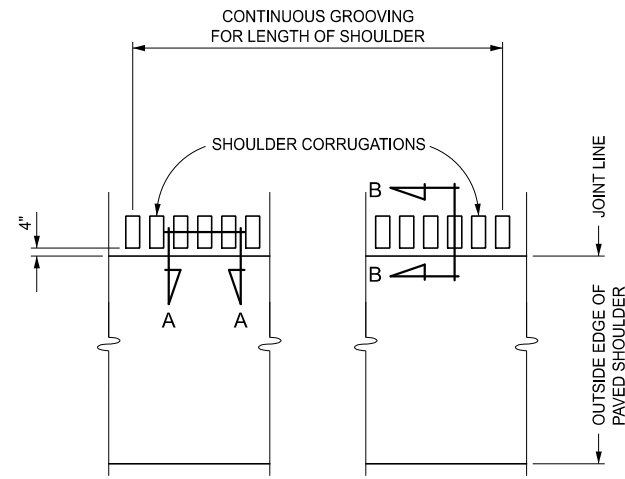
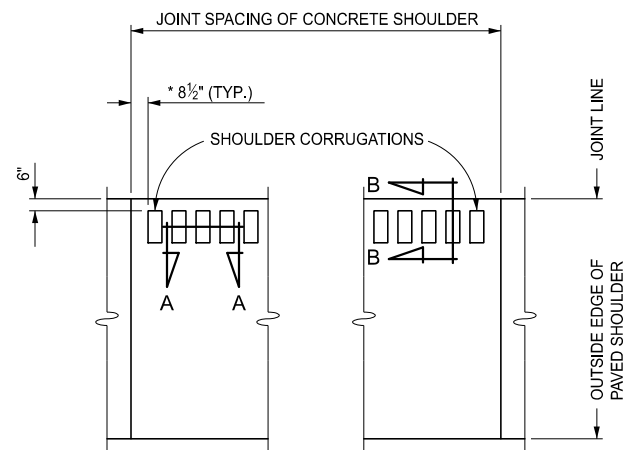


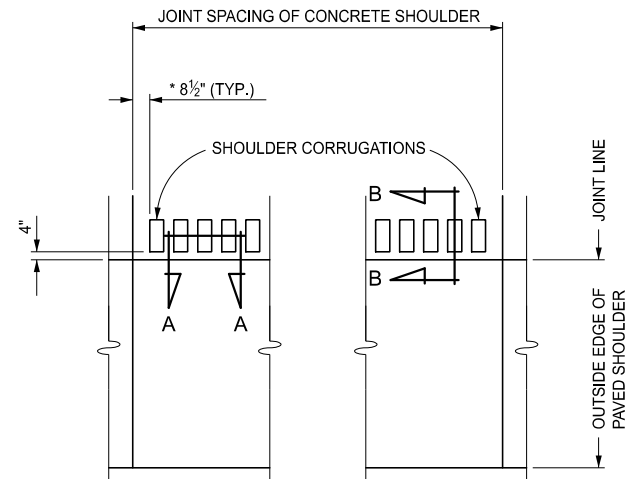
HMA SHOULDER PLAN  
ADJACENT TO 12' LANE



HMA SHOULDER PLAN  
ADJACENT TO 14' LANE



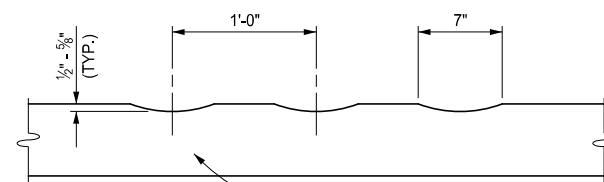
CONCRETE SHOULDER PLAN  
ADJACENT TO 12' LANE



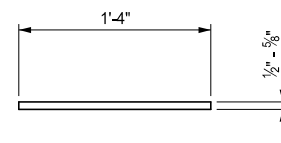
CONCRETE SHOULDER PLAN  
ADJACENT TO 14' LANE

\* THE DISTANCE FROM THE CORRUGATION TO THE TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".

\* THE DISTANCE FROM THE CORRUGATION TO THE TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".

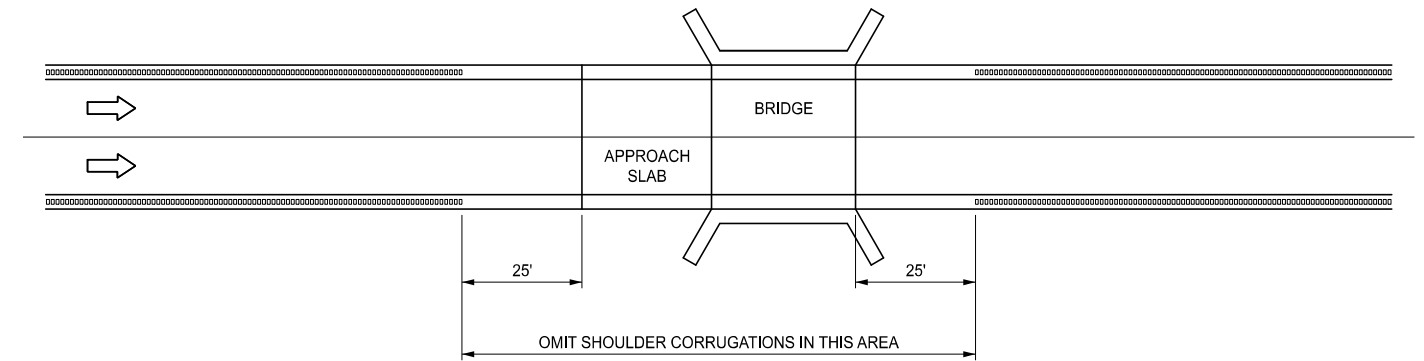


SECTION A - A



SECTION B - B

**FREEWAY SHOULDER CORRUGATIONS**  
(FOR FREEWAY SHOULDERS PAVED 4 FEET OR GREATER)



**SHOULDER CORRUGATIONS AT BRIDGES**  
**FREEWAY SHOULDER CORRUGATIONS**  
(FOR FREEWAY SHOULDERS PAVED 4 FEET OR GREATER)

