



OSHTEMO TOWNSHIP SIDEWALK/SHARED-USE PATH CONSTRUCTION STANDARDS

CONCRETE SIDEWALK CONSTRUCTION

Concrete sidewalk shall conform to MDOT 2012 (or current edition) Standard Specifications for Construction Section 803, "Concrete Sidewalks, Sidewalk Ramps and Steps" and shall be a minimum of five (5) feet wide unless a different width is required by other Township ordinances or regulations.

Grade

The sidewalk shall be constructed to match the existing grade, or as noted on the construction drawings. The sidewalk will have a transverse slope either toward or away from the road to maintain existing drainage patterns. Minor fills and cuts will be made in the field during construction to provide smooth transition of the sidewalk and maintain existing drainage patterns.

Sub-base Preparation

Existing vegetation shall be removed and topsoil excavated to provide a four (4") inch sand sub-base for the proposed sidewalk. The existing sand sub-base shall be compacted to ninety-five (95%) percent maximum unit weight in accordance with MDOT procedures. Where fill sand is required it shall be compacted to achieve ninety-five (95%) percent maximum unit weight in accordance with MDOT procedures.

Concrete

Concrete shall meet the requirements for Grade P1 Concrete or Grade S2 Concrete as specified in the MDOT Standard Specifications for Construction Section 601, "Portland Cement Concrete Pavements". Concrete shall be six sack limestone mix and shall be air-entrained and shall have a compressive strength of not less than 3,500 pounds per square inch, within twenty-eight (28) days of paving. Other materials shall meet the requirements of the applicable portions of the MDOT Standard Specifications for Construction. All concrete sidewalks shall be paved with a single course of concrete. Sidewalks through driveways shall be six (6") inches thick. All other walks shall be four (4") inches thick.

Joints

Full depth transverse expansion joints shall be constructed perpendicular to the surface of the sidewalk at intervals not to exceed fifty (50') feet. Expansion joint material shall be one-half (1/2") inch pre-molded expansion joints and shall be set 1/4" below the surface of the sidewalk. Sealing of joints will not be required. One (1") inch pre-molded expansion joints must be placed between the sidewalk and back-of-curb when sidewalk is constructed between the curb and building or other rigid structures.

Sealing of joints will not be required. Transverse plane of weakness joints shall be true to line and grade, and shall be placed at four (4') foot intervals and shall be formed with a grooving tool. Planes of weakness joints shall be constructed to a depth of at least one (1") inch and a width of 1/8 inch to 1/4 inch. Sealing of joints will not be required.

Surface

The surface of the concrete shall be floated to a level uniform surface and left with a slightly rounded surface. The surface shall be roughened with mechanic's brush to prevent smooth and slippery surfaces. No surface shall be troweled to a glassy finish. Edges at the forms and joints shall be rounded with an edging tool.

Sidewalk Detectable Warnings

Sidewalk Detectable Warnings shall be placed at all street intersections and commercial/industrial driveways.

Sidewalk Detectable Warning details shall conform to ADA requirements, MDOT Specifications and MDOT Detail R-28-E. In order to promote efficient public maintenance and uniformity in style (community sense-of-place), shop drawings for Detectable Warnings shall be submitted for Oshtemo Township approval prior to installation.

Warning details shall apply to all construction or reconstruction of streets, curbs, or sidewalks. Detectable warnings shall extend the full width of the curb/sidewalk ramp. They shall be located so that the edge nearest the curb line or street is 6" to 8" from the curb line.

HOT MIX ASPHALT SHARED-USE PATH CONSTRUCTION

Shared-use paths shall be a minimum of ten (10) feet wide unless a different width is required by other Township ordinances or regulations.

Grade

The sidewalk shall be constructed to match the existing grade, or as noted on construction drawings. The path will have a transverse slope either toward or away from the road to maintain existing drainage patterns. Minor fills and cuts will be made in the field during construction to provide smooth transition of the path and maintain existing drainage patterns.

Sub-base Preparation

Existing vegetation shall be removed and topsoil excavated to provide a six (6) inch sand sub-base for the proposed path. The existing sand sub-base shall be compacted to ninety-five (95%) percent maximum unit weight in accordance with MDOT procedures. Where fill sand is required it shall be compacted to achieve ninety-five (95%) percent maximum unit weight in accordance with MDOT procedures.

Gravel Base

The gravel base shall extend one foot beyond the width of the topcoat on each side and consist of six (6) inches of compacted MDOT 22A gravel in accordance with the section as indicated on the construction drawing. Density of the gravel shall be ninety five (95%) percent.

Hot Mix Asphalt (HMA) Surface

The hot mix asphalt surface shall consist of 120 lbs/SY MDOT 36A hot mix asphalt (top) over 165 lbs/SY of MDOT 13A hot mix asphalt (level) placed in accordance with the section as indicated on the construction drawings. The asphalt performance grade shall be 58-28. The hot mix asphalt shall be placed with a self-propelled paver; spreader boxes will not be permitted. A bond coat shall be applied between successive courses of hot mix asphalt at an application rate of 0.1 gal./SY.

REMOVABLE BOLLARDS (Vehicle Exclusion Device)

Certain Shared-Use Pathways may include removable Bollards as vehicle exclusion devices. When shown on plans, this work shall include the construction of the concrete footings, in-ground receiver, installation of the bollards, and all related work necessary to provide complete Removable Bollards as shown on the plans.

Materials

The materials shall be as specified below:

1. Removable Bollard: Model R-7901 Steel Removable Bollard with Removable Mounting and locking hinged steel lid from Reliance Foundry, Petersen Mfg. Co., Inc., or approved equal. Bollard shall be corrosion resistant under coating and safety yellow in color with safety yellow reflective tape at the top.
2. Concrete: Provide grade S1 concrete as specified in Section 701 of the MDOT Standard Specifications for Construction.
3. Steel Reinforcement: Provide steel reinforcement as specified in Section 905 of the MDOT Standard Specifications for Construction.
4. Submittals: The Contractor shall submit complete shop drawings, showing all materials, dimension, fastenings, and fastening devices.

Construction

The Removable Bollards shall be constructed according to the plans and as described below.

1. Preparation work shall be thoroughly reviewed with the Engineer prior to installation. Saw cut the existing HMA prior to placement.
2. Install Removable Bollards complete per manufacturer's specifications and instructions and as detailed on approved shop drawings.
3. Concrete: Install concrete components as specified in Section 706 of the MDOT Standard Specifications for Construction and as detailed on the plans.
4. All excess and waste materials shall be disposed of legally off-site. Upon completion of the work, leave areas in a clean condition.

SIGNS

Certain Shared-Use Pathways may include restricted usage or way-finding signs. When shown on plans, this work shall comply with the construction standards of the Kalamazoo County Road Commission and all permit requirements of the applicable operating authority of the public right-of-way. In order to promote uniformity in style (community sense-of-place), shop drawings for all signage shall be submitted for Oshtemo Township approval prior to installation.

LAWN AND YARD RESTORATION

After construction is completed all disturbed lawn areas, including adjacent cut and fill areas as required to blend into the existing yards, shall be repaired using a maximum of 1 on 4 back slope, four (4) inches of topsoil, MDOT Class A seed, fertilizer and mulch.

All disturbed areas, including adjacent cut and fill areas as required to blend into the existing yards, which are not lawns, shall be repaired using a maximum of 1 on 3 back slope, two (2) inches of topsoil, MDOT Roadside Seed, fertilizer and mulch.

Restored areas shall be repaired and reseeded as often as necessary in order to produce a close stand of weed free grass to the edges of the sidewalk or multi-use path.

ATTACHMENTS:

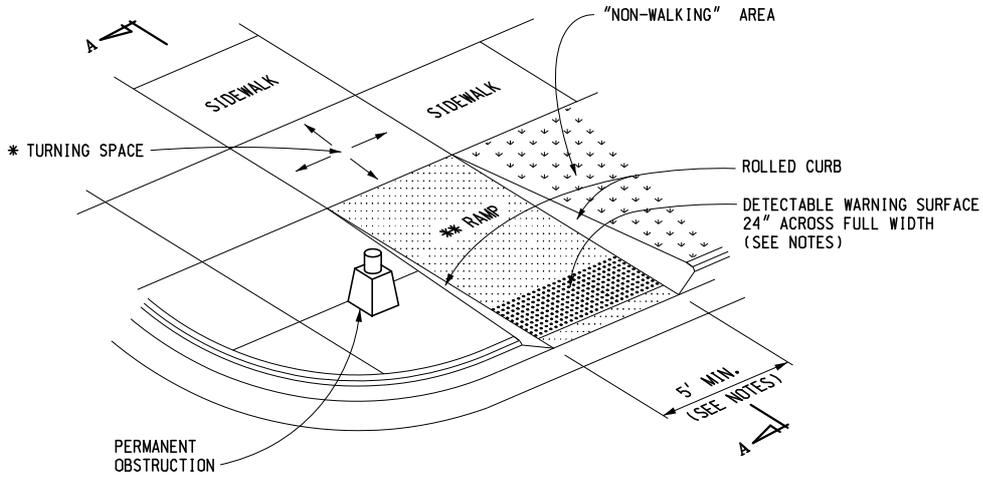
MDOT Construction Details (2013 or current edition):

