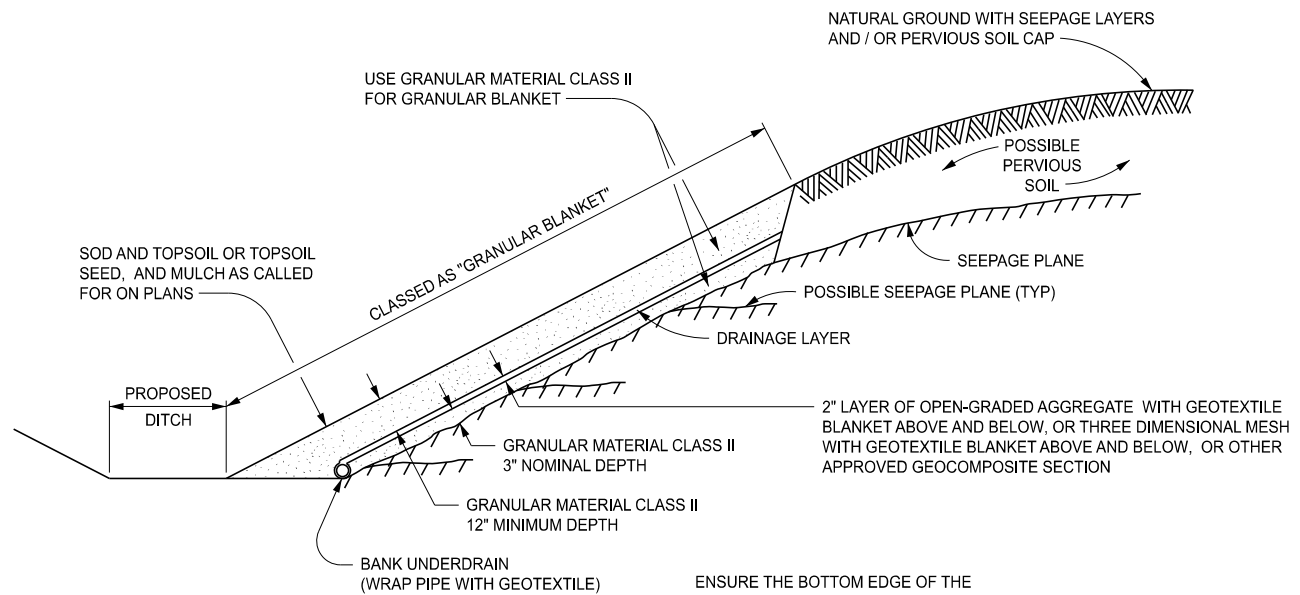
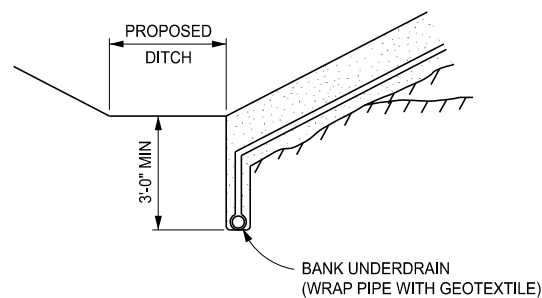


