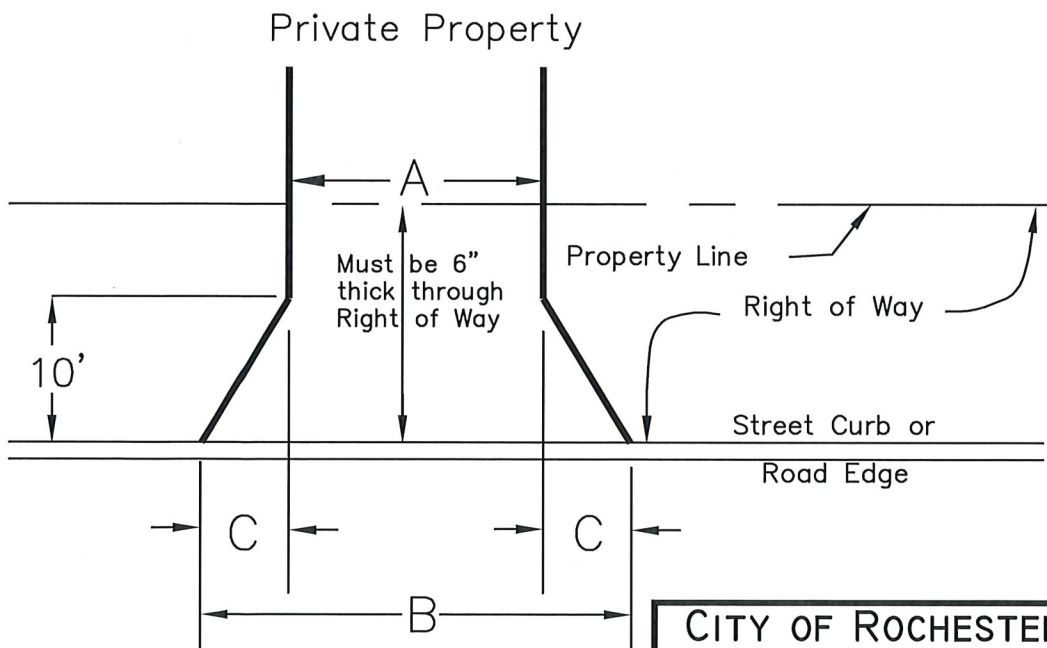


GARAGE SIZE	Local Roads			Major Roads	
	Width of Approach at P/L (in Feet)	Width of Approach at Street (in Feet)	Width of Flare (in Feet)	Width of Approach at Street (in Feet)	Width of Flare (in Feet)
	A	B	C	B	C
Min. Width	12	18	3	32	10
1 CAR GARAGE	13	19	3	33	10
	14	20	3	34	10
	15	21	3	35	10
	16	22	3	36	10
2 CAR GARAGE	17	23	3	36	9.5
	18	24	3	36	9
	19	25	3	36	8.5
	20	25	2.5	36	8
	21	25	2	36	7.5
	22	25	1.5	36	7
	23	25	1	36	6.5
	24	25	0.5	36	6
Max. Width	25	25	0	36	5.5

1. Drive approach to be a minimum of 5' from all utility structures (fire hydrant, electrical or cable boxes, etc.).
2. All manholes within 5' of the approach to be at approach grade.
3. If a storm catch basin is in an approach contact City Engineering Department prior to construction of approach.
4. If a manhole is in a drive or within 18" of a drive approach, contact City Engineering Department prior to construction of drive approach.
5. If road is paved, approach must be paved.
6. If road is gravel, approach must be gravel.

