SUBJECT: STANDARDS FOR ROADWAY CONSTRUCTION, RC 0M-100M

INFORMATION AND SPECIAL INSTRUCTIONS:


The new standard drawings should be adopted as soon as possible on all new and existing designs and in conjunction with Publication 408/2000 Specifications and Bridge Standards that already have been issued with dual numbers (Metric and English).

Note: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

It is noted that the major changes to Publication 72M were to add English units in parenthesis. Also, the speed-volume criteria relative to the use of Type 2 Strong or Weak Post (Turned-down) End Treatments for guide rail, is reduced to 70km/h (45 mph) and 4000 ADT. Turned-down treatments cannot be used on the NHS regardless of speed or volume.

Any comments or questions on the new Edition relative to revisions, Metric or English numbers, may be directed to the Highway Quality Assurance Division.

In addition to the dual numbers on each standard drawing, there were a number of other changes made and are presented below. It is strongly advised that all recipients thoroughly review and become familiar with the April 2000 Edition.

RC-Sheet #

General Changes

- Added a Note to each sheet to indicate that either all Metric or all English values must be used on plans.
- The Note that indicates the Metric and English units appears only on the first sheet of each standard.

RC-52M (1 of 6) (3 of 6)

RC-53M (2 of 2)

RC-54M (1 & 2 of 7) (5 of 7)

RC-57M (1 of 3) (6 of 7)

CANCEL THE FOLLOWING:


REQUEST ADDITIONAL COPIES FROM:

Bureau of Office Services
Publications Sales Office
P.O. Box 2028
Middletown, PA 17120

APPROVED FOR ISSUANCE BY:

Bradley L. Mallory
Secretary of Transportation

By: Michael W. Rygh, P.E.
Deputy Secretary for Highway Administration
<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-10M</td>
<td>APR 28, 2000</td>
<td>CLASSIFICATION OF EARTHWORK</td>
</tr>
<tr>
<td>RC-11M</td>
<td>APR 28, 2000</td>
<td>CLASSIFICATION OF EARTHWORK FOR STRUCTURES</td>
</tr>
<tr>
<td>RC-12M</td>
<td>APR 28, 2000</td>
<td>BACKFILL AT STRUCTURES</td>
</tr>
<tr>
<td>RC-13M</td>
<td>APR 28, 2000</td>
<td>PAY LIMIT OF SUBBASE</td>
</tr>
</tbody>
</table>

**PAVEMENTS**

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-20M</td>
<td>APR 28, 2000</td>
<td>CONCRETE PAVEMENT JOINTS</td>
</tr>
<tr>
<td>RC-21M</td>
<td>APR 28, 2000</td>
<td>Reinforced Concrete Pavement</td>
</tr>
<tr>
<td>RC-22M</td>
<td>APR 28, 2000</td>
<td>Bridge Approach Slab</td>
</tr>
<tr>
<td>RC-24M</td>
<td>APR 28, 2000</td>
<td>Pavement Relief Joint</td>
</tr>
<tr>
<td>RC-25M</td>
<td>APR 28, 2000</td>
<td>Shoulders</td>
</tr>
<tr>
<td>RC-26M</td>
<td>APR 28, 2000</td>
<td>Concrete Pavement Rehabilitation</td>
</tr>
<tr>
<td>RC-27M</td>
<td>APR 28, 2000</td>
<td>Plain Concrete Pavement</td>
</tr>
<tr>
<td>RC-28M</td>
<td>APR 28, 2000</td>
<td>Overlay Transitions and Paving Notches</td>
</tr>
</tbody>
</table>

**DRAINAGE**

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-30M</td>
<td>APR 28, 2000</td>
<td>Subsurface Drains</td>
</tr>
<tr>
<td>RC-31M</td>
<td>APR 28, 2000</td>
<td>Endwalls</td>
</tr>
<tr>
<td>RC-32M</td>
<td>APR 28, 2000</td>
<td>SlopE Pipe Fittings, Pipe Connectors and Concrete Collar for Pipe Extension</td>
</tr>
<tr>
<td>RC-33M</td>
<td>APR 28, 2000</td>
<td>End Sections for Pipe Culverts</td>
</tr>
<tr>
<td>RC-34M</td>
<td>APR 28, 2000</td>
<td>Inlets</td>
</tr>
<tr>
<td>RC-35M</td>
<td>APR 28, 2000</td>
<td>Drainage Dike</td>
</tr>
<tr>
<td>RC-36M</td>
<td>APR 28, 2000</td>
<td>Spring Boxes</td>
</tr>
<tr>
<td>RC-39M</td>
<td>APR 28, 2000</td>
<td>Standard Manholes</td>
</tr>
<tr>
<td>RC-40M</td>
<td>APR 28, 2000</td>
<td>Slope Protection</td>
</tr>
<tr>
<td>RC-43M</td>
<td>APR 28, 2000</td>
<td>Gabions</td>
</tr>
</tbody>
</table>

**GUIDE RAIL AND MEDIAN BARRIER**

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-50M</td>
<td>APR 28, 2000</td>
<td>Guide Rail Transition at End of Structure</td>
</tr>
<tr>
<td>RC-52M</td>
<td>APR 28, 2000</td>
<td>Type 2 Strong Post Guide Rail</td>
</tr>
<tr>
<td>RC-53M</td>
<td>APR 28, 2000</td>
<td>Type 2 Weak Post Guide Rail</td>
</tr>
<tr>
<td>RC-54M</td>
<td>APR 28, 2000</td>
<td>Barrier Placement at Obstructions</td>
</tr>
<tr>
<td>RC-55M</td>
<td>APR 28, 2000</td>
<td>Type 2 Weak Post Median Barrier</td>
</tr>
<tr>
<td>RC-57M</td>
<td>APR 28, 2000</td>
<td>Concrete Median Barrier</td>
</tr>
<tr>
<td>RC-58M</td>
<td>APR 28, 2000</td>
<td>Single Face Concrete Barrier</td>
</tr>
<tr>
<td>RC-59M</td>
<td>APR 28, 2000</td>
<td>Concrete Glare Screen</td>
</tr>
</tbody>
</table>

**FENCES AND CURBS**

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-60M</td>
<td>APR 28, 2000</td>
<td>Right-Of-Way Fence</td>
</tr>
<tr>
<td>RC-61M</td>
<td>APR 28, 2000</td>
<td>Right-Of-Way Gates and Removable Fence Sections</td>
</tr>
<tr>
<td>RC-63M</td>
<td>APR 28, 2000</td>
<td>Permanent Barricades</td>
</tr>
<tr>
<td>RC-64M</td>
<td>APR 28, 2000</td>
<td>Curbs and Gutters</td>
</tr>
<tr>
<td>RC-65M</td>
<td>APR 28, 2000</td>
<td>Concrete Mountable Curbs</td>
</tr>
<tr>
<td>RC-66M</td>
<td>APR 28, 2000</td>
<td>Concrete Traffic Separator</td>
</tr>
<tr>
<td>RC-67M</td>
<td>APR 28, 2000</td>
<td>Curb Ramps</td>
</tr>
</tbody>
</table>

**POLLUTION CONTROL**

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-70M</td>
<td>APR 28, 2000</td>
<td>Erosion and Sediment Pollution Control</td>
</tr>
</tbody>
</table>

**HIGHWAY LIGHTING**

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-80M</td>
<td>APR 28, 2000</td>
<td>Highway Lighting-Foundations</td>
</tr>
<tr>
<td>RC-82M</td>
<td>APR 28, 2000</td>
<td>Highway Lighting-Junction Boxes-Heavy Duty</td>
</tr>
<tr>
<td>RC-83M</td>
<td>APR 28, 2000</td>
<td>Highway Lighting-Lighting Pole Details</td>
</tr>
<tr>
<td>RC-84M</td>
<td>APR 28, 2000</td>
<td>Highway Lighting-Lighting and Electrical Details</td>
</tr>
</tbody>
</table>

**ROADSIDE DEVELOPMENT AND PLANTING**

<table>
<thead>
<tr>
<th>STANDARD DRAWING NUMBER</th>
<th>DRAWING DATE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC-91M</td>
<td>APR 28, 2000</td>
<td>Bracing and Planting Details</td>
</tr>
</tbody>
</table>
1. PROVIDE EXCAVATION, INCLUDING THE PORTIONS OF ENDWALLS ABOVE THE FLOW LINE AND TO A MAXIMUM OF 1200 (4'-0") ABOVE THE TOP OF THE PIPE OR PIPE-ARCH, AS CLASS 4 EXCAVATION FOR PIPE OR PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND CLASS 3 EXCAVATION FOR PIPE OR PIPE-ARCH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY.

2. FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, PROVIDE EXCAVATION BETWEEN THE FLOW LINE AND THE LOWER LIMIT OF CLASS 3 EXCAVATION CONFORMING TO THE AREA SHOWN WITH THE CLASS 3 EXCAVATION SYMBOL.

3. WHEN DEMANDED NECESSARY TO EXCAVATE BELOW THE BOTTOM OF THE FLOW LINE, PAY ALL EXCAVATION WITHIN THE LIMITS OF THE BOTTOM OF THE EXCAVATED TRENCH AND THE TOP OF THE EXISTING GROUND AS CLASS 1 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND AS CLASS 4 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, PLACE AND SHAPE BACKFILL MATERIAL FOR THE UNDERCUT AREA CONFORMING TO THE BOTTOM OF THE CULVERT AND CONSIDER INCIDENTAL TO THE CLASS SPECIFIED.

4. MEASURE AND PAY EXCAVATION AS SHOWN IN SECTION A-A, SECTION B-B AND SECTION C-C.

5. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS EXCEPT AS NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

NOTES

1. PROVIDE EXCAVATION, INCLUDING THE PORTIONS OF ENDWALLS ABOVE THE FLOW LINE AND TO A MAXIMUM OF 1200 (4'-0") ABOVE THE TOP OF THE PIPE OR PIPE-ARCH, AS CLASS 4 EXCAVATION FOR PIPE OR PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND CLASS 3 EXCAVATION FOR PIPE OR PIPE-ARCH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY.

2. FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, PROVIDE EXCAVATION BETWEEN THE FLOW LINE AND THE LOWER LIMIT OF CLASS 3 EXCAVATION CONFORMING TO THE AREA SHOWN WITH THE CLASS 3 EXCAVATION SYMBOL.

3. WHEN DEMANDED NECESSARY TO EXCAVATE BELOW THE BOTTOM OF THE FLOW LINE, PAY ALL EXCAVATION WITHIN THE LIMITS OF THE BOTTOM OF THE EXCAVATED TRENCH AND THE TOP OF THE EXISTING GROUND AS CLASS 1 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND AS CLASS 4 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, PLACE AND SHAPE BACKFILL MATERIAL FOR THE UNDERCUT AREA CONFORMING TO THE BOTTOM OF THE CULVERT AND CONSIDER INCIDENTAL TO THE CLASS SPECIFIED.

4. MEASURE AND PAY EXCAVATION AS SHOWN IN SECTION A-A, SECTION B-B AND SECTION C-C.

5. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS EXCEPT AS NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

NOTES

1. PROVIDE EXCAVATION, INCLUDING THE PORTIONS OF ENDWALLS ABOVE THE FLOW LINE AND TO A MAXIMUM OF 1200 (4'-0") ABOVE THE TOP OF THE PIPE OR PIPE-ARCH, AS CLASS 4 EXCAVATION FOR PIPE OR PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND CLASS 3 EXCAVATION FOR PIPE OR PIPE-ARCH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY.

2. FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, PROVIDE EXCAVATION BETWEEN THE FLOW LINE AND THE LOWER LIMIT OF CLASS 3 EXCAVATION CONFORMING TO THE AREA SHOWN WITH THE CLASS 3 EXCAVATION SYMBOL.

3. WHEN DEMANDED NECESSARY TO EXCAVATE BELOW THE BOTTOM OF THE FLOW LINE, PAY ALL EXCAVATION WITHIN THE LIMITS OF THE BOTTOM OF THE EXCAVATED TRENCH AND THE TOP OF THE EXISTING GROUND AS CLASS 1 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND AS CLASS 4 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, PLACE AND SHAPE BACKFILL MATERIAL FOR THE UNDERCUT AREA CONFORMING TO THE BOTTOM OF THE CULVERT AND CONSIDER INCIDENTAL TO THE CLASS SPECIFIED.

4. MEASURE AND PAY EXCAVATION AS SHOWN IN SECTION A-A, SECTION B-B AND SECTION C-C.

5. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS EXCEPT AS NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

NOTES

1. PROVIDE EXCAVATION, INCLUDING THE PORTIONS OF ENDWALLS ABOVE THE FLOW LINE AND TO A MAXIMUM OF 1200 (4'-0") ABOVE THE TOP OF THE PIPE OR PIPE-ARCH, AS CLASS 4 EXCAVATION FOR PIPE OR PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND CLASS 3 EXCAVATION FOR PIPE OR PIPE-ARCH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY.

2. FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, PROVIDE EXCAVATION BETWEEN THE FLOW LINE AND THE LOWER LIMIT OF CLASS 3 EXCAVATION CONFORMING TO THE AREA SHOWN WITH THE CLASS 3 EXCAVATION SYMBOL.

3. WHEN DEMANDED NECESSARY TO EXCAVATE BELOW THE BOTTOM OF THE FLOW LINE, PAY ALL EXCAVATION WITHIN THE LIMITS OF THE BOTTOM OF THE EXCAVATED TRENCH AND THE TOP OF THE EXISTING GROUND AS CLASS 1 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH WITH 1200 (4'-0") OR GREATER INSIDE DIAMETER OR SPAN, RESPECTIVELY, AND AS CLASS 4 EXCAVATION FOR PLATE PIPE OR PLATE PIPE-ARCH LESS THAN 1200 (4'-0") INSIDE DIAMETER OR SPAN, RESPECTIVELY, PLACE AND SHAPE BACKFILL MATERIAL FOR THE UNDERCUT AREA CONFORMING TO THE BOTTOM OF THE CULVERT AND CONSIDER INCIDENTAL TO THE CLASS SPECIFIED.

4. MEASURE AND PAY EXCAVATION AS SHOWN IN SECTION A-A, SECTION B-B AND SECTION C-C.

5. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS EXCEPT AS NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.
GENERAL NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUB 408/2000. PLACE BACKFILL AND EMBANKMENT IN ACCORDANCE WITH THIS STANDARD DRAWING UNLESS OTHERWISE SHOWN ON THE STRUCTURE DRAWINGS.

2. USE ONLY R-3 ROCK LINING MEETING THE REQUIREMENTS OF PUBLICATION 408/M, SECTION 850.2(1). USE 4" COIR MATS MEETING THE REQUIREMENTS OF PUBLICATION 408/M, SECTION 850.2(4) AASHTO NO. 1, 3, 5 OR 57... TO MINIMIZE WIND ACTION.

3. PLACE A CLASS 2, TYPE 8 GEOTEXTILE BLANKET ON ENTIRE TOP OF THE COMPLETED STRUCTURE BACKFILL PRIOR TO PLACING ANY SUBBASE MATERIAL FOR THE APPROACH SLAB.

4. PLACE STRUCTURE BACKFILL AND EMBANKMENT SIMULTANEOUSLY UNLESS OTHERWISE PERMITTED BY THE ENGINEER.

5. PLACE BACKFILL WITHIN 6000 MM FROM THE REAR FACE OF THE ABUTMENT AND THE WINGWALLS IN LIFTS OF 1000 MM. COMPACT EACH LAYER WITH TWO PASSES OF A WALK-BEHIND VIBRATORY PLATE SOIL COMPACTOR.

BACKFILL AT STRUCTURES

LIMITS OF BACKFILL

INTEGRAL ABUTMENT

LIMITS OF BACKFILL

WINGWALLS OF INTEGRAL ABUTMENTS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTE

1. CONSIDER PAYMENT FOR SUBGRADE INCIDENTAL TO THE ITEMS OF SUBBASE.
2. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESIS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. Place an approved tube over the lubricated end of all dowel bars used in Type E joints and provide a minimum 25 x 13/4" pocket assured by means of a positive spacing device.

2. Cut expansion joint filler material to conform to the cross section of the pavement and furnish the strips equal to the width of the pavement slab. Make the top edge of the contact surfaces of the seal on both sides of the seal the same elevation.

3. Construct all transverse joints perpendicular to the centerline.

4. Use minimum No. 32 x 450 (1 1/4") long dowel bars for pavement depths greater than 350 (14") and minimum diameter No. 38 x 450 (1 1/2") long dowel bars for pavement depths less than 350 (14"). Use only approved dowel bars having equivalent properties to conventional round dowel bars. Approved alternate type P dowel bars may be used.

5. Place dowel bars parallel to the centerline and surface of the slab.

6. Use only approved neoprene seals, as listed in Bulletin 15, Install neoprene seals in a depth of 1 to 2" below the level of the pavement surface. Make the top edges of the contact surfaces on both sides of the seal at the same elevation.

7. Make the top of the joint sealing material no less than 2.5 mm (1/16") nor more than 6 mm (1/4") below the surface of the pavement.

8. The initial saw cut for Type D and Type G joints is not required for construction joints.


10. Choose seal size and pavement surface temperature at the time of sawing, as follows:

<table>
<thead>
<tr>
<th>JOINT SEAL SIZE</th>
<th>JOINT SPACING</th>
<th>JOINT SEALING MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE E</td>
<td>25 x 3/4&quot;</td>
<td>TYPE P</td>
</tr>
<tr>
<td>TYPE D</td>
<td>50 x 3/4&quot;</td>
<td>TYPE E</td>
</tr>
</tbody>
</table>

11. When silicone joint sealing material, as specified in Publication 404M, Section 7.03.4.6, is selected for use in transverse joints Type D or Type G, use the same joint sealing material in the longitudinal and transverse shoulder joints. Use the same joint sealing material in the longitudinal and transverse shoulder joints. Use the same joint sealing material in the longitudinal and transverse shoulder joints.

12. All dimensions are given in millimeters unless otherwise noted. U.S. customary units in parentheses. Department of Transportation.

13. Provide materials and workmanship in accordance with the requirements of Publication 404M.

NOTES: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE PAVEMENT JOINTS

RECOMMENDED: APR 29, 2000
RECOMMENDED: MAR 29, 2000
FINISHED: 1 OF 3

SIGNED: D. RC-20M
NOTES

1. SPECIFY (# 1) TIE BARS 750 (2.5") LONG, SPACED 750 (2.5") CENTER TO CENTER MAXIMUM. PLACE PERPENDICULAR TO AND CENTERED OVER THE LONGITUDINAL JOINT 45 (1.75") IN FROM THE EDGE OF THE ROADWAY OR HIGHWAY (WHICH EVER IS GREATER). EXCEPT FOR TYPE L CONTRACT JOINTS, FOR ALTERNATE TRANSVERSE JOINTS, TIE BARS ARE NOT REQUIRED. WHEN USING EPOXY COAT TIE BARS AT THE TRANSVERSE SHOULDER JOINTS, USE THE SAME JOINT SEALING MATERIAL IN THE LONGITUDINAL JOINTS (ALTERNATE TYPE L AND ALTERNATE LONGITUDINAL JOINTS). SEE NOTES 1, 2, 3.

2. EPOXY COAT TIE BARS AS SPECIFIED IN PUBLICATION 408/2000, SECTION 705.11. (PRIORITY OF USE: EPOXY COAT ON ALTERNATE TIE BARS, 1/2" AND THREADED SLEEVE NUTS ON STANDARD TIE BARS) SEE PUBLICATION 408/2000, SECTION 709.11.01 OR SECTION 1105.001.5 RESPECTIVELY.

3. STRAIGHTEN DEFORMED BENT TIE BARS SO THAT THE ANGLE MADE WITH THE LONGITUDINAL JOINT IS AT LEAST 60 DEGREES.

4. MAKE THREADED SLEEVE NUT FROM STEEL PIPE OR HEXAGONAL STEEL BAR 270 x 48 (1.5" x 1.5") LONG OR HIGH STRENGTH STEEL BAR 270 x 60 (1.5" x 1.5") LONG.

5. SECURELY FASTEN THE KEY FORMER TO THE STEEL FORM. THE CONTRACTOR SHALL FURNISH A FORM, ACCEPTABLE TO THE ENGINEER, FOR TEMPORARILY SECURING THE TIEBOLT TO THE KEY FORMER OR FORM DURING PLACEMENT OF THE CONCRETE.

6. FORM ONLY FEMALE KEYWAYS.

7. PLACE TIEBOLTS AT 750 (2.5") CENTER TO CENTER MAXIMUM SPACING EMBRACE TIE BARS 750 (2.5") LONG, SPACED 750 (2.5") CENTER TO CENTER MAXIMUM. PLACE PERPENDICULAR TO AND CENTERED OVER THE LONGITUDINAL JOINT 45 (1.75") IN FROM THE EDGE OF THE ROADWAY OR HIGHWAY (WHICH EVER IS GREATER). WHEN ADJUSTING TO AN UNEQUAL PAVEMENT OR HIGHWAY, THE CONTRACTOR SHALL ADJUST THE DEPTH AS SHOWN IN SECTION 705.01.7. USE AN APPROVED EPOXY ANCHORING MATERIAL TO WITHSTAND THE NECESSARY MINIMUM PULL-OUT RESISTANCE SPECIFIED IN PUBLICATION 408/2000, SECTION 501.3(1).