R-28-H Sidewalk Ramp and Detectable Warning Details

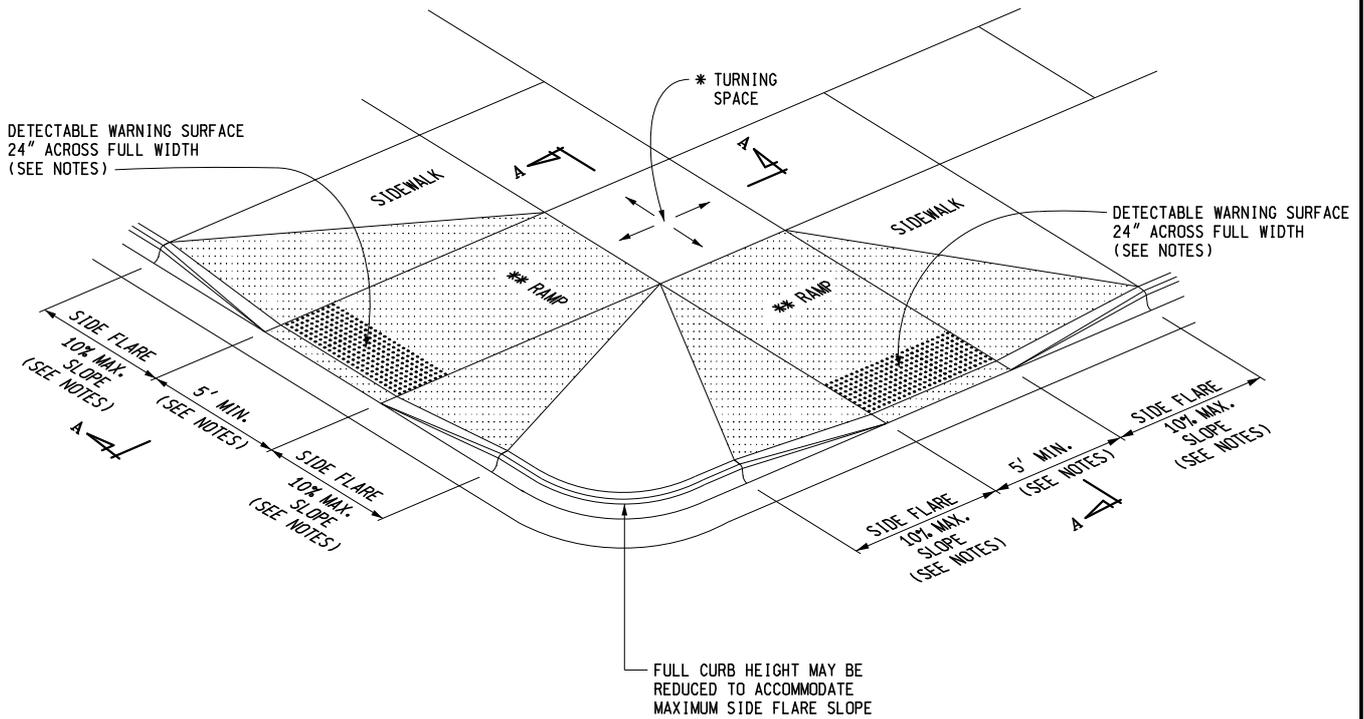
R-29-H Driveway Openings & Approaches and Concrete Sidewalk

* MAXIMUM TURNING SPACE SLOPE IS 2% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE R
(ROLLED SIDES)



SIDEWALK RAMP TYPE F
(FLARED SIDES, TWO RAMPS SHOWN)



PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: *Randy Van Pelt*
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: *Maria Van Park*
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

1-25-2013
F.H.W.A. APPROVAL

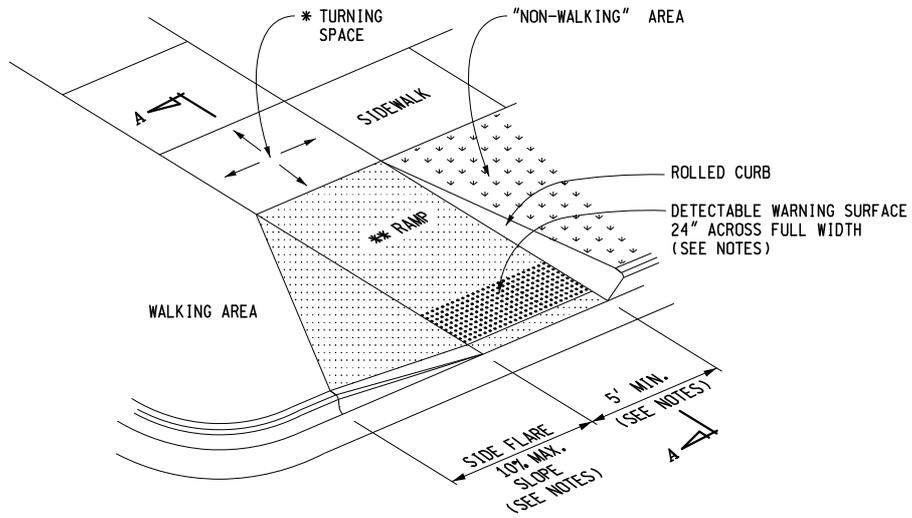
10-3-2012
PLAN DATE

R-28-H

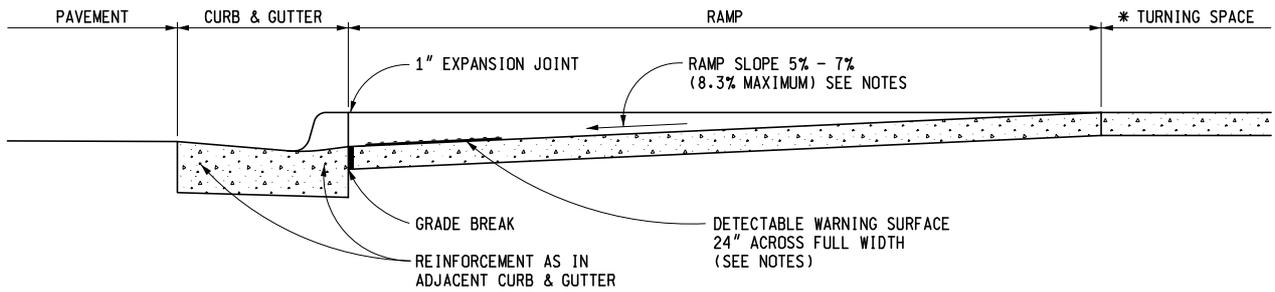
SHEET
1 OF 7

* MAXIMUM TURNING SPACE SLOPE IS 2% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

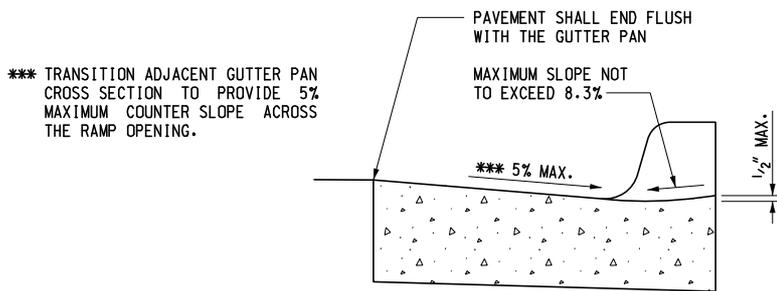
** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A



SECTION THROUGH CURB CUT
(TYPICAL ALL RAMP TYPES)

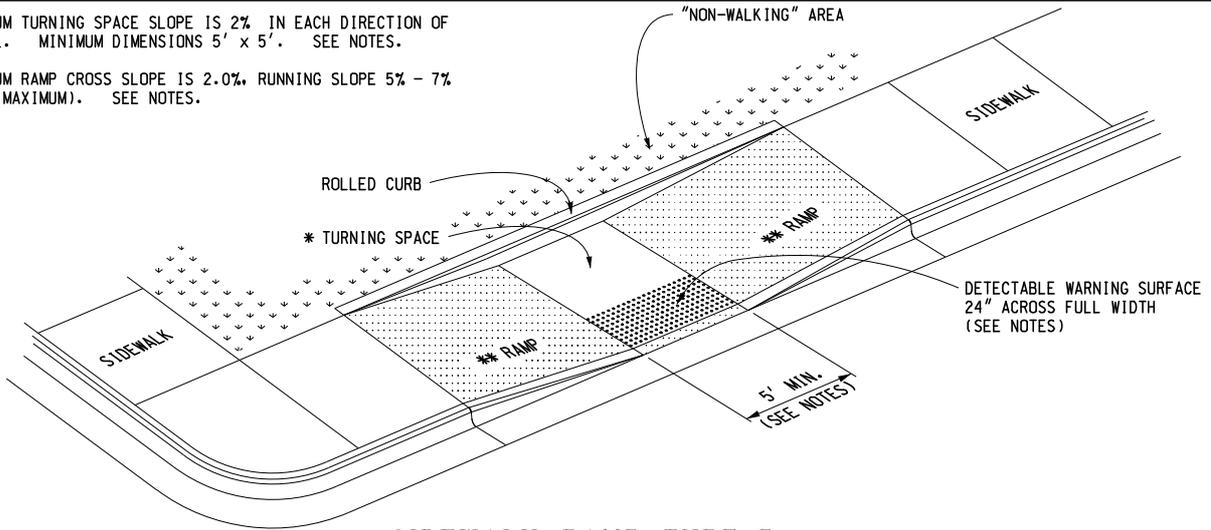
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

