COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARDS FOR ROADWAY CONSTRUCTION
SERIES RC-1M TO 100M

APRIL 2004 EDITION
OS-299 (8-72)  

TRANSMITTAL LETTER 

Publication 72M  

April 2004 Edition  

DATE: April 15, 2004  

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

APRIL 2004 EDITION  

INFORMATION AND SPECIAL INSTRUCTIONS:  

The enclosed April 2004 Edition of the Standards for Roadway Construction represents a complete Metric and English combined publication. This Edition supersedes the April 2000 Edition and all subsequent changes. The new standard drawings should be adopted as soon as possible on all new and existing designs without affecting any Letting schedules and in conjunction with the current Publication 408 Specifications and Bridge Standards. PS&E submissions to Central Office after July 15, 2004, should use these new standards. 

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

The major revisions for each Standard Drawing are presented below. Since minor changes are not indicated, it is strongly advised that all recipients thoroughly examine the changes and revisions incorporated in this new edition. 

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>SHEET</th>
<th>DESCRIPTION OF CHANGES</th>
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<tbody>
<tr>
<td>RC-11M</td>
<td>(1 of 2)</td>
<td>&quot;Elevation&quot; was changed to &quot;Section&quot; in the Typical Structure Elevation.</td>
</tr>
<tr>
<td>RC-20M</td>
<td>(1 of 3)</td>
<td>The depth dimension on Detail D was revised from 32 (1 1/4&quot;) to 35 (1 3/8&quot;) to the bottom of the reservoir.</td>
</tr>
<tr>
<td>RC-28M</td>
<td>(1 of 1)</td>
<td>Details were added to this standard for a &quot;Longitudinal Notched Wedge Joint&quot; including Table B.</td>
</tr>
<tr>
<td>RC-30M</td>
<td>(4 of 5)</td>
<td>Revised details to indicate that concrete pipes installed with 14.9M (49&quot;) of cover or more to have a minimum bedding of 300 (12&quot;) and 400 (16&quot;) when rock is present. Also added Note 8.</td>
</tr>
<tr>
<td>RC-39M</td>
<td>(4 of 6)</td>
<td>A &quot;Precast Manhole With Flat Top&quot; title was added to this sheet.</td>
</tr>
<tr>
<td>RC-50M</td>
<td>(All sheets)</td>
<td>Revised Note 1.</td>
</tr>
<tr>
<td>RC-52M</td>
<td>(1 of 6)</td>
<td>Item E: The design formula MPa was changed to RN/M3. It was an incorrect metric conversion.</td>
</tr>
<tr>
<td>RC-57M</td>
<td>(All sheets)</td>
<td>Revised bridge to highway transitions to meet minimum 20:1 taper recommended in the Roadside Design Guide. Transition section length is now 4500 (15'-0&quot;) minimum and may also be constructed using two 2250 (7'-6&quot;) sections or two 3600 (12'-0&quot;) sections.</td>
</tr>
</tbody>
</table>

The backing plate was removed in the "W-Beam Rail Element" detail. 

The dimensions in the barrier typical sections were revised slightly to be consistent between Metric and English values and the Bridge Standards. These minor revisions have no effect on the shape of the barrier. 

Revised bridge to highway transitions to meet minimum 20:1 taper recommended in the Roadside Design Guide. Transition section length is now 4500 (15'-0") minimum and may also be constructed using two 2250 (7'-6") sections or two 3600 (12'-0") sections. 

Same as RC-57M 

Same as RC-57M
New details and typical sections were added to RC-67M to provide detectable warning truncated domes. These domes are used to alert people with vision impairments of their approach to streets and hazardous drop-offs. The ADA Accessibility Guidelines require these warnings on the surface of curb ramps. The requirements were temporarily suspended in 1994. However, the suspension expired on July 26, 2001. Consequently, the requirements are again part of ADA Accessibility Guidelines. Also, the number of sheets was increased from two (2) to three (3) for RC-67M.

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APPROVED FOR ISSUANCE BY:
Allen D. Riehler, P.E.
Secretary of Transportation

by:

Gary J. Hoffman, P.E.
Deputy Secretary
for Highway Administration
# Standard Drawings for Roadway Construction

## Earthwork

<table>
<thead>
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<th>Drawing Date</th>
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<td>APR 15, 2004</td>
<td>Classification of Earthwork</td>
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<tr>
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<td>Pay Limit of Subbase</td>
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## Pavements

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<td>Overlay Transitions and Paving Notches</td>
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## Guide Rail and Median Barrier

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## Pollution Control

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## Highway Lighting

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## Roadside Development and Planting

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<td>RC-91W (12 Sheets)</td>
<td>APR 15, 2004</td>
<td>Gracing and Planting Details</td>
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</table>
**ROCK CUTS**

- **L** = LENGTH OF SLOPE
- **T** = 3.0'-0" (10'-0") OR GREATER.
- **E** = **C**/2

**APPLY ABOVE VALUES FOR ROUNDING THE TOP OF SLOPES OF DRAINAGE SWALES, CHANNELS, DITCHES AND PARALLEL DITCHES.**

- **EXCEPT IN HARD ROCK WITHOUT OVERBURDEN,** AND EXCEPT AS INDICATED ON CONTOUR GRADING AND DRAINAGE PLANS, OR CROSS SECTIONS.

**GROUND LINE**

**NORMAL CUT**

- **ROUNDING OF CUT SLOPES**
- **E** = ABOVE VALUES

**THE CONTRACTOR SHALL OBTAIN WRITTEN AUTHORIZATION FROM THE ENGINEER AND MAKE HIS OWN ARRANGEMENTS FOR OBTAINING ALL BORROW AND WASTE AREAS AND PAY ALL COSTS INVOLVED.**

**EXCAVATION ADJACENT TO ROADWAY IN LIEU OF COMMON BORROW EXCAVATION**

**FOR ROUNDING DETAILS, SEE ROUNDING OF CUT SLOPES.**

**ROADWAY SECTION SHOWING CLASS 1 EXCAVATION**

- **SLOPE AS INDICATED ON THE CROSS-SECTIONS.**
  - **FOR BOTTOM WIDTHS > 2.5'-0" (0.8 m), EXCAVATION IS CLASS 1.**
  - **PAY LIMITS FOR COMMON BORROW EXCAVATION AS INDICATED ON CROSS-SECTIONS.**

**NORMAL SURFACE OF CUT OR EMBANKMENT SLOPE**

**EXCAVATION**

- **FOR REMOVING DETAILS, SEE ROUNDINGS OF CUT SLOPES.**

**NOTES**

1. **ALLOW NO PAYMENT FOR EXCAVATION IN EXCESS OF SPECIFIED LIMITS AND FOR ADDITIONAL BORROW MATERIAL REQUIRED.**
2. **ALL DIMENSIONS ARE GIVEN IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.**
3. **EXCAVATION FOR PIPE AND PIPE-ARCH WITH > 6'-0" (1.8 m) SPAN IS CLASS 1 EXCAVATION.**

**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**
**BUREAU OF ENGINEERING**

**CLASSIFICATION OF EARTHWORK**

- **NOTE:** EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
GRADE OF HIGHWAY PROPOSED RAILROAD

PROPOSED SUBGRADE ELEVATION OF PROPOSED LOWER ROADWAY OR RAILROAD

SUBGRADE ELEVATION OF PROPOSED LOWER ROADWAY OR RAILROAD

NOTE:

1. FOLLOW OSHA SAFETY REQUIREMENTS IN ALL EXCAVATION WORK. PROVIDE SCAFFOLDING, SHORING, ETC. TO NEARLY HORIZONTAL CHEMICAL EXCAVATION, SHORED CONSTRUCTION, ETC., UNLESS OTHERWISE NOTED. U.S. CUSTOMARY PROVISION.

2. LIMITS FOR ADDITIONAL BACKFILL MATERIAL REQUIRED.

3. DO THE TOTAL EXCAVATION TO FINISHED GRADE OR BOTTOM OF EXCAVATION TO START OF LAYBACK SLOPE. IF THE TOTAL EXCAVATION DEPTH EXCEEDS 3000, START WITH THE SHORING OR SCAFFOLDING REQUIRED FOR GEOTECHNICAL BACKFILL MATERIAL REQUIRED.

4. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS UNLESS OTHERWISE NOTED, IN CUSTOMARY UNITS IN PARENTHESES.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

CLASSIFICATION OF EARTHWORK FOR STRUCTURES

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 EXCAVATION, INCLUDING THE PORTIONS OF ENUWALLS 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 1 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 1 EXCAVATION CONFORMING TO THE AREA SHOWN WITH THE CLASS 3 EXCAVATION SYMBOL.


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

5. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS EXPCEPT AS NOTED. U.S. CUSTOMARY UNITS IN PARENTHESES.
TYPICAL CROSS SECTIONS - ABUTMENTS ON FILL

TYPICAL CROSS SECTIONS - ABUTMENTS IN CUT

LEGEND

- Structure Backfill
- Embankment Material

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

BACKFILL AT STRUCTURES

Backfill & Embankment Construction at Structures

NOTE: See Sheet 2 for general notes.

Foundation Preparation for RC Box and Arch Culverts on Fine Grain Soil Only

Note: Excavate the last 600 (2 ft) with bucket without teeth to keep the foundation firm. For culverts with span less than 7500 18'-0", bottom may be sloped in one direction.

Backfill at Structures

Recommended APR. 15, 2004

Director, Bureau of Design

Backfill & Embankment Construction at Structures

Rev. 1, OP-2. 5/25/95
GENERAL NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUB 408. 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, SECTION 850.2(a); AASHTO NO. 1, 3, 5 OR 57 COARSE AGGREGATES, MEETING AT LEAST THE TYPE C QUALITY REQUIREMENTS IN PUBLICATION 408M, SECTION 703.2, TABLE B; OR TYPE OGS COARSE AGGREGATE, MEETING AT LEAST THE TYPE C QUALITY REQUIREMENTS IN PUBLICATION 408, SECTION 703.2, TABLE B; MEASURE AND PAY STRUCTURE BACKFILL AS SELECTED BORROW EXCAVATION-STRUCTURE BACKFILL. DO NOT USE R-3 FOR STRUCTURE BACKFILL FOR ANY TYPE RC OR METAL PLATE CULVERT. PLACE A CLASS 2, TYPE B GEOTEXTILE BLANKET AS A BARRIER BETWEEN THE STRUCTURE BACKFILL AND EXCAVATION/EMBANKMENT MATERIAL. PLACE A CLASS 2, TYPE B GEOTEXTILE BLANKET ON ENTIRE TOP OF THE COMPLETED STRUCTURE BACKFILL PRIOR TO PLACING ANY SUBBASE MATERIAL FOR THE ROADWAY. THE GEOTEXTILE IS CONSIDERED INCIDENTAL TO THE SELECTED BORROW EXCAVATION STRUCTURE BACKFILL AND WILL NOT BE PAID FOR SEPARATELY.

3. TREAT BACKFILL LIMITS AT RETAINING WALLS AND WINGWALLS FOR CULVERTS THE SAME AS FLARED ABUTMENT WINGWALLS.

4. TREAT BACKFILL CONSTRUCTION AT RC BOX CULVERTS WITH THE TOP SLAB AT ROADWAY GRADE THE SAME AS ABUTMENTS.

5. TREAT BACKFILL CONSTRUCTION AT SPHERICAL WHERE THE TOP OF THE CULVERT IS NEAR SUBGRADE, AS SHOWN ON THE STRUCTURE DRAWINGS OR AS DIRECTED BY THE ENGINEER.

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

7. REFER TO STRUCTURE DRAWINGS FOR DRAINAGE DETAILS, WEEP HOLES, ETC.

8. MEASURE AND PAY STRUCTURE BACKFILL QUANTITIES ON THE STRUCTURE DRAWINGS.

9. MEASURE AND PAY EMBANKMENT QUANTITIES IN MILLIMETERS UNLESS OTHERWISE NOTED.

10. PLACE BACKFILL WITHIN 600 mm (24") FROM THE REAR FACE OF THE ABUTMENT AND THE WINGWALL IN LIFTS OF 100 mm (4") COMPACT EACH LAYER WITH TWO PASSES OF A WALK-BEHIND VIBRATORY PLATE SOIL COMPACTOR.

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

BACKFILL AT STRUCTURES
SHOULDER PAVEMENT

PAY LIMIT OF SUBBASE

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 ( ) 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

PAY LIMIT OF SUBBASE

RECOMMENDED APR. 15, 2004
DIRECTOR, BUREAU OF DESIGN

RC-13M
CONCRETE PAVEMENT JOINTS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

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

JOINT DETAIL

NOTES

1. PLACE A TUBE FROM A MANUFACTURER LISTED IN BULLETIN 15 IN THE LOCATION OF THE JOINT TO ASSEMBLE THE JOINT BACKING MATERIAL AS SHOWN IN DETAIL C.

2. USE MINIMUM NO. 32 x 450 (1 1/4 " x 18") LONG DOWEL BARS FOR PAVEMENT DEPTHS 250 (10") OR LESS AND MINIMUM NO. 38 x 450 (1 1/2 " x 18") LONG DOWEL BARS FOR PAVEMENT DEPTHS GREATER THAN 250 (10"). USE MINIMUM NO. 32 x 450 (1 1/4 " x 18") LONG DOWEL BARS FOR HOT POUR JOINTS.

3. SAW DEPTHS OF NEOPRENE SEALS:

<table>
<thead>
<tr>
<th>SEAL SIZE</th>
<th>SAW CUT DEPTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 (1&quot;)</td>
<td>50 ± 25 (1&quot;&quot;)</td>
</tr>
<tr>
<td>10 (3/8&quot;)</td>
<td>75 ± 25 (1&quot;&quot;)</td>
</tr>
</tbody>
</table>

4. ALLOW SAW DEPTHS FOR JOINTS AS SHOWN IN DETAIL D.

5. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

6. WHEN SILICONE JOINT SEALING MATERIAL, AS SPECIFIED IN PUBLICATION 408, SECTION 105.4.1, IS SELECTION FOR USE IN TRANSVERSE JOINTS TYPE P ONLY IN TRANSVERSE JOINTS, USE THE SAME JOINT SEALING MATERIAL IN THE LONGITUDINAL JOINTS ALTERNATE TYPE L AND ALTERNATE LONGITUDINAL SHOULDER JOINTS.

7. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

8. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

9. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

10. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

11. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

12. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

13. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. FOR VARIABLE WIDTH PAVEMENT CUT THE REINFORCEMENT AS REQUIRED.