8. AT THE CONTRACTOR'S OPTION, THE CONCRETE SHOULDER MAY BE CONSTRUCTED AT THE SAME TIME AS THE PAVEMENT. IN THIS CASE, USE A TYPE L CONTRACT JOINT.

9. USE AN APPROVED EPOXY ANCHORING MATERIAL TO WITHSTAND THE NECESSARY MINIMUM PULL-OUT RESISTANCE SPECIFIED IN PUBLICATION 408/2000, SECTION 501.3(1). TIE BARS MOLDED IN EXISTING PAVEMENT SHOULD BE AS PER MANUFACTURER'S RECOMMENDATION. USE ROTARY IMPACT DRILL TO AVOID IMPACTING PINES INTO HOLE.

10. DO NOT USE THE HOOK Component OF THE TIEBOLT Assembly WHEN SLIP FORMING.

11. WHEN SILICONE JOINT SEALING MATERIAL, AS SPECIFIED IN PUBLICATION 408/2000, SECTION 709.11.01 IS SELECTED FOR USE IN TRANSVERSE JOINTS TYPE P OR TYPE G ONLY OR TRANSVERSE SHOULDER JOINTS, USE THE SAME JOINT SEALING MATERIAL (ALTERNATE TYPE L) AND ALTERNATE LONGITUDINAL JOINTS). NOTE EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE PAVEMENT JOINTS
**Notes**

1. This standard depicts the dimensions required for uniformity and compatibility. It does not depict all details required for fabrication, only items supplied by a manufacturer.

2. Provide anchor stakes to secure unit from movement including uplift. A number of choice is left to the discretion of the contractor and the design engineer.

3. Provide stakes of sufficient length such that 200 will be emplaced in each lane. Stake length and stake spacing shall be determined by the design engineer to prevent movement of the pavement during paving.

4. After each load transfer assembly is secured in place, remove and dispose of all side wire or shipping wires prior to installing expansion joint.

5. Provide side support assembly wires conforming to the current ASTM specifications for wire sizes and course grade wire. Carbon is used and a minimum allowable size is as follows:

   - **Pavement**
     - **Width**
       - **Less than 6.00 (20) in.**
       - **6.00 (20) in. or less**
       - **Greater than 6.00 (20) in.**
     - **Length**
       - **6.00 (20) in. or less**
       - **Greater than 6.00 (20) in.**

6. Dowel bar keeper clips may be used to secure wire to dowel bar. Wire shall be made of shipping wire as part of construction and expansion joint assemblies.

7. Fabricate and test all side wire, center support, and center support assemblies. Assure expansion joint filler, anchor stakes, and dowel caps in the field.

8. Provide side support assembly wires conforming to the current ASTM specifications for wire sizes and course grade wire. Carbon is used and a minimum allowable size is as follows:

9. Wild requirements as listed below and tested per manufacturer's quality control plan for wild shear.

10. Wire tolerances per ASTM 510M are ±0.05 mm (0.002 in).

11. Tolerances per ASTM 510M are ±0.05 mm (0.002 in).

**Typical Side Frame Details**

- **"J" Design**
- **"A" Design**

**Center Frame Wire Details**

**Typical Anchor Stake Details**

**Typical Expansion Joint Assembly**

**Typical Contraction Joint Assembly**

**Typical Load Transfer Assembly**

**Concrete Pavement Joints Non-Skewed**
NOTES

1. FOR VARIABLE WIDTH PAVEMENT CUT THE REINFORCEMENT AS REQUIRED.

2. WIRE FABRIC REINFORCEMENT MAY BE PLACED WITH TRANSVERSE WIRES ABOVE OR BELOW LONGITUDINAL WIRES.

3. PROVIDE LONGITUDINAL WIRES FOR WIRE FABRIC REINFORCEMENT IN THE FOLLOWING MINIMUM SIZES:

<table>
<thead>
<tr>
<th>PAV'T DEPTH</th>
<th>MIN LONG WIRE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>MW35</td>
</tr>
<tr>
<td>230</td>
<td>MW40</td>
</tr>
<tr>
<td>250</td>
<td>MW45</td>
</tr>
<tr>
<td>280</td>
<td>MW50</td>
</tr>
<tr>
<td>300</td>
<td>MW55</td>
</tr>
<tr>
<td>330</td>
<td>MW60</td>
</tr>
</tbody>
</table>

4. HINGED FABRIC REINFORCEMENT MAY BE USED. HAVE HINGE DETAIL APPROVED BY THE ENGINEER.

5. SECURELY TIE ALL LONGITUDINAL AND TRANSVERSE LAPS OF WIRE FABRIC REINFORCEMENT.

6. ON PROJECTS WHERE ADDITIONAL LANES ARE ADDED TO EXISTING CEMENT CONCRETE PAVEMENTS AND THE EXISTING JOINT SPACING IS MORE THAN 14.2 m (46.5'), USE A MINIMUM LONGITUDINAL WIRE SIZE OF MW60 OR MD60 (W9.5 OR D9).

7. WIRE FABRIC REINFORCEMENT MAY BE CONSTRUCTED OF SMOOTH WIRE (SIZES DESIGNATED BY W) OR DEFORMED WIRE (SIZES DESIGNATED BY D) OR A COMBINATION OF BOTH.

8. PROVIDE A MINIMUM DEPTH FOR PLACEMENT OF WIRE FABRIC REINFORCEMENT, MEASURED FROM TOP OF PAVEMENT TO TOP OF FABRIC OF 60 cm (24") TO A MAXIMUM OF ONE HALF THE PAVEMENT DEPTH MINUS 15 cm (6").

9. WIRE FABRIC REINFORCEMENT IS TO BE SERVICED BY Type L joint.

10. WHEN THE RAMP OR LANE WIDTH EXCEEDS 4.2 m (14'), A TYPE L JOINT IS REQUIRED AT THE MID-POINT.

11. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES
1. CONSTRUCT IN ACCORDANCE WITH THIS STANDARD DRAWING OR AS INDICATED ON THE STRUCTURE DRAWINGS.
2. THE TYPE E JOINT DOES NOT APPLY WHEN APPROACH SLAB IS CONSTRUCTED IN CONJUNCTION WITH A PAVEMENT RELIEF JOINT OR WITH A FLEXIBLE PAVEMENT. SEE RC-24M.
3. WHEN CONSTRUCTION INVOLVES MORE THAN 2 LANES, CONNECT ADDITIONAL LANES REQUIRED TO STANDARD 2 LANE BRIDGE APPROACH SLAB USING TYPE L CONSTRUCTION JOINTS, AS SHOWN ON RC-20M, SHEET 2.
4. INSTALL NEOPRENE COMPRESSION SEAL TO A UNIFORM DEPTH WITH TOP OF THE SEAL NOT LESS THAN 6 (1/4") NOR MORE THAN 10 (1") BELOW THE LEVEL OF THE PAVEMENT SURFACE. MAKE THE TOP EDGES OF THE CONTACT SURFACES ON BOTH SIDE OF THE SEAL AT THE SAME ELEVATION.
5. DETERMINE "d" BY ADDING 20 (3/4") TO THE MAXIMUM COMPRESSED HEIGHT OF THE NEOPRENE COMPRESSION SEAL. SEE MANUFACTURER'S INFORMATION.
6. CONSTRUCT THE BRIDGE APPROACH SLAB AFTER THE BRIDGE DECK IS CONSTRUCTED.
7. PROVIDE REINFORCEMENT BARS, EPOXY COATED IN ACCORDANCE WITH PUBLICATION 408M (408/2000), SECTION 709.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BRIDGE APPROACH SLAB
NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
430 (17") DEEP ADJACENT COMPOSITE BOX BEAMS
WITH 230 (9") DEEP APPROACH SLAB NOTCH

535 (21") TO 1220 (4'-0") DEEP ADJACENT COMPOSITE BOX BEAMS
WITH 280 (11") DEEP APPROACH SLAB NOTCH

NOTES
1. WHEN MAKING CONSTRUCTION CHANGES IN THE FIELD, THIS DRAWING IS TO SERVE AS A GUIDE FOR MODIFYING NOTCH DETAILS SHOWN ON P&S STANDARD DRAWINGS FOR ACCOMMODATING THE STANDARD 410 (16") BRIDGE APPROACH SLAB.
2. AT BEAM ENDS, BURN OFF REINFORCEMENT PROTRUDING INTO APPROACH SLAB NOTCH.
3. INCREASE IN FIELD, PROVIDING OVERHANG, IF REQUIRED.
4. PROVIDE REINFORCEMENT BARS, EPOXY COATED, IN ACCORDANCE WITH PUBLICATION NRM 408/2000, SECTION 709.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
7500 (25' -0") MIN.

PLAIN OR REINFORCED CONCRETE PAVEMENT OR FLEXIBLE PAVEMENT

EDGE OF APPROACH SLAB

APPROACH SLAB - INTEGRAL ABUTMENTS

PLAN

ELEVATION

TROWEL SMOOTH AND APPLY ONE COAT ASPHALT PAINT OR, SEE NOTE 1.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

REFERENCE DRAWINGS

DATE: 03-06-1991
REVISED: APR. 08, 2000
APR. 16, 2000
APR. 28, 2000

SLEEPER SLAB/PAVEMENT JOINT - Provide 2 sheets 0.1 mm (4 MIL.) POLYETHYLENE SHEETING AS BOND BREAKER.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

REFERENCE DRAWINGS

DATE: 03-06-1991
REVISED: APR. 08, 2000
APR. 16, 2000
APR. 28, 2000

SLEEPER SLAB/PAVEMENT JOINT - Provide 2 sheets 0.1 mm (4 MIL.) POLYETHYLENE SHEETING AS BOND BREAKER.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
PAY LIMIT FOR
PAVEMENT RELIEF JOINT

PAY LIMIT FOR
PLC PAVEMENT
AND
RC PAVEMENT

PAY LIMIT FOR
PAVEMENT RELIEF JOINT

PAY LIMIT FOR BRIDGE APPROACH SLAB

SECTION A-A

SCHEDULE OF REINFORCEMENT STEEL

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>SPACING C-C</th>
<th>LENGTH</th>
<th>NUMBER REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>#13 (4)</td>
<td>300 (12&quot;)</td>
<td>3.2 m (10'-6&quot;)</td>
<td>W/O.3</td>
</tr>
<tr>
<td>B</td>
<td>#13 (4)</td>
<td>300 (12&quot;)</td>
<td>W/100 (4&quot;)</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>#13 (4)</td>
<td>150 (6&quot;)</td>
<td>2.0 m (6'-6&quot;)</td>
<td>W/O.3x2</td>
</tr>
<tr>
<td>D</td>
<td>#13 (4)</td>
<td>300 (12&quot;)</td>
<td>W/100 (4&quot;)</td>
<td>5</td>
</tr>
</tbody>
</table>

NOTE:

1. PAVEMENT RELIEF JOINTS ARE APPLICABLE FOR ALL CEMENT CONCRETE PAVEMENTS.

2. USE CLASS AA CONCRETE IN SUBSLAB. (AT CONTRACTOR'S OPTION, SUBSLAB CONCRETE MAY BE HELD.)

3. INCLUDE PORTIONS OF REINFORCING BARS WHICH ARE LOCATED OUTSIDE THE INDICATED PAY LINES IN BIG PRICE FOR PAVEMENT RELIEF JOINT.


5. WHERE BRIDGES ARE LOCATED LESS THAN 300 m (900') APART, AS MEASURED FROM THE FACE OF THE NEAREST ABUTMENTS, DO NOT USE A RELIEF JOINT BETWEEN THE BRIDGES.

6. WHERE BRIDGES ARE LOCATED BETWEEN 300 m (900') AND 450 m (1350') APART, AND THE PAVEMENT STRUCTURE IS CEMENT CONCRETE, PLACE ONE RELIEF JOINT MIDWAY BETWEEN THE BRIDGES. IN THESE CASES, PROVIDE THE SUBSLAB AS A UNIFORM 150 (6") THICK AND 2.1 m (7') WIDE.

7. FOR JOINT DETAILS ON NEW CONSTRUCTION, SEE RC-20M. FOR JOINT DETAILS ON RECONSTRUCTION, SEE RC-26M. FOR JOINT DETAILS ON RECONSTRUCTION, SEE RC-20M. FOR JOINT DETAILS ON RECONSTRUCTION, SEE RC-26M.

8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT RELIEF JOINT

04/28/2000
NOTES

1. Construct aggregate base as specified in Publication 408/2000, Section 306.3 and consider as part of the shoulder.

2. Consider the payment for this area of subbase material incidental to the shoulder.

3. Make depth of shoulder the combined depth of surface and base courses.

4. Slope shoulder at 6.0° for effective shoulder widths 2.4 m (8') or less, and 4.0° for effective shoulder widths > 2.4 m (8').

5. For effective shoulder widths 1.8 m (6') or less, pave out-to-out of shoulders with full depth roadway pavement.

6. For shoulders that specify HERS installations, use only bituminous wearing course, ID-2 or ID-3, regular or heavy duty, 40 (1 1/2") depth maximum.

7. When installing HERS on a Type 1-L shoulder, construct the pavement/shoulder joint at the beginning of the effective shoulder, or pave full depth into the effective shoulder far enough so that the HERS are not constructed over the longitudinal joint.

8. All dimensions are in millimeters unless otherwise noted. U.S. custom units in ( ) parenthesis.

9. See sheets 4 and 5 for HERS details.

EFFECTIVE SHOULDER WIDTH, SEE NOTE 3.

SHOULDER PAY LIMIT

0.6 m (2') - O"

SEE NOTE 3.

SHOULDER ROUNDING ON HIGH SIDE

OF SUPERELEVATED CURVES

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

ROADWAY PAY LIMIT

SHOULDER PAY LIMIT

TYPE 3 SHOULDER

NOTES

1. Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

SHOULDERS
NOTES

1. FOR TYPE 4 AND TYPE 6 SHOULDERS PROPERLY PREPARE SURFACE BY EITHER SHAPING AND/OR SCARIFYING AND/OR COMPACTING. SHAPING INCLUDES REMOVAL OF EXISTING SHOULDER MATERIAL AND THE PLACEMENT OF GRADED MATERIAL FROM THE SHAPING OPERATION INTO THE LOW AREAS. WHERE THERE IS INSUFFICIENT GRADED MATERIAL FROM THE SHAPING OPERATION, COMPLETE THE WORK BY EITHER ADDING ADDITIONAL BASE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408M, SECTION 350 OR MILLED BITUMINOUS MATERIAL. THE ADDITIONAL MATERIAL IS INCIDENTAL TO THE SHOULDER ITEM.

2. FOR TYPE 7 SHOULDERS PROPERLY PREPARE EXISTING PAVED SHOULDER BY CLEANING AND PATCHING.

3. THE GUIDE RAIL TYPE, HEIGHT AND LOCATION FROM SHOULDER MAY VARY, BUT WHEN THE HEIGHT FROM THE TOP OF RAIL TO PROPOSED SURFACE DECREASES LESS THAN 610 (24") REMOVE, REPLACE AND/OR RESET THE GUIDE RAIL. WHERE THE GUIDE RAIL HAS RUBBING RAIL ATTACHED, REMOVE THE RUBBING RAIL WHEN THE HEIGHT OF GUIDE RAIL BECOMES LESS THAN 100 (21").

4. REMOVE UNSUITABLE MATERIAL AS DIRECTED, EXCAVATE, AND BACKFILL WITH MATERIAL MEETING THE REQUIREMENTS FOR PUBLICATION 408M (408/2000), SECTION 350. MEASURE AND PAY FOR SHOULDER EXCAVATION AND BACKFILL IN ACCORDANCE WITH PUBLICATION 408/2000, SECTIONS 654 AND 656. CROSS SECTIONS ARE NOT REQUIRED.

5. CONSIDER GRADING INCIDENTAL TO THE SHOULDER PAY ITEM. WHERE THERE IS INSUFFICIENT GRADED MATERIAL FROM THE GRAVING OPERATION TO COMPLETE THIS OPERATION, USE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408M (408/2000), SECTION 350 AND PAY FOR AS TONS OF SELECTED BORROW EXCAVATION. WHERE THERE IS AN EXCESS OF MATERIAL FROM THE SHOULDER EXCAVATION OR GRAVING OPERATION, REMOVE THIS MATERIAL AS SOON AS POSSIBLE AND CONSIDER AS INCIDENTAL TO THE SHOULDER PAY ITEM.

6. PROVIDE BITUMINOUS TAPER SHOULDER WEDGE 250 (10") TO 300 (12") UP CUT SLOPE WHEN INDICATED ON THE PLANS AND CONSIDER AS INCIDENTAL TO THE SHOULDER PAY ITEM.

7. "LUMP SUM" ITEMS INCLUDE ALL MATERIALS AND OPERATIONS OF WORK NECESSARY TO COMPLETE THAT ENTIRE ITEM WHETHER TABULATED OR NOT.

8. FOR SHOULDERS THAT SPECIFY WIDEN INSTALLATIONS, USE ONLY BITUMINOUS WEARING COURSE, 10-2 (3-1/2) REGULAR OR HEAVY DUTY, 40 (1 1/2") DEPTH MINIMUM.

9. SEE SHEETS 4 AND 5 FOR MORE DETAILS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SHOULDER (RECONSTRUCTED)

RECOMMENDED APR. 28, 2000
ACTION APR. 28, 2000

RC-25M
CONCRETE SHOULDERS ADJACENT TO PLAIN CONCRETE PAVEMENT FOR COLLECTORS AND LOCAL ROADS

CONCRETE SHOULDERS ADJACENT TO RC PAVEMENT AND PLC PAVEMENT FOR INTERSTATE AND OTHER LIMITED ACCESS FREeways, ARTERIALS AND RAMPS

CONCRETE SHOULDER, TYPE 2

CONC SHOULDER, TYPE 2

LONGITUDINAL ROADWAY JOINT

TIE BARS OR TIEBOLTS

TRANSVERSE SHOULDER JOINT

TIE BARS OR TIEBOLTS

LONGITUDINAL SHOULDER JOINT

TRANSVERSE SHOULDER JOINT

4.5 m (15') TYP

6.0 m (20') TYP

5.5 m (18') TYP

6.0 m (20') TYP

5.0 m (16') TYP

LONGITUDINAL ROADWAY JOINT

TIE BARS OR TIEBOLTS

TRANSVERSE ROADWAY JOINT

LONGITUDINAL SHOULDER JOINT

TRANSVERSE SHOULDER JOINT

CONCRETE SHOULDER - TYPE 2

SECTION A-A

CONCRETE SHOULDER

EXPANSION JOINTS

SECTION B-B

SHOULDER RELIEF JOINTS

CONCRETE RELIEF JOINTS

REINFORCEMENT AT OPENINGS

1. SPECIFY THE AGGREGATE BASE AS IN PUBLICATION 408/2000 SECTION 350.3 AND CONSIDER INCIDENTAL TO THE SHOULDER.
2. SEAL ALL SHOULDER JOINTS IN ACCORDANCE WITH PUBLICATION 408/2000, SECTION 501.3.
3. FOR JOINT DETAILS, SEE NOTE 1.
4. ALIGN SHOULDER TRANSVERSE JOINTS TO ADJACENT PAVEMENT JOINTS.
5. SEE SHEET 3 FOR REQUIRED MINIMUM SPACING OF THE TRANSVERSE SHOULDER JOINTS.
6. WHEN THE SHOULDER IS STRUCTURALLY PART OF A PARAPET MOMENT RESISTING SLAB, SEE BC-799 SHEET 3 FOR REQUIRED MINIMUM SPACING OF THE TRANSVERSE SHOULDER JOINTS.
7. TYPICALLY, DO NOT PLACE TIE BARS OR TIEBOLTS ON EITHER SIDE OF INTERMEDIATE SHOULDER JOINTS ADJACENT TO RC PAYMENTS.
8. WHEN THE SHOULDER IS STRUCTURALLY PART OF A PARAPET MOMENT RESISTING SLAB, SEE BC-799 SHEET 3 FOR REQUIRED MINIMUM SPACING OF THE TRANSVERSE SHOULDER JOINTS.
9. SEE SHEETS 4 AND 5 FOR MRS DETAILS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TYPICAL PLAN VIEW FOR MSRS PATTERN ON BITUMINOUS SHOULDERS

PAY LIMIT FOR MILLED RUMBLE STRIPS

TYPICAL PLAN VIEW FOR MSRS PATTERN ON CONCRETE SHOULDERS

NOTES

1. IF THERE IS NO ACTUAL PAVEMENT SHOULDER JOINT, MEASURE FROM THE PAVEMENT SHOULDER TRAFFIC LINE.
2. DO NOT MILLED SHOULDER RUMBLE STRIPS ACROSS A JOINT.
3. CONSTRUCT MSRS IN ACCORDANCE WITH PUBLICATION 408/2000 SECTION 660.
MILLED RUMBLE STRIP

SEE NOTE 4

PAVEMENT SHOULDER JOINT

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TYPICAL PAVEMENT PATCHING JOINT

SECTION A-A

TYPICAL SECTION

CONCRETE PAVEMENT PATCHING

SEE NOTE 1.

