



## **OSHTEMO TOWNSHIP SIDEWALK/SHARED-USE PATH CONSTRUCTION STANDARDS**

*Approved August 28, 2018*

### **CONCRETE SIDEWALK CONSTRUCTION**

The construction of Sidewalks and Shared-Use Paths within Oshtemo is managed through the Township's issuance of a Sidewalk/Non-Motorized Path Permit. The permitting process includes both a pre-pour inspection of the base and concrete forms, and a final project inspection for acceptance of the work. 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.

#### *Driveway Sidewalk Crossings*

Where public sidewalks (AKA pedestrian route) cross residential driveways, the sidewalk shall be constructed of concrete through the driveway. Where a curb-line concrete gutter pan begins the driveway, the driveway apron between the curb and sidewalk shall also be constructed of concrete. Hot-Mix Asphalt (HMA) commercial driveways that lack a concrete roadway gutter, and which have greater than two lanes or heavy traffic may seek administrative approval to establish a pedestrian route over the driveway in lieu of placing a concrete walkway through the HMA material. When new sidewalks are extended through existing driveways, it shall be administratively determined by the Township to what extent the existing driveway pavements will need to be reconstructed in lieu of providing a pedestrian route over the pavement.

#### *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.

### Curb Ramps and Approaches

New roadway construction in locations where non-motorized facilities are anticipated shall incorporate concrete curbing of RCKC standards at intersections. Roadway curbing shall be extended through the roadway intersection, within the right-of-way limits of each approaching roadway. The purpose of this standard is to ensure that all non-motorized ramps, (current and anticipated) are fully integrated into the casting of the concrete curb through the intersection. As required, concrete curbing within intersections shall be extended a sufficient length to assure that the concrete curb carries the transition from the existing edge of pavement design of each approaching roadway. Commonly encountered edge-of-roadway pavement designs include ditch drainage, gravel shoulder, bituminous valley gutter, mountable and high back concrete curb.

Curb ramps shall be concrete unless written approval of an alternative is pre-approved by the Township. In locations where existing concrete curb is without an integrated approach (curb-cut), the entire roadway concrete curb section may need to be removed and re-constructed to meet ADA compliance standards. On a case by case basis, the removal of an existing curb back by saw cutting may be able to yield an ADA compliant transition through the curb. Proposals to use the saw cut method of ramp construction should seek prior approval from the Township.

Ramp that approach existing roads without concrete curbing should be reviewed with the Township prior to ramp construction. If providing new concrete curb for the ramp transition is determined to be impracticable, or if extensive re-construction the intersection curb is determined to be excessive, ADA compliant asphalt transitions onto asphalt paving may be accepted upon prior written approval of the township.

Butt joints must be provided at the transition from concrete to bituminous paving for all non-motorized facilities. Saw cutting, grinding, or similar means of joint formation is required. As practicable, transition butt-joints to asphalt curbing shall be located at the curb high-point. Material transition joints are not allowed along a drainage flow-line. Surface grinding of existing asphalt curbing is an acceptable means to achieve ADA compliant transitions. Alternately, IR asphalt restoration or placement of a new transition segment of asphalt paving can be constructed through the curb profile to achieve the transition from the asphalt roadway to the concrete ramp. Regardless of construction method or prior approval of the means of construction, compliance with ADA standards will need to be demonstrated to receive acceptance of the work.

#### Sidewalk Detectable Warnings

Sidewalk Detectable Warning shall apply to all construction or reconstruction of streets, curbs, or sidewalks. Detectable Warnings shall be placed at all street intersections and at select commercial/industrial driveways where driveway traffic and pedestrian crossings are determined/projected by the Township to generate sufficient conflicts to warrant the greater risk awareness provided by detectable warnings.

Detectable Warnings shall conform to ADA requirements, MDOT Specifications and MDOT Detail R-28-E. Detectable Warnings shall be made of ductile iron material, 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.

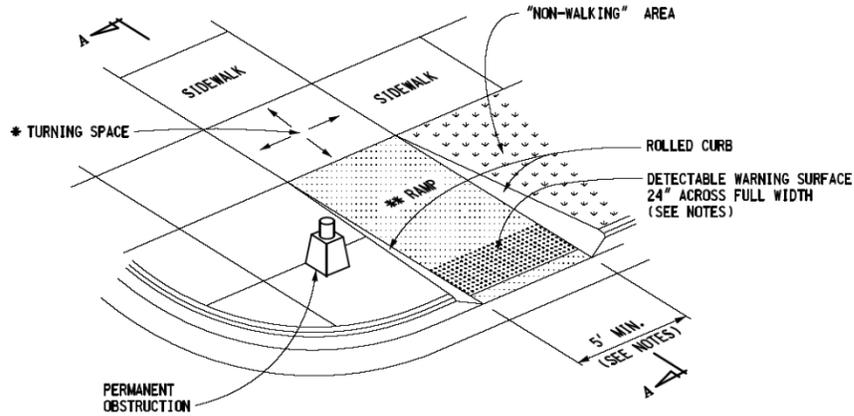
Restored areas shall be repaired and reseeded as often as necessary in order to produce a close stand of weed free grass to the edges of the sidewalk or multi-use path.

## **ATTACHMENTS:**

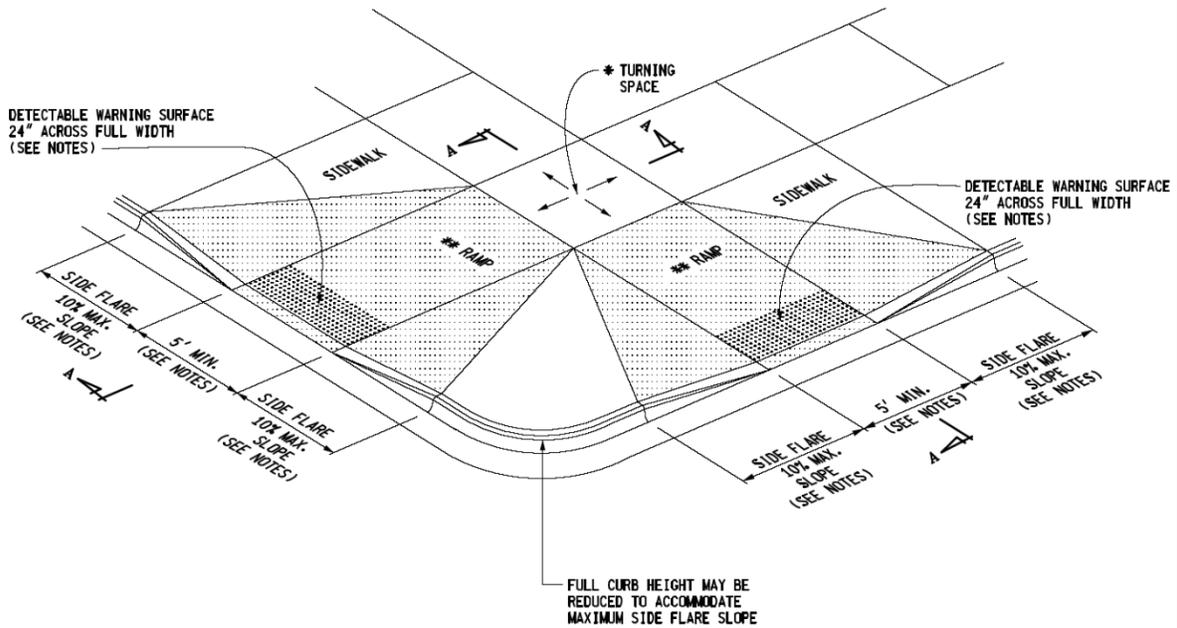
- MDOT Construction Details (2013 or current edition):
  - R-28-H Sidewalk Ramp and Detectable Warning Details
  - R-29-H Driveway Openings & Approaches and Concrete Sidewalk
- P&N Slope Cut & Fill Limitations
- P&N Precast Concrete Rip-Rap Retaining Wall
- P&N Lumber Retaining Wall
- P&N Lumber Fencing