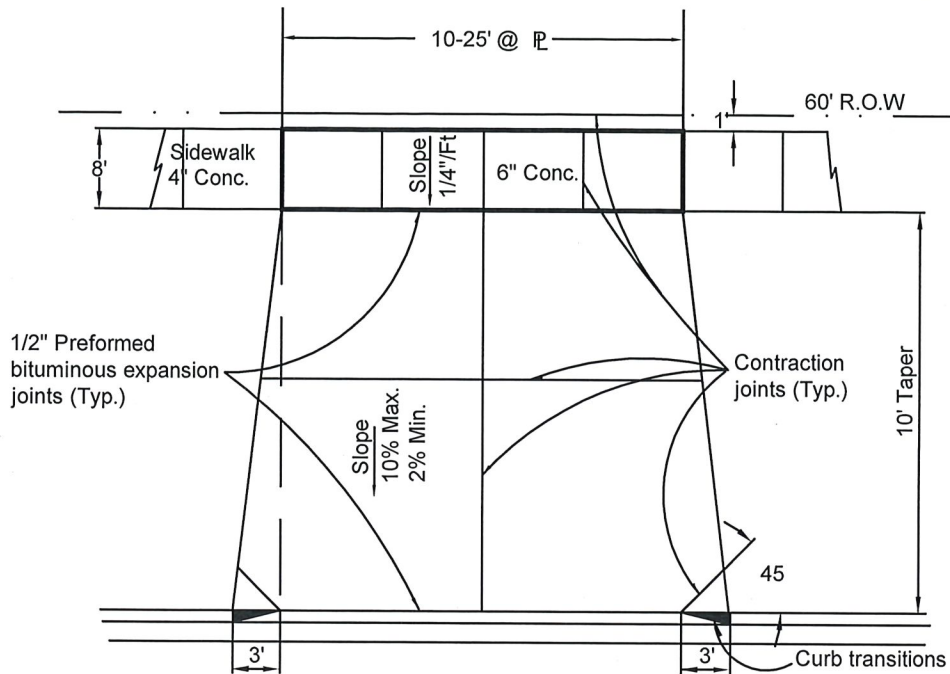


CITY OF ROCHESTER HILLS
STANDARD DETAIL FOR:
Residential Driveway Approach

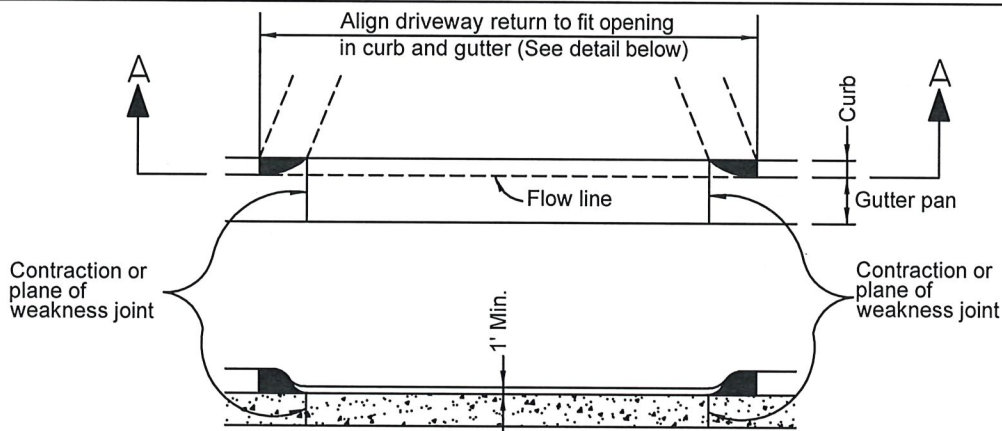


DRAWN BY: B. SMITH	FILE NAME: CIRC DRV	PLAN DATE: 8/28/1996	REV. 4/12/2012	REV. 3/15/2014	REV.
APPROVED BY: PAUL SHUMEJKO, P.E., PTOE CITY TRANSPORTATION ENGINEER					NOT TO SCALE
					SHEET 1 OF 1

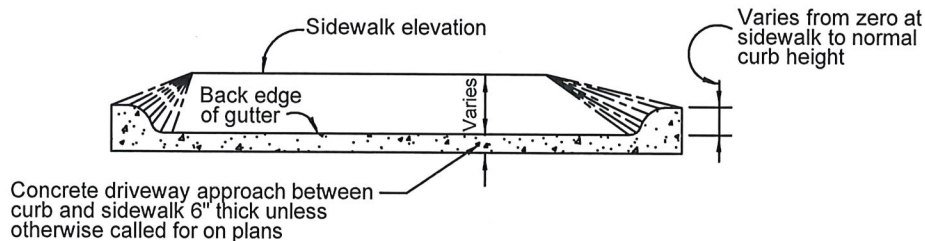
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Plan View



Section A-A
Concrete Driveway Opening - Detail

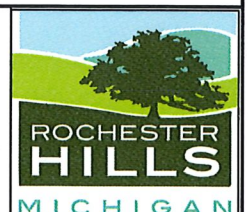


Front View - Driveway

NOTES:

1. Reinforcement is not required unless specified on the plans.
2. When area between curb and gutter and property line is more than 300 sq. ft. cast driveway approach in two or more pours.