SAW CUTS FOR LIFT OUT METHOD

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE PAVEMENT REHABILITATION
(PATCHING)

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. **Single Lane Pavement Patching**

   - **600 (2'-0") MAX**
   - **300 (1'-0") MIN**

2. **Multi-Lane Pavement Patching**

   - **600 (2'-0") MAX**
   - **300 (1'-0") MIN**

**NOTES**

1. **Construct pavement patches in adjacent lanes, with lengths that are within 1.8 m (6') of each other, to the same length. This length is the length of the larger pavement patch. If the patch lengths differ by more than 1.8 m (6'), then construct to the required lengths.**

2. **Do not leave less than 1.8 m (6') of original pavement in place between patches or between joints.**

3. **When performing single lane pavement patching, or patching one lane at a time, place a 6 (6") full depth, polyethylene board bond breaker in the longitudinal joint of all patches under 20.0 m (66') in length, prior to placing the new concrete in the patch area.**

4. **When patching adjacent to an existing joint, remove a minimum of 300 (12") of pavement in the next slab to avoid the existing dowel bars.**

5. **When replacing one full slab length and the deterioration extends more than 600 (24") into the next slab, remove a minimum of 1.8 m (6') and install a new pavement joint on the same position as the original joint.**

6. **When performing multi-lane patching, and the patches are greater than two slab lengths and less than or equal to 150 m (500'), the joint spacing of the area being patched is to conform to RC-26 or RC-27M for the specific type of pavement being placed (i.e., RC or PLC).**

7. **These drawings are provided as examples to show certain patching criteria. They may not cover every field situation.**

8. **When only one lane is being patched, do not remove more than 1.5 m (5') into next slab. If more than 1.5 m (5') is required, remove a full depth new pavement joint at original joint location. For exceptions, see note 5.**

**LEGEND**

- **Pavement Patching Joint, see Sheet 1.**
- **New Pavement Joint, see RC-26M.**
- **Exception to 1.5 m (5') maximum removal.**
- **Details apply to either end of patch.**

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**RC-26M**

**CONCRETE PAVEMENT REHABILITATION (PATCHING)**

**NOTES**

- **Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.**
**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**
**BUREAU OF DESIGN**

**CONCRETE PAVEMENT REHABILITATION**

**C R C PATCHING**

---

**NOTES**

1. **REMOVE 310 (20") MIN BY HAND FOR TIED SPLICES. REMOVE 200 (8") BY HAND FOR WELDED SPLICES.**
2. **OVERLAP TIED SPLICES BY AT LEAST 3D BAR DIAMETERS. OVERLAP WELDED SPLICES AT 150 (6").**
3. **REMOVE PAVEMENT FULL DEPTH UNDER RETAINED REINFORCEMENT BARS.**
4. **MINIMUM DISTANCE FROM PATCH EDGE TO EXISTING CRACK IN CRC PAVEMENT IS 600 (24").**
5. **WHEN TRANSVERSE SPACING OF LONGITUDINAL REINFORCING BARS IS OTHER THAN 150 (6") C TO C, MATCH EXISTING REINFORCING.**

**NOTE:** EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
HOLE PATTERNS FOR PAVEMENT SLAB STABILIZATION

NOTE 1. DRILL NEW HOLES FOR REGROUTING ISO (5") CLOSER TO JOINT OR CRACK.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
CONCRETE PAVEMENT REHABILITATION (PATCHING)
JOINT REHABILITATION

TYPE 1

SEE NOTE 2.

EXISTING JOINT

SEE NOTE 1.

REHABILITATED JOINT

SEE NOTE 3.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE PAVEMENT REHABILITATION (PATCHING)

RC-26M
NOTES

1. FOR JOINT DETAILS, SEE RC-20M.
2. CONSTRUCT TYPE E JOINTS ON INTERSTATE AND OTHER LIMITED ACCESS FREEWAYS AND RAMPS PAVEMENTS. CONSTRUCT TYPE G JOINTS ON ARTERIAL PAVEMENTS. REFER TO THE TYPICAL SECTIONS TO DETERMINE WHICH TYPE OF JOINT APPLIES.
3. WHEN RAMP OR LANE WIDTH EXCEEDS 4.2 m (14'), A TYPE L JOINT IS REQUIRED AT THE MIDPOINT.
4. CONSTRUCT ACCELERATION AND DECELERATION PORTION OF RAMPS WITH THE SAME PAVEMENT STRUCTURE AS THE MAINLINE PAVEMENT TO THE FIRST TRANSVERSE JOINT BEYOND THE SHOULDER GORE.
5. ON COLLECTORS AND LOCAL ROADS, CONSTRUCT TYPE G OR P JOINTS, AS INDICATED.
6. A 4.5 m (15') JOINT SPACING IS TO BE USED ON ALL PAVEMENTS LESS THAN 250 mm (10') THICK. A 6.0 m (20') JOINT SPACING IS TO BE USED ON ALL PAVEMENTS EQUAL TO OR GREATER THAN 250 mm (10') THICK.
7. FOR ALTERNATE JOINTS, SEE RC-20M, SHEETS 1 AND 2.
8. ON CURVES, THE JOINT SHALL BE CONSTRUCTED PERPENDICULAR TO THE TANGENT ON THE LONG RADIUS SIDE OF THE CURVE.
9. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESIS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PLAIN CONCRETE PAVEMENT

SECTION A-A

750 (30") TYP

TIE BOLTS OR TIE BARS

TYPE L JOINT

375 (15") TYP

DOWEL BARS

TYPE L JOINT

1.8 m

(6'-0")

3.0 m (10'-0") MIN TO 6.0 m (20'-0") MAX

TERMINAL SLAB

D=50 (2')

0

750 (30") TYP

TIE BOLTS OR TIE BARS

TYPE L JOINT

1.8 m

(6'-0")

3.0 m (10'-0") MIN TO 6.0 m (20'-0") MAX

SECTION A-A

PLAIN CONCRETE PAVEMENT

INTERSTATE AND OTHER LIMITED ACCESS FREEWAYS, ARTERIALS AND RAMPS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
APPLY TACK COAT, AS INDICATED

SEE NOTE 3

25 \( \frac{1}{16} \) MINIMUM

RECTANGULAR PAVING NOTCH
ASEINDICATED
THE WEARING
COURSE

EXISTING BITUMINOUS PAVEMENT

APPLY TACK COAT
AS INDICATED

\( \Delta \) SEE TABLE A FOR
DIMENSIONAL REQUIREMENTS

\* SHOULD EQUAL THE
THICKNESS OF THE WEARING
COURSE.

OVERLAY TRANSITION WITH PAVING NOTCH
ON CONCRETE AND BITUMINOUS PAVEMENTS

PLAN VIEW

SUPERELEVATION SECTION

PLAN VIEW

TANGENT SECTION
TWO-LANE DIRECTIONAL

PLAN VIEW

TANGENT SECTION
TWO-LANE, TWO-WAY TRAFFIC

OVERLAY TRANSITIONS

TABLE A

<table>
<thead>
<tr>
<th>FUNCTIONAL CLASSIFICATION</th>
<th>SLOPE ( \Delta ) MAXIMUM</th>
<th>PAVING NOTCH ( \Delta ) MINIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERSTATE AND OTHER</td>
<td>0.40% ( \pm ) 1%</td>
<td>6%</td>
</tr>
<tr>
<td>LIMITED ACCESS FREEWAYS</td>
<td>0.28% ( \pm ) 1%</td>
<td>3%</td>
</tr>
<tr>
<td>ARTERIALS ( \pm ) 100k ( \pm )</td>
<td>0.85% ( \pm ) 1%</td>
<td>3%</td>
</tr>
<tr>
<td>COLLECTORS AND LOCAL ROADS</td>
<td>0.55% ( \pm ) 1%</td>
<td>3%</td>
</tr>
<tr>
<td>CROSS STREETS</td>
<td>0.33% ( \pm ) 1%</td>
<td>3%</td>
</tr>
<tr>
<td>DRIVEWAYS</td>
<td>0.33% ( \pm ) 1%</td>
<td>NO NOTCH</td>
</tr>
</tbody>
</table>

**NOTES**

1. USE HIGHER APPROPRIATE CRITERIA IF A CROSS STREET HAS A FUNCTIONAL CLASSIFICATION OF COLLECTORS AND LOCAL ROADS OR HIGHER.
2. USE 85TH PERCENTILE SPEED, IF AVAILABLE. OTHERWISE, USE THE POSTED SPEED.
3. PLACE EDGE FLUSH WITH EXISTING PAVEMENT AND SEAL AS SPECIFIED IN PUBLICATION 408/2000, SECTION 401.31 (3, 4).
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMонWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

OVERLAY TRANSITIONS
AND PAVING NOTCHES
THOROUGHLY TAMPERED LAYERS OF SATISFACTORY EMBANKMENT MATERIAL, 100 (4") THICK, OR PAVEMENT BASE COURSE SUBBASE GRADED.

OPEN CLASS I GEOTEXTILE MATERIAL.

TYPE I BACKFILL ROCK AND SHALE

TAMPED SOIL OR SUBBASE

Tamped Soil

NO. 57 COARSE AGGREGATE (TAMPED)

NO. 8 COARSE AGGREGATE (TAMPED)

VARIABLE EXTRA DEPTH PIPE UNDERDRAIN

12" X 12" BATTER, BOTH SIDES

12" X 12" BATTER, BOTH SIDES

Tamped Soil or Subbase

EXCAVATION OVER 900 (36") IN DEPTH AND FOR A MAXIMUM WIDTH OF OUTLETS FOR ALL PIPE UNDERDRAIN AND PAVEMENT BASE DRAIN.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

600 EXTENSION OF SUBBASE WITH RIGID PAVEMENT

SUBGRADE

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 610 FOR PAVEMENT BASE DRAIN, SECTION 612 FOR SUBGRADE DRAINS AND SECTION 604 FOR COMBINATION STORM SEWER AND UNDERDRAIN.

2. PROVIDE BITUMINOUS PAPER WHEN GEOTEXTILE MATERIAL IS NOT INDICATED.

3. PREFABRICATED PAVEMENT BASE DRAIN IS NOT RECOMMENDED UNDER CURBED SECTIONS AND ADJACENT TO WIDENED PAVEMENT.

LEGEND

A DEPTH BELOW SUBBASE EQUAL TO THE OUTSIDE DIAMETER OF SPECIFIED PIPE PLUS 50 (2") MIN.

B WHEN STORM SEWER IS REQUIRED AND IT INTERFERES WITH PLACEMENT OF PAVEMENT BASE DRAIN, ELIMINATE THE PAVEMENT BASE DRAIN AND USE COMBINATION STORM SEWER AND UNDERDRAIN.

D SUBBASE DEPTH.

* IF SLOUGHING OF THE SUBBASE MATERIAL FROM UNDER THE PAVEMENT IS OBSERVED DURING TRENCH EXCAVATION, COMPACT BACKFILL HYDRAULICALLY, AS DIRECTED BY THE ENGINEER.

W VARIABLE

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DRAINS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

SUBSURFACE DRAINS
BACKFILL DETAIL AT ENDWALL
(For concrete pipe)
COMPACTED 2A MATERIAL, SEE SHEET 4.

EXCAVATION FOR ENDWALLS

BACKFILL DETAIL AT END SECTION
(For concrete pipe)
COMPACTED 2A MATERIAL, SEE SHEET 4.

EXCAVATION FOR ENDWALLS

BACKFILL DETAIL AT LAST SECTION OF PIPE
(For concrete pipe)
COMPACTED 2A MATERIAL, SEE SHEET 4.
PIPE INSTALLATION PROCEDURES

CONSTRUCTION DETAILS BELOW COVER THE FOLLOWING CONDITIONS:

1. pipe lying on top of the natural ground, rock or compacted sand fill.
2. the existing ground is within 10' of the top of the pipe.
3. the top of the pipe is below the level of the natural ground or compacted fill, the minimum height of the top of the pipe in contact with the natural ground or compacted fill is 1200 (4'-0") above the intended bottom elevation of the pipe.
4. if the excavation is through rock or hard shale, or in areas of undercut, be sure to provide the additional height required for the pipe to be covered with earth fill.
5. topsoil (compressible layer) shall be removed.
6. for concrete pipe, see step 6a. for metal pipe, see step 6b. for thermoplastic pipe, see step 6c. for trench box/shoring installation requirements refer to publication 408-2000, section 605.
7. compact top 1.0'-0" of subgrade to 1.0'-0" in accordance with section 605.
8. the installation of pipes 1600 (72") or greater in diameter or span is permitted without placing embankment first.
9. for special designs, locate "top" marking at top of pipe.
10. make the backfill envelope as shown on this drawing except provide that 2a material on each side of the pipe equal to one diameter or span. for concrete pipe, the width of uncompacted aggregate for bedding (ashto no. 6) shall be 150 (6') deep.
11. place uncompacted suitable material over pipe. do not compact base, sides and compact. continue embankment.
12. place 2a coarse aggregate material, in lifts 100 (4") thick, adjacent to the lower haunches to a height of 300 (12") above top of pipe. compact to 95% spd. test the backfill material and continue embankment in accordance with section 605.
13. place 2a coarse aggregate material on top of the bedding and form the cradle.
14. lay the pipe on the prepared cradle.
15. place 2a coarse aggregate material, in lifts 100 (4") thick, on top of the bedding and compact to 97% spd.
16. for metal pipe arch and metal plate pipe arch, see step 6a. for thermoplastic pipe, see step 6c.
17. for concrete pipe, see step 6a. for metal pipe and metal plate pipe arch, see step 6a. for thermoplastic pipe, see step 6c.
18. payment for the backfill envelope including bedding, suitable materials and compacted layers being placed, must be made in accordance with section 206.3.
19. the installation of pipes 1600 (72") or greater in diameter or span is permitted without placing embankment first.
20. either all metric or all english values must be used on plans. metric and english values shown may not be mixed.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
SUBSURFACE DRAINS
PIPE PLACEMENT
EXCAVATION - BEDDING - BACKFILL

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408/200D, SECTION 409 AND SECTION 714.

2. THE DEPARTMENT SPECIFIES THE SIZE AND SPACING REQUIRED FOR UNIFORMITY AND COMPATIBILITY. PERMIT ONLY ITEMS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR DEVIATIONS OR MODIFICATIONS TO THE STANDARDS, SUBMIT SHOP DRAWINGS FOR APPROVAL.

3. USE CLASS A CONCRETE OR BETTER AND CONFORM MARK EDGES AT 25 (1").

4. PROVIDE PIPE OPENING SIZE IN PRECAST UNITS AT LEAST 50 (1") BUT NOT MORE THAN 100 (1") LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE.

5. PROVIDE SUITABLE LIFTING DEVICES FOR HANDLING AND INSTALLATION OF PRECAST ENDWALLS ON SITE. USE METAL DEVICES AS SPECIFIED IN PUB 408/200D SECTION 1105.

6. PROVIDE REINFORCEMENT IN TWO DIRECTIONS THROUGHOUT THE CONTACT AREA BETWEEN THE MAIN CONNECTING RING AND HEADWALL SECTION, EXCEPT WHERE THE INTERFACE BETWEEN WING AND HEADWALL SECTION AND BASE SECTION.

7. PROVIDE MORTAR BED OF 25 (1") PLACED ON TOP OF THE SUBBASE MATERIAL FOR LAUNCHING PURPOSES, WHEN REQUIRED.

8. PROVIDE REINFORCEMENT, 250 (1") IN ACCORDANCE WITH PUBLICATION 408/200D, SECTION 702.

9. PROVIDE PIPE OPENING SIZE IN PRECAST UNITS AT LEAST 50 (1") BUT NOT MORE THAN 100 (1") LARGER THAN THE OUTSIDE DIAMETER OF THE PIPE.

10. PROVIDE SUITABLE LIFTING DEVICES FOR HANDLING AND INSTALLATION OF PRECAST ENDWALLS ON SITE. USE METAL DEVICES AS SPECIFIED IN PUB 408/200D SECTION 1105.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
ENDWALLS
CAST-IN-PLACE & PRECAST

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
GENERAL NOTES
1. PROVIDE END SECTIONS MEETING THE REQUIREMENTS OF
   PUBLICATION 408/2000, SECTION 616. PROVIDE
   GALVANIZED STEEL END SECTIONS WHEN SECTIONS ARE
   REQUIRED WITH ALUMINIZED STEEL PIPE OR PRECOATED
   GALVANIZED STEEL PIPE.
2. PROVIDE 2 7/8 THICK 1/2 GALVANIZED SIDES AND 3 5/8 THICK
   1/2 GALVANIZED CENTER PANELS FOR 3 PIECE UNITS IN CONCRETE
   END SECTIONS. PROVIDE 2 7/8 THICK 1/2 GALVANIZED SIDES AND
   3 5/8 THICK 1/2 GALVANIZED CENTER PANELS FOR ALUMINIZED
   STEEL UNITS AND ALUMINUM ALLOY BOLTS OR BOLTS
   FOR ALUMINUM UNITS. PROVIDE 5/8" G30 REINFORCEMENT
   ALONG THE INNER SIDE OF THE MAIN WALL. PROVIDE 5/8" G30
   REINFORCEMENT ALONG THE OUTER SIDE OF THE MAIN WALL.
   PROVIDE SLIGHTLY TIGHTER FASTENING BY 10 3/4" (1/2"
   GALVANIZED OR ALUMINIZED STEEL BOLTS OR BOLTS FOR
   STEEL UNITS AND ALUMINUM ALLOY RIVETS OR BOLTS
   FOR ALUMINUM UNITS) FOR THE CENTER PANELS. PROVIDE
   DOUBLE LAYERED SIDES AND CENTER PANELS (1 7/8"
   THICK 1/2 GALVANIZED OR ALUMINIZED STEEL SIDE PANELS
   AND 2 1/2" G30 BOLTS FOR STEEL UNITS AND ALUMINUM ALLOY
   RIVETS OR BOLTS FOR ALUMINUM UNITS) FOR THE SIDES
   THAT EXIST OF THE SAME THICKNESS AND PIECES AS THE END
   SECTION.
3. PROVIDE TOE PLATES OF THE SAME MATERIAL AS THE
   END SECTIONS. PROVIDE DREW HOLE S IN PLATE TO
   MATCH HOLES IN SKIRT. PROVIDE 10 3/4" G30 GALVANIZED
   OR ALUMINIZED STEEL BOLTS AND NUTS FOR STEEL UNITS
   AND ALUMINUM ALLOY BOLTS AND NUTS FOR ALUMINUM
   UNITS. PROVIDE THE PLATE LENGTHS AS FOLLOWS:
   PIPE-ARCH CULVERT: 1060 X 740, 1010 X 790
   PIPE: 1020 X 680, 1070 X 730
   PIPE-ARCH CULVERT: 1240 X 840, 1160 X 920
   PIPE: 1200 X 720, 1250 X 770
   PIPE-ARCH CULVERT: 1950 X 1320, 1850 X 1400
   PIPE: 1800 X 1160
   PIPE-ARCH CULVERT: 2100 X 1450, 2050 X 1500
   PIPE: 2000 X 1220
   PLACE ANGLE REINFORCEMENT UNDER THE CENTER PANEL SEAMS FOR,
   1950 X 1320, 1850 X 1400 (77"X 52", 73"X 53") AND
   2100 X 1450, 2050 X 1500 (83"X 57", 82"X 60"
   PIPE-ARCH CULVERTS.
4. SUPPLEMENT REINFORCED SIDES WITH GALVANIZED STEEL
   STIFFENER ANGLES WITH GALVANIZED OR ALUMINIZED
   BOLTS AND NUTS OR ALUMINUM ALLOY STIFFENER ANGLES
   WITH ALUMINUM ALLOY NUTS AND BOLTS OF THE
   FOLLOWING SIZES:
   •63 (2 1/2") x 63 (2 1/2") x 6 (1") FOR,
     1500 TO 1800 (60" TO 72") DIAMETER PIPE,
     2000 X 1450, 2100 X 1500 (83"X 57", 82"X 60"
     PIPE-ARCH CULVERTS.
   •83 (3") x 83 (3") x 6 (1") FOR,
     1950 TO 2100 (78" TO 84") DIAMETER PIPE.
   PLACE ANGLE REINFORCEMENT UNDER THE CENTER PANEL SEAMS FOR,
   1950 X 1320, 1850 X 1400 (77"X 52", 73"X 53") AND
   2100 X 1450, 2050 X 1500 (83"X 57", 82"X 60"
   PIPE-ARCH CULVERTS.
5. ANCHOR ALUMINUM OR STEEL END SECTIONS, THAT ARE
   USED ON THE INLET END OF PIPE LARGER THAN 1350 (54"
   DIAMETER, AS INDICATED ON THE DRAWING.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
   U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.
   COMMONWEALTH OF PENNSYLVANIA
   DEPARTMENT OF TRANSPORTATION
   BUREAU OF DESIGN
   END SECTIONS FOR
   PIPE CULVERTS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES
MUST BE USED ON PLANS. METRIC AND
ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. CONSTRUCTION REQUIREMENTS
   A. CONSTRUCT IN ACCORDANCE WITH PUB- 
      LICATION 408/2000, SECTIONS
      605, 606 AND 7141 AND AS MODIFIED
      HEREIN.
   B. MINIMUM CONCRETE CLASS:
      CAST-IN-PLACE CLASS A
      PRECAST CLASS BB.
   C. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE WITH
      PUBLICATION 408/2000, SECTION 800. MINIMUM TENSILE
      STRENGTH OF 400 MPa (58,000 psi).
   D. CLEAR COVER FOR STEEL:
      WALLS: CAST-IN-PLACE 50 (2")
      PRECAST 40 (1 1/2")
      FOOTINGS: CAST-IN-PLACE 80 (3 1/2")
      PRECAST 60 (2 1/2")
      PRECAST CONCRETE GRADE ADJUSTMENT RINGS:
      USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS
      WHEN REQUIRED. (REHABILITATION PROJECTS)
   E. PROVIDE WEEP HOLES ON INLET BOXES WHEN REQUIRED.
   F. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
      USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS
      WHEN REQUIRED.
   G. THIS SHEET DEPICTS THE VARIOUS COMPONENTS REQUIRED FOR
      COMPLETE INLET ASSEMBLIES. FOR INDIVIDUAL COMPONENTS
      AND OTHER SPECIAL DETAILS, SEE THE FOLLOWING:
   H. USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS
      WHEN REQUIRED. (REHABILITATION PROJECTS)

2. EACH TYPE OF INLET SHOWN IS SUITABLE FOR A PARTICULAR
   SITUATION AS FOLLOWS:
   A. TYPE C INLET IS DESIGNATED FOR INSTALLATION WITH
      NON-MOUNTABLE CURBS.
   B. TYPE M INLET IS DESIGNATED FOR INSTALLATION IN
      SHOULDER SWALE AREAS.
   C. TYPE S INLET IS DESIGNATED FOR INSTALLATION IN
      MEDIAN AREAS AND MOUNTABLE CURBS.
   D. THE SELECTION OF COMPONENTS TO ACHIEVE A SPECIFIED INLET
      ASSEMBLY IS THE CONTRACTOR'S RESPONSIBILITY.
   E. USE PRECAST CONCRETE OR STEEL GRADE ADJUSTMENT RINGS
      WHEN REQUIRED. (REHABILITATION PROJECTS)
   F. FOR WALL REINFORCEMENT, BOTH HORIZONTAL AND
      VERTICAL, USE 2" OD F1570 REBAR AT 1' 6" C3 SPACING.
   G. FOR POSTING REINFORCEMENT, TOP AND BOTTOM, USE 3/4" 8-16" BARS AT
      20" O.C. CENTERS EACH #4 @ 8" O.C. 1' 6" C3 SPACING.
   H. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
   I. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.
   J. PROVIDE WEEP HOLES ON INLET BOXES WHEN REQUIRED.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES
MUST BE USED ON PLANS, METRIC AND
ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. THIS SHEET DEPICTS THE SHAPE AND DIMENSIONS REQUIRED FOR UNIFORMITY AND COMPATIBILITY. PERMIT ONLY TOP UNITS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15.