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

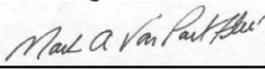
\*\* MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



**SIDEWALK RAMP TYPE R**  
(ROLLED SIDES)

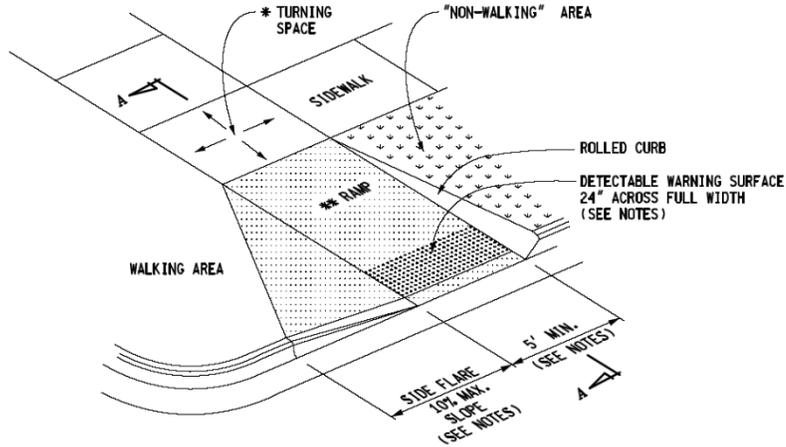


**SIDEWALK RAMP TYPE F**  
(FLARED SIDES, TWO RAMPS SHOWN)

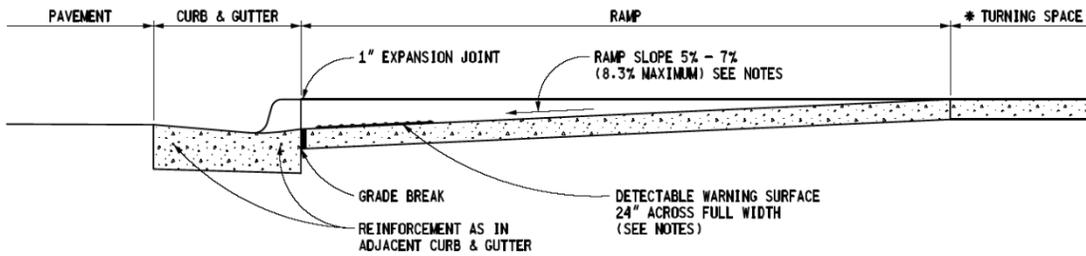
|   |  |  |                        |                           |
|---|--|--|------------------------|---------------------------|
| <br>PREPARED BY<br>DESIGN DIVISION<br>DRAWN BY: <u>B.L.T.</u><br>CHECKED BY: <u>W.K.P.</u> | DEPARTMENT DIRECTOR<br>Kirk T. Stuedle<br>APPROVED BY: <br>DIRECTOR, BUREAU OF FIELD SERVICES | MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR<br><b>SIDEWALK RAMP AND<br/>         DETECTABLE WARNING DETAILS</b> |                        |                           |
|   | APPROVED BY: <br>DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT                                      | 1-25-2013<br>F.H.W.A. APPROVAL   | 10-3-2012<br>PLAN DATE | R-28-H<br>SHEET<br>1 OF 7 |

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

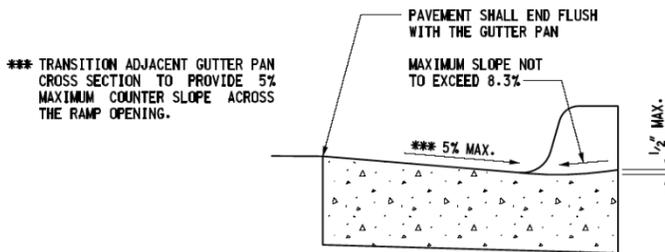
\*\* MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



**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**

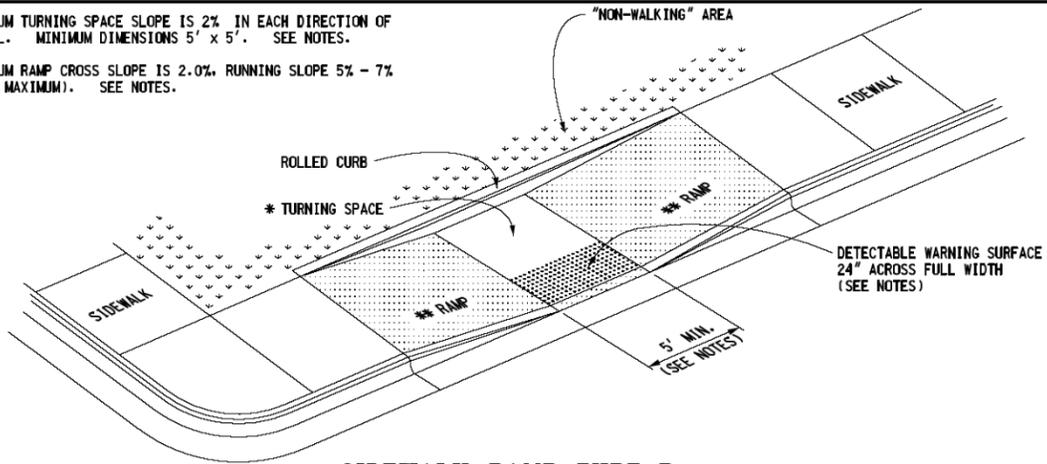
1-25-2013  
F.H.W.A. APPROVAL

10-3-2012  
PLAN DATE

R-28-H

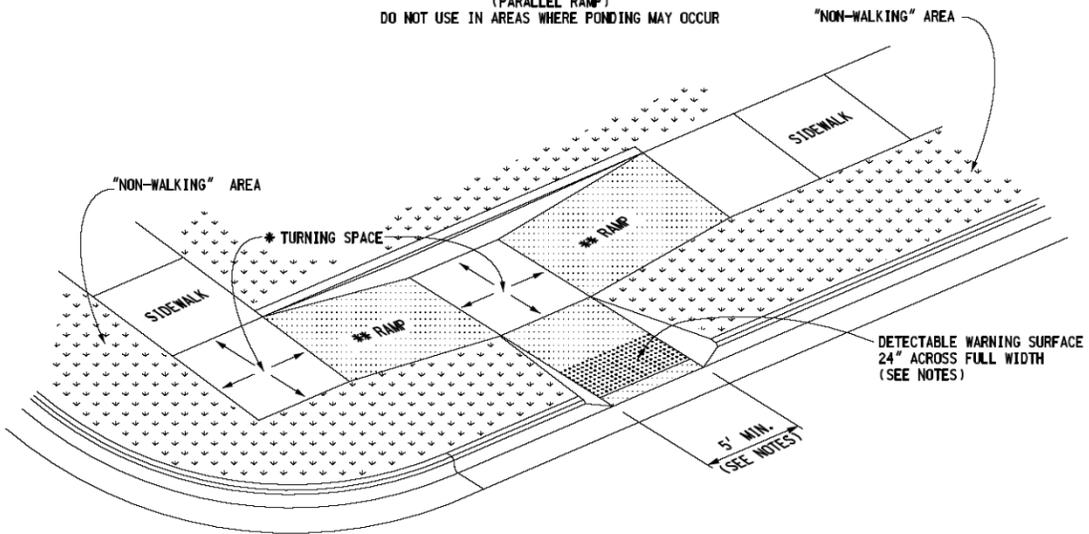
SHEET  
2 OF 7

\* 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**

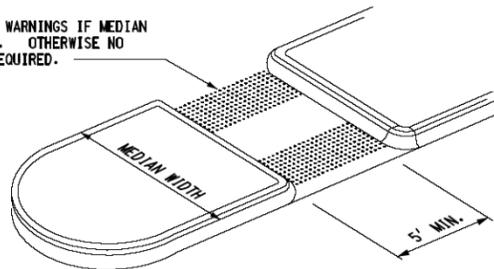
(PARALLEL RAMP)  
 DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