CITY OF ROCHESTER HILLS
STANDARD DETAIL FOR:
Residential
Sidewalk/Driveway
Opening and Approach



DRAWN BY:
M RADULSKI

PLAN DATE:
8/28/1996

REV.
7/29/2014

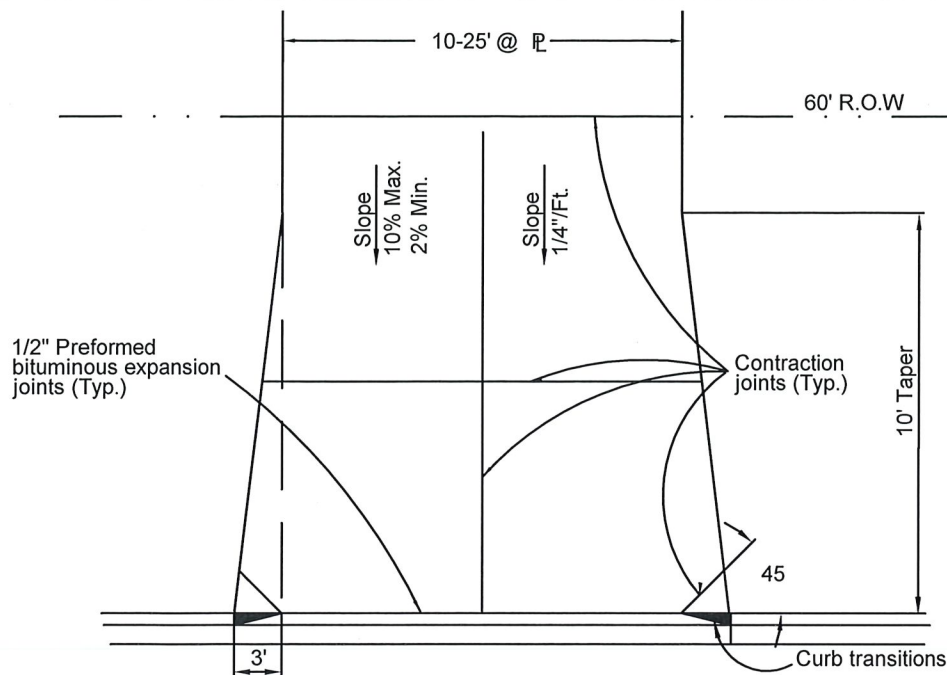
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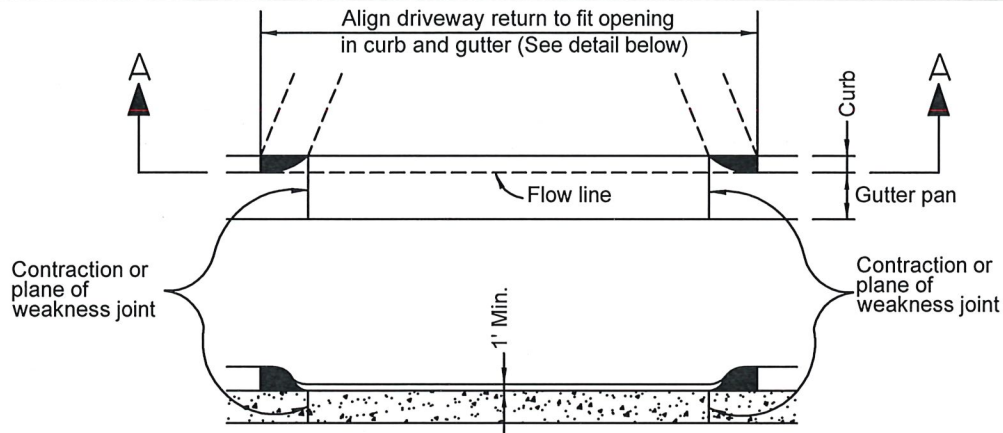
APPROVED BY:
PAUL SHUMEJKO, P.E., PTOE
CITY TRANSPORTATION ENGINEER

NOT TO SCALE

SHEET
1 OF 2

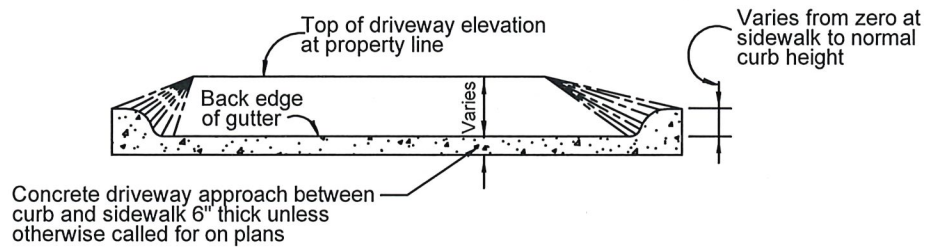


Plan View



Section A-A

Concrete Driveway Opening - Detail



Front View - Driveway

NOTES:

1. Reinforcement is not required unless specified on the plans.
2. When area between curb and gutter and property line is more than 300 sq. ft. cast driveway approach in two or more pours.