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

3. PROVIDE Longitudinal Wires for Wire Fabric Reinforcement of the Following Minimum Size:

   - Pavement Depth
   - Minimum Wire Size

<table>
<thead>
<tr>
<th>Pavement Depth</th>
<th>Minimum Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 (8')</td>
<td>250 (10')</td>
</tr>
<tr>
<td>280 (11')</td>
<td>200 (8')</td>
</tr>
<tr>
<td>300 (12')</td>
<td>250 (10')</td>
</tr>
<tr>
<td>350 (13')</td>
<td>300 (12')</td>
</tr>
</tbody>
</table>

4. Wire fabric reinforcement may be placed with transverse wires above or below longitudinal wires.

5. Provide longitudinal wires for wire fabric reinforcement of the following minimum sizes:

   - Pavement Depth
   - Minimum Wire Size

<table>
<thead>
<tr>
<th>Pavement Depth</th>
<th>Minimum Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 (8')</td>
<td>250 (10')</td>
</tr>
<tr>
<td>280 (11')</td>
<td>200 (8')</td>
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<tr>
<td>300 (12')</td>
<td>250 (10')</td>
</tr>
<tr>
<td>350 (13')</td>
<td>300 (12')</td>
</tr>
</tbody>
</table>

6. Mixed fabric reinforcement may be used. Have hinge detail approved by the Engineer.

7. Securely tie all longitudinal and transverse laps of wire fabric reinforcement.

8. See RC-20M for joint details.

9. Provide a minimum depth for placement of wire fabric reinforcement, measured from top of pavement to top of fabric at 60 (2½') to a maximum of one half the pavement depth minus 15 (6’).

10. When the ramp or lane width exceeds 4.2 (14'), a Type J Joint is required at the midpoint.

11. All dimensions are in millimeters unless otherwise noted. U.S. Customary Units in (1) parenthesis.

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
REINFORCED CONCRETE PAVEMENT
SECTION A-A

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

NOTE:
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-20M.
3. WHEN CONSTRUCTION INVOLVES MORE THAN 2 LANES, CONNECT ADDITIONAL LANES TO STANDARD 2 LANE BRIDGE APPROACH SLAB USING TYPE L CONSTRUCTION JOINTS, AS SHOWN ON RC-20M, SHEET 2.
4. INSTALL NEOPRENE COMPRESSION SEALS TO A UNIFORM DEPTH WITH TOP OF THE SEAL FROM 6 (1/4") TO 10 (¾") DEEP. MAKE THE TOP EDGES OF THE CONTACT SURFACES ON BOTH SIDES OF THE SEAL AT THE SAME ELEVATION.
5. EXCEED "d" BY ADDING 20 (¾") 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 A6B, SECTION 709.1(c).
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN ( ) PARENTHESES.
430 (17") DEEP ADJACENT COMPOSITE BOX BEAMS
WITH 230 (9") DEEP APPROACH SLAB NOTCH

230 (9") MINIMUM WITHOUT CAMBER
100 (4") MIN SLAB

PRESTRESSED
BOX BEAM,
230 (9") MIN AND OVER

515 (16") APPROACH SLAB

PITCH-OUT
SLAB

HAUNCH

PRESTRESSED
BOX BEAM
230 (9") MIN AND OVER

END OF BEAM

SPREAD BOX BEAMS WITH APPROACH SLAB NOTCH 230 (1 1/2") OR DEEPER

290 (11 1/2") MINIMUM
WITHOUT CAMBER
190 (7 1/2") MIN SLAB

PRESTRESSED
BOX BEAM
290 (11 1/2") MIN AND OVER

ELEVATION

280 (11 3/4") MINIMUM WITHOUT CAMBER
100 (4") MIN SLAB
PRESTRESSED
BOX BEAM,
280 (11 3/4") MIN AND OVER

TILT HOOK TO MAINTAIN PROPER CLEARANCE.

JOINT DETAILS,
SEE SHEET 1.

330 (13") MIN

BOND BREAKER, 2-Ply B/IT. PAPER

125 (5") MIN

210 (8") MIN

ONO APPROACH SLAB

END OF BEAM

230 (9") MIN

DIAPHRAGM
230 (9") MIN

330 (13") MIN

250 (10") MIN

125 (5") MIN

410 (16") APPROACH SLAB

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 408, SECTION 709.1(e).

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

RECOMMENDED APR 15, 2004
RECOMMENDED APR 17, 2004
SHR 2 OF 2

DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER

PUBLIC WORKS DEPARTMENT
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

RECOMMENDED APR 15, 2004
RECOMMENDED APR 17, 2004
SHR 2 OF 2

DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER

PUBLIC WORKS DEPARTMENT
BUREAU OF DESIGN

BRIDGE APPROACH SLAB

RECOMMENDED APR 15, 2004
RECOMMENDED APR 17, 2004
SHR 2 OF 2

DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER
NOTES:

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

2. ORIENT THE EDGE OF THE APPROACH SLAB PARALLEL TO THE INTEGRAL ABUTMENT FOR BRIDGE SKEWS LESS THAN 80.5 DEGREES (6:1 SLOPE)


4. MAKE THE TOP OF THE JOINT SEALING MATERIAL FROM 3/16" TO 6/16" BELOW THE SURFACE OF THE PAVEMENT.

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

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 HES.

3. EXCLUDE PORTIONS OF REINFORCING BASE WHICH ARE LOCATED OUTSIDE THE INDICATED PAY LINES IN BID PRICE FOR PAVEMENT RELIEF JOINT.

4. WHEN THE PAVEMENT GRADE CAUSES DRAINAGE TOWARDS THE BRIDGE, PLACE A SUBGRADE GRADE (LEAST 5% TOWARDS BRIDGE) AND THE 150 (6") PORTION OF THE SUBSLAB. MEASURE AND PAY FOR AS SPECIFIED IN SUBSLAB, SECTION 412.

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. IF THE DISTANCE TO THE NEAREST JOINT IS LESS THAN 3.0 m (10'), REMOVE THE EXISTING PAVEMENT TO THE JOINT.

8. ALL DIMENSIONS ARE IN MILLI METERS 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.

SCHEDULE OF REINFORCEMENT STEEL

<table>
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<tr>
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<th>SPACING</th>
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<td>3.2 x 10 (3')</td>
<td>2/0.3</td>
</tr>
<tr>
<td>B</td>
<td>1/2 (6)</td>
<td>300 (12')</td>
<td>W-100 (4')</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>1/2 (6)</td>
<td>150 (6')</td>
<td>2.0 x 10 (6')</td>
<td>3/0.6</td>
</tr>
<tr>
<td>D</td>
<td>1/2 (6)</td>
<td>300 (12')</td>
<td>W-100 (4')</td>
<td>7</td>
</tr>
</tbody>
</table>

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

PAVEMENT RELIEF JOINT

FROM COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF DESIGN

RECOMMENDED APR. 15, 2004

DIRECTOR, BUREAU OF DESIGN

RC-24M
NOTES

1. CONSTRUCT BASE AS SPECIFIED IN PUBLICATION 408, SECTION 350.3 AND CONSIDER AS PART OF THE SHOULDERS.

2. CONSIDER THE PAYMENT FOR THIS AREA OF SUBBASE MATERIAL INCIDENTAL TO THE SHOULDERS.

3. MAX DEPTH OF SHOULDERS TO COMPLEMENT DEPTH OF SURFACE AND BASE COURSE.

4. SLIDE SHOULDER AT 4.01/2" FOR EFFECTIVE SHOULDER WIDTHS < 2.4' W/1

5. SLIDE SHOULDER AT 4.01/2" FOR EFFECTIVE SHOULDER WIDTHS > 2.4' W/1.

6. FOR EFFECTIVE SHOULDER WIDTHS > 2.4' W/1 AND LESS, PAY OUT-TO-OUT OF SHOULDER WITH FULL DEPTH ROADWAY PAYMENT.

7. FOR SHOULDERS THAT SPECIFY RUMBLE STRIPS INSTALLATION, USE ONLY BITUMINOUS WEARING COURSE, 12-2 OR 12-3, OR SUPERPAVE, 9.5mm OR 12.5mm, HMA WEARING COURSE, 40 (11/2") DEPTH MINIMUM.

8. WHEN INSTALLING RUMBLE STRIPS ON A TYPE 1-F OR TYPE 1-SP SHOULDER, CONSTRUCT THE ROADWAY/SHOULDER JOINT AT THE BEGINNING OF THE EFFECTIVE SHOULDER, OR HAVE FULL DEPTH INTO THE EFFECTIVE SHOULDER FAR ENOUGH SO THAT THE RUMBLE STRIPS ARE NOT CONSTRUCTED OVER THE LONGITUDINAL JOINT.

9. SHOULDER PAY QUANTITIES ARE INCLUDED IN MAINLINE ITEMS FOR SECTION 409 OF PUB 408 PAVING ITEMS.

10. SHOULDER PAY QUANTITIES ARE INCLUDED IN MAINLINE ITEMS FOR SECTION 409 OF PUB 408 PAVING ITEMS.

SHOULDER ROUNDING ON HIGH SIDE OF SUPERELEVATED CURVES.

TYPE 1 SHOULDER
- TYPE 1-F SHOULDER
- TYPE 1-I SHOULDER
- TYPE 1-S SHOULDER
- TYPE 1-SP SHOULDER

TYPE 3 SHOULDER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SHOULders

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
PAVEMENT
EXISTING OR WIDENED
(10"
EXISTING MATERIAL
EXISTING SHOULDER PROPERLY PREPARED SURFACE, 250 TO 300
WITH BITUMINOUS TAPER SHOULDER WEDGE
TO 12"
EXISTING PAVEMENT
PAVED SHOULDERS
TYPICAL SHOULDER DETAIL
VARIABLE WIDTH
BIT. SURF. TREATMENT- DEPTH AS SHOWN ON THE NOTE
OR, SPECIFIED
SHOULDER PAY LIMIT
SEE NOTE 5
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
SHOULDER (RECONSTRUCTED)
NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES
MUST BE USED ON PLANS. METRIC AND
ENGLISH VALUES SHOWN MAY NOT BE MIXED.
SHOULDER (RECONSTRUCTED)
CONCRETE SHOULDERS ADJACENT TO PLAIN
CONCRETE PAVEMENT FOR COLLECTORS AND LOCAL ROADS

CONC SHOULDER - TYPE 1
CONCRETE SHOULDER
CONCRETE PAVEMENT
EXPANSION JOINTS
REINFORCEMENT AT OPENINGS

SECTION A-A

CONCRETE SHOULDER - TYPE 2
CONCRETE SHOULDER
CONCRETE PAVEMENT
EXPANSION JOINTS
REINFORCEMENT AT OPENINGS

SECTION B-B

TYPICAL SECTIONS

NOTES:

1. SPECIFY THE AGGREGATE BASE AS IN PUBLICATION FOR SECTION 302.5 AND CIRCULAR INCENTIVE TO THE SHOULDER.
2. SEAL ALL SHOULDER JOINTS IN ACCORDANCE WITH PUBLICATION AND SECTION 302.5.7.
3. FOR JOINT DETAILS, SEE RC-20M.
4. A 150mm (6") SHOULDER TRANSVERSE JOINTS TO ADJACENT STRUCTURE.
5. FOR THE SHEET,d. "W", FOR SHOULDER Rounding Detail
6. FOR THE CONTRACTOR'S OPTION, TYPE 2 CONCRETE SHOULDER MUST BE CONSTRUCTED IN 1' X 6" WIDE BANDS, WITH A 3/4" EDDY PIPE NYLON CONCRETE JOINT 10 AT THE END OR THE END OF THE CONTRACT.
7. ADDITIONAL DRAWINGS TO THE DEPARTMENT.
8. TYPICALLY, DO NOT PLACE TIE BARS OR TIE BOLTS ON EITHER SIDE OF INTERMEDIATE SHOULDER JOINTS ADJACENT TO RCC PAVEMENT.
9. WHEN THE SHOULDER IS STRUCTURALLY PART OF A PARAPET BLOCK, USE DETAILS "6.0" PARAPET/FLUSH/BLOCK ON AN MSE WALL.
10. SHOULDER JOINTS DECKED WITH CARPET, OR INTERMEDIATE SHOULDER JOINTS MUST BE COVERED WITH CARPET.
11. SEE SHEETS 4 AND 5 FOR RAMP STRIP DETAILS.
12. FOR USE ON FULL DEPTH CONCRETE SHOULDERS, SHOULDER PAVING QUANTITIES ARE INCLUDED IN MAINLINE ITEMS FOR SECTION ON 350.

NOTE: EITHER 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

SHOULDERS

SHOULDER RELIEF JOINTS

SECTION B-B

REMARKS

APR. 15, 2004
CHIEF ENGINEER RC-25M
DEPARTMENT OF TRANSPORTATION
COMMONWEALTH OF PENNSYLVANIA
TYPICAL PLAN VIEW FOR
RUMBLE STRIPS ON BITUMINOUS SHOULDERS

PAY LIMIT FOR
RUMBLE STRIPS

PAY LIMIT FOR RUMBLE STRIPS

RUMBLE STRIP PATTERN

TYPICAL PLAN VIEW FOR
RUMBLE STRIPS ON CONCRETE SHOULDERS

ACCELERATION LANE DETAIL
FOR RUMBLE STRIP INSTALLATION

DECELERATION LANE DETAIL
FOR RUMBLE STRIP INSTALLATION

SECTION DETAILS OF:
RUMBLE STRIP PATTERN

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
SHOULDERS
RUMBLE STRIPS
(LIMITED ACCESS HIGHWAYS)

RECOMMENDED APR. 15, 2001
RECOMMENDED APR. 15, 2001
SHEETS 1 OF 2
RC-25M
1. Shoulder rumble strips for free access highways are considered on a project-by-project basis as indicated on the construction plans.

2. Construct rumble strip in accordance with Publication 406, Section 660.

3. Do not construct shoulder rumble strips across a joint.

4. 300 ±13 (12") for left (median) shoulders, 450 ±13 (18") for right shoulders ≥ 9.1 m (30 ft). For right shoulders < 9.1 m (30 ft), see construction plans for offset dimension.

5. If there is no actual pavement shoulder joint, measure the offset from the pavement shoulder traffic line.

6. 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

SHOULDSR
RUMBLE STRIPS
(FREE ACCESS HIGHWAYS)

RECOMMENDED APR. 15, 2004
RECOMMENDED APR. 15, 2004

ART SERIES
SEALANTS
**Notes**

1. If there is no actual pavement shoulder joint, measure from the pavement shoulder traffic line.
2. Do not construct shoulder rumble strips across a joint.
3. Construct rumble strips in accordance with publication for section heel.
4. Space constructing joints in uniform lengths by sections such that a continuous transverse joint is formed across mainline, separator, and ramp pavements.
5. Form joints in gore area connecting mainline and ramp transition points over part angle less than 80° are avoided in gore pavement where possible.