2. CAST-IN-PLACE TOP UNITS MAY BE MONOLITHIC WITH THE INLET BOX.

3. PROVIDE ANGLES EMBEDDED IN THE CONCRETE AS A BEARING AREA FOR THE GRATE FOR ALL TOP UNITS WHICH SEAT THE GRATE DIRECTLY WITHIN THE UNIT.

4. PLAN A TYPE M INLET ADJACENT TO THE BACK EDGE OF THE CURB, FLUSH WITH THE PAVEMENT SURFACE, WHEN REQUIRED WITHIN A CONCRETE MOUNTABLE CURB SECTION.

5. DOWEL TYPE S INLET TOP UNITS WITH 2-#25 X 300 (1½") DOWEL BARS AND PLACE PREMOLDED EXPANSION JOINT FILLER 6 (1/4") WIDE WHEN CONNECTING TO ADJACENT CURB SECTIONS.


7. TAPERS MAY BE PROVIDED ON INLET TOP UNITS TO FACILITATE FORM STRIPPING. HOWEVER, BOTTOM DIMENSIONS MUST NOT BE REDUCED.


NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
CONCRETE TOP UNITS
CAST-IN-PLACE AND PRECAST

RC-34M

NOTE: SEE NOTE 6.
1. THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DETAILS REQUIRED FOR FABRICATION OR MANUFACTURING. POSSIBLY ONLY GRATES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 30 FOR A BULLETIN 15 LISTING. SUBMIT REPRODUCIBLE MATERIALS, MATERIALS AND TESTING DIVISION FOR REVIEW AND APPROVAL.

2. MELD STRUCTURAL STEEL GRATES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 1105.03(1).

3. PROVIDE TRANSVERSE BARS MEETING THE REQUIREMENTS OF PUBLICATION 30.

4. PROVIDE BICYCLE-SAFE, STRUCTURAL OR CAST IRON VANE GRATES FOR INSTALLATION WHERE BICYCLE TRAFFIC IS ANTICIPATED, SUCH AS CURVED MOUTAINING IN URBAN AREAS OR ROADS REMOVING SPECIFICALLY ESTABLISHED AND SIGNEO OF KIDWEY LANE S. ALTERNATE BICYCLE-SAFE GRATE DESIGNS SHALL REQUIRE A SHOP DRAWING SUBMISSION, AS SPECIFIED IN NOTE 1, AND SHALL CONFORM TO THE DIMENSIONAL REQUIREMENTS FOR PROPER INSTALLATION WITH THE CURRENT CONCRETE TOP UNITS.

5. FABRICATE SLOTS BY BURNING, DRILLING, SHEARING OR PUNCHING TO THE SHAPE OF THE ROD.

6. PROVIDE STRUCTURAL STEEL GRATES WITH THE GRATE SPACERS LOCATED FLUSH ALONG THE TOP SURFACE OF THE GRATE.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLET GRATES

SEE DETAIL D

SEE DETAIL E

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DETAILS REQUIRED FOR FABRICATION OR MANUFACTURING. PERMIT ONLY GRATES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR A BULLETIN 15 LISTING, SUBMIT REPRODUCIBLE SHOP DRAWING TO THE BUREAU OF CONSTRUCTION AND MATERIALS AND TESTING DIVISION FOR REVIEW AND APPROVAL.

2. PROVIDE BICYCLE-SAFE, STRUCTURAL STEEL OR CAST IRON VANE GRATES FOR INSTALLATION WHERE BICYCLE TRAFFIC IS ANTICIPATED, SUCH AS CURBED ROADWAYS SPECIFICALLY DESIGNATED AS BIKEWAYS OR CURRENTLY CLASSIFIED AS BIKE LANES. ALTERNATE BICYCLE-SAFE GRATE DESIGNS SHALL REQUIRE A SHOP DRAWING SUBMISSION, AS SPECIFIED IN NOTE 1, AND SHALL CONFORM TO THE DIMENSIONAL REQUIREMENTS FOR PROPER INSTALLATION WITH THE CURRENT CONCRETE TOP UNITS.

3. CAST IRON GRATES MAY BE USED AS ALTERNATES TO STRUCTURAL STEEL GRATES PROVIDED THEY ARE SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15 AND APPROVED FOR HS25 LOADING. CAST IRON GRATES SUPPLIED IN OUTSIDE SHOULDERED, SHOULDERS, MEDIAN SWALE, INFIELD AREAS. CAST IRON GRATES NOT APPROVED FOR HS25 LOADING MAY BE USED OUTSIDE OF TRAVEL LANE, AND MAY BE USED OUTSIDE SHOULDERED, SWALES, MEDIAN SWALES AND INFIELD AREAS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES
1. PROVIDE MATERIALS AND CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF PUBICATION 408/2000, SECTIONS 605, 606 AND 714. PERMIT ONLY GRATES AND GRADE ADJUSTMENT SYSTEMS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR A BULLETIN 15 LISTING, SUBMIT REPRODUCIBLE SHOP DRAWING TO THE MATERIALS AND TESTING DIVISION, BUREAU OF CONSTRUCTION AND MATERIALS FOR REVIEW AND APPROVAL.
2. INSTALL VANE GRATES WITH CURVE VANES FACING THE DIRECTION OF FLOW.
3. GRADE ADJUSTMENT RINGS:
   A. CUSTOM FABRICATE EACH ADJUSTMENT RING FROM MEASUREMENTS PROVIDED WITH EACH ORDER.
   B. MANUFACTURE BAR STOCK AND RETAINER CLIPS FROM U.S. MADE CARBON STEEL MEETING OR EXCEEDING THE MINIMUM REQUIREMENTS OF ASTM A-36M AND AASHTO TABLE 10.32, 1A.
   C. REQUIRE FULL CIRCUMFERENTIAL WELDS ON BOTH TOP AND BOTTOM RINGS. MAKE THE INNER WELD A BEVEL GROOVE WELD AND THE OUTER WELD A FILLET WELD.
   D. PROVIDE AN ADJUSTMENT RING WHICH IS FLUSH WITH COVER AND DOES NOT ALLOW EXCESSIVE MOVEMENT. PROVIDE AN ADJUSTMENT RING WHICH CONFORMS TO THE SHAPE OF THE ORIGINAL FRAME.
4. PROVIDE RADIUS OF 3 1/8" TYPICAL FOR ALL FILLETS AND ROUNDS, UNLESS NOTED. ATTACH STEEL GRADE ADJUSTMENT RINGS RIGIDLY TO THE FRAME AND SET PRECAST CONCRETE GRADE ADJUSTMENT RINGS ON A MORTAR BED.
5. CAST IRON GRATES MAY BE USED AS ALTERNATIVES TO STRUCTURAL STEEL GRATES PROVIDED THEY ARE SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15 AND APPROVED FOR HS25 LOADING. CAST IRON GRATES NOT APPROVED FOR HS25 LOADING MAY BE USED OUTSIDE OF THE TRAVEL LANES AT THE EDGE OF OUTSIDE SHOULDERS, SWALES, WIDE MEDIAN SWALES AND INFIELD AREAS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLET GRATES & GRADE ADJUSTMENT RINGS

NOTE: PROVIDE MATERIALS AND CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF PUBICATION 408/2000, SECTIONS 605, 606 AND 714. PERMIT ONLY GRATES AND GRADE ADJUSTMENT SYSTEMS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR A BULLETIN 15 LISTING, SUBMIT REPRODUCIBLE SHOP DRAWING TO THE MATERIALS AND TESTING DIVISION, BUREAU OF CONSTRUCTION AND MATERIALS FOR REVIEW AND APPROVAL.
2. INSTALL VANE GRATES WITH CURVE VANES FACING THE DIRECTION OF FLOW.
3. GRADE ADJUSTMENT RINGS:
   A. CUSTOM FABRICATE EACH ADJUSTMENT RING FROM MEASUREMENTS PROVIDED WITH EACH ORDER.
   B. MANUFACTURE BAR STOCK AND RETAINER CLIPS FROM U.S. MADE CARBON STEEL MEETING OR EXCEEDING THE MINIMUM REQUIREMENTS OF ASTM A-36M AND AASHTO TABLE 10.32, 1A.
   C. REQUIRE FULL CIRCUMFERENTIAL WELDS ON BOTH TOP AND BOTTOM RINGS. MAKE THE INNER WELD A BEVEL GROOVE WELD AND THE OUTER WELD A FILLET WELD.
   D. PROVIDE AN ADJUSTMENT RING WHICH IS FLUSH WITH COVER AND DOES NOT ALLOW EXCESSIVE MOVEMENT. PROVIDE AN ADJUSTMENT RING WHICH CONFORMS TO THE SHAPE OF THE ORIGINAL FRAME.
4. PROVIDE RADIUS OF 3 1/8" TYPICAL FOR ALL FILLETS AND ROUNDS, UNLESS NOTED. ATTACH STEEL GRADE ADJUSTMENT RINGS RIGIDLY TO THE FRAME AND SET PRECAST CONCRETE GRADE ADJUSTMENT RINGS ON A MORTAR BED.
5. CAST IRON GRATES MAY BE USED AS ALTERNATIVES TO STRUCTURAL STEEL GRATES PROVIDED THEY ARE SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15 AND APPROVED FOR HS25 LOADING. CAST IRON GRATES NOT APPROVED FOR HS25 LOADING MAY BE USED OUTSIDE OF THE TRAVEL LANES AT THE EDGE OF OUTSIDE SHOULDERS, SWALES, WIDE MEDIAN SWALES AND INFIELD AREAS.
NOTES
1. THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DETAILS REQUIRED FOR FABRICATION OR MANUFACTURING. DETAILS ON THIS SHEET ARE NOT TO BE CONSIDERED PART OF THE CONTRACT OR SPECIFICATION, BUT ARE DESIGNED TO PROVIDE A MEANS OF COMMUNICATION BETWEEN CONTRACTOR AND INSP.
SECTION A-A
MODIFIED TYPE I INLET 1829 (72") X 1150 (45'4")

SECTION B-B
MODIFIED TYPE II INLET 610 (24") X 1829 (72")

PIPE OPENING DETAILS

NOTES
1. CONSTRUCT IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408-2000, SECTION 501 AND SECTION 714.
2. PROVIDE INLETS WITH A MAXIMUM HEIGHT TO BE THE GRADE ELEVATION. WHEN THE REQUIRED HEIGHT EXCEEDS 2750 (9'), SHOW SPECIAL DETAILS AND DESIGN FOR THE INLET WALLS AND BASE. CONSTRUCT INLETS THAT EXCEED 1500 (5') IN HEIGHT WITH STEPS SIMILAR TO MANHOLES (SEE RC-34M).
3. WHEN A SITUATION CANNOT BE SATISFIED BY THE SELECTED INLET BOXES SHOWN, PROVIDE SPECIAL.
4. FOR ORIENTATION OF THE TYPE C INLET TOP WITH MODIFIED TYPE I INLET BOX, THE TYPICAL INSTALLATION DETAILS ARE SHOWN BELOW. USE ANY VARIATION ON THE CONSTRUCTION DRAWINGS BY SPECIAL DETAILS.
5. PROVIDE A MINIMUM HEIGHT OF 508 (20") MEASURED FROM THE TOP SURFACE OF THE TOP UNIT TO THE INSIDE TOP OF THE PIPE WHEN THE TOP UNIT IS CONSTRUCTED MONOLITHICALLY.
6. PERMIT ONLY PRECAST MODIFIED INLET BOXES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
MODIFIED INLET BOXES
(CAST-IN-PLACE AND PRECAST)
1. DO NOT CONSTRUCT DRAINAGE DIKE TO A HEIGHT WHICH CAUSES FLOODING OF THE SUBBASE.
2. CONSIDER CONSTRUCTION OF THE DRAINAGE DIKE INCIDENTAL TO THE CLASS 1 EXCAVATION.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS

DRAINAGE DIKE
NOTES

1. PROVIDE SPRING BOXES MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 605.

2. PRECAST SPRING BOXES MAY BE USED IN LIEU OF CAST-IN-PLACE SPRING BOXES. PERMIT ONLY PRECAST BOXES SUPPLIED BY AN APPROVED MANUFACTURER LISTED IN BULLETIN 15.

3. LOCATE OUTLET PIPE AS REQUIRED TO SUIT FIELD CONDITIONS.

4. PLACE NO. 13 (NO. 4) REINFORCEMENT BARS, MINIMUM 305 (12") LONG, SPACED AT 600 (24") MAXIMUM, AS DOWELS BETWEEN THE FOUNDATION AND WALLS WHEN THE CONSTRUCTION, EXCLUDING COVER, IS NOT MONOLITHIC. THE DOWELS MAY BE ELIMINATED IF THE ALTERNATE JOINTS SHOWN IN DETAILS B OR C ARE CONSTRUCTED.

5. PROVIDE REINFORCEMENT FOR WALLS AND FOUNDATIONS OF PRECAST BOXES MEETING THE REQUIREMENTS OF AASHTO-M199M.

6. WHEN FILL HEIGHT OVER TOP OF BOX EXCEEDS 3.0 m (10'), REQUIRE A SPECIAL DESIGN.

7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. CONSTRUCTION REQUIREMENTS
   A. CONSTRUCT IN ACCORDANCE WITH
      SOIL DESIGNATION REQUIREMENTS FOR PLAIN CONCRETE MANHOLE
      SECTIONS, AS MODIFIED HEREIN.
   B. MINIMUM CONCRETE CLASS:
      PRECAST: C-50/60
      CAST-IN-PLACE: C-60/75
   C. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE
      WITH ASTM A615/A615M, STEEL BILLET STEEL BARS.
      PROVIDE MINIMUM YIELD STRENGTH OF 605, 606 AND 714;
      OR ASTM A663/A663M & A675/A675M, PLAIN BILLET STEEL BARS
      OR ASTM A165, STEEL WELDED WIRE FABRIC
      AS MODIFIED HEREIN.
      PROVIDE MINIMUM YIELD STRENGTH OF 400 MPa (60,000 PSI),
      OR ASTM A615/A615M, STEEL BILLET STEEL BARS.
      OR ASTM A165, STEEL WELDED WIRE FABRIC
      AS MODIFIED HEREIN.
   D. CLEAR COVER OVER STEEL:
      PRECAST: 40.1/2" TOP BARS
      CAST-IN-PLACE: 40.1/2" TOP BARS
   E. PROVIDE MINIMUM COVER OVER PRESSURE CESSPOLLERS:
      (0.121 m² /FT² WWF) FOR DEPTHS TO 18.0 m (60' ),
      OR 635 mm² /FT² WWF FOR DEPTHS GREATER THAN 18.0 m (60' ).
   F. PROVIDE ADDITIONAL COVER OVER CONSTRUCTION JOINTS
      LOCATE CONSTRUCTION JOINTS AT 3.0 m (10' ) DEPTHS.
      LOCATE CONSTRUCTION JOINTS AT 6.0 m (20' ) DEPTHS.
      A-SAFE BEARING CAPACITY OF 0.15 MPa (1.5 Tons Per S.F.)
      UNDER THE SUBSOIL IS EXTREMELY POOR, SITE CONDITIONS:
      POST A WARNING SIGN OR MARK THE SITE.
   G. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE
      WITH ASTM A615/A615M, STEEL BILLET STEEL BARS.
      PROVIDE MINIMUM YIELD STRENGTH OF 400 MPa (60,000 PSI),
      OR ASTM A663/A663M & A675/A675M, PLAIN BILLET STEEL BARS
      OR ASTM A165, STEEL WELDED WIRE FABRIC
      AS MODIFIED HEREIN.
   H. PROVIDE MINIMUM COVER OVER PRESSURE CESSPOLLERS:
      40.1/2" TOP BARS
      40.1/2" TOP BARS
   I. PROVIDE MINIMUM COVER OVER CONSTRUCTION JOINTS
      LOCATE CONSTRUCTION JOINTS AT 3.0 m (10' ) DEPTHS.
      LOCATE CONSTRUCTION JOINTS AT 6.0 m (20' ) DEPTHS.
      A-SAFE BEARING CAPACITY OF 0.15 MPa (1.5 Tons Per S.F.)
      UNDER THE SUBSOIL IS EXTREMELY POOR, SITE CONDITIONS:
      POST A WARNING SIGN OR MARK THE SITE.
   J. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE
      WITH ASTM A615/A615M, STEEL BILLET STEEL BARS.
      PROVIDE MINIMUM YIELD STRENGTH OF 400 MPa (60,000 PSI),
      OR ASTM A663/A663M & A675/A675M, PLAIN BILLET STEEL BARS
      OR ASTM A165, STEEL WELDED WIRE FABRIC
      AS MODIFIED HEREIN.
   K. PROVIDE MINIMUM COVER OVER PRESSURE CESSPOLLERS:
      (0.121 m² /FT² WWF) FOR DEPTHS TO 18.0 m (60' ),
      OR 635 mm² /FT² WWF FOR DEPTHS GREATER THAN 18.0 m (60' ).
   L. PROVIDE ADDITIONAL COVER OVER CONSTRUCTION JOINTS
      LOCATE CONSTRUCTION JOINTS AT 3.0 m (10' ) DEPTHS.
      LOCATE CONSTRUCTION JOINTS AT 6.0 m (20' ) DEPTHS.
      A-SAFE BEARING CAPACITY OF 0.15 MPa (1.5 Tons Per S.F.)
      UNDER THE SUBSOIL IS EXTREMELY POOR, SITE CONDITIONS:
      POST A WARNING SIGN OR MARK THE SITE.
   M. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE
      WITH ASTM A615/A615M, STEEL BILLET STEEL BARS.
      PROVIDE MINIMUM YIELD STRENGTH OF 400 MPa (60,000 PSI),
      OR ASTM A663/A663M & A675/A675M, PLAIN BILLET STEEL BARS
      OR ASTM A165, STEEL WELDED WIRE FABRIC
      AS MODIFIED HEREIN.
   N. PROVIDE MINIMUM COVER OVER PRESSURE CESSPOLLERS:
      40.1/2" TOP BARS
      40.1/2" TOP BARS
   O. PROVIDE ADDITIONAL COVER OVER CONSTRUCTION JOINTS
      LOCATE CONSTRUCTION JOINTS AT 3.0 m (10' ) DEPTHS.
      LOCATE CONSTRUCTION JOINTS AT 6.0 m (20' ) DEPTHS.
      A-SAFE BEARING CAPACITY OF 0.15 MPa (1.5 Tons Per S.F.)
      UNDER THE SUBSOIL IS EXTREMELY POOR, SITE CONDITIONS:
      POST A WARNING SIGN OR MARK THE SITE.
   P. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE
      WITH ASTM A615/A615M, STEEL BILLET STEEL BARS.
      PROVIDE MINIMUM YIELD STRENGTH OF 400 MPa (60,000 PSI),
      OR ASTM A663/A663M & A675/A675M, PLAIN BILLET STEEL BARS
      OR ASTM A165, STEEL WELDED WIRE FABRIC
      AS MODIFIED HEREIN.
   Q. PROVIDE MINIMUM COVER OVER PRESSURE CESSPOLLERS:
      (0.121 m² /FT² WWF) FOR DEPTHS TO 18.0 m (60' ),
      OR 635 mm² /FT² WWF FOR DEPTHS GREATER THAN 18.0 m (60' ).
   R. PROVIDE ADDITIONAL COVER OVER CONSTRUCTION JOINTS
      LOCATE CONSTRUCTION JOINTS AT 3.0 m (10' ) DEPTHS.
      LOCATE CONSTRUCTION JOINTS AT 6.0 m (20' ) DEPTHS.
      A-SAFE BEARING CAPACITY OF 0.15 MPa (1.5 Tons Per S.F.)
      UNDER THE SUBSOIL IS EXTREMELY POOR, SITE CONDITIONS:
      POST A WARNING SIGN OR MARK THE SITE.
1. For construction requirements, see note A, sheet 1.
2. For design requirements, see note B, sheet 1.
3. Increased box size when required to keep walls of manhole box section from the opening. For fixed length, plan or shop drawings, based on the design procedures proposed below.
4. Design procedure for manhole box section.
5. Design all members for moment, crack control, and shear at distance of effective depth of member from face or support. Calculate all span lengths from the center of the supports.
6. Top slab:
   - Design a 305 (12") wide slab strip for one-way action to carry loads in the slab, and locate the slab at the top of the manhole opening. See section A-A for details.
   - Place additional bars in the slab at 45° from the top of the manhole opening, see section A-A for details.