CITY OF ROCHESTER HILLS
STANDARD DETAIL FOR:
**Residential Driveway
Opening and Approach**



DRAWN BY:
M RADULSKI

PLAN DATE:
8/28/1996

REV.
7/29/2014

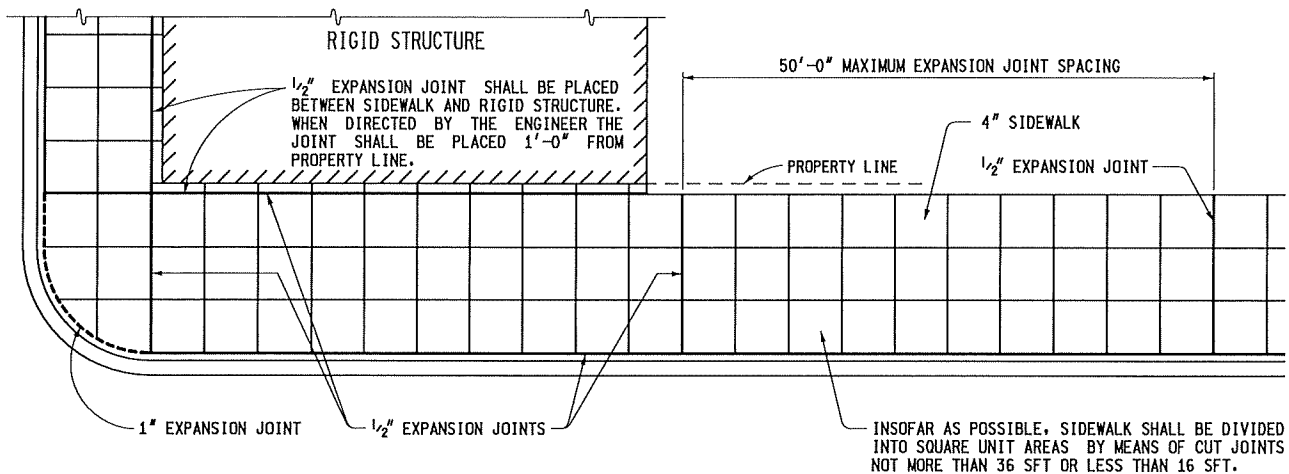
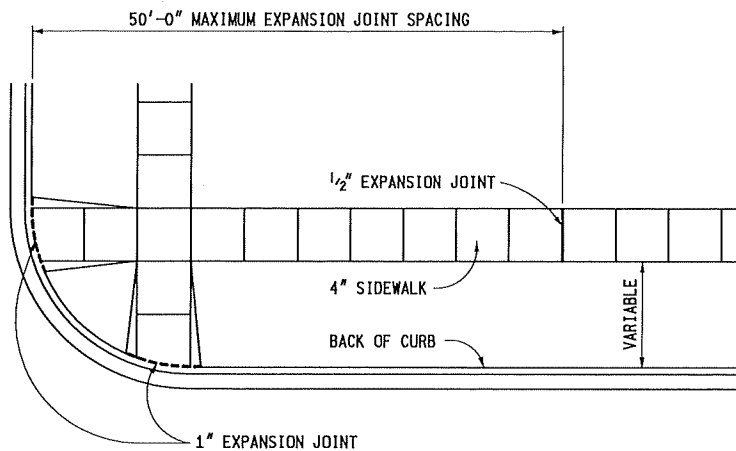
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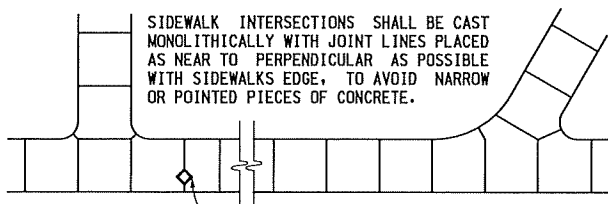
APPROVED BY:
PAUL SHUMAJKO, P.E., PTOE
CITY TRANSPORTATION ENGINEER

NOT TO SCALE

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2 OF 2

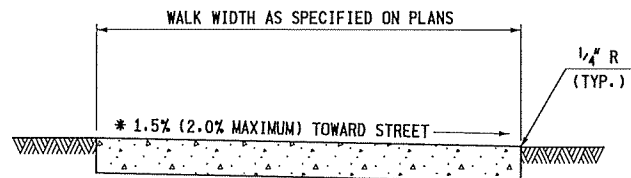


LOCATION OF JOINTS IN CONCRETE SIDEWALK



WHERE A PERMANENT STRUCTURE IS LOCATED IN SIDEWALK, PLACE EXPANSION MATERIAL AROUND STRUCTURE AND ADJUST JOINT PATTERN TO INTERSECT STRUCTURE AS ILLUSTRATED.