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES



STANDARD PLAN FOR  
SHOULDER AND CENTER LINE CORRUGATIONS

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT

DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

(SPECIAL DETAIL)  
FHWA APPROVAL

08/02/2023  
PLAN DATE

R-112-J

SHEET  
1 OF 10



STANDARD PLAN FOR  
SHOULDER AND CENTER LINE CORRUGATIONS

DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

(SPECIAL DETAIL)  
FHWA APPROVAL

08/02/2023  
PLAN DATE

R-112-J

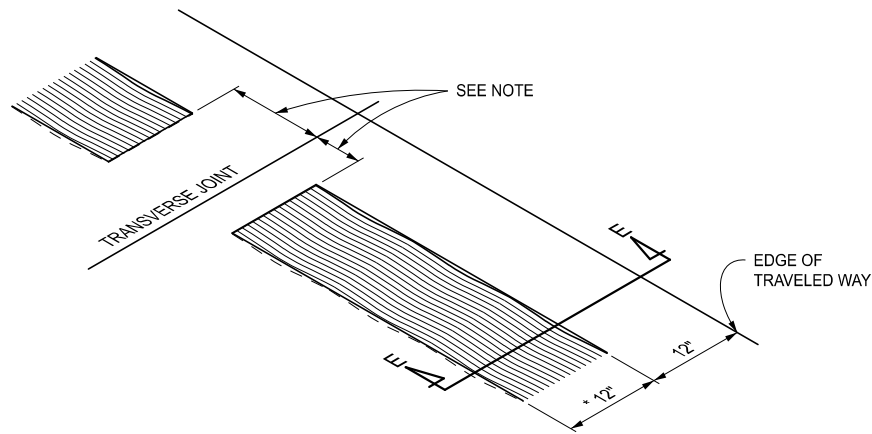
SHEET  
2 OF 10

SECT

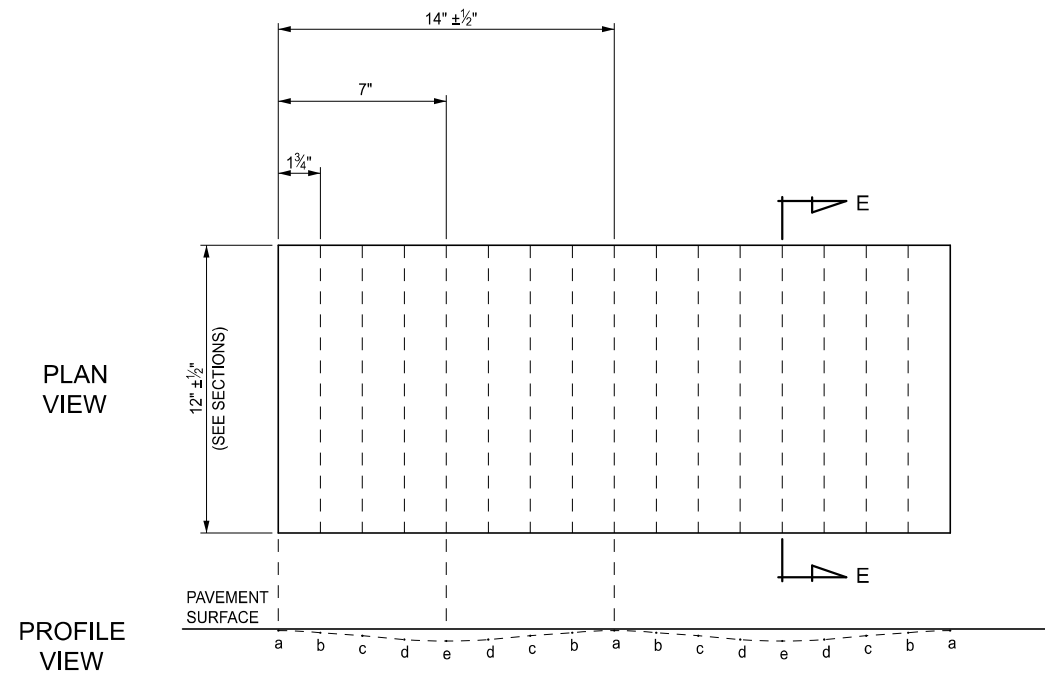
\* LATERAL DEVIATION SHALL NOT EXCEED 1" IN 100'.

NOTE:

ON CONCRETE PAVEMENTS, THE DISTANCE FROM A SHOULDER CORRUGATION TO A TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".