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

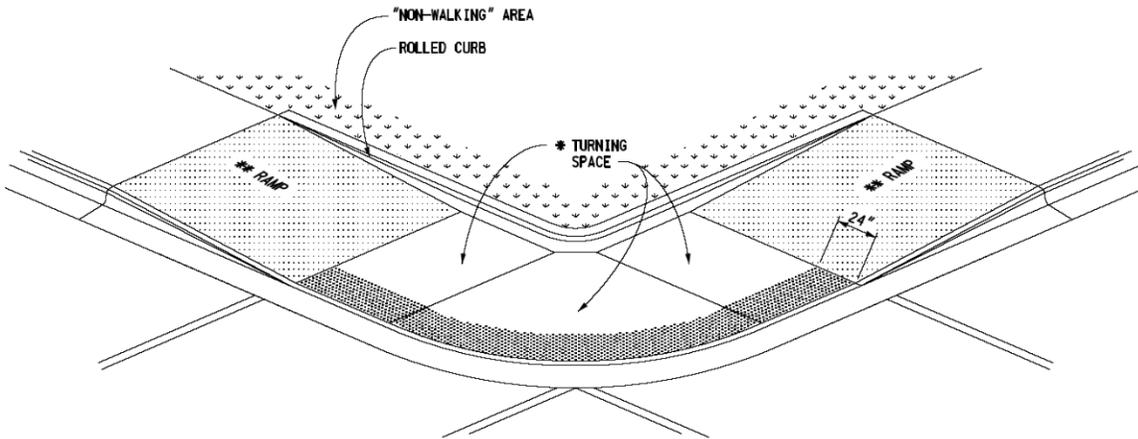
10-3-2012  
 PLAN DATE

**R-28-H**

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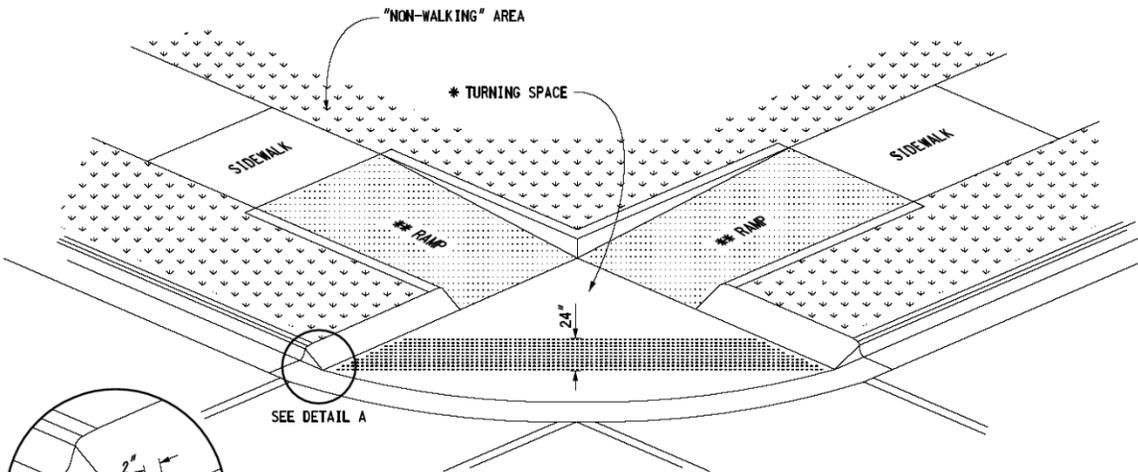
\* MAXIMUM TURNING SPACE SLOPE IS 2% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

\*\* 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  
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND  
DETECTABLE WARNING DETAILS**

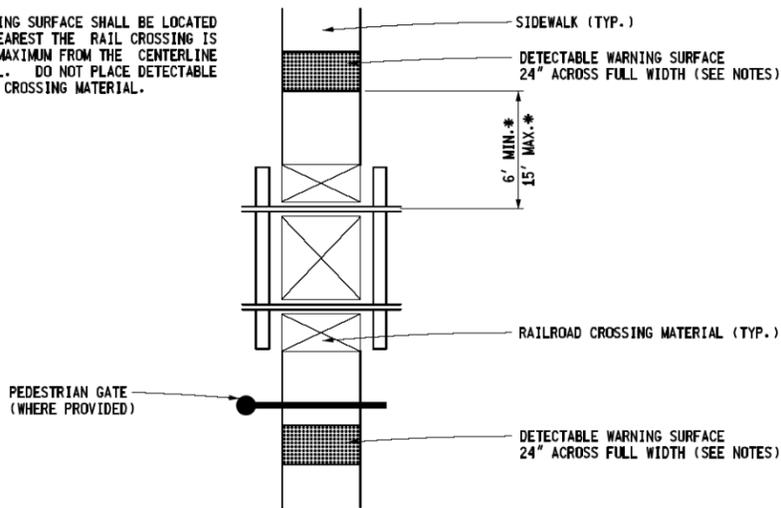
1-25-2013  
F.H.W.A. APPROVAL

10-3-2012  
PLAN DATE

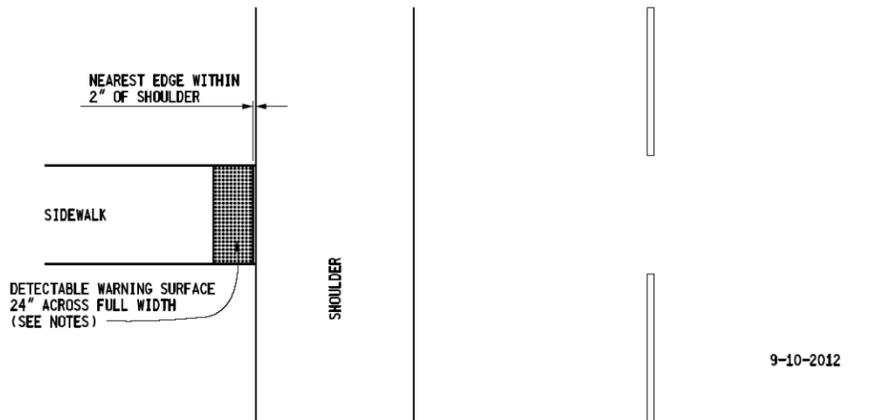
R-28-H

SHEET  
4 OF 7

\* 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.