1-25-2013 F.H.W.A. APPROVAL	10-3-2012 PLAN DATE	R-28-H	SHEET 2 OF 7
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* MAXIMUM TURNING SPACE SLOPE IS 2% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

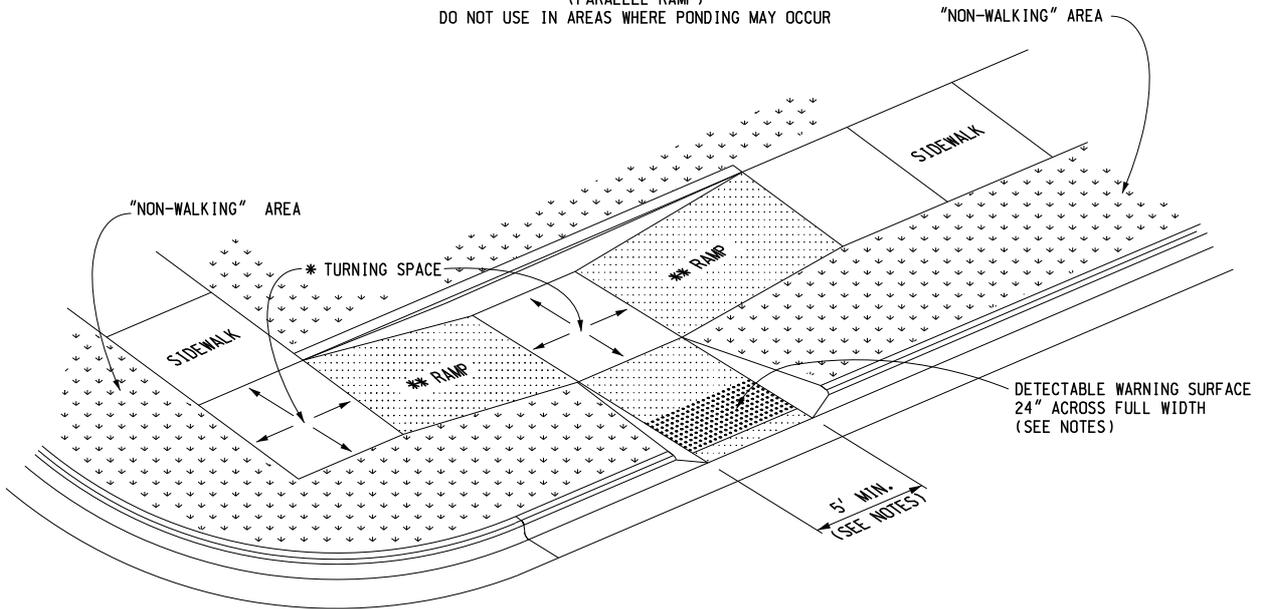
** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE P

(PARALLEL RAMP)

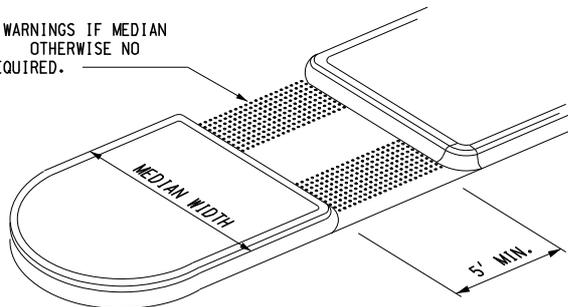
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



SIDEWALK RAMP TYPE C

(COMBINATION RAMP)

USE 24" DEEP DETECTABLE WARNINGS IF MEDIAN WIDTH IS AT LEAST 6'-0". OTHERWISE NO DETECTABLE WARNING IS REQUIRED.



SIDEWALK RAMP TYPE M

(MEDIAN ISLAND)

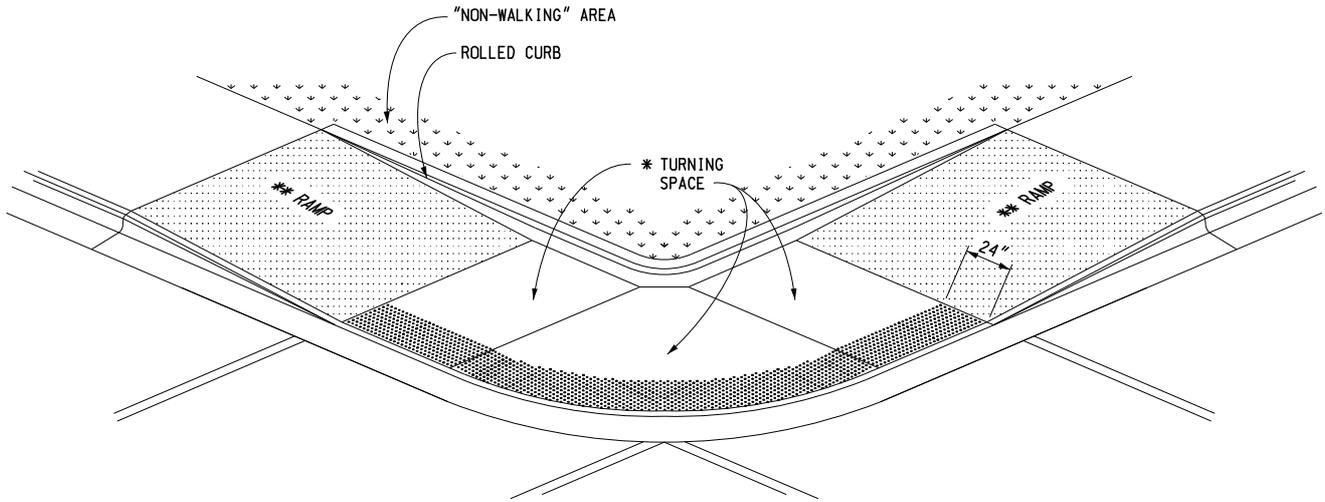
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

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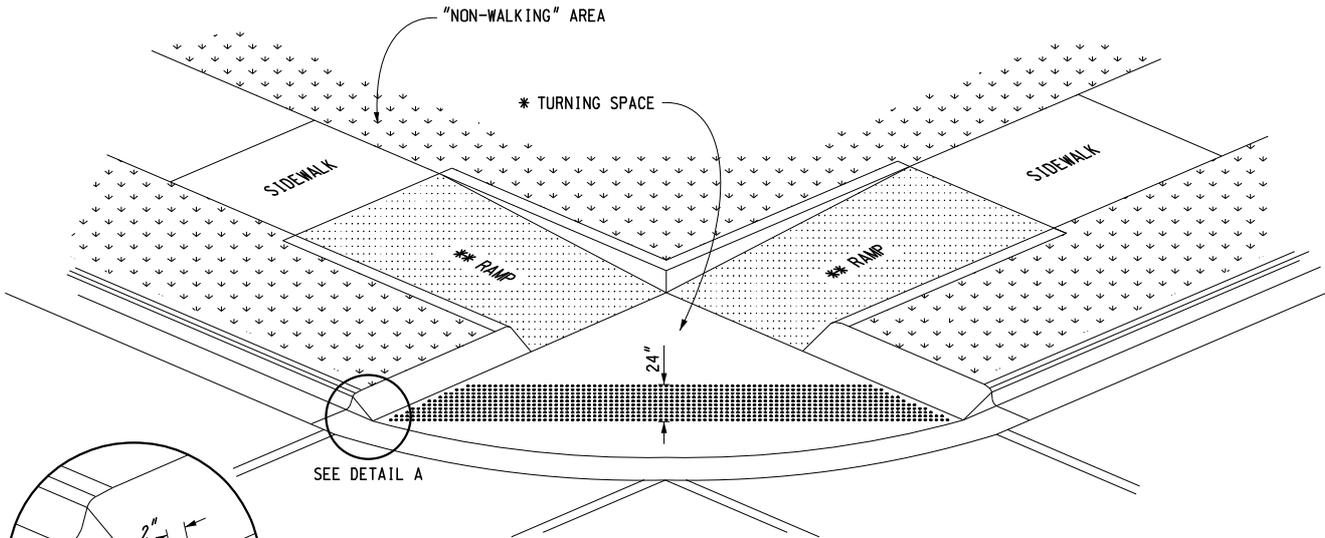
* MAXIMUM TURNING SPACE SLOPE IS 2% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



(RADIAL DETECTABLE WARNING SHOWN)

DETECTABLE WARNING SURFACE COVERAGE IS 24" FOR THE FULL WIDTH OF THE RAMP OPENING EXCLUDING CURBED OR CURB TRANSITION AREAS. A CURB OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE.



