

NO PASSING ZONES



MnDOT 2008

Office of Traffic Safety and
Operations

WEB BASED DOCUMENTS

■ TEM CHAPTER 7 (136 changes for 2008)

■ NPZ WORKBOOK

■ MnMUTCD

■ STANDARD PLAN SHEETS 5-297.341 &
.342

Minn. Statute 169.18

- No passing if drivers view is obstructed for 700 feet when approaching a crest or curve
- No passing within 100 ft of underpass, tunnel, RR Xing, city intersection, or rural intersection if marked with a warning sign.
- No passing where marked with a sign or a distinctive centerline

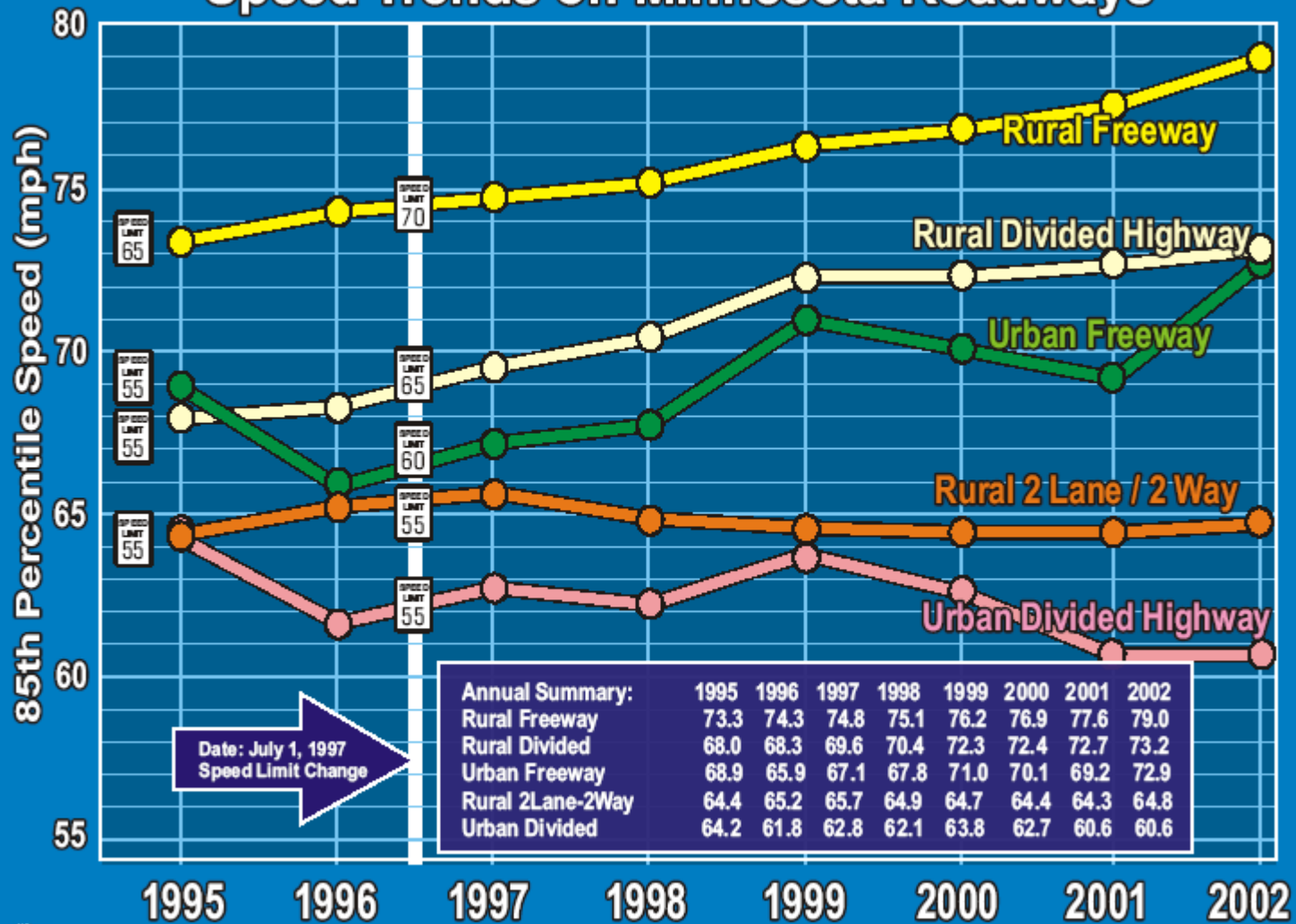
MNMUTCD

- Centerline markings required at 6000+ ADT and min. 20 foot width road or 3+ lanes.
- IF CENTERLINES EXIST, NPZ's MUST BE INSTALLED AT :
- Lane reductions, RR xing, vertical and horizontal curves not meeting min. PSD, three lane sections, undivided 4 lanes, center turn lanes or painted medians.

MNMUTCD

85th Percentile or Posted or Statutory speed mph		Minimum Passing Sight Distance	
km/h	mph	meters	feet
40	25	140	450
50	30	160	500
60	35	180	550
60	40	180	600
70	45	210	700
80	50	245	800
90	55	280	900
100	60	320	1000
110	65	355	1100
120	70	395	1200

Speed Trends on Minnesota Roadways



TYPICAL SPEED PROFILE

- 85TH %TILE IS 64 mph ON STATE AID HIGHWAY DESIGNS (6 FT SHOULDER)
- WHAT IS 85TH ON 4 FT SHOULDER ?
- WHAT IS 85TH ON 2 FT SHOULDER?
- WHAT IS 85TH ON ZERO FT SHOULDER?

TEM CHART 7-3

85th Percentile Speed MPH (KM/H)	Minimum Sight Distance	
	Meters	Feet
30 (50) or less	155	500
31-40 (51-60)	185	600
41-50 (61-80)	245	800
51-60 (81-100)	305	1,000
61 (101) or greater	335	1,100

Text Ref.: 7-4.06.01

July 1, 1991

MINIMUM PASSING SIGHT DISTANCE

CHART
7-3

Zone Length

■ MINIMUM LENGTH OF NPZ IN ADVANCE OF STOP SIGN Chart 7-2 (SL OR 85TH)

0 – 35 MPH 300 FT (100 yards)

40 – 50 MPH 400 FT (133 yards)

55 + MPH 500 FT (167 yards)

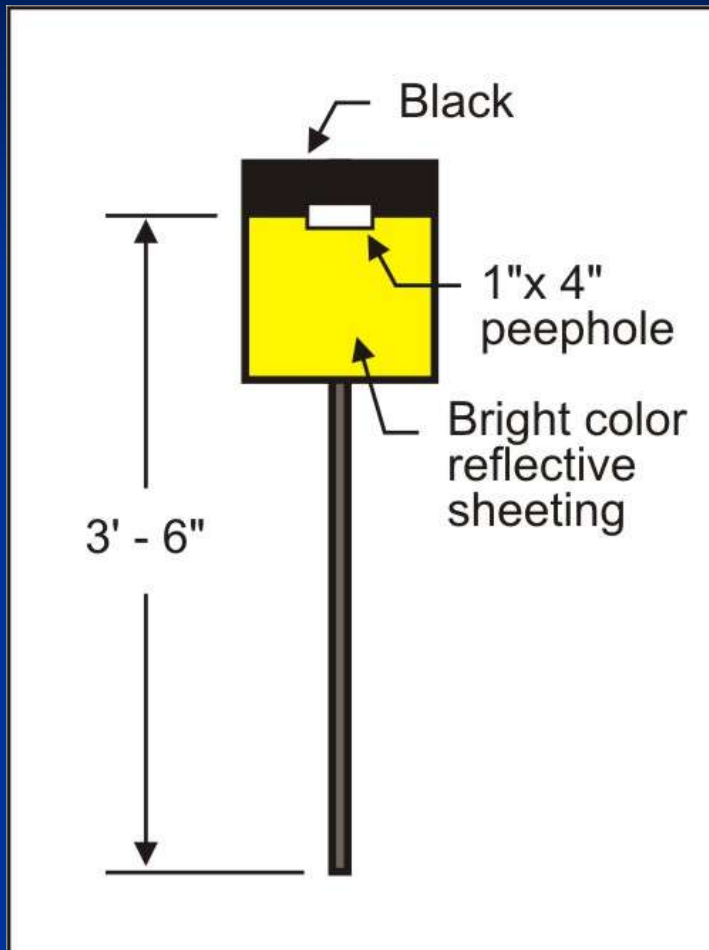
■ RR Xing - MnMUTCD Table 2 C-4

■ All other NPZ must be Min. 500 ft.

■ Other Lengths shown in TEM Chap. 7

■ Resurvey – sign should be within 100 ft

Height of Eye



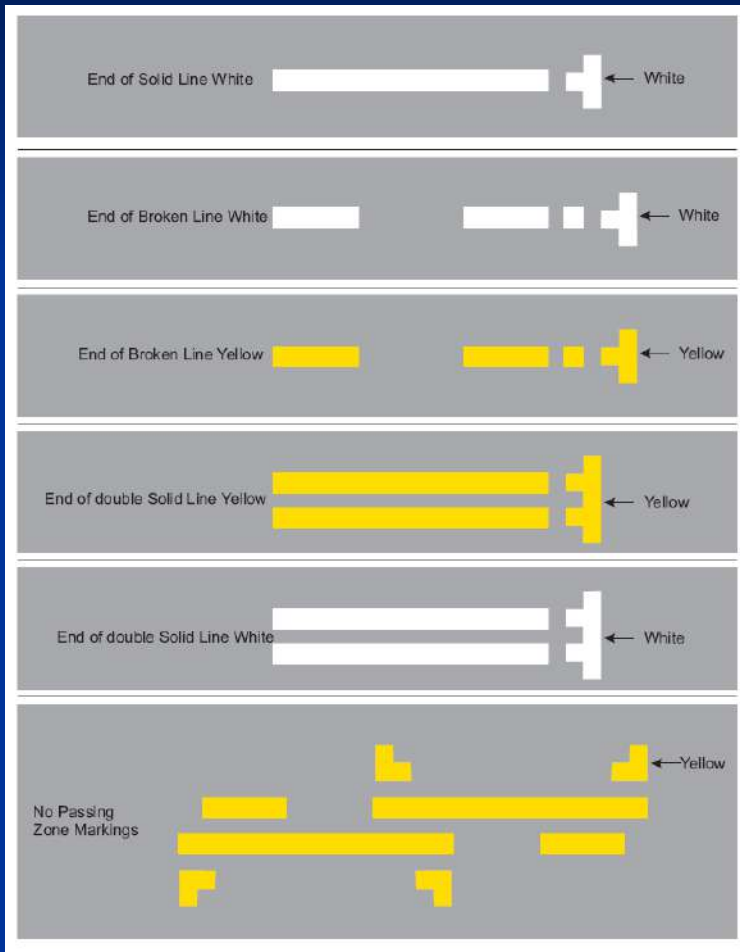
- Approx. 1 foot square or larger target
- Reflectivity helps rangefinder
- Dual purpose as a target if telspar is used
- 4 inch LED from an arrowboard for target

WORK ZONE FIELD GUIDE



- Mobile Operation
- Low ADT day
- Layout 5
- Layout 2 with Adv. Sign
- Geometry or no shoulders will require higher level WZ and coordination with maintenance area.

MARKINGS



■ YELLOW PAINT

■ SAME WIDTH 4''

■ TAPE WORKS WELL
ESPECIALLY FOR
GAP SELECTION

SOLID LINES

- DO NOT PAINT thru public access intersections – especially in rural areas.
- 50 foot accuracy window allows for adjustment at public access intersections.
- DO paint thru private drives and business driveways.

ITE 2001 TCD HANDBOOK

- Eyeball method
- Walking Method
- Towed target method
- Two vehicle method
- Computer Aid DMI
- One vehicle method
- New Jersey cone
- New Jersey cone
- Video-log method
- Laser Rangefinder
- Optical Rangefinder
- Speed/Distance formula
- New technology with vehicle mounted lasers and GPS

EQUIPMENT

- 2 VEHICLES (ONE SEDAN)
- DMI IN EACH VEHICLE
- HEIGHT-OF-EYE PADDLES
- TARGET ON THE BACK OF LEAD VEH.
MOUNTED ON THE LEFT REAR SIDE
- HANDHELD TWO WAY RADIOS
- RANGEFINDER
- SPRAY PAINT OR YELLOW TAPE
- DISTANCE CHARTS AND FORMS

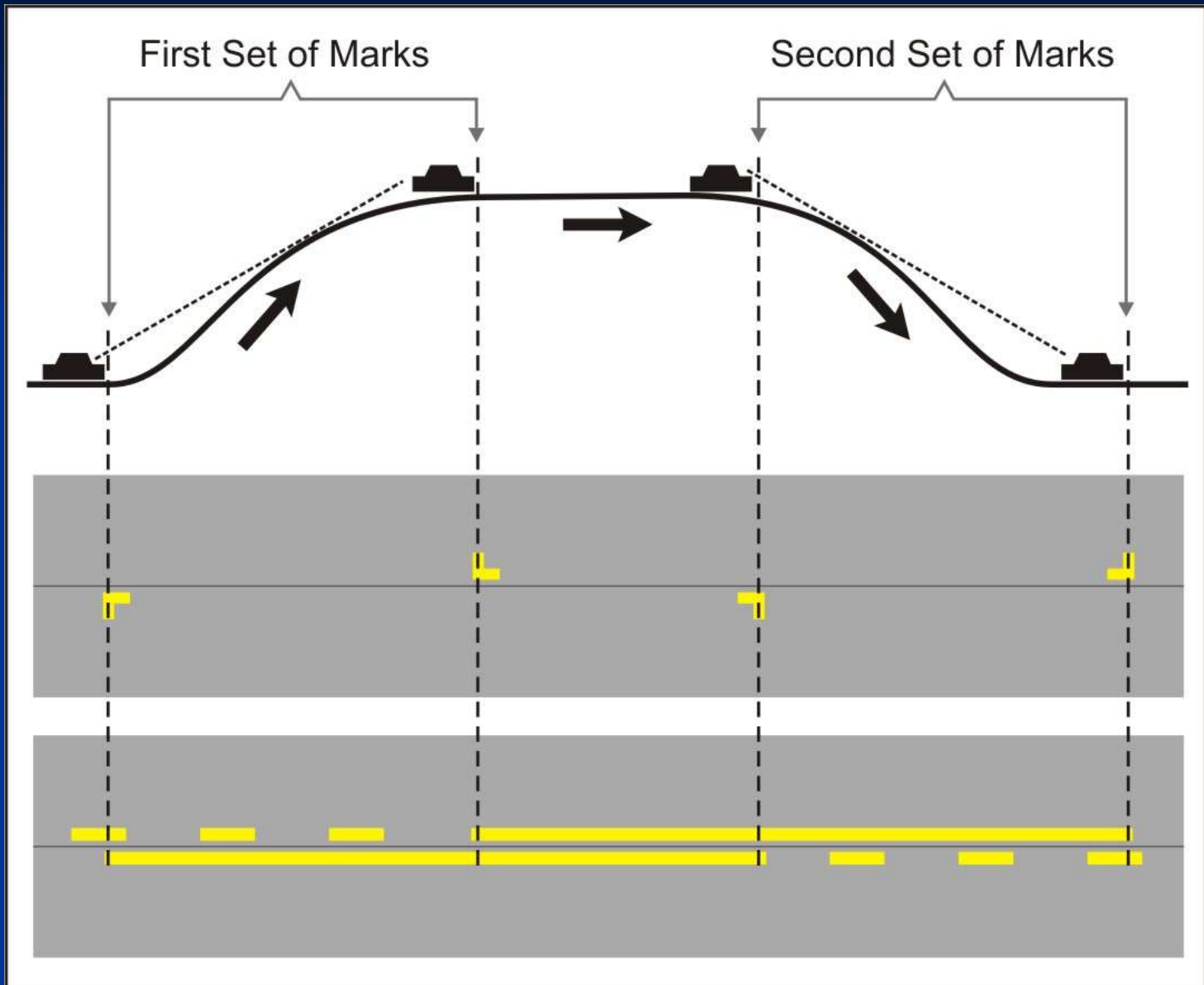
CALIBRATE DMI

- Check tire pressure
- Park cars side by side
- Zero out DMI
- Lead car moves forward to PSD for the speed limit Chart 7-3
- Lead car Zeros-out again – now synched
- Verify if DMI has reverse capability
- Drive together using radio to call out distance

PROCESS

- Vert. Curves can be done from shoulder
- Move slowly ahead until lead vehicle begins to get out of sight .
- Radio – Stop both at synched DMI reading
- Advance in short intervals until target is gone.
- Lead veh. Marks to the left of CL for the end of NPZ for opposing traffic
- Trailing veh. Marks to the right for the beginning of NPZ for same direction traffic.