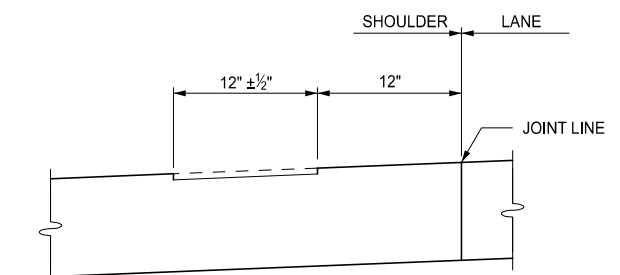


TYPICAL NON-FREEWAY SHOULDER CORRUGATION INSTALLATION



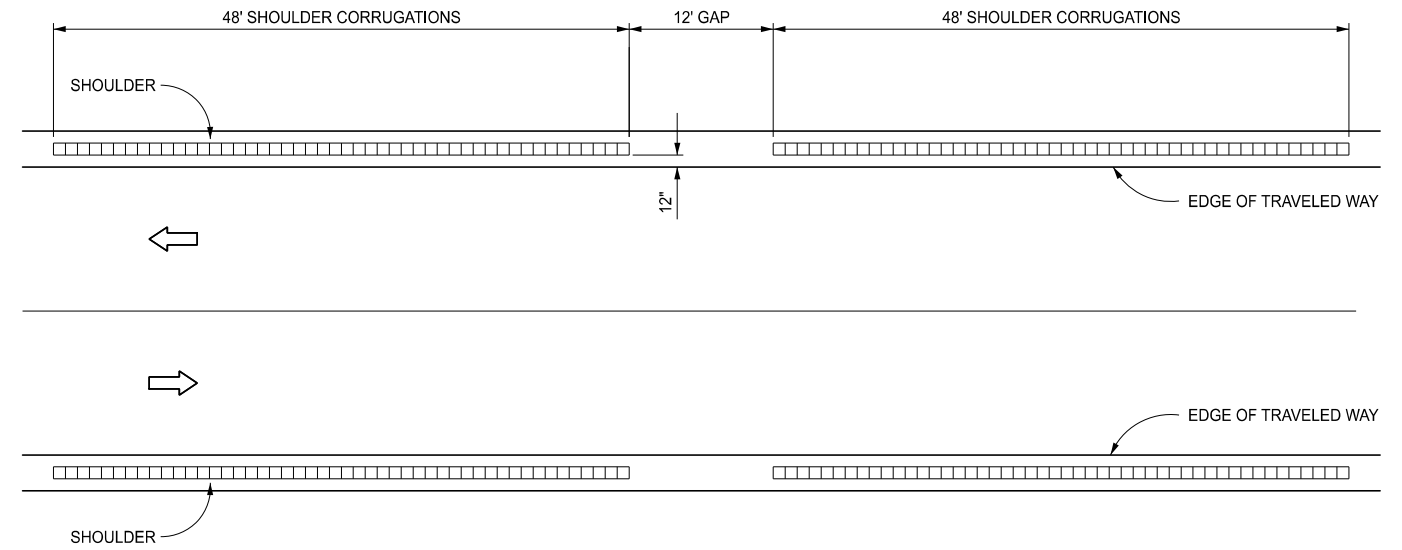
LOCATION	DEPTH AT EDGE	
	MILS	INCHES *
a	62.5	1/16
b	156	5/32
c	281	9/32
d	438	7/16
e	500	1/2

\* +1/8"





SECTION E-E  
CONCRETE & HMA SHOULDER

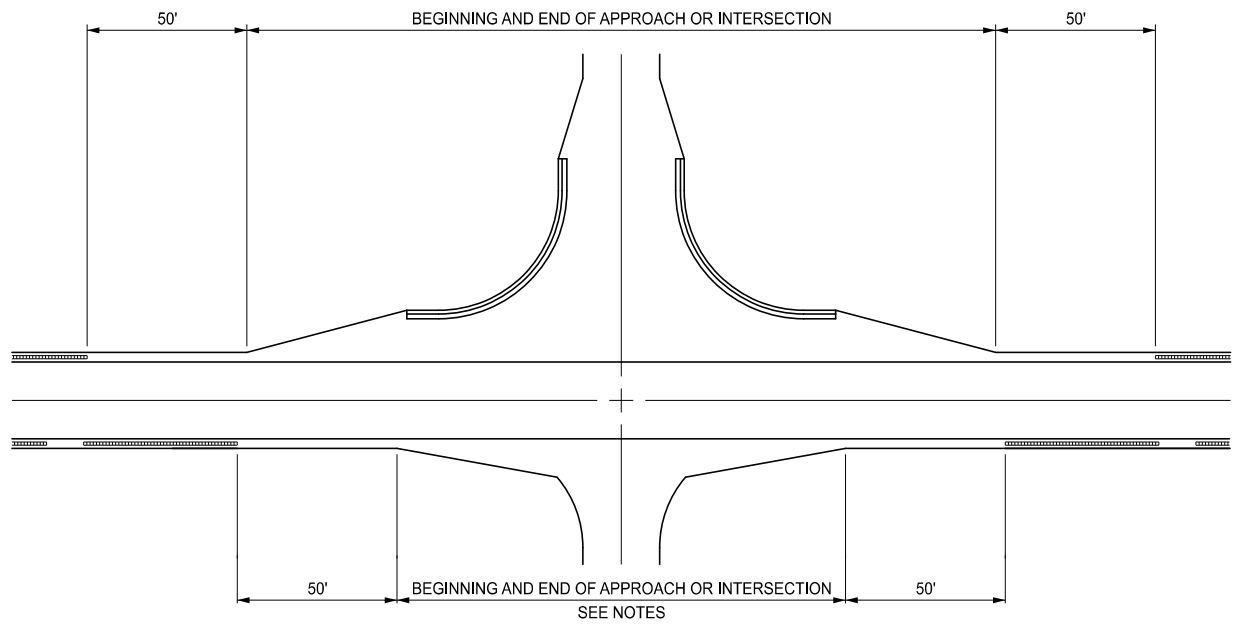
SINUSOIDAL CORRUGATIONS



SHOULDER CORRUGATIONS ON TWO-WAY ROADWAYS  
NON-FREEWAY SHOULDER CORRUGATIONS  
(FOR NON-FREEWAY SHOULDERS PAVED 6 FEET OR GREATER)

