USED IN PLACE OF 12'-6" PANELS EXCEPT ON CURVES WITH A RAIL RADIUS OF LESS THAN 300 FT.

2. GUARDRAIL HEIGHT SHALL BE SET FROM THE GRADE AT THE FACE OF RAIL.

3. DESIGNATIONS PROVIDED IN BRACKETS () REFERENCE STANDARD ELEMENTS DETAILED IN A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE, LATEST EDITION. ASHTRT-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.

4. SEE STD. NO. DL-1 FOR BEAM GUARDRAIL DELINEATORS.

5. PAID UNDER APPROPRIATE 606 ITEMS OR AS SHOWN ON PLANS.

6. DIMENSIONS OF PLASTIC AND SYNTHETIC BLOCKOUTS ARE AS SHOWN ON MANUFACTURER'S DRAWINGS.

**GUARDRAIL STANDARD**

- BEAM GUARDRAIL THRIE BEAM DOUBLE-FACED (STEEL)
ELEVATION VIEW

SIDE VIEW AT SPLICE POST

PLATE WASHER

BEAM SPLICE

POST ASSEMBLY SLOT

STRUCTURAL STEEL POST & BLOCK

GENERAL NOTES

1. 25'-0" RAIL PANELS MAY BE USED IN PLACE OF 12'-6" PANELS, EXCEPT ON CURVES WITH A RAIL RADIUS OF LESS THAN 300 FT.

2. GUARDRAIL HEIGHT SHALL BE SET FROM THE GRADE AT THE FACE OF RAIL.

3. DESIGNATIONS PROVIDED IN BRACKETS [ ] REFERENCE STANDARD ELEMENTS DETAILED IN A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE. LATEST ADOPTED VERSION, ASHTO-AMERICAN INSTITUTE OF STEEL CONSTRUCTION JOINT COOPERATIVE COMMITTEE.

4. SEE STD. NO. DL-1 FOR BEAM GUARDRAIL DELINEATORS.

5. PAID FOR UNDER APPROPRIATE 606 ITEMS, OR AS SHOWN ON PLANS.

6. DIMENSIONS OF PLASTIC AND SYNTHETIC BLOCKOUTS ARE AS SHOWN ON MANUFACTURER’S DRAWINGS.

7. POSTS SHORTER THAN THE 7'-0" INDICATED ON THE DETAIL, BUT NOT LESS THAN 6'-6", MAY ONLY BE USED WHEN
   A) THE SLOPE BEHIND THE GUARDRAIL IS NO STEEPER THAN 4:1
   B) WHERE THE DISTANCE FROM THE BACK OF THE POST TO THE BREAK OF THE SLOPE IS A MINIMUM OF 2'-0"
   C) AND THEN ONLY AS APPROVED SPECIFICALLY SHOWN ON THE PLANS.

GUARDRAIL STANDARD

BEAM GUARDRAIL THRIE
BEAM SINGLE-FACED (STEEL)
CONCRETE BARRIER PRECAST
DOUBLE-FACED 42" F-SHAPE
SECTION A-A

ELEVATION

GENERAL NOTES
1. THE CONCRETE BARRIER DETAILS, AS SHOWN ON THIS SHEET, ARE IN COMPLIANCE WITH THE REQUIREMENTS OF NCHRP REPORT 350, TL 4.
2. I-BEAMS AND STRUCTURAL TUBES SHALL BE GALVANIZED AFTER FABRICATION.
3. STUD WELDING SHALL BE IN ACCORDANCE WITH ITEM 547.
4. SLOT IN STRUCTURAL TUBE SHALL BE CUT WITH MECHANICALLY GUIDED MEANS TO A SMOOTH, UNIFORM SURFACE MEETING A SURFACE ROUGHNESS OF 1000 MICROINCHES OR BETTER (ANSI B46.1).
5. PAID FOR UNDER APPROPRIATE 606 ITEMS, OR AS SHOWN ON PLANS.

MATERIAL NOTES
1. THE BARRIERS SHALL BE LIGHT COLORED CLASS "TA" CONCRETE HAVING A MINIMUM 28 DAY COMPRESSION STRENGTH OF 4,000 PSI. BARRIERS SHALL HAVE A SMOOTH UNIFORM SURFACE FREE OF DEFECTS AND IRREGULARITIES. CASTING DATE SHALL BE SHOWN ON BARRIER. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4", UNLESS NOTED OTHERWISE.
2. ALL REINFORCING STEEL SHALL BE ASTM A615 (A311/A616) GRADE 60, EPOXY COATED.
3. EACH BARRIER UNIT SHALL INCLUDE ONE S 3 x 7.5 AS SHOWN ON THIS PLAN SHEET.
4. SHOP DRAWINGS SHALL INCLUDE REINFORCING SCHEDULE.
5. LEVELING PADS OR SHIMMING MATERIAL SHALL BE SUBSIDIARY TO THE BARRIER ITEM.
STANDARD PLANS

1. The concrete barrier details as shown on this sheet are in compliance with the requirements of NHP Report 350, VLA.
2. U.S. and structural tubes shall be galvanized after fabrication.
3. Stud welding shall be in accordance with Item 6.
4. Slot in structural tube shall be cut with mechanically dashed means to a smooth uniform surface meeting a surface roughness of 1000 microinches or better (ansi bar 11).
5. Paid for under appropriate 60 items, or as shown on plans.

MATERIAL NOTES
1. The barriers shall be light-colored class "AA" concrete having a minimum 28 day compression strength of 4,000 PSI. BARRIERS SHALL HAVE A SMOOTH UNIFORM SURFACE FREE OF DEFECTS AND IRREGULARITIES. CASTING DATE SHALL BE SHOWN ON BARRIER. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 4", UNLESS NOTED OTHERWISE.
2. ALL REINFORCING STEEL SHALL BE ASTM A615 GR. 60. EPOXY COATED.
3. EACH BARRIER UNIT SHALL INCLUDE ONE 5 3/4" X 5 3/4" X 5 3/4" END VIEW
4. Shop drawings shall include reinforcing schedule.
5. LEVELING PADS OR STANDING MATERIAL SHALL BE SUBSIDIARY TO THE BARRIER ITEM.
**GENERAL NOTES**

1. The concrete barrier details, as shown on this sheet, are in compliance with the requirements of NCHRP Report 350, TL 4.
2. I-beams and structural tubes shall be galvanized after fabrication.
3. Stud welding shall be in accordance with Item 5.
4. Slots in structural tubes shall be cut with mechanically guided means to a smooth, uniform surface meeting a surface roughness of 100 microinches or better ( ANSI B48.13).
5. Paid for under appropriate G.I. Items, or as shown on Plans.

**MATERIAL NOTES**

1. The barriers shall be light colored Class "A" concrete having a minimum 28 day compression strength of 4,000 psi. Barriers shall have a smooth uniform surface free of defects and irregularities. Casting date shall be shown on barrier. All exposed edges of concrete shall be chamfered 1/8", unless noted otherwise.
2. All reinforcing steel shall be ASTM A615, Grade 60. Epoxy coated.
3. Rebar shall be cut to 2" as shown on this plan sheet.
4. Shop drawings shall include reinforcing schedule.
5. Leveling pads or shimming material shall be subsidiary to the barrier item.

**CONCRETE BARRIER REINFORCING SCHEDULE**

<table>
<thead>
<tr>
<th>Description</th>
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**END VIEW (MASONRY)**

Guardrail standard
Concrete barrier
Precast double-faced
Single slope

**MINIMUM OF 3" END COURSE BELOW THE SURFACE OF THE PAVEMENT**
PLAN VIEW - CONCRETE BARRIER TO GUARDRAIL CONNECTION DETAIL (SINGLE-FACED THRIE BEAM GUARDRAIL)

PLAN VIEW - CONCRETE BARRIER TO GUARDRAIL CONNECTION DETAIL (DOUBLE-FACED THRIE BEAM GUARDRAIL)

ELEVATION - APPROACH RAIL

GENERAL NOTES:
1. ALL THRIE BEAM RAIL, INCLUDING TRANSITION DEVICES, SHALL BE GALVANIZED AS SPECIFIED. ALL TERMINAL CONNECTIONS SHALL BE GALVANIZED TO CAUSE.
2. CONNECTIONS TO CONCRETE BARRIER SHALL BE APPROVED 5/8" GALVANIZED HIGH STRENGTH STUD (6 Pcs) MISSES SHALL BE CAPABLE OF DEVELOPING FULL STRENGTH OF 5/8" HIGH STRENGTH BOLT: ALL COSTS INCLUDED IN ITEM - SEE NOTE.
3. ALL CONNECTIONS FOR THE THRIE BEAM RAIL AND TERMINAL CONNECTOR SHALL BE STABILIZED TO THE DIRECTION OF TRAFFIC.
4. PAID FOR UNDER APPROPRIATE 606 ITEMS, OR AS SHOWN ON PLANS.

SECTION A-A (POST RAIL ASSEMBLY)

SECTION B-B (POST RAIL ASSEMBLY)

DOUBLE-FACED THRIE BEAM ATTACHMENT

THRIE BEAM TO W-BEAM TRANSITION SECTION
### General Notes

1. The portable concrete barrier layout, as shown on this sheet, are in compliance with the requirements of NCHRP Report 350.
2. Concrete barriers installed shall be furnished and shall conform to AASHTO M-311, Grade 60, Rebars, as shown on the layout, except as noted on the plans.
3. Each barrier unit shall include one linking pin.
4. Lifting options shall be advisory only. It shall be the contractor's responsibility to provide adequate lifting points on each barrier.
5. Connecting devices shall be supplied with each unit.
6. Retractable stoppers shall be used on each end of the barrier.
7. The color of Retractable Stopper and the color of Linking Pin and Retractable Stopper shall, in all cases, conform to the Color of Edge Line Marking(s). Delimiters shall not be used to replace the need for Retractable Stopper and Linking Pin, respectively.
8. The Portable Concrete Barrier shall be light colored Class “AA” concrete having a minimum day compression strength of 4,000 psi. Barriers shall have a smooth uniform surface free of defects and irregularities. Casting date shall be shown on barrier. All exposed edges of concrete shall be chamfered 3/16 unless otherwise noted.
9. Reinforcing steel shall be AASHTO M-311, Grade 60, unless otherwise noted.
10. Barriers shall be light colored Class “AA” concrete having a minimum day compression strength of 4,000 psi. Barriers shall have a smooth uniform surface free of defects and irregularities. Casting date shall be shown on barrier. All exposed edges of concrete shall be chamfered 3/16 unless otherwise noted.

### Material Notes

- BARRIERS SHALL BE LIGHT COLORED CLASS “AA” CONCRETE HAVING A MINIMUM DAY COMPRESSION STRENGTH OF 4,000 PSI. BARRIERS SHALL HAVE A SMOOTH UNIFORM SURFACE FREE OF DEFECTS AND IRREGULARITIES. CASTING DATE SHALL BE SHOWN ON BARRIER. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/16 UNLESS OTHERWISE NOTED.
- ALL REINFORCING STEEL SHALL BE AASHTO M-311 (ASTM-A615) GRADE 60, REINFORCEMENT SHOWN IS THE MINIMUM REQUIRED.
- EACH BARRIER UNIT SHALL INCLUDE ONE LINKING PIN.
- LIFTING OPTIONS SHOWN ARE ADVISORY ONLY. IT SHALL BE THE CONTRACTORS' RESPONSIBILITY TO PROVIDE ADEQUATE LIFTING POINTS ON EACH BARRIER.
- CONNECTING DEVICES SHALL BE ADDED TO THE BARRIER USING BOLTS AND ANCHORS OR OTHER APPROVED MEANS.
- DELIMITERS SHALL BE ATTACHED TO THE BARRIER USING BOLTS AND ANCHORS OR OTHER APPROVED MEANS.

### Typical Section

**PORTABLE CONCRETE BARRIER**

**OPERATING SPEED**

<table>
<thead>
<tr>
<th>Speed (MPH)</th>
<th>Maximum Flare (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>2°</td>
</tr>
<tr>
<td>50</td>
<td>4°</td>
</tr>
<tr>
<td>60</td>
<td>6°</td>
</tr>
<tr>
<td>80</td>
<td>8°</td>
</tr>
<tr>
<td>100</td>
<td>10°</td>
</tr>
</tbody>
</table>

### General Notes

- The Portable Concrete Barrier shall be light colored Class “AA” concrete having a minimum day compression strength of 4,000 psi. Barriers shall have a smooth uniform surface free of defects and irregularities. Casting date shall be shown on barrier. All exposed edges of concrete shall be chamfered 3/16 unless otherwise noted.
- All reinforcing steel shall be AASHTO M-311 (ASTM-A615) Grade 60, reinforcement shown is the minimum required.
- Each barrier unit shall include one linking pin.
- Lifting options shown are advisory only. It shall be the contractor's responsibility to provide adequate lifting points on each barrier.
- Connecting devices shall be added to the barrier using bolts and anchors or other approved means.
- Delimiters shall be attached to the barrier using bolts and anchors or other approved means.

