



Road & Bridge Design Publications

Monthly Update – June 2012

Revisions for the month of **June** are listed and displayed below. New special details are to be included in projects submitted for the **September** letting as is stated on the special detail index sheets. Please contact Wayne Pikka (pikkaw@michigan.gov) for any questions related to the road changes or Vladimir Zokvic (zokvicv@michigan.gov) for questions related to the bridge changes.

Special Details

R-80-E: Granular Blankets, Under Drains & Outlet Endings, & Sewer Bulkheads: In the note section, a note was added which allows steel end sections to be attached to the ends of PVC outlet pipe.

Road Design Manual

3.08.01C: Combined 3R & 4R Work: This section was updated to reflect FHWA's current policy for application of standards to projects with combined 3R & 4R work. 3R rules now apply to 3R sections of the project & 4R rules apply to the 4R sections.

Bridge Design Guides

5.20.02: Rotated section A-A view to correspond to section lines in wall elevation.

8.11.06, 8.11.07, 8.15.01, 8.21.03: Updated welding symbols. None of the intended welds changed just the way they are presented on the details.

Updates to MDOT Cell Library, Bridge Auto Draw Program, etc., may be required in tandem with some of this month's updates. Until such updates to automated tools can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

Index to Special Details

6-25-2012

⑥

SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
21	2	GUARDRAIL AT INTERSECTIONS	5-24-01
24	5	GUARDRAIL ANCHORED IN BACK SLOPE TYPES 4B & 4T	7-22-02
R-29-H	4	DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK	10-20-11
R-31-F	2	INTEGRAL CURB AND INTEGRAL CURB & GUTTER	1-30-12
R-41-G	2	LONGITUDINAL PAVEMENT JOINTS	4-9-12
R-42-F	6	TYPICAL JOINT LAYOUTS FOR CONCRETE PAVEMENT	12-6-10
R-43-I	2	LOCATION OF TRANSVERSE JOINTS IN PLAIN CONCRETE PAVEMENT	2-8-12
R-45-I	2	PAVEMENT REINFORCEMENT FOR BRIDGE APPROACH	12-6-11
R-54-H	4	CONCRETE BARRIER, SINGLE FACE	5-18-12
* R-80-E	8	GRANULAR BLANKETS, UNDERDRAINS, OUTLET ENDINGS & BULKHEADS	6-13-12
R-99-B	2	CHAIN LINK FENCE WITH WIRE ROPE	11-1-00
R-100-G	4	SEEDING AND TREE PLANTING	9-8-11
R-126-I	5	PLACEMENT OF TEMPORARY BARRIER	3-26-12
<p style="text-align: center;">* Denotes New or Revised Special Detail to be included in projects for (beginning with) the September letting.</p> <p>Note: Former Standard Plans IV-87, IV-89, IV-90, and IV-91 Series, used for building cast-in-place concrete head walls for elliptical and circular pipe culverts, are now being replaced with plans that detail each specific size. The Municipal Utilities Unit will provide these full sized special details for inclusion in construction plans for MDOT jobs. To assure prompt delivery, requests <i>must</i> be made in advance.</p> <p>Former Standard Plans IV-93 and IV-94 series have been replaced with precast concrete box & three-sided culverts as per the 2012 Standard Specifications for Construction.</p>			

Index to Bridge Detail Sheets

6-25-2012

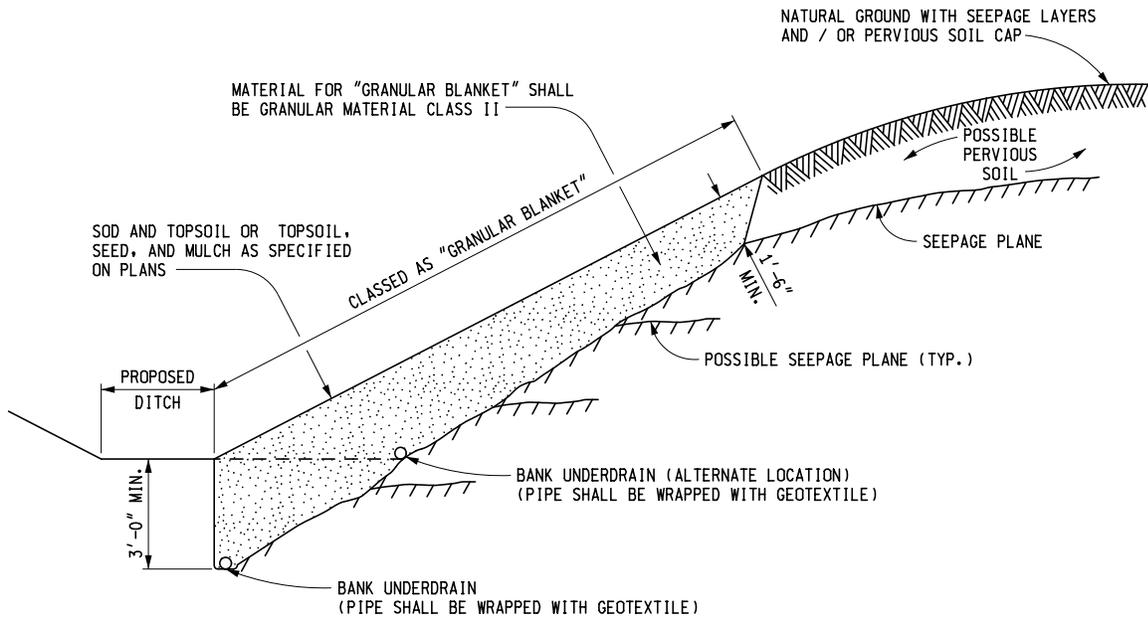
7

DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
B-21-I	4	BRIDGE RAILING, 2 TUBE	6-3-11
B-23-E	4	BRIDGE RAILING, THRIE BEAM RETROFIT	10-19-09
B-25-G	6	BRIDGE RAILING, AESTHETIC PARAPET TUBE	1-30-12
EJ3Z	1 or 2	EXPANSION JOINT DETAILS	6-8-11
EJ4M	1 or 2	EXPANSION JOINT DETAILS	6-8-11
PC-2G	1	70" PRESTRESSED CONCRETE I-BEAM DETAILS	3-31-06
PC-4E	1	PRESTRESSED CONCRETE 1800 BEAM DETAILS	3-31-06
PC-1L	1	PRESTRESSED CONCRETE I-BEAM DETAILS	7-12-06

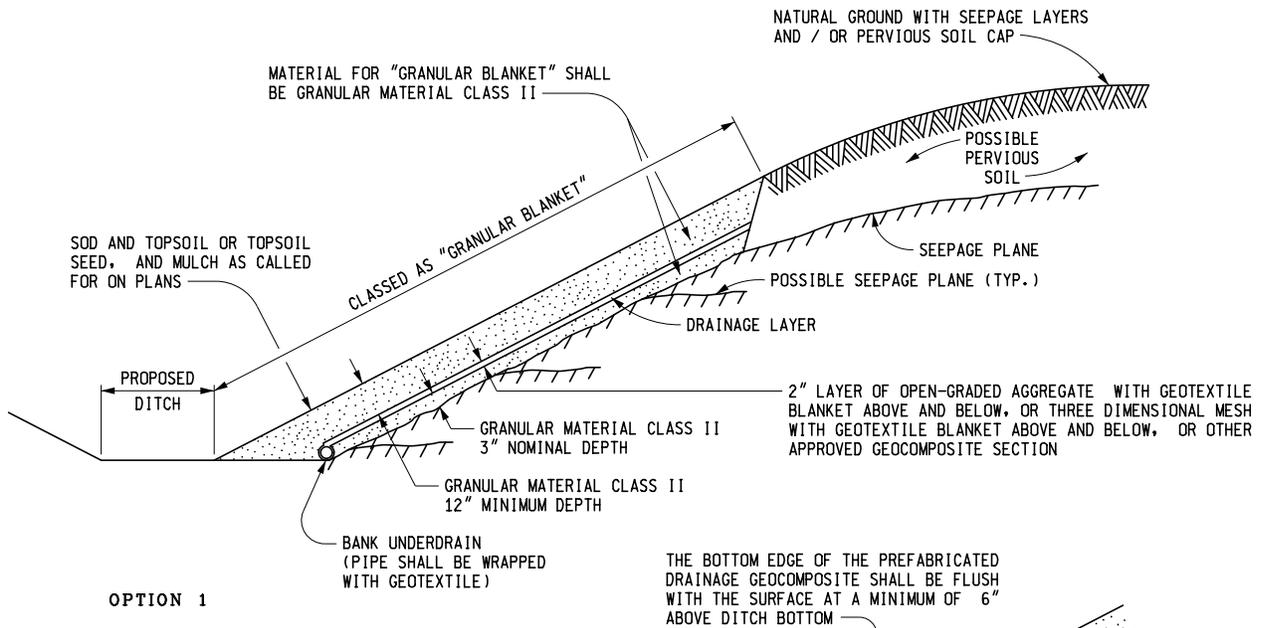
*** Denotes New or Revised Special Detail to be included in projects for (beginning with) the September letting.**

Note: Details EJ3Z & EJ4M are interactive, i.e. designers and detailers choose details based upon railing type and angle of crossing. Place all details appropriate for the project, structure specific information, and the Expansion Joint Device quantity on the sheet. The sheet shall then be added to the plans as a normal plan sheet.

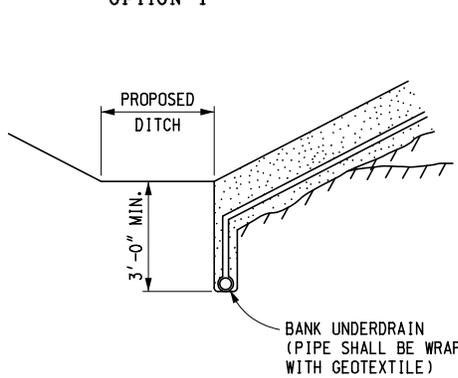
Detail PC-1L, PC-2G and PC-4E shall have structure specific information and quantities added to the sheet. The sheet shall then be added to the plans as a normal plan sheet.



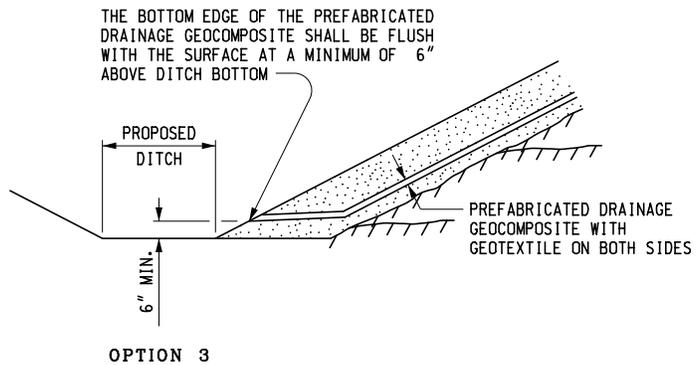
GRANULAR BLANKET TYPE 1



OPTION 1



OPTION 2



OPTION 3

NOTE: OPTION 1, 2, OR 3 WILL BE DETERMINED BY THE ENGINEER BASED ON THE PROJECT CONDITIONS.