**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**

**SHOULDERS**

**RUMBLE STRIPS (CORE AREA)**

**RECOMMENDED APR. 15, 2004**

**SMART RECOMMENDED APR. 15, 2004**

**REV. D OCT. 2004**

**G. J. K. & I. I.**
TYPICAL PAVEMENT PATCHING JOINT

SECTION A-A

LEGEND

1. WHEN ANY PATCH PATTERN REQUIRES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PARTITION JOINT OR NEAR THE PATCHING JOINT. INSTALL JOINT STABILIZER ON THE REMAINING EXPANSION JOINT. PLACE AN APPROVED TUBE HAVING A MINIMUM 1-1/2 IN (25 MM) CLEARANCE POCKET OVER THE LUBRICATED END OF ALL DOWEL BARS IN THE NEW EXPANSION JOINT.

2. WHEN ANY PATCH PATTERN REQUIRES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PATCHING JOINT OR THE NEW PAVEMENT JOINT. DO NOT INSTALL JOINT STABILIZER OR TUBE ON THE REMAINING EXPANSION JOINT.

3. WHEN ANY PATCH PATTERN REQUIRES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT IN AN ADJACENT LANE REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PATCHING JOINT OR THE NEW PAVEMENT JOINT. DO NOT INSTALL JOINT STABILIZER OR TUBE ON THE REMAINING EXPANSION JOINT.

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

5. WHEN ANY PATCH PATTERN REQUIRES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PATCHING JOINT OR THE NEW PAVEMENT JOINT. DO NOT INSTALL JOINT STABILIZER OR TUBE ON THE REMAINING EXPANSION JOINT.

6. WHEN ANY PATCH PATTERN REQUIRES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PATCHING JOINT OR THE NEW PAVEMENT JOINT. DO NOT INSTALL JOINT STABILIZER OR TUBE ON THE REMAINING EXPANSION JOINT.

7. WHEN ANY PATCH PATTERN REQUIRES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PATCHING JOINT OR THE NEW PAVEMENT JOINT. DO NOT INSTALL JOINT STABILIZER OR TUBE ON THE REMAINING EXPANSION JOINT.

8. WHEN ANY PATCH PATTERN REQUIRES AN EXISTING EXPANSION JOINT AND THE EXISTING EXPANSION JOINT REMAINS IN PLACE, INSTALL EXPANSION JOINT MATERIAL IN THE PATCHING JOINT OR THE NEW PAVEMENT JOINT. DO NOT INSTALL JOINT STABILIZER OR TUBE ON THE REMAINING EXPANSION JOINT.

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
WREHOUSE OF PRINTING

RECOMMENDED APR. 15, 2004

CHIEF ENGINEER

SHEET RC-25M
NOTE 1.

1. Remove 510 (20") Min by hand for tied splices. Remove 200 (8") Min by hand for welded splices.

2. Overlap tied splices by at least 30 bar diameters. Overlap welded splices by 150 (6").

3. Remove pavement full depth under retained reinforcement bars.

4. Minimum distance from patch edge to existing crack in CIP pavement is 600 (24").

5. When transverse spacing of longitudinal reinforcing bars is other than 150 (6") C TO C, match existing reinforcement.

6. Make the top of the joint sealing material from 3 (1/8") to 6 (1/4") below the pavement surface.

NOTES

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 150 - 6" 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)

RECOMMENDED APR. 15 '20
JOINT REHABILITATION

NOTES
1. EXISTING STEEL PLATE IS EITHER 2.01 THICK (14 GAUGE) WITH LAPPED TOP OR FLAT PLATE 3 (1/4") THICK.
2. REMOVE THE STEEL PLATE WITHIN THE SEALANT RESERVOIR.
3. MAKE THE TOP OF THE JOINT SEALING MATERIAL FROM 3 (1/4") TO 6 (1/4") BELOW THE SURFACE OF THE PAVEMENT.

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
(JOINTS)

STAFF OF D.E.

RECOMMENDED APR. 15, 2004

RECOMMENDED APR. 12, 2004

DIRECTOR, BUREAU OF DESIGN

She steward

RC-26M
1. FOR JOINT DETAILS, SEE RC-20M.
2. CONSTRUCT TYPE D JOINTS ON INTERSTATE, EXPRESSWAY, ARTIFICIAL AND RAMP PAVEMENTS.
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 RAMP GORE.
5. CONSTRUCT TYPE P JOINT, AS INDICATED, ON COLLECTORS AND LOCAL ROADS.
6. USE A 1.5m (15') JOINT SPACING ON ALL PAVEMENTS.
7. ON CURVES, THE JOINT SHALL BE CONSTRUCTED PERPENDICULAR TO THE TANGENT ON THE LONG RADIUS SIDE OF THE CURVE.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN () PARENTHESES.
APPLY TACK COAT, AS INDICATED

OVERLAY TRANSITION WITH PAVING NOTCH ON CONCRETE AND BITUMINOUS PAVEMENTS

ORIGINAL PAVEMENT
PLACEMENT
OVERLAY
APPLICATION
OVERLAY
APPLY TACK COAT, AS INDICATED

RETRACTABLE PAVING NOTCH TO THE WEARING COURSE

EXISTING PAVEMENT

APPLICATION

APPLY TACK COAT, AS INDICATED

OVERLAY TRANSITIONS

PLAN VIEW

SUPERELEVATION SECTION

TANGENT SECTION

OVERLAY TRANSITIONS

L: FIRST PASS OF PLACED HMA

DEPTH OF COMPACTED NOTCH
12.5 TO 19
1/4 TO 12

WEDGE THICKNESS AT EDGE
NOMINAL MAXIMUM AGGREGATE SIZE

LONGITUDINAL NOTCHED WEDGE JOINT

NODES:

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 404, SECTION 404.3.3.

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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

OVERLAY TRANSITIONS AND PAVING NOTCHES

RECOMMENDED APR. 15, 2004

DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER RC-28M
PREFABRICATED PAVEMENT BASE DRAIN
(REHABILITATION)

NOTE:
1. PROVIDE MATERIALS AND CONSTRUCTION WRITING THE REQUIREMENTS OF PUBLICATION NO. 494, SECTION 610 FOR PAVEMENT BASE DRAIN, SECTION 612 FROM SUBSURFACE DRAINS AND SECTION 602 FOR COMBINATION STORM SEWER AND UNDERDRAIN.

2. PROVIDE藝術 MATERIAL WHEN GEOTEXTILE MATERIAL IS NOT INDICATED.

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

NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION WRITING THE REQUIREMENTS OF PUBLICATION NO. 494, SECTION 610 FOR PAVEMENT BASE DRAIN, SECTION 612 FROM SUBSURFACE DRAINS AND SECTION 602 FOR COMBINATION STORM SEWER AND UNDERDRAIN.

2. PROVIDE藝術 MATERIAL WHEN GEOTEXTILE MATERIAL IS NOT INDICATED.

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

1. PIPELINE MATERIALS AND DIMENSIONS AS SPECIFIED IN PUBLICATION NO. 406, SECTION 601 FOR INSIDE DIAMETER OF PIPE, SECTION 602 FOR METAL PLATE CULVERTS.

2. SHORING OR TRENCH BOX INSTALLATION IS NOT NORMALLY USED FOR PIPE EXCAVATION. WHEN INSTALLATION IS PERMITTED IN SPECIFIED AREAS, REFER TO PUBLICATION NO. 408, SECTION 601.3 FOR ADDITIONAL GUIDELINES.

3. PAY LIMITS FOR EXCAVATION ARE BASED ON THE LAYBACK SLOPE OF THE EXCAVATION.

4. PIPELINE MATERIALS AND DIMENSIONS SHOWN MAY NOT BE MIXED.

5. FOR OUTER OR OUTLET PROTECTION, SEE DETAIL A.
PIECE INSTALLATION PROCEDURES

CONSTRUCTION DETAILS ARE GIVEN UNDER THE FOLLOWING CONDITIONS:

1. PIPE LAYING ON TOP OF THE NATURAL GROUND, ROCK OR COMPACTED FILL

2. THE EXISTING GROUND IS BETWEEN TOP 10 DEG. AND THE PIPE IS TO BE COVERED WITH EARTH FILL

3. THE TOP 10 DEG. OF THE NATURAL GROUND OR COMPACTED FILL IS TO BE COVERED WITH 600 MM (24") OF SUITABLE MATERIAL, AND THE PIPE IS TO BE COVERED WITH EARTH FILL

4. NOTE: IF UNSUITABLE MATERIAL IS FOUND, UNDERCUT AS DIRECTED

5. ALL PIPE IS TO BE COVERED WITH EARTH FILL. NATURAL GROUND OR COMPACTION (TO MINIMUM WIDTH 5 DIAMETERS OF PIPE). PAY AS CLASS I EXCAVATION. BENCH 150 (6") DEEP.

6. THE PIPE IN ALL FILL CONDITIONS ABOVE IS TO BE COVERED WITH EARTH FILL. THE OUTSIDE DIAMETER OF THE PIPE PLUS 1200 (4') OR LARGER, AND BACKFILL WITH SUITABLE MATERIAL TO BOTTOM OF PIPE. SEE NOTE 3.

7. FOR CONCRETE PIPE, IF THIS EXCAVATION IS THROUGH ROCK, OR SAND SHALT, OR IN AREAS OF UNRELIABILITY, PROVIDE 300 (12") OF SUITABLE AGGREGATE FOR BEDDING (AASHTO NO. 8). FOR METAL PIPE, DO NOT COMPACT AASHTO NO. 8 BEDDING MATERIAL. FOR TRENCH BOX/SHORING INSTALLATION REQUIREMENTS NOT TO PRECLUDE POINT LOADING ON RELATIVELY RIGID CONCRETE PIPES, DO NOT COMPACT AASHTO NO. 8 BEDDING MATERIAL.

8. A HIGHER STRENGTH PIPE THAN SPECIFIED MAY BE SUPPLIED WITHOUT INCREASE IN PAYMENT.

9. PERMIT PLACEMENT OF BACKFILL MATERIAL IN LAYERS, 200 (6') THICK WHEN USING VIBRATORY COMPACTION EQUIPMENT.


11. THE INSTALLATION OF PIPES 1800 (72") OR GREATER INSIDE DIAMETER OR SPAN IS PERMITTED WITHOUT PLACING UNCOMPACTED AGGREGATE FOR BEDDING (AASHTO NO. 8) OR SPAN OF THE PIPE. FOR CONCRETE PIPE, THE WIDTH OF THE BASE IS SHOWN ON THIS DRAWING EXCEPT PROVIDE 2A MATERIAL ON THE THRESHOLD FOR ELEVATION OF THE PIPE, SEE NOTE 1.

12. THE INSTALLATION OF PIPES 1800 (72") OR GREATER INSIDE DIAMETER OR SPAN IS PERMITTED WITHOUT PLACING UNCOMPACTED AGGREGATE FOR BEDDING (AASHTO NO. 8) OR SPAN OF THE PIPE. FOR CONCRETE PIPE, THE WIDTH OF THE BASE IS SHOWN ON THIS DRAWING EXCEPT PROVIDE 2A MATERIAL ON THE THRESHOLD FOR ELEVATION OF THE PIPE, SEE NOTE 1.

13. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES USED ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.

14. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.

15. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.

16. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.

17. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.

18. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.

19. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.

20. PLACE 2A GRADE MATERIAL INSIDE (2") RISE) ON TOP OF THE BEEDING AND PIPE, AS SHOWN ON THE PLANS. METRIC AND ENGLISH VALUES MAY NOT BE MIXED.
NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION AASHTO, SECTIONS 601 AND 220.

2. FLOWABLE BACKFILL WILL ENVELOPE THE LAST SECTION OF PIPE OR Pipeline. CONSTANT SIZE OF FLOWABLE BACKFILL MATERIAL, AS SPECIFIED IN SPECIAL PROVISION OR PROVIDED FORWARD TO CONTAIN FLOWABLE BACKFILL.

3. PAYMENT FOR THE BACKFILL ENVELOPE Pipe, RECLAIMING ANY BACKFILL OR FLOWABLE BACKFILL MATERIAL OR SUITABLE MATERIAL TO 300 (12") ABOVE THE PIPE IS INCIDENTAL TO THE PIPE.

4. THE FLOWABLE BACKFILL DETAIL REPLACES STEPS 6A, 6B, 6C AND 6D ON SHEET 1 WHEN FLOWABLE BACKFILL IS SPECIFIED.

- IF DRAINAGE IS REQUIRED TO MAINTAIN A POSITIVE FLOW OF WATER AWAY FROM THE TRENCH, IT MUST BE PROVIDED BY USE OF PROPERLY DESIGNED GRANULAR OR SYNTHETIC DRAINS.

- SUITABLE MATERIAL CONTAINING NO DEBRIS, ORGANIC MATERIAL, FROZEN MATERIAL OR LARGE STONES WITH A DIAMETER GREATER THAN ONE-HALF THE THICKNESS OF THE COMPACTED LAYERS SHOULD BE PLACED.

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
FLOWABLE BACKFILL

RECOMMENDED APR. 15, 2004
DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER
RC-30M
GENERAL NOTES

1. PROVIDE END SECTIONS MEETING THE REQUIREMENTS OF PUBLICATION NO. 15, SECTION 5.2 AND PROVIDING GALVANIZED STEEL END SECTIONS WHEN SECTIONS ARE ATTACHED TO GALVANIZED STEEL PIPE OR PRECAST CONCRETE END SECTIONS.

2. PROVIDE 2.77 INCH (1/2 INCH) THICK SIDES AND 3.50 INCH (3/4 INCH) CENTER PANELS FOR PIPES (D) MIND, PROVIDE CENTER PANELS HEAVIER THAN 3.00 INCH (3/4 INCH) THICKNESS, PROVIDE ENDS WITH 3.00 INCH (3/4 INCH) THICKNESS. END SECTIONS MUST BE GALVANIZED OR ALUMINIZED. END SECTION MILL FOR STEEL UNITS AND ALUMINIZED MILL FOR ALUMINUM UNITS. END SECTIONS MIGHT (5/16 INCH) FOR ALUMINUM UNITS ON CENTER AND SPACED 1/8 INCH END SECTIONS SHOULD BE THE SAME THICKNESS AND PIECES AS THE END SECTIONS.

