
INFORMATION AND SPECIAL INSTRUCTIONS:

Incorporate the attached revisions into the April, 2000 Edition of the Standards for Roadway Construction. These revisions should be adopted as soon as practical on all new and existing designs without affecting any letting schedules. DB & E submissions to Central Office after July 30, 2003 should include these revisions.

The following represents a listing of the major changes or addition to each standard drawing. Only revised sheets are listed. Remaining sheets of the same standard show new dates only.

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<td>Revised the delta note to clarify the intent of 1:6:1 slope and class 3 excavation.</td>
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<td>Revised end view of contraction joint assembly to clarify the tolerance.</td>
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<td>Provided additional dimensions for some barrier sections to clarify the embedment, height and width of barrier.</td>
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**Roadside Development and Planting**

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1. Provide excavation, including the portions of endwalls above the flow line and to a maximum of 1200 (4'-0") above the top of the pipe or pipe-arch, as Class 4 excavation for pipe or pipe-arch less than 1200 (4'-0") inside diameter or span, respectively, and Class 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.

3. When deemed necessary to excavate below the bottom of the flow line, pay all excavation within the limits of the bottom of the excavated trench and the top of the existing ground as Class 1 excavation for plate pipe or plate pipe-arch with 1200 (4'-0") or greater inside diameter or span, respectively, and as Class 4 excavation for plate pipe or plate pipe-arch less than 1200 (4'-0") inside diameter or span, respectively. Place and compact backfill material for the undercut area conforming to the bottom of the culvert and consider incidental to the class specified.

4. Measure and pay excavation as shown in Section A-A, Section B-B and Section C-C.

5. All dimensions are given in millimeters except as noted. U.S. customary units in ( ) parenthesis.
GENERAL NOTES

1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUB 40B/2000. PLACE BACKFILL AND EMBANKMENT IN ACCORDANCE WITH THIS STANDARD DRAWING UNLESS OTHERWISE SHOWN ON THE STRUCTURE DRAWINGS.

2. USE ONLY R-3 ROCK LINING, MEETING THE REQUIREMENTS OF PUBLICATION 40BM, SECTION 850.2(0), AND AASHTO NO. 1, 3, 5 OR STRONGER BACKFILL AS SELECTED BORROW EXCAVATION STRUCTURE BACKFILL. DO NOT USE R-3 FOR STRUCTURE BACKFILL FOR ANY TYPE R-C OR METAL PLATE CULVERT.

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 CULVERTS, 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 ADJOINING EMBANKMENT SIMULTANEOUSLY UNLESS OTHERWISE PERMITTED BY THE ENGINEER.

7. REPLACE MATERIAL REMOVED BEYOND THE SPECIFIED LIMITS OF CLASS 1, 2 OR 3 EXCAVATION WITH STRUCTURE BACKFILL. CONSIDER MATERIAL REMOVED OR STRUCTURE BACKFILL PLACED BEYOND THE SPECIFIED LIMITS OF CLASS 1, 2 OR 3 EXCAVATION AS INCIDENTAL TO THE SELECTED BORROW EXCAVATION STRUCTURE BACKFILL AND WILL NOT BE PAID FOR SEPARATELY.

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

9. INDICATE STRUCTURE BACKFILL QUANTITIES ON THE STRUCTURE DRAWINGS.

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

*11. PLACE BACKFILL WITHIN 600 mm (24") FROM THE REAR FACE OF THE ABUTMENT AND THE MINIMUM 100 mm (4") COMPACT EACH LAYER WITH THE PASS OF A WALK-BEHIND VIBRATORY PLATE SOIL COMPACTOR.

*12. BACKFILL SIMULTANEOUSLY BEHIND BOTH ABUTMENTS. KEEP THE DIFFERENCE BETWEEN THE FILL HEIGHT AT BOTH ENDS OF THE BRIDGE BELOW 300 mm (12") AT ALL TIMES DURING BACKFILLING.

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
DIRECTOR OF DESIGN

BACKFILL AT STRUCTURES

LEGEND

* IDENTIFIES NOTES THAT APPLY ONLY TO INTEGRAL ABUTMENTS.
COATED DOWEL BARS, SEE NOTES 4 AND 5.

- See Note 9.

**NOTES**

1. Place a tube from a manufacturer listed in Bulletin 15 over the lubricated end of all dowel bars used in Type P joints and provide a minimum 5/16" clearance measured by means of a positive spacing device.

2. Cut expansion joint filler material to conform to the shape of the pavement and furnish in strips equal to the width of the joint.

3. Joint backing material shall consist of a two-part elastomeric material compatible with the surface treatment and provide a snug fit without loss in thickness of the material.

4. CONCRETE PAVEMENT JOINTS

5. Construct all transverse joints perpendicular to the centerline.

6. Use minimum No. 32 x 450 (11/2") long dowel bars for pavement depths 250 (10") or less and minimum No. 28 x 450 (11/2") long dowel bars for pavement depths greater than 250 (10").

7. Place joint bars parallel to the centerline and surface of the slab.

8. Use only approved neoprene seals, as listed in Bulletin 15. Install neoprene seals to a uniform depth with the top of the seal from a 1/4" to 10 (1/4"") below the level of the pavement surface. Make the top of the joint sealing material even with the top of the seal from 0 (0") to 3 (1") below the surface. Use heat resistant joint backing material for hot poured joints.

9. When silicone joint sealing material, as specified in Publication 48, Section 10.8, Type P is selected for use in transverse joints (Type P only) or transverse expansion joints, use the same joint sealing material in the longitudinal joints (Type L and alternate longitudinal shoulder joints).

10. Adjust the width of the second saw cut according to the seal size and pavement surface temperature at the time of sawing, as follows:

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<td>Size (Width, mm)</td>
<td>Size (Depth, mm)</td>
<td>Size (Width, mm)</td>
</tr>
<tr>
<td>15</td>
<td>6.5</td>
<td>104</td>
</tr>
<tr>
<td>13</td>
<td>5.0</td>
<td>90</td>
</tr>
<tr>
<td>11</td>
<td>3.0</td>
<td>70</td>
</tr>
<tr>
<td>9</td>
<td>1.5</td>
<td>60</td>
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11. All dimensions are given in millimeters unless otherwise noted. U.S. customary units in ( ) parenthesis.

12. Provide materials and workmanship in accordance with the requirements of Publication 40.

**NOTE:** Either all metric or all English values must be used on plans. Metric and English values shown may not be mixed.
1. Specify #6 (1/4") TIE BARS 25 (30") long, spaced 750 (30") center to center maximum. Place tie bars vertically and embed tie bars at least 9" below thin section. Use tie bars at least 750 (30") long. For Type L Construction Joints, embed tie bars 12". When adjusting to an unequal paving depth or ignoring paving depth, the depth of the thinner section tie bars must meet the minimum full-out requirements specified in Publication 408, Section 703.111.

2. Epoxy Coat tie bars as specified in Publication 408, Section 703.114. Cross coat or galvanize tie bars and threaded tie bar ends, excluding threads, as specified in Publication 408, Section 705.110 or Section 1105.201 respectively.

3. Straighten deformed bent tie bars so that the smallest size with the longitudinal joint is at least 60 degrees.

4. Make threaded sleeve nut from steel pipe or hexagonal steel bar 3.75 (1.5") long or 6 (2.5") long or high strength steel bar 22.5 (9") long.

5. Usually take the key former to the steel form. The longitudinal joint must be formed to provide 3/4" continuous length of key former to the key former or form during placement of the concrete.

6. Only form keyways for pavement depths greater than 250 (10") form only female keyways.

7. Place tie bolts at 750 (30") center to center maximum spacing. Embed tie bolts 25 (10") long or 12 (5") long or greater. When adjusting to an unequal paving depth, use 750 (30") long. Use 6 (2.5") long or high strength steel bar 22.5 (9") long. The depth of the thinner section tie bars must meet the minimum full-out requirements specified in Publication 408, Section 703.111.

8. At the contractor’s option, the concrete shoulder may be constructed at the same time as the pavement. In this case, use a Type L contraction joint.