**CONSTRUCTION JOINT**

SEE DETAIL "A II".

**PLAN VIEW**

**REINFORCEMENT DETAILS AT VERTICAL OPENINGS**

**COMMENTARY:**

- For one-way action to carry loads in the slab, locate the slab at the top of the manhole opening.
- Place additional bars in the slab at 45° from the top of the manhole opening.

**SECTION B-B**

**PLAN-TOP OF SLAB**

FOR ONE-WAY ACTION TO CARRY LOADS IN THE SLAB, LOCATE THE SLAB AT THE TOP OF THE MANHOLE OPENING. SEE SECTION A-A FOR DETAILS.

**SECTION A-A B**

**ELEVATION-OPENING**

**DETAIL "A"**

CONSTRUCTION JOINT

SEE NOTE 24

**DETAIL "B"**

KEYWAY

SEE NOTE 24

**SECTION A-A B**

**NOTE:** Either all metric or all English values must be used on plans, metric and English values shown may not be mixed.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD MANHOLES
MODIFIED
CAST-IN-PLACE MANHOLES

RC-39M
Provide non-skid surface on tread.

Provide minimum 25 152 (6") for precast.

Provide manhole steps meeting the requirements of Publication Table B.

Provide minimum 25 152 (6") height of the riser or base section.

Provide additional reinforcement bars around openings as shown or reinforcement details at openings sheet 1.

Provide manhole steps meeting the requirements of Publication Table B.

Provide manhole steps meeting the requirements of Publication Table B.

Provide minimum 25 152 (6") section dimension for metal steps.

Provide minimum 90 76 (3") section dimension for non-deteriorating material steps.

Mechanical and/or required for installation of steps without hooks.

The alternate opening reinforcement detail is not desirable by design. Use it to meet existing pipe elevations.

Note: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
1. PROVIDE FRAME AND COVERS MEETING THE REQUIREMENTS OF APPLICATION "605", SECTION 605. PROVIDE LABELS ON FRAMES AND COVERS, IDENTIFYING MANUFACTURER AND MANUFACTURER'S SERIES NUMBER OR IDENTIFICATION. LABELS ARE TO BE INSERTED IN MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS.

2. PROVIDE FRAME AND COVERS MEETING THE REQUIREMENTS OF APPLICATION "605", SECTION 605. PROVIDE LABELS ON FRAMES AND COVERS, IDENTIFYING MANUFACTURER AND MANUFACTURER'S SERIES NUMBER OR IDENTIFICATION. LABELS ARE TO BE INSERTED IN MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS.

3. PROVIDE FRAME AND COVERS MEETING THE REQUIREMENTS OF APPLICATION "605", SECTION 605. PROVIDE LABELS ON FRAMES AND COVERS, IDENTIFYING MANUFACTURER AND MANUFACTURER'S SERIES NUMBER OR IDENTIFICATION. LABELS ARE TO BE INSERTED IN MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS.

4. PROVIDE FRAME AND COVERS MEETING THE REQUIREMENTS OF APPLICATION "605", SECTION 605. PROVIDE LABELS ON FRAMES AND COVERS, IDENTIFYING MANUFACTURER AND MANUFACTURER'S SERIES NUMBER OR IDENTIFICATION. LABELS ARE TO BE INSERTED IN MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS.

5. PROVIDE FRAME AND COVERS MEETING THE REQUIREMENTS OF APPLICATION "605", SECTION 605. PROVIDE LABELS ON FRAMES AND COVERS, IDENTIFYING MANUFACTURER AND MANUFACTURER'S SERIES NUMBER OR IDENTIFICATION. LABELS ARE TO BE INSERTED IN MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS. FRAME AND COVER MATERIALS ARE NOT IN OR ON MANUFACTURER'S MANUFACTURING METHODS.
1. DESIGN REQUIREMENTS:

A. DESIGN SPECIFICATIONS: DESIGN DIVISION 1 of AASHO, STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1992, including the latest addenda. OTHER SPECIFICATIONS AS SUPPLEMENTED BY THE DESIGN MANUAL.

B. DESIGN LOADS: LIVE LOAD: PHL 93 (HS25); DEAD LOAD: PHL 93 (HS25). EXCEPT WHERE SPECIFIED OTHERWISE.

C. DESIGN FOUNDATION BEARING PRESSURES: BY SERVICE LOAD METHODS. DESIGN ALL OTHER PORTIONS OF THE MANHOLE BY LOAD FACTOR METHODS.

D. DESIGN REINFORCEMENT: USE WALLS AT 127 (5") THICK WITH ONE (1) ROW OF REINFORCING, OR USE WALLS AT 254 (10") THICK WITH TWO (2) ROWS OF REINFORCING.

E. DESIGN REINFORCEMENT IN "COLUMN" TO CARRY AXIAL LOAD AND MOMEHT. (USE TOTAL CROSS-SECTION TO CARRY AXIAL LOAD.

F. PROVIDE AT LEAST MINIMUM REINFORCEMENT FOR SHrinkAGE AND TEMPERATURE AT ALL CONCRETE FACES WHERE REINFORCEMENT IS NOT REQUIRED BY DESIGN.

G. PLACING METHOD: DESIGNING ONLY WHEN A SIGNIFICANT LOADING EXISTS ON ONE SIDE OF THE MANHOLE AND LIMITED SUPPORT IS PROVIDED ON THE OTHER.

H. CHECK CRACK CONTROL UNDER SERVICE LOAD.

2. VERTICAL STEEL:

A. DESIGN THE MANHOLE FOR A LIVE LOAD OF PHL 93 (HS25) WHEEL LOAD. THE SAFE BEARING PRESSURE IS NOT TO EXCEED THE EXISTING LIVE LOAD BEARING PRESSURE.

B. DESIGN HOOP REINFORCEMENT SHOWN IN SECTION A-A, TO CARRY THE MOMENT AND AXIAL THRUST.

C. CHECK CRACK CONTROL UNDER SERVICE LOAD.

D. DETERMINE DIMENSIONS OF DESIGN SECTION TO CARRY MOMENT AS SHOWN IN FIGURE 1.

E. DESIGN REINFORCEMENT IN "COLUMN" TO CARRY AXIAL LOAD AND MOMENT. (USE TOTAL CROSS-SECTION TO CARRY AXIAL LOAD.

F. PROVIDE AT LEAST MINIMUM REINFORCEMENT FOR SHrinkAGE AND TEMPERATURE AT ALL CONCRETE FACES WHERE REINFORCEMENT IS NOT REQUIRED BY DESIGN.

G. CHECK CRACK CONTROL UNDER SERVICE LOAD.

H. DETERMINE MOMENTS AND AXIAL THRUSTS USING FIGURE 2 AND FIGURE 3.

I. DETERMINE SERVICE MOMENTS AND AXIAL THRUSTS USING FIGURE 2 AND FIGURE 3. THE MOMENT NOT TO BE GREATER THAN ONE-HALF OF PHH MAX.

J. DETERMINE FOOTING SIZE (USE AN EQUIVALENT CIRCULAR FOOTING FOR DESIGN). P + M.

K. CHECK CRACK CONTROL UNDER SERVICE LOAD.

L. DETERMINE HOOP MOMENTS TO DETERMINE PHH MIN NOT TO BE GREATER THAN ONE-HALF OF PHH MAX.

M. CHECK CRACK CONTROL UNDER SERVICE LOAD.

N. DETERMINE MOMENTS AND AXIAL THRUSTS USING FIGURE 2 AND FIGURE 3.

3. FLOOR LOAD:

A.設計通過的荷載和水平荷載的總和。根據圖2和圖3確定軸向力和慣性力。

B. 確定地板的慣性力。根據圖2和圖3確定地板的慣性力。根據圖2和圖3確定地板的慣性力。根據圖2和圖3確定地板的慣性力。

C. 確定地板的慣性力。根據圖2和圖3確定地板的慣性力。根據圖2和圖3確定地板的慣性力。根據圖2和圖3確定地板的慣性力。
USE CROSS WALLS AT THE BEGINNING AND END OF PAVED DITCH OR CHANNEL AND AT THE UPGRADE END OF EVERY FOURTH SECTION.

CONSTRUCT SIDE SLOPES AND BOTTOM WIDTH CONFORMING TO ADJACENT PARALLEL DITCHES.

CONCRETE PAVING FOR STREAMBEDS

ANCHOR BOLT AND NUT, SEE DETAIL C. PLACE CONCRETE PIPE ANCHORS AT THE ENDS OF PIPE, UNDER ALL JOINTS AND AT INTERMEDIATE LOCATIONS AS REQUIRED. PROVIDE 3.0 M (10 FT) MAXIMUM SPACING BETWEEN ANCHORS.

AREA FOR CLASS 2 EXCAVATION

HALF-CIRCLE PIPE IN FULL SLOPE

INSTALLATION DETAILS FOR HALF-CIRCLE PIPE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

SLOPE PROTECTION

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
CLASS 2, TYPE B GEOTEXTILE MATERIAL, SEE NOTES 7 AND 8.

FINISHED SLOPE, AS REQUIRED.

CHANNEL LINING ELEVATION, EXTEND ABOVE THE DESIGN FLOW ELEVATION, AS REQUIRED.

FINISHED GROUND LINE OF CHANNEL LINING, STREAM BED ELEVATION.

CLASS 2, TYPE B GEOTEXTILE MATERIAL, SEE NOTES 7 AND 8.

WIRE MESH BASKETS

GABIONS SIZES

MATTRESS TYPE | \( W_0 \) (lbs) | \( L_0 \) (cal) | \( H_0 \) (in)
---|---|---|---
WG | 1829 (6'-0") | 2743 (9'-0") | 229 (0'-9")
LG | 1829 (6'-0") | 3658 (12'-0") | 229 (0'-9")
HG | 1829 (6'-0") | 2743 (9'-0") | 457 (1'-6")

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

GABIONS

STANDARD

| \( W_0 \) (lbs) | \( L_0 \) (cal) | \( H_0 \) (in)
---|---|---
914 (3'-0") | 1829 (6'-0") | 229 (0'-9")
914 (3'-0") | 2743 (9'-0") | 229 (0'-9")
914 (3'-0") | 3658 (12'-0") | 229 (0'-9")
914 (3'-0") | 1829 (6'-0") | 457 (1'-6")
914 (3'-0") | 2743 (9'-0") | 457 (1'-6")
914 (3'-0") | 3658 (12'-0") | 457 (1'-6")

ADDITIONAL SIZES MAY BE AVAILABLE ON A SPECIAL ORDER BASIS.
NOTE:

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION FOR GUIDE RAIL, SECTION 620.

2. PROVIDE STEEL-HEAD STUDS (4X8X4, 5X10, 6X12) FOR PLASTIC OR COMPOSITE OFFSET BRACKETS LISTED IN BULLETIN 15.

3. AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

4. PROVIDE RUBBING RAIL WHEN THE HEIGHT OF STRONG POST GUIDE RAIL IS OVER 710 (28") IN TRANSITION AREAS TO EXISTING GUIDE RAIL.

5. ATTACH W-BEAM RAIL ELEMENT TO EACH POST. SPLICE RAIL ELEMENTS ONLY AT POSTS AND LAP IN THE DIRECTION OF TRAFFIC.

6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN () PARENTHESIS.

7. INSTALL GUIDE RAIL DELINEATORS IN ACCORDANCE WITH TC-7604.

8. FOR STRONG POST MEDIAN BARRIER APPLICATIONS, THE INSTALLATION IS A RIGHT IMAGE ON EACH SIDE OF THE POST.

9. PROVIDE PLASTIC OR COMPOSITE OFFSET BRACKETS LISTED IN BULLETIN 15.

10. PROVIDE W-BEAM RAIL ELEMENTS TO EACH POST. SPLICE RAIL ELEMENTS ONLY AT POSTS AND LAP IN THE DIRECTION OF TRAFFIC.

11. NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
**TERMINAL TO BE PLACED ON BACK OF RAIL ELEMENT**

**TERMINAL TO BE PLACED ON FACE OF RAIL ELEMENT**

**ALTERNATE TERMINAL SECTIONS**

---

**NOTES**

1. Use splice bolts to develop the design strength of the rail element.
2. Provide terminal section bridge connection, with welded plate for safety, as an incidental item.
3. Use slotted round-headed bolts to provide for wrench or screwdriver.

---

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**DIRECTOR, BUREAU OF DESIGN**

**TYPE 2 STRONG POST GUIDE RAIL**

**TERMINAL SECTION BRIDGE CONNECTION**
POSITIONING OF ROTATING BRACKET

**TABLE A**

<table>
<thead>
<tr>
<th>HEIGHT OF POST</th>
<th>450</th>
<th>370</th>
<th>300</th>
<th>215</th>
<th>115</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROTATION ANGLES</td>
<td>15°</td>
<td>30°</td>
<td>45°</td>
<td>60°</td>
<td>75°</td>
</tr>
</tbody>
</table>

TYPICAL FOR 15° THRU 75° POSITIONS

**NOTES**

1. PAYMENT FOR TYPE 2 STRONG POST END TREATMENT INCLUDES (4) 30 (3'-6") OF SLOPING RAIL, TERMINAL SECTION, HARDWARE, EXCAVATION AND CONCRETE.

2. INSTALL DELINERATOR ASSEMBLIES UNDER SEPARATE PAY ITEM OR CONTRACT, FOR ADDITIONAL DETAILS, SEE TRAFFIC STANDARD TC-164.

3. THE NECESSARY DIMENSIONS FOR UNIFORMITY AND INTERCHANGEABILITY ARE INDICATED, PROVIDE ROTATING BRACKETS SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15.

4. MEASURE OFFSETS FROM THE PROJECTED FRONT FACE OF THE GUIDE RAIL TO THE FRONT FACE OF THE POST.

5. TYPE 2 STRONG POST END TREATMENTS CAN NOT BE USED TO TERMINATE STRONG-POST GUIDE RAIL ON THE NHS. ALSO, THEY CANNOT BE USED ON OTHER HIGHWAYS WITH POSTED SPEEDS 70 km/h (45 mph) AND ABOVE AND WITH CURRENT TRAFFIC VOLUMES 4000 VEHICLES PER DAY AND ABOVE.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**
**BUREAU OF DESIGN**

**TYPE 2 STRONG POST GUIDE RAIL END TREATMENTS**
TABLE B
FLARE RATES
FOR BARRIER DESIGN

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>MAXIMUM FLARE RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>km/h (mph)</td>
<td>GUIDE RAIL</td>
</tr>
<tr>
<td>120 (75)</td>
<td>9 x 1</td>
</tr>
<tr>
<td>110 (68)</td>
<td>10 x 1</td>
</tr>
<tr>
<td>100 (62)</td>
<td>11 x 1</td>
</tr>
<tr>
<td>90 (55)</td>
<td>12 x 1</td>
</tr>
<tr>
<td>80 (50)</td>
<td>13 x 1</td>
</tr>
<tr>
<td>70 (45)</td>
<td>14 x 1</td>
</tr>
<tr>
<td>60 (38)</td>
<td>15 x 1</td>
</tr>
<tr>
<td>50 (31)</td>
<td>16 x 1</td>
</tr>
</tbody>
</table>

NOTES
2. ALL MATERIAL NECESSARY TO CONSTRUCT EARTH MOUNDS ARE IN ACCORDANCE WITH APPLICABLE SECTIONS OF PUBLICATION 408/2000.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 STRONG POST
GUIDE RAIL
END TREATMENTS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
ALL RAIL ELEMENTS ARE 1210 (40') X 1210 (40')

CASE 2

DETAILS OF NESTED W-BEAM (TYPE 2-S) GUIDERAIL ACROSS LOW-FILL CULVERTS.

CASE 1

DETAILS OF NESTED W-BEAM (TYPE 2-S) GUIDERAIL ACROSS LOW-FILL CULVERTS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

TYPE 2 STRONG POST
GUIDE RAIL ACROSS CULVERTS

RC-52M

PLACE AFTER CONSTRUCTION.

DURING ERECTION, USE SUPPORT BOLTS TO SUPPORT THE 86 (3¾") AT POSTS AND LAP IN THE DIRECTION OF TRAFFIC.

ARE PROPERLY TORQUEO. LEAVE SUPPORT BOLTS IN USE BASE PLATE FOR 86 (3¾") x 57 (2¼") x 21 (5.7) POST.

NOTE:
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 620.

2. THE 86 (3¾") x 57 (2¼") COLD FORMED CHANNEL POST, 175 (6.9") x 6 (0.24") POST AND COLD FORMED UPE OF POST MAY BE USED AS ALTERNATIVES FOR THIS 2-W BEAM POST GUIDE RAIL SYSTEM. HOWEVER, HEATING OF DIFFERENT MATERIAL IS NOT ACCEPTABLE WITHIN A PROJECT.

3. ERECTION DIRECTION: USE SUPPORT BOLTS TO SUPPORT THE RAIL ELEMENT UNTIL THE 8 9/16" POST BOLTS ARE TIGHTENED CONSTRUCTION.

4. ATTACH W-BEAM RAIL ELEMENT TO EACH POST. SPICE ONLY AT POSTS AND LAP IN THE DIRECTION OF TRAFFIC.

5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN () PARENTHESES.

SECTION A-A

TYPICAL INSTALLATION

NOTE:

OVER UNDERGROUND STRUCTURES

MAKE NO SEPARATE PAYMENT FOR INSTALLATION OF GUIDE RAIL OVER UNDERGROUND STRUCTURES. CONSIDER CONCRETE, REINFORCEMENT BARS AND HARDWARE INCIDENT TO THE GUIDE RAIL PAY ITEM.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 WEAK POST
GUIDE RAIL

NOTE:

EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

DEPARTMENT OF TRANSPORTATION

SIGNATURES

TYPED: 4/13/2000
RECEIVED: 4/17/2000
SHT. 1 OF 2
NOTES
1. FOR HIGH-SPEED HIGH-VOLUME ROADWAYS, TO BEHIND 145 kph (90 mph)
   ANNUAL AVERAGE DAILY TRAFFIC, GUIDE RAILS MUST BE USED.
   GUIDE RAILS AND TREATMENTS MUST BE USED ON THE APPROACH END WITH A 15° 1/200°
   TYPE 2 GUIDE RAIL TRANSITION FOR ANCHORAGE TO THE 2-W
   EARTHMOUND. TREATMENTS MUST BE USED ON ALL ROADS REGARDLESS OF SPEED AND VOLUME.
   ON 2-LANE ROADWAYS, USE CRASH WORTHY END TREATMENTS ON BOTH, THE APPROACH AND TRAILING, ENDS.

2. SEE RC-52M, FOR END TREATMENTS BURIED IN EARTH MOUNDS.

3. FOR HIGH-SPEED HIGH-VOLUME ROADWAYS, 70 kph (43 mph)
   AND ABOVE, USE CRASH WORTHY END TREATMENTS.

END POST SUPPORT ANGLES, SEE DETAIL E.

GUIDE RAIL, CRASH WORTHY END TREATMENTS MUST BE USED ON 2-LANE ROADWAYS, USE CRASH WORTHY END TREATMENT
ON ALL ROUTES REGARDLESS OF SPEED AND VOLUME.

TYPE 2S GUIDE RAIL TRANSITION FOR ANCHORING THE 2-W
TREATMENTS ON THE APPROACH END WITH A 15° 1/200°
VEHICLES PER DAY AND ABOVE, USE CRASH WORTHY END
TREATMENTS ON BOTH, THE APPROACH AND TRAILING, ENDS.