GRANULAR BLANKET TYPE 2



PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

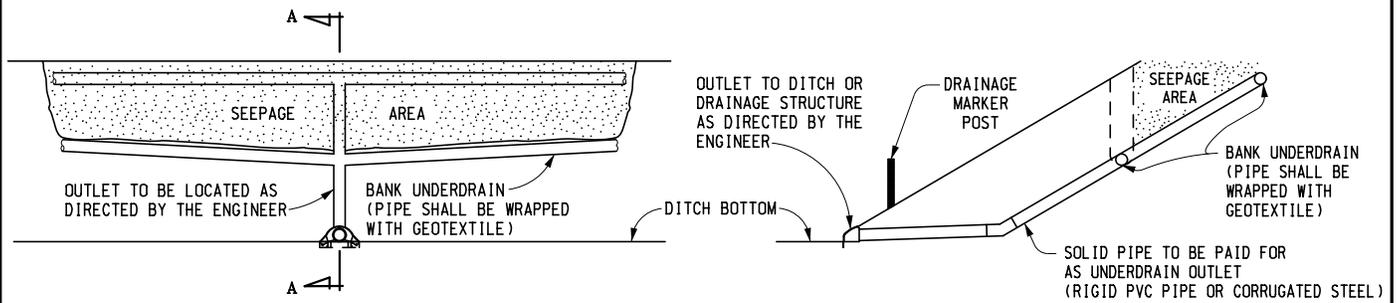
**GRANULAR BLANKET, UNDERDRAINS,
OUTLET ENDINGS FOR UNDERDRAINS,
AND SEWER BULKHEADS**

F.H.W.A. APPROVAL

6-13-2012
PLAN DATE

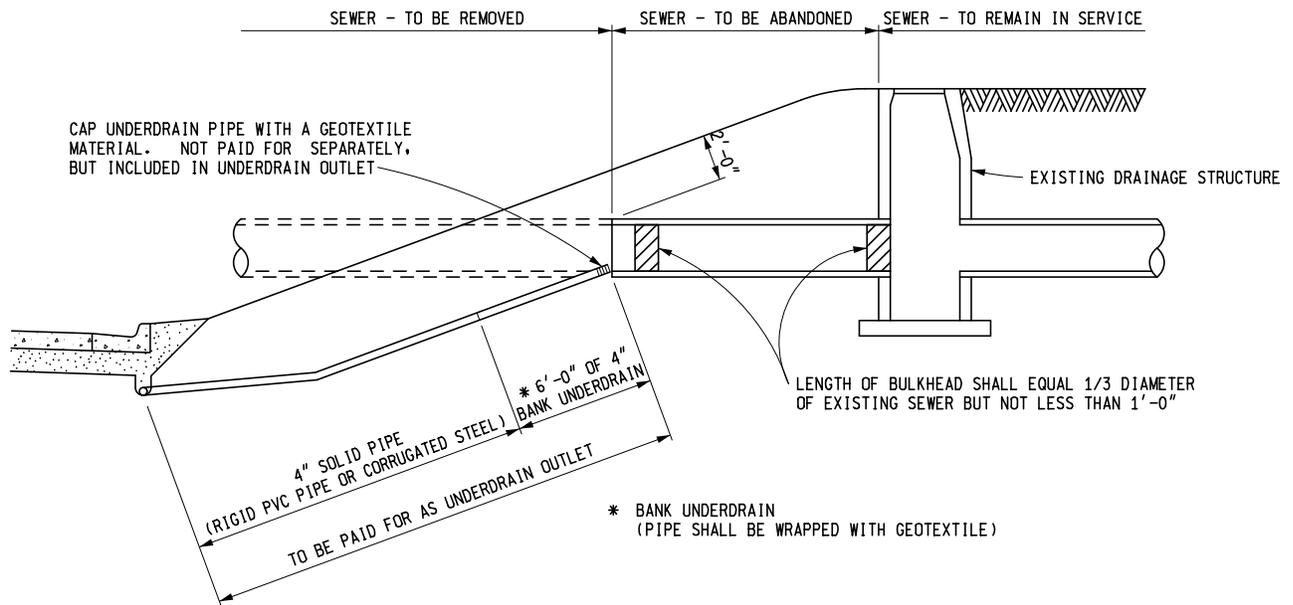
R-80-E

SHEET
1 OF 8



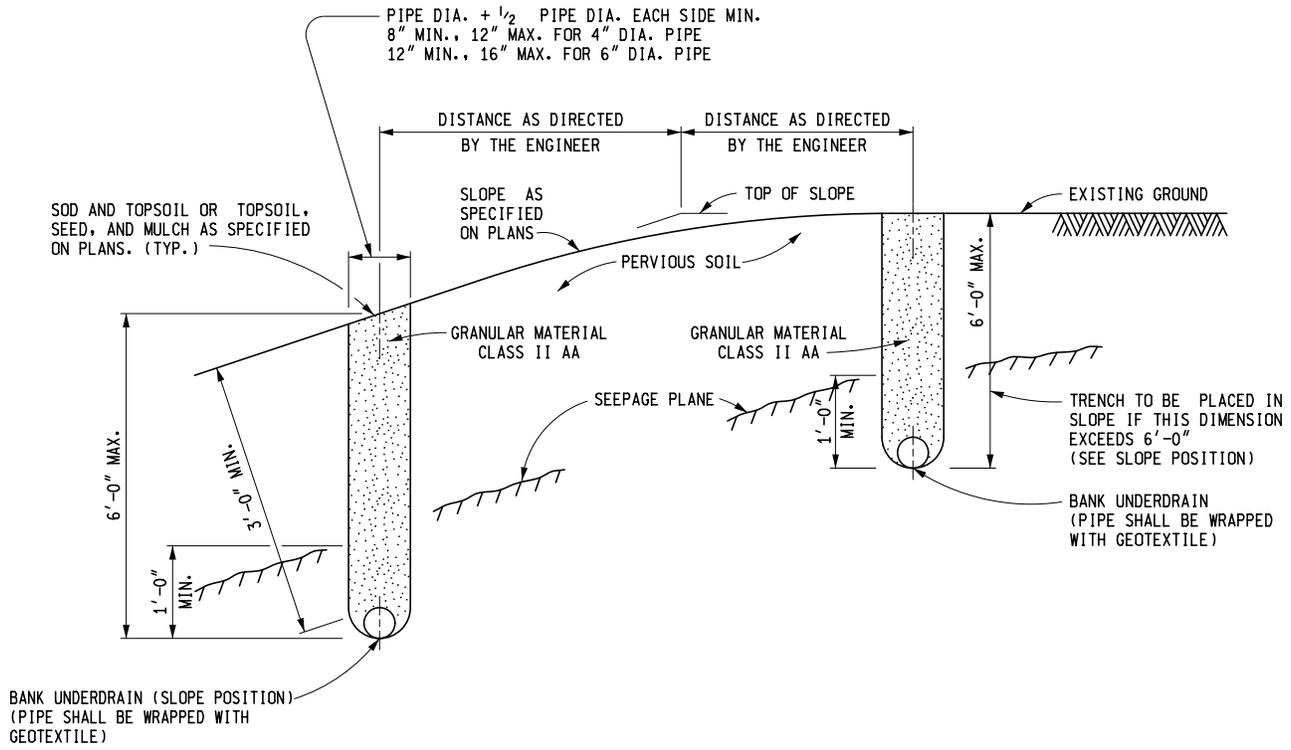
SECTION A - A

BANK UNDERDRAIN OUTLET

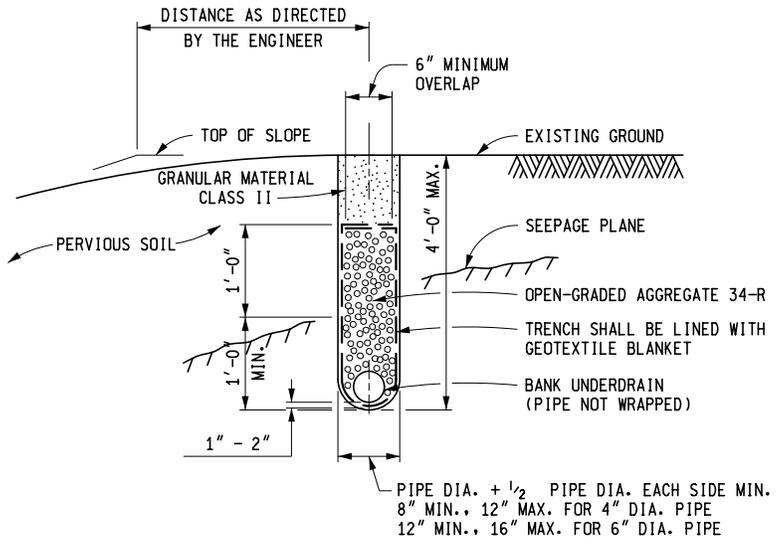


WEEPER UNDERDRAIN AND BULKHEADING SEVERED SEWER

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS FOR UNDERDRAINS, AND SEWER BULKHEADS		
F.H.W.A. APPROVAL	6-13-2012 PLAN DATE	R-80-E
		SHEET 2 OF 8