### Layout of Portable Concrete Barrier

**Typical Section**

**PORTABLE CONCRETE BARRIER**

**OPERATING SPEED**

<table>
<thead>
<tr>
<th>Speed (MPH)</th>
<th>Maximum Flare (°)</th>
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<tbody>
<tr>
<td>30</td>
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<tr>
<td>50</td>
<td>4°</td>
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<td>60</td>
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<td>80</td>
<td>8°</td>
</tr>
<tr>
<td>100</td>
<td>10°</td>
</tr>
</tbody>
</table>

- Measure flares from a line parallel to the roadway, i.e., whether on a curve or a tangent.
- ** For restricted site conditions, lesser offsets may be permitted by the Engineer.
- *** To reduce potential for high-angle impacts (> 15°).
STANDARD BLUNT END ACCEPTABLE ON DEPARTURE END FOR ONE-WAY TRAFFIC ONLY, FOR TWO-WAY TRAFFIC (C, FLARE PCB BEYOND THE CLEAR ZONE OF APPROACHING TRAFFIC OR ADEQUATELY PROTECT END AS ORDERED. SEE NOTE 1).

PORTABLE CONCRETE BARRIER (DOUBLE-FACED)

LOCATION OF TEMPORARY LIGHT I -STEM 70'-10"

FLARE PCB BEYOND CLEAR ZONE OR ADEQUATELY PROTECT END AS ORDERED - SEE NOTE 1D

1 0' 1 0" ~ 1 5° ---------:

50' MIN. PARALLEL TO ROADWAY CENTERLINE

PLAN

SECTION B-B

ELEVATION

JOINING TWO BARRIERS

SCALE: 3" = 1'-0"

SCALE: 3" = 1'-0"

PORTABLE CONCRETE BARRIER LAYOUT

OPERATING SPEED

DESIRED LATERAL OFFSET FROM I.P. **

MAXIMUM FLARE RATE & FREE-STANDING MAXIMUM LENGTH OF PCB SYSTEM

20 MPH

5' 19111

30 MPH

6' 21111

40 MPH

7' 23111

50 MPH

8' 25111

60 MPH

9' 27111

70 MPH

10' 29111

ALL SPEEDS 15' MAX. *** 200"

* MEASURE FLARE FROM A LINE PARALLEL TO THE ROADWAY TO

** WHETHER ON A CURVE, OR A TANGENT.

*** FOR RESTRICTED SITE CONDITIONS, LESSER OFFSETS MAY BE PERMITTED BY THE ENGINEER.

**** TO REDUCE POTENTIAL FOR HIGH-ANGLE IMPACTS (> 15°)

PLAN

SECTION B-B

ELEVATION

F6 3/4" (3/16" THICKNESS) LOOP BAR

SCALE: 3/16" = 1'-0"

6 LOOP BARS (11'-2" TOTAL LENGTH)

ASTM A36) HOT DIP GALVANIZE AFTER FABRICATION PER ASTM A123 OR AASHTO M 111

REBAR SCHEDULE

F SHAPE PCB

(12'-6" BARRIER)

MARYLAND DEPARTMENT OF TRAFFIC PLANS

STANDARD NO. GR-24

STANDARD NO. GR-25

GUARDRAIL STANDARD

PORTABLE CONCRETE BARRIER

(2 OF 2)
**ITEM 203.5572 - EAGRT PLATFORM**
**ALTERNATE, TL 2 - 25’**

**SECTION A-A**
**PLATFORM SLOPE GRADING**

**SECTION B-B**
**PLATFORM APPROACH GRADING**

**NOTES**
1. The TL 2 - 25’ system is a 25’ energy absorbing guardrail terminal (EAGRT) unit only to be used when site conditions restrict the use of a standard TL 2 system.
2. When possible, provide 16’ minimum clearance between roadway centerline and face of standard beam guardrail.
3. The preferred grading layout should be used on all new construction, as well as when upgrading existing terminals when practical.
4. In certain cases, "standard beam guardrail" may be a proprietary item such as Nu-Guard. See plans for standard beam guardrail type.
5. TL 2 - 25’ EAGRTs shall only be used in areas with design speeds of 45 MPH and under.
TL 2 EAGRT PAYMENT UNIT LENGTH

ITEM 203.5561 - EAGRT PLATFORM PREFERRED

ITEM 203.5562 - EAGRT PLATFORM ALTERNATE

NOTES

1. THE 62.50' ENERGY ABSORBING GUARDRAIL TERMINAL (EAGRT) PAYMENT UNIT LENGTH IS COMPRISSED OF THE TERMINAL LENGTH PLUS W-BEAM RAIL AS DESCRIBED IN THE APPROPRIATE 606 SPECIAL PROVISION.

2. WHEN POSSIBLE, PROVIDE 16' MINIMUM CLEARANCE BETWEEN ROADWAY CENTERLINE AND FACE OF STANDARD BEAM GUARDRAIL.

3. THIS DETAIL IS DESIGNED TO GET THE HEAD OF THE TERMINAL UNIT WAY FROM THE EDGE OF PAVEMENT. IF THE LONGITUDINAL PORTION OF THE GUARDRAIL RISE IS EQUAL TO OR GREATER THAN 2.50' FROM EP, USE THE PARALLEL EAGRT DETAIL.

4. THE PREFERRED GRADING LAYOUT SHOULD BE USED ON ALL NEW CONSTRUCTION AS WELL AS WHEN UPGRAADING EXISTING TERMINALS WHEN PRACTICAL.

5. IT IS RECOGNIZED THAT THE 62.50' EAGRT PAYMENT UNIT LENGTH MAY NOT FIT ALL SCENARIOS. THIS UNIT SHALL BE PAID AS A COMPLETE INSTALLATION IN THE EVENT THAT THERE IS NOT AVAILABLE SPACE TO INSTALL PER THIS DETAIL.

6. IN CERTAIN CASES, "STANDARD BEAM GUARDRAIL" MAY BE A PROPRIETARY ITEM SUCH AS NO-GUARD. SEE PLANS FOR STANDARD BEAM GUARDRAIL TYPE.

7. TL 2 EAGRTS SHALL ONLY BE USED IN AREAS WITH DESIGN SPEEDS OF 45 MPH AND UNDER.
ITEM 203.5562 - EAGRT PLATFORM ALTERNATE

SECTION A-A
PLATFORM SLOPE GRADING

SECTION B-B
PLATFORM APPROACH GRADING

NOTES
1. THE 62-50' ENERGY ABSORBING GUARDRAIL TERMINAL (EAGRT) PAYMENT UNIT LENGTH IS COMPRISED OF THE TERMINAL LENGTH PLUS W-BEAM RAIL AS DESCRIBED IN THE APPROPRIATE 606 SPECIAL PROVISION.
2. WHEN POSSIBLE, PROVIDE 16' MINIMUM CLEARANCE BETWEEN ROADWAY CENTERLINE AND FACE OF STANDARD BEAM GUARDRAIL.
3. THIS DETAIL SHOULD BE USED WHEN THE LONGITUDINAL PORTION OF THE GUARDRAIL IS EQUAL TO OR GREATER THAN 2-50' FROM THE EDGE OF PAVEMENT. IF THE OFFSET IS LESS THAN 2.50', USE THE TAPERED EAGRT DETAIL.
4. THE PREFERRED GRADING LAYOUT SHOULD BE USED ON ALL NEW CONSTRUCTION AS WELL AS WHEN UPGRADING EXISTING TERMINALS WHEN PRACTICAL.
5. IT IS RECOMMENDED THAT THE 62-50' EAGRT PAYMENT UNIT LENGTH MAY NOT EXCEED 20% OF THE PLATFORM APPROACH.
6. IN CERTAIN CASES, "STANDARD BEAM GUARDRAIL" MAY BE A PROPRIETARY ITEM SUCH AS NU-GUARD. SEE PLANS FOR STANDARD BEAM GUARDRAIL TYPE.

ITEM 203.5561 - EAGRT PLATFORM PREFERRED
ITEM 203.5562 - EAGRT
PLATFORM ALTERNATE

SECTION A-A
PLATFORM SLOPE GRADING

ITEM 203.5561 - EAGRT
PLATFORM PREFERRED
GENERAL NOTES
1. RAIL SHALL BE 1 1/4" TO 1 1/2" G.D.
2. POSTS SHALL BE 1 1/4" NOMINAL.
3. POSTS SHALL BE CENTERED IN PARAPET OF STEPS.
4. HANDRAILS SHALL BE INSTALLED ON BOTH SIDES OF STEPS.
5. THE MINIMUM SPACING BETWEEN HANDRAILS IS 3'-0". MAXIMUM 5'-0".
6. ITEM 606-610X - STEP HANDRAIL, MATERIAL.

GENERAL NOTES
1. RAIL SHALL BE 1 1/4" TO 1 1/2" G.D.
2. POSTS SHALL BE 1 1/4" NOMINAL.
3. WHEN THIS DIMENSION EXCEEDS 4'-0" A GUARD IS REQUIRED (SEE PLATE 3).
4. ITEM 606-620X - RAMP HANDRAIL, MATERIAL.

GENERAL NOTES
1. FOR DETAILS OF HANDRAIL, SEE PLATE 2.
2. FRAME AND CONNECTORS TO HANDRAIL SHALL BE 1" NOMINAL.
3. PALINGS SHALL BE 7/8" NOMINAL SPACE 6" ON CENTER.
4. ITEM 606-611X - STEP HANDRAIL W/ GUARD, MATERIAL.
5. ITEM 606-621X - RAMP HANDRAIL W/ GUARD, MATERIAL.

GENERAL NOTES
1. GUARD FOR HANDRAIL
2. FRAME AND CONNECTORS TO GUARD SHALL BE 1" NOMINAL.
3. PALINGS SHALL BE 7/8" NOMINAL SPACE 6" ON CENTER.
4. ITEM 606-630X - SAFETY RAIL, MATERIAL.
5. ITEM 606-631X - SAFETY RAIL W/ GUARD, MATERIAL.
GENERAL NOTES
1. CONCRETE SHALL BE CLASS A.
2. BOUNDS TO BE SET IN GRAVEL, 9" ON ALL SIDES OF AND UNDER BOUND.
3. WHEN BOUNDING NON-STATE RIGHT-OF-WAY FOR CITIES AND TOWNS, USE ITEM 622.4 - CONCRETE BOUNDS.
4. ITEM 622.4 - CONCRETE BOUNDS.

TYPICAL TREATMENT OF RAISED ISLAND TO PROVIDE BLOCKOUTS FOR SIGNING AND DELINEATION

GENERAL NOTES
1. ISLANDS LESS THAN 16'-0" LONG REQUIRE ONLY ONE 18" CIRCULAR BLOCKOUT LOCATED AT THE WIDESPOT.
2. ADDITIONAL SIGNING BLOCKOUTS SHALL BE PROVIDED OPPOSITE ALL DRIVeways AND SIDE ROAD APPROACHES.
3. BLOCKOUTS SHALL BE BACKFILLED WITH 2" OF COLD PATCH.
4. IT MAY BE NECESSARY TO ADJUST THE LOCATION OF BLOCKOUTS TO AVOID UTILITY STRUCTURES OR PEDESTRIAN CROSSWALK OPENINGS.

DETAIL OF CONCRETE BOUND

CONCRETE STEPS

MORTAR RUBBLE MASONRY STEPS

REINFORCING STEEL

MARK | SIZE | NUMBER | LENGTH (EACH)
-----|------|--------|-------------
8    | #5   | 1-0.453#/FT. | 1 EA. PARAPET +13" EACH "A" +15" FOR "C"
      |      | 1 EA. FT. OF WIDTH "W" +16" FOR "C"
5    | #4   | 0.668#/FT.   | 1 EA. PARAPET 1 EA. "A" +13" EACH "A" +15" FOR "C"
      |      | 2 EA. "B" +10"/FT. OF WIDTH "W"
      |      | 2 EA. "C" +10"/FT. OF WIDTH "W"
GENERAL NOTES

1. THE MAILBOX SUPPORT ASSEMBLY SHOWN ON THIS SHEET IS AN EXAMPLE OF AN ACCEPTABLE NON-PROPRIETARY DESIGN.

2. NO MORE THAN TWO MAILBOXES MAY BE MOUNTED ON A SUPPORT STRUCTURE UNLESS THE SUPPORT STRUCTURE AND MAILBOX ARRANGEMENT HAVE BEEN SHOWN TO BE SAFE BY CRASH TESTING. HOWEVER, LIGHTWEIGHT NEWSPAPER BOXES MAY BE MOUNTED BELOW THE MAILBOX ON THE SIDE OF THE MAILBOX SUPPORT.