3. PROVIDE END PLATES OF THE SAME MATERIAL AS THE END SECTION. PLACE MOUNTED UNITS IN PLATE TO PLATE CONSTRUCTION. USE GALVANIZED OR ALUMINIZED BOLTS AND NUTS FOR STEEL UNITS AND GALVANIZED BOLTS AND NUTS FOR ALUMINUM UNITS PROVIDE END PLATE LENGTH AS FOLLOWING:

Pipes under 1400 x 840, 1200 x 940 (42" x 29", 36" x 31")

- Pipe 1800 (72") DIAMETER OR SMALLER - 1/16 INCH
- Pipe 1950 (78") TO 2100 (84") DIAMETER - 1/8 INCH

4. SUPPLEMENT REINFORCED EDGES WITH GALVANIZED STEEL STIFFENER ANGLES WITH GALVANIZED OR ALUMINIZED BOLTS AND NUTS OF ALUMINUM ALLOY STIFFENER ANGLES (7/8" ALUMINUM ALLOY NUTS AND BOLTS OF THE FOLLOWING SIZES:

- 50 (2") x 50 (2") x 6 (1/4") FOR 1350 TO 1650 (53" TO 65") DIAMETER PIPE
- 50 (2") x 50 (2") x 6 (1/4") FOR 1950 TO 2100 (78" TO 84") DIAMETER PIPE

PLACE ANGLE REINFORCEMENT UNDER THE CENTER PANEL SEAMS FOR 2100 x 1450, 2050 x 1500 (83" x 57", 82" x 59") PIPE-ARCH CULVERTS.

5. ANCHOR ALUMINUM OR STEEL UNITS, THAT ARE USED ON THE INLET END OF PIPE, LARGER THAN 1350 (53") DIAMETER, AS INDICATED ON THE DRAWING.

6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

NOTE: EITHER METRIC OR 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

END SECTIONS FOR PIPE CULVERTS

NOTE: EITHER METRIC OR ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
### Table A - Dimensions for End Sections for Concrete Pipe

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### Table B - Dimensions for End Sections for Circular Corrugated Metal Pipe

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### Table C - Dimensions for End Sections for Corrugated Metal Pipe Arch

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<td>1 1/4&quot;</td>
<td>1 1/2&quot;</td>
</tr>
</tbody>
</table>

### Alternate Type Connections for Corrugated Metal Pipe End Sections

- **Type 1 Connection**: 48" to 60" 1 1/2" on 21/2" circular pipe.
- **Type 2 Connection**: 48" to 60" 2 1/2" on 3" circular pipe.
- **Type 3 Connection**: 48" to 60" 3" on 3 1/2" or larger pipe arch.

For general notes, see Sheet 1.
NOTES

1. CONSTRUCTION REQUIREMENTS:
   A. CONSTRUCT IN ACCORDANCE WITH PUBLICATION 408, SECTIONS 605, 606, AND 714; AND AS MODIFIED HERIN.
   B. MINIMUM CONCRETE CLASS:
      - CAST-IN-PLACE: CLASS A
      - PRECAST: CLASS AA
   C. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE WITH PUBLICATION 408, SECTIONS 605, 606, AND 714; PROVIDE CONCRETE IN SHEET STRENGTH OF 4000 PSI.
   D. CLEAR COVER FOR STEEL:
      - WALLS: CAST-IN-PLACE 60 (6") PRECAST 40 (4")
      - FOOTINGS: CAST-IN-PLACE 60 (6") TOP BARS 40 (4") BOTTOM BARS
      - CONCRETE INされている SPECIAL INLET BOXES (CAST-IN-PLACE)
      - CONCRETE INされている SPECIAL INLET BOXES (PRECAST)
      - CONCRETE INされている SPECIAL INLET BOXES (CAST-IN-PLACE)
      - CONCRETE INされている SPECIAL INLET BOXES (PRECAST)

2. THIS SHEET DEPICTS THE COMPLETE INLET ASSEMBLY INCLUDING COMPONENTS AND OTHER DETAILS REQUIRED FOR INSTALLATION. USE THIS SHEET TO DESCRIBE THE COMPLETE INLET ASSEMBLY.

3. EACH TYPE OF INLET SHOWN IS SUITABLE FOR A PARTICULAR SITUATION AS FOLLOWS:
   - TYPE C INLET IS DESIGNED FOR INSTALLATION IN NON-MOUNTABLE CURB AREAS.
   - TYPE M INLET IS DESIGNED FOR INSTALLATION IN MOUNTABLE CURB AREAS.
   - TYPE S INLET IS DESIGNED FOR INSTALLATION IN SHOULDER AREAS.

4. THE SELECTION OF COMPONENTS TO ASSEMBLE A DESIRED INLET ASSEMBLY IS THE CONTRACTOR'S RESPONSIBILITY.

5. USE PRECAST CONCRETE OR CAST-IN-PLACE CONCRETE INLET BOXES, CONCRETE INLET BOXES, AND CONCRETE INLET BOXES AS REQUIRED.

6. FOR MORTAR CONNECTORS, USE 1/2" (3"") BARS AT EACH JOINT CENTERED EVERY 12".

7. ALL DIMENSIONS ARE IN MILLIGRAMS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS: 1" = 1") PAVING.

8. PROVIDE MORTAR HOLES IN INLET BOXES AS REQUIRED.

9. TAPES MAY BE CONNECTED TO DRAINAGE STRUCTURES OR PRECAST INLETS, ETC., WITH TAP HOOKS OR WEIGHTED HOOKS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
SECTION A-A  SECTION B-B  CAST-IN-PLACE AND PRECAST

PLAN VIEW  SIDE VIEW  FRONT ELEVATION VIEW

SECTION A-A  SECTION B-B

TYPE C ALTERNATE

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

RECOMMENDED APR. 15, 2004
RECOMMENDED APR. 15, 2004
SHEET 2 OF 10

RC-34M
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 deviations or modifications of the standards shown in these shop drawings for approval.

2. New structural steel grates in accordance with the requirements of Publication 408, Section 1104.03.

3. Provide transverse bars meeting the requirements of Publication 408.

4. Provide bicycle-safe structural steel or cast iron vane grates for installation where bicycle traffic is anticipated. Alternate bicycle-safe grate designs shall require a shop drawing submission, as specified in note 1, and shall conform to the dimensional, spacing, and other requirements of this sheet.

5. Provide transverse bars meeting the requirements of Publication 408.

6. Provide bicycle-safe, structural steel or cast iron vane grates for installation where bicycle traffic is anticipated, such as curbed roadways in urban areas or roadways specifically established and signed as bicycle or parking bike lanes. Alternate bicycle-safe grate designs shall require a shop drawing submission, as specified in note 1, and shall conform to the dimensions and other requirements of this sheet.

5. Fabricate slots by burning, drilling, shearing or punching. Have the bottom of all burned or drilled slots conform 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.
NOTES

1. THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DEVIATIONS OR MODIFICATIONS OF THE STANDARDS SHOWN. SHOP DRAWINGS FOR APPROVAL.

2. PROVIDE BICYCLE-SAFE, Structural Steel or Cast Iron Vane Grates for Installation Where Bicycle Traffic is Anticipated, Such as Curbed Roadways in Urban Areas or Under Bridges on Both Sides of Existing Road 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, Are Approved for HS25 Loading, Cast Iron Grates Not Approved for HS25 Loading May Be Used Outside of the Travel Lanes at the Edge Shoulders, Swales, and Will Require a Shop Drawing Submission.

4. 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 construction in accordance with the requirements of Plan Section A, Section C, and CEC. Cast iron vane grates and grade adjustment systems shall be manufactured by a manufacturer listed in Bulletin 15. For deviations or modifications of the standards submit shop drawings for approval.

2. Install vane grates with curve vane facing the direction of flow.

3. Grade adjustment rings:
   a. Custom fabricate each adjustment ring from measurements provided with each order.
   c. Require full circumferential welds on both top and bottom rings. Make the inner weld a root, ground weld, and file to size. For final seating of rings and adjusting nuts.
   d. Provide an adjustment ring which is flush with cover pad and does not allow excessive movement. Provide an adjustment ring which conforms to the shape of the original frame.

4. Provide radius of 3½" typical for all foils and rounds, unless noted.

5. Attach steel grade adjustment rings rigidly to the frame and cast precast concrete grade adjustment rings on a mortar bed.

6. Cast iron grates may be used as an alternate 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, medians, and 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

Recommended April 15, 2004

[Signature] [Stamp]
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 BRIDGES

INLET FRAMES

NOTE: THIS SHEET DEPICTS THE DIMENSIONS REQUIRED FOR UNIFORMITY AND INTERCHANGEABILITY. IT DOES NOT INCLUDE DETAILS REQUIRED FOR FABRICATION OR MANUFACTURING, PERMIT ONLY FRAMES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. FOR DEVIATIONS OR MODIFICATIONS OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

1. PROVIDE EITHER GRAY, MALLEABLE OR DUCTILE IRON CASTINGS OR STRUCTURAL STEEL FRAMES.
2. PROVIDE EITHER GRAY, MALLEABLE OR DUCTILE IRON CASTINGS OR STRUCTURAL STEEL FRAMES.
3. WELD STRUCTURAL STEEL FRAMES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. Construct inlet boxes in accordance with the requirements of Publication 408, Section B.

2. Provide inlet boxes with 210 x 1150 (24 x 45") standard opening to accommodate the standard pipe diameter.

3. For cast-in-place or precast construction, provide inlet boxes in accordance with Note 1.

4. Inlets that exceed the maximum height shown shall require additional concrete to shape the bottom. These inlets that exceed 150 (6") in height with steps similar to manholes. See Section E.

5. Locate pipe in pipes as indicated, with the inlet bottom divided into channels. The pipe is not to exceed the maximum height shown.

6. Provide inlet boxes with 1100 x 1150 (24" x 45") standard box size.

7. For cast-in-place construction, when the base is constructed, the pipe shall be located within the required limits.

8. Place additional concrete in accordance with Section D.

9. When necessary, the blockout may remove up to 25 mm (1") of concrete, unless otherwise indicated.

10. Provide reinforcement bars in accordance with Section D.

11. Use a modified inlet box. See Section E.

12. Provide the above requirements in accordance with Publication 408, Section 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. CONTRACT IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408 SECTION 605.
2. THIS SHEET DESCRIBES THE REQUIREMENTS FOR UNIFORMITY AND INTERCHANGEABILITY. PLANS AND DETAILS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15.
3. USE STRUCTURAL STEEL GRATES IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408 SECTION 605.03.
4. PROVIDE ANGLES EMBEDDED IN THE CONCRETE AS A BEARING AREA FOR THE GRATES FOR TYPE D-H INLETS WHICH SEAT THE GRATES DIRECTLY WITHIN THE UNIT.
5. FOR PIPE LOCATION AND MAXIMUM ALLOWABLE SIZES, SEE SHEET 8.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

INLETS
TYPE D-H INLET
(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 excavation.

3. All dimensions are in millimeters unless otherwise noted. U.S. customary units in ( ) parentheses noted.

- Height - 150 (6") for swales, 300 (12") for medians, unless otherwise directed.

**Section A-A**

- Flow line or swale invert

**Section B-B**

**Section C-C**

- 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

DRAINAGE DIKE
DETAIL "A"

CONSTRUCTION JOINT

SECTION A-A

BASE SLAB DIMENSIONS

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CAST-IN-PLACE MANHOLE

FOR PIPES WITH INSIDE DIAMETER AND LESS

SEE TABLE A.

SEE DETAIL "A" FOR TYPICAL STEP DETAIL

FOR PIPES WITH INSIDE DIAMETER 75 (30") OR LESS

PART D.

CAST-IN-PLACE MANHOLE

FOR BASE SLAB DIMENSIONS

SEE TABLE A.

SECTION B-B OR C-C

TABLE A

<table>
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<th>DIAMETER (IN)</th>
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REINFORCEMENT DETAILS AT OPENINGS

NOTE: FOR WALLS, DIMENSIONS SHALL BE TO EXTENDED DIAMETER. ADDITIONAL FORMERS SHALL BE PROVIDED IN THE FORMWORK AT EACH FACE OF THE WALL TO MAINTAIN A WEIGHTED CENTERED IN THE WALL, AS DETERMINED BY THE ENGINEER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

STANDARD MANHOLE

CAST-IN-PLACE MANHOLES

SEE SHEET 4.

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

A. CONSTRUCTION REQUIREMENTS

B. MINIMUM COMPOSITE CLASS

C. MATERIALS

D. PRECAST MANHOLES

E. CONSTRUCTION JOINTS AND KEYS

F. OPENINGS

G. FORMS AND SUPPORTS

H. CONCRETE PLACEMENT

I. CURING AND CURING

J. CLEANING AND INSPECTION

K. TESTS AND ACCEPTANCE

L. MAINTENANCE

M. GRouting

N. DRAINAGE

O. REFERENCES

P. GENERAL

Q. SPECIFICATIONS

R. DRAWINGS

S. INDEX

T. APPENDIX

U. LEGENDS

V. TABLES

W. DRAWING SHEETS

X. NOTATION

Y. MATERIALS

Z. CONSTRUCTION

AA. FINISH

BB. MAINTENANCE

CC. QUALITY ASSURANCE

DD. QUALITY CONTROL

EE. SAFETY

FF. ENVIRONMENTAL

GG. ARCHITECTURAL

HH. ELECTRICAL

II. MECHANICAL

JJ. PLUMBING

KK. HEATING

LL. AIR CONDITIONING

MM. FIRE PROTECTION

NN. SECURITY

OO. SURVEYING

PP. SPEAKING

QQ. OTHER

RR. LEGAL

SS. GENERAL

TT. OTHER

UU. NOTATION

VV. MATERIALS

WW. CONSTRUCTION

XX. FINISH

YY. MAINTENANCE

ZZ. QUALITY ASSURANCE

AAA. QUALITY CONTROL

BBB. SAFETY

CCC. ENVIRONMENTAL

DDD. ARCHITECTURAL

EEE. ELECTRICAL

FFF. MECHANICAL

GGG. PLUMBING

HHH. HEATING

III. AIR CONDITIONING

JJJ. FIRE PROTECTION

KKK. SECURITY

LLL. SURVEYING

MMM. SPEAKING

NNN. OTHER

OOO. GENERAL

PPP. OTHER

QQQ. NOTATION

WWW. MATERIALS

XXX. CONSTRUCTION

YYY. FINISH

ZZZ. MAINTENANCE

AAAA. QUALITY ASSURANCE

BBBB. QUALITY CONTROL

CCCC. SAFETY

DDDD. ENVIRONMENTAL

EEEE. ARCHITECTURAL

FFFF. ELECTRICAL

GGGG. MECHANICAL

HHHH. PLUMBING

IIII. HEATING

III. AIR CONDITIONING

JJJJ. FIRE PROTECTION

KKKK. SECURITY

LLLL. SURVEYING

MMMM. SPEAKING

NNNN. OTHER

OOOO. GENERAL
762 (30") MAX ID
(0.12 in 2 /VERTICAL FT)
(0.12 in 2 /HORIZONTAL FT)

WALL REINFORCEMENT---
CIRCUMFERENTIAL FULL DEPTH
250 mm 2 /VERTICAL m

REQUIREMENTS AT OPENINGS,
PLACE REINFORCEMENT MESH
CENTRALLY IN WALL.
SEE NOTES 5 AND 6 FOR STEEL

PROVIDE VERTICAL BARS
SECTION.
SEE DETAIL C.