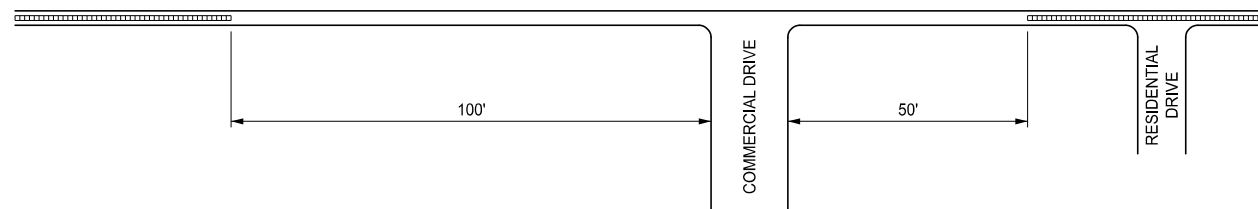
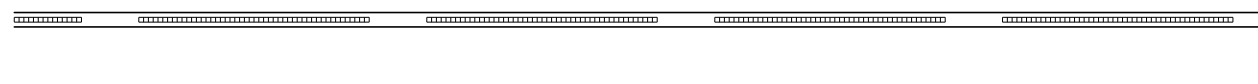
 Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			SHEET 3 OF 10
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	

 Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			SHEET 4 OF 10 SECT
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	

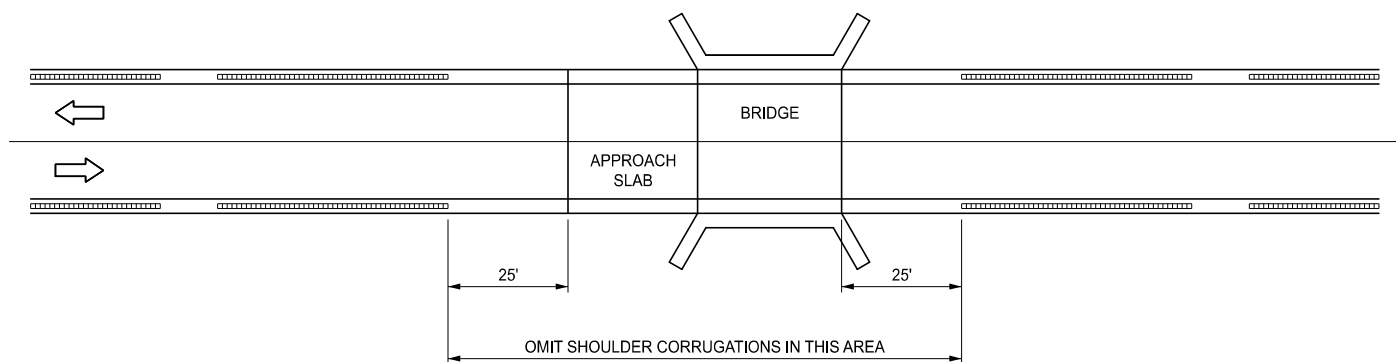


NOTE:

SHOULDER CORRUGATIONS MAY BE OMITTED IN AREAS WITH HIGH CONCENTRATIONS OF DRIVES, WHEN DIRECTED BY THE ENGINEER.