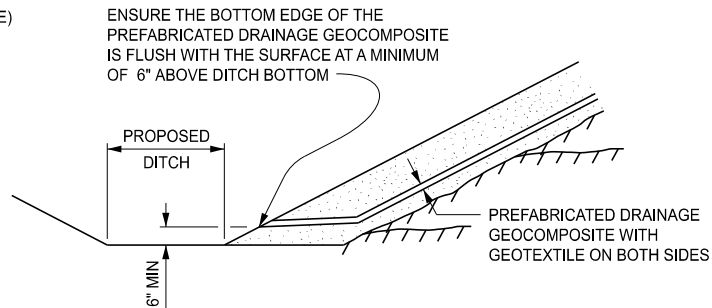
GRANULAR BLANKET TYPE 1



OPTION 1



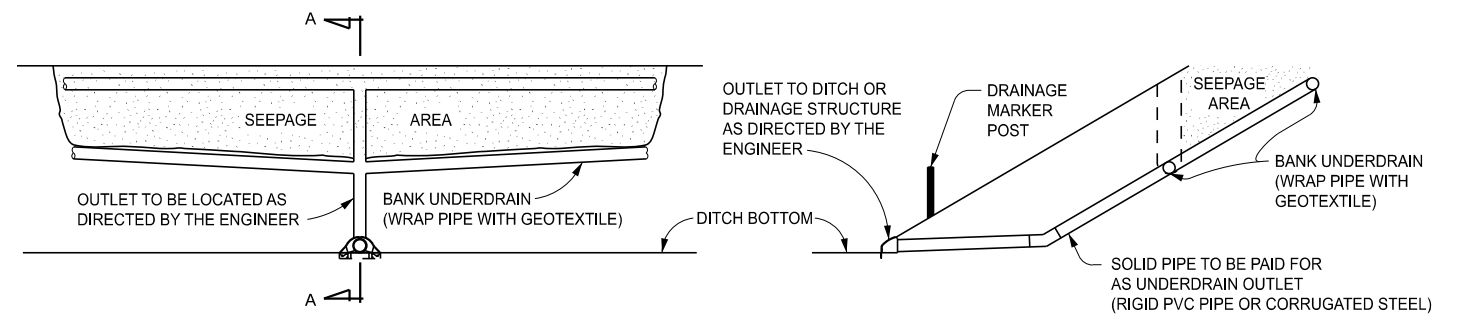
OPTION 2



OPTION 3

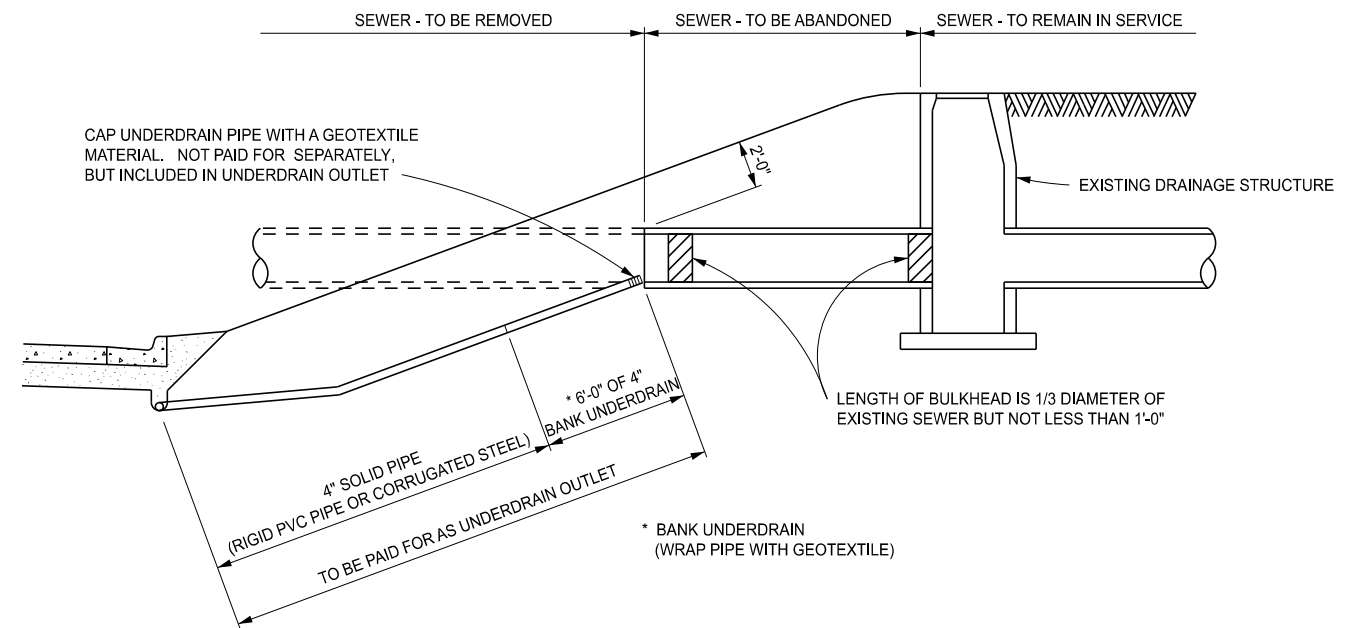
NOTE: OPTION 1, 2, OR 3 WILL BE DETERMINED BY THE ENGINEER BASED ON THE PROJECT CONDITIONS.