BANK UNDERDRAINS

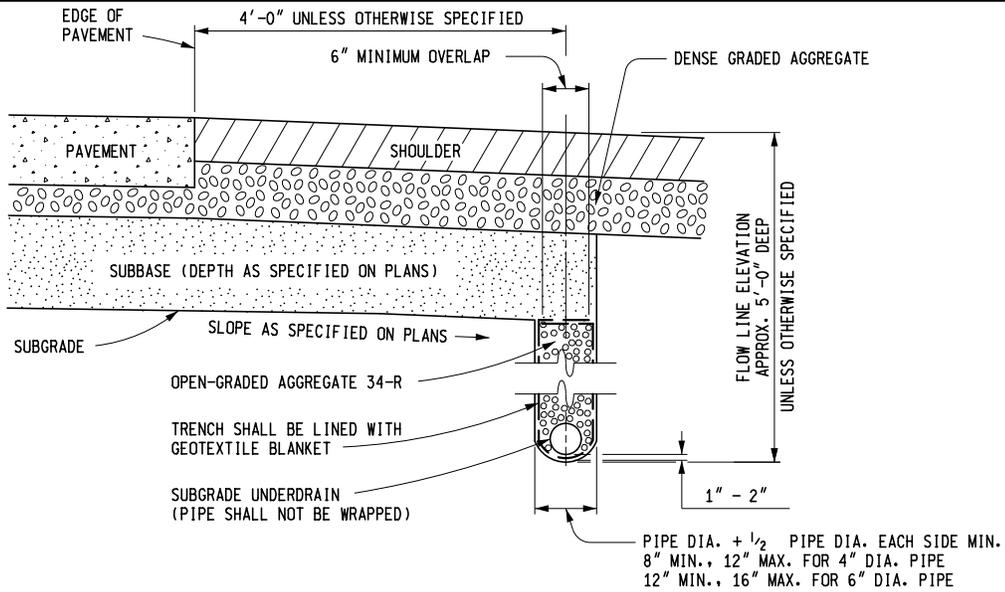


BANK UNDERDRAIN, OPEN-GRADED

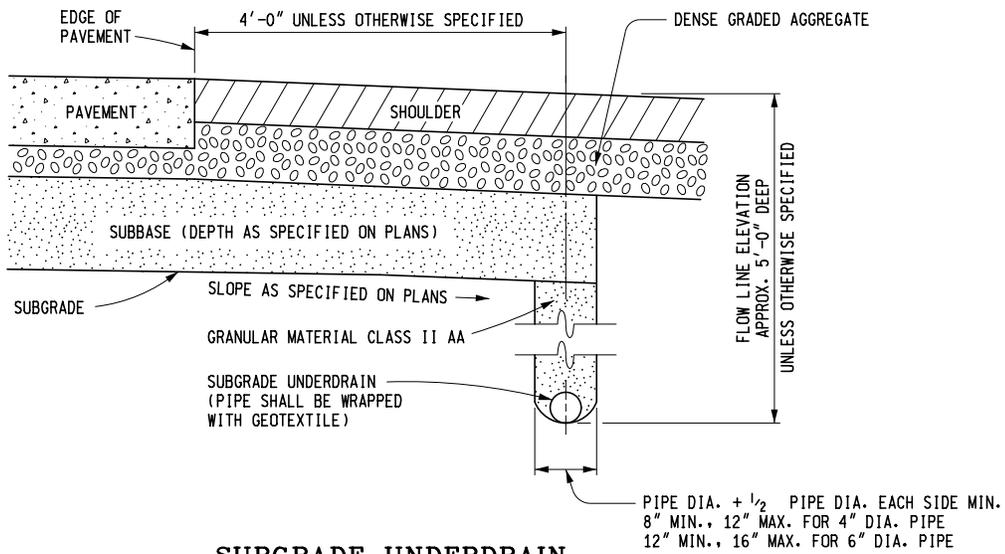
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**GRANULAR BLANKET, UNDERDRAINS,
 OUTLET ENDINGS FOR UNDERDRAINS,
 AND SEWER BULKHEADS**

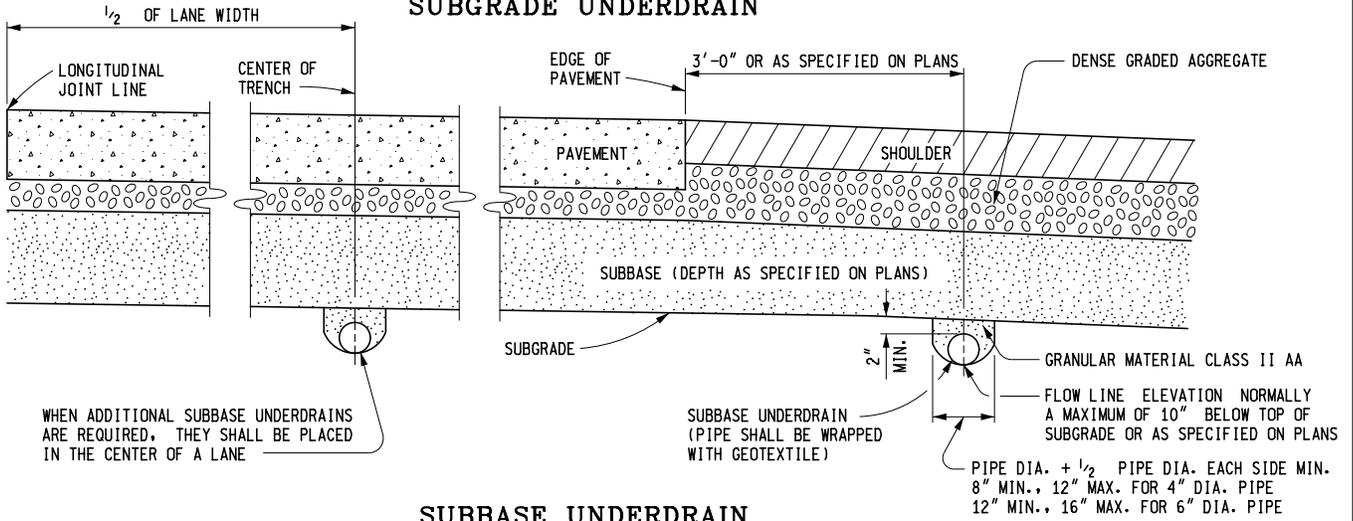
F.H.W.A. APPROVAL	6-13-2012 PLAN DATE	R-80-E	SHEET 3 OF 8
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SUBGRADE UNDERDRAIN - OPEN-GRADED



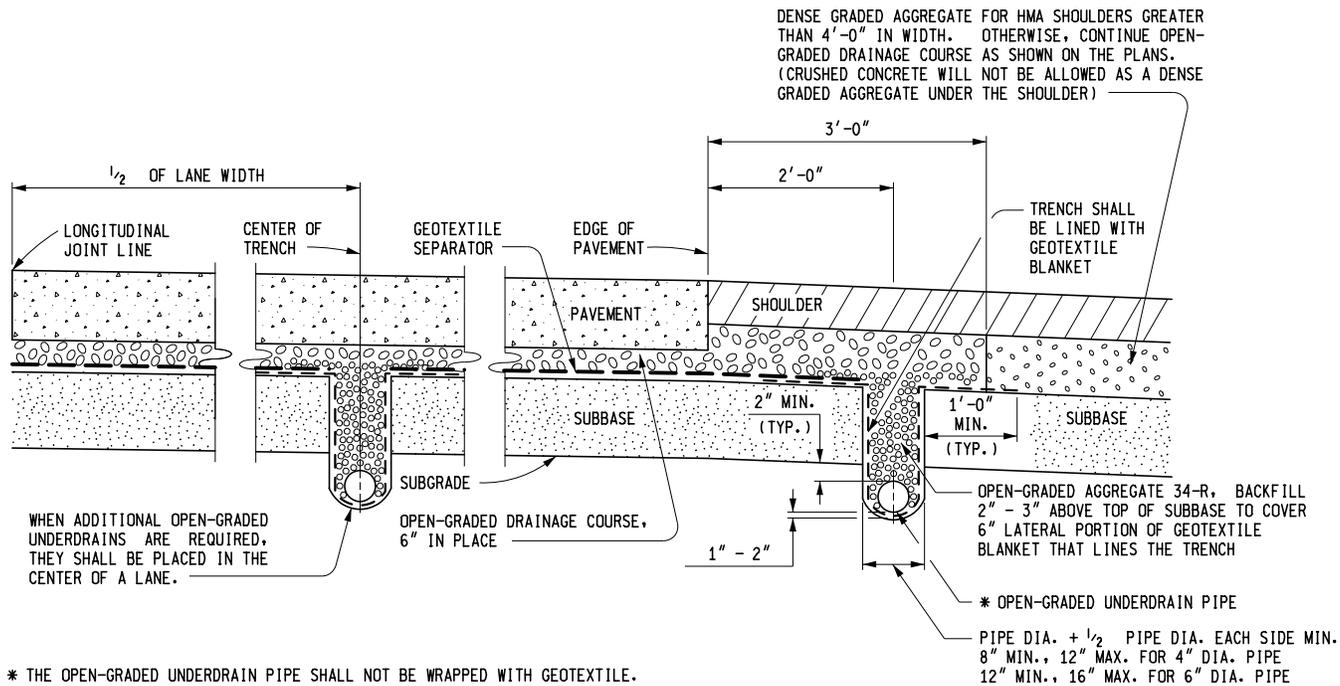
SUBGRADE UNDERDRAIN



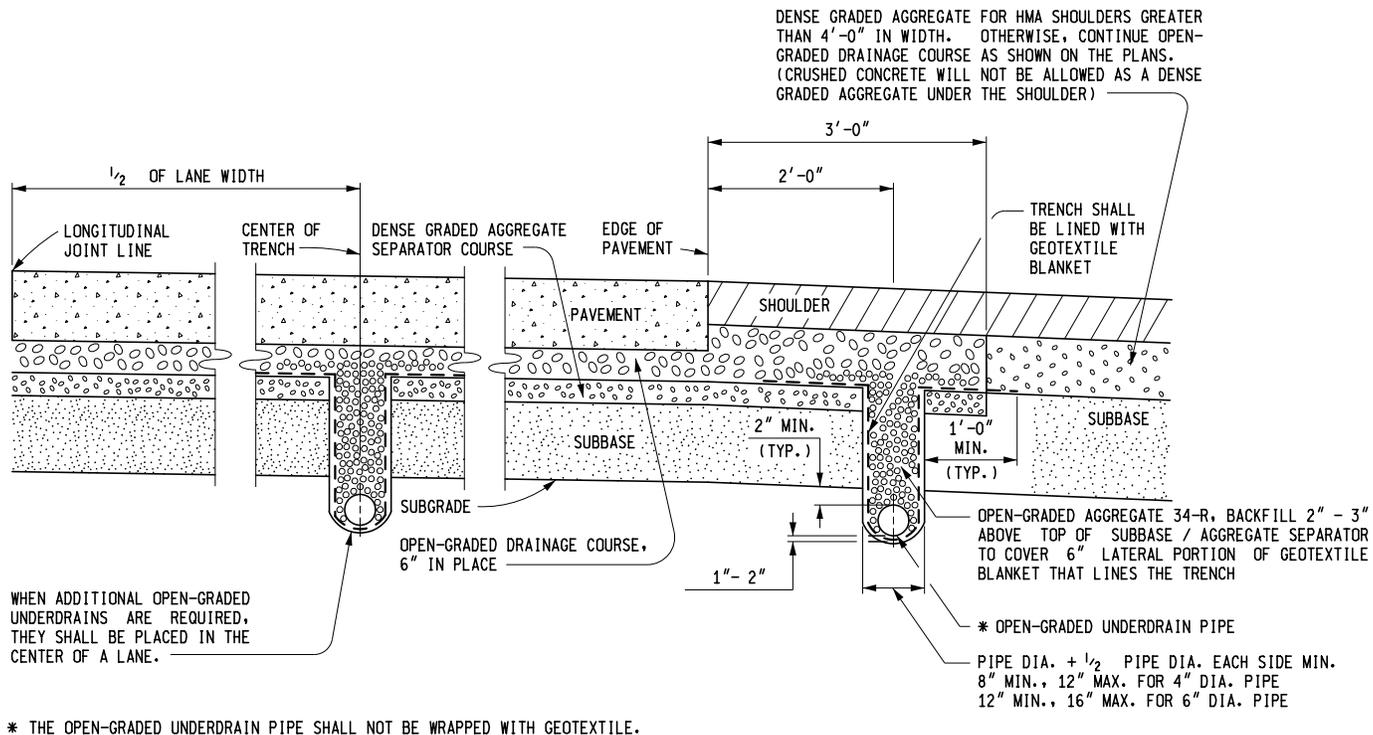
SUBBASE UNDERDRAIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR
**GRANULAR BLANKET, UNDERDRAINS,
 OUTLET ENDINGS FOR UNDERDRAINS,
 AND SEWER BULKHEADS**