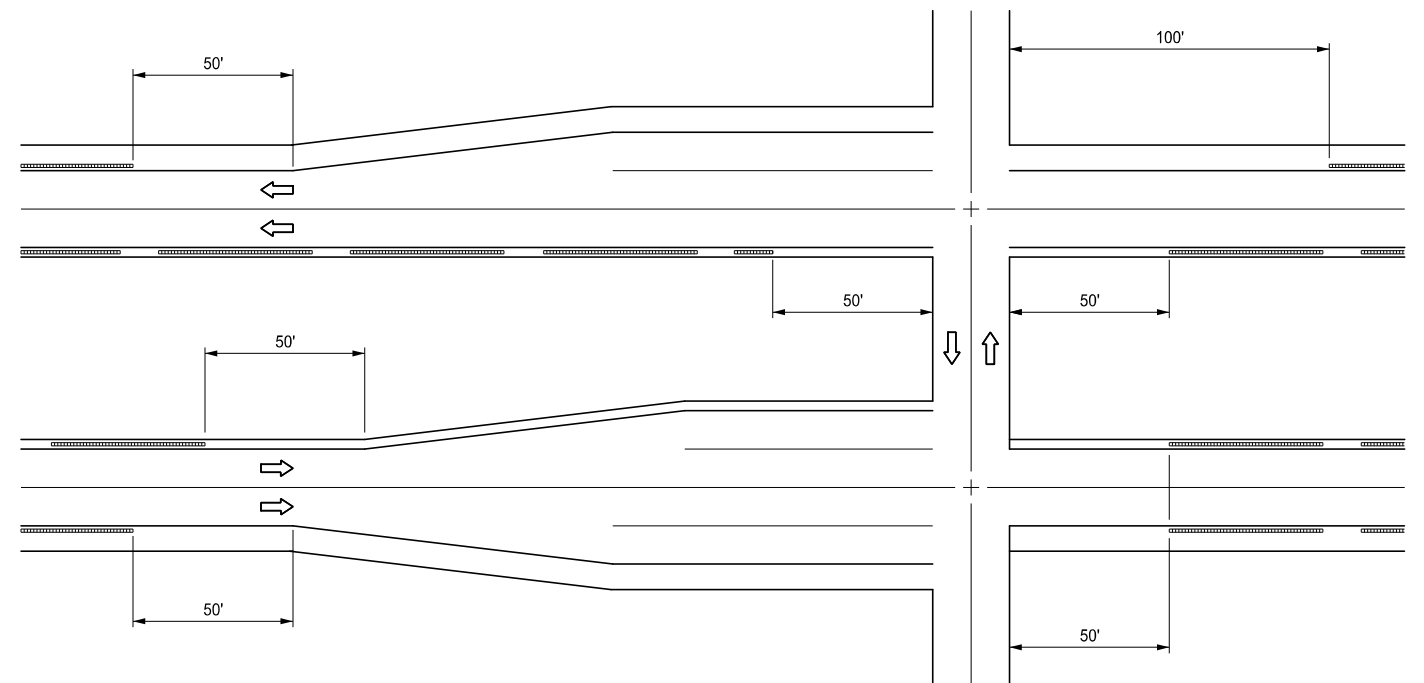
SHOULDER CORRUGATIONS AT INTERSECTIONS



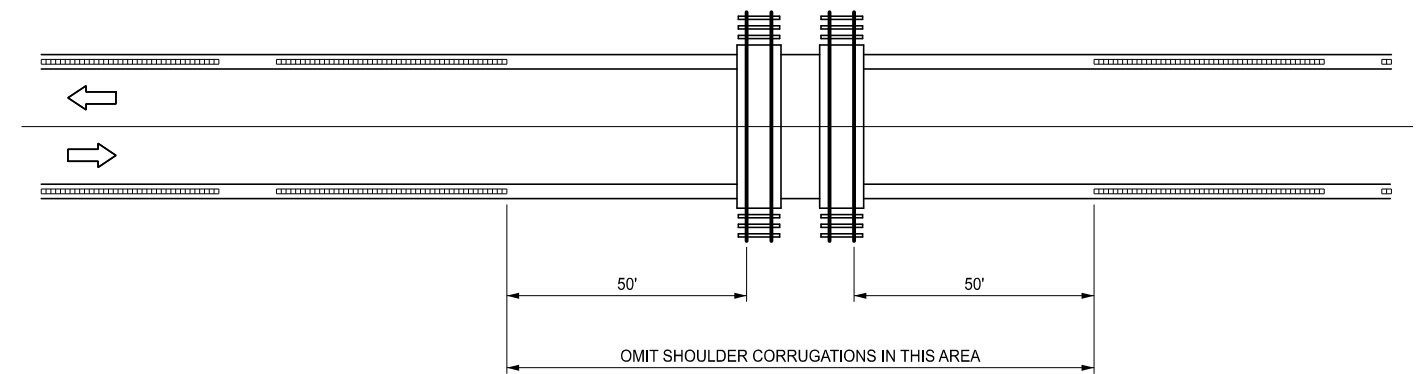
SHOULDER CORRUGATIONS AT BRIDGES

NON-FREEWAY SHOULDER CORRUGATIONS  
(FOR NON-FREEWAY SHOULDERS PAVED 6 FEET OR GREATER)

 Michigan Department of Transportation	STANDARD PLAN FOR			SHEET
	SHOULDER AND CENTER LINE CORRUGATIONS			
DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	




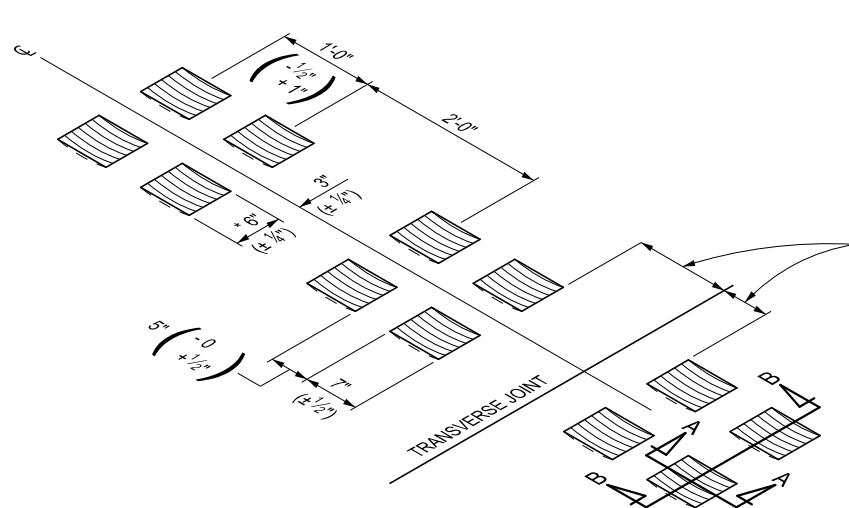
SHOULDER CORRUGATIONS AT INTERSECTIONS



SHOULDER CORRUGATIONS AT RAILROADS

NON-FREEWAY SHOULDER CORRUGATIONS  
(FOR NON-FREEWAY SHOULDERS PAVED 6 FEET OR GREATER)

 Michigan Department of Transportation	STANDARD PLAN FOR			SHEET
	SHOULDER AND CENTER LINE CORRUGATIONS			
DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SECT



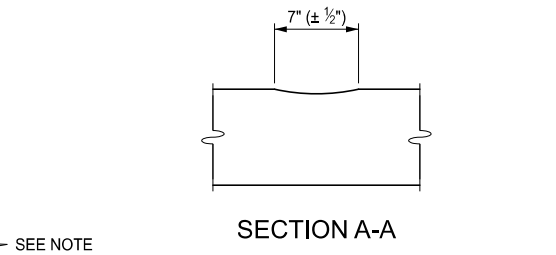
TYPICAL NON-FREEWAY CENTER LINE CORRUGATION INSTALLATION FOR CONCRETE PAVEMENT

\* LATERAL DEVIATION SHALL NOT EXCEED 1" IN 100'.

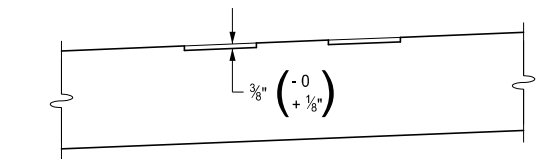
NOTES:

ON CONCRETE PAVEMENTS, THE DISTANCE FROM A CENTER LINE CORRUGATION TO A TRANSVERSE JOINT SHALL BE AT LEAST 6" BUT LESS THAN 12".

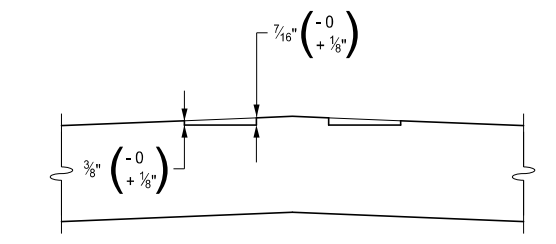
ON CONCRETE PAVEMENTS, CORRUGATIONS MAY BE CONSTRUCTED IN TWO PASSES AND THEREFORE NOT BE SYMMETRICAL ACROSS THE CENTER LINE.