GRANULAR BLANKET TYPE 2



SECTION A - A

BANK UNDERDRAIN OUTLET



WEEPER UNDERDRAIN AND BULKHEADING SEVERED SEWER

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

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

SPECIAL DETAIL
FHWA APPROVAL

04/02/2025
PLAN DATE

R-80-F

SHEET
1 OF 8



DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

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

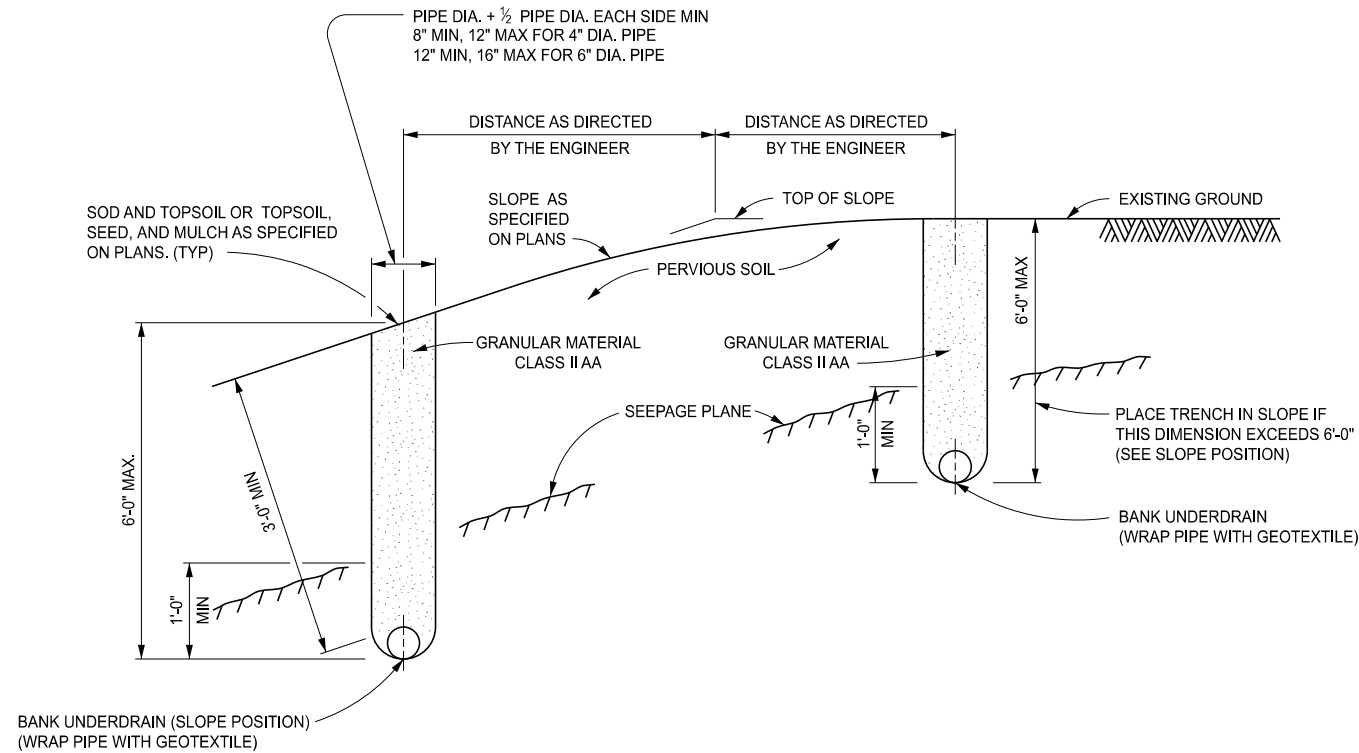
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FHWA APPROVAL