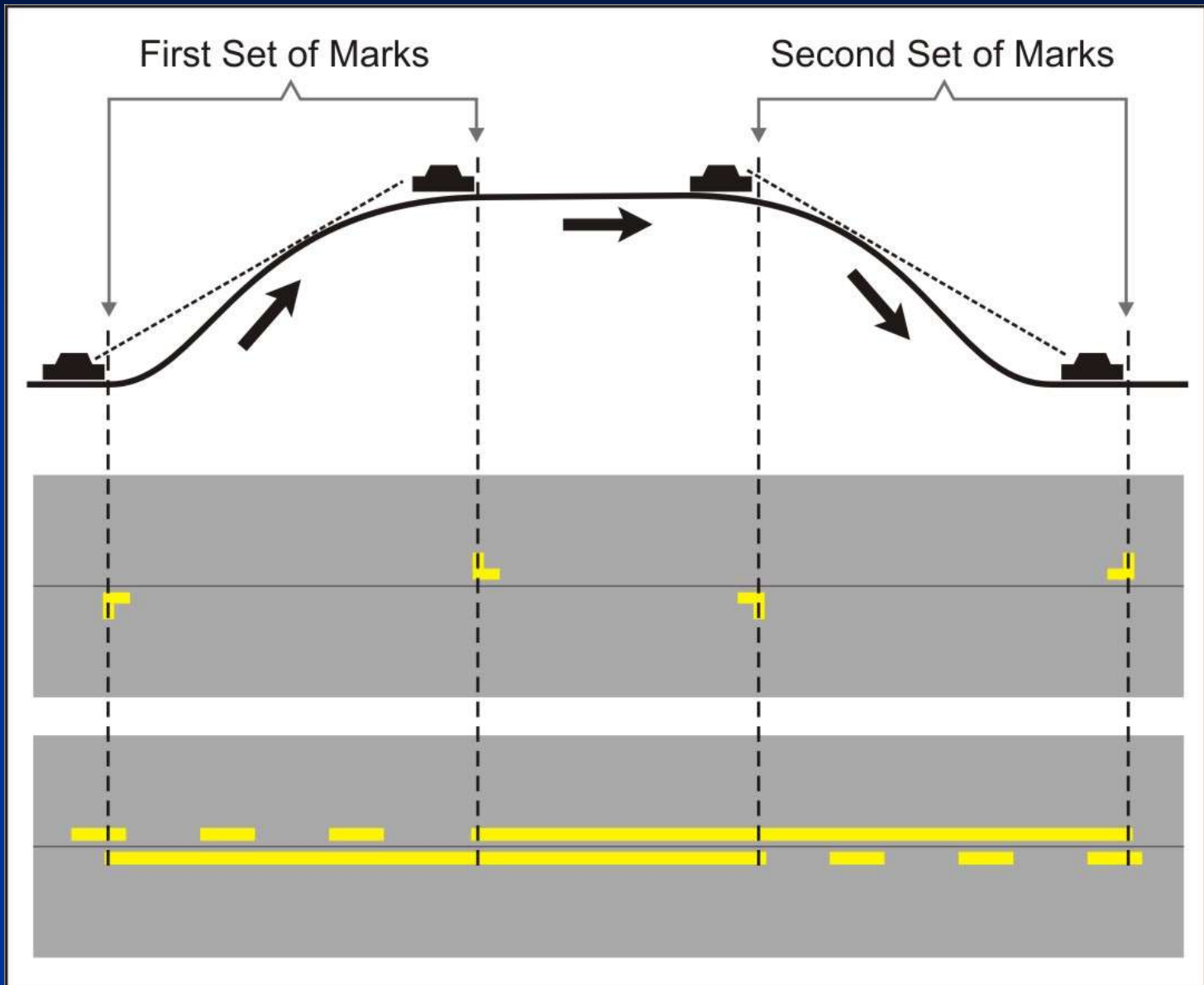
PROCESS



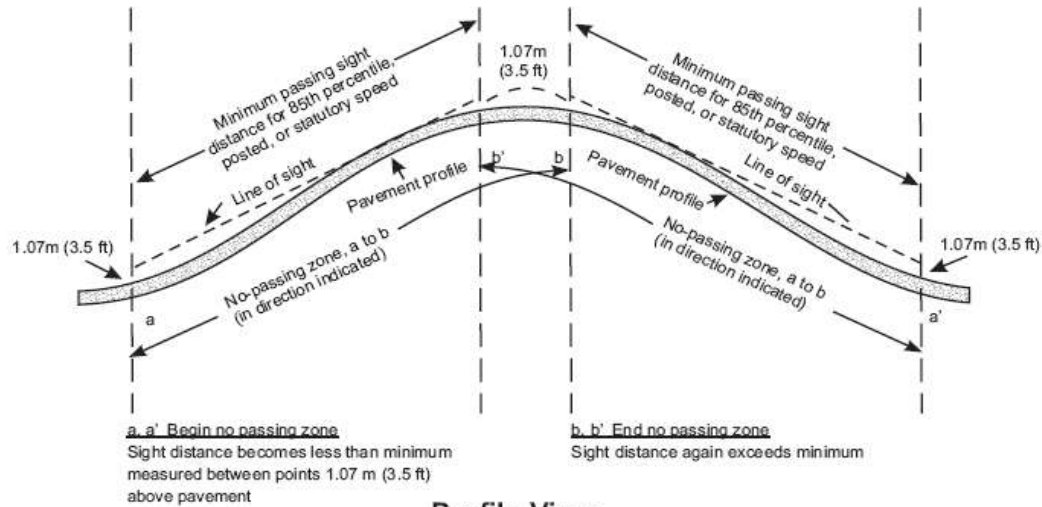
PROCESS cont'd

- Vehicles again proceed forward until trailing veh. Sees roof of lead veh.
- Radio - Stop both at synched DMI reading
- Advance in short intervals until target is visible
- Lead veh. Marks to the left of CL for the beginning of NPZ for opposing traffic
- Trailing veh. Marks the right side for end of NPZ for same direction traffic.

PROCESS



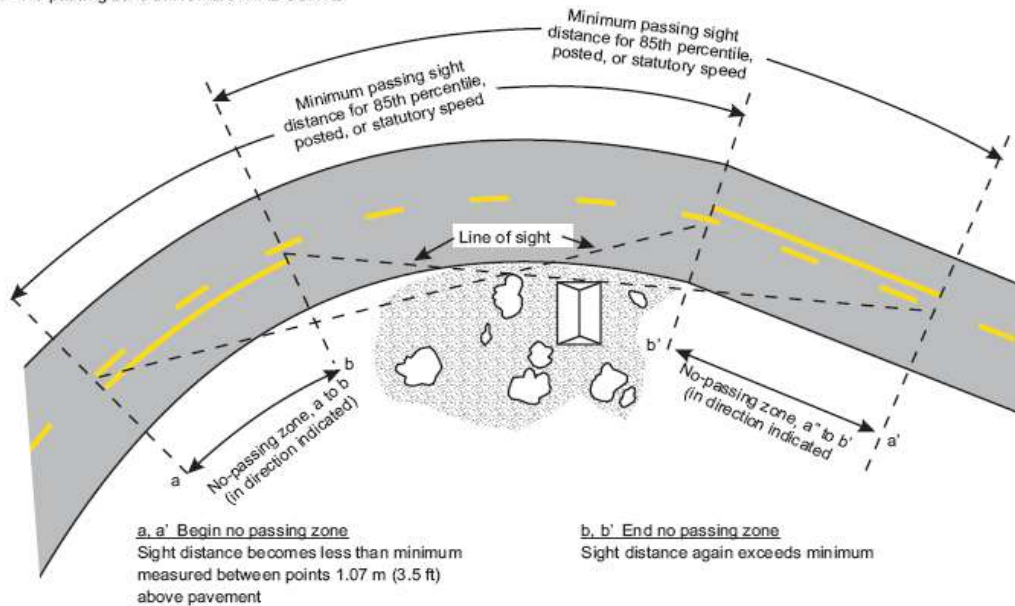
a - No-passing zone at VERTICAL CURVE



Profile View

NOTE: No-passing zones in opposite directions may or may not overlap, depending on alignment.

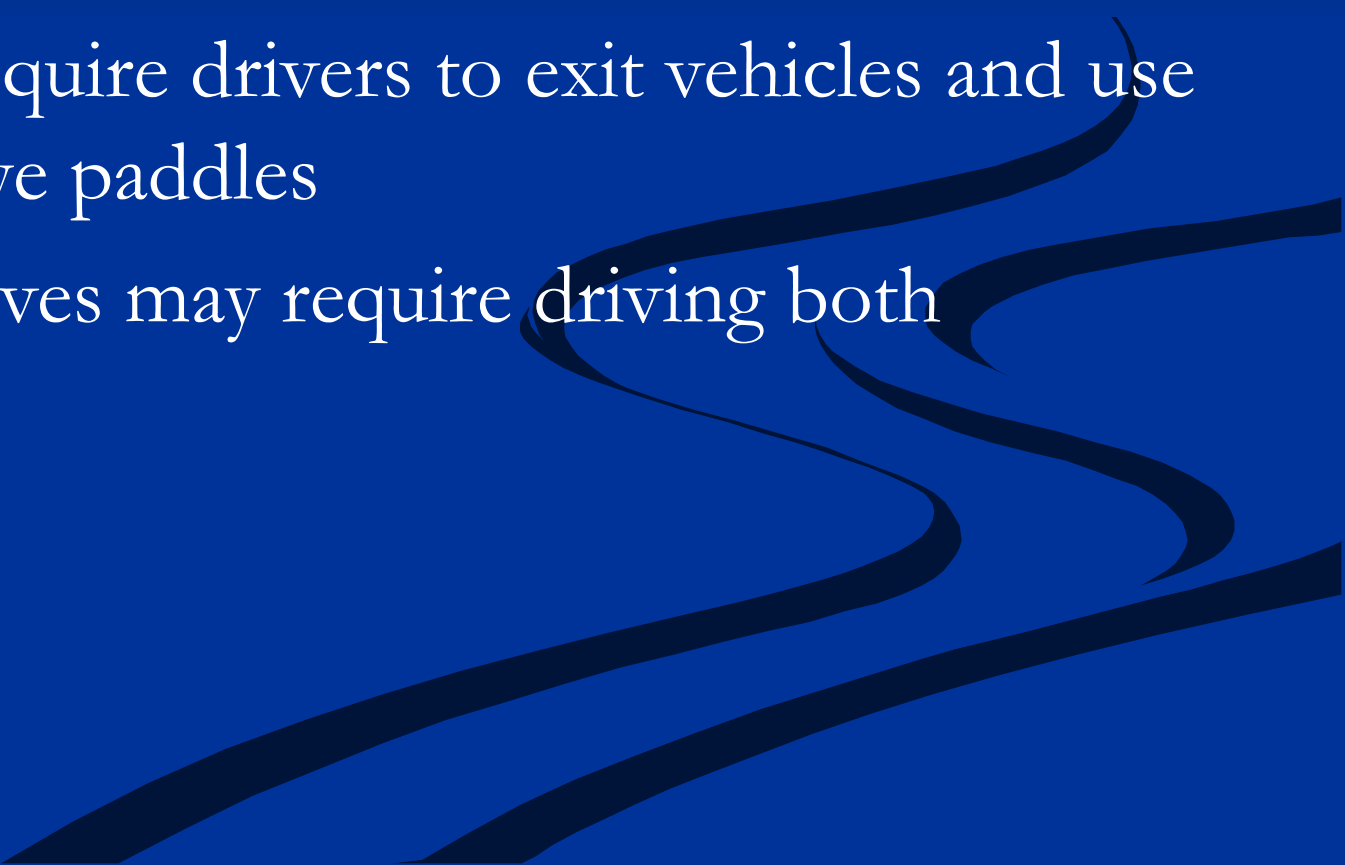
b - No-passing zone at HORIZONTAL CURVE



Plan View

NOTE: No-passing zones in opposite directions may or may not overlap, depending on alignment.

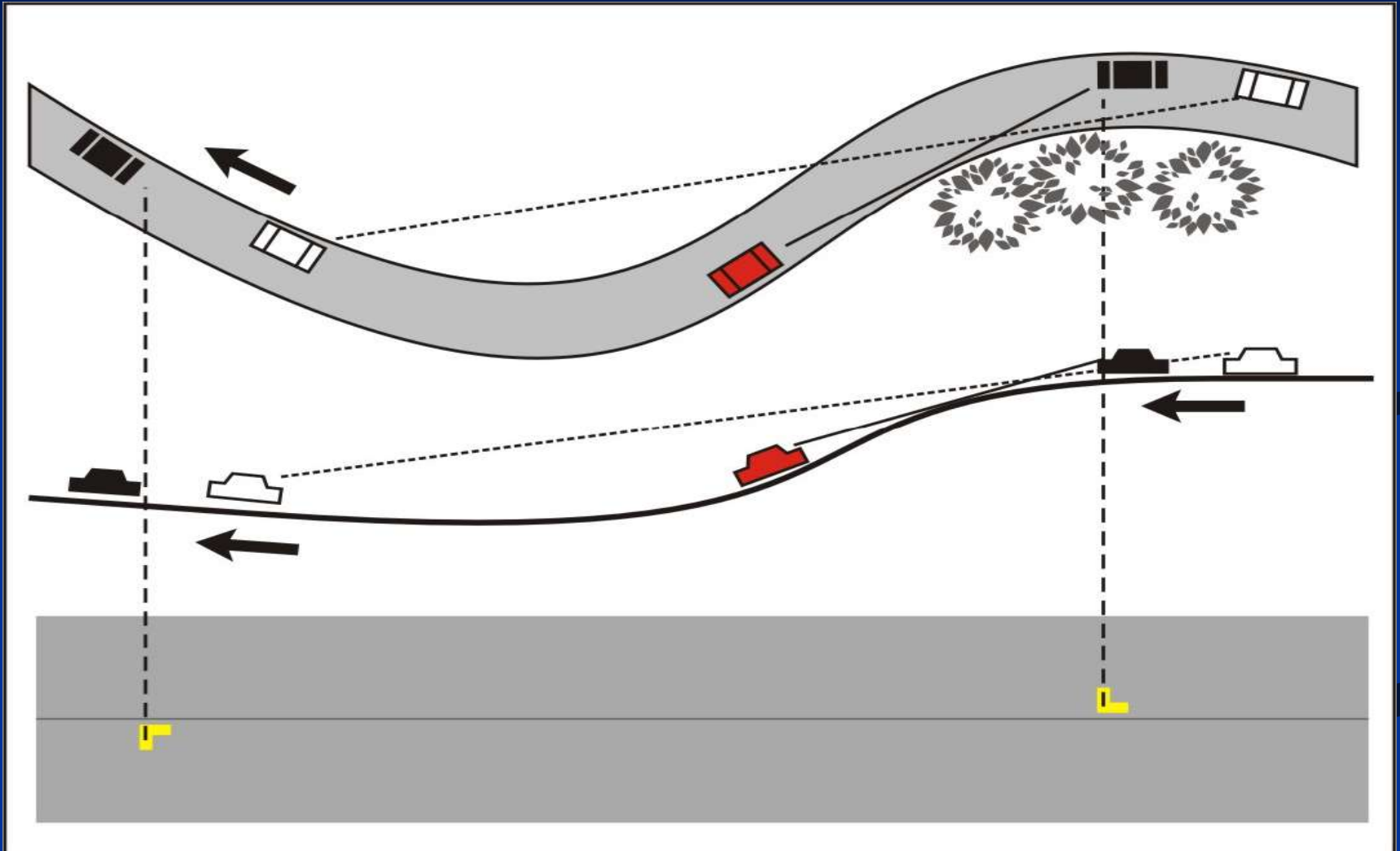
HORIZONTAL CURVES

- Centerline or left wheel path should be used for target sight distance.
 - This may require drivers to exit vehicles and use height-of-eye paddles
 - Reverse curves may require driving both directions
- 

LOST VEHICLES

- Typically happens in multiple curve or hill geometry
- Minimums PSD can be measured but view of vehicles are obstructed in the middle
- On low ADT roads - Lead vehicle may have to be used as oncoming traffic target
- Typically sighting of both headlights of oncoming traffic will suffice

LOST VEHICLES



SPEED LIMIT CHANGES

- PSD should be changed when speed limit changes
- Re-set DMI
- Speed limit change can happen in the middle of a NPZ
- Use the longer of two PSD if any doubt
- Drive both directions.