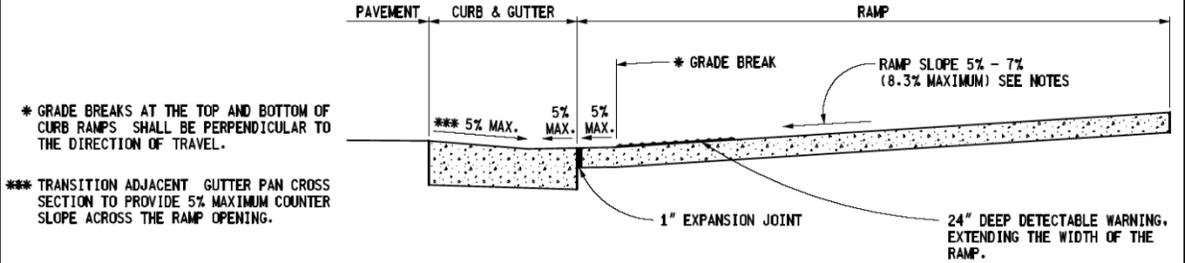
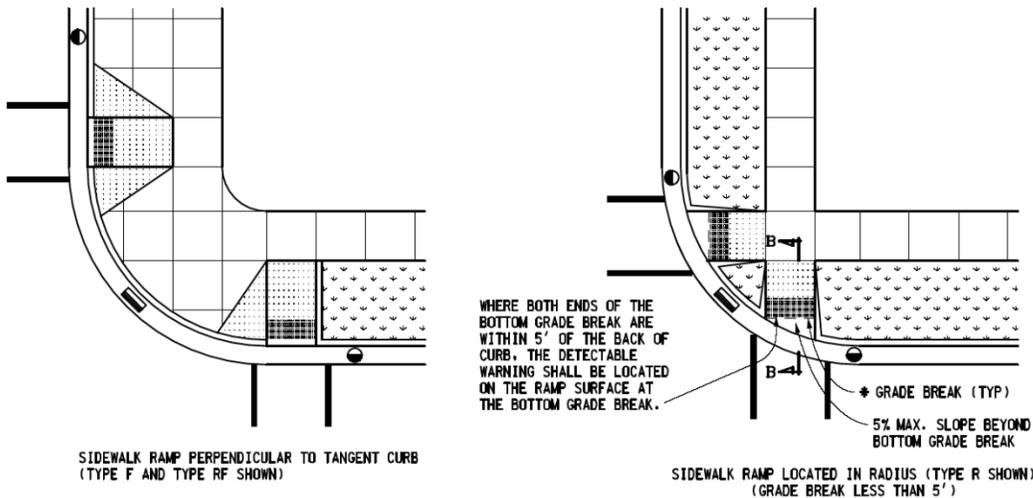
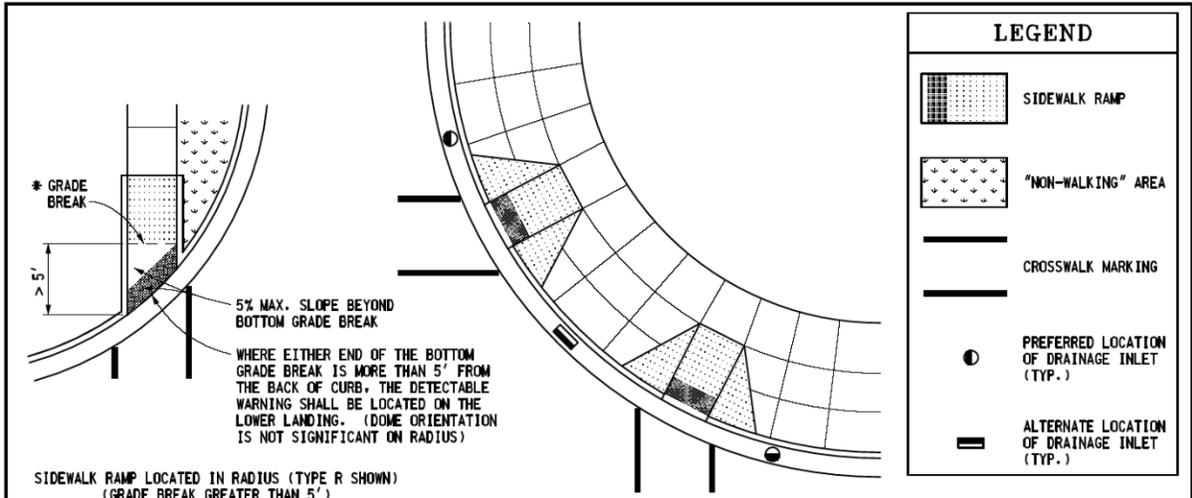


**DETECTABLE WARNING AT RAILROAD CROSSING**



**DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY**

|  |                        |               |                 |
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| MICHIGAN DEPARTMENT OF TRANSPORTATION<br>BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR<br><b>SIDEWALK RAMP AND<br/>         DETECTABLE WARNING DETAILS</b> |                        |               |                 |
| 1-25-2013<br>F.H.W.A. APPROVAL   | 10-3-2012<br>PLAN DATE | <b>R-28-H</b> | SHEET<br>5 OF 7 |

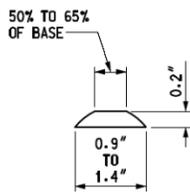


**SECTION B-B  
 SIDEWALK RAMP ORIENTATION**

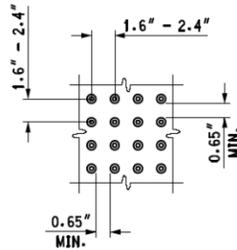
MICHIGAN DEPARTMENT OF TRANSPORTATION  
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND  
 DETECTABLE WARNING DETAILS**

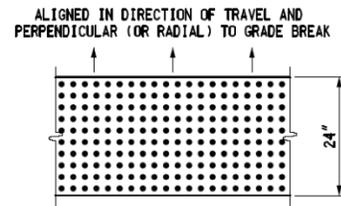
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| 1-25-2013<br>F.H.W.A. APPROVAL | 10-3-2012<br>PLAN DATE | R-28-H | SHEET<br>6 OF 7 |
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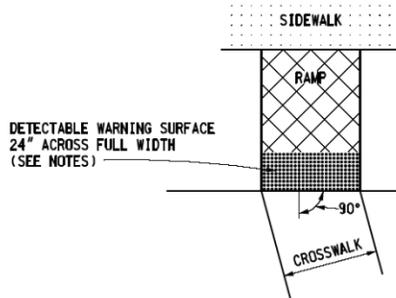
**DOME SECTION**



**DOME SPACING**



**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 RAMP ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMP SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMP 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 RAMP TO EXCEED 15 FEET IN LENGTH.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMP. 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".