3. MAILBOX SUPPORTS SHALL NOT BE SET IN CONCRETE UNLESS THE SUPPORT DESIGN HAS BEEN SHOWN TO BE SAFE BY CRASH TESTS WHEN SO INSTALLED.

4. A SINGLE 4" X 4" SQUARED OR 4" DIAMETER WOOD POST OR A METAL POST WITH A STRENGTH NO GREATER THAN A 2" DIAMETER STANDARD STRENGTH STEEL PIPE AND EMBEDDED NO MORE THAN 24" INTO THE GROUND WILL BE ACCEPTABLE AS A MAILBOX SUPPORT. A METAL POST SHALL NOT BE FITTED WITH AN ANCHOR PLATE, BUT IT SHALL HAVE AN ANTI-TWIST DEVICE THAT EXTENDS NO MORE THAN 10" BELOW THE GROUND SURFACE. THESE DIMENSIONS ARE BOTH MAXIMUM AND MINIMUM.

5. IN AREAS OF HIGH SNOWFALL, CANTILEVER DESIGNS MAY BE ADVANTAGEOUS. CANTILEVER SUPPORTS PERMIT WINDSHIELD CONTACT WITH THE MAILBOX WITHOUT THE VEHICLE FIRST CONTACTING THE POST. THEREFORE, AN APPROVED BREAKAWAY SUPPORT MUST BE USED.

6. FOR ADDITIONAL INFORMATION, REFER TO THE LATEST ADOPTED EDITION OF THE AASHTO - ROADSIDE DESIGN GUIDE - CHAPTER 11, DIRECTING MAILBOXES ON STREETS AND HIGHWAYS.

7. CONTACT THE LOCAL POSTMASTER FOR OFFSET AND HEIGHT FROM EP WHEN INSTALLING IN UNCORDED AREAS.
NOTE: NEVER CUT LEADER.

GUY MATERIAL AT TREE OR TO FIRST BRANCH, WHICHEVER IS LOWER.

GUY MATERIAL VERTICAL STAKES.

STAKE TO BE 18" BELOW TREE PIT IN UNDISTURBED GROUND.

DECIDUOUS TREE PLANTING

NOTE: GUYING AND STAKING TO BE DETERMINED IN THE FIELD BY THE ENGINEER. LOCAL FIELD CONDITIONS AS WELL AS PLANT CHARACTERISTICS WILL DETERMINE THE NECESSITY OF GUYING AND STAKING.

BURLAP AND ROPE CUT AWAY FROM TOP OF BALL. REMOVE SYNTHETIC BURLAP AND STRING ENTIRELY AND TOP 8"-16" OF WIRE BASKET. LOOSEN AND/OR SLASH ANY COMPACTED ROOTS.

4" DEEP BARK MULCH.

HUB STAKE

UNDISTURBED GROUND

ROOT COLLAR SHALL BE AT THE SAME LEVEL AS THE EXISTING GRADE.

TYPICAL PLANTING PIT ON LEVEL

ROOT COLLAR KEEP SAUCER LEVEL.

HUB STAKE

EFFECTIVE 2X ROOTBALL DIAMETER MIN.

UNDISTURBED GROUND

2X ROOTBALL DIAMETER MIN.

ERRORS

MOUND AND TAMP PIT EXCAVATION 4" ABOVE LEVEL OF ROOT COLLAR FOR SAUCER.

TYPICAL PLANTING PIT ON SLOPE 4:1 OR GREATER

NOTE: STAKE AND GUY 3 LARGEST STEMS, IF TREE HAS MORE THAN 3 LEADERS. NEVER CUT LEADERS.

5 1/2" OF TREE HEIGHT.

GUY MATERIAL VERTICAL STAKES.

SHRUB PLANTING

STAKES TO BE 18" BELOW BOTTOM OF TREE PIT IN UNDISTURBED GROUND.

TYPICAL PLANTING PIT ON SLOPE

ROOT COLLAR KEEP SAUCER LEVEL.

HUB STAKE

UNDISTURBED GROUND

3X ROOTBALL DIAMETER MIN.

ERRORS

MOUND AND TAMP PIT EXCAVATION 4" ABOVE LEVEL OF ROOT COLLAR FOR SAUCER.

TYPICAL PLANTING PIT ON SLOPE 4:1 OR GREATER

NOTE: STAKE AND GUY 3 LARGEST STEMS, IF TREE HAS MORE THAN 3 LEADERS. NEVER CUT LEADERS.

5 1/2" OF TREE HEIGHT.

GUY MATERIAL VERTICAL STAKES.

SHRUB PLANTING

STAKES TO BE 18" BELOW BOTTOM OF TREE PIT IN UNDISTURBED GROUND.

TYPICAL PLANTING PIT ON SLOPE

ROOT COLLAR KEEP SAUCER LEVEL.

HUB STAKE

UNDISTURBED GROUND

3X ROOTBALL DIAMETER MIN.

ERRORS

MOUND AND TAMP PIT EXCAVATION 4" ABOVE LEVEL OF ROOT COLLAR FOR SAUCER.

TYPICAL PLANTING PIT ON SLOPE 4:1 OR GREATER

NOTE: STAKE AND GUY 3 LARGEST STEMS, IF TREE HAS MORE THAN 3 LEADERS. NEVER CUT LEADERS.

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TYPICAL PLANTING PIT ON SLOPE

ROOT COLLAR KEEP SAUCER LEVEL.

HUB STAKE

UNDISTURBED GROUND

3X ROOTBALL DIAMETER MIN.

ERRORS

MOUND AND TAMP PIT EXCAVATION 4" ABOVE LEVEL OF ROOT COLLAR FOR SAUCER.

TYPICAL PLANTING PIT ON SLOPE 4:1 OR GREATER

NOTE: STAKE AND GUY 3 LARGEST STEMS, IF TREE HAS MORE THAN 3 LEADERS. NEVER CUT LEADERS.

5 1/2" OF TREE HEIGHT.
NOTE: DIMENSION OF PLANT SPACING (SHRUB OR GROUND COVER AS INDICATED ON PLANS)

**TYPICAL BED PLANT SPACING**

+ + + + + + + + + + +

NOTE:

- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

**GROUND COVER BED PLANTING**

- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

**SEEDLINGS (EVERGREEN) OR WETLAND PLUG PLACEMENT**

- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

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- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

**LINER PLANTING (DECIDUOUS)**

- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

**TRENCH NARROW MEDIAN PLANTING**

- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

**TREE PRUNING**

- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

**STAKING AND GUISING PLAN SCHEMATIC**

- LOCATION, SIZE AND SPACING OF SEEDLINGS OR PLANT PLUGS ARE AS INDICATED ON PLANS

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**PLANTING STANDARD**

**PLANTING DETAILS**

**STANDARD PLANS**
ON THE RIGHT SIDE OF Q WHEN TRAVELING SOUTH TO NORTH OR WEST TO EAST

TWO-LANE ROADWAY STRIPING LAYOUT

LEGEND

DIVERGING (OR CONVERGING) LINES FOR PAINTED ISLANDS

EXAMPLE: A 4" SINGLE SOLID LINE WHITE = 4" SSLW
PAVEMENT MARKING LINE(S)

TANGENT SECTION

STRING LINE (100') PARALLEL TO PAVEMENT MARKING LINE. DISTANCE FROM STRING TO PAVEMENT MARKING LINE SHALL NOT VARY MORE THAN ± 1".

CURVED SECTION

MIDDLE LENGTH ACTUAL LENGTH = CALCULATED LENGTH ± 1"

STRING LINE (100') TO FORM CHORD

TYPICAL "CROSS-SWITCH" PASSING ZONE

TYPICAL BROKEN LINE

4" DOUBLE LINES

6" DOUBLE LINES

GENERAL NOTES

1. ALL PAVEMENT MARKINGS SHALL BE IN CONFORMANCE WITH THESE STANDARDS AND THE CURRENT EDITION OF THE MUTCD.

2. WIDTH OF LINES SHALL VARY NO MORE THAN ± 1/4" FROM THAT SPECIFIED.

3. THE WET FILM THICKNESS OF A PAINTED LINE SHALL BE A MINIMUM OF 20 MIL THROUGHOUT THE ENTIRE WIDTH AND LENGTH OF LINE SPECIFIED.

4. BROKEN LINES SHALL BEGIN AND END WITH THE NEAREST FULL CYCLE OF BROKEN LINE.

5. SOLID LONGITUDINAL LINES SHALL BEGIN AND END WITHIN 2" OF A LAYOUT SYMBOL INDICATING THE END OF THE LINE OR WITH A FULL CYCLE OF BROKEN LINE IF APPROPRIATE.
GENERAL NOTES

1. All ramps with a minimum roadway width of 20' shall receive both white edge line and yellow median line whether the ramp has raised curb or not.

2. The edge and median line markings for freeway ramps shall be a minimum of 24" from centerline to the face of curb or edge of pavement. Median line markings for all other ramps shall be a minimum of 30" from the curb or edge of pavement.

3. The minimum distance between the edge and median lines for ramps shall be 18'. The median line on a ramp shall connect with the gore marking. The edgeline shall connect with the mainline edgeline to provide a continuous line.

4. See pavement marking plans or other project documents for project specific design dimensions.

5. All dotted lane lines for acceleration/deceleration lanes shall run the full length of each lane and continue through the transition taper.

LEGEND

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<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>T</td>
<td>Thermoplastic</td>
</tr>
<tr>
<td>L</td>
<td>6&quot; Solid 6&quot; Solid if associated with a partial interchange, may be paint.</td>
</tr>
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POSTED SPEED

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>L</th>
</tr>
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<tbody>
<tr>
<td>x 10</td>
<td></td>
</tr>
<tr>
<td>x 25</td>
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</tr>
</tbody>
</table>

L = Transition taper
W = Width of offset (feet)
S = Posted speed limit or design speed (mph)
GENERAL NOTES

1. ALL RAMPS WITH A MINIMUM ROADWAY WIDTH OF 20' SHALL RECEIVE BOTH WHITE EDGE LINE AND YELLOW MEDIAN LINE WHETHER THE RAMP HAS RAISED CURB OR NOT.

2. THE EDGE AND MEDIAN LINE MARKINGS FOR FREEWAY RAMPS WILL BE A MINIMUM OF 24" FROM CENTER-LINE TO THE FACE OF CURB OR EDGE OF PAVEMENT. MEDIAN LINE MARKINGS FOR ALL OTHER RAMPS WILL BE A MINIMUM OF 30" FROM THE CURB OR EDGE OF PAVEMENT.

3. THE MINIMUM DISTANCE BETWEEN THE EDGE AND MEDIAN LINES FOR RAMPS SHALL BE 14`, THE MEDIAN LINE ON A RAMP SHALL CONNECT WITH THE GORE MARKING. THE EDGELINE SHALL CONNECT WITH THE MAINLINE EDGELINE TO PROVIDE A CONTINUOUS LINE.

4. SEE PAVEMENT MARKING PLANS OR OTHER PROJECT DOCUMENTS FOR PROJECT SPECIFIC DESIGN DIMENSIONS.

5. ALL DOTTED LANE LINES FOR ACCELERATION/DECELERATION LANES SHALL RUN THE FULL LENGTH OF THE RAMP OPENING.
GENERAL NOTES

1. ALL RAMPS WITH A MINIMUM ROADWAY WIDTH OF 20' SHALL RECEIVE BOTH WHITE EDGE LINE AND YELLOW MEDIAN LINES WHETHER THE RAMPS HAVE RAISED CURB OR NOT.

2. THE EDGE AND MEDIAN LINE MARKINGS FOR FREEWAY RAMPS WILL BE A MINIMUM OF 24' FROM CENTRELINE TO THE FACE OF CURB OR EDGE OF PAVEMENT. MEDIAN LINE MARKINGS FOR ALL OTHER RAMPS WILL BE A MINIMUM OF 30' FROM THE CURB OR EDGE OF PAVEMENT.

3. THE MINIMUM DISTANCE BETWEEN THE EDGE AND MEDIAN LINES FOR RAMPS SHALL BE 18'. THE MEDIAN LINE ON A RAMP SHALL CONNECT WITH THE GORE MARKING. THE EDGE LINE SHALL CONNECT WITH THE MAINLINE EDGE LINE TO PROVIDE A CONTINUOUS LINE.