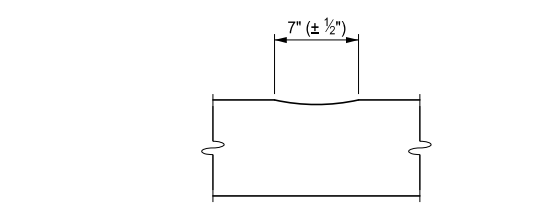
SECTION A-A



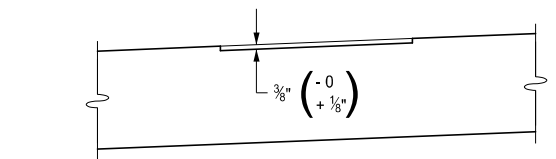
SECTION B-B  
SUPERELEVATED ROADWAY



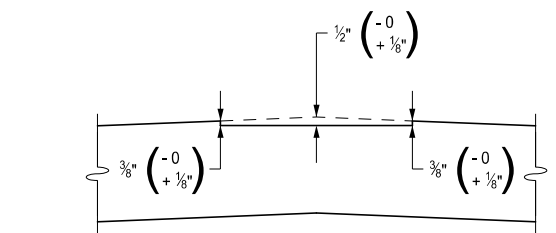
SECTION B-B  
CROWNED ROADWAY



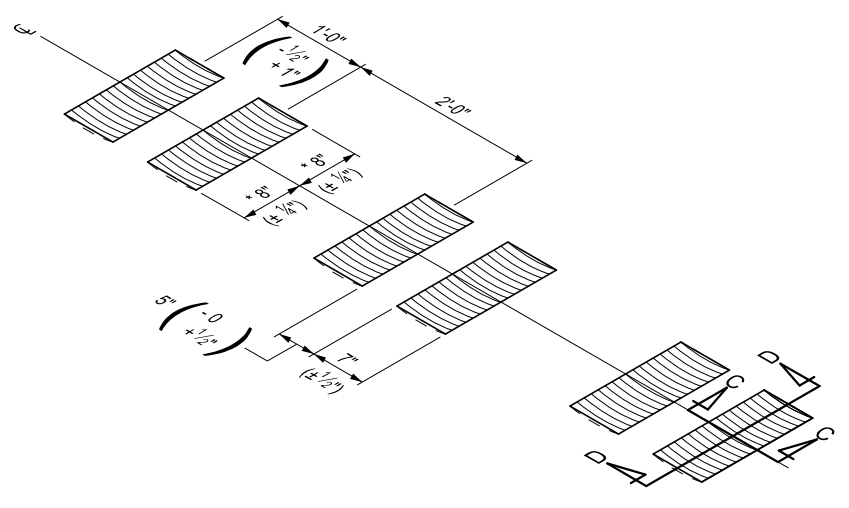
SECTION C-C



SECTION D-D  
SUPERELEVATED ROADWAY



SECTION D-D  
CROWNED ROADWAY

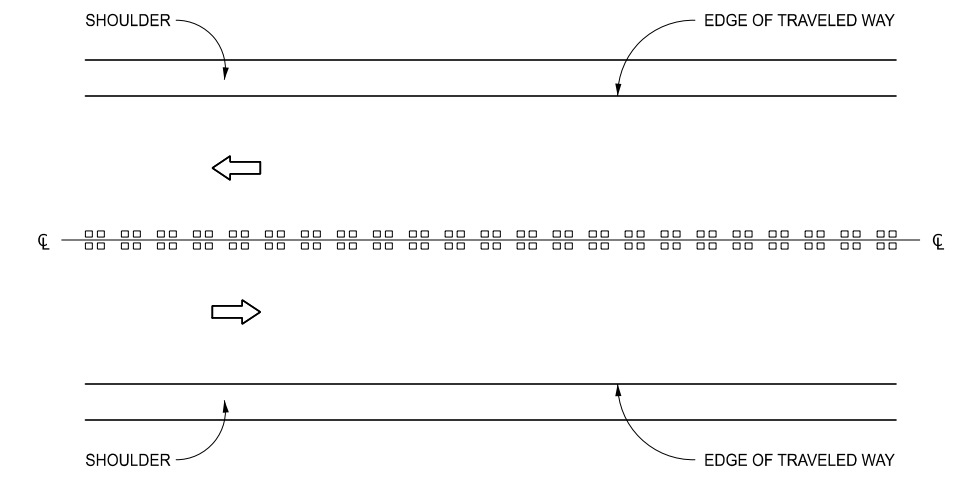