F.H.W.A. APPROVAL	6-13-2012 PLAN DATE	R-80-E	SHEET 4 OF 8
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OPEN-GRADED UNDERDRAIN PIPE WITH GEOTEXTILE SEPARATOR



OPEN-GRADED UNDERDRAIN PIPE WITH DENSE GRADED AGGREGATE SEPARATOR COURSE

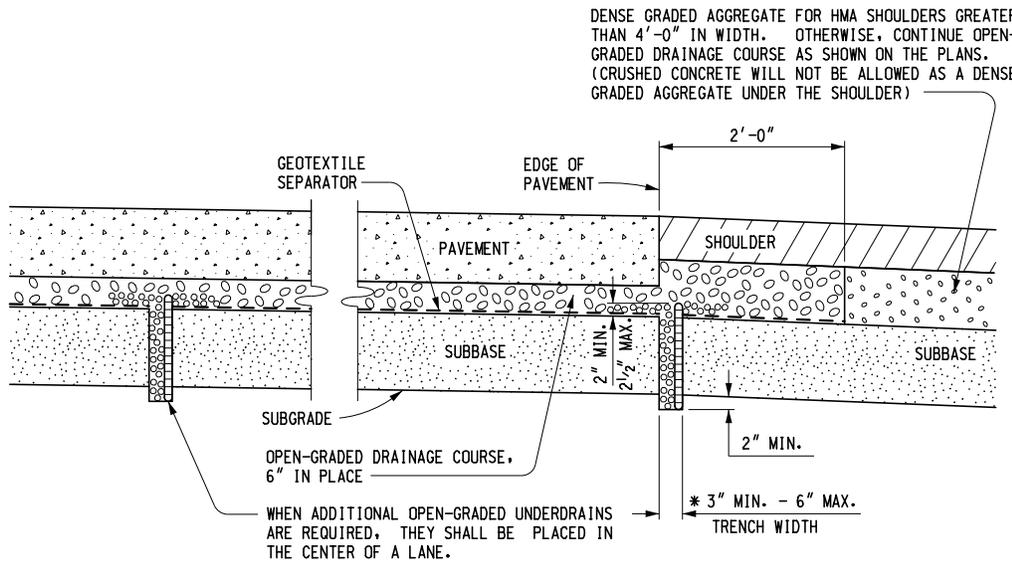
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR
**GRANULAR BLANKET, UNDERDRAINS,
OUTLET ENDINGS FOR UNDERDRAINS,
AND SEWER BULKHEADS**

F.H.W.A. APPROVAL

6-13-2012
PLAN DATE

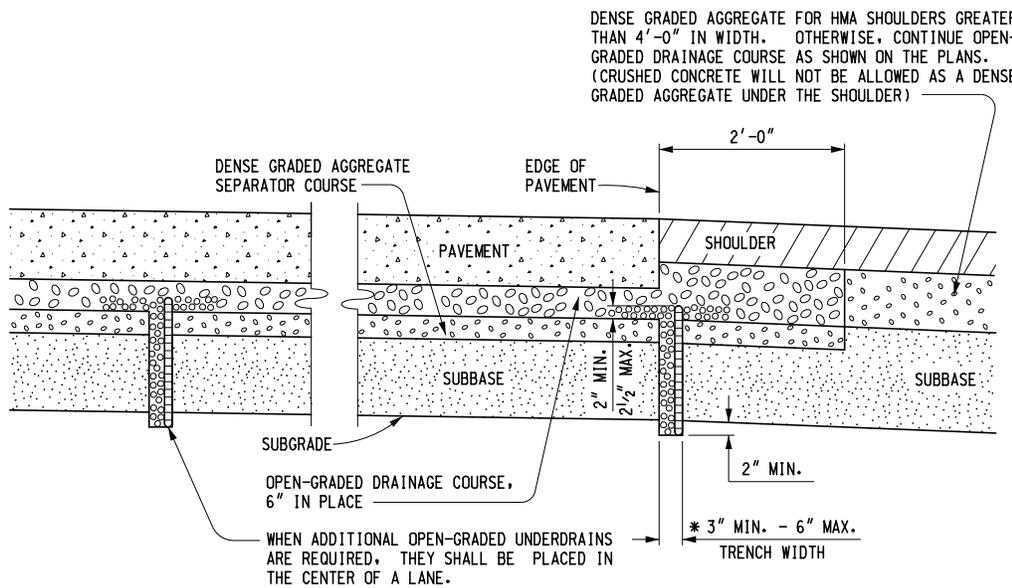
R-80-E

SHEET
5 OF 8



* OPEN-GRADED AGGREGATE 34-R, BACKFILL 2" - 3" ABOVE TOP OF SUBBASE TO COVER 6" LATERAL PORTION OF GEOTEXTILE SEPARATOR AND TO PROTECT THE PDS FILTER COVER

**OPEN-GRADED UNDERDRAIN (PDS)
WITH GEOTEXTILE SEPARATOR**



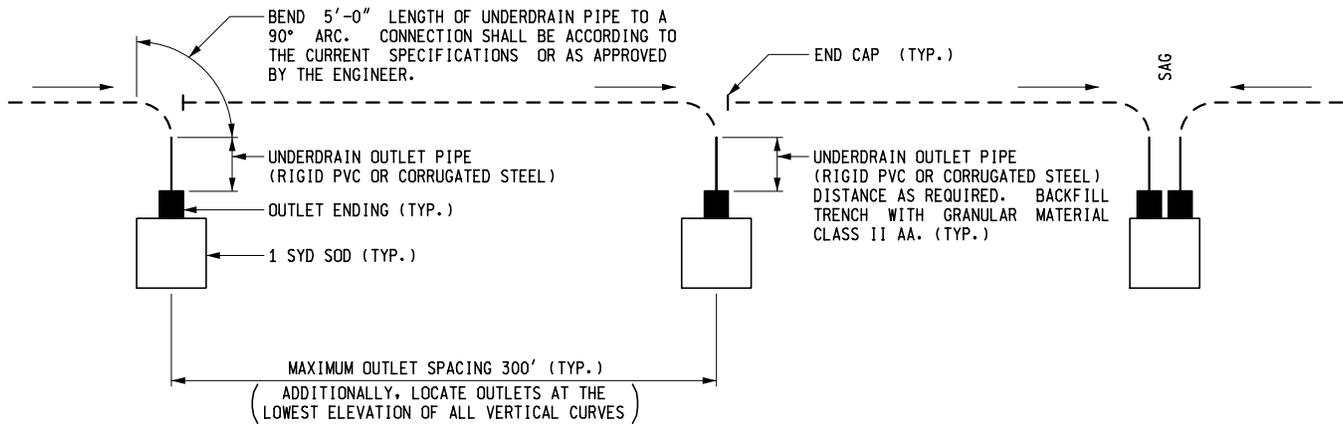
* OPEN-GRADED AGGREGATE 34-R, BACKFILL 2" - 3" ABOVE TOP OF DENSE GRADED AGGREGATE TO PROTECT THE PDS FILTER COVER

**OPEN-GRADED UNDERDRAIN (PDS)
WITH DENSE GRADED AGGREGATE SEPARATOR COURSE**

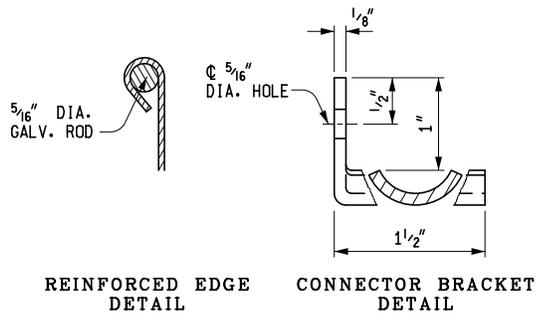
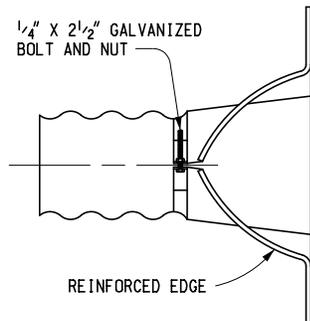
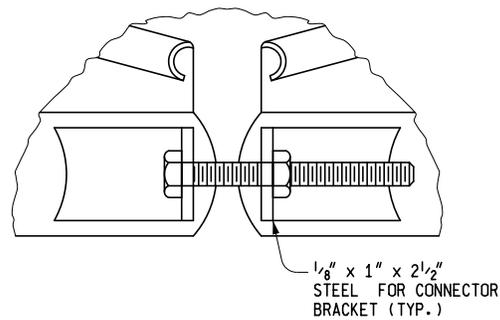
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**GRANULAR BLANKET, UNDERDRAINS,
OUTLET ENDINGS FOR UNDERDRAINS,
AND SEWER BULKHEADS**