DETAIL A

(TANGENT DETECTABLE WARNING SHOWN)

A CONCRETE BORDER OFFSET NOT GREATER THAN 2" IS ALLOWABLE FOR DETECTABLE WARNING INSTALLATION WHERE THE BACK OF CURB IS ON A RADIUS, THE BORDER OFFSET MAY BE MEASURED FROM THE END OF THE RADIUS.

SIDEWALK RAMP TYPE D

(DEPRESSED CORNER)

USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION
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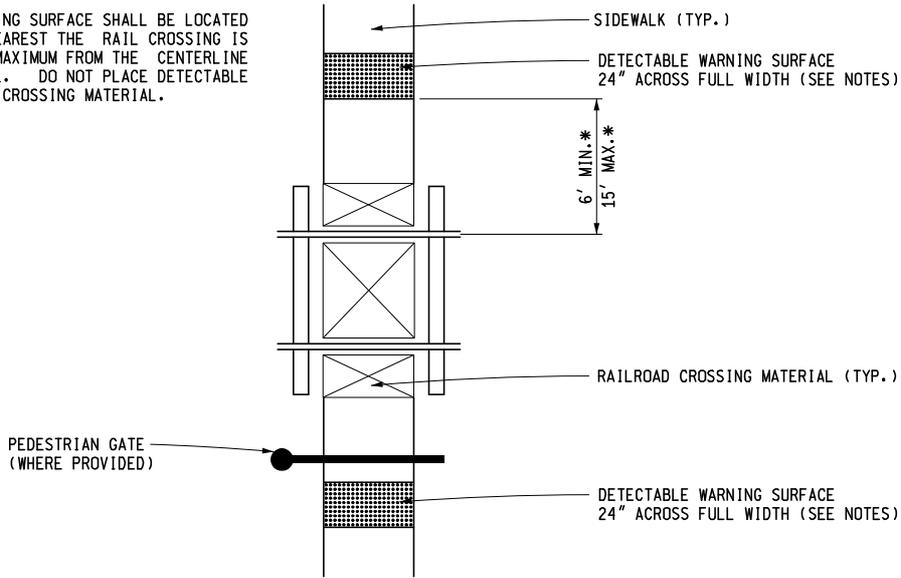
1-25-2013
F.H.W.A. APPROVAL

10-3-2012
PLAN DATE

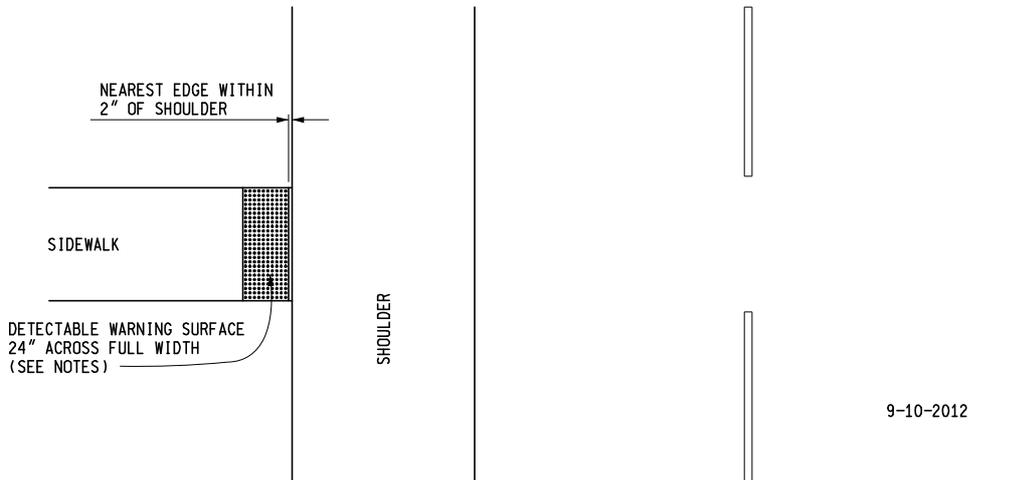
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* THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6' MINIMUM AND 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.

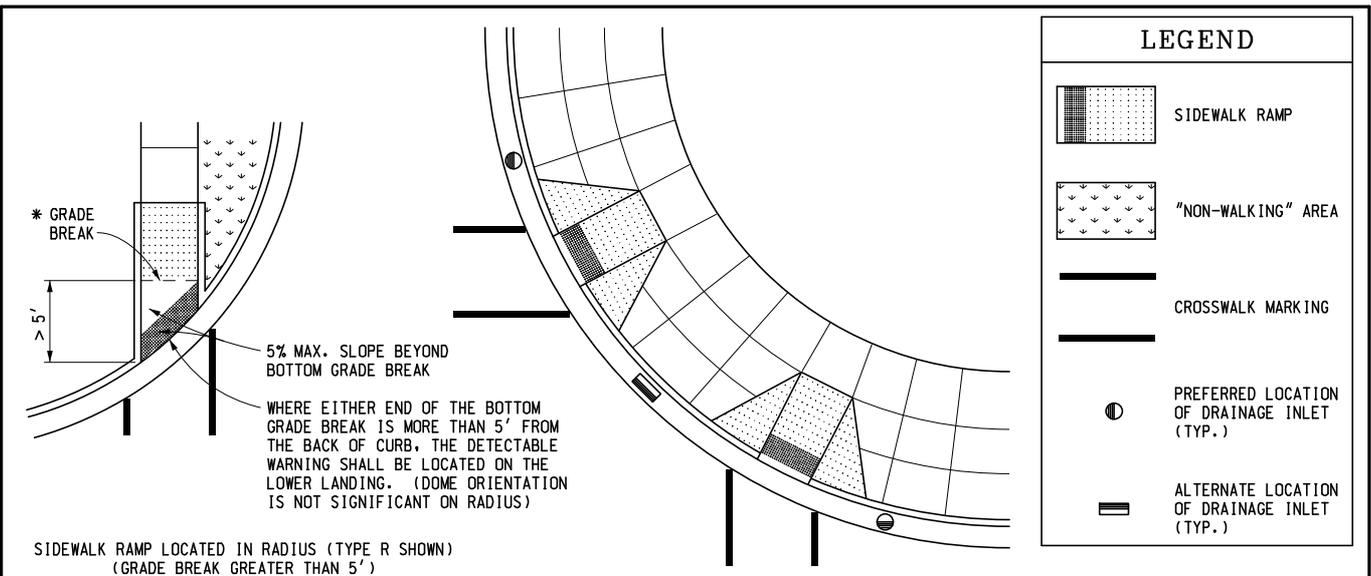


DETECTABLE WARNING AT RAILROAD CROSSING



DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

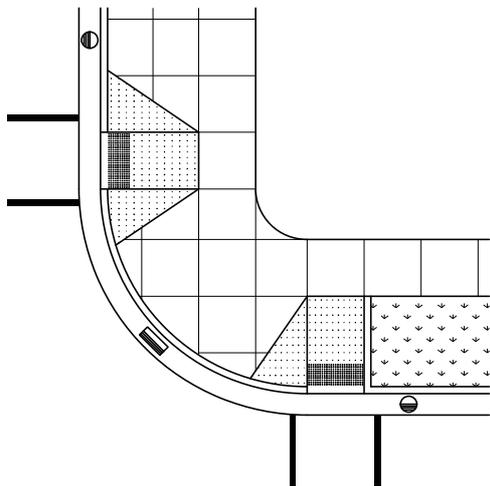
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR			
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS			
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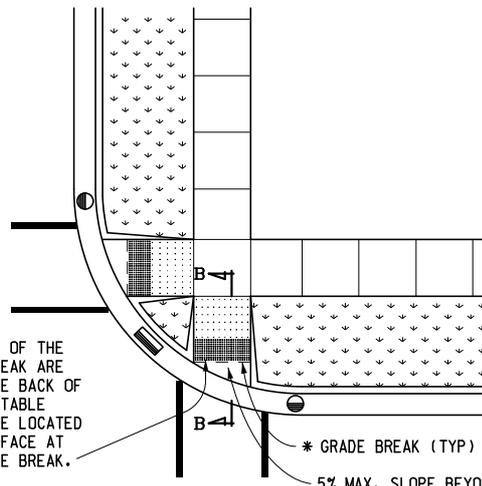
SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK GREATER THAN 5')

SIDEWALK RAMP PERPENDICULAR TO RADIAL CURB (TYPE F SHOWN)

(USE WITH RADIAL CURB WHEN THE CROSSWALK AND SIDEWALK RAMP ARE NOT ALIGNED)



SIDEWALK RAMP PERPENDICULAR TO TANGENT CURB
(TYPE F AND TYPE RF SHOWN)

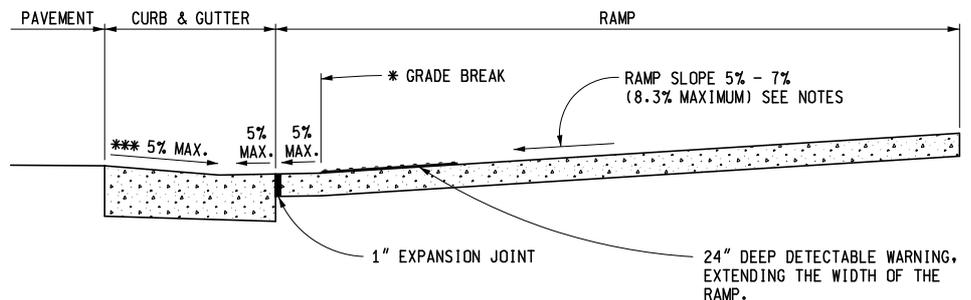


SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK LESS THAN 5')

WHERE BOTH ENDS OF THE BOTTOM GRADE BREAK ARE WITHIN 5' OF THE BACK OF CURB, THE DETECTABLE WARNING SHALL BE LOCATED ON THE RAMP SURFACE AT THE BOTTOM GRADE BREAK.

* GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

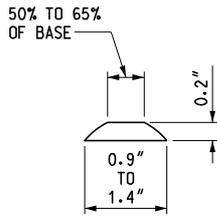


SECTION B-B
SIDEWALK RAMP ORIENTATION

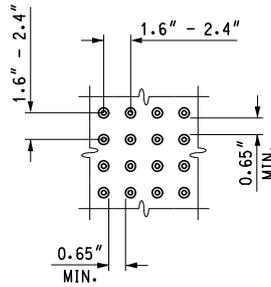
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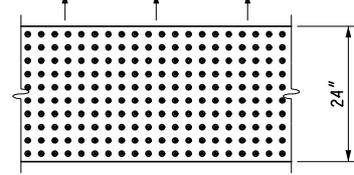


DOME SECTION

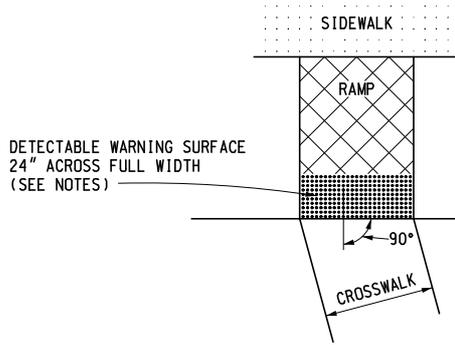


DOME SPACING

ALIGNED IN DIRECTION OF TRAVEL AND PERPENDICULAR (OR RADIAL) TO GRADE BREAK



DOME ALIGNMENT



DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS BY ALL PUBLIC AGENCIES AND BY ALL PRIVATE ORGANIZATIONS CONSTRUCTING FACILITIES FOR PUBLIC USE.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

PROVIDE TURNING SPACES WHERE PEDESTRIAN TURNING MOVEMENTS ARE REQUIRED.

WHEN 5' MINIMUM WIDTHS ARE NOT FEASIBLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND TURNING SPACES TO NOT LESS THAN 4' x 4'.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURBED OR FLARED CURB TRANSITION AREAS. A CURB OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING (OR AS OTHERWISE SHOWN ON THIS STANDARD) IS ALLOWABLE.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN 1/2". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

TRANSITION THE GUTTER PAN CROSS SECTION SUCH THAT THE COUNTER SLOPE IN THE DIRECTION OF RAMP TRAVEL IS NOT GREATER THAN 5%. MAINTAIN THE NORMAL GUTTER PAN CROSS SECTION ACROSS DRAINAGE STRUCTURES.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".

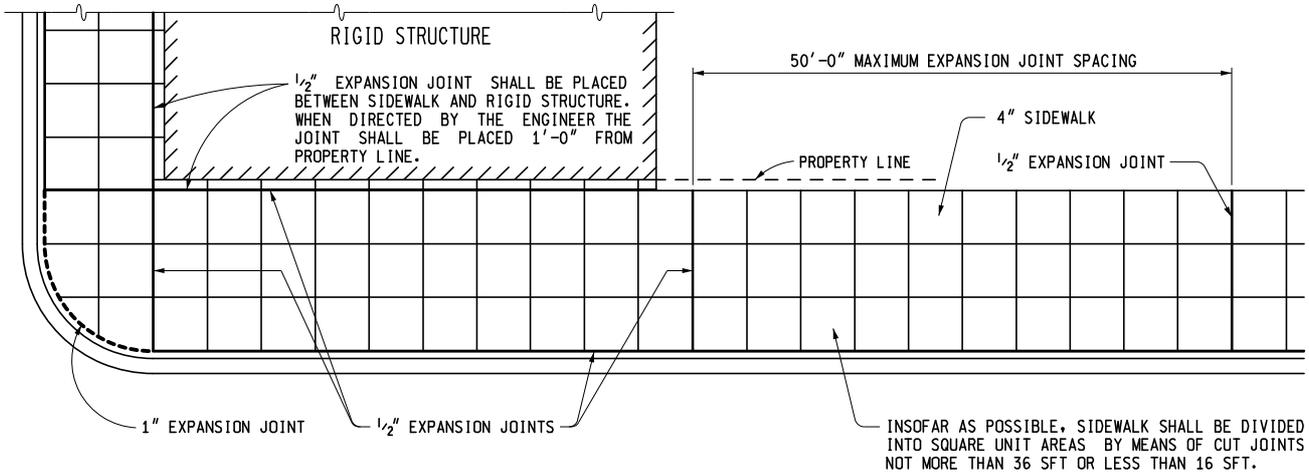
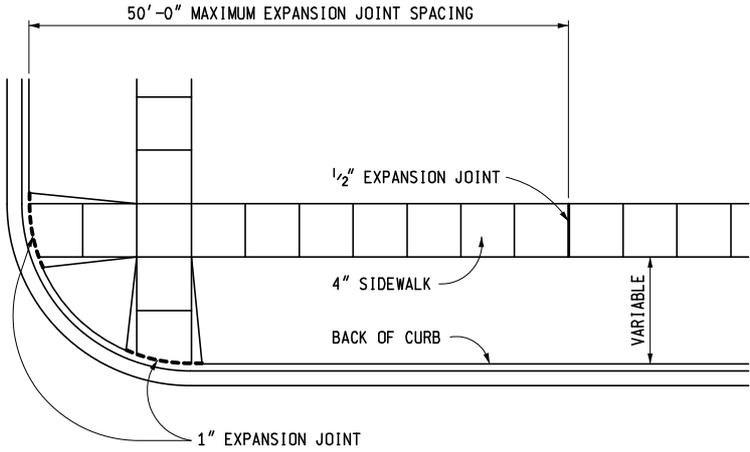
FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.

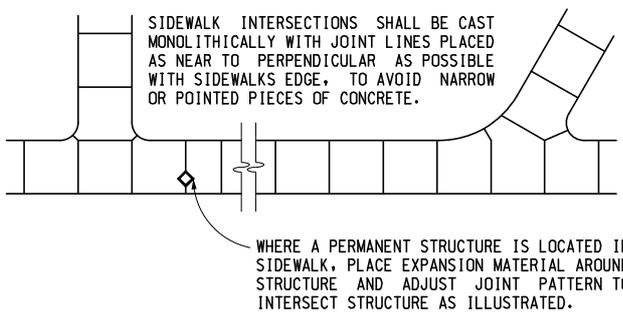
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND
DETECTABLE WARNING DETAILS**

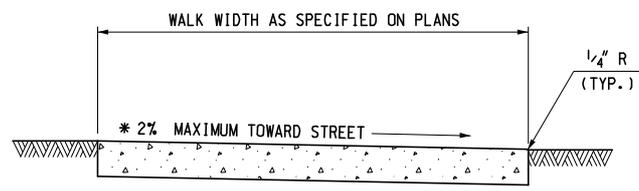
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LOCATION OF JOINTS IN CONCRETE SIDEWALK