TYPICAL SIDEWALK JOINT LAYOUTS



* SEE NOTES

4" CONCRETE SIDEWALK



PREPARED
BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: *Randy C. Piffel*
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: *Mark A. Van Pelt*
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

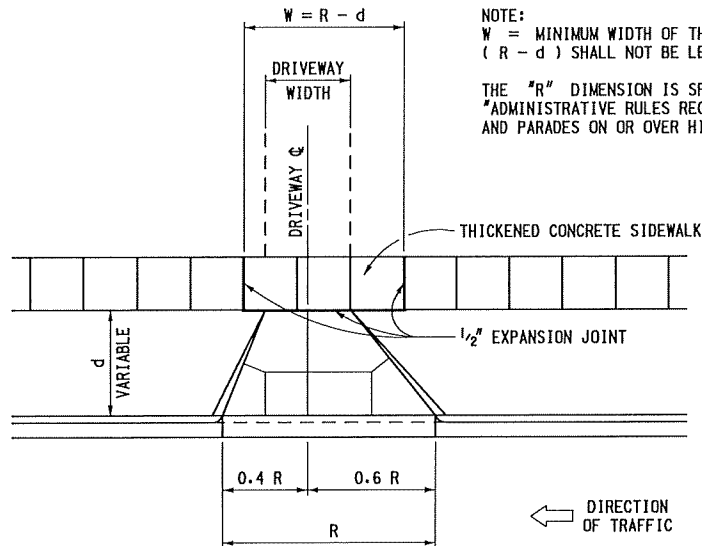
9-30-2014
F.H.W.A. APPROVAL

7-1-2014
PLAN DATE

R-29-I

SHEET
1 OF 4

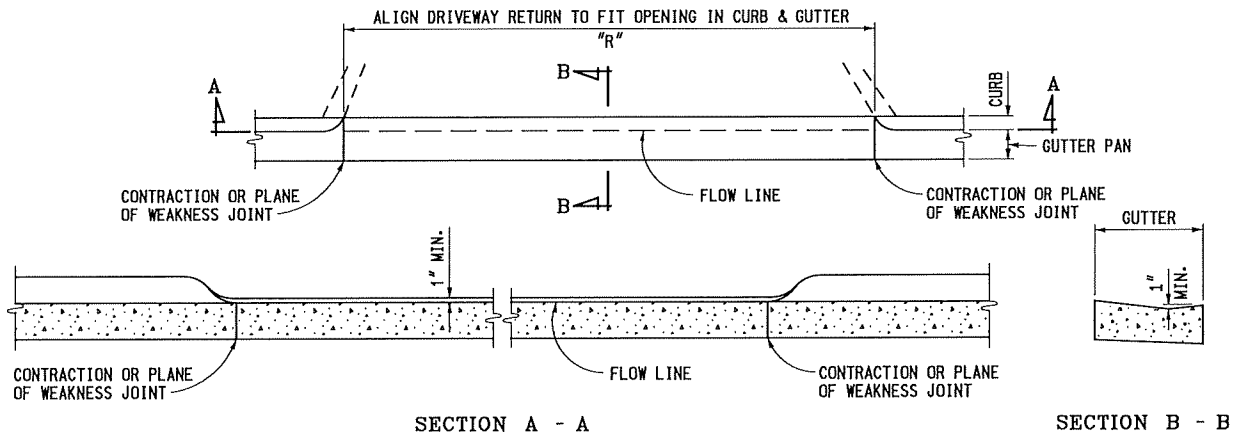
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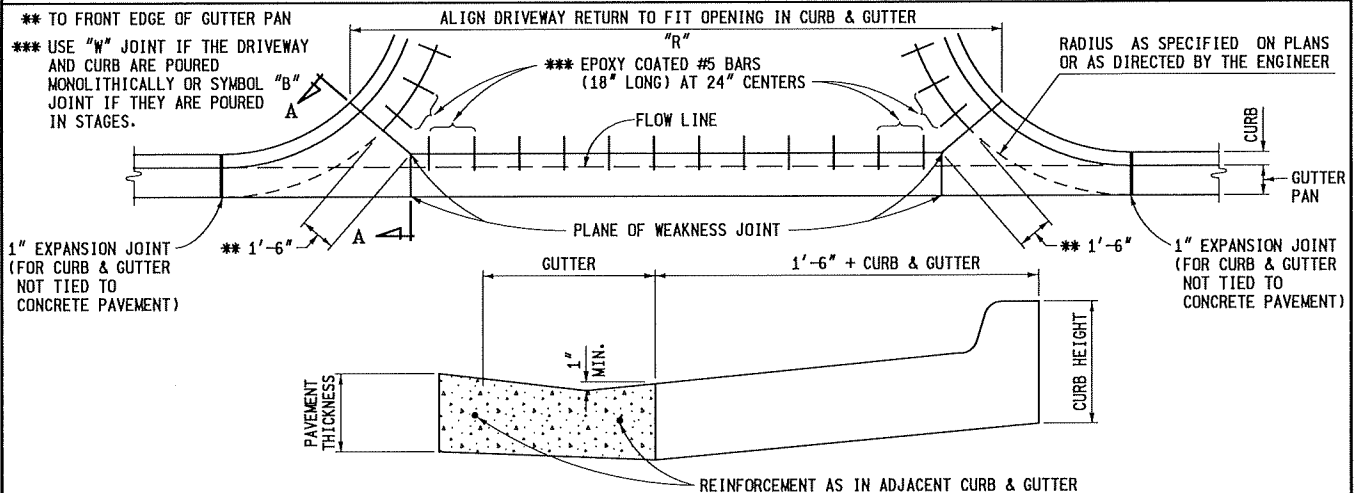
NOTE:
 W = MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK.
 $(R - d)$ SHALL NOT BE LESS THAN DRIVEWAY WIDTH.