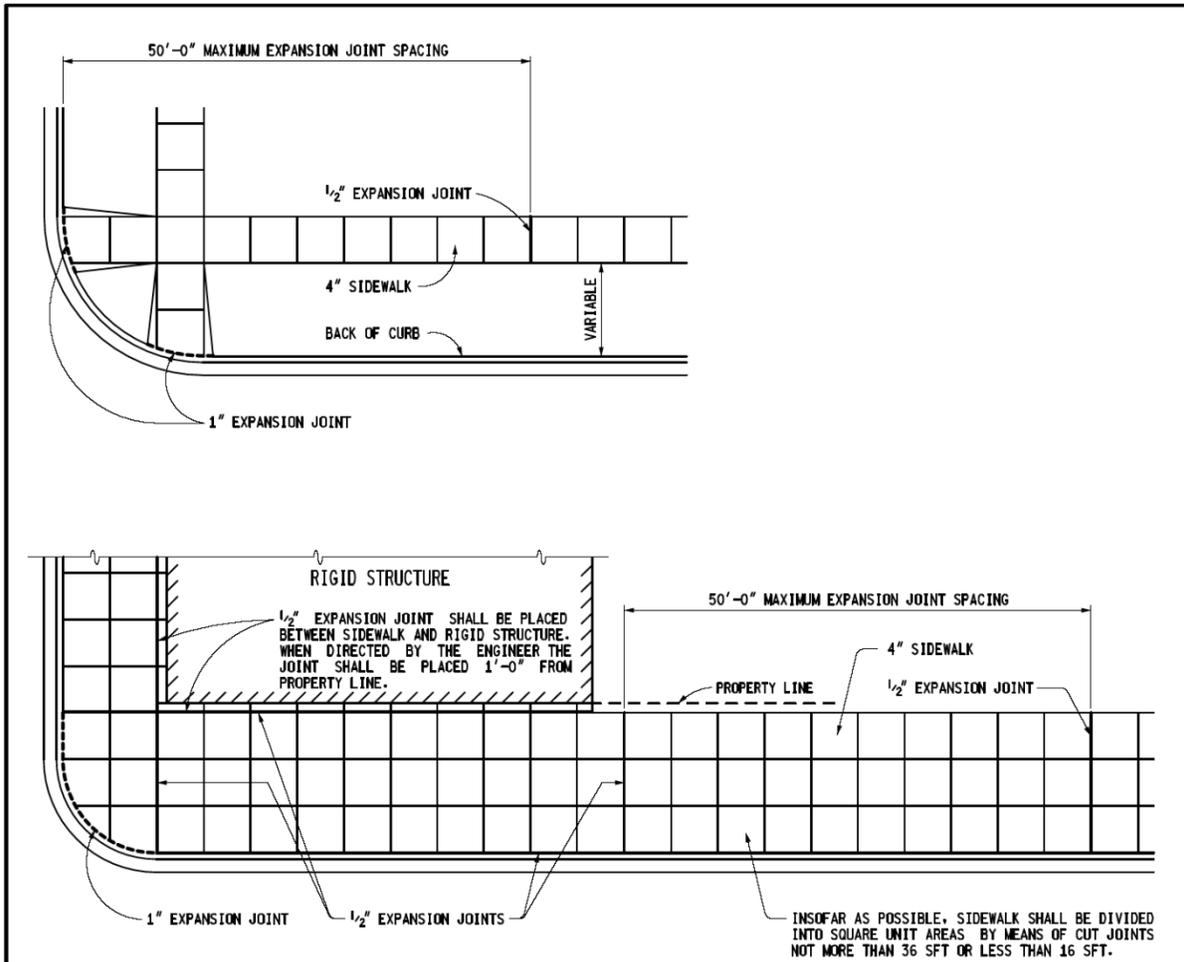
FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY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

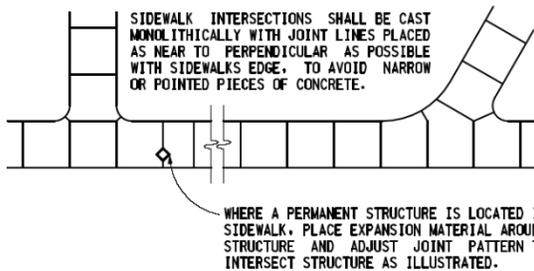
MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SIDEWALK RAMP AND  
DETECTABLE WARNING DETAILS**

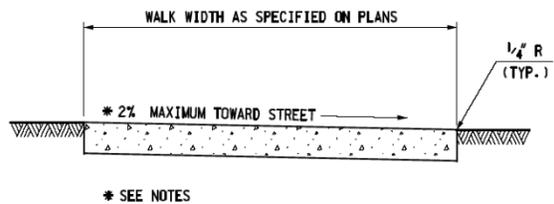
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| 1-25-2013<br>F.H.W.A. APPROVAL | 10-3-2012<br>PLAN DATE | R-28-H | SHEET<br>7 OF 7 |
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**LOCATION OF JOINTS IN CONCRETE SIDEWALK**

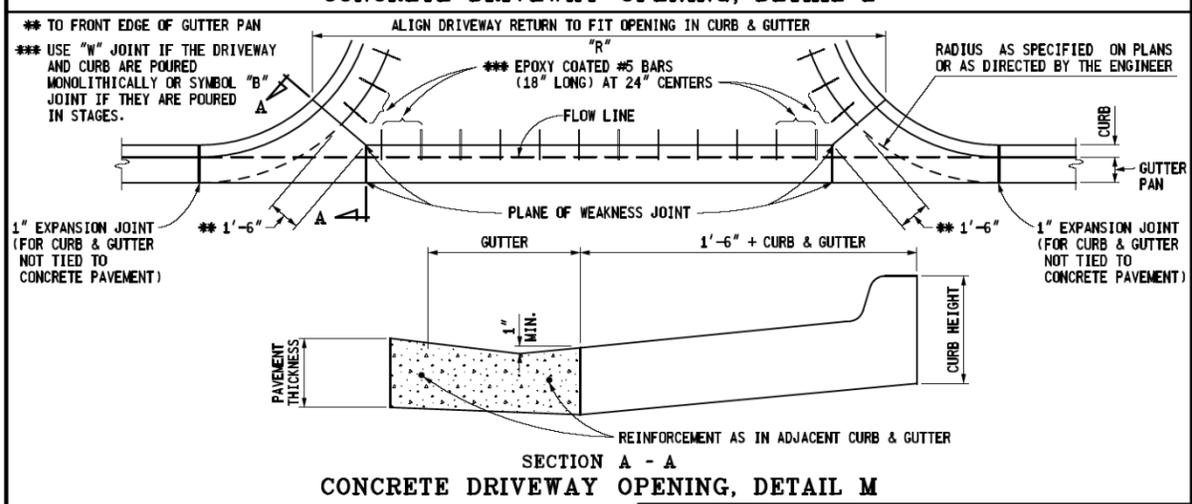
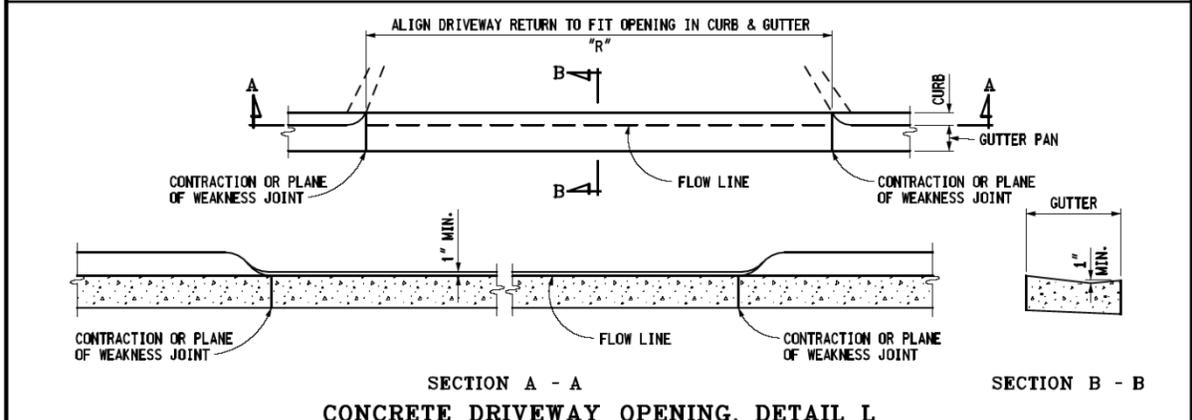
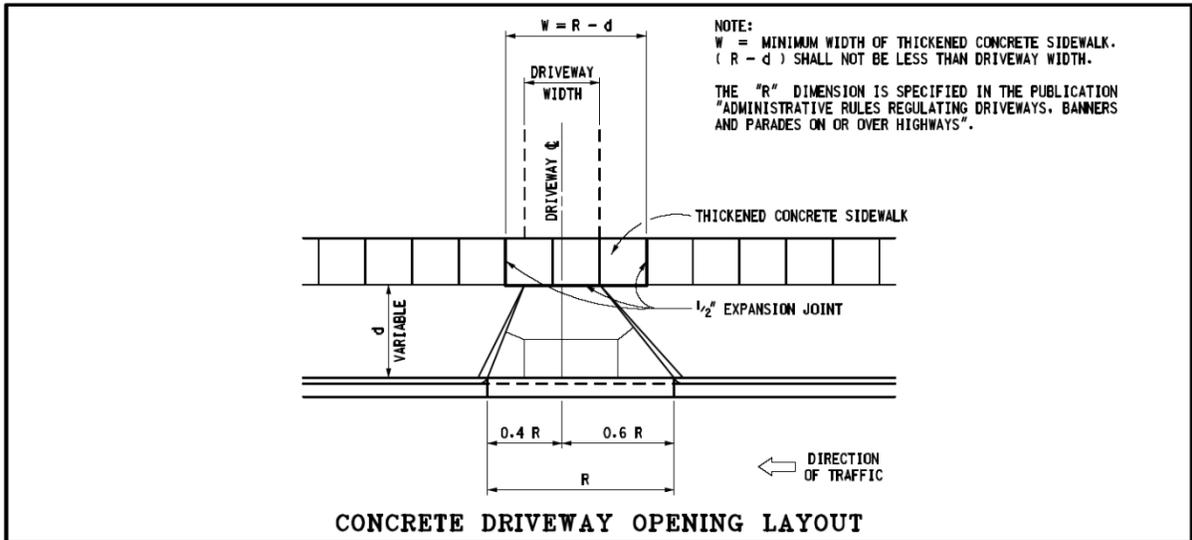