04/02/2025
PLAN DATE

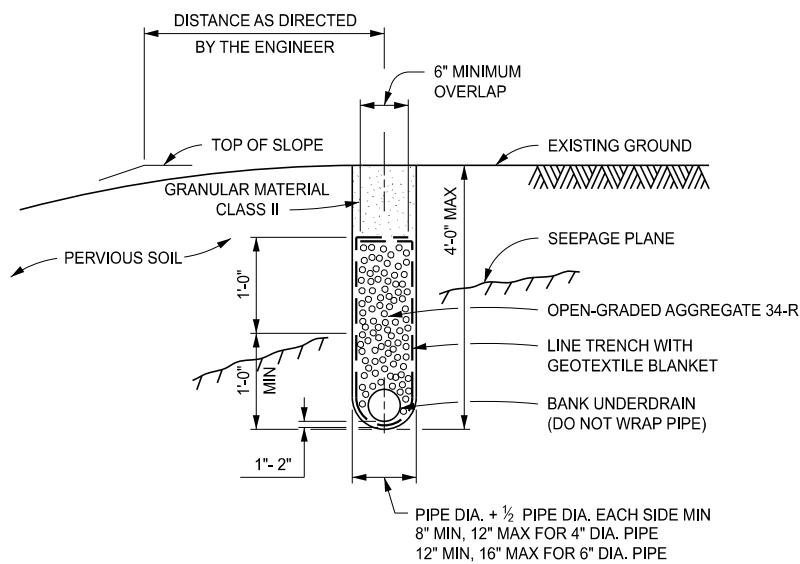
R-80-F

SHEET
2 OF 8


SECT

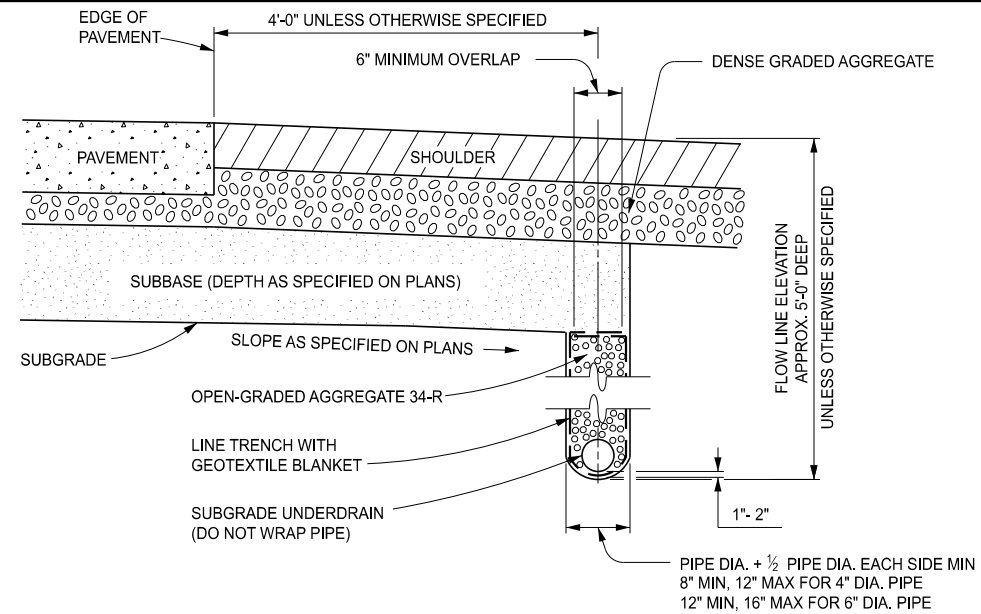


BANK UNDERDRAINS

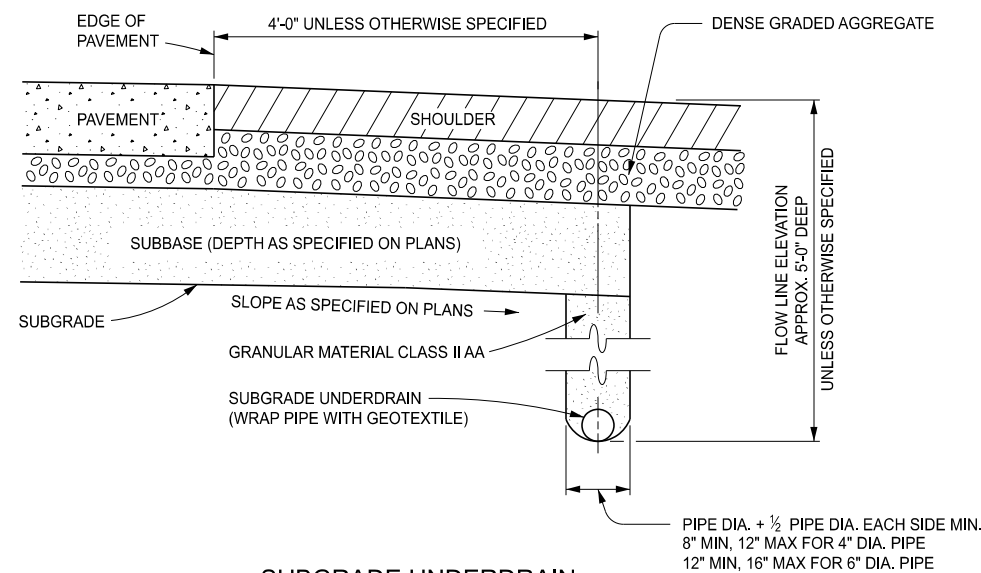


BANK UNDERDRAIN, OPEN-GRADED

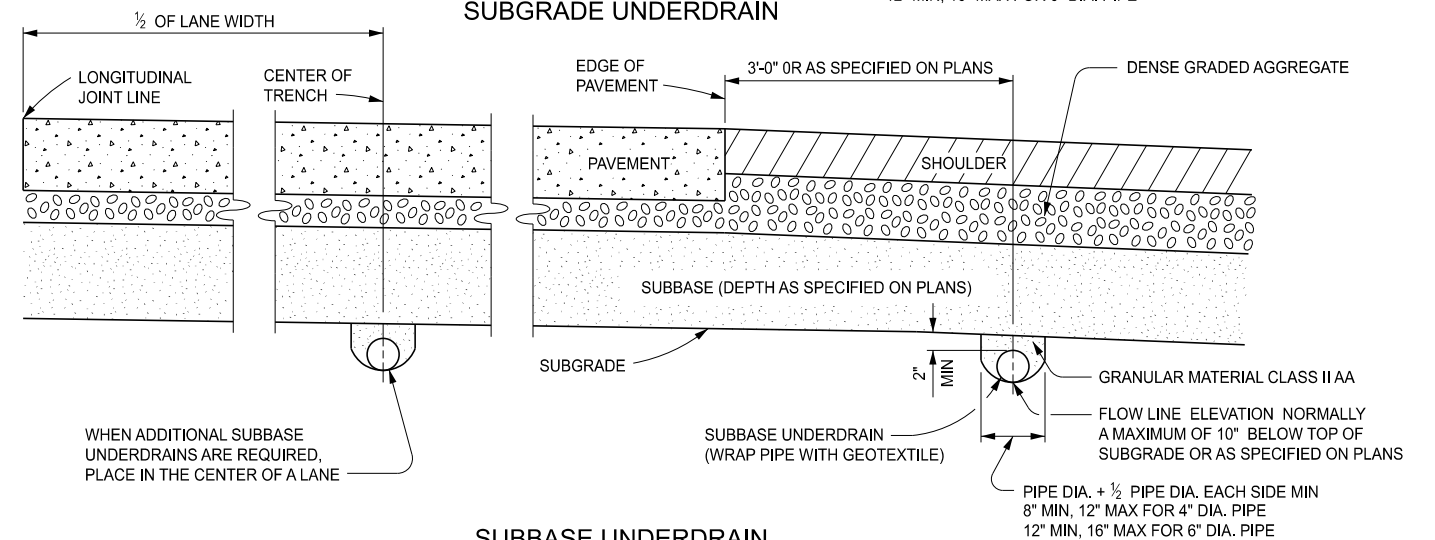
 Michigan Department of Transportation	STANDARD PLAN FOR				R-80-F	SHEET 3 OF 8
	GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS					
	FOR UNDERDRAINS, AND SEWER BULKHEADS					
DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	SPECIAL DETAIL	04/02/2025				
	FWHA APPROVAL	PLAN DATE				