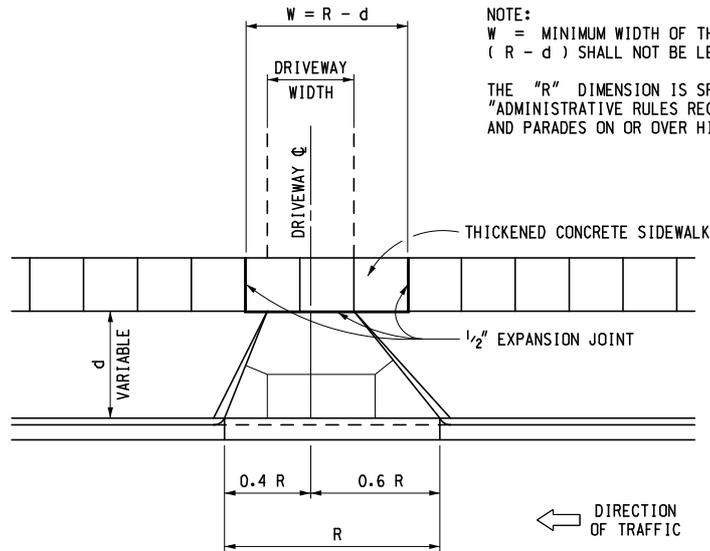


TYPICAL SIDEWALK JOINT LAYOUTS

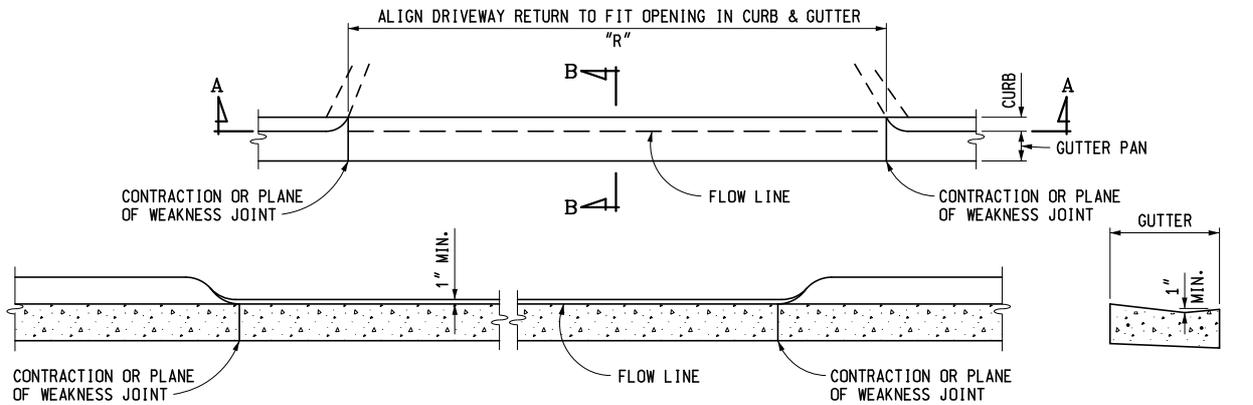


4" CONCRETE SIDEWALK

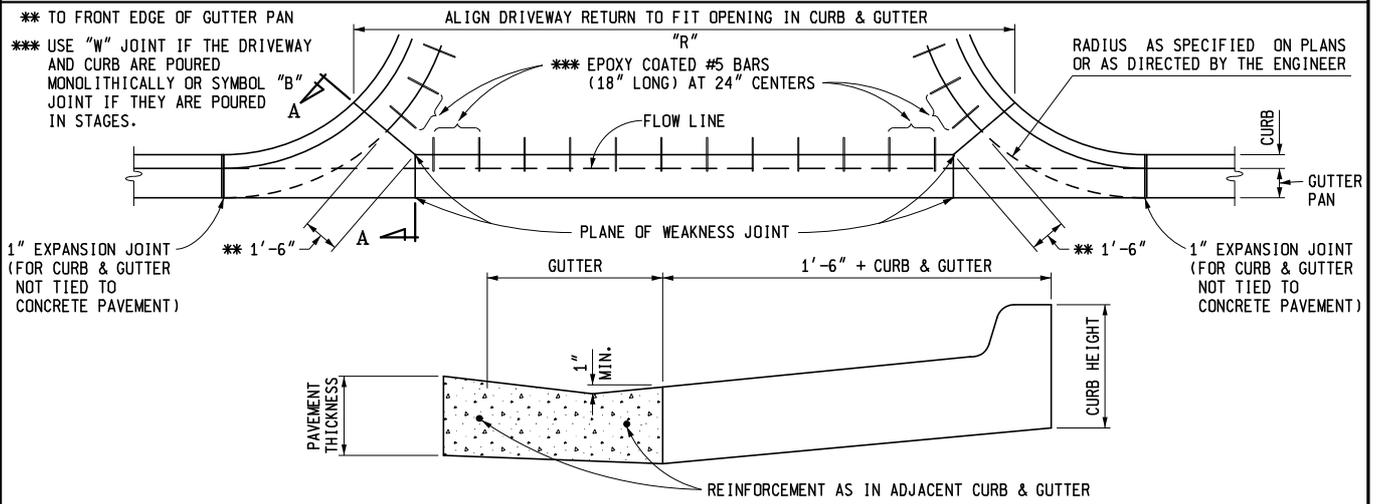
<p>PREPARED BY DESIGN DIVISION</p> <p>DRAWN BY: <u>B.L.T.</u></p> <p>CHECKED BY: <u>W.K.P.</u></p>	<p>DEPARTMENT DIRECTOR Kirk T. Stuedle</p> <p>APPROVED BY: <i>Randy Van Pelt</i> DIRECTOR, BUREAU OF FIELD SERVICES</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR</p> <p>DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK</p>		
	<p>APPROVED BY: <i>Maia Van Park</i> DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT</p>	<p>1-25-2013 F.H.W.A. APPROVAL</p>	<p>10-1-2012 PLAN DATE</p>	<p>R-29-H</p>



CONCRETE DRIVEWAY OPENING LAYOUT



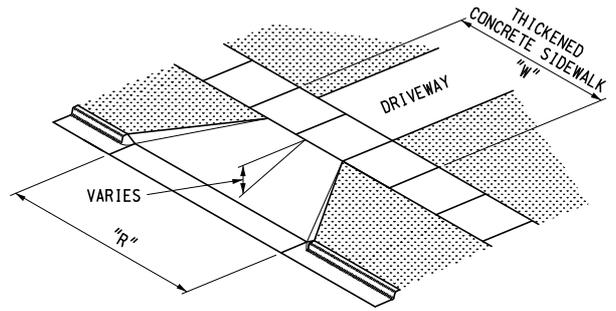
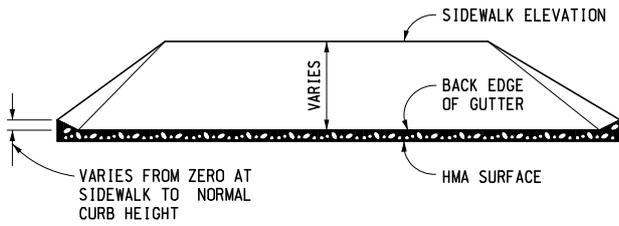
CONCRETE DRIVEWAY OPENING, DETAIL L



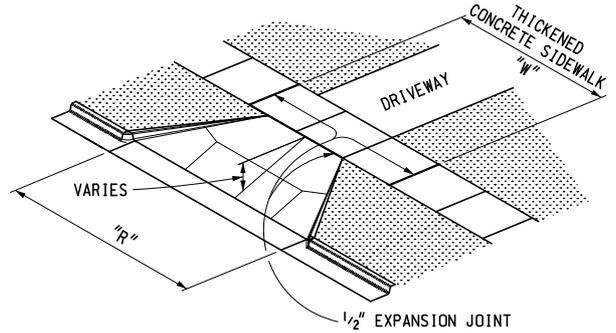
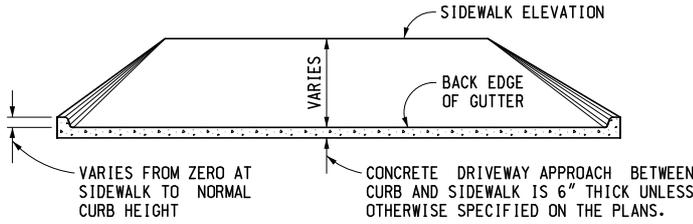
CONCRETE DRIVEWAY OPENING, DETAIL M

NOTE:
 FOR ROADWAYS WITH CONCRETE PAVEMENTS, LONGITUDINAL LANE TIES WILL BE CONTINUOUS THROUGH THE DRIVEWAY OPENING AND THE SPACING OF THE #5 BARS IN CONCRETE DRIVEWAYS SHALL BE ADJUSTED TO AVOID CONFLICT WITH THE LONGITUDINAL LANE TIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR			
DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK			
1-25-2013 F.H.W.A. APPROVAL	10-1-2012 PLAN DATE	R-29-H	SHEET 2 OF 4

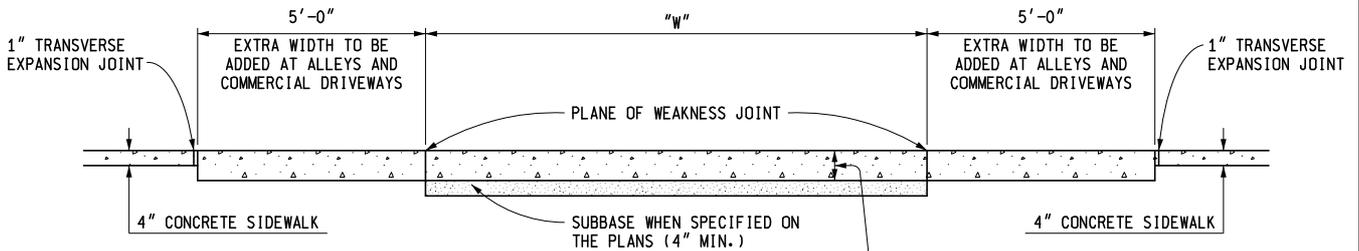


HMA DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L)



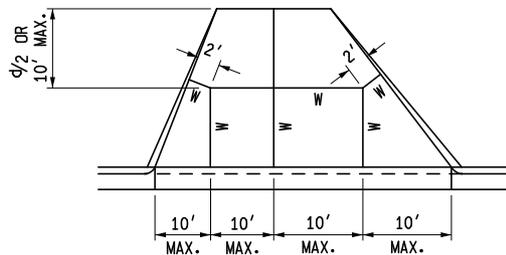
NOTES:
MONOLITHIC CURB IS INCLUDED IN THE CONCRETE DRIVEWAY APPROACH QUANTITY.
REINFORCEMENT IS NOT REQUIRED UNLESS SPECIFIED ON THE PLANS. WHEN REINFORCEMENT IS SPECIFIED, SEE CHART ON THIS SHEET.