9. Use an approved epoxy anchoring material to withstand the necessary full-out resistance specified in Publication 408, Section 703.114. Full-out resistance is 150, 180, and 200 (6") at the required depth. Use 150, 180, and 200 (6") for tie bars 0.5" or less and 6 (2.5") for tie bars 0.5" or less. Use heat resistant joint backing material for not exposed bares.

10. Do not use the hook component of the tie bolt assembly when slip forming.

11. Use an approved epoxy anchoring material to withstand the necessary full-out resistance specified in Publication 408, Section 703.114. Full-out resistance is 150, 180, and 200 (6") at the required depth. Use 150, 180, and 200 (6") for tie bars 0.5" or less and 6 (2.5") for tie bars 0.5" or less. Use heat resistant joint backing material for not exposed bares.

12. Make the tip of the joint sealing material from 3.75 (1.5") to 6 (2.5") below the pavement surface. Use heat resistant joint backing material for not exposed bares.

NOTE: Either all metric or all English values must be used on plans, metric and English values shown may not be mixed.
Dowel Bar Keeper Clip, See Note 6.

"J" Design

Typical Side Frame Details

Center Frame Wire Detail

Weld Details Center Frame Wire Detail

Notes

1. The standard test procedures for the components required for durability for fabrication, installation, testing, and acceptance of products manufactured by approved manufacturers listed in Bulletin No. 1 shall be permitted.

2. Provide anchor stakes to secure units from movement including uplift. Anchor stakes shall engage the upper side wire for fixed form paving. Anchor stakes shall engage the lower side wire for slip form paving. Anchor stakes shall be embedded if the top course is OG, asphalt treated permeable base, cement treated permeable base, asphalt treated rigid base, and concrete overlayer. Anchor stakes shall be embedded if the top course is a non-reinforced asphalt concrete wearing course or a rigid wearing course.

3. Provide stakes of sufficient length such that 4.5 ft. will be protruding above the top course of the pavement, except for reinforced permeable base and asphalt treated rigid base. Provide two anchor stakes per expansion joint and anchor stakes shall be spaced not more than 10 ft. apart.

4. Provide either all metric or all English values shown in the drawings. English values shown may not be mixed. Only metric values shall be used on plans. Metric and English values shown may not be mixed.

5. Dowel Bar Keeper Clips may be used in lieu of tie wires or shipping wires for construction and expansion joint assemblies.

6. Provide anchor stakes with a minimum of eight stakes are to be used. For fixed form paving, anchor stakes shall engage the lower side wire. For slip form paving, anchor stakes shall engage the upper side wire. Anchor stakes engage the upper side wire of the expansion joint assembly when the pavement is designed to accommodate the deflection of the expansion joint. Anchor stakes may not engage the lower side wire of the expansion joint assembly when the pavement is designed to accommodate the deflection of the expansion joint. Provide anchor stakes with a minimum of eight stakes are to be used. For fixed form paving, anchor stakes shall engage the lower side wire. For slip form paving, anchor stakes shall engage the upper side wire. Anchor stakes engage the upper side wire of the expansion joint assembly when the pavement is designed to accommodate the deflection of the expansion joint. Anchor stakes may not engage the lower side wire of the expansion joint assembly when the pavement is designed to accommodate the deflection of the expansion joint.

7. Provide expansion joint filler, see details.

8. Provide dowel bars parallel to the centerline and to the pavement surface. Make tolerances of this placement within ± 0.125" per dowel bar.

9. Provide details and assembly details that conform to publication 436.

10. Weld requirements as listed below and tested per manufacturer’s quality control plan for weld shear.

11. Wire tolerances per ASTM D1015 15.0 ± 0.05 mm (0.002 in).

Commonwealth of Pennsylvania Department of Transportation Bureau of Design

Concrete Pavement Joints Non-Skewed Load Transfer Assemblies

Recommended Apr. 20, 2003

Chief Engineer

Dowel Bar Keeper Clip

"J" Design

Typical Side Frame Details

"A" Design

Typical Anchorage Details

Typical Anchor Stake Details

Elevated Expansion Joint Assembly

Typical Load Transfer Assembly

Typical Load Transfer Assembly

SNT 3, SP 12

SNT 3, SP 12

Commonwealth of Pennsylvania

Department of Transportation

Bureau of Design

Concrete Pavement Joints

Non-Skewed Load Transfer Assemblies

Recommended Apr. 20, 2003

Chief Engineer

RC-20M
**NOTES**

1. Construct aggregate base as specified in Publication 408, Section 350.2 and consider as part of the shoulder.

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

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

4. Slope shoulder at 6.07 for effective shoulder widths < 2.4 m (8').

5. Slope shoulder at 4.07 for effective shoulder widths > 2.4 m (8').

6. For shoulders that specify rumble strips installations, use only bituminous wearing course, ID-2 or ID-3, or Superpave, 9.5mm or 12.5mm, HMA wearing course, 40 (1½") minimum.

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

8. All dimensions are in millimeters unless otherwise noted.

9. See sheets 4 and 5 for rumble strips details.
SHOULDER PAY LIMIT

EDGE OF DEPTH AS SHOWN ON THE NOTE EXISTING OR WIDENED PAVEMENT-----

EXISTING MATERIAL

SEE NOTE 5

EXISTING OR WIDENED PAVEMENT-----

BIT. SURF. TREATMENT INCIDENTAL TO TYPE 6-SHOULDERS

SEE NOTE 5

EXISTING MATERIAL

See Note 5.

GRADE TO THIS LINE

EXISTING MATERIA~ EXISTING SHOULDER PROPERLY PREPARED SURFACE, SEE NOTE 1.

250 TO 300 (10" TO 12") SHOULDER SEE NOTE 6.

TYPICAL SHOULDER DETAIL

WITH BITUMINOUS TAPER SHOULDER WEDGE

TYPICAL SHOULDER DETAIL

PROPOSED RESURFACING ACROSS SHOULDER.

SHOULDER SLOPE

SHOULDER SLOPE

SHOULDER SLOPE

GRADE TO THIS LINE

SHOULDER SLOPE

SHOULDER SLOPE

PROPERLY PREPARED SURFACE, SEE NOTE 1.

NOTES

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

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

3. THE GUIDE RAIL TYPE, HEIGHT AND LOCATION FROM SHOULDER MAY VARY, BUT WHEN THE HEIGHT FROM THE TOP OF RAIL TO PROPOSED SURFACE BECOMES LESS THAN 610 (24"), REMOVE, REPLACE AND/OR RESET THE GUIDE RAIL IN ACCORDANCE WITH CURRENT GUIDE RAIL STANDARDS. WHERE GUIDE RAIL HAS BEEN ALLOWED TO EXTEND BEYOND THE RAIL, REMOVE THE RADING RAIL WHEN THE HEIGHT FROM THE TOP OF GUIDE RAIL TO PROPOSED SURFACE BECOMES LESS THAN 100 (40").

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

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

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

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

8. FOR SHOULDERS THAT SPECIFY RUMBLE STRIP INSTALLATIONS, USE ONLY BITUMINOUS WEARING COURSE, ID-2 OR ID-3, OR SUPERPAVE, 9.5mm OR 12.5mm HMA WEARING COURSE, 40 (1 1/2") DEPTH MINIMUM.

9. SEE SHEETS 4 AND 5 FOR RUMBLE STRIP DETAILS.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
CONCRETE SHOULDER, LONGITUDINAL TIE BARS OR TRANSVERSE ROADWAY JOINT

TYPE 1

CONCRETE SHOULDER - TYPE 1

REINFORCEMENT AT OPENINGS

LONGITUDINAL SHOULDER JOINT

TIE BARS OR TIEBOLTS

CONCRETE SHOULDERS ADJACENT TO PLAIN CONCRETE PAVEMENT FOR COLLECTORS AND LOCAL ROADS.