4. SEE PAVEMENT MARKING PLANS OR OTHER PROJECT DOCUMENTS FOR PROJECT SPECIFIC DESIGN DIMENSIONS.

5. ALL DOTTED LANE LINES FOR ACCELERATION/DECELERATION LINES SHALL RUN THE FULL LENGTH OF EACH LANE AS SHOWN IN THE PROJECT DOCUMENTS.

6. 12"SDLW SHOULD BE INSTALLED OFFSET FROM THE CENTERLINE AS SHOWN TO MATCH INTO THE GORE.
PAINTED ISLAND WITH LEFT TURN LANE

<table>
<thead>
<tr>
<th>POSTED SPEED</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 40</td>
<td>75</td>
</tr>
<tr>
<td>&gt; 45</td>
<td>100</td>
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</tbody>
</table>

W = WIDTH OF OFFSET (feet)
S = POSTED SPEED LIMIT (mph)

PAINTED ISLAND DETAILS

D = TRANSITION TAPER = L

GENERAL NOTES

1. SEE STANDARD NO. PM-6 FOR LAYOUT OF WORDS AND SYMBOLS WITHIN TURN LAKES.
2. SEE RAISED ISLAND BLOCKOUTS ON STANDARD HR-2

STRIPING AT ENDS OF RAISED ISLANDS

* ARROWS SHOWN ON THIS SHEET INDICATE DIRECTION OF TRAFFIC ONLY.

SINGLE LANE, TWO-WAY LEFT TURN WITH LEFT TURN ONLY

STRIPING AT ENDS OF RAISED ISLANDS

* ARROWS SHOWN ON THIS SHEET INDICATE DIRECTION OF TRAFFIC ONLY.
GENERAL NOTES

1. Painted edge line required on curved shoulders greater than 24°.
2. All symbols, words, transverse markings (stop bars, crosswalks, lines and railroad symbols), lane lines and all other markings noted with (T) shall be thermoplastic.
3. Through arrows not typically required. See the pavement marking plans for the appropriate layout.
4. Dimension L calculated based on MUTCD transition taper formulas.
5. All segments & thru L are required to establish turn lanes.
6. Lane use signs (R3-18 series) to be placed at upstream legend.

POSTED SPEED (MPH)

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>TYPICAL &quot;B&quot; LAYOUT</th>
<th>C (FT)</th>
<th>D (FT)</th>
<th>L (FT)</th>
</tr>
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<tbody>
<tr>
<td>30</td>
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<td>55</td>
<td>6</td>
<td>3</td>
<td>240</td>
<td>175</td>
</tr>
</tbody>
</table>

**NOTE:** "B" layout is required in urban areas and 200' (min.) is required in rural areas for L.

- W is the width of offset, in feet.
- S is the higher of the posted or statutory speed limit in miles per hour.
- Where observed speeds exceed posted or statutory speed limits, longer tapers should be used.
- Where offsets are different on either side of centerline, the longer measurement shall govern the length of both tapers.
GENERAL NOTES

1. WORDS AND SYMBOLS SHALL BE CENTERED LATERALLY WITHIN THE LANE. THE LONGITUDINAL DIMENSION SHALL BE PARALLEL TO THE LANE.

2. LONGITUDINAL SPACING BETWEEN SUCCESSIVE WORDS AND/OR SYMBOLS IN TURN LANES SHOULD BE IN EVEN INCREMENTS OF AT LEAST 4 TIMES AND NO GREATER THAN 10 TIMES THE HEIGHT OF THE LARGEST CHARACTER.

3. LANE LINES LONGER THAN 75' SHALL BE LAYED OUT IN MULTIPLES OF 50'.

4. LANE LINES DESIGNED TO ACCOMMODATE A CALCULATED QUEUE SHALL BE ROUNDED UP TO THE NEAREST 50'.

5. TO COMPLETE ARROW AND "ONLY" LAYOUT FOR LANE LENGTHS GREATER THAN 350', (LENGTH OF LANE LINE MINUS 48') / NUMBER OF INCREMENTS X STENCIL SERIES SHALL BEGAIN AND END WITH AN ARROW.

6. THE STOP LINE MAY NOT BE PRESENT.

7. SEE THE PAVEMENT MARKING PLANS FOR THE APPROPRIATE LAYOUT INCLUDING THROUGH ARROWS AND REQUIRED.

8. WORDS, LANE LINES AND SYMBOLS SHALL BE THERMOPLASTIC (T).

9. THE SOLID LANE LINE SHALL BE A MINIMUM OF 25'.
CENTRERLINE AND EDGELINE "CUTS" AT SIDE ROAD

NOTE: FOR SHOULDER WIDTH > 5 ft
TAPER EDGELINE AS SHOWN OR
FOR SHOULDER WIDTH < 5 ft
STRAIGHT LINE

CENTERLINE AND EDGELINE "CUTS" AT SIDE ROAD W/ TURN LANES

NOTE: FOR SHOULDER WIDTH > 5 ft
TAPER EDGELINE AS SHOWN OR
FOR SHOULDER WIDTH < 5 ft
STRAIGHT LINE

GENERAL NOTES

1. EDGELINE DETAILS SHOWN ARE FOR MAINLINE ROADWAYS WITHOUT TURN LANES. THE PRESENCE OF TURN LANES MAY REQUIRE DIFFERENT EDGELINE TREATMENTS.

2. EDGELINES ON SIDE ROADS, WHEN CALLED FOR, SHALL FOLLOW THE ABOVE MAINLINE TYPICAL. EDGELINES SHALL NOT BE CONTINUOUS AROUND THE MAINLINE/SIDE ROAD RADIUS. EDGELINES SHALL END AT STOP BARS.

3. CENTERLINE AND EDGELINE SHALL BE CONTINUOUS PAST RESIDENTIAL DRIVEWAYS. CENTERLINE AND EDGELINE SHALL BREAK FOR COMMERCIAL DRIVES/TRAFFIC CONTROL, MINOR SIDE ROADS OR PRIVATE ROAD INTERSECTIONS.

4. LOCATION OF THE STOP LINE MAY VARY DUE TO INTERSECTION SIGHT DISTANCE AND VEHICLE TURNING RADIUS, AND MAY NOT ALWAYS COINCIDE WITH THE LOCATION OF THE STOP SIGN.

5. IF THERE IS NO EDGELINE, END STOP BAR 12" FROM EDGE OF PAVEMENT.

6. STOP BARS, WORDS, LANE LINES, SYMBOLS AND ARROWS SHALL BE THERMOPLASTIC (T).
* ARROWS SHOWN ON THIS SHEET INDICATE DIRECTION OF TRAFFIC ONLY.

(1) = THERMOPLASTIC

TURNING LANE EXTENSION DETAIL

RAMP LAYOUT
**General Notes**

1. Van Accessible Aisle shall be a minimum 8' wide. RT-8a sign will be added to van accessible parking sign RT-8.
2. Arrows on this sheet indicate direction of traffic only.
3. (T) = Thermoplastic pavement marking.

---

**Perpendicular Accessible Parking**

- Accessible sign (RT-8)
- Accessible sign & van accessible sign (RT-8 & RT-8a)
- Face of curb or pavement edge

- 3' x 3' - 2"
- International Symbol of Accessibility

**Parallel Accessible Parking**

- Accessible sign (RT-8)
- Accessible sign (RT-8)
- Face of curb or pavement edge

- 3' x 3' - 2"
- International Symbol of Accessibility

**Pavement Marking Standard**

**Accessible Parking Detail**
GENERAL NOTES

1. All words and symbols shall be retroreflective white and shall conform to the latest version of the MUTCD.

2. Multi-word messages shall read "up"; that is, the first word shall be nearest the approaching driver.

3. The word "only" shall not be used with through or combination arrows, and shall not be used adjacent to a broken lane line. A word/symbol shall precede the word "only.

4. Combination arrows may be comprised of 2 single arrows (e.g., turn and through arrows). However, the shafts of the arrows shall coincide as shown.

5. Preformed words and symbols shall be pre-cut by the manufacturer.

6. Wrong-way arrows shall not be substituted for through arrows.

7. All stop bars, words, symbols and arrows shall be thermoplastic.
PAY QUANTITIES FOR STANDARD (8 FT) LETTERS AND NUMERALS (SQUARE FEET)

<table>
<thead>
<tr>
<th>Letter</th>
<th>Pay Quantity</th>
</tr>
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<tbody>
<tr>
<td>A</td>
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<tr>
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<td>Z</td>
<td>6.6</td>
</tr>
<tr>
<td>I</td>
<td>2.0</td>
</tr>
</tbody>
</table>

RAILROAD CROSSING SYMBOL
Pay Quantity = 63.6 ft² (See Note 3)

3. RVB SYMBOL WILL BE PAID FOR BY THE SQUARE FOOT, TRANSVERSE LINES AND STOP BARS (24"wide) WILL BE PAID FOR BY THE LINEAR FOOT.

2. ON MULTI-LANE ROADS THE TRANSVERSE LINES SHOULD EXTEND ACROSS ALL APPROACH LANES, AND INDIVIDUAL RVB SYMBOLS SHOULD BE USED IN EACH APPROACH LANE.
3. RVB SYMBOL WILL BE PAID FOR BY THE SQUARE FOOT, TRANSVERSE LINES AND STOP BARS (24"wide) WILL BE PAID FOR BY THE LINEAR FOOT.
GENERAL NOTES

1. All speed zone markings shall be solid white.

2. Alternate approach end pattern shall be used for 3 zone layout only. Standard pattern shall be used in lieu of alternate pattern for left shoulder widths less than 8 ft.

3. Longitudinal distances shall be measured by NHDOT survey personnel. A copy of survey notes shall be forwarded to Bureau of Traffic.

4. For legal reasons, State Police shall be present during the installation of these markings. (Tel. 603-271-3678).

5. State Police should be notified when any existing markings are removed due to construction.

*Arrows shown on this sheet indicate direction of traffic only.

PAVEMENT MARKING DETAILS

Right shoulder shown = Left shoulder opposite in kind (see Note No. 2)
GENERAL NOTES

1. Spacing for the continental block markings should be uniform for each individual crosswalk but be adjusted to avoid placement directly in the wheel path.

2. Crosswalks located at a yield controlled slip ramp or other yield controlled intersection approach shall use continental block markings regardless of whether the crosswalk is in advance of or beyond the yield control.

3. Locate uncontrolled crosswalks to the left side of the minor street with the higher right turn volumes.


5. When proposed by a municipality outside NHDOT, installation of street lighting shall meet the requirements of the current edition of the NHDOT Utility Accommodation Manual and is subject to the requirements of the excavation permit and pole licensing procedure.

6. Verify that warning sign locations are not obscured from the view of approaching traffic by light poles or other objects.

7. Controlled crosswalks shall be outside the pavement limits of the major street. This applies to both marked and implied crosswalks.

LEGEND

TI = Thermoplastic

STANDARD PEDESTRIAN CROSSING LAYOUT FOR UNCONTROLLED MIDBLOCK LOCATIONS

N.T.S.

CONTINENTAL CROSSWALK MARKING DETAIL FOR UNCONTROLLED CROSSING LOCATIONS

N.T.S.

STANDARD PEDESTRIAN CROSSING LAYOUT FOR CONTROLLED AND UNCONTROLLED APPROACHES AT INTERSECTIONS

N.T.S.

STANDARD CROSSWALK MARKING DETAIL FOR CONTROLLED CROSSING LOCATIONS

N.T.S.

PAVEMENT MARKING STANDARD

PEDESTRIAN CROSSINGS
ATTACHMENT OF AUXILIARY PANELS AND SERVICE SYMBOL PANELS (BACK VIEW)

1. AUXILIARY PANELS SHALL BE MOUNTED TO THE RIGHT SIDE OF THE MAIN SIGN FOR RIGHT-HAND EXIT RAMPS, OR TO THE LEFT FOR LEFT-HAND EXIT RAMPS. SUPPORTS SHALL EXTEND TO THE TOP OF THE AUXILIARY PANEL AND SHALL OVERLAP THE MAIN SIGN BY A MINIMUM OF 3 FULL PLANKS AS SHOWN.

2. SERVICE SYMBOL PANELS, WHEN NOT ON A SEPARATE SIGN, SHALL BE MOUNTED IMMEDIATELY BELOW THE MAIN SIGN AND CENTERED LATERALLY WITHIN THE WIDTH OF THE SIGN. SUPPORTS SHALL OVERLAP THE MAIN SIGN BY A MINIMUM OF 2 FULL PLANKS AS SHOWN.

3. POST CLIP ASSEMBLIES SHALL BE INSTALLED ON BOTH SIDES OF EACH AUXILIARY PANEL SUPPORT AND SERVICE SYMBOL SUPPORT AT EACH PLANK, AS WELL AS EACH END OF BOTH SUPPORTS.