CONCRETE DRIVEWAY APPROACH
(TO BE USED WITH DETAIL L OR M)



WHEN CONCRETE DRIVEWAY APPROACH IS SPECIFIED, THE THICKENED CONCRETE SIDEWALK THICKNESS IS EQUAL TO THE THICKNESS OF THE CONCRETE DRIVEWAY APPROACH. WHEN HMA DRIVEWAY APPROACH IS SPECIFIED, THE THICKENED CONCRETE SIDEWALK THICKNESS IS 6" MIN.

THICKENED CONCRETE SIDEWALK



ADJUST DRIVEWAY JOINTS AS NEEDED TO ALIGN WITH ANY COINCIDING TRANSVERSE PAVEMENT JOINTS.
JOINT LAYOUT IS AS INDICATED OR AS DIRECTED BY THE ENGINEER.

INTERMEDIATE DRIVEWAY JOINT DETAILS

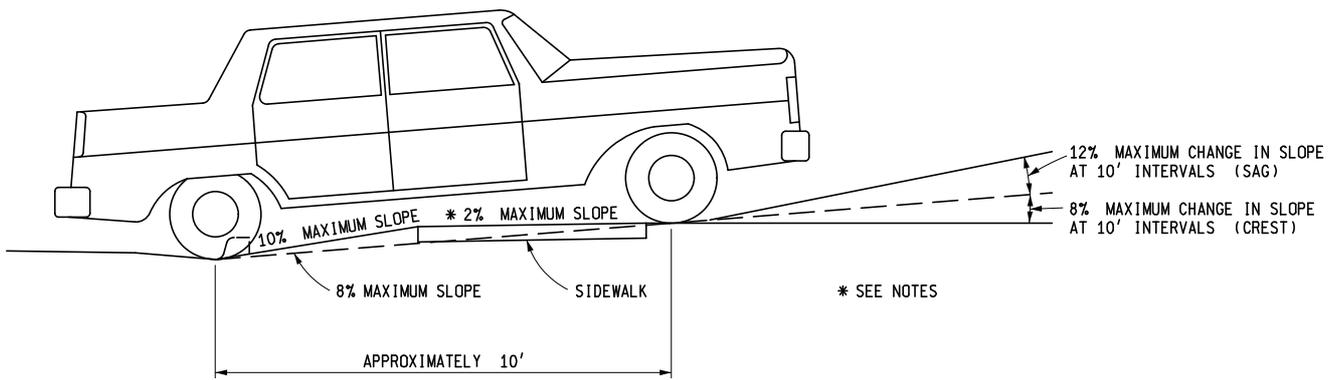
REINFORCEMENT FOR CONCRETE DRIVEWAYS

CONCRETE DRIVEWAY THICKNESS	WIRE SIZE (6" x 6" MESH)	AVERAGE WEIGHT (LBS/100 SFT)
LESS THAN 8"	W1.4	21
	W2.9	42
8" OR GREATER	USE WIRE FABRIC REINFORCEMENT SPECIFIED ON STANDARD PLAN R-37-SERIES	

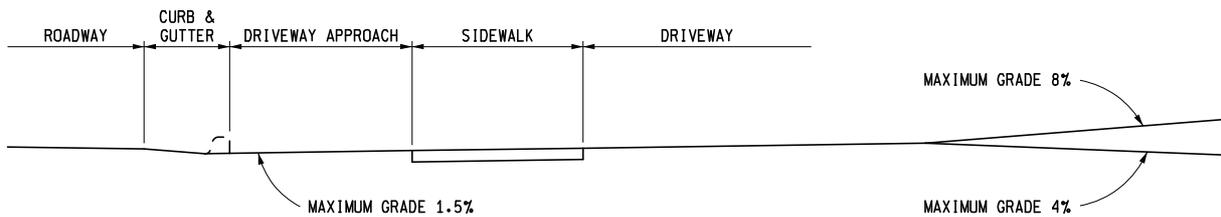
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

1-25-2013 F.H.W.A. APPROVAL	10-1-2012 PLAN DATE	R-29-H	SHEET 3 OF 4
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LOW VOLUME COMMERCIAL OR RESIDENTIAL DRIVEWAY SLOPES



COMMERCIAL DRIVEWAY PROFILE FOR MAJOR TRAFFIC GENERATORS

NOTES:

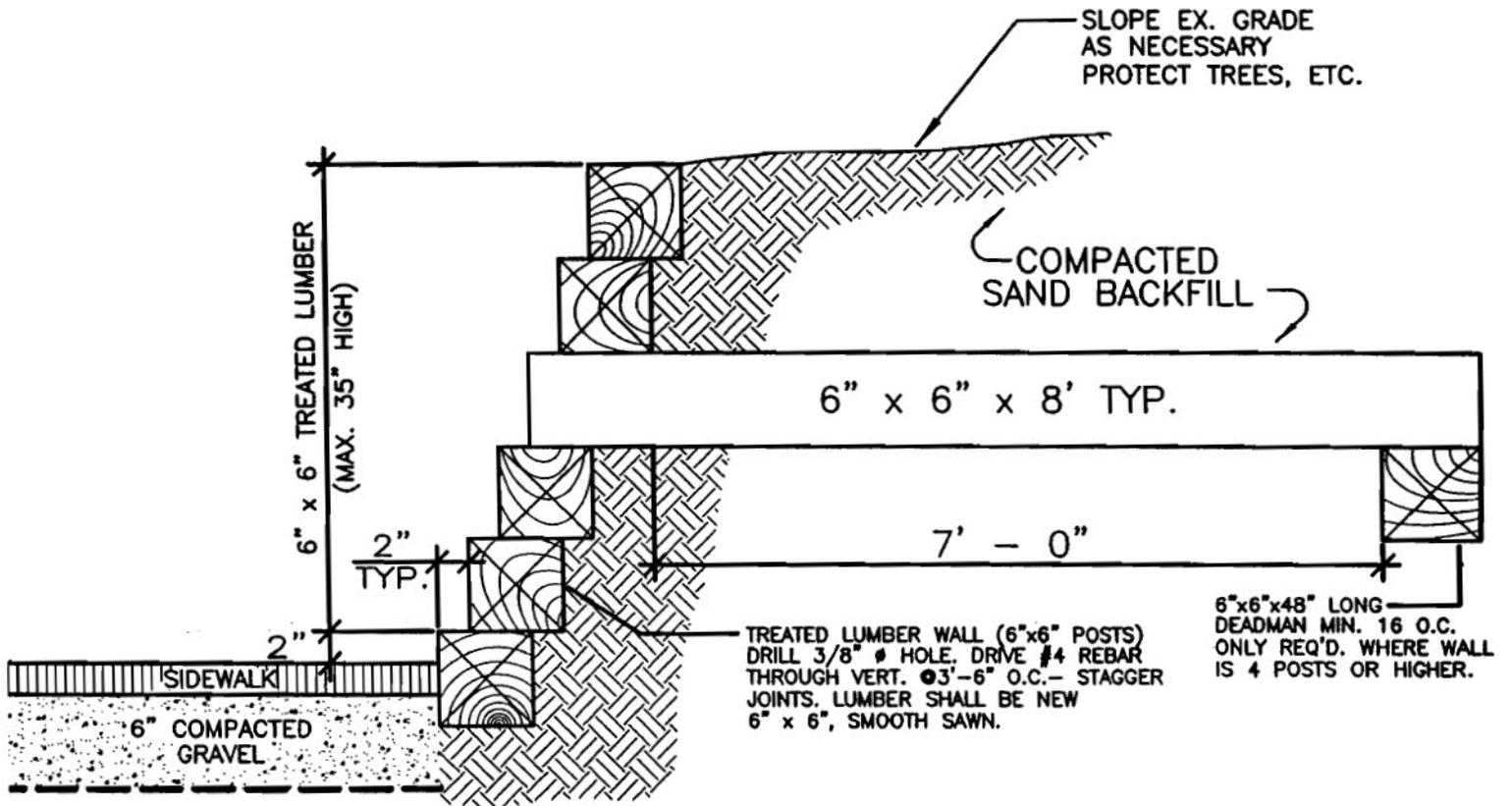
FOR DRIVEWAY DESIGN REFER ALSO TO "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS, AND PARADES ON OR OVER HIGHWAYS" AND GEOMETRIC DESIGN G-680-SERIES, COMMERCIAL DRIVEWAYS.