CONCRETE SHOULDER, TRANSVERSE ROADWAY JOINT

TYPE 2

CONCRETE SHOULDER - TYPE 2

CONCRETE SHOULDER, LONGITUDINAL TIE BARS OR TIEBOLTS

CONCRETE SHOULDER - TYPE 2

CONCRETE SHOULDER, TRANSVERSE ROADWAY JOINT

TYPE 2

CONCRETE SHOULDER - TYPE 2

CONCRETE SHOULDERS ADJACENT TO RCC PAVEMENT AND PCC PAVEMENT FOR INTERSTATE AND OTHER LIMITED ACCESS FREeways, ARTERIALS AND RAMPS

CONCRETE SHOULDERS ADJACENT TO PLAIN LIMITED ACCESS FREEWAYS, ARTERIALS AND RAMPS

CONCRETE SHOULDERS ADJACENT TO RCC PAVEMENT OR TYPICAL SECTIONS

NOTES:

1. SPECIFY THE AGGREGATE BASE AS IN PUBLICATION 408, SECTION 350.3 AND CONSIDER INCURRANT TO THE SHOULDER.

2. SEAL ALL SHOULDER JOINTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 350.3.

3. FOR JOINT DETAILS, SEE RC-20M.

4. ALIGN SHOULDER TRANSVERSE JOINTS TO ADJACENT PAVEMENT JOINTS.

5. SEAL ALL SHOULDER JOINTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 350.3 AND CONSIDER INCURRANT TO THE SHOULDER.

6. AT THE CONTRACTOR'S OPTION, TYPE 2 CONCRETE SHOULDERS MAY BE CONSTRUCTED ON A TYPICAL, WITH 4.5 m (15') DEPTH OF THE PAVEMENT, AT NO ADDITIONAL EXPENSE TO THE DEPARTMENT.

7. TYPICALLY, DO NOT PLACE TIE BARS OR TIEBOLTS ON EITHER SIDE OF INTERMEDIATE SHOULDER JOINTS ADJACENT TO RCC PAVEMENTS.

8. WHEN THE SHOULDER IS STRUCTURALLY PART OF A PARAPET TRANSVERSE SHOULDER JOINTS, SEE SHEETS 4 AND 5 FOR RUMBLE STRIP DETAILS.

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SHOULDER - (CONCRETE)

9. SEE SHEETS 4 AND 5 FOR RUMBLE STRIP DETAILS.

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SHOULDER - (CONCRETE)
ACCELERATION LANE DETAIL
FOR RUMBLE STRIP INSTALLATION

DECELERATION LANE DETAIL
FOR RUMBLE STRIP INSTALLATION

TYPICAL PLAN VIEW FOR
RUMBLE STRIPS ON BITUMINOUS SHOULDERS

TYPICAL PLAN VIEW FOR
RUMBLE STRIPS ON CONCRETE SHOULDERS

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

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SHOULDER RUMBLE STRIPS
(LIMITED ACCESS HIGHWAYS)

RECOMMENDED APR. 23, 2002
RECOMMENDED APR. 30, 2002
SIGNATURE: [Signature]
DATE: [Date]
SHEET: RC-25M
TYPICAL PLAN VIEW FOR RUMBLE STRIP ON BITUMINOUS SHOULDERS

TYPICAL PLAN VIEW FOR RUMBLE STRIPS ON CONCRETE SHOULDERS

TYPICAL INTERSECTION DETAIL FOR RUMBLE STRIP INSTALLATION

TYPICAL DRIVeway DETAIL FOR RUMBLE STRIP INSTALLATION

NOTES
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 408, SECTION 660.
3. DO NOT CONSTRUCT SHOULDER RUMBLE STRIPS ACROSS A JOINT.
4. 300 ±13 (12"±½") FOR LEFT MEDIAN SHOULDERS.
   450 ±13 (18"±½") FOR RIGHT SHOULDERS (2.4 m ±½")
   900 ±13 (36"±½") FOR RIGHT SHOULDERS LESS THAN 2.4 m (8') WIDE, SEE CONSTRUCTION PLANS FOR OFFSET DIMENSIONS.
5. IF THERE IS NO ACTUAL PAINTING SHOULDER JOINT, MEASURE THE OFFSET FROM THE PAVEMENT SHOULDER TRAFFIC LINE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SHOULDERS
RUMBLE STRIPS
(FREE ACCESS HIGHWAYS)

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

1. IF THERE IS NO ACTUAL PAVEMENT SHOULDER JOINT, MEASURE FROM THE PAVEMENT SHOULDER TRAFFIC LINE.
2. DO NOT CONSTRUCT SHOULDER RUMPBLE STRIPS ACROSS A JOINT.
3. CONSTRUCT RUMBLE STRIPS IN ACCORDANCE WITH PUBLICATION 408 SECTION 660.
4. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR 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 TRANSVERSE JOINTS SUCH THAT ANGLES LESS THAN 60° ARE AVOIDED ON CORE PAVEMENT WHERE POSSIBLE.

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

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

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

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

LEGEND

A. DEPTH BELOW SUBBASE EQUAL TO THE OUTSIDE DIAMETER OF SPECIFIED PIPE PLUS 30"

B. SUBGRADE DEPTH. IF SLUDDING OF THE SUBBASE MATERIAL FROM UNDER THE PAVEMENT IS OBSERVED DURING TRENCH EXCAVATION, COMPACT BACKFILL HYDRAULICALLY, AS DIRECTED BY THE ENGINEER.

C. WIDTH IS EQUAL TO 75-125 (3"-5") OF BACKFILL AGGREGATE PLUS 25 (1") FOR THE PREFABRICATED BASE DRAIN.

D. VARY TO MAINTAIN THE NECESSARY SUBGRADE SLOPE. CONSIDER ADDITIONAL AGGREGATE INCIDENTAL TO THE SUBGRADE DRAIN PAY ITEM.

NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.
BACKFILL DETAIL AT ENDWALL
FOR CONCRETE PIPE

EXCAVATION FOR ENDWALLS

NOTE:
- PROVIDE MATERIALS AND CONSTRUCT AS SPECIFIED IN PUBLICATION 408/2000, SECTION 601 FOR PIPE CULVERTS, SECTION 602 FOR CORRUGATED METAL PIPE-ARCH CULVERTS AND SECTION 603 FOR METAL PLATE CULVERTS.
- SHORING OR TRENCH BOX INSTALLATION FOR FLEXIBLE PIPE IS NOT NORMALLY USED. IF SHORING OR TRENCH BOX INSTALLATION IS PERMITTED IN SPECIAL CIRCUMSTANCES, REFER TO PUBLICATION 408/2000, SECTION 601.
- IN ALL EXCAVATION AREAS FOLLOW OSHA SAFETY REQUIREMENTS.
- DO NOT COMPACT NO. 8 MATERIAL USED FOR BEDDING UNDER CONCRETE PIPES.
- ALLOW NO PAYMENT FOR EXCAVATION IN EXCESS OF SPECIFIED LIMITS AND FOR ADDITIONAL BACKFILL MATERIAL REQUIRED.
- PAYMENT FOR THE BACKFILL ENVELOPE, INCLUDING BEDDING, COARSE AGGREGATE AND SUITABLE MATERIAL UP TO 300 (12") ABOVE THE PIPE IS INCIDENTAL TO THE PIPE.

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

CONSTRUCTION DETAILS BELOW COVER THE FOLLOWING CONDITIONS:

(A) PIPE Lying ON TOP OF THE NATURAL GROUND, OR ON COMPACTED FILM, LOOSE FILM AND TO BE COVERED WITH EARTH FILM.

(B) THE EXISTING GROUND IS BETWEEN THE TOP AND THE BOTTOM OF THE TRENCH OF THE PIPE AND TO BE COVERED WITH EARTH FILM.

1. THE TOP OF THE PIPE IS BELOW THE LEVEL OF THE NATURAL GROUND OR COMPACTED FILM, OR MINIMUM SUBGRADE AND TO BE COVERED WITH EARTH FILM, TO HEIGHTS ABOVE THE NATURAL GROUND.