MINIMUM LENGTHS

- 500 FT MIN. - ADD TO THE BEGINNING
- CHART 7-2
- CHART 7-4

	85th Percentile Speed	Distance Between Zones	
	MPH (KM/H)	Meters	Feet
	20-39 (30-59)	159	500
	40-54 (60-89)	200	650
	55 (90) and above	245	800

Text Ref.: 7-4.06.01

July 1, 1991	MINIMUM DISTANCE OR GAP BETWEEN NO PASSING ZONES	CHART 7-4
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RANGEFINDERS

- BUSHNELL 1500
- 1500 YARDS ON REFLECTIVE TARGET
- 1000 YARDS ON POLE OR TREE
- 500 YARDS ON A DEER OR BODY.
- + / - 1 YARD ACCURACY




CLOSING GAPS

- NPZ ZONE ENDS AT 1300 FT FROM STOP SIGN – DO YOU STOP OR CONTINUE THE ZONE ?
- Chart 7-2 and Chart 7-4
- In a 55 MPH zone: Chart 7-2 = 500 ft and Chart 7-4 equals 800 ft.
- $167 \text{ yrds} + 267 \text{ yrds} = 434 \text{ yrds}$
- YES – continue the zone – don't end it.

NPZ TOO SHORT

- NEW – 2 second EXEMPTION
- If the target vehicle is not completely out of sight for 2 seconds , the zone can be ignored.
- 1MPH = 1.467 FEET/SEC.
- 30 MPH = 44 FT/SEC. X 2 = 88 FEET
- 55 MPH = 81 FT/SEC. X 2 = 162 FEET

ENVIRONMENT

- CHECK EXEMPTION ENVIRONMENT
 - Continuous curves
 - Hidden driveways in the 2 sec. area
 - Add distance to beginning of NPZ to meet minimum 500 foot mi
- 
- A decorative graphic consisting of several thick, dark blue, wavy lines that sweep across the bottom right portion of the slide, creating a sense of motion and depth.

CHECK EXEMPTION ENVIRONMENT

162 FEET



RECOMMEND NPZ for the FULL LENGTH

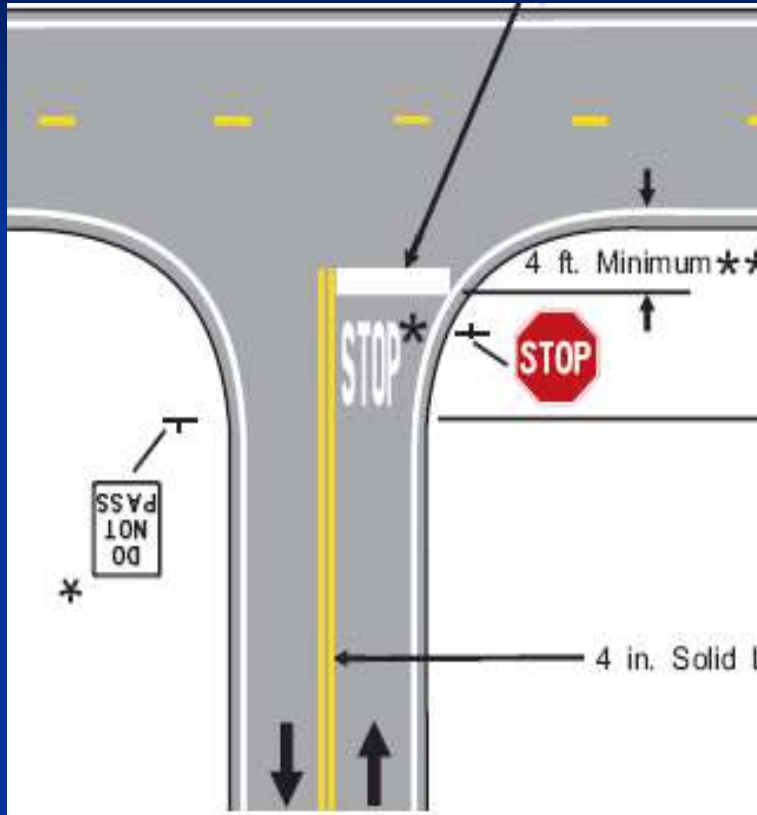
REMOVAL OF SIGHT OBSTRUCTION

- Request Maintenance Area to remove minor sight obstructions on the R/W.
- Request needs to include location and nature of sight obstruction.
- Request should be limited to the work needed to avoid extending a no passing zone.

SIGNING


- 48 X 60 Pennant W 14-3
- **Optional** for STOP controlled intersections, simple RR xing, roundabouts, and school crosswalks
- **Required** for sight obstruction, lane transitions, RR xing with stopping lane, narrow bridge and truck climbing lane

DO NOT PASS



- OPTIONAL
- BACK-TO-TO-BACK WITH STOP SIGNS MUST BE ELIMINATED BY 12/22/2013
- END ZONE - **PASS WITH CARE**

NPZ TERMINAL MARKER

- IF THERE ARE NO SHOULDERS OR CHALLENGING GEOMETRY, A YELLOW POST ON THE BACKSLOPE IS RECOMMENDED.
 - STICKERS AVAILABLE FROM SIGN SHOP.
- 
- The slide features decorative wavy lines in the bottom right corner, consisting of several thick, dark blue, curved bands that sweep across the page.

BREAK

■ QUESTIONS ????????



OTHER STATES

- AZ – Min Gap is 400 ft – no speed difference
- NPZ length is always min. 500 ft.
- Out of sight for 150 ft. – no speed difference
- Urban stop sign 100 ft - Rural 500 ft.
- 3.5 ft eye height to 4.25 ft. object height

IOWA - CTRE

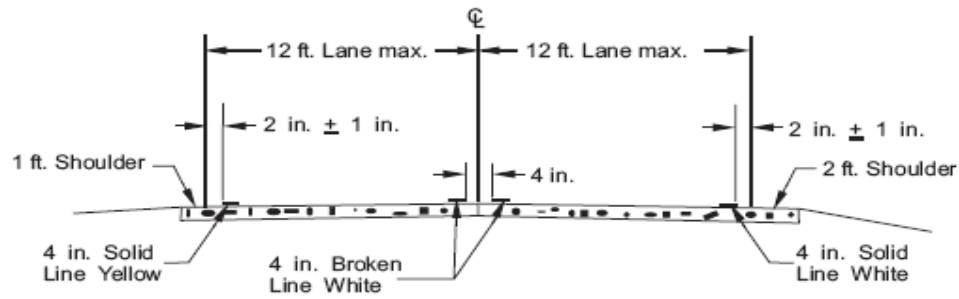
- 3.5 FT TO 3.5 FT HEIGHT – BUT add 100 feet to beginning of NPZ after survey
- Min. length is based on speed – Only 200 feet at 25 MPH and 500 feet at 55 MPH.
- Gap is always 400 feet – no speed difference
- Stop condition – 600 feet – connect zones at 300 ft gap.
- Only 300 ft in advance of narrow bridge.

FLORIDA

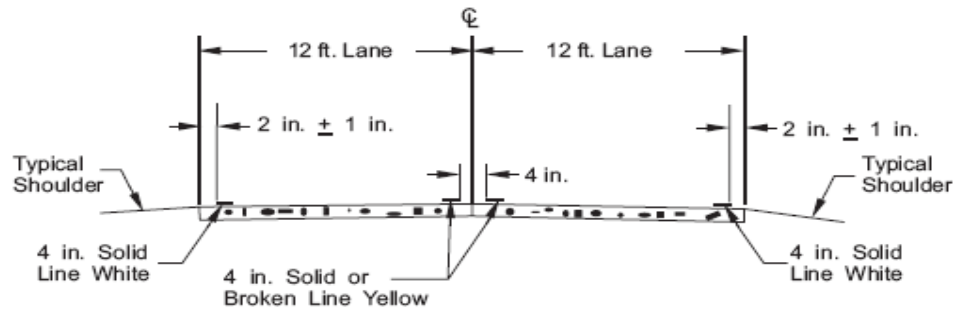
- 3.5 ft to 3.5 ft height
- 500 FT Min. length, 400 foot gap
- Stop condition – based on speed out to 850 feet at 55 MPH condition
- Only 100 ft in advance of narrow bridge

WISCONSIN

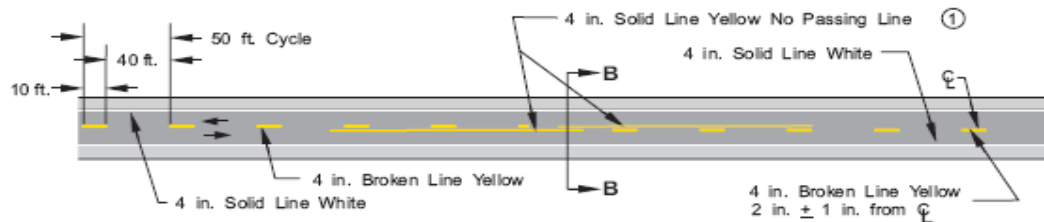
- 3.5 FT to 3.5 FT Height
- Min length is 500 ft. Gaps are based on speed from 528 ft at 40 MPH to 792 ft at 55 MPH.
- 500 FT in advance of stop conditions
- Variable PSD not based on MUTCD
- Survey Crew uses a THIS VEHICLE MAKES FREQUENT STOPS warning sign on the car.



SECTION B-B
(27 ft. roadway)



SECTION B-B
(24 ft. roadway)



① Contact traffic engineer for No Passing Survey

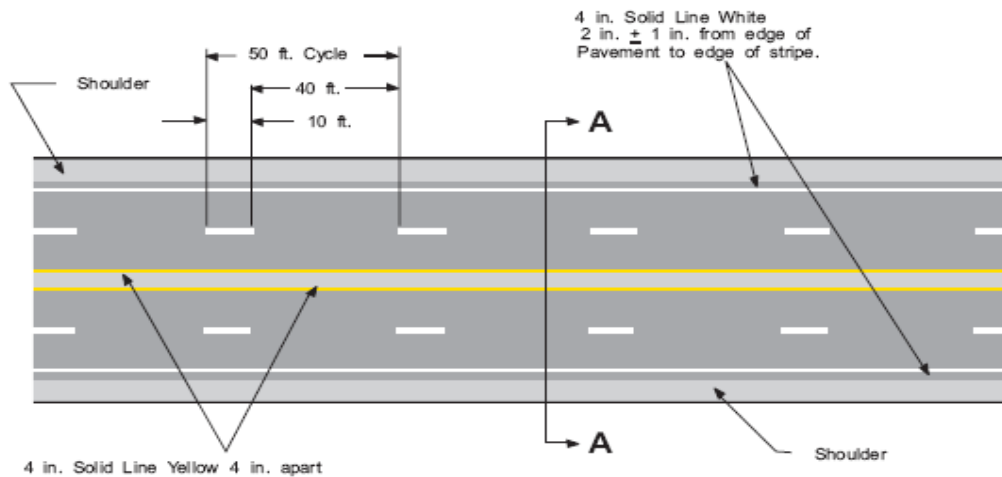
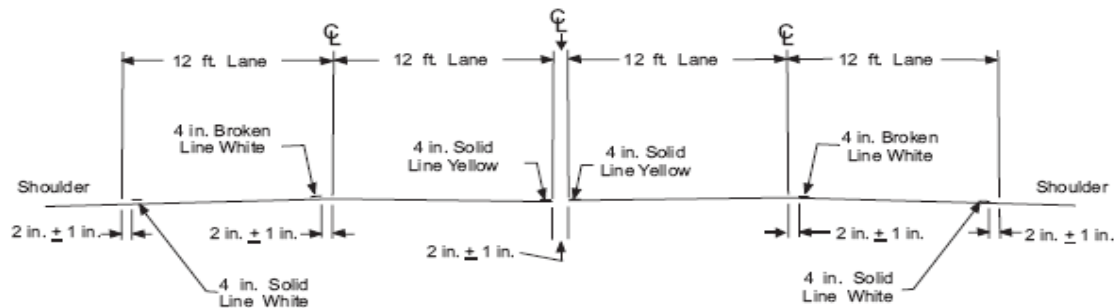
NOTE: Do not place longitudinal pavement marking lines on the roadway joints.

Text Ref.: 7-4.03.01

May 15, 2008

TWO-LANE, TWO-WAY ROADWAY
PAVEMENT MARKING DETAILS

FIGURE
7.1



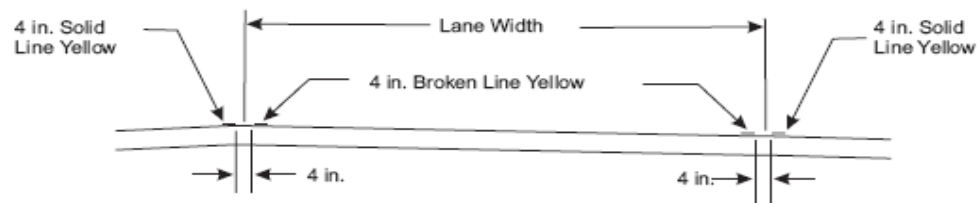
NOTE: Do not place longitudinal Pavement Marking Lines on the roadway joints.

Text Ref.: 7-4.03.02

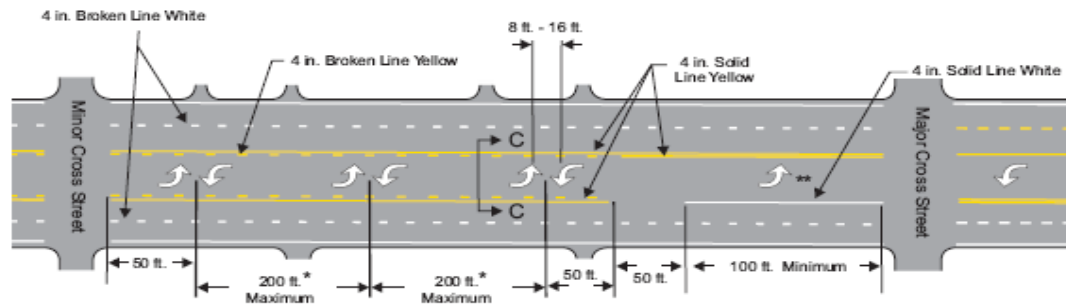
May 15, 2008

MULTI-LANE UNDIVIDED ROADWAY
PAVEMENT MARKING DETAILS

FIGURE
7.2



SECTION C-C



* These distances should be equal. The Pavement Arrows are placed to show the operation and do not have to line up with any of the driveways.