GENERAL NOTES

1. GAP BETWEEN ANY TWO ASSEMBLED PLANK SECTIONS SHALL NOT EXCEED 3/32".

2. ALLOWABLE LATERAL BOW SHALL NOT EXCEED 1/16".

3. ALL PLANK SECTIONS SHALL BE ONE PIECE FOR THE ENTIRE WIDTH OF SIGN SPECIFIED AND SHALL NOT EXCEED 1/8" FROM THE LENGTH SPECIFIED.

4. ALL PLANK SECTIONS SHALL BE 12" WIDE UNLESS OTHERWISE SPECIFIED.

5. SIGNS 8' AND GREATER IN WIDTH SHALL BE MOUNTED ON STEEL BEAM.

PLANK MOUNTED ON STEEL BEAM

1. POST CLIP ASSEMBLIES SHALL BE INSTALLED ON BOTH SIDES OF EACH POST AT EACH PLANK AS WELL AS AT THE TOP AND BOTTOM OF THE SIGN.

2. STEEL BEAM SHALL BE FLUSH WITH TOP OF SIGN AND SHALL NOT EXTEND ONTO AUXILIARY PANELS.

3. STEEL BEAM SHALL NOT BE USED AS AUXILIARY PANEL SUPPORTS.

PLANK MOUNTED ON TUBING

1. POST CLAMP ASSEMBLIES SHALL BE INSTALLED AT EACH PLANK AS WELL AS AT THE TOP AND BOTTOM OF THE SIGN.

2. TUBING SHALL NOT BE USED AS AUXILIARY PANEL SUPPORTS.
**DETAIL "A"**

- **6" PLANK**
- **12" PLANK**

**EXTRUDED ALUMINUM SIGN PLANK**

**TOP OF POST**

**FACE OF PLANK**

**CHANNEL BRACKET 14 GAUGE**

**POST CLAMP 4" DIA. 11 GAUGE**

**STIFFENER DETAILS**

**POST CLIP BOLT**

**POST CLIP**

**SIGNING STANDARD ALUMINUM PLANK DETAILS**

1. **POST CLAMP ASSEMBLIES**
   - SEE SPECIFICATION 615-2.7.3 FOR ADDITIONAL INFORMATION REGARDING THE CHANNEL BRACKET AND POST CLAMP.
   - USE 3/16" CAP SCREW WITH 2-7/8" D.O.D. WASHERS AND LOCK NUT FOR CLAMP CONNECTION.
   - ALL HARDWARE SHALL BE STAINLESS STEEL.

**END VIEW**

**SECTION A-A**

**POST CLIP ASSEMBLY**

- 2 PER PLANK
- EACH POST (TYP.)

**CHANNEL BRACKET**

**POST CLAMP**

**DETAIL "D"**

- **POST CLIP BOLT**
- **STOP NUT**
- **FLAT WASHER**
- **POST CLIP**
- **PLACE BOLT IN EVERY SLOTTED HOLE**
- **3/8" FLAT WASHER**
- **2-7/8" FLAT WASHER**
- **5/16" CAP SCREW**
- **LOCK NUT**
- **5/8" EXTRUDED SIGN PANEL**
- **GALVANIZED STEEL SIGN POST**
- **STOP NUT WITH NYLON FILLER**
- **FLAT WASHER**
- **POST CLIP**
- **EXTRUDED SIGN PANEL**
- **FACE OF PLANK**
- **3/8" FLAT WASHER UNDER BOLT HEAD AND NUT**
- **3/8" HEX NUT**
- **1/16" x 7/8" SLOT**

**REVISION DATE 07-13-2001**

**STANDARD NO. PS-2**

**SIGNING STANDARD**

**STANDARD PLANS**

**NO. PS-2**

**FILE NAME PS-2**
SIGN AND U-CHANNEL POST ASSEMBLY DETAIL

1. For galvanized U-channel post, see NDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 615.
2. The stainless steel hex head bolt length shall be increased to accommodate a thicker sign material.
3. The post shall be set a minimum of 3 inches to a maximum of 6 inches below the top of sign.
4. U-channel posts shall not be spliced and do not require channel brackets.
5. U-channel posts shall be installed 36" or greater below existing ground.

GENERAL NOTES

1. Brackets: All signs to be fastened to posts with post clamp assemblies as shown.
2. Sign width 36" or less may be mounted on one (1) U-channel post.
3. Rectangular signs 72" x 48" or less may be mounted on dual U-channel post. Diamond shape signs greater than 36" shall be mounted on aluminum tubing (INTERSTATE).
4. Sign height 48" or less, center channel bracket may be omitted.
5. Diamond shape signs 48" or larger require two channel brackets.
6. Signs 72" x 72" or greater shall be aluminum planks.

SIGN BLANK ATTACHMENT DETAIL

POST CLAMP ASSEMBLIES

1. See specification 615.2.7.3 for additional information regarding the channel bracket and post clamp.
2. Use 5/16" stainless steel cap screw with 2-7/8" O.D. washers & locknut for clamp connection.
DIRECT BURIED

SINGLE POST

STIFFENER DETAILS

DOUBLE POST

ANCHOR DETAIL

ANCHORS: USE 1 PIECE OF 2" x 12" PLANK (PRESSURE TREATED) CLAMPED TO POST WITH A MINIMUM OF 12" OVERHANG, TO BE PARALLEL WITH GROUND LINE, PLACE 2" x 12" PLANK BEHIND SIGN POST.

FOOTING DETAIL

CONCRETE BASE

MAXIMUM BREAKAWAY STUB HEIGHT

BREAKAWAY SUPPORTS PLACED ON ROADSIDE SLOPES SHALL NOT ALLOW IMPACTING VEHICLES TO SNAP ON EITHER THE FOUNDATION OR ANY SUBSTANTIAL REMAINS OF THE SUPPORT. SURROUNDING TERRAIN SHALL BE GRADED TO PERMIT VEHICLES TO PASS OVER ANY NON-BREAKAWAY PORTION OF THE SIGN INSTALLATION WHICH REMAINS IN THE GROUND OR RIGIDLY ATTACHED TO THE FOUNDATION.

GENERAL NOTES

1. MULTIPLE POST SIGNS MUST BE PROTECTED BY GUARDRAIL OR OTHER POSITIVE BARRIER, UNLESS BREAKAWAY MOUNTED.

2. THE MINIMUM HORIZONTAL CLEARANCE TO THE NEAR EDGE OF THE SIGN OF ANY MULTIPLE POST NON-BREAKAWAY MOUNT SIGN SHALL BE 1'-0" MIN. FROM FACE OF BEAM GUARDRAIL. OTHER TYPES OF GUARDRAIL OR BARRIER MAY REQUIRE A DIFFERENT OFFSET.

3. ALL HARDWARE SHALL BE STAINLESS STEEL UNLESS OTHERWISE NOTED.

CONCRETE BASE NOTES:

1. GALVANIZED STEEL TUBE 4-1/4" I.D. X 4'-2"
2. CONCRETE CLASS B.
3. TOP SHALL HAVE TROWEL FINISH.
4. USE 5/16" x 5-1/2" LONG STAINLESS STEEL BOLT WITH STAINLESS STEEL NYLON INSERT NUT FOR SECURING POST.
5. ALUMINUM CAP SHALL BE INSTALLED ON THE TOP OF THE SIGN POST WITH THIS INSTALLATION.
**Procedure for Selecting Beam Sections**

- Determine values for \( W, H, \) and \( L \) as indicated in Drawing.
  
  \( W = \) maximum width of required sign.
  
  \( H = \) maximum height of required sign including auxiliary signs and service symbols.
  
  \( L = \) maximum distance between top of footing and bottom of required sign.

(See General Note No. 4)

- For sign sizes between those values in the table, use next highest foot value.

- Enter table with maximum value of \( "L" \) and required values of \( "W" \) and \( "H" \) for selection of appropriate beam selection.

## 2 Post Sign

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</tbody>
</table>

### General Notes

1. Signs shall be provided for locations specified on the plans or as directed by the engineer. See sign text layout sheets and plans for sign sizes and approximate locations.

2. Dimensions, elevations, slopes, and situations shown are for illustrative purposes only. Actual cases will depend on field conditions.

3. When two or more independent signs are mounted as a single installation, the post supports shall be calculated with the total area of the signs being considered as one unit, including an allowance for a 6" vertical space between the signs.

4. Post length to be determined by sign size and location. Exact field location to be determined by the engineer.

5. The minimum horizontal clearance from any multiple post non-breakaway mount sign shall be 7'-0" min. from face of beam guardrail. Other types of guardrail or barrier may require a different offset.


### Footing Details

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<tr>
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<th>FOOTING</th>
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<tbody>
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<td>8'-6&quot;</td>
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**Steel Beam Details**

**Non-Breakaway**
PROCEDURE FOR SELECTING BEAM SECTIONS

- Determine values for W, H, & L as indicated in drawing. 
- W = maximum width of required sign. 
- H = maximum height of required sign including auxiliary signs and service symbols. 
- L = maximum distance between top of footing and bottom of required sign. 
(See General Note No. 4) 

For sign sizes between these values in the table, use next highest foot value. 

Enter table with maximum value of "L" and required values of "W" and "H" for selection of appropriate beam selection.

### General Notes

1. Signs shall be provided for locations specified on the plans or as directed by the engineer. See sign text layout sheets and plans for sign sizes and approximate locations. 

2. Dimensions, elevations, slopes, and situations shown are for illustrative purposes only. Actual cases will depend on field conditions. 

3. When two or more independent signs are mounted as a single installation, the post supports shall be calculated with the total area of the signs being considered as one unit. (Including an allowance for a 6" vertical space between the signs.) 

4. Post length to be determined by size of sign and location. Exact field location to be determined by the engineer. 

5. The minimum horizontal clearance to the near edge of the sign of any multiple post non-breakaway mount sign shall be 1'-0" min. from face of beam guardrail. Other types of guardrail or barrier may require a different offset. 

PROCEDURE FOR SELECTING BEAM SECTIONS

- Determine values for W, H, & L as indicated in drawing
  W = Maximum width of required sign
  H = Maximum height of required sign including auxiliary signs and service symbols.
  L = Maximum distance between top of footing and bottom of required sign.
  (See General Note No. 41)
- For sign sizes between those values in the table, use next highest foot value.
- Enter Table with maximum value of "L" and required values of "W" and "H" for selection of appropriate beam selection.

### 2 POST SIGN

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<thead>
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<th>H</th>
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<tr>
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</tr>
<tr>
<td>24</td>
<td>6</td>
<td>4x12, 4x15, 4x18, 4x21, 4x24</td>
</tr>
</tbody>
</table>

### GENERAL NOTES

1. Signs shall be provided for locations specified on the plans or as directed by the engineer. See sign text layout sheets and plans for sign sizes and approximate locations.
2. Dimensions, elevations, slopes, and situations shown are for illustrative purposes only. Actual cases will depend on field conditions.
3. When two or more independent signs are mounted as a single installation, the post supports shall be calculated with the total area of the signs being considered as one unit, including an allowance for a 6" vertical space between the signs.
4. Post length to be determined by sign size and location. Exact field location to be determined by the engineer.
5. The minimum horizontal clearance to the near edge of the sign of any multiple post non-breakaway mount sign shall be 7'-0" min. From face of beam guardrail. Other types of guardrail or barrier may require a different offset.
PROCEDURE FOR SELECTING BEAM SECTIONS

- Determine values for W, H, and L as indicated in drawing
  - W = Maximum width of required sign
  - H = Maximum height of required sign
  - L = Maximum distance between top of footing and bottom of required sign.
- For sign sizes between those values in the table, use next highest.
- Enter table with maximum value of L, and required values of W and H for selection of appropriate beam selection.

GENERAL NOTES

1. Signs shall be provided for locations specified on the plans or as directed by the engineer. See sign text layout sheets and plans for sign sizes and approximate locations.
2. Dimensions, elevations, slopes, and situations shown are for illustrative purposes only. Actual cases will depend on field conditions.
3. When two or more independent signs are mounted as a single installation, the post supports shall be calculated with the total area of the signs being considered as one unit, including an allowance for a 6" vertical space between the signs.
4. Post length to be determined by sign size and location. Exact field location to be determined by the engineer.
5. The minimum horizontal clearance to the near edge of the sign of any multiple post non-breakaway mount sign shall be 3'-0" W/D. From face of beam guardrail. Other types of guardrail or barrier may require a different offset.
6. See standard no. PS-1 & PS-2 for additional information.