NOTE: IF UNSUITABLE MATERIAL IS FOUND, UNDERCUT AS DIRECTED AND BACKFILL WITH SUITABLE MATERIAL TO BOTTOM OF BEDDING ELEVATION. (UNLESS OTHERWISE SPECIFIED.)

2. FOR CONCRETE PIPE, SEE STEP GA.

3. LAY PIPE ON APPROPRIATE BEDDING. SEE STEP GD FOR METAL PIPE AND METAL PLATE PIPE ARCH.

4. REFER TO PUBLICATION 408/2000, SECTION 601.

5. PAYMENT FOR THE BACKFILL ENVELOPE INCLUDING BEDDING, COMPACTED AGGREGATE, AND SUITABLE MATERIAL UP TO 

6. PERMIT PLACEMENT OF BACKFILL MATERIAL IN LAYERS, LIFTS, 200 (8") THICK WHEN USING VIBRATORY COMPACTION EQUIPMENT,

7. COMPACT TOP 1000 (3'-0") OF SUBGRADE TO 1000 IN ACCORDANCE WITH SECTION 601.

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
OFFICE OF DESIGN

SUBSURFACE DRAINS
PIPE PLACEMENT
EXCAVATION - BEDDING - BACKFILL
NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE REQUIREMENTS OF PUBLICATION 40B, SECTIONS 601 AND 620.
2. FLOWABLE BACKFILL WILL ENVELOP THE LAST SECTION OF PIPE OR END SECTION. CONSTRUCT SLOPE OF FLOWABLE BACKFILL MATERIAL, AS SPECIFIED IN SPECIAL PROVISION OR PROVIDE FORMWORK TO CONTAIN FLOWABLE BACKFILL.
3. PAYMENT FOR THE BACKFILL DEVELOP (ABRASIVE, BEDDING AND BEDFILL OR FLOWABLE BACKFILL MATERIAL) AND SUITABLE MATERIAL UP 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 4 WHEN FLOWABLE BACK FILL IS SPECIFIED.

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

*SUITEABLE MATERIAL CONTAINING NO DEBRIS, ORGANIC MATERIAL, PRESSED MATERIAL OR LARGE STONES WITH A DIAMETER GREATER THAN ONE-HALF THE THICKNESS OF THE COMPACTED LAYERS BEING PLACED.

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

DETAIL "A"

PLAN VIEW

SECTION B-B OR C-C

SECTION A-A

CAST-IN-PLACE MANHOLE

FOR Pipes WITH 750 (30") INSIDE DIAMETER AND LESS

FOR BASE SLAB DIMENSIONS

REINFORCEMENT DETAILS AT OPENINGS

REINFORCEMENT DETAILS AT OPENINGS

A SAFE BEARING CAPACITY OF 0.15 MPa (1.5 Tons Per SQ. ft) UNDER THE ENTIRE BASE SLAB IS ASSUMED TO DETERMINE THE BASE SIZE. WHEN THE SUBSOIL IS EXTREMELY POOR, PROCEED WITH CONSTRUCTION ONLY AFTER THE ENGINEER SPECIFIES AN ADEQUATE BASE DESIGN.

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

DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER

MARCH 30, 2003

RECOMMENDED APR. 30, 2003

SIGNED: L. C. ROSS
DIRECTOR, BUREAU OF DESIGN

RECOMMENDED APR. 30, 2003

SIGNED: L. C. ROSS
DIRECTOR, BUREAU OF DESIGN

REF: 1 OF 6

RC-39M

STANDARD MANHOLES
CAST-IN-PLACE MANHOLES
1. For construction requirements see Note 1, Sheet 1.

2. Footing design span normal to pipe to carry positive moment of 1/10 Wl and negative moment of 1/12 Wl^2 where W is the uniform load. Do not take into account the concrete in the channel when calculating capacity of the footing.

3. Design procedure for manhole box section:
   - Place reinforcement bars as shown in the manhole opening, see Section A-A for details.
   - Place additional bars in the slab at 45° around the manhole opening, see Section A-A for details.

4. Top slab:
   - Design a 305 (12") wide slab strip for one-way action to carry dead load, live load, and weight of earth. Span the strip, simply supported, across the width of the box or in the short direction. See Figure 2 for details.

5. "Edge beam":
   - Design the edge beam spanning the length of the box to carry a uniformly distributed load equal to the reaction from the slab.

6. Walls:
   - Design the walls to carry the dead load due to earth long, live load, and dead load on the reinforcement to the wall or the moment caused by saturated at rest earth pressure. See Figure 1 for details.

7. Footing:
   - Design a footing normal to pipe to carry positive moment of 1/10 Wl and negative moment of 1/12 Wl^2 where W is the uniform load. Do not take into account the concrete in the channel when calculating capacity of the footing.

8. As a minimum, provide No. 13 and No. 6 bars at 2'0" centers, top and bottom of slab in the opposite direction.
1. Precast manholes meeting the requirements of Publication 408, Section 605.2(cl. Alternate configurations and dimensions, as approved by the engineer, may be used.

2. For construction requirements, see Sheet 1.

3. For permissible location of pipes see plan view and note 3, Sheet 1.

4. For risers on base sections with openings, provide a minimum height as shown to prevent or limit wall sag.

5. For sections with openings located at a depth of 3' or more, provide circumferential reinforcement equal to 30% of the wall thickness in the opening and the closest joint between risers - see detail A.

6. For sections with openings located at a depth of 3' or more, provide circumferential reinforcement equal to 30% of the wall thickness in the opening and the closest joint between risers - see detail A.

7. For sections with openings located at a depth of 3' or more, provide circumferential reinforcement equal to 30% of the wall thickness in the opening and the closest joint between risers - see detail A.

8. Mark risers or base sections with holes clearly with maximum allowable depth.

9. Provide additional reinforcement bars around openings as shown on reinforcement detail at openings Sheet 1.

10. For channel details in precast manhole see cast-in-place manhole Sheet 1.

11. Provide manhole steps meeting the requirements of Publication 408, Section 605.2(cl. Alternate configurations and dimensions, as approved by the engineer, may be used.

12. Provide minimum 25 (1") section dimension for metal steps. Provide minimum 19 (3/8") section dimension for non-decorating material steps.

13. Mechanical anchor required for installation of steps without power.

14. The alternate opening reinforcement detail is not desirable by design. See 11 to meet existing pipe elevations.

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

Standard manholes & precast manholes

Standard manholes

Precast manhole models

Top steel requirements

Bottom steel requirements

<table>
<thead>
<tr>
<th>Precast Models</th>
<th>Top Steel Requirements</th>
<th>Bottom Steel Requirements</th>
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<tr>
<td></td>
<td>D.0 TO E.0</td>
<td>10.00</td>
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<td>NO. 10 BARS AT 150 C TO C</td>
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<td></td>
<td>NO. 15 BARS AT 200 C TO C</td>
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<tr>
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<td>MAXIMUM SPACING: 150</td>
<td>MAXIMUM SPACING: 150</td>
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TABLE B

Note: See detail Sheet 1.
SECTION B-B

NOTES:

1. PRECAST MANHOLES MEETING THE REQUIREMENTS OF PUBLICATION 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.

2. PLACE SUBBASE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 350.2, IN LAYERS 100 MM (4") THICK, COMPACTED TO A DENSITY SATISFACTORY TO THE ENGINEER AND INCIDENTAL TO THE MANHOLE PAY ITEM.

3. FOR ALL OTHER DESIGN REQUIREMENTS AND APPLICABLE NOTES, SEE SHEET 3.

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

STANDARD MANHOLES
COVERS, FRAMES AND ADJUSTMENT RISERS

RECOMMENDED APR. 30, 2003
DIRECTOR, BUREAU OF DESIGN

RC-39M
NOTE: EITHER ALL METRIC OR ALL ENGLISH VALUES MUST BE USED ON PLANS. METRIC AND ENGLISH VALUES SHOWN MAY NOT BE MIXED.

CAST IRON MANHOLE COVER

EXPANSION JOINT CORNER, SEE MANHOLE DETAILS.