SUBGRADE UNDERDRAIN - OPEN-GRADED

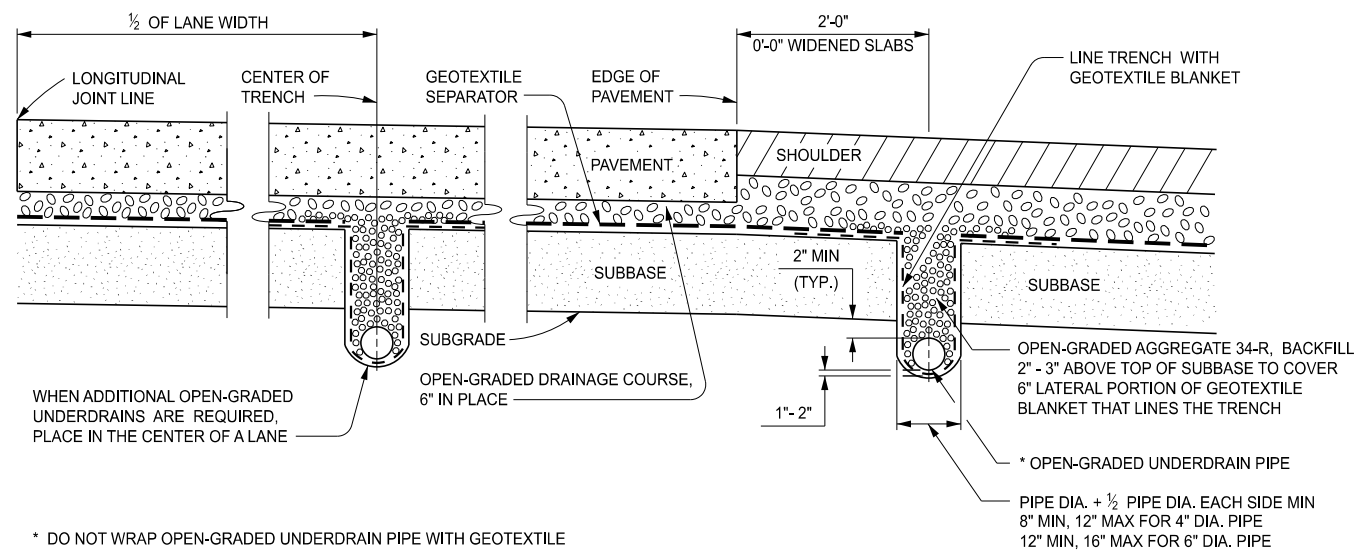


SUBGRADE UNDERDRAIN

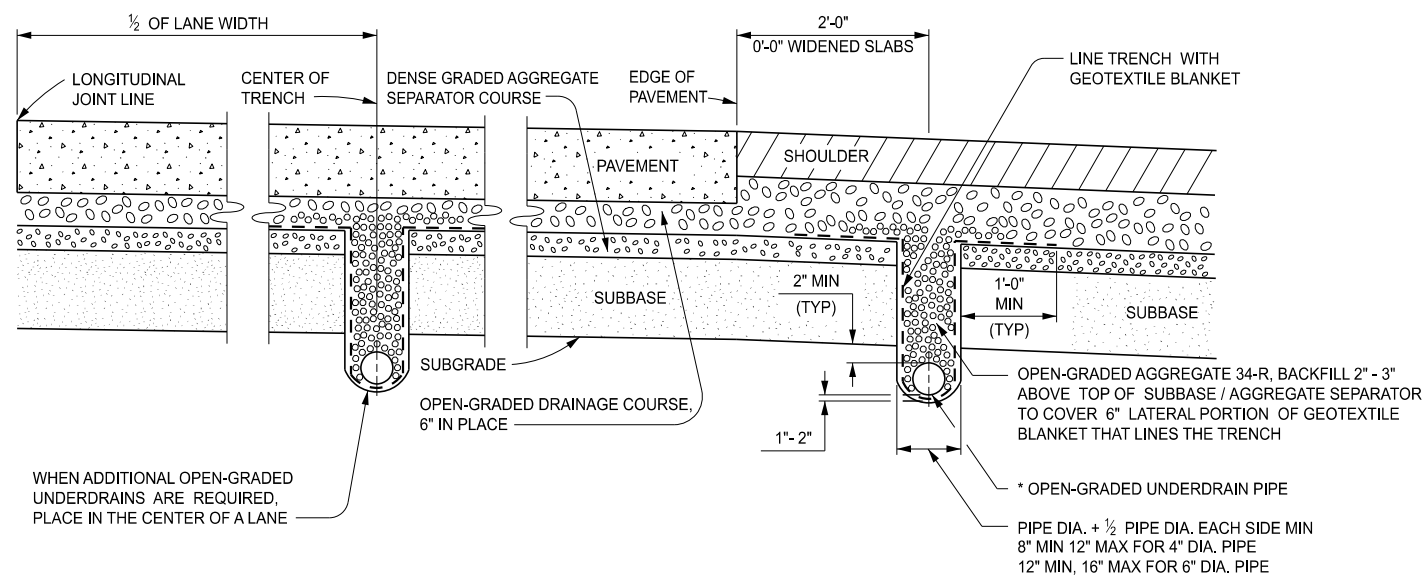


SUBBASE UNDERDRAIN


 Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS FOR UNDERDRAINS, AND SEWER BULKHEADS			
	SPECIAL DETAIL	04/02/2025	R-80-F	SHEET 4 OF 8
	FWHA APPROVAL	PLAN DATE		