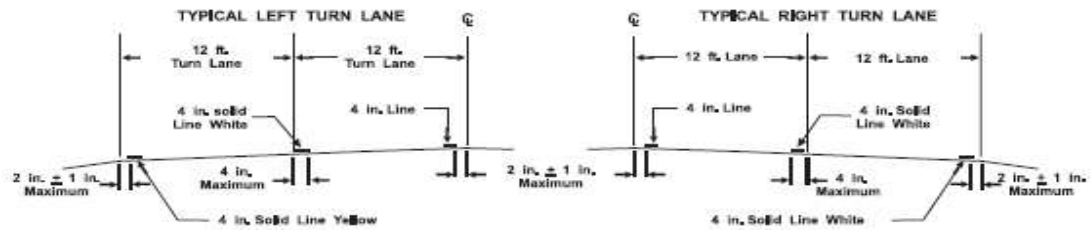
** See "TYPICAL MESSAGE PLACEMENT FOR TURN LANES" for the number and placement of turn arrows and how to introduce this lane - Figure 7.9

Text Ref.: 7-4.03.03

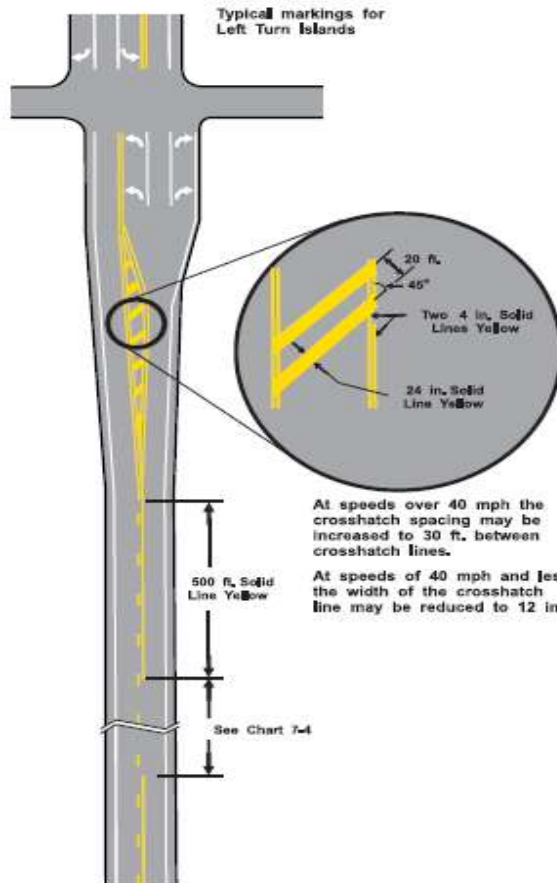
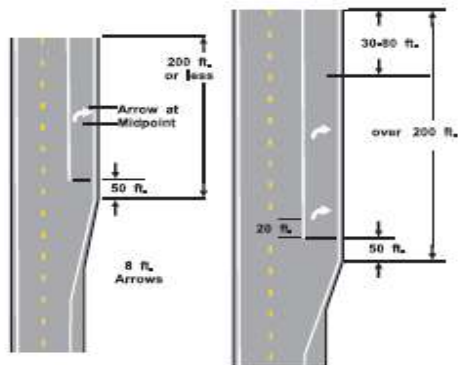
May 15, 2008

TWO-WAY LEFT TURN LANE
PAVEMENT MARKING DETAILS

FIGURE
7.3



TYPICAL MESSAGE PLACEMENT FOR TURN LANES

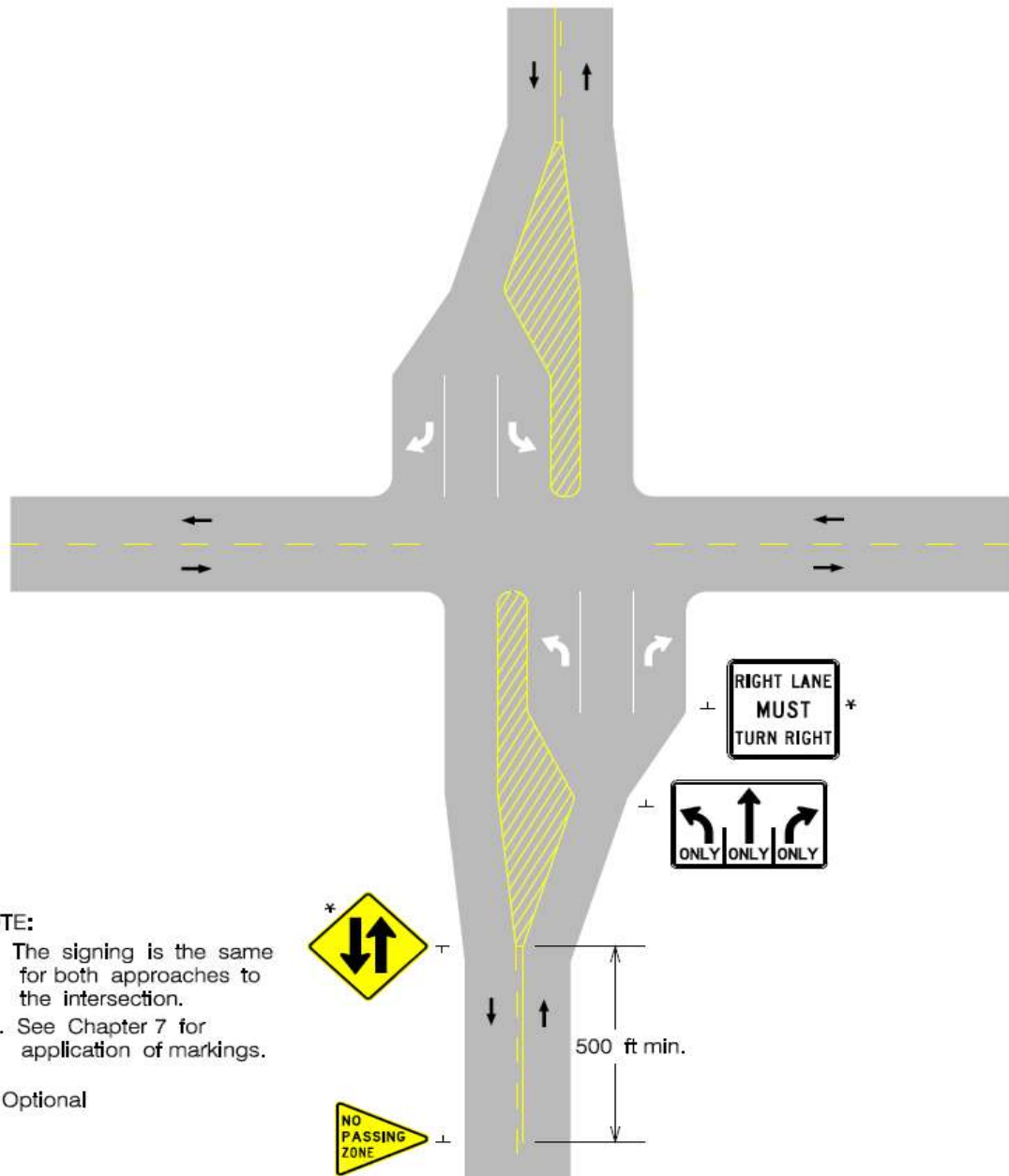


Text Ref.: 7-4.03.09

May 15, 2008

TURN LANE AND LEFT TURN ISLAND PAVEMENT MARKINGS

FIGURE 7.9



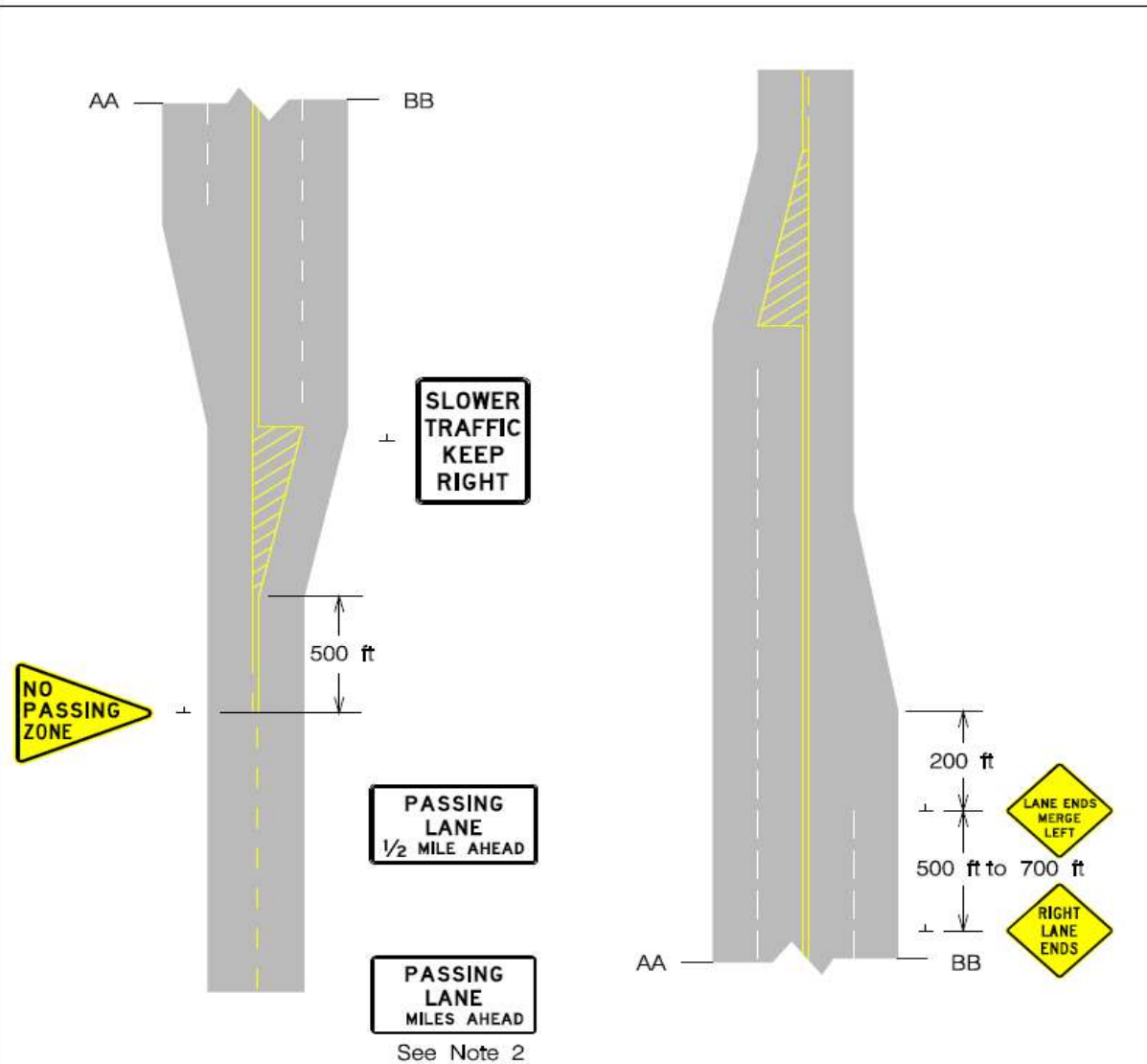
NOTE:

1. The signing is the same for both approaches to the intersection.
2. See Chapter 7 for application of markings.

* Optional



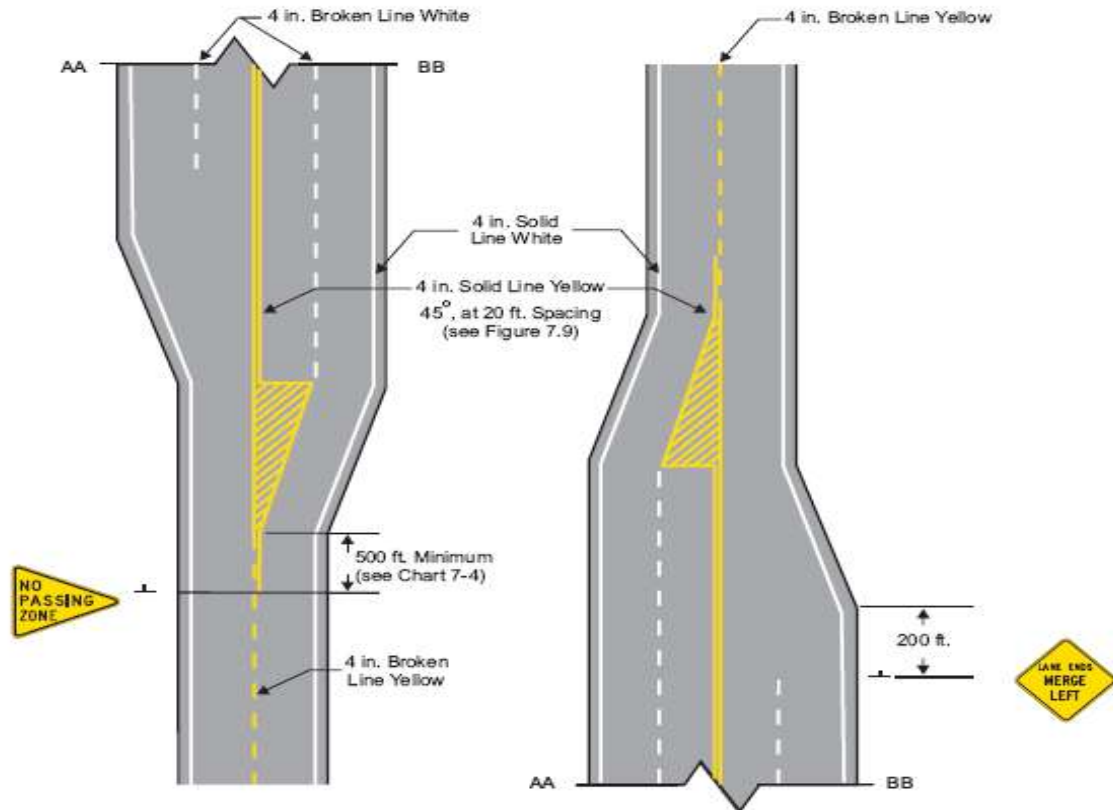
DATE	CHANNELIZED INTERSECTION SIGNING PAINTED MEDIAN	FIGURE 6.20B
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NOTES:

1. Use the same treatment for both approaches.
2. Desirable location 2–5 miles in advance of passing lane.
3. Lane skip striping shall end approximately 50 feet beyond the Lane Reduction Transition sign.
4. See Chapter 7 for application of markings.

DATE	PASSING LANE SECTION SIGNING	FIGURE 6.22A
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NOTE:

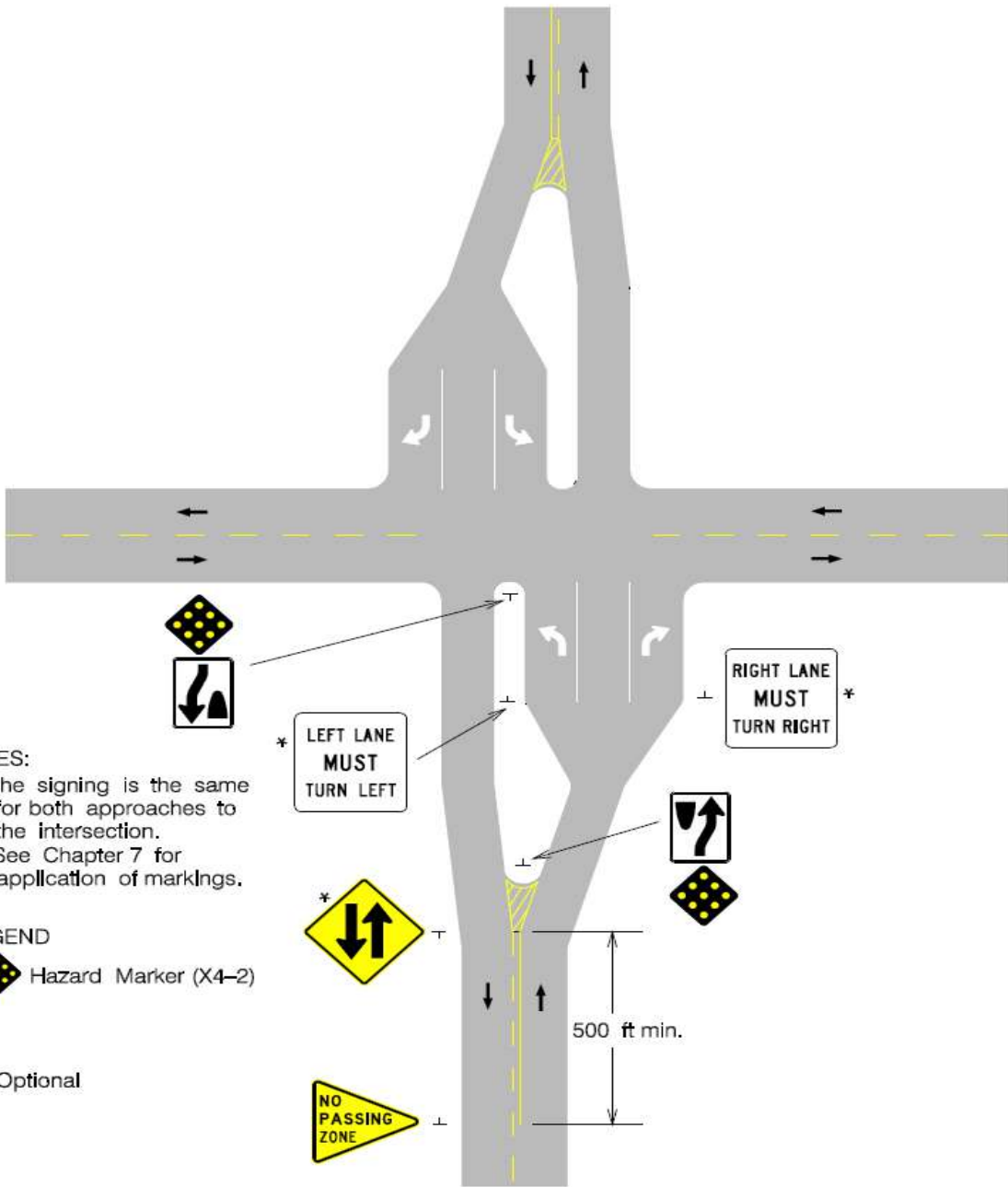
1. The same treatment is used for both approaches.
2. The lane skip striping shall end approximately 50 feet beyond the Lane Reduction sign.
3. More details on signing can be found in Chapter 6.