F.H.W.A. APPROVAL	6-13-2012 PLAN DATE	R-80-E	SHEET 6 OF 8
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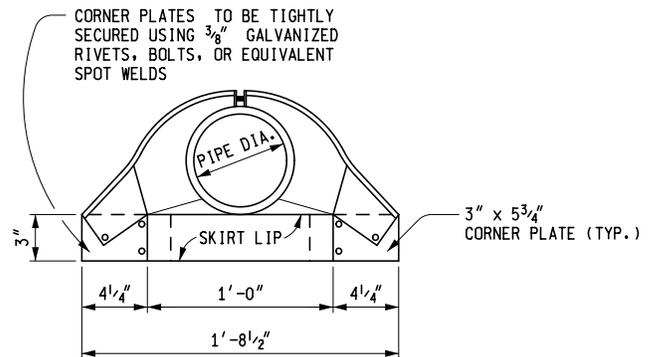
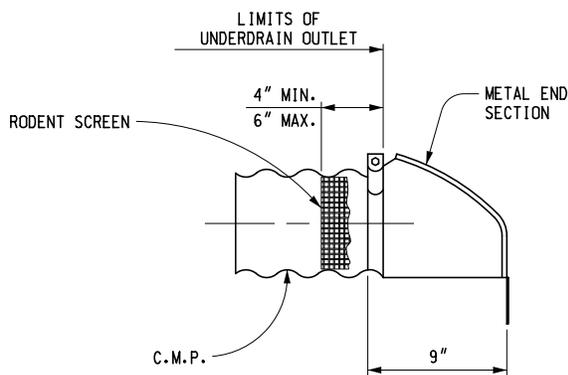


PLAN SHOWING OUTLETS FOR UNDERDRAINS



REINFORCED EDGE
DETAIL

CONNECTOR BRACKET
DETAIL



STEEL END SECTION FOR 4" OR 6" PIPE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

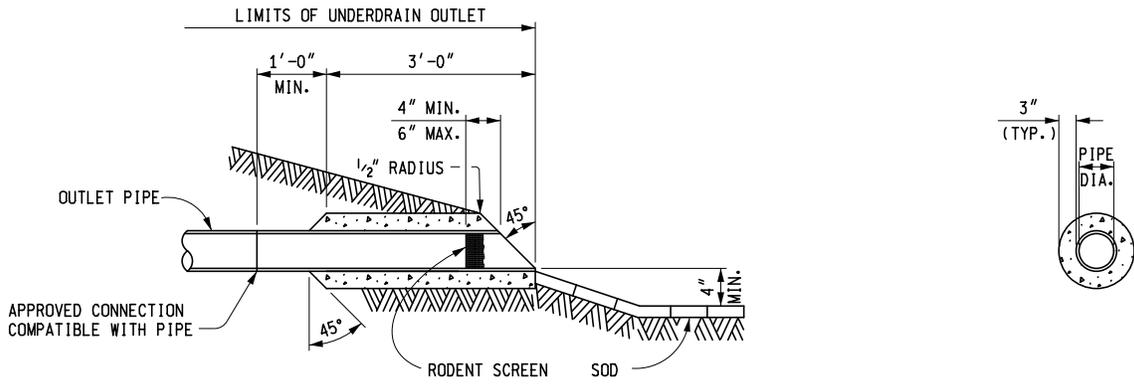
GRANULAR BLANKET, UNDERDRAINS,
OUTLET ENDINGS FOR UNDERDRAINS,
AND SEWER BULKHEADS

F.H.W.A. APPROVAL

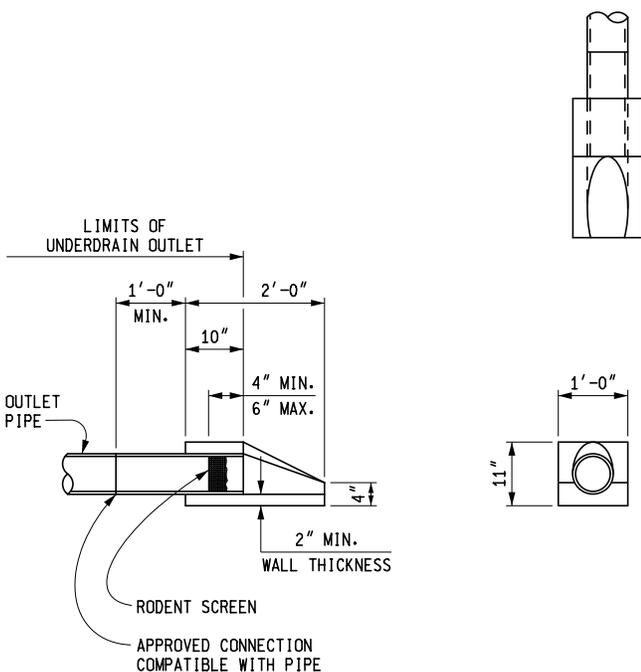
6-13-2012
PLAN DATE

R-80-E

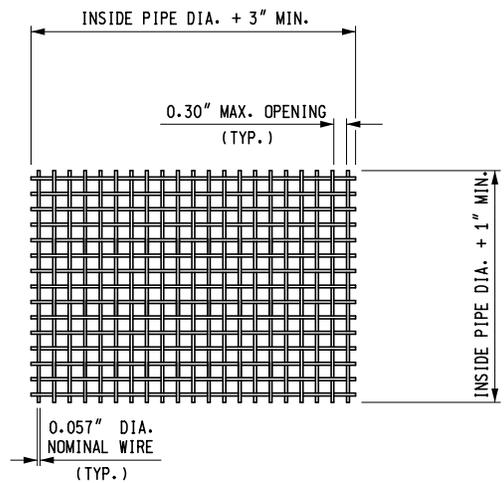
SHEET
7 OF 8



CONCRETE RING FOR 4" OR 6" PIPE



CONCRETE END SECTION FOR 4" OR 6" PIPE



RODENT SCREEN

NOTES:

POSITIVE DRAINAGE SHALL BE PROVIDED FOR UNDERDRAINS AND UNDERDRAIN OUTLETS.

UNDERDRAIN PIPE SIZES SHALL BE AS SPECIFIED ON THE PLANS.

CONNECTIONS BETWEEN UNDERDRAIN PIPE AND UNDERDRAIN OUTLET PIPE SHALL BE CONSTRUCTED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS AND AS APPROVED BY THE ENGINEER.

CONNECTIONS, IF REQUIRED WITHIN THE OUTLET PIPE, SHALL BE ACCORDING TO APPLICABLE ASTM SPECIFICATIONS REFERENCED IN THE CURRENT STANDARD SPECIFICATIONS. THEY SHALL BE WATER TIGHT, AND OF THE SAME MATERIAL AS THE OUTLET PIPE.

OUTLET CONNECTIONS TO DRAINAGE STRUCTURES SHALL BE ACCORDING TO CURRENT STANDARD SPECIFICATIONS FOR DRAINAGE STRUCTURES.

UNDERDRAIN OUTLET PIPE SHALL BE RIGID PVC OR CORRUGATED METAL ONLY.

THE CONCRETE RING OR CONCRETE END SECTION SHALL BE CAST AROUND THE SAME TYPE OF PIPE AS THAT USED FOR UNDERDRAIN OUTLET PIPE.

STEEL END SECTIONS SHALL BE ATTACHED TO THE ENDS OF CORRUGATED METAL PIPE AS SPECIFIED ON THIS STANDARD PLAN, BY STANDARD METAL BANDS, OR BY OTHER CONNECTING DEVICES AS APPROVED BY THE ENGINEER.

STEEL END SECTIONS MAY ALSO BE ATTACHED TO THE ENDS OF PVC OUTLET PIPE AS APPROVED BY THE ENGINEER BY USING A PVC ADAPTER THAT PROVIDES SIMILAR RESISTANCE TO MOVEMENT OF THE CONNECTION DEVICE AS THAT PROVIDED BY STEEL PIPE CORRUGATIONS. DIRECT ATTACHMENT OF THE STEEL END SECTION TO END OF STANDARD PVC OUTLET PIPE IS NOT ACCEPTABLE.

HELICALLY CORRUGATED PIPE (EXCEPT PERFORATED PIPE) SHALL HAVE THE ENDS OF THE PIPE REROLLED TO FORM ANNULAR CORRUGATIONS FOR CONNECTING THE END SECTION.

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR
**GRANULAR BLANKET, UNDERDRAINS,
 OUTLET ENDINGS FOR UNDERDRAINS,
 AND SEWER BULKHEADS**

F.H.W.A. APPROVAL	6-13-2012 PLAN DATE	R-80-E	SHEET 8 OF 8
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MICHIGAN DESIGN MANUAL

ROAD DESIGN

3.08

3R, 4R AND OTHER PROJECTS

3.08.01 (revised 6-25-2012)

General

A. (3R) Resurfacing Restoration and Rehabilitation

This work is defined in 23 CFR (Code of Federal Regulations) as "*work undertaken to extend the service life of an existing highway and enhance highway safety. This includes placement of additional surface material and/or other work necessary to return an existing roadway, including shoulders, bridges, the roadside and appurtenances to a condition of structural or functional adequacy. This work may include upgrading of geometric features, such as widening, flattening curves or improving sight distances.*" Examples of this type of work include:

1. Resurfacing, milling or profiling, concrete overlays and inlays (without removing subbase).
2. Lane and/or shoulder widening (no increase in number of through lanes).
3. Roadway base correction.
4. Minor alignment improvements.
5. Roadside safety improvements.
6. Signing, pavement marking and traffic signals.
7. Intersection and railroad crossing upgrades.
8. Pavement joint repair.
9. Crush and shape and resurfacing.
10. Rubblize and resurface.

3.08.01A (continued)

11. Intermittent grade modifications (used to correct deficiencies in the vertical alignment by changing the paving profile for short distances) that leave the existing pavement in service for more than 50% of the total project length.
12. Passing relief lanes.

See Chapter 12 of the Bridge Design Manual for examples of "bridge" 3R work.

B. (4R) New Construction/ Reconstruction

Projects that are mainly comprised of the following types of work are not considered 3R.

1. Complete removal and replacement of pavement (including subbase).
2. Major alignment improvements.
3. Adding lanes for through traffic.
4. New roadways and /or bridges.
5. Complete bridge deck or superstructure replacement.
6. Intermittent grade modifications (used to correct deficiencies in the vertical alignment by changing the paving profile for short distances) that leave the existing pavement in service for less than 50% of the total project length.

The above lists are not all inclusive, but are intended to give typical examples of 3R and 4R work.

MICHIGAN DESIGN MANUAL

ROAD DESIGN

3.08.01 (continued)

General

C. Combined 3R and 4R Work

If a project includes 3R and 4R work, the applicable standards are governed by the standards that correspond individually to each work type (3R or 4R). Identify the logical limits of each work type on the project information sheet to distinguish where 3R guidelines and 4R standards are separately applied. Work type overlap between separation limits may cause a default to 4R standards within the overlap.

When other work types are combined with 3R or 4R projects, they are also governed separately and identified as such on the project information sheet. See Section 3.08.01D.