ELEVATION VIEW OF MANHOLE FRAME

DETAIL A
GASKET SEALING SYSTEM

ELEVATION VIEW

SECTION A-A
ONE PIECE ADJUSTMENT RISER

PLAN VIEW

ADJUSTMENT RISERS

SECTION B-B
MULTI-PIECE ADJUSTMENT RISER

CASE IRON MANHOLE COVER

CAST IRON MANHOLE COVER

PLATEN COVER

STANDARD COVER

PLAN VIEW

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

STANDARD MANHOLE COVERS, FRAMES AND ADJUSTMENT RISERS

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**


   **B.** Calculate foundation bearing pressures by service load methods. Design all other portions of the manhole by load factor method.

   **C.** The safe bearing pressure is not to exceed the existing state of stress at 0.15 MPa (1.5 tons per sq. ft.) whenever greater.

2. **Calculation of Pressure**

   **C.** Determine the overturning moment from unbalanced earth pressure.

   **D.** Determine dimension of design section to carry moment as shown in Figure 1.

3. **Reinforcement**

   **B.** Design hoop reinforcement shown in section A-A, to carry the moment and axial thrust.

   **C.** Check crack control under service load.

   **D.** Check crack control under service load.

   **F.** Check crack control under service load.

   **F.** Check crack control under service load.

4. **Footing Design**

   **A.** Design footing size to create an equivalent circular footing for design.

   **B.** Check crack control under service load.

   **C.** Design hoop reinforcement in section A-A, to carry the moment and axial thrust.

   **D.** Check crack control under service load.

   **E.** Check crack control under service load.

   **F.** Design reinforcement for shrinkage and temperature at all concrete faces where reinforcement is not required by design.

   **G.** For construction requirements see note 1, sheet 1.

   **H.** Provide at least 1 inch of drainage and temperature at all concrete faces where reinforcement is not required by design.

5. **Concrete**

   **C.** Check crack control under service load.

   **F.** Check crack control under service load.

   **F.** Check crack control under service load.

6. **Reinforcing Steel**

   **B.** Design hoop reinforcing shown in section A-A, to carry the moment and axial thrust.

   **C.** Check crack control under service load.

   **D.** Check crack control under service load.

   **F.** Check crack control under service load.

7. **Compressive Zone**

   **C.** Check crack control under service load.

   **F.** Check crack control under service load.

8. **Structural Analysis**

   **C.** Check crack control under service load.

   **F.** Check crack control under service load.

9. **Foundation Design**

   **C.** Check crack control under service load.

   **F.** Check crack control under service load.

10. **Conclusion**

    **G.** For construction requirements see note 1, sheet 1.
1. PROVIDE CONCRETE MEDIAN BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 350.
2. PROVIDE PRECAST CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15.
3. FOR CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION, USE PREMOLDED JOINT MATERIAL AT ALL CONSTRUCTION JOINTS.
4. CONCRETE MEDIAN BARRIER CONSTRUCTION ON EXISTING PAVEMENT REQUIRES SPECIAL DETAILS TO BE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. FOR PERMANENT AND TEMPORARY BARRIER INSTALLATIONS, USE SIDE-MOUNT DELINEATOR OR REFLECTOR UNITS AS DETERMINED ON REFERENCE DRAWINGS.
6. COMPACT NO. 2A OR NO. 3S MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 623.
7. PROVIDE PRECAST CONCRETE MEDIAN BARRIER FOR USE AS TEMPORARY (MPT) BARRIER-MOUNT DELINEATOR OR TOP-MOUNT DELINEATOR AS DETERMINED ON REFERENCE DRAWINGS.
8. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") UNLESS OTHERWISE NOTED.
9. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
10. FABRICATE REINFORCEMENT BARS ACCORDING TO PENNDOT BRIDGE CONSTRUCTION STANDARDS, BC-736M.
11. TO LIMIT LATERAL DISPLACEMENT OF PORTABLE BARRIER WHEN USED IN WORK ZONES, PROVIDE TOP-MOUNT DELINEATOR OR REFLECTOR UNIT AS DETERMINED ON REFERENCE DRAWINGS.
12. PROVIDE CONCRETE MEDIAN BARRIER MEETING THE REQUIREMENTS OF STANDARD, BC-736M.
1. A TYPICAL END TRANSITION MAY BE USED FOR PERMANENT BARRIER INSTALLATIONS
   WHEN THE LAST BARRIER SECTION IS LOCATED OUTSIDE THE REQUIRED CLEAR
   ZONE, AS DETERMINED IN PUBLICATION 408, SECTION 709 WITH A MINIMUM CONCRETE
   COVER OF 40 (1½").

2. PROVIDE SUITABLE LIFTING DEVICES FOR HANDLING, INSTALLING AND
   REMOVING PRECAST CONCRETE BARRIERS, AS SPECIFIED IN PUBLICATION 408,
   SECTION 114.6.8.1.

3. PROVIDE REINFORCEMENT STEEL MEETING THE REQUIREMENTS OF
   PUBLICATION 408, SECTION 709 WITH A MINIMUM CONCRETE COVER OF 40
   (1½").

4. EPOXY COATED REINFORCEMENT IS NOT REQUIRED WHEN PRECAST CONCRETE
   MEDIAN BARRIER IS TO BE USED IN TEMPORARY INSTALLATION ONLY, IN
   ACCORDANCE WITH SECTION 627, AND IDENTIFIED AS SUCH, AS SPECIFIED IN SECTION
   714.G(c).

5. 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.
**IMPACT ATTENUATING DEVICE CLEARANCE MARKER**

W16-2R AND 2L, SEE NOTE 2.

**STEEL PLATE,** SEE NOTE 1.

**THROUGH ROADWAY W16-2R GORE AREA**

**DETAIL A**

**DELINEATION OF IMPACT ATTENUATING DEVICES**

**TYPICAL INLET PLACEMENT AT CONCRETE MEDIAN BARRIER**

**SLOT DETAIL**

**PERMISSIBLE TAPER**

**SLOTTED PLATE CONNECTION**

**SEAL JOINTS WITH AN APPROVED JOINT SEALER.**

**TYPE W CONCRETE TOP UNIT INLET BOX CAST IRON GRATE**

**TABLE 1**

<table>
<thead>
<tr>
<th>FLARE RATES FOR BARRIER DESIGN</th>
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<tr>
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</tr>
<tr>
<td>GUIDE RAIL</td>
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</tr>
<tr>
<td>120</td>
<td>75</td>
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<td>75</td>
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</tbody>
</table>

**TABLE 1**

**FLARE RATES FOR BARRIER DESIGN**

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>MAXIMUM FLARE RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>km/h</td>
<td>mph</td>
</tr>
<tr>
<td>120</td>
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<td>40</td>
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<tr>
<td>75</td>
<td>35</td>
</tr>
<tr>
<td>70</td>
<td>30</td>
</tr>
</tbody>
</table>

**NOTES**

1. PROVIDE PLATES, 13 x 305 x 685 (½" x 12" x 27"), MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105.02(5). CLEARANCE PLATES AS SPECIFIED IN PUBLICATION 408, SECTION 1105.02(1).

2. PROVIDE VERTICAL RECTANGLE, STANDARD ALUMINUM, PRESSURE SENSITIVE CLEARANCE MARKERS, W16-2R OR W16-2L, FABRICATED FROM CLASS II SHEETING MATERIAL, FOR DELINEATION OF IMPACT ATTENUATING DEVICES AS PRESENTED IN DETAIL A. ATTACH MARKERS DIRECTLY TO THE LEADING ENDS OF IMPACT ATTENUATING DEVICES. CLEARANCE MARKERS ARE SUPPLIED WITH THE ADHESIVE SIDE FACING OUT. CLEARANCE MARKERS ARE REQUIRED TO BE DIRECTLY ATTACHED TO BARRIER FRONT OR NOSE SECTION. <! INERTIAL BARRIERS SANS BARRELS J, PROVIDE SENSITIVE SHEETING, WITHOUT RIGID BACKING, DIRECTLY TO BARRIER FRONT OR NOSE SECTION. DO NOT POST-MOUNT MARKERS IN FRONT OF IMPACT ATTENUATING DEVICES. MARKERS ARE PROVIDED IN TWO SIZES: 305 x 914 (12" x 36") AND 457 x 914 (18" x 36"), WHEN ONE MARKER IS REQUIRED, USE 457 x 914 (18" x 36"), WHEN TWO MARKERS ARE REQUIRED SIDE BY SIDE, USE 305 x 914 (12" x 36"). PROVIDE COLOR FOR CLEARANCE MARKERS AS FOLLOWS:

   - BLACK STRIPES (NON-REFLECTORIZED) ORANGE REFLECTOR, CONSTRUCTION ZONES
   - REFLECTORIZED: CONSTRUCTION ZONES

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

**CONCRETE MEDIAN BARRIER F-SHAPE**

**RECOMMENDED APR.30, 2003**

**NOTES**

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

1. PROVIDE REINFORCEMENT MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 709.

2. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 " EXCEPT AS SHOWN.