Text Ref.: 7-4.03.01 (2a)

May 15, 2008

PASSING LANE SECTION PAVEMENT MARKINGS

FIGURE
7.4



NOTES:

1. The signing is the same for both approaches to the intersection.
2. See Chapter 7 for application of markings.

LEGEND

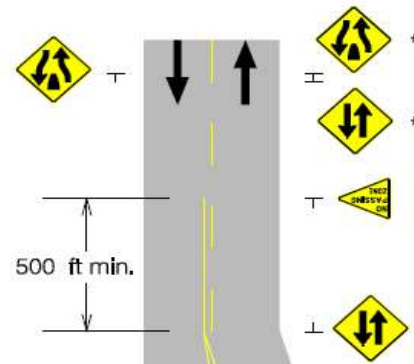
 Hazard Marker (X4-2)

* Optional

DATE

**CHANNELIZED INTERSECTION SIGNING
RAISED MEDIAN**

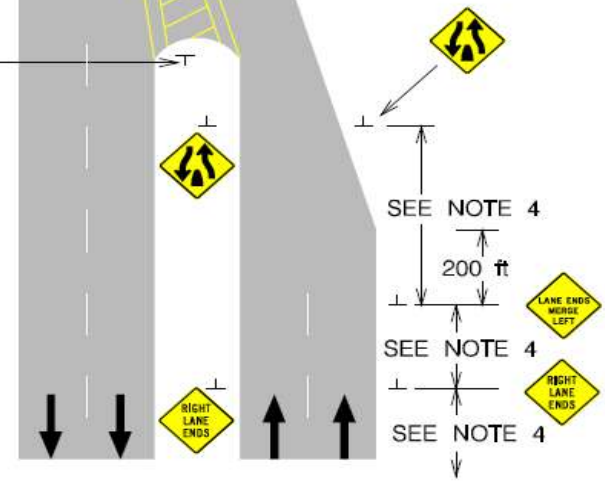
**FIGURE
6.20A**



NOTES:

1. All sign location distances are approximate.
2. Distances between advance signs in the two-lane two-way section to the painted gore are 500–1200 feet.
3. See Chapter 7 for application of markings.
4. On high speed roadways (45 mph and greater), the spacing should be 400–500 feet. On low speed roadways (40 mph and less), the spacing should be 200–400 feet.
5. Do not use DIVIDED HIGHWAY BEGINS and DIVIDED HIGHWAY ENDS signs when the highway is divided only at intersections or junctions.

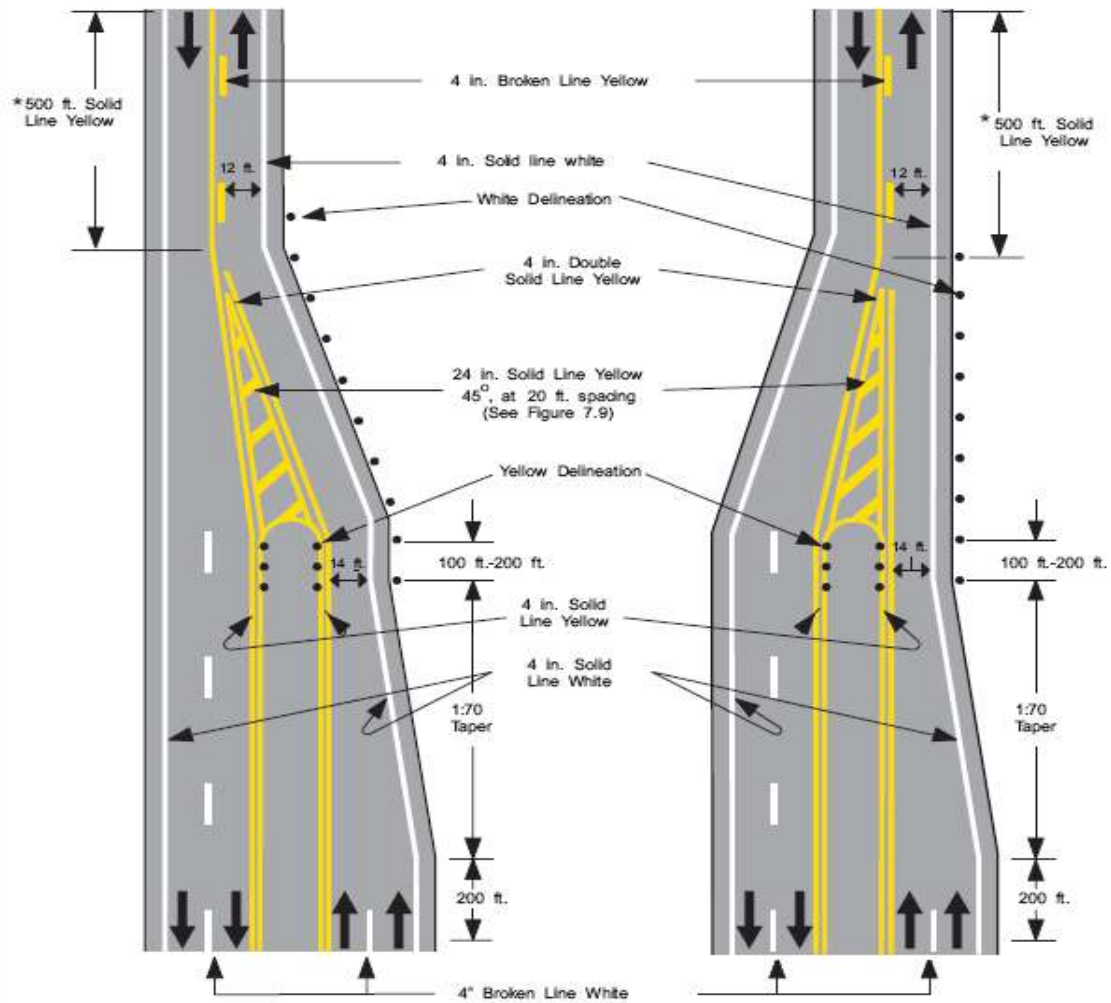
* Optional



DATE

**TRANSITION SIGNING
DIVIDED AND UNDIVIDED ROADWAYS**

**FIGURE
6.23**



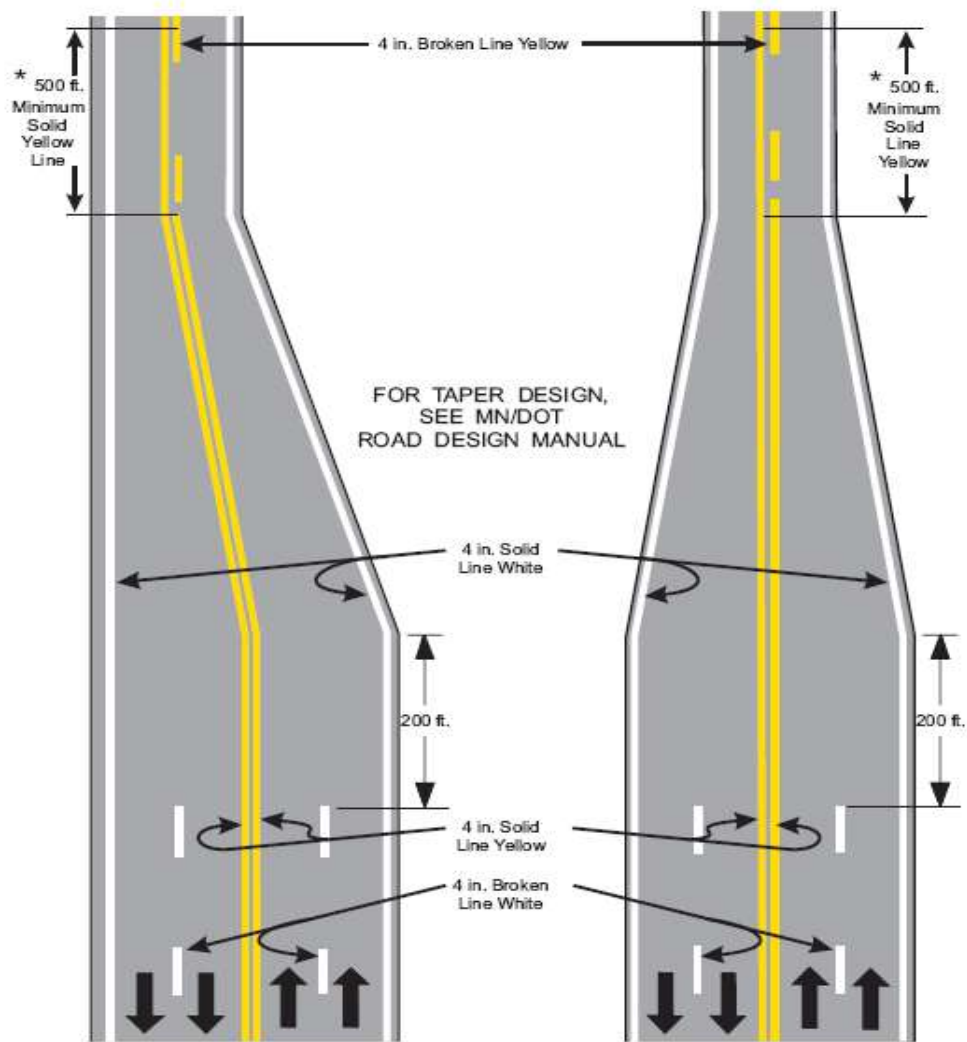
* See Chart 7-4.

Text Ref.: 7-4.03.12

May 15, 2008

**DIVIDED ROADWAY TRANSITION
PAVEMENT MARKINGS**

**FIGURE
7.11**



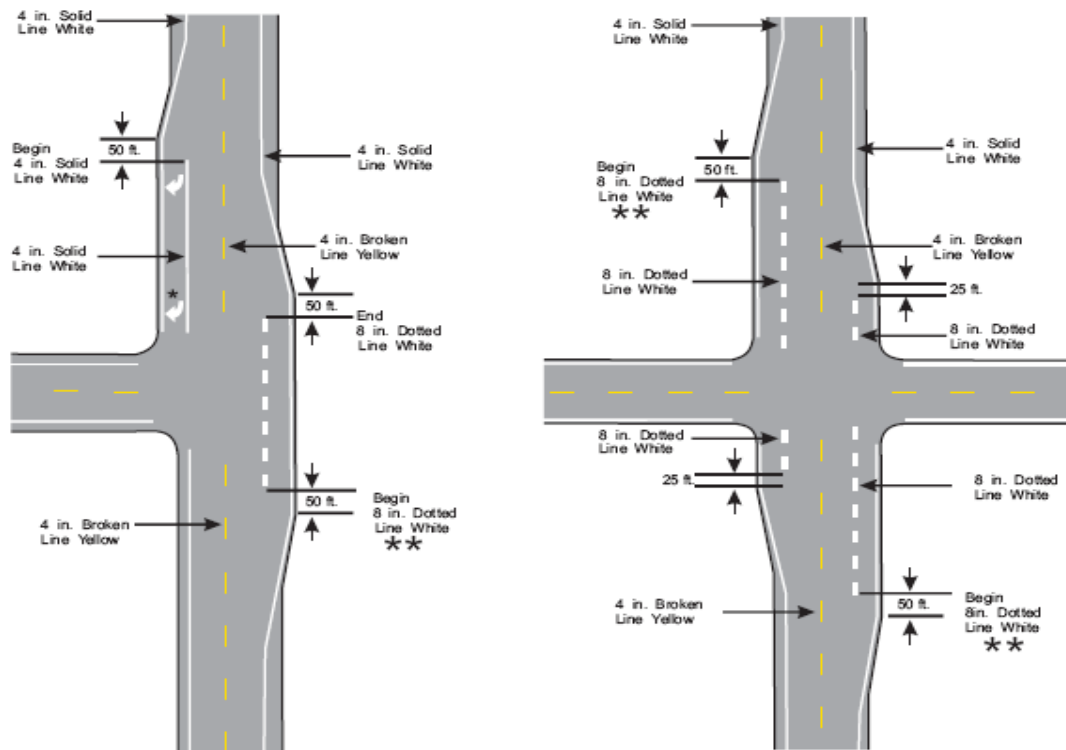
* See Chart 7-4.

Text Ref.: 7-4.03.12

May 15, 2008

UNDIVIDED ROADWAY TRANSITION
PAVEMENT MARKINGS

FIGURE
7.12



Note:

No Passing Zones at intersections shall be striped for 500 feet on both sides of the intersection if it is located within the limits. No Passing Zones at intersections shall be striped if located within any established No Passing Zone. No Passing Zone striping is optional at the discretion of the district traffic engineer for rural intersections. See Chart 7-4.

* See Figure 7.9 for the typical message placement of turn arrows.

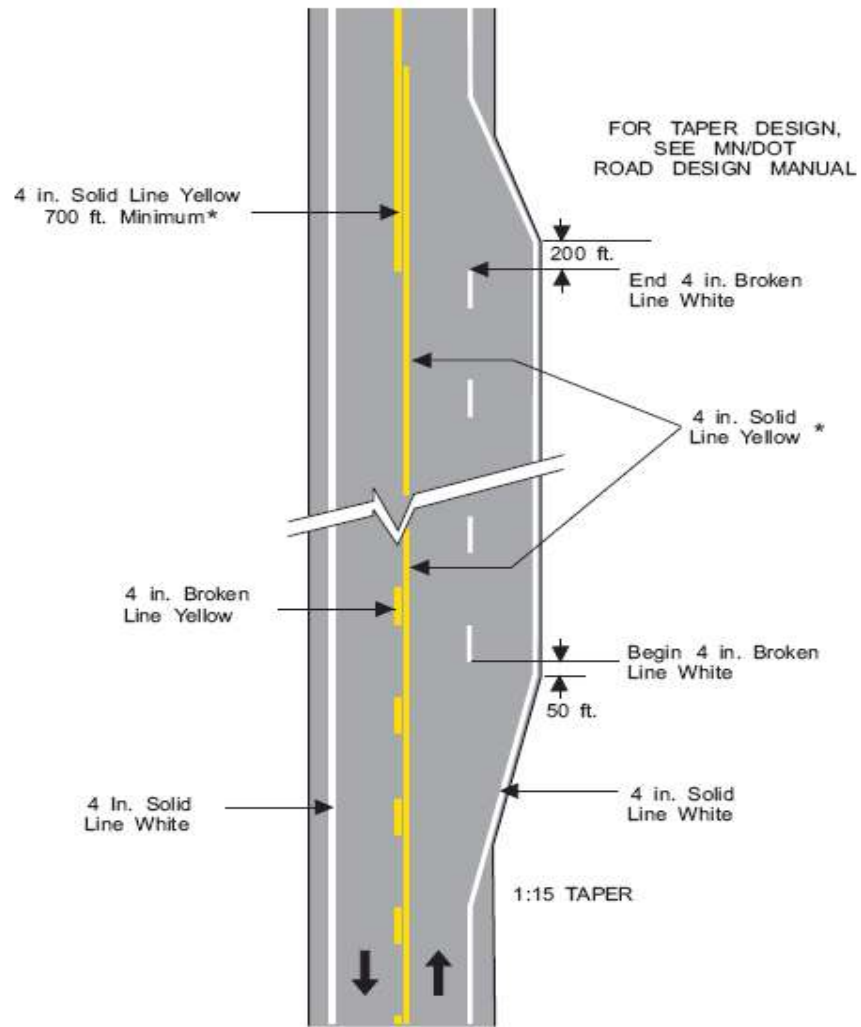
** 3 foot long line with a 12 foot gap.