*TOP STEEL
X
E
AT
405116")

FOR TYPICAL STEPS
SEE V.

*SEE TABLE B FOR BASE SLAB
CAST-IN-PLACE MANHOLE. SEE
SHEET 1.

STEEL REQUIREMENTS. PROVIDE
PRECAST MANHOLE
WALL REINFORCEMENT DETAILS
AT BASE SLAB TYPICAL OF
EWS ABOVE.

SEE DETAIL Q'.

SEE DETAIL A,

FOR TYPICAL CONICAL
229 (9")

TYPICAL RISER SECTION
FOR DETAILS.

BASE SEE SHEET 1
FOR CAST-IN-PLACE
PLACE BASE SECTION
PRECAST OR CAST-IN-
ANO INTEGRAL FOOT I NG.

152 (6")
460
MIN
9.0 m OR 700 mm <;m WWF 152

(0'-0" TO)
SEE NOTE 14
BUT NOT LESS
THAN 203 (8")

9.0 m NO. 16 BARS AT 150 CTOC
OR 340 mm 2 /m WWF < 52

MAXIMUM SPACING
408, SECTION 714, MAY BE SUBSTITUTED FOR THE
STANDARD CAST-IN-PLACE MANHOLE, FOR DEVIATION
OR MODIFICATION OF THE STANDARDS, SUBMIT SHOP DRAWINGS
FOR APPROVAL.

FOR APPROVAL.

FOR RISERS OR BASE SECTIONS WITH TWO OR MORE OPENINGS, LOCATED
AT DEPTHS GREATER THAN 7.6 m (25') USE A 254 (10") THICK WALL RISER
OR BASE SECTION WITH CIRCUMFERENTIAL REINFORCEMENT EQUAL TO
930 mm 2 /VERTICAL m.

FOR PRECAST RISER OR BASE SECTIONS WITH ONE OPENING LOCATED
FOR RISERS OR BASE SECTIONS WITH OPENINGS, PROVIDE A MINIMUM
OF THE OPENING, BUT NO LESS THAN 203 (8") , BETWEEN THE
1. PRECAST MANHOLES MEETING THE REQUIREMENTS OF PUBLICATION
BUREAU OF DESIGN
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD MANHOLES
PRECAST MANHOLES &
MANHOLE STEPS

RECOMMENDED APR. 15, 2007
RECOMMENDED NOV. 9, 2007
SHT. 3 OF 8
3RD REVISION
RC-39M

TABLE B

<table>
<thead>
<tr>
<th>PRECAST MATERIAL</th>
<th>TOP STEEL REQUIREMENTS</th>
<th>BOTTOM STEEL REQUIREMENTS</th>
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</thead>
<tbody>
<tr>
<td>0.5 to 6.0 m</td>
<td>NO. 20 BAR AT 150 C TO C NO. 14 BAR AT 150 C TO C</td>
<td></td>
</tr>
<tr>
<td>NO. 18 BAR AT 150 C TO C MAXIMUM SPACING</td>
<td>NO. 18 BAR AT 150 C TO C MAXIMUM SPACING</td>
<td></td>
</tr>
<tr>
<td>6.0 to 12 m</td>
<td>NO. 20 BAR AT 150 C TO C NO. 14 BAR AT 150 C TO C</td>
<td></td>
</tr>
<tr>
<td>NO. 18 BAR AT 150 C TO C MAXIMUM SPACING</td>
<td>NO. 18 BAR AT 150 C TO C MAXIMUM SPACING</td>
<td></td>
</tr>
</tbody>
</table>

SEE NOTE 1, SHEET 1.
NOTES:
1. PRECAST MANHOLES MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 714, MAY BE SUBSTITUTED FOR THE STANDARD CAST-IN-PLACE MANHOLE. FOR DEVIA TION OR MODIFICATION OF THE STANDARDS, SUBMIT SHOP DRAWINGS FOR APPROVAL.
2. PLACE SUBBASE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 350, IN LAYERS NOT TO EXCEED 4 INCHES THICK, COMPACTED TO A SATISFACTORY DEMENSION.
3. FOR ALL OTHER DESIGN REQUIREMENTS AND APPLICABLE NOTICES, SEE SHEET 3.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD MANHOLES
COVERS, FRAMES AND
ADJUSTMENT RISERS

RECOMMENDED APR. 15, 2004
STANDARDS DIV.

PRECAST MANHOLE WITH FLAT TOP

SECTION B-B

PRECAST MANHOLE BASE PREPARATION

SUBBASE MATERIAL 12" THICK, SEE DETAIL A SHEET 3

BASE ADJUST TO FINAL GRADE WITH PRECAST CONCRETE GRADE RINGS OR BRICK AND CEMENT MORTAR. MAXIMUM 30" TOTAL THICKNESS.
1. PROVIDE MANHOLE FRAMES AND COVERS MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 605.2(b), AND MANUFACTURED FROM MATERIALS MEETING THE REQUIREMENTS OF MANUFACTURER BULLETIN 15.

2. PROVIDE MANHOLE FRAMES, COVERS AND IRON ADJUSTMENT RISERS SUPPLIED BY A MANUFACTURER AS LISTED IN MANUFACTURER BULLETIN 15.

3. PROVIDE A GASKET SEALING SYSTEM, AS INDICATED IN DETAIL A, TO PREVENT INFLOW THROUGH THE BEARING SURFACES, OF SURFACE RUNOFF WATER INTO THE MANHOLE SYSTEM, WHEN SPECIFIED. PROVIDE ONE PIECE SELF-SEAL POLYISOPRENE ROUND GASKET, 40 OUROMETER GLUED IN PLACE. PROVIDE TWO LIFT HOLES AT 180° TO FACILITATE COVER REMOVAL FOR SELF-SEALING MANHOLE COVER.

4. PROVIDE ONE LIFT HOLE TO FACILITATE COVER REMOVAL FOR NON-SEALING MANHOLE COVER.

5. FRAME AND GRADE ADJUSTMENT RISER TO HAVE A MINIMUM BEARING SEAT OF 25 (1") FOR COVER.

6. LOCATE TOP OF FRAME OR ADJUSTMENT RISER 3 (1/4") BELOW THE TOP OF ROADWAY SURFACE.

7. PROVIDE GRADE ADJUSTMENT RISERS TO MEET THE REQUIREMENTS OF PUBLICATION 408 SPECIFICATIONS, SECTION 606, AND AS MODIFIED HEREIN:
   A. CUSTOM FABRICATE EACH ADJUSTMENT RISER FROM MEASUREMENTS PROVIDED WITH EACH ORDER.
   C. REQUIRE FULL CIRCUMFERENTIAL WELDS ON BOTH TOP AND BOTTOM RINGS. MAKE THE INNER WELD A BEVEL GROOVE WELD (FLUSH FINISH) FOR PROPER SEATING OF MANHOLE LID AND MAKE THE OUTER WELD A FILLET WELD.
   D. MAKE THE MINIMUM WIDTH OF BOTTOM AND TOP BAR STOCK 25 (1") AND 10 (3/4"), RESPECTIVELY.
   E. TAP THE BOTTOM BAR STOCK FOR MULTI-PIECE ADJUSTMENT RISER FOR M14 ADJUSTMENT BOLT.
   F. REINFORCE THE ADJUSTMENT RISER ADEQUATELY TO PREVENT BENDING.
   G. PROVIDE AN ADJUSTMENT RISER WHICH IS FLUSH WITH COVER AND DOES NOT ALLOW EXCESSIVE MOVEMENT.
   H. PROVIDE AN ADJUSTMENT RISER WHICH CONFORMS TO THE SHAPE OF THE ORIGINAL FRAME.

8. ATTACH FRAME AND/OR PRECAST CONCRETE GRADE RINGS RIGIDLY TO TOP OF MANHOLE. USE 3-M14 THREADED STUDS WITH HEX HEAD NUTS AND WASHERS, INSERTED THROUGH 16 (3/4") DIAM HOLES THROUGH FRAME AND/OR RINGS, SPACED AT 120° AND 50 (2") FROM OUTSIDE EDGE OF FRAME. EMBED STUDS 2 (4") MINIMUM INTO MANHOLE. GROUT STUDS INTO MANHOLE.

9. SET THE BASE OF THE FRAME AND/OR PRECAST CONCRETE GRADE RINGS IN A BED OF CEMENT MORTAR.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. DESIGN REQUIREMENTS:
   A. DESIGN SPECIFICATIONS: 1998 REPORTS INTO WYBRO
   DESIGN SPECIFICATION, DESIGN MANUAL, PART A, AK
   AASHTO 3RD EDITION, STANDARD SPECIFICATIONS FOR PRECAST
   CONCRETE MANHOLES.

2. VERTICAL STEEL:
   A. DESIGN SPECIFICATION: 1998 AASHTO LRFD BRIDGE
   DESIGN AT LEAST MINIMUM REINFORCEMENT FOR SHRINKAGE FO
   8.
   B. DESIGN THE MANHOLE FOR A LIVE LOAD OF PHL 93 (HS25)
   C. WITH 30 IN.. IMPACT, EXCEPT DO NOT USE IMPACT IN THE
   D. DESIGN REINFORCEMENT IN "COLUMN" TO CARRY AXIAL LOAD AND
   E. DESIGN THE MANHOLE FOR:
   F. PROVIDE AT LEAST MINIMUM REINFORCEMENT FOR SHRINKAGE ANO
   G. FOR CONSTRUCTION REQUIREMENTS SEE NOTE 1, SHEET 1.
   H. DESIGN SPECIFICATION, DESIGN MANUAL PART 4 AND
   I. THIS PROCEDURE IS REQUIRED ONLY WHEN A SIGNIFICANT LOADING
   J. PROVIDE AT LEAST MINIMUM REINFORCEMENT FOR SHRINKAGE ANO
   K. DESIGN THE MANHOLE FOR:
   L. CALCULATE FOUNDATION BEARING PRESSURES BY SERVICE LOAD
   M. DESIGN THE MANHOLE FOR:
   N. DETERMINE DIMENSIONS OF DESIGN SECTION TO CARRY MOMENT AS
   O. DETERMINE SERVICE MOMENTS AND AXIAL THRUSTS
   P. CHECK CRACK CONTROL UNDER SERVICE LOAD.

3. FOOTING DESIGN:
   A. DETERMINE FOOTING SIZE
   B. DESIGN HOOP REINFORCEMENT SHOWN IN
   C. CHECK CRACK CONTROL UNDER SERVICE LOAD.
   D. DETERMINE FOOTING SIZE
   E. DETERMINE FOOTING SIZE
   F. DETERMINE FOOTING SIZE
   G. DETERMINE FOOTING SIZE
   H. DETERMINE FOOTING SIZE
   I. DETERMINE FOOTING SIZE
   J. DETERMINE FOOTING SIZE
   K. DETERMINE FOOTING SIZE
   L. DETERMINE FOOTING SIZE
   M. DETERMINE FOOTING SIZE
   N. DETERMINE FOOTING SIZE
   O. DETERMINE FOOTING SIZE
   P. DETERMINE FOOTING SIZE

4. DESIGN PROCEDURE
   A. DETERMINE FOOTING SIZE
   B. DETERMINE FOOTING SIZE
   C. DETERMINE FOOTING SIZE
   D. DETERMINE FOOTING SIZE
   E. DETERMINE FOOTING SIZE
   F. DETERMINE FOOTING SIZE

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

STANDARD MANHOLES
DESIGN PROCEDURE

RECOMMENDED APR. 15, 2000
RECOMMENDED APR. 15, 2000
SHEET 7 OF 7
1. Provide materials and construction meeting the requirements of Publication 408, Section 626.
2. Type A gabions shall consist of wire-mesh baskets filled by hand placement of coarse aggregate, at least along the exposed faces, for a uniform appearance.
3. Specify Type B gabions or wire-mesh baskets filled by hand placement or small power equipment placement of coarse aggregate.
4. Make corrosion-resistant Type A and Type B gabions the same as Type A and Type B gabions except sheath the wire mesh in polyvinyl chloride plastic.
5. The apron or toe wall is required where the slope wall is installed adjacent to water, make the apron approximately two times as wide as the anticipated depth of scour and the toe wall height at least equal to the anticipated depth of scour.
6. When gabions are placed on a 1:1.5 (1.5:1) steeper or flatter slope or step, drive hardwood stakes through the gabions along the top edge, to anchor the installation. Embed stakes 450 (18") minimum below gabion bottom.
7. Provide geotextile material meeting the requirements of Publication 408, Sections 212 and 735.
8. Install geotextile material along all interface areas with/ground contact.
9. All dimensions are in millimeters unless otherwise noted. U.S. customary units in parenthesis.

**Channel Deflector**

**Notes**

1. Provide materials and construction meeting the requirements of Publication 408, Section 626.
2. Type A gabions shall consist of wire-mesh baskets filled by hand placement of coarse aggregate, at least along the exposed faces, for a uniform appearance.
3. Specify Type B gabions or wire-mesh baskets filled by hand placement or small power equipment placement of coarse aggregate.
4. Make corrosion-resistant Type A and Type B gabions the same as Type A and Type B gabions except sheath the wire mesh in polyvinyl chloride plastic.
5. The apron or toe wall is required where the slope wall is installed adjacent to water, make the apron approximately two times as wide as the anticipated depth of scour and the toe wall height at least equal to the anticipated depth of scour.
6. When gabions are placed on a 1:1.5 (1.5:1) steeper or flatter slope or step, drive hardwood stakes through the gabions along the top edge, to anchor the installation. Embed stakes 450 (18") minimum below gabion bottom.
7. Provide geotextile material meeting the requirements of Publication 408, Sections 212 and 735.
8. Install geotextile material along all interface areas with ground contact.
9. All dimensions are in millimeters unless otherwise noted. U.S. customary units in parenthesis.

**Commonwealth of Pennsylvania**

**Department of Transportation**

**Bureau of Design**

**Recommended Apr. 15, 2004**

**CP.**

**Engineer**

RC-3M

**Gabions**

**Note:** Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
TYPICAL AND ALTERNATE CONCRETE BRIDGE BARRIER TRANSITION POSTS 1 THRU 7, SEE SHEETS 1 AND 2.