3. FOR ALTERNATE WRF REINFORCED BARRIERS, SEE SHEET 2.

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 RECOMMENDED APR. 30, 2003

DIRECTOR, BUREAU OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

TYPICAL 810 TO 810 (32" TO 32")
BRIDGE TO HIGHWAY TRANSITION
( THE BRIDGE BARRIER IS A SPLIT CONCRETE MEDIAN BARRIER)

SHEET NO. RC-57M
SHR 5, OF 8
1. PROVIDE REINFORCEMENT MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 709 WITH A MINIMUM CONCRETE COVER OF 40 (1 1/2") EXCEPT AS SHOWN.
2. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
3. FOR ALTERNATE WWP REINFORCED BARRIERS, SEE SHEET 2.

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
BORROW OF DESIGN

CONCRETE MEDIAN BARRIER
F-SHAPE

TYPICAL 810 TO 1270 (32" TO 50") HIGHWAY TRANSITION

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

NOTE: FOR ALTERNATE WFF REINFORCED BARRIERS, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

ORTHOGONAL VIEW

TYPICAL 1270 TO 1270 (50° TO 50°) TRANSITION
BRIDGE TO HIGHWAY TRANSITION

(The bridge barrier is a concrete glare screen median barrier)
TYPICAL 1270 TO 1270 (50° TO 50°) TRANSITION
BRIDGE TO HIGHWAY TRANSITION
(THE BRIDGE BARRIER IS A SPLIT CONCRETE GLARE SCREEN MEDIAN BARRIER)
SECTION A-A
NOTE 1
A = SEE TYPICAL SECTIONS, SHEET 2.

PLAN VIEW
RIGHT END TRANSITION

SECTION B-B

ORTHOGRAPHIC VIEW
TYPICAL BARRIER SECTION

ORTHOGRAPHIC VIEW
TYPICAL END TRANSITION
SEE NOTE 5.

NOTES
1. PROVIDE SINGLE FACE CONCRETE BARRIER MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 623.
   A. MINIMUM CONCRETE CLASS AA, EXCEPT USE CLASS AAA CONCRETE FOR PRECAST BARRIERS.
2. PROVIDE PRECAST SINGLE FACE CONCRETE BARRIER SUPPLIED BY A MANUFACTURER AS LISTED IN BULLETIN 15. MODIFICATIONS OR DEVIATIONS FROM THE STANDARD REQUIRE THE SUBMISSION OF SHOP DRAWINGS FOR REVIEW.
3. PROVIDE BARRIER-MOUNT OR REFLECTOR UNIT DELINEATORS, AS INDICATED ON RC-57M.
4. PROVIDE REINFORCEMENT FOR SINGLE FACE CONCRETE BARRIER AS INDICATED ON SHEET 2.
5. PROVIDE END TRANSITIONS OR IMPACT ATTENUATING DEVICES AS INDICATED ON RC-57M.
6. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 (1") EXCEPT AS SHOWN.
7. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
   U.S. CUSTOMARY UNITS IN PARENTHESES.
8. FABRICATE REINFORCEMENT BARS ACCORDING TO PENNDOT BRIDGE CONSTRUCTION STANDARD, BC-736M.
9. TO LIMIT LATERAL DISPLACEMENT OF PORTABLE BARRIER WHEN USED IN WORK ZONES, PROVIDE A MILD 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 1/8" IN DEPTH.

TYPICAL PRECAST OR CAST-IN-PLACE SINGLE FACE CONCRETE 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 DESIGN

SINGLE FACE CONCRETE BARRIER

REFERENCE DRAWINGS

REINFORCEMENT BAR FABRICATION DETAILS

BARRIER PLAN

SHOW WITH WWF ALTERNATE ON LEFT END OF BARRIER FOR DETAILING PURPOSES. BOTH ENDS OF BARRIER ARE TYPICAL.

SELECTION A-A

NOTES

1. PROVIDE PLATES MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 1105. GALVANIZE PLATES AS SPECIFIED IN PUBLICATION 408, SECTION 1105 ALTERNATIVE 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, 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.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

SINGLE FACE CONCRETE 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.
NOTES

1. PROVIDE SINGLE FACE CONCRETE BARRIER AND GUIDE RAIL MEETING THE REQUIREMENTS OF PUBLICATION FOR, SECTIONS 620 AND 621.

2. THE TREATMENTS SHOWN ARE FOR FOUR-LANE DIVIDED HIGHWAYS. USE THE APPROACH END TREATMENT ON BOTH SIDES OF THE OBSTRUCTION IN 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, PREFERRED 1:2, ONE FOOT DEEP OR DEEPER. 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.

5. SEE NOTE 3.

6. FOR FLARE RATES SEE TABLE I.

1. PROVIDE SINGLE FACE CONCRETE BARRIER AND GUIDE RAIL MEETING THE REQUIREMENTS OF PUBLICATION FOR, SECTIONS 620 AND 621.

2. THE TREATMENTS SHOWN ARE FOR FOUR-LANE DIVIDED HIGHWAYS. USE THE APPROACH END TREATMENT ON BOTH SIDES OF THE OBSTRUCTION IN 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, PREFERRED 1:2, ONE FOOT DEEP OR DEEPER. 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.

5. SEE NOTE 3.

6. FOR FLARE RATES SEE TABLE I.

TYPICAL NONCONTINUOUS SINGLE-FACE BARRIER TREATMENT AT PIERS

TYPICAL TREATMENT WHEN CONTINUOUS GUIDE RAIL IS REQUIRED

TABLE 1

<table>
<thead>
<tr>
<th>SPEED (km/h)</th>
<th>MAXIMUM FLARE RATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>20</td>
</tr>
<tr>
<td>110</td>
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<td>50</td>
<td>8</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.
NOTES

1. REFER TO BRIDGE STANDARD DRAWINGS CBD-GOIMJ FOR DETAILS OF CONCRETE MEDIAN BARRIER ACROSS STRUCTURES.
2. THE CONCRETE TRANSITIONS AND BARRIER TAPERS AT PIERS ARE INCIDENTAL TO THE MEDIAN BARRIER.
3. BODY ADDITIONAL Voids IN THE TAPERED END SECTIONS MEETING THE REQUIREMENTS PRESENTED IN SECTION D-D.
4. PROVIDE NO. 57 COARSE AGGREGATE THAT MEETS THE REQUIREMENTS OF PUBLICATION 408, SECTION 703.2. ALTERNATE SUITABLE GRANULAR MATERIAL MAY BE USED AS FILLER MATERIAL.
5. TO PREVENT INTRUSION OF COARSE AGGREGATE INTO WEEP HOLES, USE WIRE MESH SCREENING, GEOTEXTILES OR OTHER SUITABLE MATERIAL.
6. ROUND OR CHAMFER ALL EDGES WITH A RADIUS OF 25 C 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. 20, 2005
APPROVED APR. 30, 2005
SHEET 4 OF 5