FACE OF GUIDE RAIL LINE
GROUND LINE
GROUND LINE

DETAIL D
END POST SUPPORT ANGLES

FLARED TERMINAL SECTION

DETAIL E
SHOP CURVED RAIL

ELEVATION

TYPE 2-WEAK POST END TREATMENT
SEE NOTE II

PLATE TERMINAL SECTION CONNECTION, SEE DETAIL F.

DETAIL A
CONCRETE ANCHOR

DETAIL C
SHOP CURVED RAIL

DETAIL E
SHOP CURVED RAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

TYPE 2 WEAK POST
GUIDE RAIL
END TREATMENTS

NOTES: EITHER ALL METRIC OR ALL ENGLISH VALUES
MUST BE USED ON PLANS, METRIC AND
ENGLISH VALUES SHOWN MAY NOT BE MIXED.
IS NOT REQUIRED, IF TYPE 2-S GUIDE RAIL IS USED AT THE OBSTRUCTION, THIS SECTION OF GUIDE RAIL SHOULDER TRAFFIC DIRECTION TYPE 2-S END TREATMENT SEE RC-521.4.

TYPE 2-S GUIDE RAIL

WHEN THE REQUIRED CLEARANCE TO OBSTRUCTION IS AVAILABLE

EDGE OF SHOULDER

SEE TABLE 1.

TYPICAL GUIDE RAIL TREATMENT WHEN THE REQUIRED CLEARANCE TO OBSTRUCTION IS AVAILABLE

APPROPRIATE TYPE

END TREATMENT

SEE NOTE 3

EDGE OF SHOULDER

SOIL PLATE

TYPICAL GUIDE RAIL TREATMENT WHEN THE REQUIRED CLEARANCE TO OBSTRUCTION IS NOT AVAILABLE

SOIL PLATE

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION

BUREAU OF DESIGN

BARIER PLACEMENT AT OBSTRUCTIONS

RECOMMENDED APR. 30, 2000

APPROVED APR. 30, 2000

SHR. 1 OF 2

DRAWN: ________

CHECKED: ________

SHEET NO. __________

PLAN

ELEVATION

POST ANCHORAGE

AT TRAILING END

LIMIT OF PAYMENT

GROUND LINE

NOTE: ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

U.S. CUSTOMARY UNITS IN ITALIC PARENTHESIS.

PLACEMENT OF GUIDE RAIL AND MEDIAN BARRIER, IT IS

IMPRACTICAL TO PROVIDE A STANDARD FOR ALL POSSIBLE

CONDITIONS. MODIFICATIONS OF TREATMENTS CAN BE MADE

FROM EXISTING CONDITIONS; LOCATE THE SYSTEM SELECTED AS FAR

RECOMMENDED GUIDELINES IN PUBLICATION 13M, OM-2, CHAPTER 12.

THE TYPICAL DISTANCE FROM THE EDGE OF SHOULDER TO THE FRONT FACE OF THE W-BEAM RAIL ELEMENT IS 840 (2' -9""). THIS MAY VARY;

FACE OF THE W-BEAM RAIL ELEMENT IS 840 (2' -9""). THIS MAY VARY;

WHERE THE 0.6 m REQUIRED CLEARANCE TO OBSTRUCTION IS

CALCULATIONS SHOW A DISTANCE LESS THAN 15 m (50' -0") USE 15 m (50' -0") AS A MEXIMUM DISTANCE.

2. THIS STANDARD HAS BEEN PREPARED AS A GUIDE FOR THE

PLACEMENT OF GUIDE RAIL AND MEDIAN BARRIER. IT IS

IMPRUDENT TO PROVIDE A STANDARD FOR ALL POSSIBLE

CONDITIONS. MODIFICATIONS OF TREATMENTS CAN BE MADE

FROM EXISTING CONDITIONS; LOCATE THE SYSTEM SELECTED AS FAR

RECOMMENDED GUIDELINES IN PUBLICATION 13M, OM-2, CHAPTER 12.

THE TYPICAL DISTANCE FROM THE EDGE OF SHOULDER TO THE FRONT FACE OF THE W-BEAM RAIL ELEMENT IS 840 (2' -9""). THIS MAY VARY;

FACE OF THE W-BEAM RAIL ELEMENT IS 840 (2' -9""). THIS MAY VARY;

WHERE THE 0.6 m REQUIRED CLEARANCE TO OBSTRUCTION IS

CALCULATIONS SHOW A DISTANCE LESS THAN 15 m (50' -0") USE 15 m (50' -0") AS A MEXIMUM DISTANCE.
TREATMENT AT OBSTRUCTION FOR MEDIAN WIDTHS 6.0 m (20') OR LESS WHERE CONTINUOUS BARRIER IS REQUIRED

Table 2: Flare Rates for Barrier Design

<table>
<thead>
<tr>
<th>Speed (Km/h)</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>110</td>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>100</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>90</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>80</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>70</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>60</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>50</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

1. PROVIDE SINGLE FACE CONCRETE BARRIER THROUGH THE AREA OF THE OBSTRUCTION. NO MINIMUM BARRIER-TO-OBSTRUCTION DISTANCE IS REQUIRED. FOR DETAILS, SEE RC-58M.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
EARTH MOUND TO BE 1.9 m (6'-0") ABOVE PAVEMENT GRADE LINE.

TRAFFIC DIRECTION

TYPICAL MEDIAN EARTH MOUND DETAIL FOR AT-GRADE DUAL BRIDGES

SEEN NOTE 4

TYPICAL MEDIAN EARTH MOUND DETAIL FOR OVERHEAD STRUCTURES

FOR MEDIAN WIDTHS OF 18.0 M (60'-0") OR GREATER

SEEN NOTE 4

NOTES

1. THIS STANDARD HAS BEEN PREPARED AS A GUIDE FOR THE PLACEMENT OF EARTH MOUNDS IN THE MEDIAN. IT IS IMPRACTICAL TO PROVIDE A STANDARD FOR ALL POSSIBLE CONDITIONS. MODIFICATIONS OF TREATMENTS CAN BE MADE TO FIT EXISTING CONDITIONS.

2. FOR FLARE RATES: SEE TABLE 2, SHEET 2.

3. CONSIDER EXPANSION JOINT MATERIAL, COARSE AGGREGATE, FILTER DRAIN AND WEEP HOLES INCIDENTAL TO SINGLE FACE CONC. BARRIER.

4. ALL MATERIALS NECESSARY TO CONSTRUCT EARTH MOUNDS ARE IN ACCORDANCE WITH APPLICABLE SECTIONS OF PUBLICATION 408/2000.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
GENERAL NOTES:
1. **A 1:4 (4:1) BACK SLOPE IS DESIRABLE. HOWEVER, STEEPER SLOPES MAY BE USED.**
2. **HEIGHT OF GUIDE RAIL MAY BE TAPERED DOWN TO MAINTAIN A 1:18 (18") MAXIMUM HEIGHT FROM GROUND ELEVATION TO BOTTOM OF THE RAIL ELEMENT.**
3. **WHEN THE GUIDE RAIL LENGTH OF NEED FALLS NEAR A CUT TO FILL SLOPE, THE PREFERRED TREATMENT IS TO ANCHOR THE GUIDE RAIL TO THE CUT SLOPE.**
4. **THE BACKSLOPE ANCHOR TERMINAL HAS BEEN CRASH TESTED TO ACR (1:2:3:1) SLOPE (NEW CONSTRUCTION).** IT CAN BE ANCHORED WITH A CONCRETE BLOCK OR A POST ANCHOR.
5. **PROVIDE 23' 0" (75' - 0") MINIMUM FROM WHERE THE GUIDE RAIL CROSSES THE SWALE LINE TO THE BEGINNING OF THE HAZARD.**

**NOTE:** EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

GUIDE RAIL
BACKSLOPE
ANCHOR TERMINAL
(NEW CONSTRUCTION OR RECONSTRUCTION)

RECOMMENDED APR 11, 2000
APPROVED APR 26, 2000
SHR 5 OF 7

RC-54M
GENERAL NOTES:
1. A 1:4 (1:14) BACK SLOPE IS DESIRABLE. HOWEVER, STEEPER SLOPES MAY BE USED.
3. USE 24' (8'-0") LONG POSTS FOR ALL POST LOCATIONS WITH A RUB RAIL. POSTS FOR THE POST ANCHOR ARE 18' 6" (6'-0") LONG.
4. WHEN THE GUIDE RAIL LENGTH OF NEED FALLS NEAR A CUT TO FILL SLOPE, THE PREFERRED TREATMENT IS TO ANCHOR THE GUIDE RAIL TO THE CUT SLOPE.
5. THE BACKSLOPE ANCHOR TERMINAL HAS BEEN CRASH TESTED TO NCHRP 350 CRITERIA FOR A 1:6 (6:1) SLOPE [REHAB. PROJECTS] AND A 1:10 (10:1) SLOPE [NEW CONSTRUCTION]. IT CAN BE ANCHORED WITH A CONCRETE BLOCK OR A POST ANCHOR.
6. PROVIDE 23' 0" (7'-0") MINIMUM FROM WHERE THE GUIDE RAIL CROSSES THE SWALE LINE TO THE BEGINNING OF THE HAZARD.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

NOTES

1. PROVIDE CONCRETE MEDIAN BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 623.

2. PROVIDE PRECAST CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR DEVIATIONS OR MODIFICATIONS FROM THE STANDARD, SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL.

3. FOR CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION, USE PREFORMED JOINT MATERIAL AT ALL CONSTRUCTION JOINTS.

4. CONCRETE MEDIAN BARRIER CONSTRUCTION ON EXISTING PAVEMENT REQUIRES SPECIAL DETAILS TO BE SHOWN ON THE CONSTRUCTION DRAWINGS.

5. FOR PERMANENT AND TEMPORARY BARRIER INSTALLATIONS, USE SIDE-MOUNT DELINEATOR OR TOP-MOUNT DELINEATOR (TOP-MOUNT DELINEATOR OR REFLECTOR UNIT) AS DETERMINED ON A PROJECT BY PROJECT BASIS. LOCATE SIDE-MOUNT DELINiators 600 (24") FROM THE PAVEMENT TO THE CENTER OF THE DELINiator. INSTALL TOP-MOUNT DELINiators AS NECESSARY ALONG LONGITUDINAL CENTERLINE OF MEDIAN BARRIER.

6. COMPACT NO. 2A OR NO. 0GS MATERIAL IN ACCORDANCE WITH PUBLICATION 408/2000, SECTION 350. A LAYER 25 THICK OF NON-SHRINK MORTAR MAY BE USED ON TOP OF THE SUBBASE MATERIAL FOR LEVELING PURPOSES. A RIGID BASE MAY BE USED INSTEAD OF SUBBASE.

7. PROVIDE PRECAST CONCRETE MEDIAN BARRIER FOR USE AS TEMPORARY (MPT) AND IN PERMANENT INSTALLATIONS. FOR TEMPORARY INSTALLATIONS, EMBEDMENT IS NOT REQUIRED.

8. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADII OF 25 (1") EXCEPT AS SHOWN.

9. PROVIDE CONCRETE MEDIAN BARRIER FOR USE AS TEMPORARY (MPT) AND IN PERMANENT INSTALLATIONS. FOR TEMPORARY INSTALLATIONS, EMBEDMENT IS NOT REQUIRED.

10. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.

* SEAL JOINTS WITH AN APPROVED JOINT SEALER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE
CAST-IN-PLACE AND PRECAST

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

CONTRACT NO. 2A OR 0G. 500 MATERIAL IN ACCORDANCE WITH PUBLICATION 408/2000, SECTION 350. A LAYER 25 THICK OF NON-SHRINK MORTAR MAY BE USED ON TOP OF THE SUBBASE MATERIAL FOR LEVELING PURPOSES. A RIGID BASE MAY BE USED INSTEAD OF SUBBASE.
1. A TYPICAL ENO TRANSITION MAY BE USED FOR PERMANENT BARRIER INSTALLATIONS ONLY WHEN THE LAST BARRIER SECTION IS LOCATED OUTSIDE THE REQUIRED CLEAR ZONE, AS DETERMINED IN PUBLICATION 13M, DESIGN MANUAL, PART 2, CHAPTER 12.

2. PROVIDE SUITABLE LIFTING DEVICES FOR HANDLING, INSTALLING AND REMOVING PRECAST CONCRETE BARRIER. PROVIDE INERTIAL DEVICES AS SPECIFIED IN PUBLICATION 408/2000, SECTION 1105.02(s).

3. PROVIDE REINFORCEMENT STEEL MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 709 WITH A MINIMUM CONCRETE COVER OF 40 (1 ½") OR LESS, FOR BARRIER INSTALLATIONS.

4. EPOXY COATED REINFORCEMENT IS NOT REQUIRED WHEN PRECAST CONCRETE BARRIER IS TO BE USED IN TEMPORARY INSTALLATION ONLY, IN ACCORDANCE WITH SECTION 627, AND IDENTIFIED AS SUCH, AS SPECIFIED IN PUBLICATION 408/2000, SECTION 709.

5. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
Delineation of Impact Attenuating Devices

NOTES

1. PROVIDE PLATES, 8 x 180 x 685 (3" x 7" x 27"), MEETING THE REQUIREMENTS OF THE SPECIFICATION, SECTION 1103-02, AND METERED IN PUBLICATION 40B/2000, SECTION 1105-02.1. GALVANIZE PLATES AS SPECIFIED IN PUBLICATION 40B/2000, SECTION 1105.02.1.2.

2. PROVIDE VERTICAL RECTANGULAR ALUMINUM, PRESSURE SENSITIVE CLEARANCE MARKERS, W16-2R AND/OR W16-2L, FABRICATED FROM CLASS II SHEETING MATERIAL, FOR DELINEATION OF IMPACT ATTENUATING DEVICES AS PRESENTED IN DETAIL A. ATTACH MARKERS DIRECTLY TO THE LEADING END OF IMPACT ATTENUATING DEVICES. ON INERTIAL BARRIERS (SAND BARRELS), PROVIDE SENSITIVE SHEETING, WITHOUT RIGID BACKING, DIRECTLY TO BARRIER FRONT OR NOSE SECTION. DO NOT POST-MOUNT MARKERS IN FRONT OF IMPACT ATTENUATING DEVICES. MARKERS ARE PROVIDED IN TWO SIZES; 305 x 914 (12" x 36") AND 457 x 914 (18" x 36"). WHEN ONE MARKER IS REQUIRED, USE 457 x 914 (18" x 36"), WHEN TWO MARKERS ARE REQUIRED SIDE BY SIDE, USE 305 x 914 (12" x 36"). PROVIDE COLOR FOR CLEARANCE MARKERS AS FOLLOWS:

(A) MESSAGE: BLACK STRIPES (NON-REFLECTORIZED)
(B) FIELD: YELLOW (REFLECTORIZED) ORANGE (REFLECTORIZED) CONSTRUCTION ZONES

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. PROVIDE REINFORCEMENT MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 709.
2. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

TYPICAL 810 TO 1070 (32" TO 42")
TRANSITION CONSTRUCTION
NOTES
1. PROVIDE REINFORCEMENT MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 100 WITH A MINIMUM CONCRETE COVER OF 40 (1 1/2")
2. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADIUS OF 25 ("1") EXCEPT AS SHOWN.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

TYPICAL 1070 TO 1270 (42" TO 50") TRANSITION CONSTRUCTION
NOTES

1. PROVIDE SINGLE FACE CONCRETE BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 623.

2. PROVIDE PRECAST SINGLE FACE CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. MODIFICATIONS OR DEVIATIONS FROM THE STANDARD REQUIRE THE SUBMISSION OF SHOP DRAWINGS FOR REVIEW.

3. PROVIDE BARRIER-MOUNT OR REFLECTOR UNIT DELIMITERS, AS INDICATED ON RC-57M.

4. PROVIDE REINFORCEMENT FOR SINGLE FACE CONCRETE BARRIER AS INDICATED ON SHEET 2.

5. PROVIDE ENO TRANSITIONS OR IMPACT ATTENUATING DEVICES AS INDICATED ON RC-57M.

6. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.

7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

U.S. CUSTOMARY UNITS IN BRACKETS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SINGLE FACE CONCRETE BARRIER
CAST-IN-PLACE AND PRECAST

TYPICAL PRECAST OR CAST-IN-PLACE SINGLE FACE CONCRETE BARRIER
TYPICAL SINGLE FACE BARRIER SECTIONS

1. PROVIDE PLATES MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 1105. GALVANIZE PLATES AS SPECIFIED IN PUBLICATION 408/2000, SECTION 610. IF THE HEIGHT OR SLOPE IS INCREASED, PROVIDE ALTERNATE CONNECTIONS MAY BE USED AS APPROVED BY THE BUREAU OF DESIGN.

2. WHERE SINGLE FACE CONCRETE BARRIER IS SPECIFIED FOR USE AS A RETAINING WALL AND DRAINAGE TREATMENT IS NECESSARY, CONSTRUCT A PREFORMED WALL AND DRAINAGE TREATMENT IS NECESSARY, CONSTRUCT A PREFORMED GUTTER LINE ALTERNATE CONNECTIONS MAY BE USED AS PERMITTED BY THE BUREAU OF DESIGN.

3. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADIUS OF 25 (1"") EXCEPT AS SHOWN.

SLOTTED PLATE CONNECTION

SLOT DETAIL

SLOT DETAIL

PERMISSIBLE TAPER

PERMISSIBLE TAPER

MAXIMUM AT 3.0 m (10'-0") C TO C

NO, 57 COARSE AGGREGATE

TYPICAL ROUGH ROCK TREATMENT

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SINGLE FACE CONCRETE BARRIER
NOTES

1. PROVIDE SLOTS OR OTHER ACCEPTABLE DEVICES FOR HANDLING, INSTALLING AND REMOVING PRECAST CONCRETE BARRIERS. GALVANIZE METAL DEVICES AS SPECIFIED IN PUBLICATION 408/2000, SECTION 1105.02.

2. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADIUS OF 1½" EXCEPT AS NOTED.

LEGEND

END TRANSITION
SECTION C-C
REINFORCEMENT STEEL
TYPICAL REINFORCEMENT DETAILS FOR 1040 (41") BARRIER

SECTION D-D
END TRANSITION
WELDED WIRE FABRIC

SECTION A-A
REINFORCEMENT STEEL
TYPICAL REINFORCEMENT DETAILS FOR 860 (34") BARRIER

SECTION B-B
WELDED WIRE FABRIC

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SINGLE FACE CONCRETE BARRIER

RC-58M

2. THE TREATMENTS SHOWN ARE FOR FOUR-LANE DIVIDED HIGHWAYS. USE THE APPROACH END TREATMENT ON BOTH SIDES OF THE OBSTRUCTION ON TWO-LANE FACILITIES WITH TWO-WAY TRAFFIC.

3. IF THE PREFERRED TREATMENT IS TO TERMINATE THE CONCRETE BARRIER WITHIN THE CLEAR ZONE, BURY IT INTO THE EXISTING SLOPE, PREFERABLY 1:1 (H:V). IF NOT, USE AN IMPACT ATTENUATING DEVICE.

NOTES


2. THE TREATMENTS SHOWN ARE FOR FOUR-LANE DIVIDED HIGHWAYS. USE THE APPROACH END TREATMENT ON BOTH SIDES OF THE OBSTRUCTION ON TWO-LANE FACILITIES WITH TWO-WAY TRAFFIC.

3. IF THE PREFERRED TREATMENT IS TO TERMINATE THE CONCRETE BARRIER WITHIN THE CLEAR ZONE, BURY IT INTO THE EXISTING SLOPE, PREFERABLY 1:1 (H:V). IF NOT, USE AN IMPACT ATTENUATING DEVICE.

TYPICAL NONCONTINUOUS SINGLE-FACE BARRIER TREATMENT AT PIERS

FOR FLARE RATES SEE TABLE 1.