FOR CURB AND GUTTER DETAILS, SEE STANDARD PLAN R-30-SERIES.

TRANSVERSE SIDEWALK SLOPES ARE TYPICALLY 1.5% OR 2% MAXIMUM. IN ORDER TO MEET SITE CONDITIONS, IF THE TRANSVERSE SLOPE IS REQUIRED TO BE LESS THAN 1.5%, LONGITUDINAL DRAINAGE MUST BE PROVIDED.

WHEN SETTING GRADES FOR COMMERCIAL DRIVES, THE TYPES OF VEHICLES USING THE DRIVE SHOULD BE CONSIDERED.

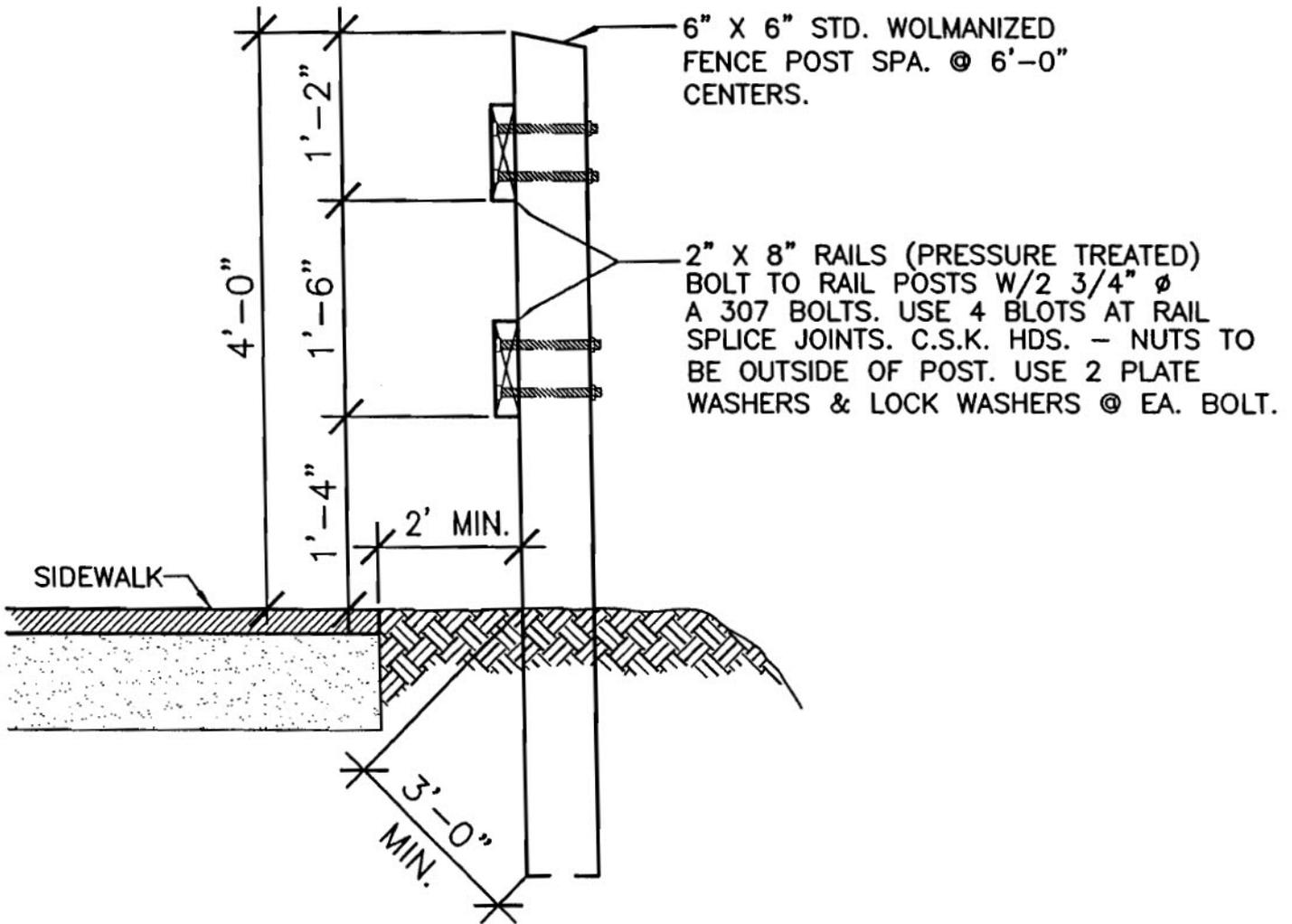
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK			
1-25-2013 F.H.W.A. APPROVAL	10-1-2012 PLAN DATE	R-29-H	SHEET 4 OF 4



(6" x 6" TREATED LUMBER, 0.4 RETENTION,
EQUIVALENT TO WOOD FOUNDATION
SOUTHERN YELLOW OR RED PINE - SMOOTH SAWN)

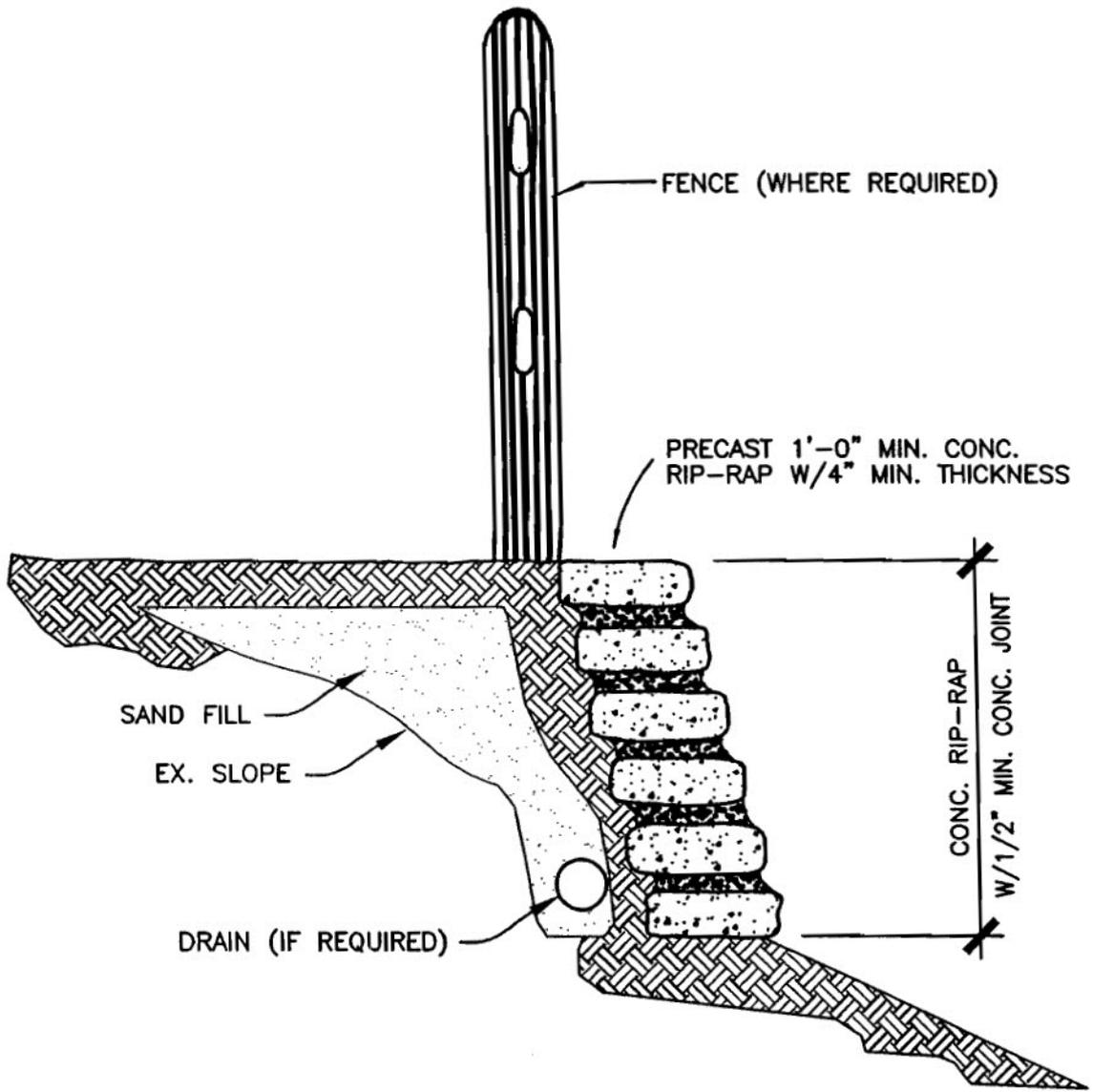
TYPICAL TREATED LUMBER RETAINING WALL DETAIL

PREIN & NEWHOF
CONSULTING ENGINEERS



TYPICAL TREATED LUMBER FENCE DETAIL

PREIN & NEWHOF
 CONSULTING ENGINEERS



TYPICAL CONCRETE RIP-RAP RETAINING WALL

PREIN & NEWHOF
CONSULTING ENGINEERS