RC-58M
TYPICAL EARTH MOUND FOR BURYING CONCRETE BARRIER

SECTION A-A

SECTION B-B

SECTION C-C

TABLE 2

<table>
<thead>
<tr>
<th>Design Speed (km/h)</th>
<th>Maximum Flare Rate (1/min)</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>110</td>
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<td>35</td>
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<tr>
<td>50</td>
<td>30</td>
</tr>
</tbody>
</table>

NOTES
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION NO. 408.
2. ALL MATERIALS NECESSARY TO CONSTRUCT EARTH MOUNDS ARE IN ACCORDANCE WITH APPLICABLE SECTIONS OF PUBLICATION NO. 408.
3. EARTH MOUNDS MAY BE USED TO BURY CONCRETE BARRIERS ON HIGHWAYS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SINGLE FACE CONCRETE BARRIER
F-SHAPE
END TREATMENT
burying into earth mound

RECOMMENDED APR. 30, 2003
DIRECTOR, BUREAU OF DESIGN
CHIEF ENGINEER RC-58M
NOTES

1. PROVIDE CONCRETE GLARE SCREEN MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTIONS 622 AND 714.
   A. MINIMUM CONCRETE CLASS A, EXCEPT USE CLASS AAA CONCRETE FOR PRECAST BARRIERS

2. FOR INSTALLATION OF GLARE SCREEN ON TOP OF EXISTING CONCRETE MEDIAN BARRIER, PROVIDE PLASTIC ENDS ON LONGER SYSTEMS SUPPLIED BY A MANUFACTURER LISTED IN BULLETIN 15.

3. FOR PRECAST BARRIERS, PROVIDE SLOTTED PLATE CONNECTIONS AS INDICATED ON RC-57M, SHEET 3.

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

5. PROVIDE PRECAST CONCRETE GLARE SCREEN FOR USE AS TEMPORARY UNTIL OR IN PERMANENT INSTALLATIONS. FOR TEMPORARY INSTALLATIONS, ENCRYSTALAND IS NOT REQUIRED.

6. EPOXY COATED REINFORCEMENT IS NOT REQUIRED WHEN PRECAST CONCRETE GLARE SCREEN IS TO BE USED IN TEMPORARY INSTALLATIONS ONLY, IN ACCORDANCE WITH SECTION 627, AND IDENTIFIED AS SUCH, AS SPECIFIED IN SECTION 714.6(c).

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

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

9. FABRICATE REINFORCEMENT BARS ACCORDING TO PENNDOT BRIDGE CONSTRUCTION STANDARD, BC-736M.

10. TO LIMIT LATERAL DISPLACEMENT OF PORTABLE BARRIER 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 ( ) IN DEPTH.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BU0116 OF DESIGN
CONCRETE GLARE SCREEN
F-SHAPE

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

FOR ADDITIONAL DETAILS FOR TYPICAL BARRIER TREATMENT AT PIERS, SEE RC-58M, SHEET 5.

SEE TABLE 1.

NOTE 1. PROVIDE BARRIER-MOUNT DELINEATORS, WHEN INDICATED, AS SPECIFIED ON RC-58M, SHEET 1.

Table 1:

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Maximum Flare Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Km/h</td>
<td>m/s</td>
</tr>
<tr>
<td>120</td>
<td>20 x 1</td>
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<td>110</td>
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<td>105</td>
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<td>70</td>
<td>4 x 1</td>
</tr>
<tr>
<td>65</td>
<td>2 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
BUREAU OF DESIGN

RECOMMENDED APR 30, 2003

DIRECTOR, BUREAU OF DESIGN CHIEF ENGINEER

CONCRETE GLARE SCREEN
F-SHAPE

Set 2 of 2
1. PROVIDE MATERIALS AND CONSTRUCTION MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 630 FOR PLAIN CEMENT CONCRETE CURB AND DEPRESSED CURB, SECTION 640 FOR PLAIN CEMENT CONCRETE GUTTER AND SECTION 641 FOR PLAIN CEMENT CONCRETE CURB GUTTER.

2. SPACE CONTRACTION JOINTS IN UNIFORM LENGTHS OR SECTIONS.

3. PLACE 20 "½" THICK PREMOLDED EXPANSION JOINT FILLER MATERIAL AT STRUCTURES AND AT THE END OF THE WORK DAY. CUT MATERIAL TO CONFORM TO AREA ADJACENT TO CURB OR TO CONFORM TO CROSS SECTIONAL AREA OF CURB.

4. SEE SECTION 641 FOR PLAIN CEMENT CURB SLOPED TOP TREATMENT AT END OF STRUCTURES.

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

6. WHERE CURBS ARE INSTALLED ADJACENT TO PARKING LANES A 6" HIGH CURB CAN BE USED WITH APPROVAL FROM THE LOCAL MUNICIPALITY.

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

CURBS AND GUTTERS
1. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, Section 735 and Install in accordance with Section 212.

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

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

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

5. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 735 AND FURNISH AND INSTALL IN ACCORDANCE WITH SECTION 212.

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

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

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

9. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 735 AND FURNISH AND INSTALL IN ACCORDANCE WITH SECTION 212.

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

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

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

13. PROVIDE GEOTEXTILE MATERIAL MEETING THE REQUIREMENTS OF PUBLICATION 408/2000, SECTION 735 AND FURNISH AND INSTALL IN ACCORDANCE WITH SECTION 212.

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

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

16. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. U.S. CUSTOMARY UNITS IN () PARENTHESES.
TOE OF SLOPE ANGLE AS REQUIRE

DISCHARGE INTO A STABILIZED
CHANNEL OR ON A TEMPORARILY
PROTECTED AREA, SEE DETAIL A,
ANCHORING POST

450 ± 25
(18") ±

450 (18") HIGH FENCE

4.0 m (13'-2") TYPICAL

1.3 m (4'-3") DIAMETER

1.8 m (6'-0") TYPICAL

FLOW

TOP OF BANK

TOP OUTLET

0.50 (2")

0.50 (2")

150 (6")

INVERT

AASHTO NO. 67

COARSE AGGREGATE

R-4 ROCK

D = DEPTH OF WATER AT
CHANNEL CAPACITY.

TYPICAL SECTION A-A

ROCK BARRIER

SILT BARRIER FENCE

GEOTEXTILE SELECTION

TABLE A

SUGGESTED MINIMUM SIZES

<table>
<thead>
<tr>
<th>DRAINAGE AREA (HECTARES)</th>
<th>SMOOTH PIPE SIZE DIAMETER (INCHES)</th>
<th>COMBINED PIPE SIZE DIAMETER (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 TO 1.0</td>
<td>60 (2&quot;)</td>
<td>120 (4&quot;)</td>
</tr>
<tr>
<td>1.0 TO 2.0</td>
<td>120 (4&quot;)</td>
<td>120 (4&quot;)</td>
</tr>
<tr>
<td>2.0 TO 4.0</td>
<td>120 (4&quot;)</td>
<td>180 (6&quot;)</td>
</tr>
<tr>
<td>4.0 TO 10.0</td>
<td>180 (6&quot;)</td>
<td>180 (6&quot;)</td>
</tr>
</tbody>
</table>

4 DIA MIN

3.0 m (10'-0") HIGH FENCE

SILT BARRIER FENCE

GEOTEXTILE SELECTION

TABLE B

SILT BARRIER FENCE

GEOTEXTILE SELECTION

<table>
<thead>
<tr>
<th>TYPE OF CLASS 3 GEOTEXTILE MATERIAL</th>
<th>NOMINAL FABRIC HEIGHT</th>
<th>MAX POST SPACING WITHOUT MESH SUPPORT</th>
<th>MAX POST SPACING WITH MESH SUPPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>450 (18&quot;)</td>
<td>7.4 m (2'-6&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3A</td>
<td>750 (30&quot;)</td>
<td>12.5 m (4'-1&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3B</td>
<td>450 (18&quot;)</td>
<td>7.4 m (2'-6&quot;)</td>
<td>NA</td>
</tr>
<tr>
<td>3B</td>
<td>750 (30&quot;)</td>
<td>12.5 m (4'-1&quot;)</td>
<td>1.2 m (4'-0&quot;)</td>
</tr>
</tbody>
</table>

NA = NOT APPLICABLE

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

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

RECOMMENDED APRIL 23, 2003
SUPERVISOR, BUREAU OF DESIGN BRIAN K. FRANKLIN
SPLT. I, OF DES

RC-70M
DEWATERING BASIN

TYPICAL SECTION A-A

EARTHEN BERM

1 - 3 ROCK

150 (6") MIN

PLAN VIEW

1,0 0 -0"

12"

DEWATERING BASIN

300 (12") MIN

DRAINAGE

PLAN VIEW

GARDEN BED

1 - 3 ROCK

150 (6") MIN

EMBANKMENT

SEDIMENT TRAP

ELEVATION

SECTION A-A

SEDIMENTATION POND

TRASH RACK AND ANTI-VORTEX DEVICE

TRASH RACK AND ANTI-VORTEX DEVICE

SECTION A-A

SEDIMENTATION POND WITH EMERGENCY SPILLWAY

CUT INTO EXISTING GROUND

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.