D. Other Work Categories

Projects categorized by other work types such as CPM, M-Funded Non-Freeway Resurfacing, Signal Corridor and Signing Corridor projects are governed by guidelines that differ from 3R and 4R Guidelines. For information related to specific requirements for these categories of work, use other appropriate references. When other work types are packaged with a 3R or 4R project, the portion of the project that is outside the 3R or 4R work limits is governed by the guidelines that pertain to the other work type. When describing the work type in the request for Plan Review Meeting, identify the logical limits of work type separation so that the appropriate requirements are considered within those limits. Work type overlap within these separation limits may cause a default to 3R or 4R requirements.

Note that the applicability of CPM minimum design requirements is contingent on the program eligibility of the roadway. Regardless of funding source used to design and construct CPM work, CPM minimum design requirements can only be applied to work done on roadways that would otherwise be eligible for funding under the CPM program.

3.08.01 (continued)

E. Design Exceptions

The sections to follow include standards for geometric design elements for the various classifications of roadways and work types. For specific controlling geometric design elements, a formal design exception must be submitted and approved when the standards can not be met. Design exceptions should be addressed as early in the life of a design as possible. Designers should strive to process design exceptions during the scoping process. Along with the justification for not meeting MDOT and/or AASHTO standards the design exception includes a crash analysis and the estimated total cost required to attain full standards compliance. See Section 14.11 for design exception submittal procedures and required forms.

The controlling elements for which design exceptions are required include:

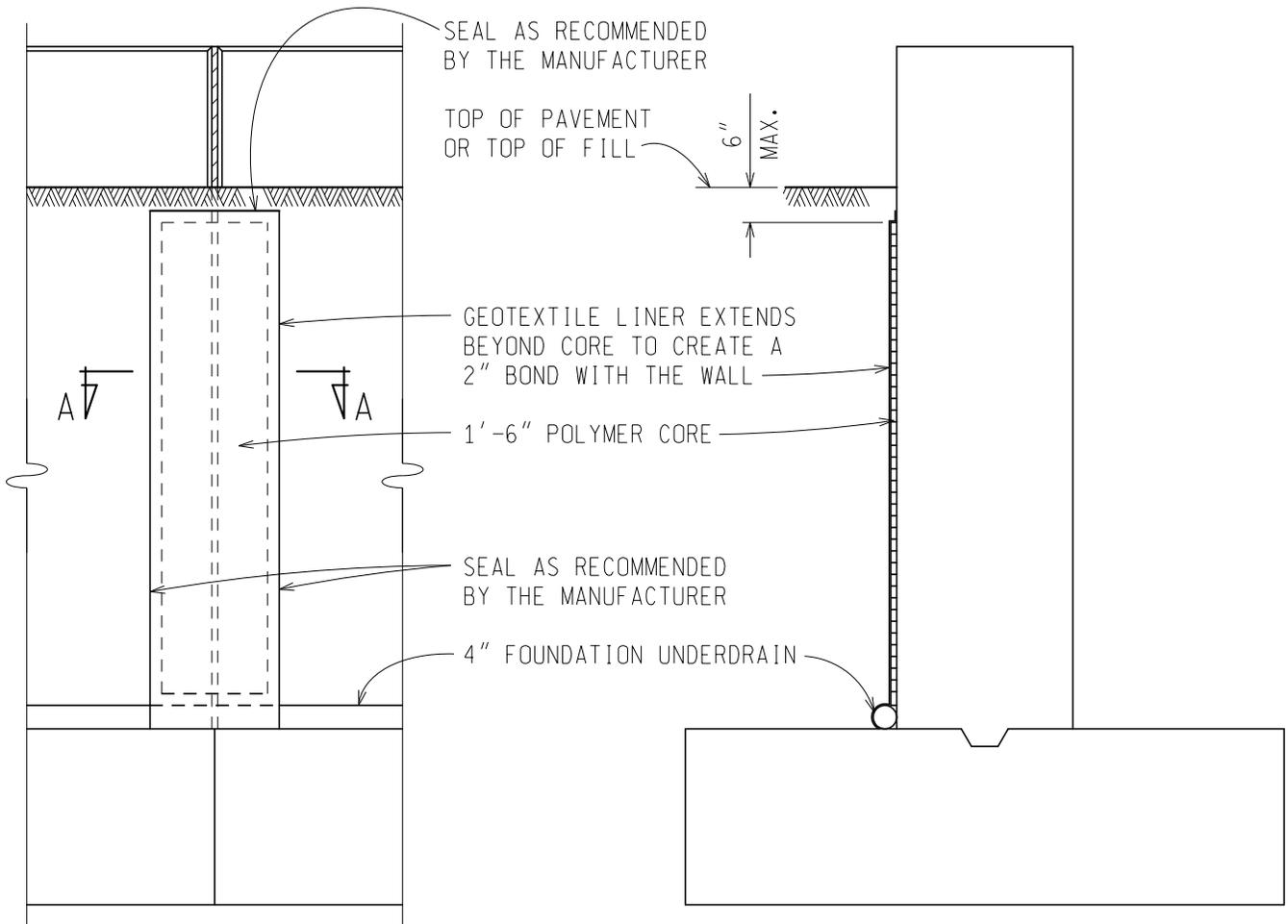
- Design Speed
- Lane Width
- Shoulder Width
- Bridge Width
- Structural Capacity
- Horizontal Alignment
- Vertical Alignment
- Grade
- Stopping Sight Distance (Horizontal Sightline Offset (HSO) and K-value)
- Cross Slope
- Superelevation
- Vertical Clearance
- Horizontal Clearance (not including clear zone, see definition of terms)
- Ramps (See Section 3.11.03B)

DRAWN BY: BLT
 CHECKED BY: VZ
 APPROVED BY: DAJ

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT

ISSUED: 06/25/12
 SUPERSEDES: 02/14/11

WALL EXPANSION JOINT DRAIN



WALL ELEVATION

WALL SECTION

NOTE TO DETAILER:

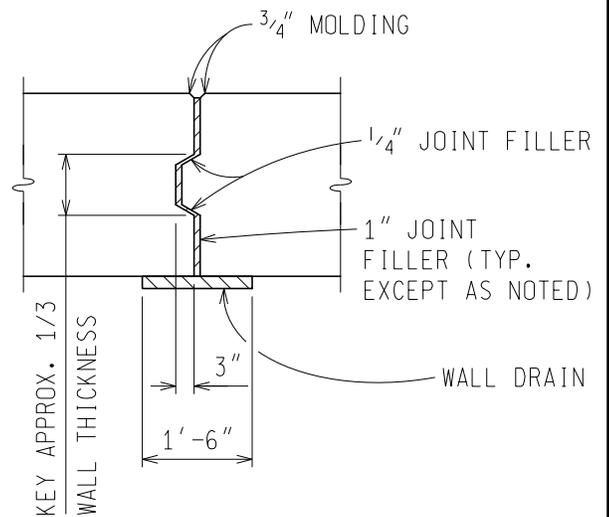
WALL DRAINS SHOULD BE USED AT EXPANSION JOINTS IN RETAINING WALLS AND FULL HEIGHT ABUTMENTS BUT SHOULD NOT BE PLACED ON STRUCTURES CROSSING WATERWAYS.

NOTES:

GEOCOMPOSITE DRAIN SHALL MEET THE REQUIREMENTS OF STANDARD SPECIFICATION 910.05.

THE ITEM "WALL DRAIN" INCLUDES FURNISHING AND ATTACHING THE POLYMER CORE AND GEOTEXTILE LINER AS DETAILED.

THE FOUNDATION UNDERDRAIN SHALL BE PAID FOR SEPARATELY AS "UNDERDRAIN, FDN, 4 INCH."