1. FOR APPROACH TRANSITION POST HEIGHTS, SEE SHEETS 1 AND 2.
2. FOR ADDITIONAL NOTES, SEE SHEET 1.
3. FOR APPROACH TRANSITION POST SIZE AND LENGTH, SEE TABLE A., ON SHEET 1.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
THREE-BEAM TO PA TYPE 10M BRIDGE BARRIER CONNECTION DETAILS

SECTION E-E

MIDSPAN TUBE ASSEMBLY DETAILS

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

COMMUNWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
THREE-BEAM TO PA TYPE 10M BRIDGE BARRIER
MIDSPAN TUBE ASSEMBLY DETAILS

RECOMMENDED APR. 15, 2004
ReCOMMENDED APR. 15, 2004
SHEET 5 OF 16

DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER
RC-50M
BEYOND POST 7

POST DETAILS

TABLE C  POSTS  LENGTH  SIDE
1  2440 (7'-11")  2x8 (2")
6  1350 (4'-5")  2x8 (2"
7  1350 (4'-5")  2x8 (2"
8  127 (4½")  2x8 (2"
9  115 (4½")  2x8 (2"
10  108 (4")  2x8 (2"
11  100 (3')  2x8 (2"
12  98 (3½")  2x8 (2"
13  91 (3")  2x8 (2"
14  84 (2½")  2x8 (2"
15  81 (2")  2x8 (2"
16  78 (2")  2x8 (2"
17  75 (1½")  2x8 (2"
18  72 (1")  2x8 (2"
19  69 (1")  2x8 (2"
20  66 (1")  2x8 (2"

NOTES:
1. FOR LOCATION OF POSTS SEE SHEET 1
2. FOR ADDITIONAL NOTES SEE SHEET 2
3. FOR LOCATION OF POSTS SEE SHEET 8
4. BOLTS WITH RECESSED NUT (TYPE 1)
5. HOLES (TYP.) 1 20 (3/4") 0
6. HOLES (TYP.) 1 20 (3/4") 0
7. POSTS 2 THRU 5 POSTS 2 THRU 5 POSTS 2 THRU 5 POSTS 2 THRU 5 POSTS 2 THRU 5 POSTS 2 THRU 5 POST 1

ROUTED OFFSET BRACKET DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
THREE-BEAM TO PA BRIDGE BARRIER
POST AND OFFSET BRACKET DETAILS

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. For Approach Transition Post Details, see Sheet 1.
2. For Approach Transition Post Locations, see Sheet 1.
3. See RC-50M for Anchor Assemblies.
4. For Bridge Barrier Details and Dimensions, see Structure Plans.
5. For Additional 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.
ELEVATION VIEW FOR THRIE-BEAM TO VERTICAL WALL BRIDGE BARRIER

ELEVATION VIEW FOR THRIE-BEAM TO TYP. VERTICAL WALL BRIDGE BARRIER

NOTES:
1. THRIE-BEAM ELEMENT, TRANSITION SECTION AND W-BEAM RAIL ELEMENTS ARE BOLTED TO ALL POSTS.
2. FOR APPROACH TRANSITION POST DETAILS, SEE SHEET 14.
3. USE 0.010" THICKNESS FOR BRIDGE BARRIER DETAILS AND HARDWARE NOT SHOWN.
4. SEE STRUCTURE DRAWINGS FOR OTHER BRIDGE BARRIER DETAILS AND DIMENSIONS.
5. FOR ADDITIONAL NOTES, SEE SHEET 1.
TRANSITION CONNECTION PLAN

Midspan Tube Assembly Details

Commonwealth of Pennsylvania
Department of Transportation
Bureau of Design

Guide Rail to Bridge Barrier Transitions
Three-Beam to Vertical Wall Bridge Barrier Midspan Tube Assembly Details

Recommended Apr. 15, 2004
Recommended Apr. 15, 2004
Sheet 13 of 16

Director, Bureau of Design
TRANSITION SECTION

THRIE-BEAM RAIL ELEMENT

- At typical thrie-beam rail element shown
- Symmetric about 31/2"
- Slotted holes for post bolts
- Slotted holes for splice bolts (typ.)
- Backing plate (not shown for clarity)

NOTES:
1. The thrie-beam rail elements and transition sections are only used in thrie-beam to PA type low bridge barrier, thrie-beam to PA bridge barrier, and thrie-beam to vertical rail transition connections.
2. Use 300 mm (12"") backing plates for the thrie-beam rail elements at all thrie-beam posts with the same section as on the thrie-beam rail element.
3. For additional 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
GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
THRIE-BEAM TRANSITION SECTION AND RAIL ELEMENT DETAILS

RECOMMENDED APR. 15, 2004

CHIEF ENGINEER

RC-50M
THREE-BEAM TERMINAL SECTION
AT PA TYPE 10M BRIDGE BARRIER
SHOWN WITH CONNECTION PLATE ASSEMBLY

SYMMETRICAL ABOUT ζ

26 1½" holes for #22 1½" H.S. bolts.
See drawings #4 and #6 for connection plate assembly details.

NOTES
1. USE THIS SHEET WITH SHEETS 4-15.
2. FOR ADDITIONAL NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
THREE-BEAM TERMINAL SECTION
BRIDGE CONNECTION DETAILS

RECOMMENDED APR. 15, 2004
SEE SHEET 16 OF 16
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

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

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

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

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

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

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
TABLE A

<table>
<thead>
<tr>
<th>HEIGHT OF POST</th>
<th>650</th>
<th>750</th>
<th>850</th>
<th>950</th>
<th>1150</th>
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<tr>
<td>ROTATION ANGLES</td>
<td>15°</td>
<td>30°</td>
<td>45°</td>
<td>60°</td>
<td>75°</td>
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</tbody>
</table>

NOTES

1. PAYMENT FOR TYPE 2 STRONG POST END TREATMENT INCLUDES 11/30 13'-4½" OF SLOPING RAIL, TERMINAL SECTION, HARDWARE, EXCAVATION AND CONCRETE.

2. INSTALL DELIMITER ASSEMBLY UNDER SEPARATE PAY ITEM OR CONTRACT. FOR ADDITIONAL DETAILS, SEE TRAFFIC STANDARD TC-7606.

3. ONLY THE NECESSARY DIMENSIONS, FOR UNIFORMITY AND INTERCHANGEABILITY OF MOUNTING BRACKETS, ARE INDICATED. PROVIDE MOUNTING 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 THE APPROACH END OF ANY GUIDE RAIL ON THE NHS OR ANY GUIDE RAIL ON HIGH-VOLUME ROADS, HIGH-SPEED, HIGH-VOLUME ROADS W/70 KM/H SPEED LIMIT & ABOVE. USE CRASHWORTHY END TREATMENTS ON ALL ROADWAYS W/60 KM/H SPEED LIMIT & ABOVE.

TABLE B
FLARE RATES
FOR BARRIER DESIGN

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Maximum Flare Rates</th>
<th>Concrete Guide Rail</th>
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<tbody>
<tr>
<td>120</td>
<td>1:10 (10:1)</td>
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<td>110</td>
<td>1:10 (10:1)</td>
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<td></td>
</tr>
<tr>
<td>105</td>
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<td>75</td>
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<td>70</td>
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<td>65</td>
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</tr>
<tr>
<td>60</td>
<td>5:10</td>
<td></td>
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</tr>
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NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408.
2. ALL MATERIAL NECESSARY TO CONSTRUCT EARTH MOUNDS ARE IN ACCORDANCE WITH APPLICABLE SECTIONS OF PUBLICATION 408.
3. EARTH MOUNDS MAY BE USED TO BURY GUIDE RAIL ON HIGHWAYS CONSTRUCTED OUTSIDE THE CLEAR ZONE AS DETERMINED IN PUB. 13-M, DESIGN MANUAL PART 2, CHAPTER 12.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS, METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TREATMENT AT OBSTRUCTIONS FOR MEDIAN WIDTHS GREATER THAN 6.0 m (20'-0") WHERE CONTINUOUS BARRIER IS NOT REQUIRED

EDGE OF PAVEMENT

EDGE OF SHOULDER

MEDIAN TREATMENT AT DUAL STRUCTURES

MEDIAN WIDTHS GREATER THAN 10.0 m (30'-0") WHERE CONTINUOUS BARRIER IS NOT REQUIRED

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
**TYPICAL MEDIAN EARTH MOUND DETAIL FOR AT-GRADE DUAL BRIDGES**

*SEE NOTE 4*

**TYPICAL MEDIAN EARTH MOUND DETAIL FOR OVERHEAD STRUCTURES**

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

*SEE 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 PLATE TRADES, 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.**

---

**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. HEIGHT OF GUIDE RAIL MAY BE TAPERED DOWN AFTER CROSSING DITCH BOTTOM TO ACHIEVE 1 FOOT OF COVER.

2. 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.

3. PROVIDE 23.5 ft (7 M) MINIMUM FROM WHERE THE GUIDE RAIL ENDS TO THE SWALE LINE TO THE BEGINNING OF THE HAZARD.

4. BACKSLOPE ANCHOR TERMINAL PAY LIMIT INCLUDES THE CONCRETE OR POST ANCHORAGE, 300 (1' -0") OF RAIL ELEMENT AND HARDWARE.

HEIGHT OF GUIDE RAIL IS MEASURED FROM GROUND DIRECTLY BENEATH THE RAIL.

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
SINGLE RAIL
10:1 FRONT SLOPE

RECOMMENDED APR. 15, 2007
DIRECTOR, BUREAU OF DESIGN
DEPUTY DEPUTY

RC-54M
GENERAL NOTES:
1. The top of the W-beam rail is held constant relative to the roadway profile grade. A second W-beam rail is required where the distance between the ground and bottom of the top rail exceeds 450 (18") and is increasing. Maximum height of double rail system 1140 (45") taper both rails to maintain maximum height. Flare rate for the rail is 12:1. See Note 2.
2. Height of guide rail may be tapered down after crossing ditch bottom to achieve one foot of cover.
3. Use same 8'-0" long posts for all post locations with a base rail. Posts for posts which are used in a double rail shall be measured and paid for at the contract unit price per linear foot of guide rail.
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. Modify 23.0 m (75'-0") minimum from where the guide rail crosses the swale line to the beginning of the hazard.
6. Backslope anchor terminal pay limit includes the concrete on post anchor.

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

Items are separated on additional paid to this item. Please consult with an engineer before using. Bars and hardware are incidental to the main structure. Refer to the standard plans. Use base plate for all type.

**DETAIL C**

**BASE PLATE**

Commonwealth of Pennsylvania
Department of Transportation
Bureau of Design

**DETAIL E**

**END POST SUPPORT ANGLES**

**DETAIL D**

**END TREATMENT-DRIVEWAYS & OPENINGS**

**NOTES**

1. Use compatible hardware and materials for high-speed, high-volume locations, see note 1, RC-53M, Sheet 2.
2. All dimensions are in millimeters unless shown in parentheses. U.S. customary units in italics.

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**TYPE 2 WEAK POST**

**MEDIAN BARRIER**


detail A

**CONCRETE ANCHOR**

4130 (13") TX 65 / 200 (8") LONG ANCHOR BOLTS. TWO BARS (7½") AND
100 (4") HOLES IN MEDIAN STRUCTURE.

**PAY LIMIT-2-WAY END TREATMENT**

**PAY LIMIT-MEDIUM BARREER**

**PAY LIMIT-TYPICAL END TREATMENT**

**PLATE ON MEDIAN BAR**

**END TREATMENT-DRIVEWAYS & OPENINGS**

**ELEVATION**

**PLATE ON MEDIAN BAR**

**ELEVATION**

**TYPICAL END TREATMENT**

**PLATE ON MEDIAN BAR**

**ELEVATION**

**PLATE ON MEDIAN BAR**

**ELEVATION**

**PLATE ON MEDIAN BAR**

**ELEVATION**

**NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.**
1. PROVIDE CONCRETE MEDIAN BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 623. EXCEPT USE CLASS AND CONCRETE FOR PRECAST BARRIERS.

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

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

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

5. FOR PERMANENT AND TEMPORARY BARRIER INSTALLATIONS, USE SIDE-MOUNT BARRIER-MOUNT DELINEATOR OR TOP-MOUNT DELINEATORS AS DETERMINED ON A PROJECT BY PROJECT BASIS. LOCATE SIDE-MOUNT DELINEATORS 600 (2′-0″) FROM THE PAVEMENT TO THE CENTER OF THE DELINEATOR. INSTALL TOP-MOUNT DELINEATORS AS DETERMINED ON A PROJECT-BY-PROJECT BASIS. LOCATE REFLECTOR UNITS AS SHOWN ON TRAFFIC STANDARD TC-7604.

6. COMPACT NO. 2A OR NO. 3G MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 350. A LAYER 25 (1″) 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 AND PERMANENT INSTALLATIONS. FOR TEMPORARY INSTALLATIONS, EMBATTMENT IS NOT REQUIRED.

8. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1″) EXCEPT AS SHOWN.

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

10. FABRICATE REINFORCEMENT BARS ACCORDING TO PENNOOT BRIDGE CONSTRUCTION STANDARD, BC-736M.

11. TO LIMIT LATERAL DISPLACEMENT OF PORTABLE BARRIERS WHEN USED IN WORK ZONES, PROVIDE A ROUGH FINISH AT THE BOTTOM SURFACE. BEFORE THE CONCRETE HAS INITIALLY SET, FINISH THE BOTTOM SURFACE WITH STIFF, WIRE BROOM OR SPECIAL TEMPLATE IN A LONGITUDINAL DIRECTION TO PRODUCE SCORES APPROXIMATELY 1/16″ IN DEPTH.

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

1. A TYPICAL END TRANSITION MAY BE USED FOR PERMANENT BARRIER INSTALLATIONS ONLY WHEN THE LAST BARRIER SECTION IS LOCATED OUTSIDE THE REQUIRED CLEAR ZONE. END OF FASTENED IN展行 5.5" LIFE MAN-4, PART 1, CHAPTER 15.

2. WHEN THE LOCAL SPEED LIMIT IS 60 km/h OR LESS, USE AN IMPACT ATTENUATING DEVICE. WHEN THE LOCAL SPEED LIMIT IS 80 km/h OR MORE, USE AN IMPACT ATTENUATING DEVICE. A TYPICAL END TRANSITION IS ACCEPTABLE FOR PERMANENT INSTALLATIONS WHERE THE END OF THE BARRIER SYSTEM IS PROPERLY CONNECTED OR TERMINATED.