**TYPICAL SIDEWALK JOINT LAYOUTS**



**4" CONCRETE SIDEWALK**

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

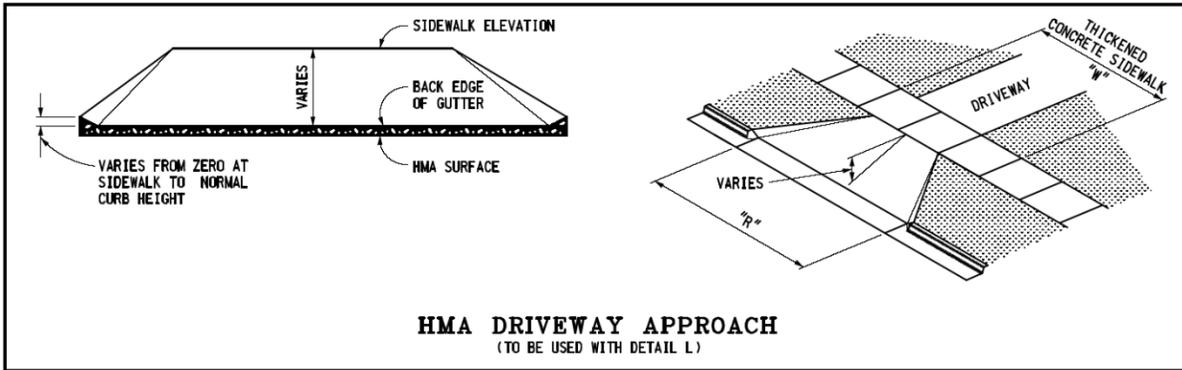


**NOTE:**  
 FOR ROADWAYS WITH CONCRETE PAVEMENTS, LONGITUDINAL LANE TIES WILL BE CONTINUOUS THROUGH THE DRIVEWAY OPENING AND THE SPACING OF THE #5 BARS IN CONCRETE DRIVEWAYS SHALL BE ADJUSTED TO AVOID CONFLICT WITH THE LONGITUDINAL LANE TIES.

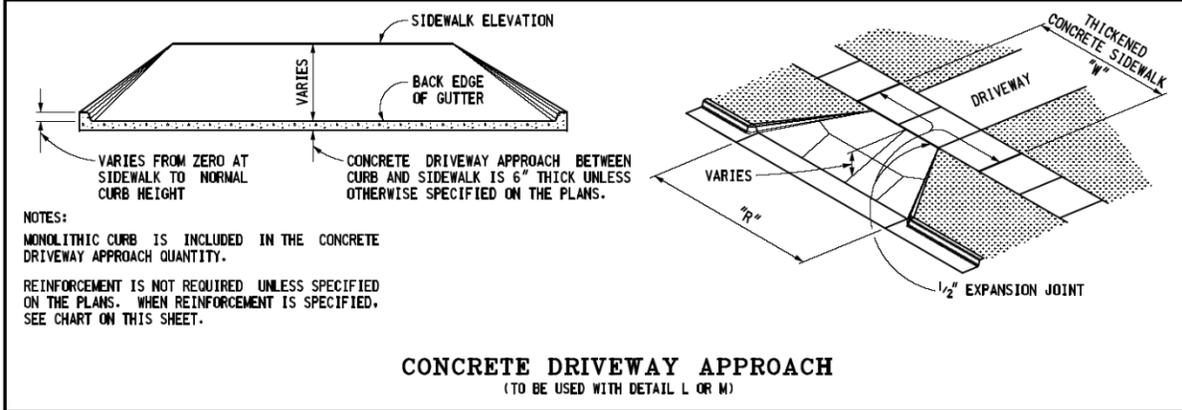
MICHIGAN DEPARTMENT OF TRANSPORTATION  
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**DRIVEWAY OPENINGS  
 & APPROACHES,  
 AND CONCRETE SIDEWALK**

|                                |                        |        |                 |
|--------------------------------|------------------------|--------|-----------------|
| 1-25-2013<br>F.H.W.A. APPROVAL | 10-1-2012<br>PLAN DATE | R-29-H | SHEET<br>2 OF 4 |
|--------------------------------|------------------------|--------|-----------------|

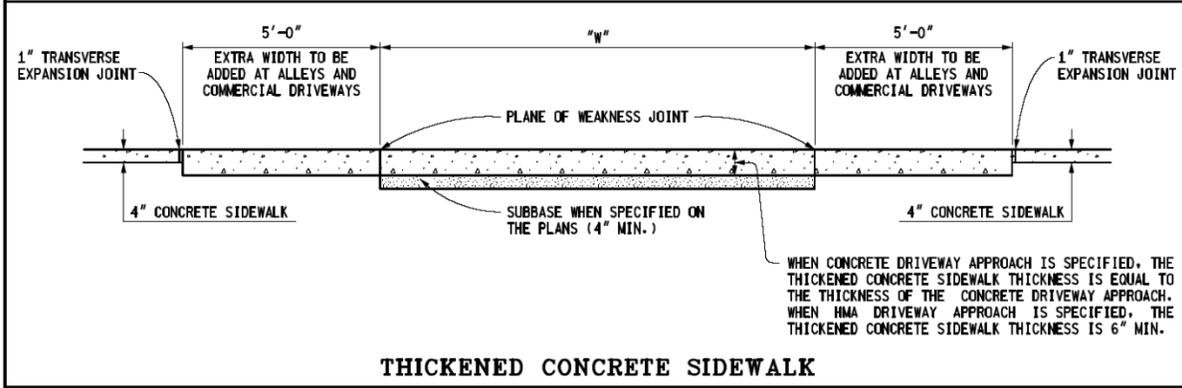


**HMA DRIVEWAY APPROACH**  
(TO BE USED WITH DETAIL L)

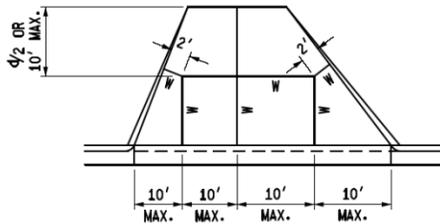


**CONCRETE DRIVEWAY APPROACH**  
(TO BE USED WITH DETAIL L OR M)

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.