Text Ref.: 7-4.03.10

May 15, 2008

**BYPASS LANE
PAVEMENT MARKINGS**

**FIGURE
7.10**



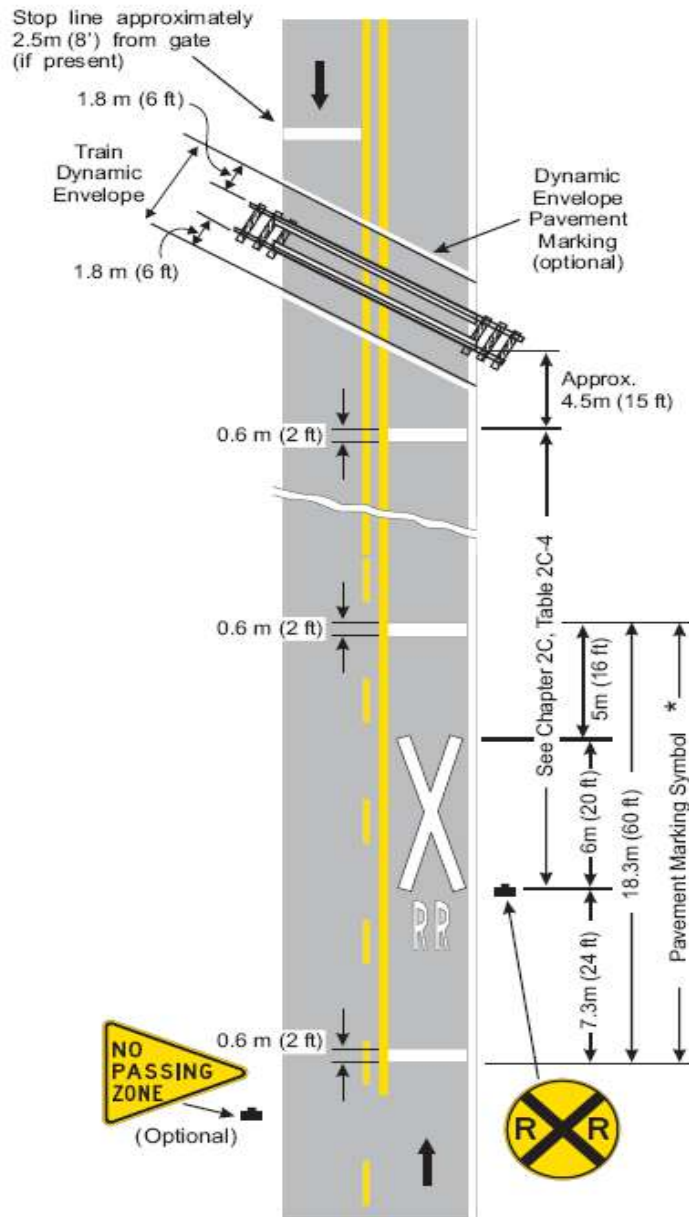
* See Chart 7-4.

Text Ref.: 7-4.03.13

May 15, 2008

**TRUCK CLIMBING LANE
PAVEMENT MARKINGS**

**FIGURE
7.13**



A three lane roadway should be marked with a centerline for two-lane approach operation on the approach to a crossing.

On multi-lane roads the transverse bands should extend across all approach lanes, and individual RXR symbols should be used in each approach lane.

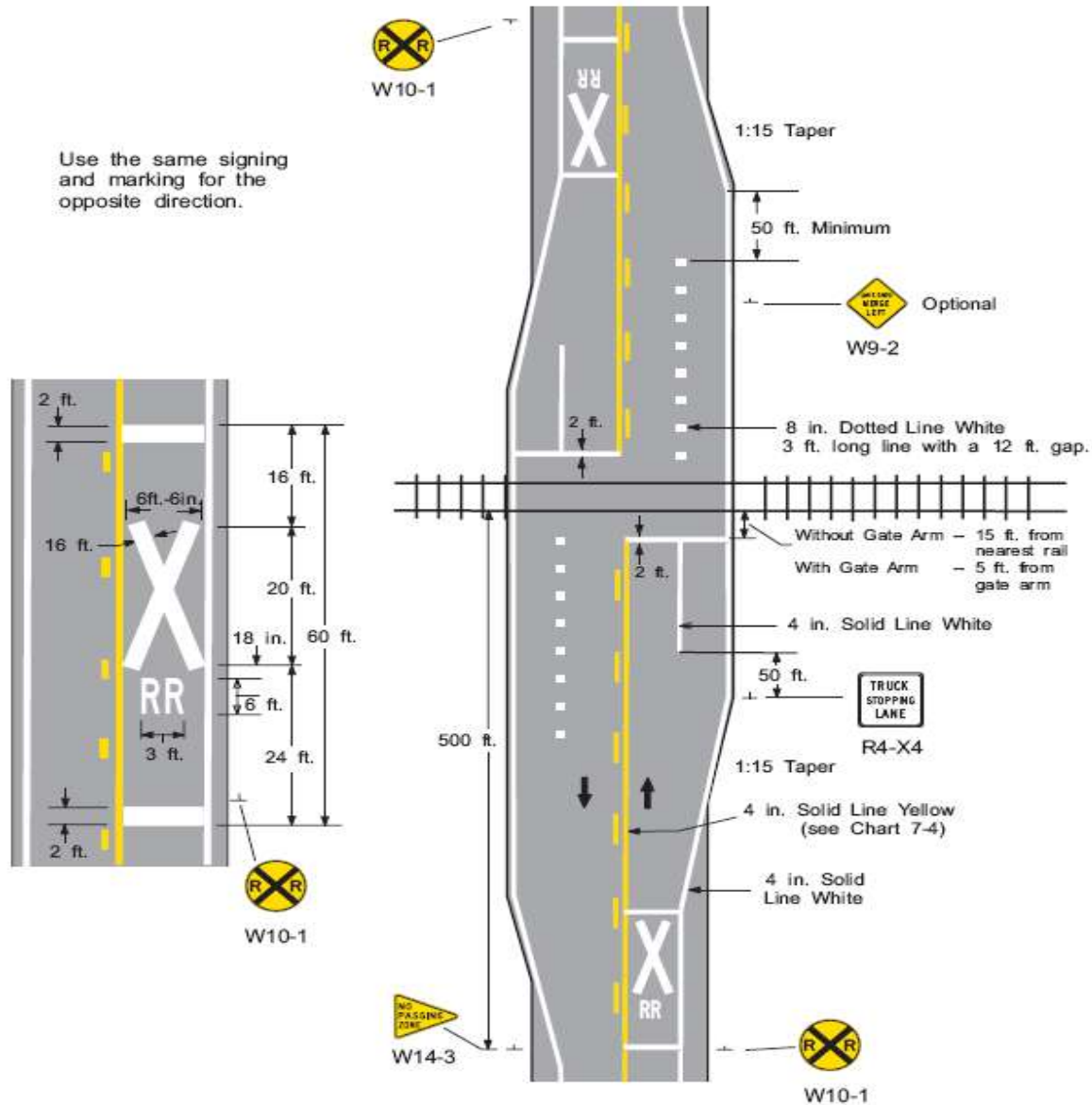
Refer to the FHWA Standard Alphabet for Highway Signs and Markings for RXR symbol details.

* When used, a portion of the pavement marking symbol should be directly opposite the Advance Warning Sign (W10-1). If needed, supplemental pavement marking symbol(s) may be placed between the Advance Warning Sign and the crossing, but should be at least 15 m (50 ft.) from the Stop Line.

Note: In an effort to simplify the figure to show warning sign and pavement marking placement, not all required traffic control devices are shown.

Figure 8B-6. Example of Placement of Warning Signs and Pavement Markings at Highway-Rail Grade Crossings

Use the same signing and marking for the opposite direction.

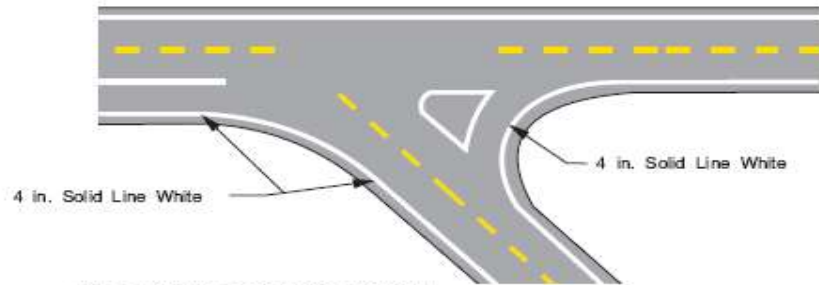


Text Ref.: 7-4.03.14 and 7-4.06.03

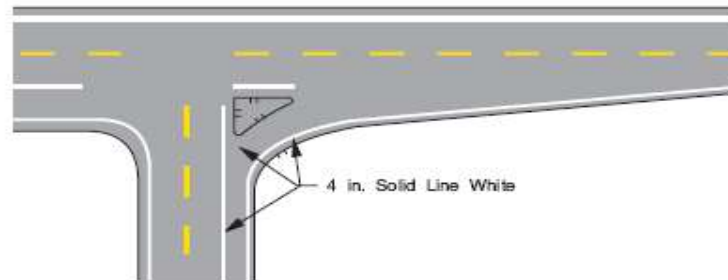
May 15, 2008

**RAILROAD CROSSINGS WITH TRUCK STOPPING LANE
PAVEMENT MARKINGS**

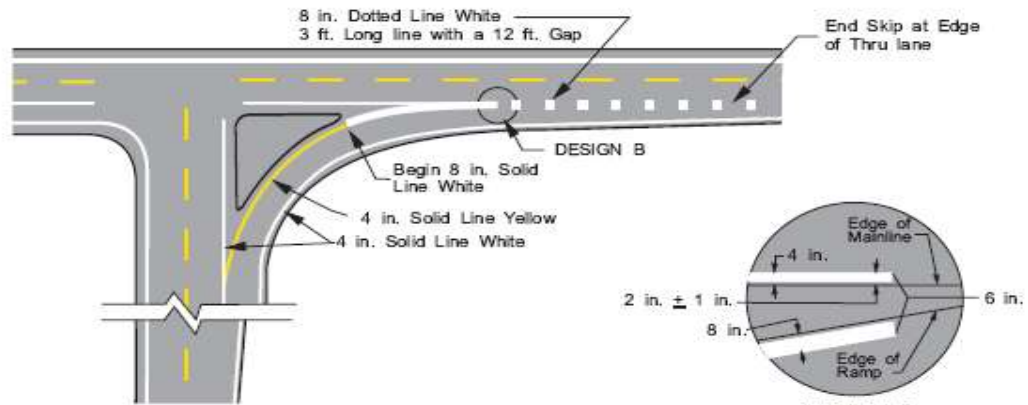
**FIGURE
7.14**



FREE RIGHT STOP CONDITION



FREE RIGHT YIELD CONDITION



FREE RIGHT ACCELERATION LANE CONDITION

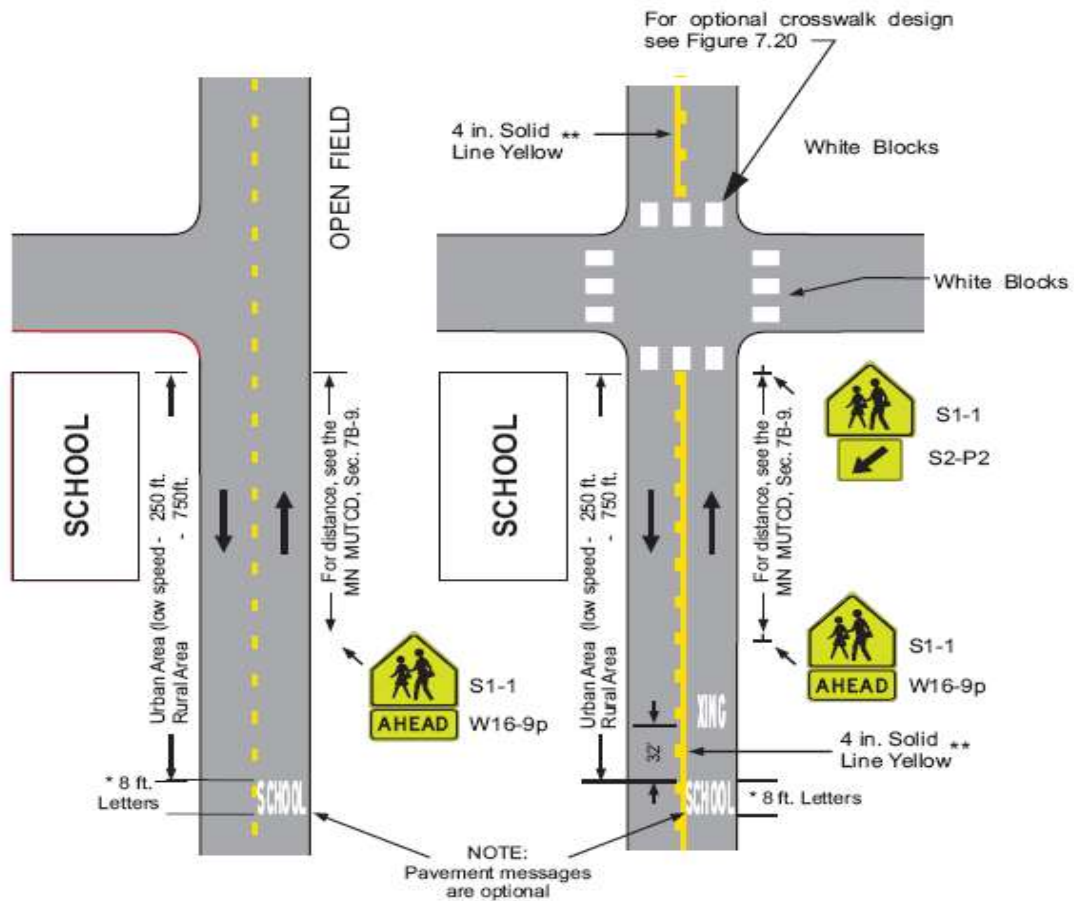
DESIGN B

Text Ref.: 7-4.03.15

May 15, 2008

FREE RIGHT TURN LANE
PAVEMENT MARKINGS

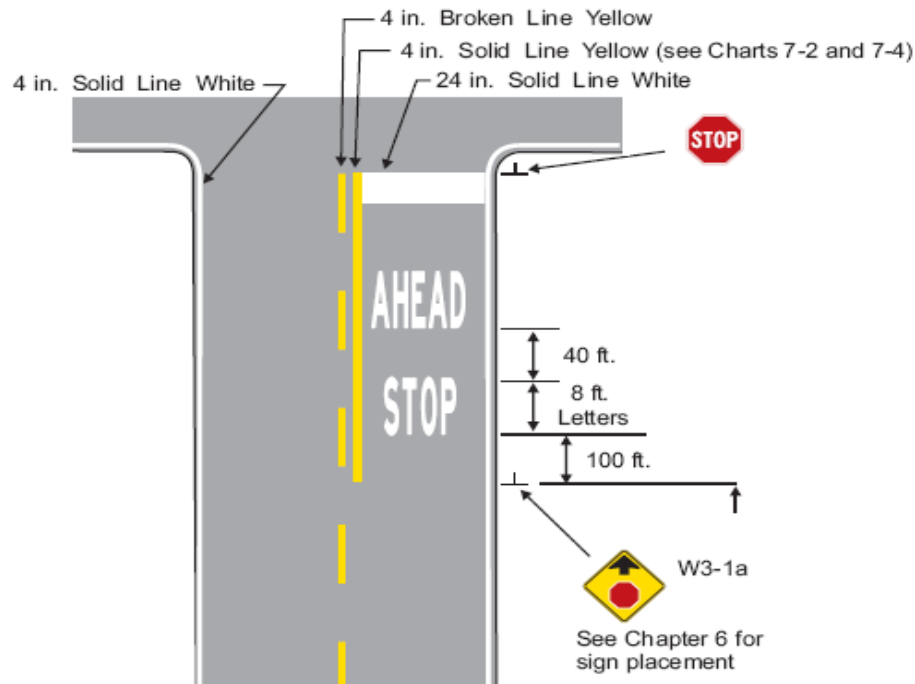
FIGURE
7.15



- * 6 ft. Letters may be used if the approach speeds are low.
- ** See Charts 7-2 and 7-4 for length of No Passing Zone line

Text Ref.: 7-4.06.02

May 15, 2008	SCHOOL ZONE MARKINGS - UNSIGNALIZED INTERSECTIONS	FIGURE 7.21
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NOTES:

1. Do not install a STOP AHEAD pavement message if the intersection has adequate lighting.
2. Install only one set of STOP AHEAD pavement messages. If a Stop Ahead sign needs to be installed more than 1000 feet from the STOP sign, contact the district traffic engineer to determine if, and where, a second set of STOP AHEAD pavement messages should be installed.
3. The stop line should ordinarily be placed 4 feet in advance of and parallel to the nearest crosswalk line. In the absence of a marked crosswalk, the stop line should be placed at the desired stopping point, and in no case no more than 30 feet or less than four feet from the nearest edge of the intersecting curb line or the near edge of the thru lane.