3. THE END OF THE BARRIER SYSTEM CAN BE BURIED IN A CUT OR COVERED WITH EXISTING GUIDE RAIL.

4. WHEN THE END OF THE BARRIER SYSTEM IS LOCATED OUTSIDE THE REQUIRED CLEAR ZONE, USE AN IMPACT ATTENUATING DEVICE.

5. THE END OF THE BARRIER SYSTEM IS DETERMINED IN PUBLICATION 13M, DESIGN MANUAL, PART 1, CHAPTER 15.

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**CONCRETE MEDIAN BARRIER**

**F-SHAPE**

**RECOMMENDED APR. 15, 2004 SHT**
DETAIL A

DELINEATION OF IMPACT ATTENUATING DEVICES

**Table 1: Flare Rates for Barrier Design**

<table>
<thead>
<tr>
<th>Design Speed (km/h)</th>
<th>Maximum Flare Rates</th>
</tr>
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<tbody>
<tr>
<td>120</td>
<td>20 x 1</td>
</tr>
<tr>
<td>100</td>
<td>18 x 1</td>
</tr>
<tr>
<td>90</td>
<td>16 x 1</td>
</tr>
<tr>
<td>80</td>
<td>14 x 1</td>
</tr>
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<td>70</td>
<td>12 x 1</td>
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<tr>
<td>65</td>
<td>11 x 1</td>
</tr>
<tr>
<td>60</td>
<td>10 x 1</td>
</tr>
<tr>
<td>50</td>
<td>8 x 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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

CONCRETE MEDIAN BARRIER
F-SHAPE

RECOMMENDED APR. 15, 2004

CHIEF ENGINEER
RC-5 7M
1. PROVIDE REINFORCEMENT MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 709.
2. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
3. FOR ALTERNATE WWF REINFORCED BARRIERS, SEE SHEET 2.
4. BRIDGE TO HIGHWAY TRANSITIONS MAY BE FORMED BY USING TWO 2250 (7'-6") OR TWO 3600 (12'-0") SECTIONS WITH SLOTTED PLATE CONNECTIONS.

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, SECTION 709.
2. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
3. FOR ALTERNATE W/ REINFORCED BARRIERS, SEE SHEET 2.
4. BRIDGE TO HIGHWAY TRANSITIONS MAY BE FORMED BY USING TWO 2250 (7'-6") OR TWO 3600 (12'-0") SECTIONS WITH SLOTTED PLATE CONNECTIONS.

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, SECTION 709 WITH A MINIMUM CONCRETE COVER OF 40 (1 1/2"").
2. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1"") EXCEPT AS SHOWN.
3. FOR ALTERNATE WWM REINFORCED BARRIERS, SEE SHEET 2.
4. BRIDGE TO HIGHWAY TRANSITIONS MAY BE FORMED BY USING TWO 2250 (7'-6") OR TWO 3600 (12'-0") SECTIONS WITH SLOTTED PLATE CONNECTIONS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
NOTE
1. FOR ALTERNATE NON-REINFORCED BARRIERS, SEE SHEET 2.
2. BRIDGE TO HIGHWAY TRANSITIONS MAY BE FORMED BY USING TWO 2250 (7'-6") OR TWO 3600 (12'-0") SECTIONS WITH SLOTTED PLATE CONNECTIONS.

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

RECOMMENDED APR. 15, 2004
DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER

TYPICAL 1270 TO 1270 (50' TO 50') TRANSITION
BRIDGE TO HIGHWAY TRANSITION
(THE BRIDGE BARRIER IS A CONCRETE GLARE SCREEN MEDIAN BARRIER)
NOTE 1. FOR ALTERNATE WWF REINFORCED BARRIERS, SEE SHEET 2.

2. BRIDGE TO HIGHWAY TRANSITIONS MAY BE FORMED BY USING TWO 2250 (7'-6") OR TWO 3600 (12'-0") SECTIONS WITH SLOTTED PLATE CONNECTIONS.

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 1270 TO 1270 (50" TO 50") TRANSITION
BRIDGE TO HIGHWAY TRANSITION

THE BRIDGE BARRIER IS A SPLIT CONCRETE GLARE SCREEN MEDIAN BARRIER
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 BRIDGES

SINGLE FACE CONCRETE BARRIER

NOTE: SEE TYPICAL SECTIONS, SHEET 2.

A. PROVIDE SINGLE FACE CONCRETE BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 6.2.
B. PROVIDE CONCRETE MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 6.2.
C. PROVIDE PRECAST SINGLE FACE CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15.
D. PROVIDE PRODUCTION CONCRETE REINFORCEMENT ACCORDING TO PENNDOT BRIDGE CONSTRUCTION STANDARD, BC-75M.
E. PROVIDE A ROUGH FINISH AT THE BOTTOM SURFACE. BEFORE THE CONCRETE HAS INITIALLY SET, FINISH THE BOTTOM SURFACE WITH STIFF, WIRE BROOM OR SPECIAL TEMPLATE IN A LONGITUDINAL DIRECTION TO PRODUCE SCORES APPROXIMATELY 4 { 1/8" IN DEPTH.

PLAN VIEW
RIGHT END TRANSITION

PLAN VIEW
LEFT END TRANSITION

NOTES
1. PROVIDE SINGLE FACE CONCRETE BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 6.2.
2. PROVIDE CONCRETE MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 6.2.
3. PROVIDE PRECAST SINGLE FACE CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15.
4. PROVIDE PRODUCTION CONCRETE REINFORCEMENT ACCORDING TO PENNDOT BRIDGE CONSTRUCTION STANDARD, BC-75M.
5. PROVIDE A ROUGH FINISH AT THE BOTTOM SURFACE. BEFORE THE CONCRETE HAS INITIALLY SET, FINISH THE BOTTOM SURFACE WITH STIFF, WIRE BROOM OR SPECIAL TEMPLATE IN A LONGITUDINAL DIRECTION TO PRODUCE SCORES APPROXIMATELY 4 { 1/8" IN DEPTH.

TYPICAL PRECAST OR CAST-IN-PLACE SINGLE FACE CONCRETE BARRIER
**Commonwealth of Pennsylvania**
**Department of Transportation**
**Bureau of Design**

**SINGLE FACE CONCRETE BARRIER**

**F-SHAPE**

**RECOMMENDED APR. 15, 2004**

1. PROVIDE PLATES MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105. GALVANIZE PLATES AS SPECIFIED IN PUBLICATION 408, SECTION 1105. 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 FABRIC FILTER DRAIN AS INDICATED AND IN ACCORDANCE WITH PUBLICATION 408, SECTION 610. CHECK STABILITY OF BARRIER USED AS A RETAINING WALL AND PROVIDE COMPUTATION WITH THE CONSTRUCTION PLANS.

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

**NOTES**

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

**Www Alternate**

**Www ALTERNATE REINFORCEMENT STEEL**

**STEEL**

**NOTE:**

- PROVIDE PLATES MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105. GALVANIZE PLATES AS SPECIFIED IN PUBLICATION 408, SECTION 1105. ALTERNATE CONNECTIONS MAY BE USED AS APPROVED BY THE BUREAU OF DESIGN.

- WHERE SINGLE FACE CONCRETE BARRIER IS SPECIFIED FOR USE AS A RETAINING WALL, AND DRAINAGE TREATMENT IS NECESSARY, CONSTRUCT A PREFORMED FABRIC FILTER DRAIN AS INDICATED AND IN ACCORDANCE WITH PUBLICATION 408, SECTION 610. CHECK STABILITY OF BARRIER USED AS A RETAINING WALL AND PROVIDE COMPUTATION WITH THE CONSTRUCTION PLANS.

- ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
1. PROVIDE SINGLE FACE CONCRETE BARRIER AND GUIDE RAIL MEETING THE
REQUIREMENTS OF PUBLICATION 408, SECTIONS 420 AND 422.
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. IF possible, USE A DEEP
CONCRETE SAFETY SHAPE, USE AN IMPACT ATTENUATING DEVICE.
4. THIS TRANSITION IS APPROPRIATE FOR CONNECTION TO A VERTICAL
CONCRETE SHAPE AND SHOULD NOT BE CONNECTED DIRECTLY TO A
CONCRETE SAFETY SHAPE. CONCRETE SAFETY SHAPES SHOULD BE
TRANSITIONED TO A VERTICAL SHAPE AT THE GUIDE RAIL CONNECTION.

TABLE 1

<table>
<thead>
<tr>
<th>DESIGN VELO</th>
<th>MAXIMUM FLARE RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>mph</td>
<td>20:1 (5')</td>
</tr>
<tr>
<td>100</td>
<td>15:1 (6')</td>
</tr>
<tr>
<td>90</td>
<td>10:1 (8')</td>
</tr>
<tr>
<td>80</td>
<td>8:1 (10')</td>
</tr>
<tr>
<td>70</td>
<td>5:1 (12')</td>
</tr>
<tr>
<td>60</td>
<td>3:1 (14')</td>
</tr>
<tr>
<td>50</td>
<td>1:1 (16')</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
SINGLE FACE CONCRETE BARRIER
F-SHAPE
PLACEMENT AT SHOULDER PIERS
RECOMMENDED APR. 15, 2004
DIRECTOR, BUREAU OF DESIGN
Chief Engineer

RC-58M
SECTION A-A

FOR ALTERNATE TAPERED END TREATMENT, SEE NOTE 3.

SECTION D-D

TYPICAL ALTERNATE BARRIER TREATMENT AT PIERS

NOTES
1. REFER TO BRIDGE STANDARD DRAWINGS 180-601M 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 VOID 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, 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, GUSSETTEES OR OTHER SUITABLE MATERIAL.
6. ROUND OR CHAMFER ALL 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
F-SHAPE
PLACEMENT AT MEDIAN PIERS

RECOMMENDED APR. 15, 2004
DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER

RC-58M
TYPICAL EARTH MOUND FOR BURYING CONCRETE BARRIER

SECTION A-A

SECTION B-B

SECTION C-C

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
F-SHAPE
END TREATMENT
buryING INTO EARTH MOUND

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408.
2. ALL MATERIALS NECESSARY TO CONSTRUCT EARTH MOUNDS ARE IN ACCORDANCE WITH APPLICABLE SECTIONS OF PUBLICATION 408.
3. EARTH MOUNDS TO BE USED TO BURY CONCRETE BARRIERS ON ALTERNATE HIGH POSTED SPEED LIMITS TO MINIMIZE THE RISK OF CONCURRENT TRAFFIC. TYPICAL EARTH MOUND HEIGHTS ARE SHOWN IN FIGS. 6 TO 7 IN PUB. 13M, DESIGN MANUAL PART 2, CHAPTER 12.

TABLE 2
FLARE RATES FOR BARRIER DESIGN

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>MAXIMUM FLARE RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. MPH</td>
<td>CONCRETE BARRIER</td>
</tr>
<tr>
<td>120</td>
<td>20 : 1</td>
</tr>
<tr>
<td>110</td>
<td>22 : 1</td>
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<td>35</td>
<td>46 : 1</td>
</tr>
<tr>
<td>30</td>
<td>48 : 1</td>
</tr>
</tbody>
</table>
1. PROVIDE CONCRETE GLARE SCREEN MEETING THE REQUIREMENTS OF PUBLICATION 40B, SECTIONS 622 AND 714.

2. PROVIDE A CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15.

3. PROVIDE STEEL REINFORCEMENT AS INDICATED ON RC-57, SHEET 3.

4. PROVIDE CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR Deviation OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

5. PROVIDE CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR Deviation OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

6. PROVIDE CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR Deviation OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

7. PROVIDE CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR Deviation OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

8. PROVIDE CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR Deviation OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

9. PROVIDE CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR Deviation OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

10. PROVIDE CONCRETE GLARE SCREEN SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. FOR MODIFICATION OR Deviation OF THE STANDARDS SUBMIT SHOP DRAWINGS FOR APPROVAL.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
TABLE I. NECESSITY FOR GLARE SCREEN IS DEPENDENT ON GEOMETRIC.

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

RECOMMENDED 04/15/2004
RECOMMENDED 04/15/2004
SHT 2 OF 2

NOTE 1. PROVIDE BARRIER-MOUNTED ILLUMINATORS, WHEN INDICATED, AS SPECIFIED ON RC-57M, SHEET 1.
GENERAL NOTES

1. CONSTRUCT IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 408, 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 FOOTING 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 150 m (500') BETWEEN END AND/OR CORNER POSTS IN LEVEL TERRAIN AND/OR MAJOR CURVES.

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

DIRECTOR, BUREAU OF DESIGN  CHIEF ENGINEER

RIGHT-OF-WAY FENCE

RECOMMENDED APR. 15, 2004

RC-60M
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 1'-0"
FOR TYPES 2 AND 5 RIGHT-OF-WAY FENCE
SEE SHEET 1
R/W FENCE TREATMENT AT HIGH WALLED ABUTMENT

R/W FENCE TREATMENT AT STUB ABUTMENTS

HIGHWAY OVER CROSSROAD

IF THE ROADWAY HAS DUAL STRUCTURES, ERASE THE RIGHT-OF-WAY FENCE TO CLOSE OFF THE WESTERN MILE.

IF THE ROADWAY HAS DUAL STRUCTURES, ERASE THE RIGHT-OF-WAY FENCE TO CLOSE OFF THE WESTERN MILE.

R/W FENCE TREATMENT AT CULVERTS

LINE POST
PULL POST
END POST
CORNER POST

DRIVE ANCHOR BLADE 12 INCHES
FENCE FABRIC
POST

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

Drive anchor orientation

Drive anchor details for post braces

Drive anchor used as anchors to frame concrete footings for all types of right-of-way fence.

NOTES:
1. Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
2. Elevation details shown are at contractor's option.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

RIGHT-OF-WAY 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
PAY LIMITS FOR TYPE 1
RIGHT-OF-WAY FENCE

OPENING AS SPECIFIED - 4570 X 1157 MAXIMUM

COPPER HARDWARE OR WELDED JOINTS
3.76/4 (1-7/8" X 3")
APPROX. 200 X 1/2" C TO C

END POSTS
CASTENS AT
353 X 1/4" C TO C

FRAME MEMBERS
305 X 3/8" OD TUBULAR

PEDESTRIAN GATE FOR TYPE I
RIGHT-OF-WAY FENCE
GATE TO SWING 180°

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 GATES
AND
REMOVABLE FENCE SECTIONS

NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
   IS. CUSTOMARY UNITS IN PARENTHESIS.
REFLECTIVE MATERIAL APPLIED TO PANELS WITH REQUIRED LENGTH OF BARRICADE.

WOOD PANEL - STEEL POSTS

DETAIL A

PANEL TO POST CONNECTION

STEEL POST FOR WOOD PANEL

WOOD POST FOR WOOD PANEL

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

RECOMMENDED APR. 15, 2004

PUBLIC WORKS AND HIGHWAYS DEPARTMENT OF TRANSPORTATION BUREAU OF DESIGN

PERMANENT BARRICADES WOOD PANEL

RECOMMENDED APR. 15, 2004

RC-63W
CONCRETE MOUNTABLE CURBS

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CONCRETE SIDEWALK TAPER CURB TO MATCH SIDEWALK AREA TO SE GRADED - CURB 610 (24" WIDEM AREA OF DETECTABLE WARNING TRUNCATED DOMES (TYP. 1, SEE DETAIL THIS SHEET.