TYPICAL NON-FREEWAY CENTER LINE CORRUGATION INSTALLATION FOR HMA PAVEMENT

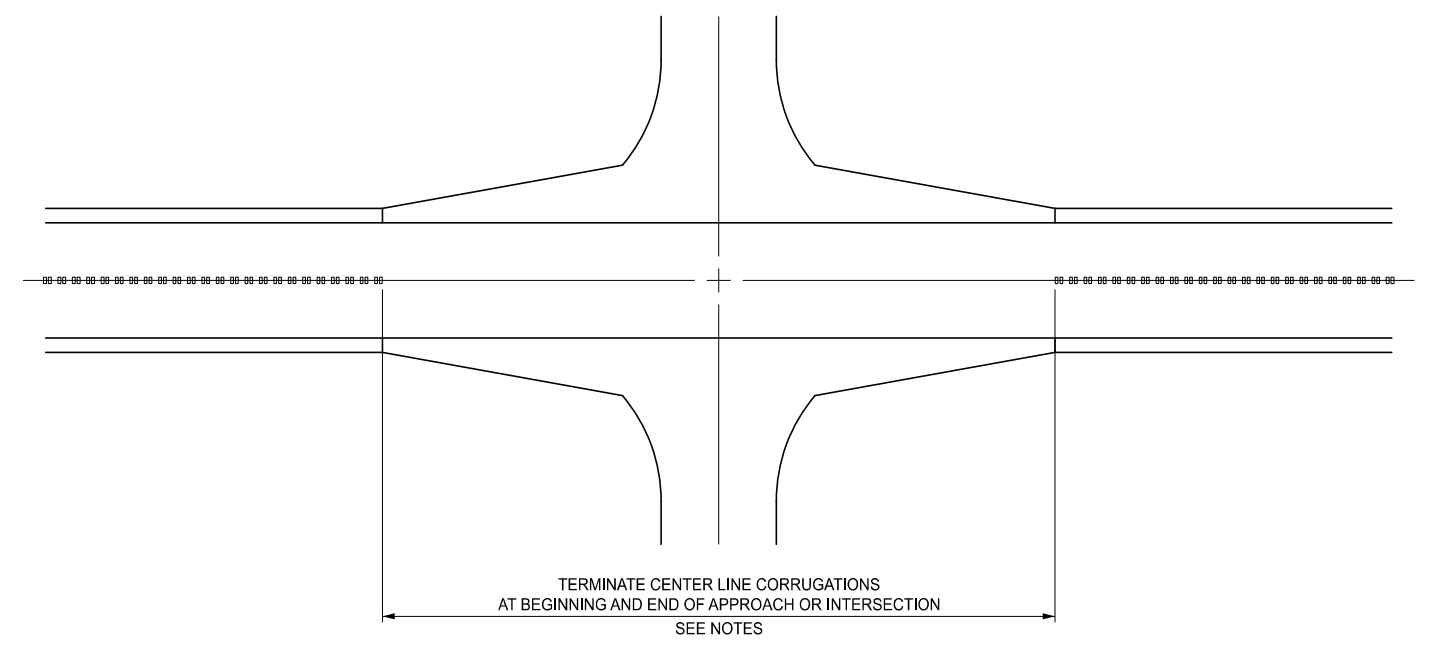
\* LATERAL DEVIATION SHALL NOT EXCEED 1" IN 100'.

NON-FREEWAY CENTER LINE CORRUGATIONS

	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 7 OF 10



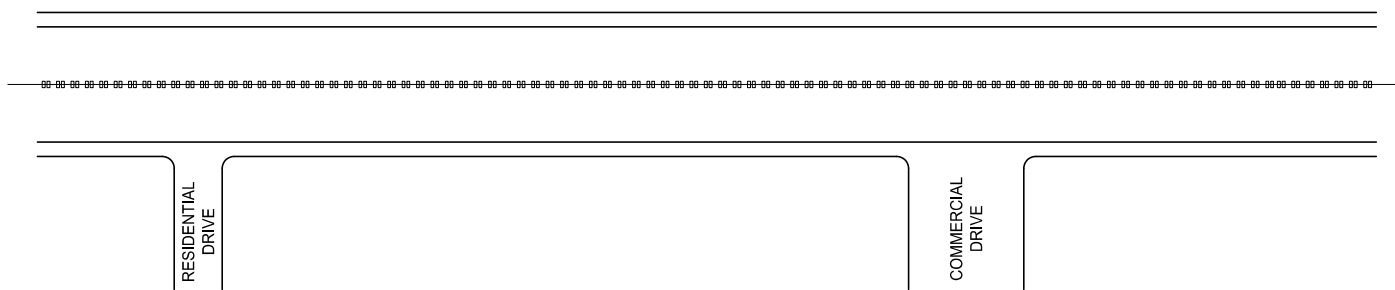
CENTER LINE CORRUGATIONS ON TWO-WAY ROADWAYS



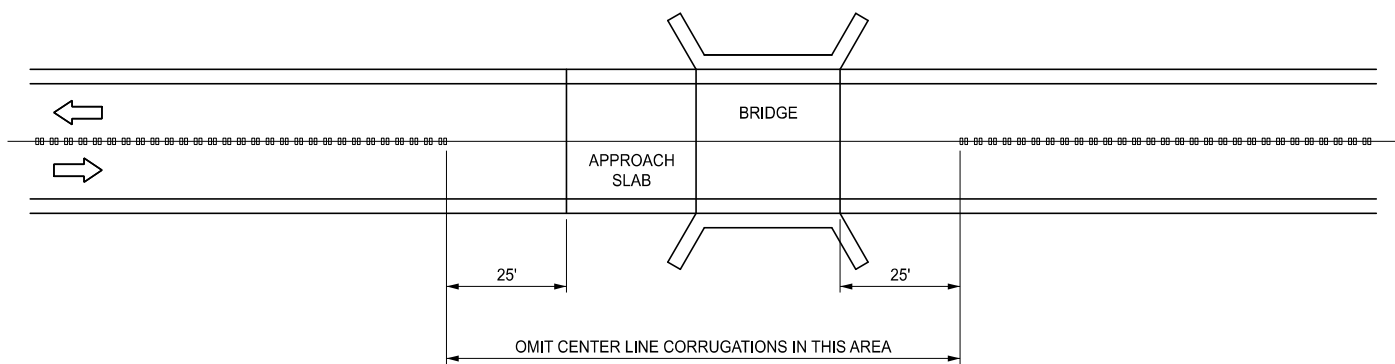
CENTER LINE CORRUGATIONS AT INTERSECTIONS