<table>
<thead>
<tr>
<th>W</th>
<th>4'</th>
<th>6'</th>
<th>8'</th>
<th>9'</th>
<th>10'</th>
<th>12'</th>
<th>13'</th>
<th>14'</th>
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<td>W6x9</td>
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<td>W6x10</td>
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POSTING

<table>
<thead>
<tr>
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<th>FOOTING</th>
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</thead>
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<tr>
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<tr>
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<td>9&quot;</td>
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FOOTING DETAIL
GENERAL NOTES

1. ASSEMBLE ACCORDING TO MANUFACTURER’S INSTRUCTIONS.
2. SEE PS-7 OR PS-8 FOR STEEL BEAM SIZES.
3. SEE PS-10 FOR BRACKET SELECTION TABLES FOR TYPE B525-LP & B-650-LP.
ANCHOR INSTALLATION & BRACKET SELECTION

A = Lateral Spacing of Anchors
- 3" for B-525 used on 6" & 8" wide flange posts
- 4" for B-650 used on 10", 12" & 14" wide flange posts
- 4-1/4" for A16 used on 5/8" wide flange posts
- 3-3/4" for AP x 4-1/2" used on 4" diameter aluminum tube.

B = Longitudinal Spacing of Anchors
- Bracket #1 = Depth of post section plus 7-15/16"
- Bracket #2 = Depth of post section plus 8-1/16"
- Bracket #3 = Depth of post section plus 8-1/8"
- Depth of post section plus 3-3/4" for A16

For B-525 & B-650 mounts, see Bracket Tables

PLAN VIEW OF FOOTINGS
(See PS-3, PS-5A, or PS-5B for footing sizes!

6" POST
POST LENGTH = L + H (FT)

8" POST
POST LENGTH = L + H (FT)

10" POST
POST LENGTH = L + H (FT)

12" POST
POST LENGTH = L + H (FT)

14" POST
POST LENGTH = L + H (FT)

BRACKET TABLES FOR B-525-LP MOUNTS

BRACKET TABLES FOR B-650-LP MOUNTS

SELECT CORRECT BRACKET NUMBER BY LOCATING THE INTERSECTION OF SIGN HEIGHT AND POST LENGTH IN THE BRACKET SELECTION MATRIX. THE INTERSECTION WILL BE EITHER ZONE 1, 2, OR 3 WHICH CORRESPONDS TO BRACKET NUMBERS 1, 2, OR 3.

LEVEL (ALL DIRECTIONS)
TEMPLES

INSTALLATION JIG AND SLOPE DETAIL

MAXIMUM BREAKAWAY STUB HEIGHT

Breakaway supports placed on roadside slopes shall not allow impacting vehicles to drag on either the foundation or any substantial remains of the support. Surrounding terrain shall be graded to permit vehicles to pass over any non-breakaway portion of the sign installation which remains in the ground or rigidly attached to the foundation.
Правила маркировки нью-хэмпширских дорог

**Общие примечания**

1. Фон всех щитов для C и CC знаков должен быть белым типа III. Фон всех щитов на перекрестиях должен быть типа VII, VIII, IX или X.

2. Сетка алюминия, используемая для демонтируемых щитов, должна соответствовать контуру щита.

3. Нью-хэмпширские государственные щиты должны использовать изображение "Старого Мужика", как показано выше.

4. Нью-хэмпширский щит для Уэдлинг-Тауншип должен иметь синий текст, границу и диск на белом фоне.

5. Щиты для Уэдлинг-Тауншип должны соответствовать следующим размерам:

   - Уэдлинг-Тауншип: синий текст, граница и диск на белом фоне.
   - Этикетка Уэдлинг-Тауншип: синий текст, граница и диск на белом фоне.

6. Размеры щитов для Уэдлинг-Тауншип не указаны на листе, они должны быть пропорциональными размерам, указанным в этом листе.
YIELD TO PEDESTRIANS

1.50" RADIUS, 0.50" BORDER, 0.50" INDENT
BLACK ON WHITE
"YIELD", "TO" & SHIELD BORDER ARE RED.

DIMENSIONS (inches)/LETTER FONTS

A B C D E F G H I J
30 48 23"v 19½" 17½" 15½" 13½" 11½" 9½" 7½" 5½" 3½" 1½"

NO LEFT TURN

1.50" RADIUS, 0.50" BORDER, 0.50" INDENT
BLACK ON WHITE

DIMENSIONS (inches)/LETTER FONTS

A B C D E F G H I J K L M N
24 18 5C 4C 3 2½ 2½ 2½ 2½ 2½ 2½ 2½ 2½

R3-3LB1

STANDARD NO. SG-2
MODIFY THE R3-8 SIGN TO REFLECT THE ACTUAL LANE USE COMBINATIONS

NO RIGHT TURN

1.50" RADIUS, 0.50" BORDER, 0.50" INDENT
BLACK ON WHITE

DIMENSIONS (inches)/LETTER FONTS

A B C D E F G H I J
24 18 5C 4C 3 2½ 2½ 2½ 2½ 2½

R3-3RB1

STANDARD NO. SG-2

NO RIGHT TURN

1.50" RADIUS, 0.50" BORDER, 0.50" INDENT
BLACK ON WHITE

DIMENSIONS (inches)/LETTER FONTS

A B C D E F G H I J K L
24 18 5C 4C 3 2½ 2½ 2½ 2½ 2½

R3-3RB1

STANDARD NO. SG-2

NO RIGHT TURN

1.50" RADIUS, 0.50" BORDER, 0.50" INDENT
BLACK ON WHITE

DIMENSIONS (inches)/LETTER FONTS

A B C D E F G H I J K L
24 18 5C 4C 3 2½ 2½ 2½ 2½ 2½
1.50" RADIUS, 0.50" BORDER, 0.375" INDENT, BLACK ON YELLOW OR FLUORESCENT YELLOW GREEN

**W16-9p(M)**

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**WARNING SIGN**

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<td>07-13-2001</td>
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1.50" RADIUS, 0.38" BORDER, 0.375" INDENT, BLACK ON YELLOW; BB GRADE PLYWOOD SIGN

**W16-8b(M)**

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1.50" RADIUS, 0.38" BORDER, 0.375" INDENT, BLACK ON YELLOW; BB GRADE PLYWOOD SIGN

**W16-8c(M)**

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**WARNING SIGN**

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PUT "T/L" FOR TOWN LINE

0.75" RADIUS, 0.5" BORDER
WHITE ON GREEN
I-20

1.50" RADIUS, 0.75" BORDER, WHITE ON GREEN
I-21

INTERSTATE SIGN

DIMENSIONS (inches)/LETTER FONTS
A B C D E F G H I J K L M
10 CHARACTERS OR LESS
48 50 50 40 40 38 33 33 30 30
OVER 10 CHARACTERS
60 51 30 30 30 30 30 30 30 30

UNDER 8 CHARACTERS USE 1" FOR VERTICAL SPACING BETWEEN CHARACTERS.

FH:hijkl

IF THE TOWN OR CITY NAME IS SMALL, CENTER THE TEXT ON THE SIGN.

1.50" RADIUS, 0.75" BORDER, WHITE ON GREEN
I-22

DIMENSIONS (inches)/LETTER FONTS
A B C D E F G H I J K L M
10 CHARACTERS OR LESS
48 46 40 40 38 38 30 30 30 30
OVER 10 CHARACTERS
60 54 30 30 30 30 30 30 30 30

UNDER 8 CHARACTERS USE 1" FOR VERTICAL SPACING BETWEEN CHARACTERS.

FH:ijkl

IF THE TOWN OR CITY NAME IS SMALL, CENTER THE TEXT ON THE SIGN.

SIGNING STANDARD
**STANDARD BOLT SIZE, SPACING AND PROJECTION ABOVE CONCRETE**

**ANCHOR BOLTS**

1. Size of foundation may be changed in the plans or special provisions, or by the engineer.
2. All exposed edges shall be chamfered 45°.
3. Open ends of all conduits into foundation shall be capped until cables are installed.
4. Anchor bolts, ground rod and ground wire to be furnished by the power company, unless otherwise directed.
5. Bolt circle diameter shall be verified with the power company.
6. All bases shall be located 10'-0" to center from face of curb or edge of paved shoulder, unless otherwise noted.
7. Reinforcement shall conform to Section 544 of the standard specifications.
8. Any anchor bolts damaged during installation shall be repaired or replaced as directed by the engineer.
9. Upon installation, anchor bolt threads shall be cleaned with a wire brush.
10. Terrain surrounding base must be graded as shown in detail "A" to prevent vehicles from hanging over base.

**CONCRETE FOUNDATION FOR PEDESTALS**

1. Foundation shall be 6" wider and longer than cabinet base to be installed.
2. All exposed edges shall be chamfered 45°.
3. Workman's pad (and cabinet door) should be oriented to permit maximum view of signal installation (away from traffic, if possible).

**CONCRETE FOUNDATION FOR CONTROL CABINET**

1. Foundation shall be 6" wider and longer than cabinet base to be installed.
2. All exposed edges shall be chamfered 45°.
3. Workman's pad (and cabinet door) should be oriented to permit maximum view of signal installation (away from traffic, if possible).
4. Ensure maximum view of signal installation (away from traffic, if possible).

**GENERAL NOTES**

1. All light poles, luminaires, and wire to be furnished and installed by the power company, unless otherwise directed.
2. Anchor bolts, ground rod & ground wire to be furnished by the power company and installed by the contractor, unless otherwise directed.
3. Bolt circle diameter shall be verified with the power company.
4. All bases shall be located 10'-0" to center from face of curb or edge of paved shoulder, unless otherwise noted.
5. Reinforcement shall conform to Section 544 of the standard specifications.
6. Any anchor bolts damaged during installation shall be repaired or replaced as directed by the engineer.
7. Upon installation, anchor bolt threads shall be cleaned with a wire brush.
8. Terrain surrounding base must be graded as shown in detail "A" to prevent vehicles from hanging off base.
GENERAL NOTES (TYPE 1 FOUNDATION)

1. There shall be a minimum of 24 test bored holes required at the approximate foundation location to confirm the engineering properties of the soils. Providing foundation support, the engineer may require additional borings or consideration necessary.

2. All reinforcing steel shall conform to ASTM E1181 (Grade 60) unless otherwise noted. Unless noted otherwise and shall meet the requirements of Section 544.

3. Concrete shall be class C5 having a minimum 28-day compressive strength of 3000 psi placed in accordance with Section 520. Cylinders for strength testing shall be taken during concrete placement.

4. Bearing capacity is based on the allowable stress design. The allowable bearing capacity shall be a minimum of 15 tons per square foot after the application of a factor of safety of 5 to the ultimate bearing capacity.

5. Footing concrete shall be placed in undisturbed material. Unsuitable material found at the bottom of footing shall be removed and placed in contact with structural fill, not less than 3 feet above the surface. Structural fill used in excess of the amount specified on the project plans or under Item 616.1 will be paid for as extra work in accordance with 109.01.01.

6. Stainless steel pipe, or, where steel meets 2/3 of the design, shall be stainless steel banded after anchor rods are fully tightened.

7. No grout shall be placed between the foundation and bottom of the base plate.

8. The exposed length of the anchor rod between the top of the foundation and the bottom of the leveling nut shall not exceed one rod diameter in maximum or 1 1/2 inches, whichever is less.

9. For the installation, pretensioning, and ultrasonic testing of anchor rods, see the special provision supplement to Section 416, Traffic Signals.

10. Anchor rods shall be straight rods and conform to ASTM F1554 (Grade 50) unless otherwise specified. Anchor rods shall be supplied to the contractor or, in the case of jacketed anchors, to the manufacturer. Anchor rods shall be Grade 50 and shall be galvanized to a minimum of 300,000 psi. Anchor rods shall not be used.

11. Excavation and backfill quantities are based on an excavation area one foot in front of the foundation sides and one foot in front of the footing.

12. Where backfill is encountered, excavation shall still extend to limits shown.

13. Type 1 foundations shall be paid for under Item 616.12.1.

14. See the Type 1 foundation plan on standard plan TS-1.

15. See the Type 1 foundation plan on standard plan TS-1. 

TRAFFIC SIGNAL STANDARD
Traffic Signal Mast Arm Foundation - Type 1A
TRAFFIC SIGNAL MAST ARM FOUNDATION - TYPE 1B

NOTES

1. SEE MAST ARM FOUNDATION - TYPE 1A STANDARD PLAN TS-1, FOR TYPE 1 FOUNDATION NOTES.

TYPICAL QUANTITIES PER BASE

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>ITEM</th>
<th>QUANTITY</th>
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<tbody>
<tr>
<td>206.1</td>
<td>COMMON STRUCTURE EXCAVATION</td>
<td>22 CY</td>
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<td>GRANULAR BACKFILL</td>
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<td>520.21</td>
<td>CONCRETE CLASS B, FOOTINGS</td>
<td>5.4 CY</td>
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REINFORCING STEEL

1. REINFORCING STEEL 457 LB

ITEM NUMBERS ARE FOR SPECIFICATION REFERENCE ONLY. NO SEPARATE PAYMENT WILL BE MADE FOR THESE ITEMS.