TYPICAL TREATMENT WHEN CONTINUOUS GUIDE RAIL IS REQUIRED

TABLE 1 PLAN VIEW

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>MAXIMUM FLARE RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Km/h</td>
<td>CONCRETE BARRIER</td>
</tr>
<tr>
<td></td>
<td>GUIDE RAIL</td>
</tr>
<tr>
<td>120</td>
<td>16:1</td>
</tr>
<tr>
<td>110</td>
<td>14:1</td>
</tr>
<tr>
<td>100</td>
<td>12:1</td>
</tr>
<tr>
<td>90</td>
<td>10:1</td>
</tr>
<tr>
<td>80</td>
<td>8:1</td>
</tr>
<tr>
<td>70</td>
<td>6:1</td>
</tr>
<tr>
<td>60</td>
<td>5:1</td>
</tr>
<tr>
<td>50</td>
<td>4:1</td>
</tr>
<tr>
<td>40</td>
<td>3:1</td>
</tr>
<tr>
<td>30</td>
<td>2:1</td>
</tr>
<tr>
<td>20</td>
<td>1:1</td>
</tr>
</tbody>
</table>

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. REFER TO BRIDGE STANDARD DRAWINGS (BD-601M) FOR DETAILS OF CONCRETE MEDIAN BARRIER ACROSS STRUCTURES.
2. THE CONCRETE TRANSITIONS AND BARRIER TAPERS AT PIERS ARE INCIDENTAL TO THE MEDIAN BARRIER.
3. CAST ADDITIONAL VOIDS IN THE TAPERED END SECTIONS MEETING THE REQUIREMENTS PRESENTED IN SECTION D-D.
4. PROVIDE NO. 57 COARSE AGGREGATE THAT MEETS THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 703.2. ALTERNATE SUITABLE GRANULAR MATERIAL MAY BE USED AS FILLER MATERIAL.
5. TO PREVENT INTRUSION OF COARSE AGGREGATE INTO WEEP HOLES, USE WIRE MESH SCREENING, GEOTEXTILES OR OTHER SUITABLE MATERIAL.
6. ROUND OR CHAMFER HORIZONTAL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
### Table 2

<table>
<thead>
<tr>
<th>DESIGN SPEED (km/h)</th>
<th>MAXIMUM FLARE RATES (CONCRETE BARRIER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>175</td>
</tr>
<tr>
<td>110</td>
<td>170</td>
</tr>
<tr>
<td>100</td>
<td>160</td>
</tr>
<tr>
<td>90</td>
<td>150</td>
</tr>
<tr>
<td>80</td>
<td>145</td>
</tr>
<tr>
<td>70</td>
<td>135</td>
</tr>
<tr>
<td>60</td>
<td>130</td>
</tr>
<tr>
<td>50</td>
<td>125</td>
</tr>
</tbody>
</table>

### Notes
1. Provide materials and construction meeting the requirements of Publication 408/2000.
2. All materials necessary to construct earth mounds are in accordance with applicable sections of Publication 408/2000.
3. Earthmounds may be used to bury concrete barriers on highways, with the end treatment designed per Publication 408/2000. Earthmounds are constructed outside the clear zone as determined in Pub. 15 W, Design Manual Part 1, Chapter 12.

### Typical Earth Mound for Burying Concrete Barrier

**Section A-A**
- Shoulder
- Shoulder
- 1.5 m (5'-0") Rounding
- 1.8 m (6'-0") At Termination Point

**Section B-B**
- Shoulder
- Varies
- 1.5 m (5'-0") Rounding

**Section C-C**
- Shoulder
- Varies

Note: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

---

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SINGLE FACE CONCRETE BARRIER
END TREATMENT
burying into earth mound

Recommended APR 28, 2000
Drawn APR 28, 2000
SIT 8 of 8
1. Provide concrete glare screen meeting the requirements of Publication 408/2000, Sections 622 and 714.
2. For installation of glare screen on top of existing concrete median barrier, provide plastic paddles or modular systems supplied by a manufacturer listed in Bulletin 15.
3. For precast barriers, provide slotted plate connections as indicated on RC-57M, Sheet 3.
4. Provide precast concrete glare screen supplied by a manufacturer as listed in Bulletin 15. Modification or deviation from the standard requires the submission of shop drawings for approval.
5. Provide precast concrete glare screen for use as temporary units in permanent installations. For temporary installations, embedment is not required.
6. Epoxy coated reinforcement is not required when precast concrete glare screen is to be used in temporary installations only. In accordance with Section 627, and identified as such, as specified in Section 714.61.
7. Round or chamfer horizontal edges with a radius of 25 (1") except as shown.
8. All dimensions are in millimeters unless otherwise noted. U.S. customary units in ( ) parenthesis.

Notes: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.


NECESSITY FOR GLARE SCREEN IS DEPENDENT ON GEOMETRICS.

SEE TABLE 1.

NOTE 1. PROVIDE BARRIER-MOUNT DELIMITORS, WHEN INDICATED, AS SPECIFIED ON RC-59M, SHEET 1.

FOR ADDITIONAL DETAILS FOR TYPICAL BARRIER TREATMENT AT PIERS, SEE RC-59M, SHEET 1.

FOR ADDITIONAL DETAILS FOR TYPICAL BARRIER TREATMENT AT PIERS, SEE RC-59M, SHEET 1.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE GLARE SCREEN
F-SHAPE

TABLE 1

FLARE RATES FOR BARRIER DESIGN

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Maximum Flare Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>mph to mph</td>
<td>Concrete Barrier</td>
</tr>
<tr>
<td>120</td>
<td>175 : 0.02 : 0.15 : 0.15</td>
</tr>
<tr>
<td>110</td>
<td>160 : 0.02 : 0.14 : 0.14</td>
</tr>
<tr>
<td>100</td>
<td>155 : 0.02 : 0.13 : 0.13</td>
</tr>
<tr>
<td>90</td>
<td>150 : 0.02 : 0.12 : 0.12</td>
</tr>
<tr>
<td>80</td>
<td>145 : 0.02 : 0.11 : 0.11</td>
</tr>
<tr>
<td>70</td>
<td>140 : 0.02 : 0.10 : 0.10</td>
</tr>
<tr>
<td>60</td>
<td>135 : 0.02 : 0.09 : 0.09</td>
</tr>
<tr>
<td>50</td>
<td>130 : 0.02 : 0.08 : 0.08</td>
</tr>
</tbody>
</table>
GENERAL NOTES

1. Construct in accordance with the requirements of Publication 408/2000, Section 624.

2. Fill all depressions greater than 75 (3") and less than 300 (12") with rocks or compacted earth to prevent animals from going under the right-of-way fence.

3. Install concrete posts or drive anchors at maximum intervals of 50 m (160') for all line posts.

4. Place pull posts at angle points in vertical alignment at maximum intervals of 300 (12') between end and/or corner posts in level terrain and/or where directed.

5. All dimensions are in millimeters unless otherwise noted. U.S. customary units in ( ) parenthesis.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TYPE 1 RIGHT-OF-WAY FENCE

NOTE
1. FOR GENERAL NOTES SEE SHEET 1.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

RIGHT-OF-WAY FENCE

TREATMENT AT GROUND DEPRESSIONS
GREATER THAN 300 (11'-0")
FOR TYPES 2 AND 3 RIGHT-OF-WAY FENCE
SEE SHEET 1
R/W FENCE TREATMENT AT HIGH WALLED ABUTMENT

R/W FENCE TREATMENT AT STUB ABUTMENTS

LINE POST
FULL POST
END POST
CORNER POST

DRIVE ANCHOR BLADE (2 REQ'D)
FENCE FABRIC
POST
DRIVE ANCHOR BLADE (4 REQ'D)
FENCE FABRIC
POST
DRIVE ANCHOR BLADE (4 REQ'D)
FENCE FABRIC
POST
DRIVE ANCHOR BLADE (2 REQ'D)
POST

DRIVE ANCHOR DETAILS FOR POST BRACES
ON TYPE 2 AND TYPE 5 R/W FENCE

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

RIGHT-OF-WAY FENCE

R/W FENCE TREATMENT AT CULVERTS

PLACE THE LAST POST WITHIN 150 (5') OF THE WALL AND AT A POINT WHERE THE WALL HEIGHT IS NOT LESS THAN 3.0 (10')-

TABLE A

<table>
<thead>
<tr>
<th>FENCE HEIGHT</th>
<th>MINIMUM BLADE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 (5') OR LESS</td>
<td>25 x 25 x 3 (1&quot; X 1&quot; X (\frac{3}{8}&quot;))</td>
</tr>
<tr>
<td>GREATER THAN 1500 (5') BUT LESS THAN 2130 (7')-0&quot;</td>
<td>32 x 32 x 3 ((\frac{1}{4}&quot; X \frac{1}{4}&quot; X (\frac{3}{8}&quot;)))</td>
</tr>
<tr>
<td>2130 (7')-0&quot; OR GREATER</td>
<td>38 x 38 x 3 (1(\frac{1}{2}&quot;) X 1(\frac{1}{2}&quot;) X (\frac{3}{8}&quot;))</td>
</tr>
</tbody>
</table>

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

RIGHT-OF-WAY FENCE

R/W FENCE TREATMENT AT CULVERTS

PLACE THE LAST POST WITHIN 150 (5') OF THE WALL AND AT A POINT WHERE THE WALL HEIGHT IS NOT LESS THAN 3.0 (10')-

TABLE A

<table>
<thead>
<tr>
<th>FENCE HEIGHT</th>
<th>MINIMUM BLADE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 (5') OR LESS</td>
<td>25 x 25 x 3 (1&quot; X 1&quot; X (\frac{3}{8}&quot;))</td>
</tr>
<tr>
<td>GREATER THAN 1500 (5') BUT LESS THAN 2130 (7')-0&quot;</td>
<td>32 x 32 x 3 ((\frac{1}{4}&quot; X \frac{1}{4}&quot; X (\frac{3}{8}&quot;)))</td>
</tr>
<tr>
<td>2130 (7')-0&quot; OR GREATER</td>
<td>38 x 38 x 3 (1(\frac{1}{2}&quot;) X 1(\frac{1}{2}&quot;) X (\frac{3}{8}&quot;))</td>
</tr>
</tbody>
</table>

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

RIGHT-OF-WAY FENCE

R/W FENCE TREATMENT AT CULVERTS

PLACE THE LAST POST WITHIN 150 (5') OF THE WALL AND AT A POINT WHERE THE WALL HEIGHT IS NOT LESS THAN 3.0 (10')-

TABLE A

<table>
<thead>
<tr>
<th>FENCE HEIGHT</th>
<th>MINIMUM BLADE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 (5') OR LESS</td>
<td>25 x 25 x 3 (1&quot; X 1&quot; X (\frac{3}{8}&quot;))</td>
</tr>
<tr>
<td>GREATER THAN 1500 (5') BUT LESS THAN 2130 (7')-0&quot;</td>
<td>32 x 32 x 3 ((\frac{1}{4}&quot; X \frac{1}{4}&quot; X (\frac{3}{8}&quot;)))</td>
</tr>
<tr>
<td>2130 (7')-0&quot; OR GREATER</td>
<td>38 x 38 x 3 (1(\frac{1}{2}&quot;) X 1(\frac{1}{2}&quot;) X (\frac{3}{8}&quot;))</td>
</tr>
</tbody>
</table>

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

RIGHT-OF-WAY FENCE

R/W FENCE TREATMENT AT CULVERTS

PLACE THE LAST POST WITHIN 150 (5') OF THE WALL AND AT A POINT WHERE THE WALL HEIGHT IS NOT LESS THAN 3.0 (10')-

TABLE A

<table>
<thead>
<tr>
<th>FENCE HEIGHT</th>
<th>MINIMUM BLADE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 (5') OR LESS</td>
<td>25 x 25 x 3 (1&quot; X 1&quot; X (\frac{3}{8}&quot;))</td>
</tr>
<tr>
<td>GREATER THAN 1500 (5') BUT LESS THAN 2130 (7')-0&quot;</td>
<td>32 x 32 x 3 ((\frac{1}{4}&quot; X \frac{1}{4}&quot; X (\frac{3}{8}&quot;)))</td>
</tr>
<tr>
<td>2130 (7')-0&quot; OR GREATER</td>
<td>38 x 38 x 3 (1(\frac{1}{2}&quot;) X 1(\frac{1}{2}&quot;) X (\frac{3}{8}&quot;))</td>
</tr>
</tbody>
</table>

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
WOOD PANEL - STEEL POSTS

DETAIL A

CLASS I, CLASS I-A OR CLASS II REFLECTIVE MATERIAL APPLIED TO 0.063" X 10" ALUMINUM BLANK AND FASTENED TO WOOD PLANKS. SEE NOTE 1, SHEET 1.

LENGTH OF BARRICADE

- 50 ROUND HEAD WOOD OR LAG SCREWS, 20+X4" LONG, TOP AND BOTTOM
- ALTERNATE RED AND WHITE STRIPES, TRAFFIC SIDE ONLY, SEE NOTE 1, SHEET 1.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PERMANENT BARRICADES
WOOD PANEL

DATE: 04/20/2000
REF.
SHT 2 OF 2

RC-63M
CONTRACTION JOINT

TYPICAL CROSS SECTION

PLAIN CEMENT CONCRETE CURB

PLAIN CEMENT CONCRETE GUTTER

NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION WORKING FOR THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 630 FOR PLAIN CEMENT CONCRETE CURB AND DEPRESSED CURB, SECTION 640 FOR PLAIN CEMENT CONCRETE GUTTER AND SECTION 641 FOR PLAIN CEMENT CONCRETE CURB GUTTER.

2. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS.

3. PLACE ALL JOINTS TWO PLANKS OR TWO PLANKS PLUS EXPANSION JOINT MATERIAL AT THE CROSS SECTIONAL POINTS."¢" WHERE CURB AND GUTTER ARE ADJACENT TO CURB OR TO CONFORM TO CROSS SECTIONAL AREA OF GUTTER.

4. SEE SECTION FOR PLAIN CEMENT CONCRETE CURB SLOPED 4" UNDER 1.5 m (5'-0") GUTTER WIDTH.

5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
CURBS AND GUTTERS

DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER

RECOMMENDED APR. 7, 2000
RECOMMENDED APR. 8, 2000
SHT 1 OF 1
RC-64M
NOTES
2. INSTALL TYPE M INLET WITH CONCRETE MOUNTABLE CURBS AND LOCATE INLET AS SHOWN ON THE DRAWING. MAKE THE BACKSLOPE TRaversable IN THE AREA OF THE INLET AS INDICATED.
3. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS AND SEAL AS SPECIFIED IN PUBLICATION 408/2000, SECTION 501.3(n).
4. PLACE PREMOLDED EXPANSION JOINT FILLER MATERIAL 20 (3") THICK AT STRUCTURES AND AT THE END OF THE WORK DAY. CUT MATERIAL TO CONFORM TO AREA ADJACENT TO CURB OR TO CONFORM TO CROSS-SECTIONAL AREA OF CURB.
5. PROVIDE FLONIGATED ISLANDS NOT LESS THAN 1.2 (4')-9") WIDE AND 6.0 (20')-0") LONG, EXCEPT IN SPECIAL CASES WHERE SPACE IS SEVERELY LIMITED.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

TYPICAL CONSTRUCTION

CONCRETE MOUNTABLE CURB ON EXISTING CONCRETE PAVEMENT AND BRIDGE DECKS

1. PROVIDE ELONGATED ISLANDS NOT LESS THAN 1.2 (4')-0") WIDE AND 6.0 (20')-0") LONG, EXCEPT IN SPECIAL CASES WHERE SPACE IS SEVERELY LIMITED.

END DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MOUNTABLE CURBS

TYPICAL DIVISOR AREA

TREATMENT FOR CONCRETE MOUNTABLE CURBS AT INLETS
NOTES


2. DESIGN AND DRAF TRAFFIC SEPARATOR PAVEMENT AT MAINLINE TRANSVERSE JOINTS WITH A MINIMUM SEPARATOR PAVEMENT WIDTH OF 0.154 (6") AND A MAXIMUM WIDTH OF 0.601 (24").

3. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS SUCH THAT A CONTINUOUS TRANSVERSE JOINT IS FORMED ACROSS MAINLINE, SEPARATOR, AND RAMP PAVEMENTS.

4. FORM JOINTS IN CORE AREA CONNECTING MAINLINE AND RAMP TRANSVERSE JOINTS SUCH THAT ANGLES LESS THAN 80° ARE AVOIDED IN CORE PAVEMENT WHERE POSSIBLE.

5. PLACE 13.05 (4") PREMOLORED EXPANSION JOINT FILLER MATERIAL AT STRUCTURES AND AT THE END OF THE WORK AREA, TO CONFORM TO AREA ADJACENT TO CURB OR CROSS SECTIONAL AREA.

6. DO NOT NULL RUMBLE STRIPS ACROSS A JOINT.

7. WHEN RAMP OR LANE WIDTH EXCEEDS 4.2 m (14-6"), A TYPE L JOINT IS REQUIRED AT THE WORKPOINT.

8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS (IN PARENTHESES).

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
**NOTES**

1. Provide materials and construction meeting the requirements of Publication 40B/2000, Sections 420, 421, 422, 630 and 676.
2. Provide expansion joint material, 1/2" thick where curb ramp adjoins any rigid pavement, sidewalk or structure with the top of joint filler flush with adjacent concrete surface.
3. If pedestrian crosswalks are not wide enough to provide minimum 1220 (4' - 0") wide wheelchair overrun zone at the bottom of the ramp, position crosswalks as indicated in Detail A.
4. Seal joints with an approved sealing material.
5. Provide slip resistant texture on curb ramp by course brooming transverse to the slope of the ramp. Extend texture the full width and length of the curb ramp including flared side ramps.
6. Modify construction details to adapt dimensions to existing curb alterations where the curb is less than the standard 200 (8") height.
7. Curb ramp and side flared lengths are variable and based on curb height and the sidewalk pitch. See Table A (Sheet 2) for typical ramp dimensions.
8. Measure and pay for depressed curb in accordance with Publication 40B/2000, Section 676.
9. When possible, construct the transition slope from the curb ramp and plane side to adjoining surfaces with a gradual curve rather than an abrupt angle.
10. Construct built-up curb ramp of bituminous material as indicated, including surface preparation and tack coat, as required.
11. All dimensions are on millimeters unless otherwise noted. U.S. customary units in parenthesis.
Table A

<table>
<thead>
<tr>
<th>Rise of Ramp</th>
<th>Max Ramp Slope</th>
<th>Normal Ramp Length</th>
<th>Side Plane Dimension at Curb</th>
<th>Side Plane Dimension at Curb</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 1/12 1/12</td>
<td>1000 13'-0&quot;</td>
<td>150 12'-0&quot;</td>
<td>900 13'-0&quot;</td>
<td>900 13'-0&quot;</td>
</tr>
<tr>
<td>100 1/13 1/13</td>
<td>1200 13'-0&quot;</td>
<td>160 12'-0&quot;</td>
<td>1000 13'-0&quot;</td>
<td>1000 13'-0&quot;</td>
</tr>
<tr>
<td>150 1/14 1/14</td>
<td>1500 13'-0&quot;</td>
<td>190 12'-0&quot;</td>
<td>1200 13'-0&quot;</td>
<td>1200 13'-0&quot;</td>
</tr>
<tr>
<td>175 1/15 1/15</td>
<td>1750 13'-0&quot;</td>
<td>210 12'-0&quot;</td>
<td>1500 13'-0&quot;</td>
<td>1500 13'-0&quot;</td>
</tr>
<tr>
<td>200 1/16 1/16</td>
<td>2000 13'-0&quot;</td>
<td>230 12'-0&quot;</td>
<td>1750 13'-0&quot;</td>
<td>1750 13'-0&quot;</td>
</tr>
<tr>
<td>225 1/17 1/17</td>
<td>2250 13'-0&quot;</td>
<td>250 12'-0&quot;</td>
<td>2000 13'-0&quot;</td>
<td>2000 13'-0&quot;</td>
</tr>
<tr>
<td>250 1/18 1/18</td>
<td>2500 13'-0&quot;</td>
<td>270 12'-0&quot;</td>
<td>2250 13'-0&quot;</td>
<td>2250 13'-0&quot;</td>
</tr>
<tr>
<td>275 1/19 1/19</td>
<td>2750 13'-0&quot;</td>
<td>290 12'-0&quot;</td>
<td>2500 13'-0&quot;</td>
<td>2500 13'-0&quot;</td>
</tr>
<tr>
<td>300 1/20 1/20</td>
<td>3000 13'-0&quot;</td>
<td>310 12'-0&quot;</td>
<td>2750 13'-0&quot;</td>
<td>2750 13'-0&quot;</td>
</tr>
</tbody>
</table>

Note: Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

Commonwealth of Pennsylvania
Department of Transportation

Bureau of Design

Curb Ramps

RC-67M

Director, Bureau of Design

M. M. McCall, Chief Engineer
1. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 735 AND FURNISH AND INSTALL IN ACCORDANCE WITH SECTION 212.

2. PROVIDE GEOTEXTILE MATERIAL ALONG ALL INTERFACE AREAS WITH GROUND CONTACT.

3. ROCK SIZE AS PER DESIGN DRAWINGS. NOMINAL PLACEMENT THICKNESS AS PER PUBLICATION 408/2000, SECTION 850.

4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.

5. ROCK LINING ELEVATION, EXTEND ABOVE THE DESIGN FLOW ELEVATION.

6. FINISHED SLOPE, AS REQUIRED.

7. CLASS 2, TYPE A GEOTEXTILE MATERIAL, SEE NOTE 2.

8. PIPE ENDS TREATED, AS REQUIRED.

9. ROCK BASIN

10. SECTION B-B SECTION C-C

11. ROCK ENERGY DISSIPATOR

12. PAVED ENERGY DISSIPATOR

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
EROSION AND SEDIMENT POLLUTION CONTROL
TOE OF SLOPE DISCHARGE INTO A STABILIZED CHANNEL OR ON A TEMPORARILY PROTECTED AREA, SEE DETAIL A.

1.8 m (6'-0") TYPICAL ANCHORING POST

ANCHORING POST

CLASS 3 GEOTEXTILE MATERIAL

COMPACTED EXCAVATED SOIL

DIRECTION OF FLOW

EMBANKMENT SLOPE OR EXISTING GROUND LINE

SEEN DETAIL B FOR EMBEDMENT DETAILS.

1.8 m (6'-0") TYPICAL

ANCHORING POST

CLASS 3 GEOTEXTILE MATERIAL

DIRECTION OF FLOW

EMBANKMENT SLOPE OR EXISTING GROUND LINE

SEEN DETAIL B FOR EMBEDMENT DETAILS.