THE "R" DIMENSION IS SPECIFIED IN THE PUBLICATION
 "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS
 AND PARADES ON OR OVER HIGHWAYS".

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

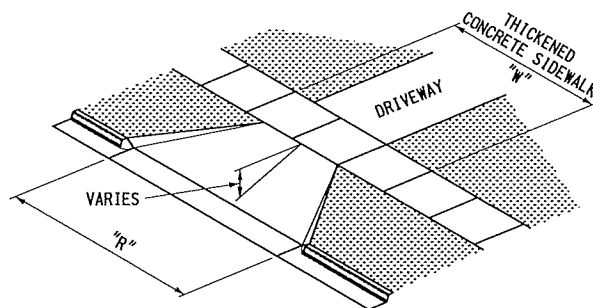
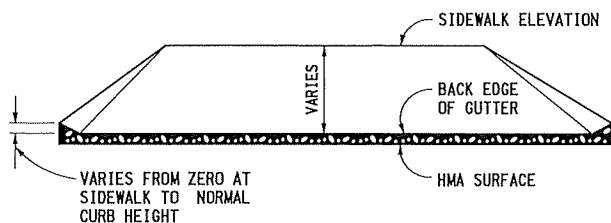
DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

9-30-2014
 F.H.W.A. APPROVAL

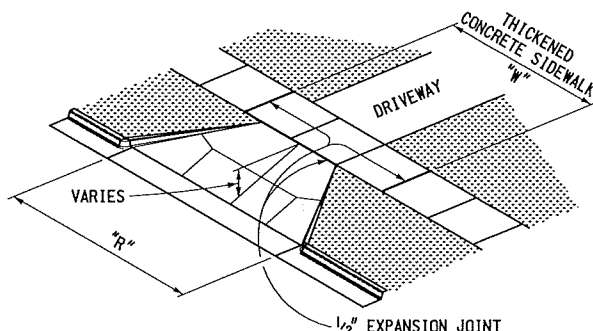
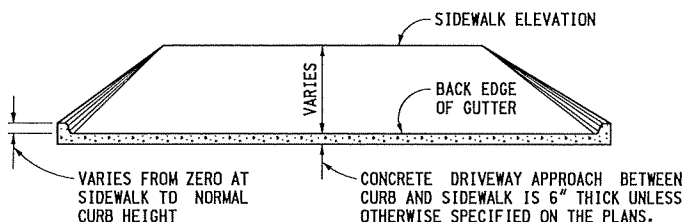
7-1-2014
 PLAN DATE

R-29-I

SHEET
 2 OF 4



HMA DRIVEWAY APPROACH (TO BE USED WITH DETAIL L)

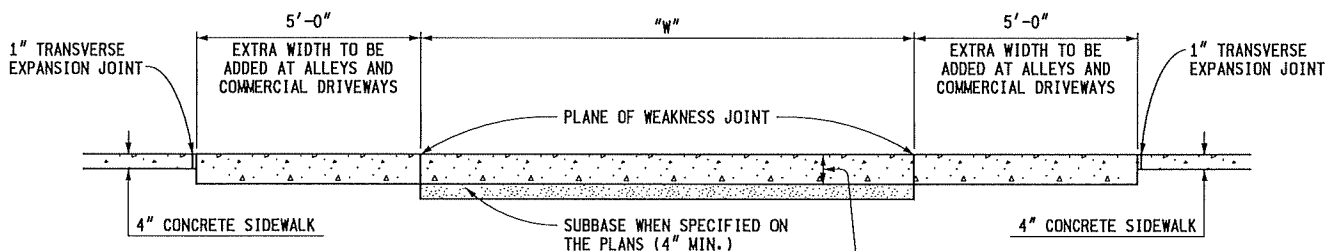


NOTES:

MONOLITHIC CURB IS INCLUDED IN THE CONCRETE DRIVEWAY APPROACH QUANTITY.