ELEVATION VIEW

SECTION B-B

SCREEN DETAIL

END ELEVATION VIEW

TRAFFIC SIGNAL MAST ARM FOUNDATION - TYPE 1C

NOTES

1. SEE MAST ARM FOUNDATION - TYPE 1A STANDARD PLAN TS-1, FOR TYPE 1 FOUNDATION NOTES.

TYPICAL QUANTITIES PER BASE

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<th>ITEM NUMBER</th>
<th>ITEM</th>
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<td>520.21</td>
<td>CONCRETE CLASS B, FOOTINGS</td>
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REINFORCING STEEL

1. REINFORCING STEEL 457 LB

ITEM NUMBERS ARE FOR SPECIFICATION REFERENCE ONLY. NO SEPARATE PAYMENT WILL BE MADE FOR THESE ITEMS.

ELEVATION VIEW

SECTION C-C

SCREEN DETAIL

END ELEVATION VIEW

Traffic Signal Mast Arm Foundations - Type 1B & 1C
TRAFFIC SIGNAL MAST ARM FOUNDATION - TYPE 1D

NOTES:
1. See Mast Arm Foundation - Type 1A Standard Plan TS-1,
   for Type 1 Foundation Notes.

Typical Quantities Per Base

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PLAN VIEW

Typical Reinforcing Schedule

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<tbody>
<tr>
<td>ANCHOR RODS</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>REINFORCING STEEL</td>
<td>5</td>
<td>510 LB</td>
</tr>
<tr>
<td>CONCRETE CLASS B, FOOTINGS</td>
<td>6</td>
<td>21 CY</td>
</tr>
<tr>
<td>CONCRETE CLASS B, FOOTINGS</td>
<td>7</td>
<td>9 CY</td>
</tr>
<tr>
<td>ELASTOMER</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

ELEVATION VIEW

SECTION D-D

TRAFFIC SIGNAL MAST ARM FOUNDATION - TYPE 1E

NOTES:
1. See Mast Arm Foundation - Type 1A Standard Plan TS-1,
   for Type 1 Foundation Notes.

Typical Quantities Per Base

<table>
<thead>
<tr>
<th>ITEM</th>
<th>NO.</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDUIT</td>
<td>1</td>
<td>3-3/4</td>
</tr>
<tr>
<td>CONSTRUCTION</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>END ELEVATION VIEW</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>

PLAN VIEW

Typical Reinforcing Schedule

<table>
<thead>
<tr>
<th>ITEM</th>
<th>NO.</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANCHOR RODS</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>REINFORCING STEEL</td>
<td>5</td>
<td>510 LB</td>
</tr>
<tr>
<td>CONCRETE CLASS B, FOOTINGS</td>
<td>6</td>
<td>21 CY</td>
</tr>
<tr>
<td>CONCRETE CLASS B, FOOTINGS</td>
<td>7</td>
<td>9 CY</td>
</tr>
<tr>
<td>ELASTOMER</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

ELEVATION VIEW

SECTION E-E

SCREEN DETAIL

STANDARD PLAN

Traffic Signal Mast Arm Foundations - Type 1D & 1E
### Typical Quantities for Shaft Length

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item</th>
<th>Shaft Length</th>
<th>Concrete Fill</th>
<th>Concrete Class X</th>
<th>Reinforcing Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM 1</td>
<td>CONCRETE CLASS X</td>
<td>18'-0&quot;</td>
<td>1,240 cu ft</td>
<td>2,385 lb</td>
<td>16' 6&quot;</td>
</tr>
<tr>
<td>ITEM 2</td>
<td>CONCRETE CLASS X</td>
<td>21'-0&quot;</td>
<td>1,644 cu ft</td>
<td>3,266 lb</td>
<td>19' 6&quot;</td>
</tr>
<tr>
<td>ITEM 3</td>
<td>CONCRETE CLASS X</td>
<td>24'-0&quot;</td>
<td>1,848 cu ft</td>
<td>3,266 lb</td>
<td>22' 0&quot;</td>
</tr>
</tbody>
</table>

**Table Note:** Use the traffic signal mast arm layout standard plans TS-11 to TS-17 for attachment layout. Attachment combinations shown that do not have a solid line are not approved and require the approval of the Bureau of Bridge Design before proceeding.

**Reinforcing Schedule:**

<table>
<thead>
<tr>
<th>Shaft Length</th>
<th>SAE Type</th>
<th># of Bars</th>
<th>Bar Dia</th>
</tr>
</thead>
<tbody>
<tr>
<td>0'-0&quot;</td>
<td>F2</td>
<td>5</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>3'-0&quot;</td>
<td>F2</td>
<td>5</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>F2</td>
<td>6</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>9'-0&quot;</td>
<td>F2</td>
<td>5</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>12'-0&quot;</td>
<td>F2</td>
<td>6</td>
<td>1/2&quot;</td>
</tr>
</tbody>
</table>

**Drilled Holes:**

1. The drilled shaft foundation shall be constructed by cast-in-place concrete against undisturbed material using temporary shaft. If necessary, the concrete mix shall be capable of flowing through the reinforcing cage to the excavation with a minimum of vibration equipment. Whether the method of placement is cast-in-place or precast, the contractor shall coordinate with the engineer for visual inspection of the excavation, the arrangement of the reinforcing bars, and the anchor bolts prior to concrete placement.

2. The excavated portion of the shaft and to a depth of at least 12 inches shall have a finished appearance with the top having a smooth level finish.

3. Undisturbed placement procedures for dump or pumping methods shall be required for a drilled hole where the shaft is to be cast-in-place. Excavation and any fill are to be completed before the concrete is placed. Curing is to be completed in accordance with Section 201. In the event of delays, a fresh concrete cover shall be used.

4. Where required, the drill shall penetrate the anchor a minimum of 1 foot and in all cases with a minimum shaft length of 6 feet shall be obtained. It is not necessary to extend the shaft in boring beyond the specified 12-inch concrete cover on the plan.

5. When required, it is to be constructed where the excavation shall be made prior to the placement and concrete shall be in accordance with Section 203.

6. If the drilled hole method is not performed, the anchor shall be made of cast-in-place concrete. A cast-in-place circular shaft foundation shall be installed.

**Excavated Holes:**

1. As an alternative to a cast-in-place method, the circular shaft foundation concrete shall be cast-in-place within the excavated shaft. The excavation shall be cast-in-place using forms which must be removed or alternated. A precast circular shaft foundation shall be installed.

2. The excavated hole shall be at least 1 foot clear of the foundation sides and 1 foot deeper than the foundation wall. Any excavated shafts shall be filled with the undisturbed material before the concrete is placed.

3. The excavation hole shall be backfilled to the limits of excavation with structural fill according to Section 520. The excavation shall be made of the soil as appropriate for structural fill or excavation.

**Anchor Rods:**

- Anchor rods shall be straight rods and conform to ASTM F1554 grade 50. Where necessary, galvanize on the entire rod for an acid attack. Anchor rod shall be supplied with a nut at the top with nuts spaced at 180 degrees by ASTM A563 and a minimum of the flat washer washer. Washer fixed. Lock washers shall not be used. The embedded end of the anchor rod shall have either one nut welded or double nut reinforcing schedule. Anchor rod shall not be used.

**General Notes:**

- The applicable foundation standard for the installation, pretensioning, and ultrasonic testing of anchor rods shall be the special provision shown on the special detail sheet. No separate payment shall be made for these items.
TYPICAL WIRE LOOP DIAGRAM
NOT TO SCALE

NOTE: LOOP DIMENSIONS AS SHOWN ON SIGNALIZATION PLAN

QUADRUPOLE LOOP INSTALLATION SAW CUT DETAIL
NOT TO SCALE

SECTION G-G
LEAD-IN SAW CUT FROM SEGMENT TO BOX OUT

SECTION D-D
SEGMENT SECTION SAW CUT

GENERAL NOTES

1. MAXIMUM OF TWO LEAD-IN PAIRS PER \( \frac{1}{2} \)" CONDUIT.

2. TAPE TUBING 3" ON EACH SIDE OF THE SAW CUT BOX OUT BOUNDARY WITH ELECTRICAL TAPE.

3. AFTER TUBING IS INSTALLED, FILL CONDUIT WITH CRUMPLED PAPER AND SEAL WITH PLIABLE DUCT SEALANT.

4. USE ITEM 209.3 - GRANULAR BACKFILL (SAND) TO COVER AND SUPPORT THE VINYL PLASTIC TUBING.

TRAFFIC SIGNAL STANDARD
QUADRUPOLE LOOP DETECTOR
2-4-2 TURNS
NOTE: LOOP DIMENSIONS AS SHOWN ON SIGNALIZATION PLAN.

TYPICAL WIRE LOOP DIAGRAM

RECTANGULAR LOOP INSTALLATION SAW CUT DETAIL

DETECTOR BOX OUT DETAIL STAGE 1: AT PAVING

DETECTOR BOX OUT DETAIL STAGE 2: AT LOOP INSTALLATION

GENERAL NOTES

1. MAXIMUM OF TWO LEAD-IN PAIRS PER ¾" CONDUIT.

2. TAPE TUBING 3" ON EACH SIDE OF THE SAW CUT BOX OUT BOUNDARY WITH ELECTRICAL TAPE.

3. AFTER TUBING IS INSTALLED, FILL CONDUIT WITH CRUMPLED PAPER AND SEAL WITH PLIABLE DUCT SEALANT.

4. USE ITEM 203.3 - GRANULAR BACKFILL (SAND) (SUBSIDIARY) TO COVER AND SUPPORT THE VINYL PLASTIC TUBING.
AMENDMENTS TO PART VI OF THE MUTCD (2009 EDITION)

NOTE: Revised Standards TC-1 through TC-8 amend Part VI of the 2009 Edition of the MUTCD by superseding or supplementing certain Sections. They shall be used in conjunction with the MUTCD and the Specifications for work zone traffic control on all projects.

Section 6C.04, Table 6C-1 and Section 6H.01, Table 6H-3. "Urban (low speed)" shall be defined as those roadways with regulatory speed limits of 30 mph or less; "Urban (high speed)" shall be defined as those roadways with regulatory speed limits of 40 mph or more.

Section 6F.03, Sign Placement. Add the following paragraph as a "Standard" heading:

1. Cones or tubular markers may be used, only in the tangent sections of the lane closure, when inadequate width, geometric constraints or the duration of the operation (short-duration or mobile, see 6G.02 for Work Duration definitions) necessitates the use of a narrower or more easily moved channelization device.

Section 6F.78 - Temporary Markings. Add the following sentence:

5a Temporary markings on divided highways shall be 4-inch removable tape or paint conforming to MUTCD Chapter 3, Section 3A.

5b Temporary markings shall be offset 1-foot from the final striping location.

5c All temporary white broken-line pavement markings for traffic moving in the same direction shall be retroreflective painted or tape. Temporary paint or tape markings shall have a cycle length of 4 feet long with minimum 4-foot long slip and 36-foot long gap. Stop lines shall be installed during temporary conditions and shall be retroreflective painted or tape.

5d Stop lines shall be installed during temporary conditions and shall be retroreflective painted or tape.

Replace "Guidance" paragraph 03 with:

3c Edge lines, channelizing lines, lane reduction transitions, gore markings, and non-longitudinal lines (e.g., railroad crossings, crosswalks, words, symbols, etc.) are usually not required for temporary situations. Their use should be evaluated on a project by project basis based on field conditions, relative traffic speeds and volumes, and the use of other traffic control devices. When used, temporary markings for these types of longitudinal and non-longitudinal lines shall be retroreflective painted or tape and conform to MUTCD Part 3 Chapters 3A and 3B.

Section 6F.85 - Temporary Traffic Barriers. Add the following to the "Standard" paragraph 06:

6a Temporary end treatments in the form of sand barrels and water filled arrays shall not be used from November 1st to April 15th unless they are greater than ten feet from the travel lanes (measured to the face) or specifically approved in writing by the Engineer. If approved by the Engineer for winter use, the sand or water shall be treated in accordance with the manufacturer’s recommendations to prevent freezing.

6b Impact attenuators shall be marked with a Type 3 Object Marker per Section 2C.63 Object Marker Design and Placement Height paragraph 02.

9 Section 6G.05 - Work Affecting Pedestrian and Bicycle Facilities. Add the following to the "Support" paragraph 01:

10 Section 6H.01, Typical Applications. Add the following paragraph to the Option heading:

11 Section 6H.01, Figure 6H-14. The diagram for the unsignalized crossing of a Naural Road shows interim tape and a NO PASSING ZONE (W-14-3) sign to deter passing maneuvers. In lieu of interim tape, cones may be placed along the centerline, using a maximum spacing of 40-feet.