SITBARRIERFENCE

ROCK BARRIER

EXISTING GROUND LINE (OR EXISTING GROUND LINE)

TABLE B

SILT BARRIER FENCE 

GEOTEXTILE SELECTION

<table>
<thead>
<tr>
<th>TYPE OF CLASS</th>
<th>NOMINAL FABRIC HEIGHT</th>
<th>MAX POST SPACING WITHOUT MESH SUPPORT</th>
<th>MAX POST SPACING WITH MESH SUPPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>450 (18&quot;)</td>
<td>0.4 m (1'-2&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3A</td>
<td>750 (30&quot;)</td>
<td>2.4 m (7'-10&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3B</td>
<td>450 (18&quot;)</td>
<td>1.2 m (4'-0&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3B</td>
<td>750 (30&quot;)</td>
<td>1.2 m (4'-0&quot;)</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA = NOT APPLICABLE

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
SILT BARRIER FENCE FOR INLET PROTECTION

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION AND SEDIMENT POLLUTION CONTROL

NOTE:
1. UPON ESTABLISHMENT OF SUITABLE SOIL STABILIZATION AND AT THE DIRECTION OF THE ENGINEER, REMOVE BARRIERS AND ENDMARKERS FROM ENDWALLS AND ENDMARKERS OF THE CONTRACTOR.
2. CLEAN THE BASIN AND PERIODICALLY DEPOSIT OF SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

CLASS 3, TYPE B GEOTEXTILE MATERIAL. SEE SHEET 2 AND PUBLICATION 408/2000, SECTION 865 FOR ADDITIONAL SILT BARRIER FENCE DETAILS.

LOCATION OF SILT BARRIER FENCE TO PREVENT THE INFILTRATION OF FINE OR SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

TEMPORARY BERM OR DIKE (MAY BE ALTERED TO BE USED AS PERMANENT FACILITY AS REQUIRED FOR DRAINAGE PURPOSES)

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION AND SEDIMENT POLLUTION CONTROL

NOTE:
1. UPON ESTABLISHMENT OF SUITABLE SOIL STABILIZATION AND AT THE DIRECTION OF THE ENGINEER, REMOVE BARRIERS AND ENDMARKERS FROM ENDWALLS AND ENDMARKERS OF THE CONTRACTOR.
2. CLEAN THE BASIN AND PERIODICALLY DEPOSIT OF SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

CLASS 3, TYPE B GEOTEXTILE MATERIAL. SEE SHEET 2 AND PUBLICATION 408/2000, SECTION 865 FOR ADDITIONAL SILT BARRIER FENCE DETAILS.

LOCATION OF SILT BARRIER FENCE TO PREVENT THE INFILTRATION OF FINE OR SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

TEMPORARY BERM OR DIKE (MAY BE ALTERED TO BE USED AS PERMANENT FACILITY AS REQUIRED FOR DRAINAGE PURPOSES)

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION AND SEDIMENT POLLUTION CONTROL

NOTE:
1. UPON ESTABLISHMENT OF SUITABLE SOIL STABILIZATION AND AT THE DIRECTION OF THE ENGINEER, REMOVE BARRIERS AND ENDMARKERS FROM ENDWALLS AND ENDMARKERS OF THE CONTRACTOR.
2. CLEAN THE BASIN AND PERIODICALLY DEPOSIT OF SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

CLASS 3, TYPE B GEOTEXTILE MATERIAL. SEE SHEET 2 AND PUBLICATION 408/2000, SECTION 865 FOR ADDITIONAL SILT BARRIER FENCE DETAILS.

LOCATION OF SILT BARRIER FENCE TO PREVENT THE INFILTRATION OF FINE OR SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

TEMPORARY BERM OR DIKE (MAY BE ALTERED TO BE USED AS PERMANENT FACILITY AS REQUIRED FOR DRAINAGE PURPOSES)

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

EROSION AND SEDIMENT POLLUTION CONTROL

NOTE:
1. UPON ESTABLISHMENT OF SUITABLE SOIL STABILIZATION AND AT THE DIRECTION OF THE ENGINEER, REMOVE BARRIERS AND ENDMARKERS FROM ENDWALLS AND ENDMARKERS OF THE CONTRACTOR.
2. CLEAN THE BASIN AND PERIODICALLY DEPOSIT OF SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

CLASS 3, TYPE B GEOTEXTILE MATERIAL. SEE SHEET 2 AND PUBLICATION 408/2000, SECTION 865 FOR ADDITIONAL SILT BARRIER FENCE DETAILS.

LOCATION OF SILT BARRIER FENCE TO PREVENT THE INFILTRATION OF FINE OR SEDIMENTS INTO THE INLET BOX. IF NO BACKFILL OPERATIONS ARE PERFORMED, LOCATE THE SILT BARRIER FENCE OUTSIDE THE AREA EXCAVATED FOR THE INLET BOX.

TEMPORARY BERM OR DIKE (MAY BE ALTERED TO BE USED AS PERMANENT FACILITY AS REQUIRED FOR DRAINAGE PURPOSES)
CONSTRUCT THE BERM HIGHER THAN THE TOP OF INLET.

FINISHED GRADE

CLASS 1 EXCAVATION

450 (18") TO 600 (24") FLATTER

600 CLASS 3 , TYPE B GEOTEXTILE MATERIAL LAYER OF NO. 57 ROCK TO SECURE FABRIC.

75 (3") DIRECTION OF FLOW 0.4 (4") 0.6 (4.5") 1.2 (5") 1.6 (6") 2.0 (6.5") 3.0 (9") 4.0 (12") 5.0 (15") 6.0 (18") 8.0 (24")

EXCAVATED INLET SEDIMENT TRAP

SECTION A-A

SEEN TABLE B, SHEET 5 , FOR GEOTEXTILE SELECTION.

EXCAVATION (OPTIONAL) - - - - -

SECTION A-A

A.5 X 150 (6' X 50") TRENCH, EXTEND FABRIC 200 TO 100 (8' TO 12") INTO EXCAVATED TRENCH

SECTION B-B

150 X 150 (6' X 50") TRENCH, EXTEND FABRIC 200 TO 100 (8' TO 12") INTO EXCAVATED TRENCH

SECTION B-B

SECTION D-D

GRATE CONVEYER Belt - •

SECTION D-D

CONCRETE BLOCKS PLACED AROUND WIRE SCREEN TO PREVENT MOVEMENT OF GRAVEL

SECTION D-D

GRAVEL FILTER FOR AREA INLET

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
EROSION AND SEDIMENT POLLUTION CONTROL

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
EROSION AND SEDIMENT POLLUTION CONTROL

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
A FORM 150 t 6") BELOW GROUND LEVEL. BELOW THIS DESIGN.

SLOPE, 1:2 (2:1) MAX., DESIGNED FOR 9.1 m (30'-0") MAXIMUM ARM LENGTH. SEE TYPE A POLE BASE FOUNDATION DETAILS FOR ADDITIONAL TYPE S POLE BASE FOUNDATION REQUIREMENTS. 1.5 m (5'-0") MIN LONG CHORD DETAIL FOR TYPE A POLE BASE FOR FILL SECTION.

FOR FOUNDATION DIMENSIONS, SEE TYPE A LIGHTING POLE MANUFACTURER'S SPECIFICATIONS. FOR FUNDAMENTAL FREQUENCY AND NATURAL FREQUENCY BENDS, SEE NOTE 4. FOR COMPLETE FOUNDATION DETAILS, SEE TABLE A.

FOR INSTALLATION IN CONVENTIONAL LIGHTING POLES, PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 408/2000, SECTIONS 910 AND 1101.

LEVEL TOP OF FORMS IN BOTH DIRECTIONS, LEVEL TOP OF THE FOUNDATION, ANCHOR BOLT, OR STUB OF BREAKAWAY DEVICE, WHICHEVER IS HIGHER, MEASURED FROM ADJACENT CONDUIT BUSHING. 25 < 1" FROM THE TOP OF THE FOUNDATION.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTES

1. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 408/2000, SECTION 910, AND 1101.2.

2. USE JB-1 AND JB-2 JUNCTION BOXES IN LOCATIONS SUBJECT TO LOADS HEAVIER THAN PEDESTRIAN TRAFFIC. USE JB-11 AND JB-12 JUNCTION BOXES IN OTHER LOCATIONS AS SHOWN ON RC-82M.

3. PROVIDE PRECAST CONCRETE JUNCTION BOXES SUPPLIED BY A MANUFACTURER LISTS IN UNIFORM BUILDING CODE (UBC). SUBMIT REPRODUCIBLE SHOP DRAWING TO THE BUREAU OF CONSTRUCTION AND MATERIALS, MATERIALS AND TESTING DIVISION FOR REVIEW.

4. PROVIDE POSITIVE DRAINAGE FOR A BULLETIN 15 LISTING, SUBMIT REPRODUCIBLE SHOP DRAWING TO THE BUREAU OF CONSTRUCTION AND MATERIALS, MATERIALS AND TESTING DIVISION FOR REVIEW.

5. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 408/2000, SECTION 910, AND 1101.2.

6. PROVIDE CENTERLINE OF THE ROADWAY AND CONNECTING ANY POINT WITHIN THE WIDTH OF THE ROAD EXTENDING TO THE GROUND SURFACE ON BOTH SIDES OF THE JUNCTION BOX.

7. THE CONDUIT LOCATIONS SHOWN REPRESENT NORMAL POSITIONS. FOR CAST-IN-PLACE OR PRECAST CONSTRUCTION, WHEN TWO OR THREE CONDUITS ARE INDICATED ON THE SAME VERTICAL FACE, SPACE CONDUITS AT 150 (6") C TO C AND SYMMETRICAL ABOUT THE CENTERLINE OF THE BOX. AS INDICATED IN DETAIL B, IF FULL WALL THICKNESS BETWEEN OPENINGS IS REQUIRED.

8. PROVIDE POSITIVE DRAINAGE 38 - 50 1 1/2" X 2" NONMETALLIC CONDUIT FOR JUNCTION BOXES WHEN FEASIBLE. PROVIDE RODENT PROOF DRAIN. SEE NOTE 5, RC-82M.

9. PROVIDE POSITIVE DRAINAGE FOR A BULLETIN 15 LISTING, SUBMIT REPRODUCIBLE SHOP DRAWING TO THE BUREAU OF CONSTRUCTION AND MATERIALS, MATERIALS AND TESTING DIVISION FOR REVIEW.

10. PROVIDE AS A MINIMUM TYPICAL KNOCKOUTS FOR PRECAST BOXES.

11. GROUND EXPOSED METAL PARTS OF JUNCTION BOXES. DO NOT CONNECT GROUND ROD DIRECTLY TO LID.

12. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

13. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.


15. PROVIDE POSITIVE DRAINAGE FOR A BULLETIN 15 LISTING, SUBMIT REPRODUCIBLE SHOP DRAWING TO THE BUREAU OF CONSTRUCTION AND MATERIALS, MATERIALS AND TESTING DIVISION FOR REVIEW.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

HIGHWAY LIGHTING
JUNCTION BOXES-LIGHT DUTY
CAST-IN-PLACE OR PRECAST

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
LOCATE THE ALTERNATE TRENCH AT MIDDLE OF SHOULDER. "IN SPACED, 25 MIN " MIN DEPTH 1.7m (5'-6" l, FITTING. CONTROL CABINET CONDUIT TO POLE CLAMP. ENTRY FROM THE TRAFFIC ACTION SIDE OF POLE. CONDUIT TO POLE CLAMP. INSTALL CONDUIT TO PERMIT DRAINAGE TOWARDS NEAREST EARTH JUNCTION BOX AS APPLICABLE. PROVIDE PERMANENT MARKING TAPE IN THE LAST LIFT FOR THE ENTIRE TRENCH LENGTH.

CABLE AND CONDUIT MARKER

CLASS A CONCRETE

PHOTOELECTRIC CONTROL CABLE IN TRENCH MARKER TYPE

WEATHERHEAD SECONDARY RACK

CLAMP CONDUIT TO POLE

CONDUIT ON FAR SIDE OF POLE TYPE 0.6" CONDUIT FITTING

EXOTHERMIC WELD OR BRONZE CONNECTOR

SIDE VIEW

FINISHED GRADE

TO ROADWAY LIGHTING GROUND ROG 130 x 2.4 m 1/8" GROUND WIRE THRU GROUND LUG PROVIDED IN TRANSFORMER BASE AND RUB TO NEUTRAL, WIRE FOR TRANSFORMER TYPE BREAKAWAY BASE.

GROUND ROG 130 x 2.4 m 1/8" GROUND WIRE THRU GROUND LUG PROVIDED IN TRANSFORMER BASE AND RUB TO NEUTRAL, WIRE FOR TRANSFORMER TYPE BREAKAWAY BASE.

WIRING DETAIL

NOTES

1. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 408/2000, SECTIONS 910 AND 1101.

2. PROVIDE METERED ELECTRIC SERVICE EXCEPT WHERE DEPARTMENT APPROVED SPECIAL UNMETERED ENERGY ONLY RATE IS AVAILABLE.

3. MAKE SPLICES WITH WELDING, DISCONNECTABLE CONNECTOR KIT. PROVIDE SPLICES WITH TIES FOR TAPS TO LUMINAIRES FOR CONVENTIONAL LIGHTING. CONNECT THE GROUND TO THE NEUTRAL WITH A SPLIT BOLT CONNECTOR AND COAT WITH CORROSION PROHIBITOR.

4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TIE ATTACHMENTS AS SPECIFIED — 150 (6") TRUNK PROTECTOR <DECIDUOUS TREES ONLY>

---

TREE PLANTING DETAILS

SLOPE PLANTING DETAILS FOR
DECIDUOUS AND EVERGREEN TREES
USE TYPE 2 OR TYPE 3 BRACING, AS REQUIRED.

PLANTING DETAILS

BRACING DETAILS

ELEVATION VIEW
TYPE 3 BRACING
FOR DECIDUOUS TREES
1.5 m (5'-0") TO
4-11/2" CALIPER

ELEVATION VIEW
TYPE 2 BRACING
FOR DECIDUOUS TREES
1.5 m (5'-0") TO
4 1/2" CALIPER

WEED CONTROL MAT OR WEED BARRIER MAT, WHEN INDICATED.

CRUSHED NO. 67 GRADATION AGGREGATE FOR MULCH.

DO NOT PLACE WEED BARRIER MAT IN THE PIT FOR TREES TO BE PLANTED IN UNMOWED AREAS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN
BRACING AND PLANTING DETAILS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

BRACING AND PLANTING DETAILS

NOTES

1. USE MOUNDS CONSISTING OF SOIL MATERIAL FROM THE PIT EXCAVATION FOR ALL TREES AND FOOD (MATERIAL TO 1") OR LARGER TO ANY CONDITION, USE SOIL MATERIAL FREE OF ALL STONES AND FOREIGN MATERIAL 50 (2") OR LARGER IN ANY DIRECTION.

2. SET TOP OF ROOT BALL 25 (1") TO 50 (2") HIGHER THAN SURROUNDING GROUND WHERE MOUNDS ARE USED.

3. ATTACH TIES TO THE TREE AT A POINT NOT LESS THAN 50% OF THE HEIGHT OF THE TREE.

4. PROVIDE TREE PROTECTOR DIAMETERS AS FOLLOWS:

   150 (6") DIAMETER OR 150 (6") SQUARE FOR TREES 100 (4") CALIPER AND UNDER.

   300 (12") DIAMETER OR 300 (12") SQUARE FOR TREES OVER 100 (4") CALIPER.

   USE PLASTIC PROTECTOR DEVICES OR HARDWARE CLOTH PROTECTORS IN UNMOWED AREAS.

5. FOR NORMALLY WET SOIL CONDITIONS PROVIDE BACKFILL MIX COMPOSED OF TOPSOIL ONLY, AS DETERMINED BY THE ENGINEER.

6. ANCHOR MULCH BARIER MAT FOR TREE PILLS WITH A MINIMUM OF THREE U-SHAPED STAPLES SPACED EQUALLY AROUND THE TREE. ANCHOR MULCH BARIER MAT FOR SHRUB AREAS WITH U-SHAPED STAPLES SPACED 24" TO 36" AT THE EDGES OF THE MAT AND ALONG ALL OVERLAPS OF THE MAT MATERIAL. OR AS DIRECTED.

7. SPACE ROOT CONTACT FERTILIZER PACKETS EQUALLY AROUND THE BALL OR ROOTS AND SPACE 150 (6") TO 200 (8") DEEP. PLACE FERTILIZER TABLETS AT THE ROOT ZONE APPROXIMATELY 75 (3") TO 100 (4") DEEP.

8. DO NOT PLACE WEED BARRIER MAT IN THE PIT FOR TREES TO BE PLANTED IN UNMOWED AREAS. USE CRUSHED NO. 67 GRADATION AGGREGATE FOR MULCH.


10. ALL DIMENSIONS ARE IN MILLI METERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESIS.

---

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
**Table A**

<table>
<thead>
<tr>
<th>BRACING TYPE</th>
<th>TREE SIZE</th>
<th>MINIMUM POST LENGTH</th>
<th>STAKE BRACE TYPE</th>
<th>REQUIRED POST SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1.2m TO 1.8m HT (4'-0&quot; TO 6'-0&quot;)</td>
<td>2.0m (6'-0&quot;)</td>
<td>CHANNEL BAR</td>
<td>0.57 kg x 15/8&quot; POST H2-1</td>
</tr>
<tr>
<td>2</td>
<td>1.2m TO 1.8m HT (4'-0&quot; TO 6'-0&quot;)</td>
<td>2.0m (6'-0&quot;)</td>
<td>CHANNEL BAR</td>
<td>0.57 kg x 15/8&quot; POST H2-1</td>
</tr>
<tr>
<td>2</td>
<td>1.2m TO 1.8m HT (4'-0&quot; TO 6'-0&quot;)</td>
<td>2.0m (6'-0&quot;)</td>
<td>CHANNEL BAR</td>
<td>0.57 kg x 15/8&quot; POST H2-1</td>
</tr>
<tr>
<td>2</td>
<td>1.2m TO 1.8m HT (4'-0&quot; TO 6'-0&quot;)</td>
<td>2.0m (6'-0&quot;)</td>
<td>CHANNEL BAR</td>
<td>0.57 kg x 15/8&quot; POST H2-1</td>
</tr>
<tr>
<td>2</td>
<td>1.2m TO 1.8m HT (4'-0&quot; TO 6'-0&quot;)</td>
<td>2.0m (6'-0&quot;)</td>
<td>CHANNEL BAR</td>
<td>0.57 kg x 15/8&quot; POST H2-1</td>
</tr>
</tbody>
</table>

**Table B**

<table>
<thead>
<tr>
<th>TREE SIZE</th>
<th>NUMBER OF PACKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDER 25 (1&quot;) CALIPER</td>
<td>1</td>
</tr>
<tr>
<td>25 (1&quot;) TO 50 (1&quot;) CALIPER</td>
<td>2</td>
</tr>
<tr>
<td>50 (2&quot;) TO 60 (2&quot;) CALIPER</td>
<td>3</td>
</tr>
<tr>
<td>60 (2&quot;) TO 90 (2&quot;) CALIPER</td>
<td>4</td>
</tr>
<tr>
<td>90 (2&quot;) TO 120 (2&quot;) CALIPER</td>
<td>5</td>
</tr>
<tr>
<td>120 (2&quot;) TO 150 (2&quot;) CALIPER</td>
<td>6</td>
</tr>
</tbody>
</table>

**Table C**

<table>
<thead>
<tr>
<th>TREE SIZE</th>
<th>NUMBER OF PACKETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 m/5'-0&quot; TO 5.0 m/16'-0&quot;</td>
<td>5</td>
</tr>
<tr>
<td>1.5 m/5'-0&quot; TO 5.0 m/16'-0&quot;</td>
<td>5</td>
</tr>
<tr>
<td>1.5 m/5'-0&quot; TO 5.0 m/16'-0&quot;</td>
<td>5</td>
</tr>
<tr>
<td>1.5 m/5'-0&quot; TO 5.0 m/16'-0&quot;</td>
<td>5</td>
</tr>
</tbody>
</table>

**Table D**

<table>
<thead>
<tr>
<th>TREE SIZE</th>
<th>TIE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TREES UNDER 2.7 CALIPER</td>
<td>MIN. 33 11/32&quot; x 33 11/32&quot;</td>
</tr>
<tr>
<td>TREES 2.7 CALIPER OR LARGER</td>
<td>MIN. 33 11/32&quot; x 33 11/32&quot;</td>
</tr>
</tbody>
</table>

**Table E**

<table>
<thead>
<tr>
<th>PLANT HEIGHT</th>
<th>NO. OF CARTONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 TO 300 (1')</td>
<td>1</td>
</tr>
<tr>
<td>300 TO 600 (2')</td>
<td>2</td>
</tr>
<tr>
<td>600 TO 900 (3')</td>
<td>3</td>
</tr>
</tbody>
</table>

**Notes:** Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.

**Planting Method B**

**Seedling Material & Seedling Transplants**

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**Bracing and Planting Details**

**Preparations:**

1. **Prepare Plant Pit**
   - Wide enough to install root system and gel water carton.
   - **Bottom of Plant Cut-Up**

2. **Mix Time-Release Water Carton**
   - **Bottom of Plant Cut-Up**

**PLANTING METHOD B**

**Seedling Material & Seedling Transplants**

**Note:** Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.