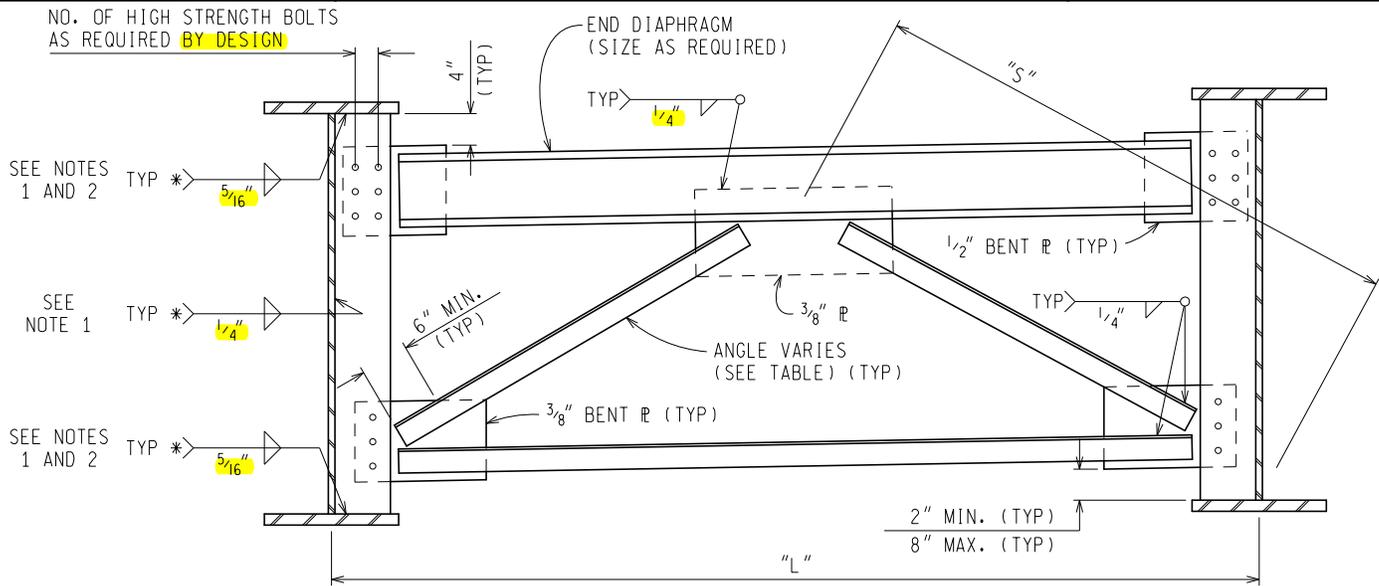
SECTION A-A

DRAWN BY: BLT
 CHECKED BY: VZ
 APPROVED BY: DAJ

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT

ISSUED: 06/25/12
 SUPERSEDES: 11/27/01

END CROSS FRAMES



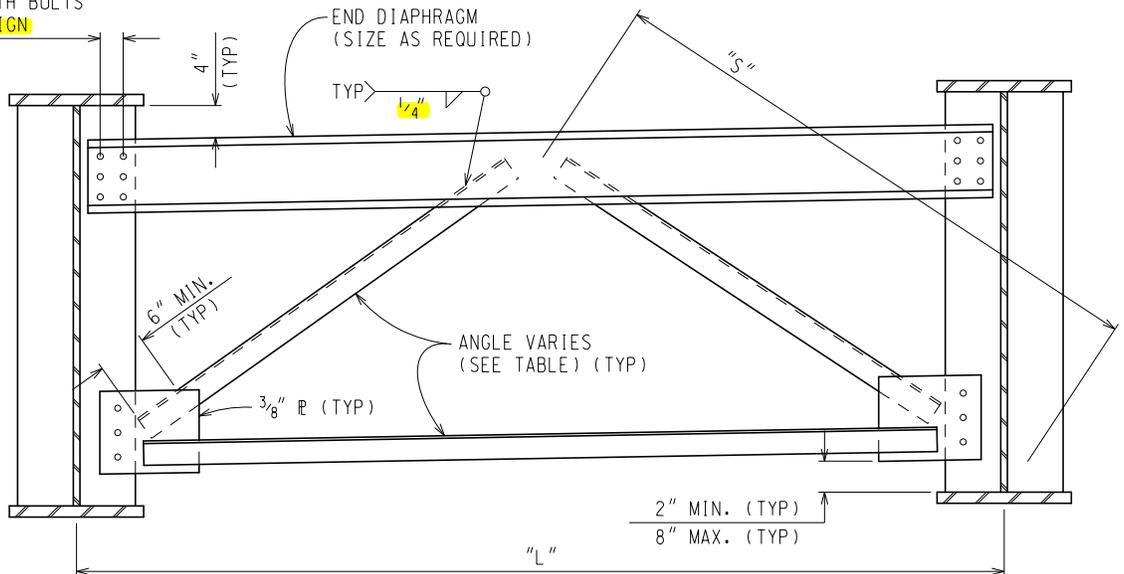
ANGLE OF CROSSING < 45° AT HANGERS OR
 < 70° AT PIERS & ABUTMENTS WITH INDEPENDENT BACKWALLS

BEARING STIFFENERS OR CONNECTION PLATES SHALL BE SET PERPENDICULAR TO GIRDER

NOTE 1: STOP WELD 1/4" SHORT OF CORNER CLIPS

NOTE 2: WRAP WELD AROUND OUTSIDE EDGE

NO. OF HIGH STRENGTH BOLTS
 AS REQUIRED **BY DESIGN**



ANGLE OF CROSSING = 45°-90° AT HANGERS OR
 = 70°-90° AT PIERS & ABUTMENTS WITH INDEPENDENT BACKWALLS

BEARING STIFFENERS OR CONNECTION PLATES SHALL BE SET AT ANGLE OF CROSSING

STRAIGHT GIRDERS	
"L" OR "S"	MIN. ANGLE SIZE
LESS THAN 6'-9"	3" x 3" x 5/16"
6'-9" TO 9'-3"	4" x 4" x 5/16"
9'-3" TO 11'-6"	5" x 5" x 3/8"
11'-6" TO 13'-9"	6" x 6" x 3/8"
13'-9" TO 18'-6"	8" x 8" x 1/2"
CURVED GIRDERS	
LESS THAN 5'-9"	3" x 3" x 5/16"
5'-9" TO 7'-9"	4" x 4" x 5/16"
7'-9" TO 9'-9"	5" x 5" x 3/8"
9'-9" TO 11'-9"	6" x 6" x 1/2"
11'-9" TO 15'-9"	8" x 8" x 5/8"

NOTES:

USE FULL DEPTH STIFFENERS OR 1/2" CONNECTION PLATES.

ANGLE SIZE BASED ON L/R RATIO. STRESSES MAY REQUIRE USE OF LARGER ANGLES.

USE DETAIL A, GUIDE 8.06.02 IF CONNECTION PLATE EXTENDS BEYOND FLANGE.

* WELD TOP AND BOTTOM UNLESS FATIGUE LIMITATIONS CONTROL. CONNECTION PLATE WELDS SHOWN HERE. SEE GUIDE 8.06.02 FOR STIFFENER WELDING DETAILS. SEE GUIDE 8.11.08 FOR CONNECTION R DETAILS IF FATIGUE LIMITATIONS CONTROL.

PREPARED BY
 DESIGN DIVISION

8.11.06

DRAWN BY: BLT
 CHECKED BY: VZ
 APPROVED BY: DAJ

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT
 INTERMEDIATE AND PIER CROSS FRAMES

ISSUED: 06/25/12
 SUPERSEDES: 11/27/01

NOTES:

USE FULL DEPTH STIFFENERS OR 1/2" CONNECTION PLATES.

FOR ANGLES OF CROSSING > 70°, SET CONNECTION PLATE AND BEARING STIFFENER TO ANGLE OF CROSSING. FOR ANGLE OF CROSSING < 70°, SET CONNECTION PLATE AND BEARING STIFFENER NORMAL TO WEB. USE BENT GUSSET PLATES ON PIER CROSSFRAMES.

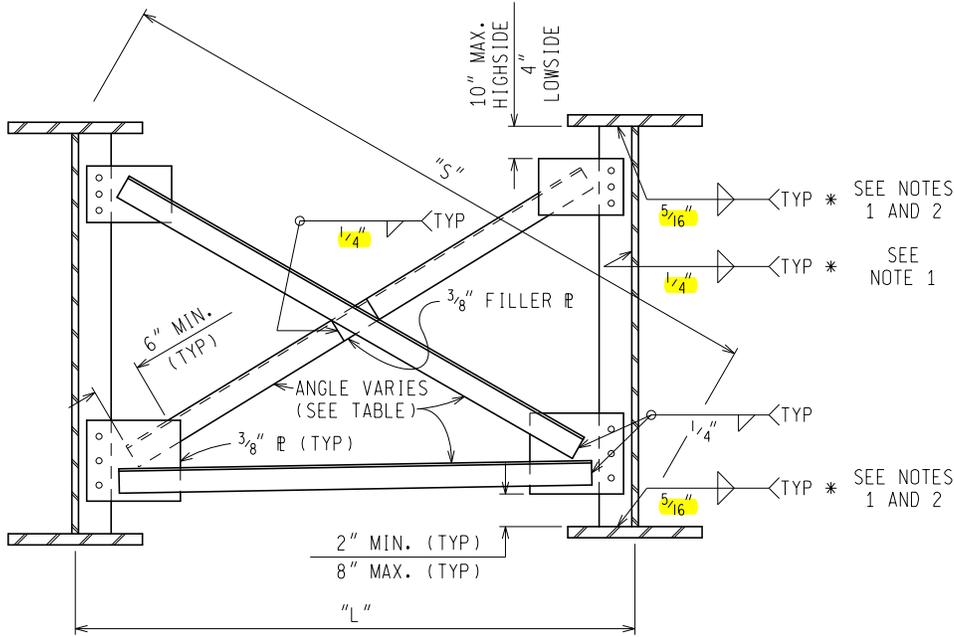
USE DETAIL A, GUIDE 8.06.02 IF CONNECTION PLATE EXTENDS BEYOND FLANGE.

INTERMEDIATE CROSS FRAMES TO BE IN LINE.

ANGLE SIZE BASED ON L/R RATIO. STRESSES MAY REQUIRE USE OF LARGER ANGLES.

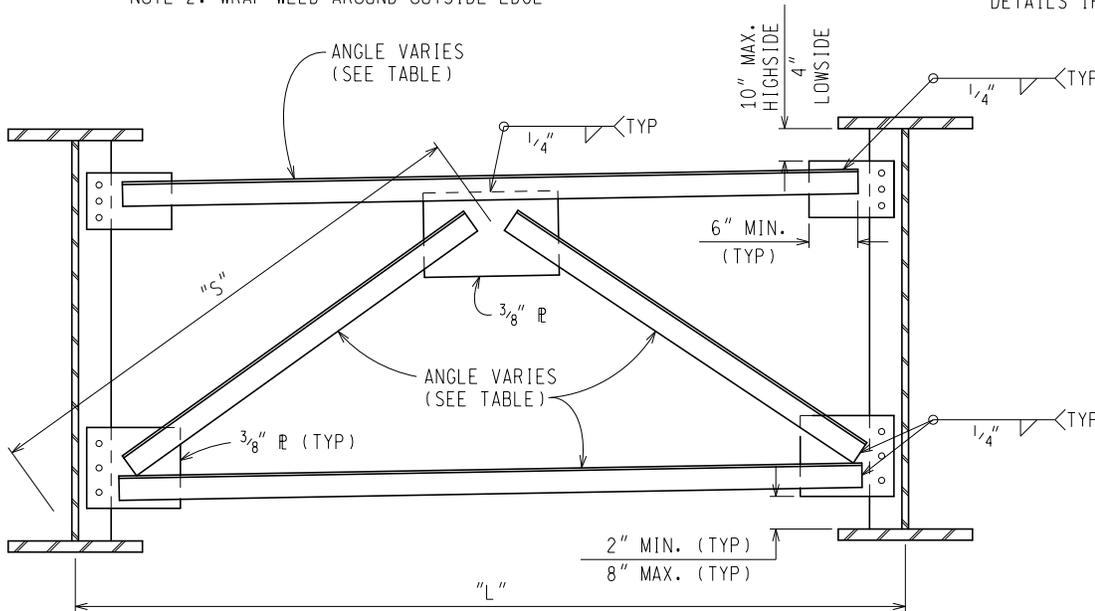
USE DIAPHRAGMS FOR WEB DEPTHS < 48". (30" DIAPHRAGM FOR 42" WEB DEPTH.) SEE GUIDE 8.11.03 FOR DETAILS.

* WELD TOP AND BOTTOM UNLESS FATIGUE LIMITATIONS CONTROL. CONNECTION PLATE WELDING SHOWN HERE. SEE GUIDE 8.06.02 FOR STIFFENER WELDING DETAILS. SEE GUIDE 8.11.08 FOR CONNECTION PLATE DETAILS IF FATIGUE LIMITATIONS CONTROL.