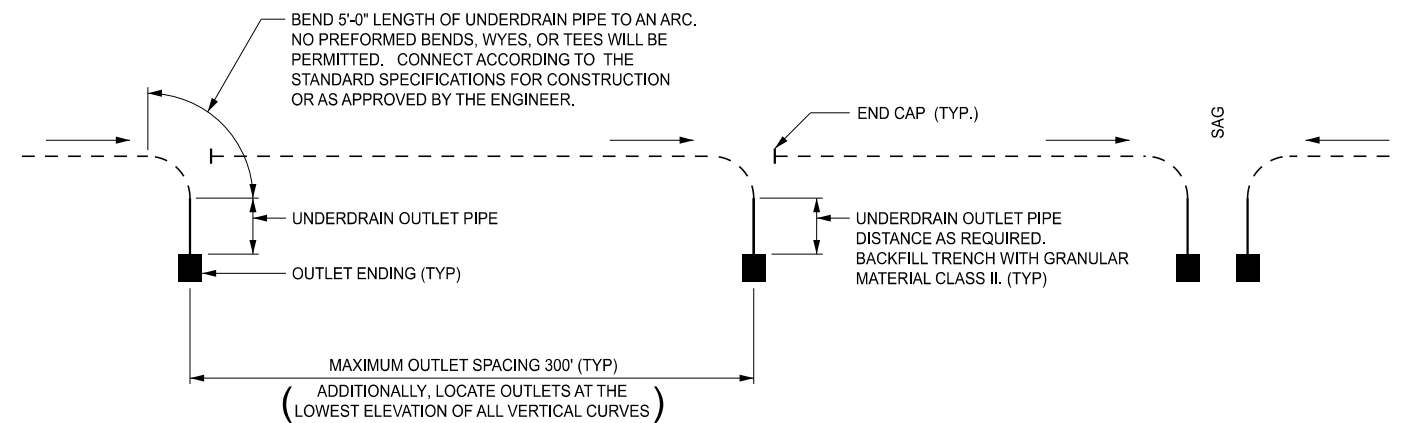


OPEN-GRADED UNDERDRAIN PIPE WITH GEOTEXTILE SEPARATOR

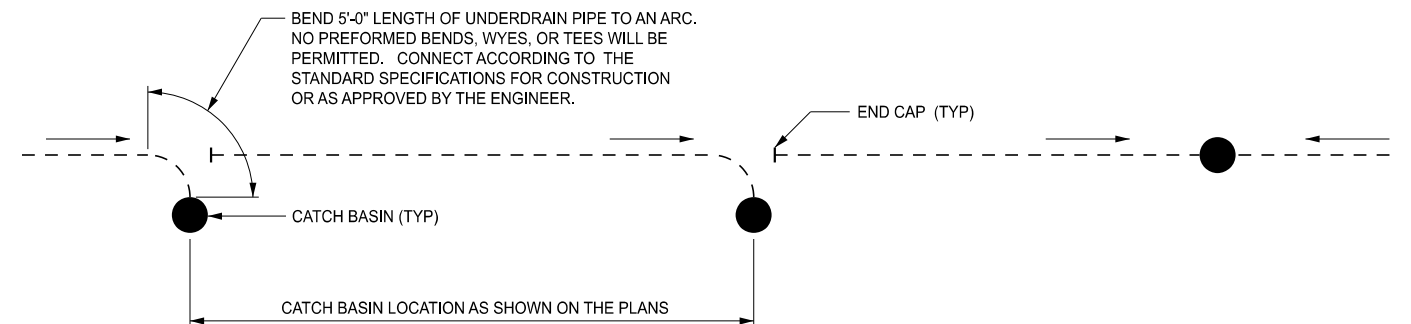


OPEN-GRADED UNDERDRAIN PIPE WITH DENSE GRADED AGGREGATE SEPARATOR COURSE

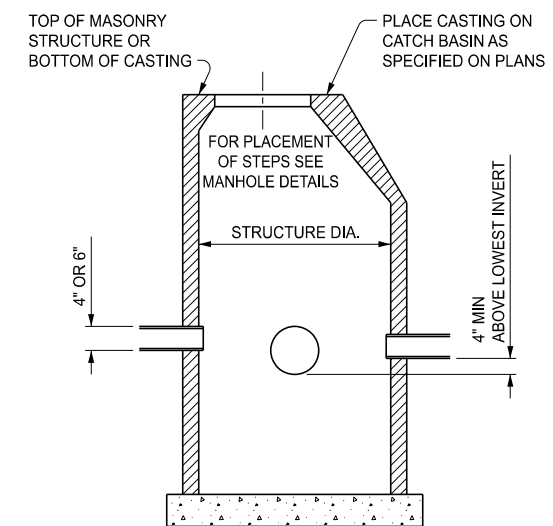
 <p>Michigan Department of Transportation</p> <p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	STANDARD PLAN FOR GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS FOR UNDERDRAINS, AND SEWER BULKHEADS			
	SPECIAL DETAIL FHWA APPROVAL	04/02/2025 PLAN DATE	R-80-F	SHEET 5 OF 8