TAPERED CURB TO MATCH SIDEWALK AREA TO SE GRADED - CURB 610 (24" WIDEM AREA OF DETECTABLE WARNING TRUNCATED DOMES (TYP. 1, SEE DETAIL THIS SHEET.

DEPRESSED CURB SECTION A-A

ELEVATION TYPE 1

DEPRESSED CURB SECTION B-B

NOTES
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 350, 420, 630, AND 676.

2. PROVIDE EXPANSION JOINT MATERIAL 13 (1") THICK WHERE CURB RAMP ADJOINS ANY RIGID PAVEMENT, SUBGRADE, OR CONSTRUCTION WITH THE TOP OF JOINT FILLER FLUSH WITH ADJACENT CONCRETE SURFACE.

3. IF DETECTABLE WARNING SURFACES ARE NOT PROVIDED IN CONFORMANCE WITH MINIMUM TYP. 610,(8") WIDE PROFILES IN A TRANSITION ZONE AT THE BOTTOM OF THE CURB, POSITION DOMES AS INDICATED IN DETAIL A, ON SHEET 3.

4. SEAL JOINTS WITH AN APPROVED SEALING MATERIAL.

5. PROVIDE NON-SLIP RESISTANT TEXTURE ON CURB RAMP BY COARSE 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 CURB PAINT LENGTHS ARE VARIABLE AND BASED ON CURB HEIGHT AND THE STORMONE PITCH.

8. PREPARE AND APPLY BITUMINOUS MATERIAL AS INDICATED, INCLUDING SURFACE PREPARATION AND TACK COAT, AS REQUIRED.

9. PROVIDE DETECTABLE WARNING SURFACES THAT CONTRAST (70%) IN LIGHT REFLECTANCE WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT OR SAFETY YELLOW.
NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
1. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, 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, SECTION 850.

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

FINISHED SLOPE, AS REQUIRED.

ROCK Lining

PLAN

SECTION A-A

ROCK LINING ELEVATION EXTEND ABOVE THE DESIGN FLOW ELEVATION.

SECTION B-B

ROCK BASIN

SECTION C-C

PAVED ENERGY DISSIPATOR

NOTES

1. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, 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, SECTION 850.

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

5. WHEN CHANNEL BOTTOM WIDTH IS LESS THAN 300 (10'), USE A SIMPLER, STAGGERED ROW OF STONES OR BLOCKS ALONG CHANNEL BOTTOM.

6. ALL DIMENSIONS IN METRIC UNLESS OTHERWISE NOTED.

7. 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
EROSION AND SEDIMENT POLLUTION CONTROL

RECOMMENDED APR. 15, 2004
RECOMMENDED APR. 15, 2004

DIRECTOR, DEPARTMENT OF TRANSPORTATION
DEPUTY DIRECTOR, DEPARTMENT OF TRANSPORTATION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
EROSION AND SEDIMENT POLLUTION CONTROL

RECOMMENDED APR. 15, 2004
RECOMMENDED APR. 15, 2004

DIRECTOR, DEPARTMENT OF TRANSPORTATION
DEPUTY DIRECTOR, DEPARTMENT OF TRANSPORTATION

RECOMMENDED APR. 15, 2004
RECOMMENDED APR. 15, 2004

DIRECTOR, DEPARTMENT OF TRANSPORTATION
DEPUTY DIRECTOR, DEPARTMENT OF TRANSPORTATION

RECOMMENDED APR. 15, 2004
RECOMMENDED APR. 15, 2004

DIRECTOR, DEPARTMENT OF TRANSPORTATION
DEPUTY DIRECTOR, DEPARTMENT OF TRANSPORTATION
Provide length of transverse berm to contain surface drainage and to direct into temporary slope drain. The transverse berm will not be an required unless the drain is located at a low point.

Provide length of transverse berm to contain surface drainage and to direct into temporary slope drain. The transverse berm will not be required unless the drain is located at a low point.

**TABLE A**

<table>
<thead>
<tr>
<th>DRAINAGE AREA (HECTARES)</th>
<th>MIN</th>
<th>MAX</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 to 1.2</td>
<td>200</td>
<td>300</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>1.2 to 4.0</td>
<td>150</td>
<td>300</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>4.0 to 16.0</td>
<td></td>
<td></td>
<td>150</td>
<td>300</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
- Chief Engineer
- Bureau of Design
- Erosion and Sediment Pollution Control
- Recommended Apr. 15, 2004
- Recommended Apr. 15, 2004
- Director, Bureau of Design
- Chief Engineer
- RC-70M
- RC-1M
- NA: Not applicable

**TABLE B**

<table>
<thead>
<tr>
<th>TYPE OF CLASS GEOTEXTILE MATERIAL</th>
<th>NOMINAL MAX POST HEIGHT</th>
<th>MAX POST TYPE OF CLASS GEOTEXTILE MATERIAL</th>
<th>NOMINAL MAX POST HEIGHT</th>
<th>MAX POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>450 (18&quot;)</td>
<td>3A</td>
<td>450 (18&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3B</td>
<td>450 (18&quot;)</td>
<td>3B</td>
<td>450 (18&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3C</td>
<td>750 (30&quot;)</td>
<td>3C</td>
<td>750 (30&quot;)</td>
<td>1.2 (4’-0&quot;)</td>
</tr>
<tr>
<td>3D</td>
<td>750 (30&quot;)</td>
<td>3D</td>
<td>750 (30&quot;)</td>
<td>1.2 (4’-0&quot;)</td>
</tr>
</tbody>
</table>

| NA: Not applicable |

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION**

**BUREAU OF DESIGN**

**EROSION AND SEDIMENT POLLUTION CONTROL**

**DIRECTOR, BUREAU OF DESIGN**

**CHIEF ENGINEER**

**RECOMMENDED APR. 15, 2004**

**RC-70M**
DRAINAGE

STEEL PLATE 5/32" THICK

CONTINUOUS WELD, BOTH SIDES

1/2" x 2 1/4" THICK SLOTTED HOLES FOR 3/16" DIAMETER BOLTS

1/2" x 2 1/4" TRICK SHEET METAL

2 PIECE CONNECTING BAND, MODIFY TO ELIMINATE OVERLAP AROUND PIPE.

300 1/2" MINIMUM

PUMP DISCHARGE SHALL NOT CAUSE EROSION OR SCOUR AT OUTLET. AN ANCILLAR VERTICAL DRAINAGE IS RECOMMENDED.

TRASH RACK AND ANTI-VORTEX DEVICE

MAKE THE DIAMETER OF THE RISER PIPE AT LEAST 1 1/2 TIMES THE DIAMETER OF THE OUTLET PIPE. PERFORATE THE TOP TWO-THIRDS OF THE RISER PIPE WITH THE FOLLOWING DIAMETER HOLES SPACED 250 1/16" VERTICALLY C TO C AND 250 1/16" HORIZONTALLY C TO C.

1 1/2" DIA. THICK SHEET METAL (3/6" X 3/8"") CORRUGATIONS

SHALLOW 1.5 M (5' - 0"") MIN, 3 M (10' - 0"") MAX

EMBANKMENT, OUTLET PIPE

SECTION A-A

DEWATERING BASIN

3.5 M (12"") THICK SHEET METAL (11/16" X 1/2"") CORRUGATIONS

DRAINAGE

PLANT VIEW OF SEDIMENTATION POND WITH EMERGENCY SPILLWAY

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
EROSION AND SEDIMENT POLLUTION CONTROL

RECOMMENDED APR. 15, 2004
RECOMMENDED APR. 15, 2004

NOTES

1. PROVIDE AN EMERGENCY SPILLWAY WITH A MINIMUM BOTTOM WIDTH OF 2.4 M (8' -0") FOR EVERY SEDIMENTATION POND.

2. PLACE THE EMERGENCY SPILLWAY IN UNDISTURBED GROUND NOT IN EMBANKMENT AREAS. THE EMERGENCY SPILLWAY CAN GO OVER THE EMBANKMENT IF ROCK LINING IS USED.


4. CONSTRUCT THE CREST OF THE EMERGENCY SPILLWAY 4.5 M (15"") ABOVE THE TOP OF THE RISER.

5. WHERE THERE IS A LIMITED ROOM FOR STORAGE AT THE BOTTOM PORTION OF THE POND, PERFORATE THE BOTTOM HOLES IN THE RISER PIPE LOADING THE SECOND SEV ENERGY OF THE TOTAL POND CAPACITY, TO PROVIDE ADEQUATE SEDIMENT STORAGE.
CONSTRUCT THE BERM HIGHER THAN THE TOP OF INLET.
FINISHED GRADE
CLASS I EXCAVATION
600 (24")
1:6 OR FLATTER
300 MAX
EXCAVATED SEDIMENT
SECTION A-A
SEED
ELEVATION
GRADIENT
CLASS 3 GEOTEXTILE MATERIAL ANCHORING POST SIDE SLOPE DIRECT JON
DITCH OR SWALE CONDITION
CLASS 3, TYPE B GEOTEXTILE MATERIAL
EXCAVATION OPTIONAL
SIDE SLOPE
SIDE SLOPE
CONSTRUCTION OF SUFFICIENT LENGTH TO ELIMINATE END FLOW.
DITCH OR SWALE EMBANKMENTS CENTER SECTION TO BE LOWER THAN EMBANKMENTS LENGTH = 4.5 m (15') MAX AREA IN HECTARES AREA IN ACRES
SEDIMENT TRAP OUTLET
Sediment Trap Entrants
LENGTH = 4.5 m (15') MAX
AREA IN HECTARES AREA IN ACRES
CLASS 1, CRUSHED AGGREGATE
CONCRETE BLOCKS
CONCRETE BLOCKS
CONCRETE BLOCKS
CONCRETE BLOCKS
600 x 100 3/4" - 4" WOOD STUD EXTENDED INTO CONCRETE BLOCKS
WIRE SCREEN AROUND PERIMETER OF CONCRETE BLOCKS TO PREVENT MOVEMENT OF GRAVEL
GRAVEL FILTER NOTES:
1. GRAVEL FILTERS MAY BE USED ON PAVEMENT OR BARE GROUND.
2. ALL GRAVEL FILTERS INSTALLED AROUND AREA DRAINS SHOULD BE INSPECTED AND REPAIRED AFTER EACH RUNOFF EVENT.
3. SEDIMENT SHOULD BE REMOVED IMMEDIATELY FROM ANY TRAVELED WAY OR ROADS AND STREETS.

Sediment Trap Entrants

1.5 M (5') MAX

Sediment Trap Entrants

1.5 M (5') MAX

Sediment Trap Entrants

1.5 M (5') MAX

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF DESIGN EROSION AND SEDIMENT POLLUTION CONTROL RECOMMENDED APR. 15, 2004 RECOMMENDED APR. 15, 2004 EXT 1 OF 6 RC-70M
1. Filter bags may be used on low volume dewatering operations not to exceed 3785 liters (1000 gallons) per minute.

2. Clear site but do not grub.

3. Inspect area to determine path discharge water will take. Stabilize any potentially erodible areas (steep slopes).

4. Construct course aggregate platform surface level. Place sediment filter bag on stabilized area.

5. If the existing area is stabilized, straw may be used instead of No. 57 coarse aggregate. Place bag over straw distributed at rate of a Bale per 3m² (30 SQ. FT).

6. Use pump with a rating in gallons per minute not to exceed size of the maximum flow rate listed on the bag label. Double clamp the pump discharge hose firmly to the bag.

7. Monitor and evaluate the entire pumping operation to assure that the bag continues to function properly. Replace the bag when the contained silts reduces the bag flow to approximately 50% of the rate of initial discharge, or when directed by inspector-in-charge. Dispose of sediment in a manner satisfactory to the engineer. Restore the area as specified in Section 105.14.

8. All dimensions are in millimeters unless otherwise noted. U.S. customary units are 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

SEDIMENT FILTER BAG

RECOMMENDED APR. 15, 2004

RECOMMENDED APR. 15, 2004

DIRECTOR, BUREAU OF DESIGN

CHIEF ENGINEER

RC-70M
1. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

2. USE JB-1 AND JB-2 JUNCTION BOXES IN SHOULDERS OR OTHER LOCATIONS SUBJECT TO VEHICULAR LOADS. PROVIDE CONDUIT OR SLEEVE, FOR JB-1 JUNCTION BOXES, IN ACCORDANCE WITH PUBLICATION 403, SECTIONS 910 AND 1101.

3. PROVIDE PRECAST CONCRETE JUNCTION BOXES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. USE JB-1 AND JB-2 JUNCTION BOXES IN LOCATIONS SUBJECT TO VEHICULAR LOADS. PROVIDE CONDUIT OR SLEEVE, FOR JB-1 JUNCTION BOXES, IN ACCORDANCE WITH PUBLICATION 403, SECTIONS 910 AND 1101.

4. PROVIDE POSITIVE DRAINAGE, 38-50 (1'-0") NONMETALLIC CONDUIT FOR JB-2 JUNCTION BOXES IN LOCATIONS WITH PEDESTRIAN TYPE LOADINGS. SEE DETAILS ON RC-81M.

5. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

6. PROVIDE STRUCTURAL STEEL CONFORMING TO ASTM-A36/A36M.

7. PROVIDE ALUMINUM CONFORMING TO ASTM-B221 ALLOY 6061-T6.

8. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

9. PROVIDE POSITIVE DRAINAGE, 38-50 (1'-0") NONMETALLIC CONDUIT FOR JB-1 JUNCTION BOXES, WHEN FEASIBLE. PROVIDE CONDUIT OR SLEEVE, FOR JB-1 JUNCTION BOXES, IN ACCESSION WITH PUBLICATION 403, SECTIONS 910 AND 1101.

10. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

11. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

12. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

13. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

14. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

NOTES:

1. PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 403, SECTIONS 910 AND 1101.

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3. PROVIDE PRECAST CONCRETE JUNCTION BOXES SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15. USE JB-1 AND JB-2 JUNCTION BOXES IN LOCATIONS SUBJECT TO VEHICULAR LOADS. PROVIDE CONDUIT OR SLEEVE, FOR JB-1 JUNCTION BOXES, IN ACCORDANCE WITH PUBLICATION 403, SECTIONS 910 AND 1101.

4. PROVIDE POSITIVE DRAINAGE, 38-50 (1'-0") NONMETALLIC CONDUIT FOR JB-2 JUNCTION BOXES, IN LOCATIONS WITH PEDESTRIAN TYPE LOADINGS. SEE DETAILS ON RC-81M.

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6. PROVIDE STRUCTURAL STEEL CONFORMING TO ASTM-A36/A36M.

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POLE MOUNTING DETAILS

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

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### TABLE G

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