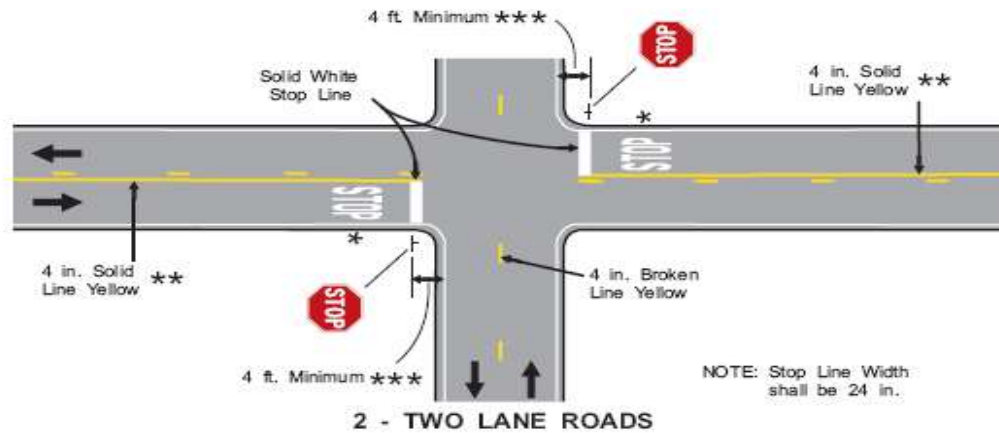
If a stop line is used in conjunction with a stop sign, it should ordinarily be placed in line with the stop sign. However, if the sign cannot be located exactly where vehicles are expected to stop, the stop line should be placed at the stopping point.

Text Ref.: 7-4.06.04

May 15, 2008

**STOP AHEAD & STOP LINE
PAVEMENT MARKINGS**

**FIGURE
7.22**



* Optional

** see Charts 7-2 and 7-4

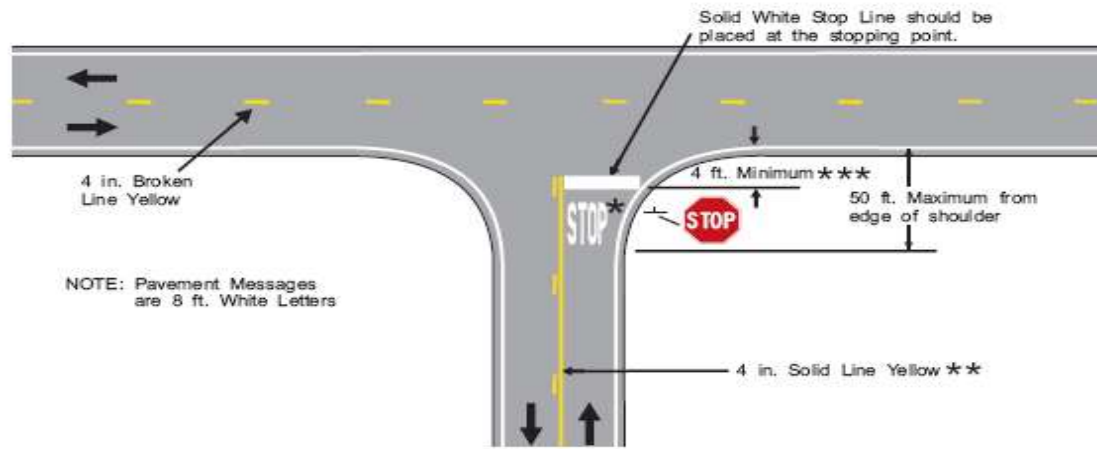
*** from Curb Line or near edge of the thru traveled lane.

Text Ref.: 7-4.03.06

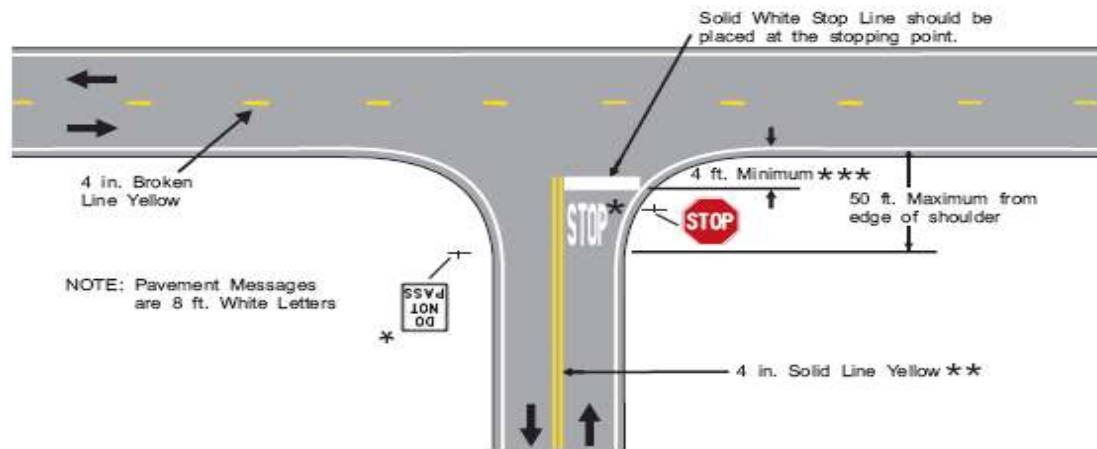
May 15, 2008

MAJOR INTERSECTION PAVEMENT MARKINGS

FIGURE
7.5A



LARGE RADIUS INTERSECTION



LARGE RADIUS INTERSECTION

* Optional

** see Charts 7-2 and 7-4

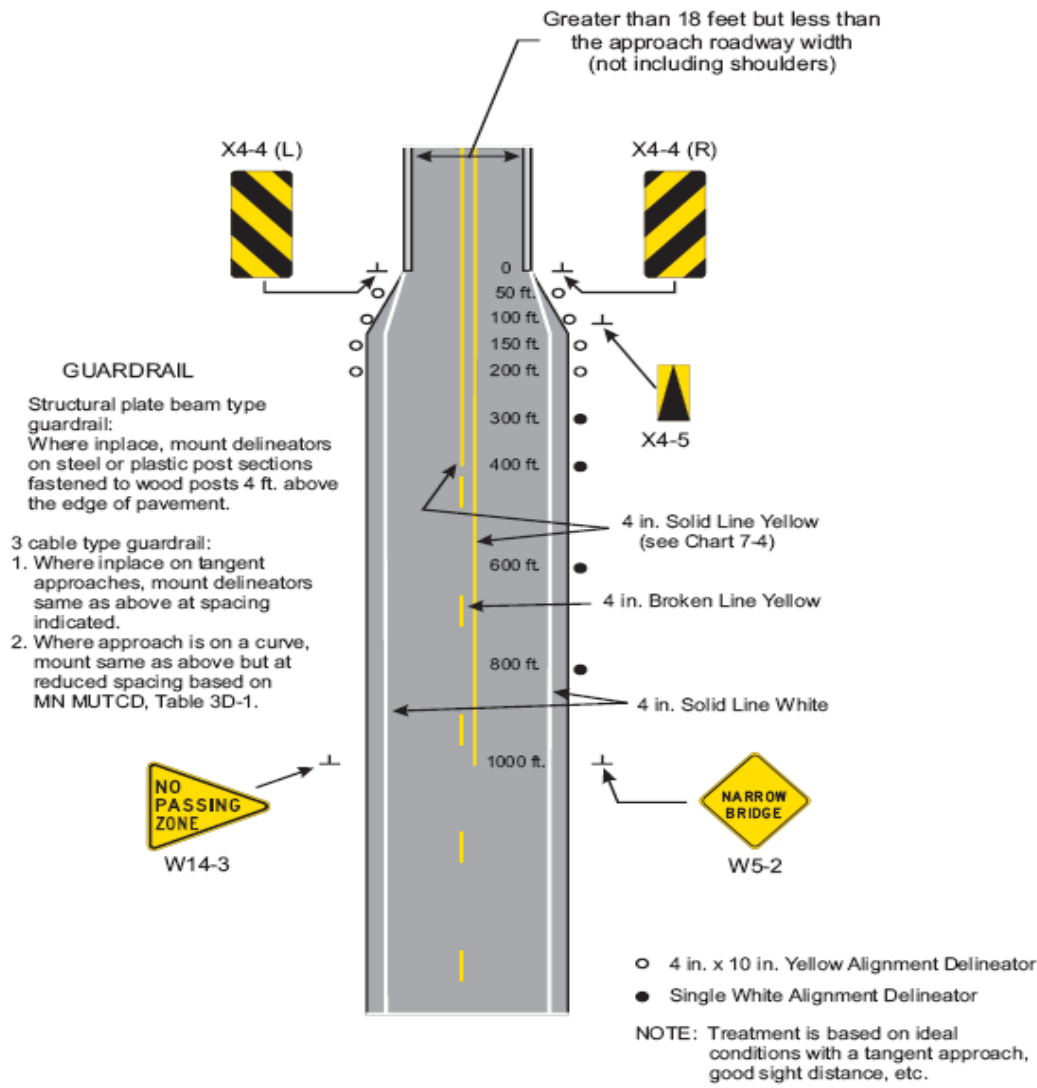
*** from Curb Line or near edge of the thru traveled lane.