12 Section 6H.01, Figure 6H-36. Make the following revisions:

a. Use REVERSE CURVE (W-14) series signs which show side-by-side arrows, one arrow for each open lane, at each location that the sign is shown.

WORK ZONE TRAFFIC CONTROL

AMENDMENTS TO PART VI MUTCD (2009)
UNIFORMED OFFICER AND FLAGGER USE GUIDELINES

Flaggers shall be used to the greatest extent possible for "dynamic" traffic control operations. Uniformed Officers may be utilized for their specific authority above and beyond that of a flagger, such as assistance in speed control and traffic law enforcement. The use of Uniformed Officers may be necessary in some instances. However, Officer use is not a requirement. Their use must be preapproved by NHDOT.

Examples of traffic control operations where Uniformed Officers and flaggers are typically not needed:
1. Shoulder work.
2. Work behind barrier.

Examples of traffic control operations where flaggers should be used include:
1. Alternating 1-way traffic (stop/slow paddles must be used).
2. Directing traffic through low volume intersections.
3. Assisting trucks and equipment in and out of work areas.
4. Providing coverage at side roads and driveways during mobile operations (e.g., paving, striping, etc.).
5. Directing pedestrians and bicyclists through the work zone.

Examples of traffic control operations where Uniformed Officers may be used include:
1. Directing traffic through complex intersections, especially where signals are being overridden.
2. Assisting construction vehicles and equipment in and out of work areas on high speed (>45 mph), high volume facilities (>15,000 vpd). Note: If an access area is anticipated to be in place for an extended period of time and it is determined that assistance is required for the safe exit and entry of construction vehicles, then it is cost effective for NHDOT to place stationary traffic control devices (e.g., signals) along the roadway.
4. If a uniformed officer is already on site for other needs (enforcement or presence), then the officer may be asked to supplement these duties by providing limited duration traffic control that would otherwise be covered by a flagger. However, the officer must be adequately trained for the flagger operation to be performed and must use appropriate equipment and techniques (which may include the use of stop/slow paddles).
5. If approved, officers may be hired as a speed deterrent and/or to increase driver awareness through a work zone under the following conditions:
   a. The work zone has a posted speed of 45 mph or higher and an average daily traffic (ADT) volume of 15,000 vpd or greater; and
   b. The work zone presents a unique safety issue, such as a high rate of crashes, vehicles traveling at excessive speeds, poor roadway geometries, excessive east-west sun glare; workers exposed to traffic; and/or construction equipment frequently entering and exiting the work zone.
6. In rare cases, a presence officer may be approved for use on low speed (<45 mph) or low volume (<15,000 vpd) roads if a unique safety issue exists and other speed deterrents are not available.
7. The use of law enforcement may be considered for nighttime operations. When used at night the use of blue lights and positioning should be carefully considered. Excessive use of police vehicles with lights at night, or inappropriate positioning of these vehicles may actually detract from the positive guidance the work zone traffic control devices provide. When used for nighttime work, blue lights should be dimmed and head lights should be off.

See complete Flagger and Uniformed Officer guidelines at this link: http://www.nh.gov/dot/org/projectdevelopment/construction/documents/FlaggerPoliceUseGuidelines.pdf

UNIFORMED OFFICER PLACEMENT IN THE WORK ZONE

If Uniformed Officer with Vehicle use has been approved for presence, cruiser placement is recommended as follows:

1. Park in the shoulder or median, not in the travel lane.
2. Do not park behind the Truck Mounted Attenuator (TMA).
3. Do not park in the buffer zone. If buffer zone presence is needed, then consideration should be given to installing a truck TMA instead.
4. Do not park in the taper.
5. Locate the police cruiser between the 1st and 2nd signs (from the taper):
   a. Urban (low) < 30 mph) 150' from the taper.
   b. Urban (high) > 35 mph) 525' from the taper.
   c. Rural > 750' from the taper.
   d. Expressway/Highway > 1750' from the taper.
6. Consider having the cruiser face traffic for stationary operations.
   a. Recommended cruiser positioning for stationary operations:
      i. Less than 5 mph face traffic (e.g. crack seal).
      ii. Greater than 5 mph face traffic (e.g. striping, rumble strips).
7. Stay 4 miles in front of queue.
8. If a second Officer is used for enforcement, and there is no queue, the enforcement officer should be immediately after the work zone. If there is a traffic queue then the enforcement officer should be several miles before the backup queue and presence Officer.
9. Hands free and cell phone use should be only for work zone activity.
10. Headlights off, dim blue lights at night if possible.
TYPICAL APPLICATION
PERMANENT CONSTRUCTION SIGNING

MULTI-LANE DIVIDED

TWO LANE UNDIVIDED

NOT TO SCALE

GENERAL NOTES
1. SIGNS SHOWN INDICATE TYPICAL INSTALLATIONS. ACTUAL NUMBER OF SIGNS MAY VARY TO FIT INDIVIDUAL PROJECT NEEDS.
2. CONSTRUCTION SIGNS SHOWN ON THIS SHEET SHALL BE FLUORESCENT ORANGE. WITH THE EXCEPTION OF R50-1 AND G20-2a.
3. REFER TO TYPICAL APPLICATIONS FOR SIGNING OF INTERMEDIATE WORK AREAS.

NOT TO SCALE

STANDARD NO TC-3

STANDARD PLANS

WORK ZONE TRAFFIC CONTROL

PERMANENT CONSTRUCTION SIGNING
TYPICAL APPLICATION
TWO WAY TRAFFIC LANE SHIFT

GENERAL NOTES

1. FOR OPERATIONS WHERE TWO-WAY TRAFFIC LANE SHIFT CAN BE MAINTAINED ON TWO 10' MIN. CLEAR WIDTH LANES.

2. FOR LONG-TERM STATIONARY OR INTERMEDIATE-TERM STATIONARY WORK, PAVEMENT MARKINGS INDICATING NO PASSING SHALL BE USED. DO NOT PASS SIGNS (R4-11) MAY BE REQUIRED.

3. FOR TAPER LENGTH CRITERIA, SEE MUTCD TABLES 6C-3 AND 6C-4.

4. FOR SPEEDS > 50 MPH, LENGTH = L. FOR SPEEDS ≤ 50 MPH LENGTH = 1.2L.

5. FOR BUFFER SPACE CRITERIA, SEE STOPPING DISTANCE, MUTCD TABLE 6C-2.

6. INSTALL ON ALL APPROACHES IF THE CRITERIA IN AMENDMENT NO. 9 ON TC-1 APPLIES.

7. THE SPACE BETWEEN THE TRUCK MOUNTED ATTENUATOR (TMA) AND THE WORK SPACE SHALL BE PER MANUFACTURER'S RECOMMENDATIONS.

NOT TO SCALE
**RECOMMENDED ADVANCE WARNING SIGN MINIMUM SPACING**

**TABLE 6-1C FROM MUTCD 2009 EDITION**

<table>
<thead>
<tr>
<th>ROAD TYPE</th>
<th>DISTANCE BETWEEN SIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>100'</td>
<td>100'</td>
</tr>
<tr>
<td>URBAN (~30 MPH)</td>
<td>350'</td>
</tr>
<tr>
<td>URBAN (~35 MPH)</td>
<td>500'</td>
</tr>
<tr>
<td>RURAL</td>
<td>1000'</td>
</tr>
<tr>
<td>EXPRESSWAY / FREEWAY</td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- See Amendment No. 10 on TC-1
- Posted bridge width shall be 1 foot less than actual width.
- This typical application should be used as an alternate to noted MUTCD Figure TA-11 when construction activities are for a period longer than that considered (intermediate-term work). (See MUTCD Section 6B.01)
- Existing pavement markings shall be removed and temporary markings installed as ordered.
- Regulatory sign placement shall be approved by Bureau of Traffic.

**TYPICAL APPLICATION**

**LANE CLOSURE: TWO-LANE ROAD WITH LOW TRAFFIC VOLUMES**

**NOT TO SCALE**

- Use of barrier is anticipated for most situations requiring application of this lane closure. Required barrier protection shall be determined as described in the most current edition of the Roadside Design Guide as adopted by the Department. Taper rates for barrier are found on the portable concrete barrier standard (CR-23).
- Crash cushions shall be delineated with Type 3 object markers. See MUTCD Figure 2C-13.

**LEGALITY NOTES**

- PORTABLE BARRIER
- CHANNELIZING DEVICES
- IMPACT ATTENUATOR

**TEMPLATES**

- DEPARTMENT OF TRANSPORTATION
- BUREAU OF HIGHWAY DESIGN

**NOTES**

- Lane closure: Two-lane road with low traffic volumes
- Revision date: 03-16-17
- State project no.: 747701-11
- Sheet no.: 3
- Total sheets: 12
TYPICAL APPLICATION
LANE SHIFTS - DIVIDED HIGHWAYS

GENERAL NOTES

1. FOR TAPER LENGTH (L) CRITERIA, SEE MUTCD TABLES 6C-3 AND 6C-4.
2. FOR BUFFER SPACE CRITERIA, SEE STOPPING SIGHT DISTANCE, MUTCD TABLE 6C-2.
3. THE SPACE BETWEEN THE TRUCK MOUNTED ATTENUATOR (TMA) AND THE WORK SPACE SHALL BE PER MANUFACTURER’S RECOMMENDATIONS.

NOT TO SCALE
TYPICAL APPLICATION
LANE CLOSURE: SIGNALIZED CONTROL WITH BARRIER

GENERAL NOTES

1. Temporary traffic signals are preferable to flaggers for long-term projects and other activities that would require flaggers at night.
2. The maximum length of the activity area for one-way traffic signal control is determined by the capacity required to handle the peak-hour demand. Signal timing shall be established by qualified personnel.
3. Signals shall be installed and operated in accordance with the requirements of Part IV of the MUTCD. Temporary traffic control shall meet the physical display and operational requirements of conventional traffic signals.
4. Adequate area illumination shall be provided to clearly identify the transition areas at night for long-term operations.
5. Stop lines 18 inches wide shall be installed. Add "no-passing" lines when necessary. Removable pavement markings may be used. Conflicting pavement markings and raised pavement marker reflectors between the activity area and the stop lines shall be removed.
6. Hazard identification beacons or type T flashing warning lights may be mounted with warning signs, if warranted.
7. The vertical alignment of the roadway may require adjustments in the height of the signal heads.
8. When the signal is changed to a flash condition either manually or automatically, all approaches shall flash red.
9. The use of barrier is anticipated for most situations requiring application of this lane closure. Required barrier protection shall be determined as described in the most current edition of the roadside design guide as adopted by the department. Taper rates for barrier are found on the Portable Concrete Barrier Standard (SR-23).
10. For temporary traffic barrier criteria, see section 6F.85 of the MUTCD.
11. Crash cushions shall be delineated with type 3 object markers, see MUTCD Figure 2C-13.
12. Install on all approaches if the criteria in Amendment No. 9 on TC-1 applies.
TYPICAL APPLICATION

CONSTRUCTION SIGNING FOR COLD-PLANED OPERATIONS

**TABLE 6-1C FROM MUTCD 2009 EDITION**

<table>
<thead>
<tr>
<th>ROAD TYPE</th>
<th>DISTANCE BETWEEN SIGNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN (≤ 30 MPH)</td>
<td>A 100’  B 100’  C 100’</td>
</tr>
<tr>
<td>URBAN (≤ 35 MPH)</td>
<td>150’  200’  250’</td>
</tr>
<tr>
<td>RURAL</td>
<td>200’  250’  300’</td>
</tr>
<tr>
<td>EXPRESSWAY / FREEWAY</td>
<td>300’  500’  500’</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

1. THE ABOVE DIAGRAM ILLUSTRATES COLD-PLANED SURFACES FOR PAVEMENT WATCHES.
   THIS SAME SIGN PACKAGE SHALL BE USED FOR ANY COLD-PLANED SURFACE WITHIN
   THE LIMITS OF THE TRAVELED WAY. SEE PAVEMENT WATCH TYPICAL INCLUDED IN
   THE PLANS FOR LENGTH OF PAVEMENT WATCH, FILLET DETAIL, ETC.

2. THE GROOVED PAVEMENT AHEAD W2D-60 SIGN MAY BE ELIMINATED FOR RELATIVELY
   SHORT PAVEMENT WATCHES AT THE DISCRETION OF THE ENGINEER. IF W2D-60 IS NOT
   USED W8-15 & W8-15P MUST BE PLACED.

---

**LEGEND**

- **COLD-PLANED SURFACE**

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**NOT TO SCALE**