PLAN SHOWING OUTLETS FOR UNDERDRAINS



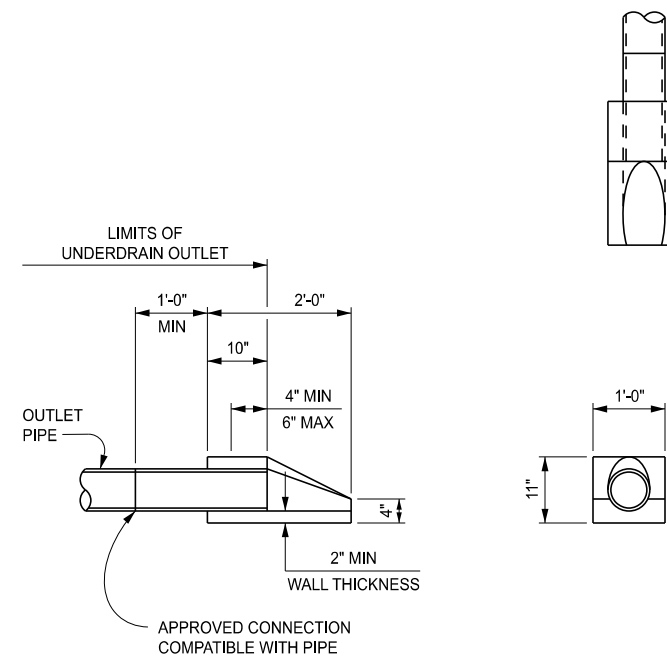
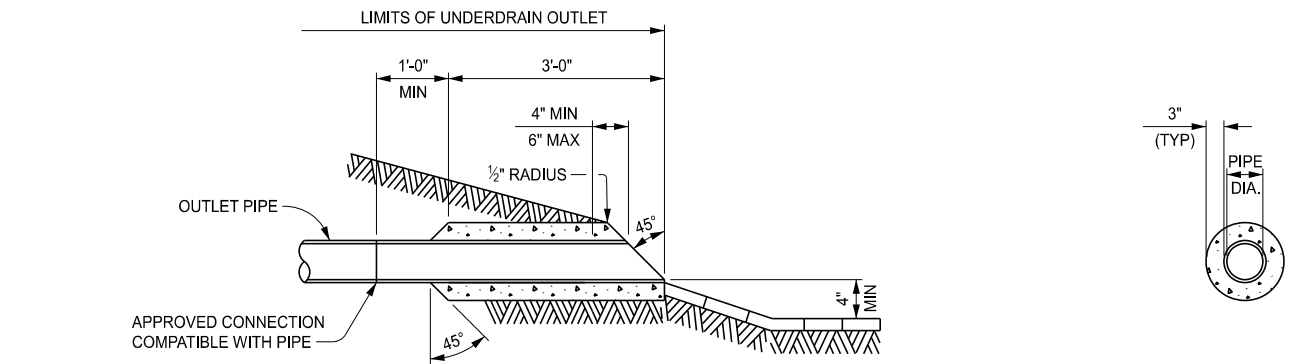
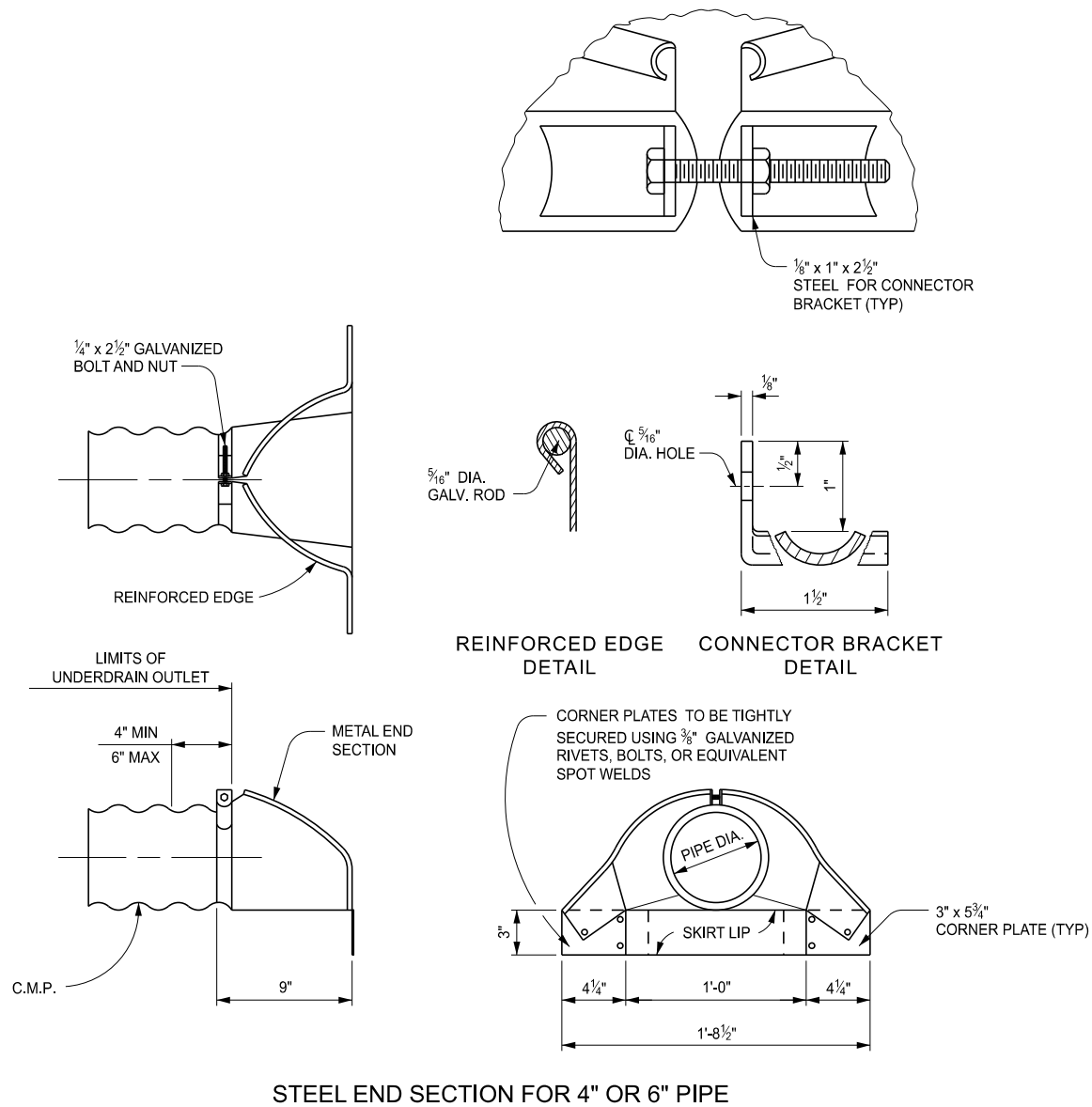
PLAN SHOWING UNDERDRAINS TAPPED INTO CATCH BASINS