Text Ref.: 7-4.03.06

May 15, 2008

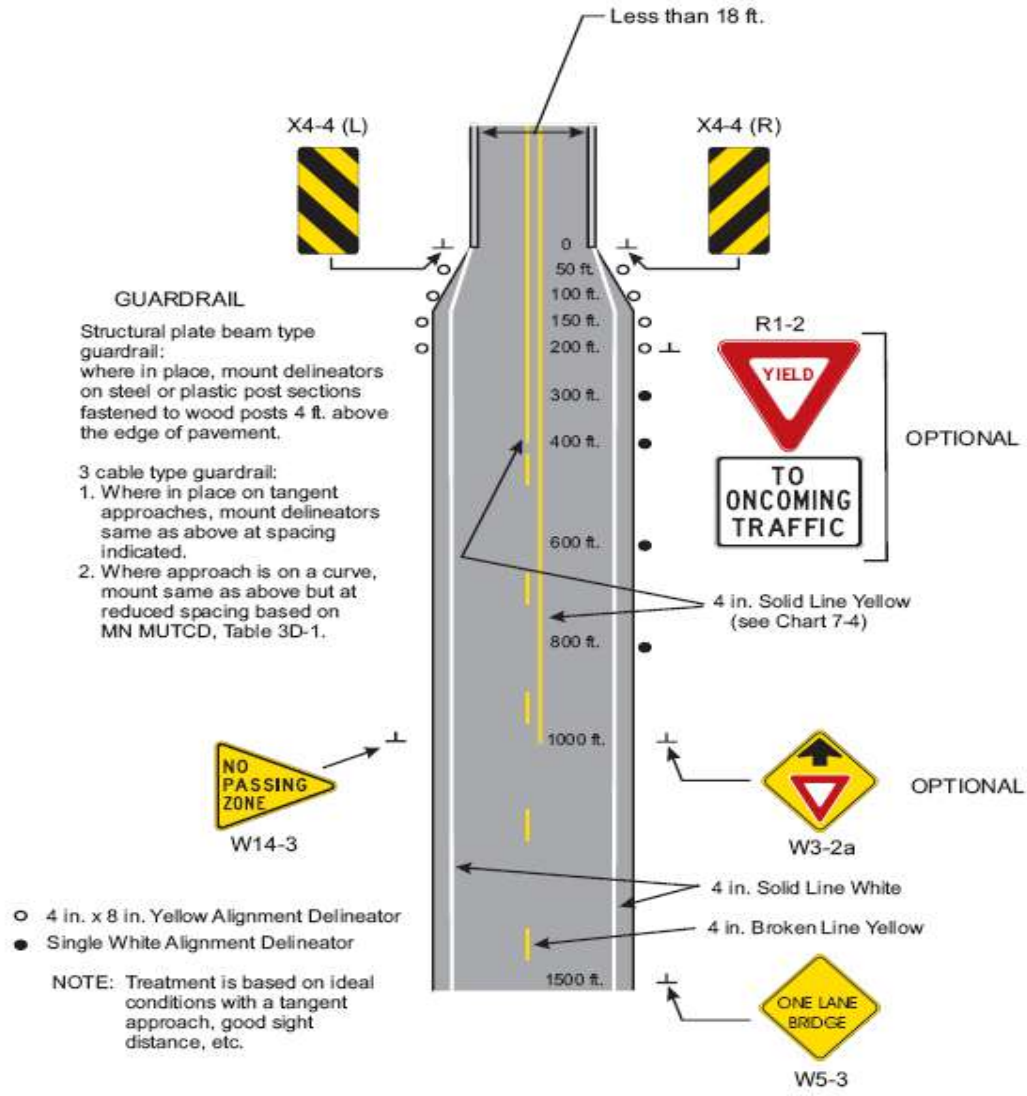
MAJOR INTERSECTION PAVEMENT MARKINGS

FIGURE
7.5B



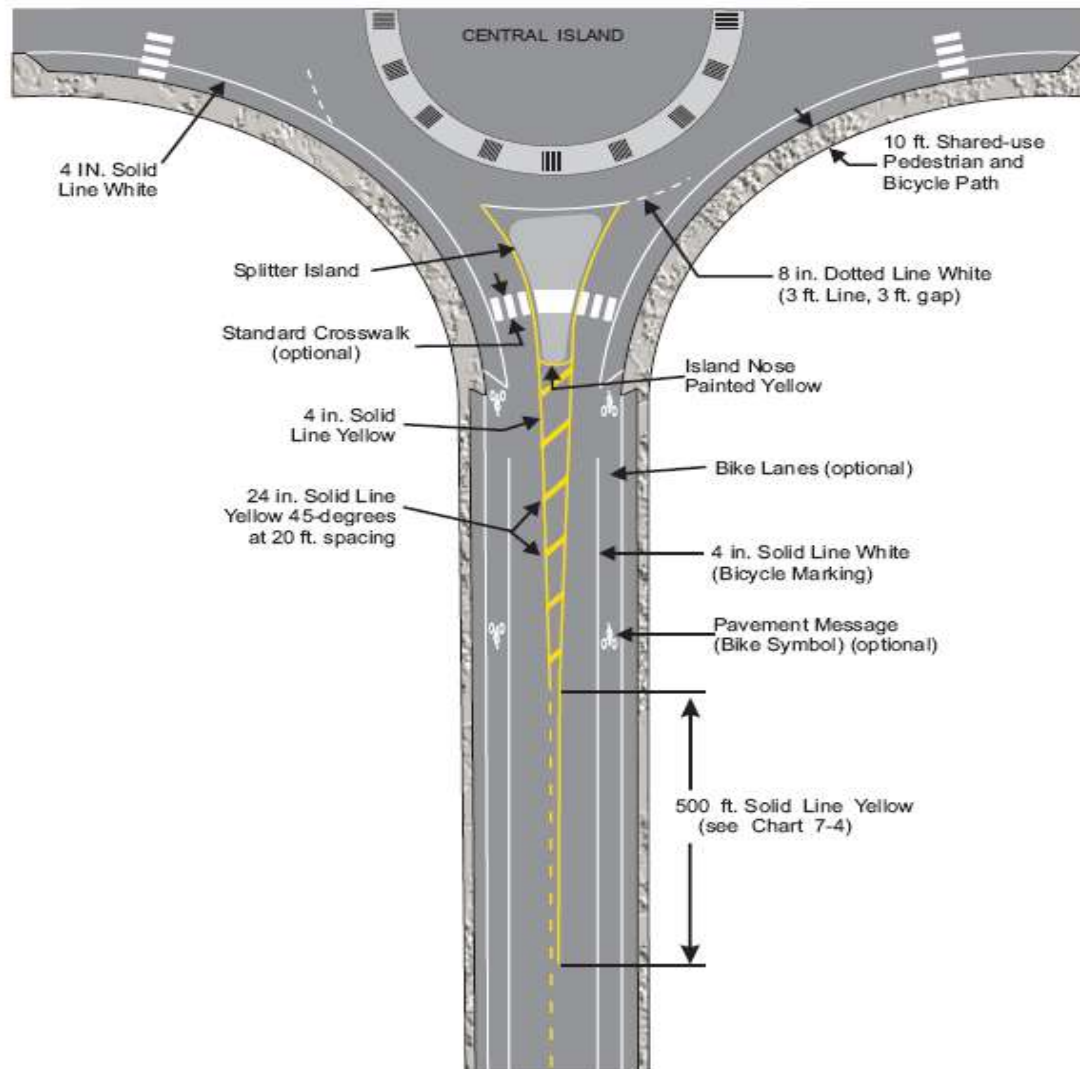
Text Ref.: 7-4.03.05 and 7-5.03.02

May 15, 2008	NARROW BRIDGE SIGNING, MARKING & DELINEATION	FIGURE 7.27
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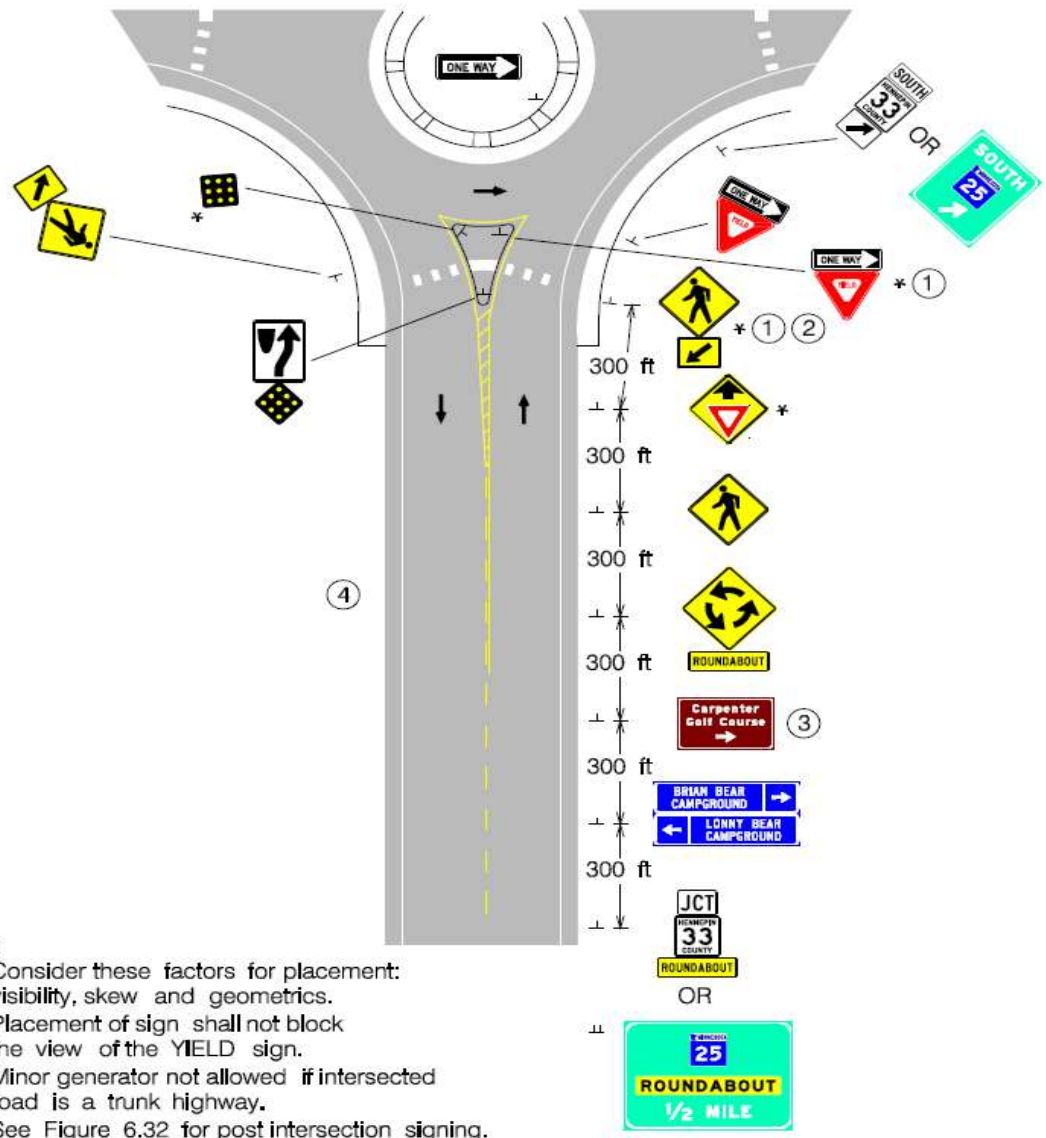
Text Ref.: 7-5.03.02

May 15, 2008	ONE LANE BRIDGE SIGNING, MARKING & DELINEATION	FIGURE 7.28
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Text Ref.: 7-4.06.10

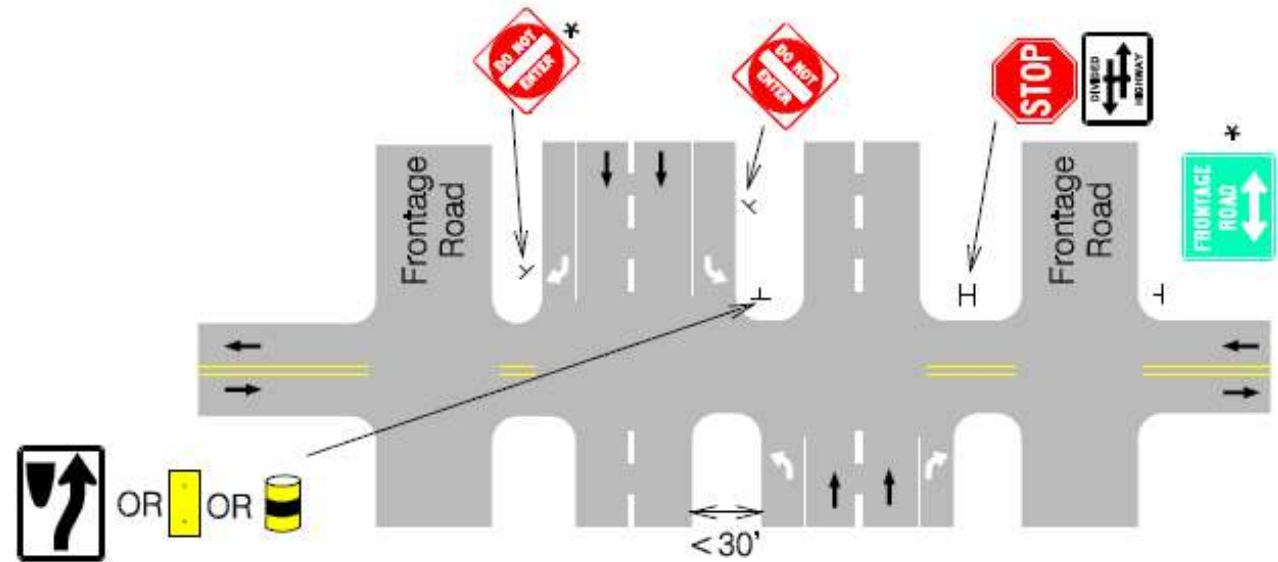
May 15, 2008	ROUNDABOUT INTERSECTION PAVEMENT MARKINGS	FIGURE 7.36
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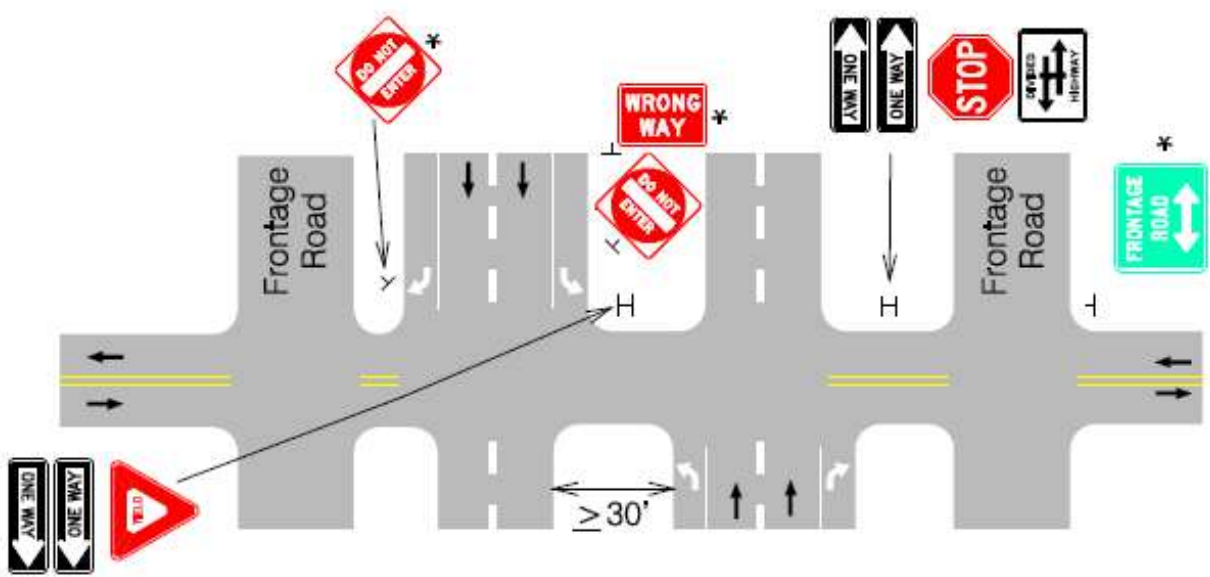
NOTES:

- ① Consider these factors for placement: visibility, skew and geometrics.
 - ② Placement of sign shall not block the view of the YIELD sign.
 - ③ Minor generator not allowed if intersected road is a trunk highway.
 - ④ See Figure 6.32 for post intersection signing.
- * Optional

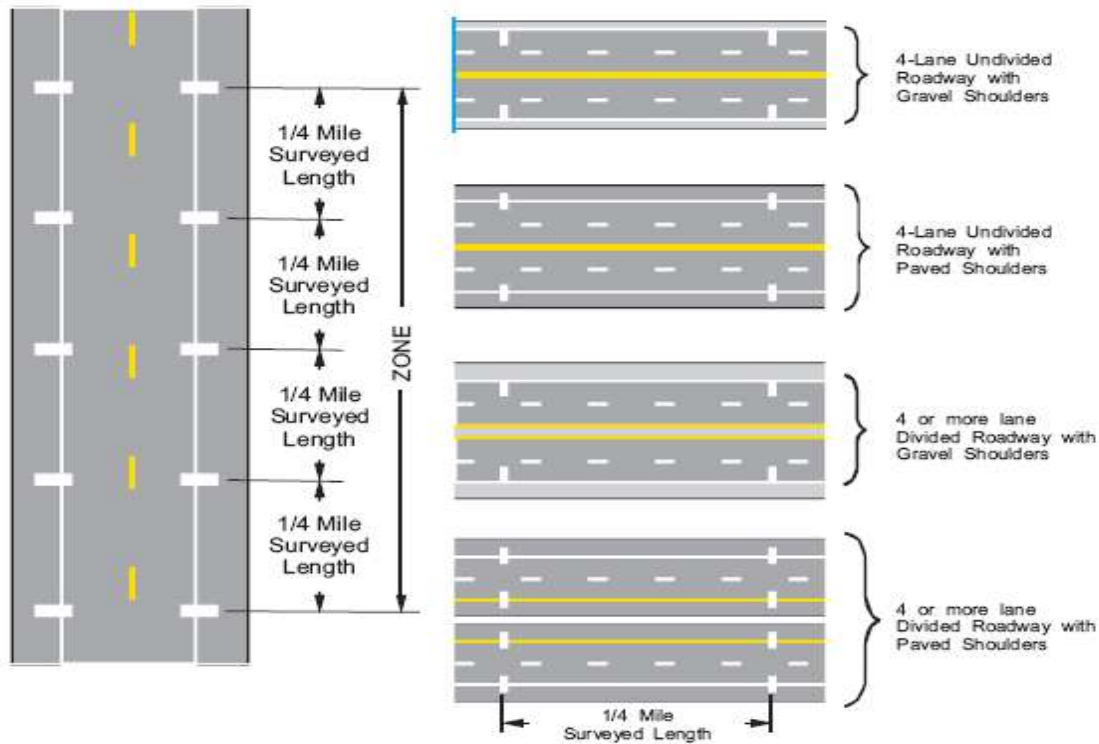
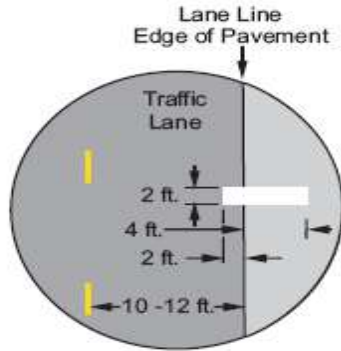
DATE	SINGLE LANE ROUNDABOUT	FIGURE 6.34
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MEDIAN LESS THAN 30 FT.



MEDIAN 30 FT. OR GREATER

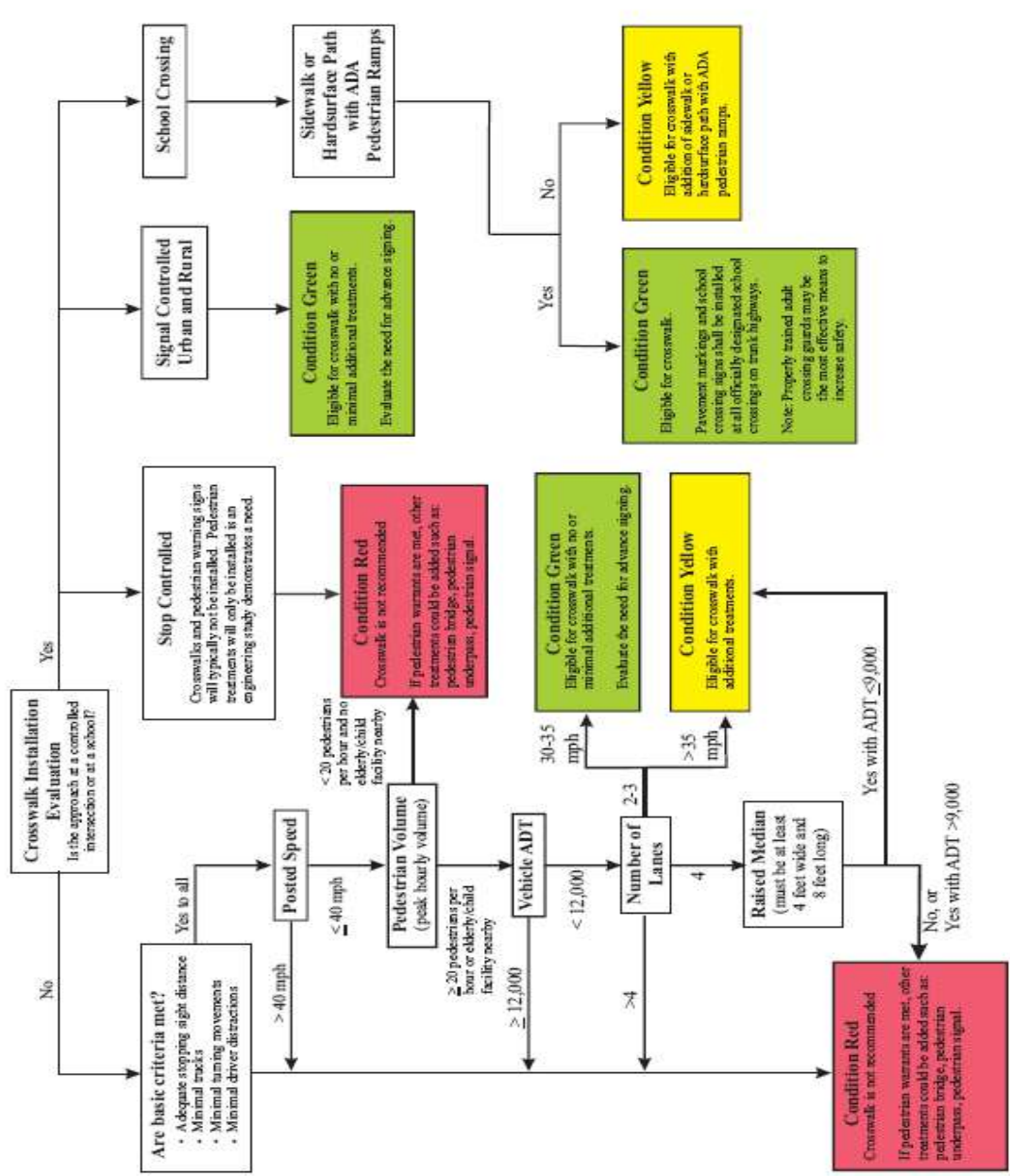


Text Ref.: 7-4.06.08

May 15, 2008

AIRPLANE PAVEMENT MARKINGS

FIGURE
7.24



Text Ref.: 7-6.02.02

May 15, 2008	CROSSWALK WARRANTS	CHART 7-8
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BRANXTON LIONS CLUB

DRIVE CAREFULLY

60



We have



TWO CEMETERIES
NO HOSPITAL