3. MAKE THE ELEVATION OF THE EMERGENCY SPILLWAY SUCH THAT THE DAM IS AT LEAST 0.6 m (2'-0") ABOVE THE DESIGN FLOW OF THE SPILLWAY. MAKE THE COMBINED CAPACITY OF THE RISER AND EMERGENCY SPILLWAY AT LEAST 0.1 m³/s/ha (0.4 CFS/AC) FROM THE ENTIRE WATERSHED OF THE BASIN.

4. CONSTRUCT THE CREST OF THE EMERGENCY SPILLWAY 300 (10') ABOVE THE TOP OF THE RISER.

5. WHERE THERE IS LIMITED ROOM FOR STORAGE AT THE BOTTOM PORTION OF THE POND, PERFORATE THE LOWEST HOLES IN THE RISER PIPE AT THE LEVEL OF TWO SEVENTHS OF THE TOTAL POND CAPACITY, TO PROVIDE ADEQUATE SEDIMENT STORAGE.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

EROSION AND SEDIMENT POLLUTION CONTROL

RECOMMENDED APR 30, 2003

RC-70M
**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**

**DIRECTOR, BUREAU OF DESIGN**

**EROSION AND SEDIMENT POLLUTION CONTROL**

**RECOMMENDED APRIL 30, 2000**

**SILT BARRIER FENCE FOR INLET PROTECTION**

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

**ENDWALL STANDBOX**

- 1 row 75 (1/2") holes
- 1 row 65 (2") holes
- 2 rows 50 (2") holes
- Remaining 40 (1/2") holes

**DETAIL A**

- 50 x 50 (2") x 2" material
- Nailer

**DETAIL B**

- 50 x 50 (2") x 2" x 2" material
- Nailer

**NOTES**

1. Upon establishment of suitable soil stabilization and at the direction of the engineer, remove the endwall standboxes. Standboxes are the property of the contractor.

2. Clean the basin and/or area upstream from the standboxes. Remove the sediment and debris in an area approved by the engineer.

**SECTION A-A**

**SILT BARRIER FENCE FOR INLET PROTECTION**

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**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**EROSION AND SEDIMENT POLLUTION CONTROL**

**DIRECTOR, BUREAU OF DESIGN**

**EROSION AND SEDIMENT POLLUTION CONTROL**

**RECOMMENDED APRIL 30, 2000**

**SILT BARRIER FENCE FOR INLET PROTECTION**

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CONSTRUCT THE BERM HIGHER THAN THE TOP OF INLET.

**CLASS 3, TYPE B GEOTEXTILE MATERIAL**

BERM FINISHED GRADE

EXCAVATION

450 (18") TO 600 (24") MAX.

150 TO 300 (6" TO 12") SLOPE.

150 (4")

150 X 150 (6" X 6") FENCE, SECTORED FABRIC, 200 TO 250 (8" TO 10") INTO EXCAVATED TRENCH.

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

**SECTION D-D**

**DITCH OR SWALE CONDITION**

**CROSS SECTION**

**ZIP CODE**

**SEDIMENT TRAP EMBANKMENTS**

**Berms**

**FINISHED GRADE**

**EXCAVATION**

**SIDE SLOPE**

**SIDE SLOPE**

**Sediment Trap Outlet**

**Ditch or Swale Condition**

**Cross Section**

**Sizing Sediment Trap Embankments**

**Gravel Filter for Curb Inlet**

**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 of roads and streets.

**Commonwealth of Pennsylvania**

**Department of Transportation**

**Bureau of Engineering**

**Erosion and Sediment Pollution Control**

**Recommended Apr 30, 2003**

**Director, Bureau of Design**

**RC-70m**
NOTES
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 COURSE AGGREGATE. PLACE BAG OVER STRAW DISTRIBUTED AT THE RATE OF 1 BALE PER M2 (30 SQ. FT).
6. USE PUMP WITH A RATING IN GALLONS PER MINUTE NOT TO EXCEED 60% 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 Silt REDUCES THE BAG S 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.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF DESIGN

SEDIMENT FILTER BAG

SHEET A OF A
BLACK CLAYTON
DIRECTOR, BUREAU OF DESIGN

RECOMMENDED APR-70 2003
RECOMMENDED APR-70 2003
SHT 3 OF 6
DRAFT CLAYTON
R6834

RC-TOM
THRU BOLT REQ'O FOR TWO-SECTION SHAFT, CHAMFER INSIDE SEE DETAIL C AND NOTE 5
CHAMFER OUTSIDE TOP OF FOUNDATION ANCHOR BASE POLE OVERLAP DETAIL
HANDHOLE ROUND POLES ----
SECTION A-A AND OUTSIDE OF MALE MATING AT THE OVERLAP. INSIDE OF OUTER GRIND SMOOTH THE LONGITUDINAL WELD BEADS OF MULTISECTIONAL POLES=

---;

(SINGLE MEMBER ARM)

SEE DETAIL B AND NOTE 6 ' 

3.0m (10'-0")
2.4m
4.6m (15'-0")
7.6m (25'-0")

ARM LENGTH L

TAPERED STEEL ARM

ARM ATTACHMENT TO POLE SHAFT

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
REVIEW OF BROOCH

HIGHWAY LIGHTING
CONVENTIONAL LIGHTING POLE DETAILS

NOTE: LOCATIONS OF PROTECTION FOR CABLES SHOWN ON SHEET 2, FOR ALL POLES.

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

1. SEAL HEAD FRAME AND LUMINAIRE ASSEMBLIES TO PREVENT INTRUSION OF INSECTS, ETC.

2. PROVIDE 2 POLE, CIRCUIT BREAKER DISCONNECT, IN HEAD 1 ENCLOSURE WITH EXTERNAL OPERATING MEANS.

3. GROUND LUMINAIRE AND GROUNDING CONDUCTOR DIRECTLY ON THE POLE SHAFT, WITH LUGS PROVIDED BY THE MANUFACTURER OF THE LIGHTNING ROD. BORE THE NEUTRAL WIRE TO THE GROUNDIssuer AT THE GROUND LUG OR INSIDE THE ENCLOSURE AT THE POLE BASE.

4. MAKE ALL MISCELLANEOUS HARDWARE STAINLESS STEEL.

5. PROVIDE HORIZONTAL TERMINAL FOR LUMINAIRE, ON BAREodcast PROVIDED IN LUMINAIRE HINGE OR IN A QUALITATIVE FLEXIBLE CONNECTOR.

6. ATTACH POLE IDENTIFICATION & DATE TAG TO EACH HIGH MAST POLE.

7. PROVIDE BOXES AS PER PUBLICATION 400/2000, SECTION 1101.11 (c). PADLOCKS ARE NOT REQUIRED FOR THE BOXES.

**COMMONWEALTH OF PENNSYLVANIA**

DEPARTMENT OF TRANSPORTATION

BUREAU OF DESIGN

HIGHWAY LIGHTING

HIGH MAST LIGHTING

POLE DETAILS

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

**POLE IDENTIFICATION AND DATE TAG DETAIL**

FOR CONVENTIONAL AND HIGH MAST POLES