NON-FREEWAY CENTER LINE CORRUGATIONS

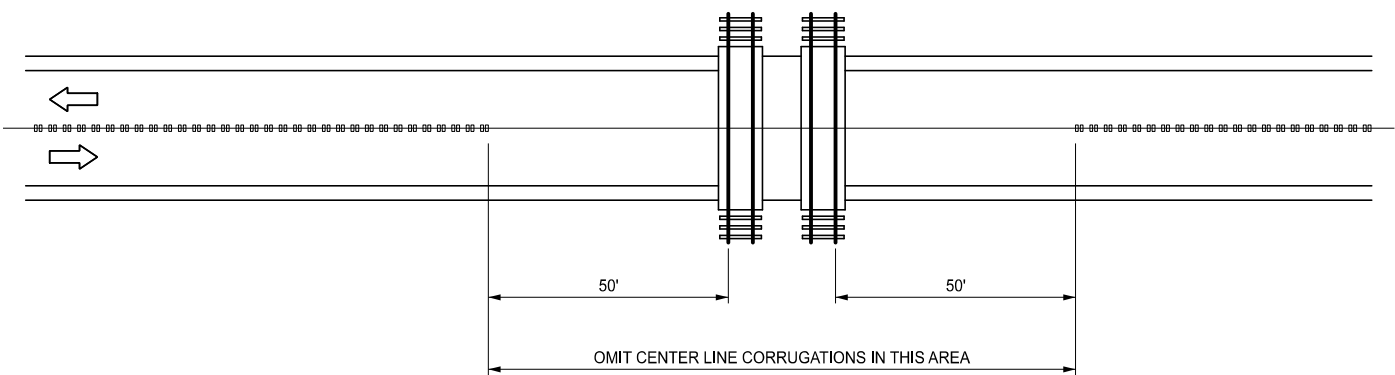
	STANDARD PLAN FOR SHOULDER AND CENTER LINE CORRUGATIONS			
	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SHEET 8 OF 10 SECT



CENTER LINE CORRUGATIONS AT DRIVEWAYS



CENTER LINE CORRUGATIONS AT BRIDGES



CENTER LINE CORRUGATIONS AT RAILROADS

NON-FREEWAY CENTER LINE CORRUGATIONS

NOTES: (NON-FREEWAY)

SHOULDER CORRUGATION CROSS-SECTIONS AND LOCATIONS SHALL BE AS DETAILED ON THIS STANDARD. CORRUGATIONS ON NON-FREEWAYS SHALL BE IN CONCRETE AND HMA SHOULDERS PAVED AT LEAST 6'-0" WIDE WITH A POSTED SPEED OF 55 MPH. CORRUGATIONS CAN BE USED IN OTHER SITUATIONS WHERE THEY HAVE BEEN PREVIOUSLY APPROVED USING CURRENT GUIDELINES.

CORRUGATIONS SHALL NOT BE PLACED OVER A TRANSVERSE SHOULDER JOINT.

DO NOT MILL SHOULDER OR CENTER LINE CORRUGATIONS THROUGH ANY INTERSECTION, MARKED CROSSWALK, NON-MOTORIZED PATH CROSSING, OR SNOWMOBILE CROSSING.

NOTES: (FREEWAY)

SHOULDER CORRUGATION CROSS-SECTIONS AND LOCATIONS SHALL BE AS DETAILED ON THIS STANDARD. CORRUGATIONS ON FREEWAYS SHALL BE IN CONCRETE AND HMA SHOULDERS PAVED 4'-0" OR WIDER OR WHERE THE SHOULDER LIES BETWEEN THE PAVEMENT AND VALLEY GUTTER OR CURB AND GUTTER. CORRUGATIONS WILL NOT BE USED IN FREEWAY EXIT/ENTRANCE RAMP SHOULDERS OR WHERE SHOULDERS ARE SEPARATED FROM THE PAVEMENT BY VALLEY GUTTER OR CURB AND GUTTER. EXCEPT FOR LOOP RAMP, CORRUGATIONS WILL BE USED ON FREEWAY TO FREEWAY RAMP.

CORRUGATIONS SHALL NOT BE PLACED OVER A TRANSVERSE SHOULDER JOINT.

CORRUGATION LOCATION IN THE AREA OF FREEWAY RAMP WILL BE AS FOLLOWS: THE TYPICAL OFFSET WILL BE INCREASED TO 24" AND BE LOCATED ON THE SHOULDER SIDE OF THE JOINT BEGINNING 300' IN ADVANCE OF THE EXIT RAMP TAPER. THIS OFFSET WILL CONTINUE UNTIL THE 2' POINT OF THE GORE. FOR EXIT/ENTRANCE RAMP AND LOOP RAMP THE CORRUGATIONS WILL END ALONG THE RAMP AT THIS POINT AND SIMULTANEOUSLY RESUME ON THE MAINLINE SHOULDER AND GORE WITH THE NORMAL OFFSET. THE CONFIGURATION FOR ENTRANCE RAMP WILL BE IN THE REVERSE ORDER OF THE EXIT RAMP. FOR FREEWAY TO FREEWAY RAMP, IN ADDITION TO RESUMING THE MAINLINE SHOULDER CORRUGATION AT THIS POINT, RETURN TO THE NORMAL MAINLINE OFFSET ALONG THE LENGTH OF THE RAMP SHOULDER.

WITHIN AN URBAN FREEWAY AREA OR OTHER LIMITED FREEWAY AREA, SHOULDER CORRUGATIONS MAY BE OFFSET UP TO 12" FROM THE EDGE OF THE TRAVEL LANE, AS SHOWN IN THE PLANS, OR AS DIRECTED BY THE ENGINEER. IF NEEDED, THE CORRUGATION MAY BE LOCATED ON THE OPPOSITE SIDE OF THE JOINT FOR 14' LANES TO MAINTAIN THE MINIMUM OFFSET TO THE JOINT LINE.

	STANDARD PLAN FOR			SHEET
	SHOULDER AND CENTER LINE CORRUGATIONS			
DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	

	STANDARD PLAN FOR			SHEET
	SHOULDER AND CENTER LINE CORRUGATIONS			
DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	(SPECIAL DETAIL) FHWA APPROVAL	08/02/2023 PLAN DATE	R-112-J	SECT