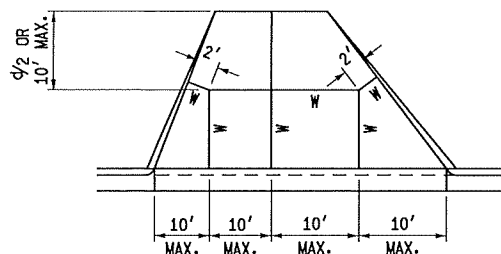
REINFORCEMENT IS NOT REQUIRED UNLESS SPECIFIED ON THE PLANS. WHEN REINFORCEMENT IS SPECIFIED, SEE CHART ON THIS SHEET.

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

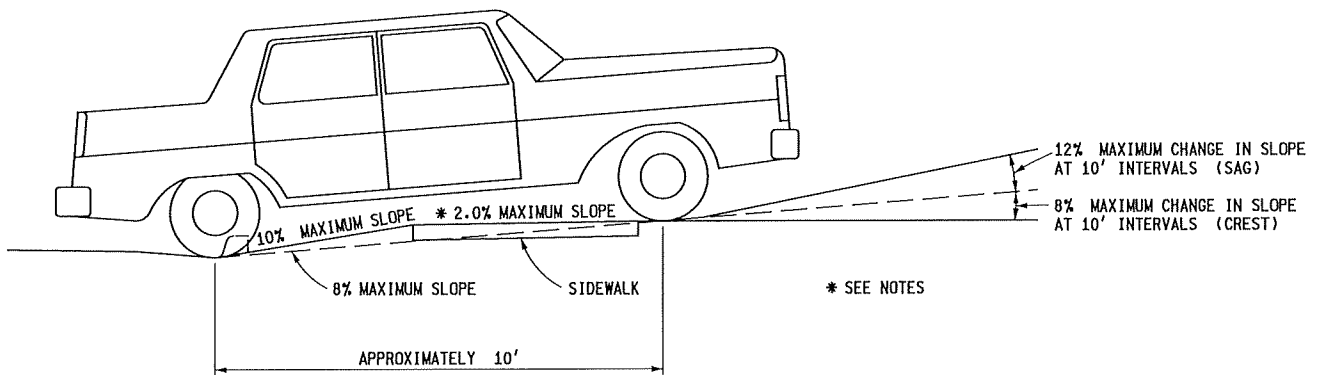
DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

9-30-2014
F.H.W.A. APPROVAL

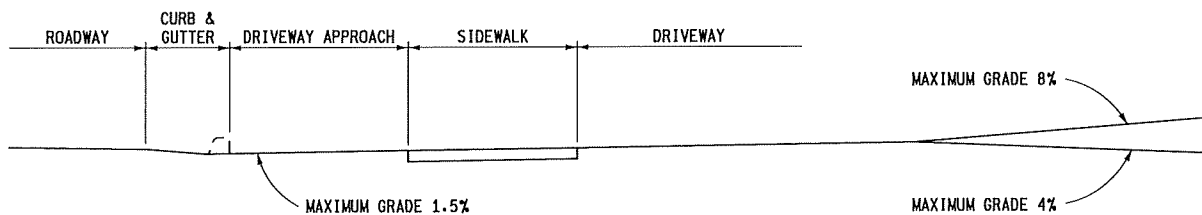
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LOW VOLUME COMMERCIAL OR RESIDENTIAL DRIVEWAY SLOPES



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% (2.0% 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

9-30-2014
F.H.W.A. APPROVAL

7-1-2014
PLAN DATE

R-29-I

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4 OF 4

CITY OF ROCHESTER HILLS
ENGINEERING DESIGN STANDARDS

CHAPTER 8

Driveway Approaches and Drainage Ditches

A. Plans and Specifications – Submittal Procedure

1. The plans and specifications shall be prepared in accordance with Chapter 1, *General Requirements and Submittals*.

B. Requirements for Residential Driveway Approaches

1. Pavement cross-sections shall conform to the following requirements:
 - a. Concrete driveway approaches shall be six inches (6”) 3,500 psi concrete over four inches (4”) 21AA aggregate base coarse materials (crushed limestone or crushed concrete). Alternate recycled asphalt product (RAP) base course materials may be considered upon approval of the City Engineer. Alternate RAP materials must meet equivalent structural strength of 21AA aggregate (crushed limestone or concrete).
 - b. Asphalt driveway approaches shall be six inches (6”) hot mix asphalt (HMA) over four inches (4”) 21AA aggregate base coarse materials (crushed limestone or crushed concrete). Alternate recycled asphalt product (RAP) base course materials may be considered upon approval of the City Engineer. Alternate RAP materials must meet equivalent structural strength of 21AA aggregate (crushed limestone or concrete). The cross-section shall consist of two inches (2”) HMA 13A wearing course over four inches (4”) HMA 3C leveling course (two (2) two inch (2”) lifts).
2. Driveway approach dimensions shall conform to the following requirements:

Garage Size	Approach Width At ROW	<u>Local/Collector</u> Approach Width at Street	Flare Width	<u>Major Street</u> Approach Width at Street	Radius
1 Car	12 Ft	18 Ft	3 Ft	32 Ft	10 Ft
	13 Ft	19 Ft	3 Ft	33 Ft	10 Ft
	14 Ft	20 Ft	3 Ft	34 Ft	10 Ft
	15 Ft	21 Ft	3 Ft	35 Ft	10 Ft
2 or More Cars	16 Ft	22 Ft	3 Ft	36 Ft	5 Ft to 10 Ft
	18 Ft	24 Ft	3 Ft	36 Ft	5 Ft to 10 Ft
	20 Ft	25 Ft	2.5 Ft	36 Ft	5 Ft to 10 Ft
	22 Ft	25 Ft	1.5 Ft	36 Ft	5 Ft to 10 Ft
	24 Ft	25 Ft	0.5 Ft	36 Ft	5 Ft to 10 Ft
	25 Ft	25 Ft	0.0 Ft	36 Ft	5 Ft to 10 Ft

3. Circular Driveways

- a. The property shall have a minimum of eighty feet (80') of road frontage.
 - b. The minimum spacing between driveway approaches shall be forty-five feet (45') from centerline to centerline.
 - c. Entering driveway approach angle from street shall be ninety degrees (90°).
4. Proposed driveways shall be shown with grades called out at the house and at the street. Driveway slopes shall be shown in percent (%). The minimum allowable slope is two percent (2%) with maximum allowable slopes of eight percent (8%) along roads with posted speed limits of 40 MPH or greater and ten percent (10%) along roads with a posted speed limit of 35 MPH or less. Note: driveway slopes shall not exceed two percent (2%) through the portion of the driveway that is to be utilized for existing and/or proposed pedestrian facilities, i.e., pathways and sidewalks, in order to meet American with Disabilities Act (ADA) requirements.
5. Additional requirements shall be in accordance with the City Standard Details.

C. Requirements for Commercial Driveway Approaches

1. Pavement cross-sections shall conform to the following requirements:
 - a. Concrete driveway approaches shall be eight inches (8") 3,500 psi concrete over four inches (4") 21AA aggregate base coarse materials (crushed limestone or crushed concrete). Alternate recycled asphalt product (RAP) base course materials may be considered upon approval of the City Engineer. Alternate RAP materials must meet equivalent structural strength of 21AA aggregate (crushed limestone or concrete).
 - b. Asphalt driveway approaches shall be nine inches (9") hot mix asphalt (HMA) over six inches (6") 21AA aggregate base coarse materials (crushed limestone or crushed concrete). Alternate recycled asphalt product (RAP) base course materials may be considered upon approval of the City Engineer. Alternate RAP materials must meet equivalent structural strength of 21AA aggregate (crushed limestone or concrete). The cross-section shall consist of two inches (2") HMA 13A wearing course over two inches (2") HMA 3C leveling course over five inches (5") HMA base course two (2) two inch (2") lifts.
2. Driveway locations and geometrics shall at a minimum meet the Road Commission for Oakland County (RCOC) *Permit Rules, Specifications & Guidelines*, Michigan Department of Transportation (MDOT) *Administrative Rules Regulating Driveways Banners & Parades*, and MDOT *Access Management Guidebook*. City requirements may exceed those of RCOC and MDOT.
3. Driveway grades shall not exceed six percent (6%) within the right-of-way. Note: driveway slopes shall not exceed two percent (2%) through the portion of the driveway that is to be utilized for existing and/or proposed pedestrian facilities, i.e., pathways and sidewalks, in order to meet American with Disabilities Act (ADA) requirements.
4. Additional requirements shall be in accordance with the City Standard Details.

D. Drive Culverts and Drainage Ditches

1. Drive culverts shall meet the following requirements:
 - a. Minimum of twelve inches (12") in diameter.
 - b. Material shall be sixteen (16) Gauge Galvanized Corrugated Metal Pipe (CMP).
 - c. A minimum of one foot (1') of cover must be provided between top of culvert pipe and top of driveway pavement.
 - d. The culvert shall extend a minimum of three feet (3') beyond driveway width and shall meet the minimum side slopes of 1 on 2 for local streets, and 1 on 3 for major roads.
2. Ditches shall meet the following requirements:
 - a. The maximum ditch depth shall be two feet (2') from bottom of centerline of ditch to top of road pavement.
 - b. The maximum roadside ditch slope shall be 1 on 4.
 - c. The maximum property side ditch slope shall be 1 on 3.
3. Ditch-enclosures shall meet the following requirements:
 - a. The minimum depth required for enclosure is two and a half feet (2.5') from the top of road pavement to bottom of ditch centerline.