PIER AND INTERMEDIATE CROSS FRAMES

NOTE 1: STOP WELD 1/4" SHORT OF CORNER CLIPS
 NOTE 2: WRAP WELD AROUND OUTSIDE EDGE



PIER CROSS FRAMES

BEAM SPACING > 12'-6"

STRAIGHT GIRDERS	
"L" OR "S"	MIN. ANGLE SIZE
LESS THAN 6'-9"	3" x 3" x 5/16"
6'-9" TO 9'-3"	4" x 4" x 5/16"
9'-3" TO 11'-6"	5" x 5" x 3/8"
11'-6" TO 13'-9"	6" x 6" x 3/8"
13'-9" TO 18'-6"	8" x 8" x 1/2"
CURVED GIRDERS	
LESS THAN 5'-9"	3" x 3" x 5/16"
5'-9" TO 7'-9"	4" x 4" x 5/16"
7'-9" TO 9'-9"	5" x 5" x 3/8"
9'-9" TO 11'-9"	6" x 6" x 1/2"
11'-9" TO 15'-9"	8" x 8" x 5/8"

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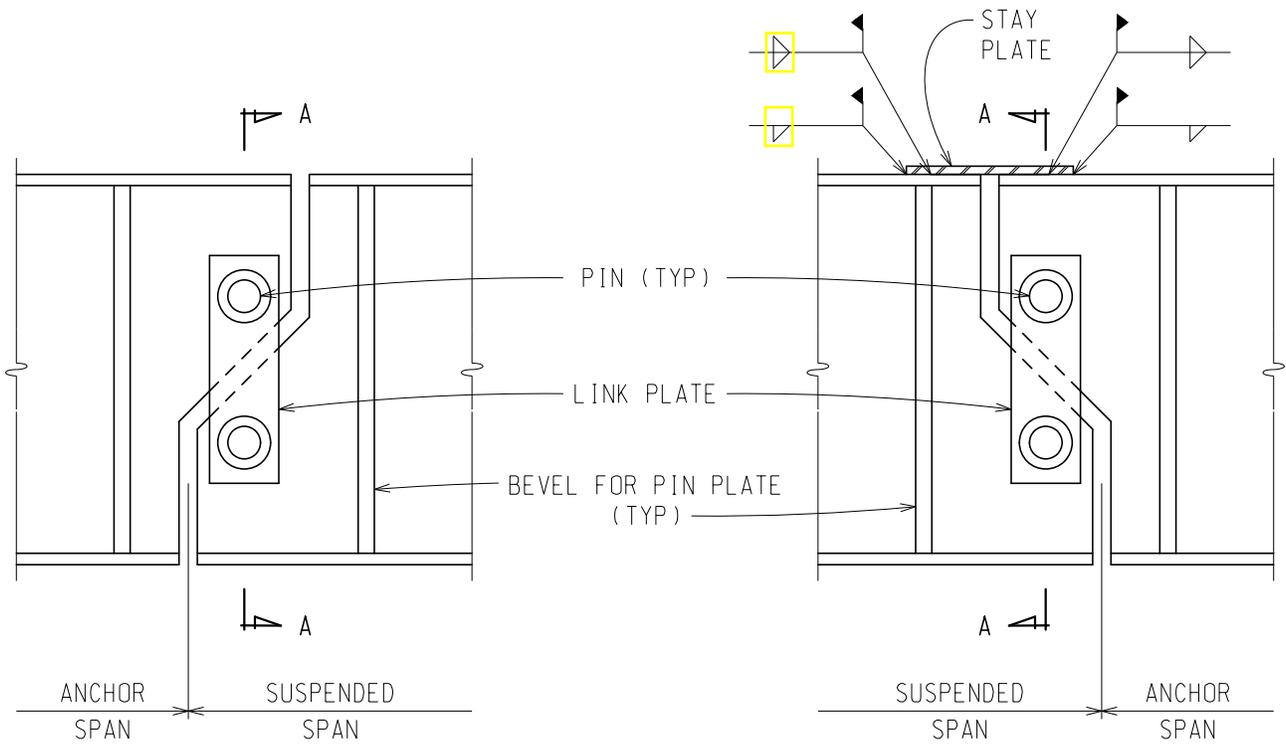
8.11.07

DRAWN BY: BLT
 CHECKED BY: VZ
 APPROVED BY: DAJ

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT

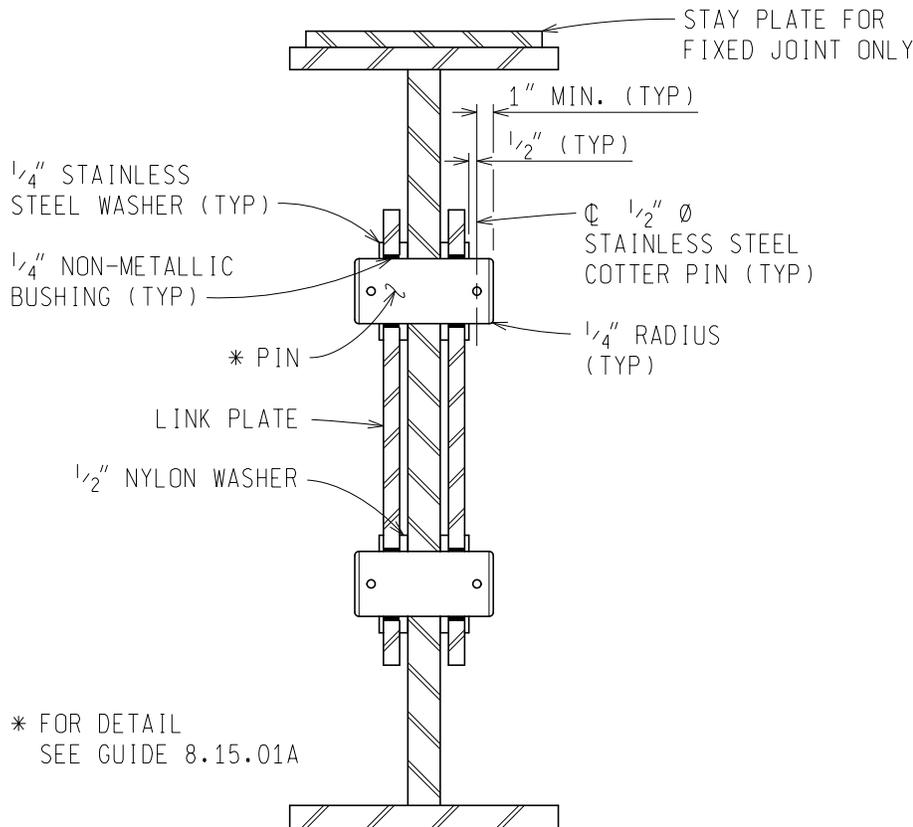
ISSUED: 06/25/12
 SUPERSEDES: 05/04/06

SUSPENDER DETAILS FOR
 CANTILEVERED PLATE GIRDERS



ELEVATION
 EXPANSION JOINT

ELEVATION
 FIXED JOINT



* FOR DETAIL
 SEE GUIDE 8.15.01A

SECTION A-A

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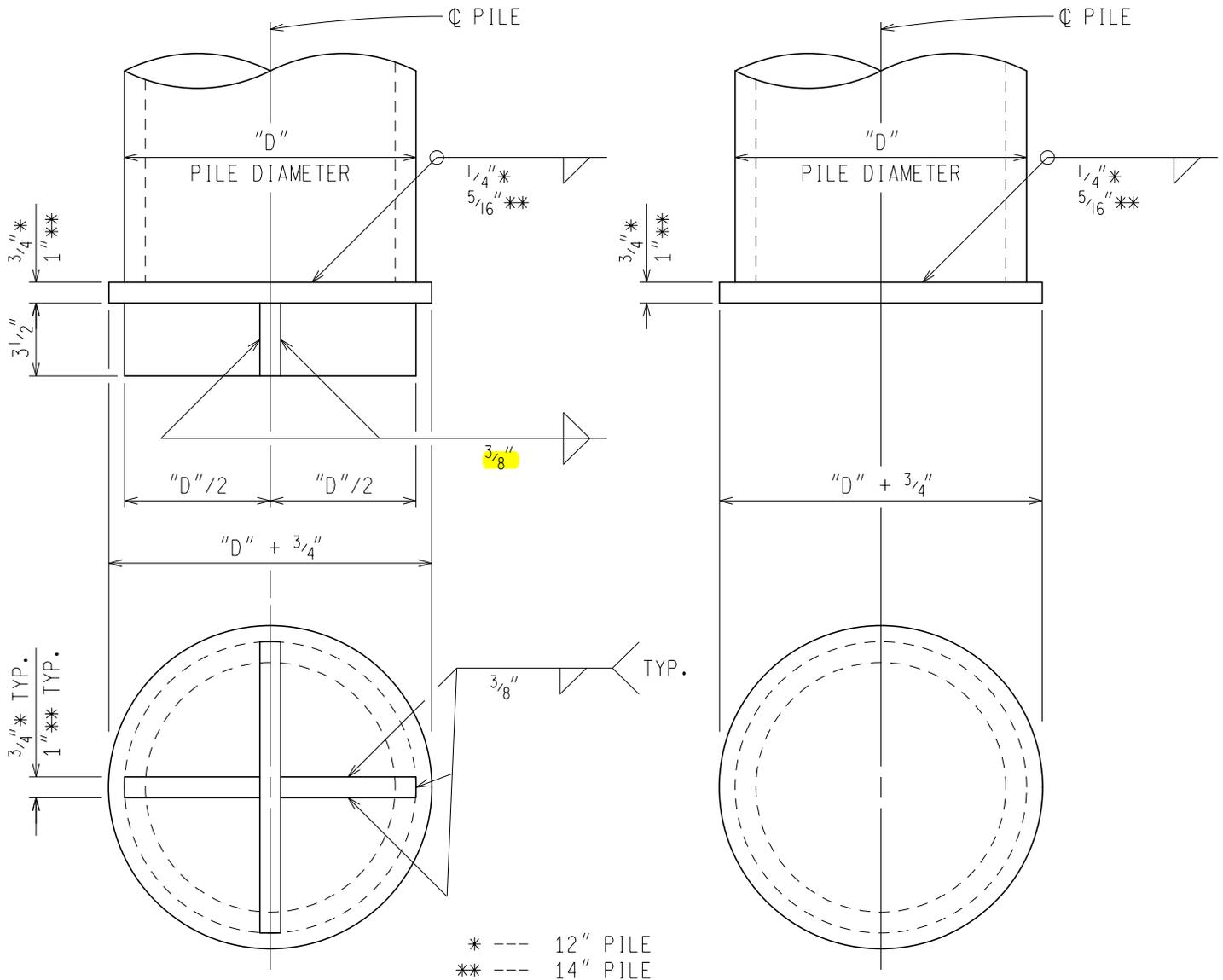
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DRAWN BY: BLT
 CHECKED BY: VZ
 APPROVED BY: DAJ

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 BUREAU OF HIGHWAY DEVELOPMENT

ISSUED: 06/25/12
 SUPERSEDES: 11/27/01

CIP PILE POINT DETAILS



ALTERNATE CIP PILE POINT DETAILS

FOR POINT BEARING PILES ONLY. USE
 WHEN RECOMMENDED BY SOILS SECTION.

CIP PILE POINT DETAILS

NOTE TO DESIGNER:

THE PILE POINTS DETAILED ON THIS SHEET SHOULD NOT BE PAID FOR SEPARATELY.

PLAN NOTE:

POINTS FOR FLUTED SHELLS SHALL BE FORGINGS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

PREPARED BY
 DESIGN DIVISION

8.21.03