**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.

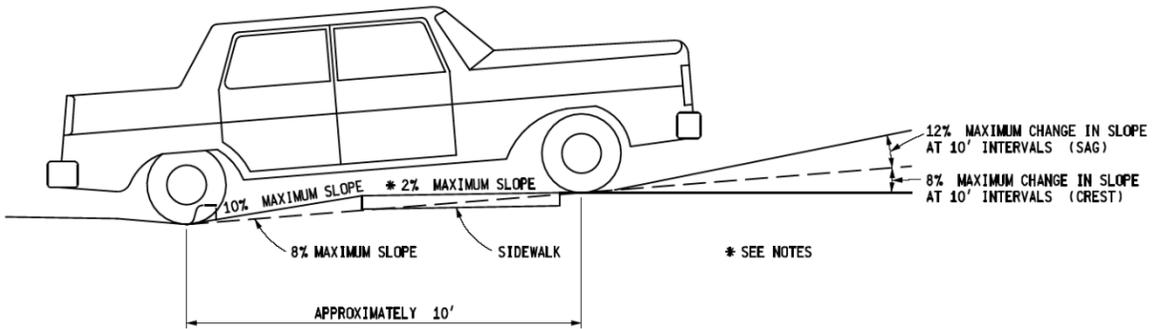
**INTERMEDIATE DRIVEWAY JOINT DETAILS**

| 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 |                              |

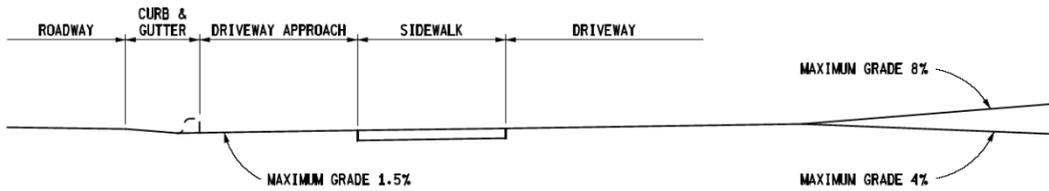
MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**DRIVEWAY OPENINGS  
& APPROACHES,  
AND CONCRETE SIDEWALK**

|                                |                        |        |                 |
|--------------------------------|------------------------|--------|-----------------|
| 1-25-2013<br>F.H.W.A. APPROVAL | 10-1-2012<br>PLAN DATE | R-29-H | SHEET<br>3 OF 4 |
|--------------------------------|------------------------|--------|-----------------|



**LOW VOLUME COMMERCIAL OR RESIDENTIAL DRIVEWAY SLOPES**



**COMMERCIAL DRIVEWAY PROFILE FOR MAJOR TRAFFIC GENERATORS**

**NOTES:**

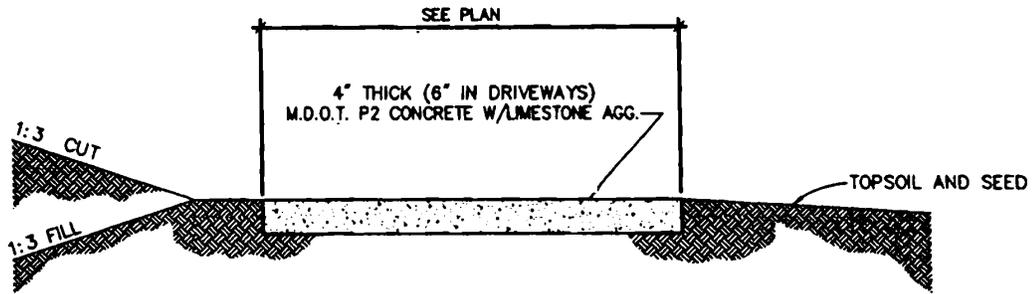
FOR DRIVEWAY DESIGN REFER ALSO TO "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS, AND PARADES ON OR OVER HIGHWAYS" AND GEOMETRIC DESIGN G-680-SERIES, COMMERCIAL DRIVEWAYS.

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.

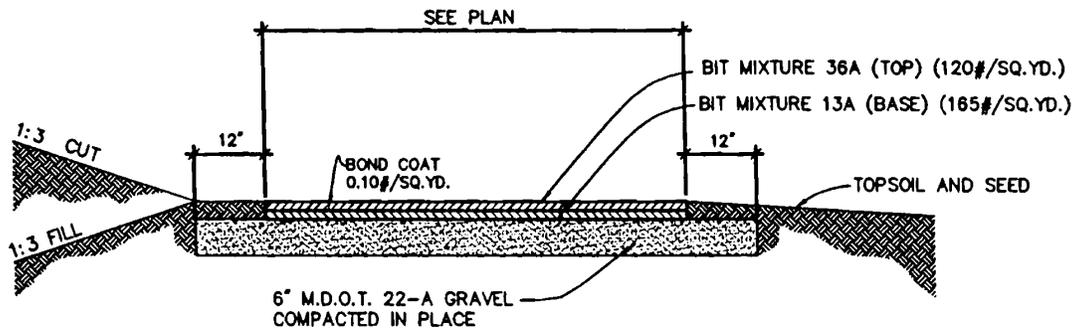
WHEN SETTING GRADES FOR COMMERCIAL DRIVES, THE TYPES OF VEHICLES USING THE DRIVE SHOULD BE CONSIDERED.