PROFILE VIEW


 <p>Michigan Department of Transportation</p> <p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	STANDARD PLAN FOR GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS FOR UNDERDRAINS, AND SEWER BULKHEADS			
	SPECIAL DETAIL FHWA APPROVAL	04/02/2025 PLAN DATE	R-80-F	SHEET 6 OF 8

SECT



- NOTES:
- PROVIDE POSITIVE DRAINAGE FOR UNDERDRAINS AND UNDERDRAIN OUTLETS.
- ENSURE UNDERDRAIN PIPE SIZES ARE AS SPECIFIED ON THE PLAN.
- CONSTRUCT CONNECTIONS BETWEEN UNDERDRAIN PIPE AND UNDERDRAIN OUTLET PIPE ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION AND AS APPROVED BY THE ENGINEER.
- ENSURE CONNECTIONS, IF REQUIRED WITHIN THE OUTLET PIPE, ARE ACCORDING TO APPLICABLE ASTM SPECIFICATIONS REFERENCED IN THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, ARE WATER TIGHT, AND OF THE SAME MATERIAL AS THE OUTLET PIPE.
- ENSURE OUTLET CONNECTIONS TO DRAINAGE STRUCTURES ARE ACCORDING TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION FOR DRAINAGE STRUCTURES.
- USE ONLY RIGID PVC OR CORRUGATED METAL FOR UNDERDRAIN OUTLET PIPE .
- CAST THE CONCRETE RING OR CONCRETE END SECTION AROUND THE SAME TYPE OF PIPE THAT IS USED FOR UNDERDRAIN OUTLET PIPE.
- ATTACH STEEL END SECTIONS 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.
- DO NOT USE STEEL END SECTIONS ON PVC OUTLET PIPE. USE CONCRETE END SECTIONS.
- REROLL THE ENDS OF HELICALLY CORRUGATED PIPE (EXCEPT PERFORATED PIPE) TO FORM ANNULAR CORRUGATIONS FOR CONNECTING THE END SECTION.
- DO NOT USE GRANULAR MATERIAL PRODUCED FROM CRUSHED PORTLAND CEMENT CONCRETE FOR ANY BACKFILL MATERIAL.

 <p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	STANDARD PLAN FOR GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS FOR UNDERDRAINS, AND SEWER BULKHEADS			SHEET 7 OF 8
	SPECIAL DETAIL FHWA APPROVAL	04/02/2025 PLAN DATE	R-80-F	

 <p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	STANDARD PLAN FOR GRANULAR BLANKET, UNDERDRAINS, OUTLET ENDINGS FOR UNDERDRAINS, AND SEWER BULKHEADS			SHEET 8 OF 8
	SPECIAL DETAIL FHWA APPROVAL	04/02/2025 PLAN DATE	R-80-F	

SECT