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



### CONCRETE SIDEWALK DETAIL

NO SCALE

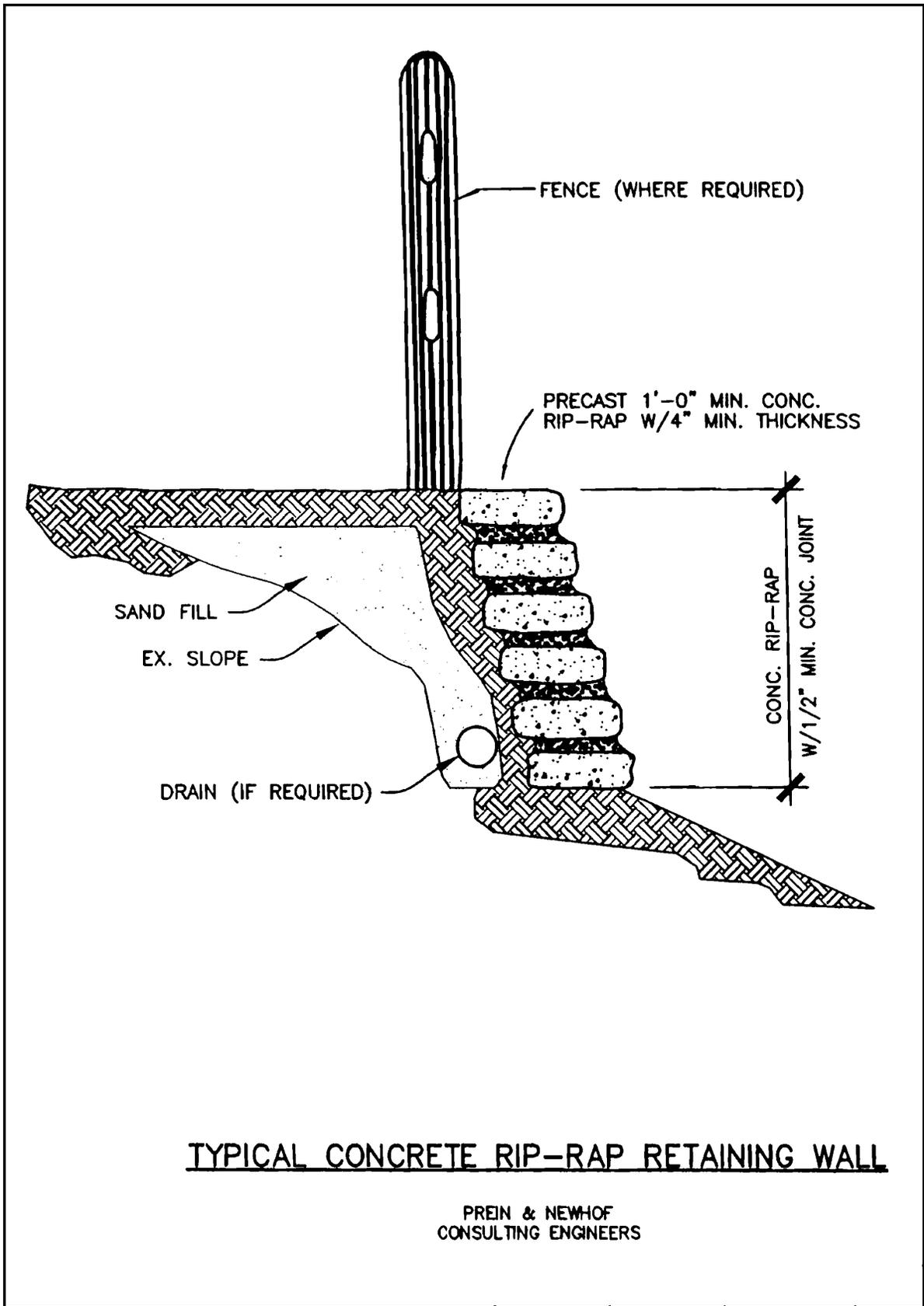


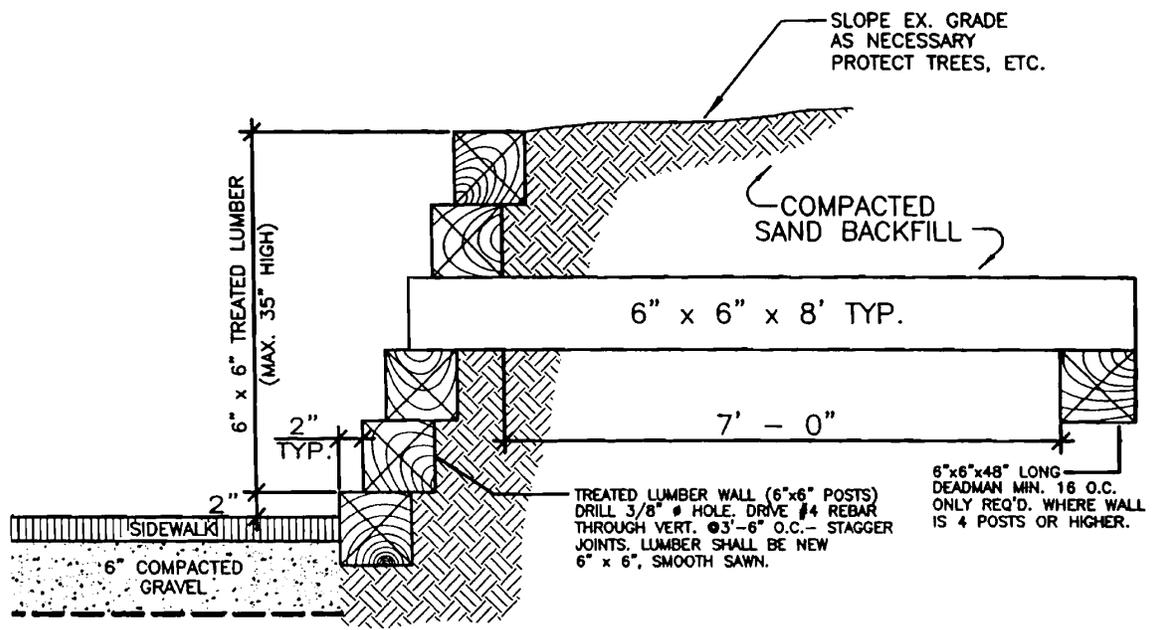
### BITUMINOUS MULTI-PURPOSE PATH DETAIL

NO SCALE

## SIDEWALK DETAILS

PREIN & NEWHOF  
CONSULTING ENGINEERS

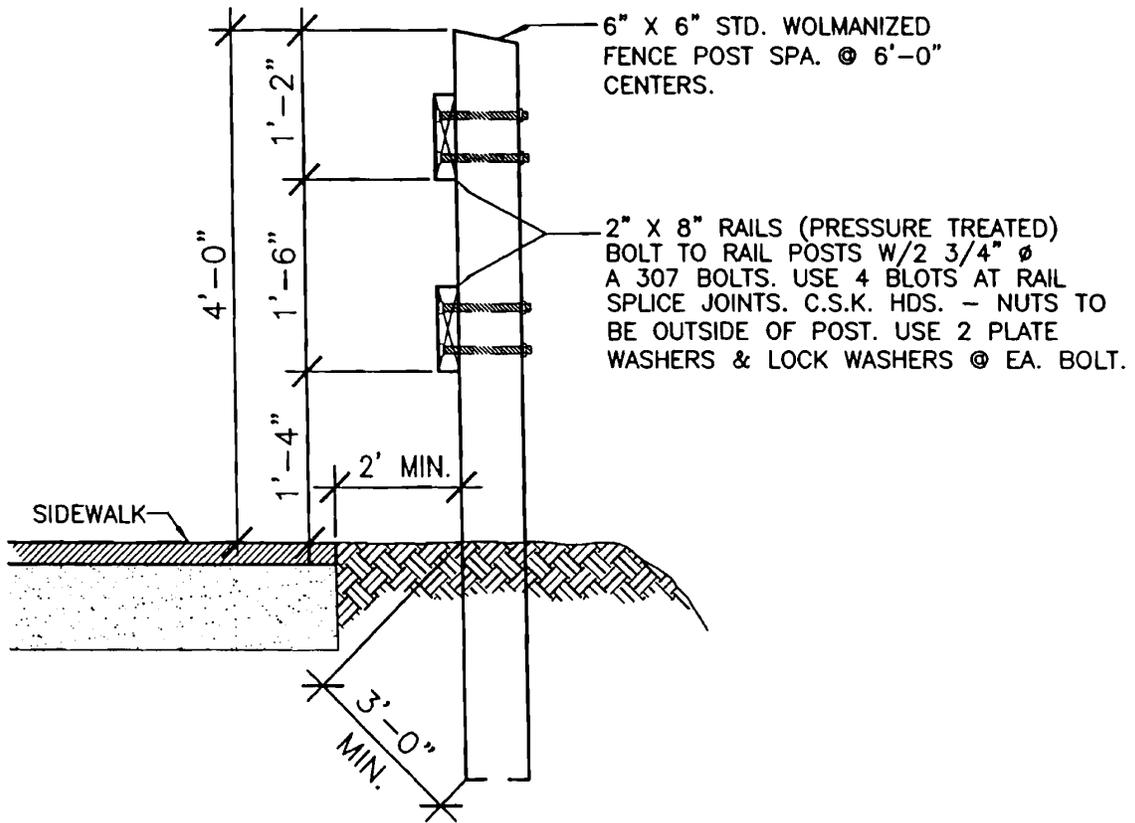




(6" x 6" TREATED LUMBER, 0.4 RETENTION,  
EQUIVALENT TO WOOD FOUNDATION  
SOUTHERN YELLOW OR RED PINE - SMOOTH SAWN)

TYPICAL TREATED LUMBER RETAINING WALL DETAIL

PREIN & NEUHOFF  
CONSULTING ENGINEERS



**TYPICAL TREATED LUMBER FENCE DETAIL**

PREIN & NEWHOF  
CONSULTING ENGINEERS